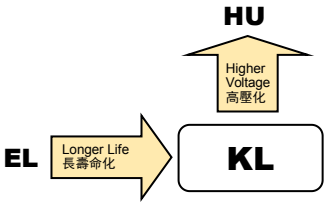
KL Series

CHIP TYPE, 5000 HOURS LONG LIFE ASSURANCE
貼片式，5000 小時長壽命品

- Wide temperature range -55~+105°C
  適用於 -55~+105°C 的寬溫範圍
- Load life of 3000~5000 hours
  負荷壽命 3000~5000 小時
- RoHS & REACH compliant, Halogen-free
  符合 RoHS 與 REACH，無鹵



SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性
Operation Temperature Range 使用溫度範圍	-55 ~ +105°C
Voltage Range 額定工作電壓範圍	6.3 ~ 100V
Capacitance Range 靜電容量範圍	0.1 ~ 1500μF
Capacitance Tolerance 靜電容量允許偏差	±20% at 120Hz, 20°C
Leakage Current 漏電流	Leakage current ≤0.01CV or 3μA (∅4~∅10), whichever is greater (after 2 minutes application of rated voltage at 20°C) Leakage current ≤0.03CV or 4μA (∅12.5~∅16), whichever is greater (after 1 minute application of rated voltage at 20°C) 漏電流 ≤0.01CV 或 3μA (∅4~∅10)，取較大值（在 20°C 環境中施加額定工作電壓 2 分鐘後） 漏電流 ≤0.03CV 或 4μA (∅12.5~∅16)，取較大值（在 20°C 環境中施加額定工作電壓 1 分鐘後）
	C: Nominal capacitance (μF) 標稱靜電容量, V: Rated voltage (V) 額定電壓
Dissipation Factor (tan δ) 損耗角正切	Measurement frequency 測試頻率: 120Hz, Temperature 温度: 20°C

Rated Voltage (V) 額定工作電壓		6.3	10	16	25	35	50~100
tan δ (max.) 最大損耗角正切	∅4~∅10	0.28	0.24	0.20	0.16	0.13	0.12
	∅12.5~∅16	0.38	0.34	0.30	0.26	0.22	0.18

Stability at Low Temperature 低溫特性

Measurement frequency 測試頻率: 120Hz

Rated Voltage (V) 額定工作電壓			6.3	10	16	25	35	50~100
Impedance Ratio 阻抗比 ZT/Z20 (max.)	∅4~∅10	Z(-25°C) / Z(20°C)	3	3	2	2	2	2
		Z(-55°C) / Z(20°C)	8	5	4	3	3	3
	∅12.5~∅16	Z(-25°C) / Z(20°C)	5	4	3	2	2	2
		Z(-55°C) / Z(20°C)	12	10	8	5	4	3

Load Life 高溫負荷特性

After 5000 hrs. (3000 hrs. for ∅4~∅6.3×5.8) application of the rated voltage at 105°C, they meet the characteristics listed below.
在 105°C 環境中施加額定工作電壓 5000 小時（∅4~∅6.3×5.8 為 3000 小時）後，電容器的特性符合下表的要求。

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

Shelf Life 高溫貯存特性

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 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

(Please refer page 23 for soldering conditions)
(焊接條件請查閱第 23 頁)

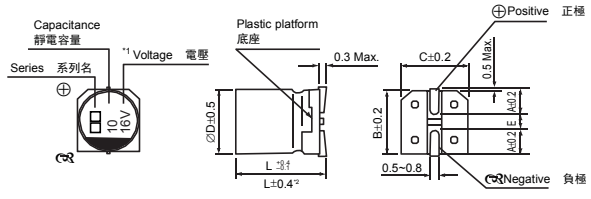
After reflow soldering and restored at room temperature, they meet the characteristics listed below.
經過回流焊並冷卻至室溫後，電容器的特性符合下表的要求。

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

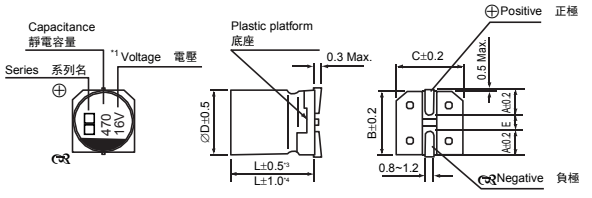
Marking 標識 — Black print on the case top. 鋁殼頂部黑字印刷。

DRAWING 外形圖 (Unit: mm)

(∅4~∅6.3×7.7)



(∅8×10.5~∅16)



*1. Voltage mark for 6.3V is [6V]
*2. Applicable to ∅6.3×7.7
*3. Applicable to ∅8×10.5~∅10
*4. Applicable to ∅12.5~∅16

6.3V 的產品標識為 [6V]
適用於∅6.3×7.7
適用於∅8×10.5~∅10
適用於∅12.5~∅16

Dimension table in next page.
尺寸表見下一頁。

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DIMENSIONS (Unit: mm) 尺寸表

ØD 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 規格尺寸及最大允許紋波電流

WV / Code 代碼 / μF		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	63
100	101	6.3 × 5.8	69	6.3 × 7.7	81	6.3 × 7.7	81	8 × 10.5	116
150	151	6.3 × 7.7	85	8 × 10.5	125	8 × 10.5	125	10 × 10.5	320
220	221	6.3 × 7.7	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 尺寸	Ripple current 紋波電流

WV / Code 代碼 / μF		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	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	45	8 × 10.5	55
22	220	6.3 × 5.8	44	6.3 × 7.7	58	8 × 10.5	65	10 × 10.5	70
33	330	6.3 × 7.7	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)
100	101	10 × 10.5	151	10 × 10.5	310	10 × 13.5	150	12.5 × 13.5	300
150	151	10 × 10.5	290	10 × 10.5	310			16 × 16.5 (12.5 × 16) (12.5 × 13.5)	600 (420) (380)
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 尺寸	Ripple current 紋波電流

ꕥCase size ∅D×L(mm), ripple current (mA rms) at 105°C, 120Hz ꕥ尺寸∅D×L(mm)，紋波電流(mA rms)於 105°C, 120Hz

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

Frequency 頻率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系數	Ø4 ~ Ø10		0.70	1.00	1.17	1.36	1.50
	Ø12.5 ~ Ø16	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 470μF	0.80	1.00	1.23	1.34	1.50
		680 ~ 3300μF	0.85	1.00	1.10	1.13	1.15

The endurance of capacitors is reduced with internal heating produced by ripple current at the rate of halving the lifetime with every 5~10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced. 鋁電解電容器在疊加紋波電流後會引起發熱，溫度每上升 5~10°C 壽命會減半。若要保持長壽命性能，請在使用過程中適當降低紋波電流。