

SMQ Series

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

SMQ

↑ Downsized
SMG

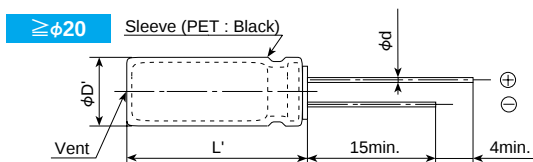
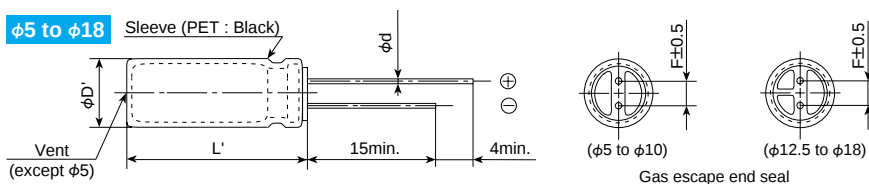


SPECIFICATIONS

Items	Characteristics														
Category															
Temperature Range	-40 to +85°C(6.3 to 400V _{dc}) -25 to +85°C(450V _{dc})														
Rated Voltage Range	6.3 to 450V _{dc}														
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)														
Leakage Current		6.3 to 100V _{dc}						160 to 450V _{dc}							
	≤φ18	I=0.03CV or 4μA, whichever is greater.						CV / Time		After 1minute					
								CV≤1,000		I=0.1CV+40 max.					
								CV>1,000		I=0.04CV+100 max.					
		(at 20C after 1 minute)										(at 20°C)			
	≥φ20	I=0.03CV						(at 20°C after 3 minutes)							
Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V)															
Dissipation Factor (tanδ)	Rated voltage (V _{dc})	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	315 to 400V	450V			
	tanδ (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°C, 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°C)/Z(+20°C)	≤φ8	5	4	3	2	2	2	2	3	3	4	4	6	
		≥φ10	5	4	3	2	2	2	2	3	3	4	4	6	
	Z(-40°C)/Z(+20°C)	≤φ8	12	10	8	5	4	3	3	8	10	8	8	—	
		≥φ10	12	10	8	5	4	3	3	4	4	6	6	—	
(at 120Hz)															
Endurance	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 2,000 hours at 85°C.														
	Capacitance change	≤±20% of the initial value													
	D.F. (tanδ)	≤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°C after exposing them for 1,000 hours at 85°C 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. (tanδ)	≤200% of the initial specified value						≤200% of the initial specified value							
	Leakage current	≤The initial specified value						≤500% of the initial specified value							

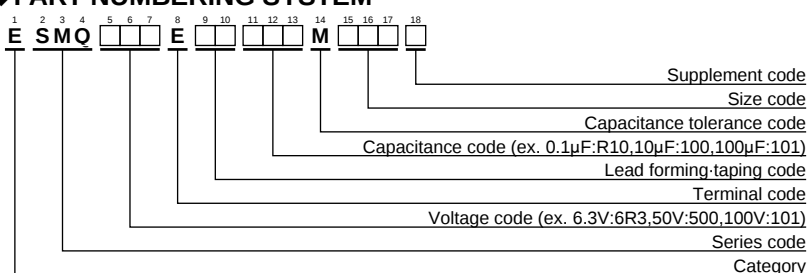
DIMENSIONS [mm]

- Terminal Code : E



φD	5	6.3	8	10	12.5	16	18	20	22
φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8	1.0	1.0
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10.0	10.0
φD'	φD+0.5max.							φD+0.5max.	
L'	L+1.5max.							L+2.0max.	

PART NUMBERING SYSTEM



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

◆STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)	Part No.	WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mArms/85°C,120Hz)	Part No.
6.3	1,000	8×11.5	0.28	540	ESMQ6R3E□□102MHB5D	50	47	6.3×11	0.12	155	ESMQ500E□□470MF11D
	2,200	10×16	0.30	890	ESMQ6R3E□□222MJ16S		68	6.3×11	0.12	210	ESMQ500E□□680MF11D
	3,300	10×20	0.32	1,190	ESMQ6R3E□□332MJ20S		100	8×11.5	0.12	260	ESMQ500E□□101MHB5D
	4,700	12.5×20	0.34	1,550	ESMQ6R3E□□472MK20S		220	10×12.5	0.12	430	ESMQ500E□□221MJCS
	6,800	12.5×25	0.38	1,920	ESMQ6R3E□□682MK25S		330	10×16	0.12	590	ESMQ500E□□331MJ16S
	10,000	16×25	0.46	2,350	ESMQ6R3E□□103ML25S		470	10×20	0.12	760	ESMQ500E□□471MJ20S
	15,000	16×31.5	0.56	2,550	ESMQ6R3E□□153MLN3S		1,000	12.5×25	0.12	1,350	ESMQ500E□□102MK25S
	22,000	18×35.5	0.70	3,200	ESMQ6R3E□□223MMP1S		2,200	16×31.5	0.14	1,980	ESMQ500E□□222MLN3S
	33,000	20×40	0.92	3,500	ESMQ6R3E□□333MNP4S		3,300	18×35.5	0.16	2,500	ESMQ500E□□332MMP1S
	47,000	22×50	1.20	3,900	ESMQ6R3E□□473MP50S		4,700	20×40	0.18	2,900	ESMQ500E□□472MNP4S
10	220	5×11	0.24	240	ESMQ100E□□221MF11D	63	6,800	22×50	0.22	3,500	ESMQ500E□□682MP50S
	330	6.3×11	0.24	290	ESMQ100E□□331MF11D		22	5×11	0.09	100	ESMQ630E□□220ME11D
	470	6.3×11	0.24	350	ESMQ100E□□471MF11D		33	6.3×11	0.09	140	ESMQ630E□□330MF11D
	1,000	10×12.5	0.24	650	ESMQ100E□□102MJC5S		47	6.3×11	0.09	170	ESMQ630E□□470MF11D
	2,200	10×16	0.26	990	ESMQ100E□□222MJ16S		68	8×11.5	0.09	220	ESMQ630E□□680MHB5D
	3,300	12.5×20	0.28	1,450	ESMQ100E□□332MK20S		100	8×11.5	0.09	280	ESMQ630E□□101MHB5D
	4,700	12.5×25	0.30	1,800	ESMQ100E□□472MK25S		220	10×16	0.09	490	ESMQ630E□□221MJ16S
	6,800	16×25	0.34	2,250	ESMQ100E□□682ML25S		330	10×20	0.09	710	ESMQ630E□□331MJ20S
	10,000	16×31.5	0.42	2,550	ESMQ100E□□103MLN3S		470	12.5×20	0.09	900	ESMQ630E□□471MK20S
	15,000	16×35.5	0.52	2,880	ESMQ100E□□153MLP1S		1,000	16×25	0.09	1,300	ESMQ630E□□102ML25S
16	22,000	18×40	0.66	3,400	ESMQ100E□□223MMP4S	100	2,200	18×35.5	0.11	2,300	ESMQ630E□□222MMP1S
	33,000	22×50	0.88	4,500	ESMQ100E□□333MP50S		3,300	20×40	0.13	2,700	ESMQ630E□□332MNP4S
	220	6.3×11	0.20	260	ESMQ160E□□221MF11D		4,700	22×50	0.15	3,400	ESMQ630E□□472MP50S
	330	6.3×11	0.20	320	ESMQ160E□□331MF11D		0.10	5×11	0.08	2.1	ESMQ101E□□R10ME11D
	470	8×11.5	0.20	440	ESMQ160E□□471MHB5D		0.22	5×11	0.08	4.7	ESMQ101E□□R22ME11D
	1,000	10×12.5	0.20	700	ESMQ160E□□102MJC5S		0.33	5×11	0.08	7.0	ESMQ101E□□R33ME11D
	2,200	10×20	0.22	1,000	ESMQ160E□□222MJ20S		0.47	5×11	0.08	10	ESMQ101E□□R47ME11D
	3,300	12.5×25	0.24	1,700	ESMQ160E□□332MK25S		1.0	5×11	0.08	21	ESMQ101E□□R10ME11D
	4,700	16×25	0.26	2,100	ESMQ160E□□472ML25S		2.2	5×11	0.08	30	ESMQ101E□□R22ME11D
	6,800	16×25	0.30	2,250	ESMQ160E□□682ML25S		3.3	5×11	0.08	40	ESMQ101E□□R33ME11D
25	10,000	16×35.5	0.38	2,710	ESMQ160E□□103MLP1S	160	4.7	5×11	0.08	45	ESMQ101E□□R47ME11D
	15,000	18×40	0.48	3,100	ESMQ160E□□153MMP4S		10	5×11	0.08	70	ESMQ101E□□R100ME11D
	22,000	22×40	0.62	3,800	ESMQ160E□□223MMP4S		22	6.3×11	0.08	130	ESMQ101E□□R220MF11D
	100	5×11	0.16	180	ESMQ250E□□101ME11D		33	8×11.5	0.08	180	ESMQ101E□□R330MHB5D
	220	6.3×11	0.16	280	ESMQ250E□□221MF11D		47	8×11.5	0.08	200	ESMQ101E□□R470MHB5D
	330	8×11.5	0.16	440	ESMQ250E□□331MHB5D		68	10×12.5	0.08	270	ESMQ101E□□R680MJC5S
	470	10×12.5	0.16	550	ESMQ250E□□471MJC5S		100	10×16	0.08	340	ESMQ101E□□R101MJ16S
	1,000	10×16	0.16	860	ESMQ250E□□102MJ16S		220	12.5×20	0.08	550	ESMQ101E□□R221MK20S
	2,200	12.5×25	0.18	1,550	ESMQ250E□□222MK25S		330	12.5×25	0.08	760	ESMQ101E□□R331MK25S
	3,300	16×25	0.20	1,980	ESMQ250E□□332ML25S		470	16×25	0.08	1,000	ESMQ101E□□R471ML25S
35	4,700	16×25	0.22	2,200	ESMQ250E□□472ML25S	200	1,000	18×35.5	0.08	1,350	ESMQ101E□□R102MMP1S
	6,800	16×35.5	0.26	2,600	ESMQ250E□□682MLP1S		2,200	22×50	0.08	2,400	ESMQ101E□□R222MP50S
	10,000	18×40	0.34	2,800	ESMQ250E□□103MMP4S		10	8×11.5	0.20	80	ESMQ161E□□R100MHB5D
	15,000	22×50	0.44	3,800	ESMQ250E□□153MP50S		22	10×12.5	0.20	130	ESMQ161E□□R220MJC5S
	47	5×11	0.14	130	ESMQ350E□□470ME11D		33	10×16	0.20	180	ESMQ161E□□R330MJ16S
	68	6.3×11	0.14	160	ESMQ350E□□680MF11D		47	10×20	0.20	210	ESMQ161E□□R470MJ20S
	100	6.3×11	0.14	210	ESMQ350E□□101MF11D		68	12.5×20	0.20	350	ESMQ161E□□R680MK20S
	220	8×11.5	0.14	385	ESMQ350E□□221MHB5D		100	12.5×25	0.20	430	ESMQ161E□□R101MK25S
	330	10×12.5	0.14	490	ESMQ350E□□331MJC5S		220	16×31.5	0.20	760	ESMQ161E□□R221MLN3S
	470	10×16	0.14	650	ESMQ350E□□471MJ16S		330	18×35.5	0.20	995	ESMQ161E□□R331MMP1S
50	1,000	12.5×20	0.14	1,150	ESMQ350E□□102MK20S	250	470	18×40	0.20	1,200	ESMQ161E□□R471MMP4S
	2,200	16×25	0.16	1,800	ESMQ350E□□222ML25S		1.0	6.3×11	0.20	22	ESMQ201E□□R10MF11D
	3,300	16×31.5	0.18	2,100	ESMQ350E□□332MLN3S		2.2	6.3×11	0.20	33	ESMQ201E□□R22MF11D
	4,700	16×35.5	0.20	2,500	ESMQ350E□□472MLP1S		3.3	6.3×11	0.20	40	ESMQ201E□□R33MF11D
	6,800	18×40	0.24	2,800	ESMQ350E□□682MMP4S		4.7	6.3×11	0.20	50	ESMQ201E□□R47MF11D
	10,000	22×50	0.32	3,700	ESMQ350E□□103MP50S		10	8×11.5	0.20	80	ESMQ201E□□R100MHB5D
	0.10	5×11	0.12	1.3	ESMQ500E□□R10ME11D		22	10×16	0.20	150	ESMQ201E□□R220MJ16S
	0.22	5×11	0.12	2.9	ESMQ500E□□R22ME11D		33	10×20	0.20	205	ESMQ201E□□R330MJ20S
	0.33	5×11	0.12	4.3	ESMQ500E□□R33ME11D		47	12.5×20	0.20	270	ESMQ201E□□R470MK20S
	0.47	5×11	0.12	6.2	ESMQ500E□□R47ME11D		68	12.5×25	0.20	350	ESMQ201E□□R680MK25S

□ : Enter the appropriate lead forming or taping code.

◆STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mA _{rms} /85°C,120Hz)	Part No.	WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mA _{rms} /85°C,120Hz)	Part No.
250	33	10×20	0.20	200	ESMQ251E□□330MJ20S	400	3.3	8×11.5	0.24	48	ESMQ401E□□3R3MHB5D
	47	12.5×20	0.20	270	ESMQ251E□□470MK20S		4.7	10×12.5	0.24	60	ESMQ401E□□4R7MJC5S
	68	16×25	0.20	380	ESMQ251E□□680ML25S		10	10×16	0.24	90	ESMQ401E□□100MJ16S
	100	16×25	0.20	440	ESMQ251E□□101ML25S		22	12.5×25	0.24	205	ESMQ401E□□220MK25S
	220	18×35.5	0.20	680	ESMQ251E□□221MMP1S		33	16×25	0.24	275	ESMQ401E□□330ML25S
350	2.2	6.3×11	0.24	30	ESMQ351E□□2R2MF11D		47	16×25	0.24	280	ESMQ401E□□470ML25S
	3.3	8×11.5	0.24	46	ESMQ351E□□3R3MHB5D		68	16×31.5	0.24	340	ESMQ401E□□680MLN3S
	4.7	8×11.5	0.24	55	ESMQ351E□□4R7MHB5D		100	18×35.5	0.24	440	ESMQ401E□□101MMP1S
	10	10×12.5	0.24	90	ESMQ351E□□100MJC5S	450	2.2	8×11.5	0.24	28	ESMQ451E□□2R2MHB5D
	22	12.5×20	0.24	185	ESMQ351E□□220MK20S		3.3	10×12.5	0.24	40	ESMQ451E□□3R3MJC5S
	33	12.5×25	0.24	240	ESMQ351E□□330MK25S		4.7	10×12.5	0.24	46	ESMQ451E□□4R7MJC5S
	47	16×25	0.24	325	ESMQ351E□□470ML25S		10	10×20	0.24	80	ESMQ451E□□100MJ20S
	68	16×25	0.24	400	ESMQ351E□□680ML25S		22	12.5×25	0.24	140	ESMQ451E□□220MK25S
	100	18×31.5	0.24	530	ESMQ351E□□101MMN3S		33	16×25	0.24	180	ESMQ451E□□330ML25S
400	0.47	6.3×11	0.24	12	ESMQ401E□□R47MF11D		47	16×31.5	0.24	220	ESMQ451E□□470MLN3S
	1.0	6.3×11	0.24	22	ESMQ401E□□1R0MF11D		68	18×35.5	0.24	260	ESMQ451E□□680MMP1S
	2.2	8×11.5	0.24	38	ESMQ401E□□2R2MHB5D		100	18×40	0.24	280	ESMQ451E□□101MM40S

□ : Enter the appropriate lead forming or taping code.

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

(φ5 to φ18)

Capacitance (μF)	Frequency (Hz)	50	120	300	1k	10k	100k
0.1 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

(φ20 to φ22)

Rated Voltage (V _{dc})	Frequency (Hz)	50	120	300	1k	10k	100k
6.3 to 50		0.95	1.00	1.03	1.05	1.08	1.08
63 to 100		0.92	1.00	1.07	1.13	1.19	1.20

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