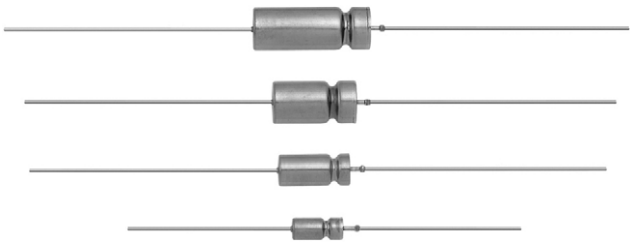
Wet Tantalum Capacitors Tantalum-Case With Glass-to-Tantalum Hermetic Seal for -55 °C to +125 °C Operation, Low ESR



FEATURES

- Models:
  - 136D - axial through-hole terminations
  - 136J - SMD, outward L-leaded terminations
  - 136L - SMD, inward L-leaded terminations
- Military specification MIL-PRF-39006/30 and 39006/31. model 136D capacitors are commercial equivalents of military style CLR90 and CLR91
- Capacitors to meet the MIL-specs must be ordered by M39006 part numbers shown in the relative specification
- Terminations: standard tin / lead (SnPb), 100 % tin (RoHS-compliant) available
- Standard and extended ratings
- Low ESR
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912

Pb-free Available

RoHS* Available

HALOGEN FREE GREEN (5-2008) Available

Note

* This datasheet provides information about parts that are RoHS-compliant and / or parts that are non RoHS-compliant. For example, parts with lead (Pb) terminations are not RoHS-compliant. Please see the information / tables in this datasheet for details

LINKS TO ADDITIONAL RESOURCES

3D Models

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

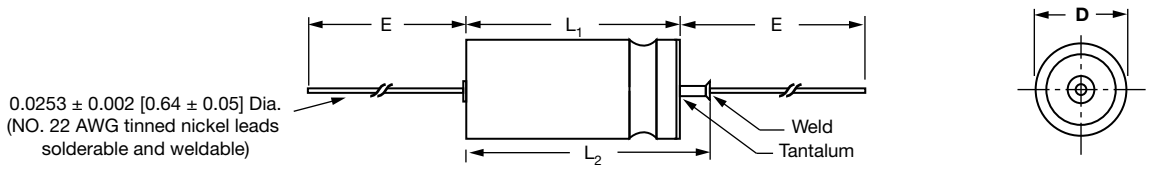
136D	306	X0	006	C	2	E3
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT +85 °C	CASE CODE	STYLE NUMBER	RoHS-COMPLIANT
136D = axial through-hole leaded terminations 136J = SMD, outward L-leaded terminations 136L = SMD, inward L-leaded terminations	This is expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros to follow	X0 = ± 20 % X9 = ± 10 % X5 = ± 5 %	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)	See Ratings and Case Codes table	Std. temperature (max. +125 °C) 0 = no insulating sleeve 2 = polyester insulation sleeve 3 = high temperature film insulation	E3 = 100 % tin termination (RoHS-compliant design) Blank = SnPb termination (standard design)

Note

- Packaging: the use of formed plastic trays for packaging these axial lead components is standard. Tape and reel is not available due to the unit weight

For technical questions, contact: tantalum@vishay.com

DIMENSIONS in inches [millimeters]



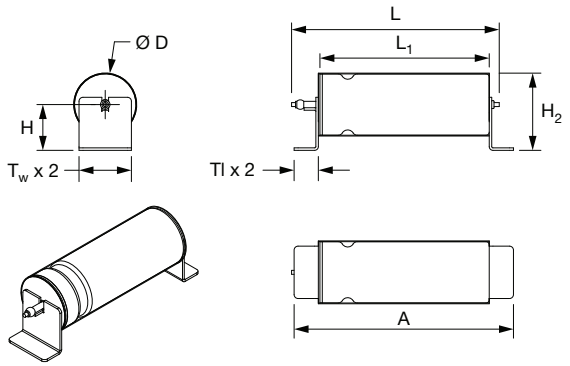
TYPE 136D CASE CODE	CLR 90 / 91 EQUIV.	D	L_1	L_2 (Max.)	E	WEIGHT (g) (Max.)
C	T1	0.188 ± 0.016 [4.78 ± 0.41]	0.453 + 0.031 / - 0.016 [11.51 + 0.79 / - 0.41]	0.734 [18.64]	1.500 ± 0.250 [38.10 ± 6.35]	2.6
F	T2	0.281 ± 0.016 [7.14 ± 0.41]	0.641 + 0.031 / - 0.016 [16.28 + 0.79 / - 0.41]	0.922 [23.42]	2.250 ± 0.250 [57.15 ± 6.35]	6.2
T	T3	0.375 ± 0.016 [9.53 ± 0.41]	0.766 + 0.031 / - 0.016 [19.46 + 0.79 / - 0.41]	1.047 [26.59]	2.250 ± 0.250 [57.15 ± 6.35]	11.6
K	T4	0.375 ± 0.016 [9.53 ± 0.41]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	1.343 [34.11]	2.250 ± 0.250 [57.15 ± 6.35]	17.7

Note

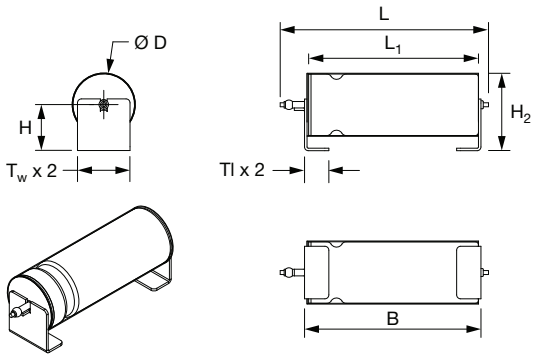
- For insulated parts, add 0.015" [0.38] to the diameter. The insulation shall lap over the ends of the capacitor body

SMD PRODUCT DIMENSIONS in inches [millimeters]

136J Outward L-Leaded Terminations



136L Inward L-Leaded Terminations



TYPE 136J / 136L CASE CODE	A (max.)	B (max.)	Tl (max.)	H (max.)	T_w ± 0.008	H_2 (max.)	L (max.)	L_1	D (max.)
C	0.773 [19.6]	0.513 [13.0]	0.157 [4.0]	0.177 [4.5]	0.158 [4.0]	0.296 [7.5]	0.705 [17.9]	0.469 + 0.031 / - 0.016 [11.91 + 0.79 / - 0.41]	0.228 [5.8]
F	1.001 [25.4]	0.720 [18.3]	0.157 [4.0]	0.212 [5.4]	0.217 [5.5]	0.374 [9.5]	0.903 [22.9]	0.668 + 0.012 / - 0.12 [16.97 + 0.30 / - 0.30]	0.316 [8.0]
T	1.143 [29.0]	0.858 [21.8]	0.157 [4.0]	0.280 [7.1]	0.331 [8.4]	0.492 [12.5]	1.051 [26.7]	0.806 + 0.012 / - 0.12 [20.47 + 0.30 / - 0.30]	0.397 [10.1]
K	1.432 [36.4]	1.140 [29.0]	0.157 [4.0]	0.295 [7.5]	0.331 [8.4]	0.492 [12.5]	1.343 [34.1]	1.062 + 0.031 / - 0.016 [26.97 + 0.79 / - 0.41]	0.397 [10.1]

Note

- Use appropriate adhesive between capacitor body and the board for improved mechanical strength

RATINGS AND CASE CODES (Standard)												
µF	6 V	8 V	10 V	15 V	25 V	30 V	35 V	50 V	60 V	75 V	100 V	125 V
1.7												C
2.5											C	
3.5										C		
3.6												C
4.0									C			
4.7											C	
5.0								C				
6.8										C		
8.0						C						
8.2									C			
9.0												F
10					C			C				
11											F	
14												F
15				C		C	C			F		
18												T
20			C						F			
22					C						F	
25		C						F			T	T
30	C										T	
33				C						F		
39									F			
40						F				T		
43											T	
47			C					F				
50					F				T			
56		C								T	K	K
60								T				
68	C					F	F		T			
70				F								
82								T				
86											K	
100			F		F	T						
110										K		
120		F		F	T							
140	F								K			
150						T						
160								K				
170				T								
180			F		T							
220		F										
250			T									
270	F			T			K					
290		T										
300						K						
330	T											
350					K							
390			T									
430		T										
540				K								
560	T											
750			K									
850		K										
1200	K											

RATINGS AND CASE CODES (Extended)														
µF	6 V	8 V	10 V	15 V	25 V	30 V	35 V	40 V	50 V	60 V	63 V	75 V	100 V	125 V
6.8														C
10													C	
12												C		
18										C				
22												C		
27										C				F
33									C					
39							C	C					F	
47					C	C								T
56					C	C							T	T
68					C							F	T	K
82				C						F		F		K
100				C					F	F	F			
120			C				F		F				K	
150			C			F								
180		C			F							T		
220	C					F				T		K		
270				F	F				T	K				
300												K		
330							T		K	K				
370							K							
390			F	F		T								
470					T	T								
560	F		F		T	K								
680		F		T	K									
820	F			T										
1000				K										
1200	T		T											
1500	T	T	K											
1800		K												
2200	K													

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz I_{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	136(1)306(2)0006C(3)(4)	1.99	100	1	2	-40	+10.5	+12	820
68	C	136(1)686(2)0006C(3)(4)	1.58	60	1	2	-40	+14	+16	960
140	F	136(1)147(2)0006F(3)(4)	0.99	40	1	3	-40	+14	+16	1200
270	F	136(1)277(2)0006F(3)(4)	1.11	25	1	6.5	-44	+17.5	+20	1375
330	T	136(1)337(2)0006T(3)(4)	0.73	20	2	7.9	-44	+14	+16	1800
560	T	136(1)567(2)0006T(3)(4)	0.65	25	2	13	-64	+17.5	+20	1900
1200	K	136(1)128(2)0006K(3)(4)	0.50	20	3	14	-80	+25	+25	2265
8 V_{DC} AT +85 °C; 5 V_{DC} AT +125 °C										
25	C	136(1)256(2)0008C(3)(4)	1.99	100	1	2	-40	+10.5	+12	820
56	C	136(1)566(2)0008C(3)(4)	1.66	59	1	2	-40	+14	+16	900
120	F	136(1)127(2)0008F(3)(4)	1.11	50	1	2	-44	+17.5	+20	1230
220	F	136(1)227(2)0008F(3)(4)	1.12	30	1	7	-44	+17.5	+20	1370
290	T	136(1)297(2)0008T(3)(4)	0.78	25	2	6	-64	+17.5	+20	1770
430	T	136(1)437(2)0008T(3)(4)	0.71	25	2	14	-64	+17.5	+20	1825
850	K	136(1)857(2)0008K(3)(4)	0.47	22	4	16	-80	+25	+25	2330
10 V_{DC} AT +85 °C; 7 V_{DC} AT +125 °C										
20	C	136(1)206(2)0010C(3)(4)	1.99	175	1	2	-32	+10.5	+12	820
47	C	136(1)476(2)0010C(3)(4)	1.84	100	1	2	-36	+14	+16	855
100	F	136(1)107(2)0010F(3)(4)	0.99	60	1	4	-36	+14	+16	1200
180	F	136(1)187(2)0010F(3)(4)	1.11	40	1	7	-36	+14	+16	1365
250	T	136(1)257(2)0010T(3)(4)	0.80	30	2	10	-40	+14	+16	1720
390	T	136(1)397(2)0010T(3)(4)	0.75	25	2	16	-64	+17.5	+20	1800
750	K	136(1)757(2)0010K(3)(4)	0.44	23	4	16	-80	+25	+25	2360
15 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C										
15	C	136(1)156(2)0015C(3)(4)	1.99	155	1	2	-24	+10.5	+12	780
33	C	136(1)336(2)0015C(3)(4)	1.66	90	1	2	-28	+14	+16	820
70	F	136(1)706(2)0015F(3)(4)	1.11	75	1	4	-28	+14	+16	1150
120	F	136(1)127(2)0015F(3)(4)	1.12	50	1	7	-28	+17.5	+20	1450
170	T	136(1)177(2)0015T(3)(4)	0.78	35	2	10	-32	+14	+16	1480
270	T	136(1)277(2)0015T(3)(4)	0.71	30	2	16	-56	+17.5	+20	1740
540	K	136(1)547(2)0015K(3)(4)	0.47	23	6	24	-80	+25	+25	2330
25 V_{DC} AT +85 °C; 15 V_{DC} AT +125 °C										
10	C	136(1)106(2)0025C(3)(4)	2.66	220	1	2	-16	+8	+9	715
22	C	136(1)226(2)0025C(3)(4)	1.99	140	1	2	-20	+10.5	+12	800
50	F	136(1)506(2)0025F(3)(4)	1.46	70	1	2	-28	+13	+15	1130
100	F	136(1)107(2)0025F(3)(4)	0.99	50	1	10	-28	+13	+15	1435
120	T	136(1)127(2)0025T(3)(4)	1.16	38	2	6	-32	+13	+15	1450
180	T	136(1)187(2)0025T(3)(4)	0.96	32	2	18	-48	+13	+15	1525
350	K	136(1)357(2)0025K(3)(4)	0.67	24	7	28	-70	+25	+25	1970

Notes

- Part number definitions:
  (1) Model type:
  136D - axial through-hole terminations
  136J - SMD, outward L-leaded terminations
  136L - SMD, inward L-leaded terminations
  (2) Capacitance tolerance: X0 = 20 %, X9 = 10 %, X5 = 5 %
  (3) Style number:
  Standard temperature: 0 = no insulating sleeve, 2 = polyester insulation sleeve, 3 = high temperature film insulation;
  High temperature: 6 = high temperature film insulation, 8 = no insulating sleeve
  (4) Termination: blank = standard tin / lead, E3 = RoHS-compliant 100 % tin

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz I_{RMS} (mA)
					+25 °C	+85 °C +125 °C	-55 °C	+85 °C	+125 °C	
30 V_{DC} AT +85 °C; 20 V_{DC} AT +125 °C										
8	C	136(1)805(2)0030C(3)(4)	3.32	275	1	2	-16	+8	+12	640
15	C	136(1)156(2)0030C(3)(4)	2.21	175	1	2	-20	+10.5	+12	780
40	F	136(1)406(2)0030F(3)(4)	1.66	65	1	5	-24	+10.5	+12	1120
68	F	136(1)686(2)0030F(3)(4)	1.27	60	1	8	-24	+13	+15	1285
100	T	136(1)107(2)0030T(3)(4)	1.13	40	2	12	-28	+10.5	+12	1450
150	T	136(1)157(2)0030T(3)(4)	1.02	35	2	18	-48	+13	+15	1525
300	K	136(1)307(2)0030K(3)(4)	0.69	25	8	32	-60	+25	+25	1950
35 V_{DC} AT +85 °C; 22 V_{DC} AT +125 °C										
15	C	136(1)156(2)0035C(3)(4)	3.10	175	0.75	1.5	-20	+10.5	+12	660
68	F	136(1)686(2)0035F(3)(4)	1.45	60	1	2	-24	+13	+15	1195
270	K	136(1)277(2)0035K(3)(4)	0.70	26	3	12	-58	+25	+25	1950
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C										
5	C	136(1)505(2)0050C(3)(4)	3.98	400	1	2	-16	+5	+6	580
10	C	136(1)106(2)0050C(3)(4)	2.66	250	1	2	-24	+8	+9	715
25	F	136(1)256(2)0050F(3)(4)	2.13	95	1	5	-20	+10.5	+12	1005
47	F	136(1)476(2)0050F(3)(4)	1.56	70	1	9	-28	+13	+15	1155
60	T	136(1)606(2)0050T(3)(4)	1.33	45	2	12	-16	+10.5	+12	1335
82	T	136(1)826(2)0050T(3)(4)	1.22	45	2	16	-32	+13	+15	1400
160	K	136(1)167(2)0050K(3)(4)	0.71	27	8	32	-50	+25	+25	1900
60 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C										
4	C	136(1)405(2)0060C(3)(4)	4.65	550	1	2	-16	+5	+6	525
8.2	C	136(1)825(2)0060C(3)(4)	3.24	275	1	2	-24	+8	+9	625
20	F	136(1)206(2)0060F(3)(4)	2.32	105	1	5	-16	+8	+12	930
39	F	136(1)396(2)0060F(3)(4)	1.70	90	1	9	-28	+10.5	+12	1110
50	T	136(1)506(2)0060T(3)(4)	1.33	50	2	12	-16	+10.5	+12	1330
68	T	136(1)686(2)0060T(3)(4)	1.27	50	2	16	-32	+10.5	+15	1365
140	K	136(1)147(2)0060K(3)(4)	0.76	28	8	32	-40	+20	+20	1850
75 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C										
3.5	C	136(1)355(2)0075C(3)(4)	4.74	650	1	2	-16	+5	+6	525
6.8	C	136(1)685(2)0075C(3)(4)	3.42	300	1	2	-20	+8	+9	610
15	F	136(1)156(2)0075F(3)(4)	2.66	150	1	5	-16	+10.5	+9	890
33	F	136(1)336(2)0075F(3)(4)	2.01	90	1	10	-24	+10.5	+15	1000
40	T	136(1)406(2)0075T(3)(4)	1.50	60	2	12	-16	+10.5	+12	1250
56	T	136(1)566(2)0075T(3)(4)	1.31	60	2	17	-28	+10.5	+15	1335
110	K	136(1)117(2)0075K(3)(4)	0.73	29	9	36	-35	+20	+20	1850

Notes

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  - (2) Capacitance tolerance: X0 = 20 %, X9 = 10 %, X5 = 5 %
  - (3) Style number:
    - Standard temperature: 0 = no insulating sleeve, 2 = polyester insulation sleeve, 3 = high temperature film insulation;
    - High temperature: 6 = high temperature film insulation, 8 = no insulating sleeve
  - (4) Termination: blank = standard tin / lead, E3 = RoHS-compliant 100 % tin

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz
					+25 °C	+85 °C +125 °C	-55 °C	+85 °C	+125 °C	I_{RMS} (mA)
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C										
2.5	C	136(1)255(2)0100C(3)(4)	5.31	950	1	4	-16	+8	+8	505
4.7	C	136(1)475(2)0100C(3)(4)	4.24	500	1	2	-16	+7	+8	565
11	F	136(1)116(2)0100F(3)(4)	3.02	200	1	4	-16	+7	+8	835
22	F	136(1)226(2)0100F(3)(4)	2.26	100	1	9	-16	+7	+8	965
25	T	136(1)256(2)0100T(3)(4)	1.60	93	2	13	-16	+7	+8	1200
30	T	136(1)306(2)0100T(3)(4)	1.55	80	2	12	-16	+8	+8	1240
43	T	136(1)436(2)0100T(3)(4)	1.31	70	2	17	-20	+8	+8	1335
56	K	136(1)566(2)0100K(3)(4)	0.80	32	10	40	-25	+15	+15	1800
86	K	136(1)866(2)0100K(3)(4)	0.77	30	9	36	-25	+15	+15	1800
125 V_{DC} AT +85 °C; 85 V_{DC} AT +125 °C										
1.7	C	136(1)175(2)0125C(3)(4)	7.81	1250	1	2	-16	+7	+8	415
3.6	C	136(1)365(2)0125C(3)(4)	4.98	600	1	2	-16	+7	+8	520
9	F	136(1)905(2)0125F(3)(4)	3.69	240	1	5	-16	+7	+8	755
14	F	136(1)146(2)0125F(3)(4)	2.85	167	1	7	-16	+7	+8	860
18	T	136(1)186(2)0125T(3)(4)	1.85	129	2	9	-16	+7	+8	1130
25	T	136(1)256(2)0125T(3)(4)	1.59	93	2	13	-16	+7	+8	1200
56	K	136(1)566(2)0125K(3)(4)	0.77	32	10	40	-25	+15	+15	1800

Notes

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  - (1) Model type:
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  - (2) Capacitance tolerance: X0 = 20 %, X9 = 10 %, X5 = 5 %
  - (3) Style number:
    - Standard temperature: 0 = no insulating sleeve, 2 = polyester insulation sleeve, 3 = high temperature film insulation;
    - High temperature: 6 = high temperature film insulation, 8 = no insulating sleeve
  - (4) Termination: blank = standard tin / lead, E3 = RoHS-compliant 100 % tin

EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz I_{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										
220	C	136(1)227(2)0006C(3)(4)	1.50	36	2	9	-64	+13	+16	1000
560	F	136(1)567(2)0006F(3)(4)	1.25	21	3	9	-77	+16	+20	1500
820	F	136(1)827(2)0006F(3)(4)	1.25	18	3	14	-88	+16	+20	1500
1200	T	136(1)128(2)0006T(3)(4)	0.75	18	5	18	-88	+20	+25	1900
1500	T	136(1)158(2)0006T(3)(4)	0.75	18	5	20	-90	+20	+25	1900
2200	K	136(1)228(2)0006K(3)(4)	0.50	13	6	24	-90	+25	+30	2300
8 V_{DC} AT +85 °C; 5 V_{DC} AT +125 °C										
180	C	136(1)187(2)0008C(3)(4)	1.50	45	2	9	-60	+13	+16	1000
680	F	136(1)687(2)0008F(3)(4)	1.25	22	3	14	-83	+16	+20	1500
1500	T	136(1)158(2)0008T(3)(4)	0.75	18	5	20	-90	+20	+25	1900
1800	K	136(1)188(2)0008K(3)(4)	0.50	14	7	25	-90	+25	+30	2300
10 V_{DC} AT +85 °C; 7 V_{DC} AT +125 °C										
120	C	136(1)127(2)0010C(3)(4)	1.60	54	2	6	-40	+14	+16	900
150	C	136(1)157(2)0010C(3)(4)	1.50	54	2	9	-55	+13	+16	900
390	F	136(1)397(2)0010F(3)(4)	1.25	27	3	9	-66	+16	+20	1450
560	F	136(1)567(2)0010F(3)(4)	1.25	27	3	16	-77	+16	+20	1450
1200	T	136(1)128(2)0010T(3)(4)	0.75	18	5	20	-88	+20	+25	1850
1500	K	136(1)158(2)0010K(3)(4)	0.50	15	7	25	-88	+25	+30	2300
15 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C										
82	C	136(1)826(2)0015C(3)(4)	0.95	72	2	6	-35	+12	+16	900
100	C	136(1)107(2)0015C(3)(4)	0.95	72	2	9	-44	+13	+16	900
270	F	136(1)277(2)0015F(3)(4)	1.25	31	3	9	-62	+16	+15	1450
390	F	136(1)397(2)0015F(3)(4)	1.25	31	3	16	-66	+16	+20	1450
680	T	136(1)687(2)0015T(3)(4)	0.90	22	6	18	-74	+20	+25	1800
820	T	136(1)827(2)0015T(3)(4)	0.90	22	6	24	-77	+20	+25	1800
1000	K	136(1)108(2)0015K(3)(4)	0.60	17	8	32	-77	+25	+30	2330
25 V_{DC} AT +85 °C; 15 V_{DC} AT +125 °C										
47	C	136(1)476(2)0025C(3)(4)	2.60	100	2	6	-23	+12	+15	800
56	C	136(1)566(2)0025C(3)(4)	2.15	90	2	6	-25	+12	+15	850
68	C	136(1)686(2)0025C(3)(4)	2.15	90	2	9	-40	+12	+15	850
180	F	136(1)187(2)0025F(3)(4)	1.35	33	3	9	-54	+13	+15	1400
270	F	136(1)277(2)0025F(3)(4)	1.35	33	3	16	-62	+13	+16	1400
470	T	136(1)477(2)0025T(3)(4)	0.90	24	6	18	-65	+18	+25	1750
560	T	136(1)567(2)0025T(3)(4)	0.90	24	7	28	-72	+20	+25	1750
680	K	136(1)687(2)0025K(3)(4)	0.60	19	8	32	-72	+25	+30	2100

Notes

- Part number definitions:
  - (1) Model type:
    - 136D - axial through-hole terminations
    - 136J - SMD, outward L-leaded terminations
    - 136L - SMD, inward L-leaded terminations
  - (2) Capacitance tolerance: X0 = 20 %, X9 = 10 %, X5 = 5 %
  - (3) Style number:
    - Standard temperature: 0 = no insulating sleeve, 2 = polyester insulation sleeve, 3 = high temperature film insulation;
    - High temperature: 6 = high temperature film insulation, 8 = no insulating sleeve
  - (4) Termination: blank = standard tin / lead, E3 = RoHS-compliant 100 % tin

EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER (1)	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz I_{RMS} (mA)
					+25 °C	+85 °C +125 °C	-55 °C	+85 °C	+125 °C	
30 V_{DC} AT +85 °C; 20 V_{DC} AT +125 °C										
47	C	136(1)476(2)0030C(3)(4)	2.60	100	2	6	-23	+12	+15	800
56	C	136(1)566(2)0030C(3)(4)	2.60	100	2	9	-38	+12	+15	800
150	F	136(1)157(2)0030F(3)(4)	1.25	36	3	9	-42	+13	+15	1200
220	F	136(1)227(2)0030F(3)(4)	1.25	36	3	16	-60	+13	+16	1200
390	T	136(1)397(2)0030T(3)(4)	0.90	25	6	18	-55	+18	+25	1500
470	T	136(1)477(2)0030T(3)(4)	0.90	25	8	32	-65	+20	+25	1500
560	K	136(1)567(2)0030K(3)(4)	0.65	20	9	36	-65	+25	+30	2000
35 V_{DC} AT +85 °C; 22 V_{DC} AT +125 °C										
39	C	136(1)396(2)0035C(3)(4)	2.05	61	2	6	-22	+12	+14	820
120	F	136(1)127(2)0035F(3)(4)	1.25	31	3	10	-40	+13	+15	1315
330	T	136(1)337(2)0035T(3)(4)	0.90	20	6	18	-50	+16	+25	1640
370	K	136(1)377(2)0035K(3)(4)	0.65	15	9	36	-60	+25	+30	2040
40 V_{DC} AT +85 °C; 25 V_{DC} AT +125 °C										
39	C	136(1)396(2)0040C(3)(4)	2.05	61	2	6	-22	+12	+14	820
50 V_{DC} AT +85 °C; 30 V_{DC} AT +125 °C										
33	C	136(1)336(2)0050C(3)(4)	2.50	135	2	9	-29	+10	+12	700
100	F	136(1)107(2)0050F(3)(4)	1.40	49	4	12	-36	+13	+15	1200
120	F	136(1)127(2)0050F(3)(4)	1.25	49	4	24	-42	+12	+15	1200
270	T	136(1)277(2)0050T(3)(4)	1.00	30	8	32	-46	+20	+25	1450
330	K	136(1)337(2)0050K(3)(4)	0.75	30	9	36	-46	+25	+30	1900
60 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C										
18	C	136(1)186(2)0060C(3)(4)	3.50	160	2	12	-20	+7	+8	700
27	C	136(1)276(2)0060C(3)(4)	2.51	144	3	12	-24	+10	+12	700
82	F	136(1)826(2)0060F(3)(4)	1.45	54	4	16	-30	+15	+15	1100
100	F	136(1)107(2)0060F(3)(4)	1.25	54	4	20	-36	+12	+15	1100
220	T	136(1)227(2)0060T(3)(4)	0.90	29	8	32	-40	+16	+20	1400
270	K	136(1)277(2)0060K(3)(4)	0.70	23	9	36	-45	+20	+25	1850
330	K	136(1)337(2)0060K(3)(4)	0.65	31	10	40	-72	+25	+25	1850
63 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C										
100	F	136(1)107(2)0063F(3)(4)	1.25	54	2	12	-36	+12	+15	1100
75 V_{DC} AT +85 °C; 50 V_{DC} AT +125 °C										
12	C	136(1)126(2)0075C(3)(4)	2.55	157	3	12	-19	+10	+12	600
22	C	136(1)226(2)0075C(3)(4)	2.57	157	3	12	-19	+10	+12	600
68	F	136(1)686(2)0075F(3)(4)	1.50	63	4	16	-25	+12	+15	1000
82	F	136(1)826(2)0075F(3)(4)	1.23	63	4	24	-30	+12	+15	1000
180	T	136(1)187(2)0075T(3)(4)	0.90	30	9	36	-35	+16	+20	1300
220	K	136(1)227(2)0075K(3)(4)	1.12	24	10	40	-40	+20	+25	1800
300	K	136(1)307(2)0075K(3)(4)	0.90	32	12	48	-60	+22	+22	2000

Notes

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  (3) Style number:
  Standard temperature: 0 = no insulating sleeve, 2 = polyester insulation sleeve, 3 = high temperature film insulation;
  High temperature: 6 = high temperature film insulation, 8 = no insulating sleeve
  (4) Termination: blank = standard tin / lead, E3 = RoHS-compliant 100 % tin

EXTENDED RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER [1]	MAX. ESR AT +25 °C 120 Hz (Ω)	MAX. IMP. AT -55 °C 120 Hz (Ω)	MAX. DCL (µA) AT		MAX. CAPACITANCE CHANGE (%) AT			MAX. RIPPLE 40 kHz I_{RMS} (mA)
					+25 °C	+85 °C +125 °C	-55 °C	+85 °C	+125 °C	
100 V_{DC} AT +85 °C; 65 V_{DC} AT +125 °C										
10	C	136(1)106(2)0100C(3)(4)	2.99	200	3	12	-17	+10	+12	800
39	F	136(1)396(2)0100F(3)(4)	1.77	80	5	24	-20	+12	+15	1300
56	T	136(1)566(2)0100T(3)(4)	1.22	50	5	20	-25	+12	+12	1400
68	T	136(1)686(2)0100T(3)(4)	1.11	40	10	40	-30	+14	+16	1600
120	K	136(1)127(2)0100K(3)(4)	1.38	30	12	48	-35	+15	+17	2000
125 V_{DC} AT +85 °C; 85 V_{DC} AT +125 °C										
6.8	C	136(1)685(2)0125C(3)(4)	5.86	300	3	12	-14	+10	+12	700
27	F	136(1)276(2)0125F(3)(4)	1.77	90	5	24	-18	+12	+15	1200
47	T	136(1)476(2)0125T(3)(4)	1.12	50	10	40	-26	+14	+16	1500
56	T	136(1)566(2)0125T(3)(4)	1.11	50	10	40	-26	+14	+16	1500
68	K	136(1)686(2)0125K(3)(4)	1.10	32	11	44	-28	+15	+16	1850
82	K	136(1)826(2)0125K(3)(4)	1.41	32	12	48	-30	+15	+17	1900

Notes

- Part number definitions:
  (1) Model type:
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