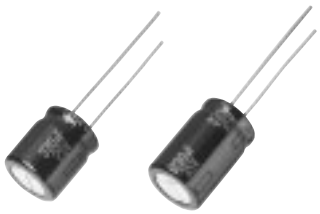
Radial Lead Type

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



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

■ Country of origin
Malaysia

■ Attention
Not applicable for automotive

■ Specifications

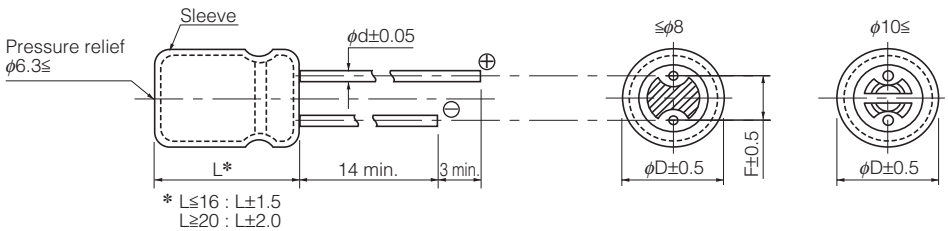
Category Temp. Range	−40 °C to +105 °C								
Rated W.V. Range	6.3 V.DC to 63 V.DC								
Nominal Cap. Range	4.7 µF to 8200 µF								
Capacitance Tolerance	±20 % (120 Hz/+20 °C)								
DC Leakage Current	I ≦ 0.01 CV (µA) After 2 minutes								
tan δ	W.V.	6.3	10	16	25	35	50	63	(120 Hz/+20 °C)
	tan δ	0.22	0.19	0.16	0.14	0.12	0.10	0.09	
	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 : 5000 hours ϕ8×11.5/ ϕ10×12.5 : 6000 hours (✻ Only EEUFR1V331U (ϕ10×12.5) 5000 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 63	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 in mm (not to scale)

(Unit : 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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04 May. 2013

NEW

■ Case size/Impedance/Ripple current

W.V.(V.DC) / Case size (φD×L)	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

W.V.(V.DC) / Case size (φD×L)	63 V		
	Impedance (Ω/100 kHz)		Ripple Current (mA r.m.s./100 kHz)
	+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

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■ 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)	Imped-ance (100 kHz) (+20 °C)	Endur-ance	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	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	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR0J821( )	200	1000
	1000	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR0J102( )	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
	3300	10	25	2470	0.018	10000	0.6	5.0	5.0		EEUFR0J332L( )	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	5000	0.5	2.0	5.0	2.5	EEUFR1A101( )	200	2000
	150	5	11	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	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1A471( )	200	1000
	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	10	16	1790	0.028	8000	0.6	5.0	5.0		EEUFR1A102( )	200	500
		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

· 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”.

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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)	Imped-ance (100 kHz) (+20 °C)	Endur-ance	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)
16	68	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1C680( )	200	2000
	100	5	11	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	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
25	47	5	11	280	0.300	5000	0.5	2.0	5.0	2.5	EEUFR1E470( )	200	2000
	68	5	11	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	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1E221( )	200	1000
	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
		16	20	3300	0.017	10000	0.8	7.5	7.5		EEUFR1E182S( )	100	250
	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

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■ 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)	Imped-ance (100 kHz) (+20 °C)	Endur-ance	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)
35	33	5	11	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	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V101( )	200	1000
	180	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V181( )	200	1000
	220	8	11.5	950	0.056	6000	0.6	3.5	5.0		EEUFR1V221( )	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
	330	10	12.5	1330	0.043	5000	0.6	5.0	5.0		EEUFR1V331U( )	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	
		16	25	3820	0.014	10000	0.8	7.5	7.5		EEUFR1V182( )	100	250
	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	4.7	5	11	185	0.620	5000	0.5	2.0	5.0	2.5	EEUFR1H4R7( )	200	2000
	10	5	11	250	0.340	5000	0.5	2.0	5.0	2.5	EEUFR1H100( )	200	2000
	22	5	11	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	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
63	18	5	11	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	11.5	566	0.092	6000	0.6	3.5	5.0		EEUFR1J820( )	200	1000
	100	8	15	741	0.068	8000	0.6	3.5	5.0		EEUFR1J101L( )	200	1000
		10	12.5	761	0.063	6000	0.6	5.0	5.0		EEUFR1J101( )	200	500
	120	8	20	930	0.050	9000	0.6	3.5	5.0		EEUFR1J121L( )	200	1000
		10	16	1073	0.045	8000	0.6	5.0	5.0		EEUFR1J121( )	200	500
	150	8	20	930	0.050	9000	0.6	3.5	5.0		EEUFR1J151L( )	200	1000
		10	16	1073	0.045	8000	0.6	5.0	5.0		EEUFR1J151( )	200	500
	180	10	20	1229	0.035	10000	0.6	5.0	5.0		EEUFR1J181( )	200	500
	220	10	25	1500	0.033	10000	0.6	5.0	5.0		EEUFR1J221L( )	200	500
	270	10	20	1229	0.035	10000	0.6	5.0	5.0		EEUFR1J271U( )	200	500
		10	25	1500	0.033	10000	0.6	5.0	5.0		EEUFR1J271L( )	200	500
		12.5	20	1582	0.033	10000	0.6	5.0	5.0		EEUFR1J271( )	200	500
	330	12.5	20	1582	0.033	10000	0.6	5.0	5.0		EEUFR1J331( )	200	500
	390	12.5	25	1995	0.027	10000	0.6	5.0	5.0		EEUFR1J391( )	200	500
	470	12.5	25	1995	0.027	10000	0.6	5.0	5.0		EEUFR1J471( )	200	500
	560	12.5	30	2528	0.024	10000	0.8	5.0			EEUFR1J561L	100	
		16	20	2153	0.029	10000	0.8	7.5	7.5		EEUFR1J561S( )	100	250
	680	12.5	35	2780	0.021	10000	0.8	5.0			EEUFR1J681L	100	
	820	16	25	2988	0.024	10000	0.8	7.5	7.5		EEUFR1J821( )	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.
· Please refer to the page of "Taping Dimensions".

Design and specifications are each subject to change without notice. Ask factory for the current technical specifications before purchase and/or use.
Should a safety concern arise regarding this product, please be sure to contact us immediately.