

STANDARD
标准品

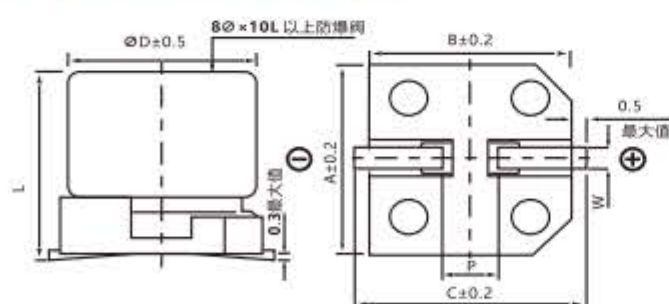
- Operating with wide temperature range $-55\sim+105^{\circ}\text{C}$
适用于 $-55\sim+105^{\circ}\text{C}$ 的宽温范围
- Load life of 2000 hours
负荷寿命2000 小时
- Comply with the RoHS directive
符合 RoHS 指令



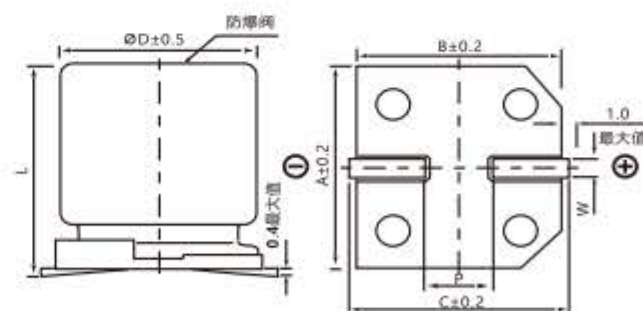
SPECIFICATIONS 特性表

Items 项目	Characteristics 主要特性
Operation Temperature Range 使用温度范围	6.3~100V: $-55\sim+105^{\circ}\text{C}$ 160~400V: $-40\sim+105^{\circ}\text{C}$ 450V: $-25\sim+105^{\circ}\text{C}$
Voltage Range 额定工作电压范围	4 ~ 450V
Capacitance Range 静电容量范围	0.1 ~ 6800 μF
Capacitance Tolerance 静电容量允许偏差	$\pm 20\%$ at 120Hz, 20°C
Leakage Current 漏电流	Rated Voltage 额定工作电压
	6.3 ~ 100V
	160 ~ 450V
	Case size 尺寸
Dissipation Factor (tan δ) 损耗角正切	Time 时间
	after 2min. (application of rated voltage) 2 分钟后 (施加额定工作电压)
	after 2min. (application of rated voltage) 2 分钟后 (施加额定工作电压)
	after 5min. (application of rated voltage) 5 分钟后 (施加额定工作电压)
Stability at Low Temperature 低温特性	Leakage current 漏电流
	$\leq 0.01\text{CV}$ or $3\mu\text{A}$, whichever is greater $\leq 0.01\text{CV}$ 或 $3\mu\text{A}$, 取较大值
	$\leq 0.03\text{CV}$ or $4\mu\text{A}$, whichever is greater $\leq 0.03\text{CV}$ 或 $4\mu\text{A}$, 取较大值
	$\leq 0.04\text{CV}+100\mu\text{A}$
Load Life 高温负荷特性	Measurement frequency 测试频率: 120Hz, Temperature 温度: 20°C
	Rated Voltage(V) 额定工作电压
	tan δ (max.)
	最大损耗角正切
Shelf Life 高温贮存特性	Impedance Ratio 阻抗比
	Z(-25 $^{\circ}\text{C}$)/Z(20 $^{\circ}\text{C}$)
	Z(-55 $^{\circ}\text{C}$)/Z(20 $^{\circ}\text{C}$)
	Z(-25 $^{\circ}\text{C}$)/Z(20 $^{\circ}\text{C}$)
Resistance to Soldering Heat 耐焊接热特性	Z(-55 $^{\circ}\text{C}$)/Z(20 $^{\circ}\text{C}$)
	17 12 10 8 5 4 3 3 6 10
	After 2000 hrs. application of the rated voltage at 105°C , they meet the characteristics listed below. 在 105°C 环境中施加额定工作电压2000 小时后, 电容器的特性符合下表的要求。
	Capacitance Change 静电容量变化率
	Within $\pm 20\%$ of initial value (Within $\pm 30\%$ of initial value for capacitors of 10V or less) 初始值的 $\pm 20\%$ 以内 ($\leq 10\text{V}$ 为初始值的 $\pm 30\%$ 以内)
	Dissipation Factor 损耗角正切
	200% or less of initial specified value 不大于规范值的200%
	Leakage Current 漏电流
	initial specified value or less 不大于规范值
Marking 标识	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。
	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。
	Capacitance Change 静电容量变化率
	Within $\pm 10\%$ of initial value 初始值的 $\pm 10\%$ 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

Diagram of Dimensions 尺寸图



ΦD=4~10 适用



ΦD=12.5 以上适用

DIMENSIONS (Unit: mm) 尺寸表

DXL	4X5.4	5X5.4	6.3X4.5	6.3X5.4	6.3X7.7	8X10.5	10X10.5	10X13.5	12.5X13.5	12.5X16	16X16.5
A	4.3	5.3	6.6	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
B	4.3	5.3	6.6	6.6	6.6	8.3	10.3	10.3	13.0	13.0	17.0
C	5.1	5.9	7.2	7.2	7.2	9.2	11.2	11.2	13.7	13.7	18.0
P ± 0.2	1.0	1.5	2.0	2.0	2.0	3.1	4.4	4.4	4.4	4.4	6.4
L	5.4 ± 0.3	5.4 ± 0.3	4.5 ± 0.3	5.4 ± 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 规格尺寸及最大允许纹波电流

WV Code 代码	µF	4		6.3		10		16		25	
		0G		0J		1A		1C		1E	
4.7	4R7							4 × 5.4	13	4 × 5.4	14
10	100							4 × 5.4	19	5 × 5.4 (4 × 5.4)	23 (16)
22	220	4 × 5.4	20	4 × 5.4	23	5 × 5.4 (4 × 5.4)	29 (20)	5 × 5.4 (4 × 5.4)	32 (25)	6.3 × 5.4 (5 × 5.4)	39 (32)
33	330	5 × 5.4 (4 × 5.4)	30 (25)	5 × 5.4 (4 × 5.4)	32 (30)	5 × 5.4 (4 × 5.4)	35 (22)	6.3 × 5.4 (5 × 5.4)	45 (35)	6.3 × 5.4 (5 × 5.4)	48 (35)
47	470	5 × 5.4 (4 × 5.4)	36 (30)	5 × 5.4 (4 × 5.4)	38 (35)	5 × 5.4	38	6.3 × 5.4 (5 × 5.4)	55 (40)	6.3 × 5.4	60
100	101	6.3 × 5.4 (5 × 5.4)	60 (49)	6.3 × 5.4 (5 × 5.4)	65 (54)	6.3 × 5.4 (5 × 5.4)	70 (60)	6.3 × 5.4 (6.3 × 4.5)	80 (55)	6.3 × 7.7 (6.3 × 5.4)	100 (80)
150	151	6.3 × 5.4	70	6.3 × 5.4	55	6.3 × 5.4	62	6.3 × 7.7	105	8 × 10.5 (6.3 × 7.7)	140 (120)
220	221	6.3 × 5.4	85	6.3 × 7.7 (6.3 × 5.4)	120 (95)	6.3 × 7.7 (6.3 × 5.4) (6.3 × 4.5)	120 (95) (60)	8 × 10.5 (6.3 × 7.7)	180 (120)	8 × 10.5	200
330	331	6.3 × 7.7	100	6.3 × 7.7	120	8 × 10.5 (6.3 × 7.7)	200 (135)	8 × 10.5	220	10 × 10.5 (8 × 10.5)	240 (250)
470	471	6.3 × 7.7	105	8 × 10.5 (6.3 × 7.7)	230 (120)	6.3 × 7.7 (8 × 10.5)	120 (230)	10 × 10.5 (8 × 10.5)	300 (270)	10 × 10.5	280
680	681	8 × 10.5	210	8 × 10.5	230	10 × 10.5 (8 × 10.5)	270 (220)	10 × 10.5	315	10 × 13.5	400
1000	102	8 × 10.5	230	10 × 10.5 (8 × 10.5)	340 (290)	10 × 10.5	315	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	500 (390) (340)	12.5 × 13.5	580
1500	152	10 × 10.5	315	10 × 13.5 (10 × 10.5)	450 (410)	10 × 13.5	460	12.5 × 13.5	550	12.5 × 16	850
2200	222	10 × 13.5 (10 × 10.5)	440 (340)	12.5 × 13.5 (10 × 13.5)	620 (500)	12.5 × 13.5	680	16 × 16.5 (12.5 × 16)	950 (750)	16 × 16.5	1050
3300	332	10 × 13.5	490	12.5 × 16 (12.5 × 13.5)	700 (660)	16 × 16.5	1000	16 × 16.5	1000		
4700	472	12.5 × 13.5	600	16 × 16.5	1000					Case size 尺寸	Ripple current 纹波电流
6800	682	16 × 16.5 (12.5 × 16)	950 (650)								

WV Code 代码	µF	35		50		63		100	
		1V		1H		1J		2A	
0.1	0R1			4 × 5.4	2	4 × 5.4	2		
0.22	R22			4 × 5.4	4	4 × 5.4	4		
0.33	R33			4 × 5.4	4	4 × 5.4	4		
0.47	R47			4 × 5.4	5	4 × 5.4	5		
1	010			4 × 5.4	8	4 × 5.4	8	4 × 5.4	8
2.2	2R2			4 × 5.4	11	4 × 5.4	11	6.3 × 5.4 (5 × 5.4)	14 (12)
3.3	3R3	4 × 5.4	13	4 × 5.4	14	5 × 5.4	14	6.3 × 7.7 (6.3 × 5.4)	32 (20)
4.7	4R7	4 × 5.4	15	5 × 5.4 (4 × 5.4)	19 (14)	5 × 5.4	19	6.3 × 7.7 (6.3 × 5.4)	35 (21)
10	100	5 × 5.4 (4 × 5.4)	25 (18)	6.3 × 5.4 (5 × 5.4)	31 (20)	6.3 × 7.7 (6.3 × 5.4)	39 (24)	8 × 10.5 (6.3 × 7.7)	77 (35)
22	220	6.3 × 5.4 (5 × 5.4)	42 (34)	6.3 × 7.7 (6.3 × 5.4)	51 (42)	8 × 10.5 (6.3 × 7.7)	98 (49)	10 × 10.5 (8 × 10.5)	126 (84)
33	330	6.3 × 5.4	50	6.3 × 7.7	60	8 × 10.5	112	10 × 10.5	133
47	470	6.3 × 7.7 (6.3 × 5.4) (6.3 × 4.5)	78 (58) (50)	8 × 10.5 (6.3 × 7.7)	120 (63)	10 × 10.5 (8 × 10.5)	160 (119)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	250 (160) (140)
68	680					Case size 尺寸	Ripple current 纹波电流	12.5 × 13.5 (10 × 13.5)	300 (180)

•Case size ØD×L(mm), ripple current (mA rms) at 105°C, 120Hz •尺寸ØD×L(mm), 纹波电流(mA rms) 于105°C, 120Hz

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

WV Code 代码	μF	35		50		63		100		160	
		1V		1H		1J		2A		2C	
22	220									10 × 13.5	50
33	330									12.5 × 13.5	95
47	470									12.5 × 13.5 (16 × 16.5)	205 (240)
100	101	8 × 10.5 (6.3 × 7.7)	150 (92)	10 × 10.5 (8 × 10.5)	180 (160)	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	270 (210) (196)	16 × 16.5 (12.5 × 13.5)	450 (380)	16 × 16.5	250
150	151	8 × 10.5	185	10 × 10.5	200	10 × 13.5	225				
220	221	10 × 10.5 (8 × 10.5)	250 (220)	10 × 13.5 (10 × 10.5)	280 (220)	16 × 16.5 (12.5 × 13.5)	560 (470)	16 × 16.5	550		
330	331	10 × 10.5	300	16 × 16.5 (12.5 × 13.5) (10 × 13.5)	600 (420) (295)	16 × 16.5 (12.5 × 16)	700 (510)				
470	471	12.5 × 13.5 (10 × 13.5) (10 × 10.5)	520 (375) (310)	16 × 16.5 (12.5 × 16) (12.5 × 13.5)	700 (520) (470)	16 × 16.5	750				
680	681	12.5 × 13.5	530	16 × 16.5	750						
1000	102	16 × 16.5 (12.5 × 16)	750 (600)							Case size 尺寸	Ripple current 纹波电流
1500	152	16 × 16.5	750								

WV Code 代码	μF	200		250		350		400		450	
		2D		2E		2V		2G		2W	
3.3	3R3							10 × 13.5 (8 × 10.5)	40 (35)	10 × 13.5 (8 × 12.5)	40 (38)
4.7	4R7			10 × 13.5	75	10 × 13.5	85	10 × 13.5 (12.5 × 13.5)	45 (48)	10 × 13.5 (12.5 × 13.5)	42 (45)
10	100	10 × 13.5	75	10 × 13.5	75	12.5 × 13.5	105	12.5 × 13.5	50	12.5 × 13.5	55
22	220	12.5 × 13.5	105	12.5 × 13.5	105	16 × 16.5	130	16 × 16.5	85	16 × 16.5	85
33	330	12.5 × 13.5	120	16 × 16.5	135					Case size 尺寸	Ripple current 纹波电流
47	470	16 × 16.5	220								

• Case size $\varnothing D \times L$ (mm), ripple current (mA rms) at 105°C, 120Hz • 尺寸 $\varnothing D \times L$ (mm), 纹波电流 (mA rms) 于 105°C, 120Hz

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

Frequency 频率			50Hz	120Hz	300Hz	1KHz	10KHz~
Coefficient 系数	$\varnothing 4 \sim \varnothing 10$	0.1 ~ 68μF	0.70	1.00	1.17	1.36	1.50
		100 ~ 3300μF	0.85	1.00	1.08	1.20	1.30
	$\varnothing 12.5 \sim \varnothing 16$	~ 68μF	0.75	1.00	1.35	1.57	2.00
		100 ~ 680μF	0.80	1.00	1.23	1.34	1.50
		1000 ~ 6800μF	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 10°C rise. When long life performance is required in actual use, the rms ripple current has to be reduced.

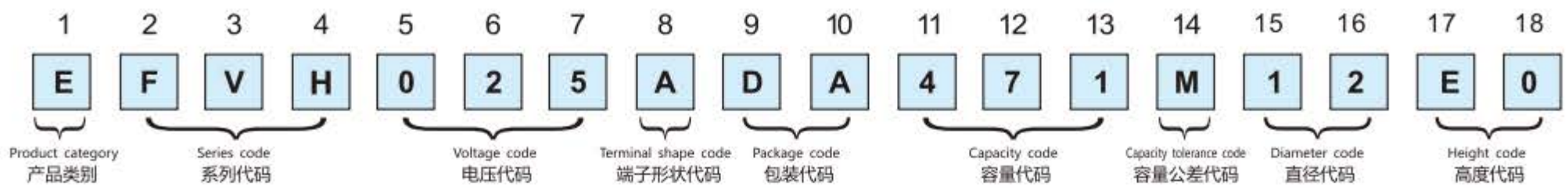
● 铝电解电容器由于在纹波电流叠加时自我发热，温度上升而老化，每升温10°C寿命减少一半；要想保持长寿命请在使用过程中降低纹波电流。

● Taping specifications are given in page 17 "Taping Specifications". 编带标准请参阅第 17 页“编带标准”。

● Please refer to page 18 "Package Quantity" for the minimum package quantity. 最小包装数量请参阅第 18 页“包装数量”。

SMD EXPLANATION OF PART NUMBERS

贴片产品编码规则

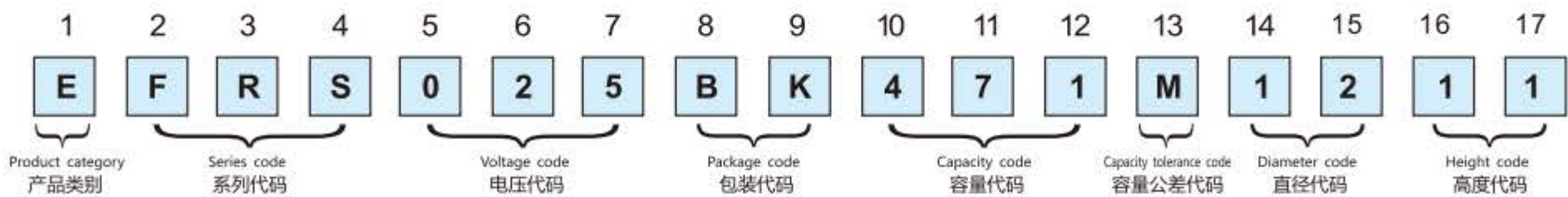


(2、3、4)			(5、6、7)		(11、12、13)		(14)		(8)		(15、16)		(17、18)	
Series 系列	Voltage (w.v) 电压	Code 代码	Capacitance (uF) 静电容量	Code 代码	Cap.Tolerance (%) 容量允许	Code 代码	Tape 端子类型		Code 代码	Diameter (□) 直径	Code 代码	Length (mm) 高度	Code 代码	
FVE	4	4R0	0.1	0R1	± 10	K	No dummy terminal 无辅助端子		A	4	04	4.5	45	
FVH	6.3	6R3	0.22	R22	± 20	M	With dummy terminal 有辅助端子		G	5	05	5.4	54	
FVA	10	010	1	010						6.3	06	5.8	58	
FVZ	16	016	4.7	4R7						8	08	6.5	65	
FVR	25	025	10	100						10	10	7.7	77	
FVL	35	035	47	470						12.5	12	10.2	A0	
FVM	50	050	100	101						16	16	10.5	B0	
FVU	63	063	470	471						18	18	13.5	E0	
FVG	100	100	1000	102								16	G5	
FVB	160	160	4700	472								16.5	H0	
FVN	250	250	10000	103								21.5	N0	
FVD	350	350												
FVC	400	400												

(9、10)		External diameter 纸盘外径	Fit size 适合尺寸	Code 代码
Packaging 包装要求	□(mm)	□D(mm)		
Braiding 编带	Paper tray 纸盘	380	ØD4~18	DA
		330	ØD4~18	DB
	Glue tray 胶盘	380	ØD4~10	RA
	Blister box 吸塑盒	-	ØD12.5~18	TR

Radial EXPLANATION OF PART NUMBERS

插件产品编码规则



(2、3、4)			(5、6、7)		(10、11、12)		(13)		(8、9)		(14、15)		(16、17)	
Series 系列	Voltage (w.v) 电压	Code 代码	Capacitance (uF) 静电容量	Code 代码	Cap.Tolerance (%) 容量允许	Code 代码	Packaging 包装形式		Code 代码	Diameter (∅) 直径	Code 代码	Length (mm) 高度	Code 代码	
FRA	4	4R0	0.1	0R1	± 10	K	Long-legged bulk长脚散装		BK	4	04	4.5	04	
FRS	6.3	6R3	0.22	R22	± 20	M	Long-legged taping长脚编带		BA	5	05	5.5	05	
FRU	10	010	1	010						6.3	06	6.0	06	
FRK	16	016	4.7	4R7						8	08	6.5	06	
FBR	25	025	10	100						10	10	7.0	07	
FBU	35	035	47	470						12.5	12	8.0	08	
	50	050	100	101						16	16	10	10	
	63	063	470	471						18	18	11	11	
	100	100	1000	102								11.5	11	
	160	160	4700	472								12	12	
	250	250	10000	103								16	16	
	350	350												
	400	400												

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