

Aluminum Electrolytic Capacitors

Radial Lead Type

FR-A series



Features

- Endurance : 105 °C 5000 h to 10000 h
- Low ESR (Same as FM Series)
- RoHS compliant

Country of origin

- Malaysia

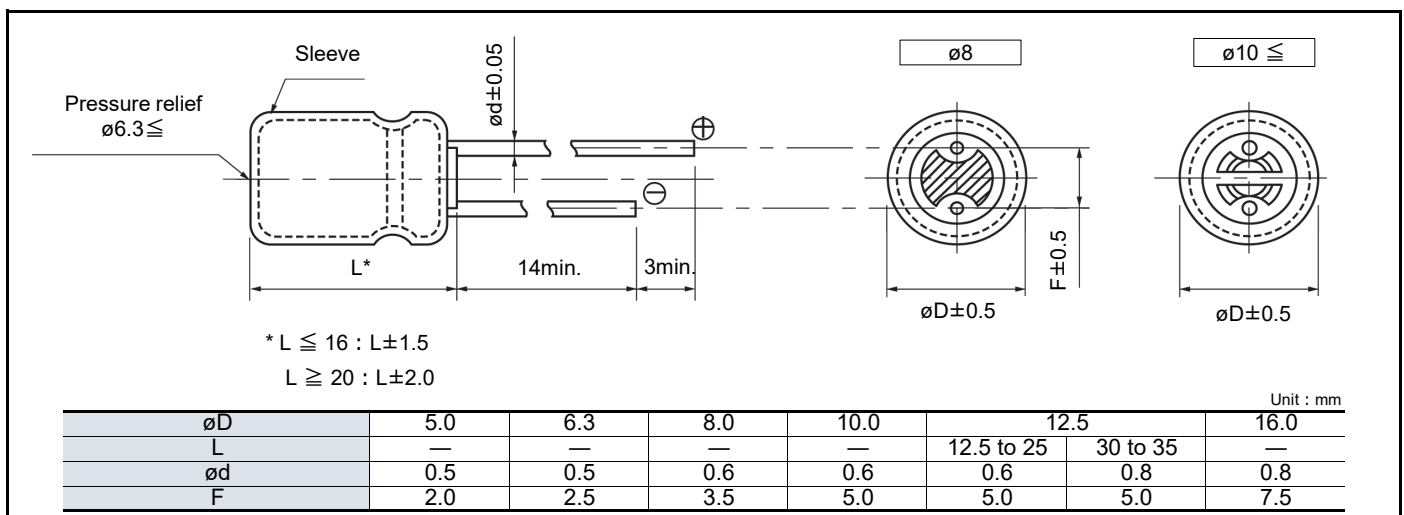
Specifications

Category temp. range	-40 °C to +105 °C										
Rated voltage range	6.3 V to 100 V										
Capacitance range	4.7 μF to 8200 μF										
Capacitance tolerance	±20 % (120 Hz / +20°C)										
Leakage current	I ≤ 0.01 CV (μA) After 2 minutes										
Dissipation factor (tan δ)	Rated voltage (V)	6.3	10	16	25	35	50	63	100	(120 Hz /+20°C)	
	Dissipation factor (tan δ)	0.22	0.19	0.16	0.14	0.12	0.10	0.09	0.08		
	For capacitance value ≥ 1000 μF, add 0.02 per every 1000 μF.										
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 bellow. Duration ø5×11, ø6.3×11.2 : 5000 h ø8×11.5, ø10×12.5 : 6000 h (* Only EEUFR1V331U (ø10×12.5) 5000 h) ø8×15, ø10×16 : 8000 h, ø8×20 : 9000 h ø10×20 to ø10×25, ø12.5×20 to ø12.5×35, ø16×20 to ø16×25 : 10000 h										
	Capacitance change	Within ±25 % of the initial value (6.3 V to 10 V : ±30 %)									
	Dissipation factor (tan δ)	≤ 200 % of the initial limit									
	DC leakage current	Within the initial limit									
	Shelf life	After storage for 1000 h 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

Freq. (Hz)	60	120	1 k	10 k	100 k
Cap. (µF)					
4.7 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



Case size / Impedance / Ripple current

R. voltage Case size (mm) (øD×L)	6.3 V to 35 V			50 V		
	Impedance* ¹ (Ω)		Ripple current* ¹ (mA rms)	Impedance* ¹ (Ω)		Ripple current* ¹ (mA rms)
	+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

R. voltage Case size (mm) (øD×L)	63 V		
	Impedance* ¹ (Ω)		Ripple current* ¹ (mA rms)
	+20 °C	-10 °C	+105 °C
5 × 11	0.510	2.040	175
6.3 × 11.2	0.210	0.840	284
8 × 11.5	0.092	0.368	566
8 × 15	0.068	0.272	741
8 × 20	0.050	0.200	930
10 × 12.5	0.063	0.252	761
10 × 16	0.045	0.180	1073
10 × 20	0.035	0.140	1229
10 × 25	0.033	0.132	1500
12.5 × 20	0.033	0.125	1582
12.5 × 25	0.027	0.092	1995
12.5 × 30	0.024	0.082	2528
12.5 × 35	0.021	0.071	2780
16 × 20	0.029	0.093	2153
16 × 25	0.024	0.074	2988

R. voltage Case size (mm) (øD×L)	100 V		
	Impedance* ¹ (Ω)		Ripple current* ¹ (mA rms)
	+20 °C	-10 °C	+105 °C
10 × 20	0.084	0.336	1500

*1: 100 kHz

Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current ^{*1} (mA rms)	Impe- dance ^{*2} (Ω)	Endu- rance (h)	Lead dia. (ød)	Lead space				Straight leads	Taping
								Straight	Taping *B	Taping *H			
6.3	150	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR0J151()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J221()	200	2000
	330	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J331()	200	2000
	470	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR0J471()	200	2000
	820	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR0J821()	200	1000
	1000	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR0J102()	200	1000
	1200	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR0J122L()	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR0J122()	200	500
	1500	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR0J152L()	200	1000
	1800	10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR0J182()	200	500
	2200	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR0J222()	200	500
	2700	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR0J272L()	200	500
	3300	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR0J332L()	200	500
	3900	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR0J392()	200	500
	4700	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR0J472()	200	500
	5600	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR0J562L	100	—
	6800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR0J682L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR0J682S()	100	250
	8200	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR0J822()	100	250
10	100	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A101()	200	2000
	150	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1A151()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A221()	200	2000
	270	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1A271()	200	2000
	470	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1A471()	200	1000
	680	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1A681()	200	1000
	820	10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1A821()	200	500
	1000	10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1A102()	200	500
		8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1A102L()	200	1000
	1500	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1A152L()	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1A152()	200	500
	1800	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1A182()	200	500
	2200	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1A222L()	200	500
	3300	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1A332()	200	500
	3900	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1A392()	200	500
	4700	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1A472L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1A472S()	100	250
	5600	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1A562L	100	—
	6800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1A682L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1A682()	100	250

*1: Ripple current (100 kHz / +105 °C)

*2: Impedance (100 kHz / +20 °C)

• 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.

• Please refer to the page of "Taping dimensions".

Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current ^{*1} (mA rms)	Impe- dance ^{*2} (Ω)	Endu- rance (h)	Lead dia. (ød)	Lead space				Straight leads	Taping
								Straight	Taping *B	Taping *H			
16	68	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C680()	200	2000
	100	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C101()	200	2000
	120	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C121()	200	2000
	220	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1C221()	200	2000
	470	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1C471()	200	1000
	680	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1C681L()	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1C681()	200	500
	1000	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1C102L()	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1C102()	200	500
	1500	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1C152()	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1C152L()	200	500
	1800	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1C182L()	200	500
	2200	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1C222()	200	500
	2700	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1C272()	200	500
	3300	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1C332L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1C332S()	100	250
	3900	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1C392L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1C392S()	100	250
	4700	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1C472L	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1C472()	100	250
	5600	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1C562()	100	250
25	47	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E470()	200	2000
	68	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E680()	200	2000
	100	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E101()	200	2000
	150	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1E151()	200	2000
	220	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1E221()	200	1000
	330	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1E331()	200	1000
	390	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1E391L()	200	1000
	470	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1E471Y()	200	1000
		8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E471L()	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1E471()	200	500
	560	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E561L()	200	1000
	680	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1E681L()	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1E681()	200	500
	820	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1E821()	200	500
	1000	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1E102()	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1E102L()	200	500
	1200	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1E122L()	200	500
	1500	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1E152()	200	500
	1800	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1E182()	200	500
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E182S()	100	250
	2200	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1E222L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E222S()	100	250
	2700	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1E272L	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1E272S()	100	250
	3300	16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1E332()	100	250

*1: Ripple current (100 kHz / +105 °C)

*2: Impedance (100 kHz / +20 °C)

• 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.

• Please refer to the page of "Taping dimensions".

Characteristics list

Rated voltage (V)	Capacitance (±20 %) (μF)	Case size (mm)		Specification			Lead length (mm)				Part No.	Min. Packaging Q'ty (PCS)	
		øD	L	Ripple current ^{*1} (mA rms)	Impe- dance ^{*2} (Ω)	Endu- rance (h)	Lead dia. (ød)	Lead space				Straight leads	Taping
								Straight	Taping *B	Taping *H			
35	33	5.0	11.0	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1V330()	200	2000
	68	6.3	11.2	455	0.130	5000	0.5	2.5	5.0	2.5	EEUFR1V680()	200	2000
	100	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V101()	200	1000
	180	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V181()	200	1000
	220	8.0	11.5	950	0.056	6000	0.6	3.5	5.0	—	EEUFR1V221()	200	1000
	270	8.0	15.0	1240	0.041	8000	0.6	3.5	5.0	—	EEUFR1V271L()	200	1000
		10.0	12.5	1290	0.043	6000	0.6	5.0	5.0	—	EEUFR1V271()	200	500
	330	10.0	12.5	1330	0.043	5000	0.6	5.0	5.0	—	EEUFR1V331U()	200	500
	390	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1V391L()	200	1000
	470	8.0	20.0	1560	0.030	9000	0.6	3.5	5.0	—	EEUFR1V471L()	200	1000
		10.0	16.0	1790	0.028	8000	0.6	5.0	5.0	—	EEUFR1V471()	200	500
	560	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1V561()	200	500
	680	10.0	20.0	2180	0.020	10000	0.6	5.0	5.0	—	EEUFR1V681()	200	500
		10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1V681L()	200	500
	820	10.0	25.0	2470	0.018	10000	0.6	5.0	5.0	—	EEUFR1V821L()	200	500
	1000	12.5	20.0	2600	0.018	10000	0.6	5.0	5.0	—	EEUFR1V102()	200	500
	1200	12.5	25.0	3190	0.015	10000	0.6	5.0	5.0	—	EEUFR1V122()	200	500
	1500	12.5	30.0	3630	0.013	10000	0.8	5.0	—	—	EEUFR1V152L()	100	—
		16.0	20.0	3300	0.017	10000	0.8	7.5	7.5	—	EEUFR1V152S()	100	250
	1800	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1V182L()	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1V182()	100	250
	2200	12.5	35.0	3750	0.012	10000	0.8	5.0	—	—	EEUFR1V222L()	100	—
		16.0	25.0	3820	0.014	10000	0.8	7.5	7.5	—	EEUFR1V222()	100	250
50	4.7	5.0	11.0	185	0.620	5000	0.5	2.0	5.0	2.5	EEUFR1H4R7()	200	2000
	10	5.0	11.0	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H100()	200	2000
	22	5.0	11.0	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H220()	200	2000
	47	6.3	11.2	405	0.140	5000	0.5	2.5	5.0	—	EEUFR1H470()	200	2000
	56	6.3	11.2	405	0.140	5000	0.5	2.5	5.0	2.5	EEUFR1H560()	200	2000
	100	8.0	11.5	870	0.061	6000	0.6	3.5	5.0	—	EEUFR1H101()	200	1000
	120	8.0	15.0	1140	0.045	8000	0.6	3.5	5.0	—	EEUFR1H121L()	200	1000
	150	10.0	12.5	1170	0.042	6000	0.6	5.0	5.0	—	EEUFR1H151()	200	500
	180	8.0	20.0	1430	0.033	9000	0.6	3.5	5.0	—	EEUFR1H181L()	200	1000
	220	10.0	16.0	1650	0.030	8000	0.6	5.0	5.0	—	EEUFR1H221()	200	500
	270	10.0	20.0	1890	0.023	10000	0.6	5.0	5.0	—	EEUFR1H271()	200	500
	330	10.0	25.0	2150	0.022	10000	0.6	5.0	5.0	—	EEUFR1H331L()	200	500
	470	12.5	20.0	2260	0.022	10000	0.6	5.0	5.0	—	EEUFR1H471()	200	500
	560	12.5	25.0	2660	0.018	10000	0.6	5.0	5.0	—	EEUFR1H561()	200	500
	680	12.5	30.0	3160	0.016	10000	0.8	5.0	—	—	EEUFR1H681L()	100	—
	820	12.5	35.0	3270	0.014	10000	0.8	5.0	—	—	EEUFR1H821L()	100	—
		16.0	20.0	2870	0.019	10000	0.8	7.5	7.5	—	EEUFR1H821S()	100	250
	1000	16.0	25.0	3320	0.016	10000	0.8	7.5	7.5	—	EEUFR1H102()	100	250
63	18	5.0	11.0	175	0.510	5000	0.5	2.0	5.0	2.5	EEUFR1J180()	200	2000
	47	6.3	11.2	284	0.210	5000	0.5	2.5	5.0	2.5	EEUFR1J470()	200	2000
	82	8.0	11.5	566	0.092	6000	0.6	3.5	5.0	—	EEUFR1J820()	200	1000
	100	8.0	15.0	741	0.068	8000	0.6	3.5	5.0	—	EEUFR1J101L()	200	1000
		10.0	12.5	761	0.063	6000	0.6	5.0	5.0	—	EEUFR1J101()	200	500
	120	8.0	20.0	930	0.050	9000	0.6	3.5	5.0	—	EEUFR1J121L()	200	1000
		10.0	16.0	1073	0.045	8000	0.6	5.0	5.0	—	EEUFR1J121()	200	500
	150	8.0	20.0	930	0.050	9000	0.6	3.5	5.0	—	EEUFR1J151L()	200	1000
		10.0	16.0	1073	0.045	8000	0.6	5.0	5.0	—	EEUFR1J151()	200	500
	180	10.0	20.0	1229	0.035	10000	0.6	5.0	5.0	—	EEUFR1J181()	200	500
	220	10.0	25.0	1500	0.033	10000	0.6	5.0	5.0	—	EEUFR1J221L()	200	500
		10.0	20.0	1229	0.035	10000	0.6	5.0	5.0	—	EEUFR1J271U()	200	500
	270	10.0	25.0	1500	0.033	10000	0.6	5.0	5.0	—	EEUFR1J271L()	200	500
		12.5	20.0	1582	0.033	10000	0.6	5.0	5.0	—	EEUFR1J271()	200	500
	330	12.5	20.0	1582	0.033	10000	0.6	5.0	5.0	—	EEUFR1J331()	200	500
	390	12.5	25.0	1995	0.027	10000	0.6	5.0	5.0	—	EEUFR1J391()	200	500
	470	12.5	25.0	1995	0.027	10000	0.6	5.0	5.0	—	EEUFR1J471()	200	500
	560	12.5	30.0	2528	0.024	10000	0.8	5.0	—	—	EEUFR1J561L()	100	—
		16.0	20.0	2153	0.029	10000	0.8	7.5	7.5	—	EEUFR1J561S()	100	250
	680	12.5	35.0	2780	0.021	10000	0.8	5.0	—	—	EEUFR1J681L()	100	—
	820	16.0	25.0	2988	0.024	10000	0.8	7.5	7.5	—	EEUFR1J821()	100	250
100	100	10.0	20.0	1500	0.084	10000	0.6	5.0	5.0	—	EEUFR2A101()	200	500

*1: Ripple current (100 kHz / +105 °C)

*2: Impedance (100 kHz / +20 °C)

• 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.

• Please refer to the page of "Taping dimensions".