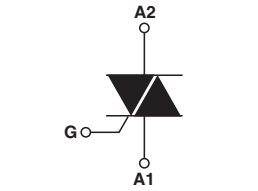
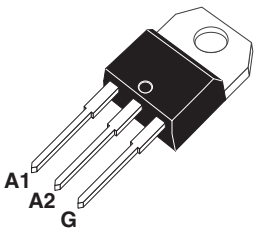
TXDVxx12

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/µs: up to 42.5 A/ms
- Noise immunity: 2 kV/µs
- Insulated package:
  - 2,500 V rms (UL recognized: E81734).





TO-220AB
insulated

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 °C	12	A
V_{DRM} V_{RRM}	Repetitive peak off-state voltage	TXDV812	T_j = 125 °C	800	V
		TXDV1212		1200	
I_{TSM}	Non repetitive surge peak on-state current	t_p = 2.5 ms	T_j = 25 °C	170	A
		t_p = 8.3 ms		125	
		t_p = 10 ms		120	
I^2t	I^2t value for fusing	t_p = 10 ms		72	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 500 mA dI_G/dt = 1 A/µs	F = 50 Hz		100	A/µs
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			- 40 to + 150 - 40 to + 125	°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 conditions		Quadrant		Value		Unit
					TXDV812	TXDV1212	
I_{GT}	V_D = 12 V DC, R_L = 33 Ω		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 kΩ	T_j = 110 °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_L	I_G = 1.2 x I_{GT}		I-III	TYP.	100		mA
			II		200		
I_H (1)	I_T = 500 mA Gate open			MAX.	100		mA
dV/dt (1)	Linear slope up to: V_D = 67% V_{DRM} Gate open	T_j = 125 °C		MIN.	2		kV/µs
(dI/dt)c (1)	(dV/dt)c = 10 V/µs	T_j = 110 °C		MIN.	42.5	30	A/ms
V_{TM} (1)	I_{TM} = 17 A t_p = 380 µs			MAX.	1.95		V
V_{to} (1)	Threshold voltage			MAX.	1.21		V
R_d (1)	Dynamic resistance			MAX.	40		mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$	T_j = 25 °C		MAX.	0.01		mA
		T_j = 110 °C			2	5	

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	10	W
I_{GM}	Peak gate current	t_p = 20 µs	4	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	60	°C/W
$R_{th(j-c)}$ DC	Junction to case for DC	2.5	°C/W
$R_{th(j-c)}$ AC	Junction to case for 360 °Conduction angle (F = 50 Hz)	1.9	°C/W

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

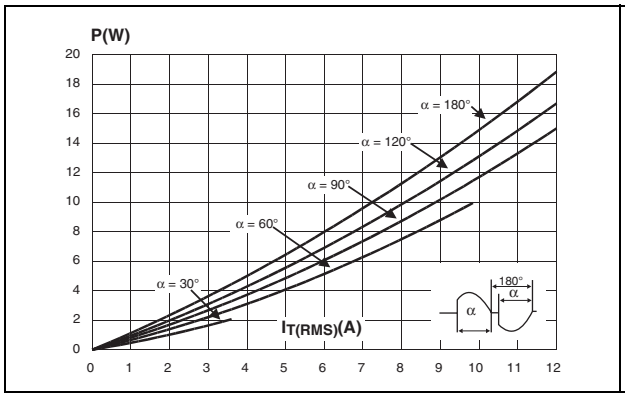


Figure 2. Max. rms power dissipation and max. allowable temperatures (T_{amb} and T_{case}) for various R_{th}

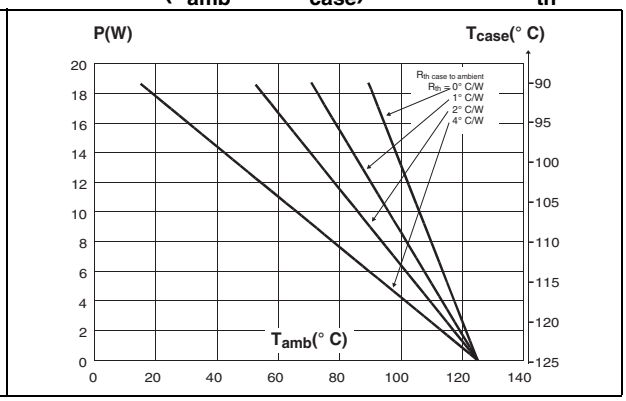


Figure 3. On-state rms current versus case temperature

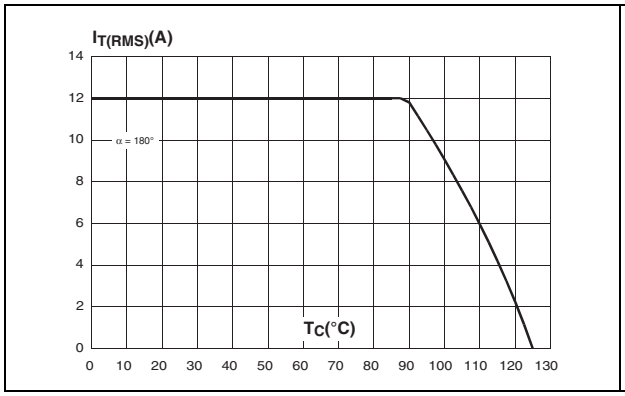


Figure 4. Relative variation of thermal impedance versus pulse duration

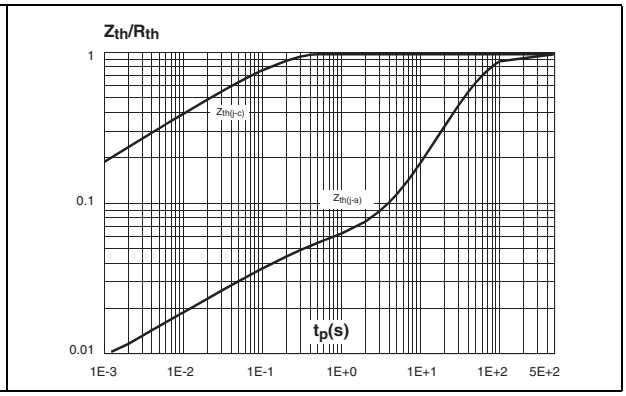


Figure 5. Relative variation of gate trigger current and holding current versus junction temperature

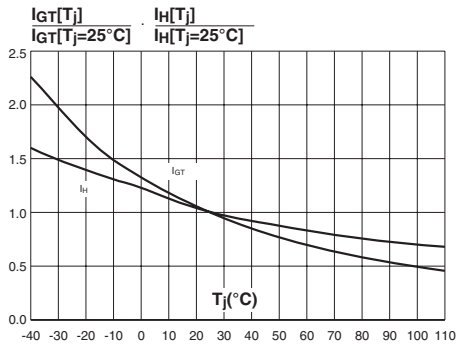


Figure 6. Non repetitive surge peak on-state current versus number of cycles

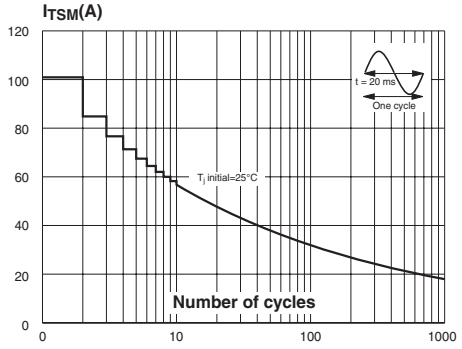


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse and corresponding values of I^2t

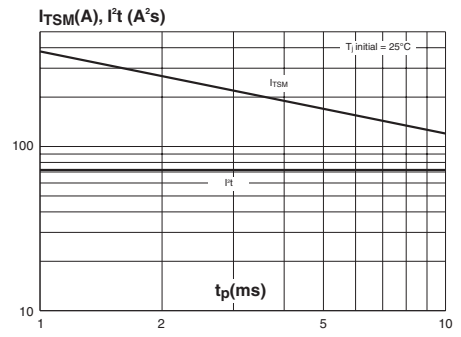


Figure 8. On-state characteristics (maximum values)

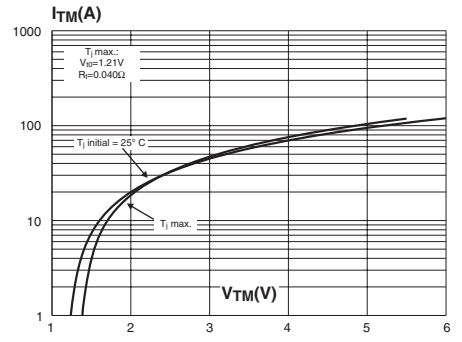
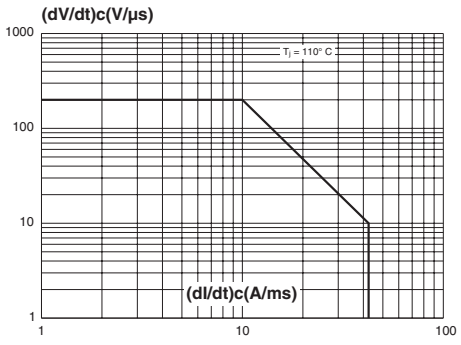


Figure 9. Safe turn-off operating area

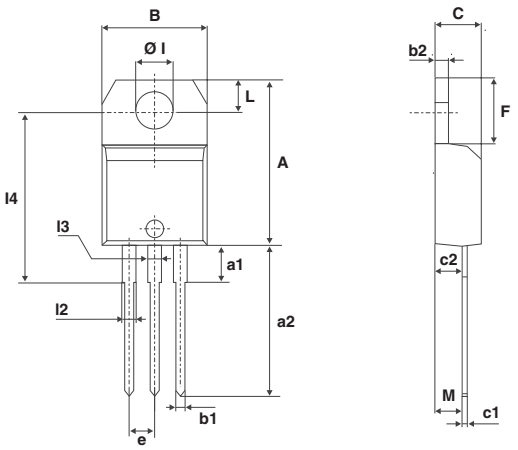


2 Package information

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

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. 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
l4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
l2	1.14		1.70	0.044		0.066
l3	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 *Table 2*, and added V_{to} and R_d in *Table 3*

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