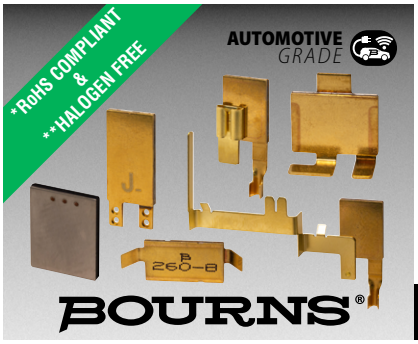


Features

- Wide range of resettable overcurrent and overtemperature protection solutions for automotive DC motor applications
- Resistance range from 5 to 500 milliohms
- Voltage ratings from 16 V to 60 V, supporting 48 V automotive architecture
- Operating temperature from -40 °C to +125 °C
- Solid-state with no moving parts
- No on-off cycling under fault conditions
- Shock and vibration resistant
- Custom designs enable flexibility in form factor and performance
- RoHS compliant* and halogen free**
- AEC-Q200 compliance testing available upon request

MF-DC Series - DC Motor PPTC Resettable Fuses

Bourns offers polymer PTC resettable fuses in metal terminal and bare chip configurations for overcurrent and overtemperature protection in DC motor applications. All products are designed and manufactured according to customer requirements, but some typical specifications are provided below for reference. Additional high-temperature rated radial leaded PTCs for DC motor protection can be found on our MF-RHT series data sheet, and DC motor design considerations can be reviewed in our DC Motor Application Note.

Examples of typical automotive DC motors utilizing Polymer PTC devices for overcurrent and overtemperature protection include seat position motors, lumbar support motors, window lift motors, mirror position motors, sunroof position motors, door lock actuators, fuel/charging compartment door actuators, automatic trunk/lift gate actuators, and convertible roof top position actuators. Users are responsible for performing and ensuring adequate, independent evaluation of the PTC protection device within their own application.

Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

Electrical Characteristics

Metal Terminal Configurations

Models shown here are representative only. For ordering information, please contact your nearest Bourns representative. Typical applications for terminal-style MF-DC products include window lift motors, seat adjust motors, sun-roof motors, and door actuator motors.

Model	Max. Voltage (Volts)	Max. Current (Amps)	Resistance (Milliohms)	Time to Trip (Typical)	Terminal Material
MODEL 1	16	50	12~50	2~20 sec. @ 20 A	Brass, Copper Clad Steel, or Similar
MODEL 2					
MODEL 3					
MODEL 4					

Bare Chip Configurations

Models shown here are representative only. For ordering information, please contact your nearest Bourns representative. Typical applications for bare chip style MF-DC products include door lock actuators and mirror adjust motors.

Model	Max. Voltage (Volts)	Max. Current (Amps)	Resistance (Ohms)	Time to Trip (Typical)
MODEL 5	16	50	0.1~2.0	1~30 sec. @ 8 A
MODEL 6	16	50	0.2~2.0	1~30 sec. @ 8 A
MODEL 7	16	50	0.1~2.0	2~30 sec. @ 8 A
MODEL 8	16	50	0.2~2.0	2~30 sec. @ 8 A

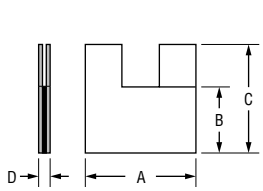
WARNING Cancer and Reproductive Harm - www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.
** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

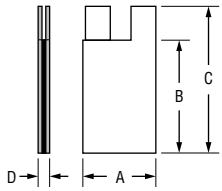
Product Dimensions

Metal Terminal Configurations

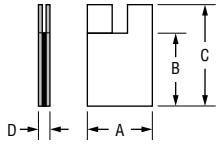
Model	A	B	C	D
MODEL 1	15.5 (.610)	11.2 (.441)	16.2 (.638)	1.4 (.055)
MODEL 2	9.2 (.362)	17.0 (.669)	24.0 (.945)	1.4 (.055)
MODEL 3	9.2 (.362)	12.0 (.472)	17.0 (.669)	1.4 (.055)
MODEL 4	8.0 (.315)	12.0 (.472)	17.0 (.669)	1.4 (.055)



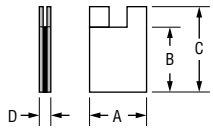
Model 1



Model 2



Model 3



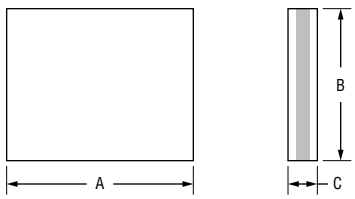
Model 4

DIMENSIONS: MM / (INCHES)

Bare Chip Configurations

Model	A	B	C
MODEL 5	9.3 (.366)	7.5 (.295)	1.1 (.043)
MODEL 6	7.0 (.276)	6.0 (.236)	1.1 (.043)
MODEL 7	9.3 (.366)	7.5 (.295)	1.1 (.043)
MODEL 8	7.0 (.276)	6.0 (.236)	1.1 (.043)

DIMENSIONS: MM / (INCHES)



Environmental Characteristics

Metal Terminal Configurations

Item	Condition	Accept/Reject Criteria
Operating Temperature	-40 °C to +125 °C	
Recommended Storage	+40 °C max, 70 % R.H. max	
Passive Aging	+85 °C, 1000 hours	±5 % typical resistance chang
Humidity Aging	+85 °C, 85 % R.H., 1000 hours	±5 % typical resistance change
Thermal Shock	-40 °C to +125 °C, 20 times	-10 % typical resistance change

Bare Chip Configurations

Item	Condition	Accept/Reject Criteria
Operating Temperature	-40 °C to +85 °C (Models 5 and 6) -40 °C to +125 °C (Models 7 and 8)	
Recommended Storage	+40 °C max, 70 % R.H. max	
Passive Aging	+85 °C, 1000 hours	±5 % typical resistance chang
Humidity Aging	+85 °C, 85 % R.H., 1000 hours	±5 % typical resistance change
Thermal Shock	-40 °C to +125 °C, 20 times	-10 % typical resistance change

Test Procedures and Requirements

Metal Terminal and Bare Chip Configurations

Item	Condition	Accept/Reject Criteria
Visual/Mechanical	Verify dimensions and materials	Per MF physical description
Resistance	In still air, 23 °C	$R_{min} \le R \le R_{max}$
Time to Trip	At specified current, V_{max}, 23 °C	Min time to trip ≤ T ≤ max time to trip (sec.)
Hold Current	30 min. at I_{hold}	No trip
Trip Cycle Life	V_{max}, I_{max}, 100 cycles	No arcing or burning
Trip Endurance	V_{max}, 48 hours	No arcing or burning

How to Order

MF - DC xxx

- Multifuse® Product Designator
- Series — DC Motor
- Custom Serial Number

BOURNS®

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Application Notice

- Users are responsible for independent and adequate evaluation of Bourns® Multifuse® Polymer PTC devices in the user's application, including the PPTC device characteristics stated in the applicable data sheet.
- Polymer PTC devices must not be allowed to operate beyond their stated maximum ratings. Operation in excess of such maximum ratings could result in damage to the PTC device and possibly lead to electrical arcing and/or fire. Circuits with inductance may generate a voltage above the rated voltage of the polymer PTC device and should be thoroughly evaluated within the user's application during the PTC selection and qualification process.
- Polymer PTC devices are intended to protect against adverse effects of temporary overcurrent or overtemperature conditions up to rated limits and are not intended to serve as protective devices where overcurrent or overvoltage conditions are expected to be repetitive or prolonged.
- In normal operation, polymer PTC devices experience thermal expansion under fault conditions. Thus, a polymer PTC device must be protected against mechanical stress, and must be given adequate clearance within the user's application to accommodate such thermal expansion. Rigid potting materials or fixed housings or coverings that do not provide adequate clearance should be thoroughly examined and tested by the user, as they may result in the malfunction of polymer PTC devices if the thermal expansion is inhibited.
- Exposure to lubricants, silicon-based oils, solvents, gels, electrolytes, acids, and other related or similar materials may adversely affect the performance of polymer PTC devices.
- Aggressive solvents may adversely affect the performance of polymer PTC devices. Conformal coating, encapsulating, potting, molding, and sealing materials may contain aggressive solvents including but not limited to xylene and toluene, which are known to cause adverse effects on the performance of polymer PTCs. Such aggressive solvents must be thoroughly cured or baked to ensure their complete removal from polymer PTCs to minimize the possible adverse effect on the device.
- Recommended storage conditions should be followed at all times. Such conditions can be found on the applicable data sheet and on the Multifuse® Polymer PTC Moisture/Reflow Sensitivity Classification (MSL) note: https://www.bourns.com/docs/RoHS-MSL/msl_mf.pdf

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