

Resin-Molded, Radial-Lead Solid Tantalum Capacitors



FEATURES

- Terminations: Tin/lead (SnPb), 100 % tin (Sn)
- 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
- Compliant to RoHS directive 2002/95/EC



RoHS*
COMPLIANT

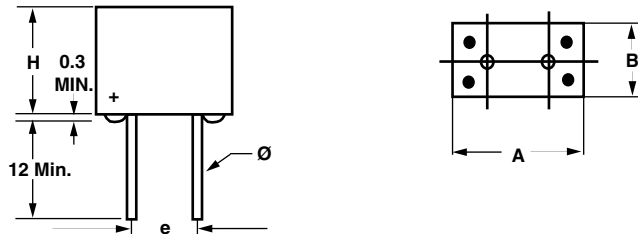
PERFORMANCE CHARACTERISTICS

Operating Temperature: - 55 °C to + 125 °C

ORDERING INFORMATION

790D	157	X0	006	R	2	P	E3
MODEL	CAPACITANCE	CAPACITANCE TOLERANCE	DC VOLTAGE RATING	CASE CODE	STYLE NUMBER	PACKAGING	ROHS COMPLIANT
790D = Standard and extended range	Expressed in picofarads. The first two digits are the significant figures. The third is the number of zeros following.	X0 = $\pm 20\%$ X9 = $\pm 10\%$	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 V)	See ratings and case codes table	Insulated case (standard)	See taping specification B : Bulk G : Ammopack H = 16.5 mm H : Ammopack H = 18.5 mm I : Ammopack shouldered Leads (A case) X : Reel Pack H = 16.5 mm Y : Reel Pack H = 18.5 mm Z : Reel pack shouldered Leads (A case)	E3 = 100 % tin termination (RoHS compliant) Blank = SnPb termination

DIMENSIONS in millimeters

					
CASE CODE	H MAX. (mm)	A MAX. (mm)	B MAX. (mm)	E ± 0.15 (mm)	$\varnothing 0.05$ (+ 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 ⁽¹⁾	300 ⁽¹⁾	100
D	200 ⁽¹⁾	200 ⁽¹⁾	50

Note

⁽¹⁾ Non preferred configuration on request only

* Pb containing terminations are not RoHS compliant, exemptions may apply

**RATINGS AND CASE CODES**

C _R μF	RATED VOLTAGE U _R AT + 85 °C															
	6.3 V		10 V		16 V		20 V		25 V		35 V		40 V		50 V	
	CATEGORY VOLTAGE U _C AT + 125 °C															
	4.0 V		6.3 V		10 V		13 V		16 V		23 V		25 V		32 V	
	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															A	
1.0													A			
1.5									A				B		A	
2.2					A		A						B		B	
3.3					A							A	B		B	
4.7			A							A			B		B	
6.8	A							A					B		B	
10						A			B			B	C		C	
15				A	B		B			B			C		C	
22		A			B			B		B			C		C	
33			B			B			C			C				
47	B			B	C		C									
68		B		B	C			C								
100			C		D	C	D									
150	C			C												
220		C	D													
330	D															

STANDARD/EXTENDED RATINGS

CAPACITANCE C_R (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF 120 Hz, AT + 25 °C (%)	MAX. IMPEDANCE 100 kHz, AT + 25 °C (Ω)
$U_R = 6.3$ V AT + 85 °C, SURGE = 8 V . . . $U_C = 4$ V AT + 125 °C, SURGE = 5 V					
6.8	A	790D685X(*)6R3A2(#)	1.0	6	4.0
22	A	790D226X(*)6R3A2(#)	1.3	6	2.1
47	B	790D476X(*)6R3B2(#)	2.9	6	1.3
68	B	790D686X(*)6R3B2(#)	4.2	6	1.3
150	C	790D157X(*)6R3C2(#)	9.4	6	0.6
220	C	790D227X(*)6R3C2(#)	13.8	6	0.6
330	D	790D337X(*)6R3D2(#)	20.7	8	0.4
$U_R = 10$ V AT + 85 °C, SURGE = 13 V . . . $U_C = 6.3$ V AT + 125 °C, SURGE = 8 V					
4.7	A	790D475X(*)010A2(#)	1.0	6	4.0
15	A	790D156X(*)010A2(#)	1.5	6	2.5
33	B	790D336X(*)010B2(#)	3.3	6	1.3
47	B	790D476X(*)010B2(#)	4.7	6	1.4
68	B	790D686X(*)010B2(#)	6.8	6	1.3
100	C	790D107X(*)010C2(#)	10.0	6	0.6
150	C	790D157X(*)010C2(#)	15.0	6	0.6
220	D	790D227X(*)010D2(#)	22.0	8	0.4
$U_R = 16$ V AT + 85 °C, SURGE = 20 V . . . $U_C = 10$ V AT + 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	A	790D106X(*)016A2(#)	1.6	6	2.7
15	B	790D156X(*)016B2(#)	2.4	6	1.6
22	B	790D226X(*)016B2(#)	3.5	6	1.3
33	B	790D336X(*)016B2(#)	5.2	6	1.6
47	C	790D476X(*)016C2(#)	7.5	6	0.8
68	C	790D686X(*)016C2(#)	10.8	6	0.6
100	C	790D107X(*)016C2(#)	16.0	6	0.7
100	D	790D107X(*)016D2(#)	16.0	6	0.5
$U_R = 20$ V AT + 85 °C, SURGE = 26 V . . . $U_C = 13$ V AT + 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	B	790D156X(*)020B2(#)	3.0	6	1.5
22	B	790D226X(*)020B2(#)	4.4	6	2.1
47	C	790D476X(*)020C2(#)	9.4	6	0.7
68	C	790D686X(*)020C2(#)	13.6	6	0.8
100	D	790D107X(*)020C2(#)	20.0	6	0.7

Note

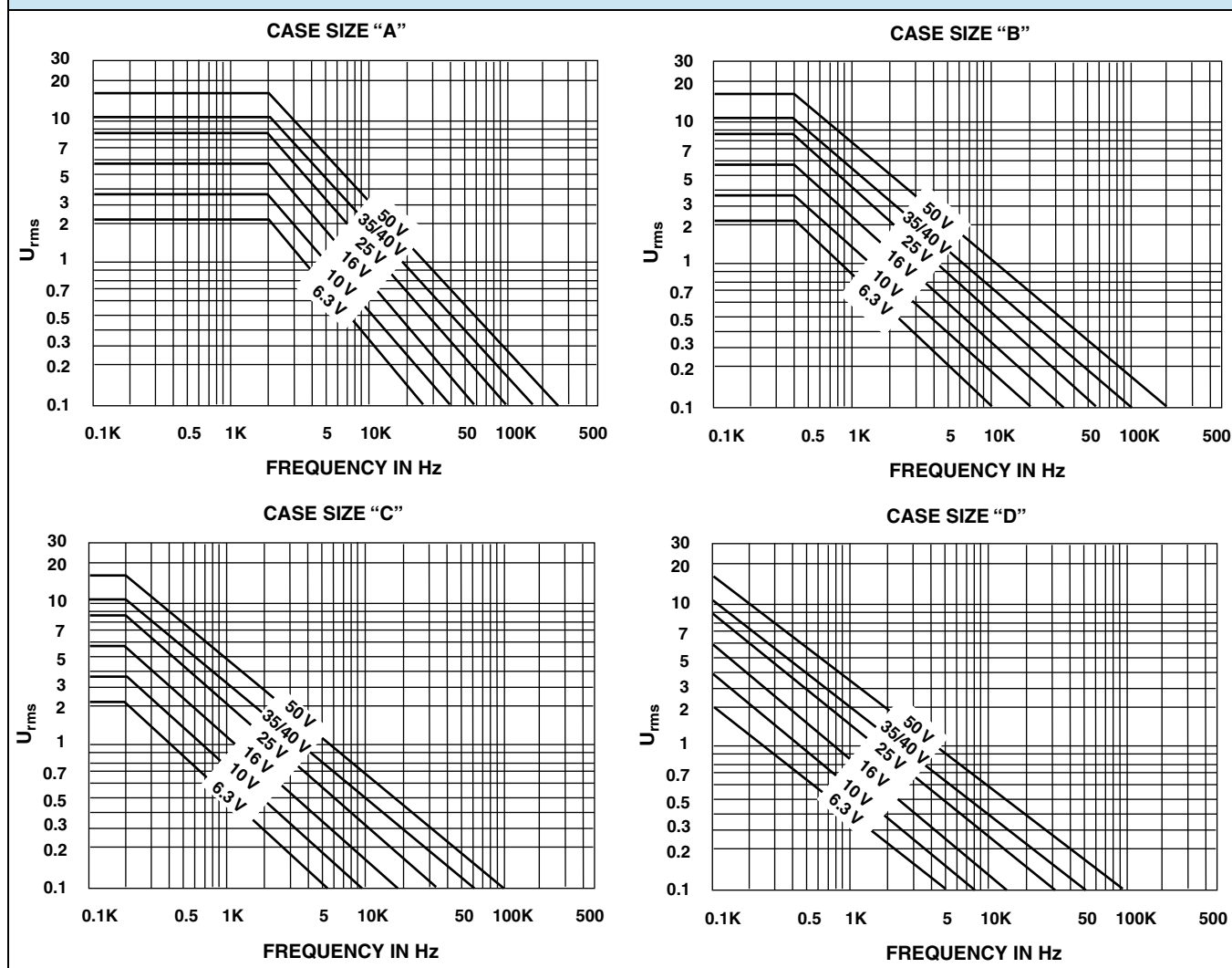
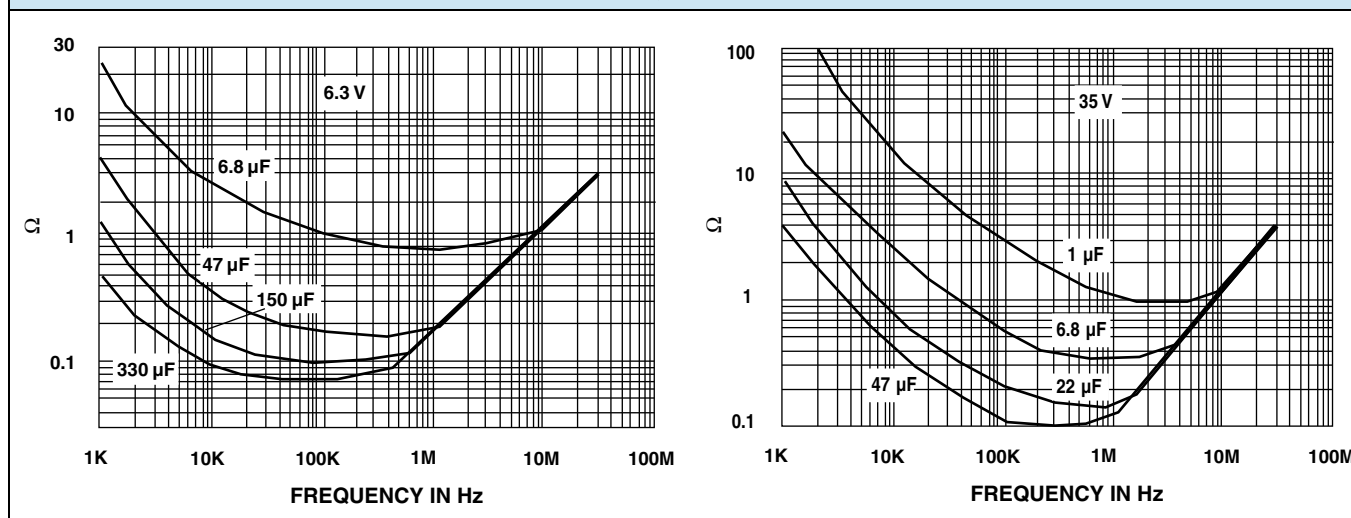
- Extended Ratings in bold print
- (*) Insert 0 for ± 20 % tolerance or 9 for ± 10 %
- (#) See order information, packaging code

**STANDARD/EXTENDED RATINGS**

CAPACITANCE C_R (μ F)	CASE CODE	PART NUMBER	MAX. DCL AT + 25 °C (μ A)	MAX. DF 120 Hz, AT + 25 °C (%)	MAX. IMPEDANCE 100 kHz, AT + 25 °C (Ω)
$U_R = 25$ V AT + 85 °C, SURGE = 32 V . . . $U_C = 16$ V AT + 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	B	790D106X(*)025B2(#)	2.5	6	1.6
15	B	790D156X(*)025B2(#)	3.7	6	2.4
22	B	790D226X(*)025B2(#)	5.5	6	2.1
33	C	790D336X(*)025C2(#)	8.2	6	0.8
$U_R = 35$ V AT + 85 °C, SURGE = 45 V . . . $U_C = 23$ V AT + 125 °C, SURGE = 29 V					
3.3	A	790D335X(*)035A2(#)	1.2	6	6.0
10	B	790D106X(*)035B2(#)	3.5	6	2.6
33	C	790D336X(*)035C2(#)	11.6	6	1.3
$U_R = 40$ V AT + 85 °C, SURGE = 52 V . . . $U_C = 25$ V AT + 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	C	790D106X(*)040C2(#)	4.0	6	1.3
15	C	790D156X(*)040C2(#)	6.0	6	1.0
22	C	790D226X(*)040C2(#)	8.8	6	0.8
$U_R = 50$ V AT + 85 °C, SURGE = 65 V . . . $U_C = 32$ V AT + 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
0.68	A	790D684X(*)050A2(#)	1.0	6	8.0
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	C	790D106X(*)050C2(#)	5.0	6	1.3
15	C	790D156X(*)050C2(#)	7.5	6	1.0

Note

- 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**TYPICAL CURVES OF IMPEDANCE VS FREQUENCY**

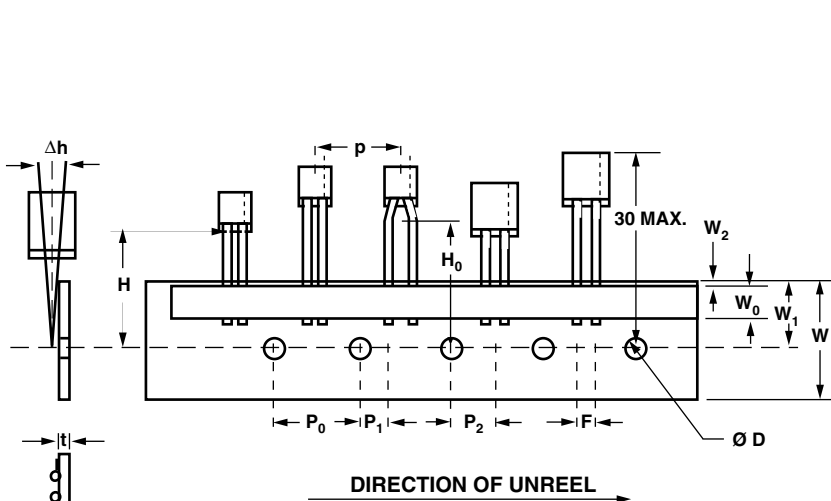
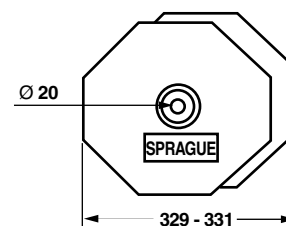
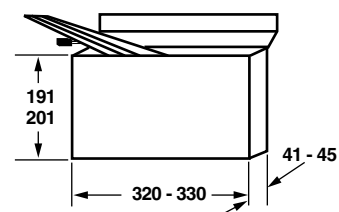
**PERFORMANCE CHARACTERISTICS**

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 100 Hz 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 $\pm$ 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.
7. **Life Test:** 2000 h at + 85 °C with rated voltage applied
2000 h at + 125 °C. with category voltage applied
 $\Delta C/C \leq 10$ % of initial value
 $IL \leq 1.25$ initial limit
 $DF \leq$ initial limit
8. **Humidity Test:** 56 days at + 40 °C, 90 % relative humidity
 $\Delta C/C \leq 8$ % of initial value
 $IL \leq$ initial limit
 $DF \leq$ initial limit
- **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 Ω
 $\Delta C/C \leq 5$ % of initial value
 $IL \leq$ initial limit
 $DF \leq$ initial limit
10. **Marking:**
Top: Rating and polarity
Front: Type, date code, Sprague trademark

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

TAPE AND REEL PACKING

“A” AND “B” CASES ONLY (MEETS IEC 286-2)

**REEL PACKING****AMMOPACKING**

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



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All product specifications and data are subject to change without notice.

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