

## L. INDUSTRY TEST STANDARDS

Chip capacitor test parameters, performance specifications and quality conformance requirements are outlined in the EIA 198 and MIL-C-55681 specifications. A summary of electrical specifications for popular Class I and Class II dielectrics is presented in Table L-1. Relevant EIA and MIL test methods and quality conformance requirements (most commonly applicable to MLC capacitors) are given in Table L-2.

TABLE L-1  
ELECTRICAL SPECIFICATIONS FOR CLASS I AND CLASS II

	COG or NPO EIA 198, MIL-C-55681	BX MIL-C-55681	X7R EIA 198	Z5U EIA 198	Y5V EIA 198
Oper. Temp. Range	-55°C to 125°C	-55°C to 125°C	-55°C to 125°C	10°C to 85°C	-30°C to 85°C
Temp. Coefficient %ΔC Max., 0 Bias	0 +/- 30 ppm/°C	+/- 15%	+/- 15%	+22% -56%	+22% -82%
Temp-Volt Coeff. %ΔC Max., @ Vdc	0 +/- 30 ppm/°C	+15% -25%	N/A	N/A	N/A
Dissipation Factor, @ 25°C	0.10% Max.	2.5% Max.	2.5% Max.	3.0% Max.	5.0% Max.
Insulation R @ Vdc, 25°C	>100GΩ or >1000ΩF	>100GΩ or >1000ΩF	>100GΩ or >1000ΩF	>10GΩ or >100ΩF	>10GΩ or >100ΩF
Insulation R @ Vdc, 125°C	>10GΩ or >100ΩF	>10GΩ or >100ΩF	>10GΩ or >100ΩF	N/A	N/A
Dielectric Test Voltage, 25°C	250% WVdc	250% WVdc	250% WVdc	250% WVdc	250% WVdc
Aging Rate, Max %ΔC/decade	0%	-2.0%	-2.5%	-3.0%	-5.0%
Test Frequency, 25°C	<100 pF, !.0MHz >100pF, 1.0 KHz	1.0 KHz	1.0 KHz	1.0 KHz	1.0 KHz
Test Voltage, 25°C		1.0 +/- 0.2 Vrms	1.0 +/- 0.2 Vrms	0.5 +/- 0.2 Vrms	0.5 +/- 0.2 Vrms

Note: The dielectric withstanding test voltage shown in the table applies to voltage ratings for 200V or less. Typically, the following test voltages apply for varied ratings:

- 16V to 200V: 250% WVdc
- >200V <500V: 150% WVdc, or 500V: whichever is greater
- <500V: 120% WVdc, or 750V: whichever is greater

TABLE L-2  
GENERAL TESTING AND QUALITY CONFORMANCE  
SPECIFICATIONS FOR CHIP CAPACITORS

Specification	Test Category	MIL Method Number	EIA-198-1-E Method	Test Description
EIA-198-1-E MIL-C-55681: MIL-STD-202F (MIL-STD-883E)	Environmental	103B 104A (1002) 106F (1004.7) 107G (1011.9) 108A (1010.7)	205 203 204 202 201	Humidity Immersion Moisture Resistance Thermal Shock Life (@ elevated Temp.) Temperature Cycling
EIA-198-1-E MIL-C-55681: MIL-STD-202F (MIL-STD-883E)	Physical	204D 208H (2003.7) 210E 211A 212A 213B (2002.3) 215J (2001.2)	304 301 302 303  305 210 306 (EIA-469-C)	Vibration Solderability Resistance to Solder Heat Terminal Strength Acceleration Shock Resistance to Solvents Constant Acceleration Destructive Physical Analysis
EIA-198-1-E MIL-C-55681: MIL-STD-202F (MIL-STD-883E)	Electrical	301 302 (1003) 305 306	103 104 101 102 105	Dielectric Withstanding Voltage Insulation Resistance Capacitance and DF Quality Factor Voltage-Temp. Cap Coefficient
MIL-PRF-49467A		Appendix B		Partial Discharge (High Voltage)