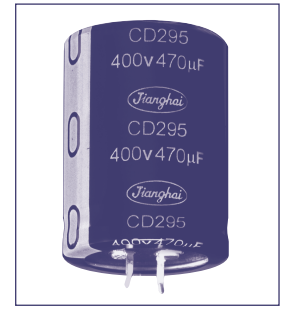
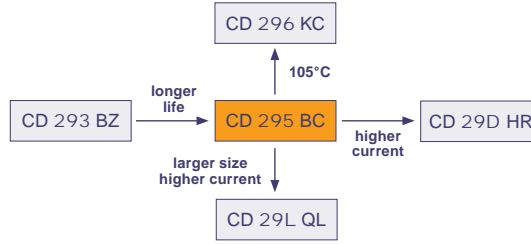


6000h at 85°C

- Long Life at 85°C
- High Ripple Current
- Long Life General Industrial Electronics



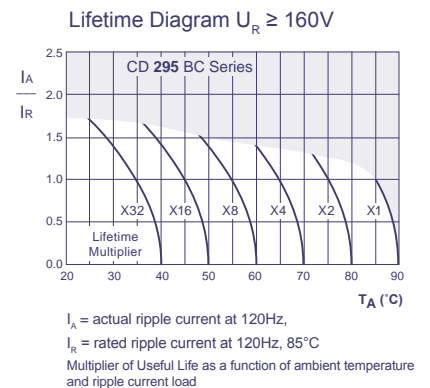
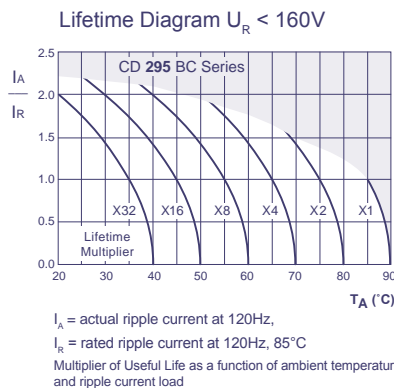
Item	Characteristics										
Operating Temperature Range (°C)	-40 ~ +85					-25 ~ +85					
Voltage Range (V)	10 ~ 400					450					
Capacitance Range (µF)	68 ~ 22 000										
Capacitance Tolerance (20°C, 120Hz)	± 20%										
Leakage Current (µA)	After 5 minutes at 20°C application of rated voltage, leakage current is not more than 0,01CV or 1,5mA, whichever is smaller C: Nominal Capacitance (µF) V: Rated Voltage (V)										
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V)	10	16	25	35	50	63~100	160~250	315~450		
	Tan δ (max)	0,80	0,60	0,50	0,40	0,30	0,20	0,15	0,15		
Stability at Low Temperature (Impedance Ratio at 120Hz)	Rated Voltage (V)	10	16~35	50~100	160~200	250~400	450				
	Z <sub>-25°C</sub> / Z <sub>+20°C</sub>	5	4	3		4					
	Z <sub>-40°C</sub> / Z <sub>+20°C</sub>	18	15	10	6	8	-				

	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	6 000h	>100000h	5000h	5000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ± 30% of initial value		Within ± 20% of initial value	Within ± 20% of initial value	Within ± 20% of initial value
Dissipation Factor	Not more than 300% of specified value		Not more than 200% of specified value	Not more than 130% of specified value	Not more than 200% of specified value
Condition:	U <sub>R</sub>		U <sub>R</sub>	U <sub>R</sub>	U <sub>R</sub> = 0
Applied Voltage	U <sub>R</sub>		U <sub>R</sub>	U <sub>R</sub>	U <sub>R</sub> = 0
Applied Current	I <sub>R</sub>		I <sub>R</sub>	I <sub>R</sub> = 0	I <sub>R</sub> = 0
Applied Temperature	85°C		40°C	85°C	85°C
Failure Rate Level	≤ 1% Failure Rate		≤ 1% Failure Rate	guaranteed	After test: U <sub>R</sub> to be applied for 30min >24h before measurement

## Multiplier for Ripple Current

Frequency Coefficient

Rated Voltage (V)	Frequency				
	50Hz	120Hz	1kHz	10kHz	100kHz
≤ 50	0,95	1,00	1,10	1,15	1,15
63 ~ 100	0,95	1,00	1,16	1,30	1,33
≥ 160	0,90	1,00	1,20	1,50	1,55





V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 85°C, 120Hz	Size Ø D x L	
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)	
<b>160 (200) 2C</b>	1200	166	117	3,1	25 x 50	
		166	117	3,2	30 x 40	
		166	117	3,0	35 x 35	
	1500	133	93	3,7	30 x 45	
		133	93	3,5	35 x 40	
	1800	111	78	3,9	35 x 45	
2200		91	64	4,5	35 x 50	
<b>180 (225) 2K</b>	270	737	516	1,2	22 x 25	
		330	603	423	1,4	22 x 30
		390	511	358	1,5	25 x 25
	470	424	297	1,7	22 x 35	
		424	297	1,7	25 x 30	
		424	297	1,8	30 x 25	
	560	356	249	1,9	22 x 40	
		356	249	2,0	25 x 35	
	680	293	205	2,3	22 x 50	
		293	205	2,2	25 x 40	
		293	205	2,3	30 x 30	
	820	243	170	2,5	25 x 45	
		243	170	2,6	30 x 35	
		243	170	2,5	35 x 30	
		199	140	2,9	25 x 50	
	1000	199	140	2,9	30 x 40	
		166	117	3,3	30 x 45	
	1500	166	117	3,1	35 x 35	
		133	93	3,6	35 x 45	
	<b>200 (250) 2D</b>	220	905	634	1,1	22 x 25
737			516	1,2	22 x 25	
330		603	423	1,4	22 x 30	
		603	423	1,4	25 x 25	
390		511	358	1,6	22 x 35	
		511	358	1,6	25 x 30	
470		424	297	1,8	22 x 40	
		424	297	1,9	30 x 25	
560		356	249	2,0	22 x 45	
		356	249	2,0	25 x 35	
		356	249	2,1	30 x 30	
		356	249	2,0	35 x 25	
680		293	205	2,3	25 x 40	
		293	205	2,4	30 x 35	
820		243	170	2,6	25 x 50	
		243	170	2,7	30 x 40	
		243	170	2,5	35 x 30	
		199	140	3,1	30 x 45	
1000		199	140	2,8	35 x 35	
		166	117	3,4	30 x 50	
1200	166	117	3,2	35 x 40		
	1500	133	93	3,8	35 x 50	
<b>250 (300) 2E</b>	100	1990	1393	0,72	22 x 25	
		1106	774	0,94	22 x 25	
	220	905	634	1,1	22 x 30	
		905	634	1,1	25 x 25	
	270	737	516	1,2	22 x 35	
		603	423	1,4	22 x 40	
	330	603	423	1,4	25 x 30	
		603	423	1,5	30 x 25	
	390	511	358	1,6	22 x 45	
		511	358	1,6	25 x 35	
	470	424	297	1,8	22 x 50	
		424	297	1,8	25 x 40	
		424	297	1,8	30 x 30	
		424	297	1,9	35 x 25	
	560	356	249	2,0	25 x 45	
		356	249	2,0	30 x 35	
	680	293	205	2,3	30 x 40	
		293	205	2,4	35 x 30	
	820	243	170	2,6	30 x 45	
		243	170	2,6	35 x 35	
1000	199	140	3,0	35 x 40		
	1200	166	117	3,4	35 x 45	
<b>315 (365) 2F</b>	100	1990	1393	0,67	22 x 25	
		1658	1161	0,75	22 x 30	
	150	1327	929	0,85	22 x 30	
		1327	929	0,85	25 x 25	
	180	1106	774	0,96	22 x 35	
		1106	774	0,96	25 x 30	
	220	905	634	1,1	22 x 40	
		905	634	1,1	25 x 35	
	270	905	634	1,1	30 x 25	
		737	516	1,2	22 x 45	
		737	516	1,3	25 x 40	
		737	516	1,3	30 x 30	
		737	516	1,3	35 x 25	
		737	516	1,3	35 x 20	

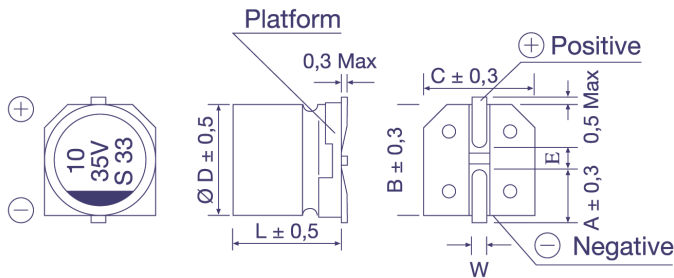
V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 85°C, 120Hz	Size Ø D x L	
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)	
<b>315 (365) 2F</b>	330	603	423	1,4	25 x 45	
		603	423	1,4	30 x 35	
	390	511	358	1,6	25 x 50	
		511	358	1,6	30 x 40	
		511	358	1,6	35 x 30	
	470	424	297	1,8	30 x 45	
		424	297	1,8	35 x 35	
	560	356	249	2,0	30 x 50	
		356	249	2,0	35 x 40	
	680	293	205	2,3	35 x 45	
		82	2427	1699	0,64	22 x 25
	<b>350 (400) 2V</b>	100	1990	1393	0,72	22 x 25
1658			1161	0,82	22 x 30	
120		1658	1161	0,81	25 x 25	
		1327	929	0,94	22 x 35	
150		1327	929	0,94	25 x 30	
		1106	774	1,1	22 x 40	
180		1106	774	1,1	30 x 25	
		905	634	1,2	22 x 45	
220		905	634	1,2	25 x 35	
		905	634	1,2	30 x 30	
270		905	634	1,3	35 x 25	
		737	516	1,4	25 x 45	
<b>400 (450) 2G</b>	330	737	516	1,4	30 x 35	
		603	423	1,6	25 x 50	
	390	603	423	1,6	35 x 30	
		511	358	1,7	30 x 40	
	470	424	297	2,0	35 x 35	
		424	297	2,0	35 x 40	
	560	356	249	2,3	35 x 45	
		680	293	205	2,6	35 x 50
	820	243	170	2,8	35 x 60	
		243	170	2,8	35 x 40	
	100	68	2926	2048	0,55	22 x 25
		82	2427	1699	0,60	22 x 25
<b>450 (500) 2W</b>	100	1990	1393	0,70	22 x 30	
		1990	1393	0,70	25 x 25	
	120	1658	1161	0,79	22 x 35	
		1327	929	0,90	22 x 40	
	150	1327	929	0,89	25 x 30	
		1327	929	0,95	30 x 25	
	180	1106	774	1,0	22 x 45	
		1106	774	1,0	25 x 35	
	220	1106	774	1,1	30 x 30	
		1106	774	1,2	35 x 25	
	270	905	634	1,1	22 x 50	
		905	634	1,2	25 x 40	
<b>450 (500) 2W</b>	330	905	634	1,2	30 x 35	
		737	516	1,3	25 x 45	
	390	737	516	1,4	30 x 40	
		737	516	1,4	35 x 30	
	470	603	423	1,6	30 x 45	
		603	423	1,7	35 x 35	
	560	511	358	1,8	30 x 50	
		511	358	1,8	35 x 40	
	680	424	297	2,1	35 x 45	
		356	249	2,3	35 x 50	
	820	68	2926	2048	0,57	22 x 30
		82	2427	1699	0,64	22 x 35
100	1990	1393	0,72	22 x 35		
	1990	1393	0,73	25 x 30		
120	1658	1161	0,80	22 x 40		
	1658	1161	0,83	25 x 35		
150	1327	929	0,95	22 x 50		
	1327	929	0,95	25 x 40		
180	1327	929	0,98	30 x 30		
	1106	774	1,1	25 x 45		
220	1106	774	1,1	30 x 35		
	1106	774	1,2	35 x 25		
270	905	634	1,2	25 x 50		
	905	634	1,3	30 x 40		
330	905	634	1,3	35 x 30		
	737	516	1,4	30 x 45		
390	737	516	1,5	35 x 35		
	603	423	1,7	30 x 50		
470	511	358	1,9	35 x 45		
	424	297	2,2	35 x 50		

## Order Code SMD, Radial, Snap-In

EC	R	1C	PT	101	M	FF	25	0611	JE xxxxx
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code (in $\mu\text{F}$ )	Capacitance Tolerance	Lead Form	Terminal/Pitch Size	Dimension	for Specials only
EC = Electrolytic Capacitor	SMD = V Radial = R	For coding please refer to the pages of ratings	CD VS = BS	0,47 = R47	$\pm 20\%$ = M	SMD:		4x7 = 0407	
			CD VH = VH	1,0 = 010	$\pm 10\%$ = K	Taped = FF	Terminal = T2	5x11,5 = 0511	
PC = Polymer Capacitor	Snap-In = S		CD VZ = VZ	2,2 = 2R2	+30 / -10% = Q	Radial:		6,3x11,5 = 0611	
			CD 261 = LK	100 = 101	+50 / -10% = T	Long Lead = LL	2,0mm = 20	35x80 = 3580	
			CD 261X = QX	1000 = 102		Cut 5,0mm = CB	2,5mm = 25	45x100 = 45100	
			CD 262 = QM	10000 = 103		Cut 4,5mm = CC	3,5mm = 35		
			CD 263 = BK			Cut 4,0mm = CD	5,0mm = 50		
			CD 269 = PH			Cut 3,5mm = CE	7,5mm = 75		
			CD 281 = LL			Cut 3,0mm = CF	10,0mm = 10		
			CD 284 = XY			on request: alternative lead forms (axial, 90° - angle, others)			
			CD 287 = GC				12,5mm = 12		
			CD 28L = QL			Snap-In:			
			CD 293 = BZ			4,0mm Pin Length = T4	2 Pin = P2		
			CD 294 = BW			6,3mm Pin Length = T6	3 Pin = P3		
			CD 295 = BC			Soldering Pin = S4	4 Pin = P4		
			CD 296 = KC				5 Pin = P5		
			CD 297 = BB			preferred			
			CD 299 = PG						
			CD 29D = HR						
			CD 29H = QH						
			CD 29L = QL						
			HCP = CP						
			HPM = PM						
			HVC = VC						

## Technical Specification SMD Type

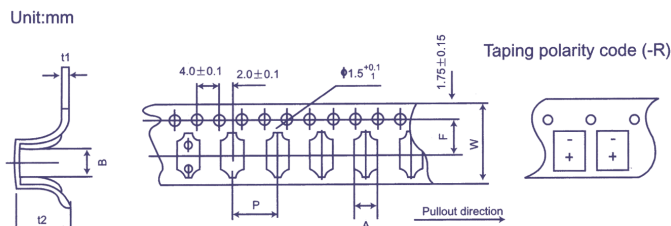
### Dimensions



Ø D x L	4x5,4	5x5,4	6,3x5,4	6,3x7,7	8x10,5	8x11,8	10x10,5	10x12,7
A	1,8	2,1	2,4	2,5	2,9	2,9	3,2	3,2
B	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
C	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
E	1,0	1,3	2,2	2,2	3,1	3,1	4,5	4,5
L	5,4	5,4	5,4	7,7	10,5	11,8	10,5	12,7
W	0,5 - 0,8			0,7 - 1,1				

in mm

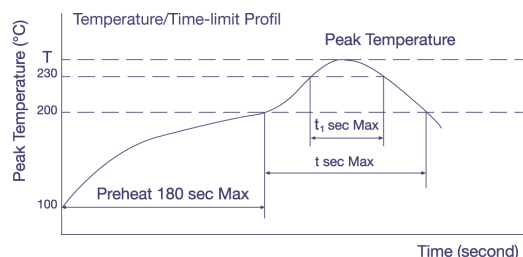
### Taping Dimensions



Size (DxL)	w ± 0,3	A ± 0,2	B ± 0,2	P ± 0,1	t2 ± 0,2	F ± 0,1	t1 ± 0,1
4 x 5,4	12,0	5,0	5,0	8,0	5,8	5,5	0,4
5 x 5,4	12,0	6,0	6,0	12,0	5,8	5,5	0,4
6,3 x 5,4	16,0	7,0	7,0	12,0	5,8	7,5	0,4
6,3 x 7,7	16,0	7,0	7,0	12,0	8,4	7,5	0,4
8 x 10,5	24,0	8,7	8,7	16,0	11,0	11,5	0,5
8 x 11,8	24,0	8,7	8,7	16,0	12,3	11,5	0,5
10 x 10,5	24,0	10,7	10,7	16,0	11,0	11,5	0,5
10 x 12,7	24,0	10,7	10,7	16,0	14,0	11,5	0,5

in mm

### Soldering Profile (Aluminium Electrolytic Capacitors)

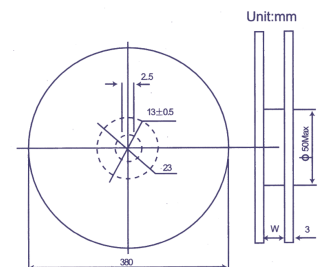


### Allowable Range of Peak Temperature

Size	T (°C)	t (second)	t <sub>1</sub> (second)
Ø 4 ~ 6,3	250	90	40
Ø 8 x 10,5	240	90	30
Ø 10 x 10,5	235	60	30

Diameter	w	D
4; 5	14 ± 1	50 ± 1
6,3	18 ± 1	50 ± 1
8; 10	25 ± 1	50 ± 1
Polymer	25 ± 1	80 ± 1

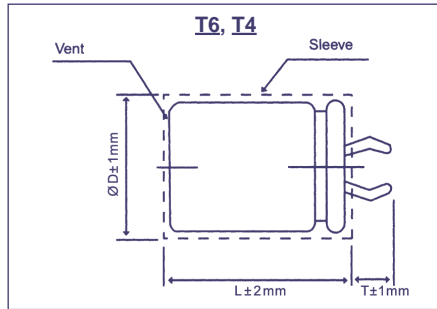
in mm



For more details or Soldering Profiles of Radials or Polymer-Capacitors please contact our local Sales Offices.

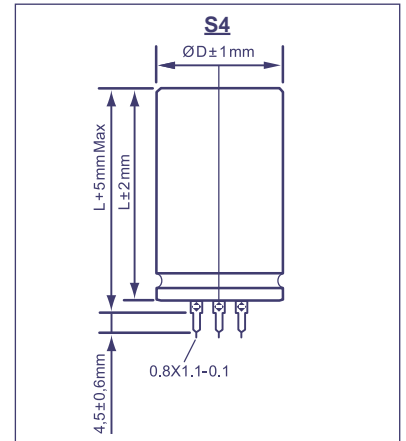
## Technical Specification Snap-In Type

**Pin Type: Snap-In**  
Order Code: T6, T4

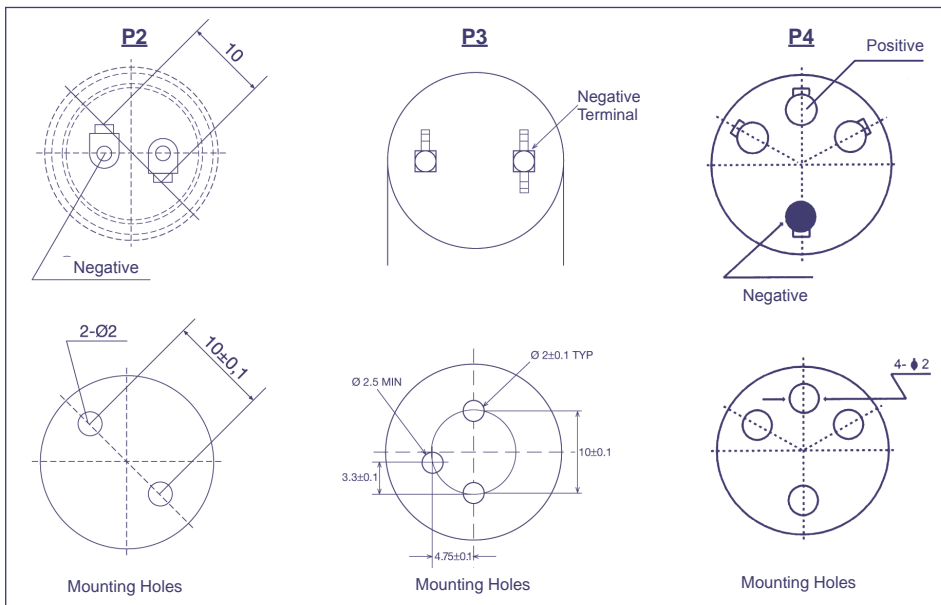


Terminal	T6	T4
Pin Length T	6,3	4,0

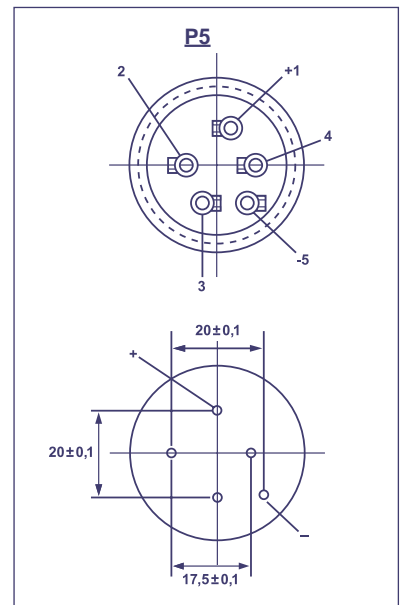
**Pin Type: Soldering**  
Order Code: S4



**Snap-In Terminal**  
Order Code: P2, P3, P4



**Soldering Terminal**  
Order Code: P5



P3 only T4 Terminal

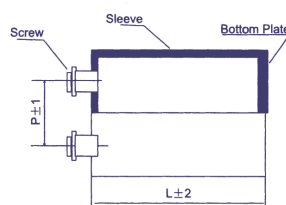
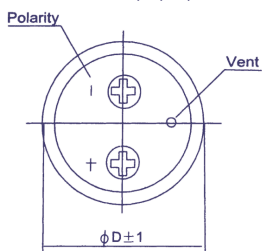
## Order Code Screw Type

EC	G	1C	BP	101	M	B	E	160	A361	JExxxxx
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code	Capacitance Tolerance	Mounting	Diameter	Length	For Terminal Code see tables below	for Specials only
EC = Electrolytic Capacitor	Screw = G	For coding please refer to the pages of ratings	CD 135 = BP	100 = 101	±20% = M	Bolt = B	36 = A	53 = 053		
			CD 136 = PK	1000 = 102	±10% = K	No double sleeve = N	40 = B	65 = 065		
			CD 137 = PX	10000 = 103	+30 / -10% = Q	2 stoppers bracket+double sleeve* = I	51 = C	96 = 096		
			CD 138 = PC		+20 / -0% = R	3 stoppers bracket+double sleeve* = Y	64 = D	100 = 100		
			CD 139 = BL		+50 / -10% = T	No bracket, but double sleeve* = D	77 = E	115 = 115		
				<b>preferred</b>	* Double sleeve for diameter ≥ 51 only		90 = F	236 = 236		
							101 = G			

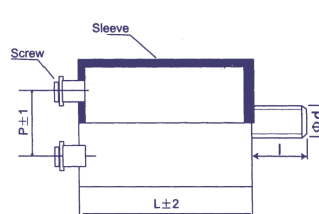
## Technical Specification Screw Type

### Dimensions

**Standard Housing**  
Order Code: I, Y, D, N



**Bolt Housing**  
Order Code: B



Ø D	Ø d	l
Ø 36	M8	12
≥ Ø 51	M12	16

in mm