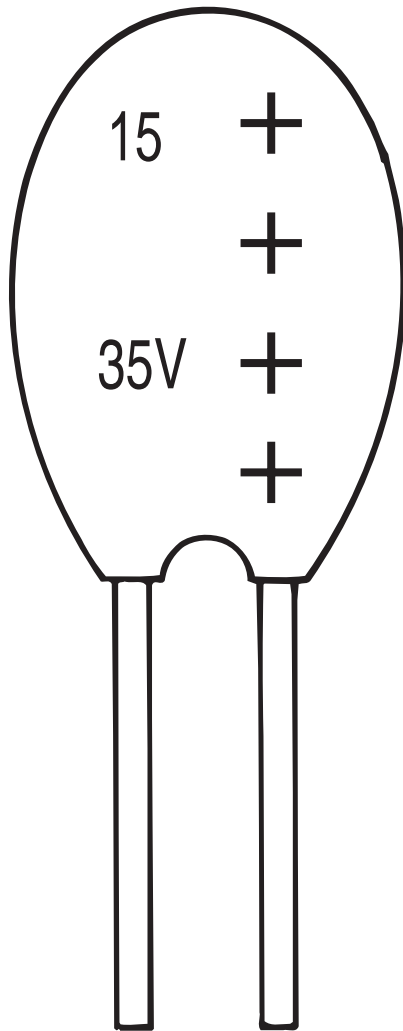


SOLID TANTALUM EPOXY DIPPED CAPACITORS

TYPE 511



Technical data		All technical data relate to an ambient temperature of +20°C						
Capacitance range:		0.1µF to 330µF						
Capacitance tolerance:		@1KHZ ±20%, ±10%						
Rated voltage d.c. V _R :		6.3	10	16	20	25	35	50
Surge voltage:		8	13	20	26	33	46	65
Temperature range:		-55°C to +125°C						
Environmental classification:		55/085/21 (IEC 68-2)						
Dissipation factor tan Δ:		-0.04 for C _R 0.1 — 1.5µF						
@120HZ		-0.06 for C _R 2.2 — 6.8µF						
		-0.08 for C _R 10 — 68µF						
		-0.10 for C _R 100 — 330µF						
Reliability:		1% per 1000 hrs at 85°C with 0.1Ω/V series impedance, 60% confidence level						

SOLID TANTALUM

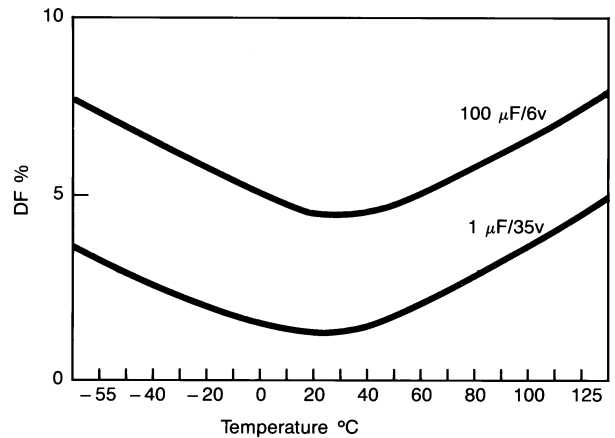
TYPE 511

Capacitance Range (letter denotes case code)							
Capacitance E	Rated voltage DC (V _R)						
	6.3V	10V	16V	20V	25V	35V	50V
0.1						A	A
0.15						A	A
0.22						A	A
0.33						A	A
0.47						A	A
0.68						A	B
1.0				A	A	A	C
1.5			A	A	A	A	D
2.2		A	A	A	A	B	E
3.3	A	A	A	B	B	C	F
4.7	A	A	B	C	C	E	G
6.8	A	B	C	D	D	F	H
10	B	C	D	E	E	F	J
15	C	D	E	F	F	H	K
22	D	E	F	H	H	K	L
33	E	F	F	J	J	M	
47	F	G	J	K	M	N	
68	G	H	L	N	N		
100	H	K	N	N			
150	K	N	N				
220	M	P	R				
330	P	R					

Values outside this standard range may be available on request without appropriate release or qualification. TI reserves the right to supply capacitors to a tighter specification than that ordered.

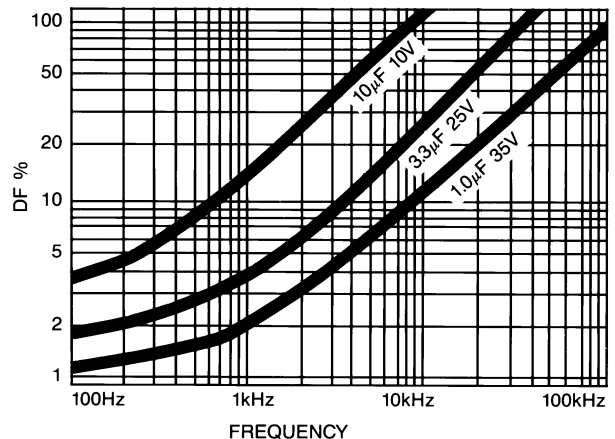
Max. ESR Ω @ 100 kHz							
Capacitance E	Rated voltage DC (V _R)						
	6.3V	10V	16V	20V	25V	35V	50V
0.10						26.0	26.0
0.15						21.0	21.0
0.22						17.0	17.0
0.33						15.0	15.0
0.47						13.0	13.0
0.68						10.0	10.0
1.0				10.0	10.0	8.0	8.0
1.5			10.0	9.0	8.0	6.0	5.0
2.2		13.0	8.0	7.0	6.0	5.0	3.5
3.3	13.0	10.0	6.0	5.5	5.0	4.0	3.0
4.7	10.0	8.0	5.0	4.5	4.0	3.0	2.5
6.8	8.0	6.0	4.0	3.6	3.1	2.5	2.0
10	6.0	5.0	3.2	2.9	2.5	2.0	1.6
15	5.0	3.7	2.5	2.3	2.0	1.6	1.2
22	3.7	2.7	2.0	1.8	1.5	1.3	1.0
33	3.0	2.1	1.6	1.4	1.2	1.0	
47	2.0	1.7	1.3	1.2	1.0	0.8	
68	1.8	1.3	1.0	0.9	0.8		
100	1.6	1.0	0.8	0.6			
150	0.9	0.8	0.6				
220	0.9	0.6	0.5				
330	0.7	0.5					

Typical Curves-Dissipation Factor vs. Temperature



Maximum Leakage Current (A)							
Capacitance E	Rated voltage DC (V _R)						
	6.3V	10V	16V	20V	25V	35V	50V
0.10						0.5	0.5
0.15						0.5	0.5
0.22						0.5	0.5
0.33						0.5	0.5
0.47						0.5	0.5
0.68						0.5	0.5
1.0				0.5	0.5	0.5	0.5
1.5			0.5	0.5	0.5	0.5	0.6
2.2		0.5	0.5	0.5	0.5	0.6	0.8
3.3	0.5	0.5	0.5	0.5	0.6	0.9	1.3
4.7	0.5	0.5	0.6	0.7	0.9	1.3	1.8
6.8	0.5	0.5	0.8	1.0	1.3	1.9	2.7
10	0.5	0.8	1.2	1.6	2.0	2.8	4.0
15	0.7	1.2	1.9	2.4	3.0	4.2	6.0
22	1.1	1.7	2.8	3.5	4.4	6.1	8.8
33	1.6	2.6	4.2	5.2	6.6	9.2	
47	2.3	3.7	6.0	7.5	9.4	10.0	
68	3.4	5.4	8.7	10.8	13.6		
100	5.0	8.0	12.8	16.0			
150	7.5	12.0	19.2				
220	11.0	17.6	20.0				
330	16.6	20.0					

Typical curve-dissipation factor vs. frequency

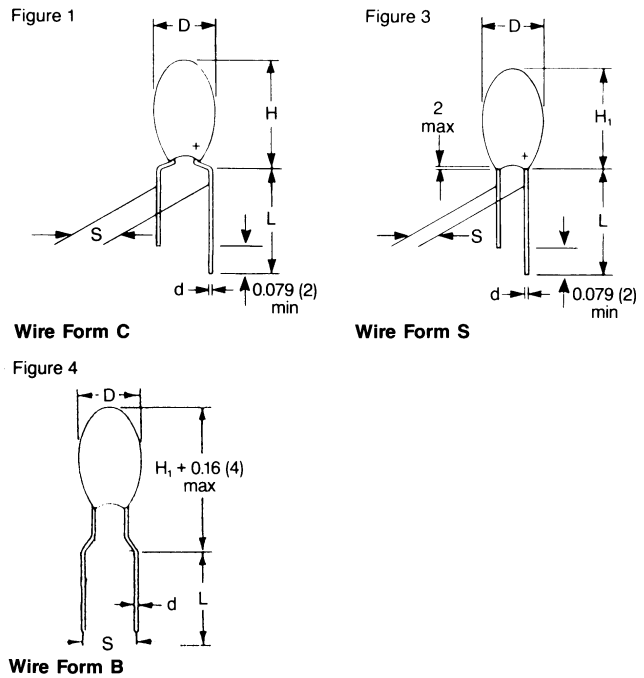


Solid Tantalum Epoxy Dipped

Case Dimensions – inches (mm)			
Case	H	*H ₁	D
A	0.33 (8.5)	0.28 (7.0)	0.18 (4.5)
B	0.35 (9.0)	0.30 (7.5)	0.18 (4.5)
C	0.39 (10.0)	0.33 (8.5)	0.20 (5.0)
D	0.41 (10.5)	0.35 (9.0)	0.20 (5.0)
E	0.41 (10.5)	0.35 (9.0)	0.22 (5.5)
F	0.45 (11.5)	0.39 (10.0)	0.24 (6.0)
G	0.45 (11.5)	0.39 (10.0)	0.26 (6.5)
H	0.47 (12.0)	0.41 (10.5)	0.28 (7.0)
J	0.51 (13.0)		0.31 (8.0)
K	0.55 (14.0)		0.33 (8.5)
L	0.55 (14.0)		0.35 (9.0)
M	0.57 (14.5)		0.35 (9.0)
N	0.63 (16.0)		0.35 (9.0)
P	0.67 (17.0)		0.39 (10.0)
R	0.73 (18.5)		0.39 (10.0)

*H₁ refers to H dimension on S wire form (straight leads).

Wire Form and Outline

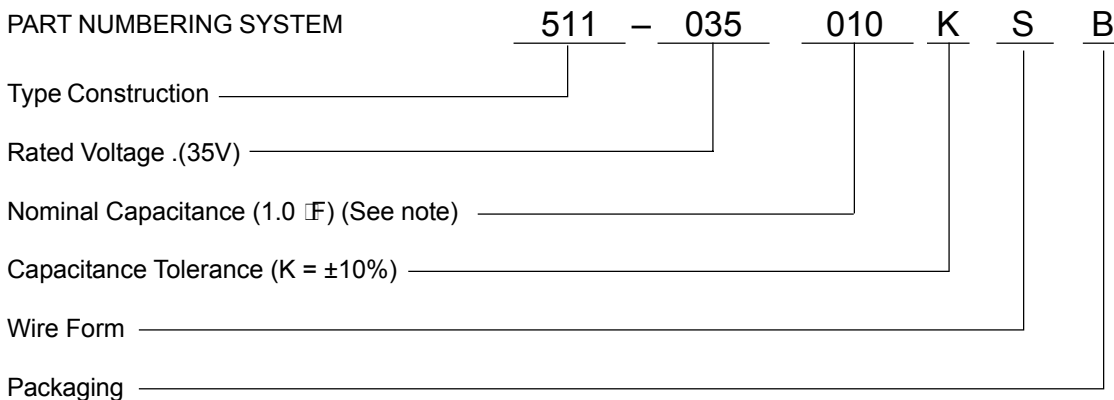


DIMENSIONS: Inches (mm)

Wire Form	Figure	Case Size	L (see note 1)	Lead Spacing S	d	Packaging Suffixes Available*
C	Figure 1	A-R	0.630 ± 0.160 (16 ± 4)	0.200 ± 0.040 (5.0 ± 1.0)	0.020 ± 0.002 (0.5 ± 0.05)	CB Bulk CTR Tape/Reel CTA Tape/Ammo
H	Similar to Figure 1	A-R	0.630 ± 0.160 (16 ± 4)	0.250 ± 0.040 (6.35 ± 1.0)	0.020 ± 0.002 (0.5 ± 0.05)	H Bulk
S	Figure 3	A-H	0.630 ± 0.160 (16 ± 4)	0.100 ± 0.020 (2.5 ± 0.5)	0.020 ± 0.002 (0.5 ± 0.05)	SB Bulk STR Tape/Reel STA Tape/Ammo
B	Figure 4	A-H	0.630 ± 0.160 (16 ± 4)	0.200 ± 0.020 (5.0 ± 1.0)	0.020 ± 0.002 (0.5 ± 0.05)	BTR Tape/Reel BTA Tape/Ammo

Notes: (1) Lead lengths can be supplied to tolerances other than those above and should be specified in the ordering information.

PART NUMBERING SYSTEM



NOTE – CAPACITANCE: The nominal capacitance value in micro farad (μF) is expressed by a three-digit number. The first two digits represent significant figures and the last digit is number of zeros to follow. The letter "R" is used instead of decimal point.

EXAMPLE:

0R1 = 0.1 μF	R47 = 0.47 μF
4R7 = 4.7 μF	470 = 47 μF
471 = 470 μF	471 = 470 μF

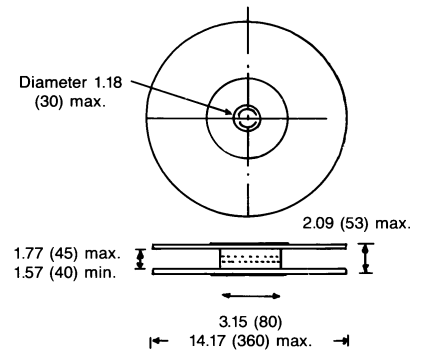
SOLID TANTALUM

TYPE 511

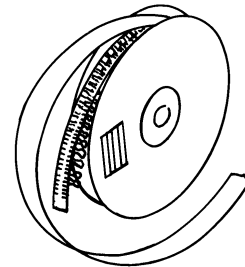
Dimensions: inches (mm)

Description	Code	Dimension
Feed hole pitch	P	0.5 ± 0.01 (12.7 ± 0.3)
Hole center to lead	P ₁	0.15 ± 0.03 (3.85 ± 0.7) to be measured at bottom of clinch
		0.2 ± 0.04 (5.05 ± 1.0) for S wires
Hole center to component center	P ₂	0.25 ± 0.02 (6.35 ± 0.4)
Change in pitch	Δp	± 0.04 (±1.0)
Lead diameter	d	0.02 ± 0.003 (0.5 ± 0.05)
Lead spacing	S	See wireform table
Component alignment	Δh	0 ± 0.08 (0 ± 0.2)
Feed hole diameter	D	0.15 ± 0.008 (4.0 ± 0.2)
Tape width	W	0.7 + 0.04 (18.0 + 1.0) - 0.02 - 0.5)
Hold down tape width	W ₁	0.24 (6.0) min.
Hold down tape position	W ₂	0.04 (1.0) max.
Lead wire clinch height	H	0.63 ± 0.02 (16 ± 0.5) 0.75 ± 0.04 (19 ± 1.0) on request
Hole position	H ₁	0.35 ± 0.02 (9.0 ± 0.5)
Base of component height	H ₂	0.7 (18) min.
Component height	H ₃	1.3 (32.25) max.
Length of snapped lead	L	0.43 (11.0) max.
Total tape thickness	T	0.03 ± 0.001 (0.7 ± 0.2)
		Carrying card 0.02 ± 0.005 (0.5 ± 0.1)

Reel Configuration and Dimensions inches (mm)

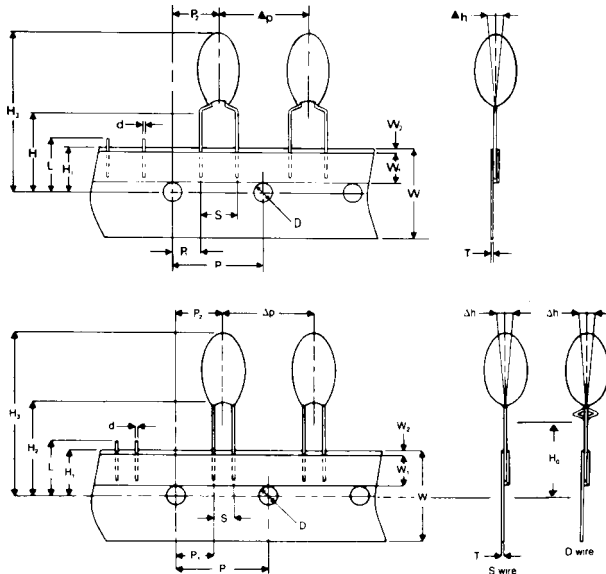


Manufactured from cardboard with plastic hub



Holding tape outside

Positive terminal leading (negative terminal by special request)



'B' wires for normal automatic insertion on 5mm pitch.

BTR suffix for reel
BTA suffix for 'ammo' pack
Available in case sizes A-H

'C' wires for preforming.

CTR suffix for reel
CTA suffix for 'ammo' pack
Available in case sizes A-M

'S' wire for special applications, automatic insertion on 2.5mm pitch.

STR suffix for reel
STA suffix for 'ammo' pack
Available in case sizes A-H

PACKAGING QUANTITIES

For reels

Case Code	No. of pieces
A	1500
B, C, D	1250
E, F	1000
G, H, J	750
K, L, M	500

For 'Ammo' pack

Case Code	No. of pieces
A, B, C, D	3000
E, F, G	2500
H	2000

For bulk products

Case Code	No. of pieces
A to H	1000