

RM Series 105°C

Features

Long useful life

Applications

- ◆ Frequency converters
- ◆ Professional power supplies
- ◆ Hybrid electric vehicles(HEV)
- ◆ Traction

Features

- ◆ High reliability
- ◆ Extremely high ripple current capability
- ◆ Wide temperature range
- ◆ All-welded construction ensures reliable electrical contact
- ◆ low-inductance design
- ◆ Self-extinguishing electrolyte
- ◆ long useful life
- ◆ RoHS-compatible

Construction

- ◆ Charge-discharge proof, polar
- ◆ Aluminum case with insulating sleeve
- ◆ Poles with screw terminal connections
- ◆ Mounting with ring clips, clamps or threaded stud

Specifications

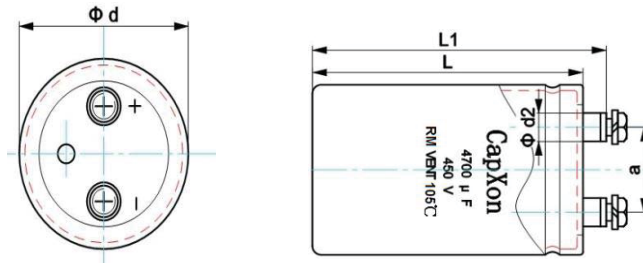
Item	Performance Characteristics							
Operating Temperature Range	-40 to +105°C(160Vdc~450Vdc) -25 to +105°C(500Vdc)							
Rated voltage V_R	160 to 500 V DC							
Surge voltage V_S	$V_R \leq 315V$ 1.15 V_R $V_R > 315V$ 1.10 V_R							
Rated capacitance C_R	180 to 68000 μF							
Capacitance tolerance	$\pm 20\%$ (120Hz,+20°C)							
Leakage Current I_{leak} (+20°C,max.)	$I_{leak} = 0.018 * (C * V)^{0.85} + 4$ or 5mA, whichever is smaller (after 5 minutes) Where, I_{leak} : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)							
Dissipation Factor (tan δ ,at 20°C,120Hz)	Less than the value under table(%)							
	Working Voltage(VDC)	<table border="1"> <tr> <td>160~450</td> <td>500~550</td> </tr> <tr> <td>D.F. (%)max.</td> <td>15 20</td> </tr> </table>	160~450	500~550	D.F. (%)max.	15 20		
160~450	500~550							
D.F. (%)max.	15 20							
Self-inductance ESL	d = 51 mm: approx. 16 nH							
	d \geq 63.5 mm: approx. 18 nH							
	Capacitors with low-inductance design: d \geq 63.5 mm: approx. 14 nH							
Useful life 105 °C; $V_R, I_{AC,R}$	>6000 h	Requirements: $\Delta C/C \leq 15\%$ of initial value ESR ≤ 1.75 times initial specified limit $I_{leak} \leq$ initial specified limit Failure rate : $\leq 1\%/1000$ hour						
	2000 h	Post test requirements: DC/C $\leq 10\%$ of initial value ESR ≤ 1.3 times initial specified limit $I_{leak} \leq$ initial specified limit						
Vibration Resistance test	To IEC 60068-2-6, test Fc: Displacement amplitude 0.75 mm, frequency range 10 ... 55 Hz, acceleration max. 10 g, duration 3×2 h. Capacitor mounted by its body which is rigidly clamped to the work surface.							
Characteristics at lowtemperature	Max. impedance ratio at 120 Hz							
	$V_R(V)$	<table border="1"> <tr> <td>160~450</td> <td>≥ 500</td> </tr> <tr> <td>$Z_{-25^\circ C} / Z_{20^\circ C}$</td> <td>4</td> </tr> <tr> <td>$Z_{-40^\circ C} / Z_{20^\circ C}$</td> <td>10</td> </tr> </table>	160~450	≥ 500	$Z_{-25^\circ C} / Z_{20^\circ C}$	4	$Z_{-40^\circ C} / Z_{20^\circ C}$	10
	160~450	≥ 500						
$Z_{-25^\circ C} / Z_{20^\circ C}$	4							
$Z_{-40^\circ C} / Z_{20^\circ C}$	10							
Sectional specification	IEC 60384-4 and JIS-C-5101							

Multiplier for Ripple Current vs. Frequency

Frequency(Hz)	50	120	300	1K	$\geq 3K$
Multiplier	0.8	1	1.2	1.3	1.4

Dimensional drawings

Ring clip/clamp mounting:



M5:Min.reach of screw = 8mm
M6:Min.reach of screw = 12mm

Dimensions

Terminal	Dimensions(mm) with insulating sleeve				
	d±2	L±3	L ₁ ±3	d ₂ max.	a±0.5
M5	35	50~120	56.5~126.5	10.3	12.7
M5	51	80~140	86.5~146.5	10.3	22
M5	63.5	80~140	86.5~146.5	10.3	28.6
M5	76.2/89	100~240	106.4~246.5	10.3	31.8
M6	76.2/89	100~240	106.4~246.5	17.5	31.8
M6	100	100~240	110~250	17.5	41.5

Packing

Capacitor diameter d(mm)	length l(mm)	Packing units (pcs.)
35	≤70mm	120
	>70mm	60
42	≤70mm	120
	>70mm	60
51	≤70mm	70
	>70mm	35
63.5	all	24
76.2	all	15
89	all	12
100	all	6

Packing of screw



Accessories

The following items are included in the delivery package, but are not fastened to the capacitors.

	Thread	Maximum torque
For terminals	M5	2 Nm
	M6	2.5 Nm
For mounting	M12	10 Nm

Case Size

WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/85°C /120Hz)	Typ. ESR 20°C 120Hz mΩ	MAX ESR 20°C 120Hz mΩ
160	470	35×50	1.1	230	420
160	560	35×50	1.3	200	360
160	680	35×50	1.4	160	290
160	820	35×50	1.5	130	240
160	1000	35×50	1.6	110	200
160	1200	35×60	2	94	170
160	1500	35×60	2.2	72	130
160	1800	35×80	2.6	61	110
160	2200	35×80	2.9	50	90
160	2700	35×100	3.4	41	74
160	3300	51×75	3.9	33	60
160	3900	51×75	4	28	51
160	4700	51×96	4.7	24	42
160	5600	51×96	5.2	20	36
160	6800	51×120	6.2	16	29
160	6800	63.5×96	6.2	16	29
160	8200	63.5×96	7.1	13	24
160	10000	63.5×120	8.5	11	20
160	10000	76.2×96	8.5	11	20
160	12000	76.2×100	9.5	9.2	17
160	15000	76.2×120	11.5	7.4	13
160	18000	76.2×140	13.5	6.1	11
160	22000	76.2×140	14	5.0	9.0
160	22000	89×130	14.8	5.0	9.0
160	27000	89×140	16.1	4.1	7.5
160	33000	89×140	16.6	3.3	7.0
160	47000	89×220	17.5	3.0	6.5
160	68000	100×250	19.3	2	6.0
200	330	35×50	1	330	600
200	390	35×50	1.1	280	510
200	470	35×50	1.2	230	420
200	560	35×50	1.4	200	360
200	680	35×50	1.5	160	290
200	820	35×50	1.6	130	240
200	1000	35×60	1.8	110	200
200	1200	35×60	2.1	94	170
200	1500	35×80	2.3	72	130
200	1800	35×80	2.7	61	110
200	2200	35×100	3.1	50	90
200	2200	51×75	3.2	50	90
200	2700	35×120	3.7	41	74
200	2700	51×96	3.7	41	74
200	3300	51×80	4.2	33	60
200	3900	51×100	5	28	51
200	4700	51×140	5.8	24	42
200	4700	63.5×96	5.4	24	42
200	5600	63.5×96	5.9	20	36
200	6800	63.5×115	7	16	29
200	8200	63.5×120	7.7	13	24
200	10000	76.2×115	9.7	11	20
200	12000	76.2×120	10.3	9	17
200	15000	76.2×140	11.6	7	13
200	15000	89×130	12.3	7	13
200	18000	89×140	13.6	6	11
200	22000	76.2×160	14	5.0	9
200	22000	89×140	15.2	5.0	9
200	33000	89×220	16.6	3.5	6
200	47000	89×250	19.9	3.0	5
250	270	35×50	0.9	410	740
250	330	35×50	1.1	330	600

WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/85°C /120Hz)	Typ. ESR 20°C 120Hz mΩ	MAX ESR 20°C 120Hz mΩ
250	390	35×50	1.2	280	510
250	470	35×50	1.3	230	420
250	560	35×50	1.5	200	360
250	680	35×60	1.6	160	290
250	820	35×80	1.7	130	240
250	1000	35×80	1.9	110	200
250	1200	35×80	2.2	94	170
250	1500	35×100	2.4	72	130
250	1500	51×75	2.5	72	130
250	1800	35×120	2.8	61	110
250	1800	51×75	2.8	61	110
250	2200	51×96	3.3	50	90
250	2700	51×100	3.8	41	74
250	3300	51×120	4.3	33	60
250	3300	63.5×96	4.3	33	60
250	3900	51×120	5.1	28	51
250	3900	63.5×96	4.7	28	51
250	4700	63.5×115	5.8	24	42
250	5600	63.5×120	6.4	20	36
250	6800	76.2×115	7.8	16	29
250	8200	76.2×120	8.5	13	24
250	10000	76.2×140	10.1	11	20
250	10000	89×140	10.3	11	20
250	12000	89×140	12	9	17
250	15000	89×157	12.6	7	13
250	22000	89×220	15.5	5.0	9
250	33000	100×250	17.1	3.3	6
315	180	35×50	0.8	620	1110
315	220	35×50	1	500	900
315	270	35×50	1.1	410	740
315	330	35×50	1.2	330	600
315	390	35×50	1.3	280	510
315	470	35×60	1.5	230	420
315	560	35×55	2.5	200	360
315	680	35×65	3	160	290
315	820	35×75	3.4	130	240
315	1000	35×80	3.9	110	200
315	1200	35×100	4.6	94	170
315	1500	51×70	5.5	72	130
315	1800	51×75	6.1	61	110
315	2200	51×90	7.3	50	90
315	2700	51×100	8.5	41	74
315	3300	63.5×85	10	33	60
315	3900	63.5×96	11.4	28	51
315	4700	76.2×85	13.2	24	42
315	5600	76.2×96	15.1	20	36
315	6800	76.2×110	17.7	16	29
315	8200	89×100	17.8	13	24
315	10000	89×115	20.2	11	20
350	180	35×50	0.9	620	1110
350	220	35×50	1.1	500	900
350	270	35×50	1.2	410	740
350	330	35×50	1.3	330	600
350	390	35×60	1.4	280	510
350	470	35×55	2.3	230	420
350	560	35×60	2.6	200	360
350	680	35×70	3.1	160	290
350	820	35×80	3.5	130	240
350	1000	35×90	4.1	110	200
350	1000	51×75	4.3	110	200

Case Size

WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/85°C /120Hz)	Typ. ESR 20°C 120Hz mΩ	MAX ESR 20°C 120Hz mΩ	WV (Vdc)	Cap (uF)	Size mm	Rated Ripple current (Arms/85°C /120Hz)	Typ. ESR 20°C 120Hz mΩ	MAX ESR 20°C 120Hz mΩ
350	1200	51×65	4.7	94	170	400	15000	89×200	29.7	7	13
350	1500	51×75	5.6	72	130	450	220	35×50	1.2	500	900
350	1800	51×85	6.5	61	110	450	330	35×55	1.9	330	600
350	2200	51×100	7.7	50	90	450	390	35×65	2.3	280	510
350	2700	51×105	8.7	41	74	450	470	35×75	2.6	230	420
350	2700	63.5×80	8.8	41	74	450	560	35×80	2.9	200	360
350	3300	51×130	10.1	33	60	450	680	35×100	3.6	160	290
350	3300	63.5×96	10.1	33	60	450	680	51×80	3.8	160	290
350	3900	63.5×105	11.2	28	51	450	820	35×110	4.2	130	240
350	3900	76.2×80	11.8	28	51	450	1000	51×80	4.7	110	200
350	4700	63.5×130	12.7	24	42	450	1200	51×90	5.4	94	170
350	4700	76.2×96	13.3	24	42	450	1500	51×90	5.85	72	130
350	5600	63.5×130	14.2	20	36	450	1500	51×105	6.8	72	130
350	5600	76.2×105	15.7	20	36	450	1500	63.5×80	7	72	130
350	6800	76.2×125	18.7	16	29	450	1800	51×130	7.8	61	110
350	6800	89×120	18.8	16	29	450	1800	63.5×96	7.8	61	110
350	8200	76.2×143	19	13	24	450	2200	63.5×96	8.6	50	90
350	8200	89×115	18.9	13	24	450	2700	63.5×118	10.2	41	74
350	10000	76.2×160	19.5	11	20	450	2700	76.2×96	10.7	41	74
350	10000	89×140	21	11	20	450	3300	63.5×145	11.5	33	60
350	12000	76.2×190	24.8	9	17	450	3300	76.2×120	11	33	60
350	12000	89×145	25.7	9	17	450	3300	89×97	13.1	33	60
350	15000	76.2×220	29.1	7	13	450	3900	76.2×130	13.4	28	51
350	15000	89×170	29.6	7	13	450	3900	89×120	14.9	28	51
350	18000	89×200	33.2	6	11	450	4700	76.2×120	14.5	24	42
400	180	35×50	1	620	1110	450	4700	89×120	16.7	24	42
400	220	35×50	1.2	500	900	450	5600	76.2×160	15.9	20	36
400	270	35×50	1.3	410	740	450	5600	89×120	15.4	20	36
400	330	35×60	1.5	330	600	450	6800	76.2×160	19.1	16	29
400	390	35×55	2.1	280	510	450	6800	89×140	19.2	16	29
400	470	35×60	2.4	230	420	450	8200	76.2×220	23.1	13	24
400	560	35×70	2.8	200	360	450	8200	89×170	23.7	13	24
400	680	51×80	3.7	160	290	450	10000	89×200	24	11	20
400	820	35×90	3.7	130	240	500	330	51×80	2.8	440	800
400	1000	51×65	4.4	110	200	500	470	51×60	2.7	310	560
400	1200	51×75	5	94	170	500	680	51×80	4.1	220	390
400	1500	51×80	5.8	72	130	500	820	51×85	4.3	180	320
400	1800	51×96	7	61	110	500	1000	51×105	4.8	150	270
400	2200	51×115	8.1	50	90	500	1200	51×120	6	120	220
400	2200	63.5×85	8.2	50	90	500	1200	63.5×85	5.8	120	220
400	2700	51×130	9.4	41	74	500	1500	51×130	7	100	180
400	2700	63.5×96	9.3	41	74	500	1500	63.5×96	7.1	100	180
400	3300	63.5×105	10.8	33	60	500	1800	63.5×105	7.9	83	150
400	3300	76.2×105	11.3	33	60	500	2200	63.5×130	9.4	67	120
400	3900	63.5×118	11.8	28	51	500	2200	76.2×96	9.5	67	120
400	3900	76.2×105	12.3	28	51	500	2700	63.5×145	10.3	55	98
400	4700	63.5×143	13.5	24	42	500	2700	76.2×105	10.8	55	98
400	4700	76.2×105	14.4	24	42	500	2700	89×97	11.6	55	98
400	4700	89×97	14.9	24	42	500	3300	63.5×170	13	45	80
400	5600	63.5×195	17.2	20	36	500	3300	76.2×130	12.2	45	80
400	5600	76.2×130	15.8	20	36	500	3300	89×120	13.4	45	80
400	5600	89×96	15.3	20	36	500	3900	76.2×145	13.5	38	68
400	6800	76.2×143	19	16	29	500	3900	89×120	15	38	68
400	6800	89×115	18.9	16	29	500	4700	76.2×170	16	31	56
400	8200	76.2×170	20.6	13	24	500	4700	89×145	16.8	31	56
400	8200	89×130	19.3	13	24	500	5600	76.2×220	18.1	26	47
400	10000	76.2×190	21.8	11	20	500	5600	89×150	17.9	26	47
400	10000	89×160	22	11	20	500	6800	89×170	20.8	22	39
400	12000	76.2×220	27	9	17	500	8200	89×220	25.6	18	32
400	12000	89×180	26	9	17	500	10000	89×250	30	15	27

Useful life

depending on ambient temperature T_a versus under ripple current operating conditions

