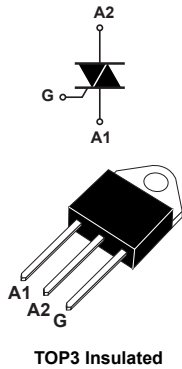


25 A standard Triacs in TOP3 package



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

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/ μ s: up to 88 A/ms
- Noise immunity: 2 kV/ μ s
- 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).

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameters		Value	Unit	
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		$T_c = 85\text{ °C}$ 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 ² s	
di/dt	Critical rate of rise of on-state current $I_G = 500\text{ mA}$, $di_G/dt = 1\text{ A}/\mu\text{s}$	$f = 50\text{ Hz}$	100	A/ μs	
V_{DRM} , V_{RRM}	Repetitive surge peak off-state voltage	TPDV825	$T_j = 125\text{ °C}$ 800	V	
		TPDV1025			1000
		TPDV1225			1200
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu\text{s}$	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 ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Parameters	Quadrant		Value	Unit
$I_{GT}^{(1)}$	$V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$	I - II - III	Max.	150	mA
V_{GT}		I - II - III	Max.	1.5	V
V_{GD}	$V_D = V_{DRM}$, $R_L = 3.3\text{ k}\Omega$, $T_j = 125\text{ °C}$	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	μs
$I_H^{(2)}$	$I_T = 500\text{ mA}$		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, $T_j = 125\text{ °C}$		Min.	2000	V/ μs
$(di/dt)_c^{(2)}$	$(di/dt)_c = 200\text{ A/ms}$, $T_j = 125\text{ °C}$		Min.	20	A/ms
	$(di/dt)_c = 10\text{ A/ms}$, $T_j = 125\text{ °C}$			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	T _j	Value	Unit
V _{TM} ⁽¹⁾	I _{TM} = 35 A, t _p = 380 μs	25 °C	1.8	V
V _{TO} ⁽¹⁾	threshold on-state voltage	125 °C	1.1	V
R _D ⁽¹⁾	Dynamic resistance	125 °C	19	mΩ
I _{DRM} /I _{RDM}	V _{DRM} = V _{RDM}	25 °C	20	μA
		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)	1.5	°C/W
	Junction to case (AC) for 360 ° conduction angle (F = 50 Hz)	1.1	
R _{th(j-a)}	Junction to ambient	50	

1.1 Characteristics (curves)

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

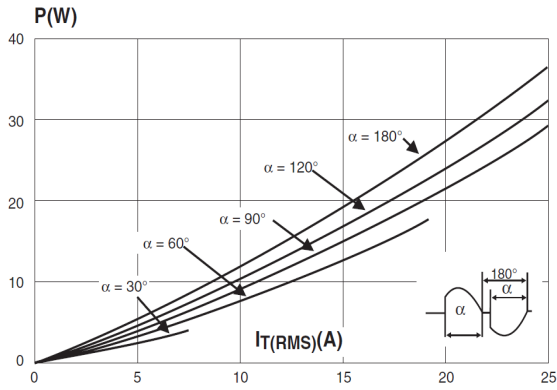


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

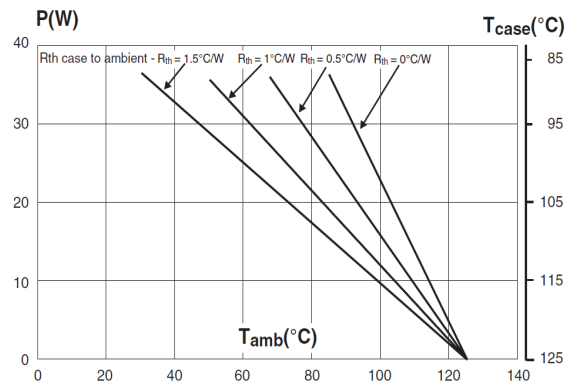


Figure 3. On-state rms current versus case temperature

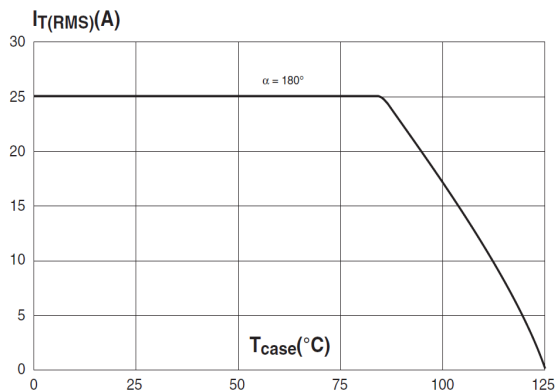


Figure 4. Relative variation of thermal impedance versus pulse duration

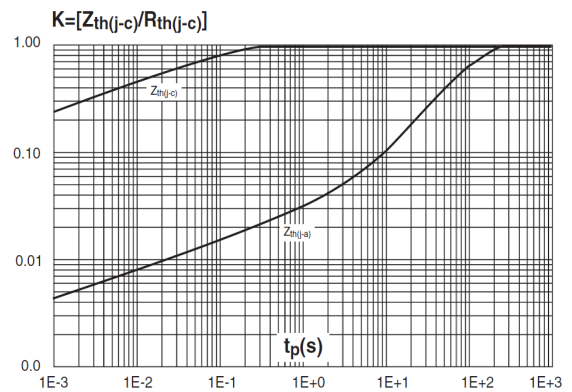


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

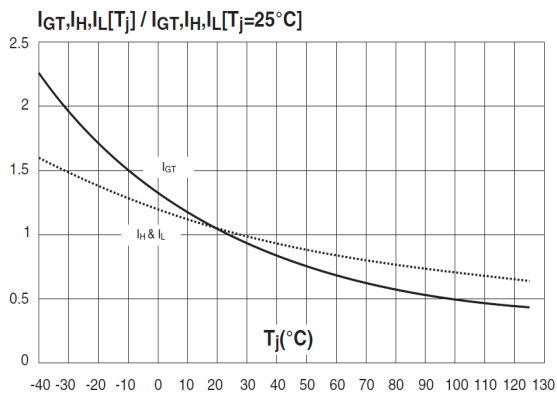


Figure 6. Non-repetitive surge peak on-state current versus number of cycles

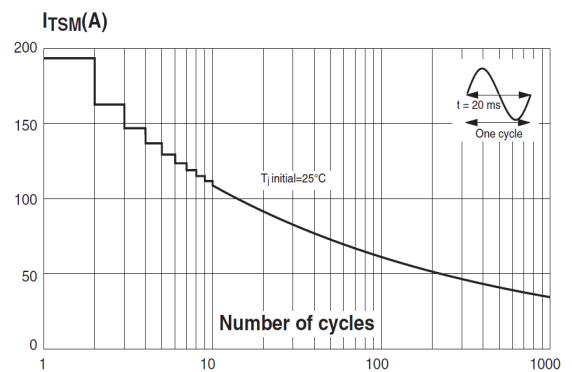


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

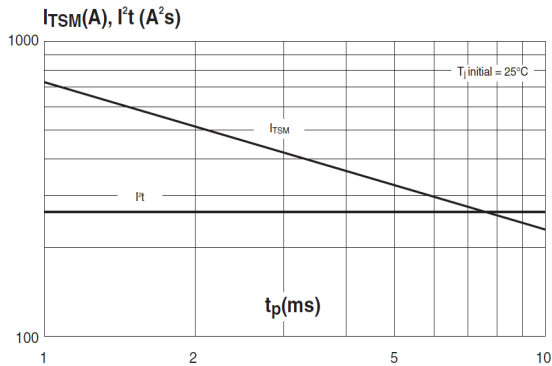


Figure 8. On-state characteristics (maximum values)

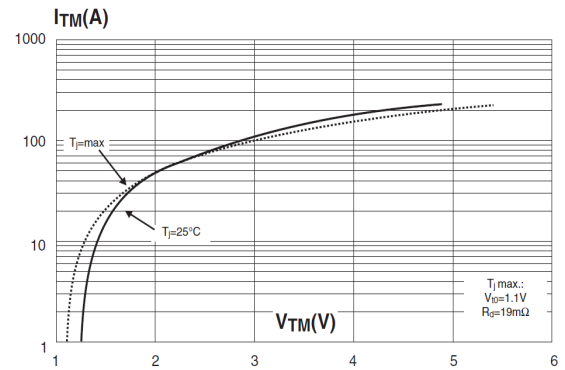
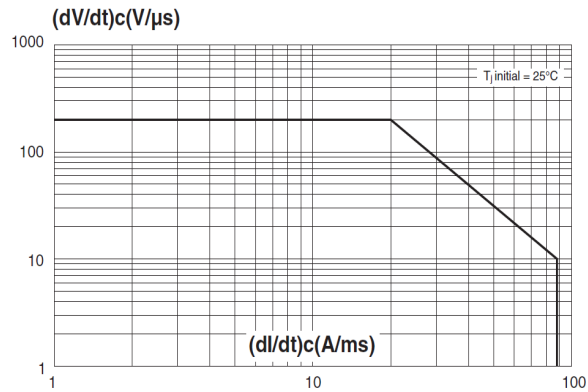


Figure 9. Safe turn-off operating area



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

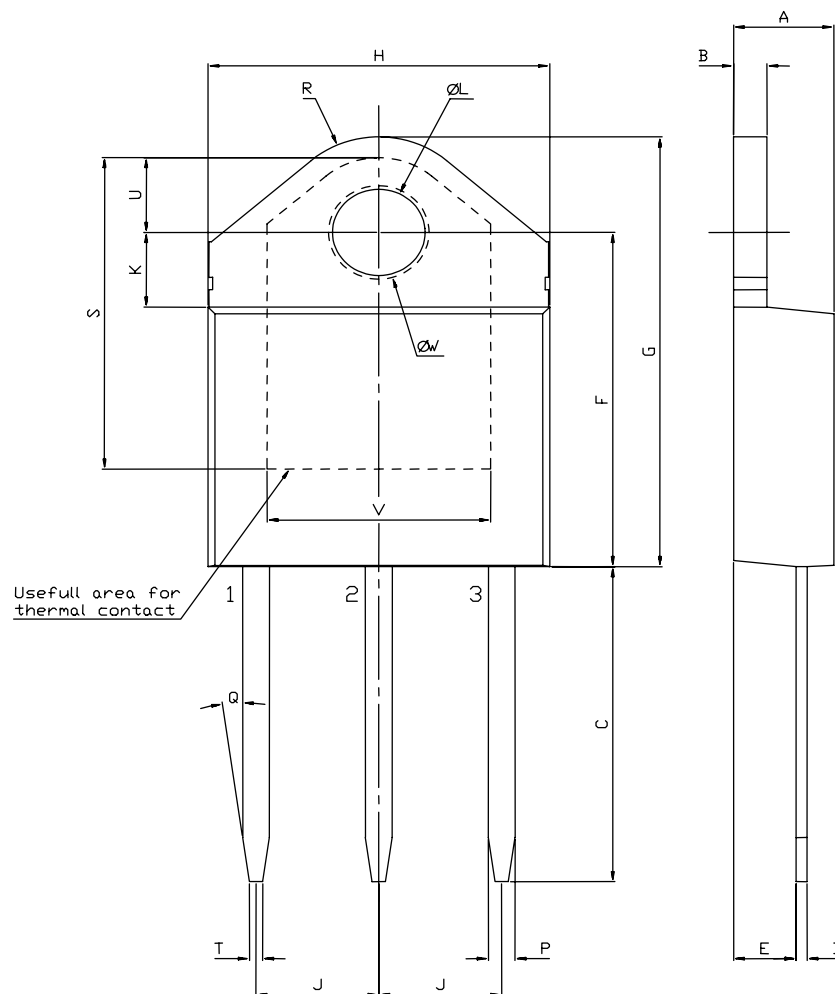


Table 5. Mechanical data

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 dl/dt in <i>Table 2</i> and added V_{to} and R_d to <i>Table 3</i> .
06-Oct-2023	3	Updated Section 2.1 Package information .

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