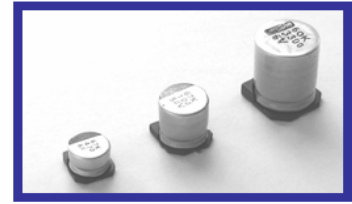


**KL 3000~5000 Hours Load Life 3000~5000 小时长寿命品**

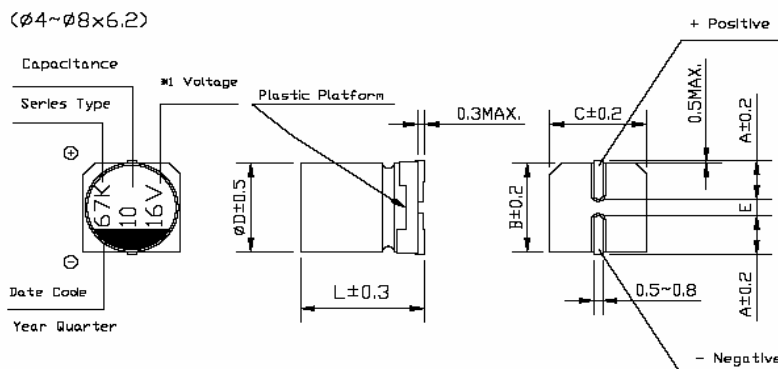
- Load life of 3000~5000 hours with temperature up to +105°C.
- Lead-free reflow soldering is available subject to customers' request.



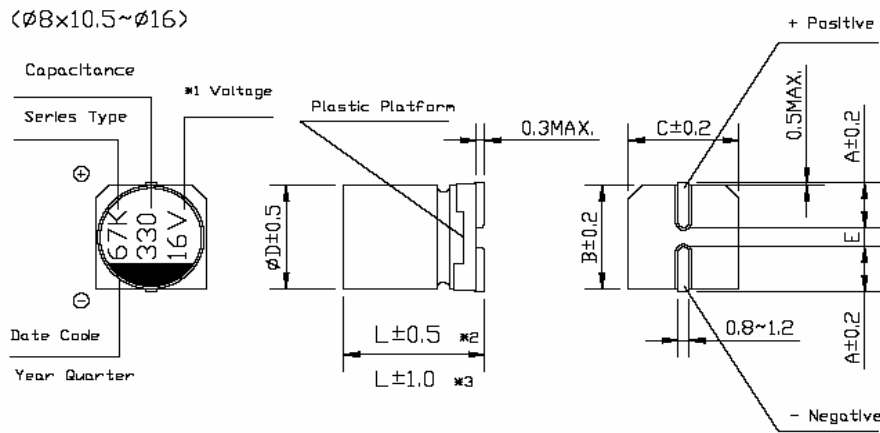
**◆ Specifications 特性**

Items 项目	Performance Characteristics 主要特性																																													
Operating Temperature Range 使用温度范围	-55~+105°C																																													
Voltage Range 额定工作电压范围	6.3~100V																																													
Capacitance Range 静电容量范围	0.1~3300 μF																																													
Capacitance Tolerance 静电容量允许偏差	±20% at 120 Hz, 20°C																																													
Leakage Current 漏电流	For φ4~φ10, after 2 minutes' application of rated voltage, leakage current is not more than 0.01CV or 3(μA), whichever is greater. For φ12.5~φ16, after 1 minute's application of rated voltage, leakage current is not more than 0.03CV or 4(μA), whichever is greater. φ4~φ10: 施加额定工作电压 2 分钟, LC≤0.01CV 或 3(μA), 取较大值; φ12.5~φ16: 施加额定工作电压 1 分钟, LC≤0.03CV 或 4(μA), 取较大值。																																													
Tan δ 损耗角正切	Measurement frequency 测试频率: 120Hz, Temperature 温度: 20°C <table border="1"> <tr> <td>Rated voltage (V.DC) 额定工作电压</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 损耗角正切(max)</td> <td>φ4~φ10</td> <td>0.28</td> <td>0.24</td> <td>0.20</td> <td>0.16</td> <td>0.13</td> <td>0.12</td> <td>0.12</td> </tr> <tr> <td></td> <td>φ12.5~φ16</td> <td>0.38</td> <td>0.34</td> <td>0.30</td> <td>0.26</td> <td>0.22</td> <td>0.18</td> <td>0.18</td> </tr> </table>	Rated voltage (V.DC) 额定工作电压	6.3	10	16	25	35	50	63	100	Tan δ 损耗角正切(max)	φ4~φ10	0.28	0.24	0.20	0.16	0.13	0.12	0.12		φ12.5~φ16	0.38	0.34	0.30	0.26	0.22	0.18	0.18																		
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Stability at Low Temperature 低温特性	Measurement frequency 测试频率: 120Hz <table border="1"> <tr> <td>Rated voltage (V.DC) 额定工作电压</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 rowspan="2">Impedance ratio 阻抗比</td> <td rowspan="2">φ4~φ10</td> <td>Z(-25°C)/Z(20°C)</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C)/Z(20°C)</td> <td>10</td> <td>7</td> <td>5</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> </tr> <tr> <td rowspan="2">ZT/Z20 (max)</td> <td rowspan="2">φ12.5~φ16</td> <td>Z(-25°C)/Z(20°C)</td> <td>5</td> <td>4</td> <td>3</td> <td>2</td> <td>2</td> <td>2</td> <td>2</td> </tr> <tr> <td>Z(-55°C)/Z(20°C)</td> <td>12</td> <td>10</td> <td>8</td> <td>5</td> <td>4</td> <td>3</td> <td>3</td> </tr> </table>	Rated voltage (V.DC) 额定工作电压	6.3	10	16	25	35	50	63	100	Impedance ratio 阻抗比	φ4~φ10	Z(-25°C)/Z(20°C)	4	3	2	2	2	2	2	Z(-55°C)/Z(20°C)	10	7	5	3	3	3	3	ZT/Z20 (max)	φ12.5~φ16	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	2	Z(-55°C)/Z(20°C)	12	10	8	5	4	3	3
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ZT/Z20 (max)	φ12.5~φ16	Z(-25°C)/Z(20°C)	5	4	3	2	2	2	2																																					
		Z(-55°C)/Z(20°C)	12	10	8	5	4	3	3																																					
Load Life 高温负荷特性	After 5000 hours' (3000 hours' for φ4~φ6.3 and φ8×6.2) application of rated voltage at 105°C, capacitors meet the characteristics requirements listed at right 在 105°C 环境中施加额定工作电压 5000 小时 (φ4~φ6.3 和 φ8×6.2 为 3000 小时) 后, 电容器的特性符合右表的要求。 <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ±30% of the initial value 初始值的±30%以内</td> </tr> <tr> <td>Tan δ 损耗角正切</td> <td>300% or less of the 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> </table>	Capacitance Change 静电容量变化率	Within ±30% of the initial value 初始值的±30%以内	Tan δ 损耗角正切	300% or less of the 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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Leakage Current 漏电流	Initial specified value or less 不大于规范值																																													
Shelf Life 高温储存特性	After leaving capacitors under no load at 105°C for 1000 hours, they meet the specified value for load life characteristics listed above. 在 105°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定值。																																													
Resistance to Soldering Heat 耐焊接热特性	After reflow soldering and restored at room temperature, they meet the characteristics requirements listed at right. 经过回流焊并冷却至室温后, 电容器的特性符合右表的要求。 <table border="1"> <tr> <td>Capacitance Change 静电容量变化率</td> <td>Within ±10% of the initial value 初始值的±10%以内</td> </tr> <tr> <td>Tan δ 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> </table>	Capacitance Change 静电容量变化率	Within ±10% of the initial value 初始值的±10%以内	Tan δ 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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Applicable Standards 适用标准	JIS C-5141 and JIS C-5102																																													

**◆ Dimensions & Marking 尺寸及印字**



**KL Series**



\*1 Voltage mark [6V] represents 6.3V for  $\phi 4 \sim \phi 10$ ; \*2 [ $L \pm 0.5$ ] is applicable to  $\phi 8 \times 10.5 \sim \phi 10$ ; \*3 [ $L \pm 1.0$ ] is applicable to  $\phi 12.5 \sim \phi 16$ .

Re: Date code and series type — 1<sup>st</sup> digit for Year; 2<sup>nd</sup> digit for Quarter, 4 quarter codes in one year are 1, 4, 7, 0; 3<sup>rd</sup> character for Series; KL Series = K.

	(mm)										
D×L	$\phi 4 \times 5.8$	$\phi 5 \times 5.8$	$\phi 6.3 \times 5.8$	$\phi 6.3 \times 7.7$	$\phi 8 \times 6.2$	$\phi 8 \times 10.5$	$\phi 10 \times 10.5$	$\phi 10 \times 13.5$	$\phi 12.5 \times 13.5$	$\phi 12.5 \times 16$	$\phi 16 \times 16.5$
A	1.8	2.1	2.4	2.4	3.3	2.9	3.2	3.2	4.7	4.7	5.5
B	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
C	4.3	5.3	6.6	6.6	8.3	8.3	10.3	10.3	13.0	13.0	17.0
E±0.2	1.0	1.3	2.2	2.2	2.2	3.1	4.4	4.4	4.4	4.4	6.7
L	5.8	5.8	5.8	7.7	6.2	10.5	10.5	13.5	13.5	16.0	16.5

◆ Standard size & Maximum permissible ripple current 规格壳号及最大允许纹波电流

容量 Cap. (μF) \ WV 电压		6.3		10		16		25	
		0J		1A		1C		1E	
10	100					4×5.8	18	5×5.8	27
22	220	4×5.8	22	5×5.8	30	5×5.8	30	6.3×5.8	44
33	330	5×5.8	35	5×5.8	36	6.3×5.8	48	6.3×5.8	50
47	470	5×5.8	38	6.3×5.8	50	6.3×5.8	50	6.3×7.7 (8×6.2)	63
100	101	6.3×5.8	69	6.3×7.7 (8×6.2)	81	6.3×7.7 (8×6.2)	81	8×10.5	116
150	151	6.3×7.7 (8×6.2)	85	8×10.5	125	8×10.5	125	10×10.5	320
220	221	6.3×7.7 (8×6.2)	120	8×10.5	141	10×10.5	216	10×10.5	320
330	331	8×10.5	290	10×10.5	290	10×10.5	290	10×10.5	320
470	471	10×10.5	320	10×10.5	320	10×10.5	320	12.5×13.5 (10×13.5)	400 (350)
680	681	10×10.5	320	10×10.5	320	10×13.5	420	12.5×13.5	415
1000	102	10×10.5	410	10×13.5	390	12.5×13.5	550	12.5×13.5	460
1500	152	10×13.5	450	12.5×13.5	480	12.5×13.5	650	12.5×16	700
2200	222	12.5×13.5	680	12.5×16 (12.5×13.5)	750 (510)	16×16.5	800		
3300	332	12.5×16 (12.5×13.5)	850 (800)	16×16.5	800			Case Size	Ripple Current

Ripple Current (mA rms) at 105°C 120Hz

**KL Series**

◆ **Standard size & Maximum permissible ripple current** 规格壳号及最大允许纹波电流

容量 Cap. (μF) \ WV 电压		35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4×5.8	1.0				
0.22	R22			4×5.8	2.6				
0.33	R33			4×5.8	3.2				
0.47	R47			4×5.8	5				
1	010			4×5.8	8				
2.2	2R2			4×5.8	12				
3.3	3R3			4×5.8	17			6.3×7.7 (8×6.2)	30
4.7	4R7	4×5.8	16	5×5.8	22			8×10.5	50
10	100	5×5.8	27	6.3×5.8	32	6.3×7.7 (8×6.2)	45	8×10.5	55
22	220	6.3×5.8	44	6.3×7.7 (8×6.2)	58	8×10.5	65	10×10.5	70
33	330	6.3×7.7 (8×6.2)	57	8×10.5	140	10×10.5	80	10×10.5	80
47	470	8×10.5	92	10×10.5	310	10×10.5	90	12.5×13.5 (10×13.5)	250 (150)
68	680							12.5×13.5	300
100	101	10×10.5	151	10×10.5	310	10×13.5	150	16×16.5 (12.5×16) (12.5×13.5)	600 (420) (380)
150	151	10×10.5	290	10×10.5	310				
220	221	10×10.5	375	12.5×13.5 (10×13.5)	340 (320)	12.5×13.5	470		
330	331	12.5×13.5 (10×13.5)	380 (375)	12.5×16 (12.5×13.5)	600 (500)	16×16.5 (12.5×16)	650 (550)		
470	471	12.5×13.5	520	16×16.5	700				
680	681	12.5×13.5	550						
1000	102	16×16.5 (12.5×16)	750 (600)					Case Size	Ripple Current

Ripple Current (mA rms) at 105°C 120Hz

◆ **Frequency Correction Factor of Rated Ripple Current** 纹波电流频率补偿系数

Frequency		50Hz	120Hz	300Hz	1kHz	10kHz~
		Capacitance (μF)				
Φ4~Φ10		0.70	1.00	1.17	1.36	1.50
Φ12.5~Φ16	~68	0.75	1.00	1.35	1.57	2.00
	100~470	0.80	1.00	1.23	1.34	1.50
	680~3300	0.85	1.00	1.10	1.13	1.15