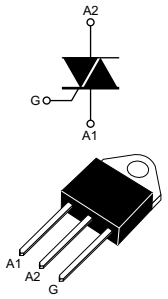
TPDVxx40

40 A high voltage Triacs

Datasheet - production data



TOP3 insulated

Features

- On-state current ($I_{T(RMS)}$): 40 A
- Max. blocking voltage (V_{DRM}/V_{RRM}): 1200 V
- Gate current (I_{GT}): 200 mA
- Commutation at 10 V/µs: up to 142 A/ms
- Noise immunity: 500 V/µs
- Insulated package:
  - 2,500 V rms (UL recognized: E81734)

Description

The TPDVxx40 series use a high performance alternistor technology. Featuring very high commutation levels and high surge current capability, this family is well adapted to power control on inductive load (motor, transformer...).

Table 1. Device summary

Parameter	Blocking voltage V_{DRM}/V_{RRM}	On-state current $I_{T(RMS)}$	Gate current I_{GT}
TPDV640RG	600 V	40 A	200 mA
TPDV840RG	800 V		
TPDV1240RG	1200 V		

1 Characteristics

Table 2. Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (180° conduction angle)		T_c = 75 °C	40	A
I_{TSM}	Non repetitive surge peak on-state current	t_p = 2.5 ms	T_j = 25 °C	590	A
		t_p = 8.3 ms		370	
		t_p = 10 ms		350	
I^2t	I^2t value for fusing	t_p = 10 ms	T_j = 25 °C	610	A^2S
dI/dt	Critical rate of rise of on-state current I_G = 500 mA; dI_G/dt = 1 A/µs	Repetitive F = 50 Hz		20	A/µs
		Non repetitive		100	
V_{DRM} V_{RRM}	Repetitive peak off-state voltage	TPDV640	T_j = 125 °C	600	V
		TPDV840		800	
		TPDV1240		1200	
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			-40 to +150 -40 to +125	°C
T_L	Maximum lead temperature for soldering during 10 s at 2 mm from case			260	°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 condition		Quadrant		Value	Unit
I_{GT}	V_D = 12 V DC, R_L = 33 Ω		I - II - III	Max.	200	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 = 3A/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 x 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.	500	V/µs
V_{TM} (1)	I_{TM} = 56 A t_p = 380 µs			Max.	1.8	V
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.	35	A/ms
	(dV/dt)c = 10 V/µs				142	

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

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	1.2	°C/W
$R_{th(j-c)}$ AC	Junction to case for 360 °conduction angle (F = 50 Hz)	0.9	°C/W

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

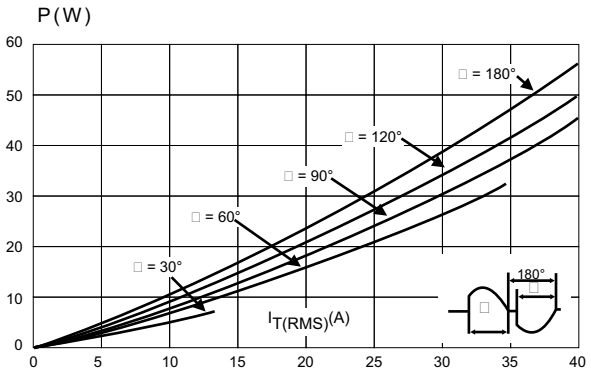


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

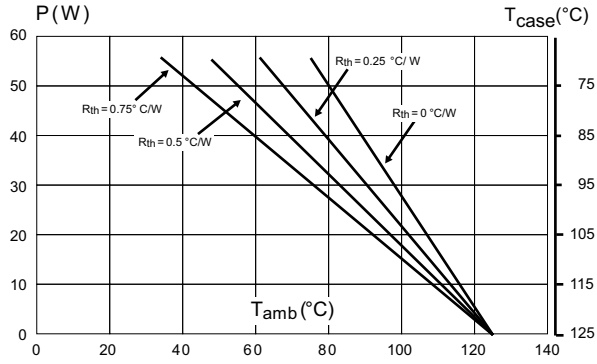


Figure 3. On-state rms current versus case temperature

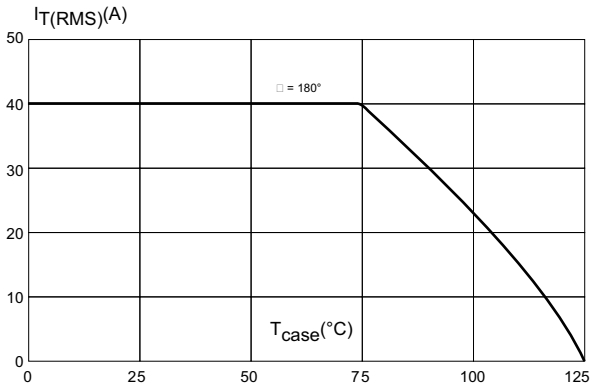


Figure 4. Relative variation of thermal impedance versus pulse duration

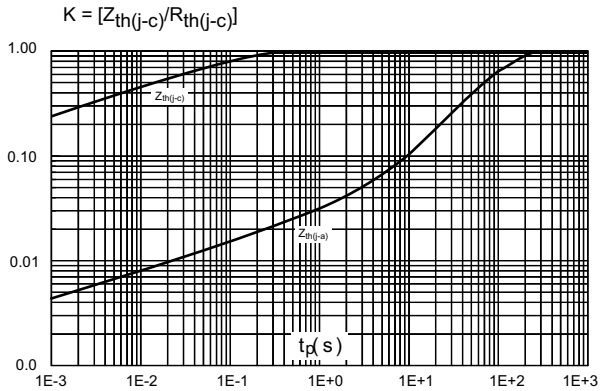


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

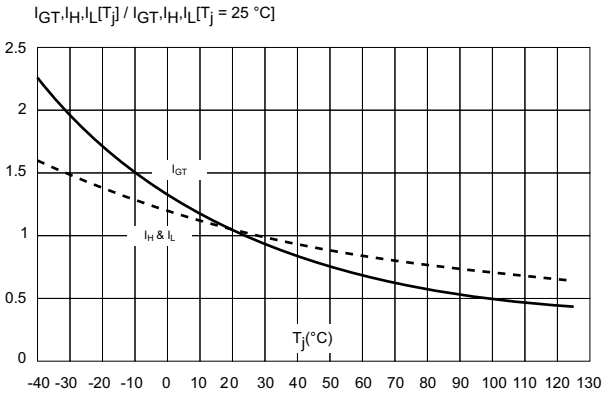


Figure 6. Non repetitive surge peak on-state current versus number of cycles

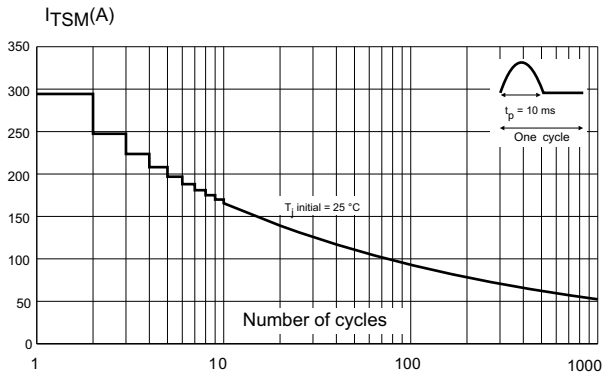


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

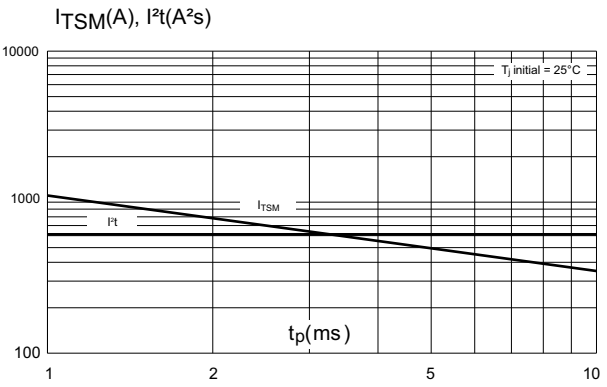


Figure 8. On-state characteristics (maximum values)

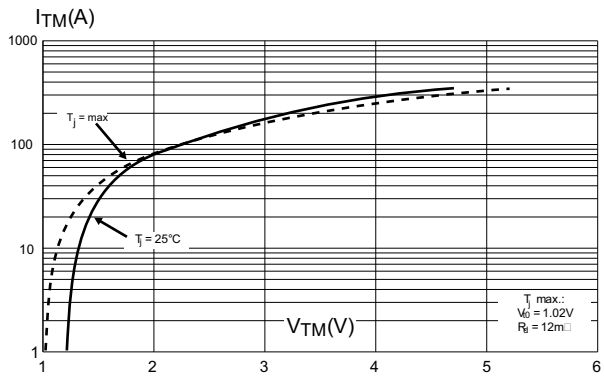
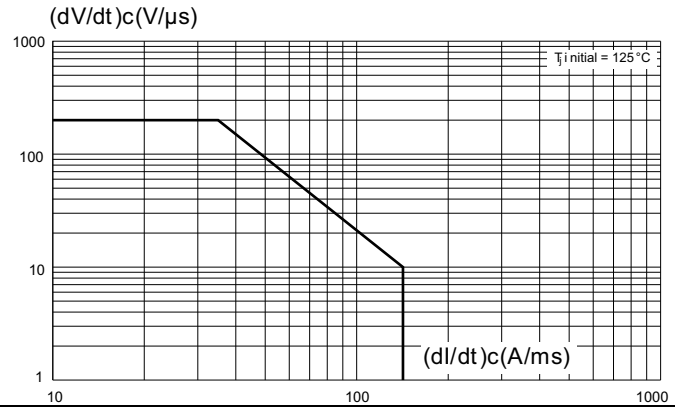


Figure 9. Safe operating area below curve



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*. ECOPACK® is an ST trademark.

2.1 TOP3 insulated package information

Figure 10. TOP3 insulated package outline

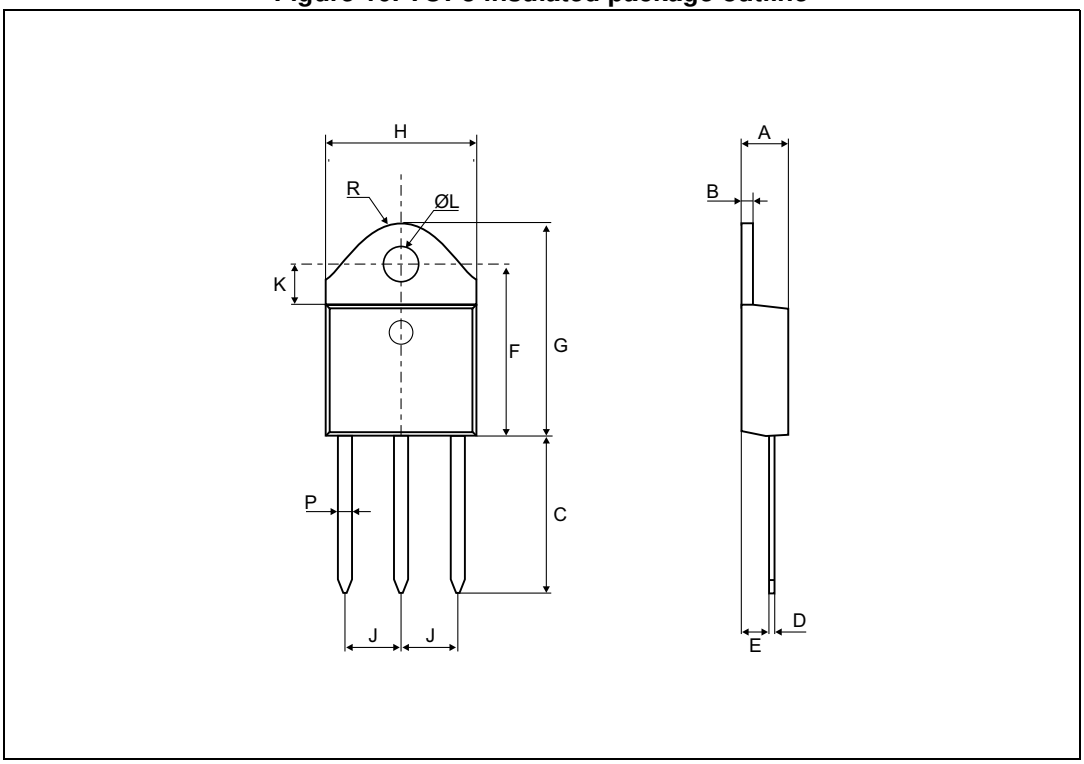


Table 6. TOP3 insulated package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[1]		
	Typ.	Min.	Max.	Typ.	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			0.181		

1. Values in inches are converted from mm and rounded to 4 decimal digits.

3 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty.	delivery mode
TPDV640RG	TPDV640	TOP3 insulated	4.5 g	30	Tube
TPDV840RG	TPDV840				
TPDV1240RG	TPDV1240				

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
30-Mar-2011	1	Initial release.
10-Jun-2015	2	Updated *Table 3*. Updated *Figure 9*. Format updated to current standard.