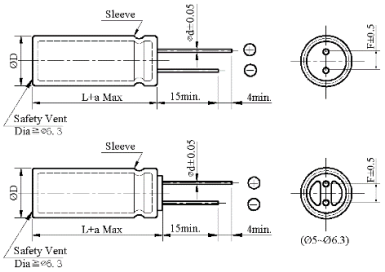
RF Series

- **Miniaturized, low ESR and low impedance**
- **Suitable for use in high ripple current capability**
- **Load life 6,000~12,000 hours at 105°C**
- **Applied to lighting products**

◆ SPECIFICATIONS

Item	Performance Characteristics
Category Temperature Range	-55~ +105°C
Working Voltage Range	6.3 ~ 100Vdc
Capacitance Range	6.8 ~22,000µF
Capacitance Tolerance	±20% (at 25°C and 120Hz)
Dissipation Factor (tanδ) (at 25°C, 120Hz)	Rated Voltage (V): 6.3, 10, 16, 25, 35, 50, 63, 100 tanδ(Max): 0.22, 0.19, 0.16, 0.14, 0.12, 0.10, 0.09, 0.08 When nominal capacitance exceeds 1,000uF, add 0.02 to the value above for each 1,000uF increase.
Leakage Current	I=0.01CV or 3µA whichever is greater I : Leakage current (µA) C : Rated capacitance (µF) V : Rated voltage (V) Impress the rated voltage for 2 minutes
Low Temperature Characteristics Impedance Ratio(MAX)	Rated voltage (V): 6.3, 10, 16, 25, 35, 50, 63, 100 Z(-55°C)/Z(+20°C): 4, 3, 3, 3, 3, 3, 3, 3 (at 120Hz)
Endurance	The following specifications shall be satisfied when the capacitors are restored to 25°C after subjected to DC voltage with the rated ripple current is applied for 6,000~12,000 hours at 105°C. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ specified value Size / Life time (hours): ≦Φ6.3 / 6,000; Φ8 / 8,000; Φ10 / 10,000; ≧Φ12.5 / 12,000
Shelf Life	The following requirements shall be satisfied when the capacitor are restored to 25°C after exposing them for 1,000 hours at 105°C without voltage applied. Capacitance change: ≦ ±25% of the initial value Dissipation factor(tanδ): ≦ 200% of the specified value Leakage current: ≦ 200% of the specified value
Others	Conforms to JIS-C-5101-4 (1998)

◆ DIMENSIONS (mm)



ΦD	5	6.3	8	10	12.5	16	18
ΦD	ΦD + 0.5 Max						
Φd	0.5	0.5	0.6	0.6	0.6	0.8	0.8
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5
a	L + 1.5 Max				≦ 35 L+1.5Max ≧ 40 L+2.0 Max	L + 1.5 Max	

◆ PART NUMBER SYSTEM(Example : 50V 2700µF)

R F 1 H 2 7 2 M N N 1 8 4 0 □ □ □ □ □ □

- Special Request
- Size code(1840 : 18×40)
- Lead length code
- Lead forming Type code
- Capacitance tolerance code(M:±20%)
- Capacitance code (2700µF)
- Voltage code(50V)
- Series code(RF)

RF Series

◆ STANDARD RATINGS

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ω max/ 100kHz) 20°C	IMPD. (Ω max/ 100kHz) -10°C	Rated Ripple current (mA rms/ 105°C, 100kHz)	Part Number
6.3 (0J)	150	5×11	0.57	2.3	210	RF0J151MNN0511
	220	5×11	0.38	0.9	345	RF0J221MNN0511
	330	6.3×11	0.21	0.87	380	RF0J331MNN6311
	470	6.3×11	0.17	0.58	540	RF0J471MNN6311
	680	8×11.5	0.13	0.52	645	RF0J681MNN08B5
	820	8×11.5	0.08	0.32	865	RF0J821MNN08B5
	1000	8×15	0.085	0.35	870	RF0J102MNN0815
	1200	8×15	0.059	0.26	1250	RF0J122MNN0815
	1200	10×12.5	0.053	0.24	1330	RF0J122MNN10C5
	1500	8×20	0.041	0.18	1500	RF0J152MNN0820
	1800	10×16	0.038	0.16	1760	RF0J182MNN1016
	2200	10×20	0.042	0.17	1650	RF0J222MNN1020
	2700	10×20	0.028	0.12	1960	RF0J272MNN1020
	2700	12,5×15	0.035	0.12	1900	RF0J272MNN1215
	3300	10×25	0.026	0.12	2250	RF0J332MNN1025
	3900	12.5×20	0.025	0.088	2480	RF0J392MNN1220
	3900	18×15	0.042	0.11	2210	RF0J392MNN1815
	4700	12.5×30	0.023	0.078	2670	RF0J472MNN1230
	5600	12.5×35	0.02	0.065	2890	RF0J562MNN1235W
	5600	16×20	0.026	0.077	2540	RF0J562MNN1620
	6800	12.5×30	0.018	0.055	3450	RF0J682MNN1230
	6800	16×20	0.021	0.06	3250	RF0J682MNN1620
	6800	18×20	0.025	0.066	2870	RF0J682MNN1820
	8200	12.5×35	0.016	0.05	3570	RF0J822MNN1235W
	10000	16×25	0.017	0.044	3630	RF0J103MNN1625
	10000	18×25	0.018	0.049	3150	RF0J103MNN1825
	12000	16×40	0.012	0.048	4090	RF0J123MNN1640
	12000	18×31.5	0.014	0.04	4180	RF0J123MNN18N3
	15000	18×31.5	0.014	0.042	4190	RF0J153MNN18N3
	18000	16×40	0.013	0.039	4580	RF0J183MNN1640
10 (1A)	100	5×11	0.58	2.3	215	RF1A101MNN0511
	150	5×11	0.58	2.3	230	RF1A151MNN0511
	220	6.3×11	0.22	0.87	340	RF1A221MNN6311
	330	6.3×11	0.22	0.87	380	RF1A331MNN6311
	470	8×11.5	0.13	0.52	640	RF1A471MNN08B5
	680	8×15	0.086	0.35	845	RF1A681MNN0815
	680	10×12.5	0.08	0.31	865	RF1A681MNN10C5
	820	8×15	0.059	0.28	1600	RF1A821MNN0815
	1000	8×20	0.041	0.27	1960	RF1A102MNN0820
	1000	10×12.5	0.053	0.24	1700	RF1A102MNN10C5
	1200	10×16	0.038	0.18	2000	RF1A122MNN1016
	1500	10×20	0.041	0.17	1610	RF1A152MNN1020
	1500	12.5×16	0.049	0.16	1450	RF1A152MNN1216
	1800	12.5×16	0.035	0.15	2400	RF1A182MNN1216
	2200	10×25	0.026	0.12	2900	RF1A222MNN1025
	2200	12.5×20	0.035	0.12	1910	RF1A222MNN1220
	2200	16×16	0.042	0.12	1900	RF1A222MNN1616
	2700	12.5×20	0.025	0.11	2600	RF1A272MNN1220
	3300	12.5×25	0.026	0.089	2250	RF1A332MNN1225
	3900	12.5×25	0.019	0.078	3200	RF1A392MNN1225
	3900	16×20	0.026	0.078	2540	RF1A392MNN1620
	4700	12.5×30	0.018	0.065	3660	RF1A472MNN1230
	5600	12.5×40	0.016	0.055	3360	RF1A562MNN1240W
	5600	12.5×35	0.016	0.06	4120	RF1A562MNN1235W
	5600	18×20	0.025	0.066	3450	RF1A562MNN1820
	6800	16×25	0.017	0.05	3810	RF1A682MNN1625
	6800	18×25	0.018	0.049	3150	RF1A682MNN1825
	8200	16×35.5	0.015	0.044	3610	RF1A822MNN16P1
	8200	18×31.5	0.015	0.04	4180	RF1A822MNN18N3

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ω max/ 100kHz) 20°C	IMPD. (Ω max/ 100kHz) -10°C	Rated Ripple current (mA rms/ 105°C, 100kHz)	Part Number
10 (1A)	10000	16×35.5	0.014	0.042	4280	RF1A103MNN16P1
	10000	18×31.5	0.014	0.042	4190	RF1A103MNN18N3
	12000	18×40	0.011	0.032	4290	RF1A123MNN1840
16 (1C)	10	5×11	1.1	3.02	96	RF1C100MNN0511
	22	5×11	0.75	2.8	120	RF1C220MNN0511
	47	5×11	0.6	2.6	100	RF1C470MNN0511
	56	5×11	0.57	2.3	220	RF1C560MNN0511
	100	5×11	0.35	0.76	260	RF1C101MNN0511
	100	6.3×11	0.21	0.82	310	RF1C101MNN6311
	120	5×11	0.38	0.87	450	RF1C121MNN0511
	220	6.3×11	0.15	0.65	450	RF1C221MNN6311
	220	8×11.5	0.19	0.85	650	RF1C221MNN08B5
	330	8×11.5	0.12	0.52	760	RF1C331MNN08B5
	470	8×11.5	0.075	0.35	1200	RF1C471MNN08B5
	470	10×12.5	0.08	0.32	865	RF1C471MNN10C5
	680	8×15	0.059	0.27	1600	RF1C681MNN0815
	680	10×12.5	0.053	0.24	1700	RF1C681MNN10C5
	820	8×20	0.041	0.22	1960	RF1C821MNN0820
	1000	10×16	0.038	0.18	2000	RF1C102MNN1016
	1000	12.5×16	0.05	0.16	1450	RF1C102MNN1216
	1200	10×25	0.043	0.17	1650	RF1C122MNN1025
	1500	10×20	0.028	0.12	2500	RF1C152MNN1020
	1500	12.5×20	0.035	0.12	1910	RF1C152MNN1220
	1500	16×16	0.042	0.12	1940	RF1C152MNN1616
	1800	10×25	0.026	0.095	2900	RF1C182MNN1025
	2200	12.5×20	0.025	0.089	2600	RF1C222MNN1220
	2200	18×15	0.042	0.11	2220	RF1C222MNN1815
	2700	12.5×25	0.019	0.077	3200	RF1C272MNN1225
	2700	16×20	0.026	0.078	2540	RF1C272MNN1620
	3300	12.5×30	0.018	0.066	3660	RF1C332MNN1230
	3900	12.5×35	0.016	0.056	4120	RF1C392MNN1235W
	3900	16×20	0.021	0.063	3330	RF1C392MNN1620
	3900	16×25	0.021	0.06	2930	RF1C392MNN1625
	4700	16×31.5	0.016	0.05	3450	RF1C472MNN16N3
	4700	18×20	0.02	0.06	3450	RF1C472MNN1820
	5600	16×25	0.017	0.051	3810	RF1C562MNN1625
	5600	18×31.5	0.015	0.04	4180	RF1C562MNN18N3
	6800	16×31.5	0.016	0.048	4100	RF1C682MNN16N3
	8200	18×31.5	0.014	0.042	4190	RF1C822MNN18N3
	18000	18×40	0.011	0.032	4290	RF1C183MNN1840
25 (1E)	10	5×11	1.1	3.02	100	RF1E100MNN0511
	22	5×11	0.7	2.8	140	RF1E220MNN0511
	47	5×11	0.57	2.3	205	RF1E470MNN0511
	56	5×11	0.57	2.3	240	RF1E560MNN0511
	100	6.3×11	0.21	0.87	360	RF1E101MNN6311
	120	6.3×11	0.21	0.87	370	RF1E121MNN6311
	220	8×11.5	0.12	0.52	650	RF1E221MNN08B5
	330	8×15	0.087	0.35	850	RF1E331MNN0815
	330	10×12.5	0.081	0.32	870	RF1E331MNN10C5
	470	8×15	0.059	0.27	1600	RF1E471MNN0815
	470	10×12.5	0.053	0.24	1700	RF1E471MNN10C5
	680	10×16	0.038	0.18	2000	RF1E681MNN1016
	680	12.5×16	0.049	0.16	1460	RF1E681MNN1216
	820	10×20	0.028	0.17	2500	RF1E821MNN1020
	1000	10×30	0.03	0.12	1920	RF1E102MNN1030
	1000	12.5×16	0.035	0.12	2400	RF1E102MNN1216
	1000	16×16	0.042	0.12	1940	RF1E102MNN1616
	1200	10×25	0.026	0.11	2900	RF1E122MNN1025
	1500	12.5×20	0.025	0.089	2600	RF1E152MNN1220

RF Series

◆ **STANDARD RATINGS**

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ω max/ 100kHz) 20°C	IMPD. (Ω max/ 100kHz) -10°C	Rated Ripple current (mA rms/ 105°C, 100kHz)	Part Number
25 (1E)	1800	12.5×25	0.019	0.078	3200	RF1E182MNN1225
	1800	16×20	0.026	0.078	2540	RF1E182MNN1620
	2200	12.5×30	0.018	0.065	3660	RF1E222MNN1230
	2200	16×20	0.021	0.066	3330	RF1E222MNN1620
	2700	12.5×35	0.016	0.056	4120	RF1E272MNN1235W
	2700	16×25	0.021	0.06	2940	RF1E272MNN1625
	3300	16×25	0.017	0.051	3810	RF1E332MNN1625
	3300	18×20	0.02	0.06	3450	RF1E332MNN1820
	3900	16×35.5	0.014	0.043	3620	RF1E392MNN16P1
	3900	18×31.5	0.015	0.04	4180	RF1E392MNN18N3
	4700	16×31.5	0.016	0.048	4100	RF1E472MNN16N3
	4700	18×25	0.016	0.048	3880	RF1E472MNN1825
	5600	18×31.5	0.014	0.042	4190	RF1E562MNN18N3
35 (1V)	10	5×11	0.7	2.5	120	RF1V100MNN0511
	22	5×11	0.6	1.9	165	RF1V220MNN0511
	33	5×11	0.56	2.3	220	RF1V330MNN0511
	47	5×11	0.38	1.4	450	RF1V470MNN0511
	56	6.3×11	0.21	0.86	340	RF1V560MNN6311
	100	6.3×11	0.17	0.56	700	RF1V101MNN6311
	150	8×11.5	0.13	0.52	650	RF1V151MNN08B5
	220	8×15	0.059	0.35	1600	RF1V221MNN0815
	330	8×20	0.041	0.24	1960	RF1V331MNN0820
	470	10×20	0.028	0.18	2500	RF1V471MNN1020
	560	12.5×16	0.035	0.16	2400	RF1V561MNN1216
	680	10×25	0.026	0.12	2900	RF1V681MNN1025
	820	12.5×20	0.025	0.095	2600	RF1V821MNN1220
	1000	12.5×25	0.028	0.088	2250	RF1V102MNN1225
	1200	12.5×25	0.019	0.078	3200	RF1V122MNN1225
	1500	12.5×30	0.018	0.065	3660	RF1V152MNN1230
	2200	16×31.5	0.016	0.056	3370	RF1V222MNN16N3
	2700	16×31.5	0.016	0.048	4100	RF1V272MNN16N3
	3300	16×35.5	0.014	0.042	4280	RF1V332MNN16P1
	3900	18×35.5	0.012	0.036	4380	RF1V392MNN18P1
50 (1H)	10	5×11	1.3	2.8	135	RF1H100MNN0511
	22	5×11	0.7	2.5	190	RF1H220MNN0511
	33	6.3×11	0.6	1.9	225	RF1H330MNN6311
	47	6.3×11	0.38	1.5	230	RF1H470MNN6311
	56	6.3×11	0.18	1.2	700	RF1H560MNN6311
	100	8×11.5	0.085	0.67	1200	RF1H101MNN08B5
	150	10×12.5	0.073	0.48	1280	RF1H151MNN10C5
	220	10×16	0.053	0.34	1650	RF1H221MNN1016
	330	10×20	0.038	0.22	2060	RF1H331MNN1020
	470	12.5×20	0.032	0.15	2300	RF1H471MNN1220
	560	12.5×25	0.033	0.11	1960	RF1H561MNN1225
	680	12.5×25	0.025	0.1	2800	RF1H681MNN1225
	820	12.5×30	0.023	0.081	3370	RF1H821MNN1230
	1000	16×25	0.025	0.075	2565	RF1H102MNN1625
	1200	16×25	0.022	0.07	3510	RF1H122MNN1625
	1500	16×31.5	0.019	0.057	4030	RF1H152MNN16N3
	2200	18×31.5	0.016	0.048	4080	RF1H222MNN18N3
	2700	18×35.5	0.013	0.039	4270	RF1H272MNN18P1
63 (1J)	15	5×11	2.2	9.2	56	RF1J150MNN0511
	33	6.3×11	1.2	5	120	RF1J330MNN6311
	47	8×11.5	0.68	3.1	190	RF1J470MNN08B5
	68	8×11.5	0.15	2.9	720	RF1J680MNN08B5
	100	8×15	0.1	1.8	990	RF1J101MNN0815
	120	10×12.5	0.09	1.5	990	RF1J121MNN10C5

WV (Vdc)	Cap (μF)	Case Size (mm) ΦD×L	IMPD. (Ω max/ 100kHz) 20°C	IMPD. (Ω max/ 100kHz) -10°C	Rated Ripple current (mA rms/ 105°C, 100kHz)	Part Number
63 (1J)	180	10×16	0.061	0.94	1200	RF1J181MNN1016
	220	10×25	0.2	0.84	535	RF1J221MNN1025
	330	10×25	0.037	0.45	1990	RF1J331MNN1025
	470	12.5×30	0.1	0.42	910	RF1J471MNN1230
	560	12.5×25	0.026	0.35	2460	RF1J561MNN1225
	680	12.5×30	0.024	0.3	2760	RF1J681MNN1230
	820	12.5×35	0.022	0.2	3040	RF1J821MNN1235W
	1000	16×25	0.024	0.17	2890	RF1J102MNN1625
	1200	16×31.5	0.02	0.15	3280	RF1J122MNN16N3
	1500	18×31.5	0.018	0.13	3380	RF1J152MNN18N3
80 (1K)	12	5×11	0.72	3.2	235	RF1K120MNN0511
	27	6.3×11	0.34	1.5	390	RF1K270MNN6311
	47	8×11.5	0.2	0.9	650	RF1K470MNN08B5
	68	8×15	0.14	0.63	820	RF1K680MNN0815
	82	8×20	0.12	0.54	1090	RF1K820MNN0820
	82	10×12.5	0.14	0.56	860	RF1K820MNN10C5
	100	10×12.5	0.14	0.56	860	RF1K101MNN10C5
	120	10×16	0.09	0.36	1150	RF1K121MNN1016
	150	10×16	0.09	0.36	1150	RF1K151MNN1016
	180	10×20	0.068	0.28	1570	RF1K181MNN1020
	180	12.5×16	0.09	0.27	1430	RF1K181MNN1216
	220	10×20	0.068	0.28	1570	RF1K221MNN1020
	220	10×25	0.055	0.22	1780	RF1K221MNN1025
	220	12.5×16	0.09	0.27	1430	RF1K221MNN1216
	270	10×25	0.055	0.22	1780	RF1K271MNN1025
	270	12.5×20	0.048	0.15	1800	RF1K271MNN1220
	330	12.5×20	0.048	0.15	1800	RF1K331MNN1220
	390	12.5×25	0.038	0.12	2210	RF1K391MNN1225
	470	12.5×30	0.033	0.11	2520	RF1K471MNN1230
	470	16×20	0.036	0.12	2150	RF1K471MNN1620
	560	12.5×35	0.026	0.078	2860	RF1K561MNN1235W
	680	12.5×40	0.026	0.078	3150	RF1K681MNN1240W
	680	16×25	0.028	0.084	2620	RF1K681MNN1625
	680	18×20	0.032	0.096	2280	RF1K681MNN1820
	820	16×31.5	0.022	0.066	2900	RF1K821MNN16N3
	820	18×25	0.027	0.081	2750	RF1K821MNN1825
	1000	16×35.5	0.02	0.06	3150	RF1K102MNN16P1
	1000	18×25	0.027	0.081	2750	RF1K102MNN1825
	1200	16×40	0.018	0.054	3710	RF1K122MNN1640
	1200	18×31.5	0.02	0.06	3150	RF1K122MNN18N3
	1500	18×35.5	0.018	0.054	3710	RF1K152MNN18P1
	1800	18×40	0.017	0.051	4060	RF1K182MNN1840
100 (2A)	6.8	5×11	2.2	9.2	56	RF2A6R8MNN0511
	15	6.3×11	1.2	5	120	RF2A150MNN6311
	33	8×11.5	0.2	3.2	650	RF2A330MNN08B5
	47	8×15	0.14	1.8	820	RF2A470MNN0815
	68	10×16	0.3	1.5	350	RF2A680MNN1016
	100	10×20	0.065	0.84	1570	RF2A101MNN1020
	120	10×20	0.068	0.71	1570	RF2A121MNN1020
	180	12.5×20	0.048	0.45	1800	RF2A181MNN1220
	220	12.5×25	0.038	0.42	2210	RF2A221MNN1225
	330	16×20	0.036	0.3	2150	RF2A331MNN1620
	470	16×31.5	0.022	0.17	2900	RF2A471MNN16N3
	560	16×31.5	0.022	0.15	2900	RF2A561MNN16N3
	680	18×31.5	0.02	0.15	3150	RF2A681MNN18N3
	820	18×35.5	0.018	0.13	3710	RF2A821MNN18P1

RF Series

◆ **RIPPLE CURRENT MULTIPLIERS**

Frequency Multipliers

Vdc	Cap(uF)	Frequency (Hz)			
		120	1K	10K	100K
6.3 ~ 100	6.8 ~ 68	0.30	0.55	0.80	1.00
	82 ~ 220	0.40	0.60	0.85	1.00
	330 ~ 820	0.50	0.65	0.90	1.00
	1000 ~ 22000	0.60	0.70	0.95	1.00