

HiQ-CBR Series, COG Dielectric, Low ESR**6.3 – 500 VDC, 1 MHz – 50 GHz (RF & Microwave)****Overview**

KEMET's CBR Series surface mount multilayer ceramic capacitors (MLCCs) in COG dielectric feature a robust and exceptionally stable copper electrode dielectric system that offers excellent low loss performance (high Q). These devices provide extremely low ESR and high self-resonance characteristics, and are well-suited for resonant circuit applications or those where Q and stability of capacitance characteristics are required. CBR Series capacitors exhibit no change in capacitance with respect to time and voltage, and boast a negligible change in capacitance with

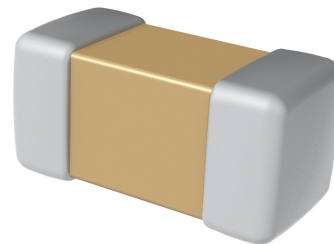


reference to ambient temperature. Capacitance change is limited to ± 30 ppm/°C from -55°C to $+125^{\circ}\text{C}$.

CBR Series devices are suitable for many circuit applications including RF power amplifiers, mixers, oscillators, low noise amplifiers, filter networks, antenna tuning, timing circuits, delay lines, and MRI imaging coils.

Benefits

- High Q and low ESR
- High SRF
- High thermal stability
- 1 MHz to 50 GHz frequency range
- Operating temperature range of -55°C to $+125^{\circ}\text{C}$
- Base metal electrode (BME) dielectric system
- Pb-free and RoHS compliant
- 0201, 0402, 0603, and 0805 case sizes (inches)
- DC voltage ratings of 6.3 V, 10 V, 25 V, 50 V, 100 V, 200 V, 250 V, and 500 V
- Capacitance offerings ranging from 0.1 pF up to 100 pF

**Ordering Information**

CBR	02	C	330	F	9	G	A	C	
Series	Case Size (L"x W")	Specification/ Series	Capacitance Code (pF)	Capacitance Tolerance	Rated Voltage (VDC)	Dielectric	Termination Style	Termination Finish	Packaging/ Grade (C-Spec) ¹
CBR	02 = 0201 04 = 0402 06 = 0603 08 = 0805	C = Standard	Two significant digits + number of zeros Use 9 for 1.0 – 9.9 pF Use 8 for 0.1 – 0.99 pF e.g., 2.2 pF = 229 e.g., 0.5 pF = 508	A = ± 0.05 pF B = ± 0.1 pF C = ± 0.25 pF D = ± 0.5 pF F = $\pm 1\%$ G = $\pm 2\%$ J = $\pm 5\%$	9 = 6.3 V 8 = 10 V 3 = 25 V 5 = 50 V 1 = 100 V 2 = 200 V A = 250 V C = 500 V	G = COG	A = N/A	C = 100% Matte Sn	Blank = 7" Reel Unmarked

¹ When ordering CBR Series devices, a "suffix" or "C-Spec" is not required to indicate a 7" reel packaging option. CBR devices are only available and shipped on 7" reels (paper tape). Bulk bag and cassette packaging options are not available. Please contact KEMET if you have a specific, non-standard packaging requirement.

Benefits cont'd

- Available capacitance tolerances of ± 0.05 pF, ± 0.1 pF, ± 0.25 pF, ± 0.5 pF, $\pm 1\%$, $\pm 2\%$, and $\pm 5\%$
- No piezoelectric noise
- No capacitance change with respect to applied rated DC voltage
- Negligible capacitance change with respect to temperature
- No capacitance decay with time
- Non-polar device, minimizing installation concerns
- 100% pure matte tin-plated termination finish allowing for excellent solderability

Applications

Typical applications include critical timing, tuning, bypass, coupling, feedback, filtering, impedance matching and DC blocking.

Field applications include wireless and cellular base stations, wireless LAN, subscriber-based wireless services, wireless broadcast equipment, satellite communications, RF power amplifier (PA) modules, filters, voltage-controlled oscillators (VCOs), PAs, matching networks, RF modules, satellite communications and medical electronics.

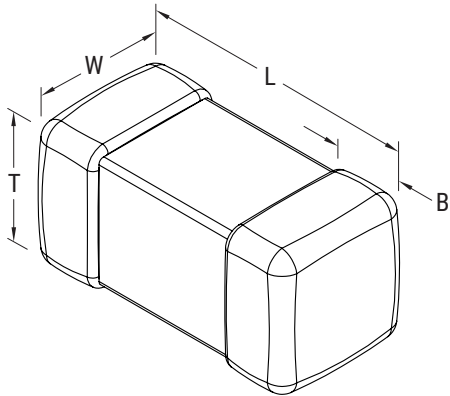
Qualification

RF and microwave products are subject to internal qualification. Details regarding test methods and conditions are referenced in Table 4, Performance & Reliability.

Environmental Compliance

Pb-free and RoHS compliant.

Dimensions – Millimeters (Inches)



Case Size (in.)	Case Size (mm)	L Length	W Width	T Thickness	B Bandwidth	Mounting Technique
0201	0603	0.60±0.03 (0.024±0.001)	0.30±0.03 (0.012±0.001)	0.30±0.03 (0.012±0.001)	0.15±0.05 (0.006±0.002)	Solder Reflow Only
0402	1005	1.00±0.05 (0.040±0.002)	0.50±0.05 (0.020±0.002)	0.50±0.05 (0.020±0.002)	0.25+0.05/-0.10 (0.010+0.002/-0.004)	
0603	1608	1.60±0.10 (0.063±0.004)	0.80±0.10 (0.031±0.004)	0.80±0.07 (0.031±0.003)	0.40±0.15 (0.016±0.006)	Solder Wave or Solder Reflow
0805	2012	2.00±0.20 (0.079±0.008)	1.25±0.20 (0.049±0.008)	0.85±0.10 (0.031±0.004)	0.50±0.20 (0.020±0.008)	

Electrical Parameters/Characteristics

Item	Parameters/Characteristics
Operating Temperature Range:	-55°C to +125°C
Capacitance Change with Reference to +25°C and 0 VDC Applied (TCC):	0 ±30 ppm/°C (0 ±60 ppm/°C for 0201 case size product ≥ 22 pF)
Aging Rate (Maximum % Capacitance Loss/Decade Hour):	0%
¹ Dielectric Withstanding Voltage (DWV):	See Dielectric Withstanding Voltage Table (5±1 seconds and charge/discharge not exceeding 50 mA)
² Quality Factor (Q):	≥ 1,000 for capacitance values ≥ 30 pF ≥ 400 + 20°C for capacitance values < 30 pF
³ Insulation Resistance (IR) Limit at 25°C:	10 GΩ minimum (rated voltage applied for 120±5 seconds)

¹ DWV is the voltage a capacitor can withstand (survive) for a short period of time. It exceeds the nominal and continuous working voltage of the capacitor.

² Capacitance and quality factor (Q) measured at 1 MHz ±100 kHz and 1.0 ±0.2 Vrms.

³ To obtain IR limit, divide MΩ·μF value by the capacitance and compare to GΩ limit. Select the lower of the two limits.

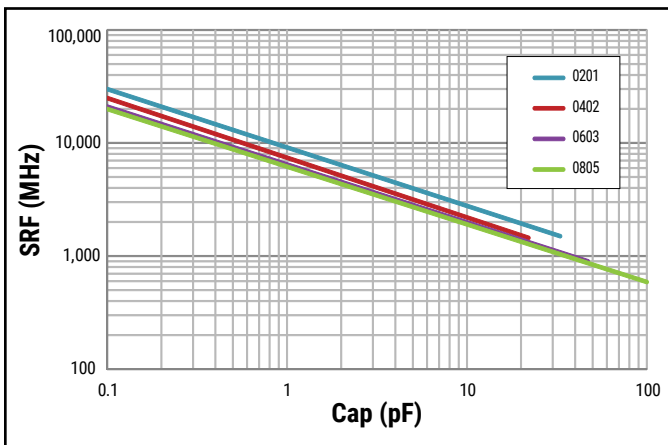
Note: When measuring capacitance it is important to ensure the set voltage level is held constant. The HP4284 & Agilent E4980 have a feature known as Automatic Level Control (ALC). The ALC feature should be switched to "ON."

Dielectric Withstanding Voltage Table

Rated Voltage (VDC)	≤100 V	200 V	250 V	500 V
DWV	250%	200%	200%	150%

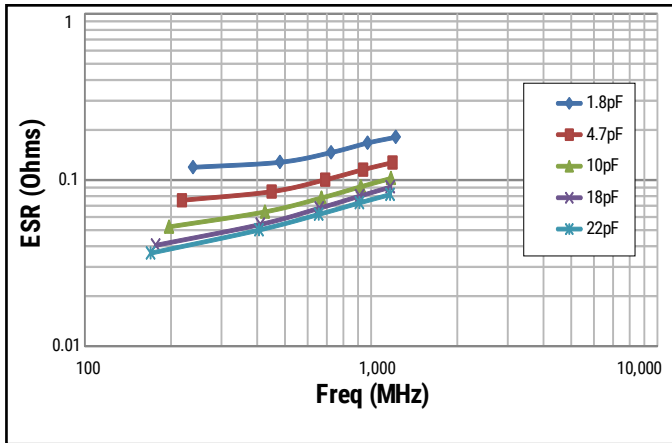
Electrical Characteristics

SRF (MHz) vs. Cap (pF)

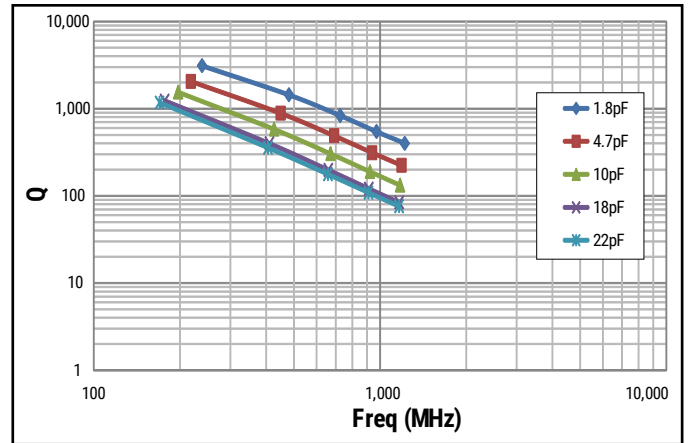


Electrical Characteristics cont'd

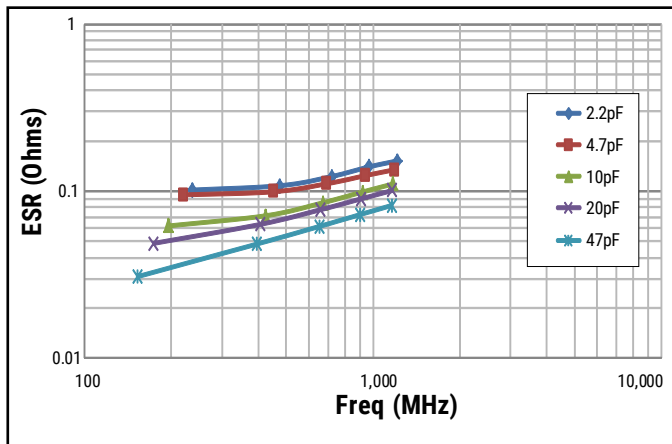
ESR vs. Frequency 0402



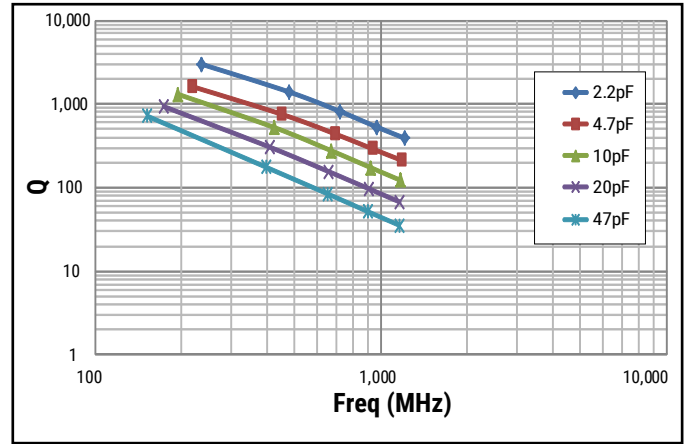
Q vs. Frequency 0402



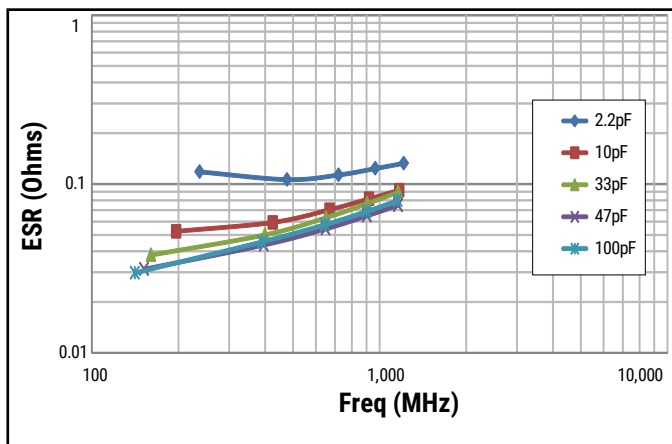
ESR vs. Frequency 0603



Q vs. Frequency 0603



ESR vs. Frequency 0805



Q vs. Frequency 0805

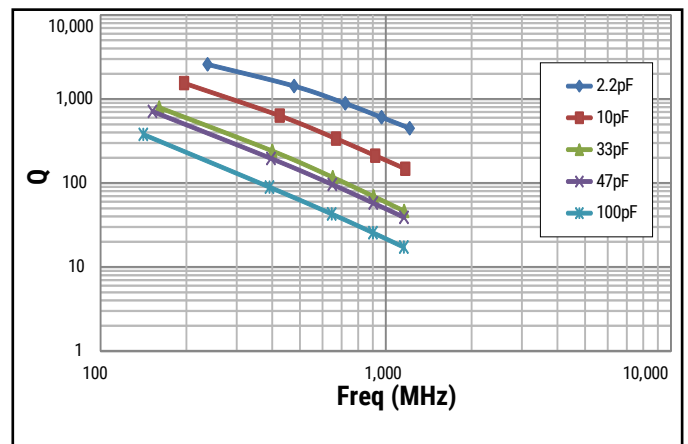


Table 1 – CBR Series, Capacitance Range Waterfall cont'd

Case Size – Inches (mm)		0201 (0603)				0402 (1005)				0603 (1608)			0805 (2012)			
Length	mm (Inches)	0.60 ± 0.03 (0.024 ± 0.001)				1.00 ± 0.05 (0.040 ± 0.002)				1.60 ± 0.10 (0.063 ± 0.004)			2.00 ± 0.20 (0.079 ± 0.008)			
Width	mm (Inches)	0.30 ± 0.03 (0.012 ± 0.001)				0.50 ± 0.05 (0.020 ± 0.002)				0.80 ± 0.10 (0.031 ± 0.004)			1.25 ± 0.20 (0.049 ± 0.008)			
Thickness	mm (Inches)	0.30 ± 0.03 (0.012 ± 0.001)				0.50 ± 0.05 (0.020 ± 0.002)				0.80 ± 0.07 (0.031 ± 0.003)			0.85 ± 0.10 (0.031 ± 0.004)			
Bandwidth	mm (Inches)	0.15 ± 0.05 (0.006 ± 0.002)				0.25 + 0.05 / -0.10 (0.010 + 0.002 / -0.004)				0.40 ± 0.15 (0.016 ± 0.006)			0.50 ± 0.20 (0.020 ± 0.008)			
Rated Voltage (VDC)		6.3	10	25	50	25	50	100	200	50	100	250	50	100	250	500
Voltage Code		9	8	3	5	3	5	1	2	5	1	A	5	1	A	C
Capacitance	Capacitance Tolerance	Capacitance Code (Available Capacitance)														
9.6 pF	B = ±0.1 pF C = ±0.25 pF D = ±0.5 pF	969	969	969	969	969	969	969	969	969	969	969	969	969	969	969
9.7 pF		979	979	979	979	979	979	979	979	979	979	979	979	979	979	979
9.8 pF		989	989	989	989	989	989	989	989	989	989	989	989	989	989	989
9.9 pF		999	999	999	999	999	999	999	999	999	999	999	999	999	999	999
10 pF	F = ±1% G = ±2% J = ±5%	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
11 pF		110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
12 pF		120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
13 pF		130	130	130	130	130	130	130	130	130	130	130	130	130	130	130
15 pF		150	150	150	150	150	150	150	150	150	150	150	150	150	150	150
16 pF		160	160	160	160	160	160	160	160	160	160	160	160	160	160	160
18 pF		180	180	180	180	180	180	180	180	180	180	180	180	180	180	180
20 pF		200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
22 pF		220	220	220		220	220	220	220	220	220	220	220	220	220	220
24 pF		240	240	240		240	240	240	240	240	240	240	240	240	240	240
27 pF		270	270	270		270	270	270	270	270	270	270	270	270	270	270
30 pF		300	300	300		300	300	300	300	300	300	300	300	300	300	300
33 pF		330	330	330		330	330	330	330	330	330	330	330	330	330	330
36 pF						360	360	360			360	360	360	360	360	360
39 pF						390	390	390			390	390	390	390	390	390
43 pF						430	430	430			430	430	430	430	430	430
47 pF						470	470	470			470	470	470	470	470	470
51 pF						510	510	510			510	510	510	510	510	510
56 pF						560	560	560			560	560	560	560	560	560
62 pF						620					620	620	620	620	620	620
68 pF					680					680	680	680	680	680	680	
75 pF					750					750	750	750	750	750	750	
82 pF					820					820	820	820	820	820	820	
91 pF					910					910	910	910	910	910	910	
100 pF					101					101	101	101	101	101	101	
Rated Voltage (VDC)		6.3	10	25	50	25	50	100	200	50	100	250	50	100	250	500
Voltage Code		9	8	3	5	3	5	1	2	5	1	A	5	1	A	C

Table 2 – Chip Thickness/Reeling Quantities

Chip Size Inches (mm)	Chip Thickness (mm)	Reel Quantity	
		7" Paper	13" Paper
0201 (0603)	0.30 ±0.03	15,000	Contact KEMET for availability.
0402 (1005)	0.50 ±0.05	10,000	
0603 (1608)	0.80 ±0.07	4,000	
0805 (2012)	0.85 ±0.10	4,000	

Table 3 – Chip Capacitor Land Pattern Design Recommendations per IPC-7351 (mm)

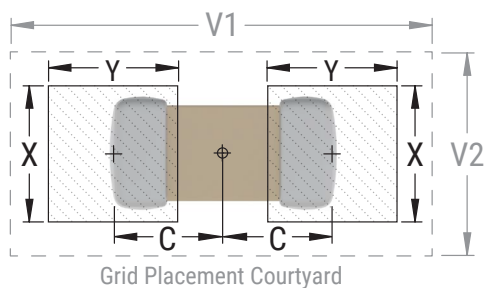
Case Size (Inches)	Case Size (mm)	Density Level A: Maximum (Most) Land Protrusion					Density Level B: Median (Nominal) Land Protrusion					Density Level C: Minimum (Least) Land Protrusion				
		C	Y	X	V1	V2	C	Y	X	V1	V2	C	Y	X	V1	V2
0201	0603	0.38	0.56	0.52	1.80	1.00	0.33	0.46	0.42	1.50	0.80	0.28	0.36	0.32	1.20	0.60
0402	1005	0.50	0.72	0.72	2.20	1.20	0.45	0.62	0.62	1.90	1.00	0.40	0.52	0.52	1.60	0.80
0603	1608	0.90	1.15	1.10	4.00	2.10	0.80	0.95	1.00	3.10	1.50	0.60	0.75	0.90	2.40	1.20
0805	2012	1.00	1.35	1.55	4.40	2.60	0.90	1.15	1.45	3.50	2.00	0.75	0.95	1.35	2.80	1.70

Density Level A: For low-density product applications. Recommended for wave solder applications and provides a wider process window for reflow solder processes. KEMET only recommends wave soldering of 0603(1608) and 0805 (2012) case sizes.

Density Level B: For products with a moderate level of component density. Provides a robust solder attachment condition for reflow solder processes.

Density Level C: For high component density product applications. Before adapting the minimum land pattern variations the user should perform qualification testing based on the conditions outlined in IPC Standard 7351 (IPC-7351).

Image below based on Density Level B for an EIA 1608 case size.



Soldering Process

Recommended Soldering Technique:

- Solder wave or solder reflow for 0603 and 0805 case sizes
- 0201 and 0402 case sizes are limited to solder reflow only

Recommended Soldering Profile:

- KEMET recommends following the guidelines outlined in IPC/JEDEC J-STD-020

Recommended Solder Alloys:

Alloy	Composition	Solidus	Liquidous
In50	50 In, 50 Pb	180°C	209°C
In52	52 In, 48 Sn	118°C	118°C
Sn62	62.5 Sn, 36.1 Pb, 1.4 Ag	179°C	179°C
Sn63	63 Sn, 37 Pb	183°C	183°C
Pb-Free	95.5 Sn, 3.8 Ag, 0.7 Cu	217°C	217°C
Hi-Temp	5 Sn, 93.5 Pb, 1.5 Ag	296°C	301°C
Sn5	5 Sn, 95 Pb	308°C	312°C

Table 4 – Performance & Reliability: Test Methods & Conditions

Stress	Test or Inspection Method	Requirements	
Terminal Strength	Pressurizing force: 0201 case size: 2N 0402 & 0603 case sizes: 5N 0805 case size: 10N Test time: 10±1 second	No visible damage or separation of termination system.	
Vibration Resistance	Vibration frequency: 10 ~ 55 Hz/minimum Total amplitude: 1.5 mm Test time: 6 hours (Two hours each in three mutually perpendicular directions.)	No visible damage. Cap change and Q/DF: To meet initial specification	
Solderability	Solder temperature: 235±5°C Dipping time: 2±0.5 seconds	95% minimum coverage of termination finish.	
Board Flex	Capacitor is mounted to a substrate which is flexed by means of ram at a rate of 1 mm per second until the deflection becomes 1 mm. (Deflection is maintained for 5±1 second) Store at room temperature for 24±2 hours before measuring electrical properties.	No visible damage. Capacitance change: within ±5.0% or ±0.5 pF, whichever is larger. (Capacitance change is monitored during flexure.)	
Resistance to Soldering Heat	Solder temperature: 260±5°C Dipping time: 10±1 second Preheating: 120 to 150°C for 1 minute before immerse the capacitor in a eutectic solder. Store at room temperature for 24±2 hours before measuring electrical properties.	No visible damage. Capacitance change: within ±2.5% or ±0.25 pF, whichever is larger. Q/DF, IR and dielectric strength: To meet initial requirements. 25% maximum leaching on each edge.	
Temperature Cycling	5 cycles of steps 1 - 4:		
	Step	Temperature (°C)	Time (min.)
	1	Minimum operating temperature +0/-3	30 ±3
	2	Room temperature	2 ~ 3
	3	Maximum operating temperature +3/-0	30 ±3
4	Room temperature (25°C)	2 ~ 3	
	Store at room temperature for 24±2 hours before measuring electrical properties.		
		No visible damage. Capacitance change: within ±2.5% or ±0.25 pF, whichever is larger. Q/DF, IR and dielectric strength: To meet initial requirements.	

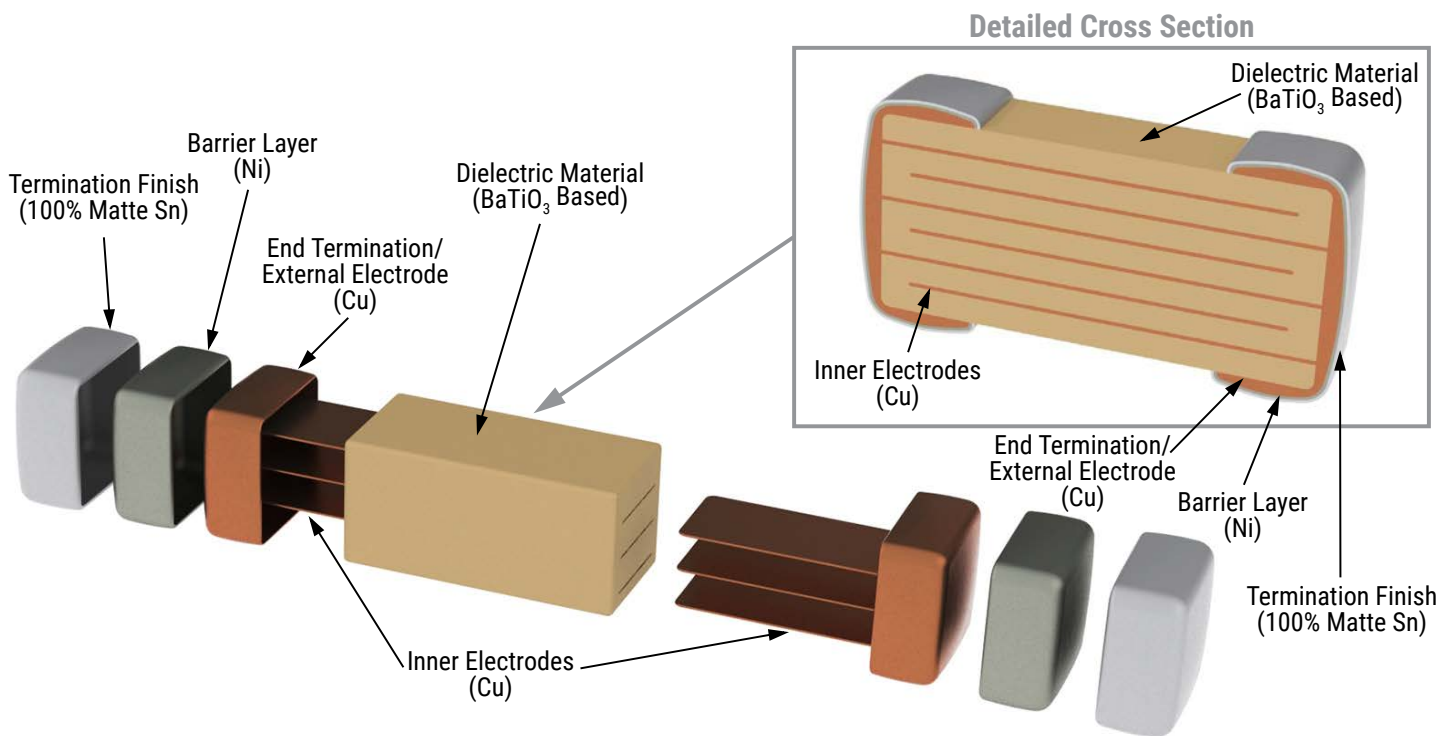
Table 4 – Performance & Reliability: Test Methods & Conditions cont'd

Stress	Test or Inspection Method	Requirements																
Humidity (Damp Heat) Steady State	Test temperature: 40±2°C Humidity: 90 ~ 95% RH Test time: 500 +24/-0 hours Store at room temperature for 24±2 hours before measuring electrical properties.	No visible damage. Capacitance change: within ±5.0% or ±0.5 pF, whichever is larger. Q/DF value: Capacitance ≥ 30 pF, Q ≥ 350, 10 pF ≤ Capacitance < 30 pF, Q ≥ 275+2.5°C Capacitance < 10 pF; Q ≥ 200+10°C IR: ≥ 1GΩ																
Humidity (Damp Heat) Load	Test temperature: 40±2°C Humidity: 90 ~ 95% RH Test time: 500 +24/-0 hours Applied voltage: rated voltage Store at room temperature for 24±2 hours before measuring electrical properties.	No visible damage. Capacitance change: within ±7.5% or ±0.75 pF, whichever is larger. Q/DF value: Capacitance ≥ 30 pF, Q ≥ 200, Capacitance < 30 pF, Q ≥ 100+10/3°C IR: ≥ 500MΩ																
High Temperature Life	Test temperature: 125±3°C Applied voltage: 200% of rated voltage (10 VDC – 250 VDC) 150% of rated voltage (6.3 VDC and 500 VDC) Test time: 1,000 +24/-0 hours Store at room temperature for 24±2 hours before measuring electrical properties.	No visible damage. Capacitance change: within ±3.0% or ±0.3 pF, whichever is larger. Q/DF value: Capacitance ≥ 30 pF, Q ≥ 350, 10 pF ≤ Capacitance < 30 pF, Q ≥ 275 +2.5°C Capacitance < 10 pF, Q ≥ 200 +10°C IR: ≥ 1 GΩ																
ESR	The ESR should be measured at room temperature and tested at frequency 1±0.1 GHz.	<table border="1"> <thead> <tr> <th>0201 Case Size</th> <th>0402 Case Size</th> </tr> </thead> <tbody> <tr> <td>0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF</td> <td>0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF</td> </tr> <tr> <td>1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ</td> <td>1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ</td> </tr> <tr> <td>5.0 pF < Capacitance ≤ 22.0 pF: < 250 mΩ</td> <td>5.0 pF < Capacitance ≤ 100 pF: < 250 mΩ</td> </tr> <tr> <th>0603 Case Size</th> <th>0805 Case Size</th> </tr> <tr> <td>0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ</td> <td>0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ</td> </tr> <tr> <td>1 pF < Capacitance ≤ 10 pF: < 250 mΩ</td> <td>1 pF < Capacitance ≤ 10 pF: < 250 mΩ</td> </tr> <tr> <td>10 pF < Capacitance ≤ 100 pF: < 200 mΩ</td> <td>Capacitance > 10 pF: < 200 mΩ</td> </tr> </tbody> </table>	0201 Case Size	0402 Case Size	0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF	0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF	1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ	1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ	5.0 pF < Capacitance ≤ 22.0 pF: < 250 mΩ	5.0 pF < Capacitance ≤ 100 pF: < 250 mΩ	0603 Case Size	0805 Case Size	0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ	0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ	1 pF < Capacitance ≤ 10 pF: < 250 mΩ	1 pF < Capacitance ≤ 10 pF: < 250 mΩ	10 pF < Capacitance ≤ 100 pF: < 200 mΩ	Capacitance > 10 pF: < 200 mΩ
		0201 Case Size	0402 Case Size															
0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF	0.1 pF ≤ Capacitance ≤ 1 pF: < 350 mΩ/pF																	
1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ	1.0 pF < Capacitance ≤ 5.0 pF: < 300 mΩ																	
5.0 pF < Capacitance ≤ 22.0 pF: < 250 mΩ	5.0 pF < Capacitance ≤ 100 pF: < 250 mΩ																	
0603 Case Size	0805 Case Size																	
0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ	0.3 pF ≤ Capacitance ≤ 1 pF: < 1,500 mΩ																	
1 pF < Capacitance ≤ 10 pF: < 250 mΩ	1 pF < Capacitance ≤ 10 pF: < 250 mΩ																	
10 pF < Capacitance ≤ 100 pF: < 200 mΩ	Capacitance > 10 pF: < 200 mΩ																	
The ESR should be measured at room temperature and tested at frequency 500±50 MHz.	0201 case size, 22pF ≤ Cap ≤ 33pF: < 300 mΩ																	

Storage and Handling

Ceramic chip capacitors should be stored in normal working environments. While the chips themselves are quite robust in other environments, solderability will be degraded by exposure to high temperatures, high humidity, corrosive atmospheres, and long term storage. In addition, packaging materials will be degraded by high temperature—reels may soften or warp and tape peel force may increase. KEMET recommends that maximum storage temperature not exceed 40°C and maximum storage humidity not exceed 70% relative humidity. Temperature fluctuations should be minimized to avoid condensation on the parts and atmospheres should be free of chlorine and sulfur bearing compounds. For optimized solderability chip stock should be used promptly, preferably within 1.5 years of receipt.

Construction



Marking

CBR series devices are supplied unmarked.

If you require marked product, please contact KEMET for availability of a laser-marked option.

Tape & Reel Packaging Information

KEMET offers RF and Microwave Multilayer Ceramic Chip Capacitors packaged in 8 mm tape on 7" reels. This packaging system is compatible with all tape-fed automatic pick and place systems.

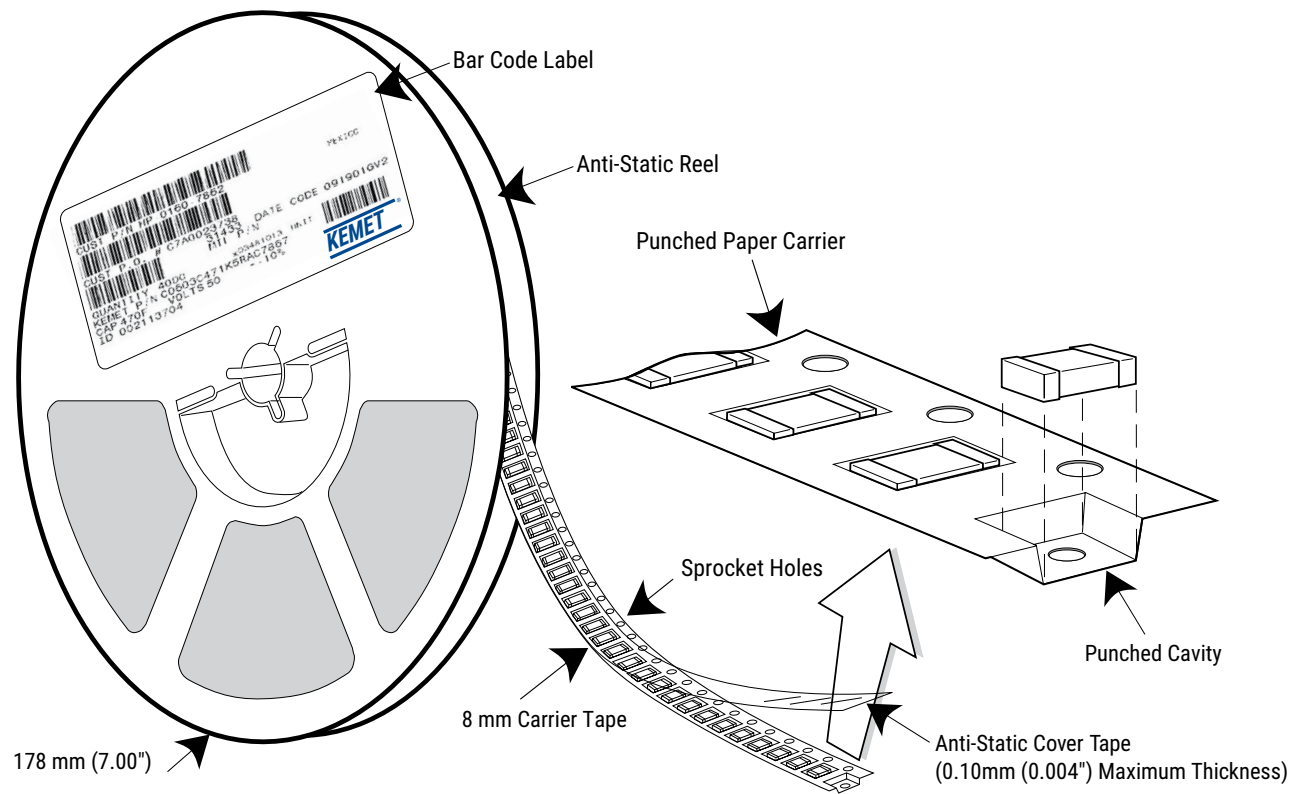


Table 5 – Carrier Tape Configuration (mm)

EIA Case Size	Tape Size (W)*	Lead Space (P ₁)*
0201 – 0402	8	2
0603 – 1210	8	4

*Refer to Figure 1 for W and P₁ carrier tape reference locations.

*Refer to Table 6 for tolerance specifications.

Figure 1 – Punched (Paper) Carrier Tape Dimensions

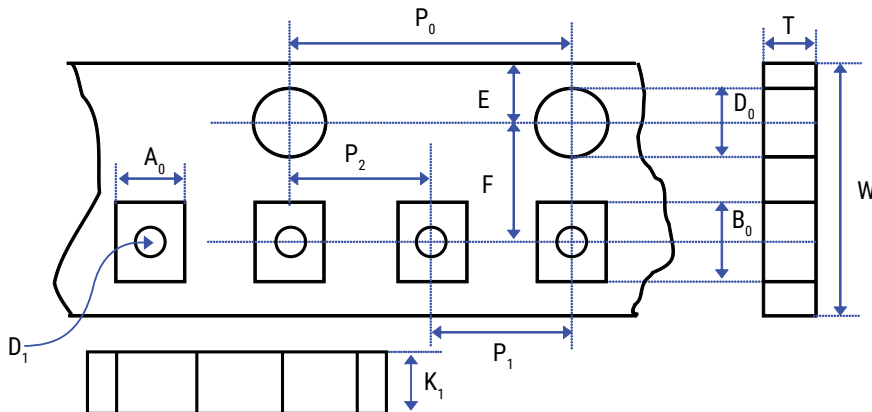


Table 6 – Punched (Paper) Carrier Tape Dimensions

Metric will govern

Constant Dimensions – Millimeters (Inches)								
Tape Size	D ₀	E ₁	P ₀	P ₂	R Reference Note 2	K ₀		
8 mm	1.55±0.05 (0.061±0.002)	1.55±0.05 (0.061±0.002)	4.0±0.10 (0.157±0.004)	2.0±0.05 (0.079±0.002)	25.0 (0.984)	-		
Variable Dimensions – Millimeters (Inches)								
Tape Size	Pitch	A ₀	B ₀	F	P ₁	T	W	D ₁
8 mm	Half (2 mm)	0.37±0.03 (0.015±0.001)	0.67±0.03 (0.03±0.001)	3.5±0.05 (0.138±0.002)	2.0±0.05 (0.079±0.002)	0.42±0.03 (0.017±0.001)	8.0±0.10 (0.315±0.004)	-
		0.62±0.05 (0.025±0.002)	1.12±0.05 (0.04±0.002)			0.60±0.05 (0.024±0.002)		
8 mm	Single (4 mm)	1.00±0.10 (0.040±0.004)	1.80±0.10 (0.07±0.004)		4.0±0.10 (0.157±0.004)	0.95±0.05 (0.037±0.002)		
		1.50±0.10 (0.06±0.004)	2.30±0.10 (0.09±0.004)					

2. The tape with or without components shall pass around R without damage (see Figure 3).

Packaging Information Performance Notes

- 1. Cover Tape Break Force:** 1.0 Kg minimum.
- 2. Cover Tape Peel Strength:** The total peel strength of the cover tape from the carrier tape shall be:

Tape Width	Peel Strength
8 mm	0.1 to 1.0 Newton (10 to 100 gf)
12 and 16 mm	0.1 to 1.3 Newton (10 to 130 gf)

The direction of the pull shall be opposite the direction of the carrier tape travel. The pull angle of the carrier tape shall be 165° to 180° from the plane of the carrier tape. During peeling, the carrier and/or cover tape shall be pulled at a velocity of 300 ±10 mm/minute.

- 3. Labeling:** Bar code labeling (standard or custom) shall be on the side of the reel opposite the sprocket holes. Refer to EIA Standards 556 and 624.

Figure 2 – Bending Radius

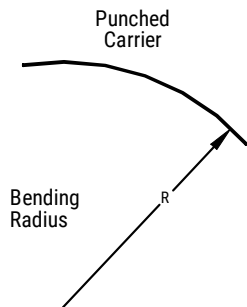


Figure 3 – Tape Leader & Trailer Dimensions

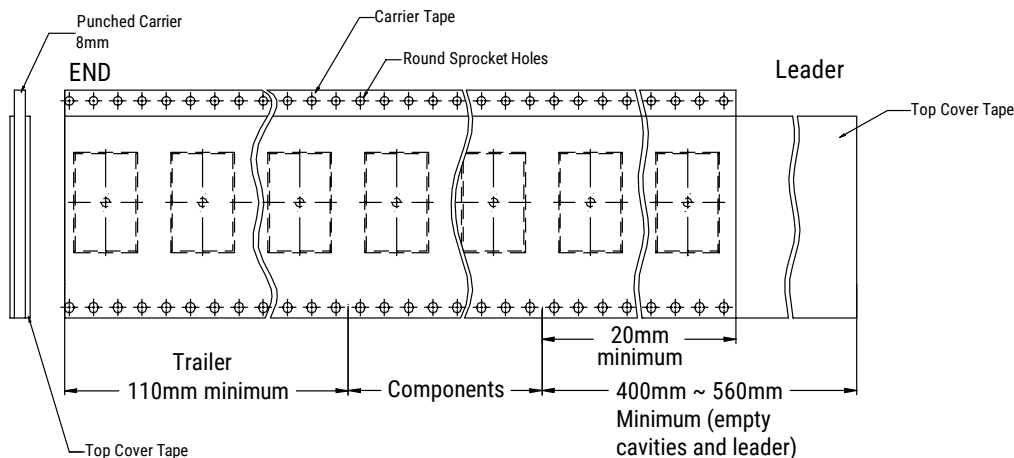


Figure 4 – Maximum Camber

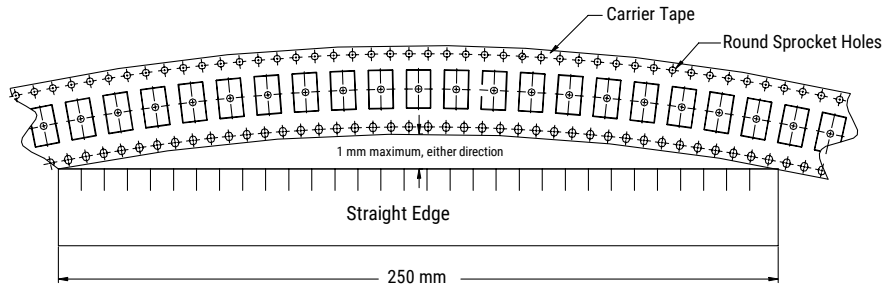


Figure 5 – Reel Dimensions

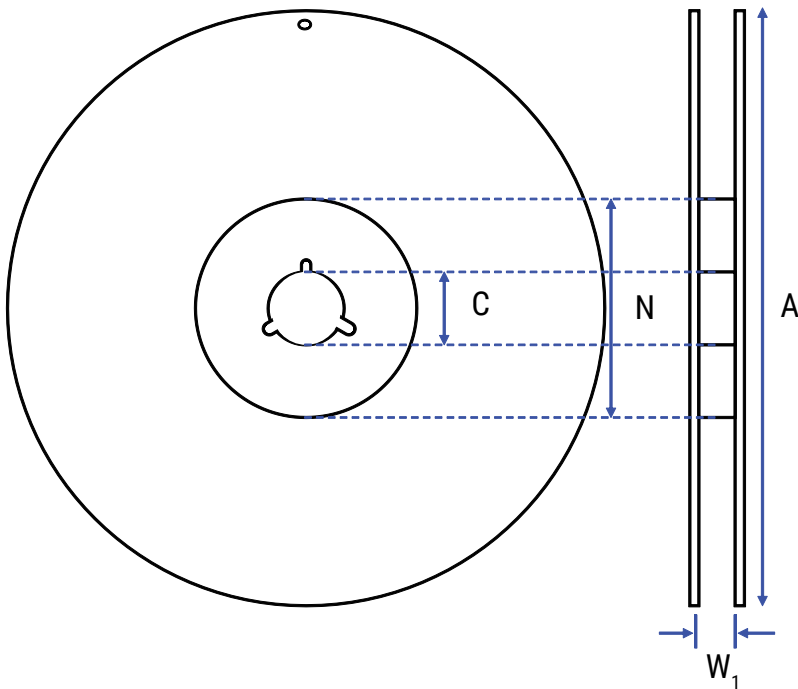


Table 7 – Reel Dimensions

Metric will govern

Constant Dimensions – Millimeters (Inches)			
Tape Size	Reel Size	A	C
8 mm	7	178±0.10 (7.008±0.004)	13.0±0.20 (0.512±0.008)
Variable Dimensions – Millimeters (Inches)			
Tape Size	N Minimum See Note 2, Table 6	W ₁	
8 mm	60±0.10 (2.4±0.04)	8.4+1.5/-0.0 (0.331+0.059/-0.0)	

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