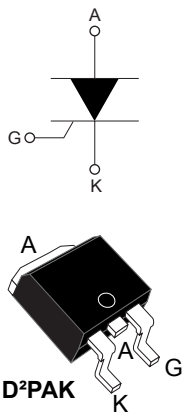


## Standard SCR, D<sup>2</sup>PAK, 25 A, 1200 V



### Features

- Max. blocking voltage =  $V_{DRM}, V_{RRM} = 1200\text{ V}$
- $I_{GT}$  maximum = 40 mA
- High static and dynamic commutation at  $T_j = 125\text{ °C}$ 
  - $di/dt = 50\text{ A}/\mu\text{s}$
  - $dV/dt = 1500\text{ V}/\mu\text{s}$
- ECOPACK<sup>®</sup>2 compliant (RoHS and HF compliance)

### Applications

- Solar
- Wind renewable energy inverters
- Solid State Relay (SSR)
- Uninterruptible Power Supply (UPS)
- AC DC Inrush Current Limiter (ICL)
- Battery charger
- AC DC voltage controlled rectifier
- Industrial welding systems
- Off board automotive battery charger
- Soft starter
- General purpose motor control

#### Product status link

[TN2540-12G](#)

#### Product summary

$I_{T(RMS)}$	25 A
$V_{DRM}, V_{RRM}$	1200 V
$I_{GT}$	40 mA
$T_j$	125 °C

### Description

Available in SMD D<sup>2</sup>PAK with anode in backside.

The **TN2540-12G** SCR is suitable in industrial applications where high immunity is required with a lower gate current.

# 1 Characteristics

**Table 1. Absolute maximum ratings (limiting values),  $T_j = 25\text{ °C}$  unless otherwise specified**

Symbol	Parameter		Value	Unit
$V_{DRM}/V_{RRM}$	Repetitive peak off-state voltage (50-60 Hz)		$T_j = 125\text{ °C}$ 1200	V
$I_{T(RMS)}$	On-state RMS current (180° conduction angle)		$T_c = 102\text{ °C}$ 25	A
$I_{T(AV)}$	Average on-state current (180° conduction angle)			
$I_{TSM}$	Non repetitive surge peak on-state current		$t_p = 8.3\text{ ms}$ 314	A
			$t_p = 10\text{ ms}$ 300	
$I^2t$	$I^2t$ value for fusing		$t_p = 10\text{ ms}$ 450	$A^2s$
$dI/dt$	$I_G = 2 \times I_{GT}$ , $t_r \leq 100\text{ ns}$ Critical rate of rise of on-state current		$f = 60\text{ Hz}$ 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
$T_{stg}$	Storage junction temperature range		-40 to +150	$^{\circ}C$
$T_j$	Operating junction temperature range		-40 to +125	$^{\circ}C$

**Table 2. 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.	4	mA
			Max.	40	
$V_{GT}$			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.	80	mA
$I_L$	$I_G = 1.2 \times I_{GT}$		Max.	90	mA
$dV/dt$	$V_D = 67\% V_{DRM}$ , gate open	$T_j = 125\text{ °C}$	Min.	1500	$V/\mu s$

**Table 3. Static electrical characteristics**

Symbol	Test conditions		Value	Unit		
$V_{TM}$	$I_{TM} = 50\text{ A}$ , $t_p = 380\text{ }\mu s$	$T_j = 25\text{ °C}$	Max.	1.60	V	
$V_{TO}$	Threshold voltage		$T_j = 125\text{ °C}$	Max.		0.85
$R_D$	Dynamic resistance		$T_j = 125\text{ °C}$	Max.	14	$m\Omega$
$I_{DRM}$ , $I_{RRM}$	$V_{OUT} = 1200\text{ V}$		$T_j = 25\text{ °C}$	Max.	10	$\mu A$
			$T_j = 125\text{ °C}$		6	mA

Table 4. Thermal resistance parameter

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Thermal resistance Junction to case (DC)	Max.	$^{\circ}\text{C}/\text{W}$

## 1.1 Characteristics (curves)

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

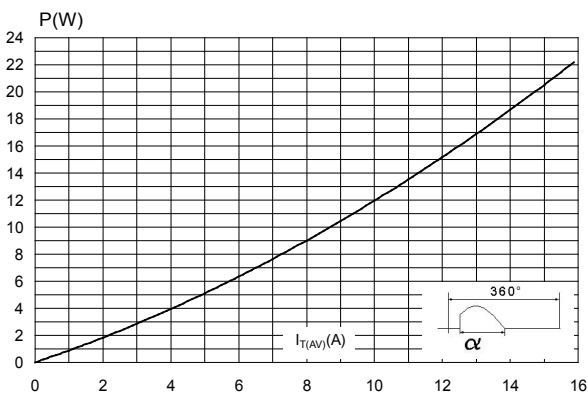


Figure 2. Average and DC on-state current versus case temperature

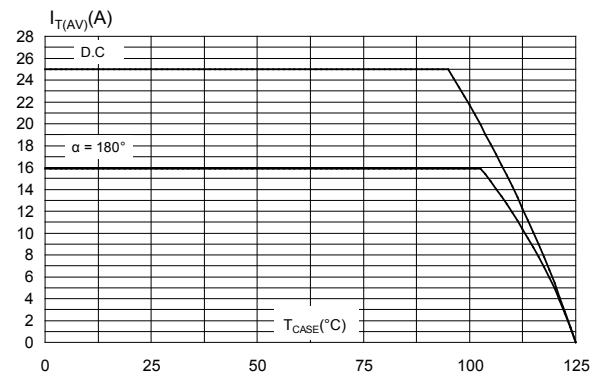


Figure 3. Average and D.C. on state current versus ambient temperature

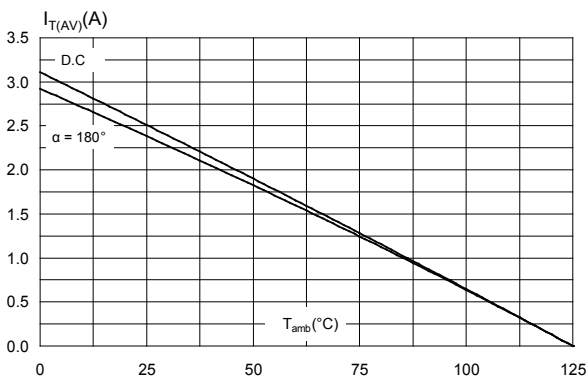
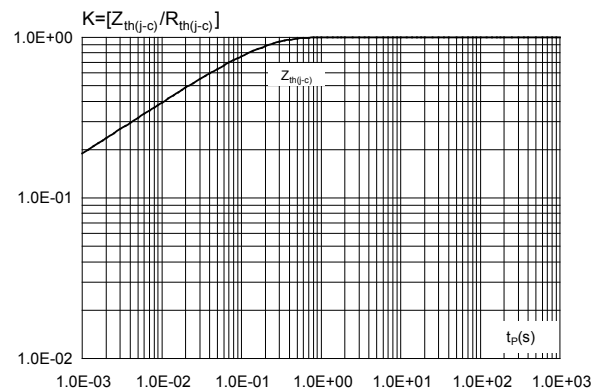
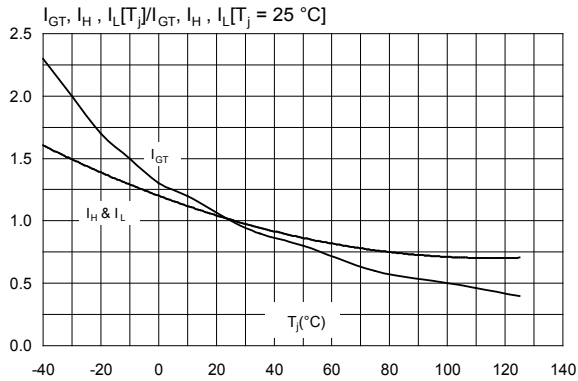


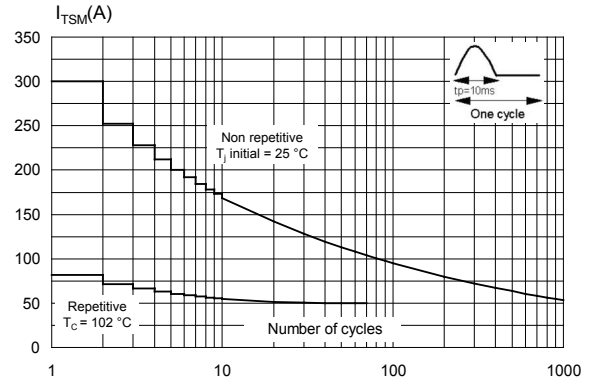
Figure 4. Relative variation of thermal impedance junction to case



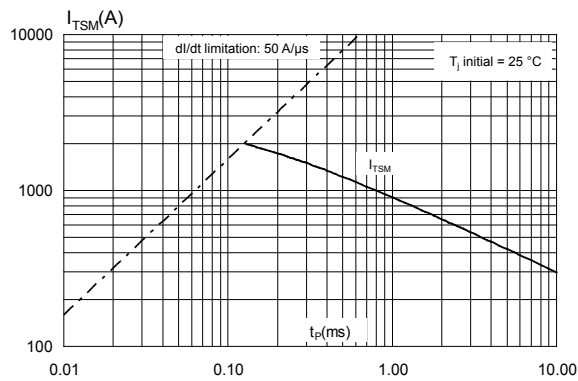
**Figure 5. Relative variation of gate trigger and holding current versus junction temperature**



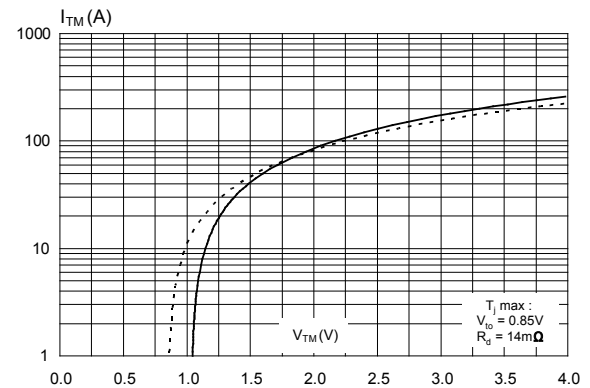
**Figure 6. Surge peak on-state current versus number of cycles**



**Figure 7. Non repetitive surge peak on-state current for a sinusoidal pulse with width  $t_p < 10$  ms**



**Figure 8. On-state characteristics (maximum values)**



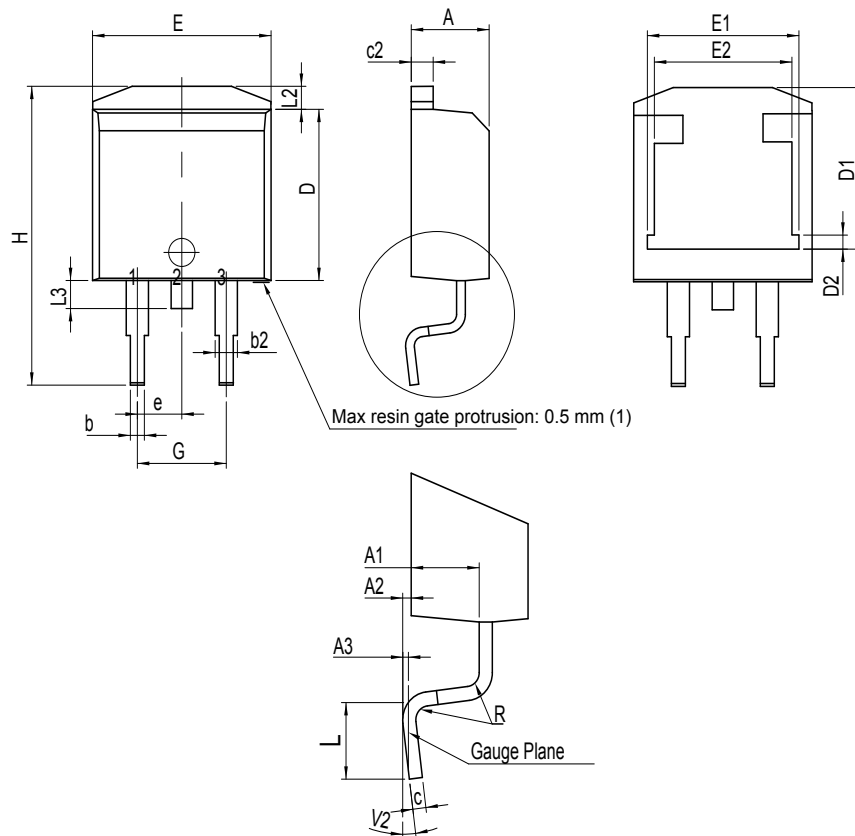
## 2 Package information

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

### 2.1 D<sup>2</sup>PAK package information

- ECOPACK®2 compliant
- Lead-free package leads finishing
- Molding compound resin is halogen-free and meets UL standard level V0

Figure 9. D<sup>2</sup>PAK package outline



(1) Resin gate is accepted in each of position shown on the drawing, or their symmetrical.

**Table 5. D<sup>2</sup>PAK package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches <sup>(1)</sup>		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.1693		0.1811
A1	2.49		2.69	0.0980		0.1059
A2	0.03		0.23	0.0012		0.0091
A3		0.25			0.0098	
b	0.70		0.93	0.0276		0.0366
b2	1.25		1.7	0.0492		0.0669
c	0.45		0.60	0.0177		0.0236
c2	1.21		1.36	0.0476		0.0535
D	8.95		9.35	0.3524		0.3681
D1	7.50		8.00	0.2953		0.3150
D2	1.30		1.70	0.0512		0.0669
e	2.54			0.10000		
E	10.00		10.28	0.3937		0.4047
E1	8.30		8.70	0.3268		0.3425
E2	6.85		7.25	0.2697		0.2854
G	4.88		5.28	0.1921		0.2079
H	15		15.85	0.5906		0.6240
L	1.78		2.28	0.0701		0.0898
L2	1.27		1.40	0.0500		0.0551
L3	1.40		1.75	0.0551		0.0689
R		0.40			0.0157	
V2 <sup>(2)</sup>	0°		8°	0°		8°

1. Dimensions in inches are given for reference only

2. Degrees

Figure 10. D<sup>2</sup>PAK recommended footprint (dimensions are in mm)

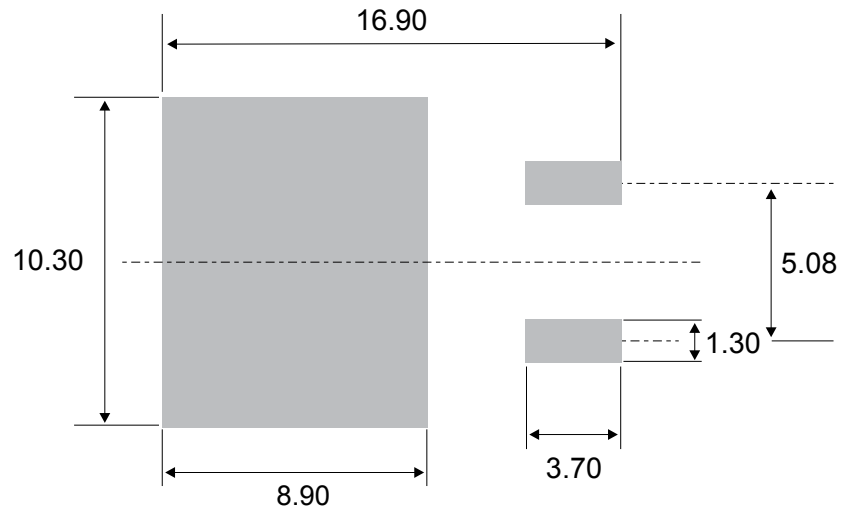
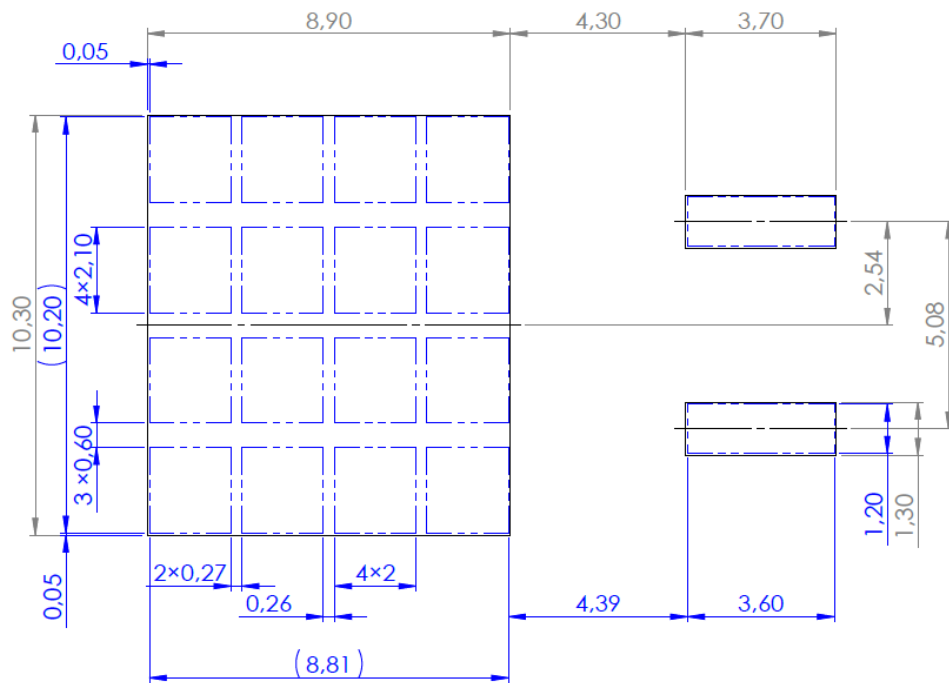


Figure 11. D<sup>2</sup>PAK stencil definitions (dimensions are in mm)



### 3 Ordering information

Figure 12. Ordering information scheme

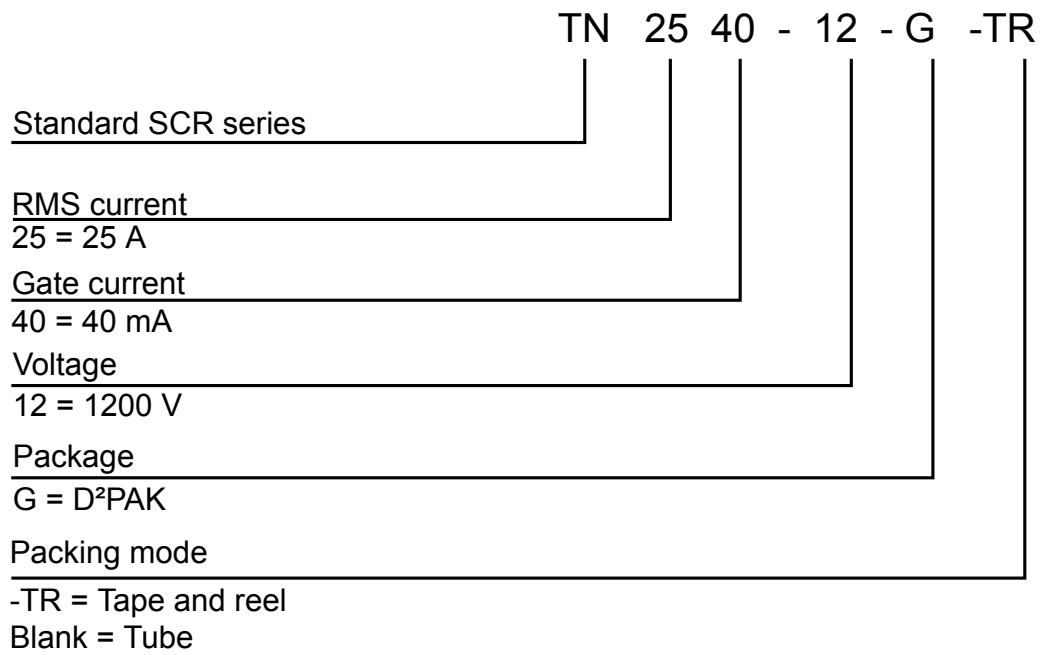


Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
TN2540-12G-TR	TN2540-12G	D <sup>2</sup> PAK	1.6 g	1000	Tape and Reel
TN2540-12G				50	Tube



## Revision history

**Table 7. Document revision history**

Date	Version	Changes
18-Oct-2018	1	Initial release.

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