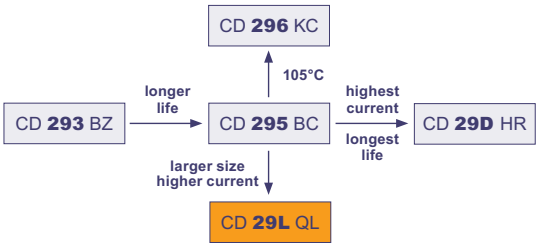
CD **29L** QL Series

7 000h at 85°C

- Larger Size Components
- Long Useful Life
- High Ripple Current
- Industrial Power Supplies



Item	Characteristics	
Operating Temperature Range (°C)	-40 ~ +85	-25 ~ +85
Voltage Range (V)	16 ~ 400	450 ~ 500
Capacitance Range (µF)	390 ~ 120 000	
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)	16	25	35	50	63~100	160~250	350~450	500
Tan δ (max)	0,60	0,50	0,40	0,30	0,20	0,15		

Stability at Low Temperature (Impedance Ratio at 120Hz)

Rated Voltage (V)	16~35	50~100	160~200	250~400	450	500
$Z_{-25°C} / Z_{+20°C}$	4	3		4		
$Z_{-40°C} / Z_{+20°C}$	15	10	6	8	-	

	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	**7 000h**	>100 000h	5 000h	5 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:					
Applied Voltage	U_R	U_R	U_R	U_R	$U_R = 0$
Applied Current	I_R	1,2 x I_R	I_R	$I_R = 0$	$I_R = 0$
Applied Temperature	85°C	40°C	85°C	85°C	85°C
Failure Rate Level	≤ 1% Failure Rate	≤ 1% Failure Rate	guaranteed		

After test: U_R to be applied for 30min >24h before measurement

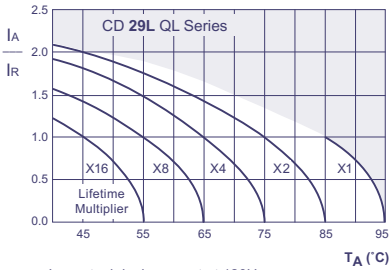
Multiplier for Ripple Current

Frequency Coefficient

Frequency / Rated Voltage (V)	50Hz	120Hz	1kHz	10kHz	100kHz
≤ 50	0,95	1,00	1,10	1,15	1,15
63 ~ 100	0,90	1,00	1,16	1,30	1,33
≥ 160	0,85	1,00	1,20	1,35	1,40

Multiplier for Lifetime

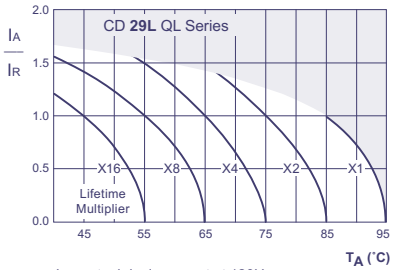
Lifetime Diagram U_R < 160V



I_A = actual ripple current at 120Hz,
I_R = rated ripple current at 120Hz, 85°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

Multiplier for Lifetime

Lifetime Diagram U_R ≥ 160V



I_A = actual ripple current at 120Hz,
I_R = rated ripple current at 120Hz, 85°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

Snap-In

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Ratings for CD **29L** QL Series

$U_{R.DC}$ (Surge Voltage) Code	Rated Capa-citance	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)
16 (20) 1C	56000	14,3	10,0	10,4	35 x 45
		14,3	10,0	9,8	40 x 40
	68000	12,0	8,2	10,8	35 x 50
		12,0	8,2	11,5	40 x 50
	82000	10,0	7,0	11,8	35 x 60
		10,0	7,0	11,8	40 x 50
	100000	8,0	6,0	13,2	35 x 80
		8,0	6,0	13,5	40 x 60
	120000	7,0	5,0	15,3	35 x 105
		7,0	5,0	14,8	40 x 80
25 (32) 1E	33000	20,1	14,1	8,1	35 x 40
		20,1	14,1	8,7	40 x 40
	39000	17,1	12,0	9,0	35 x 45
		17,1	12,0	9,6	40 x 40
	47000	14,2	9,9	9,6	35 x 50
	56000	12,0	8,3	10,3	35 x 60
		12,0	8,3	10,8	40 x 50
	68000	10,0	7,0	11,3	35 x 80
		10,0	7,0	11,8	40 x 60
	82000	8,1	6,0	13,5	40 x 80
35 (44) 1V	27000	20,0	14,0	8,2	35 x 45
		20,0	14,0	8,0	40 x 40
	33000	16,1	11,3	8,7	35 x 50
	39000	14,0	10,0	10,3	35 x 60
		14,0	10,0	9,6	40 x 50
	47000	11,3	8,0	11,4	35 x 80
		11,3	8,0	10,8	40 x 60
	56000	10,0	7,0	12,1	40 x 70
	68000	8,0	6,0	14,2	40 x 80
50 (63) 1H	15000	27,0	19,0	7,7	35 x 40
		27,0	19,0	8,1	40 x 40
	18000	23,0	16,0	8,3	35 x 45
		23,0	16,0	8,3	40 x 40
	22000	18,1	13,0	9,1	35 x 50
		18,1	13,0	9,4	40 x 50
	27000	15,0	10,4	11,2	35 x 80
		15,0	10,4	10,8	40 x 60
	33000	12,1	8,5	11,0	35 x 80
		12,1	8,5	14,4	40 x 70
	39000	10,3	7,2	12,8	40 x 80
63 (79) 1J	12000	23,0	16,0	8,7	35 x 50
		23,0	16,0	8,6	40 x 40
	15000	18,0	12,4	10,2	35 x 70
		18,0	12,4	9,5	40 x 50
	18000	15,0	10,4	11,2	35 x 80
		15,0	10,4	10,7	40 x 60
	27000	10,0	7,0	12,7	40 x 80
80 (100) 1K	8200	33,0	23,0	6,9	35 x 50
	10000	27,0	19,0	8,7	35 x 60
	12000	23,0	16,0	9,7	35 x 70
		23,0	16,0	9,0	40 x 50
	15000	18,0	12,4	10,5	35 x 80
		18,0	12,4	10,2	40 x 60
	18000	15,0	10,4	12,3	40 x 80
100 (125) 2A	5600	48	34	7,0	35 x 45
		48	34	7,4	40 x 40
	6800	40	28	8,0	35 x 50
		40	28	8,9	40 x 50
	8200	33	23	9,6	35 x 70
		33	23	9,6	40 x 60
	10000	27	19	10,4	35 x 80
		27	19	10,2	40 x 60
	12000	23	16	12,3	40 x 80
160 (200) 2C	2200	91	64	4,9	35 x 45
	2700	74	52	5,3	35 x 50
	3300	61	43	5,5	35 x 70
		61	43	5,5	40 x 60
	3900	52	35	5,9	35 x 80
	4700	43	30	7,3	40 x 80
200 (250) 2D	1500	133	93	4,3	35 x 40
	1800	111	78	4,7	35 x 45
	2200	91	64	5,4	35 x 50
		91	64	5,4	40 x 40
	2700	74	52	5,9	35 x 60
		74	52	5,9	40 x 50

$U_{R.DC}$ (Surge Voltage) Code	Rated Capa-citance	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)
200 (250) 2D	3300	61	43	6,5	35 x 80
		61	43	6,5	40 x 60
	3900	52	36	7,0	40 x 80
	4700	43	30	9,2	40 x 90
250 (300) 2E	1000	199	140	3,7	35 x 40
	1200	166	117	3,8	35 x 45
	1500	133	93	4,4	35 x 50
		133	93	4,5	40 x 40
	1800	111	78	5,0	35 x 70
		111	78	5,0	40 x 50
	2200	91	64	5,4	35 x 70
	2700	74	52	6,9	40 x 80
350 (400) 2V	680	293	205	3,6	35 x 45
		293	205	3,6	40 x 40
	820	243	170	4,5	35 x 60
		243	170	4,3	40 x 50
	1000	199	140	5,2	35 x 70
		199	140	4,9	40 x 60
	1200	166	117	5,6	35 x 80
		166	117	5,5	40 x 70
	1500	133	93	6,5	40 x 80
		133	93	6,2	45 x 70
	1800	111	78	7,9	40 x 100
		111	78	7,1	45 x 70
	2200	91	64	8,7	40 x 100
400 (450) 2G	560	356	249	3,2	35 x 50
		356	249	2,8	40 x 40
	680	293	205	3,7	35 x 60
		293	205	3,8	40 x 50
	820	243	170	4,2	35 x 60
		243	170	4,1	40 x 50
	1000	199	140	4,9	35 x 70
		199	140	4,8	40 x 60
		199	140	4,6	45 x 50
	1200	166	117	5,8	35 x 80
		166	117	5,5	40 x 60
	1500	133	93	6,9	40 x 90
		133	93	6,6	45 x 70
		133	93	6,8	45 x 80
	1800	111	78	7,9	40 x 100
		111	78	7,3	45 x 80
450 (500) 2W	470	424	297	3,0	35 x 50
		424	297	3,0	40 x 40
	560	356	249	3,1	35 x 50
		356	249	3,3	35 x 60
		356	249	3,4	40 x 50
	680	293	205	3,5	35 x 60
		293	205	3,8	35 x 70
		293	205	3,8	40 x 60
	820	243	170	4,6	35 x 80
		243	170	4,4	40 x 60
	1000	199	140	5,7	35 x 80
		199	140	5,2	40 x 60
	1200	166	117	5,9	40 x 70
		166	117	6,2	45 x 70
	1500	133	93	7,3	40 x 100
		133	93	7,0	45 x 80
	1800	111	78	7,9	45 x 100
500 (550) 2H	390	511	358	1,9	35 x 50
	470	424	297	2,3	35 x 60
	560	356	249	2,5	35 x 60
		356	249	2,7	40 x 60
	680	293	205	3,1	35 x 80
		293	205	2,8	40 x 70
	820	243	170	3,4	35 x 90
		243	170	3,3	40 x 70
	1000	199	140	3,9	40 x 80
		199	140	3,9	45 x 70
	1200	166	117	4,3	40 x 90
	1500	133	93	4,8	40 x 100

Snap-In

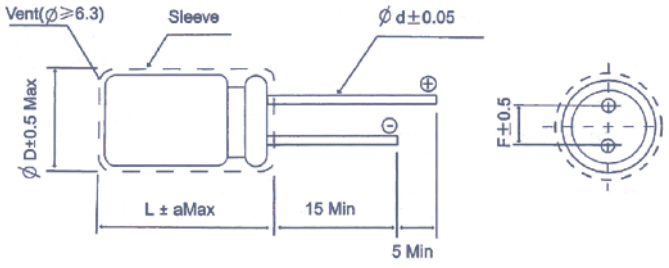
Customer specific products and adaptions on request.

Order Code **SMD, Radial, Snap-In**

EC	R	1C	PT	101	M	FF	25	0611	JExxxxx
Technology	Terminal Type	Rated Voltage Code	Series Code	Capacitance Code (in µF)	Capacitance Tolerance	Lead Form	Terminal/ Pitch Size	Size Ø D x L	for Specials only
EC = Electrolytic Capacitor	SMD = V	2,5V = 0E	CD **110** = PT	0,47 = R47	**±20% = M**	SMD:		4x7 = 0407	
	Radial = R	4V = 0G	CD **11GL** = GL	1,0 = 010	±10% = K	**Taped = FF**	Terminal = T2	5x11,5 = 0511	
PC = Polymer Capacitor	Snap-In = S	6,3V = 0J	CD **261** = LK	2,2 = 2R2	+20 / -0% = R	Radial:		6,3x11,5 = 0611	
		10V = 1A	CD **261X** = QX	10 = 100	+20 / -10% = V	**Taped = FF**	2,0mm = 20	35x80 = 3580	
		16V = 1C	CD **262** = QM	100 = 101	+30 / -10% = Q	**Long Lead = LL**	2,5mm = 25	45x100 = 45100	
		20V = 1D	CD **263** = BK	1000 = 102	+50 / -10% = T	Cut 5,0mm = CB	3,5mm = 35		
		25V = 1E	CD **269** = PH	10000 = 103		**Cut 4,5mm = CC**	5,0mm = 50		
		35V = 1V	CD **269L** = HL			Cut 4,0mm = CD	7,5mm = 75		
		40V = 1G	CD **281** = LL			Cut 3,5mm = CE	10,0mm = 10		
		50V = 1H	CD **281L** = LH			Cut 3,0mm = CF	12,5mm = 12		
		63V = 1J	CD **287** = GC			on request: alternative lead forms (Keyed Polarity, axial, 90° - angle, others)			
		80V = 1K	CD **28L** = QL			**Snap-In:**			
		100V = 2A	CD **293** = BZ			4,0mm Pin Length = T4	2 Pin = P2		
		160V = 2C	CD **294** = BW			**6,3mm Pin Length = T6**	3 Pin = P3		
		180V = 2K	CD **295** = BC			Soldering Pin = S4	4 Pin = P4		
		200V = 2D	CD **296** = KC				5 Pin = P5		
		250V = 2E	CD **297** = BB			**preferred**			
		315V = 2F	CD **299** = PG						
		350V = 2V	CD **29D** = HR						
		385V = 2J	CD **29H** = QH						
		400V = 2G	CD **29L** = QL						
		415V = 2P	**HVC** = VC						
		420V = 2X	**HVM** = VM						
		450V = 2W	**HCP/HCN** = CP/CN						
		500V = 2H	**HPN** = PN						
		550V = 2Y	**HPE/HEN** = PE/EN						

Technical Specification **Radial Type**

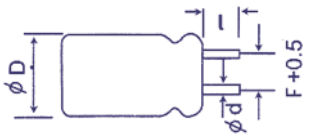
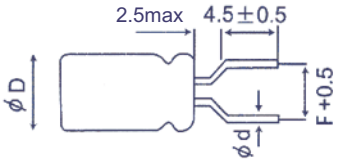
Dimensions for loose, long-lead type (bulk)
Order Code: LL



L	L ≤ 7					L ≥ 11									
Ø D	3	4	5	6,3	8	5	6,3	8	10	12,5	16	18	20	22	25
F	1	1,5	2,0	2,5	3,5	2,0	2,5	3,5	5,0		7,5		10,0		12,5
Ø d	0,4	0,45				0,5		0,6			0,8		1,0		
a_{Max}	1,0					2,0									

in mm

Dimensions for loose, short cut leads (bulk)
Order Code: CC (CB, CD, CE, CF)

Straight Lead					Bended Lead
					
Code	CB	**CC**	CD	CE	CF
l	5,0 ± 0,5	**4,5 ± 0,5**	4,0 ± 0,5	3,5 ± 0,5	3,0 ± 0,5

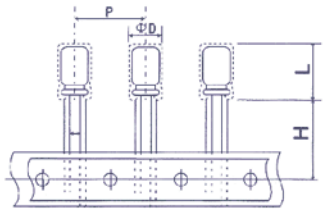
preferred

in mm

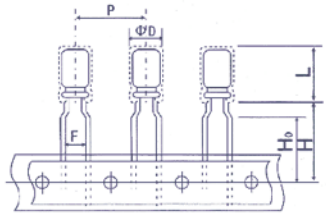
Dimensions for Ammopack taping
Order Code: FF (FD)

Code	Case Range		Dimensions				Form
	Ø D	L (max)	H ± 0,75	Ho ± 0,5	F ± 0,5	P ± 0,1	
FF	4 ~ 5	13	18,5	17	2,5	12,7	B
	6,3	13	18,5	-	2,5	12,7	A
	8	13	18,5	-	3,5	12,7	
	4 ~ 8	7	17,5	16	5,0	12,7	B
	5 ~ 6,3	13	18,5				
	8	22	20,0				
	10	22	18,5	-			A
	12,5	27	18,5	-		15,0	
FD	12,5	27	18,5	-		25,4	C
FF	16 ~ 18	27	18,5	-	7,5	30,0	

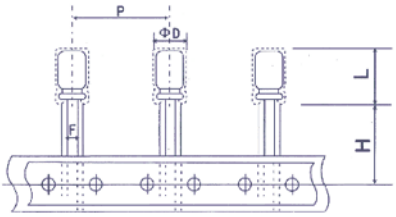
Form A



Form B



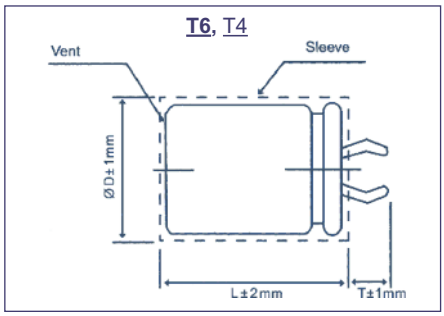
Form C



in mm

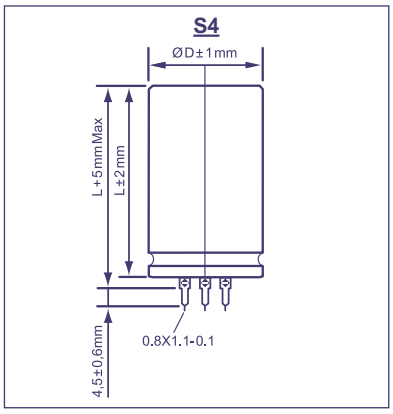
Technical Specification **Snap-In Type**

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

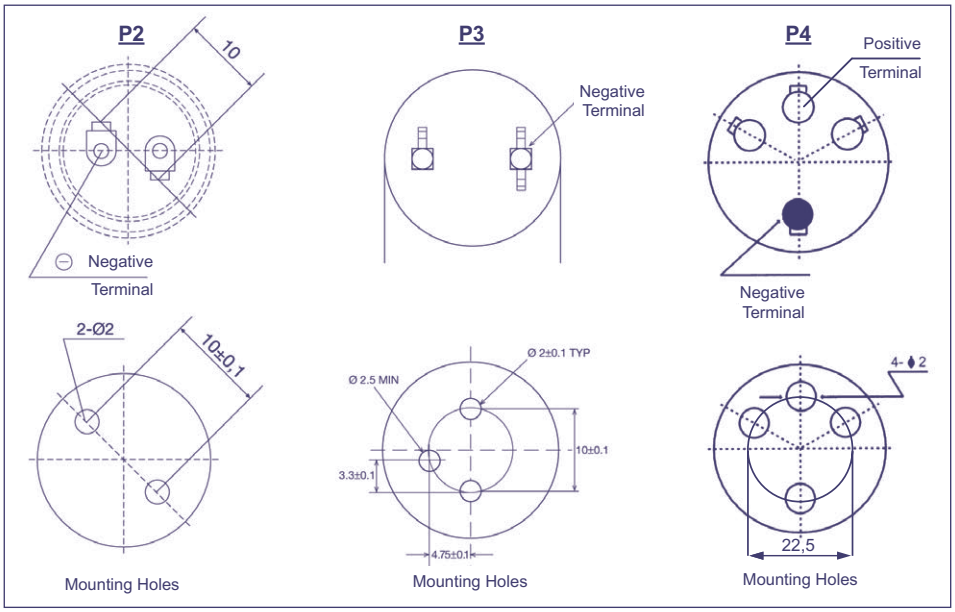


Terminal	T6	T4
Pin Length	6,3	4,0
	preferred	

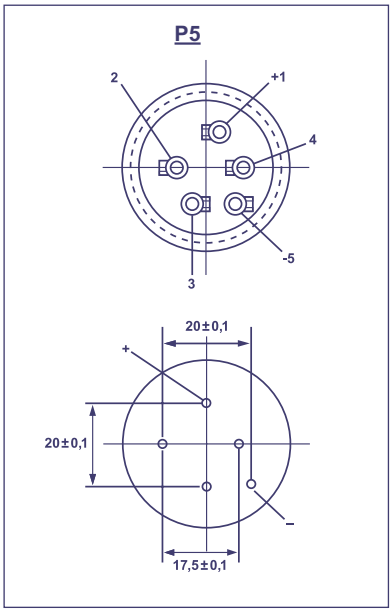
Pin Type: Soldering Order Code: S4



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



Soldering Terminal Order Code: P5



P3 only as T4 Terminal available, P4 for Ø D ≥ 30mm, P5 for Ø D ≥ 40mm