Wet Tantalum Capacitors, High Energy, Ultra High Capacitance, -55 °C to +125 °C Operation

FEATURES

- High energy, very high capacitance design
- All tantalum, hermetically sealed case
- Utilizes Vishay proven SuperTan® technology
- Terminations: radial leaded
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

APPLICATIONS

- Industrial
- Avionics / military / space

PERFORMANCE CHARACTERISTICS

Operating Temperature:
-55 °C to +85 °C (to +125 °C with voltage derating)

Capacitance Tolerance:
at 120 Hz, +25 °C ± 20 % standard
± 10 % available as special

Contact marketing for availability of 10 % tolerance

DC Leakage Current (DCL Max.):
at +25 °C: leakage current shall not exceed the values listed in the Standard Ratings tables.

Life Test:
capacitors are capable of withstanding a 2000 h life test at a temperature of +85 °C at the applicable rated DC working voltage.

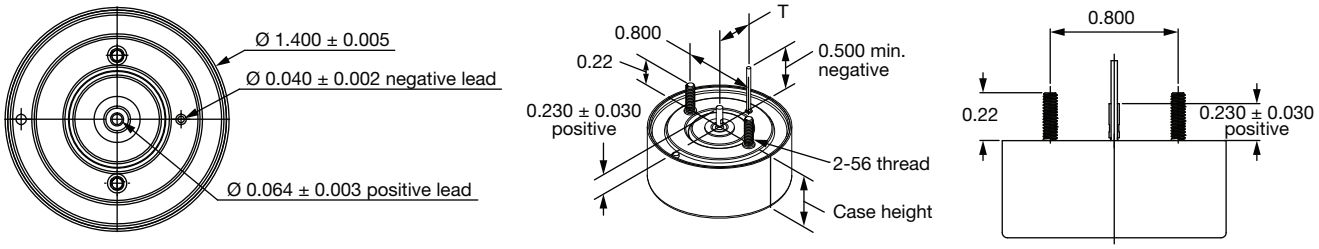
ORDERING INFORMATION

HE5	C	543	K	025	B	Z	S	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	TERMINATION	RELIABILITY LEVEL	TEMPERATURE	ESR
	See Ratings and Case Codes table	This is expressed in microfarads. The first two digits are the significant figures. The third is the number of zeros to follow.	K = 10 % (1) M = 20 %	This is expressed in V. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V)	A = 100 % tin (RoHS-compliant) B = tin / lead C = 100 % tin (RoHS-compliant) with mounting lugs D = tin / lead with mounting lugs	Z = non-ER	S = standard (-55 °C to +85 °C)	S = standard

Note

(1) Contact marketing for availability of 10 % tolerance

DIMENSIONS in inches [millimeters]



CASE CODE	D	HEIGHT	L2 (MIN.)	L1 (MIN.)	T	WEIGHT (g) (TYPICAL)
A	1.400 ± 0.005 [35.56 ± 0.127]	0.350 ± 0.015 [8.89 ± 0.381]	0.500 [12.70]	0.500 [12.70]	0.40 ± 0.015 [10.2 ± 0.38]	48.0
B	1.400 ± 0.005 [35.56 ± 0.127]	0.488 ± 0.015 [12.395 ± 0.381]	0.500 [12.70]	0.500 [12.70]	0.40 ± 0.015 [10.2 ± 0.38]	73.0
C	1.400 ± 0.005 [35.56 ± 0.127]	0.608 ± 0.015 [15.4 ± 0.4]	0.500 [12.70]	0.500 [12.70]	0.40 ± 0.015 [10.2 ± 0.38]	95.0

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. ESR AT +25 °C, 1 kHz (Ω)	MAX. DCL AT +25 °C (µA)
25 V_{DC} AT +85 °C; 15 V_{DC} AT +125 °C				
18 000	A	HE5A183(1)025(2)(3)(4)(5)	0.050	150
24 000	A	HE5A243(1)025(2)(3)(4)(5)	0.060	150
36 000	B	HE5B363(1)025(2)(3)(4)(5)	0.045	200
48 000	B	HE5B483(1)025(2)(3)(4)(5)	0.045	200
54 000	C	HE5C543(1)025(2)(3)(4)(5)	0.035	300
72 000	C	HE5C723(1)025(2)(3)(4)(5)	0.035	350
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C				
8000	A	HE5A802(1)050(2)(3)(4)(5)	0.075	170
14 500	B	HE5B143(1)050(2)(3)(4)(5)	0.045	270
16 000	B [2]	HE5B163(1)050(2)(3)(4)(5)	0.045	270
18 000	C [1]	HE5C183(1)050(2)(3)(4)(5)	0.035	400
24 000	C [2]	HE5C243(1)050(2)(3)(4)(5)	0.035	400
63 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C				
4000	A	HE5A402(1)063(2)(3)(4)(5)	0.100	170
8000	B	HE5B802(1)063(2)(3)(4)(5)	0.055	270
11 500	C	HE5C113(1)063(2)(3)(4)(5)	0.035	400
12 000	C [2]	HE5C123(1)063(2)(3)(4)(5)	0.035	400
80 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C				
3000	A	HE5A302(1)080(2)(3)(4)(5)	0.100	200
5600	B	HE5B562(1)080(2)(3)(4)(5)	0.065	350
6000	B [2]	HE5B602(1)080(2)(3)(4)(5)	0.065	350
7000	C [1]	HE5C702(1)080(2)(3)(4)(5)	0.040	500
9000	C [2]	HE5C902(1)080(2)(3)(4)(5)	0.040	500

Notes

- Part number definitions:
  (1) Standard capacitance tolerance is 20 % or “M“. Contact marketing for availability of 10 % or “K“
  (2) Standard termination is “B” (tin / lead) or “D” (tin / lead with mounting lugs). RoHS-compliant is “A” (100 % tin) or “C” (100 % tin with mounting lugs)
  (3) Standard reliability is “Z” or non-established reliability
  (4) Standard temperature range is “S” or -55 °C to +125 °C
  (5) Standard ESR is “S“

[1] Preliminary rating, specification subject to change. Contact marketing for availability

[2] Requires export license for shipments outside the US. Contact marketing for availability

STANDARD RATINGS				
CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. ESR AT +25 °C, 1 kHz (Ω)	MAX. DCL AT +25 °C (µA)
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C				
1900	A	HE5A192(1)100(2)(3)(4)(5)	0.085	200
3600	B	HE5B362(1)100(2)(3)(4)(5)	0.065	350
3800	B (2)	HE5B382(1)100(2)(3)(4)(5)	0.065	350
4500	C (1)	HE5C452(1)100(2)(3)(4)(5)	0.050	500
5700	C (2)	HE5C572(1)100(2)(3)(4)(5)	0.050	500
110 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C				
1500	A	HE5A152(1)110(2)(3)(4)(5)	0.100	200
3000	B	HE5B302(1)110(2)(3)(4)(5)	0.085	350
3600	C (1)	HE5C362(1)110(2)(3)(4)(5)	0.075	500
4500	C (2)	HE5C452(1)110(2)(3)(4)(5)	0.075	500
125 V_{DC} AT +85 °C; 85 V_{DC} AT +125 °C				
1100	A	HE5A112(1)125(2)(3)(4)(5)	0.100	200
2200	B	HE5B222(1)125(2)(3)(4)(5)	0.085	350
2900	C (1)	HE5C292(1)125(2)(3)(4)(5)	0.075	500
3300	C (2)	HE5C332(1)125(2)(3)(4)(5)	0.075	500

Notes

- Part number definitions:
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  (2) Standard termination is “B” (tin / lead) or “D” (tin / lead with mounting lugs). RoHS-compliant is “A” (100 % tin) or “C” (100 % tin with mounting lugs)
  (3) Standard reliability is “Z” or non-established reliability
  (4) Standard temperature range is “S” or -55 °C to +125 °C
  (5) Standard ESR is “S“

(1) Preliminary rating, specification subject to change. Contact marketing for availability

(2) Requires export license for shipments outside the US. Contact marketing for availability

PERFORMANCE CHARACTERISTICS OF HIGH ENERGY CAPACITORS

ELECTRICAL PERFORMANCE CHARACTERISTICS	
ITEM	PERFORMANCE CHARACTERISTICS
Operating temperature range	-55 °C to +85 °C (to +125 °C with voltage derating)
Storage temperature range	-62 °C to +130 °C
Capacitor tolerance	± 20 % ± 10 % at 120 Hz
ESR	Limits per Standard Ratings table
DC leakage current (DCL max.)	At 25 °C the leakage current shall not exceed values listed in the Standard Rating table.
Reverse voltage	No continuous reverse voltage permitted
Surge voltage	The test shall be at 1000 cycles at 110 % of rated voltage at 85 °C. A cycle consists of a 30 s charge and a 330 s discharge through 100 Ω resistor.
Life test	2000 h at +85 °C

ENVIRONMENTAL CHARACTERISTICS		
ITEM	TEST AND CONDITIONS	COMMENTS
Hermeticity	MIL-STD-202, method 112 C/IIIa	The capacitor shall be hermetically sealed such that the case does not leak electrolyte or vent any gas when exposed to a vacuum.
Moisture resistance	MIL-STD-202, method 106	6 V polarity
Altitude	MIL-STD-202, method 105 C, test condition D	100 000 feet test

MECHANICAL PERFORMANCE CHARACTERISTICS		
ITEM	**TEST AND CONDITIONS**	**COMMENTS**
Thermal shock	MIL-STD-202, method 107 G	Test condition A
Shock	MIL-STD-202, method 213 B test condition G	11 ms, 50 *g*
Vibration - high frequency	MIL-STD-202, method 204 D test condition D	12 sweeps/axis, 20 *g* peak
Vibration - random	MIL-STD-202, method 214 A test condition I, letter D	1.5 h/axis, 12 *g*
Resistance to solder heat	MIL-STD-202, method 210 F	The capacitor must withstand solder dipping of the terminals at 260 °C for 10 s. The capacitor must not be visibly damaged and the electrical characteristics must not be affected.
Solderability	MIL-STD-202, method 208	
Terminal strength	MIL-STD-202, method 211 A	The capacitor terminals must withstand a 5 pound pull test for 5 s to 10 s. The capacitor must not be visibly damaged and the electrical characteristics must not be affected.
Part markings	MIL-STD-202, method 215 J	The capacitor shall be permanently and legibly marked on the circumference of the case. The markings shall be resistant to solvents.
Weight (mass)		See dimensions table
Seal	MIL-PRF-39006	
MSL	J-STD-033	Not applicable
Packaging	MIL-PRF-39006	All units are shipped in individual bulk packages
Stud mounting		Tighten nuts only ½ to ¾ turn beyond point of initial contact, equivalent to 24 to 28 maximum inch-ounces torque. Maximum pre-load tension ~ 15 pounds. Lock washers are not recommended; use an adhesive lock nut conforming to MIL-S-22473E, grade A - red

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