

D13-00-E-09

SPECIFICATION OF MULTI-LAYER RADIAL-LEADED TYPE CAPACITOR

Ver: 9

Page: 1 / 15

# PRODUCT SPECIFICATION

PRODUCT: MULTILAYER CERAMIC CAPACITOR

TYPE: RADIAL-LEADED TYPE CAPACITOR

CUSTOMER:		
DOC. NO.:	D13-00-E-09	
Ver.:	09	

## 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.

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







## 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".	3
		2. Review the body size W/H/T according to the chip size.	4
		3. Review the contents of description.	11
		4. Correct the size of P1 for type RD20.	13
2013/5/6	7	1. Review the Lead diameter φ from 0.55±0.05mm to	4,12,13
		0.5+/-0.05mm	
		2. Add "H1 max" to lead configuration and size form.	4
		3. Review the Solderability temperature from $235\pm5^{\circ}$ C to	8
		245±5°C.,Solderability time from 2 ±0.5s to 5±0.5s"	
2014/8/8	8	1. Review the item 8 from "Storing condition and term" to be	11
		"Operating and storage environment"	
		2. Delete the 1206size for RD20 type.	4
		3. Delete the 500V ~630V type of 0805 size.	14
		4. Review the D.F. spec according to MLCC spec of Walsin.	6,8,9,10
2015/11/24	9	1. Review the Part number defining.	4
		2. Add the 1812 size for RD21 type.	4
		3. Add the 1812 size for the D.F. spec according to MLCC	6,8,9,10
		spec of Walsin.	
		4. Review the Packing quantity.	14
		5. Add voltage code in Marking for 2000V&3000V.	15



## Table of Contents 目錄

No.	Item 項目	Page
1	Scope	4
2	Part number defining	4
3	Lead configuration and size	4
4	Product structure	5
5	Test conditions	5
6	Handle procedure	5
7	Specification and test method	6~11
8	Storing condition and term	11
9	Description	11
10	Features	11
11	Taping Figure and Specification(RD21)	12
12	Taping Figure and Specification(RD20)	13
13	Packing quantity	14
14	Size code and capacitance (pF) available	14~15
15	Marking	15



#### 1. Scope:

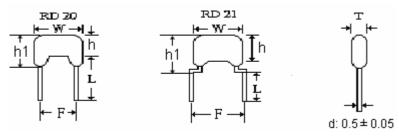
Its specification applies to Radial Series Ceramic Capacitor.

## 2. Part number defining (SAP):

RD21			В		102	K	500	В	5	С	07	В
Product Type			Dielectric C					Packaging Code	Chip Size	Termination	Lead length	Lead length Tolerance
RD20	Code		1 0		100=10 pF 102=1000 pF	C=±0.25pF D=±0.5pF	100=10V 250=25V	B=Bulk		L=Ag/Ni/Sn C=Cu/Ni/Sn	* * •	D=Tapping
RD21	N	NPO	-55 ~ +125 °C	0±30(PPM/°C)	103=10000 pF	J=±5 % K=+10 %	101=100V				Bulk (ex):	A=±0.5mm
	В	X7R	-55 ~ +125 ℃		1R5=1.5 pF 101=100 pF 472=4700 pF	M=±20 % Z=+80 %	201=200V 251=250V 501=500V		0=1210 2=1812	H=Cu/Ni/Sn Halogen	07=7.0 mm	B=±1mm C=Min
	F	Y5V	-25~ +85°C	+30% ~ -80%	104=100000 pF	7-2070	631=630V 102=1000V 202=2000V 302=3000V			free		

<sup>\*</sup> Remark about tolerance code: NPO: all tolerance, X7R: K \ M, Y5V: M \ Z

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

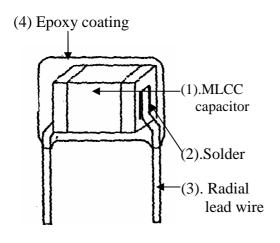


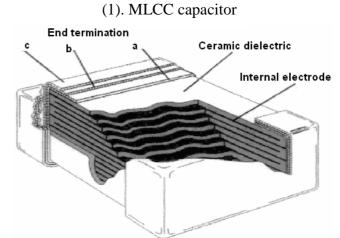
Type	Chip	Chip	Chip	Width	Height	(Max.)	Thickness	Lead length	Lead spacing	Lead spacing	Lead	
Code	size	(W)Max.	h	h1	(T)Max. (L)		for Taping (F)	for Bulk (F)	diameter(d)			
RD20	0805	5.0	4.5	6.0	3.5	D.C.	2.5±0.8	2.54±1.0				
	0805	5.0	4.5	6.5	3.5	Refer to			0.5+0.05			
	1206	6.5	5.0	7.0	4.0	the item "2.2 SAP						
RD21	1210	6.5	<i>( 5</i>	6.5	6.5	<i>5 5</i>	7.5	5.0	Part	5.0±0.8	5.08±1.0	0.5±0.05
	(Special size)	6.5	5.5	7.5	5.0							
	1812	8.0	6.5	8.5	5.5	Number"						



#### 4. Product structure:

#### Radial capacitor





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

#### 5. Test conditions:

Tests shall, unless otherwise specified, be carried out at 15 to 35°C and RH 45 to 75%. If any doubt and argument has been encounter in judgement, the final test shall be done at  $25\pm2$ °C, RH45 to 55% and  $860\sim1060$ mbar. (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 :

No.	Item			Per	formance		Test or inspection method				
(1)	Appearance structure size	No de	efects w	hich m	ay affect performance.	As	section 3				
(2)	Withstand Voltage				ge without on or other damage.	1~	DC Tested voltage shall be applied for $1 \sim 5$ sec. Charge/discharge current shall not exceed 50 mA.				
							Rated Voltage Tested Voltage				
							<100V	2.5Ra			
							100V	3.0Ra			
							200~300V	2.0 Ra			
							500~999V	1.5 Ra			
							1000~3000V	1.2 Ra			
(3)	Insulation resistance	X7R 10 R	000MΩ · Y5V: GΩ M • C ≧		·F	me	sulation resista: easured at 120± ed voltage app  Rated Voltage  <500V  ≥500V	5 seconds after	r		
(4)	Capacitance	Withi	in the si	ecified	tolerance.	Me	easuring freque	ency & voltage:	:		
(5)	Dissipation Factor		More th	an 30pF: n 30pF: n 30pF: 0 DF ≤	Q $\ge$ 1000 Q $\ge$ 400+20C Special chip size and capacitance 1206 $\ge$ 0.47uF 0805 $>$ 0.1μF,1206 $>$ 1μF 0805 $\ge$ 0.18μF, 1206 $\ge$ 0.47μF 1210 $\ge$ 4.7μF 0805 $\ge$ 1μF, 1206 $\ge$ 2.2μF, 1210 $\ge$ 10μF Special chip size and capacitance 0805 $\ge$ 0.47μF, 1206 $\ge$ 4.7μF 1206 $\ge$ 1μF, 1210 $\ge$ 4.7μF 1206 $\ge$ 1μF, 1210 $\ge$ 22μF		PO: >1000pF 1KHz±10 1.0±0.2 V ≤1000pF 1MHz±1 1.0±0.2 V C7R \ Y5V: C ≤10u 1.0±0.2 V 1KHz±100 C>10 uf 0.5±0.2 V 120Hz±20	0% Vrms 7: 0% Vrms F rms % =			

Temperature Characteristic	Т	· · · · · · · · · · · · · · · · · · ·		The			
		emperatures C	Coefficient	detern	temperature coefficient is nined using the capacitance ared at base temperature as		
	T. C	Operating	Capacitance	a refe	rence. Test the specimen in		
of Canacitance	T.C.	Temperature	Change( $\Delta C$ )	minin	nge of maximum and num operation temperature		
Сараснанес	NPO	-55~+125°C	0±30(ppm/°C)	* Base	nown as left table. e Temp 25±2°C e Temp for Y5V: 20±2°C		
	X7R	-55~+125°C	± 15%	Step	Temperature(°C)		
				1	Base Temp.(25°C) $\pm$ 2°C		
	Y5V	-25~+85°C	+30%~-80%	2	Min. Operation Temp.±2 °C		
					Base Temp.(25°C) $\pm$ 2°C		
				4	Max. Operation Temp.±2°C		
n · 1	/D 11 /	.1			Base Temp. $(25^{\circ}\text{C}) \pm 2^{\circ}\text{C}$		
		•			ng weight 0.5 Kgs is applied ±1 seconds		
•					g weight 0.25 Kgs is applied		
		U			g back and forth 90 degrees twice		
	External appearance		l damage.	Lead wire or terminals shall be			
esistance	Cap. change	NPO	±2.5% or	imme	rsed (A) up to 2.0 mm from		
	$(\Delta C/C)$		± 0.25 pF max.	body	(B) into the Molten solder		
			Whichever is larger	of wh	nich temperature is 260+5		
		X7R	±7.5%	_0°C	for 3±0.5 sec. Then leave		
		Y5V	±20%	at sta	andard test conditions for		
	D.F.	To meet initia	al standard value		hours, then measured.		
					onditioning:		
				_	for Class 2):		
					rm a heat treatment at		
				150 +0/-10 °C for one hour and then let sit for $48 \pm 4$ hours at room			
		TD	1 , 1 1 1				
		To meet initia	ai standard value	tempe	rature.		
	* D						
	1.K.						
<u>-</u> Γ		Tensile stre Y5V  Tensile stre No bre Bending str No bre  Coldering heat esistance  Cap. change (\(\Delta\) C/C)	Papacitance  NPO $-55 \sim +125^{\circ}\mathbb{C}$ X7R $-55 \sim +125^{\circ}\mathbb{C}$ Y5V $-25 \sim +85^{\circ}\mathbb{C}$ Tensile strength:  No breakdown  Bending strength:  No breakdown  External appearance  Cap. change  ( $\Delta \mathbb{C}/\mathbb{C}$ )  X7R  Y5V  D.F.  To meet initial	Tensile strength: No breakdown  Bending strength: No breakdown  Cap. change $(\Delta C/C)$ NPO $-55 \sim +125^{\circ}C$ $\pm 15\%$ $\pm 10\%$	Tensile strength: No breakdown  External appearance  Cap. change $(\Delta C/C)$ D.F.  To meet initial standard value  that si hat si * Base * Ba		

No.	Item			Per	formance	Test or inspection method
(9)	Solderability			nall be s t directi	oldered over 75% of the on	To comply with JIS-C-5102 8.4, the soldering temperature is 245±5°C and dipping time is 5±0.5 seconds.  Flux: weight ratio of Rosin 25%
(10)	Humidity (Steady state)	Cap. α (Δ C)  D.F.:  NPO:  C≥3  10pF	change $/C$ )  : $30pF: D$ $F \le C < 2$ $10pF: D$	NPO: $\pm$ (Y X7R: $\pm$ Y5V: $\pm$ 0.F. $\leq \frac{1}{35}$ 30pF: I 0.F. $\leq \frac{1}{20}$ inal Cap  DF $\leq$ $\leq 3\%$ $\leq 6\%$ $\leq 10\%$ $\leq 10\%$ $\leq 7.5\%$ $\leq 10\%$ $\leq 10\%$ $\leq 10\%$ $\leq 15\%$ $\leq 10\%$ $\leq 10\%$ $\leq 10\%$ $\leq 10\%$ $\leq 10\%$	30%  D.F. $\leq \frac{1}{275+2.5*C}$ 1 00+10*C acitance (pF)  Special chip size and capacitance  1206 $\geq$ 0.47uF 0805 $>$ 0.1μF,1206 $>$ 1μF  1210 $\geq$ 4.7μF 1210 $\geq$ 4.7μF 1210 $\geq$ 10μF Special chip size and capacitance  0805 $\geq$ 0.18μF, 1206 $\geq$ 2.2μF, 1210 $\geq$ 10μF Special chip size and capacitance  0805 $\geq$ 0.47μF, 1206 $\geq$ 4.7μF  0805 $\geq$ 0.33μF, 1206 $\geq$ 4.7μF 1206 $\geq$ 4.7μF 1206 $\geq$ 4.7μF, 1210 $\geq$ 22μF	Humidity (Steady state): At temperature 40±2 °C 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°C. Remove and let sit for 48±4 hours at room temperature. Perform initial measurement.
		I.R.			nin. or $50 \Omega *F$ ever is smaller)	

No.	Item			P	erformance	<b>Test or inspection method</b>									
(11)	Humidity load	Externappear	rance		hanical damage.	Humidity load: ( apply for the product with rated voltage 500V-Max):									
		Cap. c	C)	NPO: ± ±0.5 pFi (Whiche X7R: ± Y5V: ±3	ever is larger) 12.5%	Apply the rated voltage at temperature $40\pm2$ °C and humidity 90 to 95% RH for 500 $+24/-0$ hours.  Leave the capacitors in ambient									
		10pF C<1	≦C<3 0pF: D.	F. $\leq \frac{1}{200}$	$0.F. \leq \frac{1}{275 + 2.5 * C}$	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									
		X7R	Rated vol. ≥100V	DF≦ ≤3%	Special chip size and capacitance  1206 ≥ 0.47uF  0805 > 0.1µF,1206>1µF	1hour at $150 \pm 5$ °C. Remove and let sit for $48\pm 4$ hours at room temperature. Perform initial measurement.									
												50V	<ul><li>≤6%</li><li>≤10%</li><li>≤20%</li></ul>	$0805 \ge 0.18 \mu F, 1206 \ge 0.47 \mu F$ $1210 \ge 4.7 \mu F$ $0805 \ge 1 \mu F, 1206 \ge 2.2 \mu F,$ $1210 \ge 10 \mu F$	
			Rated vol. ≥50V	DF≦ ≤7.5% ≤10%	Special chip size and capacitance $0805 \!\ge\! 0.47 \mu F, 1206 \!\ge\! 4.7 \mu F$										
		Y5V	25V	\(\le 10\) \(\le 7.5\) \(\le 10\) \(\le 15\) \(\le 15\) \(\le 15\)	0805≥0.33μF, 1206≥1μF, 1210≥4.7μF 1206≥4.7μF, 1210≥22μF										
			16V (C<1.0μF) 16V (C≥1.0μF	$\leq 10\%$ $\leq 12.5\%$ $\leq 20\%$											
		I.R.			min. or $25\Omega*F$ ever is smaller)										

No.	Item			Per	formance	Te	est or i	nspection	n m	ethod	
(12)	Temperatu re Load	Extern appear		No mec	hanical damage.			Voltage 00V	Te	ested Voltage 2.0Ra	
	ic Load	Com	1	NPO: +3	3% or ±0.3pFmax.		500			1.5Ra	
				(V	Vhichever is larger)			30V		1.2Ra	
		$(\Delta \mathbf{C}/2)$	C)		10V, ±12.5%			000V		1.2Ra	
				Y5V: ≥	10V, ±30%				•	e is 150% of	
		D.F.:					rated voltage for below range.  Size Rated Capacitance				
							Size	voltage		Capacitance	
		NPO:					0805	50V(X7F	R)	C≧2.2uF	
		C≥3	0pF: D	o.F. $\leq \frac{1}{350}$	_			100V(X7	'R)	C≧0.47uF	
				33,	,			16V(Y5V	<i>V</i> )	C≧0.47uF	
		10pF	$\leq C < 3$	30pF: L	$0.F. \leq \frac{1}{275 + 2.5 * C}$		1206	100V(X7	'R)	C≥1.0uF	
		C<1	0pF: D	o.F. $\leq \frac{1}{200}$	1					<u>C≦1.0u1</u>	
					0+10* <i>C</i> scitance (pF)						
		15.	J. INOIII	шаг Сара	icitance (pr)			_		ig temperature	
			Rated	DF≦	Special chip size and					−0 hours.	
			vol.	<b>≦3%</b>	capacitance			-		in ambient	
			≥100V		1206≧0.47uF	co	condition for the following time before measurement.				
		X7R		≦7.5%	$0805 > 0.1 \mu F, 1206 > 1 \mu F$	be					
				<u>≤</u> 3% ≤6%	$0805 \ge 0.18 \mu \text{F}, 1206 \ge 0.47 \mu \text{F}$	1	Class I: 24±2 hours				
			50V	<u>≡</u> 070 <u>≤</u> 10%	1210≥4.7μF		Class	II: 48±4	hou	ars	
				≦20%	0805≥1μF, 1206≥2.2μF, 1210≥10μF		<i>C</i> 1	- / <b>-1:1</b> -			
			Rated	DF≦	Special chip size and		_		_	e current shall.	
			vol.	<b>≦</b> 7.5%	capacitance			ceed 50 n			
			≥50V	≤10%	$0805 \ge 0.47 \mu F$ , $1206 \ge 4.7 \mu F$	_1 1		ditioning	: (	only for Class	
				<u>≤7.5%</u>	0805≧0.33μF,	2)	:				
		37537	25V	≦10%	1206≥1μF, 1210≥4.7μF	A	pply 20	00% of th	e ra	ated DC voltage	
		Y5V		≦15%	$1206 \ge 4.7 \mu F$ , $1210 \ge 22 \mu F$	fo	r 1 hou	r at the n	าลชา	imum	
			16V (C<1.0μF	≦10%							
			-	<u>≤12.5%</u>		op	erating	g tempera	itur	$e \pm 3 \%$ .	
			16V (C≧1.0μI	<b>≤20%</b>	$\begin{array}{c} 0805\!\geq\!3.3\mu\text{F}; 1206\!\geq\!10\mu\text{F}; \\ 1210\!\geq\!22\mu\text{F}; 1812\!\geq\!47\mu\text{F}; \end{array}$					or 48±4 hours at	
			10V	≦20%		lro	om ten	nperature	. Ре	erform initial	
		I.R.		$1000 \mathrm{M}\Omega$ or $50\Omega$ *F (Whichever is smaller)			easurer	nent.			

No.	Item		Performance		Test or inspection met	thod			
(13)	1 emperature	External appearance	No mechanical damage.	The cycle	capacitor shall be sees according to for	subject 5 our heat			
	cycle	Cap.	NPO: ±2.5% or ±0.25pFmax.	treat	treatments listed in the following				
		change $(\Delta C/C)$	(Whichever is larger) X7R: ±7.5%	table Then	Leave the capacitors in a	mbient			
			Y5V: ±20%		ition for the following tim urement.	e before			
				Class I: 24±2 hours Class II: 48±4 hours					
		D.F.	To meet initial standard value	Class 11. 40_4 Hours					
				Step	Temperature ( $^{\circ}$ C)	Duration (min.)			
				1	Min. Operation Temp.±3	30±3			
				2	Room Temp. (25°C)	2 ~ 3			
				3	Max. Operation Temp.±3	30±2			
				4	Room Temp. (25°C)	2 ~ 3			
				*Preconditioning: (only for Class 2 Perform a heat treatment at					
		I D	$10000 \mathrm{M}\Omega$ min. or $500\Omega$ *F						
		I.R.	(Whichever is smaller)		150 +0-10°C for one hour and then let sit for 48±4 hours at room				

#### 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)

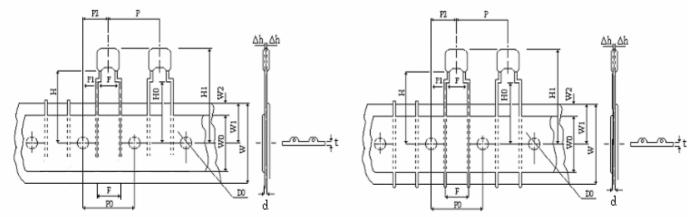
#### 10. Features:

- (1) Enhanced environmental protection coating.
- (2) COG (NPO) \ X7R \ Y5V characteristic.
- (3) Variety of Lead configuration.



## 11. Taping Figure and Specification: (RD21)

(Unit: mm)

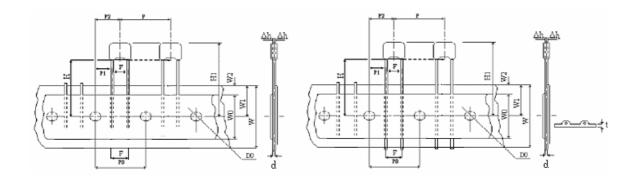


Description	Symbol	Dimension	Remarks
Pitch Of Component	P	12.7±1.0	
Feed Hold Pitch	P0	12.7±0.3	Cumulative Pitch Error : ±1.0 Mm/20 Pitches
Feed Hold Center to Lead	P1	3.85±0.7	
Feed Hold Center to Component Center	P2	6.35±1.3	
Lead diameter	d	0.5±0.05	
Lead To Lead Spacing	F	$5.0 \pm 0.8$	To Lead Tip Within Tolerance
Component Alignment, F-R	$\Delta$ 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	Н	18.0+2.0/-0	H+12.5mm≤H1
Lead-Wire Clinch Height	Н0	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±0.05	
Lead To Lead Spacing	F	$2.5 \pm 0.8$	To Lead Tip Within Tolerance
Component Alignment, F-R	$\Delta h$	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.	
Lead-Wire Clinch Height from bottom of capacitor to the hold center	Н	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:

Chipsize	Taping	type	Bulk type
Chipsize	Quantity per reel	Quantity per box	Quantity per bag
0805	2,000	2,000	1,000
1206,1210,1812	1,500	1,500	1,000

## 14. Size code and capacitance (pF) available:

	Dielectric	NPO									Dielectric		X7R																
	Size	0805 1206							Size							1206													
١	/oltage (VDC)	50	100	200	250			50	100	200	250	500	630	1000	١	/oltage (VDC)	5	100	200	250			50	100	200	250	500	630	1000
	1.0pF (010)	В	В	В	В											100pF (101)	) E	В	В	В									
	1.2pF (1R2)	В	В	В	В			В	В							120pF (121)	) E	В	В	В									
	1.5pF (1R5)	В	В	В	В			В	В	В	В	В	В	В		150pF (151)	) E	В	В	В			В	В	В	В	В	В	В
	1.8pF (1R8)	В	В	В	В			В	В	В	В	В	В	В		180pF (181)	) E	В	В	В			В	В	В	В	В	В	В
	2.2pF (2R2)	В	В	В	В			В	В	В	В	В	В	В		220pF (221)	) E	В	В	В			В	В	В	В	В	В	В
	2.7pF (2R7)	В	В	В	В			В	В	В	В	В	В	В		270pF (271)	) E	В	В	В			В	В	В	В	В	В	В
	3.3pF (3R3)	В	В	В	В			В	В	В	В	В	В	В		330pF (331)	) E	В	В	В			В	В	В	В	В	В	В
	3.9pF (3R9)	В	В	В	В			В	В	В	В	В	В	В		390pF (391)	) E	В	В	В			В	В	В	В	В	В	В
	4.7pF (4R7)	В	В	В	В			В	В	В	В	В	В	В		470pF (471)	) E	В	В	В			В	В	В	В	В	В	В
	5.6pF (5R6)	В	В	В	В			В	В	В	В	В	В	В		560pF (561)	) E	В	В	В			В	В	В	В	В	В	В
	6.8pF (6R8)	В	В	В	В			В	В	В	В	В	В	В		680pF (681)	) E	В	В	В			В	В	В	В	В	В	В
	8.2pF (8R2)	В	В	В	В			В	В	В	В	В	В	В		820pF (821)	) E	В	В	В			В	В	В	В	В	В	В
	10pF (100)	В	В	В	В			В	В	В	В	В	В	В		1000pF (102	() E	В	В	В			В	В	В	В	В	В	В
	12pF (120)	В	В	В	В			В	В	В	В	В	В	В		1200pF (122	() E	В	В	В			В	В	В	В	В	В	В
	15pF (150)	В	В	В	В			В	В	В	В	В	В	В		1500pF (152	() E	В	В	В			В	В	В	В	В	В	В
	18pF (180)	В	В	В	В			В	В	В	В	В	В	В		1800pF (182	) E	В	В	В			В	В	В	В	В	В	В
	22pF (220)	В	В	В	В			В	В	В	В	В	В	В		2200pF (222	() E	В	В	В			В	В	В	В	В	В	В
	27pF (270)	В	В	В	В			В	В	В	В	В	В	В		2700pF (272	() E	В	В	В			В	В	В	В	В	В	В
	33pF (330)	В	В	В	В			В	В	В	В	В	В	В		3300pF (332	() E	В	В	В			В	В	В	В	В	В	В
	39pF (390)	В	В	В	В			В	В	В	В	В	В	В		3900pF (392	) E	В	В	В			В	В	В	В	В	В	В
	47pF (470)	В	В	В	В			В	В	В	В	В	В	В		4700pF (472	() E	В	В	В			В	В	В	В	В	В	В
	56pF (560)	В	В	В	В			В	В	В	В	В	В	В		5600pF (562	() E	В	В	В			В	В	В	В	В	В	В
ee	68pF (680)	В	В	В	В			В	В	В	В	В	В	В	Se	6800pF (682	() E	В	В	В			В	В	В	В	В	В	В
a	82pF (820)	В	В	В	В			В	В	В	В	В	В	В	a	8200pF (822	() E	В	В	В			В	В	В	В	В	В	В
Capacitance	100pF (101)	В	В	В	В			В	В	В	В	В	В	В	pacitance	0.01uF (103	) E	В	В	В			В	В	В	В	В	В	В
pa	120pF (121)	В	В	В	В			В	В	В	В	В	В	В	pa	0.012uF (123	3) E	В	В	В			В	В	В	В	В	В	
ပ္ပ	150pF (151)	В	В	В	В			В	В	В	В	В	В	В	S	0.015uF (153	3) E	В	В	В			В	В	В	В	В	В	
	180pF (181)	В	В	В	В			В	В	В	В	В	В	В		0.018uF (183	3) E	В	В	В			В	В	В	В	В	В	
	220pF (221)	В	В	В	В			В	В	В	В	В	В	В		0.022uF (223	3) E	В	В	В			В	В	В	В	В	В	
	270pF (271)	В	В	В	В			В	В	В	В	В	В	В		0.027uF (273	3) E	В					В	В	В	В	В	В	
	330pF (331)	В	В	В	В			В	В	В	В	В	В	В		0.033uF (333	3) E	В					В	В	В	В	В	В	
	390pF (391)	В	В	В	В			В	В	В	В	В	В	В		0.039uF (393	3) E	В					В	В	В	В			
	470pF (471)	В	В	В	В			В	В	В	В	В	В	В		0.047uF (473	3) E	В					В	В	В	В			
	560pF (561)	В	В	В	В			В	В	В	В	В	В			0.056uF (563	3) E	В					В	В	В	В			
1	680pF (681)	В	В	В	В			В	В	В	В	В	В			0.068uF (683	3) E	В					В	В	В	В			
1	820pF (821)	В	В	В	В			В	В	В	В	В	В			0.082uF (823	3) E	ВВ					В	В	В	В			
	1000pF (102)	В	В	В				В	В	В	В	В	В			0.1uF (104)							В	В	В	В			
1	1200pF (122)	В	В					В	В	В	В	В	В			0.12uF (124	) E	3					В	В					
1	1500pF (152)	В	В					В	В	В	В	В	В			0.15uF (154	_	_					В	В					
1	1800pF (182)	В	В					В	В	В	В	В	В			0.18uF (184	) E	3					В	В					oxdot
	2200pF (222)	В	В					В	В	В	В	В	В			0.22uF (224							В	В					
1	2700pF (272)	В	В					В	В							0.27uF (274		_					В						
1	3300pF (332)	В	В					В	В							0.33uF (334	_	_					В						
1	3900pF (392)	В	В					В	В							0.39uF (394	_	_					В						
	4700pF (472)	В	В					В	В							0.47uF (474	) E	3					В						
1	5600pF (562)	В						В	В							0.56uF (564	)						В						
1	6800pF (682)	В						В	В							0.68uF (684	)						В						
	8200pF (822)	В						В	В							0.82uF (824	)						В						
	0.01uF (103)	В						В								1.0uF (105)							В						

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

<sup>☆</sup> RD21 type can use Mlcc size 0805 and 1206, but RD20 type can only use Mlcc size 0805.

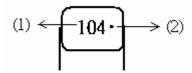


	Dielectric		Y5V														
	Size	0805								1206							
	Voltage (VDC)	10	16	25	50	100	200	250	10	16	25	50	100	200	250		
	0.01uF (103)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.015uF (153)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.022uF (223)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.033uF (333)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.047uF (473)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.068uF (683)	В	В	В	В	В	В	В	В	В	В	В	В	В	В		
	0.1uF (104)	В	В	В	В	В			В	В	В	В	В	В	В		
Φ	0.15uF (154)	В	В	В	В				В	В	В	В	В	В	В		
Capacitance	0.22uF (224)	В	В	В	В				В	В	В	В	В				
ita	0.33uF (334)	В	В	В	В				В	В	В	В					
ac	0.47uF (474)	В	В	В	В				В	В	В	В					
ap	0.68uF (684)	В	В	В	В				В	В	В	В					
0	1.0uF (105)	В	В	В	В				В	В	В	В					
	1.5uF (155)	В	В						В	В	В						
	2.2uF (225)	В	В	В					В	В	В	В					
	3.3uF (335)	В	В						В	В	В						
	4.7uF (475)	В	В	В					В	В	В						
	6.8uF (685)	В							В	В							
	10uF (106)	В							В	В	В						
	22uF (226)								В								

- ☆ 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 (VDC)	10	16	25	50	100	200	250	500	630	1000	2000	3000
Marking	<del>1</del> 04	104	104	104	<u>104</u>	<u>1</u> 04	10 <u>4</u>	<u>104</u>	104	~ 104	104 ~	<b>A</b> 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.