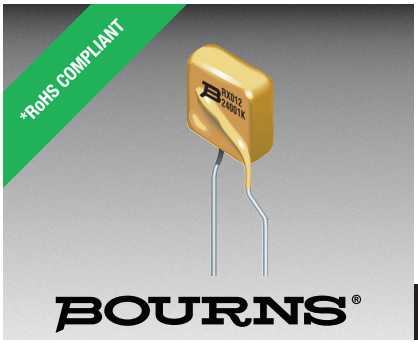


Features

- Radial leaded devices
- Fast trip resettable PTCs
- Binned and sorted narrow resistance ranges available
- RoHS compliant*
- Agency recognition:

Applications

- Customer Premise Equipment (CPE)
- Central Office / Telecom Centers (CO)
- Access equipment

MF-RX/250 Series - Telecom PTC Resettable Fuses

Electrical Characteristics

Model	Maximum Operating Voltage (DC)	Maximum Interrupt Ratings		I_{hold}	I_{trip}	Initial Resistance		One Hour (R_1) Post-Trip Resistance	Maximum Time to Trip		Tripped Power Dissipation	Agency Recognition	
		Vrms	Amps	at 23 °C		at 23 °C Ohms		at 23 °C Ohms	at 23 °C		at 23 °C Ohms	cUL	TÜV
	Volts	Max.	Max.	Amps		Min.	Max.	Max.	Amps	Sec.	Max.	E174545	50260658
MF-RX012/250	60	250	3	0.12	0.24	4.0	8.0	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-A	60	250	3	0.12	0.24	7.0	9.0	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-C	60	250	3	0.12	0.24	5.5	7.5	14.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-F	60	250	3	0.12	0.24	6.0	10.5	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-G	60	250	3	0.12	0.24	5.5	6.5	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-H	60	250	3	0.12	0.24	9.0	10.5	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-T	60	250	3	0.12	0.24	7.0	12.0	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-1	60	250	3	0.12	0.24	6.0	9.0	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250-2	60	250	3	0.12	0.24	8.0	10.5	16.0	1.0	2.5	1.0	✓	✓
MF-RX012/250U	60	250	3	0.12	0.24	6.0	10.0	16.0	1.0	2.5	1.0	✓	✓
MF-RX014/250	60	250	3	0.145	0.28	3.0	6.0	14.0	1.0	5.0	1.0	✓	✓
MF-RX014/250-A	60	250	3	0.145	0.28	3.0	5.5	12.0	1.0	5.0	1.0	✓	✓
MF-RX014/250-B	60	250	3	0.145	0.28	4.5	6.0	14.0	1.0	5.0	1.0	✓	✓
MF-RX014/250-C	60	250	3	0.145	0.28	3.0	4.0	14.0	1.0	5.0	1.0	✓	✓
MF-RX014/250-T	60	250	3	0.145	0.28	5.4	7.5	14.0	1.0	5.0	1.0	✓	✓
MF-RX014/250U	60	250	3	0.145	0.28	3.5	6.5	12.0	1.0	4.0	1.0	✓	✓
MF-RX018/250	60	250	10	0.18	0.50	0.8	2.0	4.0	1.0	20	1.0	✓	✓
MF-RX018/250U	60	250	10	0.18	0.50	0.8	2.0	4.0	1.0	20	1.0	✓	✓

"U" suffix indicates product without insulation coating.

Environmental Characteristics

Item	Condition	Criteria
Operating Temperature	-40 °C to +85 °C	
Recommended Storage	+40 °C max. / 70 % R.H. max.	
Passive Aging	+85 °C, 1000 hours	±15 % typical resistance change
Humidity Aging	+85 °C, 85 % R.H. 1000 hours	±15 % typical resistance change
Thermal Shock	-55 °C to +125 °C, 10 times	±15 % typical resistance change
Solvent Resistance	MIL-STD-202, Method 215	No change (marking still legible)
Vibration	MIL-STD-883C, Method 2007.1 Condition A	±15 % typical resistance change
Moisture Sensitivity Level (MSL)	See Note	
ESD Classification	Class 6 (per AEC-Q200-2, HBM)	

Additional Information

Click these links for more information:

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CALIFORNIA WARNING: Can expose you to lead, a carcinogen and reproductive toxicant. See www.P65Warnings.ca.gov

* RoHS Directive 2015/863, Mar 31, 2015 and Annex.

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Additional Features

- Ability to withstand AC power cross conditions
- Assists equipment with meeting ITU-T K.20/K.21/K.45
- Assists equipment with meeting Telcordia GR-1089-C Intrabuilding

Test Procedures and Requirements

Item	Test 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, still air	T ≤ max. time to trip (seconds)
Hold Current	30 min. at I_{hold}, still air	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
Solderability	245 °C ±5 °C, 5 seconds	95 % min. coverage

Thermal Derating Chart - I_{hold} (Amps)

Model	Ambient Operating Temperature								
	-40 °C	-20 °C	0 °C	23 °C	40 °C	50 °C	60 °C	70 °C	85 °C
MF-RX012/250	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-A	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-C	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-F	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-G	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-H	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-T	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-1	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250-2	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX012/250U	0.186	0.165	0.143	0.120	0.099	0.088	0.077	0.066	0.050
MF-RX014/250	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX014/250-A	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX014/250-B	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX014/250-C	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX014/250-T	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX014/250U	0.225	0.199	0.172	0.145	0.119	0.106	0.093	0.080	0.060
MF-RX018/250	0.269	0.240	0.211	0.180	0.153	0.138	0.123	0.109	0.087
MF-RX018/250U	0.269	0.240	0.211	0.180	0.153	0.138	0.123	0.109	0.087

I_{trip} is approximately two times I_{hold}.

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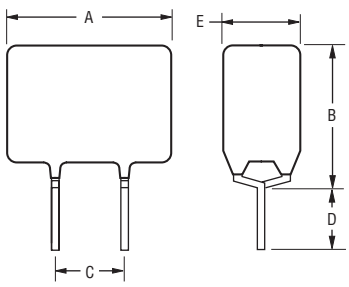
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Product Dimensions

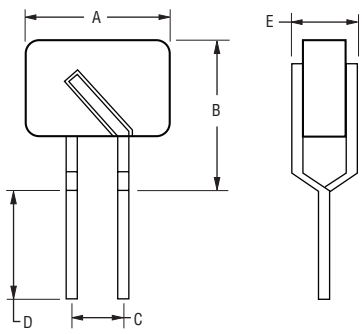
Model	A	B	C	D	E	Physical Characteristics		
	Max.	Max.	Nom.	Min.	Max.	Lead Dia.	Style	Material
MF-RX012/250	6.5 (0.256)	11.0 (0.433)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	4.6 (0.181)	0.65 (0.026)	1	Sn/Cu
MF-RX012/250-A								
MF-RX012/250-C								
MF-RX012/250-F								
MF-RX012/250-G								
MF-RX012/250-H								
MF-RX012/250-T								
MF-RX012/250-1								
MF-RX012/250-2								
MF-RX012/250U	6.0 (0.236)	10.0 (0.394)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	3.8 (0.150)	0.65 (0.026)	2	Sn/Cu
MF-RX014/250	6.5 (0.256)	11.0 (0.433)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	4.6 (0.181)	0.65 (0.026)	1	Sn/Cu
MF-RX014/250-A								
MF-RX014/250-B								
MF-RX014/250-C								
MF-RX014/250-T								
MF-RX014/250U	6.0 (0.236)	10.0 (0.394)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	3.8 (0.150)	0.65 (0.026)	2	Sn/Cu
MF-RX018/250	11.0 (0.433)	13.6 (0.535)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	4.6 (0.181)	0.65 (0.026)	1	Sn/Cu
MF-RX018/250U	10.4 (0.409)	12.6 (0.496)	5.1 ± 0.7 (0.201 ± 0.028)	4.7 (0.185)	3.8 (0.150)	0.65 (0.026)	2	Sn/Cu

DIMENSIONS: MM (INCHES)

Style 1

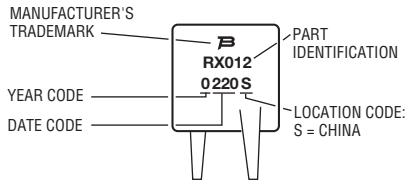


Style 2



Typical Part Marking

Represents total content. Layout may vary.



Packaging Quantity

Packaging Options	Models	Unit Quantity (Pcs.)	Unit	Notes
Bulk	All models	500	Bag	
Tape & Reel	All models	1500	Reel	Available Binned

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How to Order

MF - RX 012/250 U - A 05 - 2

Multifuse® Product Designator

Series
RX = Radial Leaded Component

Hold Current, I_{hold}
012-018 (0.12-0.18 Amps)

Max. Interrupt Voltage, V
250 (250 Volts)

Insulation Options
Blank = Coated
U = Uncoated

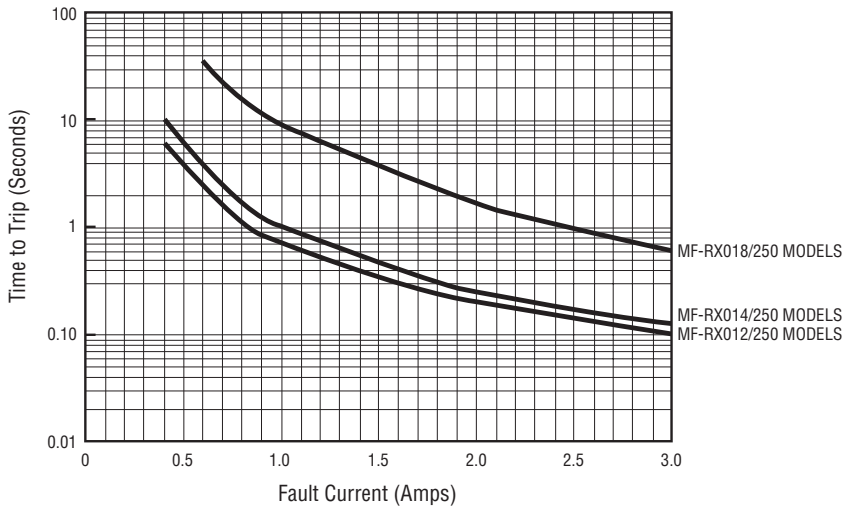
Resistance Sorted
Narrow resistance ranges - see Resistance Options chart

Resistance Bins
05 = 0.5 ohm binned parts (coated only)

Packaging Options
- 0 = Bulk Packaging
- 2 = Tape and Reel*

*Packaged per EIA-468

Typical Time to Trip at 23 °C



Resistance Options

Model	Initial Resistance Values		R_{1max}	Bin
	Ohms @ 23 ° C		Ohms @ 23 ° C	
	Min.	Max.	Max.	
MF-RX012/250	4.0	8.0	16.0	N/A
MF-RX012/250-A05	7.0	9.0	16.0	0.5
MF-RX012/250-C05	5.5	7.5	14.0	0.5
MF-RX012/250-F05	6.0	10.5	16.0	0.5
MF-RX012/250-G05	5.5	6.5	16.0	N/A
MF-RX012/250-H05	9.0	10.5	16.0	N/A
MF-RX012/250-T05	7.0	12.0	16.0	0.5
MF-RX012/250-105	6.0	9.0	16.0	0.5
MF-RX012/250-205	8.0	10.5	16.0	0.5
MF-RX012/250U	6.0	10.0	16.0	N/A
MF-RX014/250	3.0	6.0	14.0	N/A
MF-RX014/250-A05	3.0	5.5	12.0	0.5
MF-RX014/250-B05	4.5	6.0	14.0	0.5
MF-RX014/250-C05	3.0	4.0	14.0	N/A
MF-RX014/250-T05	5.4	7.5	14.0	0.5
MF-RX014/250U	3.5	6.5	12.0	N/A
MF-RX018/250	0.8	2.0	4.0	N/A
MF-RX018/250U	0.8	2.0	4.0	N/A

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MF-RX/250 Series Tape and Reel Specifications

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Devices taped using EIA-468/IEC 60286-2 standards. See table below and figures for details.

Dimension Description	IEC Mark	EIA Mark	Dimensions	
			Dimensions	Tolerance
Carrier tape width	W	W	18 (0.709)	-0.5/+1.0 (-0.02/+0.039)
Hold down tape width	W_0	W_0	5 (0.197)	min.
Hold down tape			No protrusion beyond the carrier tape	
Adhesive tape position	W_2	W_2	3 (0.118)	max.
Sprocket hole position	W_1	W_1	9 (0.354)	-0.5/+0.75 (-0.02/+0.03)
Sprocket hole diameter	D_0	D_0	4 (0.157)	±0.2 (±0.0078)
Height to seating plane (straight lead)	H	H	18 ~ 20 (0.709 ~ 0.787)	
Height to seating plane (formed lead)	H_0	H_0	16 (0.63)	±0.5 (±.02)
Overall height above abscissa	H_1	H_1	38.5 (1.516)	max.
Cutout Length		L	11 (0.433)	max.
Sprocket hole pitch	P_0	P_0	12.7 (0.5)	±0.3 (±0.012
Device pitch	P	P	12.7 (0.5)	±0.3 (±0.012)
Pitch tolerance			20 consecutive	±1 (±0.039)
Composite tape thickness	t	t	0.9 (0.035)	max.
Overall tape and lead thickness	t_1	t_1	2.0 (0.079)	max.
Splice sprocket hole alignment			0	±0.3 (±0.012)
Front-to-back deviation	Δh	Δh	0	±1.0 (±0.039)
Side-to-side deviation	Δp	Δp	0	±1.3 (±0.051)
Ordinate to adjacent component lead	P_1	P_1	3.81 (0.150)	±0.7 (±0.028)
Lead spacing	F	F	5.08 (0.2)	+0.6/-0.2 (+0.024/-0.008)
Reel width including flanges and hub	W_4	w_2	62.0 (2.44)	max.
Dimension between flanges (measured at hub)	W_3	w_1	allow proper reeling and unreeling	
Reel diameter	A	a	370.0 (14.57)	max.

— *Continued on next page* —

DIMENSIONS: MM (INCHES)

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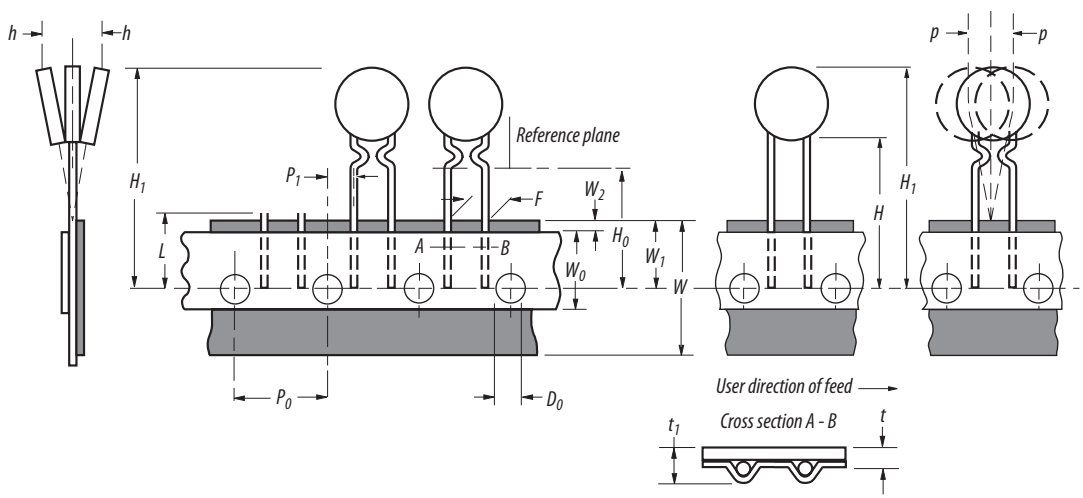
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MF-RX/250 Series Tape and Reel Specifications

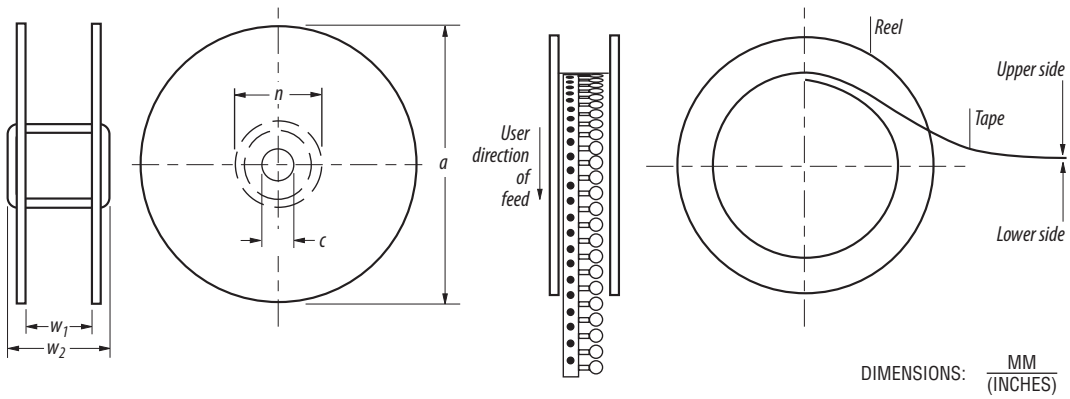
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Dimension Description	IEC Mark	EIA Mark	Dimensions Dimensions	Tolerance
Space between flanges (at hub, excluding device)			4.75 (0.187)	±3.25 (±0.128)
Arbor hole diameter	C	c	26.0 (1.024)	±12.0 (±0.472)
Core diameter	N	n	80 (3.15)	min.
Box dimensions			62 (2.44) 372 (14.6) 372 (14.6)	max.
Consecutive missing places			3	max.
Empty places per reel			Less than 0.1 %	

Taped Component Dimensions - per EIA Mark - Figure 1



Reel Dimensions - per EIA Mark - Figure 2



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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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The characteristics and parameters of a Bourns® product set forth in its data sheet are based on laboratory conditions, and statements regarding the suitability of products for certain "typical" applications are based on Bourns' knowledge of typical requirements in generic applications. Bourns assumes that "typical" applications include failsafe/backup features to address critical risks to users and are designed to allow rework of Bourns® product to avoid scrap of a device solely due to malfunctioning Bourns® product. The characteristics and parameters of a Bourns® product in a user application may vary from the data sheet characteristics and parameters due to (i) the combination of the Bourns® product with other components in the user's application, or (ii) the environment of the user application itself. The characteristics and parameters of a Bourns® product also can and do vary in different applications and actual performance may vary over time. Thus, users should always verify the actual performance of the Bourns® product in their specific devices and applications and make their own independent judgments regarding the suitability of Bourns® product and the amount of additional test margin to design into their device or application to compensate for differences between laboratory and real-world conditions.

Unless Bourns has explicitly designated an individual Bourns® product as meeting the requirements of a particular industry standard (e.g., IATF 16949) or a particular qualification (e.g., UL listed or recognized), Bourns is not responsible for any failure of an individual Bourns® product to meet the requirements of such industry standard or particular qualification even if such industry standard or qualification is a "state of art". Users of Bourns® products are responsible for ensuring compliance with safety-related requirements and standards applicable to their devices or applications.

Bourns® products are not recommended, authorized or intended for use in applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage, such as without limitation nuclear, life-critical medical and certain automotive and aviation applications. Except as set forth in the bullet points below or unless expressly and specifically approved in writing on a case-by-case basis by an authorized Bourns' representative, use of any Bourns® products in such unauthorized high-risk applications is at the user's sole risk.

- Bourns considers implantable/invasive devices and devices/procedures designed as life-supporting or life-sustaining by the U.S. Food and Drug Administration or equivalent organizations outside of the United States as "life-critical" medical applications. Bourns expressly identifies those Bourns® standard products that are suitable for use in typical medical applications that are not life-critical in its publication entitled "Bourns Medical Grade Component Guide."

- Bourns expressly identifies those Bourns® standard products that are suitable for use in typical automotive applications associated with any Automotive Safety Integrity Level (ASIL) in its publication entitled "Bourns Automotive Grade Component Guide." Bourns' designation of Bourns® product as compliant with the AEC-Q standard does not by itself mean that Bourns has approved such product for use in an automotive application.

- Bourns expressly identifies Bourns® standard products that are suitable for use in the typical aviation applications/systems requiring System Design Assurance Level (RTCA DO-254 DAL) of C, D or E in its publication entitled "Bourns Civilian Aerospace/Aviation Grade Component Guide." Bourns does not test its products for compliance with United States Federal Aviation Administration standards or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aviation applications. Use of Bourns® standard components in aviation applications associated with RTCA DO-254 DAL A or B without proper approval noted above shall be at the user's sole risk.

- Bourns will review and authorize on a case-by-case basis the use of Bourns® standard products which are at least AEC-Q compliant in space-related civil applications (rockets, satellites) with a negotiated cross-waiver and indemnity agreement.

The use and level of testing applicable to Bourns® custom products shall be negotiated on a case-by-case basis by Bourns and the user for which such Bourns® custom products are specially designed. Absent a written agreement between Bourns and the user regarding the use and level of such testing, the above provisions applicable to Bourns® standard products shall also apply to such Bourns® custom products.

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