

# SMG Series

- Endurance : 2,000 hours at 85°C
- Solvent resistant type except 350 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)
- RoHS2 Compliant



## SPECIFICATIONS

Items	Characteristics													
Category	-40 to +85°C (6.3 to 400V <sub>dc</sub> ) -25 to +85°C (450V <sub>dc</sub> )													
Temperature Range														
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>									160 to 450V <sub>dc</sub>				
	I=0.03CV or 4μA, whichever is greater.													
										CV	Time	After 1 minute	After 5 minute	
										CV ≤ 1,000		I=0.1CV+40 max.	I=0.03CV+15 max.	
											CV > 1,000		I=0.04CV+100 max.	I=0.02CV+25 max.
Where, I : Max. leakage current (μA), C : Nominal capacitance (μF), V : Rated voltage (V) (at 20°C)														
Dissipation Factor (tan δ)	Rated voltage (V <sub>dc</sub> )	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	350 to 400V	450V		
	tan δ (Max.)	0.34	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 250V	350 to 400V	450V		
	Z(-25°C)/Z(+20°C)	5	4	3	2	2	2	2	2	3	6	6		
	Z(-40°C)/Z(+20°C)	12	10	8	5	4	3	3	3	4	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. (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°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. (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						

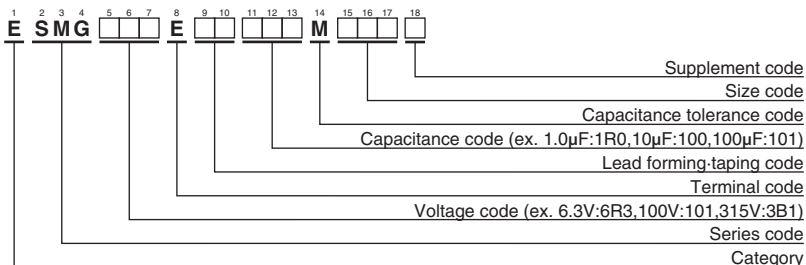
## DIMENSIONS [mm]

- 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



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

◆ STANDARD RATINGS

□ is not solvent resistant.

WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mAmps/85°C, 120Hz)	Part No.	WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mAmps/85°C, 120Hz)	Part No.
6.3	220	5 × 11	0.34	200	ESMG6R3E□□221ME11D	63	22	5 × 11	0.09	100	ESMG630E□□220ME11D
	330	6.3 × 11	0.34	270	ESMG6R3E□□331MF11D		33	6.3 × 11	0.09	140	ESMG630E□□330MF11D
	470	6.3 × 11	0.34	320	ESMG6R3E□□471MF11D		47	6.3 × 11	0.09	170	ESMG630E□□470MF11D
	1,000	8 × 11.5	0.34	540	ESMG6R3E□□102MHB5D		100	10 × 12.5	0.09	300	ESMG630E□□101MJC5S
	2,200	10 × 20	0.36	1,000	ESMG6R3E□□222MJ20S		220	10 × 16	0.09	490	ESMG630E□□221MJ16S
	3,300	10 × 20	0.38	1,185	ESMG6R3E□□332MJ20S		330	10 × 20	0.09	710	ESMG630E□□331MJ20S
	4,700	12.5 × 20	0.40	1,545	ESMG6R3E□□472MK20S		470	12.5 × 20	0.09	900	ESMG630E□□471MK20S
	6,800	12.5 × 25	0.44	1,915	ESMG6R3E□□682MK25S		1,000	16 × 25	0.09	1,300	ESMG630E□□102ML25S
	10,000	16 × 25	0.52	2,330	ESMG6R3E□□103ML25S		1.0	5 × 11	0.08	21	ESMG101E□□1R0ME11D
	15,000	16 × 35.5	0.62	2,845	ESMG6R3E□□153MLP1S		2.2	5 × 11	0.08	30	ESMG101E□□2R2ME11D
22,000	18 × 40	0.76	3,320	ESMG6R3E□□223MM40S	3.3	5 × 11	0.08	40	ESMG101E□□3R3ME11D		
10	220	5 × 11	0.24	240	ESMG100E□□221ME11D	100	4.7	5 × 11	0.08	45	ESMG101E□□4R7ME11D
	330	6.3 × 11	0.24	290	ESMG100E□□331MF11D		10	6.3 × 11	0.08	75	ESMG101E□□100MF11D
	470	6.3 × 11	0.24	350	ESMG100E□□471MF11D		22	8 × 11.5	0.08	130	ESMG101E□□220MHB5D
	1,000	10 × 12.5	0.24	650	ESMG100E□□331MJC5S		33	8 × 11.5	0.08	180	ESMG101E□□330MHB5D
	2,200	10 × 20	0.26	1,070	ESMG100E□□222MJ20S		47	10 × 12.5	0.08	230	ESMG101E□□470MJC5S
	3,300	12.5 × 20	0.28	1,420	ESMG100E□□332MK20S		100	10 × 20	0.08	370	ESMG101E□□101MJ20S
	4,700	12.5 × 25	0.30	1,780	ESMG100E□□472MK25S		220	12.5 × 25	0.08	620	ESMG101E□□221MK25S
	6,800	16 × 25	0.34	2,220	ESMG100E□□682ML25S		330	12.5 × 25	0.08	760	ESMG101E□□331MK25S
	10,000	16 × 35.5	0.42	2,670	ESMG100E□□103MLP1S		470	16 × 25	0.08	1,000	ESMG101E□□471ML25S
	15,000	18 × 35.5	0.52	3,080	ESMG100E□□153MMP1S		1,000	18 × 40	0.08	1,380	ESMG101E□□102MM40S
16	100	5 × 11	0.20	160	ESMG160E□□101ME11D	160	3.3	6.3 × 11	0.20	40	ESMG161E□□3R3MF11D
	220	6.3 × 11	0.20	260	ESMG160E□□221MF11D		4.7	6.3 × 11	0.20	48	ESMG161E□□4R7MF11D
	330	8 × 11.5	0.20	370	ESMG160E□□331MHB5D		10	10 × 12.5	0.20	94	ESMG161E□□100MJC5S
	470	8 × 11.5	0.20	440	ESMG160E□□471MHB5D		22	10 × 20	0.20	170	ESMG161E□□220MJ20S
	1,000	10 × 16	0.20	785	ESMG160E□□102MJ16S		33	10 × 20	0.20	205	ESMG161E□□330MJ20S
	2,200	12.5 × 20	0.22	1,295	ESMG160E□□222MK20S		47	12.5 × 20	0.20	270	ESMG161E□□470MK20S
	3,300	12.5 × 25	0.24	1,655	ESMG160E□□332MK25S		100	12.5 × 25	0.20	430	ESMG161E□□101MK25S
	4,700	16 × 25	0.26	2,090	ESMG160E□□472ML25S		220	16 × 31.5	0.20	760	ESMG161E□□221MLN3S
	6,800	16 × 31.5	0.30	2,520	ESMG160E□□682MLN3S		330	18 × 35.5	0.20	995	ESMG161E□□331MMP1S
	10,000	18 × 35.5	0.38	2,920	ESMG160E□□103MMP1S		3.3	6.3 × 11	0.20	40	ESMG201E□□3R3MF11D
25	47	5 × 11	0.16	115	ESMG250E□□470ME11D	200	4.7	8 × 11.5	0.20	55	ESMG201E□□4R7MHB5D
	100	6.3 × 11	0.16	190	ESMG250E□□101MF11D		10	10 × 12.5	0.20	94	ESMG201E□□100MJC5S
	220	8 × 11.5	0.16	330	ESMG250E□□221MHB5D		22	10 × 20	0.20	170	ESMG201E□□220MJ20S
	330	8 × 11.5	0.16	440	ESMG250E□□331MHB5D		33	10 × 20	0.20	205	ESMG201E□□330MJ20S
	470	10 × 12.5	0.16	545	ESMG250E□□471MJC5S		47	12.5 × 20	0.20	270	ESMG201E□□470MK20S
	1,000	10 × 20	0.16	955	ESMG250E□□102MJ20S		100	16 × 25	0.20	475	ESMG201E□□101ML25S
	2,200	12.5 × 25	0.18	1,540	ESMG250E□□222MK25S		220	18 × 35.5	0.20	810	ESMG201E□□221MMP1S
	3,300	16 × 25	0.20	1,975	ESMG250E□□332ML25S		2.2	6.3 × 11	0.20	32	ESMG251E□□2R2MF11D
	4,700	16 × 31.5	0.22	2,420	ESMG250E□□472MLN3S		3.3	8 × 11.5	0.20	46	ESMG251E□□3R3MHB5D
	6,800	18 × 35.5	0.26	2,880	ESMG250E□□682MMP1S		4.7	8 × 11.5	0.20	55	ESMG251E□□4R7MHB5D
35	47	5 × 11	0.14	130	ESMG350E□□470ME11D	250	10	10 × 16	0.20	105	ESMG251E□□100MJ16S
	100	6.3 × 11	0.14	210	ESMG350E□□101MF11D		22	10 × 20	0.20	170	ESMG251E□□220MJ20S
	220	8 × 11.5	0.14	385	ESMG350E□□221MHB5D		33	12.5 × 20	0.20	230	ESMG251E□□330MK20S
	330	10 × 12.5	0.14	490	ESMG350E□□331MJC5S		47	12.5 × 25	0.20	295	ESMG251E□□470MK25S
	470	10 × 16	0.14	645	ESMG350E□□471MJ16S		100	16 × 31.5	0.20	515	ESMG251E□□101MLN3S
	1,000	12.5 × 20	0.14	1,145	ESMG350E□□102MK20S		220	18 × 40	0.20	825	ESMG251E□□221MM40S
	2,200	16 × 25	0.16	1,785	ESMG350E□□222ML25S		1.0	6.3 × 11	0.24	22	ESMG351E□□1R0MF11D
	3,300	16 × 35.5	0.18	2,275	ESMG350E□□332MLP1S		2.2	8 × 11.5	0.24	38	ESMG351E□□2R2MHB5D
	4,700	18 × 35.5	0.20	2,700	ESMG350E□□472MMP1S		3.3	8 × 11.5	0.24	46	ESMG351E□□3R3MHB5D
	50	1.0	5 × 11	0.12	17		ESMG500E□□1R0ME11D	350	4.7	10 × 12.5	0.24
2.2		5 × 11	0.12	28	ESMG500E□□2R2ME11D	10	10 × 20		0.24	115	ESMG351E□□100MJ20S
3.3		5 × 11	0.12	35	ESMG500E□□3R3ME11D	22	12.5 × 20		0.24	185	ESMG351E□□220MK20S
4.7		5 × 11	0.12	41	ESMG500E□□4R7ME11D	33	16 × 25		0.24	275	ESMG351E□□330ML25S
10		5 × 11	0.12	60	ESMG500E□□100ME11D	47	16 × 25		0.24	325	ESMG351E□□470ML25S
22		5 × 11	0.12	95	ESMG500E□□220ME11D	100	18 × 31.5		0.24	530	ESMG351E□□101MMN3S
33		5 × 11	0.12	125	ESMG500E□□330ME11D	1.0	6.3 × 11		0.24	22	ESMG401E□□1R0MF11D
47		6.3 × 11	0.12	155	ESMG500E□□470MF11D	2.2	8 × 11.5		0.24	38	ESMG401E□□2R2MHB5D
100		8 × 11.5	0.12	260	ESMG500E□□101MHB5D	3.3	10 × 12.5		0.24	54	ESMG401E□□3R3MJC5S
220		10 × 12.5	0.12	430	ESMG500E□□221MJC5S	4.7	10 × 16		0.24	71	ESMG401E□□4R7MJ16S
63	330	10 × 16	0.12	585	ESMG500E□□331MJ16S	400	10	10 × 20	0.24	115	ESMG401E□□100MJ20S
	470	10 × 20	0.12	755	ESMG500E□□471MJ20S		22	12.5 × 25	0.24	205	ESMG401E□□220MK25S
	1,000	12.5 × 25	0.12	1,340	ESMG500E□□102MK25S		33	16 × 25	0.24	275	ESMG401E□□330ML25S
	2,200	16 × 35.5	0.14	2,075	ESMG500E□□222MLP1S		47	16 × 31.5	0.24	350	ESMG401E□□470MLN3S
	3,300	18 × 35.5	0.16	2,500	ESMG500E□□332MMP1S		2.2	10 × 12.5	0.24	32	ESMG451E□□2R2MJC5S
	10	5 × 11	0.09	65	ESMG630E□□100ME11D		3.3	10 × 16	0.24	44	ESMG451E□□3R3MJ16S

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

**SMG** Series

◆ **STANDARD RATINGS**

is not solvent resistant.

WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mA <sub>rms</sub> /85°C, 120Hz)	Part No.	WV (V <sub>dc</sub> )	Cap (μF)	Case size φD×L(mm)	tan δ	Rated ripple current (mA <sub>rms</sub> /85°C, 120Hz)	Part No.
450	4.7	10 × 20	0.24	56	ESMG451E□□4R7MJ20S	450	33	16 × 31.5	0.24	215	ESMG451E□□330MLN3S
	10	12.5 × 20	0.24	91	ESMG451E□□100MK20S		47	16 × 35.5	0.24	265	ESMG451E□□470MLP1S
	22	16 × 25	0.24	165	ESMG451E□□220ML25S						

□□ : 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 47	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°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.