Wet Tantalum Capacitors Surface Mount, Molded Case

FEATURES

- Molded surface mountable design
- Terminations: standard tin/lead (SnPb), 100 % tin (RoHS compliant) available
- Industry standard ratings
- Model M35 wet tantalum electrolytic chip capacitors incorporate the advantages of all the varieties of electrolytic capacitors and eliminate most of the disadvantages. These units have a 3 V reverse voltage capability at + 85 °C and a higher ripple current capability than any other electrolytic type with similar combinations of capacitance and case size.
- Compliant to RoHS Directive 2002/95/EC

Pb-free Available

RoHS* COMPLIANT

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 %, ± 5 % available as special.

DC Leakage Current (DCL Max.): At + 25 °C and above: 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 or + 125 °C at the applicable rated DC working voltage.

Following life test:

1. DCL, measured at + 85 °C rated voltage, shall not be in excess of the original requirement.
2. The equivalent series resistance shall not exceed 150 % of the initial requirement.
3. Change in capacitance shall not exceed 10 % from the initial measurement.

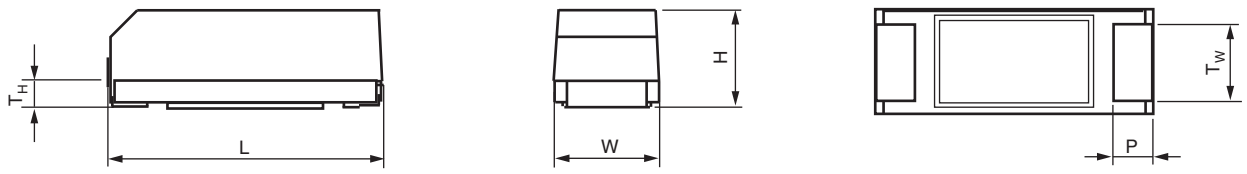
ORDERING INFORMATION

M35	C	826	M	125	B	Z	S	L
MODEL	CASE CODE	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85 °C	TERMINATION AND PACKAGING	RELIABILITY LEVEL	TEMP	ESR
	See Ratings and Case Codes 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)	A = 100 % tin (RoHS compliant), bulk B = Std, tin/lead, bulk	Z = Non-ER	S = Std	**S = Std.** L = Low

Note

- Packaging: The use of formed plastic tubes for packing bulk components is standard

DIMENSIONS in inches [millimeters]



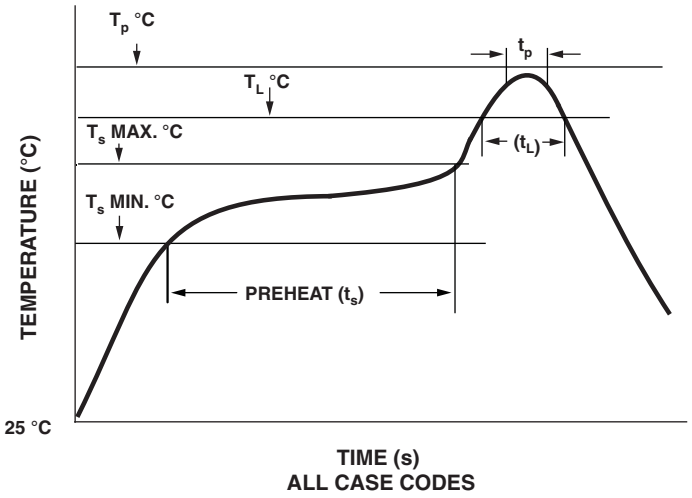
CASE CODE	L (MAX.)	W	H	P (MIN.)	T_W	T_H (MIN.)
C	0.835 [21.2]	0.315 ± 0.012 [8 ± 0.3]	0.295 ± 0.012 [7.5 ± 0.3]	0.118 [3.0]	0.236 ± 0.012 [6.0 ± 0.3]	0.075 [1.9]

For technical questions, contact: tantalum@vishay.com

THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000

Downloaded from Arrow.com.

RECOMMENDED REFLOW PROFILES



T_p Lead (Pb)-free	T_p Sn/Pb	t_p	T_L Lead (Pb)-free	T_L Sn/Pb	T_s MIN. Lead (Pb)-free	T_s MIN. Sn/Pb	T_s MAX. Lead (Pb)-free	T_s MAX. Sn/Pb	t_s Lead (Pb)-free	t_s Sn/Pb	t_L
260 °C	240 °C	10	217 °C	183 °C	150 °C	100 °C	200 °C	150 °C	60 to 150	60 to 90	60

MOUNTING

Due to the size and weight of these capacitors, we recommend that a supplemental mounting restraint to be used in printed circuit board attachment in addition to the reflowed solder.

One recommendation is to use an adhesive such as defined in the J-STD-001DS.

This is the Space Application Electronic Hardware Addendum to J-STD-001 (Requirements for Solder Electrical and Electronic Assemblies).

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. ESR AT + 25 °C	MAX. ESR AT - 55 °C	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz RMS (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
6 V_{DC} AT + 85 °C; 4 V_{DC} AT + 125 °C										
30	C	M35C306(1)006(2)ZS(3)	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820
68	C	M35C686(1)006(2)ZS(3)	3.2	60	1.0	2.0	- 40	+ 14	+ 16	960
220	C	M35C227(1)006(2)ZS(3)	3.0	36	2.0	9.0	- 64	+ 13	+ 16	1000
8 V_{DC} AT + 85 °C; 5 V_{DC} AT + 125 °C										
25	C	M35C256(1)008(2)ZS(3)	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820
56	C	M35C566(1)008(2)ZS(3)	3.3	59	1.0	2.0	- 40	+ 14	+ 16	900
180	C	M35C187(1)008(2)ZS(3)	3.0	45	2.0	9.0	- 60	+ 13	+ 16	1000
10 V_{DC} AT + 85 °C; 7 V_{DC} AT + 125 °C										
20	C	M35C206(1)010(2)ZS(3)	4.0	120	1.0	2.0	- 32	+ 10.5	+ 12	820
47	C	M35C476(1)010(2)ZS(3)	3.7	90	1.0	2.0	- 36	+ 14	+ 16	855
120	C	M35C127(1)010(2)ZS(3)	3.2	54	2.0	6.0	- 40	+ 14	+ 16	900
150	C	M35C157(1)010(2)ZS(3)	3.0	54	2.0	9.0	- 55	+ 13	+ 16	900

Note

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination/packaging: (see Ordering Information)
  Reliability level: Z = Non-ER
  Temperature: S = STD
  (3) ESR: S = STD, L = Low (1/2 standard ESR value)

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000
Downloaded from Arrow.com.

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER	MAX. ESR AT + 25 °C	MAX. ESR AT - 55 °C	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz RMS (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
15 V_{DC} AT + 85 °C; 10 V_{DC} AT + 125 °C										
15	C	M35C156(1)015(2)ZS(3)	4.4	155	1.0	2.0	- 24	+ 10.5	+ 12	780
33	C	M35C336(1)015(2)ZS(3)	4.0	90	1.0	2.0	- 28	+ 14	+ 16	820
82	C	M35C826(1)015(2)ZS(3)	3.9	72	2.0	6.0	- 35	+ 12	+ 16	900
100	C	M35C107(1)015(2)ZS(3)	3.9	72	2.0	9.0	- 44	+ 13	+ 16	900
25 V_{DC} AT + 85 °C; 15 V_{DC} AT + 125 °C										
10	C	M35C106(1)025(2)ZS(3)	5.3	220	1.0	2.0	- 16	+ 8	+ 9	715
22	C	M35C226(1)025(2)ZS(3)	4.2	140	1.0	2.0	- 20	+ 10.5	+ 12	800
56	C	M35C566(1)025(2)ZS(5)	4.3	90	2.0	6.0	- 25	+ 12	+ 15	850
68	C	M35C686(1)025(2)ZS(5)	4.3	90	2.0	9.0	- 40	+ 12	+ 15	850
30 V_{DC} AT + 85 °C; 20 V_{DC} AT + 125 °C										
8	C	M35C805(1)030(2)ZS(3)	6.6	275	1.0	2.0	- 16	+ 8	+ 12	640
15	C	M35C156(1)030(2)ZS(3)	6.2	175	1.0	2.0	- 20	+ 10.5	+ 12	780
47	C	M35C476(1)030(2)ZS(3)	5.2	100	2.0	6.0	- 23	+ 12	+ 15	800
56	C	M35C566(1)030(2)ZS(3)	5.2	100	2.0	9.0	- 38	+ 12	+ 15	800
35 V_{DC} AT + 85 °C; 22 V_{DC} AT + 125 °C										
15	C	M35C156(1)035(2)ZS(3)	6.2	175	0.75	1.5	- 20	+ 10.5	+ 12	660
39	C	M35C396(1)035(2)ZS(3)	4.1	61	2.0	6.0	- 22	+ 12	+ 14	820
50 V_{DC} AT + 85 °C; 30 V_{DC} AT + 125 °C										
5	C	M35C505(1)050(2)ZS(3)	8.0	400	1.0	2.0	- 16	+ 5	+ 6	580
10	C	M35C106(1)050(2)ZS(3)	6.4	250	1.0	2.0	- 24	+ 8	+ 9	715
33	C	M35C336(1)050(2)ZS(3)	5.0	135	2.0	9.0	- 29	+ 10	+ 12	700
60 V_{DC} AT + 85 °C; 40 V_{DC} AT + 125 °C										
4	C	M35C405(1)060(2)ZS(3)	9.3	550	1.0	2.0	- 16	+ 5	+ 6	525
8.2	C	M35C825(1)060(2)ZS(3)	6.6	275	1.0	2.0	- 24	+ 8	+ 9	625
27	C	M35C276(1)060(2)ZS(3)	5.0	144	3.0	12	- 24	+ 10	+ 12	700
75 V_{DC} AT + 85 °C; 50 V_{DC} AT + 125 °C										
3.5	C	M35C355(1)075(2)ZS(3)	9.5	650	1.0	2.0	- 16	+ 5	+ 6	525
6.8	C	M35C685(1)075(2)ZS(3)	6.8	300	1.0	2.0	- 20	+ 8	+ 9	610
22	C	M35C226(1)075(2)ZS(3)	5.1	157	3.0	12	- 19	+ 10	+ 12	600
100 V_{DC} AT + 85 °C; 65 V_{DC} AT + 125 °C										
2.5	C	M35C255(1)100(2)ZS(3)	10.6	950	1.0	2.0	- 16	+ 7	+ 8	505
4.7	C	M35C475(1)100(2)ZS(3)	8.5	500	1.0	2.0	- 16	+ 7	+ 8	565
10	C	M35C106(1)100(2)ZS(3)	5.9	200	3.0	12	- 17	+ 10	+ 12	800
125 V_{DC} AT + 85 °C; 85 V_{DC} AT + 125 °C										
1.7	C	M35C175(1)125(2)ZS(3)	15.6	1250	1.0	2.0	- 16	+ 7	+ 8	415
3.6	C	M35C365(1)125(2)ZS(3)	10.0	600	1.0	2.0	- 16	+ 7	+ 8	520
6.8	C	M35C685(1)125(2)ZS(3)	11.7	300	3.0	12	- 14	+ 10	+ 12	700

Note

- Part number definitions:
  (1) Capacitance tolerance: K, M
  (2) Termination/packaging: (see Ordering Information)
  Reliability level: Z = Non-ER
  Temperature: S = STD
  (3) ESR: S = STD, L = Low (1/2 standard ESR value)

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000
Downloaded from Arrow.com.

PERFORMANCE CHARACTERISTICS OF M35 CAPACITORS

ELECTRICAL CHARACTERISTICS

ITEM	PERFORMANCE CHARACTERISTICS
Operating temperature range	- 55 °C to + 125 °C
Capacitor tolerance	± 20 %, ± 10 % at 120 Hz
Capacitance change (maximum)	Limits per Standard Ratings table. Measured per requirements of MIL-PRF-39006.
ESR	
AC ripple current	
DCL (maximum leakage current)	
Impedance (maximum)	
Reverse voltage	Reverse voltage shall be in accordance with MIL-PRF-39006/22. Units are capable of withstanding 3 V in reverse at + 85 °C for 125 h.
Surge voltage	Surge voltage shall be in accordance with MIL-PRF-39006. The DC rated surge voltage is the maximum voltage to which the capacitors should be subjected under any conditions. This includes transients and peak ripple at the highest line voltage. The surge voltage is 115 % of rated DC working voltage.
Life test	The capacitors shall be capable of withstanding a 2000 h life test at 85 °C at rated voltage.

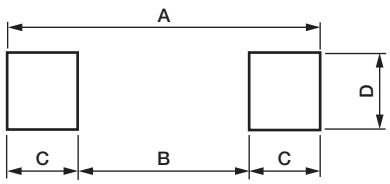
ENVIRONMENTAL CHARACTERISTICS

ITEM	CONDITION	COMMENTS
Hermeticity	MIL-PRF-39006	The internal component has been tested to be compliant to the hermeticity requirements of MIL-PRF-39006/22. The internal component has been tested to be compliant to the moisture resistance requirements of MIL-PRF-39006/22. The internal component has been tested to be compliant to the altitude or reduced barometric pressure requirements of MIL-PRF-39006/22 (150 000 feet).
Moisture resistance	MIL-PRF-39006	
Altitude/barometric pressure (reduced)	MIL-PRF-39006	

MECHANICAL CHARACTERISTICS

ITEM	CONDITION	COMMENTS
Thermal shock	MIL-STD-202, Method 107, A	Per MIL-PRF-39006, 30 cycles
Shock	MIL-STD-202, Method 213	Per MIL-PRF-39006, 500 g
Vibration (high frequency)	MIL-STD-202, Method 204	Per MIL-PRF-39006, 80 g
Vibration (random)	MIL-STD-202, Method 214	Per MIL-PRF-39006, 53.79 g
Resistance to solder heat	MIL-STD-202, Method 210	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	The terminations must be solderable per the requirements of MIL-PRF-55365 para. 4.10
Part markings	MIL-STD-1285	The part marking shall include Vishay name, trademark, capacitance, voltage, date code and lot symbol.
Weight (typical) in g	3.5	

PAD DIMENSIONS in millimeters



CASE CODE	A (MIN.)	B (NOM.)	C (NOM.)	D (NOM.)
C	22.7	14.7	4.0	6.4

STANDARD PACKAGING QUANTITY

SERIES	CASE CODE	BULK/TUBE
M35	C	10 pcs

For technical questions, contact: tantalum@vishay.com
THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE. THE PRODUCTS DESCRIBED HEREIN AND THIS DOCUMENT ARE SUBJECT TO SPECIFIC DISCLAIMERS, SET FORTH AT www.vishay.com/doc?91000
Downloaded from Arrow.com.

Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Vishay”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.

© 2022 VISHAY INTERTECHNOLOGY, INC. ALL RIGHTS RESERVED

Downloaded from Arrow.com.