

# SMQ Series

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

SMQ

↑ Downsized  
SMG

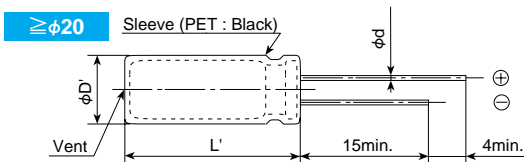
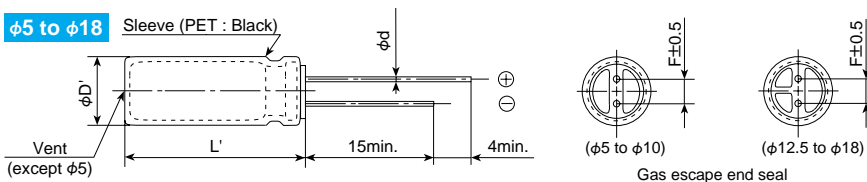


## ◆ SPECIFICATIONS

Items	Characteristics														
Category Temperature Range	-40 to +85°C(6.3 to 400V <sub>dc</sub> ) -25 to +85°C(450V <sub>dc</sub> )														
Rated Voltage Range	6.3 to 450V <sub>dc</sub>														
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)														
Leakage Current	6.3 to 100V <sub>dc</sub>														
	≤φ18	I=0.03CV or 4μA, whichever is greater.													
	CV Time After 1 minute CV ≤ 1,000 I=0.1CV+40 max. CV > 1,000 I=0.04CV+100 max. (at 20°C)														
≥φ20	I=0.03CV (at 20C after 1 minute) (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 <sub>dc</sub> )	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 <sub>dc</sub> )	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	2	3	3	4	4	6
		≥φ10	5	4	3	2	2	2	2	2	3	3	4	4	6
	Z(-40°C)/Z(+20°C)	≤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°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 <sub>dc</sub>						160 to 450V <sub>dc</sub>							
	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



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)"

◆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	330	10×16	0.12	590	ESMQ500E□□331MJ16S	
	2,200	10×16	0.30	890	ESMQ6R3E□□222MJ16S		470	10×20	0.12	760	ESMQ500E□□471MJ20S	
	3,300	10×20	0.32	1,190	ESMQ6R3E□□332MJ20S		1,000	12.5×25	0.12	1,350	ESMQ500E□□102MK25S	
	4,700	12.5×20	0.34	1,550	ESMQ6R3E□□472MK20S		2,200	16×31.5	0.14	1,980	ESMQ500E□□222MLN3S	
	6,800	12.5×25	0.38	1,920	ESMQ6R3E□□682MK25S		3,300	18×35.5	0.16	2,500	ESMQ500E□□332MMP1S	
	10,000	16×25	0.46	2,350	ESMQ6R3E□□103ML25S		4,700	20×40	0.18	2,900	ESMQ500E□□472MNP40S	
	15,000	16×31.5	0.56	2,550	ESMQ6R3E□□153MLN3S		6,800	22×50	0.22	3,500	ESMQ500E□□682MP50S	
	22,000	18×35.5	0.70	3,200	ESMQ6R3E□□223MMP1S		63	22	5×11	0.09	100	ESMQ630E□□220ME11D
	33,000	20×40	0.92	3,500	ESMQ6R3E□□333MM40S			33	6.3×11	0.09	140	ESMQ630E□□330MF11D
	47,000	22×50	1.20	3,900	ESMQ6R3E□□473MP50S			47	6.3×11	0.09	170	ESMQ630E□□470MF11D
10	220	5×11	0.24	240	ESMQ100E□□221ME11D	68		8×11.5	0.09	220	ESMQ630E□□680MHB5D	
	330	6.3×11	0.24	290	ESMQ100E□□331MF11D	100		8×11.5	0.09	280	ESMQ630E□□101MHB5D	
	470	6.3×11	0.24	350	ESMQ100E□□471MF11D	220		10×16	0.09	490	ESMQ630E□□221MJ16S	
	1,000	10×12.5	0.24	650	ESMQ100E□□102MJC5S	330		10×20	0.09	710	ESMQ630E□□331MJ20S	
	2,200	10×16	0.26	990	ESMQ100E□□103ML16S	470		12.5×20	0.09	900	ESMQ630E□□471MK20S	
	3,300	12.5×20	0.28	1,450	ESMQ100E□□332MK20S	1,000		16×25	0.09	1,300	ESMQ630E□□102ML25S	
	4,700	12.5×25	0.30	1,800	ESMQ100E□□472MK25S	2,200		18×35.5	0.11	2,300	ESMQ630E□□222MMP1S	
	6,800	16×25	0.34	2,250	ESMQ100E□□682ML25S	3,300	20×40	0.13	2,700	ESMQ630E□□332MNP40S		
	10,000	16×31.5	0.42	2,550	ESMQ100E□□103MLN3S	4,700	22×50	0.15	3,400	ESMQ630E□□472MP50S		
	15,000	16×35.5	0.52	2,880	ESMQ100E□□153MLP1S	100	1.0	5×11	0.08	21	ESMQ101E□□1R0ME11D	
22,000	18×40	0.66	3,400	ESMQ100E□□223MM40S	2.2		5×11	0.08	30	ESMQ101E□□2R2ME11D		
33,000	22×50	0.88	4,500	ESMQ100E□□333MP50S	3.3		5×11	0.08	40	ESMQ101E□□3R3ME11D		
16	220	6.3×11	0.20	260	ESMQ160E□□221MF11D		4.7	5×11	0.08	45	ESMQ101E□□4R7ME11D	
	330	6.3×11	0.20	320	ESMQ160E□□331MF11D		10	5×11	0.08	70	ESMQ101E□□100ME11D	
	470	8×11.5	0.20	440	ESMQ160E□□471MHB5D		22	6.3×11	0.08	130	ESMQ101E□□220MF11D	
	1,000	10×12.5	0.20	700	ESMQ160E□□102MJC5S		33	8×11.5	0.08	180	ESMQ101E□□330MHB5D	
	2,200	10×20	0.22	1,000	ESMQ160E□□222MJ20S		47	8×11.5	0.08	200	ESMQ101E□□470MHB5D	
	3,300	12.5×25	0.24	1,700	ESMQ160E□□332MK25S		68	10×12.5	0.08	270	ESMQ101E□□680MJC5S	
	4,700	16×25	0.26	2,100	ESMQ160E□□472ML25S		100	10×16	0.08	340	ESMQ101E□□101MJ16S	
	6,800	16×25	0.30	2,250	ESMQ160E□□682ML25S	220	12.5×20	0.08	550	ESMQ101E□□221MK20S		
	10,000	16×35.5	0.38	2,710	ESMQ160E□□103MLP1S	330	12.5×25	0.08	760	ESMQ101E□□331MK25S		
	15,000	18×40	0.48	3,100	ESMQ160E□□153MM40S	470	16×25	0.08	1,000	ESMQ101E□□471ML25S		
22,000	22×40	0.62	3,800	ESMQ160E□□223MP40S	1,000	18×35.5	0.08	1,350	ESMQ101E□□102MMP1S			
25	100	5×11	0.16	180	ESMQ250E□□101ME11D	2,200	22×50	0.10	2,400	ESMQ101E□□222MP50S		
	220	6.3×11	0.16	280	ESMQ250E□□221MF11D	160	10	8×11.5	0.20	80	ESMQ161E□□100MHB5D	
	330	8×11.5	0.16	440	ESMQ250E□□331MHB5D		22	10×12.5	0.20	130	ESMQ161E□□220MJC5S	
	470	10×12.5	0.16	550	ESMQ250E□□471MJC5S		33	10×16	0.20	180	ESMQ161E□□330MJ16S	
	1,000	10×16	0.16	860	ESMQ250E□□102MJ16S		47	10×20	0.20	210	ESMQ161E□□470MJ20S	
	2,200	12.5×25	0.18	1,550	ESMQ250E□□222MK25S		68	12.5×20	0.20	350	ESMQ161E□□680MK20S	
	3,300	16×25	0.20	1,980	ESMQ250E□□332ML25S		100	12.5×25	0.20	430	ESMQ161E□□101MK25S	
	4,700	16×25	0.22	2,200	ESMQ250E□□472ML25S		220	16×31.5	0.20	760	ESMQ161E□□221MLN3S	
	6,800	16×35.5	0.26	2,600	ESMQ250E□□682MLP1S		330	18×35.5	0.20	995	ESMQ161E□□331MMP1S	
	10,000	18×40	0.34	2,800	ESMQ250E□□103MM40S		470	18×40	0.20	1,200	ESMQ161E□□471MM40S	
15,000	22×50	0.44	3,800	ESMQ250E□□153MP50S	200		1.0	6.3×11	0.20	22	ESMQ201E□□1R0MF11D	
35	47	5×11	0.14	130		ESMQ350E□□470ME11D	2.2	6.3×11	0.20	33	ESMQ201E□□2R2MF11D	
	68	6.3×11	0.14	160		ESMQ350E□□680MF11D	3.3	6.3×11	0.20	40	ESMQ201E□□3R3MF11D	
	100	6.3×11	0.14	210		ESMQ350E□□101MF11D	4.7	6.3×11	0.20	50	ESMQ201E□□4R7MF11D	
	220	8×11.5	0.14	385		ESMQ350E□□221MHB5D	10	8×11.5	0.20	80	ESMQ201E□□100MHB5D	
	330	10×12.5	0.14	490		ESMQ350E□□331MJC5S	22	10×16	0.20	150	ESMQ201E□□220MJ16S	
	470	10×16	0.14	650		ESMQ350E□□471MJ16S	33	10×20	0.20	205	ESMQ201E□□330MJ20S	
	1,000	12.5×20	0.14	1,150		ESMQ350E□□102MK20S	47	12.5×20	0.20	270	ESMQ201E□□470MK20S	
	2,200	16×25	0.16	1,800		ESMQ350E□□222ML25S	68	12.5×25	0.20	350	ESMQ201E□□680MK25S	
	3,300	16×31.5	0.18	2,100		ESMQ350E□□332MLN3S	100	16×25	0.20	475	ESMQ201E□□101ML25S	
	4,700	16×35.5	0.20	2,500	ESMQ350E□□472MLP1S	220	16×35.5	0.20	700	ESMQ201E□□221MLP1S		
6,800	18×40	0.24	2,800	ESMQ350E□□682MM40S	330	18×40	0.20	950	ESMQ201E□□331MM40S			
10,000	22×50	0.32	3,700	ESMQ350E□□103MP50S	250	3.3	6.3×11	0.20	40	ESMQ251E□□3R3MF11D		
50	1.0	5×11	0.12	17		ESMQ500E□□1R0ME11D	4.7	6.3×11	0.20	50	ESMQ251E□□4R7MF11D	
	2.2	5×11	0.12	28		ESMQ500E□□2R2ME11D	10	10×12.5	0.20	100	ESMQ251E□□100MJC5S	
	3.3	5×11	0.12	35		ESMQ500E□□3R3ME11D	22	10×20	0.20	170	ESMQ251E□□220MJ20S	
	4.7	5×11	0.12	41		ESMQ500E□□4R7ME11D	33	10×20	0.20	200	ESMQ251E□□330MJ20S	
	10	5×11	0.12	60		ESMQ500E□□100ME11D	47	12.5×20	0.20	270	ESMQ251E□□470MK20S	
	22	5×11	0.12	95		ESMQ500E□□220ME11D	68	16×25	0.20	380	ESMQ251E□□680ML25S	
	33	5×11	0.12	125		ESMQ500E□□330ME11D	100	16×25	0.20	440	ESMQ251E□□101ML25S	
	47	6.3×11	0.12	155		ESMQ500E□□470MF11D	220	18×35.5	0.20	680	ESMQ251E□□221MMP1S	
	68	6.3×11	0.12	210		ESMQ500E□□680MF11D	350	2.2	6.3×11	0.24	30	ESMQ351E□□2R2MF11D
	100	8×11.5	0.12	260	ESMQ500E□□101MHB5D	3.3		8×11.5	0.24	46	ESMQ351E□□3R3MHB5D	
220	10×12.5	0.12	430	ESMQ500E□□221MJC5S	4.7	8×11.5		0.24	55	ESMQ351E□□4R7MHB5D		

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

## ◆STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mA <sub>rms</sub> /85°C,120Hz)	Part No.	WV (Vdc)	Cap (μF)	Case size φD×L(mm)	tanδ	Rated ripple current (mA <sub>rms</sub> /85°C,120Hz)	Part No.
350	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	1.0	6.3×11	0.24	22	ESMQ401E□□1R0MF11D		47	16×31.5	0.24	220	ESMQ451E□□470MLN3S
	2.2	8×11.5	0.24	38	ESMQ401E□□2R2MHB5D		68	18×35.5	0.24	260	ESMQ451E□□680MMP1S
	3.3	8×11.5	0.24	48	ESMQ401E□□3R3MHB5D		100	18×40	0.24	280	ESMQ451E□□101MM40S
	4.7	10×12.5	0.24	60	ESMQ401E□□4R7MJC5S						
	10	10×16	0.24	90	ESMQ401E□□100MJ16S						
	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						

□□ : 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
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

(φ20 to φ22)

Rated Voltage (V <sub>ra</sub> )	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.