

# SMG Series

- Endurance : 2,000 hours at 85°C
- Solvent resistant type except 315 to 450V<sub>dc</sub>  
(see PRECAUTIONS AND GUIDELINES)
- RoHS Compliant

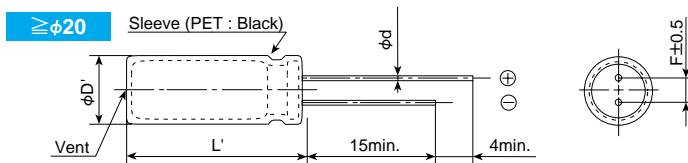
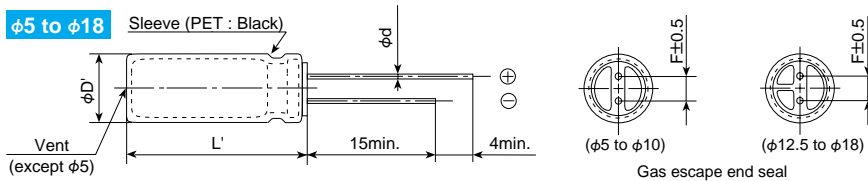


## ◆ SPECIFICATIONS

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>						
	≤φ18	I=0.03CV or 4μA, whichever is greater. (at 20°C after 1 minute)						CV \ Time		After 1 minute		After 5 minutes	
								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.								
≥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 <sub>dc</sub> )	6.3V	10V	16V	25V	35V	50V	63V	100V	160 to 250V	315 to 400V	450V	
	tanδ (Max.)	≤φ18	0.34	0.24	0.20	0.16	0.14	0.12	0.09	0.08	0.20	0.24	0.24
		≥φ20	0.28	0.24	0.20	0.16	0.14	0.12	0.09	0.08	0.15	0.15	0.20
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	315 to 400V	450V	
	Z(-25°C)/Z(+20°C)	≤φ18	5	4	3	2	2	2	2	2	3	6	6
		≥φ20	5	4	3	2	2	2	2	2	4	6	6
Z(-40°C)/Z(+20°C)	≤φ18	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. (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					

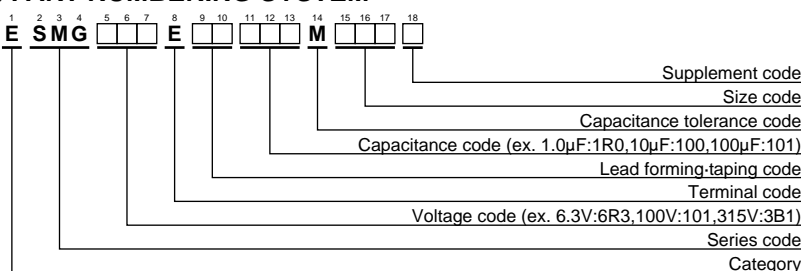
## ◆ DIMENSIONS [mm]

- 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



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



◆STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case size φDXL(mm)	tanδ	Rated ripple current (mA rms/85°C, 120Hz)	Part No.	WV (Vdc)	Cap (μF)	Case size φDXL(mm)	tanδ	Rated ripple current (mA rms/85°C, 120Hz)	Part No.	
6.3	220	5X11	0.34	200	ESMG6R3E□□221ME11D	25	6,800	22X30	0.26	2,510	ESMG250E□□682MP30S	
	330	6.3X11	0.34	270	ESMG6R3E□□331MF11D		8,200	20X40	0.30	2,810	ESMG250E□□822MN40S	
	470	6.3X11	0.34	320	ESMG6R3E□□471MF11D		8,200	22X35	0.30	2,810	ESMG250E□□822MP35S	
	1,000	8X11.5	0.34	540	ESMG6R3E□□102MHB5D		10,000	22X40	0.34	3,240	ESMG250E□□103MP40S	
	2,200	10X20	0.36	1,000	ESMG6R3E□□222MJ20S		12,000	22X40	0.38	3,240	ESMG250E□□123MP40S	
	3,300	10X20	0.38	1,185	ESMG6R3E□□332MJ20S		35	47	5X11	0.14	130	ESMG350E□□470ME11D
	4,700	12.5X20	0.40	1,545	ESMG6R3E□□472MK20S			100	6.3X11	0.14	210	ESMG350E□□101MF11D
	6,800	12.5X25	0.44	1,915	ESMG6R3E□□682MK25S			220	8X11.5	0.14	385	ESMG350E□□221MHB5D
	10,000	16X25	0.52	2,330	ESMG6R3E□□103ML25S			330	10X12.5	0.14	490	ESMG350E□□331MJC5S
	10,000	20X25	0.46	2,310	ESMG6R3E□□103MN25S			470	10X16	0.14	645	ESMG350E□□471MJ16S
	15,000	16X35.5	0.62	2,845	ESMG6R3E□□153MLP1S			1,000	12.5X20	0.14	1,145	ESMG350E□□102MK20S
	15,000	20X30	0.56	2,660	ESMG6R3E□□153MN30S			2,200	16X25	0.16	1,785	ESMG350E□□222ML25S
	18,000	20X35	0.62	2,890	ESMG6R3E□□183MN35S			2,200	20X20	0.16	1,670	ESMG350E□□222MN20S
	18,000	22X30	0.62	2,860	ESMG6R3E□□183MP30S			3,300	16X35.5	0.18	2,275	ESMG350E□□332MLP1S
	22,000	18X40	0.76	3,320	ESMG6R3E□□223MM40S			3,300	20X25	0.18	2,050	ESMG350E□□332MN25S
	22,000	20X40	0.70	3,130	ESMG6R3E□□223MN40S			3,900	20X30	0.18	2,310	ESMG350E□□392MN30S
22,000	22X35	0.70	3,130	ESMG6R3E□□223MP35S	4,700	18X35.5		0.20	2,700	ESMG350E□□472MMP1S		
27,000	22X40	0.80	3,280	ESMG6R3E□□273MP40S	4,700	20X35		0.20	2,510	ESMG350E□□472MN35S		
10	220	5X11	0.24	240	ESMG100E□□221ME11D	4,700		22X30	0.20	2,380	ESMG350E□□472MP30S	
	330	6.3X11	0.24	290	ESMG100E□□331MF11D	5,600		20X40	0.22	2,690	ESMG350E□□562MN40S	
	470	6.3X11	0.24	350	ESMG100E□□471MF11D	5,600		22X35	0.22	2,690	ESMG350E□□562MP35S	
	1,000	10X12.5	0.24	650	ESMG100E□□102MJC5S	6,800	22X40	0.24	3,090	ESMG350E□□682MP40S		
	2,200	10X20	0.26	1,070	ESMG100E□□222MJ20S	50	1.0	5X11	0.12	17	ESMG500E□□1R0ME11D	
	3,300	12.5X20	0.28	1,420	ESMG100E□□332MK20S		2.2	5X11	0.12	28	ESMG500E□□2R2ME11D	
	4,700	12.5X25	0.30	1,780	ESMG100E□□472MK25S		3.3	5X11	0.12	35	ESMG500E□□3R3ME11D	
	6,800	16X25	0.34	2,220	ESMG100E□□682ML25S		4.7	5X11	0.12	41	ESMG500E□□4R7ME11D	
	6,800	20X20	0.34	2,080	ESMG100E□□682MN20S		10	5X11	0.12	60	ESMG500E□□100ME11D	
	10,000	16X35.5	0.42	2,670	ESMG100E□□103MLP1S		22	5X11	0.12	95	ESMG500E□□220ME11D	
	10,000	20X25	0.42	2,410	ESMG100E□□103MN25S		33	5X11	0.12	125	ESMG500E□□330ME11D	
	12,000	20X30	0.46	2,620	ESMG100E□□123MN30S		47	6.3X11	0.12	155	ESMG500E□□470MF11D	
	15,000	18X35.5	0.52	3,080	ESMG100E□□153MMP1S		100	8X11.5	0.12	260	ESMG500E□□101MHB5D	
	15,000	20X35	0.52	2,870	ESMG100E□□153MN35S		220	10X12.5	0.12	430	ESMG500E□□221MJC5S	
	15,000	22X30	0.52	2,660	ESMG100E□□153MP30S		330	10X16	0.12	585	ESMG500E□□331MJ16S	
	18,000	22X35	0.58	3,050	ESMG100E□□183MP35S		470	10X20	0.12	755	ESMG500E□□471MJ20S	
22,000	22X40	0.66	3,480	ESMG100E□□223MP40S	1,000		12.5X25	0.12	1,340	ESMG500E□□102MK25S		
16	100	5X11	0.20	160	ESMG160E□□101ME11D		1,500	20X20	0.12	1,570	ESMG500E□□152MN20S	
	220	6.3X11	0.20	260	ESMG160E□□221MF11D		2,200	16X35.5	0.14	2,075	ESMG500E□□222MLP1S	
	330	8X11.5	0.20	370	ESMG160E□□331MHB5D		2,200	20X25	0.14	1,880	ESMG500E□□222MN25S	
	470	8X11.5	0.20	440	ESMG160E□□471MHB5D	2,700	20X30	0.14	2,150	ESMG500E□□272MN30S		
	1,000	10X16	0.20	785	ESMG160E□□102MJ16S	3,300	18X35.5	0.16	2,500	ESMG500E□□332MMP1S		
	2,200	12.5X20	0.22	1,295	ESMG160E□□222MK20S	3,300	20X35	0.16	2,420	ESMG500E□□332MN35S		
	3,300	12.5X25	0.24	1,655	ESMG160E□□332MK25S	3,300	22X30	0.16	2,420	ESMG500E□□332MP30S		
	4,700	16X25	0.26	2,090	ESMG160E□□472ML25S	3,900	20X40	0.16	2,590	ESMG500E□□392MN40S		
	4,700	20X20	0.26	1,960	ESMG160E□□472MN20S	3,900	22X35	0.16	2,590	ESMG500E□□392MP35S		
	6,800	16X31.5	0.30	2,520	ESMG160E□□682MLN3S	4,700	22X40	0.18	2,960	ESMG500E□□472MP40S		
	6,800	20X25	0.30	2,330	ESMG160E□□682MN25S	63	10	5X11	0.09	65	ESMG630E□□100ME11D	
	8,200	20X30	0.34	2,500	ESMG160E□□822MN30S		22	5X11	0.09	100	ESMG630E□□220ME11D	
	10,000	18X35.5	0.38	2,920	ESMG160E□□103MMP1S		33	6.3X11	0.09	140	ESMG630E□□330MF11D	
	10,000	20X35	0.38	2,720	ESMG160E□□103MN35S		47	6.3X11	0.09	170	ESMG630E□□470MF11D	
	10,000	22X30	0.38	2,660	ESMG160E□□103MP30S		100	10X12.5	0.09	300	ESMG630E□□101MJC5S	
	12,000	20X40	0.42	2,900	ESMG160E□□123MN40S		220	10X16	0.09	490	ESMG630E□□221MJ16S	
12,000	22X35	0.42	2,900	ESMG160E□□123MP35S	330		10X20	0.09	710	ESMG630E□□331MJ20S		
15,000	22X40	0.48	3,380	ESMG160E□□153MP40S	470		12.5X20	0.09	900	ESMG630E□□471MK20S		
25	47	5X11	0.16	115	ESMG250E□□470ME11D		820	20X20	0.09	1,370	ESMG630E□□821MN20S	
	100	6.3X11	0.16	190	ESMG250E□□101MF11D		1,000	16X25	0.09	1,300	ESMG630E□□102ML25S	
	220	8X11.5	0.16	330	ESMG250E□□221MHB5D		1,000	20X25	0.09	1,600	ESMG630E□□102MN25S	
	330	8X11.5	0.16	440	ESMG250E□□331MHB5D		1,500	20X30	0.09	1,850	ESMG630E□□152MN30S	
	470	10X12.5	0.16	545	ESMG250E□□471MJC5S		2,200	20X35	0.11	2,330	ESMG630E□□222MN35S	
	1,000	10X20	0.16	955	ESMG250E□□102MJ20S		2,200	22X30	0.11	2,190	ESMG630E□□222MP30S	
	2,200	12.5X25	0.18	1,540	ESMG250E□□222MK25S		2,700	20X40	0.11	2,640	ESMG630E□□272MN40S	
	3,300	16X25	0.20	1,975	ESMG250E□□332ML25S		3,300	22X40	0.13	2,810	ESMG630E□□332MP40S	
	3,300	20X20	0.20	1,850	ESMG250E□□332MN20S	100	1.0	5X11	0.08	21	ESMG101E□□1R0ME11D	
	4,700	16X31.5	0.22	2,420	ESMG250E□□472MLN3S		2.2	5X11	0.08	30	ESMG101E□□2R2ME11D	
	4,700	20X25	0.22	2,420	ESMG250E□□472MN25S		3.3	5X11	0.08	40	ESMG101E□□3R3ME11D	
	5,600	20X30	0.24	2,430	ESMG250E□□562MN30S		4.7	5X11	0.08	45	ESMG101E□□4R7ME11D	
	6,800	18X35.5	0.26	2,880	ESMG250E□□682MMP1S		10	6.3X11	0.08	75	ESMG101E□□100MF11D	
	6,800	20X35	0.26	2,680	ESMG250E□□682MN35S		22	8X11.5	0.08	130	ESMG101E□□220MHB5D	

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

◆STANDARD RATINGS

□ is not solvent resistant.

WV (Vdc)	Cap (μF)	Case size φDXL(mm)	tanδ	Rated ripple current (mA rms/85°C, 120Hz)	Part No.	WV (Vdc)	Cap (μF)	Case size φDXL(mm)	tanδ	Rated ripple current (mA rms/85°C, 120Hz)	Part No.	
100	33	8X11.5	0.08	180	ESMG101E□□330MHB5D	315	47	20X20	0.15	310	ESMG3B1E□□470MN20S	
	47	10X12.5	0.08	230	ESMG101E□□470MJC5S		68	20X25	0.15	400	ESMG3B1E□□680MN25S	
	100	10X20	0.08	370	ESMG101E□□101MJ20S		82	20X25	0.15	440	ESMG3B1E□□820MN25S	
	220	12.5X25	0.08	620	ESMG101E□□221MK25S		100	20X30	0.15	500	ESMG3B1E□□101MN30S	
	330	12.5X25	0.08	760	ESMG101E□□331MK25S		120	20X30	0.15	550	ESMG3B1E□□121MN30S	
	330	20X20	0.08	870	ESMG101E□□331MN20S		180	20X40	0.15	720	ESMG3B1E□□181MN40S	
	470	16X25	0.08	1,000	ESMG101E□□471ML25S		180	22X35	0.15	720	ESMG3B1E□□181MP35S	
	680	20X30	0.08	1,360	ESMG101E□□681MN30S		220	22X40	0.15	810	ESMG3B1E□□221MP40S	
	820	22X30	0.08	1,540	ESMG101E□□821MP30S		350	1.0	6.3X11	0.24	22	ESMG351E□□1R0MF11D
	1,000	18X40	0.08	1,380	ESMG101E□□102MN40S			2.2	8X11.5	0.24	38	ESMG351E□□2R2MHB5D
	1,000	20X35	0.08	1,720	ESMG101E□□102MN35S			3.3	8X11.5	0.24	46	ESMG351E□□3R3MHB5D
	1,200	22X40	0.08	1,980	ESMG101E□□122MP40S			4.7	10X12.5	0.24	65	ESMG351E□□4R7MJC5S
160	3.3	6.3X11	0.20	40	ESMG161E□□3R3MF11D	10		10X20	0.24	115	ESMG351E□□100MJ20S	
	4.7	6.3X11	0.20	48	ESMG161E□□4R7MF11D	22		12.5X20	0.24	185	ESMG351E□□2R20MN20S	
	10	10X12.5	0.20	94	ESMG161E□□100MJC5S	33		16X25	0.24	275	ESMG351E□□330ML25S	
	22	10X20	0.20	170	ESMG161E□□220MJ20S	47		16X25	0.24	325	ESMG351E□□470ML25S	
	33	10X20	0.20	205	ESMG161E□□330MJ20S	47		20X20	0.15	310	ESMG351E□□470MN20S	
	47	12.5X20	0.20	270	ESMG161E□□470MK20S	68		20X25	0.15	400	ESMG351E□□680MN25S	
	100	12.5X25	0.20	430	ESMG161E□□101MK25S	100		18X31.5	0.24	530	ESMG351E□□101MMN3S	
	220	16X31.5	0.20	760	ESMG161E□□221MLN3S	100		20X30	0.15	500	ESMG351E□□101MN30S	
	220	20X25	0.15	730	ESMG161E□□221MN25S	120	20X35	0.15	560	ESMG351E□□121MN35S		
	330	18X35.5	0.20	995	ESMG161E□□331MMP1S	400	1.0	6.3X11	0.24	22	ESMG401E□□1R0MF11D	
	330	20X30	0.15	920	ESMG161E□□331MN30S		2.2	8X11.5	0.24	38	ESMG401E□□2R2MHB5D	
	390	20X35	0.15	1,160	ESMG161E□□391MN35S		3.3	10X12.5	0.24	54	ESMG401E□□3R3MJC5S	
	390	22X30	0.15	1,160	ESMG161E□□391MP30S		4.7	10X16	0.24	71	ESMG401E□□4R7MJ16S	
	470	20X40	0.15	1,340	ESMG161E□□471MN40S		10	10X20	0.24	115	ESMG401E□□100MJ20S	
	470	22X35	0.15	1,340	ESMG161E□□471MP35S		22	12.5X25	0.24	205	ESMG401E□□220MK25S	
	560	22X40	0.15	1,470	ESMG161E□□561MP40S		33	16X25	0.24	275	ESMG401E□□330ML25S	
200	3.3	6.3X11	0.20	40	ESMG201E□□3R3MF11D		33	20X20	0.15	260	ESMG401E□□330MN20S	
	4.7	8X11.5	0.20	55	ESMG201E□□4R7MHB5D		47	16X31.5	0.24	350	ESMG401E□□470MLN3S	
	10	10X12.5	0.20	94	ESMG201E□□100MJC5S		56	20X25	0.15	350	ESMG401E□□560MN25S	
	22	10X20	0.20	170	ESMG201E□□220MJ20S		68	20X30	0.15	420	ESMG401E□□680MN30S	
	33	10X20	0.20	205	ESMG201E□□330MJ20S		100	20X35	0.15	520	ESMG401E□□101MN35S	
	47	12.5X20	0.20	270	ESMG201E□□470MK20S	100	22X30	0.15	520	ESMG401E□□101MP30S		
	100	16X25	0.20	475	ESMG201E□□101ML25S	120	20X40	0.15	580	ESMG401E□□121MN40S		
	100	20X20	0.15	460	ESMG201E□□101MN20S	120	22X35	0.15	580	ESMG401E□□121MP35S		
	180	20X25	0.15	660	ESMG201E□□181MN25S	450	2.2	10X12.5	0.24	32	ESMG451E□□2R2MJC5S	
	220	18X35.5	0.20	810	ESMG201E□□221MMP1S		3.3	10X16	0.24	44	ESMG451E□□3R3MJ16S	
	220	20X30	0.15	750	ESMG201E□□221MN30S		4.7	10X20	0.24	56	ESMG451E□□4R7MJ20S	
	270	20X30	0.15	830	ESMG201E□□271MN30S		10	12.5X20	0.24	91	ESMG451E□□100MK20S	
	330	20X35	0.15	1,070	ESMG201E□□331MN35S		22	16X25	0.24	165	ESMG451E□□220ML25S	
	330	22X30	0.15	1,070	ESMG201E□□331MP30S		22	20X20	0.20	180	ESMG451E□□220MN20S	
	390	20X40	0.15	1,190	ESMG201E□□391MN40S		33	16X31.5	0.24	215	ESMG451E□□330MLN3S	
	390	22X30	0.15	1,160	ESMG201E□□391MP30S		33	20X25	0.20	240	ESMG451E□□330MN25S	
470	22X40	0.15	1,350	ESMG201E□□471MP40S	47		16X35.5	0.24	265	ESMG451E□□470MLP1S		
560	22X40	0.15	1,430	ESMG201E□□561MP40S	47		20X25	0.20	290	ESMG451E□□470MN25S		
250	2.2	6.3X11	0.20	32	ESMG251E□□2R2MF11D		56	20X30	0.20	320	ESMG451E□□560MN30S	
	3.3	8X11.5	0.20	46	ESMG251E□□3R3MHB5D		68	20X35	0.20	370	ESMG451E□□680MN35S	
	4.7	8X11.5	0.20	55	ESMG251E□□4R7MHB5D	68	22X30	0.20	370	ESMG451E□□680MP30S		
	10	10X16	0.20	105	ESMG251E□□100MJ16S	82	20X40	0.20	420	ESMG451E□□820MN40S		
	22	10X20	0.20	170	ESMG251E□□220MJ20S	82	22X35	0.20	420	ESMG451E□□820MP35S		
	33	12.5X20	0.20	230	ESMG251E□□330MK20S	100	22X40	0.20	470	ESMG451E□□101MP40S		
	47	12.5X25	0.20	295	ESMG251E□□470MK25S							
	82	20X20	0.15	420	ESMG251E□□820MN20S							
	100	16X31.5	0.20	515	ESMG251E□□101MLN3S							
	100	20X25	0.15	490	ESMG251E□□101MN25S							
	120	20X25	0.15	530	ESMG251E□□121MN25S							
	180	20X30	0.15	680	ESMG251E□□181MN30S							
	220	18X40	0.20	825	ESMG251E□□221MM40S							
	220	20X35	0.15	780	ESMG251E□□221MN35S							
	220	22X30	0.15	820	ESMG251E□□221MP30S							
	270	20X40	0.15	880	ESMG251E□□271MN40S							
	270	22X35	0.15	880	ESMG251E□□271MP35S							
	330	22X40	0.15	1,060	ESMG251E□□331MP40S							

□ : 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
<b>1.0 to 4.7</b>	0.65	1.00	1.35	1.75	2.30	2.50
<b>10 to 47</b>	0.75	1.00	1.25	1.50	1.75	1.80
<b>100 to 1,000</b>	0.80	1.00	1.15	1.30	1.40	1.50
<b>2,200 to</b>	0.85	1.00	1.03	1.05	1.08	1.08

(φ20, φ22)

Rated Voltage (V <sub>dc</sub> ) \ Frequency (Hz)	50	120	300	1k	10k	100k
<b>6.3 to 50</b>	0.95	1.00	1.03	1.05	1.08	1.08
<b>63 to 100</b>	0.92	1.00	1.07	1.13	1.19	1.20
<b>160 to 250</b>	0.81	1.00	1.17	1.32	1.45	1.50
<b>315 to 450</b>	0.77	1.00	1.16	1.30	1.41	1.43

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.