

Radial Lead Type

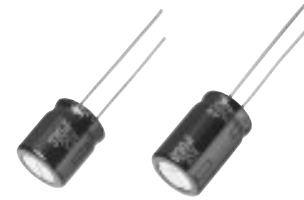
Series: **FR** Type: **A**

■ Features

- Low ESR (Same as FM Series)
- Endurance : 2000 h to 10000 h at +105 °C
- RoHS directive compliant

■ Country of origin

Malaysia



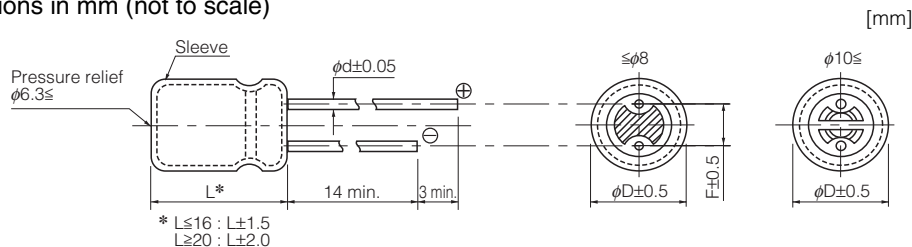
■ Specifications

Category Temp. Range	-40 °C to +105 °C							
Rated W.V. Range	6.3 V.DC to 50 V.DC							
Nominal Cap. Range	22 μF to 8200 μF							
Capacitance Tolerance	±20 % (120 Hz/+20 °C)							
DC Leakage Current	I ≤ 0.01 CV (μA) After 2 minutes							
tan δ	W.V.	6.3	10	16	25	35	50	(120 Hz/+20 °C)
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	
Add 0.02 per 1000 μF for products of 1000 μF or more.								
Endurance	After following life test with DC voltage and +105 °C±2 °C ripple current value applied. (The sum of DC and ripple peak voltage shall not exceed the rated working voltage) when the capacitors are restored to 20 °C, the capacitors shall meet the limits specified below.							
	Duration							
	φ5×11/ φ6.3×11.2 : 2000 hours, φ8×11.5/ φ10×12.5 : 6000 hours							
	φ8×15/ φ10×16 : 8000 hours, φ8×20 : 9000 hours φ10×20 to φ10×25/ φ12.5×20 to φ12.5×35/ φ16×20 to φ16×25 : 10000 hours							
Capacitance change	±25 % of initial measured value (6.3 V to 10 V : ±30 %)							
tan δ	≤ 200 % of initial specified value							
DC leakage current	≤ initial specified value							
Shelf Life	After storage for 1000 hours at +105 °C±2 °C with no voltage applied and then being stabilized at +20 °C, capacitors shall meet the limits specified in Endurance. (With voltage treatment)							

■ Frequency correction factor for ripple current

W.V.(V.DC)	Cap (μF)	Frequency (Hz)				
		60	120	1 k	10 k	100 k
6.3 to 50	22 to 33	0.45	0.55	0.75	0.90	1.00
	47 to 330	0.60	0.70	0.85	0.95	1.00
	390 to 1000	0.65	0.75	0.90	0.98	1.00
	1200 to 8200	0.75	0.80	0.95	1.00	1.00

■ Dimensions in mm (not to scale)



	[mm]						
Body Dia. φD	5	6.3	8	10	12.5		16
Body Length L	—	—	—	—	12.5 to 25	30 to 35	—
Lead Dia. φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Lead space F	2.0	2.5	3.5	5.0	5.0		7.5

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### ■ Case size/Impedance/Ripple current

W.V.(V.DC)  Case size ( $\phi$ DxL)	6.3 V to 35 V			50 V		
	Impedance ( $\Omega$ /100 kHz)		Ripple Current (mA r.m.s./100 kHz)	Impedance ( $\Omega$ /100 kHz)		Ripple Current (mA r.m.s./100 kHz)
	+20 °C	-10 °C	+105 °C	+20 °C	-10 °C	+105 °C
5 × 11	0.300	1.000	280	0.340	1.130	250
6.3 × 11.2	0.130	0.430	455	0.140	0.460	405
8 × 11.5	0.056	0.168	950	0.061	0.183	870
8 × 15	0.041	0.123	1240	0.045	0.135	1140
8 × 20	0.030	0.090	1560	0.033	0.099	1430
10 × 12.5	0.043	0.114	1290	0.042	0.126	1170
10 × 16	0.028	0.078	1790	0.030	0.090	1650
10 × 20	0.020	0.057	2180	0.023	0.069	1890
10 × 25	0.018	0.054	2470	0.022	0.066	2150
12.5 × 20	0.018	0.045	2600	0.022	0.055	2260
12.5 × 25	0.015	0.038	3190	0.018	0.045	2660
12.5 × 30	0.013	0.033	3630	0.016	0.040	3160
12.5 × 35	0.012	0.030	3750	0.014	0.035	3270
16 × 20	0.017	0.043	3300	0.019	0.048	2870
16 × 25	0.014	0.035	3820	0.016	0.040	3320

**NEW**

■ Standard Products

W.V.	Cap. (±20 %)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty		
		Dia.	Length	Ripple Current (100 kHz (+105 °C))	Impedance (100 kHz (+20 °C))	Endurance	Lead Dia.	Lead Space			Straight Leads	Taping	
								Straight	Taping *B				Taping *H
(V)	(μF)	(mm)	(mm)	(mA r.m.s.)	(Ω)	(hours)	(mm)	(mm)	(mm)	(mm)	(pcs)	(pcs)	
6.3	150	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR0J151( )	200	2000
	330	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR0J331( )	200	2000
	820	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR0J821( )	200	1000
	1200	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR0J122L( )	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR0J122( )	200	500
	1500	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR0J152L( )	200	1000
	1800	10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR0J182( )	200	500
	2200	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR0J222( )	200	500
	2700	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR0J272L( )	200	500
	3900	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR0J392( )	200	500
	4700	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR0J472( )	200	500
	5600	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR0J562L	100	
	6800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR0J682L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR0J682S( )	100	250
8200	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR0J822( )	100	250	
10	100	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1A101( )	200	2000
	150	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1A151( )	200	2000
	220	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1A221( )	200	2000
	680	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1A681( )	200	1000
	820	10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1A821( )	200	500
	1000	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1A102L( )	200	1000
	1500	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1A152L( )	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1A152( )	200	500
	1800	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1A182( )	200	500
	2200	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1A222L( )	200	500
	3300	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1A332( )	200	500
	3900	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1A392( )	200	500
	4700	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1A472L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1A472S( )	100	250
	5600	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1A562L	100	
	6800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1A682L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1A682( )	100	250
	16	68	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1C680( )	200
100		5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1C101( )	200	2000
120		6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1C121( )	200	2000
220		6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1C221( )	200	2000
470		8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1C471( )	200	1000
680		8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1C681L( )	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1C681( )	200	500
1000		8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1C102L( )	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1C102( )	200	500
1500		10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1C152( )	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1C152L( )	200	500
1800		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1C182L( )	200	500
2200		12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1C222( )	200	500
2700		12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1C272( )	200	500
3300		12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1C332L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1C332S( )	100	250
3900		12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1C392L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1C392S( )	100	250
4700		12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1C472L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1C472( )	100	250
5600	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1C562( )	100	250	

When requesting taped product, please put the letter "B" or "H" between the "( )". Lead wire pitch B=5 mm, 7.5 mm, H=2.5 mm. The taping dimensions are explained on EE189 of our Catalog. Please use it as a reference guide.

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■ Standard Products

W.V. (V)	Cap. (±20 %) (μF)	Case size		Specification			Lead Length			Part No.	Min. Packaging Q'ty		
		Dia. (mm)	Length (mm)	Ripple Current (100 kHz) (+105 °C) (mA r.m.s.)	Impedance (100 kHz) (+20 °C) (Ω)	Endurance (hours)	Lead Dia. (mm)	Lead Space			Straight Leads (pcs)	Taping (pcs)	
								Straight (mm)	Taping *B (mm)				Taping *H (mm)
25	47	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1E470( )	200	2000
	68	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1E680( )	200	2000
	100	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1E101( )	200	2000
	150	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1E151( )	200	2000
	330	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1E331( )	200	1000
	390	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1E391L( )	200	1000
	470	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1E471Y( )	200	1000
		8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E471L( )	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1E471( )	200	500
	560	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E561L( )	200	1000
	680	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1E681L( )	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1E681( )	200	500
	820	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1E821( )	200	500
	1000	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1E102( )	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1E102L( )	200	500
	1200	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1E122L( )	200	500
	1500	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1E152( )	200	500
	1800	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1E182( )	200	500
	2200	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1E222L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E222S( )	100	250
2700	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1E272L	100		
	16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E272S( )	100	250	
3300	16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1E332( )	100	250	
35	33	5	11	280	0.300	2000	0.5	2.0	5.0	2.5	EEUFR1V330( )	200	2000
	68	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	2.5	EEUFR1V680( )	200	2000
	180	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V181( )	200	1000
	270	8	15	1240	0.041	8000	0.6	3.5	5.0		EEUFR1V271L( )	200	1000
		10	12.5	1290	0.043	6000	0.6	5.0	5.0		EEUFR1V271( )	200	500
	390	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1V391L( )	200	1000
	470	8	20	1560	0.030	9000	0.6	3.5	5.0		EEUFR1V471L( )	200	1000
		10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1V471( )	200	500
	560	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1V561( )	200	500
	680	10	20	2180	0.020	10000	0.6	5.0	5.0		EEUFR1V681( )	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1V681L( )	200	500
	820	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR1V821L( )	200	500
	1000	12.5	20	2600	0.018	10000	0.6	5.0	5.0		EEUFR1V102( )	200	500
	1200	12.5	25	3190	0.015	10000	0.6	5.0	5.0		EEUFR1V122( )	200	500
	1500	12.5	30	3630	0.013	10000	0.8	5.0			EEUFR1V152L	100	
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1V152S( )	100	250
	1800	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1V182L	100	
	2200	12.5	35	3750	0.012	10000	0.8	5.0			EEUFR1V222L	100	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1V222( )	100	250
	50	22	5	11.5	250	0.340	2000	0.5	2.0	5.0	2.5	EEUFR1H220( )	200
56		6.3	11.2	405	0.140	2000	0.5	2.5	5.0	2.5	EEUFR1H560( )	200	2000
100		8	11.5	870	0.061	6000	0.6	3.5	5.0		EEUFR1H101( )	200	1000
120		8	15	1140	0.045	8000	0.6	3.5	5.0		EEUFR1H121L( )	200	1000
150		10	12.5	1170	0.042	6000	0.6	5.0	5.0		EEUFR1H151( )	200	500
180		8	20	1430	0.033	9000	0.6	3.5	5.0		EEUFR1H181L( )	200	1000
220		10	16	1650	0.030	8000	0.6	5.0	5.0		EEUFR1H221( )	200	500
270		10	20	1890	0.023	10000	0.6	5.0	5.0		EEUFR1H271( )	200	500
330		10	25	2150	0.022	10000	0.6	5.0	5.0		EEUFR1H331L( )	200	500
470		12.5	20	2260	0.022	10000	0.6	5.0	5.0		EEUFR1H471( )	200	500
560		12.5	25	2660	0.018	10000	0.6	5.0	5.0		EEUFR1H561( )	200	500
680		12.5	30	3160	0.016	10000	0.8	5.0			EEUFR1H681L	100	
820		12.5	35	3270	0.014	10000	0.8	5.0			EEUFR1H821L	100	
		16	20	2870	0.019	10000	0.8	7.5	7.5		EEUFR1H821S( )	100	250
1000		16	25	3320	0.016	10000	0.8	7.5	7.5		EEUFR1H102( )	100	250

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