

SMG Series

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

SMQ
↑
Downsized
SMG

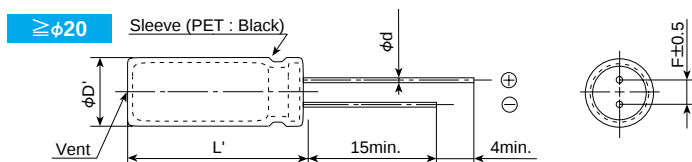
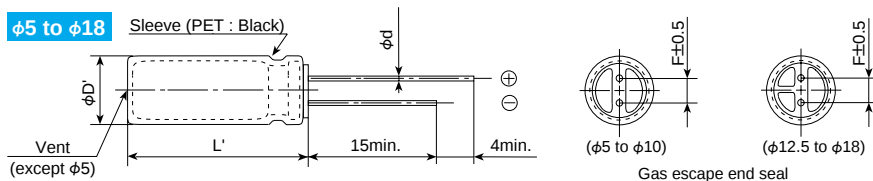


◆SPECIFICATIONS

Items	Characteristics												
Category													
Temperature Range	-40 to +85℃(6.3 to 400V _{dc}) -25 to +85℃(450V _{dc})												
Rated Voltage Range	6.3 to 450V _{dc}												
Capacitance Tolerance	±20% (M) (at 20℃, 120Hz)												
Leakage Current		6.3 to 100V _{dc}						160 to 450V _{dc}					
	≤φ18	I=0.03CV or 4μA, whichever is greater. (at 20℃ after 1 minute)						CV / Time		After 1minute		After 5minutes	
								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.	
							(at 20℃)						
	≥φ20	I=0.03CV						(at 20℃ 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℃, 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℃)/Z(+20℃)	≤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℃)/Z(+20℃)		≤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℃ after the rated voltage is applied for 2,000 hours at 85℃.												
	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℃ after exposing them for 1,000 hours at 85℃ 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					

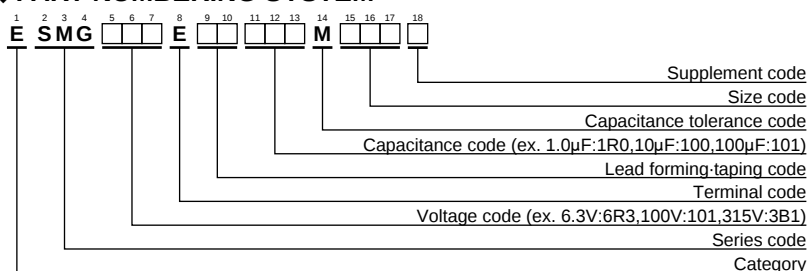
◆DIMENSIONS [mm]

- 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□□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
							4,700	22X30	0.20	2,380	ESMG350E□□472MP30S
							5,600	20X40	0.22	2,690	ESMG350E□□562MN40S
10	220	5X11	0.24	240	ESMG100E□□221ME11D		5,600	22X35	0.22	2,690	ESMG350E□□562MP35S
	330	6.3X11	0.24	290	ESMG100E□□331MF11D		6,800	22X40	0.24	3,090	ESMG350E□□682MP40S
	470	6.3X11	0.24	350	ESMG100E□□471MF11D	50	1.0	5X11	0.12	17	ESMG500E□□1R0ME11D
	1,000	10X12.5	0.24	650	ESMG100E□□102MJC5S		2.2	5X11	0.12	28	ESMG500E□□2R2ME11D
	2,200	10X20	0.26	1,070	ESMG100E□□222MJ20S		3.3	5X11	0.12	35	ESMG500E□□3R3ME11D
	3,300	12.5X20	0.28	1,420	ESMG100E□□332MK20S		4.7	5X11	0.12	41	ESMG500E□□4R7ME11D
	4,700	12.5X25	0.30	1,780	ESMG100E□□472MK25S		10	5X11	0.12	60	ESMG500E□□100ME11D
	6,800	16X25	0.34	2,220	ESMG100E□□682ML25S		22	5X11	0.12	95	ESMG500E□□220ME11D
	6,800	20X20	0.34	2,080	ESMG100E□□682MN20S		33	5X11	0.12	125	ESMG500E□□330ME11D
	10,000	16X35.5	0.42	2,670	ESMG100E□□103MLP1S		47	6.3X11	0.12	155	ESMG500E□□470MF11D
	10,000	20X25	0.42	2,410	ESMG100E□□103MN25S		100	8X11.5	0.12	260	ESMG500E□□101MHB5D
	12,000	20X30	0.46	2,620	ESMG100E□□123MN30S		220	10X12.5	0.12	430	ESMG500E□□221MJC5S
	15,000	18X35.5	0.52	3,080	ESMG100E□□153MMP1S		330	10X16	0.12	585	ESMG500E□□331MJ16S
	15,000	20X35	0.52	2,870	ESMG100E□□153MN35S		470	10X20	0.12	755	ESMG500E□□471MJ20S
	15,000	22X30	0.52	2,660	ESMG100E□□153MP30S		1,000	12.5X25	0.12	1,340	ESMG500E□□102MK25S
	18,000	22X35	0.58	3,050	ESMG100E□□183MP35S		1,500	20X20	0.12	1,570	ESMG500E□□152MN20S
	22,000	22X40	0.66	3,480	ESMG100E□□223MP40S		2,200	16X35.5	0.14	2,075	ESMG500E□□222MLP1S
							2,200	20X25	0.14	1,880	ESMG500E□□222MN25S
16	100	5X11	0.20	160	ESMG160E□□101ME11D		2,700	20X30	0.14	2,150	ESMG500E□□272MN30S
	220	6.3X11	0.20	260	ESMG160E□□221MF11D		3,300	18X35.5	0.16	2,500	ESMG500E□□332MMP1S
	330	8X11.5	0.20	370	ESMG160E□□331MHB5D		3,300	20X35	0.16	2,420	ESMG500E□□332MN35S
	470	8X11.5	0.20	440	ESMG160E□□471MHB5D		3,300	22X30	0.16	2,420	ESMG500E□□332MP30S
	1,000	10X16	0.20	785	ESMG160E□□102MJ16S		3,900	20X40	0.16	2,590	ESMG500E□□392MN40S
	2,200	12.5X20	0.22	1,295	ESMG160E□□222MK20S		3,900	22X35	0.16	2,590	ESMG500E□□392MP35S
	3,300	12.5X25	0.24	1,655	ESMG160E□□332MK25S		4,700	22X40	0.18	2,960	ESMG500E□□472MP40S
	4,700	16X25	0.26	2,090	ESMG160E□□472ML25S	63	10	5X11	0.09	65	ESMG630E□□100ME11D
	4,700	20X20	0.26	1,960	ESMG160E□□472MN20S		22	5X11	0.09	100	ESMG630E□□220ME11D
	6,800	16X31.5	0.30	2,520	ESMG160E□□682MLN3S		33	6.3X11	0.09	140	ESMG630E□□330MF11D
	6,800	20X25	0.30	2,330	ESMG160E□□682MN25S		47	6.3X11	0.09	170	ESMG630E□□470MF11D
	8,200	20X30	0.34	2,500	ESMG160E□□822MN30S		100	10X12.5	0.09	300	ESMG630E□□101MJC5S
	10,000	18X35.5	0.38	2,920	ESMG160E□□103MMP1S		220	10X16	0.09	490	ESMG630E□□221MJ16S
	10,000	20X35	0.38	2,720	ESMG160E□□103MN35S		330	10X20	0.09	710	ESMG630E□□331MJ20S
	10,000	22X30	0.38	2,660	ESMG160E□□103MP30S		470	12.5X20	0.09	900	ESMG630E□□471MK20S
	12,000	20X40	0.42	2,900	ESMG160E□□123MN40S		820	20X20	0.09	1,370	ESMG630E□□821MN20S
	12,000	22X35	0.42	2,900	ESMG160E□□123MP35S		1,000	16X25	0.09	1,300	ESMG630E□□102ML25S
	15,000	22X40	0.48	3,380	ESMG160E□□153MP40S		1,000	20X25	0.09	1,600	ESMG630E□□102MN25S
							1,500	20X30	0.09	1,850	ESMG630E□□152MN30S
							2,200	20X35	0.11	2,330	ESMG630E□□222MN35S
							2,200	22X30	0.11	2,190	ESMG630E□□222MP30S
							2,700	20X40	0.11	2,640	ESMG630E□□272MN40S
25	47	5X11	0.16	115	ESMG250E□□470ME11D		3,300	22X40	0.13	2,810	ESMG630E□□332MP40S
	100	6.3X11	0.16	190	ESMG250E□□101MF11D	100	1.0	5X11	0.08	21	ESMG101E□□1R0ME11D
	220	8X11.5	0.16	330	ESMG250E□□221MHB5D		2.2	5X11	0.08	30	ESMG101E□□2R2ME11D
	330	8X11.5	0.16	440	ESMG250E□□331MHB5D		3.3	5X11	0.08	40	ESMG101E□□3R3ME11D
	470	10X12.5	0.16	545	ESMG250E□□471MJC5S		4.7	5X11	0.08	45	ESMG101E□□4R7ME11D
	1,000	10X20	0.16	955	ESMG250E□□102MJ20S		10	6.3X11	0.08	75	ESMG101E□□100MF11D
	2,200	12.5X25	0.18	1,540	ESMG250E□□222MK25S		22	8X11.5	0.08	130	ESMG101E□□220MHB5D
	3,300	16X25	0.20	1,975	ESMG250E□□332ML25S						
	3,300	20X20	0.20	1,850	ESMG250E□□332MN20S						
	4,700	16X31.5	0.22	2,420	ESMG250E□□472MLN3S						
	4,700	20X25	0.22	2,420	ESMG250E□□472MN25S						

□□ : 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	8×11.5	0.08	180	ESMG101E□□330MHB5D	315	47	20×20	0.15	310	ESMG3B1E□□470MN20S
	47	10×12.5	0.08	230	ESMG101E□□470MJC5S		68	20×25	0.15	400	ESMG3B1E□□680MN25S
	100	10×20	0.08	370	ESMG101E□□101MJ20S		82	20×25	0.15	440	ESMG3B1E□□820MN25S
	220	12.5×25	0.08	620	ESMG101E□□221MK25S		100	20×30	0.15	500	ESMG3B1E□□101MN30S
	330	12.5×25	0.08	760	ESMG101E□□331MK25S		120	20×30	0.15	550	ESMG3B1E□□121MN30S
	330	20×20	0.08	870	ESMG101E□□331MN20S		180	20×40	0.15	720	ESMG3B1E□□181MN40S
	470	16×25	0.08	1,000	ESMG101E□□471ML25S		180	22×35	0.15	720	ESMG3B1E□□181MP35S
	680	20×30	0.08	1,360	ESMG101E□□681MN30S		220	22×40	0.15	810	ESMG3B1E□□221MP40S
	820	22×30	0.08	1,540	ESMG101E□□821MP30S	350	1.0	6.3×11	0.24	22	ESMG351E□□1R0MF11D
	1,000	18×40	0.08	1,380	ESMG101E□□102MM40S		2.2	8×11.5	0.24	38	ESMG351E□□2R2MHB5D
	1,000	20×35	0.08	1,720	ESMG101E□□102MN35S		3.3	8×11.5	0.24	46	ESMG351E□□3R3MHB5D
160	1,200	22×40	0.08	1,980	ESMG101E□□122MP40S		4.7	10×12.5	0.24	65	ESMG351E□□4R7MJC5S
	3.3	6.3×11	0.20	40	ESMG161E□□3R3MF11D		10	10×20	0.24	115	ESMG351E□□100MJ20S
	4.7	6.3×11	0.20	48	ESMG161E□□4R7MF11D		22	12.5×20	0.24	185	ESMG351E□□2R2MK20S
	10	10×12.5	0.20	94	ESMG161E□□100MJC5S		33	16×25	0.24	275	ESMG351E□□330ML25S
	22	10×20	0.20	170	ESMG161E□□220MJ20S		47	16×25	0.24	325	ESMG351E□□470ML25S
	33	10×20	0.20	205	ESMG161E□□330MJ20S		47	20×20	0.15	310	ESMG351E□□470MN20S
	47	12.5×20	0.20	270	ESMG161E□□470MK20S		68	20×25	0.15	400	ESMG351E□□680MN25S
	100	12.5×25	0.20	430	ESMG161E□□101MK25S		100	18×31.5	0.24	530	ESMG351E□□101MMN3S
	220	16×31.5	0.20	760	ESMG161E□□221MLN3S		100	20×30	0.15	500	ESMG351E□□101MN30S
	220	20×25	0.15	730	ESMG161E□□221MN25S		120	20×35	0.15	560	ESMG351E□□121MN35S
	330	18×35.5	0.20	995	ESMG161E□□331MMP1S	400	1.0	6.3×11	0.24	22	ESMG401E□□1R0MF11D
200	330	20×30	0.15	920	ESMG161E□□331MN30S		2.2	8×11.5	0.24	38	ESMG401E□□2R2MHB5D
	390	20×35	0.15	1,160	ESMG161E□□391MN35S		3.3	10×12.5	0.24	54	ESMG401E□□3R3MJC5S
	390	22×30	0.15	1,160	ESMG161E□□391MP30S		4.7	10×16	0.24	71	ESMG401E□□4R7MJ16S
	470	20×40	0.15	1,340	ESMG161E□□471MN40S		10	10×20	0.24	115	ESMG401E□□100MJ20S
	470	22×35	0.15	1,340	ESMG161E□□471MP35S		22	12.5×25	0.24	205	ESMG401E□□220MK25S
	560	22×40	0.15	1,470	ESMG161E□□561MP40S		33	16×25	0.24	275	ESMG401E□□330ML25S
	3.3	6.3×11	0.20	40	ESMG201E□□3R3MF11D		33	20×20	0.15	260	ESMG401E□□330MN20S
	4.7	8×11.5	0.20	55	ESMG201E□□4R7MHB5D		47	16×31.5	0.24	350	ESMG401E□□470MLN3S
	10	10×12.5	0.20	94	ESMG201E□□100MJC5S		56	20×25	0.15	350	ESMG401E□□560MN25S
	22	10×20	0.20	170	ESMG201E□□220MJ20S		68	20×30	0.15	420	ESMG401E□□680MN30S
	33	10×20	0.20	205	ESMG201E□□330MJ20S	450	100	20×35	0.15	520	ESMG401E□□101MN35S
250	47	12.5×20	0.20	270	ESMG201E□□470MK20S		100	22×30	0.15	520	ESMG401E□□101MP30S
	100	16×25	0.20	475	ESMG201E□□101ML25S		120	20×40	0.15	580	ESMG401E□□121MN40S
	100	20×20	0.15	460	ESMG201E□□101MN20S		120	22×35	0.15	580	ESMG401E□□121MP35S
	180	20×25	0.15	660	ESMG201E□□181MN25S		2.2	10×12.5	0.24	32	ESMG451E□□2R2MJC5S
	220	18×35.5	0.20	810	ESMG201E□□221MMP1S		3.3	10×16	0.24	44	ESMG451E□□3R3MJ16S
	220	20×30	0.15	750	ESMG201E□□221MN30S		4.7	10×20	0.24	56	ESMG451E□□4R7MJ20S
	270	20×30	0.15	830	ESMG201E□□271MN30S		10	12.5×20	0.24	91	ESMG451E□□100MK20S
	330	20×35	0.15	1,070	ESMG201E□□331MN35S		22	16×25	0.24	165	ESMG451E□□220ML25S
	330	22×30	0.15	1,070	ESMG201E□□331MP30S		22	20×20	0.20	180	ESMG451E□□220MN20S
	390	20×40	0.15	1,190	ESMG201E□□391MN40S		33	16×31.5	0.24	215	ESMG451E□□330MLN3S
	390	22×30	0.15	1,160	ESMG201E□□391MP30S		33	20×25	0.20	240	ESMG451E□□330MN25S
	470	22×40	0.15	1,350	ESMG201E□□471MP40S		47	16×35.5	0.24	265	ESMG451E□□470MLP1S
250	560	22×40	0.15	1,430	ESMG201E□□561MP40S		47	20×25	0.20	290	ESMG451E□□470MN25S
	2.2	6.3×11	0.20	32	ESMG251E□□2R2MF11D		56	20×30	0.20	320	ESMG451E□□560MN30S
	3.3	8×11.5	0.20	46	ESMG251E□□3R3MHB5D		68	20×35	0.20	370	ESMG451E□□680MN35S
	4.7	8×11.5	0.20	55	ESMG251E□□4R7MHB5D		68	22×30	0.20	370	ESMG451E□□680MP30S
	10	10×16	0.20	105	ESMG251E□□100MJ16S		82	20×40	0.20	420	ESMG451E□□820MN40S
	22	10×20	0.20	170	ESMG251E□□220MJ20S		82	22×35	0.20	420	ESMG451E□□820MP35S
	33	12.5×20	0.20	230	ESMG251E□□330MK20S		100	22×40	0.20	470	ESMG451E□□101MP40S
	47	12.5×25	0.20	295	ESMG251E□□470MK25S						
	82	20×20	0.15	420	ESMG251E□□820MN20S						
	100	16×31.5	0.20	515	ESMG251E□□101MLN3S						
	100	20×25	0.15	490	ESMG251E□□101MN25S						
	120	20×25	0.15	530	ESMG251E□□121MN25S						
	180	20×30	0.15	680	ESMG251E□□181MN30S						
	220	18×40	0.20	825	ESMG251E□□221MM40S						
	220	20×35	0.15	780	ESMG251E□□221MN35S						
	220	22×30	0.15	820	ESMG251E□□221MP30S						
	270	20×40	0.15	880	ESMG251E□□271MN40S						
	270	22×35	0.15	880	ESMG251E□□271MP35S						
	330	22×40	0.15	1,060	ESMG251E□□331MP40S						

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

SMG Series

◆RATED RIPPLE CURRENT MULTIPLIERS

●Frequency Multipliers

($\phi 5$ to $\phi 18$)

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

($\phi 20$, $\phi 22$)

Rated Voltage (V _o) \ 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.