

1. General description

Planar passivated high commutation three quadrant triac in a SOT54 (TO-92) plastic package. This "series DN" triac balances the requirements of commutation performance and gate sensitivity and is intended for interfacing with low power drivers and logic ICs including microcontrollers.

2. Features and benefits

- 3Q technology for improved noise immunity
- Direct gate triggering from low power drivers and logic ICs
- High commutation capability with very sensitive gate
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only
- Very sensitive gate for easy logic level triggering

3. Applications

- Low power motor controls
- Small inductive loads e.g. solenoids, door locks, water valves
- Small loads in large white goods

4. Quick reference data

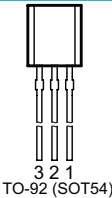
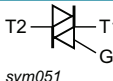
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
Absolute maximum rating				
V_{DRM}	repetitive peak off-state voltage		1000	V
$I_{\text{T(RMS)}}$	RMS on-state current	square-wave pulse; $T_{\text{lead}} \leq 57\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	0.8	A
I_{TSM}	non-repetitive peak forward current	full sine wave; $t_p = 20\text{ ms}$; $T_{\text{j(init)}} = 25\text{ °C}$; Fig. 4 ; Fig. 5	9	A
		full sine wave; $t_p = 16.7\text{ ms}$; $T_{\text{j(init)}} = 25\text{ °C}$	9.9	A
T_{j}	junction temperature		125	°C

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+ $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	0.25	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G- $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	0.25	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G- $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	0.25	-	5	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9	-	-	10	mA
V_T	on-state voltage	$I_T = 0.85\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10	-	1.3	1.6	V
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 670\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	-	150	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 0.8\text{ A}$; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$; gate open circuit;	0.5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 0.8\text{ A}$; $dV_{com}/dt = 1\text{ V}/\mu\text{s}$; gate open circuit	1	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T2	main terminal 2	 TO-92 (SOT54)	 sym051
2	G	gate		
3	T1	main terminal 1		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA2008-1000DN	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

7. Marking

Table 4. Marking codes

Type number	Marking codes
BTA2008-1000DN	BTA2008-1000DN

8. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Values	Unit
V_{DRM}	repetitive peak off-state voltage		1000	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{lead}} \leq 57^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	0.8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $t_p = 20 \text{ ms}$; $T_{\text{j(init)}} = 25^\circ\text{C}$; Fig. 4 ; Fig. 5	9	A
		full sine wave; $t_p = 16.7 \text{ ms}$; $T_{\text{j(init)}} = 25^\circ\text{C}$	9.9	A
I^2t	I^2t for fusing	$t_p = 10 \text{ ms}$; sine wave	0.41	A^2/s
dI_{T}/dt	rate of rise of on-state current	$I_{\text{G}} = 10 \text{ mA}$	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current		1	A
P_{GM}	peak gate power		2	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	0.1	W
T_{stg}	storage temperature		-40 to 150	$^\circ\text{C}$
T_{j}	junction temperature		125	$^\circ\text{C}$

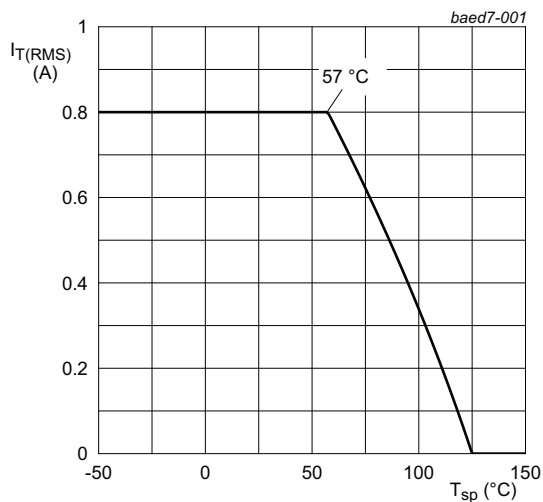
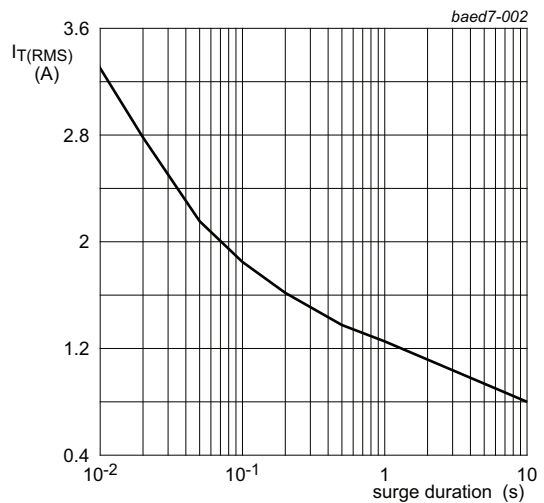


Fig. 1. RMS on-state current as a function of solder point temperature; maximum values



$f = 50 \text{ Hz}$; $T_{\text{lead}} = 57^\circ\text{C}$

Fig. 2. RMS on-state current as a function of surge duration; maximum values

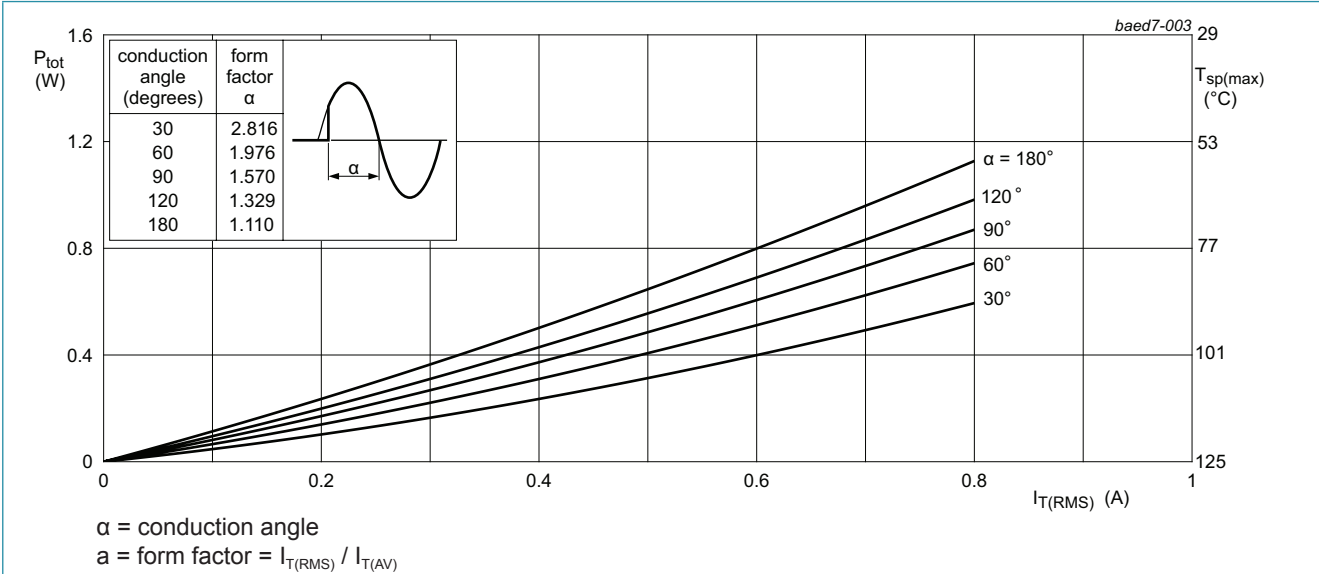


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

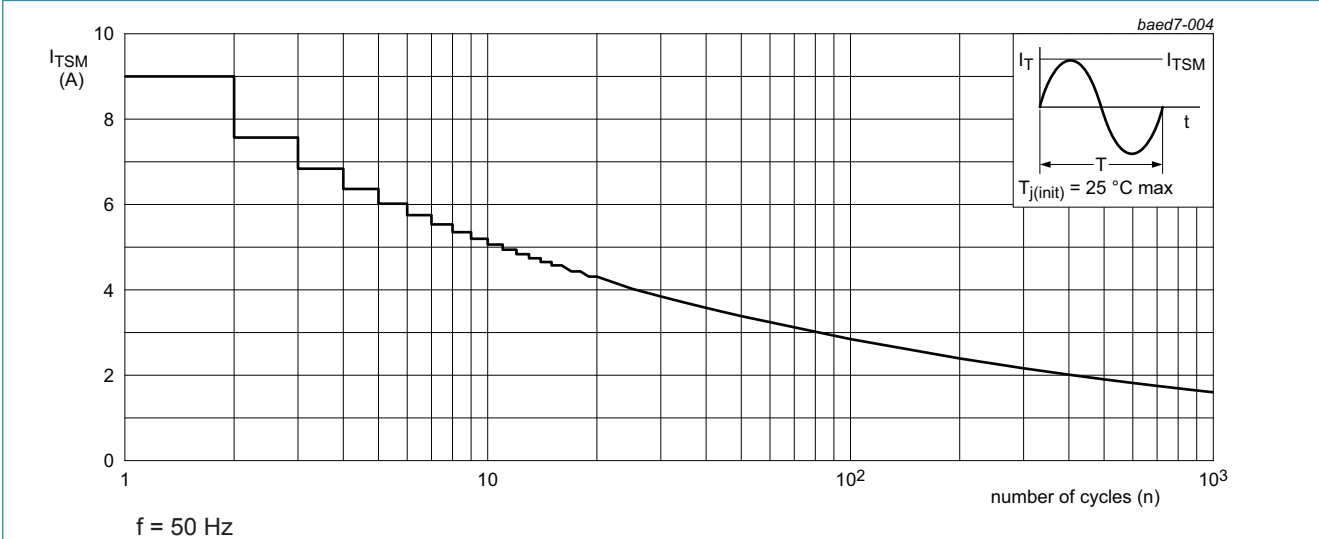


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

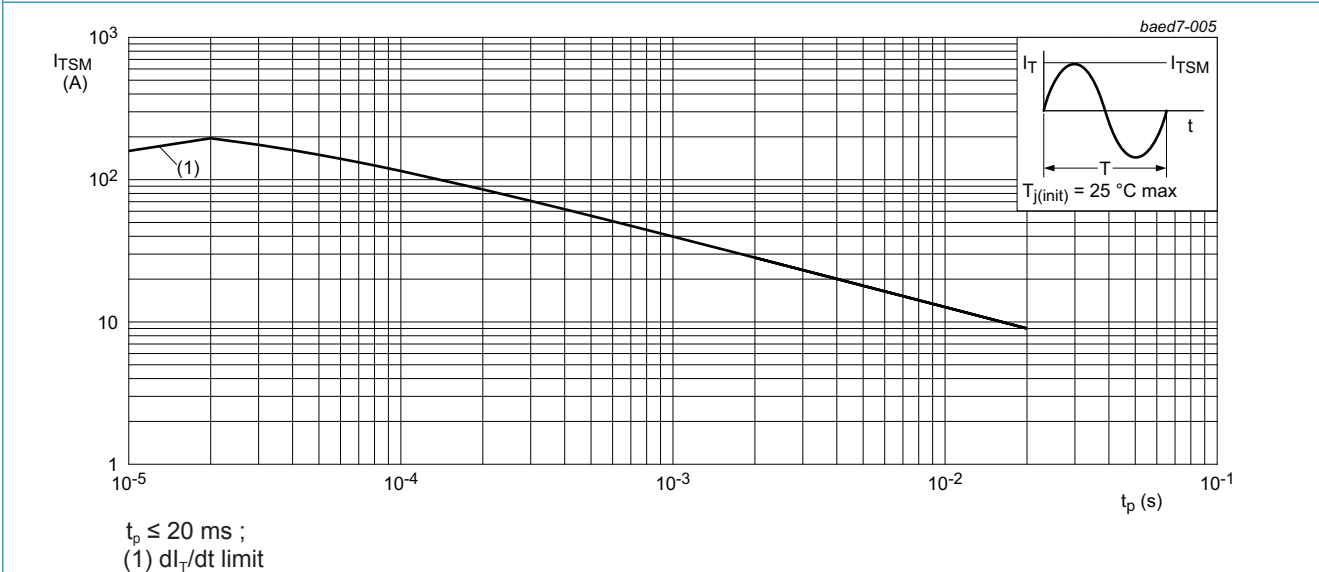


Fig. 5. Total power dissipation as a function of RMS on-state current; maximum values

9. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	Fig. 6		-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	150	-	K/W

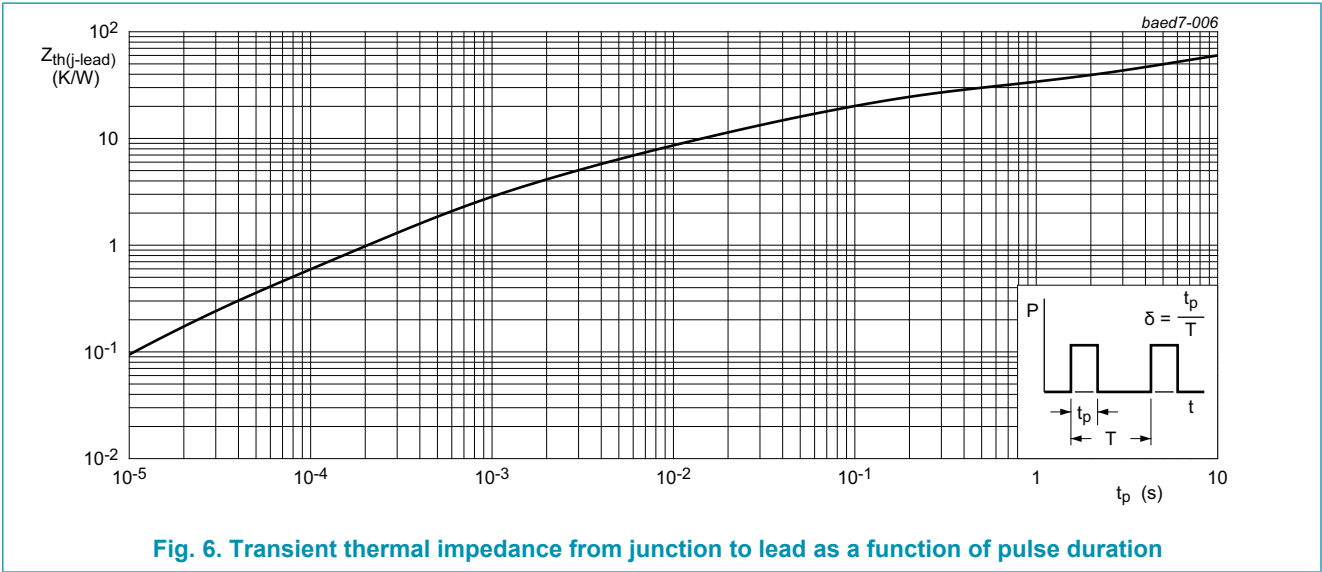
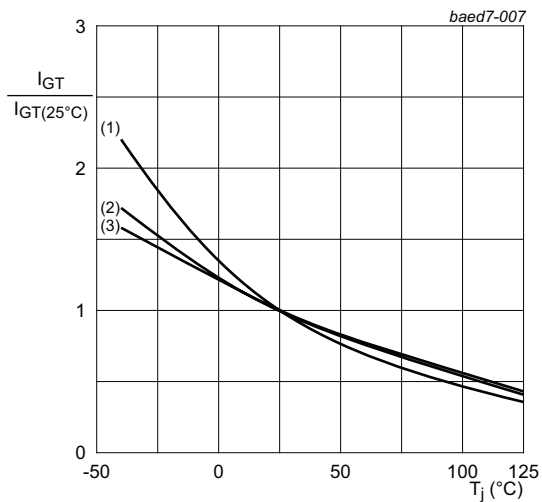


Fig. 6. Transient thermal impedance from junction to lead as a function of pulse duration

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _J = 25 °C; Fig. 7		0.25	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _J = 25 °C; Fig. 7		0.25	-	5	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _J = 25 °C; Fig. 7		0.25	-	5	mA
I _L	latching current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _J = 25 °C; Fig. 8		-	-	10	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _J = 25 °C; Fig. 8		-	-	20	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _J = 25 °C; Fig. 8		-	-	10	mA
I _H	holding current	V _D = 12 V; T _J = 25 °C; Fig. 9		-	-	10	mA
V _T	on-state voltage	I _T = 0.85 A; T _J = 25 °C; Fig. 10		-	1.3	1.6	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C; Fig. 11		-	0.85	1	V
		V _D = 400 V; I _T = 0.1 A; T _J = 125 °C; Fig. 11		0.2	0.3	-	V
I _D	off-state current	V _D = 1000 V; T _J = 25 °C		-	-	10	μA
		V _D = 1000 V; T _J = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 670 V; T _J = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		-	150	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _J = 125 °C; I _{T(RMS)} = 0.85 A; dV _{com} /dt = 10 V/μs; gate open circuit		0.5	-	-	A/ms
		V _D = 400 V; T _J = 125 °C; I _{T(RMS)} = 0.85 A; dV _{com} /dt = 1 V/μs; gate open circuit		1	-	-	A/ms



- (1) T2- G-
(2) T2+ G-
(3) T2+ G+

Fig. 7. Normalized gate trigger current as a function of junction temperature

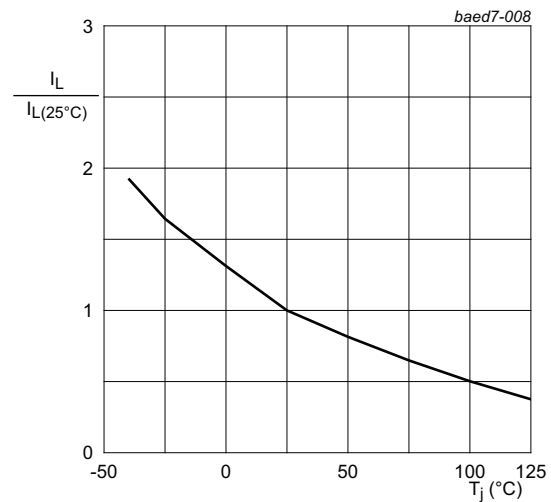


Fig. 8. Normalized latching current as a function of junction temperature

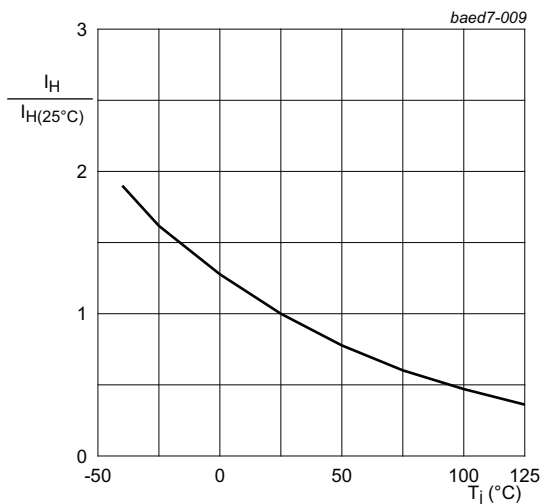
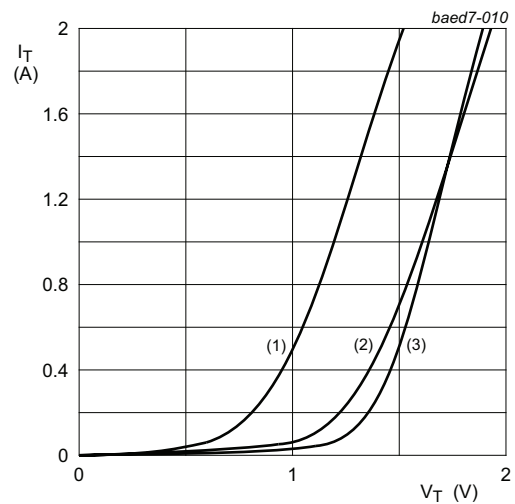


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.220 \text{ V}$; $R_s = 0.3875 \Omega$

(1) $T_J = 125^{\circ}C$; typical values

(2) $T_J = 125^{\circ}C$; maximum values

(3) $T_J = 25^{\circ}C$; maximum values

Fig. 10. On-state current as a function of on-state voltage

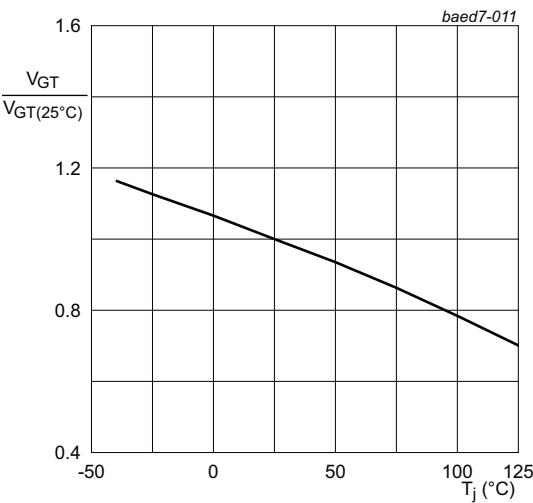
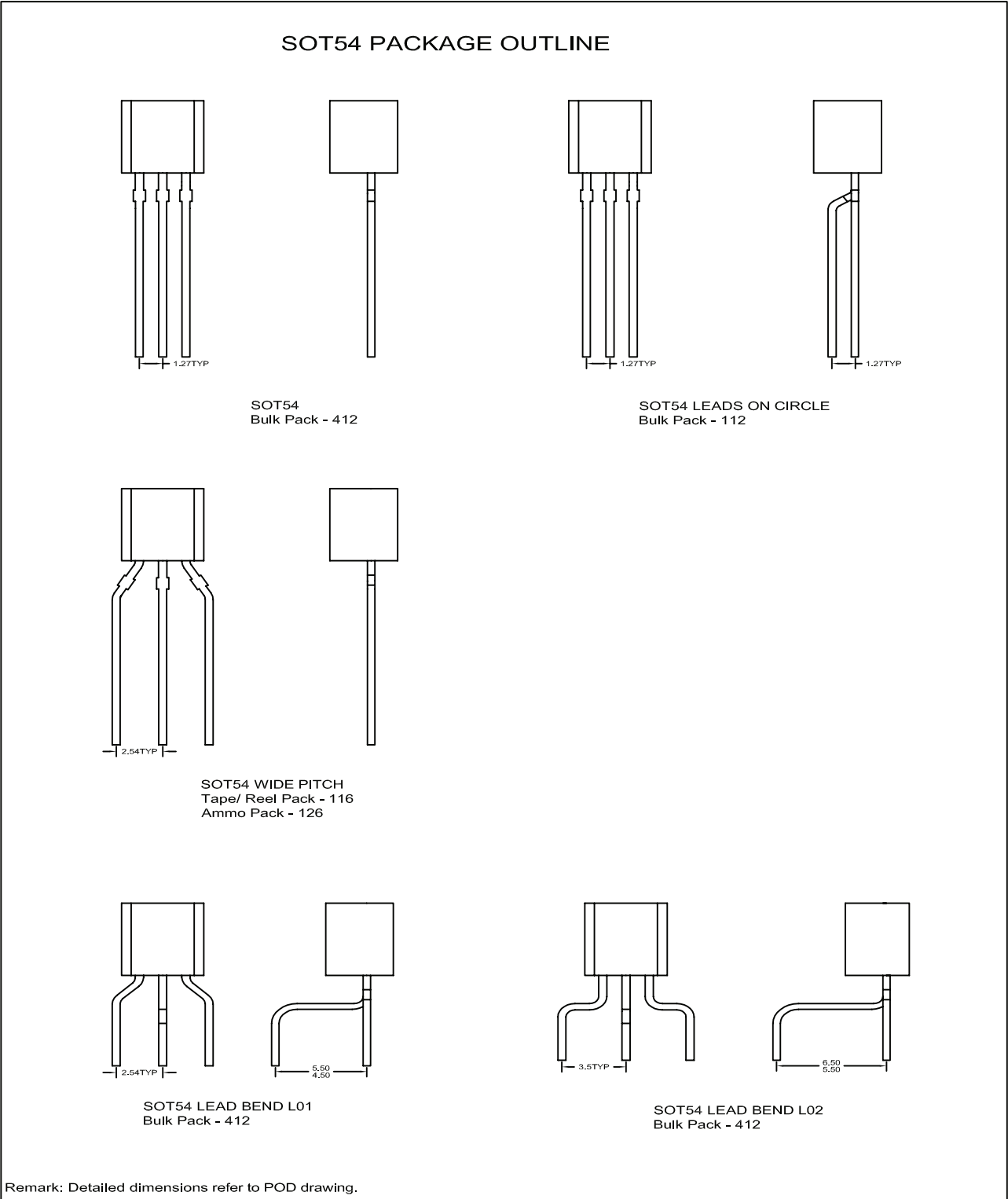


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline



12. Legal information

Data sheet status

Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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