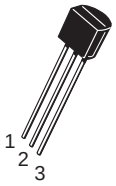
Suntac ELECTRONIC CORP

STC OT391
Sensitive Gate Silicon Controlled Rectifier
Reverse Blocking Thyristor

SCR
0.8 AMPERES RMS
600 VOLTS

PNPN device designed for line-powered general purpose applications such as relay and lamp drivers, small motor controls, gate drivers for larger thyristors, and sensing and detection circuits. Supplied in a cost effective plastic TO-92 package.

- Sensitive Gate Allows Direct Triggering by Microcontrollers and Other Logic Circuits
- On–State Current Rating of 0.8 Amperes RMS at 80°C
- Surge Current Capability – 10 Amperes
- Immunity to dV/dt – 20 V/µsec Minimum at 110°C
- Glass-Passivated Surface for Reliability and Uniformity
- Blocking Voltage to 600 Volts



TO−92 (TO−226)
CASE 029
STYLE 10

MAXIMUM RATINGS (T_J = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Peak Repetitive Off–State Voltage (Note 1.) (T_J = −40 to 110°C, Sine Wave, 50 to 60 Hz; Gate Open)	V_{DRM}, V_{RRM}	600	Volts
On-State RMS Current (T_C = 80°C) 180° Conduction Angles	$I_{T(RMS)}$	0.8	Amp
Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, T_J = 25°C)	I_{TSM}	10	Amps
Circuit Fusing Consideration (t = 10 ms)	I^2t	0.415	A^2s
Forward Peak Gate Power (T_A = 25°C, Pulse Width ≤ 1.0 µs)	P_{GM}	0.1	Watt
Forward Average Gate Power (T_A = 25°C, t = 20 ms)	$P_{G(AV)}$	0.10	Watt
Forward Peak Gate Current (T_A = 25°C, Pulse Width ≤ 1.0 µs)	I_{GM}	1.0	Amp
Reverse Peak Gate Voltage (T_A = 25°C, Pulse Width ≤ 1.0 µs)	V_{GRM}	5.0	Volts
Operating Junction Temperature Range @ Rate V_{RRM} and V_{DRM}	T_J	–40 to 110	°C
Storage Temperature Range	T_{stg}	–40 to 150	°C

PIN ASSIGNMENT	
1	Cathode
2	Gate
3	Anode

(1) V_{DRM} and V_{RRM} for all types can be applied on a continuous basis. 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 source such that the voltage ratings of the devices are exceeded.

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance – Junction to Case – Junction to Ambient	$R_{\theta JC}$ $R_{\theta JA}$	75 200	°C/W
Lead Solder Temperature (< 1/16″ from case, 10 secs max)	T_L	260	°C

ELECTRICAL CHARACTERISTICS (T_C = 25°C unless otherwise noted)

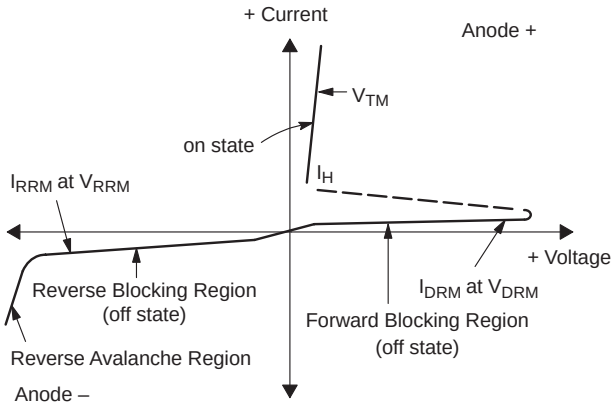
Characteristic		Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS						
Peak Repetitive Forward or Reverse Blocking Current (Note 1.) (V_D = Rated V_{DRM} and V_{RRM}; R_{GK} = 1.0 kΩ)	 T_C = 25°C T_C = 110°C	I_{DRM}, I_{RRM}	 – –	 – –	 10 0.1	 μA mA
ON CHARACTERISTICS						
Peak Forward On–State Voltage(*) (I_{TM} = 1.0 Amp Peak @ T_A = 25°C)		V_{TM}	–	–	1.3	Volts
Gate Trigger Current (Continuous dc) (Note 2.) (V_{AK} = 12 V, R_L = 100 Ohms)	T_C = 25°C	I_{GT}	–	6	8	μA
Holding Current (Note 2.) (V_{AK} = 12 V, I_{GT} = 0.5 mA)	T_C = 25°C T_C = –40°C	I_H	– –	0.5 –	5.0 10	mA
Latch Current (V_{AK} = 12 V, I_{GT} = 0.5 mA, R_{GK} = 1.0 k)	T_C = 25°C T_C = –40°C	I_L	– –	0.6 –	10 15	mA
Gate Trigger Voltage (Continuous dc) (Note 2.) (V_{AK} = 12 V, R_L = 100 Ohms, I_{GT} = 10 mA)	T_C = 25°C T_C = –40°C	V_{GT}	– –	0.5 –	0.52 1.2	Volts
DYNAMIC CHARACTERISTICS						
Critical Rate of Rise of Off–State Voltage (V_D = Rated V_{DRM}, Exponential Waveform, R_{GK} = 1000 Ohms, T_J = 110°C)		dV/dt	20	35	–	V/μs
Critical Rate of Rise of On–State Current (I_{PK} = 20 A; Pw = 10 μsec; diG/dt = 1.0 A/μsec, Igt = 20 mA)		di/dt	–	–	50	A/μs

*Indicates Pulse Test: Pulse Width ≤ 1.0 ms, Duty Cycle ≤ 1%.

1. R_{GK} = 1000 Ohms included in measurement.
2. Does not include R_{GK} in measurement.

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



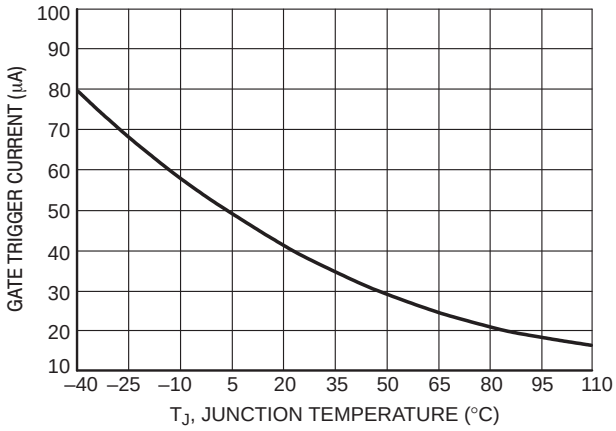


Figure 1. Typical Gate Trigger Current versus Junction Temperature

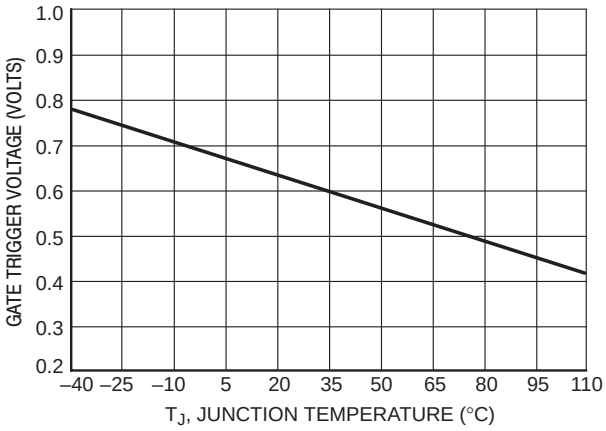


Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

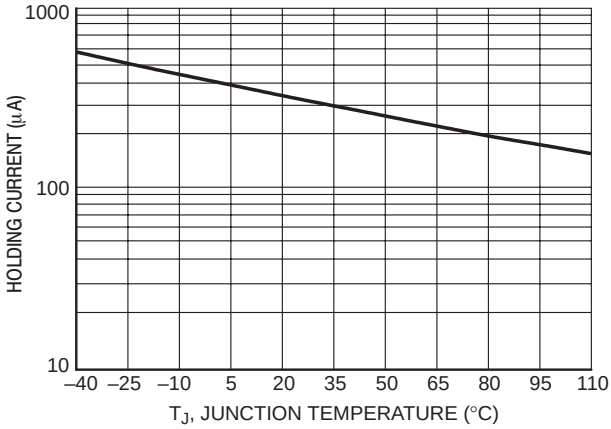


Figure 3. Typical Holding Current versus Junction Temperature

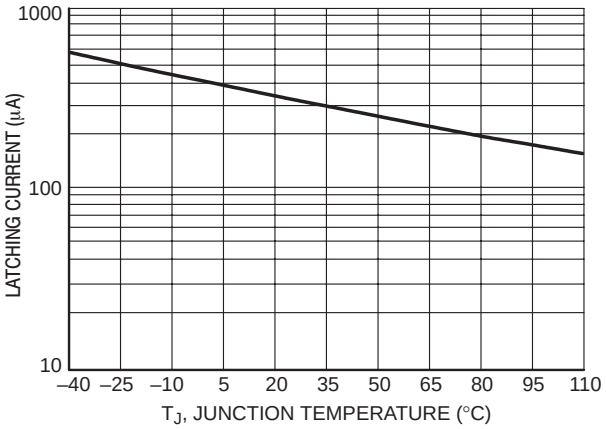


Figure 4. Typical Latching Current versus Junction Temperature

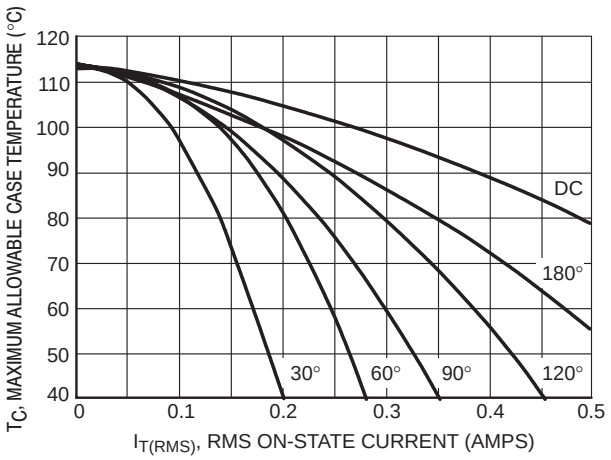


Figure 5. Typical RMS Current Derating

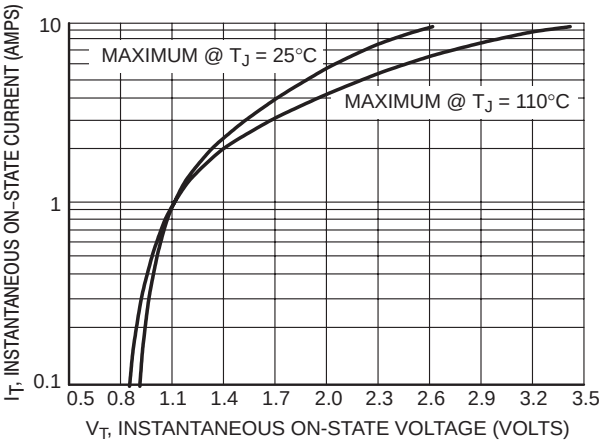


Figure 6. Typical On–State Characteristics