

# Wet Tantalum Capacitors, Tantalum-Case with Glass-to-Tantalum Hermetic Seal for - 55 °C to + 125 °C Operation



## FEATURES

Vishay HE3 represents a major breakthrough in wet tantalum capacitor technology for high-energy applications. The unique case design provides for the highest capacitance per unit volume. The HE3 also utilizes the proven hybrid technology of our SuperTan® product.



The HE3 is housed in an all tantalum, hermetically sealed case, and is manufactured to withstand high stress and hazardous environments. The design provides a unique double seal for improved reliability and performance.

- Compliant to RoHS Directive 2002/95/EC

### Note

\* Pb containing terminations are not RoHS compliant, exemptions may apply

## 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 1000 h life test at a temperature of + 85 °C at the applicable rated DC working voltage.

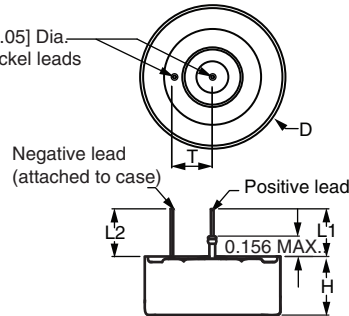
ORDERING INFORMATION								
HE3	C	543	K	025	B	Z	S	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION AND PACKAGING	RELIABILITY LEVEL	TEMPERATURE	ESR
	See Ratings and Case Codes table	This is expressed in microfarads. The first two digits are the significant figures. The third is the number of zeros to follow.	K = 10 % <sup>(1)</sup> 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 and bulk	Z = Non-ER	S = Standard (- 55 °C to + 85 °C)	S = Standard

### Note

<sup>(1)</sup> Contact marketing for availability of 10 % tolerance

**DIMENSIONS** in inches [millimeters]

0.0253 ± 0.002 [0.64 ± 0.05] Dia.  
(No. 22 AWG) Tinned Nickel leads  
solderable and weldable



CASE CODE	D	HEIGHT	L2 (MIN.)	L1 (MIN.)	T	WEIGHT (g) (TYPICAL)
TYPE HE3						
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]	0.615 ± 0.015 [15.6 ± 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)
<b>25 V<sub>DC</sub> AT + 85 °C; 15 V<sub>DC</sub> AT + 125 °C</b>				
18 000	A	HE3A183(1)025(2)(3)(4)(5)	0.060	150
24 000	A	HE3A243(1)025(2)(3)(4)(5)	0.060	150
36 000	B	HE3B363(1)025(2)(3)(4)(5)	0.045	200
48 000	B	HE3B483(1)025(2)(3)(4)(5)	0.045	200
54 000	C	HE3C543(1)025(2)(3)(4)(5)	0.035	300
72 000	C	HE3C723(1)025(2)(3)(4)(5)	0.035	350
<b>50 V<sub>DC</sub> AT + 85 °C; 30 V<sub>DC</sub> AT + 125 °C</b>				
8000	A	HE3A802(1)050(2)(3)(4)(5)	0.075	170
16 000	B	HE3B163(1)050(2)(3)(4)(5)	0.045	270
24 000	C	HE3C243(1)050(2)(3)(4)(5)	0.035	400
<b>63 V<sub>DC</sub> AT + 85 °C; 40 V<sub>DC</sub> AT + 125 °C</b>				
4000	A	HE3A402(1)063(2)(3)(4)(5)	0.100	170
8000	B	HE3B802(1)063(2)(3)(4)(5)	0.055	270
12 000	C	HE3C123(1)063(2)(3)(4)(5)	0.035	400
<b>80 V<sub>DC</sub> AT + 85 °C; 50 V<sub>DC</sub> AT + 125 °C</b>				
3000	A	HE3A302(1)080(2)(3)(4)(5)	0.100	300
6000	B	HE3B602(1)080(2)(3)(4)(5)	0.065	400
9000	C	HE3C902(1)080(2)(3)(4)(5)	0.040	500
<b>100 V<sub>DC</sub> AT + 85 °C; 65 V<sub>DC</sub> AT + 125 °C</b>				
1900	A	HE3A192(1)100(2)(3)(4)(5)	0.085	300
3800	B	HE3B382(1)100(2)(3)(4)(5)	0.065	400
5700	C	HE3C572(1)100(2)(3)(4)(5)	0.050	500
<b>125 V<sub>DC</sub> AT + 85 °C; 85 V<sub>DC</sub> AT + 125 °C</b>				
1100	A	HE3A112(1)125(2)(3)(4)(5)	0.100	300
2200	B	HE3B222(1)125(2)(3)(4)(5)	0.085	400
3300	C	HE3C332(1)125(2)(3)(4)(5)	0.075	500

**Note**

- Part number definitions:
  - (1) Standard capacitance tolerance is 20 % or "M". Contact marketing for availability of 10 % or "K".
  - (2) Standard termination is "B" or tin/lead. RoHS compliant or 100 % tin is available as "A".
  - (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".



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)
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 one and one half (1.5) min charge and a four and one half (4.5) min discharge through 100 Ω resistor.
Life test at + 85 °C	1000 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	
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	
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	ANSI J-STD-002	
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

## HE3 MOUNTING OPTIONS

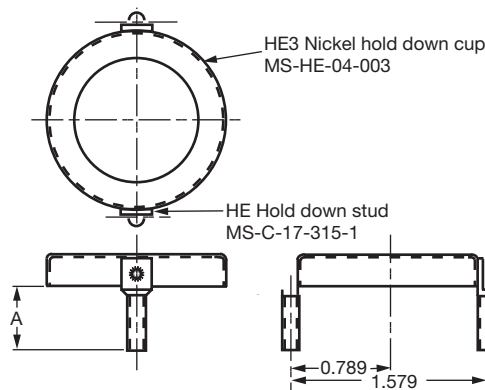
The HE3 capacitor can be mounted with many commercially available methods. Vishay offers the optional mounting hardware outlined below.

### THROUGH-HOLE

If mounted through-hole, the glass-to-metal seal must be protected from potential mounting and application stress. The HE3 can be mounted termination down through the HE3SPC001 spacer into the PCB. The proper size bracket HE3BKT00\* can then be utilized to hold the HE3 rigidly to the PCB.

### TERMINATIONS UP

If mounted with terminations facing up for attachment to wiring, the spacer is not needed. The HE3 can be reverse with terminations facing upward through the center of the HE3BKT00\* bracket, which is then mounted through the PCB.



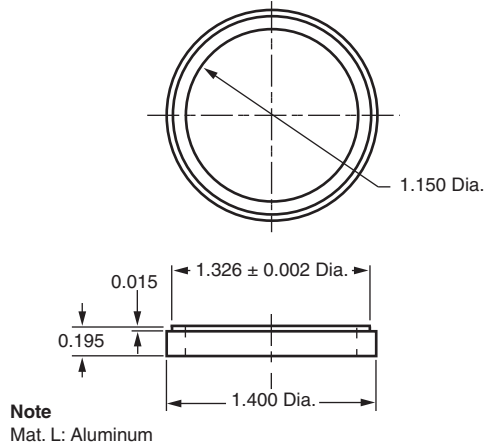
#### Notes

- Spot weld, 2 places
- Mounting bolt:
  1. Material - Stainless steel
  2. Thread - 6-32 NC-2A

PART NUMBER <sup>(1)</sup>	STUD	A ± 0.010
HE3BKT001	HE3A	0.391
HE3BKT002	HE3B	0.518
HE3BKT003	HE3C	0.605
HE3BKT004	HE3A W/spacer	0.572
HE3BKT005	HE3B W/spacer	0.699
HE3BKT006	HE3C W/spacer	0.831

#### Note

- <sup>(1)</sup> The part numbers shown are for ordering the mounting bracket and/or spacer. The HE3 capacitor must be ordered separately using the correct part number as outlined in ORDERING INFORMATION and in the STANDARD RATINGS table.

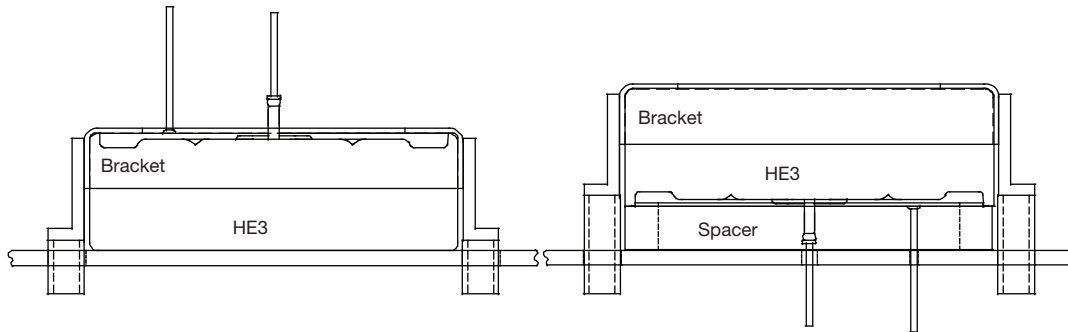


<b>PART NUMBER <sup>(1)</sup></b>
HE3SPC001

**Note**

<sup>(1)</sup> The part numbers shown are for ordering the mounting bracket and/or spacer. The HE3 capacitor must be ordered separately using the correct part number as outlined in ORDERING INFORMATION and in the STANDARD RATINGS table.

**HE3 PC BOARD MOUNTED**





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