

### Surface Mount Type

Series: **CS,CT,CX**



CS, CT and CX series part numbers rated 10 V.DC or above are Not Recommended For New Design.

### SP-Cap



### Features

- High voltage (35 V.DC max.)
- Low profile (Height 1.0 mm max.)
- High ripple current (5600 mAr.m.s. max.)
- RoHS compliance, Halogen free

### Specifications

Series	CS	CT	CX	
Category temp. range	-55 °C to +105 °C			
Rated voltage range	4 V.DC to 35 V.DC		2 V.DC to 35 V.DC	
Nominal cap. range	10 µF to 120 µF	15 µF to 180 µF	15 µF to 560 µF	
Capacitance tolerance	±20 % (120 Hz / +20 °C)			
DC leakage current	I ≤ 0.1 CV(µA) [2 V.DC to 6.3 V.DC, 2 min], I ≤ 0.3 CV(µA) [10 V.DC to 35 V.DC, 2 min]			
Dissipation factor (tan δ)	≤ 0.06 (120 Hz / + 20 °C)			
Surge voltage (V.DC)	Rated voltage × 1.25 [2 V.DC to 16 V.DC], × 1.15 [20 V.DC to 35 V.DC] (15 °C to 35 °C)			
Endurance	+105 °C ± 2 °C, 2000 h, rated voltage applied			
	Capacitance change	Within ±20 % of the initial value		
	Dissipation factor (tan δ)	≤ 2 times of the initial limit		
	DC leakage current	≤ 3 times of the initial limit : 2 V.DC to 6.3 V.DC Within the initial limit : 10 V.DC to 35 V.DC		
Damp heat (Steady state)	+60 °C, 90 %, 500 h, No-applied voltage			
	Capacitance change of initial measured value	2 V.DC to 2.5 V.DC +70 %, -20 %	4 V.DC, 10 V.DC to 35 V.DC +60 %, -20 %	6.3 V.DC +50 %, -20 %
	Dissipation factor (tan δ)	≤ 2 times of the initial limit		
	DC leakage current	Within the initial limit : 2 V.DC to 6.3 V.DC ≤ 3 times of the initial limit : 10 V.DC to 35 V.DC		

### Marking

Capacitance      Polarity bar (Positive)

Lot No.      R. voltage code

R. voltage code		Unit : V.DC	
d	2	C	16
e	2.5	D	20
g	4	E	25
j	6.3	V	35
A	10		

### Dimensions (not to scale)

Series	Unit : mm				
	L±0.2	W1±0.2	W2±0.1	H±0.1	P±0.3
CS	7.3	4.3	2.4	1.1	1.3
CT	7.3	4.3	2.4	1.4	1.3
CX	7.3	4.3	2.4	1.9	1.3

\* Externals of figure are the reference.

### Characteristics list

#### ■ 2 V.DC to 6.3 V.DC

Reflow<sup>\*3</sup> <Standard>

Series	Rated volt. (V.DC)	Cap. (μF)	Case size (mm)			Specification		Part number	Min. Packaging Q'ty <sup>*4</sup> (pcs)
			L	W	H	Ripple current <sup>*1</sup> (mAr.m.s.)	ESR <sup>*2</sup> (mΩ max.)		
CS	4	120	7.3	4.3	1.1	5100	15	EEFCS0G121R	3500
	6.3	68	7.3	4.3	1.1	5100	15	EEFCS0J680R	3500
CT	4	180	7.3	4.3	1.4	5100	15	EEFCT0G181R	3500
	6.3	100	7.3	4.3	1.4	5100	15	EEFCT0J101R	3500
CX	2	220	7.3	4.3	1.9	5100	15	EEFCX0D221R	3500
		270	7.3	4.3	1.9	5600	12	EEFCX0D271XR	3500
		330	7.3	4.3	1.9	5100	15	EEFCX0D331R	3500
			7.3	4.3	1.9	5600	12	EEFCX0D331XR	3500
		390	7.3	4.3	1.9	5100	15	EEFCX0D391R	3500
		470	7.3	4.3	1.9	5100	15	EEFCX0D471R	3500
		560	7.3	4.3	1.9	5100	15	EEFCX0D561R	3500
	2.5	220	7.3	4.3	1.9	5100	15	EEFCX0E221R	3500
		330	7.3	4.3	1.9	5100	15	EEFCX0E331R	3500
		390	7.3	4.3	1.9	5100	15	EEFCX0E391R	3500
		470	7.3	4.3	1.9	5100	15	EEFCX0E471R	3500
	4	150	7.3	4.3	1.9	5100	15	EEFCX0G151R	3500
		180	7.3	4.3	1.9	5100	15	EEFCX0G181R	3500
			7.3	4.3	1.9	5600	12	EEFCX0G181XR	3500
		220	7.3	4.3	1.9	5100	15	EEFCX0G221R	3500
			7.3	4.3	1.9	5600	12	EEFCX0G221XR	3500
		270	7.3	4.3	1.9	5100	15	EEFCX0G271R	3500
		330	7.3	4.3	1.9	5100	15	EEFCX0G331R	3500
	6.3	100	7.3	4.3	1.9	5100	15	EEFCX0J101R	3500
		120	7.3	4.3	1.9	5100	15	EEFCX0J121R	3500
		150	7.3	4.3	1.9	5100	15	EEFCX0J151R	3500
			7.3	4.3	1.9	5600	12	EEFCX0J151XR	3500
		180	7.3	4.3	1.9	5100	15	EEFCX0J181R	3500
		220	7.3	4.3	1.9	5100	15	EEFCX0J221R	3500

\*1: Ripple current (100 kHz / +45 °C)

\*2: ESR (100 kHz / +20 °C)

\*3: Please refer to the page of "Mounting Specifications".

\*4: Please contact us when 500 pcs packing is necessary.

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

### Temperature compensation multipliers for ripple current

Temperature	T ≤ 45 °C	45 °C < T ≤ 85 °C	85 °C < T ≤ 105 °C
2 V.DC to 6.3 V.DC	1.0	0.7	0.25

◆ Ripple current should be controlled so that surface temperature of capacitor does not exceed the category temperature.

### Characteristics list

■ 10 V.DC to 35 V.DC

**Not Recommended for New Design**

Reflow<sup>\*3</sup> <Standard>

Series	Rated volt. (V.DC)	Cap. (μF)	Case size (mm)			Specification		Part number	Min. Packaging Q'ty <sup>*4</sup> (pcs)
			L	W	H	Ripple current <sup>*1</sup> (mAr.m.s.)	ESR <sup>*2</sup> (mΩ max.)		
CS	10	47	7.3	4.3	1.1	3200	40	EEFCS1A470R	3500
		15	7.3	4.3	1.1	3200	40	EEFCS1C150R	3500
	16	22	7.3	4.3	1.1	3200	40	EEFCS1C220R	3500
		33	7.3	4.3	1.1	3200	40	EEFCS1C330R	3500
	20	10	7.3	4.3	1.1	3200	40	EEFCS1D100R	3500
		15	7.3	4.3	1.1	3200	40	EEFCS1D150R	3500
		22	7.3	4.3	1.1	3200	40	EEFCS1D220R	3500
	25	10	7.3	4.3	1.1	3200	40	EEFCS1E100R	3500
		15	7.3	4.3	1.1	3200	40	EEFCS1E150R	3500
	35	10	7.3	4.3	1.1	3200	40	EEFCS1V100R	3500
CT	10	68	7.3	4.3	1.4	3200	40	EEFCT1A680R	3500
	16	47	7.3	4.3	1.4	3200	40	EEFCT1C470R	3500
	20	33	7.3	4.3	1.4	3200	40	EEFCT1D330R	3500
		47	7.3	4.3	1.4	3200	40	EEFCT1D470R	3500
	25	22	7.3	4.3	1.4	3200	40	EEFCT1E220R	3500
	35	15	7.3	4.3	1.4	3200	40	EEFCT1V150R	3500
CX	10	47	7.3	4.3	1.9	3200	40	EEFCX1A470R	3500
		68	7.3	4.3	1.9	3200	40	EEFCX1A680R	3500
		100	7.3	4.3	1.9	3200	40	EEFCX1A101R	3500
	16	15	7.3	4.3	1.9	3200	40	EEFCX1C150R	3500
		22	7.3	4.3	1.9	3200	40	EEFCX1C220R	3500
		33	7.3	4.3	1.9	3200	40	EEFCX1C330R	3500
		47	7.3	4.3	1.9	3200	40	EEFCX1C470R	3500
		68	7.3	4.3	1.9	3200	40	EEFCX1C680R	3500
	20	22	7.3	4.3	1.9	3200	40	EEFCX1D220R	3500
		33	7.3	4.3	1.9	3200	40	EEFCX1D330R	3500
		47	7.3	4.3	1.9	3200	40	EEFCX1D470R	3500
		56	7.3	4.3	1.9	3200	40	EEFCX1D560R	3500
	25	15	7.3	4.3	1.9	3200	40	EEFCX1E150R	3500
		22	7.3	4.3	1.9	3200	40	EEFCX1E220R	3500
		33	7.3	4.3	1.9	3200	40	EEFCX1E330R	3500
	35	15	7.3	4.3	1.9	3200	40	EEFCX1V150R	3500
		22	7.3	4.3	1.9	3200	40	EEFCX1V220R	3500

\*1: Ripple current (100 kHz / +45 °C)

\*2: ESR (100 kHz / +20 °C)

\*3: Please refer to the page of "Mounting Specifications".

\*4: Please contact us when 500 pcs packing is necessary.

◆ Please refer to each page in this catalog for "Reflow conditions" and "Taping specifications".

### Temperature compensation multipliers for ripple current

Temperature	T ≤ 45 °C	45 °C < T ≤ 85 °C	85 °C < T ≤ 105 °C
10 V.DC to 35 V.DC	1.0	0.8	0.5

◆ Ripple current should be controlled so that surface temperature of capacitor does not exceed the category temperature.

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