

Resin-Dipped Type Tantalum Solid Electrolytic Capacitors

Series: EF

Type: F (Resin-Dipped Type)



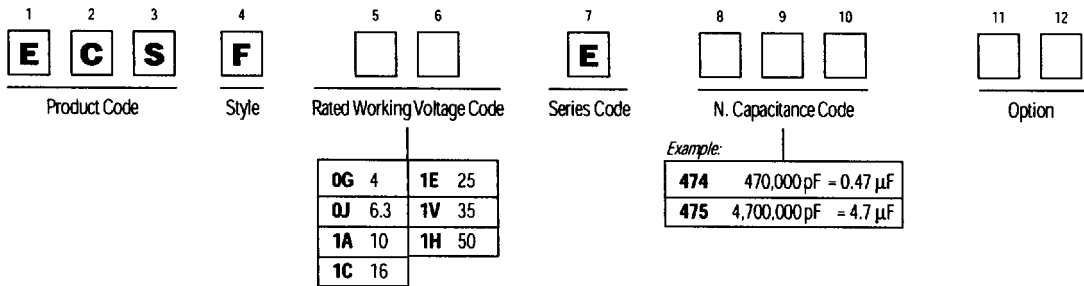
Features

- Compact size and wide capacitance range
- Excellent frequency and temperature characteristics
- Available for direct mounting on thin circuit boards
- Washable in organic solvents after soldering
- IEC pub. 384-15 approved

Recommended Applications

- Television, audio, and compact-size electronic equipment

Explanation of Part Numbers



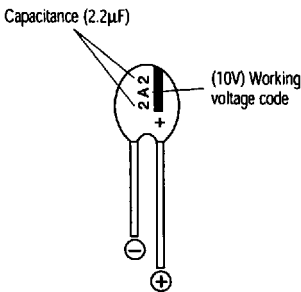
Specifications

Operating temperature range	−55 to +85 °C (W.V. ≥10 V.DC −55 to +105 °C
Rated working voltage	4 to 50 V DC
Nominal capacitance range	0.1 to 220 μF
Capacitance tolerance	+20%, (120 Hz/+20 °C)
DC leakage current	I ≤ 0.008 CV or 0.05 (μA) after 2 minutes application of rated working voltage at +20 °C (whichever greater)
tan δ	≤ 1 μF 0.04 max. ≤ 1.5 to 68 μF 0.06 max. ≥ 100 μF 0.08 max.

Moisture resistance: After 500 hours exposure at +40 °C and 90 to 95% R.H. without load, the capacitor shall meet the following limits:	
Capacitance change	± 10% of initial measured value
tan δ	≤ 150% of initial specified value
DC leakage current	0.012 CV or 0.75 (μA) max., whichever greater
Endurance: After 2,000 hours application of rated DC working voltage at +105 °C with derated voltage for 10 to 50 W.V., the capacitor shall meet the following limits:	
Capacitance change	± 10% of initial measured value
tan δ	≤ initial specified value
DC leakage current	0.01 CV or 0.625 (μA) max., whichever greater

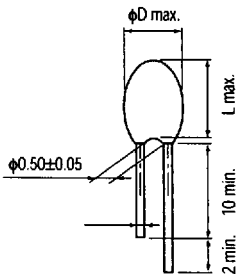
■ Marking

For straight-lead products under size codes A–C, some (products with the • in case size table) will have the markings below the voltage (10V) code. This also represents a decimal point.



W.V. (V)	W. V. code
4	G
6.3	J
10	A
16	C
25	E
35	V
50	H

■ Dimensions in mm (not to scale)



Size Code	φD	L	F
A	3.3	5.0	2.5±0.5
B	3.3	5.5	2.5±0.5
C	3.5	5.5	2.5±0.5
D	3.7	6.5	2.5±0.5
E	4.0	7.0	2.5 ^{+1.0} _{-0.5}
F	4.5	7.0	2.5 ^{+1.0} _{-0.5}
G	4.7	8.0	2.5 ^{+1.0} _{-0.5}
H	5.2	8.5	2.5 ^{+1.0} _{-0.5}
I	5.5	9.5	2.5 ^{+1.0} _{-0.5}
J	6.0	11.0	2.5 ^{+1.0} _{-0.5}
K	7.5	12.5	5.0±0.5

■ Case Size

Capacitance (μF)	Working Voltage (V DC)						
	4 (0G)	6.3 (0J)	10 (1A)	16 (1C)	25 (1E)	35 (1V)	50 (1H)
0.10 (104)						• A	• A
0.15 (154)						• A	• A
0.22 (224)						• A	• B
0.33 (334)						• B	• C
0.47 (474)						• B	D
0.68 (684)						• B	D
1.0 (105)				• A	• B	C	E
1.5 (155)				• B	C	C	F
2.2 (225)			• B	• C	C	D	G
3.3 (335)			• C	C	D	E	H
4.7 (475)		• C	C	D	E	F	I
6.8 (685)	• C	C	D	E	F	H	
10 (106)	C	D	E	F	H	I	
15 (156)	D	E	F	G	I	J	
22 (226)	E	F	G	H	J	K	
33 (336)	F	G	H	I	K		
47 (476)	G	H	I	J			
68 (686)	H	I	J	K			
100 (107)	I	J	K				
150 (157)	J	K					
220 (227)	K						

- () shows W.V. and capacitance code.
- Products designated by (•) have the voltage code on body.
- When selecting W.V., see page ••.

Series: **EF**

Type: **F (Resin Dipped Type)**

Resin Dipped Type Tantalum Solid Electrolytic Capacitors

Japan



■ Features

- Compact size and wide capacitance range
- Excellent frequency and temperature characteristics
- Available for direct mounting on thin circuit boards
- Washable in organic solvents after soldering
- IEC pub. 384-15 approved

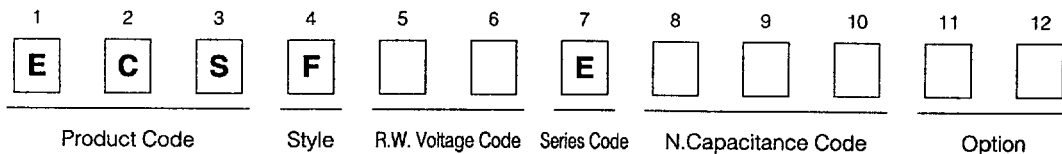
■ Recommended Applications

- TV, Audio, Compact size electronic equipment

■ Specifications

Operating Temp. Range	-55 to +85 °C (W.V. $\geq$ 10 V.DC -55 to +105 °C)								
Rated W.V. Range	4 to 50 V.DC								
Nominal Cap. Range	0.1 to 220 μ F								
Capacitance Tolerance	$\pm$ 20 %, (120 Hz/+20 °C)								
DC Leakage Current	I $\leq$ 0.008 CV or 0.05 (μ A) after 2 minutes application of rated working voltage at +20 °C (Whichever, greater)								
tan δ	$\leq$ 1 μ F 0.04 max. 1.5 to 68 μ F 0.06 max. 4 W.V. 0.1 max. (120 Hz/+20 °C) $\geq$ 100 μ F 0.08 max.								
Moisture Resistance	After 500 hours exposure at +40 °C and 90 to 95 % R.H. without load, the capacitor shall meet the following limits. <table><tr><td>Capacitance change</td><td>$\pm$10 % of initial measured value</td></tr><tr><td>tan δ</td><td>$\leq$ 150 % of initial specified value</td></tr><tr><td>DC leakage current</td><td>0.012 CV or 0.75 (μA) max. whichever, greater</td></tr></table>			Capacitance change	$\pm$ 10 % of initial measured value	tan δ	$\leq$ 150 % of initial specified value	DC leakage current	0.012 CV or 0.75 (μ A) max. whichever, greater
Capacitance change	$\pm$ 10 % of initial measured value								
tan δ	$\leq$ 150 % of initial specified value								
DC leakage current	0.012 CV or 0.75 (μ A) max. whichever, greater								
Endurance	After 2000 hours application of rated DC working voltage at +85 °C or 1000 hours at +105 °C with derated voltage for 10 to 50 W.V., the capacitor shall meet the following limits. <table><tr><td>Capacitance change</td><td>$\pm$10 % of initial measured value</td></tr><tr><td>tan δ</td><td>$\leq$ Initial specified value</td></tr><tr><td>DC leakage current</td><td>0.01 CV or 0.625 (μA) max. whichever, greater</td></tr></table>			Capacitance change	$\pm$ 10 % of initial measured value	tan δ	$\leq$ Initial specified value	DC leakage current	0.01 CV or 0.625 (μ A) max. whichever, greater
Capacitance change	$\pm$ 10 % of initial measured value								
tan δ	$\leq$ Initial specified value								
DC leakage current	0.01 CV or 0.625 (μ A) max. whichever, greater								

■ Explanation of Part Numbers



W.V. code	0G	0J	1A	1C	1E	1V	1H
W.V.(V)	4	6.3	10	16	25	35	50

Example:

Capacitance code	Capacitance
474	470000 pF=0.47 μ F
475	4700000 pF=4.7 μ F

■ Marking

For straight-lead products under size codes A-C, some will have the markings below (products with ● in size table) Voltage (10 V) code and this also represents a decimal point.

* (for 6.3 W.V. abbreviated to 6)

W.V. (V)	W.V. code
4	G
6.3	J
10	A
16	C
25	E
35	V
50	H

■ Dimensions in mm (not to scale)

Straight-lead-products

Size code	φD	L	F
A	3.3	5.0	2.5±0.5
B	3.3	5.5	2.5±0.5
C	3.5	5.5	2.5±0.5
D	3.7	6.5	2.5±0.5
E	4.0	7.0	2.5 ^{+1.0} _{-0.5}
F	4.5	7.0	2.5 ^{+1.0} _{-0.5}
G	4.7	8.0	2.5 ^{+1.0} _{-0.5}
H	5.2	8.5	2.5 ^{+1.0} _{-0.5}
I	5.5	9.5	2.5 ^{+1.0} _{-0.5}
J	6.0	11.0	2.5 ^{+1.0} _{-0.5}
K	7.5	12.5	5.0±0.5

■ Case size

W.V.(V.DC)	4 (0G)	6.3 (0J)	10 (1A)	16 (1C)	25 (1E)	35 (1V)	50 (1H)
Cap.(μF)							
0.10 (104)						● A	● A
0.15 (154)						● A	● A
0.22 (224)						● A	● B
0.33 (334)						● A	● C
0.47 (474)						● B	D
0.68 (684)						● B	D
1.0 (105)				● A	● B	C	E
1.5 (155)				● B	C	C	F
2.2 (225)			● B	● C	C	D	G
3.3 (335)			● C	C	D	E	H
4.7 (475)		● C	C	D	E	F	I
6.8 (685)	● C	C	D	E	F	H	
10 (106)	C	D	E	F	H	I	
15 (156)	D	E	F	G	I	J	
22 (226)	E	F	G	H	J	K	
33 (336)	F	G	H	I	K		
47 (476)	G	H	I	J			
68 (686)	H	I	J	K			
100 (107)	I	J	K				
150 (157)	J	K					
220 (227)	K						

Note: 1. () shows W.V. and capacitance code.
 2. Products designated by (●) have the voltage code on the body.
 3. When selecting W.V., see the page 153.