

### Surface Mount Type **SP-Cap**

Series: **FD, CD, CX, UD, UE**



#### ■ Features

- Low ESR
- Excellent Noise-absorbent Characteristics
- RoHS directive compliant

#### ■ Specifications

Series & Size Code	FD	CD	CX	UD	UE
Category Temp. Range	-40 °C to +105 °C				
Rated W.V.Range	2 V.DC to 12.5 V.DC	2 V.DC to 16 V.DC	2 V.DC to 6.3 V.DC	2 V.DC to 8 V.DC	2 V.DC to 8 V.DC
Nominal Cap.Range	15 μF to 68 μF	2.2 μF to 220 μF	100 μF to 470 μF	68 μF to 470 μF	100 μF to 560 μF
Capacitance Tolerance	±20 %				
DC Leakage Current	Reflow 240 °C : $I \leq 0.06 CV (\mu A) 2 \text{ minutes (2 V.DC to 4 V.DC)}$ $I \leq 0.04 CV \text{ or } 3 (\mu A) 2 \text{ minutes (6.3 V.DC to 16 V.DC)}$ (Whichever is greater)  Reflow 260 °C : $I \leq 0.1 CV (\mu A) 2 \text{ minutes}$				
$\tan \delta$	$\leq 0.06 (120 \text{ Hz}/+20 \text{ }^\circ\text{C})$			$\leq 0.10 (120 \text{ Hz}/+20 \text{ }^\circ\text{C})$	
Surge Voltage	Rated Working Voltage $\times 1.25 (15 \text{ }^\circ\text{C to } 35 \text{ }^\circ\text{C})$				
Endurance	After applying rated working voltage for 1000 hours at 105 °C±2 °C, and then being stabilized at +20 °C, capacitor shall meet the following limits.				
	Capacitance change	±10% of initial measured value			
	$\tan \delta$	$\leq$ Initial specified value			
	DC leakage current	$\leq$ Initial specified value			
Moisture resistance	After storing for 500 hours at 60 °C, 90 %				
	Capacitance change of initial measured value	2, 2.5 V.DC	4 V.DC	6.3 V.DC	8 V.DC to 16 V.DC
		+70, -20 %	+60, -20 %	+50, -20 %	+40, -20 %
	$\tan \delta$	$\leq 200 \%$ of initial specified value			
	DC leakage current	$\leq$ Initial specified value			

#### ■ Marking



#### ■ Dimensions in mm(not to scale)



(mm)

Series & Size Code	L±0.2	W1±0.2	W2±0.1	H	P±0.3
FD	7.3	4.3	2.4	1.1±0.1	1.3
CD	7.3	4.3	2.4	1.8±0.1	1.3
CX	7.3	4.3	2.4	1.9±0.2	1.3
UD	7.3	4.3	2.4	2.8±0.2	1.3
UE	7.3	4.3	2.4	4.2±0.1	1.3

\* Externals of figure are the reference.

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use. Should a safety concern arise regarding this product, please be sure to contact us immediately.

00 Sep. 2010

### Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number		Min. Packaging Q'ty (pcs)	
			L (mm)	W (mm)	H (mm)	Ripple current (Ar.m.s.) <sup>*1</sup>	ESR <sup>*2</sup> (mΩ max.)	Reflow condition : 240 °C <sup>*3</sup>	Reflow condition : 260 °C [Proposal] <sup>*3</sup>		
FD	2	68	7.3	4.3	1.1	2.0	28	EEFFD0D680R	—	3500	
	2.5	56	7.3	4.3	1.1	2.0	28	EEFFD0E560R	—	3500	
	4	39	7.3	4.3	1.1	2.0	28	EEFFD0G390R	—	3500	
		47	7.3	4.3	1.1	2.0	28	EEFFD0G470R	—	3500	
	6.3	33	7.3	4.3	1.1	2.0	28	EEFFD0J330R	—	3500	
	8	22	7.3	4.3	1.1	2.0	28	EEFFD0K220R	—	3500	
12.5	15	7.3	4.3	1.1	1.4	40	EEFFD1B150R	—	3500		
CD	2	100	7.3	4.3	1.8	2.5	18	EEFCD0D101R	EEFCD0D101ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0D101XR	EEFCD0D101XE	3500	
		120	7.3	4.3	1.8	2.5	18	EEFCD0D121R	EEFCD0D121ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0D121XR	EEFCD0D121XE	3500	
		150	7.3	4.3	1.8	2.5	18	EEFCD0D151R	EEFCD0D151ER	3500	
		180	7.3	4.3	1.8	2.5	18	EEFCD0D181R	EEFCD0D181ER	3500	
	220	7.3	4.3	1.8	2.5	18	EEFCD0D221R	EEFCD0D221ER	3500		
	2.5	82	7.3	4.3	1.8	2.5	18	EEFCD0E820R	EEFCD0E820ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0E820XR	EEFCD0E820XE	3500	
		100	7.3	4.3	1.8	2.5	18	EEFCD0E101R	EEFCD0E101ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0E101XR	EEFCD0E101XE	3500	
		120	7.3	4.3	1.8	2.5	18	EEFCD0E121R	EEFCD0E121ER	3500	
		150	7.3	4.3	1.8	2.5	18	EEFCD0E151R	EEFCD0E151ER	3500	
	4	56	7.3	4.3	1.8	2.5	18	EEFCD0G560R	EEFCD0G560ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0G560XR	EEFCD0G560XE	3500	
		68	7.3	4.3	1.8	2.5	18	EEFCD0G680R	EEFCD0G680ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0G680XR	EEFCD0G680XE	3500	
		82	7.3	4.3	1.8	2.5	18	EEFCD0G820R	EEFCD0G820ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0G820XR	EEFCD0G820XE	3500	
	100	7.3	4.3	1.8	2.5	18	EEFCD0G101R	EEFCD0G101ER	3500		
	6.3	10	7.3	4.3	1.8	1.4	55	EEFCD0J100R	EEFCD0J100ER	3500	
		22	7.3	4.3	1.8	1.6	40	EEFCD0J220R	EEFCD0J220ER	3500	
		33	7.3	4.3	1.8	2.0	28	EEFCD0J330R	EEFCD0J330ER	3500	
		47	7.3	4.3	1.8	2.5	18	EEFCD0J470R	EEFCD0J470ER	3500	
			7.3	4.3	1.8	2.7	15	EEFCD0J470XR	EEFCD0J470XE	3500	
		68	7.3	4.3	1.8	2.5	18	EEFCD0J680R	EEFCD0J680ER	3500	
	8	8.2	7.3	4.3	1.8	1.4	55	EEFCD0K8R2R	EEFCD0K8R2ER	3500	
			7.3	4.3	1.8	1.6	40	EEFCD0K150R	EEFCD0K150ER	3500	
		22	7.3	4.3	1.8	2.0	28	EEFCD0K220R	EEFCD0K220ER	3500	
		33	7.3	4.3	1.8	2.5	18	EEFCD0K330R	EEFCD0K330ER	3500	
		47	7.3	4.3	1.8	1.8	25	EEFCD0K470R	EEFCD0K470ER	3500	
			—	—	—	—	—	—	EEFCD1A220ER	3500	
	10	33	7.3	4.3	1.8	1.8	25	—	EEFCD1A330ER	3500	
		39	7.3	4.3	1.8	1.8	25	—	EEFCD1A390ER	3500	
		4.7	7.3	4.3	1.8	1.0	80	EEFCD1B4R7R	—	3500	
	12.5	10	7.3	4.3	1.8	1.0	60	EEFCD1B100R	—	3500	
		15	7.3	4.3	1.8	1.3	50	EEFCD1B150R	—	3500	
		22	7.3	4.3	1.8	1.6	30	EEFCD1B220R	—	3500	
		2.2	7.3	4.3	1.8	1.0	110	EEFCD1C2R2R	—	3500	
	16	4.7	7.3	4.3	1.8	1.0	80	EEFCD1C4R7R	—	3500	
		6.8	7.3	4.3	1.8	1.0	70	EEFCD1C6R8R	—	3500	
		8.2	7.3	4.3	1.8	1.3	45	EEFCD1C8R2R	—	3500	
	CX	2	220	7.3	4.3	1.9	2.7	15	—	EEFCX0D221R	3500
			270	7.3	4.3	1.9	3.0	12	—	EEFCX0D271XR	3500
			330	7.3	4.3	1.9	2.7	15	—	EEFCX0D331R	3500
				7.3	4.3	1.9	3.0	12	—	EEFCX0D331XR	3500
			390	7.3	4.3	1.9	2.7	15	—	EEFCX0D391R	3500
			470	7.3	4.3	1.9	2.7	15	—	EEFCX0D471R	3500
		2.5	220	7.3	4.3	1.9	2.7	15	—	EEFCX0E221R	3500
			330	7.3	4.3	1.9	2.7	15	—	EEFCX0E331R	3500
390			7.3	4.3	1.9	2.7	15	—	EEFCX0E391R	3500	
470			7.3	4.3	1.9	2.7	15	—	EEFCX0E471R	3500	
4		150	7.3	4.3	1.9	2.7	15	—	EEFCX0G151R	3500	
		180	7.3	4.3	1.9	2.7	15	—	EEFCX0G181R	3500	
			7.3	4.3	1.9	3.0	12	—	EEFCX0G181XR	3500	
		220	7.3	4.3	1.9	2.7	15	—	EEFCX0G221R	3500	
6.3		100	7.3	4.3	1.9	3.0	12	—	EEFCX0G221XR	3500	
			7.3	4.3	1.9	2.7	15	—	EEFCX0J101R	3500	
		120	7.3	4.3	1.9	2.7	15	—	EEFCX0J121R	3500	
		150	7.3	4.3	1.9	2.7	15	—	EEFCX0J151R	3500	
			7.3	4.3	1.9	3.0	12	—	EEFCX0J151XR	3500	

\*1: Ripple current (100 kHz/ +20 to +105 °C), \*2: ESR (100 kHz/+20 °C)

\*3: Please confirm EE25 in detail of the Mounting Specifications.

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01 Mar. 2011

### Standard Products

Series & Size Code	Rated W.V. (V.DC)	Capacitance (±20 %) (μF)	Case Size			Specification		Part number		Min. Packaging Qty (pcs)
			L (mm)	W (mm)	H (mm)	Ripple current* <sup>1</sup> (Ar.m.s.)	ESR* <sup>2</sup> (mΩ max.)	Reflow condition : 240 °C* <sup>3</sup>	Reflow condition : 260 °C* <sup>3</sup> [Proposal]	
UD	2	330	7.3	4.3	2.8	3.0	15	EEFUD0D331R* <sup>4</sup>	EEFUD0D331ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.3	12	EEFUD0D331XR* <sup>4</sup>	EEFUD0D331XE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0D331LR* <sup>4</sup>	EEFUD0D331LE* <sup>4</sup>	2000
		390	7.3	4.3	2.8	3.0	15	EEFUD0D391R* <sup>4</sup>	EEFUD0D391ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0D391LR* <sup>4</sup>	EEFUD0D391LE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0D471LR* <sup>4</sup>	EEFUD0D471LE* <sup>4</sup>	2000
	2.5	220	7.3	4.3	2.8	3.0	15	EEFUD0E221R* <sup>4</sup>	EEFUD0E221ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.3	12	EEFUD0E221XR* <sup>4</sup>	EEFUD0E221XE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0E221LR* <sup>4</sup>	EEFUD0E221LE* <sup>4</sup>	2000
		270	7.3	4.3	2.8	3.0	15	EEFUD0E271R* <sup>4</sup>	EEFUD0E271ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0E271LR* <sup>4</sup>	EEFUD0E271LE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.0	15	EEFUD0G121R* <sup>4</sup>	EEFUD0G121ER* <sup>4</sup>	2000
	4	120	7.3	4.3	2.8	3.4	12	EEFUD0G121XR* <sup>4</sup>	EEFUD0G121XE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.0	15	EEFUD0G151R* <sup>4</sup>	EEFUD0G151ER* <sup>4</sup>	2000
		150	7.3	4.3	2.8	3.3	12	EEFUD0G151XR* <sup>4</sup>	EEFUD0G151XE* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0G151LR* <sup>4</sup>	EEFUD0G151LE* <sup>4</sup>	2000
		180	7.3	4.3	2.8	2.5	18	EEFUD0G181R* <sup>4</sup>	EEFUD0G181ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.4	9	EEFUD0G181LR* <sup>4</sup>	EEFUD0G181LE* <sup>4</sup>	2000
	6.3	100	7.3	4.3	2.8	3.0	15	EEFUD0J101R* <sup>4</sup>	EEFUD0J101ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.3	12	EEFUD0J101XR* <sup>4</sup>	EEFUD0J101XE* <sup>4</sup>	2000
		120	7.3	4.3	2.8	3.0	15	EEFUD0J121R* <sup>4</sup>	EEFUD0J121ER* <sup>4</sup>	2000
			7.3	4.3	2.8	3.3	12	EEFUD0J121XR* <sup>4</sup>	EEFUD0J121XE* <sup>4</sup>	2000
		150	7.3	4.3	2.8	3.4	9	EEFUD0J121LR* <sup>4</sup>	—	2000
			7.3	4.3	2.8	2.5	18	EEFUD0J151R* <sup>4</sup>	EEFUD0J151ER* <sup>4</sup>	2000
8	68	7.3	4.3	2.8	3.0	15	EEFUD0K680R	EEFUD0K680ER	2000	
	100	7.3	4.3	2.8	2.5	18	EEFUD0K101R	EEFUD0K101ER	2000	
UE	2	270	7.3	4.3	4.2	3.3	12	EEFUE0D271R* <sup>4</sup>	EEFUE0D271ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0D271XR* <sup>4</sup>	EEFUE0D271XE* <sup>4</sup>	2000
		330	7.3	4.3	4.2	3.3	12	EEFUE0D331R* <sup>4</sup>	EEFUE0D331ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0D331XR* <sup>4</sup>	EEFUE0D331XE* <sup>4</sup>	2000
		390	7.3	4.3	4.2	3.3	12	EEFUE0D391R* <sup>4</sup>	EEFUE0D391ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0D391XR* <sup>4</sup>	EEFUE0D391XE* <sup>4</sup>	2000
			7.3	4.3	4.2	3.7	7	EEFUE0D391LR* <sup>4</sup>	EEFUE0D391LE* <sup>4</sup>	2000
			7.3	4.3	4.2	3.3	12	EEFUE0D471R* <sup>4</sup>	EEFUE0D471ER* <sup>4</sup>	2000
		470	7.3	4.3	4.2	3.5	10	EEFUE0D471XR* <sup>4</sup>	EEFUE0D471XE* <sup>4</sup>	2000
			7.3	4.3	4.2	3.7	7	EEFUE0D471LR* <sup>4</sup>	EEFUE0D471LE* <sup>4</sup>	2000
		560	7.3	4.3	4.2	3.3	12	EEFUE0D561R	EEFUE0D561ER	2000
			7.3	4.3	4.2	3.7	7	EEFUE0D561LR	EEFUE0D561LE	2000
	2.5	220	7.3	4.3	4.2	3.3	12	EEFUE0E221R* <sup>4</sup>	EEFUE0E221ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0E221XR* <sup>4</sup>	EEFUE0E221XE* <sup>4</sup>	2000
		270	7.3	4.3	4.2	3.3	12	EEFUE0E271R* <sup>4</sup>	EEFUE0E271ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0E271XR* <sup>4</sup>	EEFUE0E271XE* <sup>4</sup>	2000
		330	7.3	4.3	4.2	3.3	12	EEFUE0E331R* <sup>4</sup>	EEFUE0E331ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0E331XR* <sup>4</sup>	EEFUE0E331XE* <sup>4</sup>	2000
		390	7.3	4.3	4.2	3.7	7	EEFUE0E331LR* <sup>4</sup>	EEFUE0E331LE* <sup>4</sup>	2000
			7.3	4.3	4.2	3.3	12	EEFUE0E391R* <sup>4</sup>	EEFUE0E391ER* <sup>4</sup>	2000
		470	7.3	4.3	4.2	3.7	7	EEFUE0E391LR* <sup>4</sup>	EEFUE0E391LE* <sup>4</sup>	2000
			7.3	4.3	4.2	3.3	12	EEFUE0E471R	EEFUE0E471ER	2000
		7.3	4.3	4.2	3.7	7	EEFUE0E471LR	EEFUE0E471LE	2000	
			4	180	7.3	4.3	4.2	3.3	12	EEFUE0G181R* <sup>4</sup>
	7.3	4.3			4.2	3.5	10	EEFUE0G181XR* <sup>4</sup>	EEFUE0G181XE* <sup>4</sup>	2000
	220	7.3		4.3	4.2	3.3	12	EEFUE0G221R* <sup>4</sup>	EEFUE0G221ER* <sup>4</sup>	2000
		7.3		4.3	4.2	3.5	10	EEFUE0G221XR* <sup>4</sup>	EEFUE0G221XE* <sup>4</sup>	2000
	270	7.3		4.3	4.2	3.7	7	EEFUE0G221LR* <sup>4</sup>	EEFUE0G221LE* <sup>4</sup>	2000
		7.3		4.3	4.2	3.3	12	EEFUE0G271R	EEFUE0G271ER	2000
	330	7.3	4.3	4.2	3.7	7	EEFUE0G271LR	EEFUE0G271LE	2000	
		7.3	4.3	4.2	3.3	12	EEFUE0G331R	EEFUE0G331ER	2000	
	6.3	150	7.3	4.3	4.2	3.3	12	EEFUE0J151R* <sup>4</sup>	EEFUE0J151ER* <sup>4</sup>	2000
			7.3	4.3	4.2	3.5	10	EEFUE0J151XR* <sup>4</sup>	EEFUE0J151XE* <sup>4</sup>	2000
		180	7.3	4.3	4.2	3.3	12	EEFUE0J181R	EEFUE0J181ER	2000
			7.3	4.3	4.2	3.5	10	EEFUE0J181XR	EEFUE0J181XE	2000
		220	7.3	4.3	4.2	3.7	7	EEFUE0J181LR	—	2000
			7.3	4.3	4.2	3.0	15	EEFUE0J221R	EEFUE0J221ER	2000
	8	100	7.3	4.3	4.2	3.7	7	EEFUE0J221LR	—	2000
		150	7.3	4.3	4.2	3.3	12	EEFUE0K101R* <sup>4</sup>	EEFUE0K101ER* <sup>4</sup>	2000
	7.3	4.3	4.2	3.0	15	EEFUE0K151R	EEFUE0K151ER	2000		

\*1: Ripple current (100 kHz/ +20 to +105 °C), \*2: ESR (100 kHz/+20 °C)

\*3: Please confirm EE25 in detail of the Mounting Specifications.

\*4: Please use proposal part number of EE12, 13 when examining it.

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00 Sep. 2010