

Conductive Polymer Hybrid Capacitors



FEATURES

- 125 °C, 4000 h
- Low ESR
- High ripple current
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912


**RoHS
COMPLIANT**

APPLICATIONS

- Industrial
- Telecommunications and IT
- Portable and mobile equipment

QUICK REFERENCE DATA		
DESCRIPTION	UNIT	VALUE
Nominal case sizes (Ø D)	mm	6.3 to 10
Rated capacitance range	µF	10 to 470
Capacitance tolerance	%	± 20 (at 120 Hz, 20 °C)
Rated voltage range	V _{DC}	16 to 80
Category temperature range	°C	-55 to +125
Endurance	h	4000
Shelf life	h	1000

ORDERING INFORMATION							
Part number example: HSC221M1ETR-0810							
HSC	221	M	1E	TR	-	0810	
SERIES NAME	CAPACITANCE	CAPACITANCE TOLERANCE	RATED VOLTAGE	PACKAGE TYPE	TERMINAL TYPE	CASE SIZE	LEAD WIRE AND COATING TYPE
HSC series	221 = 220 µF	M = ± 20 %	1C = 16 V 1E = 25 V 1V = 35 V 1H = 50 V 1J = 63 V 1K = 80 V	Carrier tape		Ø 8 x 10 L	Lead (Pb)-free and PET coating case

ADDITIONAL ELECTRICAL DATA

LEAKAGE CURRENT (Test conditions: U _R , 20 °C)			
RATED VOLTAGE	TIME	CASE SIZE	VALUE
16 V to 80 V	After 2 min	Ø 6.3 mm to Ø 10 mm	I = 0.01 CV ⁽¹⁾ or 3 µA, whichever is greater

Note

- ⁽¹⁾ C = rated capacitance in µF
V = rated DC working voltage in V

DISSIPATION FACTOR (tan δ at 120 Hz, 20 °C)						
RATED VOLTAGE	16	25	35	50	63	80
Ø 6.3 mm to Ø 10 mm	0.16	0.14	0.12	0.10	0.08	0.08

MULTIPLIER OF RIPPLE CURRENT AS A FUNCTION OF FREQUENCY	
FREQUENCY (Hz)	MULTIPLIER
$120 \leq f < 1K$	0.1
$1K \leq f < 10K$	0.3
$10K \leq f < 100K$	0.6
$100K \leq f < 500K$	1.0

TEST PROCEDURES AND REQUIREMENTS					
TEST	TEST TIME	CAPACITANCE CHANGE	DISSIPATION FACTOR ($\tan \delta$)	ESR	LEAKAGE CURRENT
Endurance ⁽¹⁾	4000 h	Within ± 30 % of initial value	Less than 200 % of specified value	Less than 200 % of specified value	Within specified value
Shelf life ⁽²⁾	1000 h				
Resistance to solder heat	-	Within ± 10 % of initial value	Within specified value	Within specified value	Within specified value

Notes

- (1) The above specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage applied with rated ripple current for 4000 hours at 125 °C
- (2) After storage for 1000 hours at 125 °C ± 2 °C with no voltage applied and then being stabilized at 20 °C, capacitors shall meet the limits specified (with voltage treatment)

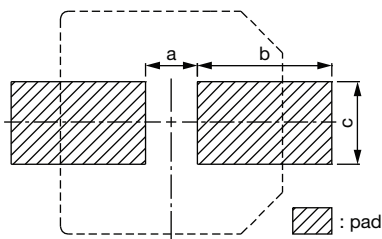
DIMENSIONS in millimeters						
Ø D	L	A	B	C	W	P ± 0.2
6.3	5.8 ± 0.3	6.6	6.6	7.2	0.5 to 0.8	2.0
6.3	7.7 ± 0.3	6.6	6.6	7.2	0.5 to 0.8	2.0
8	10.0 ± 0.5	8.3	8.3	9.0	0.7 to 1.1	3.1
10	10.0 ± 0.5	10.3	10.3	11.0	0.7 to 1.3	4.7
10	12.5 ± 0.5	10.3	10.3	11.0	0.7 to 1.3	4.7

Note

- (1) For Ø 6.3 mm is 0.4 mm max.

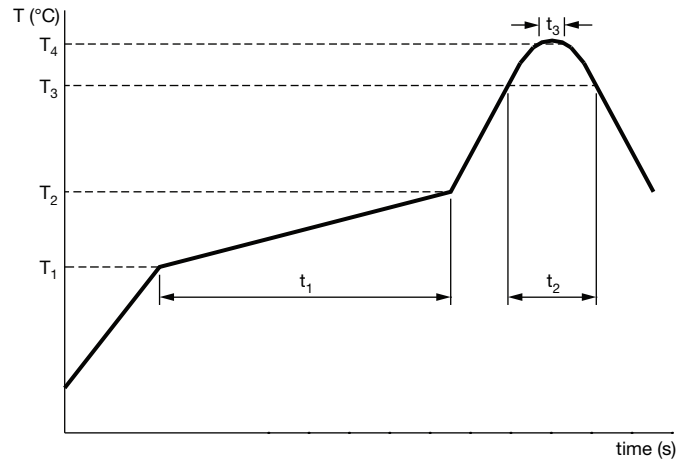
MARKING	
<p>Ø D = 6.3 mm</p>	<p>Ø D = 8 mm to 10 mm</p>

ELECTRICAL DATA							
RATED VOLTAGE (V)	SURGE VOLTAGE (V)	CAPACITANCE (μF)	SIZE Ø D x L (mm)	$\tan \delta$ AT 120 Hz, 20 °C	LEAKAGE CURRENT (μA)	ESR AT 100 kHz, 20 °C MAX. (mΩ)	RATED RIPPLE CURRENT AT 100 kHz, 125 °C (mA/RMS)
16	18.4	82	6.3 x 5.8	0.16	13.1	50	900
		150	6.3 x 7.7	0.16	24	30	1400
		270	8 x 10	0.16	43.2	27	1600
		470	10 x 10	0.16	75.2	20	2000
25	28.8	47	6.3 x 5.8	0.14	11.8	50	900
		56	6.3 x 5.8	0.14	14	50	900
		68	6.3 x 7.7	0.14	17	30	1400
		100	6.3 x 7.7	0.14	25	30	1400
		150	8 x 10	0.14	37.5	27	1600
		220	8 x 10	0.14	55	27	1600
35	40.3	330	10 x 10	0.14	82.5	20	2000
		27	6.3 x 5.8	0.12	9.5	60	900
		33	6.3 x 5.8	0.12	11.6	60	900
		47	6.3 x 5.8	0.12	16.5	60	900
		68	6.3 x 7.7	0.12	23.8	35	1400
		100	8 x 10	0.12	35	27	1600
50	57.5	150	8 x 10	0.12	52.5	27	1600
		220	10 x 10	0.12	77	20	2000
		270	10 x 10	0.12	94.5	20	2000
		22	6.3 x 5.8	0.10	11	80	750
		33	6.3 x 7.7	0.10	16.5	40	1100
		47	8 x 10	0.10	23.5	30	1250
63	72.5	68	8 x 10	0.10	34	30	1250
		100	10 x 10	0.10	50	28	1600
		120	10 x 10	0.10	60	28	1600
		10	6.3 x 5.8	0.08	6.3	120	700
		22	6.3 x 7.7	0.08	13.9	80	900
		27	8 x 10	0.08	17	40	1100
80	92.0	33	8 x 10	0.08	20.8	40	1100
		47	8 x 10	0.08	29.6	40	1100
		56	10 x 10	0.08	35.3	30	1400
		56	10 x 12.5	0.08	35.3	26	1500
		68	10 x 10	0.08	42.8	30	1400
		82	10 x 10	0.08	51.7	30	1400
80	92.0	22	8 x 10	0.08	17.6	45	1050
		33	10 x 10	0.08	35.3	36	1360
		47	10 x 10	0.08	37.6	36	1360

SOLDERING


Recommended soldering pad dimensions

RECOMMENDED SOLDERING PAD DIMENSIONS in millimeters			
CASE SIZE (Ø)	LAND SIZE		
	a	b	c
6.3	1.9	3.5	1.6
8 x 6.5	2.1	4.0	1.6
8	3.0	3.5	2.5
10	4.0	4.0	2.5

STANDARD SOLDERING PROFILE FOR LEAD (Pb)-FREE REFLOW PROCESS


Maximum temperature load during reflow soldering

REFLOW SOLDERING CONDITIONS				
Rated voltage (V)		16 to 80		
Case size (Ø)		6.3 to 10		
Preheat	Temperature (T ₁ to T ₂ , °C)	150 to 180		
	Time (t ₁) (max., s)	120		
Duration	Temperature (T ₃ , °C)	200	217	230
	Time (t ₂) (max., s)	70	50	40
Peak	Temperature (T ₄ , °C)	260		
	Time (t ₃ , s)	5		
Reflow cycles		1		

Note

Reflow soldering may reduce the capacitance of products before or after soldering even if soldering conditions stipulated in recommendable reflow condition are met.

Though the actual reflow conditions are subject to change depending on the kind of reflow soldering method, please be aware that the peak temperature at the top of Al-case and electrode terminals should not exceed peak temperature.

Particular notice should be given to the time that the capacitor is heated at 200 °C or higher during reflow.

If your reflow conditions (temperature and / or duration) exceed the above capacitor may be damaged exhibiting; 50 % decrease in capacitance, an increase of leakage current, (up to several mA) as well as damage to the exterior of the capacitor