

### Description

These standard SCRs are suitable for applications where in-rush current conditions are critical, such as overvoltage crowbar protection circuits in power supplies, in-rush current limiting circuits, solid state relays (in back to back configuration), welding equipment, high power motor control circuits.

Using clip assembly technology, they provide a superior performance in high surge current capabilities.

**Table 1. Device summary**

Order code	Voltage	Sensitivity
TYN640RG	600 V	35 mA
TYN840RG	800 V	35 mA

### Features

- On-state rms current,  $I_{T(RMS)}$ : 40 A
- Repetitive peak off-stat voltage,  $V_{DRM}$ ,  $V_{RRM}$ :
  - 600 V
  - 800 V
- Triggering gate current,  $I_{GT}$ : 35 mA

# 1 Characteristics

**Table 2. Absolute ratings (limiting values)**

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	On-state rms current (180° conduction angle)		$T_C = 95\text{ °C}$ 40	A	
$I_{T(AV)}$	Average on-state current (180° conduction angle)		$T_C = 95\text{ °C}$ 25	A	
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 8.3\text{ ms}$	$T_j = 25\text{ °C}$	480	A
		$t_p = 10\text{ ms}$		460	
$I^2t$	$I^2t$ Value for fusing	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	1060	$A^2s$
$di/dt$	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$	$F = 60\text{ Hz}$	$T_j = 125\text{ °C}$	50	$A/\mu s$
$I_{GM}$	Peak gate current	$t_p = 20\text{ }\mu s$	$T_j = 125\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation		$T_j = 125\text{ °C}$	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

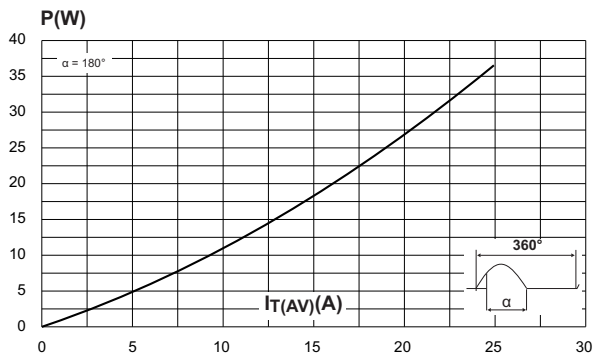
**Table 3. Electrical Characteristics ( $T_j = 25\text{ °C}$ , unless otherwise specified)**

Symbol	Test Conditions		Value	Unit		
$I_{GT}$	$V_D = 12\text{ V}$ $R_L = 33\text{ }\Omega$	MIN.	3.5	mA		
		MAX.	35			
$V_{GT}$		MAX.	1.3	V		
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$	$T_j = 125\text{ °C}$	MIN.	0.2	V	
$I_H$	$I_T = 500\text{ mA}$ Gate open		MAX.	75	mA	
$I_L$	$I_G = 1.2 \times I_{GT}$		MAX.	150	mA	
$dV/dt$	$V_D = 67\% V_{DRM}$ Gate open	$T_j = 125\text{ °C}$	MIN.	1000	$V/\mu s$	
$V_{TM}$	$I_{TM} = 80\text{ A}$ $t_p = 380\text{ }\mu s$	$T_j = 25\text{ °C}$	MAX.	1.6	V	
$V_{t0}$	Threshold voltage		$T_j = 125\text{ °C}$	MAX.	0.85	V
$R_d$	Dynamic resistance		$T_j = 125\text{ °C}$	MAX.	10	$m\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ °C}$	MAX.	5	$\mu A$	
		$T_j = 125\text{ °C}$		4	mA	

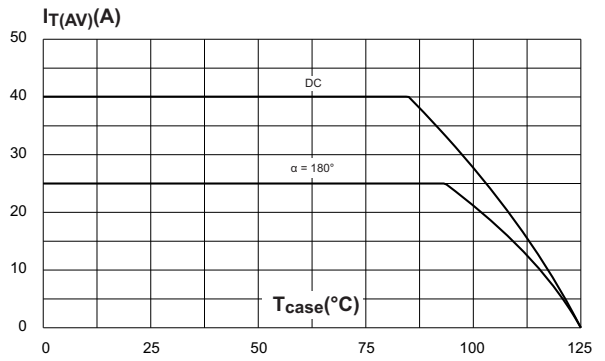
**Table 4. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	0.8	$^{\circ}C/W$
$R_{th(j-a)}$	Junction to ambient (DC)	60	$^{\circ}C/W$

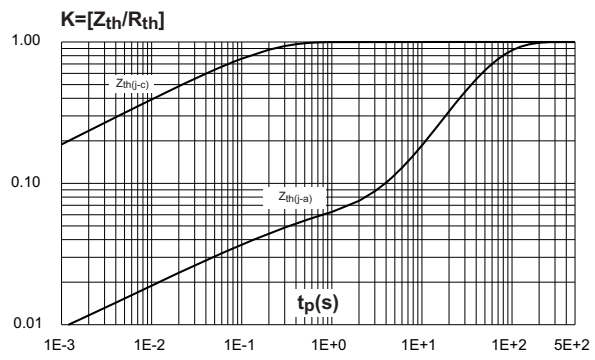
**Figure 1. Maximum average power dissipation versus average on-state current**



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



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



**Figure 4. Relative variation of gate trigger current, holding current and latching current versus junction temperature**

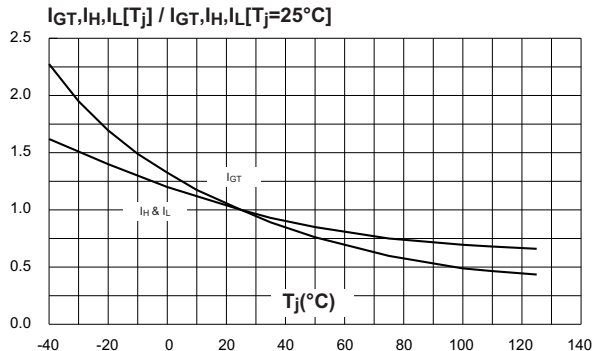


Figure 5. Surge peak on-state current versus number of cycles

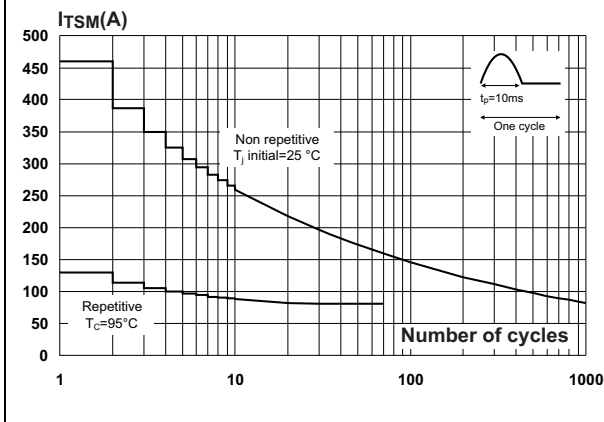


Figure 6. Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms, and corresponding values of  $I^2t$

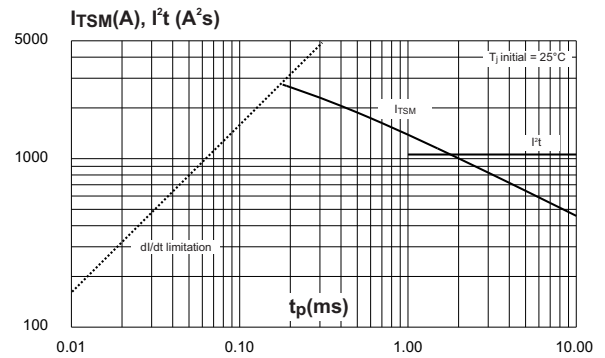
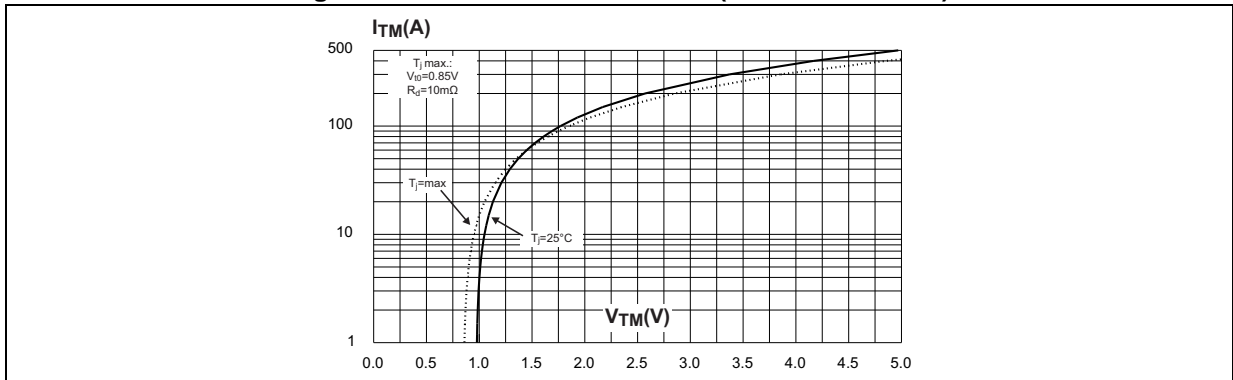


Figure 7. On-state characteristics (maximum values)



## 2 Package information

- Epoxy meets UL94, V0
- Lead-free package

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Figure 8. TO-220AB dimension definitions

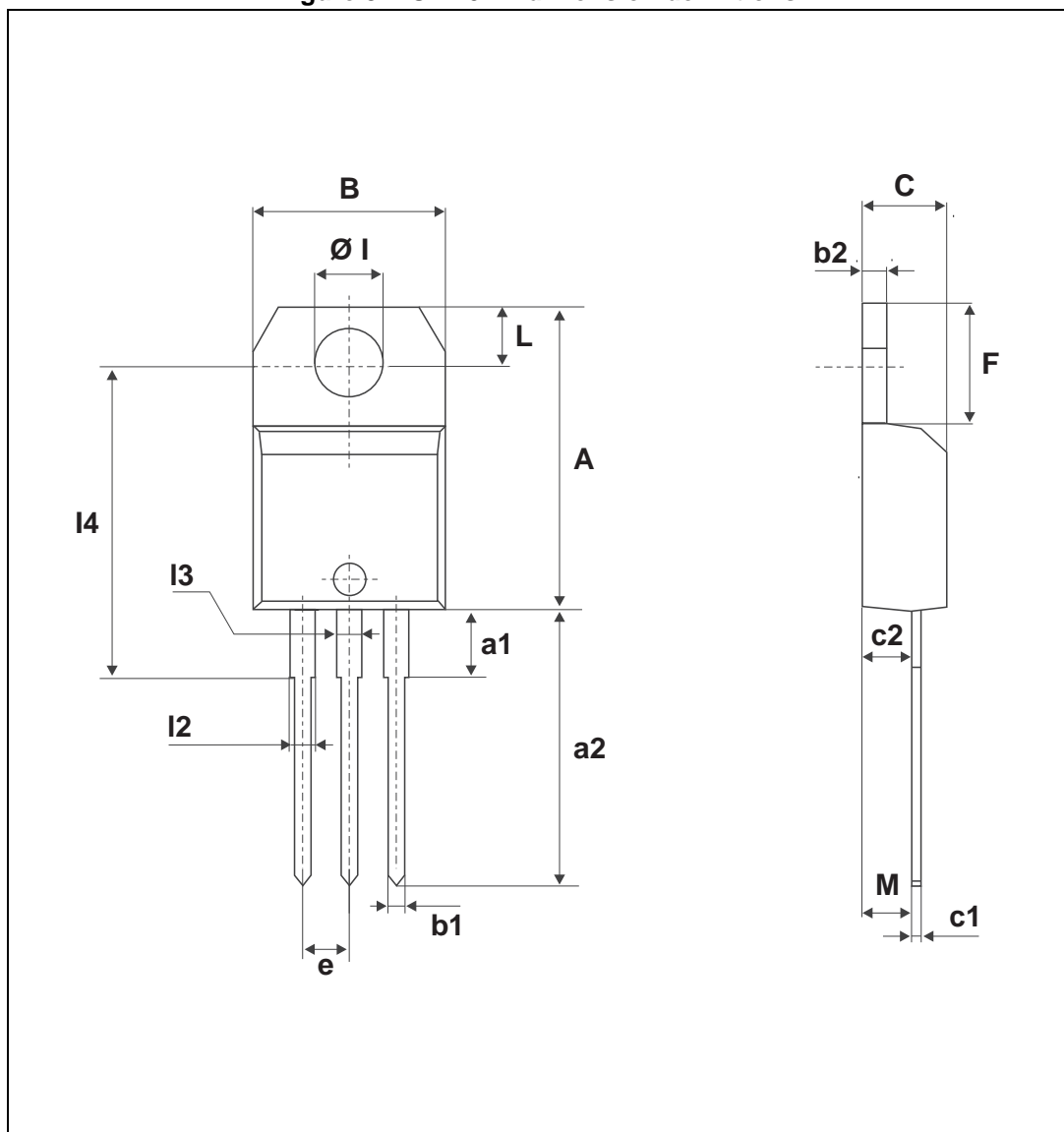


Table 5. TO-220AB dimension values

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
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	1.14		1.70	0.044		0.066
M		2.60			0.102	

### 3 Ordering information

Figure 9. Ordering Information Scheme

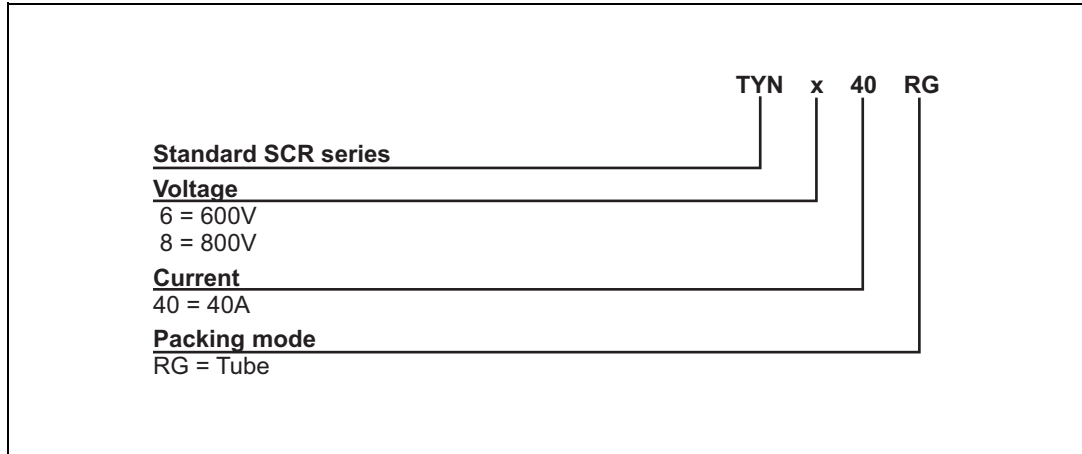


Table 6. Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
TYN640RG	TYN640	TO-220AB	2.3 g	50	Tube
TYN840RG	TYN840				

### 4 Revision history

Table 7. Document revision history

Date	Revision	Changes
Apr-2002	4A	Last update.
13-Feb-2006	5	TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added.
05-Nov-2013	6	Updated <a href="#">Figure 5</a> .

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