

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/ μ s: up to 142 A/ms
- Noise immunity: 500 V/ μ 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...)

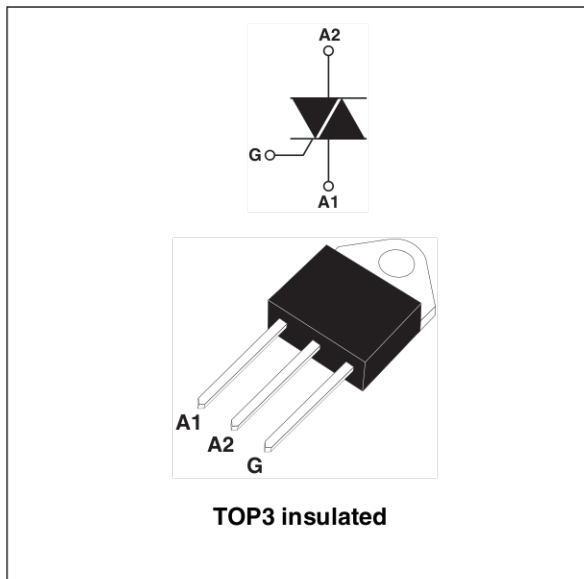


Table 1. Device summary

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 °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 ² t	I ² t value for fusing	t _p = 10 ms	T _j = 25 °C	610	A ² S
dl/dt	Critical rate of rise of on-state current I _G = 500 mA , dl _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 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 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 = 3 A/μs		I - II - III	TYP.	2.5	μs
I _H ⁽¹⁾	I _T = 500 mA Gate open			MAX.	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} = 35 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 A₂ voltage with reference to electrode A₁.

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 ($F = 50 Hz$)	0.9	$^{\circ}C/W$

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

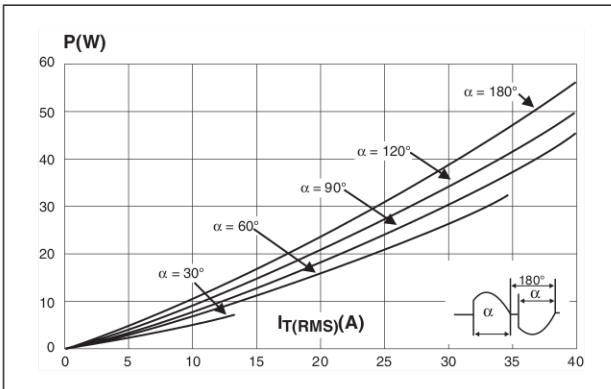


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

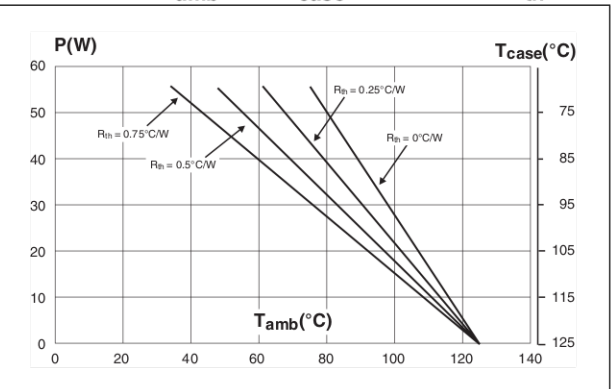


Figure 3. On-state rms current versus case temperature

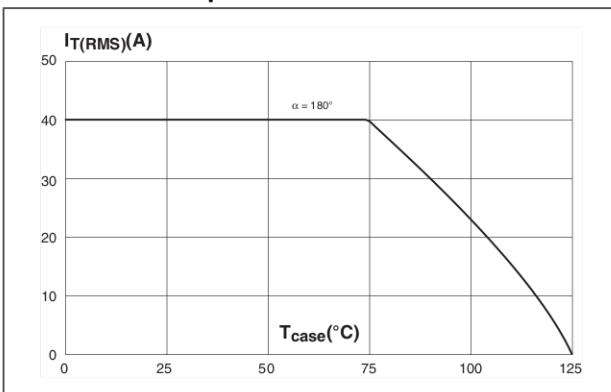


Figure 4. Relative variation of thermal impedance versus pulse duration

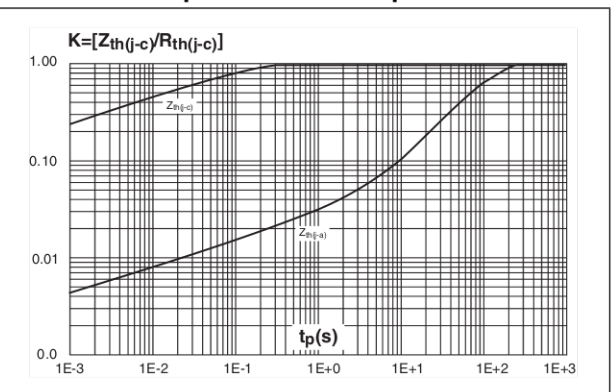


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

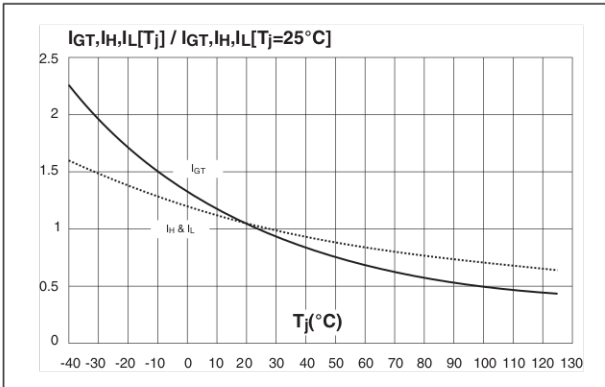


Figure 6. Non repetitive surge peak on-state current versus number of cycles

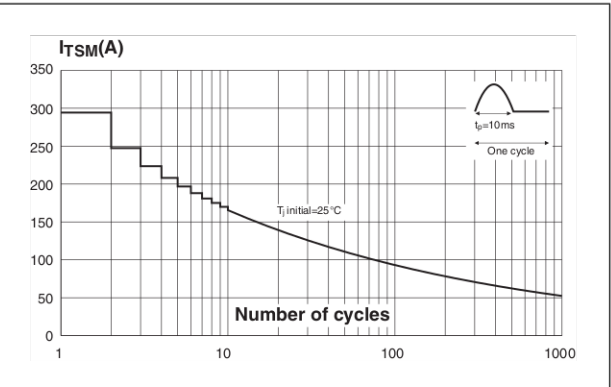


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

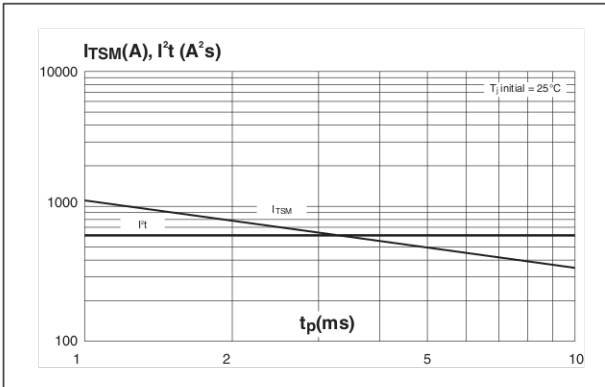


Figure 8. On-state characteristics (maximum values)

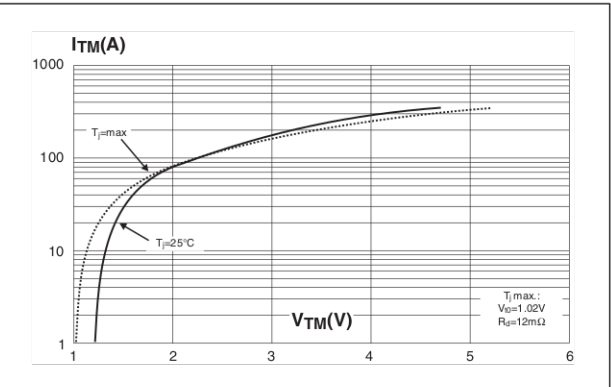
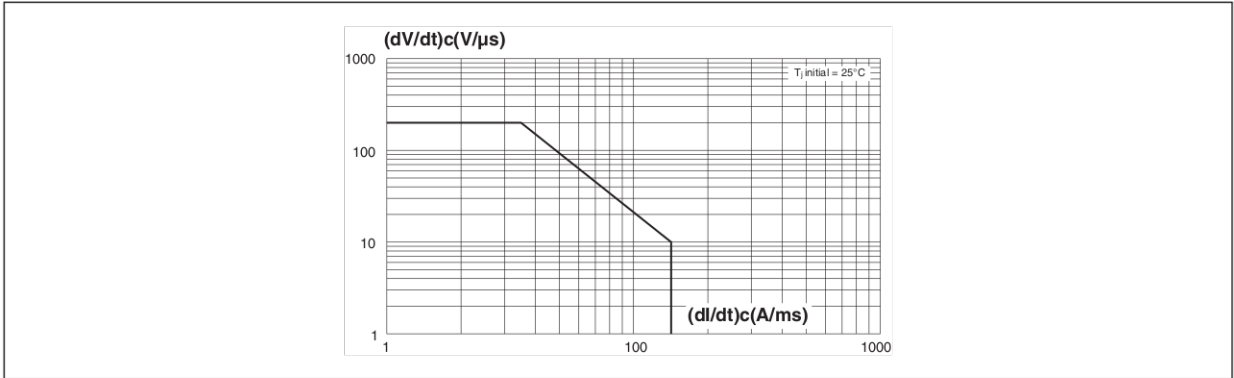


Figure 9. Safe operating area below curve



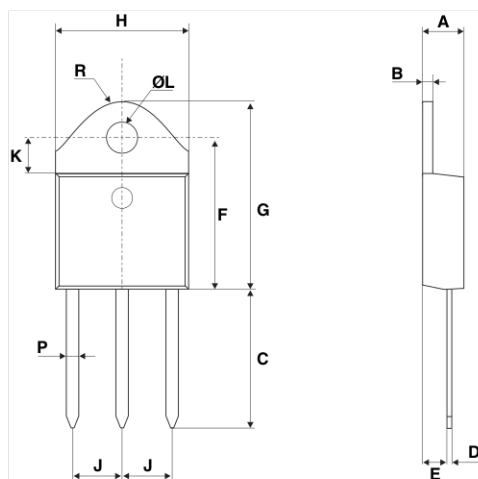
2 Package information

- 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.

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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