

BTA2008 series D and E

0.8 A Three-quadrant triacs high commutation

Rev. 01 — 18 January 2008

Product data sheet

1. Product profile

1.1 General description

Passivated, guaranteed commutation, sensitive gate triacs in a SOT54 plastic package

1.2 Features

- Guaranteed commutation performance at each gate sensitivity
- Easily interfaced with low power drivers including microcontrollers
- Sensitive gate

1.3 Applications

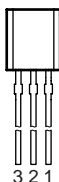
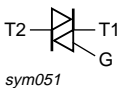
- Motor control
- Solenoid drivers

1.4 Quick reference data

- $V_{\text{DRM}} \leq 600 \text{ V}$ (BTA2008-600D)
- $V_{\text{DRM}} \leq 600 \text{ V}$ (BTA2008-600E)
- $V_{\text{DRM}} \leq 800 \text{ V}$ (BTA2008-800D)
- $V_{\text{DRM}} \leq 800 \text{ V}$ (BTA2008-800E)
- $I_{\text{TSM}} \leq 9 \text{ A}$ ($t = 20 \text{ ms}$)
- $I_{\text{GT}} \leq 5 \text{ mA}$ (BTA2008-600D)
- $I_{\text{GT}} \leq 5 \text{ mA}$ (BTA2008-800D)
- $I_{\text{GT}} \leq 10 \text{ mA}$ (BTA2008-600E)
- $I_{\text{GT}} \leq 10 \text{ mA}$ (BTA2008-800E)
- $I_{\text{T(RMS)}} \leq 0.8 \text{ A}$

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	main terminal 2 (T2)		
2	gate (G)		
3	main terminal 1 (T1)		

SOT54 (TO-92)

3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
BTA2008-600D	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54
BTA2008-600E			
BTA2008-800D			
BTA2008-800E			

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	BTA2008-600D; BTA2008-600E	[1] -	600	V
		BTA2008-800D; BTA2008-800E	-	800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{lead}} \leq 70\text{ }^{\circ}\text{C}$; see Figure 4 and 5	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{j}} = 25\text{ }^{\circ}\text{C}$ prior to surge; see Figure 2 and 3			
		$t = 20\text{ ms}$	-	9	A
		$t = 16.7\text{ ms}$	-	9.9	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$	-	0.41	A^2s
di_{T}/dt	rate of rise of on-state current	$I_{\text{TM}} = 1.5\text{ A}$; $I_{\text{G}} = 20\text{ mA}$; $di_{\text{G}}/dt = 0.2\text{ A}/\mu\text{s}$	-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current		-	1	A
P_{GM}	peak gate power		-	5	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	-	0.1	W
T_{stg}	storage temperature		-40	+150	$^{\circ}\text{C}$
T_{j}	junction temperature		-	125	$^{\circ}\text{C}$

- [1] Although not recommended, off-state voltages up to 800 V may be applied without damage, but the triac may switch to the on-state. The rate of rise of current should not exceed 6 A/ μs .

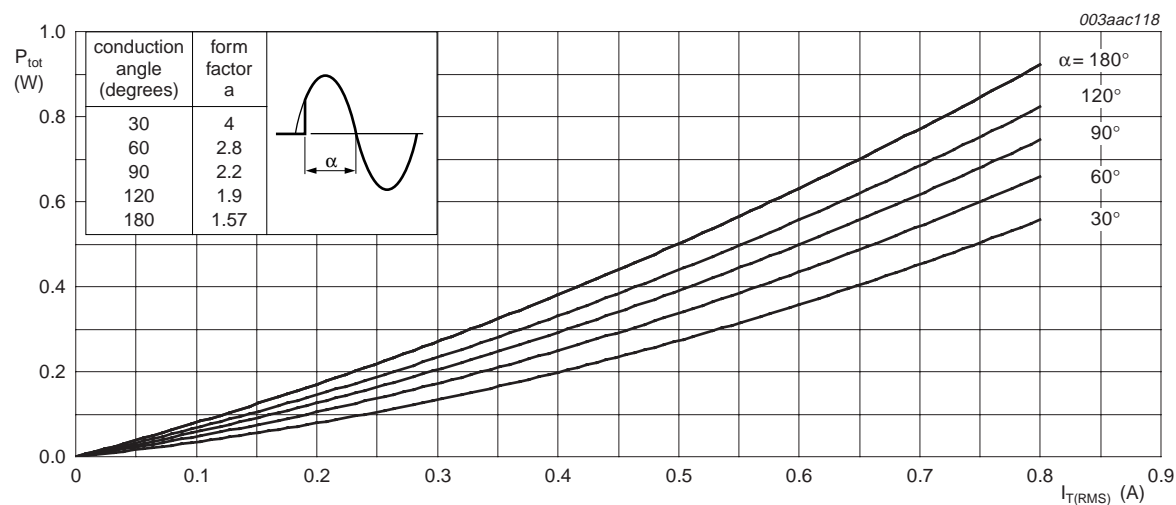


Fig 1. Total power dissipation as a function of RMS on-state current; maximum values

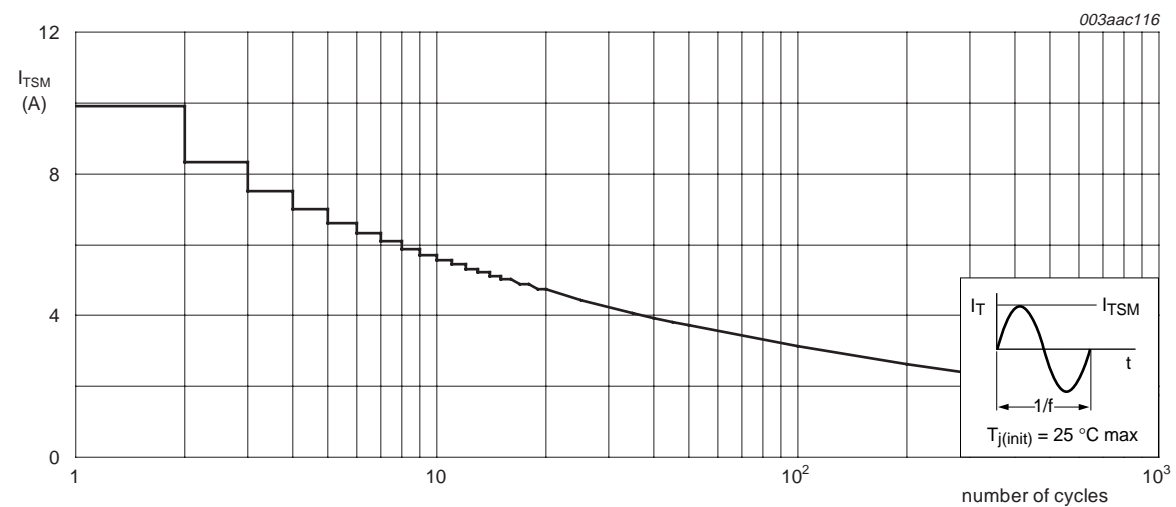
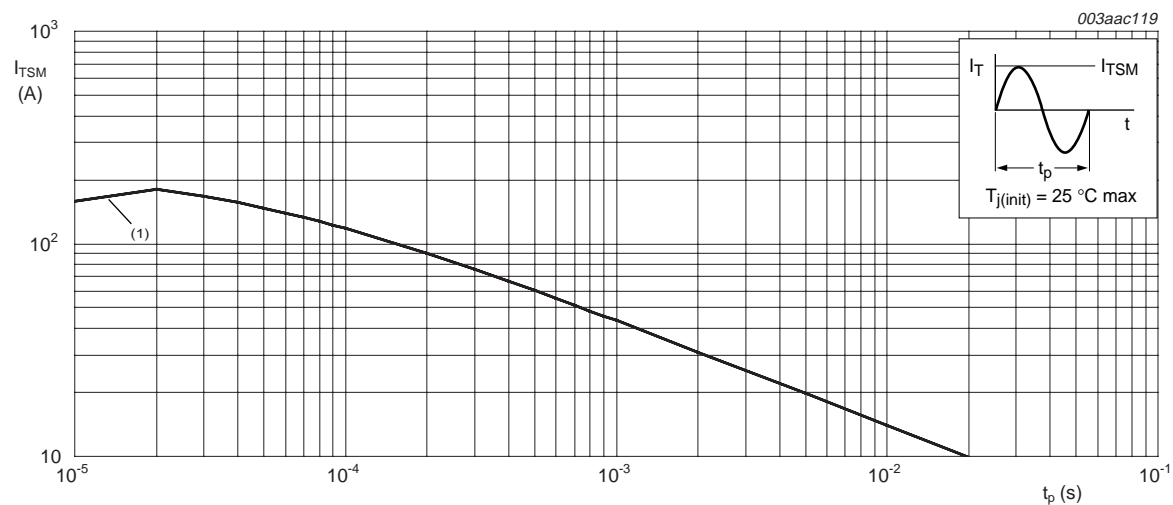
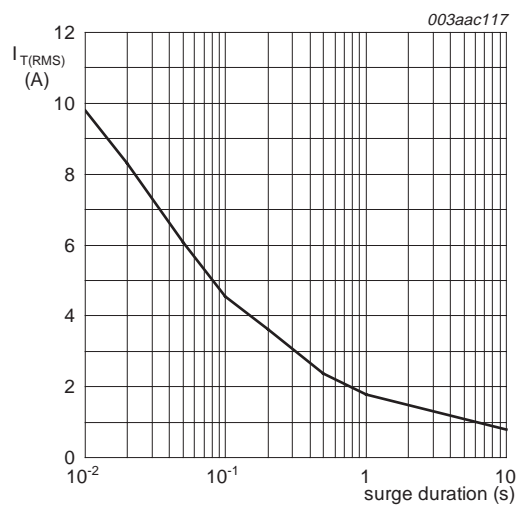


Fig 2. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



$t_p \leq 20\text{ ms}$
(1) dI_T/dt limit

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



$f = 50\text{ Hz}$
 $T_{lead} = 70\text{ °C}$

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

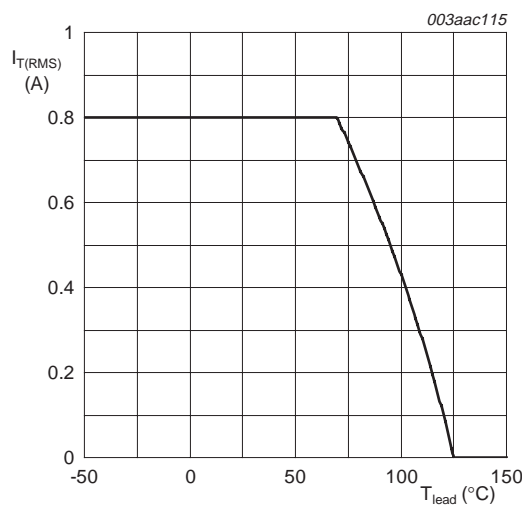


Fig 5. RMS on-state current as a function of lead temperature; maximum values

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 Figure 6	-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed circuit board mounted; lead length 4 mm	-	150	-	K/W

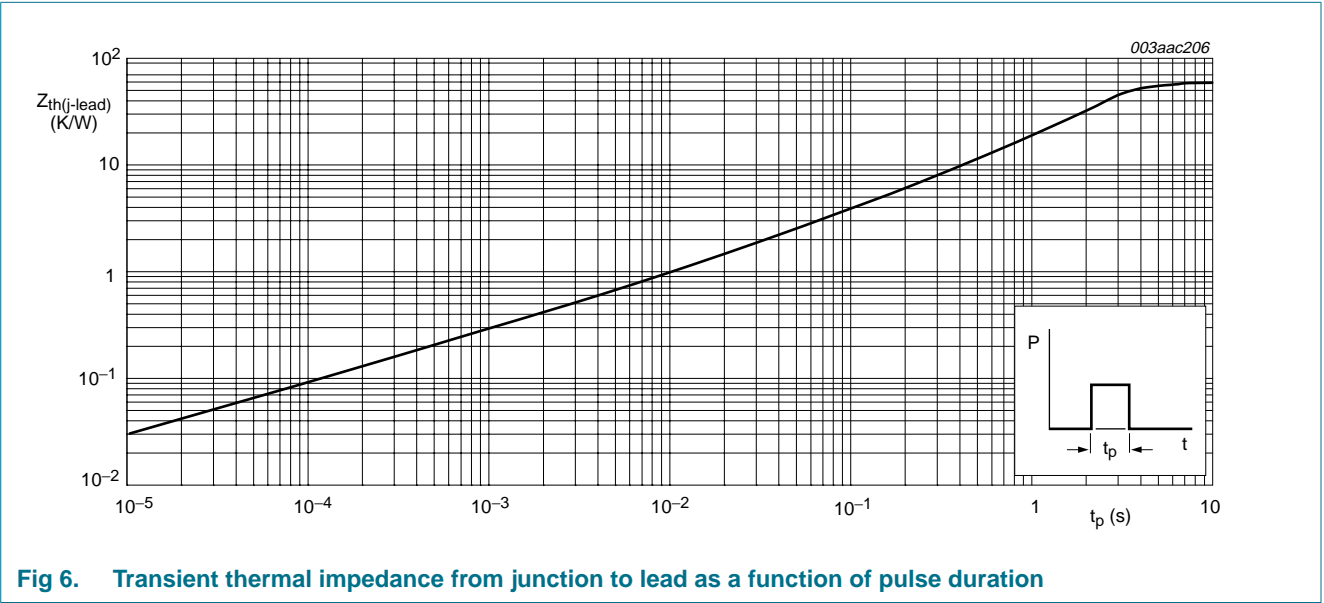


Fig 6. Transient thermal impedance from junction to lead as a function of pulse duration

6. Static characteristics

Table 5. Static characteristics

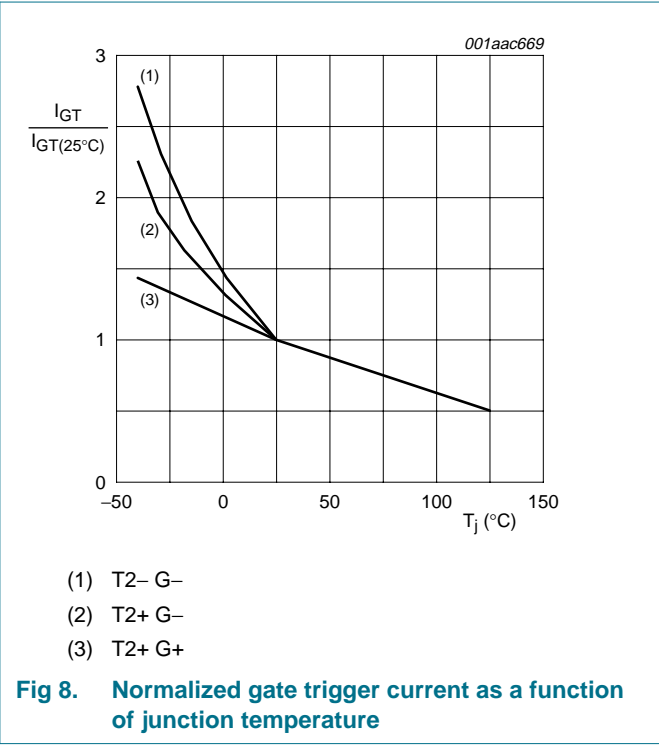
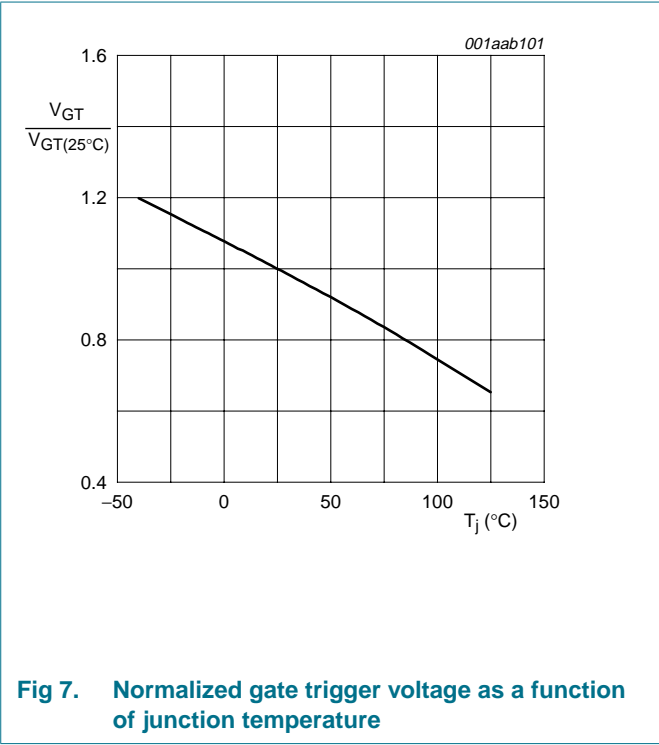
$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

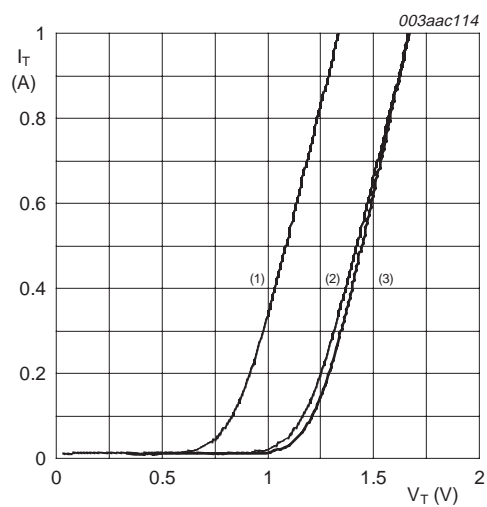
Symbol	Parameter	Conditions	BTA2008-600D BTA2008-800D			BTA2008-600E BTA2008-800E			Unit
			Min	Typ	Max	Min	Typ	Max	
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 8							
		T2+ G+	0.25	-	5	0.5	-	10	mA
		T2+ G-	0.25	-	5	0.5	-	10	mA
		T2- G-	0.25	-	5	0.5	-	10	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$; see Figure 10							
		T2+ G+	-	-	10	-	-	12	mA
		T2+ G-	-	-	20	-	-	20	mA
		T2- G-	-	-	10	-	-	12	mA
I_H	holding current	$V_D = 12\text{ V}$; $I_{GT} = 0.1\text{ A}$; see Figure 11	-	-	10	-	-	12	mA
V_T	on-state voltage	$I_T = 0.85\text{ A}$; see Figure 9	-	1.35	1.6	-	1.35	1.6	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 7	-	0.9	2	-	0.9	2	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^{\circ}\text{C}$	0.2	0.3	-	0.2	0.3	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ }^{\circ}\text{C}$	-	0.1	0.5	-	0.1	0.5	mA

7. Dynamic characteristics

Table 6. Dynamic characteristics

Symbol	Parameter	Conditions	BTA2008-600D BTA2008-800D			BTA2008-600E BTA2008-800E			Unit
			Min	Typ	Max	Min	Typ	Max	
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$; $T_j = 125\text{ }^{\circ}\text{C}$; exponential waveform; gate open circuit	200	-	-	600	-	-	$\text{V}/\mu\text{s}$
dI_{com}/dt	rate of change of commutating current	$V_{DM} = 400\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$; $I_{T(RMS)} = 0.8\text{ A}$; $dV/dt = 10\text{ V}/\mu\text{s}$; gate open circuit	0.5	-	-	1.6	-	-	A/ms
t_{gt}	gate-controlled turn-on time	$I_{TM} = 1\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	-	2	-	μs





- $V_o = 0.835$ V
 $R_s = 0.5$ Ω
- (1) $T_j = 125$ °C; typical values
 - (2) $T_j = 125$ °C; maximum values
 - (3) $T_j = 25$ °C; maximum values

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

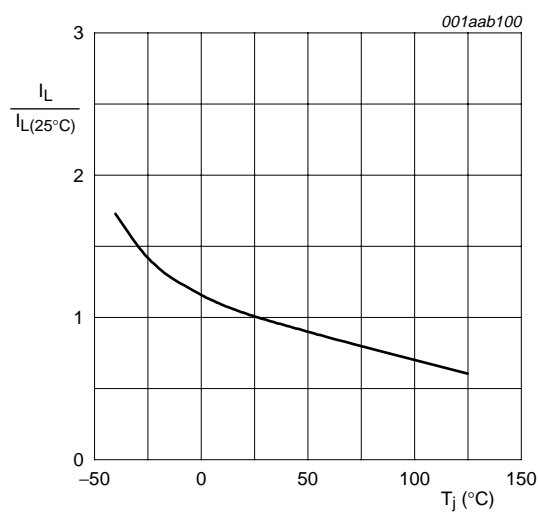


Fig 10. Normalized latching current as a function of junction temperature

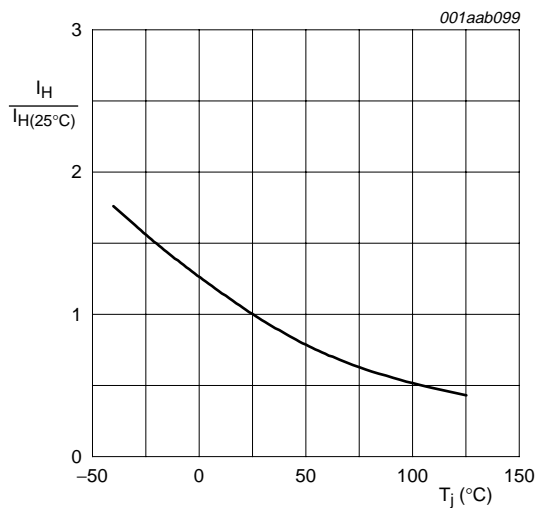


Fig 11. Normalized holding current as a function of junction temperature

8. Package outline

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

SOT54

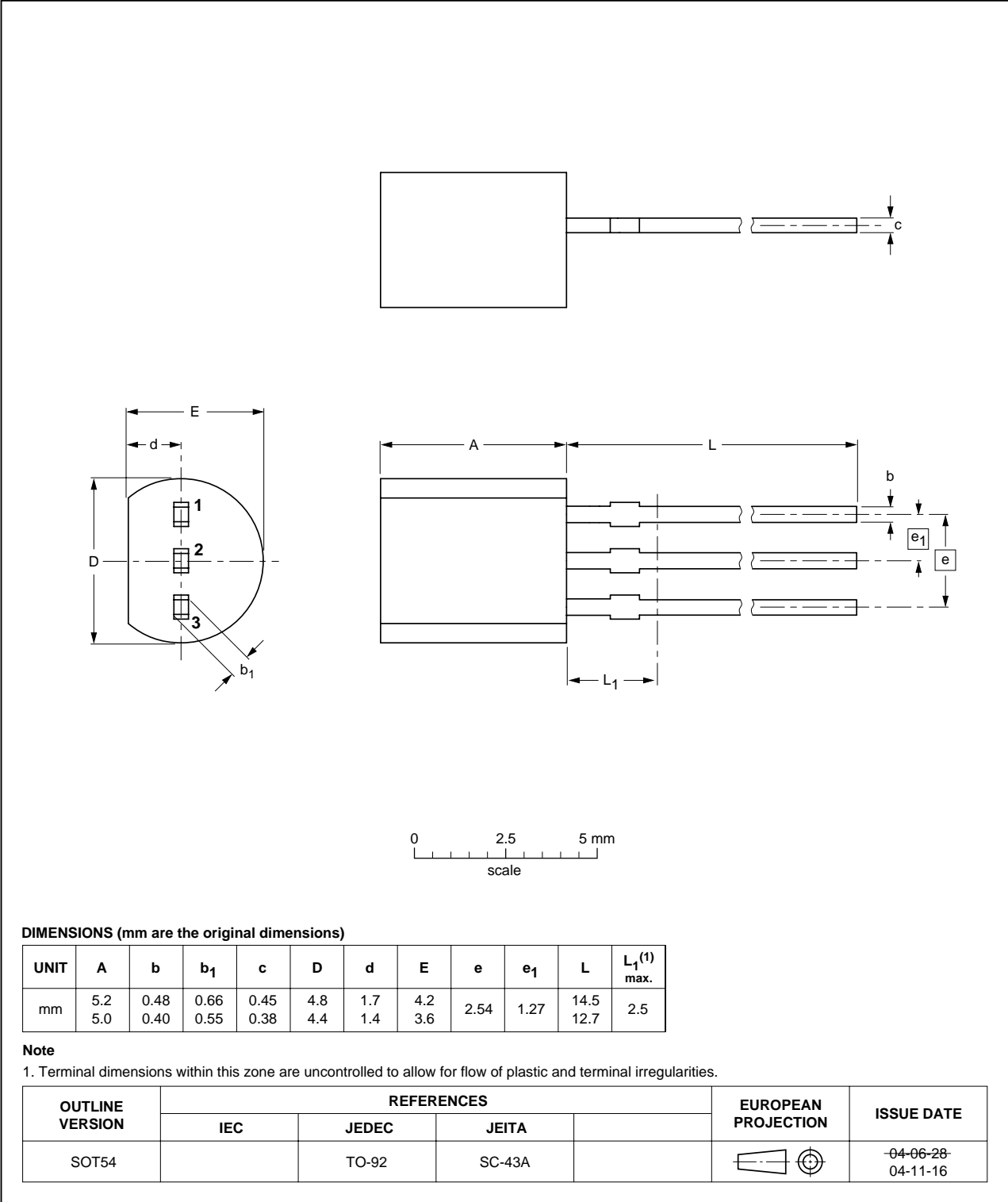


Fig 12. Package outline SOT54 (TO-92)

9. Revision history

Table 7. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BTA2008_SER_D_E_1	20080118	Product data sheet	-	-

10. Legal information

10.1 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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