



EIA Temperature Characteristic

Class I

(Table 1)

EIA code	Material Coefficient	Temperature Coefficient
C0	NPO	
S1	N030	G:±30
U1	N080	H:±60
P2	N150	J:±120
R2	N220	K:±250
S2	N330	L:±500
T2	N470	
U2	N750	
P3	N1500	
R3	N2200	M:±1000
S3	N3300	
T3	N4700	

* For multilayer radial leaded type COG (NPO) is standard.

* For disc leaded type SL T.C. range will be P350-N1000

* T.C. Tolerance in PPM/°C

* Recommend COG (C0H) , U2J . SL are Standard Types.

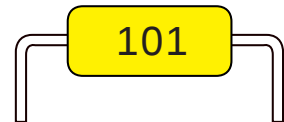
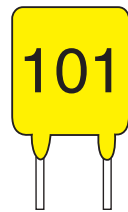
Class II, III

(Table 2)

First digit is Low temperature	Second digit is high temperature	Last digit is capacitance change over temperature range from 25°C reading
X: -55°C	4: +65°C	A:±1. 0% P:±10%
Y: -25°C	5: +85°C	B:±1. 5% R:±15%
Z: +10°C	6: +105°C	C:±2. 2% S:±22%
	7: +125°C	D:±3. 3% T:±22%, -33%
	8: +150°C	E:±4. 7% U:±22%, -56%
		F:±7. 5% V:±22%, -82%

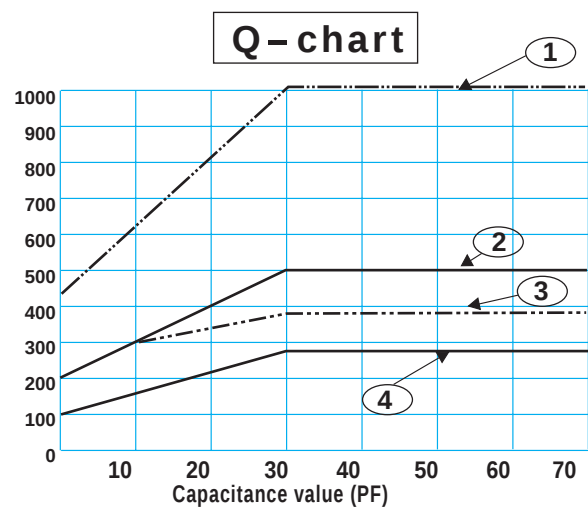
Class I

Temperature Compensating Capacitors have a ceramic dielectric that is formulated to provide a predictable linear capacitance change versus temperature. This predictable linear capacitance change allows to be used in critical circuit applications such as tuned circuit.



Q-chart

1. NPO-N1500 initial
2. Over N1500 initial
3. NPO-N1500 after life & humidity
4. Over N1500 after life & humidity



Electrical Specification

Item	Specification	Testing method
Capacitance	To be within the spec. tolerance.	shall be measured at $25 \pm 1^\circ\text{C}$, $1.0 \pm 0.2 \text{ Vrms}$ and 1 MHz, 1 KHz for value above 1000 pf.
Dissipation factor	$C > 30\text{pf}$, DF:0.1% max $C \leq 30\text{pf}$, $Q = 400 + 20C$ min	
Insulation resistance	Cap. $\leq 10\text{nF}$: $I.R \geq 100\text{G}\Omega$	shall be measured 60 ± 5 sec, at rated voltage.
Dielectric strength	To be within the 250% rated voltage.	With 50 mA (max) charging current.

Class II, III

The HI-K (Dielectric constant) capacitor, the maximum capacitance can be controlled in tolerance when the temperature is over 25°C. The general application in circuit where a large amount of capacitance is required but less sensitive to change with temperature variation such as “coupling”, “by pass” circuit.

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Electrical Specification

Item	Specification	Testing method
Capacitance	To be within the spec. tolerance.	shall be measured at 25±1°C, X7R, Y5V:1.0±0.2V and 1KHz Z5U : 0.5V±0.1 and 1KHz
Dissipation factor	X7R : 2.5%max Z5U : 4%max Y5V : 5%max	
Insulation resistance	Cap.≤10nF: I.R≥100GΩ Cap.>10nF: I.R≥1000MΩ - μF	shall be measured 60±5 sec, at rated voltage.
Dielectric strength	To be within the 250% rated voltage.	With 50 mA (max) charging current.

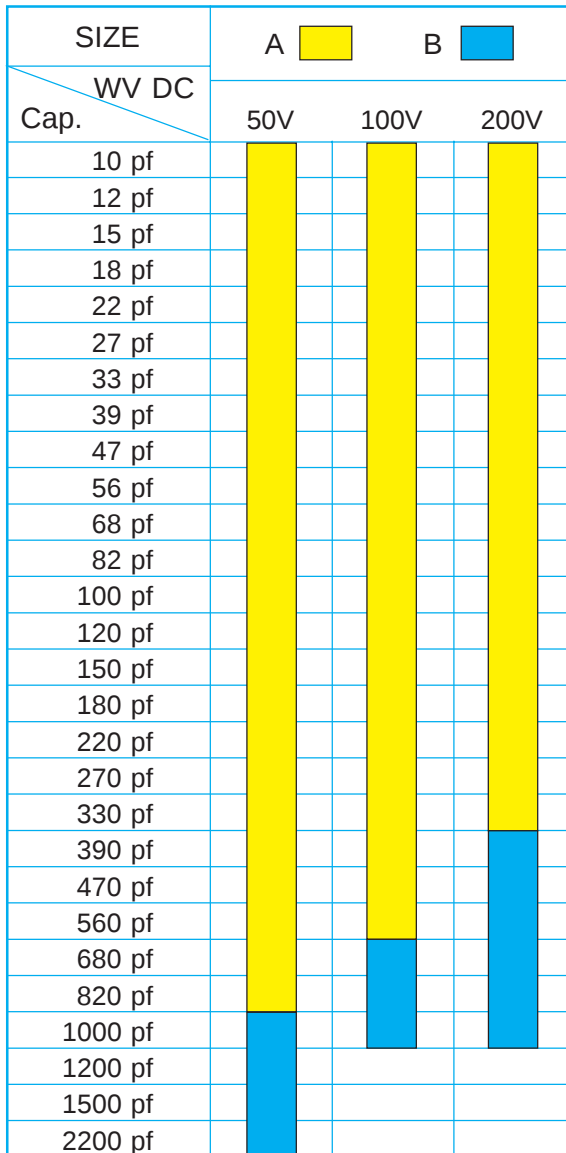
Reliability testing:

	Item	Specification	Testing method
Humidity test	Appearance	No damage	Temperature:40±2°C Relative humidity:90%~95% Duration:500+24/-0 hrs Test step: a..oven dry at 40±5°C for 24 hrs. b..take required measurement as specified. c..subject specimens to test. d..final measurement at room condition for not less than 2 hours unless otherwise specified.
	Capacitance	Capacitance change NPO:±2% or 1.0pF X7R:±20% Z5U,Y5V:±30%	
	Dissipation factor	Dissipation factor change NPO:0.5% max X7R,Z5U:5% max Y5V:7.5% max	
	Insulation Resistance	Cap.≤10nF: I.R≥10GΩ Cap.>10nF: I.R≥100MΩ - μF	
Life test	Appearance	No damage	Ambient temperature:85±2°C Applied voltage:200% the rated voltage Duration:1000 + 48/-0 hrs Charging and discharging current shall be limited to 50 mA (max). Deaging at 150°C for 2 hrs and recover 24 hrs before measure. (NPO unnecessary)
	Capacitance	Capacitance change NPO:±2% or 1.0pF X7R,Z5U:±20% Y5V:±30%	
	Dissipation factor	NPO:0.5% max X7R,Z5U:5% max Y5V:7.5% max	
	Insulation Resistance	Cap.≤10nF:I.R≥10GΩ Cap.>10nF:I.R≥100MΩ - μF	

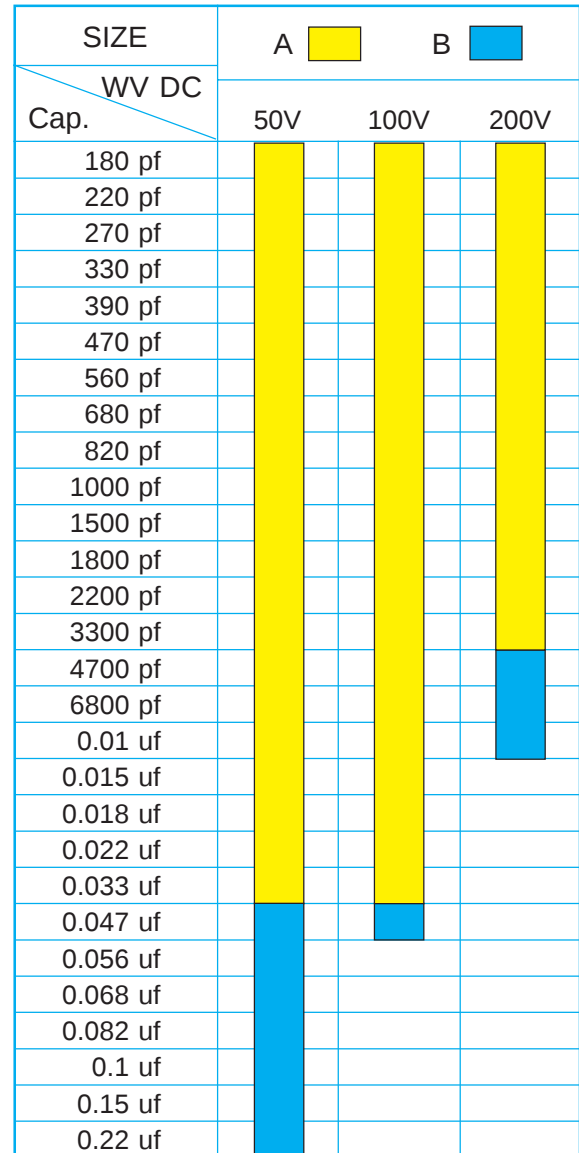


Range Chart:

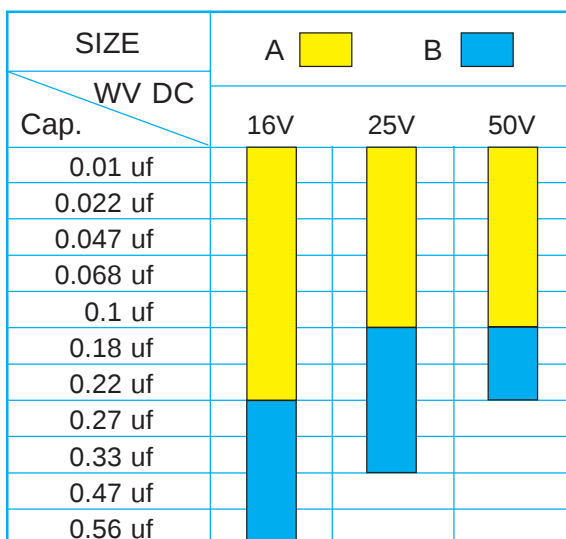
NPO (COG) SERIES



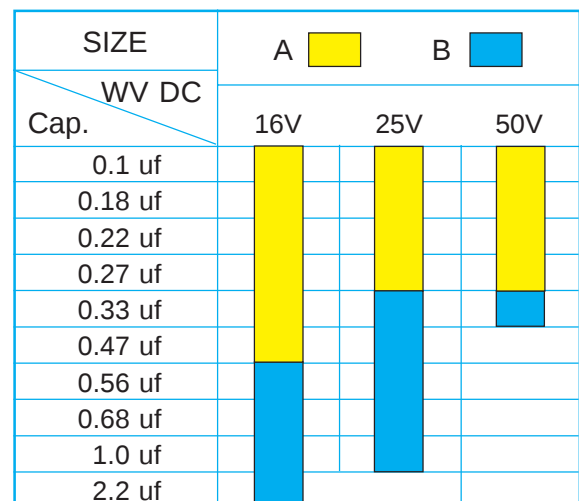
X7R SERIES



Z5U SERIES



Y5V SERIES

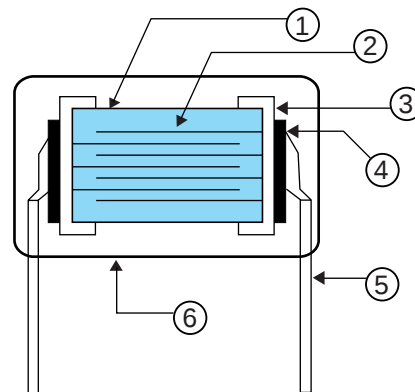


Mechanical specification

	Specification	Test condition
Marking	To be clear and legible.	Marking shall be tested with Acetone.
Terminal strength	Tensile Strength: No Breakdown	Wire dia. 0.55 mm, loading weight 1.0 Kg for 10±1 seconds
	Bending strength: No Breakdown	Wire dia. 0.55 mm, loading weight 0.5 Kg (Bend back and forth 90 degree twice)
Solder ability	Lead wire to be soldered up to the dipped end point, with no gap in the axial direction, over 3/4 of the circumferential direction.	Solder temperature : 235±5°C Dipping : 2±0.5 sec Flux shall be used.

Construction

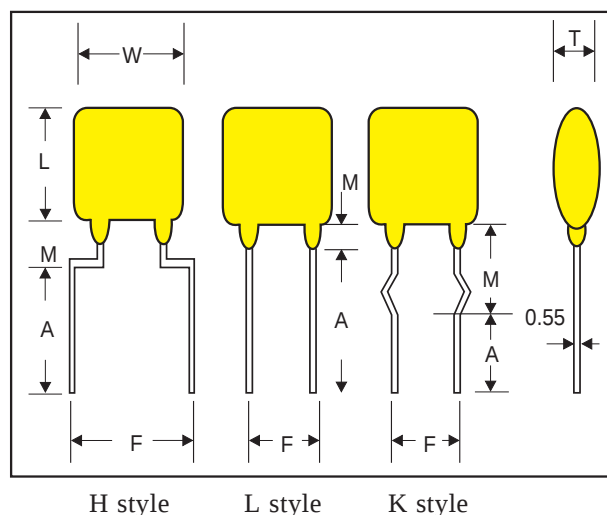
1. Ceramic Dielectric
2. Electrodes
3. Metalized end
4. Solder
5. c.p. wire
6. Epoxy resin encapsulant



Dimension

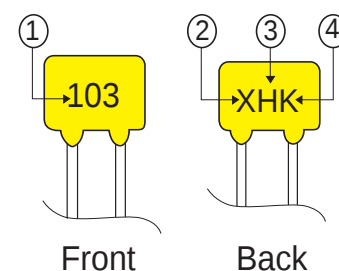
Dimension in mm

Lead Style	Side Code	Pitch (F)±0.5	Length (L) Max.	Width (W) Max.	Thick (T) Max.	Seat Height (M) Max.	Lead Length (A)
H	A	5.08	3.81	3.81	2.54	2.54	Standard Long Lead: 25±1.0
	B	5.08	5.08	5.08	3.18	2.54	
K	A	2.54	3.81	3.81	2.54	3.50	Standard Short Lead: 3±0.5
	B	2.54	5.08	5.08	3.81	3.50	
	B	5.08	5.08	5.08	3.81	3.50	
L	A	2.54	3.81	3.81	2.54	1.00	4±0.5
	B	2.54	5.08	5.08	3.81	1.00	5±0.5



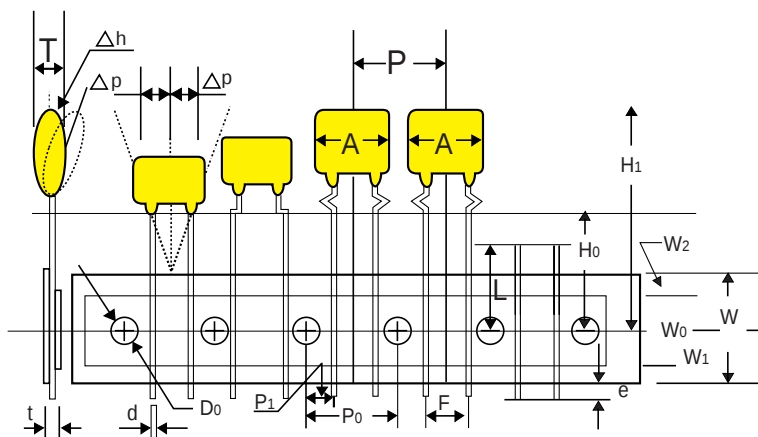
Marking principle:

1. Normal capacitance
2. Temperature characteristic
3. Working voltage
4. Capacitance tolerance





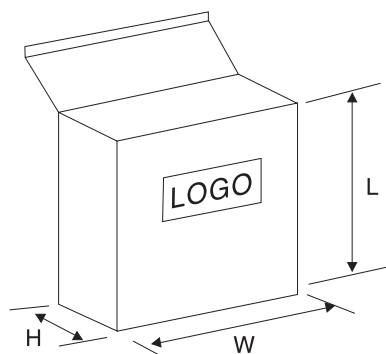
Packing Specification



		unit:mm	unit:inch
Body Dimension	A	11.0*11.0 Max	0.43*0.43 Ref
Body Thickness	T	4.0 Max	0.157 Ref
Wire Lead Dia.	d	0.55±0.05	#24 AWG
Taping Pitch	P	12.7 Ref	0.05 Ref
Feed Hole Pitch (Note:1)	P0	12.7±0.3	0.5 Ref
Plane Deviation	ΔP	+1.0 Max	0.0394 Ref
Feed Hole Off Alignment	(2e) P1	3.81±0.7	0.15 Ref (F=5.08)
	(1e) P1	5.08±0.7	0.20 Ref (F=2.54)
Lead Spacing	F	5.08±0.5	0.2 Ref
	F	2.54±0.5	0.10 Ref
Body Inclination	Δh	0±1.0	0±0.39 Ref
Carrier Tape Width	W	18.0±1.0/-0	0.709 Ref
Adhesive Tape Width	W0	13.0 Ref	0.512 Ref
Feed Hole Ht Off Alignment	W1	9.0+0.75/-0.5	0.354 Ref
Adhesive Tape Width	W2	3.0 Ref	0.118 Ref
Straight Lead Height (Note:2)	H	20.0±0.5	0.787 Ref
Lead Crimp Height	H0	16.0 or 18.0±0.5	0.63 Ref
Top of Component Height	H1	32.0 Max	1.20 Ref
Lead End Protrusion	e	1.0 Max	0.039 Ref
Feed Hole Diameter	D0	4.0±0.3	0.157 Ref
Overall Tape Thickness	t	0.9 Max	0.035 Ref
Rejected Component Cut Height	L	10.0 Max	0.394 Ref

Note : 1. Cumulative pitch tolerance over 20 consecutive units not to exceed ±1.0 mm
 2. H=20.0±0.5 for lead style. L, H0=16 or 18.0±0.5 mm for lead style K.H
 3. Dimensions meet requirement defined in EIA RS468

Package quantity



SIZE	Tape-Ammo	Bulk
	PCS/BOX	PCS/BAG
A	2000	1000
B	2000	1000

BOX SIZE:
 330*250*50mm(W*L*H)



Range Chart:

NPO (COG) SERIES

SIZE	35	50
WV DC		
Cap.	50V	
10 pf		
12 pf		
15 pf		
18 pf		
22 pf		
27 pf		
33 pf		
39 pf		
47 pf		
56 pf		
68 pf		
82 pf		
100 pf		
120 pf		
150 pf		
180 pf		
220 pf		
270 pf		
330 pf		
390 pf		
470 pf		
560 pf		
680 pf		
820 pf		
1000 pf		
1200 pf		
1500 pf		
1800 pf		

X7R SERIES

SIZE	35	50
WV DC		
Cap.	50V	
180 pf		
220 pf		
270 pf		
330 pf		
390 pf		
470 pf		
560 pf		
680 pf		
820 pf		
1000 pf		
1500 pf		
1800 pf		
2200 pf		
3300 pf		
4700 pf		
6800 pf		
0.01 uf		
0.015 uf		
0.018 uf		
0.022 uf		
0.033 uf		
0.047 uf		
0.056 uf		
0.068 uf		
0.082 uf		
0.1 uf		
0.15 uf		
0.22 uf		

Z5U SERIES

SIZE	35	50
WV DC		
Cap.	25V	50V
0.01 uf		
0.022 uf		
0.047 uf		
0.068 uf		
0.1 uf		
0.15 uf		
0.22 uf		
0.33 uf		
0.47 uf		
0.56 uf		
1.0 uf		

Y5V SERIES

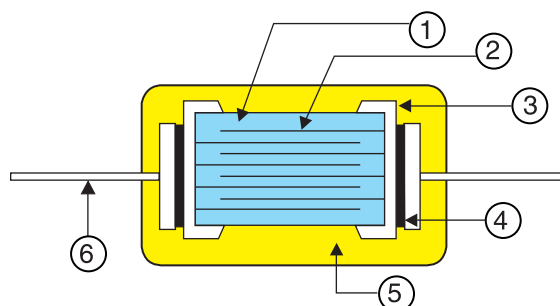
SIZE	35	50
WV DC		
Cap.	25V	50V
0.1 uf		
0.18 uf		
0.22 uf		
0.27 uf		
0.33 uf		
0.47 uf		
0.56 uf		
0.68 uf		
1.0 uf		
2.2 uf		

Mechanical specification

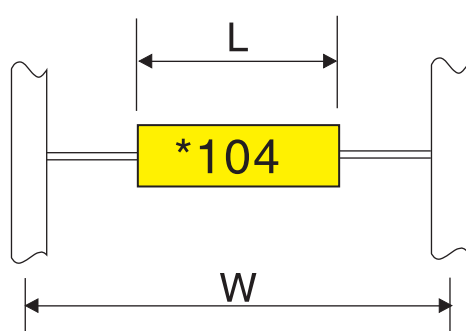
	Specification	Test condition
Marking	To be clear and legible.	Marking shall be test with Acetone.
Terminal strength	Pull force ≥ 2 lb	Pull both lead ends till body broken
Solder ability	Lead wire to be soldered up to the dipped end point, with no gap in the axial direction, over 3/4 of the circumferential direction.	Solder temperature : $235 \pm 5^\circ\text{C}$ Dipping : 2 ± 0.5 sec Flux shall be used.

Construction

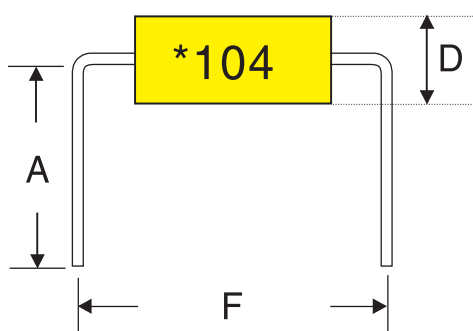
1. Ceramic dielectric
2. Internal electrode
3. Terminal end
4. Solder paste
5. Epoxy resin encapsulant
6. Lead wire



Marking principle & Dimension



Tapping



Bulk

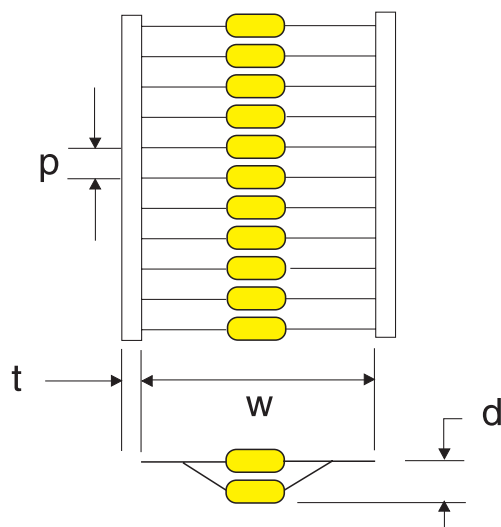
* Marking normal capacitance

(In mm)

SIZE	T (max)	D (max)	Tapping	BULK	
			W (mm)	F	A
35	3.5	2.5	26	5	5
50	5.0	3.0	52	NA	↓ 10

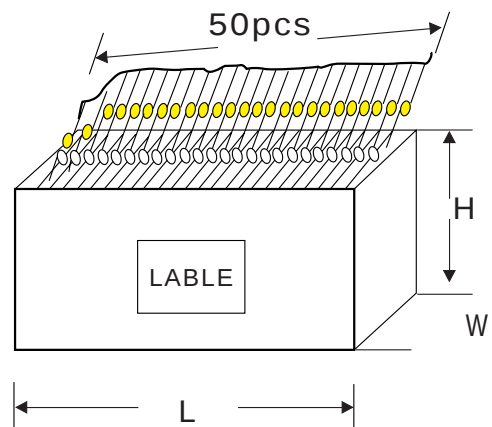
Tapping specification

Dim Unit	p	t	w	d
mm	5 ±0.5	6 ±0.5	26 52	1.2 max



Packing specification

Dim Unit	L	W	H
mm	258	80	95



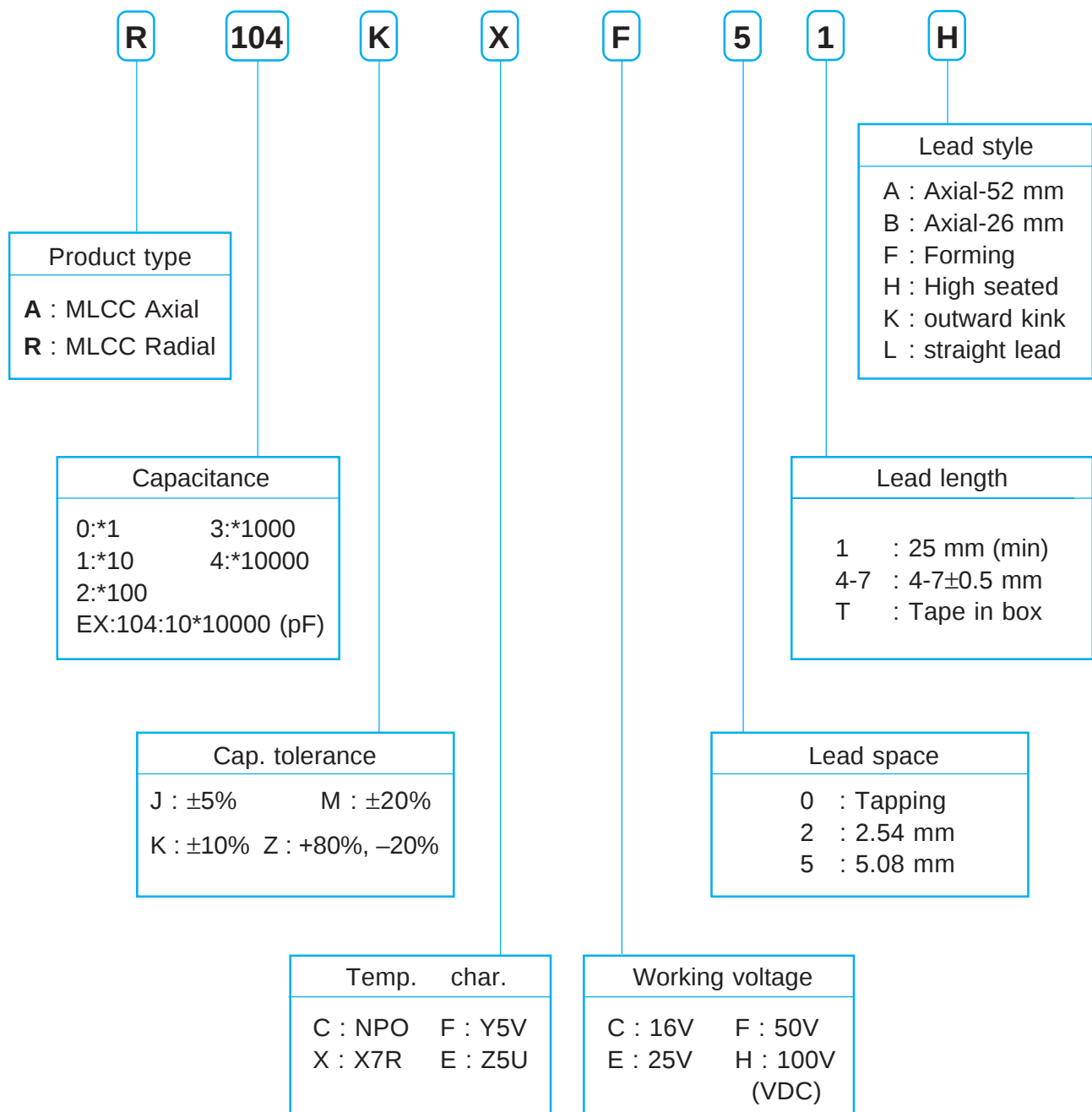
Package quantity

(pcs)

SIZE	35	50
Ammo	5000	5000
Bulk	1,000/PE bag	



Part number system



*Please contact with us if your design has a special requirement.