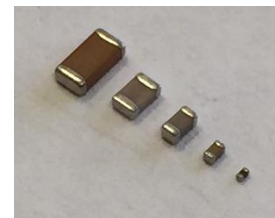
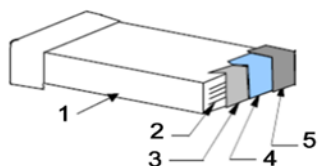


Features:

- -55°C to 125°C operating temperature range
- EIA sizes 0402, 0603, 0805, 1206, 1210 and 1812
- Capacitance offering from 0.1 pF to 0.1 uF
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant



Construction



- 1 - Ceramic layers (dielectric)
- 2 - Inner electrodes
- 3 - Base termination
- 4 - Nickel plating layer
- 5 - Tin plating layer

Electrical Specifications

Type/Code	Dielectric Code	Standard Tolerance		Capacitance Range	
		Code	Description	50V	100V
CML0402	C0G	C	± 0.25 pF	0.1 pF - 8.2 pF	-
		J	± 5%	10 pF - 1000 pF	-
CML0603	C0G	C	± 0.25 pF	0.1 pF - 6.8 pF	0.5 pF - 8.2 pF
		J	± 5%	10 pF - 6800 pF	10 pF - 1000 pF
CML0805	C0G	C	± 0.25 pF	0.3 pF - 6.8 pF	0.5 pF - 8.2 pF
		J	± 5%	10 pF - 0.022 uF	10 pF - 3300 pF
CML1206	C0G	C	± 0.25 pF	0.3 pF - 8.2 pF	0.5 pF - 8.2 pF
		J	± 5%	10 pF - 3300 pF 3900 pF - 4700 pF	10 pF - 3300 pF -
CML1210	C0G	C	± 0.25 pF	-	1 pF - 8.2 pF
		J	± 5%	10 pF - 0.1 uF	10 pF - 6800 pF
CML1812	C0G	C	± 0.25 pF	-	3 pF - 8.2 pF
		J	± 5%	10 pF - 0.1 uF	10 pF - 0.01 uF

Note: Capacitance values < 10 pF: B = ± 0.1 pF may be available
Capacitance values ≥ 10 pF: G = ± 2% may be available

How to Order

C	M	L	0	4	0	2	C	0	G	1	0	0	J	T	5	0	V
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

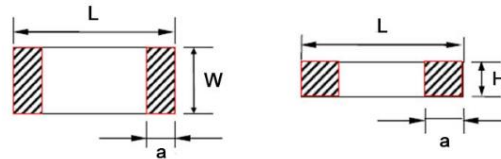
Product Series		Size	Dielectric	Capacitance Range		Tolerance (*)		Packaging			Max Working Voltage
Code	Description	Code	Code	EIA Code	Capacitance	Code	Description	Code	Description	Size and Quantity	
CML	Multilayer Ceramic	0402	C0G	0R1	0.1 pF	B	± 0.1 pF	T	7" Paper Reel	Refer to Packaging Specifications	50V
		0603		100	10 pF	C	± 0.25 pF		7" Plastic Tape		100V
		0805		101	100 pF	G	± 2%				
		1206		102	1000 pF	J	± 5%				
		1210		103	0.01 uF						
		1812		104	0.1 uF						

(*) Other tolerances may be available. Contact Stackpole.

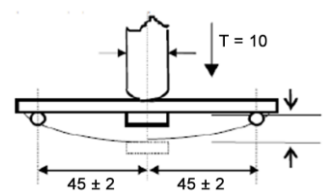
Capacitance and Voltage Available															
Dielectric		C0G													
EIA Code	Size	0402			0603			0805		1206		1210		1812	
	VDCW	50V	50V	100V	50V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
0R1	0.1 pF														
0R2	0.2 pF														
0R3	0.3 pF														
0R4	0.4 pF														
0R5	0.5 pF														
0R6	0.6 pF														
0R7	0.7 pF														
0R8	0.8 pF														
0R9	0.9 pF														
1R0	1 pF														
1R2	1.2 pF														
1R5	1.5 pF														
1R8	1.8 pF														
2R0	2 pF														
2R2	2.2 pF														
2R7	2.7 pF														
3R0	3 pF														
3R3	3.3 pF														
3R9	3.9 pF														
4R7	4.7 pF														
5R0	5 pF														
5R6	5.6 pF														
6R8	6.8 pF														
8R2	8.2 pF														
100	10 pF														
120	12 pF														
150	15 pF														
180	18 pF														
220	22 pF														
270	27 pF														
330	33 pF														
390	39 pF														
470	47 pF														
560	56 pF														
680	68 pF														
820	82 pF														
101	100 pF														
121	120 pF														
151	150 pF														
181	180 pF														
221	220 pF														
271	270 pF														
331	330 pF														
391	390 pF														
471	470 pF														
561	560 pF														
681	680 pF														
751	750 pF														
821	820 pF														
102	1000 pF														
122	1200 pF														
152	1500 pF														
182	1800 pF														
222	2200 pF														
272	2700 pF														
332	3300 pF														
392	3900 pF														
472	4700 pF														
562	5600 pF														
682	6800 pF														
822	8200 pF														
103	0.01 uF														

Capacitance and Voltage Available (cont.)															
Dielectric		C0G													
EIA Code	Size	0402			0603			0805		1206		1210		1812	
	VDCW	50V	50V	100V	50V	50V	100V	50V	100V	50V	100V	50V	100V	50V	100V
123	0.012 uF														
153	0.015 uF														
183	0.018 uF														
223	0.022 uF														
273	0.027 uF														
333	0.033 uF														
473	0.047 uF														
563	0.056 uF														
683	0.068 uF														
823	0.082 uF														
104	0.1 uF														

Mechanical Specifications and Packaging Specifications

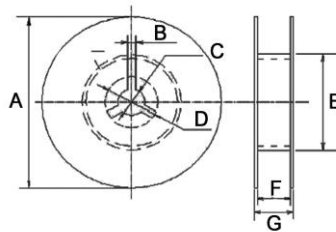


Type/Code	Voltage	Capacitance Value	L	W	H	a	Unit	Packaging (7" Reel) Qty.	
								Paper Tape	Plastic Tape
CML0402C0G	50V	0.1 pF - 1000 pF	0.039 ± 0.008 1.00 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	0.020 ± 0.002 0.50 ± 0.05	0.010 ± 0.004 0.25 ± 0.10	inches mm	10000	-
CML0603C0G	50V - 100V	0.1 pF - 6800 pF	0.063 ± 0.008 1.60 ± 0.20	0.031 ± 0.008 0.80 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.012 ± 0.004 0.30 ± 0.10	inches mm	4000	-
CML0805C0G	50V	0.3 pF - 1500 pF 4700 pF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.002 0.70 ± 0.05	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		1800 pF - 3900 pF	0.079 ± 0.008	0.049 ± 0.008	0.031 ± 0.004	0.020 ± 0.008	inches	4000	-
		5600 pF - 8200 pF	2.00 ± 0.20	1.25 ± 0.20	0.80 ± 0.09	0.50 ± 0.20	mm	4000	-
		0.01 uF - 0.022 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	2000
CML1206C0G	50V	0.3 pF - 8200 pF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.028 ± 0.002 0.70 ± 0.05	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		0.01 uF - 0.1 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
	100V	0.5 pF - 3300 pF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.09	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
CML1210C0G	50V	10 pF - 0.1 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
	100V	1 pF - 6800 pF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
CML1812C0G	50V	10 pF - 0.1 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
	100V	3 pF - 0.01 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000

Environmental Characteristics																	
Test	Test Specification		Test Condition														
Capacitance	Should be within the specified tolerance.		C0G: (Class I) Cap ≤ 1000 pF 1.0 ± 0.2 Vrms, 1 MHz ± 10% Cap > 1000 pF 1.0 ± 0.2 Vrms, 1 KHz ± 10%														
Dissipation Factor (DF)	C0G (Class I)	DF	Capacitance														
		≤ 0.56%	Cr < 5 pF														
		1.5 [(150 / Cr) + 7] × 10 ⁻⁴	5 pF ≤ Cr < 50 pF														
		≤ 0.15%	50 pF ≤ Cr ≤ 1000 pF														
		≤ 0.15%	> 1000 pF														
Insulation Resistance	C0G (Class I)	C ≤ 10 nF, Ri ≥ 50000 MΩ C > 10 nF, Ri*CR ≥ 500 S	Measuring Voltage: Rated Voltage (Max 500V) Duration: 60 ± 5 seconds Test Humidity: ≤ 75% Test Temperature: 25°C ± 5°C Test Current: ≤ 50 mA														
			Measuring voltage: Class I: 300% rated voltage Duration: 1 ~ 5 seconds Charge/Discharge Current: 50 mA max.														
Dielectric Withstanding Voltage	No breakdown or damage.		Preheating Conditions: 80°C to 120°C, 10 ~ 30 seconds Solder Temperature: 235°C ± 5% (Sn/Pb: 63/37) Duration: 2 ± 0.5 seconds Solder Temperature: 245°C ± 5°C (Lead-free) Duration: 2 ± 0.5 seconds														
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual appearance: No visible damage.		Preheating Conditions: 100°C to 200°C; 10 ± 2 minutes Solder Temperature: 265°C ± 5°C Duration: 10 ± 1 seconds Clean the capacitor with solvent and examine it with a 10X (min.) microscope. Recovery Time: 24 ± 2 hours Recovery Condition: Room temperature.														
			Test Board: Al2O3 or PCB Warp: 1 mm Speed: 0.5 mm/second The measurement should be made with the board in the bending position.														
																	
			Unit: mm														
Resistance to Soldering Heat	Item	C0G	Applied Force: 5 N Duration: 10 ± 1 seconds														
	Δ C/C	≤ ± 0.5% or ± 0.5 pF whichever is larger	Preheating Conditions: up-category Temperature: 1 hour Recovery Time: 24 ± 1 hours Initial Measurement														
	DF	Same to initial value	Cycling times: 5 times, 1 cycle, 4 steps:														
	IR	Same to initial value	<table border="1"> <thead> <tr> <th>Step</th> <th>Temp. (°C)</th> <th>Time (min.)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Low-category temp. C0G: -55°C</td> <td>30 ± 3</td> </tr> <tr> <td>2</td> <td>Normal temp. (+20)</td> <td>2 - 3</td> </tr> <tr> <td>3</td> <td>Up-category temp. C0G: +125°C</td> <td>30 ± 3</td> </tr> <tr> <td>4</td> <td>Normal temp. (+20°C)</td> <td>2 - 3</td> </tr> </tbody> </table>	Step	Temp. (°C)	Time (min.)	1	Low-category temp. C0G: -55°C	30 ± 3	2	Normal temp. (+20)	2 - 3	3	Up-category temp. C0G: +125°C	30 ± 3	4	Normal temp. (+20°C)
Step	Temp. (°C)	Time (min.)															
1	Low-category temp. C0G: -55°C	30 ± 3															
2	Normal temp. (+20)	2 - 3															
3	Up-category temp. C0G: +125°C	30 ± 3															
4	Normal temp. (+20°C)	2 - 3															
Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.			Recovery time after test: 24 ± 2 hours														
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage. Δ C/C: ≤ ± 10%																
Termination Adhesion	No visible damage																
Temperature Cycle	C0G: Δ C/C: ≤ ± 1% or ± 1 pF, whichever is larger																

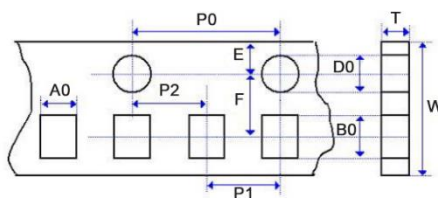
Environmental Characteristics (cont.)		
Test	Test Specification	Test Condition
Moisture Resistance	C0G: $\Delta C/C$: $\leq \pm 2\%$ or ± 1 pF, whichever is larger DF: Not more than twice of initial value. IR: C0G: $R_i \geq 2500$ M Ω or $R_i \cdot CR \geq 25$ S whichever is smaller Appearance: No visible damage	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: 90 ~ 95% R.H. Duration: 500 hours Recovery Conditions: Room temperature Recovery Time: 24 hours (Class I)
Life Test	C0G: $\Delta C/C$: $\leq \pm 2\%$ or ± 1 pF, whichever is larger DF: Not more than twice of initial value. IR: C0G: $R_i \geq 4000$ M Ω or $R_i \cdot CR \geq 40$ S whichever is smaller Appearance: No visible damage	Low-voltage (< 100V) Applied Voltage: 1.5 x rated voltage Duration: 1000 hours Temperature: 125°C (C0G) Charge/Discharge Current: 50 mA max. Recovery Conditions: Room temperature Recovery Time: 24 hours (Class I)
Middle and High Voltage Life Test	C0G: $\Delta C/C$: $\leq \pm 2\%$ or ± 1 pF, whichever is larger DF: Not more than twice of initial value. IR: C0G: $R_i \geq 4000$ M Ω or $R_i \cdot CR \geq 40$ S whichever is smaller Appearance: No visible damage	Applied voltage: $100\text{V} \leq$ rated voltage < 500V: 2 multiple $500\text{V} \leq$ rated voltage $\leq 1000\text{V}$: 1.5 multiple > 1000V rated voltage: 1.2 multiple Duration: 1000 hours Charge/Discharge Current: 50 mA max. Temperature: 125°C (C0G) Recovery Conditions: Room temperature Recovery Time: 24 hours (Class I)

Reel Specifications



Type/Code	A	B	C	D	E	F	G	Unit
CML_C0G (all sizes)	7.008 ± 0.079 178.00 ± 2.00	0.118 3.00	0.512 ± 0.020 13.00 ± 0.50	0.827 ± 0.031 21.00 ± 0.80	1.969 or more 50.00 or more	0.394 ± 0.059 10.00 ± 1.50	0.472 max 12.00 max	inches mm

Paper Tape Specifications

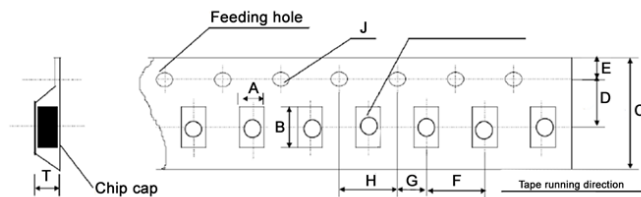


Type/Code	A ₀	B ₀	T	W	P ₀	Unit
CML0402C0G	0.026 ± 0.004 0.65 ± 0.10	0.045 ± 0.004 1.15 ± 0.10	0.031 below 0.80 below	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0603C0G	0.043 ± 0.004 1.10 ± 0.10	0.075 ± 0.004 1.90 ± 0.10	0.043 max 1.10 max	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0805C0G	0.057 ± 0.006 1.45 ± 0.15	0.091 ± 0.006 2.30 ± 0.15	0.043 max 1.10 max	0.315 ± 0.006 8.00 ± 0.15	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML1206C0G	0.071 ± 0.008 1.80 ± 0.20	0.134 ± 0.008 3.40 ± 0.20	0.043 max 1.10 max	0.315 ± 0.008 8.00 ± 0.20	0.157 ± 0.004 4.00 ± 0.10	inches mm

Paper Tape Specifications (cont.)

Type/Code	P ₁	P ₂	D ₀	E	F	Unit
CML0402C0G	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0603C0G	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.002 4.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0805C0G	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML1206C0G	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm

Plastic Tape Specifications



Type/Code	A	B	C	D	E	Unit
CML0805C0G	0.061 ± 0.008 1.55 ± 0.20	0.093 ± 0.008 2.35 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1206C0G	0.077 ± 0.008 1.95 ± 0.20	0.142 ± 0.008 3.60 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1210C0G	0.106 ± 0.004 2.70 ± 0.10	0.135 ± 0.004 3.42 ± 0.10	0.315 ± 0.004 8.00 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1812C0G	0.144 ± 0.004 3.66 ± 0.10	0.195 ± 0.004 4.95 ± 0.10	0.472 ± 0.004 12.00 ± 0.10	0.217 ± 0.002 5.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
Type/Code	F	G	H	J	T	Unit
CML0805C0G	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.059 max 1.50 max	inches mm
CML1206C0G	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.073 max 1.85 max	inches mm
CML1210C0G	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.126 max 3.20 max	inches mm
CML1812C0G	0.315 ± 0.004 8.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.157 max 4.00 max	inches mm

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/WW)
CML	Multilayer Ceramic Chip Capacitor	SMD	YES	100% Matte Sn over Ni	Always	Always

“Conflict Metals” Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to “REACH”

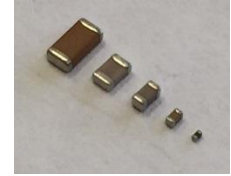
We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

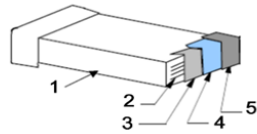
It is the policy of Stackpole Electronics, Inc. to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

Features:

- -55°C to 125°C operating temperature range
- EIA sizes 0402, 0603, 0805, 1206, 1210 and 1812
- Capacitance offering from 100 pF to 47 uF
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant



Construction



- 1 - Ceramic layers (dielectric)
- 2 - Inner electrodes
- 3 - Base termination
- 4 - Nickel plating layer
- 5 - Tin plating layer

Electrical Specifications

Type/Code	Dielectric Code	Standard Tolerance		Capacitance Range				
		Code	Description	10V	16V	25V	50V	100V
CML0402	X7R	K	± 10%	120 pF - 0.039 uF			-	
				0.012 uF - 0.1 uF			-	
CML0603	X7R	K	± 10%	150 pF - 0.1 uF			-	
				0.012 uF - 0.18 uF			-	
				0.12 uF - 0.33 uF			-	
CML0805	X7R	K	± 10%	150 pF - 0.1 uF			-	
				0.12 uF - 0.39 uF			-	
				0.12 uF - 2.2 uF			-	
CML1206	X7R	K	± 10%	150 pF - 1 uF			-	
				2.2 uF - 4.7 uF			-	
CML1210	X7R	K	± 10%	-			150 pF - 2.2 uF	
				220 pF - 10 uF			-	
				47 uF			-	
CML1812	X7R	K	± 10%	-			270 pF - 1 uF	
				470 pF - 4.7 uF			-	
				6.8 uF			-	

Note: J = 5% tolerance may be available

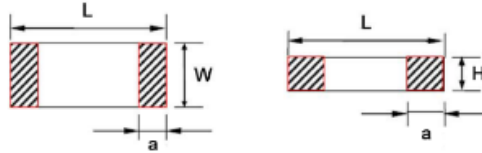
How to Order

C M L 0 4 0 2 X 7 R 1 0 3 K T 5 0 V

Product Series		Size	Dielectric	Capacitance Range		Tolerance (*)		Packaging			Max Working Voltage	
Code	Description	Code	Code	0.1 pF to 0.10 uF (E12)	Code	Description	Code	Description	Size	Quantity		
CML	Multilayer Ceramic	0402	X7R	EIA Code	101	100 pF	J	± 5%	T	7" Paper Reel	Refer to Packaging Specifications	10V
		0603		102	1000 pF	K	± 10%	7" Plastic Tape	16V			
		0805		103	0.01 uF	(*) Other tolerances may be available. Contact Stackpole.		25V				
		1206		104	0.1 uF	50V						
		1210		105	1 uF	100V						
		1812		106	10 uF							

Dielectric		X7R																											
EIA Code	Size	0402				0603				0805				1206				1210				1812							
	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	16V	25V	50V	100V
101	100 pF																												
121	120 pF																												
151	150 pF																												
181	180 pF																												
201	200 pF																												
221	220 pF																												
271	270 pF																												
331	330 pF																												
391	390 pF																												
471	470 pF																												
561	560 pF																												
681	680 pF																												
751	750 pF																												
821	820 pF																												
102	1000 pF																												
122	1200 pF																												
152	1500 pF																												
182	1800 pF																												
222	2200 pF																												
272	2700 pF																												
332	3300 pF																												
392	3900 pF																												
472	4700 pF																												
562	5600 pF																												
682	6800 pF																												
822	8200 pF																												
103	0.01 uF																												
123	0.012 uF																												
153	0.015 uF																												
183	0.018 uF																												
223	0.022 uF																												
273	0.027 uF																												
333	0.033 uF																												
393	0.039 uF																												
473	0.047 uF																												
563	0.056 uF																												
683	0.068 uF																												
823	0.082 uF																												
104	0.1 uF																												
124	0.12 uF																												
154	0.15 uF																												
184	0.18 uF																												
224	0.22 uF																												
274	0.27 uF																												
334	0.33 uF																												
394	0.39 uF																												
474	0.47 uF																												
564	0.56 uF																												
684	0.68 uF																												
824	0.82 uF																												
105	1 uF																												
125	1.2 uF																												
155	1.5 uF																												
225	2.2 uF																												
335	3.3 uF																												
475	4.7 uF																												
685	6.8 uF																												
106	10 uF																												
226	22 uF																												
476	47 uF																												

Mechanical Specifications and Packaging Specifications



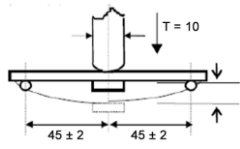
Type/Code	Voltage	Capacitance Range	L	W	H	a	Unit	Packaging (7" Reel) Qty.	
								Paper Tape	Plastic Tape
CML0402X7R	10V - 50V	100 pF - 0.47 uF	0.039 ± 0.008 1.00 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	0.020 ± 0.002 0.50 ± 0.05	0.010 ± 0.004 0.25 ± 0.10	inches mm	10000	-
CML0603X7R	10V - 100V	150 pF - 2.2 uF	0.063 ± 0.008 1.60 ± 0.20	0.031 ± 0.008 0.80 ± 0.20	0.031 ± 0.006 0.80 ± 0.15	0.016 ± 0.008 0.40 ± 0.20	inches mm	4000	-
CML0805X7R	10V	150 pF - 0.33 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.47 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.56 uF - 0.68 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		0.82 uF - 1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		1.5 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
	3.3 uF - 10 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	2000	
	16V	150 pF - 0.33 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.47 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.56 uF - 0.68 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		0.82 uF - 1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		1.5 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
	3.3 uF - 4.7 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	2000	
	25V	150 pF - 0.33 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.47 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.56 uF - 0.68 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		0.82 uF - 1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
1.5 uF - 2.2 uF		0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	2000	
3.3 uF - 4.7 uF		0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	2000	

Mechanical Specifications and Packaging Specifications (cont.)

Type/Code	Voltage	Capacitance Range	L	W	H	a	Unit	Packaging (7" Reel) Qty.	
								Paper Tape	Plastic Tape
CML0805X7R	50V	150 pF - 0.33 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.47 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.56 uF - 0.68 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		0.82 uF - 1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.039 ± 0.004 1.00 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
		1.5 uF - 2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
	100V	100 pF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.020 0.70 ± 0.50	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		150 pF - 0.047 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.056 uF - 0.1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
	CML1206X7R	10V	200 pF - 0.33 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000
0.47 uF - 0.68 uF			0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
0.82 uF - 1.5 uF			0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
2.2 uF			0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
3.3 uF			0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
4.7 uF - 22 uF			0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
16V - 25V		200 pF - 0.33 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		0.47 uF - 0.68 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
		0.82 uF - 1.5 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		2.2 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		3.3 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
		4.7 uF - 10 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
50V		200 pF - 0.33 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		0.47 uF - 0.68 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
		0.82 uF - 1.5 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		2.2 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		3.3 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
		4.7 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
100V		150 pF - 0.056 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		0.068 uF - 0.33 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	3000
		0.47 uF - 1 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000

Mechanical Specifications and Packaging Specifications (cont.)

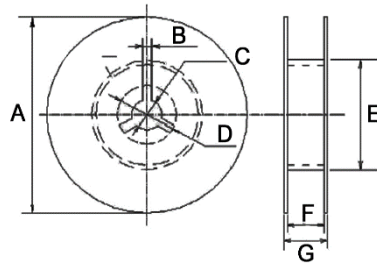
Type/Code	Voltage	Capacitance Range	L	W	H	a	Unit	Packaging (7" Reel) Qty.	
								Paper Tape	Plastic Tape
CML1210X7R	10V	220 pF - 0.47 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		0.68 uF - 1 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		4.7 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		10 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.071 ± 0.004 1.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		47 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.098 ± 0.010 2.50 ± 0.25	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	500
	16V - 25V	220 pF - 0.47 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		0.68 uF - 1 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		4.7 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		10 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.071 ± 0.004 1.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		22 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.098 ± 0.010 2.50 ± 0.25	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	500
	50V	220 pF - 0.47 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.047 ± 0.004 1.20 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		0.68 uF - 1 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		4.7 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.071 ± 0.004 1.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		10 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.098 ± 0.010 2.50 ± 0.25	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	500
	100V	150 pF - 0.22 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.055 ± 0.004 1.40 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
		0.33 uF - 2.2 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
CML1812X7R	16V - 25V	470 pF - 1 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
		1.5 uF - 6.8 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.071 ± 0.004 1.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
	50V	470 pF - 1 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
		1.5 uF - 4.7 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.071 ± 0.004 1.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
	100V	270 pF - 0.56 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000
		0.68 uF - 1 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.009 1.60 ± 0.24	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	500

Environmental Characteristics								
Test	Test Specification					Test Condition		
Capacitance	Should be within the specified tolerance.					X7R: (Class II) Cap ≤ 10uF 1.0 ± 0.2 Vrms, 1 KHz ± 10% Cap > 10uF 0.5 ± 0.1 Vrms, 120 Hz ± 10%		
Dissipation Factor (DF)	X7R (Class II)	X7R (≥ 0402)	≥ 50V	25V	16V	10V		
			≤ 2.5%	≤ 3.5% (C < 0.47uF) ≤ 10.0% (C ≥ 0.47uF)	≤ 5% (C < 0.15uF) ≤ 10.0% (C ≥ 0.15 uF)			
Insulation Resistance	X7R (Class II)	C ≤ 25nF, Ri ≥ 10000M Ω C > 25nF, Ri*CR > 100S				Measuring Voltage: Rated Voltage (Max 500V) Duration: 60 ± 5 seconds Test Humidity: ≤ 75% Test Temperature: 25°C ± 5°C Test Current: ≤ 50 mA		
Dielectric Withstanding Voltage	No breakdown or damage.					Measuring voltage: Class II: 250% rated voltage Duration: 1 ~ 5 seconds Charge/Discharge Current: 50 mA max.		
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual appearance: No visible damage.					Preheating Conditions: 80°C to 120°C, 10 ~ 30 seconds Solder Temperature: 235°C ± 5% (Sn/Pb: 63/37) Duration: 2 ± 0.5 seconds		
						Solder Temperature: 245°C ± 5°C (Lead-free) Duration: 2 ± 0.5 seconds		
Resistance to Soldering Heat	Item	X7R				Preheating Conditions: 100°C to 200°C; 10 ± 2 minutes Solder Temperature: 265°C ± 5°C Duration: 10 ± 1 seconds Clean the capacitor with solvent and examine it with a 10X (min.) microscope. Recovery Time: 24 ± 2 hours Recovery Condition: Room temperature.		
	Δ C/C	-5 ~ + 10%						
	DF	Same to initial value						
	IR	Same to initial value						
	Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.							
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage. Δ C/C: ≤ ± 10%					Test Board: Al2O3 or PCB Warp: 1 mm Speed: 0.5 mm / second The measurement should be made with the board in the bending position. Unit: mm 		
Termination Adhesion	No visible damage					Applied Force: 5 N Duration: 10 ± 1 seconds		
Temperature Cycle	X7R: Δ C/C: ≤ ± 10%					Preheating Conditions: up-category temperature 1 hour Recovery Time: 24 ± 1 hours Initial Measurement Cycling times: 5 times, 1 cycle, 4 steps:		
						Step	Temp. (°C)	Time (min.)
						1	Low-category temp. X7R: -55°C	30 ± 3
						2	Normal temp. (+20°C)	2 - 3
						3	Up-category temp. X7R: +125°C	30 ± 3
4	Normal temp. (+20°C)	2 - 3						
Recovery time after test: 24 ± 2 hours								

Environmental Characteristics (cont.)

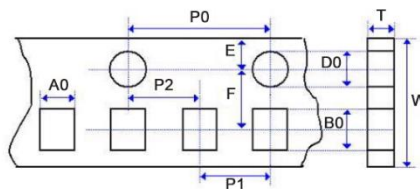
Test	Test Specification	Test Condition
Moisture Resistance	X7R: $\Delta C/C: \leq \pm 10\%$ DF: Not more than twice of initial value. IR: X7R: $R_i \geq 1000M \Omega$ or $R_i^*CR \geq 25S$ whichever is smaller Appearance: No visible damage	Temperature: $40^\circ C \pm 2^\circ C$ Humidity: 90 ~ 95% R.H. Duration: 500 hours Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)
Life Test	X7R: $\Delta C/C: \leq \pm 20\%$ DF: Not more than twice of initial value. IR: X7R: $R_i \geq 2000M \Omega$ or $R_i^*CR \geq 50 S$ whichever is smaller Appearance: No visible damage	Low-voltage ($< 100V$) Applied Voltage: 1.5 x rated voltage Duration: 1000 hours Temperature: $125^\circ C$ (X7R) Charge/Discharge Current: 50 mA max. Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)
Middle and High Voltage Life Test	X7R: $\Delta C/C: \leq \pm 20\%$ DF: Not more than twice of initial value. IR: X7R: $R_i \geq 2000M \Omega$ or $R_i^*CR \geq 50 S$ whichever is smaller Appearance: No visible damage	Applied voltage: $100V \leq$ rated voltage $< 500V$: 2 multiple $500V \leq$ rated voltage $\leq 1000V$: 1.5 multiple $> 1000V$ rated voltage: 1.2 multiple Duration: 1000 hours Charge/Discharge Current: 50 mA max. Temperature: $125^\circ C$ (X7R) Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)

Reel Specifications



Type/Code	A	B	C	D	E	F	G	Unit
CML_X7R (all sizes)	7.008 ± 0.079 178.00 ± 2.00	0.118 3.00	0.512 ± 0.020 13.00 ± 0.50	0.827 ± 0.031 21.00 ± 0.80	1.969 or more 50.00 or more	0.394 ± 0.059 10.00 ± 1.50	0.472 max 12.00 max	inches mm

Paper Tape Specifications

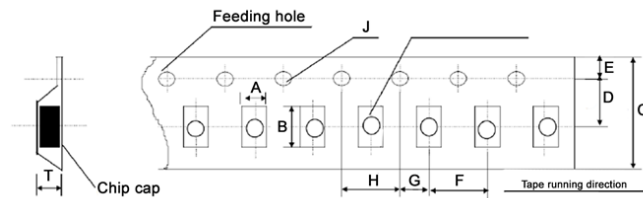


Type/Code	A0	B0	T	W	P0	Unit
CML0402X7R	0.026 ± 0.004 0.65 ± 0.10	0.045 ± 0.004 1.15 ± 0.10	0.031 below 0.80 below	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0603X7R	0.043 ± 0.004 1.10 ± 0.10	0.075 ± 0.004 1.90 ± 0.10	0.043 max 1.10 max	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0805X7R	0.057 ± 0.006 1.45 ± 0.15	0.091 ± 0.006 2.30 ± 0.15	0.043 max 1.10 max	0.315 ± 0.006 8.00 ± 0.15	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML1206X7R	0.071 ± 0.008 1.80 ± 0.20	0.134 ± 0.008 3.40 ± 0.20	0.043 max 1.10 max	0.315 ± 0.008 8.00 ± 0.20	0.157 ± 0.004 4.00 ± 0.10	inches mm

Paper Tape Specifications (cont.)

Type/Code	P1	P2	D0	E	F	Unit
CML0402X7R	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0603X7R	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.002 4.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0805X7R	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML1206X7R	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm

Plastic Tape Specifications



Type/Code	A	B	C	D	E	Unit
CML0805X7R	0.061 ± 0.008 1.55 ± 0.20	0.093 ± 0.008 2.35 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1206X7R	0.077 ± 0.008 1.95 ± 0.20	0.142 ± 0.008 3.60 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1210X7R	0.106 ± 0.004 2.70 ± 0.10	0.135 ± 0.004 3.42 ± 0.10	0.315 ± 0.004 8.00 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1812X7R	0.144 ± 0.004 3.66 ± 0.10	0.195 ± 0.004 4.95 ± 0.10	0.472 ± 0.004 12.00 ± 0.10	0.217 ± 0.002 5.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
Type/Code	F	G	H	J	T	Unit
CML0805X7R	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.059 max 1.50 max	inches mm
CML1206X7R	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.073 max 1.85 max	inches mm
CML1210X7R	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.126 max 3.20 max	inches mm
CML1812X7R	0.315 ± 0.004 8.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.157 max 4.00 max	inches mm

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/MM)
CML	Multilayer Ceramic Chip Capacitor	SMD	YES	100% Matte Sn over Ni	Always	Always

“Conflict Metals” Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to “REACH”

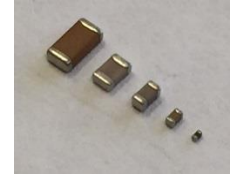
We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

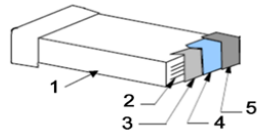
It is the policy of Stackpole Electronics, Inc. to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.

Features:

- -30°C to 85°C operating temperature range
- EIA sizes 0402, 0603, 0805, 1206, 1210 and 1812
- Capacitance offering from 1000 pF to 22 uF
- 100% RoHS compliant and lead free without exemption
- Halogen free
- REACH compliant



Construction



- 1 - Ceramic layers (dielectric)
- 2 - Inner electrodes
- 3 - Base termination
- 4 - Nickel plating layer
- 5 - Tin plating layer

Electrical Specifications

Type / Code	Dielectric Code	Standard Tolerance		Capacitance Range					
		Code	Description	10V	16V	25V	50V	100V	
CML0402	Y5V	Z	+80% / -20%	1000 pF - 0.1 uF					-
				0.12 uF - 0.18 uF			-		-
				0.12 uF - 0.47 uF		-			-
				0.12 uF - 1 uF		-			-
CML0603	Y5V	Z	+80% / -20%	10000 pF - 0.1 uF					-
				10000 pF - 0.82 uF			-		-
CML0805	Y5V	Z	+80% / -20%	0.012 uF - 0.1 uF					-
				1 uF - 4.7 uF			-		-
CML1206	Y5V	Z	+80% / -20%	10000 pF - 1 uF					-
				2.2 uF - 4.7 uF			-		-
CML1210	Y5V	Z	+80% / -	10 uF	-	-	-	0.015 uF - 1 uF	
CML1812	Y5V	Z	+80% / -	-	-	-	-	0.15 uF - 2.2 uF	

Note: M = ±20% tolerance may be available

How to Order

C
M
L
0
4
0
2
Y
5
V
1
0
3
Z
T
5
0
V

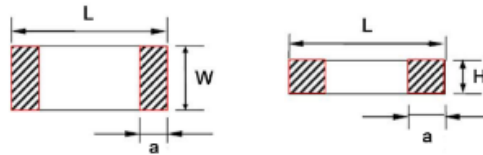
Product Series		Size	Dielectric	Capacitance Range		Tolerance (*)		Packaging				Max Working Voltage
Code	Description	Code	Code	0.1pF to 0.10uF (E6)		Code	Description	Code	Description	Size	Quantity	
CML	Multilayer Ceramic	0402	Y5V	EIA Code	Capacitance	M	± 20%	T	7" Paper Reel	Refer to Packaging Specifications		10V
		0603		102	1000 pF							16V
		0805		103	0.01 uF				25V			
		1206		104	0.1 uF				50V			
		1210		105	1 uF				100V			
		1812		106	10 uF							

(*) Other tolerances may be available. Contact

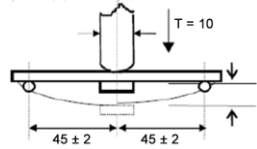
Capacitance and Voltage Available

Dielectric		Y5V																					
EIA	Size	0402				0603					0805					1206					1210	1812	
Code	VDCW	10V	16V	25V	50V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	25V	50V	100V	10V	16V	
102	1000 pF																						
122	1200 pF																						
152	1500 pF																						
182	1800 pF																						
222	2200 pF																						
272	2700 pF																						
332	3300 pF																						
392	3900 pF																						
472	4700 pF																						
562	5600 pF																						
682	6800 pF																						
822	8200 pF																						
103	0.01 uF																						
123	0.012 uF																						
153	0.015 uF																						
183	0.018 uF																						
223	0.022 uF																						
273	0.027 uF																						
333	0.033 uF																						
393	0.039 uF																						
473	0.047 uF																						
563	0.056 uF																						
683	0.068 uF																						
823	0.082 uF																						
104	0.1 uF																						
124	0.12 uF																						
154	0.15 uF																						
224	0.22 uF																						
334	0.33 uF																						
394	0.39 uF																						
474	0.47 uF																						
564	0.56 uF																						
684	0.68 uF																						
824	0.82 uF																						
105	1 uF																						
125	1.2 uF																						
135	1.3 uF																						
155	1.5 uF																						
225	2.2 uF																						
335	3.3 uF																						
475	4.7 uF																						
685	6.8 uF																						
106	10 uF																						
226	22 uF																						

Mechanical Specifications and Packaging Specifications



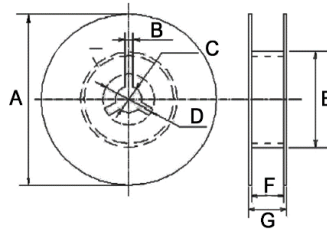
Type / Code	Voltage	Capacitance Range	L	W	H	a	Unit	Packaging (7" Reel) Qty.	
								Paper Tape	Plastic Tape
CML0402Y5V	10V - 50V	1000 pF - 1 uF	0.039 ± 0.008 1.00 ± 0.20	0.020 ± 0.008 0.50 ± 0.20	0.020 ± 0.002 0.50 ± 0.05	0.010 ± 0.004 0.25 ± 0.10	inches mm	10000	-
CML0603Y5V	10V - 100V	1000 pF - 10 uF	0.063 ± 0.008 1.60 ± 0.20	0.031 ± 0.008 0.80 ± 0.20	0.031 ± 0.004 0.80 ± 0.09	0.012 ± 0.004 0.30 ± 0.10	inches mm	4000	-
CML0805Y5V	10V	1000 pF - 0.22 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.020 0.70 ± 0.50	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.33 uF - 2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		3.3 uF - 22 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
	16V	1000 pF - 0.22 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.002 0.70 ± 0.05	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.33 uF - 2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		3.3 uF - 10 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
	25V	1000 pF - 0.22 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.002 0.70 ± 0.05	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.33 uF - 2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		3.3 uF - 4.7 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.047 ± 0.004 1.20 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	-	3000
	50V	1000 pF - 0.22 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.002 0.70 ± 0.05	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
		0.33 uF - 2.2 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.031 ± 0.004 0.80 ± 0.10	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
	100V	0.01 uF - 0.1 uF	0.079 ± 0.008 2.00 ± 0.20	0.049 ± 0.008 1.25 ± 0.20	0.028 ± 0.002 0.70 ± 0.05	0.020 ± 0.008 0.50 ± 0.20	inches mm	4000	-
CML1206Y5V	10V - 16V	1000 pF - 10 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
		22 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
	25V	1000 pF - 10 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
	50V - 100V	1000 pF - 4.7 uF	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.012 1.60 ± 0.30	0.031 ± 0.004 0.80 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	4000	-
CML1210Y5V	100V	0.015 uF - 1 uF	0.126 ± 0.012 3.20 ± 0.30	0.098 ± 0.012 2.50 ± 0.30	0.039 ± 0.004 1.00 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	2000
CML1812Y5V	100V	0.15 uF - 2.2 uF	0.177 ± 0.016 4.50 ± 0.40	0.126 ± 0.012 3.20 ± 0.30	0.063 ± 0.004 1.60 ± 0.10	0.024 ± 0.012 0.60 ± 0.30	inches mm	-	1000

Environmental Characteristics						
Test	Test Specification			Test Condition		
Capacitance	Should be within the specified tolerance.			Y5V: (Class II) Cap ≤ 10uF 1.0 ± 0.2 Vrms, 1 KHz ± 10% Cap > 10uF 0.5 ± 0.1 Vrms, 120 Hz ± 10%		
Dissipation Factor (DF)	Y5V (Class II)	≥ 25V ≤ 7% (C < 1uF) ≤ 9% (C ≥ 1uF)	16V ≤ 15%	10V ≤ 15%	Cap ≤ 10uF 1.0 ± 0.2 Vrms, 1 KHz ± 10% Cap > 10uF 0.5 ± 0.1 Vrms, 120 Hz ± 10%	
Insulation Resistance	Y5V (Class II)	C ≤ 25 nF, Ri ≥ 4,000 MΩ C > 25 nF, Ri*CR > 100 S		Measuring Voltage: Rated Voltage (Max 500V) Duration: 60 ± 5 seconds Test Humidity: ≤ 75% Test Temperature: 25°C ± 5°C Test Current: ≤ 50 mA		
Dielectric Withstanding Voltage	No breakdown or damage.			Measuring voltage: Class II: 250% rated voltage Duration: 1 ~ 5 seconds Charge/Discharge Current: 50 mA max.		
Solderability	At least 95% of the terminal electrode is covered by new solder. Visual appearance: No visible damage.			Preheating Conditions: 80°C to 120°C, 10 ~ 30 seconds		
				Solder Temperature: 235°C ± 5% (Sn/Pb: 63/37) Duration: 2 ± 0.5 seconds		
				Solder Temperature: 245°C ± 5 °C (Lead-free) Duration: 2 ± 0.5 seconds		
Resistance to Soldering Heat	Item	Y5V		Preheating Conditions: 100°C to 200°C; 10 ± 2 minutes Solder Temperature: 265°C ± 5°C Duration: 10 ± 1 seconds Clean the capacitor with solvent and examine it with a 10X (min.) microscope. Recovery Time: 24 ± 2 hours Recovery Condition: Room temperature.		
	Δ C/C	-10 ~ +20%				
	DF	Same to initial value				
	IR	Same to initial value				
	Appearance: No visible damage. At least 95% of the terminal electrode is covered by new solder.					
Resistance to Flexure of Substrate (Bending Strength)	Appearance: No visible damage. Δ C/C: ≤ ± 10%			Test Board: Al2O3 or PCB Warp: 1 mm Speed: 0.5 mm / second The measurement should be made with the board in the bending position. Unit: mm 		
Termination Adhesion	No visible damage			Applied Force: 5 N Duration: 10 ± 1 seconds		
Temperature Cycle	Y5V: Δ C/C: ≤ ± 20%			Preheating Conditions: up-category temperature 1 hour Recovery Time: 24 ± 1 hours Initial Measurement Cycling times: 5 times, 1 cycle, 4 steps:		
				Step	Temp. (°C)	Time (min.)
				1	Low-category temp. Y5V: -25 °C	30 ± 3
				2	Normal temp. (+20°C)	2 - 3
				3	Up-category temp. Y5V: +85°C	30 ± 3
				4	Normal temp. (+20°C)	2 - 3
Recovery time after test: 24 ± 2 hours						

Environmental Characteristics (cont.)

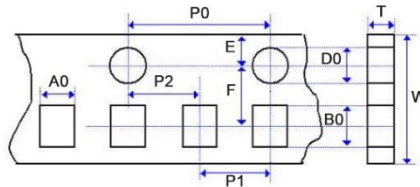
Test	Test Specification	Test Condition
Moisture Resistance	Y5V: $\Delta C/C: \leq \pm 30\%$ DF: Not more than twice of initial value. IR: Y5V: $R_i \geq 1000 \text{ M}\Omega$ or $R_i \cdot CR \geq 25 \text{ S}$ whichever is smaller Appearance: No visible damage	Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity: 90 ~ 95% R.H. Duration: 500 hours Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)
Life Test	Y5V: $\Delta C/C: \leq \pm 30\%$ DF: Not more than twice of initial value. IR: Y5V: $R_i \geq 2000 \text{ M}\Omega$ or $R_i \cdot CR \geq 50 \text{ S}$ whichever is smaller Appearance: No visible damage	Low-voltage (<100V) Applied Voltage: 1.5 x rated voltage Duration: 1000 hours Temperature: 85°C (Y5V) Charge/Discharge Current: 50mA max. Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)
Middle and High Voltage Life Test	Y5V: $\Delta C/C: \leq \pm 30\%$ DF: Not more than twice of initial value. IR: Y5V $R_i \geq 2000 \text{ M}\Omega$ or $R_i \cdot CR \geq 50 \text{ S}$ whichever is smaller Appearance: No visible damage	Applied voltage: $100 \text{ V} \leq \text{rated voltage} < 500 \text{ V}$: 2 multiple $500 \text{ V} \leq \text{rated voltage} \leq 1000 \text{ V}$: 1.5 multiple > 1000V rated voltage: 1.2 multiple Duration: 1000 hours Charge/Discharge Current: 50 mA max. Temperature: 85°C (Y5V) Recovery Conditions: Room temperature Recovery Time: 48 hours (Class II)

Reel Specifications



Type/Code	A	B	C	D	E	F	G	Unit
CML_Y5V (all sizes)	7.008 ± 0.079 178.00 ± 2.00	0.118 3.00	0.512 ± 0.020 13.00 ± 0.50	0.827 ± 0.031 21.00 ± 0.80	1.969 or more 50.00 or more	0.394 ± 0.059 10.00 ± 1.50	0.472 max 12.00 max	inches mm

Paper Tape Specifications

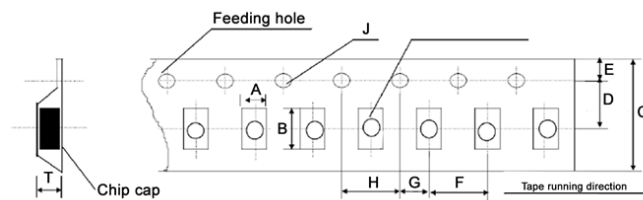


Type/Code	A0	B0	T	W	P0	Unit
CML0402Y5V	0.026 ± 0.004 0.65 ± 0.10	0.045 ± 0.004 1.15 ± 0.10	0.031 below 0.80 below	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0603Y5V	0.043 ± 0.004 1.10 ± 0.10	0.075 ± 0.004 1.90 ± 0.10	0.043 max 1.10 max	0.315 ± 0.004 8.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML0805Y5V	0.057 ± 0.006 1.45 ± 0.15	0.091 ± 0.006 2.30 ± 0.15	0.043 max 1.10 max	0.315 ± 0.006 8.00 ± 0.15	0.157 ± 0.004 4.00 ± 0.10	inches mm
CML1206Y5V	0.071 ± 0.008 1.80 ± 0.20	0.134 ± 0.008 3.40 ± 0.20	0.043 max 1.10 max	0.315 ± 0.008 8.00 ± 0.20	0.157 ± 0.004 4.00 ± 0.10	inches mm

Paper Tape Specifications (cont.)

Type/Code	P1	P2	D0	E	F	Unit
CML0402Y5V	0.079 ± 0.002 2.00 ± 0.05	0.079 ± 0.002 2.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0603Y5V	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.002 4.00 ± 0.05	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML0805Y5V	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.002 1.75 ± 0.05	0.138 ± 0.002 3.50 ± 0.05	inches mm
CML1206Y5V	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.069 ± 0.004 1.75 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	inches mm

Plastic Tape Specifications



Type/Code	A	B	C	D	E	Unit
CML0805Y5V	0.061 ± 0.008 1.55 ± 0.20	0.093 ± 0.008 2.35 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1206Y5V	0.077 ± 0.008 1.95 ± 0.20	0.142 ± 0.008 3.60 ± 0.20	0.315 ± 0.008 8.00 ± 0.20	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1210Y5V	0.106 ± 0.004 2.70 ± 0.10	0.135 ± 0.004 3.42 ± 0.10	0.315 ± 0.004 8.00 ± 0.10	0.138 ± 0.002 3.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
CML1812Y5V	0.144 ± 0.004 3.66 ± 0.10	0.195 ± 0.004 4.95 ± 0.10	0.472 ± 0.004 12.00 ± 0.10	0.217 ± 0.002 5.50 ± 0.05	0.069 ± 0.004 1.75 ± 0.10	inches mm
Type/Code	F	G	H	J	T	Unit
CML0805Y5V	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.059 max 1.50 max	inches mm
CML1206Y5V	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.004 2.00 ± 0.10	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.073 max 1.85 max	inches mm
CML1210Y5V	0.157 ± 0.004 4.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.126 max 3.20 max	inches mm
CML1812Y5V	0.315 ± 0.004 8.00 ± 0.10	0.079 ± 0.002 2.00 ± 0.05	0.157 ± 0.004 4.00 ± 0.10	0.059-0/+0.004 1.5-0/+0.10	0.157 max 4.00 max	inches mm

RoHS Compliance

Stackpole Electronics has joined the worldwide effort to reduce the amount of lead in electronic components and to meet the various regulatory requirements now prevalent, such as the European Union's directive regarding "Restrictions on Hazardous Substances" (RoHS 3). As part of this ongoing program, we periodically update this document with the status regarding the availability of our compliant components. All our standard part numbers are compliant to EU Directive 2011/65/EU of the European Parliament as amended by Directive (EU) 2015/863/EU as regards the list of restricted substances.

RoHS Compliance Status

Standard Product Series	Description	Package / Termination Type	Standard Series RoHS Compliant	Lead-Free Termination Composition	Lead-Free Mfg. Effective Date (Std Product Series)	Lead-Free Effective Date Code (YY/MM)
CML	Multilayer Ceramic Chip Capacitor	SMD	YES	100% Matte Sn over Ni	Always	Always

“Conflict Metals” Commitment

We at Stackpole Electronics, Inc. are joined with our industry in opposing the use of metals mined in the “conflict region” of the eastern Democratic Republic of the Congo (DRC) in our products. Recognizing that the supply chain for metals used in the electronics industry is very complex, we work closely with our own suppliers to verify to the extent possible that the materials and products we supply do not contain metals sourced from this conflict region. As such, we are in compliance with the requirements of Dodd-Frank Act regarding Conflict Minerals.

Compliance to “REACH”

We certify that all passive components supplied by Stackpole Electronics, Inc. are SVHC (Substances of Very High Concern) free and compliant with the requirements of EU Directive 1907/2006/EC, “The Registration, Evaluation, Authorization and Restriction of Chemicals”, otherwise referred to as REACH. Contact us for complete list of REACH Substance Candidate List.

Environmental Policy

It is the policy of Stackpole Electronics, Inc. to protect the environment in all localities in which we operate. We continually strive to improve our effect on the environment. We observe all applicable laws and regulations regarding the protection of our environment and all requests related to the environment to which we have agreed. We are committed to the prevention of all forms of pollution.