



# Z00607MA

Triac logic level

Rev. 01 — 26 February 2008

Product data sheet

## 1. Product profile

### 1.1 General description

Passivated sensitive gate triac in a SOT54 plastic package

### 1.2 Features

- Sensitive gate
- Direct interfacing to logic level ICs
- Gate triggering in four quadrants
- Direct interfacing to low power gate drive circuits

### 1.3 Applications

- General purpose switching and phase control
- Low power AC fan speed controllers

### 1.4 Quick reference data

- $V_{DRM} \leq 600$  V
- $I_{GT} \leq 5$  mA
- $I_{GT} \leq 7$  mA (T2– G+)
- $I_{T(RMS)} \leq 0.8$  A
- $I_{TSM} \leq 9$  A (t = 20 ms)

## 2. Pinning information

Table 1. Pinning

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

### 3. Ordering information

**Table 2. Ordering information**

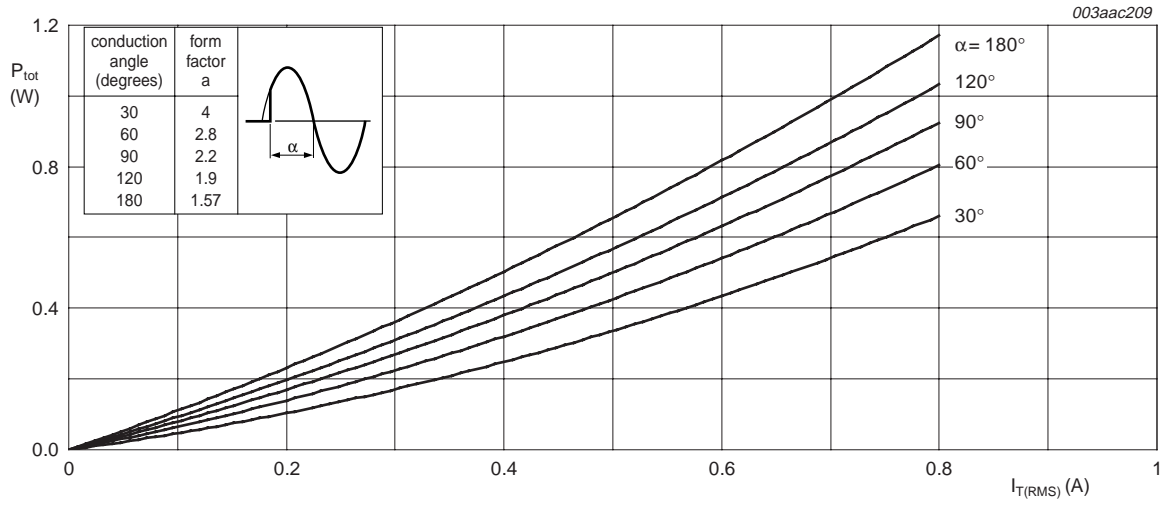
Type number	Package		Version
	Name	Description	
Z00607MA	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

### 4. Limiting values

**Table 3. Limiting values**

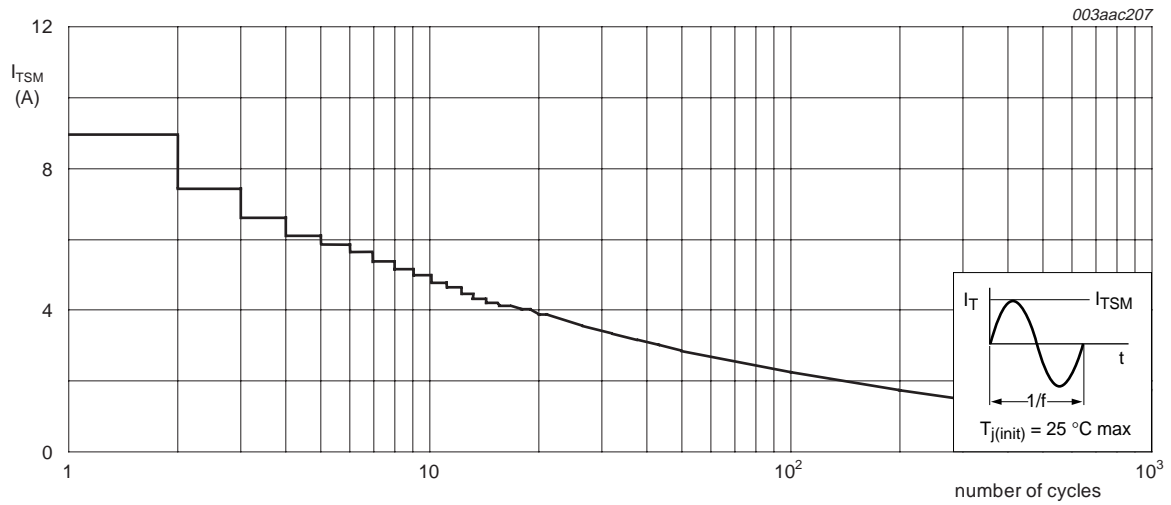
In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{DRM}$	repetitive peak off-state voltage		-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{lead} \leq 55\text{ °C}$ ; see <a href="#">Figure 4</a> and <a href="#">5</a>	-	0.8	A
$I_{TSM}$	non-repetitive peak on-state current	full sine wave; $T_j = 25\text{ °C}$ prior to surge; see <a href="#">Figure 2</a> and <a href="#">3</a>			
		$t = 20\text{ ms}$	-	9	A
		$t = 16.7\text{ ms}$	-	10	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$	-	0.32	A <sup>2</sup> s
$di_T/dt$	rate of rise of on-state current	$I_{TM} = 1\text{ A}$ ; $I_G = 20\text{ mA}$ ; $di_G/dt = 0.2\text{ A}/\mu\text{s}$			
		T2+ G+	-	50	A/ $\mu\text{s}$
		T2+ G-	-	50	A/ $\mu\text{s}$
		T2- G-	-	50	A/ $\mu\text{s}$
		T2- G+	-	10	A/ $\mu\text{s}$
$I_{GM}$	peak gate current		-	1	A
$P_{GM}$	peak gate power		-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.1	W
$T_{stg}$	storage temperature		-40	+150	°C
$T_j$	junction temperature		-	125	°C



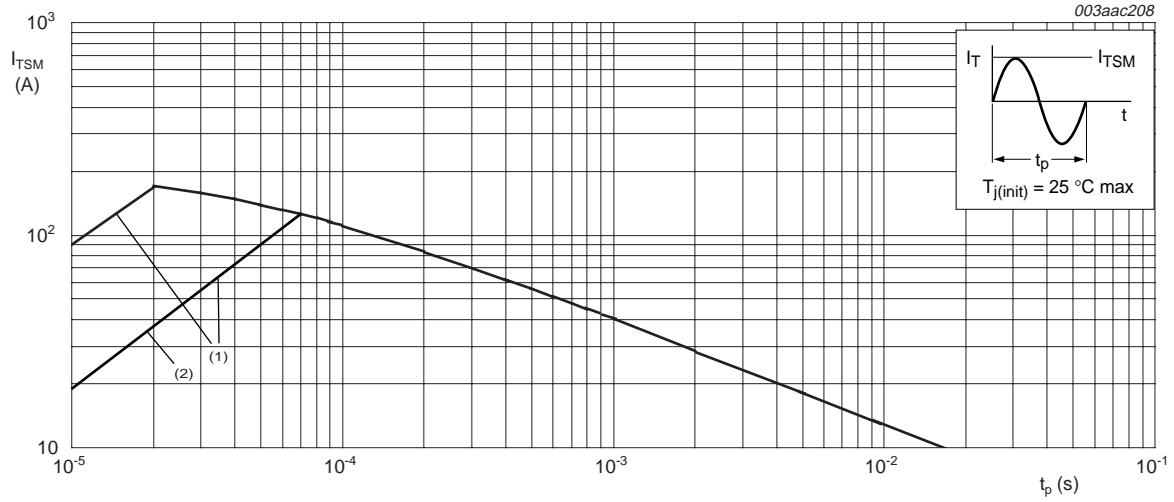
$\alpha$  = conduction angle

Fig 1. Total power dissipation as a function of RMS on-state current; maximum values



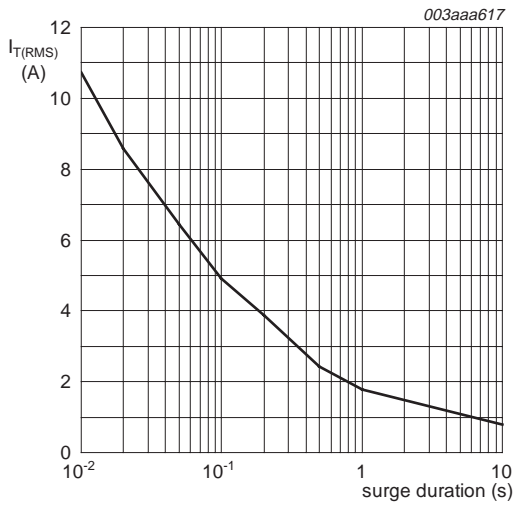
f = 50 Hz

Fig 2. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



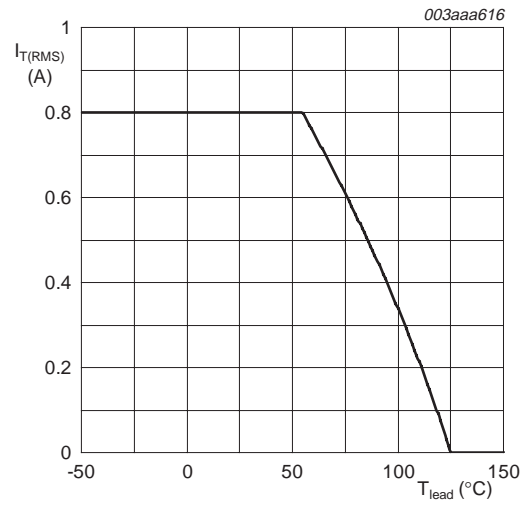
- $t_p \leq 20 \text{ ms}$
- (1)  $dI_T/dt$  limit
  - (2) T2- G+ quadrant limit

**Fig 3. Non-repetitive peak on-state current as a function of pulse width; maximum values**



$f = 50 \text{ Hz}$   
 $T_{\text{lead}} = 55 \text{ }^\circ\text{C}$

**Fig 4. RMS on-state current as a function of surge duration; maximum values**

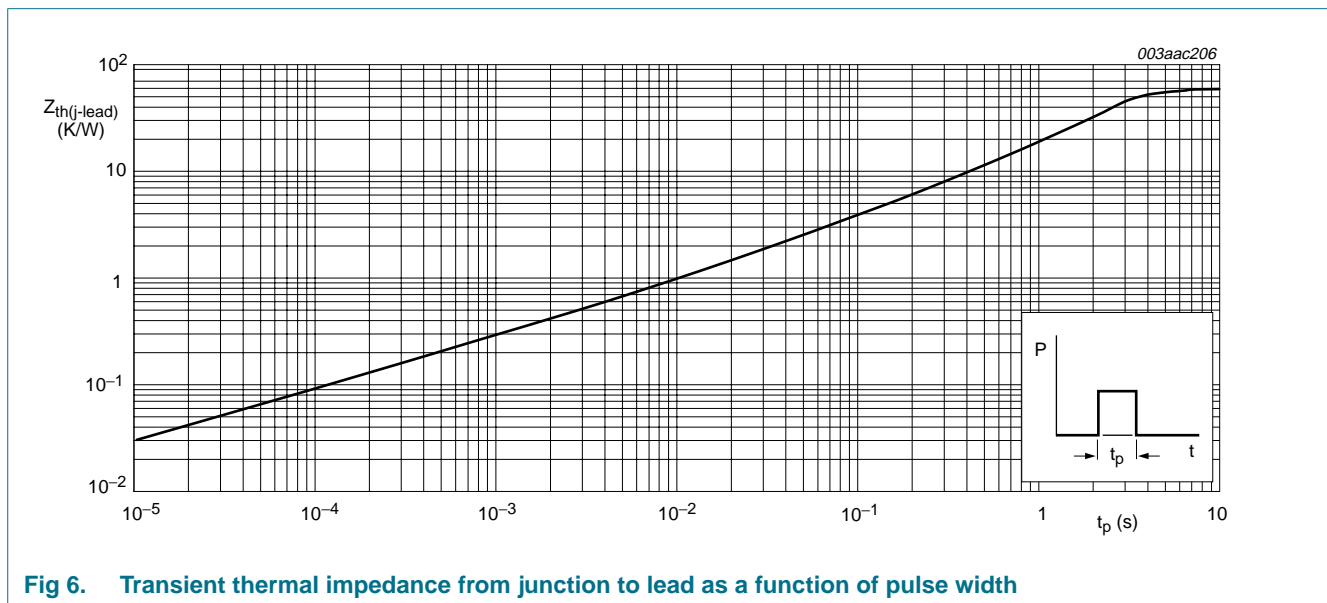


**Fig 5. RMS on-state current as a function of lead temperature; maximum values**

## 5. Thermal characteristics

**Table 4. Thermal characteristics**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	full cycle; see <a href="#">Figure 6</a>	-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	full cycle; printed circuit board mounted; lead length = 4 mm	-	150	-	K/W



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

## 6. Static characteristics

**Table 5. Static characteristics**

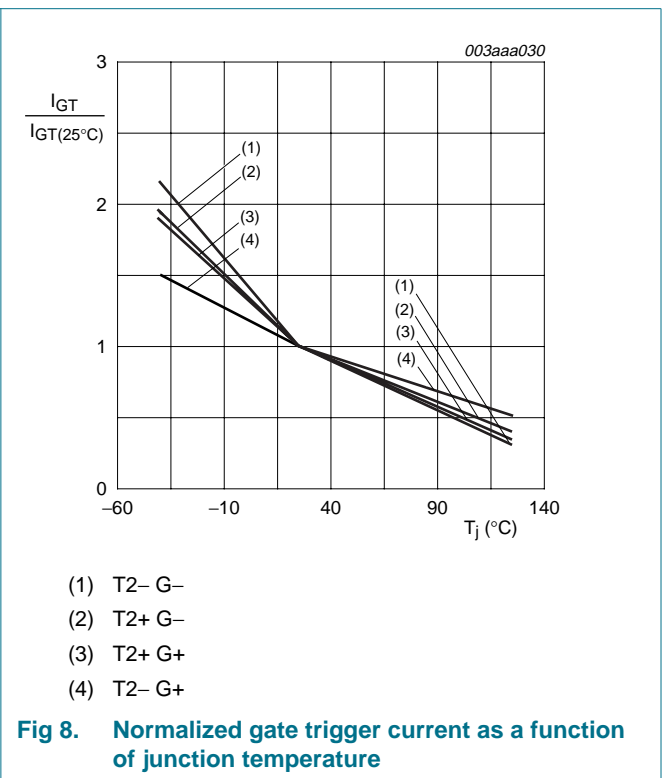
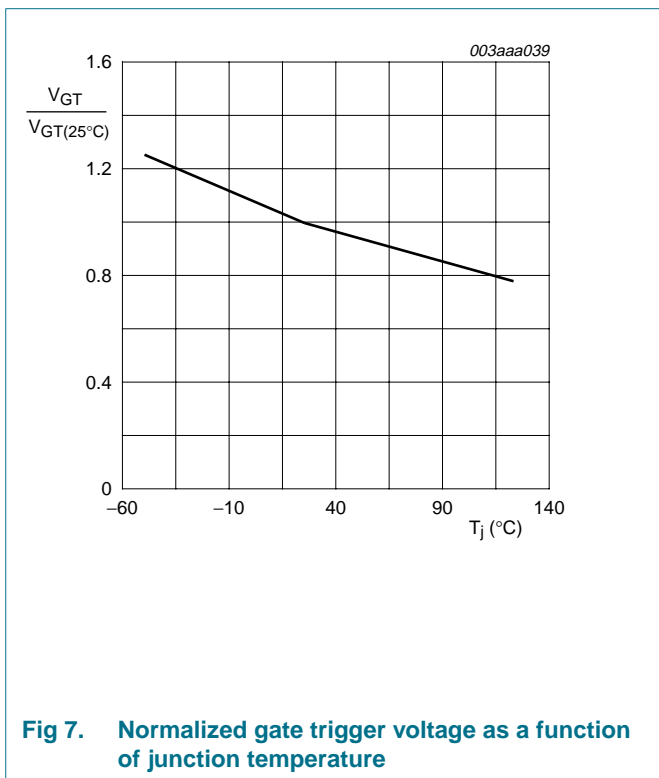
$T_j = 25\text{ °C}$  unless otherwise specified.

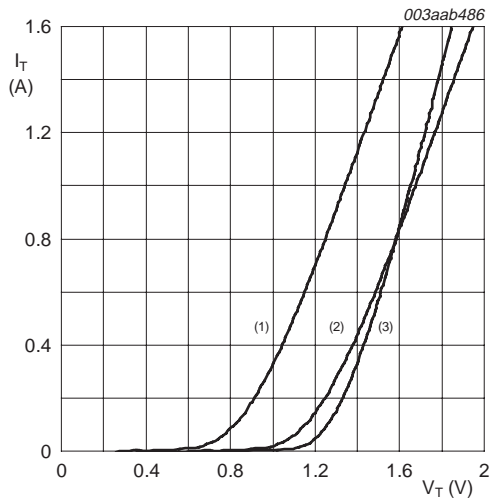
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; see <a href="#">Figure 8</a>				
		T2+ G+	-	1	5	mA
		T2+ G-	-	2	5	mA
		T2- G-	-	2	5	mA
		T2- G+	-	4	7	mA
$I_L$	latching current	$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; see <a href="#">Figure 10</a>				
		T2+ G+	-	1	10	mA
		T2+ G-	-	5	10	mA
		T2- G-	-	1	10	mA
		T2- G+	-	2	10	mA
$I_H$	holding current	$V_D = 12\text{ V}$ ; $I_G = 0.1\text{ A}$ ; see <a href="#">Figure 11</a>	-	1	10	mA
$V_T$	on-state voltage	$I_T = 0.85\text{ A}$ ; see <a href="#">Figure 9</a>	-	1.35	1.6	V
$V_{GT}$	gate trigger voltage	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; see <a href="#">Figure 7</a>	-	0.9	2	V
		$V_D = V_{DRM}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 110\text{ °C}$	0.1	0.7	-	V
$I_D$	off-state current	$V_D = V_{DRM(max)}$ ; $T_j = 125\text{ °C}$	-	0.1	0.5	mA

## 7. Dynamic characteristics

**Table 6. Dynamic characteristics**

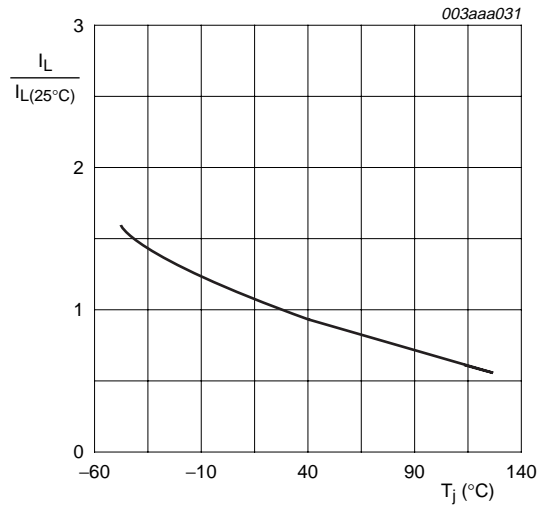
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$ ; $T_j = 110\text{ °C}$ ; exponential waveform; gate open circuit	30	45	-	V/ $\mu$ s
$dV_{com}/dt$	rate of change of commutating voltage	$V_{DM} = V_{DRM(max)}$ ; $T_j = 50\text{ °C}$ ; $I_{TM} = 0.84\text{ A}$ ; $dI_{com}/dt = 0.3\text{ A/ms}$	-	5	-	V/ $\mu$ s
$t_{gt}$	gate-controlled turn-on time	$I_{TM} = 1\text{ A}$ ; $V_D = V_{DRM(max)}$ ; $I_G = 25\text{ mA}$ ; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	$\mu$ s



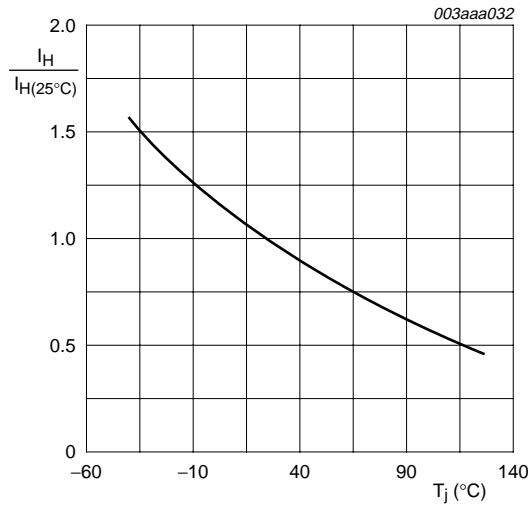


$V_o = 1.171\text{ V}$   
 $R_s = 0.5125\ \Omega$   
 (1)  $T_j = 125\text{ }^\circ\text{C}$ ; typical values  
 (2)  $T_j = 125\text{ }^\circ\text{C}$ ; maximum values  
 (3)  $T_j = 25\text{ }^\circ\text{C}$ ; maximum values

**Fig 9. On-state current as a function of on-state voltage**



**Fig 10. Normalized latching current as a function of junction temperature**



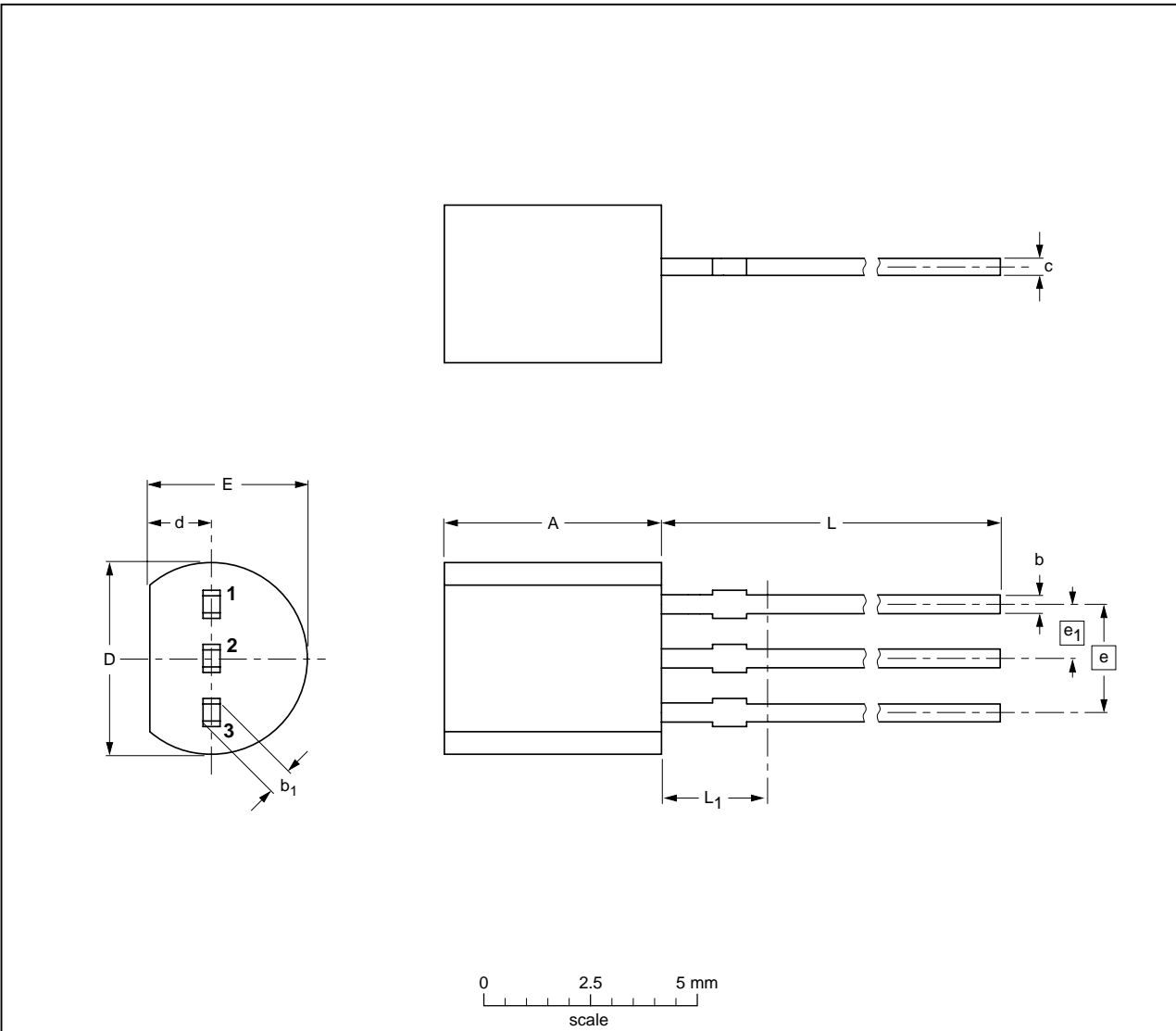
**Fig 11. Normalized holding current as a function of junction temperature**



8. Package outline

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

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max.
mm	5.2	0.48	0.66	0.45	4.8	1.7	4.2	2.54	1.27	14.5	2.5
	5.0	0.40	0.55	0.38	4.4	1.4	3.6				

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 12. Package outline SOT54 (TO-92)

## 9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
Z00607MA_1	20080226	Product data sheet	-	-

## 10. Legal information

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Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.

[1] Please consult the most recently issued document before initiating or completing a design.

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

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