



HIGH RELIABILITY

高可靠品

- High temperature range up to -40~+125°C
适用于 -40~+125°C 的高温范围
- Suitable for automotive equipment
适用于汽车电子设备
- Load life of 1000~3000 hours
负荷寿命1000~3000 小时
- Comply with the RoHS directive
符合 RoHS 指令



SPECIFICATIONS 特性表

Items 项目	Characteristics 主要特性																																			
Operation Temperature Range 使用温度范围	-40~+125°C																																			
Voltage Range 额定工作电压范围	10-450V																																			
Capacitance Range 静电容量范围	3.3-2200μF																																			
Capacitance Tolerance 静电容量允许偏差	±20% at 120Hz, 20°C																																			
Leakage Current 漏电流	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) 漏电流 (10V-100V) ≤ 0.03CV 或 4 μA, 取较大值 (施加额定工作电压2分钟后) 漏电流 (160V-450V) ≤ 0.04CV + 100 μA, 取较大值 (施加额定工作电压2分钟后)																																			
Dissipation Factor (tan δ) 损耗角正切	Measurement frequency 测试频率: 120Hz, Temperature 温度: 20°C <table border="1"> <thead> <tr> <th>Rated Voltage (V) 额定工作电压</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>0.24</td> <td>0.20</td> <td>0.18</td> <td>0.16</td> <td>0.16</td> <td>0.14</td> <td>0.14</td> <td></td> <td></td> </tr> <tr> <td>最大损耗角正切</td> <td>∅12.5-∅16</td> <td>0.26</td> <td>0.22</td> <td>0.20</td> <td>0.18</td> <td>0.18</td> <td>0.16</td> <td>0.16</td> <td>0.20</td> </tr> </tbody> </table>	Rated Voltage (V) 额定工作电压	10	16	25	35	50	63	100	160-250	400,450	tan δ(max.)	0.24	0.20	0.18	0.16	0.16	0.14	0.14			最大损耗角正切	∅12.5-∅16	0.26	0.22	0.20	0.18	0.18	0.16	0.16	0.20					
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Stability at Low Temperature 低温特性	Measurement frequency 测试频率: 120Hz <table border="1"> <thead> <tr> <th>Rated Voltage (V) 额定工作电压</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 rowspan="2">Impedance Ratio 阻抗比</td> <td rowspan="2">∅4-∅10</td> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td></td> </tr> <tr> <td>Z(-40°C) / Z(20°C)</td> <td>10</td> <td>8</td> <td>6</td> <td>4</td> <td></td> </tr> <tr> <td rowspan="2">ZT/Z20 (max.)</td> <td rowspan="2">∅12.5-∅16</td> <td>Z(-25°C) / Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>3</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> </tr> </tbody> </table>	Rated Voltage (V) 额定工作电压	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	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	3	Z(-40°C) / Z(20°C)	8	6	4	3	6
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Load Life 高温负荷特性	After 3000 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 3000 hrs. application of rated voltage for ∅12.5-16 (160-450V) at 125°C, they meet the characteristics listed below. 在125°C 环境中施加额定工作电压3000 小时于∅12.5-16 (10-100V), 2000 小时于∅8×10.5-∅10 (10-100V), 1000 小时于∅6.3, 以及施加额定工作电压3000 小时于∅12.5-16 (160-450V)后, 电容器的特性符合下表的要求。 <table border="1"> <tbody> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ±30% of initial value 初始值的 ±30% 以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>300% or less of initial specified value 不大于规范值的300%</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 不大于规范值</td> </tr> </tbody> </table>	Capacitance Change 静电容量变化率	Within ±30% of initial value 初始值的 ±30% 以内	Dissipation Factor 损耗角正切	300% or less of initial specified value 不大于规范值的300%	Leakage Current 漏电流	initial specified value or less 不大于规范值																													
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Shelf Life 高温贮存特性	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 环境中无负荷放置1000 小时后, 电容器的特性符合高温负荷特性中所列的规范值。																																			
Resistance to Soldering Heat 耐焊接热特性	After reflow soldering and restored at room temperature, they meet the characteristics listed below. 经过回流焊并冷却至室温后, 电容器的特性符合下表的要求。 <table border="1"> <tbody> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ±10% of initial value 初始值的 ±10% 以内</td> </tr> <tr> <td>Dissipation Factor 损耗角正切</td> <td>initial specified value or less 不大于规范值</td> </tr> <tr> <td>Leakage Current 漏电流</td> <td>initial specified value or less 不大于规范值</td> </tr> </tbody> </table>	Capacitance Change 静电容量变化率	Within ±10% of initial value 初始值的 ±10% 以内	Dissipation Factor 损耗角正切	initial specified value or less 不大于规范值	Leakage Current 漏电流	initial specified value or less 不大于规范值																													
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Marking 标识	Black print on the case top. 铝壳顶部黑字印刷。																																			

FVA | Chip Type 贴片式

Diagram of Dimensions 尺寸图



DIMENSIONS (Unit: mm) 尺寸表

DXL	6.3X5.8	6.3X7.7	8X10.5	10X10.5	10X13.5	12.5X13.5	12.5X16	16X16.5
A	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
B	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
C	7.2	7.2	9.2	11.2	11.2	13.7	13.7	18.0
P±0.2	2.0	2.0	3.1	4.4	4.4	4.4	4.4	6.4
L	5.8±0.3	7.7±0.3	10.5±0.5	10.5±0.5	13.5±0.5	13.5±0.5	16±0.5	16.5±0.5

□ DRAWING (Unit: mm) 外形图



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT & ESR 规格尺寸及最大允许纹波电流及ESR值

Parameter 参数	WV	10 (1A)				16 (1C)				25 (1E)			
		Case size $\varnothing D \times L$ (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 纹波电流	Case size $\varnothing D \times L$ (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 纹波电流	Case size $\varnothing D \times L$ (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 纹波电流
33	330									6.3 × 5.8	3.3	66	45
47	470				6.3 × 5.8	3.3	66	43	6.3 × 7.7	2.3	46	68	
100	101	6.3 × 7.7	2.3	46	72	8 × 10.5	1.0	20	115	8 × 10.5	1.0	20	126
220	221	8 × 10.5	1.0	20	136	10 × 10.5	0.7	13.4	175	10 × 10.5	0.7	13.4	211
330	331	10 × 10.5	0.7	13.4	188	10 × 13.5	0.5	9.5	280	12.5 × 13.5 (10×13.5)	0.14 (0.5)	2.1 (9.5)	750 (270)
470	471	10 × 13.5	0.5	9.5	300	12.5 × 13.5	0.14	2.1	750	12.5 × 13.5	0.14	2.1	750
680	681	12.5×13.5	0.14	2.1	750	16 × 16.5 (12.5×13.5)	0.10 (0.14)	1.5 (2.1)	1000 (750)	16 × 16.5	0.10	1.5	1000
1000	102	12.5 × 16 (12.5×13.5)	0.11 (0.14)	1.5 (2.1)	900 (750)								
2200	222	16 × 16.5	0.10	1.5	1000								

Parameter 参数	WV	35 (1V)				50 (1H)			
		Case size $\varnothing D \times L$ (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 纹波电流	Case size $\varnothing D \times L$ (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 纹波电流
10	100	6.3 × 5.8	3.3	66	38	6.3 × 7.7 (6.3 × 5.8)	2.3 (3.3)	46 (66)	50 (38)
22	220	6.3 × 5.8	3.3	66	39	6.3 × 7.7	2.3	46	50
33	330	6.3 × 7.7	2.3	46	62	8 × 10.5	1.0	20	83
47	470	8 × 10.5	1.0	20	92	10 × 10.5	0.7	13.4	111
100	101	10 × 10.5	0.7	13.4	151	12.5 × 13.5	0.23	3.5	550
220	221	12.5 × 13.5 (10 × 13.5)	0.14 (0.5)	2.1 (9.5)	750 (260)	16 × 16.5 (12.5 × 13.5)	0.15 (0.23)	2.3 (3.5)	850 (550)
330	331	12.5 × 13.5	0.14	2.1	750	16 × 16.5 (12.5 × 16)	0.15 (0.18)	2.3 (2.7)	850 (700)
470	471	16 × 16.5 (12.5 × 16)	0.10 (0.11)	1.5 (1.5)	1000 (900)				

Parameter 参数	WV	63 (1J)				100 (2A)			
		Case size $\varnothing D \times L$ (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 纹波电流	Case size $\varnothing D \times L$ (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 纹波电流
10	100	6.3 × 7.7	2.3	115	42	8 × 10.5	1.00	50	53
22	220	8 × 10.5	1.0	50	56	10 × 10.5	0.70	35	63
33	330	10 × 10.5	0.7	35	77	10 × 13.5	0.45	22.5	130
47	470	10 × 13.5	0.45	22.5	150	12.5 × 13.5	0.33	16.5	450
68	680					12.5 × 16	0.26	13	550
100	101	12.5 × 13.5	0.25	12.5	500	16 × 16.5	0.24	12	650
220	221	12.5 × 16	0.20	10	600				
330	331	16 × 16.5	0.18	9	820				

FVA | Chip Type 贴片式



□ DIMENSIONS & MAXIMUM PERMISSIBLE RIPPLE CURRENT 规格尺寸及最大允许纹波电流

μF	WV Code 代码	160		200		250		400		450	
		2C		2D		2E		2G		2W	
3.3	3R3									12.5 × 16	65
4.7	4R7							12.5 × 13.5	70	16 × 16.5	85
6.8	6R8							16 × 16.5	100		
10	100	12.5 × 13.5	100	12.5 × 13.5	100	12.5 × 16	110			Case size 尺寸	Ripple current 纹波电流
22	220	16 × 16.5	180	16 × 16.5	180						

•Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 125°C, 120Hz •尺寸 $\varnothing D \times L$ (mm), 纹波电流(mA rms)于125°C, 120Hz

□ FREQUENCY COEFFICIENT OF ALLOWABLE RIPPLE CURRENT 纹波电流频率补偿系数

Frequency 频率			50Hz	120Hz	1KHz	10KHz~	100KHz~
Coefficient 系数	10~100V	10 ~ 100μF	0.35	0.40	0.75	0.90	1.00
		220 ~ 470μF	0.35	0.50	0.85	0.94	1.00
		680 ~ 2200μF	0.40	0.60	0.85	0.95	1.00

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

- The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.
- 铝电解电容器由于在纹波电流叠加时自我发热，温度上升而老化，每升温10°C寿命减少一半；要想保持长寿命请在使用过程中降低纹波电流。