1 Characteristics

Table 1. **Absolute maximum ratings (limiting values)**

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 (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 x I_{GT}, tr ≤ 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}	Storage junction temperature range			-40 to +150	°C
T_j	Operating junction temperature range			-40 to +150	°C
T_L	Maximum lead temperature soldering during 10 s			260	°C

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

Symbol	Test conditions			Value	Unit
I_{GT}(1)	V_D = 12 V, R_L = 30 Ω	I - II - III	Min.	1.75	mA
			Max.	35	
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.	40	mA
I_L	I_G = 1.2 x I_{GT}	I - III	Max.	60	mA
		II		65	
dV/dt(1)	V_D = 536 V, gate open	T_j = 125 °C	Min.	2000	V/µs
	VD = 402 V, gate open	T_j = 150 °C		1000	
(dI/dt)c(1)	Without snubber (dV/dt)c > 20 V/µs	T_j = 125 °C	Min.	8	A/ms
		T_j = 150 °C		4	

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

Table 3. **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_{TO}(1)	Threshold voltage	T_j = 150 °C	Max.	0.85	
R_d(1)	Dynamic resistance	T_j = 150 °C	Max.	57	mΩ
I_{DRM}, I_{RRM}	V_D = V_R = 800 V	T_j = 25 °C	Max.	5.0	µA
		T_j = 125 °C		0.8	mA
	V_D = V_R = 600 V	T_j = 150 °C	Max.	2.4	

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

Table 4. **Thermal parameters**

Symbol	Parameter	Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	1.9	°C/W
$R_{th(j-a)}$	Junction to ambient	60	°C/W

1.1 Characteristics curves

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

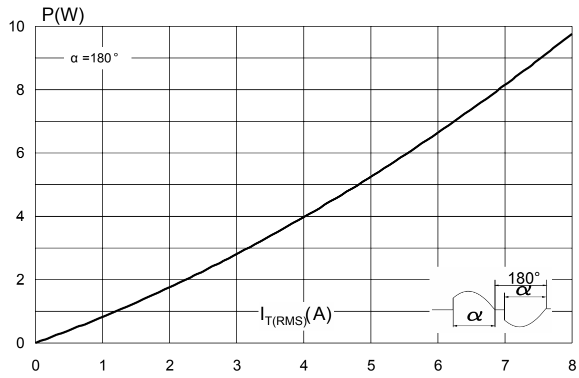


Figure 2. On-state RMS current versus case temperature (full cycle)

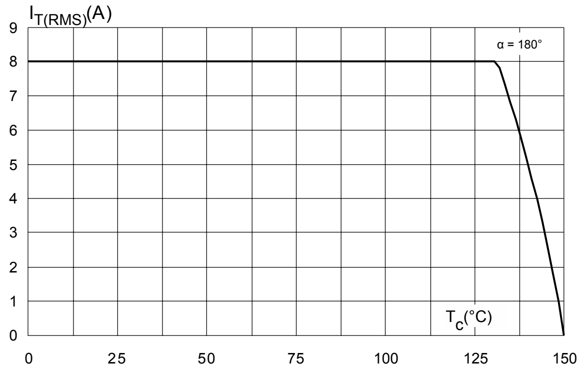


Figure 3. On-state RMS current versus ambient temperature (free air convection)

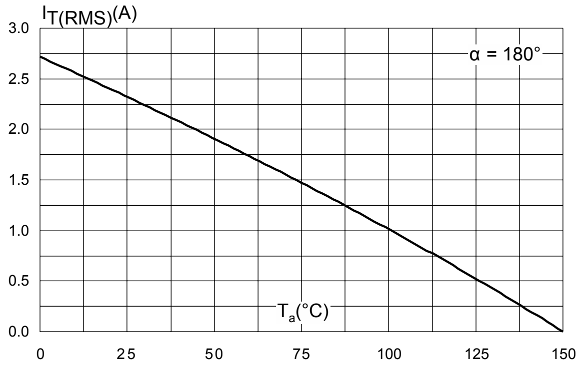


Figure 4. Relative variation of thermal impedance versus pulse duration

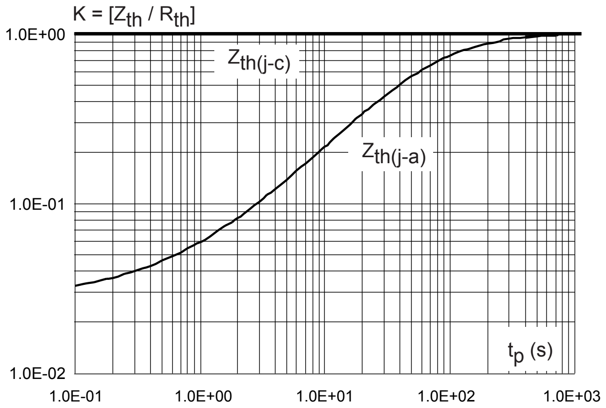


Figure 5. On-state characteristics (maximum values)

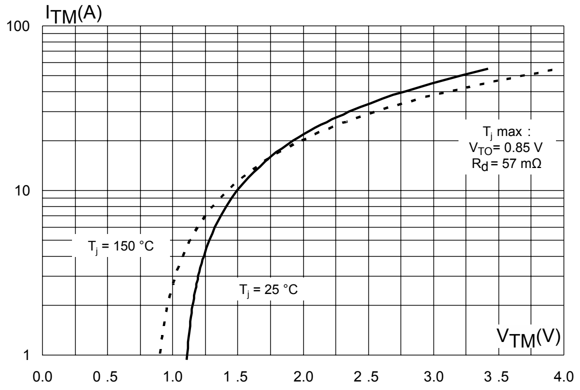


Figure 6. Surge peak on-state current versus number of cycles

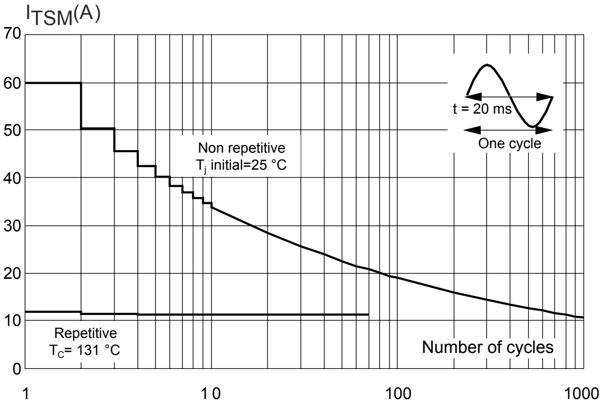


Figure 7. Non repetitive surge peak on-state current

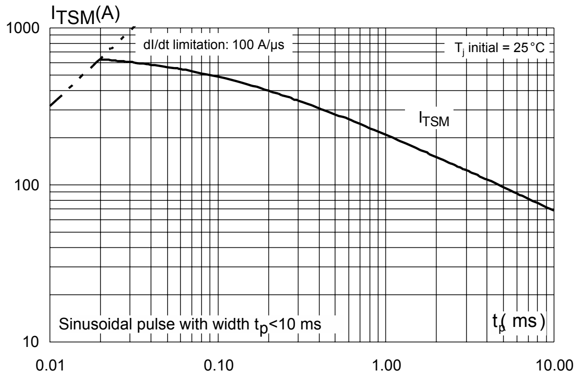


Figure 8. Relative variation of gate trigger current and gate voltage versus junction temperature (typical values)

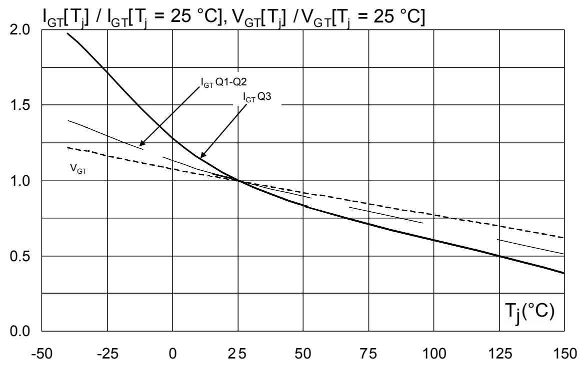


Figure 9. Relative variation of static dV/dt immunity versus junction temperature (typical values)

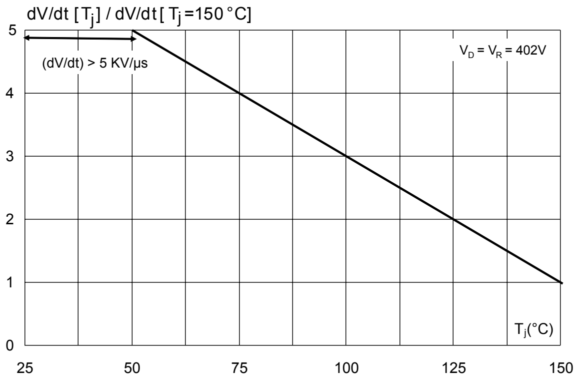


Figure 10. Relative variation of holding current and latching current versus junction temperature (typical values)

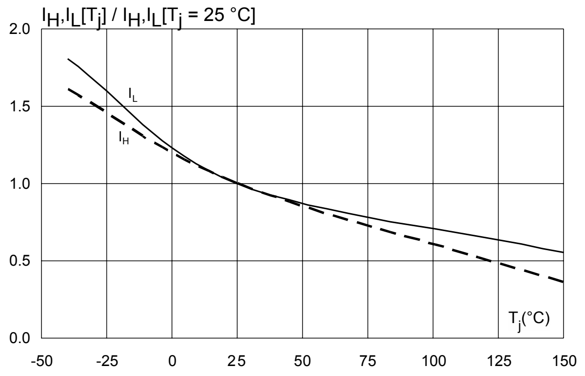


Figure 11. Relative variation of critical rate of decrease of main current (di/dt)c versus reapplied (dV/dt)c (typical values)

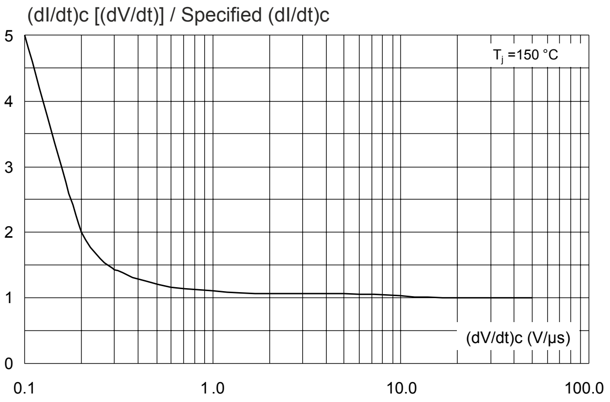


Figure 12. Relative variation of critical rate of decrease of main current (di/dt)c versus junction temperature (typical values)

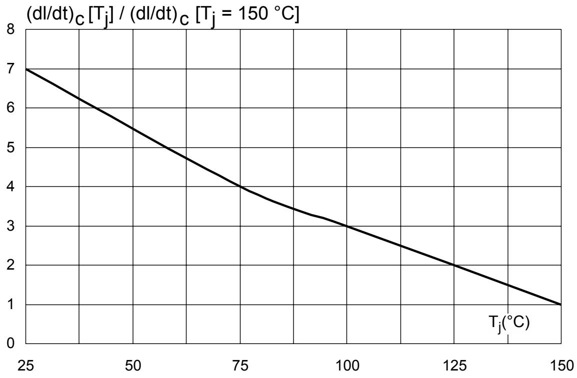
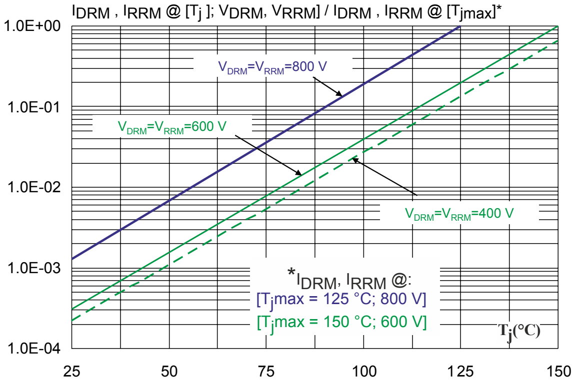


Figure 13. Relative variation of leakage current versus junction temperature for $V_D = V_{DRM}$ / $V_R = V_{RRM}$ blocking voltage (typical values)



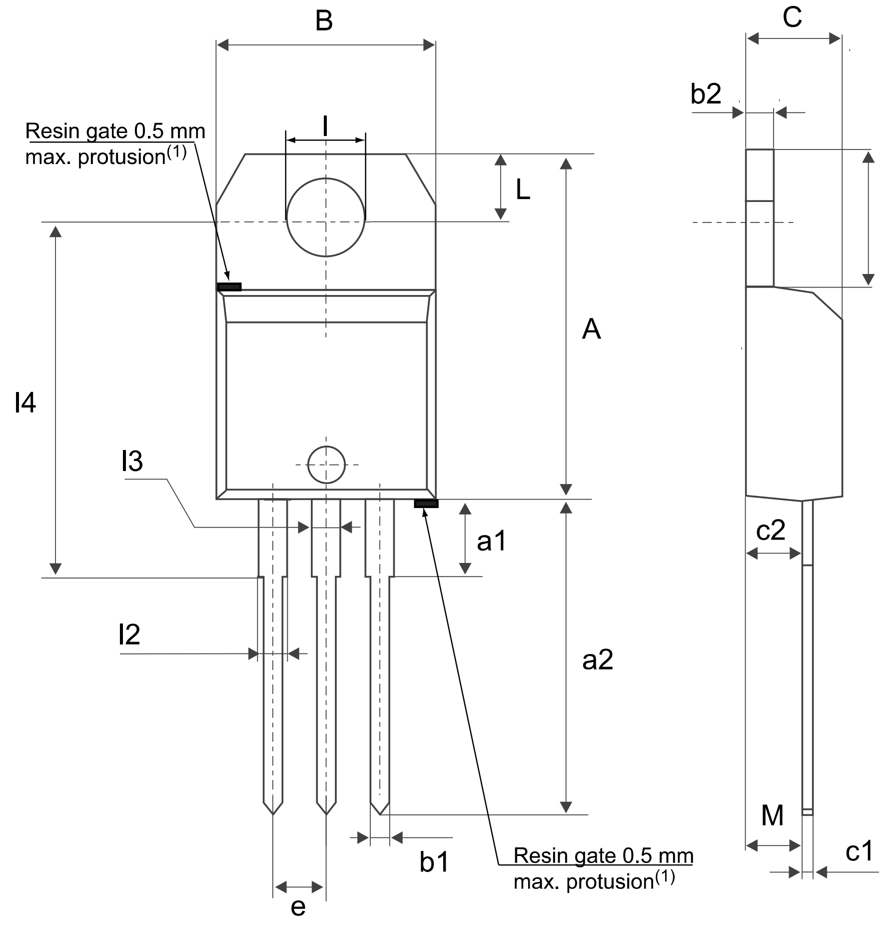
2 Package information

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 package information

- Epoxy 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		
	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

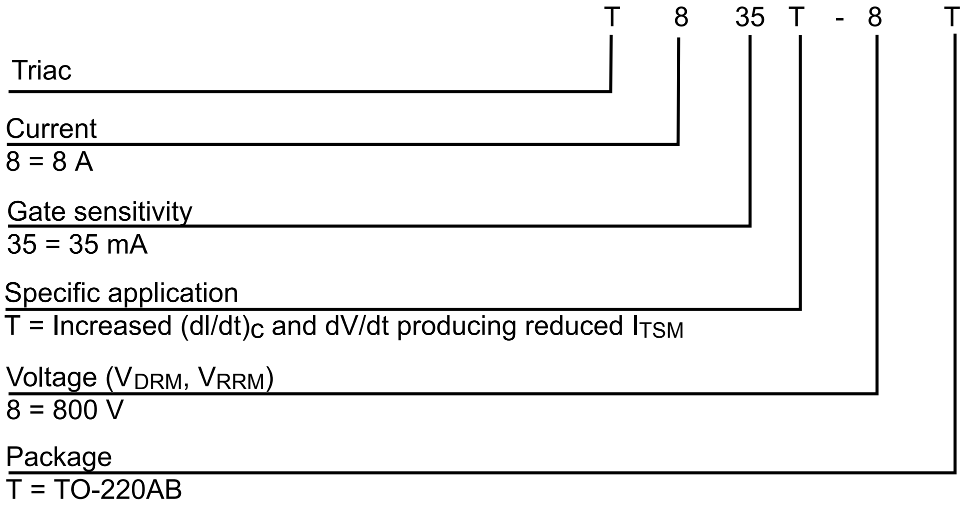


Figure 15. Ordering information scheme

Table 6. Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T835T-8T	T835T-8T	TO-220AB	2.0 g	50	Tube

Revision history

Table 7. **Document revision history**

Date	Revision	Changes
05-Aug-2013	1	Initial release.
01-Jul-2014	2	Updated Table 2.
28-Jul-2014	3	Updated Table 5.
16-Sep-2019	4	Updated Figure 1 and Table 1.
18-Sep-2019	5	Updated Section 2.1 .

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