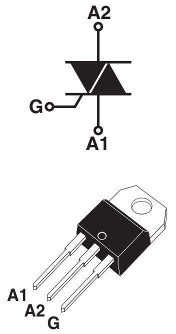
T8T

Snubberless™, logic level and standard 8 A Triacs

Features

- Medium current Triac
- High static and dynamic commutation
- Low thermal resistance with clip bonding
- Packages is RoHS (2002/95/EC) compliant
- 600 V V_{RM}
- UL certified (ref. file E81734)



TO-220AB insulated
(T8xxT-6I)

Applications

- Value sensitive application
- General purpose ac line load switching
- Motor control circuits in power tools
- Small home appliances, lighting
- Inrush current limiting circuits
- Overvoltage crowbar protection

Description

Available in through-hole, the T8T series of Triacs can be used as on/off or phase angle control function in general purpose ac switching where high commutation capability is required.

This series can be designed-in in many value sensitive appliances thanks to the parameters guidance provided in the following pages.

Provides insulation rated at 2500 V rms (TO-220AB insulated package).

Table 1. Device summary

Order code	Symbol	Value
T810T-6I	I_{GT} 3Q logic level	10 mA
T820T-6I T835T-6I	I_{GT} 3Q Snubberless	20 / 35 mA
T825T-6I	I_{GT} 4Q standard	25 mA

TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute ratings (limiting values; T_j = 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)		T_c = 97 °C	8	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t_p = 20 ms	60	A
		F = 60 Hz	t_p = 16.7 ms	63	
I^2t	I^2t Value for fusing		t_p = 10 ms	26	A^2s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$ $t_r \leq 100$ ns	F = 60 Hz	T_j = 125 °C	50	A/µs
V_{DSM} / V_{RSM}	Non repetitive surge peak off-state voltage	t_p = 10 ms	T_j = 25 °C	V_{DRM}/V_{RRM} + 100	V
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 125 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 125 °C	1	W
T_{stg}	Storage junction temperature range			- 40 to + 150	°C
T_j	Operating junction temperature range			- 40 to + 125	°C

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

Symbol	Test conditions	Quadrant		T8xxT				Unit
				T810T	T820T	T825T	T835T	
I_{GT} (1)	V_D = 12 V, R_L = 30 Ω	I - II - III	MAX.	10	20	25	35	mA
		IV				40		
V_{GT}	V_D = V_{DRM}, R_L = 30 Ω, T_j = 25 °C	ALL	MAX.	1.3				V
V_{GD}	V_D = V_{DRM}, R_L = 3.3 kΩ, T_j = 125 °C	ALL	MIN.	0.2				V
I_H (2)	I_T = 500 mA		MAX.	15	25	30	40	mA
I_L	I_G = 1.2 I_{GT}	I - III	MAX.	20	35	40	50	mA
		IV				40		
		II		25	40	70	70	
dV/dt (2)	V_D = 67% V_{DRM}, gate open	T_j = 125 °C	MIN.	100	750	500	2000	V/µs
		T_j = 150 °C(3)		50	500	300	1000	
(di/dt)c (2)	(dV/dt)c = 0.1 V/µs	T_j = 125 °C	MIN.	5.4				A/ms
	(dV/dt)c = 10 V/µs			2		4.5		
	Without snubber				3.4		8	
	(dV/dt)c = 0.1 V/µs	T_j = 150 °C(3)		2.5				
	(dV/dt)c = 10 V/µs			1		2		
	Without snubber				2		6.5	

1. Minimum I_{GT} is guaranted at 5% of I_{GT} max.
2. For both polarities of A2 referenced to A1.
3. Derating information for excess temperature above T_j max.

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_T (1)	I_{TM} = 11.3 A, t_p = 380 µs	T_j = 25 °C	MAX.	1.60	V
V_{TO} (1)	Threshold voltage	T_j = 125 °C	MAX.	0.87	V
R_D (1)	Dynamic resistance	T_j = 125 °C	MAX.	60	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	MAX.	5	µA
		T_j = 125 °C		1	mA
	V_D = 0.9 x V_{DRM}	T_j = 150 °C(2)	TYP.	1.9	

1. For both polarities of A2 referenced to A1.
2. Derating information for excess temperature above T_j max.

Table 5. Thermal resistance

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	2.8	°C/W
$R_{th(j-a)}$	Junction to ambient (DC)	60	°C/W

Figure 1. Maximum power dissipation versus rms on-state current

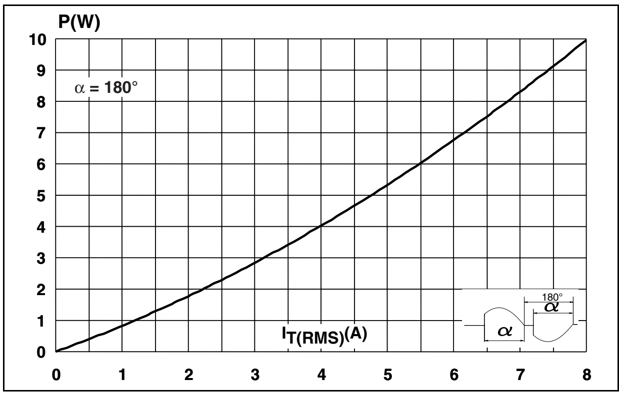


Figure 2. On-state rms current versus case temperature

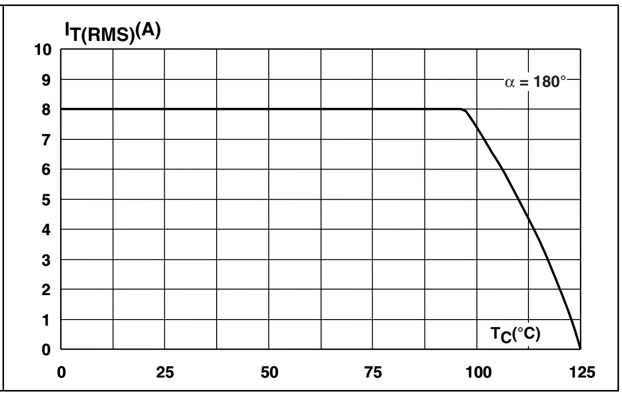


Figure 3. On-state rms current versus ambient temperature (free air convection)

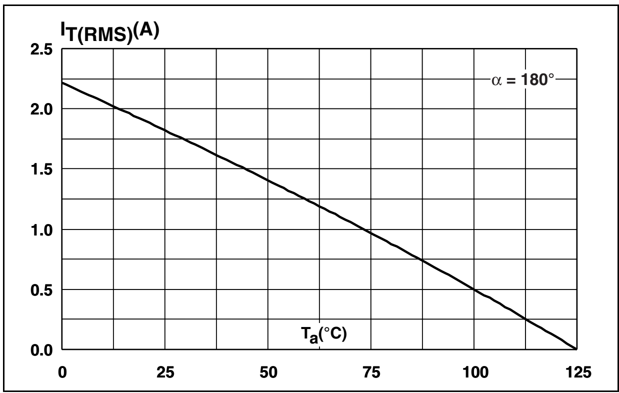


Figure 4. Relative variation of thermal impedance versus pulse duration

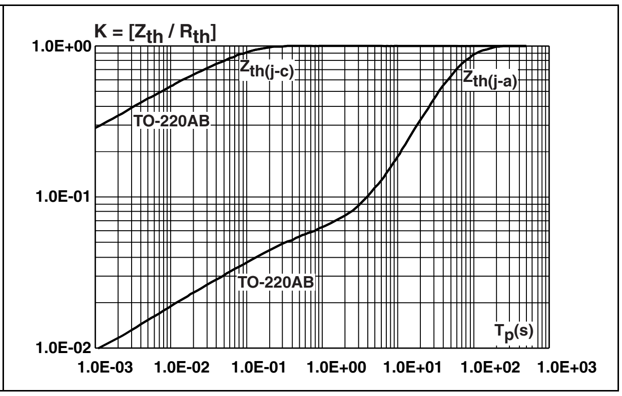


Figure 5. On-state characteristics (maximum values)

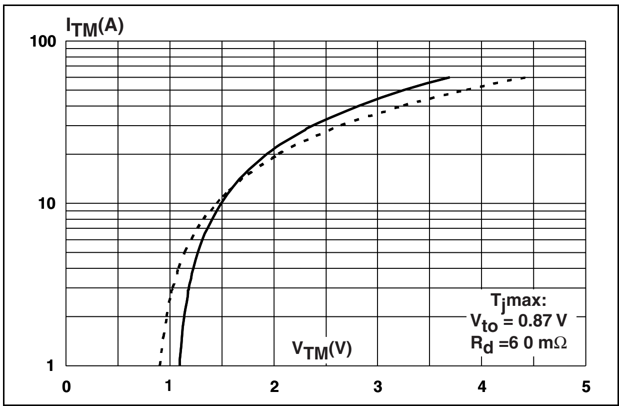


Figure 6. Surge peak on state current versus number of cycles

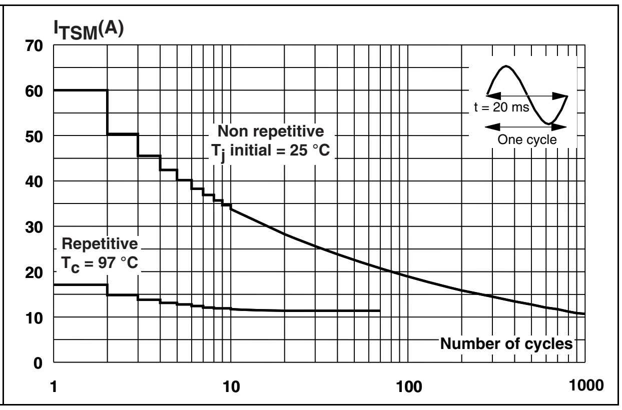


Figure 7. Non repetitive surge peak on-state current for a sinusoidal

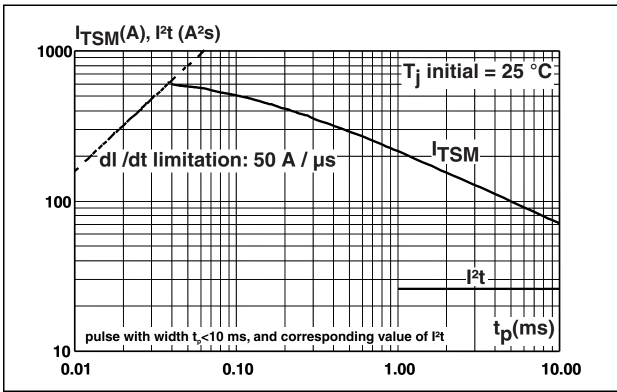


Figure 8. Relative variation of gate trigger current and gate trigger voltage versus junction temperature

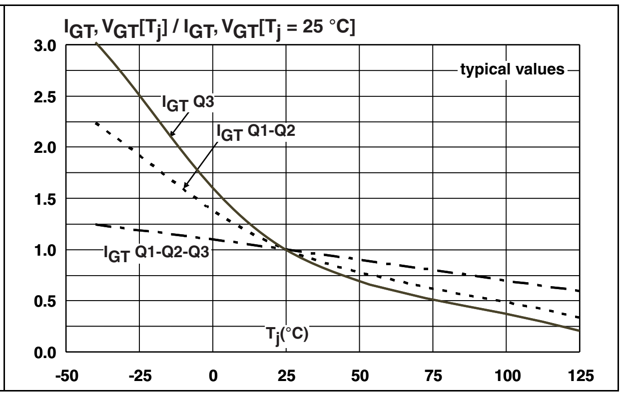


Figure 9. Relative variation of holding current and latching current versus junction temperature

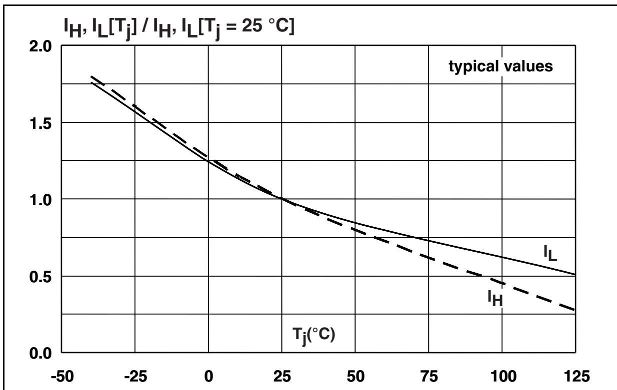


Figure 10. Relative variation of static dV/dt immunity versus junction temperature

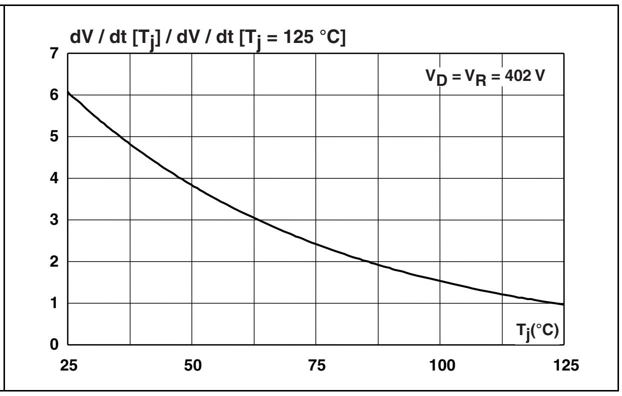


Figure 11. Relative variation of critical rate of decrease of main current versus junction temperature

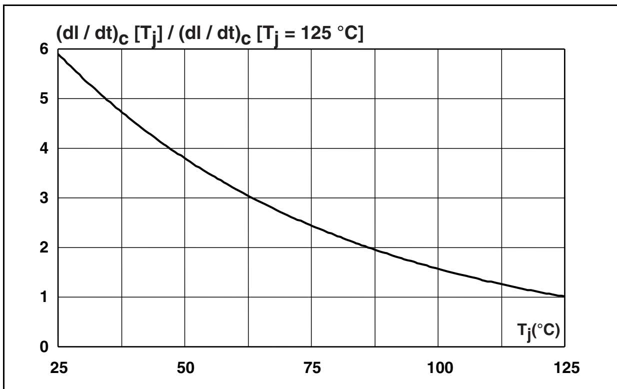
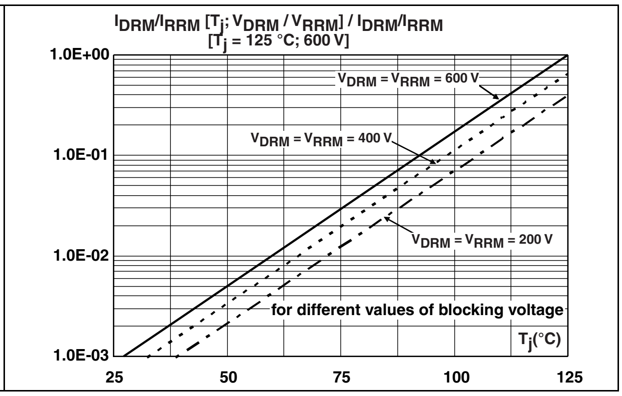
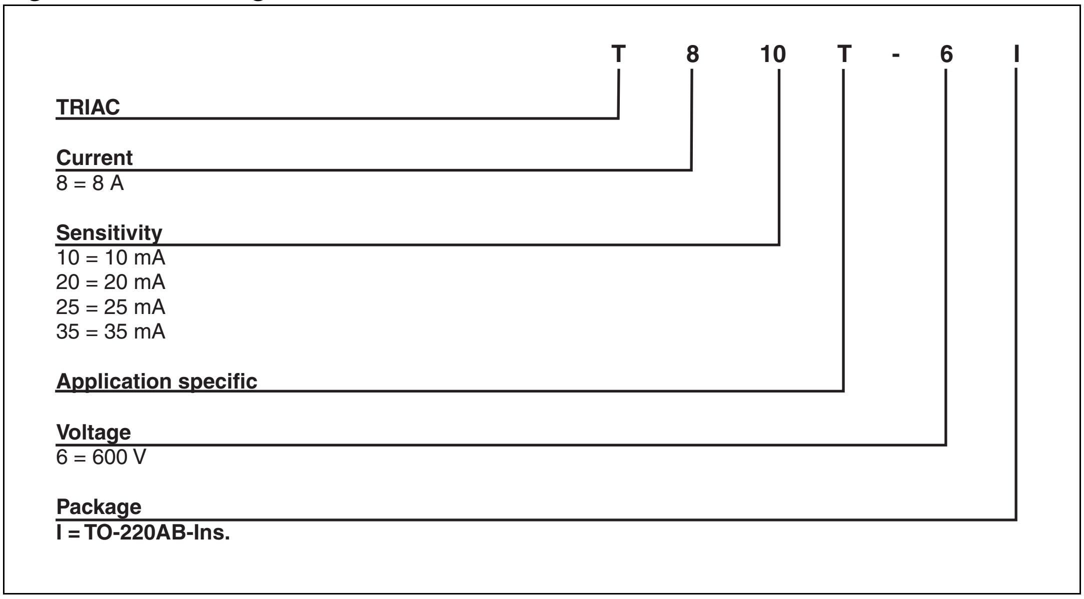


Figure 12. Relative variation of leakage current versus junction temperature



2 Ordering information scheme

Figure 13. Ordering information scheme

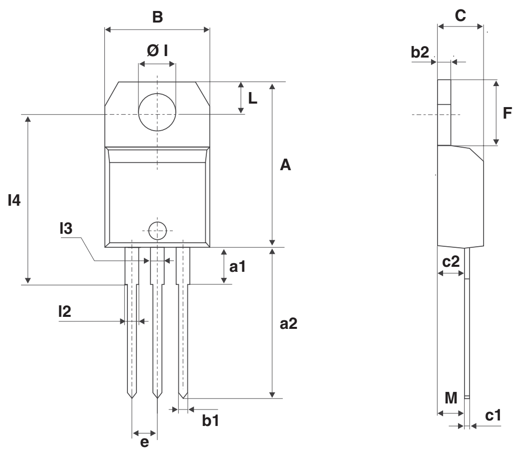


3 Package mechanical data

- Epoxy meets UL94, V0
- Lead-free packages

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	

4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T810T-6I	T810T-6I	TO-220AB-Ins.	2.3 g	50	Tube
T820T-6I	T820T-6I				
T825T-6I	T825T-6I				
T835T-6I	T835T-6I				

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
10-Sep-2009	1	First issue.
18-Jan-2010	2	Updated pag.1.
20-Sep-2011	3	Updated*: Features*.