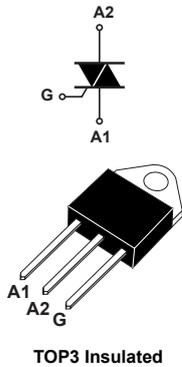


40 A standard Triacs in TOP3 package



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/ μ s: up to 142 A/ms
- Noise immunity: 500 V/ μ s
- Insulated package:
 - 2500 V rms (UL recognized: E81734)

Application

- Motor control
- Induction motor speed control

Description

The TPDVxx40 series use high performance alternistor technology.

Featuring very high commutation levels and high surge current capability, this family is well adapted to power control for inductive loads (motor, transformer...).



Product status link

[TPDV640RG](#)

[TPDV840RG](#)

[TPDV1240RG](#)

Product summary

$I_{T(RMS)}$	40 A
V_{DRM}/V_{RRM}	TPDV640RG: 600 V
	TPDV840RG: 800 V
	TPDV1240RG: 1200 V
I_{GT}	200 mA

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameters		Value	Unit		
$I_{T(RMS)}$	RMS on-state current (180° conduction angle)		$T_c = 75\text{ °C}$	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		
		$t_p = 10\text{ ms}$		250		
I^2t	I^2t value for fusing	$t_p = 10\text{ ms}$	$T_j = 25\text{ °C}$	610	A ² s	
di/dt	Critical rate of rise of on-state current $I_G = 500\text{ mA}$, $di_G/dt = 1\text{ A}/\mu\text{s}$	Repetitive $f = 50\text{ Hz}$		20	A/ μs	
		Non repetitive		100		
V_{DRM} , V_{RRM}	Repetitive surge peak off-state voltage	TPDV640	$T_j = 125\text{ °C}$	600	V	
		TPDV840		800		
		TPDV1240		1200		
I_{GM}	Peak gate current			8	A	
P_{GM}	Peak gate power dissipation	$t_p = 20\text{ }\mu\text{s}$			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	
T_L	Maximum lead temperature for soldering during 10 s at 2 mm from case			260	°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}	$V_D = 12\text{ V}$, $R_L = 33\text{ }\Omega$	I - II - III	Max.	200	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	
$I_H^{(1)}$	$I_T = 500\text{ mA}$			Typ.	50	mA
I_L	$I_G = 1.2 I_{GT}$	I - III	Typ.	100	mA	
		II	Typ.	200		
dV/dt	$V_D = 67\text{ }\% V_{DRM}$ gate open, $T_j = 125\text{ °C}$			Min.	500	V/ μs
$V_{TM}^{(1)}$	$I_{TM} = 56\text{ A}$, $t_p = 380\text{ }\mu\text{s}$			Max.	1.8	V
I_{DRM}/I_{RRM}	$V_{DRM} = V_{RRM}$	$T_j = 25\text{ °C}$	Max.	20	μA	
		$T_j = 125\text{ °C}$		8	mA	
$(di/dt)_c^{(1)}$	$(di/dt)_c = 200\text{ A/ms}$, $T_j = 125\text{ °C}$		Min.	35	A/ms	
	$(di/dt)_c = 10\text{ A/ms}$, $T_j = 125\text{ °C}$			142		

1. For both polarities of A2 referenced to A1

Table 3. Thermal resistance

Symbol	Parameters	Value	Unit
$R_{th(j-c)}$	Junction to case (DC)	1.2	°C/W
	Junction to case (AC) for 360 ° conduction angle (f = 50 Hz)	0.9	
$R_{th(j-a)}$	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 $(di/dt)c$)

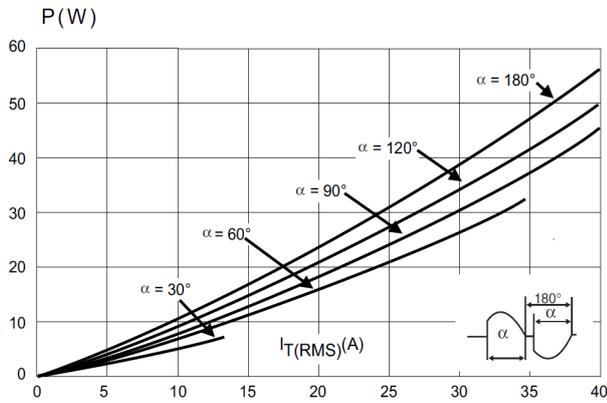


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

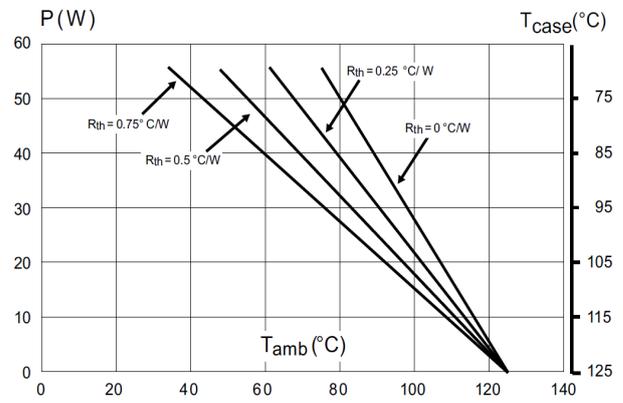


Figure 3. On-state rms current versus case temperature

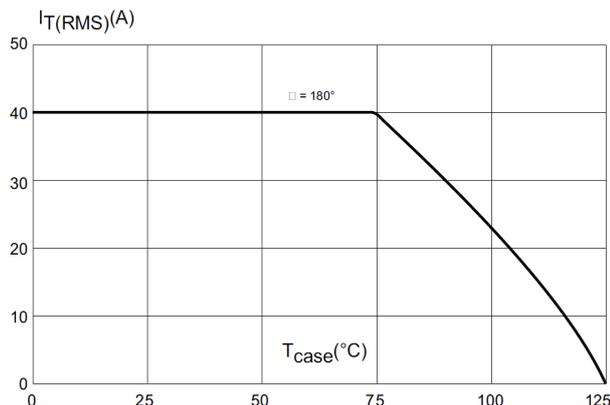


Figure 4. Relative variation of thermal impedance versus pulse duration

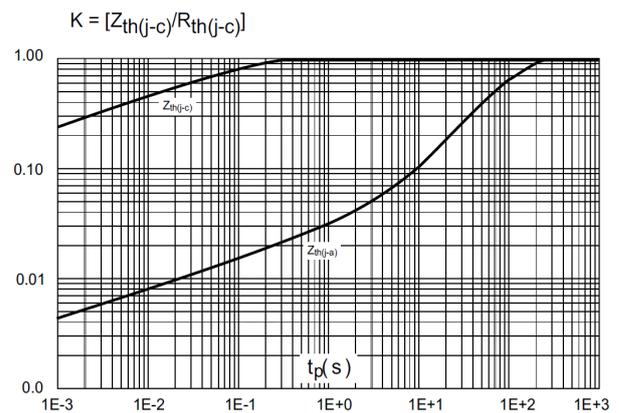


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

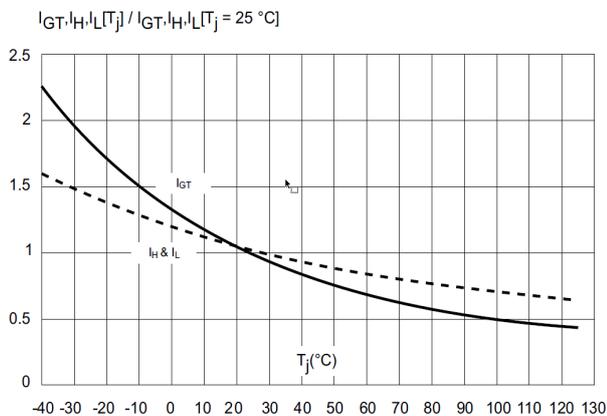


Figure 6. Non-repetitive surge peak on-state current versus number of cycles

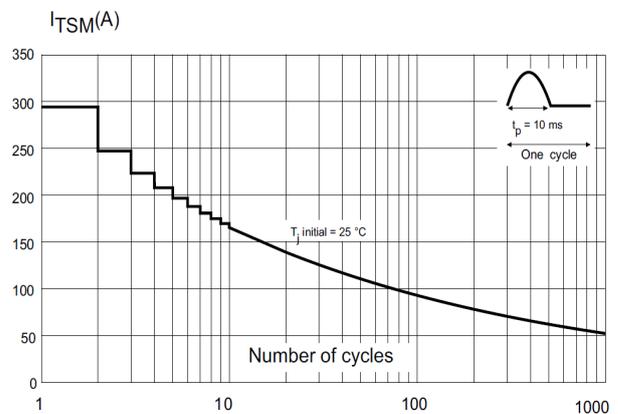


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

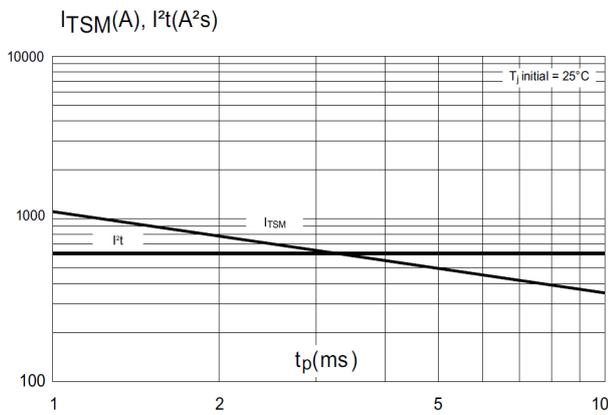


Figure 8. On-state characteristics (maximum values)

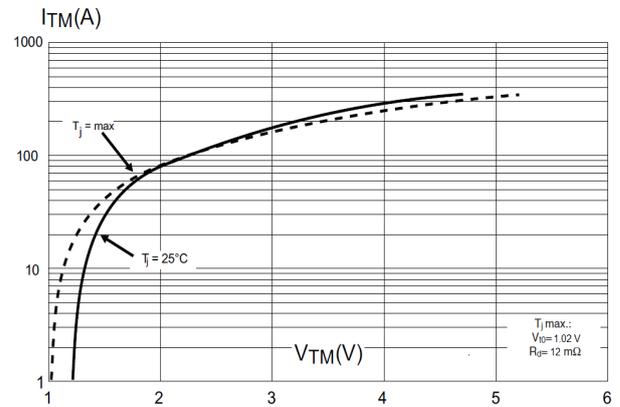
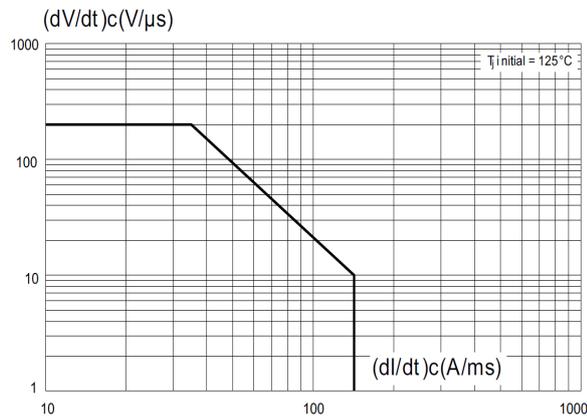


Figure 9. Safe operating area below curve



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

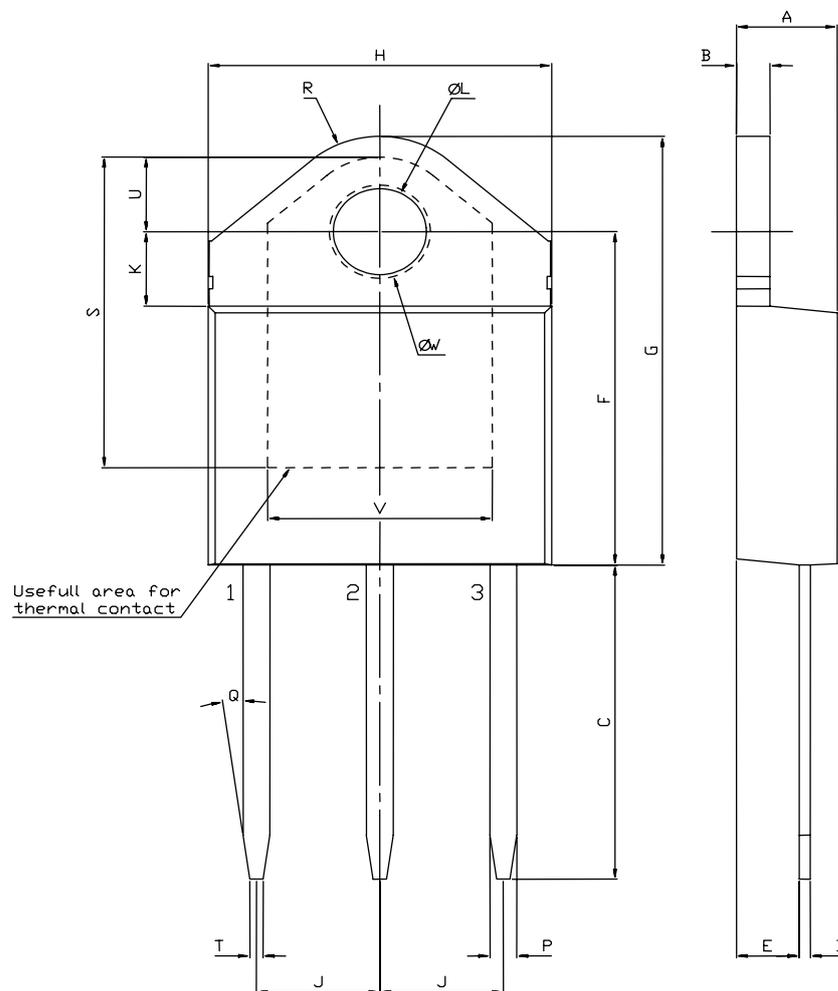


Table 4. Mechanical data

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 5. Ordering information

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

Revision history

Table 6. Document revision history

Date	Revision	Changes
30-Mar-2011	1	Initial release.
10-Jun-2015	2	Updated <i>Table 3</i> . Updated <i>Figure 9</i> . Format updated to current standard.
06-Oct-2023	3	Updated Section 2.1 Package information .

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