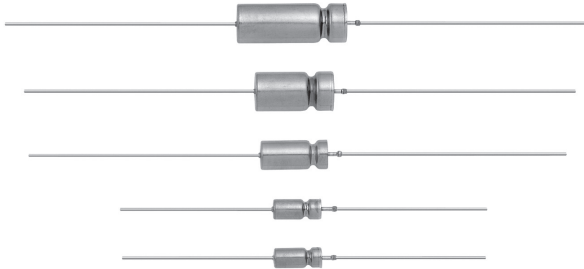


Wet Tantalum Capacitors

Tantalum-Case with Glass-to-Tantalum Hermetic Seal For -55°C to + 200°C Operation



FEATURES

Standard and Extended Ratings.

Model 135D tantalum-case tantalum electrolytic capacitors incorporate the advantages of all the varieties of electrolytic capacitors and eliminate most of the disadvantages. These units have a 3 volt 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.

Designed for the aerospace applications, this capacitor was developed under partial sponsorship of the Marshall Space Flight Center, National Aeronautics and Space Administration. The capacitors have a high resistance to damage from shock and vibration. Extended range ratings and high temperature designs are available.

Model 135D capacitors are commercial equivalents of Tansitor Style; AQ, AR, HAQ, HAR, Mallory-NACC Style; TLT, TXT, THT, THX and Military Style CLR79 and CLR81, designed to meet the performance requirements of Military Specification MIL-PRF-39006/22/25. Capacitors to meet MIL-PRF-39006/22/25 should be ordered by part numbers shown in that specification.

PERFORMANCE CHARACTERISTICS

Operating Temperature: - 55°C to + 85°C. (To + 200°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 hour 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.

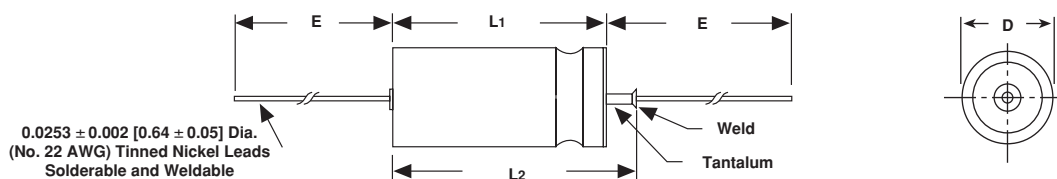
ORDERING INFORMATION

135D	306	X0	006	C	2
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85°C	CASE CODE	STYLE NUMBER
	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 volts).	See Ratings and Case Codes Table.	Standard 0 = No outer tube. 2 = Outer polyester-film insulation. High Temperature 60 = No outer tube 6 = High temperature-film insulation (above + 125°C).

Packaging: The use of formed plastic trays for packaging this type of axial lead component is standard. Tape and reel is not recommended due to the unit weight.

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DIMENSIONS in inches [millimeters]



CASE CODE		D	L1	L2 (Max.)	E	WEIGHT IN GRAMS (Max.)
TYPE 135D	CLR 79/81 EQUIV.					
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

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

STANDARD RATINGS

CAPACITANCE (µF)	CASE CODE	PART NUMBER*	Max. ESR at + 25°C 120 Hz (Ohms)	Max. IMP. at - 55°C 120 Hz (Ohms)	Max. DCL (µA) at			Max. CAPACITANCE CHANGE (%) at			Max. RIPPLE 40kHz rms (mA)
					+ 25°C	+ 85°C	+ 125°C	- 55°C	+ 85°C	+ 125°C	
6 WVDC at + 85°C . . . 4 WVDC at + 125°C . . . 3.6 WVDC at + 200°C											
30	C	135D306X0006C2	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820	
68	C	135D686X0006C2	3.2	60	1.0	2.0	- 40	+ 14	+ 16	960	
140	F	135D147X0006F2	2.0	40	1.0	3.0	- 40	+ 14	+ 16	1200	
270	F	135D277X0006F2	2.2	25	1.0	6.5	- 44	+ 17.5	+ 20	1375	
330	T	135D337X0006T2	1.4	20	2.0	7.9	- 44	+ 14	+ 16	1800	
560	T	135D567X0006T2	1.3	25	2.0	13.0	- 64	+ 17.5	+ 20	1900	
1200	K	135D128X0006K2	1.0	20	3.0	14.0	- 80	+ 25	+ 25	2265	
8 WVDC at + 85°C . . . 5 WVDC at + 125°C . . . 4.8 WVDC at + 200°C											
25	C	135D256X0008C2	4.0	100	1.0	2.0	- 40	+ 10.5	+ 12	820	
56	C	135D566X0008C2	3.3	59	1.0	2.0	- 40	+ 14	+ 16	900	
120	F	135D127X0008F2	2.6	50	1.0	2.0	- 44	+ 17.5	+ 20	1230	
220	F	135D227X0008F2	2.4	30	1.0	7.0	- 44	+ 17.5	+ 20	1370	
290	T	135D297X0008T2	1.8	25	2.0	6.0	- 64	+ 17.5	+ 20	1770	
430	T	135D437X0008T2	1.4	25	2.0	14.0	- 64	+ 17.5	+ 20	1825	
850	K	135D857X0008K2	1.0	22	4.0	16.0	- 80	+ 25	+ 25	2330	
10 WVDC at + 85°C . . . 7 WVDC at + 125°C . . . 6 WVDC at + 200°C											
20	C	135D206X0010C2	4.0	120	1.0	2.0	- 32	+ 10.5	+ 12	820	
47	C	135D476X0010C2	3.7	90	1.0	2.0	- 36	+ 14	+ 16	855	
100	F	135D107X0010F2	2.4	60	1.0	4.0	- 36	+ 14	+ 16	1200	
180	F	135D187X0010F2	2.2	40	1.0	7.0	- 36	+ 14	+ 16	1365	
250	T	135D257X0010T2	1.8	30	2.0	10.0	- 40	+ 14	+ 16	1720	
390	T	135D397X0010T2	1.5	25	2.0	16.0	- 64	+ 17.5	+ 20	1800	
750	K	135D757X0010K2	1.0	23	4.0	16.0	- 80	+ 25	+ 25	2360	
15 WVDC at + 85°C . . . 10 WVDC at + 125°C . . . 9 WVDC at + 200°C											
15	C	135D156X0015C2	4.4	155	1.0	2.0	- 24	+ 10.5	+ 12	780	
33	C	135D336X0015C2	4.0	90	1.0	2.0	- 28	+ 14	+ 16	820	
70	F	135D706X0015F2	2.8	75	1.0	4.0	- 28	+ 14	+ 16	1150	
120	F	135D127X0015F2	2.6	50	1.0	7.0	- 28	+ 17.5	+ 20	1450	
170	T	135D177X0015T2	2.4	35	2.0	10.0	- 32	+ 14	+ 16	1480	
270	T	135D277X0015T2	2.2	30	2.0	16.0	- 56	+ 17.5	+ 20	1740	
540	K	135D547X0015K2	1.0	23	6.0	24.0	- 80	+ 25	+ 25	2330	



Wet Tantalum Capacitors
Tantalum-Case with Glass-to-Tantalum Hermetic Seal
For -55°C to + 200°C Operation

STANDARD RATINGS										
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	Max. ESR at + 25°C 120 Hz (Ohms)	Max. IMP. at - 55°C 120 Hz (Ohms)	Max. DCL (μ A) at		Max. CAPACITANCE CHANGE (%) at			Max. RIPPLE 40kHz rms (mA)
					+ 25°C	+ 85°C + 125°C	- 55°C	+ 85°C	+ 125°C	
25 WVDC at + 85°C . . . 15 WVDC at + 125°C . . . 12 WVDC at + 200°C										
10	C	135D106X0025C2	5.3	220	1.0	2.0	- 16	+ 8	+ 9	715
22	C	135D226X0025C2	4.2	140	1.0	2.0	- 20	+ 10.5	+ 12	800
50	F	135D506X0025F2	3.0	70	1.0	2.0	- 28	+ 13	+ 15	1130
100	F	135D107X0025F2	2.8	50	1.0	10.0	- 28	+ 13	+ 15	1435
120	T	135D127X0025T2	2.6	38	2.0	6.0	- 32	+ 13	+ 15	1450
180	T	135D187X0025T2	2.2	32	2.0	18.0	- 48	+ 13	+ 15	1525
350	K	135D357X0025K2	1.3	24	7.0	28.0	- 70	+ 25	+ 25	1970
30 WVDC at + 85°C . . . 20 WVDC at + 125°C . . . 18 WVDC at + 200°C										
8	C	135D805X0030C2	6.6	275	1.0	2.0	- 16	+ 8	+ 12	640
15	C	135D156X0030C2	6.2	175	1.0	2.0	- 20	+ 10.5	+ 12	780
40	F	135D406X0030F2	4.0	65	1.0	5.0	- 24	+ 10.5	+ 12	1120
68	F	135D686X0030F2	2.9	60	1.0	8.0	- 24	+ 13	+ 15	1285
100	T	135D107X0030T2	2.7	40	2.0	12.0	- 28	+ 10.5	+ 12	1450
150	T	135D157X0030T2	2.3	35	2.0	18.0	- 48	+ 13	+ 15	1525
300	K	135D307X0030K2	1.4	25	8.0	32.0	- 60	+ 25	+ 25	1950
35 WVDC at + 85°C . . . 22 WVDC at + 125°C . . . 21 WVDC at + 200°C										
15	C	135D156X0035C2	6.2	175	0.75	1.5	- 20	+ 10.5	+ 12	660
68	F	135D686X0035F2	2.9	60	1.0	2.0	- 24	+ 13	+ 15	1195
270	K	135D277X0035K2	1.4	26	3.0	12.0	- 58	+ 25	+ 25	1950
50 WVDC at + 85°C . . . 30 WVDC at + 125°C . . . 30 WVDC at + 200°C										
5	C	135D505X0050C2	8.0	400	1.0	2.0	- 16	+ 5	+ 6	580
10	C	135D106X0050C2	6.4	250	1.0	2.0	- 24	+ 8	+ 9	715
25	F	135D256X0050F2	4.6	95	1.0	5.0	- 20	+ 10.5	+ 12	1005
47	F	135D476X0050F2	3.7	70	1.0	9.0	- 28	+ 13	+ 15	1155
60	T	135D606X0050T2	2.9	45	2.0	12.0	- 16	+ 10.5	+ 12	1335
82	T	135D826X0050T2	2.5	45	2.0	16.0	- 32	+ 13	+ 15	1400
160	K	135D167X0050K2	1.5	27	8.0	32.0	- 50	+ 25	+ 25	1900
60 WVDC at + 85°C . . . 40 WVDC at + 125°C . . . 36 WVDC at + 200°C										
4	C	135D405X0060C2	9.3	550	1.0	2.0	- 16	+ 5	+ 6	525
8.2	C	135D825X0060C2	6.6	275	1.0	2.0	- 24	+ 8	+ 9	625
20	F	135D206X0060F2	4.7	105	1.0	5.0	- 16	+ 8	+ 9	930
39	F	135D396X0060F2	3.4	90	1.0	9.0	- 28	+ 10.5	+ 15	1110
50	T	135D506X0060T2	2.9	50	2.0	12.0	- 16	+ 10.5	+ 12	1330
68	T	135D686X0060T2	2.5	50	2.0	16.0	- 32	+ 10.5	+ 15	1365
140	K	135D147X0060K2	1.5	28	8.0	32.0	- 40	+ 20	+ 20	1850
75 WVDC at + 85°C . . . 50 WVDC at + 125°C . . . 45 WVDC at + 200°C										
3.5	C	135D355X0075C2	9.5	650	1.0	2.0	- 16	+ 5	+ 6	525
6.8	C	135D685X0075C2	6.8	300	1.0	2.0	- 20	+ 8	+ 9	610
15	F	135D156X0075F2	5.3	150	1.0	5.0	- 16	+ 8	+ 9	890
33	F	135D336X0075F2	4.2	90	1.0	10.0	- 24	+ 10.5	+ 15	1000
40	T	135D406X0075T2	3.0	60	2.0	12.0	- 16	+ 10.5	+ 12	1250
56	T	135D566X0075T2	2.6	60	2.0	17.0	- 28	+ 10.5	+ 15	1335
110	K	135D117X0075K2	1.5	29	9.0	36.0	- 35	+ 20	+ 20	1850

*Part Numbers listed are for units with \pm 20% capacitance tolerance insulated capacitors. For \pm 10% tolerance capacitors, change the digit following the letter "X" from "0" to "9"; for \pm 5%, change the digit following the letter "X" from "0" to "5". For capacitors without outer polyester-film insulation, change the last digit in the part number from "2" to "0". For capacitors with a high temperature insulating sleeve, change the last digit in the part number from "2" to "6".

Wet Tantalum Capacitors
Tantalum-Case with Glass-to-Tantalum Hermetic Seal
For -55°C to + 200°C Operation

STANDARD RATINGS										
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	Max. ESR at + 25°C 120 Hz (Ohms)	Max. IMP. at - 55°C 120 Hz (Ohms)	Max. DCL (μ A) at		Max. CAPACITANCE CHANGE (%) at			Max. RIPPLE 40kHz rms (mA)
					+ 25°C	+ 85°C	- 55°C	+ 85°C	+ 125°C	
100 WVDC at + 85°C . . . 65 WVDC at + 125°C . . . 60 WVDC at + 200°C										
2.5	C	135D255X0100C2	10.6	950	1.0	2.0	- 16	+ 7	+ 8	505
4.7	C	135D475X0100C2	8.5	500	1.0	2.0	- 16	+ 7	+ 8	565
11	F	135D116X0100F2	6.0	200	1.0	4.0	- 16	+ 7	+ 8	835
22	F	135D226X0100F2	4.8	100	1.0	9.0	- 16	+ 7	+ 8	965
30	T	135D306X0100T2	3.3	80	2.0	12.0	- 16	+ 7	+ 8	1240
43	T	135D436X0100T2	2.6	70	2.0	17.0	- 20	+ 7	+ 8	1335
86	K	135D866X0100K2	1.6	30	9.0	36.0	- 25	+ 15	+ 15	1800
125 WVDC at + 85°C . . . 85 WVDC at + 125°C . . . 75 WVDC at + 200°C										
1.7	C	135D175X0125C2	15.6	1250	1.0	2.0	- 16	+ 7	+ 8	415
3.6	C	135D365X0125C2	10.0	600	1.0	2.0	- 16	+ 7	+ 8	520
9	F	135D905X0125F2	7.4	240	1.0	5.0	- 16	+ 7	+ 8	755
14	F	135D146X0125F2	5.7	167	1.0	7.0	- 16	+ 7	+ 8	860
18	T	135D186X0125T2	3.7	129	2.0	9.0	- 16	+ 7	+ 8	1130
25	T	135D256X0125T2	3.2	93	2.0	13.0	- 16	+ 7	+ 8	1200
56	K	135D566X0125K2	1.6	32	10.0	40.0	- 25	+ 15	+ 15	1800
EXTENDED RATINGS										
6 WVDC at + 85°C . . . 4 WVDC at + 125°C . . . 3.6 WVDC at + 200°C										
220	C	135D227X0006C2	3.0	36	2	9	- 64	+13	+16	1000
560	F	135D567X0006F2	2.5	21	3	9	- 77	+16	+20	1500
820	F	135D827X0006F2	2.5	18	3	14	- 88	+16	+20	1500
1200	T	135D128X0006T2	1.5	18	5	18	- 88	+20	+25	1900
1500	T	135D158X0006T2	1.5	18	5	20	- 90	+20	+25	1900
2200	K	135D228X0006K2	1.0	13	6	24	- 90	+25	+30	2300
8 WVDC at + 85°C . . . 5 WVDC at + 125°C . . . 4.8 WVDC at + 200°C										
180	C	135D187X0008C2	3.0	45	2	9	- 60	+13	+16	1000
680	F	135D687X0008F2	2.5	22	3	14	- 83	+16	+20	1500
1500	T	135D158X0008T2	1.5	18	5	20	- 90	+20	+25	1900
1800	K	135D188X0008K2	1.0	14	7	25	- 90	+25	+30	2300
10 WVDC at + 85°C . . . 7 WVDC at + 125°C . . . 6 WVDC at + 200°C										
120	C	135D127X0010C2	3.2	54	2	6	- 40	+14	+16	900
150	C	135D157X0010C2	3.0	54	2	9	- 55	+13	+16	900
390	F	135D397X0010F2	2.5	27	3	9	- 66	+16	+20	1450
560	F	135D567X0010F2	2.5	27	3	16	- 77	+16	+20	1450
1200	T	135D128X0010T2	1.5	18	5	20	- 88	+20	+25	1850
1500	K	135D158X0010K2	1.0	15	7	25	- 88	+25	+30	2300
15 WVDC at + 85°C . . . 10 WVDC at + 125°C . . . 9 WVDC at + 200°C										
82	C	135D826X0015C2	3.9	72	2	6	- 35	+12	+16	900
100	C	135D107X0015C2	3.9	72	2	9	- 44	+13	+16	900
270	F	135D277X0015F2	2.5	31	3	9	- 62	+16	+15	1450
390	F	135D397X0015F2	2.5	31	3	16	- 66	+16	+20	1450
680	T	135D687X0015T2	1.8	22	6	18	- 74	+20	+25	1800
820	T	135D827X0015T2	1.8	22	6	24	- 77	+20	+25	1800
1000	K	135D108X0015K2	1.2	17	8	32	- 77	+25	+30	2330
25 WVDC at + 85°C . . . 15 WVDC at + 125°C . . . 12 WVDC at + 200°C										
56	C	135D566X0025C2	4.3	90	2	6	- 25	+12	+15	850
68	C	135D686X0025C2	4.3	90	2	9	- 40	+12	+15	850
180	F	135D187X0025F2	2.7	33	3	9	- 54	+13	+15	1400
270	F	135D277X0025F2	2.7	33	3	16	- 62	+13	+16	1400
470	T	135D477X0025T2	1.8	24	6	18	- 65	+18	+25	1750
560	T	135D567X0025T2	1.8	24	7	28	- 72	+20	+25	1750
680	K	135D687X0025K2	1.2	19	8	32	- 72	+25	+30	2100

* Part Numbers listed are for units with \pm 20% capacitance tolerance insulated capacitors. For \pm 10% tolerance capacitors, change the digit following the letter "X" from "0" to "9"; for \pm 5%, change the digit following the letter "X" from "0" to "5". For capacitors without outer polyester-film insulation, change the last digit in the part number from "2" to "0". For capacitors with a high temperature insulating sleeve, change the last digit in the part number from "2" to "6".



Wet Tantalum Capacitors
Tantalum-Case with Glass-to-Tantalum Hermetic Seal
For -55°C to + 200°C Operation

EXTENDED RATINGS										
CAPACITANCE (μ F)	CASE CODE	PART NUMBER*	Max. ESR at + 25°C 120 Hz (Ohms)	Max. IMP. at - 55°C 120 Hz (Ohms)	Max. DCL (μ A) at		Max. CAPACITANCE CHANGE (%) at			Max. RIPPLE 40kHz rms (mA)
					+ 25°C	+ 85°C + 125°C	- 55°C	+ 85°C	+ 125°C	
30 WVDC at + 85°C . . . 20 WVDC at + 125°C . . . 18 WVDC at + 200°C										
47	C	135D476X0030C2	5.2	100	2	6	- 23	+12	+15	800
56	C	135D566X0030C2	5.2	100	2	9	- 38	+12	+15	800
150	F	135D157X0030F2	2.5	36	3	9	- 42	+13	+15	1200
220	F	135D227X0030F2	2.5	36	3	16	- 60	+13	+16	1200
390	T	135D397X0030T2	1.8	25	6	18	- 55	+18	+25	1500
470	T	135D477X0030T2	1.8	25	8	32	- 65	+20	+25	1500
560	K	135D567X0030K2	1.3	20	9	36	- 65	+25	+30	2000
35 WVDC at + 85°C . . . 22 WVDC at + 125°C . . . 21 WVDC at + 200°C										
39	C	135D396X0035C2	4.1	61	2	6	- 22	+12	+14	820
120	F	135D127X0035F2	2.5	31	3	10	- 40	+13	+15	1315
330	T	135D337X0035T2	1.8	20	6	18	- 50	+16	+25	1640
370	K	135D477X0035K2	1.3	15	9	36	- 60	+25	+30	2040
50 WVDC at + 85°C . . . 30 WVDC at + 125°C . . . 30 WVDC at + 200°C										
33	C	135D336X0050C2	5.0	135	2	9	- 29	+10	+12	700
100	F	135D107X0050F2	2.8	49	4	12	- 36	+13	+15	1200
120	F	135D127X0050F2	2.5	49	4	24	- 42	+12	+15	1200
270	T	135D277X0050T2	2.0	30	8	32	- 46	+20	+25	1450
330	K	135D337X0050K2	1.5	30	9	36	- 46	+25	+30	1900
60 WVDC at + 85°C . . . 40 WVDC at + 125°C . . . 36 WVDC at + 200°C										
27	C	135D276X0060C2	5.0	144	3	12	- 24	+10	+12	700
82	F	135D826X0060F2	2.9	54	4	16	- 30	+15	+15	1100
100	F	135D107X0060F2	2.5	54	4	20	- 36	+12	+15	1100
220	T	135D227X0060T2	1.8	29	8	32	- 40	+16	+20	1400
270	K	135D277X0060K2	1.4	23	9	36	- 45	+20	+25	1850
75 WVDC at + 85°C . . . 50 WVDC at + 125°C . . . 45 WVDC at + 200°C										
22	C	135D226X0075C2	5.1	157	3	12	- 19	+10	+12	600
68	F	135D686X0075F2	3.0	63	4	16	- 25	+12	+15	1000
82	F	135D826X0075F2	2.5	63	4	24	- 30	+12	+15	1000
180	T	135D187X0075T2	2.2	30	9	36	- 35	+16	+20	1300
220	K	135D227X0075K2	1.8	24	10	40	- 40	+20	+25	1800
100 WVDC at + 85°C . . . 65 WVDC at + 125°C . . . 60 WVDC at + 200°C										
10	C	135D106X0100C2	5.9	200	3	12	- 17	+10	+12	800
39	F	135D396X0100F2	3.5	80	5	24	- 20	+12	+15	1300
68	T	135D686X0100T2	2.2	40	10	40	- 30	+14	+16	1600
120	K	135D127X0100K2	2.7	30	12	48	- 35	+15	+17	2000
125 WVDC at + 85°C . . . 85 WVDC at + 125°C . . . 75 WVDC at + 200°C										
6.8	C	135D685X0125C2	11.7	300	3	12	- 14	+10	+12	700
27	F	135D276X0125F2	3.5	90	5	24	- 18	+12	+15	1200
47	T	135D476X0125T2	2.2	50	10	40	- 26	+14	+16	1500
82	K	135D826X0125K2	2.8	32	12	48	- 30	+15	+17	1900

*Part Numbers listed are for units with \pm 20% capacitance tolerance insulated capacitors. For \pm 10% tolerance capacitors, change the digit following the letter "X" from "0" to "9"; for \pm 5%, change the digit following the letter "X" from "0" to "5". For capacitors without outer polyester-film insulation, change the last digit in the part number from "2" to "0". For capacitors with a high temperature insulating sleeve, change the last digit in the part number from "2" to "6".



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