

## 40 A high voltage Triacs

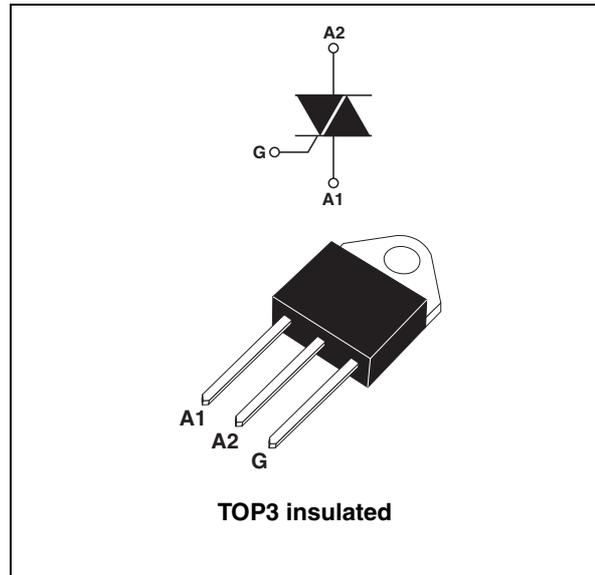
### Features

- On-state current ( $I_{T(RMS)}$ ): 40 A
- Max. blocking voltage ( $V_{DRM}/V_{RRM}$ ): 1200 V
- Gate current ( $I_{GT}$ ): 200 mA
- Commutation @ 10 V/ $\mu$ s: up to 142 A/ms
- Noise immunity: 500 V/ $\mu$ s
- 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	TPDV640RG	TPDV840RG	TPDV1240RG
Blocking voltage $V_{DRM}/V_{RRM}$	600 V	800 V	1200 V
On-state current $I_{T(RMS)}$	40 A		
Gate current $I_{GT}$	200 mA		

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	On-state rms current (180° conduction angle)		$T_c = 75\text{ °C}$	40	A
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 2.5\text{ ms}$	$T_j = 25\text{ °C}$	590	A
		$t_p = 8.3\text{ ms}$		370	
		$t_p = 10\text{ ms}$		350	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	610	A <sup>2</sup> S
dl/dt	Critical rate of rise of on-state current $I_G = 500\text{ mA}$ , $dl_G/dt = 1\text{ A}/\mu\text{s}$	Repetitive $F = 50\text{ Hz}$		20	A/ $\mu\text{s}$
		Non repetitive		100	
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage	TPDV640	$T_j = 125\text{ °C}$	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 10s at 2mm 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 ( $T_j = 25\text{ °C}$ , 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.	200	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
$t_{gt}$	$V_D = V_{DRM}$ , $I_G = 500\text{ mA}$ , $dl_G/dt = 3\text{ A}/\mu\text{s}$		I - II - III	TYP.	2.5	$\mu\text{s}$
$I_H^{(1)}$	$I_T = 500\text{ mA}$ , Gate open			MAX.	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.	500	V/ $\mu\text{s}$
$V_{TM}^{(1)}$	$I_{TM} = 35\text{ A}$ , $t_p = 380\ \mu\text{s}$			MAX.	1.8	V
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ °C}$		MAX.	20	$\mu\text{A}$
		$T_j = 125\text{ °C}$			8	mA
$(dl/dt)_c^{(1)}$	$(dV/dt)_c = 200\text{ V}/\mu\text{s}$	$T_j = 125\text{ °C}$		MIN.	35	A/ms
	$(dV/dt)_c = 10\text{ V}/\mu\text{s}$				142	

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

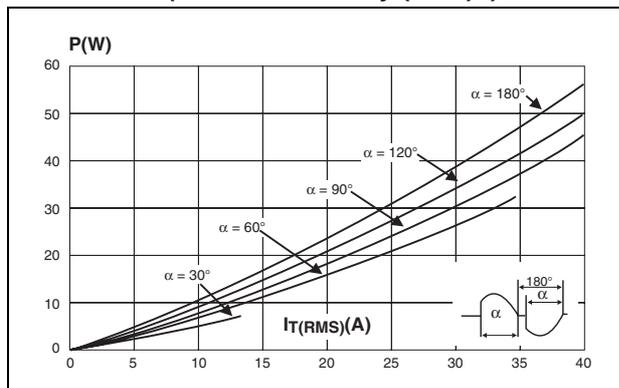
**Table 4. Gate characteristics (maximum values)**

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

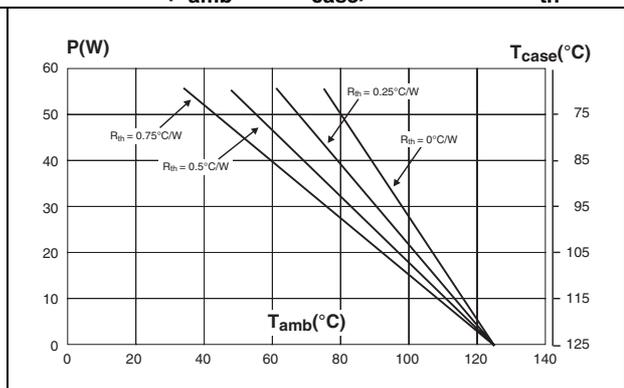
**Table 5. Thermal resistance**

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	1.2	$^{\circ}C/W$
$R_{th(j-c) AC}$	Junction to case for 360 $^{\circ}$ Conduction angle ( $F = 50 \text{ Hz}$ )	0.9	$^{\circ}C/W$

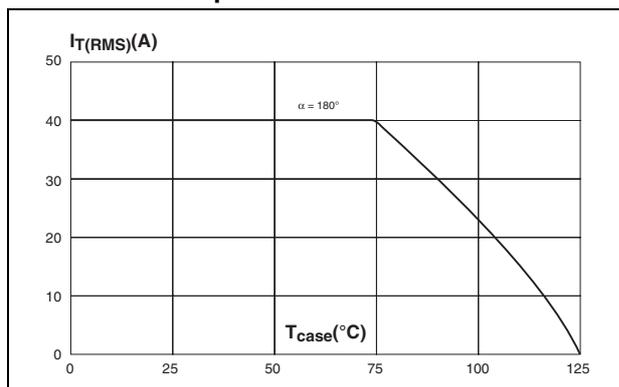
**Figure 1. Max. rms power dissipation versus on-state rms current ( $F = 50 \text{ Hz}$ ). (curves limited by  $(di/dt)_c$ )**



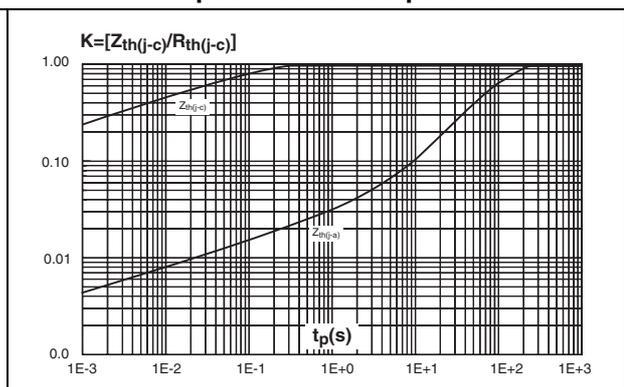
**Figure 2. Max. rms power dissipation and max. allowable temperatures ( $T_{amb}$  and  $T_{case}$ ) for various  $R_{th}$**



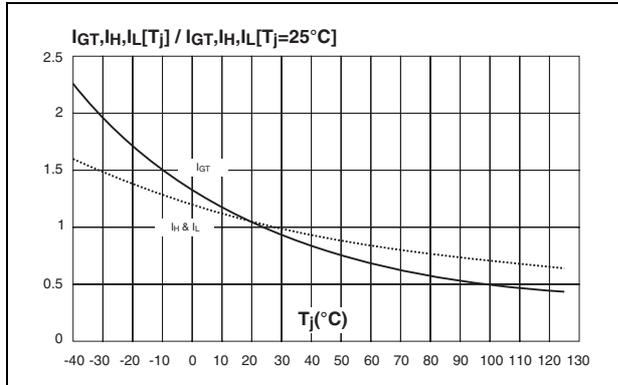
**Figure 3. On-state rms current versus case temperature**



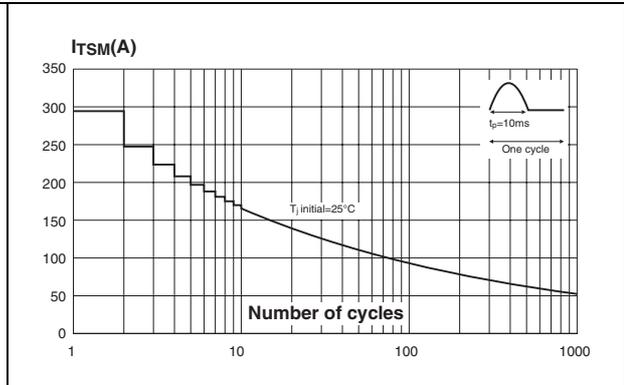
**Figure 4. Relative variation of thermal impedance versus pulse duration**



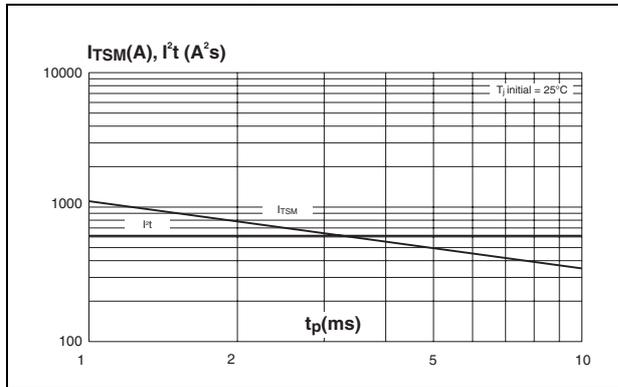
**Figure 5. Relative variation of gate trigger current and holding current versus junction temperature**



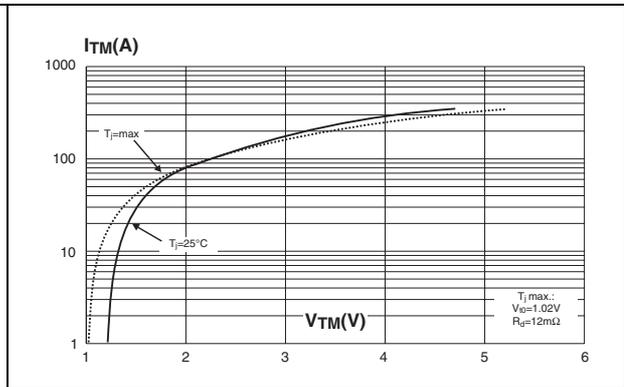
**Figure 6. Non repetitive surge peak on-state current versus number of cycles**



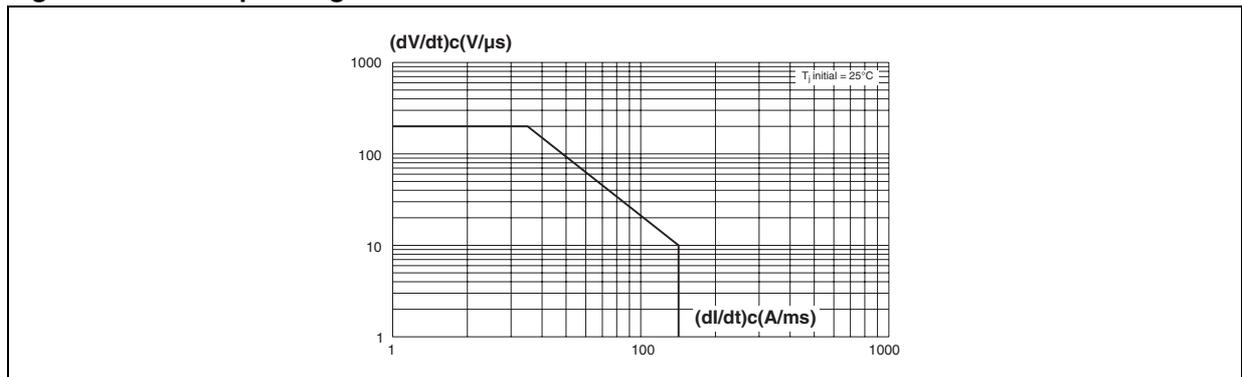
**Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I²t**



**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

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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.	

### 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	First issue.

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