



## Features

- Surface Mount SMA package
- Breakdown Voltage: 6.8 to 250 volts
- Power Dissipation: 400 watts
- RoHS compliant\* and halogen free\*\*
- AEC-Q101 compliant\*\*\*

## Applications

- Protection of power buses
- Protection of I/O interfaces
- Overvoltage transient protection
- Telecom, computer, industrial and consumer electronics applications

# P4SMA-Q Transient Voltage Suppressor Diode Series

## General Information

The markets of portable communications, computing and video equipment are challenging the semiconductor industry to develop increasingly smaller electronic components.

Bourns offers Transient Voltage Suppressor Diodes for surge and ESD protection applications, in compact chip package DO-214AC (SMA) size format. The Transient Voltage Suppressor series offers a choice of Breakdown Voltages from 6.8 V up to 250 V. Typical fast response times are less than 1.0 picosecond for unidirectional devices and less than 5.0 picoseconds for bidirectional devices.

Bourns® Chip Diodes conform to JEDEC standards, are easy to handle with standard pick and place equipment and the flat configuration minimizes roll away.

## Maximum Ratings (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation (T <sub>P</sub> = 1 ms) (Note 1,2)	P <sub>PK</sub>	400	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I <sub>FSM</sub>	40	Amps
Instantaneous Forward Voltage @ 25 A (For Unidirectional Units Only)	V <sub>F</sub>	3.5	Volts
Operating Temperature Range	T <sub>J</sub>	-55 to +150	°C
Storage Temperature Range	T <sub>STG</sub>	-55 to +150	°C

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T<sub>A</sub> = 25 °C per Pulse Derating Curve.
2. Mounted on 5.0 mm x 5.0 mm copper pad to each terminal.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

# BOURNS®

### Asia-Pacific:

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

### Europe:

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

### The Americas:

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

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

## How to Order

**P4SMA 15 CA - Q**

Series \_\_\_\_\_  
P4SMA = SMA/DO-214AC

Breakdown Voltage \_\_\_\_\_  
6.8 to 250 = 6.8 to 250 V<sub>BR</sub> (Volts)

Suffix \_\_\_\_\_  
A = 5 % Tolerance Unidirectional Device  
CA = 5 % Tolerance Bidirectional Device

AEC-Q101 Suffix \_\_\_\_\_  
Q = AEC-Q101 Compliant, 13-inch Reel (5000 pcs.)



**WARNING Cancer and Reproductive Harm - [www.P65Warnings.ca.gov](http://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.

\*\*\* Q suffix for applications requiring appropriate AEC-Q101 compliance for electronic limiters.

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](http://www.bourns.com/docs/legal/disclaimer.pdf).

# P4SMA-Q Transient Voltage Suppressor Diode Series

## Electrical Characteristics (@ T<sub>A</sub> = 25 °C Unless Otherwise Noted)

Unidirectional Device		Bidirectional Device		Breakdown Voltage V <sub>BR</sub> (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V <sub>RWM</sub>	Maximum Clamping Voltage @ I <sub>pp</sub> (10/1000 μs)	Maximum Peak Pulse Current (10/1000 μs)	Maximum Clamping Voltage @ I <sub>pp</sub> (8/20 μs)	Maximum Peak Pulse Current (8/20 μs)
Part No.	Marking	Part No.	Marking	Min.	Max.	@ I <sub>T</sub> (mA)	V <sub>RWM</sub> (V)	I <sub>R</sub> (μA)	V <sub>c</sub> (V)	I <sub>pp</sub> (A)	V <sub>c</sub> (V)	I <sub>pp</sub> (A)
P4SMA6.8A-Q	6V8AQ	P4SMA6.8CA-Q	6V8CQ	6.45	7.14	10	5.8	1000	10.5	39	14	195
P4SMA7.5A-Q	7V5AQ	P4SMA7.5CA-Q	7V5CQ	7.13	7.88	10	6.4	500	11.3	36.3	14.7	181.5
P4SMA8.2A-Q	8V2AQ	P4SMA8.2CA-Q	8V2CQ	7.79	8.61	10	7.02	200	12.1	33.9	15.7	169.5
P4SMA9.1A-Q	9V1AQ	P4SMA9.1CA-Q	9V1CQ	8.65	9.55	1	7.78	50	13.4	30.6	17.4	153.0
P4SMA10A-Q	10AQ	P4SMA10CA-Q	10CQ	9.5	10.5	1	8.55	10	14.5	28.3	18.9	141.5
P4SMA11A-Q	11AQ	P4SMA11CA-Q	11CQ	10.5	11.6	1	9.4	5	15.6	26.3	20.3	131.5
P4SMA12A-Q	12AQ	P4SMA12CA-Q	12CQ	11.4	12.6	1	10.2	5	16.7	24.6	21.7	123.0
P4SMA13A-Q	13AQ	P4SMA13CA-Q	13CQ	12.4	13.7	1	11.1	1	18.2	22.5	23.7	112.5
P4SMA15A-Q	15AQ	P4SMA15CA-Q	15CQ	14.3	15.8	1	12.8	1	21.2	19.3	27.6	96.5
P4SMA16A-Q	16AQ	P4SMA16CA-Q	16CQ	15.2	16.8	1	13.6	1	22.5	18.2	29.3	91.0
P4SMA18A-Q	18AQ	P4SMA18CA-Q	18CQ	17.1	18.9	1	15.3	1	25.5	16.1	33.2	80.5
P4SMA20A-Q	20AQ	P4SMA20CA-Q	20CQ	19	21	1	17.1	1	27.7	14.8	36.0	74.0
P4SMA22A-Q	22AQ	P4SMA22CA-Q	22CQ	20.9	23.1	1	18.8	1	30.6	13.4	39.8	67.0
P4SMA24A-Q	24AQ	P4SMA24CA-Q	24CQ	22.8	25.2	1	20.5	1	33.2	12.3	43.2	61.5
P4SMA27A-Q	27AQ	P4SMA27CA-Q	27CQ	25.7	28.4	1	23.1	1	37.5	10.9	48.8	54.5
P4SMA30A-Q	30AQ	P4SMA30CA-Q	30CQ	28.5	31.5	1	25.6	1	41.4	9.9	53.8	49.5
P4SMA33A-Q	33AQ	P4SMA33CA-Q	33CQ	31.4	34.7	1	28.2	1	45.7	9	59	45
P4SMA36A-Q	36AQ	P4SMA36CA-Q	36CQ	34.2	37.8	1	30.8	1	49.9	8.2	64.9	41.0
P4SMA39A-Q	39AQ	P4SMA39CA-Q	39CQ	37.1	41	1	33.3	1	53.9	7.6	70.1	38.0
P4SMA43A-Q	43AQ	P4SMA43CA-Q	43CQ	40.9	45.2	1	36.8	1	59.3	6.9	77.1	34.5
P4SMA47A-Q	47AQ	P4SMA47CA-Q	47CQ	44.7	49.4	1	40.2	1	64.8	6.3	84.2	31.5
P4SMA51A-Q	51AQ	P4SMA51CA-Q	51CQ	48.5	53.6	1	43.6	1	70.1	5.8	91.1	29.0
P4SMA56A-Q	56AQ	P4SMA56CA-Q	56CQ	53.2	58.8	1	47.8	1	77	5.3	100.1	26.5
P4SMA62A-Q	62AQ	P4SMA62CA-Q	62CQ	58.9	65.1	1	53	1	85	4.8	110.5	24.0
P4SMA68A-Q	68AQ	P4SMA68CA-Q	68CQ	64.6	71.4	1	58.1	1	92	4.5	119.6	22.5
P4SMA75A-Q	75AQ	P4SMA75CA-Q	75CQ	71.3	78.8	1	64.1	1	103	4	134	20
P4SMA82A-Q	82AQ	P4SMA82CA-Q	82CQ	77.9	86.1	1	70.1	1	113	3.6	146.9	18.0
P4SMA91A-Q	91AQ	P4SMA91CA-Q	91CQ	86.5	95.5	1	77.8	1	125	3.3	162.5	16.5
P4SMA100A-Q	100AQ	P4SMA100CA-Q	100CQ	95	105	1	85.5	1	137	3	178	15
P4SMA110A-Q	110AQ	P4SMA110CA-Q	110CQ	105	116	1	94	1	152	2.7	197.6	13.5
P4SMA120A-Q	120AQ	P4SMA120CA-Q	120CQ	114	126	1	102	1	165	2.5	214.5	12.5
P4SMA130A-Q	130AQ	P4SMA130CA-Q	130CQ	124	137	1	111	1	179	2.3	232.7	11.5
P4SMA150A-Q	150AQ	P4SMA150CA-Q	150CQ	143	158	1	128	1	207	2	269	10
P4SMA160A-Q	160AQ	P4SMA160CA-Q	160CQ	152	168	1	136	1	219	1.9	284.7	9.5
P4SMA170A-Q	170AQ	P4SMA170CA-Q	170CQ	162	179	1	145	1	234	1.8	304.2	9.0
P4SMA180A-Q	180AQ	P4SMA180CA-Q	180CQ	171	189	1	154	1	246	1.7	319.8	8.5
P4SMA200A-Q	200AQ	P4SMA200CA-Q	200CQ	190	210	1	171	1	274	1.5	356.2	7.5
P4SMA220A-Q	220AQ	P4SMA220CA-Q	220CQ	209	231	1	185	1	328	1.3	426.4	6.5
P4SMA250A-Q	250AQ	P4SMA250CA-Q	250CQ	237	263	1	214	1	344	1.2	447.2	6.0

- Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.  
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

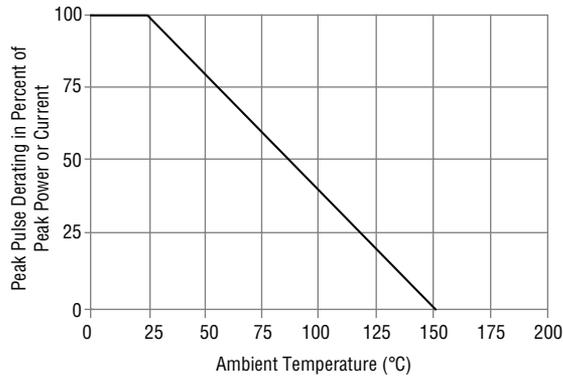
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# P4SMA-Q Transient Voltage Suppressor Diode Series

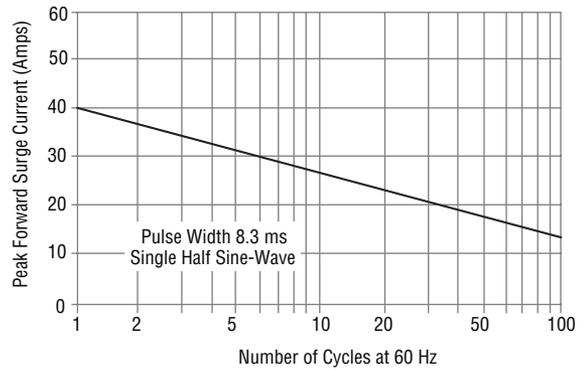


## Rating & Characteristic Curves

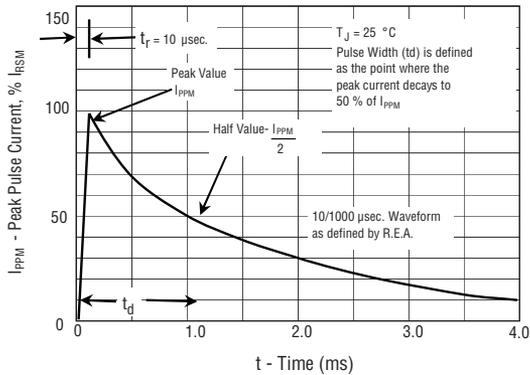
### Pulse Derating Curve



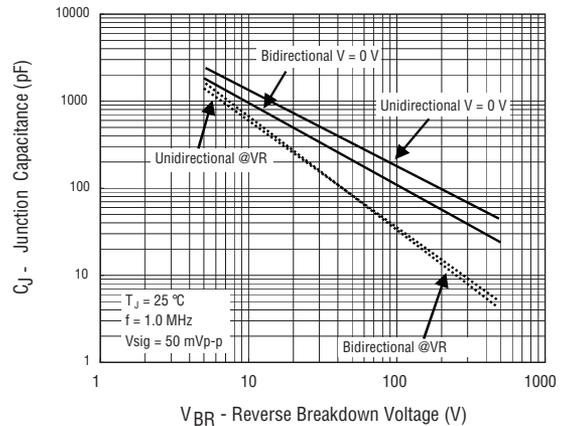
### Maximum Non-Repetitive Surge Current



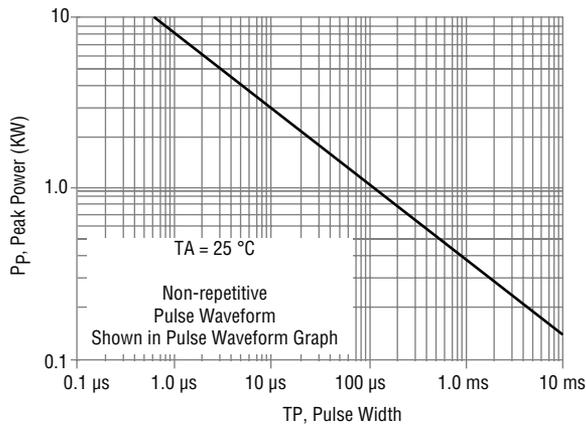
### Pulse Waveform



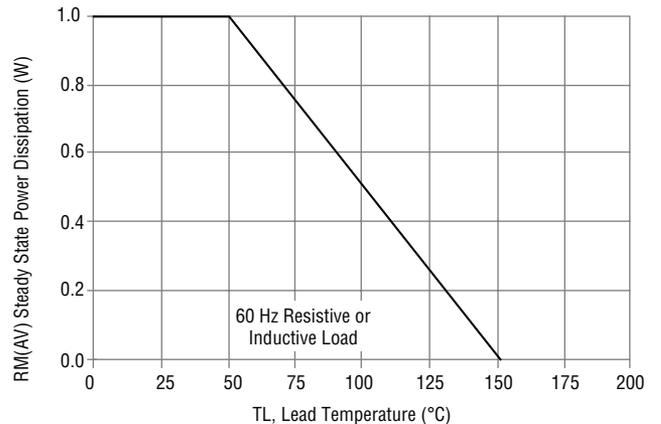
### Typical Junction Capacitance



### Pulse Rating Curve



### Steady State Power Derating Curve

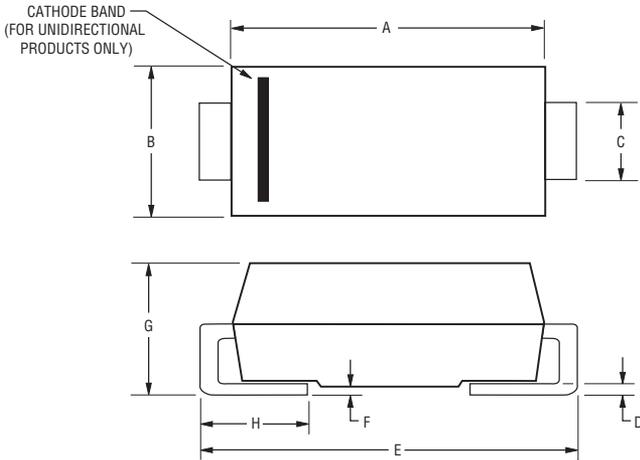


Specifications are subject to change without notice.  
 Users should verify actual device performance in their specific applications.  
 The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/discla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

# P4SMA-Q Transient Voltage Suppressor Diode Series



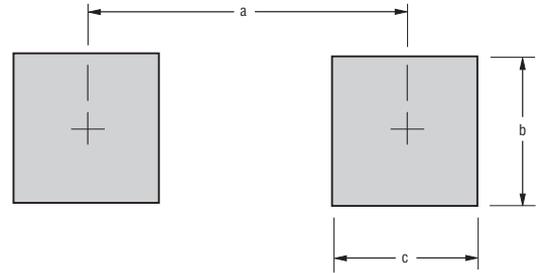
## Product Dimensions



Dimension	SMA (DO-214AC)
A	$\frac{3.99 - 4.50}{(0.157 - 0.177)}$
B	$\frac{2.54 - 2.79}{(0.100 - 0.110)}$
C	$\frac{1.25 - 1.65}{(0.049 - 0.065)}$
D	$\frac{0.15 - 0.31}{(0.006 - 0.012)}$
E	$\frac{4.93 - 5.28}{(0.194 - 0.208)}$
F	$\frac{0.203}{(0.008)}$ MAX.
G	$\frac{1.98 - 2.29}{(0.078 - 0.090)}$
H	$\frac{0.76 - 1.52}{(0.030 - 0.060)}$

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

## Recommended Footprint



Dimension	SMA (DO-214AC)
a (Max.)	$\frac{2.70}{(0.106)}$
b (Min.)	$\frac{2.10}{(0.083)}$
c (Min.)	$\frac{1.27}{(0.050)}$

DIMENSIONS:  $\frac{\text{MM}}{\text{(INCHES)}}$

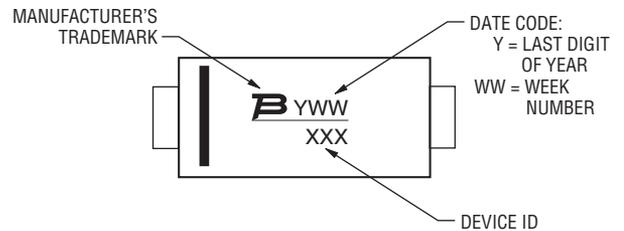
## Physical Specifications

Case ..... Molded plastic per UL Class 94V-0  
 Polarity..... Cathode band indicates unidirectional device  
 No cathode band indicates bidirectional device

## Environmental Specifications

Moisture Sensitivity Level ..... 1  
 ESD Classification (HBM)..... 3B

## Typical Part Marking



Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

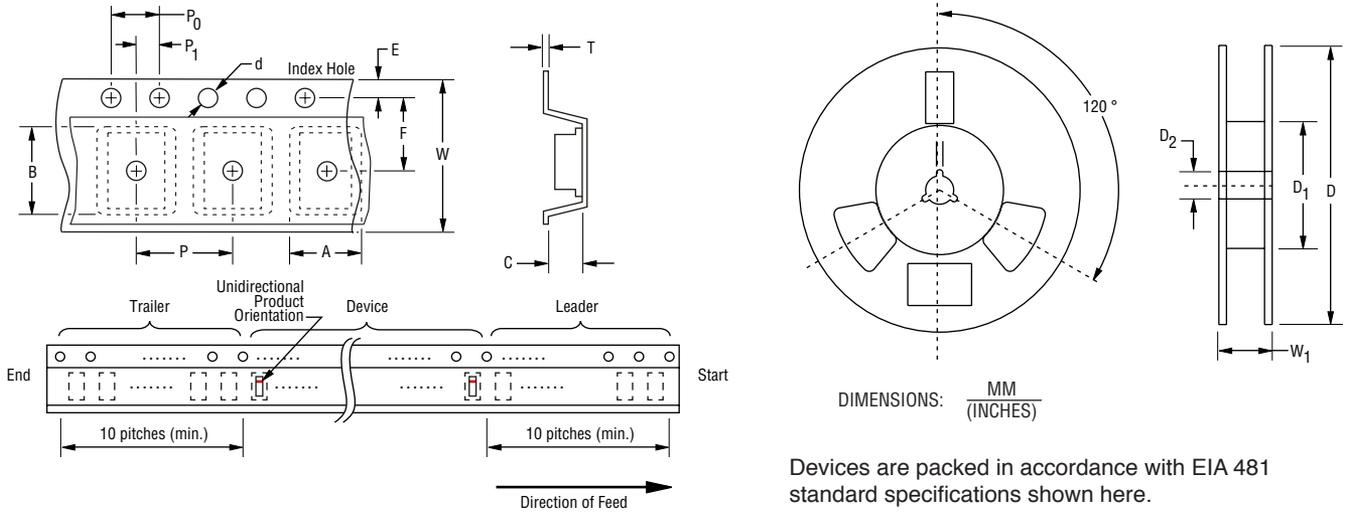
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at [www.bourns.com/docs/legal/disclaimer.pdf](http://www.bourns.com/docs/legal/disclaimer.pdf).

# P4SMA-Q Transient Voltage Suppressor Diode Series

**BOURNS®**

## Packaging Information

The product will be dispensed in tape and reel format (see diagram below).



Devices are packed in accordance with EIA 481 standard specifications shown here.

Item	Symbol	SMA (DO-214AC)
		13-Inch Reel
Carrier Width	A	$2.90 \pm 0.20$ (0.114 ± 0.008)
Carrier Length	B	$5.50 \pm 0.20$ (0.217 ± 0.008)
Carrier Depth	C	$2.26 \pm 0.20$ (0.089 ± 0.008)
Sprocket Hole	d	$1.50 \pm 0.10$ (0.061 ± 0.004)
Reel Outside Diameter	D	$330$ (12.992)
Reel Inner Diameter	D <sub>1</sub>	$50.0$ (1.969) MIN.
Feed Hole Diameter	D <sub>2</sub>	$13.0 \pm 0.20$ (0.512 ± 0.008)
Sprocket Hole Position	E	$1.75 \pm 0.10$ (0.069 ± 0.004)
Punch Hole Position	F	$5.50 \pm 0.05$ (0.217 ± 0.002)
Punch Hole Pitch	P	$4.00 \pm 0.10$ (0.157 ± 0.004)
Sprocket Hole Pitch	P <sub>0</sub>	$4.00 \pm 0.10$ (0.157 ± 0.004)
Embossment Center	P <sub>1</sub>	$2.00 \pm 0.05$ (0.079 ± 0.002)
Overall Tape Thickness	T	$0.30 \pm 0.10$ (0.012 ± 0.004)
Tape Width	W	$12.00 \pm 0.30$ (0.472 ± 0.012)
Reel Width	W <sub>1</sub>	$18.4$ (0.724) MAX.
Quantity per Reel	--	5000

REV. 03/20

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](http://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 types of applications are based on Bourns' knowledge of typical requirements in generic applications. 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. 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 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., ISO/TS 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. 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 nuclear, lifesaving, life-critical or life-sustaining applications, nor in any other applications where failure or malfunction may result in personal injury, death, or severe property or environmental damage. Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any Bourns® products in such unauthorized applications might not be safe and thus is at the user's sole risk. Life-critical applications include devices identified by the U.S. Food and Drug Administration as Class III devices and generally equivalent classifications outside of the United States.

Bourns expressly identifies those Bourns® standard products that are suitable for use in automotive applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard products in an automotive application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk. If Bourns expressly identifies a sub-category of automotive application in the data sheet for its standard products (such as infotainment or lighting), such identification means that Bourns has reviewed its standard product and has determined that if such Bourns® standard product is considered for potential use in automotive applications, it should only be used in such sub-category of automotive applications. Any reference to Bourns® standard product in the data sheet as compliant with the AEC-Q standard or "automotive grade" does not by itself mean that Bourns has approved such product for use in an automotive application.

Bourns® standard products are not tested to comply with United States Federal Aviation Administration standards generally or any other generally equivalent governmental organization standard applicable to products designed or manufactured for use in aircraft or space applications. Bourns expressly identifies Bourns® standard products that are suitable for use in aircraft or space applications on such products' data sheets in the section entitled "Applications." Unless expressly and specifically approved in writing by two authorized Bourns representatives on a case-by-case basis, use of any other Bourns® standard product in an aircraft or space application might not be safe and thus is not recommended, authorized or intended and is at the user's sole risk.

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.

Users shall not sell, transfer, export or re-export any Bourns® products or technology 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 in any facility which engages in activities relating to such devices. The foregoing restrictions apply to all uses and applications that violate national or international prohibitions, including embargos or international regulations. 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 may not, without prior authorization from Bourns and/or the U.S. Government, be resold, transferred, or re-exported to any party not eligible to receive U.S. commodities, software, and technical data.

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, 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:* <http://www.bourns.com/legal/disclaimers-terms-and-policies>

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