

# Wet Tantalum Capacitors, Sintered Anode TANTALEX™, Tantalum Foil Replacement



Type 285D capacitors are commercial replacements for Military Style M39006/01, 02, 03, 04, 16, 17 and are designed to meet the performance requirements of Military Specification MIL-PRF-39006. Internal cells are M39006/22 and M39006/25.

## PERFORMANCE CHARACTERISTICS

**Operating Temperature:** -55 °C to +85 °C (to +125 °C with voltage derating)

**Capacitance Tolerance:** at 120 Hz, +25 °C:  $\pm 20\%$  standard,  $\pm 10\%$ ,  $\pm 5\%$  available as special

**DC Leakage Current (DCL Max.):**

at +25 °C, +85 °C, +125 °C: leakage current shall not exceed the values listed in the Standard Ratings Tables

## FEATURES

- High ripple current capability
- Extended temperature range
- Very low impedances over wide frequency ranges
- Long history of reliable operation
- Mounting: axial

**Life Test:** capacitors are capable of withstanding a 2000 h life test at a temperature of +85 °C or +125 °C at the applicable DC working voltage.

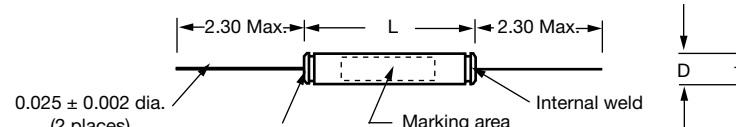
Following the life test:

1. DCL shall not exceed the initial requirement.
2. Dissipation factor shall meet the initial requirement.
3. Change in capacitance shall not exceed 10 % from the initial measurement. For capacitors with voltage ratings of 15 V<sub>DC</sub> and below, change in capacitance shall not exceed + 10 %, - 25 % from the initial measurement.

## ORDERING INFORMATION

285D MODEL	126 CAPACITANCE	X0 CAPACITANCE TOLERANCE	250 DC VOLTAGE RATING AT +85 °C	B CASE CODE	0 STYLE NUMBER	POLARITY
	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow.	X0 = $\pm 20\%$ X9 = $\pm 10\%$	This is expressed in volts. To complete the three-digit block, zeros precede the voltage rating.	See Ratings and Case Codes table	0 = no outer tube 2 = outer polyester-film insulation	P = polar N = non polar

## DIMENSIONS in inches [millimeters]

<p>Case material: Aluminum Case neutral</p> 				
CASE CODE	BARE CASE		WITH INSULATION SLEEVE	
	D $\pm 0.010$	L $\pm 0.062$	D (MAX.)	L
A	0.385 [9.78]	1.850 [46.99]	0.406 [10.31]	(Sleeve will extend over both ends of the case)
B	0.385 [9.78]	2.250 [57.15]	0.406 [10.31]	
C	0.385 [9.78]	2.700 [68.58]	0.406 [10.31]	
D	0.385 [9.78]	3.000 [76.20]	0.406 [10.31]	
E	0.478 [12.14]	1.950 [49.53]	0.500 [12.70]	
F	0.478 [12.14]	2.380 [60.43]	0.500 [12.70]	
G	0.478 [12.14]	3.060 [77.72]	0.500 [12.70]	
H	0.478 [12.14]	3.500 [88.90]	0.500 [12.70]	

**RATINGS AND CASE CODES, POLAR CAPACITORS**

$\mu\text{F}$	150 V	200 V	250 V	300 V
1.0				C
1.5		A		
1.8			A	
2.3		A		
3.4			B	
11		B		
13			B	D
14				H
21		F		
23			F	
41			G	
43		G		
55	B			

**RATINGS AND CASE CODES, NON-POLAR CAPACITORS**

$\mu\text{F}$	6 V	15 V	25 V	30 V	50 V	75 V	100 V	125 V	150 V	200 V	250 V
1.2										E	
1.7											E
1.8								A			
5.0							A				
7.0								B			
8.3									E		
11						A	B				
15							F				
23.5								F			
28								G			
34			A		A						
41						B					
55						G					
58				A							
60					B						
135			B								
235				B	F						
340					G						
410	B	F									

**STANDARD RATINGS POLAR CAPACITORS**

CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL (μA)			Z MAX. IMPEDANCE AT -55 °C 120 Hz (Ω)	CAPACITANCE CHANGE (%)			DF (%)	RIPPLE CURRENT <sup>(1)</sup> (mA)
			25 °C	85 °C	125 °C		-55 °C	85 °C	125 °C		
150 V <sub>DC</sub> AT 85 °C; 100 V <sub>DC</sub> AT +125 °C											
55	B	285D556(1)150B(2)P	2	10	10	48	-35	6	10	10	1650
200 V <sub>DC</sub> AT 85 °C; 135 V <sub>DC</sub> AT +125 °C											
1.5	A	285D155(1)200A(2)P	1	2	2	1420	-16	7	8	3	400
2.3	A	285D235(1)200A(2)P	1	2	2	995	-16	7	8	3	565
11	B	285D116(1)200B(2)P	1	9	9	200	-16	8	8	8	970
21	F	285D216(1)200F(2)P	2	17	17	140	-20	8	8	8.5	1335
43	G	285D436(1)200G(2)P	9	36	36	60	-25	15	15	10	1800
250 V <sub>DC</sub> AT 85 °C; 165 V <sub>DC</sub> AT +125 °C											
1.8	A	285D185(1)250A(2)P	1	2	2	1200	-16	7	8	3	520
3.4	B	285D345(1)250B(2)P	3	12	12	600	-14	10	12	6	700
13	B	285D136(1)250B(2)P	5	24	24	180	-18	12	15	7.2	1200
23	F	285D236(1)250F(2)P	10	40	40	100	-26	14	16	8	1500
41	G	285D416(1)250G(2)P	12	48	48	64	-30	15	17	17.4	1900
300 V <sub>DC</sub> AT 85 °C; 200 V <sub>DC</sub> AT +125 °C											
1.0	C	285D105(1)300C(2)P	1	2	2	2130	-16	7	8	2.8	400
13	D	285D136(1)300D(2)P	5	24	24	240	-20	12	15	10	1300
14	H	285D146(1)300H(2)P	2	17	17	210	-20	8	8	8.5	1335

**Notes**

- Part number definitions:

(1) Capacitance tolerance:

X0 = 20 %,

X9 = 10 %

(2) Style number or case insulation:

0 = no insulation,

2 = polyester film insulation

- <sup>(1)</sup> Ripple current is at 40 kHz and is govern by the ripple current multipliers associated with MIL-PRF-39006/22 and MIL-PRF-39006/25. All capacitance, DF and Z measurements are based on 120 Hz frequency and equivalent series circuit measuring equipment settings. Other ratings are available. Contact factory with inquiry.

**STANDARD RATINGS NON-POLAR CAPACITORS**

CAPACITANCE (μF)	CASE CODE	PART NUMBER	MAX. DCL (μA)			Z MAX. IMPEDANCE AT -55 °C 120 Hz (Ω)	CAPACITANCE CHANGE (%)			DF (%)	RIPPLE CURRENT (1) (mA)
			25 °C	85 °C	125 °C		-55 °C	85 °C	125 °C		
6 V <sub>DC</sub> AT 85 °C; 4 V <sub>DC</sub> AT +125 °C											
410	B	285D417(1)006B(2)N	3	14	14	36	-88	16	20	155	1500
15 V <sub>DC</sub> AT 85 °C; 10 V <sub>DC</sub> AT +125 °C											
410	F	285D417(1)015F(2)N	6	24	24	44	-77	20	25	3.6	1800
25 V <sub>DC</sub> AT 85 °C; 15 V <sub>DC</sub> AT +125 °C											
34	A	285D346(1)025A(2)N	2	9	9	180	-40	12	15	22	850
135	B	285D147(1)025B(2)N	3	16	16	66	-62	13	16	55	1400
30 V <sub>DC</sub> AT 85 °C; 20 V <sub>DC</sub> AT +125 °C											
58	A	285D586(1)030A(2)N	1	5	5	60	-38	8	12	12	1200
235	B	285D247(1)030B(2)N	2	10	10	30	-65	10	18	30	1800
50 V <sub>DC</sub> AT 85 °C; 30 V <sub>DC</sub> AT +125 °C											
34	A	285D346(1)050A(2)N	1	5	5	66	-25	8	15	7.6	1050
60	B	285D606(1)050B(2)N	4	24	24	98	-42	12	15	23	1200
235	F	285D247(1)050F(2)N	3	25	25	20	-45	8	15	31	2100
340	G	285D347(1)050G(2)N	5	40	40	16	-58	10	20	35	2750
75 V <sub>DC</sub> AT 85 °C; 50 V <sub>DC</sub> AT +125 °C											
11	A	285D116(1)075A(2)N	3	12	12	314	-19	10	12	8.5	600
41	B	285D416(1)075B(2)N	4	24	24	126	-30	12	15	15.2	1000
55	G	285D556(1)075G(2)N	9	36	36	58	-35	20	20	12	1850
100 V <sub>DC</sub> AT 85 °C; 65 V <sub>DC</sub> AT +125 °C											
5	A	285D505(1)100A(2)N	3	12	12	400	-35	16	20	4.5	800
11	B	285D116(1)100B(2)N	1	9	9	200	-16	8	8	7.5	965
15	F	285D156(1)100F(2)N	2	12	12	160	-16	8	8	7	1240
125 V <sub>DC</sub> AT 85 °C; 87 V <sub>DC</sub> AT +125 °C											
1.8	A	285D185(1)125A(2)N	1	2	2	1200	-16	7	8	2.7	520
7.0	B	285D705(1)125B(2)N	1	7	7	334	-16	7	8	6	860
23.5	F	285D246(1)125F(2)N	10	40	40	100	-26	14	16	7.9	1200
28	G	285D286(1)125G(2)N	10	40	40	64	-25	15	15	6.5	1800
150 V <sub>DC</sub> AT 85 °C; 100 V <sub>DC</sub> AT +125 °C											
8.3	E	285D835(1)150E(2)N	1	5	5	264	-25	5	9	10	1050
200 V <sub>DC</sub> AT 85 °C; 150 V <sub>DC</sub> AT +125 °C											
1.2	E	285D125(1)200E(2)N	1	2	2	2260	-16	7	8	3	600
250 V <sub>DC</sub> AT 85 °C; 165 V <sub>DC</sub> AT +125 °C											
1.7	E	285D175(1)250E(2)N	3	12	12	1200	-14	10	12	6	700

**Notes**

- Part number definitions:
  - (1) Capacitance tolerance:  
X0 = 20 %,  
X9 = 10 %
  - (2) Style number or case insulation:  
0 = no insulation,  
2 = polyester film insulation
- (1) Ripple current is at 40 kHz and is govern by the ripple current multipliers associated with MIL-PRF-39006/22 and MIL-PRF-39006/25. All capacitance, DF and Z measurements are based on 120 Hz frequency and equivalent series circuit measuring equipment settings. Other ratings are available. Contact factory with inquiry.



## 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.

Vishay products are not designed for use in life-saving or life-sustaining applications or any application in which the failure of the Vishay product could result in personal injury or death unless specifically qualified in writing by Vishay. 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.