LITE-ON SEMICONDUCTOR

# S1U50-A SERIES

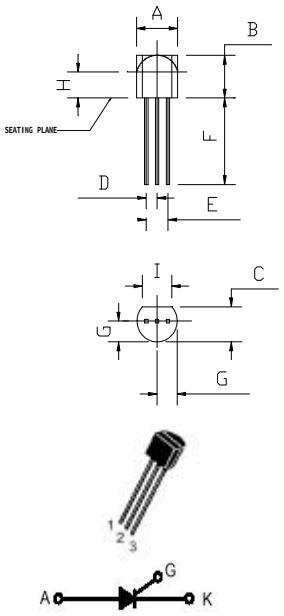
**Sensitive Gate**
**Sillicon Controlled Rectifiers**
**Reverse Blocking Thyristors**

SCRs
1 AMPERES RMS
100 thru 600 VOLTS

## FEATURES

- Sensitive Gate Allows Triggering by Microcontrollers and Other Logic Circuits
- Blocking Voltage to 600 Volts
- On– State Current Rating of 0.8 Amperes RMS at 80℃
- High Surge Current Capability — 10 Amperes
- Minimum and Maximum Values of IGT, VGT and IH Specified for Ease of Design
- Immunity to dV/dt — 20 V/msec Minimum at 110℃
- Glass-Passivated Surface for Reliability and Uniformity
- Pb-Free Package

## TO-92 (TO-226AA)




| TO-92 | | |
|---|---|---|
| DIM. | MIN. | MAX. |
| A | 4.45 | 4.70 |
| B | 4.32 | 5.33 |
| C | 3.18 | 4.19 |
| D | 1.15 | 1.39 |
| E | 2.42 | 2.66 |
| F | 12.7 | ------ |
| G | 2.04 | 2.66 |
| H | 2.93 | ----- |
| I | 3.43 | ----- |
| All Dimensions in millimeter | | |

| PIN ASSIGNMENT | |
|---|---|
| 1 | Cathode |
| 2 | Gate |
| 3 | Anode |

## MAXIMUM RATINGS (Tj= 25℃ unless otherwise noticed)

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Off– State Voltage (TJ= -40 to 110℃, Sine Wave, 50 to 60 Hz; Gate Open)<br>S1U50100A<br>S1U50200A<br>S1U50400A<br>S1U50600A<br>S1U50700A | VDRM, VRRM | 100<br>200<br>400<br>600<br>700 | Volts |
| On-State RMS Current (TC = 80℃) 180° Conduction Angles | IT(RMS) | 1.0 | Amp |
| Peak Non-Repetitive Surge Current (1/2 Cycle, Sine Wave, 60 Hz, TJ = 25℃) | ITSM | 10 | Amps |
| Circuit Fusing Consideration (t = 8.3 ms) | $I^2t$ | 0.415 | $A^2s$ |
| Forward Peak Gate Power (TA = 25℃, Pulse Width ≦ 1.0 us) | PGM | 0.1 | Watt |
| Forward Average Gate Power (TA = 25℃, t = 8.3 ms) | PG(AV) | 0.1 | Watt |
| Forward Peak Gate Current (TA = 25℃, Pulse Width≦ 1.0 us) | IGM | 1.0 | Amp |
| Reverse Peak Gate Voltage (TA = 25℃, Pulse Width ≦ 1.0 ms) | VGRM | 5 | Volts |
| Operating Junction Temperature Range @ Rate VRRM and VDRM | TJ | -40 to +110 | ℃ |
| Storage Temperature Range | Tstg | -40 to +150 | ℃ |

Notice: (1) VDRM and VRRM for all types can be applied on a continuous basis. Ratings apply for zero or negative gate voltage; 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

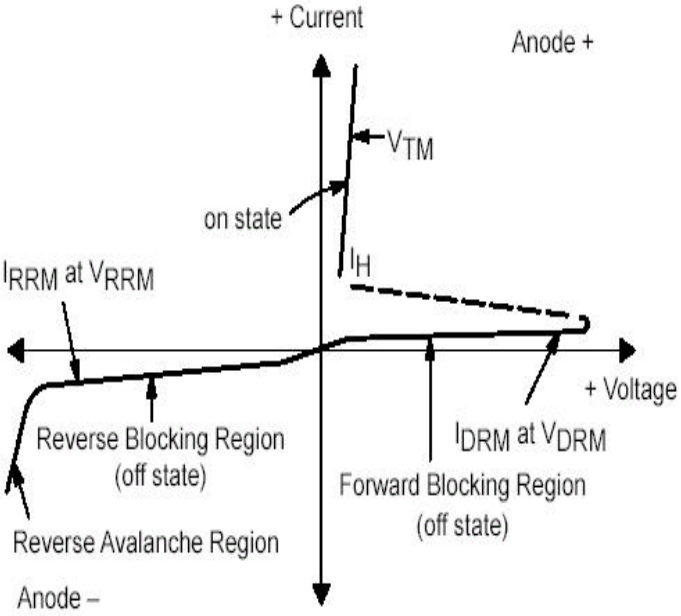
| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance - Junction to Case<br>- Junction to Ambient | $R_{thJC}$<br>$R_{thJA}$ | 75<br>150 | ℃/W |
| Maximum Lead Temperature for Soldering Purposes 1/16" from Case for 10 Seconds | $T_L$ | 260 | ℃ |

## ELECTRICAL CHARACTERISTICS ($T_C$=25℃unless otherwise noted)

| Characteristics | | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | | |
| Peak Reptitive Forward or Reverse Blocking Current (1)<br>(VD=Rated VDRM and VRRM; RGK =1K Ohms) | $T_C$=25℃<br>$T_C$=125℃ | $I_{DRM}$<br>$I_{RRM}$ | ----<br>---- | ----<br>---- | 10<br>100 | uA |
| **ON CHARACTERISTICS** | | | | | | |
| Peak Forward On-State Voltage @$T_A$=25℃<br>($I_{TM}$=± 1.0A Peak, Pulse Width≦ 1.0 ms, Duty Cycle ≦ 1%) | | $V_{TM}$ | ---- | ---- | 1.7 | Volts |
| Gate Trigger Current (Continuous dc) (2)<br>($V_{AK}$ = 7.0 Vdc; RL = 100 Ohms) | $T_C$=25℃ | $I_{GT}$ | ---- | 20 | 50 | uA |
| Holding Current ($V_{AK}$ = 7.0 V, Initiating Current = 20 mA) | $T_C$=25℃<br>$T_C$=-40℃ | $I_H$ | ----<br>---- | 0.5<br>---- | 5.0<br>10 | mA |
| Latch Current ($V_{AK}$ =7.0 V, Ig= 200 uA) | $T_C$=25℃<br>$T_C$=-40℃ | $I_L$ | ---- | 0.6<br>---- | 10<br>15 | mA |
| Gate Trigger Voltage (Continuous dc)<br>($V_D$ = 7.0 Vdc; $R_L$ =100 Ohms) | $T_C$= 25℃<br>$T_C$=-40℃ | $V_{GT}$ | ----<br>---- | 0.62<br>----- | 0.8<br>1.2 | Volts |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| Critical Rate of Rise of Off-State Voltage<br>($V_D$=Rated $V_{DRM}$,Exponential Waveform, PGK=1K Ohms, $T_J$=110℃ | | dv/dt | 20 | 35 | ---- | V/us |
| Repetitive Critical Rate of Rise of On-State Current<br>IPK=20A,Pw=10 usec,diG/dt=1A/usex,Igt=20mA | | di/dt | ---- | ---- | 50 | A/us |

(1) $R_{GK}$ = 1000 Ohms included in measurement
(2) Does not include $R_{GK}$ in measure

| 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 |



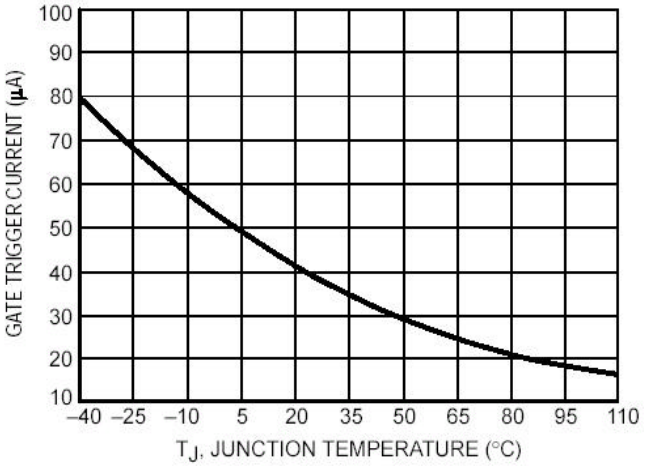




Figure 1. Typical Gate Trigger Current versus Junction Temperature

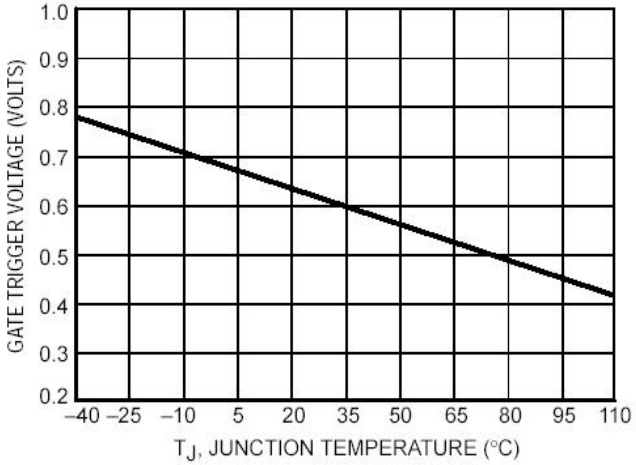



Figure 2. Typical Gate Trigger Voltage versus Junction Temperature

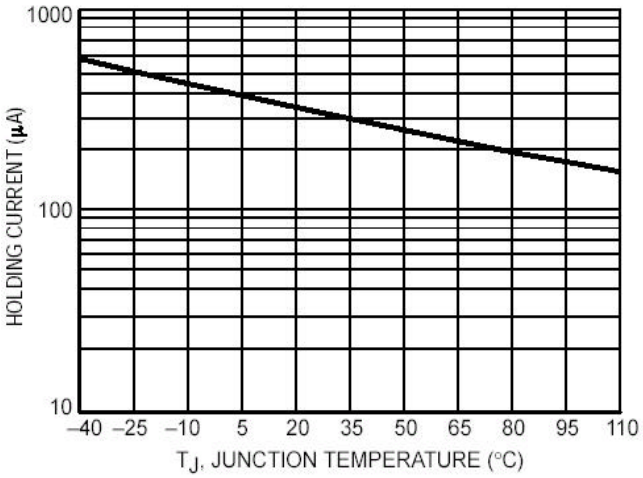



**Figure 3. Typical Holding Current versus Junction Temperature**

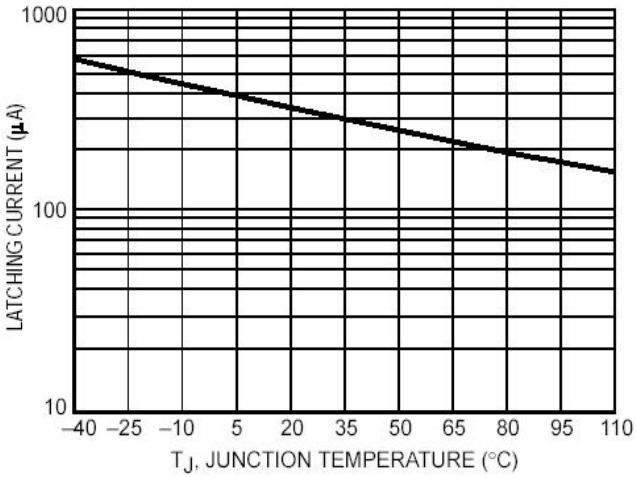



**Figure 4. Typical Latching Current versus Junction Temperature**

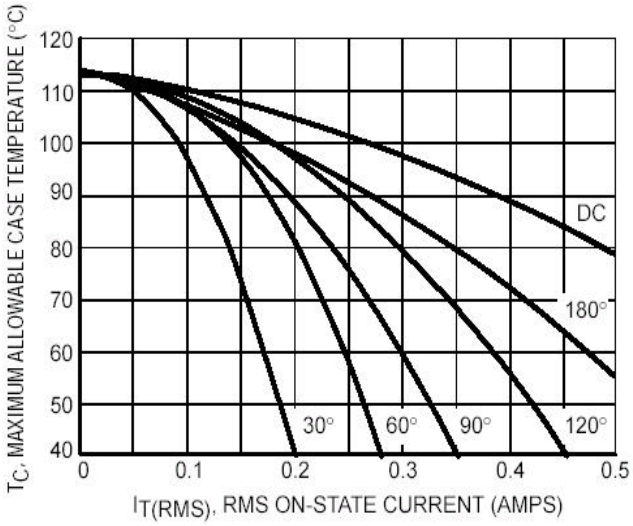



**Figure 5. Typical RMS Current Derating**

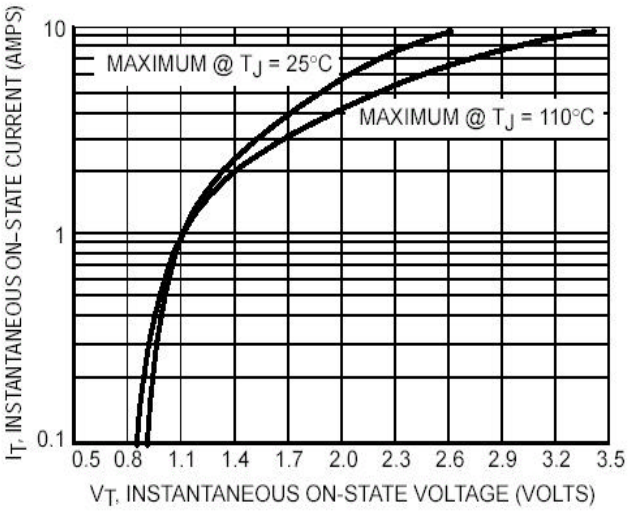



**Figure 6. Typical On–State Characteristics**