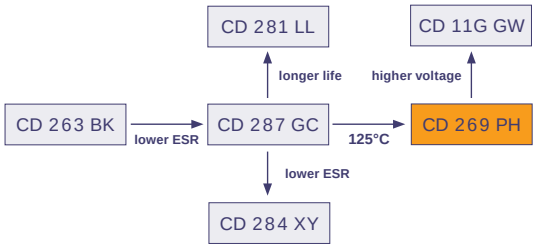
4 000h at 125°C

· High Reliability at High Temperature
· Automotive
· Professional Long-Life Applications



Item	Characteristics
Operating Temperature Range (°C)	-40 ~ +125
Voltage Range (V)	10 ~ 63
Capacitance Range (µF)	47 ~ 3300
Capacitance Tolerance (20°C, 120Hz)	± 20%
Leakage Current (µA)	After 2 minutes at 20°C application of rated voltage, leakage current is less than 0,04CV. C: Nominal Capacitance (µF) V: Rated Voltage (V)
Dissipation Factor (20°C, 120Hz)	Rated Voltage (V): 10 / 16 / 25 / 35 / 50 / 63 Tan δ (max): 0,20 / 0,16 / 0,14 / 0,12 / 0,10 / 0,09 For Capacitances >1.000µF add 0,02 to every 1.000µF

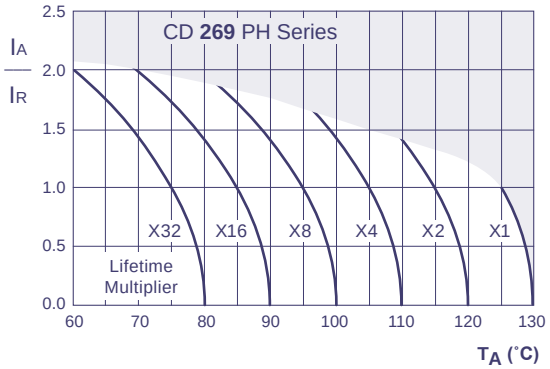
	Useful Life		Load Life	Endurance Test	Shelf Life
Lifetime	4 000h	>200 000h	2000h	3000h	1000h
Leakage Current	Not more than specified value		Not more than specified value	Not more than specified value	Not more than specified value
Capacity Change	Within ± 50% of initial value		Within ± 30% of initial value	Within ± 30% of initial value	Within ± 30% of initial value
Dissipation Factor	Not more than 500% of specified value		Not more than 300% of specified value	Not more than 300% of specified value	Not more than 300% of specified value
Condition: Applied Voltage Applied Current Applied Temperature Failure Rate Level	 U_R I_R 125°C ≤ 1% Failure Rate	 U_R 1,4 x I_R 50°C ≤ 1% Failure Rate	 U_R I_R 125°C guaranteed	 U_R I_R = 0 125°C	 U_R = 0 I_R = 0 125°C After test: U_R to be applied for 30min >24h before measurement

Multiplier for Ripple Current

Frequency Coefficient

Frequency / Capacitance (µF)	120Hz	1kHz	10kHz	100kHz
47 ~ 100	0,40	0,75	0,90	1,00
220 ~ 330	0,50	0,85	0,95	1,00
470 ~ 1000	0,60	0,88	0,96	1,00
2200 ~ 3300	0,75	0,90	0,98	1,00

Lifetime Diagram



I_A = actual ripple current at 100kHz, I_R = rated ripple current at 100kHz, 125°C
Multiplier of Useful Life as a function of ambient temperature and ripple current load

Radial

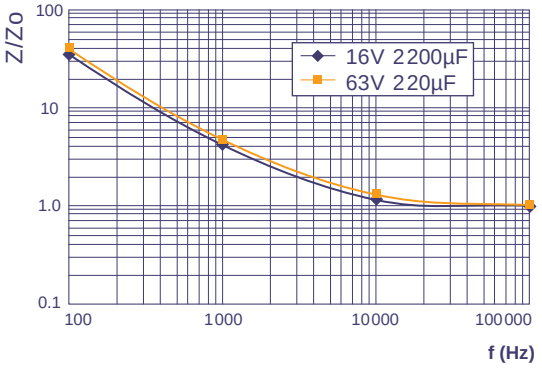
Ratings for CD **269** PH Series

V_{DC} (Surge Voltage) Code	Rated Capacitance	Max ESR 20°C, 120Hz	Max Imp 20°C, 100kHz	Max Imp -10°C, 100kHz	Max Ripple Current 125°C, 100kHz	Size Ø D x L
(V)	(µF)	(Ω)	(Ω)	(Ω)	(mArms)	(mm)
10 (13) 1A	330	0,80	0,33	0,66	340	8 x 11,5
	470	0,57	0,24	0,48	500	10 x 12,5
	1000	0,27	0,12	0,24	770	10 x 20
	2200	0,14	0,061	0,13	1250	12,5 x 25
	3300	0,10	0,050	0,10	1380	16 x 25
16 (20) 1C	220	0,97	0,33	0,66	340	8 x 11,5
	330	0,65	0,24	0,48	500	10 x 12,5
	470	0,46	0,20	0,40	630	10 x 16
	1000	0,22	0,077	0,16	920	12,5 x 20
	2200	0,11	0,050	0,10	1380	16 x 25
25 (32) 1E	220	0,85	0,23	0,46	480	8 x 16
	330	0,57	0,20	0,40	630	10 x 16
	470	0,40	0,12	0,24	770	10 x 20
	1000	0,19	0,061	0,13	1250	12,5 x 25
35 (44) 1V	100	1,60	0,33	0,66	340	8 x 11,5
	220	0,73	0,20	0,40	630	10 x 16
	330	0,49	0,12	0,24	770	10 x 20
	470	0,34	0,077	0,16	920	12,5 x 20
	1000	0,16	0,050	0,10	1380	16 x 25
50 (63) 1H	100	1,33	0,36	0,72	420	10 x 12,5
	220	0,61	0,20	0,40	655	10 x 20
	330	0,41	0,12	0,24	780	12,5 x 20
	470	0,29	0,10	0,20	1060	12,5 x 25
63 (79) 1J	47	2,55	0,68	2,1	245	8 x 11,5
	100	1,20	0,38	1,2	425	10 x 16
	220	0,55	0,18	0,54	665	12,5 x 20
	330	0,37	0,14	0,42	900	12,5 x 25

Custom products are available on request.

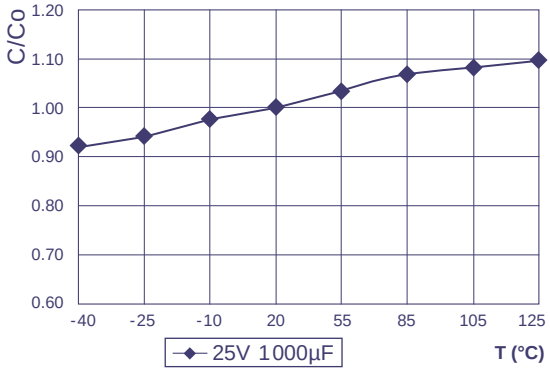
Radial

Impedance Ratio



Z = actual Impedance of each frequency at 20°C
Zo = Impedance at 100kHz, 20°C
Impedance Ratio as a function of frequency

Capacitance Ratio



C = actual capacitance of each temperature at 100Hz
Co = Capacitance at 20°C, 100Hz
Capacitance Ratio as a function of temperature (typical curve)

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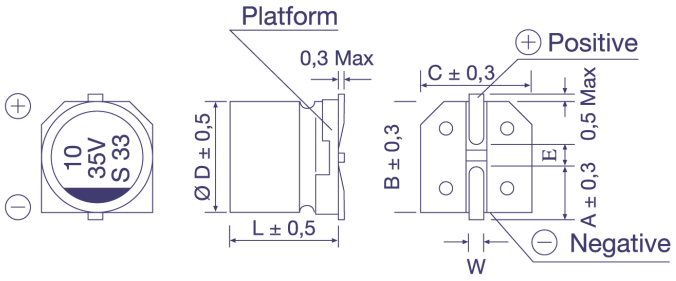
Part Number System

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	Dimension	for Specials only
EC = Electrolytic Capacitor	SMD = V	For coding please refer to the pages of ratings	CD VS = BS	0,47 = R47	±20% = M	SMD:		4x7 = 0407	
	Radial = R		CD VH = VH	1,0 = 010	±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)	12,5mm = 12		
			CD 287 = GC						
			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						
			CD 299 = PG			**preferred**			
			CD 29D = HR						
			CD 29H = QH						
			CD 29L = QL						
			HCP = CP						
			HPM = PM						
			HVC = VC						

Technical Specification SMD Type

Dimensions

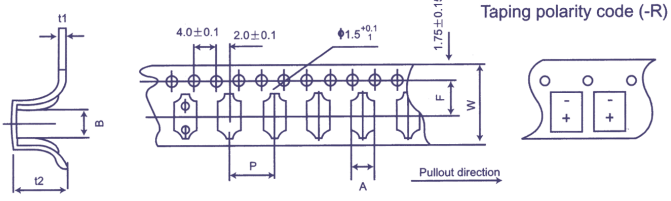


Ø D x L	4 x 5,4	5 x 5,4	6,3 x 5,4	6,3 x 7,7	8 x 10,5	8 x 11,8	10 x 10,5	10 x 12,7
A	1,8	2,1	2,4	2,5	2,9	2,9	3,2	3,2
B	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
C	4,3	5,3	6,6	6,6	8,3	8,4	10,3	10,4
E	1,0	1,3	2,2	2,2	3,1	3,1	4,5	4,5
L	5,4	5,4	5,4	7,7	10,5	11,8	10,5	12,7
W	0,5 - 0,8				0,7 - 1,1			

in mm

Taping Dimensions

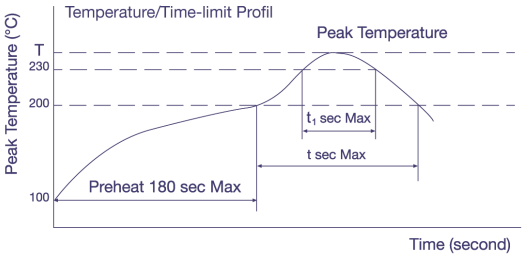
Unit:mm



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)



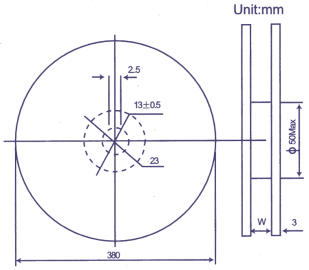
Allowable Range of Peak Temperature

Size	T (°C)	t (second)	t_1 (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

Unit:mm



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

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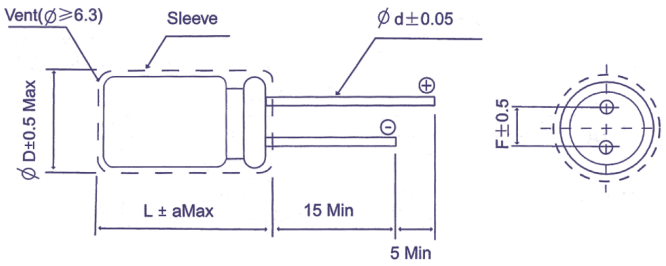
Technical Specification Radial Type

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

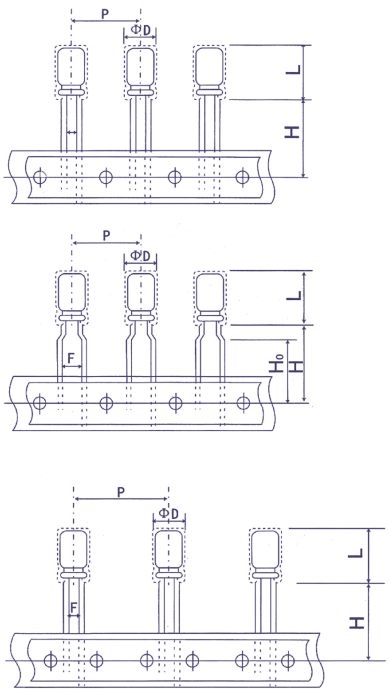


L	L ≤ 7					L ≥ 11									
Ø D	3	4	5	6,3	8	5	6,3	8	10	12,5	16	18	20	22	25
F	1	1,5	2,0	2,5	3,5	2,0	2,5	3,5	5,0		7,5		10,0		12,5
Ø d	0,4	0,45				0,5		0,6			0,8		1,0		
a_{Max}	1,0					2,0									

in mm

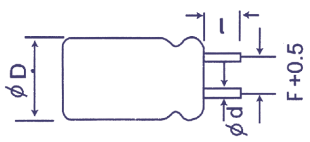
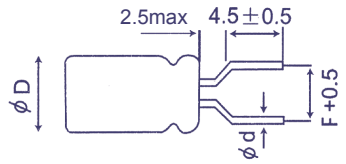
Dimensions for Ammopack taping
Order Code: FF (FD)

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



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