



## Features

- Four model sizes available - 7, 10, 14, and 20 mm
- Three lead styles available
- Broad range of current and energy handling capabilities
- 150 to 550 V<sub>rms</sub> AC voltage range
- 200 to 745 V<sub>dc</sub> DC operating voltage range
- RoHS compliant\*



This series is obsolete and not recommended for new designs.

## EV Series - EdgMOV™ High Surge Disc Varistors

### General Information

The EV series of EdgMOV™ disc varistors feature extra high surge capability in reduced case sizes. The EV series consists of 7 mm, 10 mm, 14 mm and 20 mm sized varistors with extremely high current and energy capabilities. This series provides an increased level of protection for the transients expected in telecommunication and AC power networks. The AC operating voltage ranges from 150 V to 550 V.

### Absolute Maximum Ratings

Parameter	Value	Units
<b>Continuous:</b>		
Steady State Applied Voltage		
DC Voltage Range (V <sub>dc</sub> )	200 to 745	V
AC Voltage Range (V <sub>rms</sub> )	150 to 550	V
<b>Transient:</b>		
Peak Single Pulse Surge Current, 8/20 $\mu$ s Waveform (I <sub>max</sub> )	2500 to 15000	A
Operating Ambient Temperature	-40 to +105	°C
Storage Temperature Range	-40 to +125	°C
Threshold Voltage Temperature Coefficient	< +0.05	%/°C
Insulation Resistance	> 1	G $\Omega$
Isolation Voltage Capability	> 2.5	kV
Response Time	< 25	ns
Climatic Category	40 / 105 / 56	

### Additional Information

Click these links for more information:



[PRODUCT](#)



[TECHNICAL  
LIBRARY](#)



[INVENTORY](#)



[SAMPLES](#)



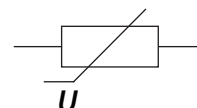
[CONTACT](#)

### Agency Recognition

Standard	UL 1449
File Number	E313168**

\*\* Although UL recognition information shows I<sub>n</sub> = 5 kA due to UL 1449 nominal current selection of either 1,3,5,10 or 20 kA, EVxxxK20 models were tested and approved at 8 kA.

### Varistor Symbol



# BOURNS®

**Asia-Pacific:** Tel: +886-2 2562-4117 • Email: [asiacus@bourns.com](mailto:asiacus@bourns.com)

**EMEA:** Tel: +36 88 885 877 • Email: [eurocus@bourns.com](mailto:eurocus@bourns.com)

**The Americas:** Tel: +1-951 781-5500 • Email: [americus@bourns.com](mailto:americus@bourns.com)

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



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

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

"EdgMOV" is a trademark of Bourns, Inc.

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).

# EV Series - EdgMOV™ High Surge Disc Varistors

**BOURNS®**

## Device Ratings

Model	V <sub>rms</sub>	V <sub>dc</sub>	V <sub>n</sub> @ 1 mA	V <sub>c</sub> max.	I <sub>c</sub> (8/20 μs)	I <sub>n</sub> (8/20 μs) 15 Times	I <sub>max</sub> (8/20 μs) 1 Time	C @ 1 kHz
	V	V	V	V	A	A	A	pF
EV150K7	150	200	240	395	25	1500	2500	280
EV150K10	150	200	240	395	50	3000	5000	510
EV150K14	150	200	240	395	100	5000	8000	900
EV150K20**	150	200	240	395	150	8000	12000	1600
EV175K7	175	225	270	455	25	1500	2500	250
EV175K10	175	225	270	455	50	3000	5000	440
EV175K14	175	225	270	455	100	5000	8000	800
EV175K20**	175	225	270	455	150	8000	12000	1400
EV230K7	230	300	360	595	25	1500	2500	190
EV230K10	230	300	360	595	50	3000	5000	350
EV230K14	230	300	360	595	100	5000	8000	650
EV230K20**	230	300	360	595	150	8000	12000	1200
EV250K7	250	320	390	650	25	1500	2500	180
EV250K10	250	320	390	650	50	3000	5000	320
EV250K14	250	320	390	650	100	5000	8000	580
EV250K20**	250	320	390	650	150	8000	12000	1000
EV275K7	275	350	430	710	25	1500	2500	160
EV275K10	275	350	430	710	50	3000	5000	300
EV275K14	275	350	430	710	100	5000	8000	530
EV275K20**	275	350	430	710	150	8000	12000	900
EV300K7	300	385	470	775	25	1000	2500	150
EV300K14	300	385	470	775	100	5000	8000	490
EV300K20**	300	385	470	775	150	8000	12000	850
EV320K7	320	420	510	840	25	1000	2500	140
EV320K14	320	420	510	840	100	5000	8000	460
EV320K20**	320	420	510	840	150	8000	12000	800
EV385K7	385	505	620	1025	25	1000	2500	130
EV385K14	385	505	620	1025	100	5000	8000	400
EV385K20**	385	505	620	1025	150	8000	12000	700
EV420K14	420	560	680	1120	100	5000	8000	350
EV420K20	420	560	680	1120	150	8000	12000	650
EV460K14	460	615	750	1240	100	5000	8000	330
EV460K20**	460	615	750	1240	150	8000	12000	550
EV510K14	510	670	820	1355	100	5000	8000	310
EV510K20**	510	670	820	1355	150	8000	12000	510
EV550K10	550	745	910	1500	50	3000	6000	170
EV550K14	550	745	910	1500	100	5000	10000	290
EV550K20**	550	745	910	1500	150	8000	15000	480

\*\* Although UL recognition information shows I<sub>n</sub> = 5 kA due to UL 1449 nominal current selection of either 1,3,5,10 or 20 kA, EVxxxK20 models were tested and approved at 8 kA.

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).

# EV Series - EdgMOV™ High Surge Disc Varistors

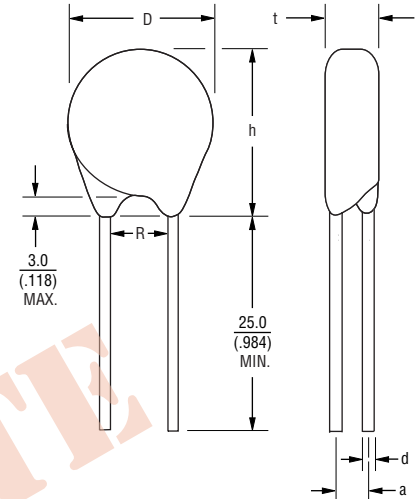
**BOURNS®**

## Product Dimensions

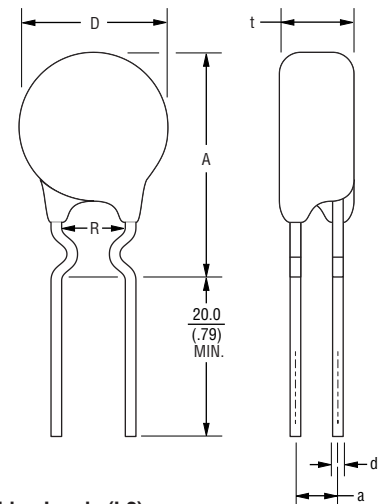
Model	Dimension						
	D (Max.)	t (Max.)	R ± 1.0 (.039)	d ± 0.05 (.002)	h (Max.)	a ± 1.0 (.039)	A (Max.)
EV150K7	9.0 (.35)	4.3 (.17)	5.0 (.20)	0.6 (.02)	11.5 (.45)	2.0 (.08)	15.5 (.61)
EV150K10	12.5 (.49)	4.6 (.18)	7.5 (.30)	0.8 (.03)	15 (.59)	2.2 (.09)	18.0 (.71)
EV150K14	16.5 (.65)	4.8 (.19)	7.5 (.30)	0.8 (.03)	20 (.79)	2.2 (.09)	23.0 (.91)
EV150K20	22.5 (.89)	5.2 (.21)	10 (.39)	1.0 (.04)	26 (1.02)	2.4 (.09)	27.0 (1.06)
EV175K7	9.0 (.35)	4.8 (.19)	5.0 (.20)	0.6 (.02)	11.5 (.45)	2.1 (.08)	15.5 (.61)
EV175K10	12.5 (.49)	4.9 (.19)	7.5 (.30)	0.8 (.03)	15 (.59)	2.3 (.09)	18.0 (.71)
EV175K14	16.5 (.65)	4.9 (.19)	7.5 (.30)	0.8 (.03)	20 (.79)	2.3 (.09)	23.0 (.91)
EV175K20	22.5 (.89)	5.3 (.25)	10 (.39)	1.0 (.04)	26 (1.02)	2.5 (.10)	27.0 (1.06)
EV230K7	9.0 (.35)	4.8 (.19)	5.0 (.20)	0.6 (.02)	11.5 (.45)	2.6 (.10)	15.5 (.61)
EV230K10	12.5 (.49)	5.4 (.21)	7.5 (.30)	0.8 (.03)	15 (.59)	2.8 (.11)	18.0 (.71)
EV230K14	16.5 (.65)	5.5 (.22)	7.5 (.30)	0.8 (.03)	20 (.79)	2.8 (.11)	23.0 (.91)
EV230K20	22.5 (.89)	5.9 (.23)	10 (.39)	1.0 (.04)	26 (1.02)	3.0 (.12)	27.0 (1.06)
EV250K7	9.0 (.35)	5.0 (.20)	5.0 (.20)	0.6 (.02)	11.5 (.45)	2.8 (.11)	15.5 (.61)
EV250K10	12.5 (.49)	5.6 (.22)	7.5 (.30)	0.8 (.03)	15 (.59)	3.0 (.12)	18.0 (.71)
EV250K14	16.5 (.65)	5.7 (.22)	7.5 (.30)	0.8 (.03)	20 (.79)	3.0 (.12)	23.0 (.91)
EV250K20	22.5 (.89)	6.1 (.24)	10 (.39)	1.0 (.04)	26 (1.02)	3.2 (.13)	27.0 (1.06)
EV275K7	9.0 (.35)	5.6 (.22)	5.0 (.20)	0.6 (.02)	11.5 (.45)	3.0 (.12)	15.5 (.61)
EV275K10	12.5 (.49)	5.8 (.23)	7.5 (.30)	0.8 (.03)	15 (.59)	3.2 (.13)	18.0 (.71)
EV275K14	16.5 (.65)	5.9 (.23)	7.5 (.30)	0.8 (.03)	20 (.79)	3.2 (.13)	23.0 (.91)
EV275K20	22.5 (.89)	6.3 (.25)	10 (.39)	1.0 (.04)	26 (1.02)	3.4 (.13)	27.0 (1.06)
EV300K7	9.0 (.35)	5.8 (.23)	5.0 (.20)	0.6 (.02)	11.5 (.45)	3.2 (.13)	15.5 (.61)
EV300K14	16.5 (.65)	6.1 (.24)	7.5 (.30)	0.8 (.03)	20 (.79)	3.4 (.13)	23.0 (.91)
EV300K20	22.5 (.89)	6.6 (.26)	10 (.39)	1.0 (.04)	26 (1.02)	3.6 (.14)	27.0 (1.06)
EV320K7	9.0 (.35)	6.0 (.24)	5.0 (.20)	0.6 (.02)	11.5 (.45)	6.4 (.25)	15.5 (.61)
EV320K14	16.5 (.65)	6.8 (.27)	7.5 (.30)	0.8 (.03)	20 (.79)	3.6 (.14)	23.0 (.91)
EV320K20	22.5 (.89)	6.8 (.27)	10 (.39)	1.0 (.04)	26 (1.02)	3.8 (.15)	27.0 (1.06)

~ Continued on next page ~

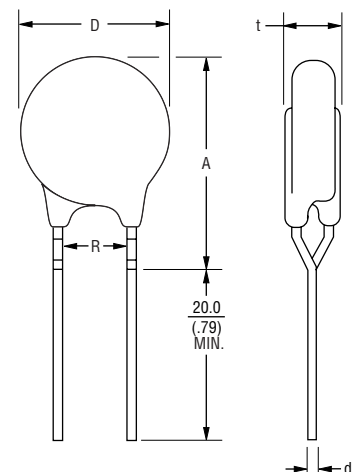
### Straight Leads (L1)



### Crimped Leads (L5)



### In-Line Leads (L2)



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

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).

# EV Series - EdgMOV™ High Surge Disc Varistors

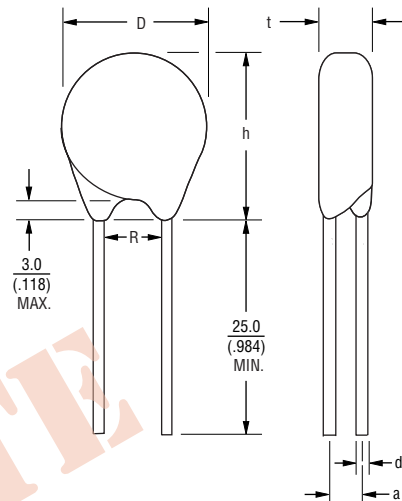
**BOURNS®**

## Product Dimensions (Continued)

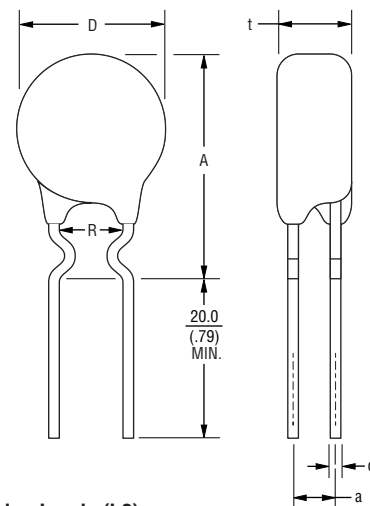
Model	Dimension						
	D (Max.)	t (Max.)	R ± 1.0 (.039)	d ± 0.05 (.002)	h (Max.)	a ± 1.0 (.039)	A (Max.)
EV385K7	9.0 (.35)	6.5 (.26)	5.0 (.20)	0.6 (.02)	11.5 (.45)	6.9 (.27)	15.5 (.61)
EV385K14	16.5 (.65)	7.4 (.29)	7.5 (.30)	0.8 (.03)	20 (.79)	4.2 (.17)	23.0 (.91)
EV385K20	22.5 (.89)	7.5 (.30)	10 (.39)	1.0 (.04)	26 (1.02)	4.4 (.17)	27.0 (1.06)
EV420K14	16.5 (.65)	7.4 (.29)	7.5 (.30)	0.8 (.03)	20 (.79)	4.4 (.17)	23.0 (.91)
EV420K20	22.5 (.89)	7.8 (.31)	10 (.39)	1.0 (.04)	26 (1.02)	4.6 (.18)	27.0 (1.06)
EV460K14	16.5 (.65)	7.8 (.31)	7.5 (.30)	0.8 (.03)	20 (.79)	4.8 (.19)	23.0 (.91)
EV460K20	22.5 (.89)	8.2 (.32)	10 (.39)	1.0 (.04)	26 (1.02)	5.0 (.20)	27.0 (1.06)
EV510K14	16.5 (.65)	8.2 (.32)	7.5 (.30)	0.8 (.03)	20 (.79)	5.1 (.20)	23.0 (.91)
EV510K20	22.5 (.89)	8.7 (.34)	10 (.39)	1.0 (.04)	26 (1.02)	5.3 (.21)	27.0 (1.06)
EV550K10	12.5 (.49)	8.8 (.35)	7.5 (.30)	0.8 (.03)	15 (.59)	5.6 (.22)	18.0 (.71)
EV550K14	16.5 (.65)	8.8 (.35)	7.5 (.30)	0.8 (.03)	20 (.79)	5.6 (.22)	23.0 (.91)
EV550K20	22.5 (.89)	9.2 (.36)	10 (.39)	1.0 (.04)	26 (1.02)	5.8 (.223)	27.0 (1.06)

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

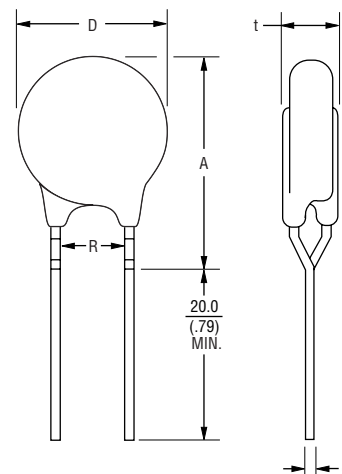
### Straight Leads (L1)



### Crimped Leads (L5)



### In-Line Leads (L2)



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).

# EV Series - EdgMOV™ High Surge Disc Varistors

**BOURNS®**

## How to Order

**EV 150 K 20 B L 2**

Series Designator \_\_\_\_\_  
 EV = EV Series

Max. Continuous Operating Voltage ( $V_{rms}$ ) \_\_\_\_\_

$V_n$  Tolerance \_\_\_\_\_  
 K =  $\pm 10\%$

Model Size \_\_\_\_\_  
 7 = 7 mm      14 = 14 mm  
 10 = 10 mm    20 = 20 mm

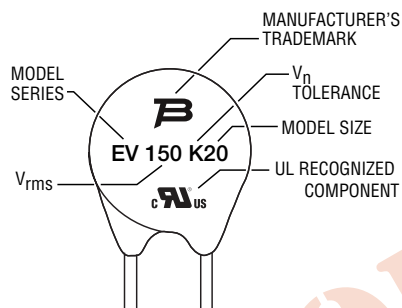
Packaging \_\_\_\_\_  
 B = Bulk

Lead Style \_\_\_\_\_  
 L2 = In-Line Leads (standard)  
 L1 = Straight Leads (upon request)  
 L5 = Crimped Leads (upon request)

## Instructions for Creating Orderable Part Number:

- 1) Start with base part number in characteristics table  
 (example: *EV150K20*).
- 2) Add Packaging: B  
 (example part number becomes *EV150K20B*).
- 3) Add Lead Style: L2  
 (example part number becomes *EV150K20BL2*).
- 4) Part number can have no spaces or lower case letters.

## Typical Part Marking



## Packaging Quantities - Bulk

Voltage	Model Size			
	7	10	14	20
150	1000	500	400	300
175	1000	500	400	300
230	1000	500	300	300
250	1000	500	300	200
275	1000	500	300	200
300	1000	-	300	200
320	1000	-	300	200
385	1000	-	300	200
420	-	-	300	200
460	-	-	300	200
510	-	-	300	200
550	-	300	300	200

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).

# EV Series - EdgMOV™ High Surge Disc Varistors

**BOURNS®**

## Terminology

Term	Symbol	Definition
Rated AC Voltage .....	$V_{rms}$ .....	Maximum continuous sinusoidal AC voltage (<5 % total harmonic distortion) which may be applied to the component under continuous operation conditions at +25 °C
Rated DC Voltage .....	$V_{dc}$ .....	Maximum continuous DC voltage (<5 % ripple) which may be applied to the component under continuous operating conditions at +25 °C
Supply Voltage.....	$V$ .....	The voltage by which the system is designated and to which certain operating characteristics of the system are referred; $V_{rms} = 1.1 \times V$
Leakage Current.....	$I_{dc}$ .....	The current passing through the varistor at $V_{dc}$ and at +25 ° or at any other specified temperature
Varistor Voltage .....	$V_n$ .....	Voltage across the varistor measured at a given reference current ( $I_n$ )
Reference Current .....	$I_n$ .....	Reference current = 1 mA DC
Clamping Voltage .....	$V_c$ .....	The peak voltage developed across the varistor under standard atmospheric conditions, when passing an 8/20 $\mu s$ class current pulse
Class Current.....	$I_c$ .....	A peak value of current which is 1/10 of the maximum peak current for 100 pulses at two per minute for the 8/20 $\mu s$ pulse
Rated Peak Single Pulse.....	$I_{max}$ .....	Maximum peak current which may be applied for a single 8/20 $\mu s$ pulse, with rated line voltage also applied, without causing device failure
Capacitance.....	$C$ .....	Capacitance between two terminals of the varistor measured @ 1 kHz
Response Time.....	$t_r$ .....	The time lag between application of a surge and varistor's "turn-on" conduction action
Varistor Voltage Temperature .....	TC .....	$(V_n @ 85 ^\circ C - V_n @ 25 ^\circ C) / (V_n @ 25 ^\circ C) \times 60 ^\circ C \times 100$
Insulation Resistance .....	IR.....	Minimum resistance between shorted terminals and varistor surface
Operating Temperature .....		The range of ambient temperature for which the varistor is designed to operate continuously as defined by the temperature limits of its climatic category
Climatic Category .....	LCT/UCT/DHD .....	LCT & UCT = Lower and Upper Category Temperature - the minimum and maximum ambient temperatures for which a varistor has been designed to operate continuously. DHD = Dump Heat Test Duration
Storage Temperature.....		Storage temperature range without voltage applied

REV. A 2/26

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](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., 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. 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>