

# Bourns® Multifuse® PPTC Resettable Fuses

## Product Selection Worksheet



Selecting the appropriate Multifuse® Polymer PTC Resettable Fuse for your application is easy - *just follow these simple steps:*

### Step 1. What is the preferred product form factor?

Radial Through-Hole – refer to the following data sheets:



- [MF-R Series](#)
- [MF-RX/72 Series](#)
- [MF-RX/250 Series](#) for telecom applications
- [MF-RHT Series](#) for high temperature applications
- [MF-RHS Series](#) for high temperature applications
- [MF-RG Series](#) for automotive applications
- [MF-RM Series](#) for AC power applications

Surface Mount – refer to the following data sheets:



- [MF-FSMF Series](#) (0603)
- [MF-PSMF Series](#) (0805)
- [MF-NSMF Series](#) (1206)
- [MF-USMF Series](#) (1210)
- [MF-MSMF Series](#) (1812)
- [MF-SMDF Series](#) (2018)
- [MF-LSMF Series](#) (2920)
- [MF-GSMF Series](#) (3425)
- [MF-FSHT Series](#) (0603)
- [MF-PSHT Series](#) (0805) for automotive applications
- [MF-NSHT Series](#) (1206) for automotive applications
- [MF-USHT Series](#) (1210) for automotive applications
- [MF-MSHT Series](#) (1812) for automotive application
- [MF-ASML/X Series](#) (0402) for low resistance applications
- [MF-FSML/X Series](#) (0603) for low resistance applications
- [MF-PSML/X Series](#) (0805) for low resistance applications
- [MF-NSML/X Series](#) (1206) for low resistance applications
- [MF-USML/X Series](#) (1210) for low resistance applications
- [MF-SM Series](#) (2920 / 3425)
- [MF-SMHT Series](#) for automotive applications
- [MF-SM/250 Series](#) for telecom applications
- [MF-SM/250V Series](#) for telecom applications
- [MF-SD/250 Series](#) for telecom applications

Strap (typically for battery packs) – refer to the following data sheets:



- [MF-S Series](#)
- [MF-LS Series](#)
- [MF-SVS Series](#)
- [MF-VS Series](#)
- [MF-VS Narrow Body Series](#)
- [MF-LR Series](#)

### Step 2. What is the normal operating current of the circuit?

(This is the equivalent of the  $I_{hold}$  specification of the Multifuse® Polymer PTC device.)

Hint: Select a Multifuse® Polymer PTC device with an  $I_{hold}$  greater than the operating current.

For example, if a customer wants a surface mount PTC device (e.g. one of the MF-MSMF models) and has an operating current of 900 mA, the MF-MSMF110 would be a suitable model as the  $I_{hold}$  of 1.1 A is greater than 900 mA.

Model	V max. Volts	I max. Amps	$I_{hold}$	$I_{trip}$	Resistance		Max. Time To Trip		Tripped Power Dissipation
			Amperes at 23 °C		Ohms at 23 °C		Amperes at 23 °C	Seconds at 23 °C	Watts at 23 °C
			Hold	Trip	RMin.	R1Max.	23 °C	23 °C	Typ.
MF-MSMF010	60.0	40	0.10	0.30	0.70	15.00	0.5	1.50	0.8
MF-MSMF014	60.0	40	0.14	0.34	0.40	6.50	1.5	0.15	0.8
MF-MSMF020	30.0	80	0.20	0.40	0.40	6.50	6.0	0.06	0.8
MF-MSMF030	30.0	10	0.30	0.60	0.40	6.50	8.0	0.10	0.8
MF-MSMF050	15.0	100	0.50	1.00	0.15	1.00	8.0	0.15	0.8
MF-MSMF075	13.2	100	0.75	1.50	0.11	0.45	8.0	0.20	0.8
MF-MSMF110	6.0	100	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMF125	6.0	100	1.25	2.50	0.035	0.14	8.0	0.40	0.8
MF-MSMF150	6.0	100	1.50	3.00	0.03	0.120	8.0	0.5	0.8

*$I_{hold}$  of 1.1 A is greater than operating current of 900 mA*

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### Step 3. What is the maximum circuit voltage?

Hint: Select a Multifuse® Polymer PTC device with a  $V_{max}$  greater than the circuit voltage.

For example, if a customer wants a surface mount PTC device (e.g. one of the MF-MSMF models) and has a maximum circuit voltage of 5 V, the MF-MSMF110 would be a suitable model as the  $V_{max}$  of 6 V is greater than 5 V.

Model	V max. Volts	I max. Amps	$I_{hold}$	$I_{trip}$	Resistance		Max. Time To Trip		Tripped Power Dissipation
			Amperes at 23 °C		Ohms at 23 °C		Amperes at	Seconds at	Watts at 23 °C
			Hold	Trip	RMin.	R1Max.	23 °C	23 °C	Typ.
MF-MSMF010	60.0	40	0.10	0.30	0.70	15.00	0.5	1.50	0.8
MF-MSMF014	60.0	40	0.11	0.31	0.40	6.50	1.5	0.15	0.8
MF-MSMF020	30.0	80	0.11	0.31	0.40	6.00	6.0	0.06	0.8
MF-MSMF030	30.0	10	0.11	0.31	0.30	3.00	8.0	0.10	0.8
MF-MSMF050	15.0	100	0.50	1.00	0.15	1.00	8.0	0.15	0.8
MF-MSMF075	13.2	100	0.75	1.50	0.11	0.45	8.0	0.20	0.8
MF-MSMF110	6.0	100	1.10	2.20	0.04	0.21	8.0	0.30	0.8
MF-MSMF125	6.0	100	1.25	2.50	0.035	0.14	8.0	0.40	0.8
MF-MSMF150	6.0	100	1.50	3.00	0.03	0.120	8.0	0.5	0.8

$V_{max}$  of 6 V is greater than circuit voltage of 5 V

### Step 4. What is the ambient temperature of the circuit?

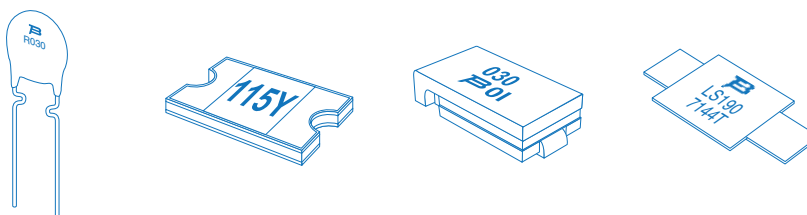
Hint: Refer to the thermal derating chart of the data sheet and select a Multifuse® Polymer PTC device with an  $I_{hold}$  greater than the operating current at that ambient temperature.

For example, if a customer wants a surface mount PTC device (e.g. one of the MF-MSMF models) and has an operating current of 900 mA with a circuit ambient temperature of 40 °C, then the MF-MSMF110 would still be a suitable model as the  $I_{hold}$  of 950 mA at 40 °C is greater than the operating current of 900 mA.

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-MSMF010	0.16	0.14	0.12	0.10	0.08	0.07	0.06	0.05	0.03
MF-MSMF014	0.23	0.19	0.17	0.14	0.12	0.10	0.09	0.08	0.06
MF-MSMF020	0.29	0.26	0.23	0.20	0.17	0.15	0.12	0.10	0.10
MF-MSMF030	0.44	0.39	0.35	0.30	0.26	0.23	0.18	0.15	0.15
MF-MSMF050	0.77	0.68	0.59	0.50	0.44	0.40	0.33	0.29	0.29
MF-MSMF075	1.15	1.01	0.88	0.75	0.65	0.60	0.55	0.49	0.43
MF-MSMF110	1.59	1.43	1.26	1.10	0.95	0.87	0.80	0.71	0.60
MF-MSMF125	1.80	1.63	1.43	1.25	1.08	0.99	0.91	0.81	0.68
MF-MSMF150	2.17	1.95	1.72	1.50	1.30	1.18	1.09	0.97	0.82

$I_{hold}$  of 950 mA is greater than operating current of 900 mA

### Step 5. Request samples from your nearest Bourns representative and start testing in your application.



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### Parametric Search

An alternative method to find suitable models for the desired application is to use the Parametric Search function on the website.

<https://www.bourns.com/parametric-search>

Circuit Protection - Multifuse®

Hold current (A)  MIN  MAX  
0.05 13

Vmax (VDC)  -  15  36  
 6  16  40  
 8  20  42  
 9  24  48  
 10  30  60  
 12  32  72  
 13.2  33

Vmax (VAC)  -  240  250

Configuration  Radial Leaded  Surface Mount  Strap

Footprint (EIA)  -  1206  2613  
 0402  1210  2920  
 0603  1812  3425  
 0805  2018  3528

Resistance (Ohms)  MIN  MAX  
0.001 18.5

Simply key in the required hold current, product configuration,  $V_{max}$ , footprint, and resistance range, then a selection of viable solutions will be shown shortly.

For example, fill in parameters below and press the button "calculate now":

- Hold current 0.5 A ~ 1.5 A
- Configuration: Surface mount
- $V_{max}$  (VDC): 9 VDC ~ 16 VDC
- Footprint (EIA): 1206 and 1210
- Resistance: 0.001 Ohm to 0.1 Ohm

Hold current (A)  MIN  MAX  
0.05 13

Vmax (VDC)  -  15  36  
 6  16  40  
 8  20  42  
 9  24  48  
 10  30  60  
 12  32  72  
 13.2  33

Vmax (VAC)  -  240  250

Configuration  Radial Leaded  Surface Mount  Strap

Footprint (EIA)  -  1206  2613  
 0402  1210  2920  
 0603  1812  3425  
 0805  2018  3528

Resistance (Ohms)  MIN  MAX  
0.001 18.5

See next page for an example of the results

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## Product Selection Worksheet



### Parametric Search (Continued)

The results for workable solutions were shown below:

Results found: 9 Results per page: 25

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Part Number	Series	Hold current (A)	Vmax (VDC)	Vmax (VAC)	Configuration	Footprint (EIA)	Resistance (Ohms)	I <sub>max</sub> (A)	Interrupt Current (A)	Interrupt Voltage (AC)	Working Temp Min (°C)	Working Temp Max (°C)	Agency Certificate	Engineering Files	Buy Now
<a href="#">MF-NSHT075KX</a>	MF-NSHT	0.75	12	-	Surface Mount	1206	0.08	40	-	-	-40	125	cUL/TuV/AEC-Q200		<a href="#">Buy Now</a>
<a href="#">MF-NSMF075/13X</a>	MF-NSMF	0.75	13.2	-	Surface Mount	1206	0.09	100	-	-	-40	85	cUL/TuV		<a href="#">Buy Now</a>
<a href="#">MF-NSMF075/16X</a>	MF-NSMF	0.75	16	-	Surface Mount	1206	0.09	100	-	-	-40	85	cUL/TuV		<a href="#">Buy Now</a>
<a href="#">MF-NSMF110/16X</a>	MF-NSMF	1.1	16	-	Surface Mount	1206	0.06	100	-	-	-40	85	cUL/TuV		<a href="#">Buy Now</a>
<a href="#">MF-NSML150/12</a>	MF-NSMLX	1.5	12	-	Surface Mount	1206	0.01	50	-	-	-40	85	cUL/TuV		<a href="#">Buy Now</a>
<a href="#">MF-USHT075KX</a>	MF-USHT	0.75	16	-	Surface Mount	1210	0.1	20	-	-	-40	125	cUL/TuV/AEC-Q200		<a href="#">Buy Now</a>
<a href="#">MF-USHT110KX</a>	MF-USHT	1.1	9	-	Surface Mount	1210	0.06	20	-	-	-40	125	cUL/TuV/AEC-Q200		<a href="#">Buy Now</a>
<a href="#">MF-USHT125KX</a>	MF-USHT	1.25	9	-	Surface Mount	1210	0.03	40	-	-	-40	125	cUL/TuV/AEC-Q200		<a href="#">Buy Now</a>
<a href="#">MF-USHT150KX</a>	MF-USHT	1.5	9	-	Surface Mount	1210	0.025	40	-	-	-40	125	cUL/TuV/AEC-Q200		<a href="#">Buy Now</a>

A data sheet for the suggested part number can be found by clicking on the hyperlink associated with the part number shown on the list.

A simplified method can also be accessed in the tab of "Parametric Table" via the link below:

<https://www.bourns.com/products/circuit-protection/resettable-fuses-multifuse-pttc#smdhts>

Product Series
**Parametric Table**
RoHS Files
Collateral
Request Samples
Contact Us

Hold Current (A)  
0.75

Max. Voltage (V)  
16

Mounting Style  
Surface Mount

Size  
1210

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Part Number	Hold Current (A)	Max. Voltage (V)	Mounting Style	Size	Max. Current (A)	Interrupt Rating	Rated Temperature	Agency Approval	Engineering	Buy Now
<a href="#">MF-USHT075KX</a>	0.75	16	Surface Mount	1210	20	-	-40°C to +125°C	AEC-Q200		<a href="#">BUY</a>

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[www.bourns.com](http://www.bourns.com)