

BIDIRECTIONAL THYRISTOR OVERVOLTAGE PROTECTORS



TISP4xxxJ3BJ Overvoltage Protector Series

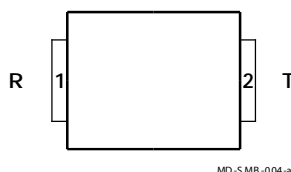
Ion-Implanted Breakdown Region
 -Precise and Stable Voltage
 -Low Voltage Overshoot Under Surge

Designed for Transformer Center Tap
 (Ground Return) Overvoltage Protection
 -Enables GR-1089-CORE Compliance
 -High Holding Current Allows Protection
 of Data Lines with d.c. Power Feed

Can be Used to Protect Rugged
 Modems Designed for Exposed
 Applications Exceeding TIA-968-A

Device Name	V _{DRM} V	V _(BO) V
TISP4070J3BJ	58	70
TISP4080J3BJ	65	80
TISP4095J3BJ	75	95
TISP4115J3BJ	90	115
TISP4125J3BJ	100	125
TISP4145J3BJ	120	145
TISP4165J3BJ	135	165
TISP4180J3BJ	145	180
TISP4200J3BJ	155	200
TISP4219J3BJ	180	219
TISP4250J3BJ	190	250
TISP4290J3BJ	220	290
TISP4350J3BJ	275	350
TISP4395J3BJ	320	395

SMB Package (Top View)



Device Symbol



Rated for International Surge Wave Shapes

Wave Shape	Standard	I _{TSP} A
2/10 μs	GR-1089-CORE	1000
8/20 μs	IEC 61000-4-5	800
10/160 μs	TIA-968-A	400
10/700 μs	ITU-T K.20/21/45	350
10/560 μs	TIA-968-A	250
10/1000 μs	GR-1089-CORE	200

Additional Information

Click these links for more information:

[PRODUCT SELECTOR](#)
[TECHNICAL LIBRARY](#)
[INVENTORY](#)
[SAMPLES](#)
[CONTACT](#)

Agency Recognition

Description	
UL	File Number: E215609

UL Recognized Component

Description

The range of TISP4xxxJ3BJ devices are designed to limit overvoltages on telecom lines. The TISP4xxxJ3BJ is primarily designed to address GR-1089-CORE compliance on data transmission lines with d.c. power feeding. When overvoltage protection is applied to transformer coupled lines from the transformer center tap to ground, the total ground return current can be 200 A, 10/1000 and 1000 A, 2/10. The high 150 mA holding current is set above common d.c. feed system levels to allow the TISP4xxxJ3BJ to reset following a disturbance.

These devices allow signal voltages, without clipping, up to the maximum off-state voltage value, V_{DRM}, see Figure 1. Voltages above V_{DRM} are limited and will not exceed the breakover voltage, V_(BO), level. If sufficient current flows due to the overvoltage, the device switches into a low voltage on-state condition, which diverts the current from the overvoltage through the device. When the diverted current falls below the holding current, I_H, level the devices switches off and restores normal system operation.

How to Order

Device	Package	Carrier	Order As	Marking Code	Standard Quantity
TISP4xxxJ3BJ	SMB	Embossed Tape Reeled	TISP4xxxJ3BJR-S	4xxxJ3	3000

Insert xxx corresponding to device name.



Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com
 EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com
 The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com
www.bourns.com

JULY 2003 – REVISED JULY 2019
 *RoHS Directive 2015/863, Mar 31, 2015 and Annex.
 Specifications are subject to change without notice.
 Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.



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

TISP4xxxJ3BJ Overvoltage Protector Series

BOURNS®

Absolute Maximum Ratings, $T_A = 25\text{ °C}$ (Unless Otherwise Noted)

Rating	Symbol	Value	Unit
Repetitive peak off-state voltage	'4070J3BJ	±58	V
	'4080J3BJ	±65	
	'4095J3BJ	±75	
	'4115J3BJ	±90	
	'4125J3BJ	±100	
	'4145J3BJ	±120	
	'4165J3BJ	±135	
	'4180J3BJ	±145	
	'4200J3BJ	±155	
	'4219J3BJ	±180	
	'4250J3BJ	±190	
	'4290J3BJ	±220	
	'4350J3BJ	±275	
	'4395J3BJ	±320	
Non-repetitive peak impulse current (see Notes 1 and 2) 2/10 μs (GR-1089-CORE, 2/10 μs voltage wave shape) 8/20 μs (IEC 61000-4-5, combination wave generator, 1.2/50 μs voltage wave shape) 10/160 μs (TIA-968-A, 10/160 μs voltage wave shape) 4/250 μs (ITU-T K.20/21, 10/700 μs voltage waveshape, simultaneous) 5/310 μs (ITU-T K.20/21, 10/700 μs voltage wave shape, single) 5/320 μs (TIA-968-A, 9/720 μs voltage waveshape, single) 10/560 μs (TIA-968-A, 10/560 μs voltage wave shape) 10/1000 μs (GR-1089-CORE, 10/1000 μs voltage wave shape)	I_{PPSM}	±1000 ±800 ±400 ±370 ±350 ±350 ±250 ±200	A
Non-repetitive peak on-state current (see Notes 1 and 2) 20 ms, 50 Hz (full sine wave)	I_{TSM}	50	A
Initial rate of rise of on-state current. Linear current ramp. Maximum ramp value < 50 A	di_T/dt	800	A/ μs
Junction temperature	T_J	-40 to +150	°C
Storage temperature range	T_{stg}	-65 to +150	°C

NOTES: 1. Initially the device must be in thermal equilibrium with $T_J = 25\text{ °C}$.

2. These non-repetitive rated currents are peak values of either polarity. The surge may be repeated after the device returns to its initial conditions.

Electrical Characteristics, $T_A = 25\text{ °C}$ (Unless Otherwise Noted)

Parameter	Test Conditions	Min	Typ	Max	Unit
I_{DRM} Repetitive peak off-state current	$V_D = V_{DRM}$ $T_A = 25\text{ °C}$ $T_A = 85\text{ °C}$			±5 ±10	μA
$V_{(BO)}$ AC Breakover voltage	$dv/dt = \pm 250\text{ V/ms}$, $R_{SOURCE} = 300\ \Omega$			±70 ±80 ±95 ±115 ±125 ±145 ±165 ±180 ±200 ±219 ±250 ±290 ±350 ±395	V

JULY 2003 – REVISED JULY 2019

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

TISP4xxxJ3BJ Overvoltage Protector Series

BOURNS®

Electrical Characteristics, T_A = 25 °C (Unless Otherwise Noted)

Parameter	Test Conditions	Min	Typ	Max	Unit
V _(BO) Ramp breakover voltage	dv/dt ≤ ±1000 V/μs, Linear voltage ramp, Maximum ramp value = ±500 V di/dt = ±20 A/μs, Linear current ramp, Maximum ramp value = ±10 A			±77 ±88 ±104 ±125 ±135 ±156 ±177 ±192 ±212 ±231 ±263 ±303 ±364 ±409	V
I _(BO) Breakover current	dv/dt = ±250 V/ms, R _{SOURCE} = 300 Ω			±900 ±800 ±600	mA
I _H Holding current	I _T = ±5 A, di/dt = ±30 mA/ms	±150		±600	mA
dv/dt Critical rate of rise of off-state voltage	Linear voltage ramp Maximum ramp value < 0.85V _{DRM}	±5			kV/μs
I _D Off-state current	V _D = ±50 V T _A = 85 °C			±10	μA
C _O Off-state capacitance	f = 1 MHz, V _d = 1 V rms, V _D = 0		195 120 105	235 145 125	pF
	f = 1 MHz, V _d = 1 V rms, V _D = -1 V		180 110 95	215 132 115	
	f = 1 MHz, V _d = 1 V rms, V _D = -2 V		165 100 90	200 120 105	
	f = 1 MHz, V _d = 1 V rms, V _D = -50 V		85 50 42	100 60 50	
	f = 1 MHz, V _d = 1 V rms, V _D = -100 V (see Note 3)		40 35	50 40	

NOTE: 3. To avoid possible clipping, the TISP4125J3BJ is tested with V_D = -98 V.

Thermal Characteristics

Parameter	Test Conditions	Min	Typ	Max	Unit
R _{θJA} Junction to ambient thermal resistance	EIA/JESD51-3 PCB, I _T = I _{TSM(1000)} (see Note 4)			90	°C/W

NOTE: 4. EIA/JESD51-2 environment and PCB has standard footprint dimensions connected with 5 A rated printed wiring track widths.

JULY 2003 – REVISED JULY 2019

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Parameter Measurement Information

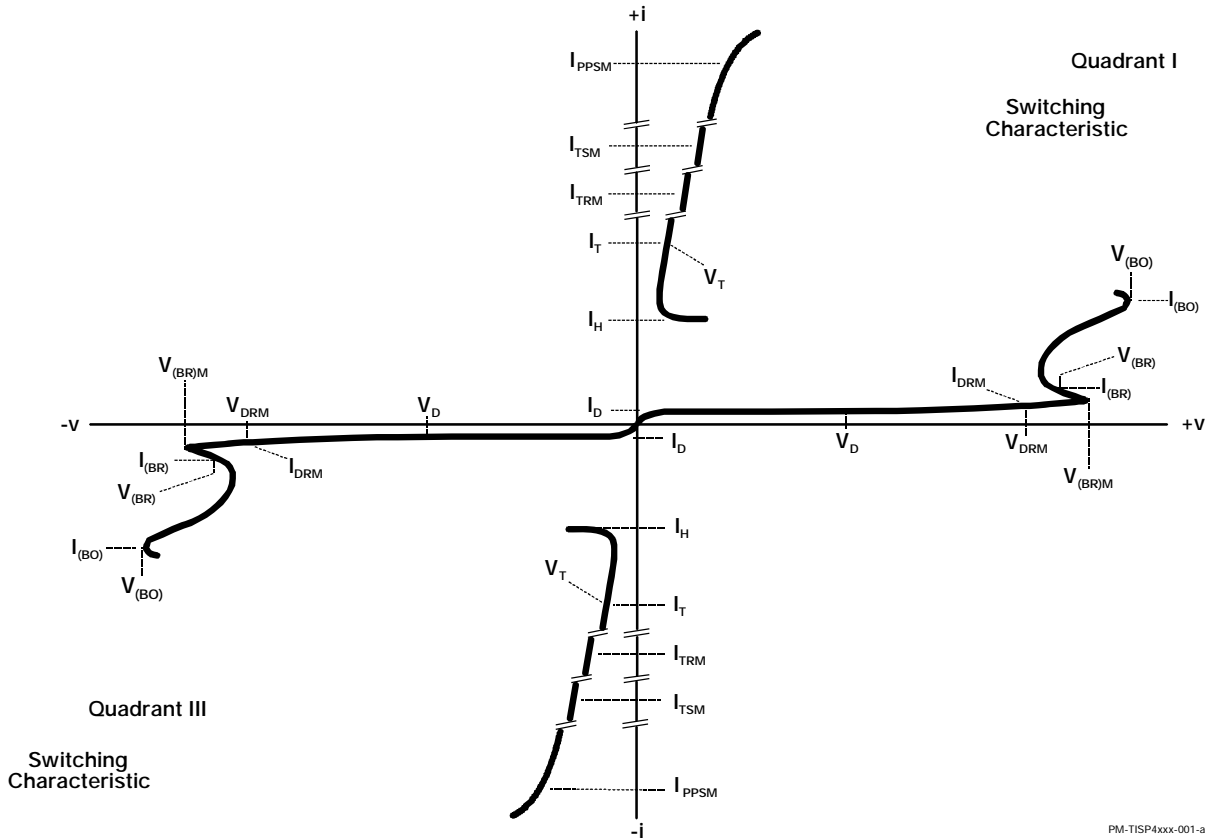


Figure 1. Voltage-Current Characteristic for T and R Terminals
All Measurements are Referenced to the R Terminal

PM-TISP4xxx-001-a

Typical Characteristics

**OFF-STATE CURRENT
vs
JUNCTION TEMPERATURE**

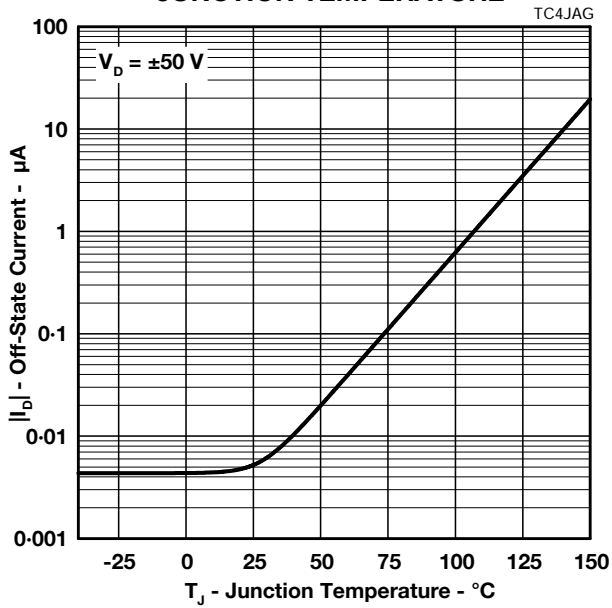


Figure 2.

**NORMALIZED BREAKOVER VOLTAGE
vs
JUNCTION TEMPERATURE**

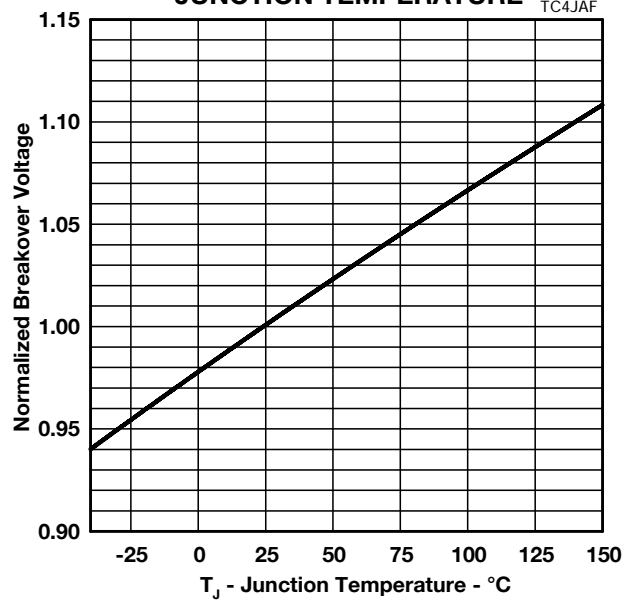


Figure 3.

**NORMALIZED HOLDING CURRENT
vs
JUNCTION TEMPERATURE**

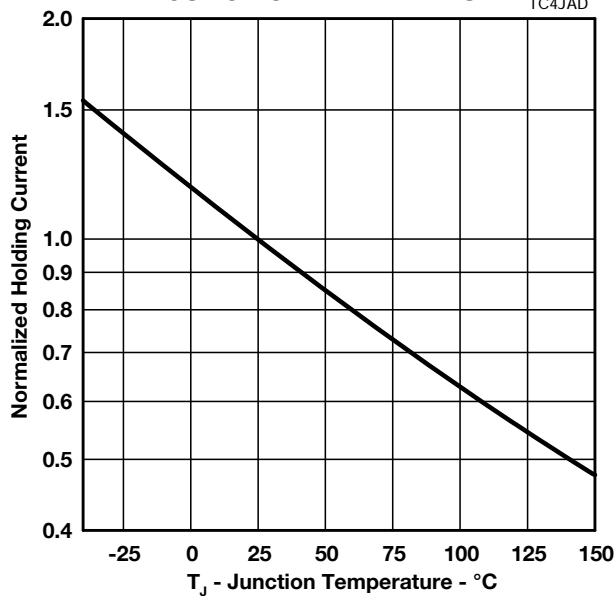


Figure 4.

**NORMALIZED CAPACITANCE
vs
OFF-STATE VOLTAGE**

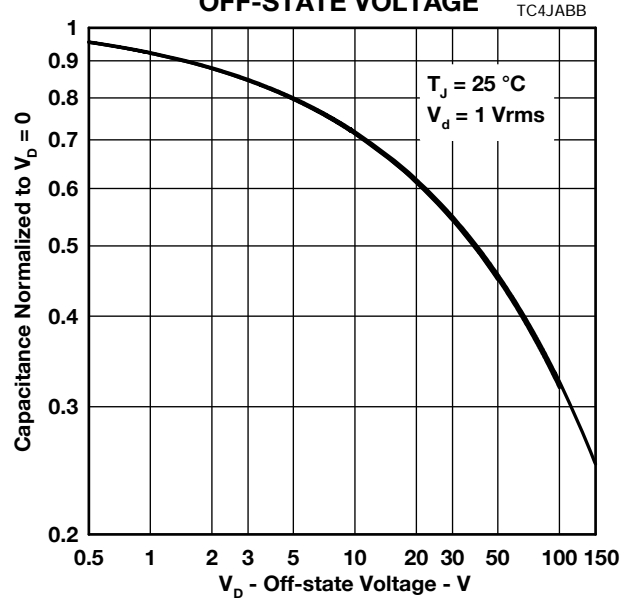


Figure 5.

JULY 2003 – REVISED JULY 2019

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Rating and Thermal Characteristics

NON-REPETITIVE PEAK ON-STATE CURRENT VS CURRENT DURATION

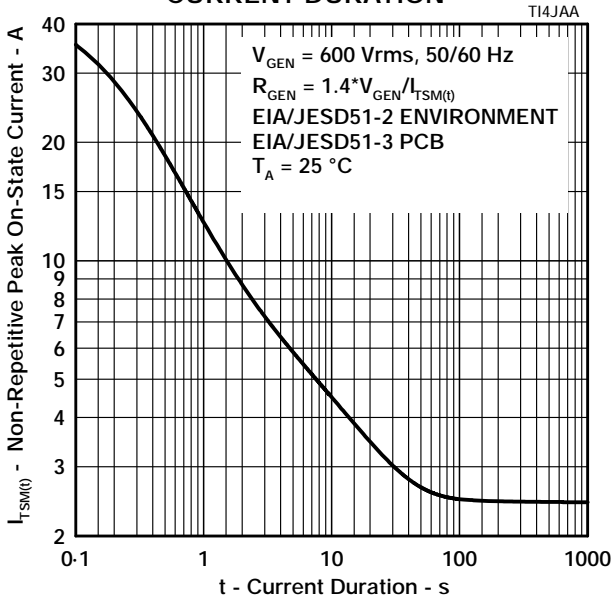


Figure 6.

V_{DRM} DERATING FACTOR VS MINIMUM AMBIENT TEMPERATURE

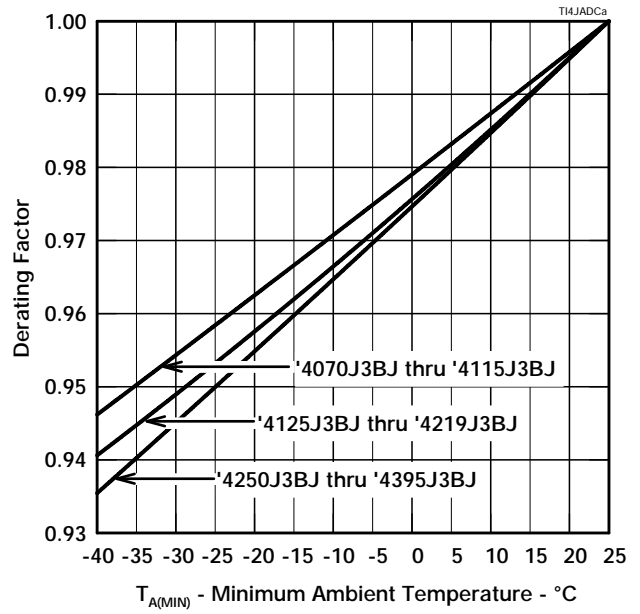


Figure 7.

Applications Information

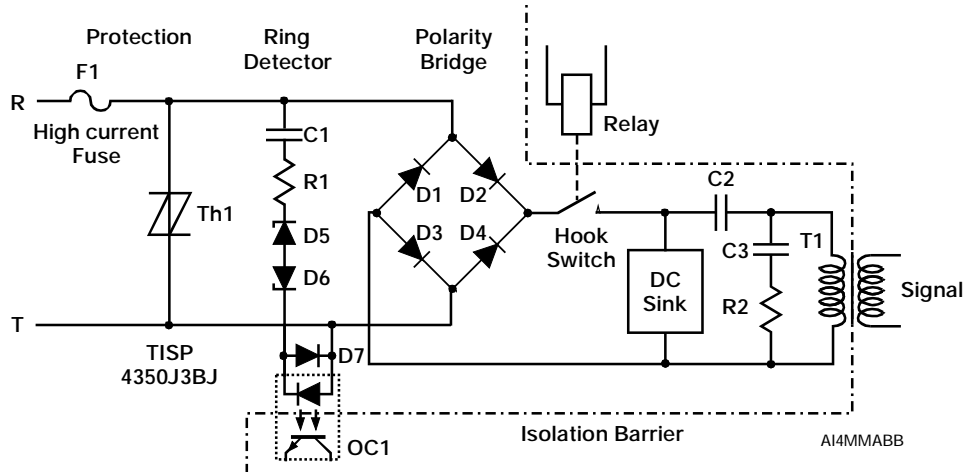


Figure 8. Typical Application Circuit

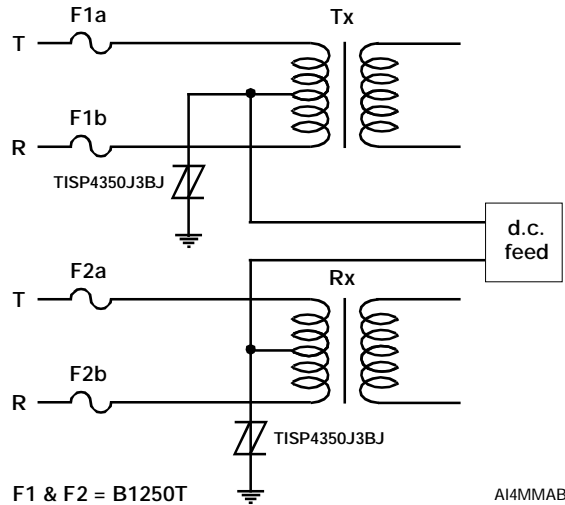


Figure 9. Typical Application Circuit

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com

EMEA: Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com

www.bourns.com

"TISP" is a trademark of Bourns, Ltd., a Bourns Company, and is Registered in the U.S. Patent and Trademark Office. "Bourns" is a registered trademark of Bourns, Inc. in the U.S. and other countries.

JULY 2003 – REVISED JULY 2019

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

This legal disclaimer applies to purchasers and users of Bourns® products manufactured by or on behalf of Bourns, Inc. and its affiliates (collectively, "Bourns").

Unless otherwise expressly indicated in writing, Bourns® products and data sheets relating thereto are subject to change without notice. Users should check for and obtain the latest relevant information and verify that such information is current and complete before placing orders for Bourns® products.

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 Automate 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.

Use of Bourns® products or Bourns' technology in military/defense applications must be reviewed with Bourns for compliance with applicable export control laws and embargoes. Users shall not sell, transfer, export or re-export (which includes transfers within a country) any Bourns® products or technology or technical data for use in activities which involve the design, development, production, use or stockpiling of nuclear, chemical or biological weapons or missiles, nor shall they use Bourns® products or technology or technical data in any facility which engages in activities relating to such devices. Further, Bourns® products and Bourns' technology and technical data may not under any circumstance be exported or re-exported to countries subject to international sanctions or embargoes. Bourns® products and technology may not, without prior authorization from Bourns and/or the Government of a country where such product/technology is designed and/or manufactured, be resold, transferred, or re-exported (including within the same country) to any party not eligible to receive commodities, software, and technical data originating in such country.

To the maximum extent permitted by applicable law, Bourns disclaims (i) any and all liability for special, punitive, consequential, incidental or indirect damages or lost revenues or lost profits, and (ii) any and all implied warranties (those not based on parameters specified in Bourns' data sheets and/or specifications), including implied warranties of fitness for particular purpose, non-infringement and merchantability.

For your convenience, copies of this Legal Disclaimer Notice with German, Spanish, Japanese, Traditional Chinese and Simplified Chinese bilingual versions are available at:

Web Page: <https://www.bourns.com/legal/disclaimers-terms-and-policies>

PDF: <https://www.bourns.com/docs/Legal/disclaimer.pdf>