T3035H, T3050H

Snubberless™ high temperature 30 A Triacs

Features

- High current Triac
- High immunity level
- Low thermal resistance with clip bounding
- RoHS (2002/95/EC) compliant package
- Very high commutation (3Q) at 150 °C capability

Applications

Thanks to its high electrical noise immunity level and its strong current robustness, the T30xxH series is designed for the control of AC actuators in appliances and industrial systems.

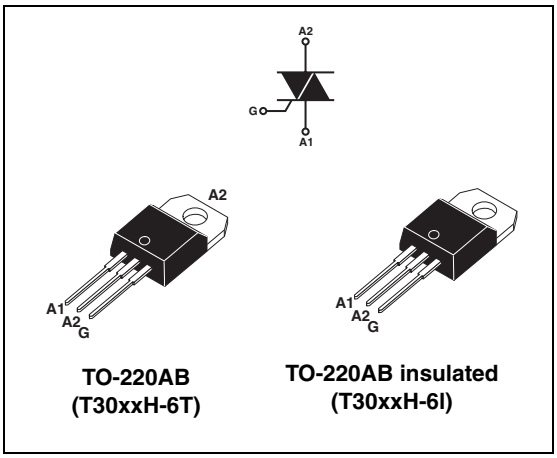
Description

Specifically designed to operate at 150 °C, the new 30 A T30xxH Triacs provide very high dynamic performance and enhanced performance in terms of power loss and thermal dissipation. This allows optimizing the heatsink size, leading to space and cost effectiveness when compared to electro-mechanical solutions.

Based on ST Snubberless™ technology, they offer a specified minimal commutation and high noise immunity levels valid up to the T_j max.

The T30xxH series optimize safely the control of universal motors and of inductive loads found in power tools and major appliances.

By using an internal ceramic pad, the T30xxH-6I provides voltage insulation (rated at 2500 V rms).



TO-220AB (T30xxH-6T)

TO-220AB insulated (T30xxH-6I)

Table 1. Device summary

Symbol	Value
$I_{T(rms)}$	30 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 rating

Symbol	Parameter			Value	Unit
$I_{T(RMS)}$	On-state rms current (full sine wave)	TO-220AB	T_c = 121 °C	30	A
		TO-220AB insul.	T_c = 92 °C		
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 50 Hz	t = 20 ms	270	A
		F = 60 Hz	t = 16.7 ms	284	
I^2t	I^2t Value for fusing	t_p = 10 ms		487	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 volt-age	t_p = 10 µs	T_j = 25 °C	V_{DSM}/V_{RSM} +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
				T3035H	T3050H	
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.	60	75	mA
I_L	I_G = 1.2 I_{GT}	I - III	MAX.	75	90	mA
		II		90	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.	33	44	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_{TM} (1)	I_{TM} = 42 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.	15	mΩ
I_{DRM} I_{RRM}	$V_{DRM} = V_{RRM}$	T_j = 25 °C	MAX.	10	µA
		T_j = 150 °C		8.5	mA
	V_D/V_R = 400V (at peak mains voltage)	T_j = 150 °C	MAX.	7	
	V_D/V_R = 200V (at peak mains voltage)	T_j = 150 °C		5.5	

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)	TO-220AB	0.8	°C/W
		TO-220AB Insul	1.6	
$R_{th(j-a)}$	Junction to ambient	TO-220AB / TO-220AB Insul	60	°C/W

Figure 1. Maximum power dissipation versus rms on-state current (full cycle 180°)

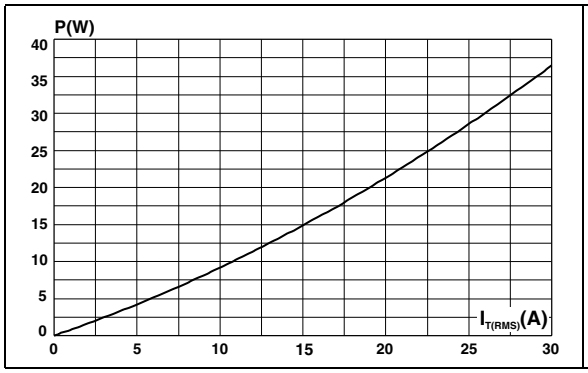


Figure 2. On-state rms current vs case temperature

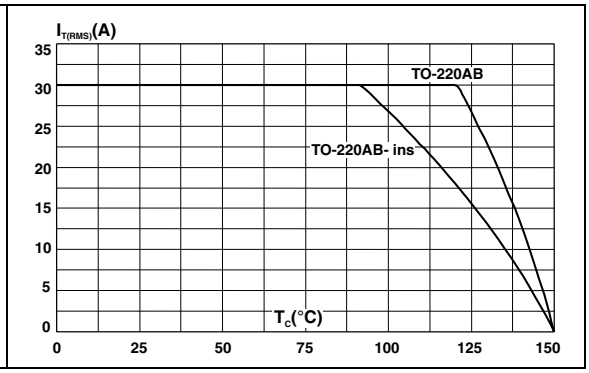


Figure 3. On-state rms current versus ambient temperature (free air convection)

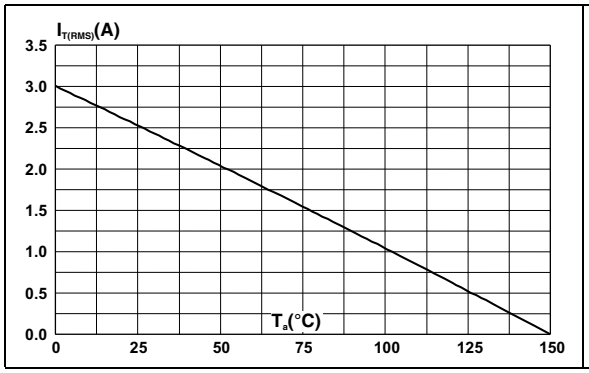


Figure 4. Relative variation of thermal impedance versus pulse duration

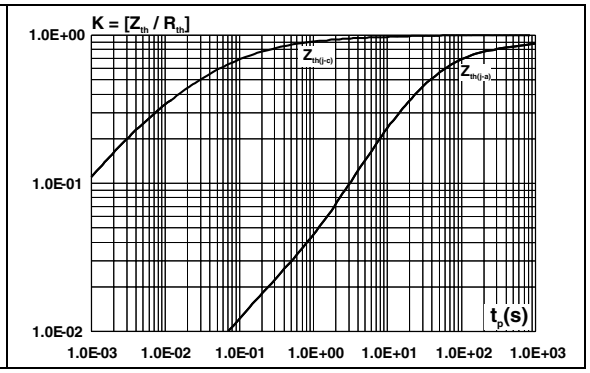


Figure 5. Relative variation of gate trigger current and gate trigger voltage versus junction temperature

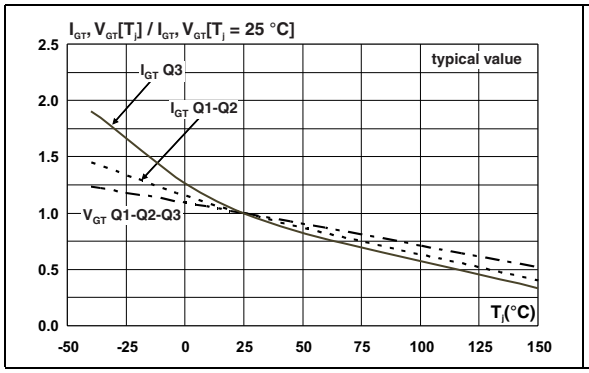


Figure 6. Relative variation of holding current and latching current vs junction temperature (typical value)

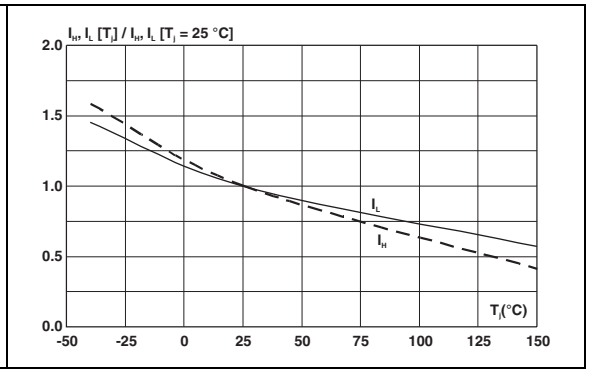


Figure 7. Surge peak on-state current vs number of cycles

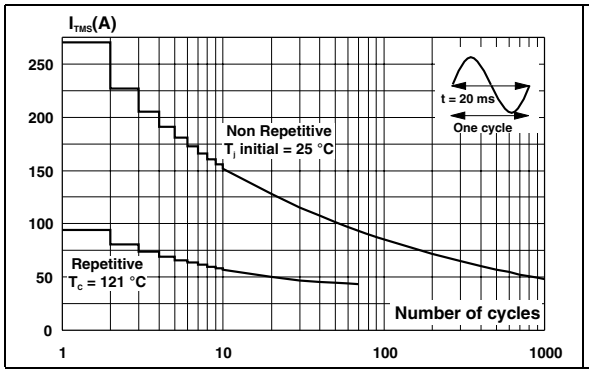


Figure 8. Non repetitive surge peak on-state current for a sinusoidal pulse

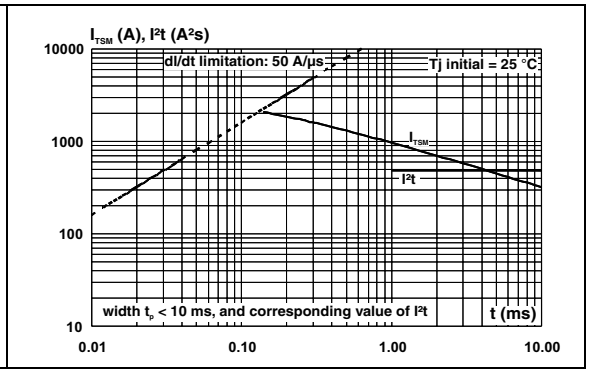


Figure 9. On state characteristics (maximum values)

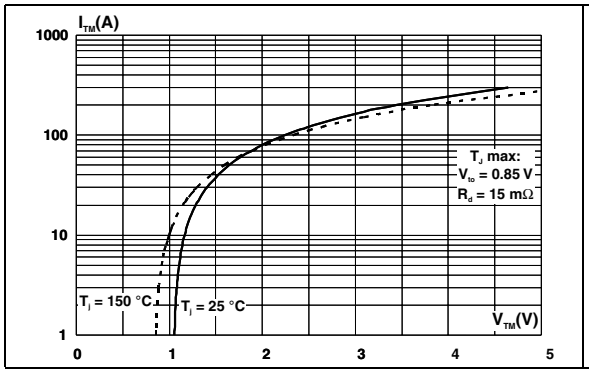


Figure 10. Relative variation of critical rate of decrease of main current vs junction temeprature

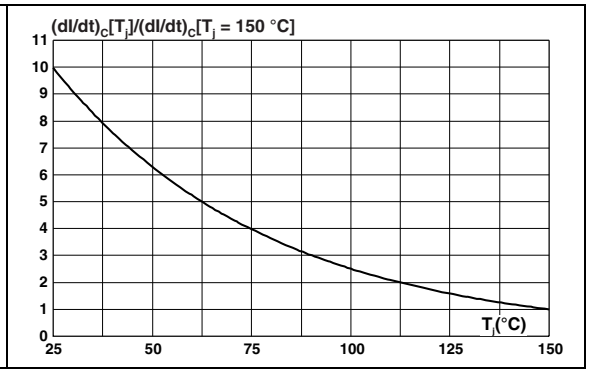


Figure 11. Relative variation of static dV/dt immunity vs junction temperature

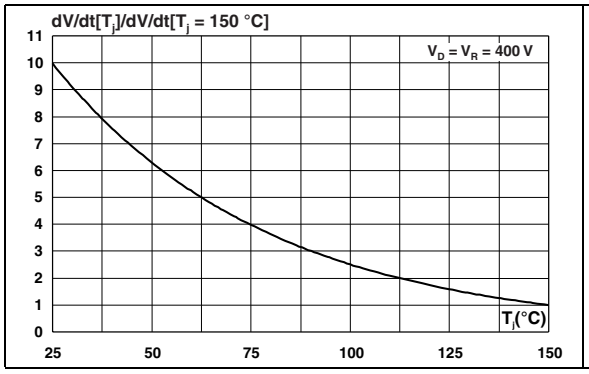


Figure 12. Relative variation of leakage current vs junction temperature for different values of blocking voltage

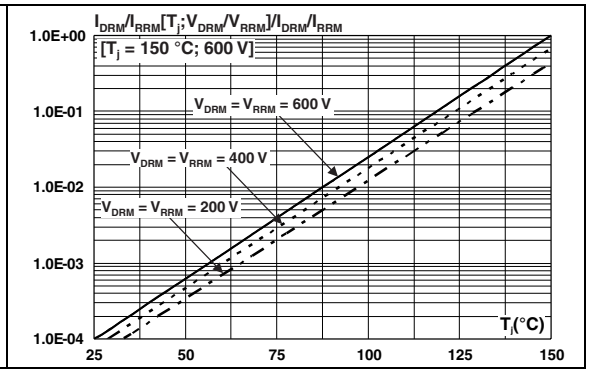
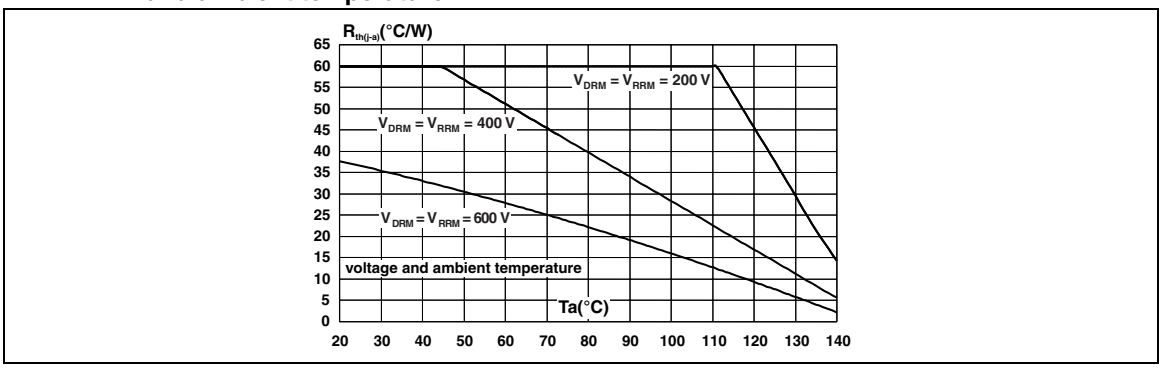


Figure 13. Acceptable junction to ambient thermal resistance vs repetitive peak off-state voltage and ambient temperature

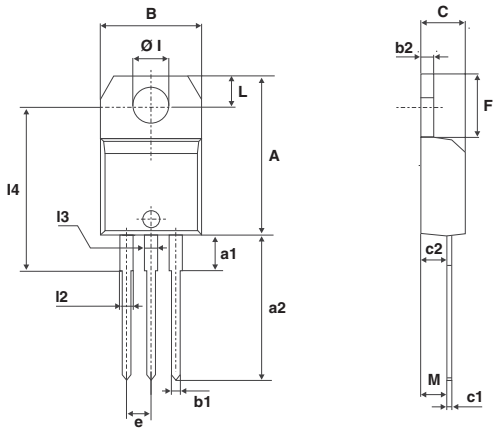


2 Package information

- 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.

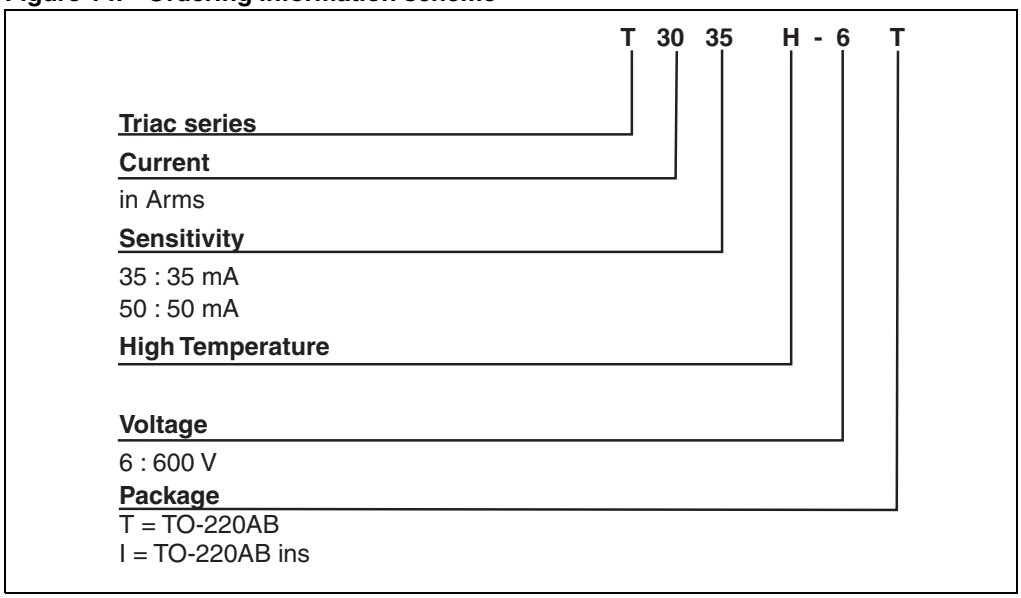
Table 6. TO-220AB (NIns. and Ins. 20-up) dimensions



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
T3035H-6T	T3035H 6T	TO-220AB	2.3 g	50	Tube
T3050H-6T	T3050H 6T				
T3035H-6I	T3035H 6I	TO-220AB Insulated			
T3050H-6I	T3050H 6I				

5 Revision history

Table 8. Document revision history

Date	Revision	Changes
28-Jan-2010	1	Initial release.
17-May-2010	2	Updated maximum T_j in *Table 2*.
14-Dec-2010	3	Updated I_{GT} in *Table 1*.

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