

CULUS ISO9001
ISO14001



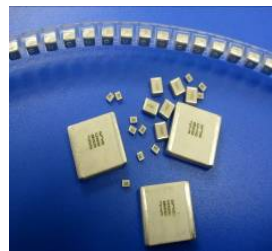
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2011

Electronic Materials Components

Multilayer Ceramic Capacitor

- High Q MLCC ; JQ Series
- High V MLCC ; ECCA Series



Joinset Co., Ltd.

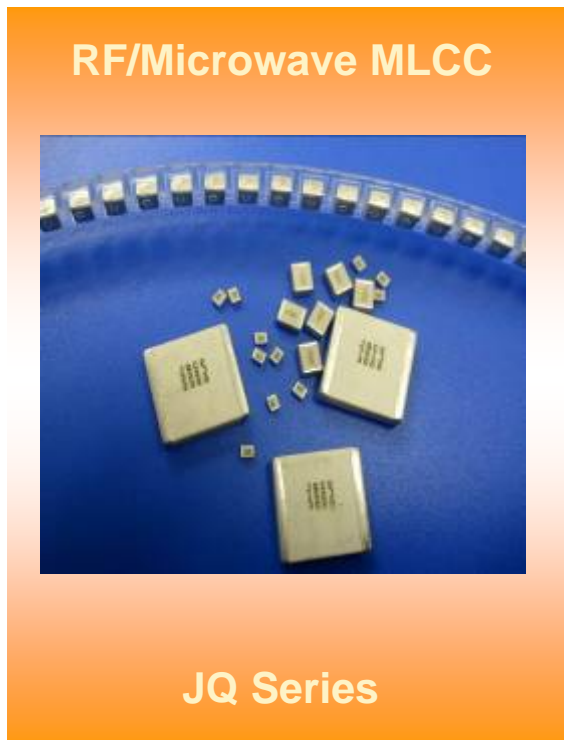
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I. High Q MLCC – JQ Series



1 What is High Q MLCC?

JQ series capacitor offers a very stable, High Q material system that provides excellent, low loss performance in application fields system below 4GHz. The range is available in 1414 to 9694 case sizes with various capacitance and voltage rating. This range of high frequency capacitors is suitable for many applications where economical, high performance is required.

2 Features

- Low ESR, High Quality Factor
- Temperature compensation ceramic [COG, A7G]
- Wide range of Cp & Vw spec.
- High range of resonance frequency
- EU-RoHS compliant

3 Applications

- RF Power / Low Noise Amplifiers
- Cellular Base Station Amplifiers, Filter Networks
- RF Impedance Matching, DC Blocking, By-Pass, Coupling

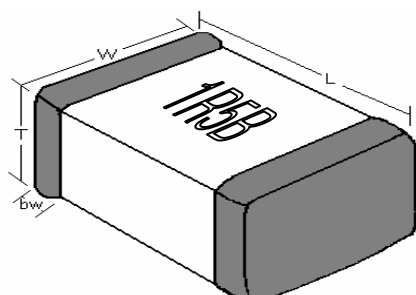
4 How to order

Part No. : JQ C B 101 J 501D N B
 (1) (2) (3) (4) (5) (6) (7) (8)

(1)	Product	JQ	Joinset High Q MLCC
(2)	Dielectric	C	COG : 0 +/- 30ppm/C
		P	A7G : 90 +/- 30ppm/C
(3)	Case Size	B	S : 1608, A : 1414, F : 2012, B : 2828, E : 9694
(4)	Capacitance	101	Examples 1R2 : 1.2pF 100 : 10pF 101 : 100pF

(5)	Tolerance	J	B : +/- 0.1pF C : +/- 0.25pF F : +/- 1%, J : +/- 5%
(6)	Voltage	501D	Examples 251D : 250Vdc 501D : 500Vdc
(7)	Termination	N	Ni Barrier / Sn Solder Plating
(8)	Taping	B	B : Bulk, T : Taping

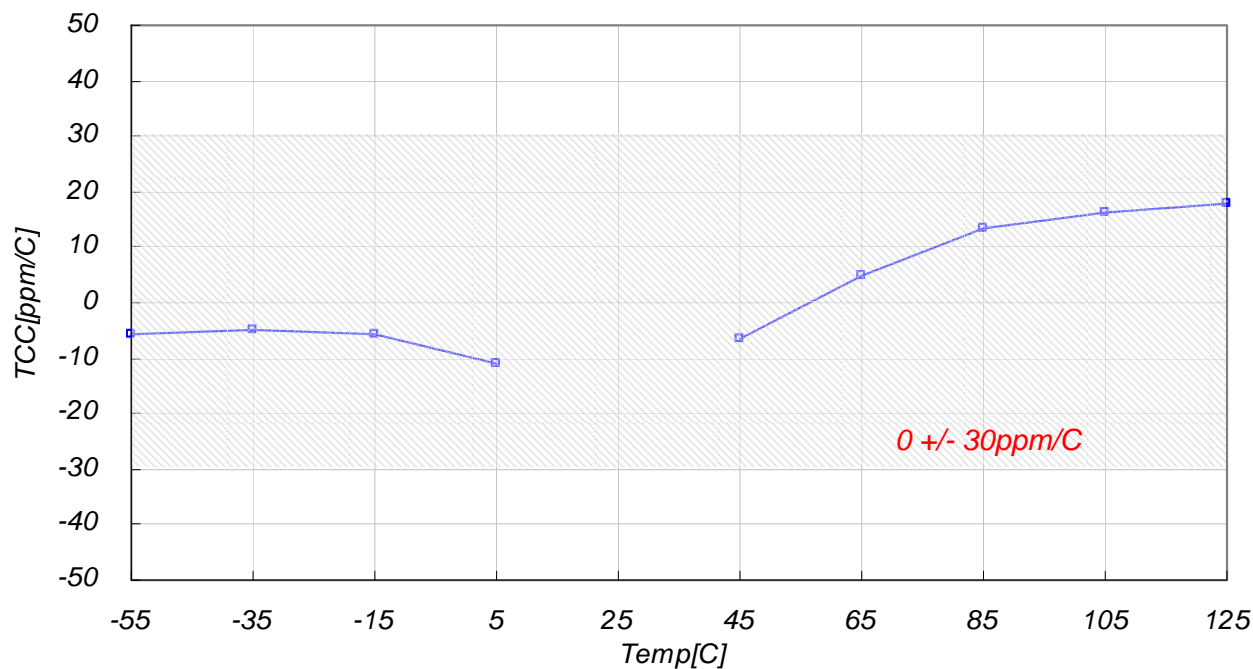
5 Dimension



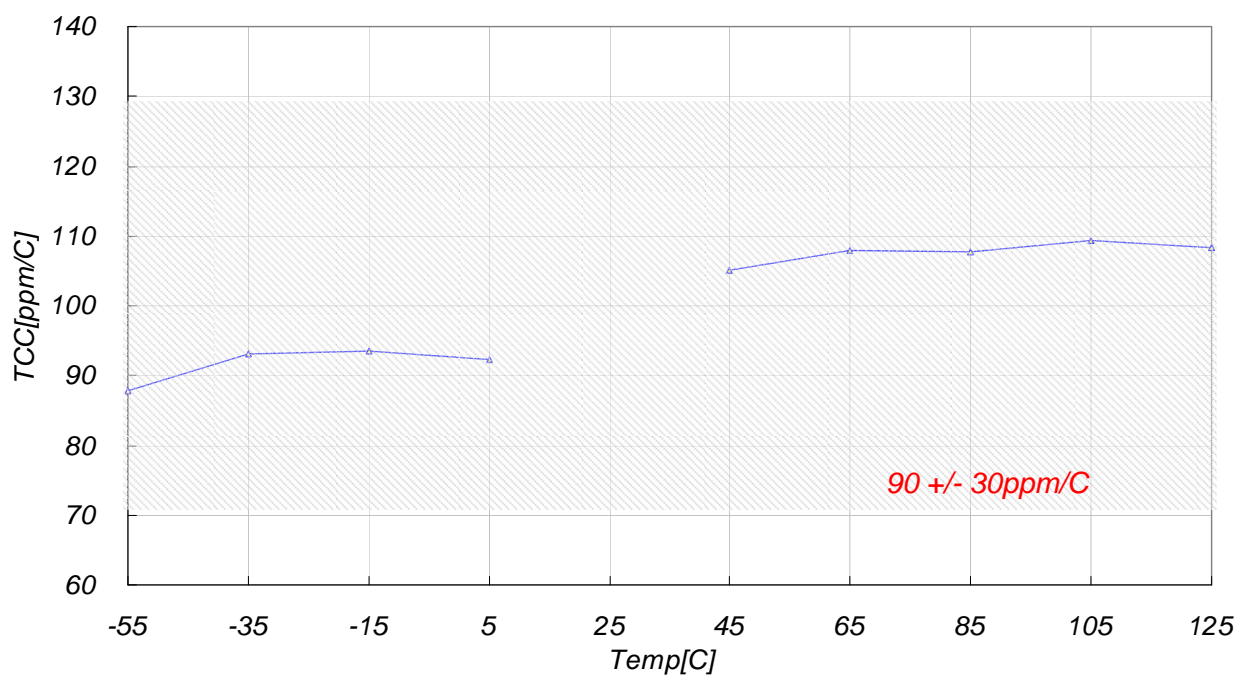
Case	Dimension [mm]				Marking
	L	W	T [max]	BW	
S	1.6 +/- 0.2	0.8 +/- 0.1	0.9	0.2 +/- 0.1	-
A	1.4 +/- 0.4	1.4 +/- 0.4	1.2	0.3 +/- 0.2	O
F	2.0 +/- 0.2	1.25 +/- 0.2	1.0	0.3 +/- 0.2	-
B	2.8 +/- 0.5	2.8 +/- 0.4	2.5	0.4 +/- 0.2	O
E	10 +/- 1.0	10 +/- 1.0	7.0	1.0 +/- 0.5	O

6 Temperature Characteristics

TC 1 : EIA C0G [NP0] Material



TC 2 : EIA A7G [P90] Material



7 Product List

TC 1 : EIA C0G [NP0] Material

Cp			Case Size				Cp			Case Size				
code	[pF]	Tol.	S [1608]	A [1414]	F [2012]	B [2828]	code	[pF]	Tol.	S [1608]	A [1414]	F [2012]	B [2828]	E [9694]
0R1	0.1	B					100	10	J					
0R2	0.2	B					120	12	J				500V	
0R3	0.3	B					150	15	J				[2kV]	
0R4	0.4	B					160	16	J					
0R5	0.5	B					180	18	J					
0R6	0.6	B					220	22	J	250V				
0R8	0.8	B					270	27	J					
0R9	0.9	B					330	33	J					
1R0	1.0	B					360	36	J				500V [1kV]	
1R1	1.1	B					390	39	J		250V	250V		3.6kV [7.2kV]
1R2	1.2	B					470	47	J		[500V]	[500V]		
1R3	1.3	B					560	56	J					
1R4	1.4	B					680	68	J					
1R5	1.5	B					820	82	J					
1R8	1.8	B	250V	250V	250V		101	100	J					
2R0	2.0	B	[500V]	[1kV]	[1kV]		121	120	J				500V	
2R1	2.1	B, C					131	130	J					
2R2	2.2	B, C					151	150	J					
2R5	2.5	B, C					181	180	J					
2R7	2.7	B, C					221	220	J					
3R0	3.0	B, C					271	270	J					
3R3	3.3	B, C					331	330	J					
3R6	3.6	B, C					391	390	J					3.6kV [5kV]
3R9	3.9	B, C					471	470	J					
4R0	4.0	B, C					561	560	J				250V	
4R7	4.7	B, C					681	680	J					
5R6	5.6	B, C					821	820	J					3kV
6R8	6.8	B, C					102	1000	J					
8R2	8.2	B, C					222	2200	J					2kV

- Note : “[]” – Extended Rating Voltage
- Please contact to us for more information.



TC 2 : EIA A7G [P90] Material

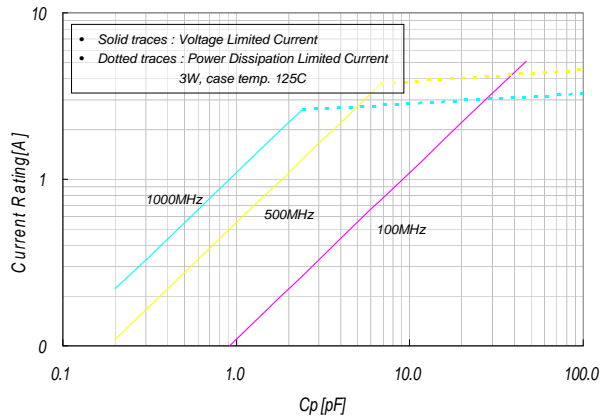
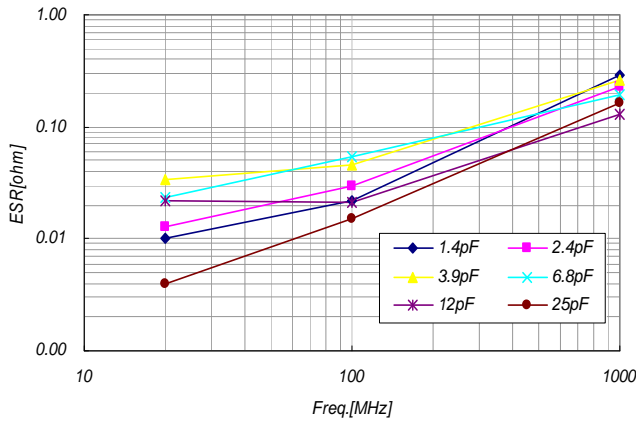
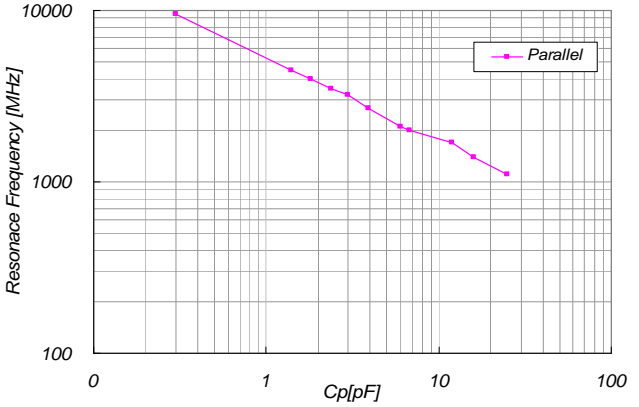
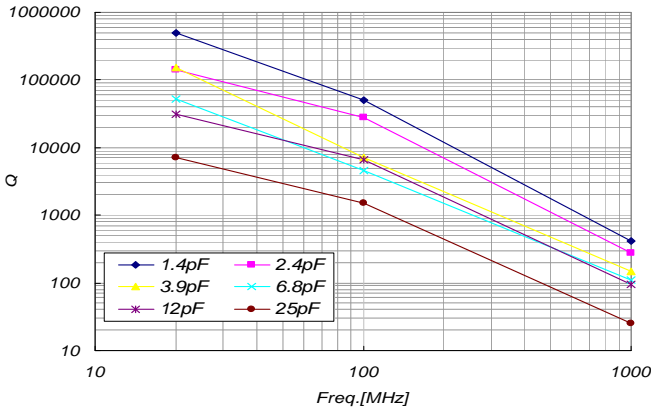
Cp			Case Size		Cp			Case Size		
code	[pF]	Tol.	A [1414]	B [2828]	code	[pF]	Tol.	A [1414]	B [2828]	E [9694]
0R1	0.1	B	250V	500V	100	10	J	250V	500V	3.6kV
0R2	0.2	B			120	12	J			
0R3	0.3	B			150	15	J			
0R4	0.4	B			160	16	J			
0R5	0.5	B			180	18	J			
0R6	0.6	B			220	22	J			
0R8	0.8	B			270	27	J			
0R9	0.9	B			330	33	J			
1R0	1.0	B			360	36	J			
1R1	1.1	B			390	39	J			
1R2	1.2	B	470	47	J	[500V]	500V	[7.2kV]		
1R3	1.3	B	560	56	J					
1R4	1.4	B	680	68	J					
1R5	1.5	B	820	82	J					
1R8	1.8	B	101	100	J					
2R0	2.0	B	121	120	J					
2R1	2.1	B, C	131	130	J					
2R2	2.2	B, C	151	150	J					
2R5	2.5	B, C	181	180	J					
2R7	2.7	B, C	221	220	J					
3R0	3.0	B, C	271	270	J	[1kV]	[3kV]			
3R3	3.3	B, C	331	330	J					
3R6	3.6	B, C	391	390	J					
3R9	3.9	B, C	471	470	J					
4R0	4.0	B, C	561	560	J					
4R7	4.7	B, C	681	680	J					
5R6	5.6	B, C	751	750	J					
6R8	6.8	B, C	821	820	J					
8R2	8.2	B, C	102	1000	J					

- Note : “[]” – Extended Rating Voltage
- Please contact to us for more information.

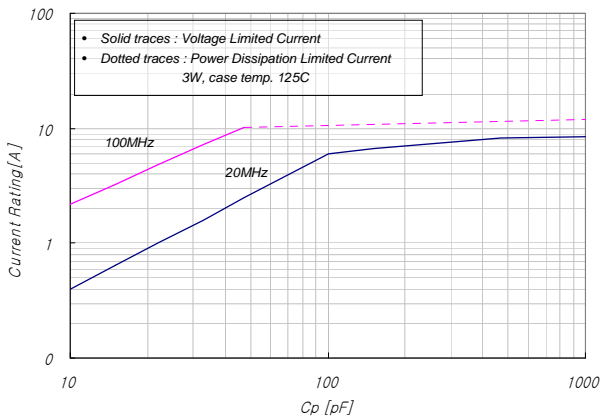
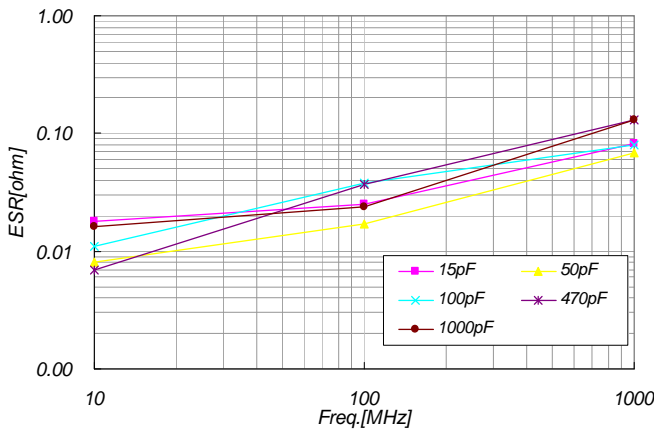
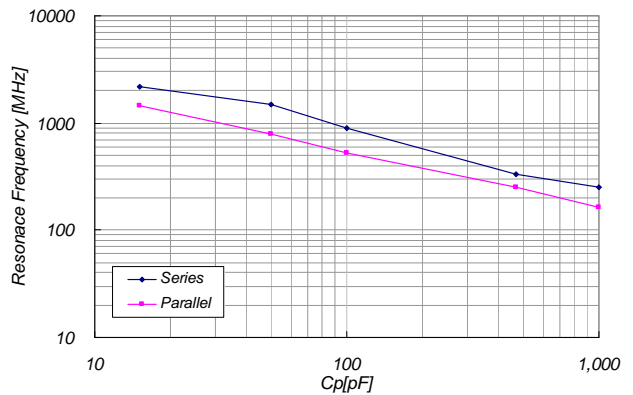
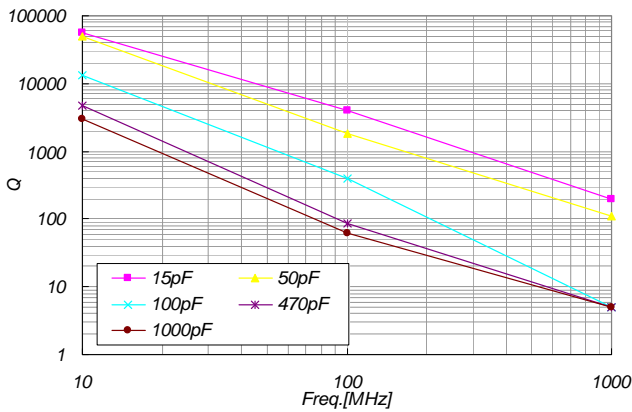


8 Frequency Characteristics

JQCS Series

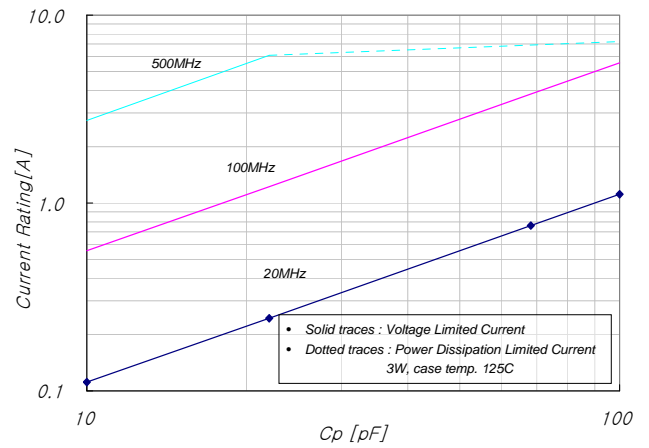
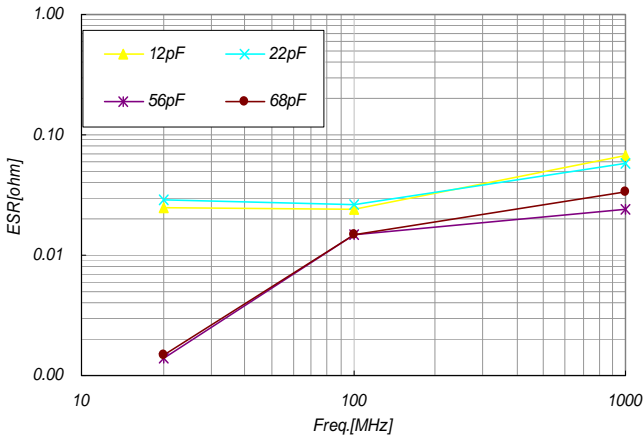
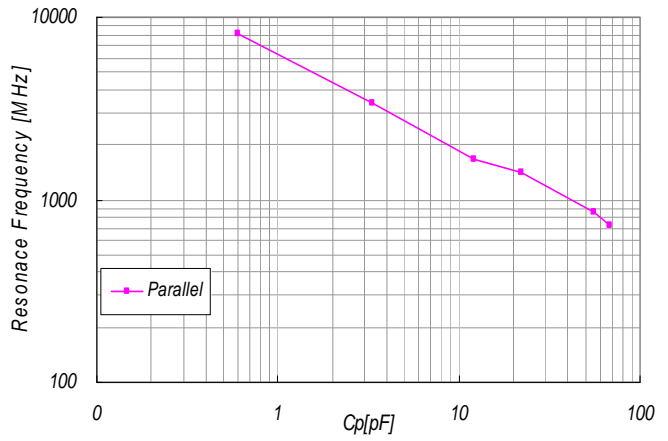
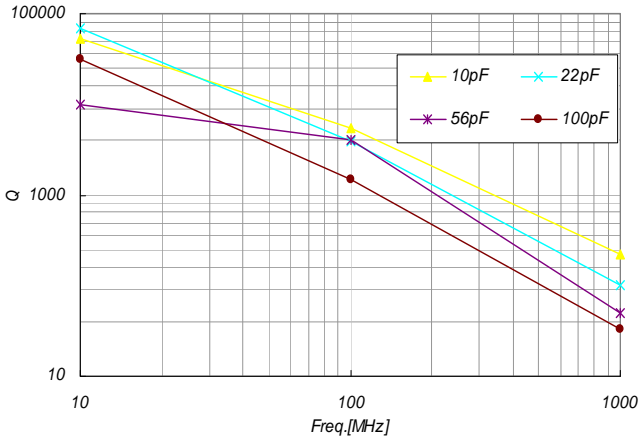


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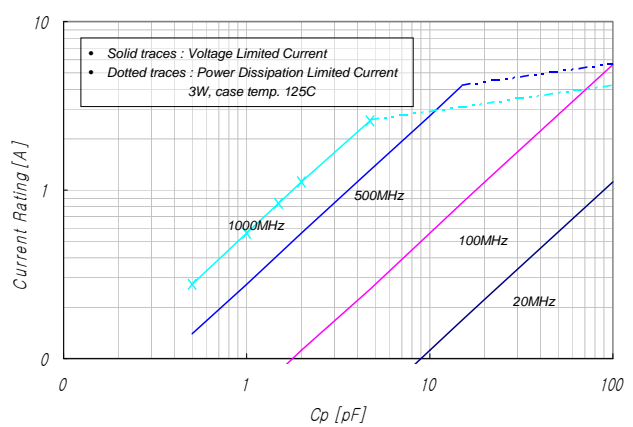
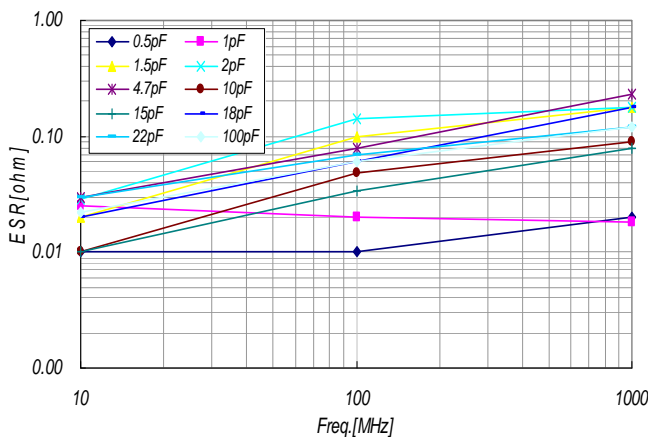
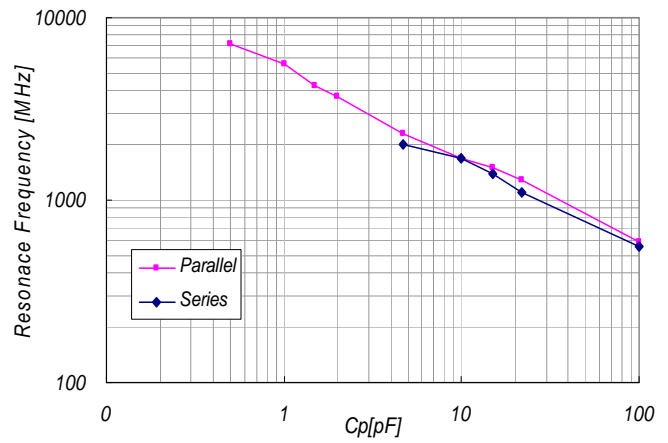
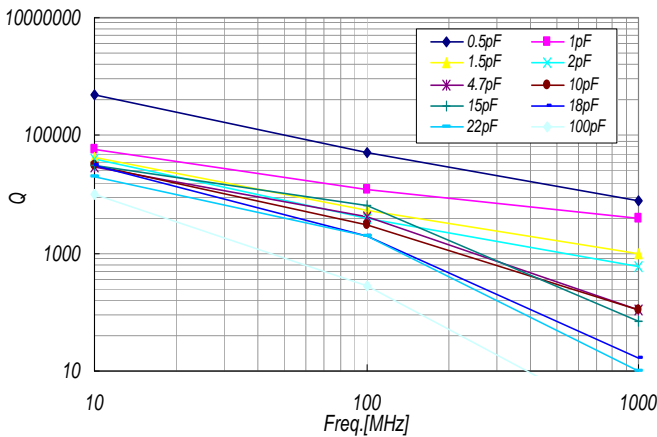




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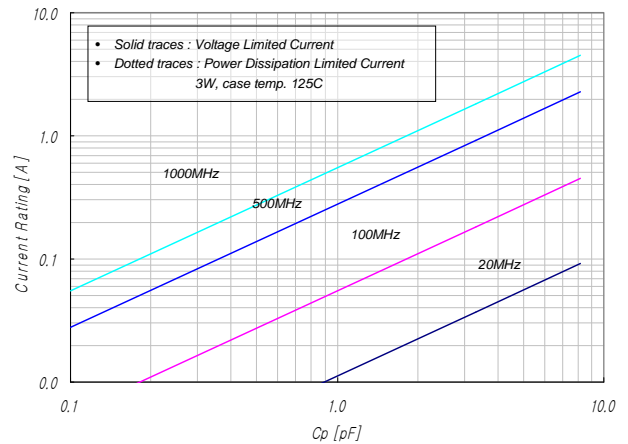
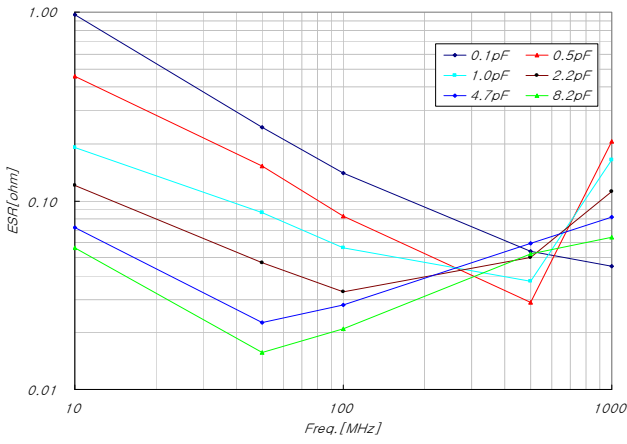
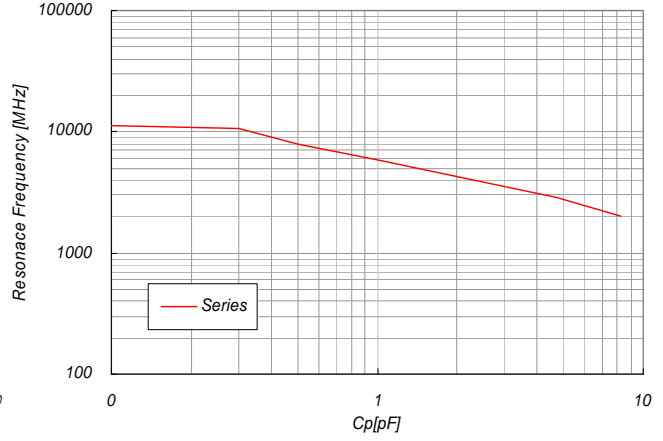
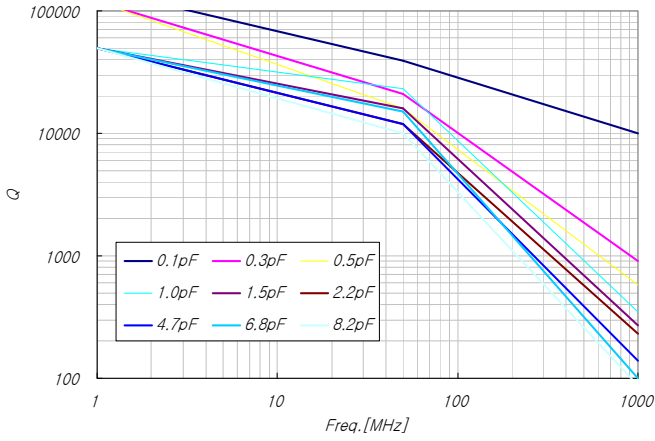


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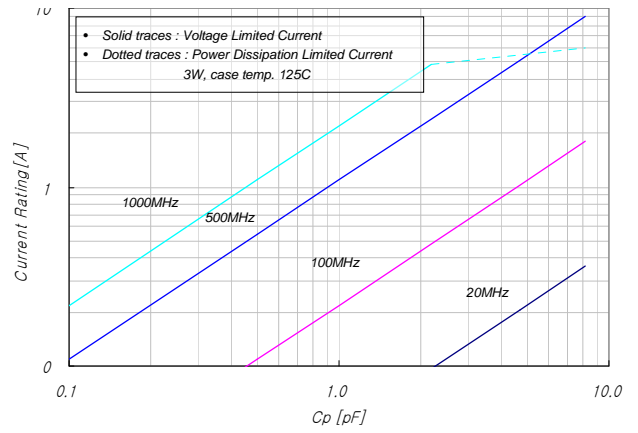
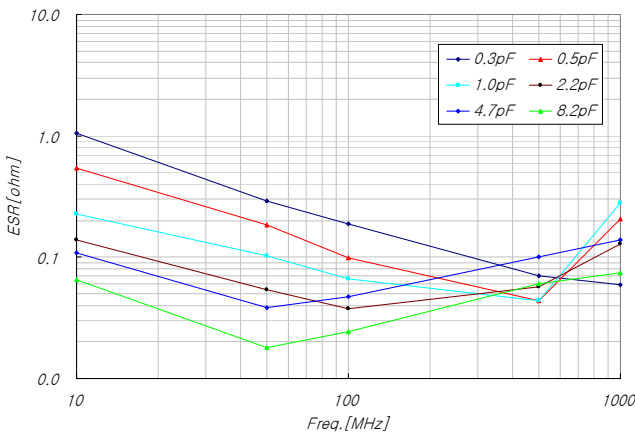
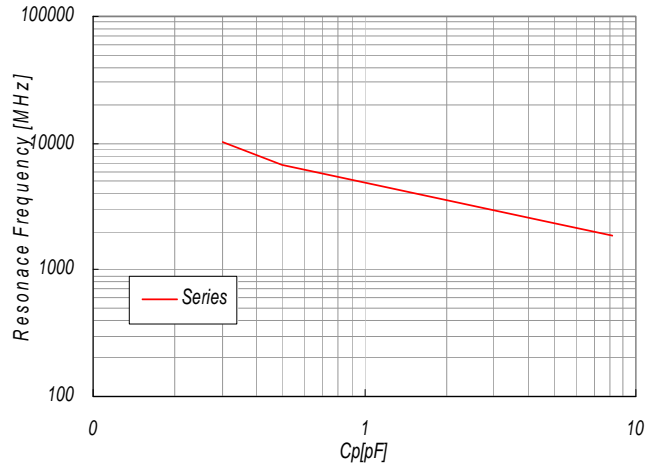
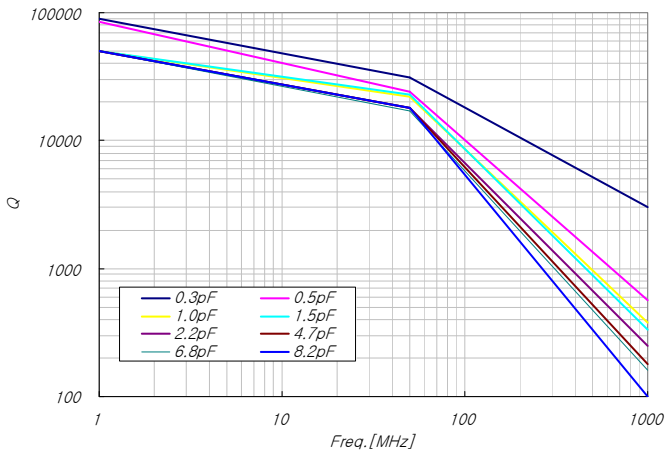




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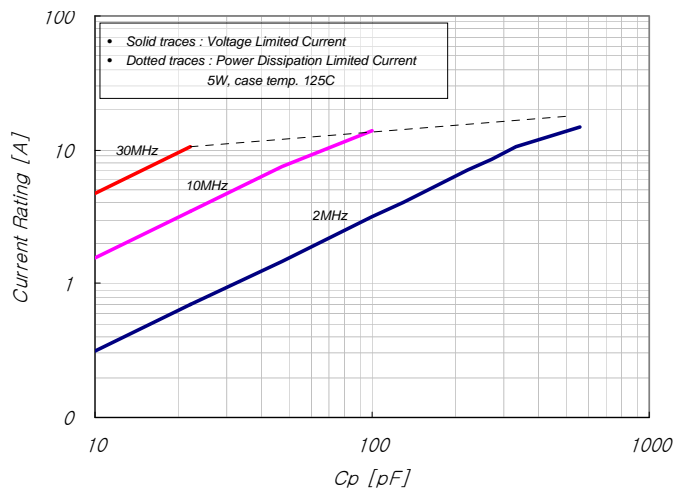
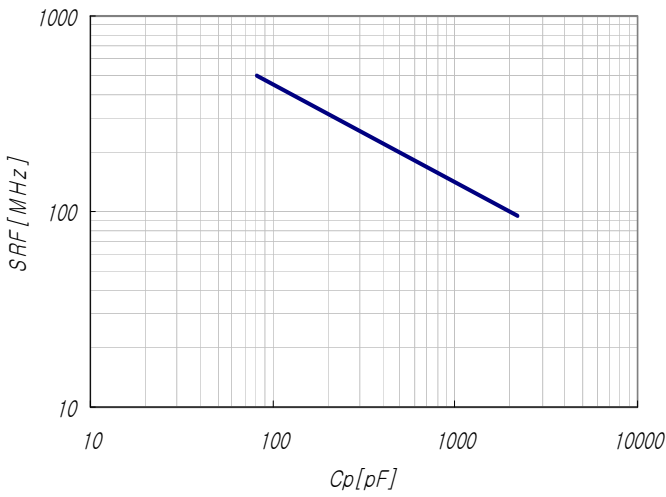
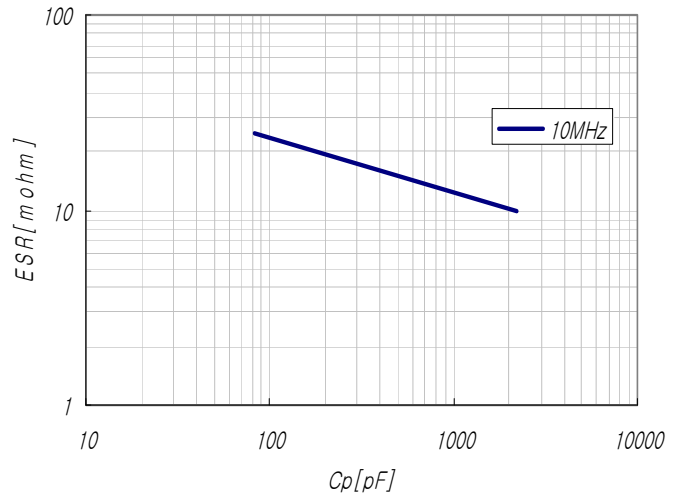
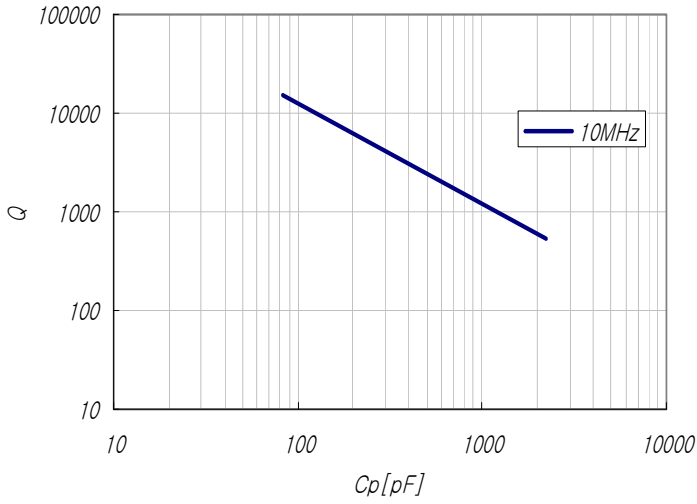


JQPB Series



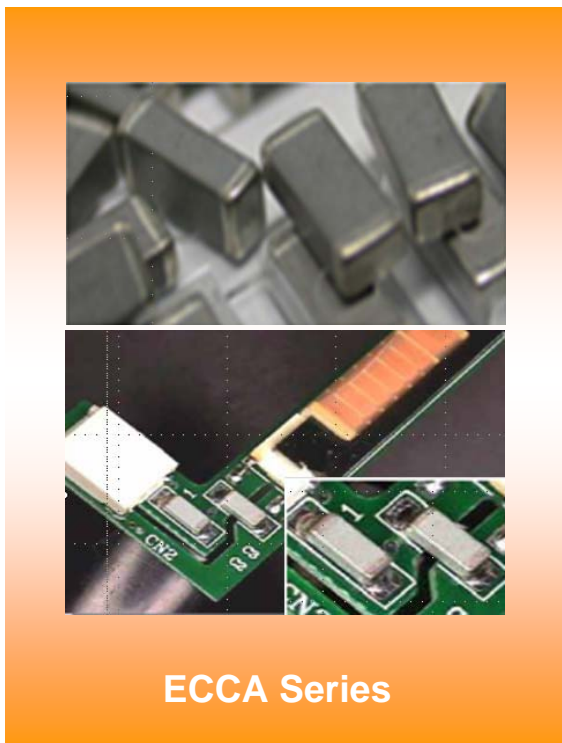


JQPE (<560pF), JQCE (≥ 560pF) Series





II. High Voltage MLCC – ECCA Series



1 What is High Voltage MLCC?

Joinset's high voltage MLCC, ECCA series has a wide range of working voltage specification 100V to 5kVdc, it is designed that it can maintain its own high insulation resistance and low loss without degradation in the high voltage circuit.

Especially, in case of 3kVdc products, it is certified by UL, TUV through their electrical safety recognition test, we hope that it can offer more stable reliability to application fields.

2 Features

- EU RoHS Compliant / Halogen Free
- Safety Recognition Certification [4520 3kVdc Product]
UL File No. : E248982 / TUV Certification No. : R50016122
- High Reliability in High Voltage Application Circuit

3 Applications

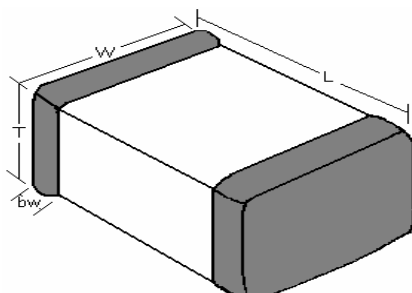
- LCD Backlight Inverter ; LCD TV, Monitor, Lap-top computer
- Ballast, SMPS Noise Filter
- Telecommunication unit [Modem/LAN] etc.

4 How To Order

Part No. : ECCA C0G 452013 100 J 302D N T
 (1) (2) (3) (4) (5) (6) (7) (8)

(1)	Product	ECCA	Joinset Ceramic Capacitor	(5)	Tolerance	J	F : +/- 1%, J : +/- 5% K : +/- 10%
(2)	Dielectric	C0G	0 +/- 30ppm/C	(6)	Voltage	302D	Examples 301D : 3,000Vdc
		X7R	+/- 15%				
(3)	Case Size	452013	L4.5 x W2.0 x t1.3 [mm] "Refer to dimension"	(7)	Termination	N	Ni Barrier / Sn Solder Plating
(4)	Capacitance	100	Examples 5R6 : 5.6p 100 : 10p 101 :100pF	(8)	Taping	T	B : Bulk, T : Taping

5 Dimension



Size	Dimension [mm]			
	L	W	T [max]	BW
3225	3.2 +/- 0.3	2.5 +/- 0.3	2.0	0.2 +/- 0.15
4520	4.5 +/- 0.4	2.0 +/- 0.2	1.8	0.6 +/- 0.30
5750	5.7 +0.5/-0.1	5.0 +/- 0.5	2.5	0.6 +/- 0.10

6 Product List

COG Material

Code	Cp[pF]	Tol.	3225	4520	5730	Code	Cp[pF]	Tol.	3225	4520	5750
5R6	5.6	J				331	330	J			
100	10	J				471	470	J		1kV	3kV
120	12	J				561	560	J			
150	15	J				681	680	J			
180	18	J				102	1,000	J, K			
220	22	J				152	1,500	J, K			
270	27	J	1kV			222	2,200	J, K			
330	33	J				252	2,500	J, K	200V		
360	26	J		3kV	5kV	272	2,700	J, K			
390	29	J				332	3,300	J, K			
470	47	J				472	4,700	J, K			
560	56	J				682	6,800	J, K			
680	68	J				103	10,000	J, K			
820	82	J				153	15,000	J, K			
101	100	J				223	22,000	J, K	N/A	N/A	N/A
121	120	J				333	33,000	J, K			
151	150	J	500V			473	47,000	J, K			
181	180	J		2kV	3kV	683	68,000	J, K			
221	220	J				104	100,000	K			

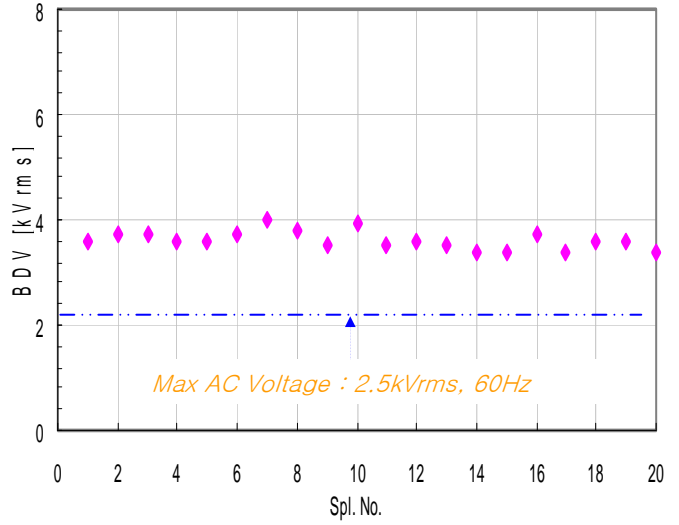
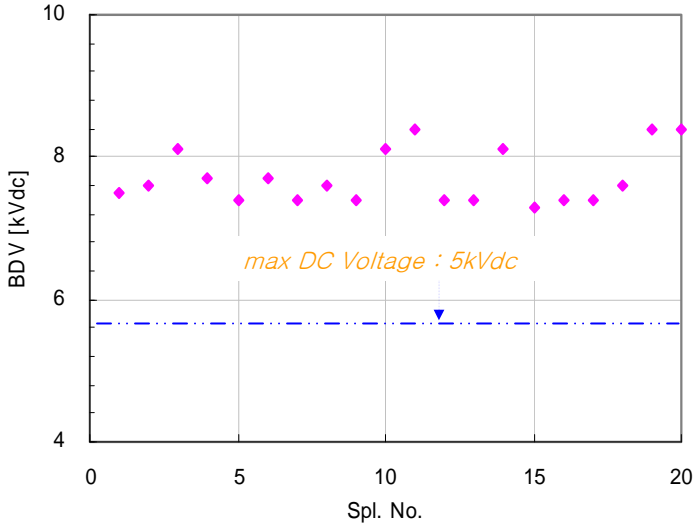
X7R Material

Code	Cp[pF]	Tol.	3225	4520	5730	Code	Cp[pF]	Tol.	3225	4520	5750
101	100	J				252	2,500	J			
121	120	J				272	2,700	J		1kV	
151	150	J				332	3,300	J	200V		
181	180	J			5kV	472	4,700	J			
221	220	J				682	6,800	J, K			
331	330		500V	3kV		103	10,000	J, K			
471	470					153	15,000	J, K			
561	560					223	22,000	J, K			
681	680					333	33,000	J, K			
102	1,000				3kV	473	47,000	J, K	100V		
152	1,500			2kV		683	68,000	J, K		100V	
222	2,200					104	100,000	J, K			

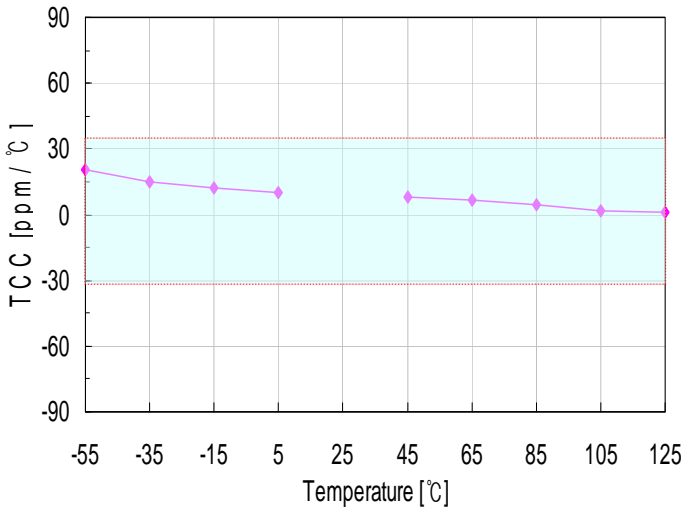


7 Electrical Properties [ECCAC0G575018680J502DNT]

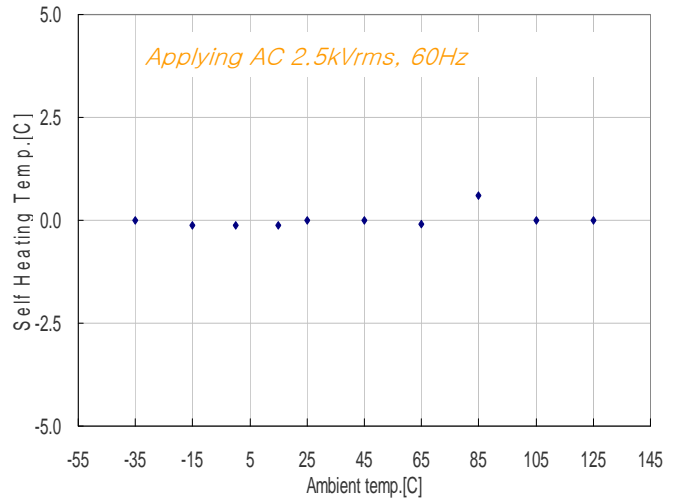
Breakdown Voltage, BDV



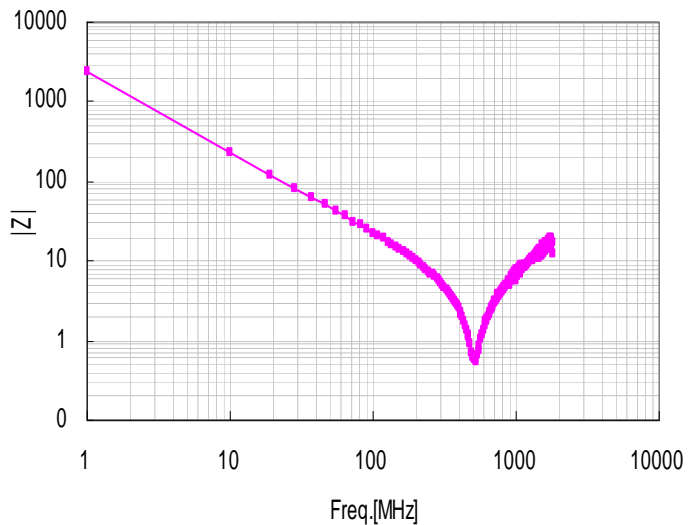
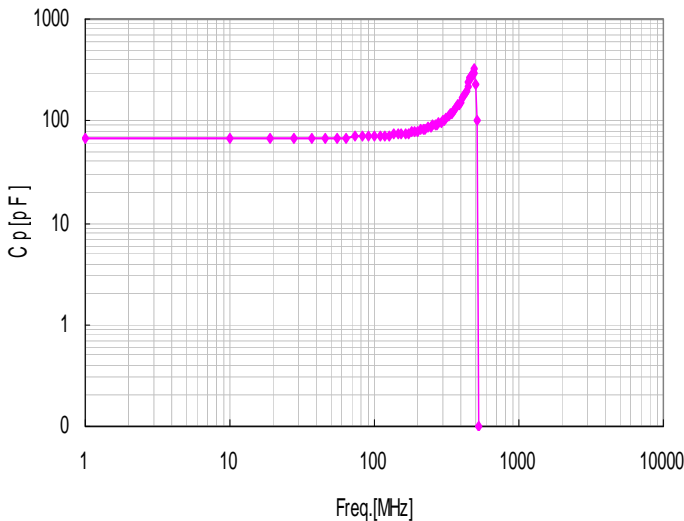
Temperature Change of Capacitance, TCC



Self Heating Temp.



Frequency Characteristics



III. Specifications

1 Product Specifications

항목	JQ Series		ECCA Series		비고
	C [C0G]	P [A7G]	C0G	X7R	
TCC	0+/-30ppm/C	90+/-30ppm/C	0+/-30ppm/C	+/-15%	
Operating Temp.	-55C ~ +125C		-55C ~ +125C		
Capacitance, Cp	10pF ~ 2.2nF	0.1pF ~ 470pF	5.6pF~4.7nF	100pF~100nF	
Dissipation factor, DF	a. 1414~2828 : ≤ 0.01% b. 9694 : ≤ 0.02%		≤ 0.1%	≤ 2.5%	<ul style="list-style-type: none"> ▪ ≤ 1nF : 1MHz, 1Vrms ▪ > 1nF : 1kHz, 1Vrms
Quality Factor, Q	a. 1414~2828 : ≥ 10,000 b. 9694 : ≥ 5,000		-	-	
Insulation Resistance, IR	a. 1414~2828 : ≥ 1,000GΩ b. 9694 : ≥ 10GΩ		≥ 10 GΩ	≥ 10GΩ	▪ Vw Applied (max 1kV)
Rating Voltage, Vw	Refer to the product list		Refer to the product list		
Dielectric Withstand Voltage	a. Vw ≤ 500V : Vw x 250% b. 1kV ≤ Vw ≤ 3kV : Vw x 150% c. 3kV < Vw ≤ 5kV : Vw x 120%		d. Vw > 5 : Vw x 110%		▪ Duration 5sec
Aging Effect	N/A		N/A	O	
Piezoelectric Effect	N/A		N/A	O	

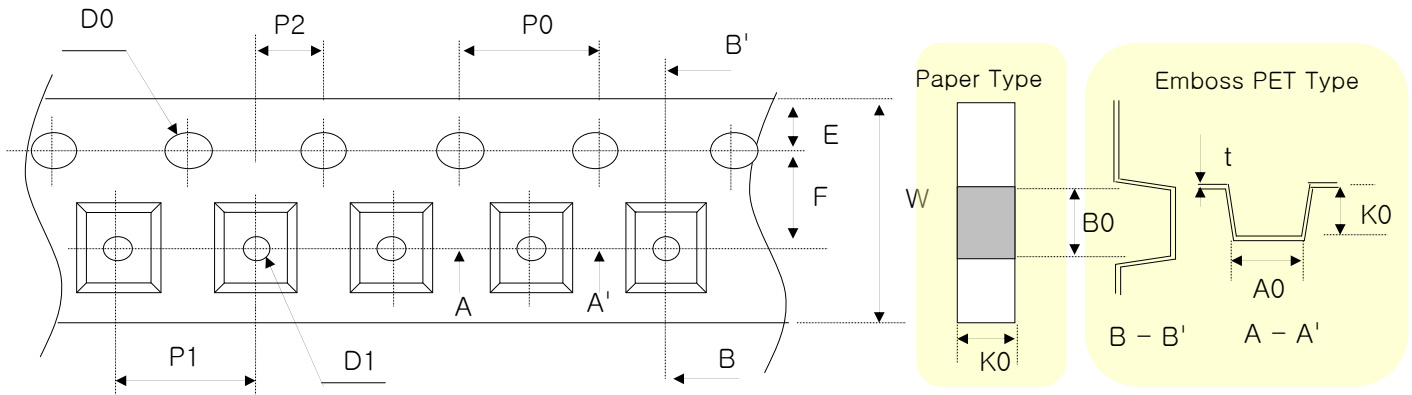
2 Environmental Reliability Test

	JQ Series		ECCA Series		MIL-STD-202
	C [C0G]	P [A7G]	C0G	X7R	
High Temp Load	<ul style="list-style-type: none"> • No mechanical damage • ΔCp : ≤ +/-3% • Q 1414~2828 : min 5,000 9694 : min 2,500 • IR : min 10GΩ 		<ul style="list-style-type: none"> • ΔCp : ≤ 5% • DF : ≤ 0.2% • IR : ≥ 10GΩ 	<ul style="list-style-type: none"> • ΔCp : ≤ 12.5% • DF : ≤ 5% • IR : ≥ 1GΩ 	METHOD : 108 a. Applied Voltage * Vw ≤ 500V : Vw x 200% * 1kV ≤ Vw ≤ 2kV : Vw x 150% * Vw ≥ 3kV : Vw x 100% b. Temp. & time : 125C, 1,000hrs
Humidity			<ul style="list-style-type: none"> • ΔCp : ≤ 5% • DF : ≤ 0.2% • IR : ≥ 10GΩ 	<ul style="list-style-type: none"> • ΔCp : ≤ 12.5% • DF : ≤ 2.5% • IR : ≥ 10GΩ 	METHOD : 106 85%RH, 85C, 1,000hrs
Solder Heat			<ul style="list-style-type: none"> • ΔCp : ≤ 2.5% • DF : ≤ 0.1% • IR : ≥ 10GΩ 	<ul style="list-style-type: none"> • ΔCp : ≤ 7.5% • DF : ≤ 2.5% • IR : ≥ 10GΩ 	METHOD : 210 Contact the hot iron(350C, 10sec) to product termination
Temp. Cycle			<ul style="list-style-type: none"> • ΔCp : ≤ 7.5% • DF : ≤ 0.1% • IR : ≥ 10GΩ 	<ul style="list-style-type: none"> • ΔCp : ≤ 7.5% • DF : ≤ 2.5% • IR : ≥ 10GΩ 	METHOD : 102 1cycle : -55C → 25C → 125C → 25C Maintain for 30min [5times Repetition of Cycle]
PCB Bending Strength	<ul style="list-style-type: none"> • No mechanical damage • ΔCp : ≤ +/-10% 				METHOD : IEC60068-2-21 FR4 t 1.6mm PCB, Solder Joint 1mm bending depth
Adhesion Test	<ul style="list-style-type: none"> • No mechanical damage • ΔCp : ≤ 10% 				METHOD : 211 1608/1414 : 1kgf, 2828 : min 1.5kgf 9694 : min 3.0kgf



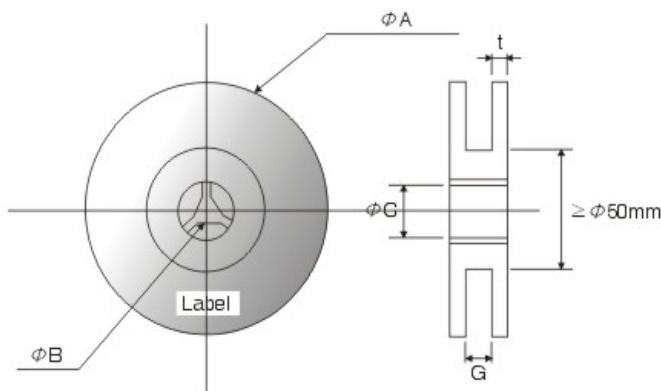
3 Packing Specifications

1) Carrier Tape



Case	type	A0	B0	W	D	D1	E	F	P	P0	P2	K0	t
1608	Paper	1.1 ±0.1	1.9 ±0.1	8.0 ±0.2	1.55 ±0.05		1.75 ±0.1	3.5 ±0.05	4.0 ±0.1	4.0 ±0.1	2.0 ±0.1	1.1max	
1414	Emboss	1.40 ±0.1	2.30 ±0.1	8.0 ±0.2	1.55 ±0.05	1.0 ±0.25	1.75 ±0.1	3.5 ±0.05	4.0 ±0.1	4.0 ±0.1	2.0 ±0.1	1.1max	0.23 ±0.1
2828 3225	Emboss	2.8 ±0.1	3.5 ±0.1	12.0 ±0.2	1.55 ±0.05	1.5 ±0.25	1.75 ±0.1	5.5 ±0.05	4.0 ±0.1	4.0 ±0.1	2.0 ±0.1	2.2 ±0.1	0.23 ±0.1
4520	Emboss	2.35 ±0.1	4.95 ±0.1	12.0 ±0.3	1.75 ±0.1	1.5 ±0.25	1.75 ±0.1	5.5 ±0.05	4.0 ±0.1	4.0 ±0.1	2.0 ±0.05	1.60 ±0.1	0.25 ±0.1
5750	Emboss	5.3 ±0.1	6.2 ±0.1	12.0 ±0.3	1.75 ±0.1	1.5 ±0.25	1.75 ±0.1	5.5 ±0.05	8.0 ±0.1	4.0 ±0.1	2.0 ±0.05	2.8max	0.25 ±0.1

2) Plastic Reel



Unit : [mm]

code	1608/1414	2828~5750
ΦA	178±2.0	178±2.0
ΦB	13.0±0.5	13.0±0.5
ΦC	22.0±2.0	22.0±2.0
G	10.0±1.5	14.0±1.5
t	2.5±0.5	2.5±0.5

3) Packing Unit

Size [mm]	1608	1414	2828	3225	4520	5750	9694
pcs/reel	4,000	4,000	1,500	3,000	3,000	1,000	
Inner Box [pcs]	20,000	20,000	7,500	12,000	12,000	4,000	벌크 포장
Outer Box [pcs]	200,000	200,000	75,000	120,000	120,000	40,000	