

## 12 A high voltage Triacs

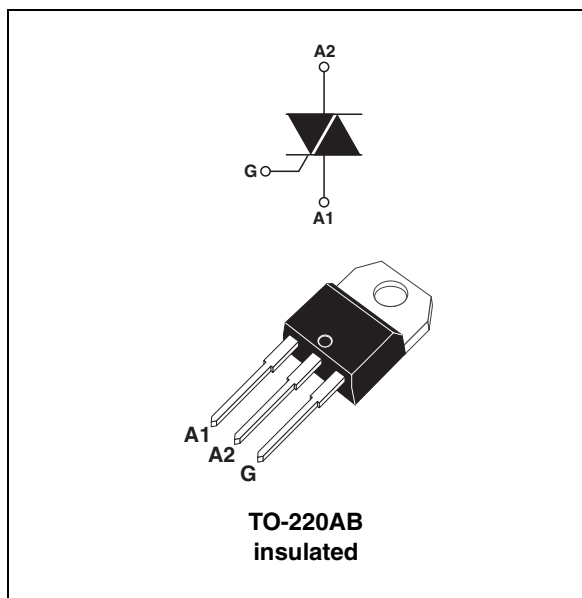
### Features

- On-state current ( $I_{T(RMS)}$ ): 12 A
- Max. blocking voltage ( $V_{DRM}/V_{RRM}$ ): 1200 V
- Gate current ( $I_{GT}$ ): 100 mA
- Commutation @ 10 V/ $\mu$ s: up to 42.5 A/ms
- Noise immunity: 2 kV/ $\mu$ s
- Insulated package:
  - 2,500 V rms (UL recognized: E81734).

### Description

The TXDVxx12 series uses a 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	TXDV812RG	TXDV1212RG
Blocking voltage $V_{DRM}/V_{RRM}$	800 V	1200 V
On-state current $I_{T(RMS)}$	12 A	
Gate current $I_{GT}$	100 mA	

# 1 Characteristics

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

Symbol	Parameter		Value	Unit	
$I_{T(RMS)}$	On-state rms current (180° conduction angle)		$T_c = 90\text{ °C}$	12	A
$V_{DRM}$ $V_{RRM}$	Repetitive peak off-state voltage	TXDV812	$T_j = 125\text{ °C}$	800	V
		TXDV1212		1200	
$I_{TSM}$	Non repetitive surge peak on-state current	$t_p = 2.5\text{ ms}$	$T_j = 25\text{ °C}$	170	A
		$t_p = 8.3\text{ ms}$		125	
		$t_p = 10\text{ ms}$		120	
$I^2t$	$I^2t$ value for fusing	$t_p = 10\text{ ms}$		72	$A^2s$
$di/dt$	Critical rate of rise of on-state current $I_G = 500\text{ mA}$ $di_G/dt = 1\text{ A}/\mu s$	$F = 50\text{ Hz}$		100	$A/\mu s$
$T_{stg}$ $T_j$	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	$^{\circ}C$
$V_{INS(RMS)}^{(1)}$	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	
				TXDV812	TXDV1212		
$I_{GT}$	$V_D = 12\text{ V DC}$ , $R_L = 33\ \Omega$	I-II-III	MAX.	100		mA	
$V_{GT}$		I-II-III	MAX.	1.5		V	
$V_{GD}$	$V_D = V_{DRM}$ $R_L = 3.3\text{ k}\Omega$ $T_j = 110\text{ °C}$	I-II-III	MIN.	0.2		V	
$t_{gt}$	$V_D = V_{DRM}$ $I_G = 500\text{ mA}$ $di_G/dt = 3\text{ A}/\mu s$	I-II-III	TYP.	2.5		$\mu s$	
$I_L$	$I_G = 1.2 \times I_{GT}$	I-III	TYP.	100		mA	
		II		200			
$I_H^{(1)}$	$I_T = 500\text{ mA}$ Gate open		MAX.	100		mA	
$dV/dt^{(1)}$	Linear slope up to: $V_D = 67\% V_{DRM}$ Gate open		$T_j = 125\text{ °C}$	MIN.	2		$kV/\mu s$
$(di/dt)_c^{(1)}$	$(dV/dt)_c = 10\text{ V}/\mu s$		$T_j = 110\text{ °C}$	MIN.	42.5	30	A/ms
$V_{TM}^{(1)}$	$I_{TM} = 17\text{ A}$ $t_p = 380\ \mu s$		MAX.	1.95		V	
$V_{to}^{(1)}$	Threshold voltage		MAX.	1.21		V	
$R_d^{(1)}$	Dynamic resistance		MAX.	40		$m\Omega$	
$I_{DRM}$ $I_{RRM}$	$V_{DRM} = V_{RRM}$		MAX.	0.01		mA	
		$T_j = 25\text{ °C}$		2	5		
		$T_j = 110\text{ °C}$					

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

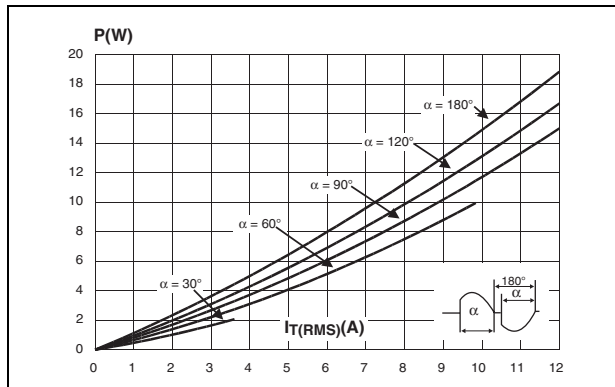
**Table 4. Gate characteristics (maximum values)**

Symbol	Parameter	Value	Unit
$P_{G(AV)}$	Average gate power dissipation	1	W
$P_{GM}$	Peak gate power dissipation	$t_p = 20 \mu s$ 10	W
$I_{GM}$	Peak gate current	$t_p = 20 \mu s$ 4	A
$V_{GM}$	Peak positive gate voltage	$t_p = 20 \mu s$ 16	V

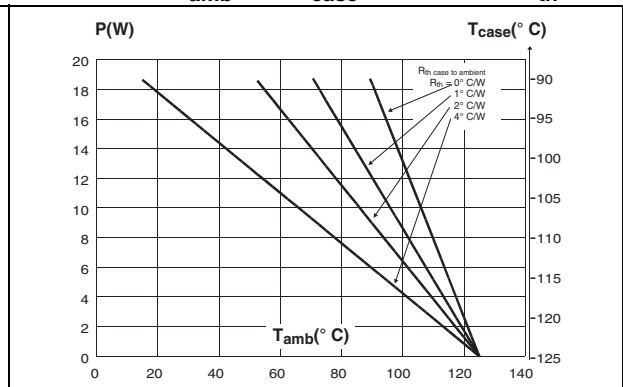
**Table 5. Thermal resistance**

Symbol	Parameter	Value	Unit
$R_{th(j-a)}$	Junction to ambient	60	$^{\circ}C/W$
$R_{th(j-c)}$ DC	Junction to case for DC	2.5	$^{\circ}C/W$
$R_{th(j-c)}$ AC	Junction to case for 360 $^{\circ}$ Conduction angle ( $F = 50$ Hz)	1.9	$^{\circ}C/W$

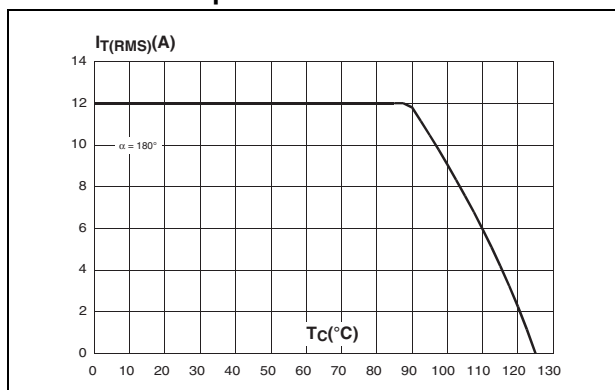
**Figure 1. Max. rms power dissipation versus on-state rms current ( $F = 50$ Hz). (curves limited by  $(di/dt)_c$ )**



**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**

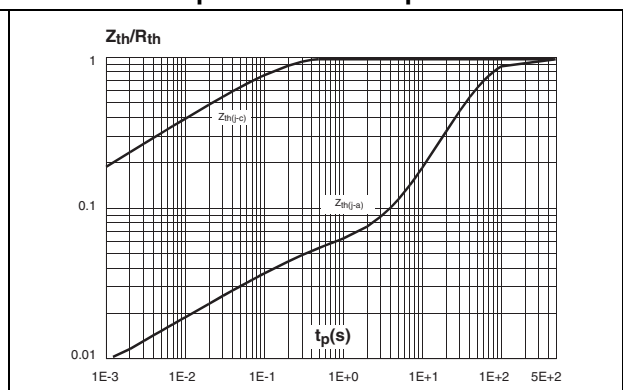


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

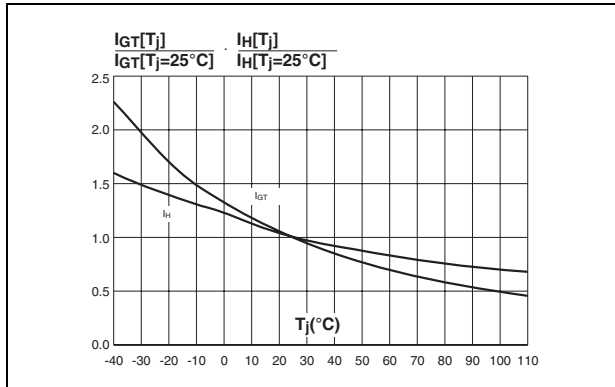


Figure 6. Non repetitive surge peak on-state current versus number of cycles

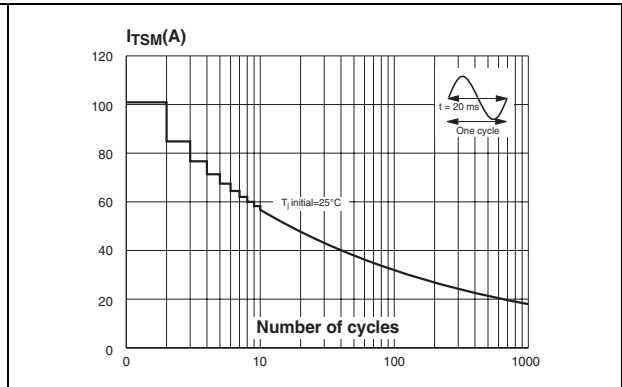


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of  $I^2t$

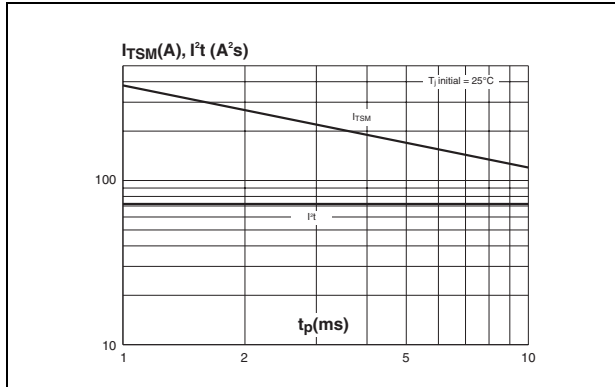


Figure 8. On-state characteristics (maximum values)

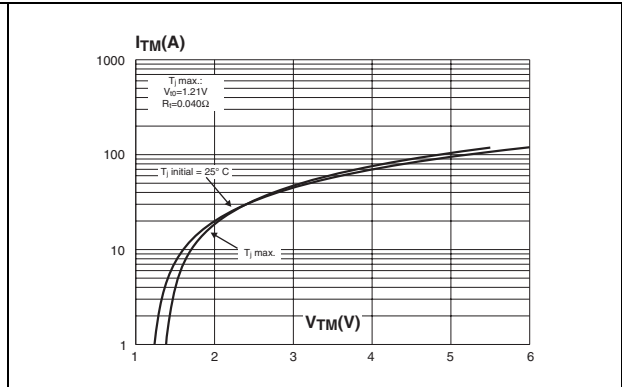
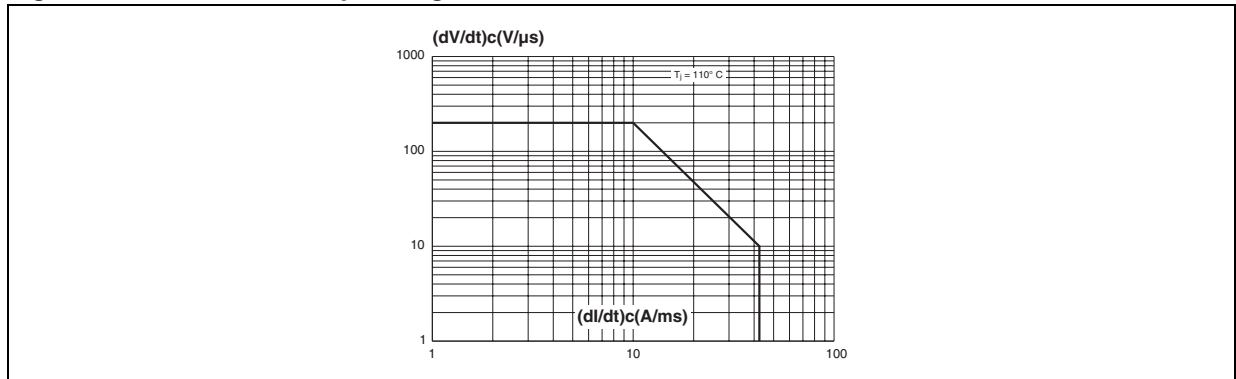


Figure 9. Safe turn-off operating area



## 2 Package information

- Epoxy meets UL94,V0
- Cooling method: C (by conduction)
- Recommended torque value: 0.4 to 0.6 N·m

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**Table 6. TO-220AB insulated dimensions**

Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.598		0.625
a1		3.75			0.147	
a2	13.00		14.00	0.511		0.551
B	10.00		10.40	0.393		0.409
b1	0.61		0.88	0.024		0.034
b2	1.23		1.32	0.048		0.051
C	4.40		4.60	0.173		0.181
c1	0.49		0.70	0.019		0.027
c2	2.40		2.72	0.094		0.107
e	2.40		2.70	0.094		0.106
F	6.20		6.60	0.244		0.259
ØI	3.75		3.85	0.147		0.151
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

### 3 Ordering information

**Table 7. Ordering information**

Order code	Marking	Package	Weight	Base qty	Delivery mode
TXDV812RG	TXDV812	TO-220AB insulated	2.3 g	50	Tube
TXDV1212RG	TXDV1212				

### 4 Revision history

**Table 8. Document revision history**

Date	Revision	Changes
30-Mar-2011	1	Initial release.
13-Jan-2012	2	Updated $dI/dt$ in <a href="#">Table 2</a> , and added $V_{t0}$ and $R_d$ in <a href="#">Table 3</a>

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