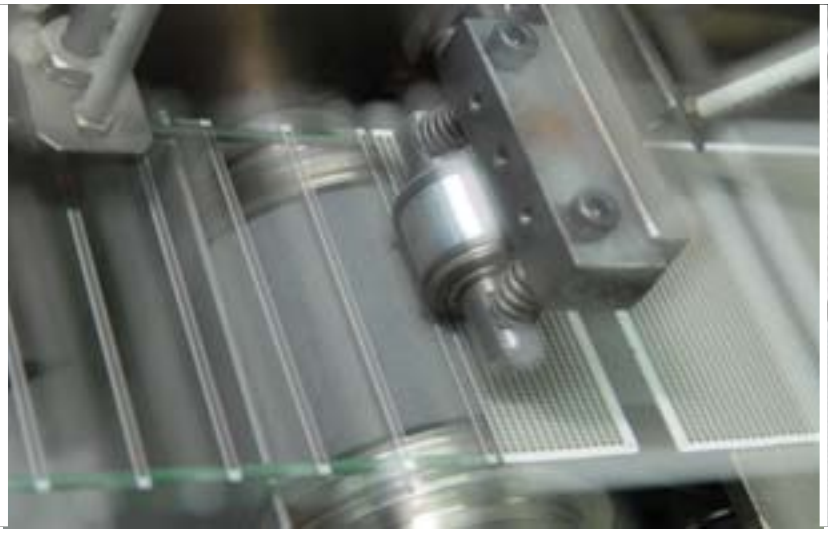
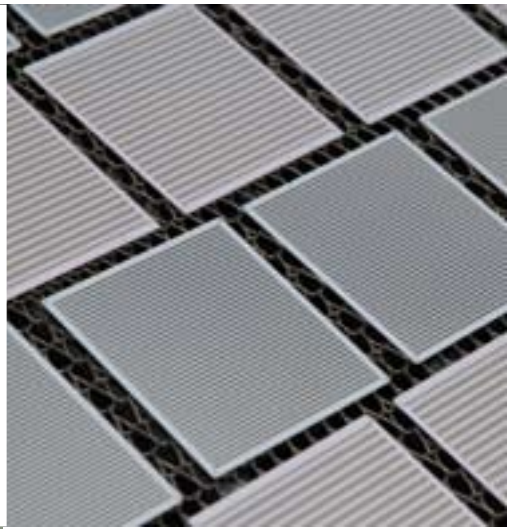
A S J

HARD TO RESIST





PRODUCT CATALOG

www.asj.com.sg

Foreword

ASJ was formerly known as AIRCO (S) Pte Ltd, a divison of AIRCO Speer Electronics Inc. (USA). Established in Singapore since 1969, AIRCO started out with manufacturing capabilities of Carbon and Metal Film leaded resistors.

In 1980, AIRCO divested away from resistive products, and formed the company named ASJ Pte Ltd.

ASJ Pte Ltd and it's manufacturing plants are positioned under ASJ Holdings group of companies. ASJ Holdings was the first resistor manufacturer to be listed on the Singapore Stock Exchange in January 1997, and thereafter, listed on the Mainboard of the Singapore Stock Exchange in 2002.

With its sales headquarters in Singapore and manufacturing facilities in Senai, Malaysia, ASJ manufactures and distributes quality resistors, providing essential support to a diverse base of customers from various market segments. The close proximity of the sales headquarters and manufacturing facilities allowed great flexibility and on time delivery support to our extensive network of customers, which spans across Asia, Europe and the United States of America. Flourishing its' reputation over the years, ASJ is now one of the largest chip resistors manufacturers in South Asia.

Mission

- Enhance customer satisfaction by continuous improvement and commitment to provide high quality products
- Continual expansion of ASJ resistors global presence
- Encompassing range of resistive products
- Foster an environment that encourages continual improvement to respond to the changing needs of customers

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
THICK FILM CHIP RESISTORS	CR	CR05	0201	1/20	1 ≤ R < 10	±1%, ±2%, ±5%	-200 / +400
					10 ≤ R ≤ 10M		±200
		CR10	0402	1/16	10 ≤ R < 1M	±1%, ±2%, ±5%	±100
					1 ≤ R < 10, 1M ≤ R < 10M		±200
		CR16	0603	1/10	10 ≤ R < 1M	±1%, ±2%, ±5%	±100
		CR21	0805	1/8			
		CR32	1206	1/4			
		CR40	1210	1/3	1 ≤ R < 10, 1M ≤ R ≤ 10M		±200
		CR50	2010	3/4			
		CR63	2512	1			
	CR	CR05	0201	1/20	1 ≤ R < 10	±0.5%	-200 / +400
					10 ≤ R ≤ 10M		±200
		CR10	0402	1/16	10 ≤ R < 1M	±0.5%	±100
		CR16	0603	1/10			
		CR21	0805	1/8			
		CR32	1206	1/4	1 ≤ R < 10, 1M ≤ R ≤ 10M		±200
		CR40	1210	1/3			
		CR50	2010	3/4			
		CR63	2512	1			
THIN FILM CHIP RESISTORS	CT	CT10	0402	1/16	10 - 121K	±1%	±50
		CT16	0603	1/10	1 - 681K		
		CT21	0805	1/8	1 - 1.5M		
		CT32	1206	1/8	1 - 1.5M		
		CT40	1210	1/4	1 - 1M		
		CT50	2010	1/2	10 - 1M		
		CT63	2512	3/4	10 - 1M		
	CT	CT10	0402	1/16	10 - 121K	±0.1%	±25, ±50
					10 - 100K		±10, ±15
					10 - 121K	±0.25%	±25, ±50
					10 - 100K		±10, ±15
					10 - 121K	±0.5%	±25, ±50
		CT16	0603	1/10	1K - 47K	±0.05%	±10, ±15, ±25
					10 - 681K	±0.1%	±25, ±50
					10 - 100K		±10, ±15
					1 - 681K	±0.25%	±50
					10 - 681K		±25
					10 - 100K		±10, ±15
					1 - 681K	±0.5%	±50
					10 - 681K		±25
		CT21 CT32	0805 1206	1/8	100 - 100K	±0.05%	±10, ±15, ±25
					10 - 1.5M	±0.1%	±25, ±50
					10 - 100K		±10, ±15
					1- 1.5M	±0.25%	±50
					10 - 1.5M		±25
					10 - 100K		±10, ±15
					1 - 1.5M	±0.5%	±50
					10 - 1.5M		±25
		CT40	1210	1/4	100 - 100K	±0.05%	±10, ±15, ±25
					10 - 1M	±0.1%	±25, ±50
					10 - 100K		±10, ±15
					1 - 1M	±0.25%	±50
					10 - 1M		±25
					10 - 100K		±10, ±15
					1 - 1M	±0.5%	±50
					10 - 1M		±25
		CT50 CT63	2010 2512	1/2 3/4	100 - 100K	±0.05%	±10, ±15, ±25
					10 - 1M	±0.1%	±25, ±50
					100 - 100K		±10, ±15
					10 - 1M	±0.25%	±25, ±50
					10 - 100K		±10, ±15
					10 - 1M	±0.5%	±25, ±50
	CT	CT10	0402	1/16	0.5 ≤ R < 1	±0.5%, ±1%	±50, ±100
		CT16 CT21	0603 0805	1/10 1/8	0.2 - 0.3	±0.5%, ±1%	±100
					0.31 ≤ R < 1	±0.5%, ±1%	±50
		CT50 CT63	2010 2512	3/4 1	0.05 - 0.1	±0.5%, ±1%	±200
					0.101 - 0.3		±100
					0.31 ≤ R < 1		±50
		CT633	2512	3	0.1 ≤ R < 1	±1%	±100

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
CURRENT SENSING CHIP RESISTORS	CR	CR10	0402	1/16	0.1 ≤ R < 1	±1%	±200
					0.04 ≤ R < 0.1		±200
					0.04 ≤ R < 1	±5%	±200
		CR16	0603	1/10	0.1 ≤ R < 1	±1%	±200
					0.04 ≤ R < 0.1		±200
					0.04 ≤ R < 1	±5%	±200
		CR21	0805	1/8	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±200
					0.03 ≤ R < 1	±5%	±200
		CR32	1206	1/4	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±200
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CR40	1210	1/3	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CR50	2010	3/4	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CR63	2512	1	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
	CLP	CLP10	0402	1/8	0.1 ≤ R < 1	±1%	±200
					0.04 ≤ R < 0.1		±200
					0.04 ≤ R < 1	±5%	±200
		CLP16	0603	1/5	0.1 ≤ R < 1	±1%	±200
					0.04 ≤ R < 0.1		±200
					0.04 ≤ R < 1	±5%	±200
		CLP21	0805	1/4	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±200
					0.03 ≤ R < 1	±5%	±200
		CLP32	1206	1/2	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±200
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CLP40	1210	3/4	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CLP50	2010	1	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
		CLP63	2512	2	0.1 ≤ R < 1	±1%	±100
					0.03 ≤ R < 0.1		±100
					0.01 ≤ R < 0.03		±1500
					0.03 ≤ R < 1	±5%	±200
					0.01 ≤ R < 0.03		±1500
	CLS	CLS631	2512	1	0.011 - 0.015	±1% ±5%	±50
		CLS632		2	0.0035, 0.0065 - 0.01		
		CLS6325		2.5	0.004, 0.005, 0.006		
		CLS633		3	0.001 - 0.003		
					0.0005, 0.00075		±100

Specifications given herein may be changed at any time without prior notice. Please confirm technical specifications with factory before use.

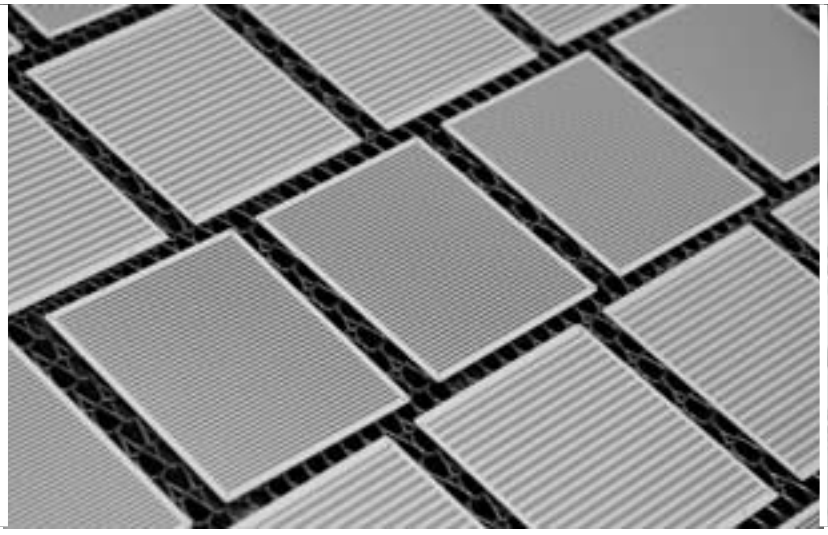
	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
HIGH POWER CHIP RESISTORS	CPW	CPW10	0402	1/8	10 ≤ R < 1M	±0.5% ±1% ±2% ±5%	±100
		CPW16	0603	1/5			
		CPW21	0805	1/4			
		CPW32	1206	1/2	1 ≤ R < 10 1M - 15M		±200
		CPW40	1210	3/4			
		CPW50	2010	1			
		CPW63	2512	2			
	CPM	CPM21	0805	1/8	100K - 10M	±1%, ±5%	±200
		CPM32	1206	1/4	100K - 27M	±1%, ±5%	±200
		CPM63	2512	1	4.7M - 16M	±5%	±200
	CPH	CPH10	0402	1/16	10 - 1M	±1% ±5%	±100
		CPH16	0603	1/10			
		CPH21	0805	1/8			
		CPH32	1206	1/4	1.02M - 10M		±200
		CPH50	2010	1/2			
		CPH63	2512	1			
HIGH OHMIC RESISTANCE VALUES CHIP RESISTORS	CH	CH10	0402	1/16	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
					102M - 470M	±5%	±500
		CH16	0603	1/10	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
					102M - 1G	±5%	±500
					1.02G - 10G		±1000
		CH21	0805	1/8	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
					102M - 1G	±5%	±500
					1.02G - 10G		±1000
					10.2G - 100G		±2000
					102G - 1T		±2500
		CH32	1206	1/4	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
					102M - 1G	±5%	±500
					1.02G - 10G		±1000
					10.2G - 100G		±2000
					102G - 1T		±2500
					10M < R ≤ 100M	±0.1% ±0.25% ±0.5%	±25 ±50 ±100
		CH40	1210	1/3	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 39M		±400
					39M - 100M	±5%	±300
					102M - 470M		±500
		CH50	2010	3/4	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
				1/2	102M - 470M	±5%	±500
		CH63	2512	1	10M < R ≤ 20M	±1%, ±5%	±200
					20.5M - 100M		±400
					102M - 1G	±5%	±500
					10M < R ≤ 100M	±0.1% ±0.25% ±0.5%	±25 ±50 ±100

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
ARRAY & NETWORKS	YCN	YCN052	0201 X 2	1/32	3 ≤ R <10	±2% ±5%	±500
					10 ≤ R < 1K		±300
					1K - 1M		±200
		YCN102	0402 X 2	1/16	1 ≤ R < 10	±1%, ±5%	±300
					10 - 1M		±200
		YCN104	0402 X 4		1 ≤ R < 10	±1%, ±5%	±300
					10 - 1M		±200
		YCN162	0603 X 2		10 - 1M	±1%	±200
					1 - 10M	±5%	
		YCN164	0603 X 4		22 - 470K	±0.5%	±200
					1 - 10M	±1%	
						±5%	
		YCN158	0612		10 - 100K	±5%	±200
		YCN358	1225		10 - 330K		
	LCN	LCN164	0603 X 4	1/16	10 - 330K	±0.1% ±0.5% ±1%	±25 ±50
	YSN	YSN	A, B, C, D, E, F, G	0.7 - 3	10 - 3M	±1% ±2% ±5%	±50 ±100
	LSN	LSN	A, B	0.12 - 0.9	50 - 100K	±0.1% ±0.25% ±0.5% ±1%	±5 ±10 ±15 ±25 ±50 ±100
SPECIALTY	SAS	SAS10	0402	1/16	0.1 ≤ R < 1	±0.5%, ±1%, ±2%, ±5%	±200
					10 ≤ R < 1M		±100
					1 ≤ R < 10, 1M ≤ R < 15M		±200
		SAS16	0603	1/10	0.1 ≤ R < 1	±0.5%, ±1%	±200
					10 ≤ R < 1M		±100
					1 ≤ R < 10, 1M ≤ R < 15M	±0.5%	±200
					1 ≤ R < 10, 1M ≤ R < 30M	±1%, ±2%, ±5%	±200
		SAS21 SAS32 SAS40 SAS50 SAS63	0805 1206 1210 2010 2512	1/8 1/4 1/3 3/4 1	0.1 ≤ R < 1	±0.5%	±100
					10 ≤ R < 1M		±100
					1 ≤ R < 10, 1M ≤ R < 15M		±200
					0.1 ≤ R < 1	±1%	±100
					10 ≤ R < 1M		±100
					1 ≤ R < 10, 1M ≤ R < 30M		±200
					0.1 ≤ R < 1	±2% ±5%	±200
					10 ≤ R < 1M		±100
					1 ≤ R < 10, 1M ≤ R < 30M		±200
	TR	TR10	0402	1/16	10 ≤ R < 1M 1M ≤ R ≤ 10M	0~-30% 0~-15% ±10% ±15%	±100 ±200
		TR16	0603	1/10			
		TR21	0805	1/8			
		TR32	1206	1/4			
		TR40	1210	1/3			
		TR50	2010	3/4			
		TR63	2512	1			
	SWC	SWC1/2	-	1/2	0.01 - 2K	±0.01% ±0.02% ±0.05% ±0.1% ±0.25% ±0.5% ±1% ±2% ±5%	±5 ±10 ±20 ±25 ±30 ±50 ±100 ±200
		SWC1	-	1	0.001 - 10K		
		SWC2	-	2	0.002 - 25K		
		SWC2SS	-	2	0.1 - 200		
		SWC27	-	2.7	0.005 - 20K		
		SWC3	-	3	0.005 - 25K		
		SWC35	-	3.5	0.005 - 50K		
		SWC5	-	5	0.005 - 100K		
		SWC1/2L	-	1/2	0.003 - 0.05		
		SWC1L	-	1	0.001 - 0.1		
		SWC2L	-	2	0.002 - 0.2		
		SWC2SSL	-	2	0.0005 - 0.005		

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
METAL FILM RESISTORS	MF	MF50	3.4 x 1.9	1/6	1 - 10M	±0.1% ±0.5% ±1% ±2% ±5%	0.1Ω - 1Ω (±200ppm) 1Ω - 10Ω (±100ppm) 10Ω - 1MΩ (±50ppm) 1MΩ - 2.8MΩ (±100ppm) 2.8MΩ - 10MΩ (±150ppm)
		MF55	6.3 x 2.3	1/4	0.1 - 10M		
		MF55SS	3.4 x 1.9	0.4	0.1 - 10M		
		MF60	9.0 x 3.3	1/2	0.1 - 10M		
		MF60SS	6.3 x 2.3	0.6	0.1 - 1M		
		MF65	11.0 x 4.2	1	0.1 - 1M		
		MF70	16.0 x 5.0	2	0.1 - 10M		
		MF75	17.0 x 6.0	3	0.1 - 10M		
		MF55	6.2 x 1.8	1/4	100 - 500K	±0.02%, ±0.05%	±5, ±10
		MF60	9.1 x 2.1	1/2			
	FM	FM50	3.2 X 1.9	1/6	1 - 1M	±1% ±2% ±5%	> 10Ω (±50ppm) < 10Ω (±100ppm)
		FM55	6.2 X 2.3	1/4	1 - 1M		
		FM55SS	3.2 X 1.9	0.4	1 - 1M		
		FM60	9.1 X 3.2	1/2	1 - 1M		
		FM60SS	6.2 X 3.2	0.6	1 - 1M		
		FM65	11.2 X 4.2	1	1 - 1M		
		FM70	15.2 X 5.0	2	1 - 1M		
	FMP	FMP60SS	3.4 x 1.9	1/2	1 - 10M	±1% ±5%	±100
		FMP65SS	6.3 x 2.4	1			
		FMP70SS	9.0 x 3.9	2			
		FMP75	15.5 x 5.0	3			
		FMP75SS	11.5 x 4.5	3			
		FMP80SS	17.0 x 7.5	4			
	FSR	FSR1/4	6.2 x 2.3	1/4W	1 - 2K	±1% ±2% ±5%	< 10Ω (±200ppm, ±400ppm) ≥ 10Ω (±100ppm, ±200ppm)
		FSR1/2	9.1 x 3.2	1/2W			
		FSR1/2SS	6.2 x 2.3				
		FSR1	11.2 x 4.2	1W			
		FSR1SS	9.1 x 3.2				
		FSR2	15.2 x 5.0	2W			
		FSR2SS	11.2 x 4.2				
		FSR3SS	15.2 x 5.0	3W			
CARBON FILM RESISTORS	CF	CF1/6	3.4 x 1.9	1/6	1 - 10M	±2% ±5%	±300ppm 0 to -350ppm 0 to -500ppm 0 to -800ppm 0 to -1,600ppm 0 to -2,000ppm
		CF1/4	6.3 x 2.3	1/4			
		CF1/4SS	3.4 x 1.9				
		CF1/2	9.0 x 3.3	1/2			
		CF1/2SS	6.3 x 2.3				
		CF1	11.0 x 4.2	1			
		CF1SS	9.0 x 3.3				
		CF2	15.5 x 5.0	2			
		CF2SS	11.0 x 4.2				
		CF3	15.5 x 5.0	3			
	FP	FP1/6	3.2 x 1.9	1/6	1 - 10M	±2% ±5%	±300ppm 0 to -350ppm 0 to -500ppm 0 to -800ppm 0 to -1,600ppm 0 to -2,000ppm
		FP1/4	6.2 x 2.3	1/4			
		FP1/2	9.1 x 3.2	1/2			
		FP1	11.2 x 4.2	1			
		FP2	15.2 x 5.0	2			
METAL OXIDE RESISTORS	MO	MO1/4	6.3 x 2.3	1/4	0.1 - 100K	±2% ±5%	±350
		MO1/2	9.0 x 3.2	1/2			
		MO1/2SS	6.3 x 2.3				
		MO1	11.0 x 4.3	1			
		MO1SS	9.0 x 3.2				
		MO2	16.0 x 5.0	2			
		MO2SS	11.0 x 4.3				
		MO3	17.0 x 6.0	3			
		MO3SS	16.0 x 5.0				
		MO5	25.0 x 8.5	5			
		MO5SS	25.0 x 8.5				

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
METAL GLAZE RESISTORS	MGP	MGP1/4	6.3 x 2.4	1/4	100K - 10M	±5%	±300
		MGP1/2	9.0 x 3.3	1/2			
		MGP1/2SS	6.3 x 2.4				
		MGP1	11.5 x 4.5	1			
		MGP2	15.5 x 5.0	2			
WIREWOUND RESISTORS	KNP	KNP1/4	6.3 x 2.3	1/4	0.1 - 47	±1% ±2% ±5%	±300
		KNP1/2	9.0 x 3.3	1/2	0.1 - 100		
		KNP1/2SS	6.3 x 2.3	1/2	0.1 - 47		
		KNP1	12.0 x 4.5	1	0.1 - 100		
		KNP1SS	9.0 x 3.3		0.1 - 100		
		KNP2	16.0 x 5.0	2	0.1 - 470		
		KNP2SS	12.0 x 4.5		0.1 - 100		
		KNP3	17.5 x 6.5	3	0.1 - 680		
		KNP3SS	16.0 x 5.0		0.1 - 680		
		KNP4	17.5 x 6.5	4	0.1 - 1K		
		KNP5	25.0 x 9.0	5	0.1 - 1K		
		KNP5SS	17.5 x 6.5		0.05 - 10K		
		KNP6	25.0 x 9.0	6	0.1 - 1K		
		KNP7	41.0 x 9.0	7	0.1 - 4.3K		
		KNP8	41.0 x 9.0	8	0.1 - 18K		
		KNP10	53.0 x 9.0	10	0.1 - 8.2K		
	KNH	KNH1	6.3 x 2.4	1	0.1 - 33	±1% ±5%	±300
		KNH2	9.0 x 3.3	2	0.1 - 100		
		KNH3	11.5 x 4.5	3	0.1 - 150		
		KNH4	15.5 x 5.0	4	0.1 - 330		
	FWW	FWW1/4	6.2 x 2.3	1/4	0.1 - 10	±1% ±2% ±5%	< 1Ω (±350ppm) ≥ 1Ω (±200ppm)
		FWW1/2	9.1 x 3.2	1/2	0.1 - 47		
		FWW1/2SS	6.2 x 2.3		0.1 - 10		
		FWW1	11.2 x 4.2	1	0.1 - 100		
		FWW1SS	9.1 x 3.2		0.1 - 47		
		FWW2	15.2 x 5.0	2	0.1 - 220		
		FWW2SS	11.2 x 4.2		0.1 - 100		
		FWW3	17.1 x 6.0	3	0.1 - 330		
		FWW3SS	15.2 x 5.0		0.1 - 220		
		FWW5SS	17.1 x 6.0	5	0.1 - 330		

	Series	Type	Case Size / Configuration / L x Ø / L x W x H	Power Rating (W)	Resistance Range (Ω)	Resistance Tolerance (%)	T.C.R (ppm/°C)
CEMENT RESISTORS	SQP	SQP2	18.0 x 8.0 x 7.0	2	0.1 - 100K	±5%	±300
		SQP3	22.0 x 8.0 x 8.0	3			
		SQP5	22.0 x 10.0 x 9.0	5			
		SQP7	35.0 x 10.0 x 9.0	7			
		SQP10	48.0 x 10.0 x 9.0	10			
		SQP15	48.0 x 12.0 x 12.0	15			
		SQP20	60.0 x 14.0 x 14.0	20			
		SQP25	60.0 x 14.0 x 14.0	25			
	SQM	SQM2	11.0 x 7.0 x 20.0	2	0.1 - 100K	±5%	±300
		SQM3	12.0 x 8.0 x 25.0	3			
		SQM5	13.0 x 9.0 x 25.0	5			
		SQM7	13.0 x 10.0 x 39.0	7			
		SQM10	13.0 x 10.0 x 51.0	10			
		SQM10SS	16.0 x 12.0 x 25.0	10			
		SQM15SS	16.0 x 12.0 x 35.0	15			
	PQM	PQM4	20.0 x 7.0 x 8.0	4	0.1 - 2.5K	±5%	±400
		PQM5	25.0 x 7.0 x 8.0	5	0.1 - 2.7K		
		PQM7	25.0 x 9.0 x 10.0	7	0.3 - 3.9K		
		PQM7SS	38.0 x 7.0 x 8.0	7	0.1 - 2.7K		
		PQM9	38.0 x 10.0 x 10.0	9	0.3 - 3.9K		
	SQZ	SQZ5	27.0 x 9.5 x 9.5	5	0.1 - 100K	±5%	±300
		SQZ7	35.0 x 9.5 x 9.5	7			
		SQZ10	48.0 x 9.5 x 9.5	10			
		SQZ15	48.0 x 12.5 x 12.0	15			
		SQZ20	60.0 x 15.0 x 13.0	20			
	SQH	SQH10	48.0 x 10.5 x 10.5	10	0.1 - 100K	±5%	±300
		SQH15	48.0 x 12.5 x 12.5	15			
		SQH20	63.5 x 12.5 x 12.5	20			
		SQH25	63.5 x 16.0 x 16.0	25			
		SQH30	75.0 x 19.0 x 19.0	30			
		SQH40	90.0 x 19.0 x 19.0	40			
	SQL	SQL2	13.0 x 5.0 x 8.0	2	0.1 - 0.68	±5% ±10%	±250
		SQL3	13.0 x 5.0 x 13.0	3	0.05 - 1		
		SQL5	14.0 x 5.0 18.0	5	0.05 - 3.3		
		SQL7	26.0 x 5.0 x 18.0	7			
		SQL10	26.0 x 5.0 x 20.0	10			
	FTR	FTR100	13.0 x 9.0 x 25.0	-	1 - 10K	±5%	±250
		FTR200	13.0 x 9.0 x 38.0				
		FTR300	14.0 x 12.0 x 35.0				
JUMPER	Z	Z16	3.3 x 1.7	-	0.02 Maximum	-	-
		Z25	6.3 x 2.3				
	JW	JW55	60.0 x 0.48	-	0.01 Maximum	-	-
		JW56	60.0 x 0.58				
		JW57	60.0 x 0.7				
		JW58	60.0 x 0.8				
		JW60	60.0 X 0.6				
SPECIALTY	SAT /SAL	SAT5/SAL5	Refer to Specs	5	0.1 - 100	±0.25% ±0.5% ±1% ±5% ±10%	±200
		SAT10/SAL10		10			
		SAT25/SAL25		25			
		SAT50/SAL50		50			
		SAT80		80			
		SAT100		100	0.1 - 3K		
		SAT250		250			



SMD RESISTORS

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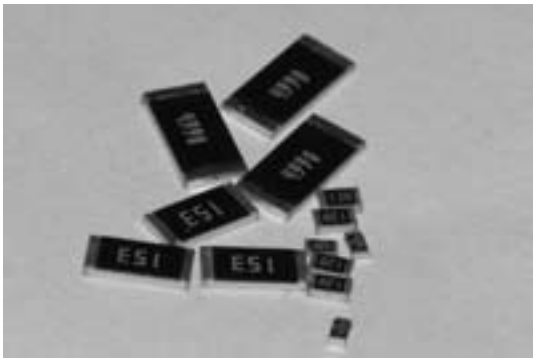
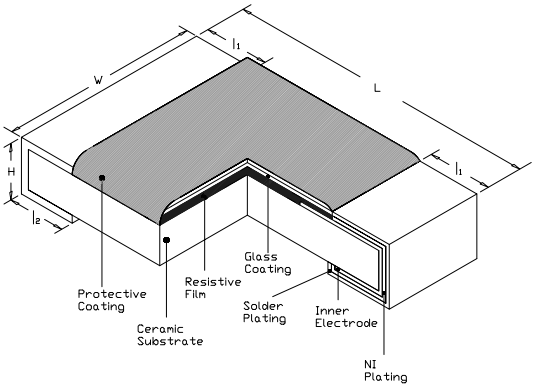
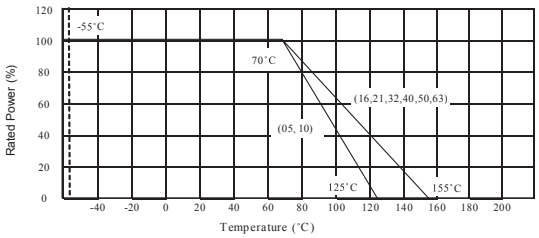


Features

- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb Free with Reflow soldering backward compatibility

Dimensions and Construction





Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CR05 0201 (0603)	0.024±0.001 (0.60±0.03)	0.012±0.001 (0.30±0.03)	0.009±0.001 (0.23±0.003)	0.005±0.002 (0.13±0.05)	0.006±0.002 (0.15±0.05)
CR10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CR16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CR21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CR32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CR40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CR63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)

Ordering Code / Information

CR	10	-	XXXX	-	F	K	-	E

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
General Purpose Thick Film Chip Resistors	05 (0201/0603) 10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F = ± 1% G = ± 2% J = ± 5% Z = Zero ohm	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free	E = ±50 (Leave Blank for Standard)
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			
		Jumper	000 - 5% 0000 - 1%				

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Jumper Rated Current	Jumper Resistance Value	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CR05 0201 (0603)	1/20W	-100 to +600	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω	0.5A	< 0.05Ω for 5% < 0.02Ω for 1%	15V	50V	-55°C to +125°C
		± 250	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ					
CR10 0402 (1005)	1/16W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	1A		50V	100V	
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR16 0603 (1608)	1/10W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	2A				-55°C to +155°C
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR21 0805 (2012)	1/8W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ			150V	300V	
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR32 1206 (3216)	1/4W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ			200V	400V	
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR40 1210 (3225)	1/3W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR50 2010 (5025)	3/4W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
CR63 2512 (6432)	1W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	3A				
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	1Ω ≤ R < 10Ω	1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1.0% + 0.1Ω)	For 1% , 2% & 5% tolerance resistor	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0% + 0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0% + 0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5% + 0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	

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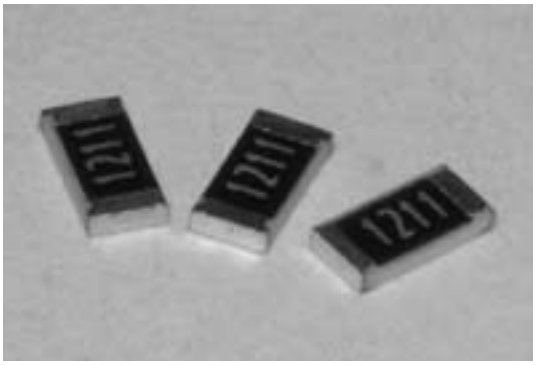
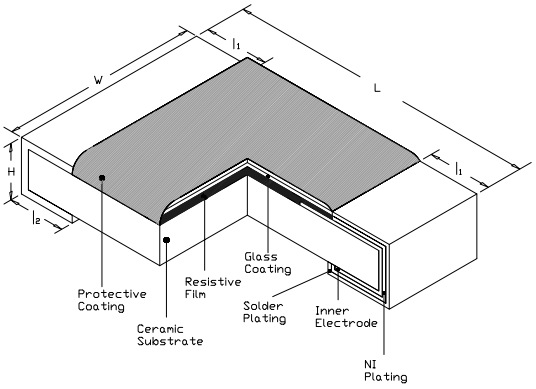
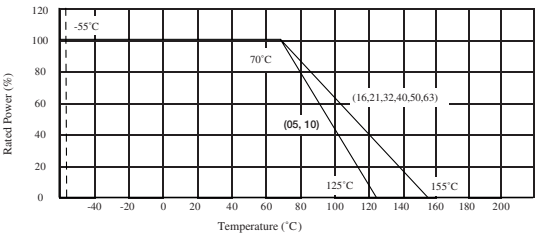


Features

- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb Free with Reflow soldering backward compatibility
- Precision 0.5%

Dimensions and Construction





Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CR05 (0201/0603)	0.024±0.001 (0.06±0.03)	0.012±0.001 (0.30±0.03)	0.009±0.001 (0.23±0.003)	0.005±0.002 (0.12±0.05)	0.006±0.002 (0.15±0.05)
CR10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CR16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CR21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CR32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CR40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CR63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)

Ordering Code / Information

CR	10	-	XXXX	-	D	K	-	E

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
		Resistors	4-Digit	E96 Series			
Precision Thick Film Chip Resistors	05 (0201/0603) 10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)			10.2Ω=10R2 10KΩ=1002	D = ± 0.5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free	E = ±50 (Leave Blank for Standard)

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96 D(±0.5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CR05 0201 (0603)	1/20W	-200 - +400	1Ω ≤ R < 10Ω	50V	100V	-55°C to +125°C
		±200	10Ω ≤ R ≤ 10MΩ			
CR10 0402 (1005)	1/16W	±100	10Ω ≤ R < 1MΩ	50V	100V	-55°C to +125°C
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR16 0603 (1608)	1/10W	±50	10Ω - 1MΩ	50V	100V	-55°C to +155°C
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR21 0805 (2012)	1/8W	±50	10Ω - 1MΩ	150V	300V	
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR32 1206 (3216)	1/4W	±50	10Ω - 1MΩ	200V	400V	
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR40 1210 (3225)	1/3W	±50	10Ω - 1MΩ			
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR50 2010 (5025)	3/4W	±50	10Ω - 1MΩ			
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			
CR63 2512 (6432)	1W	±50	10Ω - 1MΩ			
		±100	10Ω ≤ R < 1MΩ			
		±200	1Ω ≤ R < 10Ω			
			1MΩ ≤ R ≤ 10MΩ			

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Short Time Overload	± 0.5%	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5%+0.05Ω)	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(1%+0.1Ω)	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(0.5%+0.05Ω)	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.

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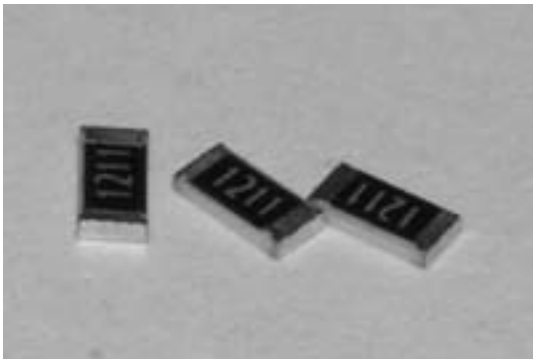
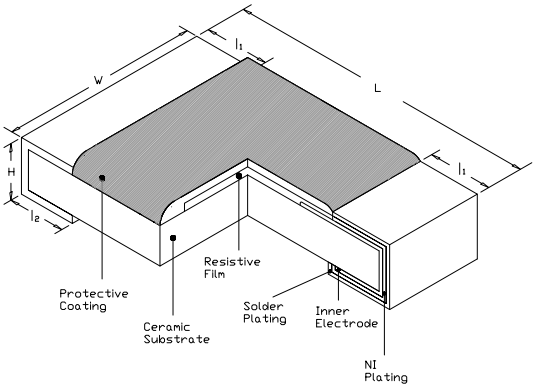


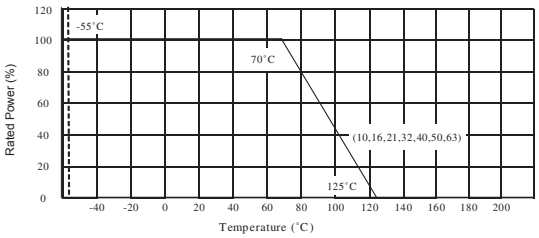
Features

- Tolerance 1%, Temperature Coefficient of Resistance 50ppm/°C
- Excellent stability
- Halogen Free Epoxy
- Products with lead free terminations meet RoHs requirements

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CT10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.012 ± 0.002 (0.30 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
CT16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.010 ± 0.006 (0.25 ± 0.15)	0.010 ± 0.006 (0.25 ± 0.15)
CT21 0805 (2012)	0.079 ± 0.004 (2.00 ± 0.10)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.014 ± 0.008 (0.35 ± 0.20)	0.014 ± 0.008 (0.35 ± 0.20)
CT32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.004 (1.60 ± 0.10)	0.022 ± 0.004 (0.55 ± 0.10)	0.018 ± 0.008 (0.45 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CT40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.102 ± 0.006 (2.60 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.020 ± 0.008 (0.50 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.20)
CT50 2010 (5025)	0.200 ± 0.004 (5.00 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.024 ± 0.008 (0.60 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.2)
CT63 2512 (6432)	0.250 ± 0.004 (6.35 ± 0.10	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.024 ± 0.008 (0.60 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.20)



Ordering Code / Information

CT	10	-	XXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
		Resistors	4-Digit	E96 Series		
General Purpose Thin Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)			10.2Ω=10R2 10KΩ=1002	F = ±1%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range (E-96, E-24) F(±1%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CT10 0402 (1005)	1/16W	±50	10Ω - 121KΩ	50V	100V	-55°C to +125°C
CT16 0603(1608)	1/10W	±50	1Ω - 681KΩ	75V	150V	
CT21 0805 (2012)	1/8W	±50	1Ω - 1.5MΩ	150V	300V	
CT32 1206 (3216)	1/8W	±50	1Ω - 1.5MΩ	200V	400V	
CT40 1210 (3225)	1/4W	±50	1Ω - 1MΩ			
CT50 2010 (5025)	1/2W	±50	10Ω - 1MΩ			
CT63 2512 (6432)	3/4W	±50	10Ω - 1MΩ			

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Short Time Overload	± (0.5%+0.05Ω). No visible damage	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
Resistance to Soldering Heat	± (0.5%+0.05Ω). No visible damage	260°C ± 5°C, 10 seconds ± 1 second
Load Life	± (0.5%+0.05Ω)	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	± (0.5%+0.05Ω)	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.

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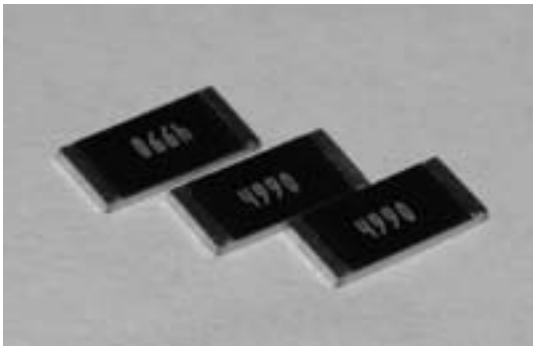
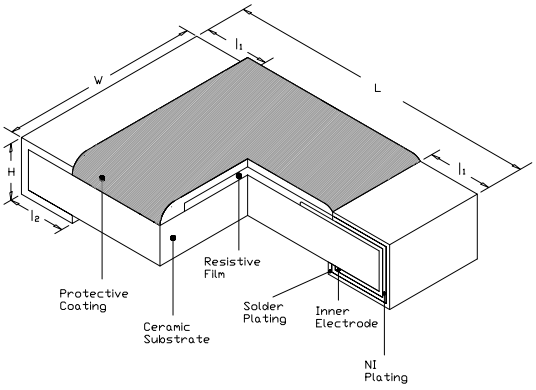


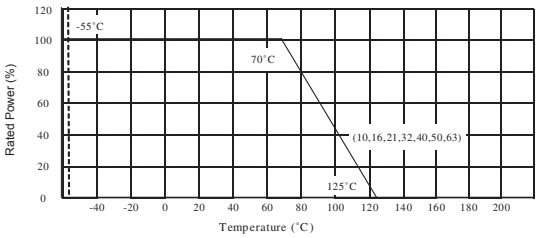
Features

- Precise Tolerance up to 0.05% and Low T.C.R down to 10ppm/°C
- Excellent stability
- Halogen Free Epoxy
- Products with lead free terminations meet RoHs requirements

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CT10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.012 ± 0.002 (0.30 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
CT16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.010 ± 0.006 (0.25 ± 0.15)	0.010 ± 0.006 (0.25 ± 0.15)
CT21 0805 (2012)	0.079 ± 0.004 (2.00 ± 0.10)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.014 ± 0.008 (0.35 ± 0.20)	0.014 ± 0.008 (0.35 ± 0.20)
CT32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.004 (1.60 ± 0.10)	0.022 ± 0.004 (0.55 ± 0.10)	0.018 ± 0.008 (0.45 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CT40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.102 ± 0.006 (2.60 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.020 ± 0.008 (0.50 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.20)
CT50 2010 (5025)	0.200 ± 0.004 (5.00 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.024 ± 0.008 (0.60 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.2)
CT63 2512 (6432)	0.250 ± 0.004 (6.35 ± 0.10	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.024 ± 0.008 (0.60 ± 0.20)	0.020 ± 0.008 (0.50 ± 0.20)



Ordering Code / Information

CT	10	-	XXXX	-	F	K	-	E

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
		Resistors	4-Digit	E24 & E96 Series 10.2Ω=10R2 10KΩ=1002			
Precision Thin Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)				A = ±0.05% B = ±0.1% C = ±0.25% D = ±0.5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free	B = ±10 C = ±15 D = ±25 E = ±50

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range (E-96, E-24)				Max Working Voltage	Max Overload Voltage	Operating Temperature Range
			A(±0.05%)	B(±0.1%)	C(±0.25%)	D(±0.5%)			
CT10 0402 (1005)	1/16W	±50	-	10Ω - 121KΩ	10Ω -121KΩ	10Ω -121KΩ	50V	100V	-55°C to +125°C
		±25		10Ω - 121KΩ	10Ω -121KΩ	10Ω -121KΩ			
		±15		10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10		10Ω - 100KΩ	10Ω - 100KΩ				
CT16 0603 (1608)	1/10W	±50	-	10Ω - 681KΩ	1Ω - 681KΩ	1Ω - 681KΩ	75V	150V	
		±25	1KΩ - 47KΩ	10Ω - 681KΩ	10Ω - 681KΩ	10Ω - 681KΩ			
		±15	1KΩ - 47KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	1KΩ - 47KΩ	10Ω - 100KΩ	10Ω - 100KΩ				
CT21 0805 (2012)	1/8W	±50	-	10Ω - 1.5MΩ	1Ω - 1.5MΩ	1Ω - 1.5MΩ	150V	300V	
		±25	100Ω - 100KΩ	10Ω - 1.5MΩ	10Ω - 1.5MΩ	10Ω - 1.5MΩ			
		±15	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ				
CT32 1206 (3216)	1/8W	±50	-	10Ω - 1.5MΩ	1Ω - 1.5MΩ	1Ω - 1.5MΩ	200V	400V	
		±25	100Ω - 100KΩ	10Ω - 1.5MΩ	10Ω - 1.5MΩ	10Ω - 1.5MΩ			
		±15	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ				
CT40 1210 (3225)	1/4W	±50	-	10Ω - 1MΩ	1Ω - 1MΩ	1Ω - 1MΩ			
		±25	100Ω - 100KΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ			
		±15	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ				
CT50 2010 (5025)	1/2W	±50	-	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ			
		±25	100Ω - 100KΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ			
		±15	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ				
CT63 2512 (6432)	3/4W	±50	-	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ			
		±25	100Ω - 100KΩ	10Ω - 1MΩ	10Ω - 1MΩ	10Ω - 1MΩ			
		±15	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ	-			
		±10	100Ω - 100KΩ	10Ω - 100KΩ	10Ω - 100KΩ				

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Short Time Overload	± (0.5%+0.05Ω). No visible damage	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	± (0.5%+0.05Ω). No visible damage	260°C ± 5°C, 10 seconds ± 1 second
Load Life	± (0.5%+0.05Ω)	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	± (0.5%+0.05Ω)	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.

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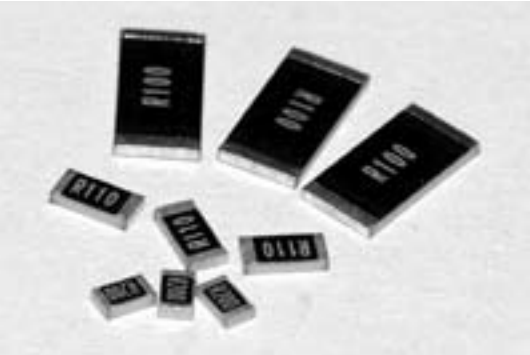
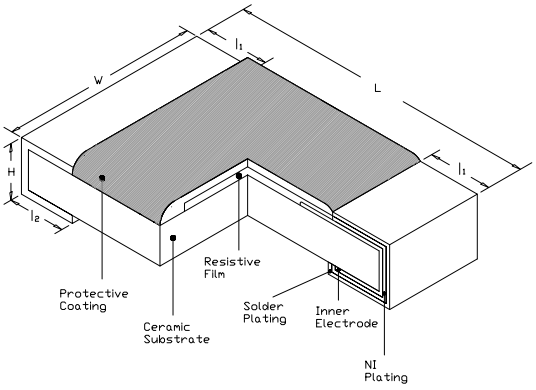


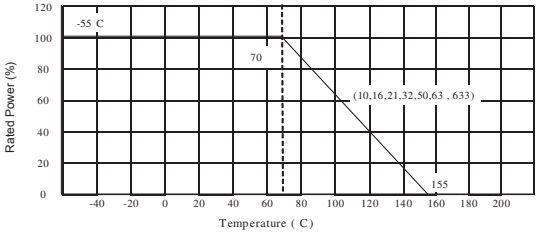
Features

- Thin film process
- High power rating up to 3 Watts in 2512 size
- Precise tolerance down to ±0.5%
- Extremely low TCR down to ±50 PPM/˚C
- Resistance values from 50m to 1ohm
- High purity alumina substrate for high power dissipation

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CT10 0402 (1005)	0.040 ± 0.002 (1.0 ± 0.05)	0.020 ± 0.002 (0.5 ± 0.05)	0.014 ± 0.004 (0.32 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)	0.008 ± 0.004 (0.2 ± 0.10)
CT16 0603 (1608)	0.063 ± 0.004 (1.6 ± 0.10)	0.031 ± 0.004 (0.8 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.3 ± 0.20)	0.012 ± 0.008 (0.3 ± 0.20)
CT21 0805 (2012)	0.079 ± 0.006 (2.0 ± 0.15)	0.049 ± 0.006 (1.25 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.012 ± 0.008 (0.3 ± 0.20)	0.016 ± 0.010 (0.4 ± 0.25)
CT32 1206 (3216)	0.120 ± 0.006 (3.05 ± 0.15)	0.061 ± 0.006 (1.55 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.020 ± 0.012 (0.5 ± 0.30)	0.016 ± 0.010 (0.4 ± 0.25)
CT50 2010 (5025)	0.200 ± 0.008 (5.0 ± 0.20)	0.096 ± 0.006 (2.45 ± 0.15)	0.024 ± 0.006 (0.6 ± 0.15)	0.024 ± 0.012 (0.6 ± 0.30)	0.020 ± 0.010 (0.5 ± 0.25)
CT63 CT633 2512 (6432)	0.25 ± 0.008 (6.35 ± 0.20)	0.124 ± 0.006 (3.15 ± 0.15)	0.024 ± 0.004 (0.6 ± 0.10)	0.024 ± 0.012 (0.6 ± 0.30)	0.022 ± 0.010 (0.55 ± 0.25)



Ordering Code / Information

CT	10	-	R500	-	F	K	-	E

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/˚C)
		Resistors	4-Digit	E96 & E24 Series			
Thin Film Current Sensing Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 50 (2010/5025) 63 (2512/6432) 633 (2512/6432)			0.47Ω=R470 0.499Ω=R499	D = ±0.5% F = ±1%	E = 4,000 pcs L = 5,000 pcs K = 10,000 pcs	E = ± 50 F = ± 100 G = ± 200

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range		Maximum Working Voltage	Maximum Overload Voltage	Operating Temperature Range
			D(±0.5%)	F(±1%)			
CT10 0402 (1005)	1/16W	±50, ±100	0.5Ω ≤ R < 1Ω		√(P*R)	2.5*√(P*R)	-55°C + 155°C
CT16 0603 (1608)	1/10W	±100	0.2Ω - 0.3Ω				
		±50	0.301Ω ≤ R < 1Ω				
CT21 0805 (2012)	1/8W	±100	0.2Ω - 0.3Ω				
		±50	0.301Ω ≤ R < 1Ω				
CT32 1206 (3216)	1/4W	±200	-	0.05Ω - 0.1Ω			
		±100	0.101Ω - 0.3Ω				
		±50	0.301Ω ≤ R < 1Ω				
CT50 2010 (5025)	3/4W	±200	0.05Ω - 0.1Ω				
CT63 2512 (6432)	1W	±100	0.101Ω - 0.3Ω				
		±50	0.301Ω ≤ R < 1Ω				
CT633 2512 (6432)	2W	±100	-	0.1Ω ≤ R < 1Ω			

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	As Spec.	As Spec. +25/-55/+25/+125/+25°C
Short Time Overload	±1%	RCWV*2.5 or Max. overload voltage for 5 seconds
Insulation Resistance	>1000MΩ	Apply 100VDC for 1 minute
Endurance	±1%	70 ± 2°C, Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Damp Heat with Load	±0.5%	40 ± 2°C, 90 ~ 95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs "ON" and 0.5 hrs "OFF"
Bending Strength	As Spec.	Bending amplitude 3mm for 10 seconds
Solderability	95% min. coverage	245 ± 5°C for 3 seconds
Resistance to Soldering Heat	±0.5%	260 ± 5°C for 10 seconds
Dielectric Withstand Voltage	By Type	Apply Max. Overload Voltage for 1 minute
Thermal Shock	±0.5%	-55°C ~150°C, 100 cycles
Low Temperature Operation	±0.5%	1 hour, -65°C followed by 45 minutes of RCWV

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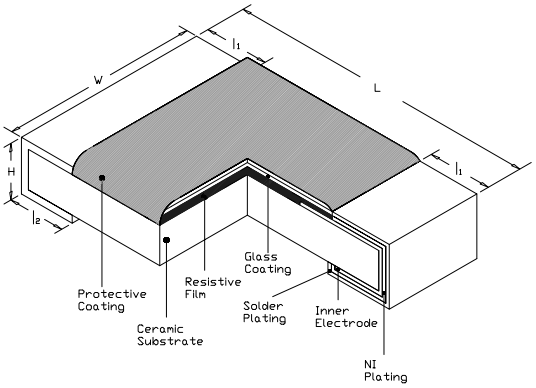
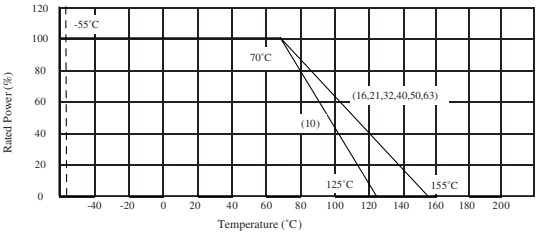
Features

- Resistance Range: 0.1Ω to less than 1Ω
- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb-Free with reflow soldering backward compatibility

Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CR10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CR16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CR21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CR32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CR40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CR63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)

Dimensions and Construction





Ordering Code / Information

CR	10	-	RXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
Milli Ohm Thick Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	4-Digit	E96 & E24 Series 0.47Ω=R470 0.499Ω=R499	F = ± 1% G = ± 2% J = ± 5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CR10 0402 (1005)	1/16W	±200	0.1Ω ≤ R < 1Ω	0.1Ω ≤ R < 1Ω	50V	100V	-55°C to +125°C
CR16 0603 (1608)	1/10W	±200	0.1Ω ≤ R < 1Ω	0.1Ω ≤ R < 1Ω			-55°C to +155°C
CR21 0805 (2012)	1/8W	±100	0.1Ω ≤ R < 1Ω	-	150V	300V	
		±200	-	0.1Ω ≤ R < 1Ω			
CR32 1206 (3216)	1/4W	±100	0.1Ω ≤ R < 1Ω	-	200	400V	
		±200	-	0.1Ω ≤ R < 1Ω			
CR40 1210 (3225)	1/3W	±100	0.1Ω ≤ R < 1Ω	-			
		±200	-	0.1Ω ≤ R < 1Ω			
CR50 2010 (5025)	3/4W	±100	0.1Ω ≤ R < 1Ω	-			
		±200	-	0.1Ω ≤ R < 1Ω			
CR63 2512 (6432)	1W	±100	0.1Ω ≤ R < 1Ω	-			
		±200	-	0.1Ω ≤ R < 1Ω			

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±1.0%	For 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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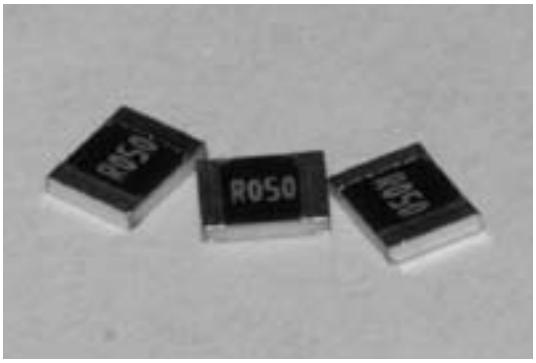
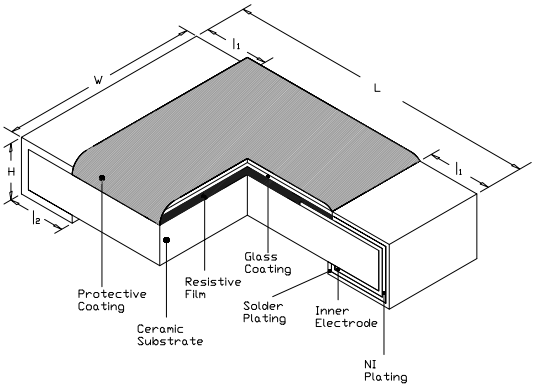


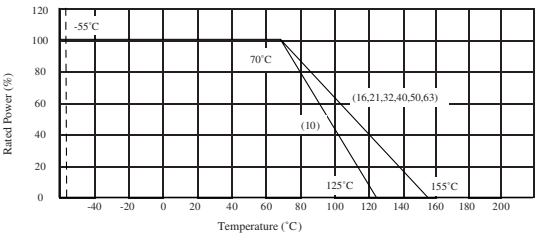
Features

- Resistance Range: 0.01Ω - 0.1Ω
- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb-Free with reflow soldering backward compatibility

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CR10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CR16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CR21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CR32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CR40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CR50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CR63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)



Ordering Code / Information

CR	32	-	RXXX	-	HTC	-	F	L

Type	Size (Inch / mm)	Nominal Resistance			Option	Resistance Tolerance	Packaging
Ultra Low Ohmic Thick Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	4-Digit	E96 & E24 Series 0.091Ω=R091 0.03Ω=R030	HTC = High Temperature Coefficient (Only applicable for selection of resistance range between 0.01Ω ≤ x 0.03Ω with T.C.R of ±1,500ppm)	F = ±1% G = ±2% J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CR10 0402 (1005)	1/16W	±200	0.04Ω ≤ R < 0.1Ω		50V	100V	-55°C to +125°C
CR16 0603 (1608)	1/10W						-55°C to +155°C
CR21 0805 (2012)	1/8W	±200	0.03Ω ≤ R < 0.1Ω		150V	300V	
CR32 1206 (3216)	1/4W	±200	0.03Ω ≤ R < 0.1Ω		200V	400V	
		±100	0.01Ω ≤ R < 0.03Ω				
		±1500					
CR40 1210 (3225)	1/3W	±100	0.03Ω ≤ R < 0.1Ω	-			
		±200	-	0.03Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				
CR50 2010 (5025)	3/4W	±100	0.01Ω ≤ R < 0.1Ω	-			
		±200	-	0.01Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				
CR63 2512 (6432)	1W	±100	0.03Ω ≤ R < 0.1Ω	-			
		±200	-	0.03Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	± 0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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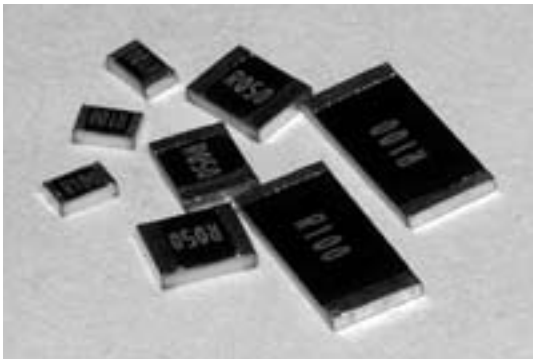
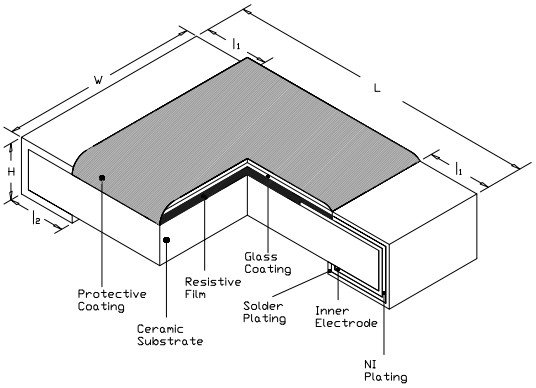


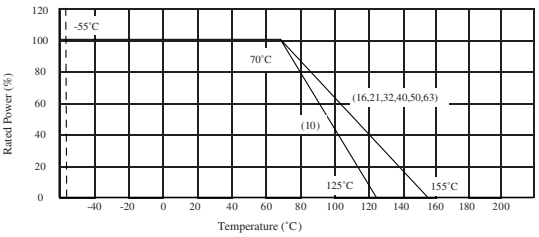
Features

- Resistance Range: 0.01Ω to less than 1Ω
- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb-Free with reflow soldering backward compatibility

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CLP10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CLP16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CLP21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CLP32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CLP40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CLP50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CLP63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)



Ordering Code / Information

CLP	10	-	RXXX	-	HTC	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Option	Resistance Tolerance	Packaging
Low Ohmic High Power Current Sensing Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	4-Digit	E24 & E96 Series 0.47Ω=R470 0.499Ω=R499	HTC = High Temperature Coefficient (Only applicable for selection of resistance range between 0.01Ω ≤ x 0.03Ω with T.C.R of ±1,500ppm)	F = ±1% G = ±2% J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free

Application and Ratings

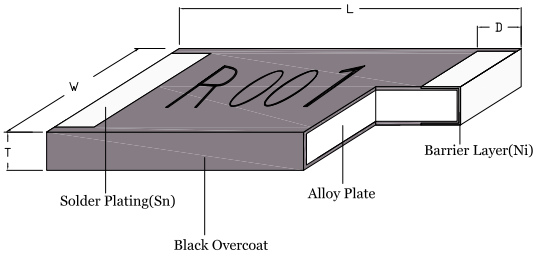
Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CLP10 0402 (1005)	1/8W	±200	0.04Ω ≤ R < 0.1Ω		50V	100V	-55°C to +125°C
CLP16 0603 (1608)	1/5W						-55°C to +155°C
CLP21 0805 (2012)	1/4W	±200	0.03Ω ≤ R < 0.1Ω		150V	300V	
CLP32 1206 (3216)	1/2W	±200	0.03Ω ≤ R < 0.1Ω		200V	400V	
		±100	0.01Ω ≤ R < 0.03Ω				
		±1500					
CLP40 1210 (3225)	3/4W	±100	0.03Ω ≤ R < 0.1Ω	-			
		±200	-	0.03Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				
CLP50 2010 (5025)	1W	±100	0.01Ω ≤ R < 0.1Ω	-			
		±200	-	0.01Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				
CLP63 2512 (6432)	2W	±100	0.03Ω ≤ R < 0.1Ω	-			
		±200	-	0.03Ω ≤ R < 0.1Ω			
		±1500	0.01Ω ≤ R < 0.03Ω				

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

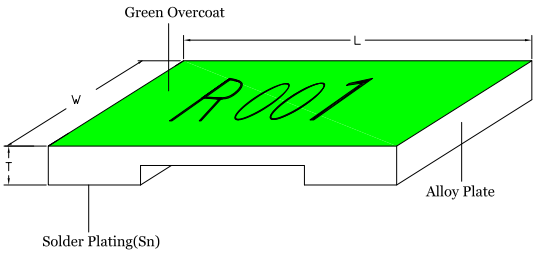
Features

- Robust metal strip able to withstand high temperature and high current
- Low TCR and Inductance
- Resistance range from 0.5mΩ to 15mΩ
- Designed for current sense circuits in power electronic systems

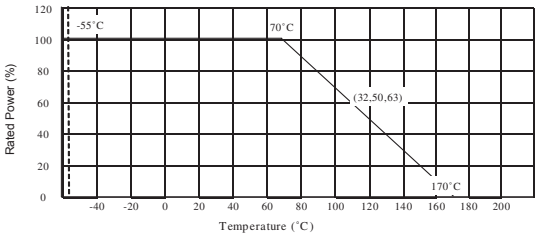
Dimensions and Construction



Black- Wave or IR reflow soldering



Green- IR reflow soldering only



Type	Dimensions				
	Inches (Millimeters)				
	Resistance Value	L	W	T	D
CLS32 1206 (3216)	0.001Ω - 0.01Ω	0.126 ± 0.010 (3.20 ± 0.254)	0.063 ± 0.004 (1.60 ± 0.104)	0.024 ± 0.008 (0.60 ± 0.20)	0.039 ± 0.015 (0.98 ± 0.38)
CLS50 2010 (5025)	0.001Ω - 0.01Ω	0.200 ± 0.010 (5.08 ± 0.254)	0.100 ± 0.006 (2.54 ± 0.15)	0.024 ± 0.008 (0.60 ± 0.20)	0.066 ± 0.025 (1.665 ± 0.625)
CLS63 2512 (6432)	0.0005Ω	0.250 ± 0.010 (6.35 ± 0.254)	0.125 ± 0.014 (3.18 ± 0.35)	0.024 ± 0.008 (0.60 ± 0.20)	0.105 ± 0.010 (2.675 ± 0.254)
	0.00075Ω				0.097 ± 0.010 (2.475 ± 0.254)
	0.001Ω - 0.0015Ω				0.056 ± 0.010 (1.425 ± 0.254)
	0.002Ω - 0.003Ω				0.046 ± 0.010 (1.175 ± 0.254)
	0.004Ω				0.086 ± 0.010 (2.175 ± 0.254)
	0.005Ω - 0.006Ω				0.076 ± 0.010 (1.925 ± 0.254)
	0.007Ω				0.056 ± 0.010 (1.425 ± 0.254)
	0.008Ω - 0.02Ω				0.046 ± 0.010 (1.175 ± 0.254)

Ordering Code / Information

CLS	6325	-	RXXX	-	F	P

Type	Size (Inch / mm)(Power Rating)	Nominal Resistance			Resistance Tolerance	Packaging
Metal Element Current Sensing Chip Resistors	32 (1206/3216)(1W) 50 (2010/5025)(1.5W) 631 (2512/6432)(1W) 632 (2512/6432)(2W) 6325 (2512/6432)(2.5W) 633 (2512/6432)(3W)	Resistors	4-Digit	E24 & E96 Series 0.0005Ω = R0005 0.001Ω = R001	F = ±1% J = ±5%	P = 2,000 pcs

Application and Ratings

Product Type	Coating	Power Rating @ 80°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CLS32 1206 (3216)	Black	1W	±50	0.001Ω - 0.01Ω	√(P*R)	2.5*√(P*R)	-55°C to +170°C
CLS50 2010 (5025)	Black	1.5W	±50	0.001Ω - 0.01Ω			
CLS631 CLS632 CLS6325 CLS633 2512 (6432)	Green	1W	±50	0.011Ω - 0.015Ω			
		2W	±50	0.0035Ω, 0.0065Ω - 0.01Ω			
		2.5W	±50	0.004Ω, 0.005Ω, 0.006Ω			
		3W	±50	0.001Ω - 0.003Ω			
			±100	0.0005Ω, 0.00075Ω			

** Green Coating is only suitable for IR reflow soldering only*

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	Black coating	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	Green coating	
Resistance to Soldering Heat	±0.5%	Black coating	260°C ± 5°C, 10 seconds ± 1 second
	±1.0%	Green coating	
Load Life	±1.0%	Black coating	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±1.0%	Green coating	
Thermal shock	±0.5%	Black coating	-55°C ~ 150°C, 100 cycles
	±1.0%	Green coating	

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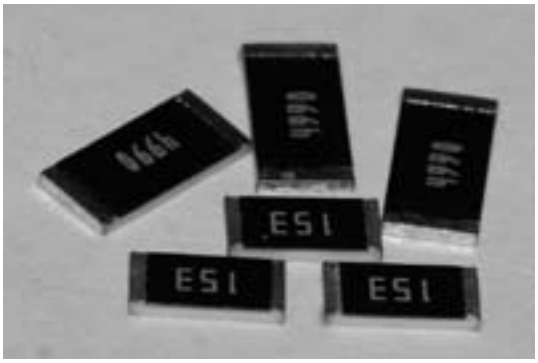
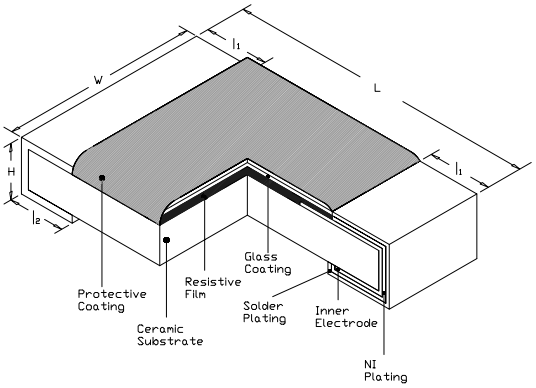
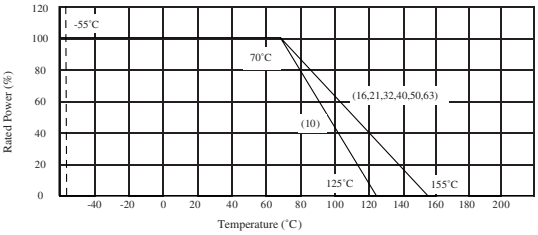


Features

- Offers double the power rating of standard chip resistors
- Up to 2W for 2512 case size
- Pb-Free with reflow soldering backward compatibility

Dimensions and Construction





CPW10 0402 (1005)	0.040±0.004 (1.00±0.10)	0.020±0.002 (0.50±0.05)	0.014±0.002 (0.35±0.05)	0.008±0.004 (0.20±0.10)	0.010±0.004 (0.25±0.10)
CPW16 0603 (1608)	0.063±0.004 (1.60±0.10)	0.031±0.004 (0.80±0.10)	0.018±0.004 (0.45±0.10)	0.012±0.008 (0.30±0.20)	0.012±0.008 (0.30±0.20)
CPW21 0805 (2012)	0.079±0.006 (2.00±0.15)	0.049±0.004 (1.25±0.10)	0.020±0.004 (0.50±0.10)	0.016±0.008 (0.40±0.20)	0.016±0.008 (0.40±0.20)
CPW32 1206 (3216)	0.122±0.004 (3.10±0.10)	0.063±0.006 (1.60±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.020±0.010 (0.50±0.25)
CPW40 1210 (3225)	0.122±0.004 (3.10±0.10)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.020±0.010 (0.50±0.25)	0.016±0.008 (0.40±0.20)
CPW50 2010 (5025)	0.200±0.006 (5.00±0.15)	0.098±0.006 (2.50±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)
CPW63 2512 (6432)	0.250±0.006 (6.30±0.15)	0.126±0.006 (3.20±0.15)	0.022±0.002 (0.55±0.05)	0.024±0.010 (0.60±0.25)	0.016±0.008 (0.40±0.20)

Ordering Code / Information

CPW	10	-	XXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
High Power Rating Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	D = ±0.5% F = ±1% G = ±2% J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002		

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96 D(±0.5%)	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CPW10 0402 (1005)	1/8W	±200	0.1Ω ≤ R < 10Ω			50V	100V	-55°C to +125°C
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW16 0603 (1608)	1/5W	±200	0.1Ω ≤ R < 10Ω					-55°C to +155°C
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW21 0805 (2012)	1/4W	±200	0.1Ω ≤ R < 10Ω			150V	300V	
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW32 1206 (3216)	1/2W	±200	0.1Ω ≤ R < 10Ω			200V	400V	
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW40 1210 (3225)	2/3W	±200	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW50 2010 (5025)	1W	±200	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					
CPW63 2512 (6432)	2W	±200	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 15MΩ					
		±100	10Ω ≤ R < 1MΩ					

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolorence resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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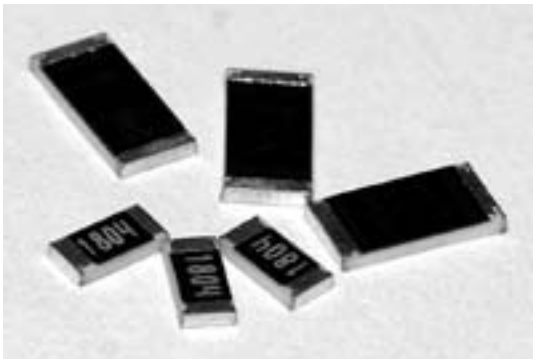
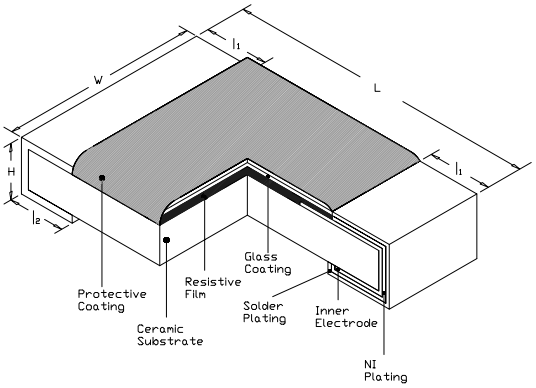


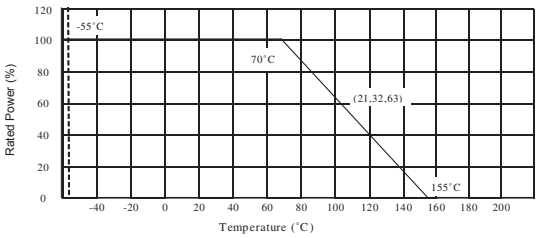
Features

- Higher maximum working voltage compared to standard chip resistors
- Reliable electrode construction

Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CPM21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.15)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.016 ± 0.008 (0.40 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CPM32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.006 (1.60 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.010 (0.50 ± 0.25)
CPM63 2512 (6432)	0.250 ± 0.006 (6.30 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.004 (0.55 ± 0.10)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)

Dimensions and Construction





Ordering Code / Information

CPM	21	-	1000	-	F	L

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
Medium Voltage Chip Resistors	21 (0805/2012) 32 (1206/3216) 63 (2512/6432)	Resistors	3-Digit	E24 Series 100KΩ=104	F = ±1% J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free
			4-Digit	E96 Series 100KΩ=1003		

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Dielectric Withstanding Voltage	Operating Temperature Range
CPM21 0805 (2012)	1/8W	± 200	100KΩ to 10MΩ		400V	800V		-55°C to +155°C
CPM32 1206 (3216)	1/4W		100KΩ to 10MΩ	100KΩ to 27MΩ	500V	1,000V		
CPM63 2512 (6432)	1W		-	4.7MΩ to 16MΩ				

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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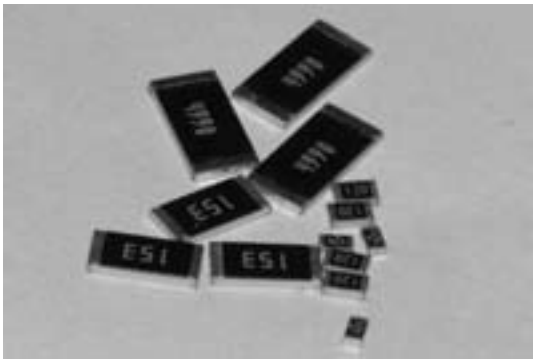
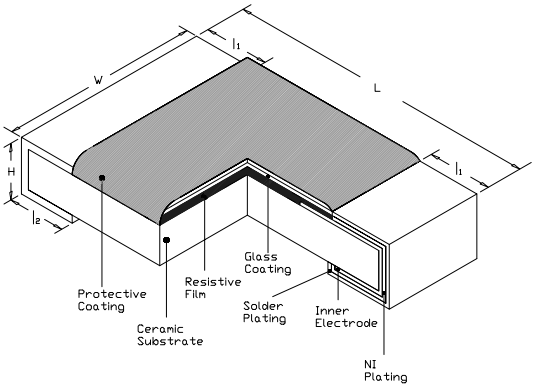


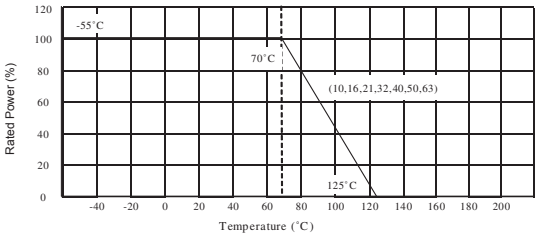
Features

- Highly reliable multilayer electrode construction
- Up to 3.0kV for 2512 case size
- Excellent performance at high voltage
- Suitable for inverters and camera flash circuits

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	i_2
CPH10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.05)	0.020 ± 0.002 (0.50 ± 0.0.05)	0.014 ± 0.002 (0.35 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.20 ± 0.10)
CPH16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
CPH21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.10)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.014 ± 0.008 (0.35 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CPH32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.061 ± 0.004 (1.55 ± 0.10)	0.022 ± 0.004 (0.55 ± 0.10)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.008 (0.50 ± 0.20)
CPH50 2010 (5025)	0.200 ± 0.008 (5.00 ± 0.20)	0.098 ± 0.006 (2.50 ± 0.15)		0.024 ± 0.010 (0.60 ± 0.25)	
CPH63 2512 (6432)	0.25 ± 0.008 (6.35 ± 0.20)	0.126 ± 0.006 (3.20 ± 0.15)			



Ordering Code / Information

CPH	10	-	XXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
High Voltage Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 50 (2010/5025) 63 (2512/6432)	Resistors	3-Digit	E24 Series 10Ω=100 100Ω=101	F = ± 1% J = ± 5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002		

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CPH10 0402 (1005)	1/16W	±100 ±200	10Ω - 1MΩ 1.02MΩ - 10MΩ		100V	200V	-55°C to +125°C
CPH16 0603 (1608)	1/10W				200V	400V	
CPH21 0805 (2012)	1/8W				400V	800V	
CPH32 1206 (3216)	1/4W				500V	1,000V	
CPH50 2010 (5025)	1/2W				2,000V	3,000V	
CPH63 2512 (6432)	1W				3,000V	4,000V	

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±1%	±(1.0%+0.05Ω)	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±5%	±(2.0%+0.05Ω)	
Insulation Resistance	±1%	≥ 10G	Max. overload voltage for 1 minute
	±5%		
Endurance	±1%	±(2.0%+0.10Ω)	70 ± 2°C, Max. working voltage for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
	±5%	±(3.0%+0.10Ω)	
Damp Heat with Load	±1%	±(2.0%+0.10Ω)	40 ± 2°C, 90~95% R.H. Max. working voltage for 1000 hrs with 1.5 hrs “ON” and 0.5 hrs “OFF”
	±5%	±(3.0%+0.10Ω)	
Dry Heat	±1%	±(1.0%+0.05Ω)	at +125°C for 1000 hrs
	±5%	±(1.5%+0.10Ω)	
Bending Strength	±1%	±(1.0%+0.05Ω)	Bending once for 5 seconds 2010, 2512 sizes: 2mm Other sizes: 3mm
	±5%	±(1.0%+0.05Ω)	
Solderability	±1%	95% min. coverage	245 ± 5°C for 3 seconds
	±5%		
Resistance to Soldering Heat	±1%	±(0.5%+0.05Ω)	260 ± 5°C for 10 seconds
	±5%	±(1.0%+0.05Ω)	
Voltage Proof	No breakdown or flashover		1.42 times RCWV (RMS) for 1 minute
Leaching	Individual leaching area <= 5% Total leaching area <= 10%		260 ± 5°C for 30 seconds
Rapid Change of Temperature	±1%	±(0.5%+0.05Ω)	-55°C to +125°C, 5 cycles
	±5%	±(1.0%+0.05Ω)	

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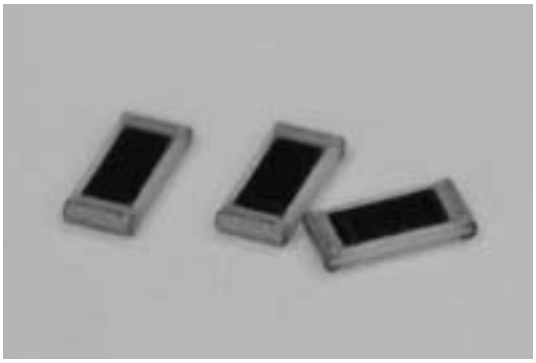
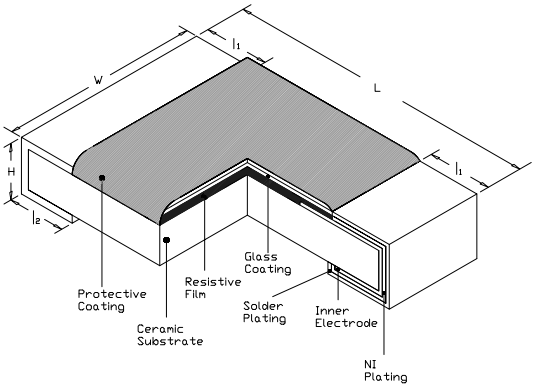


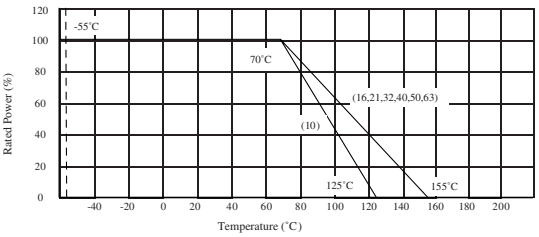
Features

- Resistance range - above 10MΩ to 100MΩ
- Highly reliable multilayer electrode construction
- Compatible with all soldering process

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CH10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.014 ± 0.002 (0.35 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
CH16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
CH21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.15)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.016 ± 0.008 (0.40 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CH32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.006 (1.60 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.010 (0.50 ± 0.25)
CH40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
CH50 2010 (5025)	0.200 ± 0.006 (5.00 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
CH63 2512 (6432)	0.250 ± 0.006 (6.30 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)



Ordering Code / Information

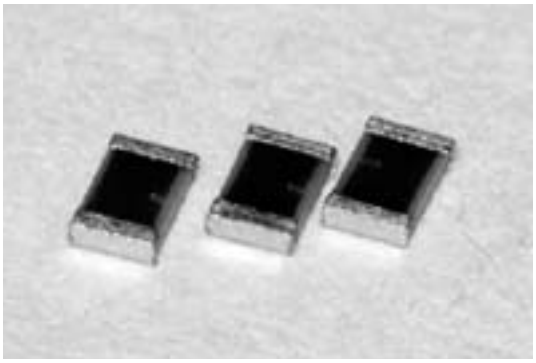
CH	10	-	XXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
High Ohmic Value Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F = ±1% J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002		

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CH10 0402 (1005)	1/16W	±200	10MΩ < R ≤ 15MΩ		50V	100V	-55°C to +125°C
		±500	15MΩ < R ≤ 100MΩ				
CH16 0603 (1608)	1/10W	±200	10MΩ < R ≤ 30MΩ				-55°C to +155°C
		±500	30MΩ < R ≤ 100MΩ				
CH21 0805 (2012)	1/8W	±200	10MΩ < R ≤ 30MΩ		150V	300V	
		±500	30MΩ < R ≤ 100MΩ				
CH32 1206 (3216)	1/4W	±200	10MΩ < R ≤ 30MΩ		200V	400V	
		±500	30MΩ < R ≤ 100MΩ				
CH40 1210 (3225)	1/3W	±200	10MΩ < R ≤ 30MΩ				
		±500	30MΩ < R ≤ 100MΩ				
CH50 2010 (5025)	3/4W	±200	10MΩ < R ≤ 30MΩ				
		±500	30MΩ < R ≤ 100MΩ				
CH63 2512 (6432)	1W	±200	10MΩ < R ≤ 30MΩ				
		±500	30MΩ < R ≤ 100MΩ				

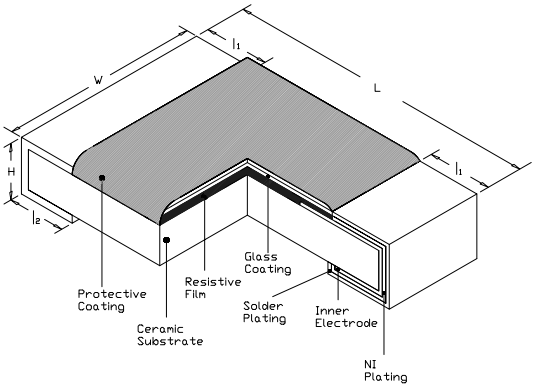
Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	



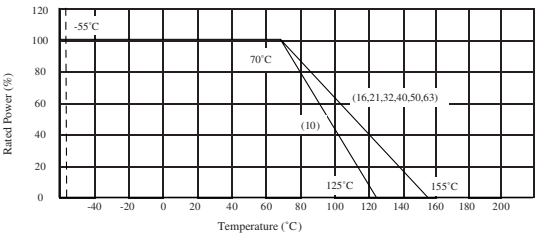
Features

- Resistance Range - above 10MΩ to 1TΩ (10^{12}Ω)
- Tolerance of ±5% for resistance values up to 500MΩ.
- For resistance range more than 500MΩ to 1TΩ, tolerance available are ±10% and ±20%
- Excellent thermal, voltage and environmental stability

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	l_1	l_2
CH10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.014 ± 0.002 (0.35 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
CH16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
CH21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.15)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.016 ± 0.008 (0.40 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
CH32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.006 (1.60 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.010 (0.50 ± 0.25)
CH40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
CH50 2010 (5025)	0.200 ± 0.006 (5.00 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
CH63 2512 (6432)	0.250 ± 0.006 (6.30 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)



Ordering Code / Information

CH	10	-	XXX		-	J	K
Type	**Size (Inch / mm)**		**Nominal Resistance**			**Resistance Tolerance**	**Packaging**
Ultra High Ohmic Value Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)		Resistors	3-Digit	E24 Series 100MΩ=107	J = ±5% K = ±10% M = ±20%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free
				For Resistance Value 1G and above Tolerance 5% - Represented by 3 figures, "G" (For Giga Ohm) and "T" (For Tera Ohm) indicates the decimal on value (Only available for E-24 Series)			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 K(±10%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CH10 0402 (1005)	1/16W	±500	100MΩ < R ≤ 470MΩ		50V	100V	-55°C to +125°C
CH16 0603 (1608)	1/10W	±500	100MΩ < R ≤ 1GΩ				-55°C to +155°C
		±1000	1GΩ < R ≤ 10GΩ				
CH21 0805 (2012)	1/8W	±500	100MΩ < R ≤ 1GΩ		150V	300V	
		±1000	1GΩ < R ≤ 10GΩ				
		±2000	10GΩ < R ≤ 100GΩ				
		±2500	100GΩ < R ≤ 1TΩ				
CH32 1206 (3216)	1/4W	±500	100MΩ < R ≤ 1GΩ		200V	400V	
		±1000	1GΩ < R ≤ 10GΩ				
		±2000	10GΩ < R ≤ 100GΩ				
		±2500	100GΩ < R ≤ 1TΩ				
CH40 1210 (3225)	1/3W	±500	100MΩ < R ≤ 470MΩ				
CH50 2010 (5025)	3/4W	±500	100MΩ < R ≤ 470MΩ				
CH63 2512 (6432)	1W	±500	100MΩ < R ≤ 1GΩ				

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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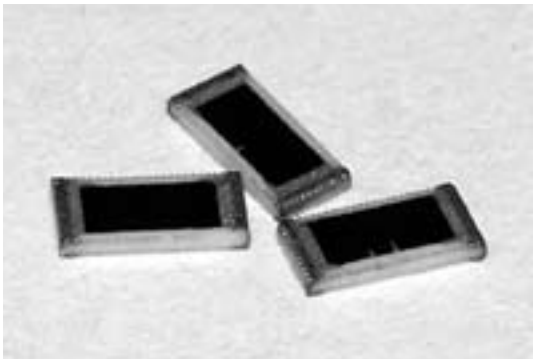
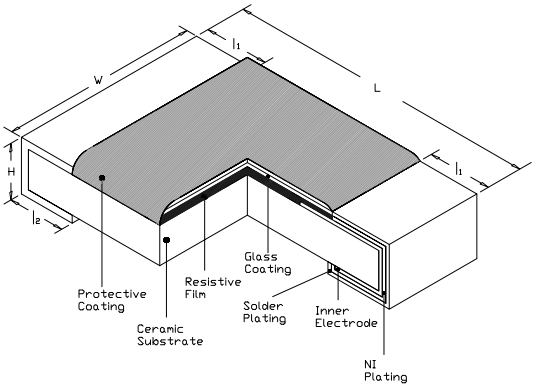


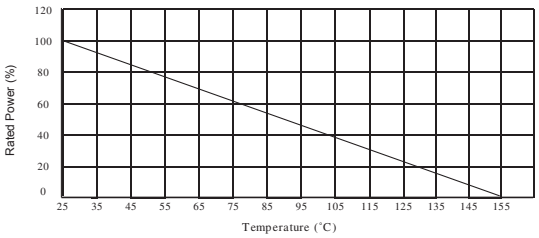
Features

- High resistance range (up to 1GΩ), with maximum working voltage as high as 1kV
- Precise tolerance down to ±0.1%

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
CH32 1206 (3216)	0.126 ± 0.01 (3.2 ± 0.25)	0.061 ± 0.014 (1.55 ± 0.35)	0.024 ± 0.008 (0.6 ± 0.2)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.015 (0.51 ± 0.38)
CH63 2512 (6432)	0.25 ± 0.01 (6.4 ± 0.25)	0.132 ± 0.014 (3.35 ± 0.35)	0.024 ± 0.008 (0.6 ± 0.2)	0.024 ± 0.010 (0.60 ± 0.25)	0.025 ± 0.015 (0.63 ± 0.38)



Ordering Code / Information

CH	32	-	XXXX	-	B	L

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
Precision High Ohmic Chip Resistors	32 (1206/3216) 63 (2512/6432)	Resistors	4-Digit	E96 Series 100KΩ = 1003 1MΩ=1004	B = ±0.1% C = ±0.25% D = ±0.5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 25°C	T.C.R (ppm/°C) Max	Resistance Range E-192 B (±0.1%), C (±0.25%), D (±0.5%)	Max Working Voltage	Max Overload Voltage
CH32 1206 (3216)	1/4W	±100	100KΩ to 100MΩ	300V	600V
CH63 2512 (6432)	1W			1,000V	2,000V

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Pulse Capability	1.0%	2 times of rated voltage, 1.2x 50uS
Resistance to Soldering Heat	0.10%	260°C ± 5°C, 3 seconds
Moisture Resistance	0.50%	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	1.00%	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
Low Temp Exposure	0.50%	24 hrs @ -55^0 C
High Temp Exposure	0.50%	100 hrs @ 125^0 C

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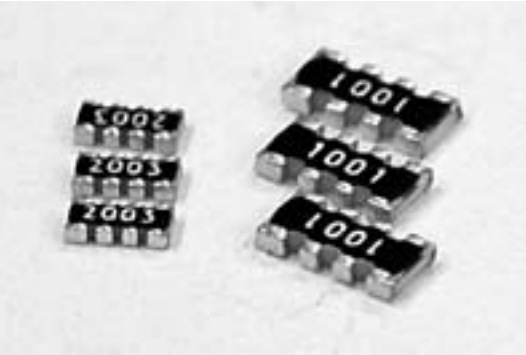
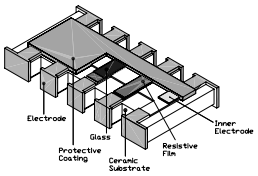
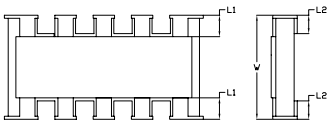


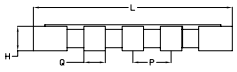
Features

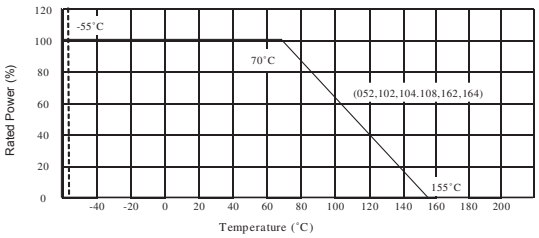
- Highly reliability and stability
- Efficient, space and cost saving
- Convex terminations

Dimensions and Construction









Type	Dimensions						
	Inches (Millimeters)						
	L	W	H	L_1	L_2	P	Q
YCN052 (0201 X 2)	0.031 ± 0.004 (0.80 ± 0.10)	0.024 ± 0.004 (0.60 ± 0.10)	0.012 ± 0.002 (0.30 ± 0.05)	0.006 ± 0.004 (0.15 ± 0.10)	0.006 ± 0.004 (0.15 ± 0.10)	0.02 (0.50)	0.012 ± 0.004 (0.30 ± 0.10)
YCN102 (0402 X 2)	0.040 ± 0.004 (1.00 ± 0.10)	0.040 ± 0.004 (1.00 ± 0.10)	0.012 ± 0.002 (0.30 ± 0.05)	0.006 ± 0.004 (0.15 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)	0.03 (0.67)	0.013 ± 0.004 (0.33 ± 0.10)
YCN104 (0402 X 4)	0.078 ± 0.004 (2.00 ± 0.10)	0.040 ± 0.004 (1.00 ± 0.10)	0.016 ± 0.004 (0.40 ± 0.10)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)	0.02 (0.50)	0.012 ± 0.004 (0.30 ± 0.10)
YCN108 (0402 X 8)	0.157 ± 0.008 (4.00 ± 0.20)	0.063 ± 0.004 (1.60 ± 0.10)	0.016 ± 0.004 (0.40 ± 0.1)	0.012 ± 0.006 (0.30 ± 0.15)	0.012 ± 0.004 (0.30 ± 0.10)	0.02 (0.50)	0.010 ± 0.004 (0.25 ± 0.10)
YCN162 (0603 X 2)	0.063 ± 0.006 (1.60 ± 0.15)	0.063 ± 0.006 (1.60 ± 0.15)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.006 (0.30 ± 0.15)	0.012 ± 0.006 (0.30 ± 0.15)	0.031 (0.80)	0.024 ± 0.004 (0.60 ± 0.10)
YCN164 (0603 X 4)	0.126 ± 0.008 (3.20 ± 0.20)	0.063 ± 0.006 (1.60 ± 0.15)	0.020 ± 0.004 (0.50 ± 0.10)	0.012 ± 0.006 (0.30 ± 0.15)	0.012 ± 0.006 (0.30 ± 0.15)	0.031 (0.80)	0.020 ± 0.004 (0.50 ± 0.10)

Ordering Code / Information

YCN	102	-	XXXX	-	F	K

Type	Size (Configuration)	Nominal Resistance			Resistance Tolerance	Packaging
Thick Film Chip Resistor Array	052 - 0201 X 2 102 - 0402 X 2 104 - 0402 X 4 108 - 0402 X 8 162 - 0603 X 2 164 - 0603 X 4	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	D = ±0.5% F = ±1% G = ±2% J = ±5% Z = zero obm	L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002		
		Jumper	000			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	ResistanceRange			Max Working Voltage	Max Overload Voltage	Operating Temperature Range	Jumper Rated Current	Jumper Resistance Value
			E-96 D(±0.5%)	E-96 F(±1%)	E-24 G(±2%), J(±5%)					
YCN052 (0201 X 2)	1/32W	±500	-	-	3Ω ≤ R < 10Ω	12.5V	25V	-55°C to +155°C	0.5A	50mΩ max
		±300	-	-	10Ω ≤ R < 1KΩ					
		±200	-	-	1KΩ - 1MΩ					
YCN102 (0402 X 2)	1/16W	±300	-	-	1Ω ≤ R < 10Ω	25V	50V		1.0A	
		±200	-	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ					
YCN104 (0402 X 4)		±300	-	-	1Ω ≤ R < 10Ω					
		±200	-	10Ω ≤ R ≤ 1MΩ	10Ω ≤ R ≤ 1MΩ					
YCN108 (0402 X 8)		±250	-	10Ω - 1MΩ	1Ω - 1MΩ					
			-							
YCN162 (0603 X 2)		±200	-	10Ω - 1MΩ	1Ω - 10MΩ	50V	100V			
			-							
YCN164 (0603 X 4)		±200	22Ω - 470KΩ	1Ω - 1MΩ	1Ω - 10MΩ					

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(1.0%+0.05Ω)	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±(2.0%+0.10Ω)	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(1.0%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
		For 2% & 5% tolerance	
Moisture Resistance	±(2.0%+0.10Ω)	For 1% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
	±(3.0%+0.10Ω)	For 2% & 5% tolerance	
Load Life	±(2.0%+0.10Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(3.0%+0.10Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(1.0%+0.05Ω)	For 1% tolerance	155°C , 1000 hours. Unpowered. Measurement at 1000 hours after test conclusion.
	±(2.0%+0.10Ω)	For 2% & 5% tolerance	

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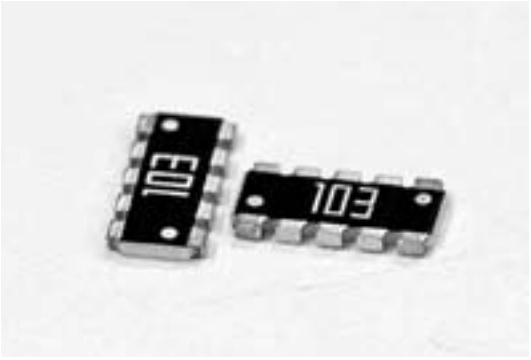
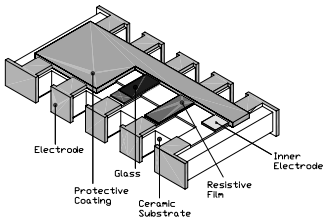


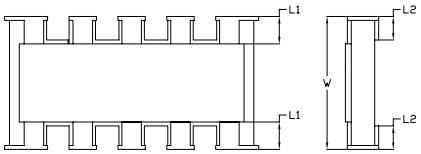
Features

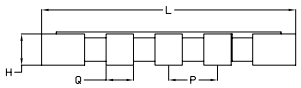
- Eight bussed resistor elements included in one array
- Resistor network takes up significantly less board space than a network based on discrete resistors
- Reduces placement costs

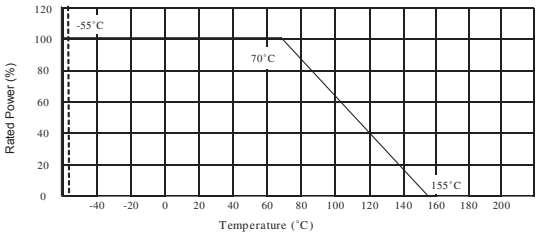
Type	Dimensions						
	Inches (Millimeters)						
	L	W	H	L_1	L_2	P	Q
YCN158 0612 (1632)	0.126 ± 0.008 (3.20 ± 0.20)	0.063 ± 0.006 (1.60± 0.15)	0.018 ± 0.002 (0.45 ± 0.05)	0.012 ± 0.006 (0.30 ± 0.15)	0.014 ± 0.006 (0.35 ± 0.15)	0.025 ± 0.002 (0.64 ± 0.05)	0.018 ± 0.002 (0.45 ± 0.05)
YCN358 1225 (3264)	0.252 ± 0.008 (6.40 ± 0.20)	0.126 ± 0.008 (3.20 ± 0.20)	0.043 ± 0.006 (1.10 ± 0.15)	0.020 ± 0.006 (0.50 ± 0.15)	0.020 ± 0.006 (0.50 ± 0.15)	0.050 ± 0.002 (1.27 ± 0.05)	0.035 ± 0.006 (0.90 ± 0.15)

Dimensions and Construction









Ordering Code / Information

YCN	158	-	XXX	-	J	L

Type	Size(mm)	Nominal Resistance			Resistance Tolerance	Packaging
Thick Film Chip Resistor Network	158 (0612/1632) 358 (1225/3264)	Resistors	3-Digit	E24 Series 10Ω=100 100Ω=101	J = ±5%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
YCN158 0612 (1632)	1/16W	±200	10Ω to 100KΩ	25V	50V	-55°C to +155°C
YCN358 1225 (3264)	1/16W		10Ω TO 330KΩ	50V	100V	

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Short Time Overload	±(2.0%+0.05Ω)	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(1.0%+0.05Ω)	270°C ± 5°C, 10 seconds ± 1 second
Load Life	±(2.0%+0.05Ω)	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(1.0%+0.05Ω)	155°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.

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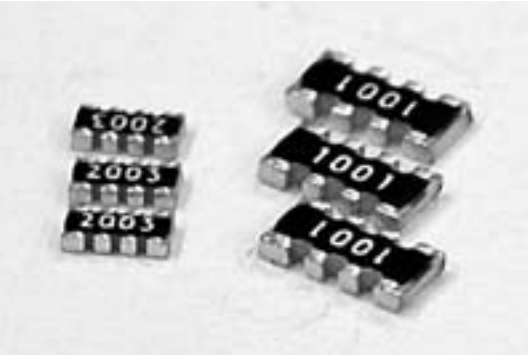
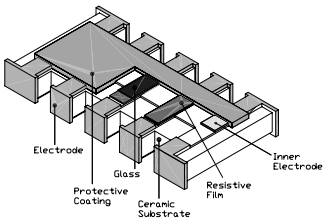


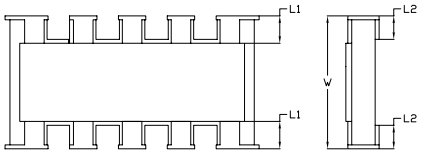
Features

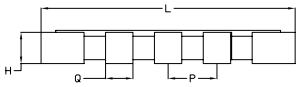
- Tight Tolerance and Low T.C.R
- Highly reliability and stability
- Efficicent, space and cost saving
- Convex terminations

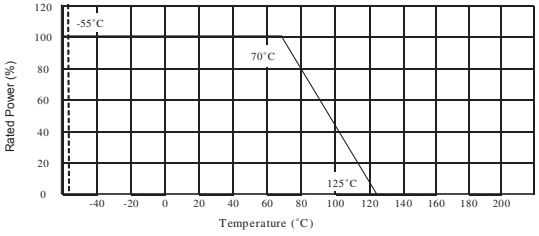
Type	Dimensions						
	Inches (Millimeters)						
	L	W	H	L_1	L_2	P	Q
LCN164 (0603 X 4)	0.126 ± 0.006 (3.20 ± 0.15)	0.063 ± 0.006 (1.60 ± 0.15)	0.020 ± 0.004 (0.50 ± 0.10)	0.019 ± 0.006 (0.30 ± 0.15)	0.019 ± 0.006 (0.30 ± 0.15)	0.031 ± 0.002 (0.80 ± 0.05)	0.020 ± 0.006 (0.50 ± 0.15)

Dimensions and Construction









Ordering Code / Information

LCN	164	-	XXXX	-	B	L	-	L

Type	Size (Configuration)	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
		Resistors	4-Digit	E24 & E96 Series 10.2Ω=10R2 10KΩ=1002			
Thin Film Chip Resistor Array	164 - 0603 X 4				B = ±0.1% D = ±0.5% F = ±1%	L = 5,000 pcs Lead Free	D = ±25 E = ±50

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range			Max Working Voltage	Max Overload Voltage	Operating Temperature Range
			B(±0.1%)	D(±0.5%)	F(±1%)			
LCN164 (0603 X 4)	1/16W	±25 ±50	10R ≤ R ≤ 330KR			75V	150V	-55°C to +125°C

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/+125°C
Short Time Overload	±(0.5%+0.05Ω)	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Moisture Resistance	±(0.5%+0.05Ω)	Each temperature/humidity cycle is defined at 8hrs, 3cycles/24hrs for 10days
Load Life	±(0.5%+0.05Ω)	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	Meet electrical and physical characteristic	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.

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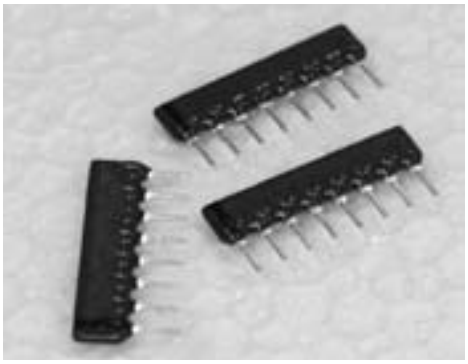
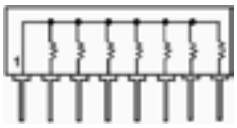


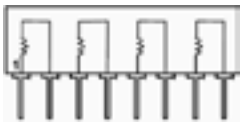
Features

- Up to 6 Configurations available for different applications (4 Pins - 12 Pins)
- Single resistor or dual resistors configuration available
- Tolerances available - 1%, 2%, 5%

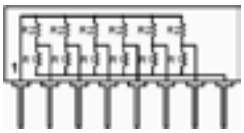
Configuration No. A



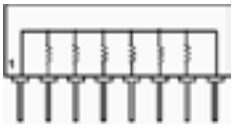
Configuration No. B



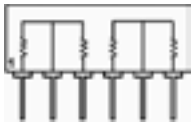
Configuration No. C



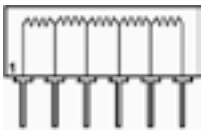
Configuration No. D



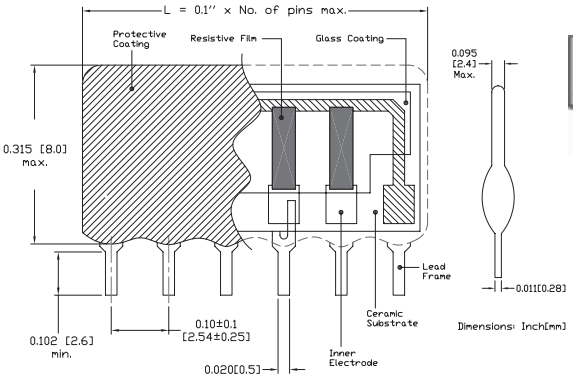
Configuration No. E

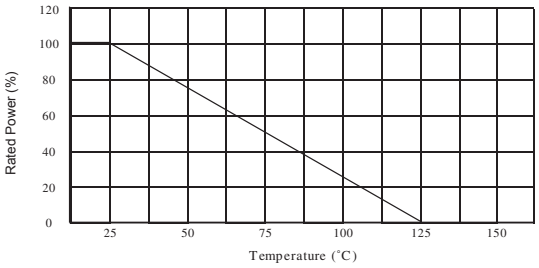


Configuration No. F



Dimensions and Construction





Ordering Code / Information

YSN	04	A	-	1000	-	F	A3	-	E

Type	Number of Pins	Configuration Type	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/ C)
			Resistors	3-Digit for 5% 4-Digit for 1%	E24 Series 2.2Ω=2R2 100Ω=101			
Thick Film SIP Networks	04 - 4 Pins 06 - 6 Pins 07 - 7 Pins 08 - 8 Pins 09 - 9 Pins 10 - 10 Pins 12 - 12 Pins	A - Refer to Diagram B - Refer to Diagram C - Refer to Diagram D- Refer to Diagram E - Refer to Diagram F - Refer to Diagram				F = ±1% G = ±2% J = ±5%	A3 = Ammo Pack 3 Pin Taping	E = ±50 F = ±100 (Leave Blank if Standard)

Application and Ratings

Product Type	Single Resistor Power Rating			Package Power Rating							Max Working Voltage
	Config. A,C,D,E,F	Config. B	Config. C	4-Pins	6-Pins	7-Pins	8-Pins	9-Pins	10-Pins	12-Pins	
YSN	0.3W	0.5W	0.17W	1W	1.5W	1.75W	2W	2.25W	2.5W	3W	200V

Standard Values - For Configuration A, B, D, E, F

Available in E-24 series.
Resistance Range: 10Ω - 3MΩ (Preferred values in bold)
10, 11, **12**, 13, **15**, 16, **18**, 29, **22**, 24, **27**, 30, **33**, 36, **39**, 43, **47**, 51, **56**, 62, **68**, 75, **82**, 91

Standard Values - For Configuration C, Dual Terminator (R_1 / R_2)

81Ω/130Ω	160Ω/260Ω	220Ω/270Ω	330Ω/470Ω
120Ω/195Ω	162Ω/260Ω	220Ω/330Ω	330Ω/680Ω
121Ω/195Ω	180Ω/390Ω	330Ω/390Ω	3.0KΩ/6.2KΩ

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±0.25%		350°C , 5 seconds
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	

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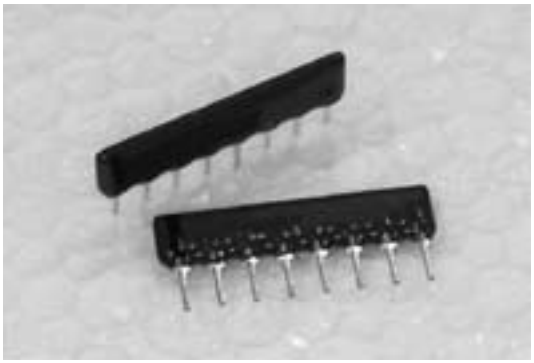
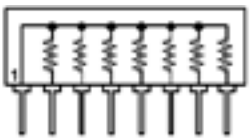


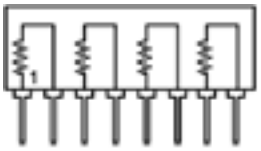
Features

- Thin film process
- High power rating up to 3 Watts in 2512 size
- Precise tolerance down to ±0.5%
- Extremely low TCR down to ±50 PPM/˚C
- Resistance values from 50m to 1ohm
- High purity alumina substrate for high power dissipation

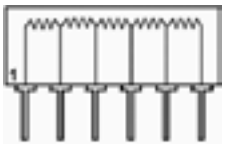
Configuration No. A



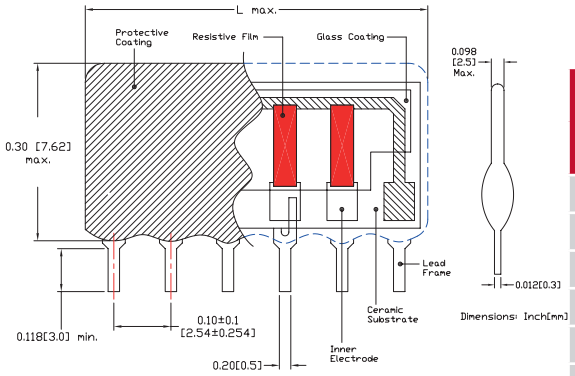
Configuration No. B



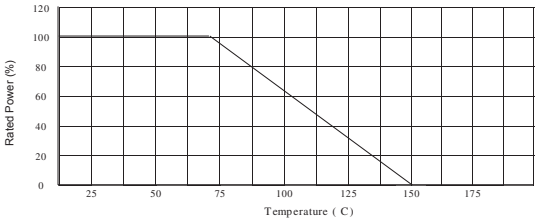
Configuration No. C



Dimensions and Construction



Number of Pins	Dimension 'L'
	Inch (Millimeters)
5	0.550 (14.0)
6	0.650 (16.5)
7	0.750 (19.0)
8	0.850 (21.6)
9	0.950 (24.1)
10	1.050 (26.7)



Ordering Code / Information

LSN	05	A	-	1000	-	F	A3	-	E

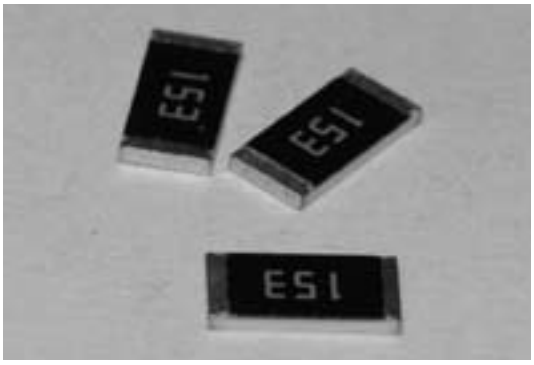
Type	Number of Pins	Configuration Type	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
Precision Thin Film SIP Networks	05 - 5 Pins 06 - 6 Pins 07 - 7 Pins 08 - 8 Pins 09 - 9 Pins 10 - 10 Pins	A - Refer to Diagram B - Refer to Diagram C - Refer to Diagram	Resistors	4-Digit for 1%	E192 & E96 Series 2.2Ω=2R2 100Ω=101	B = ±0.1% C = ±0.25% D = ±0.5% F = ±1%	A3 = Ammo Pack 3 Pin Taping	A = ±5 B = ±10 C = ±15 D = ±25 E = ±50

Application and Ratings

Resistance Range			
Configuration Type	Resistance Range		
	15ppm/°C	25ppm/°C	50ppm/°C
A	1KΩ - 10KΩ	100Ω - 30KΩ	50Ω - 50KΩ
B	1KΩ - 30KΩ	100Ω - 75KΩ	50Ω - 100KΩ

Power Ratings									
Configuration Type	Single Resistor	Package Power						Max working voltage	Operating Temp
		5-Pins	6-Pins	7-Pins	8-Pins	9-Pins	10-Pins		
A	0.12W	0.4W	0.5W	0.6W	0.7W	0.8W	0.9W	100V	-55^{0} to +150^{0}C
B	0.15W	-	0.3W	-	0.4W	-	0.5W		

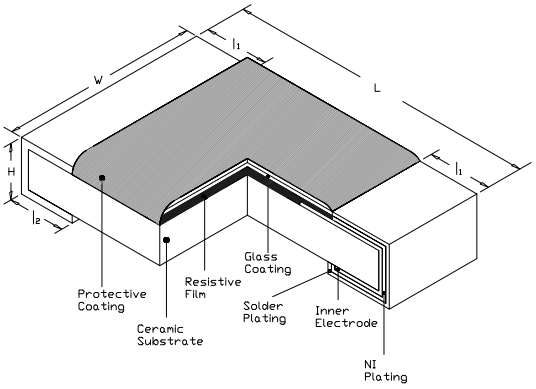
Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/+125°C
Short Time Overload	±0.1%	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±0.1%	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±0.25%	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±0.25%	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle

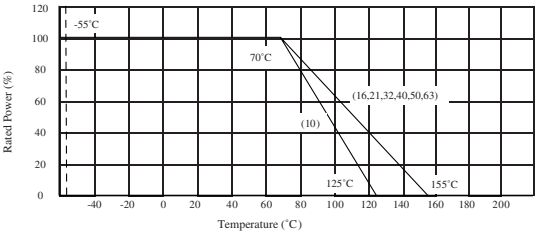


Features

- Excellent anti-sulphuration characteristics due to usage of high sulphuration-proof inner top electrode material
- Excellent heat resistance and moisture resistance ensured
- Greater reliability and stability in sulphur-rich environments compared to standard products
- Suitable for both flow and reflow soldering

Dimensions and Construction





Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
SAS10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.014 ± 0.002 (0.35 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
SAS16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
SAS21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.15)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.016 ± 0.008 (0.40 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
SAS32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.006 (1.60 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.010 (0.50 ± 0.25)
SAS40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
SAS50 2010 (5025)	0.200 ± 0.006 (5.00 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
SAS63 2512 (6432)	0.250 ± 0.006 (6.30 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)

Ordering Code / Information

SAS	10	-	XXXX	-	F	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
Anti-Sulphur Thick Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	D = ±0.5% F = ±1% G = ±2% J = ±5% Z = Zero Ohm	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free Y = 20,000 pcs Lead Free
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002 0.1Ω = R100		
		Jumper	000 - 5% 0000 - 1%			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%)	Resistance Range E-24 G(±2%), J(±5%)	Jumper Rated Current	Jumper Resistance Value	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
SAS10 0402 (1005)	1/16W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	1A	< 0.05Ω for 5% < 0.02Ω for 1%	50V	100V	-55°C to +125°C
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS16 0603 (1608)	1/10W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	2A				-55°C to +155°C
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS21 0805 (2012)	1/8W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ			150V	300V	
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS32 1206 (3216)	1/4W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ			200V	400V	
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS40 1210 (3225)	1/3W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS50 2010 (5025)	3/4W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					
SAS63 2512 (6432)	1W	±50	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ	3A				
		±100	10Ω ≤ R < 1MΩ	10Ω ≤ R < 1MΩ					
		±200	0.1Ω ≤ R < 10Ω	0.1Ω ≤ R < 10Ω					
			1MΩ ≤ R ≤ 10MΩ	1MΩ ≤ R ≤ 10MΩ					

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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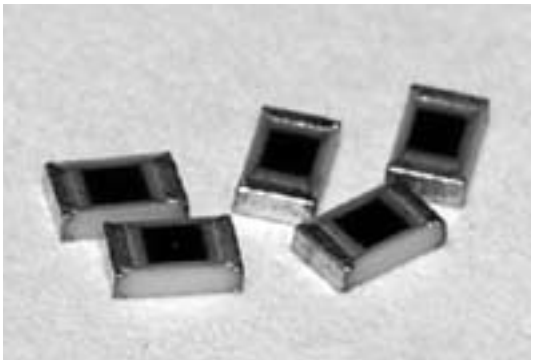
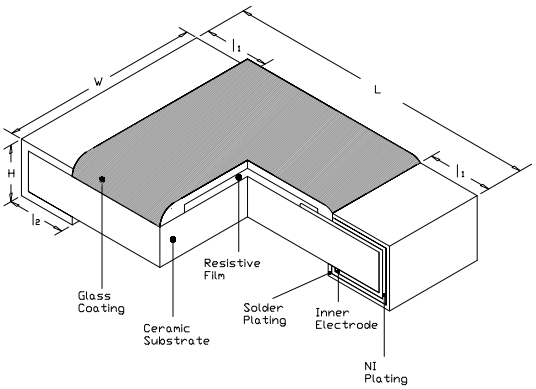


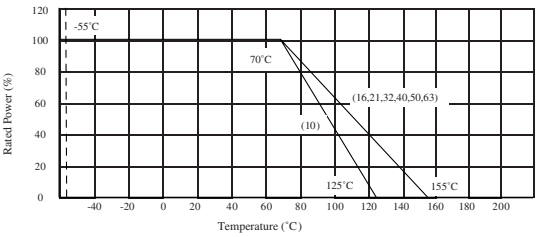
Features

- Suitable for laser fine tune
- Highly reliable multilayer electrode construction

Dimensions and Construction



Type	Dimensions				
	Inches (Millimeters)				
	L	W	H	I_1	I_2
TR10 0402 (1005)	0.040 ± 0.004 (1.00 ± 0.10)	0.020 ± 0.002 (0.50 ± 0.05)	0.014 ± 0.002 (0.35 ± 0.05)	0.008 ± 0.004 (0.20 ± 0.10)	0.010 ± 0.004 (0.25 ± 0.10)
TR16 0603 (1608)	0.063 ± 0.004 (1.60 ± 0.10)	0.031 ± 0.004 (0.80 ± 0.10)	0.018 ± 0.004 (0.45 ± 0.10)	0.012 ± 0.008 (0.30 ± 0.20)	0.012 ± 0.008 (0.30 ± 0.20)
TR21 0805 (2012)	0.079 ± 0.006 (2.00 ± 0.15)	0.049 ± 0.004 (1.25 ± 0.10)	0.020 ± 0.004 (0.50 ± 0.10)	0.016 ± 0.008 (0.40 ± 0.20)	0.016 ± 0.008 (0.40 ± 0.20)
TR32 1206 (3216)	0.122 ± 0.004 (3.10 ± 0.10)	0.063 ± 0.006 (1.60 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.020 ± 0.010 (0.50 ± 0.25)
TR40 1210 (3225)	0.122 ± 0.004 (3.10 ± 0.10)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.020 ± 0.010 (0.50 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
TR50 2010 (5025)	0.200 ± 0.006 (5.00 ± 0.15)	0.098 ± 0.006 (2.50 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)
TR63 2512 (6432)	0.250 ± 0.006 (6.30 ± 0.15)	0.126 ± 0.006 (3.20 ± 0.15)	0.022 ± 0.002 (0.55 ± 0.05)	0.024 ± 0.010 (0.60 ± 0.25)	0.016 ± 0.008 (0.40 ± 0.20)



Ordering Code / Information

TR	10	-	XXX	-	N	K

Type	Size (Inch / mm)	Nominal Resistance			Resistance Tolerance	Packaging
		Resistors	3-Digit	E24 Series		
Trimmable Thick Film Chip Resistors	10 (0402/1005) 16 (0603/1608) 21 (0805/2012) 32 (1206/3216) 40 (1210/3225) 50 (2010/5025) 63 (2512/6432)			2.2Ω=2R2 100Ω=101	N = 0 ~ -30% M = 0 ~ -15% K = ±10% L = ±15%	E = 4,000 pcs Lead Free L = 5,000 pcs Lead Free K = 10,000 pcs Lead Free

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 N(0~-30%), M(0~-15%) K(±10%), L(±15%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
TR10 0402 (1005)	1/16W	±100	10Ω ≤ R < 1MΩ	50V	100V	-55°C to +125°C
		±200	1MΩ ≤ R < 10MΩ			
TR16 0603 (1608)	1/10W	±100	10Ω ≤ R < 1MΩ			-55°C to +155°C
		±200	1MΩ ≤ R < 10MΩ			
TR21 0805 (2012)	1/8W	±100	10Ω ≤ R < 1MΩ	150V	300V	
		±200	1MΩ ≤ R < 10MΩ			
TR32 1206 (3216)	1/4W	±100	10Ω ≤ R < 1MΩ	200V	400V	
		±200	1MΩ ≤ R < 10MΩ			
TR40 1210 (3225)	1/3W	±100	10Ω ≤ R < 1MΩ			
		±200	1MΩ ≤ R < 10MΩ			
TR50 2010 (5025)	3/4W	±100	10Ω ≤ R < 1MΩ			
		±200	1MΩ ≤ R < 10MΩ			
TR63 2512 (6432)	1W	±100	10Ω ≤ R < 1MΩ			
		±200	1MΩ ≤ R < 10MΩ			

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	± 0.5%	For 1% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
	±1.0%	For 2% & 5% tolerance	
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1% tolerance	260°C ± 5°C, 10 seconds ± 1 second
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	
Moisture Resistance	±(1%+0.1Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
	±(2.0%+0.1Ω)	For 2% & 5% tolerance	
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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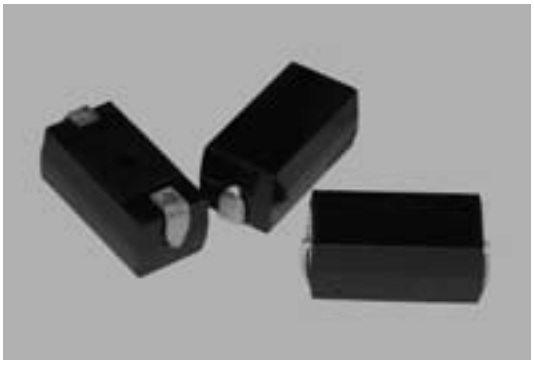
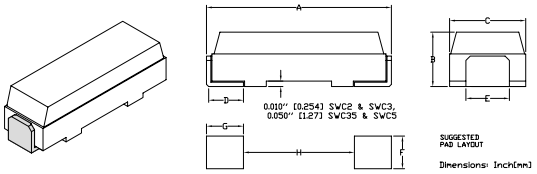


Features

- Large terminals and optimized body shape for power dissipation
- Extremely precise tolerance (±0.01%), Low Temperature Coefficient of Resistance of ±30ppm
- Widely used in applications where surge voltages or insurge currents are present

Dimensions and Construction



Derating Information

1. Standard SWC1/2 to SWC5 are derated by 0.67%/°C when ambient temperature exceeds 25°C.
2. Low Profile parts SWC1/2L to SWC2SSL are derated by 0.95%/°C above 70°C.

Standard Models

Type	Dimensions							
	Inches (Millimeters)							
	A	B (Max)	C	D (Min)	E	F	G	H
SWC1/2 (1/2W)	0.204 ± 0.02 (5.2 ± 0.5)	0.111 (2.82)	0.125 ± 0.01 (3.2 ± 0.25)	0.025 (0.63)	0.045 ± 0.015 (1.14 ± 0.4)	0.08 (2.0)	0.1 (2.5)	0.08 (2.0)
SWC1 (1W)	0.258 ± 0.02 (6.55 ± 0.5)	0.125 (3.17)	0.15 ± 0.015 (3.8 ± 0.4)	0.032 (0.8)	0.06 ± 0.015 (1.15 ± 0.4)	0.1 (2.5)	0.125 (3.2)	0.12 (3.0)
SWC2 (2W)	0.449 ± 0.032 (11.4 ± 0.8)	0.208 (5.28)	0.225 ± 0.015 (5.7 ± 0.4)	0.06 (1.5)	0.07 ± 0.02 (1.78 ± 0.5)	0.16 (4.0)	0.157 (4.0)	0.2 (5.0)
SWC2SS (2W)	0.297 ± 0.02 (7.5 ± 0.5)	0.165 (4.19)	0.15 ± 0.015 (3.8 ± 0.4)	0.044 (1.1)	0.05 ± 0.016 (1.27 ± 0.4)	0.1 (2.5)	0.125 (3.2)	0.14 (3.6)
SWC27 (2.7W)	0.48 ± 0.032 (12.2 ± 0.8)	0.23 (5.84)	0.228 ± 0.016 (5.8 ± 0.4)	0.05 (1.27)	0.07 ± 0.02 (1.78 ± 0.5)	0.16 (4.0)	0.18 (4.57)	0.2 (5.0)
SWC3 (3W)	0.625 ± 0.032 (15.9 ± 0.8)	0.27 (6.86)	0.275 ± 0.015 (7 ± 0.38)	0.05 (1.27)	0.085 ± 0.016 (2.16 ± 0.4)	0.16 (4.0)	0.175 (4.5)	0.4 (10.0)
SWC35 (3.5W)	0.811 ± 0.020 (20.6 ± 0.5)	0.295 (7.49)	0.273 ± 0.02 (6.9 ± 0.5)	0.063 (1.6)	0.102 ± 0.028 (2.6 ± 0.7)	0.2 (5.0)	0.2 (5.0)	0.6 (15.0)
SWC5 (5W)	0.811 ± 0.02 (20.6 ± 0.5)	0.295 (7.49)	0.273 ± 0.02 (6.9 ± 0.5)	0.063 (1.6)	0.102 ± 0.028 (2.6 ± 0.7)	0.2 (5.0)	0.25 (6.4)	0.6 (15.0)

Low Profile Metal Plate Models

Type	Dimensions							
	Inches (Millimeters)							
	A	B (Max)	C	D (Min)	E (Minimum)	F	G	H
SWC1/2L (1/2W)	0.2 ± 0.012 (5.1 ± 0.3)	0.053 (1.35)	0.1 ± 0.01 (2.54 ± 0.25)	0.025 (0.63)	0.06 (1.5)	0.08 (2.0)	0.1 (2.5)	0.08 (2.0)
SWC1L (1W)	0.25 ± 0.012 (6.3 ± 0.3)	0.057 (1.45)	0.126 ± 0.012 (3.2 ± 0.3)	0.025 (0.63)	0.07 (1.8)	0.15 (3.8)	0.125 (3.2)	0.12 (3.0)
SWC2L (2W)	0.33 ± 0.012 (8.38 ± 0.3)	0.057 (1.45)	0.157 ± 0.012 (4.0 ± 0.3)	0.032 (0.8)	0.1 (2.5)	0.197 (5.0)	0.157 (4.0)	0.157 (4.0)
SWC2SSL (2W)	0.25 ± 0.012 (6.3 ± 0.3)	0.079 (2.0)	0.126 ± 0.012 (3.2 ± 0.3)	0.032 (0.8)	0.08 (0.2)	0.15 (3.8)	0.125 (3.2)	0.12 (0.3)

Ordering Code / Information

SWC	1/2	L	-	XXXX	-	F	TR	-	F

Type	Power Rating	Option	Nominal Resistance			Resistance Tolerance	Packaging	T.C.R (ppm/°C)
SMD WireWound Resistors (Chip Type)	1/2 - 1/2W 1 - 1W 2 - 2W 2SS - 2W 27 - 2.7W 3 - 3W 35 - 3.5W 5 - 5W	X = Non Inductive P = Increased Pulse Capability M = Power Metal Film Element L = Low Profile Non-Inductive Metal Plate Design E = Low Thermal EMF Design (Leave blank if standard) (Refer to Application Notes)	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	T = ±0.01% Q = ±0.02% A = ±0.05% B = ±0.1% C = ±0.25% D = ±0.5% F = ±1% G = ±2% J = ±5%	TR	A = ± 5 B = ± 10 20 = ± 20 D = ± 25 30 = ± 30 E = ± 50 F = ± 100 G = ± 200 (Leave Blank if Standard)
				4-Digit	E96, E192 Series 10.2Ω=10R2 10KΩ=1002			
				5-Digit	Resistance values below 0.001Ω 0.0005Ω=R0005			

Application and Ratings

Product Type	Power Rating	WireWound & Option L Metal Plate			Option M Film Element			Operating Temperature Range
		T.C.R (ppm/°C) Max (Standard parts power rated @ 25°C, Low Profile parts power rated @ 70°C)	Resistance Range E-192, E-96, E-24 T(±0.01%), Q(±0.02%), A(±0.05%), B(±0.1%), C(±0.25%), D(±0.5%), F(±1%), G(±2%), J(±5%)	Max Working Voltage	T.C.R (ppm/°C) Max	Resistance Range E-192, E-96, E-24 C(± 0.25%), D(± 0.5%), F(± 1%), G(± 2%), J(± 5%)	Max Working Voltage	
SWC1/2	1/2W	0.0005Ω ≤ X < 0.025Ω (±400) 0.025Ω ≤ X < 0.05Ω (±300) 0.05Ω ≤ X < 0.1Ω (±200) 0.1Ω ≤ X < 1Ω (±90) 1Ω ≤ X < 10Ω (±50) > 10Ω (±30)	0.01Ω - 2KΩ	33V	0.1Ω ≤ X < 1Ω (±350) 1Ω ≤ X < 10Ω (±200) > 10Ω (±100)	5Ω - 1MΩ	33V	-55°C to +175°C
SWC1	1W		0.001Ω - 10KΩ	58V		0.1Ω - 1MΩ	58V	
SWC2	2W		0.002Ω - 25KΩ	120V		0.1Ω - 1MΩ	120V	
SWC2SS	2W		0.1Ω - 200Ω	80V		1Ω - 1MΩ	80V	
SWC27	2.7W		0.005Ω - 20KΩ	180V		1Ω - 1MΩ	180V	
SWC3	3W		0.005Ω - 25KΩ	200V		1Ω - 1MΩ	200V	
SWC35	3.5W		0.005Ω - 50KΩ	250V		1Ω - 1MΩ	250V	
SWC5	5W		0.005Ω - 100kΩ	300V		-	300V	
SWC1/2L	1/2W		0.003Ω - 0.05Ω	√(P*R)		-	-	
SWC1L	1W		0.001Ω - 0.1Ω	√(P*R)		-	-	
SWC2L	2W		0.002Ω - 0.2Ω	√(P*R)		-	-	
SWC2SSL	2W		0.0005Ω - 0.005Ω	√(P*R)		-	-	

Temperature Coefficient of Resistance	Standard WireWound Type / Option L (Low Profile Non-Inductive Metal Plate Design)		Option M (Power Metal Film Element)	
Resistance Value	Standard (ppm/°C)	Optional (ppm/°C)	Standard (ppm/°C)	Optional (ppm/°C)
0.0005Ω - 0.024Ω	400	100, 200	-	-
0.025Ω - 0.049Ω	300	100, 200	-	-
0.050Ω - 0.099Ω	200	50, 100	-	-
0.1Ω - 0.99Ω	90	20, 30, 50	350	200
1Ω - 9.9Ω	50	10, 20, 30	200	100
10Ω & above	30	5, 10, 20	100	25, 50

Application Notes:

1. **Power Rating**: Resistors may be operated up to full rated power with consideration of mounting density, pad and trace geometery, PCB material, and ambient temperature. Standard parts should be derated (Power & Voltage) by 0.67%/°C when ambient temperature exceeds 25°C. Low Profile models should be derated by 1%/°C above 70°C.
2. **Inductance**: Standard wirewound parts' inductance are typically 1uH to 20uH. For Option X (Non Inductive design), the inductance for resistance ≤ 50Ω is 0.2uH maximum, and 0.37uH for resistance > 50Ω. Option L (Low Profile Non-Inductive Metal Plate Design) and Option M (Power Metal Film Element) are inherently low inductance (Typically 1nH to 10nH). Consult factory for more information.
3. **Pulse Capability**: Standard SWC series (WireWound) and Option L (Low Profile Non-Inductive Metal Plate Design) offer excellent overload capability, greatly exceeding that of film resistors. The overload level can often be economically enhanced by a factor of 50% or more via selecting Option P (Increased Pulse Capability). Pulse capability is highly dependent on size and resistance (available up to 50 Joules). Consult factory for more information.

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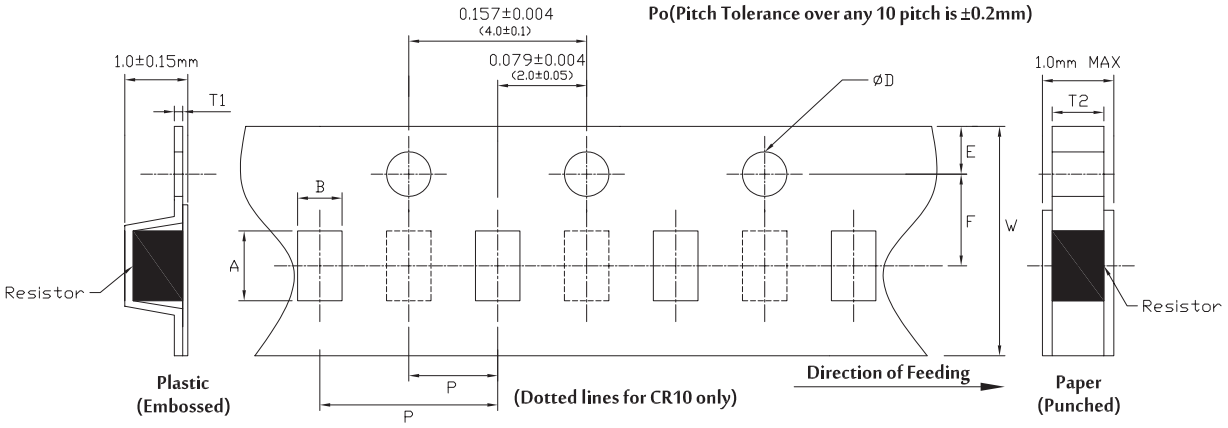
Tape Dimensions



Chip Resistors

	Inches (Millimeters)				
Dimensions	A	B	W	E	F
Chip Resistor 05 0201 (0603)	0.015 ± 0.002 (0.38 ± 0.05)	0.027 ± 0.002 (0.68 ± 0.05)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 10 0402 (1005)	0.045 ± 0.004 (1.15 ± 0.10)	0.026 ± 0.004 (0.65 ± 0.10)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 16 0603 (1608)	0.075 ± 0.004 (1.90 ± 0.10)	0.043 ± 0.004 (1.10 ± 0.10)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 21 0805 (2012)	0.094 ± 0.004 (2.40 ± 0.10)	0.065 ± 0.004 (1.65 ± 0.10)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 32 1206 (3216)	0.138 ± 0.004 (3.50 ± 0.10)	0.075 ± 0.004 (1.90 ± 0.10)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 40 1210 (3225)	0.138 ± 0.004 (3.50 ± 0.10)	0.110 ± 0.004 (2.80 ± 0.10)	0.315 ± 0.008 (8.00 ± 0.20)	0.069 ± 0.004 (1.75 ± 0.10)	0.138 ± 0.002 (3.50 ± 0.05)
Chip Resistor 50 2010 (5025)	0.213 ± 0.008 (5.40 ± 0.20)	0.114 ± 0.008 (2.90 ± 0.20)	0.472 ± 0.004 (12.0 ± 0.10)	0.069 ± 0.004 (1.75 ± 0.10)	0.217 ± 0.002 (5.50 ± 0.05)
Chip Resistor 63 2512 (6432)	0.272 ± 0.008 (6.60 ± 0.20)	0.142 ± 0.008 (3.60 ± 0.20)	0.472 ± 0.004 (12.0 ± 0.10)	0.069 ± 0.004 (1.75 ± 0.10)	0.217 ± 0.002 (5.50 ± 0.05)

	Inches (Millimeters)			
Dimensions	T1	T2	P	D
Chip Resistor 05 0201 (0402)	-	0.012 ± 0.004 (0.31 ± 0.10)	0.079 ± 0.002 (2.00 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 10 0402 (1005)	-	0.018 ± 0.004 (0.45 ± 0.10)	0.079 ± 0.002 (2.00 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 16 0603 (1608)	-	0.024 ± 0.004 (0.60 ± 0.10)	0.157 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 21 0805 (2012)	-	0.030 ± 0.004 (0.75 ± 0.10)	0.157 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 32 1206 (3216)	-	0.030 ± 0.004 (0.75 ± 0.10)	0.157 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 40 1210 (3225)	-	0.030 ± 0.004 (0.75 ± 0.10)	0.157 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 50 2010 (5025)	0.008 ± 0.004 (0.20 ± 0.10)	-	0.157 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)
Chip Resistor 63 2512 (6432)	0.008 ± 0.004 (0.20 ± 0.10)	-	0.315 ± 0.004 (4.00 ± 0.10)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)

Array & Networks

Inches (Millimeters)						
Dimensions	A	B	W	E	F	P1
YCN052 0201 X 2	0.028 ± 0.004 (0.7 ± 0.1)	0.035 ± 0.004 (0.9 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.079 ± 0.004 (2.0 ± 0.1)
YCN102 0402 X 2	0.047 ± 0.004 (1.2 ± 0.1)	0.047 ± 0.004 (1.2 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.079 ± 0.004 (2.0 ± 0.1)
YCN104 0402 X 4	0.047 ± 0.004 (1.2 ± 0.1)	0.087 ± 0.004 (2.2 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.079 ± 0.004 (2.0 ± 0.1)
YCN108 0402 X 8	0.075 ± 0.008 (1.9 ± 0.2)	0.169 ± 0.008 (4.3 ± 0.2)	0.472 ± 0.008 (12.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)
YCN162 0603 X 2	0.075 ± 0.004 (1.9 ± 0.1)	0.075 ± 0.004 (1.9 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)
YCN164 0603 X 4	0.075 ± 0.004 (1.9 ± 0.1)	0.136 ± 0.004 (3.45 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)
YCN158 0612 (1632)	0.079 ± 0.004 (2.0 ± 0.1)	0.138 ± 0.004 (3.5 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)
YCN358 1225 (3264)	0.138 ± 0.008 (3.5 ± 0.2)	0.264 ± 0.008 (6.7 ± 0.2)	0.472 ± 0.008 (12.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)
LCN164 0603 X 4	0.079 ± 0.004 (2.0 ± 0.1)	0.138 ± 0.004 (3.5 ± 0.1)	0.315 ± 0.008 (8.0 ± 0.2)	0.069 ± 0.004 (1.75 ± 0.1)	0.138 ± 0.002 (3.5 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)

Inches (Millimeters)					
Dimensions	P2	P0	D0	T2	T
YCN052 0201 X 2	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.018^{\pm 0.008}_{-0}$ ($0.45^{+0.2}_{-0}$)	0.017 ± 0.004 (0.43 ± 0.1)
YCN102 0402 X 2	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.018^{\pm 0.008}_{-0}$ ($0.45^{+0.2}_{-0}$)	0.017 ± 0.004 (0.43 ± 0.1)
YCN104 0402 X 4	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.025^{\pm 0.008}_{-0}$ ($0.60^{+0.2}_{-0}$)	0.024 ± 0.004 (0.6 ± 0.1)
YCN108 0402 X 8	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.025^{\pm 0.008}_{-0}$ ($0.60^{+0.2}_{-0}$)	0.024 ± 0.004 (0.6 ± 0.1)
YCN162 0603 X 2	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.025^{\pm 0.008}_{-0}$ ($0.60^{+0.2}_{-0}$)	0.024 ± 0.004 (0.6 ± 0.1)
YCN164 0603 X 4	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.002 (4.0 ± 0.05)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.03^{\pm 0.008}_{-0}$ ($0.75^{+0.2}_{-0}$)	0.030 ± 0.004 (0.75 ± 0.1)
YCN158 0612 (1632)	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	$0.033^{\pm 0.004}_{-0}$ ($0.85^{+0.10}_{-0}$)	-
YCN358 1225 (3264)	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-1}$)	-	-
LCN164 0603 X 4	0.079 ± 0.002 (2.0 ± 0.05)	0.157 ± 0.004 (4.0 ± 0.1)	$0.059^{\pm 0.004}_{-0}$ ($1.5^{+0.10}_{-0}$)	$0.033^{\pm 0.004}_{-0}$ ($0.85^{+0.10}_{-0}$)	-

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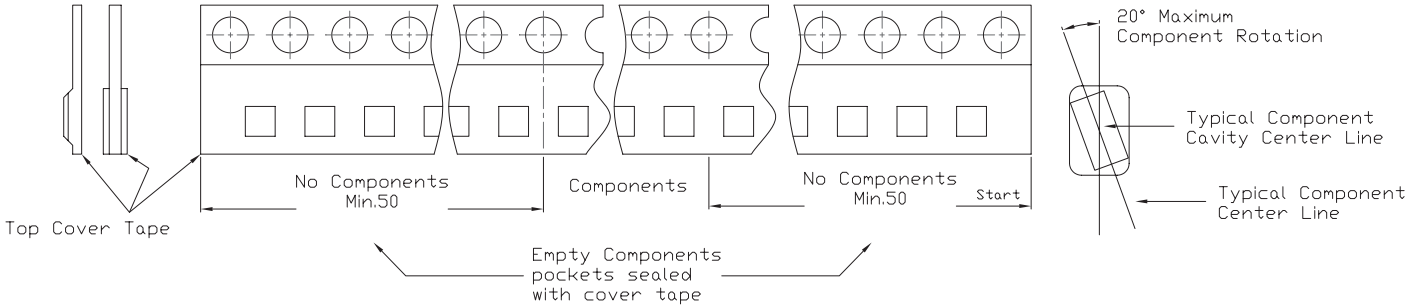
Specialty

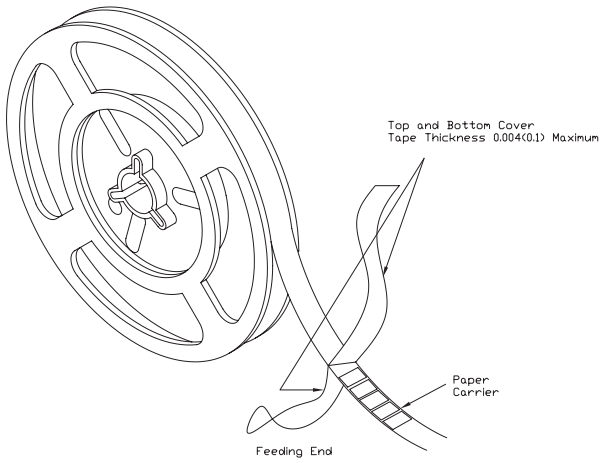
SIP Network Taping : Packaging code = A3 (Ammo Pack 3 Pin Taping)
SIP with 4 or 5 pins have pins 2-4 taped. SIP with 6 or 7 pins have pins 3-5 taped. SIP with 8, 9 or 10 pins have pins 4-6 taped

*Packing quantity varies with size of part and order, consult factory for detailed information

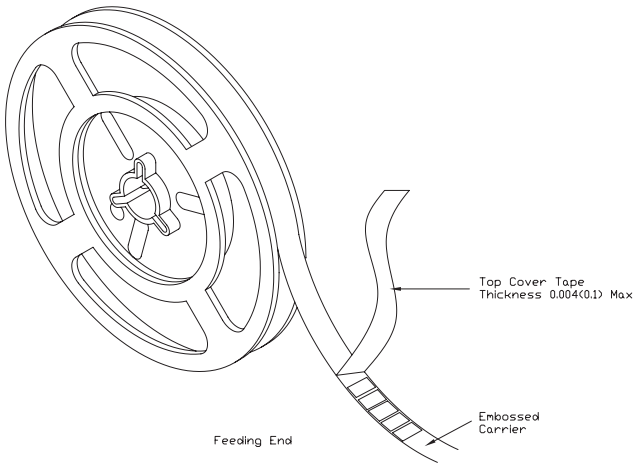
Tape Packing



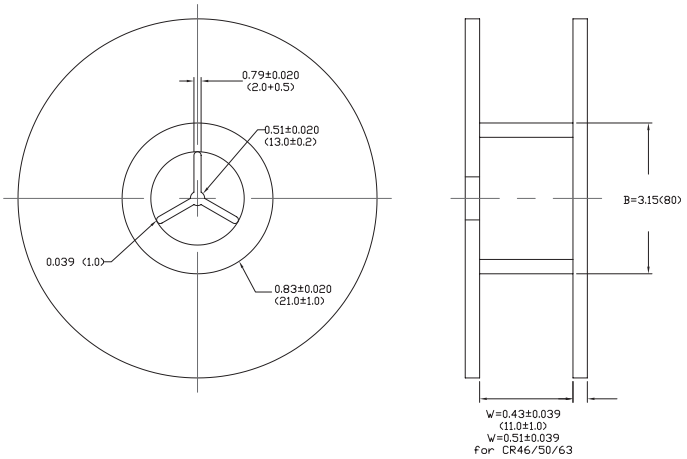
Paper Carrier



Embossed Plastic Carrier



Reel Dimensions



Packing Quantity

Thick Film Chip Resistors

Reels (Diameter A)	Component / Reel				
	Paper Carrier			Embossed Plastic Carrier	
	Chip Resistor 03,05	Chip Resistor 10	Chip Resistor 16/21/32/40	CLS 32/50/63	Chip Resistor 50/63
7" (178 ± 2.0mm)	20,000	10,000	5,000	2,000	4,000
			5,000	-	
10" (254 ± 2.0mm)	-	-	10,000	-	-
13" (330 ± 2.0mm)	-	50,000	20,000	-	10,000

Packing Quantity

Array & Networks

Reels (Diameter A)	Component / Reel	
	Paper Carrier	
	YCN052 / YCN102 / YCN104 (2mm Pitch)	YCN108 / YCN162 / YCN164 (4mm Pitch)
7" (178 ± 2.0mm)	10,000	5,000
10" (254 ± 2.0mm)	20,000	10,000
13" (330 ± 2.0mm)	30,000	15,000

**Tape width for YCN052 / YCN102 / YCN104 / YCN162 / YCN164 is 8mm, and tape width for YCN 108 is 12mm*

Packing Quantity

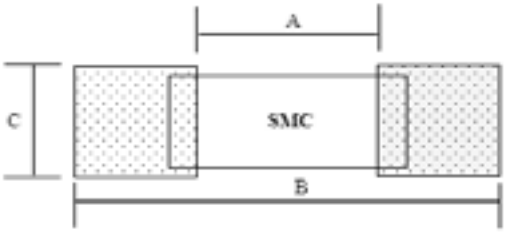
Specialty

Series	Power Rating	Tape & Reel Type / Dimensions			Packing Qty (pcs)
		Tape Type	Tape Width	Reel size	
SWC1/2	1/2W	Embossed Plastic	12mm	13"	2,500 / 5,000
SWC1	1W	Embossed Plastic	12mm	13"	2,500
SWC2	2W	Embossed Plastic	24mm	13"	1,000
SWC2SS	2W	Embossed Plastic	16mm	13"	2,000
SWC27	2.7W	Embossed Plastic	24mm	13"	1,000
SWC3	3W	Embossed Plastic	32mm	13"	800
SWC35	3.5W	Embossed Plastic	44mm	13"	750
SWC5	5W	Embossed Plastic	44mm	13"	750
SWC1/2L	1/2W	Embossed Plastic	12mm	13"	2,500 / 5,000
SWC1L	1W	Embossed Plastic	12mm	13"	3,000
SWC2L	2W	Embossed Plastic	24mm	13"	2,000
SWC2SSL	2W	Embossed Plastic	12mm	13"	2,000

Above information serves as a standard Tape & Reel selection guide for user. Specifications to change without notice.

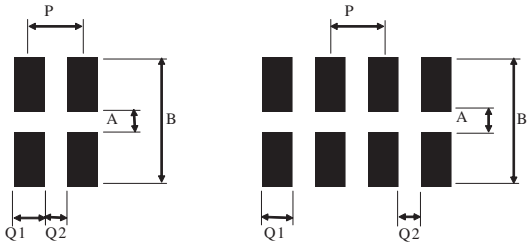
Consult factory for detailed information before ordering

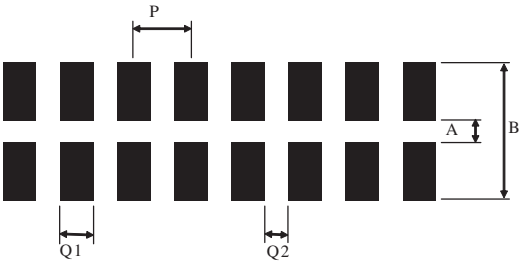
Soldering Pad Dimensions for Chip Resistors



Product (Type)	Land Dimensions - Inches (mm)		
	A	B	C
Chip Resistor 05 (0201)	0.012 (0.3)	0.04 (1.0)	0.016 (0.4)
Chip Resistor 10 (0402)	0.20 (0.5)	0.059 (1.5)	0.020~0.024 (0.5~0.6)
Chip Resistor 16 (0603)	0.039 (1.0)	0.106 (2.7)	0.020~0.035 (0.5~0.9)
Chip Resistor 21 (0805)	0.047 (1.2)	0.138 (3.5)	0.043~0.051 (1.1~1.3)
Chip Resistor 32 (1206)	0.087 (2.2)	0.197 (5.0)	0.055~0.071 (1.4~1.8)
Chip Resistor 40 (1210)	0.087 (2.2)	0.197 (5.0)	0.083~0.118 (2.1~3.0)
Chip Resistor 50 (2010)	0.15 (3.9)	0.331 (8.4)	0.083~0.118 (2.1~3.0)
Chip Resistor 63 (2512)	0.205 (5.2)	0.413 (10.5)	0.098~0.189 (2.5~4.8)

Soldering Pad Dimensions for Chip Array & Networks

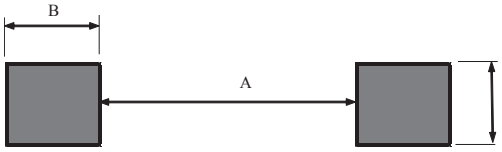




Product (Type)	Land Dimensions - Inches (mm)				
	A	B	P	Q1	Q2
YCN052	0.012 (0.3)	0.035 (0.9)	0.02 (0.5)	0.012 (0.3)	0.012 (0.3)
YCN102	0.02 (0.5)	0.079 (2.0)	0.026 (0.67)	0.013 (0.33)	0.013 (0.34)
YCN162	0.039 (1.0)	0.102 (2.6)	0.031 (0.8)	0.016 (0.4)	0.016 (0.4)
YCN104	0.02 (0.5)	0.079 (2.0)	0.02 (0.5)	0.011 (0.28)	0.009 (0.22)
YCN164	0.039 (1.0)	0.102 (2.6)	0.031 (0.8)	0.016 (0.4)	0.016 (0.4)
YCN108	0.039 (1.0)	0.079 (2.0)	0.02 (0.5)	0.010 (0.25)	0.010 (0.25)

Product (Type)	Land Dimensions - Inches (mm)		
	A	B	C
SWC1/2	0.08 (2.0)	0.10 (2.5)	0.08 (2.0)
SWC1	0.12 (3.0)	0.125 (3.2)	0.10 (2.5)
SWC2	0.20 (5.0)	0.157 (4.0)	0.16 (4.0)
SWC2SS	0.14 (3.6)	0.125 (3.2)	0.10 (2.5)
SWC27	0.20 (5.0)	0.18 (4.57)	0.16 (4.0)
SWC3	0.40 (10.0)	0.175 (4.5)	0.16 (4.0)
SWC35	0.60 (15.0)	0.20 (5.0)	0.20 (5.0)
SWC5	0.60 (15.0)	0.25 (6.4)	0.25 (6.4)
SWC1/2L	0.08 (2.0)	0.10 (2.5)	0.08 (2.0)
SWC1L	0.12 (3.0)	0.125 (3.2)	0.15 (3.8)
SWC2L	0.157 (4.0)	0.157 (4.0)	0.197 (5.0)
SWC2SSL	0.12 (3.0)	0.125 (3.2)	0.15 (3.8)

Soldering Pad Dimensions for SMD Wirewound



NUMERIC NUMBERING (CHIP RESISTOR)

5% Tolerance: 3 digits (First 2 digits are significant figures, third digit is number of zeros. Letter R is decimal point).
* 4 digits alpha numeric marking for ultra low resistance chip resistor.

1R0	1.0 ohm
100	10 ohm
101	100 ohm

1% Tolerance: 4 digits (First 3 digits are significant figures, fourth digit is number zeros. Letter R is decimal point).

Examples

1R00	1.0 ohm
10R0	10.0 ohm
1000	100 ohm
1001	1K ohm

0603 1% E-96 MARKING

Code	R Value	Code	R Value	Code	R Value	Code	R Value	Code	R Value
01	100	21	162	40	255	59	402	78	634
02	102	22	165	41	261	60	412	79	649
03	105	23	169	42	267	61	422	80	665
04	107	24	174	43	274	62	432	81	681
05	110	25	178	44	280	63	442	82	698
06	113	26	182	45	287	64	453	83	715
07	115	27	187	46	294	65	464	84	732
08	118	28	191	47	301	66	475	85	750
09	121	29	196	48	309	67	487	86	768
10	124	30	200	49	316	68	499	87	787
11	127	31	205	50	324	69	511	88	806
12	130	32	210	51	332	70	523	89	825
13	133	33	215	52	340	71	536	90	845
14	137	34	221	53	348	72	549	91	866
15	140	35	226	54	357	73	562	92	887
16	143	36	232	55	365	74	576	93	909
17	147	37	237	56	374	75	590	94	931
18	150	38	243	57	383	76	604	95	953
19	154	39	249	58	392	77	619	96	976
20	158								

This table shows the first two digits for the three-digits E-96 part marking scheme. The third character is a letter multiplier:

Y=10^{-2} X=10^{-1} A=10^{0} B=10^{1} C=10^{2} D=10^{3} E=10^{4} F=10^{5}

Example:
1K = 01B ($100 \times 10^{1} = 1000$)
10K = 01C ($100 \times 10^{2} = 10000$)
100K = 01D

Marking for 0603 1% will be as per table above except for those resistance values available in E24 series and not in E96 series will be in three-digits (e.g. 12Ω = 120)

5% Marking

Value = 10K Ω

0603 (1608)

0805 (2012)

1206 (3216)

1210 (3225)

2010 (5025)

2512 (6432)

1% Marking

Value = 10K Ω

0805 (2012)

1206 (3216)

1210 (3225)

2010 (5025)

2512 (6432)

1% Marking

Value = 10K Ω

0603(1608)

E-96 Marking

No Marking

01005 (0402)

0201 (0603)

0402 (10005)

Marking Explanation

- 2%, 5% tolerance: 3 digits (First two digits are significant figures, third digit is number of zeros).

Letter R is decimal point
- 1% tolerance: 4 digits (First three digits are significant figures, fourth digit is number of zeros).

Letter R is decimal point
0603 1% : E-96 marking
0402 : No marking
Chip jumper resistor : Marking shall be 0

LEADED RESISTORS

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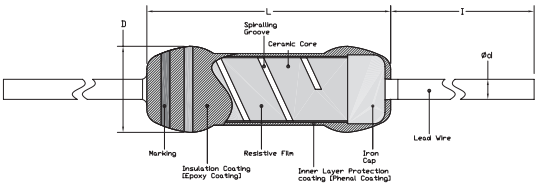
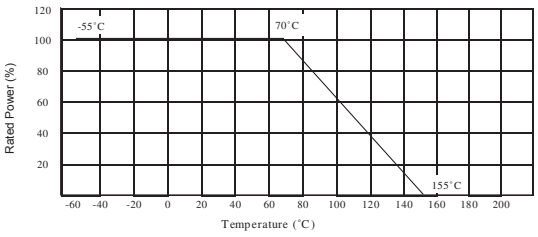
Features

- Available in tolerance 1%, 2% and 5%
- Miniature size series available
- Suitable for automatic machine insertion
- Products with lead free terminations meet EU RoHS and China RoHS requirements
- Resistors are coated with layers of blue color lacquer

Dimensions and Construction



Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
MF50 (1/6W)	0.134 ± 0.008 (3.40 ± 0.20)	0.075 ± 0.008 (1.90 ± 0.20)	1.102 ± 0.118 (28.00 ± 3.00)	0.018 ± 0.002 (0.45 ± 0.050
MF55SS (0.4W)				
MF55 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.012 (2.30 ± 0.30)		0.024 ± 0.002 (0.60 ± 0.05)
MF60SS (0.6W)				
MF60 (1/2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.130 ± 0.012 (3.30 ± 0.30)		
MF65 (1W / T52mm)	0.433 ± 0.040 (11.00 ± 1.00)	0.165 ± 0.020 (4.20 ± 0.50)	1.063 ± 0.118 (27.00 ± 3.00)	0.031 ± 0.002 (0.78 ± 0.05)
MF65 (1W / T73mm)			1.378 ± 0.118 (35.00 ± 3.00)	
MF70 (2W / T73mm)	0.0630 ± 0.040 (16.00 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.300 ± 0.118 (33.00 ± 3.00)	
MF75 (3W / T73mm)	0.670 ± 0.040 (17.00 ± 1.00)	0.236 ± 0.020 (6.00 ± 0.50)	1.378 ± 0.118 (35.00 ± 3.00)	



Ordering Code / Information

MF	50	-	XXXX	F	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
General Purpose Metal Film Resistor	50 55SS 55 60SS 60 65 70 75	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F =±1% G =±2% J =±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 = 1,000 pcs 2 = 2,000 pcs 3 = 3,000 pcs 5 = 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%), G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
MF50	1/6W	0.1Ω - 1Ω (±200 ppm) 1Ω - 10Ω (±100 ppm) 10Ω - 1MΩ (±50 ppm) 1MΩ - 2.8MΩ (±100 ppm) 2.8MΩ - 10MΩ (±150 ppm)	1Ω - 10MΩ	250V	500v	-55°C to +155°C
MF55	1/4W		0.1Ω - 10MΩ	300V	600V	
MF55SS	0.4W					
MF60	1/2W			350V	700V	
MF60SS	0.6W		0.1Ω - 1MΩ	300V	600V	
MF65 (T52mm)	1W		0.1Ω - 1MΩ	450V	900V	
MF65 (T73mm)	1W					
MF70 (T73mm)	2W		0.1Ω - 10MΩ	500V	1,000V	
MF75 (T73mm)	3W			600V		

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5%+0.05Ω)	For 1%, 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1%, 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(1%+0.05Ω)	For 1% , 2% & 5% tolerance resistor	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1%, 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle

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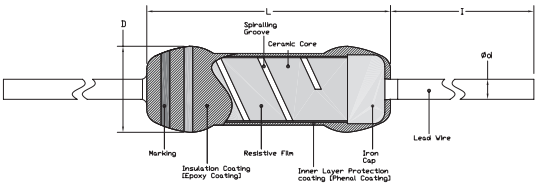
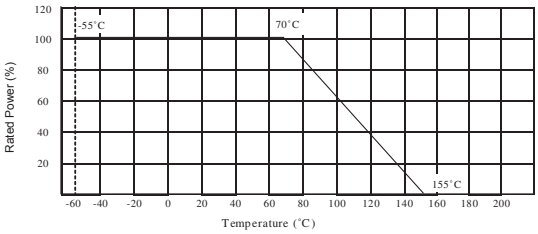
Features

- Available in tolerance 0.1% and 0.5%
- Miniature size series available
- Suitable for automatic machine insertion
- Products with lead free terminations meet EU RoHS and China RoHS requirements
- Resistors are coated with layers of blue color lacquer

Dimensions and Construction



Type (Power Rating)	Dimensions Inches (Millimeters)			
	L	D	I	d
MF50 (1/6W)	0.134 ± 0.008 (3.40 ± 0.20)	0.075 ± 0.008 (1.90 ± 0.20)	1.102 ± 0.118 (28.00 ± 3.00)	0.018 ± 0.002 (0.45 ± 0.050
MF55SS (0.4W)				
MF55 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.012 (2.30 ± 0.30)		0.024 ± 0.002 (0.60 ± 0.05)
MF60SS (0.6W)				
MF60 (1/2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.130 ± 0.012 (3.30 ± 0.30)		
MF65 (1W / T52mm)	0.433 ± 0.040 (11.00 ± 1.00)	0.165 ± 0.020 (4.20 ± 0.50)	1.063 ± 0.118 (27.00 ± 3.00)	0.031 ± 0.002 (0.78 ± 0.05)
MF65 (1W / T73mm)			1.378 ± 0.118 (35.00 ± 3.00)	
MF70 (2W / T73mm)	0.0630 ± 0.040 (16.00 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.300 ± 0.118 (33.00 ± 3.00)	
MF75 (3W / T73mm)	0.670 ± 0.040 (17.00 ± 1.00)	0.236 ± 0.020 (6.00 ± 0.50)	1.378 ± 0.118 (35.00 ± 3.00)	



Ordering Code / Information

MF	50	-	XXXX	F	-	A	5

Type	Size	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
Precision Metal Film Resistors	50 55 55SS 60 60SS 65 70 75	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	B = ±0.1% D = ±0.5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 = 1,000 pcs 2 = 2,000 pcs 3 = 3,000 pcs 5 = 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(±1%), G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
MF50	1/6W	0.1Ω - 1Ω (±200ppm) 1Ω - 10Ω (±100ppm) 10Ω - 1MΩ (±50ppm) 1MΩ - 2.8MΩ (±100ppm) 2.8MΩ - 10MΩ (±150ppm)	1Ω - 10MΩ	250V	500v	-55°C to +155°C
MF55	1/4W		0.1Ω - 10MΩ	300V	600V	
MF55SS	0.4W					
MF60	1/2W			350V	700V	
MF60SS	0.6W		0.1Ω - 1MΩ	300V	600V	
MF65 (T52mm)	1W		0.1Ω - 1MΩ	450V	900V	
MF65 (T73mm)	1W					
MF70 (T73mm)	2W		0.1Ω - 10MΩ	500V	1,000V	
MF75 (T73mm)	3W			600V		

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5%+0.05Ω)	For 1%, 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 1%, 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(1.0%+0.05Ω) for 1% , 2% & 5% tolerance resistor		40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(1.0%+0.05Ω)	For 1%, 2% & 5% tolerance	70 °C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(0.5%+0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion.
	±(1.0%+0.05Ω)	For 2% & 5% tolerance	

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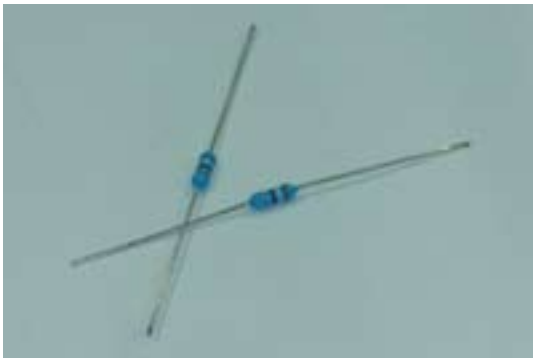
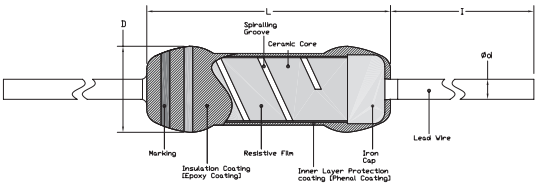


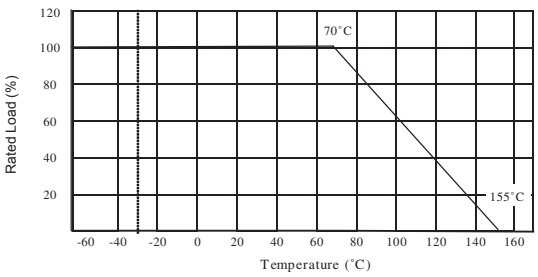
Features

- Available in tolerance 1%, 2% and 5%
- Miniature size series available
- Suitable for automatic machine insertion
- Products with lead free terminations meet EU RoHS and China RoHS requirements
- Resistors are coated with layers of blue color lacquer

Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	l	d
MF55 (1/4W)	0.244 ± 0.012 (6.20 ± 0.30)	0.071 ± 0.012 (1.80 ± 0.30)	1.417 ± 0.079 (36.00 ± 2.00)	0.025 ± 0.002 (0.63 ± 0.05)
MF60 (1/2W)	0.358 ± 0.012 (9.10 ± 0.30)	0.083 ± 0.012 (2.10 ± 0.30)	1.417 ± 0.118 (36.00 ± 3.00)	

Dimensions and Construction





Ordering Code / Information

MF	-	50	-	XXXX	F	-	A	5

Type	Size	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
High Precision Metal Film Resistors	55 60	Resistors	4-Digit	E192 Series 10.2Ω=10R2 10KΩ=1002	Q = ±0.02% A = ±0.05%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 = 1,000 pcs 2 = 2,000 pcs 3 = 3,000 pcs 5 = 5,000 pcs

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E192 Q(±0.02%), A(±0.05%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
MF50	1/4W	±5 ppm ±10 ppm	100Ω - 500KΩ	200V	400V	-55°C to +150°C
MF60	1/2W			250V	500V	

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.25%+0.05Ω)	For 0.02% & 0.05% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5secs which is lower
Resistance to Soldering Heat	±(0.1%+0.05Ω)	For 0.02% & 0.05% tolerance	260°C ± 10°C, 3 seconds ± 0.5 second
Moisture Resistance	±(0.5%+0.05Ω)	For 0.02% & 0.05% tolerance resistor	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(0.5%+0.05Ω)	For 0.02% & 0.05% tolerance	70°C ± 2°C ,1000hours, 1.5 hours On,0.5 hours Off cycle

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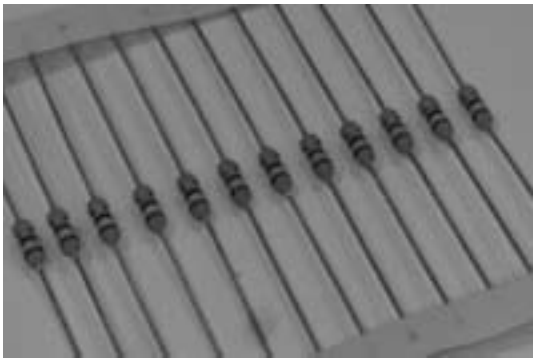
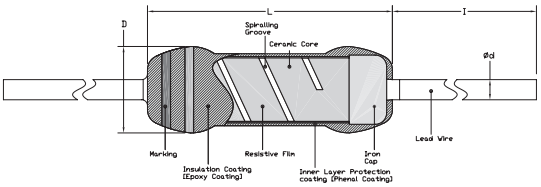


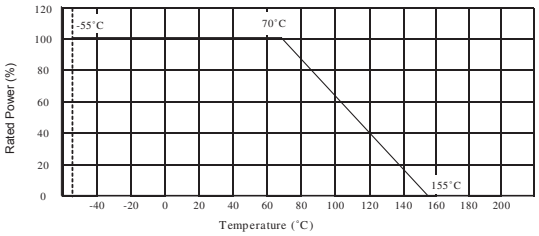
Features

- Flame-proof lacquer coating insulation
- Suitable for automatic machine insertion
- Resistors are coated with layers of blue color lacquer

Dimensions and Construction



Type	Dimensions			
	Inches (Millimeters)			
	L	D	l	d
FM50 (1/6W)	0.126 ± 0.020 (3.20 ± 0.50)	0.075 ± 0.020 (1.90 ± 0.50)	1.102 ± 0.079 (0.28 ± 2.00)	0.018 ± 0.002 (0.45 ± 0.05)
FM55SS (0.4W)				
FM55 (1/4W)	0.244 ± 0.020 (6.20 ± 0.50)	0.091 ± 0.020 (2.30 ± 0.50)	1.063 ± 0.079 (27.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
FM60SS (0.6W)				
FM60 (1/2W)	0.358 ± 0.020 (9.10 ± 0.50)	0.126 ± 0.020 (3.20 ± 0.50)		
FM65 (1W)	0.441 ± 0.020 (11.20 ± 0.50)	0.165 ± 0.020 (4.20 ± 0.50)	1.339 ± 0.079 (34.00 ± 2.00)	0.031 ± 0.002 (0.78 ± 0.05)
FM70 (2W)	0.598 ± 0.020 (15.20 ± 0.50)	0.197 ± 0.020 (5.00 ± 0.50)		



Ordering Code / Information

FM	50	-	XXXX	F	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
Flame-Proof Metal Film Resistors	50 55 55SS 60 60SS 65 70	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F = ±1% G = ±2% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 = 1,000 pcs 2 = 2,000 pcs 3 = 3,000 pcs 5 = 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-96, E-24 F(± 1%), G(± 2%), J(± 5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
FM50	1/6W	> 10Ω (±50 ppm) < 10Ω (±100 ppm)	1Ω - 1MΩ	200V	400V	-55°C to +155°C
FM55	1/4W			250V	500V	
FM55SS	0.4W					
FM60	1/2W			350V	700V	
FM60SS	0.6W					
FM65	1W			500V		
FM70	2W				1,000V	

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5% + 0.05Ω)	For 1%, 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	For 1%, 2% & 5% tolerance	350°C ± 10°C, 3 seconds ± 0.5 second
Moisture Resistance	±(3.0% + 0.05Ω)	For 1% , 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(5.0% + 0.05Ω) Max	For 1%, 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle

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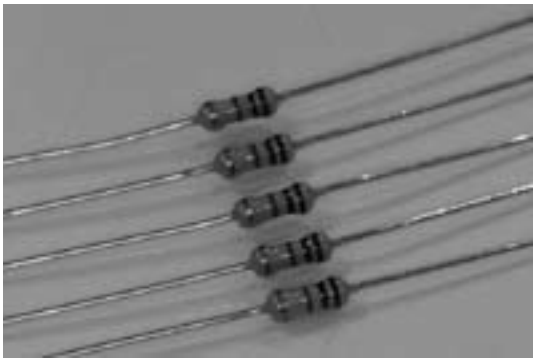
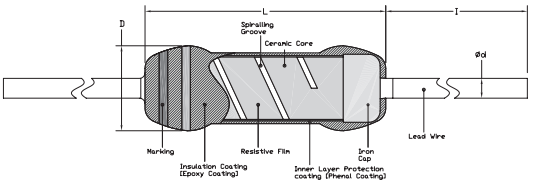


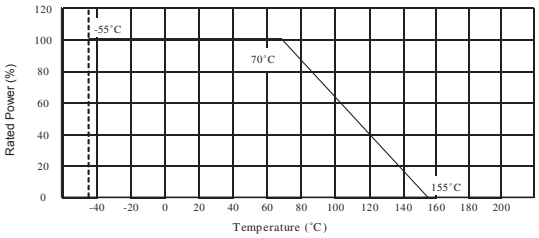
Features

- Small size, High power
- Flame-proof multi-layer coating meets UL-94V-0
- Resistors are coated with layers of pink color lacquer

Dimensions and Construction



Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
FMP60SS (1/2W)	0.134 ± 0.012 (3.40 ± 0.30)	0.075 ± 0.008 (1.90 ± 0.20)	1.102 ± 0.079 (28.00 ± 2.00)	0.018 ± 0.002 (0.45 ± 0.05)
FMP65SS (1W)	0.248 ± 0.020 (6.30 ± 0.50)	0.094 ± 0.008 (2.40 ± 0.20)		0.022 ± 0.002 (0.55 ± 0.05)
FMP70SS (2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.154 ± 0.012 (3.90 ± 0.30)	1.024 ± 0.079 (26.00 ± 2.00)	
FMP75SS (3W)	0.453 ± 0.040 (11.50 ± 1.00)	0.177 ± 0.020 (4.50 ± 0.50)	1.378 ± 0.079 (35.00 ± 2.00)	0.031 ± 0.002 (0.80 ± 0.05)
FMP75 (3W)	0.610 ± 0.040 (15.50 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.300 ± 0.079 (33.00 ± 2.00)	
FMP80SS (4W)	0.670 ± 0.040 (17.00 ± 1.00)	0.295 ± 0.020 (7.50 ± 0.50)	1.260 ± 0.079 (32.00 ± 2.00)	



Ordering Code / Information

FMP	60SS	-	XXXX	F	-	A	1

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
High Power Flame-Proof Metal Film Resistor	60SS 65SS 70SS 75SS 75 80SS	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F = ±1% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm)	500 = 500 pcs 1 = 1,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24, E-96 F(±1%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
FMP60SS	1/2W	±100	1Ω - 10MΩ	200V	400V	-55°C to +155°C
FMP65SS	1W			350V	600V	
FMP70SS	2W			500V	700V	
FMP75SS	3W					
FMP75				750V	1,000V	
FMP80	4W					

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5% + 0.05Ω)	For 1% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	± (0.25% + 0.05Ω)	For 1% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(2.0% + 0.05Ω)	For 1% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(2.0% + 0.05Ω)	For 1% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle

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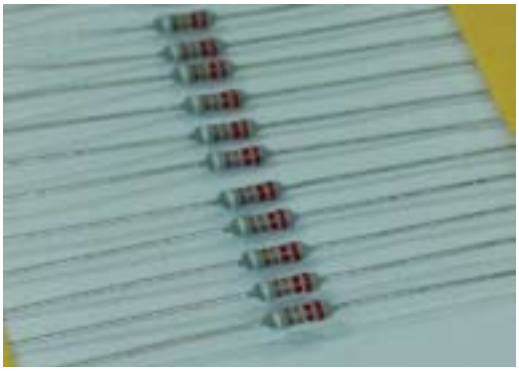
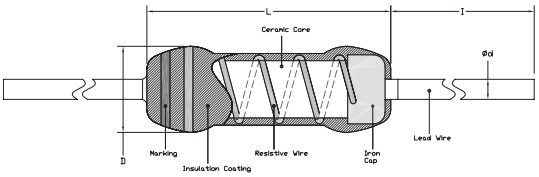
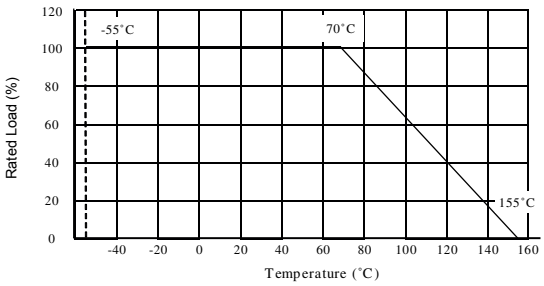


Features

- Function as a metal film resistors and when in presence of abnormal current, fusing capabilities activated to protect machine or equipment
- Saves the cost of having a fuse on PCB, hence increase cost savings
- Excellent TCR and reliable.
- Flameproof feature meets UL-1412 standard
- Flameproof coating meets UL-94V-0 standard
- Resistors are coated with layers of grey color lacquer
- FSR2SS is coated with layers of pink color lacquer

Dimensions and Construction





Type	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
FSR1/4 (1/4W)	0.244 ± 0.040 (6.20 ± 1.00)	0.087 ± 0.040 (2.30 ± 1.00)	1.063 ± 0.079 (27.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
FSR1/2SS (1/2W)				
FSR1/2 (1/2W)	0.358 ± 0.040 (9.10 ± 1.00)	0.126 ± 0.040 (3.20 ± 1.00)		
FSR1SS (1W)				
FSR1 (1W)	0.441 ± 0.040 (11.20 ± 1.00)	0.065 ± 0.040 (4.20 ± 1.00)	1.024 ± 0.079 (26.00 ± 2.00)	0.031 ± 0.002 (0.78 ± 0.05)
FSR2SS (2W)				
FSR2 (2W)	0.598 ± 0.040 (15.20 ± 1.00)	0.197 ± 0.040 (5.00 ± 1.00)	1.260 ± 0.079 (32.0 ± 2.00)	
FSR3SS (3W)				

Ordering Code / Information

FSR	1/4	-	XXX	J	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
Fusible Metal Film Resistors	1/4 1/2 1/2SS 1 1SS 2 2SS 3SS	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F = ±1% G = ±2% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 = 1,000 pcs 2 = 2,000 pcs 5 = 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Tolerance (±1%)	T.C.R (ppm/°C) Tolerance (±2%, ±5%)	Resistance Range E96 and E-24 F(±1%),G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
FSR1/4	1/4W	< 10Ω (±200 ppm) ≥ 10Ω (±100 ppm)	< 10Ω (±400 ppm) ≥ 10Ω (±200 ppm)	1Ω - 2KΩ	250V	500V	-55°C to +155°C
FSR1/2	1/2W				350V	600V	
FSR1/2SS					250V	500V	
FSR1	1W				350V	600V	
FSR1SS					350V	600V	
FSR2	2W				500V	600V	
FSR2SS					350V	600V	
FSR3SS	3W				350V	600V	

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(2.0% + 0.05Ω)	For 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(5.0% + 0.05Ω)	For 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(5.0% + 0.05Ω)	For 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
Clearing time current test	a) Open within 30 secs at 4 times rated voltage (1 Ω and above)		Resistor fusing without flaming and arcing
	b) Open within 30 secs at 5 times rated voltage (below 1 Ω)		

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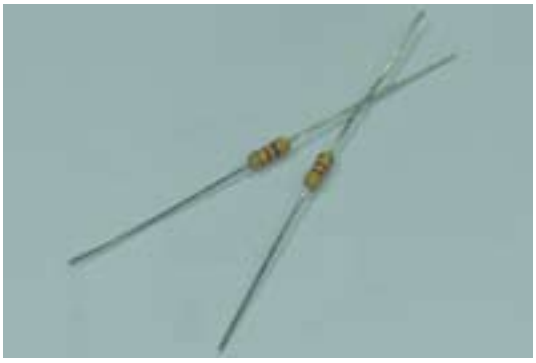
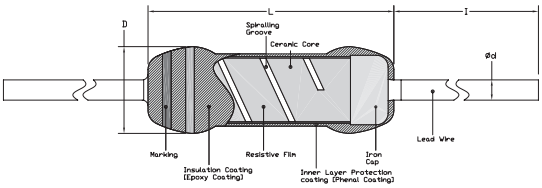
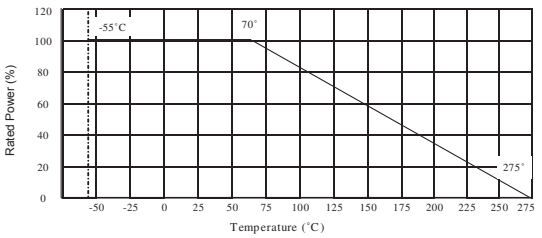


Features

- Highly reliable multi-layer electrode construction.
- Compatible with wave and reflow soldering process.
- Pb Free with Reflow soldering backward compatibility
- Resistors are coated with layers of beige color lacquer
- CF 1/2SS resistors are coated with layers of pink color lacquer

Dimensions and Construction





Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
CF 1/6 (1/6W)	0.134 ± 0.008 (3.40 ± 0.20)	0.075 ± 0.008 (1.90 ± 0.20)	1.102 ± 0.118 (28.00 ± 3.00)	0.018 ± 0.002 (0.45 ± 0.05)
CF1/4SS (1/4W)				
CF1/4 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.012 (2.30 ± 0.30)		0.024 ± 0.002 (0.60 ± 0.05)
CF1/2SS (1/2W)				
CF1/2 (1/2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.130 ± 0.012 (3.30 ± 0.30)	1.102 ± 0.118 (28.00 ± 3.00)	
CF1SS (1W)				0.031 ± 0.002 (0.78 ± 0.05)
CF1 (1W / T52mm)	0.433 ± 0.040 (11.00 ± 1.00)	0.165 ± 0.020 (4.20 ± 0.50)	1.063 ± 0.118 (27.00 ± 3.00)	0.031 ± 0.002 (0.78 ± 0.05)
CF1 (1W / T73mm)			1.378 ± 0.118 (35.00 ± 3.00)	
CF2SS (2W / T52mm)			1.063 ± 0.118 (27.00 ± 3.00)	
CF2SS (2W / T73mm)			1.378 ± 0.118 (35.00 ± 3.00)	
CF2 (2W)	0.610 ± 0.040 (15.50 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.300 ± 0.118 (33.00 ± 3.00)	
CF3 (3W)	0.591 ± 0.040 (15.00 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)		

Ordering Code / Information

CF	1/6	-	XXX	J	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101			
General Purpose Carbon Film Resistor	1/6 1/4 1/4SS 1/2 1/2SS 1 1SS 2 2SS 3				G = ±2% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) N = Ammo (73mm) Q = Spool (73mm)	05 = 500 pcs 1 = 1,000pcs 2 = 2,000pcs 3 = 3,000pcs 5 = 5,000pcs

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 G(±2%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
CF 1/6	1/6W	<10Ω (±300 ppm) 10Ω ≤ X ≤ 50KΩ (0 to -350 ppm) 50KΩ < X ≤ 430KΩ (0 to -500 ppm) 430KΩ < X ≤ 1MΩ (0 to -800 ppm) 1MΩ < X ≤ 4.7MΩ (0 to -1,600 ppm) 4.7MΩ < X ≤ 10MΩ (0 to -2,000 ppm)	1Ω - 1MΩ	1Ω - 10MΩ	250V	400V	-55°C to +155°C
CF 1/4	1/4W					500V	
CF1/4SS							
CF1/2	1/2W				350V	700V	
CF1/2SS							
CF1	1W				500V	1000V	
CF1SS							
CF2	2W		10Ω - 1MΩ				
CF2SS							
CF3	3W						

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5% + 0.05Ω)	For 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5% + 0.05Ω)	For 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	< 100KΩ, ±2% Max.	For 2% & 5% tolerance	70 °C ± 2°C ,1000 hours, 1.5 hours On, 0.5 hours Off cycle
	≥ 100KΩ, ±3% Max.		

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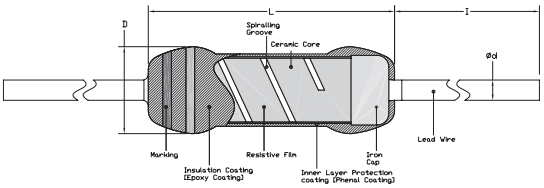
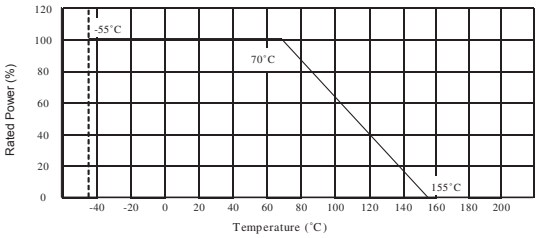
Features

- Flame-proof lacquer coating
- Marking: Light gray body color with color-coded bands
- Suitable for automatic machine insertion
- Resistors are coated with layers of gray color lacquer

Dimensions and Construction



Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
FP1/6 (1/6W)	0.126 ± 0.020 (3.20 ± 0.50)	0.075 ± 0.020 (1.90 ± 0.50)	1.102 ± 0.079 (28.00 ± 2.00)	0.018 ± 0.002 (0.45 ± 0.05)
FP1/4 (1/4W)	0.244 ± 0.020 (6.20 ± 0.50)	0.091 ± 0.020 (2.30 ± 0.50)	1.063 ± 0.079 (27.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
FP1/2 (1/2W)	0.358 ± 0.020 (9.10 ± 0.50)	0.126 ± 0.020 (3.20 ± 0.50)	1.063 ± 0.079 (27.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
FP1 (1W)	0.441 ± 0.020 (11.20 ± 0.50)	0.165 ± 0.020 (4.20 ± 0.50)	1.024 ± 0.079 (26.00 ± 2.00)	0.031 ± 0.002 (0.78 ± 0.05)
FP2 (2W)	0.598 ± 0.020 (15.20 ± 0.50)	0.197 ± 0.020 (5.00 ± 0.50)	1.339 ± 0.079 (34.00 ± 2.00)	0.031 ± 0.002 (0.78 ± 0.05)



Ordering Code / Information

FP	1/6	-	XXX	J	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101			
Flame-Proof Carbon Film Resistors	1/6 1/4 1/2 1 2				G = ±2% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm)	1 = 1,000pcs 2 = 2,000pcs 3 = 3,000pcs 5 = 5,000pcs

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 G(±2%)	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
FP1/6	1/6W	<10Ω (±300 ppm) 10Ω ≤ X ≤ 50KΩ (0 to -350 ppm) 50KΩ < X ≤ 430KΩ (0 to -500 ppm) 430KΩ < X ≤ 1MΩ (0 to -800 ppm) 1MΩ < X ≤ 4.7MΩ (0 to -1,600 ppm) 4.7MΩ < X ≤ 10MΩ (0 to -2,000 ppm)	10Ω - 1MΩ	1Ω - 10MΩ	200V	400V	-55°C to +155°C
FP1/4	1/4W				250V	500V	
FP1/2	1/2W				350V	700V	
FP1	1W				500V	1,000V	
FP2	2W						

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(2.0% + 0.1Ω)	For 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion

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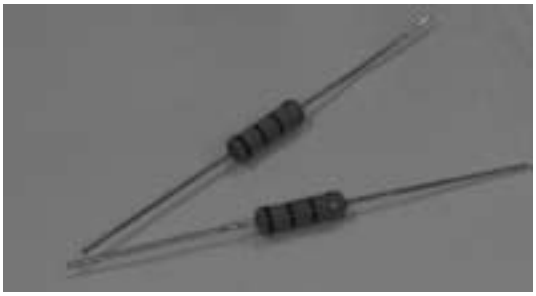
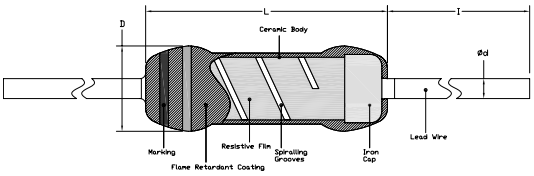
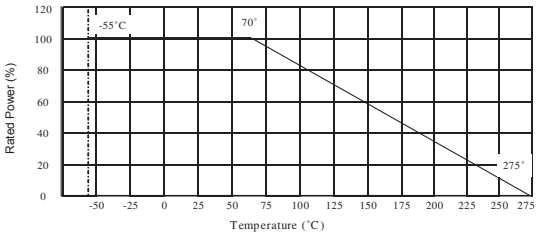


Features

- Flame-proof silicone coating equivalent to UL94V0
- Suitable for automatic machine insertion
- High reliability for performance
- Standard size resistors are coated with layers of grey color lacquer
- Miniature size resistors are coated with layers of pink color lacquer

Dimensions and Construction





Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
MO1/4 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.012 (2.30 ± 0.30)	1.102 ± 0.118 (28.00 ± 3.00)	0.024 ± 0.002 (0.60 ± 0.05)
MO1/2SS (1/2W)				
MO1/2 (1/2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.26 ± 0.020 (3.20 ± 0.50)	1.063 ± 0.118 (27.00 ± 3.00)	
MO1SS (1W)				
MO1 (1W)	0.433 ± 0.040 (11.00 ± 1.00)	0.169 ± 0.020 (4.30 ± 0.50)	1.378 ± 0.118 (35.00 ± 3.00)	0.031 ± 0.002 (0.78 ± 0.05)
MO2SS (2W)				
MO2 (2W)	0.630 ± 0.040 (16.00 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.260 ± 0.118 (32.00 ± 3.00)	
MO3SS (3W)				
MO3 (3W)	0.669 ± 0.040 (17.00 ± 1.00)	0.236 ± 0.040 (6.00 ± 1.00)		
MO5SS (5W)	0.984 ± 0.079 (25.00 ± 2.00)	0.335 ± 0.040 (8.50 ± 1.00)	1.496 ± 0.118 (38.00 ± 3.00)	
MO5 (5W)				

Ordering Code / Information

MO	1/4	-	XXXX	J	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101			
Flame-Proof Metal Oxide Resistors	1/4 1/2 1/2SS 1 1SS 2 2SS 3 3SS 5 5SS				G = ±2% J = ±5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm) B = Bulk	025 = 250 pcs 05 = 500 pcs 1 = 1,000pcs 2 = 2,000pcs 3 = 3,000pcs 5 = 5,000pcs

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 G(±2%), J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
MO1/4	1/4W	±350	0.1Ω - 100KΩ	250V	400V	-55°C to +275°C
MO1/2	1/2W				500V	
MO1/2SS						
MO1	1W			350V	700V	
MO1SS						
MO2	2W					
MO2SS				500V		
MO3	3W					
MO3SS				350V		
MO5	5W			500V	1000V	
MO5SS						

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(0.5%+0.05Ω)	For 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(0.5%+0.05Ω)	For 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(3.0%+0.05Ω)	For 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(3.0%+0.05Ω)	For 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On, 0.5 hours Off cycle

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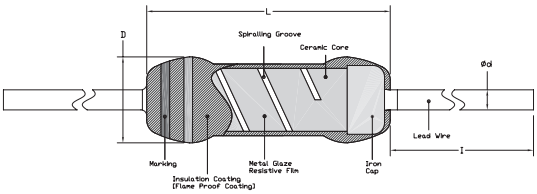
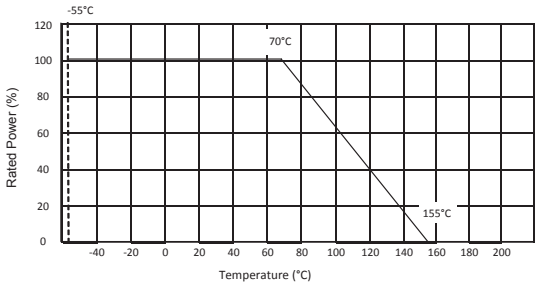
Features

- Metal Glaze film element are coated to solid ceramic core
- Excellent pulse loading capabilities
- Suitable for automatic machine insertion
- Resistors are coated with layers of blue color lacquer

Dimensions and Construction



Type	Dimensions			
	Inches (Millimeters)			
	L	D	l	d
MGP1/4 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.094 ± 0.008 (2.40 ± 0.20)	1.102 ± 0.079 (28.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
MGP1/2SS (1/2W)				
MGP1/2 (1/2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.130 ± 0.012 (3.30 ± 0.30)	1.024 ± 0.079 (26.00 ± 2.00)	
MGP1 (1W)	0.453 ± 0.040 (11.50 ± 1.00)	0.177 ± 0.020 (4.50 ± 0.50)	1.378 ± 0.079 (35.00 ± 2.00)	0.031 ± 0.002 (0.80 ± 0.05)
MGP2 (2W)	0.610 ± 0.040 (15.50 ± 1.00)	0.197 ± 0.02 (5.00 ± 0.50)	1.300 ± 0.079 (33.00 ± 2.00)	



Ordering Code / Information

MGP	1/4	-	XXX	J	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101			
Pulse Loading Metal Glaze Resistor	1/4 1/2 1/2SS 1 2				J - 5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm)	1 - 1,000pcs 5 - 5,000pcs

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range J(±5%)	Max Working Voltage	Dielectric Withstanding Voltage	Operating Temperature Range
MGP1/4	1/4W	±300	100KΩ - 10MΩ	√P*√R	500V	-55°C to +155°C
MGP1/2	1/2W				700V	
MGP1/2SS	1/2W				500V	
MGP1	1W				700V	
MGP2	2W				700V	

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25ºC
Short Time Overload	±(1% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	Within resistors specification	In V-Block for 60 seconds
Temperature Coefficient of Resistance	Within resistors specification	-55°C to +155°C
Insulation Resistance	>10,000MΩ	In V-Block
Solderability	95% min. coverage	260°C ± 5°C for 5 ±0.5 seconds
Pulse Overload	±(1% + 0.05Ω)	4 times RCWV 10000 cycles (1 sec. on , 25 sec. off)
Load Life In Humidity	±(5% + 0.05Ω)	40°C ± 2°C , 90~95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5% + 0.05Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1% + 0.05Ω)	350°C ± 10°C for 3 ±0.5 seconds

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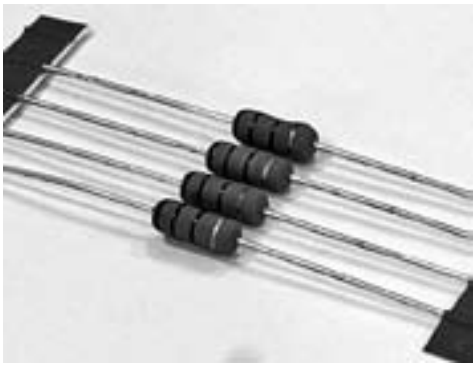
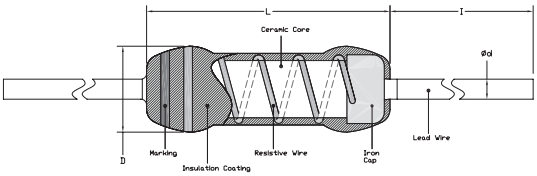
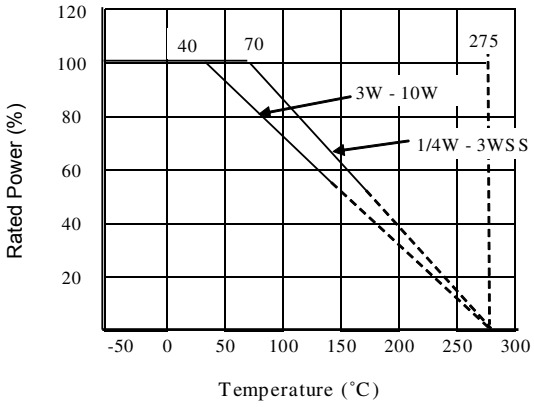


Features

- Flame-proof silicone coating, conforming to UL94V0
- Miniature series - Small body size, Higher power rating
- Suitable for automatic machine insertion
- Resistors are coated with layers of green color flame-proof lacquer

Dimensions and Construction





Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
KNP1/4 (1/4W)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.020 (2.30 ± 0.50)	1.102 ± 0.079 (28.00 ± 2.00)	0.024 ± 0.002 (0.60 ± 0.05)
KNP1/2SS (1/2W)				
KNP1/2 (1/2W)	0.354 ± 0.040 (9.00 ± 1.00)	0.130 ± 0.020 (3.30 ± 0.50)	1.063 ± 0.118 (27.00 ± 3.00)	0.028 ± 0.002 (0.70 ± 0.05)
KNP1SS (1W)				
KNP1 (1W)	0.472 ± 0.040 (12.00 ± 1.00)	0.177 ± 0.020 (4.50 ± 0.50)	1.260 ± 0.118 (32.00 ± 3.00)	0.031 ± 0.002 (0.80 ± 0.05)
KNP2SS (2W)				
KNP2 (2W)	0.630 ± 0.040 (16.00 ± 1.00)	0.197 ± 0.040 (5.00 ± 1.00)		
KNP3SS (3W)				
KNP3 (3W)	0.689 ± 0.040 (17.50 ± 1.00)	0.256 ± 0.040 (6.50 ± 1.00)	1.378 ± 0.118 (35.00 ± 3.00)	
KNP4 (4W)				
KNP5SS (5W)				
KNP5 (5W)	0.984 ± 0.079 (25.00 ± 2.00)	0.354 ± 0.040 (9.00 ± 1.00)	1.496 ± 0.118 (38.00 ± 3.00)	
KNP6 (6W)				
KNP7 (7W)	1.614 ± 0.059 (41.00 ± 1.50)	0.354 ± 0.020 (9.00 ± 0.50)		
KNP8 (8W)				
KNP10 (10W)	2.087 ± 0.040 (53.00 ± 1.00)			

Ordering Code / Information

KNP	1/4	-	XXXX	F	-	A	5

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
Flame-Proof Coating Wirewound Resistors	1/4 1/2 1/2SS 1 1SS 2 2SS 3 3SS 4 5 5SS 6 7 8 10	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F - 1% G - 2% J - 5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm) B = Bulk (200 pcs) For 91mm taping consult factory	025 - 250 pcs 05 - 500 pcs 1 - 1,000 pcs 2 - 2,000 pcs 3 - 3,000 pcs 5 - 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating	T.C.R (ppm/°C) Max	Resistance Range E-24, E-96 F(±1%), G(±2%), J(±5%)	Operating Temperature Range
KNP1/4	1/4W	±300	0.1Ω - 47Ω	-50°C to +155°C
KNP1/2	1/2W		0.1Ω - 100Ω	
KNP1/2SS			0.1R - 47R	
KNP1	1W		0.1Ω - 100Ω	
KNP1SS				
KNP2	2W		0.1Ω - 470Ω	
KNP2SS			0.1Ω - 100Ω	
KNP3	3W		0.1Ω - 680Ω	
KNP3SS				
KNP4	4W		0.1Ω - 1KΩ	
KNP5	5W		0.1Ω - 1KΩ	
KNP5SS			0.05Ω - 10KΩ	
KNP6	6W		0.1Ω - 1KΩ	
KNP7	7W		0.1Ω - 4.3KΩ	
KNP8	8W		0.1Ω - 18KΩ	
KNP10	10W		0.1Ω\ - 8.2KΩ	

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(2.0% + 0.05Ω)	For 1%, 2% & 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(2.0% + 0.05Ω)	For 1%, 2% & 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(5% + 0.05Ω)	For 1% , 2% & 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(5.0% + 0.1Ω)	For 1%, 2% & 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(0.5% + 0.05Ω)	For 1% tolerance	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion
	±(1.0% + 0.05Ω)	For 2% & 5% tolerance	

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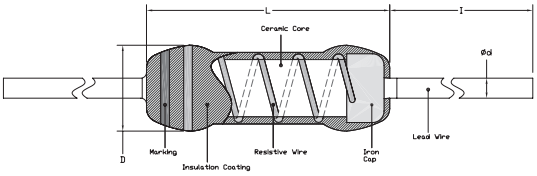
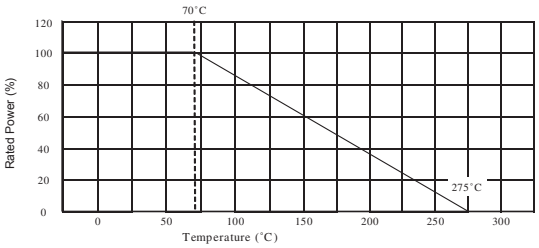
Features

- Higher power rating achieved, with smaller body size
- Flame-proof multi-layer coating meets UL94V0
- PCB space saving
- Resistors are coated with layers of green color flame-proof lacquer

Dimensions and Construction



Type	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
KNH1 (1W)	0.248 ± 0.020 (6.30 ± 0.50)	0.095 ± 0.008 (2.40 ± 0.20)	1.102 ± 0.079 (28.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
KNH2 (2W)	0.354 ± 0.020 (9.00 ± 0.50)	0.130 ± 0.012 (3.30 ± 0.30)	1.024 ± 0.079 (26.00 ± 2.00)	
KNH3 (3W)	0.453 ± 0.040 (11.50 ± 1.00)	0.177 ± 0.020 (4.50 ± 0.50)	1.378 ± 0.079 (35.00 ± 2.00)	0.031 ± 0.002 (0.80 ± 0.05)
KNH4 (4W)	0.610 ± 0.040 (15.50 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	1.300 ± 0.079 (33.00 ± 2.00)	



Ordering Code / Information

KNH	1	-	XXXX	F	-	A	1

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
High Power Flame-Proof WireWound Resistor	1 2 3 4	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F - 1% J - 5%	A = Ammo (52mm) S = Spool (52mm) N = Ammo (73mm) Q = Spool (73mm)	05 - 500 pcs 1 - 1,000pcs 2 - 2,000pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

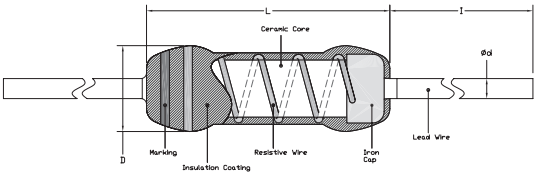
Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range F(±1%), J(±5%)	Dielectric Withstanding Voltage	Operating Temperature Range
KNH1	1W	±300	0.1Ω - 33Ω	300V	-40°C to +200°C
KNH2	2W		0.1Ω - 100Ω		
KNH3	3W		0.1Ω - 150Ω		
KNH4	4W		0.1Ω - 330Ω		

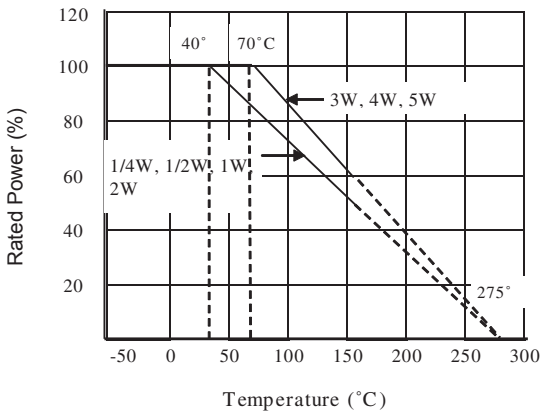
Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	Within resistors specification	In V-Block for 60 seconds
Temperature Coefficient of Resistance	Within resistors specification	-40°C to +200°C
Insulation Resistance	>100MΩ	In V-Block
Solderability	95% min. coverage	260°C ± 5°C for 5 ±0.5 seconds
Load Life In Humidity	±(5% + 0.05Ω)	40°C ± 2°C , 90~95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5% + 0.05Ω)	20°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1% + 0.05Ω)	350°C ± 10°C for 3 ±0.5 seconds
Overload Flame Retardant	No evidence of flaming or arcing	4 times RCWV for 1 Min.

Features

- Function as a wirewound resistors and when in presence of abnormal current, fusing capabilities activated to protect machine or equipment
- Saves the cost of having a fuse on PCB, hence increase cost savings
- Flameproof feature meets UL-1412 standard
- Flameproof coating meets UL-94V-0 standard
- Resistors are coated with layers of blue color flame-proof lacquer

Dimensions and Construction





Type	Dimensions			
	Inches (Millimeters)			
	L	D	I	d
FWW1/4 (1/4W)	0.244 ± 0.040 (6.20 ± 1.00)	0.091 ± 0.040 (2.30 ± 1.00)	1.102 ± 0.079 (28.00 ± 2.00)	0.022 ± 0.002 (0.55 ± 0.05)
FWW1/2SS (1/2W)				
FWW1/2 (1/2W)	0.258 ± 0.040 (9.10 ± 1.00)	0.126 ± 0.040 (3.20 ± 1.00)	1.063 ± 0.079 (27.00 ± 2.00)	
FWW1SS (1W)				
FWW1 (1W)	0.441 ± 0.040 (11.20 ± 1.00)	0.165 ± 0.040 (4.20 ± 1.00)		0.031 ± 0.002 (0.78 ± 0.05)
FWW2SS (2W)				
FWW2 (2W)	0.598 ± 0.040 (15.20 ± 1.00)	0.197 ± 0.040 (5.00 ± 1.00)	1.260 ± 0.079 (32.00 ± 2.00)	
FWW3SS (3W)				
FWW3 (3W)	0.673 ± 0.040 (17.10 ± 1.00)	0.236 ± 0.040 (6.00 ± 1.00)	1.181 ± 0.079 (30.00 ± 2.00)	
FWW5SS (5W)				

Ordering Code / Information

FWW	1/4	-	XXXX	F	-	A	1

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging	Quantity
Fusible Flame-Proof Wirewound Resistors	1/4 1/2 1/2SS 1 1SS 2 2SS 3 3SS 5SS	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	F - 1% G - 2% J - 5%	A = Ammo (52mm) S = Spool (52mm) M = Ammo (26mm) R = Spool (26mm) N = Ammo (73mm) Q = Spool (73mm) B = Bulk (200 pcs) For 91mm taping consult factory	025 = 250 pcs 05 = 500 pcs 1 = 1,000 pcs 2 = 2,000 pcs 3 = 3,000 pcs 5 = 5,000 pcs
			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002			

Application and Ratings

Product Type	Power Rating	T.C.R (ppm/°C) Max	Resistance Range	Di-electric Withstanding voltage	Operating Temperature Range
FWW1/4 (1/4W)	1/4W	< 1Ω (±350 ppm) ≥ 1Ω (±200 ppm)	0.1Ω - 10Ω	300V	-55°C to +155°C
FWW1/2SS (1/2W)	1/2W		0.1Ω - 10Ω	300V	
FWW1/2 (1/2W)	1/2W		0.1Ω - 47Ω	300V	
FWW1SS (1W)	1W		0.1Ω - 47Ω	500V	
FWW1 (1W)	1w		0.1Ω - 100Ω		
FWW2SS (2W)	2W		0.1Ω - 100Ω		
FWW2 (2W)	2W		0.1Ω - 220Ω		
FWW3SS (3W)	3W		0.1Ω - 220Ω		
FWW3 (3W)	3W		0.1Ω - 330Ω		
FWW5SS (5W)	4W		0.1Ω - 330Ω		

Test	Specification	Test Method
Resistance Value	Within Resistors specification	To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR	25°C/ +125°C
Short Time Overload	±(2% + 0.05Ω) for 5% tolerance resistor	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(2% + 0.05Ω) for 5% tolerance resistor	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(5% + 0.05Ω) for 5% tolerance resistor	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(5% + 0.05Ω) for 5% tolerance resistor	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
Clearing time current test	Open within 30 secs at 40 times rated power	Resistor fusing without flaming and arcing

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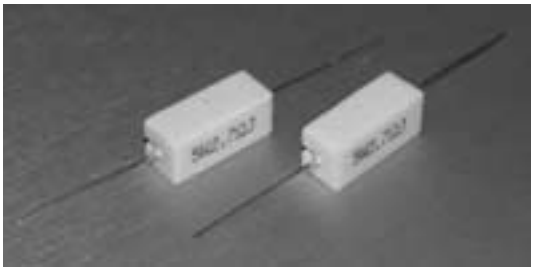
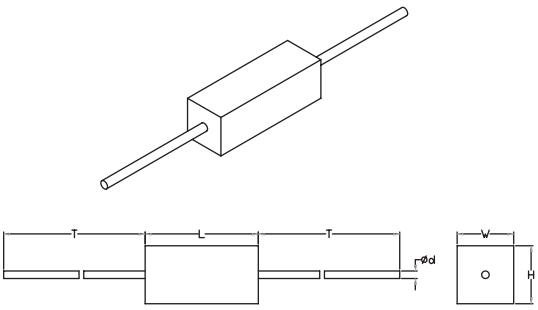
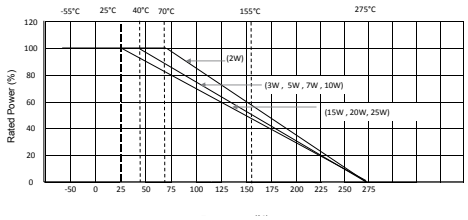


Features

- Good heat dissipation
- Excellent electrical characteristics
- Ability to withstand rigorous load test
- Flame, arc and moisture resistance as well as self extinguishing capabilities

Dimensions and Construction





Type (Power Rating)	Dimensions				
	Inches (Millimeters)				
	L	W	H	T	d
SQP2 (2W)	0.709 ± 0.040 (18.00 ± 1.00)	0.315 ± 0.020 (8.00 ± 1.00)	0.276 ± 0.020 (7.00 ± 1.00)	1.260 ± 0.118 (32.00 ± 3.00)	0.031 ± 0.002 (0.78 ± 0.05)
SQP3 (3W)	0.866 ± 0.040 (22.00 ± 1.00)		0.315 ± 0.020 (8.00 ± 1.00)		
SQP5 (5W)		0.394 ± 0.020 (10.00 ± 1.00)	0.354 ± 0.020 (9.00 ± 1.00)		
SQP7 (7W)	1.378 ± 0.040 (35.00 ± 1.00)				
SQP10 (10W)	1.890 ± 0.040 (48.00 ± 1.00)			1.378 ± 0.118 (35.00 ± 3.00)	
SQP15 (15W)		0.472 ± 0.020 (12.00 ± 1.00)	0.472 ± 0.020 (12.00 ± 1.00)		
SQP20 (20W)	2.362 ± 0.040 (60.00 ± 1.00)	0.551 ± 0.020 (14.00 ± 1.00)	0.551 ± 0.020 (14.00 ± 1.00)		
SQP25 (25W)					

Ordering Code / Information

SQP	2	-	XXXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Cement Axial Lead Type Resistor	2 3 5 7 10 15 20 25	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J - 5%	B = Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Operating Temperature Range
SQP2	2W	±300	0.1Ω - 100KΩ	-55°C to +155°C
SQP3	3W			
SQP5	5W			
SQP7	7W			
SQP10	10W			
SQP15	15W			
SQP20	20W			
SQP25	25W			

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	±(0.5% + 0.05Ω)	In V-Block for 60 seconds
Temperature Coefficient of Resistance	±300 ppm/°C	Room Temp. ± 100°C
Insulation Resistance	>100MΩ	In V-Block for 60 seconds
Solderability	95% min. coverage	235°C for 5 ±0.5 seconds
Pulse Overload	±(3% + 0.05Ω)	4 times RCWV 10,000 cycles (1 sec. on , 25 sec. off)
Load Life In Humidity	±(5% + 0.05Ω)	40°C ± 2°C , 90% - 95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5% + 0.05Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1% + 0.05Ω)	350°C ± 10°C for 3 ± 0.5 seconds

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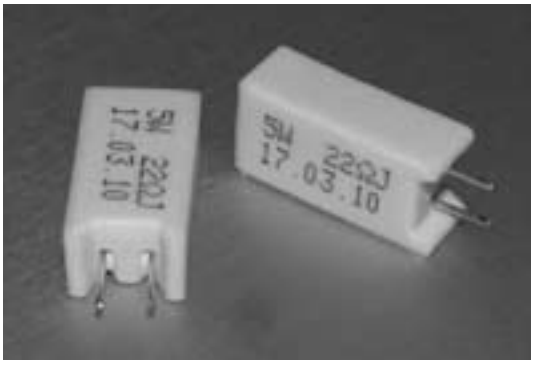
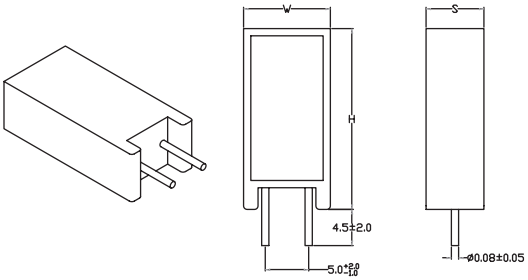


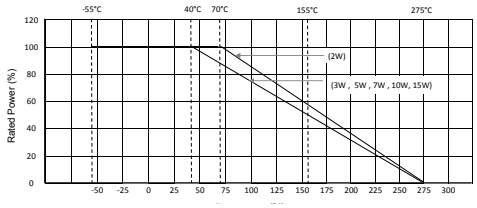
Features

- Exceptionally small, sturdy and mechanically safe
- Flame, arc and moisture resistant as well as self extinguishing capabilities
- Excellent electrical characteristics
- Ability to withstand rigorous load test

Dimensions and Construction



Type (Power Rating)	Dimensions		
	Inches (Millimeters)		
	H	W	S
SQM2 (2W)	0.787 ± 0.059 (20.00 ± 1.50)	0.433 ± 0.040 (11.00 ± 1.00)	0.276 ± 0.040 (7.00 ± 1.00)
SQM3 (3W)	0.984 ± 0.059 (25.00 ± 1.50)	0.472 ± 0.040 (12.00 ± 1.00)	0.315 ± 0.040 (8.00 ± 1.00)
SQM5 (5W)		0.512 ± 0.040 (13.00 ± 1.00)	0.354 ± 0.040 (9.00 ± 1.00)
SQM7 (7W)	1.535 ± 0.059 (39.00 ± 1.50)		0.394 ± 0.040 (10.00 ± 1.00)
SQM10SS (10W)	0.984 ± 0.059 (25.00 ± 1.50)	0.630 ± 0.040 (16.00 ± 1.00)	0.472 ± 0.040 (12.00 ± 1.00)
SQM10 (10W)	2.008 ± 0.059 (51.00 ± 1.50)	0.512 ± 0.040 (13.00 ± 1.00)	0.394 ± 0.040 (10.00 ± 1.00)
SQM15SS (15W)	1.378 ± 0.059 (35.00 ± 1.50)	0.630 ± 0.040 (16.00 ± 1.00)	0.472 ± 0.040 (12.00 ± 1.0)



Ordering Code / Information

SQM	2	-	XXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Cement Vertical Lead Type Resistors	2 3 5 7 10 10SS 15	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J = ±5%	B - Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Max Overload Voltage	Operating Temperature Range
SQM2	2W	±300	0.1Ω - 100KΩ	1,000V	-55°C to +155°C
SQM3	3W				
SQM5	5W				
SQM7	7W			1,500V	
SQM10	10W				
SQM10SS	10W				
SQM15SS	15W				

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2.0% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	±(2.0% + 0.05Ω)	In V-Block for 60 seconds
Temperature Coefficient of Resistance	±260 ppm/°C	Room Temp. ± 100°C
Solderability	95% min. coverage	240°C for 5 ± 0.5 seconds
Load Life In Humidity	±(5.0% + 0.05Ω)	40°C ± 2°C , 90% - 95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5.0% + 0.05Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(2.0% + 0.05Ω)	260°C ± 5°C for 3 ± 0.5 seconds

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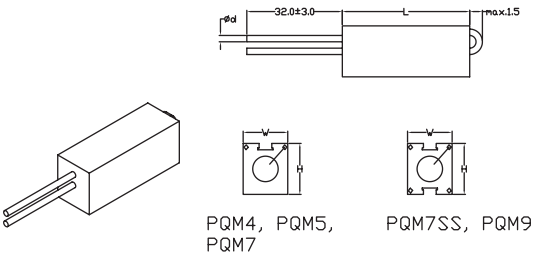
Features

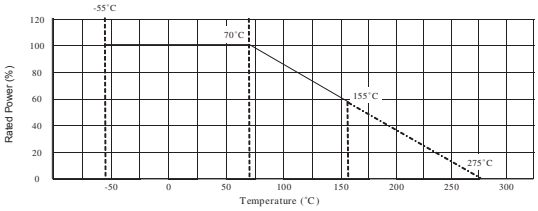
- Exceptionally small, sturdy and mechanically safe
- Higher power rating compared to standard Cement Vertical Lead Type Resistors
- Flame, arc and moisture resistant as well as self extinguishing capabilities
- Excellent electrical characteristics
- Ability to withstand rigorous load test

Dimensions and Construction



PQM4, PQM5, PQM7 | PQM7SS, PQM9

Type (Power Rating)	Dimensions			
	Inches (Millimeters)			
	L	W	H	d
PQM4 (4W)	0.787 ± 0.040 (20.00 ± 1.00)	0.276 ± 0.020 (7.00 ± 0.50)	0.315 ± 0.016 (8.00 ± 0.40)	0.031 ± 0.001 (0.80 ± 0.02)
PQM5 (5W)	0.984 ± 0.040 (25.00 ± 1.00)			
PQM7SS (7W)		0.354 ± 0.016 (9.00 ± 0.40)	0.394 ± 0.016 (10.00 ± 0.40)	
PQM7 (7W)	1.496 ± 0.040 (38.00 ± 1.00)	0.276 ± 0.020 (7.00 ± 0.50)	0.315 0 0.016 (8.00 ± 0.40)	
PQM9 (9W)		0.394 ± 0.016 (10.00 ± 0.40)	0.394 ± 0.016 (10.00 ± 0.40)	



Ordering Code / Information

PQM	4	-	XXXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
		Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101		
High Power Cement Vertical Lead Type Resistors	4 5 7 7SS 9				J - 5%	B - Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range J(±5%)	Operating Temperature Range
PQM4	4W	±400	0.1Ω - 2.5KΩ	-55°C to +155°C
PQM5	5W		0.1Ω - 2.7KΩ	
PQM7	7W		0.3Ω - 3.9KΩ	
PQM7SS	7W		0.1Ω - 2.7KΩ	
PQM9	9W		0.3Ω - 3.9KΩ	

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2.0% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	Within resistors specification	In V-Block for 60 seconds
Temperature Coefficient of Resistance	Within resistors specification	-55°C to +155°C
Solderability	95% min. coverage	260°C ± 5°C for 5 ± 0.5 seconds
Load Life In Humidity	±(5.0% + 0.1Ω)	40°C ± 2°C , 90% - 95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5.0% + 0.1Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1.0% + 0.05Ω)	350°C ± 10°C for 3 ±0.5 seconds

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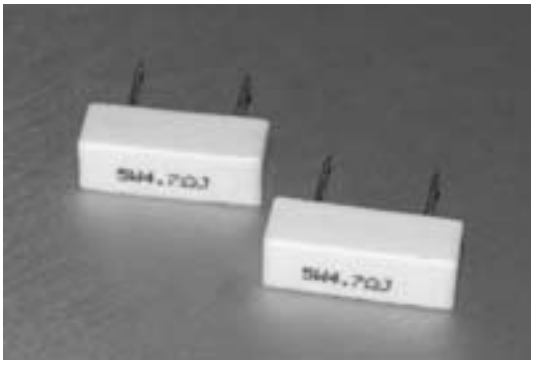
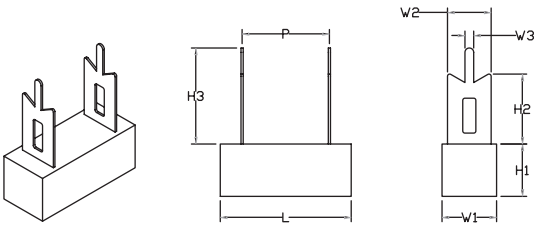


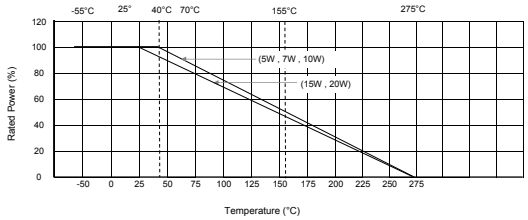
Features

- Good heat dissipation
- Excellent electrical characteristics
- Ability to withstand rigorous load test
- Flame, arc and moisture resistance as well as self extinguishing capabilities

Dimensions and Construction



Type (Power Rating)	Dimensions (Millimeters)							
	L	P	W_1	W_2	W_3	H_1	H_2	H_3
SQZ5 (5W)	1.063 ± 0.040 (27.00 ± 1.00)	0.591 ± 0.059 (15.00 ± 1.50)	0.374 ± 0.040 (9.50 ± 1.00)	0.287 ± 0.020 (7.30 ± 0.50)	0.177 ± 0.020 (4.50 ± 0.50)	0.374 ± 0.040 (9.50 ± 1.00)	0.374 ± 0.020 (9.50 ± 0.50)	0.591 ± 0.020 (15.00 ± 0.50)
SQZ7 (7W)	1.378 ± 0.040 (35.00 ± 1.00)	0.787 ± 0.059 (20.00 ± 1.50)						
SQZ10 (10W)	1.890 ± 0.040 (48.00 ± 1.00)	1.260 ± 0.059 (32.00 ± 1.50)						
SQZ15 (15W)			0.492 ± 0.040 (12.50 ± 1.00)	0.394 ± 0.020 (10.00 ± 0.50)	0.197 ± 0.020 (5.00 ± 0.50)	0.472 ± 0.040 (12.00 ± 1.00)	0.591 ± 0.020 (15.00 ± 0.50)	0.827 ± 0.020 (21.00 ± 0.50)
SQZ20 (20W)	2.362 ± 0.040 (60.00 ± 1.00)	1.654 ± 0.059 (42.00 ± 1.50)	0.591 ± 0.040 (15.00 ± 1.00)			0.512 ± 0.040 (13.00 ± 1.00)		



Ordering Code / Information

SQZ	5	-	XXXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Cement Radial Terminals Type Resistors	5 7 10 15 20	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J - 5%	B = Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Operating Temperature Range
SQZ5	5W	±300	0.1Ω - 100KΩ	-55°C to +155°C
SQZ7	7W			
SQZ10	10W			
SQZ15	15W			
SQZ20	20W			

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	±(1.0% + 0.05Ω)	In V-Block for 60 seconds
Temperature Coefficient of Resistance	±300 ppm/°C	Room Temp. ± 100°C
Solderability	95% min. coverage	235°C for 5 ± 0.5 seconds
Load Life In Humidity	±(5.0% + 0.05Ω)	40°C ± 2°C , 90% - 95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5.0% + 0.05Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1.0% + 0.05Ω)	260°C ± 10°C for 3 ± 0.5 seconds

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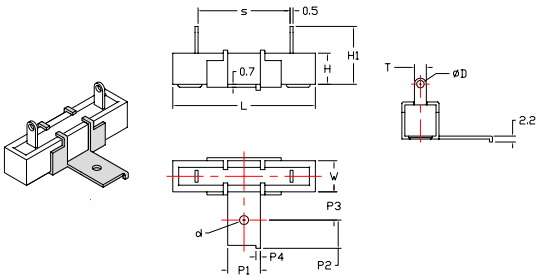
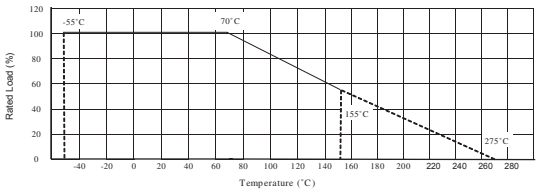
Features

- Completely inflammable
- Rectangular, clamp mounting type

Dimensions and Construction



Type (Power Rating)	Dimensions											
	Inches (Milimeters)											
	L	H	W	S	H1	P1	P2	P3	P4	d	T	D
SQH (10W)	1.890 ± 0.060 (48.00 ± 1.50)	0.413 ± 0.040 (10.50 ± 1.00)	0.413 ± 0.002 (10.50 ± 1.00)	1.300 ± 0.079 (33.00 ± 2.00)	0.768 ± 0.040 (19.50 ± 1.00)	0.472 ± 0.020 (12.0 ± 0.5)	0.236 ± 0.020 (6.00 ± 0.50)	0.315 ± 0.020 (8.00 ± 0.50)	0.118 ± 0.020 (3.00 ± 0.50)	0.150 ± 0.020 (3.80 ± 0.50)	0.217 ± 0.020 (5.50 ± 0.50)	0.094 ± 0.012 (2.40 ± 0.30)
SQH (15W)		0.492 ± 0.040 (12.50 ± 1.00)	0.492 ± 0.040 (12.50 ± 1.00)		0.807 ± 0.040 (20.50 ± 1.00)						0.244 ± 0.020 (6.20 ± 0.50)	
SQH (20W)	2.500 ± 0.079 (63.50 ± 2.00)			1.890 ± 0.079 (48.00 ± 2.00)							0.295 ± 0.020 (7.50 ± 0.50)	0.126 ± 0.012 (3.20 ± 0.30)
SQH (25W)		0.630 ± 0.002 (16.00 ± 1.00)	0.630 ± 0.040 (16.00 ± 1.00)	1.811 ± 0.079 (46.00 ± 2.00)	1.102 ± 0.059 (28.00 ± 1.50)			0.394 ± 0.020 (10.00 ± 0.50)				
SQH (30W)	2.953 ± 0.079 (75.00 ± 2.00)	0.748 ± 0.002 (19.00 ± 1.00)	0.748 ± 0.079 (19.00 ± 2.00)	2.205 ± 0.079 (56.00 ± 2.00)	1.142 ± 0.059 (29.00 ± 1.50)	0.709 ± 0.020 (18.00 ± 0.50)	0.315 ± 0.020 (8.00 ± 0.50)			0.165 ± 0.020 (4.20 ± 0.50)		
SQH (40W)	3.543 ± 0.118 (90.00 ± 3.00)			2.677 ± 0.079 (68.00 ± 2.00)			0.354 ± 0.020 (9.00 ± 0.50)					



Ordering Code / Information

SQH	10	-	XXXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Rectangular Cement Clamp Mounting Type Resistors	10 15 20 25 30 40	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J - 5%	B = Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Operating Temperature Range
SQH10	10W	±300	0.1Ω - 100KΩ	-55°C to +155°C
SQH15	15W			
SQH12	20W			
SQH13	25W			
SQH14	30W			
SQH15	40W			

Test	Specification		Test Method
Resistance Value	Within Resistors specification		To be measure at 25°C
Resistance Temperature Coefficient	Within Specification of TCR		25°C/ +125°C
Short Time Overload	±(2.0% + 0.05Ω)	For 5% tolerance	Apply 2.5 times of rated voltage or maximum overload voltage for 5 secs which is lower
Resistance to Soldering Heat	±(1.0% + 0.05Ω)	For 5% tolerance	260°C ± 5°C, 10 seconds ± 1 second
Moisture Resistance	±(5.0% + 0.05Ω)	For 5% tolerance	40°C ± 2°C, 90% - 95% RH, 1000 hours
Load Life	±(5.0% + 0.05Ω)	For 5% tolerance	70°C ± 2°C ,1000 hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	±(2.0% + 0.05Ω)	For 5% tolerance	275°C ± 3°C, for 2 hours

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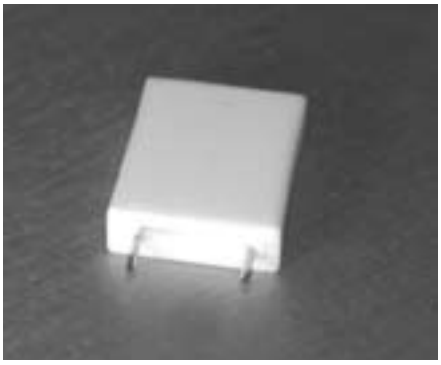
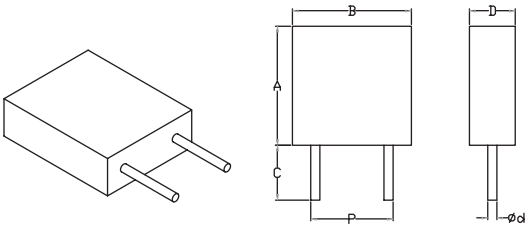


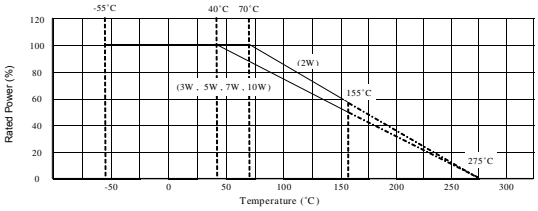
Features

- Excellent flame, arc and moisture resistance as well as self extinguishing capabilities
- Ability to withstand the most rigorous loading tests

Dimensions and Construction



Type (Power Rating)	Dimensions					
	Inches (Millimeters)					
	A	B	C	D	d	p
SQL2 (2W)	0.315 ± 0.040 (8.00 ± 1.00)	0.512 ± 0.040 (13.00 ± 1.00)	0.138 ± 0.040 (3.50 ± 1.00)	0.197 ± 0.040 (5.00 ± 1.00)	0.024 ± 0.002 (0.60 ± 0.05)	0.354 ± 0.040 (9.00 ± 1.00)
SQL3 (3W)	0.512 ± 0.040 (13.00 ± 1.00)					0.315 ± 0.040 (8.00 ± 1.00)
SQL5 (5W)	0.709 ± 0.040 (18.00 ± 1.00)	0.551 ± 0.040 (14.00 ± 1.00)				0.394 ± 0.040 (10.00 ± 1.00)
SQL7 (7W)		1.024 ± 0.040 (26.00 ± 1.00)			0.031 ± 0.002 (0.80 ± 0.05)	0.787 ± 0.040 (20.00 ± 1.00)
SQL10 (10W)	0.787 ± 0.040 (20.00 ± 1.00)					



Ordering Code / Information

SQL	2	-	XXX	J	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Cement Radial Lead Type Resistors	2 3 5 7 10	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J - 5%	B - Bulk

Application and Ratings

Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range E-24 J(±5%)	Max Working Voltage	Max Overload Voltage	Operating Temperature Range
SQL2	2W	±250	0.1Ω - 0.68Ω	250V	500V	-55°C to +155°C
SQL3	3W		0.05Ω - 1Ω	350V	700V	
SQL5	5W		0.05Ω - 3.3Ω			
SQL7	7W			500V	1,000V	
SQL10	10W					

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	Within resistors specification	In V-Block for 60 seconds
Temperature Coefficient of Resistance	Within resistors specification	-55°C to +155°C
Solderability	95% min. coverage	260°C ± 5°C for 5 ± 0.5 seconds
Load Life In Humidity	±(5.0% + 0.05Ω)	40°C ± 2°C , 90% - 95% RH at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(5.0% + 0.05Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1.0% + 0.05Ω)	350°C ± 10°C for 3 ± 0.5 seconds

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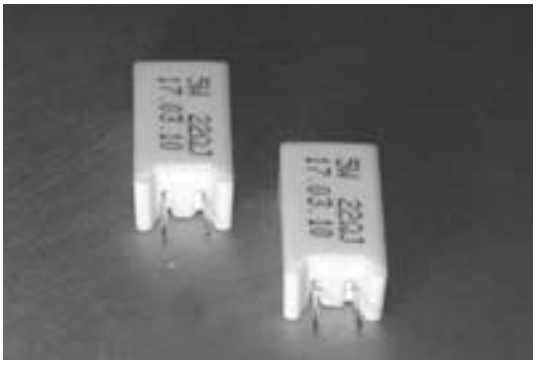
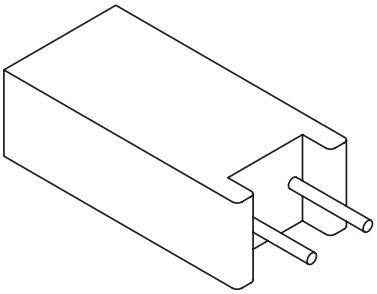
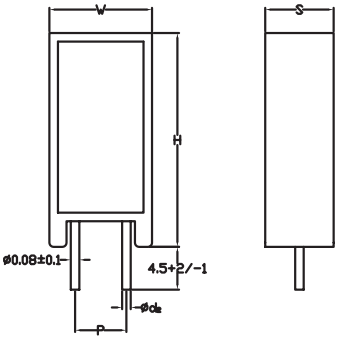


Features

- Prevents overloading
- Provide outstanding feature against surges, suitable for the prevention of inrush current for switching regulators

Dimensions and Construction





Type (Power Rating)	Dimensions Inches (Millimeters)				
	H	W	S	P	d_2
FTR100	0.984 ± 0.059 (25.00 ± 1.50)	0.512 ± 0.040 (13.00 ± 1.00)	0.354 ± 0.040 (9.00 ± 1.00)	0.197 ± 0.040 (5.00 ± 1.00)	2A: 0.024 ± 0.004 (0.60 ± 0.10) 3A: 0.024 ± 0.004 (0.60 ± 0.10) 5A: 0.040 ± 0.004 (1.00 ± 0.10) 10A: 0.040 ± 0.004 (1.00 ± 0.10)
FTR200	1.500 ± 0.059 (38.00 ± 1.50)				
FTR300	1.378 ± 0.059 (35.00 ± 1.50)	0.551 ± 0.040 (14.00 ± 1.00)	0.472 ± 0.040 (12.0 ± 1.0)	0.295 ± 0.040 (7.50 ± 1.00)	

Ordering Code / Information

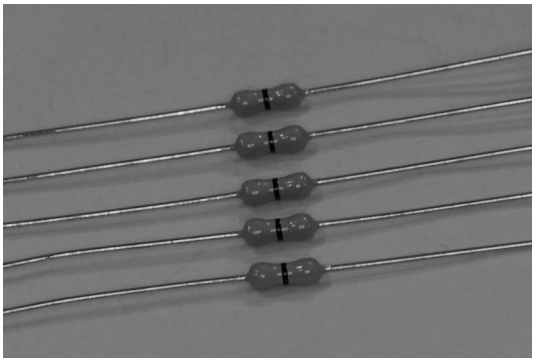
FTR	2A	-	XXX	J	-	B

Type	Current Rating	Nominal Resistance			Resistance Tolerance	Packaging
Fusible Thermal Cement Type Resistors	2A 3A 5A 10A	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	J - 5%	B = Bulk

Application and Ratings

Product Type	Standard Current Rating	Fusing Temperature (°C)	T.C.R (ppm/°C) Max	Resistance Range J(±5%)	Standard Voltage	Operating Temperature Range	FTR 100	FTR 200	FTR 300
							Power Rating at 70°C		
FTR100 FTR200 FTR300	10A	109 + 1/-3	±250	1Ω - 10KΩ	250V	-25°C to +125°C	1.2	1.4	2.0
		129 ± 4					1.6	2.0	2.5
		152 ± -4					1.6	2.0	2.5
		188 + 3/-1					2.0	2.4	3.5
		226 + 1/-3					2.0		
	5A	129 ± 3					1.6	2.2	-
		187 + 1/-3					2.1	2.4	-
	3A	145 ± 4					1.6	2.2	-
	2A	95 + 3/0					0.8	1.2	-
		110 ± 4					1.2	1.4	-
		126 ± 4					1.4	1.6	-
		130 ± 4					1.6	2.1	-
		145 ± 4					2.1	2.4	-

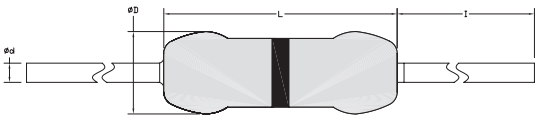
Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(2.0% + 0.05Ω)	2.5 times RCWV for 5 seconds
Temperature Coefficient of Resistance	Within resistors specification	-55°C to +155°C
Load Life	±(5.0% + 0.1Ω)	70°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)



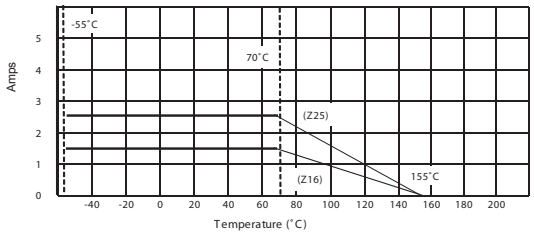
Features

- Interconnection devices between points on a PCB
- Suitable for automatic machine insertion

Dimensions and Construction



Type	Dimensions			
	Inches (Millimeters)			
	L	D	d	l
Z16 (1.6A)	0.130 ± 0.012 (3.30 ± 0.30)	0.067 ± 0.008 (1.70 ± 0.20)	0.018 ± 0.002 (0.45 ± 0.05)	1.102 ± 0.079 (28.00 ± 2.00)
Z25 (2.5A)	0.248 ± 0.020 (6.30 ± 0.50)	0.091 ± 0.020 (2.30 ± 0.50)	0.024 ± 0.002 (0.60 ± 0.05)	



Ordering Code / Information

Z	16	-	A	5

Type	Current Rating		Packaging	Quantity
Zero Ohm Jumper Leaded Resistors	16 25		A = Ammo S = Spool B = Bulk	1 = 1,000 pcs 2 = 2,000 pcs 5 = 5,000 pcs

Application and Ratings

Product Type	Current Rating (A)	Min. Dielectric Withstanding Voltage	Resistance Range	Operating Temperature Range
Z16	1.6A	300V	0.02Ω Maximum	-55°C to +155°C
Z25	2.5A	500V		

Test	Specification	Test Method
Resistance Value	< 0.02Ω	To be measure at 25°C
Resistance to Soldering Heat	< 0.02Ω	260°C ± 5°C, 10 seconds ± 1 second
Load Life	< 0.02Ω	70°C ± 2°C ,1000hours, 1.5 hours On,0.5 hours Off cycle
High Temperature Exposure	< 0.02Ω	125°C , 1000 hours. Unpowered. Measurement at 24 ± 2 hours after test conclusion
	< 0.02Ω	

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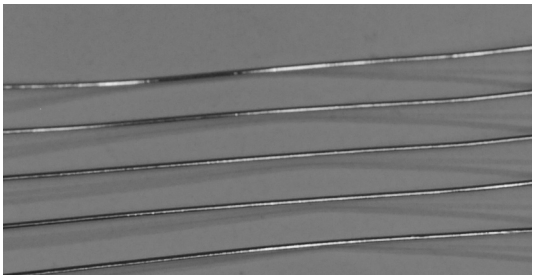
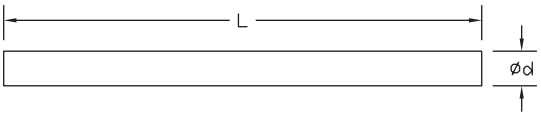


Features

- Interconnection devices between points on a PCB
- Suitable for automatic machine insertion
- Lead-free tinned annealed copper wire

Dimensions and Construction



Type	Dimensions	
	Inches (Millimeters)	
	L	d
JW55	2.362 ± 0.040 (60.00 ± 1.00)	0.019 ± 0.002 (0.48 ± 0.05)
JW56		0.023 ± 0.002 (0.58 ± 0.05)
JW57		0.028 ± 0.002 (0.70 ± 0.05)
JW58		0.031 ± 0.002 (0.80 ± 0.05)
JW60		0.024 ± 0.002 (0.60 ± 0.05)

Ordering Code / Information

JW	55	-	A	10

Type	Current Diameter	Packaging	Quantity
Jumper Wires	55 56 57 58 60	A = Ammo	10 = 10,000 pcs

Application and Ratings

Test	JW55	JW56	JW57	JW58	JW60
Maximum Resistance (Ω)	0.01Ω	0.01Ω	0.01Ω	0.01Ω	0.01Ω
Elongation (%)	Min 24	Min 25	Min 25	Min 25	Min 25
Tensile strength (Kg/mm²)	28	28	28	28	28
Bending strength (cycle)	250g	500g	500g	500g	500g
	Min 3	Min 3	Min 3	Min 3	Min 3
Current rating at 70 °C (AMPS)	6	7.5	8.5	10	7.5
Solderability	260°C, 5 sec > 95% coverage				
Appearance	Smooth and Shinning				

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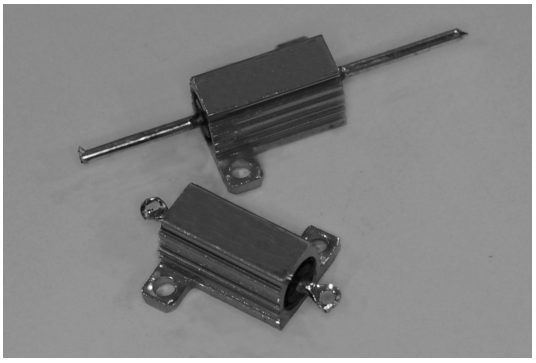
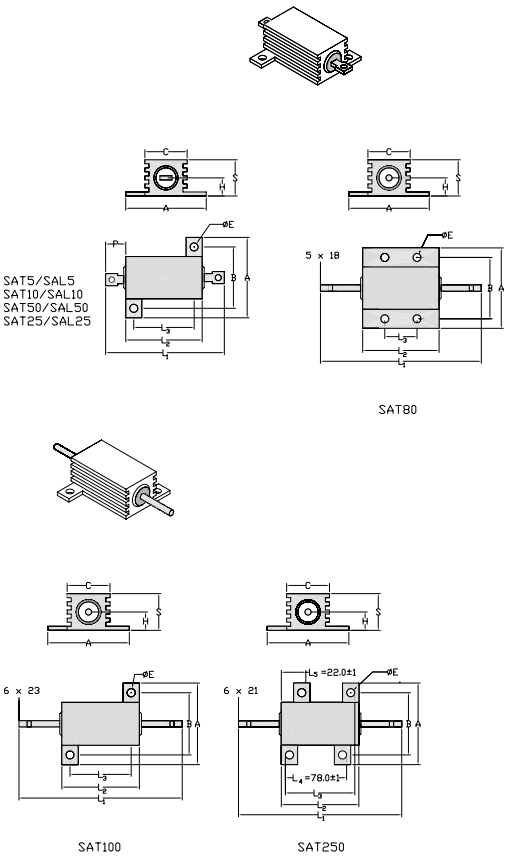


Features

- Great power rating in small package size for space constraint board
- Good heat dissipation
- Straight lead wire or Lug / Threaded type available

Dimensions and Construction



Type	Dimensions (Inches (Millimeters))									
	L_1	L_2	L_3	A	B	C	ØE	S	H	P
SAT5 / SAL5 (5W)	0.984 ± 0.079 (25.00 ± 2.00)	0.591 ± 0.040 (15.00 ± 1.00)	0.394 ± 0.040 (10.00 ± 1.00)	0.650 ± 0.040 (16.50 ± 1.00)	0.492 ± 0.040 (12.50 ± 1.00)	0.350 ± 0.040 (8.50 ± 1.00)	0.079 ± 0.012 (2.00± 0.30)	0.315 ± ±0.040 (8.00 ± 1.00)	0.157 ± 0.020 (4.00 ± 0.50)	0.197 ± 0.079 (5.00 ± 2.00)
SAT10 / SAL10 (10W)	1.260 ± 0.079 (32.00 ± 2.00)	0.748 ± 0.040 (19.00 ± 1.00)	0.551 ± 0.040 (14.00 ± 1.00)	0.787 ± 0.040 (20.00 ± 1.00)	0.610 ± 0.040 (15.50 ± 1.00)	0.413 ± 0.040 (10.50 ± 1.00)		0.394 ± 0.040 (10.00 ± 1.00)	0.197 ± 0.020 (5.00 ± 0.50)	0.236 ± 0.079 (6.00 ± 2.0)
SAT25 / SAL25 (25W)	1.850 ± 0.079 (47.00 ± 2.00)	1.063 ± 0.040 (27.00 ± 1.00)	0.709 ± 0.040 (18.00 ± 1.00)	1.063 ± 0.040 (27.00 ± 1.00)	0.748 ± 0.040 (19.00 ± 1.00)	0.591 ± 0.040 (15.00 ± 1.00)	0.126 ± 0.012 (3.20 ± 0.30)	0.610 ± 0.040 (15.50 ± 1.00)	0.276 ± 0.020 (7.00 ± 0.50)	0.394 ± 0.079 (10.00 ± 2.0)
SAT50 / SAL50 (50W)	2.756 ± 0.079 (70.00 ± 2.00)	1.969 ± 0.040 (50.00 ± 1.00)	1.535 ± 0.040 (39.00 ± 1.00)	1.142 ± 0.040 (29.00 ± 1.00)	0.827 ± 0.040 (21.00 ± 1.00)					
SAT80 (80W)	4.016 ± 0.079 (102.00 ± 2.00)	2.600 ± 0.040 (66.00 ± 1.00)	1.378 ± 0.040 (35.00 ± 1.00)	1.850 ± 0.040 (47.00 ± 1.00)	1.457 ± 0.040 (37.00 ± 1.00)	1.102 ± 0.040 (28.00 ± 1.00)	0.177 ± 0.012 (4.50 ± 0.30)	0.984 ± 0.040 (25.00 ± 1.00)	0.472 ± 0.020 (12.00 ± 0.50)	-
SAT100 (100W)	5.315 ± 0.079 (135.00 ± 2.00)	3.504 ± 0.040 (89.00 ± 1.00)	2.717 ± 0.040 (69.00 ± 1.00)	2.756 ± 0.040 (70.00 ± 1.00)	1.890 ± 0.040 (48.00 ± 1.00)	1.811 ± 0.040 (46.00 ± 1.00)	0.197 ± 0.012 (5.00 ± 0.30)	1.752 ± 0.040 (44.50 ± 1.00)	0.768 ± 0.020 (19.50 ± 0.50)	
SAT250 (250W)	6.102 ± 0.079 (155.00 ± 2.00)	4.488 ± 0.040 (114.00 ± 1.00)	3.858 ± 0.040 (98.00 ± 1.00)	3.031 ± 0.040 (77.00 ± 1.00)	2.520 ± 0.040 (64.00 ± 1.00)	2.087 ± 0.040 (53.00 ± 1.00)		2.185 ± 0.040 (55.50 ± 1.00)	0.984 ± 0.020 (25.00 ± 0.50)	

Ordering Code / Information

SAT	5	-	XXXX	C	-	B

Type	Power Rating	Nominal Resistance			Resistance Tolerance	Packaging
Aluminum Housed Resistors	5 - 5W 10 - 10W 25 - 25W 50 - 50W 80 - 80W 100 - 100W 250 - 250W	Resistors	3-Digit	E24 Series 2.2Ω=2R2 100Ω=101	C = ±0.25% D = ±0.5% F = ±1% J = ±5% K = ±10%	B = Bulk
SAT - Lug Terminals SAL - Straight Lead Wire			4-Digit	E96 Series 10.2Ω=10R2 10KΩ=1002		

Application and Ratings				
Product Type	Power Rating @ 70°C	T.C.R (ppm/°C) Max	Resistance Range C(±0.25%), D(±0.5%), F(±1%), J(±5%), K(±10%)	Operating Temperature Range
SAT5 / SAL5	5W	±200	0.1Ω - 100Ω	-55°C to +275°C
SAT10 / SAL10	10W			
SAT25 / SAL25	25W			
SAT50 / SAL50	50W			
SAT80	80W			
SAT100	100W		0.1Ω - 3KΩ	
SAT250	250W			

Test	Specification	Conditions
Resistance Value	Within resistors specification	To be measure at 25°C
Short Time Overload	±(0.5% + 0.05Ω)	2.5 times RCWV for 5 seconds
Dielectric Withstanding Voltage	Within resistors specification	In V-Block for 60 seconds
Temperature Coefficient of Resistance	Within resistors specification	-55°C to +275°C
Insulation Resistance	>100MΩ	In V-Block
Solderability	95% min. coverage	260°C ± 5°C for 5 ±0.5 seconds
Load Life In Humidity	±(0.5% + 0.05Ω)	40°C ± 2°C , 90% - 95% RH at 1/10 x Power Rating for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Load Life	±(1.5% + 0.05Ω)	25°C at RCWV for 1000hrs (1.5 hrs. on , 0.5 hrs. off)
Resistance To Soldering Heat	±(1.0% + 0.05Ω)	260°C ± 10°C for 3 ± 0.5 seconds

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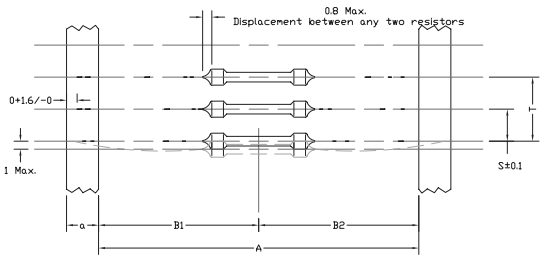
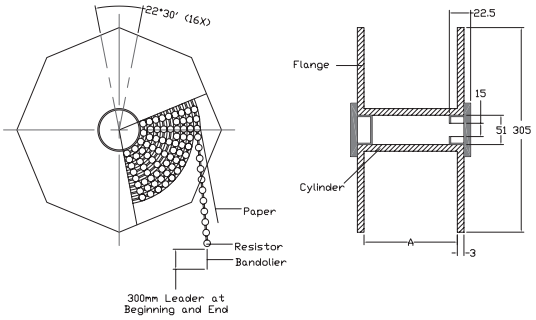
Dimensions and Construction



Dimensions (Millimeters)

Type	26mm Taping			52mm Taping			73mm Taping			91mm Taping			T (max. deviation of spacing)
	a	A	S	a	A	S	a	A	S	a	A	S	
MF	6.0 ± 0.5	26.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	1mm per 10 spacings 0.5 mm per 5 spacings
CF	6.0 ± 0.5	26.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
MO	6.0 ± 0.5	26.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	6.2 ± 0.5	91.0 ± 1.0	10.16 ± 1.0	
KNP	-	-	-	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	6.0 ± 0.5	91.0 ± 1.0	10.0 ± 1.0	
JW	-	-	-	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	-	-	-	-	-	-	
Z	6.0 ± 0.5	26.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	-	-	-	-	-	-	
FM	6.0 ± 0.5	26.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
FSR	-	-	-	6.0 ± 0.5	52.4 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
FP	6.0 ± 0.5	26.0 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	52.0 ± 1.0	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	5.0 ± 1.0	-	-	-	
MGH	6.0 ± 0.5	26.0 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	52.4 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
MGP	6.0 ± 0.5	26.0 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	52.4 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
KNH	-	-	-	6.0 ± 0.5	52.4 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	-	-	-	
FWW	-	-	-	6.0 ± 0.5	52.4 ± 1.5	5.0 ± 1.0	6.0 ± 0.5	73.0 ± 1.5	10.0 ± 1.0	6.0 ± 0.5	91.0 ± 1.0	10.0 ± 1.0	

Dimensions and Construction

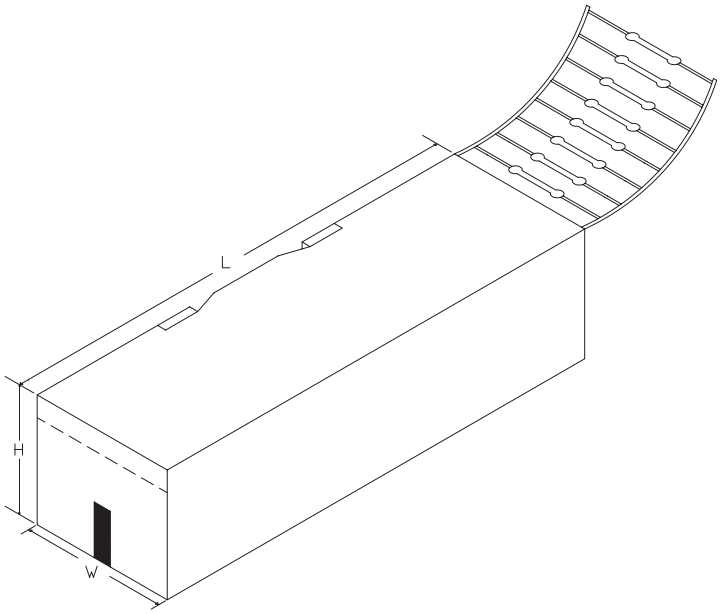


Dimensions (Millimeters)

Type		Quantity Per Reel (Pcs)		Across Flange (A)	
Normal	Small Size		26mm Tapping	52mm Tapping	73 mm Tapping
MF50	MF55SS	5000	-	72	-
MF55	MF60SS	5000		72	
MF60	-	1000 / 3000		72	95
MF70	-	1000 / 2000		-	95
MF75	-	1000			95

Type		Quantity Per Reel (Pcs)		Across Flange (A)	
Normal	Small Size		26mm Tapping	52mm Tapping	73 mm Tapping
CF1/6	CF1/4SS	5000	-	72	-
CF1/4	CF1/2SS			72	
CF1/2	CF1SS	3000		72	
CF1	CF2SS	1000 / 3000		72	
CF2	-	1000 / 2000		-	95
CF3	-	1000			95
MO1/4	MO1/2SS	5000	-	72	-
MO1/2	MO1SS	3000		72	
MO1	MO2SS	2000		72	95
MO2	MO3SS	1000		-	95
MO3	-				95
MO5	MO5SS	500			95
KNP1/4	KNP1/2SS	5000	-	72	-
KNP1/2	KNP1SS	3000		72	
KNP1	KNP2SS	2000		72	95
KNP2	KNP3SS	1000		72	95
KNP3	-			-	95
Z16 / Z25	-	5000	40	75	-
FM50	FM55SS	5000	48	72	-
FM55	FM60SS	5000	48	72	
FM60	-	3000	-	72	
FM65	-	2000		-	95
FM70	-	1000			95
FP1/6	FP1/4SS	5000	48	72	-
FP1/4	FP1/2SS	5000	48	72	
FP1/2	-	3000	-	72	
FP1	-	1000		-	95
FP2	-	1000			95
MGH1/4	-	5000	48	72	-
MGH1/2	-	2500	-	72	
-	MGH1SS	2500		72	
MGH1	-	1000		-	95
MGP1/4		5000	48	72	-
-	MGP1/2SS	5000	48	72	
MGP1/2	-	2500	-	72	
MGP1	-	2000		-	95
MGP2	-	1000			95
KNH1	-	5,000	-	72	-
KNH2	-	2,500		72	
KNH3	-	2,000	-	-	95
KNH4	-	1,000			95

Dimensions and Construction



Dimensions (Millimeters)

Type		NO. OF UNITS	26MM TAPING			52MM TAPING			73MM TAPING			91MM TAPING		
Normal	Small Size		L	W	H	L	W	H	L	W	H	L	W	H
KNH2	-	2,500	-	-	-	260	81	104	-	-	-	-	-	-
KNH3	-	2,000	-	-	-	-	-	-	260	103	78			
KNH4	-	1,000	-	-	-	-	-	-	260	103	94			

Dimensions (Millimeters)

Type		Pcs /Per Bag	Pcs /Per Box
Normal	**Small Size**		
KNP6 , KNP7 , KNP8 , KNP10	**-**	50	200
JW55 , JW56 , JW57 , JW58 , JW60	**-**	-	10, 000
SQP2 , SQP3 , SQP5	**-**	50	500
SQP7 , SQP10 , SQP15	**-**	50	200
SQP20 , SQP25	**-**	25	100
SQM2 , SQM3 , SQM5	**-**	50	500
SQM7	**-**	50	400
SQM10	**SQM10SS , SQM15SS**	50	200
SQZ5 , SQZ7 , SQZ10	**-**	50	200
SQZ15 , SQZ20	**-**	25	100
SQH10 , SQH15 , SQH12	**-**	-	30
SQH13 , SQH14 , SQH15	**-**	-	20

*For other products, packaging quantity varies with order quantity. Please consult factory.

NOMINAL STANDARD RESISTANCE VALUES FOR THE 10-TO-100 DECADE

(also usable in decade multiples or sub-multiples)

Resistance Tolerance (±%)																	
0.1%		1%	0.1%		1%	0.1%		1%	0.1%		1%	0.1%		1%	0.1%		1%
0.25%	1%	2%	0.25%	1%	2%	0.25%	1%	2%	0.25%	1%	2%	0.25%	1%	2%	0.25%	1%	2%
0.5%		5%	0.5%		5%	0.5%		5%	0.5%		5%	0.5%		5%	0.5%		5%
10.0	10.0	10	14.7	14.7	-	21.5	21.5	-	31.6	31.6	-	46.4	46.4	-	68.1	68.1	68
10.1	-	-	14.9	-	-	21.8	-	-	32.0	-	-	47.0	-	47	69.0	-	-
10.2	10.2	-	15.0	15.0	15	22.1	22.1	22	32.4	32.4	-	47.5	47.5	-	69.8	69.8	-
10.4	-	-	15.2	-	-	22.3	-	-	32.8	-	-	48.1	-	-	70.6	-	-
10.5	10.5	-	15.4	15.4	-	22.6	22.6	-	33.2	33.2	33	48.7	48.7	-	71.5	71.5	-
10.6	-	-	15.6	-	-	22.9	-	-	33.6	-	-	49.3	-	-	72.3	-	-
10.7	10.7	-	15.8	15.8	-	23.2	23.2	-	34.0	34.0	-	49.9	49.9	-	73.2	73.2	-
10.9	-	-	16.0	-	16	23.4	-	-	34.4	-	-	50.5	-	-	74.1	-	-
11.0	11.0	11	16.2	16.2	-	23.7	23.7	-	34.8	34.8	-	51.1	51.1	51	75.0	75.0	75
11.1	-	-	16.4	-	-	24.0	-	24	35.2	-	-	51.7	-	-	75.9	-	-
11.3	11.3	-	16.5	16.5	-	24.3	24.3	-	35.7	35.7	-	52.3	52.3	-	76.8	76.8	-
11.4	-	-	16.7	-	-	24.6	-	-	36.1	-	36	53.0	-	-	77.7	-	-
11.5	11.5	-	16.9	16.9	-	24.9	24.9	-	36.5	36.5	-	53.6	53.6	-	78.7	78.7	-
11.7	-	-	17.2	-	-	25.2	-	-	37.0	-	-	54.2	-	-	79.6	-	-
11.8	11.8	-	17.4	17.4	-	25.5	25.5	-	37.4	37.4	-	54.9	54.9	-	80.6	80.6	-
12.0	-	12	17.6	-	-	25.8	-	-	37.9	-	-	55.6	-	-	81.6	-	-
12.1	12.1	-	17.8	17.8	-	26.1	26.1	-	38.3	38.3	-	56.2	56.2	56	82.5	82.5	82
12.3	-	-	18.0	-	18	26.4	-	-	38.8	-	-	56.9	-	-	83.5	-	-
12.4	12.4	-	18.2	18.2	-	26.7	26.7	-	39.2	39.2	39	57.6	57.6	-	84.5	84.5	-
12.6	-	-	18.4	-	-	27.1	-	27	39.7	-	-	58.3	-	-	85.6	-	-
12.7	12.7	-	18.7	18.7	-	27.4	27.4	-	40.2	40.2	-	59.0	59.0	-	86.6	86.6	-
12.9	-	-	18.9	-	-	27.7	-	-	40.7	-	-	59.7	-	-	87.6	-	-
13.0	13.0	13	19.1	19.1	-	28.0	28.0	-	41.2	41.2	-	60.4	60.4	-	88.7	88.7	-
13.2	-	-	19.3	-	-	28.4	-	-	41.7	-	-	61.2	-	-	89.8	-	-
13.3	13.3	-	19.6	19.6	-	28.7	28.7	-	42.2	42.2	-	61.9	61.9	62	90.9	90.9	91
13.5	-	-	19.8	-	-	29.1	-	-	42.7	-	-	62.6	-	-	92.0	-	-
13.7	13.7	-	20.0	20.0	20	29.4	29.4	-	43.2	43.2	43	63.4	63.4	-	93.1	93.1	-
13.8	-	-	20.3	-	-	29.8	-	-	43.7	-	-	64.2	-	-	94.2	-	-
14.0	14.0	-	20.5	20.5	-	30.1	30.1	30	44.2	44.2	-	64.9	64.9	-	95.3	95.3	-
14.2	-	-	20.8	-	-	30.5	-	-	44.8	-	-	65.7	-	-	96.5	-	-
14.3	14.3	-	21.0	21.0	-	30.9	30.9	-	45.3	45.3	-	66.5	66.5	-	97.6	97.6	-
14.5	-	-	21.3	-	-	31.2	-	-	45.9	-	-	67.3	-	-	98.8	-	-
E-192	E-96	E-24	E-192	E-96	E-24	E-192	E-96	E-24	E-192	E-96	E-24	E-192	E-96	E-24	E-192	E-96	E-24

MANUFACTURING PLANT

MALAYSIA

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CHINA

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