



**THE DATASHEET OF
P6SMB13CA**





Features

- RoHS compliant* and halogen free**
- Surface Mount SMB package
- Breakdown Voltage: 6.8 to 550 volts
- Peak Pulse Power: 600 watts
- Typical temperature coefficient:
 $\Delta V_{BR} = 0.1 \% \times V_{BR} @ 25\text{ }^{\circ}\text{C} \times \Delta T$

Applications

- IEC 61000-4-2 ESD (Min. Level 4)
- IEC 61000-4-4 EFT
- IEC 61000-4-5 Surge

P6SMB 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-214AA (SMB) size format. The Transient Voltage Suppressor series offers a choice of Breakdown Voltages from 6.8 V up to 550 V. Typical fast response times are less than 1.0 picosecond for unidirectional devices and less than 5.0 picoseconds for bidirectional devices from 0 V to Minimum Breakdown Voltage.

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

Additional Information

Click these links for more information:



Maximum Characteristics (@ T_A = 25 °C Unless Otherwise Noted)

Parameter	Symbol	Value	Unit
Peak Pulse Power Dissipation (T _P = 1 ms) (Note 1,2)	P _{PK}	600	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I _{FSM}	100	Amps
Maximum Instantaneous Forward Voltage @ I _{PP} = 50 A (For Unidirectional Units Only)	V _F	3.5 5.0	Volts
Operating Temperature Range	T _J	-55 to +150	°C
Storage Temperature Range	T _{STG}	-55 to +150	°C

1. Non-repetitive current pulse, per Pulse Waveform graph and derated above T_A = 25 °C per Pulse Derating Curve.
2. Thermal Resistance Junction to Lead.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).



Asia-Pacific:

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

EMEA:

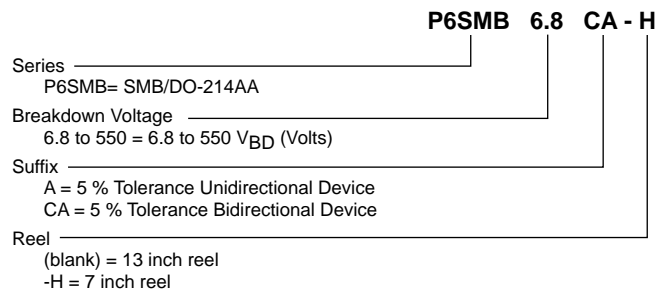
Tel: +36 88 885 877 • Email: eurocus@bourns.com

The Americas:

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

www.bourns.com

How to Order



WARNING Cancer and Reproductive Harm - 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.

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.

P6SMB Transient Voltage Suppressor Diode Series

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

Unidirectional Device		Bidirectional Device		Breakdown Voltage V _{BR} (Volts)			Working Peak Reverse Voltage	Maximum Reverse Leakage @ V _{RWM}	Maximum Clamping Voltage @ I _{pp} (10/1000 μs)	Maximum Peak Pulse Current (10/1000 μs)	Maximum Clamping Voltage @ I _{pp} (8/20 μs)	Maximum Peak Pulse Current (8/20 μs)
Part No.	Marking	Part No.	Marking	Min.	Max.	@ I _T (mA)	V _{RWM} (V)	I _R (μA)	V _c (V)	I _{pp} (A)	V _c (V)	I _{pp} (A)
P6SMB6.8A	6V8A	P6SMB6.8CA	6V8C	6.45	7.14	10	5.8	1000	10.5	58.1	13.7	290.5
P6SMB7.5A	7V5A	P6SMB7.5CA	7V5C	7.13	7.88	10	6.4	500	11.3	54	15	270
P6SMB8.2A	8V2A	P6SMB8.2CA	8V2C	7.79	8.61	10	7.02	200	12.1	50.4	15.7	252.0
P6SMB9.1A	9V1A	P6SMB9.1CA	9V1C	8.65	9.55	1	7.78	50	13.4	45.5	17.4	227.5
P6SMB10A	10A	P6SMB10CA	10C	9.5	10.5	1	8.55	10	14.5	42.1	18.9	210.5
P6SMB11A	11A	P6SMB11CA	11C	10.5	11.6	1	9.4	5	15.6	39.1	20.3	195.5
P6SMB12A	12A	P6SMB12CA	12C	11.4	12.6	1	10.2	5	16.7	36.5	21.7	182.5
P6SMB13A	13A	P6SMB13CA	13C	12.4	13.7	1	11.1	1	18.2	33.5	23.7	167.5
P6SMB15A	15A	P6SMB15CA	15C	14.3	15.8	1	12.8	1	21.2	28.8	27.6	144.0
P6SMB16A	16A	P6SMB16CA	16C	15.2	16.8	1	13.6	1	22.5	27.1	29.3	135.5
P6SMB18A	18A	P6SMB18CA	18C	17.1	18.9	1	15.3	1	25.5	24.2	33.2	121.0
P6SMB20A	20A	P6SMB20CA	20C	19	21	1	17.1	1	27.7	22	36	110
P6SMB22A	22A	P6SMB22CA	22C	20.9	23.1	1	18.8	1	30.6	19.9	39.8	99.5
P6SMB24A	24A	P6SMB24CA	24C	22.8	25.2	1	20.5	1	33.2	18.4	43.2	92.0
P6SMB27A	27A	P6SMB27CA	27C	25.7	28.4	1	23.1	1	37.5	16.3	48.8	81.5
P6SMB30A	30A	P6SMB30CA	30C	28.5	31.5	1	25.6	1	41.4	14.7	53.8	73.5
P6SMB33A	33A	P6SMB33CA	33C	31.4	34.7	1	28.2	1	45.7	13.3	59.4	66.5
P6SMB36A	36A	P6SMB36CA	36C	34.2	37.8	1	30.8	1	49.9	12.2	64.9	61.0
P6SMB39A	39A	P6SMB39CA	39C	37.1	41	1	33.3	1	53.9	11.3	70.1	56.5
P6SMB43A	43A	P6SMB43CA	43C	40.9	45.2	1	36.8	1	59.3	10.3	77.1	51.5
P6SMB47A	47A	P6SMB47CA	47C	44.7	49.4	1	40.2	1	64.8	9.4	84.2	47.0
P6SMB51A	51A	P6SMB51CA	51C	48.5	53.6	1	43.6	1	70.1	8.7	91.1	43.5
P6SMB56A	56A	P6SMB56CA	56C	53.2	58.8	1	47.8	1	77	7.9	100.1	39.5
P6SMB62A	62A	P6SMB62CA	62C	58.9	65.1	1	53	1	85	7.2	110.5	36.0
P6SMB68A	68A	P6SMB68CA	68C	64.6	71.4	1	58.1	1	92	6.6	119.6	33.0
P6SMB75A	75A	P6SMB75CA	75C	71.3	78.8	1	64.1	1	103	5.9	133.9	29.5
P6SMB82A	82A	P6SMB82CA	82C	77.9	86.1	1	70.1	1	113	5.4	146.9	27.0
P6SMB91A	91A	P6SMB91CA	91C	86.5	95.5	1	77.8	1	125	4.9	162.5	24.5
P6SMB100A	100A	P6SMB100CA	100C	95	105	1	85.5	1	137	4.5	178.1	22.5
P6SMB110A	110A	P6SMB110CA	110C	105	116	1	94	1	152	4	198	20
P6SMB120A	120A	P6SMB120CA	120C	114	126	1	102	1	165	3.7	214.5	18.5
P6SMB130A	130A	P6SMB130CA	130C	124	137	1	111	1	179	3.4	232.7	17.0
P6SMB150A	150A	P6SMB150CA	150C	143	158	1	128	1	207	2.9	269.1	14.5
P6SMB160A	160A	P6SMB160CA	160C	152	168	1	136	1	219	2.8	284.7	14.0
P6SMB170A	170A	P6SMB170CA	170C	162	179	1	145	1	234	2.6	304.2	13.0
P6SMB180A	180A	P6SMB180CA	180C	171	189	1	154	1	246	2.5	319.8	12.5
P6SMB200A	200A	P6SMB200CA	200C	190	210	1	171	1	274	2.2	356.2	11.0
P6SMB220A	220A	P6SMB220CA	220C	209	231	1	185	1	328	1.9	426.4	9.5
P6SMB250A	250A	P6SMB250CA	250C	237	263	1	214	1	344	1.8	447.2	9.0
P6SMB300A	300A	P6SMB300CA	300C	285	315	1	256	1	414	1.5	538.2	7.5
P6SMB350A	350A	P6SMB350CA	350C	332	368	1	300	1	482	1.3	626.6	6.5
P6SMB400A	400A	P6SMB400CA	400C	380	420	1	342	1	548	1.1	712.4	5.5
P6SMB440A	440A	P6SMB440CA	440C	418	462	1	376	1	602	1	783	5
P6SMB480A	480A	P6SMB480CA	480C	456	504	1	408	1	658	0.9	855.4	4.6
P6SMB510A	510A	P6SMB510CA	510C	485	535	1	434	1	698	0.9	907.4	4.3
P6SMB530A	530A	P6SMB530CA	530C	503.5	556.5	1	477	1	725	0.8	942.5	4.1
P6SMB540A	540A	P6SMB540CA	540C	513	567	1	486	1	740	0.8	962.0	4.1
P6SMB550A	550A	P6SMB550CA	550C	522.5	577.5	1	495	1	760	0.8	988.0	3.9

Notes:

1. Suffix 'A' denotes a 5 % tolerance unidirectional device.
2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.
3. For bidirectional devices with a V_R of 10 volts or less, the I_R limit is double.

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

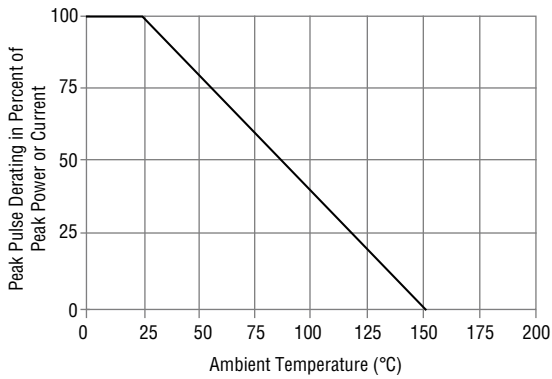
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

P6SMB Transient Voltage Suppressor Diode Series

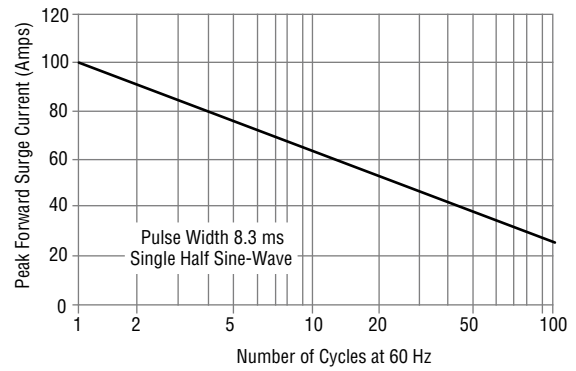


Rating & Characteristic Curves

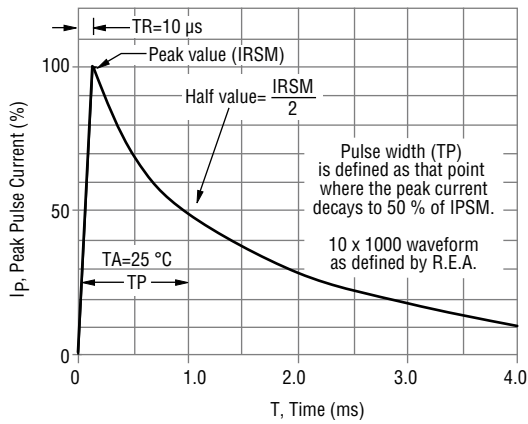
Pulse Derating Curve



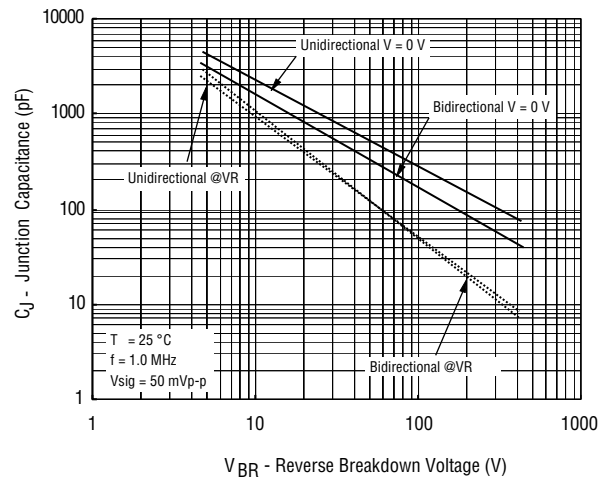
Maximum Non-Repetitive Surge Current



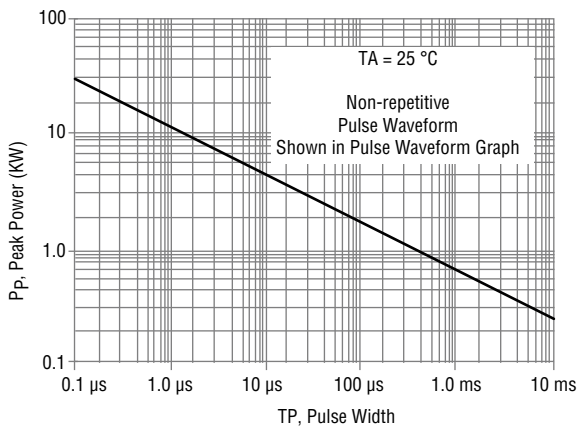
Pulse Waveform



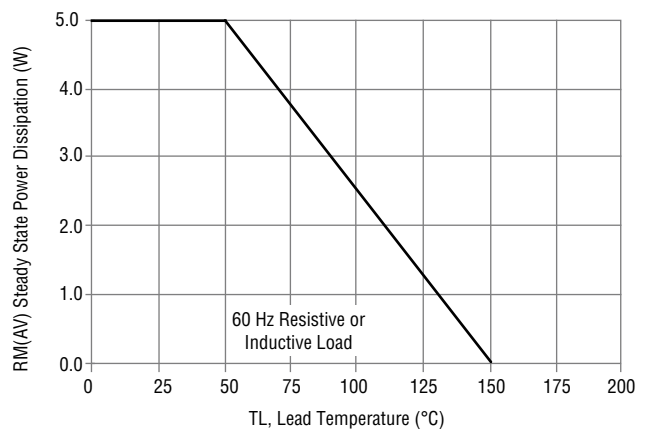
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



Specifications are subject to change without notice.

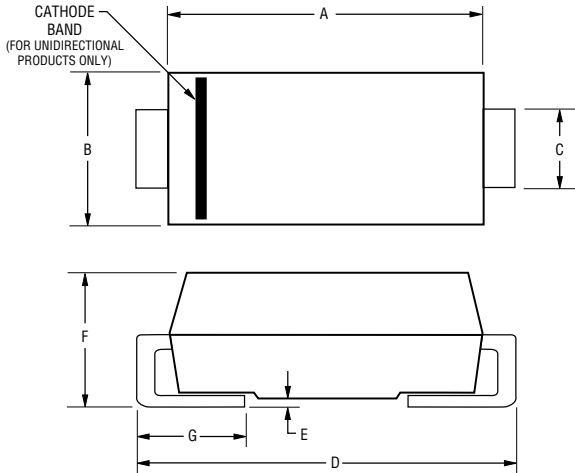
Users should verify actual device performance in their specific applications.

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.

P6SMB Transient Voltage Suppressor Diode Series

BOURNS®

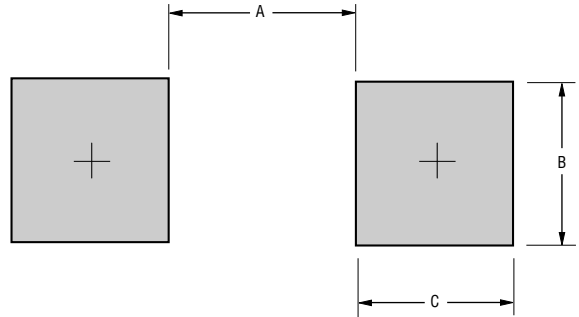
Product Dimensions



Dimension	SMB (DO-214AA)
A	$\frac{4.06 - 4.57}{(0.160 - 0.180)}$
B	$\frac{3.30 - 3.94}{(0.130 - 0.155)}$
C	$\frac{1.95 - 2.20}{(0.077 - 0.087)}$
D	$\frac{5.21 - 5.59}{(0.205 - 0.220)}$
E	$\frac{0.05 - 0.203}{(0.002 - 0.008)}$
F	$\frac{2.13 - 2.44}{(0.084 - 0.096)}$
G	$\frac{0.76 - 1.52}{(0.030 - 0.060)}$

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

Recommended Footprint



Dimension	SMB (DO-214AA)
a (Max.)	$\frac{2.69}{(0.106)}$
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

Specifications are subject to change without notice.

Users should verify actual device performance in their specific applications.

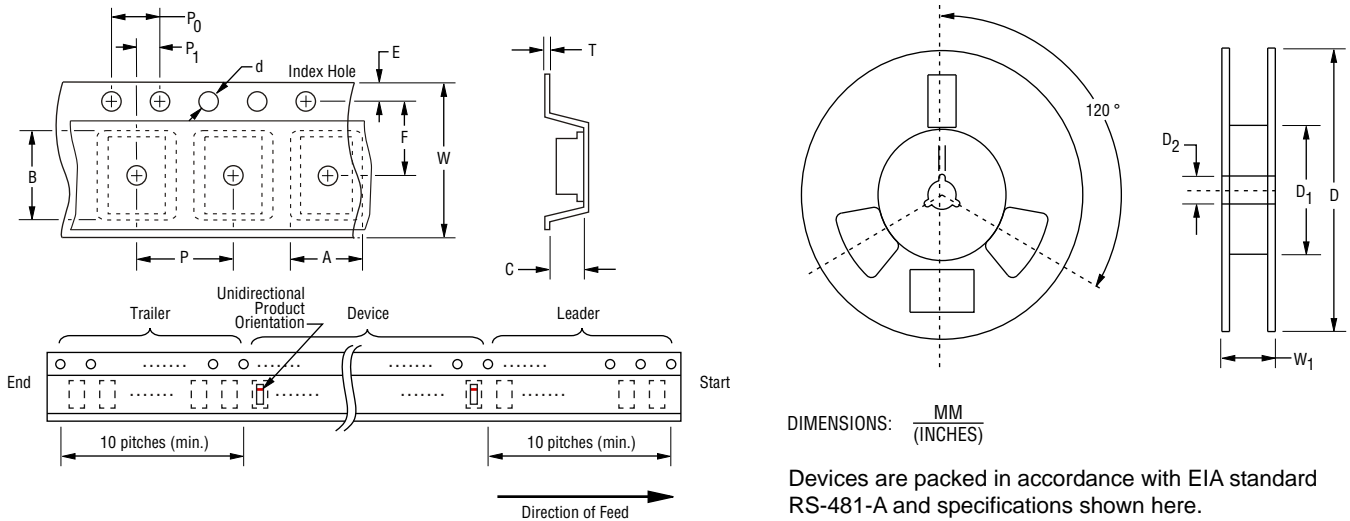
The products described herein and this document are subject to specific legal disclaimers as set forth on the last page of this document, and at www.bourns.com/docs/legal/disclaimer.pdf.

P6SMB Transient Voltage Suppressor Diode Series

BOURNS®

Packaging Information

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



Item	Symbol	SMB (DO-214AA)	
		7 Inch Reel	13 Inch Reel
Carrier Width	A	3.67 ± 0.20 (0.144 ± 0.008)	
Carrier Length	B	5.60 ± 0.20 (0.220 ± 0.008)	
Carrier Depth	C	2.57 ± 0.20 (0.101 ± 0.008)	
Sprocket Hole	d	1.50 ± 0.10 (0.059 ± 0.004)	
Reel Outside Diameter	D	$\frac{178}{(7.008)}$	$\frac{330}{(12.992)}$
Reel Inner Diameter	D ₁	$\frac{50.0}{(1.969)}$ MIN.	
Feed Hole Diameter	D ₂	13.0 ± 0.20 (0.512 ± 0.008)	
Sprocket Hole Position	E	1.75 ± 0.10 (0.069 ± 0.004)	
Punch Hole Position	F	5.50 ± 0.05 (0.217 ± 0.002)	
Punch Hole Pitch	P	8.00 ± 0.10 (0.315 ± 0.004)	
Sprocket Hole Pitch	P ₀	4.00 ± 0.10 (0.157 ± 0.004)	
Embossment Center	P ₁	2.00 ± 0.05 (0.079 ± 0.002)	
Overall Tape Thickness	T	0.30 ± 0.10 (0.012 ± 0.004)	
Tape Width	W	12.00 ± 0.30 (0.472 ± 0.012)	
Reel Width	W ₁	$\frac{18.4}{(0.724)}$ MAX.	
Quantity per Reel	--	500	3,000

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.

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>

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View P6SMB13CA on WIN SOURCE](#)

 [Bourns Inc. Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management