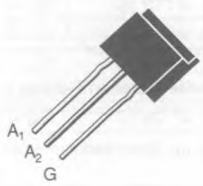
SGS-THOMSON MICROELECTRONICS

# TLC 111 S→TLC 381 S

## SENSITIVE GATE TRIACS

- GLASS PASSIVATED CHIP
- HIGH SURGE CURRENT




TL
(Plastic)

### DESCRIPTION

Low power triacs suited for 50 and 60 Hz up to 380 $V_{RMS}$.

### APPLICATIONS

- CONTROL SPEED FOR LITTLE MOTORS ; ELECTRIC PUMP OR VENTILATOR, SEWING MACHINE
- RELAY, DETECTOR, ALARM SYSTEM
- ELECTRONIC STARTER FOR LAMP
- HIGH POWER TRIAC DRIVER

### ABSOLUTE RATINGS (limiting values)

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $I_{T(RMS)}$ | RMS on-state Current (360° conduction angle) | $T_l$ = 40 °C | 1 | A |
| $I_{T(RMS)}$ | RMS on-state Current on Printed Circuit (360° conduction angle) | $T_a$ = 25 °C | 0.77 | A |
| $I_{TSM}$ | Non Repetitive Surge Peak on-state Current ($T_j$ initial = 25 °C - Half sine wave) | t = 8.3 ms | 16 | A |
| | | t = 10 ms | 15 | |
| $I^2t$ | $I^2t$ Value for Fusing | t = 10 ms | 1.125 | $A^2s$ |
| di/dt | Critical Rate of Rise of on-state Current (1) | Repetitive | 10 | A/µs |
| $T_{stg}$<br>$T_j$ | Storage and Operating Junction Temperature Range | | – 40 to 150<br>– 40 to 110 | °C<br>°C |

| Symbol | Parameter | TLC111S | TLC221S | TLC331S | TLC381S | Unit |
|---|---|---|---|---|---|---|
| $V_{DRM}$ | Repetitive Peak off-state Voltage (2) | 200 | 400 | 600 | 700 | V |

(1) $I_G$ = 100 mA  $di_G/dt$ = 1 A/µs
(2) $T_j$ = 110 °C.

### THERMAL RESISTANCES

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $R_{th\ (j-a)}$ | Junction to Ambient on Printed Circuit | 75 | °C/W |
| $R_{th\ (j-l)}$ | Junction-leads for 360° Conduction Angle (F = 50 Hz) | 45 | °C/W |

## GATE CHARACTERISTICS (maximum values)

$P_{GM}$ = 2 W ($t_p$ = 10 µs) $I_{GM}$ = 1 A ($t_p$ = 10 µs)

$P_{G(AV)}$ = 0.1 W $V_{GM}$ = 16 V ($t_p$ = 10 µs)

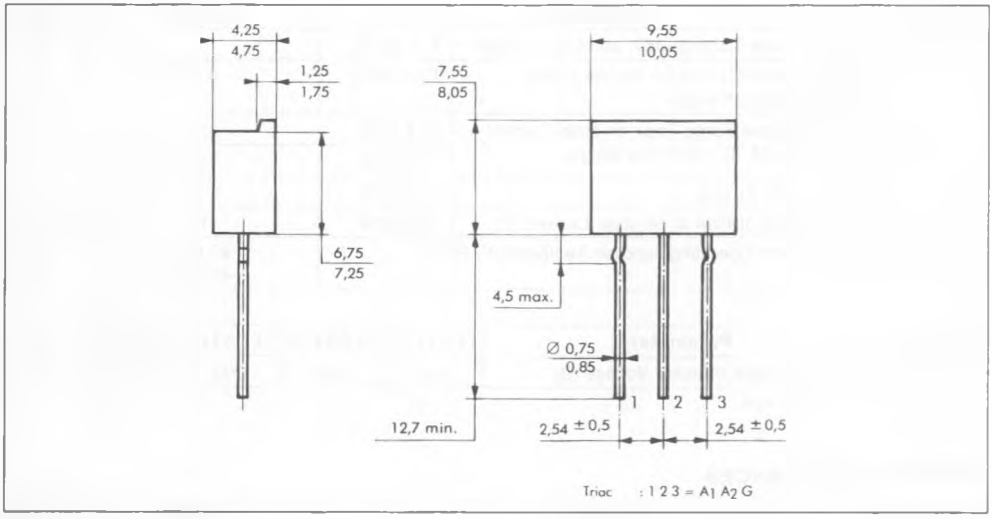
## ELECTRICAL CHARACTERISTICS

| Symbol | Test Conditions | | | Quadrants | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|---|
| $I_{GT}$ | $T_j$ = 25 °C<br>Pulse Duration > 20 µs | $V_D$ = 12 V | $R_L$ = 33 Ω | I-II-III-IV | | | 10 | mA |
| $V_{GT}$ | $T_j$ = 25 °C<br>Pulse Duration > 20 µs | $V_D$ = 12 V | $R_L$ = 33 Ω | I-II-III-IV | | | 1.5 | V |
| $V_{GD}$ | $T_j$ = 110 °C | $V_D = V_{DRM}$ | $R_L$ = 3.3 kΩ | I-II-III-IV | 0.2 | | | V |
| $I_H$* | $T_j$ = 25 °C | $I_T$ = 100 mA | Gate Open | | | | 25 | mA |
| $I_L$ | $T_j$ = 25 °C<br>Pulse Duration > 20 µs | $V_D$ = 12 V | $I_G$ = 20 mA | I-II-III-IV | | | 25 | mA |
| $V_{TM}$* | $T_j$ = 25 °C | $I_{TM}$ = 1.4 A | $t_p$ = 10 ms | | | | 1.8 | V |
| $I_{DRM}$* | $V_{DRM}$ Specified | | $T_j$ = 25 °C | | | | 0.01 | mA |
| | | | $T_j$ = 110 °C | | | | 0.75 | |
| dv/dt* | $T_j$ = 110 °C<br>Linear Slope up to $V_D$ = 67 % $V_{DRM}$ | Gate Open | | | | 20 | | V/µs |
| $(dv/dt)_c$* | $T_j$ = 40 °C<br>$(di/dt)_c$ = 0.4 A/ms | $V_D = V_{DRM}$ | $I_T$ = 1.4 A | | | 5 | | V/µs |
| $t_{gt}$ | $T_j$ = 25 °C<br>$I_G$ = 100 mA | $V_D = V_{DRM}$<br>$dI_G/dt$ = 1 A/µs | $I_T$ = 1.4 A | I-II-III-IV | | 3 | | µs |

* For either polarity of electrode $A_2$ voltage with reference to electrode $A_1$.

## PACKAGE MECHANICAL DATA

TL Plastic




Cooling method : by convection (method A)
Marking : type number
Weight : 0.8 g.

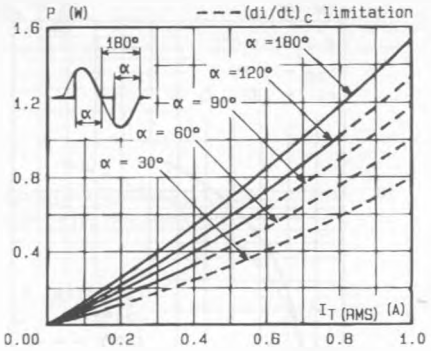



Fig.1 - Maximum mean power dissipation versus RMS on-state current (F = 60 Hz).

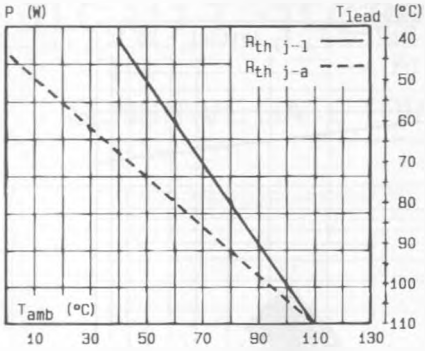



Fig.2 - Correlation between maximum mean power dissipation and maximum allowable temperatures ($T_{amb}$ and $T_{lead}$) resistances heatsink + contact.

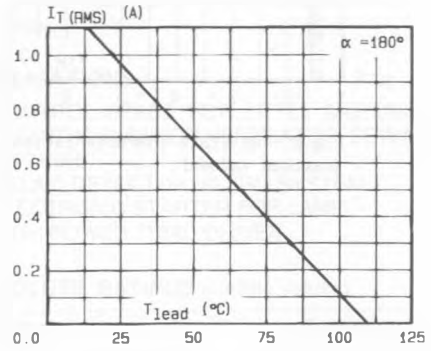



Fig.3 - RMS on-state current versus lead temperature.

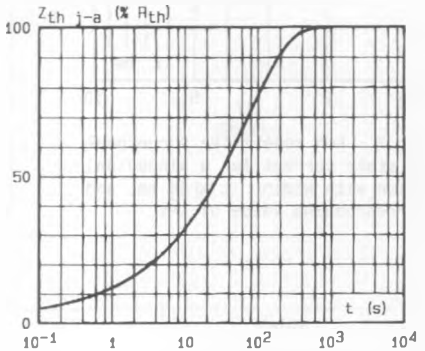



Fig.4 - Thermal transient impedance junction to ambient versus pulse duration.

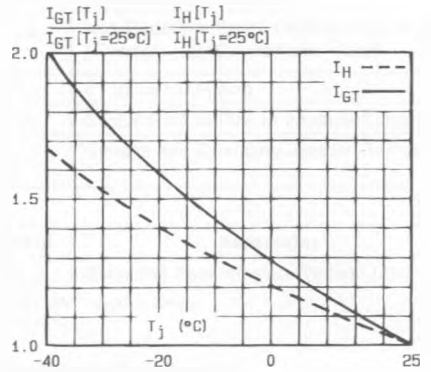



Fig.5 - Relative variation of gate trigger current and holding current versus junction temperature.

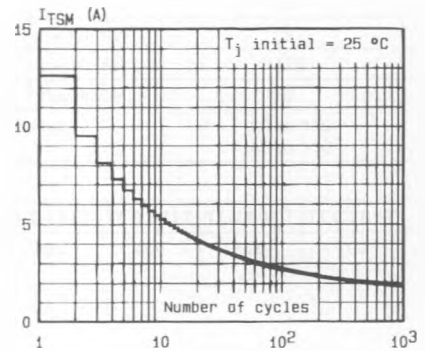



Fig.6 - Non repetitive surge peak on state current versus number of cycles.

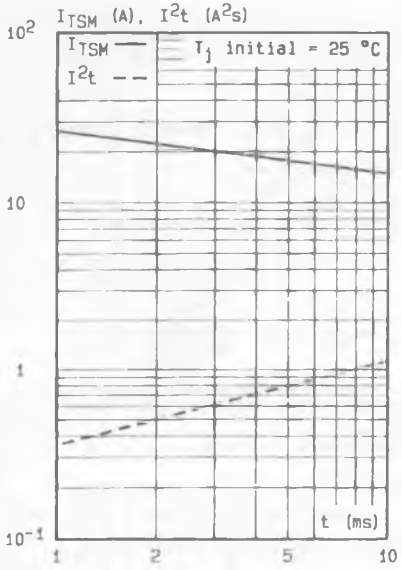



Fig.7 - Non repetitive surge peak on-state current for a sinusoidal pulse with width : t ≤ 10 ms, and corresponding value of $I^2t$.

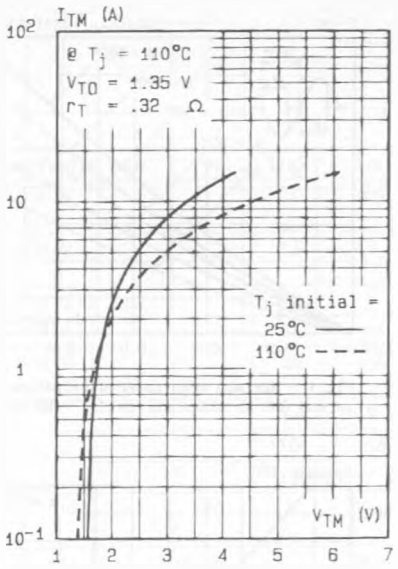



Fig.8 - On-state characteristics (maximum values).