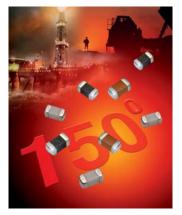
# X8R/X8L Dielectric







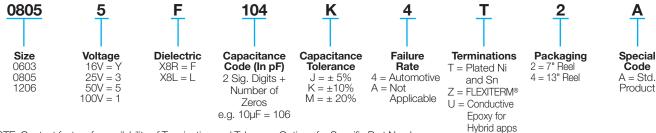
AVX has developed a range of multilayer ceramic capacitors designed for use in applications up to 150°C. These capacitors are manufactured with an X8R and an X8L dielectric material. X8R material has capacitance variation of  $\pm 15\%$  between -55°C and +150°C. The X8L material has capacitance variation of  $\pm 15\%$  between -55°C to 125°C and +15/-40% from +125°C to +150°C.

The need for X8R and X8L performance has been driven by customer requirements for parts that operate at elevated temperatures. They provide a highly reliable capacitor with low loss and stable capacitance over temperature.

They are ideal for automotive under the hood sensors, and various industrial applications. Typical industrial application would be drilling monitoring system. They can also be used as bulk capacitors for high temperature camera modules.

Both X8R and X8L dielectric capacitors are automotive AEC-Q200 qualified. Optional termination systems, tin, FLEXITERM® and conductive epoxy for hybrid applications are available. Providing this series with our FLEXITERM® termination system provides further advantage to customers by way of enhanced resistance to both, temperature cycling and mechanical damage.

#### PART NUMBER (see page 2 for complete part number explanation)



NOTE: Contact factory for availability of Termination and Tolerance Options for Specific Part Numbers.

X8R X8L

	SIZE		0603		0805		1206		SIZE		0603		0805		1206				
	WVDC	25V	50V	25V	50V	25V	50V		WVDC	25V	50V	100V	25V	50V	100V	16V	25V	50V	100
331	Cap 330	G	G	J	J			331	Cap 330		G	G		J	J				
471	(pF) 470	G	G	J	J			471	(pF) 470		G	G		J	J				
681	680	G	G	J	J			681	680		G	G		J	J				
102	1000	G	G	J	J	J	J	102	1000		G	G		J	J				
152	1500	G	G	J	J	J	J	152	1500		G	G		J	J			J	J
222	2200	G	G	J	J	J	J	222	2200		G	G		J	J			J	J
332	3300	G	G	J	J	J	J	332	3300		G	G		J	J			J	J
472	4700	G	G	J	J	J	J	472	4700		G	G		J	J			J	J
682	6800	G	G	J	J	J	J	682	6800		G	G		J	J			J	J
103	Cap 0.01	G	G	J	J	J	J	103	Cap 0.01		G	G		J	J			J	J
153	(µF) 0.015	G	G	J	J	J	J	153	(μF) 0.015	G	G		J	J	J			J	J
223	0.022	G	G	J	J	J	J	223	0.022	G	G		J	J	J			J	J
333	0.033	G	G	J	J	J	J	333	0.033	G	G		J	J	N			J	J
473	0.047	G	G	J	J	J	J	473	0.047	G	G		J	J	N			J	J
683	0.068	G		N	N	M	M	683	0.068	G	G		J	J				J	J
104	0.1			N	N	M	M	104	0.1	G	G		J	J				J	M
154	0.15			N	N	M	M	154	0.15				J	N		J	J	J	Q
224	0.22			N		M	M	224	0.22				N	N		J	J	J	Q
334	0.33					M	M	334	0.33				N			J	М	Р	Q
474	0.47					M		474	0.47				N			M	М	Р	
684	0.68							684	0.68							М			
105	1							105	1							М			
	WVDC	25V	50V	25V	50V	25V	50V		WVDC	25V	50V	100V	25V	50V	100V	16V	25V	50V	100
	SIZE	0603 0805		805	1206		SIZE		0603		0805		1206						

Letter	А	С	Е	G	J	K	М	N	Р	Q	Х	Υ	Z
Max.	0.33	0.56	0.71	0.90	0.94	1.02	1.27	1.40	1.52	1.78	2.29	2.54	2.79
Thickness	(0.013)	(0.022)	(0.028)	(0.035)	(0.037)	(0.040)	(0.050)	(0.055)	(0.060)	(0.070)	(0.090)	(0.100)	(0.110)
	PAPER					EMBOSSED							

= AEC-Q200 Qualified



## X8R/X8L Dielectric

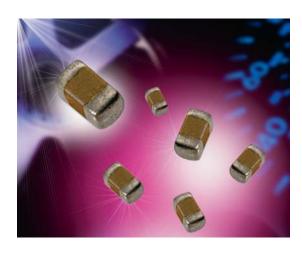
### **General Specifications**



#### **APPLICATIONS FOR X8R AND X8L CAPACITORS**

- All market sectors with a 150°C requirement
- Automotive on engine applications
- Oil exploration applications
- Hybrid automotive applications
  - Battery control
  - Inverter / converter circuits
  - Motor control applications
  - Water pump
- Hybrid commercial applications
  - Emergency circuits
  - Sensors
  - Temperature regulation



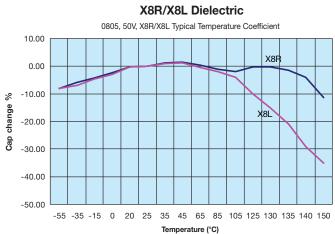


#### **ADVANTAGES OF X8R AND X8L MLC CAPACITORS**

- Both ranges are qualified to the highest automotive AEC-Q200 standards
- Excellent reliability compared to other capacitor technologies
- RoHS compliant
- Low ESR / ESL compared to other technologies
- Tin solder finish
- FLEXITERM® available
- Epoxy termination for hybrid available
- 100V range available

#### **ENGINEERING TOOLS FOR HIGH VOLTAGE MLC CAPACITORS**

- Samples
- Technical Articles
- Application Engineering
- Application Support





# X8R/X8L Dielectric



# **Specifications and Test Methods**

Parame		X8R/X8L Specification Limits	Measuring Conditions				
Operating Temp		-55°C to +150°C	Temperature Cycle Chamber				
Capac	itance	Within specified tolerance	Freq.: 1.0 kHz ± 10%				
Dissipation	on Factor	≤ 2.5% for ≥ 50V DC rating ≤ 3.5% for 25V DC and 16V DC rating	Voltage: 1.0Vrms ± .2V				
Insulation I	Resistance	100,000ΜΩ or 1000ΜΩ - $\mu$ F, whichever is less	Charge device with rated voltage for 120 ± 5 secs @ room temp/humidity				
Dielectric	Strength	No breakdown or visual defects	Charge device with 300% of rated voltage for 1-5 seconds, w/charge and discharge current limited to 50 mA (max)  Note: Charge device with 150% of rated voltage for 500V devices.				
	Appearance	No defects	Deflection: 2mm				
Resistance to	Capacitance Variation	≤ ±12%	Test Time: 30 seconds				
Flexure Stresses	Dissipation Factor	Meets Initial Values (As Above)	\ 	/ 1mm/sec			
Ollesses	Insulation Resistance	≥ Initial Value x 0.3	90 mm				
Solder	rability	≥ 95% of each terminal should be covered with fresh solder	Dip device in eutectic solder at 230 ± 5°C for 5.0 ± 0.5 seconds				
	Appearance	No defects, <25% leaching of either end terminal					
	Capacitance Variation	≤ ±7.5%					
Resistance to	Dissipation Factor	Meets Initial Values (As Above)	Dip device in eutectic seconds. Store at room	temperature for $24 \pm 2$			
Solder Heat	Insulation Resistance	Meets Initial Values (As Above)	hours before measuring electrica				
	Dielectric	Meets Initial Values (As Above)					
	Strength Appearance	No visual defects	Step 1: -55°C ± 2°	30 ± 3 minutes			
	Capacitance	≤ ±7.5%	Step 2: Room Temp	≤ 3 minutes			
		S ±1.570	Step 2. Noom lemp 5 3 minutes				
Thermal Shock	Dissipation Factor	Meets Initial Values (As Above)	Step 3: +125°C ± 2°	30 ± 3 minutes			
Gilook	Insulation Resistance	Meets Initial Values (As Above)	Step 4: Room Temp	≤ 3 minutes			
	Dielectric Strength	Meets Initial Values (As Above)	Repeat for 5 cycles and measure after 24 ± 2 hours at room temperature				
	Appearance	No visual defects					
	Capacitance Variation	≤ ±12.5%	Charge device with 1.5 rated voltage (≤ 10V) in test chamber set at 150°C ± 2°C				
Load Life	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	for 1000 hou	urs (+48, -0)			
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from test ch at room temperatu				
	Dielectric Strength	Meets Initial Values (As Above)	before measuring.				
	Appearance	No visual defects	Ctoro in a test share-	or oot at 0E00 : 000/			
	Capacitance Variation	≤ ±12.5%	Store in a test chamber set at 85°C ± 2°C/ 85% ± 5% relative humidity for 1000 hours				
Load Humidity	Dissipation Factor	≤ Initial Value x 2.0 (See Above)	(+48, -0) with rate				
	Insulation Resistance	≥ Initial Value x 0.3 (See Above)	Remove from chamber and stabilize at room temperature and humidity for				
	Dielectric Strength	Meets Initial Values (As Above)	24 ± 2 hours be	Tore measuring.			

