

RoHS Compliant



Description:

MLCC consists of a conducting material and electrodes. To manufacture a chip-type SMT and achieve miniaturization, high density and high efficiency, ceramic condensers are used. 0201 MLCC is performed by high precision technology achieve high capacitance in unit size and ensure the stability and reliability of products.

Features:

- · High capacitance in unit size
- · High precision dimensional tolerances
- · Suitable used in high-accuracy automatic mounting machine

Applications:

- · Miniature microwave module.
- · Portable equipments (ex. Mobile phone, PDA)
- · High frequency circuits

External Dimensions:

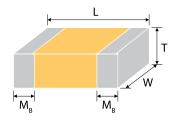


Fig. 1 The outline of MLCC

Size Inch (mm)	L (mm)	L W T nm) (mm) (mm)/Sym		ıbol	MB (mm)
0204 (0602)	0.6 ±0.03	0.3 ±0.03	0.3 ±0.03	_	0.15±0.05
0201 (0603)	0.6 ±0.05 ^{#1}	0.3 ±0.05 ^{#1}	0.3 ±0.05 #1	L	0.15±0.05

Reflow soldering only.

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^{#1} For 0201/Cap ≥0.68uF



General Electrical Data:

Size	0201						
Dielectric	NP0	X7R	X5R				
Capacitance*	0.3pF to 100pF	100pF to 10nF	100pF to 1μF				
Capacitance tolerance**	Cap≤5pF: B (±0.1pF), C (±0.25pF) 5pF <cap<10pf: (±0.25pf),d(±0.5pf)<br="" c="">Cap≥10pF: F (±1%), G (±2%), J (±5%), K (±10%)</cap<10pf:>	J (±5%), K (±10%)					
Rated voltage (WV DC)	16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V	6.3V, 10V, 16V, 25V, 50V				
Tan δ / Q*	Cap<30pF, Q≥400+20C Cap≥30pF, Q≥1000	No	te 1				
Insulation resistance at Ur	≥10GΩ	≥10GΩ or RxC≥500ΩxF whichever is less					
Operating temperature	-55 to +125°C	-55 to +85°C					
Capacitance change	±30ppm	±15%					
Termination	Ni/Sn (lead-fre	ee termination)					

^{*} Measured at 30% ~ 70% related humidity.

NP0: Apply 1.0±0.2Vrms, 1.0MHz±10% at the condition of 25°C ambient temperature.

X7R, X5R: Apply 1.0±0.2Vrms, 1.0kHz±10%(0201/6.3V,Cap≥224 : 0.5±0.2Vrms, 1.0kHz±10%) at the condition of 25°C ambient temperature.

Note 1: X7R/X5R

Rated vol.	D.F.	Exception of D.F.				
≥50V	≤3%					
25V	≤3.5%	≤5%	0201≥0.01uF			
16V	≤3.5%	≤5%	0201≥0.01uF			
10\/	≤5%	≤10%	0201≥0.012uF			
10V	≥5%	≤15%	0201≥0.1uF			
6.3V	≤10%	≤15% 0201≥0.1uF				

Packaging Dimension And Quantity:

Size	e Thickness (mm)/Symbol		Papei	[·] Tape
Size			7" reel	13" reel
0204 (0602)	0.3 ±0.03		15,000	70,000
0201 (0603)	0.3 ±0.05 ^{#1}	L	15,000	-

#1 For 0201/Cap≥0.68uF



^{**} Preconditioning for Class II MLCC: Perform a heat treatment at 150±10°C for 1 hour, then leave in ambient condition for 24±2 hours before measurement.



Capacitance Range:

	Size		0201	
	Dielectric		NP0	
Ra	ated Voltage (V DC)	16	25	50
	0.3pF (0R3)		L^	L^
	0.4pF (0R4)		L^	L^
	0.5pF (0R5)		L^	L^
	1.0pF (1R0)		L^	L^
	1.2pF (1R2)		L^	L^
	1.5pF (1R5)		L^	L^
	1.8pF (1R8)		L^	L^
	2.2pF (2R2)		L^	L^
	2.7pF (2R7)		L^	L^
	3.0pF (3R0)		L^	L^
	3.3pF (3R3)		L^	L^
	3.9pF (3R9)		L^	L^
	4.0pF(4R0)		L^	L^
Se	4.7pF (4R7)		L^	L^
Capacitance	5.6pF (5R6)		L^	L^
pac	6.8pF (6R8)		L^	L^
S	8.2pF (8R2)		L^	L^
	10pF (100)		L^	L^
	12pF (120)		L^	L^
	15pF (150)		L^	L^
	18pF (180)		L^	L^
	22pF (220)		L^	L^
	27pF (270)		L^	L^
	33pF (330)		L^	L^
	39pF (390)		L^	L^
	47pF (470)		L^	L^
	56pF (560)	L^	L^	L
	68pF (680)	L^	L^	L
	82pF (820)	L^	L^	L
	100pF (101)	L^	L^	L

	Size					02	01				
Dielectric		X7R					X5R				
R	Rated Voltage (V DC)	6.3	10	16	25	50	6.3	10	16	25	50
	100pF (101)			L	L	L			L	L	L
	120pF (121)			L	L	L			L	L	L
	150pF (151)			L	L	L			L	L	L
	180pF (181)			L	L	L			L	L	L
	220pF (221)			L	L	L			L	L	L
	270pF (271)			L	L	┙			┙	L	L
	330pF (331)			L	L	L			L	L	L
	390pF (391)			L	L	L			L	L	L
	470pF (471)			L	L	L			L	L	L
	560pF (561)			L	L	L			L	L	L
	680pF (681)			L	L	L			┙	L	L
	820pF (821)			L	L	L			┙	L	L
	1,000pF (102)	L	L	L	L	L		L	L	L	L
a)	1,200pF (122)	L	L	L	L			L	L		
ance	1,500pF (152)	L	L	L	L			L	L		
Capacitance	2,200pF (222)	L	L	L				L	L		
Зар	3,300pF (332)	L	L	L				L	L		
	4,700pF (472)	L	L	L				L	L		
	6,800pF (682)	L	L					L			
	8,200pF (822)	L	L					L			
	0.010µF (103)	L	L	L			L	L			
	0.015µF (153)						L	L			
	0.022µF (223)						L	L			
	0.033µF (333)						L	L			
	0.047µF (473)						L	L			
	0.068µF (683)						L	L			
	0.082µF (823)						L	L			
	0.10µF (104)						L	L			
	0.22µF (224)						L				
	0.47µF (474)						L				
	1.0µF (105)						L				

- 1. The letter in cell is expressed the symbol of product thickness.
- 2. The letter in cell with "A" mark is expressed product with Ag/Ni/Sn terminations.





Reliability Test Conditions and Requirements:

No	Item	Test Condition					Requir	ements	
1	Visual and Mechanical	-			No remai Dimension sheet.			to individual specificat	tion
2	Capacitance				Shall not spec.	t exceed	the lim	its given in the detaile	∍d
		Class I: NP0			NP0: Cap Q≥400+2 X7R, X5F	.0C	Q≥1000); Cap<30pF,	
		Cap>1,000pF	1.0±0.2Vrms, 1MHz±10 1.0±0.2Vrms, 1kHz±10		Rated Vol.	D.F.	E	Exception of D.F.	
	Q/ D.F. (Dissi-	Class II: X7R, 1±0.2Vrms, 1			≥50V	≤3%			7
3	pation Factor)		1.0kHz±10% 1.0kHz±10% : 0201 ≥0.2	22	25V	≤3.5%	≤5%	0201≥0.01uF	7
		uF(6.3V)			16V	≤3.5%	≤5%	0201≥0.01uF]
					10V	≤5%	≤10%	6 0201≥0.012uF]
					100	≥5%	≤15%	6 0201≥0.1uF]
					6.3V	≤10%	≤15%	% 0201≥0.1uF]
4a	Dielectric Strength	Duration: 1 to	age (≤100V) 250%. 5 sec. lischarge current less tha	an	No evide	ence of d	amage	or flash over during to	est.
_	Insulation				≥10GΩ o Class II (X5R, X7		00Ω-F	whichever is smaller.	
5	Resistance	io appiy rated	To apply rated voltage for max. 120 sec.			ed Volta	ige	Insulation Resistan	се
					6.3V; 10	V:0201≥	:47nF	≥100Ω-F	
		With no electr	ical load.						
		T.C.	Operating		T.C	;.	Capa	citance Change	
6	Temperature	LIBS (OSO)	Temperature NP0 (C0G) 55~125°C at 25°C X7R -55~125°C at 25°C X5R -55~85°C at 25°C		NP0 (0	C0G)	Wit	hin ±30ppm/°C	
"	Coefficient	l - ` 			X7	R	١	Within ±15%	
					X5	R	١	Nithin ±15%	
		L ASK	-55~65 C at 25 C						
7	Adhesive Strength of Termination		Pressurizing force: 2N Test time: 10±1 sec.			rkable d ons.	amage	or removal of the	





Reliability Test Conditions and Requirements:

No	Item		Test Condition		Requirements
8	Vibration Resistance	Vibration frequency: 10~55 Hz/min. Total amplitude: 1.5mm Test time: 6 hrs. (Two hrs each in three mutually perpendicular directions.) Measurement to be made after keeping at room temp. for 24±2 hrs.		n three .)	No remarkable damage. Cap change and Q/D.F.: To meet initial spec.
9	Solderability	Solder	temperature: 235±5°C		95% min. coverage of all metalized area.
10	Bending Test	surized a rate of deflection pressure Measure	ddle part of substrate shat by means of the pressurize for about 1 mm per second on becomes 1 mm and the estall be maintained for the ement to be made after keep. for 24±2 hrs.	zing rod at until the n the 5±1 sec.	No remarkable damage. Cap change: NP0: within ±5.0% or ±0.5pF whichever is larger. X7R, X5R: within ±12.5% (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)
11	Resistance to Soldering Heat	Dipping Preheat imme rs Before i Perform for 24±2	temperature: 260±5°C time: 10±1 sec ting: 120 to 150°C for 1 minute before se the capacitor in a eutectic solder. initial measurement (Class II only): in 150+0/-10°C for 1 hr and then set 2 hrs at r oom temp ement to be made after keeping at		No remarkable damage. Cap change: NP0: within ±2.5% or ±0.25pF whichever is larger. X7R, X5R: within ±7.5% Q/D.F., I.R. and dielectric strength: To meet initial requirements. 25% max. leaching on each edge.
			t the five cycles according es and time.	to the tem-	
		Step	Temp. (°C)	Time (Min.)	
		1	Min. operating temp. +0/-3	30±3	No remarkable damage. Cap change:
	Temperature	2	Room temp.	2~3	NP0: within ±2.5% or ±0.25pF whichever is
12	Cycle			30±3	larger. X7R, X5R: within ±7.5%
		4			Q/D.F., I.R. and dielectric strength: To meet initial requirements.
		Perform for 24±2 Measure			





Reliability Test Conditions and Requirements:

No	Item	Test Condition	Requirements				
13	Humidity (Steady State)	Test temp.: 40±2°C Humidity: 90~95% RH Test time: 500+24/-0hrs. Before initial measurement (Class II only): Perform 150+0/-10°C for 1 hr and then set	Cap cha ever is la X7R, X5 10V^0.1 6.3V, wit Y5V: ≥1 6.3V, wit Q/D.F. v NP0: Ca Q≥275+ X7R, X5	arger. R: ≥10V, µF, withir hin ±25% 0V, withir hin +30/- alue: .p≥30pF, 2.5C Cap	o: within ±1 in ±25%; in ±30% 40% Q≥350; 1 o<10pF; (±5.0% or ±0.5pF v 12.5%, 10pF≤Cap<30pF, Q≥200+10C eption of D.F.	which-
		for 24±2 hrs at r oom temp.	Vol.	/6 0/		<u>.</u> I	
		Measurement to be made after keeping at room temp. for 24±2 hrs.	≥50V 25V	≤6% ≤5%	- ≤10%	0201≥0.01uF	
		room comp. for 2 (22 mg.	16V	≤5%	≤15%	0201≥0.01uF	
					≤15%	0201≥0.012uF	
			10V	≤7.5%	≤20%	0201≥0.1uF	
			6.3V	≤15%	≤30%	0201≥0.1uF	
			smaller. 6.3V; 10	V:0201≥₄	47nF, Rx	50Ω-F whichever C≥10Ω-F	is
	Test temp.: 40±2°C Humidity: 90~95%RH Test time: 500+24/-0 hrs.		Cap cha whichev X7R, X5 10V≧0. 6.3V, wii Y5V: ≥1 6.3V, wii Q/D.F. v	er is large R: ≥10V, 1µF, within thin ±25% 0V, within thin +30/- alue: p≥30pF, 10/3C	o: within : er. within ±1 n ±25%; 6 1 ±30% 40%	±7.5% or ±0.75pF 12.5%, Cap<30pF,	
14	Humidity Load (Damp Heat)	To apply voltage: rated voltage. Before initial measurement (Class II only): To apply test voltage for 1hr at 40°C and then	Rated Vol.	D.F.	Exce	eption of D.F.	
		set for 24±2 hrs a t room temp.	≥50V	≤6%	-		
		Measurement to be made after keeping at room temp. for 24±2 hrs.	25V	≤5%	≤10%	0201≥0.01uF	
		'	16V	≤5%	≤15%	0201≥0.01uF	
			 10V	≤7.5%	≤15%	0201≥0.012uF	
					≤20%	0201≥0.1uF	
			6.3V	≤15%	≤30%	0201≥0.1uF	
			smaller.	V,500M (V:0201≥₄		25-F whichever is C≥5-F	

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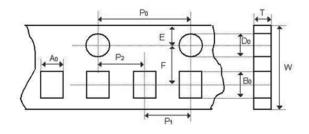


Reliability Test Conditions and Requirements:

No	Item	Test Condition Requirements			ments			
15	High Temperature Load	Test temp.: NP0, X7R: 125±3°C X5R,Y5V: 85±3°C To apply voltage: (1) Cap.≥0.1uF: 100% of rated voltage (2) 6.3V: 150% of rated voltage. (3) >6.3V: 200% of rated voltage. Test time: 1000+24/-0 hrs.		Cap chan ever is la x7R, X5l 10V≧0.1 6.3V, with y5V: ≥10 6.3V, with y75V: Can y2275+2	arger. R: ≥10V, IµF, withi hin ±25% DV, within hin +30/- alue: p≥30pF, 2.5C DF; Q≥20	o: within ±1 within ±1 n ±25%; o 1 ±30% 40% Q≥350; 1	±3.0% or ±0.3pF v 12.5%, 10pF≤Cap<30pF,	which-
	(Endurance)	Before initial measurement (Class II only): To apply test voltage for 1hr at test temp. and		Rated Vol.	D.F.	Exce	eption of D.F.	
		then set for 24±2 hrs at room temp.		≥50V	≤6%	-		
		Measurement to be made after keeping at room temp. for		25V	≤5%	≤10%	0201≥0.01uF	
	24±2 hrs		16V	≤5%	≤15%	0201≥0.01uF		
				10V	≤7.5%	≤20%	0201≥0.1uF	
			6.3V	≤15%	≤30%	0201≥0.1uF		
							0-F whichever is 7nF, RxC≥10-F	

Appendixes

Tape & Reel Dimensions

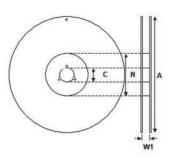


The dimension of paper tape

Size	0201
Thickness	L
A 0	0.38 ±0.05
Bo	0.68 ±0.05
Т	0.42 ±0.05
K₀	-
w	8 ±0.1
P ₀	4 ±0.1
10xP ₀	40 ±0.1
P ₁	2 ±0.05
P ₂	2 ±0.05
Do	1.55 ±0.05
D ₁	-
E	1.75 ±0.05
F	3.5 ±0.05



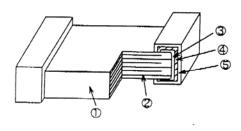




Size	0201					
Reel size	7"	13"				
С	13+0.5/-0.2	13+0.5/-0.2				
W 1	8.4+1.5/-0	8.4+1.5/-0				
Α	178±0.1	330±1				
N	60+1/-0	100±1				

The dimension of reel

Constructions:



No.	Name		NP0	NP0, X7R, X5R
1	Ceramic material		BaTiO₃ based	
2	Inner electrode		AgPd alloy	Ni
3		Inner layer	Ag	Cu
4	Termination	Middle layer	Ni	
5		Outer layer	Sn (Matt)	

Storage and handling conditions

- (1) To store products at 5 to 40°C ambient temperature and 20 to 70%. related humidity conditions.
- (2) The product is recommended to be used within one year after shipment. Check solderability in case of shelf life extension is needed.

Cautions:

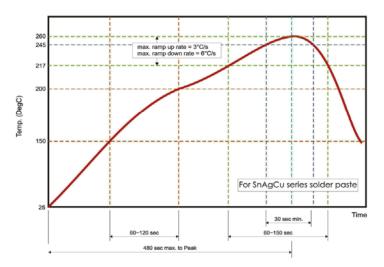
- a. The corrosive gas reacts on the terminal electrodes of capacitors, and results in the poor solderability. Do not store the capacitors in the ambience of corrosive gas (e.g., hydrogen sulfide, sulfur dioxide, chlorine, ammonia gas etc.)
- b. In corrosive atmosphere, solderability might be degraded, and silver migration might occur to cause low reliability.
- c. Due to the dewing by rapid humidity change, or the photochemical change of the terminal electrode by direct sunlight, the solderability and electrical performance may deteriorate. Do not store capacitors under direct sunlight or dewing condition. To store products on the shelf and avoid exposure to moisture.



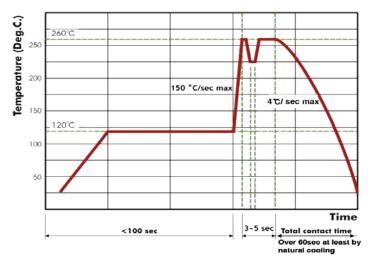


Recommended Soldering Conditions:

The lead-free termination MLCCs are not only to be used on SMT against lead-free solder paste, but also suitable against lead-containing solder paste. If the optimized solder joint is requested, increasing soldering time, temperature and concentration of N_2 within oven are recommended.



Recommended reflow soldering profile for SMT process with SnAgCu series solder paste.



Recommended wave soldering profile for SMT process with SnAgCu series solder.





Part Number Table

Description				
Cap, MLCC, 100PF, 25V, NP0, 0201				
Cap, MLCC, 100NF, 6.3V, X5R, 0201				

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