



HITANO ENTERPRISE CORP.

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Data Sheet

Customer: _____

Product: Safety Certified Multilayer Ceramic Chip Capacitors. FK / FH series _____

Size : 1206/1808/1812/2220/2211 _____

Issued Date: 1-Mar.-2017 _____

Edition: Ver. 1 _____

Record of change

Date	Ver.	Description	Page
1-Mar.-2017	1		

VENDOR :

HITANO ENTERPRISE CORP.

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MAKER :

Prosperity Dielectric Co., Ltd.

No.220-1, Sec. 2, Nanshan Rd., Lujhu, Taoyuan 33860,
Taiwan, R.O.C



1. Introduction

SAFETY CERTIFIED CAPACITORS are designed for surge or lightning immunity in modem facsimile and other equipments. The capacitors of series FK are class X1/Y2 compliant respectively.

The green type capacitors in FK series are manufactured by using environmentally friendly materials without lead or cadmium.

The terminations are composed of plated nickel and pure tin to feature the superior leaching resistance during soldering

2. Features

- High reliability and stability.
- Small size and high capacitance
- RoHS compliant
- Safety standard approval by
EN132400:1994+A2+A3+A4,
IEC60384-14:2013
UL 60384-14(Ed 2.0)
- Certificate number:
R 50041666 & R 50359148 by TUV E231248
by UL, E346791 by UL(FOWX2/8)
- HALOGEN compliant



3. Application

- Modem.
- Facsimile.
- Telephone.
- Other electronic equipment for lightning or surge protection and isolation.

4. How To Order

FK	08	N	100	J	502	E	F	G
Series	Size	Dielectric	Capacitance	Tolerance	Rated voltage	Packaging	Thickness	Control Code
Table1.	Table2	Table3	Table4	Table5	Table6	Table7	Table8	Table9

※ Reference document with No.11 reference table detail.

5. External Dimensions

Size Inch (mm)	L (mm)	W (mm)	Code / T (mm)	M _B (mm)	
1206 (3216)	3.30±0.30	1.60±0.20	See No.11 Reference Table 8	0.75±0.35	
1808 (4520)	4.50+0.5/-0.3	2.00±0.25		0.75±0.35	
1812 (4532)	4.50+0.5/-0.3	3.20±0.40		0.75±0.35	
2211 (5728)	5.70±0.40	2.80±0.30		0.85±0.35	
2220 (5750)	5.70±0.40	5.00±0.40		0.85±0.35	

Fig.5-1 The outline of MLCC

6. General Electrical Data

Dielectric	C0G	X7R									
Size	1808,1812, 2211	1808, 1812, 2211, 2220	1206								
Rated voltage	250VAC		2.5KVDC 2.0KVDC								
Capacitance range	X1/Y2 Class(Impulse 6KV) : 4pF ~ 100pF X1/Y2 Class(Impulse 5KV) : 3pF ~ 720pF X2 Class : 3pF ~ 1000pF	X1/Y2 Class : 100pF ~ 4700pF X2 Class : 150pF ~ 23000pF	1000pF								
Capacitance tolerance	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Cap. Rang</th> <th style="width: 70%;">Tolerance Spec.</th> </tr> </thead> <tbody> <tr> <td>Cap≤5pF</td> <td>B (±0.1pF), C (±0.25pF)</td> </tr> <tr> <td>5pF<Cap<10pF</td> <td>C (±0.25pF), D (±0.5pF)</td> </tr> <tr> <td>10pF≤Cap</td> <td>F (±1%), G (±2%), J (±5%),K (±10%)</td> </tr> </tbody> </table>	Cap. Rang	Tolerance Spec.	Cap≤5pF	B (±0.1pF), C (±0.25pF)	5pF<Cap<10pF	C (±0.25pF), D (±0.5pF)	10pF≤Cap	F (±1%), G (±2%), J (±5%),K (±10%)	J (±5%) K (±10%) M (±20%)	
Cap. Rang	Tolerance Spec.										
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Tan δ	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Cap. Rang</th> <th style="width: 70%;">Q Spec.</th> </tr> </thead> <tbody> <tr> <td>Cap<30pF</td> <td>Q≥400+20C</td> </tr> <tr> <td>Cap≥30pF</td> <td>Q≥1000</td> </tr> </tbody> </table>	Cap. Rang	Q Spec.	Cap<30pF	Q≥400+20C	Cap≥30pF	Q≥1000	≤2.5%			
Cap. Rang	Q Spec.										
Cap<30pF	Q≥400+20C										
Cap≥30pF	Q≥1000										
Capacitance & Tan δ Test Condition	Measured at the condition of 30~70% related humidity										
	for 25°C at ambient temperature	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.									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Cap. Rang</th> <th style="width: 70%;">Test Condition</th> </tr> </thead> <tbody> <tr> <td>Cap≤1000pF</td> <td>1.0±0.2Vrms, 1.0MHz±10%</td> </tr> <tr> <td>Cap>1000pF</td> <td>1.0±0.2Vrms, 1.0kHz±10%</td> </tr> </tbody> </table>	Cap. Rang	Test Condition	Cap≤1000pF	1.0±0.2Vrms, 1.0MHz±10%	Cap>1000pF	1.0±0.2Vrms, 1.0kHz±10%	1.0±0.2Vrms, 1.0kHz±10%, at 25°C ambient temperature.			
Cap. Rang	Test Condition										
Cap≤1000pF	1.0±0.2Vrms, 1.0MHz±10%										
Cap>1000pF	1.0±0.2Vrms, 1.0kHz±10%										
Insulation resistance	≥100GΩ or R•C≥ 1000Ω-F whichever is smaller	≥10GΩ or R•C≥500Ω-F whichever is smaller									
Operating temperature	-55 to +125°C										
Temperature coefficient	±30ppm / °C	±15%									
	Cu (or Ag)/Ni/Sn (lead-free termination)										

7. Capacitance Range

Class		X1/Y2(FK Series)								X2(FH Series)						
Rated Voltage		250Vac														2KVdc
Certificated		TUV IEC60384-14 / UL-60384														UL-60950
DIELECTRIC		C0G				X7R				C0G		X7R			X7R	
Cap	EIA Size	1808	1812	2211	2211	1808	1812	2211	2220	1808	1812	1808	1812	2220	1206	
(pF)	Impulse	5KV			6KV	5KV				2.5KV					---	
3	3R0	D								D						
3.3	3R3	D								D						
3.9	3R9	D								D						
4	4R0	D		F	F					D						
4.7	4R7	D		F	F					D						
5	5R0	D		F	F					D						
5.6	5R6	D		F	F					D						
6	6R0	D		F	F					D						
6.8	6R8	D		F	F					D						
7	7R0	D		F	F					D						
8	8R0	D		F	F					D						
8.2	8R2	D		F	F					D						
9	9R0	D		F	F					D						
10	100	D	C	F	F					D	C					
12	120	D	C	F	F					D	C					
15	150	D	C	F	F					D	C					
18	180	D	C	F	F					D	C					
22	220	D	C	F	F					D	C					
27	270	D	C	F	F					D	C					
33	330	D	C	F	F					D	C					
39	390	E	C	F	F					E	C					
47	470	E	C	F	F					E	C					
56	560	E	C	F	F					E	C					
68	680	E	C	F	G					E	C					
82	820	E	C	F	G					E	C					
100	101	F	C	F	H	E				F	C					
120	121	F	C	G		E				F	C					
130	131	F	C	G		E		E		F	C					

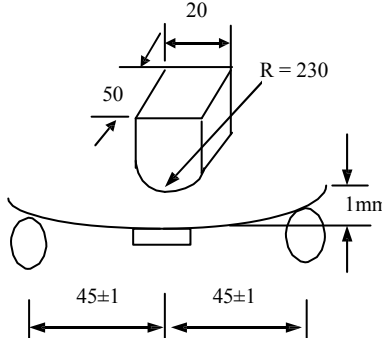
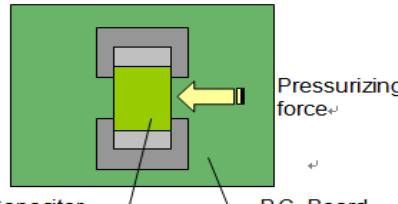
8. Reliability Test Conditions and Requirement

No.	Item	Standard Methods	Test Condition	Requirements												
1.	Visual examination and Dimensions	IEC 60384-1 4.1	---	*No remarkable defect. *Dimensions to confirm to individual specification sheet.												
2.	Capacitance	IEC 60384-1 4.2.2	Class I: COG	* Capacitance is within specified tolerance * C _R means rated capacitance for conform to the E6 series of preferred values given in IEC 60063.												
3.	Q/D.F. (Dissipation Factor)	IEC 60384-1 4.2.3	Cap≤1000pF, 1.0±0.2Vrms, 1MHz±10%	<table border="1"> <tr> <td>Dielectric</td> <td>Q/D.F.</td> <td>Remark</td> </tr> <tr> <td rowspan="2">Class I(COG)</td> <td>Q≥1000</td> <td>Cap≥30pF</td> </tr> <tr> <td>Q≥400+20C</td> <td>Cap<30pF</td> </tr> <tr> <td>Class II(X7R)</td> <td>D.F. < 2.5%</td> <td></td> </tr> </table>	Dielectric	Q/D.F.	Remark	Class I(COG)	Q≥1000	Cap≥30pF	Q≥400+20C	Cap<30pF	Class II(X7R)	D.F. < 2.5%		
			Dielectric		Q/D.F.	Remark										
			Class I(COG)		Q≥1000	Cap≥30pF										
					Q≥400+20C	Cap<30pF										
Class II(X7R)	D.F. < 2.5%															
Cap>1000pF, 1.0±0.2Vrms, 1kHz±10%																
Class II: (X7R)																
1.0±0.2Vrms, 1kHz±10%																
4.	Temperature Coefficient	IEC 60384-21/22 4.6	With no electrical load. <table border="1"> <tr> <td>T.C.</td> <td>Operating Temp</td> <td>T.C.</td> <td>Capacitance Change</td> </tr> <tr> <td>COG</td> <td>-55~125°C at 25°C</td> <td>COG</td> <td>±30 ppm/°C</td> </tr> <tr> <td>X7R</td> <td>-55~125°C at 25°C</td> <td>X7R</td> <td>Within ±15%</td> </tr> </table>	T.C.	Operating Temp	T.C.	Capacitance Change	COG	-55~125°C at 25°C	COG	±30 ppm/°C	X7R	-55~125°C at 25°C	X7R	Within ±15%	
T.C.	Operating Temp	T.C.	Capacitance Change													
COG	-55~125°C at 25°C	COG	±30 ppm/°C													
X7R	-55~125°C at 25°C	X7R	Within ±15%													
5.	Voltage proof (Dielectric Strength)	IEC 60384-14 4.2.1	To apply voltage: X Capacitor: 1075Vdc (4.3U _R) Y Capacitor: 1500Vac *Duration: 60 sec. *The charge current shall not exceed 0.05A. *The voltage shall be raised from the near zero to the test voltage a rate not exceeding 150V(r.m.s.)/sec.	*No evidence of damage or flash over during test												
6.	Insulation Resistance	IEC 60384-21/22 4.5.3		<table border="1"> <tr> <td>Dielectric</td> <td>Requirements</td> </tr> <tr> <td>Class I(COG)</td> <td>≥100GΩ or R•C≥1000Ω-F whichever is smaller</td> </tr> <tr> <td>Class II(X7R)</td> <td>≥10GΩ or R•C≥500Ω-F whichever is smaller</td> </tr> </table>	Dielectric	Requirements	Class I(COG)	≥100GΩ or R•C≥1000Ω-F whichever is smaller	Class II(X7R)	≥10GΩ or R•C≥500Ω-F whichever is smaller						
			Dielectric	Requirements												
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Class II(X7R)	≥10GΩ or R•C≥500Ω-F whichever is smaller															
Rated vol.(V)	Apply Voltage	Charge Current	Charge Time													
> 500	500VDC	≤ 50mA	60 sec													
7.	Solderability	IEC 60384-21/22 4.10	*Solder temperature: 235±5°C (0201~1210) *Solder temperature: 245±5°C (1808~2225) *Dipping time: 2±0.5 sec.	*75% min. coverage of all metalized area.												
8.	Resistance to Soldering Heat	EC 60384-14 4.4 IEC 60384-21/22 4.9	* Solder temperature: 260±5°C	<table border="1"> <tr> <td>Dielectric</td> <td>I.R</td> <td>Cap Change</td> <td>Q/D.F</td> </tr> <tr> <td rowspan="2">Class I(COG)</td> <td>≥ 1GΩ</td> <td>Within ±2.5% or ±0.25pF whichever is larger.</td> <td rowspan="2">≤ 1.0 × Initial requirement</td> </tr> <tr> <td>Class II(X7R)</td> <td>≥ 1GΩ</td> <td>within ±7.5%</td> </tr> </table>	Dielectric	I.R	Cap Change	Q/D.F	Class I(COG)	≥ 1GΩ	Within ±2.5% or ±0.25pF whichever is larger.	≤ 1.0 × Initial requirement	Class II(X7R)	≥ 1GΩ	within ±7.5%	
			Dielectric		I.R	Cap Change	Q/D.F									
			Class I(COG)		≥ 1GΩ	Within ±2.5% or ±0.25pF whichever is larger.	≤ 1.0 × Initial requirement									
					Class II(X7R)	≥ 1GΩ		within ±7.5%								
* Dipping time: 10±1 sec																
* Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder.																
* Measurement to be made after keeping at room temperature for 24c hrs (Class I)																

8. Reliability Test Conditions and Requirement

No.	Item	Standard Methods	Test Condition	Requirements															
9.	Temperature Cycle	IEC-60384-21/22 4.11	* Conduct the five cycles according to the temperatures and time <table border="1"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min. operating temp.+0/-3</td> <td>30±3</td> </tr> <tr> <td>2</td> <td>Room Temp.</td> <td>2~3</td> </tr> <tr> <td>3</td> <td>Max. operating temp.+3/-0</td> <td>30±3</td> </tr> <tr> <td>4</td> <td>Room Temp.</td> <td>2~3</td> </tr> </tbody> </table>	Step	Temp. (°C)	Time(min)	1	Min. operating temp.+0/-3	30±3	2	Room Temp.	2~3	3	Max. operating temp.+3/-0	30±3	4	Room Temp.	2~3	
			Step	Temp. (°C)	Time(min)														
1	Min. operating temp.+0/-3	30±3																	
2	Room Temp.	2~3																	
3	Max. operating temp.+3/-0	30±3																	
4	Room Temp.	2~3																	
			*Measurement to be made after keeping at room temperature for 24c hrs (Class I)	<table border="1"> <thead> <tr> <th>T.C.</th> <th>I.R.</th> <th>Cap Change</th> <th>Q/D.F</th> </tr> </thead> <tbody> <tr> <td>COG</td> <td rowspan="2">Meet Initial value</td> <td>Within ±2.5% or ±0.25pF whichever is larger.</td> <td>≤1.0(Q)x Initial requirement</td> </tr> <tr> <td>X7R</td> <td>within ±7.5%</td> <td>≤1.5(DF)x Initial requirement</td> </tr> </tbody> </table>	T.C.	I.R.	Cap Change	Q/D.F	COG	Meet Initial value	Within ±2.5% or ±0.25pF whichever is larger.	≤1.0(Q)x Initial requirement	X7R	within ±7.5%	≤1.5(DF)x Initial requirement				
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COG	Meet Initial value	Within ±2.5% or ±0.25pF whichever is larger.	≤1.0(Q)x Initial requirement																
X7R		within ±7.5%	≤1.5(DF)x Initial requirement																
10.	Humidity (Damp Heat) Steady State	IEC 60384-14 4.12	* Test temp.: 40±2°C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. * Applied Voltage:250Vac. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) and 48±4 hrs (Class II)	* No remarkable damage.															
				<table border="1"> <thead> <tr> <th>T.C.</th> <th>I.R.</th> <th>Cap Change</th> <th>Q/D.F</th> </tr> </thead> <tbody> <tr> <td>COG</td> <td rowspan="2">Meet Initial value</td> <td>Within ±2.5% or ±0.25pF whichever is larger.</td> <td>≤1.0(Q)x Initial requirement</td> </tr> <tr> <td>X7R</td> <td>within ±7.5%</td> <td>≤1.5(DF)x Initial requirement</td> </tr> </tbody> </table>	T.C.	I.R.	Cap Change	Q/D.F	COG	Meet Initial value	Within ±2.5% or ±0.25pF whichever is larger.	≤1.0(Q)x Initial requirement	X7R	within ±7.5%	≤1.5(DF)x Initial requirement				
T.C.	I.R.	Cap Change	Q/D.F																
COG	Meet Initial value	Within ±2.5% or ±0.25pF whichever is larger.	≤1.0(Q)x Initial requirement																
X7R		within ±7.5%	≤1.5(DF)x Initial requirement																
11.	Passive Flammability	IEC 60384-14 4.17 IEC 60384-1 4.38	* Volume sample: 21.56 mm ³ * Flame exposure time: 5 sec Max. * Category of flammability : C.	* Capacitor didn't burn at all (FH06X series not include)															
12.	Active Flammability	IEC 60384-14 4.17 IEC 60384-1 4.38	* The capacitors applied UR (250Vac). Then each sample shall be subjected to 20 discharges from a tank capacitor, charge to a voltage that, when discharged, places Ui 2500V for X2, Ui 5000V for X1Y2 across the capacitor under test. The interval between successive discharges shall be 5 sec.	* The cheese cloth shall not burn with a flame. (FH06X series not include)															
13.	High Temperature Load (Endurance)	IEC 60384-14 4.14	* Impulse Voltage: Each individual capacitor shall be subjected to a Vp = 5.0KV (X1Y2 Class Impulse 5KV) & Vp = 6.0KV (X1Y2 Class Impulse 6KV) impulse for three times before applied to endurance test. * Test Temp.: 125±3°C * Test time: 1000+48/-0 hrs. * Applied Voltage: X capacitor: 1.25UR (312.5Vac) Y capacitor: 1.70UR (425Vac) Once every hour the voltage shall be increased to 1000Vrms for 0.1 sec. * Measurement to be made after keeping at room temp. for 24±2 hrs (Class I) and 48±4 hrs (Class II) For FH06X series * Test temp.: 125±3°C * To apply voltage: 100% of rated voltage. * Test time: 1000+24/-0 hrs. * Measurement to be made after keeping at room temp. for 48±4 hrs.	* Appearance: No mechanical damage. * Cap change: COG within ±5% or ±0.5pF whichever is larger X7R within ±20% * D.F Value: COG ≤ 0.25% X7R: ≤5.0% * I.R. ≥1G ₁ * Dielectric strength satisfies the specified initial value															

8. Reliability Test Conditions and Requirement

No.	Item	Standard Methods	Test Condition	Requirements						
14.	Resistance to Flexure of Substrate	IEC 60384-21/22 4.8	<p>* Capacitors mounted on a substrate. The board shall be bent 1mm with a rate of 1mm/sec.</p> 	<p>* No remarkable damage.</p> <table border="1"> <tr> <td>T.C.</td> <td></td> </tr> <tr> <td>COG</td> <td>Within $\pm 3.0\%$ or $\pm 2\text{pF}$ whichever is larger</td> </tr> <tr> <td>X7R</td> <td>within $\pm 12.5\%$</td> </tr> </table>	T.C.		COG	Within $\pm 3.0\%$ or $\pm 2\text{pF}$ whichever is larger	X7R	within $\pm 12.5\%$
				T.C.						
				COG	Within $\pm 3.0\%$ or $\pm 2\text{pF}$ whichever is larger					
				X7R	within $\pm 12.5\%$					
<p>(This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before the test.)</p>										
15.	Adhesive Strength of Termination	IEC 60384-21/22 4.15 IEC 60384-1 4.13	<p>*Capacitors mounted on a substrate. A force of 10N applied perpendicular to the place of substrate and parallel the line joining the center of terminations for 10±1 sec.</p> 	<p>*No remarkable damage or removal of the terminations.</p>						
16.	Vibration	IEC 60384-1 4.17	<p>*Reflow solder the capacitors on P C. Board before test.</p> <p>*Vibration frequency: 10~55 Hz/min.</p> <p>*Total amplitude: 1.5mm</p> <p>*Repeat the conditions for 2 hours each in 3perpendicular directions.</p>	<p>* No remarkable damage.</p> <p>* Cap change and Q/D.F.: To meet initial spec.</p>						
17.	Impulse Voltage	IEC 60384-14 4.13	<p>* X1: 4.0KV, X2: 2.5KV.</p> <p>* Y2: 5.0KV,</p> <p>* Number of impulse : 24 max.</p>	<p>*There shall be no permanent breakdown or flashover. (FH06X series not include)</p>						

9. Package Dimensions and Quantity

F	3.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05	5.50+/-0.05	5.50±0.05	5.50±0.05	5.50±0.05	5.50±0.05
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10. Application Notes

STORAGE

To prevent the damage of solderability of terminations, the following storage conditions are recommended: Indoors under 5 ~ 40°C and 20% ~ 70% RH.

No harmful gases containing sulfuric acid, ammonia, hydrogen sulfide or chlorine.

Packaging should not be opened until the capacitors are required for use. If opened, the pack should be re-sealed as soon as is practicable. Taped product should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 12 months after shipment and checked the solderability before use.

HANDLING

Chip capacitors are dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chip Capacitors should be handled with care to avoid contamination or damage. To use vacuum or plastic tweezers to pick up or plastic tweezers is recommended for manual placement. Tape and reeled packages are suitable for automatic pick and placement machine.

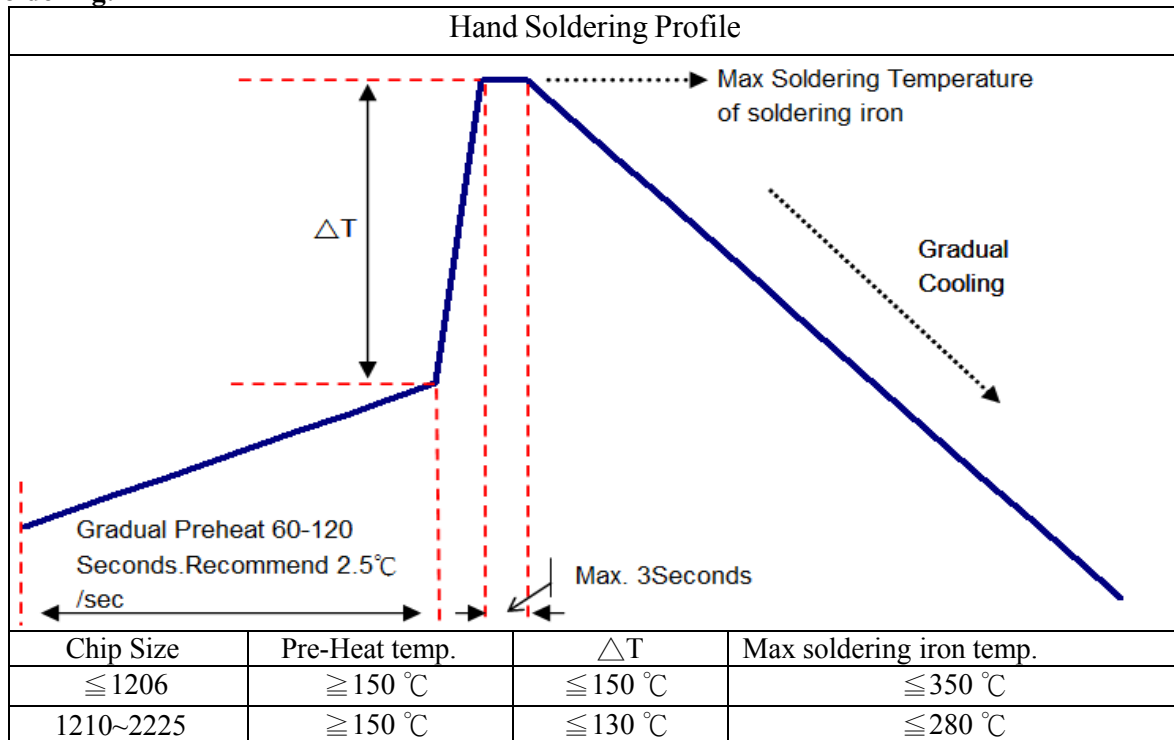
PREHEAT

In order to minimize the risk of thermal shock during soldering, a carefully controlled preheat is required. The rate of preheat should not exceed 3°C per second.

SOLDERING

Use middy activated rosin RA and RMA fluxes do not use activated flux. The amount of solder in each solder joint should be controlled to prevent the damage of chip capacitors caused by the stress between solder, chips, and substrate.

a.) Hand soldering:



*Soldering iron tip diameter ≤ 1.0 mm and wattage max. 20W.

*The Capacitors shall be pre-heated and that the temperature gradient between the devices and the tip of the soldering iron.

*The required amount of solder shall be melted on the soldering tip.

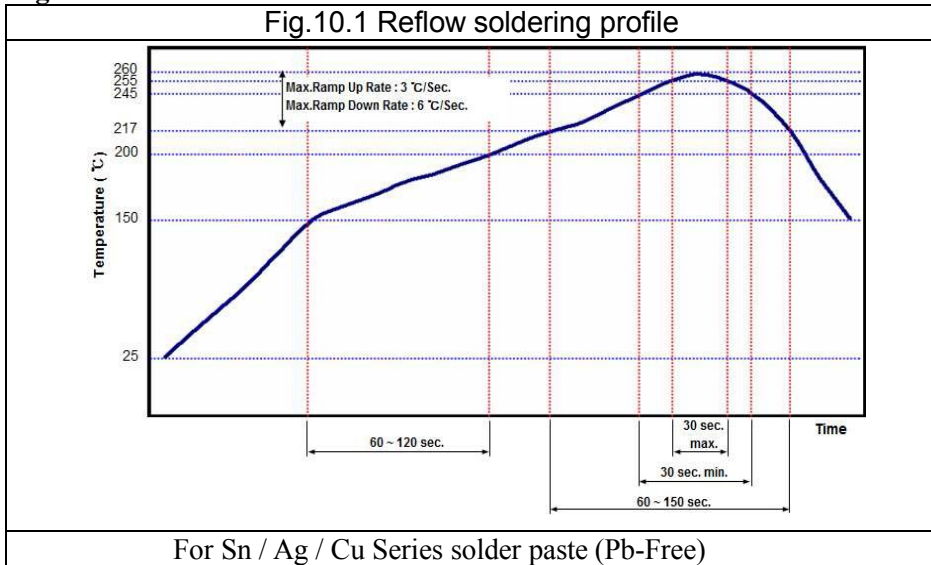
*The tip of iron should not contact the ceramic body directly.

*The Capacitors shall be cooled gradually at room temperature after soldering.

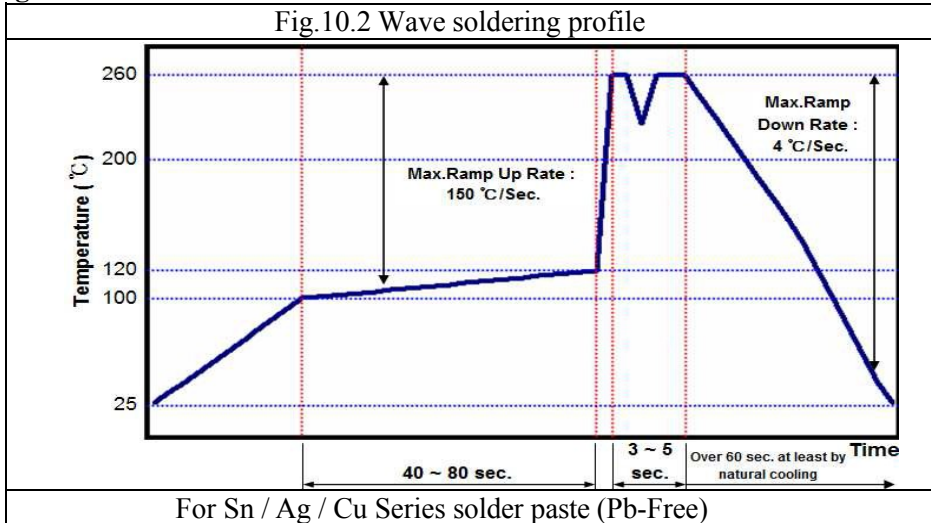
*Forced air cooling is not allowed.

10. Application Notes

b.) Reflow soldering:



c.) Wave soldering:



Soldering conditions:

Class I:

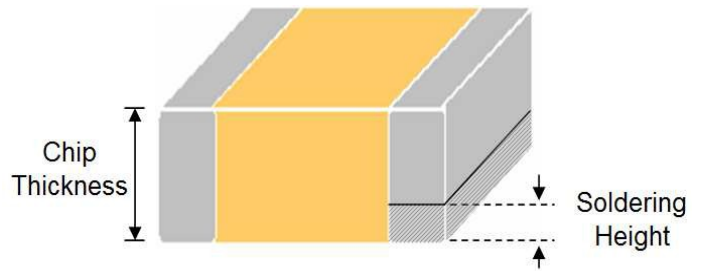
Size Inch (mm)	Dielectric	Capacitance	Condition	
			Wave	Reflow
0402(1005)	COG	All	X	O
0603(1608)	COG	All	O	O
0805(2012)	COG	All	O	O
1206(3216)	COG	All	O	O
≥1210(3225)	COG	All	X	O

Class II:

Size Inch (mm)	Dielectric	Capacitance	Condition	
			Wave	Reflow
0402(1005)	X7R	All	X	O
0603(1608)	X7R	Cap. < 2.2μF	O	O
0805(2012)		Cap. ≥ 2.2μF	X	O
1206(3216)	X7R	Cap. < 4.7μF	O	O
		Cap. ≥ 4.7μF	X	O
0402(1005)	X7R	Cap. < 4.7μF	O	O
0603(1608)		Cap. ≥ 4.7μF	X	O
0805(2012)	X7R	All	X	O

10. Application Notes

The solder climbing minimum height is suggesting to 25% of chip thickness or 500um whichever is less.
(Reference from IPC-610E)



COOLING

After soldering, cool the chips and the substrate gradually to room temperature. Natural cooling in air is recommended to minimize stress in the solder joint.

CLEANING

All flux residues must be removed by using suitable electronic-grade vapor-cleaning solvents to eliminate contamination that could cause electrolytic surface corrosion. Good results can be obtained by using ultrasonic cleaning of the solvent. The choice of the proper system is depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability of the cleaning system to remove flux residues and contamination from under the chips is very important.

11. Reference Table

Table 1	SERIES	
Code	Description	
FK	Safety X1 & Y2 series	

Table 2	Size					
Code	Description	Code	Description	Code	Description	
15	0402 (1005)	32	1210 (3225)	52	2211 (5728)	
18	0603 (1608)	42	1808 (4520)	55	2220 (5750)	
21	0805 (2012)	43	1812 (4532)	56	2225 (5763)	
31	1206 (3216)	46	1825 (4563)			

Table 3	Dielectric Material Characteristics			
Code	Description	Code	Description	
N	C0G	X	X7R	
B	X5R	F	Y5V	

Table 4	Table 4 Capacitance Rule Code			
Code	Description	Code	Description	
R47	0.47pF	102	102=10x10 ² =1000pF	
0R5	0.5pF	104	104=10x10 ⁴ =100nF	
100	100=10x10 ⁰ =10pF	106	106=10x10 ⁶ =10μF	

Table 5	Tolerance					
Code	Description	Code	Description	Code	Description	
A	±0.05 pF	I	-10% ~ 0%	Q	±0.03 pF	
B	±0.10 pF	J	±5 %	Z	-20% ~ +80%	
C	±0.25 pF	K	±10 %			
D	±0.50 pF	L	0% ~ +10%			
F	±1 %	M	±20 %			
G	±2 %	N	-5% ~ +10%			
H	±3 %	P	±0.02 pF			

Table 6	Rated voltage					
Code	Description	Code	Description	Code	Description	
6R3	6.3VDC	201	200VDC	152	1500VDC	
100	10VDC	251	250VDC	202	2000VDC	
160	16VDC	401	400VDC	302	3000VDC	
250	25VDC	501	500VDC	402	4000VDC	
500	50VDC	631	630VDC	502	5000VDC	
101	100VDC	102	1000VDC	602	6000VDC	

Table 7	Packaging Type			
Code	Description	Code	Description	
B	Bulk	T	Tray package	
E	Tape and 7" Reel, Embossed Tape	P	Tape and 7" Reel, Paper Tape	
K	Tape and 10" Reel, Embossed Tape	D	Tape and 10" Reel, Paper Tape	
L	Tape and 13" Reel, Embossed Tape	G	Tape and 13" Reel, Paper Tape	

Table 8	Thickness Description unit(mm)					
Code	Description	Code	Description	Code	Description	
A	0.60 ± 0.10	I	1.25 ± 0.20	Q	0.50 + 0.02/-0.05	
B	0.8 + 0.15/-0.10	J	1.15 ± 0.15	R	3.10 ± 0.30	
C	1.25 ± 0.10	K	0.50 ± 0.20	S	0.80 ± 0.07	
D	1.40 ± 0.15	L	0.30 ± 0.03	T	0.85 ± 0.10	
E	1.60 ± 0.20	M	0.95 ± 0.10	U	0.50 ± 0.10	
F	2.00 ± 0.20	N	0.50 ± 0.05	V	0.20 ± 0.02	
G	2.50 ± 0.30	O	3.50 ± 0.20	X	0.80 ± 0.10	
H	2.80 ± 0.30	P	1.60 +0.3/-0.10	Z	0.25 ± 0.03	

Table 9	Special Control Code	
Code	Description	
G	RoHS compliant	
Q	Surface Coating(1206`2225)	