

## SENSITIVE GATE TRIACS

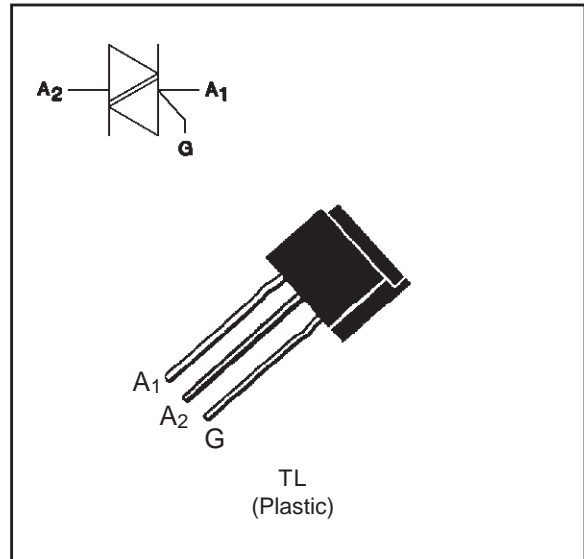
### FEATURES

- 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	
$I_T(\text{RMS})$	RMS on-state current (360° conduction angle)	$T_I = 40^\circ\text{C}$	3	A
		$T_a = 25^\circ\text{C}$	1.3 (1)	
$I_{TSM}$	Non repetitive surge peak on-state current ( $T_j$ initial = $25^\circ\text{C}$ )	$t_p = 8.3 \text{ ms}$	31.5	A
		$t_p = 10 \text{ ms}$	30	
$I^2t$	$I^2t$ value	$t_p = 10 \text{ ms}$	4.5	$\text{A}^2\text{s}$
$di/dt$	Critical rate of rise of on-state current Gate supply : $I_G = 50\text{mA}$ $di_G/dt = 0.1\text{A}/\mu\text{s}$	Repetitive $F = 50 \text{ Hz}$	10	$\text{A}/\mu\text{s}$
		Non Repetitive	50	
$T_{stg}$ $T_j$	Storage and operating junction temperature range	- 40 to + 150 - 40 to + 110	$^\circ\text{C}$ $^\circ\text{C}$	
$T_I$	Maximum lead temperature for soldering during 4 s at 4.5 mm from case	230	$^\circ\text{C}$	

Symbol	Parameter	TLC				Unit
		116 T/D/S/A	226 T/D/S/A	336 T/D/S/A	386 T/D/S/A	
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage $T_j = 110^\circ\text{C}$	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**

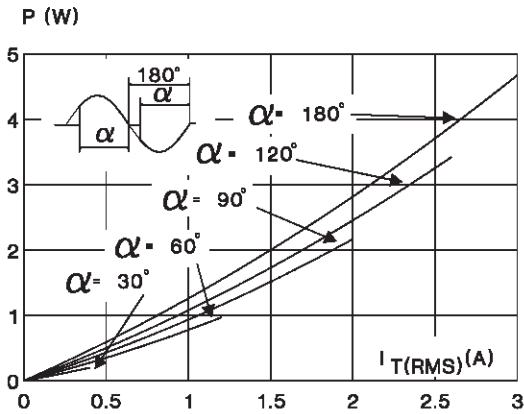
Symbol	Test Conditions		Quadrant		Suffix				Unit
					T	D	S	A	
I <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω	T <sub>j</sub> =25°C	I-II-III	MAX	5	5	10	10	mA
			IV	MAX	5	10	10	25	
V <sub>GT</sub>	V <sub>D</sub> =12V (DC) R <sub>L</sub> =33Ω	T <sub>j</sub> =25°C	I-II-III-IV	MAX	1.5				V
V <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
t <sub>gt</sub>	V <sub>D</sub> =V <sub>DRM</sub> I <sub>G</sub> = 40mA 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> I <sub>RRM</sub>	V <sub>DRM</sub> Rated V <sub>R</sub> RRM 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 V <sub>D</sub> =67%V <sub>DRM</sub> 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>.

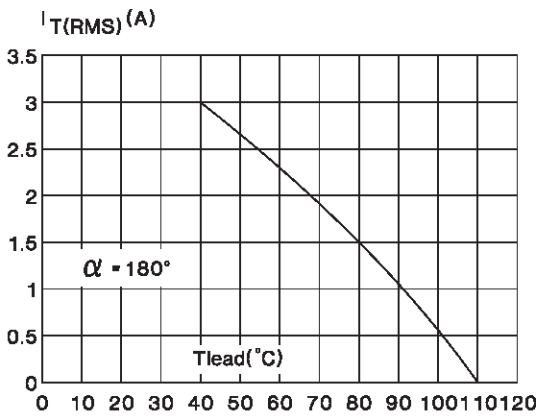
ORDERING INFORMATION

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

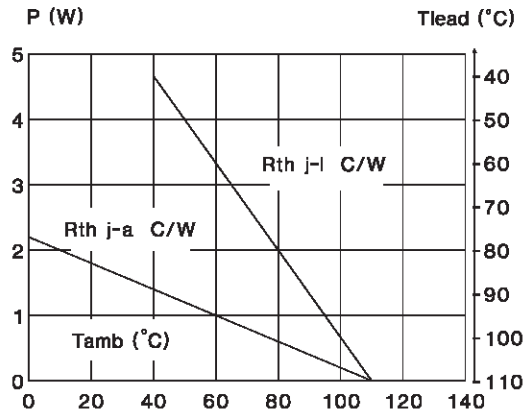
**Fig.1** : Maximum RMS power dissipation versus RMS on-state current ( $F=50\text{Hz}$ ).  
(Curves are cut off by  $(di/dt)_c$  limitation)



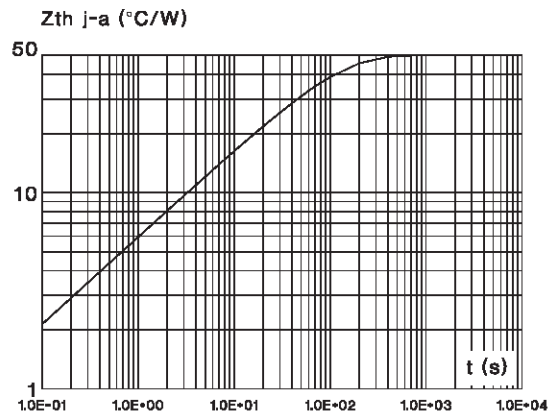
**Fig.3** : RMS on-state current versus case temperature.



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

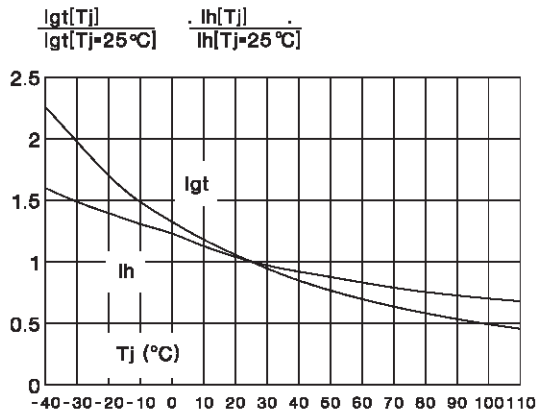


**Fig.4** : Thermal transient impedance junction to case and junction to ambient versus pulse duration.

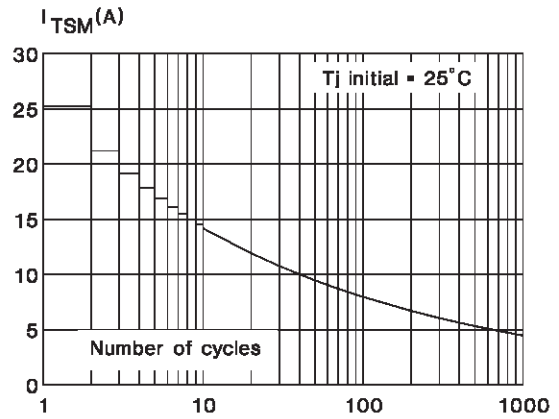


# TLC116 T/D/S/A ---> TLC386 T/D/S/A

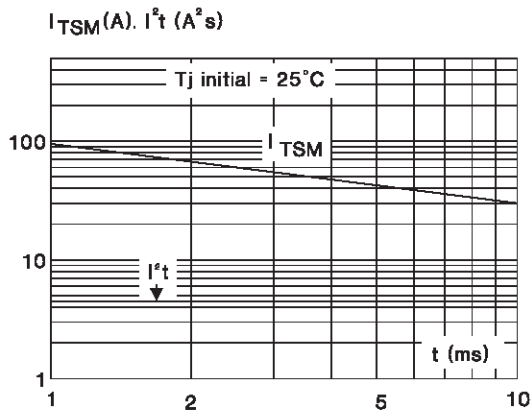
**Fig.5** : Relative variation of gate trigger current and holding current versus junction temperature.



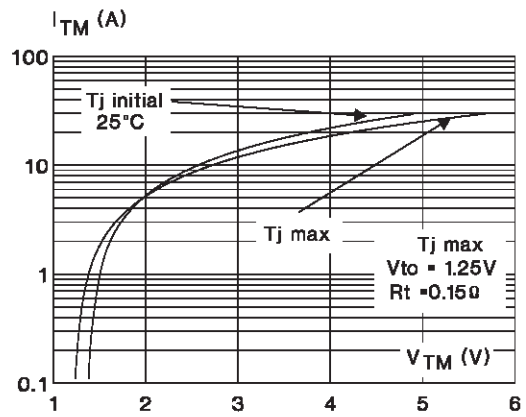
**Fig.6** : Non Repetitive surge peak on-state current versus number of cycles.



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

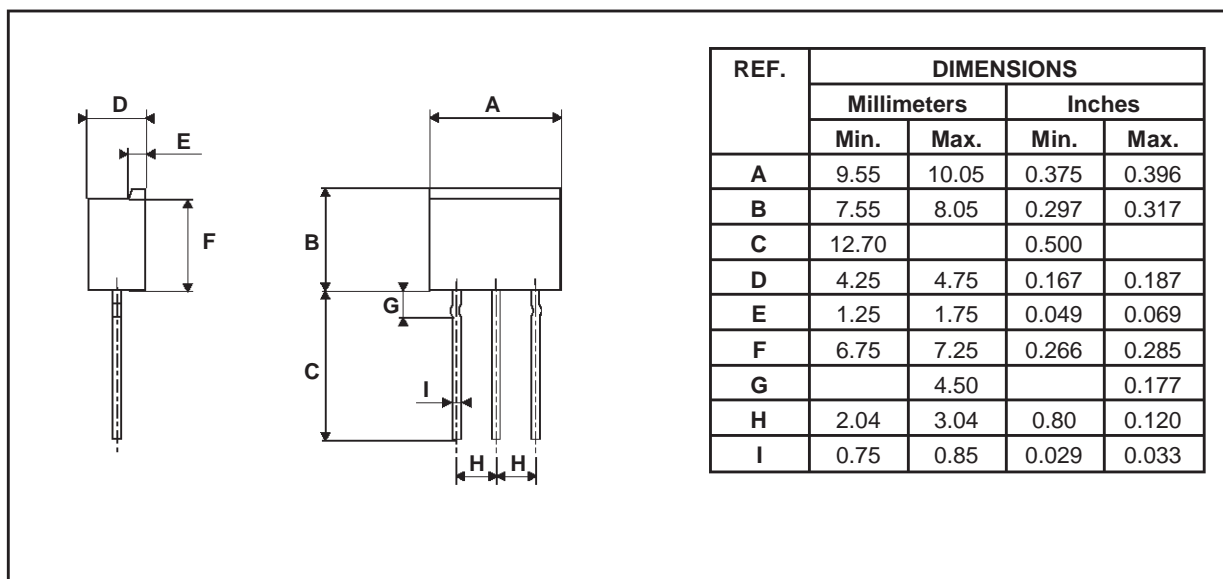


**Fig.8** : On-state characteristics (maximum values).



**PACKAGE MECHANICAL DATA**

TL Plastic



Marking : type number  
Weight : 0.75 g

Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics - Printed in Italy - All rights reserved.

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - France - Germany - Italy - Japan - Korea - Malaysia - Malta - Mexico - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.

<http://www.st.com>

