

### SENSITIVE GATE TRIACS

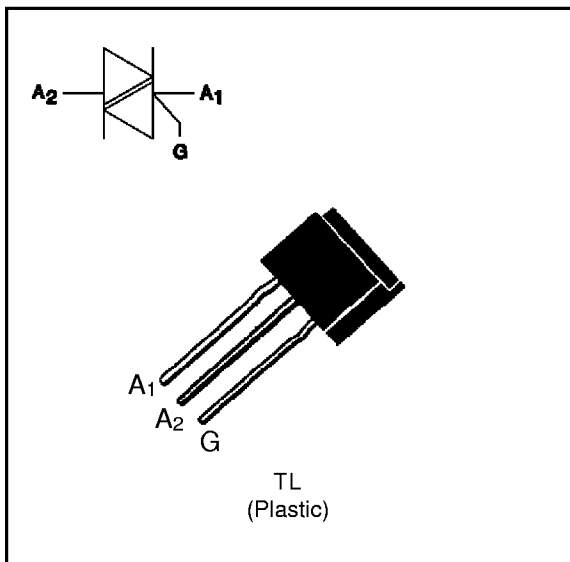
#### FEATURES

- VERY LOW  $I_{GT} = 5\text{mA max}$
- LOW  $I_H = 15\text{mA max}$

#### DESCRIPTION

The TLC116 ---> TLC386 T/D/S/A triac family uses a high performance glass passivated PNPN technology.

These parts are suitable for general purpose applications where gate high sensitivity is required. Application on 4Q such as phase control and static



#### ABSOLUTE RATINGS (limiting values)

| Symbol     | Parameter                                                                             |                         | Value                          | Unit     |
|------------|---------------------------------------------------------------------------------------|-------------------------|--------------------------------|----------|
| IT(RMS)    | RMS on-state current<br>(360° conduction angle)                                       | TI = 40°C               | 3                              | A        |
|            |                                                                                       | Ta = 25°C               | 1.3 (1)                        |          |
| ITSM       | Non repetitive surge peak on-state current<br>( TJ initial = 25°C )                   | tp = 8.3 ms             | 31.5                           | A        |
|            |                                                                                       | tp = 10 ms              | 30                             |          |
| I2t        | I2t value                                                                             | tp = 10 ms              | 4.5                            | A2s      |
| di/dt      | Critical rate of rise of on-state current<br>Gate supply : IG = 50mA diG/dt = 0.1A/μs | Repetitive<br>F = 50 Hz | 10                             | A/μs     |
|            |                                                                                       | Non<br>Repetitive       | 50                             |          |
| Tstg<br>TJ | Storage and operating junction temperature range                                      |                         | - 40 to + 150<br>- 40 to + 110 | °C<br>°C |
| TI         | Maximum lead temperature for soldering during 4 s at 4.5 mm from case                 |                         | 230                            | °C       |

| Symbol       | Parameter                                    | TLC         |             |             |             | Unit |
|--------------|----------------------------------------------|-------------|-------------|-------------|-------------|------|
|              |                                              | 116 T/D/S/A | 226 T/D/S/A | 336 T/D/S/A | 386 T/D/S/A |      |
| VDRM<br>VRRM | Repetitive peak off-state voltage TJ = 110°C | 200         | 400         | 600         | 700         | V    |

(1) With Cu surface  $1\text{cm}^2$ .

**THERMAL RESISTANCES**

| Symbol       | Parameter                                                               | Value | Unit |
|--------------|-------------------------------------------------------------------------|-------|------|
| Rth (j-a)    | Junction to ambient on printed circuit with Cu surface 1cm <sup>2</sup> | 50    | °C/W |
| Rth (j-l) DC | Junction leads for DC                                                   | 20    | °C/W |
| Rth (j-l) AC | Junction leads for 360° conduction angle ( F= 50 Hz)                    | 15    | °C/W |

**GATE CHARACTERISTICS (maximum values)**

P<sub>G</sub> (AV) = 0.1W    P<sub>GM</sub> = 2W (tp = 20 μs)    I<sub>GM</sub> = 1A (tp = 20 μs)    V<sub>GM</sub> = 16V (tp = 20 μs).

**ELECTRICAL CHARACTERISTICS**

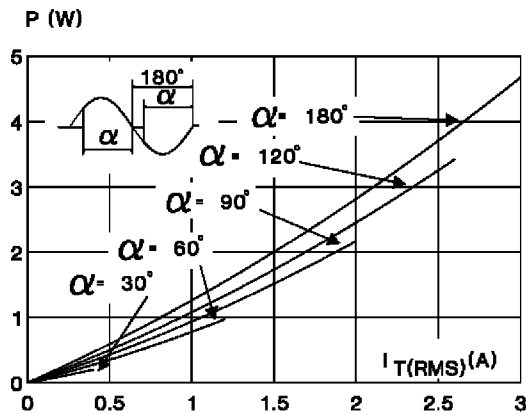
| Symbol                               | Test Conditions                                                                         |                       | Quadrant    |     | Suffix |    |    |    | Unit |
|--------------------------------------|-----------------------------------------------------------------------------------------|-----------------------|-------------|-----|--------|----|----|----|------|
|                                      |                                                                                         |                       |             |     | T      | D  | S  | A  |      |
| I <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                            | T <sub>j</sub> =25°C  | I-II-III    | MAX | 5      | 5  | 10 | 10 | mA   |
|                                      |                                                                                         |                       | IV          | MAX | 5      | 10 | 10 | 25 |      |
| V <sub>GT</sub>                      | V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω                                            | T <sub>j</sub> =25°C  | I-II-III-IV | MAX | 1.5    |    |    |    | V    |
| V <sub>GD</sub>                      | V <sub>D</sub> =V <sub>DRM</sub> R <sub>L</sub> =3.3kΩ                                  | T <sub>j</sub> =110°C | I-II-III-IV | MIN | 0.2    |    |    |    | V    |
| tgt                                  | V <sub>D</sub> =V <sub>DRM</sub> I <sub>G</sub> = 40mA<br>dI <sub>G</sub> /dt = 0.5A/μs | T <sub>j</sub> =25°C  | I-II-III-IV | TYP | 2      |    |    |    | μs   |
| I <sub>L</sub>                       | I <sub>G</sub> = 1.2 I <sub>GT</sub>                                                    | T <sub>j</sub> =25°C  | I-III-IV    | MAX | 15     | 15 | 25 | 25 | mA   |
|                                      |                                                                                         |                       | II          |     | 15     | 15 | 25 | 25 |      |
| I <sub>H</sub> *                     | I <sub>T</sub> = 100mA gate open                                                        | T <sub>j</sub> =25°C  |             | MAX | 15     | 15 | 25 | 25 | mA   |
| V <sub>TM</sub> *                    | I <sub>TM</sub> = 4A tp= 380μs                                                          | T <sub>j</sub> =25°C  |             | MAX | 1.85   |    |    |    | V    |
| I <sub>DRM</sub><br>I <sub>RRM</sub> | V <sub>DRM</sub> Rated<br>V <sub>RRM</sub> Rated                                        | T <sub>j</sub> =25°C  |             | MAX | 0.01   |    |    |    | mA   |
|                                      |                                                                                         | T <sub>j</sub> =110°C |             | MAX | 0.75   |    |    |    |      |
| dV/dt *                              | Linear slope up to<br>V <sub>D</sub> =67%V <sub>DRM</sub><br>gate open                  | T <sub>j</sub> =110°C |             | TYP | 10     | 10 | 20 | 20 | V/μs |
| (dV/dt) <sub>c</sub> *               | (dI/dt) <sub>c</sub> = 1.3A/ms                                                          | T <sub>j</sub> =110°C |             | TYP | 1      | 1  | 5  | 5  | V/μs |

\* For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>.

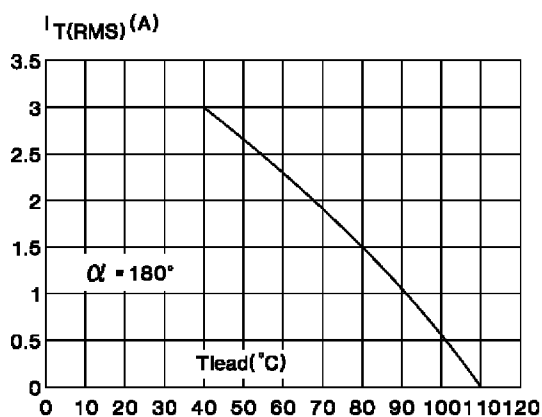
## ORDERING INFORMATION

| Package | $I_T(\text{RMS})$ | $V_{\text{DRM}} / V_{\text{RRM}}$ | Sensitivity Specification |   |   |   |
|---------|-------------------|-----------------------------------|---------------------------|---|---|---|
|         | A                 | V                                 | T                         | D | S | A |
| TLC ..6 | 3                 | 200                               | X                         | X | X | X |
|         |                   | 400                               | X                         | X | X | X |
|         |                   | 600                               | X                         | X | X | X |
|         |                   | 700                               | X                         | X | X | X |

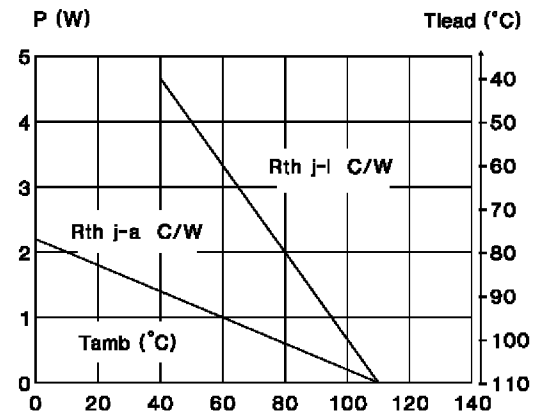
**Fig.1** : Maximum RMS power dissipation versus RMS on-state current ( $F=50\text{Hz}$ ).  
(Curves are cut off by  $(di/dt)_c$  limitation)



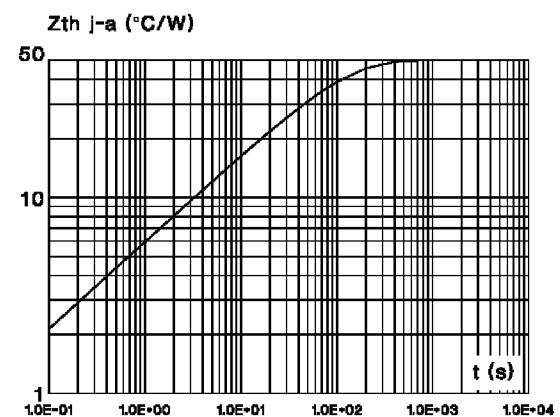
**Fig.3** : RMS on-state current versus case temperature.



**Fig.2** : Correlation between maximum RMS power dissipation and maximum allowable temperatures ( $T_{\text{amb}}$  and  $T_{\text{lead}}$ ).



**Fig.4** : Thermal transient impedance junction to case and junction to ambient versus pulse duration.



TLC116 T/D/S/A ---> TLC386 T/D/S/A

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

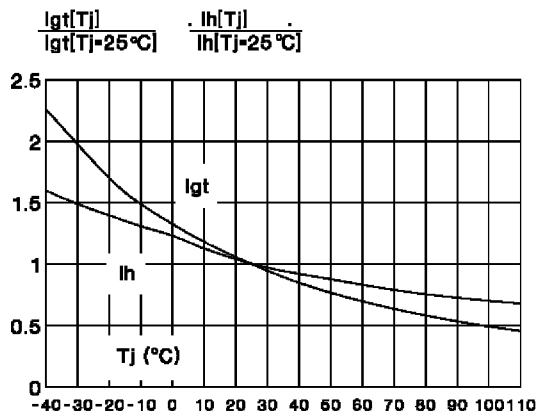


Fig.6 : Non Repetitive surge peak on-state current versus number of cycles.

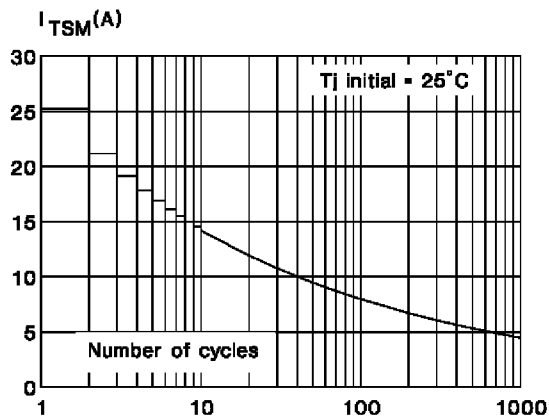


Fig.7 : Non repetitive surge peak on-state current for a sinusoidal pulse with width :  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .

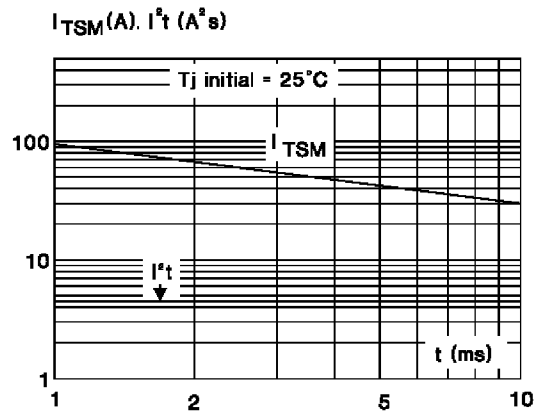
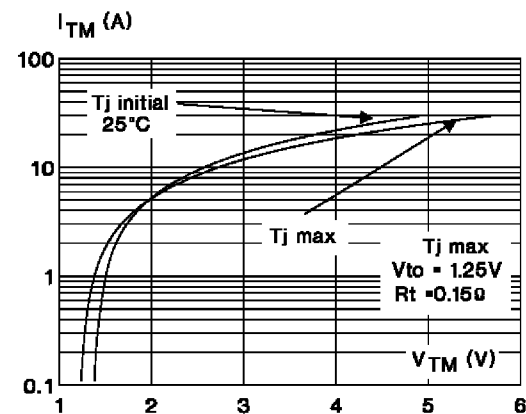
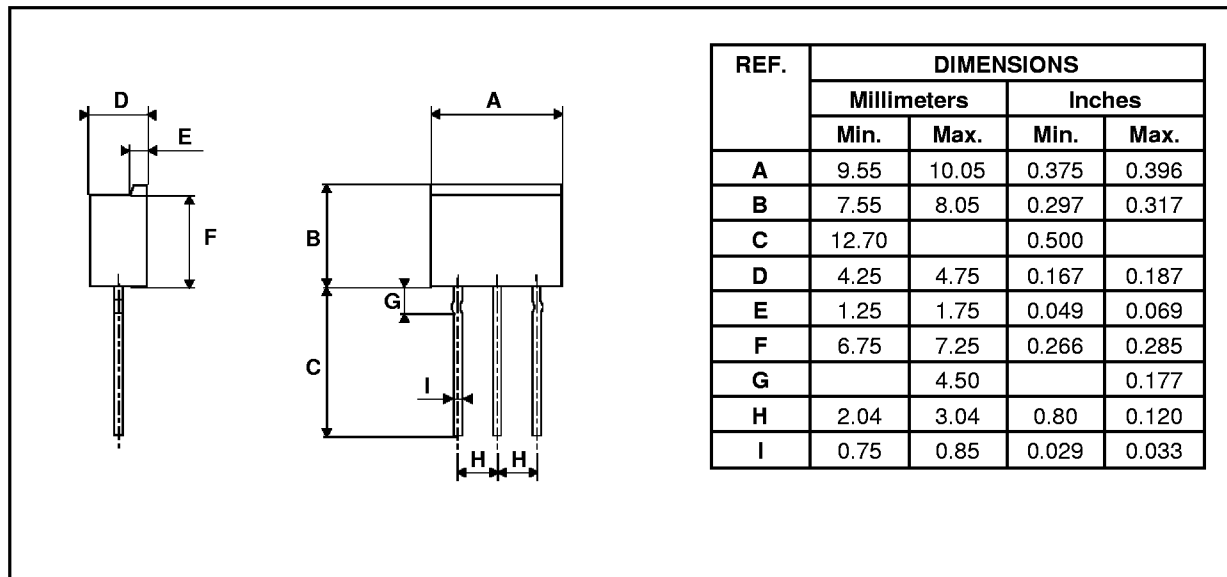


Fig.8 : On-state characteristics (maximum values).



**PACKAGE MECHANICAL DATA**

TL Plastic



Marking : type number

Weight : 0.75 g

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