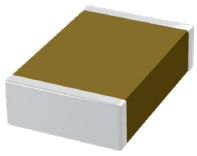
SMD High Voltage Class II

1KV - 15KV

HVP
High Voltage Products. High Voltage Experts

APPLICATIONS

- **Typical uses : passing, coupling, filtering, blocking**



Pb

RoHS compliant

FEATURES

- **Temperature stable class II ceramic**
- **Custom voltage, package size, capacitance value on request**
- **Tested in accordance to CECC 32100 and AEC-Q200**
- **CECC 30700 et NFC 83-132 compliant**
- **Available in stack or radial**
- **Surface coating can be necessary to prevent surface arcing**

ELECTRICAL PARAMETERS

ELECTRICAL CHARACTERISTICS :
at + 25°C unless otherwise specified

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

TEMPERATURE COEFFICIENT :
± 15% with 0Vdc applied

DISSIPATION FACTOR :
≤ 2.5% at 1kHz for C ≥ 100pF

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 :
Performed per method 103 of EIA 198-2-E
1.2Un for 5s with 50mA max charging current

QUICK REFERENCE DATA

	0805	1206	1210	1808	1812	1825	2220	2225	3640	4040	5440	5550	6660	8060	80150
Min	6.8 pF	10 pF	10 pF	10 pF	10 pF	33 pF	33 pF	33 pF	100 pF	100 pF	100 pF	100 pF	100 pF	100 pF	180 pF
1KV	3.3 nF	10 nF	27 nF	27 nF	82 nF	220 nF	270 nF	330 nF	820 nF	820 nF	1.2 µF	1.5 µF	2.2 µF	2.7 µF	6.8 µF
1.5KV	1.2 nF	3.9 nF	10 nF	12 nF	33 nF	82 nF	82 nF	100 nF	270 nF	330 nF	470 nF	560 nF	820 nF	1.0 µF	2.2 µF
2KV	560 pF	1.8 nF	5.6 nF	5.6 nF	15 nF	39 nF	47 nF	56 nF	180 nF	180 nF	270 nF	330 nF	470 nF	560 nF	1.5 µF
3KV		680 pF	1.8 nF	2.2 nF	5.6 nF	15 nF	18 nF	22 nF	68 nF	82 nF	100 nF	120 nF	180 nF	220 nF	560 nF
4KV				1.2 nF	3.3 nF	8.2 nF	10 nF	12 nF	33 nF	39 nF	56 nF	68 nF	100 nF	120 nF	270 nF
5KV				560 pF	1.8 nF	5.6 nF	5.6 nF	8.2 nF	22 nF	22 nF	33 nF	39 nF	56 nF	68 nF	180 nF
8KV							1.8 nF	2.7 nF	8.2 nF	8.2 nF	12 nF	15 nF	22 nF	27 nF	68 nF
10KV									3.9 nF	4.7 nF	5.6 nF	6.8 nF	10 nF	12 nF	33 nF
12KV									2.7 nF	2.7 nF	3.9 nF	4.7 nF	6.8 nF	8.2 nF	22 nF

ORDERING INFORMATION

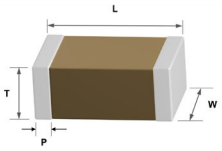
5440	Y	103	K	H	X	B	-
SIZE	**DIELECTRIC**	**CAPACITANCE**	**TOLERANCE**	**VOLTAGE**	**TERMINATION**	**PACKAGING**	**SPECIAL PARAMETERS**
0805 1206 1210 1808 1812 1825 2220 2225 3033 3640 4040 4055 40100 5550 6660 8060 80150	Y = X7R	Expressed in picofarads (pF). The first two digits are significant, the third digit gives the number of noughts. Example : 102 = 1 000pF	J = ± 5% K = ± 10% M = ± 20%	G = 1KV O = 1.5KV H = 2KV T = 2.5KV I = 3KV K = 4KV L = 5KV 6 = 6KV 8 = 8KV 10 = 10KV 12 = 12KV 15 = 15KV	X = Nickel Tin F = Palladium-Silver P = Polymer Tin C = Copper Tin W = Nickel Gold	B = Reel V = Bulk	- BM = BME Dxx = Reliability spec Exx = Sorting spec

For other sizes, voltage, tolerance contact us.

DIMENSIONS IN MILLIMETERS

		0805	1206	1210	1808	1812	1825	2220	2225	3640	4040	5440	5550	6660	8060	80150
Length (L)		2.00 ± 0.2	3.20 ± 0.2	3.20 ± 0.2	4.60 ± 0.3	4.60 ± 0.3	4.60 ± 0.4	5.60 ± 0.4	5.60 ± 0.4	9.15 ± 0.8	10.20 ± 0.8	13.70 ± 1.0	14.00 ± 1.0	16.80 ± 1.0	20.30 ± 1.0	20.30 ± 1.0
Width (W)		1.25 ± 0.2	1.60 ± 0.2	2.50 ± 0.2	2.00 ± 0.2	3.20 ± 0.2	6.35 ± 0.3	5.10 ± 0.4	6.35 ± 0.4	10.20 ± 0.8	10.20 ± 0.8	10.20 ± 1.0	12.70 ± 1.0	15.20 ± 1.0	15.20 ± 1.0	38.10 ± 1.0
Thickness max (T)		1.40	1.70	2.50	2.20	3.30	3.60	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
Termination (P)	Min	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.80	0.80	0.80	0.80	0.80	0.80	0.80
	Max	0.70	0.70	0.80	0.80	0.80	0.80	0.80	1.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50

For P termination (Polymer type) add 0.20mm to all dimensions



This document is subject to change without notice.

STANDARD SIZE : 0805 to 3640

SIZE		0805			1206				1210				1808					1812					1825					2220						2225						3640							SIZE	
CODE	CAP	1KV	1.5KV	2KV	1KV	1.5KV	2KV	3KV	1KV	1.5KV	2KV	3KV	1KV	1.5KV	2KV	3KV	4KV	1KV	1.5KV	2KV	3KV	4KV	1KV	1.5KV	2KV	3KV	4KV	5KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	CAP	CODE
220	22 pF																																												22 pF	220
270	27 pF																																												27 pF	270
330	33 pF																																												33 pF	330
390	39 pF																																												39 pF	390
470	47 pF																																												47 pF	470
560	56 pF																																												56 pF	560
680	68 pF																																												68 pF	680
820	82 pF																																												82 pF	820
101	100 pF																																												100 pF	101
121	120 pF																																												120 pF	121
151	150 pF																																												150 pF	151
181	180 pF																																												180 pF	181
221	220 pF																																												220 pF	221
271	270 pF																																												270 pF	271
331	330 pF																																												330 pF	331
391	390 pF																																												390 pF	391
471	470 pF																																												470 pF	471
561	560 pF																																												560 pF	561
681	680 pF																																												680 pF	681
821	820 pF																																												820 pF	821
102	1.0 nF																																												1.0 nF	102
122	1.2 nF																																												1.2 nF	122
152	1.5 nF																																												1.5 nF	152
182	1.8 nF																																												1.8 nF	182
222	2.2 nF																																												2.2 nF	222
272	2.7 nF																																												2.7 nF	272
332	3.3 nF																																												3.3 nF	332
392	3.9 nF																																												3.9 nF	392
472	4.7 nF																																												4.7 nF	472
562	5.6 nF																																												5.6 nF	562
682	6.8 nF																																												6.8 nF	682
822	8.2 nF																																												8.2 nF	822
103	10 nF																																												10 nF	103
123	12 nF																																												12 nF	123
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183	18 nF																																												18 nF	183
223	22 nF																																												22 nF	223
273	27 nF																																												27 nF	273
333	33 nF																																												33 nF	333
393	39 nF																																												39 nF	393
473	47 nF																																												47 nF	473
563	56 nF																																												56 nF	563
683	68 nF																																												68 nF	683
823	82 nF																																												82 nF	823
104	100 nF																																												100 nF	104
124	120 nF																																												120 nF	124
154	150 nF																																												150 nF	154
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224	220 nF																																												220 nF	224
274	270 nF																																												270 nF	274
334	330 nF																																												330 nF	334
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474	470 nF																																												470 nF	474
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106	10 µF																																												10 µF	106
126	12 µF																																												12 µF	126
156	15 µF																																												15 µF	156

STANDARD SIZE : 4040 to 80150

SIZE		4040								5440								5550								6660								8060								80150								SIZE	
CODE	CAP	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	1KV	1.5KV	2KV	3KV	4KV	5KV	8KV	10KV	12KV	CAP	CODE
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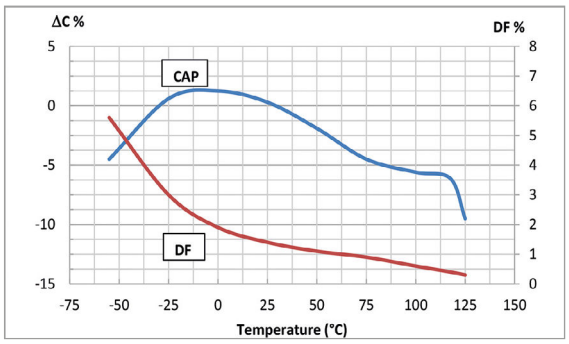
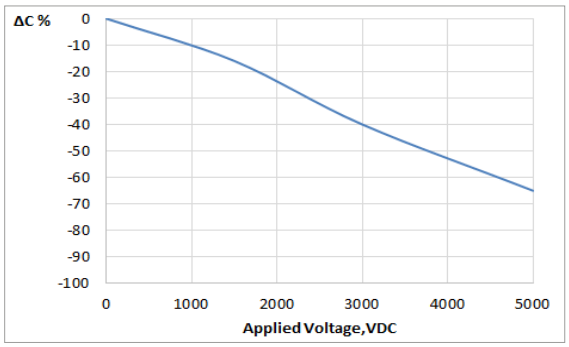
TYPICAL CHARACTERISTICS

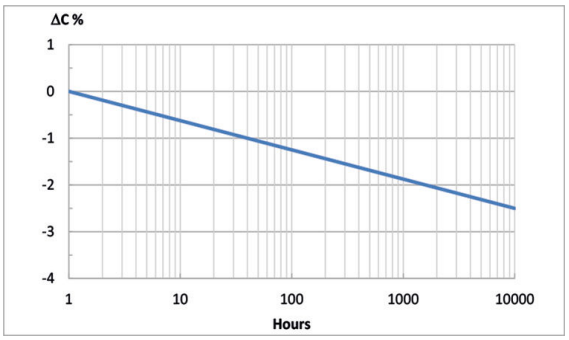
X7R Capacitance and factor vs temperature



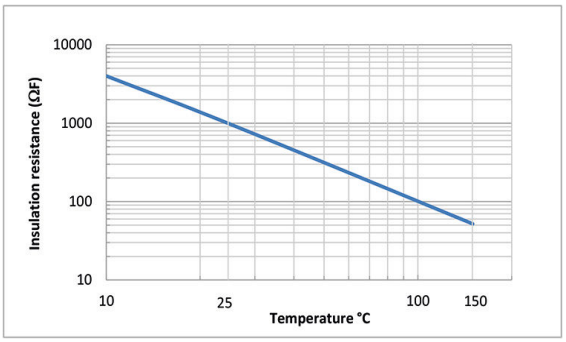
X7R Voltage coefficient of capacitance



X7R Aging



X7R Insulation resistance vs temperature



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 requires a solderability check before use.

HANDLING

Chip capacitors are made of dense, hard, brittle, and abrasive materials. They are liable to suffer mechanical damage, in the form of cracks or chips. Chips Capacitors should be handled with care to avoid contamination or damage. The use of 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 process 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

Leads 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 leads 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.

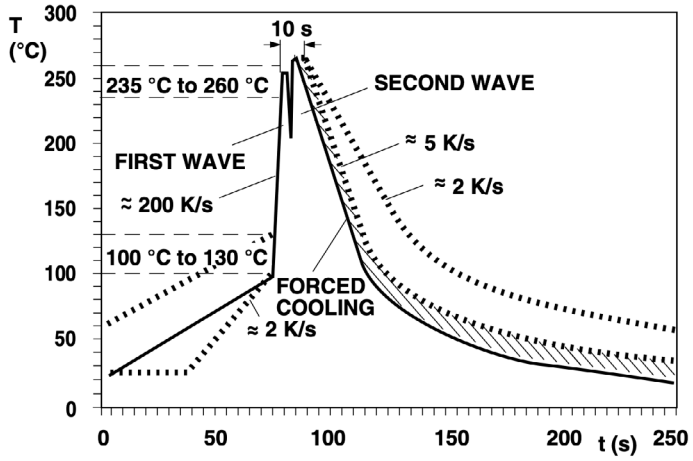
CLEANING

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 solvents. The choice of the proper system depends upon many factors such as component mix, flux, and solder paste and assembly method. The ability for the cleaning system to remove flux residues and contamination from under the chips is of paramout importance.

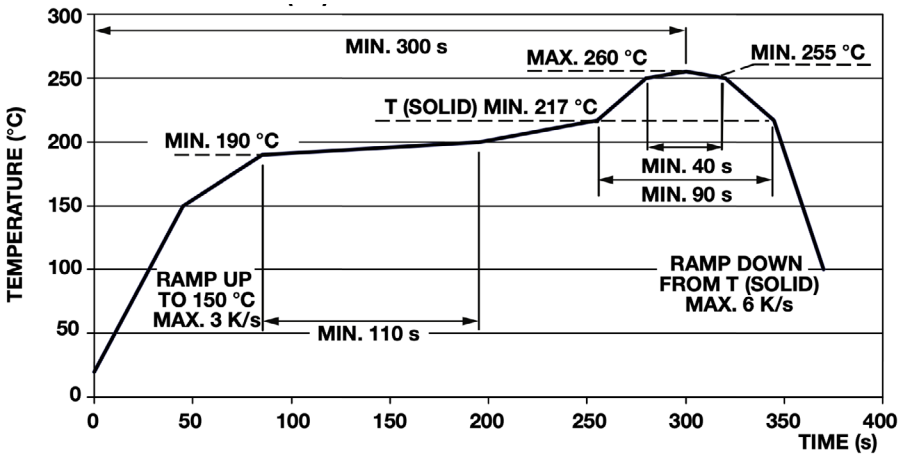
SOLDERING CONDITIONS

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

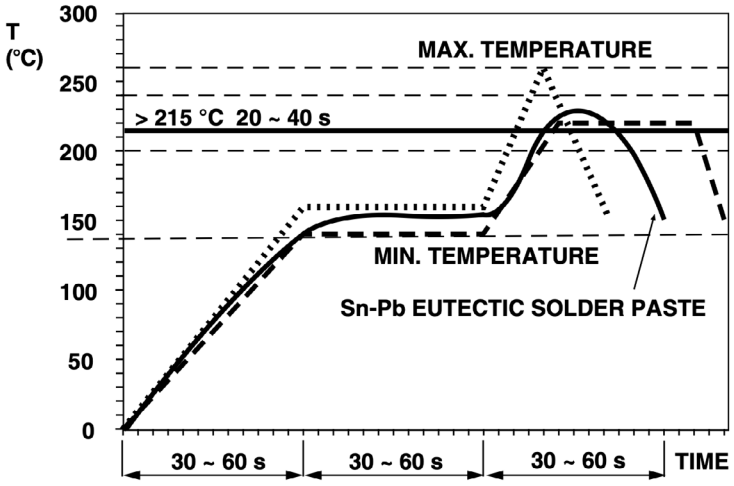
WAVE SOLDERING PROFILE



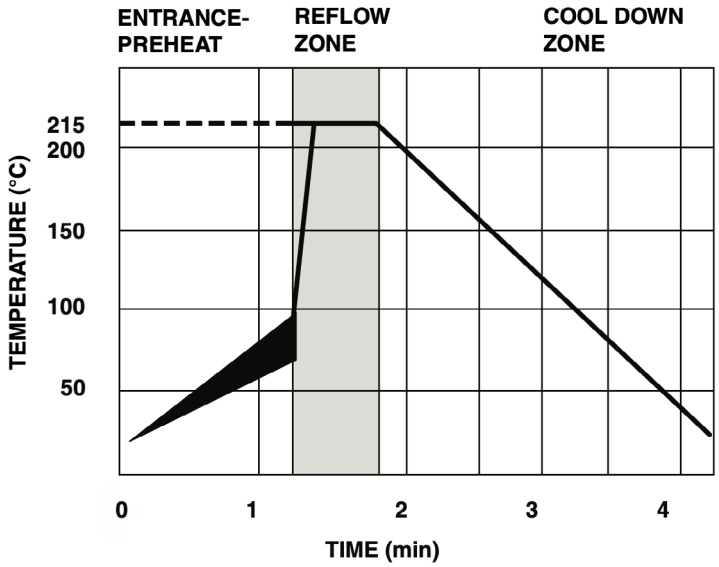
LEADFREE REFLOW SOLDERING PROFILE



SNPB REFLOW SOLDERING PROFILE



VAPOUR PHASE REFLOW PROFILE



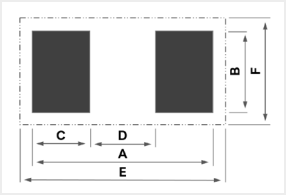
HAND SOLDERING

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 ≤3.0 mm and wattage max. 20W.
- The Capacitors shall be pre-heated to 150°C and the temperature gradient between the devices and the tip of the soldering iron.
- Tip temperature should be ≤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.

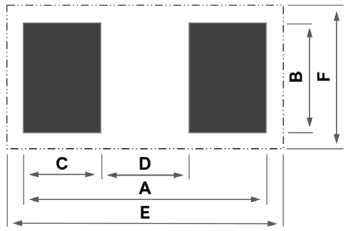
TYPICAL SMD FOOTPRINT WAVE SOLDERING

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



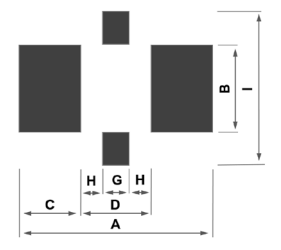
TYPICAL SMD FOOTPRINT REFLOW SOLDERING

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



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



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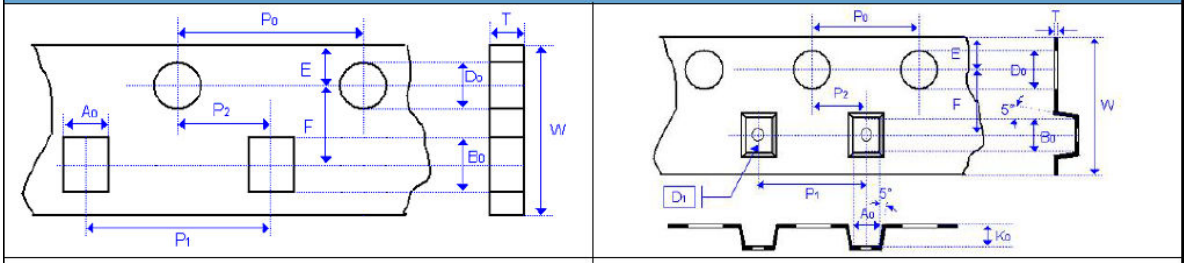
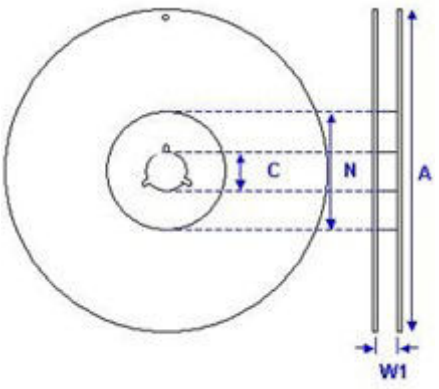
PACKAGE DIMENSION AND QUANTITY

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

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



RELIABILITY PRINCIPLES OVERVIEW

In order to guarantee highly reliable products to their customers, we follow a strict quality policy which is explained below :

- According to AECQ philosophy, each component belongs to a family, in which the 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 deepen 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.

TESTING

Tests conducted during each batch

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/batch	DPA		AEC-Q200-5	internal component integrity
5/batch	Dimension	CECC-32100-4.5	AEC-Q200-5	according to datasheet
5/batch	Resistance to soldering heat	CECC-32100-4.10	AEC-Q200-15	
5/batch	Solderability	CECC-32100-4.11	AEC-Q200-18	
10/batch	Voltage proof	CECC-32100-4.6.4		
1/ceramic batch	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	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 10-3	±2%	10% initial limit
N2T	≤ 6 10-3	±4%	10% initial limit
X7R	≤ 0.035	±15%	10% initial limit

REACH Compliance

- We deliver 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).

We confirm 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

We herewith confirms that RoHS-compliant 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 to the RoHS appendit 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 ***Sn*** 96.5 ***Ag*** 3 ***Cu*** 0.5

Export controls and dual-use regulations

Some components fall under ‘dual-use’ items under international export controls definition - those that can be used for civil or mili- tary 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 we use and maintain 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.