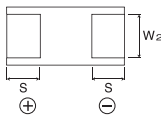


Conductive Polymer New Bottom Surface Electrode (Extra Large Capacitance): TCSO series

- M case: 1608-10 (0603) size
- PE case: 2012-08 (0805) size H=Max 0.8mm
- PS case: 2012-09 (0805) size H=Max 0.9mm
- PL case: 2012-10 (0805) size H=Max 1.0mm

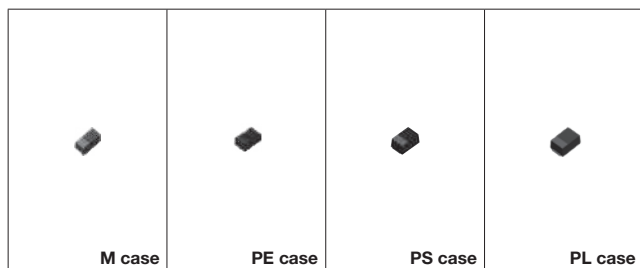
Dimensions

Anode mark



(Unit: mm)

Dimensions	Size			
	M case	PE case	PS case	PL case
L	1.6+0.2/-0	2.0±0.2	2.0±0.2	2.0±0.2
W ¹	0.85±0.1	1.25±0.2	1.25±0.2	1.25±0.2
W ²	0.55±0.1	0.85±0.2	0.85±0.2	0.85±0.2
H	0.8+0.2/-0	Max 0.8	Max 0.9	0.9±0.1
S	0.5±0.1	0.5±0.1	0.5±0.1	0.5±0.1



Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCSO series	M case 1608-10 (0603) size	±20% (M)	-55°C to +105°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +105°C	Max 15% at 120Hz (25°C)*	Max 0.1 CV (25°C, 5 min.)	Max 700mΩ (at 100kHz)*
	PE case 2012-08 (0805) size					Max 500mΩ (at 100kHz)*
	PS case 2012-09 (0805) size					
	PL case 2012-10 (0805) size					

*Spec. values are specified for each parts number.

Capacitance Range

- M case: 1608-10 (0603) size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)			
	6.3	10	16	25
2.2 (225)				☆700
4.7 (475)			☆500	
10 (106)		300		
22 (226)	300	☆300		
47 (476)	300			

☆: Under Development

- PE case: 2012-08 (0805) size H=Max 0.8mm (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)		
	6.3	8	25
3.3 (335)			☆500
33 (336)		☆150	
47 (476)	☆150		

☆: Under Development

- PS case: 2012-09 (0805) size H=Max 0.9mm (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)						
	4	6.3	8	10	16	25	35
1 (105)							☆500
2.2 (225)							
4.7 (475)							
10 (106)							
22 (226)				☆200			
47 (476)		150/200	150/200				
100 (107)							

☆: Under Development

- PL case: 2012-10 (0805) size H=Max 1.0mm (ESR: mΩ)

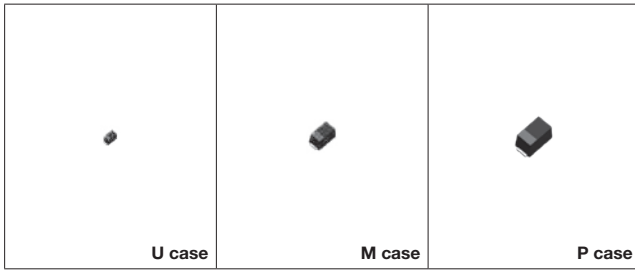
Capacitance (μF)	Rated Voltage (V.DC)						
	4	6.3	10	16	20	25	35
2.2 (225)							☆500
4.7 (475)						500	
10 (106)				☆150			
22 (226)			200				
33 (336)							
47 (476)		150/200					
68 (686)		☆150/☆200					

☆: Under Development

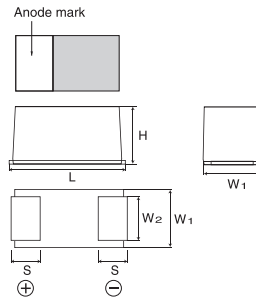
*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

Conductive Polymer Bottom Surface Electrode (Large Capacitance): TCTO series

- U case: 1005-064 (0402) size
- M case: 1608-09 (0603) size
- P case: 2012-12 (0805) size



■ Dimensions



(Unit: mm)

Dimensions	Size		
	U case	M case	P case
L	1.0+0.2/-0	1.6±0.1	2.0±0.2
W ¹	0.5+0.2/-0	0.85±0.1	1.25±0.2
W ²	0.35±0.1	0.55±0.1	0.85±0.2
H	Max 0.64	0.8±0.1	Max 1.2
S	0.35±0.1	0.5±0.1	0.5±0.2

Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCTO series	U case 1005-064 (0402) size	±20% (M)	-55°C to +105°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +105°C	Max 30% at 120Hz (25°C)*	3μA or 0.1CV whichever is greater (25°C, 5 min.)	Max 1200mΩ (at 100kHz)*
	M case 1608-09 (0603) size			Max 8% at 120Hz (25°C)*	Max 0.1CV (25°C, 5 min.)	Max 700mΩ (at 100kHz)*
	P case 2012-12 (0805) size			Max 15% at 120Hz (25°C)*	3μA or 0.1CV whichever is greater (25°C, 5 min.)	Max 500mΩ (at 100kHz)*

*Spec. values are specified for each parts number.

■ Capacitance Range

● U case: 1005-064 (0402) size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)			
	2.5	4	6.3	10
0.47 (474)				
1 (105)				
2.2 (225)				☆1200
4.7 (475)			☆1000	
10 (106)	☆800			

☆: Under Development

● M case: 1608-09 (0603) size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)					
	2.5	4	6.3	10	16	25
1.0 (105)						☆700
2.2 (225)				500	☆500	
3.3 (335)				500		
4.7 (475)				500		
10 (106)			500			

☆: Under Development

● P case: 2012-12 (0805) size (ESR: mΩ)

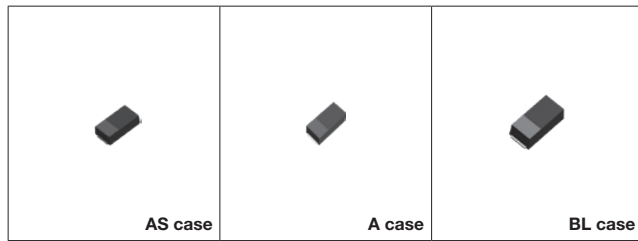
Capacitance (μF)	Rated Voltage (V.DC)					
	2.5	4	6.3	10	25	50
0.1 (104)						☆
2.2 (225)					☆500	
10 (106)				300		
22 (226)						
47 (476)						
100 (107)						

☆: Under Development

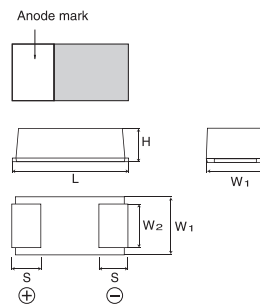
*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

Conductive Polymer Bottom Surface Electrode (Large Capacitance): TCTO series

- AS case: 3216-10 (1206) size H=Max 1.0mm
- A case: 3216-18 (1206) size H=Max 1.8mm
- BL case: 3528-12 (1411) size H=Max 1.2mm



Dimensions



(Unit: mm)

Dimensions	Size		
	AS case	A case	BL case
L	3.2±0.2	3.2±0.2	3.5±0.2
W¹	1.6±0.2	1.6±0.2	2.8±0.2
W²	1.2±0.2	1.2±0.2	2.0±0.2
H	0.9±0.1	1.6±0.2	1.1±0.1
S	0.8±0.2	0.8±0.2	0.8±0.2

Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCTO series	AS case 3216-10 (1206) size	±20% (M)	-55°C to +105°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +105°C	Max 10% at 120Hz (25°C)*	3μA or 0.1CV whichever is greater (25°C, 5 min.)	Max 200mΩ (at 100kHz)*
	Max 15% at 120Hz (25°C)*			Max 0.1CV (25°C, 5 min.)	Max 200mΩ (at 100kHz)*	
	Max 0.2CV (25°C, 5 min.)			Max 150mΩ (at 100kHz)*		

*Spec. values are specified for each parts number.

Capacitance Range

- AS case: 3216-10 (1206) size H=Max 1.0mm (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)				
	2.5	4	6.3	10	16
22 (226)					
33 (336)				150/200	
47 (476)			200	100/200	
100 (107)			55/70		
227 (227)	☆70				

☆: Under Development

- A case: 3216-18 (1206) size H=Max 1.8mm (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V)				
	2.5	6.3	10	16	25
10 (106)					☆200
22 (226)				200	
47 (476)			200		
100 (107)		☆35/45/70			
150 (157)		☆35/200			
220 (227)	35				
330 (337)	☆35/☆200				

☆: Under Development

- BL case: 3528-12 (1411) size H=Max 1.2mm

(ESR: mΩ)

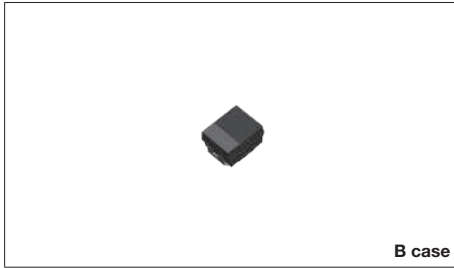
Capacitance (μF)	Rated Voltage (V.DC)									
	2	2.5	4	6.3	10	16	20	25	35	
6.8 (685)									150	
10 (106)								☆100	☆150	
15 (156)								100		
22 (226)							☆100	☆100		
33 (336)						70				
47 (476)					100	70				
100 (107)				☆25/☆35/45						
150 (157)				25/35						
220 (227)		☆25/☆35		☆25/☆35						
330 (337)		20/☆25/☆35	☆25/☆35/☆45							
470 (477)	☆15									

☆: Under Development

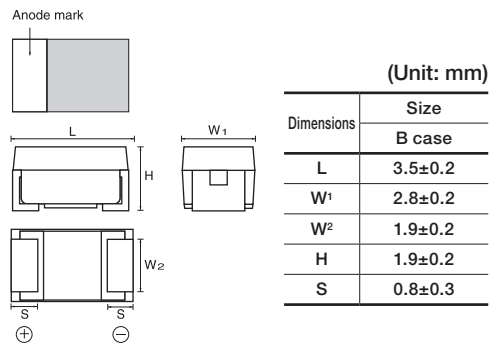
*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

Conductive Polymer Standard: TCO series

■ B case: 3528-21 (1411) size



■ Dimensions



Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCO series	B case 3528-21 (1411) size	±20% (M)	-55°C to +105°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +105°C	Max 15% at 120Hz (25°C)*	Max 0.1CV (25°C, 5 min.)	Max 150mΩ (at 100kHz)*

*Spec. values are specified for each parts number.

■ Capacitance Range

● B case: 3528-21 (1411) size

(ESR: mΩ)

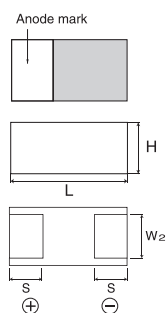
Capacitance (μF)	Rated Voltage (V.DC)						
	2.5	4	6.3	10	16	25	35
10 (106)							☆150
15 (156)						100	
22 (226)						100	
33 (336)				150	100		
47 (476)			70	150			
100 (107)			35/45				
150 (157)			35/45				
220 (227)	35		35/45				
330 (337)	35/45						

☆: Under Development

*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

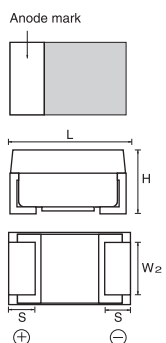
Conductive Polymer High Voltage: 16 to 50V

■ Dimensions



(Unit: mm)

Dimensions	Size								
	TCSOM	TCTOM	TCSOPE	TCSOPS	TCSOPL	TCSOP	TCTOP	TCTOA	TCTOBL
L	1.6+0.2/-0	1.6±0.1	2.0±0.2	2.0±0.2	2.0±0.2	2.0±0.2	2.0±0.2	3.2±0.2	3.5±0.2
W ¹	0.85±0.1	0.85±0.1	1.25±0.2	1.25±0.2	1.25±0.2	1.25±0.2	1.25±0.2	1.6±0.2	2.8±0.2
W ²	0.55±0.1	0.55±0.1	0.85±0.2	0.85±0.2	0.85±0.2	0.85±0.2	0.85±0.2	1.2±0.2	2.0±0.2
H	0.8+0.2/-0	0.8±0.1	Max 0.8	Max 0.9	0.9±0.1	Max 1.2	Max 1.2	1.6±0.1	1.1±0.1
S	0.5±0.1	0.5±0.1	0.5±0.1	0.5±0.1	0.5±0.1	0.5±0.1	0.5±0.2	0.8±0.2	0.8±0.2



(Unit: mm)

Dimensions	Size
	TCOB
L	3.5±0.2
W ¹	2.8±0.2
W ²	1.9±0.2
H	1.9±0.2
S	0.8±0.3

■ Capacitance Range

● 1608 to 3528 size

(ESR: mΩ)

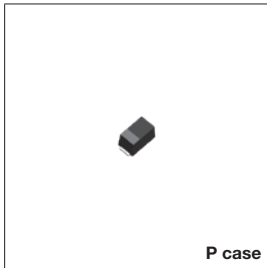
Capacitance (μF)	Rated Voltage (V.DC)				
	16	20	25	35	50
0.1 (104)					☆TCTOP
1 (105)			☆TCTOM (700)	☆TCSOPS (500)	
2.2 (225)	☆TCTOM (500)		☆TCSOM (700) ☆TCTOP (500)	☆TCSOPL (500)	
3.3 (335)			☆TCSOPE (500)		
4.7 (475)	☆TCSOM (500)		TCSOPL (500)		
6.8 (685)				TCTOBL (150)	
10 (106)	☆TCSOPL (150)		☆TCTOA (200) ☆TCTOBL (100)	☆TCTOBL (150) ☆TCOB (150)	
15 (156)			TCTOBL (100) TCOB (100)		
22 (226)	TCTOA (200)	☆TCTOBL (100)	☆TCTOBL (100) TCOB (100)		
33 (336)	TCTOBL (70) TCOB (100)				
47 (476)	TCTOBL (70)				

☆: Under Development

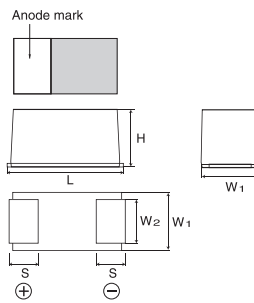
*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

Conductive Polymer Small type Ultra Low ESR: ZR series

■ P case: 2012-12 (0805) size



■ Dimensions



(Unit: mm)

Dimensions	Size
	P case
L	2.0±0.2
W ¹	1.25±0.2
W ²	0.85±0.2
H	Max 1.2
S	0.5±0.2

Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCTO series	P case 2012-12 (0805) size	±20% (M)	-55°C to +105°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +105°C	Max 15% at 120Hz (25°C)*	3μA or 0.1CV whichever is greater (25°C, 5 min.)	Max 100mΩ (at 100kHz)*

*Spec. values are specified for each parts number.

■ Capacitance Range

● P case: 2012-12 (0805) size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)					
	2.5	4	6.3	10	25	50
0.1 (104)						
2.2 (225)						
10 (106)						
22 (226)			100			
47 (476)		100				
100 (107)						

● Part Number Explanation

■ Conductive Polymer Capacitors

T C S O M 0 J 4 7 6 M 8 R - Z M 1

Series Name	Case	Rated Voltage	Capacitance	Capacitance Tolerance	Packaging	Product Specification	ESR	Discrimination Code
TCSO (New Bottom Surface Electrode) TCTO (Bottom Surface Electrode) TCO (Standard)	Code Size [mm [inch]] U 1005-064 [0402] M 1608-09 [0603] PE 2012-08 [0805] PS 2012-09 [0805] PL 2012-10 [0805] P 2012-12 [0805] AS 3216-10 [1206] A 3216-18 [1206] BL 3528-12 [1411] B 3528-21 [1411]	Code Rated Voltage (V) 0E 2.5 0G 4 0J 6.3 0K 8 1A 10 1C 16 1D 20 1E 25 1V 35	Nominal capacitance (in pF) is denoted by 3 digits: 2 significant figures followed by a 3rd digit representing the number of zeroes (i.e. 226 = 22,000,000pF)	Code Capacitance Tolerance M ±20%	Code Tape Width Parts Orientation 8R 8mm Positive electrode on the side opposite to sprocket hole	Code Specifications Z ESR sorting product E Halogen-free materials product TCO (B Case)	Code ESR Max (mΩ) E 15 K 25 N 35 S 45 U 55 W 70 B 100 F 150 D 200 M 300 T 500	Code Specifications 1 Usually Other than 1 Special specifications

● Package Quantity

■ Conductive Polymer Capacitors

Case (mm[inch])	Series	Package Quantity (pcs)
U (1005-064 [0402])	TCTO	10,000
M (1608-09 [0603])		4,000
M (1608-10 [0603])		3,000
PE (2012-08 [0805])	TCSO	4,000
PS (2012-09 [0805])		3,000
PL (2012-10 [0805])		
P (2012-12 [0805])	TCTO	3,000
AS (3216-10 [1206])		2,000
A (3216-18 [1206])		
BL (3528-12 [1411])	TCTO	3,000
B (3528-21 [1411])		TCO

*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"