SMQ Series

- Downsized from current standard SMG series
- Endurance : 2,000 hours at 85℃
- Non solvent resistant type
- RoHS2 Compliant

SMQ
↑ Downsized
SMG

◆SPECIFICATIONS

Items	Characteristics
Category Temperature Range	-40 to +85℃(6.3 to 400V$_{dc}$) -25 to +85℃(450V$_{dc}$)
Rated Voltage Range	6.3 to 450V$_{dc}$
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)
Leakage Current	6.3 to 100V$_{dc}$: I=0.03CV or 4μA, whichever is greater. 160 to 450V$_{dc}$: CV≦1,000 I=0.1CV+40 max.; CV>1,000 I=0.04CV+100 max. Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20℃ after 1 minute)

Dissipation Factor (tan δ)

Rated voltage (V$_{dc}$)	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	315 to 400V	450V
tan δ (Max.)	0.28	0.24	0.20	0.16	0.14	0.12	0.09	0.08	0.20	0.24	0.24

When nominal capacitance exceeds 1,000μF, add 0.02 to the value above for each 1,000μF increase. (at 20℃, 120Hz)

Low Temperature Characteristics (Max. Impedance Ratio)

Rated voltage (V$_{dc}$)		6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 200V	250V	350V	400V	450V
Z(-25℃)/Z(+20℃)	≦φ8	5	4	3	2	2	2	2	2	3	3	4	4	6
	≧φ10	5	4	3	2	2	2	2	2	3	3	4	4	6
Z(-40℃)/Z(+20℃)	≦φ8	12	10	8	5	4	3	3	3	8	10	8	8	—
	≧φ10	12	10	8	5	4	3	3	3	4	4	6	6	—

(at 120Hz)

Endurance

The following specifications shall be satisfied when the capacitors are restored to 20℃ after the rated voltage is applied for 2,000 hours at 85℃.

Capacitance change	≦±20% of the initial value
D.F. (tan δ)	≦200% of the initial specified value
Leakage current	≦The initial specified value

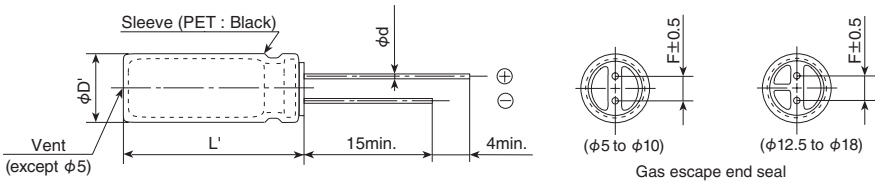
Shelf Life

The following specifications shall be satisfied when the capacitors are restored to 20℃ after exposing them for 1,000 hours at 85℃ without voltage applied. Before the measurement, the capacitor shall be preconditioned by applying voltage according to Item 4.1 of JIS C 5101-4.

Rated voltage	6.3 to 100V$_{dc}$	160 to 450V$_{dc}$
Capacitance change	≦±20% of the initial value	≦±20% of the initial value
D.F. (tan δ)	≦200% of the initial specified value	≦200% of the initial specified value
Leakage current	≦The initial specified value	≦500% of the initial specified value

◆DIMENSIONS [mm]

● Terminal Code : E



φD	5	6.3	8	10	12.5	16	18
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
φD'	φD+0.5max.						
L'	L+1.5max.						

◆PART NUMBERING SYSTEM

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
E SMQ □□□ E □□ □□□ M □□□ □

- Supplement code
- Size code
- Capacitance tolerance code
- Capacitance code (ex. 1.0μF:1R0,10μF:100,100μF:101)
- Lead forming·taping code
- Terminal code
- Voltage code (ex. 6.3V:6R3,50V:500,100V:101)
- Series code
- Category

Please refer to "Product code guide (radial lead type)"

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SMQ Series

◆STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mArms/ 85℃, 120Hz)	Part No.
6.3	1,000	8×11.5	0.28	540	ESMQ6R3E□□102MHB5D
	2,200	10×16	0.30	890	ESMQ6R3E□□222MJ16S
	3,300	10×20	0.32	1,190	ESMQ6R3E□□332MJ20S
	4,700	12.5×20	0.34	1,550	ESMQ6R3E□□472MK20S
	6,800	12.5×25	0.38	1,920	ESMQ6R3E□□682MK25S
	10,000	16×25	0.46	2,350	ESMQ6R3E□□103ML25S
	15,000	16×31.5	0.56	2,550	ESMQ6R3E□□153MLN3S
	22,000	18×35.5	0.70	3,200	ESMQ6R3E□□223MMP1S
10	220	5×11	0.24	240	ESMQ100E□□221ME11D
	330	6.3×11	0.24	290	ESMQ100E□□331MF11D
	470	6.3×11	0.24	350	ESMQ100E□□471MF11D
	1,000	10×12.5	0.24	650	ESMQ100E□□102MJC5S
	2,200	10×16	0.26	990	ESMQ100E□□222MJ16S
	3,300	12.5×20	0.28	1,450	ESMQ100E□□332MK20S
	4,700	12.5×25	0.30	1,800	ESMQ100E□□472MK25S
	6,800	16×25	0.34	2,250	ESMQ100E□□682ML25S
	10,000	16×31.5	0.42	2,550	ESMQ100E□□103MLN3S
	15,000	16×35.5	0.52	2,880	ESMQ100E□□153MLP1S
	22,000	18×40	0.66	3,400	ESMQ100E□□223MM40S
16	220	6.3×11	0.20	260	ESMQ160E□□221MF11D
	330	6.3×11	0.20	320	ESMQ160E□□331MF11D
	470	8×11.5	0.20	440	ESMQ160E□□471MHB5D
	1,000	10×12.5	0.20	700	ESMQ160E□□102MJC5S
	2,200	10×20	0.22	1,000	ESMQ160E□□222MJ20S
	3,300	12.5×25	0.24	1,700	ESMQ160E□□332MK25S
	4,700	16×25	0.26	2,100	ESMQ160E□□472ML25S
	6,800	16×25	0.30	2,250	ESMQ160E□□682ML25S
	10,000	16×35.5	0.38	2,710	ESMQ160E□□103MLP1S
	15,000	18×40	0.48	3,100	ESMQ160E□□153MM40S
25	100	5×11	0.16	180	ESMQ250E□□101ME11D
	220	6.3×11	0.16	280	ESMQ250E□□221MF11D
	330	8×11.5	0.16	440	ESMQ250E□□331MHB5D
	470	10×12.5	0.16	550	ESMQ250E□□471MJC5S
	1,000	10×16	0.16	860	ESMQ250E□□102MJ16S
	2,200	12.5×25	0.18	1,550	ESMQ250E□□222MK25S
	3,300	16×25	0.20	1,980	ESMQ250E□□332ML25S
	4,700	16×25	0.22	2,200	ESMQ250E□□472ML25S
	6,800	16×35.5	0.26	2,600	ESMQ250E□□682MLP1S
	10,000	18×40	0.34	2,800	ESMQ250E□□103MM40S
35	47	5×11	0.14	130	ESMQ350E□□470ME11D
	68	6.3×11	0.14	160	ESMQ350E□□680MF11D
	100	6.3×11	0.14	210	ESMQ350E□□101MF11D
	220	8×11.5	0.14	385	ESMQ350E□□221MHB5D
	330	10×12.5	0.14	490	ESMQ350E□□331MJC5S
	470	10×16	0.14	650	ESMQ350E□□471MJ16S
	1,000	12.5×20	0.14	1,150	ESMQ350E□□102MK20S
	2,200	16×25	0.16	1,800	ESMQ350E□□222ML25S
	3,300	16×31.5	0.18	2,100	ESMQ350E□□332MLN3S
	4,700	16×35.5	0.20	2,500	ESMQ350E□□472MLP1S
	6,800	18×40	0.24	2,800	ESMQ350E□□682MM40S
50	1.0	5×11	0.12	17	ESMQ500E□□1R0ME11D
	2.2	5×11	0.12	28	ESMQ500E□□2R2ME11D
	3.3	5×11	0.12	35	ESMQ500E□□3R3ME11D
	4.7	5×11	0.12	41	ESMQ500E□□4R7ME11D
	10	5×11	0.12	60	ESMQ500E□□100ME11D
	22	5×11	0.12	95	ESMQ500E□□220ME11D
	33	5×11	0.12	125	ESMQ500E□□330ME11D
	47	6.3×11	0.12	155	ESMQ500E□□470MF11D
	68	6.3×11	0.12	210	ESMQ500E□□680MF11D
	100	8×11.5	0.12	260	ESMQ500E□□101MHB5D
	220	10×12.5	0.12	430	ESMQ500E□□221MJC5S
	330	10×16	0.12	590	ESMQ500E□□331MJ16S
	470	10×20	0.12	760	ESMQ500E□□471MJ20S
	1,000	12.5×25	0.12	1,350	ESMQ500E□□102MK25S
	2,200	16×31.5	0.14	1,980	ESMQ500E□□222MLN3S
	3,300	18×35.5	0.16	2,500	ESMQ500E□□332MMP1S
63	22	5×11	0.09	100	ESMQ630E□□220ME11D
63	33	6.3×11	0.09	140	ESMQ630E□□330MF11D
	47	6.3×11	0.09	170	ESMQ630E□□470MF11D
	68	8×11.5	0.09	220	ESMQ630E□□680MHB5D
	100	8×11.5	0.09	280	ESMQ630E□□101MHB5D
	220	10×16	0.09	490	ESMQ630E□□221MJ16S
	330	10×20	0.09	710	ESMQ630E□□331MJ20S
	470	12.5×20	0.09	900	ESMQ630E□□471MK20S
	1,000	16×25	0.09	1,300	ESMQ630E□□102ML25S
	2,200	18×35.5	0.11	2,300	ESMQ630E□□222MMP1S
100	1.0	5×11	0.08	21	ESMQ101E□□1R0ME11D
	2.2	5×11	0.08	30	ESMQ101E□□2R2ME11D
	3.3	5×11	0.08	40	ESMQ101E□□3R3ME11D
	4.7	5×11	0.08	45	ESMQ101E□□4R7ME11D
	10	5×11	0.08	70	ESMQ101E□□100ME11D
	22	6.3×11	0.08	130	ESMQ101E□□220MF11D
	33	8×11.5	0.08	180	ESMQ101E□□330MHB5D
	47	8×11.5	0.08	200	ESMQ101E□□470MHB5D
	68	10×12.5	0.08	270	ESMQ101E□□680MJC5S
	100	10×16	0.08	340	ESMQ101E□□101MJ16S
	220	12.5×20	0.08	550	ESMQ101E□□221MK20S
	330	12.5×25	0.08	760	ESMQ101E□□331MK25S
	470	16×25	0.08	1,000	ESMQ101E□□471ML25S
	1,000	18×35.5	0.08	1,350	ESMQ101E□□102MMP1S
160	10	8×11.5	0.20	80	ESMQ161E□□100MHB5D
	22	10×12.5	0.20	130	ESMQ161E□□220MJC5S
	33	10×16	0.20	180	ESMQ161E□□330MJ16S
	47	10×20	0.20	210	ESMQ161E□□470MJ20S
	68	12.5×20	0.20	350	ESMQ161E□□680MK20S
	100	12.5×25	0.20	430	ESMQ161E□□101MK25S
	220	16×31.5	0.20	760	ESMQ161E□□221MLN3S
	330	18×35.5	0.20	995	ESMQ161E□□331MMP1S
	470	18×40	0.20	1,200	ESMQ161E□□471MM40S
200	1.0	6.3×11	0.20	22	ESMQ201E□□1R0MF11D
	2.2	6.3×11	0.20	33	ESMQ201E□□2R2MF11D
	3.3	6.3×11	0.20	40	ESMQ201E□□3R3MF11D
	4.7	6.3×11	0.20	50	ESMQ201E□□4R7MF11D
	10	8×11.5	0.20	80	ESMQ201E□□100MHB5D
	22	10×16	0.20	150	ESMQ201E□□220MJ16S
	33	10×20	0.20	205	ESMQ201E□□330MJ20S
	47	12.5×20	0.20	270	ESMQ201E□□470MK20S
	68	12.5×25	0.20	350	ESMQ201E□□680MK25S
	100	16×25	0.20	475	ESMQ201E□□101ML25S
	220	16×35.5	0.20	700	ESMQ201E□□221MLP1S
	330	18×40	0.20	950	ESMQ201E□□331MM40S
250	3.3	6.3×11	0.20	40	ESMQ251E□□3R3MF11D
	4.7	6.3×11	0.20	50	ESMQ251E□□4R7MF11D
	10	10×12.5	0.20	100	ESMQ251E□□100MJC5S
	22	10×20	0.20	170	ESMQ251E□□220MJ20S
	33	10×20	0.20	200	ESMQ251E□□330MJ20S
	47	12.5×20	0.20	270	ESMQ251E□□470MK20S
	68	16×25	0.20	380	ESMQ251E□□680ML25S
	100	16×25	0.20	440	ESMQ251E□□101ML25S
	220	18×35.5	0.20	680	ESMQ251E□□221MMP1S
350	2.2	6.3×11	0.24	30	ESMQ351E□□2R2MF11D
	3.3	8×11.5	0.24	46	ESMQ351E□□3R3MHB5D
	4.7	8×11.5	0.24	55	ESMQ351E□□4R7MHB5D
	10	10×12.5	0.24	90	ESMQ351E□□100MJC5S
	22	12.5×20	0.24	185	ESMQ351E□□220MK20S
	33	12.5×25	0.24	240	ESMQ351E□□330MK25S
	47	16×25	0.24	325	ESMQ351E□□470ML25S
	68	16×25	0.24	400	ESMQ351E□□680ML25S
	100	18×31.5	0.24	530	ESMQ351E□□101MMN3S
400	1.0	6.3×11	0.24	22	ESMQ401E□□1R0MF11D
	2.2	8×11.5	0.24	38	ESMQ401E□□2R2MHB5D
	3.3	8×11.5	0.24	48	ESMQ401E□□3R3MHB5D
	4.7	10×12.5	0.24	60	ESMQ401E□□4R7MJC5S
	10	10×16	0.24	90	ESMQ401E□□100MJ16S

□□ : Enter the appropriate lead forming or taping code.

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SMQ Series

◆STANDARD RATINGS

WV (V_{dc})	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mArms/ 85℃, 120Hz)	Part No.
400	22	12.5×25	0.24	205	ESMQ401E□□220MK25S
	33	16×25	0.24	275	ESMQ401E□□330ML25S
	47	16×25	0.24	280	ESMQ401E□□470ML25S
	68	16×31.5	0.24	340	ESMQ401E□□680MLN3S
	100	18×35.5	0.24	440	ESMQ401E□□101MMP1S
450	2.2	8×11.5	0.24	28	ESMQ451E□□2R2MHB5D
	3.3	10×12.5	0.24	40	ESMQ451E□□3R3MJC5S

WV (V_{dc})	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mArms/ 85℃, 120Hz)	Part No.
450	4.7	10×12.5	0.24	46	ESMQ451E□□4R7MJC5S
	10	10×20	0.24	80	ESMQ451E□□100MJ20S
	22	12.5×25	0.24	140	ESMQ451E□□220MK25S
	33	16×25	0.24	180	ESMQ451E□□330ML25S
	47	16×31.5	0.24	220	ESMQ451E□□470MLN3S
	68	18×35.5	0.24	260	ESMQ451E□□680MMP1S
	100	18×40	0.24	280	ESMQ451E□□101MM40S

□□ : Enter the appropriate lead forming or taping code.

◆RATED RIPPLE CURRENT MULTIPLIERS

◎Frequency Multipliers

Capacitance(μF) \ Frequency(Hz)	50	120	300	1k	10k	100k
1.0 to 4.7	0.65	1.00	1.35	1.75	2.30	2.50
10 to 68	0.75	1.00	1.25	1.50	1.75	1.80
100 to 1,000	0.80	1.00	1.15	1.30	1.40	1.50
2,200 to	0.85	1.00	1.03	1.05	1.08	1.08

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5℃ rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

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