

NEW

Radial Lead Type

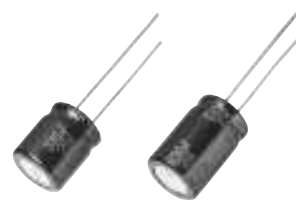
Series: **FR** Type: **A**

■ Features

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

■ Country of origin

Malaysia



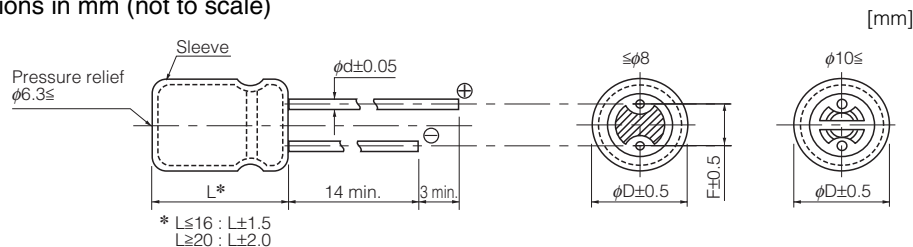
■ Specifications

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	$I \leq 0.01 CV (\mu A)$ 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							
	$\phi 5 \times 11 / \phi 6.3 \times 11.2$: 2000 hours, $\phi 8 \times 11.5 / \phi 10 \times 12.5$: 6000 hours $\phi 8 \times 15 / \phi 10 \times 16$: 8000 hours, $\phi 8 \times 20$: 9000 hours $\phi 10 \times 20$ to $\phi 10 \times 25 / \phi 12.5 \times 20$ to $\phi 12.5 \times 35 / \phi 16 \times 20$ to $\phi 16 \times 25$: 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 (ϕ DxL)	6.3 V to 35 V			50 V		
	Impedance (Ω /100 kHz)		Ripple Current (mA r.m.s./100 kHz)	Impedance (Ω /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. (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)			
6.3	150	5	11	280	0.300	2000	0.5	2.0	5.0	EEUFR0J151()	200	2000
	330	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	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	EEUFR1A101()	200	2000
	150	5	11	280	0.300	2000	0.5	2.0	5.0	EEUFR1A151()	200	2000
	220	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	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
		8	20	1560	0.030	9000	0.6	3.5	5.0	EEUFR1A152L()	200	1000
	1500	10	16	1790	0.028	8000	0.6	5.0	5.0	EEUFR1A152()	200	500
		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	EEUFR1C680()	200
100		5	11	280	0.300	2000	0.5	2.0	5.0	EEUFR1C101()	200	2000
120		6.3	11.2	455	0.130	2000	0.5	2.5	5.0	EEUFR1C121()	200	2000
220		6.3	11.2	455	0.130	2000	0.5	2.5	5.0	EEUFR1C221()	200	2000
470		8	11.5	950	0.056	6000	0.6	3.5	5.0	EEUFR1C471()	200	1000
		8	15	1240	0.041	8000	0.6	3.5	5.0	EEUFR1C681L()	200	1000
680		10	12.5	1290	0.043	6000	0.6	5.0	5.0	EEUFR1C681()	200	500
		8	20	1560	0.030	9000	0.6	3.5	5.0	EEUFR1C102L()	200	1000
1000		10	16	1790	0.028	8000	0.6	5.0	5.0	EEUFR1C102()	200	500
		10	20	2180	0.020	10000	0.6	5.0	5.0	EEUFR1C152()	200	500
1500		10	25	2470	0.018	10000	0.6	5.0	5.0	EEUFR1C152L()	200	500
		10	25	2470	0.018	10000	0.6	5.0	5.0	EEUFR1C182L()	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" between the "()". Lead wire pitch B=5 mm, 7.5 mm. The taping dimensions are explained on p.178 of our Catalog. Please use it as a reference guide.

■ 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)				
25	47	5	11	280	0.300	2000	0.5	2.0	5.0	EEUFR1E470()	200	2000	
	68	5	11	280	0.300	2000	0.5	2.0	5.0	EEUFR1E680()	200	2000	
	100	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	EEUFR1E101()	200	2000	
	150	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	EEUFR1E151()	200	2000	
	330	8	11.5	11.5	950	0.056	6000	0.6	3.5	5.0	EEUFR1E331()	200	1000
	470	8	15	15	1240	0.041	8000	0.6	3.5	5.0	EEUFR1E471Y()	200	1000
				20	1560	0.030	9000	0.6	3.5	5.0	EEUFR1E471L()	200	1000
				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	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
	820	10	20	2180	0.020	10000	0.6	5.0	5.0	EEUFR1E821()	200	500	
	1000	10	20	20	2180	0.020	10000	0.6	5.0	5.0	EEUFR1E102()	200	500
				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	30	3630	0.013	10000	0.8	5.0		EEUFR1E222L	100	
				20	3300	0.017	10000	0.8	7.5	7.5	EEUFR1E222S()	100	250
2700	12.5	35	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	EEUFR1V330()	200	2000	
	68	6.3	11.2	455	0.130	2000	0.5	2.5	5.0	EEUFR1V680()	200	2000	
	180	8	11.5	11.5	950	0.056	6000	0.6	3.5	5.0	EEUFR1V181()	200	1000
	470	8	20	20	1560	0.030	9000	0.6	3.5	5.0	EEUFR1V471L()	200	1000
				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	20	2180	0.020	10000	0.6	5.0	5.0	EEUFR1V681()	200	500
				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	25	3190	0.015	10000	0.6	5.0	5.0	EEUFR1V122()	200	500
				30	3630	0.013	10000	0.8	5.0		EEUFR1V152L	100	
	1500	12.5	35	35	3750	0.012	10000	0.8	5.0		EEUFR1V182L	100	
				20	3300	0.017	10000	0.8	7.5	7.5	EEUFR1V152S()	100	250
	2200	12.5	35	35	3750	0.012	10000	0.8	5.0		EEUFR1V222L	100	
				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	EEUFR1H220()	200	2000
		56	6.3	11.2	405	0.140	2000	0.5	2.5	5.0	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	30	3160	0.016	10000	0.8	5.0		EEUFR1H681L	100	
				35	3270	0.014	10000	0.8	5.0		EEUFR1H821L	100	
820		12.5	35	35	3270	0.014	10000	0.8	5.0		EEUFR1H821L	100	
				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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