1 Characteristics

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

Symbol	Parameter			Value	Unit
$I_{T(rms)}$	On-state rms current (full sine wave)		T_c = 131 °C	8	A
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	f = 50 Hz	t = 20 ms	60	A
		f = 60 Hz	t = 16.7 ms	63	
I^2t	I^2t value for fusing, T_j initial = 25 °C		t_p = 10 ms	24	A^2s
V_{DRM}, V_{RRM}	Repetitive surge peak off-state voltage		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	900	V
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100$ ns		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	Maximum lead temperature for soldering during 10 s			260	°C

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

Symbol	Test conditions	Quadrant		Value	Unit
I_{GT}	V_D = 12 V, R_L = 30 Ω	I - II - III	Min.	0.5	mA
			Max.	10	
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.	0.2	V
I_H (1)	I_T = 500 mA		Max.	15	mA
I_L	$I_G = 1.2\ I_{GT}$	I - III	Max.	20	mA
		II		25	
dV/dt(1)	$V_D = V_R$ = 536 V, gate open	T_j = 125 °C	Min.	250	V/µs
	$V_D = V_R$ = 402 V, gate open	T_j = 150 °C		170	V/µs
(dI/dt)c(1)	(dV/dt)c = 0.1 V/µs	T_j = 125 °C	Min.	6.0	A/ms
		T_j = 150 °C		4.2	
(dI/dt)c(1)	(dV/dt)c = 10 V/µs	T_j = 125 °C	Min.	3.2	A/ms
		T_j = 150 °C		1.4	

1. For both polarities of A2 referenced to A1

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.	1.55	V
V_{t0} (1)	Threshold voltage	T_j = 150 °C	Max.	0.85	V
R_d (1)	Dynamic resistance	T_j = 150 °C	Max.	57	mΩ
I_{DRM} I_{RRM}	V_{DRM} = V_{RRM} = 800 V	T_j = 25 °C	Max.	5	µA
		T_j = 125 °C		0.8	mA
	V_{DRM} = V_{RRM} = 600 V	T_j = 150 °C	Max.	2.4	

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)	1.9	°C/W
$R_{th(j-a)}$	Junction to ambient (DC)	60	°C/W

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

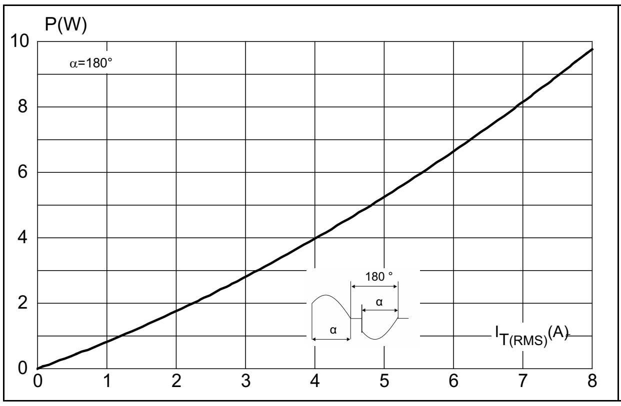


Figure 2. On-state rms current versus case temperature

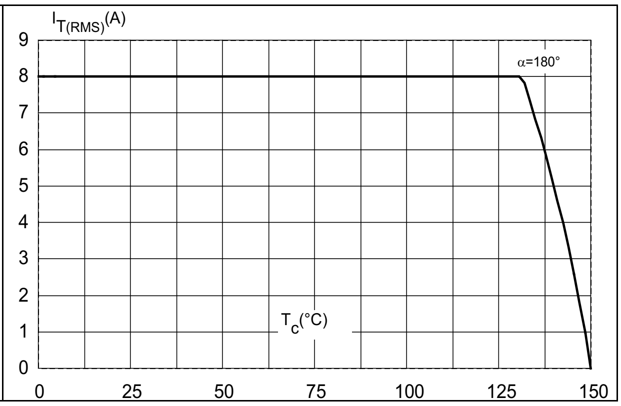


Figure 3. On-state rms current versus ambient temperature (free air convection)

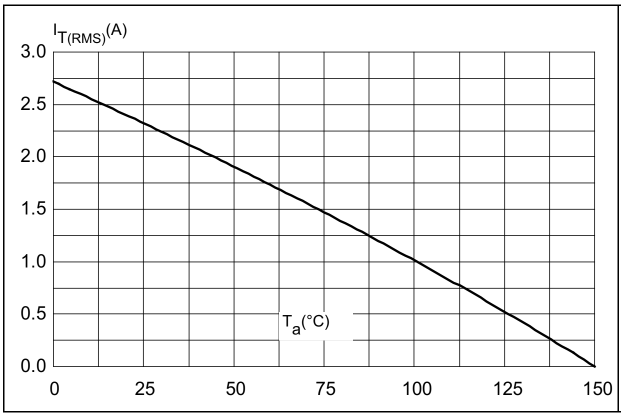


Figure 4. Relative variation of thermal impedance versus pulse duration

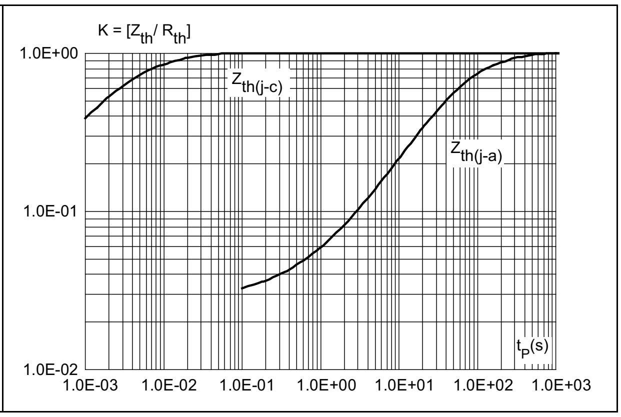


Figure 5. On-state characteristics (maximum values)

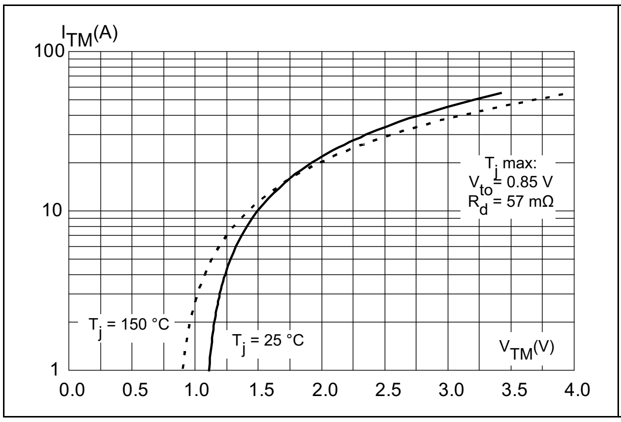


Figure 6. Surge peak on-state current versus number of cycles

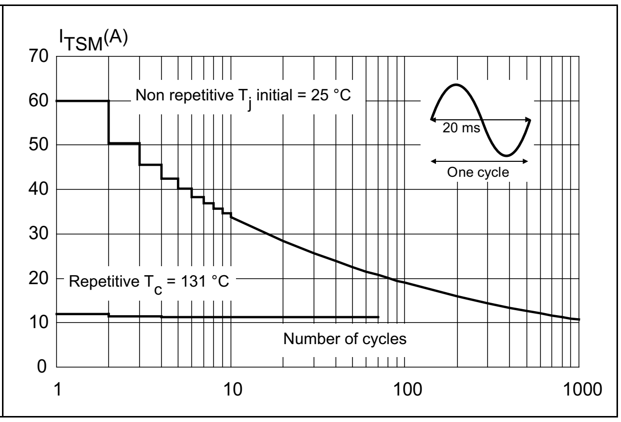


Figure 7. Non repetitive surge peak on-state current

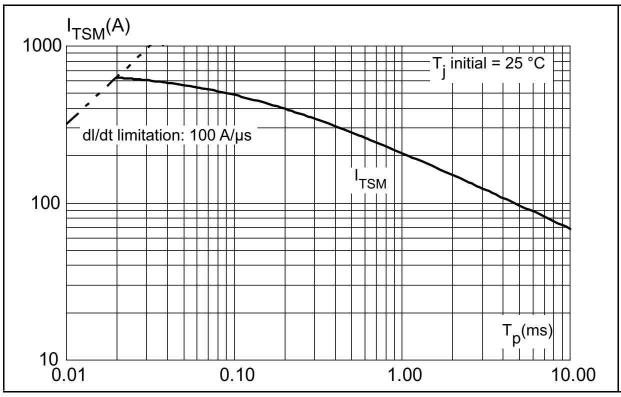


Figure 8. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

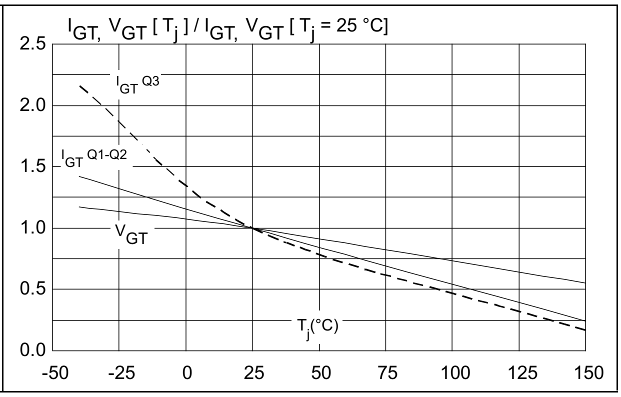


Figure 9. Relative variation of critical rate of decrease of main current versus junction temperature (typical values)

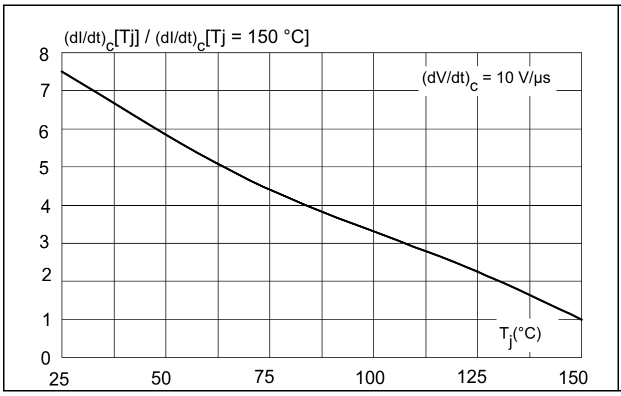


Figure 10. Relative variation of holding current and latching current versus junction temperature (typical values)

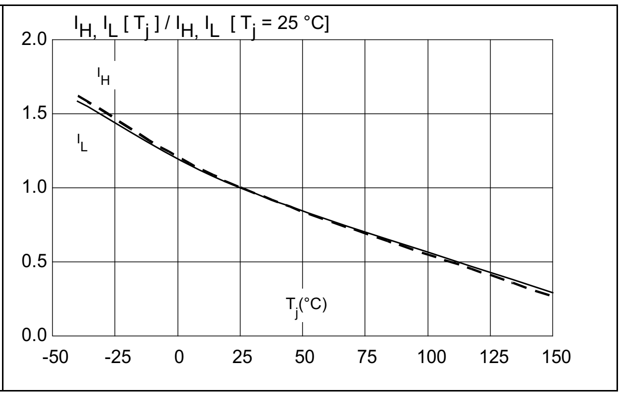


Figure 11. Relative variation of critical rate of decrease of main current $(dI/dt)_C$ versus reapplied $(dV/dt)_C$ (maximum values)

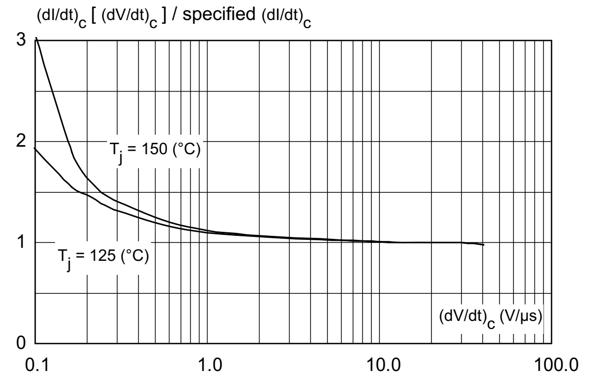


Figure 12. Relative variation of static dV/dt immunity versus junction temperature (typical values)

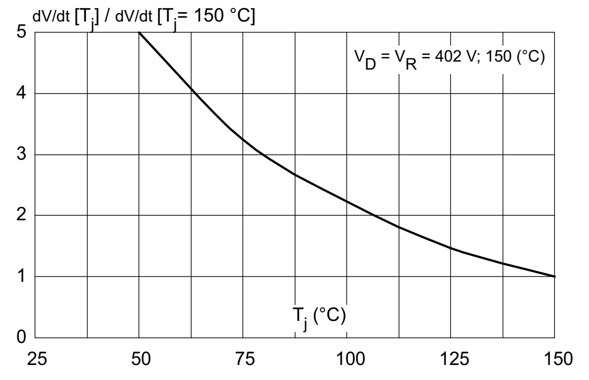
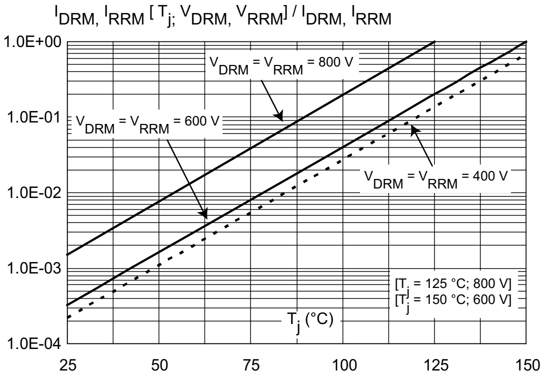


Figure 13. Relative variation of leakage current versus junction temperature for different values of blocking voltage (typical values)

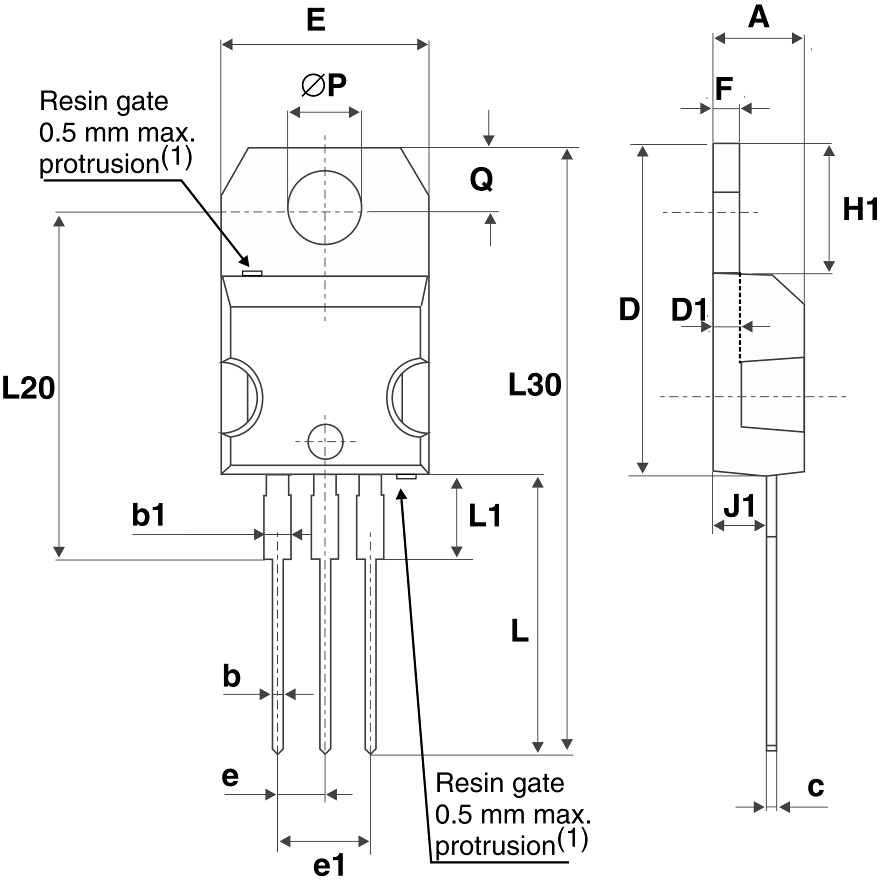


2 Package information

- Epoxy meets UL94, V0
- Lead-free package
- Recommended torque: 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.

Figure 14. TO-220AB dimension definitions



(1) Resin gate position accepted in each of the two position shown as well as the symmetrical opposites

Table 6. TO-220AB dimension values

Ref.	Dimensions			
	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	4.40	4.60	0.17	0.18
b	0.61	0.88	0.024	0.035
b1	1.14	1.70	0.045	0.067
c	0.48	0.70	0.019	0.027
D	15.25	15.75	0.60	0.62
D1	1.27 typ.		0.05 typ.	
E	10	10.40	0.39	0.41
e	2.40	2.70	0.094	0.106
e1	4.95	5.15	0.19	0.20
F	1.23	1.32	0.048	0.052
H1	6.20	6.60	0.24	0.26
J1	2.40	2.72	0.094	0.107
L	13	14	0.51	0.55
L1	3.50	3.93	0.137	0.154
L20	16.40 typ.		0.64 typ.	
L30	28.90 typ.		1.13 typ.	
∅P	3.75	3.85	0.147	0.151
Q	2.65	2.95	0.104	0.116

3 Ordering information

Figure 15. Ordering information scheme

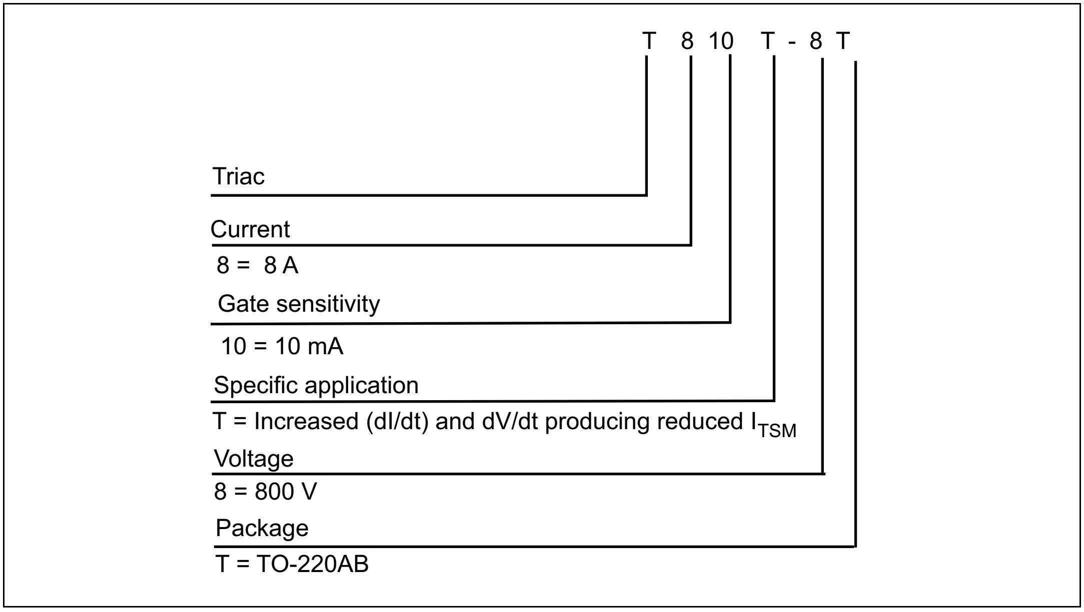


Table 7. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T810T-8T	T810T-8T	TO-220AB	2.0 g	50	Tube

4 Revision history

Table 8. Document revision history

Date	Revision	Changes
07-Nov-2014	1	Initial release.