Data Sheet

Customer:	
Product:	**Industrial MLCC – IM Series**
Sizes.:	**0201/0402/0603/0805/1206/1210/1808/1812**
Issued Date:	**25-Jul-22**
Edition:	**REV.A**

RoHS Compliant

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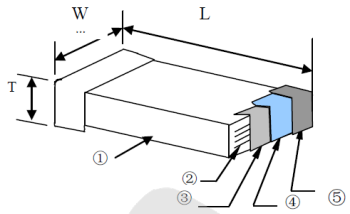
Produced by (QC)	Checked (QC)	Approved by (QC)	Prepared by (Sales)	Accepted by (Customer)
25-Jul-22	25-Jul-22	25-Jul-22		
Mandy Chen	*Ben Chang*	*Ben Chang*		

Industrial MLCC

Industrial MLCC



■Construction



①	Ceramic Dielectric	④	Nickel Layer:
②	Inner Electrodes	⑤	Tin Layer
③	Substrate Electrodes		

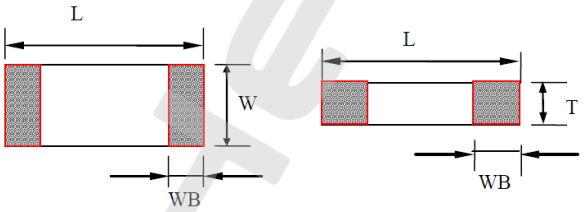
■Feature

- The product has high reliability and is suitable for various electronic products with harsh application conditions, high quality requirements and low failure rate.
- Executive Standard: GH/T 21041-2007, GH/T 21042-2007

■Applications

- The products are specially designed and applied to industrial electronic automation equipment, network core equipment and related electronic products.

■Dimensions



Capacitance ≦ 50V

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	WB (mm)	Special Instructions
01	0201	0.60±0.03	0.30±0.03	0.30±0.03	0.15±0.05	C<220nF
		0.60±0.05	0.30±0.05	0.30±0.05	0.15±0.05	C≧220nF
02	0402	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.05	C<1uF
		1.00±0.15	0.50±0.15	0.50±0.15	0.25±0.05	1uF≦C<10uF
		1.00±0.20	0.50±0.20	0.50±0.20	0.25±0.05	C≧10uF
03	0603	1.60±0.10	0.80±0.10	0.80±0.10	0.35±0.20	C<10uF
		1.60±0.20	0.80±0.20	0.80±0.20	0.35±0.20	C≧10uF
05	0805	2.00±0.20	1.25±0.20	0.80±0.20	0.50±0.20	C<1uF
				1.25±0.20	0.50±0.20	C≧1uF
06	1206	3.20±0.30	1.60±0.30	0.80±0.20	0.60±0.30	C≦330nF
				1.00±0.20	0.60±0.30	330nF<C<470nF
				1.25±0.20	0.60±0.30	470nF≦C<2.2uF
				1.60±0.30	0.60±0.30	C≧2.2uF
10	1210	3.20±0.30	2.50±0.30	≦2.80	0.60±0.30	All
08	1808	4.50±0.40	2.00±0.20	≦2.20	0.60±0.30	All
12	1812	4.50±0.40	3.20±0.30	≦3.50	0.60±0.30	All

Note: The specific thickness of the product can read capacity range and voltage in this approval sheet.

Capacitance ＞ 50V

Type	Size (Inch)	L (mm)	W (mm)	T (mm)	WB (mm)
02	0402	1.00±0.05	0.50±0.05	0.50±0.05	0.25±0.10
03	0603	1.60±0.10	0.80±0.10	0.80±0.10	0.30±0.10
05	0805	2.00±0.20	1.25±0.20	≦0.55	0.50±0.20
				0.80±0.20	
				1.00±0.20	
				1.25±0.20	
06	1206	3.20±0.30	1.60±0.30	0.80±0.20	0.60±0.30
				1.00±0.20	
				1.25±0.20	
				1.60±0.30	
10	1210	3.20±0.30	2.50±0.30	≦2.80	0.60±0.30
08	1808	4.50±0.40	2.00±0.20	≦2.20	0.60±0.30
12	1812	4.50±0.40	3.20±0.30	≦3.50	0.60±0.30

Note: The specific thickness of the product can read capacity range and voltage in this approval sheet.

■Part Numbering

IM	03	J	T	N	250	3R9
Product Type	Dimensions (L×W)	Capacitance Tolerance	Packaging	Dielectric	Voltage (VDCW)	Capacitance
	01: 0201 02: 0402 03: 0603 05: 0805 06: 1206 10: 1210 08: 1808 12: 1812	A: ±0.05pF (Cap≦10pF) B: ±0.1pF (Cap≦10pF) C: ±0.25pF (Cap≦10pF) D: ±0.5pF (Cap≦10pF) F: ±1% G: ±2% J: ±5% K: ±10% M: ±20%	T: Taping Reel	N: NPO (COG) B: X7R BS: X7S S: X6S X: X5R	4V0: 4V 6V3: 6.3V 250: 25V 500: 50V 101: 100V 102: 1000V 202: 2000V 302: 3000V	3R9: 3.9pF 150: 15pF 181: 180pF 225: 2.2μF 106: 10μF

■Temperature Coefficient /Characteristics

Dielectric	Reference Temperature Point	Temperature Coefficient	Operation Temperature Range
NOP(COG)	20℃	0±30ppm/℃	-55~125℃
X5R	20℃	±15%	-55~85℃
X7R	20℃	±15%	-55~125℃
X7S	20℃	±22%	-55~125℃
X6S	20℃	±22%	-55~105℃

Note：Nominal temperature coefficient and allowed tolerance of class Ⅰ are decided by the changing of the capacitance between 20℃ and 85℃.
Nominal temperature coefficient of class Ⅱ are decided by the temperature of 20℃.

■General Capacitance & Voltage

Capacitance & Voltage (NPO)

Type	Rated Voltage	Capacitance
		NPO(COG) (pF)
0201	50V	0R1~221【0.3】
0402	50V	0R1~102【0.5】
	100V	0R1~101【0.5】
0603	50V	0R1~682【0.8】
	100V	0R1~102【0.8】
	200V	0R1~471【0.8】
	250V	0R1~471【0.8】
0805	50V	0R1~822【0.8】
		103~223【1.25】
	100V	0R1~332【0.8】
	200V ~ 250V	0R1~102【0.8】
		122~152【1.25】
	500V ~ 630V	0R1~331【0.8】
		471~561【1.25】
	1000V	0R1~101【1.25】
1206	50V	0R3~822【0.8】
		103~104【1.6】
	100V	0R1~332【0.8】
	200V ~ 250V	0R1~182【0.8】
		202~272【1.25】
	500V ~ 630V	0R1~100【0.8】
		110~471【1】
		561~152【1.25】
	1000V	0R1~121【1】
		151~102【1.25】
	2000V	0R1~390【1】
		470~680【1.25】
		820~271【1.6】
1210	50V	100~104【1.25】
	100V	1R0~682【1.25】
	200V ~ 250V	1R0~332【1.25】
	500V ~ 630V	1R0~122【1.25】
		152~222【1.6】
	1000V	1R0~681【1.25】
		821~122【1.6】
	2000V	1R0~271【1.25】
		301~471【1.6】
1808	50V	100~104【1.6】
	100V	2R0~472【1.6】
	200V ~ 250V	2R0~392【1.6】
	500V ~ 630V	2R0~272【1.6】
	1000V	2R0~102【1.6】
	2000V	2R0~471【1.6】
	3000V	2R0~331【1.6】
	4000V	2R0~330【1.6】
	5000V	2R0~330【1.6】
1812	50V	100~104【1.25】
	100V	3R0~103【1.25】
	200V ~ 250V	3R0~682【1.25】
	500V ~ 630V	3R0~102【1.25】
		122~472【1.6】
	1000V	3R0~122【1.6】
	2000V	3R0~102【1.6】
	3000V	3R0~561【1.6】
	4000V	3R0~221【1.6】
	5000V	3R0~680【1.6】

■【】General thickness corresponds to the capacity, unit: mm

■General Capacitance & Voltage

Capacitance & Voltage (X7R)

Type	Rated Voltage	Capacitance X7R (pF)
0201	≦16V	101~223【0.3】
	25V	101~103【0.3】
	50V	101~102【0.3】
0402	≦10V	101~473【0.5】
	16V	101~224【0.5】
	25V	101~104【0.5】
	50V	101~473【0.5】
	100V	151~103【0.5】
0603	≦10V	151~225【0.8】
	16V	151~225【0.8】
	25V	151~105【0.8】
	50V	151~474【0.8】
	100V	151~104【0.8】
	200V	151~103【0.8】
	250V	151~103【0.8】
0805	≦10V	151~474【0.8】
		564~475【1.25】
	16V	151~474【0.8】
		564~225【1.25】
	25V	151~474【0.8】
		564~105【1.25】
	50V	151~334【0.8】
		364~474【1.25】
	100V	151~563【0.8】
		683~224【1.25】
	200V ~ 250V	151~183【0.8】
		203~223【1.25】
	500V ~ 630V	151~562【0.8】
		682~103【1.25】
1206	6V3	201~334【0.8】
		474~155【1.25】
		225~106【1.6】
	10V	201~334【0.8】
		474~155【1.25】
		225~106【1.6】
	16V	201~334【0.8】
		474~155【1.25】
		225~106【1.6】
	25V	201~334【0.8】
		474~155【1.25】
		225~106【1.6】
	50V	201~334【0.8】
		474~155【1.25】
		225~475【1.6】
	100V	151~563【0.8】
		683~334【1.25】
		474~105【1.6】
	220V ~ 250V	151~273【0.8】
		333~154【1.25】
		184~224【1.6】
	500V ~ 630V	151~272【0.8】
		332~333【1.25】
	1000V	151~102【0.8】
		112~123【1.25】
	2000V	151~272【1.25】

■【】General thickness corresponds to the capacity, unit: mm

■General Capacitance & Voltage

Capacitance & Voltage (X7R)

Type	Rated Voltage	Capacitance
		X7R (pF)
1210	6V3	221~474【1.25】
		564~106【1.6】
	10V	221~474【1.25】
		564~106【1.6】
	16V	221~474【1.25】
		564~106【1.6】
	25V	221~474【1.25】
		564~475【1.6】
	50V	221~474【1.25】
		564~475【1.6】
	100V	151~224【1.25】
		334~225【1.6】
	200V ~ 250V	151~154【1.25】
		184~224【1.25】
	500V ~ 630V	151~563【1.25】
		683~104【1.6】
	1000V	151~392【1.25】
		472~223【1.6】
	2000V	151~272【1.25】
		332~103【1.6】
1808	6V3	221~475【1.6】
	10V	221~475【1.6】
	16V	221~475【1.6】
	25V	221~475【1.6】
	50V	221~475【1.6】
	100V	221~225【1.6】
	200V ~ 250V	221~224【1.6】
	500V ~ 630V	221~683【1.6】
	1000V	151~223【1.6】
	2000V	151~103【1.6】
	3000V	151~472【1.6】
	4000V	151~222【1.6】
1812	16V	471~105【1.6】
		125~685【2.5】
	25V	471~105【1.6】
		125~475【2.5】
	50V	471~105【1.6】
		125~475【2.5】
	100V	271~564【1.6】
		684~105【2】
	200V ~ 250V	271~224【1.6】
		334~564【2】
	500V ~ 630V	281~104【1.6】
		124~224【2】
	1000V	271~473【1.6】
		563【2】
	2000V	271~123【1.6】
	3000V	271~472【1.6】
	4000V	271~332【1.6】

■【】General thickness corresponds to the capacity, unit: mm

■General Capacitance & Voltage

Capacitance & Voltage (X7S)

Type	Rated Voltage	Capacitance (pF)
0402	≦10V	104~474【0.5】
	16V	473~224【0.5】
	25V	223~224【0.5】
	50V	472~103【0.5】
0603	≦10V	474~225【0.8】
	16V	474~105【0.8】
	25V	474~105【0.8】
	50V	474~105【0.8】
0805	≦10V	105~106【1.25】
	16V	154~474【0.8】
		564~225【1.25】
	25V	154~474【0.8】
		564~105【1.25】
	50V	154~334【0.8】
		364~474【1.25】
1206	4V	225~226【1.6】
	6V3	225~1.6【1.6】
	10V	225~106【1.6】
	16V	105~155【0.8】
		225~106【1.6】
	25V	105~155【0.8】
		225~106【1.6】
	50V	105~155【0.8】
		225~474【1.6】
1210	6V3	475~106【1.6】
	16V	225~106【1.6】
	25V	225~106【1.6】
	50V	105~106【1.6】

■【】General thickness corresponds to the capacity, unit: mm

■General Capacitance & Voltage

Capacitance & Voltage (X6S)

Type	Rated Voltage	Capacitance (pF)
0201	≦16V	153~104【0.3】
	25V	153~104【0.3】
0402	≦10V	104~105【0.5】
	16V	104~105【0.5】
	25V	103~104【0.5】
0603	≦10V	104~225【0.8】
	16V	104~105【0.8】
0805	≦10V	104~474【0.8】
		564~475【1.25】
1206	4V	225~226【1.6】
	6V3	104~155【0.8】
		225~226【1.6】
	10V	104~155【0.8】
		225~226【1.6】
	16V	104~155【0.8】
		225~106【1.6】
	25V	104~155【0.8】
		225~475【1.6】
1210	4V	104~474【1.25】
		564~106【1.6】
	6V3	104~474【1.25】
		564~106【1.6】
	10V	104~474【1.25】
		564~106【1.6】
	16V	104~474【1.25】
		564~106【1.6】
	25V	104~474【1.25】
		564~106【1.6】

■【】General thickness corresponds to the capacity, unit: mm

■General Capacitance & Voltage

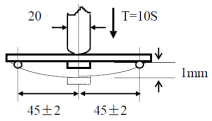
Capacitance & Voltage (X5R)

Type	Rated Voltage	Capacitance (pF)
0201	≦16V	153~224【0.3】
	25V	153~104【0.3】
	50V	472~103【0.3】
0402	≦10V	223~105【0.5】
	16V	223~105【0.5】
	25V	223~224【0.5】
	50V	472~104【0.5】
0603	≦10V	474~225【0.8】
	16V	474~225【0.8】
	25V	474~225【0.8】
	50V	474~105【0.8】
0805	≦10V	564~106【1.25】
	16V	564~475【1.25】
	25V	564~225【1.25】
	50V	564~105【1.25】
1206	4V	105~155【0.8】
		225~106【1.6】
	6V3	225~106【1.6】
	10V	225~106【1.6】
	16V	225~106【1.6】
	25V	225~475【1.6】
	50V	225~475【1.6】
1210	4V	475~106【1.6】
	6V3	475~106【1.6】
	10V	475~106【1.6】
	16V	475~106【1.6】
	25V	475~106【1.6】
	50V	475~106【1.6】
1808	6V3	475~106【1.6】
	10V	475~106【1.6】
	16V	475~106【1.6】
	25V	475~106【1.6】
1812	25V	475~106【2.5】

■【】General thickness corresponds to the capacity, unit: mm

■Environmental Characteristics

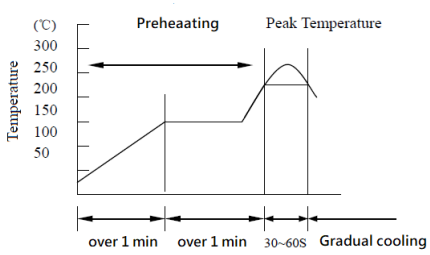
<table>
<tr><th>Item</th><th colspan="9">Requirement</th><th colspan="3">Test Method</th></tr>
<tr><td>Capacitance</td><td colspan="9">Should be within the specified tolerance</td><td colspan="3">NPO: (Class I)
Cap≤ 1000pF 1.0±0.2Vrms, 1MHz±10%
Cap>1000pF 1.0±0.2Vrms, 1KHz±10%
X7R,X7S,X6S,X5R: (Class II)
Test Temperature:25℃±3℃
Cap≤ 10uF 1.0±0.2Vrms, 1KHz±10%
Cap>10uF 0.5±0.1Vrms, 120Hz±24 Hz</td></tr>
<tr><td rowspan="20">(DF, tanδ) Dissipation Factor</td><td rowspan="3">NPO
(Class Ⅰ)</td><td colspan="8">DF</td><td>Capacitance</td><td>Measuring Frequency</td><td>Measuring Voltage</td></tr>
<tr><td colspan="8">≤0.1%</td><td>Cr≧30 pF</td><td rowspan="2">1MHz±10%</td><td rowspan="2">1.0±0.2Vrms</td></tr>
<tr><td colspan="8">≤1/(400+20Cr)</td><td>Cr< 30 pF</td></tr>
<tr><td rowspan="17">X7R,X7S,
X6S,X5R:
(Class II)</td><td>Voltage</td><td>DF</td><td>0201</td><td>0402</td><td>0603</td><td>0805</td><td>≧1206</td><td colspan="3" rowspan="17">Cap≤ 10uF 1.0±0.2Vrms, 1KHz±10%
Cap>10uF 0.5±0.1Vrms, 120Hz±24Hz</td></tr>
<tr><td>>100V</td><td>≦ 250</td><td colspan="5">all</td></tr>
<tr><td rowspan="2">100V</td><td>≦ 250</td><td>-</td><td>≦ 10nF</td><td>≦ 100 nF</td><td>≦ 220 nF</td><td>≦ 680 nF</td></tr>
<tr><td>≦ 350</td><td>-</td><td>-</td><td>-</td><td>-</td><td>≦ 1μF</td></tr>
<tr><td rowspan="4">50V</td><td>≦ 250</td><td>≦ 3.3nF</td><td>≦ 10nF</td><td>≦ 100nF</td><td>≦ 330nF</td><td>≦ 680 nF</td></tr>
<tr><td>≦ 350</td><td>≦ 10nF</td><td>-</td><td>-</td><td>-</td><td>≦ 1μF</td></tr>
<tr><td>≦ 500</td><td>-</td><td>-</td><td>-</td><td>≦ 680nF</td><td>-</td></tr>
<tr><td>≦ 1000</td><td>-</td><td>≦ 100μF</td><td>≦ 1μF</td><td>≦ 1μF</td><td>≦ 4.7μF</td></tr>
<tr><td rowspan="4">25V</td><td>≦ 250</td><td>≦ 3.3nF</td><td>≦ 10nF</td><td>≦ 150nF</td><td>≦ 330nF</td><td>≦ 680 nF</td></tr>
<tr><td>≦ 350</td><td>≦ 10nF</td><td>-</td><td>≦ 330nF</td><td>-</td><td>≦ 2.2μF</td></tr>
<tr><td>≦ 500</td><td>-</td><td>-</td><td>-</td><td>≦ 1μF</td><td>-</td></tr>
<tr><td>≦ 750</td><td>-</td><td>-</td><td>-</td><td>≦ 2.2μF</td><td>≦ 4.7μF</td></tr>
<tr><td rowspan="4">16V</td><td>≦ 1000</td><td>≦ 100nF</td><td>≦ 100nF</td><td>≦ 2.2μF</td><td>-</td><td>≦ 10μF</td></tr>
<tr><td>≦ 250</td><td>≦ 3.3 nF</td><td>≦ 10nF</td><td>≦ 150nF</td><td>≦ 330nF</td><td>≦ 680 nF</td></tr>
<tr><td>≦ 350</td><td>≦ 15nF</td><td>≦ 100nF</td><td>≦ 330nF</td><td>-</td><td>≦ 2.2μF</td></tr>
<tr><td>≦ 500</td><td>≦ 47nF</td><td>≦ 220nF</td><td>≦ 680nF</td><td>≦ 2.2μF</td><td>-</td></tr>
<tr><td rowspan="4">≦ 10V</td><td>≦ 750</td><td>-</td><td>-</td><td>-</td><td>≦ 4.7μF</td><td>≦ 4.7μF</td></tr>
<tr><td>≦ 1000</td><td>≦ 100nF</td><td>≦ 1μF</td><td>≦ 2.2μF</td><td>-</td><td>≦ 10μF</td></tr>
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<tr><td>≦ 750</td><td>-</td><td>-</td><td>-</td><td>≦ 4.7μF</td><td>≦ 10μF</td></tr>
<tr><td>≦ 1000</td><td>≦ 100nF</td><td>≦ 1μF</td><td>≦ 2.2μF</td><td>≦ 10μF</td><td>≦ 22μF</td></tr>
<tr><td>Appearance</td><td colspan="9">No visible damage</td><td colspan="3">Visual inspection</td></tr>
<tr><td>Physical Dimension</td><td colspan="9">Within the specified dimensions</td><td colspan="3">Use caliper</td></tr>
</table>

Item	Requirement	Test Method
Dielectric Withstanding Voltage(DWV)	No breakdown or damage.	Ur<100V Measuring Voltage: Class Ⅰ :300% Ur Class Ⅱ :250% Ur Duration: 1~5s Charge/Discharge Current: 50mA max. 100V≦Vr<500V Force 200% Rated voltage for 5 seconds. Max current should not exceed 50mA. 500V≦Vr≦1000V Force 150% Rated voltage for 5 seconds. Max current should not exceed 50mA. 1000V≦Vr≦2000V Force 120% Rated voltage for 5 seconds. Max current should not exceed 50mA. 2000V≦Vr≦5000V Force 120% Rated voltage for 5 seconds. Max current should not exceed 10mA.
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual Appearance: No visible damage.	Preheating conditions:80 to 120℃; 10~30s. Solder Temperature: 235±5℃ (Sn/Pb:63/37) Duration: 2±0.5s Solder Temperature: 245±5℃ (Lead-free) Duration: 3±0.3s
Resistance to Flexure of Substrate (Bending Strength)	NPO: ΔC/C:≤±1% or ±1pF, whichever is larger. X7R/X7S/X6S/X5R: ΔC/C: -10%~10% DF&IR: Same to initial value Appearance: no visible damage.	Test Board: Al2O3 or PCB Warp: 1mm Speed: 1 mm/sec. Unit: mm The measurement should be made with the board in the bending position. 
Resistance to Soldering Heat	Item: NPO / X7R/X7S/X6S/X5R ΔC/C: ≤±1% or ±1pF whichever is larger / -15%~+15% DF: Same to initial value IR: Same to initial value Appearance：No visible damage. At least 95% of the terminal electrode is covered by new solder.	Preheating conditions: 100 to 200℃; 60~120s. Solder Temperature: 265±5℃ Duration: 10±1s Clean the capacitor with solvent and examine it with a 10X(min.) microscope. Recovery Time: 24±2h Recovery condition: Room temperature
Termination Adhesion	No visible damage	Applied Force: 5N Duration: 10±1S
Vibration	NPO: ΔC/C:≤±1% or ±1pF, whichever is larger. X7R/X7S/X6S/X5R: ΔC/C: -10%~10% DF&IR: Same to initial value Appearance: no visible damage.	5 g's for 20 minutes, 12 cycles each of 3 orientations. Note: Use 8"x5" PCB. 0.31" thick 7 secure points on one long side and 2 secure points at corners of opposite side. Parts mounted within 2" form any secure point. Test from 10~2000Hz.
Humidity Load	NPO: ΔC/C :±2.5% or ±2.5pF, whichever is larger. X7R/X7S/X6S/X5R: ΔC/C: ≤±10% DF: Same to initial value. IR:Class I: C≦10nF, Ri≧10000MΩ C>10nF,Ri·CR≧100S Class II: C≦25nF, Ri≧2000MΩ C>25nF,Ri·CR≧20S Appearance: No visible damage	Preconditioning, class 2 only: At 140~150℃ 1hour, then keep for 24±1 hour at room temp. Test condition: 40℃, 95%RH Add 100KΩ resistor, applied Ur and 1.3 to 1.5 volts for 500 hours.

<table>
<tr><th>Item</th><th>Requirement</th><th>Test Method</th></tr>
<tr><td>Temperature Cycle</td><td>NPO: ΔC/C:≤±1% or ±1pF, whichever is larger.
X7R/X7S/X6S/X5R: ΔC/C: -10%~10%
DF&IR: Same to initial value
Appearance: no visible damage.</td><td>Preconditoning (class II only): up-category temperature, 1h
Recovery time: 24±1h
Initial Measurement
Cycling Times: 1000 times, 1 cycle, 4 steps:
<table>
<tr><th>Step</th><th>Temp.(℃)</th><th>Time (min)</th></tr>
<tr><td>1</td><td>Low- category temp
NPO/X7R/X7S/X6S/X5R : -55</td><td>30</td></tr>
<tr><td>2</td><td>Normal temp. (+20)</td><td>1</td></tr>
<tr><td>3</td><td>Up- category temp
NPO/X7R/X7S : +125
X5R: +85 X6S:+105</td><td>30</td></tr>
<tr><td>4</td><td>Normal temp. (+20)</td><td>1</td></tr>
</table>
Recovery time after test: 24±2h</td></tr>
<tr><td>Life Test</td><td>NPO: ΔC/C :≤±2% or ±1pF,whichever is larger.
X7R/X7S/X6S/X5R: ΔC/C ≤±20%
DF: Same to initial value.
IR:Class I: Ri≧5000MΩ or Ri·CR≧50S whichever is smaller
Class II: Ri≧1000MΩ or Ri·CR≧10S whichever is smaller
Visual Appearance: No visible damage</td><td>Low-Voltage:
Ur<100V: 2x Rated Voltage
100V≦Ur<500V: 2x Rated Voltage
500V≦Ur≦1000V: 1.5x Rated Voltage
Ur>1000V: 1.2x Rated Voltage
Duration: 1000h
Temperature：125℃（NPO/X7R/X7S）
85℃（X5R） 105℃(X6S)
Charge/ Discharge Current: 50mA max.
Recovery Conditions: Room Temperature
Recovery Time: 24h (Class 1), or 48h (Class2)
<table>
<tr><td colspan="4">Table 1</td></tr>
<tr><td>Capacitance</td><td>Test Voltage</td><td>Capacitance</td><td>Test Voltage</td></tr>
<tr><td>0201≧47nF</td><td rowspan="3">1.5Ur</td><td>0805≧1uF</td><td rowspan="3">1.5 Ur</td></tr>
<tr><td>0402≧330nF</td><td>1206≧10uF</td></tr>
<tr><td>0603≧470nF</td><td>1210≧10uF</td></tr>
</table></td></tr>
<tr><td>High Temperature Exposure</td><td>NPO: ΔC/C:≤±1% or ±1pF, whichever is larger.
X7R/X7S/X6S/X5R: ΔC/C: -10%~10%
DF&IR: Same to initial value</td><td>Temperature: 125℃(NPO/X7R/X7S) 85℃(X5R) 105℃(X6S)
Voltage: without
Duration: 1000h
Recovery conditions: room temperature
Recovery Time: 24h(Class I) or 48h(Class II)</td></tr>
<tr><td>Destructive Physical Analysis</td><td>No defects or abnormalities</td><td>Accounting to EIA-469</td></tr>
<tr><td>Insulation Resistnace(IR)</td><td>I : C≦10nF,Ri≧50000MΩ
C>10nF,Ri·CR≧500S
II: C≦25nF,Ri≧10000MΩ
C>25nF,Ri·CR≧100S</td><td>Measuring Voltage: Rated Voltage
Duration: 60±5s
Test Humidity: ≦75%
Test Temperature: 25±3℃
Test Current: ≦50mA</td></tr>
</table>

■Storage Temperature: 5 ~ 40℃; Relative Humidity 20 ~70 %RH

■The temperature profile for soldering



	Pb-Sn Soldering	Lead-free Soldering
Peak Temperature	230~250℃	240~260℃

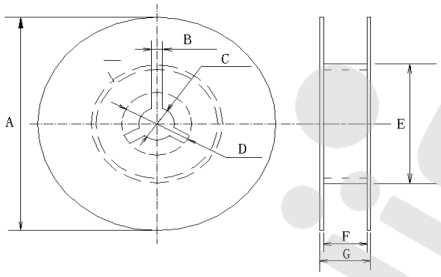
■While in preheating, please keep the temperature difference between soldering temperature and surface temperature of chips as: T≦150℃.

■Packaging

Packaging Quantity

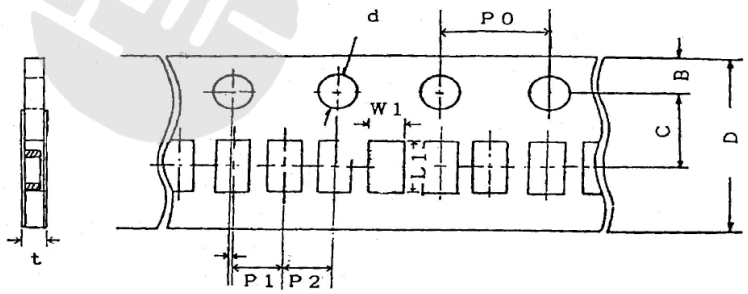
Type	Packaging (7" Reel)	
	Paper tape	Plastic tape
0201	15K	-
0402	10K	-
0603	4K	-
0805	4K	3K
1206	4K	T≦1.35mm 3K T>1.35mm 2K
1210	-	T≦1.80mm 2K T>1.80mm 1K
1808	-	2K
1812	-	T≦1.85mm 1K T>1.85mm 0.5K

Tape and Reel



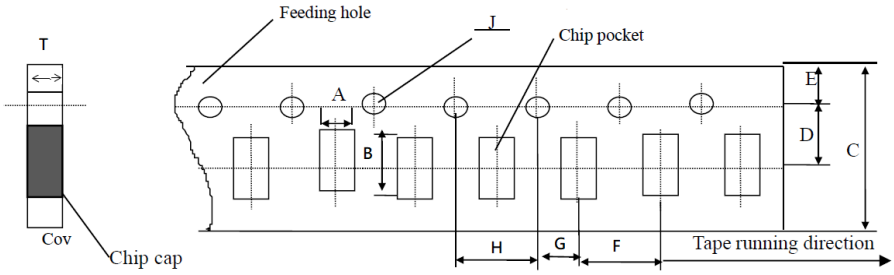
Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)
0201	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
0402	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
0603	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
0805	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
1206	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
1210	178±2.0(7")	3.0	13.0±0.5	21.0±0.8	50 or more	10.0±1.5	12 max
1808	330±2.0(13")	3.0	13.0±0.5	21.0±0.8	50 or more	12.6 max	13.6 max
1812	330±2.0(13")	3.0	13.0±0.5	21.0±0.8	50 or more	12.6 max	13.6 max

Paper Tape Size Specification



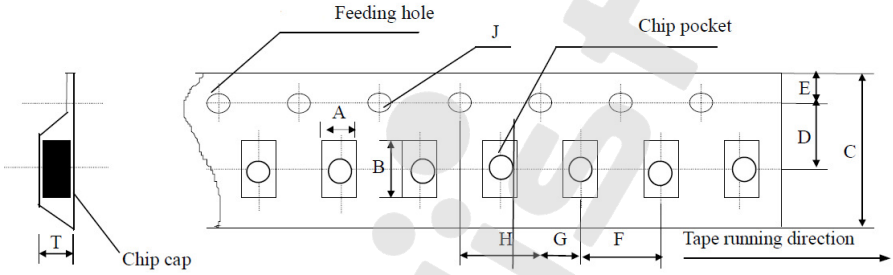
Type	W1 (mm)	L1 (mm)	D (mm)	C (mm)	B (mm)	P1 (mm)	P2 (mm)	P0 (mm)	d (mm)	t (mm)
0201	0.37±0.10	0.67±0.10	8.00±0.10	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50-0/+0.10	0.80 Below
0402	0.65±0.10	1.15±0.10	8.00±0.10	3.50±0.05	1.75±0.10	2.00±0.05	2.00±0.05	4.00±0.10	1.50-0/+0.10	0.80 Below

Paper Tape Size Specification



Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	J (mm)	T (mm)
0603	1.10±0.10	1.90±0.10	8.00±0.10	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.10 max
0805	1.45±0.15	2.30±0.15	8.00±0.15	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.10 max
1206	1.80±0.20	3.40±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.10 max

Plastic Tape Size Specification



Type	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)	J (mm)	T (mm)
0805	1.55±0.20	2.35±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.50 Max
1206	1.95±0.20	3.60±0.20	8.00±0.20	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.10	4.00±0.10	1.50-0/+0.10	1.85 Max
1210	2.70±0.10	3.42±0.10	8.00±0.10	3.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	3.20 Max
1808	2.20±0.10	4.95±0.10	12.00±0.10	5.50±0.05	1.75±0.10	4.00±0.10	2.00±0.05	4.00±0.10	1.50-0/+0.10	3.00 Max
1812	3.66±0.10	4.95±0.10	12.00±0.10	5.50±0.05	1.75±0.10	8.00±0.10	2.00±0.05	4.00±0.10	1.55-0/+0.10	4.00 Max

■Recommended Soldering Method

Type	Dielectric	Capacitance	Soldering Method
0201	NPO	-	R
	X7R/X7S/X6S/X5R	-	R
0402	NPO	-	R
	X7R/X7S/X6S/X5R	-	R
0603	NPO	-	R
	X7R/X7S/X6S/X5R	C≧1uF	R
		C<1uF	
0805	NPO	-	R
	X7R/X7S/X6S/X5R	C≧4.7uF	R
		C<4.7uF	
1206	NPO	-	R
	X7R/X7S/X6S/X5R	C≧10uF	R
		C<10uF	
≧1210	NPO	-	R
	X7R/X7S/X6S/X5R	-	R

Soldering method：R－Reflow Soldering