

## SCR FOR OVERVOLTAGE PROTECTION

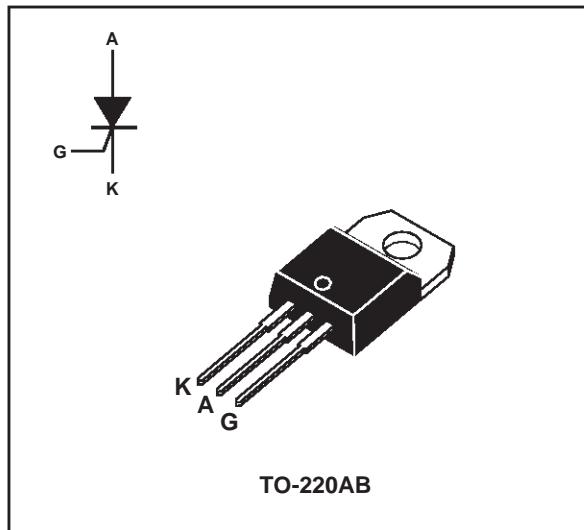
### FEATURES

- High surge current capability
- High  $dI/dt$  rating
- High stability and reliability

### DESCRIPTION

The TYN512 and TYN1012 Family of Silicon Controlled Rectifiers uses a high performance glass passivated technology.

This general purpose Family of Silicon Controlled Rectifiers is designed for overvoltage protection in crowbar circuits application.



### ABSOLUTE RATINGS (limiting values)

Symbol	Parameter	Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle, single phase circuit)	12	A
$I_{T(AV)}$	Average on-state current (180° conduction angle, single phase circuit)	8	A
$I_{TSM}$	Non repetitive surge peak on-state current ( $T_j$ initial = 25°C)	$t_p = 8.3\text{ms}$	A
		$t_p = 10\text{ms}$	
$I^2t$	$I^2t$ value	450	$\text{A}^2\text{s}$
$I_{TM}$	Non repetitive surge peak on-state current ( $T_j$ initial = 25°C) Exponential pulse wave form	750	A
$dl/dt$	Critical rate of rise of on-state current Gate supply: $I_G = 100\text{mA}$ $dl_G/dt = 1\text{A}/\mu\text{s}$	100	$\text{A}/\mu\text{s}$
$T_{stg}$ $T_j$	Storage and operating junction temperature range	-40 to +150 -40 to +125	°C
TI	Maximum lead soldering temperature during 10s at 4.5mm from case	260	°C

Symbol	Parameter	TYP		Unit
		512	1012	
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage $T_j = 125^\circ\text{C}$	50	100	V

## TYP512 TYP1012

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### THERMAL RESISTANCE

Symbol	Parameter	Value	Unit
R <sub>th</sub> (j-a)	Junction to ambient	60	°C/W
R <sub>th</sub> (j-c) DC	Junction to case for DC	1.3	°C/W

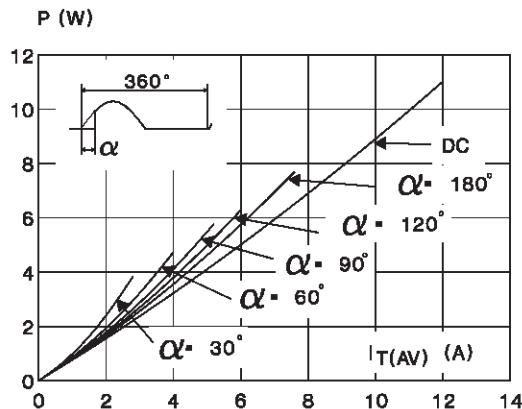
### GATE CHARACTERISTICS (maximum values)

$$P_{G(AV)} = 1W \quad P_{GM} = 10W \quad (t_p = 20\mu s) \quad I_{FGM} = 4A \quad (t_p = 20\mu s) \quad V_{RGM} = 5V$$

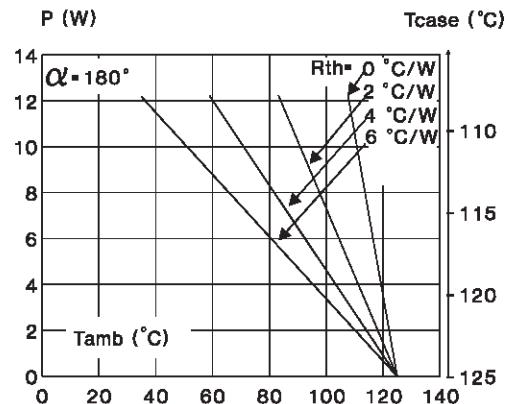
### ELECTRICAL CHARACTERISTICS

Symbol	Test conditions		Value	Unit
I <sub>GT</sub>	V <sub>D</sub> = 12V (DC) R <sub>L</sub> = 33Ω	T <sub>j</sub> = 25°C	MAX.	30
V <sub>GT</sub>	V <sub>D</sub> = 12V (DC) R <sub>L</sub> = 33Ω	T <sub>j</sub> = 25°C	MAX.	1.5
V <sub>GD</sub>	V <sub>D</sub> = V <sub>DRM</sub> R <sub>L</sub> = 3.3kΩ	T <sub>j</sub> = 125°C	MIN.	0.2
t <sub>gt</sub>	V <sub>D</sub> = V <sub>DRM</sub> I <sub>G</sub> = 200mA dI <sub>G</sub> /dt = 1.5A/μs	T <sub>j</sub> = 25°C	TYP.	1
I <sub>L</sub>	I <sub>G</sub> = 1.2I <sub>GT</sub>	T <sub>j</sub> = 25°C	TYP.	60
I <sub>H</sub>	I <sub>T</sub> = 500mA Gate open	T <sub>j</sub> = 25°C	MAX.	50
V <sub>TM</sub>	I <sub>TM</sub> = 50A t <sub>p</sub> = 380μs	T <sub>j</sub> = 25°C	MAX.	1.5
I <sub>DRM</sub> I <sub>RRM</sub>	V <sub>DRM</sub> rated V <sub>RRM</sub> rated	T <sub>j</sub> = 25°C	MAX.	0.01
		T <sub>j</sub> = 125°C	MAX.	2
dV/dt	Linear slope up to V <sub>D</sub> = 67% V <sub>DRM</sub> gate open	T <sub>j</sub> = 125°C	MIN.	200
t <sub>q</sub>	V <sub>D</sub> =67%V <sub>DRM</sub> I <sub>TM</sub> =50A V <sub>R</sub> =25V dI <sub>TM</sub> /dt=30 A/μs dV <sub>D</sub> /dt= 50V/μs	T <sub>j</sub> = 125°C	TYP.	100
				μs

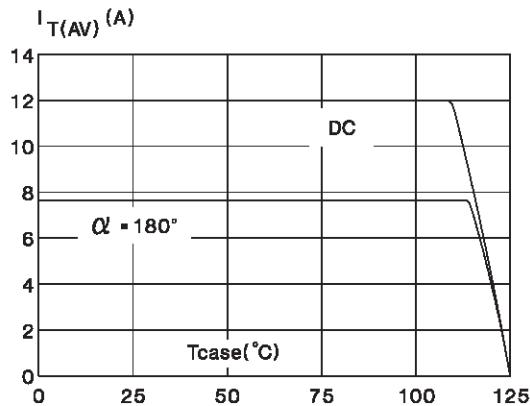
**Fig. 1:** Maximum average power dissipation versus average on-state current.



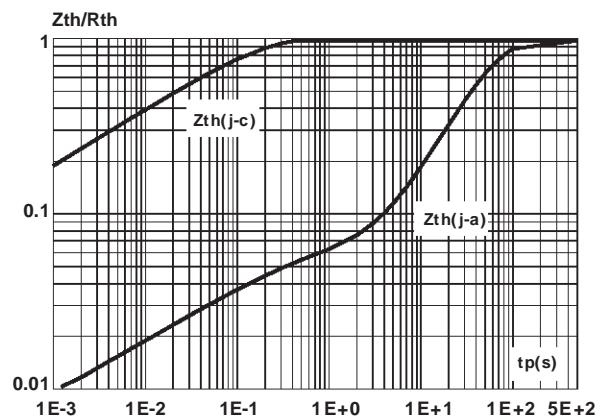
**Fig. 2:** Correlation between maximum average power dissipation and maximum allowable temperatures (Tamb and Tcase) for different thermal resistances heatsink + contact.



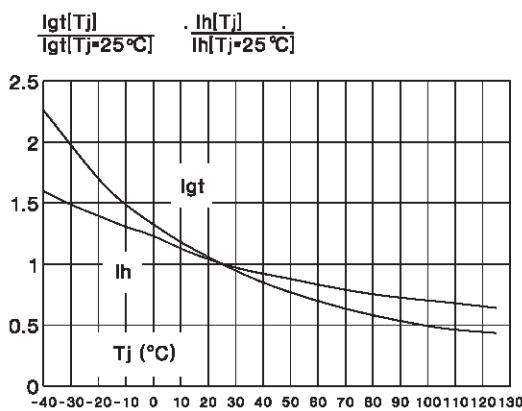
**Fig. 3:** Average on-state current versus case temperature.



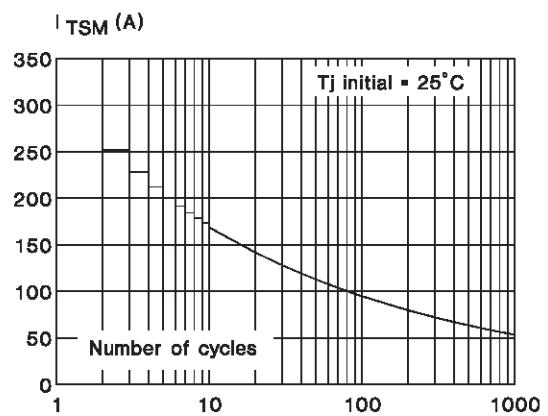
**Fig. 4:** Relative variation of thermal impedance versus pulse duration.



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

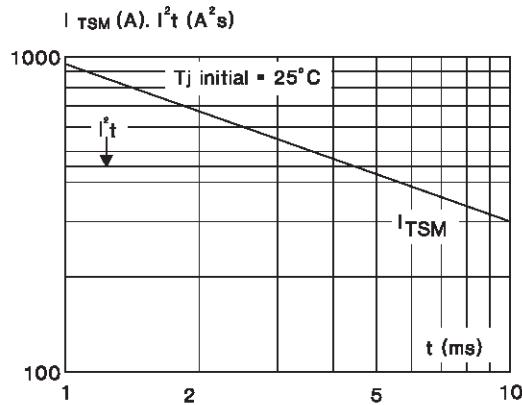


**Fig. 6:** Non repetitive surge peak on-state current versus number of cycles.

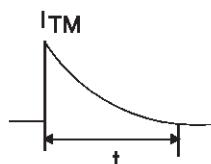
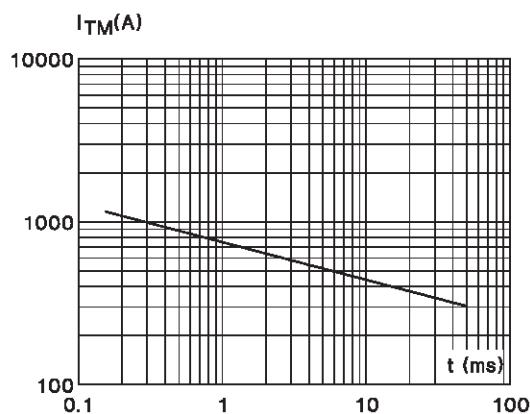


## TYP512 TYP1012

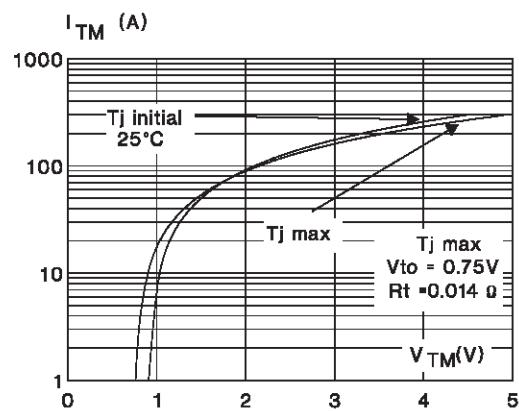
**Fig. 7:** Non repetitive surge peak on-state current for a sinusoidal pulse with width:  $t \leq 10\text{ms}$ , and corresponding value of  $I^2t$ .



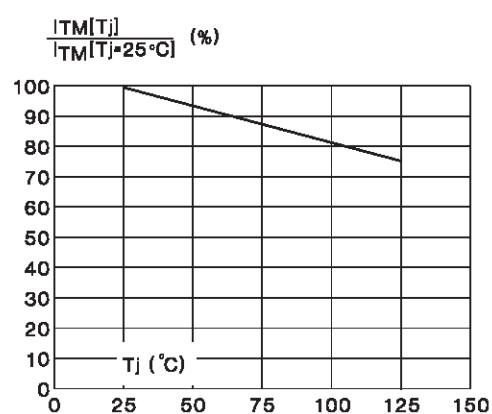
**Fig. 9:** Peak capacitor discharge current versus pulse width.



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

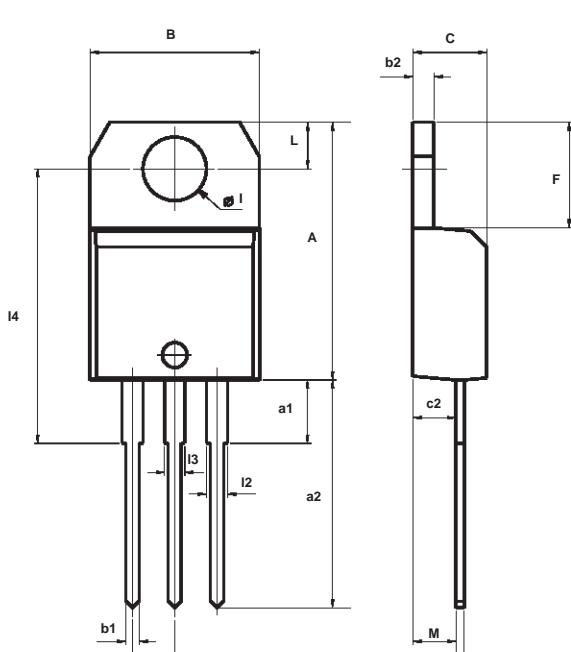


**Fig. 10:** Allowable peak capacitor discharge current versus initial junction temperature.



**PACKAGE MECHANICAL DATA**  
TO-220AB (Plastic)

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
I	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	


**OTHER INFORMATION**

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
TYPx12	TYPx12	TO-220AB	2.3 g	250	Bulk

- Epoxy meets UL94,V0
- Cooling method: C
- Recommended torque value: 0.8 m.N.
- Maximum torque value: 1 m.N.

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