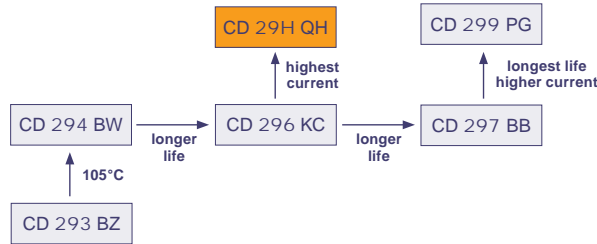


5000h at 105°C

- Long Useful Life
- Highest Ripple Current
- Miniaturized
- Industrial Power Supplies and Inverters



Item	Characteristics						
Operating Temperature Range (°C)	-40 ~ +105						
Voltage Range (V)	160 ~ 450						
Capacitance Range (µF)	47 ~ 2200						
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)	160	200	250	350	400	450
	Tan δ (max)	0,15				0,12	
Stability at Low Temperature (Impedance Ratio at 120Hz)	Rated Voltage (V)	160 ~ 450					
	Z <sub>-40°C</sub> / Z <sub>+20°C</sub>	4					

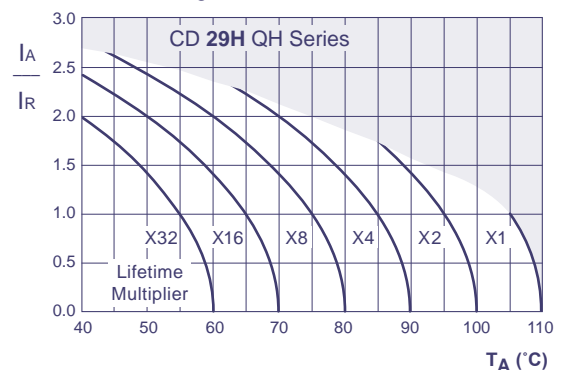
	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	5 000h	>100 000h	3 000h	3 000h	1 000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ± 30% of initial value		Within ± 20% of initial 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	105°C		105°C	105°C	105°C
Failure Rate Level	≤ 1% Failure Rate		guaranteed		After test: U <sub>R</sub> to be applied for 30min >24h before measurement

## Multiplier for Ripple Current

Frequency Coefficient

Frequency	50Hz	120Hz	1kHz	10kHz	100kHz
Coefficient	0,87	1,00	1,15	1,35	1,40

Lifetime Diagram



I<sub>A</sub> = actual ripple current at 120Hz, I<sub>R</sub> = rated ripple current at 120Hz, 105°C  
Multiplier of Useful Life as a function of ambient temperature and ripple current load

## Ratings for CD 29H QH Series

V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 105°C, 120Hz	Size Ø D x L
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)
<b>160 (200) 2C</b>	330	603	355	1,50	22 x 25
	390	511	306	1,60	25 x 25
	470	424	245	1,80	22 x 35
	560	356	210	2,10	22 x 35
		356	210	2,20	25 x 30
	680	356	210	2,10	30 x 25
		293	175	2,60	22 x 40
	820	293	175	2,50	25 x 35
		243	145	2,80	22 x 50
		243	145	2,70	25 x 40
		243	145	2,90	30 x 30
	1000	243	145	2,80	35 x 25
		199	119	3,30	25 x 45
		199	119	3,40	30 x 35
	1200	199	119	3,30	35 x 30
		166	99	3,70	25 x 50
		166	99	3,80	30 x 40
	1500	166	99	3,60	35 x 35
		133	79	4,40	30 x 45
	1800	133	79	4,30	35 x 40
2200	111	73	4,40	35 x 45	
<b>200 (250) 2D</b>	220	905	550	1,10	22 x 25
	270	737	460	1,17	22 x 25
	330	603	370	1,40	22 x 30
		603	370	1,40	25 x 25
	390	511	310	1,45	22 x 30
	470	424	260	1,55	22 x 35
		424	260	1,55	25 x 30
	560	424	260	1,60	30 x 25
		356	220	1,65	22 x 45
	680	356	220	1,65	25 x 35
		293	180	1,68	22 x 50
		293	180	1,92	25 x 40
		293	180	1,92	30 x 30
	820	293	180	2,20	35 x 25
		243	150	2,20	25 x 45
		243	150	2,20	30 x 35
	1000	243	150	2,40	35 x 30
		199	120	2,40	30 x 40
	1200	199	120	2,40	35 x 35
		166	100	2,75	30 x 45
1500	166	100	2,75	35 x 40	
1800	133	80	3,45	35 x 40	
2200	111	68	4,00	35 x 45	
<b>250 (300) 2E</b>	2200	91	56	4,50	35 x 50
	180	1106	620	1,00	22 x 25
	220	905	570	1,20	22 x 30
		905	570	1,20	25 x 25
	270	737	470	1,25	22 x 35
		603	380	1,30	22 x 40
	330	603	380	1,35	25 x 30
		603	380	1,35	30 x 25
	390	511	325	1,40	22 x 45
		511	325	1,45	25 x 35
	470	424	268	1,65	22 x 50
		424	268	1,65	30 x 30
		424	268	1,65	35 x 25
	560	356	225	1,85	25 x 45
		356	225	1,85	30 x 35
	680	356	225	1,85	35 x 30
		293	185	2,20	25 x 50
	820	293	185	2,20	30 x 40
		243	153	2,50	30 x 45
	1000	243	153	2,50	30 x 50
199		125	2,90	30 x 50	
1200	199	125	2,90	35 x 40	
1500	166	105	3,30	35 x 45	
1500	133	85	3,80	35 x 50	

V <sub>DC</sub> (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Typ ESR 20°C, 120Hz	Max Ripple Current 105°C, 120Hz	Size Ø D x L
(V)	(µF)	(mΩ)	(mΩ)	(Arms)	(mm)
<b>350 (400) 2V</b>	68	2926	1280	0,70	22 x 25
	100	1990	1060	0,87	22 x 30
		1990	1060	0,87	25 x 25
	120	1658	880	0,90	22 x 35
		1327	700	0,98	22 x 40
	150	1327	700	1,02	25 x 30
		1327	700	1,02	30 x 25
	180	1106	580	1,11	22 x 45
		1106	580	1,11	25 x 35
		1106	580	1,12	30 x 30
	220	905	480	1,16	22 x 50
		905	480	1,20	25 x 40
		905	480	1,20	35 x 25
	270	737	390	1,26	25 x 50
		737	390	1,31	30 x 35
	330	737	390	1,26	35 x 30
		603	320	1,45	30 x 45
		603	320	1,45	35 x 35
	390	511	270	1,58	30 x 50
		511	270	1,58	35 x 40
470	424	225	1,69	35 x 45	
560	356	190	1,89	35 x 50	
<b>400 (450) 2G</b>	47	3387	1835	0,40	22 x 25
	68	2341	1260	0,48	22 x 25
	82	1941	1050	0,57	22 x 30
		1941	1050	0,56	25 x 25
	100	1592	860	0,65	22 x 35
		1592	860	0,65	25 x 25
	120	1327	718	0,71	22 x 35
		1327	718	0,71	25 x 30
	150	1327	718	0,71	30 x 25
		1062	575	0,85	22 x 40
		1062	575	0,85	25 x 35
	180	1062	575	0,85	30 x 25
		885	479	1,00	22 x 50
		885	479	1,00	25 x 40
		885	479	1,00	30 x 30
	220	885	479	1,00	35 x 25
		724	292	1,20	25 x 45
		724	292	1,20	30 x 35
	270	724	292	1,20	35 x 30
		590	319	1,35	25 x 50
590		319	1,35	30 x 40	
330	590	319	1,35	35 x 30	
	483	260	1,60	30 x 45	
390	483	260	1,60	35 x 35	
	409	220	1,80	30 x 50	
470	409	220	1,80	35 x 40	
560	339	183	2,10	35 x 45	
<b>450 (500) 2W</b>	56	2843	1360	0,50	22 x 25
	68	2341	1170	0,60	22 x 30
	82	1941	970	0,65	22 x 35
		1941	970	0,65	25 x 25
	100	1592	790	0,72	22 x 35
		1592	790	0,72	25 x 30
	120	1592	790	0,72	30 x 25
		1327	660	0,80	22 x 45
		1327	660	0,80	25 x 35
	150	1327	660	0,80	25 x 35
		1062	530	0,95	22 x 50
		1062	530	0,95	25 x 40
	180	1062	530	0,95	30 x 30
		1062	530	0,95	35 x 25
		885	440	1,05	25 x 45
	220	885	440	1,05	30 x 35
		724	360	1,30	25 x 50
	270	724	360	1,30	30 x 40
		724	360	1,30	35 x 30
	330	590	295	1,50	30 x 45
590		295	1,50	35 x 35	
390	590	295	1,50	35 x 35	
	483	240	1,90	30 x 50	
470	483	240	1,90	35 x 40	
470	409	205	1,90	35 x 45	
470	339	170	2,20	35 x 50	

Snap-In

Custom products are available on request.

## Order Code SMD, Radial, Snap-In

EC	R	1C	PT	101	M	FF	25	O611	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						
			CD 293 = BZ						
			CD 294 = BW						
			CD 295 = BC						
			CD 296 = KC						
			CD 297 = BB						
			CD 299 = PG						
			CD 29D = HR						
			CD 29H = QH						
			CD 29L = QL						
			HCP = CP						
			HPM = PM						
			HVC = VC						

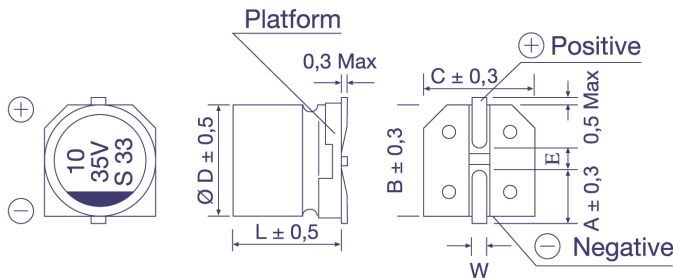
  

Snap-In:	
4,0mm Pin Length = T4	2 Pin = P2
6,3mm Pin Length = T6	3 Pin = P3
Soldering Pin = S4	4 Pin = P4
	5 Pin = P5

preferred

## Technical Specification SMD Type

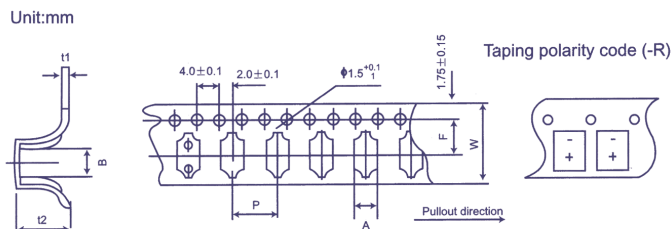
### Dimensions



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

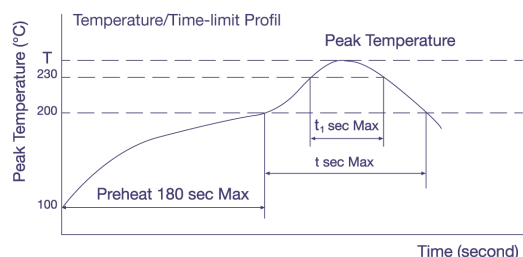
### Taping Dimensions



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)

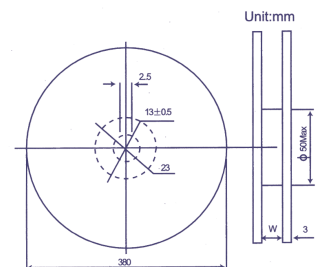


### Allowable Range of Peak Temperature

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

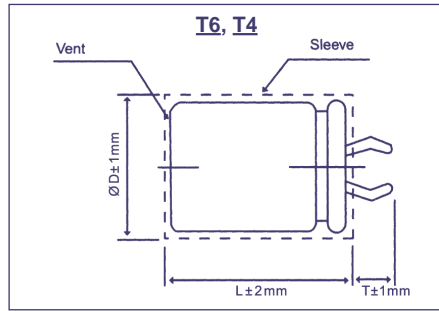
in mm



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

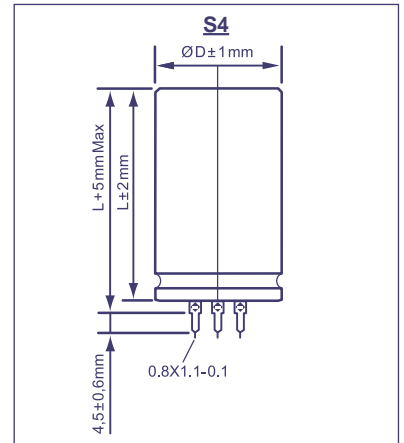
## Technical Specification Snap-In Type

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

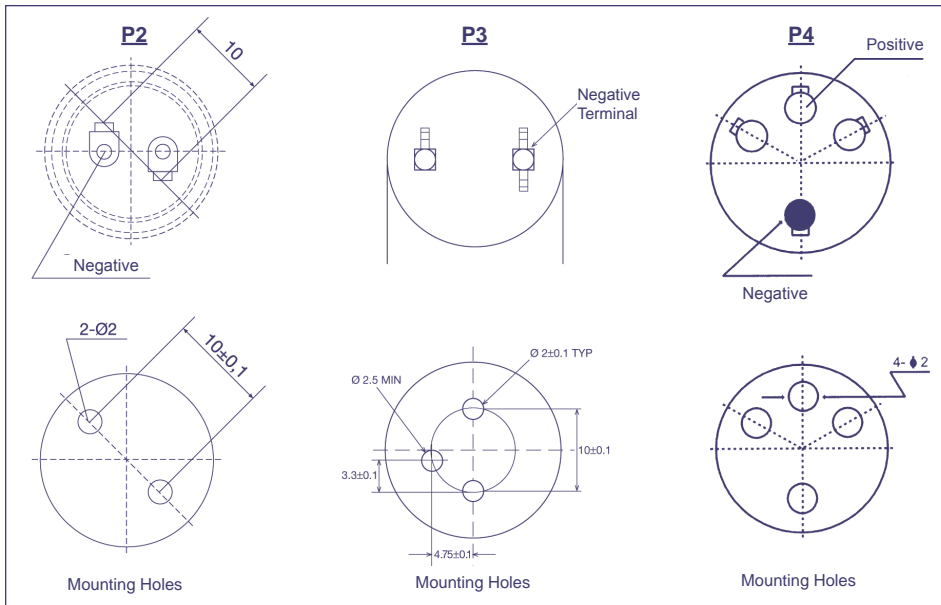


Terminal	T6	T4
Pin Length T	6,3	4,0

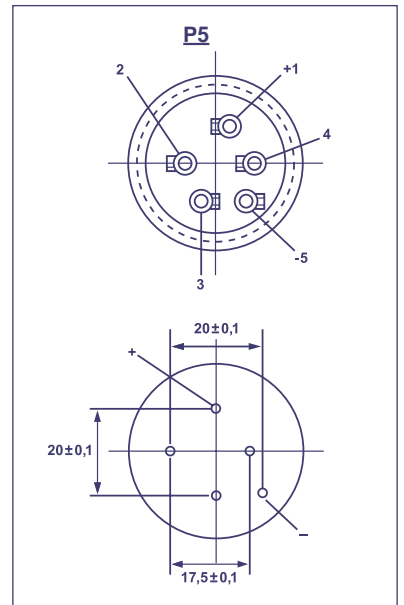
**Pin Type: Soldering**  
Order Code: S4



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



**Soldering Terminal**  
Order Code: P5



P3 only T4 Terminal

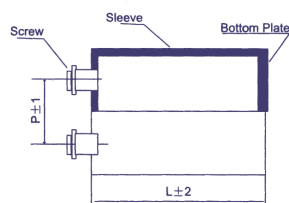
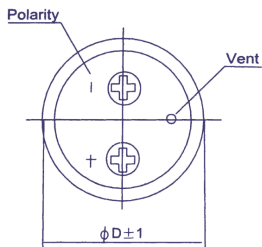
## Order Code Screw Type

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				

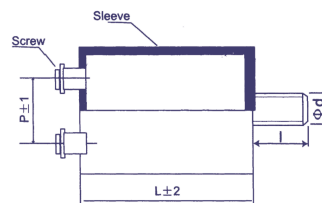
## Technical Specification Screw Type

### 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