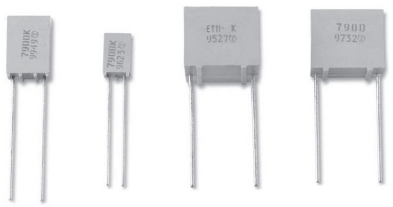
Resin-Molded, Radial-Lead Solid Tantalum Capacitors



FEATURES

- Four case sizes precisely molded with a flame retardant epoxy resin
- Stand off on all case sizes
- Available on tape for automatic insertion equipment (only A- and B-case, C-and D-case on request).
- Low leakage current
- Low impedance
- Extended value ranges available

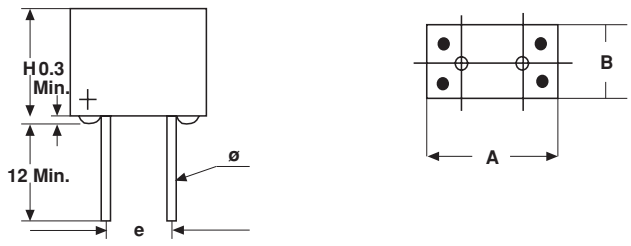
PERFORMANCE CHARACTERISTICS

Operating temperature range: – 55°C to + 125°C

ORDERING INFORMATION

790D	157	X0	006	R	2	P
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING AT + 85°C	CASE CODE	STYLE NUMBER	PACKAGING
790D = Standard and Extended Range	Expressed in picofarads. First two digits are significant figures. Third digit is the number of zeros to follow.	X0 = ± 20% X9 = ± 10%	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.	Insulated Case (Standard)	See Taping Specification B : Bulk G : Ammopack H = 16.5mm H : Ammopack H = 18.5mm I : Ammopack Shouldered Leads (A case) X : Reel Pack H = 16.5mm Y : Reel Pack H = 18.5mm Z : Reel Pack Shouldered Leads (A case)

DIMENSIONS in millimeters



CASE CODE	H MAX. (mm)	A MAX. (mm)	B MAX. (mm)	E ± 0.15 (mm)	Ø 0.05 (+ 10%) (mm)
A	7.3	4.7	4.2	2.54	0.5
B	10.5	7.3	4.8	5.08	0.5
C	10.5	12.3	7.3	10.16	0.6
D	10.5	12.3	12.3	10.16	0.6

PACKAGING QUANTITIES

CASE CODE	REEL X/Y	AMMO G/H	BULK B
A	1000	1000	500
B	1000	1000	250
C	300*	300*	100
D	200*	200*	50

*Non preferred configuration on request only

RATINGS AND CASE CODES

C_R µF	RATED VOLATAGE U_R @ + 85°C															
	6.3V		10V		16V		20V		25V		35V		40V		50V	
	CATEGORY VOLTAGE U_C @ +125°C															
	4.0V		6.3V		10V		13V		16V		23V		25V		32V	
	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.	Std.	Ext.
0.10													A		A	
0.15															A	
0.22															A	
0.33													A			
0.47													A			
0.68																
1.0													A		A	
1.5									A				B		B	
2.2					A		A						B		B	
3.3					A							A	B		B	
4.7			A							A			B		B	
6.8	A							A					B		C	
10						A			B			B	C		C	
15				A	B		B			B			C		C	
22		A			B			B		B			C			
33			B			B			C			C				
47	B			B	C		C									
68		B		B	C			C								
100			C		D	C										
150	C			C												
220		C	D													
330	D															

STANDARD/EXTENDED RATINGS

CAPACITANCE C_R (μF)	CASE CODE	PART NUMBER	MAX. DCL @ + 25°C (μA)	MAX. DF 120Hz, @ + 25°C (%)	MAX. IMPEDANCE 100kHz, @ + 25°C (OHMS)
U_R = 6.3 Volt @ + 85°C, SURGE = 8 V			**U_C = 4 V @ + 125°C, SURGE = 5 V**		
6.8	A	790D685X(*)6R3A2(#)	1.0	6	4.0
22.0	**A**	**790D226X(*)6R3A2(#)**	**1.3**	**6**	**2.1**
47.0	B	790D476X(*)6R3B2(#)	2.9	6	1.3
68.0	**B**	**790D686X(*)6R3B2(#)**	**4.2**	**6**	**1.3**
150.0	C	790D157X(*)6R3C2(#)	9.4	6	0.6
220.0	**C**	**790D227X(*)6R3C2(#)**	**13.8**	**6**	**0.6**
330.0	D	790D337X(*)6R3D2(#)	20.7	8	0.4
U_R = 10 Volt @ + 85°C, SURGE = 13 V			**U_C = 6.3 V @ + 125°C, SURGE = 8 V**		
4.7	A	790D475X(*)010A2(#)	1.0	6	4.0
15.0	**A**	**790D156X(*)010A2(#)**	**1.5**	**6**	**2.5**
33.0	B	790D336X(*)010B2(#)	3.3	6	1.3
47.0	**B**	**790D476X(*)010B2(#)**	**4.7**	**6**	**1.4**
68.0	**B**	**790D686X(*)010B2(#)**	**6.8**	**6**	**1.3**
100.0	C	790D107X(*)010C2(#)	10.0	6	0.6
150.0	**C**	**790D157X(*)010C2(#)**	**15.0**	**6**	**0.6**
220.0	D	790D227X(*)010D2(#)	22.0	8	0.4
U_R = 16 Volt @ + 85°C, SURGE = 20 V			**U_C = 10 V @ + 125°C, SURGE = 13 V**		
2.2	A	790D225X(*)016A2(#)	1.0	6	5.5
3.3	A	790D335X(*)016A2(#)	1.0	6	4.4
10.0	**A**	**790D106X(*)016A2(#)**	**1.6**	**6**	**2.7**
15.0	B	790D156X(*)016B2(#)	2.4	6	1.6
22.0	B	790D226X(*)016B2(#)	3.5	6	1.3
33.0	**B**	**790D336X(*)016B2(#)**	**5.2**	**6**	**1.6**
47.0	C	790D476X(*)016C2(#)	7.5	6	0.8
68.0	C	790D686X(*)016C2(#)	10.8	6	0.6
100.0	**C**	**790D107X(*)016C2(#)**	**16.0**	**6**	**0.7**
100.0	D	790D107X(*)016D2(#)	16.0	6	0.5
U_R = 20 Volt @ + 85°C, SURGE = 26 V			**U_C = 13 V @ + 125°C, SURGE = 16 V**		
2.2	A	790D225X(*)020A2(#)	1.0	6	5.5
6.8	**A**	**790D685X(*)020A2(#)**	**1.3**	**6**	**3.5**
15.0	B	790D156X(*)020B2(#)	3.0	6	1.5
22.0	**B**	**790D226X(*)020B2(#)**	**4.4**	**6**	**2.1**
47.0	C	790D476X(*)020C2(#)	9.4	6	0.7
68.0	**C**	**790D686X(*)020C2(#)**	**13.6**	**6**	**0.8**

Extended Ratings in bold print.

(*)Insert 0 for ± 20% tolerance or 9 for ± 10%

(#)See order information, packaging code

STANDARD/EXTENDED RATINGS

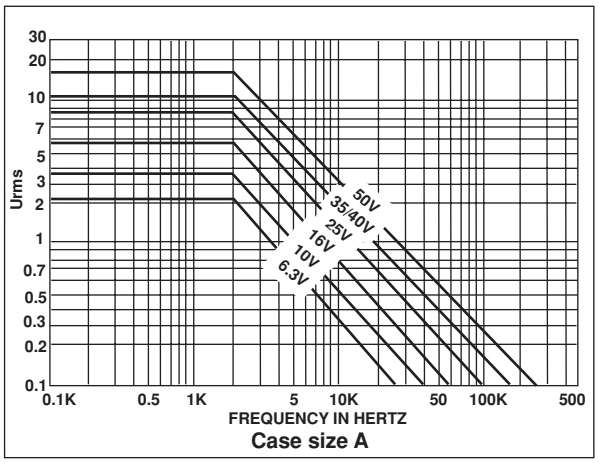
CAPACITANCE C_R (µF)	CASE CODE	PART NUMBER	MAX. DCL @ + 25°C (µA)	MAX. DF 120Hz, @ + 25°C (%)	MAX. IMPEDANCE 100kHz, @ + 25°C (OHMS)
		U_R = 25 Volt @ + 85°C, SURGE = 32 V U_C = 16 V @ + 125°C, SURGE = 20 V			
1.5	A	790D155X(*)025A2(#)	1.0	6	6.0
4.7	**A**	**790D475X(*)025A2(#)**	**1.1**	**6**	**4.5**
10.0	B	790D106X(*)025B2(#)	2.5	6	1.6
15.0	**B**	**790D156X(*)025B2(#)**	**3.7**	**6**	**2.4**
22.0	**B**	**790D226X(*)025B2(#)**	**5.5**	**6**	**2.1**
33.0	C	790D336X(*)025C2(#)	8.2	6	0.8
		U_R = 35 Volt @ + 85°C, SURGE = 45 V U_C = 23 V @ + 125°C, SURGE = 29 V			
3.3	**A**	**790D335X(*)035A2(#)**	**1.2**	**6**	**6.0**
10.0	**B**	**790D106X(*)035B2(#)**	**3.5**	**6**	**2.6**
33.0	**C**	**790D336X(*)035C2(#)**	**11.6**	**6**	**1.3**
		U_R = 40 Volt @ + 85°C, SURGE = 52 V U_C = 25 V @ + 125°C, SURGE = 32 V			
0.10	A	790D104X(*)040A2(#)	1.0	6	30
0.33	A	790D334X(*)040A2(#)	1.0	6	14
0.47	A	790D474X(*)040A2(#)	1.0	6	11
1.0	A	790D105X(*)040A2(#)	1.0	6	6.5
1.5	B	790D155X(*)040B2(#)	1.0	6	5.2
2.2	B	790D225X(*)040B2(#)	1.0	6	4.0
3.3	B	790D335X(*)040B2(#)	1.3	6	2.8
4.7	B	790D475X(*)040B2(#)	1.8	6	2.0
6.8	B	790D685X(*)040B2(#)	2.7	6	1.6
10.0	C	790D106X(*)040C2(#)	4.0	6	1.3
15.0	C	790D156X(*)040C2(#)	6.0	6	1.0
22.0	C	790D226X(*)040C2(#)	8.8	6	0.8
		U_R = 50 Volt @ + 85°C, SURGE = 65 V U_C = 32 V @ + 125°C, SURGE = 41 V			
0.10	A	790D104X(*)050A2(#)	1.0	6	30
0.15	A	790D154X(*)050A2(#)	1.0	6	24
0.22	A	790D224X(*)050A2(#)	1.0	6	18
1.0	A	790D105X(*)050A2(#)	1.0	6	6.5
1.5	B	790D155X(*)050B2(#)	1.0	6	5.2
2.2	B	790D225X(*)050B2(#)	1.1	6	4.0
3.3	B	790D335X(*)050B2(#)	1.6	6	2.8
4.7	B	790D475X(*)050B2(#)	2.3	6	2.0
6.8	C	790D685X(*)050C2(#)	3.4	6	1.6
10.0	C	790D106X(*)050C2(#)	5.0	6	1.3
15.0	C	790D156X(*)050C2(#)	7.5	6	1.0

Extended Ratings in bold print.

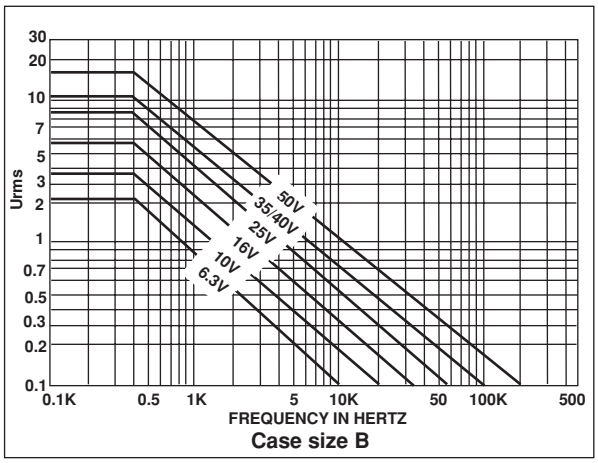
(*) Insert 0 for ± 20% tolerance or 9 for ± 10%

(#) See order information, packaging code

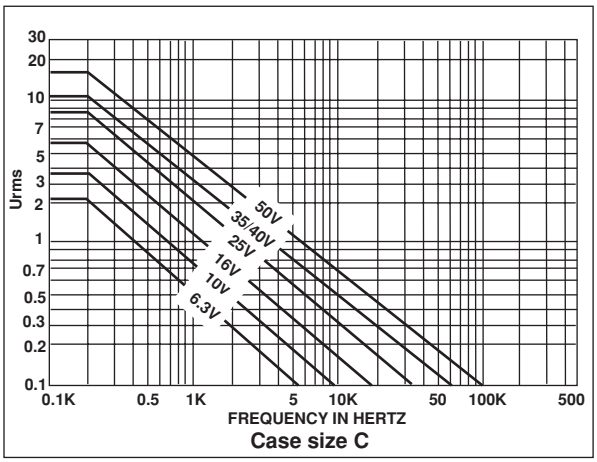
MAXIMUM PERMISSIBLE RIPPLE VOLTAGE AT + 25°C



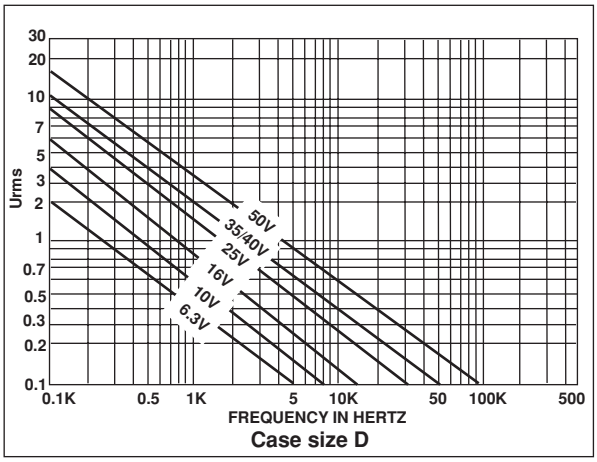
Case size A



Case size B

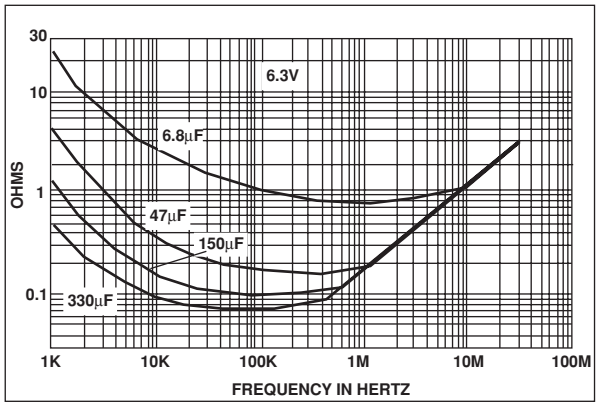


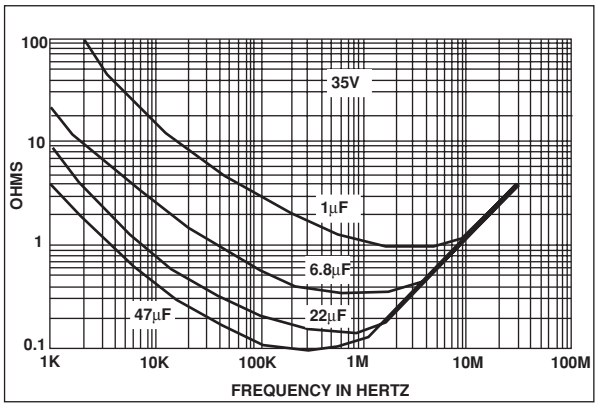
Case size C



Case size D

TYPICAL CURVES OF IMPEDANCE VS FREQUENCY





PERFORMANCE CHARACTERISTICS

1. **Operating Temperature**: - 55°C to + 85°C with rated voltage U_R applied. + 85°C to + 125°C with linear voltage derating to category voltage U_C (see general information) applied.

2. **Capacitance and Tolerance**: Capacitance measured at 100Hz and + 25°C shall be within the specified tolerance limits of the nominal rating.

3. **Reverse Voltage:** 15% of rated voltage at + 25°C
   5% of rated voltage at + 85°C

4. **Surge Voltage**: 130% of U_R at + 85°C
   130% of U_C at + 125°C.

5. **Impedance at 100 kHz:** Measured at + 20°C ± 5°C, impedance shall not exceed the values listed in data sheet.

6. **Stability at low and high temperatures:** Capacitance change with temperature, dissipation factor and DC leakage current shall not exceed the limits of the following table.

TEMP-ERATURE	CAPACITANCE CHANGE $C_RU_R \leq 1900$ $C_RU_R > 1900$	DISSIPATION FACTOR I_L	LEAKAGE CURRENT
- 55°C	- 10%	9% 11%	-
+ 25°C	-	6% 8%	0.01 C_R x U_R or 1µA whichever is greater
+ 85°C	+ 12%	9% 11%	0.1 C_R x U_R or 10µA whichever is greater
+ 125°C	+ 15%	12% 14%	0.125 C_R x U_R or 12.5µA whichever is greater

7. **Life Test**: 2000 hours at + 85°C with rated voltage applied 2000 hours at + 125°C. with category voltage applied.

   $\Delta C/C \leq 10\%$ of initial value

   $I_L \leq 1.25$ initial limit

   DF ≤ initial limit

8. **Humidity Test:** 56 days at + 40°C, 90% relative humidity

   $\Delta C/C \leq 8\%$ of initial value
   $I_L \leq$ initial limit
   DF ≤ initial limit

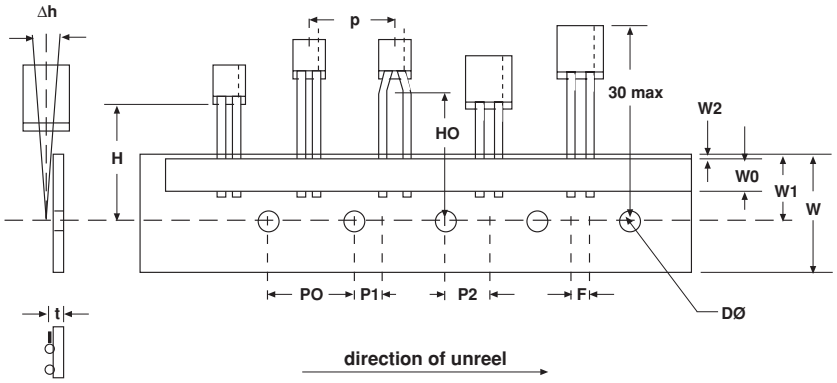
9. **Charge and Discharge Test**: 1 million cycles at + 85°C,
   0.5 s charge at U_R.
   0.5 s discharge
   Series resistance < 0.5 ohm

   $\Delta C/C \leq 5\%$ of initial value
   $I_L \leq$ initial limit
   DF ≤ initial limit

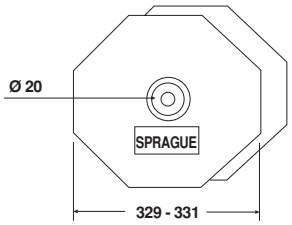
10. **Marking:**
    Top: Rating and polarity
    Front: Type, date code, SPRAGUE trademark

TAPE AND REEL PACKING

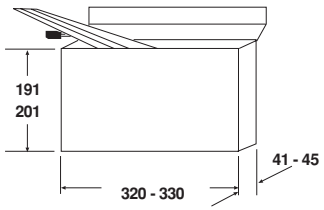
A and B Cases only (Meets IEC 286-2)



REEL PACKING



AMMOPACKING



CASE CODE	TAPE WIDTH	DIMENSIONS (mm) /UNITS PER REEL		
Pitch of component	P [mm]	12.7 ± 1.0		
Feed hole pitch	P0 [mm]	12.7 ± 0.3		
Tape width	W [mm]	18 (+1 / - 0.5)		
Hold down tape width	W0 [mm]	5.0		
Hole position	W1 [mm]	9 (+0.75 / -0.5)		
Hold down tape position	W2 [mm]	0 (+3 /-0)		
Feed hole diameter	D0 [mm]	4.0 ± 0.3		
Tape thickness	T [mm]	0.5 ± 0.2		
Component alignment	Δh [mm]	0 ± 2		
Lead clinch height	H0 [mm]	16.0 ± 0.5		
Hole center to component center	P2 [mm]	6.35 ± 1.3		
		Case A	**Case B**	**Case B**
Lead wire spacing	F[mm]	2.5 + 0.6, - 0.1	5 + 0.6, - 0.1	5 + 0.6, - 0.1
Feed hole center to wire center	P1 [mm]	5.1 ± 0.7	3.85 ± 0.7	3.85 ± 0.7
Reel pack options	H = 16.5 mm H = 18.5 mm	X Y	 Z	X Y
Ammopack options	H = 16.5 mm H = 18.5 mm	G H	 I	G H
Quantity per reel / box		1000	1000	1000

littlediode
COMPONENTS FOR ALL

Littlediode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.