

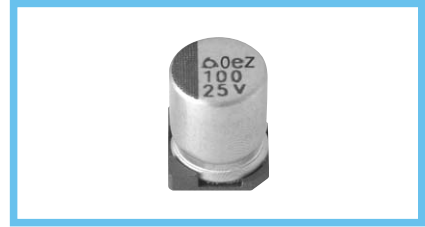
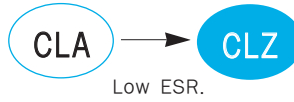
CLZ Series

• 125°C 1,000~5,000Hrs assured.

- Vertical SMD type.
- LOW ESR of CLA Series
- For ECU, ESA
- RoHS compliant.
- Halogen-free capacitors are also available.

Solvent-proof

WV ≤ 80V_{DC}

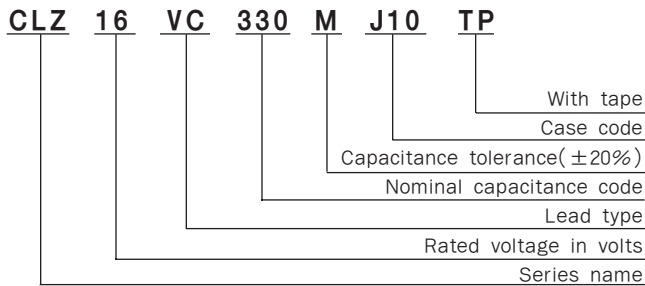


SPECIFICATIONS

Item	Characteristics																					
Rated Voltage Range	10 ~ 400 V _{DC}																					
Operating Temperature Range	-40 ~ +125°C																					
Capacitance Tolerance	±20%(M)																					
Leakage Current	<table border="1"> <tr> <td>Rated voltage(V_{DC})</td> <td>10~80</td> <td>160~400</td> </tr> <tr> <td>Max. Leakage current (μA)</td> <td>I=0.01CV(μA) or 3μA, whichever is greater. (at 20°C, 2 minutes)</td> <td>0.04CV + 100(μA) (at 20°C, 2 minutes)</td> </tr> </table> <p>Where, C : Nominal capacitance(μF), V : Rated voltage(V_{DC})</p>	Rated voltage(V _{DC})	10~80	160~400	Max. Leakage current (μA)	I=0.01CV(μA) or 3μA, whichever is greater. (at 20°C, 2 minutes)	0.04CV + 100(μA) (at 20°C, 2 minutes)															
	Rated voltage(V _{DC})	10~80	160~400																			
Max. Leakage current (μA)	I=0.01CV(μA) or 3μA, whichever is greater. (at 20°C, 2 minutes)	0.04CV + 100(μA) (at 20°C, 2 minutes)																				
Dissipation Factor (Tanδ)	<table border="1"> <tr> <td>Rated voltage(V_{DC})</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50~80</td> <td>100</td> <td>160~250</td> <td>400</td> <td rowspan="2">(at 20°C, 120Hz)</td> </tr> <tr> <td>Tanδ(Max.)</td> <td>0.22</td> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> <td>0.20</td> <td>0.24</td> </tr> </table>	Rated voltage(V _{DC})	10	16	25	35	50~80	100	160~250	400	(at 20°C, 120Hz)	Tanδ(Max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.20	0.24		
Rated voltage(V _{DC})	10	16	25	35	50~80	100	160~250	400	(at 20°C, 120Hz)													
Tanδ(Max.)	0.22	0.19	0.16	0.14	0.12	0.10	0.20	0.24														
Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <tr> <td>Rated voltage(V_{DC})</td> <td>10</td> <td>16</td> <td>25</td> <td>35~100</td> <td>160~250</td> <td>400</td> </tr> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>3</td> <td>6</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> <td>6</td> <td>10</td> </tr> </table> <p>(at 120Hz)</p>	Rated voltage(V _{DC})	10	16	25	35~100	160~250	400	Z(-25°C)/Z(+20°C)	4	3	2	2	3	6	Z(-40°C)/Z(+20°C)	8	6	4	3	6	10
Rated voltage(V _{DC})	10	16	25	35~100	160~250	400																
Z(-25°C)/Z(+20°C)	4	3	2	2	3	6																
Z(-40°C)/Z(+20°C)	8	6	4	3	6	10																
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for the specified time at 125°C</p> <table border="1"> <tr> <td>Case Code</td> <td>10~80V</td> <td>100V</td> <td>160~400V</td> </tr> <tr> <td>D55~F60</td> <td>1,000Hrs</td> <td>-</td> <td>-</td> </tr> <tr> <td>H63</td> <td>3,000Hrs</td> <td>-</td> <td>-</td> </tr> <tr> <td>H10, J10</td> <td>5,000Hrs</td> <td>2,000Hrs</td> <td>-</td> </tr> <tr> <td>K14~M22</td> <td>5,000Hrs</td> <td>5,000Hrs</td> <td>2,000Hrs</td> </tr> </table> <p>Capacitance change ≤ ±30% of the initial value Tanδ ≤ 300% of the initial specified value Leakage current ≤ The initial specified value</p>	Case Code	10~80V	100V	160~400V	D55~F60	1,000Hrs	-	-	H63	3,000Hrs	-	-	H10, J10	5,000Hrs	2,000Hrs	-	K14~M22	5,000Hrs	5,000Hrs	2,000Hrs	
Case Code	10~80V	100V	160~400V																			
D55~F60	1,000Hrs	-	-																			
H63	3,000Hrs	-	-																			
H10, J10	5,000Hrs	2,000Hrs	-																			
K14~M22	5,000Hrs	5,000Hrs	2,000Hrs																			
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 125°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. (Where, D55 ~ F60 is 500 hours)</p> <p>Capacitance change ≤ ±30% of the initial value Tanδ ≤ 300% of the initial specified value Leakage current ≤ 500% of the initial specified value</p>																					
Others	Satisfied characteristics KS C IEC 60384-4																					

CLZ Series

PART NUMBERING SYSTEM



Capacitance	Code
0.1μF	R1
0.47μF	R47
1.0μF	1
4.7μF	4R7
10μF	10
100μF	100



DIMENSIONS OF CLZ Series (Type : VC)

Unit(mm)

DIMENSIONS

● Vibration Resistance

<Size code:H63~M22> <Size code:L17~M22>

■ : Dummy terminals

Recommended solder land on PC board

■ : Solder pad on PC board

MARKING

<D55~J10> <K14~M22>

Note 1 : L±0.5 for 8×6.3(H63)~18×21.5(M22)
 Note 2 : 4×5.2(D55), 5×5.2(E55) is excluded symbol mark

Case code	∅D	L	A	B	C	W	P	a	b	c	a	b	c
D55	4	5.2	4.3	4.3	5.1	0.5~0.8	1.0	1.0	2.6	1.6			
E55	5	5.2	5.3	5.3	5.9	0.5~0.8	1.4	1.4	3.0	1.6			
F55	6.3	5.2	6.6	6.6	7.2	0.5~0.8	1.9	1.9	3.5	1.6			
F60	6.3	5.7	6.6	6.6	7.2	0.5~0.8	1.9	1.9	3.5	1.6			
H63	8	6.3	8.3	8.3	9.0	0.5~0.8	2.3	2.3	4.5	1.6			
H10	8	10	8.3	8.3	9.0	0.7~1.1	3.1	3.1	4.2	2.2			
J10	10	10	10.3	10.3	11.0	0.7~1.1	4.5	4.5	4.4	2.2			
K14	12.5	13.5	13.0	13.0	13.7	1.0~1.3	4.2	4.0	5.7	2.5			
L17	16	16.5	17.0	17.0	18.0	1.0~1.3	6.5	6.0	6.9	2.5	4.7	7.8	9.6
L22	16	21.5	17.0	17.0	18.0	1.0~1.3	6.5	6.0	6.9	2.5			
M17	18	16.5	19.0	19.0	20.0	1.0~1.3	6.5	6.0	7.9	2.5	4.7	8.8	9.6
M22	18	21.5	19.0	19.0	20.0	1.0~1.3	6.5	6.0	7.9	2.5			

● Vibration Resistance

RATINGS OF CLZ Series

Vdc μF	10			16			25			35			50			63			80			100		
	10				D55	7.00	12	E55	3.30	23	F60	1.60	69	F60	2.80	51	H63	2.00	60	H10	1.20	70	H10	1.60
22	E55	3.30	23	E55	3.30	23	F55	2.00	40	F60	1.60	69	H63	1.60	83	H10	1.00	70	J10	0.55	115	H10	1.60	70
33	E55	3.30	23	F55	2.00	40	F60	1.60	69	H63	0.90	110	H10	0.70	160	J10	0.55	115	J10	0.55	115	J10	0.80	115
47	F55	2.00	40	F60	1.60	69	H63	0.90	110	H10	0.40	220	J10	0.50	247	J10	0.55	115	K14	0.33	450	K14	0.33	450
100	H63	0.90	110	H63	0.90	110	H10	0.40	220	H10	0.40	220	J10	0.50	247	K14	0.33	450	L17	0.24	650	K14	0.33	450
220	H10	0.40	220	H10	0.40	220	J10	0.30	296	J10	0.30	296	K14	0.23	550	L17	0.24	650	M17	0.16	950			
330	J10	0.30	296	J10	0.30	296	K14	0.14	750	K14	0.14	750	L17	0.15	850	L17	0.24	650						
470	J10	0.30	296	K14	0.14	750	L17	0.10	1000	M17	0.10	1000	M17	0.15	920	L22	0.16	950						
1,000	K14	0.14	750	M17	0.10	1200	M22	0.058	1550															
2,200	L17	0.10	1000																					
3,300	M17	0.10	1200																					
4,700	M22	0.058	1550																					

Rated Ripple Current (mA rms/125°C, 100kHz)
 ESR (Ω max./ 20°C, 100kHz)
 Case code

Vdc μF	160		200		250		400	
1							J10	18
2.2							J10	26
3.3							J10	37
4.7							K14	70
10	K14	100	K14	100	L17	120	L22	140
22	L17	180	L17	180	M17	205		
33	M17	245	M17	245	M22	260		
47	M22	315	M22	315				
68	M22	380						

Rated Ripple Current (mA rms/125°C, 120Hz)
 Case code

NFC Series

• 105°C 5,000Hrs assured.

- Non-solvent proof.
- High ripple , Long Life.
- For SMPS, IP-Board, Adaptor
- RoHS compliant.
- Halogen-free capacitors are also available.

KMF (KMX)

Long Life

NFC



SPECIFICATIONS

Item	Characteristics													
Rated Voltage Range	160 ~ 400 V _{DC}	450 ~ 500 V _{DC}												
Operating Temperature Range	-40 ~ + 105°C	-25 ~ + 105°C												
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)													
Leakage Current	<table border="1"> <thead> <tr> <th>C · V \ Time</th> <th>After 1 minute</th> <th>After 5 minutes</th> </tr> </thead> <tbody> <tr> <td>≤ 1000</td> <td>I = 0.1CV + 40</td> <td>I = 0.03CV + 15</td> </tr> <tr> <td>> 1000</td> <td>I = 0.04CV + 100</td> <td>I = 0.02CV + 25</td> </tr> </tbody> </table> <p>Where, I:Max. Leakage current(μA) C:Nominal capacitance (μF) V:Rated voltage (V_{DC})(at 20°C)</p>		C · V \ Time	After 1 minute	After 5 minutes	≤ 1000	I = 0.1CV + 40	I = 0.03CV + 15	> 1000	I = 0.04CV + 100	I = 0.02CV + 25			
C · V \ Time	After 1 minute	After 5 minutes												
≤ 1000	I = 0.1CV + 40	I = 0.03CV + 15												
> 1000	I = 0.04CV + 100	I = 0.02CV + 25												
Dissipation Factor (Tanδ)	<table border="1"> <thead> <tr> <th>Rated Voltage(V_{DC})</th> <th>160~250</th> <th>400~500</th> </tr> </thead> <tbody> <tr> <td>Tanδ(Max.)</td> <td>0.20</td> <td>0.24</td> </tr> </tbody> </table> <p>(at 20°C, 120Hz)</p>		Rated Voltage(V _{DC})	160~250	400~500	Tanδ(Max.)	0.20	0.24						
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Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <thead> <tr> <th>Rated Voltage(V_{DC})</th> <th>160~250</th> <th>400</th> <th>450~500</th> </tr> </thead> <tbody> <tr> <td>Z(-25°C)/Z(+20°C)</td> <td>3</td> <td>5</td> <td>6</td> </tr> <tr> <td>Z(-40°C)/Z(+20°C)</td> <td>6</td> <td>6</td> <td>—</td> </tr> </tbody> </table> <p>(at 120Hz)</p>		Rated Voltage(V _{DC})	160~250	400	450~500	Z(-25°C)/Z(+20°C)	3	5	6	Z(-40°C)/Z(+20°C)	6	6	—
Rated Voltage(V _{DC})	160~250	400	450~500											
Z(-25°C)/Z(+20°C)	3	5	6											
Z(-40°C)/Z(+20°C)	6	6	—											
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied at 105°C for 5,000 hours. (where, 2,000 hours for ø6.3)</p> <p>Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage current ≤ The initial specified value</p>													
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. (where, 500 hours for ø6.3)</p> <p>Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage current ≤ 500% of the initial specified value</p>													
Others	Satisfied characteristics KS C IEC 60384-4													

DIMENSIONS OF NFC Series

Unit(mm)

Marking : DARK BROWN SLEEVE, SILVER INK

	øD	6.3	8	10	12.5	16	18	20	22
ød	0.5	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8
F	2.5	3.5	5.0	5.0	7.5	7.5	7.5	7.5	10.0
øD'	øD + 0.5 max.								
L'	L + 2.0 max.								

※ ø6.3, ø8 x 20L, øD' ≤ øD + 0.5 and L' ≤ L + 1.5

NFC Series



RATINGS OF NFC Series

V _{DC}		160		200	
Items μF	∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		22	8 × 20		
	10 × 20	192	10 × 20	192	
33	10 × 20	236	12.5 × 20	262	
47	12.5 × 20	312	12.5 × 20	312	
68	12.5 × 25	409	12.5 × 25	409	
			8 × 50	320	
82	8 × 50	360	16 × 20	462	
100	16 × 25	548	16 × 25	548	
150	16 × 25	701	16 × 25	701	
220	16 × 31.5	876	18 × 31.5	906	
330	18 × 31.5	1,110			

V _{DC}		250		350	
Items μF	∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		10	8 × 20		
	10 × 20	130	10 × 20	126	
22	12.5 × 20	214	12.5 × 20	207	
33	12.5 × 25	285	16 × 20	284	
			8 × 50	245	
47	8 × 50	250	16 × 25	364	
	12.5 × 25	340			
68	16 × 25	452	16 × 31.5	472	
100	16 × 31.5	591	18 × 31.5	591	
150	18 × 31.5	748	18 × 40	760	
220	18 × 40	951	22 × 45	970	
330	20 × 40	1,196			

V _{DC}		400		450	
Items μF	∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		∅ D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		1	6.3 × 11		
1.5			8 × 11.5	23	
2.2			8 × 15	38	
3.3	8 × 11.5	42			
4.7			8 × 20	62	
6.8	8 × 15	66	10 × 20	100	
8.2	8 × 20	80	10 × 25	121	
10	10 × 20	126	12.5 × 20	135	
22	12.5 × 25	225	8 × 50	230	
27	8 × 50	240	16 × 25	267	
33	16 × 20	284	16 × 31.5	319	
			10 × 50	334	
47	16 × 25	364	18 × 25	368	
			18 × 31.5	473	
68	16 × 31.5	472	12.5 × 50	473	
			18 × 35.5	537	
82	18 × 31.5	536	12.5 × 60	569	
			18 × 40	602	
100	18 × 40	680	18 × 40	659	
150	18 × 40	760	20 × 40	757	
180	20 × 40	855	22 × 50	892	
220	22 × 45	996			



RATINGS OF NFC Series

V _{dc}	500	
μF \ Items	$\varnothing D \times L$ (mm)	Rated ripple current (mA _{rms} /105°C,120Hz)
6.8	10 × 20	100
10	12.5 × 20	135
15	12.5 × 25	182
22	16 × 25	241
27	10 × 50	253
33	18 × 25	308
	16 × 31.5	319
39	12.5 × 50	358
47	18 × 31.5	393
60	12.5 × 60	440
68	18 × 35.5	489
82	18 × 40	544
100	20 × 40	618

RATED RIPPLE CURRENT MULTIPLIERS

Frequency Multipliers

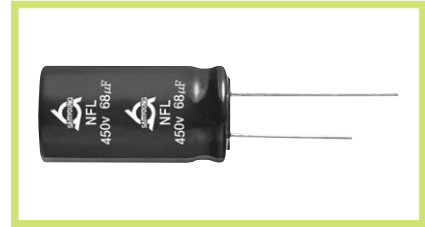
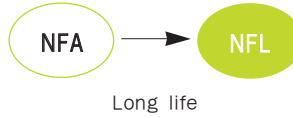
Freq.(Hz)	120	1k	10k	100k
Factor	1.00	1.25	1.50	1.75



NFL Series

• 105°C 10,000~12,000Hrs assured.

- Non-solvent proof.
- High ripple and long life.
- For ballasts stabilizer and other long life required applications.
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics													
Rated Voltage Range	160~400 V _{DC}	450~500 V _{DC}												
Operating Temperature Range	-40~+105°C	-25~+105°C												
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)													
Leakage Current	<table border="1"> <thead> <tr> <th>C · V \ Time</th> <th>After 1 minute</th> <th>After 5 minutes</th> </tr> </thead> <tbody> <tr> <td>≤ 1000</td> <td>I = 0.1CV + 40</td> <td>I = 0.03CV + 15</td> </tr> <tr> <td>> 1000</td> <td>I = 0.04CV + 100</td> <td>I = 0.02CV + 25</td> </tr> </tbody> </table> <p>Where, I:Max. Leakage current(µA) C:Nominal capacitance(µF) V:Rated voltage(V_{DC}) (at 20°C)</p>		C · V \ Time	After 1 minute	After 5 minutes	≤ 1000	I = 0.1CV + 40	I = 0.03CV + 15	> 1000	I = 0.04CV + 100	I = 0.02CV + 25			
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Dissipation Factor (Tanδ)	<table border="1"> <thead> <tr> <th>Rated Voltage(V_{DC})</th> <th>160~250</th> <th>350~500</th> </tr> </thead> <tbody> <tr> <td>Tanδ(Max.)</td> <td>0.20</td> <td>0.24</td> </tr> </tbody> </table> <p>(at 20°C, 120Hz)</p>		Rated Voltage(V _{DC})	160~250	350~500	Tanδ(Max.)	0.20	0.24						
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Rated Voltage(V _{DC})	160~250	350~400	450~500											
Z(-25°C)/Z(20°C)	3	5	6											
Z(-40°C)/Z(20°C)	6	6	-											
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied at 105°C for 12,000 hours.(where, 10,000 hours for Ø10, Ø8)</p> <p>Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage current ≤ The initial specified value</p>													
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage current ≤ 500% of the initial specified value</p>													
Others	Satisfied characteristics KS C IEC 60384-4													

DIMENSIONS OF NFL Series

Unit(mm)

Marking : DARK BROWN SLEEVE, SILVER INK

ØD	8	10	12.5	16	18
Ød	0.6	0.6	0.6	0.8	0.8
F	3.5	5.0	5.0	7.5	7.5
ØD'	ØD + 0.5 max.				
L'	L + 2.0 max.				



RATINGS OF NFL Series

V _{dc}		160		200	
Items μF	ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		27			
39	10 × 16		237	10 × 20	256
47	10 × 20		280	12.5 × 20	312
56	10 × 25		335	12.5 × 25	371
68	12.5 × 20		375	12.5 × 25	409
100	12.5 × 25		496	16 × 25	550
	10 × 45		562	10 × 50	591
150	16 × 31.5		724	16 × 25	671
				12.5 × 50	786
220	16 × 31.5		876	18 × 31.5	905
	12.5 × 50		952		
270	16 × 35.5		992	18 × 35.5	1,036
330	16 × 40		1,132	18 × 40	1,164
	18 × 31.5		1,109		
390	18 × 35.5		1,246		
470	18 × 40		1,389		

V _{dc}		250		350	
Items μF	ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		10	10 × 16		
22	10 × 20		192	12.5 × 20	213
33	10 × 25		257	12.5 × 25	285
47	8 × 50		250	8 × 50	245
	12.5 × 20		312	10 × 50	405
68	12.5 × 30		441	16 × 25	375
82	10 × 50		536	16 × 31.5	503
100	16 × 25		548	12.5 × 45	571
150	12.5 × 50		786	18 × 31.5	610
	18 × 25		748		
220	18 × 31.5		905		

V _{dc}		400		450	
Items μF	ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)		ø D × L (mm)	Rated ripple current (mArms/105°C, 120Hz)
		10	10 × 20		
22	12.5 × 20		208	16 × 25	228
27	8 × 50		240		
33	16 × 20		261	16 × 31.5	270
39	10 × 45		340	10 × 50	305
47	16 × 25		335	18 × 31.5	360
68	16 × 31.5		460	12.5 × 50	473
	12.5 × 45		482	18 × 35.5	500
82	18 × 31.5		520	18 × 35.5	549
	12.5 × 50		527		
100	18 × 35.5		630	12.5 × 60	626
				18 × 40	670
120	18 × 40		700	20 × 40	720



RATINGS OF NFL Series

Vdc	500	
Items μF	$\varnothing D \times L$ (mm)	Rated ripple current (mA _{rms} /105°C,120Hz)
10	12.5 × 20	150
22	16 × 25	228
27	10 × 50	253
33	18 × 25	260
	16 × 31.5	270
39	12.5 × 50	358
47	18 × 31.5	360
60	12.5 × 60	467
68	18 × 35.5	500
82	18 × 40	606
100	20 × 40	657

RATED RIPPLE CURRENT MULTIPLIERS

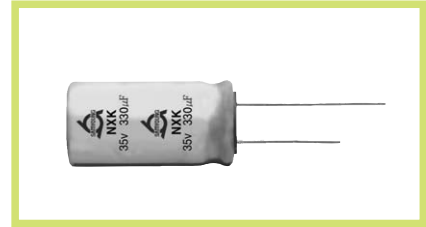
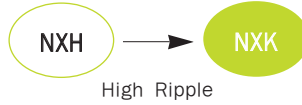
Frequency Multipliers

Cap. (μF) \ Freq. (Hz)	120	1k	10k	100k
Factor	1.00	1.25	1.50	1.75

NXK Series

- 105°C 4,000~5,000Hrs assured

- Non-solvent proof.
- Low impedance.
- High Ripple.
- For LCD TV BLU Inverter, SMPS, IP-Board, Adaptor
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics																			
Rated Voltage Range	10 ~ 50 V _{DC}																			
Operating Temperature Range	-40 ~ + 105°C																			
Capacitance Tolerance	±20% (M) (at 20°C, 120Hz)																			
Leakage Current	I=0.01CV(μA) or 3μA, whichever is greater. Where, I:Max. leakage current(μA), C:Nominal capacitance(μF), V:Rated voltage(V _{DC}) (at 20°C, 2 minutes)																			
Dissipation Factor (Tanδ)	<table border="1"> <tr> <th>Rated Voltage(V_{DC})</th> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> </tr> <tr> <th>Tanδ(Max.)</th> <td>0.19</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.10</td> </tr> </table> <p>When the capacitance exceeds 1,000μF, 0.02 shall be added every 1,000μF increase. (at 20°C, 120Hz)</p>	Rated Voltage(V _{DC})	10	16	25	35	50	Tanδ(Max.)	0.19	0.16	0.14	0.12	0.10							
Rated Voltage(V _{DC})	10	16	25	35	50															
Tanδ(Max.)	0.19	0.16	0.14	0.12	0.10															
Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <tr> <td>Z(-25°C) / Z(+20°C)</td> <td>2</td> </tr> <tr> <td>Z(-40°C) / Z(+20°C)</td> <td>3</td> </tr> </table> <p>(at 120Hz)</p>	Z(-25°C) / Z(+20°C)	2	Z(-40°C) / Z(+20°C)	3															
Z(-25°C) / Z(+20°C)	2																			
Z(-40°C) / Z(+20°C)	3																			
Load Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage with the rated ripple current is applied for the specified period of time at 105°C.</p> <table border="1"> <tr> <td>Rated voltage(V_{DC})</td> <td>10</td> <td>16~50</td> <td>Case Size(∅D)</td> <td>Life Time</td> </tr> <tr> <td>Capacitance change</td> <td>≤ ±30% of the initial value</td> <td>≤ ±25% of the initial value</td> <td>∅ 8</td> <td rowspan="3">4,000Hrs</td> </tr> <tr> <td>Tanδ</td> <td colspan="2">≤ ±200% of the initial specified value</td> <td>∅ 10x12.5L</td> </tr> <tr> <td>Leakage current</td> <td colspan="2">≤ The initial specified value</td> <td>∅ 10</td> <td>5,000Hrs</td> </tr> </table>	Rated voltage(V _{DC})	10	16~50	Case Size(∅D)	Life Time	Capacitance change	≤ ±30% of the initial value	≤ ±25% of the initial value	∅ 8	4,000Hrs	Tanδ	≤ ±200% of the initial specified value		∅ 10x12.5L	Leakage current	≤ The initial specified value		∅ 10	5,000Hrs
Rated voltage(V _{DC})	10	16~50	Case Size(∅D)	Life Time																
Capacitance change	≤ ±30% of the initial value	≤ ±25% of the initial value	∅ 8	4,000Hrs																
Tanδ	≤ ±200% of the initial specified value		∅ 10x12.5L																	
Leakage current	≤ The initial specified value		∅ 10		5,000Hrs															
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <table border="1"> <tr> <td>Rated voltage(V_{DC})</td> <td>10</td> <td>16~50</td> </tr> <tr> <td>Capacitance change</td> <td>≤ ±30% of the initial value</td> <td>≤ ±25% of the initial value</td> </tr> <tr> <td>Tanδ</td> <td colspan="2">≤ ±200% of the initial specified value</td> </tr> <tr> <td>Leakage current</td> <td colspan="2">≤ The initial specified value</td> </tr> </table>	Rated voltage(V _{DC})	10	16~50	Capacitance change	≤ ±30% of the initial value	≤ ±25% of the initial value	Tanδ	≤ ±200% of the initial specified value		Leakage current	≤ The initial specified value								
Rated voltage(V _{DC})	10	16~50																		
Capacitance change	≤ ±30% of the initial value	≤ ±25% of the initial value																		
Tanδ	≤ ±200% of the initial specified value																			
Leakage current	≤ The initial specified value																			
Others	Satisfied characteristics KS C IEC 60384-4																			

DIMENSIONS OF NXK Series

Unit(mm)

Marking : YELLOW SLEEVE, BLACK INK

∅D	8	10
∅d	0.6	0.6
F	3.5	5.0
∅D'	∅D + 0.5 max.	
L'	L + 1.5 max. L + 2.0 max.	

NXK Series



RATINGS OF NXK series

V _{bc}	10		
Capacitance (μF)	∅ D × L (mm)	Rated Ripple Current (mArms/105°C, 100kHz)	IMP. (Ω max./20°C, 100kHz)
680	8 × 11.5	1,417	0.073
1,000	8 × 15	2,050	0.059
1,000	10 × 12.5	2,190	0.053
1,500	8 × 20	2,380	0.041
1,500	10 × 16	2,550	0.038
1,800	10 × 20	2,880	0.028
2,200	10 × 25	3,160	0.024
2,700	10 × 33	3,570	0.020

V _{bc}	16		
Capacitance (μF)	∅ D × L (mm)	Rated Ripple Current (mArms/105°C, 100kHz)	IMP. (Ω max./20°C, 100kHz)
470	8 × 11.5	1,417	0.073
680	8 × 15	2,050	0.059
680	10 × 12.5	2,190	0.053
1,000	8 × 20	2,380	0.041
1,000	10 × 16	2,550	0.038
1,500	10 × 20	2,880	0.028
1,800	10 × 25	3,160	0.024
2,200	10 × 33	3,570	0.020

V _{bc}	25		
Capacitance (μF)	∅ D × L (mm)	Rated Ripple Current (mArms/105°C, 100kHz)	IMP. (Ω max./20°C, 100kHz)
330	8 × 11.5	1,417	0.073
390	8 × 15	2,050	0.059
470	10 × 12.5	2,190	0.053
560	8 × 20	2,380	0.041
680	10 × 16	2,550	0.038
820	10 × 20	2,880	0.028
1,000	10 × 25	3,160	0.024
1,200	10 × 33	3,570	0.020

V _{bc}	35		
Capacitance (μF)	∅ D × L (mm)	Rated Ripple Current (mArms/105°C, 100kHz)	IMP. (Ω max./20°C, 100kHz)
220	8 × 11.5	1,417	0.073
270	8 × 15	2,050	0.059
330	10 × 12.5	2,190	0.053
390	8 × 20	2,380	0.041
470	10 × 16	2,550	0.038
560	10 × 20	2,880	0.028
680	10 × 25	3,160	0.024
1,000	10 × 33	3,570	0.020

V _{bc}	50		
Capacitance (μF)	∅ D × L (mm)	Rated Ripple Current (mArms/105°C, 100kHz)	IMP. (Ω max./20°C, 100kHz)
100	8 × 11.5	1,086	0.096
120	8 × 15	1,558	0.080
150	10 × 12.5	1,612	0.083
180	8 × 20	1,888	0.065
220	10 × 16	1,985	0.057
270	10 × 20	2,322	0.042
330	10 × 25	2,626	0.037
470	10 × 33	2,954	0.033

RIPPLE CURRENT MULTIPLIERS

Friquency Multiplires

Cap.(μF) \ Freq.(Hz)	120	1k	10k	100k
100 ~ 270	0.50	0.73	0.92	1.00
330 ~ 680	0.55	0.77	0.94	1.00
820 ~ 1,800	0.60	0.80	0.96	1.00
2,200 ~ 2,700	0.70	0.85	0.98	1.00



LARGE SIZED ALUMINUM ELECTROLYTIC CAPACITORS

TDA Series

• 105°C 2,000Hrs assured.

- Non-solvent proof.
- Downsized of KMH series.
- For SMPS, Inverter
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics																									
Rated Voltage Range	16 ~ 100 V _{DC}	160 ~ 500 V _{DC}																								
Operating Temperature Range	-40 ~ +105°C	-25 ~ +105°C																								
Capacitance Tolerance	±20% (M) (at 20°C, at 120Hz)																									
Leakage Current	I=0.02CV(µA) or 3mA, whichever is smaller Where, I:Max. leakage current(µA) C:Nominal capacitance(µF) V:Rated voltage(V _{DC}) (at 20°C, 5 minutes)																									
* Dissipation Factor (Tanδ)	<table border="1"> <tr> <td>Rated Voltage(V_{DC})</td> <td>16</td> <td>25~35</td> <td>50~63</td> <td>100</td> <td>160~400</td> <td>420~500</td> </tr> <tr> <td>Tanδ(Max.)</td> <td>0.40</td> <td>0.35</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.20</td> </tr> </table> (at 20°C, 120Hz)		Rated Voltage(V _{DC})	16	25~35	50~63	100	160~400	420~500	Tanδ(Max.)	0.40	0.35	0.25	0.20	0.15	0.20										
Rated Voltage(V _{DC})	16	25~35	50~63	100	160~400	420~500																				
Tanδ(Max.)	0.40	0.35	0.25	0.20	0.15	0.20																				
Temperature Characteristics (Max.Impedance ratio)	<table border="1"> <tr> <td>Rated Voltage(V_{DC})</td> <td>16</td> <td>25</td> <td>35</td> <td>50~63</td> <td>100</td> <td>160~400</td> <td>420~500</td> </tr> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>4</td> <td>8</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>15</td> <td>10</td> <td>8</td> <td>6</td> <td>5</td> <td>-</td> <td>-</td> </tr> </table> (at 120Hz)		Rated Voltage(V _{DC})	16	25	35	50~63	100	160~400	420~500	Z(-25°C)/Z(20°C)	4	3	3	2	2	4	8	Z(-40°C)/Z(20°C)	15	10	8	6	5	-	-
Rated Voltage(V _{DC})	16	25	35	50~63	100	160~400	420~500																			
Z(-25°C)/Z(20°C)	4	3	3	2	2	4	8																			
Z(-40°C)/Z(20°C)	15	10	8	6	5	-	-																			
Load Life	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 105°C Capacitance change ≤ ±20% of the initial value 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 the exposing them at 105°C for 1,000 hours without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage Current ≤ The initial specified value																									
Others	Satisfied characteristics KS C IEC 60384-4																									

* For capacitors with CV products > 100,000 Higher Tanδ value may apply.
When the capacitors exceed 1,000µF, 0.01 shall be added every 1,000µF increase.

RATED RIPPLE CURRENT

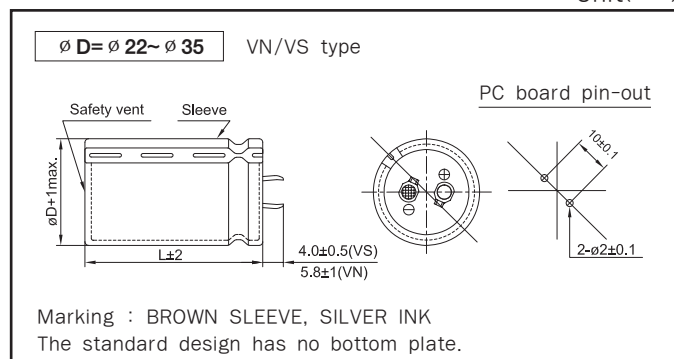
When capacitors are operated in any other condition at 120Hz, the maximum ripple current must be multiplied by the figure shown in the table.

Frequency multiplying factor

Frequency(Hz)	60	120	300	1k	10k~
16~50V _{DC}	0.95	1.00	1.03	1.05	1.08
63~100V _{DC}	0.92	1.00	1.07	1.13	1.19
160~250V _{DC}	0.81	1.00	1.17	1.32	1.45
315~450V _{DC}	0.77	1.00	1.16	1.30	1.41

DIMENSIONS OF TDA Series

Unit(mm)





RATINGS OF TDA Series

μF \ V _{DC} / ∅ D	16				25				35			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
3,300									22 × 25			
3,900									22 × 30			
4,700					22 × 25				22 × 30	25.4 × 25		
5,600					22 × 25				22 × 35	25.4 × 30	30 × 25	
6,800	22 × 25				22 × 30	25.4 × 25			22 × 40	25.4 × 35	30 × 25	
8,200	22 × 30				22 × 35	25.4 × 30	30 × 25		22 × 50	25.4 × 40	30 × 30	
10,000	22 × 30	25.4 × 25			22 × 40	25.4 × 35	30 × 25			25.4 × 45	30 × 35	35 × 30
12,000	22 × 35	25.4 × 30			22 × 45	25.4 × 40	30 × 30	35 × 25		25.4 × 50	30 × 40	35 × 30
15,000	22 × 40	25.4 × 35				25.4 × 45	30 × 35	35 × 30			30 × 45	35 × 35
18,000	22 × 45	25.4 × 40	30 × 30			25.4 × 50	30 × 40	35 × 30				35 × 40
22,000		25.4 × 45	30 × 35				30 × 45	35 × 35				35 × 50
27,000		25.4 × 50	30 × 40	35 × 30				35 × 45				
33,000			30 × 45	35 × 35				35 × 50				
39,000			30 × 50	35 × 40								
47,000				35 × 50								

μF \ V _{DC} / ∅ D	50				63				100			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
560									22 × 25			
820									22 × 30	25.4 × 25		
1,000									22 × 35	25.4 × 30		
1,200					22 × 25				22 × 40	25.4 × 35	30 × 25	
1,500					22 × 25				22 × 45	25.4 × 40	30 × 30	
1,800	22 × 25				22 × 30	25.4 × 25				25.4 × 45	30 × 35	35 × 25
2,200	22 × 30				22 × 35	25.4 × 30				25.4 × 50	30 × 40	35 × 30
2,700	22 × 30	25.4 × 25			22 × 40	25.4 × 35	30 × 25				30 × 45	35 × 35
3,300	22 × 35	25.4 × 30			22 × 50	25.4 × 40	30 × 30				30 × 50	35 × 40
3,900	22 × 40	25.4 × 35	30 × 25			25.4 × 45	30 × 35	35 × 25				35 × 45
4,700	22 × 45	25.4 × 35	30 × 30	35 × 25		25.4 × 50	30 × 40	35 × 30				35 × 50
5,600	22 × 50	25.4 × 40	30 × 35	35 × 25			30 × 45	35 × 35				
6,800		25.4 × 50	30 × 40	35 × 30			30 × 50	35 × 40				
8,200			30 × 45	35 × 35				35 × 45				
10,000			30 × 50	35 × 40				35 × 50				
12,000				35 × 45	← Case Size ∅ D × L (mm)							
				4.56	← Rated Ripple Current (Arms/105°C, 120Hz)							



LARGE SIZED ALUMINUM ELECTROLYTIC CAPACITORS

RATINGS OF TDA Series

Vdc μF / ∅ D	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
100												
120										25.4 × 20 0.48		
150					22 × 20 0.53					25.4 × 20 0.59		
180					22 × 20 0.62	25.4 × 20 0.64			22 × 25 0.78	25.4 × 20 0.75		
220		25.4 × 20 0.66			22 × 25 0.70	25.4 × 20 0.70			22 × 30 0.96	25.4 × 25 0.95	30 × 20 0.93	
270		25.4 × 20 0.80			22 × 25 0.87	25.4 × 20 0.83			22 × 30 1.11	25.4 × 25 1.10	30 × 20 1.10	
330	22 × 25 1.20	25.4 × 20 1.10			22 × 30 1.20	25.4 × 25 1.21	30 × 20 1.20		22 × 35 1.20	25.4 × 30 1.20	30 × 25 1.26	35 × 20 1.17
390	22 × 30 1.30	25.4 × 25 1.29	30 × 20 1.19		22 × 30 1.28	25.4 × 25 1.27	30 × 25 1.25		22 × 40 1.45	25.4 × 35 1.49	30 × 25 1.44	35 × 25 1.49
470	22 × 30 1.36	25.4 × 25 1.39	30 × 20 1.31	35 × 20 1.35	22 × 35 1.41	25.4 × 30 1.41	30 × 25 1.50	35 × 20 1.30	22 × 45 1.53	25.4 × 35 1.50	30 × 30 1.57	35 × 25 1.57
560	22 × 35 1.46	25.4 × 30 1.51	30 × 25 1.54	35 × 20 1.41	22 × 45 1.56	25.4 × 35 1.53	30 × 30 1.57	35 × 25 1.52	22 × 50 1.77	25.4 × 40 1.74	30 × 30 1.73	35 × 25 1.72
680	22 × 40 1.66	25.4 × 30 1.65	30 × 25 1.68	35 × 20 1.69	22 × 45 1.73	25.4 × 35 1.69	30 × 30 1.74	35 × 25 1.72		25.4 × 50 1.84	30 × 35 1.94	35 × 30 1.97
820	22 × 45 1.99	25.4 × 30 1.95	30 × 30 2.00	35 × 25 1.91		25.4 × 45 1.99	30 × 35 2.00	35 × 30 2.04		25.4 × 60 2.20	30 × 40 2.10	35 × 35 1.98
1,000	22 × 50 2.18	25.4 × 40 2.14	30 × 30 2.15	35 × 25 2.17		25.4 × 50 2.21	30 × 40 2.23	35 × 35 2.30			30 × 50 2.31	35 × 40 2.30
1,200		25.4 × 45 2.39	30 × 35 2.37	35 × 30 2.41		25.4 × 60 2.57	30 × 45 2.53	35 × 35 2.57			30 × 60 2.50	35 × 45 2.43
1,500		25.4 × 60 2.87	30 × 40 2.74	35 × 35 2.79			30 × 50 3.01	35 × 40 2.99				35 × 50 2.80
1,800			30 × 45 3.14	35 × 35 3.11			30 × 60 3.47	35 × 45 3.38				
2,200			30 × 60 3.76	35 × 45 3.66				35 × 60 3.60				

Vdc μF / ∅ D	315				350				400			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
47									22 × 20 0.22			
68									22 × 25 0.51	25.4 × 20 0.46		
82	22 × 25 0.64				22 × 25 0.56				22 × 25 0.55	25.4 × 20 0.53		
100	22 × 30 0.68				22 × 25 0.67				22 × 30 0.67	25.4 × 25 0.67	30 × 20 0.60	
120	22 × 30 0.75	25.4 × 25 0.76			22 × 30 0.73	25.4 × 25 0.73			22 × 35 0.76	25.4 × 30 0.76	30 × 25 0.76	35 × 20 0.70
150	22 × 35 0.82	25.4 × 30 0.83			22 × 35 0.83	25.4 × 30 0.83	30 × 25 0.83		22 × 40 0.82	25.4 × 30 0.80	30 × 25 0.82	35 × 20 0.80
180	22 × 40 0.91	25.4 × 30 0.88	30 × 25 0.85		22 × 40 0.89	25.4 × 30 0.89	30 × 25 0.91		22 × 45 0.88	25.4 × 35 0.88	30 × 30 0.89	35 × 25 0.90
220	22 × 45 0.94	25.4 × 35 0.96	30 × 30 1.00		22 × 45 0.98	25.4 × 35 0.98	30 × 30 0.98	35 × 25 0.96	22 × 50 1.01	25.4 × 40 0.99	30 × 30 0.98	35 × 25 1.02
270		25.4 × 45 1.13	30 × 35 1.12	35 × 25 1.06	22 × 50 1.12	25.4 × 40 1.10	30 × 30 1.08	35 × 25 1.12		25.4 × 45 1.12	30 × 35 1.12	35 × 30 1.16
330		25.4 × 50 1.28	30 × 40 1.28	35 × 30 1.30		25.4 × 45 1.24	30 × 40 1.24	35 × 30 1.29		25.4 × 50 1.27	30 × 40 1.28	35 × 35 1.35
390			30 × 45 1.44	35 × 35 1.42		25.4 × 60 1.47	30 × 40 1.40	35 × 35 1.47		25.4 × 60 1.51	30 × 45 1.49	35 × 35 1.47
470			30 × 50 1.63	35 × 40 1.64		25.4 × 60 1.70	30 × 45 1.67	35 × 35 1.65			30 × 50 1.63	35 × 40 1.62
560				35 × 45 1.87			30 × 50 1.87	35 × 40 1.86			30 × 60 1.88	35 × 50 1.88
680				35 × 50 2.07			30 × 60 2.18	35 × 50 2.18				35 × 60 2.19
820								35 × 60 2.53				

← Case Size ∅ D × L (mm)
← Rated Ripple Current (Arms/105°C, 120Hz)



RATINGS OF TDA Series

Vdc μF ∅ D	420				450				500				
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35	
56					22 × 25 0.40					22 × 35 0.46	25.4 × 30 0.46	30 × 30 0.48	
68	22 × 25 0.50				22 × 30 0.50	25.4 × 25 0.50				22 × 40 0.45	25.4 × 35 0.53	30 × 30 0.55	
82	22 × 25 0.51	25.4 × 25 0.63			22 × 30 0.55	24.5 × 25 0.54				22 × 45 0.56	25.4 × 35 0.58	30 × 35 0.58	
100	22 × 30 0.58	25.4 × 30 0.69			22 × 35 0.62	25.4 × 30 0.62	30 × 25 0.64				25.4 × 40 0.65	30 × 35 0.66	
120	22 × 35 0.72	25.4 × 30 0.73	30 × 25 0.75		22 × 40 0.70	25.4 × 35 0.71	30 × 30 0.72	35 × 25 0.73			25.4 × 45 0.75	30 × 40 0.76	35 × 30 0.78
150	22 × 45 0.79	25.4 × 35 0.74	30 × 25 0.75	35 × 25 0.81	22 × 45 0.77	25.4 × 40 0.75	30 × 30 0.74	35 × 25 0.75				30 × 45 0.80	35 × 35 0.81
180	22 × 50 0.89	25.4 × 40 0.89	30 × 30 0.88	35 × 25 0.87		25.4 × 45 0.84	30 × 35 0.87	35 × 30 0.88				30 × 50 0.90	35 × 40 0.93
220		25.4 × 45 1.01	30 × 35 1.00	35 × 30 1.05		25.4 × 50 0.98	30 × 40 0.98	35 × 30 1.00				30 × 60 1.10	35 × 45 1.11
270			30 × 45 1.19	35 × 35 1.19		25.4 × 60 1.17	30 × 45 1.15	35 × 35 1.17					35 × 50 1.28
330			30 × 50 1.36	35 × 40 1.39			30 × 50 1.38	35 × 40 1.38					35 × 60 1.50
390				35 × 45 1.57			30 × 60 1.60	35 × 45 1.56					
470				35 × 50 1.73				35 × 50 1.72					
560								35 × 60 1.98	← Case Size ∅ D × L (mm) ← Rated Ripple Current (Arms/105°C, 120Hz)				

TLA Series

• 105°C 3,000Hrs assured.

- Non-solvent proof.
- Long Life.
- Equal to TDA case size
- For SMPS, Inverter
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics						
Rated Voltage Range	160 ~ 500 V _{bc}						
Operating Temperature Range	-25 ~ +105°C						
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)						
Leakage Current	I = 0.02CV or 3mA, whichever is smaller. Where, I: Leakage Current(µA), C: Nominal capacitance(µF), V: Rated voltage(V _{bc}) (at 20°C, 5minutes)						
※ Dissipation Factor(Tanδ)	<table border="1"> <tr> <td>Rated voltage(V_{bc})</td> <td>160 ~ 500</td> </tr> <tr> <td>Tanδ(Max.)</td> <td>0.20</td> </tr> </table> (at 20°C, 120Hz)	Rated voltage(V _{bc})	160 ~ 500	Tanδ(Max.)	0.20		
Rated voltage(V _{bc})	160 ~ 500						
Tanδ(Max.)	0.20						
Temperature Characteristics (Max. Impedance ratio)	<table border="1"> <tr> <td>Rated voltage(V_{bc})</td> <td>160 ~ 400</td> <td>420 ~ 500</td> </tr> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>8</td> </tr> </table> (at 120Hz)	Rated voltage(V _{bc})	160 ~ 400	420 ~ 500	Z(-25°C)/Z(20°C)	4	8
Rated voltage(V _{bc})	160 ~ 400	420 ~ 500					
Z(-25°C)/Z(20°C)	4	8					
Load Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after the rated voltage is applied for 3,000 hours at 105°C. Capacitance change ≤ ±20% of the initial value 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 the exposing them at max. operating temperature for 1,000 hours without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements. Capacitance change ≤ ±20% of the initial value Tanδ ≤ 200% of the initial specified value Leakage current ≤ The initial specified value						
Others	Satisfied characteristics KS C IEC 60384-4						

※For capacitors with CV products >100,000 higher Tanδ value may apply.
 When the capacitance exceeds 1,000µF, 0.01 shall be added every 1,000µF increase.

RATED RIPPLE CURRENT

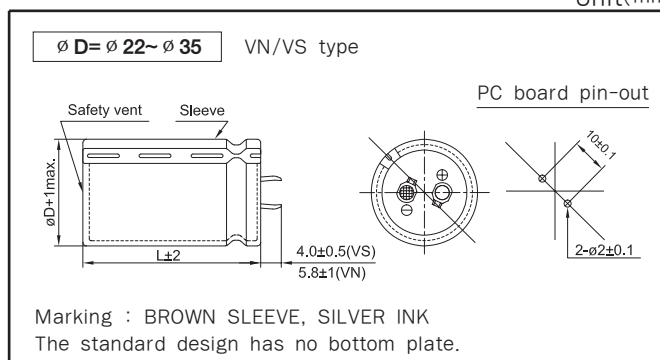
When capacitor are operated in any other condition at 120Hz, the maximum ripple current must be multiplied by the figure shown in the table.

Frequency multiplying factor

Frequency(Hz)	60	120	300	1k	10k~
160~250V _{bc}	0.81	1.00	1.17	1.32	1.45
350~450V _{bc}	0.77	1.00	1.16	1.30	1.41

DIMENSIONS OF TLA Series

Unit(mm)





RATINGS OF TLA Series

Vdc μF / ØD	160				200				250			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
180									22 × 25 0.78			
220									22 × 25 1.00	25.4 × 25 0.95		
270					22 × 25 1.10				22 × 30 1.18	25.4 × 25 1.18		
330	22 × 25 1.20				22 × 30 1.25	25.4 × 25 1.25			22 × 35 1.30	25.4 × 35 1.30	30 × 25 1.30	
390	22 × 25 1.30	25.4 × 25 1.26			22 × 30 1.35	25.4 × 25 1.35			22 × 40 1.49	25.4 × 35 1.49	30 × 25 1.49	
470	22 × 30 1.55	25.4 × 25 1.55			22 × 40 1.67	25.4 × 30 1.50	30 × 25 1.50		22 × 45 1.65	25.4 × 35 1.65	30 × 30 1.65	35 × 25 1.65
560	22 × 35 1.67	25.4 × 30 1.67	30 × 25 1.67		22 × 45 1.67	25.4 × 30 1.67	30 × 25 1.67		22 × 50 1.67	25.4 × 40 1.80	30 × 30 1.80	35 × 25 1.80
680	22 × 40 1.82	25.4 × 30 1.82	30 × 25 1.82		22 × 45 1.78	25.4 × 35 1.78	30 × 30 1.78	35 × 25 1.78		25.4 × 50 2.00	30 × 35 2.00	35 × 30 2.00
820	22 × 45 2.04	25.4 × 35 2.04	30 × 30 2.04	35 × 25 2.04		25.4 × 45 2.04	30 × 30 2.04	35 × 25 2.04		25.4 × 60 2.20	30 × 40 2.30	35 × 35 2.30
1,000	22 × 50 2.25	25.4 × 40 2.25	30 × 30 2.25	35 × 25 2.25		25.4 × 50 2.30	30 × 35 2.30	35 × 30 2.30			30 × 50 2.47	35 × 40 2.47
1,200		25.4 × 45 2.49	30 × 35 2.49	35 × 30 2.49		25.4 × 60 2.66	30 × 40 2.65	35 × 35 2.65			30 × 60 2.85	35 × 45 2.60
1,500		25.4 × 60 2.97	30 × 40 2.84	35 × 30 2.84			30 × 50 3.08	35 × 40 3.08				35 × 50 3.00
1,800			30 × 45 3.32	35 × 35 3.00			30 × 60 3.49	35 × 45 3.48				35 × 60 3.42
2,200			30 × 60 3.86	35 × 45 3.50				35 × 50 3.78	← Case Size ØD × L (mm) ← Rated Ripple Current (Arms/105°C, 120Hz)			

Vdc μF / ØD	350				400			
	22	25.4	30	35	22	25.4	30	35
56								
68					22 × 25 0.55			
82	22 × 25 0.55				22 × 25 0.64			
100	22 × 25 0.69				22 × 30 0.70	25.4 × 25 0.70		
120	22 × 30 0.75	25.4 × 25 0.75			22 × 35 0.75	25.4 × 25 0.75	30 × 25 0.80	
150	22 × 35 0.82	25.4 × 30 0.83	30 × 25 0.82		22 × 40 0.88	25.4 × 30 0.88	30 × 25 0.88	
180	22 × 40 0.92	25.4 × 30 0.92	30 × 25 0.90		22 × 45 0.98	25.4 × 35 0.98	30 × 30 0.98	35 × 25 0.98
220	22 × 45 1.05	25.4 × 35 1.04	30 × 30 1.02	35 × 25 1.04	22 × 50 1.10	25.4 × 40 1.10	30 × 30 1.10	35 × 25 1.0
270	22 × 50 1.16	25.4 × 40 1.18	30 × 30 1.17	35 × 25 1.20		25.4 × 45 1.22	30 × 35 1.22	35 × 30 1.22
330		25.4 × 45 1.29	30 × 35 1.34	35 × 30 1.22		25.4 × 50 1.44	30 × 40 1.44	35 × 30 1.44
390		25.4 × 50 1.51	30 × 40 1.51	35 × 35 1.47		25.4 × 60 1.51	30 × 45 1.60	35 × 35 1.60
470		25.4 × 60 1.66	30 × 45 1.65	35 × 35 1.69			30 × 50 1.90	35 × 40 1.90
560			30 × 50 1.85	35 × 40 1.90			30 × 60 2.10	35 × 45 2.12
680			30 × 60 2.15	35 × 50 1.99				35 × 60 2.27



RATINGS OF TLA Series

V _{DC} μF ∅D	420				450			
	22	25.4	30	35	22	25.4	30	35
56					22 × 25 0.40			
68	22 × 25 0.50				22 × 30 0.53	25.4 × 25 0.50		
82	22 × 25 0.64	25.4 × 25 0.58			22 × 30 0.64	25.4 × 25 0.64		
100	22 × 30 0.70	25.4 × 25 0.70			22 × 35 0.69	25.4 × 30 0.69	30 × 25 0.64	
120	22 × 35 0.75	25.4 × 30 0.75	30 × 25 0.73		22 × 40 0.80	25.4 × 30 0.80	30 × 25 0.80	35 × 25 0.73
150	22 × 40 0.88	25.4 × 35 0.88	30 × 25 0.88		22 × 45 0.88	25.4 × 35 0.88	30 × 30 0.88	35 × 25 0.75
180	22 × 45 0.95	25.4 × 35 0.95	30 × 30 0.95	35 × 25 0.94	22 × 50 1.00	25.4 × 40 1.00	30 × 30 1.00	
220	22 × 50 1.10	25.4 × 45 1.10	30 × 35 1.10	35 × 25 1.10		25.4 × 45 1.12	30 × 35 1.12	35 × 30 1.12
270		25.4 × 50 1.22	30 × 40 1.22	35 × 30 1.22		25.4 × 50 1.18	30 × 40 1.28	35 × 35 1.28
330		25.4 × 60 1.41	30 × 45 1.45	35 × 35 1.45			30 × 50 1.45	35 × 40 1.45
390			30 × 50 1.55	35 × 40 1.55			30 × 60 1.51	35 × 40 1.55
470			30 × 60 1.79	35 × 45 1.90	← Case Size ∅D × L (mm) ← Rated Ripple Current (Arms/105°C, 120Hz)			

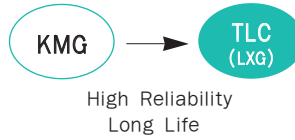
V _{DC} μF ∅D	500			
	22	25.4	30	35
47				
56	22 × 35 0.46	25.4 × 30 0.46	30 × 30 0.48	
68	22 × 40 0.45	25.4 × 35 0.53	30 × 30 0.55	
82	22 × 45 0.56	25.4 × 35 0.58	30 × 35 0.58	
100		25.4 × 40 0.65	30 × 35 0.66	
120		25.4 × 45 0.75	30 × 40 0.76	35 × 30 0.78
150			30 × 45 0.80	35 × 35 0.81
180			30 × 50 0.90	35 × 40 0.93
220			30 × 60 1.10	35 × 45 1.11
270				35 × 50 1.28
330				35 × 60 1.50
390				
470				
560				



TLC(LXG) Series

• 105°C 5,000Hrs assured.

- Non-solvent proof.
- Long life.
- Almost equal to KMG case sizes.
- For SMPS, Inverter
- RoHS compliant.
- Halogen-free capacitors are also available.



SPECIFICATIONS

Item	Characteristics																									
Rated Voltage Range	10 ~ 100 V _{DC}	200 ~ 500 V _{DC}																								
Operating Temperature Range	-40 ~ +105°C	-25 ~ +105°C																								
Capacitance Tolerance	±20%(M) (at 20°C, 120Hz)																									
Leakage Current	I=0.02CV or 3mA, whichever is smaller. Where, I: Leakage current (µA) C: Nominal capacitance (µF) V: Rated voltage (V _{DC}) (at 20°C, 5 minutes)																									
※ Dissipation Factor(Tanδ)	<table border="1"> <tr> <td>Rated Voltage(V_{DC})</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63~400</td> <td>420~500</td> </tr> <tr> <td>Tanδ(Max.)</td> <td>0.60</td> <td>0.45</td> <td>0.30</td> <td>0.25</td> <td>0.20</td> <td>0.15</td> <td>0.20</td> </tr> </table> <p>(at 20°C, 120Hz)</p>		Rated Voltage(V _{DC})	10	16	25	35	50	63~400	420~500	Tanδ(Max.)	0.60	0.45	0.30	0.25	0.20	0.15	0.20								
Rated Voltage(V _{DC})	10	16	25	35	50	63~400	420~500																			
Tanδ(Max.)	0.60	0.45	0.30	0.25	0.20	0.15	0.20																			
Temperature Characteristics (Max.Impedance ratio)	<table border="1"> <tr> <td>Rated Voltage(V_{DC})</td> <td>10~16</td> <td>25</td> <td>35</td> <td>50~63</td> <td>80~100</td> <td>200~400</td> <td>420~500</td> </tr> <tr> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>3</td> <td>3</td> <td>2</td> <td>2</td> <td>4</td> <td>8</td> </tr> <tr> <td>Z(-40°C)/Z(20°C)</td> <td>15</td> <td>10</td> <td>8</td> <td>6</td> <td>5</td> <td>-</td> <td>-</td> </tr> </table> <p>(at 120Hz)</p>		Rated Voltage(V _{DC})	10~16	25	35	50~63	80~100	200~400	420~500	Z(-25°C)/Z(20°C)	4	3	3	2	2	4	8	Z(-40°C)/Z(20°C)	15	10	8	6	5	-	-
Rated Voltage(V _{DC})	10~16	25	35	50~63	80~100	200~400	420~500																			
Z(-25°C)/Z(20°C)	4	3	3	2	2	4	8																			
Z(-40°C)/Z(20°C)	15	10	8	6	5	-	-																			
Load Life	<p>After the capacitor are subjected to DC voltage and the rated ripple current applied for 5,000 hours at 105°C, the following specifications shall be satisfied when the capacitors are restored to 20°C. The sum of DC voltage and peak AC voltage must not exceed the full rated voltage of the capacitor.</p> <p>Capacitance change ≤ ±25% of the initial value Tanδ ≤ 250% of the initial specified value Leakage current ≤ The initial specified value</p>																									
Shelf Life	<p>The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them at 105°C for 500 hours without voltage applied. The rated voltage shall be applied to the capacitors for a minimum of 30 minutes, at least 24 hours and not more than 48 hours before the measurements.</p> <p>Capacitance change ≤ ±20% of the initial value Tanδ ≤ 150% of the initial specified value Leakage current ≤ The initial specified value</p>																									
Others	Satisfied characteristics KS C IEC 60384-4																									

※ For capacitors with CV products > 100,000 higher Tanδ value may apply.
 When the capacitance exceeds 1,000µF, 0.01 shall be added every 1,000µF increase.

RATED RIPPLE CURRENT

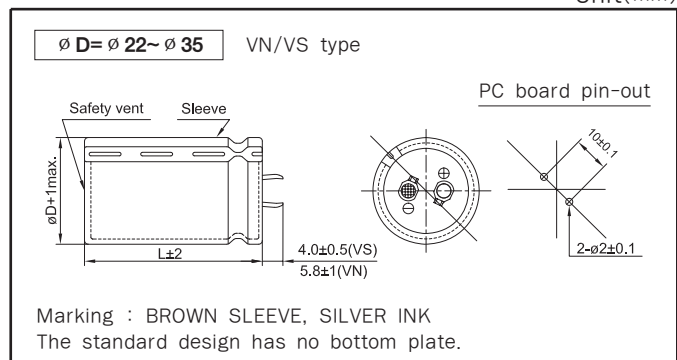
When capacitors are operated in any other conditions at 120Hz the maximum ripple current must be multiplied by the figure shown in the table.

Frequency multiplying factor

Frequency(Hz)	50	120	300	1k	10k~
10~50V _{DC}	0.95	1.00	1.03	1.05	1.08
63~100V _{DC}	0.92	1.00	1.07	1.13	1.19
200, 250V _{DC}	0.81	1.00	1.17	1.32	1.45
350~450V _{DC}	0.77	1.00	1.16	1.30	1.41

DIMENSIONS OF TLC(LXG) Series

Unit(mm)



TLC(LXG) Series



RATINGS OF TLC(LXG) Series

μF \ V _{DC} / ∅ D	10				16				25			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
3,900									22 × 25 1.31			
4,700									22 × 30 1.51	25.4 × 25 1.51		
5,600					22 × 25 1.44				22 × 35 1.70			
6,800	22 × 25 1.30				22 × 30 1.66	25.4 × 25 1.66			22 × 40 1.92	25.4 × 30 1.87	30 × 25 1.90	
8,200					22 × 35 1.87					25.4 × 35 2.14	30 × 30 2.15	35 × 25 2.19
10,000	22 × 30 1.65	25.4 × 25 1.64			22 × 40 2.12	25.4 × 30 2.07	30 × 25 2.11		22 × 50 2.45	25.4 × 40 2.43		
12,000	22 × 35 1.85	25.4 × 30 1.85	30 × 25 1.89			25.4 × 35 2.37	30 × 30 2.37	35 × 25 2.42		25.4 × 50 2.78	30 × 35 2.70	35 × 30 2.76
15,000	22 × 40 2.12	25.4 × 35 2.16			22 × 50 2.74	25.4 × 40 2.71					30 × 40 3.13	35 × 35 3.16
18,000	22 × 50 2.45	25.4 × 40 2.43	30 × 30 2.37	35 × 25 2.42		25.4 × 50 3.11	30 × 35 3.02	35 × 30 3.09			30 × 50 3.64	35 × 40 3.61
22,000			30 × 35 2.73	35 × 30 2.79			30 × 40 3.46	35 × 35 3.49				
27,000		25.4 × 50 3.11	30 × 40 3.13				30 × 50 4.07	35 × 40 4.04				35 × 50 4.70
33,000				35 × 35 3.49								
39,000			30 × 50 3.99	35 × 40 3.96				35 × 50 5.16				
47,000				35 × 50 4.62								

μF \ V _{DC} / ∅ D	35				50				63			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
1,000									22 × 25 1.00			
1,200									22 × 30 1.15	25.4 × 25 1.15		
1,500					22 × 25 1.02				22 × 35 1.32			
1,800					22 × 30 1.17	25.4 × 25 1.17			22 × 40 1.49	25.4 × 30 1.45	30 × 25 1.48	
2,200	22 × 25 1.10				22 × 35 1.33					25.4 × 35 1.67	30 × 30 1.68	35 × 25 1.71
2,700					22 × 40 1.51	25.4 × 30 1.47	30 × 25 1.50		22 × 50 1.92	25.4 × 40 1.90	30 × 35 1.93	
3,300	22 × 30 1.42	25.4 × 25 1.41				25.4 × 35 1.70	30 × 30 1.70	35 × 25 1.74		25.4 × 50 2.20		35 × 30 2.18
3,900	22 × 35 1.58	25.4 × 30 1.58			22 × 50 1.91	25.4 × 40 1.89					30 × 40 2.41	35 × 35 2.43
4,700	22 × 40 1.78		30 × 35 1.77				30 × 35 2.11	35 × 30 2.16			30 × 50 2.80	35 × 40 2.78
5,600		25.4 × 35 1.98	30 × 30 1.98	35 × 25 2.03		25.4 × 50 2.38	30 × 40 2.39	35 × 35 2.41				
6,800	22 × 50 2.26	25.4 × 40 2.24					30 × 50 2.79	35 × 40 2.78				35 × 50 3.55
8,200		25.4 × 50 2.57	30 × 35 2.50	35 × 30 2.55								
10,000			30 × 40 2.86	35 × 35 2.88				35 × 50 3.57				
12,000			30 × 50 3.32	35 × 40 3.30								
18,000				35 × 50 4.29	← Case Size ∅ D × L (mm)			← Rated Ripple Current (Arms/105°C, 120Hz)				



RATINGS OF TLC(LXG) Series

VDC μF / ∅ D	80				100				200			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
180									22X25 0.63			
270									22X30 0.81	25.4X25 0.81		
330									22X35 0.92	25.4X30 0.92	30X25 0.94	
390					22X25 0.78				22X40 1.02			
470									22X50 1.17	25.4X35 1.15	30X30 1.15	35X25 1.22
560					22X30 0.99	25.4X25 0.98				25.4X40 1.28	30X35 1.30	
680	22X25 0.97				22X35 1.12					25.4X50 1.48	30X40 1.49	35X30 1.47
820	22X30 1.12				22X40 1.26	25.4X30 1.23	30X25 1.25					35X35 1.65
1,000	22X35 1.27	25.4X25 1.23				25.4X35 1.41	30X30 1.42	35X25 1.45			30X50 1.91	35X40 1.90
1,200	22X40 1.42	25.4X30 1.39	30X25 1.41		22X50 1.60	25.4X40 1.59	30X35 1.61					35X50 2.21
1,500		25.4X35 1.62				25.4X50 1.86	30X40 1.87	35X30 1.85				
1,800	22X50 1.84	25.4X40 1.82	30X30 1.78	35X25 1.82				35X35 2.07				
2,200		25.4X50 2.11	30X35 2.05	35X30 2.09			30X50 2.40	35X40 2.39				
2,700			30X40 2.35	35X35 2.37				35X50 2.81				
3,300			30X50 2.75	35X40 2.73								
4,700				35X50 3.46								

VDC μF / ∅ D	250				350				400			
	22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
56									22X25 0.34			
68					22X25 0.39				22X30 0.44	25.4X25 0.40		
82					22X30 0.49				22X35 0.50			
100					22X35 0.52	25.4X25 0.51				25.4X30 0.52	30X25 0.52	
120					22X40 0.56	25.4X30 0.55	30X25 0.56		22X40 0.57	25.4X35 0.58		35X25 0.61
150	22X25 0.57					25.4X35 0.60		35X25 0.69	22X50 0.67	25.4X40 0.66	30X30 0.65	
180	22X30 0.66	25.4X25 0.66			22X50 0.73	25.4X40 0.72	30X30 0.71				30X35 0.74	35X30 0.76
220	22X35 0.75					25.4X50 0.93	30X35 0.82	35X30 0.83		25.4X50 0.84	30X40 0.84	35X35 0.94
270	22X40 0.85	25.4X30 0.83	30X25 0.85				30X40 0.94	35X35 1.04			30X50 1.10	35X40 1.09
330		25.4X35 0.96	30X30 0.96	35X25 1.02			30X50 1.19	35X40 1.19				
390	22X50 1.08	25.4X40 1.07										35X50 1.26
470		25.4X50 1.22	30X35 1.19	35X30 1.22				35X50 1.38				
560			30X40 1.35	35X35 1.36								
680			30X50 1.58	35X40 1.57								
1,000				35X50 2.02	← Case Size ∅D×L (mm) ← Rated Ripple Current (Arms/105°C, 120Hz)							



RATINGS OF TLC(LXG) Series

μF	V _{DC} ∅ D	420				450				500			
		22	25.4	30	35	22	25.4	30	35	22	25.4	30	35
47						22 × 25 0.30				22 × 35 0.32			
56						22 × 30 0.36				22 × 35 0.38	25.4 × 30 0.36	30 × 30 0.39	
68		22 × 30 0.44				22 × 35 0.44	25.4 × 30 0.45			22 × 40 0.45	25.4 × 35 0.47	30 × 30 0.44	
82		22 × 30 0.50	25.4 × 30 0.50			22 × 35 0.50	25.4 × 30 0.50			22 × 45 0.54	25.4 × 35 0.54	30 × 35 0.50	
100		22 × 35 0.52	25.4 × 30 0.52			22 × 40 0.53	25.4 × 35 0.52	30 × 30 0.53			25.4 × 40 0.55	30 × 35 0.56	
120		22 × 40 0.56	25.4 × 35 0.56	30 × 30 0.57		22 × 45 0.57	25.4 × 35 0.58	30 × 30 0.58	35 × 30 0.59		25.4 × 45 0.62	30 × 40 0.62	35 × 30 0.63
150		22 × 45 0.67	25.4 × 40 0.67	30 × 30 0.67		22 × 50 0.67	25.4 × 40 0.67	30 × 35 0.67	35 × 30 0.68			30 × 45 0.70	35 × 35 0.71
180		22 × 50	25.4 × 40 0.74	30 × 35 0.75	35 × 30 0.76		25.4 × 45 0.76	30 × 35 0.76				30 × 50 0.85	35 × 40 0.86
220			25.4 × 50 0.84	30 × 40 0.84	35 × 30 0.84		25.4 × 50 0.84	30 × 40 0.84	35 × 35 0.86			30 × 60 1.00	35 × 45 0.95
270				30 × 45 1.10	35 × 35 1.10			30 × 45 1.10	35 × 40 1.11				35 × 50 1.20
330				30 × 50 1.22	35 × 40 1.22			30 × 50 1.22	35 × 45 1.23				35 × 60 1.35
390					35 × 45 1.35				35 × 50 1.35				
470					35 × 50 1.47								

← Case Size ∅ D×L(mm)

← Rated Ripple Current(Arms/105°C, 120Hz)