

High-Voltage Types Application Guide, Transmitting Mica

Type F2 — Rectangular Case, High-Current and High-Voltage Circuits



Type F2 are designed for frequencies ranging from 100 kHz to 3 MHz and are well suited for high-current and high-voltage radio transmitter circuit applications. Cast in rectangular cases, these capacitors are electrically equivalent to MIL-C-5 Styles CM70 in capacitance and current ratings, but are far superior in environmental capability, temperature range, physical size, mounting configuration and reliability.

Specifications

Capacitance Range	47 pF to 0.1 μ F
Capacitance Tolerance	\pm 5% (J)
Rated Voltage	1 to 60 kVpk
Operating Temperature Range with Ripple	-55 °C to 70 °C

Ratings

Catalog Number	Cap. (pf)	Rated Peak Voltage	Rated Current of Frequencies (rms amperes)			
			3 MHz	1 MHz	.3 MHz	.1 MHz
F250B470JM	47	5000	1.5	0.62	0.2	0.062
F250B510JM	51	5000	1.6	0.68	0.22	0.062
F250B560JM	56	5000	1.8	0.75	0.27	0.068
F250B620JM	62	5000	1.8	0.82	0.3	0.075
F250B680JM	68	5000	2	0.91	0.33	0.075
5230B750JM	75	5000	2	1	0.36	0.082
F230B820JM	82	5000	2.2	1.1	0.39	0.091
F230B910JM	91	5000	2.4	1.2	0.43	0.1
F230B101JM	100	5000	2.4	1.2	0.47	0.1
F230B111JM	110	5000	2.7	1.3	0.51	0.15
F230B121JM	120	5000	2.7	1.5	0.56	0.18
F230B131JM	130	5000	3	1.6	0.62	0.22
F230B151JM	150	5000	3.3	1.8	0.68	0.24
F230B161JM	160	5000	3.3	1.8	0.75	0.27
F250B181JM	180	5000	3.3	2	0.82	0.3
F230B201JM	200	5000	3.6	2	0.82	0.33
F230B221JM	220	5000	3.6	2.2	0.91	0.39
F230B241JM	240	5000	3.6	2.4	1	0.43
F230B251JM	250	5000	3.6	2.4	1	0.43
F220B271JM	270	5000	3.9	2.4	1.1	0.47
F220B301JM	300	5000	3.9	2.7	1.1	0.51
F220B331JM	330	5000	4.3	2.7	1.2	0.51
F220B361JM	360	5000	4.3	2.7	1.3	0.56
F220B391JM	390	5000	4.3	2.7	1.3	0.62
F220B431JM	430	5000	4.7	3	1.5	0.68

Catalog Number	Cap. (pf)	Rated Peak Voltage	Rated Current of Frequencies (rms amperes)			
			3 MHz	1 MHz	.3 MHz	.1 MHz
F220B471JM	471	5000	4.7	3.3	1.5	0.68
F220B501JM	500	5000	4.7	3.3	1.6	0.75
F220B511JM	510	5000	4.7	3.3	1.6	0.75
F220B561JM	560	5000	5.1	3.6	1.8	0.82
F220B601JM	600	5000	5.1	3.6	1.8	0.82
F215B621JM	620	5000	5.1	3.6	1.8	0.82
F215B681JM	680	5000	5.1	3.6	2	0.91
F215B751JM	750	5000	5.6	3.9	2.2	0.91
F215B821JM	820	5000	5.6	3.9	2.4	1
F215B911JM	910	5000	5.6	4.3	2.4	1.1
F215B102JM	1000	5000	6.2	4.3	2.4	1.2
F215B112JM	1100	5000	6.2	4.7	2.7	1.2
F215B122JM	1200	5000	6.2	4.7	2.7	1.3
F215B132JM	1300	5000	6.8	5.1	3	1.3
F215B152JM	1500	5000	6.8	5.1	3.3	1.5
F250B162JM	1600	5000	6.8	5.6	3.6	1.5
F250B182JM	1800	5000	7.5	5.6	3.6	1.6
F250B202JM	2000	5000	7.5	6.2	3.6	1.8
F250B222JM	2200	5000	7.5	6.2	3.9	2
F250B242JM	2400	5000	8.2	6.2	4.3	2
F230B272JM	2700	3000	8.2	6.8	4.3	2.2
F230B302JM	3000	3000	8.2	6.8	4.7	2.2
F230B332JM	3300	3000	8.2	6.8	4.7	2.4
F230B362JM	3600	3000	8.2	7.5	5.1	2.4
F230B392JM	3900	3000	9.1	7.5	5.6	2.7

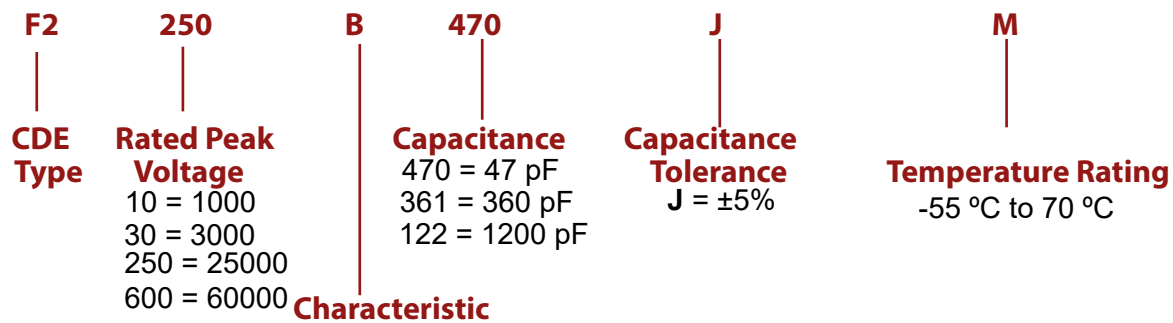
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Ratings

Catalog Number	Cap. (pf)	Rated Peak Voltage	Rated Current of Frequencies (rms amperes)			
			3 MHz	1 MHz	.3 MHz	.1 MHz
F230B432JM	4300	3000	9.1	7.5	5.6	2.7
F230B472JM	4700	3000	9.1	8.2	6.2	3
F230B502JM	5000	3000	9.1	8.2	6.2	3
F230B512JM	5100	3000	9.1	8.2	6.2	3
F250B562JM	5600	3000	9.1	9.1	6.2	3.3
F230B602JM	6000	3000	10	9.1	6.8	3.6
F230B622JM	6200	3000	10	9.1	6.8	3.6
F230B682JM	6800	3000	10	9.1	6.8	3.6
F230B752JM	7500	3000	10	9.1	6.8	3.9
F220B822JM	8200	2000	10	10	7.5	3.9
F220B912JM	9100	2000	11	10	8.2	4.3
F220B103JM	10000	2000	11	11	8.2	4.3
F220B113JM	11000	2000	11	11	8.2	4.7
F220B123JM	12000	2000	11	11	9.1	4.7
F220B133JM	13000	2000	12	12	9.1	5.1
F220B153JM	15000	2000	12	12	10	5.1
F220B163JM	16000	2000	12	12	10	5.6
F220B183JM	18000	2000	12	13	10	5.6
F220B203JM	20000	2000	13	13	11	6.2
F220B223JM	22000	2000	13	13	11	6.2

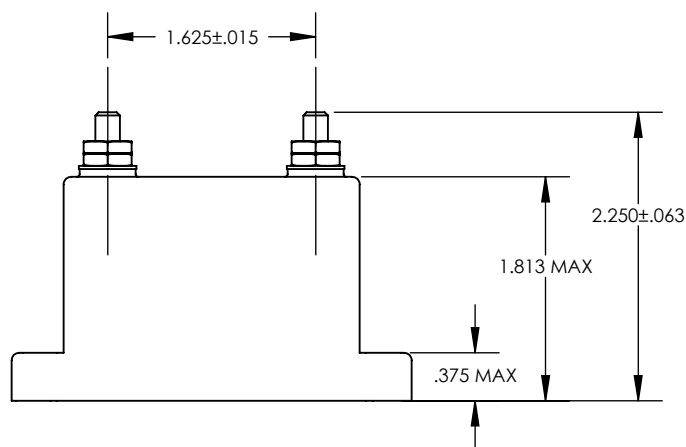
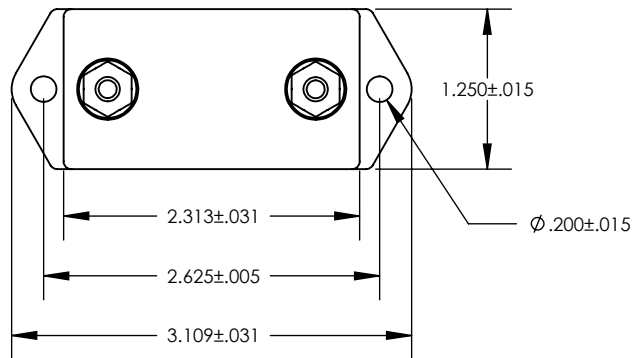
Catalog Number	Cap. (pf)	Rated Peak Voltage	Rated Current of Frequencies (rms amperes)			
			3 MHz	1 MHz	.3 MHz	.1 MHz
F215B243JM	24000	1500	13	15	12	6.8
F215B273JM	27000	1500	13	15	12	6.8
F215B303JM	30000	1500	13	15	12	6.8
F215B333JM	33000	1500	13	15	13	7.5
F215B363JM	36000	1500	13	16	13	7.5
F215B393JM	39000	1500	15	16	13	7.5
F215B433JM	43000	1500	15	16	13	7.5
F215B473JM	47000	1500	15	16	13	7.5
F215B503JM	50000	1500	15	16	15	7.5
F215B513JM	51000	1500	15	16	15	7.5
F210B563JM	56000	1000	15	16	15	8.2
F210B623JM	62000	1000	15	18	15	8.2
F210B683JM	68000	1000	15	18	15	8.2
F210B753JM	75000	1000	15	18	15	8.2
F205B823JM	82000	500	15	18	15	8.2
F205B913JM	91000	500	15	18	15	8.2
F205B104JM	100000	500	15	18	15	8.2
F205B204JM	200000	500	15	18	15	8.2
F205B254JM	250000	500	15	18	15	8.2

Part Numbering System



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Dimensions



Specifications

Capacitance is within tolerance when measured at these frequencies:

- 1–1000 pF @ 1 MHz
- > 1000 pF @ 1 kHz

Dissipation Factor is typically less than 0.05% when measured as above. Dissipation factor (DF) equals $2\pi fRC$, where f is the test frequency, R is the equivalent series resistance (Ω), and C is nominal capacitance (F). Q is the reciprocal of the dissipation factor.

Operating Temperature Range is $-55\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$. Insulation Resistance is no less than $7500\text{ M}\Omega$ when measured at 100 Vdc.

Temperature Coefficient and Capacitance Drift: Measure the capacitors' capacitance at $25\text{ }^{\circ}\text{C}$, $55\text{ }^{\circ}\text{C}$, $25\text{ }^{\circ}\text{C}$, $70\text{ }^{\circ}\text{C}$, and at $25\text{ }^{\circ}\text{C}$ after stabilizing at each temperature. The capacitance will meet the limits of the Characteristic table shown in Ordering Information.

Rated Peak Voltage is not to be exceeded in actual use. Voltage ratings are in the listings and apply under the following conditions:

- Temperature: Within the specified operating temperature range.
- Altitude: Up to 50,000 feet or 3.4 inches of mercury.
- Relative Humidity: Up to 80%.
- Frequency: As specified.
- Where pulse conditions are encountered, contact us.

Withstanding Voltage: Capacitors will withstand application of an ac potential between terminals having an rms value equal to the rated peak voltage at a frequency of 100 Hz or less without damage, arcing or breakdown. Apply the potential by raising the voltage from zero to the specified value. Apply the full potential for a minimum of 5 seconds.

Case Insulation: Capacitor cases will withstand, without damage, arcing or breakdown, a 60-Hz peak ac potential equal to twice the rated peak voltage applied between the terminals connected together and a metal electrode touching the case. Apply this potential for 1 to 5 seconds.

Current Ratings at various frequencies are in the listings and apply under the following conditions:

- Temperature: $65\text{ }^{\circ}\text{C}$ maximum
- Derating Factor: None

Vibration: Capacitors will withstand vibrational forces occurring at rates of from 10 to 55 Hz for $4\frac{1}{2}$ hours. The total excursion during vibration is 0.06 inches. At the end of this period, make the following inspections and tests:

Visual and Mechanical Inspection: No perceptible deterioration. Withstanding Voltage: As specified under Withstanding Voltage.

Insulation Resistance: No less than $7500\text{ M}\Omega$.

Capacitance Change: Not to exceed 3% of the nominal value or one picofarad, whichever is greater.

Temperature and Immersion Cycling: Capacitors will withstand the temperature and immersion cycles indicated in the tables below. Follow three temperature cycles by two immersion cycles. Make the measurements listed below no more than 30 minutes following the final immersion cycle:

Withstanding Voltage: As specified under Withstanding Voltage.

Insulation Resistance: No less than $7500\text{ M}\Omega$.

Capacitance: Change not to exceed 4% of the nominal value or one picofarad, whichever is greater.

Temperature Cycling Test Conditions

Steps	Temp (°C)	Interval (Minutes)
1	$-55 + 0$ -3	30
2	$25 + 10$ -5	10 to 15
3	$70 + 3$ -0	30
4	$25 + 10$ -5	10 to 15

Immersion Test Conditions

- Number of cycles: 2
- Duration of each immersion: 15 minutes
- Immersion bath: Saturated solution of sodium chloride and water
- Temp. of hot bath: $65 - 0 + 5\text{ }^{\circ}\text{C}$
- Temp. of cold bath: $25 - 0 + 10\text{ }^{\circ}\text{C}$

Life Test: Subject all capacitors to a temperature of $55\text{ }^{\circ}\text{C}$ for 48 hours. Then subject units cast in rectangular cases (Types 271, 272, and 273) to a 60-Hz rms voltage equal to the rated peak voltage for 250 hours. Subject units cast in cylindrical cases (Types 291, 292, 293, and 294) to a 60-Hz rms voltage equal to 90% of the rated peak voltage for 250 hours. In both tests, maintain the temperature at $125\text{ }^{\circ}\text{C}$. After test, the capacitors will meet these requirements:

Withstanding Voltage: As specified under Withstanding Voltage.

Insulation Resistance: No less than $7500\text{ M}\Omega$.

Capacitance Change: Within the limits given in the table below or one picofarad, whichever is greater.

Characteristic Maximum Cap.

B $\pm 8\%$

In addition, the capacitor must show no visual damage and the markings must be legible.

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