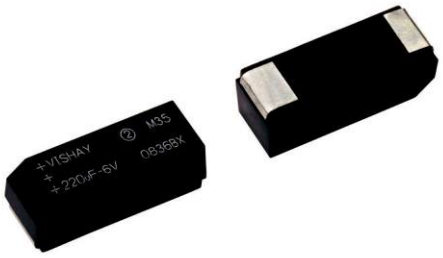
Wet Tantalum Capacitors Surface Mount, Molded Case



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

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:

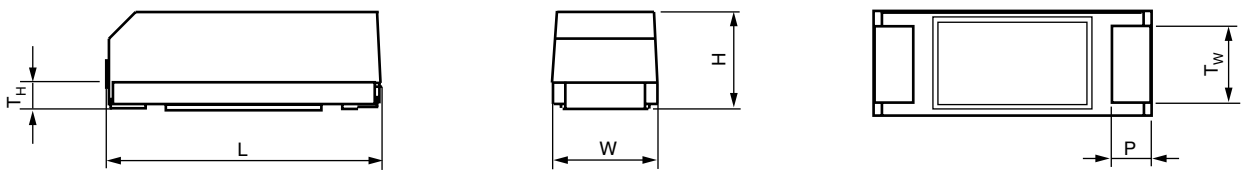
1. DCL, measured at + 85 °C rated voltage, shall not be in excess of the original requirement.
2. The equivalent series resistance shall not exceed 150 % of the initial requirement.
3. Change in capacitance shall not exceed 10 % from the initial measurement.

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 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), bulk B = Std, tin/lead, bulk	Z = Non-ER	S = Std.	**S = Std.** L = Low

Packaging: The use of formed plastic trays for packing bulk components is standard.

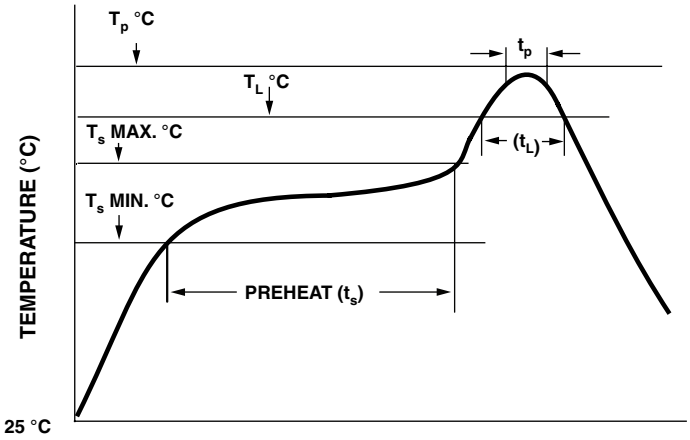
DIMENSIONS in millimeters



CASE CODE	L (MAX.)	W	H	P (MIN.)	T_W	T_H (MIN.)
M35	21.2	8 ± 0.3	7.5 ± 0.3	3.0	6.0 ± 0.3	1.9

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

RECOMMENDED REFLOW PROFILES



TYPE	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
M35	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

CAP (µF)	CASE CODE	PART NUMBER	MAX. ESR AT + 25 °C	MAX. IMP. AT - 55 °C	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz rms
					+ 25 °C	+ 85 °C	- 55 °C	+ 85 °C	+ 125 °C	
6 WVDC AT + 85 °C . . . 4 WVDC AT + 125 °C										
30	C	M35C306(1)006(2)ZS(5)	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820
68	C	M35C686(1)006(2)ZS(5)	3.2	60	1.0	2.0	- 40	+ 14	+ 16	960
220	C	M35C227(1)006(2)ZS(5)	3.0	36	2.0	9.0	- 64	+ 13	+ 16	1000
8 WVDC AT + 85 °C . . . 5 WVDC AT + 125 °C										
25	C	M35C256(1)008(2)ZS(5)	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820
56	C	M35C566(1)008(2)ZS(5)	3.3	59	1.0	2.0	- 40	+ 14	+ 16	900
180	C	M35C187(1)008(2)ZS(5)	3.0	45	2.0	9.0	- 60	+ 13	+ 16	1000
10 WVDC AT + 85 °C . . . 7 WVDC AT + 125 °C										
20	C	M35C206(1)010(2)ZS(5)	4.0	120	1.0	2.0	- 32	+ 10.5	+ 12	820
47	C	M35C476(1)010(2)ZS(5)	3.7	90	1.0	2.0	- 36	+ 14	+ 16	855
120	C	M35C127(1)010(2)ZS(5)	3.2	54	2.0	6.0	- 40	+ 14	+ 16	900
150	C	M35C157(1)010(2)ZS(5)	3.0	54	2.0	9.0	- 55	+ 13	+ 16	900
15 WVDC AT + 85 °C . . . 10 WVDC AT + 125 °C										
15	C	M35C156(1)015(2)ZS(5)	4.4	155	1.0	2.0	- 24	+ 10.5	+ 12	780
33	C	M35C336(1)015(2)ZS(5)	4.0	90	1.0	2.0	- 28	+ 14	+ 16	820
82	C	M35C826(1)015(2)ZS(5)	3.9	72	2.0	6.0	- 35	+ 12	+ 16	900
100	C	M35C107(1)015(2)ZS(5)	3.9	72	2.0	9.0	- 44	+ 13	+ 16	900
25 WVDC AT + 85 °C . . . 15 WVDC AT + 125 °C										
10	C	M35C106(1)025(2)ZS(5)	5.3	220	1.0	2.0	- 16	+ 8	+ 9	715
22	C	M35C226(1)025(2)ZS(5)	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

STANDARD RATINGS

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

Notes
1. Capacitance tolerance: K, M
2. Termination/packaging: (see Ordering Information)
3. Reliability level: Z = Non-ER
4. Temperature: S = STD
5. 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 the 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.

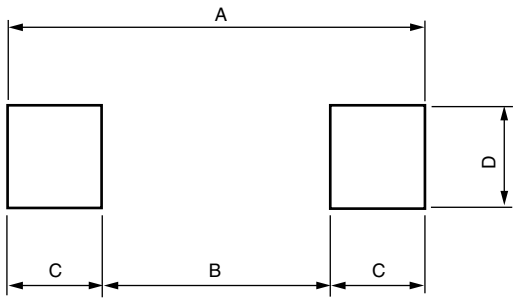
ENVIRONMENTAL CHARACTERISTICS

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 inches [mm]



CASE CODE M35	A (MIN.)	B (NOM.)	C (NOM.)	D (NOM.)
C	[22.7]	[14.7]	[4.0]	[6.4]

STANDARD PACKAGING QUANTITY

SERIES	CASE CODE		
M35	C		

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