



CURRENT SENSE / LOW OHM
OPEN FRAME TYPE

OA/OP

SERIES

OPEN FRAME

Low Inductance Axial / PCB
Mounting

- 0.5W to 5W
- R0015 to R10

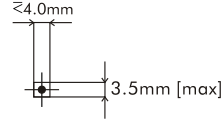
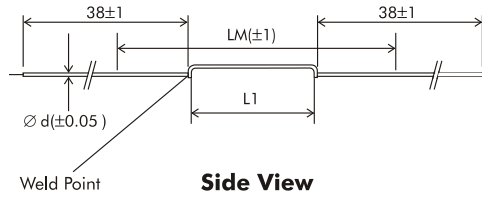
As per AEC-Q200





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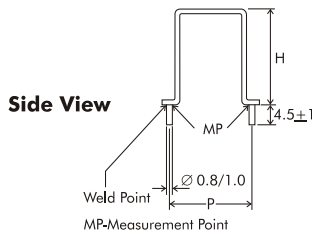
PHYSICAL CONFIGURATION



OA SERIES (AXIAL)

HTR TYPE	POWER RATING at 85°C	DIMENSIONS (mm)			RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms) BASED ON RESISTANCE VALUE		
		L1	d	LM	min	max	low	med	high
OA-1	1 W	11 to 15	0.8	40	R003	R051	1.25	0.75	0.5
OA-2	2 W	16.3 to 22.5	1.0	45	R0041	R068	1.75	1.1	0.75
OA-3	3 W	28 to 35.5	1.0	60	R0056	R10	2.25	1.4	0.85

Note: Resistance values must be checked using 4½ digit micro ohm meter with four wire system and insulated clips, which should be attached to the resistor leads over centered length "LM" in the case of OA series and at the weld points in OP series. In differing conditions, please compensate by $\pm 0.4m \Omega/cm$.



Profile Dimensions



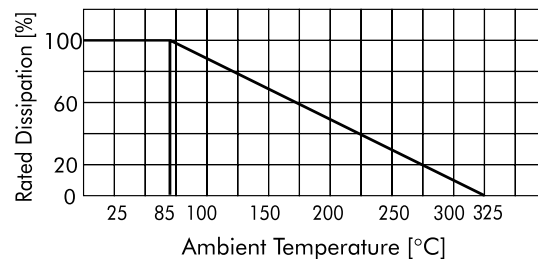
OP SERIES (PCB MOUNTING)

HTR TYPE	POWER RATING at 85°C	DIMENSIONS (mm)		RESISTANCE RANGE		TYPICAL WEIGHT PER PC (gms) BASED ON RESISTANCE VALUE		
		P ±1.0	H max	min	max	low	med	high
OP-0.5	0.5W	10.0	7.0	R003	R051	1.0	0.5	0.15
OP-1	1W	10.0	11.0	R003	R068	1.5	0.75	0.25
OP-1A	1W	15.0	9.0	R0022	R068	1.5	0.75	0.25
◆ OP-1.5	1.5W	10.0	17.0	R002	R10	1.8	0.90	0.35
▼ OP-1.5A	1.5W	15.0	15.5	R002	R10	1.8	0.90	0.35
▼ OP-1.5B	1.5W	20.0	12.5	R002	R10	1.9	1.0	0.35
▼ OP3	3W	10.0	18.0	R002	R10	2.85	1.1	0.45
▼ OP3A	3W	15.0	16.0	R002	R10	2.85	1.1	0.45
OP3B	3W	20.0	13.0	R002	R10	2.85	1.1	0.45
OP5W	5W	20.0	26.0	R0015	R10	3.10	1.5	0.9

Note: For 0.5W - 1.5W the terminations will be tin pated copper/copper clad steel $\varnothing 0.8mm$.
For 3W - 5W the terminations will be tin plated copper/copper clad steel $\varnothing 1.0mm$.

- ◆ In OP 1A for resistance values lower than R003, it is recommended that 1.0mm terminations are requested.
- ▼ In OP 1.5 / OP 1.5A and OP 1.5B for resistance values lower than R004, it is recommended that 1.0mm terminations are requested.

DERATING CURVE





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ELECTRICAL AND ENVIRONMENTAL CHARACTERISTICS / DATA

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
Power Rating (Rated Ambient Temperature)	Full Power dissipation at 85°C and linearly derated to zero at +325°C - [Refer Derating curve above]
Resistance Tolerances Available	±10% [K]; ±5% [J]; ±3% [H]; ±2%[G]; ±1% [F]
Temperature Range	-55°C to +325°C with suitable derating as per derating curve above.
Voltage Rating / Limiting Voltage / Max Working Voltage	$V = \sqrt{P \times R}$
Short Time Overload (5 x Rated power for 5 secs)	$\Delta R \pm [0.75\% + R0005]$ - Average. $\Delta R \pm [1.25\% + R0005]$ - For resistance values near maximum range.
Temperature Co-efficient of Resistance (Measured from -55°C to +125°C referenced to +25°C)	± 60 ppm/°C to 900 ppm/°C [Depending on resistance value and can be lowered by using 1mm Ø terminations]
Climatic Category	55 / 200 / 56
Temperature Cycling (Room temperature → -55°C → Room temperature → 200°C → Room temperature for 5 cycles)	$\Delta R \pm [0.5\% + R0005]$ - Typical
Damp Heat (Steady State) [40°C at 93% R.H for 1000 hours - no load applied]	$\Delta R \pm [0.5\% + R0005]$ - Average
Endurance - Load Life [70°C with limiting voltage - 1.5 hours on / 0.5 hours off for 1000 hours]	$\Delta R \pm [\leq 2.75\% + R0005]$ - Average

MECHANICAL SPECIFICATIONS

PARAMETER/PERFORMANCE TEST & TEST METHOD	PERFORMANCE REQUIREMENTS
Terminal Tensile Strength	30 Newtons
Resistance to Soldering Heat (260°C - 270°C for 10 sec)	$\Delta R \pm [0.2\% + R0005]$ - Typical
Solderability (As per IEC Pub. 60068 - 2 - 20 Ta)	Must meet the requirements laid down.

Temperature rise observed in OA/OP series. Temperatures given are absolute temperatures at maximum power rating/free air rating and ambient of 30°C.

OP SERIES

HTR TYPE	POWER RATING	TEMP. ON BODY OF RESISTOR	TEMP. ON TERMINATION
OP 0.5	0.5W	55°C to 68°C	42°C to 56°C
OP1/OP 1A	1W	50°C to 68°C	46°C to 59°C
OP 1.5/1.5A & 1.5B	1.5W	64°C to 86°C	50°C to 71°C
OP3/3A/3B	3W	76°C to 137°C	61°C to 92°C
OP5W	5W	68°C to 170°C	61°C to 115°C

TEMPERATURES-OP SERIES

WATTAGE	RESISTANCE VALUE IN MILLIOHMS (mΩ)	TEMP ON HOT SPOT (TOP)	TEMP. ON SIDE WALL	TEMP. ON TERMINATION
0.5 W	3.0	62	56	48
0.5 W	10.0	68	60	48
0.5 W	51.0	70	62	48
1.0 W	2.2	70	63	52
1.0 W	3.0	70	63	52
1.0 W	10.0	78	67	52
1.0 W	68.0	86	71	52
1.5 W	2.0	85	74	60
1.5 W	10.0	100	84	62
1.5 W	100.0	124	98	65
3.0 W	2.0	100	84	65
3.0 W	10	116	96	68
3.0 W	100.0	138	106	70
5.0 W	1.5	110	94	70
5.0 W	10.0	126	103	74
5.0 W	50.0	157	120	78



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OA SERIES

HTR TYPE	POWER RATING	TEMP. ON BODY OF RESISTOR	TEMP. ON TERMINATION
OA1	1W	60°C to 89°C	59°C to 84°C
OA2	2W	69°C to 118°C	66°C to 110°C
OA3	3W	76°C to 147°C	70°C to 139°C

TEMPERATURES-OA SERIES

WATTAGE	RESISTANCE VALUE IN MILLIOHMS (mΩ)	TEMP ON HOT SPOT (TOP)	TEMP. ON TERMINATION
1.0 W	3.0	75	75
1.0 W	10.0	81	81
1.0 W	51.0	90	90
2.0 W	4.1	95	95
2.0 W	10.0	110	110
2.0 W	68.0	135	135
3.0 W	5.6	120	120
3.0 W	10.0	135	135
3.0 W	100.0	175	175

TYPICAL APPLICATIONS

The OA/OP series offer a non insulated - non inductive resistor having high stability / overload capacity. The tin plated copper/tin plated copper clad steel terminals are butt welded to the alloy resistive element forming a very reliable all welded construction which is finding increasing usage in switching and linear power supplies, instruments, regulators and other modern current sensing circuits

For the effective utilization of these resistors, please refer "Applications / Design notes for current sense resistors".

MARKING

Due to the nature of their construction these resistors cannot be marked with all relevant details on the resistive element, however resistive value, tolerance and date code will be marked on the device. All other relevant details will be on the packing box.

For complete details, please refer to the section titled - "PRINTING / MARKING SYSTEM being followed in OA / OP and OF series resistors".

ORDERING INFORMATION

Series	Type	Packing	Resistance Value	Tolerance
OA / OP	OA1/OA1* OP1/OP1*	Bulk OA1/OA1* OP1/OP1*	R047	J

1) RoHS version - OA1 * or OP1 *

2) In OP1A for resistance values lower than R003, it is recommended 1.0mm terminations be used.

For this - OA1 (1) or OP1 (1)

3) In OP1.5 / A / B for resistance values lower than R004, it is recommended 1.0mm terminations be used.

For this - OP 1.5 (1), OP 1.5A (1), OP 1.5B (1)