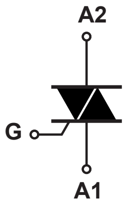
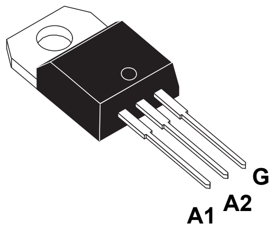
12 A - 800 V - 150 °C 8H Triac in TO-220AB insulated





TO-220AB insulated

Features

- 12 A medium current Triac
- 800 V symmetrical blocking voltage
- 150 °C maximum junction temperature T_j
- Three triggering quadrants
- High noise immunity - static dV/dt
- Robust dynamic turn-off commutation - (dI/dt)c
- ECOPACK2 compliant component
- Molding resin UL94-V0 flammability certified
- UL recognized for insulation , UL1557: 2.5 kV
  - Reference file: E81734

Applications

- General purpose AC line load control
- AC induction and universal motor control
- Lighting and automation I/O control
- Water heater, room heater and coffee machine
- Home automation smart AC plug
- Inrush current limiter in AC DC rectifiers

Product status link
T1235H-8I

Product summary	
$I_{T(RMS)}$	12 A
V_{DRM}/V_{RRM}	800 V
V_{DSM}/V_{RSM}	900 V
I_{GT}	35 mA
T_j max.	150 °C

Description

Specifically designed to operate at 800 V and 150 °C, the T1235H-8I Triac housed in TO-220AB insulated provides an enhanced thermal management: this 12 A Triac is the right choice for a compact drive of AC loads and enables the heatsink size reduction.

Based on the ST high temperature Snubberless technology, it offers higher specified turn off commutation and noise immunity levels up to the T_j max.

Snubberless is a trademark of STMicroelectronics.

The T1235H-8I safely optimizes the control of the motors and heaters loads for the most constraining environments of home appliances and industrial control.

By using an internal ceramic pad, it provides a recognized voltage insulation, rated at 2500 V_{RMS}.

1 Characteristics

Table 1. Absolute maximum ratings (limiting values)

Symbol	Parameter		Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	T_c = 122 °C	12	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	t = 16.7 ms	126	A
		t = 20 ms	120	
I^2t	I^2t value for fusing	t_p = 10 ms	95	A^2s
dI/dt	Critical rate of rise of on-state current, I_G = 2 x I_{GT}, tr ≤ 100 ns, f = 100 Hz	T_j = 25 °C	100	A/µs
V_{DRM}/V_{RRM}	Repetitive peak off-state voltage		800	V
V_{DSM}/V_{RSM}	Non Repetitive peak off-state voltage	t_p = 10 ms, T_j = 25 °C	900	V
I_{GM}	Peak gate current	t_p = 20 µs, T_j = 150 °C	4	A
P_{GM}	Maximum gate power dissipation		5	W
$P_{G(AV)}$	Average gate power dissipation	T_j = 150 °C	1	W
T_{stg}	Storage temperature range		-40 to +150	°C
T_j	Operating junction temperature range		-40 to +150	°C
T_L	Maximum lead temperature for soldering during 10 s		260	°C
V_{INS}	Insulation RMS voltage, 1 minute		2.5	kV

Table 2. Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions		Quadrants		Value	Unit
I_{GT}	V_D = 12 V, R_L = 30 Ω		I - II - III	Min.	5	mA
				Max.	35	mA
V_{GT}	V_D = 12 V, R_L = 30 Ω		I - II - III	Max.	1.3	V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ	T_j = 150 °C	I - II - III	Min.	0.15	V
I_L	I_G = 1.2 x I_{GT}		I - III	Max.	50	mA
			II	Max.	80	mA
I_H (1)	I_T = 500 mA, gate open			Max.	35	mA
dV/dt (1)	V_D = V_R = 536 V, gate open		T_j = 150 °C	Min.	2000	V/µs
(dI/dt)c (1)	Without snubber network		T_j = 150 °C	Min.	12	A/ms

1. *For both polarities of A2 referenced to A1.*

Table 3. Static characteristics

Symbol	Test conditions	T_j		Value	Unit
V_{TM} (1)	I_{TM} = 17 A, t_p = 380 µs	25 °C	Max.	1.50	V
V_{TO} (1)	Threshold voltage	150 °C	Max.	0.80	V
R_D (1)	Dynamic resistance	150 °C	Max.	32	mΩ
I_{DRM}/I_{RRM}	$V_D = V_R = V_{DRM} = V_{RRM}$	25 °C	Max.	2.0	µA
		150°C		4.5	mA
	$V_D = V_R$ = 400 V, peak voltage	150 °C	Max.	1.7	mA

1. *For both polarities of A2 referenced to A1.*

Table 4. Thermal resistance

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	Max.	2.1	°C/W
$R_{th(j-a)}$	Junction to ambient	Typ.	60	°C/W

1.1 Characteristics (curves)

Figure 1. Maximum power dissipation versus on-state RMS current (full cycle)

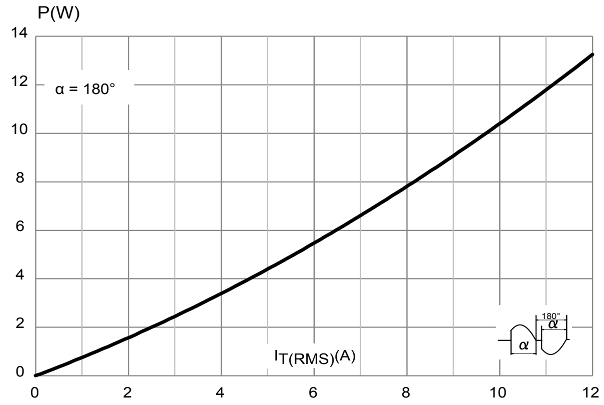


Figure 2. On-state RMS current versus case temperature (full cycle)

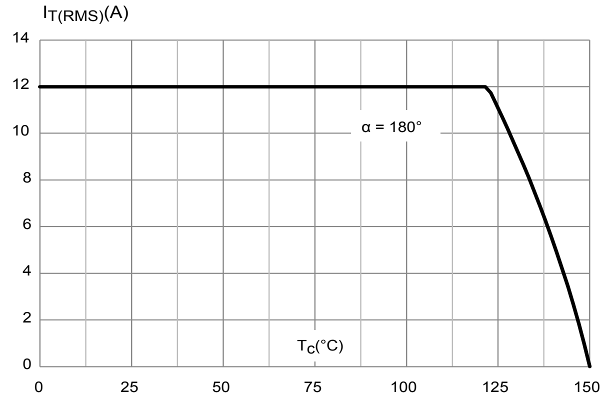


Figure 3. On-state RMS current versus ambient temperature (free air convection)

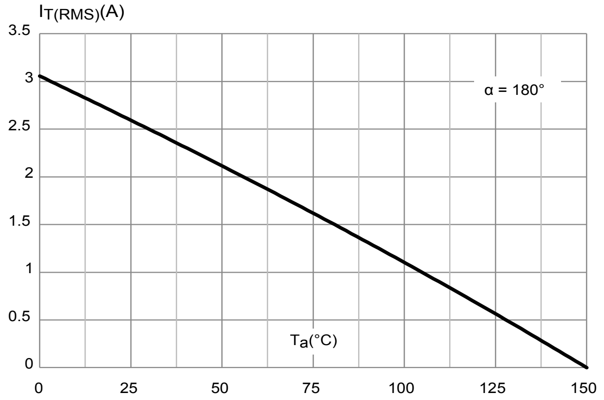


Figure 4. On-state characteristics (maximum values)

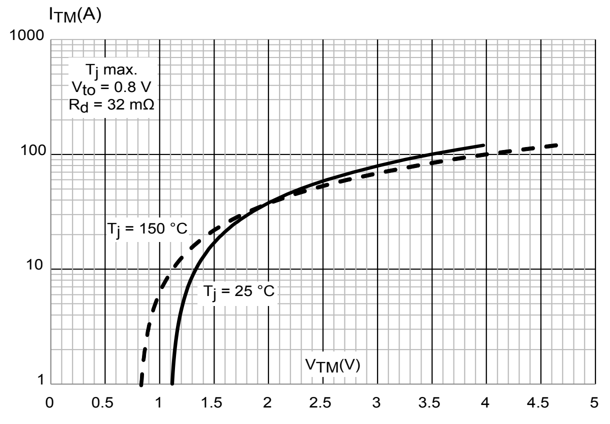


Figure 5. Relative variation of thermal impedance versus pulse duration

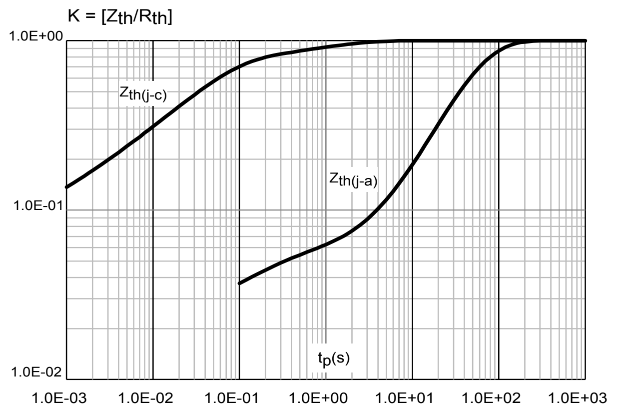


Figure 6. Recommended maximum case-to-ambient thermal resistance versus ambient temperature for different peak off-state voltages

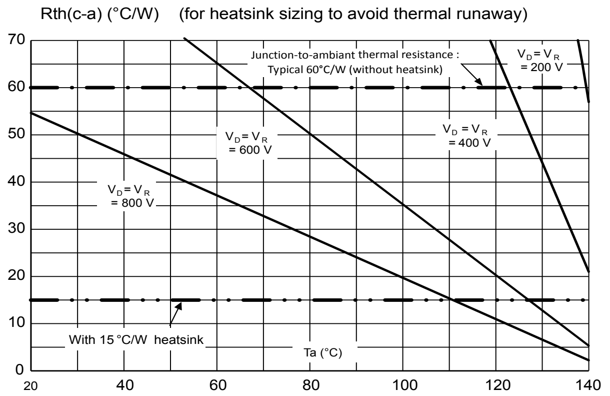


Figure 7. Relative variation of gate trigger voltage and current versus junction temperature (typical values)

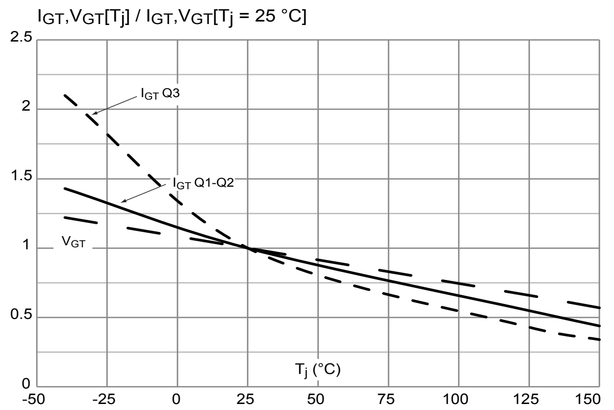


Figure 8. Relative variation of holding current and latching current versus junction temperature (typical values)

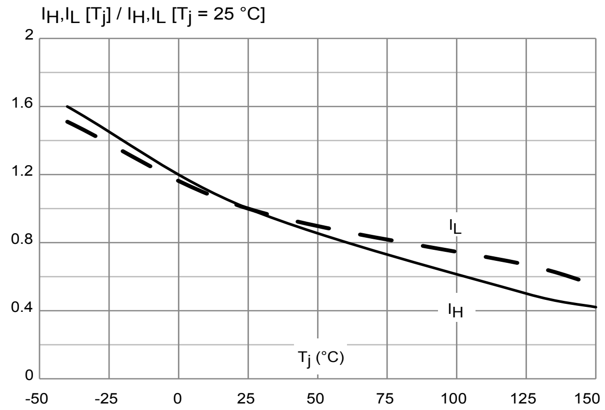


Figure 9. Surge peak on-state current versus number of cycles

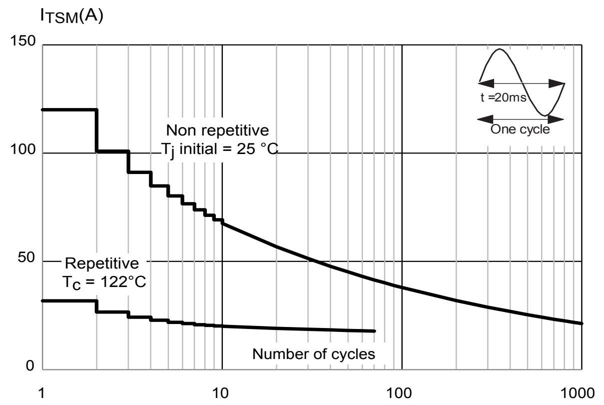


Figure 10. Non repetitive surge peak on-state current for a sinusoidal pulse with width t_p < 10 ms

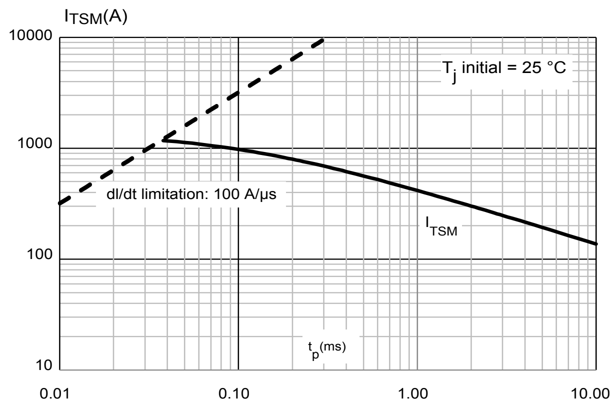


Figure 11. Relative variation of static dV/dt immunity versus junction temperature

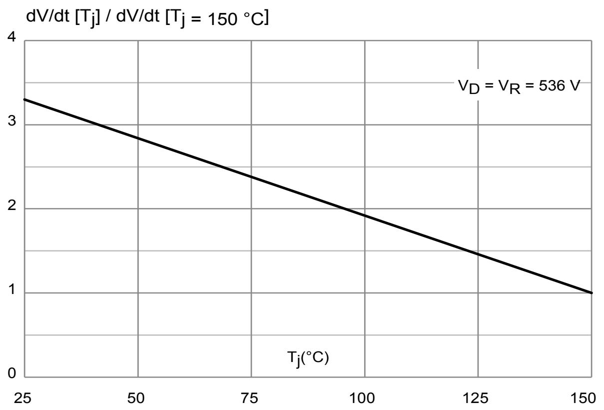


Figure 12. Relative variation of critical rate of decrease of main current versus junction temperature

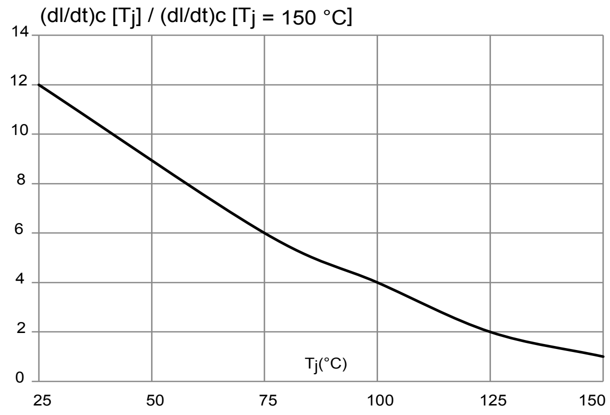
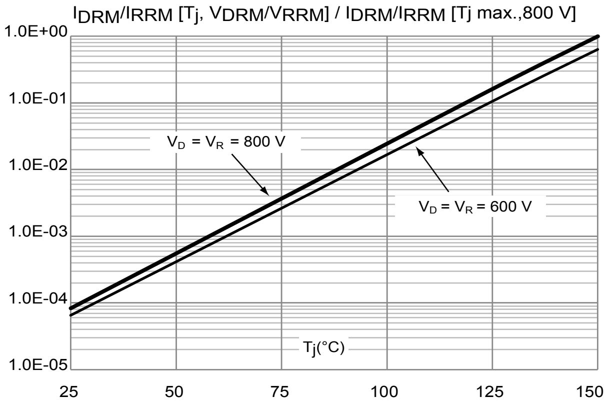


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage



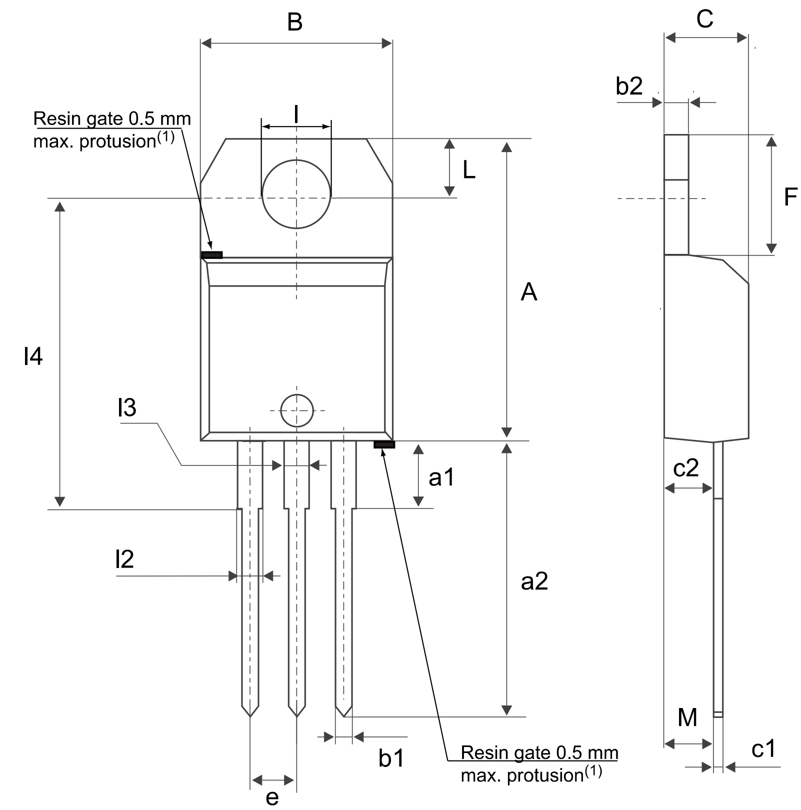
2 Package information

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 TO-220AB insulated package information

- Molding compound resin is halogen free and meets UL94 flammability standard, level V0
- Lead-free plating package leads
- Recommended torque: 0.4 to 0.6 N·m

Figure 14. TO-220AB package outline



(1)Resin gate position accepted in one of the two positions or in the symmetrical opposites.

Table 5. **TO-220AB package mechanical data**

Ref.	Dimensions					
	Millimeters			Inches[(1)]		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	15.20		15.90	0.5984		0.6260
a1		3.75			0.1476	
a2	13.00		14.00	0.5118		0.5512
B	10.00		10.40	0.3937		0.4094
b1	0.61		0.88	0.0240		0.0346
b2	1.23		1.32	0.0484		0.0520
C	4.40		4.60	0.1732		0.1811
c1	0.49		0.70	0.0193		0.0276
c2	2.40		2.72	0.0945		0.1071
e	2.40		2.70	0.0945		0.1063
F	6.20		6.60	0.2441		0.2598
I	3.73		3.88	0.1469		0.1528
L	2.65		2.95	0.1043		0.1161
l2	1.14		1.70	0.0449		0.0669
l3	1.14		1.70	0.0449		0.0669
l4	15.80	16.40	16.80	0.6220	0.6457	0.6614
M		2.6			0.1024	

1. *Inch dimensions are for reference only.*

3 Ordering information

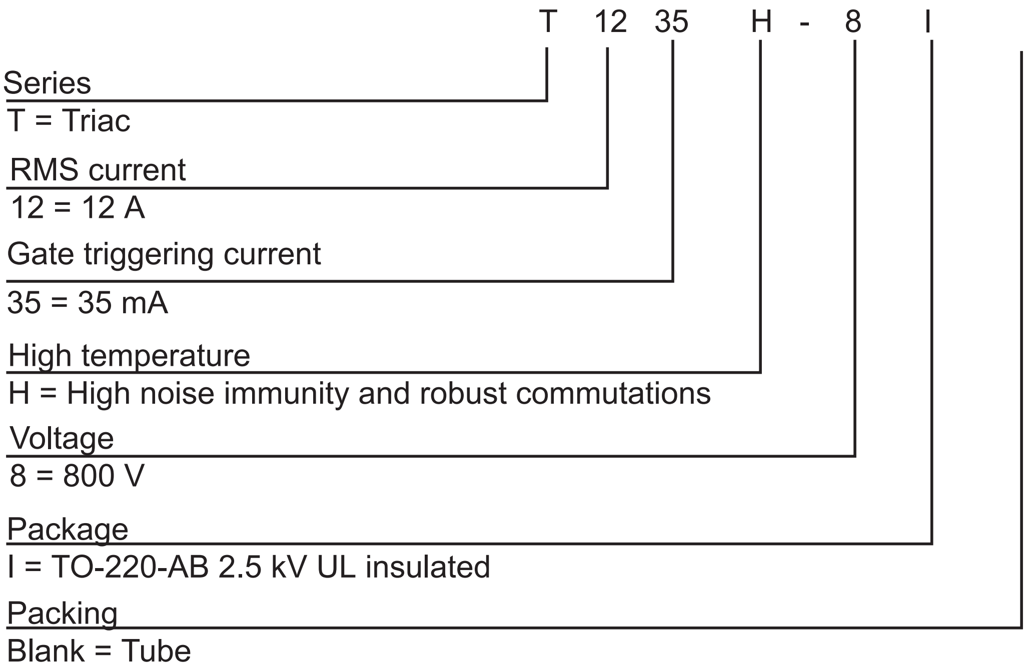


Figure 15. **Ordering information scheme**

Table 6. **Ordering information**

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T1235H-8I	T1235H-8I	TO-220AB Ins.	2.3 g	50	Tube

Revision history

Table 7. **Document revision history**

Date	Version	Changes
20-Nov-2020	1	Initial release.
11-Dec-2020	2	Updated general description.