

HIGH RELIABILITY

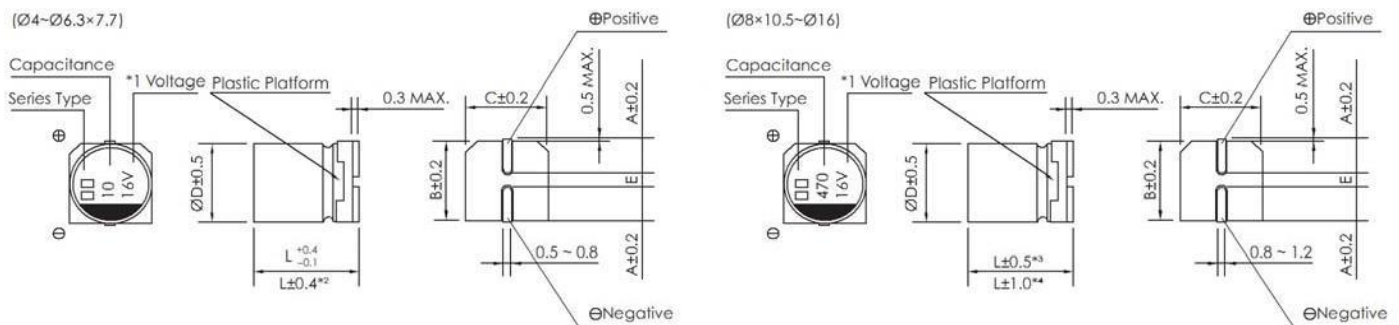
高可靠品

High temperature range up to +125°C
 適用於+125°C 的高溫範圍
 Suitable for automotive equipment
 適用於汽車電子裝備
 Load life of 1000~5000 hours
 負荷壽命 1000~5000 小時
 Comply with the RoHS directive
 符合 RoHS 指令

SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性																																			
Operation Temperature Range 使用溫度範圍	-40 ~ +125°C																																			
Voltage Range 額定工作電壓範圍	10 ~ 450V																																			
Capacitance Range 靜電容量範圍	3.3 ~ 2200µF																																			
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C																																			
Leakage Current 漏電流	Leakage current (10V~100V) ≤0.03CV or 4µA, whichever is greater (after 2 minutes application of rated voltage) Leakage current (160V~450V) ≤0.04CV + 100µA, whichever is greater (after 2 minutes application of rated voltage) 漏電流 (10V~100V) ≤0.03CV 或 4µA, 取較大值 (施加額定工作電壓 2 分鐘後) 漏電流 (160V~450V) ≤0.04CV + 100µA, 取較大值 (施加額定工作電壓 2 分鐘後)																																			
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 溫度: 20°C <table border="1"> <thead> <tr> <th>Rated Voltage (V) 額定工作電壓</th> <th>10</th> <th>16</th> <th>25</th> <th>35</th> <th>50</th> <th>63</th> <th>100</th> <th>160~250</th> <th>400,450</th> </tr> </thead> <tbody> <tr> <td>tan δ (max.)</td> <td>4~ 10</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> <td>0.18</td> <td>0.18</td> <td>—</td> </tr> <tr> <td>最大損耗角正切</td> <td>12.5~ 16</td> <td>0.22</td> <td>0.18</td> <td>0.16</td> <td>0.14</td> <td>0.12</td> <td>0.14</td> <td>0.10</td> <td>0.20</td> </tr> </tbody> </table>	Rated Voltage (V) 額定工作電壓	10	16	25	35	50	63	100	160~250	400,450	tan δ (max.)	4~ 10	0.24	0.20	0.16	0.14	0.14	0.18	0.18	—	最大損耗角正切	12.5~ 16	0.22	0.18	0.16	0.14	0.12	0.14	0.10	0.20					
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Stability at Low Temperature 低溫特性	Measurement frequency 測試頻率: 120Hz <table border="1"> <thead> <tr> <th>Rated Voltage (V) 額定工作電壓</th> <th>10</th> <th>16</th> <th>25</th> <th>35~100</th> <th>160~250</th> <th>400,450</th> </tr> </thead> <tbody> <tr> <td>Impedance Ratio 阻抗比</td> <td>4~ 10</td> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>—</td> </tr> <tr> <td></td> <td></td> <td>Z(-40°C) / Z(20°C)</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> </tr> <tr> <td>ZT/Z20 (max.)</td> <td>12.5~ 16</td> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> </tr> <tr> <td></td> <td></td> <td>Z(-40°C) / Z(20°C)</td> <td>8</td> <td>6</td> <td>4</td> <td>3</td> </tr> </tbody> </table>	Rated Voltage (V) 額定工作電壓	10	16	25	35~100	160~250	400,450	Impedance Ratio 阻抗比	4~ 10	Z(-25°C) / Z(20°C)	4	3	2	—			Z(-40°C) / Z(20°C)	10	8	6	4	ZT/Z20 (max.)	12.5~ 16	Z(-25°C) / Z(20°C)	4	3	2	2			Z(-40°C) / Z(20°C)	8	6	4	3
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Load Life 高溫負荷特性	After 5000 hrs. application of the rated voltage for 12.5~16 (10~100V), and 2000 hrs. for 8·10.5~ 10 (10~100V), and 1000 hrs. for 6.3, as well as 2000 hrs. application of rated voltage for 12.5~16 (160~450V) at 125°C, they meet the characteristics listed below. 在 125°C 環境中施加額定工作電壓 5000 小時於 12.5~16 (10~100V), 2000 小時於 8·10.5~ 10 (10~100V), 1000 小時於 6.3, 以及施加額定工作電壓 2000 小時於 12.5~16 (160~450V)後, 電容器的特性符合下表的要求。 <table border="1"> <tbody> <tr> <td>Capacitance Change 靜電容量變化率</td> <td>Within ±30% of initial value 初始值的±30%以內</td> </tr> <tr> <td>Dissipation Factor 損耗角正切</td> <td>300% or less of initial specified value 不大於規範值的 300%</td> </tr> <tr> <td>Leakage Current 漏電流</td> <td>initial specified value or less 不大於規範值</td> </tr> </tbody> </table>	Capacitance Change 靜電容量變化率	Within ±30% of initial value 初始值的±30%以內	Dissipation Factor 損耗角正切	300% or less of initial specified value 不大於規範值的 300%	Leakage Current 漏電流	initial specified value or less 不大於規範值																													
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Shelf Life 高溫貯存特性	After leaving capacitors under no load at 125°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 125°C 環境中無負荷放置 1000 小時後, 電容器的特性符合高溫負荷特性中所列的規定值。																																			
Resistance to Soldering Heat 耐焊接熱特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 經過回流焊並冷卻至室溫後, 電容器的特性符合下表的要求。 <table border="1"> <tbody> <tr> <td>Capacitance Change 靜電容量變化率</td> <td>Within ±10% of initial value 初始值的±10%以內</td> </tr> <tr> <td>Dissipation Factor 損耗角正切</td> <td>initial specified value or less 不大於規範值</td> </tr> <tr> <td>Leakage Current 漏電流</td> <td>initial specified value or less 不大於規範值</td> </tr> </tbody> </table>	Capacitance Change 靜電容量變化率	Within ±10% of initial value 初始值的±10%以內	Dissipation Factor 損耗角正切	initial specified value or less 不大於規範值	Leakage Current 漏電流	initial specified value or less 不大於規範值																													
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Marking 標識	Black print on the case top. 鋁殼頂部黑字印刷。																																			

DRAWING (Unit: mm) 外形圖



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DIMENSIONS (Unit: mm) 尺寸表

D x L	4 x 5.8	5 x 5.8	6.3 x 5.8	6.3 x 7.7	8 x 10.5	10 x 10.5	10 x 13.5	12.5 x 13.5	12.5 x 16	16 x 16.5
A	2.0	2.2	2.6	2.6	3.0	3.3	3.3	4.9	4.9	5.8
B	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.4	10.4	10.4	13.0	13.0	17.0
E ± 0.2	1.0	1.4	1.9	1.9	3.1	4.7	4.7	4.7	4.7	6.4
L	5.8	5.8	5.8	7.7	10.5	10.5	13.5	13.5	16.0	16.5

DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 規格尺寸及最大允許紋波電流及 ESR 值

Parameter 參數 μF	WV	10 (1A)				16 (1C)				25 (1E)			
		Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流	Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流	Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流
33	330								6.3 x 5.8	3.3	66	45	
47	470					6.3 x 5.8	3.3	66	43	6.3 x 7.7	2.3	46	68
100	101	6.3 x 7.7	2.3	46	72	8 x 10.5	1.0	20	115	8 x 10.5	1.0	20	126
220	221	8 x 10.5	1.0	20	136	10 x 10.5	0.7	13.4	175	10 x 10.5	0.7	13.4	211
330	331	10 x 10.5	0.7	13.4	188	10 x 13.5	0.5	9.5	280	12.5 x 13.5 (10x13.5)	0.14 (0.5)	2.1 (9.5)	750 (270)
470	471	10 x 13.5	0.5	9.5	300	12.5 x 13.5	0.14	2.1	750	12.5 x 13.5	0.14	2.1	750
680	681					16 x 16.5 (12.5x13.5)	0.10 (0.14)	1.5 (2.1)	1000 (750)	16 x 16.5	0.10	1.5	1000
1000	102	12.5 x 16 (12.5x13.5)	0.11 (0.14)	1.5 (2.1)	900 (750)								
2200	222	16 x 16.5	0.10	1.5	1000								

Parameter 參數 μF	WV	35 (1V)				50 (1H)			
		Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流	Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流
10	100	6.3 x 5.8	3.3	66	38	6.3 x 7.7 (6.3 x 5.8)	2.3 (3.3)	46 (66)	50 (38)
22	220	6.3 x 5.8	3.3	66	39	6.3 x 7.7	2.3	46	50
33	330	6.3 x 7.7	2.3	46	62	8 x 10.5	1.0	20	83
47	470	8 x 10.5	1.0	20	92	10 x 10.5	0.7	13.4	111
100	101	10 x 10.5	0.7	13.4	151	12.5 x 13.5	0.23	3.5	550
220	221	12.5 x 13.5 (10 x 13.5)	0.14 (0.5)	2.1 (9.5)	750 (260)	16 x 16.5 (12.5 x 13.5)	0.15 (0.23)	2.3 (3.5)	850 (550)
330	331	12.5 x 13.5	0.14	2.1	750	16 x 16.5 (12.5 x 16)	0.15 (0.18)	2.3 (2.7)	850 (700)
470	471	16 x 16.5 (12.5 x 16)	0.10 (0.11)	1.5 (1.5)	1000 (900)				

Parameter 參數 μF	WV	63 (1J)				100 (2A)			
		Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流	Case size D-L (mm) 尺寸	E.S.R. (Ω) 20°C E.S.R.值	E.S.R. (Ω) -40°C E.S.R.值	Ripple current (mA rms) at 125°C, 100KHz 紋波電流
10	100	6.3 x 7.7	2.3	115	42	8 x 10.5	1.00	50	53
22	220	8 x 10.5	1.0	50	56	10 x 10.5	0.70	35	63
33	330	10 x 10.5	0.7	35	77	10 x 13.5	0.45	22.5	130
47	470	10 x 13.5	0.45	22.5	150	12.5 x 13.5	0.33	16.5	450
68	680					12.5 x 16	0.26	13	550
100	101	12.5 x 13.5	0.25	12.5	500	16 x 16.5	0.24	12	650
220	221	12.5 x 16	0.20	10	600				
330	331	16 x 16.5	0.18	9	820				

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DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 規格尺寸及最大允許紋波電流

WV Code		160		200		250		400		450	
μ F	代碼	2C		2D		2E		2G		2W	
3.3	3R3									12.5 x 16	65
4.7	4R7							12.5 x 13.5	70	16 x 16.5	85
6.8	6R8							16 x 16.5	100		
10	100	12.5 x 13.5	100	12.5 x 13.5	100	12.5 x 16	110			Case size 尺寸	Ripple current 紋波電流
22	220	16 x 16.5	180	16 x 16.5	180						

☐Case size D-L(mm), ripple current (mA rms) at 125°C, 120Hz ☐尺寸 D-L(mm), 紋波電流(mA rms)於 125°C, 120Hz

FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 紋波電流頻率補償系數

Frequency 頻率		50Hz	120Hz	1KHz	10KHz~	100KHz~
Coefficient 系數	10~100V	10 ~ 100 μ F	0.35	0.40	0.75	1.00
		220 ~ 470 μ F	0.35	0.50	0.85	1.00
		680 ~ 2200 μ F	0.40	0.60	0.85	0.95

Frequency 頻率		50Hz	120Hz	300Hz	1KHz	10KHz	100KHz~
Coefficient 系數	160~450V	0.75	1.00	1.25	1.50	1.75	1.80

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