Low Voltage Transient Suppression

F5B, Metallized Polyester Film with Integrated Suppression Diode 18 – 63 VDC

Overview

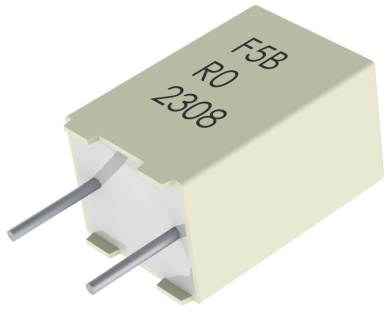
The F5B series is a metallized polyester (MKT) film capacitor with an integrated suppression diode, encapsulated in a thermosetting, resin-filled, plastic box with tinned wire leads. Box material is solvent-resistant and flame-retardant, meeting the requirements of UL 94 V–0.

Applications

For worldwide use as EMI/RFI and advanced transient voltage suppressors for automotive motors and other suppression applications. These include engine blower fans, central locking systems, heating/air-conditioning blowers, electric sun roofs, electric window regulators, fuel/oil pumps, electric windshield wipers, and electrically operated seats. This through-hole EMI/RFI suppression element is mainly used for automotive applications without a printed circuit board (e.g. motor suppression) or mixed through-hole and surface-mount printed circuit boards.

Benefits

- Low-inductive MKT capacitors in parallel construction with a high-power bidirectional transient voltage suppressor diode in a single case that provides superior suppression results
- Approvals: AEC–Q200 (in progress), ISO7637
- Rated Voltage: 18 – 63 VDC
- Capacitance Range: 0.1 – 2.2 µF
- Lead Spacing: 5 mm
- Capacitance Tolerance: ±10%, ±20%
- Climatic Category: 55/125/56 IEC 60068–1
- Tape & Reel packaging in accordance with IEC 60286–2
- RoHS compliance and lead-free terminations
- Operating temperature range: –55˚C to +125˚C



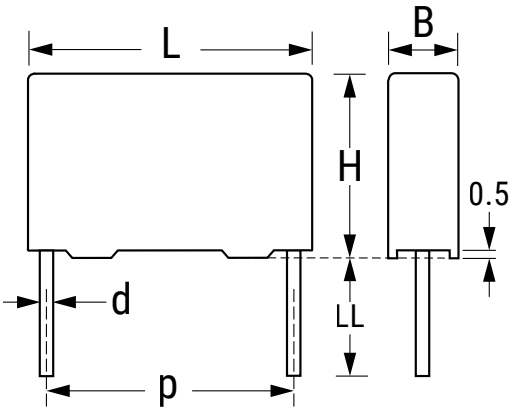
Part Number System

F5B	H	C	4100	DQ	A	7	K
Series	Rated Voltage (VDC)	Lead Spacing (mm)	Capacitance Code (pF)	Lead and Packaging Code	Diode Breakdown Voltage V_{BR} at 1 mA	Size Code	Capacitance Tolerance
Film Capacitor/ Diode Unit	B= 18 H = 25 J = 30 N = 45 C = 50 D = 63	C = 5 mm	Digits 2 – 4 indicate the first three digits of the capacitance value. The first digit indicates the number of zeros to be added.	See Ordering Options Table	See Diode Breakdown Voltage table	See Dimension Table	K = ±10% M = ±20%

Ordering Options Table

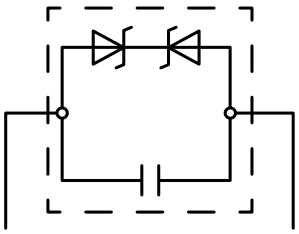
Lead Spacing Nominal (mm)	Type of Leads and Packaging	Lead Length (mm)	Lead and Packaging Code
5	**Standard Lead and Packaging Options**		
	Bulk (Bag) – Short Leads	4 +2/−0	AA
	Ammo Pack	H_0 = 18.5 ±0.5	DQ
	Other Lead and Packaging Options		
	Bulk (Bag) – Long Leads	17 +1/−2	Z3
	Tape & Reel (Standard Reel)	H_0 = 18.5 ±0.5	CK

Dimensions – Millimeters



Rated Capacitance µF	Size Code	p		B		H		L		d	
		Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance	Nominal	Tolerance
0.1 – 1.2	7	5	±0.4	6.1	Maximum	11.1	Maximum	7.5	Maximum	0.6	±0.05
1.5 – 2.2	8	5	±0.4	7.3	Maximum	13.1	Maximum	7.5	Maximum	0.6	±0.05
Note: See the Ordering Options Table for lead length (LL) options.											

Circuit Diagram



Diode Breakdown Voltage & Clamping Voltage Table

Part Number Digit 4		Part Number Digit 12		Clamping Voltage (Pulse 10/700 µs)	
Letter	V_R (VDC)	Letter	V_{BR} (VDC)	V_C (V)	I_p (A)
B	18	B	22	28	24
B	18	E	27	33	31
H	25	A	30	36	20
H	25	C	33	40	19
J	30	D	36	43	18
J	30	I	39	46	17
J	30	N	44	52	16
N	45	B	53	62	14
C	50	C	68	78	12
D	63	C	78	89	11

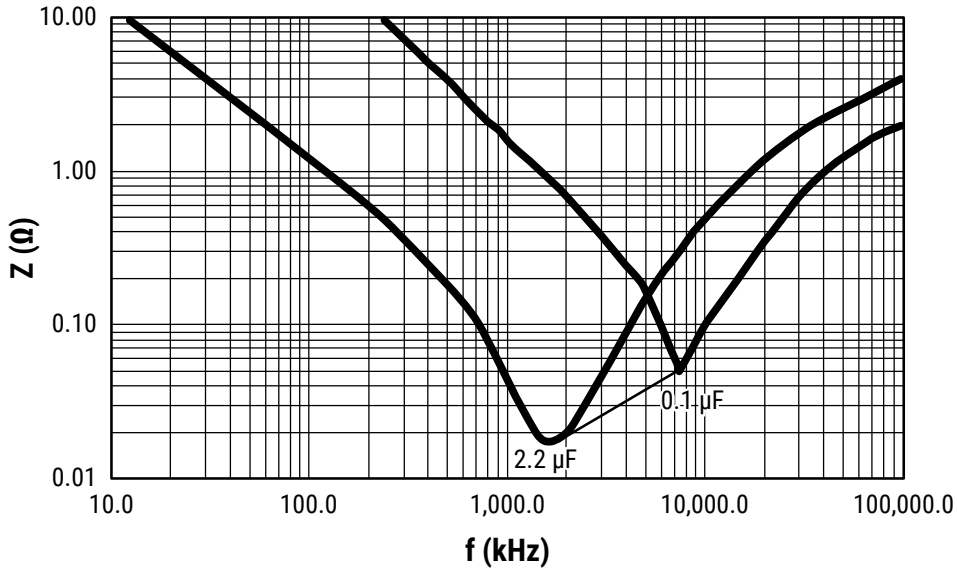
Performance Characteristics

Rated Voltage	18 – 63 VDC (For temperature over 100°C a decreasing factor of 2% per degree has to be applied on the rated voltage V_R)
Capacitance Range	0.1 – 2.2 µF
Capacitance Tolerance	±10%, ±20%
Temperature Range	–55°C to +125°C
Climatic Category	55/125/56, IEC 60068–1
Leakage Current	≤ 50 µA at V_R
Approvals	AEC–Q200 (in progress), ISO 7637–2
Dissipation Factor	0.01 (1 kHz at 25°C ±5°C)
Test Voltage Between Terminals	100 VDC
Insulation Resistance	1 MΩ at 12 V (24 V for V_R > 24 V)
Diode	600 W TVS diode, bidirectional
Peak Current Pulse	10/700 µs
Peak Current	See Diode Breakdown Voltage & Clamping Voltage Table

Environmental Compliance

All KEMET pulse capacitors are RoHS compliant.

Impedance Graph



Environmental Test Data

Test	Conditions	Performance	
Damp Heat Steady State	+40°C ±2°C and 93% ±2% RH, 56 days	Δ C/C	≤ 5%
		V_{BR} Change	≤ 10%
		DF Change	≤ 50 x 10^{-4} at 1 kHz
		Leakage Current at V_R	≤ 100 µA
Endurance	+125°C ±2°C/100°C ±2°C, 0.5 x V_R/1.0 x V_R, 1,000 hours	Δ C/C	≤ 10%
		V_{BR} Change	≤ 10%
		DF Change	≤ 50 x 10^{-4} ar 1 kHz
		Leakage Current at V_R	≤ 100 µA
Resistance to Soldering Heat	+260°C ±5°C, 10 ±1 second	Δ C/C	≤ 3%
		V_{BR} Change	≤ 5%
		DF Change	≤ 30 x 10^{-4} at 1 kHz
		Leakage Current at V_R	≤ 50 µA
Peak Current Derating	Pulse 10/700 µs, 300 V_p; 100 cycles with alternating polarity, 120 seconds between each current peak	Δ C/C	≤ 10%
		V_{BR} Change	≤ 10%
		DF Change	≤ 30 x 10^{-4} at 1 kHz
		Leakage Current at V_R	≤ 100 µA
Long-Term Stability (After 2 Years)	−40°C to +80°C, ≤ 70% humidity	Δ C/C	≤ 3%
		V_{BR} Change	≤ 5%
		DF Change	≤ 20 x 10^{-4} at 1 kHz
		Leakage Current at V_R	≤ 50 µA
Reliability Failure Criteria	Reference MIL HDB 217 +40°C ±2°C, 0.5 x V_R, ≤ 5 FIT	Δ C/C	> 10%
		V_{BR} Change	> 10%
		DF Change	≥ 20 x 10^{-4} at 1 kHz
		Leakage Current at V_R	> 200 µA

Table 1 – Ratings & Part Number Reference

Capacitance Value (µF)	VDC	Max Dimensions in mm			Lead Spacing (p)	Diode Breakdown Voltage (VDC)	New KEMET Part Number	Legacy Part Number
		B	H	L				
0.10	18	6.1	11.1	7.5	5.0	22	5BBC3100(1)B7(2)	F5BBC3100(1)B7(2)
0.10	18	6.1	11.1	7.5	5.0	27	5BBC3100(1)E7(2)	F5BBC3100(1)E7(2)
0.22	18	6.1	11.1	7.5	5.0	22	5BBC3220(1)B7(2)	F5BBC3220(1)B7(2)
0.22	18	6.1	11.1	7.5	5.0	27	5BBC3220(1)E7(2)	F5BBC3220(1)E7(2)
0.33	18	6.1	11.1	7.5	5.0	22	5BBC3330(1)B7(2)	F5BBC3330(1)B7(2)
0.33	18	6.1	11.1	7.5	5.0	27	5BBC3330(1)E7(2)	F5BBC3330(1)E7(2)
0.47	18	6.1	11.1	7.5	5.0	22	5BBC3470(1)B7(2)	F5BBC3470(1)B7(2)
0.47	18	6.1	11.1	7.5	5.0	27	5BBC3470(1)E7(2)	F5BBC3470(1)E7(2)
0.56	18	6.1	11.1	7.5	5.0	22	5BBC3560(1)B7(2)	F5BBC3560(1)B7(2)
0.56	18	6.1	11.1	7.5	5.0	27	5BBC3560(1)E7(2)	F5BBC3560(1)E7(2)
0.68	18	6.1	11.1	7.5	5.0	22	5BBC3680(1)B7(2)	F5BBC3680(1)B7(2)
0.68	18	6.1	11.1	7.5	5.0	27	5BBC3680(1)E7(2)	F5BBC3680(1)E7(2)
0.82	18	6.1	11.1	7.5	5.0	22	5BBC3820(1)B7(2)	F5BBC3820(1)B7(2)
0.82	18	6.1	11.1	7.5	5.0	27	5BBC3820(1)E7(2)	F5BBC3820(1)E7(2)
1.00	18	6.1	11.1	7.5	5.0	22	5BBC4100(1)B7(2)	F5BBC4100(1)B7(2)
1.00	18	6.1	11.1	7.5	5.0	27	5BBC4100(1)E7(2)	F5BBC4100(1)E7(2)
1.20	18	6.1	11.1	7.5	5.0	22	5BBC4120(1)B7(2)	F5BBC4120(1)B7(2)
1.20	18	6.1	11.1	7.5	5.0	27	5BBC4120(1)E7(2)	F5BBC4120(1)E7(2)
1.50	18	7.3	13.1	7.5	5.0	22	5BBC4150(1)B8(2)	F5BBC4150(1)B8(2)
1.50	18	7.3	13.1	7.5	5.0	27	5BBC4150(1)E8(2)	F5BBC4150(1)E8(2)
1.80	18	7.3	13.1	7.5	5.0	22	5BBC4180(1)B8(2)	F5BBC4180(1)B8(2)
1.80	18	7.3	13.1	7.5	5.0	27	5BBC4180(1)E8(2)	F5BBC4180(1)E8(2)
2.20	18	7.3	13.1	7.5	5.0	22	5BBC4220(1)B8(2)	F5BBC4220(1)B8(2)
2.20	18	7.3	13.1	7.5	5.0	27	5BBC4220(1)E8(2)	F5BBC4220(1)E8(2)
0.10	25	6.1	11.1	7.5	5.0	30	5BHC3100(1)A7(2)	F5BHC3100(1)A7(2)
0.10	25	6.1	11.1	7.5	5.0	33	5BHC3100(1)C7(2)	F5BHC3100(1)C7(2)
0.22	25	6.1	11.1	7.5	5.0	30	5BHC3220(1)A7(2)	F5BHC3220(1)A7(2)
0.22	25	6.1	11.1	7.5	5.0	33	5BHC3220(1)C7(2)	F5BHC3220(1)C7(2)
0.33	25	6.1	11.1	7.5	5.0	30	5BHC3330(1)A7(2)	F5BHC3330(1)A7(2)
0.33	25	6.1	11.1	7.5	5.0	33	5BHC3330(1)C7(2)	F5BHC3330(1)C7(2)
0.47	25	6.1	11.1	7.5	5.0	30	5BHC3470(1)A7(2)	F5BHC3470(1)A7(2)
0.47	25	6.1	11.1	7.5	5.0	33	5BHC3470(1)C7(2)	F5BHC3470(1)C7(2)
0.56	25	6.1	11.1	7.5	5.0	30	5BHC3560(1)A7(2)	F5BHC3560(1)A7(2)
0.56	25	6.1	11.1	7.5	5.0	33	5BHC3560(1)C7(2)	F5BHC3560(1)C7(2)
0.68	25	6.1	11.1	7.5	5.0	30	5BHC3680(1)A7(2)	F5BHC3680(1)A7(2)
0.68	25	6.1	11.1	7.5	5.0	33	5BHC3680(1)C7(2)	F5BHC3680(1)C7(2)
0.82	25	6.1	11.1	7.5	5.0	30	5BHC3820(1)A7(2)	F5BHC3820(1)A7(2)
0.82	25	6.1	11.1	7.5	5.0	33	5BHC3820(1)C7(2)	F5BHC3820(1)C7(2)
1.00	25	6.1	11.1	7.5	5.0	30	5BHC4100(1)A7(2)	F5BHC4100(1)A7(2)
1.00	25	6.1	11.1	7.5	5.0	33	5BHC4100(1)C7(2)	F5BHC4100(1)C7(2)
1.20	25	6.1	11.1	7.5	5.0	30	5BHC4120(1)A7(2)	F5BHC4120(1)A7(2)
1.20	25	6.1	11.1	7.5	5.0	33	5BHC4120(1)C7(2)	F5BHC4120(1)C7(2)
1.50	25	7.3	13.1	7.5	5.0	30	5BHC4150(1)A8(2)	F5BHC4150(1)A8(2)
1.50	25	7.3	13.1	7.5	5.0	33	5BHC4150(1)C8(2)	F5BHC4150(1)C8(2)
1.80	25	7.3	13.1	7.5	5.0	30	5BHC4180(1)A8(2)	F5BHC4180(1)A8(2)
1.80	25	7.3	13.1	7.5	5.0	33	5BHC4180(1)C8(2)	F5BHC4180(1)C8(2)
2.20	25	7.3	13.1	7.5	5.0	30	5BHC4220(1)A8(2)	F5BHC4220(1)A8(2)
2.20	25	7.3	13.1	7.5	5.0	33	5BHC4220(1)C8(2)	F5BHC4220(1)C8(2)
0.10	30	6.1	11.1	7.5	5.0	36	5BJC3100(1)D7(2)	F5BJC3100(1)D7(2)
0.10	30	6.1	11.1	7.5	5.0	39	5BJC3100(1)I7(2)	F5BJC3100(1)I7(2)
0.10	30	6.1	11.1	7.5	5.0	44	5BJC3100(1)N7(2)	F5BJC3100(1)N7(2)
0.22	30	6.1	11.1	7.5	5.0	36	5BJC3220(1)D7(2)	F5BJC3220(1)D7(2)
0.22	30	6.1	11.1	7.5	5.0	39	5BJC3220(1)I7(2)	F5BJC3220(1)I7(2)
0.22	30	6.1	11.1	7.5	5.0	44	5BJC3220(1)N7(2)	F5BJC3220(1)N7(2)
0.33	30	6.1	11.1	7.5	5.0	36	5BJC3330(1)D7(2)	F5BJC3330(1)D7(2)
0.33	30	6.1	11.1	7.5	5.0	39	5BJC3330(1)I7(2)	F5BJC3330(1)I7(2)
0.33	30	6.1	11.1	7.5	5.0	44	5BJC3330(1)N7(2)	F5BJC3330(1)N7(2)
0.47	30	6.1	11.1	7.5	5.0	36	5BJC3470(1)D7(2)	F5BJC3470(1)D7(2)
0.47	30	6.1	11.1	7.5	5.0	39	5BJC3470(1)I7(2)	F5BJC3470(1)I7(2)
0.47	30	6.1	11.1	7.5	5.0	44	5BJC3470(1)N7(2)	F5BJC3470(1)N7(2)
Capacitance Value (µF)	**VDC**	**B (mm)**	**H (mm)**	**L (mm)**	**Lead Spacing (p)**	**Diode Breakdown Voltage (VDC)**	**New KEMET Part Number**	**Legacy Part Number**

(1) Insert lead and packaging code. See Ordering Options Table for available options.
(2) Capacitance tolerance: K= ±10%, M = ±20%.

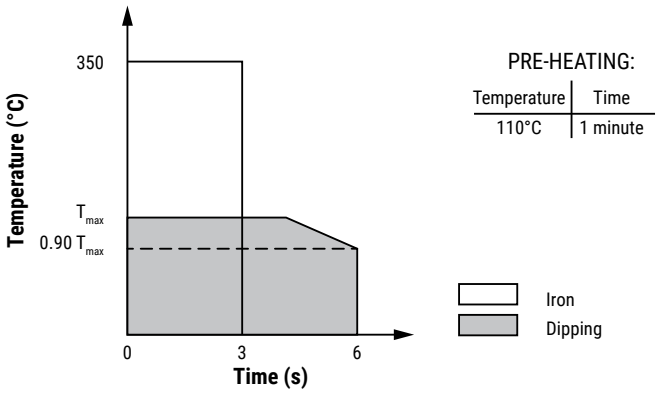
Table 1 – Ratings & Part Number Reference cont'd

Capacitance Value (µF)	VDC	Max Dimensions in mm			Lead Spacing (p)	Diode Breakdown Voltage (VDC)	New KEMET Part Number	Legacy Part Number
		B	H	L				
0.56	30	6.1	11.1	7.5	5.0	36	5BJC3560(1)D7(2)	F5BJC3560(1)D7(2)
0.56	30	6.1	11.1	7.5	5.0	39	5BJC3560(1)I7(2)	F5BJC3560(1)I7(2)
0.56	30	6.1	11.1	7.5	5.0	44	5BJC3560(1)N7(2)	F5BJC3560(1)N7(2)
0.68	30	6.1	11.1	7.5	5.0	36	5BJC3680(1)D7(2)	F5BJC3680(1)D7(2)
0.68	30	6.1	11.1	7.5	5.0	39	5BJC3680(1)I7(2)	F5BJC3680(1)I7(2)
0.68	30	6.1	11.1	7.5	5.0	44	5BJC3680(1)N7(2)	F5BJC3680(1)N7(2)
0.82	30	6.1	11.1	7.5	5.0	36	5BJC3820(1)D7(2)	F5BJC3820(1)D7(2)
0.82	30	6.1	11.1	7.5	5.0	39	5BJC3820(1)I7(2)	F5BJC3820(1)I7(2)
0.82	30	6.1	11.1	7.5	5.0	44	5BJC3820(1)N7(2)	F5BJC3820(1)N7(2)
1.00	30	6.1	11.1	7.5	5.0	36	5BJC4100(1)D7(2)	F5BJC4100(1)D7(2)
1.00	30	6.1	11.1	7.5	5.0	39	5BJC4100(1)I7(2)	F5BJC4100(1)I7(2)
1.00	30	6.1	11.1	7.5	5.0	44	5BJC4100(1)N7(2)	F5BJC4100(1)N7(2)
1.20	30	6.1	11.1	7.5	5.0	36	5BJC4120(1)D7(2)	F5BJC4120(1)D7(2)
1.20	30	6.1	11.1	7.5	5.0	39	5BJC4120(1)I7(2)	F5BJC4120(1)I7(2)
1.20	30	6.1	11.1	7.5	5.0	44	5BJC4120(1)N7(2)	F5BJC4120(1)N7(2)
1.50	30	7.3	13.1	7.5	5.0	36	5BJC4150(1)D8(2)	F5BJC4150(1)D8(2)
1.50	30	7.3	13.1	7.5	5.0	39	5BJC4150(1)I8(2)	F5BJC4150(1)I8(2)
1.50	30	7.3	13.1	7.5	5.0	44	5BJC4150(1)N8(2)	F5BJC4150(1)N8(2)
1.80	30	7.3	13.1	7.5	5.0	36	5BJC4180(1)D8(2)	F5BJC4180(1)D8(2)
1.80	30	7.3	13.1	7.5	5.0	39	5BJC4180(1)I8(2)	F5BJC4180(1)I8(2)
1.80	30	7.3	13.1	7.5	5.0	44	5BJC4180(1)N8(2)	F5BJC4180(1)N8(2)
2.20	30	7.3	13.1	7.5	5.0	36	5BJC4220(1)D8(2)	F5BJC4220(1)D8(2)
2.20	30	7.3	13.1	7.5	5.0	39	5BJC4220(1)I8(2)	F5BJC4220(1)I8(2)
2.20	30	7.3	13.1	7.5	5.0	44	5BJC4220(1)N8(2)	F5BJC4220(1)N8(2)
0.10	45	6.1	11.1	7.5	5.0	53	5BNC3100(1)B7(2)	F5BNC3100(1)B7(2)
0.22	45	6.1	11.1	7.5	5.0	53	5BNC3220(1)B7(2)	F5BNC3220(1)B7(2)
0.33	45	6.1	11.1	7.5	5.0	53	5BNC3330(1)B7(2)	F5BNC3330(1)B7(2)
0.47	45	6.1	11.1	7.5	5.0	53	5BNC3470(1)B7(2)	F5BNC3470(1)B7(2)
0.56	45	6.1	11.1	7.5	5.0	53	5BNC3560(1)B7(2)	F5BNC3560(1)B7(2)
0.68	45	6.1	11.1	7.5	5.0	53	5BNC3680(1)B7(2)	F5BNC3680(1)B7(2)
0.82	45	6.1	11.1	7.5	5.0	53	5BNC3820(1)B7(2)	F5BNC3820(1)B7(2)
1.00	45	6.1	11.1	7.5	5.0	53	5BNC4100(1)B7(2)	F5BNC4100(1)B7(2)
1.20	45	6.1	11.1	7.5	5.0	53	5BNC4120(1)B7(2)	F5BNC4120(1)B7(2)
1.50	45	7.3	13.1	7.5	5.0	53	5BNC4150(1)B8(2)	F5BNC4150(1)B8(2)
1.80	45	7.3	13.1	7.5	5.0	53	5BNC4180(1)B8(2)	F5BNC4180(1)B8(2)
2.20	45	7.3	13.1	7.5	5.0	53	5BNC4220(1)B8(2)	F5BNC4220(1)B8(2)
0.10	50	6.1	11.1	7.5	5.0	68	5BCC3100(1)C7(2)	F5BCC3100(1)C7(2)
0.22	50	6.1	11.1	7.5	5.0	68	5BCC3220(1)C7(2)	F5BCC3220(1)C7(2)
0.33	50	6.1	11.1	7.5	5.0	68	5BCC3330(1)C7(2)	F5BCC3330(1)C7(2)
0.47	50	6.1	11.1	7.5	5.0	68	5BCC3470(1)C7(2)	F5BCC3470(1)C7(2)
0.56	50	6.1	11.1	7.5	5.0	68	5BCC3560(1)C7(2)	F5BCC3560(1)C7(2)
0.68	50	6.1	11.1	7.5	5.0	68	5BCC3680(1)C7(2)	F5BCC3680(1)C7(2)
0.82	50	6.1	11.1	7.5	5.0	68	5BCC3820(1)C7(2)	F5BCC3820(1)C7(2)
1.00	50	6.1	11.1	7.5	5.0	68	5BCC4100(1)C7(2)	F5BCC4100(1)C7(2)
1.20	50	6.1	11.1	7.5	5.0	68	5BCC4120(1)C7(2)	F5BCC4120(1)C7(2)
1.50	50	7.3	13.1	7.5	5.0	68	5BCC4150(1)C8(2)	F5BCC4150(1)C8(2)
1.80	50	7.3	13.1	7.5	5.0	68	5BCC4180(1)C8(2)	F5BCC4180(1)C8(2)
2.20	50	7.3	13.1	7.5	5.0	68	5BCC4220(1)C8(2)	F5BCC4220(1)C8(2)
0.10	63	6.1	11.1	7.5	5.0	82	5BDC3100(1)C7(2)	F5BDC3100(1)C7(2)
0.22	63	6.1	11.1	7.5	5.0	82	5BDC3220(1)C7(2)	F5BDC3220(1)C7(2)
0.33	63	6.1	11.1	7.5	5.0	82	5BDC3330(1)C7(2)	F5BDC3330(1)C7(2)
0.47	63	6.1	11.1	7.5	5.0	82	5BDC3470(1)C7(2)	F5BDC3470(1)C7(2)
0.56	63	6.1	11.1	7.5	5.0	82	5BDC3560(1)C7(2)	F5BDC3560(1)C7(2)
0.68	63	6.1	11.1	7.5	5.0	82	5BDC3680(1)C7(2)	F5BDC3680(1)C7(2)
0.82	63	6.1	11.1	7.5	5.0	82	5BDC3820(1)C7(2)	F5BDC3820(1)C7(2)
1.00	63	6.1	11.1	7.5	5.0	82	5BDC4100(1)C7(2)	F5BDC4100(1)C7(2)
1.20	63	6.1	11.1	7.5	5.0	82	5BDC4120(1)C7(2)	F5BDC4120(1)C7(2)
1.50	63	7.3	13.1	7.5	5.0	82	5BDC4150(1)C8(2)	F5BDC4150(1)C8(2)
1.80	63	7.3	13.1	7.5	5.0	82	5BDC4180(1)C8(2)	F5BDC4180(1)C8(2)
2.20	63	7.3	13.1	7.5	5.0	82	5BDC4220(1)C8(2)	F5BDC4220(1)C8(2)
Capacitance Value (µF)	**VDC**	**B (mm)**	**H (mm)**	**L (mm)**	**Lead Spacing (p)**	**Diode Breakdown Voltage (VDC)**	**New KEMET Part Number**	**Legacy Part Number**

(1) Insert lead and packaging code. See Ordering Options Table for available options.
(2) Capacitance tolerance: K= ±10%, M = ±20%.

Maximum Soldering Temperature

In order to achieve optimal solderability, we suggest the following:
- Set the temperature so that the maximum temperature inside the element is below 160°C.
- Solder within the following temperature profiles, especially for iron soldering:

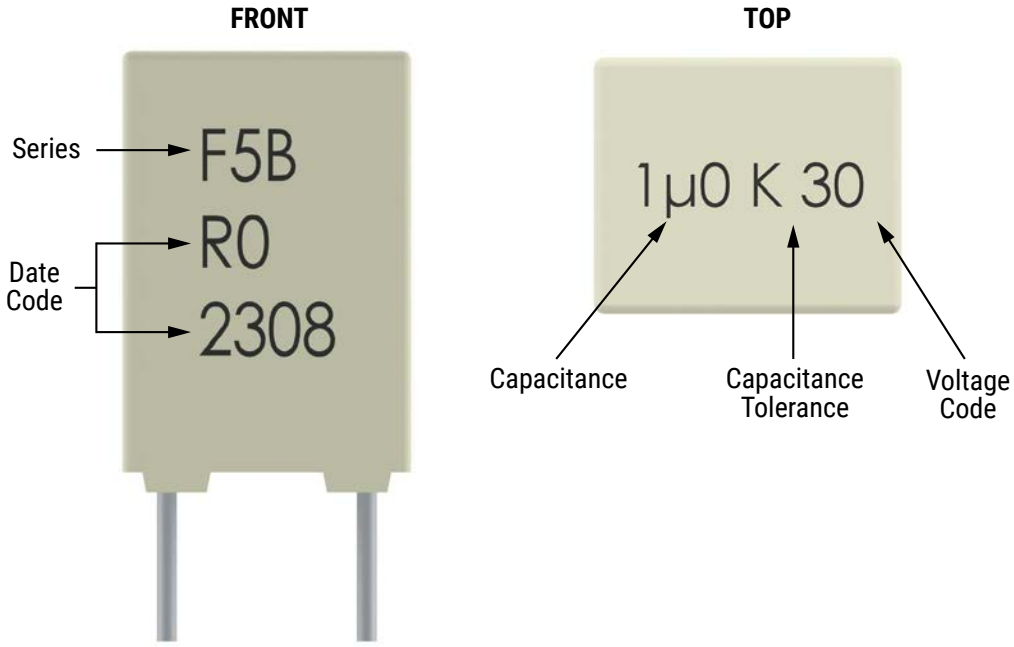


Box series: T_{max} = 275°C for 4 seconds

General Conditions

- If two solderings are required, allow for recovery time until the temperature on the capacitor surface is below 50°C.
- Avoid passing through the adhesive curing oven when fixing surface-mount parts in combination with through-hole parts. Insert through-hole parts only after curing the surface-mount parts.
- Avoid reflow soldering by combining the lead type with surface-mount parts.

Marking

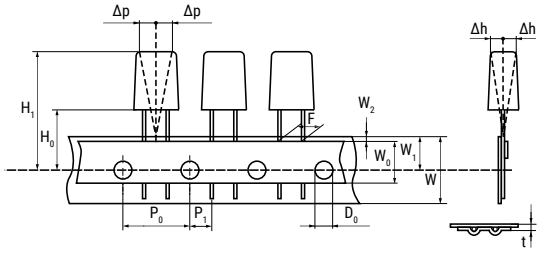


Packaging Quantities

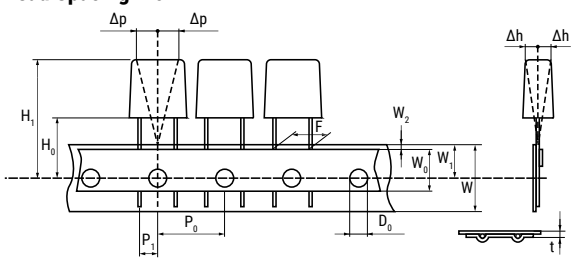
Lead Spacing	Thickness (mm)	Height (mm)	Length (mm)	Bulk Short Leads	Bulk Long Leads	Standard Reel 355 mm	Ammo
5	4.6	9.6	7.4	1,500	2,000	1,400	1,900
	5.1	10.1	7.5	1,000	1,500	1,200	1,700
	6.1	11.1	7.5	2,000	1,000	1,000	1,400
	7.3	13.1	7.5	1,500	750	800	1,150

Lead Taping & Packaging (IEC 60286–2)

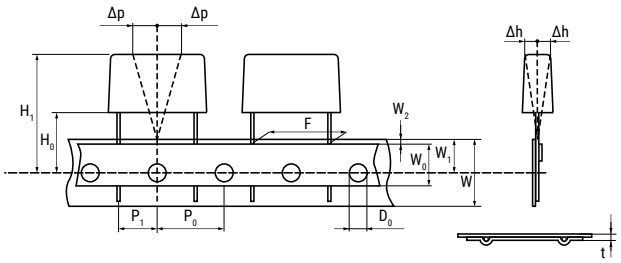
Lead Spacing 5 mm



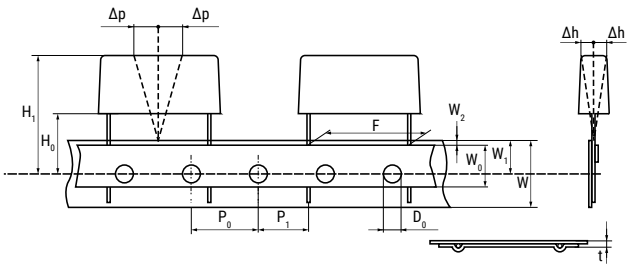
Lead Spacing 7.5 mm



Lead Spacing 10 – 15 mm



Lead Spacing 22.5 – 27.5 mm



Taping Specification

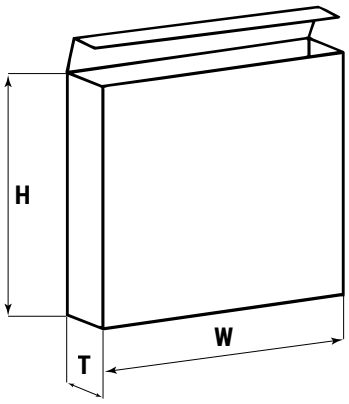
Dimensions in mm									Standard IEC 60286–2
Lead Spacing	+0.6/−0.1	F	5	7.5	10	15	22.5	27.5	F
Carrier Tape Width	+1/−0.5	W	18	18	18	18	18	18	$18^{+1/-0.5}$
Hold-down Tape Width	Minimum	W_0	6	6	9	10	10	10	
Position of Sprocket Hole	±0.5	W_1	9	9	9	9	9	9	$9^{+0.75/-0.5}$
Distance Between Tapes	Maximum	W_2	3	3	3	3	3	3	3
Sprocket Hole Diameter	±0.2	D_0	4	4	4	4	4	4	4
Feed Hole Lead Spacing	±0.2(1)	P_0(3)	12.7	12.7	12.7	12.7	12.7	12.7	12.7
Distance Lead – Feed Hole	±0.7	P_1	3.85	3.75	7.7	5.2	7.8	5.3	P1
Deviation Tape – Plane	Maximum	Δp	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Lateral Deviation	±2	Δh	2	2	2	2	2	2	2
Total Thickness	±0.2	t	0.7	0.7	0.7	0.7	0.9^{MAX}	0.9^{MAX}	0.9^{MAX}
Sprocket Hole/Cap Body	±0.5	H_0(2)	$18.5^{\pm0.5}$	$18.5^{\pm0.5}$	$18.5^{\pm0.5}$	$18.5^{\pm0.5}$	$18.5^{\pm0.5}$	$18.5^{\pm0.5}$	$18^{+2/-0}$

(1) Maximum cumulative feed hole error, 1 mm per 20 parts.
(2) 16.5 mm available on request.
(3) 15 mm available on request (F ≥ 10 mm).

Lead Taping & Packaging (IEC 60286–2) cont.

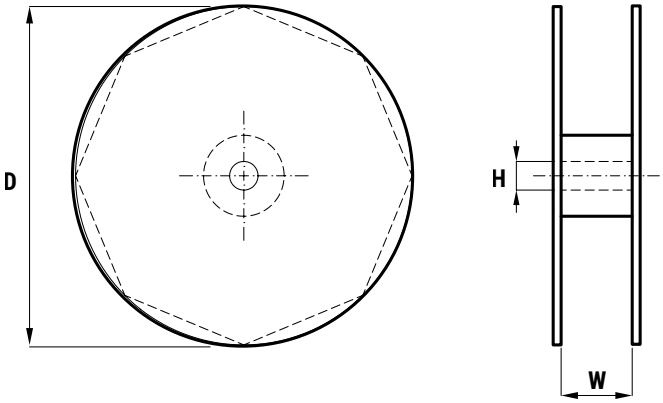
Ammo Specifications

Series	Dimensions (mm)		
	H	W	T
R4x, R4x+R, R7x, RSB	360	340	59
F5A, F5B, F5D			
F6xx, F8xx			
PHExxx, PMExxx, PMRxxx	330	330	50



Reel Specifications

Series	Dimensions (mm)		
	D	H	W
R4x, R4x+R, R7x, RSB	355 500	30 25	55 (maximum)
F5A, F5B, F5D			
F6xx, F8xx			
PHExxx, PMExxx, PMRxxx	360 500	30	46 (maximum)



Manufacturing Date Code (IEC–60062)

Y = Year, Z = Month			
Year	Code	Month	Code
2010	A	January	1
2011	B	February	2
2012	C	March	3
2013	D	April	4
2014	E	May	5
2015	F	June	6
2016	H	July	7
2017	J	August	8
2018	K	September	9
2019	L	October	O
2020	M	November	N
2021	N	December	D
2022	P		
2023	R		
2024	S		
2025	T		
2026	U		
2027	V		
2028	W		
2029	X		
2030	A		

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Although all product–related warnings, cautions and notes must be observed, the customer should not assume that all safety measures are indicted or that other measures may not be required.

Warning: The component F5B is a combined passive suppression component. Overloading with high voltage or voltage transients can strongly damage the component with the risk of fire.

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