

# 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


**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.)	TW	TH (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]

**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 ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. ESR AT + 25 °C	MAX. ESR AT - 55 °C	MAX. DCL ( $\mu$ A) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz RMS (mA)
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C	
<b>6 V<sub>DC</sub> AT + 85 °C; 4 V<sub>DC</sub> AT + 125 °C</b>										
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
<b>8 V<sub>DC</sub> AT + 85 °C; 5 V<sub>DC</sub> AT + 125 °C</b>										
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
<b>10 V<sub>DC</sub> AT + 85 °C; 7 V<sub>DC</sub> AT + 125 °C</b>										
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:
  - Capacitance tolerance: K, M
  - Termination/packaging: (see Ordering Information)
  - Reliability level: Z = Non-ER
  - Temperature: S = STD
  - ESR: S = STD, L = Low (1/2 standard ESR value)



STANDARD RATINGS											
CAPACITANCE ( $\mu$ F)	CASE CODE	PART NUMBER	MAX. ESR AT + 25 °C	MAX. ESR AT - 55 °C	MAX. DCL ( $\mu$ A) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz RMS (mA)	
					+ 25 °C	+ 85 °C + 125 °C	- 55 °C	+ 85 °C	+ 125 °C		
<b>15 V<sub>DC</sub> AT + 85 °C; 10 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>25 V<sub>DC</sub> AT + 85 °C; 15 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>30 V<sub>DC</sub> AT + 85 °C; 20 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>35 V<sub>DC</sub> AT + 85 °C; 22 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>50 V<sub>DC</sub> AT + 85 °C; 30 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>60 V<sub>DC</sub> AT + 85 °C; 40 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>75 V<sub>DC</sub> AT + 85 °C; 50 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>100 V<sub>DC</sub> AT + 85 °C; 65 V<sub>DC</sub> AT + 125 °C</b>											
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	
<b>125 V<sub>DC</sub> AT + 85 °C; 85 V<sub>DC</sub> AT + 125 °C</b>											
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:
  - Capacitance tolerance: K, M
  - Termination/packaging: (see Ordering Information)
  - Reliability level: Z = Non-ER
 Temperature: S = STD  
 (3) ESR: S = STD, L = Low (1/2 standard ESR value)

**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



## 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.

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.

## Material Category Policy

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.**

**Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.**

**Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.**



Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

**Телефон:** 8 (812) 309 58 32 (многоканальный)

**Факс:** 8 (812) 320-02-42

**Электронная почта:** [org@eplast1.ru](mailto:org@eplast1.ru)

**Адрес:** 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.