

# STACKED CAPACITOR High Compact

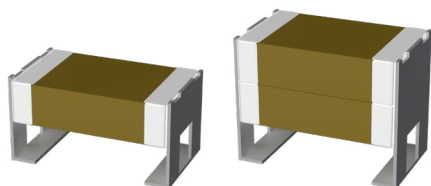
10V - 2000V



**SRT**  
MICROCÉRAMIQUE  
MLCC CAPACITORS

## APPLICATIONS

- Smoothing signals
- Energy storage
- Converters, inverters



RoHS  
compliant



## FEATURES

- Low ESR and ESL design
- Auto range based on AECQ -200 generic requirement
- Extended range based on commercial grade
- High Reliability Copper Beryllium Lead Frame
- Available in Tin or SnPb Plating

## ELECTRICAL PARAMETERS

**ELECTRICAL CHARACTERISTICS :**  
at + 25°C unless otherwise specified

**OPERATING TEMPERATURE :**

NPO, X7R : - 55°C, + 125°C  
X5R : - 55°C, + 85°C  
Y5V : - 25°C, + 85°C

**TEMPERATURE COEFFICIENT :**

X7R : ± 15% with 0Vdc applied  
X5R : ± 15% with 0Vdc applied  
Y5V : +30% -80% with 0Vdc applied

**DISSIPATION FACTOR :**

NPO : ≤ 1.10<sup>-3</sup> at 1Vrms and 1MHz for values ≤ 1000pF  
          : ≤ 1.10<sup>-3</sup> at 1Vrms and 1KHz for values > 1000pF  
X7R : ≤ 5% (10V), ≤ 3.5% (16V and 25V) and ≤ 2.5% (50V to 2000V)  
X5R : ≤ 15% (6.3V), ≤ 10% (16V, 25V, 35V)  
Y5V : ≤ 12.5% (16V)

**INSULATION RESISTANCE (IR) :**

25°C/Un 10<sup>5</sup> MOhm or 1000 Ohm-Farad whichever is less  
125°C/Un 10<sup>4</sup> MOhm or 100 Ohm-Farad whichever is less

**DIELECTRIC STRENGTH TEST :**

2.5U U≤200V | U+250V 200<U≤500 | 1.5U 500<U<1000 | 1.2U U≥1000  
for 5s with 50mA max charging current

## ORDERING INFORMATION

SRH	D	1210	Y	106	K	Q	-	A	B	-
SERIE	CHIPS	SIZE	DIELECTRIC	CAPACITANCE	TOLERANCE	VOLTAGE	LEAD FRAME	RANGE	PACKAGING	SPECIAL
SRH	S = 1 chip D = 2 chips	1210 1812 2220	A = NPO Y = X7R S = X5R V = Y5V	Expressed in picofarads (pF) The first two digits are significant, the third digit gives the number of noughts Example : 102 = 1 000pF	J = ± 5% (1 chip NPO) K = ± 10% (1 chip Class II/ 2 chips NPO) M = ± 20% (1 or 2 chips Class II)	Q = 10V J = 16 V X = 25 V A = 50 V U = 63 V B = 100 V P = 250 V E = 500 V F = 630 V G = 1000 V O = 1500 V H = 2000 V	- = Tin Plated N = SnPb Plated	A = AECQ E = Commercial	B = Reel	Dxx = Reliability parameters

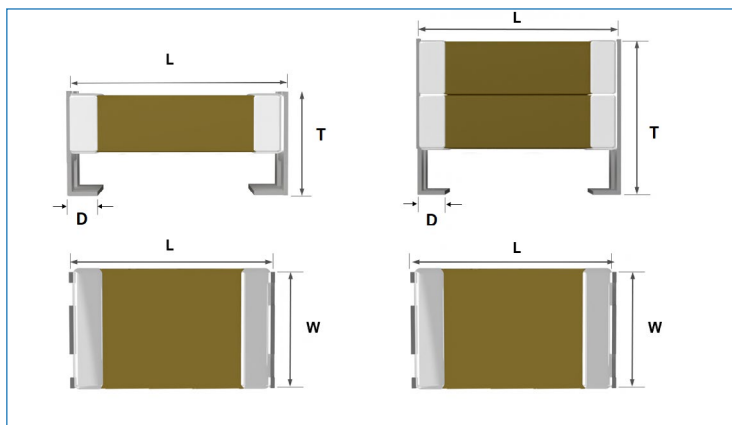
For any other size, voltage and tolerance please contact us.

## DIMENSIONS J (In millimeters)

1 CHIP STACK	1210	1812	2220
Length (L)	3.50 ± 0.30	5.00 ± 0.45	6.00 ± 0.50
Width (W)	2.60 ± 0.30	3.5 ± 0.50	5.00 ± 0.50
Max Height std (T)	3.35 ± 0.10	2.90 ± 0.10	3.50 ± 0.30
Max Height alt (T)			4.10 ± 0.30
Lead Width (D)	0.80 ± 0.15	1.10 ± 0.30	1.60 ± 0.30

2 CHIPS STACK	1210	1812	2220
Length (L)	3.50 ± 0.30	5.00 ± 0.45	6.00 ± 0.50
Width (W)	2.60 ± 0.30	3.5 ± 0.50	5.00 ± 0.50
Max Height std (T)	6.15 ± 0.15	5.00 ± 0.5	5.00 ± 0.50
Max Height alt (T)			7.20 ± 0.50
Lead Width (D)	0.80 ± 0.15	1.10 ± 0.30	1.60 ± 0.30

Refere to Value Chart for Height std or Height alt



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10V - 2000V



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## VALUES CHART

SIZE			1210							1812							2220											
DIELECTRIC			X7R							X7R							X7R											
MAX AUTO			47 µF	47 µF	47 µF	22 µF	10 µF	1.5 µF	330 nF	330 nF	22 µF	22 µF	22 µF	10 µF	4.7 µF	1.5 µF	470 nF	220 nF	220 nF	47 µF	47 µF	22 µF	22 µF	22 µF	2.2 µF	1.2 µF	1.2 µF	470 nF
MAX NON AUTO			100 µF	47 µF	47 µF	22 µF	10 µF	1.5 µF	330 nF	330 nF	22 µF	68 µF	22 µF	22 µF	10 µF	2.2 µF	1 µF	470 nF	220 nF	100 µF	100 µF	47 µF	22 µF	22 µF	4.7 µF	2.2 µF	2.2 µF	470 nF
Nbr. chips	CODE	CAP	10V	16V	25V	50V	100V	250V	500V	630V	10V	16V	25V	50V	100V	250V	500V	630V	1000V	16V	25V	50V	63V	100V	250V	500V	630V	1000V
1 chip	104	100 nF							A/E	A/E						A/E	A/E	A/E										
	154	150 nF							A/E	A/E																		
	224	220 nF							A/E								A/E	E										A/E
	474	470 nF							A/E								A/E	E										A/E
	564	560 nF																										A/E
	684	680 nF															A/E											A/E
	105	1.0 µF																										A/E
	225	2.2 µF																										A/E
	475	4.7 µF																										A/E
	565	5.6 µF																										A/E
	685	6.8 µF																										A/E
	825	8.2 µF																										A/E
	106	10 µF																										A/E
	156	15 µF																										A/E
	226	22 µF																										A/E
476	47 µF																										A/E	
2 chips	225	220 nF															A/E	A/E	A/E									
	335	330 nF															A/E	A/E	A/E									
	474	470 nF																										A/E
	105	1.0 µF																										A/E
	125	1.2 µF																										A/E
	155	1.5 µF																										A/E
	225	2.2 µF																										A/E
	475	4.7 µF																										A/E
	106	10 µF																										A/E
	226	22 µF																										A/E
	336	33 µF																										A/E
	476	47 µF																										A/E
	686	68 µF																										A/E
	107	100 µF																										A/E

A : Auto generic range E : Commercial range White : Height std Black : Height alt

SIZE			1210							1812							2220										
DIELECTRIC			NPO							NPO							NPO										
MAX AUTO			200 nF	200 nF	94 nF	66 nF	66 nF	44 nF	-	-	300 nF	200 nF	200 nF	94 nF	94 nF	-	-	-	940 nF	440 nF	300 nF	200 nF	300 nF	66 nF	-	-	
MAX NON AUTO			300 nF	200 nF	94 nF	66 nF	66 nF	66 nF	4.4 nF	4.4 nF	440 nF	300 nF	200 nF	140 nF	140 nF	44 nF	16 nF	9.4 nF	940 nF	660 nF	300 nF	300 nF	300 nF	200 nF	66 nF	66 nF	
Nbr. chips	CODE	CAP	50V	100V	250V	500V	630V	1000V	1500V	2000V	50V	100V	250V	500V	630V	1000V	1500V	2000V	50V	100V	250V	500V	630V	1000V	1500V	2000V	
1 chip	222	2.2 nF																									
	472	4.7 nF																									
	822	8.2 nF																									
	223	22 nF																									
	333	33 nF																									
	473	47 nF																									
	683	68 nF																									
	104	100 nF																									
	154	150 nF																									
	224	220 nF																									
2 chips	442	4.4 nF																									
	942	9.4 nF																									
	163	16 nF																									
	443	44 nF																									
	663	66 nF																									
	943	94 nF																									
	144	140 nF																									
	204	200 nF																									
	304	300 nF																									
	444	440 nF																									

A : Auto generic range E : Commercial range White : Height std Black : Height alt

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SIZE			1210				1812
DIELECTRIC			X5R				Y5V
Nb.chip	CODE	CAP	6.3V	16V	25V	35V	16V
1 chip	106	10 µF				E	
	226	22 µF				E	
	476	47 µF			E		E
	107	100 µF		E			
	227	220 µF	E				
2 chips	226	22 µF				E	
	476	47 µF				E	
	107	100 µF			E		E
	227	220 µF		E			
	477	470 µF	E				

**E : Commercial range**

Contact us for any other voltage, capacitance value, tolerance...

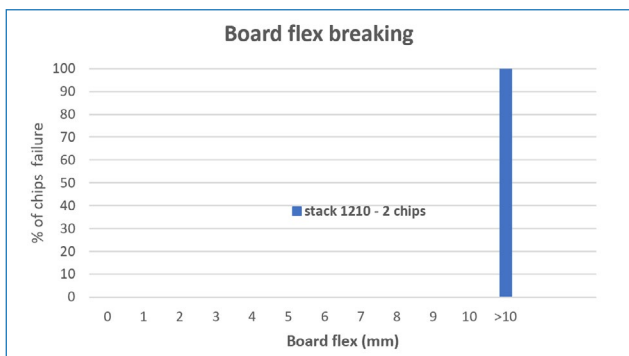
## AECQ QUALITY STANDARD

Our components are all subject so strict internal qualifications. For this series, our auto generic range is based on AECQ standards. This means that our chips will meet the quality requirements defined by the AEC.

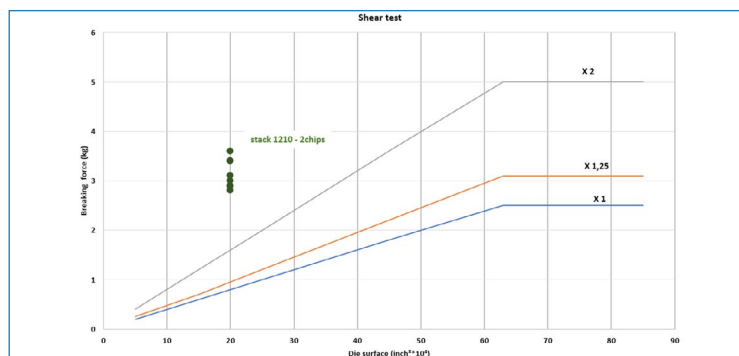
The Auto generic range of our high compact series are designed to meet the Automotive industry standard, but will not require submitting a SCD (Source Controlled Drawing). This series is therefore not AEC qualified, and will not be primarily addressed to Automotive customers. These quality standards include specific tests, such as : Shear test, board flex, environmental tests, and these stacks insure good performance and reliability.

## TYPICAL CHARACTERISTICS

### Board Flex Breaking



### Shear test



## 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 possible. Taped products should be stored out of direct sunlight, which might promote deterioration in tape or adhesion performance. The product is recommended to be used within 24 months after shipment. Extended shelf life over this period require a solderability check 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 FLUX

Use mildly activated rosin RA and RMA fluxes, but 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.

## SOLDERING TYPE

Lead containing solders, such as Sn60, Sn62 or Sn63 and lead free solders, such as SnAgCu, can all be used with our MLCCs.

In case of non-magnetic termination code C, use lead containing or lead (Pb)-free SAC305 solders.

## SOLDERING HEIGHT

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.

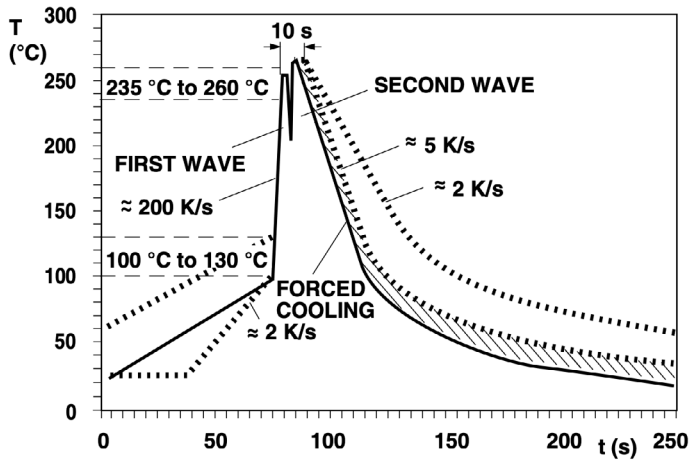
## CLEANING

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.

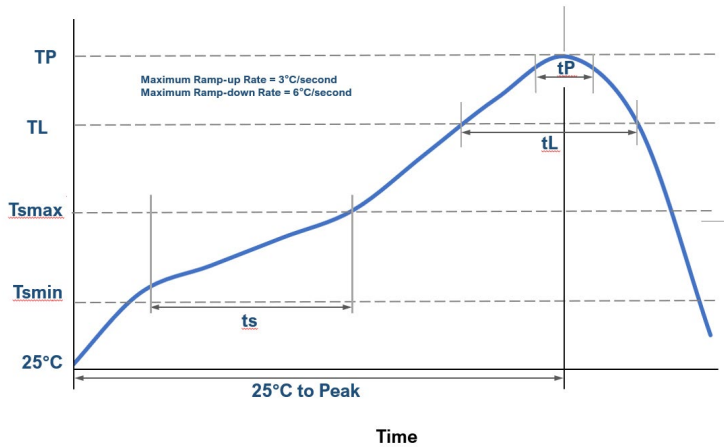
## SOLDERING CONDITIONS

SIZE	THICKNESS	WAVE	REFLOW
0402	All	0	0
0505	All	0	0
0603	All	0	0
0805	< 1.25mm	0	0
0805	≥ 1.25mm	0	0
1111	< 1.25mm	0	0
1111	≥ 1.25mm	0	0
1206	< 1.25mm	0	0
1206	≥ 1.25mm	0	0
1210	< 1.25mm	0	0
1210	≥ 1.25mm	0	0
larger than 1210	All	0	0
High compact	All	0	0

## WAVE SOLDERING PROFILE

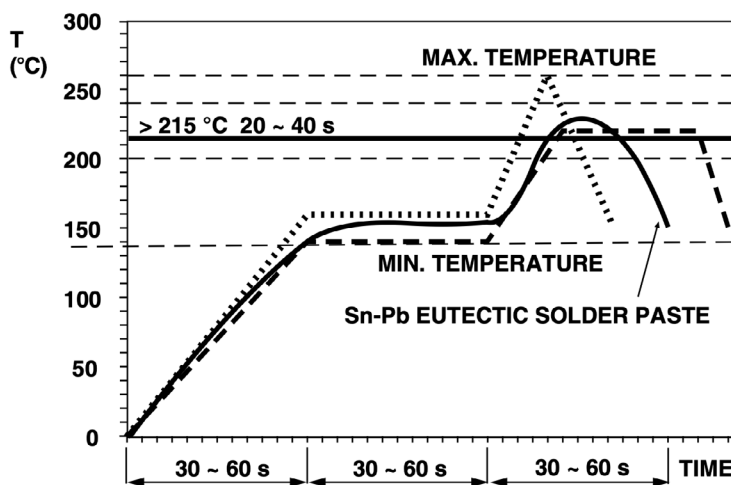


## LEADFREE REFLOW SOLDERING PROFILE



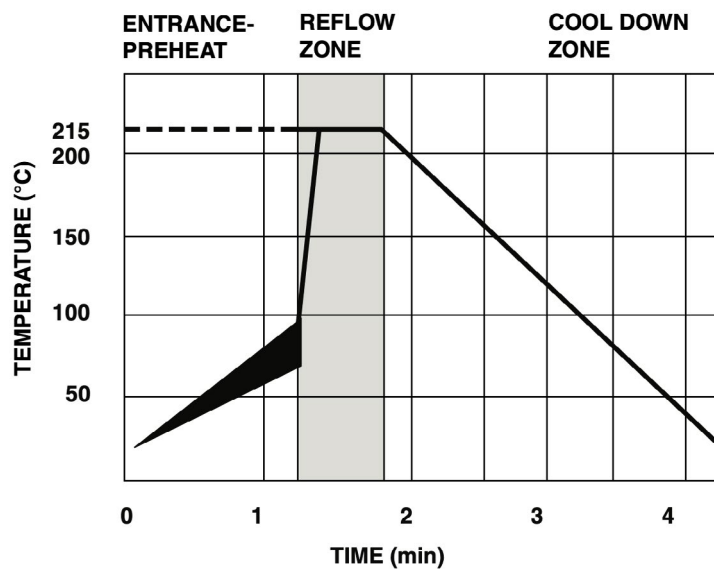
PROFILE FEATURE	LEAD FREE (SAC 305)
Tsmin	150°C
Tsmax	190°C
Time from Tsmin to Tsmax	60 - 120 seconds
Ramp-up Rate	3°C/second max
Liquidous Temperature	217°C
Time above Liquidous	60 - 120 seconds
Peak Temperature	250°C
Time within 5°C of maximum	10 seconds max
Peak Temperature	250°C
Ramp-down Rate	6°C/second max
Time 25°C to Peak	8min max

## SNPB REFLOW SOLDERING PROFILE



## VAPOUR PHASE REFLOW PROFILE

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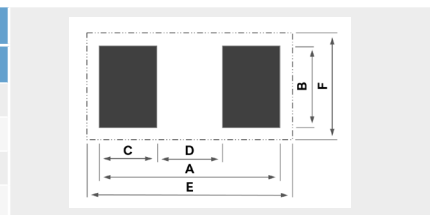
## HAND SOLDERING

Hand soldering is not recommended as the thermal shock may cause a crack, however if used the following recommendations should be taken :

- Soldering iron tip diameter  $\leq 3.0$  mm and wattage max. 20W.
- The Capacitors shall be pre-heated to 150°C and that the temperature gradient between the devices and the tip of the soldering iron.
- Tip temperature  $\leq 280$ °C and should't be applied for more than 5 seconds.
- 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.

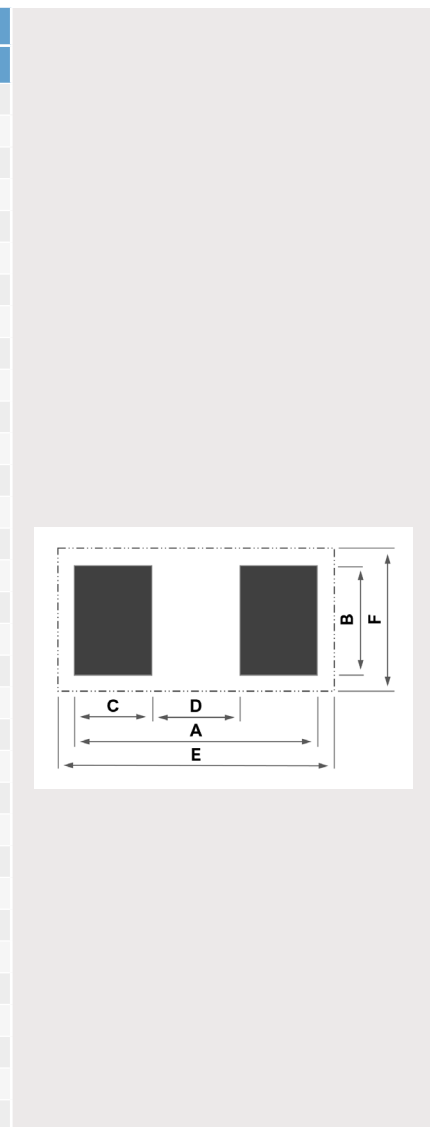
## TYPICAL SMD FOOTPRINT WAVE SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN MM					
	A	B	C	D	E	F
0603	2.40	0.80	0.70	1.00	3.10	1.40
0805	3.20	1.30	0.90	1.40	4.10	1.85
1206	4.80	1.70	1.25	2.30	5.90	2.25
1210	4.80	2.60	1.25	2.30	5.90	3.15



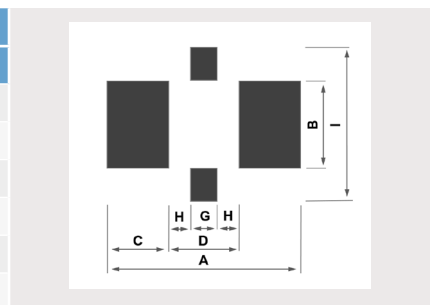
## TYPICAL SMD FOOTPRINT REFLOW SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN mm					
	A	B	C	D	E	F
0201	0.65	0.30	0.21	0.23	0.90	0.60
0204	1.00	1.00	0.30	0.40	1.25	1.45
0402	1.50	0.50	0.40	0.70	1.75	0.95
0306	1.30	1.60	0.40	0.50	1.55	2.05
0404	1.50	1.00	0.40	0.70	1.75	1.45
0504	1.90	1.00	0.40	1.10	2.15	1.45
0505	1.90	1.30	0.50	0.80	2.15	1.75
0508	1.90	2.00	0.50	0.90	2.15	2.55
0603	2.30	0.80	0.60	1.10	2.55	1.35
0612	2.30	3.20	0.60	1.10	2.55	3.75
0805	2.90	1.25	0.90	1.10	3.15	1.80
1206	4.10	1.60	0.90	2.30	4.35	2.25
1210	4.10	2.50	1.00	2.10	4.35	3.15
1808	5.50	2.10	1.20	3.10	5.75	2.75
1812	5.50	3.30	1.20	3.10	5.75	3.95
1825	5.50	6.55	1.20	3.10	5.75	7.20
2211	6.80	3.00	1.40	4.00	7.05	3.65
2220	6.80	5.40	1.40	4.00	7.05	6.05
2225	6.80	6.70	1.65	3.50	7.05	7.50
2525	7.70	6.75	1.65	4.40	7.95	7.55
2825	8.40	6.70	1.65	5.10	8.65	7.50
3033	9.00	8.80	1.95	5.10	9.25	9.60
3640	10.55	10.70	2.35	5.85	10.80	11.50
4040	11.60	10.70	2.35	6.90	11.85	11.50
40100	11.60	26.20	2.35	6.90	11.85	27.00
5550	15.50	13.20	2.35	10.80	15.75	14.00
6080	16.70	20.80	2.35	12.00	16.95	21.60
6660	18.30	15.70	2.35	13.60	18.55	16.50
8060	21.90	15.70	2.35	17.20	22.15	16.50
80150	21.90	38.90	2.35	17.20	22.15	39.70
HIGH COMPACT 1210	4.15	2.60	1.15	1.85	5.05	3.30
HIGH COMPACT 1812	5.75	3.40	1.35	3.05	6.70	4.20
HIGH COMPACT 2220	6.80	5.50	1.70	3.40	7.70	6.30



## TYPICAL FILTER FOOTPRINT REFLOW SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN mm						
	A	B	C	D	G	H	I
0603	2.30	0.80	0.45	1.40	0.60	0.40	1.50
0805	2.90	1.25	0.90	1.80	0.80	0.50	2.00
1206	4.10	1.60	0.90	2.40	1.00	0.70	3.00
1806	5.50	1.60	1.20	3.20	1.00	1.10	3.00
1812	5.50	3.30	1.20	3.90	1.50	1.20	4.80
2220	6.80	5.40	1.40	4.50	1.50	1.50	7.00





## ORDERING INFORMATION

SRMC	0603	Y	102	J	A	-	L	040	-	-	-	B	-
SERIE	SIZE	DIELECTRIC	CAPACITANCE	TOLERANCE	VOLTAGE	TERMINAISON	FORM	HEIGHT	LEADS	COATING	CUR-RENT	PACKAGING	SPECIAL
-	0201	Q = High Q	Expressed in picofarads (pF)	A = ± 0.05pF/0.1%	Y = 4V	- = Sn lead/lead frame	-	020	-	-	-	B = Reel	-
FK	0204	A = NPO		B = ± 0.1pF	R = 6.3V	X = Nickel Tin	J	030	2 to 10	-	1	V = Bulk	BM = BME
FH	0402	P = N2T	The first two digits are significant,	C = ± 0,25pF	Q = 10V	F = Palladium-Silver	L	040	B	I = Conformal-Coating	2	T = Tray Package	Dxx = Reliability spec
SREV	0303	X = BX	the third digit gives the number of noughts	D = ± 0,5pF	J = 16V	P = Polymer Tin (Flex)	D	050		H = EpoxyCoating		W = Waffle Pack	Exx = Sorting spec
MCF	0306	Y=X7R		E = ± 0.5%	X = 25V	C = Copper Tin (Non magnetic)	M	060					H = High Reliability
M2F	0404	BY=2C1		F = ± 1%	Z = 35V	CP = Copper Polymer Tin (Non magnetic)	T = 2	070					Q = Anti-Arcing
MPF	0505	T = X7S	Example : 102 = 1 000pF	G = ± 2%	A = 50V	W = Nickel Gold Flash	leads	080					E = Anti Bending
SRMC	0508	S = X5R		J = ± 5%	U = 63V	G = Nickel Gold Thick	U = 4	090					Z = Anti-Arcing + Anti-Bending
SRTV	0603	R = X6S		K = ± 10%	B = 100V	HP = Dipped SnPb Polymer	leads	100					
SR	0612	V = Y5V	For special values R is used as decimal separator	M = ± 20%	C = 200V	H = Dipped SnPb		110					
SA	0805	U = X8R	Example 12R7 = 12.7pF	Z = -20% +80%	P = 250V	S = Dipped SAC		120					
H	1206		Example 1340R0 = 1340pF		D = 300V	SP = Polymer Dipped SAC		130					
	1210				E = 500V	I = Electrolytic SnPb		140					
	1808				F = 630V	IP = Polymer Electrolytical SnPb		160					
	1812				G = 1000V	Q = Solderable Silver		180					
	1825				O = 1500V	M = Microstrip							
	2211				H = 2000V	A = Axial Ribbon							
	2220				T = 2500V	R = Radial Ribbon							
	2225				I = 3000V	U = Axial Wire							
	2325				K = 4000V	V = Radial Wire							
	2525				L = 5000V	CM = Microstrip (Non magnetic)							
	2825				6 = 6000V	CA = Axial Ribbon (Non magnetic)							
	3033				S = 7200V	CR = Radia Ribbon (Non magnetic)							
	3640				8 = 8000V	CU = Axial Wire (Non magnetic)							
	4040				10 = 10000V	CV = Radial Wire (Non magnetic)							
	40100				12 = 12000V								
	5550				15 = 15000V								
	6080												
	6660												
	7274												
	8060												
	80150												
	40 to 94												

## RELIABILITY

OPTIONAL CODE	TESTING DETAIL
D03	Burn-In 100% 125° 168H, no default allowed
D05	Burn-In 100% 125° 168H, less than 5% default allowed VRT CEI 68-2-14 10 cycles 0V -55°C/+125°C, less than 5% default allowed 20 pieces life test 125°C, 1.5Un, 1 default allowed
D20	AECQ-200
D30	Screened and LAT according to ECSS-3009 for space application
D32	Evaluation version for space development according to ECSS-2310
COTS1	Class 1 COTS+ according to ECSS-Q-ST-60-13C-Rev1
COTS2	Class 2 COTS+ according to ECSS-Q-ST-60-13C-Rev1
COTS3	Class 3 COTS+ according to ECSS-Q-ST-60-13C-Rev1

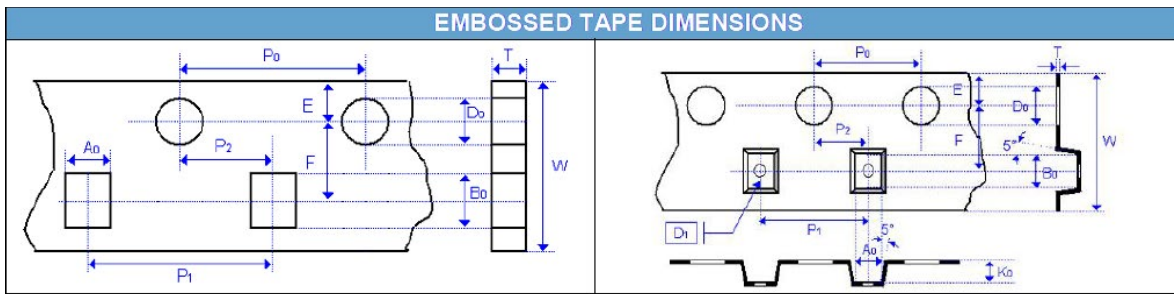
## SORTING

OPTIONAL CODE	SORTING DETAIL
E01	2 cells sorting 0 to +2,5 & +2,5 to +5 (% or pF according to value)
E02	4 cells sorting -5 to -2,5 ; -2,5 to 0 ; 0 to +2,5 & +2,5 to 5 (% or pF according to value)
E21	2% cells

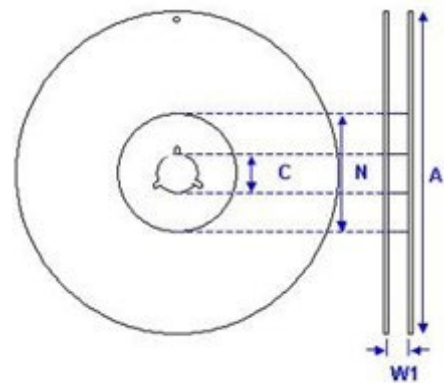


## PACKAGE DIMENSION AND QUANTITY

SIZE	THICKNESS	PAPER TAPE		PLASTIC TAPE	
		7 REEL	13 REEL	7' REEL	13 REEL
0402	0.5 ± 0.05	10 K	50 K		
0504	0.6 ± 0.05			4K	15K
	0.9 ± 0.05			4K	15K
0603	0.7 ± 0.07	4K		4K	15K
	0.9 ± 0.07	4K	15K	4K	15K
	0.9 ± 0.07			4K	15K
	1.1 ± 0.07			4K	15K
0805	0.8 ± 0.07	4K	15K	4K	15K
	0.9 ± 0.07			4K	10K
	1.1 ± 0.07			3K	10K
	1.3 ± 0.07			3K	10K
1206	1.1 ± 0.1			3K	10K
	1.4 ± 0.1			3K	8K
	1.8 ± 0.1			2K	8K
1210	1.4 ± 0.1			3K	8K
	1.8 ± 0.1			1K	6K
1808	1.4 ± 0.1			3K	8K
1812	1.6 ± 0.1			2K	8K
	2.1 ± 0.1			1K	6K
	2.8 ± 0.1			1K	6K
2220	1.8 ± 0.1			1K	6K
	3.0 ± 0.1			0.5K	2K
2225	3.0 ± 0.1			0.5K	2K
3033	3.0 ± 0.1			0.5K	2K
3640	3.0 ± 0.1			0.5K	2K
5440	3.9 ± 0.1				0.5K - 1K
HIGH COMPACT 1210				1K	6K
HIGH COMPACT 1812				1K	6K
HIGH COMPACT 2220				0.5K	2K



REEL SIZE	7	7	13
C	13.0 +0.5/-0.2	13.0 +0.5/-0.2	13.0 +0.7/-0.3
W1	8.4 +1.5/-0	12.4 +2.0/-0	8.4 +2.0/-0
A	178.0 ±0.10	178.0 ±0.10	330.0 ±1.0
N	60.0 ±1.0	80.0 ±1.0	100 ±1.0



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## RELIABILITY PRINCIPLES OVERVIEW GENERAL PRODUCTION

In order to guarantee highly reliable products to their customers, SRT-Microcéramique follows a strict quality policy which is explained below :

- According to AECQ philosophy, each component belongs to a family, which most restrictive members (four corners) have been fully qualified.
- PME components are produced in our Vendôme facility, with very stable process and equipments, in order to ensure Reliability and reproductibility.
- Reliability is based on batch tests, new product or equipment-specific qualifications and periodic requalifications.
- In addition to those regular tests, our quality departement launches regular accelerated tests to further deepens our reliability datas.
- Tests and qualifications of our standard products are based on AECQ methodology and are qualified according to the following limits.
- In accordance to AECQ methodology, specifics tests and limits can be adapted to fit our clients' needs.
- A whole range of stricter reliability tests can be offered for high Reliability products (burn-in, shocks, pulses...) for medical, space and defense applications.
- Based on our reliability database, FIT datas can be provided if necessary.

## PRODUCTION CONTROL

Test conducted on each lot according to ESCC-3009 for

FREQUENCY	TEST/STRESS	REFERENCE	AEC-Q	DETAIL
100%	Capa, DF, IR	CECC-32100-4.6		according to datasheet
100%	Visual	CECC-32100-4.5	AEC-Q200-9	no visual defects
50/lot	DPA		AEC-Q200-5	internal component integrity
5/lot	Dimension	CECC-32100-4.5	AEC-Q200-5	according to datasheet
5/lot	Resistance to soldering heat	CECC-32100-4.10	AEC-Q200-15	
5/lot	Solderability	CECC-32100-4.11	AEC-Q200-18	
10/lot	Voltage proof	CECC-32100-4.6.4		
1/ceramic lot	Temperature coefficient	CECC 32100-Prgph4,7		according to datasheet

## QUALIFICATIONS

Each component family has been qualified according to CECC and AECQ tests methodology, which are renewed on a periodic basis.

FREQUENCY	TEST/STRESS	REFERENCE	AEC-Q	DETAIL
Qualif	Electrical Characterization	CECC-32100-4.6 4.7	AEC-Q200-19	measure before test according to datasheet and after test according to post environmental limits
Qualif	Temperature Cycling	JESD22 Method-JA method 104	AEC-Q200-4	1,000 cycles -55°C to +125°C Measurement at 24 ± 2 hours after test conclusion
Qualif	Biased Humidity	MIL-STD-202 Method 103	AEC-Q200-7	1,000 hours 85°C/85%RH. Rated voltage. Measurement at 24 ± 2 hours after test conclusion
Qualif	Operational Life	MIL-STD-202 Method 108 condition D	AEC-Q200-8	1,000 hours at 125°C with applied Voltage : 2xRV RV≤500V, 1.2xRV 500V<RV≤1250V, RV RV>1250V
Qualif	High Temperature Exposure (Storage)	MIL-STD-202 Method 108	AEC-Q200-3	1,000 hours at 150°C with 0V. Measurement at 24 ± 2 hours after test conclusion
Qualif	Terminal Strength	CECC-32100-4.8	AEC-Q200-6	1.8kg 60 seconds
Qualif	Vibration	MIL-STD-202 Method 204	AEC-Q200-14	5g 20min 12cycles 3 orientations 10-2000Hz
Qualif	Board Flex	CEC 32100-4.9	AEC-Q200-21	3mm Type 1, 2mm Type 2, Measurement at 24 ± 2 hours after test conclusion

## POST ENVIRONMENTAL STRESS LIMIT

DIELECTRIC	DISSIPATION FACTOR (MAXIMUM)	CAPACITANCE SHIFT	INSULATION RESISTANCE
NPO	≤ 4 10 <sup>-3</sup>	±2%	10% initial limit
N2T	≤ 6 10 <sup>-3</sup>	±4%	10% initial limit
X7R	≤ 0.035	±15%	10% initial limit

## SPACE LEVEL COMPONENT SCREENED AND QUALIFIED ACCORDING TO ESCC-3009

SRT-Microcéramique can propose a wide range of BME and PME component qualified and tested according to ESCC-3009 standard for space projects. Both for development en evaluation (D32) and flight ready with full lot validation and ESCC standard documentation. Specific qualification programmes can be included to meet final customer requirement.

## PRODUCTION CONTROL/SCREENING

Tests conducted on each lot and screening for evaluation components D32 and flying components D30

FREQUENCY	TEST/STRESS	REFERENCE	DETAIL
Lot	DPA	ESCC-23400	Construction analysis
3/Lot	Dimension/weight	ESCC-20400/20500	Dimension in spec/max weight in spec
100%	Burn-In	ESCC-3009	168H, max T°, 2Ur Ur<500V, 1.5Ur Ur=500V, 1.3Ur 500V<Ur≤1250V, 1Ur Ur>1250V (fail<5%)
100%	Room Temperature Electrical Measurements	ESCC-3009	Cp, DF, IR, VP according to datasheet
5/lot	High and Low Temperatures Electrical Measurements	ESCC-3009	0 fail
100%	Visual Inspection	ESCC-20400/20500	

## LOT VALIDATION

Lot validation for flying components D30

FREQUENCY	TEST/STRESS	REFERENCE	DETAIL
20/Lot	PCB Mounting, Rapid Change of Temperature, Steady State Humidity, external visual inspection	ESCC-3009/ IEC 60384-1/IEC 60068-2-14	
20/Lot	PCB Mounting, Life test	ECSS-3009/IEC 60384-1	1000H, max T°, 2Ur Ur<500V, 1.5Ur Ur=500V, 1.3Ur 500V<Ur≤1250V, 1Ur Ur>1250V
6/Lot	PCB Mounting, Temperature Characterisation, Robustness of Terminations	ESCC-3009/ IEC 60068-2-14/IEC 60384-1	
6/Lot	Solderability, Permanence of Marking	ECSS-3009/ IEC 60068-2-58/ ECSS-24800	

## SPACE LEVEL COMPONENT SCREENED ACCORDING TO COTS+ ECSS-Q-ST-60-13C-REV1

SRT-Microcéramique can apply the COTS+ qualification framework to any suitable component AEQ-200 or not, to make them fly ready, offering a wide range of possibilities at competitive cost, either in Class 1 (COTS1), Class 2 (COTS2) or Class 3 (COTS3).

## EVALUATION/SCREENING/LAT

Class 1 (COTS1), Class 2 (COTS2), Class 3 (COTS3)

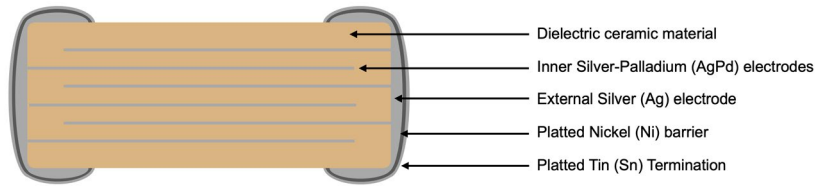
AECQ-200	CLASS 1	CLASS 2	CLASS 3	CATEGORY	TEST TYPE	SAMPLE	PROCEDURE
Yes	X	X	X	Evaluation	Construction Analysis	5	ESCC21001
Yes	X	X	X	Evaluation	Temperature characterization	5	ESCC3009 8.10
Yes	X			Evaluation	Life Test 2000h	40	ESCC3009 8.6 + 8.9
Yes	X			Screening	Complete screening	100%	ESCC3009 chart F3
Yes	X	X	X	LAT	DPA	3	ESCC21001
Yes	X	X		LAT	Life Test 1000h	20	ESCC3009 8.6 + 8.9
No	X	X	X	Evaluation	Construction Analysis	5	ESCC21001
No	X	X	X	Evaluation	Temperature characterization	5	ESCC 3009 8.10
No	X	X		Evaluation	Complete evaluation	72	ESCC 3009 chart F4
No			X	Evaluation	Life Test 1000h	40	ESCC3009 8.6 + 8.9
No	X	X	X	Screening	Complete screening	100%	ESCC3009 chart F3
No	X	X	X	LAT	DPA	3	ESCC21001
No	X			LAT	Complete LAT	52	ESCC 3009 chart F4
No		X	X	LAT	Life Test 1000h	20	ESCC3009 8.6 + 8.9

## TINNING

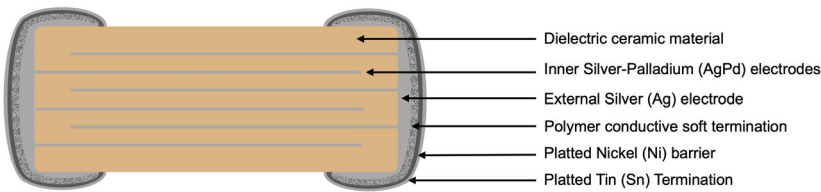
All component for space application can be proposed with dipped SnPb termination (Sn62 Pb36 Ag2) or SAC 305 (Sn96.5 Ag3 Cu0.5) for maximum reliability and whiskers avoidance.

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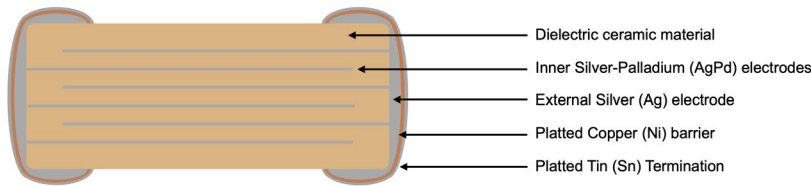
### PME (Precious Metal Electrodes)



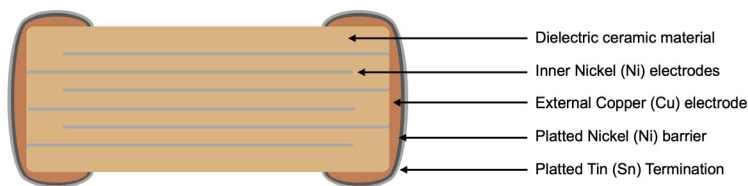
### PME (Precious Metal Electrodes) Polymer Soft Termination



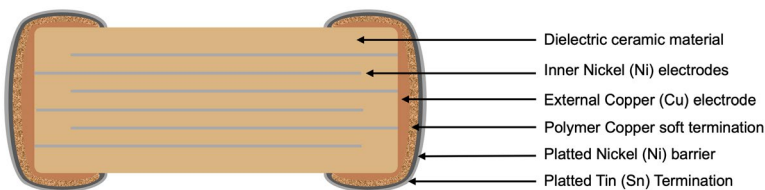
### PME (Precious Metal Electrodes) Non Magnetic



### BME (Basis Metal Electrodes) code BM



### BME (Basis Metal Electrodes) code BM Polymer Soft Termination



## REACH Compliance

- SRT-Microcéramique delivers non-chemical articles only.
- These contain no substances which are intended to be released under normal or reasonably foreseeable conditions of use according to Reach article 7(1).

SRT-Microcéramique confirms hereby that our products contain none of the substances which are listed in the present candidate list of the European Chemicals Agency (ECHA), above a concentration of 0.1% by weight of the whole component.

Candidate list of substances (European Chemicals Agency ECHA) :  
<http://echa.europa.eu/fr/candidate-list-table>

## ROHS COMPLIANCE

SRT-Microcéramique herewith confirms that RoHS-compliant SRT-microcéramique products are conforming to the following EU directives:  
**EU directive 2015/863/EU EU directive 2011/65/EU EU directive 2003/11/EC**

Following restricted materials are not used and do not exceed the legal limits: Lead (Pb, see exemptions),

- Mercury (Hg)
- Cadmium (Cd)
- Chromium (Cr VI)
- Polybrominated biphenyls (PBB) Polybrominated diphenyl ethers (PBDE) Bis(2-Ethylhexyl) phthalate (DEHP) Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP) Diisobutyl phthalate (DIBP)

Exemptions: The following exemptions according to the RoHS annexe are applicable:

Identity 7(a) :

- Lead in high melting temperature type solders (i.e lead-based alloys containing 85% by weight or more lead).

Identity 7(c)-I :

- Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic capacitors, e.g. piezoelectronic devices, or in a glass or ceramic matrix compound.

The components are suitable for a lead-free process according to EN 60068-2-58 and in accordance with the IPC/JEDEC standard J-Std-020D. The lead free process has been tested using solder alloy Sn96.5Ag3Cu0.5

## Export controls and dual-use regulations

Some SRT-Microcéramique components fall under 'dual-use' items under international export controls definition - those that can be used for civil or military purposes which meet certain specified technical standards.

The defining criteria for a dual use component is one with a voltage rating of >750Vdc and a capacitance value of >250nF when measured at 750Vdc and a series inductance <10nH. Components defined as dual-use under the above criteria may require a licence for export across international borders. Please contact us for further information on specific part numbers.

## ISO9001:2015

In their design, research and development as well as the manufacturing of MLCC capacitors, customer service and distribution SRT-Microcéramique uses and maintains a Management System audited and certified in accordance to : **ISO9001:2015**

You may contact us for any inquiry regarding the regulations and compliance listed above.