

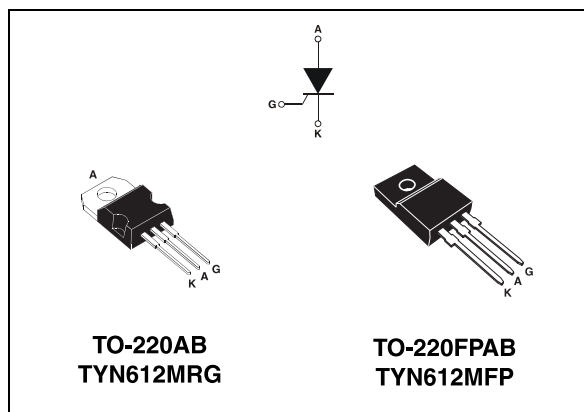
### Main features

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
$V_{DRM}/V_{RRM}$	600	V
$I_{GT} \text{ (min / max)}$	1.5 / 5	mA

### Description

The TYN612M SCR is suitable to fit modes of control found in applications such as voltage regulation circuits for motorbikes, overvoltage crowbar protection, motor control circuits in power tools and kitchen aids, inrush current limiting circuits, capacitive discharge ignition.

The insulated fullpack package allows a back to back configuration.



### Order codes

Part Numbers	Marking
TYN612MRG	TYN612M
TYN612MFP	TYN612MFP

**Table 1. Absolute ratings (limiting values)**

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)	TO-220AB	$T_c = 105^\circ \text{ C}$	12	A
		TO-220FPAB	$T_c = 70^\circ \text{ C}$	12	
$I_{T(AV)}$	Average on-state current (180° conduction angle)	TO-220AB	$T_c = 105^\circ \text{ C}$	8	A
		TO-220FPAB	$T_c = 70^\circ \text{ C}$	8	
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 8.3 \text{ ms}$	$T_j = 25^\circ \text{ C}$	125	A
		$t_p = 10 \text{ ms}$		120	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10 \text{ ms}$	$T_j = 25^\circ \text{ C}$	72	$A^2s$
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100 \text{ ns}$	F = 60 Hz	$T_j = 125^\circ \text{ C}$	50	A/ $\mu s$
$I_{GM}$	Peak gate current	$t_p = 20 \mu s$	$T_j = 125^\circ \text{ C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125^\circ \text{ C}$	1	W
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	$^\circ \text{ C}$
$V_{RGM}$	Maximum peak reverse gate voltage			5	V

# 1 Characteristics

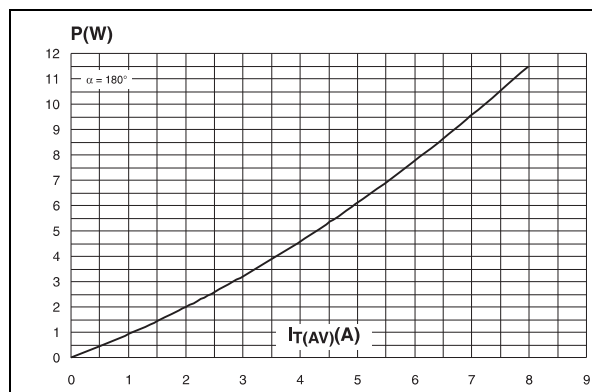
**Table 2. Electrical characteristics ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)**

Symbol	Test Conditions		Value	Unit	
$I_{GT}$	$V_D = 12\text{ V}$ $R_L = 140\ \Omega$	MIN.	1.5	mA	
		MAX.	5		
$V_{GT}$	$V_D = 12\text{ V}$ $R_L = 140\ \Omega$	MIN.	0.5	V	
		TYP.	0.7		
		MAX.	1.3		
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$	$T_j = 125^\circ\text{C}$	MIN.	0.2	V
$I_H$	$I_T = 500\text{ mA}$ Gate open		MAX.	20	mA
$I_L$	$I_G = 1.2 I_{GT}$		MAX.	40	mA
dV/dt	$V_D = 67\% V_{DRM}$ Gate open	$T_j = 125^\circ\text{C}$	MIN.	50	V/ $\mu\text{s}$
$V_{TM}$	$I_{TM} = 24\text{ A}$ $t_p = 380\ \mu\text{s}$	$T_j = 25^\circ\text{C}$	MAX.	1.6	V
$V_{t0}$	Threshold voltage	$T_j = 125^\circ\text{C}$	MAX.	0.85	V
$R_d$	Dynamic resistance	$T_j = 125^\circ\text{C}$	MAX.	30	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25^\circ\text{C}$	MAX.	5	$\mu\text{A}$
		$T_j = 125^\circ\text{C}$		2	mA

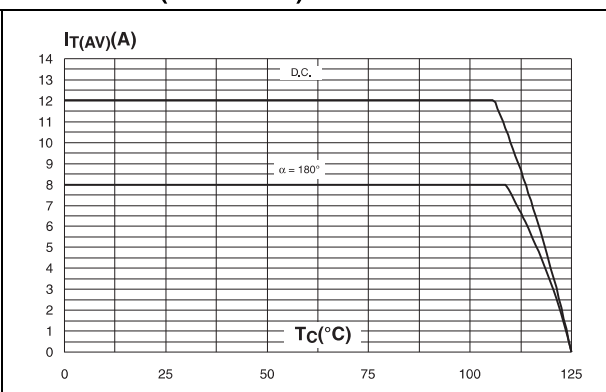
**Table 3. Thermal resistance**

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	TO-220AB	1.3	$^\circ\text{C/W}$
		TO-220FPAB	4.5	
$R_{th(j-a)}$	Junction to ambient (DC)	TO-220AB	55	$^\circ\text{C/W}$
		TO-220FPAB	55	

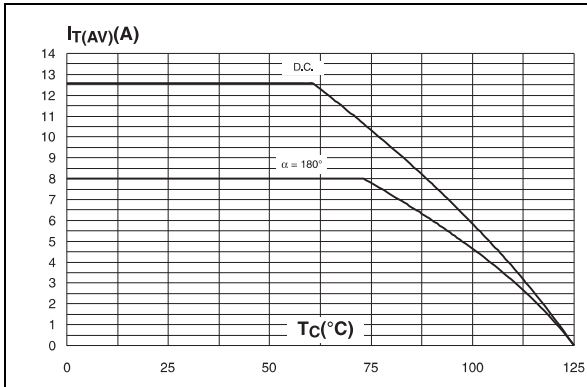
**Figure 1. Maximum average power dissipation versus average on-state current**



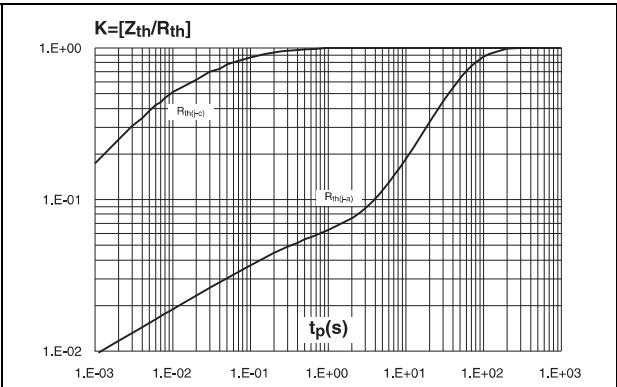
**Figure 2. Average and D.C. on-state current versus case temperature (TO-220AB)**



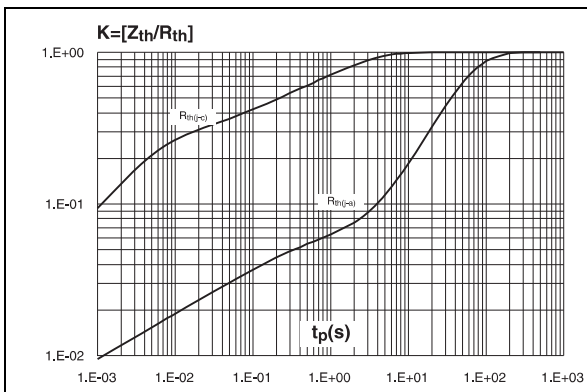
**Figure 3. Average and D.C. on-state current versus case temperature (TO-220FPAB)**



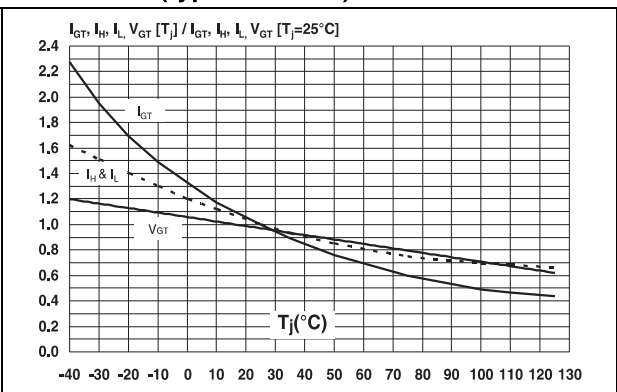
**Figure 4. Relative variation of thermal impedance versus pulse duration (TO-220AB)**



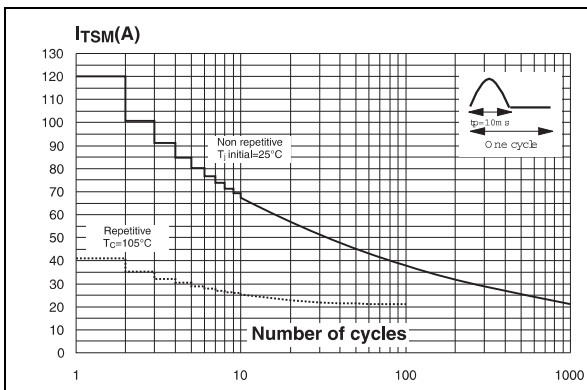
**Figure 5. Relative variation of thermal impedance versus pulse duration (TO-220FPAB)**



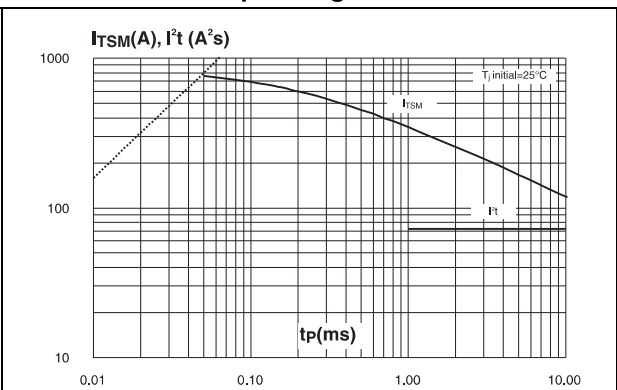
**Figure 6. Relative variation of gate trigger current, holding current, latching current and gate trigger voltage versus junction temperature (typical values)**



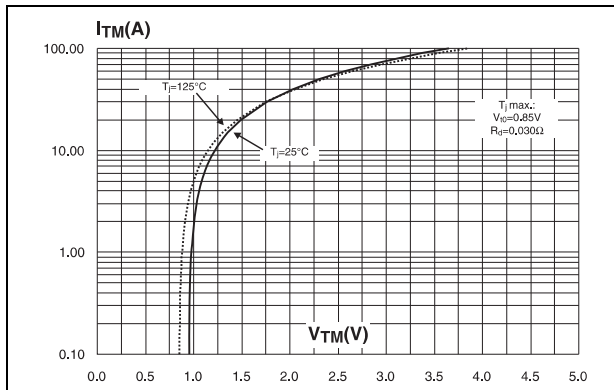
**Figure 7. Surge peak on-state current versus number of cycles**



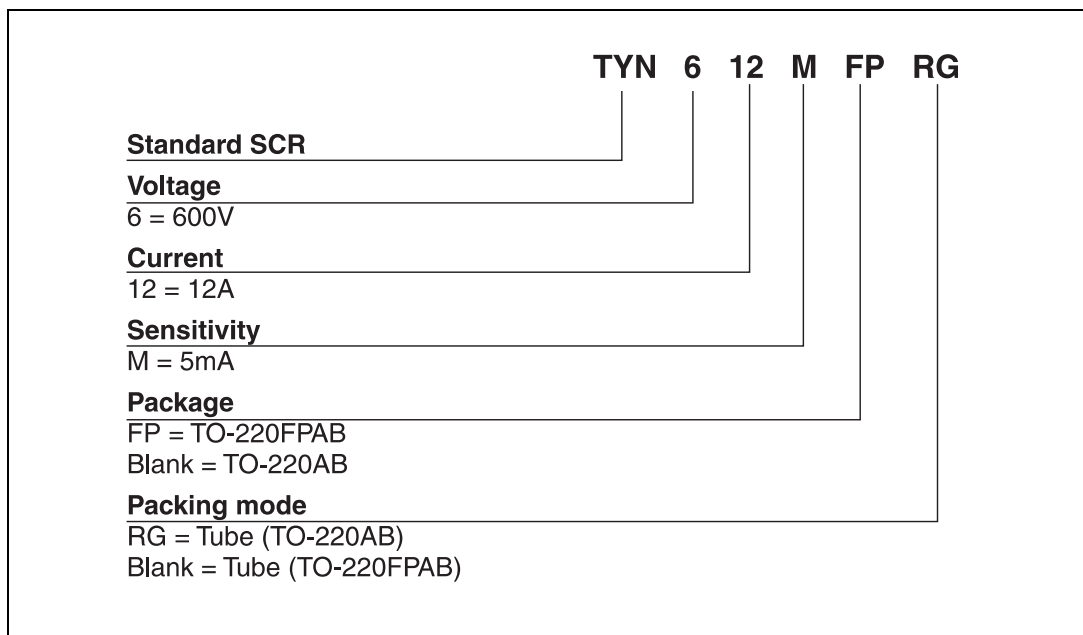
**Figure 8. Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms, and corresponding values of  $I^2t$**



**Figure 9. On-state characteristics (maximum values)**



## 2 Ordering information scheme



### 3 Package information

- Epoxy meets UL94, V0

Table 4. TO-220AB dimensions

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

Table 5. TO-220FPAB Dimensions

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	2.5	2.7	0.098	0.106
D	2.5	2.75	0.098	0.108
E	0.45	0.70	0.018	0.027
F	0.75	1	0.030	0.039
F1	1.15	1.70	0.045	0.067
F2	1.15	1.70	0.045	0.067
G	4.95	5.20	0.195	0.205
G1	2.4	2.7	0.094	0.106
H	10	10.4	0.393	0.409
L2	16 Typ.		0.63 Typ.	
L3	28.6	30.6	1.126	1.205
L4	9.8	10.6	0.386	0.417
L5	2.9	3.6	0.114	0.142
L6	15.9	16.4	0.626	0.646
L7	9.00	9.30	0.354	0.366
Dia.	3.00	3.20	0.118	0.126

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second level interconnect is marked on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

## 4 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
TYN612MRG	TYN612M	TO-220AB	2.3 g	50	Tube
TYN612MFP	TYN612MFP	TO-220AB	2.0 g	50	Tube

## 5 Revision history

Date	Revision	Description of Changes
Sep-2002	1A	Last update.
10-Fev-2005	2	TO-220FPAB package added.
11-Apr-2007	3	Reformatted to current standards. Added typical and minimum values for $V_{GT}$ in <a href="#">Table 2</a> .
17-Apr-2007	4	Added $V_{GT}$ curve in <a href="#">Figure 6</a> .

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