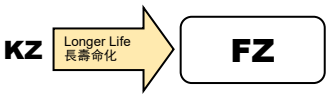
FZ Series

CHIP TYPE, LONG LIFE WITH ULTRA-LOW ESR
貼片式，長壽命，超低等效串聯電阻品





- Ultra-low ESR
  超低等效串聯電阻
- Endurance 2000~5000 hours
  耐久性 2000~5000 小時
- ESR 5~25% less than KZ series
  低等效串聯電阻比 KZ 系列低 5~25%
- RoHS & REACH compliant, Halogen-free
  符合 RoHS 與 REACH，無鹵
- AEC-Q200 compliant (Please contact us for details)
  符合 AEC-Q200（請與我們聯繫瞭解詳細信息）



☐ SPECIFICATIONS 特性表

Items 項目	Characteristics 主要特性
Category Temperature Range 工作温度範圍	-55 ~ +105°C
Voltage Range 額定工作電壓範圍	6.3 ~ 100V
Capacitance Range 靜電容量範圍	3.3 ~ 8200μF
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~∅18), 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~∅18)，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	63~80	100
tan δ (max.) 最大損耗角正切	∅4~∅10	0.26	0.19	0.16	0.14	0.12	0.10	0.08	0.07
	∅12.5~∅18	0.26	0.19	0.18	0.16	0.14	0.10	0.08	0.07

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 ~ 16	25 ~ 100
Impedance Ratio 阻抗比 ZT/Z20 (max.)	Z(-25°C) / Z(+20°C)	2	2
	Z(-40°C) / Z(+20°C)	3	3
	Z(-55°C) / Z(+20°C)	4	3

Endurance
耐久性

When the capacitors are restored to 20°C after 5000 hrs. (2000 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 2000 小時）後，待電容器恢復至 20°C 時進行測量，電容器的特性符合下表要求。

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	200% or less of initial specified value 不大於規範值的 200%
Leakage Current 漏電流	initial specified value or less 不大於規範值

Shelf Life
高溫貯存特性

When the capacitors are restored to 20°C after leaving under no load at 105°C for 1000 hours, they meet the specified value for endurance characteristics listed above.
在 105°C 環境中無負荷放置 1000 小時後，待電容器恢復至 20°C 時進行測量，電容器的特性符合耐久性特性中所列的規定值。

Resistance to Soldering Heat
耐焊接熱特性
(Please refer page 25 for soldering conditions)
(焊接條件請查閱第 25 頁)

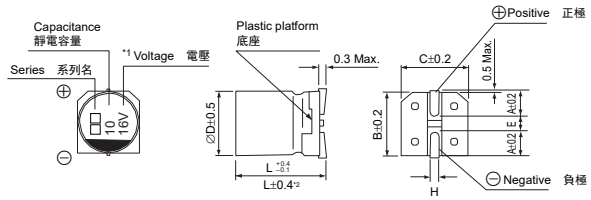
After reflow soldering and restored at room temperature, they meet the characteristics listed below.
經過回流焊並冷卻至室温後，電容器的特性符合下表要求。

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

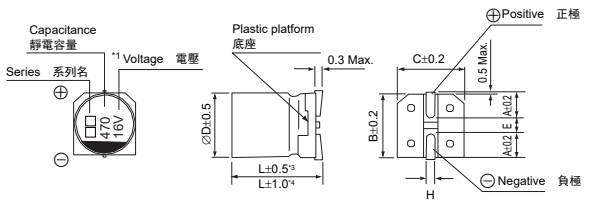
Marking 標識: Black print on the case top. 鋁殼頂部黑字印刷。

☐ DRAWING 外形圖 (Unit: mm)

(∅4~∅6.3×7.7)



(∅8×10.5~∅18)



*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~∅18

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~∅18

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

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CAT.2026/V2.1

FZ Series

☐ DIMENSIONS (Unit: mm) 尺寸表

ØD x L	4 x 5.8	5 x 5.8	6.3 x 5.8/7.7	8 x 10.5	10 x 10.5/13.5	12.5 x 13.5/16	16 x 16.5	18 x 16.5/18.5
A	2.0	2.2	2.6	3.0	3.3	4.9	5.8	6.2
B	4.3	5.3	6.6	8.4	10.4	13.0	17.0	19.0
C	4.3	5.3	6.6	8.4	10.4	13.0	17.0	19.0
E ± 0.2	1.0	1.4	1.9	3.1	4.7	4.7	6.4	6.4
L	5.8	5.8	5.8/7.7	10.5	10.5/13.5	13.5/16.0	16.5	16.5/18.5
H	0.5~0.8	0.5~0.8	0.5~0.8	0.8~1.2	0.8~1.2	0.8~1.2	1.1~1.4	1.1~1.4

☐ DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV / Code 代碼 / µF		6.3			10			16		
		0J			1A			1C		
10	100							4 × 5.8	1.35	90
15	150							4 × 5.8	1.35	90
22	220	4 × 5.8	1.35	90	4 × 5.8	1.35	90	5 × 5.8	0.76	160
33	330	5 × 5.8 (4 × 5.8)	0.76 (1.35)	160 (90)	5 × 5.8	0.76	160	6.3 × 5.8	0.44	240
47	470	5 × 5.8 (4 × 5.8)	0.76 (1.35)	160 (90)	6.3 × 5.8	0.44	240	6.3 × 5.8 (5 × 5.8)	0.44 (0.76)	240 (160)
56	560	5 × 5.8	0.76	160	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240
68	680	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)
100	101	6.3 × 5.8	0.44	240	6.3 × 7.7	0.34	300	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)
150	151	6.3 × 5.8	0.44	240	6.3 × 7.7	0.34	300	6.3 × 7.7	0.34	300
220	221	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)	6.3 × 7.7	0.34	300	8 × 10.5 (6.3 × 7.7)	0.17 (0.34)	600 (300)
330	331	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5 (8 × 10.5)	0.08 (0.17)	850 (600)
470	471	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)
680	681	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 10.5	0.09	850	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)
1000	102	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)	12.5 × 16 (12.5 × 13.5)	0.055 (0.06)	1200 (1100)
1500	152	10 × 13.5	0.09	950	12.5 × 13.5	0.06	1100	16 × 16.5	0.05	1450
2200	222	12.5 × 13.5	0.06	1100	12.5 × 16	0.055	1200	16 × 16.5	0.05	1450
3300	332	12.5 × 16 (12.5 × 13.5)	0.055 (0.06)	1200 (1100)	16 × 16.5	0.05	1260	16 × 16.5	0.05	1450
4700	472	16 × 16.5	0.05	1450	16 × 16.5	0.05	1450	18 × 18.5 (18 × 16.5)	0.048 (0.048)	1500 (1500)
6800	682	18 × 16.5	0.048	1500	18 × 16.5	0.048	1500	Case size 尺寸	ESR 等效串聯電阻	Ripple current 紋波電流
8200	822	18 × 16.5	0.048	1500						

WV / Code 代碼 / µF		25			35			50		
		1E			1V			1H		
4.7	4R7				4 × 5.8	1.35	90	5 × 5.8	1.52	85
10	100	4 × 5.8	1.35	90	5 × 5.8	0.76	160	6.3 × 5.8 (5 × 5.8)	0.88 (1.35)	165 (115)
15	150	5 × 5.8	0.76	160	5 × 5.8	0.76	160	6.3 × 5.8	0.88	165
22	220	6.3 × 5.8 (5 × 5.8)	0.44 (0.76)	240 (160)	6.3 × 5.8	0.44	240	6.3 × 7.7 (6.3 × 5.8)	0.68 (0.88)	195 (165)
33	330	6.3 × 5.8	0.44	240	6.3 × 5.8	0.44	240	6.3 × 7.7	0.68	195
47	470	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.44)	300 (240)	6.3 × 7.7 (6.3 × 5.8)	0.34 (0.88)	300 (165)	8 × 10.5 (6.3 × 7.7)	0.34 (0.68)	350 (195)
56	560	6.3 × 7.7	0.34	300	6.3 × 7.7	0.34	300	8 × 10.5	0.34	350
68	680	6.3 × 7.7	0.34	300	8 × 10.5	0.17	600	8 × 10.5	0.34	350
100	101	8 × 10.5 (6.3 × 7.7)	0.17 (0.34)	600 (300)	8 × 10.5 (6.3 × 7.7)	0.17 (0.34)	600 (300)	10 × 10.5 (8 × 10.5)	0.18 (0.34)	670 (350)
150	151	8 × 10.5 (6.3 × 7.7)	0.16 (0.34)	600 (300)	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 13.5 (10 × 10.5)	0.14 (0.18)	780 (670)
220	221	8 × 10.5	0.17	600	10 × 10.5 (8 × 10.5)	0.09 (0.16)	850 (600)	10 × 13.5 (10 × 10.5)	0.14 (0.26)	780 (750)
330	331	10 × 10.5 (8 × 10.5)	0.09 (0.17)	850 (600)	10 × 13.5 (10 × 10.5)	0.07 (0.10)	950 (850)	12.5 × 13.5	0.12	900
470	471	10 × 13.5 (10 × 10.5)	0.07 (0.09)	950 (850)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	0.06 (0.07) (0.10)	1100 (1000) (950)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.08 (0.10) (0.08)	1250 (1050) (1100)
680	681	12.5 × 13.5	0.06	1100	12.5 × 16 (12.5 × 13.5)	0.055 (0.06)	1200 (1100)	16 × 16.5	0.073	1250
1000	102	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.05 (0.055) (0.06)	1450 (1200) (1100)	16 × 16.5	0.05	1450	18 × 18.5 (18 × 16.5) (16 × 16.5)	0.073 (0.073) (0.08)	1250 (1250) (1000)
1500	152	16 × 16.5	0.05	1450	16 × 16.5	0.048	1500	18 × 16.5	0.066	1500
2200	222	16 × 16.5	0.05	1450	18 × 18.5	0.038	1750	Case size 尺寸	ESR 等效串聯電阻	Ripple current 紋波電流
3300	333	18 × 18.5 (18 × 16.5)	0.048 (0.048)	1500 (1500)						

•Case size 尺寸 ØD×L(mm), ESR 等效串聯電阻 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

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CAT.2026/V2.1

FZ Series

□ DIMENSIONS & STANDARD RATINGS 規格尺寸及標準參數

WV / Code 代碼 / μF		63			80			100		
		1J			1K			2A		
3.3	3R3				5 × 5.8	5.0	25			
4.7	4R7	5 × 5.8	3.0	50	6.3 × 5.8	3.0	40			
10	100	6.3 × 7.7 (6.3 × 5.8)	1.2 (1.5)	120 (80)	6.3 × 7.7	2.4	60	8 × 10.5	1.3	130
22	220	8 × 10.5 (6.3 × 7.7)	0.65 (1.2)	250 (120)	8 × 10.5	1.3	130	10 × 10.5 (8 × 10.5)	0.7 (1.3)	200 (160)
33	330	8 × 10.5	0.65	250	10 × 10.5	0.7	200	10 × 13.5	0.7	200
47	470	10 × 10.5 (8 × 10.5)	0.5 (0.65)	300 (250)	10 × 13.5	0.45	300	12.5 × 13.5 (10 × 10.5)	0.32 (0.8)	500 (300)
68	680	12.5 × 13.5 (10 × 10.5) (8 × 10.5)	0.16 (0.5) (0.6)	800 (300) (280)	12.5 × 13.5	0.32	500	12.5 × 13.5	0.32	500
100	101	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	0.16 (0.25) (0.5)	800 (400) (300)	12.5 × 13.5 (10 × 13.5)	0.32 (0.18)	500 (750)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	0.17 (0.26) (0.32)	795 (550) (500)
150	151	12.5 × 13.5 (10 × 13.5)	0.16 (0.25)	800 (650)	12.5 × 13.5	0.32	500	16 × 16.5 (12.5 × 16)	0.17 (0.26)	650 (550)
220	221	12.5 × 13.5	0.16	800	12.5 × 16 (12.5 × 13.5)	0.26 (0.12)	550 (900)	18 × 16.5	0.15	850
330	331	16 × 16.5	0.082	900	16 × 16.5	0.17	795	18 × 16.5	0.15	850
470	471	16 × 16.5	0.082	900	18 × 16.5	0.15	850	18 × 18.5	0.15	950
680	681	18 × 16.5	0.08	1150	18 × 18.5	0.15	950	Case size 尺寸	ESR 等效串聯電阻	Ripple current 紋波電流
1000	102	18 × 18.5	0.06	1250						

•Case size 尺寸 ∅D×L(mm), ESR 等效串聯電阻 (Ω) at 20°C, 100KHz, Ripple current 紋波電流 (mA rms) at 105°C, 100KHz

□ 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	∅4 ~ ∅10	4.7 ~ 68μF	0.35	0.50	0.64	0.83	1.00
		100 ~ 1500μF	0.40	0.55	0.70	0.85	1.00
	∅12.5 ~ ∅18	~ 68μF	0.40	0.55	0.70	0.85	1.00
		100 ~ 680μF	0.45	0.65	0.80	0.90	1.00
		1000 ~ 4700μF	0.65	0.85	0.95	1.00	1.00

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。

- Taping specifications are given in page 19. 編帶標準請查閱第 19 頁。
- Soldering conditions and recommended land size are given in page 25. 焊接條件及推薦安裝尺寸請查閱第 25 頁。
- Please refer to page 20 for the minimum package quantity. 最小包裝數量請查閱第 20 頁。
- Please refer to page 18 for the Part Number System. 產品編碼規則請查閱第 18 頁。

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