2N6394-2N6399

SILICON CONTROLLED RECTIFIERS

FEATURES

- Available as “HR” (high reliability) screened per MIL-PRF-19500, JANTX level. Add “HR” suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding “-PBF” suffix.

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Peak repetitive forward and reverse blocking voltage[1] (T_J = -40 to +125°C, sine wave, 50 to 60 Hz, gate open) 2N6394 2N6395 2N6396 2N6397 2N6398 2N6399	V_{RRM}, V_{DRM}	50 100 200 400 600 800	Volts
On state RMS current (180° conduction angles, T_C = 90°C)	$I_{T(RMS)}$	12	Amps
Peak non-repetitive surge current (1/2 cycle, 60Hz, sine wave, T_J = 90°C)	I_{TSM}	100	Amps
Circuit fusing considerations (t = 8.3ms)	I^2t	40	A^2s
Forward peak gate power (pulse width ≤ 1.0µs, T_C = 90°C)	P_{GM}	20	Watts
Forward average gate power (t = 8.3ms, T_C = 90°C)	$P_{G(AV)}$	0.5	Watts
Forward peak gate current (pulse width ≤ 1.0µs, T_C = 90°C)	I_{GM}	2	Amps
Operating junction temperature range	T_J	-40 to +125	°C
Storage temperature range	T_{stg}	-40 to +150	°C

Note 1: V_{DRM} and V_{RRM} for all types can be applied on a continuous basis without incurring damage. Ratings apply for zero or negative gate voltage; however, positive gate voltage shall not be applied concurrent with negative potential on the anode. Blocking voltages shall not be tested with a constant current source such that the voltage ratings of the devices are exceeded.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Maximum	Unit
Thermal resistance, junction to case	$R_{\theta JC}$	2.0	°C/W
Maximum lead temperature for soldering purposes 1/8” from case for 10 seconds	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C)

Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Peak forward or reverse blocking current (V_{AK} = Rated V_{DRM} or V_{RRM}, gate open) T_J = 25°C T_J = 100°C	I_{DRM} or I_{RRM}	- -	- -	10 2.0	µA mA
ON CHARACTERISTICS					
Peak forward on-state voltage (2) (I_{TM} = 24A peak)	V_{TM}	-	1.7	2.2	Volts
Gate trigger current (continuous dc) (V_D = 12 Vdc, R_L = 100 Ω)	I_{GT}	-	5.0	30	mA

2N6394-2N6399

SILICON CONTROLLED RECTIFIERS

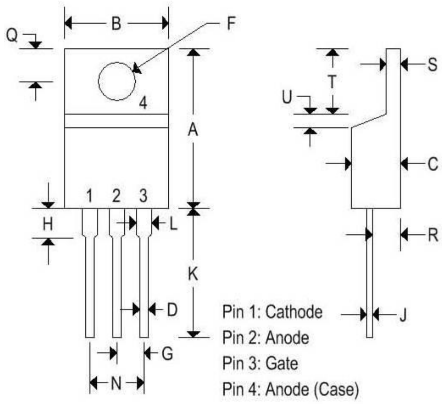
ELECTRICAL CHARACTERISTICS (T_C = 25°C)

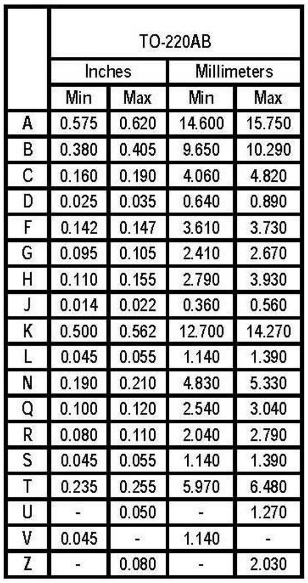
Characteristic	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS					
Gate trigger voltage (continuous dc) (V_D = 12 Vdc, R_L = 100 Ω)	V_{GT}	-	0.7	1.5	Volts
Gate non-trigger voltage (V_D = 12 Vdc, R_L = 100 Ω, T_J = 125°C)	V_{GD}	0.2	-	-	Volts
Holding current (V_D = 12Vdc, initiating current = 200mA, gate open)	I_H	-	6.0	50	mA
Turn on time (I_{TM} = 12A, I_{GT} = 40mAdc, V_D = rated V_{DRM})	t_{gt}	-	1.0	2.0	µs
Turn-off time (V_D = rated V_{DRM}) (I_{TM} = 12A, I_R = 12A) (I_{TM} = 12A, I_R = 12A, T_J = 125°C)	t_q	 - -	 15 35	 - -	µs
DYNAMIC CHARACTERISTICS					
Critical rate of rise of off-state voltage exponential (V_D = rated V_{DRM}, T_J = 125°C)	dv/dt	-	50	-	V/µs

Note 2: Pulse test: Pulse width ≤ 300µs, duty cycle ≤ 2%.

MECHANICAL CHARACTERISTICS

Case:	TO-220AB
Marking:	Body painted, alpha-numeric
Pin out:	See below

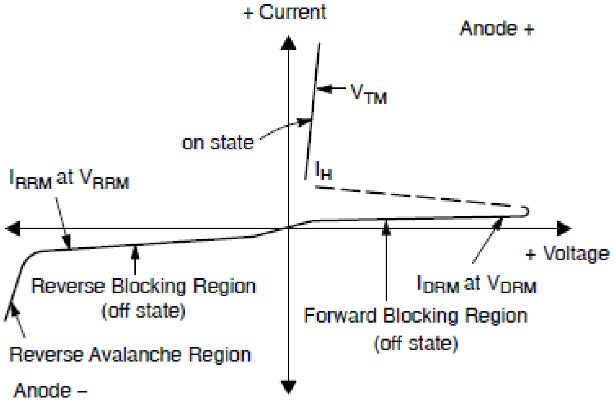




	TO-220AB			
	Inches		Millimeters	
	Min	Max	Min	Max
A	0.575	0.620	14.600	15.750
B	0.380	0.405	9.650	10.290
C	0.160	0.190	4.060	4.820
D	0.025	0.035	0.640	0.890
F	0.142	0.147	3.610	3.730
G	0.095	0.105	2.410	2.670
H	0.110	0.155	2.790	3.930
J	0.014	0.022	0.360	0.560
K	0.500	0.562	12.700	14.270
L	0.045	0.055	1.140	1.390
N	0.190	0.210	4.830	5.330
Q	0.100	0.120	2.540	3.040
R	0.080	0.110	2.040	2.790
S	0.045	0.055	1.140	1.390
T	0.235	0.255	5.970	6.480
U	-	0.050	-	1.270
V	0.045	-	1.140	-
Z	-	0.080	-	2.030

Voltage Current Characteristic of SCR

Symbol	Parameter
V_{DRM}	Peak Repetitive Off State Forward Voltage
I_{DRM}	Peak Forward Blocking Current
V_{RRM}	Peak Repetitive Off State Reverse Voltage
I_{RRM}	Peak Reverse Blocking Current
V_{TM}	Peak On State Voltage
I_H	Holding Current



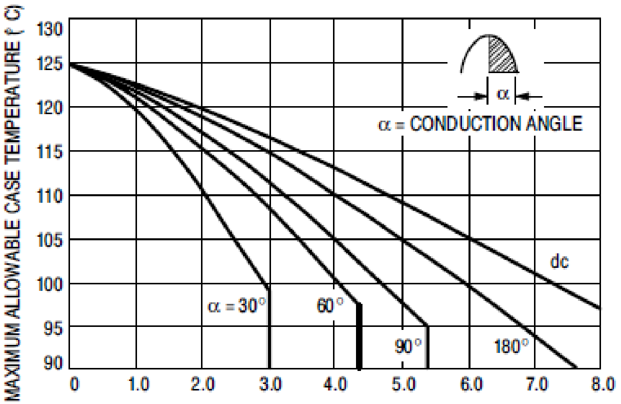


Figure 1. Current Derating

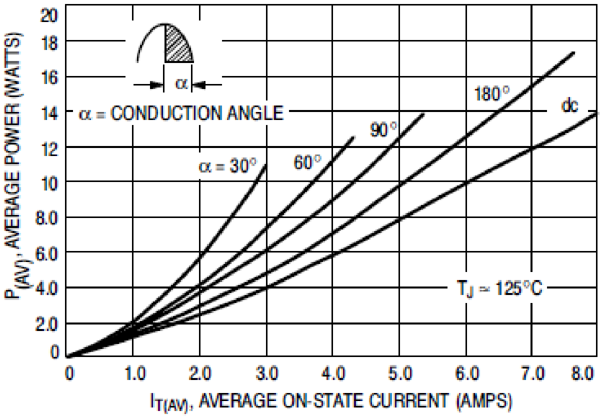


Figure 2. Maximum On–State Power Dissipation

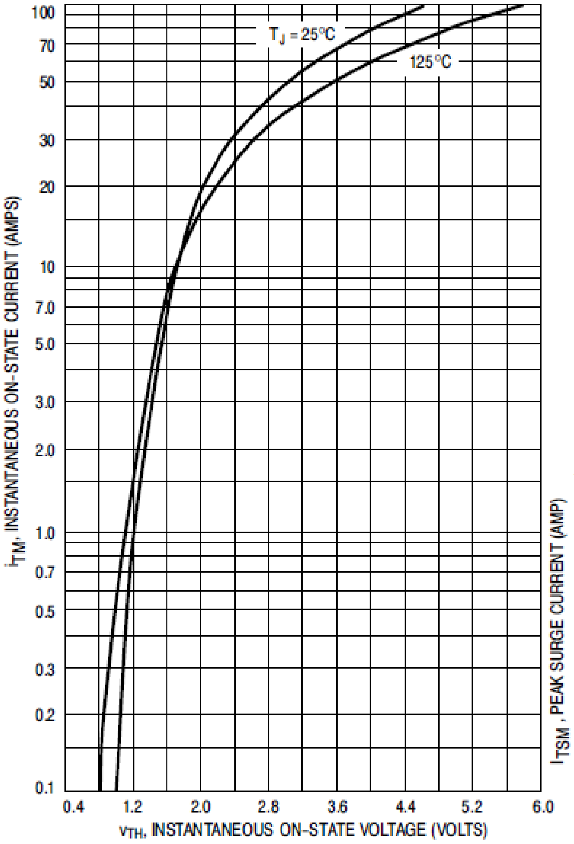


Figure 3. On–State Characteristics

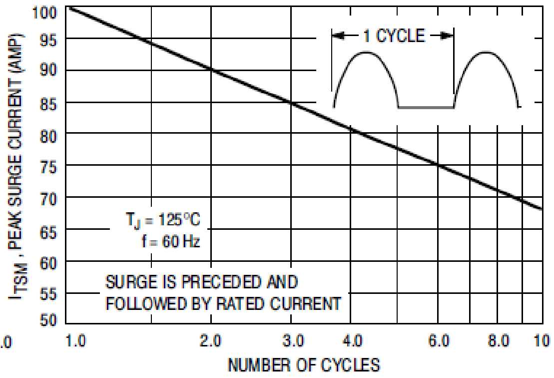


Figure 4. Maximum Non–Repetitive Surge Current

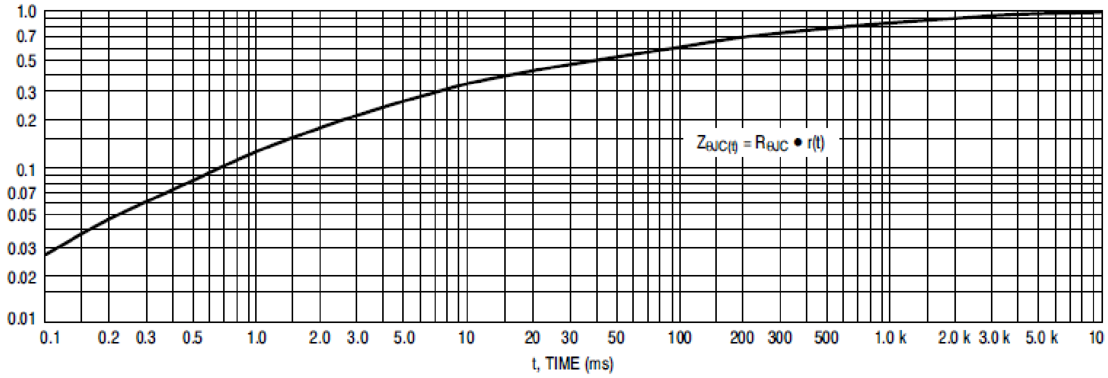


Figure 5. Thermal Response

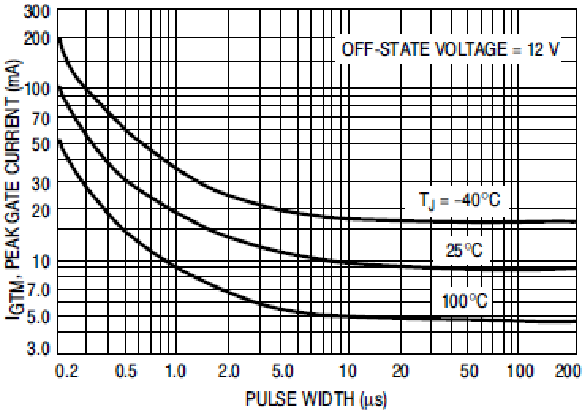


Figure 6. Typical Gate Trigger Current versus Pulse Width

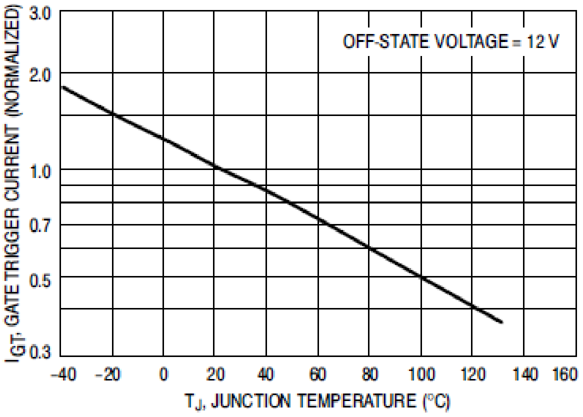


Figure 7. Typical Gate Trigger Current versus Temperature

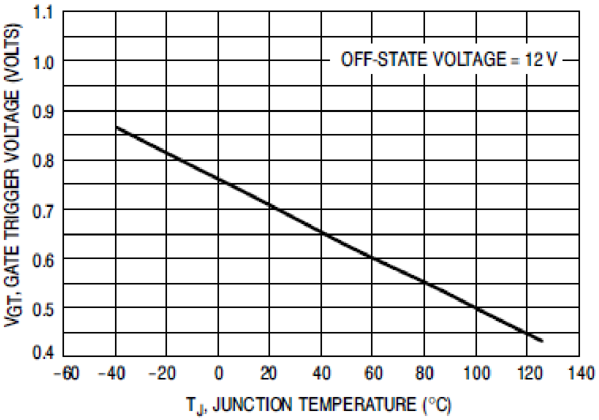


Figure 8. Typical Gate Trigger Voltage versus Temperature

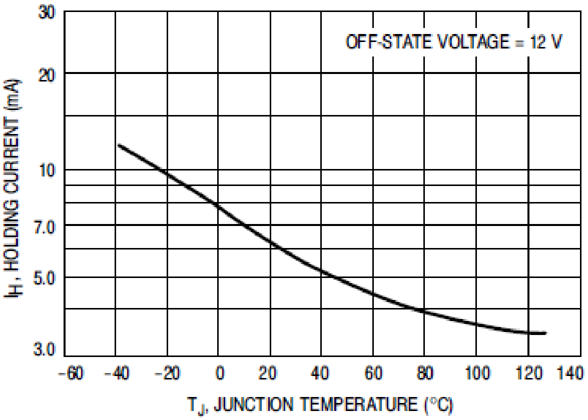


Figure 9. Typical Holding Current versus Temperature