



# TYN412

## Standard

## 12 A SCR

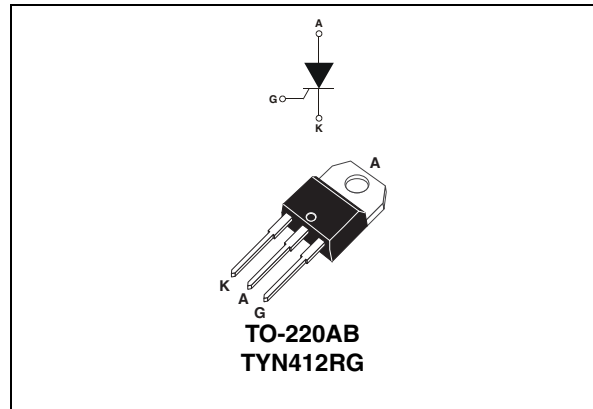
Custom Data

### Main features

Symbol	Value	Unit
$I_{T(RMS)}$	12	A
$V_{DRM}/V_{RRM}$	400	V
$I_{GT}$	15	mA

### Description

TYN412 with standard gate triggering levels, is a 12 A SCR suitable to fit all modes of control, found in applications such as overvoltage crowbar protection, motor control circuits in power tools and kitchen aids, inrush current limiting circuits, capacitive discharge ignition and voltage regulation circuits.



### Order codes

Part Numbers	Marking
TYN412RG	TYN412

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

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		$T_c = 105^\circ C$	12	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)		$T_c = 105^\circ C$	8	A
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 8.3 \text{ ms}$	$T_j = 25^\circ C$	146	A
		$t_p = 10 \text{ ms}$		140	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10 \text{ ms}$	$T_j = 25^\circ C$	98	$A^2s$
$di/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100 \text{ ns}$	$F = 60 \text{ Hz}$	$T_j = 125^\circ C$	100	$A/\mu s$
$I_{GM}$	Peak gate current	$t_p = 20 \mu s$	$T_j = 125^\circ C$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125^\circ C$	1	W
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	$^\circ C$
$V_{RGM}$	Maximum peak reverse gate voltage			5	V

# 1 Characteristics

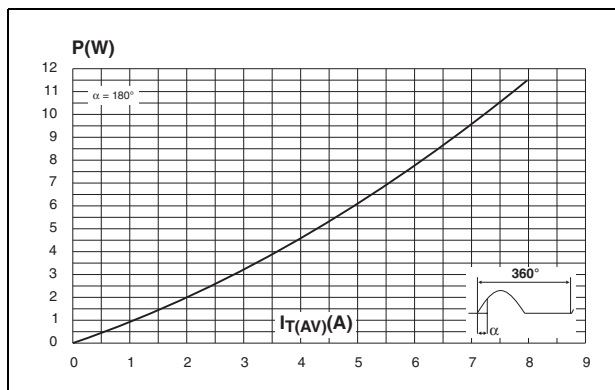
**Table 2. Electrical characteristics ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)**

Symbol	Test Conditions		Value	Unit	
$I_{GT}$	$V_D = 12\text{ V}$ $R_L = 33\ \Omega$	MIN.	2	mA	
		MAX.	15		
$V_{GT}$	$V_D = 12\text{ V}$ $R_L = 33\ \Omega$	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.	30	mA
$I_L$	$I_G = 1.2 I_{GT}$		MAX.	60	mA
dV/dt	$V_D = 67\% V_{DRM}$ Gate open	$T_j = 125^\circ\text{C}$	MIN.	200	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.	0.01	mA
		$T_j = 125^\circ\text{C}$		3	mA

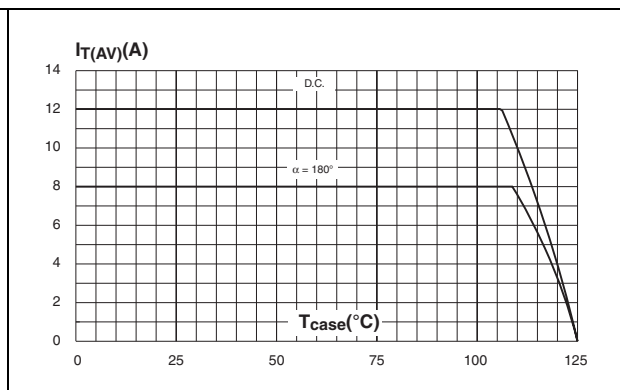
**Table 3. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	1.3	$^\circ\text{C/W}$
$R_{th(j-a)}$	Junction to ambient (DC)	60	$^\circ\text{C/W}$

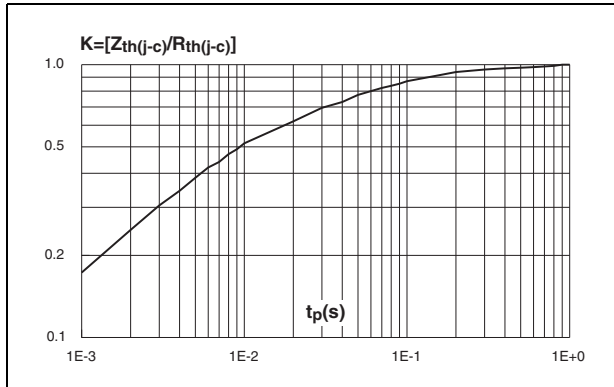
**Figure 1. Maximum average power dissipation versus average on-state current**



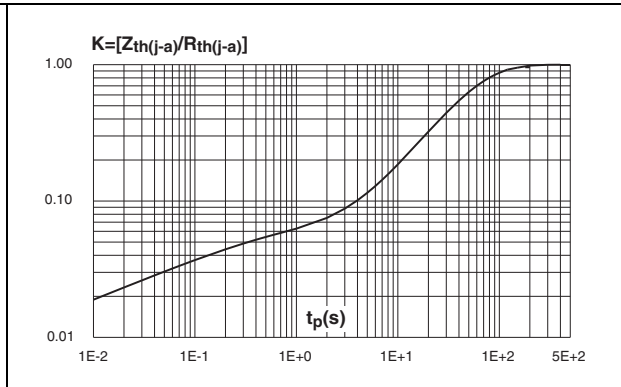
**Figure 2. Average and D.C. on-state current versus case temperature**



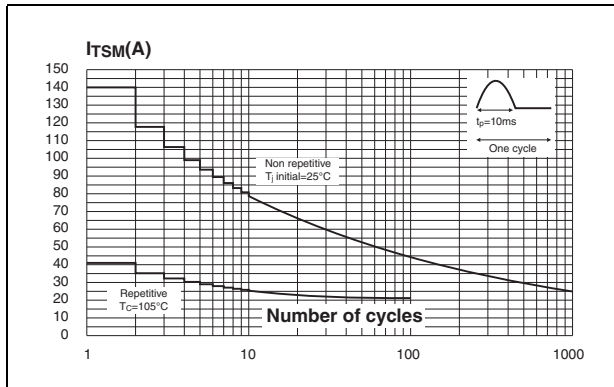
**Figure 3. Relative variation of thermal impedance junction to case versus pulse duration**



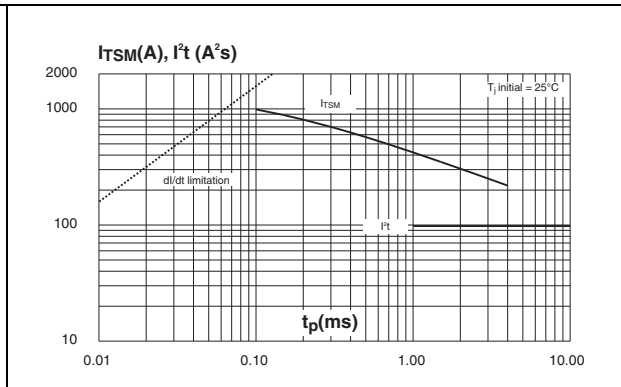
**Figure 4. Relative variation of thermal impedance junction to ambient versus pulse duration**



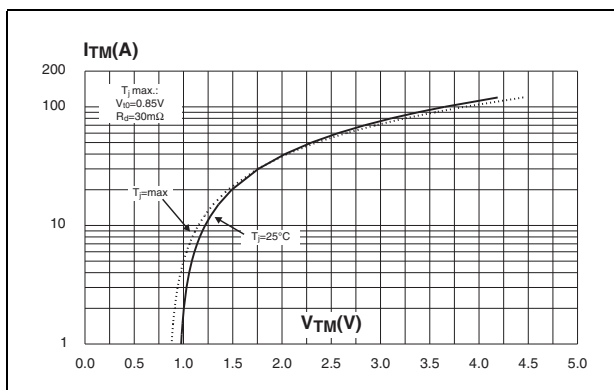
**Figure 5. Surge peak on-state current versus number of cycles**



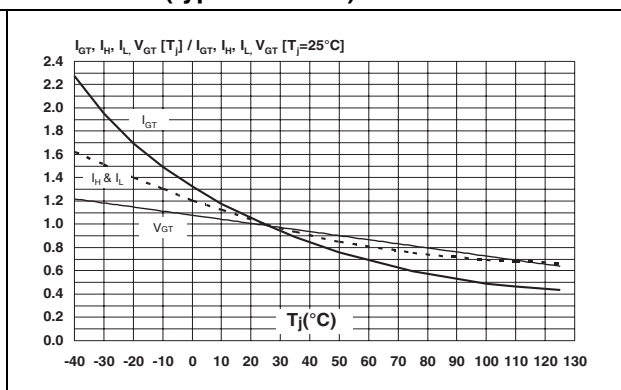
**Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms, and corresponding values of  $I^2t$**



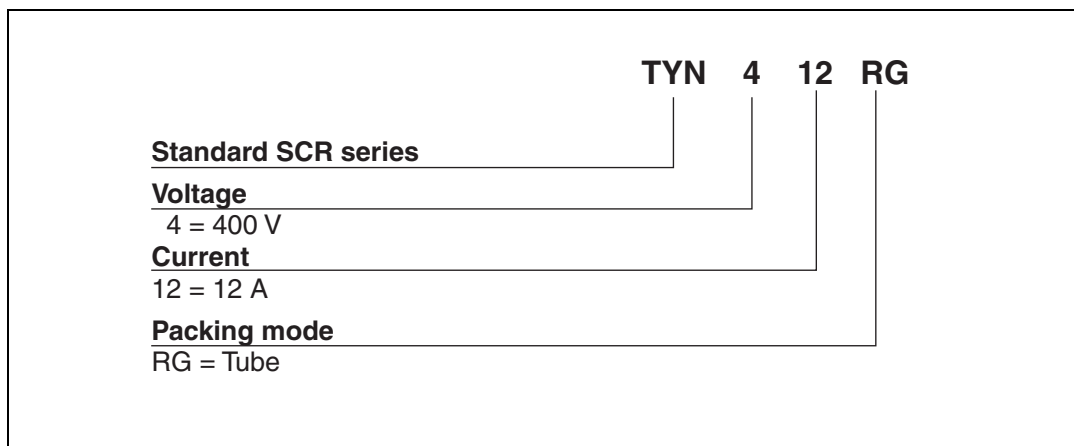
**Figure 7. On-state characteristics (maximum values)**



**Figure 8. Relative variation of gate trigger current, holding current, latching current and gate trigger voltage versus junction temperature (typical values)**



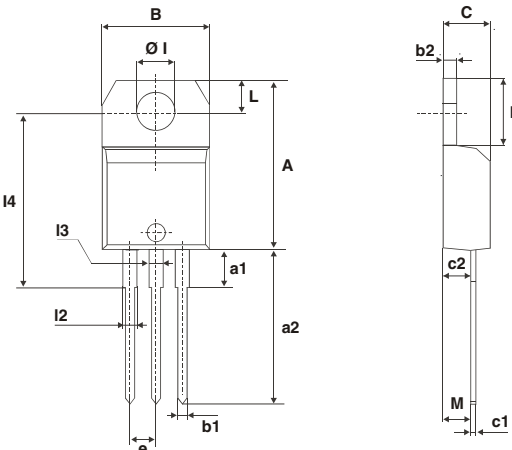
## 2 Ordering information scheme



### 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	

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## 4 Ordering information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
TYN412RG	TYN412	TO-220AB	2.3 g	50	Tube

## 5 Revision history

Date	Revision	Description of Changes
06-Apr-2007	1	First issue

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