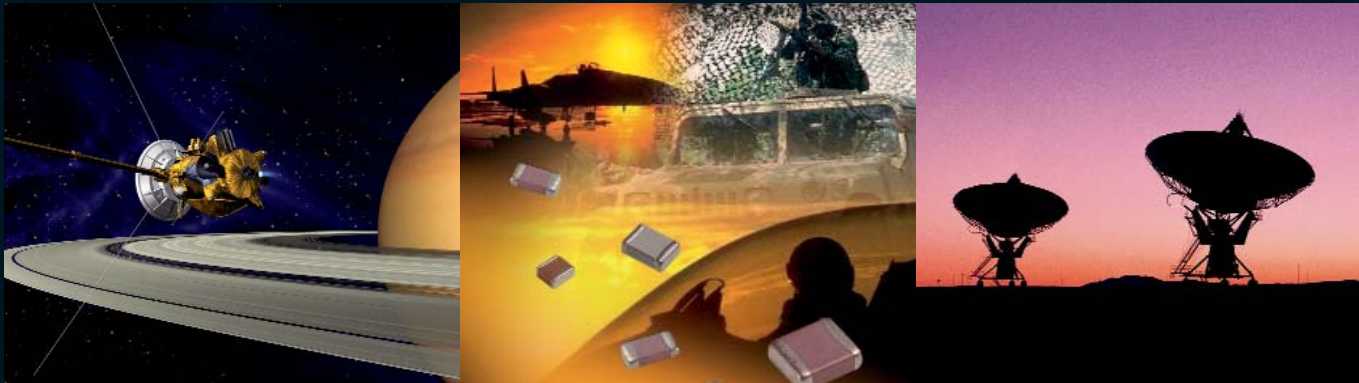


# AVX European Space Agency and CECC Ceramic Capacitor Products



Version 14.1

**AVX**  
A KYOCERA GROUP COMPANY

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***All products to be considered Not RoHS Compliant unless otherwise indicated.***

NOTICE: Specifications are subject to change without notice. Contact your nearest AVX Sales Office for the latest specifications. All statements, information and data given herein are believed to be accurate and reliable, but are presented without guarantee, warranty, or responsibility of any kind, expressed or implied. Statements or suggestions concerning possible use of our products are made without representation or warranty that any such use is free of patent infringement and are not recommendations to infringe any patent. The user should not assume that all safety measures are indicated or that other measures may not be required. Specifications are typical and may not apply to all applications.



# Space Level BME MLCCs



## EPPL II ESA Approved (ESCC 3009)



The AVX Space BME ( Base Metal Electrode ) X7R surface mount MLCC utilizes the leading edge technology in MLCC construction and processing. This technology delivers high reliability with a superior capacitance voltage capability compared to conventional technologies. The higher capacitance values in the smaller case sizes not only reduces the amount of board space used but also the weight of the components. The surface mount components also incorporate Flexitem<sup>®</sup>, which greatly improves the resistance to the mechanical stress of the MLCCs.

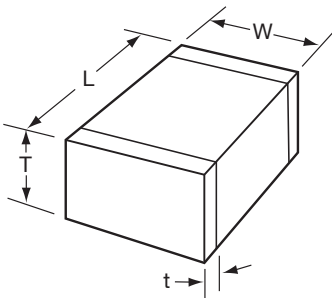
### FEATURES

- Higher CV capability than PME capacitors resulting in reduced weight of components.
- Use of Flexitem<sup>®</sup> technology for enhanced mechanical stress resistance.
- EPPL II ESA Approved, (ESCC 3009)
- A wide range of case sizes: 0603-1812
- A wide voltage range: 16-100V

### HOW TO ORDER

<b>0603</b>	<b>5</b>	<b>C</b>	<b>103</b>	<b>K</b>	<b>E</b>	<b>7</b>	<b>2</b>	<b>C</b>	<b>0</b>
<b>Size</b>	<b>Voltage</b>	<b>Dielectric</b>	<b>Capacitance Code (In pF)</b>	<b>Capacitance Tolerance</b>	<b>Failure Rate</b>	<b>Terminations</b>	<b>Packaging</b>	<b>Special Code</b>	<b>LAT Code</b>
0603 (var 01) 0805 (var 02) 1206 (var 03) 1210 (var 04) 1812 (var 05)	Y = 16V 3 = 25V 5 = 50V 1 = 100V	C = X7R	2 Sig. Digits + Number of Zeros e.g. 102 = 1000pF	J = ± 5% K = ±10% M = ± 20%	E = ESCC	R = Sn/Pb (10% Pb Min)	6 = Waffle pack	B = Test level B C = Test level C	0 = No LAT 1 = LAT 1 2 = LAT 2 3 = LAT 3

### DIMENSIONS



mm (inches)

Size	0603		0805		1206		1210		1812	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
(L) Length	1.45 (0.057)	1.75 (0.069)	1.80 (0.071)	2.20 (0.087)	3.00 (0.118)	3.40 (0.134)	3.00 (0.118)	3.40 (0.124)	4.20 (0.165)	4.80 (0.189)
(W) Width	0.65 (0.026)	0.95 (0.037)	1.05 (0.041)	1.45 (0.057)	1.40 (0.055)	1.80 (0.071)	2.30 (0.091)	2.70 (0.106)	3.00 (0.118)	3.40 (0.124)
(T) Thickness	1.00 (0.039) Max.		1.52 (0.060) Max.		1.80 (0.071) Max.		2.80 (0.110) Max.		2.80 (0.110) Max.	
(t) terminal	0.20 (0.008)	0.50 (0.020)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.95 (0.037)



# Space Level BME MLCCs

EPPL II ESA Approved (ESCC 3009)



**PREFERRED SIZES ARE SHADED**

Case Size		0603			0805			1206			1210			1812		
Code	Value	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V	25V	50V	100V
222	2.2 (nF)	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
272	2.7	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
332	3.3	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
392	3.9	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
472	4.7	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
562	5.6	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
682	6.8	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
822	8.2	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded									
103	10	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded						
123	12	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded						
153	15	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded						
183	18	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded						
223	22	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
273	27	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
333	33	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
393	39	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
473	47	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
563	56	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
683	68	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
823	82	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded			
104	100	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
124	120	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
154	150	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
184	180	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
224	220	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
274	270	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
334	330	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
394	390	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
474	470	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
564	560	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
684	680	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
824	820	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
105	1 (µF)	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
125	1.2	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
155	1.5	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
185	1.8	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
225	2.2	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
275	2.7	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
335	3.3	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
395	3.9	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
475	4.7	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
565	5.6	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
685	6.8	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded
825	8.2	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded	Shaded

# Space Level BME MLCCs



EPPL II ESA Approved (ESCC 3009)

## ELECTRICAL SPECIFICATION

### ELECTRICAL MEASUREMENTS AT ROOM TEMPERATURE

No.	Charateristics	Symbol	ESCC 3009 Test Conditions	Limits		Unit
				Min.	Max.	
1	Capacticance	C	Para. 9.4.1.1	-5.0 -10 -20	+5.0 +10 +20	%
2	Tangent of Loss Angle	Tgδ	Para 9.4.1.2	-	250 (1)	10 <sup>-4</sup>
3	Insulation Resistance	R <sub>i</sub> R <sub>i</sub> xC	Para. 9.4.1.3 C≤10,000 pF C≥10,000 pF	100 1000	-	GΩ sec
4	Voltage Proof	VP	Para. 9.4.1.4	2.5 U <sub>R</sub>	-	V

**NOTE:** 1. 300 max for 16 volt and 25 volt rated components

### ELECTRICAL MEASUREMENTS AT HIGH AND LOW TEMPERATURE

No.	Charateristics	Symbol	ESCC 3009 Test Conditions	Limits		Unit	Remarks
				Min.	Max.		
3	Insulation Resistance At +125 ± 3°C	R <sub>i</sub> R <sub>i</sub> xC	Para. 9.4.1.3 C≤10,000 pF C≥10,000 pF	10 100	-	GΩ sec	Notes 1 and 2
5	Temperature Characteristic $\frac{\Delta C}{C} = f(T)$	TCC	Para. 9.12 V <sub>T</sub> -0	-20	+20	%	5 parts for each capacitance value Notes 2 and 3

**NOTE:** 1. Single Sample, Inspection Level S3, AQL = 2.5%  
 2. If 1 failure out of 5 parts, then test 100%. 1.0% rejects maximum allowed in case of 100% testing.  
 3. X7R dielectric: Delta C/C at U<sub>R</sub> is typically -10% to -70% dependant on capacitance value. (See curves on next page)



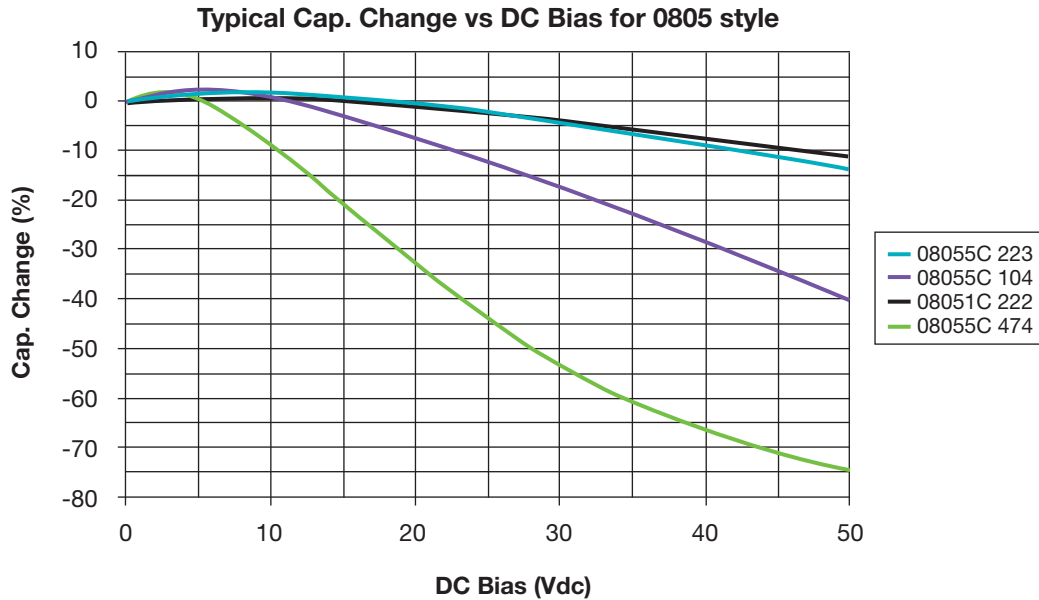
# Space Level BME MLCCs



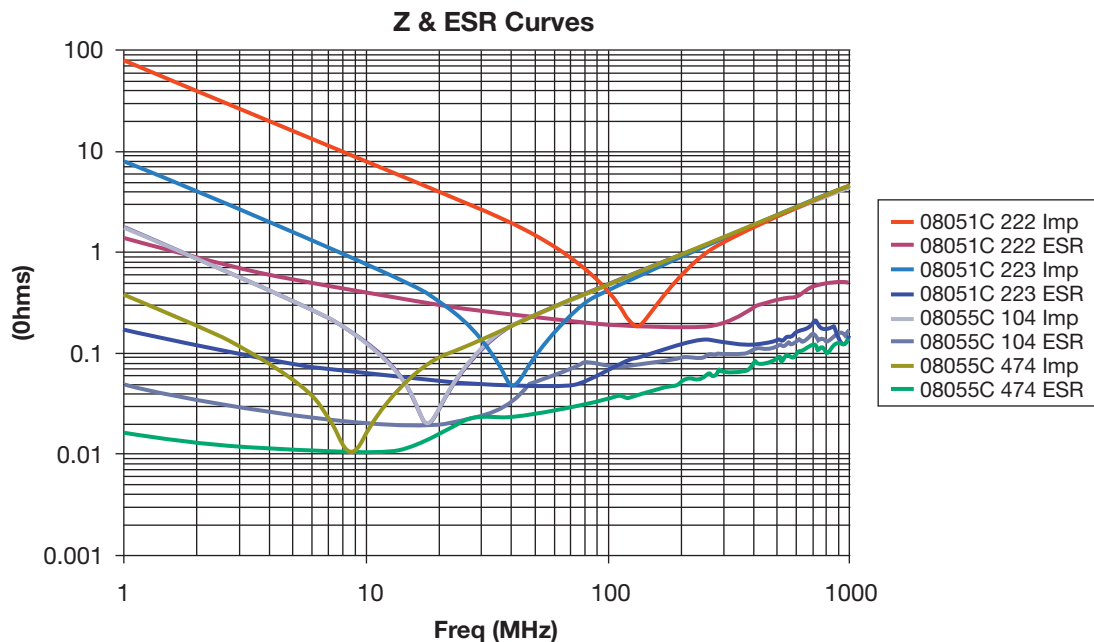
EPPL II ESA Approved (ESCC 3009)

## TYPICAL ELECTRICAL CHARACTERISTICS FOR ESCC BME SURFACE MOUNT

### CAPACITANCE TEMPERATURE CHARACTERISTICS FOR 0805 STYLE (WITH DC BIAS)



### IMPEDANCE WITH ESR CHARACTERISTICS FOR 0805 CAPACITANCE RANGE



If required AVX will produce a data sheet for each part number with the following information:

- Impedance/ESR Frequency Sweep
- Capacitance Change with Temperature from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Capacitance Change with DC Voltage up to the rated voltage of the component
- Temperature Change with AC Current applied for higher capacitance values.



# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products

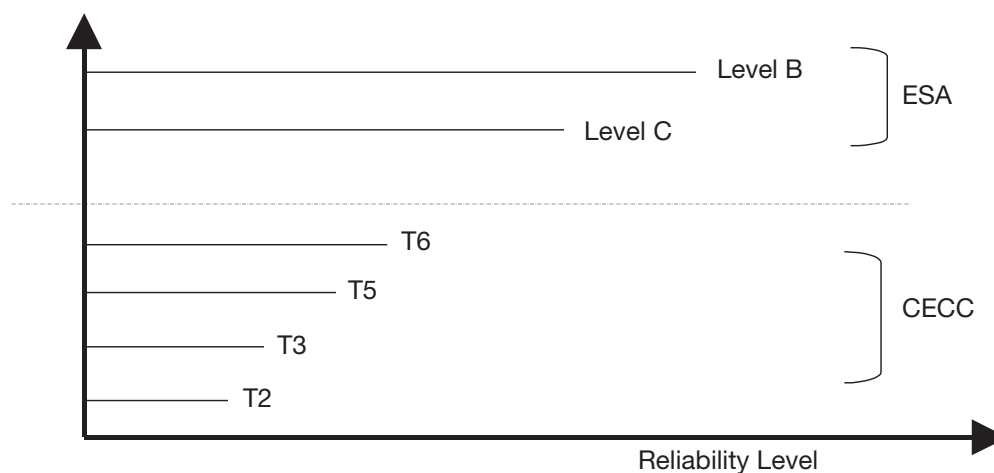


## AVAILABLE TYPES

MLC CHIPS vs ESA ESCC & vs CECC 32101-002, 003 (established reliability) from 25V up to 500V.

## AVAILABLE RELIABILITY LEVELS

ESA QUALIFIED - LEVEL B	NB	with or without LAT I, II or III
ESA QUALIFIED - LEVEL C	NC	
CECC + 100% Burn in /168H + Thermal shock + 85/85 humidity test + on 40 samples per batch + DPA	T6	
CECC + 100% Burn in /168H + DPA	T5	
CECC + 100% Burn in /48H + DPA	T3	
CECC + DPA	T2	



- ▶ Level T5 & T6: Reliability Level = MIL S
- ▶ Level T3: Reliability Level = MIL R

## AVAILABLE RELIABILITY LEVELS SUMMARY/TYPES

Types	Products		Reliability Level		
			T6 to T2	Level B	Level C
MLC Chips	AN, AC & AD 12, 13, 14, 15, 20 (NP0, X7R)	<b>CECC</b>	X		
MLC Chips ESA Qualified/3009	A...C NP0 A...Z X7R A...G 2C1	<b>ESA ESCC</b>		X	X

## RELEVANT STANDARDS

Type of Component	Reliability Level	
	T2 / T3 / T5 / T6	Level B & C
MLC Chips	CECC 32101-002 32101-003 32101-801 (IEC 384-8-9-10)	ESA ESCC 3009

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## DIELECTRIC TYPES USED

### Type I

▶ NP0      ▶ TPC Code: C

### Type II

▶ X7R      ▶ TPC Code: Z  
▶ 2C1      ▶ TPC Code: G

## ELECTRICAL MEASUREMENT CONDITIONS FOR CECC CHIPS: T2 / T3 / T5 / T6

Type		1	2
TPC code		<b>C</b>	<b>Z</b>
Classification	IEC/CECC EIA DIN MIL	1B C0G NP0 CG	2R1 X7R
Capacitance change With temperature & : Ubias = 0 Ubias = UR		±30ppm/°C	± 15% N.A.
Typical ageing (%/dec.)		0	1.5
Reference temperature		22°C ±3°C	22°C ±3°C
Capacitance and D.F. measurement	Frequency Voltage	C ≤ 1000 pF    F = 1MHz C > 1000 pF    F = 1 kHz Um ≤ 5 Vrms	C ≤ 100 pF      F = 1MHz C > 100 pF      F = 1 kHz Um ≤ 0.3 Vrms ± 0.2
Dissipation Factor (DF)		C ≤ 50 pF    DF < 1.5 (150/C + 7).10 <sup>-4</sup> C > 50 pF    DF < 15.10 <sup>-4</sup>	DF < 250 .10 <sup>-4</sup>
Insulation Resistance under UR /1 mn		For C ≤ 10nF: Ri > 100 GΩ or For C > 10nF: Ri x Cr > 1000s	For C ≤ 10nF: Ri > 100 GΩ or For C > 10nF: Ri x C > 1000s
Proof voltage		For UR ≤ 100V : 2.5 x UR For UR > 100V : 1.5 UR + 100V	For UR ≤ 100V: 2.5 x UR For UR > 100V: 1.5 x UR + 100V

Note: ESA Chips are strictly measured vs ESA spec. 3009 + detail spec.

## ELECTRICAL MEASUREMENT CONDITIONS FOR ESA CHIPS: LEVEL B & C

Type		1	2	
TPC code		<b>C</b>	<b>Z</b>	<b>G</b>
Classification	IEC/CECC EIA DIN MIL	1B C0G NP0 CG	2R1 X7R	2C1  BX
Capacitance change With temperature & : Ubias = 0 Ubias = UR		±30ppm/°C	± 20% *-60/+20%	± 20% -30/+20%
Typical ageing (%/dec.)		0	1.5	1.5
Reference temperature		22°C ±3°C	22°C ±3°C	22°C ±3°C
Capacitance and D.F. measurement	Frequency Voltage	C ≤ 1000 pF    F = 1MHz C > 1000 pF    F = 1 kHz Um ≤ 5 Vrms	C ≤ 100 pF      F = 1MHz C > 100 pF      F = 1 kHz Um ≤ 1 Vrms	
Dissipation Factor (DF)		C ≤ 50 pF    DF < 1.5 (150/C + 7).10 <sup>-4</sup> C > 50 pF    DF < 15.10 <sup>-4</sup>	DF < 250 .10 <sup>-4</sup>	
Insulation Resistance under UR /1 mn		Ri > 100 GΩ	For C ≤ 10nF: Ri > 100 GΩ or For C > 10nF: Ri x C > 1000s	
Proof voltage		For UR < 500V : 2.5 x UR	For UR < 500V: 2.5 x UR For UR = 500V: 2 x UR	

\*Typical value for this dielectric class

Note: ESA Chips are strictly measured vs ESA spec. 3009 + detail spec.

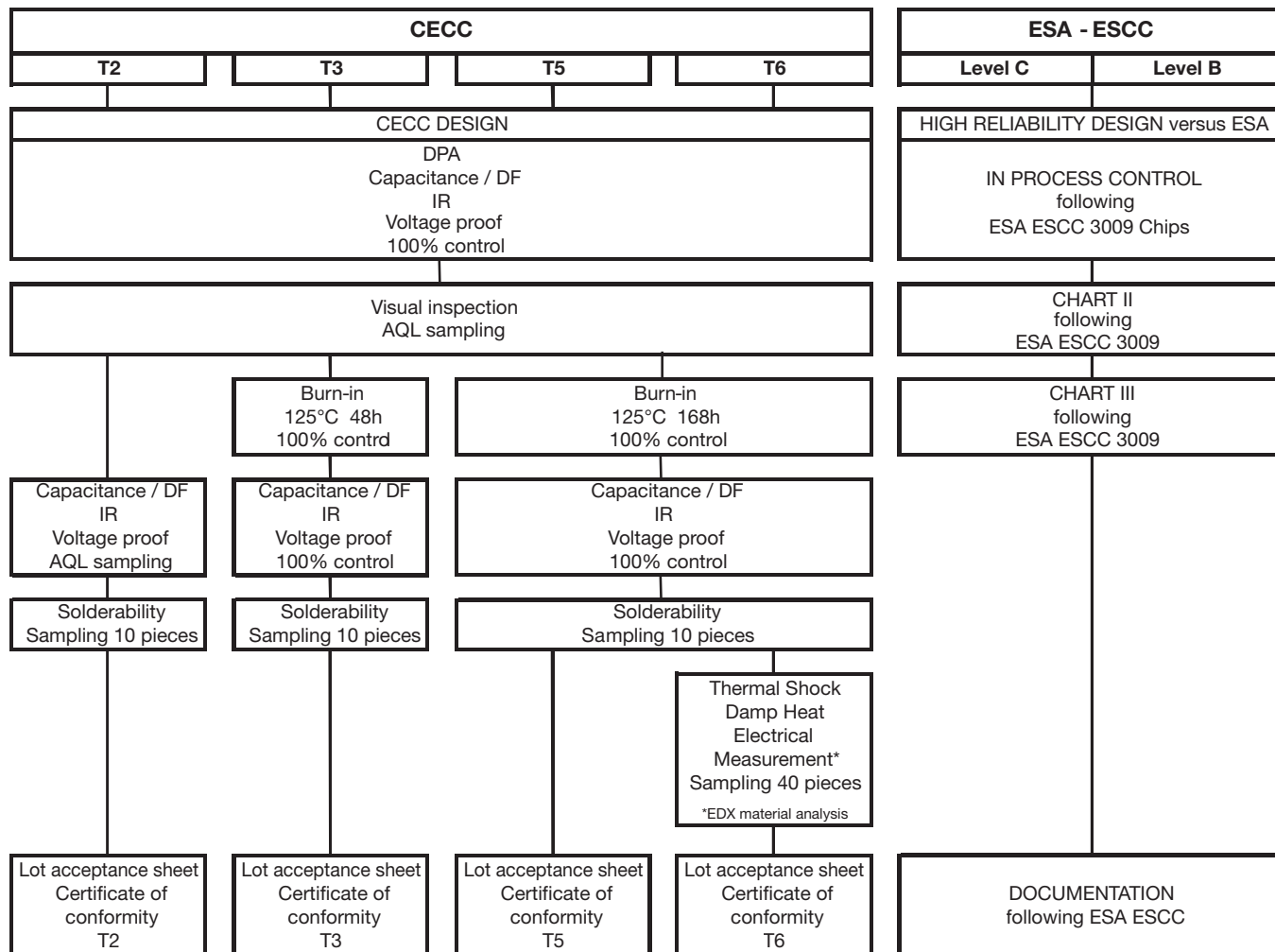




# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## RELIABILITY LEVELS DESCRIPTION



# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## AVAILABLE TERMINATIONS

### Summary

Type	CECC Level T2/T3/T5/T6	ESA Level B & C	Remark
Ag - Pd - Pt	AC	A3..	-
Nickel Barrier + Tin Lead Finish <sup>(1)</sup>	AN	A6...	Preferred Version
Nickel Barrier + Tin Finish <sup>(2)</sup>	AD		

<sup>(1)</sup> "No Pure Tin" terminations.

<sup>(2)</sup> Lead Free terminations.

## TERMINATION CODES FOR ESA MLC PARTS

TPC Code eg: A.12	ESA Version	
	Code	Termination
A312	03	Silver Palladium Platinum
A612C... A612G...	06	ESA Preferred Termination Nickel Barrier + Tin Lead Finish
A612Z...	07	X7R Dielectric + ESA Preferred Termination Nickel Barrier + Tin Lead Finish

## PACKAGING

- Plastic Tape – Minimum Order Quantity: 1000p for CECC and ESA products
- Waffle Pack – Anti-static material only ESA Products – Minimum Order Quantity: 50p for ESA products
- Vacuum Pack only CECC Products – Minimum Order Quantity: 1Kp for CECC products

## MARKING

### Chips:

CECC	T6/T5/T3/T2	On packaging label only - versus TPC code
ESA Level	C & B	On packaging label only - versus ESA code

## AVAILABLE CLIMATIC AND ELECTRIC TESTS

Test P/N	Test Description	Qty. of Parts	Average Lead Time
XX00--5028---	DPA versus EIA RS469	25/X + 25/Y	1 to 2 weeks
MX00--5056---	85/85 Humidity test / ESA 3009 / 5.2.2 85°C / 85% HR / 1.5Vdc / 240h	50	3 weeks
MX00--5059---	85/85 Humidity test / MIL STD 202 Method 103 40°C / 95 HR / 100Vdc / 240h	50	3 weeks
MX00--5060---	85°C/85° HR / 240h Humidity test	12	3 weeks
XX00--5080-00	100% burn in (same as "5079" but limited to 48H)	100%	1 week
XX00--5079-00	100% burn in versus ESA 3009 (168H / 2x Ur)	100%	3 weeks
XX00--5090-00	Halt test (accelerated burn-in 140°C / 3Ur)	100pc	4 weeks
XX00--5100-00	Life test 1000 or 2000H versus ESA 3009/9.10	100pc	7 or 14 weeks
XX00--5082-00	Solderability test (bath method vs. ESA or CECC)	20pc	2 weeks
XX00--5091-00	Electric test (Cr; DF; IR) 100%	100%	Tbd
XX00--5092-00	Rapid change of temperature (-55° to 125°C)	50pc	Tbd
XX00--5093-00	Climatic test sequence	50pc	Tbd
XX00--5094-00	Visual insp. Versus ESA or customer spec.	100%	Tbd

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## ESA QUALIFIED CHIPS TYPE I - NP0 (AVAILABLE RELIABILITY LEVEL: B & C)

Size	TPC Code	Dielectric Class	Voltage (V)	Capacitance Range		Tol %	Relevant Specification
				min.	max.		
0805	A.12C..	NP0	50 & 100	4.7	1500pF	1, 2, 5, 10 %	QPL - ESA ESCC 3009 - 003
1206	A.20C..	NP0	50 & 100	10	3900pF		QPL - ESA ESCC 3009 - 022
1210	A.13C..	NP0	50 & 100	22	6800pF	±0.5pF for C <10pF	QPL - ESA ESCC 3009 - 004
1812	A.14C..	NP0	50 & 100	0.1	15 nF		QPL - ESA ESCC 3009 - 005
2220	A.15C..	NP0	50 & 100	0.47	33 nF		QPL - ESA ESCC 3009 - 006

Available Terminations:

A3.. Silver Palladium Platinum (ESA variant 03) and

A6.. Nickel Barrier with Tin Lead Finish (ESA variant 06)

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## ESA QUALIFIED CHIPS TYPE II - 2C1 (AVAILABLE RELIABILITY LEVEL: B & C)

Size	TPC Code	Dielectric Class	Voltage (V)	Capacitance Range		Tol %	Qualified Following Specification
				min.	max.		
0805	A.12G	2C1	100	820	10000 pF	5, 10, 20	QPL - ESA ESCC 3009 - 008
			50	3.9	27 nF		
			25	10	47 nF		
1206	A.20G	2C1	100	2.2	22 nF	5, 10, 20	QPL - ESA ESCC 3009 - 023
			50	12	68 nF		
			25	27	100 nF		
1210	A.13G	2C1	100	3.9	47 nF	5, 10, 20	QPL - ESA ESCC 3009 - 009
			50	33	120 nF		
			25	47	220 nF		
1812	A.14G	2C1	100	6.8	82 nF	5, 10, 20	QPL - ESA ESCC 3009 - 010
			50	56	270 nF		
			25	82	470 nF		
2220	A.15G	2C1	100	18	180 nF	5, 10, 20	QPL - ESA ESCC 3009 - 011
			50	100	680 nF		
			25	180	1000 nF		

Available Terminations:

A3.. Silver Palladium Platinum (ESA variant 03) and

A6.. Nickel Barrier with Tin Lead Finish (ESA variant 06)

## ESA QUALIFIED CHIPS TYPE II - X7R ESA VARIANT 07 (AVAILABLE RELIABILITY LEVEL: B & C)

Size	TPC Code	Dielectric Class	Voltage (V)	Capacitance Range		Tol %	Qualified Specification
				min.	max.		
0805	A612Z..	X7R	100	10nF	47 nF	5, 10, 20	QPL - ESA ESCC 3009 - 008
			50	27nF	68 nF		
			25	27nF	100 nF		
1206	A620Z..	X7R	100	27nF	100 nF	5, 10, 20	QPL - ESA ESCC 3009 - 023
			50	47nF	150 nF		
			25	47nF	220 nF		
1210	A613Z..	X7R	100	47nF	220 nF	5, 10, 20	QPL - ESA ESCC 3009 - 009
			50	100nF	330 nF		
			25	100nF	470 nF		
1812	A614Z..	X7R	100	82nF	470 nF	5, 10, 20	QPL - ESA ESCC 3009 - 010
			50	220nF	680 nF		
			25	220nF	1000 nF		
2220	A615Z..	X7R	100	180nF	1000 nF	5, 10, 20	QPL - ESA ESCC 3009 - 011
			50	470nF	1500 nF		
			25	470nF	2200 nF		
1206	A.20Z	X7R	200 400	0.470 0.27	33 nF 4.7 nF	5, 10, 20	According to "ESA ESCC 3009"
1210	A.13Z	X7R	200 400	0.680 0.680	68 nF 10 nF	5, 10, 20	
1812	A.14Z	X7R	200 400	3.3 3.3	150 nF 47 nF	5, 10, 20	
2220	A.15Z	X7R	200	6.8	270 nF	5, 10, 20	
			400	6.8	68 nF		

One single termination type: A6.. Nickel Barrier with Tin Lead Finish



# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## CECC CHIPS TYPE I – NP0 (AVAILABLE RELIABILITY LEVEL: T6 TO T2) CECC UPGRADED

Size	TPC Code	Dielectric Class	Voltage (V)	Capacitance Range		Tol %	Relevant Specification
				min.	max.		
0805/ CEC2	A. 12CF A. 12CE A. 12CD	NP0	200 100 50/25	4.7 4.7 4.7	470 pF 1800 pF 1800 pF	1, 2, 5, 10%  ±0.5pF if C < 10pF	IEC 384-8....10  CECC 32100 - 32101/801
1206/ CEC12	A. 20CJ A. 20CF A. 20CE A. 20CD	NP0	500 200 100 50/25	12 12 12 12	330 pF 1500 pF 4700 pF 4700 pF		
1210/ CEC4	A. 13CJ A. 13CF A. 13CE A. 13CD	NP0	500 200 100 50/25	15 15 15 15	1500 pF 2700 pF 10000 pF 10000 pF		
1812/ CEC6	A. 14CJ A. 14CF A. 14CE A. 14CD	NP0	500 200 100 50/25	100 100 100 100	1000 pF 5600 pF 18000 pF 18000 pF		
2220/ CEC7	A. 15CJ A. 15CF A. 15CE A. 15CD	NP0	500 200 100 50/25	470 470 470 470	3300 pF 12000 pF 39000 pF 39000 pF		

Note: 3 terminations available: Ag Pd Pt ► AC, Nickel Barrier with Tin Lead finish ► AN, Nickel Barrier with Tin finish ► AD  
Size 2225 available on request

## CECC CHIPS TYPE II – X7R (AVAILABLE RELIABILITY LEVEL: T6 TO T2) CECC UPGRADED

Size	TPC Code	Dielectric Class	Voltage (V)	Capacitance Range		Tol %	Relevant Specification
				min.	max.		
0805/ CNC2	A. 12ZF A. 12ZE A. 12ZD	X7R	200 100 50	0.33 0.33 0.33	18 nF 47 nF 100 nF	5, 10 & 20%	IEC 384-8....10  CECC 32100 - 32101/801
1206/ CNC12	A. 20ZJ A. 20ZF A. 20ZE A. 20ZD	X7R	500 200 100 50	1 1 1 1	8.2 nF 39 nF 100 nF 180 nF		
1210/ CNC4	A. 13ZJ A. 13ZF A. 13ZE A. 13ZD	X7R	500 200 100 50	2.2 2.2 2.2 2.2	22 nF 100 nF 220 nF 330 nF		
1812/ CNC6	A. 14ZJ A. 14ZF A. 14ZE A. 14ZD A. 14ZC	X7R	500 200 100 50 25	2.7 2.7 2.7 2.7 1000	47 nF 180 nF 470 nF 680 nF 1000 nF		
2220/ CNC7	A. 15ZJ A. 15ZF A. 15ZE A. 15ZD	X7R	500 200 100 50	4.7 4.7 4.7 4.7	68 nF 390 nF 1000 nF 1500 nF		

Note: 3 terminations available: Ag Pd Pt ► AC, Nickel Barrier with Tin Lead finish ► AN, Nickel Barrier with Tin finish ► AD  
Size 2225 available on request



# ESCC Qualified SMPS Capacitors

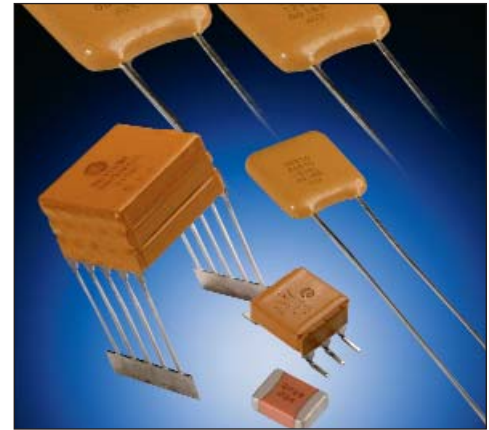


## High Voltage Chip/Leaded Capacitors

### HIGH VOLTAGE CHIP CAPACITORS

Capacitors, Fixed, Chip, Ceramic Dielectric, Type II, High Voltage, Based on Styles 1812 and 1825 for use in ESCC space programs, according to ESCC Generic Specification 3009 and associated Detail Specification 3009/034 as recommended by the Space Components Coordination Group. (ranges in table below)

Note: Variants 01 to 12: metallized pads



Size	Variant	Rated Voltage (kV)	Tolerance (%)	Capacitance Code (E12)
1812	01	1.0	±10	392 - 223
	02		±20	
	03	2.0	±10	152 - 182
	04		±20	
	05	3.0	±10	821 - 102
	06		±20	
1825	07	1.0	±10	273 - 563
	08		±20	
	09	2.0	±10	222 - 682
	10		±20	
	11	3.0	±10	821 - 392
	12		±20	

### HOW TO ORDER

Parts should be ordered using the ESCC variant number as follows:

**3009034**

**XX**  
Type Variant  
(per table)

**B**

**Test Level**

C = Standard test level  
B = Level C plus serialized and capacitance recorded before and after 100% burn-in.

**XXX**

**Capacitance Code**

The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e.  
102 = 1000pF  
103 = 10000pF

Eg 300903401C223

### HIGH VOLTAGE LEADED CAPACITORS

Capacitors, Fixed, Ceramic Dielectric, Type II, High Voltage, 1.0 to 5.0 kV, Based on Case Styles VR, CV and CH for use in ESCC space programs, according to ESCC Generic Specification 3001 and associated Detail Specification 3001/034 as recommended by the Space Components Coordination Group. (ranges in table)

Note 1: Lead Types

- a - Leaded Radial (epoxy coated)
- b - Leaded Radial (Polyurethane Varnish)
- c - Straight Dual in Line
- d - L Dual in Line

Note 2: Tolerances of ±10% and ±20% are available

Case Size	Variant	Lead Type	Capacitance Code (E12)				
			1.0kV	2.0kV	3.0kV	4.0kV	5.0kV
VR30S	01	a	392 - 203	152 - 182	821 - 102		
VR30	02	a	273 - 563	222 - 682	821 - 392		
VR40	03	a	473 - 124	822 - 153	472 - 103	182 - 222	
VR50	04	a	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
VR66	05	a	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
VR84	06	a	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
VR90	07	a	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CV41	08	b	473 - 124	822 - 153	472 - 103	182 - 222	
CH41	09	c	473 - 124	822 - 153	472 - 103	182 - 222	
CH41	10	d	473 - 124	822 - 153	472 - 103	182 - 222	
CV51	11	b	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CH51	12	c	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CH51	13	d	154 - 274	183 - 333	123 - 183	562 - 822	332 - 392
CV61	14	b	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CH61	15	c	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CH61	16	d	224 - 564	393 - 823	223 - 393	103 - 153	682 - 103
CV76	17	b	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CH76	18	c	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CH76	19	d	684 - 105	473 - 154	473 - 683	183 - 393	123 - 183
CV91	20	b	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CH91	21	c	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563
CH91	22	d	125 - 275	184 - 334	823 - 184	473 - 124	223 - 563

### HOW TO ORDER

Parts should be ordered using the ESCC variant number as follows:

**3001034**

**Detail Spec Number**

**XX**

**Type Variant**  
(per table above)

**B**

**Test Level**  
C = Standard test level  
B = Level C plus serialized and capacitance recorded before and after 100% burn-in.

**XXX**

**Capacitance Code**

The first two digits represent significant figures and the third digit specifies the number of zeros to follow; i.e.  
102 = 1000pF  
103 = 10000pF

**K**

**Capacitance Tolerance**  
K = 10%  
M = 20%

**X**

**Voltage**  
M = 1kV  
P = 2kV  
R = 3kV  
S = 4kV  
Z = 5kV

Eg 300103412C274KM



# ESCC Qualified SMPS Capacitors



## High Capacitance

### HIGH CAPACITANCE LEADED CAPACITORS

Capacitors, Fixed, Ceramic Dielectric, Type II, High Capacitance, Based on Case Styles BR, CV and CH for use in ESCC space programs, according to ESCC Generic Specification 3001 and associated Detail Specification 3001/030 as recommended by the Space Components Coordination Group. (see ranges in table below)

Note 1: Lead Types

- a - Leaded Radial (epoxy coated)
- b - Leaded Radial (Polyurethane Varnish)
- c - Straight Dual in Line
- d - L Dual in Line

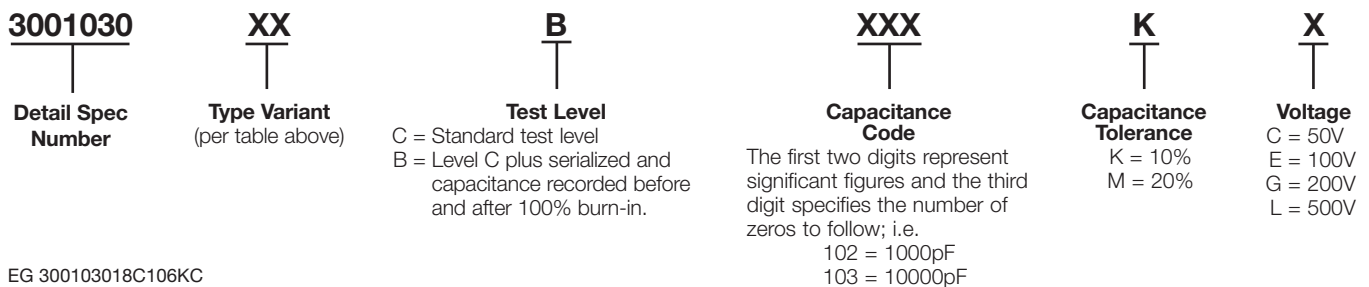
Note 2: Tolerances of ±10% and ±20% are available

Case Size	Variant	Figure	Capacitance Code (E12)			
			50V	100V	200V	500V
BR40	01	a	185 - 335	125 - 395	334 - 564	124 - 224
BR50	02	a	395 - 565	225 - 395	684 - 105	274 - 394
BR66	03	a	685 - 106	475 - 825	105 - 225	474 - 105
BR72	04	a	126 - 186	825 - 156	225 - 335	824 - 155
BR84	05	a	126 - 186	825 - 156	225 - 335	824 - 155
CV41	06	b	185 - 335	125 - 275	334 - 564	124 - 224
CH41	07	c	185 - 335	125 - 275	334 - 564	124 - 224
CH41	08	d	185 - 335	125 - 275	334 - 564	124 - 224
CH42	09	c	395 - 685	335 - 565	684 - 125	274 - 474
CH42	10	d	395 - 685	335 - 565	684 - 125	274 - 474
CH43	11	c	825 - 106	685 - 825	155 - 185	564 - 684
CH43	12	d	825 - 106	685 - 825	155 - 185	564 - 684
CH44	13	c	126	106	225	824 - 105
CH44	14	d	126	106	225	824 - 105
CV51	15	b	395 - 565	225 - 395	684 - 105	274 - 394
CH51	16	c	395 - 565	225 - 395	684 - 105	274 - 394
CH51	17	d	395 - 565	225 - 395	684 - 105	274 - 394
CH52	18	c	685 - 106	475 - 825	125 - 225	474 - 824
CH52	19	d	685 - 106	475 - 825	125 - 225	474 - 824
CH53	20	c	126 - 156	106 - 126	275 - 335	105 - 125
CH53	21	d	126 - 156	106 - 126	275 - 335	105 - 125
CH54	22	c	186 - 226	156	395	155
CH54	23	d	186 - 226	156	395	155
CV61	24	b	685 - 106	475 - 825	105 - 225	474 - 105
CH61	25	c	685 - 106	475 - 825	105 - 225	474 - 105
CH61	26	d	685 - 106	475 - 825	105 - 225	474 - 105
CH62	27	c	126 - 226	106 - 156	275 - 475	105 - 185
CH62	28	d	126 - 226	106 - 156	275 - 475	105 - 185
CH63	29	c	276 - 336	186 - 226	565 - 685	225 - 275
CH63	30	d	276 - 336	186 - 226	565 - 685	225 - 275
CH64	31	c	396	276 - 336	825 - 106	335
CH64	32	d	396	276 - 336	825 - 106	335
CV71	33	b	126 - 186	825 - 156	225 - 335	824 - 155
CH71	34	c	126 - 186	825 - 156	225 - 335	824 - 155
CH71	35	d	126 - 186	825 - 156	225 - 335	824 - 155
CH72	36	c	226 - 396	186 - 276	395 - 685	185 - 335
CH72	37	d	226 - 396	186 - 276	395 - 685	185 - 335

Case Size	Variant	Figure	Capacitance Code (E12)			
			50V	100V	200V	500V
CH73	38	c	476 - 566	336 - 396	825 - 106	395 - 475
CH73	39	d	476 - 566	336 - 396	825 - 106	395 - 475
CH74	40	c	686	476	126	565
CH74	41	d	686	476	126	565
CV76	42	b	126 - 186	825 - 156	225 - 335	824 - 155
CH76	43	c	126 - 186	825 - 156	225 - 335	824 - 155
CH76	44	d	126 - 186	825 - 156	225 - 335	824 - 155
CH77	45	c	226 - 396	186 - 276	395 - 685	185 - 335
CH77	46	d	226 - 396	186 - 276	395 - 685	185 - 335
CH78	47	c	476 - 566	336 - 396	825 - 106	395 - 475
CH78	48	d	476 - 566	336 - 396	825 - 106	395 - 475
CH79	49	c	686	476	126	565
CH79	50	d	686	476	126	565
CH81	51	c	156 - 226	126 - 186	225 - 395	824 - 155
CH81	52	d	156 - 226	126 - 186	225 - 395	824 - 155
CH82	53	c	276 - 476	226 - 396	475 - 825	
CH82	54	d	276 - 476	226 - 396	475 - 825	
CH83	55	c	566 - 686	476 - 566	106 - 126	
CH83	56	d	566 - 686	476 - 566	106 - 126	
CH84	57	c	826	686	156	
CH84	58	d	826	686	156	
CH86	59	c	226 - 336	156 - 276	395 - 685	155 - 225
CH86	60	d	226 - 336	156 - 276	395 - 685	155 - 225
CH87	61	c	396 - 686	336 - 566	825 - 156	
CH87	62	d	396 - 686	336 - 566	825 - 156	
CH88	63	c	826 - 107	686 - 826	186 - 226	
CH88	64	d	826 - 107	686 - 826	186 - 226	
CH89	65	c	127	107	276	
CH89	66	d	127	107	276	
CH91	67	c	396 - 476	336 - 396	825 - 106	
CH91	68	d	396 - 476	336 - 396	825 - 106	
CH92	69	c	566 - 107	476 - 826	126 - 226	
CH92	70	d	566 - 107	476 - 826	126 - 226	
CH93	71	c	127 - 157	107 - 127	276 - 336	
CH93	72	d	127 - 157	107 - 127	276 - 336	
CH94	73	c	187	157	396	
CH94	74	d	187	157	396	

### HOW TO ORDER

Parts should be ordered using the ESCC variant number as follows:



EG 300103018C106KC

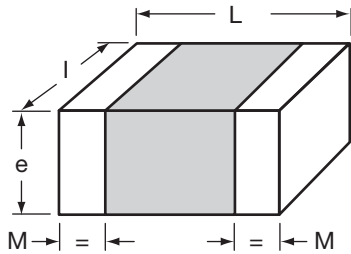
Lot Acceptance Testing is available for all our ESCC qualified ranges.

- LAT 1      42 samples → 12 mechanical + 20 life test + 6 for TC + 4 for solder
- LAT 2      30 samples → 20 life test + 6 for TC + 4 for solder
- LAT 3      10 samples → 6 for TC + 4 for solder





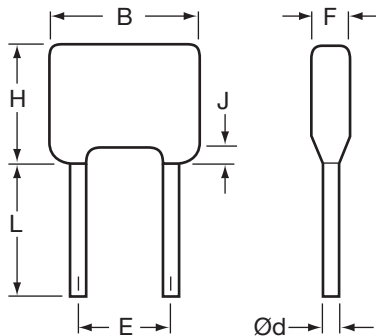
## ESCC DETAIL SPECIFICATION NO. 3009/034 PHYSICAL DIMENSIONS



Millimeters (Inches)

Symbol	Variants 01 to 06		Variants 07 to 12	
	Min.	Max.	Min.	Max.
<b>L</b>	4.20 (0.165)	5.00 (0.197)	4.20 (0.165)	5.00 (0.197)
<b>l</b>	2.80 (0.110)	3.60 (0.142)	5.67 (0.223)	6.67 (0.263)
<b>e</b>	-	3.00 (0.118)	-	3.30 (0.130)
<b>M</b>	0.25 (0.010)	0.75 (0.030)	0.25 (0.010)	0.75 (0.030)

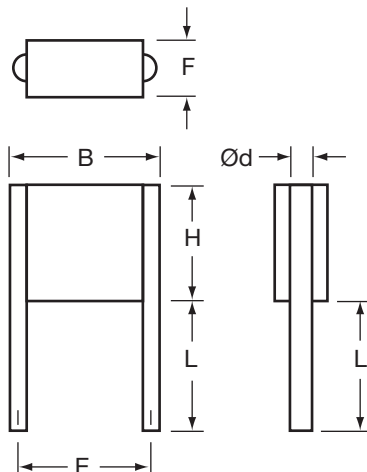
## ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – VR STYLE



Millimeters (Inches)

Variant	Case Size	B		Ød		E		F	H	J	L
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	
<b>01</b>	<b>VR30S</b>	7.62 (0.300)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	4.60 (0.181)	1.50 (0.059)	31.7 (1.248)	
<b>02</b>	<b>VR30</b>	7.62 (0.300)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	9.62 (0.379)	1.50 (0.059)	31.7 (1.248)	
<b>03</b>	<b>VR40</b>	10.16 (0.400)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	11.7 (0.461)	1.50 (0.059)	31.7 (1.248)	
<b>04</b>	<b>VR50</b>	12.7 (0.500)	0.59 (0.023)	0.69 (0.027)	9.66 (0.380)	10.66 (0.420)	5.10 (0.201)	14.2 (0.559)	1.50 (0.059)	31.7 (1.248)	
<b>05</b>	<b>VR66</b>	17.5 (0.689)	0.86 (0.034)	0.96 (0.038)	14.2 (0.559)	15.2 (0.598)	6.40 (0.252)	16.5 (0.650)	1.50 (0.059)	31.7 (1.248)	
<b>06</b>	<b>VR84</b>	23.62 (0.930)	0.86 (0.034)	0.96 (0.038)	20.4 (0.803)	22.0 (0.866)	6.40 (0.252)	19.78 (0.779)	1.50 (0.059)	31.7 (1.248)	
<b>07</b>	<b>VR90</b>	23.5 (0.925)	0.86 (0.034)	0.96 (0.038)	20.4 (0.803)	22.0 (0.866)	6.40 (0.252)	42.0 (1.654)	1.50 (0.059)	31.7 (1.248)	

## ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CV STYLE

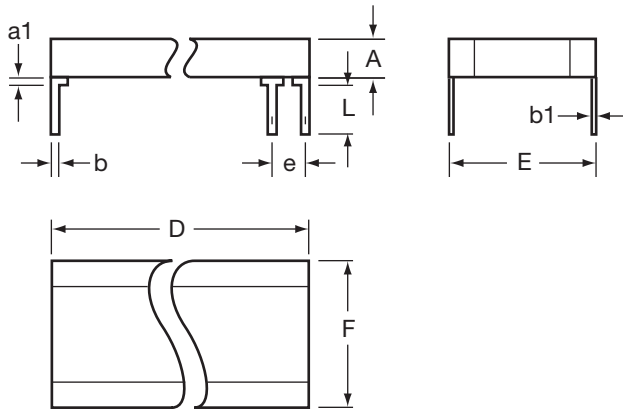


Millimeters (Inches)

Variant	Case Size	B		Ød		E		F	H	L	
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	
<b>08</b>	<b>CV41</b>	10.6 (0.417)	0.65 (0.026)	0.75 (0.030)	7.70 (0.303)	8.70 (0.343)	3.80 (0.150)	8.70 (0.343)	22.0 (0.866)	28.0 (1.102)	
<b>11</b>	<b>CV51</b>	11.9 (0.469)	0.85 (0.033)	0.95 (0.037)	9.66 (0.380)	10.66 (0.420)	3.80 (0.150)	10.7 (0.421)	22.0 (0.866)	28.0 (1.102)	
<b>14</b>	<b>CV61</b>	16.5 (0.650)	0.85 (0.033)	0.95 (0.037)	14.74 (0.580)	15.74 (0.620)	3.80 (0.150)	13.6 (0.535)	22.0 (0.866)	28.0 (1.102)	
<b>17</b>	<b>CV76</b>	22.7 (0.894)	0.85 (0.033)	0.95 (0.037)	20.4 (0.803)	22.0 (0.866)	3.80 (0.150)	16.6 (0.654)	22.0 (0.866)	28.0 (1.102)	
<b>20</b>	<b>CV91</b>	22.7 (0.894)	1.15 (0.045)	1.25 (0.049)	20.4 (0.803)	22.0 (0.866)	3.80 (0.150)	40.6 (1.598)	22.0 (0.866)	28.0 (1.102)	

## ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CH STYLE, D.I.L.

Millimeters (Inches)



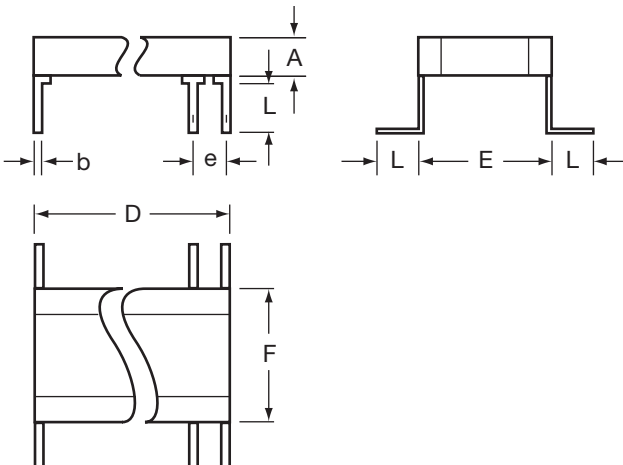
Symbol	Min.	Max.	Notes
a1	-	2.00 (0.079)	1
b	0.45 (0.018)	0.55 (0.022)	1
b1	0.204 (0.008)	0.304 (0.012)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	12.0 (0.472)	14.0 (0.551)	1

Notes: 1 – All leads  
2 – Each space

Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
07	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
09	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
11	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
13	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
16	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
18	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
20	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
22	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
25	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
27	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
29	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
31	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
34	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
36	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
38	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
40	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
43	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
45	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
47	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
49	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
51	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
53	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
55	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
57	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
59	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
61	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
63	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
65	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
67	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
69	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
71	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
73	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)

## ESCC DETAIL SPECIFICATION NO. 3001/034 PHYSICAL DIMENSIONS – CH STYLE, L

Millimeters (Inches)



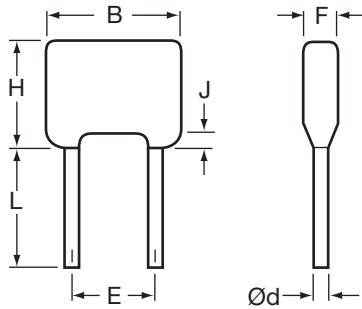
Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
10	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
13	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
16	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
19	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
22	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)

Symbol	Min.	Max.	Notes
b	0.45 (0.018)	0.55 (0.022)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.01 (0.120)	1

Notes: 1 – All leads  
2 – Each space

## ESCC DETAIL SPECIFICATION NO. 3001/030 PHYSICAL DIMENSIONS – BR STYLE

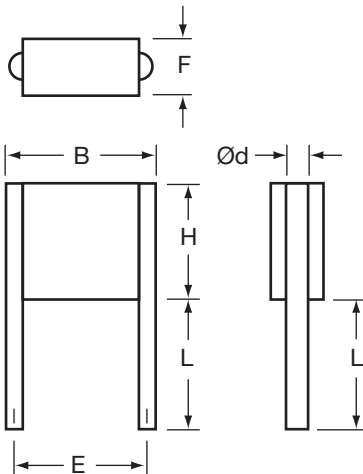
Millimeters (Inches)



Variant	Case Size	B		Ød		E		F	H	J	L
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Max.	Min.	
01	BR40	10.16 (0.400)	0.46 (0.018)	0.56 (0.022)	4.58 (0.180)	5.58 (0.220)	5.00 (0.197)	11.7 (0.461)	1.50 (0.059)	31.7 (1.248)	
02	BR50	12.7 (0.500)	0.59 (0.023)	0.69 (0.027)	9.66 (0.380)	10.66 (0.420)	5.10 (0.201)	14.2 (0.559)	1.50 (0.059)	31.7 (1.248)	
03	BR66	17.5 (0.689)	0.86 (0.034)	0.96 (0.038)	14.2 (0.559)	15.2 (0.598)	6.40 (0.252)	16.5 (0.650)	1.50 (0.059)	31.7 (1.248)	
04	BR72	19.3 (0.760)	0.86 (0.034)	0.96 (0.038)	14.74 (0.580)	15.74 (0.620)	6.40 (0.252)	24.0 (0.945)	1.50 (0.059)	31.7 (1.248)	
05	BR84	23.62 (0.930)	0.71 (0.028)	0.81 (0.032)	18.93 (0.745)	20.83 (0.820)	6.40 (0.252)	19.78 (0.779)	1.50 (0.059)	31.7 (1.248)	

## ESCC DETAIL SPECIFICATION NO. 3001/030 PHYSICAL DIMENSIONS – CV STYLE

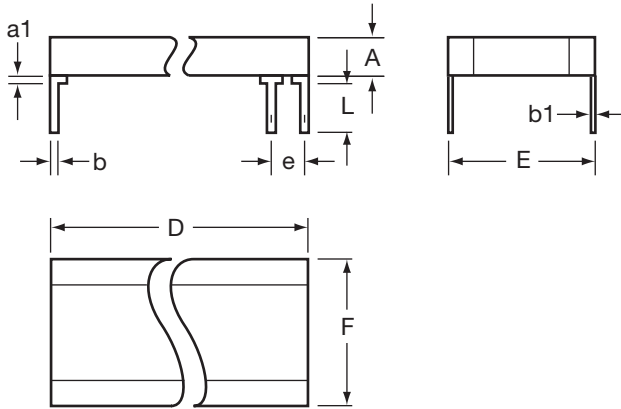
Millimeters (Inches)



Variant	Case Size	B		Ød		E		F	H	L	
		Max.	Min.	Max.	Min.	Max.	Max.	Max.	Min.	Max.	
06	CV41	10.6 (0.417)	0.65 (0.026)	0.75 (0.030)	7.70 (0.303)	8.70 (0.343)	3.80 (0.150)	8.70 (0.343)	22.0 (0.866)	28.0 (1.102)	
15	CV51	11.9 (0.469)	0.85 (0.033)	0.95 (0.037)	9.66 (0.380)	10.66 (0.420)	3.80 (0.150)	10.7 (0.421)	22.0 (0.866)	28.0 (1.102)	
24	CV61	16.5 (0.650)	0.85 (0.033)	0.95 (0.037)	14.74 (0.580)	15.74 (0.620)	3.80 (0.150)	13.6 (0.535)	22.0 (0.866)	28.0 (1.102)	
33	CV71	17.8 (0.701)	0.85 (0.033)	0.95 (0.037)	14.74 (0.580)	15.74 (0.620)	3.80 (0.150)	21.6 (0.850)	22.0 (0.866)	28.0 (1.102)	
42	CV76	22.7 (0.894)	0.85 (0.033)	0.95 (0.037)	20.4 (0.803)	22.0 (0.866)	3.80 (0.150)	16.6 (0.654)	22.0 (0.866)	28.0 (1.102)	

## ESCC DETAIL SPECIFICATION NO. 3001/030 PHYSICAL DIMENSIONS – CH STYLE, D.I.L.

Millimeters (Inches)



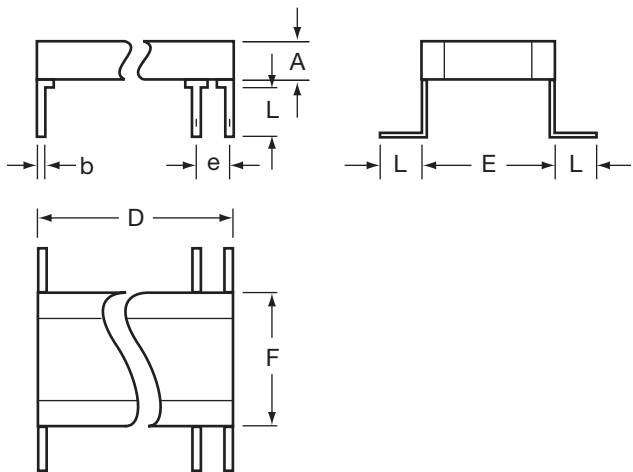
Symbol	Min.	Max.	Notes
a1	-	2.00 (0.079)	1
b	0.45 (0.018)	0.55 (0.022)	1
b1	0.204 (0.008)	0.304 (0.012)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.04 (0.120)	1

Notes: 1 – All leads  
2 – Each space

Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
07	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
09	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
11	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
13	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
16	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
18	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
20	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
22	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
25	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
27	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
29	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
31	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
34	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
36	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
38	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
40	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
43	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
45	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
47	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
49	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
51	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
53	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
55	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
57	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
59	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
61	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
63	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
65	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
67	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
69	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
71	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
73	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)

## ESCC DETAIL SPECIFICATION NO. 3001/030 PHYSICAL DIMENSIONS – CH STYLE, L

Millimeters (Inches)



Symbol	Min.	Max.	Notes
b	0.45 (0.018)	0.55 (0.022)	1
e	2.49 (0.098)	2.59 (0.102)	2
L	2.04 (0.080)	3.04 (0.120)	1

Notes: 1 – All leads  
2 – Each space

Variant	Case Size	A	D	E		F
		Max.	Max.	Min.	Max.	Max.
08	CH41	3.80 (0.150)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
10	CH42	7.40 (0.291)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
12	CH43	11.1 (0.437)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
14	CH44	14.8 (0.583)	8.70 (0.343)	7.70 (0.303)	8.70 (0.343)	9.20 (0.362)
17	CH51	3.80 (0.150)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
19	CH52	7.40 (0.291)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
21	CH53	11.1 (0.437)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
23	CH54	14.8 (0.583)	10.7 (0.421)	9.66 (0.380)	10.66 (0.420)	10.7 (0.421)
26	CH61	3.80 (0.150)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
28	CH62	7.40 (0.291)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
30	CH63	11.1 (0.437)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
32	CH64	14.8 (0.583)	13.6 (0.535)	13.5 (0.531)	14.5 (0.571)	14.9 (0.587)
35	CH71	3.80 (0.150)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
37	CH72	7.40 (0.291)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
39	CH73	11.1 (0.437)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
41	CH74	14.8 (0.583)	21.6 (0.850)	14.74 (0.580)	15.74 (0.620)	16.8 (0.661)
44	CH76	3.80 (0.150)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
46	CH77	7.40 (0.291)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
48	CH78	11.1 (0.437)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
50	CH79	14.8 (0.583)	16.6 (0.654)	19.52 (0.769)	21.12 (0.831)	21.6 (0.850)
52	CH81	3.80 (0.150)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
54	CH82	7.40 (0.291)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
56	CH83	11.1 (0.437)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
58	CH84	14.8 (0.583)	38.2 (1.504)	9.66 (0.380)	10.66 (0.420)	12.0 (0.472)
60	CH86	3.80 (0.150)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
62	CH87	7.40 (0.291)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
64	CH88	11.1 (0.437)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
66	CH89	14.8 (0.583)	38.2 (1.504)	14.74 (0.580)	15.74 (0.620)	18.9 (0.744)
68	CH91	3.80 (0.150)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
70	CH92	7.40 (0.291)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
72	CH93	11.1 (0.437)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)
74	CH94	14.8 (0.583)	40.6 (1.598)	19.52 (0.769)	21.12 (0.831)	24.0 (0.945)

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## QPL CERTIFICATES

Types covered by similarity:  Tolerance ( $\pm$ ): 0.5pF, 2, 5, 20%		Remarks:																																																			
Procurement Specifications		Manufacturer	Nature of Approval	Supervising Authority	Date																																																
Generic ESCC 3009  Detail ESCC 3009/003 3009/004 3009/005 3009/006 3009/022		AVX/TPC St. Apollinaire France	Qualification	CNES	Feb 1983																																																
			Extension	CNES	Sep 1986																																																
			Requalification	CNES	Apr 1992																																																
			Extension	CNES	Jan 1995																																																
			Extension	CNES	Jun 1998																																																
			Extension	CNES	Nov 2000																																																
			Extension	CNES	Jun 2003																																																
			Requalification	CNES	Feb 2005																																																
			Extension	CNES	May 2007																																																
			Extension	CNES	June 2009																																																
			Extension	CNES	June 2011																																																
Characteristics: Operating Temp Range ( $^{\circ}$ C), -55 to +125 Variants 01, 03 and 06 are qualified Values covered by ESCC Specification defined below.																																																					
<table border="1"> <thead> <tr> <th>Style</th> <th>Model</th> <th>Detail Spec</th> <th>Variants</th> <th>Cap Range (pF)</th> <th>Rated Volt. (V)</th> <th>Tolerance (<math>\pm</math>%)</th> <th>TC (ppm/<math>^{\circ}</math>C)</th> </tr> </thead> <tbody> <tr> <td>0805</td> <td>A_12C</td> <td>3000/003</td> <td>01, 06</td> <td>4.7 to 9.1 10 to 1500</td> <td>50,100</td> <td>0.5pF 1, 2, 5, 10</td> <td><math>\pm</math>30</td> </tr> <tr> <td>1206</td> <td>A_20C</td> <td>3000/022</td> <td>01, 06</td> <td>10 to 3900</td> <td>50,100</td> <td>1, 2, 5, 10</td> <td><math>\pm</math>30</td> </tr> <tr> <td>1210</td> <td>A_13C</td> <td>3000/004</td> <td>01, 06</td> <td>22 to 6800</td> <td>50,100</td> <td>1, 2, 5, 10</td> <td><math>\pm</math>30</td> </tr> <tr> <td>1812</td> <td>A_14C</td> <td>3000/005</td> <td>01, 06</td> <td>100 to 15000</td> <td>50,100</td> <td>1, 2, 5, 10</td> <td><math>\pm</math>30</td> </tr> <tr> <td>2220</td> <td>A_15C</td> <td>3000/006</td> <td>01, 06</td> <td>470 to 33000</td> <td>50,100</td> <td>1, 2, 5, 10</td> <td><math>\pm</math>30</td> </tr> </tbody> </table>		Style	Model	Detail Spec	Variants	Cap Range (pF)	Rated Volt. (V)	Tolerance ( $\pm$ %)	TC (ppm/ $^{\circ}$ C)	0805	A_12C	3000/003	01, 06	4.7 to 9.1 10 to 1500	50,100	0.5pF 1, 2, 5, 10	$\pm$ 30	1206	A_20C	3000/022	01, 06	10 to 3900	50,100	1, 2, 5, 10	$\pm$ 30	1210	A_13C	3000/004	01, 06	22 to 6800	50,100	1, 2, 5, 10	$\pm$ 30	1812	A_14C	3000/005	01, 06	100 to 15000	50,100	1, 2, 5, 10	$\pm$ 30	2220	A_15C	3000/006	01, 06	470 to 33000	50,100	1, 2, 5, 10	$\pm$ 30				
Style	Model	Detail Spec	Variants	Cap Range (pF)	Rated Volt. (V)	Tolerance ( $\pm$ %)	TC (ppm/ $^{\circ}$ C)																																														
0805	A_12C	3000/003	01, 06	4.7 to 9.1 10 to 1500	50,100	0.5pF 1, 2, 5, 10	$\pm$ 30																																														
1206	A_20C	3000/022	01, 06	10 to 3900	50,100	1, 2, 5, 10	$\pm$ 30																																														
1210	A_13C	3000/004	01, 06	22 to 6800	50,100	1, 2, 5, 10	$\pm$ 30																																														
1812	A_14C	3000/005	01, 06	100 to 15000	50,100	1, 2, 5, 10	$\pm$ 30																																														
2220	A_15C	3000/006	01, 06	470 to 33000	50,100	1, 2, 5, 10	$\pm$ 30																																														
		CAPACITORS, CERAMIC, FIXED, CHIP, TYPE I	Current Validity of Qualification		Page																																																
			Certificate No.	Valid Until	01-02																																																
			109 K	June 2013	001-1																																																

# AVX European Space Agency and CECC Surface Mount Ceramic Capacitor Products



## QPL CERTIFICATES

Characteristics:

Style	Model	Detail Spec	Variants	Cap Range (pF)	Rated Volt. (V)	Tolerance (±%)
0805	A_12G	3009/008	01, 03, 06	10000 to 47000	25	5, 10, 20
				3900 to 27000	50	5, 10, 20
				820 to 10000	100	5, 10, 20
0805	A612Z	3009/008	07	27000 to 100000	25	5, 10, 20
				27000 to 68000	50	5, 10, 20
				10000 to 47000	100	5, 10, 20
1210	A_13G	3009/009	01, 03, 06	47000 to 220000	25	5, 10, 20
				33000 to 120000	50	5, 10, 20
				3900 to 47000	100	5, 10, 20
1210	A613Z	3009/009	07	100000 to 470000	25	5, 10, 20
				100000 to 330000	50	5, 10, 20
				47000 to 220000	100	5, 10, 20
1812	A_14G	3009/010	01, 03, 06	82000 to 470000	25	5, 10, 20
				56000 to 270000	50	5, 10, 20
				6800 to 82000	100	5, 10, 20
1812	A614Z	3009/010	07	220000 to 1000000	250	5, 10, 20
				220000 to 680000	50	5, 10, 20
				82000 to 470000	100	5, 10, 20
2220	A_15G	3009/011	01, 03, 06	180000 to 1000000	25	5, 10, 20
				100000 to 680000	50	5, 10, 20
				18000 to 180000	100	5, 10, 20
2220	A615Z	3009/011	07	470000 to 2200000	25	5, 10, 20
				470000 to 1500000	50	5, 10, 20
				180000 to 1000000	100	5, 10, 20
1206	A_20G	3009/023	01, 03, 06	27000 to 100000	25	5, 10, 20
				12000 to 68000	50	5, 10, 20
				2200 to 22000	100	5, 10, 20
1206	A620Z	3009/023	07	47000 to 220000	25	5, 10, 20
				47000 to 150000	50	5, 10, 20
				27000 to 100000	100	5, 10, 20

	CAPACITORS, CERAMIC, FIXED, CHIP, TYPE II	Current Validity of Qualification		Page
		Certificate No.	Valid Until	01-02
		110 K	June 2013	002-1B

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