



BTA201-800B

3Q Hi-Com Triac

11 June 2014

Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT54 (TO-92) plastic package. This "series B" triac is designed to commutate the full RMS current at the maximum junction temperature without the aid of a snubber.

2. Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High voltage capability
- Less sensitive gate for highest noise immunity
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only
- Very high immunity to false turn-on by dV/dt

3. Applications

- General purpose motor control
- Small loads in washing machines
- Solenoid drivers

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	800	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 20 \text{ ms}$; Fig. 4 ; Fig. 5		-	-	12.5	A
$I_{T(\text{RMS})}$	RMS on-state current	full sine wave; $T_{\text{lead}} \leq 54^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	1	A
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G+; $T_j = 25^\circ\text{C}$; Fig. 7		5	-	50	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G-; $T_j = 25^\circ\text{C}$; Fig. 7		5	-	50	mA



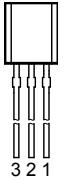
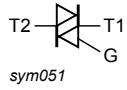
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Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; $T_2 - G -$; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7		5	-	50	mA

5. Pinning information

Table 2. Pinning information

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

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA201-800B	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

7. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{lead} \leq 54^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 16.8 \text{ ms}$		-	13.7	A
		full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 20 \text{ ms}$; Fig. 4 ; Fig. 5		-	12.5	A
I^2t	I^2t for fusing	$t_p = 10 \text{ ms}$; SIN		-	0.78	A^2s
dl_T/dt	rate of rise of on-state current	$I_T 1.5 \text{ A}$; $I_G 0.2 \text{ A}$; $dl_G/dt = 0.2 \text{ A}/\mu\text{s}$		-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			-	2	A
P_{GM}	peak gate power			-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period		-	0.1	W
T_j	junction temperature			-40	125	$^\circ\text{C}$

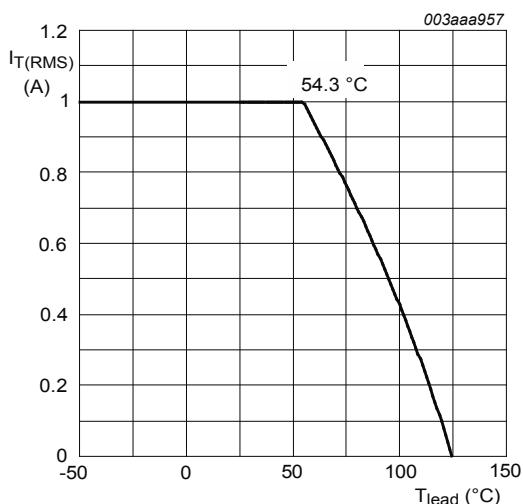
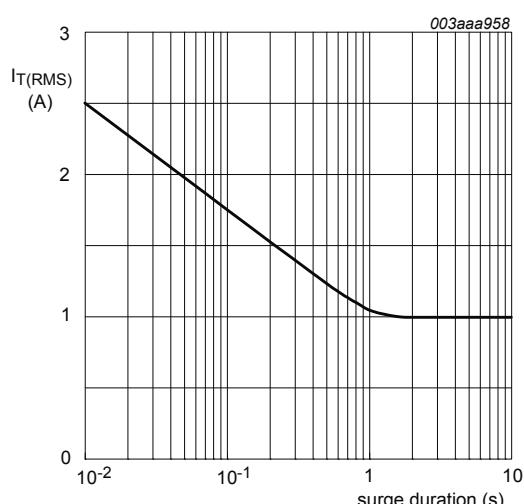
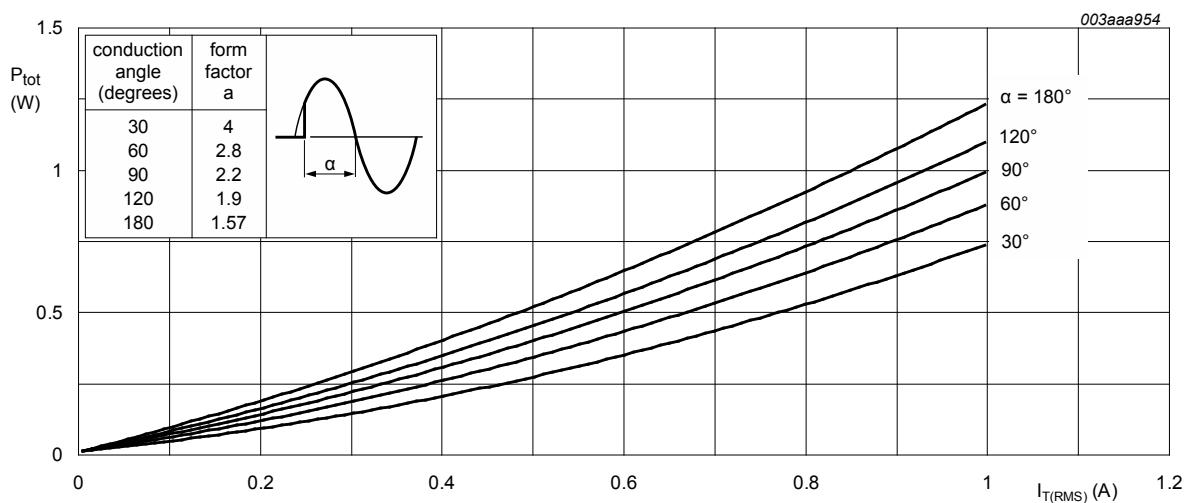


Fig. 1. RMS on-state current as a function of lead temperature; maximum values



$f = 50 \text{ Hz}; T_{lead} = 54^\circ\text{C}$

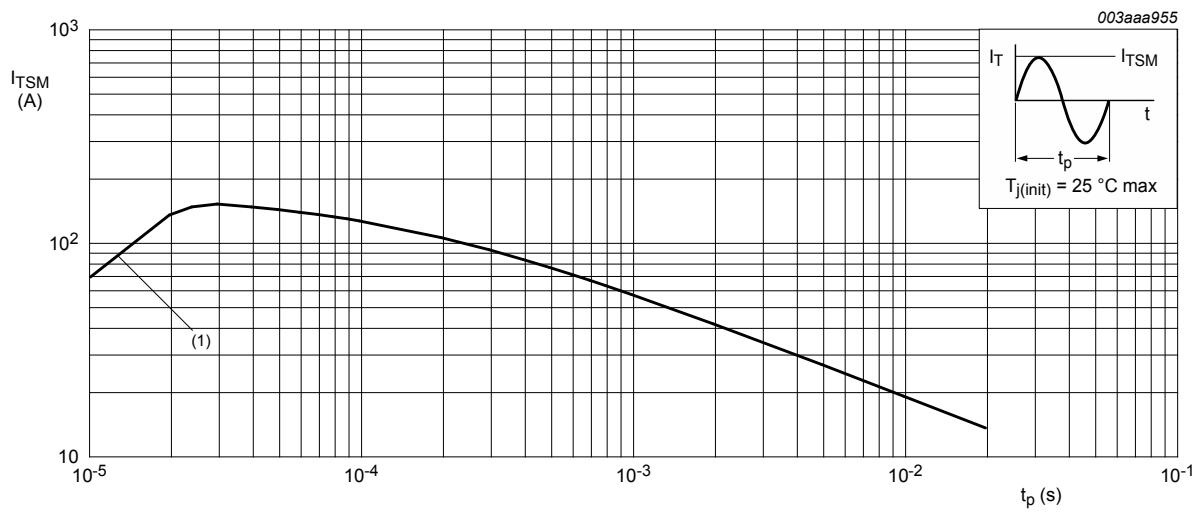
Fig. 2. RMS on-state current as a function of surge duration; maximum values



α = conduction angle

a = form factor = $I_{T(\text{RMS})} / I_{T(\text{AV})}$

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



$t_p \leq 20$ ms

(1) dI_T/dt limit

Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

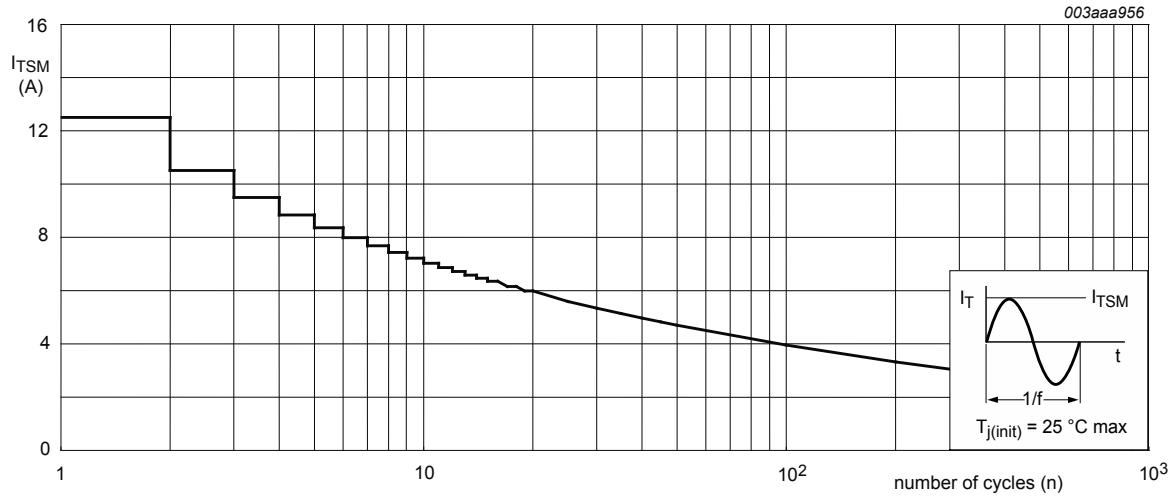
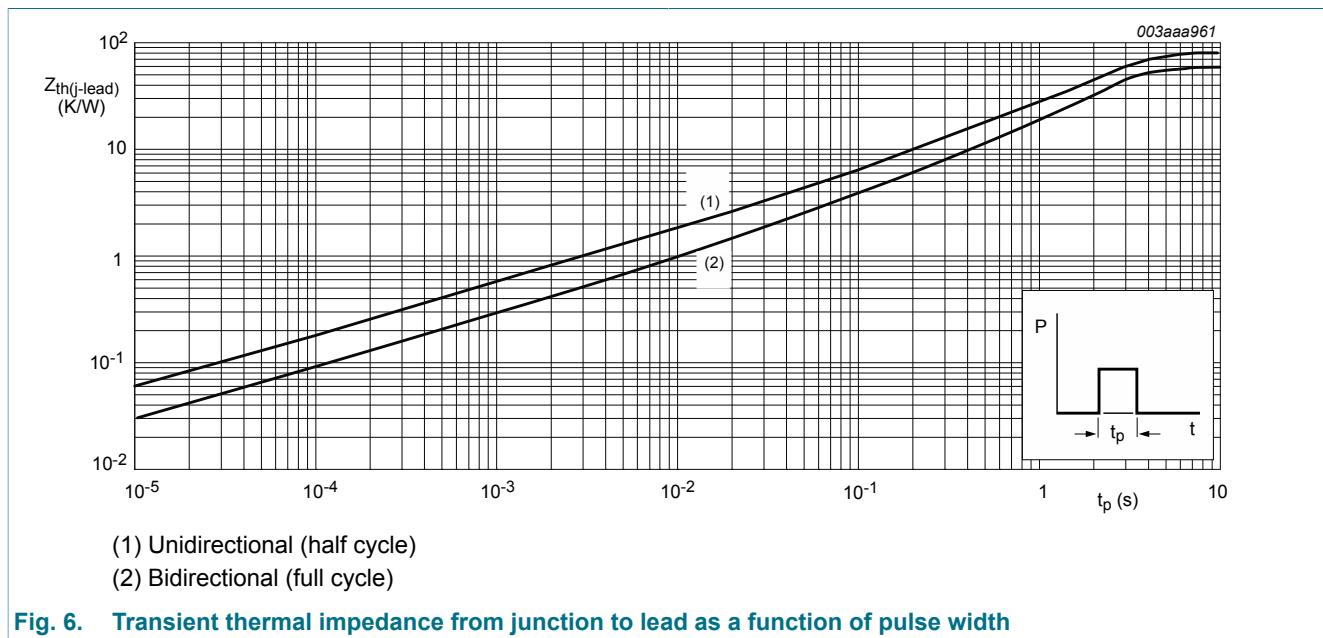


Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	full cycle; Fig. 6	-	-	60	K/W
		half cycle; Fig. 6	-	-	80	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed circuit board mounted; lead length = 4 mm	-	150	-	K/W



9. Characteristics

Table 6. 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		5	-	50	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7		5	-	50	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7		5	-	50	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 8		-	-	30	mA
		V _D = 12 V; I _G = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 8		-	-	50	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; Fig. 8		-	-	30	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 9		-	-	30	mA
V _T	on-state voltage	I _T = 1.4 A; T _j = 25 °C; Fig. 10		-	1.2	1.5	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _j = 25 °C; Fig. 11		-	0.7	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 = 800 V; T _j = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} 536 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit; Fig. 12		1000	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 1 A; dV _{com} /dt = 20 V/s; (snubberless condition); gate open circuit		12	-	-	A/ms
		V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 1 A; dV _{com} /dt = 10 V/μs; gate open circuit		16	-	-	A/ms

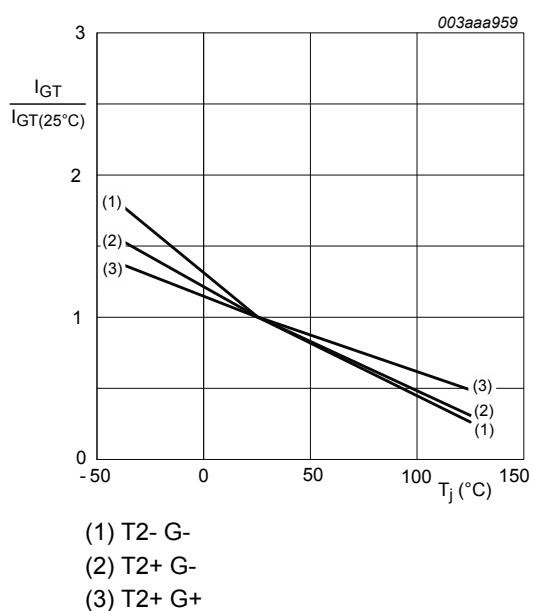


Fig. 7. Normalized gate trigger current as a function of junction temperature

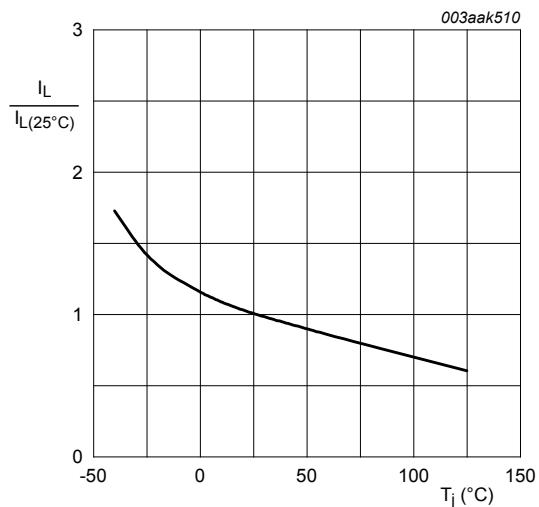


Fig. 8. Normalized latching current as a function of junction temperature

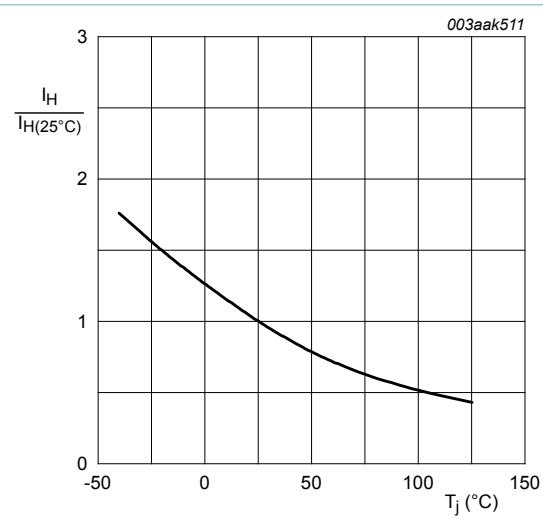


Fig. 9. Normalized holding current as a function of junction temperature

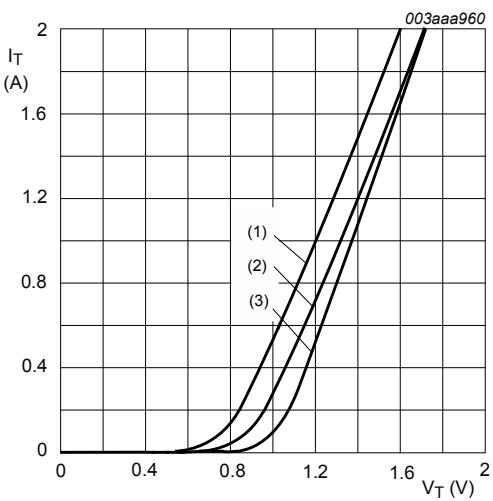


Fig. 10. On-state current as a function of on-state voltage

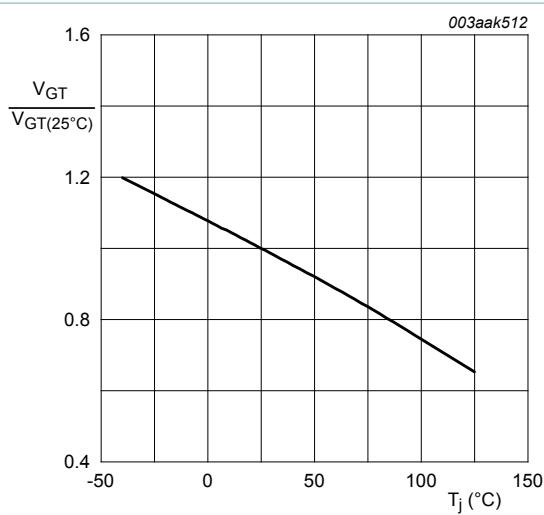


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

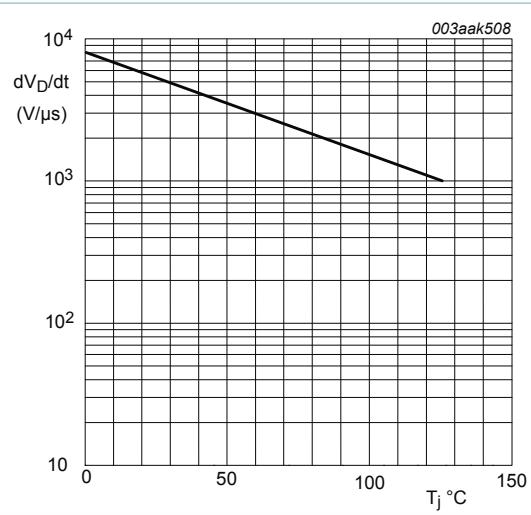
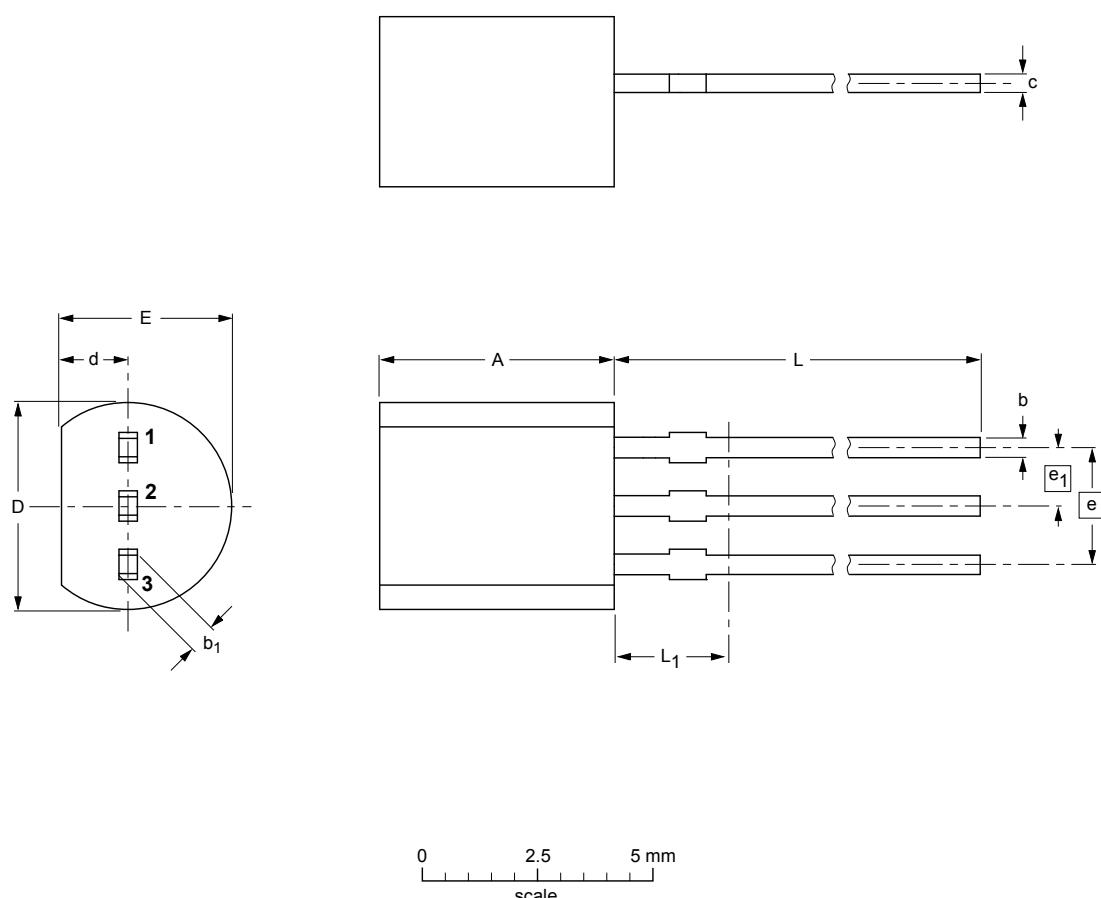


Fig. 12. Critical rate of rise of off-state voltage as a function of junction temperature; minimum values

10. Package outline

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b_1	c	D	d	E	e	e_1	L	$L_1^{(1)}$ max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT54		TO-92	SC-43A			04-06-28- 04-11-16

Fig. 13. Package outline TO-92 (SOT54)

11. Legal information

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