

## 25 A high voltage Triacs

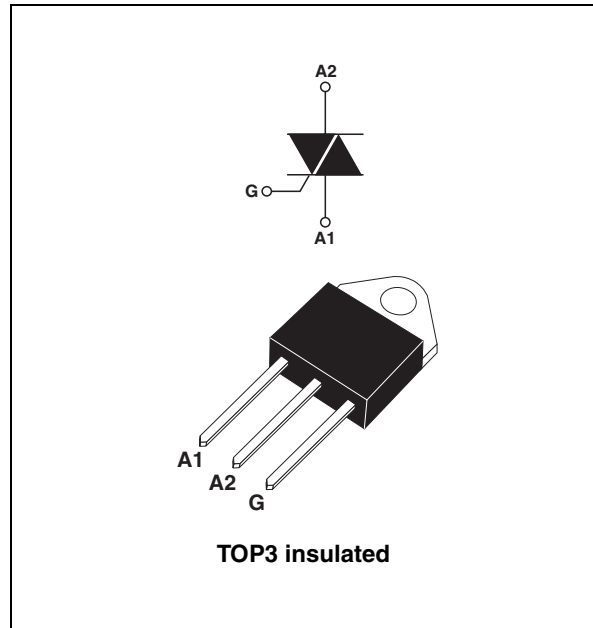
### Features

- On-state current ( $I_{T(RMS)}$ ): 25 A
- Max. blocking voltage ( $V_{DRM}/V_{RRM}$ ): 1200 V
- Gate current ( $I_{GT}$ ): 150 mA
- Commutation @ 10 V/ $\mu$ s: up to 88 A/ms
- Noise immunity: 2 kV/ $\mu$ s
- Insulated package:
  - 2,500 V rms (UL recognized: E81734).

### Description

The TPDVxx25 series use high performance alternistor technology.

Featuring very high commutation levels and high surge current capability, these devices are well adapted to power control for inductive and resistive loads (motor, transformer...) especially on three-phase power grid. Targeted three-phase applications include heating systems, motor starters, and induction motor speed control (especially for fans).



**Table 1. Device summary**

Parameter	TPDV825RG	TPDV1025RG	TPDV1225RG
Blocking voltage $V_{DRM}/V_{RRM}$	800 V	1000 V	1200 V
On-state current $I_{T(RMS)}$	25 A		
Gate current $I_{GT}$	150 mA		

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	On-state rms current (180° conduction angle)		$T_c = 85\text{ °C}$	25	A
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 2.5\text{ ms}$	$T_j = 25\text{ °C}$	390	A
		$t_p = 8.3\text{ ms}$		250	
		$t_p = 10\text{ ms}$		230	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	265	A <sup>2</sup> s
$di/dt$	Critical rate of rise of on-state current $I_G = 500\text{ mA}$ , $dI_G/dt = 1\text{ A}/\mu\text{s}$	F = 50 Hz		100	A/ $\mu\text{s}$
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage	TPDV825	$T_j = 125\text{ °C}$	800	V
		TPDV1025		1000	
		TPDV1225		1200	
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°C
$V_{INS(RMS)}^{(1)}$	Insulation rms voltage			2500	V

1. A1, A2, gate terminals to case for 1 minute

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

Symbol	Test conditions		Quadrant		Value	Unit
$I_{GT}$	$V_D = 12\text{ V DC}$ , $R_L = 33\ \Omega$		I - II - III	MAX.	150	mA
$V_{GT}$				MAX.	1.5	V
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$	$T_j = 125\text{ °C}$	I - II - III	MIN.	0.2	V
$t_{gt}$	$V_D = V_{DRM}$ $I_G = 500\text{ mA}$ $dI_G/dt = 3\text{ A}/\mu\text{s}$		I - II - III	TYP.	2.5	$\mu\text{s}$
$I_H^{(1)}$	$I_T = 500\text{ mA}$ Gate open			TYP.	50	mA
$I_L$	$I_G = 1.2 \times I_{GT}$		I - III	TYP.	100	mA
			II		200	
$dV/dt$	Linear slope up to: $V_D = 67\% V_{DRM}$ Gate open	$T_j = 125\text{ °C}$		MIN.	2000	V/ $\mu\text{s}$
$V_{TM}^{(1)}$	$I_{TM} = 35\text{ A}$ $t_p = 380\ \mu\text{s}$			MAX.	1.8	V
$V_{to}^{(1)}$	Threshold voltage			MAX.	1.1	V
$R_d^{(1)}$	Dynamic resistance			MAX.	19	m $\Omega$
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ °C}$		MAX.	20	$\mu\text{A}$
		$T_j = 125\text{ °C}$			8	mA
$(di/dt)_c^{(1)}$	$(dV/dt)_c = 200\text{ V}/\mu\text{s}$		$T_j = 125\text{ °C}$	MIN.	20	A/ms
	$(dV/dt)_c = 10\text{ V}/\mu\text{s}$				88	

1. For either polarity of electrode A<sub>2</sub> voltage with reference to electrode A<sub>1</sub>.

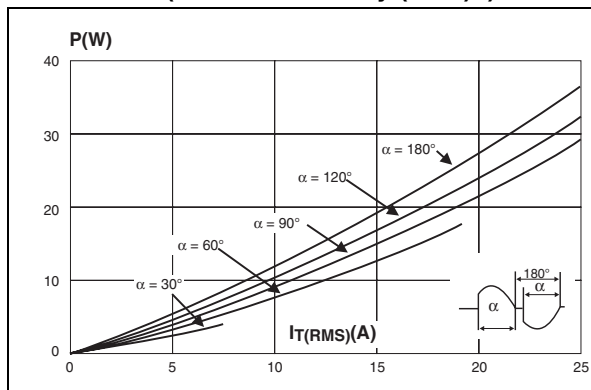
**Table 4. Gate characteristics (maximum values)**

Symbol	Parameter	Value	Unit
$P_{G(AV)}$	Average gate power dissipation	1	W
$P_{GM}$	Peak gate power dissipation	$t_p = 20 \mu s$ 40	W
$I_{GM}$	Peak gate current	$t_p = 20 \mu s$ 8	A
$V_{GM}$	Peak positive gate voltage	$t_p = 20 \mu s$ 16	V

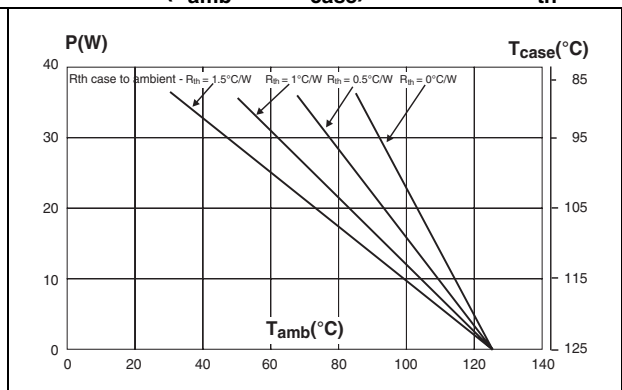
**Table 5. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient	50	$^{\circ}C/W$
$R_{th(j-c) DC}$	Junction to case for DC	1.5	$^{\circ}C/W$
$R_{th(j-c) AC}$	Junction to case for 360 $^{\circ}$ Conduction angle ( $F = 50 Hz$ )	1.1	$^{\circ}C/W$

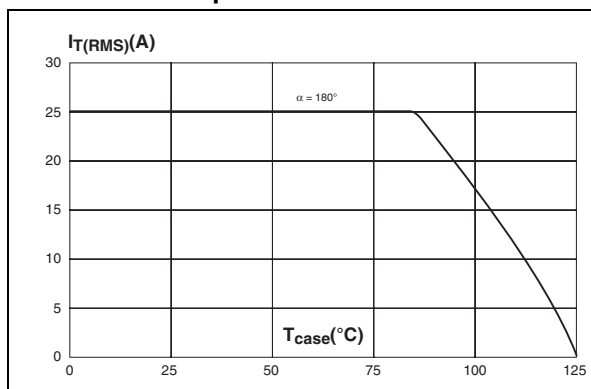
**Figure 1. Max. rms power dissipation versus on-state rms current ( $F = 50Hz$ ). (curves limited by  $(di/dt)_c$ )**



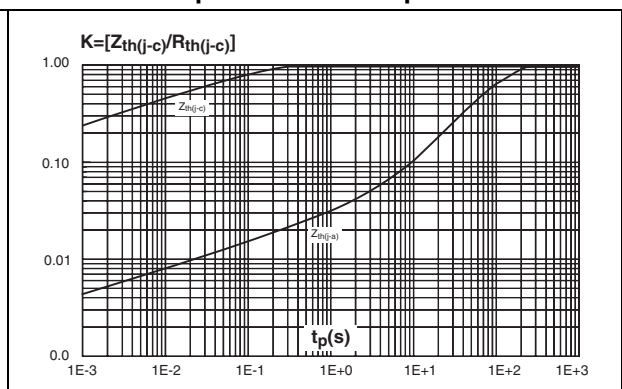
**Figure 2. Max. rms power dissipation and max. allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for various  $R_{th}$**



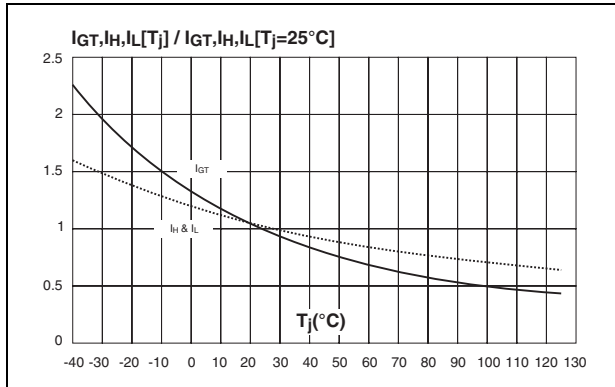
**Figure 3. On-state rms current versus case temperature**



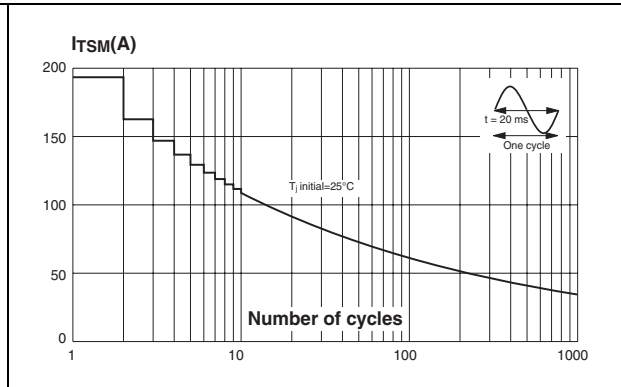
**Figure 4. Relative variation of thermal impedance versus pulse duration**



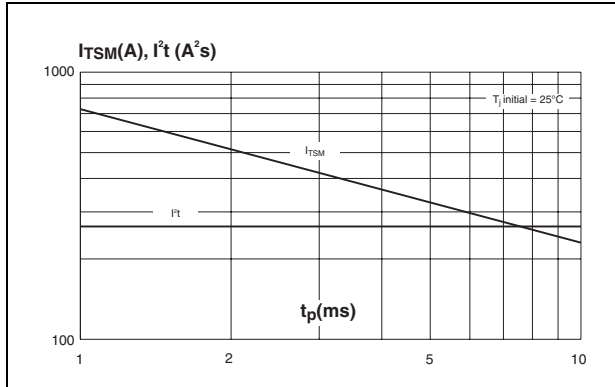
**Figure 5. Relative variation of gate trigger current and holding current versus junction temperature**



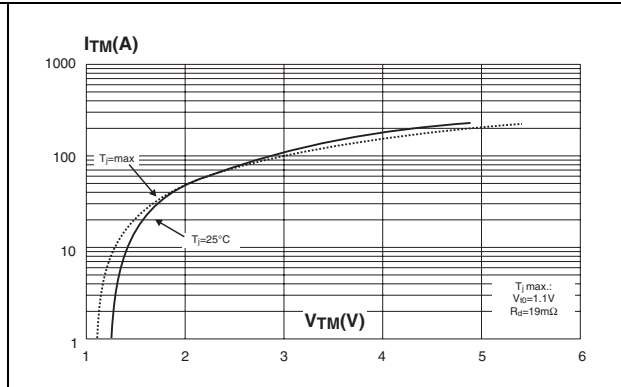
**Figure 6. Non repetitive surge peak on-state current versus number of cycles**



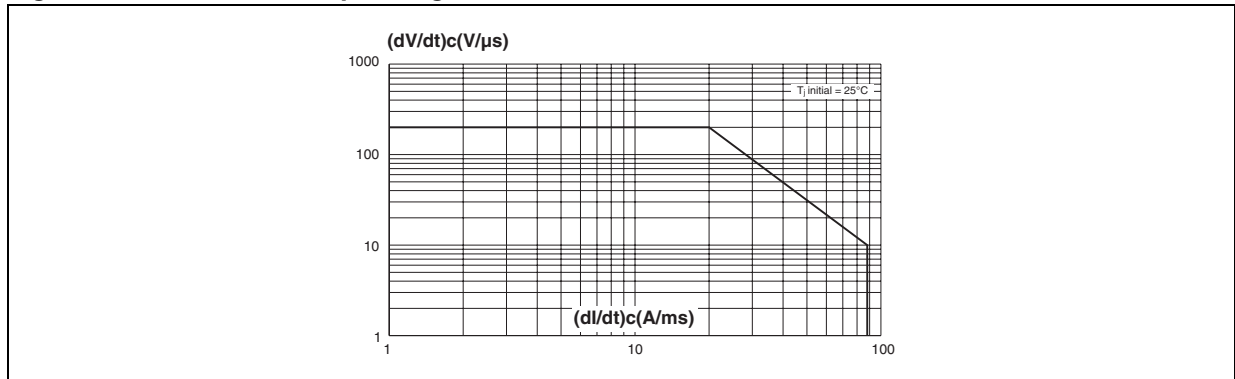
**Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I²t**



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



**Figure 9. Safe turn-off operating area**



## 2 Package information

- Epoxy meets UL94,V0
- Cooling method: C (by conduction)
- Recommended torque value: 0.9 to 1.2 N·m

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.

**Table 6. TOP3 insulated dimensions**

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.4	4.6	0.173	0.181
B	1.45	1.55	0.057	0.061
C	14.35	15.60	0.565	0.614
D	0.5	0.7	0.020	0.028
E	2.7	2.9	0.106	0.114
F	15.8	16.5	0.622	0.650
G	20.4	21.1	0.815	0.831
H	15.1	15.5	0.594	0.610
J	5.4	5.65	0.213	0.222
K	3.4	3.65	0.134	0.144
ØL	4.08	4.17	0.161	0.164
P	1.20	1.40	0.047	0.055
R	4.60 typ.		0.181 typ.	

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
TPDV825RG	TPDV825	TOP3 insulated	4.5 g	30	Tube
TPDV1025RG	TPDV1025				
TPDV1225RG	TPDV1225				

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
30-Mar-2011	1	First issue.
13-Jan-2012	2	Updated $dI/dt$ in <a href="#">Table 2</a> and added $V_{t0}$ and $R_d$ to <a href="#">Table 3</a> .

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries ("ST") reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST's terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST'S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER'S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2012 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

[www.st.com](http://www.st.com)

# Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[STMicroelectronics:](#)

[TPDV1225RG](#) [TPDV1025RG](#) [TPDV825RG](#)