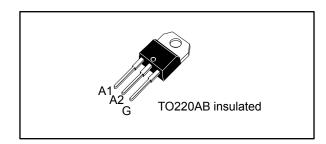


12 A Snubberless™ Triac

Datasheet -production data



Features

- High static dV/dt
- High dynamic turn-off commutation (dl/dt)c
- 150 °C maximum T_i
- Three quadrants
- Built-in ceramic for tab insulation
- Compliance to UL1557 standard (ref : E81734)
- ECOPACK[®]2 compliant component
- Complies with UL94,V0
- Surge capability V_{DSM}, V_{RSM} = 900 V

Benefits

- High immunity to false turn-on thanks to high static dV/dt
- Better turn-off in high temperature environments thanks to (dl/dt)c
- Increase of thermal margin due to extended working T_j up to 150 $^{\circ}C$
- Better thermal resistance due to the ceramic inside the package

Applications

- General purpose AC line load switching
- Motor control circuits
- Home appliances
- Heating
- Lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

Description

Available in through-hole package, the T1235T-8I Triac can be used for the on/off or phase angle control function in general purpose AC switching where high commutation capability is required. This device can be used without a snubber RC circuit when the limits defined are respected.

TO-220AB insulated provides tab insulation, UL1557 certified, rated at 2.5 kV RMS and UL-94, V0 resin compliance.

Package environmentally friendly Ecopack®2 graded (RoHS and Halogen Free compliance).

Snubberless™ is a trademark of STMicroelectronics.

Figure 1: Functional diagram

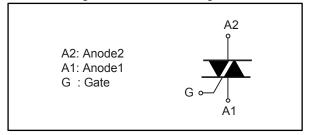


Table 1: Device summary

Symbol	Value	Unit
I _{T(RMS)}	12	Α
V _{DRM} /V _{RRM}	800	V
V _{DSM} /V _{RSM}	900	V
I _{GT}	35	mA

Characteristics T1235T-8I

1 Characteristics

Table 2: Absolute maximum ratings (limiting values)

Symbol	Parameter			Value	Unit
I _{T(RMS)}	RMS on-state current (full sine w	12	Α		
Irou	TISM TO TOPOLICE OUT OF SIGN OF STATE OUT OF SIGN OF STATE OUT OF SIGN OF SIGN OF STATE OUT OF SIGN OF		t _p = 16.7 ms	95	_
IISM			t _p = 20 ms	90	Α
l ² t	I ² t value for fusing		T _j initial = 25 °C	54	A^2s
dl/dt	Critical rate of rise of on-state current, $I_G = 2 \times I_{GT}$, $tr \le 100 \text{ ns}$ $f = 100 \text{ Hz}$		100	A/µs	
\/\/\/	Repetitive peak off-state voltage		T _j = 150 °C	600	V
V _{DRM} /V _{RRM}			T _j = 125 °C	800	V
V _{DSM} /V _{RSM}	Non Repetitive peak off-state vo	ltage	t _p = 10 ms	900	V
I _{GM}	Peak gate current	t _p = 20 μs	T _j = 150 °C	4	Α
P _{G(AV)}	Average gate power dissipation T _j = 150 °C			1	W
T _{stg}	Storage junction temperature range			-40 to +150	°C
Tj	Operating junction temperature range			-40 to +150	°C
TL	Maximum lead temperature for soldering during 10 s			260	ů
Vins	Insulation RMS voltage, 1 minute	2.5	kV		

Table 3: Electrical characteristics (T_j = 25 °C, unless otherwise specified)

Symbol	Test conditions	Quadrants; T _j		Value	Unit
1	V _D = 12 V, R _L = 33 Ω	1 - 11 - 111	Min.	1.75	mA
I _{GT}	$V_D = 12 \text{ V}, R_L = 33 \Omega$	1 - 11 - 111	Max.	35	mA
V_{GT}	$V_D = 12 \text{ V}, R_L = 33 \Omega$	1 - 11 - 111	Max.	1.3	V
V_{GD}	$V_D = V_{DRM}, R_L = 3.3 \text{ k}\Omega, T_j = 150 \text{ °C}$	1 - 11 - 111	Min.	0.2	V
1.	I _G = 1.2 x I _{GT}	I - III	Max.	60	mA
IL	I _G = 1.2 x I _{GT}	II	Max.	80	mA
Iн ⁽¹⁾	I _T = 500 mA, gate open		Max.	40	mA
dV/dt ⁽¹⁾	V _D = 536 V, gate open	T _j = 125 °C	Min.	2000	V/µs
av/at ^(*)	V _D = 402 V, gate open	T _j = 150 °C	Min.	1000	V/µs
(41/44) = (1)	Without apulphor (d)/(dt)a > 20)//ug	T _j = 125 °C	Min.	12	A/ms
(dl/dt)c ⁽¹⁾	Without snubber, (dV/dt)c > 20 V/µs	T _j = 150 °C	Min.	6	A/ms

Notes:

⁽¹⁾For both polarities of A2 referenced to A1.

T1235T-8I Characteristics

Table 4: Static characteristics

Symbol	Test conditions	Tj		Value	Unit
V _{TM} ⁽¹⁾	I _T = 17 A, t _p = 380 μs	25 °C	Max.	1.60	V
V _{TO} ⁽¹⁾	Threshold on-state voltage	150 °C	Max.	0.85	V
R _D ⁽¹⁾	Dynamic resistance	150 °C	Max.	50	mΩ
	V _{DRM} = V _{RRM} = 800 V	25 °C	Max.	5	μΑ
I _{DRM} /I _{RRM}	VDRM - VRRM - 800 V	125°C	IVIAX.	1	mA
	V _{DRM} = V _{RRM} = 600 V	150 °C	Max.	3.1	mA

Notes:

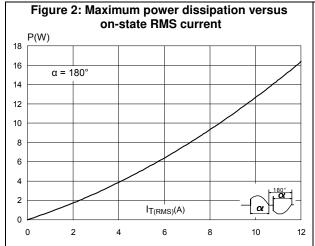
Table 5: Thermal resistance

Symbol	Parameter Value			
R _{th(j-c)}	Junction to case (AC)	2.6	°C/\\/	
R _{th(j-a)}	Junction to ambient	60	°C/W	

⁽¹⁾For both polarities of A2 referenced to A1.

Characteristics T1235T-8I

1.1 Characteristics (curves)



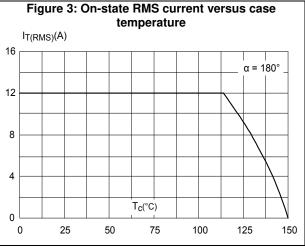


Figure 4: On-state RMS current versus ambient temperature (free air convection) I_{T(RMS)}(A) 3.5 $\alpha = 180^{\circ}$ 3.0 2.5 2.0 1.5 1.0 0.5 0.0 25 50 75 100 150

Figure 5: Relative variation of thermal impedance versus pulse duration

K = [Z_{th}/R_{th}]

1.0E+00

1.0E-01

1.0E-02

1.0E-03

1.0E-02

1.0E-03

1.0E-02

1.0E-03

1.0E-02

1.0E-03

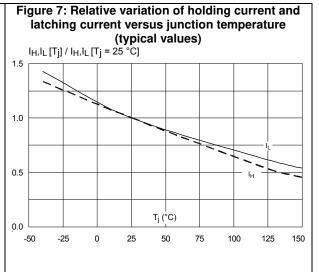
1.0E-03

1.0E-03

1.0E-04

1.0E+05

Figure 6: Relative variation of gate trigger voltage and current versus junction temperature (typical values) $I_{GT}, V_{GT}[T_i] / I_{GT}, V_{GT}[T_i = 25 °C]$ 2.5 2.0 I_{GT} Q3 1.5 V_{GT} Q1-Q2-Q3 1.0 0.5 T_j (°C) 0.0 -50 50 150



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T1235T-8I Characteristics

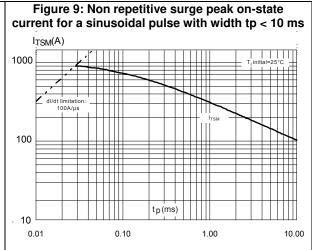
Figure 8: Surge peak on-state current versus number of cycles

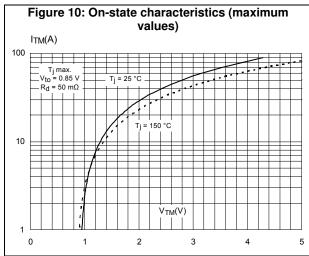
ITSM(A)

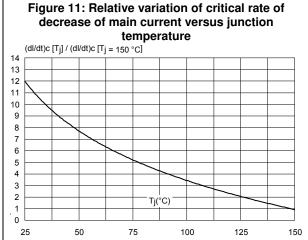
Non repetitive
T_c = 114°C

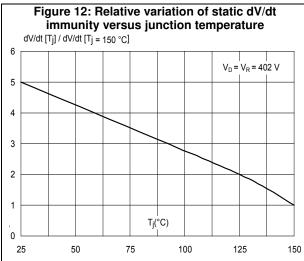
Number of cycles

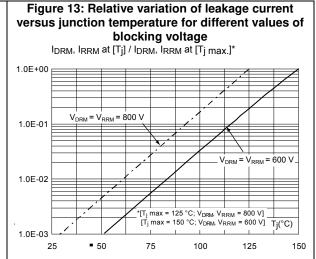
1 10 100 1000











Package information T1235T-8I

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.

- ECOPACK®2 (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 (for package screwing assembly): 0.4 to 0.6 N·m

2.1 TO-220AB Insulated package information

Figure 14: TO-220AB Insulated package outline С В b2 Resin gate 0.5 mm max. protusion(1) F Α 14 13 c2 a1 12 a2 Μ c1 Resin gate 0.5 mm b1 max. protusion⁽¹⁾ (1)Resin gate position accepted in one of the two positions or in the symmetrical opposites.

T1235T-8I Package information

Table 6: TO-220AB Insulated package mechanical data

	Dimensions					
Ref.	Millimeters			Inches ⁽¹⁾		
	Min.	Тур.	Max.	Min.	Тур.	Max.
Α	15.20		15.90	0.5984		0.6260
a1		3.75			0.1476	
a2	13.00		14.00	0.5118		0.5512
В	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
С	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
е	2.40		2.70	0.0945		0.1063
F	6.20		6.60	0.2441		0.2598
- 1	3.73		3.88	0.1469		0.1528
L	2.65		2.95	0.1043		0.1161
12	1.14		1.70	0.0449		0.0669
13	1.14		1.70	0.0449		0.0669
14	15.80	16.40	16.80	0.6220	0.6457	0.6614
М		2.6			0.1024	

Notes:

⁽¹⁾Inch dimensions are for reference only.

Ordering information T1235T-8I

3 Ordering information

Figure 15: Ordering information scheme

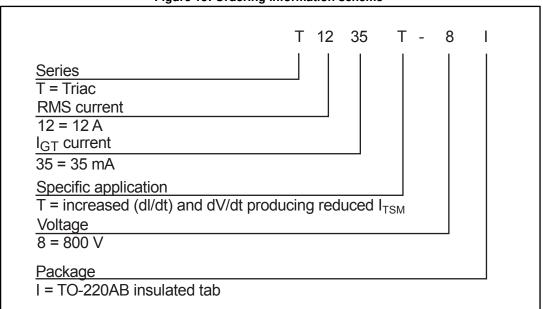


Table 7: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T1235T-8I	T1235T-8I	TO-220AB insulated	2.3 g	50	Tube

4 Revision history

Table 8: Document revision history

Date	Revision	Changes	
17-Oct-2017	1	Initial release.	
18-Dec-2017	2	Updated Table 4: "Static characteristics".	

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