

Features

- Surface Mount SMA package
- Standoff Voltage: 5 to 220 volts
- Power Dissipation: 400 watts
- RoHS compliant*
- AEC-Q101 compliant**

Applications

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

SMAJ-Q Transient Voltage Suppressor Diode Series

General Information

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 Working Peak Reverse Voltage from 5 V up to 220 V. Typical fast response times are less than 1.0 picosecond from 0 V to 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.

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

Parameter	Symbol	Value	Unit
Minimum Peak Pulse Power Dissipation (T _P = 1 ms) (Note 1,2)	P _{PK}	400	Watts
Peak Forward Surge Current 8.3 ms Single Half Sine Wave Superimposed on Rated Load (JEDEC Method) (Note 3)	I _{FSM}	40	Amps
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. Mounted on 5.0 mm² (0.03 mm thick) copper pads to each terminal.
3. 8.3 ms Single Half-Sine Wave duty cycle = 4 pulses maximum per minute (unidirectional units only).

Additional Information

Click these links for more information:



Agency Recognition

Description	
UL	File Number: E153537



WARNING Cancer and Reproductive Harm

www.P65Warnings.ca.gov

*RoHS Directive 2015/863, Mar 31, 2015 and Annex. **"Q" part number suffix indicates AEC-Q101 compliance.

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.

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)
SMAJ5.0A-Q	HEQ	SMAJ5.0CA-Q	TEQ	6.40	7.00	10	5.0	800	9.2	43.5	12.0	217.5
SMAJ6.0A-Q	HGQ	SMAJ6.0CA-Q	TGQ	6.67	7.37	10	6.0	800	10.3	38.8	13.4	194.0
SMAJ6.5A-Q	HKQ	SMAJ6.5CA-Q	TKQ	7.22	7.98	10	6.5	500	11.2	35.7	14.6	178.5
SMAJ7.0A-Q	HMQ	SMAJ7.0CA-Q	TMQ	7.78	8.60	10	7.0	200	12.0	33.3	15.6	166.5
SMAJ7.5A-Q	HPQ	SMAJ7.5CA-Q	TPQ	8.33	9.21	1.0	7.5	100	12.9	31.0	16.8	155.0
SMAJ8.0A-Q	HRQ	SMAJ8.0CA-Q	TRQ	8.89	9.83	1.0	8.0	50	13.6	29.4	17.7	147.0
SMAJ8.5A-Q	HTQ	SMAJ8.5CA-Q	TTQ	9.44	10.4	1.0	8.5	20	14.4	27.8	18.7	139.0
SMAJ9.0A-Q	HVQ	SMAJ9.0CA-Q	TVQ	10.0	11.1	1.0	9.0	10	15.4	26.0	20.0	130.0
SMAJ10A-Q	HXQ	SMAJ10CA-Q	TXQ	11.1	12.3	1.0	10	5	17.0	23.5	22.1	117.5
SMAJ11A-Q	HZQ	SMAJ11CA-Q	TZQ	12.2	13.5	1.0	11	1.0	18.2	22.0	23.7	110.0
SMAJ12A-Q	IEQ	SMAJ12CA-Q	UEQ	13.3	14.7	1.0	12	1.0	19.9	20.1	25.9	100.5
SMAJ13A-Q	IGQ	SMAJ13CA-Q	UGQ	14.4	15.9	1.0	13	1.0	21.5	18.6	28.0	93.0
SMAJ14A-Q	IKQ	SMAJ14CA-Q	UKQ	15.6	17.2	1.0	14	1.0	23.2	17.2	30.2	86.0
SMAJ15A-Q	IMQ	SMAJ15CA-Q	UMQ	16.7	18.5	1.0	15	1.0	24.4	16.4	31.7	82.0
SMAJ16A-Q	IPQ	SMAJ16CA-Q	UPQ	17.8	19.7	1.0	16	1.0	26.0	15.4	33.8	77.0

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

~ Continued on next page ~

SMAJ-Q Transient Voltage Suppressor Diode Series

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

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)
SMAJ17A-Q	IRQ	SMAJ17CA-Q	URQ	18.9	20.9	1.0	17	1.0	27.6	14.5	35.9	72.5
SMAJ18A-Q	ITQ	SMAJ18CA-Q	UTQ	20.0	22.1	1.0	18	1.0	29.2	13.7	38.0	68.5
SMAJ20A-Q	IVQ	SMAJ20CA-Q	UVQ	22.2	24.5	1.0	20	1.0	32.4	12.3	42.1	61.5
SMAJ22A-Q	IXQ	SMAJ22CA-Q	UXQ	24.4	26.9	1.0	22	1.0	35.5	11.3	46.2	56.5
SMAJ24A-Q	IZQ	SMAJ24CA-Q	UZQ	26.7	29.5	1.0	24	1.0	38.9	10.3	50.6	51.5
SMAJ26A-Q	JEQ	SMAJ26CA-Q	VEQ	28.9	31.9	1.0	26	1.0	42.1	9.5	54.7	47.5
SMAJ28A-Q	JGQ	SMAJ28CA-Q	VGQ	31.1	34.4	1.0	28	1.0	45.4	8.8	59.0	44.0
SMAJ30A-Q	JKQ	SMAJ30CA-Q	VKQ	33.3	36.8	1.0	30	1.0	48.4	8.3	62.9	41.5
SMAJ33A-Q	JMQ	SMAJ33CA-Q	VMQ	36.7	40.6	1.0	33	1.0	53.3	7.5	69.3	37.5
SMAJ36A-Q	JPQ	SMAJ36CA-Q	VPQ	40	44.2	1.0	36	1.0	58.1	6.9	75.5	34.5
SMAJ40A-Q	JRQ	SMAJ40CA-Q	VRQ	44.4	49.1	1.0	40	1.0	64.5	6.2	83.9	31.0
SMAJ43A-Q	JTQ	SMAJ43CA-Q	VTQ	47.8	52.8	1.0	43	1.0	69.4	5.8	90.2	29.0
SMAJ45A-Q	JVQ	SMAJ45CA-Q	VVQ	50	55.3	1.0	45	1.0	72.7	5.5	94.5	27.5
SMAJ48A-Q	JXQ	SMAJ48CA-Q	VXQ	53.3	58.9	1.0	48	1.0	77.4	5.2	100.6	26.0
SMAJ51A-Q	JZQ	SMAJ51CA-Q	VZQ	56.7	62.7	1.0	51	1.0	82.4	4.9	107.1	24.5
SMAJ54A-Q	REQ	SMAJ54CA-Q	WEQ	60	66.3	1.0	54	1.0	87.1	4.6	113.2	23.0
SMAJ58A-Q	RGQ	SMAJ58CA-Q	WGQ	64.4	71.2	1.0	58	1.0	93.6	4.3	121.7	21.5
SMAJ60A-Q	RKQ	SMAJ60CA-Q	WKQ	66.7	73.7	1.0	60	1.0	96.8	4.1	125.8	20.5
SMAJ64A-Q	RMQ	SMAJ64CA-Q	WMQ	71.1	78.6	1.0	64	1.0	103	3.9	133.9	19.5
SMAJ70A-Q	RPQ	SMAJ70CA-Q	WPQ	77.8	86.0	1.0	70	1.0	113	3.5	146.9	17.5
SMAJ75A-Q	RRQ	SMAJ75CA-Q	WRQ	83.3	92.1	1.0	75	1.0	121	3.3	157.3	16.5
SMAJ78A-Q	RTQ	SMAJ78CA-Q	WTQ	86.7	95.8	1.0	78	1.0	126	3.2	163.8	16.0
SMAJ85A-Q	RVQ	SMAJ85CA-Q	WVQ	94.4	104	1.0	85	1.0	137	2.9	178.1	14.5
SMAJ90A-Q	RXQ	SMAJ90CA-Q	WXQ	100	111	1.0	90	1.0	146	2.7	189.8	13.5
SMAJ100A-Q	RZQ	SMAJ100CA-Q	WZQ	111	123	1.0	100	1.0	162	2.5	210.6	12.5
SMAJ110A-Q	SEQ	SMAJ110CA-Q	XEQ	122	135	1.0	110	1.0	177	2.3	230.1	11.5
SMAJ120A-Q	SGQ	SMAJ120CA-Q	XGQ	133	147	1.0	120	1.0	193	2.1	250.9	10.5
SMAJ130A-Q	SKQ	SMAJ130CA-Q	XKQ	144	159	1.0	130	1.0	209	1.9	271.7	9.5
SMAJ150A-Q	SMQ	SMAJ150CA-Q	XMQ	167	185	1.0	150	1.0	243	1.6	315.9	8.0
SMAJ160A-Q	SPQ	SMAJ160CA-Q	XPQ	178	197	1.0	160	1.0	259	1.5	336.7	7.5
SMAJ170A-Q	SRQ	SMAJ170CA-Q	XRQ	189	209	1.0	170	1.0	275	1.5	357.5	7.5
SMAJ180A-Q	STQ	SMAJ180CA-Q	XTQ	201	222	1.0	180	1.0	292	1.4	379.6	7.0
SMAJ200A-Q	SVQ	SMAJ200CA-Q	XVQ	224	247	1.0	200	1.0	324	1.2	421.2	6.0
SMAJ220A-Q	SXQ	SMAJ220CA-Q	XXQ	246	272	1.0	220	1.0	356	1.1	462.8	5.5

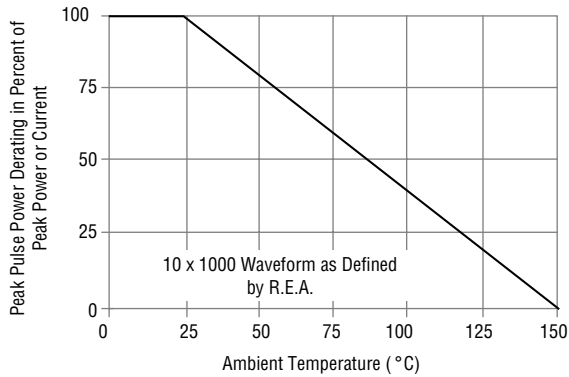
Notes: 1. Suffix 'A' denotes a 5 % tolerance unidirectional device.
 2. Suffix 'CA' denotes a 5 % tolerance bidirectional device.

SMAJ-Q Transient Voltage Suppressor Diode Series

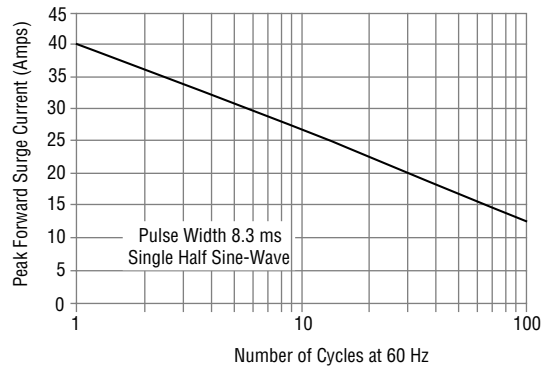


Performance Graphs

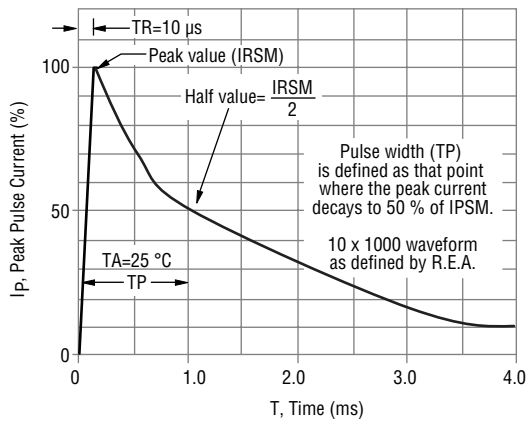
Peak Pulse Power Derating Curve



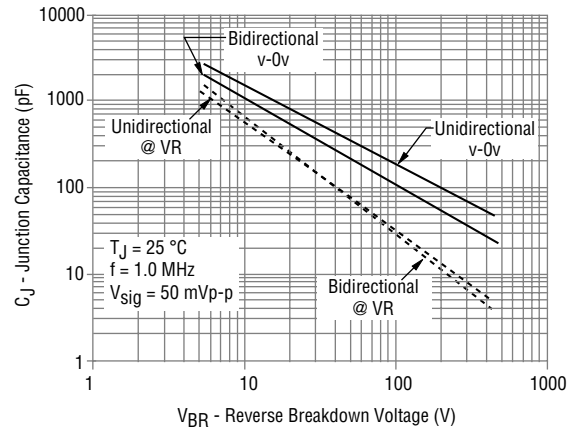
Maximum Non-Repetitive Surge Current



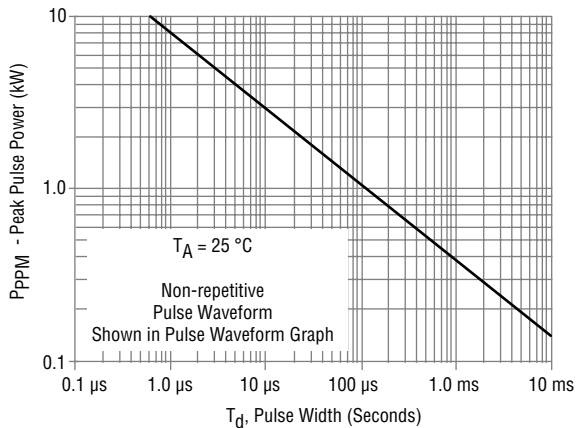
Pulse Waveform



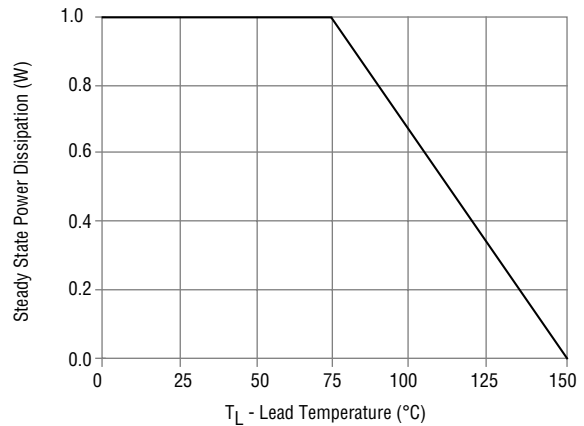
Typical Junction Capacitance



Pulse Rating Curve



Steady State Power Derating Curve



Specifications are subject to change without notice.

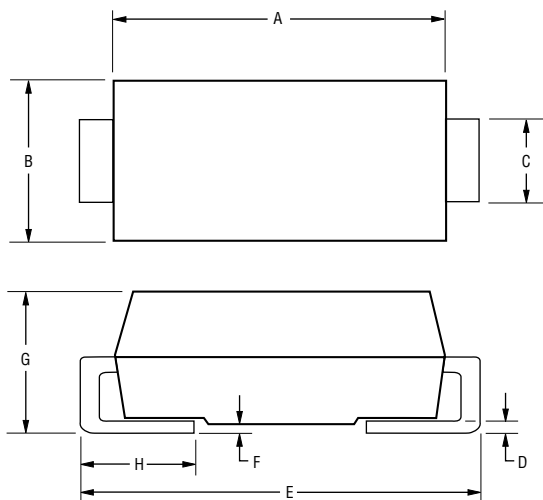
Users should verify actual device performance in their specific applications.

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.

SMAJ-Q Transient Voltage Suppressor Diode Series



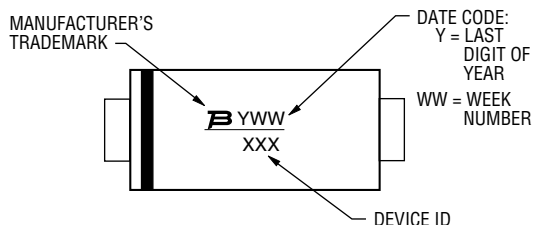
Product Dimensions



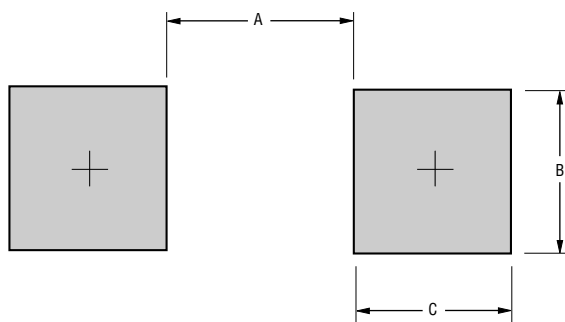
Dimension	SMA (DO-214AC)
A	3.99 - 4.50 (0.157 - 0.177)
B	2.54 - 2.79 (0.100 - 0.110)
C	1.25 - 1.65 (0.049 - 0.065)
D	0.15 - 0.31 (0.006 - 0.012)
E	4.93 - 5.28 (0.194 - 0.208)
F	0.203 MAX. (0.008)
G	1.98 - 2.29 (0.078 - 0.090)
H	0.76 - 1.52 (0.030 - 0.060)

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

Typical Part Marking



Recommended Footprint



Dimension	SMA (DO-214AC)
A (Max.)	2.70 (0.106)
B (Min.)	2.10 (0.083)
C (Min.)	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

How to Order

Package **SMAJ 12 CA - Q**
 SMAJ = SMA/DO-214AC
 Working Peak Reverse Voltage
 12 = 12 V_{RWM} (Volts)
 Suffix
 A = 5 % Tolerance Unidirectional Device
 CA = 5 % Tolerance Bidirectional Device
 AEC-Q101 Suffix
 Q = AEC-Q101 Compliant, 13-inch Reel
 QH = AEC-Q101 Compliant, 7-inch Reel
 (available only for 12 V to 58 V models)

Environmental Specifications

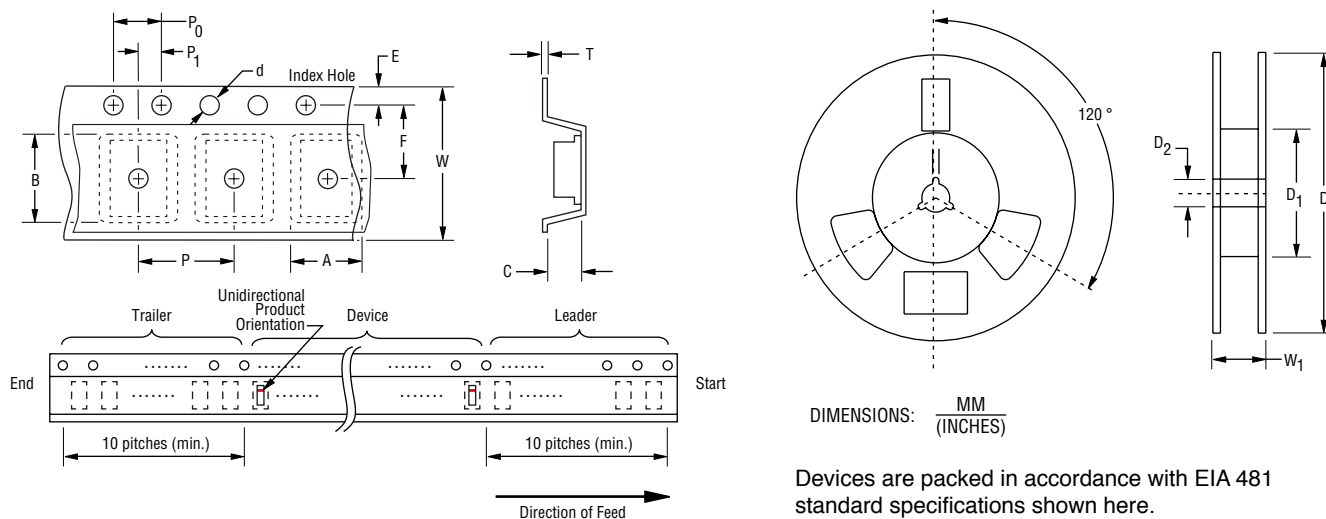
Moisture Sensitivity Level..... 1
 ESD Classification (HBM).....3B

SMAJ-Q Transient Voltage Suppressor Diode Series

BOURNS®

Packaging Information

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



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

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

Item	Symbol	SMA (DO-214AC)	
		7-Inch Reel	13-Inch Reel
Carrier Width	A	$\frac{2.90 \pm 0.20}{(0.114 \pm 0.008)}$	
Carrier Length	B	$\frac{5.50 \pm 0.20}{(0.217 \pm 0.008)}$	
Carrier Depth	C	$\frac{2.26 \pm 0.20}{(0.089 \pm 0.008)}$	
Sprocket Hole	d	$\frac{1.50 \pm 0.10}{(0.061 \pm 0.004)}$	
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	$\frac{13.0 \pm 0.20}{(0.512 \pm 0.008)}$	
Sprocket Hole Position	E	$\frac{1.75 \pm 0.10}{(0.069 \pm 0.004)}$	
Punch Hole Position	F	$\frac{5.50 \pm 0.05}{(0.217 \pm 0.002)}$	
Punch Hole Pitch	P	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$	
Sprocket Hole Pitch	P ₀	$\frac{4.00 \pm 0.10}{(0.157 \pm 0.004)}$	
Embossment Center	P ₁	$\frac{2.00 \pm 0.05}{(0.079 \pm 0.002)}$	
Overall Tape Thickness	T	$\frac{0.30 \pm 0.10}{(0.012 \pm 0.004)}$	
Tape Width	W	$\frac{12.00 \pm 0.30}{(0.472 \pm 0.012)}$	
Reel Width	W ₁	$\frac{18.4}{(0.724)}$ MAX.	
Quantity per Reel	--	1,000	5,000

REV. 06/25

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>