

SMG Series

- Endurance : 2,000 hours at 85°C
- Solvent resistant type except 315 to 450V_{dc}
(see PRECAUTIONS AND GUIDELINES)
- RoHS Compliant

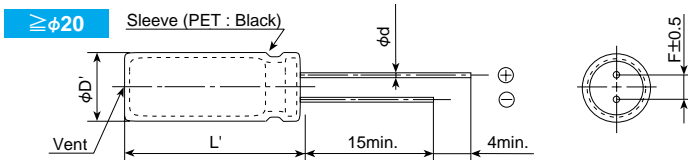
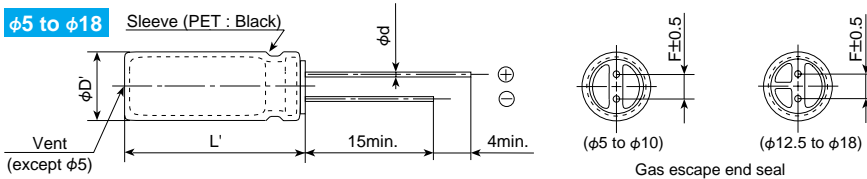


◆ SPECIFICATIONS

Items	Characteristics												
Category	-40 to +85°C(6.3 to 400V _{dc}) -25 to +85°C(450V _{dc})												
Temperature Range													
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. (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 _{dc})	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 _{dc})	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 _{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					

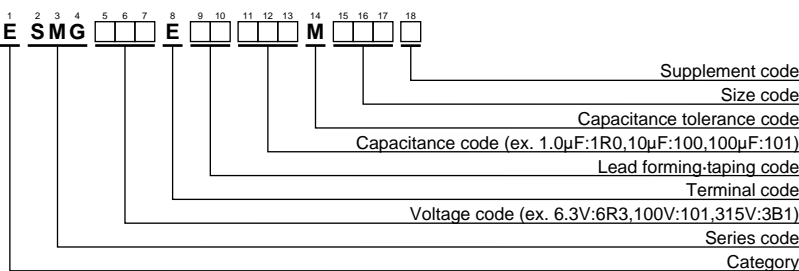
◆ DIMENSIONS [mm]

- 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 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□□183MN25S			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
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

(φ20, φ22)

Rated Voltage (V _r) \ 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
160 to 250	0.81	1.00	1.17	1.32	1.45	1.50
315 to 450	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.