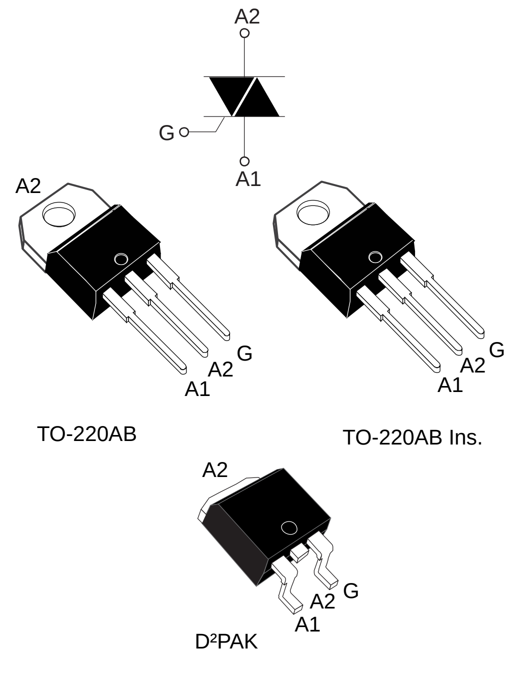
T835H, T850H

High temperature 8 A Snubberless™ Triacs

Datasheet - production data



Features

- Medium current Triac
- 150 °C max. T_j turn-off commutation
- Low thermal resistance with clip bonding
- Very high 3 quadrant commutation capability
- Packages are RoHS (2002/95/EC) compliant
- UL certified (ref. file E81734)

Applications

Especially designed to operate in high power density or universal motor applications such as vacuum cleaner and washing machine drum motor, these 8 A Triacs provide a very high switching capability up to 150 °C junction temperatures.

The heatsink can be reduced, compared to traditional Triac, according to the high performance at given junction temperatures.

Description

Available in through-hole or surface mount packages, these Triacs series are suitable for general purpose mains power ac switching.

By using an internal ceramic pad, they provide voltage insulation (rated at 2500 V_{RMS}).

Table 1: Device summary

Symbol	Value	Unit
$I_{T(RMS)}$	8	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	35 or 50	mA

This is information on a product in full production. www.st.com

1 Characteristics

Table 2: Absolute ratings (limiting values)

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	RMS on-state current (full sine wave)	D²PAK, TO-220AB	T_C = 133 °C	8	A
		TO-220A Ins.	T_C = 116 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	f = 50 Hz	t_p = 20 ms	80	A
		f = 60 Hz	t_p = 16.7 ms	84	
I^2t	I^2t value for fusing		t_p = 10 ms	42	A²s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100$ ns	f = 50 Hz	T_j = 150 °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 forward 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

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

Symbol	Test Conditions	Quadrant		Value		Unit
				T835H	T850H	
I_{GT}(1)	V_D = 12 V, R_L = 33 Ω	I - II - III	Max.	35	50	mA
V_{GT}				1.0		mA
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3 kΩ	I - II - III	Min.	0.15		V
I_H(2)	I_T = 500 mA		Max.	35	75	mA
I_L	$I_G = 1.2 \times I_{GT}$	I - III	Max.	50	60	mA
		II		80	110	
dV/dt(2)	$V_D = 2/3 \times V_{DRM}$, gate open	T_j = 150 °C	Min.	1000	1500	V/µs
(dI/dt)c(2)	Without snubber	T_j = 150 °C	Min.	11	14	A/ms

Notes:

(1)minimum I_{GT} is guaranteed at 20% of I_{GT} max.

(2)for both polarities of A2 referenced to A1.

Table 4: Static characteristics

Symbol	Test conditions			Value	Unit
V_T(1)	I_{TM} = 11 A, t_p = 380 µs	T_j = 25 °C	Max.	1.5	V
V_{t0}(1)	Threshold voltage	T_j = 150 °C	Max.	0.80	V
R_d(1)	Dynamic resistance	T_j = 150 °C	Max.	52	mΩ
I_{DRM} / I_{RRM}	V_{DRM} = V_{RRM}	T_j = 25 °C	Max.	5	µA
		T_j = 150 °C	Max.	3.1	mA
	V_D/V_R = 400 V (at peak mains voltage)	T_j = 150 °C	Max.	2.5	
	V_D/V_R = 200 V (at peak mains voltage)	T_j = 150 °C	Max.	2.0	

Notes:

(1)for both polarities of A2 referenced to A1

Table 5: Thermal parameters

Symbol	Parameter		Value	Unit
$R_{th(j-c)}$	Junction to case (AC)	D²PAK, TO-220AB	1.85	°C/W
		TO-220AB Ins.	3.7	
$R_{th(j-a)}$	Junction to ambient (S_{cu} = 1 cm², D²PAK)	D²PAK	45	
	Junction to ambient	TO-220AB, TO-220AB Ins.	60	

1.1 Characteristics (curves)

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

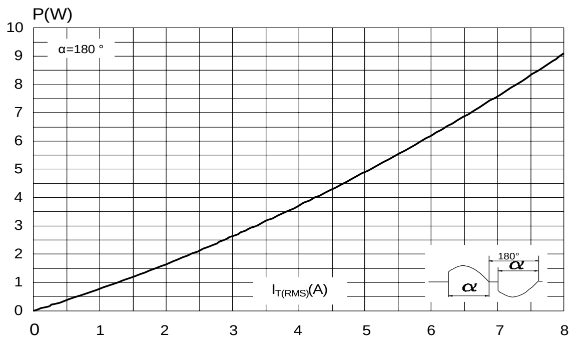


Figure 2: On-state RMS current versus case temperature (full cycle)

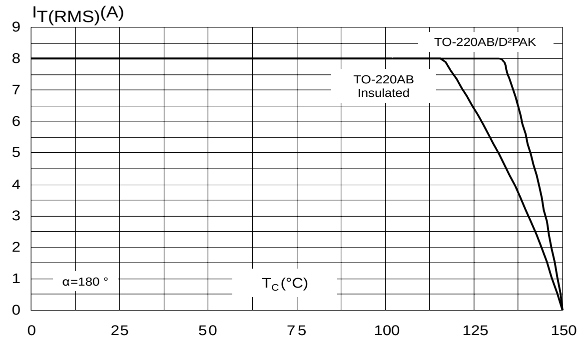


Figure 3: On-state RMS current versus ambient temperature

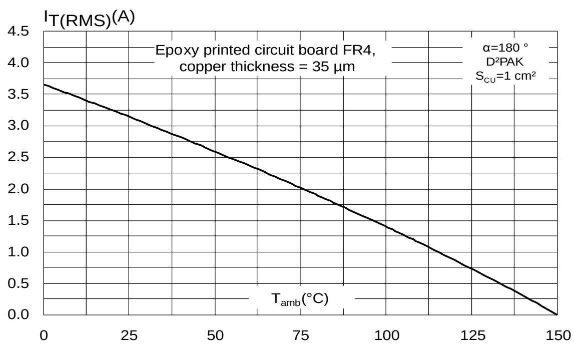


Figure 4: Variation of thermal impedance versus pulse duration

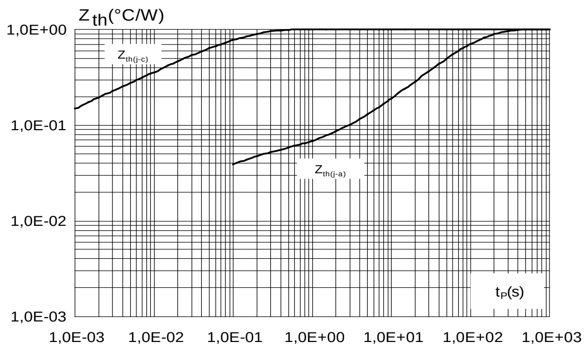


Figure 5: On-state characteristics (maximum values)

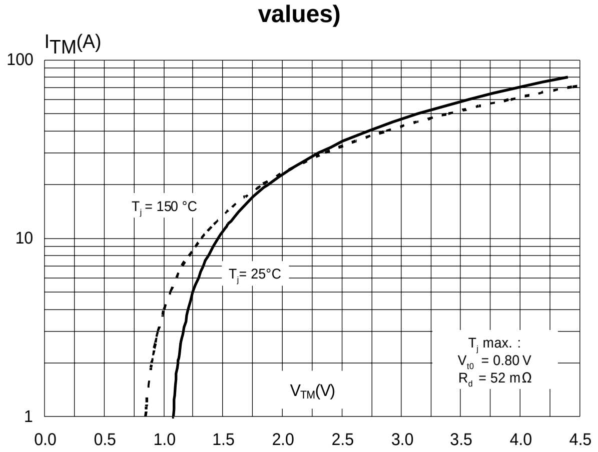


Figure 6: Surge peak on-state current versus number of cycles

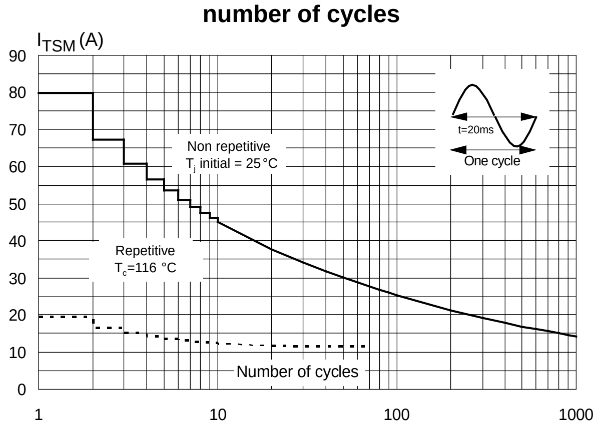


Figure 7: Non-repetitive surge peak on-state current for a sinusoidal pulse

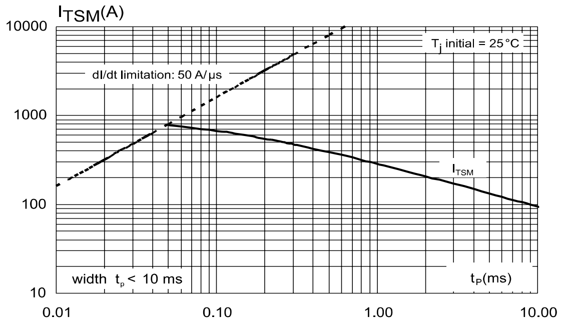


Figure 8: Relative variation of I_{GT}, I_H, I_L vs junction temperature (typical values)

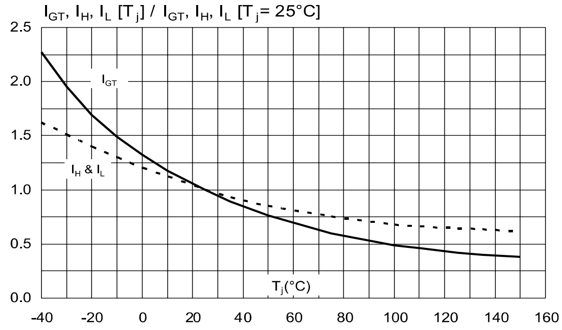


Figure 9: Relative variation of critical rate of decrease of main current (dI/dt)c versus reapplied (dV/dt)c

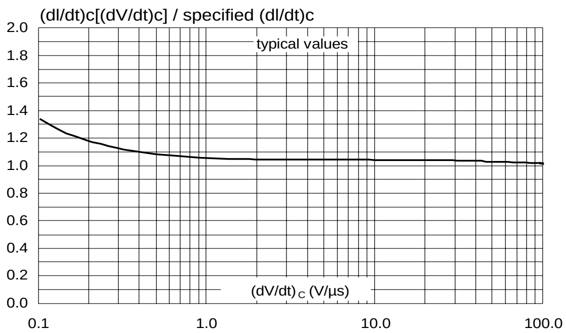


Figure 10: Relative variation of critical rate of decrease of main current versus junction temperature

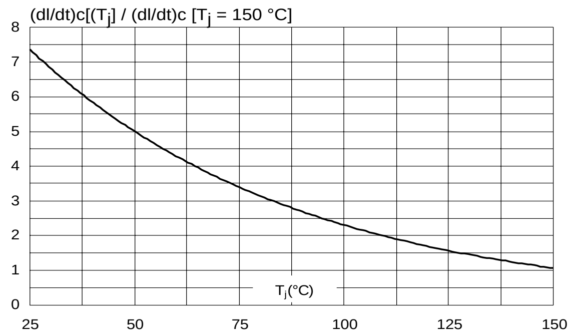


Figure 11: Leakage current versus junction temperature for different values of blocking voltage (typical values)

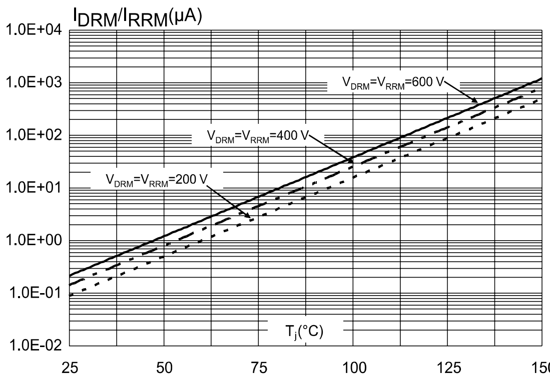
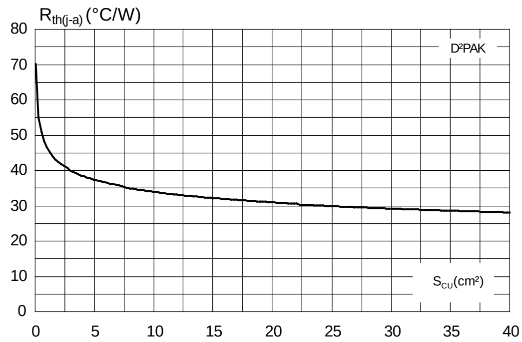


Figure 12: Variation of thermal resistance junction to ambient versus copper surface under tab



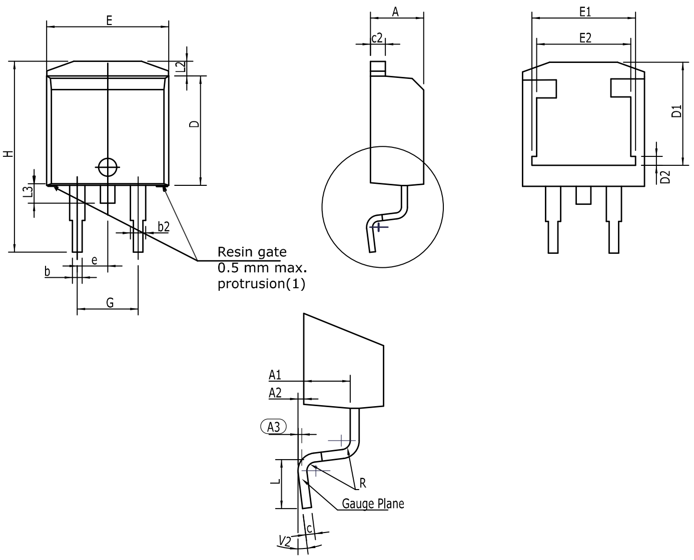
2 Package information

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.

- Epoxy meets UL94, V0
- Lead-free package leads
- Cooling method: by conduction (C)

2.1 D²PAK package information

Figure 13: D²PAK package outline



(1) Resin gate position accepted in one of the two positions or in the symmetrical opposites

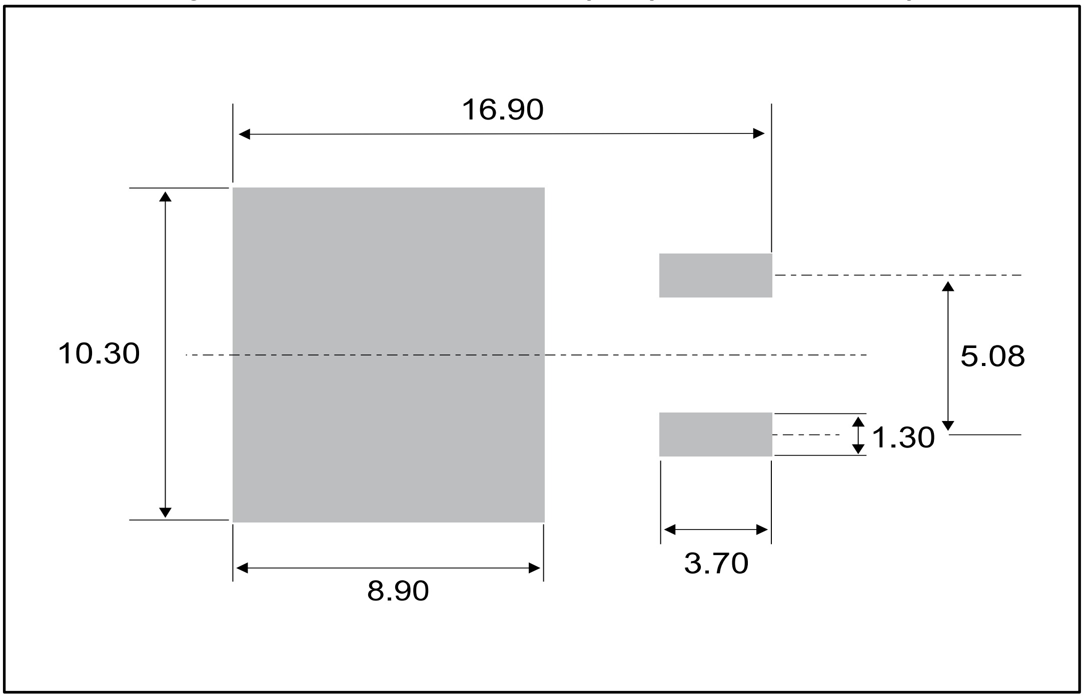
Table 6: D²PAK package mechanical data

Ref.	Dimensions					
	Millimeters			Inches(1)		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.1693		0.1811
A1	2.49		2.69	0.0980		0.1059
A2	0.03		0.23	0.0012		0.0091
A3		0.25			0.0098	
b	0.70		0.93	0.0276		0.0366
b2	1.25		1.7	0.0492		0.0669
c	0.45		0.60	0.0177		0.0236
c2	1.21		1.36	0.0476		0.0535
D	8.95		9.35	0.3524		0.3681
D1	7.50		8.00	0.2953		0.3150
D2	1.30		1.70	0.0512		0.0669
e	2.54			0.1		
E	10.00		10.28	0.3937		0.4047
E1	8.30		8.70	0.3268		0.3425
E2	6.85		7.25	0.2697		0.2854
G	4.88		5.28	0.1921		0.2079
H	15		15.85	0.5906		0.6240
L	1.78		2.28	0.0701		0.0898
L2	1.27		1.40	0.0500		0.0551
L3	1.40		1.75	0.0551		0.0689
R		0.40			0.0157	
V2	0°		8°	0°		8°

Notes:

(1)Dimensions in inches are given for reference only

Figure 14: D²PAK recommended footprint (dimensions are in mm)



2.2 TO-220AB Insulated package information

Figure 15: TO-220AB Insulated package outline

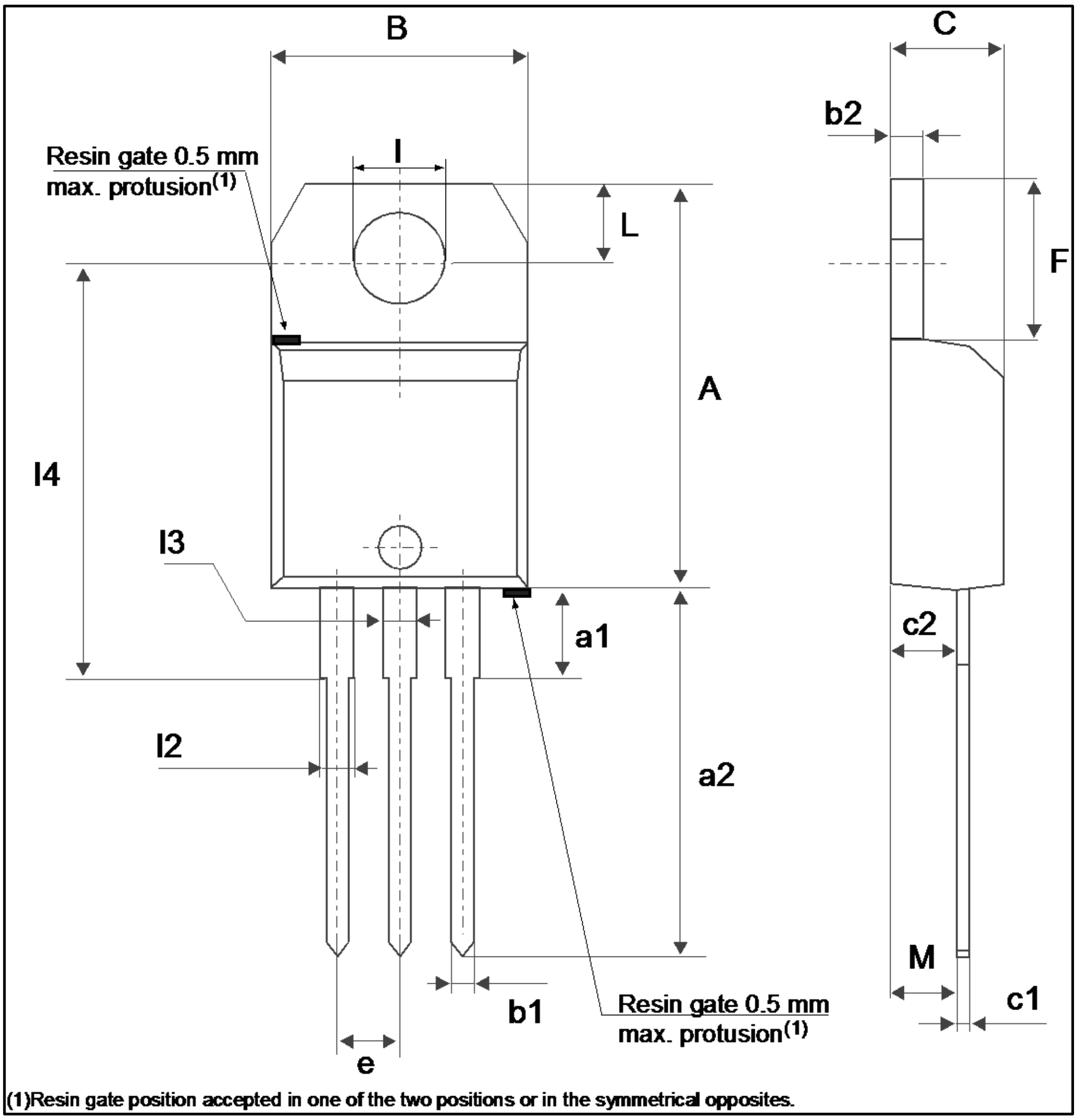


Table 7: TO-220AB Insulated package mechanical data

Ref.	Dimensions					
	Millimeters			Inches[(1)]		
	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	

Notes:

(1)Inch dimensions are for reference only.

3 Ordering information

Figure 16: Ordering information scheme

T 8 xx H - 6 y -TR

Triac series

Current

8 = 8 A

Sensitivity

35 = 35 mA

50 = 50 mA

High temperature

Voltage

6 = 600 V

Package

G = D²PAK

T = TO-220AB

I = TO-220AB Ins

Packing

Blank = Tube (D²PAK, TO-220AB)

-TR = Tape and reel (D²PAK)

Table 8: Ordering information

Order code	Marking	Package	Weight	Base qty.	Delivery mode
T8xxH-6G	T8xxH 6G	D²PAK	1.5 g	50	Tube
T8xxH-6G-TR	T8xxH 6G	D²PAK	1.5 g	1000	Tape and reel
T8xxH-6T	T8xxH 6T	TO-220AB	2.3 g	50	Tube
T8xxH-6I	T8xxH 6I	TO-220AB Ins.	2.3 g	50	Tube

4 Revision history

Table 9: Document revision history

Date	Revision	Changes
17-Apr-2007	1	First issue.
19-Sep-2011	2	Updated: *Features*, *Description*, *Figure 2*, *Table 2* and *4*.
30-Mar-2017	3	Minor text changes. Updated *Table 4: "Static characteristics"* and *Figure 7: "Non-repetitive surge peak on-state current for a sinusoidal pulse"*.
07-Feb-2018	4	Updated *Table 2: "Absolute ratings (limiting values)"*, *Figure 2: "On-state RMS current versus case temperature (full cycle)"* and *Figure 6: "Surge peak on-state current versus number of cycles"*.

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