HITANO ENTERPRISE CORP.

7F-7, No. 3 Wu Chuan 1st Road, Wu Ku Industrial Park, New Taipei City, TAIWAN R.O.C.
Tel.：886-2-2299 1331 (Rep.)　　Fax：886-2-22982466 2298-2969

SPECIFICATION FOR CAPACITOR ARRAY

Series.　　: CA Series

Description : Size 0508 & 0612 , COG(NPO) , X7R, Y5V

16Vdc ~ 50Vdc

DRAWN BY	CHECKED BY	APPROVED BY
蕭敏珍	蔡永承	巫宏俊

1. INTRODUCTION

HITANO middle and high voltage series MLCC is designed by a special internal electrode pattern, which can reduce voltage concentrations by distributing voltage gradients throughout the entire capacitor. This special design also affords increased capacitance values in a given case size and voltage rating.

HITANO capacitor arrays are developed to offer designers the opportunity to lower placement costs increase assembly line output through lower component count per board.

2. FEATURES

- High density mounting due to mounting space saving.
- Mounting cost saving.
- Increased throughput.
- RoHS compliant.& HALOGEM compliant

3. APPLICATIONS

- For use as a bypass for digital and analog signal line noise
- Computer motherboards and peripherals.
- The other common electronic circuits.

4. HOW TO ORDER

CA	0612	N	100	J	500	N	T
Series	**Size**	**Dielectric**	**Capacitance**	**Tolerance**	**Rated voltage**	**Termination**	**Packaging**
CA=Capacitor Array	**0508**=0402*4 **0612**=0603*4	**N**=NP0 (C0G) **B**=X7R **Y**=Y5V	Two significant digits followed by no. of zeros. And R is in place of decimal point. eg.: 0R5=0.5pF 1R0=1.0pF 100=10x10^0 =10pF	**J**=±5% **K**=±10% **M**=±20% **Z**=+80-20%	Two significant digits followed by no. of zeros. And R is in place of decimal point. **160**=16 VDC **250**=25 VDC **500**=50 VDC	**N**=Nickel barrier with 100% Tin	**T**=7" reeled

5. EXTERNAL DIMENSIONS

Size Inch (mm)	L (mm)	W (mm)	T (mm)/Symbol		S (mm)	BW (mm)	P (mm)
0508	2.00±0.15	1.25±0.15	0.85±0.10	H	0.20±0.10	0.25±0.10	0.50±0.10
0612	3.20±0.15	1.65±0.15	0.85±0.10	H	0.30±0.20	0.40±0.15	0.80±0.15

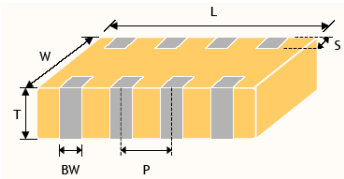

Fig. 1 The outline of Capacitor array

6. GENERAL ELECTRICAL DATA

Dielectric	NPO	X7R	Y5V
Size	0508, 0612	0612	0612
Capacitance*	10pF to 470pF	180pF to 100nF	10nF to 100nF
Capacitance tolerance	J(±5%), K(±10%)	K(±10%), M(±20%)	Z(+80-20%)
Rated voltage (WVDC)	25, 50V	16V, 25V, 50V	16V, 50V
Q*/D.F.	Cap<30pF: Q ≥ 400+20C Cap ≥ 30pF: Q	Ur=50V, ≤ 2.5% Ur=25V&16V, ≤3.5%	Ur=50V, ≤ 5% Ur=16V, ≤ 7%
Insulation resistance at Ur	≥ 10G Ω	≥ 10G Ω or RxC ≥ 500 Ω xF whichever is less	
Operating temperature	-55 to +125℃		-25 to +85℃
Capacitance change	±30ppm	±15%	+30-80%
Termination	Ni/Sn (lead free termination)		

* Measured at the conditions of 30~70% related humidity.

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

X7R: Apply 1.0 ± 0.2Vrms, 1.0kHz ± 10% at the condition of 25°C ambient temperature

Y5V: Apply 1.0 ± 0.2Vrms, 1.0kHz ± 10% at the condition of 20°C ambient temperature

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

7. CAPACITANCE RANGE

SIZE		0508(0402*4)				0612(0603*4)						
DIELECTRIC		NPO	X7R			NPO		X7R			Y5V	
RATED VOLTAGE		50V	10V	16V	25V	25V	50V	16V	25V	50V	16V	50V
Capacitance	10pF (100)	H				H	H					
	15pF (150)	H				H	H					
	22pF (220)	H				H	H					
	33pF (330)	H				H	H					
	47pF (470)	H				H	H					
	68pF (680)	H				H	H					
	100pF (101)	H				H	H					
	150pF (151)	H				H	H					
	180pF (181)	H				H	H		H	H		
	220pF (221)	H				H	H		H	H		
	330pF (331)		H	H	H	H	H		H	H		
	470pF (471)		H	H	H	H	H		H	H		
	680pF (681)		H	H	H				H	H		
	1000pF (102)		H	H	H				H	H		
	1500pF (152)		H	H	H				H	H		
	2200pF (222)		H	H	H				H	H		
	3300pF (332)		H	H	H				H	H		
	4700pF (472)		H	H	H				H	H		
	6800pF (682)		H	H	H				H	H		
	10nF (103)		H	H	H				H	H		H
	15nF (153)		H	H	H			H	H	H		H
	22nF (223)		H	H	H			H	H	H		H
	33nF (333)		H	H	H			H				H
	47nF (473)		H	H	H			H				H
	68nF (683)		H	H	H			H				
	100nF (104)		H	H	H			H			H	H

8. PACKAGING DIMENSION AND QUANTITY

Size	Thickness (mm)/Symbol		Paper tape 7" reel
0508 (0402X4)	0.85±0.10	H	4Kpcs
0612 (0603X4)	0.85±0.10	H	4kpcs

10. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Conditions	Requirements
1.	**Visual and Mechanical**	---	* No remarkable defect. * Dimensions to conform to individual specification sheet.
2.	**Capacitance**	1.0±0.2Vrms, 1MHz±10%	* Shall not exceed the limits given in the detailed spec.
3.	**Q/ D.F. (Dissipation Factor)**	At 25°C ambient temperature.	* Cap≥30pF, Q≥1000; Cap<30pF,Q≥400+20C
4.	**Dielectric Strength**	* To apply voltage: ≤50V, 250% of rated voltage. * Duration: 1 to 5 sec. * Charge and discharge current less than 50mA.	* No evidence of damage or flash over during test.
5.	**Insulation Resistance**	To apply rated voltage for max. 120 sec.	≥10GΩ or RxC≥500Ω-F whichever is smaller
6.	**Temperature Coefficient**	With no electrical load. Operating temperature: -55~125°C at 25°C	* Capacitance change: within ±30ppm/°C
7.	**Adhesive Strength of Termination**	* Pressurizing force： 5N≤0603: 10N＞0603 * Test time: 10±1 sec.	* No remarkable damage or removal of the terminations.
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.)	* No remarkable damage. * Cap change and Q/D.F.: To meet initial spec.
9.	**Solderability**	* Solder temperature: 235±5°C * Dipping time: 2±0.5 sec.	95% min. coverage of all metalized area.
10.	**Bending Test**	* The middle part of substrate shall be pressurized by means of the pressurizing rod at a rate of about 1 mm per second until the deflection becomes 1 mm and then the pressure shall be maintained for 5±1 sec. * Measurement to be made after keeping at room temp. for 24±2 hrs.	* No remarkable damage. * Cap change: NPO: within ±5.0% or ±0.5pF whichever is larger. X7R: within ±12.5% Y5V: within ±30% (This capacitance change means the change of capacitance under specified flexure of substrate from the capacitance measured before test.)
11.	**Resistance to Soldering Heat**	* Solder temperature: 270±5°C * Dipping time: 10±1 sec * Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. *Before initial measurement (Class II) only): Perform 150 +0/-10°C for 1hr and then set for 48±4hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.(Class I) or 48±4hrs.(Class II)	* No remarkable damage. * Cap change: NPO: within ±2.5% or ±0.25pF whichever is larger. X7R: within ±7.5% Y5V: within ±20% * Q/D.F., I.R. and dielectric strength: To meet initial requirements. * 25% max. leaching on each edge.
12.	**Temperature Cycle**	* Conduct the five cycles according to the temperatures and time. *Before initial measurement (Class II) only): Perform 150 +0/-10°C for 1hr and then set for 48±4hrs at room temp. * Measurement to be made after keeping at room temp. for 24±2 hrs.(Class I) or 48±4hrs.(Class II)	* No remarkable damage. * Cap change： NPO: within ±2.5% or ±0.25pF whichever is larger. X7R: within ±7.5% Y5V: within ±20% * Q/D.F., I.R. and dielectric strength: To meet initial requirements.

10. RELIABILITY TEST CONDITIONS AND REQUIREMENTS

No.	Item	Test Condition	Requirements
13.	**Humidity (Damp Heat) Steady State**	* Test temp.: 40±2°C * Humidity: 90~95% RH * Test time: 500+24/-0hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs.(Class I) or 48±4hrs.(Class II)	* No remarkable damage. * Cap change: NPO: within ±5.0% or ±0.5pF whichever is larger. X7R: within ±12.5% Y5V: within ±30% * Q/D.F. value: NPO: Cap≥30pF, Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C Cap<10pF; Q≥200+10C X7R: Ur=50V, ≦ 3.0% Ur=16V, ≦ 5.0% Y5V: ≦ 7.5% * I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller
14.	**Humidity (Damp Heat) Load**	* Test temp.: 40±2°C * Humidity: 90~95%RH * Test time: 500+24/-0 hrs. * To apply voltage：rated voltage * Measurement to be made after keeping at room temp. for 24±2 hrs.(Class I) or 48±4hrs.(Class II)	* No remarkable damage. * Cap change: NPO: within ±7.5% or ±0.75pF whichever is larger. X7R: within ±12.5% Y5V: within ±30% * Q/D.F. value: NPO: Cap≥30pF, Q≥350; 10pF≤Cap<30pF, Q≥275+2.5C Cap<10pF; Q≥200+10C X7R: Ur=50V, ≦ 3.0% Ur=16V, ≦ 5.0% Y5V: ≦ 7.5% * I.R.: ≥ 500MΩ or RxC≥25Ω-F whichever is smaller
15.	**High Temperature Load (Endurance)**	* Test temp.: NPO, X7R : 125±3°C, Y5V: 85±3°C * To apply voltage: 200% of rated voltage. * Test time: 1000+24/-0 hrs. * Measurement to be made after keeping at room temp. for 24±2 hrs.(Class I) or 48±4hrs.(Class II)	* No remarkable damage. * Cap change: NPO: within ±3.0% or ±0.3pF whichever is larger. X7R: within ±12.5% Y5V: within ±30% * Q/D.F. value: NPO: Cap≥30pF, Q≥350, 10pF≤Cap<30pF, Q≥275+2.5C Cap<10pF, Q≥200+10C. X7R: Ur=50V, ≦ 3.0% Ur=16V, ≦ 5.0% Y5V: ≦ 7.5% * I.R.: ≥1GΩ or RxC≥50Ω-F whichever is smaller

11. APPENDIXES

◙ Tape & reel dimensions

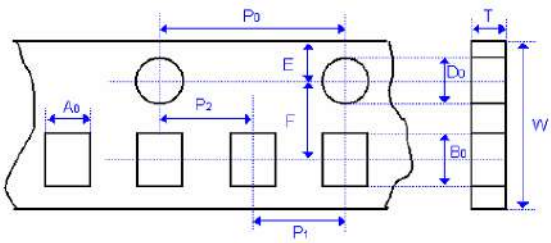

Fig. 5 The dimension of paper tape

Size	0508	0612
Thickness	T	T
A_0	1.50±0.10	2.00±0.10
B_0	2.30±0.10	3.50±0.10
T	0.95±0.05	0.95±0.05
K_0	-	-
W	8.00±0.10	8.00±0.10
P_0	4.00±0.10	4.00±0.10
$10xP_0$	40.0±0.20	40.0±0.20
P_1	4.00±0.10	4.00±0.10
P_2	2.00±0.05	2.00±0.05
D_0	1.55±0.05	1.55±0.05
D_1	-	-
E	1.75±0.05	1.75±0.05
F	3.50±0.05	3.50±0.05

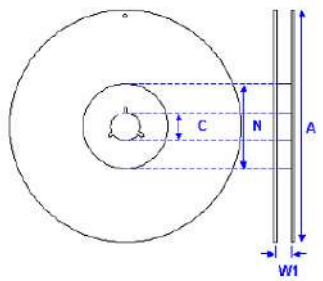

Fig. 6 The dimension of reel

Size	0508, 0612	
Reel size	7”	13”
C	13.0+0.5/-0.2	13.0+0.5/-0.2
W_1	8.4+1.5/-0	8.4+1.5/-0
A	178.0±1.0	330.0±1.0
N	60.0+1.0/-0	100±1.0

◙ 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. Don't store products in a corrosive environment such as sulfide, chloride gas, or acid. It may cause oxidization of electrode, which easily be resulted in poor soldering.

b. To store products on the shelf and avoid exposure to moisture.

c. Don't expose products to excessive shock, vibration, direct sunlight and so on.

◙ 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.

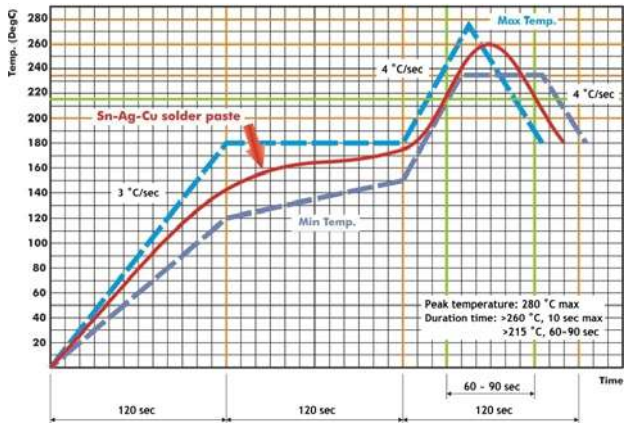

Fig. 8 Recommended IR reflow soldering profile for SMT process with SnAgCu series solder paste.

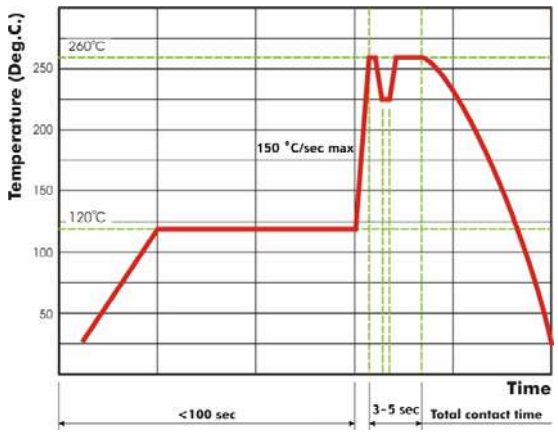

Fig. 9 Recommended wave soldering profile for SMT process with SnAgCu series solder.