

FES series

Features

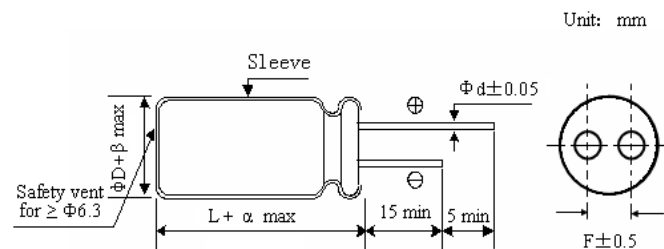
- ◆ Life time: +130°C 3,000 hours, 105°C 12,000 hours
- ◆ Withstand high temperature +130°C, miniaturized and long life
- ◆ Suitable for output circuit and input circuit of LED driving Power, electronic ballast and electronic energy saving lamp
- ◆ RoHS Compliant



Specifications

Item	Performance Characteristics								
Operating Temperature Range	-40~+130°C (160~400V _{dc})			-25~+130°C (450V _{dc})			-25~+105°C (500V _{dc})		
Rate Voltage Range	160~500V _{dc}								
Capacitance Tolerance	±20% (M)				(20°C, 120Hz)				
Leakage current (+20°C, max.)	160~400V _{dc}				450~500V _{dc}				
	I ≤ 0.02CV + 10 (μA)				I ≤ 0.03CV + 10 (μA)				
I : Leakage Current(μA), C: Nominal capacitance(uF), V: Rated Voltage(V)									
Dissipation factor (tanδ)	Rated Voltage(V _{dc})	160	200	250	350	400	450	500	(120Hz, +20°C)
	Tanδ(max)	0.15	0.15	0.15	0.20	0.20	0.20	0.24	
Low Temperature Characteristics (120Hz)	Impedance ratio max.								
	Rate Voltage(V _{dc})	160	200	250	350	400	450	500	
	Z-25°C / Z+20°C	3	3	3	5	5	6	6	
	Z-40°C / Z+20°C	6	6	6	6	6	--	--	
Endurance	After application of the rated DC voltage at 130°C 3,000 hours or application of DC Voltage with rated ripple current (the voltage peak is not more than rated voltage) at 105°C 12,000 hours(wv:500V for 10,000 hours),measuring the parameters when the capacitors are restored to 20°C,the capacitors shall meet the requirements as below								
	Capacitance Change : ≤±20% of the initial value								
	D.F(tanδ) : ≤200% of the initial specified value								
	Leakage Current : ≤The initial specified value								
Shelf Life	The following specifications shall be satisfied when the capacitors are restored to 20°C after exposing them for 1,000 hours at 105°C without voltage application.								
	Capacitance Change : ≤±20% of the initial value								
	D.F(tanδ) : ≤200% of the initial specified value								
	Leakage Current : ≤200% of the initial specified value								

Diagram of Dimensions



ΦD	6.3	8		10	13	16	18
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.5	3.5		5.0	5.0	7.5	7.5
ΦD	ΦD+0.5max						
L	L+2max						

Rated Ripple Current Multipliers

Frequency correction factor for ripple current

Freq(Hz)	120	1K	10K	100K
Cap < 33	0.4	0.7	0.9	1
Cap ≥ 33	0.5	0.8	0.9	1

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Standard ratings

WV (V _{dc})	Cap(μF)	Size ΦD×L(mm)	tanδ	Ripple current (mArms/105°C;100KHZ)
160V(2C)	1	6.3×12	0.15	43
	1.5	6.3×12	0.15	47
	1.8	6.3×12	0.15	52
	2.2	6.3×12	0.15	58
	2.8	6.3×12	0.15	74
	3.3	6.3×12	0.15	87
	4.7	8×12	0.15	95
	5.6	8×12	0.15	102
	6.8	8×16	0.15	110
	8.2	8×16	0.15	180
	10	8×16	0.15	285
	15	8×20	0.15	332
	22	10×20	0.15	475
	33	10×20	0.15	617
	47	10×20	0.15	712
	68	13×21	0.15	1121
	100	13×25	0.15	1349
	150	16×25	0.15	1800
220	18×25	0.15	2251	
200V(2D)	1	6.3×12	0.15	59
	1.5	6.3×12	0.15	63
	1.8	6.3×12	0.15	68
	2.2	6.3×12	0.15	77
	2.8	6.3×12	0.15	90
	3.3	6.3×12	0.15	106
	4.7	8×12	0.15	152
	5.6	8×12	0.15	180
	6.8	8×16	0.15	209
	8.2	8×16	0.15	265
	10	8×16	0.15	285
		10×16	0.15	304
	15	8×20	0.15	340
	22	10×16	0.15	475
		10×20	0.15	500
	33	10×20	0.15	617
	47	13×21	0.15	931
	68	13×25	0.15	1235
		16×21	0.15	1230
	82	16×21	0.15	1311
	100	16×21	0.15	1349
		16×25	0.15	1419
	150	16×25	0.15	1795
		16×30	0.15	1889

WV (V _{dc})	Cap(μF)	Size ΦD×L(mm)	tanδ	Ripple current (mArms/105°C;100KHZ)
250V(2E)	1	6.3×12	0.15	59
	1.5	6.3×12	0.15	63
	1.8	6.3×12	0.15	68
	2.2	6.3×12	0.15	77
	2.8	6.3×12	0.15	90
	3.3	6.3×12	0.15	106
	4.7	8×12	0.15	152
	5.6	8×12	0.15	180
	6.8	8×16	0.15	214
	8.2	8×20	0.15	274
	10	8×20	0.15	304
	15	8×20	0.15	400
	22	10×16	0.15	475
		10×20	0.15	522
	33	13×16	0.15	722
		13×21	0.15	760
	47	13×21	0.15	931
	56	13×25	0.15	1026
68	16×25	0.15	1299	
82	13×31	0.15	1425	
100	16×31	0.15	1530	
150	16×35	0.15	1900	
350V(2V)	1	6.3×12	0.20	61
	1.5	8×12	0.20	71
	1.8	8×12	0.20	81
	2.2	8×12	0.20	91
	2.8	8×12	0.20	95
	3.3	8×12	0.20	112
	4.7	8×16	0.20	161
	5.6	8×16	0.20	190
	6.8	8×20	0.20	239
		10×16	0.20	240
	8.2	8×20	0.20	274
	10	8×20	0.20	304
		10×20	0.20	332
	15	10×20	0.20	427
	22	13×21	0.20	617
	33	13×21	0.20	807
		16×1	0.20	855
	47	16×21	0.20	1026
	68	18×21	0.20	1300
		18×5	0.20	1400
	82	18×25	0.20	1453
	100	18×30	0.20	1615

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Standard ratings

WV (V _{dc})	Cap(μF)	Size ΦD×L(mm)	tanδ	Ripple current (mA _{rms} /105°C;100KHZ)
400V(2G)	1	8×12	0.2	68
	1.5	8×12	0.2	86
		8×16	0.2	95
	1.8	8×12	0.2	90
		8×16	0.2	114
	2.2	8×12	0.2	95
		8×16	0.2	133
	2.8	8×16	0.2	138
	3.3	8×16	0.2	142
		10×16	0.2	171
	4.7	8×20	0.2	188
		10×6	0.2	209
	5.6	8×20	0.2	214
		10×16	0.2	237
	6.8	8×20	0.2	240
		10×16	0.2	252
	8.2	10×16	0.2	274
		10×20	0.2	280
	10	10×20	0.2	332
	15	13×21	0.2	522
	22	13×25	0.2	722
		16×21	0.2	721
	33	16×21	0.2	855
		16×25	0.2	1068
47	16×30	0.2	1121	
	18×25	0.2	1121	
56	18×25	0.2	1402	
68	18×30	0.2	1470	
100	18×40	0.2	1632	

WV (V _{dc})	Cap(μF)	Size ΦD×L(mm)	tanδ	Ripple current (mA _{rms} /105°C;100KHZ)
450V(2W)	1	8×12	0.2	78
	1.5	8×12	0.2	84
	1.8	8×12	0.2	86
	2.2	8×16	0.2	91
	2.8	8×16	0.2	113
	3.3	8×16	0.2	121
	4.7	10×16	0.2	171
	5.6	10×20	0.2	238
	6.8	10×20	0.2	252
	8.2	10×20	0.2	266
	10	10×5	0.2	313
	15	13×21	0.2	428
	22	13×25	0.2	570
		16×21	0.2	694
	33	16×25	0.2	931
	47	16×35	0.2	1026
		18×25	0.2	1140
	56	18×30	0.2	1357
	68	18×35	0.2	1425
	100	18×45	0.2	1583
500V(2H)	10	13×21	0.24	304
		13×25	0.24	320
	15	13×25	0.24	418
		16×21	0.24	418
	22	13×35	0.24	532
		16×25	0.24	532
	33	18×25	0.24	665
	47	18×30	0.24	836