



# TYNx40 Series

STANDARD

40A SCRs

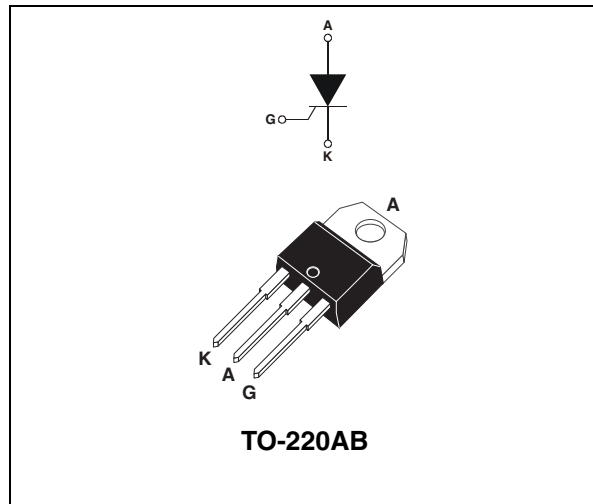
**Table 1: Main Features**

Symbol	Value	Unit
$I_{T(RMS)}$	40	A
$V_{DRM}/V_{RRM}$	600 to 1000	V
$I_{GT}$	35	mA

## DESCRIPTION

The **TYNx40** series is 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 2: Order Codes**

Part Numbers	Marking
TYN640RG	TYN640
TYN840RG	TYN840
TYN1040RG	TYN1040

**Table 3: Absolute Ratings** (limiting values)

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

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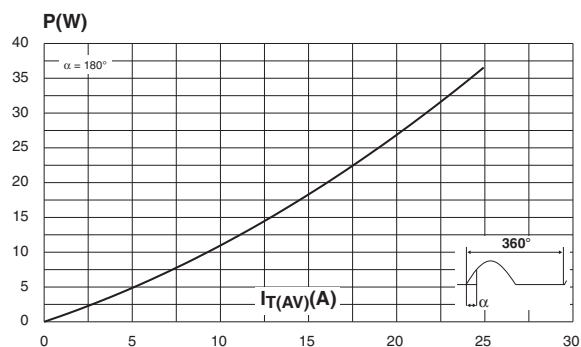
**Tables 4: Electrical Characteristics** ( $T_j = 25^\circ\text{C}$ , unless otherwise specified)

Symbol	Test Conditions		Value	Unit		
$I_{GT}$	$V_D = 12\text{ V}$	$R_L = 33\ \Omega$	MIN.	3.5	mA	
			MAX.	35		
$V_{GT}$			MAX.	1.3	V	
$V_{GD}$	$V_D = V_{DRM}$	$R_L = 3.3\ \text{k}\Omega$	$T_j = 125^\circ\text{C}$	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		$T_j = 125^\circ\text{C}$	MIN.	1000	V/ $\mu\text{s}$
$V_{TM}$	$I_{TM} = 80\ \text{A}$ $t_p = 380\ \mu\text{s}$		$T_j = 25^\circ\text{C}$	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.	10	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$		$T_j = 25^\circ\text{C}$	MAX.	5	$\mu\text{A}$
			$T_j = 125^\circ\text{C}$		4	mA

**Table 5: Thermal resistance**

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

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



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

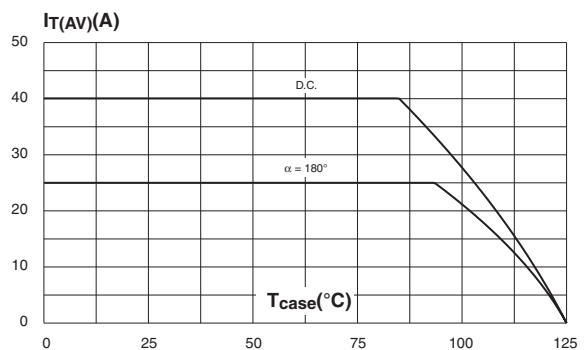


Figure 3: Relative variation of thermal impedance versus pulse duration

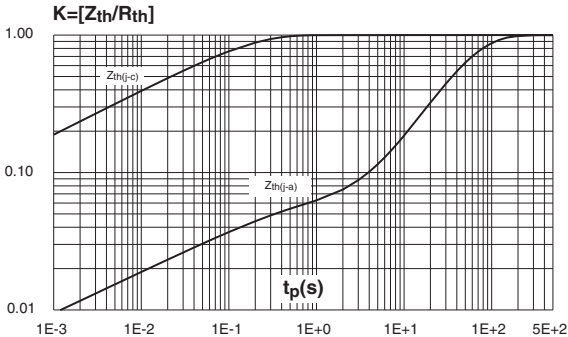


Figure 4: Relative variation of gate trigger current, holding current and latching current versus junction temperature

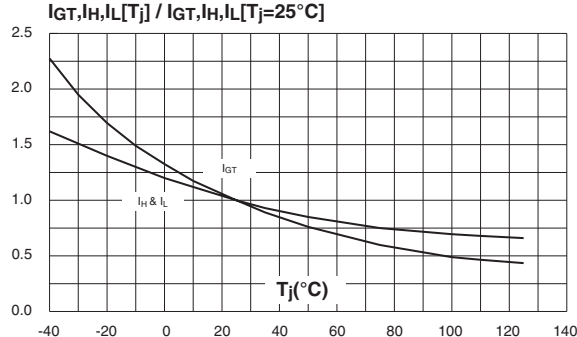


Figure 5: Surge peak on-state current versus number of cycles

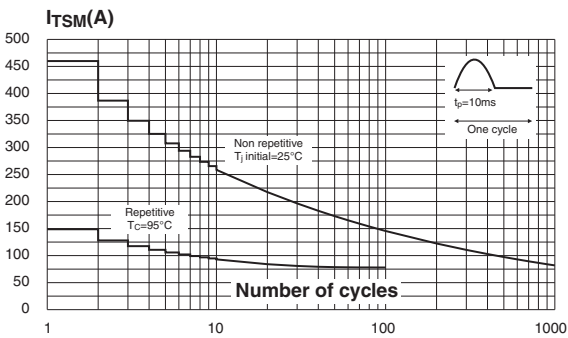


Figure 6: Non-repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms, and corresponding values of  $I^2t$

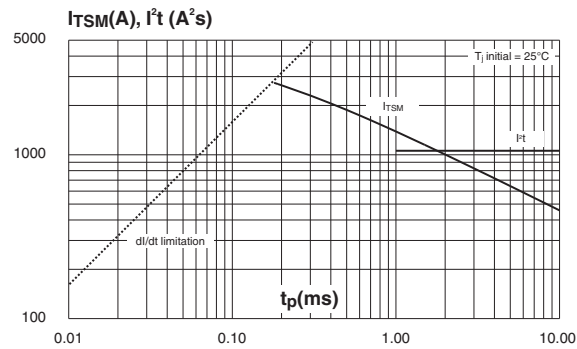
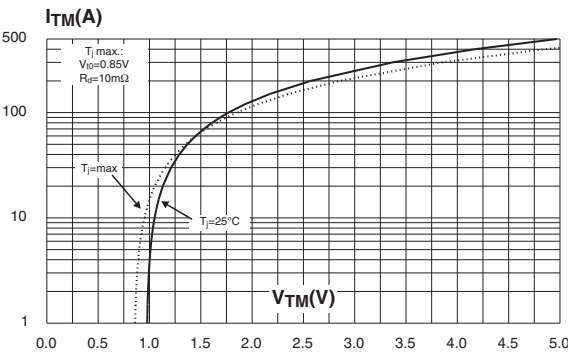


Figure 7: On-state characteristics (maximum values)



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Figure 8: Ordering Information Scheme

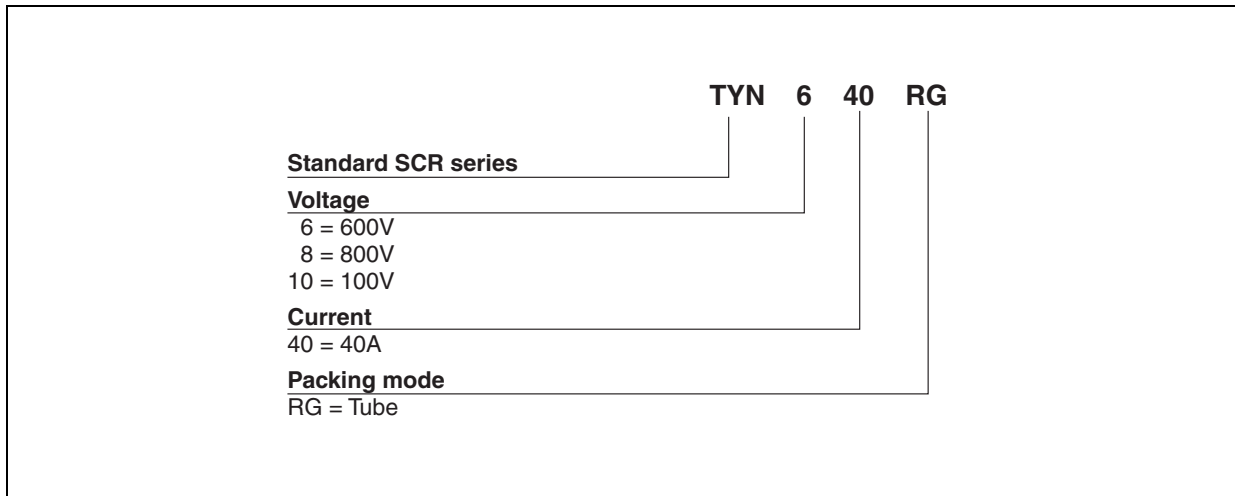
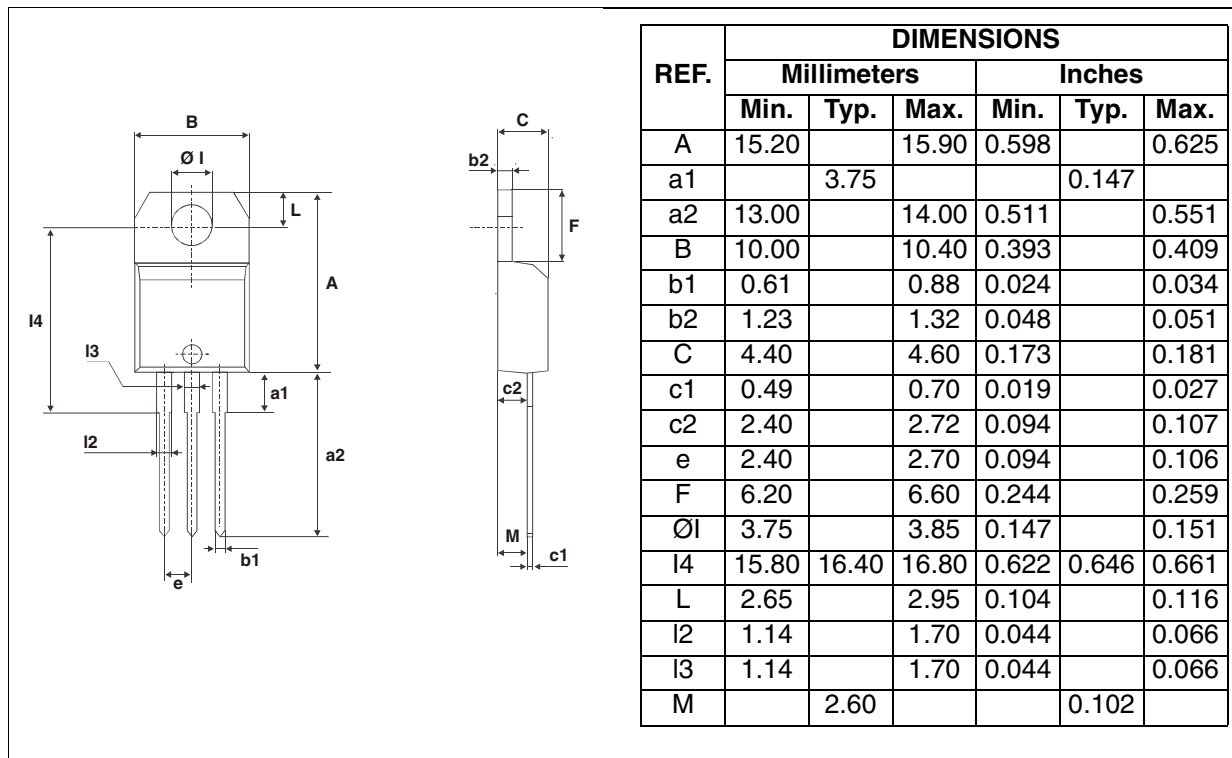


Table 6: Product Selector

Part Numbers	Voltage (xxx)			Sensitivity	Package
	600 V	800 V	1000 V		
TYNx40	X	X	X	35 mA	TO-220AB

Figure 9: TO-220AB Package Mechanical Data



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 package and 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).

Table 7: Ordering Information

Ordering type	Marking	Package	Weight	Base qty	Delivery mode
TYN640RG	TYN640	TO-220AB	2.3 g	50	Tube
TYN840RG	TYN840				
TYN1040RG	TYN1040				

Table 8: Revision History

Date	Revision	Description of Changes
Apr-2002	4A	Last update.
13-Feb-2006	5	TO-220AB delivery mode changed from bulk to tube. ECOPACK statement added.

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