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T1010H-6G-TR

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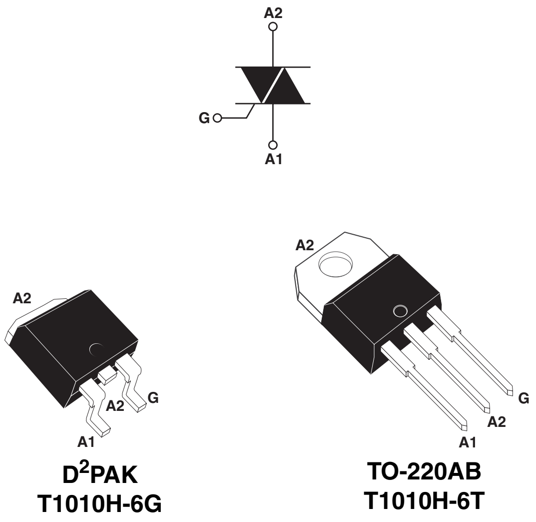
T1010H

High temperature 10 A sensitive TRIACs

Features

- Medium current TRIAC
- Logic level sensitive TRIAC
- 150 °C max. T_j turn-off commutation
- Clip bounding
- RoHS (2002/95/EC) compliant packages



Applications

- The T1010H is designed for the control of AC actuators in appliances and industrial systems.
- The multi-port drive of the microcontroller can control the multiple loads of such appliances and systems through these sensitive gate TRIACs.

Description

Specifically designed to operate at 150 °C, the new 10 A T1010H TRIACs provide an enhanced performance in terms of power loss and thermal dissipation. This allows the optimization of the heatsink size, leading to space and cost effectiveness when compared to electro-mechanical solutions.

Based on ST logic level technology, they offer an I_{GT} lower than 10 mA and specified minimal commutation and high noise immunity levels valid up to the T_j max.

Table 1. Device summary

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

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
I_{TSM}	Non repetitive surge peak on-state current (full cycle, T_j initial = 25 °C)	F = 60 Hz	t = 16.7 ms	105	A
		F = 50 Hz	t = 20 ms	100	
I^2t	I^2t Value for fusing	t_p = 10 ms		66	A^2s
dI/dt	Critical rate of rise of on-state current $I_G = 2 \times I_{GT}$, $t_r \leq 100$ 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	Min.	Max.	Unit
I_{GT}	V_D = 12 V R_L = 33 Ω	I - II - III	1	10	mA
V_{GT}		I - II - III		1.0	V
V_{GD}	$V_D = V_{DRM}$, R_L = 3.3 kΩ	I - II - III	0.15		V
I_H (1)	I_T = 100 mA			25	mA
I_L	$I_G = 1.2\ I_{GT}$	I - III		30	mA
		II		35	
dV/dt (1)	V_D = 67% V_{DRM}, gate open, T_j = 150 °C		75		V/µs
(dI/dt)c (1)	Logic level, 0.1 V/µs, T_j = 150 °C		14.4		A/ms
	Logic level, 15 V/µs, T_j = 150 °C		3.8		

1. For both polarities of A2 referenced to A1.

Table 4. Static characteristics

Symbol	Test conditions			Value	Unit
V_T (1)	I_{TM} = 14.1 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.	41.0	mΩ
I_{DRM} I_{RRM}	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.

Table 5. Thermal resistance

Symbol	Parameter			Value	Unit
$R_{th(j-c)}$	Junction to case (AC)		D^2PAK / TO-220AB	1.50	°C/W
$R_{th(j-a)}$	Junction to ambient	S = 1 cm^2	D^2PAK	45	
			TO-220AB	60	

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

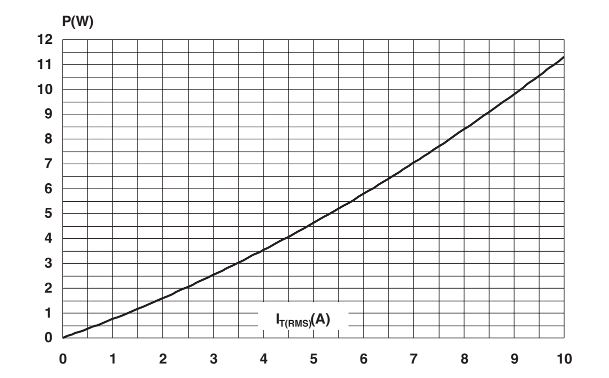


Figure 2. On-state rms current versus case temperature (full cycle)

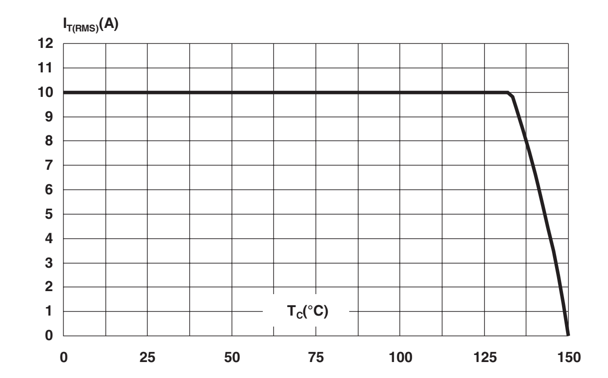


Figure 3. On-state rms current versus ambient temperature (free air convection, (full cycle)

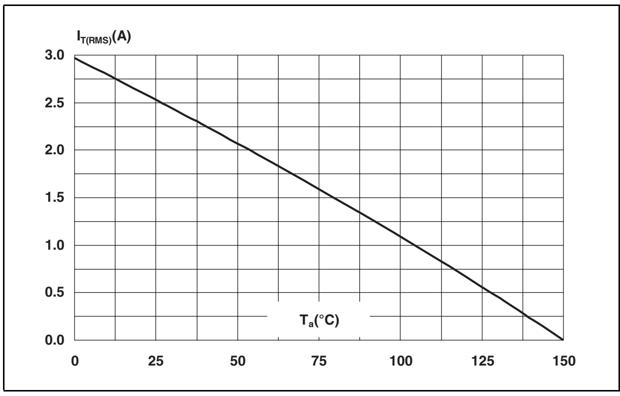


Figure 4. Relative variation of thermal impedance, versus pulse duration

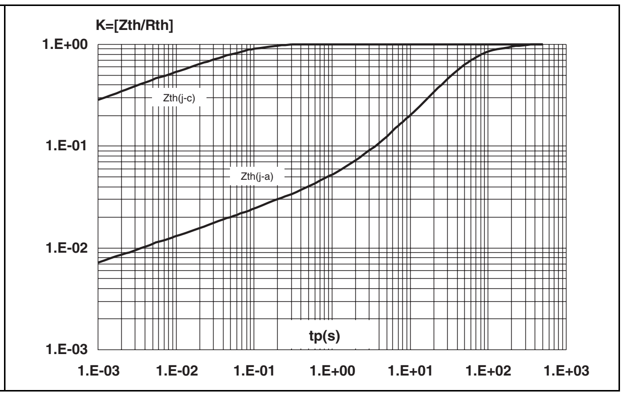


Figure 5. Relative variation of gate trigger current and voltage versus junction temperature (typical values)

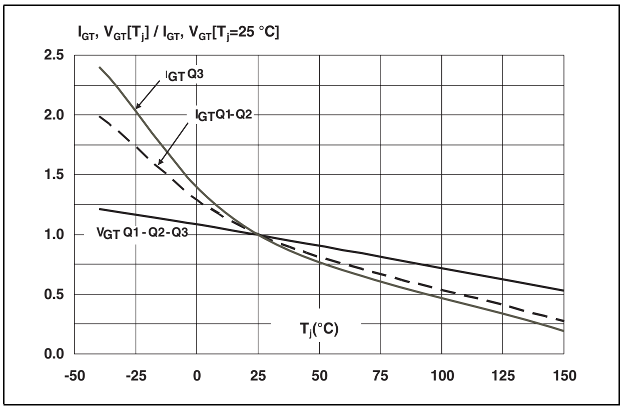


Figure 6. Relative variation of holding and latching current versus junction temperature (typical values)

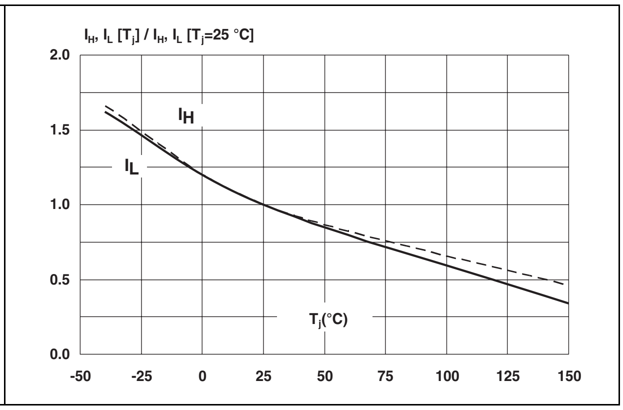


Figure 7. Surge peak on-state current versus number of cycles

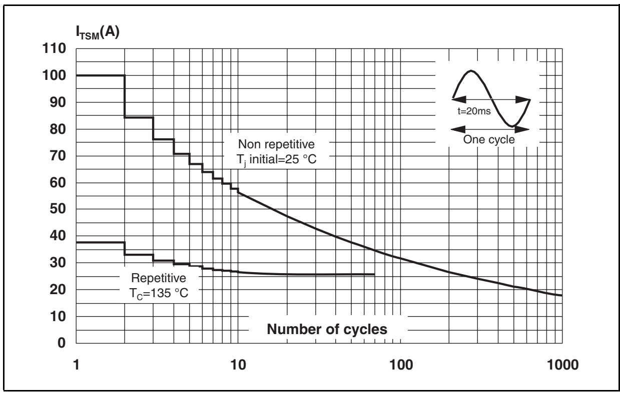


Figure 8. Non-repetitive surge peak on-state current and corresponding value of I^2t

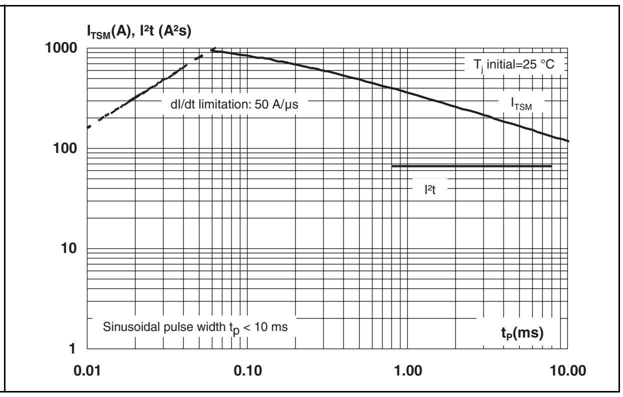


Figure 9. On-state characteristics (maximum values)

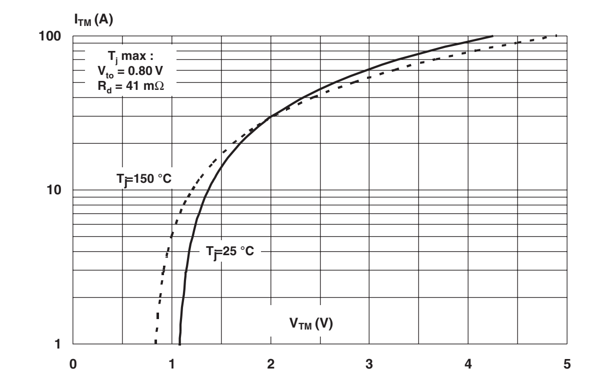


Figure 10. Relative variation of critical rate of decrease of main current versus junction temperature

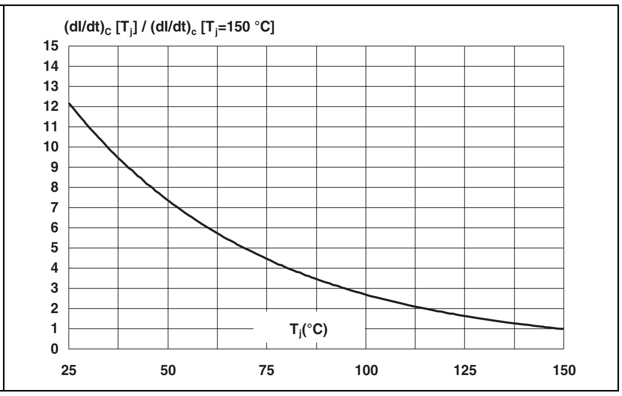


Figure 11. Relative variation of critical rate of decrease of main current versus reapplied dV/dt (typical values)

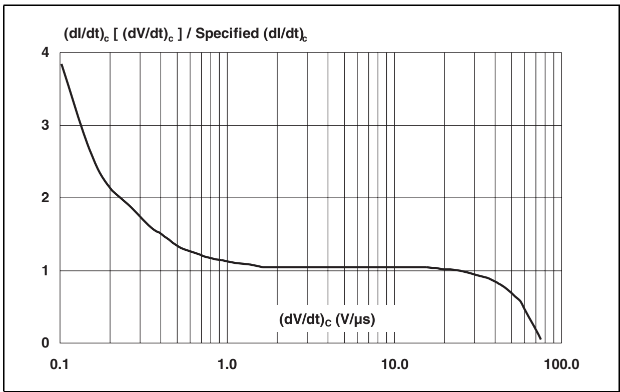


Figure 12. Relative variation of static dV/dt immunity versus junction temperature

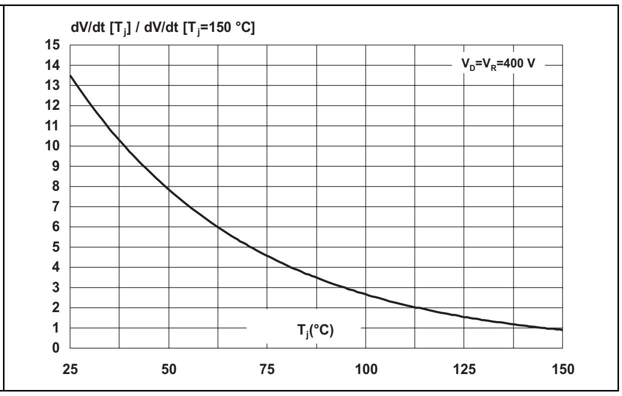


Figure 13. Variation of leakage current versus junction temperature for different values of blocking voltage

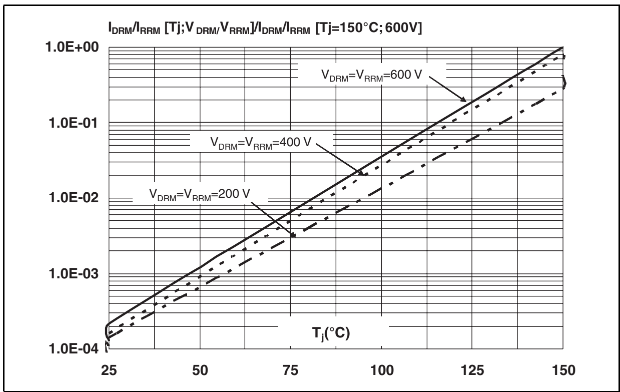
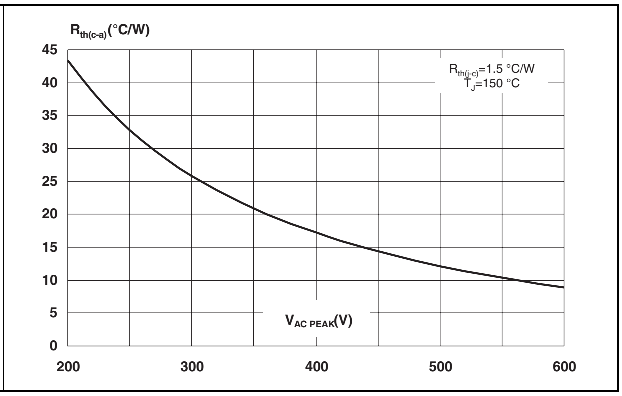
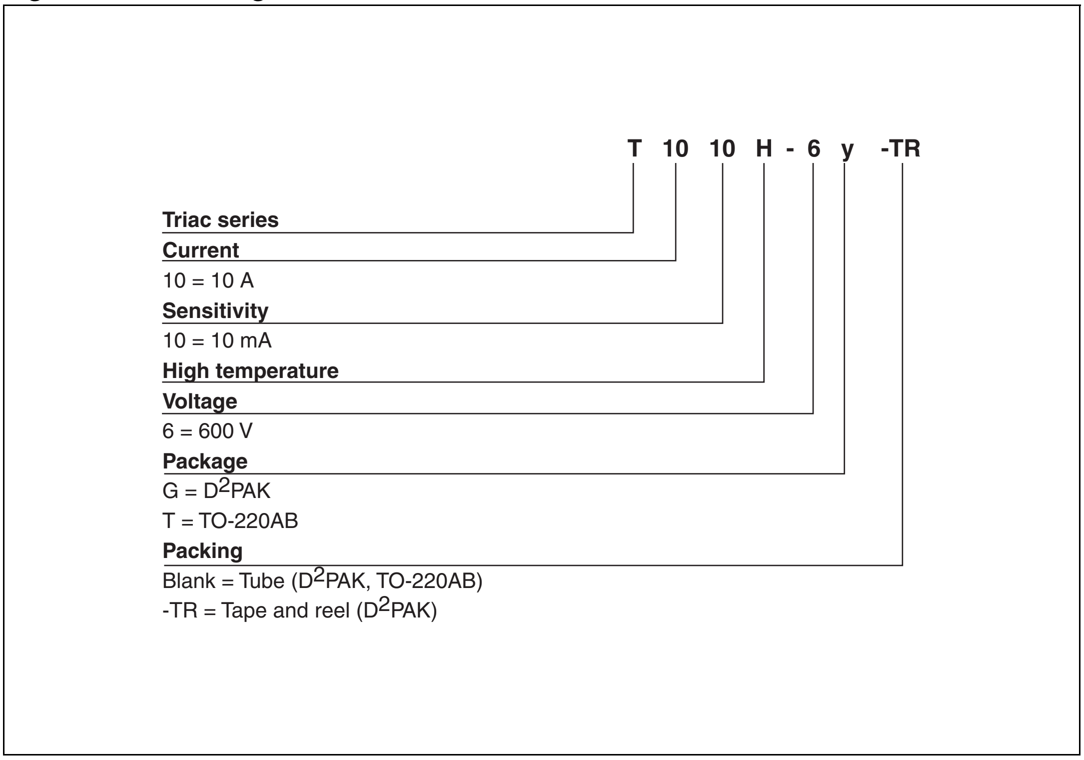


Figure 14. Acceptable case to ambient thermal resistance versus repetitive peak off-state voltage



2 Ordering information scheme

Figure 15. Ordering information scheme

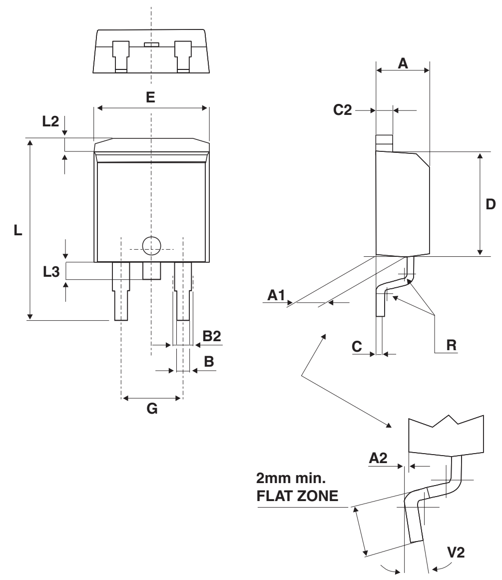


3 Package information

- 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 16. Footprint (dimensions in mm)

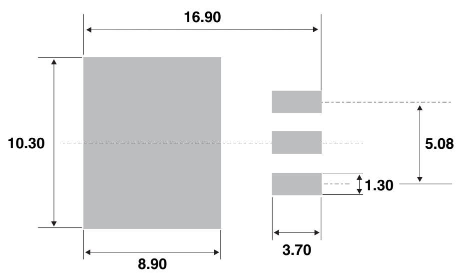
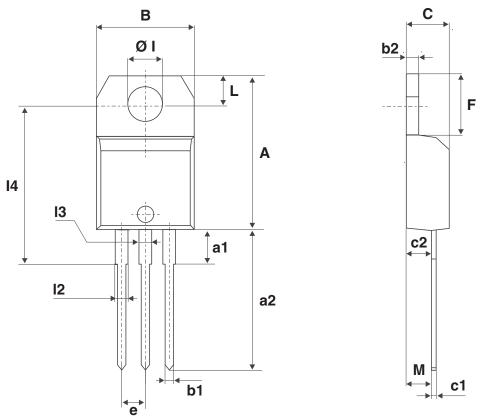


Table 7. TO-220AB dimensions



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
l2	1.14		1.70	0.044		0.066
l3	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
T1010H-6G	T1010H 6G	D^2PAK	1.5 g	50	Tube
T1010H-6G-TR	T1010H 6G	D^2PAK	1.5 g	1000	Tape and reel
T1010H-6T	T1010H 6T	TO-220AB	2.3 g	50	Tube

5 Revision history

Table 9. Document revision history

Date	Revision	Changes
15-May-2009	1	First issue.