PRODUCT SPECIFICATION

PRODUCT: MULTILAYER CERAMIC CAPACITOR

TYPE: RADIAL-LEADED TYPE CAPACITOR

CUSTOMER: _____

DOC. NO.: D13-00-E-08

Ver.: 08

APPROVED BY CUSTOMER

VENDOR：

☐ **WALSIN TECHNOLOGY CORPORATION**

566-1, KAO SHI ROAD,YANG-MEI
TAO-YUAN, TAIWAN

☐ **PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.**

NO.277,HONG MING ROAD,EASTERN SECTION,
GUANG ZHOU ECONOMIC AND TECHNOLOGY
DEVELOPMENT ZONE,CHINA

MAKER：PAN OVERSEAS (GUANGZHOU) ELECTRONIC CO.,LTD.

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WALSIN

POE

Record of change

Date	Version	Description	page
2009.6.24	3	1. Add voltage code in Marking.	14
2009.8.17	4	1. Change PSA & POE logo to Walsin & POE logo.	all
2012/5/31	5	1. Review the capacitance range.	13~14
2012/11/20	6	1. Add “Table of contents”. 2. Review the body size W/H/T according to the chip size. 3. Review the contents of description. 4. Correct the size of P1 for type RD20.	3 4 11 13
2013/5/6	7	1. Review the Lead diameter φ from 0.55±0.05mm to 0.5+/-0.1mm 2. Add “H1 max” to lead configuration and size form. 3. Review the Solderability temperature from 235±5℃ to 245±5℃.,Solderability time from 2 ±0.5s to 5±0.5s”	4,12,13 4 8
2014/8/8	8	1. Review the item 8 from “Storing condition and term” to be “Operating and storage environment” 2. Delete the 500V ~630V type of 0805 size. 3. Review the D.F. spec according to MLCC spec of Walsin.	11 14 6,8,9,10

Table of Contents 目錄

1. Scope:

Its specification applies to Radial Series Ceramic Capacitor.

2. Part number defining:

2.1 Old Part Number:

CODE：

U	RD21	R	102	K	T
1	2	3	4	5	6

(1) Rated Voltage Code：**N** = 10 VDC , **B** = 16 VDC , **T** = 25VDC, **U** = 50 VDC
A = 100 VDC , **G** = 200VDC, **H** = 250VDC , **C** = 500 VDC , **M** = 1000 VDC ,

(2) Size Code : refer to item 3

(3) Dielectric Code：**C** = NPO, **R** = X7R, **F** = Y5V

(4) Capacitance Code：10**2** = 10**00** pF (Two significant digits followed by no. of zeros)

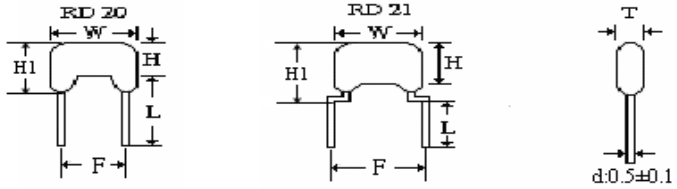
(5) Tolerance Code：**J** = ±5%, **K** = ±10%, **M** = ±20%, **Z** = +80%/-20%
(NPO: all tolerance, X7R: K、M, Y5V: M、Z)

(6) Package Code：**T** = Taping, **B** = Bulk

2.2 Internal SAP System Part Number (New):

RD21	B				102	K	500	B	5	C	07	B
Product Type	**Dielectric Code**				**Capacitance Code**	**Tolerance Code**	**Rated Voltage**	**Packaging Code**	**Chip Size**	**Termination**	**Lead Length**	**Lead Length Tolerance**
RD20	Code	T.C.	Operating Temperature	Capacitance Change(△℃)	100=10 pF 102=1000 pF	J=±5 % K=±10 % M=±20 % Z=+80 % /-20%	100=10V 250=25V 500=50V 101=100V 201=200V 251=250V 501=500V 631=630V 102=1000V	B=Bulk A=Ammo	5=0805 6=1206 0=1210	L=Ag/Ni/Sn C=Cu/Ni/Sn A=Ag/Ni/Sn Halogen free H=Cu/Ni/Sn Halogen free	Tapping: AN=Ammo Bulk (ex): 07=7.0 mm	D=Tapping A=±0.5mm B=±1mm C=Min
RD21	N	NPO	-55 ~ +125 ℃	0±30(PPM/℃)	103=10000 pF 1R5=1.5 pF 101=100 pF 472=4700 pF 104=100000 pF							
	B	X7R	-55 ~ +125 ℃	±15%								
	F	Y5V	-25~ +85℃	+30% ~ -80%								

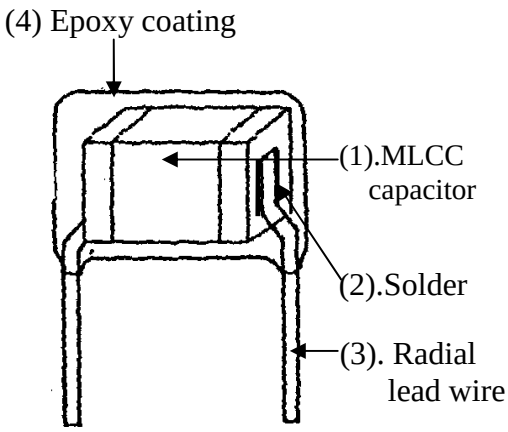
3. Lead configuration and size: (Unit: mm)



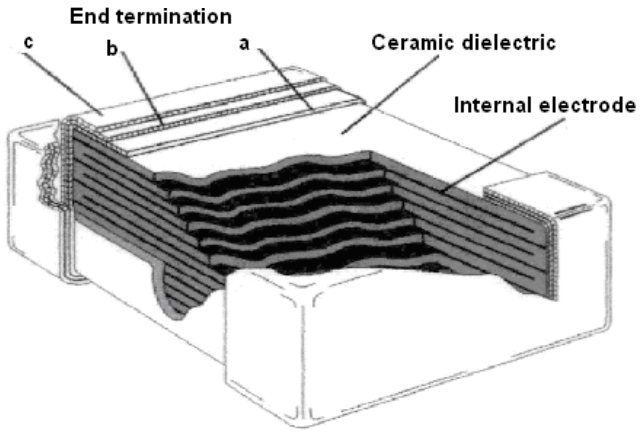
Type Code	Chip size	Width (W)Max.	Height (H)Max.	H1 (max)	Thickness (T)Max.	Length (L)	Lead spacing for Taping (F)	Lead spacing for Bulk (F)	Lead Diameter(d)
RD20	0805	5.0	4.5	6.0	3.5	Refer to the item "2.2 SAP Part Number"	2.5±0.8	2.54±1.0	0.5±0.1
	1206	6.5	5.0	6.5	4.0				
RD21	0805	5.0	4.5	6.5	3.5		5.0±0.8	5.08±1.0	
	1206	6.5	5.0	7.0	4.0				
	1210 (Special size)	6.5	5.5	7.5	5.0				

4. Product structure:

Radial capacitor



(1). MLCC capacitor



NO	Part name	Material	
(1)	MLCC capacitor	Ceramic dielectric	
		Internal Electrode	Ag-Pd or Ni (BME)
		End Termination	Ag or Cu (BME) layer
			Ni layer
			Sn layer
(2)	Solder	Tin-silver	
(3)	Radial Lead Wire	Tined CP wire	
(4)	Coating	Epoxy resin	

5. Test conditions:

Tests shall, unless otherwise specified, be carried out at 15 to 35℃ and RH 45 to 75%. If any doubt and argument has been encounter in judgement, the final test shall be done at 25±2℃, RH45 to 55% and 860～1060mbar. (Based on JIS standard)

6. Handle procedure:

To avoid unexpected testing results from occurring, the tested capacitor must be kept at room temperature for at least 30 minutes and completely discharged.

7. Specification and test method :

<table>
<tr><th>No.</th><th>Item</th><th>Performance</th><th>Test or inspection method</th></tr>
<tr><td>(1)</td><td>Appearance
structure size</td><td>No defects which may affect performance.</td><td>As section 3</td></tr>
<tr><td>(2)</td><td>Withstand
Voltage</td><td>Withstand test voltage without
Insulation breakdown or other damage.</td><td>DC Tested voltage shall be applied for 1～5sec. Charge/discharge current shall not exceed 50 mA .
<table><tr><th>Rated Voltage</th><th>Tested Voltage</th></tr><tr><td><100V</td><td>2.5Ra</td></tr><tr><td>100V</td><td>3.0Ra</td></tr><tr><td>200~300V</td><td>2.0 Ra</td></tr><tr><td>500~999V</td><td>1.5 Ra</td></tr><tr><td>1000~3000V</td><td>1.2 Ra</td></tr></table></td></tr>
<tr><td>(3)</td><td>Insulation
resistance</td><td>NPO:
10,000MΩ Min. or 500Ω*F Min
X7R、Y5V:
10GΩ Min or
R・C ≧ 500Ω・F
(Whichever is smaller)</td><td>Insulation resistance shall be measured at 120±5 seconds after rated voltage applied.
<table><tr><th>Rated Voltage</th><th>Tested Voltage</th></tr><tr><td><500V</td><td>1.0 Ra</td></tr><tr><td>≧500V</td><td>500V</td></tr></table></td></tr>
<tr><td>(4)</td><td>Capacitance</td><td>Within the specified tolerance.</td><td rowspan="2">Measuring frequency & voltage:
NPO：＞1000pF：
1KHz±10%
1.0±0.2 Vrms
≦1000pF：
1MHz±10%
1.0±0.2 Vrms
X7R、Y5V：
C ≦10uF
1.0±0.2 Vrms
1KHz±10%
C＞10 uF
0.5±0.2 Vrms
120Hz±20%</td></tr>
<tr><td>(5)</td><td>Dissipation
Factor</td><td><table>
<tr><td>NPO</td><td colspan="3">More than 30pF: Q≧1000
Less than 30pF: Q≧400+20C</td></tr>
<tr><td rowspan="8">X7R</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="3">≧100V</td><td>≦2.5%</td><td></td></tr>
<tr><td>≦3%</td><td>1206≧0.47uF</td></tr>
<tr><td>≦5%</td><td>0805＞0.1μF,1206>1μF</td></tr>
<tr><td rowspan="4">50V</td><td>≦2.5%</td><td></td></tr>
<tr><td>≦3%</td><td>0805≧0.18μF, 1206≧0.47μF</td></tr>
<tr><td>≦5%</td><td>1210≧4.7μF</td></tr>
<tr><td>≦10%</td><td>0805≧1μF, 1206≧2.2μF,
1210≧10μF</td></tr>
<tr><td rowspan="9">Y5V</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="2">≧50V</td><td>≦5%</td><td></td></tr>
<tr><td>≦7%</td><td>0805≧0.47μF, 1206≧4.7μF</td></tr>
<tr><td rowspan="3">25V</td><td>≦5%</td><td></td></tr>
<tr><td>≦7%</td><td>0805≧0.33μF,
1206≧1μF, 1210≧4.7μF</td></tr>
<tr><td>≦9%</td><td>1206≧4.7μF, 1210≧22μF</td></tr>
<tr><td>16V
(C<1.0μF)</td><td>≦7%</td><td></td></tr>
<tr><td rowspan="2">16V
(C≧1.0μF)</td><td>≦9%</td><td></td></tr>
<tr><td>≦12.5%</td><td>0805≧3.3μF;1206≧10μF;
1210≧22μF</td></tr>
<tr><td>10V</td><td>≦12.5%</td><td></td></tr>
</table></td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th colspan="4">Performance</th><th>Test or inspection method</th></tr>
<tr><td rowspan="5">(6)</td><td rowspan="5">Temperature Characteristic of Capacitance</td><td colspan="4">Temperatures Coefficient</td><td rowspan="5">The temperature coefficient is determined using the capacitance measured at base temperature as a reference. Test the specimen in a range of maximum and minimum operation temperature that shown as left table.
* Base Temp 25± 2 ℃
* Base Temp for Y5V: 20± 2 ℃
<table><tr><th>Step</th><th>Temperature(℃)</th></tr><tr><td>1</td><td>Base Temp.(25℃)± 2 ℃</td></tr><tr><td>2</td><td>Min. Operation Temp.± 2 ℃</td></tr><tr><td>3</td><td>Base Temp.(25℃)± 2 ℃</td></tr><tr><td>4</td><td>Max. Operation Temp.± 2 ℃</td></tr><tr><td>5</td><td>Base Temp.(25℃)± 2 ℃</td></tr></table></td></tr>
<tr><td>T.C.</td><td colspan="2">Operating Temperature</td><td>Capacitance Change(ΔC)</td></tr>
<tr><td>NPO</td><td colspan="2">-55~+125℃</td><td>0±30(ppm/℃)</td></tr>
<tr><td>X7R</td><td colspan="2">-55~+125℃</td><td>± 15%</td></tr>
<tr><td>Y5V</td><td colspan="2">-25~+85℃</td><td>＋30%~－80%</td></tr>
<tr><td rowspan="2">(7)</td><td rowspan="2">Terminal strength</td><td colspan="4">Tensile strength:
No breakdown</td><td>Loading weight 0.5 Kgs is applied for 10±1 seconds</td></tr>
<tr><td colspan="4">Bending strength:
No breakdown</td><td>Loading weight 0.25 Kgs is applied
Bending back and forth 90 degrees twice</td></tr>
<tr><td rowspan="4">(8)</td><td rowspan="4">Soldering heat resistance</td><td>External appearance</td><td colspan="3">No mechanical damage.</td><td rowspan="4">Lead wire or terminals shall be immersed (A) up to 2.0 mm from body (B) into the Molten solder of which temperature is 260+5 －0℃ for 3±0.5 sec. Then leave at standard test conditions for 24±2 hours, then measured.

*Preconditioning：
(only for Class 2):
Perform a heat treatment at 150 +0/-10℃ for one hour and then let sit for 48 ± 4 hours at room temperature.</td></tr>
<tr><td>Cap. change (ΔC/C)</td><td>NPO

X7R
Y5V</td><td>±2.5% or
± 0.25 pF max.
Whichever is larger
±7.5%
±20%</td></tr>
<tr><td>D.F.</td><td colspan="2">To meet initial standard value</td></tr>
<tr><td>I.R.</td><td colspan="2">To meet initial standard value</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th>Performance</th><th>Test or inspection method</th></tr>
<tr><td>(9)</td><td>Solderability</td><td>Lead wire shall be soldered over 75% of the circumfluent direction
.</td><td>To comply with JIS-C-5102 8.4 , the soldering temperature is 245±5℃ and dipping time is 5±0.5 seconds.
Flux: weight ratio of Rosin 25%</td></tr>
<tr><td>(10)</td><td>Humidity
(Steady state)</td><td>
<table>
<tr><td>External appearance</td><td>No mechanical damage.</td></tr>
<tr><td>Cap. change
(ΔC/C)</td><td>NPO: ± 5% or ±0.5 pFmax.
(Whichever is larger)
X7R: ±12.5%
Y5V: ±30%</td></tr>
</table>
D.F.:

NPO:
C≧30pF: D.F. ≦ $\frac{1}{350}$
10pF≦C＜30pF: D.F. ≦ $\frac{1}{275+2.5*C}$
C＜10pF: D.F. ≦ $\frac{1}{200+10*C}$
PS: C: Nominal Capacitance (pF)
<table>
<tr><td rowspan="6">X7R</td><td rowspan="3">≧100V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>1206≧0.47uF</td></tr>
<tr><td>≦7.5%</td><td>0805＞0.1μF,1206>1μF</td></tr>
<tr><td rowspan="4">50V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>0805≧0.18μF, 1206≧0.47μF</td></tr>
<tr><td>≦10%</td><td>1210≧4.7μF</td></tr>
<tr><td>≦20%</td><td>0805≧1μF, 1206≧2.2μF,
1210≧10μF</td></tr>
<tr><td rowspan="9">Y5V</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="2">≧50V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.47μF, 1206≧4.7μF</td></tr>
<tr><td rowspan="3">25V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.33μF,
1206≧1μF, 1210≧4.7μF</td></tr>
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<tr><td>16V
(C<1.0μF)</td><td>≦10%</td><td></td></tr>
<tr><td rowspan="2">16V
(C≧1.0μF)</td><td>≦12.5%</td><td></td></tr>
<tr><td>≦20%</td><td>0805≧3.3μF;1206≧10μF;
1210≧22μF</td></tr>
<tr><td>10V</td><td>≦20%</td><td></td></tr>
</table>
<table>
<tr><td>I.R.</td><td>1GΩ min. or 50Ω*F
(Whichever is smaller)</td></tr>
</table>
</td><td>Humidity (Steady state):
At temperature 40±2 ℃ and humidity 90 to 95%RH for 500 ＋24/－0 hours.
Leave the capacitors in ambient condition for the following time before measurement.
Class 1：24±2 hours.
Class 2：48±4 hours.
* Charge / discharge current shall. not exceed 50 mA.
* Preconditioning：
(only for Class 2):
Apply the rated DC voltage for 1hour at 150 ±5℃. Remove and let sit for 48±4 hours at room temperature. Perform initial measurement.</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th colspan="2">Performance</th><th>Test or inspection method</th></tr>
<tr><td rowspan="4">(11)</td><td rowspan="4">Humidity load</td><td>External appearance</td><td>No mechanical damage.</td><td rowspan="4">Humidity load:
(apply for the product with rated voltage 500V-Max):
Apply the rated voltage at temperature 40±2 ℃ and humidity 90 to 95%RH for 500 ＋24/－0 hours.
Leave the capacitors in ambient condition for the following time before measurement.
Class 1：24±2 hours.
Class 2：48±4 hours.
* Charge / discharge current shall. not exceed 50 mA.
* Preconditioning：(only for Class 2):
Apply the rated DC voltage for 1hour at 150 ±5℃. Remove and let sit for 48±4 hours at room temperature. Perform initial measurement.</td></tr>
<tr><td>Cap. change
(ΔC/C)</td><td>NPO: ± 5% or
±0.5 pFmax.
(Whichever is larger)
X7R: ±12.5%
Y5V: ±30%</td></tr>
<tr><td colspan="2">D.F.:

NPO:
C≧30pF: D.F. ≦ $\frac{1}{350}$
10pF≦C＜30pF: D.F. ≦ $\frac{1}{275+2.5*C}$
C＜10pF: D.F. ≦ $\frac{1}{200+10*C}$
PS: C: Nominal Capacitance (pF)
<table>
<tr><td rowspan="8">X7R</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="3">≧100V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>1206≧0.47uF</td></tr>
<tr><td>≦7.5%</td><td>0805＞0.1μF,1206>1μF</td></tr>
<tr><td rowspan="4">50V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>0805≧0.18μF, 1206≧0.47μF</td></tr>
<tr><td>≦10%</td><td>1210≧4.7μF</td></tr>
<tr><td>≦20%</td><td>0805≧1μF, 1206≧2.2μF,
1210≧10μF</td></tr>
<tr><td rowspan="10">Y5V</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="2">≧50V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.47μF, 1206≧4.7μF</td></tr>
<tr><td rowspan="3">25V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.33μF,
1206≧1μF, 1210≧4.7μF</td></tr>
<tr><td>≦15%</td><td>1206≧4.7μF, 1210≧22μF</td></tr>
<tr><td>16V
(C<1.0μF)</td><td>≦10%</td><td></td></tr>
<tr><td rowspan="2">16V
(C≧1.0μF)</td><td>≦12.5%</td><td></td></tr>
<tr><td>≦20%</td><td>0805≧3.3μF;1206≧10μF;
1210≧22μF</td></tr>
<tr><td>10V</td><td>≦20%</td><td></td></tr>
</table></td></tr>
<tr><td>I.R.</td><td>500MΩ min. or 25Ω*F
(Whichever is smaller)</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th colspan="3">Performance</th><th>Test or inspection method</th></tr>
<tr><td>(12)</td><td>Temperature Load</td><td>External appearance</td><td colspan="2">No mechanical damage.</td><td rowspan="3">
<table>
<tr><th>Rated Voltage</th><th>Tested Voltage</th></tr>
<tr><td>< 500V</td><td>2.0Ra</td></tr>
<tr><td>500V</td><td>1.5Ra</td></tr>
<tr><td>≥ 630V</td><td>1.2Ra</td></tr>
<tr><td>≥ 1000V</td><td>1.2Ra</td></tr>
</table>
PS: The test voltage is 150% of rated voltage for below range.
<table>
<tr><th>Size</th><th>Rated voltage</th><th>Capacitance</th></tr>
<tr><td>0805</td><td>50V(X7R)</td><td>C≧2.2uF</td></tr>
<tr><td></td><td>100V(X7R)</td><td>C≧0.47uF</td></tr>
<tr><td></td><td>16V(Y5V)</td><td>C≧0.47uF</td></tr>
<tr><td>1206</td><td>100V(X7R)</td><td>C≧1.0uF</td></tr>
</table>
at maximum operating temperature ±2℃ for 1000＋48/－0 hours.
Leave the capacitors in ambient condition for the following time before measurement.
Class I: 24±2 hours
Class II: 48±4 hours

* Charge / discharge current shall. not exceed 50 mA.
* Preconditioning：(only for Class 2):
Apply 200% of the rated DC voltage for 1 hour at the maximum operating temperature ± 3℃.
Remove and let sit for 48±4 hours at room temperature. Perform initial measurement.</td></tr>
<tr><td>Cap. change (ΔC/C)</td><td colspan="2">NPO: ±3% or ±0.3pFmax.
(Whichever is larger)
X7R: ≥ 10V, ±12.5%

Y5V: ≥ 10V, ±30%</td></tr>
<tr><td colspan="3">D.F.:

NPO:
C≧30pF: D.F. ≦ $\frac{1}{350}$
10pF≦C＜30pF: D.F. ≦ $\frac{1}{275+2.5*C}$
C＜10pF: D.F. ≦ $\frac{1}{200+10*C}$
PS: C: Nominal Capacitance (pF)
<table>
<tr><td rowspan="8">X7R</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="3">≧100V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>1206≧0.47uF</td></tr>
<tr><td>≦7.5%</td><td>0805＞0.1μF,1206>1μF</td></tr>
<tr><td rowspan="4">50V</td><td>≦3%</td><td></td></tr>
<tr><td>≦6%</td><td>0805≧0.18μF, 1206≧0.47μF</td></tr>
<tr><td>≦10%</td><td>1210≧4.7μF</td></tr>
<tr><td>≦20%</td><td>0805≧1μF, 1206≧2.2μF,
1210≧10μF</td></tr>
<tr><td rowspan="10">Y5V</td><td>Rated vol.</td><td>DF≦</td><td>Special chip size and capacitance</td></tr>
<tr><td rowspan="2">≧50V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.47μF, 1206≧4.7μF</td></tr>
<tr><td rowspan="3">25V</td><td>≦7.5%</td><td></td></tr>
<tr><td>≦10%</td><td>0805≧0.33μF,
1206≧1μF, 1210≧4.7μF</td></tr>
<tr><td>≦15%</td><td>1206≧4.7μF, 1210≧22μF</td></tr>
<tr><td>16V
(C<1.0μF)</td><td>≦10%</td><td></td></tr>
<tr><td rowspan="2">16V
(C≧1.0μF)</td><td>≦12.5%</td><td></td></tr>
<tr><td>≦20%</td><td>0805≧3.3μF;1206≧10μF;
1210≧22μF</td></tr>
<tr><td>10V</td><td>≦20%</td><td></td></tr>
</table></td></tr>
<tr><td>I.R.</td><td colspan="2">1000MΩ or 50Ω*F
(Whichever is smaller)</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item</th><th colspan="2">Performance</th><th>Test or inspection method</th></tr>
<tr><td rowspan="4">(13)</td><td rowspan="4">Temperature cycle</td><td>External appearance</td><td>No mechanical damage.</td><td rowspan="2">The capacitor shall be subject 5 cycles according to four heat treatments listed in the following table.
Then Leave the capacitors in ambient condition for the following time before measurement.
Class I: 24±2 hours
Class II: 48±4 hours</td></tr>
<tr><td>Cap. change (ΔC/C)</td><td>NPO: ±2.5% or ±0.25pFmax.
(Whichever is larger)
X7R: ±7.5%
Y5V: ±20%</td></tr>
<tr><td>D.F.</td><td>To meet initial standard value</td><td rowspan="2"><table><tr><th>Step</th><th>Temperature (℃)</th><th>Duration (min.)</th></tr><tr><td>1</td><td>Min. Operation Temp.±3</td><td>30±3</td></tr><tr><td>2</td><td>Room Temp. (25℃)</td><td>2 ~ 3</td></tr><tr><td>3</td><td>Max. Operation Temp.±3</td><td>30±2</td></tr><tr><td>4</td><td>Room Temp. (25℃)</td><td>2 ~ 3</td></tr></table>*Preconditioning：(only for Class 2): Perform a heat treatment at 150 +0-10℃ for one hour and then let sit for 48±4 hours at room</td></tr>
<tr><td>I.R.</td><td>10000MΩ min. or 500Ω*F
(Whichever is smaller)</td></tr>
</table>

8. Operating and storage environment:

The insulating coating of capacitors does not form a perfect seal; therefore, do not use or store capacitors in a corrosive atmosphere, especially where chloride gas, sulfide gas, acid, alkali, salt or the like are present. Also avoid exposure to moisture. Before cleaning, bonding or molding this product, verify that these processes do not affect product quality by testing the performance of a cleaned, bonded or molded product in the intended equipment. Store the capacitors where the temperature and relative humidity do not exceed 5 to 40 degrees centigrade and 20 to 70%. Use capacitors within 6 months after delivery.

9. Description:

Radial-Leaded, Epoxy-Dipped Multilayer ceramic capacitors are built by superior moisture and shock resistant Epoxy coating, can be supplied in both bulk or tape package for automatic insertion in printed circuit board. But must to avoid effect of external force when the capacitors are used automatic insertion because the inner chips are very weak and easy broken.

Our RD series capacitors have wide application in computer, data Processor, telecom communication, industrial control, and instrumentation equipment, etc.

(Epoxy coated: Flame resistance for UL94 V-0 Approved)

10. Features:

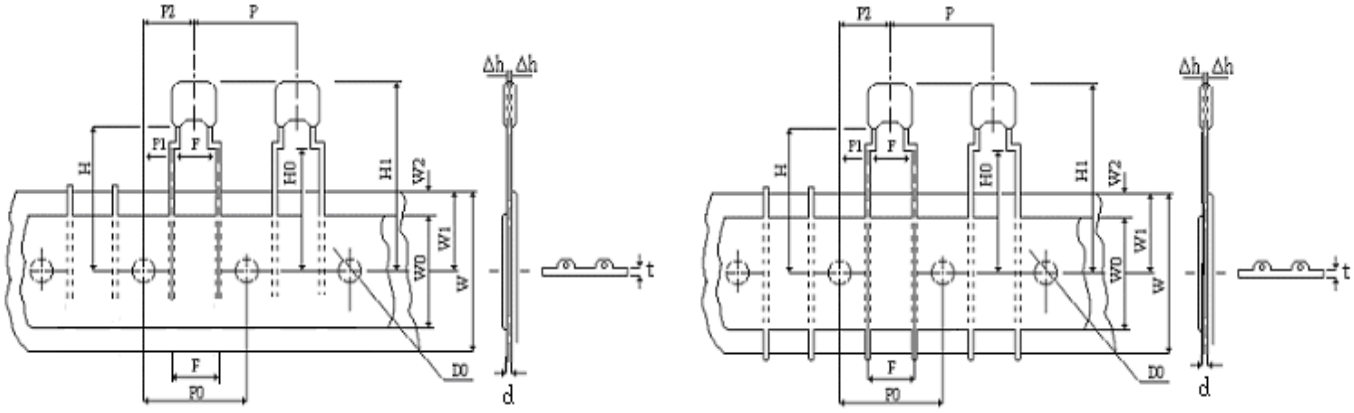
(1) Enhanced environmental protection coating.

(2) COG (NPO)、X7R、Y5V characteristic.

(3) Variety of Lead configuration.

11. Taping Figure and Specification: (RD21)

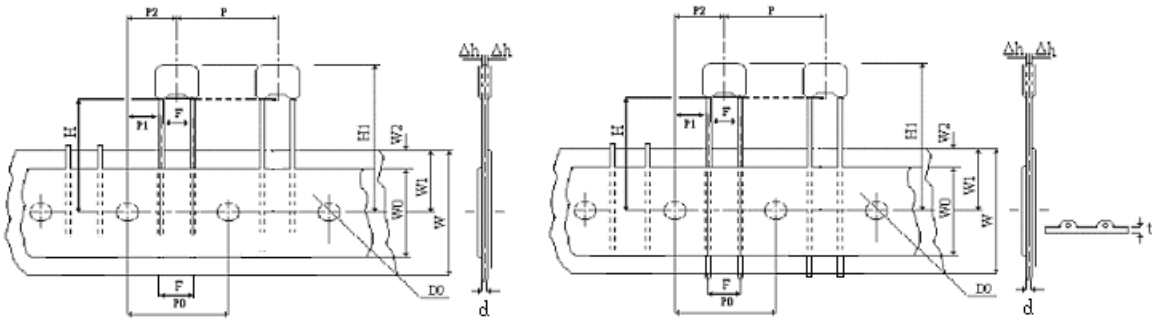
(Unit: mm)



Description	Symbol	Dimension	Remarks
Pitch Of Component	P	12.7±1.0	
Feed Hold Pitch	P0	12.7±0.3	Cumulative Pitch Error： ±1.0 Mm/20 Pitches
Feed Hold Center to Lead	P1	3.85±0.7	
Feed Hold Center to Component Center	P2	6.35±1.3	
Lead diameter	d	0.5±0.1	
Lead To Lead Spacing	F	5.0 ±0.8	To Lead Tip Within Tolerance
Component Alignment, F-R	∆h	2.0 Max	The Alignment From The Center Of The Lead Is±1.0mm
Tape Width	W	18.0+1.0/-0.5	
Adhesive Tape Width	W0	11.0 Min.	
Hole Position	W1	9.0±0.5	
Adhesive Tape Position	W2	3.0 max.	
Height Of Bottom Body From Tape Center	H	18.0+2.0/-0	H+12.5mm≤H1
Lead-Wire Clinch Height	H0	16.0±0.5	6.5≤H0-W1
Component Height	H1	32.25 Max.	
Feed Hole Diameter	D0	4.0±0.2	
Tape Thickness	t	0.6±0.3	

12. Taping Figure and Specification: (RD20)

(Unit: mm)



Unit: mm

Description	Symbol	Dimension	Remarks
Pitch Of Component	P	12.7±1.0	
Feed Hold Pitch	P0	12.7±0.3	Cumulative Pitch Error： ±1.0 Mm/20 Pitches
Feed Hold Center to Lead	P1	5.1±0.7	
Feed Hold Center to Component Center	P2	6.35±1.3	
Lead diameter	d	0.5±0.1	
Lead To Lead Spacing	F	2.5 ±0.8	To Lead Tip Within Tolerance
Component Alignment, F-R	Δh	2.0 Max	The Alignment From The Center Of The Lead Is±1.0mm
Tape Width	W	18.0+1.0/-0.5	
Adhesive Tape Width	W0	11.0 Min.	
Hole Position	W1	9.0±0.5	
Adhesive Tape Position	W2	3.0 max.	
Lead-Wire Clinch Height from bottom of capacitor to the hold center	H	18.0±0.5	
Component Height	H1	32.25 Max.	
Feed Hole Diameter	D0	4.0±0.2	
Tape Thickness	t	0.6±0.3	

13. Packing quantity：

Size code	Taping type		Bulk type
	Quantity per reel	Quantity per box	Quantity per bag
RD20,RD21	2,000	2,000	1,000

14. Size code and capacitance (pF) available:

Dielectric		NPO												
Size		0805						1206						
Voltage (VDC)		50	100	200	250			50	100	200	250	500	630	1000
Capacitance	1.0pF (010)	B	B	B	B									
	1.2pF (1R2)	B	B	B	B			B	B					
	1.5pF (1R5)	B	B	B	B			B	B	B	B	B	B	B
	1.8pF (1R8)	B	B	B	B			B	B	B	B	B	B	B
	2.2pF (2R2)	B	B	B	B			B	B	B	B	B	B	B
	2.7pF (2R7)	B	B	B	B			B	B	B	B	B	B	B
	3.3pF (3R3)	B	B	B	B			B	B	B	B	B	B	B
	3.9pF (3R9)	B	B	B	B			B	B	B	B	B	B	B
	4.7pF (4R7)	B	B	B	B			B	B	B	B	B	B	B
	5.6pF (5R6)	B	B	B	B			B	B	B	B	B	B	B
	6.8pF (6R8)	B	B	B	B			B	B	B	B	B	B	B
	8.2pF (8R2)	B	B	B	B			B	B	B	B	B	B	B
	10pF (100)	B	B	B	B			B	B	B	B	B	B	B
	12pF (120)	B	B	B	B			B	B	B	B	B	B	B
	15pF (150)	B	B	B	B			B	B	B	B	B	B	B
	18pF (180)	B	B	B	B			B	B	B	B	B	B	B
	22pF (220)	B	B	B	B			B	B	B	B	B	B	B
	27pF (270)	B	B	B	B			B	B	B	B	B	B	B
	33pF (330)	B	B	B	B			B	B	B	B	B	B	B
	39pF (390)	B	B	B	B			B	B	B	B	B	B	B
	47pF (470)	B	B	B	B			B	B	B	B	B	B	B
	56pF (560)	B	B	B	B			B	B	B	B	B	B	B
	68pF (680)	B	B	B	B			B	B	B	B	B	B	B
	82pF (820)	B	B	B	B			B	B	B	B	B	B	B
	100pF (101)	B	B	B	B			B	B	B	B	B	B	B
	120pF (121)	B	B	B	B			B	B	B	B	B	B	B
	150pF (151)	B	B	B	B			B	B	B	B	B	B	B
	180pF (181)	B	B	B	B			B	B	B	B	B	B	B
	220pF (221)	B	B	B	B			B	B	B	B	B	B	B
	270pF (271)	B	B	B	B			B	B	B	B	B	B	B
	330pF (331)	B	B	B	B			B	B	B	B	B	B	B
	390pF (391)	B	B	B	B			B	B	B	B	B	B	B
	470pF (471)	B	B	B	B			B	B	B	B	B	B	B
	560pF (561)	B	B	B	B			B	B	B	B	B	B	
	680pF (681)	B	B	B	B			B	B	B	B	B	B	
	820pF (821)	B	B	B	B			B	B	B	B	B	B	
	1000pF (102)	B	B	B				B	B	B	B	B	B	
	1200pF (122)	B	B					B	B	B	B	B	B	
	1500pF (152)	B	B					B	B	B	B	B	B	
	1800pF (182)	B	B					B	B	B	B	B	B	
	2200pF (222)	B	B					B	B	B	B	B	B	
	2700pF (272)	B	B					B	B					
	3300pF (332)	B	B					B	B					
	3900pF (392)	B	B					B	B					
	4700pF (472)	B	B					B	B					
	5600pF (562)	B						B	B					
	6800pF (682)	B						B	B					
	8200pF (822)	B						B	B					
	0.01uF (103)	B						B						

Dielectric		X7R												
Size		0805						1206						
Voltage (VDC)		50	100	200	250			50	100	200	250	500	630	1000
Capacitance	100pF (101)	B	B	B	B									
	120pF (121)	B	B	B	B									
	150pF (151)	B	B	B	B			B	B	B	B	B	B	B
	180pF (181)	B	B	B	B			B	B	B	B	B	B	B
	220pF (221)	B	B	B	B			B	B	B	B	B	B	B
	270pF (271)	B	B	B	B			B	B	B	B	B	B	B
	330pF (331)	B	B	B	B			B	B	B	B	B	B	B
	390pF (391)	B	B	B	B			B	B	B	B	B	B	B
	470pF (471)	B	B	B	B			B	B	B	B	B	B	B
	560pF (561)	B	B	B	B			B	B	B	B	B	B	B
	680pF (681)	B	B	B	B			B	B	B	B	B	B	B
	820pF (821)	B	B	B	B			B	B	B	B	B	B	B
	1000pF (102)	B	B	B	B			B	B	B	B	B	B	B
	1200pF (122)	B	B	B	B			B	B	B	B	B	B	B
	1500pF (152)	B	B	B	B			B	B	B	B	B	B	B
	1800pF (182)	B	B	B	B			B	B	B	B	B	B	B
	2200pF (222)	B	B	B	B			B	B	B	B	B	B	B
	2700pF (272)	B	B	B	B			B	B	B	B	B	B	B
	3300pF (332)	B	B	B	B			B	B	B	B	B	B	B
	3900pF (392)	B	B	B	B			B	B	B	B	B	B	B
	4700pF (472)	B	B	B	B			B	B	B	B	B	B	B
	5600pF (562)	B	B	B	B			B	B	B	B	B	B	B
	6800pF (682)	B	B	B	B			B	B	B	B	B	B	B
	8200pF (822)	B	B	B	B			B	B	B	B	B	B	B
	0.01uF (103)	B	B	B	B			B	B	B	B	B	B	B
	0.012uF (123)	B	B	B	B			B	B	B	B	B	B	
	0.015uF (153)	B	B	B	B			B	B	B	B	B	B	
	0.018uF (183)	B	B	B	B			B	B	B	B	B	B	
	0.022uF (223)	B	B	B	B			B	B	B	B	B	B	
	0.027uF (273)	B	B					B	B	B	B	B	B	
	0.033uF (333)	B	B					B	B	B	B	B	B	
	0.039uF (393)	B	B					B	B	B	B			
	0.047uF (473)	B	B					B	B	B	B			
	0.056uF (563)	B	B					B	B	B	B			
	0.068uF (683)	B	B					B	B	B	B			
	0.082uF (823)	B	B					B	B	B	B			
	0.1uF (104)	B	B					B	B	B	B			
	0.12uF (124)	B						B	B					
	0.15uF (154)	B						B	B					
	0.18uF (184)	B						B	B					
	0.22uF (224)	B						B	B					
	0.27uF (274)	B						B						
	0.33uF (334)	B						B						
	0.39uF (394)	B						B						
	0.47uF (474)	B						B						
	0.56uF (564)							B						
	0.68uF (684)							B						
	0.82uF (824)							B						
	1.0uF (105)							B						

☆ **The letter in cell is expressed the symbol of product terminations. B: (Cu/Ni/Sn)**

☆ **RD21 type can use Mlcc size 0805 and 1206, but RD20 type can only use Mlcc size 0805.**

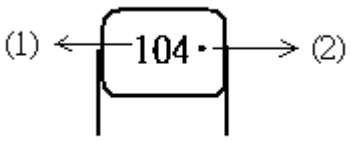
Dielectric		Y5V													
Size		0805							1206						
Voltage (VDC)		10	16	25	50	100	200	250	10	16	25	50	100	200	250
Capacitance	0.01uF (103)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.015uF (153)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.022uF (223)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.033uF (333)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.047uF (473)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.068uF (683)	B	B	B	B	B	B	B	B	B	B	B	B	B	B
	0.1uF (104)	B	B	B	B	B			B	B	B	B	B	B	B
	0.15uF (154)	B	B	B	B				B	B	B	B	B	B	B
	0.22uF (224)	B	B	B	B				B	B	B	B	B		
	0.33uF (334)	B	B	B	B				B	B	B	B			
	0.47uF (474)	B	B	B	B				B	B	B	B			
	0.68uF (684)	B	B	B	B				B	B	B	B			
	1.0uF (105)	B	B	B	B				B	B	B	B			
	1.5uF (155)	B	B						B	B	B				
	2.2uF (225)	B	B	B					B	B	B	B			
	3.3uF (335)	B	B						B	B	B				
	4.7uF (475)	B	B	B					B	B	B				
	6.8uF (685)	B							B	B					
	10uF (106)	B							B	B	B				
	22uF (226)								B						

☆ **The letter in cell is expressed the symbol of product terminations. B: (Cu/Ni/Sn)**

☆ **RD21 type can use Mlcc size 0805 and 1206, but RD20 type can only use Mlcc size 0805.**

15. Marking:

Rated voltage	10Vdc	16Vdc	25Vdc	50Vdc	100Vdc	200Vdc	250Vdc	500Vdc	630Vdc	1KVdc
Marking	104	104	104	104	104	104	104	104	104	104



(1) Rated capacitance: Identified by 3-figure code.

(2) Halogen and Pb free: There is a "•" beside the capacitance code when the coating resin is Halogen and Pb free Epoxy.