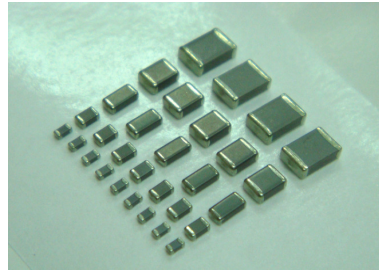


Multilayer Ceramic Chip Capacitors [High Cap. NPO – More Than 1.0nF] HCN Series



Replacement for Film Capacitor

◆ Features

- Small Size & High Capacitance
- Suitable for Wave and Reflow Soldering
- Excellent Characteristics and Tight Tolerance
- Excellent Bias, High Temperature Stability & Low Tan δ
- Replace Film Capacitor
- RoHS compliant

◆ Application

- Suitable for ADSL Filter Circuits, Cable Modem and Coupling Circuits, general Telecommunications use, Power (Inverter for oscillation Circuit) and Audio Circuits

◆ Summary of Specification

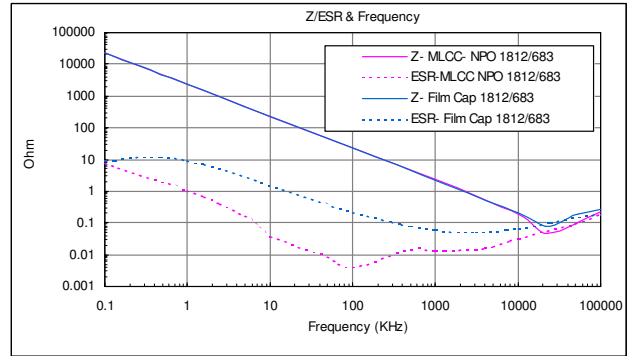
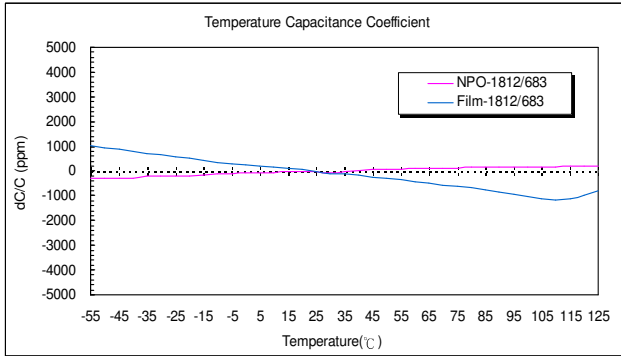
Operation Temperature	-55~+125 °C
Rated Voltage	16V to 50Vdc
Temperature Coefficient	NPO : $\leq 60\text{ppm}/^\circ\text{C}$, -55~+125 °C (EIA Class I)
Capacitance Range	1nF ~ 220nF
Dissipation Factor :	$Q \geq 1000$ at 1KHz 20°C
Insulation Resistance	10G Ω or 500/C Ω whichever is smaller (C in Farad)
Dielectric Strength	250% Rated Voltage for 5 second @ 50mA max. current
Capacitance Tolerance	$\pm 5\%$ ($\pm 1\%$, $\pm 2\%$ also available)
Aging	0% per decade hr , Typical

◆ How To Order

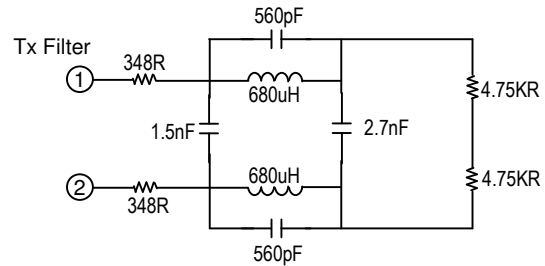
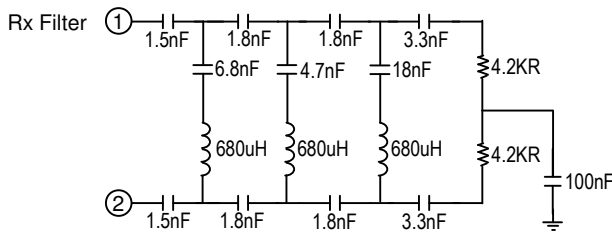
C
1206
N
103
J
025
T

Product Code	Chip Size	Dielectric	Capacitance Unit : pF	Tolerance	Rated Voltage	Packaging
C: MLCC (Multilayer Ceramic Chip of Capacitor)	0603 : 1.6×0.80 mm 0805 : 2.0×1.25 mm 1206 : 3.2×1.60 mm 1210 : 3.2×2.50 mm 1812 : 4.6×3.20 mm	N: NPO	Ex.: 102:10×10 ² 103:10×10 ³ 124:12×10 ⁴	Ex.: F : +/- 1% G : +/- 2% J : +/- 5%	Ex.: 016:16Vdc 025:25Vdc 050:50Vdc	T: Taping & Reel B: Bulk

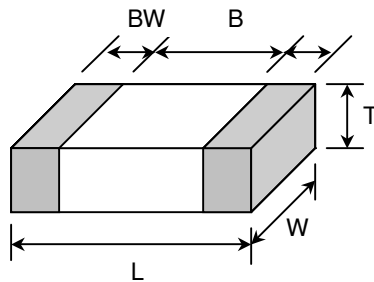
◆ Characteristic



◆ Application Example Circuit



◆ Dimension



Unit : mm [inches]

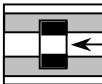
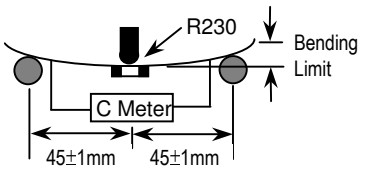

TYPE	L	W	T (max)	B (min)	BW (min)
0603	1.60+/-0.1 [.063+/-0.004]	0.80+/-0.1 [.031+/-0.004]	0.90 [.039]	0.40 [.016]	0.15 [.006]
0805	2.00±0.2 [.079±0.12]	1.25±0.2 [.049 ±0.08]	1.40 [.055]	0.70 [.028]	0.20 [.008]
1206	3.20±0.3 [.126±0.12]	1.60±0.2 [.126±0.12]	1.80 [.071]	1.50 [.059]	0.30 [.012]
1210	3.20±0.3 [.126±0.12]	2.50±0.2 [.098±0.08]	2.20 [.087]	1.60 [.063]	0.30 [.012]
1812	4.60±0.3 [.181±0.12]	3.20±0.3 [.126±0.12]	2.20 [.087]	4.00 [.157]	0.20 [.008]

◆ Capacitance Range

Dielectric Characteristic	Size	Voltage	Capacitance Range																												
			102	122	152	182	222	272	332	392	472	562	682	822	103	123	153	183	223	273	333	393	473	563	683	823	104	124	154	224	
NPO	0603	16V	B	B	B	B	B	B	B	B																					
		25V	B	B	B	B	B	B	B	B																					
		50V	B	B	B	B	B	B	B	B																					
	0805	16V	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
		25V	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
		50V	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
	1206	16V	B	B	B	B	B	B	B	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
		25V	B	B	B	B	B	B	B	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
		50V	B	B	B	B	B	B	B	B	B	B	B	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
	1210	16V																				D	E	E	E	E	E	E	E	F	F
		25V	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	D	E	E	E	E	E	E	F	F
		50V	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	D	E	E	E	E	E	F	F	F
1812	16V																												F	F	
	25V	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	
	50V	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	

■ Other dimensions, capacitance values and voltages rating are available. Please contact HEC.

HCN Series Specification & Test Condition

Item	Specification		Test Condition	
Operation Temperature	-55°C ~ +125°C			
Visual	No Abnormal Exterior Appearance		Visual Inspection	
Capacitance	Within The Specified Tolerance		Frequency	Voltage
Quality Factor	Q ≥ 1000		1KHz±10%	1.0±0.2Vrms
Insulation Resistance	10,000MΩ or 500/C Ω whichever is smaller. (C in Farad)		Applied Voltage : Rated Voltage Charge Time : 60±5 sec. Current is limited to less than 50mA	
Withstanding Voltage	No dielectric breakdown or mechanical breakdown		250% of the rated voltage for 1~5 sec. Current is limited to less than 50mA.	
Temperature Capacitance Coefficient	<u>Temperature Range</u> -55°C ~ +125°C	<u>Cap. Change</u> ± 60ppm/°C	[C2-C1/C1(T2-T1)] × 100% T1:Standard Temperature(25°C) T2:Test Temperature C1:Capacitance at Standard Temperature C2:Capacitance at Test Temperature	
Adhesive Strength of Termination	No indication of peeling shall occur on the terminal electrode.			A 5N-f (≈ 0.5Kg-f) pull force shall be applied for 10±1 sec.
Resistance to Flexure of Substrate	No mechanical damage or change capacitance more than the following table. Capacitance Change : ≤ ±5.0% of initial value		The board shall be bent 1.0mm with a rate of 1.0 mm/sec. 	
Solderability	More than 90% of the terminal surface is to be soldered newly, so metal part does not come out or dissolve . 		Solder Temperature : 245±5°C Dip Time : 5 ± 0.5 sec. Immersing Speed : 25±10% mm/s Solder : H63A Flux : Rosin Preheat : At 80~120 °C For 10~30sec.	
Resistance To Soldering Heat	<u>Appearance</u>	No mechanical damage shall occur	Preheat : at 150±10°C for 60~120sec. Dip : solder temperature of 260±5°C Dip Time : 10 ± 1 sec. Immersing Speed : 25±10% mm/s Solder : H63A Flux : Rosin Measure at room temperature after cooling for 24 ± 2 Hours	
	<u>Capacitance</u>	Cap. change within ±2.5% of initial value		
	<u>Q Factor</u>	To satisfy the specified initial value		
	<u>Insulation Resistance</u>	To satisfy the specified initial value		
	<u>Dielectric Strength</u>	To satisfy the specified initial value		

HCN Series Specification & Test Condition

Item	Specification	Test Condition															
Temperature Cycle	Appearance	No mechanical damage shall occur															
	Capacitance	Cap. change within $\pm 2.5\%$ of initial value															
	Q Factor	To satisfy the specified initial value															
	Insulation Resistance	To satisfy the specified initial value															
		Capacitor shall be subjected to five cycles of the temperature cycle as following:															
		<table border="1"> <thead> <tr> <th>Step</th> <th>Temp.(°C)</th> <th>Time(min)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Min Rated Temp.(-55)+0/-3</td> <td>30</td> </tr> <tr> <td>2</td> <td>25</td> <td>3</td> </tr> <tr> <td>3</td> <td>Max Rated Temp.(+125)+3/-0</td> <td>30</td> </tr> <tr> <td>4</td> <td>25</td> <td>3</td> </tr> </tbody> </table>	Step	Temp.(°C)	Time(min)	1	Min Rated Temp.(-55)+0/-3	30	2	25	3	3	Max Rated Temp.(+125)+3/-0	30	4	25	3
Step	Temp.(°C)	Time(min)															
1	Min Rated Temp.(-55)+0/-3	30															
2	25	3															
3	Max Rated Temp.(+125)+3/-0	30															
4	25	3															
		Measure at room temperature after cooling for 24 \pm 2 Hours															
Humidity	Appearance	No mechanical damage shall occur															
	Capacitance	Cap. change within $\pm 5.0\%$ of initial value															
	Q Factor	$Q \geq 350$															
	Insulation Resistance	1,000M Ω or 50/C Ω whichever is smaller. (C in Farad)															
		Temperature : 40 \pm 2 °C Relative Humidity : 90 ~95%RH Test Time : 500 +12/-0 hr															
		Measure at room temperature after cooling for 24 \pm 2 Hours															
Humidity Loading	Appearance	No mechanical damage shall occur															
	Capacitance	Cap. change within $\pm 5.0\%$ of initial value															
	Q Factor	$Q \geq 350$															
	Insulation Resistance	500M Ω or 25/C Ω whichever is smaller. (C in Farad)															
		Applied Voltage :Rated Voltage Temperature : 40 \pm 2 °C Relative Humidity : 90 ~ 95%RH Test Time : 500 +12/- 0Hr Current Applied : 50 mA Max.															
		Measure at room temperature after cooling for 24 \pm 2 Hours															
High Temperature Load (Life Test)	Appearance	No mechanical damage shall occur															
	Capacitance	Cap. change within $\pm 3.0\%$ of initial value															
	Q Factor	$Q \geq 350$															
	Insulation Resistance	1,000M Ω or 50/C Ω whichever is smaller. (C in Farad)															
		Applied Voltage :200% of Rated Voltage Temperature : max. operation temperature Test Time : 1000 +48/-0Hr Current Applied : 50 mA Max.															
		Measure at room temperature after cooling for 24 \pm 2 Hours															
Vibration	Appearance	No mechanical damage shall occur															
	Capacitance	Within the specified tolerance															
	Tan δ	To satisfy the specified initial value															
		Solder the capacitor on P.C. board. Vibrate the capacitor with amplitude of 1.5mm P-P changing the frequencies from 10Hz to 55Hz and back to 10Hz in about 1 min. Repeat this for 2 hours each in 3 perpendicular directions.															