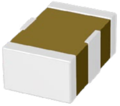
EMI M2F Filter

NPO/X7R

APPLICATIONS

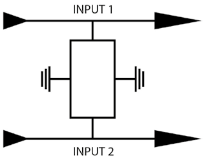
- **Flexible Quadripole Capacitor for filtering and decoupling**



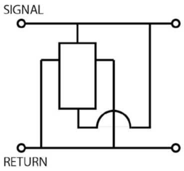
RoHS compliant

EQUIVALENT CIRCUIT

- **Filtering**



- **Decoupling**



ELECTRICAL PARAMETERS

ELECTRICAL CHARACTERISTICS :
at + 25°C unless otherwise specified

OPERATING TEMPERATURE :
- 55°C, + 125°C

TEMPERATURE COEFFICIENT :
NP0 : ± 30ppm
X7R : ± 15% with 0Vdc applied

AGING RATE :
X7R : 2% per decade

Dissipation Factor :
NP0 : ≤ 1.10^{-3} at 1Vrms and 1MHz for values ≤ 1000pF
≤ 1.10^{-3} at 1Vrms and 1KHz for values > 1000pF
X7R : ≤ 0.025 at 1kHz

INSULATION RESISTANCE (IR) :
25°C/Un 10^5 MOhm or 1000 Ohm-Farad whichever is less
125°C/Un 10^4 MOhm or 100 Ohm-Farad whichever is less

DIELECTRIC STRENGTH TEST :
2.5Un U≤200V I U+250V 200<U≤500 for 5s with 50mA max charging current

QUICK REFERENCE DATA

	0603		0805		1206		1812		2220	
	NP0	X7R	NP0	X7R	NP0	X7R	NP0	X7R	NP0	X7R
MIN	1pF	47pF	1pF	100pF	10pF	220pF	100pF	470pF	100pF	470pF
50V	120pF	8.2nF	1.2nF	47nF	2.2nF	220nF	10nF	470nF	22nF	1µF
100V	120pF	6.2nF	1nF	39nF	1.8nF	100nF	6.8nF	330nF	18nF	750nF
200V	100pF	3.3nF	1nF	27nF	1.5nF	47nF	6.8nF	220nF	18nF	560nF
500V	27pF	680pF	220pF	7.5nF	470pF	12nF	3.3nF	100nF	10nF	270nF

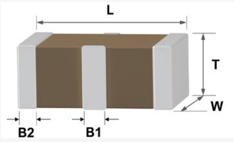
ORDERING INFORMATION

M2F	0805	Y	103	K	A	X	B	
SERIES	SIZE	DIELECTRIC	CAPACITANCE	TOLERANCE	VOLTAGE	TERMINATION	PACKAGING	SPECIAL PARAMETERS
M2F	0603 0805 1206 1806 1812 2220	A = NP0 Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third digit give the number of noughts. Example : 102 = 1 000pF For special values R is used as decimal separator Example 12R7 = 12.7pF 1340R0 = 1340pF	J = ± 5% K = ± 10% M = ± 20%	A = 50V B = 100V C = 200V E = 500V	X = Nickel Tin F = Palladium-Silver P = Polymer Tin (Flex) C = Copper Tin (Non magnetic) W = Nickel Gold	B = Reel V = Bulk	- Dxx = Reliability spec Exx = Sorting spec

For other sizes contact us

DIMENSIONS (In millimeters)

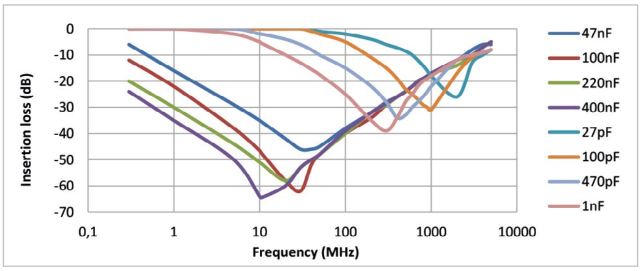
		0603	0805	1206	1812	2220
Length (L)		1.60 ± 0.2	2.00 ± 0.2	3.20 ± 0.2	4.50 ± 0.3	5.70 ± 0.4
Width (W)		0.80 ± 0.1	1.25 ± 0.2	1.60 ± 0.2	3.20 ± 0.2	5.00 ± 0.4
Thickness (T)	Max	0.9	1.25	1.60	3.20	4.00
Termination	B1 Min	0.30	0.50	0.70	1.10	1.10
	B1 Max	0.60	0.80	1.10	1.50	1.50
	B2 Min	0.15	0.15	0.15	0.15	0.15
	B2 Max	0.30	0.60	0.60	0.70	0.70



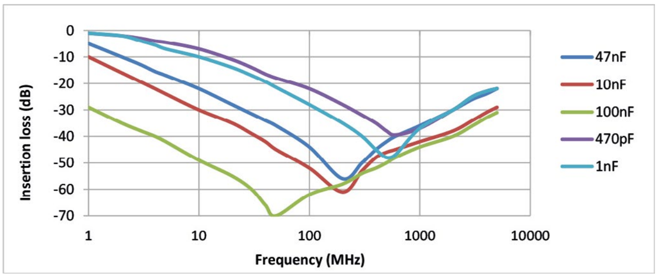
For P termination (Polymer type) add 0.10mm to Length (L) and 0.05 to Width (W) of the chip.

TYPICAL CHARACTERISTICS

Filtering

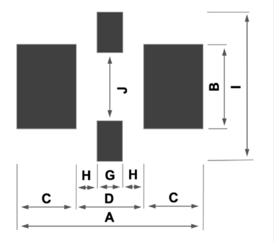


Decoupling



TYPICAL FILTER FOOTPRINT REFLOW SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN mm							
	A	B	C	D	G	H	I	J
0603	2.30	1.00	0.55	1.20	0.60	0.30	1.40	0.60
0805	2.90	1.45	0.70	1.50	0.80	0.35	1.85	1.05
1206	4.10	1.80	0.95	2.20	1.00	0.60	2.20	1.40
1806	5.50	1.80	1.15	3.20	1.50	0.85	2.20	1.40
1812	5.50	3.40	1.15	3.20	1.50	0.85	3.90	3.00
2220	6.80	5.40	1.25	4.30	2.00	1.15	7.20	5.00



Storage and Soldering

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.

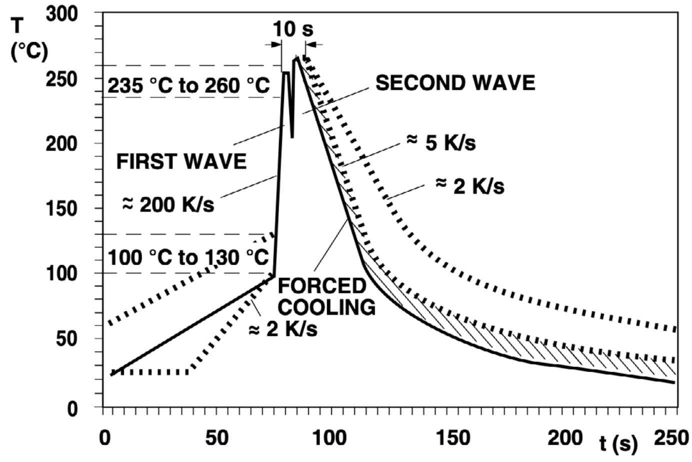
CLEANING

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.

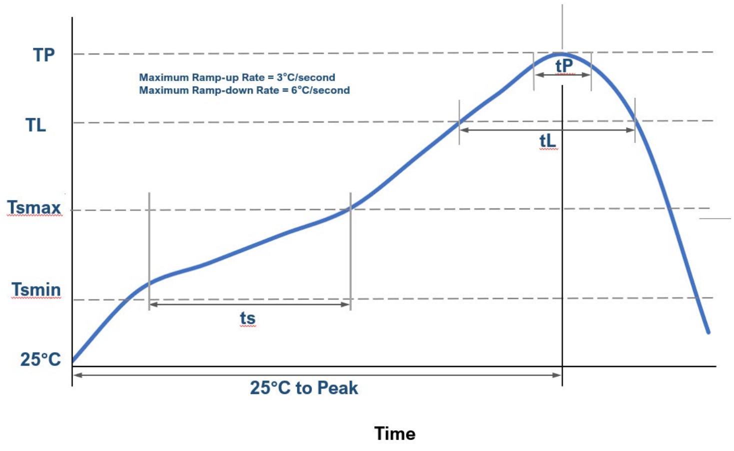
SOLDERING CONDITIONS

SIZE	THICKNESS	WAVE	REFLOW
0201	All	0	0
0402	All	0	0
0505	All	0	0
0603	All	0	0
0805	< 1.25mm	0	0
0805	≥ 1.25mm		0
1111	< 1.25mm	0	0
1111	≥ 1.25mm		0
1206	< 1.25mm	0	0
1206	≥ 1.25mm		0
1210	< 1.25mm	0	0
1210	≥ 1.25mm		0
larger than 1210	All		0
High compact	All		0

WAVE SOLDERING PROFILE

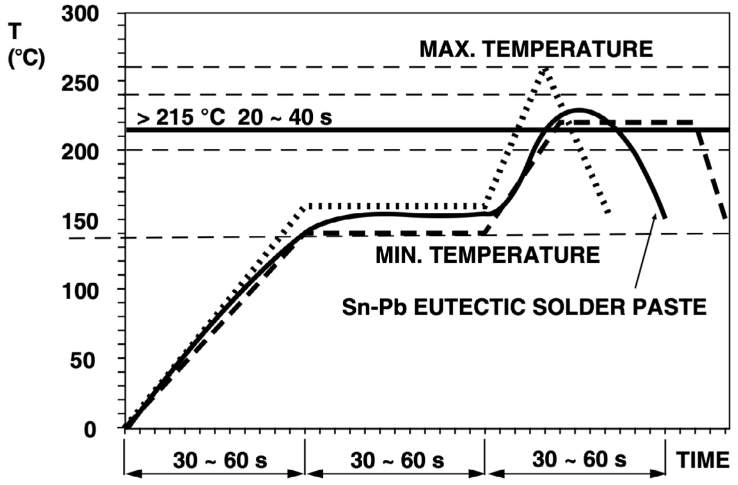


LEADFREE REFLOW SOLDERING PROFILE

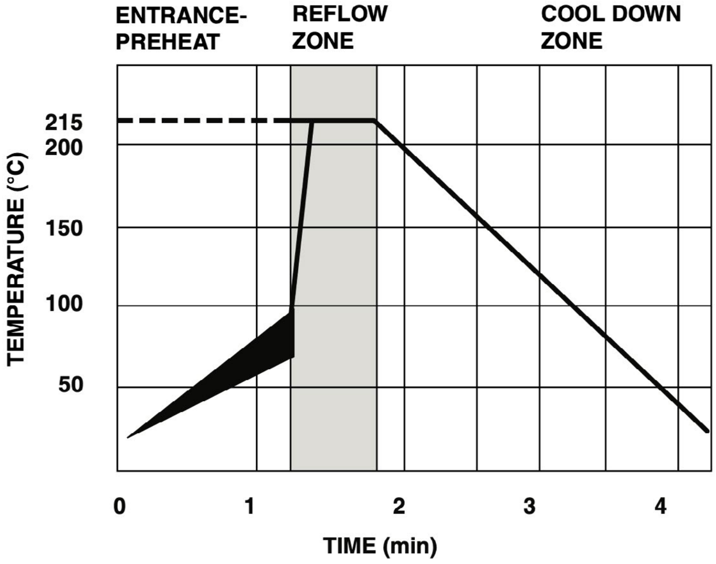


PROFILE FEATURE	LEAD FREE (SAC 305)
Tsmin	150°C
Tsmax	190°C
Time from Tsmin to Tsmax	60 - 120 seconds
Ramp-up Rate	3°C/second max
Liquidous Temperature	217°C
Time above Liquidous	60 - 120 seconds
Peak Temperature	250°C
Time within 5°C of maximum Peak Temperature	10 seconds max
Ramp-down Rate	6°C/second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

SNPB REFLOW SOLDERING PROFILE



VAPOUR PHASE REFLOW PROFILE



HAND SOLDERING

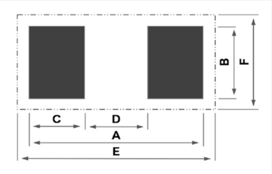
Hand soldering is not recommanded as the thermal shock may cause a crack, hot air pencil use is advised, however if used the following recommendations should be taken :

- Soldering iron tip diameter ≤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 ≤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.

Footprint

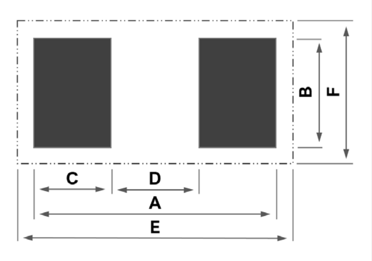
TYPICAL SMD FOOTPRINT WAVE SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN MM					
	A	B	C	D	E	F
0603	2.40	1.00	0.70	1.00	3.10	1.40
0805	3.20	1.30	0.90	1.40	4.10	1.85
1206	4.80	1.80	1.25	2.30	5.90	2.25
1210	4.80	2.70	1.25	2.30	5.90	3.15



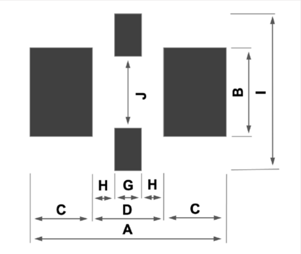
TYPICAL SMD FOOTPRINT REFLOW SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN mm					
	A	B	C	D	E	F
0201	1.00	0.40	0.30	0.40	1.25	0.85
0204	1.00	1.20	0.30	0.40	1.25	1.65
0402	1.50	0.60	0.40	0.70	1.75	1.05
0306	1.30	1.80	0.40	0.50	1.55	2.25
0404	1.50	1.20	0.40	0.70	1.75	1.65
0504	1.90	1.20	0.40	1.10	2.15	1.65
0505	1.90	1.50	0.50	0.90	2.15	1.95
0508	1.90	2.20	0.50	0.90	2.15	2.75
0603	2.30	1.00	0.60	1.10	2.55	1.55
0612	2.30	3.40	0.60	1.10	2.55	3.95
0805	2.90	1.45	0.90	1.10	3.15	2.00
1206	4.10	1.80	0.90	2.30	4.35	2.45
1210	4.10	2.70	1.00	2.10	4.35	3.35
1808	5.50	2.20	1.20	3.10	5.75	2.85
1812	5.50	3.40	1.20	3.10	5.75	4.05
1825	5.50	6.70	1.20	3.10	5.75	7.35
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	11.60	4.60	2.35	6.90	11.85	5.40
4017	11.60	5.45	2.35	6.90	11.85	6.25
4020	11.60	10.70	2.35	6.90	11.85	11.50
4040	11.60	26.20	2.35	6.90	11.85	27.00
40100	15.50	13.20	2.35	10.80	15.75	14.00
5550	16.70	20.80	2.35	12.00	16.95	21.60
6080	18.30	15.70	2.35	13.60	18.55	16.50
6660	21.90	15.70	2.35	17.20	22.15	16.50
8060	21.90	38.90	2.35	17.20	22.15	39.70
80150	4.15	2.60	1.15	1.75	5.05	3.30
HIGH COMPACT 1210	5.75	3.40	1.35	2.70	6.70	4.20
HIGH COMPACT 1812	6.80	5.50	1.70	2.80	7.70	6.30
HIGH COMPACT 2220	6.80	5.50	1.70	2.80	7.70	6.30



TYPICAL FILTER FOOTPRINT REFLOW SOLDERING

SIZE	FOOTPRINT DIMENSIONS IN mm							
	A	B	C	D	G	H	I	J
0603	2.30	1.00	0.55	1.20	0.60	0.30	1.40	0.60
0805	2.90	1.45	0.70	1.50	0.80	0.35	1.85	1.05
1206	4.10	1.80	0.95	2.20	1.00	0.60	2.20	1.40
1806	5.50	1.80	1.15	3.20	1.50	0.85	2.20	1.40
1812	5.50	3.40	1.15	3.20	1.50	0.85	3.90	3.00
2220	6.80	5.40	1.25	4.30	2.00	1.15	7.20	5.00



This document is subject to change without notice.

How to order, Reliability, Sorting options

ORDERING INFORMATION

SRMC	-	0603	Y	102	J	A	-	L	040	-	-	-	B	-
SERIE	**HT**	**SIZE**	**DIELECTRIC**	**CAPACITANCE**	**TOLERANCE**	**VOLTAGE**	**TERMINAISON**	**FORM**	**HEIGHT**	**LEADS**	**COATING/ MARKING**	**CUR-RENT**	**PACKAGING**	**SPECIAL**
- FK FH SREV MCF M2F MPF SRMC SRTV SR SA SF	- H = High Temp	0201 0204 0402 0303 0306 0404 0504 0505 0508 0603 0612 0805 1206 1210 1808 1812 1825 2211 2220 2225 2325 2525 2825 3033 3640 4040 40100 5550 6080 6560 6660 7274 7565 8060 80150 15080 40 to 94	Q = High Q A = NP0 P = N2T X = BX Y=X7R BY=2C1 S = X5R T = X7S R = X6S W = X7T U = Z5U V = Y5V	Expressed in picofarads (pF) The first two digits are significant, the third digit gives the number of noughts Example : 102 = 1 000pF For special values R is used as decimal separator Example 12R7 = 12.7pF 1340R0 = 1340pF	A = ± 0.05pF/0.5% B = ± 0.1pF C = ± 0,25pF D = ± 0,5pF E = ± 0.1% F = ± 1% G = ± 2% J = ± 5% K = ± 10% M = ± 20% Z = -20% +80%	V = 2.5V Y = 4V R = 6.3V Q = 10V J = 16V X = 25V Z = 35V A = 50V U = 63V B = 100V N = 150V C = 200V P = 250V D = 300V E = 500V F = 630V G = 1000V 1K2 = 1200V 1K4 = 1400V O = 1500V 1K7 = 1700V 1K8 = 1800V H = 2000V T = 2500V I = 3000V M = 3600V K = 4000V L= 5000V 6 = 6000V S = 7200V 7K5 = 7500V 8 = 8000V 10 = 10000V 12 =12000V 15 = 15000V	- = Sn lead/lead frame X = Nickel Tin F = Palladium-Silver P = Polymer Tin (Flex) C = Copper Tin (Non magnetic) CP = Copper Polymer Tin (Non magnetic) W = Nickel Gold Flash G = Nickel Gold Thick HP = Dipped SnPb Polymer H = Dipped SnPb S = Dipped SAC SP = Polymer Dipped SAC I = Electrolytic SnPb IP = Polymer Eletrolytical SnPb Q = Solderable Silver M = Microstrip A = Axial Ribbon R = Radial Ribbon U = Axial Wire V = Radial Wire CM = Microstrip (Non magnetic) CA = Axial Ribbon (Non magnetic) CR = Radia Ribbon (Non magnetic) CU = Axial Wire (Non magnetic) CV = Radial Wire (Non magnetic)	- J L D M T = 2 leads U = 4 leads JP = plain J Lead	- 020 030 040 050 060 070 080 090 100 110 120 130 140 160 180	- 2 to 10 B	- I = Conformal-Coating H = Epoxy Coating M = Marked R = Resistor	- 1 2	B = Reel V = Bulk T = Tray Package W = Waffle Pack	- BM = BME Dxx = Reliability spec Exx = Sorting spec

RELIABILITY/SCREENING LEVEL

OPTIONAL CODE	TESTING DETAIL
D20	Generic AECQ-200
D55681	DPA & 100% Burn-In Per Group A of MIL-PRF-55681
D123	Group A & B Per MIL-PRF-123
D3009	DPA & 100% Burn-In according to ECSS-3009 for space application
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
D03	High Temperature application Burn-In 100% 125° 168H 2Un, 6.5% AQL
D05	Burn-In 100% 125° 168H 2Un, 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

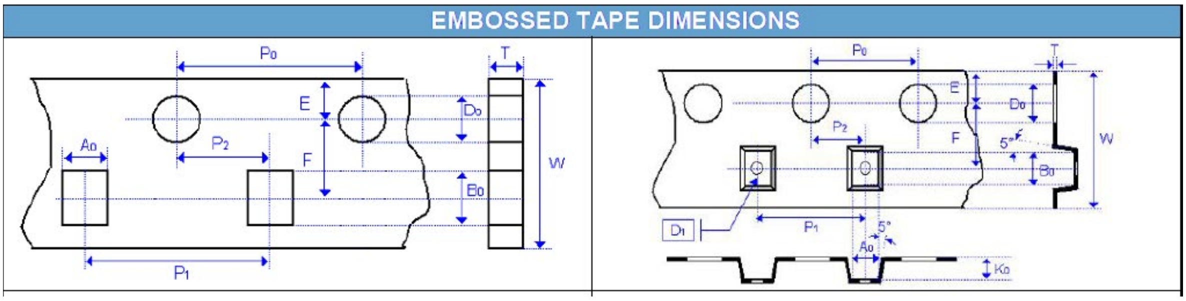
SORTING

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

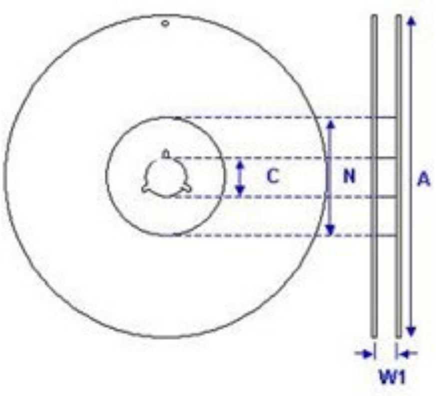
PACKAGE DIMENSION AND QUANTITY

SIZE	THICKNESS	PAPER TAPE		PLASTIC TAPE	
		7 REEL	13 REEL	7' REEL	13 REEL
0201	0.3 ± 0.05	10 K	50 K		
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

EMBOSSED TAPE DIMENSIONS



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



High Reliability Screening Levels

PRODUCTION CONTROL

Comparaison of the Screening/Testing of the standard and High Reliability SRT-Microcéramique components

	TEST/STRESS	STANDARD SMD	STACKS SRMC RADIALS	HIGH TEMPERATURE	IAW ESA-ESCC3009	COTS1	COTS2	COTS3	IAW MIL-PRF-55681 GROUP A	IAW MIL-PRF-123 GROUP A
	CODE			D03	D3009	COTS1	COTS2	COTS3	D55681	D123
	SCOPE	**PME MLCC X7R, BX, NPO, N2T, High Q**	**Encapsulated, Dipped radial and Stacks SRMC**	**Type 1, Type 2 Chips**	**SRT PME BME, Radials, Stacks, X7R, BX, N2T, NPO, High Q**	**Class 1 BME Chips**	**Class 2 BME Chips**	**Class 3 BME Chips**	**SRT PME BME X7R, NPO, BX, N2T, High Q**	**SRT PME BME X7R, BX, NPO, N2T, High Q**
PROCESS / SCREENING	Burn-In		100% Chips 24H +Stack 48H Tmax 2Un PDA 6.5%	100% 168H Tmax 2Un PDA 6.5%	100% 96H Tmax 2Un PDA 5%	100% 96H Tmax 2Un PDA 5%	100% 96H Tmax 2Un PDA 5% for non AEC-Q200	100% 96H Tmax 2Un PDA 5% for non AEC-Q200	100% 100H Min Tmax 2Un PDA 8%	100% 168H Min 0.1%/1pc last 48H 125°C 2Un PDA 5%
	Capa, DF, IR, VP (25°C)	100%	100%	100%	100%	100%	100%	100%	100%	100%
	IR (125°C)								Sample	Sample
	Voltage Breakdown	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot	10 pcs/lot
	Dimension	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot
	DPA	per lot	per lot	per lot	per lot	per lot	per lot	per lot	per lot	per lot
	Visual	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Resistance to soldering heat	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot
	Solderability	5 pcs/lot	5 pcs/lot	5 pcs/lot	6 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot
	Termination thickness	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot	5 pcs/lot
	TC	per ceramic lot	per ceramic lot	per ceramic lot	per ceramic lot and in LAT	in LAT	in LAT	in LAT	per ceramic lot	per ceramic lot
	LAT	**On request**	**On request**	**On request**	**Flying Part**	**Flying part**	**Flying part**	**Flying part**	**On request**	**On request**
LAT SUBGROUP 1	Mounting				20 serialized pcs on PCB					
	Thermal Shock				10 Cycles 30mn/1mn					
	Humidity				For Un<500V 1000h 85/85					
	Criteria				No visual/electrical default					
LAT SUBGROUP 2A	Mounting				40 serialized pcs on PCB	20 serialized pcs on PCB	20 serialized pcs on PCB	20 serialized pcs on PCB for non AEC-Q200		
	Operationnal Life				1000h ±24 125°C 2Un Un<500V 1.5Un Un=500V 1.3Un 500V<Un≤1250V 1Un Un>1250V	1000h ±24 max T° 2Un Un<500V 1.5Un Un=500V 1.3Un 500V<Un≤1250V 1Un Un>1250V	1000h ±24 max T° 2Un Un<500V 1.5Un Un=500V 1.3Un 500V<Un≤1250V 1Un Un>1250V	1000h ±24 Max T° 2Un Un<500V 1.5Un Un=500V 1.3Un 500V<Un≤1250V 1Un Un>1250V		
	Criteria				No visual/electrical default	No visual/electrical default	No visual/electrical default	No visual/electrical default		
LAT SUBGROUP 2B	Mounting				6 serialized pcs on PCB	6 serialized pcs on PCB non AEC-Q200				
	TC				IR at 125°C Cp at -55°C/20°C+125°C	IR at 125°C Cp at -55°C/20°C+125°C				
	Shear Test				5N 10s	5N 10s				
	Criteria				No visual/electrical default	No visual/electrical default				
LAT SUBGROUP 3	Mounting				6 pcs serialized	6 pcs serialized				
	Solderability				Solder bath 235°C 5s included in screening	Solder bath 235°C 5s included in screening				
	Permanence of Marking				ESCC24800 when applicable	ESCC24800 when applicable				
	Criteria				No visual/electrical default	No visual/electrical default				
	Thermal Cycle (optional)									
	Ultrasonic, Xray (optional)									

- **All components components can be proposed with SbPb termination (electrolytical I or Dipped H) with 5% min Pb for whisker mitigation**
- **Standard NiSn Termination is qualified according to JDEC JESD201A regarding whisker mitigation**
- **Other termination availabe Silver Palladium F, Solderable Silver Q, Thick Gold G, Flash Gold W, Non Magnetic Copper C, Polymer option P**
- **ECSS COTS framework is used to propose space ready components Class 1 to 3 based on SRT or customer chosen BME chips either AEC-Q200 (prefered) or non AEC-Q200. Size can start from 0201 and resistors can also be proposed and termination be changed.**
- **Specific High Reliability programs can be established to fit customer requirement for medical, defense, space, high stress applications.**

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 restrictives 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 AECQ-200 framework

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 Breakdown	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 apllied Voltage : 2xRV RV≤500V, 1.2xRV 500V<RV≤1250V, RV RV>1250V
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 10-3	±2%	10% initial limit
N2T	≤ 6 10-3	±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 from its catalog qualified and tested according to ESCC-3009 Revision 5 specifications for space applications. Both for development en evaluation and flight ready with full lot validation and ESCC standard documentation. Specific qualification programms can be included to meet final customer requirement.
SRT manufactured PME with standard production control or requalified source BME components directly or after termination change or mounting enter the following screening process :

SCREENING D3009

FREQUENCY	TEST/STRESS	REFERENCE	DETAIL
100%	Voltage conditioning	IEC Publication No. 60384-1 clause 4.23	100% 96H Tmax 2Un PDA 5%
100%	Capa, DF, IR, VP (25°C)	ESCC3009 Chart F3	According to datasheet
5/Lot	High and Low Temperatures Electri-	ESCC3009 Chart F3	According to datasheet, 0 fail or 100%
5/lot	Dimension	ESCC Basic Specification No. 20500	According to datasheet (done in manufacturing, requalification process)
5/lot	DPA	ESCC Basic Specification No. 23400	Internal component integrity
100%	Visual	ESCC Basic Specification Nos. 20400 and 20500	No defect
5/lot	Solderability	IEC Publication No. 60068-2-58	0 fail

LOT VALIDATION D3009

GROUP	NB PCS	TEST/STRESS	REFERENCE	DETAIL
SUBGROUP 1	20	**Mounting**	ESCC3009 8.6	20 serialized pcs on PCB
		Thermal Shock	ESCC3009 8.7, IEC No. 60068-2-14	10 Cycles 30mn/1mn
		Humidity	ESCC3009 8.2	For Un<500V 1000h 85/85 Un≥500V not applicable
		Criteria	ESCC3009	No visual/electrical default
SUBGROUP 2A	40	**Mounting**	ESCC3009 8.6	40 serialized pcs on PCB
		Operationnal Life	ESCC3009 Chart F4, IEC No. 60384-1 clause 4.23.	1000h ±24 125°C (optionnal 2000h) 2U U<500V | 1.5U 500≤U<1000 | 1.2U 1000≤U≤2000 | 1U U>2000
		Criteria	ESCC3009	No visual/electrical default
SUBGROUP 2B	6	Mounting	ESCC3009 8.6	6 serialized pcs on PCB
		TC	ESCC3009 8.10	IR at 125°C, CP at -55°C/25°C/125°C
		Shear Test	ESCC3009 8.7, IEC No. 60384-1	5N 10s
		Criteria	ESCC3009	No visual/electrical default
SUBGROUP 3	6	Solderability	ESCC3009 8.11, IEC No. 60068-2-58	Solder bath 235°C 5s ncluded in screening
		Permanence of Marking	ESCC3009 8.12	ESCC24800 when applicable
		Criteria	ESCC3009	No visual/electrical default

LAT3=LVT3 = Subgroup 3/LAT2=LVT2 = Subgroup 2A + Subgroup 2B + Subgroup 3/LAT1=LVT1 = Subgroup 1 + Subgroup 2A + Subgroup 2B + Subgroup 3

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, with or without termination change, 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 COTS1/COTS2/COTS3

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

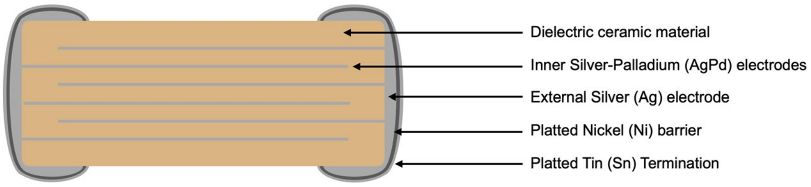
AECQ-200	CLASS 1	CLASS 2	CLASS 3	CATEGORY	TEST TYPE	SAMPLE	PROCEDURE
Yes	X	X	X	Evaluation	Construction Analysis	5	ESCC21001
Yes	X	X	X	Evaluation	Temperature characterization	5	ESCC3009 8.10
Yes	X			Evaluation	Life Test 2000h	40	ESCC3009 8.6 + 8.9
Yes	X			Screening	Complete screening	100%	ESCC3009 chart 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

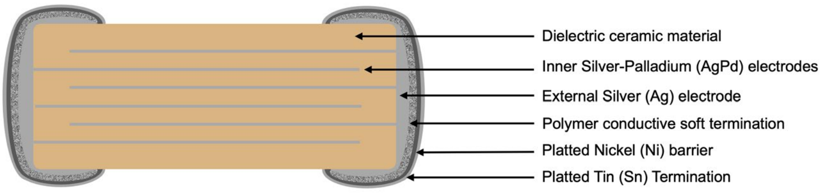
All component for space application can be proposed with dipped SnPb termination (Sn62 Pb36 Ag2) or SAC 305 (Sn96.5 Ag3 Cu0.5) for maximum reliability and whiskers avoidance.

Construction

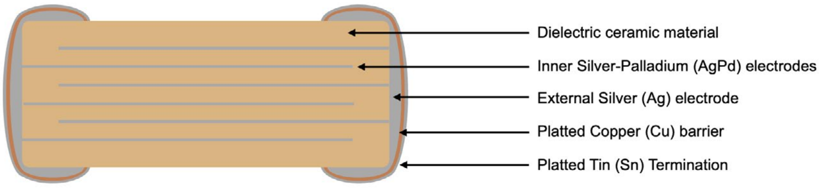
PME (Precious Metal Electrodes)



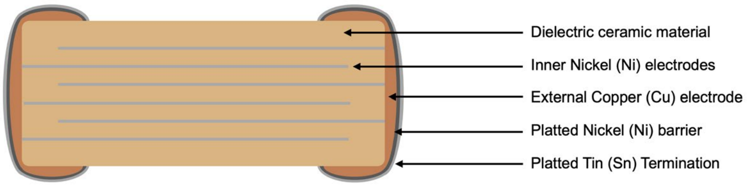
PME (Precious Metal Electrodes) Polymer Soft Termination



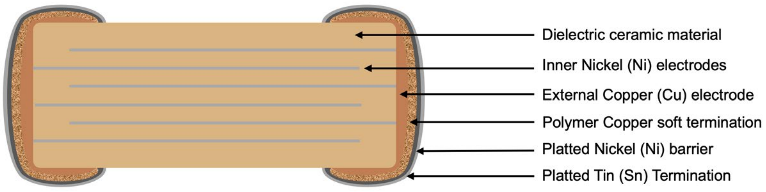
PME (Precious Metal Electrodes) Non Magnetic



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 intented to be released under normal or reasonably foreseeable conditions of use according 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) phtalate (DEHP) Benzyl butyl phtalate (BBP)
- Dibutyl phtalate (DBP) Diisobutyl phtalate (DIBP)

Exemptions: The following exemptions according tot he 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.