Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

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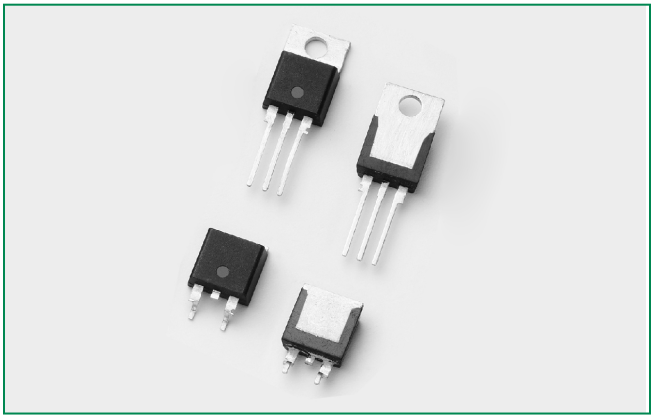
Littelfuse
Expertise Applied | Answers Delivered

Teccor® brand Thyristors
16 Amp Standard SCR

S8016xA Series

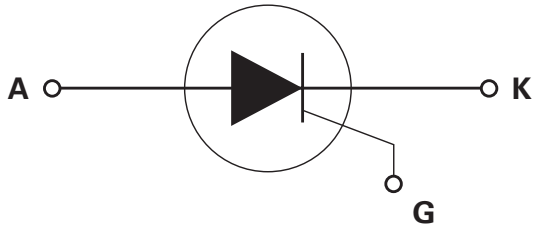
AUTOMOTIVE GRADE HF RoHS



Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	16	A
V_{DRM}/V_{RRM}	800	V
I_{GT}	50	mA

Schematic Symbol



Description

The Littelfuse SCR S8016xA series are specifically designed for Electric Vehicle On-Board Charger (EVOBC) applications. This SCR AC line input rectifier can handle Level 1 charging up to 16Arms at 120V, and Level 2 charging up to 16A rms at 240V at 100°C and up to 25A rms for 80°C. Its excellent AC handling capability and surge robustness makes this series an ideal switch for these input rectifiers.

Features & Benefits

- V_{DRM} 800V, I_T 25rms to handle input from 100-250V line AC
- High di/dt of 375/µsec enables handling of 3kA 8/20 surge current operationally
- High V_{DSM}/V_{RSM} of 1300V, high dv/dt of 2000V/µsec prevents SCR mis-triggering during 6kV 1.2/50-8/20 surge event with minimal over voltage protection or snubber circuit
- Available in the compact TO-263 SMT package
- AEC-Q101 Fully Compliant
- Halogen free and RoHS compliant

Applications

Input rectification of AC line input for EVOBC applications.

Absolute Maximum Ratings

Symbol	Parameter	Test Conditions	Value	Unit
V_{DSM}/V_{RSM}	Peak non-repetitive blocking voltage	Pw=100µs	1300	V
$I_{T(RMS)}$	RMS on-state current	T_c=100°C	16	A
		T_c=80°C	25	
$I_{T(AV)}$	Average on-state current	T_C=100°C	10	A
		T_c=80°C	16	
I_{TSM}	Peak non-repetitive surge current	single half cycle; f=50Hz; T_J (initial)=25°C	188	A
		single half cycle; f=60Hz; T_J (initial)=25°C	225	
I^2t	I^2t Value for fusing	t_p =8.3 ms	210	A^2s
I_{PP}	Non-repetitive peak surge current	with Littelfuse MOV V20E420AUTO across line; T_J=125°C, 11.2/50-8/20 combination wave, I_T=1A	2400	A
di/dt	Critical rate of rise of on-state current	T_J=125°C	375	A/µs
I_{GM}	Peak gate current	T_J=125°C	3.0	A
$P_{G(AV)}$	Average gate power dissipation	T_J=125°C	0.6	W
T_{stg}	Storage temperature range		-40 to 150	°C
T_J	Operating junction temperature range		-40 to 125	°C

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16 Amp Standard SCR

Electrical Characteristics (T_J = 25°C, unless otherwise specified)

Symbol	Test Conditions		Value	Unit
I_{GT}	V_D=12V; R_L=30Ω	MIN.	15	mA
		MAX.	50	
V_{GT}		MAX.	1.5	V
dv/dt	V_D=V_{DRM}; gate open; T_J=125°C	MIN.	2000	V/µs
	1.2/50 pulse wave, with 250V AC with Littelfuse MOV V20E420AUTO across	MIN.	5	KV/µs
V_{GD}	V_D=V_{DRM}; R_L=3.3 kΩ; T_J=125°C	MIN.	0.2	V
I_H	I_T=400mA (initial)	MAX.	150	mA
t_q	I_T=0.5A; t_p=50µs; dv/dt=5V/µs; di/dt=-30A/µs	MAX.	35	µs
t_{gt}	I_G=2 x I_{GT}; PW=15µs; I_T=40A	TYP.	2	µs

Static Characteristics

Symbol	Test Conditions			Value	Unit
V_{TM}	I_T=32A; t_p=380µs		MAX.	1.4	V
I_{DRM} / I_{RRM}	@ V_{DRM} / V_{RRM}	T_J=25°C	MAX.	20	µA
		T_J=100°C		1000	
		T_J=125°C		2000	

Thermal Resistances

Symbol	Parameter	Value	Unit
$R_{\theta(J-C)}$	Junction to case (AC)	1.0	°C/W

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

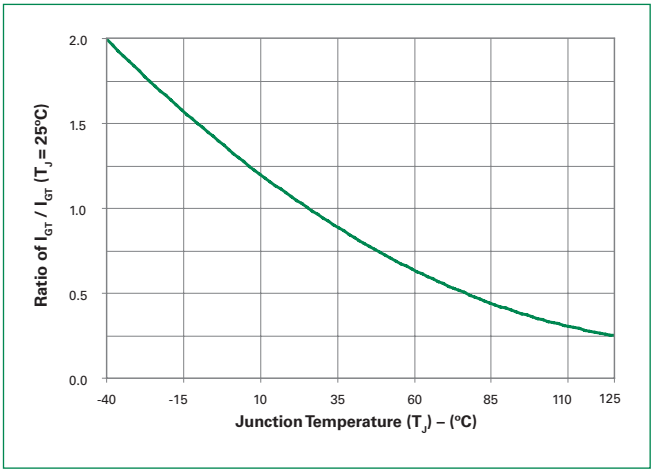

Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature

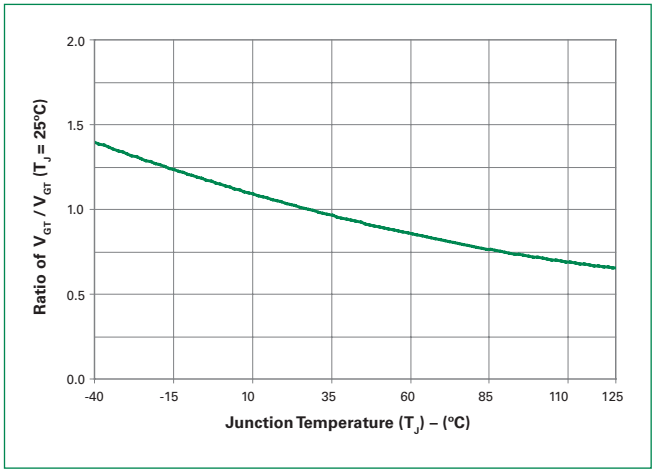

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Figure 3: Normalized DC Holding Current vs. Junction Temperature

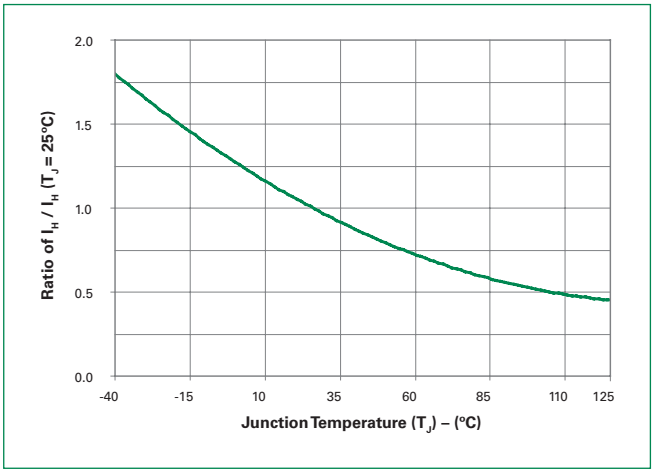

Figure 4: On-State Current vs. On-State Voltage (Typical)

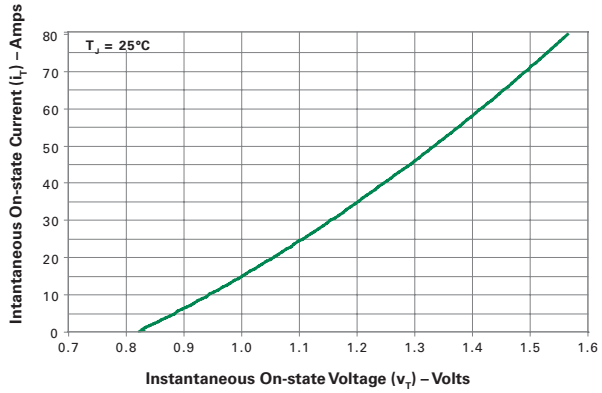

Figure 5: Power Dissipation (Typical) vs. RMS On-State Current

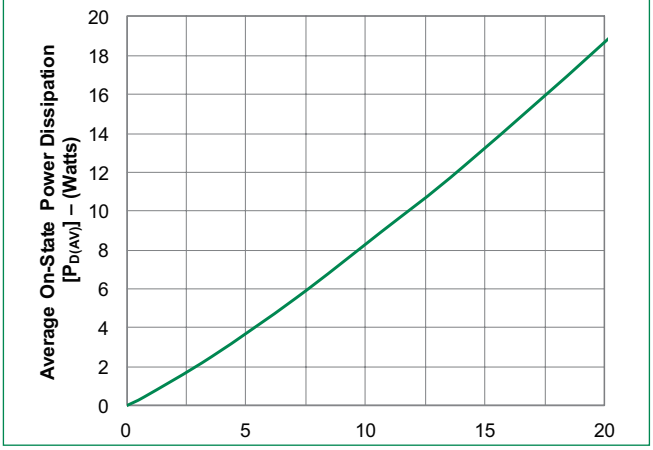

Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current

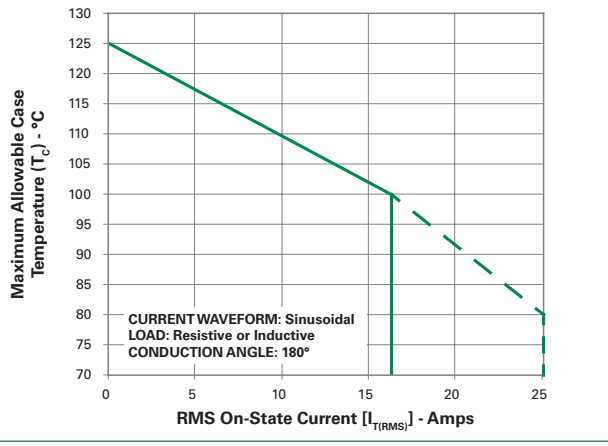

Figure 7: Maximum Allowable Case Temperature vs. Average On-State Current

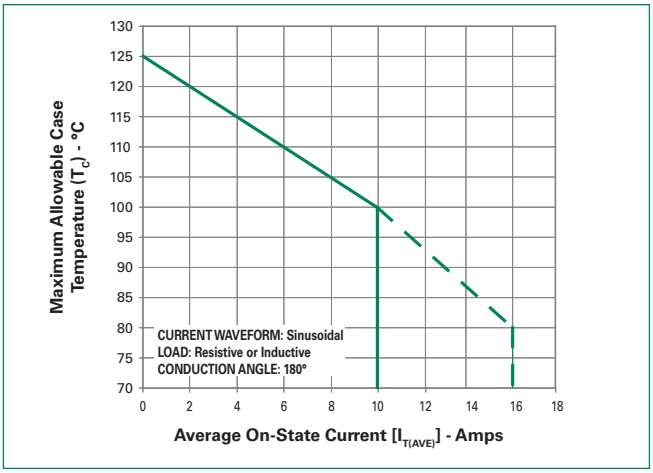

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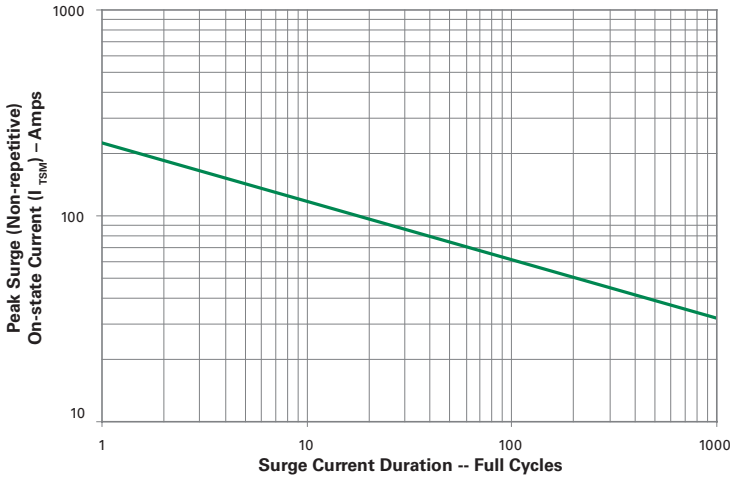
Figure 8: Surge Peak On-State Current vs. Number of Cycles

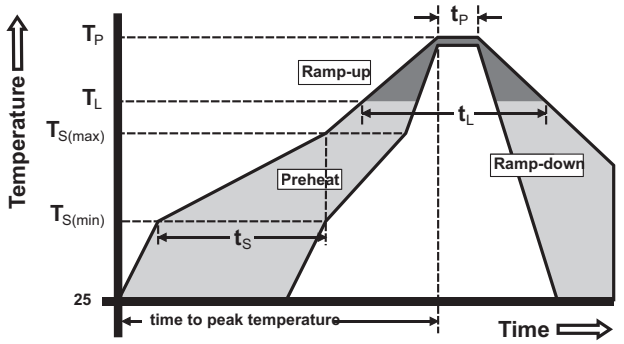


SUPPLY FREQUENCY: 60 Hz Sinusoidal
LOAD: Resistive
RMS On-State Current: [$I_{T(RMS)}$]: Maximum Rated Value at Specified Case Temperature

Notes:
1. Gate control may be lost during and immediately following surge current interval.
2. Overload may not be repeated until junction temperature has returned to steady-state rated value.

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 – 180 secs
Average ramp up rate (Liquidus Temp) (T_L) to peak		5°C/second max
$T_{S(max)}$ to T_L - Ramp-up Rate		5°C/second max
Reflow	-Temperature (T_L) (Liquidus)	217°C
	-Time (t_L)	60 – 150 seconds
Peak Temperature (T_P)		$260^{+0/-5}$ °C
Time within 5°C of actual peak Temperature (t_p)		20 – 40 seconds
Ramp-down Rate		5°C/second max
Time 25°C to peak Temperature (T_P)		8 minutes Max.
Do not exceed		280°C



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Physical Specifications

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

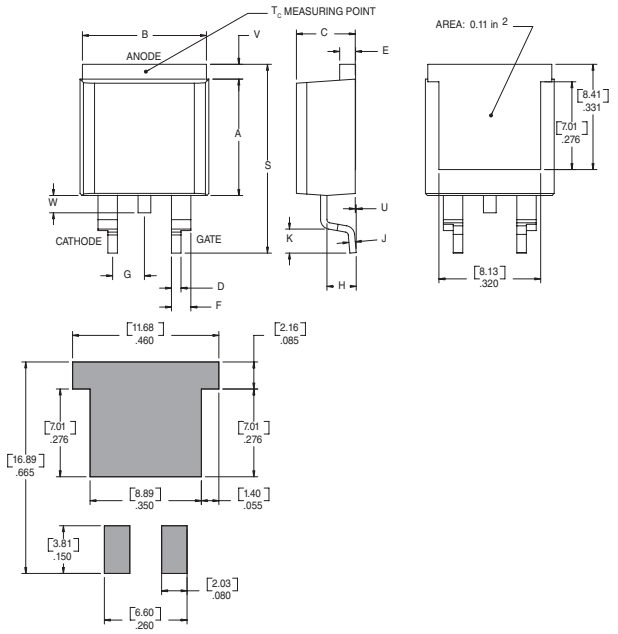
Environmental Specifications

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 125°C for 1008 hours
Temperature Cycling	JESD22 A-104 Appendix 6 -55°C to 150°C, 15-minute dwell, 1000 cycles
Autoclave (Pressure Cooker Test)	EIA/JEDEC: JESD22-A102 121°C, 100%RH, 15psig, 96hours
Biased Temperature & Humidity	EIA / JEDEC, JESD22-A101 1008 hours; 320V - DC: 85°C; 85% rel humidity
Intermittent Operational Life	T_A=25°C, ΔTJ ≥ 100°C, 1008hrs
Resistance to Solder Heat	JESD22 A-111: 260°C, 10 seconds
Solderability	ANSI/J-STD-002, category 3, Test A

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.

Dimensions –TO- 263AB (N-package) — D²-Pak Surface Mount



Dimension	Inches		Millimeters	
	Min	Max	Min	Max
A	0.360	0.370	9.14	9.40
B	0.380	0.420	9.65	10.67
C	0.178	0.188	4.52	4.78
D	0.025	0.035	0.64	0.89
E	0.045	0.060	1.14	1.52
F	0.060	0.075	1.52	1.91
G	0.095	0.105	2.41	2.67
H	0.092	0.102	2.34	2.59
J	0.018	0.024	0.46	0.61
K	0.090	0.110	2.29	2.79
S	0.590	0.625	14.99	15.88
V	0.035	0.045	0.89	1.14
U	0.002	0.010	0.05	0.25
W	0.040	0.070	1.016	1.78

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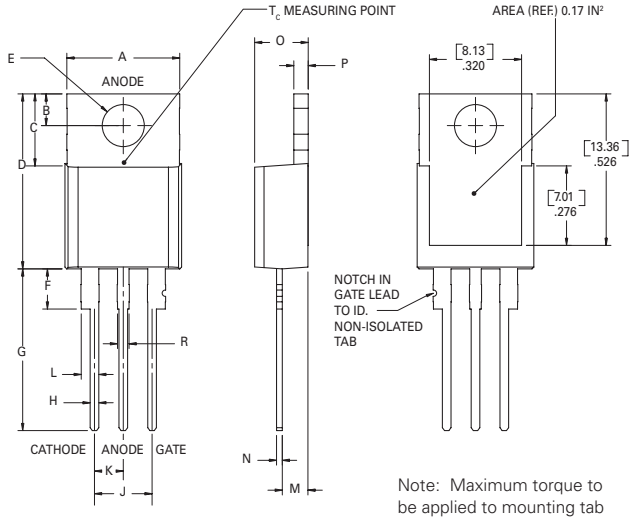
Dimensions — TO-220AB (R-Package) — Non-Isolated Mounting Tab Common with Center Lead

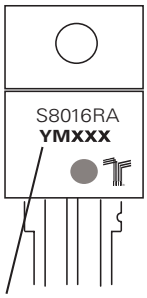


Note: Maximum torque to be applied to mounting tab is 8 in-lbs. (0.904 Nm).

Dimension	Inches		Millimeters	
	Min	Max	Min	Max
A	0.380	0.420	9.65	10.67
B	0.105	0.115	2.67	2.92
C	0.230	0.250	5.84	6.35
D	0.590	0.620	14.99	15.75
E	0.142	0.147	3.61	3.73
F	0.110	0.130	2.79	3.30
G	0.540	0.575	13.72	14.61
H	0.025	0.035	0.64	0.89
J	0.195	0.205	4.95	5.21
K	0.095	0.105	2.41	2.67
L	0.060	0.075	1.52	1.91
M	0.085	0.095	2.16	2.41
N	0.018	0.024	0.46	0.61
O	0.178	0.188	4.52	4.78
P	0.045	0.060	1.14	1.52
R	0.038	0.048	0.97	1.22

Part Marking System

TO-220 AB - (R Package)
TO-263 (N Package)



Date Code Marking
Y:Year Code
M: Month Code
XXX: Lot Trace Code

Part Numbering System

S 80 16 R A

- S — DEVICE TYPE: S: SCR
- 80 — VOLTAGE RATING: 80: 800V
- 16 — CURRENT RATING: 16: 16A
- R — PACKAGE TYPE: R: TO-220 Non-Isolated; N: TO-263
- A — AEC-Q101 QUALIFIED

Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity	Package
S8016RATP	S8016RA	1.6g	Tube	500 (50 per tube)	TO-220R
S8016NARP	S8016NA	1.6g	Embossed Carrier	500	TO-263

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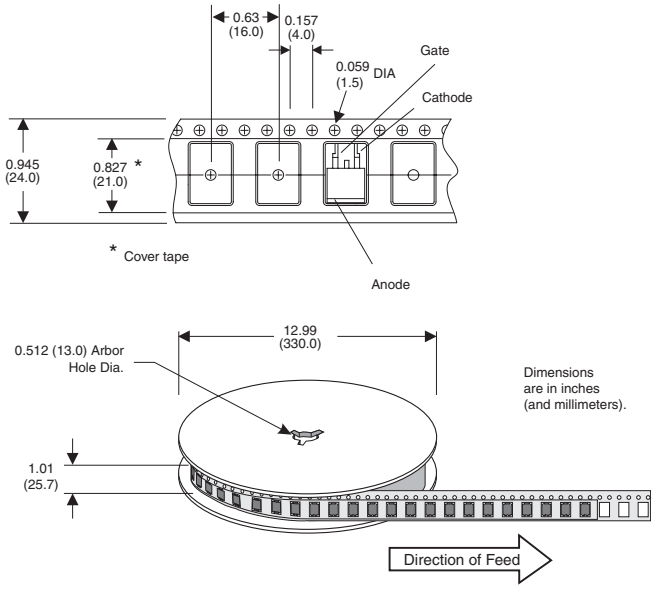
TO-263 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards



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