

Features

- Miniature Thermal Cutoff (TCO) device
- Surface mount, smallest footprint
- Overtemperature and overcurrent protection
- Controls abnormal, excessive current virtually instantaneously, up to rated limits
- Wide range of temperature options
- High corrosion resistance
- Supports USB PD 240 W (48 V / 5 A) specification

Applications

- Overtemperature protection for:
  - USB Type C cables (e.g., smartphones, notebooks, max. 240 W)
  - Electronic cigarettes
  - Heaters***
- Battery cell protection for:
  - Wearables
  - Portable equipment

SE Series Breaker (Surface Mount Thermal Cutoff Device)

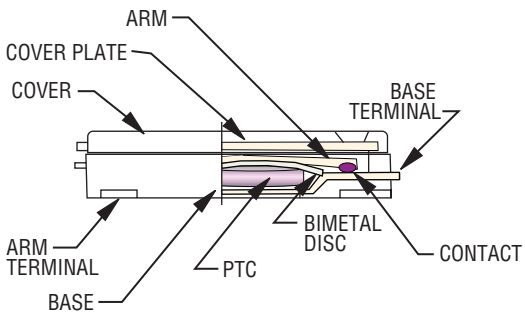
Ratings

Specification	SE Series	
Trip Temperature	72 to +105 °C ± 5 °C	
Reset Temperature	40 °C min.	
Contact Rating	DC48 V / 5 A, 1000 cycles	
Maximum Voltage	DC54 V / 5 A, 100 cycles	
Minimum Holding Voltage	3 V @ 25 °C for 1 minute	5 V @ 25 °C for 1 minute
Maximum Leakage Current	200 mA max. @ 25 °C	
Resistance	5 milliohms max.	

Mini-breaker TCOs reset when the following conditions are met:

- The ambient temperature has dropped by 10 °C below the minimum trip temperature; and
- Power to the TCO has been cycled (off/on)

Product Structure



- Model SExAAA is designed with a reinforced cover to withstand higher forces during the USB cable manufacturing injection molding process.

Additional Information

Click these links for more information:

PRODUCT SELECTOR | TECHNICAL LIBRARY | INVENTORY | SAMPLES | CONTACT

How to Order

SE 77 A A A

Series Designator — SE

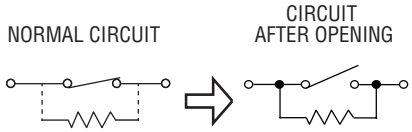
Trip Temperature (±5 °C)
- 72
- 77
- 82
- 85
- 88
- A0
- A5

Arm Material — A
A = Cu Alloy, High current type

Body Material — A
A = PPS

Body Thickness — A
A = 1.23 ± 0.05 mm

Circuit Diagram



Agency Recognition

Description	
UL, cUL	File Number: E215638 (UL 60730)
TÜV	File Number: R50740107 (TÜV Std. No. EN IEC 60730-2-9)

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.

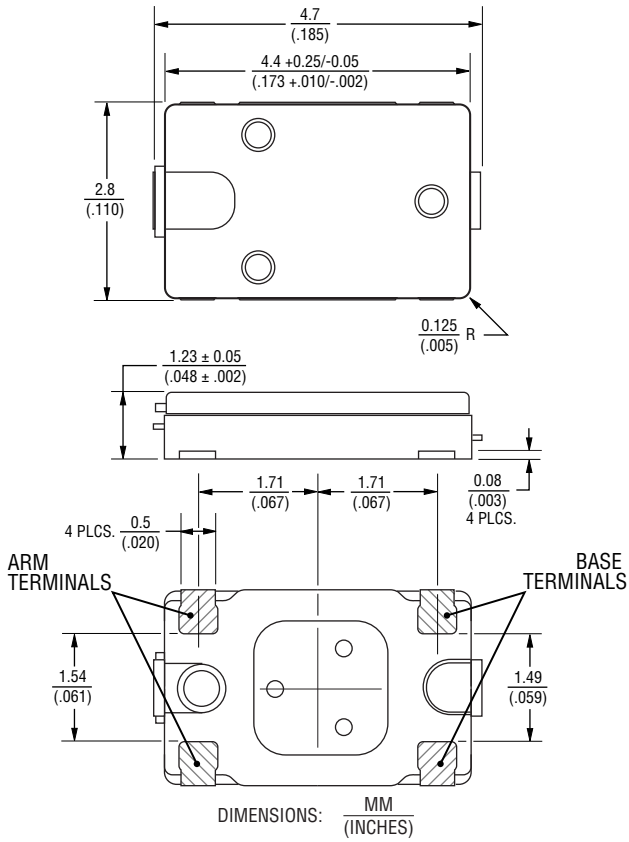
** Bourns considers a product to be "halogen free" if (a) the Bromine (Br) content is 900 ppm or less; (b) the Chlorine (Cl) content is 900 ppm or less; and (c) the total Bromine (Br) and Chlorine (Cl) content is 1500 ppm or less.

*** Excluding life-saving, life-critical or life-sustaining applications.

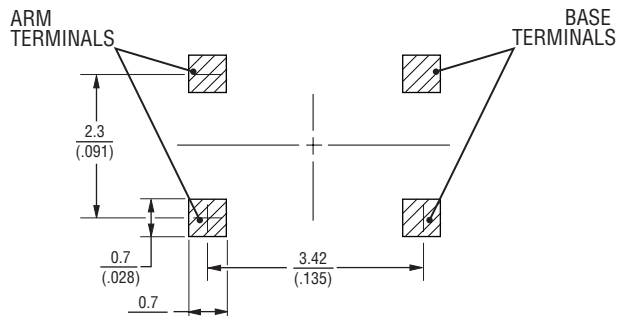
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Downloaded from Arrow.com.

Product Dimensions



Recommended Land Pattern

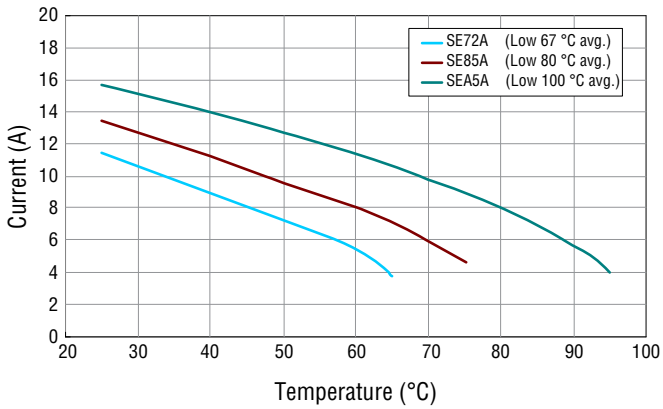


Recommended Mask Thickness: 0.12 mm / (.005 in.)

Recommended Solder Particle Size: 30 µm

Typical Performance

Current vs. Temperature Curves



The curves were derived from placing non-PCB mounted test samples in an oven at 25 °C, 40 °C, 60 °C, 70 °C and 90 °C, increasing current flow through the sample at a rate of 0.1 A/minute and recording the current value when the sample trips. The current carrying performance is influenced by the PCB design due to copper resistance; users should verify actual device performance in their specific applications.

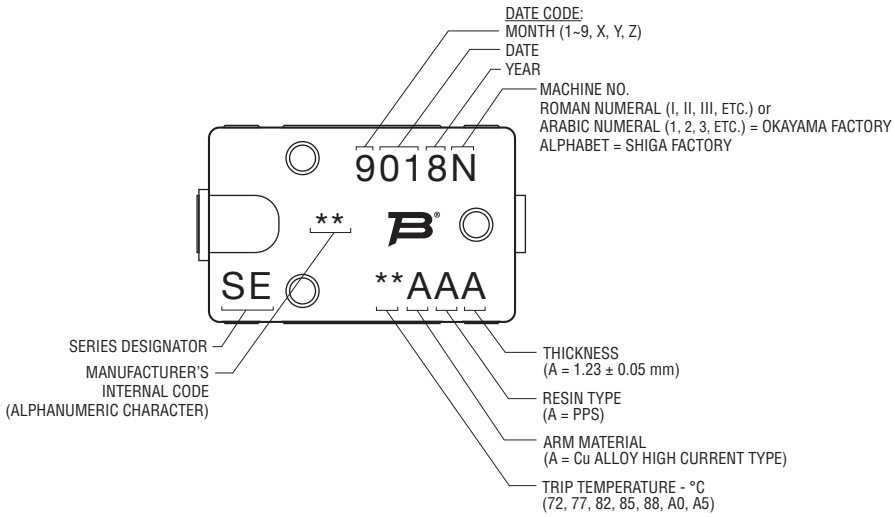
Temperature Options

Bourns Part Number	Trip Temperature (°C)	Minimum Holding Voltage (V)
SE72AAA	72	3
SE77AAA	77	
SE82AAA	82	5
SE85AAA	85	
SE88AAA	88	
SEA0AAA	100	
SEA5AAA	105	

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.

Downloaded from Arrow.com.

Typical Part Marking



Application Temperature Range

..... -30 ~ 100 °C

Environmental Specifications

Moisture Sensitivity Level.....1
ESD Classification (HBM).....6

Storage Conditions

1) The breaker must be stored in the standard packaging with the following conditions: ambient temperature of -10 to +40 °C, RH <75 % with no radical temperature change, direct sunshine, excessive vibration or shock.

2) Avoid storage locations where there is a possibility of generating corrosive gas such as from salt breeze, chlorine, hydrogen sulfide, ammonium, sulfide-oxidation, hydrogen chloride, acetate, etc.

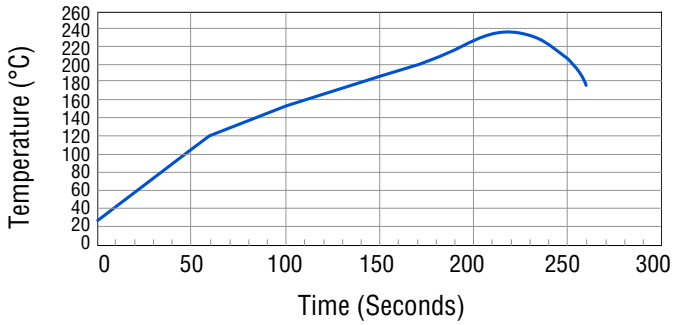
3) Storage period should be no longer than 24 months from date of shipment.

Surface Mount Recommendations

The Model SE Series breaker is designed for reflow soldering. It is not designed or warranted for flow soldering. The following conditions must be adhered to:

Reflow Soldering:
The recommended reflow soldering conditions are as follows:
130 ~ 200 °C .....90 ~ 110 seconds
≤ 217 °C..... 50 ~ 60 seconds
235~240 °C ..... Peak

Process breaker in a reflow furnace using the profile shown above three times, followed by positioning the breaker in ambient temperature of +25 °C for 8 hours.



Do not expose the breaker to temperatures exceeding +240 °C.

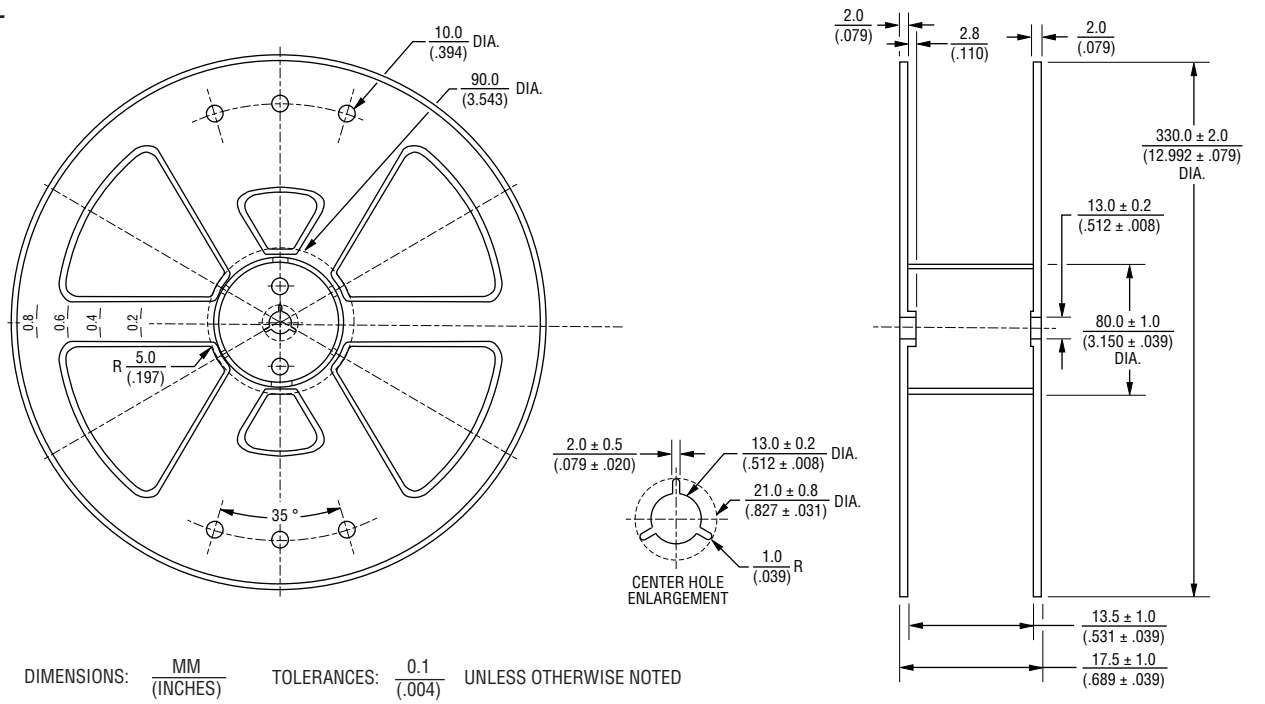
Specifications are subject to change without notice.
Users should verify actual device performance in their specific applications.
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

Downloaded from Arrow.com.

Standard Packaging Specifications

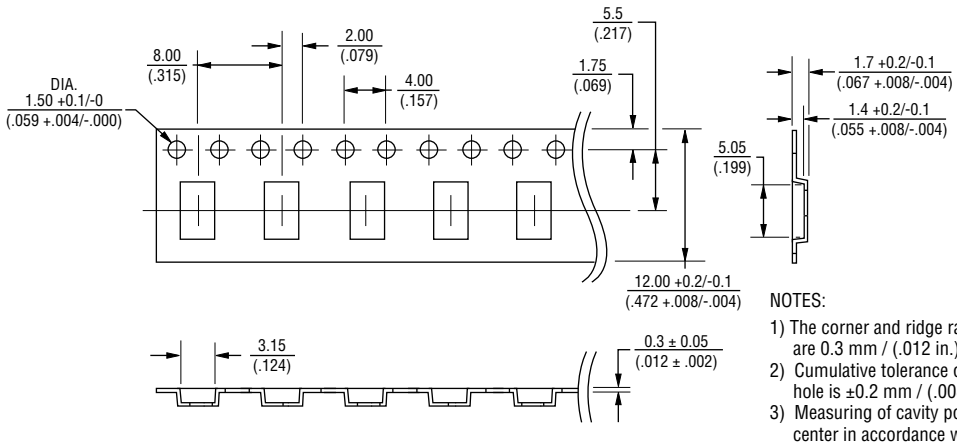
Reel (13 inch) ..... 5,000 pcs. (fixed)
Outer Box (690 mm x 344 mm x 136 mm) ..... 50,000 pcs. (fixed)
Marking.....A label will be attached on the reel and outer box which includes the following items, at a minimum:
Part name, part number, quantity, lot number, safety approval mark (UL, etc.),
company name (Bourns KK) and any other items required by the customer

REEL



DIMENSIONS: MM (INCHES) TOLERANCES: 0.1 (.004) UNLESS OTHERWISE NOTED

CARRIER TAPE



NOTES:
1) The corner and ridge radiuses (R) of inside cavity are 0.3 mm / (.012 in.) max.
2) Cumulative tolerance of 10 pitches of the sprocket hole is ±0.2 mm / (.008 in.).
3) Measuring of cavity positioning is based on cavity center in accordance with JIS/IEC standard.

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.

Downloaded from Arrow.com.

Caution when Using Breaker

Before using the breaker, please fully read the *DESIGN CAUTIONS and HANDLING CAUTIONS* stated below to avoid breaker performance deterioration and/or damage to the breaker body or terminal.

DESIGN CAUTIONS

1. Use within the electrical ratings specified in this data sheet. If used over the rating of voltage or current, ON-OFF life might be impacted and contact may deteriorate due to breaker arm damage.
2. If used over the maximum electrical rating specified in this data sheet, the circuit may not open safely or operate properly. Please test your device for any abnormalities and confirm that the breaker will open the circuit safely in your device. Any use over the maximum electrical rating is at the sole risk of the user.
3. Mount the breaker on your device where heat is the highest in order to transfer it effectively to the breaker.
4. If the breaker is affixed with an adhesive (resin, etc.), before proceeding, fully test, evaluate and verify that the adhesive presents no negative effects on the breaker before proceeding.
5. After the breaker is mounted, affix it so that the breaker body and terminals will not move. If not affixed properly, breaker resistance could increase or contact could open due to stress during handling or vibration/shock during transportation.
6. If breaker is to be resin-molded, test and evaluate the application to determine whether the breaker can be used effectively.
7. The breaker cannot be used as a repetitive ON-OFF thermostat.
8. The breaker is not washable. Do not wash.
9. Do not let a solder iron touch the breaker body.
10. Do not attach solder to the breaker body.
11. When mounting and after mounting the breaker, do not apply supersonic vibration. Vibration and heat may cause breaker resistance to increase or may cause body damage. If you plan to apply supersonic vibration after mounting the breaker, you will need to evaluate whether the breaker is suitable for your specific application. The breaker is not designed or warranted to withstand supersonic vibration.
12. Do not use the breaker in the following environments:
    a) Water, oil, chemical or organic solutions
    b) Direct sunlight, outdoor exposure, dust
    c) Dew condensation, where the breaker could get wet
    d) Salt breeze, chlorine, hydrogen sulfide, ammonium, sulfide-oxidation, hydrogen chloride, acetate and anywhere there is a possibility of generating corrosive gas such as sulfurous acid gas
    e) Strong static electric charge or electromagnetic wave
13. The breaker is not designed or tested for, and should not be used in, aerospace, airplane, nuclear, military, life-saving, life-critical or life-sustaining medical and other related applications where failure or malfunction may result in personal injury, death or severe property or environmental damage.

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.

Downloaded from Arrow.com.

Caution when using Breaker (Continued)

HANDLING CAUTIONS

1. Since the breaker body is composed of plastic parts, do not clamp or dent with tools as this could cause a resistance increase or body damage.
2. Breaker terminals are thin copper-alloy with right angle edges. Handle carefully to avoid injury to fingers. Handling while wearing finger cots and using tweezers is recommended.
3. When mounting the breaker on a cell or PCM board, be careful to avoid placing excessive stress on the breaker body and terminals. Excessive stress may cause a resistance increase or body damage. Please refer to the following cautions:
   a) Do not apply more than 10 N moment to the breaker body (refer to Figure 1)
   b) Do not apply more than 3 cN-m twist torque to the breaker body (refer to Figure 2)
   c) Do not apply more than 30 N bending force to the breaker body (refer to Figure 3)

Figure 1

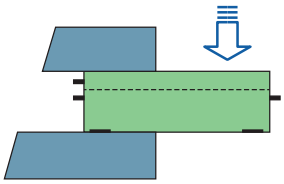


Figure 2

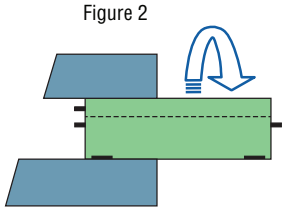
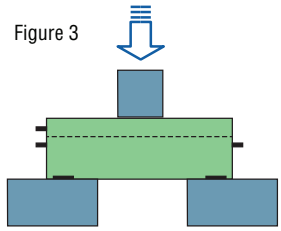


Figure 3



Due to possible updates to safety standards and other reasons, there may be changes in specifications for this data sheet without prior notification. Therefore, before design-in for your application, please contact us for the most up-to-date specifications.

BOURNS®

Asia-Pacific: Tel: +886-2 2562-4117 • Email: asiacus@bourns.com
Europe: Tel: +36 88 885 877 • Email: eurocus@bourns.com
Mexico: Tel: +52 614 478 0400 • Email: mexicus@bourns.com
The Americas: Tel: +1-951 781-5500 • Email: americus@bourns.com
www.bourns.com

REV. 08/26

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.

Downloaded from Arrow.com.

Legal Disclaimer Notice

BOURNS®

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 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.

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 a 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

Downloaded from Arrow.com.