

DATA SHEET

Ceramic Capacitors

Order code	Manufacturer code	Description			
71-1400	n/a	PK 100 100N 50V Y5V CERAMIC (RC)			
71-1385	n/a	PK 100 10N 0805 50V Y5V CAP. (RC)			
71-1390	n/a	PK 100 22N 0805 50V Y5V CAP. RC			
71-1395	n/a	PK 100 47N 0805 50V Y5V CAP. (RC)			
71-1300	n/a	PK 100 10PF 0805 50V NPO CAP. (RC)			
71-1305	n/a	PK 100 15PF 0805 50V NPO CAP. (RC)			
71-1310	n/a	PK 100 22PF 0805 50V NPO CAP. (RC)			
71-1828	n/a	330PF X7R 0603 CHIP CERAMIC (100)			
71-1830	n/a	470PF X7R 0603 CHIP CERAMIC 50V (100) RC			
71-1832	n/a	680PF X7R 0603 CHIP CERAMIC 50V (100) RC			
71-1820	n/a	330PF NPO CHIP CERAMIC (100)			
71-1824	n/a	470PF NPO 0603 CHIP CERAMIC 50V (100) RC			
71-1826	n/a	220PF X7R 0603 CHIP CERAMIC (100)			
71-1810	n/a	120PF NPO 0603 CHIP CERAMIC (100)			
71-1812	n/a	150PF NPO 0603 CHIP CERAMIC 50V (100) RC			
71-1816	n/a	220PF NPO 0603 CHIP CERAMIC (100)			
71-1946	n/a	RL 220PF X7R 0603 CHIP CERAMIC (4000)			
71-1948	n/a	RL 330PF X7R 0603 CHIP CERAMIC (4000)			
71-1808	n/a	100PF NPO 0603 CHIP CERAMIC 50V (100) RC			
71-1936	n/a	RL 220PF NPO 10% 0603 CHIP CERAMIC(4000)			
71-1940	n/a	RL 330PF NPO 10% 0603 CHIP CERAMIC(4000)			
71-1944	n/a	RL470PF NPO10% 0603CHIP CERA 50V(4000)RC			
71-1928	n/a	100PF NPO 10% 0603 CHIP CERA 50V(4000)RC			
71-1930	n/a	RL 120PF NPO 5% 0603 CHIP CERAMIC(4000)			
71-1932	n/a	RL150PF NPO 10%0603 CHIP CER 50V(4000)RC			
71-1782	n/a	2P2 NPO 0603 CHIP CERAMIC 50V (100) RC			
71-1784	n/a	4P7 NPO 0603 CHIP CERAMIC 50V (100) (RC)			
71-1924	n/a	RL 68PF NPO 10% 0603 CHIP CERAMIC (4000)			
71-1858	n/a	22N Y5V 0603 CHIP CERAMIC 50V (100) RC			
71-1860	n/a	47N Y5V 0603 CHIP CERAMIC (100)			
71-1780	n/a	1PF NPO 0603 CHIP CERAMIC 50V (100) RC			
71-1852	n/a	47N X7R 0603 CHIP CERAMIC 16V (100) (RC)			
71-1854 71-1856	n/a n/a	100N X7R 0603 CHIP CERAMIC 16V (100) RC 10N Y5V 0603 CHIP CERAMIC 50V (100) (RC)			
71-1846	n/a	15N X7R 0603 CHIP CERAMIC 50V (100) (RC)			
71-1848	n/a	22N X7R 0603 CHIP CERAMIC 50V (100) (RC)			
71-1850	n/a	33N X7R 0603 CHIP CERAMIC (100) (RC)			
71-1645	n/a	RL 4000 47N 0805 50V Y5V CAP. (RC)			
71-1650	n/a	100N 0805 50V Y5V CAP (4000) (RC)			
71-1844	n/a	10N X7R 0603 CHIP CERAMIC 50V (100) (RC)			
71-1632	n/a	RL *4000* 100N 0805 25V X7R CAP (RC)			
71-1635	n/a	RL 4000 10N 0805 50V Y5V CAP. (RC)			
71-1640	n/a	RL 4000 22N 0805 50V Y5V CAP. (RC)			
71-1615	n/a	RL 4000 10N 0805 50V X7R CAP. (RC)			
71-1620	n/a	RL 4000 22N 0805 50V X7R CAP. (RC)			
71-1625	n/a	RL 4000 47N 0805 50V X7R CAP. (RC)			
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The enclosed information is believed to be correct, Information may change ±without noticeqdue to product improvement. Users should ensure that the product is suitable for their use. E. & O. E.	Revision A 20/02/2007

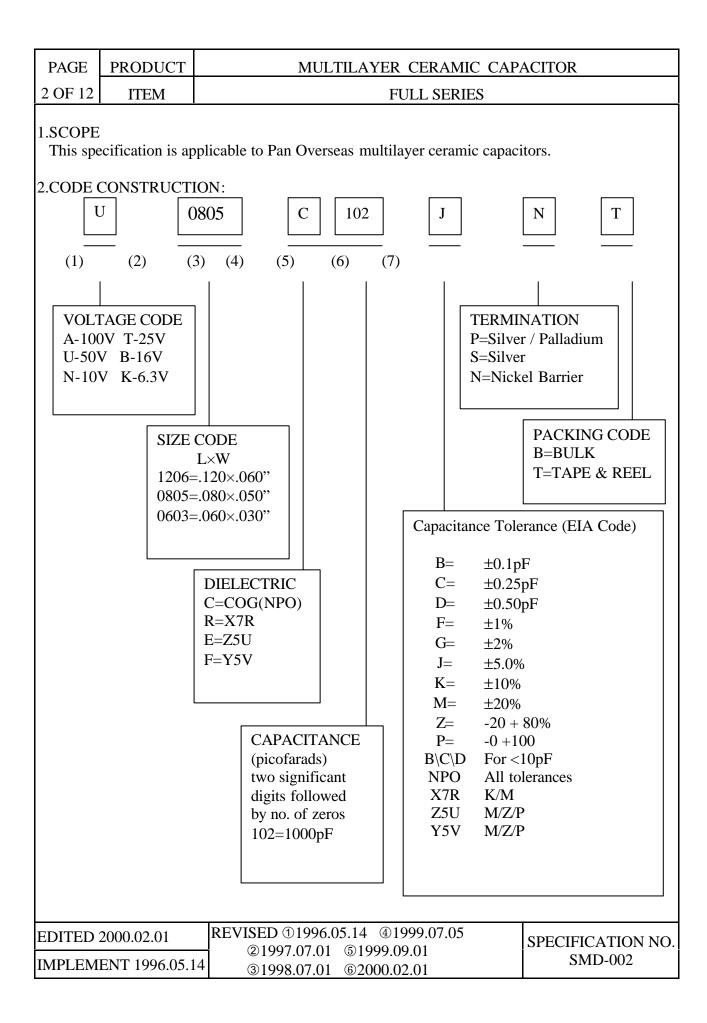
Sales: 01206 751166 Sales@rapidelec.co.uk Technical: 01206 835555 Tech@rapidelec.co.uk Fax: 01206 751188 www.rapidonline.com

Ceramic Capacitors

Order code	Manufacturer code	Description	
71-1600	n/a	RL 4000 1N 0805 50V X7R CAP. (RC)	
71-1605	n/a	RL 4000 2N2 0805 50V X7R CAP. (RC)	
71-1610	n/a	RL 4000 4N7 0805 50V X7R CAP. (RC)	
71-1585	n/a	220PF 0805 50V NPO CAP (4000) (RC)	
71-1590	n/a	RL 4000 330PF 0805 50V NPO CAP (RC)	
71-1595	n/a	RL 4000 470PF 0805 50V NPO CAP (RC)	
71-1800	n/a	47PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1802	n/a	56PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1804	n/a	68PF NPO 0603 CHIP CERAMIC (100)	
71-1792	n/a	22PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1794	n/a	27PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1796	n/a	33PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1786	n/a	6P8 NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1788	n/a	10PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1790	n/a	15PF NPO 0603 CHIP CERAMIC 50V (100) RC	
71-1370	n/a	PK 100 22N 0805 50V X7R CAP. RC	
71-1375	n/a	PK 100 47N 0805 50V X7R CAP. RC	
71-1380	n/a	PK 100 100N 0805(25V) X7R CAP. (RC)	
71-1355	n/a	PK 100 2N2 0805 50V X7R CAP. RC	
71-1360	n/a	PK 100 4N7 0805 50V X7R CAP. (RC)	
71-1365	n/a	PK 100 10N 0805 50V X7R CAP. (RC)	
71-1340	n/a	PK 100 330PF 0805 50V NPO CAP.RC	
71-1345	n/a	PK 100 470PF 0805 50V NPO CAP. (RC)	
71-1350	n/a	PK 100 1N 0805 50V X7R CAP. (RC)	
71-1325	n/a	PK 100 100PF 0805 50V NPO CAP. (RC)	
71-1330	n/a	PK 100 150PF 0805 50V NPO CAP. RC	
71-1335	n/a	PK 100 220PF 0805 50V NPO CAP. (RC)	
71-1312	n/a	PK 100 27PF 0805 50V NPO CAP. RC	
71-1315	n/a	PK 100 33PF 0805 50V NPO CAP. (RC)	
71-1320	n/a	PK 100 47PF 0805 50V NPO CAP. (RC)	
71-1570	n/a	RL 4000 47PF 0805 50V NPO CAP. (RC)	
71-1575	n/a	RL 4000 100PF 0805 50V NPO CAP (RC)	
71-1580	n/a	RL 4000 150PF 0805 50V NPO CAP RC	
71-1560	n/a	RL 4000 22PF 0805 50V NPO CAP. (RC)	
71-1562	n/a	RL 4000 27PF 0805 50V NPO CAP. (RC)	
71-1565	n/a	RL 4000 33PF 0805 50V NPO CAP. (RC)	
71-1978	n/a	RL 22N Y5V 0603 CHIP CERAMIC 50V(4000)RC	
71-1550	n/a	10PF 0805 50V NPO CAP (4000) (RC)	
71-1555	n/a	RL 4000 15PF 0805 50V NPO CAP (RC)	
71-1972	n/a	RL 47N X7R 0603 CHIP CERAMIC 16V(4000)RC	
71-1974	n/a	RL 100N X7R 0603 CHIP CERAMI 16V(4000)RC	
71-1976	n/a	RL 10N Y5V 0603 CHIP CERAMIC 50V(4000)RC	
71-1966	n/a	RL 15N X7R 0603 CHIP CERAMIC 50V(4000)RC	
71-1968	n/a	RL 22N X7R 0603 CHIP CERAMIC 25V(4000)RC	
71-1970	n/a	RL 33N X7R 0603 CHIP CERAMIC (4000)	
71-1960	n/a	RL 3N3 X7R 0603 CHIP CERAMIC 50V(4000)RC	

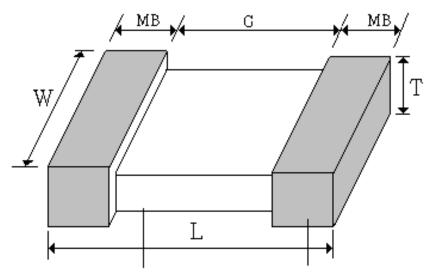
Ceramic Capacitors

Order code	Manufacturer code	Description
71-1962	n/a	RL 4N7 X7R 0603 CHIP CERAMIC 50V(4000)RC
71-1964	n/a	RL 10N X7R 0603 CHIP CERAMIC 50V(4000)RC
71-1954	n/a	RL 1N X7R 0603 CHIP CERAMIC 50V(4000)RC
71-1956	n/a	RL 1N5 X7R 0603 CHIP CERAMIC 50V(4000)RC
71-1958	n/a	RL 2N2 X7R 0603 CHIP CERAMIC 50V(4000)RC
71-1922	n/a	56PF NPO 10% 0603 CHIP CERAM 50V(4000)RC
71-1950	n/a	RL 470PF X7R 0603 CHIP CERAM 50V(4000)RC
71-1952	n/a	RL 680PF X7R 0603 CHIP CERAM 50V(4000)RC
71-1914	n/a	27PF NPO 10% 0603 CHIP CERAM 50V(4000)RC
71-1916	n/a	RL33PF NPO 10% 0603CHIP CERA 50V(4000)RC
71-1920	n/a	RL 47PF NPO10% 0603 CHIP CER 50V(4000)RC
71-1908	n/a	10PF NPO 10% 0603 CHIP CERAM 50V(4000)RC
71-1910	n/a	RL 15PF NPO10% 0603 CHIP CER 50V(4000)RC
71-1912	n/a	22PF NPO 10% 0603 CHIP CERAM 50V(4000)RC
71-1902	n/a	RL 2P2 NPO 0603 CHIP CERAMIC 50V(4000)RC
71-1904	n/a	RL 4P7 NPO 0603 CHIP CERAMIC 50V(4000)RC
71-1906	n/a	RL 6P8 NPO 0603 CHIP CERAMIC 50V(4000)RC
71-1866	n/a	470N Y5V 0603 CHIP CERAMIC 16V (100) RC
71-1868	n/a	1U Y5V 0603 CHIP CERAMIC 16V (100) RC
71-1900	n/a	RL 1PF NPO 0603 CHIP CERAMIC 50V(4000)RC
71-1988	n/a	RL 1U Y5V 0603 CHIP CERAMIC 16V(4000) RC
71-1862	n/a	100N Y5V 0603 CHIP CERAMIC 25V (100) RC
71-1864	n/a	220N Y5V 0603 CHIP CERAMIC 25V (100) RC
71-1982	n/a	RL 100N Y5V 0603 CHIP CERAMI 25V(4000)RC
71-1984	n/a	RL 220N Y5V 0603 CHIP CERAMI 25V(4000)RC
71-1986	n/a	RL 470N Y5V 0603 CHIP CERAMI 16V(4000)RC
71-1840	n/a	3N3 X7R 0603 CHIP CERAMIC 50V (100) RC
71-1842	n/a	4N7 X7R 0603 CHIP CERAMIC 50V (100) (RC)
71-1980	n/a	RL 47N Y5V 0603 CHIP CERAMIC (4000)
71-1834	n/a	1N X7R 0603 CHIP CERAMIC 50V (100) (RC)
71-1836	n/a	1N5X7R 0603 CHIP CERAMIC 50V (100) RC
71-1838	n/a	2N2 X7R 0603 CHIP CERAMIC 50V (100) RC



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3. SHAPE AND DIMENSIONS



Ceramic dielectric Terminal electrode

Unit:mm

TYPE	L	W	thickness	MB(min.)	Gmin
0603	1.6±0.1	0.80 ± 0.1	0.8 ± 0.1	0.20	0.3
0805	2.0±0.2	1.20 +0.2/-0.15	1.40max	0.25	0.7
1206	3.2±0.2	1.60±0.2	1.52max	0.25	1.4

4.STANDARD TEST CONDITIONS:

Tests shall, unless otherwise specified, be carried out at 5 to 35° C and RH 45 to 85%. If any doubt has been encounter in judgement, the test shall be done at $25\pm2^{\circ}$ C,RH 60 to 70% and $860\sim1060$ mbar.

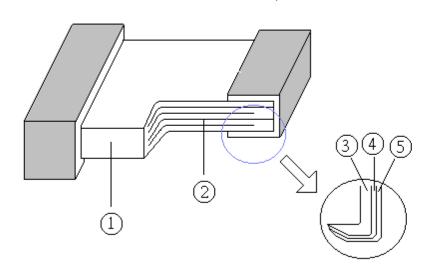
5.STORING CONDITION AND TERM

Recommends the storing of products within 6 months at temperature 15~35°C and humidity 70%RH max.

EDITED 2000.02.01		REVISED 1996.05.14 41999.07.05	SDECIEICATION NO	
-	2122 2000.02.01	②1997.07.01 ⑤1999.09.01	SPECIFICATION NO.	
IM	PLEMENT 1996.05.14	31998 07 01 62000 02 01	SMD-002	

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6.STURCTURE



NO	Specifi	Material		
1	Ceramic	Ceramic		
2	Internal I	70Ag-30Pd		
3	m : 1	Ag layer(Ta)	Pure Ag	
4	Terminal	Ni layer(Tn)	Pure Ni	
5	electrode	Sn layer(Ts)	90Sn-10Pb	

*Ta:40 im min. Tn: 1 im min. Ts: 2 im min

7.OPERATING TEMPERATURE RANGE

Y5V : -30~85°C Z5U : +10~85°C NPO,X7R : -55~125°C

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221122 2000102101	②1997.07.01 ⑤1999.09.01	SPECIFICATION NO.
IMPLEMENT 1996.05.14		SMD-002
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PA	AGE PRODUCT MULTILAYER CERAMIC CAPACITOR							
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8.PE	8.PERFORMANCE							
NO. Item			Performance	Test or inspection method				
(1)	Exte	rnal	No defects which may affect	Visual inspect	ion.			
	Appe	earance	performance.					
(2)	Volta	age Proof	Withstand test voltage without	2.5 times of ra	ated voltage About DC			
			Insulation breakdown or other	voltage shall b	be applied for 1~5sec			
			damage.	Charge/discha	rge current shall not			
				Exceed 50 mA	Α.			
(3)	Insul	ation	NPO:	Apply rated vo	oltage for 1 minute.			
	Resis	stance	100,000M Ù or 10,000M Ù ìF. M in					
			(Whichever is smaller)					
			X7R, Y5V, Z5U:					
			10,000MÙ or 1,000MÙ ìF Min					
			(Whichever is smaller)					
(4)	Capa	icitance	Within the specified tolerance.	Measuring frequency: Z5U-Y5V-X7R:1KHz±50Hz NPO:>1000pF:1KHz±50Hz ≤1000pF:1MHz±100KHz Measuring voltage: Z5U:0.5VRMS X7R-Y5V:1.0±0.2VRMS				
(5)	Dissi	ipation Factor	NPO:	NPO: 1.0±0.2V	VRMS			
	D 1001	pution I uctor	$\geq 30 \text{pF}: Q \geq 1000$					
			<30pF: Q≥400+20C					
			X7R: ≥50V : 0.025max.					
			<50V: 0.035max.					
			Y5V:					
			≥50V : 0.050max.					
			<50V: 0.070max.					
			≤16V & C≥1.0 uF : 0.090max.					
			≤10V : 0.125max.					
			Z5U: 0.040max.					
	EDITED 2000.02.01 REVISED ①1996.05.14 ④1999.07.05 ②1997.07.01 ⑤1999.09.01 SMD-002							
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NO.	D. ITEM		Performance		Test or	Test or inspection method		
(6)	Temperature		Temperatures Coefficient		Tempe	Temperature Coefficient is calculated		
	Characteristic of Capacitance		T.C.	Operating	Capacitance	basing	on valu	es determined at 25°C
			1.C.	Temperature	Change(ÄC)	and maximum operating temperatur		
			NPO	-55~+125°C	0±30(ppm/°C)	Capaci	tance sh	nall be measured by the
						step, s	shown in	n the following table.
			X7R	-55~+125°C	± 15%	Equilib	orium is	obtained for each step.
			Y5V	-30~+85°C	+22%~-82%	Step		Temperature(°C)
						1		25±2
			Z5U	+10~+85°C	+22%~ -56%	2		Min.Temp.±2
						3		25±2
						4		Max.Temp.±2
(7)	Solder	ability	New solder to over 75% of		Compl	etely	soak both terminal	
			termination			electrodes in solder at 235±5°C for		
					3±0.5 sec. Completely immerse both terminations in solder at 270±5°Cfor 3±0.5 sec.			
(8)			No Cracks and terminations are covered at least 75% with new					
		appearance						
	Heat	G	solder.	2.50/	0.05 F	_		
		Capacitance	NPO		0.25 pF max.	Leave	the o	capacitors in ambient
		ÄC/C	V7D	(whichever	is larger)	conditi	on for	the following time
				±15%		before	measur	ement.
				±20% ±20%		CI. 1		
			131	1-2070			1: 4~24	nours. 2 hours ambient.
		D.F.	Meet t	l he initial spe	cification	101055 2	2. 4 ± 4	andiomit.
						Precon	ditionin	g: (only for Class 2):
		Resistance	Meet The initial specification		Perform a heat treatment at 150 +0-			
					10°C		e hour and then let sit	
				for 48±4 hours at room				
						1		e. Perform the initial
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NO. ITEM		Performance		Test or inspection method				
(9)	Moisture Resistance			No mechanical damage.		Apply the rated voltage at temperature 40±2°C and humidity 90 to 95%RH		
	Resistance Capacitance ÄC/C Q or DF			X7R Y5V Z5U NPO: (1)≥3 (2)10 Q≥ (3) <1 X7R: 0 Y5V: ≥50V 16V≤ 16V	for 500 IPO $\pm 5\%$ or ± 0.5 pF max. (Whichever is larger.) Charge exceed Solution $\pm 15\%$ Charge exceed Condition $\pm 30\%$ Leave condition before (1) ≥ 30 pF : Q ≥ 350 (2) ± 10 pF ≤ C < 30 pF Q $\geq 275 + 2.5$ C Class ± 200 Class Class ± 200 company. Condition ± 30 pF condition ± 30 pF condition ± 30 co		Charge / discharge current shall. not exceed 50 mA. Leave the capacitors in ambient condition for the following time before measurement. Class 1: 24 ± 2 hours. Class 2: 48 ± 4 hours. Preconditioning: (only for Class 2): Apply the rated DC voltage for 1hour at 40±2°C. Remove and let sit for 48±4 hours at room temperature. Perform initial measurement.	
			Insulation Resistance		/IÙ or 100MÙ ìF min. ever is smaller)			
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NO.	ITEM	[Performance		Test or inspection method		
(10)	Life	e External appearance	No mechanical damage.		Apply 200% voltage for	ng: (only for Class 2): of the rated DC 1 hour at the operating temperature	
		Capacitance	NPO	±3% or ±0.3pF max.		nove and let sit for	
		ÄC/C.		(Whichever is larger)	48±4 hours	s at room	
			X7R	±15%	temperatui	e. Perform initial	
			Y5V	±30%	measurem	ent.	
			Z5U	±30%			
		D.F. Insulation	(2) 10pl Q≥2 (3) C<1 Q≥2 Character X7R: (1) ≥ 50 (2) < 50 Y5V: ≥50V: 16V≤C 16V & ≤10V: Z5U: 0.075 m	200+10°C ristics 0V: 0.04 max. 0V: 0.05 max. 0.075max. <50V: 0.10 max. C≥1.0uF: 0.125max. 0.15max.	temperature. Perform initial measurement. Apply 2×rated voltage at maxim operating temperature ±3°C for 500 +48/-0 hours. Charge / discharge current shall. nexceed 50 mA. Leave the capacitors in ambient condition for the following time before measurement. Class 1: 24 ± 2 hours. Class 2: 48 ± 4 hours.	mperature ±3°C for nours. harge current shall. not acitors in ambient the following time rement. 2 hours.	
	EDITED 2000.02.01 REVISED @1996.05.14 @1999.07.05					SPECIFICATION NO. SMD-002	

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NO. ITE	O. ITEM		Performance	Test or inspec	tion method	
(11) Defl	ection	NPO	No cracking or marking defects shall occur ÄC≤ ± 5% (C>10pF) ÄC≤ 0.5 pF (C≤10pF)		┌┼┐ Load	
		X7R	No cracking or marking defects shall occur ÄC≤ ±12.5%		Soldered 90mm	
		Z5U Y5V	No cracking or marking defects shall occur ÄC≤ ±20%		Flexure:1mm	
EDITED IMPLEM	2000.02.0 ENT 1990		REVISED ①1996.05.14		SPECIFICATION NO. SMD-002	

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9. Specification table of capacitance with rated voltage:

Size	T.C.	Rated volta			cita	nce value	
	COG(NPO)	50	V	0.5	~	1000	рF
		50	V	180	~	22,000	рF
	X7R	25	V	10,000	~	27,000	рF
		16	V	18,000	~	100,000	рF
O6O3	Z5U	50	V	1,000	~	10,000	pF
		50	V	1,000	~	100,000	pF
	Y5V	25	V	33,000	~	100,000	рF
	150	16	V	47,000	~	330,000	рF
		10	V	47,000	~	1,000,000	pF
	COG(NPO)	25/50/100	V	0.5	~	2,400	pF
		100	V	150	~	15,000	pF
	X7R	50	V	150	~	100,000	pF
	A/K	25	V	10,000	~	150,000	pF
		16	V	10,000	~	1,000,000	pF
O8O5	Z5U	50	V	1,000	~	100,000	pF
	250	25	V	1,000	~	100,000	рF
		50	V	1,000	~	220,000	рF
	Y5V	25	V	1,000	~	330,000	рF
	130	16	V	220,000	~	1,000,000	pF
		10	V	220,000	~	2,200,000	pF
	COG(NPO)	100	V	0.5	~	2,200	pF
	COG(NFO)	50	V	0.5	~	6,800	pF
		25	V	0.5	~	10,000	pF
		100	V	330	~	39,000	pF
	X7R	50	V	330	~	150,000	pF
1206	XIIX	25	V	330	~	330,000	pF
1200		16	V	330	~	470,000	pF
	Z5U	50	V	1,000	~	220,000	pF
		50	V	1,000	~	470,000	pF
	Y5V	25	V	68,000	~	1,000,000	pF
	150	16	V	220,000	~	4,700,000	pF
		10	V	220,000	~	10,000,000	pF

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	②1997.07.01 ⑤1999.09.01	SMD-002
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10.Packing:

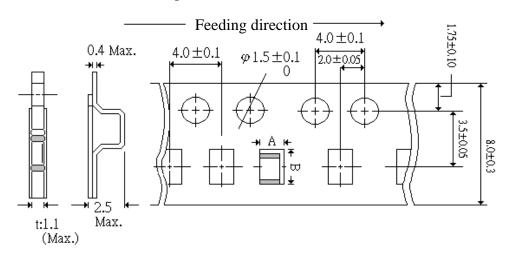
- (1) Reel specification: Standard reel diameter is 7" and 13"
- (2) Quantity for each reel:

Chip size	Tape Wide	Quantity per reel
0603	8 mm	4000
0805	8 mm	3000/4000 *
1206	8 mm	3000/4000 *

^{*} Different size of reel base on different thickness of chips

(3) Tape specification:

8 mm Tape



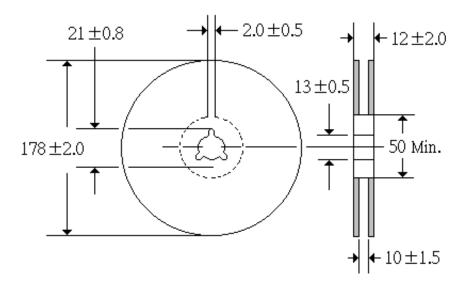
	0603	0805	1206
A	1.05±0.1	1.55±0.15	2.0±0.2
В	1.85±0.1	2.3±0.15	3.6±0.2

Unit: mm

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PAGE	PRODUCT	MULTILAYER CERAMIC CAPACITOR
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(4) Dimension of reel:



(5) Peeling off strength of Top tape

The angle between top tape and base tape is $165 \sim 180^{\circ}$, and the peeling speed is control in 300 ± 10 mm/min, and the peeling force as follows:

- a. 8mm tape or base tape : $10 \sim 100 \text{ grams } (0.1 \sim 1.0 \text{N})$
- b. 12mm tape or base tape: $10 \sim 130 \text{ grams } (0.1 \sim 1.3 \text{ N})$

