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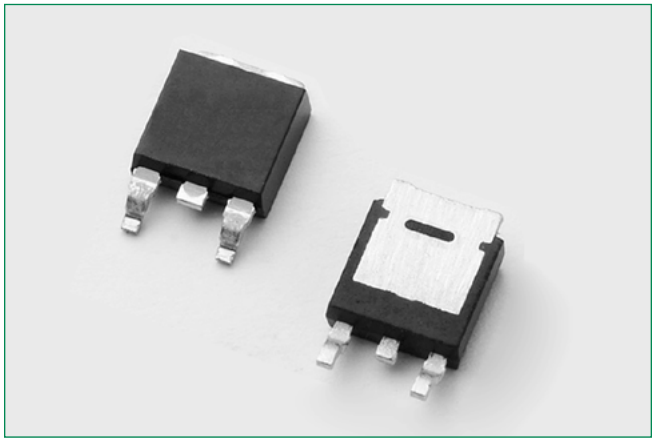
Thyristors

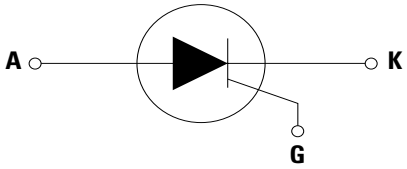
16 Amp High Junction Temperature SCRs in DPAK pacakge

SV6016Dx

HF RoHS



Schematic Symbol



Main Features

Symbol	Value	Unit
$I_{T(RMS)}$	16	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	6	mA

Description

The SV6016Dx high junction temperature SCR is ideal for unidirectional switches for phase control and general switching applications such as heating, motor control controls, converters / rectifiers and capacitive discharge ignitions.

Standard phase control SCRs are triggered with few milliamperes of current at less than 1.5V potential.

Features & Benefits

- Halogen free and RoHS compliant
- 150°C maximum junction temperature
- Surge capability up to 200A at 60 Hz half cycle

Applications

Typical applications include AC Generator (ACG) rectifiers, battery voltage regulators and generic converters and inrush current controller in various AC to DC applications. Additional applications include controls for power tools, home/brown good and white goods appliances.

Absolute Maximum Ratings

Symbol	Parameter	Test Conditions	Value	Unit
V_{DSM}/V_{RSM}	Non repetitive surge peak off-state voltage	P_W=100 µs	V_{DRM}/V_{RRM}+100	V
$I_{T(RMS)}$	RMS on-state current	T_C = 130°C	16	A
$I_{T(AV)}$	Average on-state current	T_C = 130°C	10.2	A
I_{TSM}	Peak non-repetitive surge current (single half cycle, T_J (initial) = 25°C)	f = 50Hz	180	A
		f = 60Hz	200	
I^2t	I^2t Value for fusing	t_p = 8.3 ms	200	A^2s
di/dt	Critical rate of rise of on-state current	f = 60Hz; T_J = 150°C	100	A/µs
I_{GM}	Peak gate current	T_J = 150°C	4	A
$P_{G(AV)}$	Average gate power dissipation	T_J = 150°C	0.8	W
T_{stg}	Storage temperature range		-40 to 150	°C
T_J	Operating junction temperature range		-40 to 150	

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

Symbol	Test Conditions		Value	Unit
I_{GT}	V_D = 12V R_L = 60 Ω	MAX.	6	mA
		MIN.	1.5	
V_{GT}	V_D = 12V R_L = 60 Ω	MAX.	1.5	V
dv/dt	V_D = 67% V_{DRM}; gate open; T_J = 125°C	MIN.	200	V/µs
	V_D = 67% V_{DRM}; gate open; T_J = 150°C		100	
V_{GD}	V_D = V_{DRM} R_L = 3.3 kΩ T_J = 150°C	MIN.	0.2	V
I_H	I_T = 200mA (initial)	MAX.	40	mA
t_q	I_T = 2A; t_p = 50µs; dv/dt = 5V/µs; di/dt = 30A/µs	MAX.	50	µs
t_{gt}	I_G = 2 x I_{GT} PW = 15µs I_T = 24A	TYP.	2.3	µs

Static Characteristics

Symbol	Test Conditions			Value	Unit
V_{TM}	Component I_T = 32A; t_p = 380 µs		MAX.	1.6	V
I_{DRM} / I_{RRM}	V_{DRM} = V_{RRM}	T_J = 25°C	MAX.	10	µA
		T_J = 125°C		500	
		T_J = 150°C		2000	

Thermal Resistances

Symbol	Parameter	Value	Unit
$R_{\theta(JC)}$	Junction to case (AC)	1.4	°C/W

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

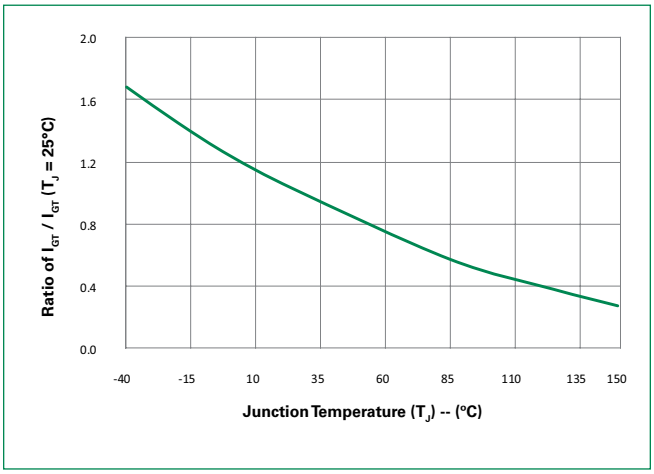

Figure 2: Normalized DC Gate Trigger Voltage vs. Junction Temperature

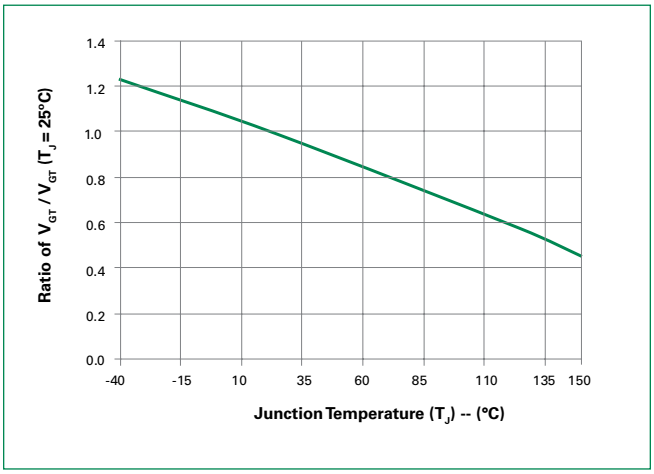

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Figure 3: Normalized DC Holding Current vs. Junction Temperature

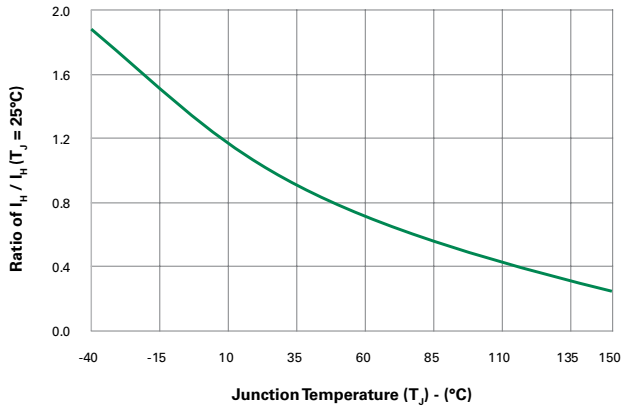

Figure 4: On-State Current vs. On-State Voltage (Typical)

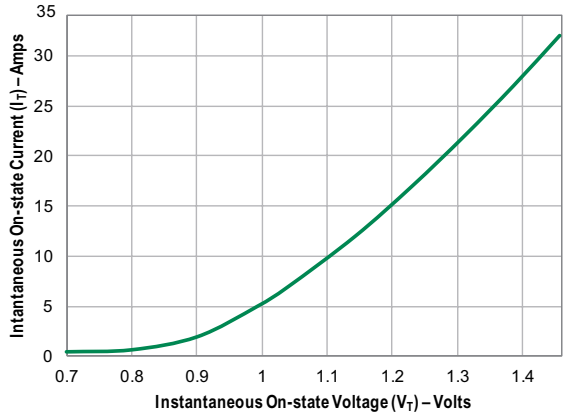

Figure 5: Power Dissipation (Typical) vs. RMS On-State Current

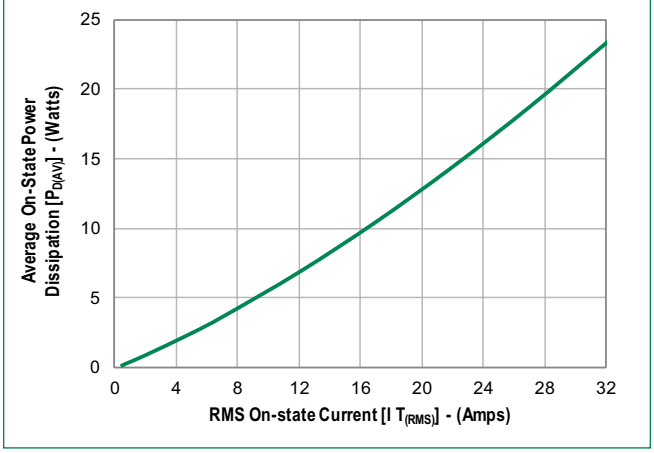

Figure 6: Maximum Allowable Case Temperature vs. RMS On-State Current

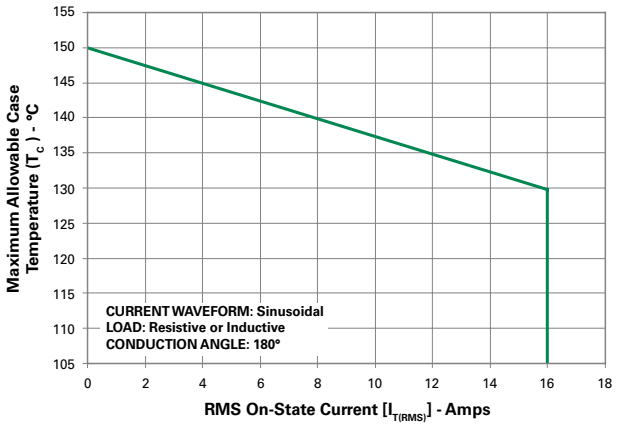

Figure 7: Maximum Allowable Case Temperature vs. Average On-State Current

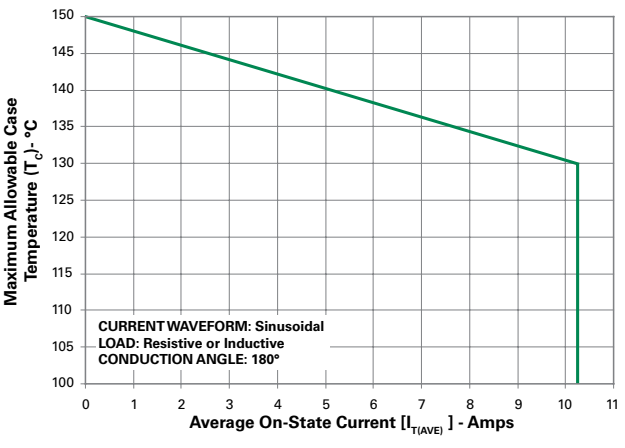

Figure 8: Peak Capacitor Discharge Current

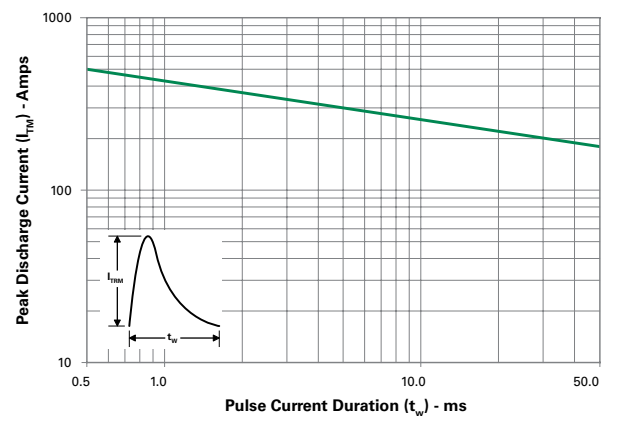

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Figure 9: Peak Capacitor Discharge Current Derating

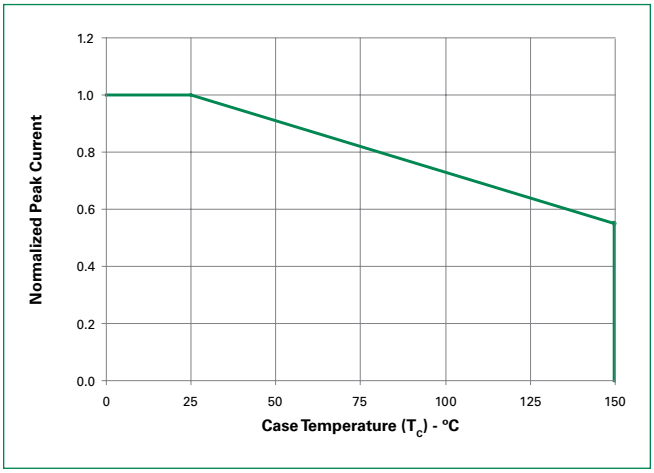
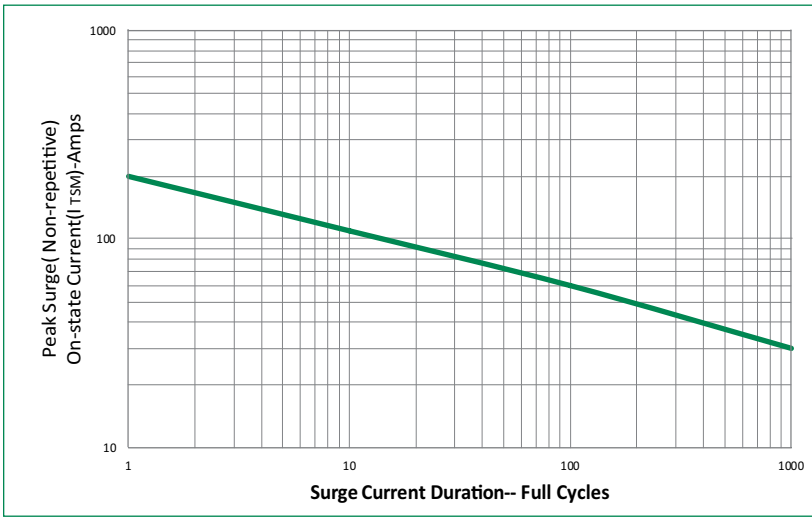


Figure 10: Surge Peak On-State Current vs. Number of Cycles

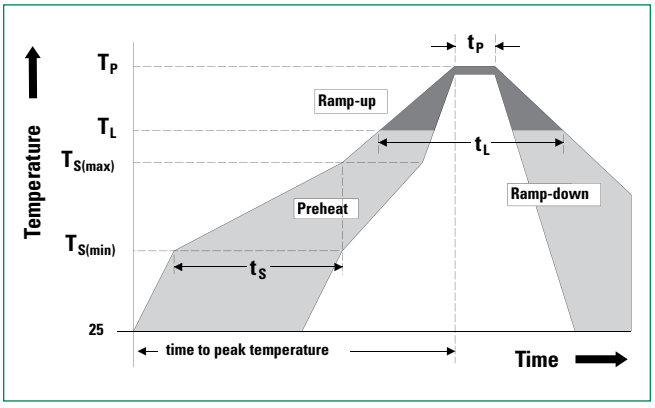


SUPPLY FREQUENCY: 60 Hz Sinusoidal
LOAD: Resistive
RMS On-State Current: [$I_{T(RMS)}$]: Maximum Rated Value at Specified Case Temperature

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 compound meeting flammability rating V-0
Lead Material	Copper Alloy

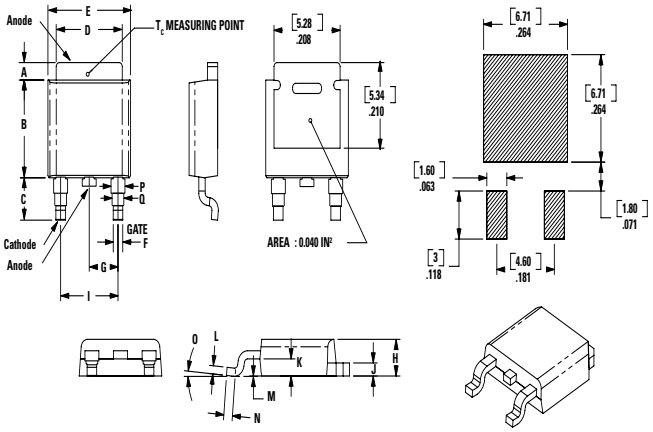
Design Considerations

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.

Environmental Specifications

Test	Specifications and Conditions
AC Blocking	MIL-STD-750, M-1040, Cond A Applied Peak AC voltage @ 150°C for 1008 hours
Temperature Cycling	MIL-STD-750, M-1051, 100 cycles; -55°C to +150°C; 15-min dwell-time
Temperature/Humidity	EIA / JEDEC, JESD22-A101 1008 hours; 160V - DC: 85°C; 85% rel humidity
High Temp Storage	MIL-STD-750, M-1031, 1008 hours; 150°C
Low-Temp Storage	1008 hours; -40°C
Resistance to Solder Heat	MIL-STD-750 Method 2031
Solderability	ANSI/J-STD-002, category 3, Test A
Lead Bend	MIL-STD-750, M-2036 Cond E
Moisture Sensitivity Level	Level 1, JEDEC-J-STD-020D

Dimensions — TO-252AA (D-Package) — D-PAK Surface Mount



Dimension	Inches			Millimeters		
	Min	Typ	Max	Min	Typ	Max
A	0.040	0.043	0.050	1.02	1.09	1.27
B	0.235	0.243	0.245	5.97	6.16	6.22
C	0.106	0.108	0.113	2.69	2.74	2.87
D	0.205	0.208	0.213	5.21	5.29	5.41
E	0.255	0.262	0.265	6.48	6.65	6.73
F	0.027	0.031	0.033	0.69	0.80	0.84
G	0.087	0.090	0.093	2.21	2.28	2.36
H	0.085	0.092	0.095	2.16	2.33	2.41
I	0.176	0.179	0.184	4.47	4.55	4.67
J	0.018	0.020	0.023	0.46	0.51	0.58
K	0.038	0.040	0.044	0.97	1.02	1.12
L	0.018	0.020	0.023	0.46	0.51	0.58
M	0.000	0.000	0.004	0.00	0.00	0.10
N	0.021	0.026	0.027	0.53	0.67	0.69
O	0°	0°	5°	0°	0°	5°
P	0.042	0.047	0.052	1.06	1.20	1.32
Q	0.034	0.039	0.044	0.86	1.00	1.11

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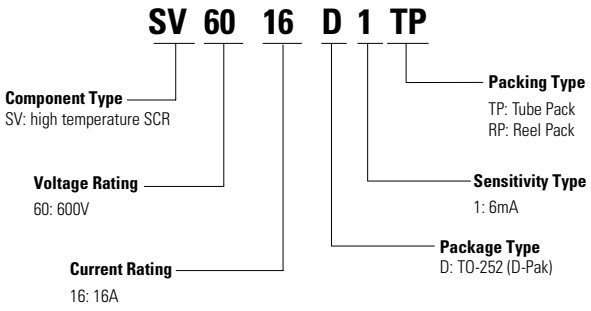
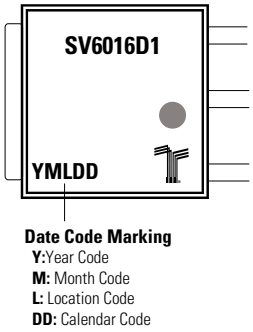
Packing Options

Part Number	Marking	Weight	Packing Mode	Base Quantity
SV6016DxTP	SV6016Dx	0.3 g	Tube	750 (75 per tube)
SV6016DxRP	SV6016Dx	0.3 g	Embossed Carrier	2500

Part Numbering System



Part Marking System



TO-252 Embossed Carrier Reel Pack (RP) Specifications

Meets all EIA-481-2 Standards