

POLYMER ELECTROLYTIC CAPACITORS
SOLID POLYMER RADIAL

PC HCN CN

PC HCS CS

PC HEG EG

PC HEL EL

PC HEN EN

PC HGN GN

PC HPF PF

PC HPK PK

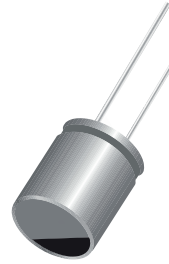
PC HPN HN

PC HPNA NA

PC HSN SN

2 000 - 5 000h
at 105°C/125°C

- Low ESR
- Solid Polymeric Electrolyte


ITEM CHARACTERISTICS

Operating Temperature Range (°C)	-55 ~ +105/125 (see table)
Voltage Range (V)	2,5 - 200
Capacitance Range (µF)	1,0 ~ 2 700
Capacitance Tolerance (20°C, 120Hz)	± 20%
Surge Voltage (V)	$U_R * 1,15$
Dissipation Factor	at 20°C, 120Hz, see table
Leakage Current (µA)	at 20°C after 2 minutes
Temperature Stability	$Z_{105°C} / Z_{20°C} \leq 1,25$ for 105°C capacitors
	$Z_{125°C} / Z_{+20°C} \leq 1,25$ for 125°C capacitors
	$Z_{-55°C} / Z_{+20°C} \leq 1,25$

! The usage at lower temperatures than indicated may be possible. Please contact the Jianghai Europe sales office for approval.

ITEM	ENDURANCE LIFETIME L_e	OPERATIONAL LIFETIME L_o	DAMP HEAT (Steady State)	RESISTANCE TO SOLDERING HEAT RADIAL
Lifetime	1 000h ~ 5 000h*	100h ~ 500h*	1 000h	10sec, Wave
Leakage Current	≤ the specified value	≤ the specified value	≤ the specified value (after voltage processing)	≤ the specified value (after voltage processing)
Capacitance Change	Within ± 20% of initial value	Within ± 20% of initial value	Within ± 20% of initial value	Within ± 5% of initial value
Dissipation Factor	≤ 150% of specified value	≤ 150% of specified value	≤ 150% of specified value	≤ specified value
ESR Change	≤ 150% of specified value	≤ 150% of specified value	≤ 150% of specified value	≤ specified value
Condition	T_o (upper category temperature) U_R $I_R = 0$	T_o (upper category temperature) U_R I_R	60°C (90-95% relative humidity) $U_R = 0$ $I_R = 0$	260°C±5°C

*concrete values: see table

*concrete values: see table

details see page 11 following

MULTIPLIER FOR RIPPLE CURRENT (FREQUENCY COEFFICIENT)

Frequency	120Hz	1kHz	10kHz	100kHz
Factor	0,05	0,30	0,70	1,00

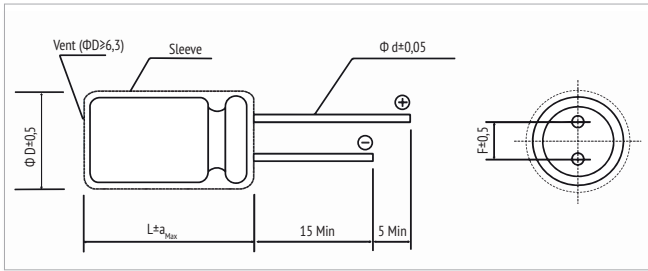
Multipliers for typical operating conditions.

ENVIRONMENTAL

The products are RoHS, WEEE and REACh compliant. The detailed version please see separate "Environmental Certificates" document or www.jianghai-europe.com

DIMENSIONS FOR LOOSE, LONG-LEAD TYPE (BULK)

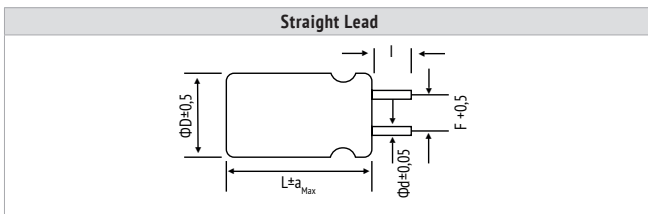
ORDER CODE: LL



L	L < 7			L ≥ 7			
∅ D	5	6,3	8	5	5,5/6,3	8	10
F	2,0	2,5	3,5	2,0	2,5	3,5	5,0
∅ d	0,5			0,5		0,6	
aMax	1,0			2,0			

in mm

DIMENSIONS FOR LOOSE, CUT LEADS (BULK)

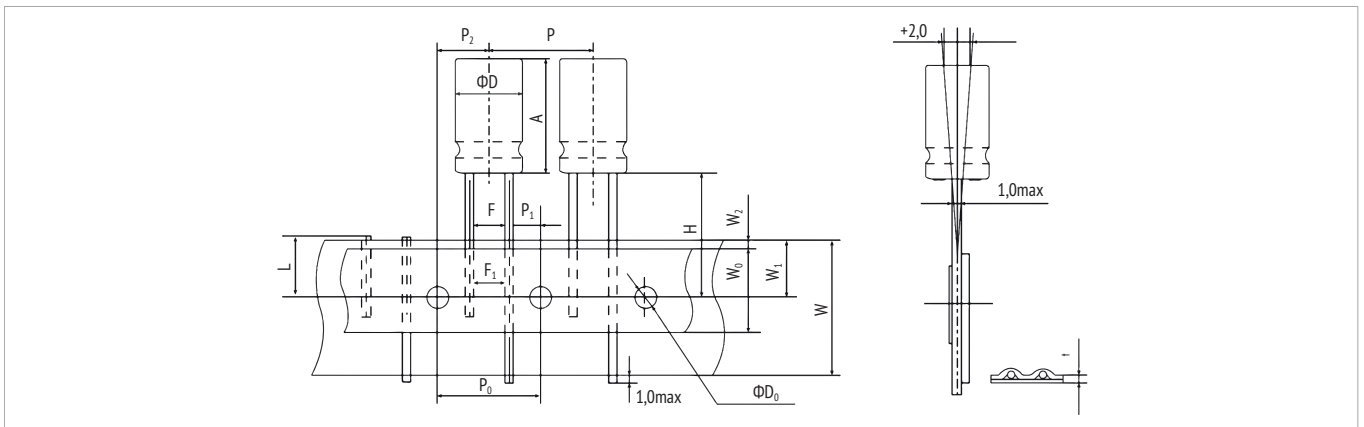


Code	CB	CC	CD	CE	CF
I	5,0 ± 0,5	4,5 ± 0,5	4,0 ± 0,5	3,5 ± 0,5	3,0 ± 0,5

in mm

preferred

DIMENSIONS AMMOPACK TAPING



in mm

∅D	A	P	P ₀	P ₁	P ₂	F	F ₁	W	W ₀	W ₁	W ₂	H	L	∅D ₀	t
± 0,5		± 1,0	± 0,2	± 0,5	± 1,0	0,8/ -0,2	± 1,0	± 0,5	min	± 0,5	max	0,75/ -0,5	max	± 0,5	± 0,3
5	5-11	12,7	12,7	5,35	6,35	2,0	3,5	18,0	10,0	9,0	1,5	18,5	11,0	4,0	0,7
5,5	9-11	12,7	12,7	5,1	6,35	2,5	3,5	18,0	10,0	9,0	1,5	18,5	11,0	4,0	0,7
6,3	5-12	12,7	12,7	5,1	6,35	2,5	3,5	18,0	10,0	9,0	1,5	18,5	11,0	4,0	0,7
8	6-12	12,7	12,7	4,6	6,35	3,5	3,5	18,0	10,0	9,0	1,5	18,5	11,0	4,0	0,7
10	7-12,5	12,7	12,7	3,85	6,35	5,0	5,0	18,0	10,0	9,0	1,5	18,5	11,0	4,0	0,7

U _{RDC} Rated Voltage Code (V)	C _R Rated Capacitance 20°C 120Hz (µF)	ESR _{max} Equivalent Series Resistance 20°C 100kHz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I _{Leak} Leakage Current (µA)	I _{max, 105°C} Max. Allowed Ripple Current <105°C 100kHz (mArms)	I _{max, 125°C} Max. Allowed Ripple Current 105°C <T<125°C 100kHz (mArms)	T ₀ Operating Temperature (°C)	Size øD x L (mm)	L _e Endurance Life Time U _R , T ₀ (h)	L _o Operational Life Time U _R , T ₀ , I _{max} (h)	Series	Ordercode ◇◇ = pin style & length Details: Page 10
2,5 OE	330	7	0,10	500	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROECS331MF08◇◇25SE3
	390	20	0,08	195	3200	-	105	6,3 x 10	2 000	200	PC HCN CN	PCROECN391MF10◇◇25SE3
	470	7	0,10	500	5600	-	105	6,3 x 8	2 000	200	PC HELEL	PCROEEL471MF08◇◇25SE3
	560	7	0,10	500	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROECS561MF08◇◇25SE3
		7	0,08	500	6100	-	105	8 x 8	2 000	200	PC HPN HN	PCROEHN561MB08◇◇35SE3
	680	7	0,08	500	6100	-	105	8 x 8	2 000	200	PC HPN HN	PCROEHN681MB08◇◇35SE3
		5	0,12	340	6630	-	105	8 x 11,5	2 000	200	PC HSN SN	PCROESN681MBAB◇◇35SE3
	820	7	0,10	500	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROECS821MF08◇◇25SE3
		7	0,10	500	6100	-	105	8 x 8	5 000	500	PC HCS CS	PCROECS821MB08◇◇35SE3
	1 000	5	0,12	410	6630	-	105	8 x 11,5	2 000	200	PC HSN SN	PCROESN821MBAB◇◇35SE3
		7	0,10	500	6100	-	105	8 x 8	5 000	500	PC HCS CS	PCROECS102MB08◇◇35SE3
	1 200	6	0,08	500	6640	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROEEN102MCAC◇◇50SE3
		6	0,08	600	6640	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROEEN122MCAC◇◇50SE3
	1 500	7	0,08	750	6100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROEEN152MBAB◇◇35SE3
		5	0,12	750	7220	-	105	10 x 12,5	2 000	200	PC HSN SN	PCROESN152MCAC◇◇50SE3
	2 700	10	0,10	1350	5560	-	105	10 x 12,5	5 000	500	PC HCS CS	PCROECS272MCAC◇◇50SE3
4 OG	270	20	0,08	216	3200	-	105	6,3 x 10	2 000	200	PC HCN CN	PCROGCN271MF10◇◇25SE3
	330	35	0,12	660	2560	810*	125	8 x 6	1 000	100	PC HGN GN	PCROGCN331MB06◇◇35SE3
	390	20	0,08	312	3300	-	105	6,3 x 10	2 000	200	PC HCN CN	PCROGCN391MF10◇◇25SE3
	560	7	0,10	500	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROGCS561MF08◇◇25SE3
		7	0,10	500	6100	-	105	8 x 8	5 000	500	PC HCS CS	PCROGCS561MB08◇◇35SE3
		5	0,12	450	6630	-	105	8 x 11,5	2 000	200	PC HSN SN	PCROGSN561MBAB◇◇35SE3
	680	13	0,12	450	4520	1430*	125	8 x 11,5	1 000	100	PC HGN GN	PCROGCN561MBAB◇◇35SE3
		6	0,08	545	6100	-	105	8 x 8	2 000	200	PC HPNA NA	PCROGNA681MB08◇◇35SE3
		7	0,10	545	6100	-	105	8 x 11,5	5 000	500	PC HCS CS	PCROGCS681MBAB◇◇35SE3
	820	7	0,08	550	6100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROGEN681MBAB◇◇35SE3
		25	0,12	545	3700	1170*	125	10 x 7	1 000	100	PC HGN GN	PCROGCN681MC07◇◇05SE3
		6	0,08	660	6100	-	105	8 x 8	2 000	200	PC HPNA NA	PCROGNA821MB08◇◇35SE3
	1 000	7	0,10	660	6640	-	105	8 x 11,5	5 000	500	PC HCS CS	PCROGCS821MBAB◇◇35SE3
		5	0,12	656	7220	-	105	10 x 12,5	2 000	200	PC HSN SN	PCROGSN821MCAC◇◇50SE3
		7	0,08	800	6100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROGEN102MBAB◇◇35SE3
	1 200	6	0,08	800	6640	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROGEN102MCAC◇◇50SE3
		7	0,08	960	6100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROGEN122MBAB◇◇35SE3
		5	0,12	960	7220	-	105	10 x 12,5	2 000	200	PC HSN SN	PCROGSN122MCAC◇◇50SE3
	1 800	12	0,12	960	5450	1740*	125	10 x 12,5	1 000	100	PC HGN GN	PCROGCN122MCAC◇◇50SE3
7		0,08	1440	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROGEN182MCAC◇◇50SE3	
2 200	7	0,08	1760	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROGEN222MCAC◇◇50SE3	
6,3 OJ	150	35	0,12	475	2560	810*	125	8 x 6	1 000	100	PC HGN GN	PCROJGN151MB06◇◇35SE3
	220	20	0,08	280	3200	-	105	6,3 x 10	2 000	200	PC HCN CN	PCROJCN221MF10◇◇25SE3
	270	11	0,10	341	3700	-	105	5 x 8	2 000	200	PC HELEL	PCROJEL271ME08◇◇20SE3
	330	11	0,10	420	3700	-	105	5 x 8	2 000	200	PC HELEL	PCROJEL331ME08◇◇20SE3
		7	0,08	420	5700	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROJEN331MBAB◇◇35SE3
		25	0,12	416	3700	1170*	125	10 x 7	1 000	100	PC HGN GN	PCROJGN331MC07◇◇05SE3
	390	11	0,10	495	3700	-	105	5 x 8	2 000	200	PC HELEL	PCROJEL391ME08◇◇20SE3
		15	0,10	495	3900	-	105	8 x 8	5 000	500	PC HCS CS	PCROJCS391MB08◇◇35SE3
		5	0,12	495	6630	-	105	8 x 11,5	2 000	200	PC HSN SN	PCROJSN391MBAB◇◇35SE3
	470	11	0,10	595	3700	-	105	5 x 11,0	2 000	200	PC HELEL	PCROJEL471ME11◇◇20SE3
		8	0,10	595	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROJCS471MF08◇◇25SE3
		8	0,10	595	5700	-	105	8 x 8	5 000	500	PC HCS CS	PCROJCS471MB08◇◇35SE3
		7	0,08	595	6100	-	105	8 x 8	2 000	200	PC HPNA NA	PCROJNA471MB08◇◇35SE3
	560	15	0,12	595	4210	1332*	125	8 x 11,5	1 000	100	PC HGN GN	PCROJGN471MBAB◇◇35SE3
		8	0,10	706	5600	-	105	6,3 x 8	5 000	500	PC HCS CS	PCROJCS561MF08◇◇25SE3
		7	0,10	706	6100	-	105	8 x 8	5 000	500	PC HCS CS	PCROJCS561MB08◇◇35SE3
	680	8	0,10	860	5000	-	105	6,3 x 8	2 000	200	PC HELEL	PCROJEL681MF08◇◇25SE3
		8	0,08	860	5700	-	105	8 x 8	2 000	200	PC HPN HN	PCROJHN681MB08◇◇35SE3
		7	0,10	860	6640	-	105	10 x 12,5	5 000	500	PC HCS CS	PCROJCS681MCAC◇◇50SE3
		5	0,12	860	7220	-	105	10 x 12,5	2 000	200	PC HSN SN	PCROJSN681MCAC◇◇50SE3
		12	0,12	645	5450	1740*	125	10 x 12,5	1 000	100	PC HGN GN	PCROJGN681MCAC◇◇50SE3
	820	10	0,10	1035	4500	-	105	5,5 x 11	2 000	200	PC HELEL	PCROJEL821MS11◇◇25SE3
		8	0,10	1035	5000	-	105	6,3 x 11	2 000	200	PC HELEL	PCROJEL821MF11◇◇25SE3
		8	0,08	1035	5700	-	105	8 x 8	2 000	200	PC HPN HN	PCROJHN821MB08◇◇35SE3
		5	0,12	1035	7220	-	105	10 x 12,5	2 000	200	PC HSN SN	PCROJSN821MCAC◇◇50SE3
		12	0,12	775	5450	1740*	125	10 x 12,5	1 000	100	PC HGN GN	PCROJGN821MCAC◇◇50SE3
	1 000	8	0,10	1260	5000	-	105	6,3 x 11	2 000	200	PC HELEL	PCROJEL102MF11◇◇25SE3
8		0,08	1260	5700	-	105	8 x 8	2 000	200	PC HPN HN	PCROJHN102MB08◇◇35SE3	

*Under certain conditions the currents can reach the value of 105°C. Please ask your Jianghai Europe Sales Office for approval.

>>

U _{RDC} Rated Voltage Code	C _R Rated Capacitance	ESR _{max} Equivalent Series Resistance	tanδ Dissipation Factor	I _{Leak} Leakage Current	I _{max, 105°C} Max. Allowed Ripple Current	I _{max, 125°C} Max. Allowed Ripple Current	T ₀ Operating Temperature	Size øD x L	L _e Endurance Life Time	L _o Operational Life Time	Series	Ordercode	
(V)	(µF)	(mΩ)		(µA)	(mArms)	(mArms)	(°C)	(mm)	(h)	(h)			
	20°C 120Hz	20°C 100kHz	20°C 120Hz		<105°C 100kHz	105°C <T<125°C 100kHz			U ₀ , T ₀	U ₀ , T ₀ , I _{max}		◇◇ = pin style & length	
												Details: Page 10	
6,3 0J	1 000	7	0,08	1260	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCROJEN102MCAC◇◇50SE3	
	1 500	7	0,08	1890	5700	-	105	8 x 11,5	2 000	200	PC HEN EN	PCROJEN152MBAB◇◇35SE3	
		10	0,10	1890	5560	-	105	10 x 12,5	5 000	500	PC HCS CS	PCROJCS152MCAC◇◇50SE3	
10 1A	47	25	0,08	95	2900	-	105	6,3 x 10	2 000	200	PC HCN CN	PCR1ACN470MF10◇◇25SE3	
	68	25	0,08	136	2900	-	105	6,3 x 10	2 000	200	PC HCN CN	PCR1ACN680MF10◇◇25SE3	
	100	24	0,10	200	2490	-	105	5 x 8	2 000	200	PC HELEL	PCR1AEL101ME08◇◇20SE3	
		25	0,08	200	2900	-	105	6,3 x 10	2 000	200	PC HCN CN	PCR1ACN101MF10◇◇25SE3	
	120	24	0,10	240	2490	-	105	5 x 8	2 000	200	PC HELEL	PCR1AEL121ME08◇◇20SE3	
		35	0,12	600	2560	810*	125	8 x 6	1 000	100	PC HGN GN	PCR1AGN121MB06◇◇35SE3	
	150	25	0,12	300	2900	-	105	6,3 x 10	2 000	200	PC HCN CN	PCR1ACN151MF10◇◇25SE3	
		10	0,10	500	4680	-	105	6,3 x 8	2 000	200	PC HELEL	PCR1AEL221MF08◇◇25SE3	
	220	17	0,12	440	3950	1260*	125	8 x 11,5	1 000	100	PC HGN GN	PCR1AGN221MBAB◇◇35SE3	
		10	0,12	330	5500	-	105	10 x 12,5	2 000	200	PC HCN CN	PCR1ACN221MCAC◇◇50SE3	
		10	0,10	540	4680	-	105	6,3 x 8	2 000	200	PC HELEL	PCR1AEL271MF08◇◇25SE3	
	270	8	0,08	540	5650	-	105	8 x 11,5	2 000	200	PC HEN EN	PCR1AEN271MBAB◇◇35SE3	
		25	0,12	540	3700	1170*	125	10 x 7	1 000	100	PC HGN GN	PCR1AGN271MC07◇◇50SE3	
		15	0,10	660	3600	-	105	6,3 x 9	2 000	200	PC HELEL	PCR1AEL331MF09◇◇25SE3	
	330	10	0,10	660	5000	-	105	8 x 8	5 000	500	PC HCS CS	PCR1ACS331MB08◇◇35SE3	
		17	0,12	660	3950	1260*	125	8 x 11,5	1 000	100	PC HGN GN	PCR1AGN331MBAB◇◇35SE3	
		10	0,08	780	5000	-	105	8 x 8	2 000	200	PC HPN HN	PCR1AHN391MB08◇◇35SE3	
	390	8	0,08	780	5650	-	105	8 x 11,5	2 000	200	PC HEN EN	PCR1AEN391MBAB◇◇35SE3	
		12	0,10	940	4100	-	105	6,3 x 9	2 000	200	PC HELEL	PCR1AEL471MF09◇◇25SE3	
		8	0,08	940	5700	-	105	8 x 8	2 000	200	PC HPN HN	PCR1AHN471MB08◇◇35SE3	
	470	11	0,10	940	5100	-	105	8 x 11,5	5 000	500	PC HCS CS	PCR1ACS471MBAB◇◇35SE3	
		7	0,08	940	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCR1AEN471MCAC◇◇50SE3	
		12	0,10	1120	4100	-	105	6,3 x 11	2 000	200	PC HELEL	PCR1AEL561MF11◇◇25SE3	
		8	0,08	1120	5700	-	105	8 x 8	2 000	200	PC HPN HN	PCR1AHN561MB08◇◇35SE3	
	560	11	1,10	1120	5100	-	105	8 x 11,5	5 000	500	PC HCS CS	PCR1ACS561MBAB◇◇35SE3	
		7	0,08	1120	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCR1AEN561MCAC◇◇50SE3	
		13	0,12	840	5250	1680*	125	10 x 12,5	1 000	100	PC HGN GN	PCR1AGN561MCAC◇◇50SE3	
		15	0,10	1360	3600	-	105	6,3 x 11	2 000	200	PC HELEL	PCR1AEL681MF11◇◇25SE3	
	680	8	0,10	1360	5650	-	105	8 x 11,5	5 000	500	PC HCS CS	PCR1ACS681MBAB◇◇35SE3	
		7	0,08	1360	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCR1AEN681MCAC◇◇50SE3	
	1 000	8	0,08	2000	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCR1AEN102MCAC◇◇50SE3	
	16 1C	82	40	0,12	656	2120	670*	125	8 x 6	1 000	100	PC HGN GN	PCR1CGN820MB06◇◇35SE3
		100	38	0,12	320	1900	-	105	5 x 5	3 000	300	PC HPF PF	PCR1CPF101ME05◇◇20SE3
			10	0,10	500	4680	-	105	6,3 x 8	5 000	500	PC HCS CS	PCR1CCS101MF08◇◇25SE3
		150	25	0,12	480	2800	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1CPF151MF05◇◇25SE3
			15	0,08	480	3820	-	105	6,3 x 8	2 000	200	PC HPN HN	PCR1CHN151MF08◇◇25SE3
			15	0,08	480	4080	-	105	8 x 8	2 000	200	PC HPN HN	PCR1CHN151MB08◇◇35SE3
			16	0,12	480	4360	-	105	8 x 11,5	2 000	200	PC HCN CN	PCR1CCN151MBAB◇◇35SE3
			30	0,12	480	3020	955*	125	10 x 7	1 000	100	PC HGN GN	PCR1CGN151MC07◇◇50SE3
			10	0,12	360	5500	-	105	10 x 12,5	2 000	200	PC HCN CN	PCR1CCN151MCAC◇◇50SE3
			25	0,12	576	2800	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1CPF181MF05◇◇25SE3
		180	10	0,10	576	5000	-	105	8 x 8	5 000	500	PC HCS CS	PCR1CCS181MB08◇◇35SE3
			11	0,08	580	5100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCR1CEN181MBAB◇◇35SE3
			20	0,12	580	3640	1151*	125	8 x 11,5	1 000	100	PC HGN GN	PCR1CGN181MBAB◇◇35SE3
		220	15	0,12	705	3000	-	105	5 x 11	2 000	200	PC HELEL	PCR1CEL221ME11◇◇20SE3
			10	0,08	705	5000	-	105	8 x 8	2 000	200	PC HPN HN	PCR1CHN221MB08◇◇35SE3
		270	15	0,12	865	3000	-	105	5 x 11	2 000	200	PC HELEL	PCR1CEL271ME11◇◇20SE3
22			0,12	864	3300	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1CPF271MF08◇◇25SE3	
26			0,12	864	1650	521*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1CPK271MF08◇◇25SE3	
26			0,12	864	1650	521*	125	8 x 6	2 000	200	PC HPK PK	PCR1CPK271MB06◇◇35SE3	
10			0,10	865	5000	-	105	8 x 8	5 000	500	PC HCS CS	PCR1CCS271MB08◇◇35SE3	
10			0,08	865	5100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCR1CEN271MBAB◇◇35SE3	
330		22	0,12	1056	3300	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1CPF331MF08◇◇25SE3	
		10	0,08	1060	5100	-	105	8 x 11,5	2 000	200	PC HEN EN	PCR1CEN331MBAB◇◇35SE3	
		10	0,08	1060	6100	-	105	10 x 12,5	2 000	200	PC HEN EN	PCR1CEN331MCAC◇◇50SE3	
		16	0,12	795	4750	1520*	125	10 x 12,5	1 000	100	PC HGN GN	PCR1CGN331MCAC◇◇50SE3	
390		15	0,12	1250	3600	-	105	6,3 x 12,0	2 000	200	PC HELEL	PCR1CEL391MF12◇◇25S	
		19	0,12	1248	2200	695*	125	8 x 8	2 000	200	PC HPK PK	PCR1CPK391MB08◇◇35SE3	
470		15	0,15	1505	3600	-	105	6,3 x 12,0	2 000	200	PC HELEL	PCR1CEL471MF12◇◇25S	
		16	0,12	1504	4400	-	105	8 x 8	3 000	300	PC HPF PF	PCR1CPF471MB08◇◇35SE3	
		14	0,12	1504	4950	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1CPF471MBAB◇◇35SE3	
		10	0,10	1505	6100	-	105	10 x 12,5	5 000	500	PC HCS CS	PCR1CCS471MCAC◇◇50SE3	

*Under certain conditions the currents can reach the value of 105°C. Please ask your Jianghai Europe Sales Office for approval.

>>

U _{RDC} Rated Voltage Code (V)	C _R Rated Capacitance 20°C 120Hz (µF)	ESR _{max} Equivalent Series Resistance 20°C 100kHz (mΩ)	tanδ Dissipation Factor 20°C 120Hz	I _{leak} Leakage Current (µA)	I _{max, 105°C} Max. Allowed Ripple Current ≤105°C 100kHz (mA Arms)	I _{max, 125°C} Max. Allowed Ripple Current 105°C <T<125°C 100kHz (mA Arms)	T ₀ Operating Temperature (°C)	Size øD x L (mm)	L _e Endurance Life Time U _R , T ₀ (h)	L _o Operational Life Time U _R , T ₀ , I _{max} (h)	Series	Ordercode ◇◇ = pin style & length Details: Page 10
25 1E	150	29	0,12	750	1600	506*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1EPK151MF08◇◇25E3
		29	0,12	750	1600	506*	125	8 x 6	2 000	200	PC HPK PK	PCR1EPK151MB06◇◇35E3
	180	24	0,12	900	3200	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1EPF181MF08◇◇25E3
		29	0,12	900	1600	506*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1EPK181MF08◇◇25E3
		24	0,12	900	3200	-	105	8 x 6	3 000	300	PC HPF PF	PCR1EPF181MB06◇◇35E3
		29	0,12	900	1600	506*	125	8 x 6	2 000	200	PC HPK PK	PCR1EPK181MB06◇◇35E3
	220	24	0,12	1100	3200	-	105	8 x 6	3 000	300	PC HPF PF	PCR1EPF221MB06◇◇35E3
		22	0,12	1100	2050	648*	125	8 x 8	2 000	200	PC HPK PK	PCR1EPK221MB08◇◇35E3
	270	18	0,12	1350	4100	-	105	8 x 8	3 000	300	PC HPF PF	PCR1EPF271MB08◇◇35E3
		22	0,12	1350	2050	648*	125	8 x 8	2 000	200	PC HPK PK	PCR1EPK271MB08◇◇35E3
	330	18	0,12	1650	4100	-	105	8 x 8	3 000	300	PC HPF PF	PCR1EPF331MB08◇◇35E3
		16	0,12	1650	4650	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1EPF331MBAB◇◇35E3
		19	0,12	1650	2325	735*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1EPK331MBAB◇◇35E3
	390	16	0,12	1950	4650	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1EPF391MBAB◇◇35E3
		19	0,12	1950	2325	735*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1EPK391MBAB◇◇35E3
	470	16	0,12	2350	4650	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1EPF471MBAB◇◇35E3
		14	0,12	2350	5000	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1EPF471MCAC◇◇50E3
		17	0,12	2350	2500	790*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1EPK471MCAC◇◇50E3
	560	16	0,12	2800	4600	-	105	8 x 14	2 000	200	PC HEG EG	PCR1EEG561MB14◇◇35E3
		14	0,12	2800	5000	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1EPF561MCAC◇◇50E3
17		0,12	2800	2500	790*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1EPK561MCAC◇◇50E3	
680	16	0,12	3400	4650	-	105	8 x 16	2 000	200	PC HEG EG	PCR1EEG681MB16◇◇35E3	
	14	0,12	3400	5000	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1EPF681MCAC◇◇50E3	
820	14	0,12	4100	5100	-	105	10 x 14	2 000	200	PC HEG EG	PCR1EEG821MC14◇◇50E3	
1 200	14	0,12	6000	5910	-	105	10 x 16	2 000	200	PC HEG EG	PCR1EEG122MC16◇◇50E3	
28 1L	47	50	0,12	264	1700	-	105	5 x 5	3 000	300	PC HPF PF	PCR1LPF470ME05◇◇20E3
	82	33	0,12	460	2450	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1LPF820MF05◇◇25E3
	150	28	0,12	840	2950	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1LPF151MF08◇◇25E3
		28	0,12	840	2950	-	105	8 x 6	3 000	300	PC HPF PF	PCR1LPF151MB06◇◇35E3
	180	22	0,12	1008	3700	-	105	8 x 8	3 000	300	PC HPF PF	PCR1LPF181MB08◇◇35E3
	220	22	0,12	1232	3700	-	105	8 x 8	3 000	300	PC HPF PF	PCR1LPF221MB08◇◇35E3
	270	18	0,12	1512	4350	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1LPF271MBAB◇◇35E3
	330	18	0,12	1848	4350	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1LPF331MBAB◇◇35E3
	470	16	0,12	2632	4650	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1LPF471MCAC◇◇50E3
	560	16	0,12	3136	4650	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1LPF561MCAC◇◇50E3
32 1F	39	55	0,12	250	1600	-	105	5 x 5	3 000	300	PC HPF PF	PCR1FPF390ME05◇◇20E3
	68	35	0,12	436	2350	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1FPF680MF05◇◇25E3
		30	0,12	768	2800	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1FPF121MF08◇◇25E3
	120	30	0,12	768	2800	-	105	8 x 6	3 000	300	PC HPF PF	PCR1FPF121MB06◇◇35E3
		24	0,12	1152	3600	-	105	8 x 8	3 000	300	PC HPF PF	PCR1FPF181MB08◇◇35E3
	220	20	0,12	1408	4000	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1FPF221MBAB◇◇35E3
	270	20	0,12	1728	4000	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1FPF271MBAB◇◇35E3
	330	20	0,12	2112	4000	-	105	8 x 14	2 000	200	PC HEG EG	PCR1FEG331MB14◇◇35E3
	390	18	0,12	2496	4350	-	105	8 x 14	2 000	200	PC HEG EG	PCR1FEG391MB14◇◇35E3
		18	0,12	2496	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1FPF391MCAC◇◇50E3
	470	18	0,12	3008	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1FPF471MCAC◇◇50E3
		18	0,12	3008	4500	-	105	10 x 14	2 000	200	PC HEG EG	PCR1FEG471MC14◇◇50E3
	560	18	0,12	3584	4500	-	105	10 x 14	2 000	200	PC HEG EG	PCR1FEG561MC14◇◇50E3
680	18	0,12	4352	4690	-	105	10 x 16	2 000	200	PC HEG EG	PCR1FEG681MC16◇◇50E3	
35 1V	10	50	0,12	175	2300	-	105	8 x 8	2 000	200	PC HCN CN	PCR1VCN100MB08◇◇35E3
	18	34	0,12	315	2830	-	105	8 x 11,5	2 000	200	PC HCN CN	PCR1VCN180MBAB◇◇35E3
	33	55	0,12	231	1600	-	105	5 x 5	3 000	300	PC HPF PF	PCR1VPF330ME05◇◇20E3
		30	0,12	580	3270	-	105	10 x 12,5	2 000	200	PC HCN CN	PCR1VCN330MCAC◇◇50E3
	47	35	0,12	329	2350	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1VPF470MF05◇◇25E3
		42	0,12	329	1175	371*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1VPK470MF05◇◇25E3
	56	35	0,12	392	2350	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1VPF560MF05◇◇25E3
		42	0,12	392	1175	371*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1VPK560MF05◇◇25E3
	82	36	0,12	574	1400	442*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1VPK820MF08◇◇25E3
		36	0,12	574	1400	442*	125	8 x 6	2 000	200	PC HPK PK	PCR1VPK820MB06◇◇35E3
	100	30	0,12	700	2800	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1VPF101MF08◇◇25E3
		36	0,12	700	1400	442*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1VPK101MF08◇◇25E3
		30	0,12	700	2800	-	105	8 x 6	3 000	300	PC HPF PF	PCR1VPF101MB06◇◇35E3
		36	0,12	700	1400	442*	125	8 x 6	2 000	200	PC HPK PK	PCR1VPK101MB06◇◇35E3
120	29	0,12	840	1800	569*	125	8 x 8	2 000	200	PC HPK PK	PCR1VPK121MB08◇◇35E3	

*Under certain conditions the currents can reach the value of 105°C. Please ask your Jianghai Europe Sales Office for approval.

>>

U _{RDC} Rated Voltage Code (V)	C _R Rated Capacitance (µF)	ESR _{max} Equivalent Series Resistance (mΩ)	tanδ Dissipation Factor (20°C 120kHz)	I _{leak} Leakage Current (µA)	I _{max, 105°C} Max. Allowed Ripple Current (mA Arms)	I _{max, 125°C} Max. Allowed Ripple Current (mA Arms)	T ₀ Operating Temperature (°C)	Size øD x L (mm)	L _e Endurance Life Time (h)	L _o Operational Life Time (h)	Series	Ordercode
35 1V	150	24	0,12	1050	3600	-	105	8 x 8	3 000	300	PC HPF PF	PCR1VPF151MB08◇◇35SE3
		29	0,12	1050	1800	569*	125	8 x 8	2 000	200	PC HPK PK	PCR1VPK151MB08◇◇35E3
	180	24	0,12	3600	3600	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1VPF181MBAB◇◇35SE3
		24	0,12	1260	2000	632*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1VPK181MBAB◇◇35E3
	220	20	0,12	1540	4000	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1VPF221MBAB◇◇35-E3
		20	0,12	1540	4000	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1VPF221MBAB◇◇35SE3
	270	24	0,12	1540	2000	632*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1VPK221MBAB◇◇35E3
		20	0,12	1890	4000	-	105	8 x 14	2 000	200	PC HEG EG	PCR1VEG271MB14◇◇35SE3
	270	22	0,12	1890	2200	695*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1VPK271MCAC◇◇50E3
		20	0,12	2310	4100	-	105	8 x 16	2 000	200	PC HEG EG	PCR1VEG331MB16◇◇35SE3
	330	18	0,12	2310	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1VPF331MCAC◇◇50SE3
		22	0,12	2310	2200	695*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1VPK331MCAC◇◇50E3
		20	0,12	2730	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1VPF391MCAC◇◇50SE3
	470	18	0,12	3290	4500	-	105	10 x 14	2 000	200	PC HEG EG	PCR1VEG471MC14◇◇50SE3
	560	18	0,12	3920	4690	-	105	10 x 16	2 000	200	PC HEG EG	PCR1VEG561MC16◇◇50SE3
	680	18	0,12	4760	4690	-	105	10 x 16	2 000	200	PC HEG EG	PCR1VEG681MC16◇◇50SE3
40 16	22	60	0,12	176	1550	-	105	5 x 5	3 000	300	PC HPF PF	PCR1GPF220ME05◇◇20SE3
	33	40	0,12	264	2200	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1GPF330MF05◇◇25SE3
		45	0,12	264	1150	363*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1GPK330MF05◇◇25E3
	39	37	0,12	312	2300	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1GPF390MF05◇◇25SE3
		45	0,12	312	1150	363*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1GPK390MF05◇◇25E3
	68	38	0,12	544	1350	426*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1GPK680MF08◇◇25E3
		38	0,12	544	1350	426*	125	8 x 6	2 000	200	PC HPK PK	PCR1GPK680MB06◇◇35E3
	82	32	0,12	656	2700	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1GPF820MF08◇◇25SE3
		38	0,12	656	1350	426*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1GPK820MF08◇◇25E3
		32	0,12	656	2700	-	105	8 x 6	3 000	300	PC HPF PF	PCR1GPF820MB06◇◇35SE3
		38	0,12	656	1350	426*	125	8 x 6	2 000	200	PC HPK PK	PCR1GPK820MB06◇◇35E3
	100	31	0,12	800	1750	553*	125	8 x 8	2 000	200	PC HPK PK	PCR1GPK101MB08◇◇35E3
	120	26	0,12	960	3500	-	105	8 x 8	3 000	300	PC HPF PF	PCR1GPF121MB08◇◇35SE3
		31	0,12	960	1750	553*	125	8 x 8	2 000	200	PC HPK PK	PCR1GPK121MB08◇◇35E3
	150	21	0,12	1200	3500	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1GPF151MBAB◇◇35SE3
		25	0,12	1200	1950	616*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1GPK151MBAB◇◇35E3
	220	18	0,12	1760	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1GPF221MCAC◇◇50SE3
		22	0,12	1760	2200	695*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1GPK221MCAC◇◇50E3
	270	20	0,12	2160	4000	-	105	8 x 14	2 000	200	PC HEG EG	PCR1GEG271MB14◇◇35SE3
		18	0,12	2160	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1GPF271MCAC◇◇50SE3
		22	0,12	2160	2200	695*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1GPK271MCAC◇◇50E3
	330	18	0,12	2640	4400	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1GPF331MCAC◇◇50SE3
		18	0,12	2640	4500	-	105	10 x 14	2 000	200	PC HEG EG	PCR1GEG331MC14◇◇50SE3
	390	18	0,12	3120	4500	-	105	10 x 14	2 000	200	PC HEG EG	PCR1GEG391MC14◇◇50SE3
470	18	0,12	3760	4690	-	105	10 x 16	2 000	200	PC HEG EG	PCR1GEG471MC16◇◇50SE3	
50 1H	10	70	0,12	100	1400	-	105	5 x 5	3 000	300	PC HPF PF	PCR1HPF100ME05◇◇20SE3
	12	70	0,12	120	1400	-	105	5 x 5	3 000	300	PC HPF PF	PCR1HPF120ME05◇◇20SE3
	18	48	0,12	180	1100	347*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1HPK180MF05◇◇25E3
	22	40	0,12	220	2200	-	105	6,3 x 5	3 000	300	PC HPF PF	PCR1HPF220MF05◇◇25SE3
		48	0,12	220	1100	347*	125	6,3 x 5	2 000	200	PC HPK PK	PCR1HPK220MF05◇◇25E3
	33	42	0,12	330	1300	411*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1HPK330MF08◇◇25E3
		35	0,12	330	2600	-	105	8 x 6	3 000	300	PC HPF PF	PCR1HPF330MB06◇◇35SE3
		42	0,12	330	1300	411*	125	8 x 6	2 000	200	PC HPK PK	PCR1HPK330MB06◇◇35E3
	39	35	0,12	390	2600	-	105	6,3 x 8	3 000	300	PC HPF PF	PCR1HPF390MF08◇◇25SE3
		42	0,12	390	1300	411*	125	6,3 x 8	2 000	200	PC HPK PK	PCR1HPK390MF08◇◇25E3
		35	0,12	390	2600	-	105	8 x 6	3 000	300	PC HPF PF	PCR1HPF390MB06◇◇35SE3
		42	0,12	390	1300	411*	125	8 x 6	2 000	200	PC HPK PK	PCR1HPK390MB06◇◇35E3
	47	35	0,12	470	1650	521*	125	8 x 8	2 000	200	PC HPK PK	PCR1HPK470MB08◇◇35E3
	56	29	0,12	560	3300	-	105	8 x 8	3 000	300	PC HPF PF	PCR1HPF560MB08◇◇35SE3
		35	0,12	560	1650	521*	125	8 x 8	2 000	200	PC HPK PK	PCR1HPK560MB08◇◇35E3
	68	29	0,12	680	3300	-	105	8 x 8	3 000	300	PC HPF PF	PCR1HPF680MB08◇◇35SE3
		35	0,12	680	1650	521*	125	8 x 8	2 000	200	PC HPK PK	PCR1HPK680MB08◇◇35E3
	82	25	0,12	820	3800	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1HPF820MBAB◇◇35SE3
		20	0,12	820	1900	600*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1HPK820MBAB◇◇35E3
	100	25	0,12	1000	3800	-	105	8 x 11,5	3 000	300	PC HPF PF	PCR1HPF101MBAB◇◇35SE3
		30	0,12	1000	1900	600*	125	8 x 11,5	2 000	200	PC HPK PK	PCR1HPK101MBAB◇◇35E3
		20	0,12	1000	4300	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1HPF101MCAC◇◇50SE3
		24	0,12	1000	2150	679*	125	10 x 12,5	2 000	200	PC HPK PK	PCR1HPK101MCAC◇◇50E3
	120	20	0,12	1200	4300	-	105	10 x 12,5	3 000	300	PC HPF PF	PCR1HPF121MCAC◇◇50SE3

*Under certain conditions the currents can reach the value of 105°C. Please ask your Jianghai Europe Sales Office for approval.

ORDER CODE SOLID POLYMER RADIAL TYPE



PC	R	1V	PF	101	M	CAC	LL	50	-	S	E3	JExxxx	
Techno-logy	Terminal Type	Rated Voltage Code	Series Code	Capa-citance Code (µF)	Capacitance Tolerance	Size Code (ΦDxL)	Lead Form	Pitch	Material Code	Rubber Code	for internal use	for Specials only	
PC = Polymer Capacitor	Radial R	2,0V OD	HCN CN	0,1 OR1	±20% M	D05 4,0 x 5,7	Taped FF	2,0 mm 20	Standard -	Standard -			
		2,5V OE	HCS CS	0,47 R47		±10% K	D07 4,0 x 7,0	Long Lead LL	2,5 mm 25	Laminated W	Flat Rubber F		
		4V OG	HEG EG	1,0 010		+30/-10% Q	E05 5,0 x 5,7	Cut 5,0 mm CB	3,5 mm 35	PVC Sleeve P	Stand-Off S		
		6,3V OJ	HEL EL	2,2 2R2	■ preferred	E07 5,0 x 7,0	Cut 4,5 mm CC	5,0 mm 50					
		6,8V O6	HEN EN	47 470		S09 5,5 x 9,0	Cut 4,0 mm CD						
		7,0V O7	HGN GN	100 101		S11 5,5 x 11,0	Cut 3,5 mm CE						
		7,5V 75	HPF PF	1000 102		F05 6,3 x 5,7	Cut 3,0 mm CF						
		10V 1A	HPK PK			F06 6,3 x 6,7							
		12,0V A1	HPN HN			F07 FF50 6,3 x 7,0							
		12,5V 1B	HPNA NA			F08 6,3 x 8,0							
		16V 1C	HSN SN			F09 6,3 x 9,0							
		20V 1D				F10 6,3 x 10,0							
		25V 1E				B05 8,0 x 5,7							
		28V L1				B06 8,0 x 6,7							
		32V 1F				B07 8,0 x 7,0							
		35V 1V				B08 8,0 x 8,0							
		40V 1G				B09 8,0 x 9,0							
		50V 1H				B10 8,0 x 10,0							
		63V 1J				B11 8,0 x 11,0							
		80V 1K				BAB 8,0 x 11,5							
		100V 2A			B12 8,0 x 12,0								
		125V 2B			BAC 8,0 x 12,5								
		160V 2C			B13 8,0 x 13,0								
		180V 2K			C08 10 x 8,0								
		200V 2D			C09 10 x 9,0								
					C10 10 x 10,0								
					C11 10 x 11,0								
			CAB 10 x 11,5										
			C12 10 x 12,0										
			CAC 10 x 12,5										
			C13 10 x 13,0										

INTRODUCTION SOLID POLYMER CAPACITORS

Aluminum solid electrolyte capacitors with conductive polymer are wound aluminum electrolytic capacitors that use a polythiophene electrolytic system. The conductive polymer yields extremely low ESR-values that allow for very high ripple currents at high frequencies. Typically, these types of capacitors are used in smoothing circuits of DC-DC converters and in high-frequency applications. Polymer Capacitors from Jianghai has been enlarged to voltages up to 200V, which allows the usage in many power supply applications too.

COMPARISON OF SOLID POLYMER CAPACITORS AND LIQUID ELECTROLYTIC CAPACITORS

Besides the excellent lifetime performance, the temperature characteristics of polymer capacitors allow for a usage in a wide range of ambient temperatures. Temperatures in the range from -55°C to 105°C lead merely to capacitance changes from 10...15%, while the ESR remains almost constant. Especially the stability of its low ESR-values makes the polymer capacitor attractive for smoothing circuits or for decoupling functions. Compared to tantalum electrolytic capacitors, polymer capacitors offer a more reliable solution with a similar functionality.

HYBRID POLYMER CAPACITORS

Hybrid Polymer Capacitors combine the technology of Solid Polymer Capacitors and Liquid Electrolytic Capacitors. As a result Hybrid Capacitors follow the rules of both technologies. Please consider carefully the Handling Precautions for Liquid Aluminum Electrolytic Capacitors (page: 10) and Solid Polymer Capacitors (page: 165) together. The lifetime of Hybrid Polymer Capacitors follows roughly the rules of Arrhenius like for Liquid Aluminum Electrolytic Capacitors, while the limitations of voltages and currents of the Polymer technology need to be applied. For details please contact Jianghai Europe.

LIFETIME ESTIMATION SOLID POLYMER CAPACITORS

In analogy to liquid electrolytic capacitors also solid polymer capacitors do have a lifetime. The characteristics differs from liquid capacitors in many ways. In the datasheets there are ripple currents defined. Anyway, most lifetime models do not include the currents for estimating the lifetime. The established lifetime models typically are based on voltage-temperature tests without any additional currents applied. As the capacitors are used in many cases under load conditions, where ripple currents are found, the many lifetime models do not meet well the real usage condition.

Jianghai defines for solid polymer capacitors different life times. Please take care when capacitors are compared, that the capacitors fulfill the needed requirements.

Endurance Lifetime L_e defines the acceptable drift criteria of the capacitor parameters, when the rated voltage is applied at the upper category temperature, without adding any ripple currents.

Operational Lifetime L_o defines the acceptable drift criteria of the capacitor parameters, where the max. allowed ripple current is applied at the upper category temperature together with a DC voltage. The sum of this DC voltage and peak of the applied ripple voltage must not exceed the rated voltage.

$$L = L_0 \cdot 10^{\frac{T_0 - T_A + 20K \cdot \left[1 - \left(\frac{I_A}{I_{max}} \right)^2 \right]}{20K}}$$

Where

- L Lifetime
- L_0 Operational Lifetime
- T_0 Rated Temperature, Upper Category Temperature
- T_A Ambient Temperature
- I_A Actual Rated Ripple Current (at 100kHz)
- I_{max} Max. Allowed Ripple Current (databook value)

For Polymer Capacitors of 125°C temperature class:

Please consult Jianghai Europe for life time calculation and consider the current derating for temperatures > 105°C.

HANDLING PRECAUTIONS SOLID POLYMER

Please see "General Handling Precautions" for Aluminum Electrolytic Capacitors on page 13 ff..

Additional requirements for aluminum solid electrolyte capacitors with conductive polymer:

- 1) Solid polymer capacitors do have a polarity. Never allow a reverse or negative voltage.
- 2) Over-voltages higher than the rated voltage will destroy the capacitors and must be avoided. The sum of DC voltage and the ripple voltage peak must not exceed the rated voltage.
- 3) If the rated voltage is low, take care that any negative ripple voltage peak does not become a reverse voltage. The minimum peak ripple voltage should be larger than $0,1 \cdot U_r$.
- 4) Leakage Currents might increase as consequence of longer storage, critical soldering processes, overload conditions, heavy charging/discharging, mechanical stress. Please note that solid polymer capacitors need a longer time for an internal repair than liquid capacitors. An increase of the leakage current shall be taken as an indication of a possible damage and should be avoided generally. It is essential to ensure a correct soldering profile. Please follow the recommendation of Jianghai page 169. In case of any questions please contact Jianghai Europe.
- 5) Polymer Capacitors cannot be used:
 - in circuits with frequent and/or rapid charging and discharging function,
 - in time-constant or coupling circuits,
 - in high impedance circuits or applications, where the leakage current affects the circuit operation,
 - after heavy thermal stress during soldering as the capacitance and leakage current may change,
 - under mechanical stress. Avoid mechanical vibration and shock.
 - in applications with heavy discharges / negative transients higher than 20% of U_r .
- 6) Ripple currents above the specified rating must be avoided as they may damage the capacitor.
- 7) Serial connections shall be avoided to prevent possible overvoltage conditions.
- 8) When parallel connections between polymer capacitors are planned, please take proper current balancing into account.
- 9) Use a protection circuit when the inrush current exceeds 10A. Especially higher voltage capacitor might need an individual protection against high inrush currents.
- 10) Always consider the safety when designing circuits. Plan for worst case failures such as short circuits and open circuits.
- 11) Protect Polymer capacitors from short-circuiting. Such high currents might destroy the capacitor and in rare case ignite the rubber inside the capacitor.
- 12) Laminated capacitors need to be handled like non-isolated components. Please take care of a completely separation of the lead wires and the case of the capacitor.
- 13) Without written consent by Jianghai, Polymer capacitors should not be used in highly reliable or life sustaining applications such as: medical equipment, aviation/aerospace equipment, automotive and nuclear applications and others, where a capacitor failure may have a major impact.
- 14) Environmental restrictions: please follow carefully all restrictions valid for liquid electrolytic capacitors, described in the "General Handling Precautions" at page 10. In addition any contact with water, especially salt water and/or oil must be avoided. In the same way the usage of polymer capacitors in places with higher concentration of noxious gases like hydrogen sulfide, sulfide acid, chlorine, ammonia and other is not allowed. Protect the capacitors against radiation, especially ultraviolet rays. If a circuit board cleaning is planned, please contact Jianghai Europe for approval of the cleaning process to avoid damages of the capacitors.
- 15) Never reuse capacitors if they have been assembled and energized already.
- 16) Do not drop capacitors or apply any mechanical shock. If this has happened, please do not use them anymore.
- 17) Storage: Do not store the capacitors at high temperature or high humidity, without any direct sunlight. Please keep the temperature in a range of 5°C to 35°C and a relative humidity less than 75%. In order to keep a good solder ability, store the capacitors in its plastic bags. The maximum storage time shall be limited to one year.
- 18) For Polymer Capacitors of 125°C temperature class current deratings for temperatures > 105°C might be necessary. Please check carefully the individual datasheet.

HANDLING PRECAUTIONS FOR ALUMINUM ELECTROLYTIC CAPACITORS FROM JIANGHAI

WARNING

JIANGHAI is not liable for any extent of possible injuries or damages to persons or things, of any kind, caused by the improper application of and/or operating conditions harmful to electrolytic capacitors. Misapplications which may cause failures include, but are not limited to: ripple current or peak current or voltage above specification, operating voltage above surge voltage specified, temperature exposure outside the specified operating temperature range. Examples of harmful operating conditions comprise, but are not limited to: unusual storage or transport temperatures, excessive and/or rapid changes of ambient temperature or humidity, heavy mechanical shock or vibration, corrosive and abrasive particles in the ambient (cooling) air, conducting dust in the ambient (cooling) air, oil or water vapor or corrosive substances, explosive gas or dust, operation under extremely high or low ambient pressure conditions (below or above sea level), superimposed radio frequency voltages, radioactivity. In case of doubt about the impact of operating conditions on capacitor performance, please contact JIANGHAI.

PERSONAL SAFETY

Electrical or mechanical misapplication of electrolytic capacitors may be hazardous. Personal injury or property damage may result from explosion of a capacitor or from the expulsion of electrolyte due to mechanical disruption or the release of a safety vent of a capacitor. In case of injury or skin or eye exposure to electrolyte, immediately seek professional medical advice. Before using electrolytic capacitors in any application, please read these Handling Precautions, familiarizing thoroughly with the information contained herein. Please check before using any of our electrolytic capacitors if these components fulfill the requirements of your application and that warnings and instructions for use are followed.

WARRANTY

The information contained in this catalogue does not form part of any quotation or contract, is believed to be accurate, reliable and up to date. Quality data are based on the statistical evaluations of a large quantity of parts and do not constitute a guarantee in a legal sense. However, agreement on these specifications does mean that the customer may claim for replacement of individual defective capacitors within the terms of delivery. We will not assume any liability beyond the replacement of defective components. This applies in particular to any consequential damage caused by component failure. Furthermore it must be taken into consideration that the figures stated for lifetime, failure rates and outlier percentages refer to the average production status and are therefore to be understood as mean values (statistic expectations) for a large number of delivery lots of identical capacitors. These figures are based on application experience and data obtained from preceding tests under normal conditions, or – for purpose of accelerated aging – more severe conditions. JIANGHAI reserves the right to change these specifications without prior notice. Any application information given is advisory and does not form part of any specification. The products are not primarily designed for use in life support applications, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. JIANGHAI customers using or selling these products for use in such applications without prior written consent of JIANGHAI do so at their own risk and agree fully to indemnify JIANGHAI for any damage resulting from such improper use or sale. This version of the catalogue supersedes all previous versions. Latest versions of datasheets can be found on our homepage: www.jianghai-europe.com. For more details on precautions and guidelines for aluminum electrolytic capacitors, please refer to CENELEC Technical Report CLC/TR 50454:2008 E, "Guide for the application of aluminum electrolytic capacitors".

POLARITY

Electrolytic capacitors are polar and shall never be used with incorrect polarity, as there is a possible danger of shorting or destruction.

RATED VOLTAGE U_R

The rated voltage is marked on the capacitor and defined in the datasheets as U_R . This voltage should never be exceeded and is the maximum peak voltage including any ripple voltages allowed to avoid a shortening of the lifetime or damage of the capacitor. When a ripple current is applied to the capacitor, the sum of the peak ripple voltage and bias DC voltage shall never exceed the rated voltage. It might be necessary to lower the maximum allowed bias DC voltage, when certain ripple currents are applied to the capacitor.

SURGE VOLTAGE

Maximum voltage, which may be applied to the capacitor for short periods of time: max. 1000 cycles of 30 sec. per 6 min., max. 5 pulses per hour. Capacitance drift +/- 15% max.

REVERSE VOLTAGE

Reverse voltages or voltages < 0V are not allowed.

RECOVERY VOLTAGE

Electric potential between the positive and negative terminal may exist as a result of dielectric absorption. Please take action that this load does not damage other devices or scare workers during the production process (sparks possible). If needed please discharge the capacitor through a 1k Ω resistor.

TEMPERATURE RANGE

Use electrolytic capacitors only within the specified operating temperature range.

OVER-CURRENT

Currents exceeding the rated ripple currents should be avoided.

RIPLLE CURRENT/VOLTAGE

The combined value of DC voltage and peak AC voltage (due to ripple current) shall not exceed the rated voltage and shall never be < 0V. Use of aluminum electrolytic capacitors under ripple current with wide amplitudes is equivalent to rapid charge-discharge operation.

RAPID CHARGING/DISCHARGING

Rapid charging/discharging generates severe heat and gas may be emitted which may lead to explosion. Consult JIANGHAI about specially designed capacitors suitable for such kind of applications. Example: Servo Drive Application

BALANCING RESISTORS

Balancing resistors should be utilized if capacitors are used in serial connection. Please choose low-tolerance resistors to limit voltage drift.

CHARGE-DISCHARGE PROOF

JIANGHAI capacitors are charge-discharge proof, which means that 10⁶ switching cycles will cause capacitance reduction of less than 10%.

LIFETIME

There are many different lifetime definitions known without any true standard definition. Take special care when capacitors are compared that the capacitors fulfill the needed requirements. JIANGHAI publishes all conditions to be as transparent as possible. In the case of lifetime tests with additional ripple currents, the bias DC voltage must be reduced, so that the sum of bias DC voltage and the peak of the ripple voltage does not exceed the Rated Voltage U_R .

Load life: Period of time, during which the technical parameters of all capacitors stay within the given limits. JIANGHAI defines this without allowing for outliers.

Useful life: Defined like load life, but with a larger range of parameter change.

Endurance test: IEC 60384-4 defines the acceptable drift criteria of electrical parameters after the endurance tests (continuous voltage test).

Shelf Life: Definition of time with acceptable drift of capacitor parameters after storage at upper category temperature without load.

VIBRATION AND MECHANICAL STRESS

Capacitors are sensitive to vibration and mechanical forces applied on the leads. Do not use capacitors, which have been dropped onto a rigid surface.

INSULATION

If any defect of the sleeve is visible, the component should not be used – the same holds for any kind of visible damage. A capacitor should be electrically isolated from the following parts: aluminum case, cathode lead wire, anode lead wire and circuit pattern, and auxiliary terminal of snap-in type. The sleeve is not recognized as an isolator and therefore the standard capacitor should not be used in a place where insulation function is needed. Please contact JIANGHAI if a higher grade of insulation is required.

ENVIRONMENTAL CONDITIONS

Avoid direct contact with water, salt solution, oil, dewing conditions. Halogens generally, especially fumigation treatment with bromides and flame retardant agents containing halogens must be avoided. Avoid exposing to direct sunshine, ozone, ultraviolet rays and x-ray radiation. Air Pressure: Max. 150kPa, min. 8kPa. For usage >2000m altitude above sea level current deratings might be necessary. No heavy air pressure changes are allowed. Do not use or store in an environment containing any hazardous gas (e.g., hydrogen sulphide, sulphurous acid, nitrous acid, chlorine, ammonia, bromine, methyl bromide, other halogens) or acidic or alkaline solutions.

STORAGE

Temperature 5 to 35°C, relative humidity below 75%. Electrolytic capacitors may accumulate charge naturally during storage. In this case discharge through a 1k Ω resistor before use (Recovery voltage). Leakage current may be increased after long storage time. In this case the capacitor should be subjected to the rated voltage treatment through a 1k Ω resistor before use for 1 hour, then it should be discharged through a resistor of about 1 Ohm/Volt. Storage times above 1 year should be avoided or rated voltage treatment may be necessary. In accordance to IEC 60384-4 electrolytic capacitors are subject to a reforming process before acceptance testing. Rated voltage is applied via a series resistance (100 Ω : $U_R \leq 100$ VDC, 1k Ω : $U_R > 100$ VDC).

SOLDERING

Soldering conditions (temperature, times) should be within specified conditions, especially for SMD components. Avoid high soldering temperatures as this may reduce lifetime or damage the capacitor. Do never dip the capacitor body into molten solder. Flux should not be adhered to the capacitor's body but only to its terminals. For details and different methods please contact us.

GLUEING, CLEANING AND COATING

Do not use fixing agents or cleaning substances containing halogens. Do not use coating and moulding components that completely seal the capacitor from the environment. Also, never use solvents containing: halogenated hydrocarbons, alkali, petroleum, trichloroethylene/-ethane, xylene, acetones, trichlorotrifluoroethane, tetrachloroethylene, methylenechloride, chloroform, acetates, ketones, esters, chlorides and bromides.

MOUNTING

Other devices, which are mounted near the capacitor, should not touch the capacitor. Additional heat coming from other components near the capacitor may reduce the lifetime of the capacitor. Do never bend or twist the capacitor after soldering to avoid stress on the leads. Radial capacitors are not protected against mechanical forces on the leads. Forces on the pins might damage the capacitor. No printed circuit board tracks are allowed between the lead pads of the capacitor. Screw Terminal capacitors should only be mounted in an upright position.

TRANSPORT

Avoid fumigation and spraying insecticides (especially with bromides) in the import or export procedures which can cause corrosion. This applies also to the finished devices.

MAINTENANCE

Periodical inspection should be carried out for the capacitor: visual inspection to check pressure relief open or leakage of electrolyte, electrical characteristics as leakage current, capacitance, and dissipation factor.

ELECTROLYTE AND SEPARATOR PAPER

Electrolyte and separator paper used in aluminum capacitors may be flammable. Also, electrolyte is electrically conductive. Therefore, in case electrolyte gets in contact with PC board it may cause corrosion of circuit pattern or cause short circuit between patterns, and may lead to smoke generation or ignition in worst case.

CAUTION DURING USE OF CAPACITORS

Do not touch the terminals of capacitors. Keep the capacitor free from conductive solution, such as acids, alkali and so on. Ensure that the operating environment of the equipment into which the capacitor has been built is within the specified conditions mentioned in the catalogue or specification sheets.

SAFETY VENT

The safety vent needs some free space to open properly. Allow for free headroom of at least 2mm for diameter ≤ 16 mm, more than 3mm for diameter 18-35mm, more than 5mm for case diameter 40mm and larger.

EMERGENCY ACTIONS

When the pressure relief vent is open and some gas blows out from the capacitor, please turn the main switch of the equipment off or pull out the plug from the power outlet immediately. During safety vent operation, extremely hot gas ($>100^{\circ}\text{C}$) may blow out of the capacitors. Do not stand close to the capacitors. In case of eye contact, rinse the open eye(s) with clean water immediately. In case of ingestion, gargle with water immediately, do not swallow. Do not touch electrolyte but wash skin with soap and water in case of skin contact.

DEFINITION OF ELECTRICAL PARAMETERS

Separate documents as application notes, equivalent circuit diagrams and so on are available on request.

PACKAGING

Please refer to the data book for details. Further information is available on request.

DISPOSAL

Scrapped capacitors are classified as scrapped metal. For disposal they are handled as controllable industrial waste because of the nature of the contents (electrolyte). Most of the material is aluminum and cannot be completely burned.

Jianghai Europe Electronic Components GmbH

VERSION 10/2021