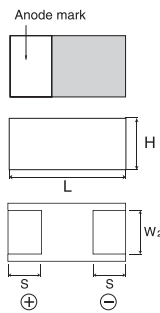
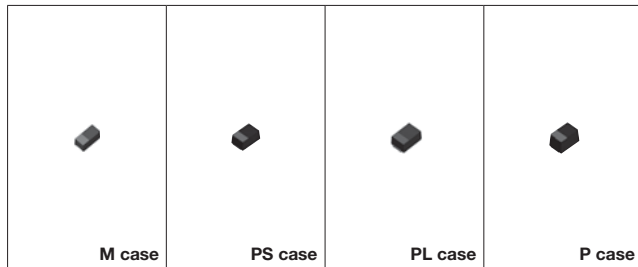


## Conductive Polymer New Bottom Surface Electrode (Extra Large Capacitance): TCSO series

- M case: 1608-10 (0603) size**
- PS case: 2012-09 (0805) Ultra-Low Profile size**
- PL case: 2012-10 (0805) Low Profile size**
- P case: 2012-12 (0805) size**

### Dimensions



(Unit: mm)

Dimensions	Size			
	M case	PS case	PL case	P case
L	1.6+0.2/-0	2.0±0.2	2.0±0.2	2.0±0.2
W <sup>1</sup>	0.85±0.1	1.25±0.2	1.25±0.2	1.25±0.2
W <sup>2</sup>	0.55±0.1	0.85±0.2	0.85±0.2	0.85±0.2
H	0.8+0.2/-0	Max 0.9	0.9±0.1	Max 1.2
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)*
	PS case 2012-09 (0805) Ultra-Low Profile size					Max 500mΩ (at 100kHz)*
	PL case 2012-10 (0805) Low Profile size					Max 500mΩ (at 100kHz)*
	P case 2012-12 (0805) size					Max 300mΩ (at 100kHz)*

\*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

**PS case: 2012-09 (0805) Ultra-Low Profile size** (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) Low Profile size** (ESR: mΩ)

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

: Under Development

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

Capacitance (μF)	Rated Voltage (V.DC)			
	4	6.3	10	16
10 (106)				300
22 (226)				
47 (476)			200	
100 (107)				

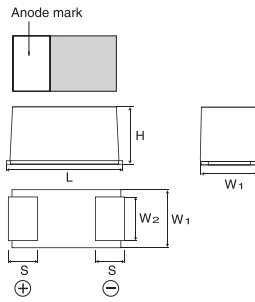
: Under Development

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

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

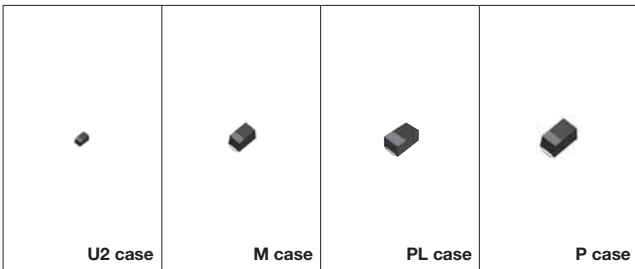
- U2 case: 1005-064 (0402) size**
- M case: 1608-09 (0603) size**
- PL case: 2012-10 (0805) Low Profile size**
- P case: 2012-12 (0805) size**

## Dimensions



(Unit: mm)

Dimensions	Size			
	U2 case	M case	PL case	P case
<b>L</b>	1.0+0.3/-0	1.6±0.1	2.0±0.2	2.0±0.2
<b>W<sup>1</sup></b>	0.5+0.2/-0	0.85±0.1	1.25±0.2	1.25±0.2
<b>W<sup>2</sup></b>	0.35±0.1	0.55±0.1	0.85±0.2	0.85±0.2
<b>H</b>	Max 0.64	0.8±0.1	0.9±0.1	Max 1.2
<b>S</b>	0.35±0.1	0.5±0.1	0.5±0.2	0.5±0.2



Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCTO series	U2 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 700mΩ (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)*
	PL case 2012-10 (0805) Low Profile size			Max 15% at 120Hz (25°C)*	3μA or 0.1CV whichever is greater (25°C, 5 min.)	Max 300mΩ (at 100kHz)*
	P case 2012-12 (0805) size					Max 500mΩ (at 100kHz)*

\*Spec. values are specified for each parts number.

## Capacitance Range

**U2 case: 1005-064 (0402) size** (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)			
	2.5	4	6.3	10
0.47 (474)				
1 (105)				700
2.2 (225)				700
4.7 (475)			700	

: 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

**PL case: 2012-10 (0805) Low Profile size** (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)			
	2.5	4	6.3	10
10 (106)				
22 (226)			300	
47 (476)				
100 (107)				

: 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

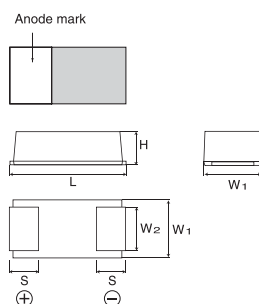
AS case: 3216-10 (1206) Ultra-Low Profile size

AL case: 3216-12 (1206) Low Profile size

A case: 3216-18 (1206) size

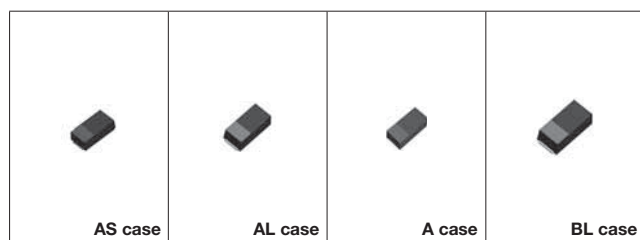
BL case: 3528-12 (1411) Low Profile size

### Dimensions



(Unit: mm)

Dimensions	Size			
	AS case	AL case	A case	BL case
L	3.2±0.2	3.2±0.2	3.2±0.2	3.5±0.2
W <sup>1</sup>	1.6±0.2	1.6±0.2	1.6±0.2	2.8±0.2
W <sup>2</sup>	1.2±0.2	1.2±0.2	1.2±0.2	2.0±0.2
H	0.9±0.1	1.1±0.1	1.6±0.2	1.1±0.1
S	0.8±0.2	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) Ultra-Low Profile 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)*
	AL case 3216-12 (1206) Low Profile size			Max 15% at 120Hz (25°C)*		Max 200mΩ (at 100kHz)*
	A case 3216-18 (1206) size			Max 0.1CV (25°C, 5 min.)	Max 200mΩ (at 100kHz)*	
	BL case 3528-12 (1411) Low Profile size			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) Ultra-Low Profile size (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				

AL case: 3216-12 (1206) Low Profile size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V)						
	4	6.3	10	16	20	25	50
1 (105)							
4.7 (475)						200	
10 (106)				200			
22 (226)			200				
33 (336)			200				
47 (476)		70/200					
100 (107)		70/200					

: Under Development

A case: 3216-18 (1206) size (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) Low Profile size (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			
33 (336)						70				
47 (476)					70	70				
100 (107)				25/ 35						
150 (157)				25/35						
220 (227)				25/ 35						
330 (337)		15/ 25/ 35	25/ 35/ 45							
470 (477)	15									

: Under Development

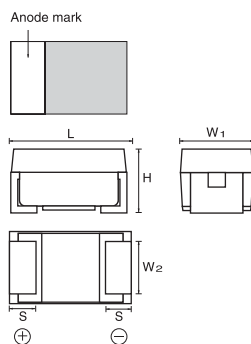
\*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

## Conductive Polymer Standard: TCO series

B case: 3528-21 (1411) size



### Dimensions



(Unit: mm)

Dimensions	Size
	B case
L	3.5±0.2
W <sup>1</sup>	2.8±0.2
W <sup>2</sup>	1.9±0.2
H	1.9±0.2
S	0.8±0.3

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.

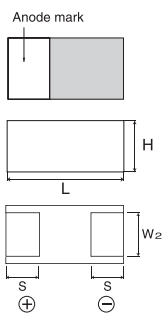
### Capacitance Range

B case: 3528-21 (1411) size (ESR: mΩ)

Capacitance (μF)	Rated Voltage (V.DC)					
	2.5	4	6.3	10	16	25
15 (156)						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					

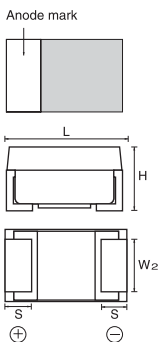
# Conductive Polymer High Voltage: 16 to 50V

## Dimensions



(Unit: mm)

Dimensions	Size								
	TCSOM	TCTOM	TCSOPS	TCSOPL	TCSOP	TCTOP	TCTOAL	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	3.2±0.2	3.2±0.2	3.5±0.2
W <sup>1</sup>	0.85±0.1	0.85±0.1	1.25±0.2	1.25±0.2	1.25±0.2	1.25±0.2	1.6±0.2	1.6±0.2	2.8±0.2
W <sup>2</sup>	0.55±0.1	0.55±0.1	0.85±0.2	0.85±0.2	0.85±0.2	0.85±0.2	1.2±0.2	1.2±0.2	2.0±0.2
H	0.8+0.2/-0	0.8±0.1	Max 0.9	0.9±0.1	Max 1.2	Max 1.2	1.1±0.1	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±0.2	0.8±0.2	0.8±0.2	0.8±0.2



(Unit: mm)

Dimensions	Size
	TCOB
L	3.5±0.2
W <sup>1</sup>	2.8±0.2
W <sup>2</sup>	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)	TCTOAL
2.2 (225)	TCTOM (500)		TCSOM (700) TCTOP (500)		
4.7 (475)	TCSOM (500)		TCSOPL (500) TCTOAL (200)		
6.8 (685)				TCTOBL (150)	
10 (106)	TCSOPL (150) TCSOP (300) TCTOAL (200)		TCTOA (200) TCTOBL (100)	TCTOBL (150)	
15 (156)			TCTOBL (100) TCOB (100)		
22 (226)	TCTOA (200)	TCTOBL (100)			
33 (336)	TCTOBL (70) TCOB (100)				
47 (476)	TCTOBL (70)				

: Under Development

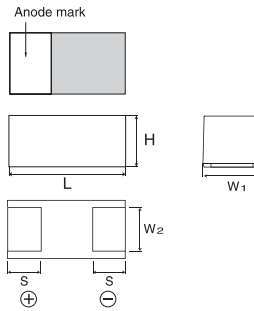
\*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

## New Bottom Surface Electrode (Extra Large Capacitance): TCS series

**M case: 1608-10 (0603) size**  
**P case: 2012-12 (0805) size**



### Dimensions



Dimensions	Size	
	M case	P case
L	1.6+0.2/-0	2.0±0.2
W <sup>1</sup>	0.85±0.1	1.25±0.2
W <sup>2</sup>	0.55±0.1	0.85±0.2
H	0.8+0.2/-0	Max 1.2
S	0.5±0.1	0.5±0.1

Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TCS series	M case 1608-10 (0603) size	±20% (M)	-55°C to +125°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +125°C	Max 40% at 120Hz (25°C)*	Max 0.2CV (25°C, 5 min.)*	Max 6.0Ω (at 100kHz)*
	P case 2012-12 (0805) size				Max 0.1CV (25°C, 5 min.)*	

\*Spec. values are specified for each parts number.

### Capacitance Range

**M case: 1608-10 (0603) size**

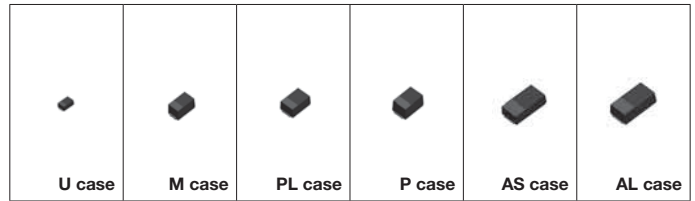
Capacitance (μF)	Rated Voltage (V.DC)			
	4	6.3	10	16
10 (106)				M
22 (226)			M	
47 (476)		M		
100 (107)	M			

**P case: 2012-12 (0805) size**

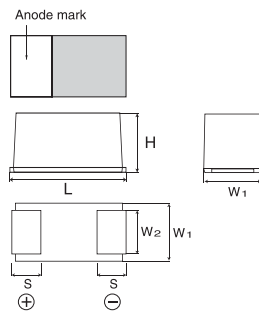
Capacitance (μF)	Rated Voltage (V.DC)			
	4	6.3	10	20
10 (106)				P
47 (476)			P	
100 (107)		P		
150 (157)		P		
220 (227)	P			

## Bottom Surface Electrode (Large Capacitance): TCT, TC series

- U case:** 1005-055 (0402) size
- M case:** 1608-09 (0603) size
- PL case:** 2012-10 (0805) Low Profile size
- P case:** 2012-12 (0805) size
- AS case:** 3216-10 (1206) Ultra-Low Profile size
- AL case:** 3216-12 (1206) Low Profile size



### Dimensions



(Unit: mm)

Dimensions	Size					
	U case	M case	PL case	P case	AS case	AL case
L	1.0+0.2/-0	1.6±0.1	2.0±0.2	2.0±0.2	3.2±0.2	3.2±0.2
W <sup>1</sup>	0.5+0.2/-0	0.85±0.1	1.25±0.2	1.25±0.2	1.6±0.2	1.6±0.2
W <sup>2</sup>	0.35±0.1	0.55±0.1	0.85±0.2	0.85±0.2	1.2±0.2	1.2±0.2
H	Max 0.55	0.8±0.1	0.9±0.1	Max 1.2	0.9±0.1	1.1±0.1
S	0.35±0.1	0.5±0.1	0.5±0.2	0.5±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
TCT series	U case 1005-055 (0402) size	±10% (K) ±20% (M)	-55°C to +125°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +125°C	Max 50% at 120Hz (25°C)*	0.5µA or 0.1CV whichever is greater (25°C, 5 min.)*	Max 35.0Ω (at 100kHz)*
TC series	M case 1608-09 (0603) size	±20%(M)		Max 30% at 120Hz (25°C)*	0.5µA or 0.01CV whichever is greater (25°C, 5 min.)*	Max 15.0Ω (at 100kHz)*
TCT series	PL case 2012-10 (0805) Low Profile size			Max 0.05CV (25°C, 5 min.)*	Max 8.0Ω (at 100kHz)*	
	P case 2012-12 (0805) size					
	AS case 3216-10 (1206) Ultra-Low Profile size					
	AL case 3216-12 (1206) Low Profile size					

\*Spec. values are specified for each parts number.

### Capacitance Range

#### U case: 1005-055 (0402) size

Capacitance (µF)	Rated Voltage (V.DC)			
	2.5	4	6.3	20
0.33 (334)				U
0.47 (474)			U	
1 (105)			U	
2.2 (225)			U	
4.7 (475)		U	U	
10 (106)				
15 (156)	U			

: Under Development

#### M case: 1608-09 (0603) size

Capacitance (µF)	Rated Voltage (V.DC)				
	4	6.3	10	16	25
1 (105)				M	M
2.2 (225)			M	M	
4.7 (475)		M	M		
10 (106)		M	M		
22 (226)	M	M			
33 (336)		M			

: Under Development

#### PL case: 2012-10 (0805) Low Profile size

Capacitance (µF)	Rated Voltage (V.DC)			
	4	6.3	10	16
1 (105)				
2.2 (225)				
4.7 (475)				
10 (106)				PL
22 (226)			PL	
33 (336)				
47 (476)		PL		
100 (107)	PL			

: Under Development

#### P case: 2012-12 (0805) size

Capacitance (µF)	Rated Voltage (V.DC)				
	4	6.3	10	16	25
2.2 (225)					P
4.7 (475)					
10 (106)				P	
22 (226)			P		
33 (336)			P		
47 (476)	P	P	P		
100 (107)	P				

: contact us

#### AS case: 3216-10 (1206) Ultra-Low Profile size

Capacitance (µF)	Rated Voltage (V.DC)				
	4	6.3	10	35	
1 (105)				AS	
2.2 (225)					
4.7 (475)					
10 (106)					
22 (226)					
33 (336)					
47 (476)		AS	AS		
100 (107)		AS			
220 (227)	AS				

: Under Development

#### AL case: 3216-12 (1206) Low Profile size

Capacitance (µF)	Rated Voltage (V.DC)						
	4	6.3	10	16	20	25	35
3.3 (335)							AL
4.7 (475)						AL	
10 (106)					AL	AL	
22 (226)				AL	AL		
33 (336)				AL			
47 (476)			AL				
100 (107)		AL	AL				
150 (157)		AL					
220 (227)	AL	AL					

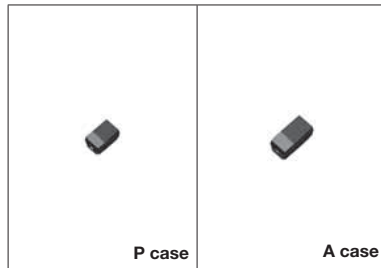
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\*Usage precaution: Based on JEITA Technical Report "EIAJ RCR-2368A"

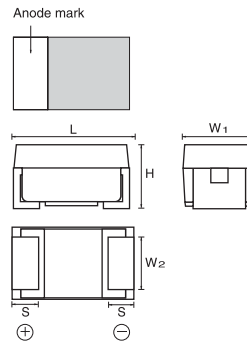
## Standard: TC series

**P case: 2012-12 (0805) size**

**A case: 3216-18 (1206) size**



### Dimensions



(Unit: mm)

Dimensions	Size	
	P case	A case
L	2.0±0.2	3.2±0.2
W <sup>1</sup>	1.25±0.2	1.6±0.2
W <sup>2</sup>	0.9±0.2	1.2±0.2
H	Max 1.2	1.6±0.2
S	0.45±0.3	0.8±0.3

Series Name	Case Name	Capacitance Tolerance	Operating Temperature	Tangent of Loss Angle	Leakage Current	ESR
TC series	<b>P case 2012-12 (0805) size</b>	±20% (M)	-55°C to +125°C Rated Voltage at -55°C to +85°C DeRated Voltage at +85°C to +125°C	Max 25% at 120Hz (25°C)*	0.5μA or 0.01CV whichever is greater (25°C, 1 min.)*	Max 17.5Ω (at 100kHz)*
	<b>A case 3216-18 (1206) size</b>			Max 30% at 120Hz (25°C)*		Max 8.8Ω (at 100kHz)*

\*Spec. values are specified for each parts number.

### Capacitance Range

**P case: 2012-12 (0805) size**

Capacitance (μF)	Rated Voltage (V.DC)					
	4	6.3	10	16	20	25
1 (105)			P	P		P
2.2 (225)		P	P			
4.7 (475)		P	P			
10 (106)	P	P	P			
22 (226)	P	P				

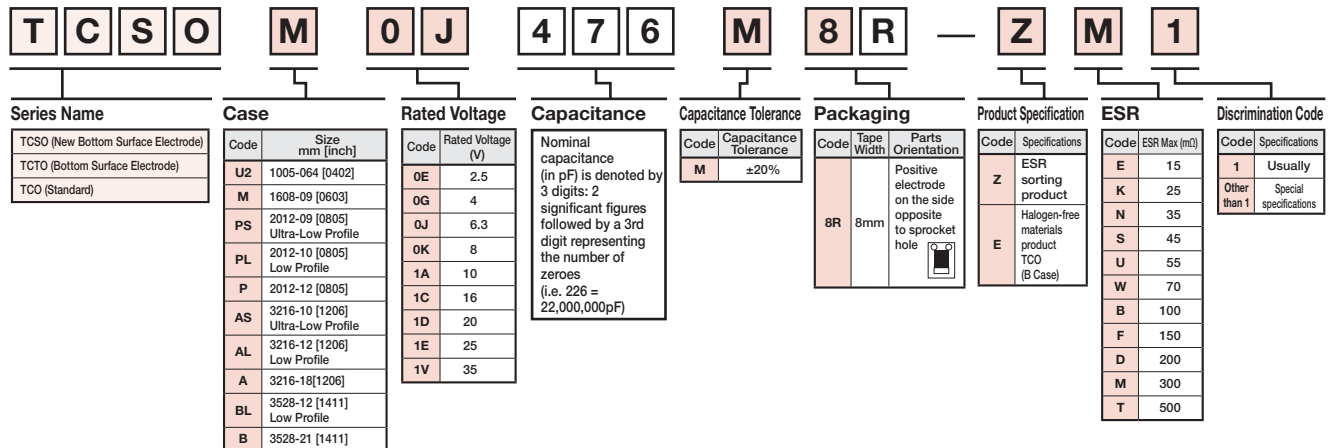
**A case: 3216-18 (1206) size**

Capacitance (μF)	Rated Voltage (V.DC)					
	4	6.3	10	16	20	25
1 (105)				A		A
2.2 (225)			A	A		
4.7 (475)			A	A		A
10 (106)		A	A	A		
22 (226)		A	A			
47 (476)		A				
100 (107)	A					

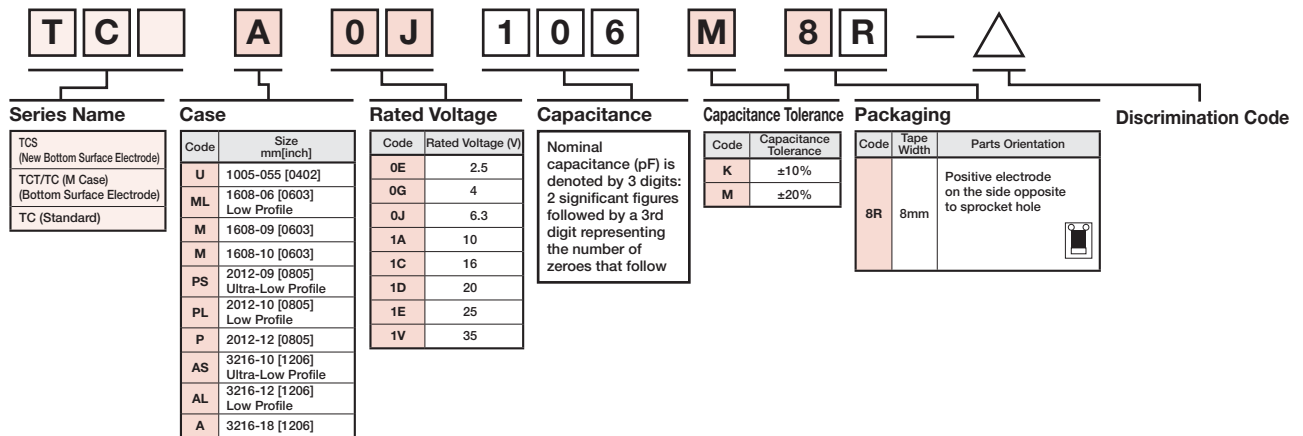


## Part Number Explanation

### Conductive Polymer Capacitors



### Tantalum Capacitors



## Package Quantity

### Conductive Polymer Capacitors

Case (mm[inch])	Series	Package Quantity (pcs)
U2 (1005-064 [0402])	TCTO	10,000
M (1608-09 [0603])	TCTO	4,000
	TCSO	3,000
PS (2012-09 [0805] Ultra-Low Profile)	TCSO/TCTO	
PL (2012-10 [0805] Low Profile)		
P (2012-12 [0805])	TCTO	
AS (3216-10 [1206] Ultra-Low Profile)		2,000
AL (3216-12 [1206] Low Profile)		
A (3216-18 [1206])	3,000	
BL (3528-12 [1411] Low Profile)		
B (3528-21 [1411])	TCO	2,000

### Tantalum Capacitors

Case (mm[inch])	Series	Package Quantity (pcs)
U (1005-055 [0402])	TCT	10,000
ML (1608-065 [0603] Low Profile)		5,000
M (1608-09 [0603])	TC	4,000
M (1608-10 [0603])	TCS	3,000
PS (2012-09 [0805] Ultra-Low Profile)		
PL (2012-10 [0805] Low Profile)		
P (2012-12 [0805])	TCS/TCT/TC	
AS (3216-10 [1206] Ultra-Low Profile)	TCT	3,000
AL (3216-12 [1206] Low Profile)		
A (3216-18 [1206])	TC	2,000