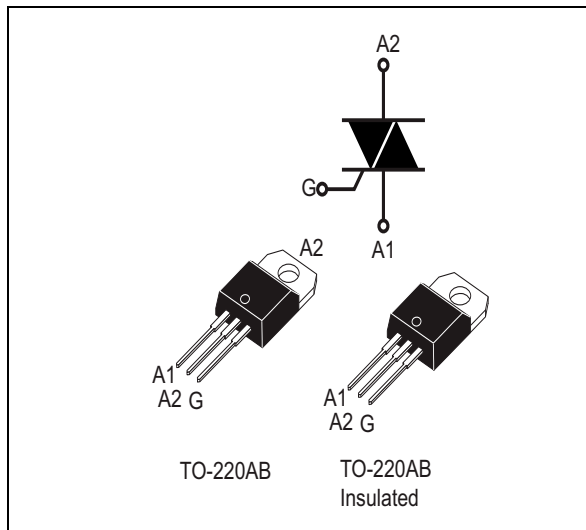


Snubberless™ high temperature 30 A Triacs

Datasheet – production data



Description

Specifically designed to operate at 150 °C, the new 30 A T3035H, T3050H 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 T3035H, T3050H 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 T3035H-6I, T3050H-6I provides voltage insulation (rated at 2500 V rms).

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
- UL certified (ref. file E81734)

Applications

Thanks to its high electrical noise immunity level and its strong current robustness, the T3035H, T3050H series is designed for the control of AC actuators in appliances and industrial systems.

Table 1. Device summary

Order code	Package	V_{DRM}/V_{RRM}	I_{GT}	$I_{T(RMS)}$
T3035H-6T	TO-220AB	600 V	35 mA	30 A
T3050H-6T			50 mA	
T3035H-6I	insulated		35 mA	
T3050H-6I			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)	TO-220AB	$T_c = 121\text{ °C}$	30	A
		TO-220AB insulated	$T_c = 92\text{ °C}$		
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 = 16.7ms	284	
I^2t	I^2t value for fusing	$t_p = 10\text{ ms}$		487	A ² s
V_{RSM}, V_{DSM}	Non repetitive surge peak off-state voltage	$t_p = 10\text{ }\mu\text{s}$	$T_j = 25\text{ °C}$	$V_{RRM}, V_{DRM} +100$	V
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}, t_r \leq 100\text{ ns}$	F = 120 Hz	$T_j = 150\text{ °C}$	50	A/ μs
I_{GM}	Peak gate current	$t_p = 20\text{ }\mu\text{s}$	$T_j = 150\text{ °C}$	4	A
$P_{G(AV)}$	Average gate power dissipation	$T_j = 150\text{ °C}$		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 ($T_j = 25\text{ °C}$, unless otherwise specified)

Symbol	Test conditions	Quadrant		Value		Unit
				T3035H	T3050H	
$I_{GT}^{(1)}$	$V_D = 12\text{ V } R_L = 33\text{ }\Omega$	I - II - III	MAX.	35	50	mA
V_{GT}		I - II - III	MAX.	1.0		V
V_{GD}	$V_D = V_{DRM} R_L = 3.3\text{ k}\Omega$	I - II - III	MIN.	0.15		V
$I_H^{(2)}$	$I_T = 500\text{ mA}$		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	$T_j = 150\text{ °C}$	MIN.	1000	1500	V/ μs
(dI/dt) _c ⁽²⁾	Without snubber	$T_j = 150\text{ °C}$	MIN.	33	44	A/ms

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	
$V_{TM}^{(1)}$	$I_{TM} = 42\text{ A}$	$t_p = 380\ \mu\text{s}$	$T_j = 25\text{ }^\circ\text{C}$	MAX.	1.55	V
$V_{to}^{(1)}$	Threshold voltage		$T_j = 150\text{ }^\circ\text{C}$	MAX.	0.85	V
$R_d^{(1)}$	Dynamic resistance		$T_j = 150\text{ }^\circ\text{C}$	MAX.	15	m Ω
I_{DRM}	$V_{DRM} = V_{RRM}$		$T_j = 25\text{ }^\circ\text{C}$	MAX.	10	μA
			$T_j = 150\text{ }^\circ\text{C}$		8.5	
I_{RRM}	$V_D/V_R = 400\text{V}$ (at peak mains voltage)		$T_j = 150\text{ }^\circ\text{C}$	MAX.	7	mA
					$V_D/V_R = 200\text{V}$ (at peak mains voltage)	

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	$^\circ\text{C/W}$
		TO-220AB Insul	1.6	
$R_{th(j-a)}$	Junction to ambient	TO-220AB / TO-220AB Insul	60	$^\circ\text{C/W}$

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

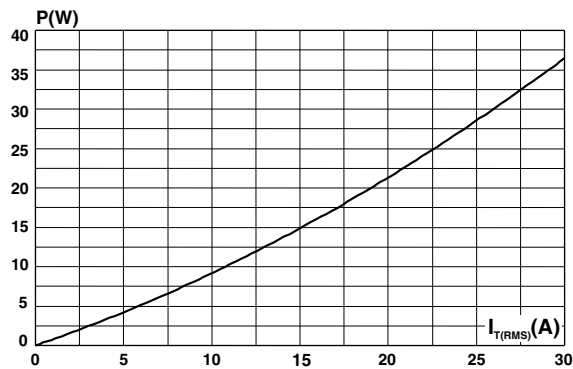


Figure 2. On-state rms current vs case temperature

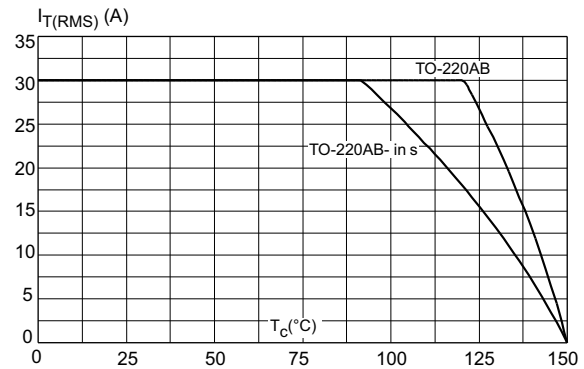


Figure 3. On-state rms current versus ambient temperature (free air convection)

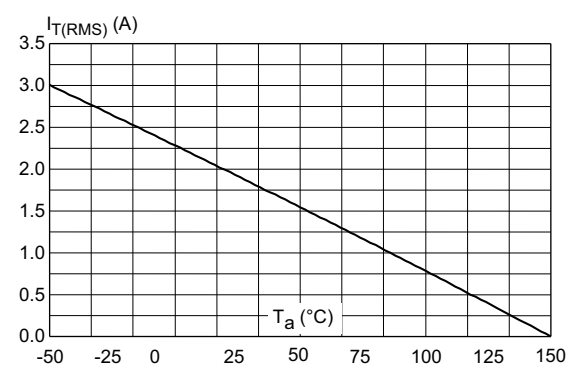


Figure 4. Relative variation of thermal impedance versus pulse duration

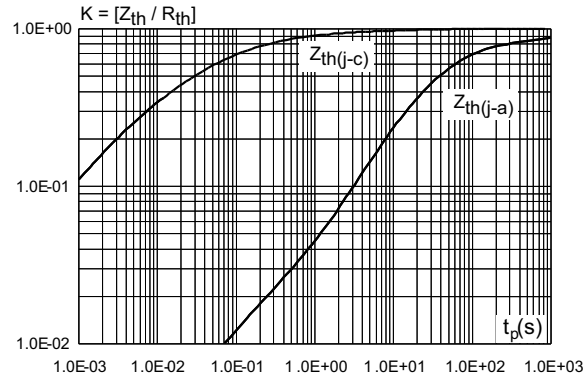


Figure 5. Relative variation of gate trigger current and gate trigger voltage versus junction temperature

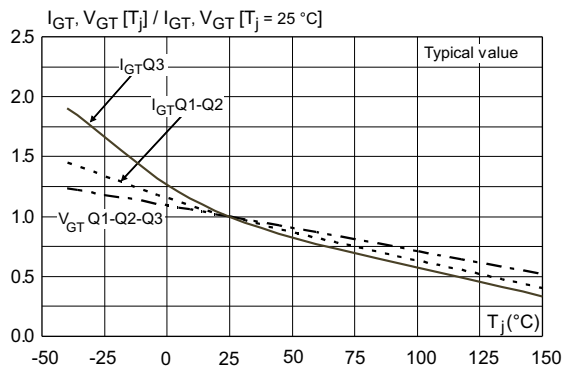


Figure 6. Relative variation of holding current and latching current vs junction temperature (typical value)

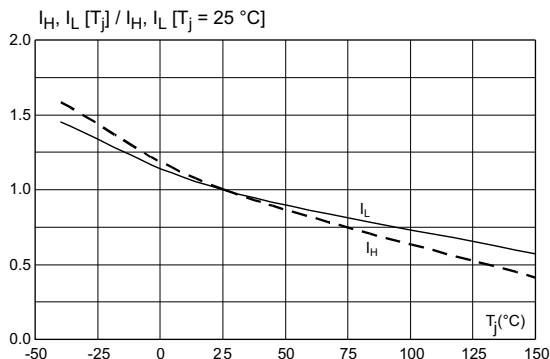


Figure 7. Surge peak on-state current vs number of cycles

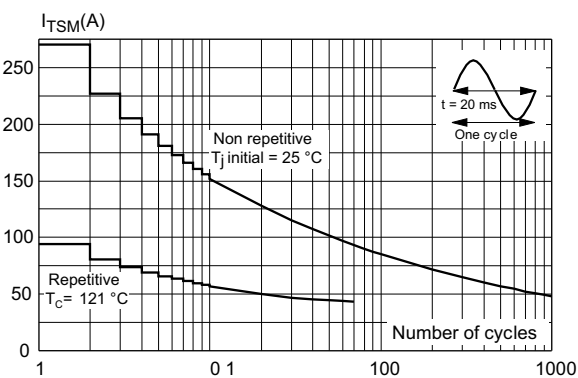


Figure 8. Non repetitive surge peak on-state current for a sinusoidal pulse

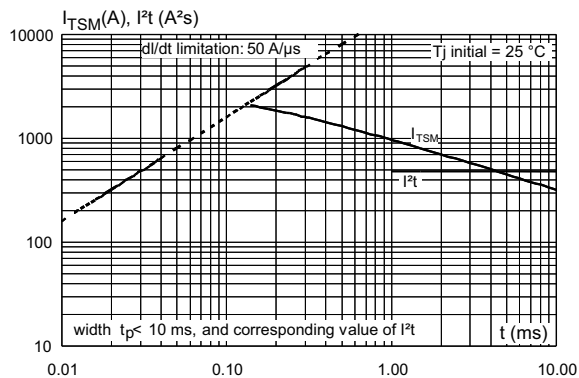


Figure 9. On state characteristics (maximum values)

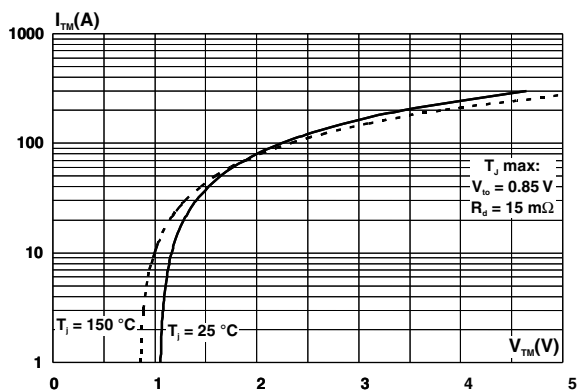


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

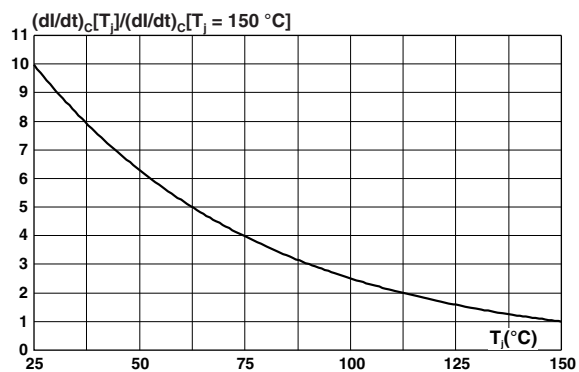


Figure 11. Relative variation of static dV/dt immunity vs junction temperature

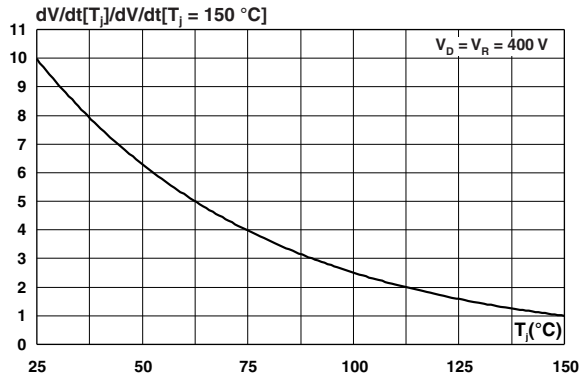


Figure 12. Relative variation of leakage current vs junction temperature for different values of blocking voltage

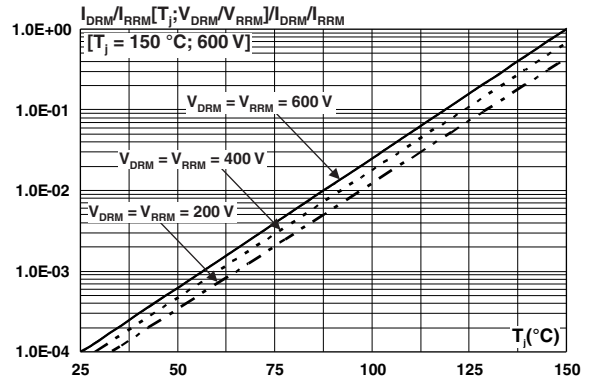
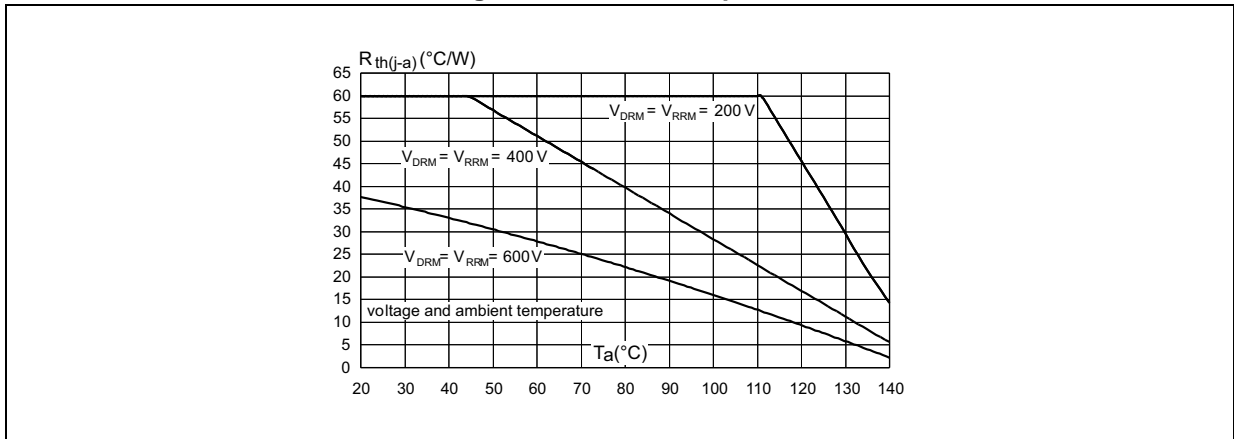


Figure 13. Acceptable junction to ambient thermal resistance versus repetitive peak off-state voltage and ambient temperature



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.

2.1 TO-220AB (insulated and non-insulated) package information

Figure 14. TO-220AB (insulated and non-insulated) dimension definitions

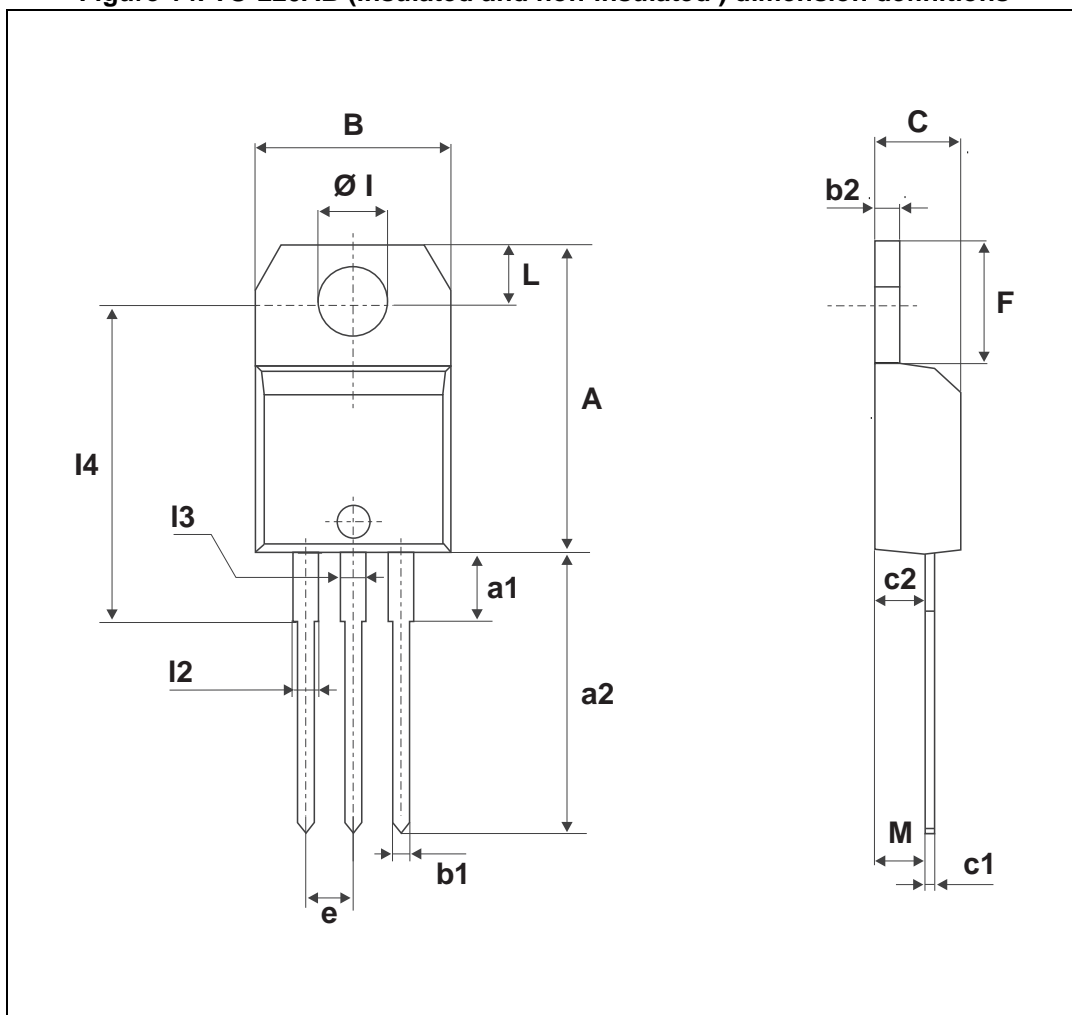


Table 6. TO-220AB package mechanical data

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	

3 Ordering information

Figure 15. Ordering information scheme

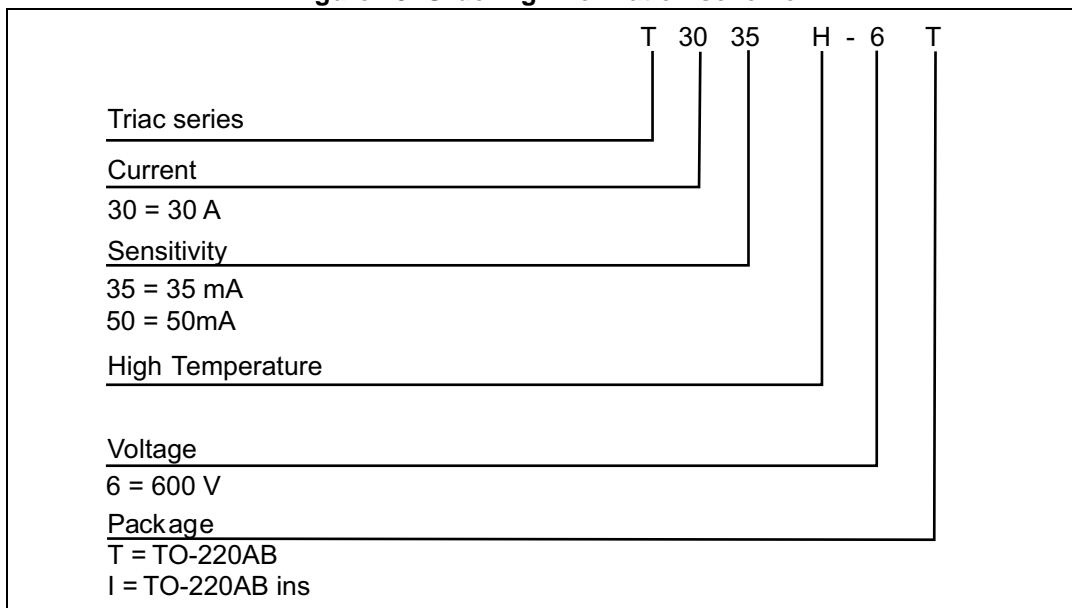


Table 7. Ordering information

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	2.3 g	50	Tube
T3050H-6I	T3050H 6I				

4 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 .
20-Sep-2011	4	Updated: Features .
21-Jul-2015	5	Update Table 2 and reformatted to current standard.

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