

AXIAL-LEADED, EPOXY-COATED MULTILAYER CERAMIC CAPACITORS

DESCRIPTION: MLC AXIAL SERIES (AD TYPE)

Pro-Cap axial-leaded, epoxy-molded multilayer ceramic capacitors are coated with superior moisture and shock resistant epoxy coating. These capacitors are supplied in both BULK and TAPE & REEL package for automatic insertion and sequencing with axial leaded components. Termination: 100% tin coated copper wire.

HOW TO ORDER

AD 10 ZU 104 M 500 AR

AXIAL TYPE: _____

SIZE CODE: _____

CODE	LENGHT(Max.)	DIAMETER (Max.)
10	3.81mm (0.150")	2.54mm (0.100")
20	5.08mm (0.200")	3.18mm (0.125")

DIELECTRIC CODE: _____

CODE	DIELECTRIC	CODE	DIELECTRIC
CG	NPO/COG(1B)	ZU	Z5U(2E6)
XR	X7R(2R1)	YV	Y5V(2F4)

CAPACITANCE CODE: _____

Capacitance expressed in pico farads (pF).
 First two digits are significant figures.
 Third digit denotes the number of zeros.
 A few examples are shown with codes.

(μ F)	(nF)	CAPACITANCE (pF)	CODE
		1.0 pF	1R0
		4.7 pF	4R7
		10 pF	100
	0.22 nF	220 pF	221
0.022 μ F	22 nF	22,000 pF	223
0.10 μ F	100 nF	100,000 pF	104
1 μ F	1,000 nF	1,000,000 pF	105

TOLERANCE CODE: _____

CODE	TOLERANCE	CODE	TOLERANCE	CODE	TOLERANCE
C	$\pm 0.25\mu$ F	J	$\pm 5\%$	Z	$\pm 80\%, - 20\%$
D	$\pm 0.50\mu$ F	K	$\pm 10\%$	P	$\pm 100\%, - 0\%$
F	$\pm 1\mu$ F	M	$\pm 20\%$	V	GMV

RATED VOLTAGE CODE: _____

2 significant digits + number of zeros.

CODE	VOLTAGE
250	25V DC
500	50V DC
101	100V DC
201	200V DC

PACKAGING CODE: _____

- AR: Axial Taping, reel package
- AB: Axial Taping, bulk package
- ATB: Axial Taping, tape & box Package
- B: Bulk package



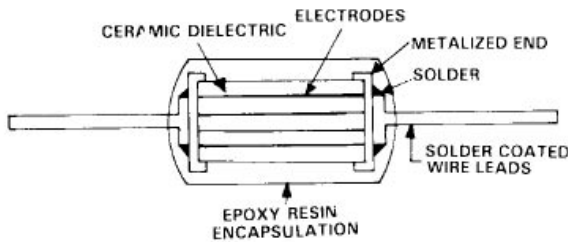
AXIAL-LEADED, EPOXY-COATED MULTILAYER CERAMIC CAPACITORS

STYLE AND DIMENSIONS

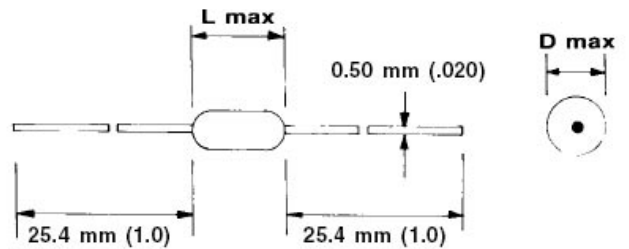
FEATURES:

- Epoxy-coated, miniature size
- 50, 100 and 200Vdc
- NPO/COG, X7R, Z5U and Y5V temperature coefficients
- Bulk, and Tape & Reel packaging

MONOLITHIC CONSTRUCTION



CASE SIZE



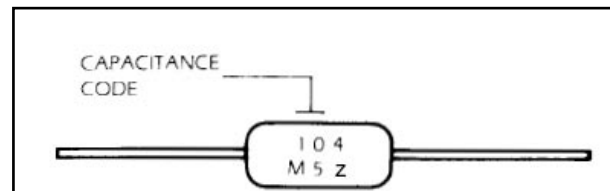
SIZE CODE AND DIMENSIONS:

CODE	L)	D	LEAD DIAMETER	LEAD LENGTH
10	3.81mm (0.150") Max.	2.54mm (0.100") Max.	0.50mm (0.020")	25.4mm (1.00")
20	5.08mm (0.200") Max.	3.18mm (0.125") Max.	0.50mm (0.020")	25.4mm (1.00")

MARKING:

TOLERANCE CODE:

CODE	TOLERAN
J	± 5%
K	± 10%
M	± 20%
Z	+80 /- 20%



RATED VOLTAGE CODE:

CODE	VOLTAGE
2	25V DC
5	50V DC
A	100V DC
B	200V DC

DIELECTRIC CODE:

CODE	DIELECTRIC	CODE	DIELECTRIC
N	NPO/COG(1B)	Z	Z5U(2E6)
X	X7R(2R1)	Y	Y5V(2F4)

SIZE CODE

CODE	CAPACITANCE	TOLERANCE	RATED VOLTAGE	TEMP. CHAR.
10	✓	-	-	-
20	✓	✓	✓	✓

**TYPICAL PERFORMANCE CHARACTERISTICS****TEMPERATURE COEFFICIENT:**NPO/COG: $\pm 30\text{PPM} / ^\circ\text{C}$, -55°C to 125°C X7R: $\pm 15\%$, -55°C to $+125^\circ\text{C}$ Z5U: $+22\%$, -56% , $+10^\circ\text{C}$ to $+85^\circ\text{C}$ Y5V: $+22\%$, -82% , -30°C to 85°C **CAPACITANCE TEST AT 25°C:**

NPO/COG: 1 VRMS max at 1KHz (1MHz for 100pF or less)

X7R: 1 VRMS max at 1KHz

Z5U: 1 VRMS max at 1KHz

Y5V: 1 VRMS max at 1KHz

DISSIPATION FACTOR 25C:

NPO/COG: 0.15% max at 1KHz, 1 VRMS max(1MHz for 1000pF or less)

X7R: (at 1KHz, 1 VRMS)

Max	Rated Voltage
2.5%	$\geq 50\text{V}$
3.5%	25V & 16V
5.0%	10V & 6.3V

Z5U: 5% max (at 1KHz, 1 VRMS max)

Y5V: (at 1KHz, 1 VRMS max)

Max	Rated Voltage
5%	$\geq 50\text{V}$
7%	25V & 16V
10%	10V & 6.3V

DIELECTRIC STRENGTH 25°C (FLASH TEST):

NPO/COG and X7R: 300% rated voltage for 5 seconds with 50 mA max charging current.

Z5U and Y5V: 250% rated voltage for 5 seconds with 50 mA max charging current.

LIFE TEST: (1000hrs at max temp. applied with Flash test voltage,**Recovery: 6-24hrs for NPO and 24 \pm 2hrs for X7R & Z5U)**NPO/COG: $\leq \pm 3\%$ at 200% rated voltage, 125°C X7R: $\leq \pm 3\%$ at 200% rated voltage, 125°C Z5U: $\leq \pm 3\%$ at 200% rated voltage, 85°C Y5V: $\leq \pm 3\%$ at 200% rated voltage, 85°C **INSULATION RESISTANCE AFTER 60SEC, CHARGIN AT RATED VOLTAGE, 25°C, 55% R.H. MAX:**NPO/COG: 100G Ω or 1000M Ω -uF whichever is lessX7R: 10G Ω or 100M Ω -uF whichever is lessZ5U: 10G Ω or 100M Ω -uF whichever is lessY5V: 10G Ω or 1000M Ω -uF whichever is less



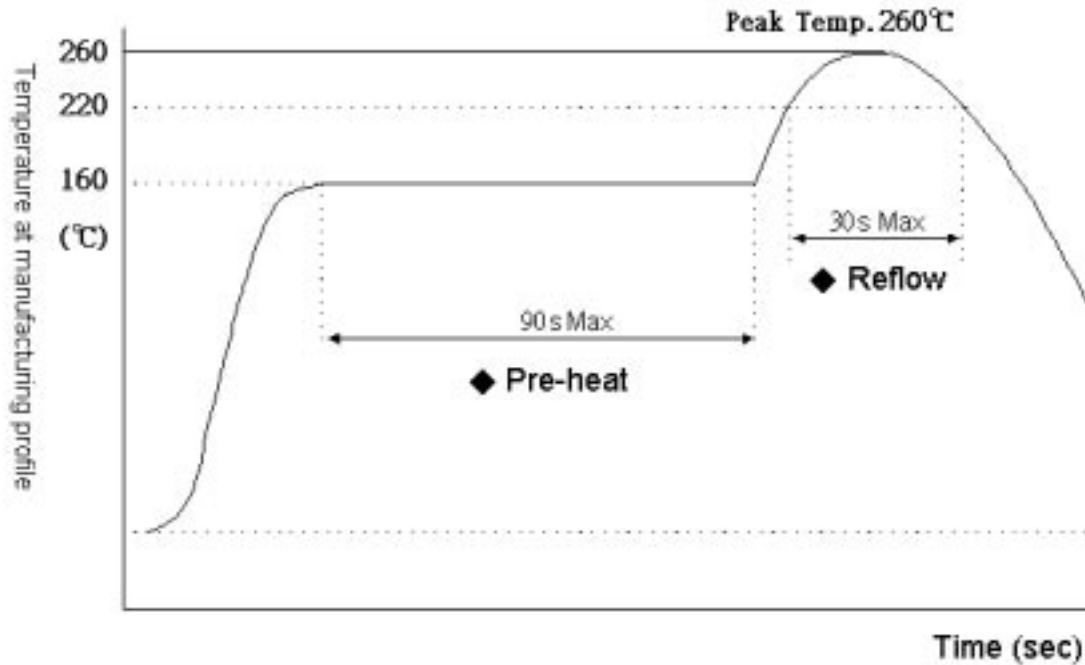
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SOLDERING PROFILE AXIAL LEADED TYPE

Soldering heat resistance as below temperature profile.

Solder iron 400°C 4~5 sec.

Solderability 235°C, 3 ± 1 sec, 95% coverage min.



Pre-heating shall be done less than +150°C within 90 seconds.

The temperature at capacitor top shall not exceed +260°C.

The duration of over +220°C temperature at component top shall not exceed 30 seconds.

The standard temperature profile differs by each reflow method.

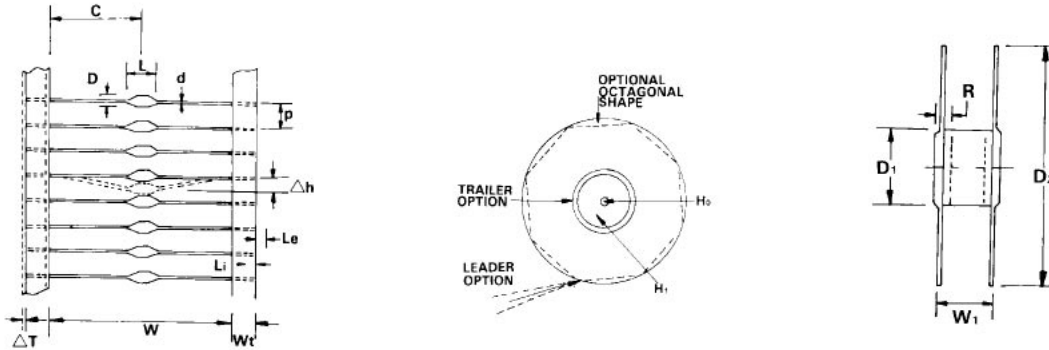
If components are subject to the conditions beyond the allowable range of reflow, please contact us.

AXIAL-LEADED, EPOXY-COATED MULTILAYER CERAMIC CAPACITORS

AXIAL TAPE & REEL

Our axial-leaded capacitors can be supplied taped and reeled. A 12 inch leader of tape starts and ends each reel. A layer of 50/60lb. craft paper separates each layer of components, and a layer of corrugated over the last layer protects the content of the reel. Reels are to EIA standards (RS-296E Class I, Level I).

TAPING DIMENSIONS: Units in mm (inches)



DESCRIPTION	SYMBOL	DIMENSIONS	DESCRIPTION	SYMBOL	DIMENSIONS
Pitch of Component	P	5.08 ± 0.51 (0.200 ± 0.020)	Centered	C	± 0.76 (± 0.030)
Cumulative Tolerance of P over 6 consecutive units		± 0.15 (± 0.0059)	Core diameter	D1	34.90 - 92.10 (1.375 - 3.260)
Tape Width	Wt	6.0 ± 1.0 (0.236 ± 0.039)	Reel diameter	D2	355.60 max (14)
Lead wire protusion	Le	1.57 max (0.062)	Core width	W1	69.85 ± 1.52 (2.750 ± 0.060)
Lead extension into tape	Li	3.96 min (0.156)	Recess depth	R	9.5 min (0.374)
Offset between tapes	ΔT	0.8 max (0.031)	Arbor hole	Ho	15.5 - 18.0 (0.510 - 0.608)
Width between tapes	W	52.37 ± 1.57 (2.06 ± 0.062)	Deflection from nomial position	Δh	1.19 max (0.047)
Pilot hole dia.	H1	8.0 (0.315)	Leader option	L	304.8 min (12)

PACKAGING QUANTITY:

CODE	TAPING TYPE		BULK TYPE
	QUANTITY PER REEL	QUANTITY PER BOX	QUANTITY PER BAG
10	5,000	5,000	500
20	4,000	4,000	500