



**MINIATURE LOW-ESR TYPE FOR SWITCHING
REGULATOR SERIES**

FEATURES

- IDEAL FOR USE IN COMPACT DC-DC CONVERTERS, SWITCHING POWER SUPPLIES AND OTHER HIGH FREQUENCY APPLICATIONS.
- WIDE OPERATING TEMPERATURE RANGE OF -55 TO +105°C.
- LARGE CAPACITANCE.
- LOW IMPEDANCE.

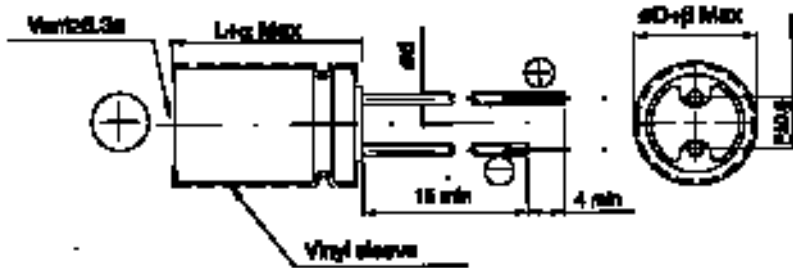


SPECIFICATIONS

Items	Performance																																										
Operating Temperature Range	-55°C~+105°C																																										
Capacitance Tolerance	±20% (at 120Hz, 20°C)																																										
Leakage Current (at 20 °C)	I = 0.01CV or 3(μA) whichever is greater (after 2 minutes) Where, C = rated capacitance in μF. V = rated DC working voltage in V.																																										
Dissipation Factor (Tan δ at 120 Hz, 20 °C)	<table border="1"> <tr> <td>Rated Voltage</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Tan δ (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>0.08</td> <td>0.05</td> </tr> </table> <p>When the capacitance exceeds 1000μF, 0.02 shall be added every 1000 μF increase.</p>	Rated Voltage	6.3	10	16	25	35	50	63	100	Tan δ (max)	0.22	0.19	0.16	0.14	0.12	0.10	0.08	0.05																								
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Low Temperature Characteristics (at 120Hz)	<p>Impedance ratio shall not exceed the values given in the table below.</p> <table border="1"> <tr> <td>Rated Voltage</td> <td>6.3</td> <td>10</td> <td>16</td> <td>25</td> <td>35</td> <td>50</td> <td>63</td> <td>100</td> </tr> <tr> <td>Impedance Ratio Z(-55°C)/Z(+20°C) </td> <td>4</td> <td>4</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> </table>	Rated Voltage	6.3	10	16	25	35	50	63	100	Impedance Ratio Z(-55°C)/Z(+20°C)	4	4	3	3	3	3	3	3																								
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Load Life Test	<table border="1"> <tr> <td>Test Time</td> <td>2000hrs (5000hrs for ø D ≥ 10mm)</td> </tr> <tr> <td>Capacitance Change</td> <td>≤ ± 20%</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </table> <p>*The above specifications shall be satisfied when the capacitors are restored to 20 °C after the rated voltage applied for 2000 hrs at 105 °C.</p>	Test Time	2000hrs (5000hrs for ø D ≥ 10mm)	Capacitance Change	≤ ± 20%	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																		
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Shelf Life Test	<table border="1"> <tr> <td>Test Time</td> <td>1000 hrs</td> </tr> <tr> <td>Capacitance Change</td> <td>≤ ± 20%</td> </tr> <tr> <td>Dissipation Factor</td> <td>Less than 200% of specified value</td> </tr> <tr> <td>Leakage Current</td> <td>Within specified value</td> </tr> </table> <p>*The above specifications shall be satisfied when the capacitors are restored to 20 °C after exposing them for 1000 hrs at 105 °C without voltage applied.</p>	Test Time	1000 hrs	Capacitance Change	≤ ± 20%	Dissipation Factor	Less than 200% of specified value	Leakage Current	Within specified value																																		
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Ripple Current & Frequency Multipliers	<table border="1"> <tr> <td rowspan="2">Cap. (μF)</td> <td colspan="7">Freq. (Hz)</td> </tr> <tr> <td>60 (50)</td> <td>120</td> <td>500</td> <td>1K</td> <td>10K</td> <td>100K</td> </tr> <tr> <td>Under 33</td> <td>0.40</td> <td>0.55</td> <td>0.65</td> <td>0.80</td> <td>0.90</td> <td>1.00</td> </tr> <tr> <td>33 to 330</td> <td>0.60</td> <td>0.70</td> <td>0.80</td> <td>0.90</td> <td>0.95</td> <td>1.00</td> </tr> <tr> <td>390 to 1000</td> <td>0.65</td> <td>0.80</td> <td>0.85</td> <td>0.98</td> <td>1.00</td> <td>1.00</td> </tr> <tr> <td>1200 up above</td> <td>0.80</td> <td>0.90</td> <td>0.95</td> <td>0.98</td> <td>1.00</td> <td>1.00</td> </tr> </table>	Cap. (μF)	Freq. (Hz)							60 (50)	120	500	1K	10K	100K	Under 33	0.40	0.55	0.65	0.80	0.90	1.00	33 to 330	0.60	0.70	0.80	0.90	0.95	1.00	390 to 1000	0.65	0.80	0.85	0.98	1.00	1.00	1200 up above	0.80	0.90	0.95	0.98	1.00	1.00
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Standards	Satisfies Characteristic W of JIS C 5141																																										



DIAGRAM OF DIMENSIONS



Unit: mm

LEAD SPACING AND DIAMETER

∅ D	5	6.3	8	10	13	16	18
P	2.0	2.5	3.5	5.0	5.0	7.5	7.5
∅ d	0.5		0.6		0.8		
α	1.0			1.5			
β	0.5						

DIMENSION & PERMISSIBLE RIPPLE CURRENT

Dimension: ∅ D x L(mm)
Ripple Current: mA/rms at 100k Hz, 105 °C

VDC Item μF	6.3(0J)					10(1A)				
	∅ D X L	Impedance (Ω) Max		Ripple Current (mA rms)		∅ D X L	Impedance (Ω) Max		Ripple Current (mA rms)	
		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz
47						5 x 11	2.10	5.50	78	111
56						5 x 11	1.90	5.70	85	121
68						5 x 11	1.30	3.90	108	154
100	5 x 11	1.30	3.90	108	154	6.3 x 11	0.60	1.80	182	260
220	6.3 x 11	0.60	1.80	182	260	8 x 11.5	0.33	0.99	280	400
330	8 x 11.5	0.33	0.88	280	400	8 x 11.5	0.33	0.99	280	400
390	8 x 11.5	0.33	0.88	320	400	10 x 12.5	0.27	0.70	410	510
470	10 x 12.5	0.25	0.75	410	510	10 x 12.5	0.25	0.75	410	510
560	10 x 12.5	0.25	0.75	410	510	10 x 16	0.19	0.57	510	635
680	10 x 16	0.19	0.57	510	635	10 x 16	0.19	0.57	510	635
1000	10 x 20	0.14	0.42	690	860	10 x 20	0.14	0.37	690	860
1200	10 x 20	0.14	0.42	775	860	10 x 25	0.12	0.30	930	1030
2200	13 x 20	0.085	0.26	1125	1250	13 x 25	0.070	0.21	1200	1355
3300	13 x 25	0.070	0.21	1200	1355	13 x 25	0.070	0.21	1200	1355
4700	16 x 25	0.060	0.18	1595	1770	16 x 31.5	0.048	0.14	1830	2030

VDC Item μF	16(1C)					25(1E)				
	∅ D X L	Impedance (Ω) Max		Ripple Current (mA rms)		∅ D X L	Impedance (Ω) Max		Ripple Current (mA rms)	
		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz
33	5 x 11	1.30	3.90	108	154	5 x 11	1.30	3.90	108	154
39	5 x 11	1.30	3.90	108	154	6.3 x 11	0.60	1.80	182	260
47	6.3 x 11	0.60	1.80	182	260	6.3 x 11	0.60	1.80	182	260
56	6.3 x 11	0.60	1.80	182	260	6.3 x 11	0.60	1.80	182	260
68	6.3 x 11	0.60	1.80	182	260	6.3 x 11	0.60	1.80	182	260
100	6.3 x 11	0.60	1.80	182	260	8 x 11.5	0.33	0.99	320	400
220	8 x 11.5	0.33	0.99	320	400	10 x 12.5	0.25	0.75	360	510
330	10 x 12.5	0.25	0.75	360	510	10 x 16	0.19	0.57	445	635
390	10 x 16	0.19	0.57	510	635	10 x 20	0.14	0.42	775	635
470	10 x 16	0.19	0.57	510	635	10 x 20	0.14	0.42	775	635
560	10 x 20	0.14	0.42	775	860	10 x 25	0.12	0.30	930	1030
680	10 x 20	0.14	0.42	775	860	13 x 20	0.085	0.26	1000	1250
1000	13 x 20	0.085	0.26	1000	1250	13 x 25	0.085	0.21	1080	1355
1200	13 x 20	0.085	0.26	1125	1250	13 x 25	0.070	0.26	1200	1355
2200	13 x 25	0.070	0.21	1200	1355	16 x 25	0.060	0.18	1595	1770
3300	16 x 31.5	0.048	0.14	1830	2030	16 x 35.5	0.044	0.13	2065	2295
4700	16 x 35.5	0.044	0.13	2065	2295	18 x 40	0.037	0.1	2465	2740



V.DC Item μF	35(1V)					50V(1H)				
	ø D X L	Impedance (Ω) Max		Ripple Current (mA rms)		ø D X L	Impedance (Ω) Max		Ripple Current (mA rms)	
		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz
1						5 x 11	5.0	15.0	43	78
2.2						5 x 11	4.0	12.0	48	88
3.3						5 x 11	3.50	11.0	52	94
4.7						5 x 11	3.00	9.00	55	100
6.8						5 x 11	3.00	9.00	55	100
10						5 x 11	2.00	6.00	68	124
22	5 x 11	1.30	3.90	108	154	6.3 x 11	0.60	1.80	143	260
33	6.3 x 11	0.60	1.80	182	260	6.3 x 11	0.60	1.80	143	260
39	6.3 x 11	0.60	1.80	182	260	6.3 x 11	0.60	1.80	182	260
47	6.3 x 11	0.60	1.80	182	260	8 x 11.5	0.33	0.99	320	400
56	6.3 x 11	0.60	1.80	182	260	8 x 11.5	0.33	0.99	320	400
68	6.3 x 11	0.60	1.80	182	260	8 x 11.5	0.33	0.99	320	400
100	8 x 11.5	0.33	0.99	320	400	10 x 16	0.19	0.57	445	635
220	10 x 16	0.19	0.57	445	635	10 x 25	0.12	0.30	825	1030
330	10 x 20	0.12	0.42	600	860	13 x 20	0.085	0.26	875	1250
390	10 x 25	0.12	0.30	930	1030	13 x 25	0.070	0.21	1085	1355
470	13 x 20	0.085	0.26	1000	1250	13 x 25	0.070	0.21	1085	1355
560	13 x 20	0.085	0.26	1000	1250	13 x 25	0.070	0.21	1085	1355
680	13 x 25	0.070	0.21	1085	1355	16 x 25	0.060	0.18	1415	1770
1000	13 x 25	0.070	0.21	1085	1355	16 x 25	0.060	0.18	1595	1770
1200	13 x 25	0.070	0.21	1200	1355	16 x 31.5	0.048	0.14	1830	2030
2200	16 x 35.5	0.044	0.13	2065	2295	18 x 40	0.037	0.10	2465	2740
3300	18 x 40	0.037	0.10	2465	2740					

V.DC Item μF	63V(1J)					100V(2A)				
	ø D X L	Impedance (Ω) Max		Ripple Current (mA rms)		ø D X L	Impedance (Ω) Max		Ripple Current (mA rms)	
		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz		20°C/100KHz	-10°C/100KHz	105°C/120Hz	105°C/100KHz
1						5 x 11	7.00	25.0	36	66
2.2						5 x 11	6.00	21.0	40	72
3.3						5 x 11	5.00	18.0	43	78
4.7						6.3 x 11	1.20	4.20	100	180
6.8						6.3 x 11	1.20	4.20	100	180
10	6.3 x 11	1.20	4.20	100	180	8 x 11.5	0.56	2.00	168	305
22	6.3 x 11	1.20	4.20	100	180	8 x 11.5	0.56	2.00	168	308
33	8 x 11.5	0.56	2.00	170	305	10 x 12.5	0.50	1.80	210	380
39	8 x 11.5	0.56	2.00	170	305	10 x 16	0.32	1.10	350	500
47	8 x 11.5	0.56	2.00	170	305	10 x 20	0.27	0.95	435	620
56	10 x 12.5	0.50	1.80	265	380	10 x 20	0.27	0.95	435	620
68	10 x 12.5	0.50	1.80	265	380	10 x 25	0.21	0.63	530	760
100	10 x 20	0.27	0.95	600	620	13 x 20	0.16	0.56	625	890
220	13 x 20	0.094	0.24	570	820	16 x 25	0.090	0.32	1010	1440
330	13 x 25	0.073	0.21	770	1100	16 x 31.5	0.060	0.17	1255	1790
390	13 x 25	0.073	0.21	770	1100	16 x 35.5	0.056	0.14	1650	2065
470	16 x 25	0.060	0.18	1420	1770					
560	16 x 31.5	0.048	0.14	1830	2030					
680	16 x 31.5	0.048	0.14	1830	2030					
1000	18 x 35.5	0.041	0.11	1790	2240					