T1620T-8I, T1635T-8I

Snubberless™ 16 A Triac

Datasheet – production data

Features

- High static and dynamic commutation
- Three quadrants
- Snubberless device
- Package is RoHS (2002/95/EC) compliant
- Tab insulated, voltage = 2500 V rms
- UL certified (ref. file E81734)

Applications

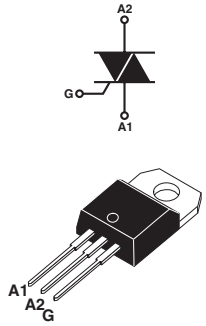
- General purpose AC line load switching
- Home appliances:
  - Fan
  - Pump
  - Solenoid
- Lighting
- Heaters
- Inrush current limiting circuits
- Overvoltage crowbar protection circuits

Description

Available in TO220AB-Ins. (ceramic insulated), the T1620T-8I, and T1635T-8I Triacs can be used as on/off or phase angle function controllers in general purpose AC switching.

These devices can be used without snubber (R + C networks) if the datasheet limits are respected.

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



TO-220AB insulated
(T1620T-8I
T1635T-8I)

Table 1. Device summary

Order code	Quadrants	Value I_{GT} (mA)
T1620T-8I	I - II - III	20
T1635T-8I	I - II - III	35

TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute maximum rating (T_j = 25 °C, unless otherwise specified)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)		T_c = 108 °C	16	A
			T_c = 119 °C	12	
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t_p = 20 ms	120	A
		F = 60 Hz	t_p = 16.7 ms	126	
I^2t	I^2t Value for fusing		t_p = 10 ms	95	A^2s
V_{DRM}/ V_{RRM}	Repetitive peak off-state voltage, gate open		T_j = 150 °C	600	V
			T_j = 125 °C	800	
V_{DSM}, V_{RSM}	Non repetitive surge peak off-state voltage	t_p = 10 ms	T_j = 25 °C	900	V
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT}		F = 100 Hz	100	A/µs
I_{GM}	Peak gate current	t_p = 20 µs	T_j = 150 °C	4	A
$P_{G(AV)}$	Average gate power dissipation		T_j = 150 °C	1	W
T_{stg} T_j	Storage junction temperature range Operating junction temperature range			-40 to +150 -40 to +150	°C
T_L	Lead temperature for soldering during 10 s (at 4 mm from case for TO220AB-ins.)			260	°C
V_{ins} (rms)	Insulation rms voltage, 1 minute, TO220AB ceramic insulated			2500	V

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

Symbol	Test conditions		Quadrant		Value		Unit
					T1620T	T1635T	
I_{GT} (1)	V_D = 12 V, R_L = 30 Ω		I - II - III	MIN.	1	1.75	mA
			I - II - III	MAX.	20	35	mA
V_{GT}	V_D = 12 V, RL = 30 Ω		All	MAX.	1.3		V
V_{GD}	V_D = 800 V, R_L = 3.3 kΩ, T_j = 125 °C		All	MIN.	0.2		V
I_H (1)	I_T = 500 mA			MAX.	25	45	mA
I_L	I_G = 1.2 I_{GT}		I - III	MAX.	35	55	mA
			II		40	65	
dV/dt (1)	V_D = 67% x 800 V gate open	T_j = 125 °C		MIN.	1000	2000	V/µs
	V_D = 67% x 600 V gate open	T_j = 150 °C			500	1000	
(dI/dt)c (1)	(dV/dt)c = snubberless (> 20 V/µs)	T_j = 125 °C		MIN.	6	16	A/ms
		T_j = 150 °C			4.5	12	
t_{GT}	gate controlled turn on time I_{TM} = 13 A, V_D = 400 V, I_G = 100 mA, dI_G/dt = 100 mA/µs, R_L = 30 Ω		I - II - III	TYP.	2		µs

1. For both polarities of A2 referenced to A1

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_{TM} (1)	I_{TM} = 22.6 A, t_p = 380 µs	T_j = 25 °C	MAX.	1.55	V
V_{to} (1)	Threshold voltage	T_j = 150 °C	MAX.	0.85	V
R_d (1)	Dynamic resistance	T_j = 150 °C	MAX.	30	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM} = 800 V	T_j = 25 °C	MAX.	5	µA
		T_j = 125 °C		1	mA
	V_{DRM} = V_{RRM} = 600 V	T_j = 150 °C		3.6	

1. for both polarities of A2 referenced to A1

Table 5. Thermal resistance

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

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

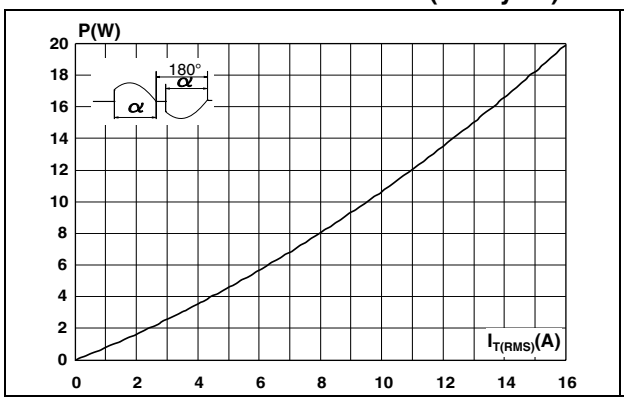


Figure 2. On-state rms current versus case temperature (full cycle)

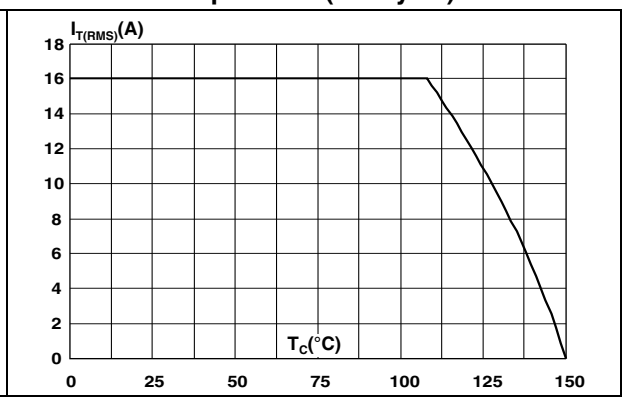


Figure 3. On-state rms current versus ambient temperature (free air convection)

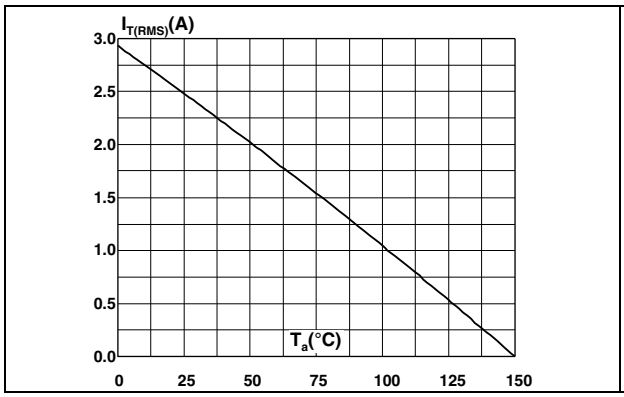


Figure 4. Relative variation of thermal impedance versus pulse duration

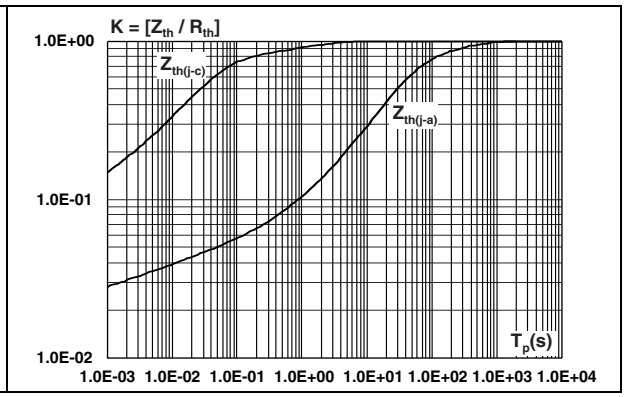


Figure 5. On-state characteristics (maximum values)

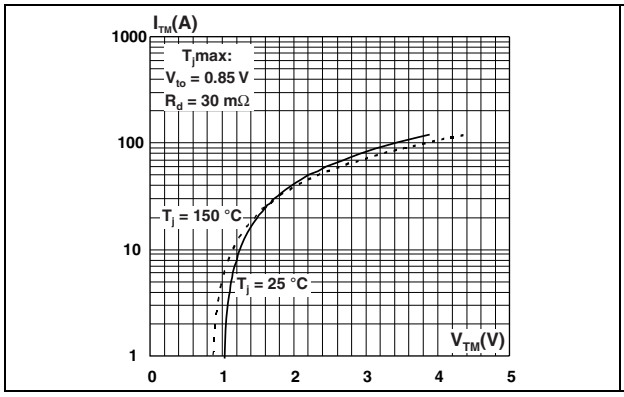


Figure 6. Surge peak on-state current versus number of cycles

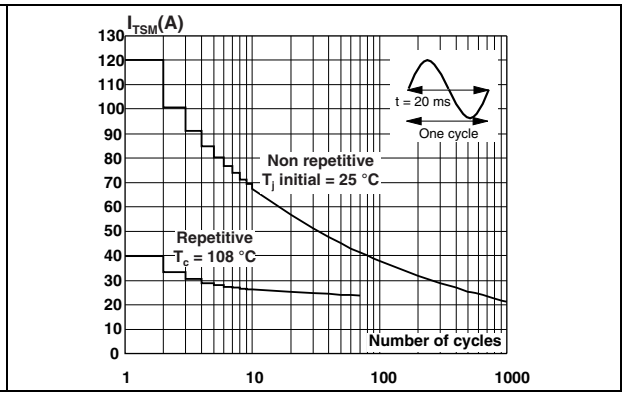


Figure 7. Non repetitive surge peak on-state current and corresponding values of I^2t

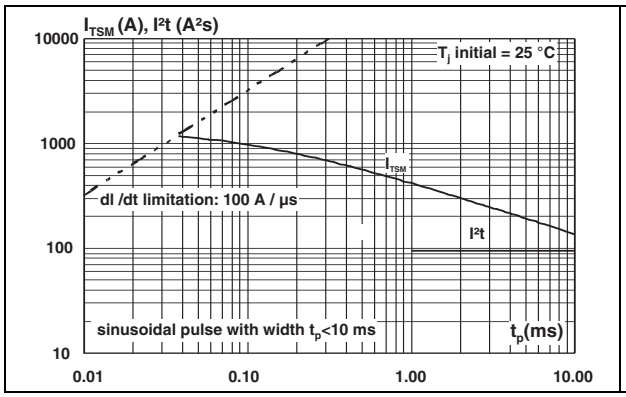


Figure 8. Relative variation of gate trigger current versus junction temperature

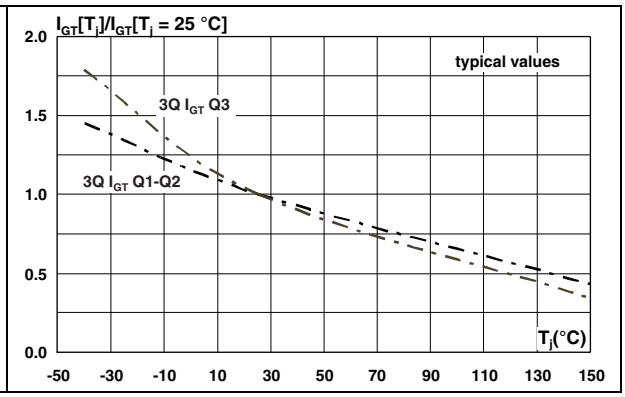


Figure 9. Relative variation of gate trigger voltage versus junction temperature

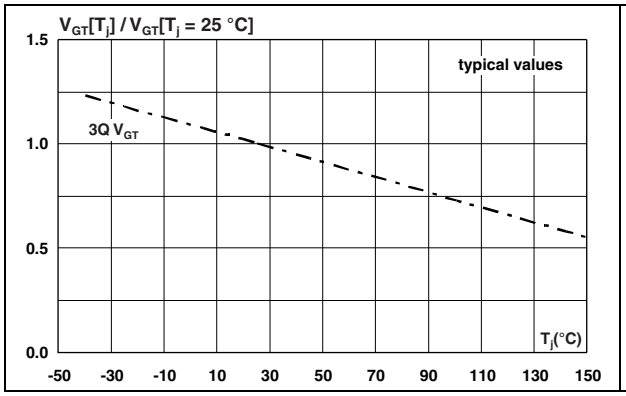


Figure 10. Relative variation of holding current and latching current versus junction temperature

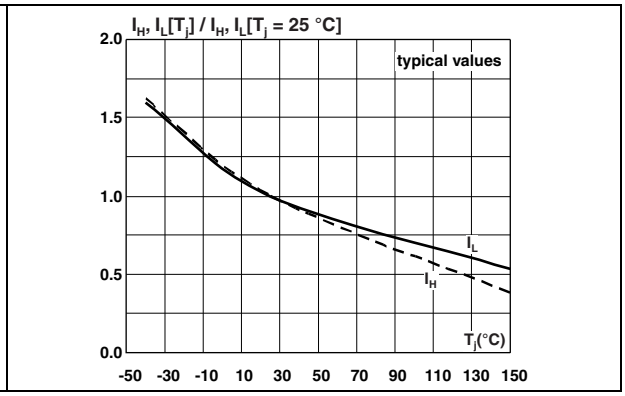


Figure 11. Relative variation of critical rate of decrease of main current (di/dt)c versus reapplied (dV/dt)c

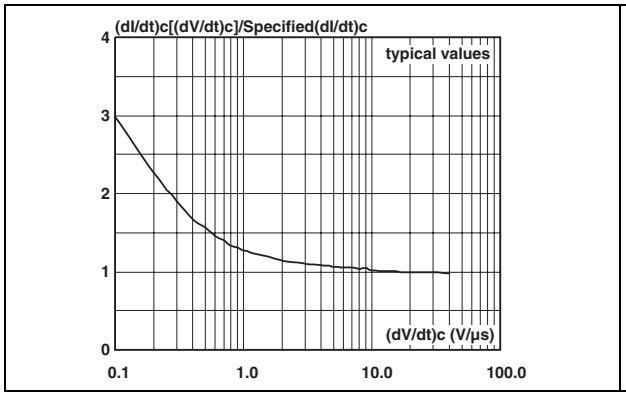


Figure 12. Relative variation of critical rate of decrease of main current (di/dt)c versus junction temperature

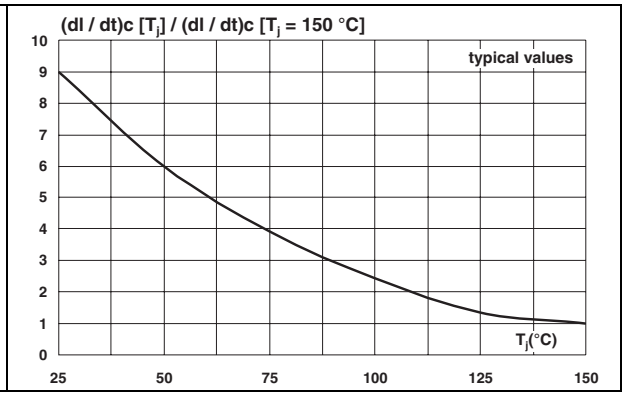
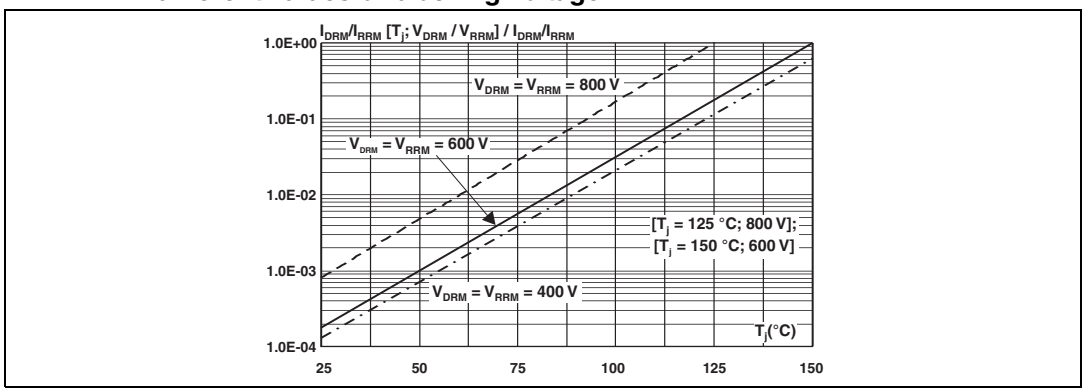


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage

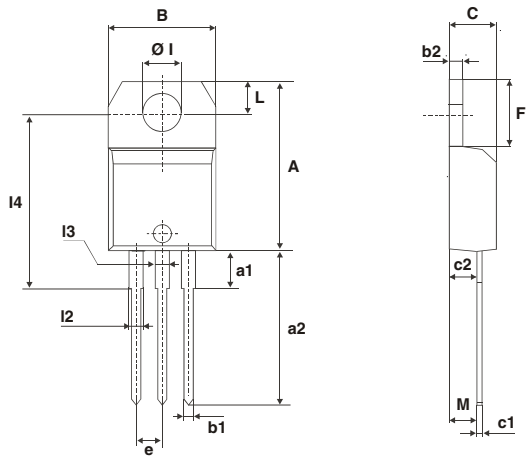


2 Package information

- Epoxy meets UL94, V0
- 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.

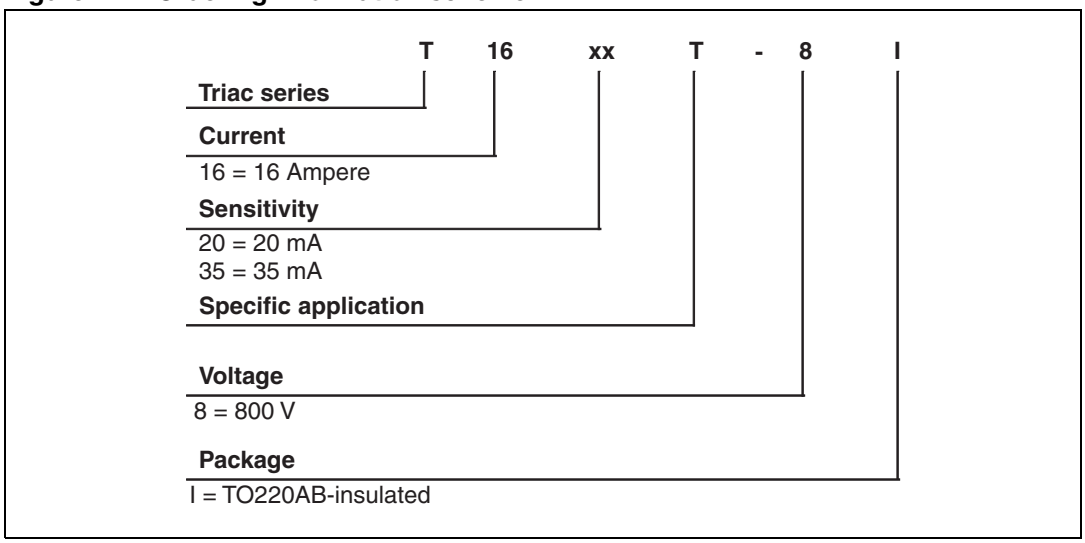
Table 6. TO-220AB insulated dimensions



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 scheme

Figure 14. Ordering information scheme



4 Ordering information

Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T1620T-8I	T1620T-8I	TO-220AB insulated	2.3	50	Tube
T1635T-8I	T1635T-8I	TO-220AB insulated	2.3	50	Tube

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
20-Jan-2012	1	First issue.
25-Apr-2012	2	Updated UL certification.

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