T1035H, T1050H

High temperature 10 A Snubberless™ Triacs

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

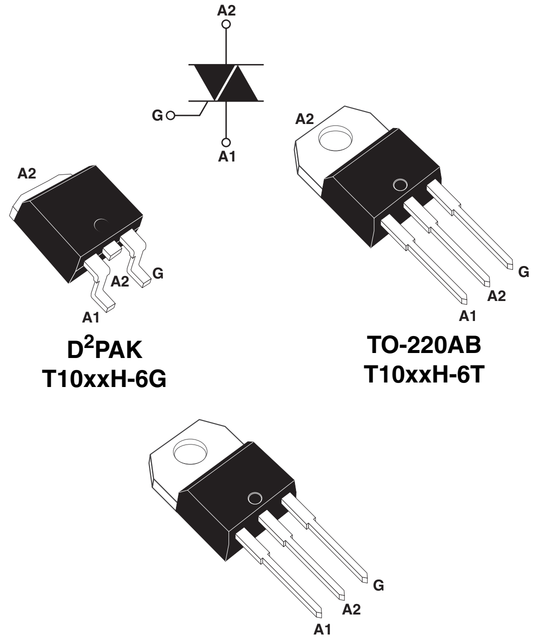
Especially designed to operate in high power density or universal motor applications such as vacuum cleaner and washing machine drum motor, these 10 A Triacs provide a very high switching capability up to junction temperatures of 150 °C.

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

Description

Available in through-hole or surface mount packages, the T1035H and T1050H Triacs series are suitable for general purpose mains power ac switching.

By using an internal ceramic pad, the T10xxH-6I provides voltage insulation (rated at 2500 V rms).



D²PAK T10xxH-6G

TO-220AB T10xxH-6T

TO-220AB Insulated T10xxH-6I

Table 1. Device summary

Symbol	Value	Unit
$I_{T(RMS)}$	10	A
V_{DRM}/V_{RRM}	600	V
I_{GT}	35 or 50	mA

TM: Snubberless is a trademark of STMicroelectronics

1 Characteristics

Table 2. Absolute maximum ratings

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	D^2PAK, TO-220AB	T_c = 135 °C	10	A
		TO-220AB Ins	T_c = 125 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	100	A
		F = 60 Hz	t = 16.7 ms	105	
I^2t	I^2t Value for fusing	t_p = 10 ms		66	A^2s
dI/dt	Critical rate of rise of on-state current I_G = 2 x I_{GT} , $t_r \leq$ 100 ns	F = 120 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 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

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

Symbol	Test Conditions	Quadrant		Value		Unit
				T1035H	T1050H	
I_{GT} (1)	V_D = 12 V, R_L = 33 Ω	I - II - III	MAX.	35	50	mA
V_{GT}		I - II - III	MAX.	1.0		V
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 I_{GT}	I - III	MAX.	50	90	mA
		II		80	110	
dV/dt (2)	V_D = 67% V_{DRM}, gate open, T_j = 150 °C		MIN.	1000	1500	V/µs
(dI/dt)c (2)	Without snubber, T_j = 150 °C		MIN.	13	18	A/ms

1. minimum I_{GT} is guaranted 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} = 14 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.	34	mΩ
I_{DRM} I_{RRM} (2)	$V_{DRM} = V_{RRM}$	T_j = 25 °C	MAX.	5	µA
		T_j = 150 °C	MAX.	3.6	mA
	V_D/V_R = 400 V (at peak mains voltage)	T_j = 150 °C	MAX.	3.0	
	V_D/V_R = 200 V (at peak mains voltage)	T_j = 150 °C	MAX.	2.5	

1. for both polarities of A2 referenced to A1.
2. t_p = 380 µs

Table 5. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		D^2PAK / TO-220AB	1.45	°C/W
			TO-220AB Ins	3.4	
$R_{th(j-a)}$	Junction to ambient	S = 1 cm^2	D^2PAK	45	
			TO-220AB / TO-220AB Ins	60	

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

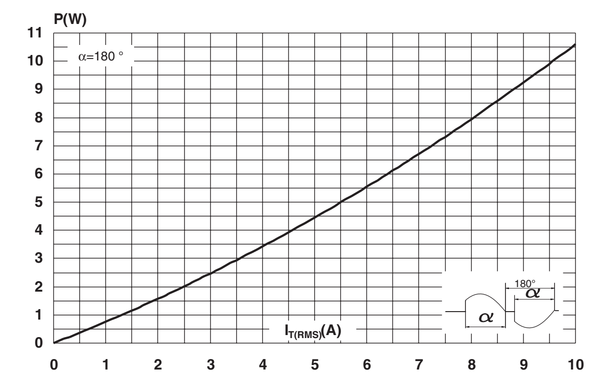


Figure 2. On-state rms current versus case temperature (full cycle)

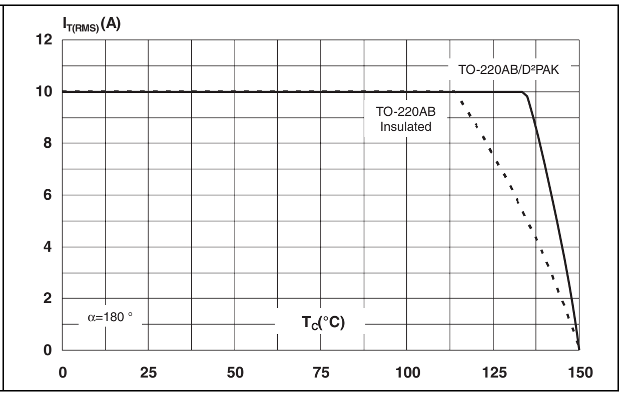


Figure 3. On-state rms current versus ambient temperature

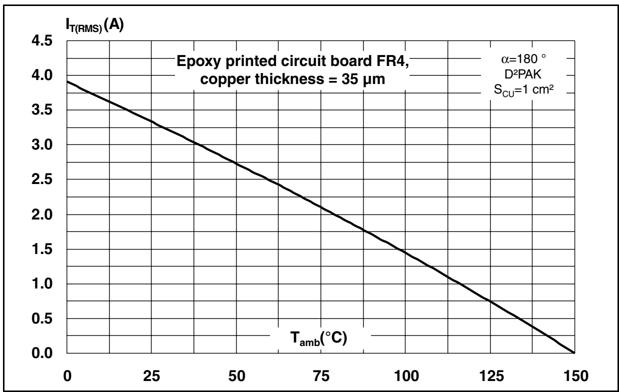


Figure 4. Variation of thermal impedance versus pulse duration

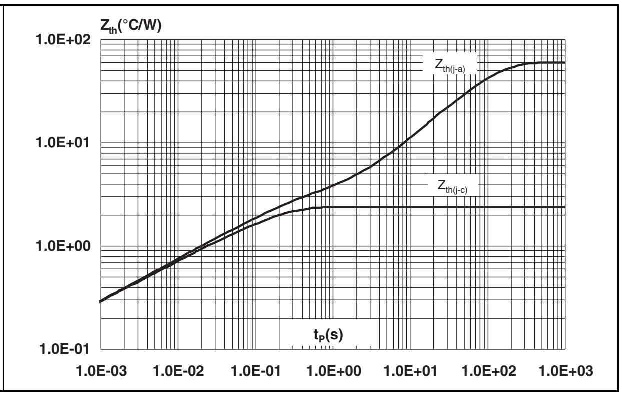


Figure 5. On-state characteristics (maximum values)

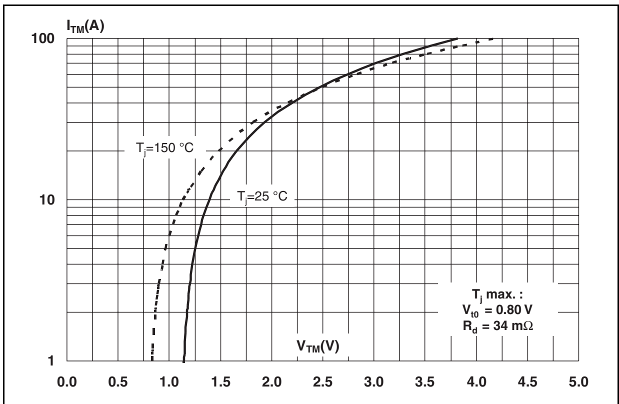


Figure 6. Surge peak on-state current versus number of cycles

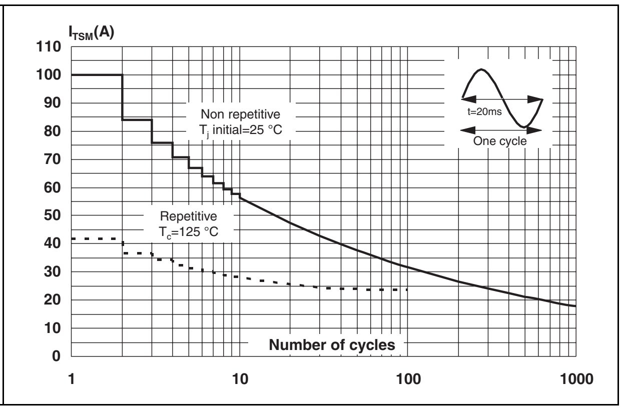


Figure 7. Non-repetitive surge peak on-state current for a sinusoidal pulse with

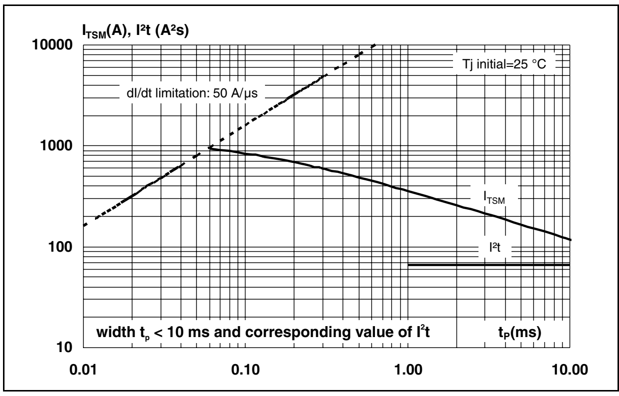


Figure 8. Relative variation of I_{GT}, I_H, I_L vs junction temperature (typical values)

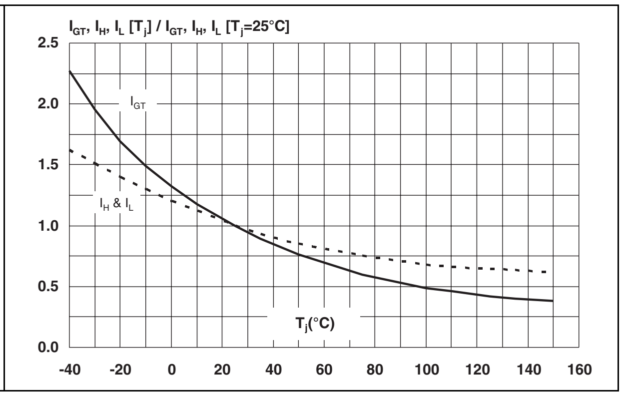


Figure 9. Relative variation of critical rate of decrease of main current (dI/dt)c versus reapplied (dV/dt)c

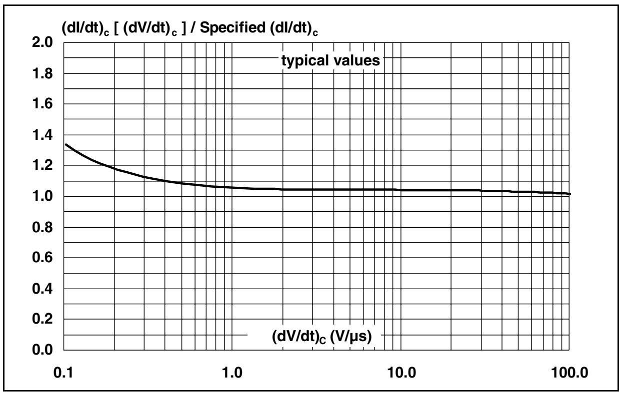


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

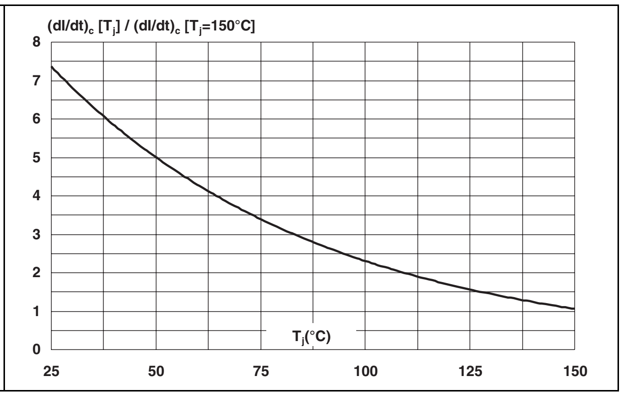


Figure 11. Leakage current versus junction temperature for different values of blocking voltage (typical values)

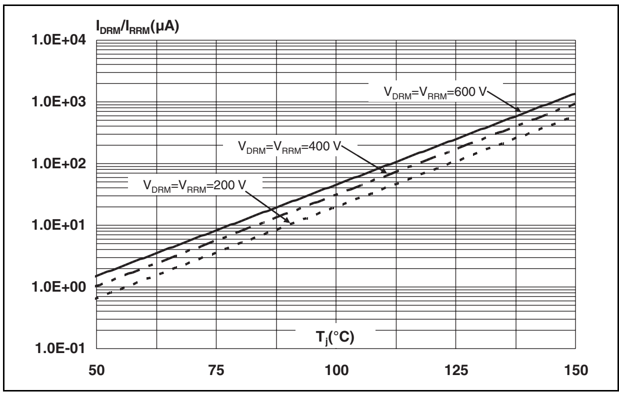
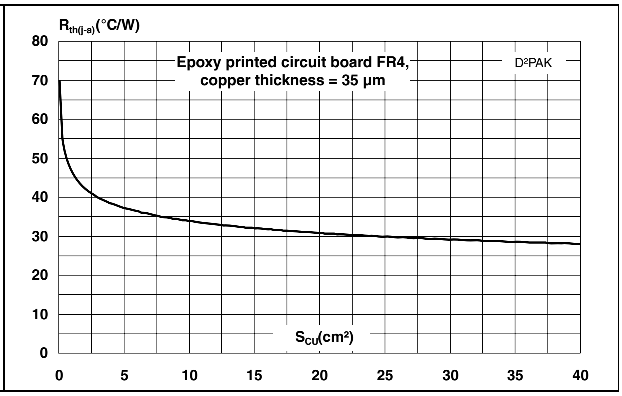


Figure 12. Variation of thermal resistance junction to ambient versus copper surface under tab



2 Ordering information scheme

Figure 13. Ordering information scheme

T 10 xx H - 6 y -TR

Triac series

Current

10 = 10 A

Sensitivity

35 = 35 mA

50 = 50 mA

High temperature

Voltage

6 = 600 V

Package

G = D^2PAK

T = TO-220AB

I = TO-220AB Ins

Packing

Blank = Tube (D^2PAK, TO-220AB)

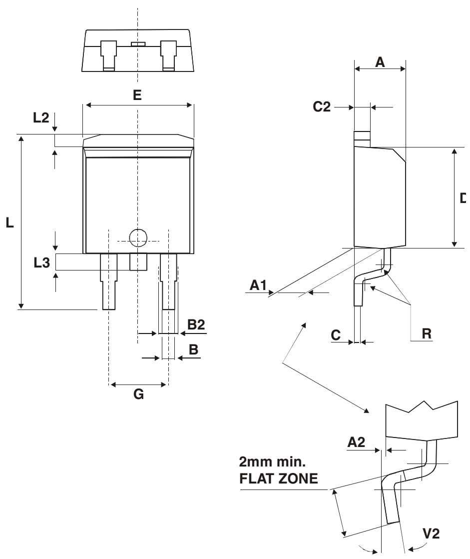
-TR = Tape and reel (D^2PAK)

3 Package information

- Epoxy meets UL94, V0
- 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.

Table 6. D²PAK dimensions



Ref.	Dimensions					
	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A	4.30		4.60	0.169		0.181
A1	2.49		2.69	0.098		0.106
A2	0.03		0.23	0.001		0.009
B	0.70		0.93	0.027		0.037
B2	1.25	1.40		0.048	0.055	
C	0.45		0.60	0.017		0.024
C2	1.21		1.36	0.047		0.054
D	8.95		9.35	0.352		0.368
E	10.00		10.28	0.393		0.405
G	4.88		5.28	0.192		0.208
L	15.00		15.85	0.590		0.624
L2	1.27		1.40	0.050		0.055
L3	1.40		1.75	0.055		0.069
R		0.40			0.016	
V2	0°		8°	0°		8°

Figure 14. Footprint (dimensions in mm)

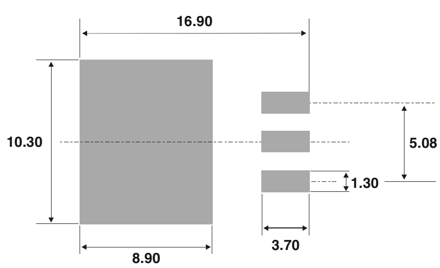
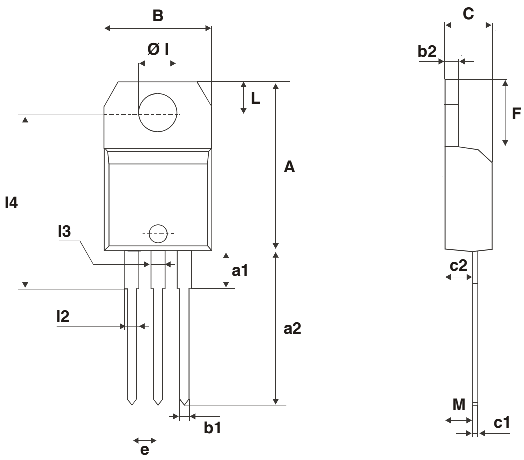


Table 7. TO-220AB and TO-220AB Ins dimensions



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
I4	15.80	16.40	16.80	0.622	0.646	0.661
L	2.65		2.95	0.104		0.116
I2	1.14		1.70	0.044		0.066
I3	1.14		1.70	0.044		0.066
M		2.60			0.102	

4 Ordering information

Table 8. Ordering information

Order code	Marking	Package	Weight	Base qty	Delivery mode
T10xxH-6G	T10xxH 6G	D^2PAK	1.5 g	50	Tube
T10xxH-6G-TR	T10xxH 6G	D^2PAK	1.5 g	1000	Tape and reel
T10xxH-6T	T10xxH 6T	TO-220AB	2.3 g	50	Tube
T10xxH-6I	T10xxH 6I	TO-220AB Ins	2.3 g	50	Tube

5 Revision history

Table 9. Document revision history

Date	Revision	Changes
17-Apr-2007	1	First issue
20-Sep-2011	2	Updated: *Features*, *Description* and *Figure 2*.

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001
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