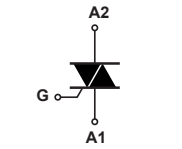
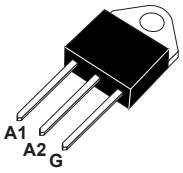
25 A standard Triacs in TOP3 package





TOP3 Insulated

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 at 10 V/µs: up to 88 A/ms
- Noise immunity: 2 kV/µs
- Insulated package:
  - 2500 V rms (UL recognized: E81734)

Application

- Heating system
- Motor starter
- Induction motor speed control

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).

Product status link
TPDV825RG
TPDV1025RG
TPDV1225RG

Product summary	
$I_{T(RMS)}$	25 A
V_{DRM}/V_{RRM}	TPDV825RG: 825 V
	TPDV1025RG: 1025 V
	TPDV1225RG: 1225 V
I_{GT}	150 mA

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameters			Value	Unit
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		T_c = 85 °C	25	A
I_{TSM}	Non repetitive surge peak on-state current	t_p = 2.5 ms	T_j = 25 °C	390	A
		t_p = 8.3 ms		250	
		t_p = 10 ms		230	
I^2t	I^2t value for fusing	t_p = 10 ms	T_j = 25 °C	265	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 500 mA, dI_G/dt = 1 A/µs	f = 50 Hz		100	A/µs
V_{DRM}, V_{RRM}	Repetitive surge peak off-state voltage	TPDV825	T_j = 125 °C	800	V
		TPDV1025		1000	
		TPDV1225		1200	
I_{GM}	Peak gate current	t_p = 20 µs		8	A
P_{GM}	Peak gate power dissipation			40	W
V_{GM}	Peak positive gate voltage			16	V
$P_{G(AV)}$	Average gate power dissipation			1	W
T_{stg}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +125	°C
V_{INS}(1)	Insulation RMS voltage, 1 minute			2500	V

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

Table 2. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Parameters	Quadrant		Value	Unit
I_{GT}(1)	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	150	mA
V_{GT}		I - II - III	Max.	1.5	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	I - II - III	Min.	0.2	V
t_{GT}	V_D = V_{DRM}, I_G = 500 mA, dI_G/dt = 3 A/µs	I - II - III	Typ.	2.5	µs
I_H(2)	I_T = 500 mA		Typ.	50	mA
I_L	I_G = 1.2 I_{GT}	I - III	Typ.	100	mA
		II	Typ.	200	
dV/dt(2)	V_D = 67 % V_{DRM} gate open, T_j = 125 °C		Min.	2000	V/µs
(dI/dt)c(2)	(dV/dt)c = 200 V/µs, T_j = 125 °C		Min.	20	A/ms
	(dV/dt)c = 10 V/µs, T_j = 125 °C			88	

1. *Minimum I_{GT} is guaranteed at 5 % of I_{GT} max.*
2. *For both polarities of A2 referenced to A1*

Table 3. Static electrical characteristics

Symbol	Test conditions			Value	Unit
V_{TM}[1]	I_{TM} = 35 A, t_p = 380 µs	T_j = 25 °C	Max.	1.8	V
V_{TO}[1]	threshold on-state voltage	T_j = 125 °C	Max.	1.1	V
R_D[1]	Dynamic resistance	T_j = 125 °C	Max.	19	mΩ
I_{DRM}/I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	Max.	20	µA
		T_j = 125 °C		8	mA

1. *For both polarities of A2 referenced to A1*

Table 4. Thermal resistance

Symbol	Parameters		Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	Max.	1.5	°C/W
	Junction to case (AC) for 360 ° conduction angle (F = 50 Hz)	Max.	1.1	
$R_{th(j-a)}$	Junction to ambient	Typ.	50	

1.1 Characteristics (curves)

Figure 1. Max. rms power dissipation versus on-state rms current (F = 50Hz, curves limited by (dI/dt)c)

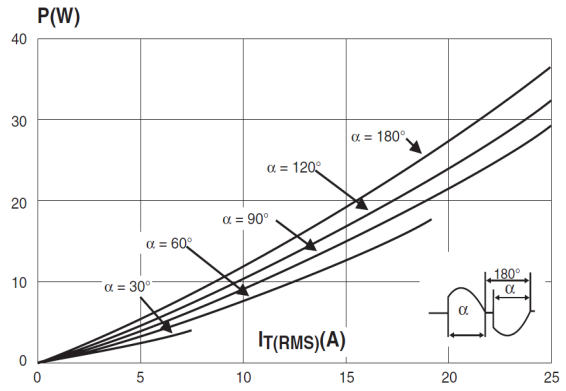


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

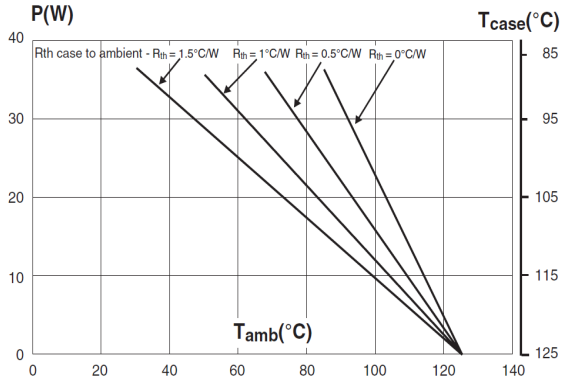


Figure 3. On-state rms current versus case temperature

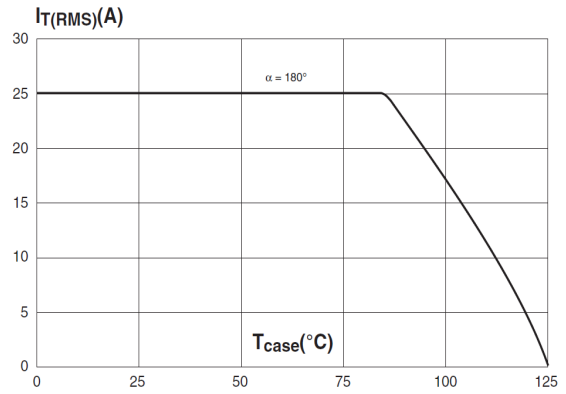


Figure 4. Relative variation of thermal impedance versus pulse duration

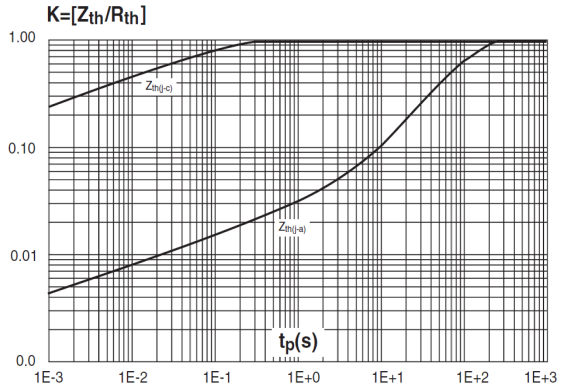


Figure 5. Relative variation of gate trigger current and holding current and latching current versus junction temperature

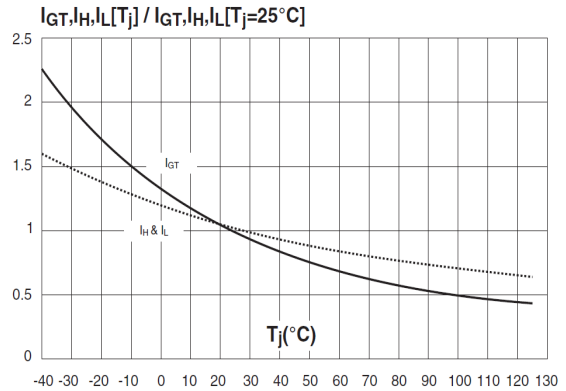


Figure 6. Non-repetitive surge peak on-state current versus number of cycles

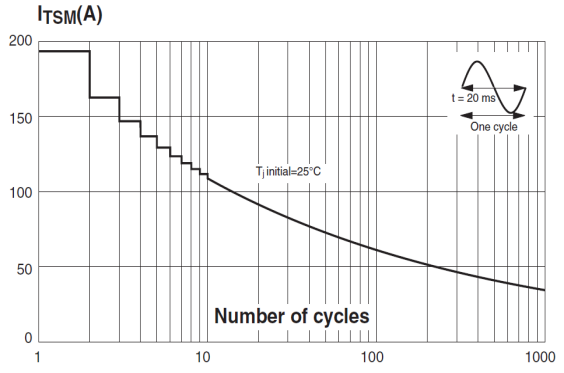


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I²t

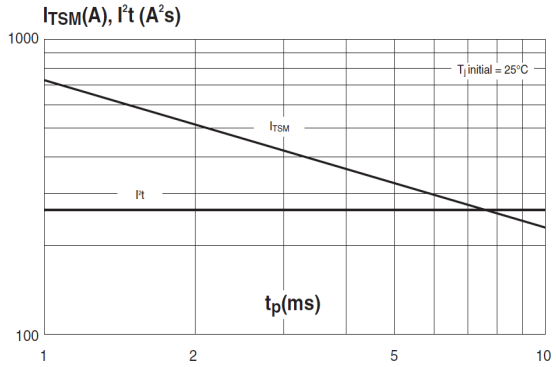


Figure 8. On-state characteristics (maximum values)

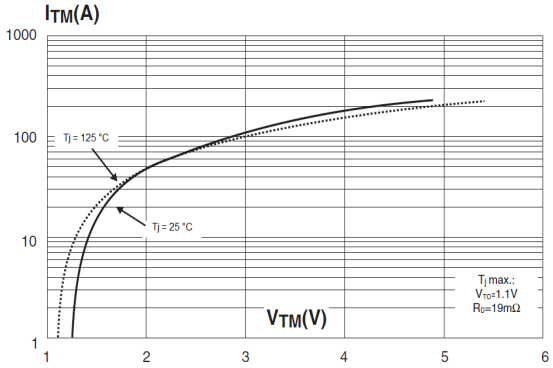
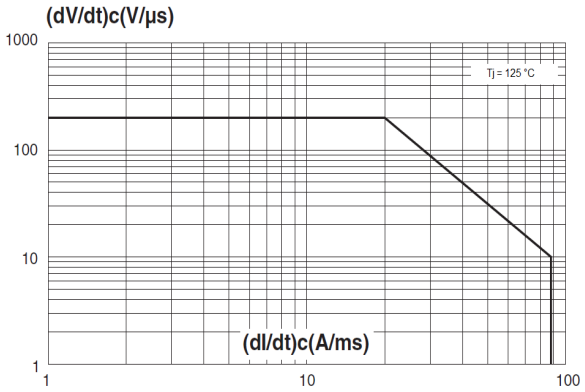


Figure 9. Safe turn-off operating area



2 Package information

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. ECOPACK is an ST trademark.

2.1 Package information

- ECOPACK (lead-free plating and halogen free package compliance)
- Lead-free package leads finishing
- Halogen-free molding compound resin meets UL94 standard level V0
- Recommended torque: 1.05 N·m (max. torque: 1.2 N·m)

Figure 10. Package outline

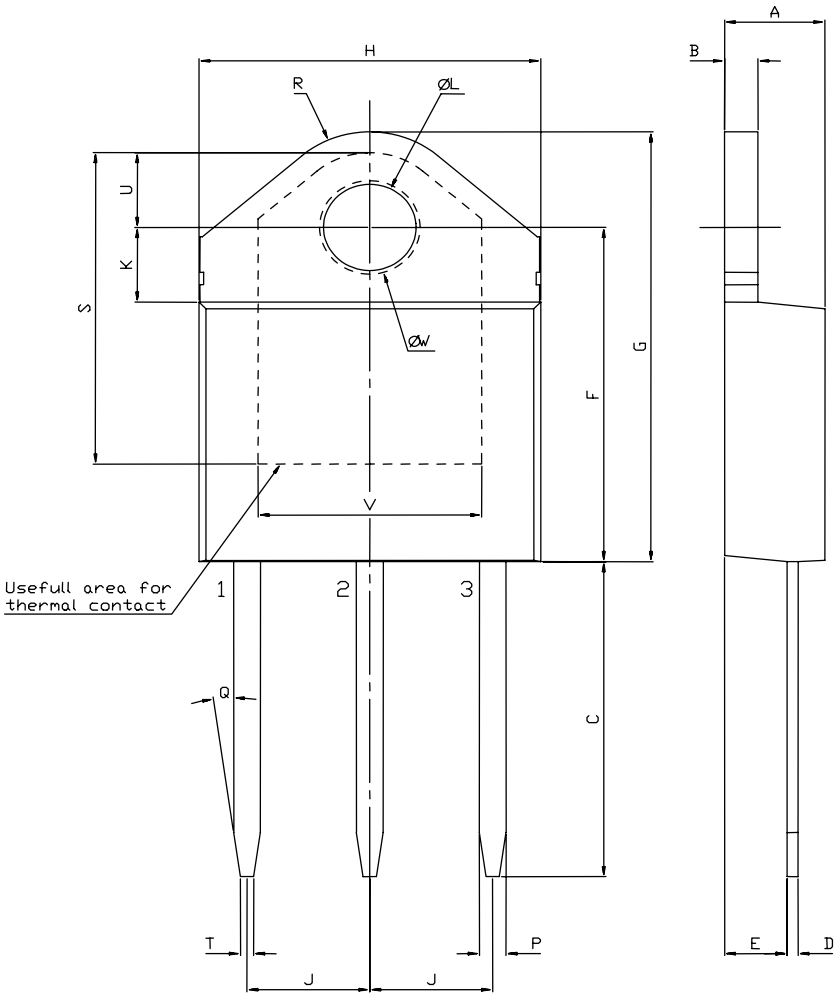


Table 5. Mechanical data

Ref.	Dimensions					
	mm			Inches[1]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.40		4.60	0.1732		0.1811
B	1.45		1.55	0.0571		0.0610
C	14.35		15.60	0.5650		0.6142
D	0.50		0.70	0.0197		0.0276
E	2.70		2.90	0.1063		0.1142
F	15.80		16.50	0.6220		0.6496
G	20.40		21.10	0.8031		0.8307
H	15.10		15.50	0.5945		0.6102
J	5.40		5.65	0.2126		0.2224
K	3.40		3.65	0.1339		0.1437
L	4.08		4.17	0.1606		0.1642
P	1.10		1.30	0.0430		0.0510
R		4.60			0.1811	

1. *Inches given for reference only*

3 Ordering information

Table 6. **Ordering information**

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

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
30-Mar-2011	1	First issue.
13-Jan-2012	2	Updated dI/dt in *Table 2* and added V_{to} and R_d to *Table 3*.
06-Oct-2023	3	Updated *Section 2.1 Package information*.
23-May-2024	4	Updated Table 2.

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