

Solid-Electrolyte TANTALEX™ Capacitors, Hermetically Sealed, Axial-Lead, CECC Approved



FEATURES

- Terminations: tin / lead (SnPb), 100 % tin (RoHS-compliant)
- Hermetically sealed metal case with plastic film insulation
- Extended capacitance range (type 749DX)
- High operational stability with both time and temperature
- Low leakage current
- Low dissipation factor
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS*
Available
**HALOGEN
FREE**

PERFORMANCE CHARACTERISTICS

Operating Temperature:

-55 °C to +85 °C (types CTS13)

-55 °C to +125 °C (types CTS1, 749DX)

SPECIFICATIONS

CECC

30201-001

30201-002 CTS1

30201-005 CTS13

30201-029 749DX

BS

749DX 9073-N001 749DX

APPLICATIONS

Performance and reliability has been proven in a wide range of applications such as: filtering, by-pass, coupling, energy storage, timing circuits.

ORDERING INFORMATION

CTS13 TYPE	105 CAPACITANCE	X0 CAPACITANCE TOLERANCE	040 DC VOLTAGE RATING AT +85 °C	A CASE CODE	2 STYLE NUMBER	P PACKAGING	E3 RoHS- COMPLIANT
Identifies the basic capacitor design CTS1 = CECC 30201-002 CTS13 = CECC 30201-005 749DX = CECC 30201-001 / CECC 30201-029	Expressed in picofarads. First two digits are significant. Third digit is the number of zeros following.	X0 = ± 20 % X9 = ± 10 % X5 = ± 5 % * * Special order	Expressed in volts. Where necessary, zeros precede the voltage rating to complete the 3 digit block 6R3 = 6.3 V	See Ratings and Case Codes table.	0 = bare case 2 = plastic-film insulation	See Tape and Reel Packaging	E3 = 100 % tin termination (RoHS-compliant) Blank = SnPb termination

DIMENSIONS in inches [millimeters]

CASE CODE	$L_1 \pm 0.031$ [0.79]	J max.	D max.	LEAD DIAMETER + 10 %, - 0.05
A	0.286 [7.26]	0.402 [10.2]	0.141 [3.6]	0.020 [0.5]
B	0.474 [12.04]	0.590 [15.0]	0.192 [4.9]	0.020 [0.5]
C	0.686 [17.42]	0.807 [20.5]	0.295 [7.5]	0.025 [0.6]
D	0.786 [19.96]	0.945 [24.0]	0.364 [9.1]	0.025 [0.6]

**RATINGS AND CASE CODES - TYPE CTS1**

C _R (μF)	RATED VOLTAGE U _R (+85 °C)						
	6.3 V	10 V	16 V	25 V	40 V	50 V	63 V
	CATEGORY VOLTAGE U _C (+125 °C)						
	4 V	6.3 V	10 V	13 V	25 V	33 V	40 V
0.10							A
0.12							A
0.15							A
0.18							A
0.22							A
0.27						A	A
0.33						A	A
0.39						A	A
0.47					A	A	A
0.56					A	A	A
0.68					A	A	A
0.82					A	A	B
1.0					A	A	B
1.2					A	B	B
1.5				A	B	B	B
1.8			A		B	B	B
2.2			A		B	B	B
2.7			A		B	B	B
3.3			A		B	B	B
3.9		A			B	B	B
4.7		A			B	B	C
5.6	A				B	C	C
6.8	A				B	C	C
8.2				B	C	C	C
10				B	C	C	C
12			B		C	C	D
15			B		C	C	D
18			B		C	C	D
22			B		C	D	
27		B		C	D		
33		B		C	D		
39	B		C		D		
47	B		C		D		
56	B		C	D			
68			C	D			
82		C	D				
100		C	D				
120	C		D				
150	C		D				
180		D					
220		D					
270	D						
330	D						

**RATINGS AND CASE CODES - TYPE CTS13**

C_R (μF)	RATED VOLTAGE U_R (+85 °C)							
	6.3 V	10 V	16 V	20 V	25 V	40 V	50 V	63 V
0.10								A
0.12								A
0.15								A
0.18								A
0.22								A
0.27							A	A
0.33							A	A
0.39							A	A
0.47						A	A	A
0.56						A	A	A
0.68						A	A	A
0.82						A	A	B
1.0						A	A	B
1.2					A	A	B	B
1.5					A	B	B	B
1.8				A		B	B	B
2.2				A		B	B	B
2.7			A			B	B	B
3.3			A			B	B	B
3.9		A				B	B	B
4.7		A				B	B	C
5.6	A					B	C	C
6.8	A					B	C	C
8.2					B	C	C	C
10					B	C	C	C
12				B		C	C	D
15				B		C	C	D
18			B			C	C	D
22			B			C	D	
27		B			C	D		
33		B			C	D		
39	B			C		D		
47	B			C		D		
56	B		C		D			
68			C		D			
82		C		D				
100		C		D				
120	C		D					
150	C		D					
180		D						
220		D						
270	D							
330	D							



RATINGS AND CASE CODES - TYPE 749DX									
C _R (μF)	RATED VOLTAGE U _R (+85 °C)								
	6.3 V	10 V	16 V	20 V	25 V	35 V	40 V	50 V	63 V
	CATEGORY VOLTAGE U _C (+125 °C)								
	4 V	6.3 V	10 V	13 V	16 V	23 V	25 V	33 V	40 V
0.068									
0.10						A	A		A
0.12						A	A		A
0.15						A	A		A
0.18						A	A		A
0.22						A	A		A
0.27						A	A		A
0.33						A	A		A
0.39						A	A		A
0.47						A	A		A
0.56						A	A		A
0.68						A	A		A
0.82						A	A	A	B
1.0						A	A	A	B
1.2					A	B	B	B	B
1.5					A	B	B	B	B
1.8				A		B	B	B	B
2.2				A		B	B	B	B
2.7			A			B	B	B	B
3.3			A			B	B	B	B
3.9		A				B	B	B	B
4.7		A				B	B	B	C
5.6	A					B	B	C	C
6.8	A					B	B	C	C
8.2					B	C	C	C	C
10					B	C	C	C	C
12				B		C	C	C	D
15				B		C	C	C	D
18			B			C	C	C	D
22			B			C	C	D	
27		B			C	D	D		
33		B			C	D	D		
39		B		C		D	D		
47	B			C		D			
56	B		C		D	D			
68			C		D				
82		C		D					
100		C		D					
120		C	D						
150	C		D						
180	C	D							
220		D							
270	D								
330	D								

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
6.3 V_{DC} AT +85 °C; 4 V_{DC} AT +125 °C					
5.6	A	CTS1565(1)6R3A(2)(3)	1.0	6	10
6.8	A	CTS1685(1)6R3A(2)(3)	1.0	6	10
39	B	CTS1396(1)6R3B(2)(3)	2.3	6	5
47	B	CTS1476(1)6R3B(2)(3)	2.8	6	5
56	B	CTS1566(1)6R3B(2)(3)	3.4	6	5
120	C	CTS1127(1)6R3C(2)(3)	7.2	6	2
150	C	CTS1157(1)6R3C(2)(3)	9.0	6	2
270	D	CTS1277(1)6R3D(2)(3)	16.2	6	1
330	D	CTS1337(1)6R3D(2)(3)	19.8	8	1
10 V_{DC} AT +85 °C; 6.3 V_{DC} AT +125 °C					
3.9	A	CTS1395(1)010A(2)(3)	1.0	6	10
4.7	A	CTS1475(1)010A(2)(3)	1.0	6	10
27	B	CTS1276(1)010B(2)(3)	2.7	6	5
33	B	CTS1336(1)010B(2)(3)	3.3	6	5
82	C	CTS1826(1)010C(2)(3)	8.2	6	2
100	C	CTS1107(1)010C(2)(3)	10.0	6	2
180	D	CTS1187(1)010D(2)(3)	18.0	6	1
220	D	CTS1227(1)010D(2)(3)	22.0	8	1
16 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C					
1.8	A	CTS1185(1)016A(2)(3)	1.0	6	10
2.2	A	CTS1225(1)016A(2)(3)	1.0	6	10
2.7	A	CTS1275(1)016A(2)(3)	1.0	6	10
3.3	A	CTS1335(1)016A(2)(3)	1.0	6	10
12	B	CTS1126(1)016B(2)(3)	1.9	6	5
15	B	CTS1156(1)016B(2)(3)	2.4	6	5
18	B	CTS1186(1)016B(2)(3)	2.9	6	5
22	B	CTS1226(1)016B(2)(3)	3.5	6	5
39	C	CTS1396(1)016C(2)(3)	6.2	6	2
47	C	CTS1476(1)016C(2)(3)	7.5	6	2
56	C	CTS1566(1)016C(2)(3)	9.0	6	2
68	C	CTS1686(1)016C(2)(3)	10.9	6	2
82	D	CTS1826(1)016D(2)(3)	13.1	6	1
100	D	CTS1107(1)016D(2)(3)	16.0	6	1
120	D	CTS1127(1)016D(2)(3)	19.2	8	1
150	D	CTS1157(1)016D(2)(3)	24.0	8	1
25 V_{DC} AT +85 °C; 16 V_{DC} AT +125 °C					
1.5	A	CTS1155(1)025A(2)(3)	1.0	6	10
8.2	B	CTS1825(1)025B(2)(3)	2.1	6	5
10	B	CTS1106(1)025B(2)(3)	2.5	6	5
27	C	CTS1276(1)025C(2)(3)	6.8	6	2
33	C	CTS1336(1)025C(2)(3)	8.3	6	2
56	D	CTS1566(1)025D(2)(3)	14.0	6	1
68	D	CTS1686(1)025D(2)(3)	17.0	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
40 V_{DC} AT +85 °C; 25 V_{DC} AT +125 °C					
0.47	A	CTS1474(1)040A(2)(3)	1.0	6	10
0.56	A	CTS1564(1)040A(2)(3)	1.0	6	10
0.68	A	CTS1684(1)040A(2)(3)	1.0	6	10
0.82	A	CTS1824(1)040A(2)(3)	1.0	6	10
1.0	A	CTS1105(1)040A(2)(3)	1.0	6	10
1.2	A	CTS1125(1)040A(2)(3)	1.0	6	10
1.5	B	CTS1155(1)040B(2)(3)	1.0	6	5
1.8	B	CTS1185(1)040B(2)(3)	1.0	6	5
2.2	B	CTS1225(1)040B(2)(3)	1.0	6	5
2.7	B	CTS1275(1)040B(2)(3)	1.1	6	5
3.3	B	CTS1335(1)040B(2)(3)	1.3	6	5
3.9	B	CTS1395(1)040B(2)(3)	1.6	6	5
4.7	B	CTS1475(1)040B(2)(3)	1.9	6	5
5.6	B	CTS1565(1)040B(2)(3)	2.2	6	5
6.8	B	CTS1685(1)040B(2)(3)	2.7	6	5
8.2	C	CTS1825(1)040C(2)(3)	3.3	6	2
10	C	CTS1106(1)040C(2)(3)	4.0	6	2
12	C	CTS1126(1)040C(2)(3)	4.8	6	2
15	C	CTS1156(1)040C(2)(3)	6.0	6	2
18	C	CTS1186(1)040C(2)(3)	7.2	6	2
22	C	CTS1226(1)040C(2)(3)	8.8	6	2
27	D	CTS1276(1)040D(2)(3)	10.8	6	1
33	D	CTS1336(1)040D(2)(3)	13.2	6	1
39	D	CTS1396(1)040D(2)(3)	15.6	6	1
47	D	CTS1476(1)040D(2)(3)	18.8	6	1
50 V_{DC} AT +85 °C; 33 V_{DC} AT +125 °C					
0.27	A	CTS1274(1)050A(2)(3)	1.0	6	n/a
0.33	A	CTS1334(1)050A(2)(3)	1.0	6	10
0.39	A	CTS1394(1)050A(2)(3)	1.0	6	10
0.47	A	CTS1474(1)050A(2)(3)	1.0	6	10
0.56	A	CTS1564(1)050A(2)(3)	1.0	6	10
0.68	A	CTS1684(1)050A(2)(3)	1.0	6	10
0.82	A	CTS1824(1)050A(2)(3)	1.0	6	10
1.0	A	CTS1105(1)050A(2)(3)	1.0	6	10
1.2	B	CTS1125(1)050B(2)(3)	1.0	6	5
1.5	B	CTS1155(1)050B(2)(3)	1.0	6	5
1.8	B	CTS1185(1)050B(2)(3)	1.0	6	5
2.2	B	CTS1225(1)050B(2)(3)	1.1	6	5
2.7	B	CTS1275(1)050B(2)(3)	1.4	6	5
3.3	B	CTS1335(1)050B(2)(3)	1.7	6	5
3.9	B	CTS1395(1)050B(2)(3)	2.0	6	5

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS1**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
50 V_{DC} AT +85 °C; 33 V_{DC} AT +125 °C					
4.7	B	CTS1475(1)050B(2)(3)	2.4	6	5
5.6	C	CTS1565(1)050C(2)(3)	2.8	6	2
6.8	C	CTS1685(1)050C(2)(3)	3.4	6	2
8.2	C	CTS1825(1)050C(2)(3)	4.1	6	2
10	C	CTS1106(1)050C(2)(3)	5.0	6	2
12	C	CTS1126(1)050C(2)(3)	6.0	6	2
15	C	CTS1156(1)050C(2)(3)	7.5	6	2
18	C	CTS1186(1)050C(2)(3)	9.0	6	2
22	D	CTS1226(1)050D(2)(3)	11.0	6	1
63 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C					
0.10	A	CTS1104(1)063A(2)(3)	1.0	6	n/a
0.12	A	CTS1124(1)063A(2)(3)	1.0	6	n/a
0.15	A	CTS1154(1)063A(2)(3)	1.0	6	n/a
0.18	A	CTS1184(1)063A(2)(3)	1.0	6	n/a
0.22	A	CTS1224(1)063A(2)(3)	1.0	6	n/a
0.27	A	CTS1274(1)063A(2)(3)	1.0	6	n/a
0.33	A	CTS1334(1)063A(2)(3)	1.0	6	10
0.39	A	CTS1394(1)063A(2)(3)	1.0	6	10
0.47	A	CTS1474(1)063A(2)(3)	1.0	6	10
0.56	A	CTS1564(1)063A(2)(3)	1.0	6	10
0.68	A	CTS1684(1)063A(2)(3)	1.0	6	10
0.82	B	CTS1824(1)063B(2)(3)	1.0	6	5
1.0	B	CTS1105(1)063B(2)(3)	1.0	6	5
1.2	B	CTS1125(1)063B(2)(3)	1.0	6	5
1.5	B	CTS1155(1)063B(2)(3)	1.0	6	5
1.8	B	CTS1185(1)063B(2)(3)	1.1	6	5
2.2	B	CTS1225(1)063B(2)(3)	1.4	6	5
2.7	B	CTS1275(1)063B(2)(3)	1.7	6	5
3.3	B	CTS1335(1)063B(2)(3)	2.1	6	5
3.9	B	CTS1395(1)063B(2)(3)	2.5	6	5
4.7	C	CTS1475(1)063C(2)(3)	3.0	6	2
5.6	C	CTS1565(1)063C(2)(3)	3.5	6	2
6.8	C	CTS1685(1)063C(2)(3)	4.3	6	2
8.2	C	CTS1825(1)063C(2)(3)	5.2	6	2
10	C	CTS1106(1)063C(2)(3)	6.3	6	2
12	D	CTS1126(1)063D(2)(3)	7.6	6	1
15	D	CTS1156(1)063D(2)(3)	9.5	6	1
18	D	CTS1186(1)063D(2)(3)	11.3	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS13**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
6.3 V_{DC} AT +85 °C					
5.6	A	CTS13565(1)6R3A(2)(3)	1.0	6	10
6.8	A	CTS13685(1)6R3A(2)(3)	1.0	6	10
39	B	CTS13396(1)6R3B(2)(3)	2.3	6	5
47	B	CTS13476(1)6R3B(2)(3)	2.8	6	5
56	B	CTS13566(1)6R3B(2)(3)	3.4	6	5
120	C	CTS13127(1)6R3C(2)(3)	7.2	6	2
150	C	CTS13157(1)6R3C(2)(3)	9.0	6	2
270	D	CTS13277(1)6R3D(2)(3)	16.2	6	1
330	D	CTS13337(1)6R3D(2)(3)	19.8	8	1
10 V_{DC} AT +85 °C					
3.9	A	CTS13395(1)010A(2)(3)	1.0	6	10
4.7	A	CTS13475(1)010A(2)(3)	1.0	6	10
27	B	CTS13276(1)010B(2)(3)	2.7	6	5
33	B	CTS13336(1)010B(2)(3)	3.3	6	5
82	C	CTS13826(1)010C(2)(3)	8.2	6	2
100	C	CTS13107(1)010C(2)(3)	10.0	6	2
180	D	CTS13187(1)010D(2)(3)	18.0	6	1
220	D	CTS13227(1)010D(2)(3)	22.0	8	1
16 V_{DC} AT +85 °C					
2.7	A	CTS13275(1)016A(2)(3)	1.0	6	10
3.3	A	CTS13335(1)016A(2)(3)	1.0	6	10
18	B	CTS13186(1)016B(2)(3)	2.9	6	5
22	B	CTS13226(1)016B(2)(3)	3.5	6	5
56	C	CTS13566(1)016C(2)(3)	9.0	6	2
68	C	CTS13686(1)016C(2)(3)	10.9	6	2
120	D	CTS13127(1)016D(2)(3)	19.2	8	1
150	D	CTS13157(1)016D(2)(3)	24.0	8	1
20 V_{DC} AT +85 °C					
1.8	A	CTS13185(1)020A(2)(3)	1.0	6	10
2.2	A	CTS13225(1)020A(2)(3)	1.0	6	10
12	B	CTS13126(1)020B(2)(3)	2.4	6	5
15	B	CTS13156(1)020B(2)(3)	3.0	6	5
39	C	CTS13396(1)020C(2)(3)	7.8	6	2
47	C	CTS13476(1)020C(2)(3)	9.4	6	2
82	D	CTS13826(1)020D(2)(3)	16.4	6	1
100	D	CTS13107(1)020D(2)(3)	20.0	8	1
25 V_{DC} AT +85 °C					
1.2	A	CTS13125(1)025A(2)(3)	1.0	6	10
1.5	A	CTS13155(1)025A(2)(3)	1.0	6	10
8.2	B	CTS13825(1)025B(2)(3)	2.1	6	5
10	B	CTS13106(1)025B(2)(3)	2.5	6	5
27	C	CTS13276(1)025C(2)(3)	6.8	6	2
33	C	CTS13336(1)025C(2)(3)	8.3	6	2
56	D	CTS13566(1)025D(2)(3)	14.0	6	1
68	D	CTS13686(1)025D(2)(3)	17.0	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code



STANDARD RATINGS / EXTENDED RATINGS - CTS13

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
40 V _{DC} AT +85 °C					
0.47	A	CTS13474(1)040A(2)(3)	1.0	6	10
0.56	A	CTS13564(1)040A(2)(3)	1.0	6	10
0.68	A	CTS13684(1)040A(2)(3)	1.0	6	10
0.82	A	CTS13824(1)040A(2)(3)	1.0	6	10
1.0	A	CTS13105(1)040A(2)(3)	1.0	6	10
1.2	A	CTS13125(1)040A(2)(3)	1.0	6	10
1.5	B	CTS13155(1)040B(2)(3)	1.0	6	5
1.8	B	CTS13185(1)040B(2)(3)	1.0	6	5
2.2	B	CTS13225(1)040B(2)(3)	1.0	6	5
2.7	B	CTS13275(1)040B(2)(3)	1.1	6	5
3.3	B	CTS13335(1)040B(2)(3)	1.3	6	5
3.9	B	CTS13395(1)040B(2)(3)	1.6	6	5
4.7	B	CTS13475(1)040B(2)(3)	1.9	6	5
5.6	B	CTS13565(1)040B(2)(3)	2.2	6	5
6.8	B	CTS13685(1)040B(2)(3)	2.7	6	5
8.2	C	CTS13825(1)040C(2)(3)	3.3	6	2
10	C	CTS13106(1)040C(2)(3)	4.0	6	2
12	C	CTS13126(1)040C(2)(3)	4.8	6	2
15	C	CTS13156(1)040C(2)(3)	6.0	6	2
18	C	CTS13186(1)040C(2)(3)	7.2	6	2
22	C	CTS13226(1)040C(2)(3)	8.8	6	2
27	D	CTS13276(1)040D(2)(3)	10.8	6	1
33	D	CTS13336(1)040D(2)(3)	13.2	6	1
39	D	CTS13396(1)040D(2)(3)	15.6	6	1
47	D	CTS13476(1)040D(2)(3)	18.8	6	1
50 V _{DC} AT +85 °C					
0.27	A	CTS13274(1)050A(2)(3)	1.0	6	n/a
0.33	A	CTS13334(1)050A(2)(3)	1.0	6	10
0.39	A	CTS13394(1)050A(2)(3)	1.0	6	10
0.47	A	CTS13474(1)050A(2)(3)	1.0	6	10
0.56	A	CTS13564(1)050A(2)(3)	1.0	6	10
0.68	A	CTS13684(1)050A(2)(3)	1.0	6	10
0.82	A	CTS13824(1)050A(2)(3)	1.0	6	10
1.0	A	CTS13105(1)050A(2)(3)	1.0	6	10
1.2	B	CTS13125(1)050B(2)(3)	1.0	6	5
1.5	B	CTS13155(1)050B(2)(3)	1.0	6	5
1.8	B	CTS13185(1)050B(2)(3)	1.0	6	5
2.2	B	CTS13225(1)050B(2)(3)	1.1	6	5
2.7	B	CTS13275(1)050B(2)(3)	1.4	6	5
3.3	B	CTS13335(1)050B(2)(3)	1.7	6	5
3.9	B	CTS13395(1)050B(2)(3)	2.0	6	5

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - CTS13**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
50 V_{DC} AT +85 °C					
4.7	B	CTS13475(1)050B(2)(3)	2.4	6	5
5.6	C	CTS13565(1)050C(2)(3)	2.8	6	2
6.8	C	CTS13685(1)050C(2)(3)	3.4	6	2
8.2	C	CTS13825(1)050C(2)(3)	4.1	6	2
10	C	CTS13106(1)050C(2)(3)	5.0	6	2
12	C	CTS13126(1)050C(2)(3)	6.0	6	2
15	C	CTS13156(1)050C(2)(3)	7.5	6	2
18	C	CTS13186(1)050C(2)(3)	9.0	6	2
22	D	CTS13226(1)050D(2)(3)	11.0	6	1
63 V_{DC} AT +85 °C					
0.10	A	CTS13104(1)063A(2)(3)	1.0	6	n/a
0.12	A	CTS13124(1)063A(2)(3)	1.0	6	n/a
0.15	A	CTS13154(1)063A(2)(3)	1.0	6	n/a
0.18	A	CTS13184(1)063A(2)(3)	1.0	6	n/a
0.22	A	CTS13224(1)063A(2)(3)	1.0	6	n/a
0.27	A	CTS13274(1)063A(2)(3)	1.0	6	n/a
0.33	A	CTS13334(1)063A(2)(3)	1.0	6	10
0.39	A	CTS13394(1)063A(2)(3)	1.0	6	10
0.47	A	CTS13474(1)063A(2)(3)	1.0	6	10
0.56	A	CTS13564(1)063A(2)(3)	1.0	6	10
0.68	A	CTS13684(1)063A(2)(3)	1.0	6	10
0.82	B	CTS13824(1)063B(2)(3)	1.0	6	5
1.0	B	CTS13105(1)063B(2)(3)	1.0	6	5
1.2	B	CTS13125(1)063B(2)(3)	1.0	6	5
1.5	B	CTS13155(1)063B(2)(3)	1.0	6	5
1.8	B	CTS13185(1)063B(2)(3)	1.1	6	5
2.2	B	CTS13225(1)063B(2)(3)	1.4	6	5
2.7	B	CTS13275(1)063B(2)(3)	1.7	6	5
3.3	B	CTS13335(1)063B(2)(3)	2.1	6	5
3.9	B	CTS13395(1)063B(2)(3)	2.5	6	5
4.7	C	CTS13475(1)063C(2)(3)	3.0	6	2
5.6	C	CTS13565(1)063C(2)(3)	3.5	6	2
6.8	C	CTS13685(1)063C(2)(3)	4.3	6	2
8.2	C	CTS13825(1)063C(2)(3)	5.2	6	2
10	C	CTS13106(1)063C(2)(3)	6.3	6	2
12	D	CTS13126(1)063D(2)(3)	7.6	6	1
15	D	CTS13156(1)063D(2)(3)	9.5	6	1
18	D	CTS13186(1)063D(2)(3)	11.3	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code



STANDARD RATINGS / EXTENDED RATINGS - 749DX					
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
6.3 V_{DC} AT +85 °C; 4 V_{DC} AT +125 °C					
5.6	A	749DX565(1)6R3A(2)(3)	1.0	6	10
6.8	A	749DX685(1)6R3A(2)(3)	1.0	6	10
47	B	749DX476(1)6R3B(2)(3)	2.8	6	5
56	B	749DX566(1)6R3B(2)(3)	3.4	6	5
150	C	749DX157(1)6R3C(2)(3)	9.0	8	2
180	C	749DX187(1)6R3C(2)(3)	10.8	8	2
270	D	749DX277(1)6R3D(2)(3)	16.2	8	1
330	D	749DX337(1)6R3D(2)(3)	19.8	8	1
10 V_{DC} AT +85 °C; 6.3 V_{DC} AT +125 °C					
3.9	A	749DX395(1)010A(2)(3)	1.0	6	10
4.7	A	749DX475(1)010A(2)(3)	1.0	6	10
27	B	749DX276(1)010B(2)(3)	2.7	6	5
33	B	749DX336(1)010B(2)(3)	3.3	6	5
39	B	749DX396(1)010B(2)(3)	3.9	6	5
82	C	749DX826(1)010C(2)(3)	8.2	6	2
100	C	749DX107(1)010C(2)(3)	10.0	6	2
120	C	749DX127(1)010C(2)(3)	12.0	8	2
180	D	749DX187(1)010D(2)(3)	18.0	8	1
220	D	749DX227(1)010D(2)(3)	22.0	8	1
16 V_{DC} AT +85 °C; 10 V_{DC} AT +125 °C					
2.7	A	749DX275(1)016A(2)(3)	1.0	6	10
3.3	A	749DX335(1)016A(2)(3)	1.0	6	10
18	B	749DX186(1)016B(2)(3)	2.9	6	5
22	B	749DX226(1)016B(2)(3)	3.5	6	5
56	C	749DX566(1)016C(2)(3)	9.0	6	2
68	C	749DX686(1)016C(2)(3)	10.9	6	2
120	D	749DX127(1)016D(2)(3)	19.2	8	1
150	D	749DX157(1)016D(2)(3)	24.0	8	1
20 V_{DC} AT +85 °C; 13 V_{DC} AT +125 °C					
1.8	A	749DX185(1)020A(2)(3)	1.0	6	10
2.2	A	749DX225(1)020A(2)(3)	1.0	6	10
12	B	749DX126(1)020B(2)(3)	2.4	6	5
15	B	749DX156(1)020B(2)(3)	3.0	6	5
39	C	749DX396(1)020C(2)(3)	7.8	6	2
47	C	749DX476(1)020C(2)(3)	9.4	6	2
82	D	749DX826(1)020D(2)(3)	16.4	6	1
100	D	749DX107(1)020D(2)(3)	20.0	6	1
25 V_{DC} AT +85 °C; 16 V_{DC} AT +125 °C					
1.2	A	749DX125(1)025A(2)(3)	1.0	6	10
1.5	A	749DX155(1)025A(2)(3)	1.0	6	10
8.2	B	749DX825(1)025B(2)(3)	2.1	6	5

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - 749DX**

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
25 V_{DC} AT +85 °C; 16 V_{DC} AT +125 °C					
10	B	749DX106(1)025B(2)(3)	2.5	6	5
27	C	749DX276(1)025C(2)(3)	6.8	6	2
33	C	749DX336(1)025C(2)(3)	8.3	6	2
56	D	749DX566(1)025D(2)(3)	14.0	6	1
68	D	749DX686(1)025D(2)(3)	17.0	6	1
35 V_{DC} AT +85 °C; 23 V_{DC} AT +125 °C					
0.10	A	749DX104(1)035A(2)(3)	1.0	6	n/a
0.12	A	749DX124(1)035A(2)(3)	1.0	6	n/a
0.15	A	749DX154(1)035A(2)(3)	1.0	6	n/a
0.18	A	749DX184(1)035A(2)(3)	1.0	6	n/a
0.22	A	749DX224(1)035A(2)(3)	1.0	6	n/a
0.27	A	749DX274(1)035A(2)(3)	1.0	6	n/a
0.33	A	749DX334(1)035A(2)(3)	1.0	6	n/a
0.39	A	749DX394(1)035A(2)(3)	1.0	6	n/a
0.47	A	749DX474(1)035A(2)(3)	1.0	6	n/a
0.56	A	749DX564(1)035A(2)(3)	1.0	6	n/a
0.68	A	749DX684(1)035A(2)(3)	1.0	6	10
0.82	A	749DX824(1)035A(2)(3)	1.0	6	10
1.0	A	749DX105(1)035A(2)(3)	1.0	6	10
1.2	B	749DX125(1)035B(2)(3)	1.0	6	5
1.5	B	749DX155(1)035B(2)(3)	1.0	6	5
1.8	B	749DX185(1)035B(2)(3)	1.0	6	5
2.2	B	749DX225(1)035B(2)(3)	1.0	6	5
2.7	B	749DX275(1)035B(2)(3)	1.0	6	5
3.3	B	749DX335(1)035B(2)(3)	1.2	6	5
3.9	B	749DX395(1)035B(2)(3)	1.4	6	5
4.7	B	749DX475(1)035B(2)(3)	1.6	6	5
5.6	B	749DX565(1)035B(2)(3)	2.0	6	5
6.8	B	749DX685(1)035B(2)(3)	2.4	6	5
8.2	C	749DX825(1)035C(2)(3)	2.9	6	2
10	C	749DX106(1)035C(2)(3)	3.5	6	2
12	C	749DX126(1)035C(2)(3)	4.2	6	2
15	C	749DX156(1)035C(2)(3)	5.3	6	2
18	C	749DX186(1)035C(2)(3)	6.3	6	2
22	C	749DX226(1)035C(2)(3)	7.7	6	2
27	D	749DX276(1)035D(2)(3)	9.5	6	1
33	D	749DX336(1)035D(2)(3)	11.6	6	1
39	D	749DX396(1)035D(2)(3)	13.7	6	1
47	D	749DX476(1)035D(2)(3)	16.5	6	1
56	D	749DX566(1)035D(2)(3)	19.6	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code



STANDARD RATINGS / EXTENDED RATINGS - 749DX

CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
40 V _{DC} AT +85 °C; 25 V _{DC} AT +125 °C					
0.10	A	749DX104(1)040A(2)(3)	1.0	6	n/a
0.12	A	749DX124(1)040A(2)(3)	1.0	6	n/a
0.15	A	749DX154(1)040A(2)(3)	1.0	6	n/a
0.18	A	749DX184(1)040A(2)(3)	1.0	6	n/a
0.22	A	749DX224(1)040A(2)(3)	1.0	6	n/a
0.27	A	749DX274(1)040A(2)(3)	1.0	6	n/a
0.33	A	749DX334(1)040A(2)(3)	1.0	6	n/a
0.39	A	749DX394(1)040A(2)(3)	1.0	6	n/a
0.47	A	749DX474(1)040A(2)(3)	1.0	6	n/a
0.56	A	749DX564(1)040A(2)(3)	1.0	6	n/a
0.68	A	749DX684(1)040A(2)(3)	1.0	6	10
0.82	A	749DX824(1)040A(2)(3)	1.0	6	10
1.0	A	749DX105(1)040A(2)(3)	1.0	6	10
1.2	B	749DX125(1)040B(2)(3)	1.0	6	5
1.5	B	749DX155(1)040B(2)(3)	1.0	6	5
1.8	B	749DX185(1)040B(2)(3)	1.0	6	5
2.2	B	749DX225(1)040B(2)(3)	1.0	6	5
2.7	B	749DX275(1)040B(2)(3)	1.1	6	5
3.3	B	749DX335(1)040B(2)(3)	1.3	6	5
3.9	B	749DX395(1)040B(2)(3)	1.6	6	5
4.7	B	749DX475(1)040B(2)(3)	1.9	6	5
5.6	B	749DX565(1)040B(2)(3)	2.2	6	5
6.8	B	749DX685(1)040B(2)(3)	2.7	6	5
8.2	C	749DX825(1)040C(2)(3)	3.3	6	2
10	C	749DX106(1)040C(2)(3)	4.0	6	2
12	C	749DX126(1)040C(2)(3)	4.8	6	2
15	C	749DX156(1)040C(2)(3)	6.0	6	2
18	C	749DX186(1)040C(2)(3)	7.2	6	2
22	C	749DX226(1)040C(2)(3)	8.8	6	2
27	D	749DX276(1)040D(2)(3)	10.8	6	1
33	D	749DX336(1)040D(2)(3)	13.2	6	1
39	D	749DX396(1)040D(2)(3)	15.6	6	1
50 V _{DC} AT +85 °C; 33 V _{DC} AT +125 °C					
0.82	A	749DX824(1)050A(2)(3)	1.0	6	10
1.0	A	749DX105(1)050A(2)(3)	1.0	6	10
1.2	B	749DX125(1)050B(2)(3)	1.0	6	5
1.5	B	749DX155(1)050B(2)(3)	1.0	6	5
1.8	B	749DX185(1)050B(2)(3)	1.0	6	5
2.2	B	749DX225(1)050B(2)(3)	1.1	6	5
2.7	B	749DX275(1)050B(2)(3)	1.4	6	5
3.3	B	749DX335(1)050B(2)(3)	1.7	6	5

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code

**STANDARD RATINGS / EXTENDED RATINGS - 749DX**

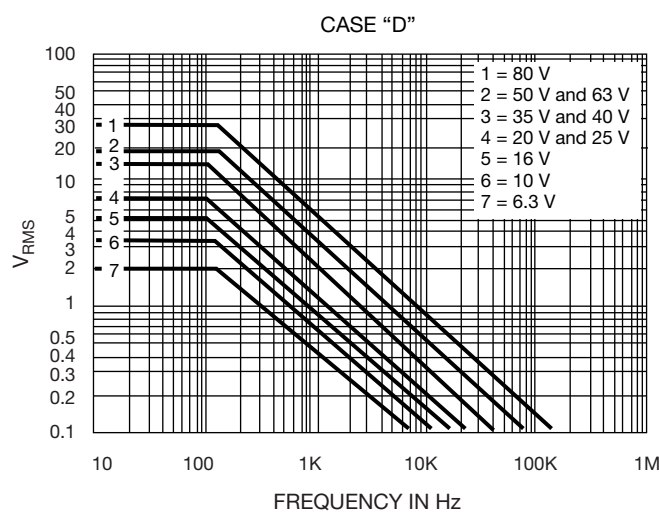
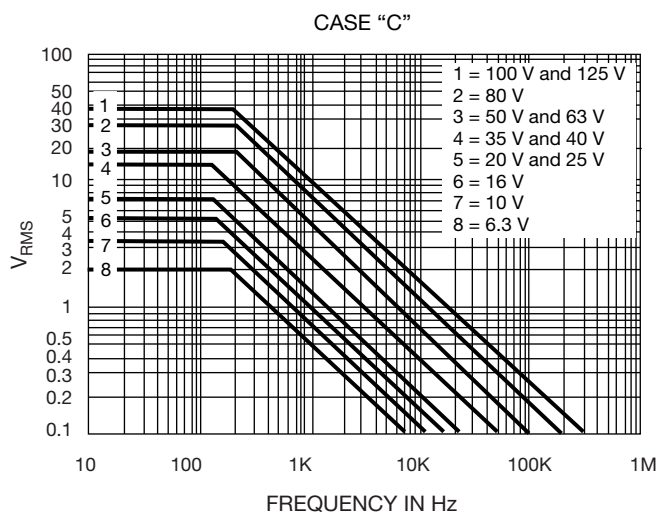
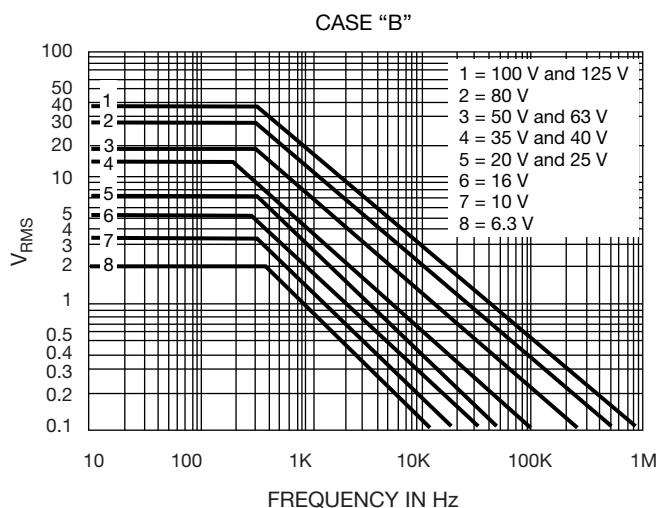
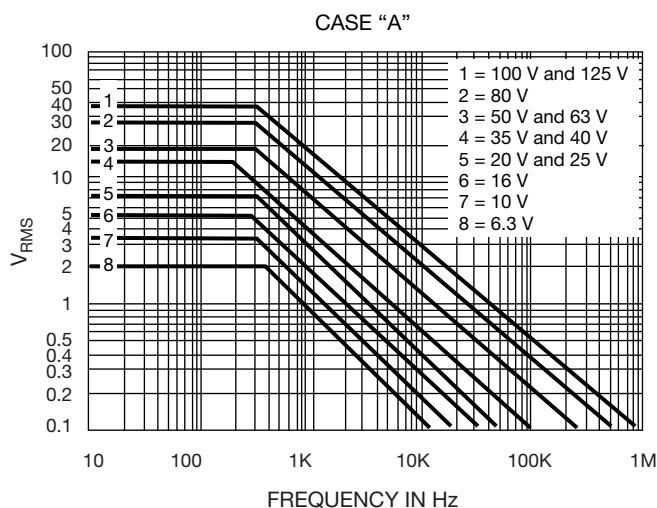
CAPACITANCE (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT +25 °C (μ A)	MAX. DF AT +25 °C 120 Hz (%)	MAX. IMPEDANCE AT +25 °C 100 kHz (Ω)
50 V_{DC} AT +85 °C; 33 V_{DC} AT +125 °C					
3.9	B	749DX395(1)050B(2)(3)	2.0	6	5
4.7	B	749DX475(1)050B(2)(3)	2.4	6	5
5.6	C	749DX565(1)050C(2)(3)	2.8	6	2
6.8	C	749DX685(1)050C(2)(3)	3.4	6	2
8.2	C	749DX825(1)050C(2)(3)	4.1	6	2
10	C	749DX106(1)050C(2)(3)	5.0	6	2
12	C	749DX126(1)050C(2)(3)	6.0	6	2
15	C	749DX156(1)050C(2)(3)	7.5	6	2
18	C	749DX186(1)050C(2)(3)	9.0	6	2
22	D	749DX226(1)050D(2)(3)	11.0	6	1
63 V_{DC} AT +85 °C; 40 V_{DC} AT +125 °C					
0.10	A	749DX104(1)063A(2)(3)	1.0	6	n/a
0.12	A	749DX124(1)063A(2)(3)	1.0	6	n/a
0.15	A	749DX154(1)063A(2)(3)	1.0	6	n/a
0.18	A	749DX184(1)063A(2)(3)	1.0	6	n/a
0.22	A	749DX224(1)063A(2)(3)	1.0	6	n/a
0.27	A	749DX274(1)063A(2)(3)	1.0	6	n/a
0.33	A	749DX334(1)063A(2)(3)	1.0	6	n/a
0.39	A	749DX394(1)063A(2)(3)	1.0	6	n/a
0.47	A	749DX474(1)063A(2)(3)	1.0	6	n/a
0.56	A	749DX564(1)063A(2)(3)	1.0	6	n/a
0.68	A	749DX684(1)063A(2)(3)	1.0	6	10
0.82	B	749DX824(1)063B(2)(3)	1.0	6	5
1.0	B	749DX105(1)063B(2)(3)	1.0	6	5
1.2	B	749DX125(1)063B(2)(3)	1.0	6	5
1.5	B	749DX155(1)063B(2)(3)	1.0	6	5
1.8	B	749DX185(1)063B(2)(3)	1.1	6	5
2.2	B	749DX225(1)063B(2)(3)	1.4	6	5
2.7	B	749DX275(1)063B(2)(3)	1.7	6	5
3.3	B	749DX335(1)063B(2)(3)	2.1	6	5
3.9	B	749DX395(1)063B(2)(3)	2.5	6	5
4.7	C	749DX475(1)063C(2)(3)	3.0	6	2
5.6	C	749DX565(1)063C(2)(3)	3.5	6	2
6.8	C	749DX685(1)063C(2)(3)	4.3	6	2
8.2	C	749DX825(1)063C(2)(3)	5.2	6	2
10	C	749DX106(1)063C(2)(3)	6.3	6	2
12	D	749DX126(1)063D(2)(3)	7.6	6	1
15	D	749DX156(1)063D(2)(3)	9.5	6	1
18	D	749DX186(1)063D(2)(3)	11.3	6	1

Note

- Part number definitions:
 - Capacitance tolerance code: X5, X9, X0
 - Style number: 0 or 2
 - Packaging code



TYPICAL CURVES RIPPLE VOLTAGE AT +25 °C



**PERFORMANCE CHARACTERISTICS****1. Operating Temperature:**

-55 °C to +85 °C with rated DC voltage U_R applied, +85 °C to +125 °C with linear voltage derating to category voltage U_C (only for types CTS1, 749DX).

2. Capacitance and Tolerance:

Capacitance measured at 100 Hz and +25 °C shall be within the specified tolerance limits of the nominal rating. Capacitance measurement shall be made by means of a polarized capacitance bridge. The polarizing voltage shall be of 2.2 V. The maximum voltage applied during measurements shall be 1.0 V_{RMS} at 100 Hz and +25 °C.

3. Reverse Voltage:

These capacitors are capable of withstanding peak voltage in the reverse direction equal to: 15 % of the rated DC voltage at +25 °C, 5 % of the rated DC voltage at +85 °C.

4. Surge Voltage:**Table 1**

PRODUCT TYPE	SURGE VOLTAGE AT +85 °C	SURGE VOLTAGE AT +125 °C
CTS13	1.30 U_R	-
749DX / CTS1	1.30 U_R	1.30 U_C

Capacitors shall withstand the surge voltage applied in series with a 1000 W resistor, at the rate of 1.5 min on, 5.5 min off, for 1000 successive test cycles at +85 °C or at +125 °C. After test, dissipation factor and leakage current shall meet the initial requirements at +25 °C (see below), capacitance change shall not exceed ± 10 % of initial value at +25 °C.

5. Leakage Current:

Rated voltage U_R shall be applied to capacitors during five minutes with a resistor of 1000 W in series with each capacitor, before making DC leakage current measurements. The leakage current shall not exceed the following limits:

Table 2

TEMPERATURE	CTS1 / CTS13 / 749DX
+25 °C	0.01 $C_R \times U_R$ or 1 μA whichever is greater
+85 °C	0.1 $C_R \times U_R$ or 10 μA whichever is greater
+125 °C	0.125 $C_R \times U_R$ or 12.5 μA whichever is greater

6. Dissipation Factor:

The dissipation factor, when measured at 100 Hz, shall not exceed the values below:

Table 3

TEMP.	CTS1 / CTS13		749DX	
	$C_R U_R \leq 1900$	$C_R U_R > 1900$	$C_R \leq 100$	$C_R > 100$
-55 °C	9 %	11 %	8 %	10 %
+25 °C	6 %	8 %	6 %	8 %
+85 °C	9 %	11 %	-	-
+125 °C ⁽¹⁾	12 %	14 %	10 %	11 %

Note

⁽¹⁾ Not applicable for CTS13

7. Stability at Low and High Temperature:

Capacitance change with temperature shall not exceed the limits of the following table, leakage current and dissipation factor shall be within the limits specified in Tables 2 and 3.

Table 4

TEMPERATURE	CTS1 / CTS13 / 749DX
-55 °C	-10 %
+85 °C	+12 %
+125 °C ⁽¹⁾	+15 %

Note

⁽¹⁾ Not applicable for CTS13

8. Impedance:

The impedance measured at 100 kHz and 25 °C shall not exceed the following values:

Table 5

CASE CODE	Z (W) ⁽¹⁾
A	10
B	5
C	2
D	1

Note

⁽¹⁾ Not applicable for $C_R \leq 0.68 \mu F$

9. Life Test:

After 2000 h at +85 °C with rated DC voltage applied, or after 2000 h at +125 °C with category DC voltage applied (for types CTS1, 749DX only) capacitors shall meet the requirements in Table 6.

Table 6

PRODUCT TYPE	CAPACITANCE CHANGE	DISSIPATION FACTOR	DC LEAKAGE CURRENT
CTS1 CTS13 749DX	Within ± 10 % of initial value at +25 °C	Within initial requirement at +25 °C	Within 125 % of initial requirements at +25 °C

**PERFORMANCE CHARACTERISTICS (Continued)****10. Humidity Test:**

After 56 days (1350 h) at +40 °C, 90 % to 95 % of relative humidity (per IEC 68-2-3) with no voltage applied, capacitors shall meet the requirements in Table 7 below.

Table 7

CAPACITANCE CHANGE	Within ± 3 % of initial value
DC LEAKAGE CURRENT	Within initial requirement at +25 °C - Table 2
DISSIPATION FACTOR	Within initial requirement at +25 °C - Table 3

Table 8

CAPACITANCE CHANGE	Within ± 5 % of initial value at +25 °C
DC LEAKAGE CURRENT	Within initial requirement at +25 °C - Table 2
DISSIPATION FACTOR	Within initial requirement at +25 °C - Table 3

Typical values of charge-discharge current (per above test conditions).

RATED VOLTAGE U_R (V)	CHARGE-DISCHARGE CURRENT (A)
6.3	13
10	20
16	32
25	50
40	80
50	100
63	126

11. Insulation Test:

For capacitors with insulating sleeves, a DC voltage of 100 V shall be applied for one minute between the case of the capacitor and a metal "V" block in intimate contact with the insulating sleeve. The insulating resistance measured in these conditions shall be at least 100 MΩ.

12. Lead Pull Test:

Leads shall withstand the following test (IEC 68-2-2): tensile stress of 5N (cases A and B) or 10N (cases C and D) for 10 s in any direction

One bend in each direction

Two consecutive rotations of 180°

GUIDE TO APPLICATION**1. AC Ripple Current:**

The maximum allowable ripple current shall be determined from the formula:

$$I_{RMS} = \sqrt{\frac{P}{R_{ESR}}}$$

where,

P = power dissipation in W at +25 °C as given below

R_{ESR} = the capacitor Equivalent Series Resistance at the specified frequency.

2. AC Ripple Voltage:

The maximum allowable ripple voltage shall be determined from the formula:

$$V_{RMS} = \sqrt{\frac{P}{R_{ESR}}} \times Z$$

where,

Z = the capacitor impedance at the specified frequency.

The calculations are summarized on the graphs in table "Typical Curves Ripple Voltage at +25 °C" giving the maximum available ripple voltage as a function of frequency.

However, the sum of the peak AC voltage plus the DC voltage shall not exceed the rated DC voltage at +85 °C of the capacitor. The sum of the negative peak AC voltage plus the DC voltage shall not allow a voltage reversal exceeding 15 % of the rated DC voltage.

3. AC Ripple Current or Voltage Derating Factor:

If these capacitors are to be operated at temperatures above +25 °C, the permissible RMS ripple current or voltage shall be calculated using the derating factors in the table below:

TEMPERATURE	DERATING FACTOR
+25 °C	1.0
+55 °C	0.8
+85 °C	0.6
+125 °C	0.4

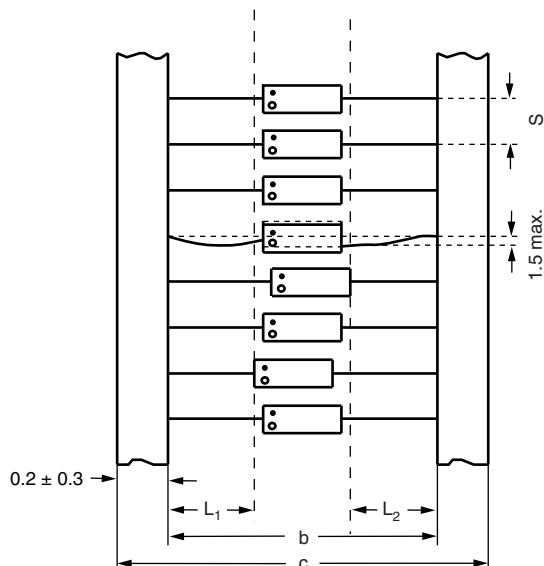
4. Power Dissipation:

Power dissipation will be affected by the heat sinking capability of the mounting surface. Non-sinusoidal ripple current may produce heating effects which differ from those shown in the following table. It is important that the equivalent I_{RMS} value be established when calculating permissible operating levels.

CASE CODE	POWER DISSIPATION AT +25 °C (W)
A	0.115
B	0.145
C	0.185
D	0.225

TAPE AND REEL PACKAGING

Meets EIA standard RS-296



$L_1 - L_2 = 1.5 \text{ mm max.}$
 $S = \text{component spacing}$
(cumulative tolerance on 20 units = 4 mm)
 $b = \text{tape spacing}$
 $c = \text{overall length}$

STANDARD PACKAGING QUANTITY AND DIMENSIONS in millimeters

CASE SIZE	REEL AND AMMO S	REEL PACK					AMMO PACK			BULK
		OPTION P		OPTION R		QTY PER REEL	OPTION G		QTY PER BOX	QTY PER PACK
		B	C MAX.	B	C MAX.		B	C MAX.		
A	5.0 ± 0.3	63 ± 2	78	53 ± 2	68	1000	53 ± 2	68	500	100
B	5.0 ± 0.3	63 ± 2	78	53 ± 2	68	1000	53 ± 2	68	500	75
C	10.0 ± 0.3	63 ± 2	78	63 ± 2	78	500	53 ± 2	68	250	50
D	10.0 ± 0.3	63 ± 2	78	63 ± 2	78	500	53 ± 2	68	250	25
PACKAGING CODE		P		R			G			B

MARKING

Capacitors shall be marked with Sprague and / or the registered trademark 2 at vendor's option; the type number; rated capacitance and tolerance (with a letter code, if different from $\pm 20\%$, $K = \pm 10\%$; $J = \pm 5\%$); rated DC voltage at $+85^\circ\text{C}$ and the date code of manufacture.

Capacitors shall be marked on one end with a "plus" sign (+) to identify the positive terminal.



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