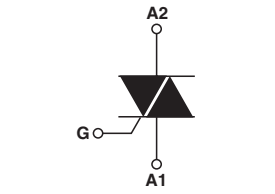
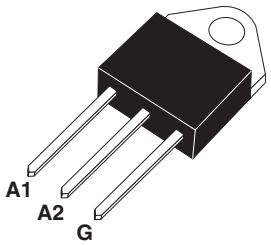
TPDVxx25

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/µs: up to 88 A/ms
- Noise immunity: 2 kV/µs
- Insulated package:
  - 2,500 V rms (UL recognized: E81734).





TOP3 insulated

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		

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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 °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 peak off-state voltage	TPDV825	T_j = 125 °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 °C, unless otherwise specified)

Symbol	Test conditions		Quadrant		Value	Unit
I_{GT}	V_D = 12 V DC, R_L = 33 Ω		I - II - III	MAX.	150	mA
V_{GT}				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 (1)	I_T = 500 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 °C		MIN.	2000	V/µs
V_{TM} (1)	I_{TM} = 35 A t_p = 380 µs			MAX.	1.8	V
V_{to} (1)	Threshold 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
(dI/dt)c (1)	(dV/dt)c = 200 V/µs	T_j = 125 °C		MIN.	20	A/ms
	(dV/dt)c = 10 V/µs				88	

1. For either polarity of electrode A_2 voltage with reference to electrode A_1.

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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 µs	40	W
I_{GM}	Peak gate current	t_p = 20 µs	8	A
V_{GM}	Peak positive gate voltage	t_p = 20 µs	16	V

Table 5. Thermal resistance

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

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

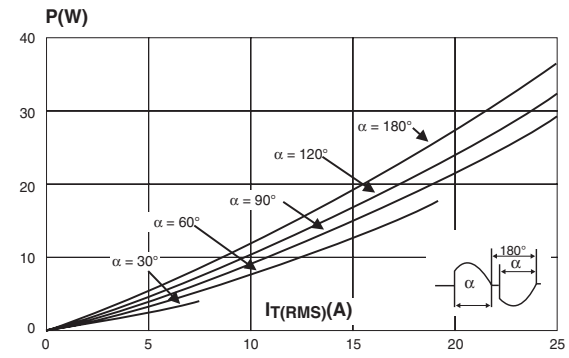

Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

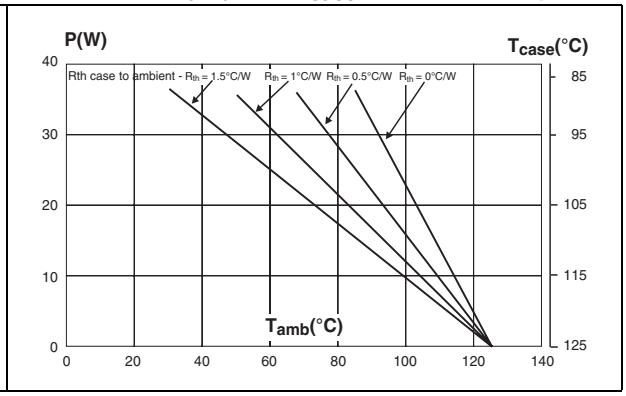

Figure 3. On-state rms current versus case temperature

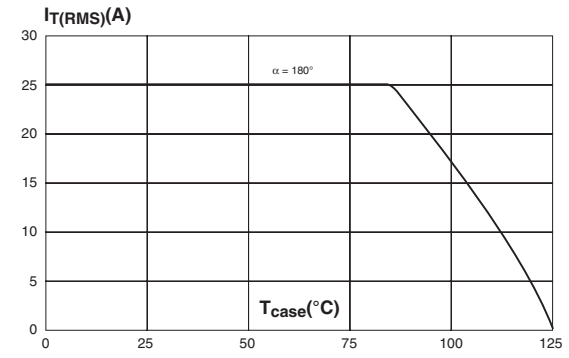

Figure 4. Relative variation of thermal impedance versus pulse duration

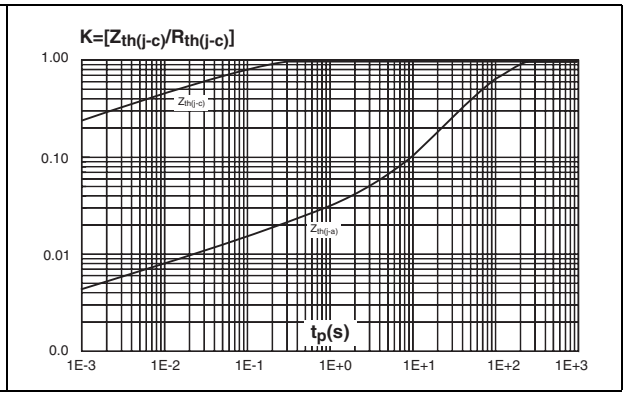

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Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

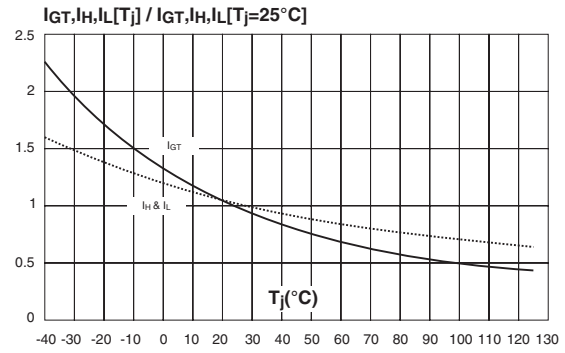


Figure 6. Non repetitive surge peak on-state current versus number of cycles

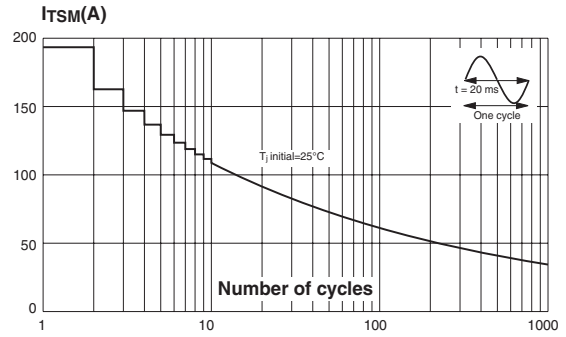


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

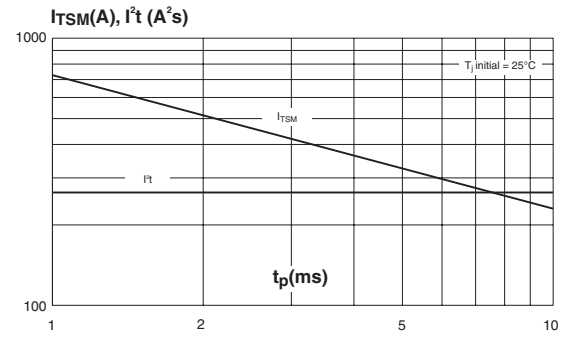


Figure 8. On-state characteristics (maximum values)

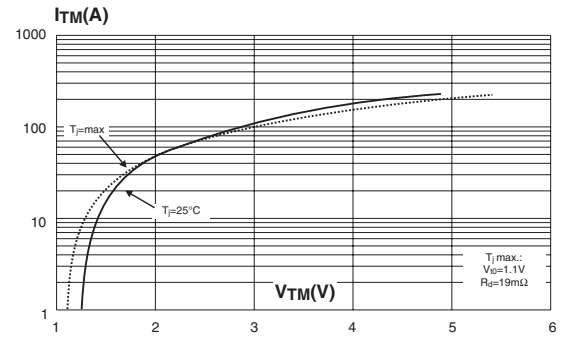
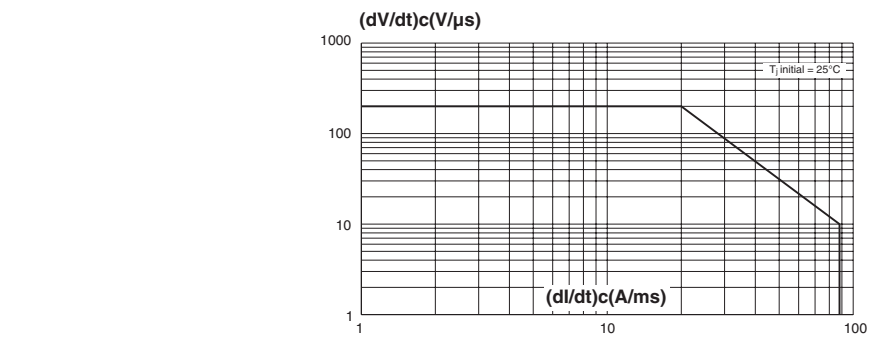


Figure 9. Safe turn-off operating area



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2 Package information

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

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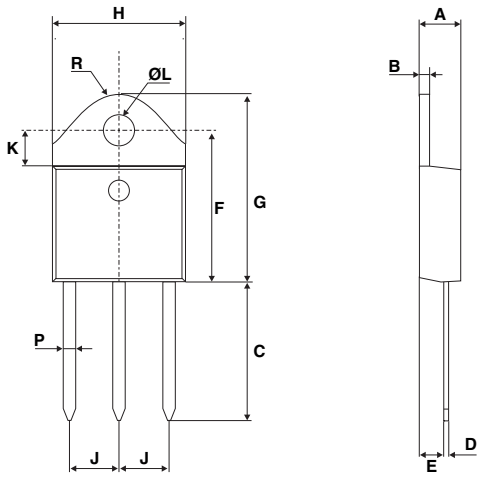
Table 6. TOP3 insulated dimensions



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.	

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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 *Table 2* and added V_{to} and R_d to *Table 3*.

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