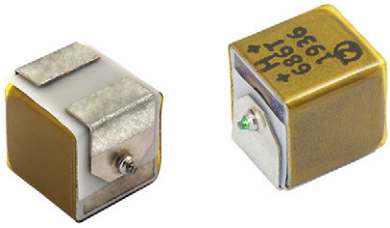
Wet Tantalum SMD HI-TMP® Capacitors for +200 °C Operation, Tantalum Metal Case With Glass-to-Tantalum Hermetic Seal



LINKS TO ADDITIONAL RESOURCES

3D Models

PERFORMANCE CHARACTERISTICS

Operating Temperature: -55 °C to +85 °C
(to +200 °C with voltage derating)

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

Capacitance Tolerance: ± 10 %, ± 20 % standard

FEATURES

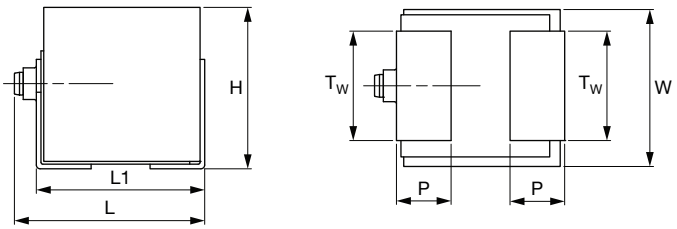
- Advanced SMD packaging with high volumetric efficiency, patents pending
- Enhanced performance, high reliability design
- SMD, 100 % tin (RoHS-compliant)
- Mounting: surface-mount
- Increased thermal shock capability of 300 cycles
- Designed for oil exploration, avionics, and aerospace applications where > 150 °C operation is required
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free
RoHS COMPLIANT
HALOGEN FREE
GREEN (5-2008)

ORDERING INFORMATION

T24	C	336	K	075	C	S	S
TYPE	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	TERMINATION / PACKAGING	RELIABILITY GRADE	ESR
	See Standard Ratings table	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	K = ± 10 % M = ± 20 %	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating. A decimal point is indicated by an "R" (6R3 = 6.3 V).	**C** = 100 % tin, 7" (178 mm), reel **H** = 100 % tin, 7" (178 mm), 1/2 reel **U** = 100 % tin, 7" (178 mm), partial reel	S = 48 h burn-in	S = standard

DIMENSIONS in inches [millimeters]

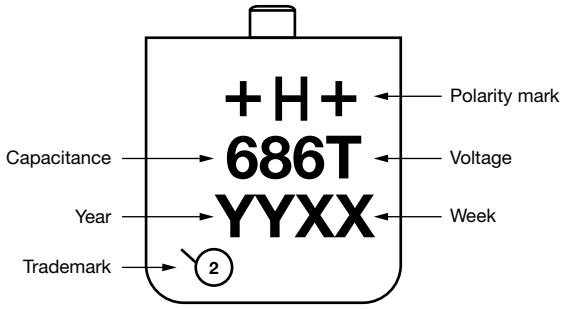


CASE CODE	L (MAX.)	L1	W	H	P	T_W	WEIGHT g (AVERAGE)
C	0.354 [9.0]	0.303 ± 0.008 [7.7 ± 0.2]	0.279 ± 0.008 [7.1 ± 0.2]	0.291 ± 0.008 [7.4 ± 0.2]	0.098 ± 0.008 [2.5 ± 0.2]	0.197 ± 0.008 [5.0 ± 0.2]	2.40

RATINGS AND CASE CODES

µF	75 V	125 V
10		C
33	C	

MARKING



VOLTAGE CODE	
V	**CODE**
50	T
75	S
100	R
125	B

STANDARD RATINGS

CAPACITANCE AT 25 °C 120 Hz (µF)	V_{DC} AT 200 °C	CASE CODE	PART NUMBER	MAX. ESR 120 Hz (Ω)	MAX. DCL (µA) 25 °C	MAX. DCL (µA) 85 °C / 125 °C	LIFE TEST PERFORMANCE (h AT +200 °C)
75 V_{DC} AT +85 °C							
33	45	C	T24C336(1)075(2)(3)(4)	2.5	1	5	2000
125 V_{DC} AT +85 °C							
10	75	C	T24C106(1)125(2)(3)(4)	5.5	1	5	2000

Note

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination and packaging: C, H, U
  (3) Reliability level: S
  (4) ESR: S

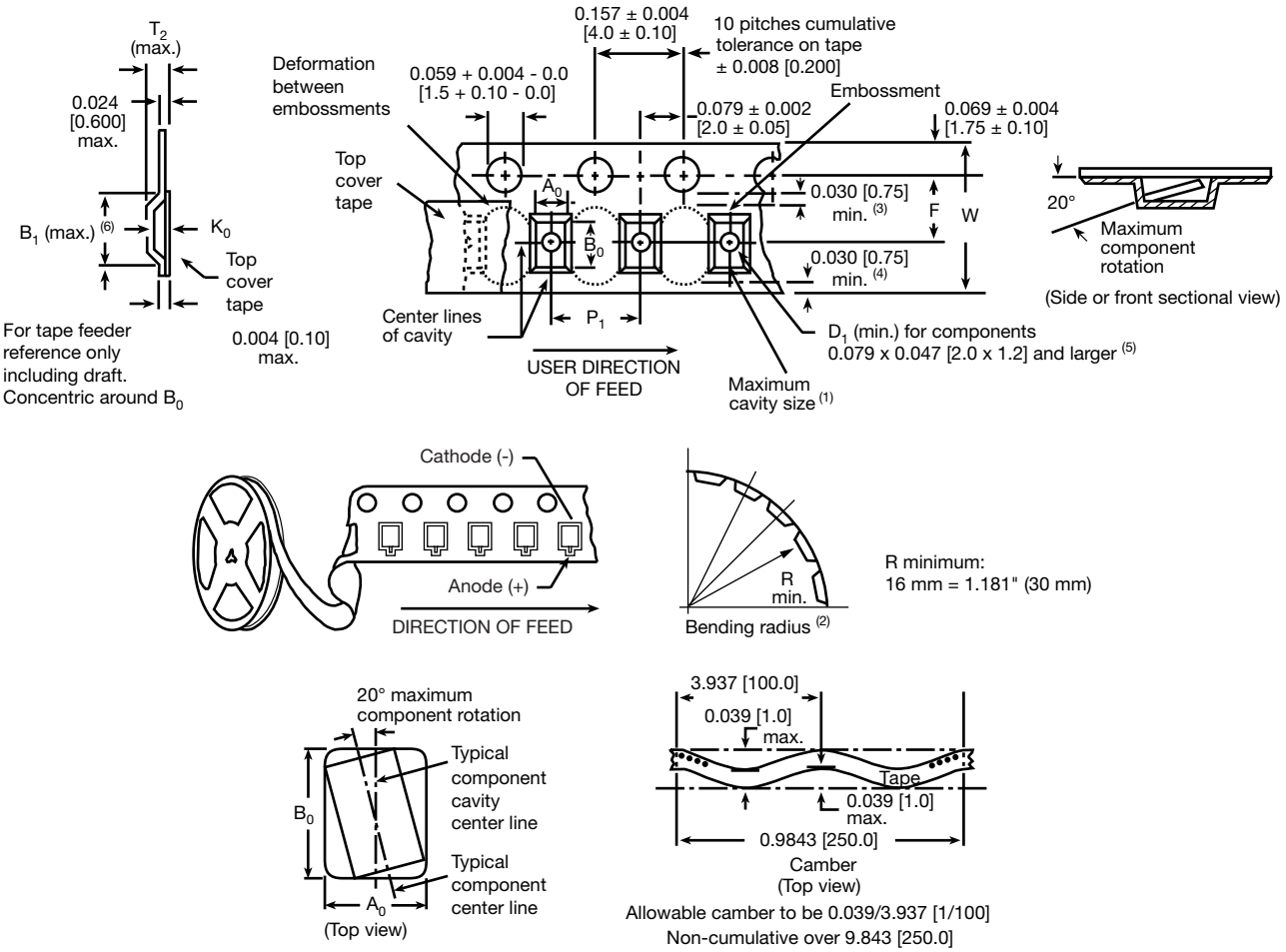
POWER DISSIPATION

CASE CODE	MAXIMUM PERMISSIBLE POWER DISSIPATION AT +25 °C (W) IN FREE AIR
C	0.9

STANDARD PACKAGING QUANTITY

CASE CODE	UNITS PER REEL		
	7" FULL REEL	7" HALF REEL	7" PARTIAL REEL
C	100	50	25

TAPE AND REEL PACKAGING in inches [millimeters]



Notes

- Metric dimensions will govern. Dimensions in inches are rounded and for reference only.

(1) A_0, B_0, K_0, are determined by the maximum dimensions to the ends of the terminals extending from the component body and / or the body dimensions of the component. The clearance between the ends of the terminals or body of the component to the sides and depth of the cavity (A_0, B_0, K_0) must be within 0.002" (0.05 mm) minimum and 0.020" (0.50 mm) maximum. The clearance allowed must also prevent rotation of the component within the cavity of not more than 20°.

(2) Tape with components shall pass around radius "R" without damage. The minimum trailer length may require additional length to provide "R" minimum for 12 mm embossed tape for reels with hub diameters approaching N minimum.

(3) This dimension is the flat area from the edge of the sprocket hole to either outward deformation of the carrier tape between the embossed cavities or to the edge of the cavity whichever is less.

(4) This dimension is the flat area from the edge of the carrier tape opposite the sprocket holes to either the outward deformation of the carrier tape between the embossed cavity or to the edge of the cavity whichever is less.

(5) The embossed hole location shall be measured from the sprocket hole controlling the location of the embossment. Dimensions of embossment location shall be applied independent of each other.

(6) B_1 dimension is a reference dimension tape feeder clearance only.

CARRIER TAPE DIMENSIONS in inches [millimeters]

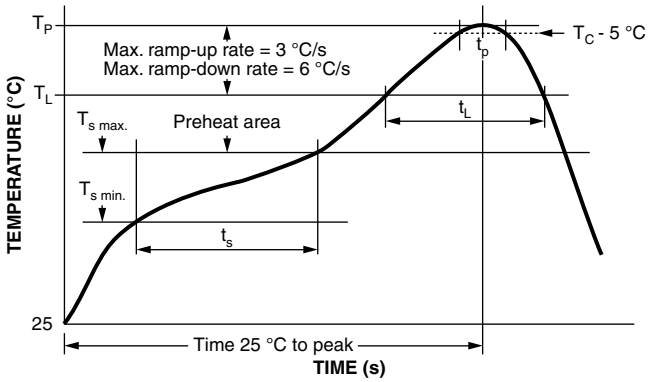
TAPE WIDTH	W	P_2	F	E_1	E_2 MIN.
16 mm	0.630 + 0.012 / - 0.004 [16.0 + 0.3 / - 0.1]	0.079 ± 0.004 [2.0 ± 0.1]	0.295 ± 0.004 [7.5 ± 0.1]	0.069 ± 0.004 [1.75 ± 0.1]	0.561 [14.25]

CARRIER TAPE DIMENSIONS in inches [millimeters]

TYPE	CASE CODE	TAPE WIDTH W (mm)	P_1	K_0 MAX.	B_1 MAX.
T24	C	16	0.476 ± 0.004 [12.0 ± 0.1]	0.31 [7.9]	0.45 [11.3]

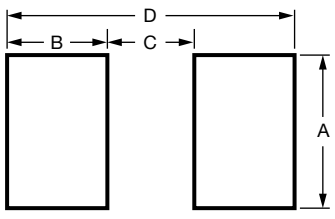
RECOMMENDED REFLOW PROFILES

Capacitors should withstand reflow profile as per J-STD-020 standard



PROFILE FEATURE	LEAD (Pb)-FREE ASSEMBLY
Preheat / soak	
Temperature min. ($T_{s\ min.}$)	150 °C
Temperature max. ($T_{s\ max.}$)	200 °C
Time (t_s) from ($T_{s\ min.}$ to $T_{s\ max.}$)	60 s to 120 s
Ramp-up	
Ramp-up rate (T_L to T_P)	3 °C/s max.
Liquidus temperature (T_L)	217 °C
Time (t_L) maintained above T_L	60 s to 150 s
Peak package body temperature (T_p)	245
Time (t_p) within 5 °C of the specified classification temperature (T_C)	30 s
Time 25 °C to peak temperature	8 min max.
Ramp-down	
Ramp-down rate (T_P to T_L)	6 °C/s max.
Time 25 °C to peak temperature	8 min max.

PAD DIMENSIONS in inches [millimeters]

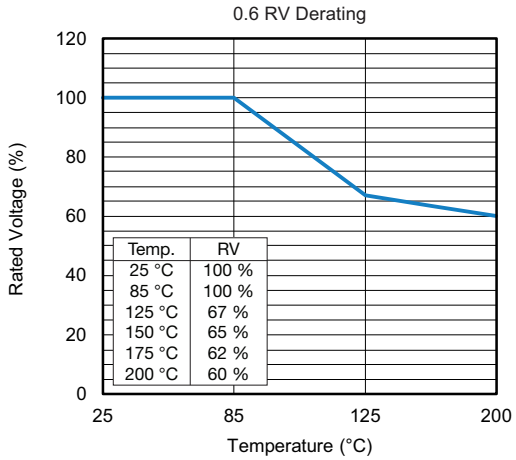


CASE CODE	A (MIN.)	B (NOM.)	C (NOM.)	D (NOM.)
C	0.295 [7.50]	0.138 [3.50]	0.100 [2.50]	0.374 [9.50]

TYPICAL PERFORMANCE CHARACTERISTICS OF T24 CAPACITORS

ELECTRICAL CHARACTERISTICS	
ITEM	**PERFORMANCE CHARACTERISTICS**
Category temperature range	-55 °C to +85 °C (to +200 °C with voltage derating)
Capacitance tolerance	± 20 %, ± 10 % at +25 °C, 120 Hz
Capacitance change by temperature	Limit per Standard Ratings table
ESR	Limit per Standard Ratings table, at +25 °C, 120 Hz
Impedance	Limit per Standard Ratings table, at -55 °C, 120 Hz
DCL (leakage current)	Limit per Standard Ratings table
AC ripple current	Limit per Standard Ratings table, at +85 °C and 40 kHz
Reverse voltage	Reverse voltage shall be in accordance with MIL-PRF-39006, paragraphs 3.23 and 4.8.19, except DC potential will be maximum of 3 V
Surge voltage	The DC surge voltage is the maximum voltage to which the capacitor can be subjected under any conditions including transients and peak ripple at the highest line voltage. The DC surge voltage is 115 % of rated DC voltage

RECOMMENDED VOLTAGE VS. TEMPERATURE DERATING



PERFORMANCE CHARACTERISTICS			
ITEM	**CONDITION**	**POST TEST PERFORMANCE**	
Surge voltage	In accordance with MIL-PRF-39006: 85 °C 1000 successive test cycles at the applicable DC surge voltage specified in series with a 1 kΩ resistor at the rate of 30 s ON, 5.5 min OFF	Capacitance change Leakage current	Within ± 10 % of initial measured value Not to exceed specified value
Life testing	In accordance with MIL-PRF-39006: capacitors shall be capable of withstanding life test at temperature +200 °C at derated voltage	Capacitance change Leakage current at 25 °C ESR	+10 % / -20 % of initial measured value Not to exceed specified value from “Standard Ratings” table Not to exceed 200 % of the applicable value from “Standard Ratings” table
AC ripple life	In accordance with MIL-PRF-39006: 2000 h, +85 °C		

ENVIRONMENTAL CHARACTERISTICS		
ITEM	**CONDITION**	**POST TEST PERFORMANCE**
Stability at low and high temperatures	As specified in MIL-PRF-39006	The capacitors shall meet the requirements of MIL-PRF-39006
Seal	MIL-PRF-39006 Method 112 of MIL-STD-202, conditions A and C	When the capacitors are tested as specified in MIL-PRF-39006, there shall be no evidence of leakage.
Moisture resistance	MIL-PRF-55365 Method 106 of MIL-STD-202, number of cycles: 10 continuous cycles except that steps 7a and 7b shall be omitted.	DC leakage — Not exceed 125 % of the specified value Capacitance change — Within ±10 % of the initial measured value ESR — Not exceed the specified value
Barometric pressure (reduced)	Method 105 of MIL-STD-202, condition E (150 000 feet) (45,720.1 m).	There shall be no mechanical or visual damage to capacitors post-conditioning.
Low temperature storage	MIL-PRF-39006 Method 502 of MIL-STD-810, Storage temperature: -62 °C + 0 °C, -3 °C Exposure time: 72 h followed by a 1 h exposure at +125 °C + 7 °C, -0 °C within 24 h after low temperature storage.	DC leakage — Not to exceed 125 % of the specified value Capacitance change — Within ± 10 % of the initial measured value ESR — Not exceed the specified value
Salt atmosphere (corrosion)	MIL-PRF-39006 Method 101 of MIL-STD-202, condition B (48 h), applicable salt solution: 5 %	There shall be no harmful corrosion. Marking shall remain legible.

MECHANICAL PERFORMANCE CHARACTERISTICS		
ITEM	**TEST METHOD**	**CONDITION**
Shear test	AEC-Q200-006 Apply a pressure load of 5 N for 10 s ± 1 s horizontally to the center of capacitor side body.	DC leakage — Not to exceed 125 % of the specified value Capacitance change — Within ± 10 % of the initial measured value ESR — Not exceed the specified value There shall be no mechanical or visual damage to capacitors post-conditioning.
Solderability	MIL-STD-202, method 208	Test B ANSI/J-STD-002: Pb-free solder - test B1 All terminations shall exhibit a continuous solder coating free from defects for a minimum of 95 % of the critical area of any individual lead.
Resistance to solvent	MIL-STD-202, method 215	There shall be no mechanical or visual damage to capacitors post-conditioning. Marking shall remain legible, no degradation of the can material.
Insulation resistance	MIL-STD-202, method 302	Test condition B (500 V_{DC} ± 10 %) The insulation resistance shall be not less than 100 MΩ. The capacitors shall meet the requirements of MIL-PRF-39006.
Shock (specified pulse)	MIL-STD-202, method 213	Test condition D (500 *g*)
Vibration, high frequency	MIL-STD-202, method 204	Test condition H (80 *g* peak)
Random vibration	MIL-STD-202, method 214	Test condition II-K (53.79 g RMS)
Thermal shock	MIL-STD-202, method 107	Test condition A, 300 cycles
Resistance to soldering heat	MIL-STD-202, method 210	Test condition J, except with only one heat cycle Capacitance change — Within ± 10 % of initial ESR — Initial specified value or less Leakage current — Initial specified value or less There shall be no mechanical or visual damage to capacitors post-conditioning.

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