

SxX8BBSx Series

EV Series 0.8 Amp Sensitive SCRs

HF RoHS



Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	0.8	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	200 to 450	μA

Description

This new sensitive SCR component series offers 600V V_{DRM} and 0.8A $I_{T(RMS)}$ capability in the smallest package size in the industry, SOT23. It is specifically designed for GFCI (Ground Fault Circuit Interrupter) applications. All SCRs junctions are glass-passivated to ensure long term reliability and parametric stability.

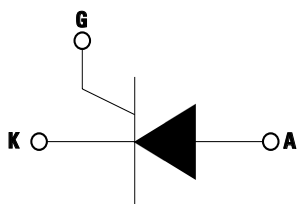
Features

- Very compact SOT23 SMT package
- Surge current capability up to 12A @ 60Hz
- Blocking voltage (V_{DRM}/V_{RRM}) capability - up to 600V
- High dv/dt noise immunity
- Improved turn-off time (t_q) < 25 μsec
- Sensitive gate for direct microprocessor interface
- RoHS compliant and Halogen-Free

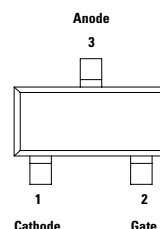
Applications

The SxX8BBS series is specifically designed for GFCI (Ground Fault Circuit Interrupter) and applications.

Schematic Symbol



Pin out



Absolute Maximum Ratings

Symbol	Parameter			Value	Unit
V_{DSM}/V_{RSM}	Peak non-repetitive blocking voltage	Pw=100 μs		700	V
$I_{T(RMS)}$	RMS on-state current (full sine wave)		$T_c = 80^\circ C$	0.8	A
$I_{T(AV)}$	Average on-state current		$T_c = 80^\circ C$	0.51	A
I_{TSM}	Non repetitive surge peak on-state current (Single cycle, T_j initial = 25 $^\circ C$)		f= 50Hz	10	A
			f= 60Hz	12	A
I^2t	I^2t Value for fusing	$t_p = 10$ ms	f= 50 Hz	0.5	A ² s
		$t_p = 8.3$ ms	f= 60 Hz	0.6	A ² s
di/dt	Critical rate of rise of on-state current $I_g = 10mA$	60 Hz	$T_j = 125^\circ C$	80	A/ μs
I_{GM}	Peak Gate Current	$t_p = 20 \mu s$	$T_j = 125^\circ C$	1.0	A
$P_{G(AV)}$	Average gate power dissipation	—	$T_j = 125^\circ C$	0.1	W
T_{stg}	Storage junction temperature range	—	—	-40 to 150	$^\circ C$
T_j	Operating junction temperature range	—	—	-40 to 125	$^\circ C$

SxX8BBSx Series

EV Series 0.8 Amp Sensitive SCRs

Electrical Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Description	Test Conditions	Limit	Value		Unit
				SxX8BBS	SxX8BBS3	
I _{GT}	DC Gate Trigger Current	V _D = 6V, R _L = 100 Ω	MIN.	50	70	μA
			TYP.	70	200	
			MAX.	200	450	
V _{GT}	DC Gate Trigger Voltage	V _D = 6V, R _L = 100 Ω	MAX.	0.8		V
V _{GRM}	Peak Reverse Gate Voltage	I _{RG} = 10μA	MIN.	8		V
I _H	Holding Current	Initial Current = 20mA	MAX.	10		mA
			TYP.	5		
(dv/dt)s	Critical Rate-of-Rise of Off-State Voltage	T _J = 125°C V _D = 67% V _{DRM} / √N _{RRM} Exp. Waveform, R _{GK} =1 kΩ	MIN.	50	350	V/μs
V _{GD}	Gate Non-Trigger Voltage	V _D = V _{DRM} , R _{GK} =1 kΩ T _J = 125°C	MIN.	0.2		V
t _q	Turn-Off Time	I _T = 0.5A	MAX.	25	20	μs
t _{gt}	Turn-On Time	I _G = 10mA, Pw = 15μsec, I _T = 1.6A(pk)	TYP.	2.0		μs

Static Characteristics ($T_J = 25^\circ\text{C}$, unless otherwise specified)

Symbol	Description	Test Conditions	Limit	Value	Unit
V_{TM}	Peak On-State Voltage	$I_{TM} = 1.6\text{A (pk)}$	MAX.	1.70	V
I_{DRM} / I_{RRM}	$V_{DRM} / \sqrt{R_{RM}}$	$T_J = 25^\circ\text{C}$	MAX.	5	μA
		$T_J = 125^\circ\text{C}$	MAX.	100	μA

Thermal Resistances

Symbol	Description	Value	Unit
$R_{\theta(JC)}$	Junction to case (AC)	45	$^\circ\text{C/W}$
$R_{\theta(JA)}$	Junction to ambient	220	$^\circ\text{C/W}$

Figure 1:
Normalized DC Gate Trigger Current vs.
Junction Temperature

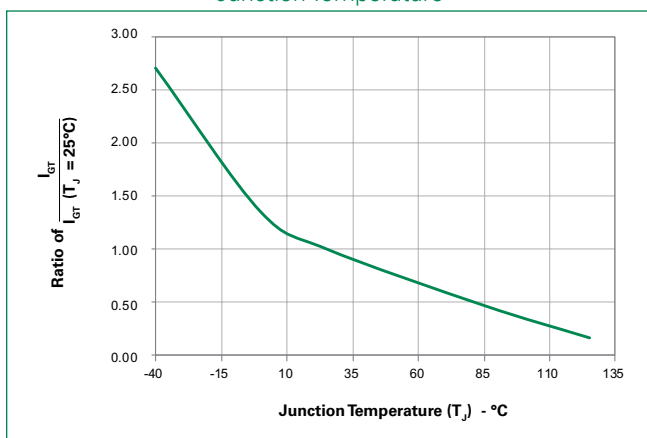
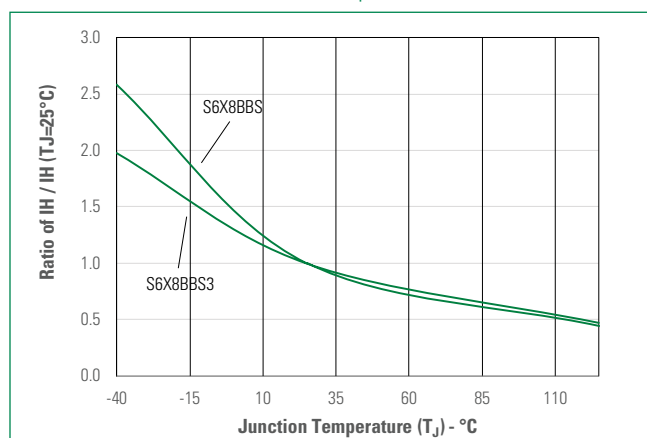


Figure 2:
Normalized DC Holding Current vs.
Junction Temperature

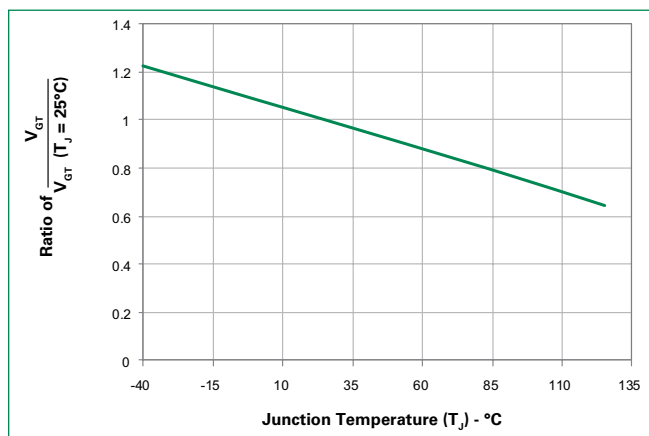


SxX8BBSx Series

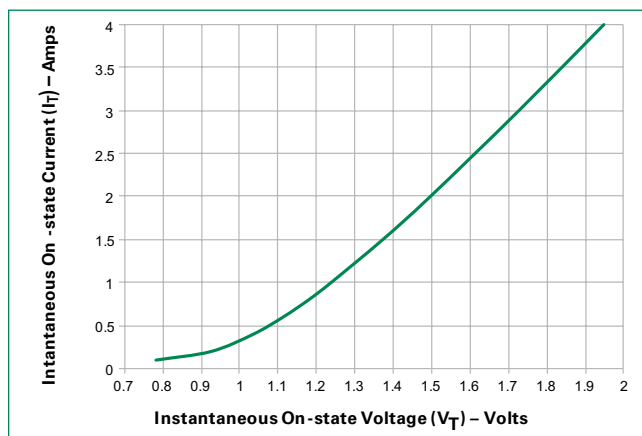
EV Series 0.8 Amp Sensitive SCRs

Figure 3:

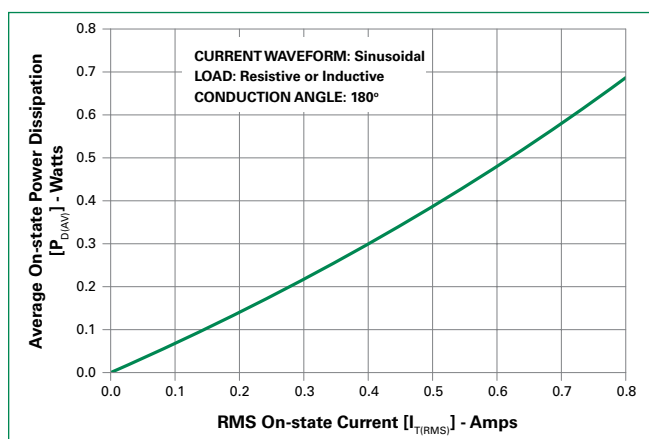
Normalized DC Gate Trigger Voltage vs. Junction Temperature

**Figure 4:**

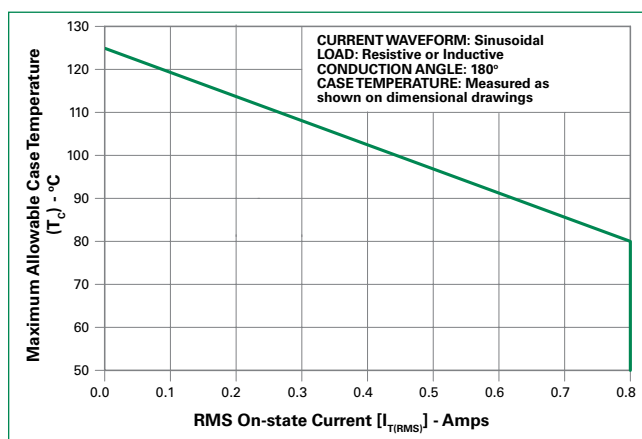
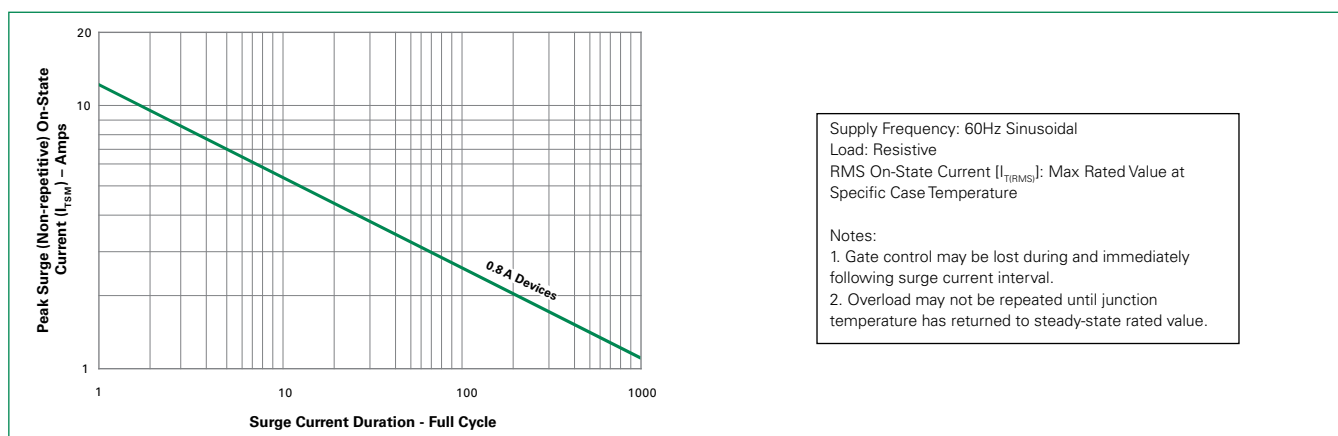
On-State Current vs. On-State Voltage (Typical)

**Figure 5:**

Power Dissipation (Typical) vs. RMS On-State Current

**Figure 6:**

Maximum Allowable Case Temperature vs. On-State Current

**Figure 7:** Surge Peak On-State Current vs. Number of Cycles

SxX8BBSx Series

EV Series 0.8 Amp Sensitive SCRs

Figure 8:

Static dv/dt vs. RGK vs. Junction Temperature (S6X8BBS)

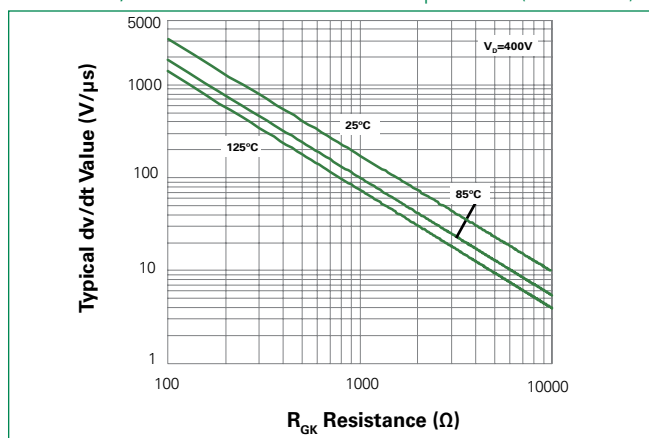


Figure 9:

Static dv/dt vs. CGK vs. Junction Temperature (S6X8BBS)

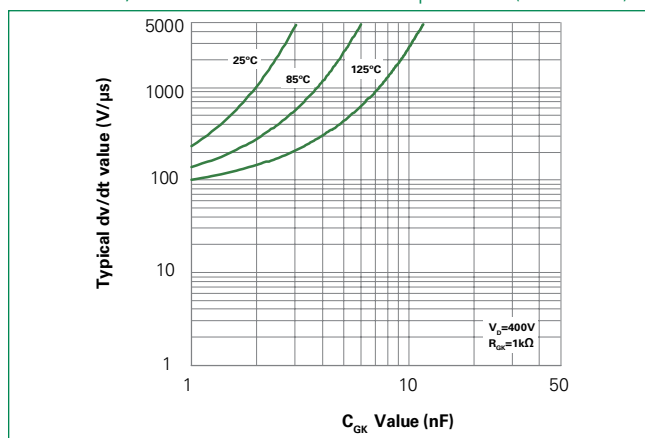


Figure 10:

Static dv/dt vs. RGK vs. Junction Temperature (S6X8BBS3)

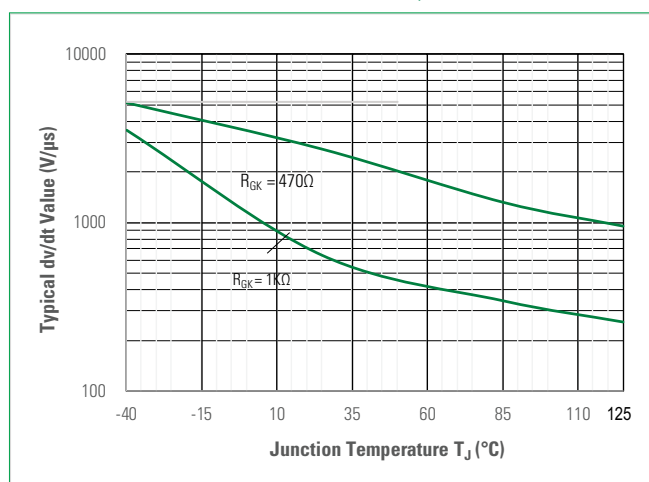
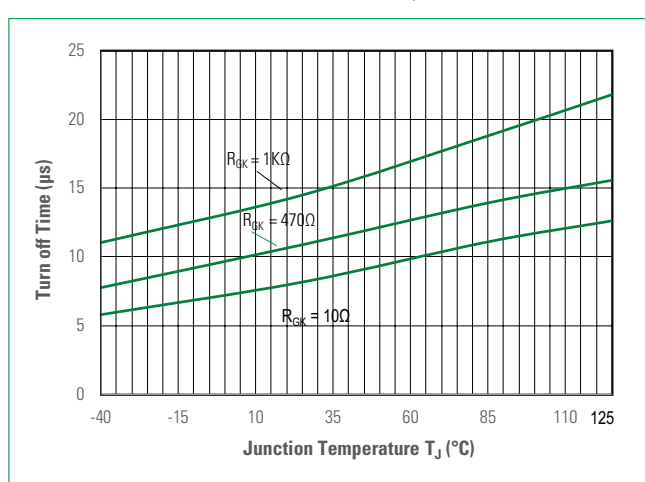


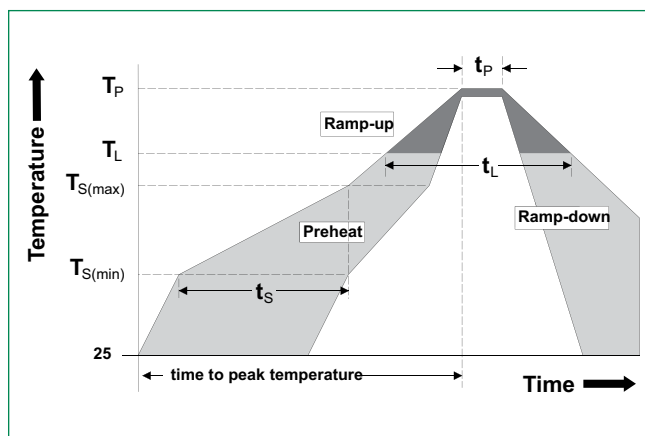
Figure 11:

Static dv/dt vs. CGK vs. Junction Temperature (S6X8BBS3)



Soldering Parameters

Reflow Condition		Pb – Free assembly
Pre Heat	- Temperature Min ($T_{s(min)}$)	150°C
	- Temperature Max ($T_{s(max)}$)	200°C
	- Time (min to max) (t_s)	60 – 120 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		3°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	- Temperature (T_L) (Liquidus)	217°C
	- Time (min to max) (t_s)	60 – 150 seconds
Peak Temperature (T_p)		260 ^{+0/-5} °C
Time within 5°C of actual peak Temperature (t_p)		30 seconds
Ramp-down Rate		6°C/second max
Time 25°C to peak Temperature (T_p)		8 minutes Max.
Do not exceed		260°C



SxX8BBSx Series

EV Series 0.8 Amp Sensitive SCRs

Physical Specifications

Terminal Finish	100% Matte Tin-plated.
Body Material	UL Recognized compound meeting flammability rating V-0.
Lead Material	Copper Alloy

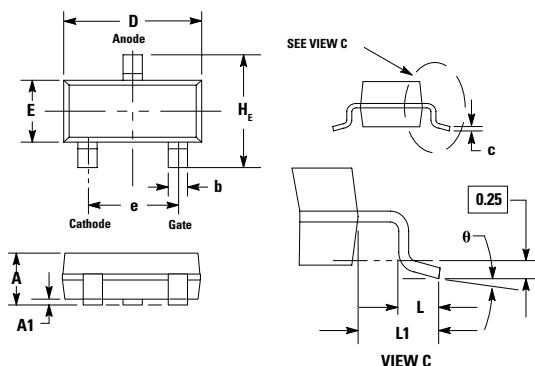
Design Considerations

Careful selection of the correct component for the application's operating parameters and environment will go a long way toward extending the operating life of the Thyristor. Good design practice should limit the maximum continuous current through the main terminals to 75% of the component rating. Other ways to ensure long life for a power discrete semiconductor are proper heat sinking and selection of voltage ratings for worst case conditions. Overheating, overvoltage (including dv/dt), and surge currents are the main killers of semiconductors. Correct mounting, soldering, and forming of the leads also help protect against component damage.

Reliability/Environmental Tests

Test	Specifications and Conditions
HTRB (AC Blocking)	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ V_{DRM} @ 125°C for 1008 hours
Temperature Cycling	MIL-STD-750, M-1051, 100 cycles; -55°C to +150°C; 15-min dwell-time
H3TRB	EIA / JEDEC, JESD22-A101 1008 hours; 160V - DC: 85°C; 85% rel humidity
UHASt	ESD22-A118, 96hours, 130°C, 85%RH
Resistance to Solder Heat	MIL-STD-750 Method 2031, 260°C, 10s
Solderability	ANSI/J-STD-002, category 3, Test A
Moisture Sensitivity Level	Level 1, JEDEC-J-STD-020D

Dimensions – SOT-23



Dimensions	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.04	0.04	0.04	0.89	1.02	1.12
A1	0.00	0.00	0.01	0.01	0.10	0.15
b	0.02	0.02	0.02	0.38	0.46	0.51
c	0.00	0.01	0.01	0.08	0.13	0.18
D	0.11	0.11	0.12	2.80	2.90	3.04
E	0.05	0.05	0.06	1.19	1.30	1.40
e	0.07	0.08	0.08	1.78	1.91	2.06
L	0.02	0.02	0.02	0.40	0.49	0.60
L1	0.01	0.02	0.03	0.36	0.53	0.74
H	0.08	0.09	0.10	2.10	2.30	2.64
θ	0°	-	10°	0°	-	10°

Product Selector

Part Number	Voltage 600V	Gate Sensitivity	Package
S6X8BBS	X	200 μ A	SOT-23
S6X8BBS3	X	450 μ A	SOT-23

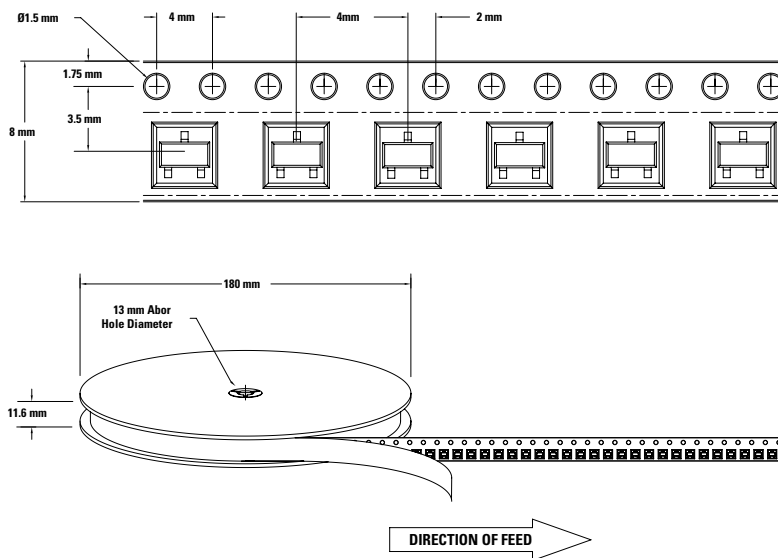
Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
S6X8BBSRP	6X8	0.01g	Tape & Reel	3000
S6X8BBS3RP	6X83	0.01g	Tape & Reel	3000

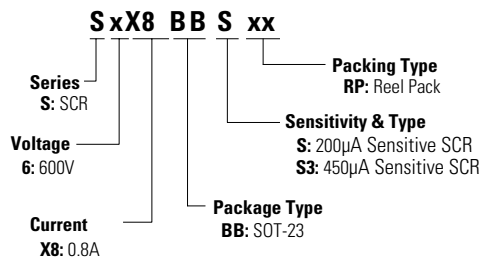
SxX8BBSx Series

EV Series 0.8 Amp Sensitive SCRs

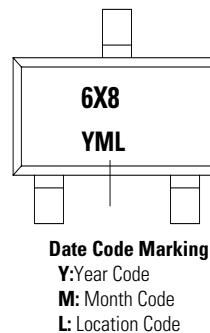
SOT-23 Reel Pack (RP) Specifications



Part Numbering System



Part Marking System



Disclaimer Notice - Information furnished is believed to be accurate and reliable. However, users should independently evaluate the suitability of and test each product selected for their own applications. Littelfuse products are not designed for, and may not be used in, all applications. Read complete Disclaimer Notice at <http://www.littelfuse.com/disclaimer-electronics>.