

NXL0840

SCR logic level

Rev. 01 — 26 February 2008

Product data sheet

1. Product profile

1.1 General description

Passivated sensitive gate Silicon-Controlled Rectifier (SCR) in a SOT54 plastic package

1.2 Features

- Direct interfacing to logic level ICs
- Direct interfacing to low-power gate drive circuits
- For operation on DC and rectified AC supplies

1.3 Applications

- Christmas lights control
- Protection and safety shutdown circuits e.g. lighting ballasts

1.4 Quick reference data

- $V_{\text{DRM}} \leq 400 \text{ V}$
- $I_{\text{T(RMS)}} \leq 0.8 \text{ A}$
- $I_{\text{TSM}} \leq 8 \text{ A (t = 10 ms)}$
- $I_{\text{T(AV)}} \leq 0.5 \text{ A}$

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	anode (A)	<p>SOT54 (TO-92)</p>	<p>A — G — K sym037</p>
2	gate (G)		
3	cathode (K)		

3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
NXL0840	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		-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{lead} \leq 83\text{ °C}$; see Figure 1	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	all conduction angles; see Figure 4 and 5	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_j = 25\text{ °C}$ prior to surge; see Figure 2 and 3			
		$t = 10\text{ ms}$	-	8	A
		$t = 8.3\text{ ms}$	-	9	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$	-	0.32	A ² s
di_T/dt	rate of rise of on-state current	$I_{TM} = 2\text{ A}$; $I_G = 10\text{ mA}$; $di_G/dt = 100\text{ mA}/\mu\text{s}$	-	50	A/ μs
I_{GM}	peak gate current		-	1	A
V_{GM}	peak gate voltage		-	5	V
V_{RGM}	peak reverse gate voltage		-	5	V
P_{GM}	peak gate power		-	2	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

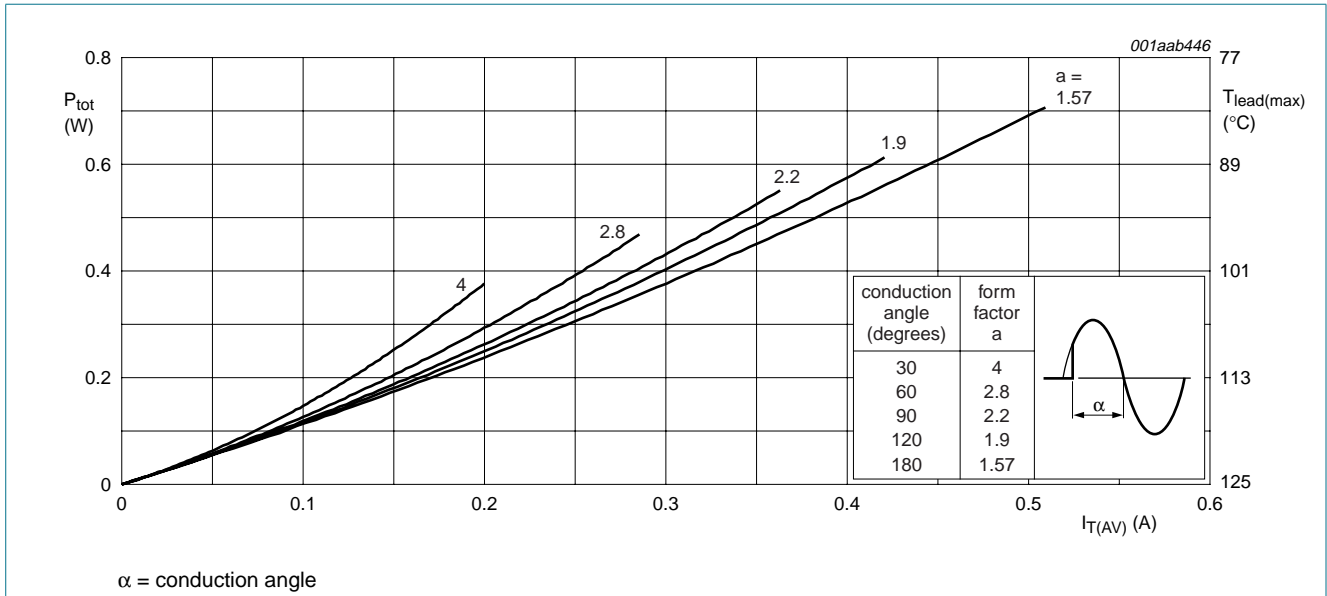


Fig 1. Total power dissipation as a function of average on-state current; maximum values

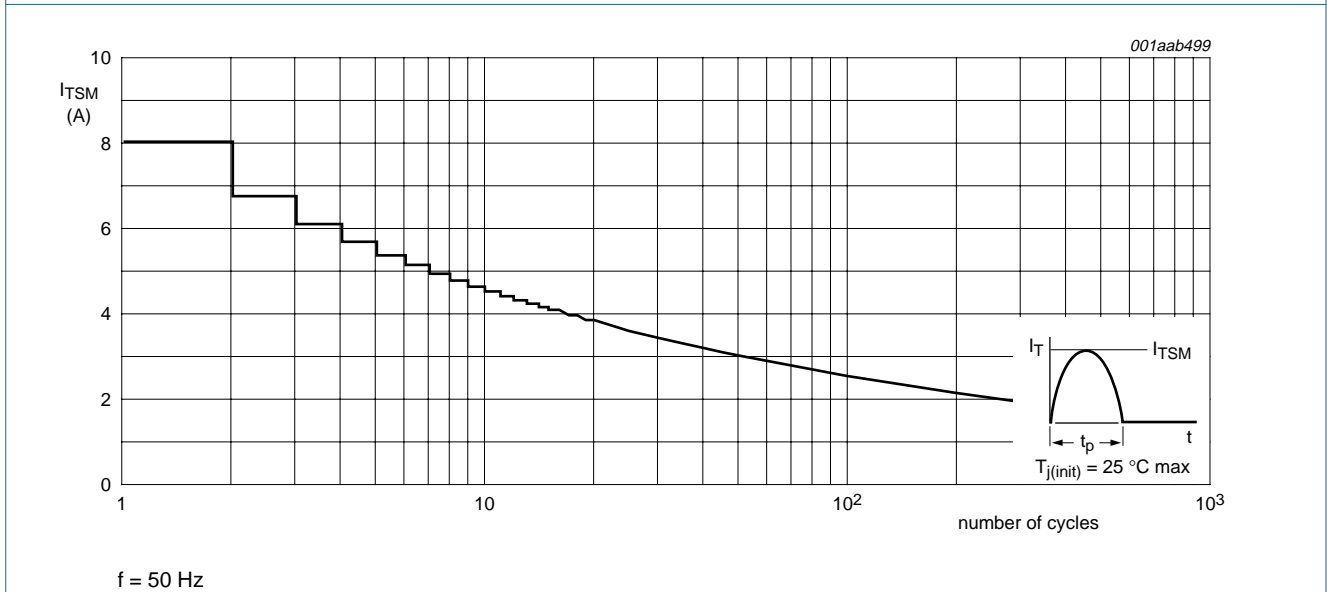
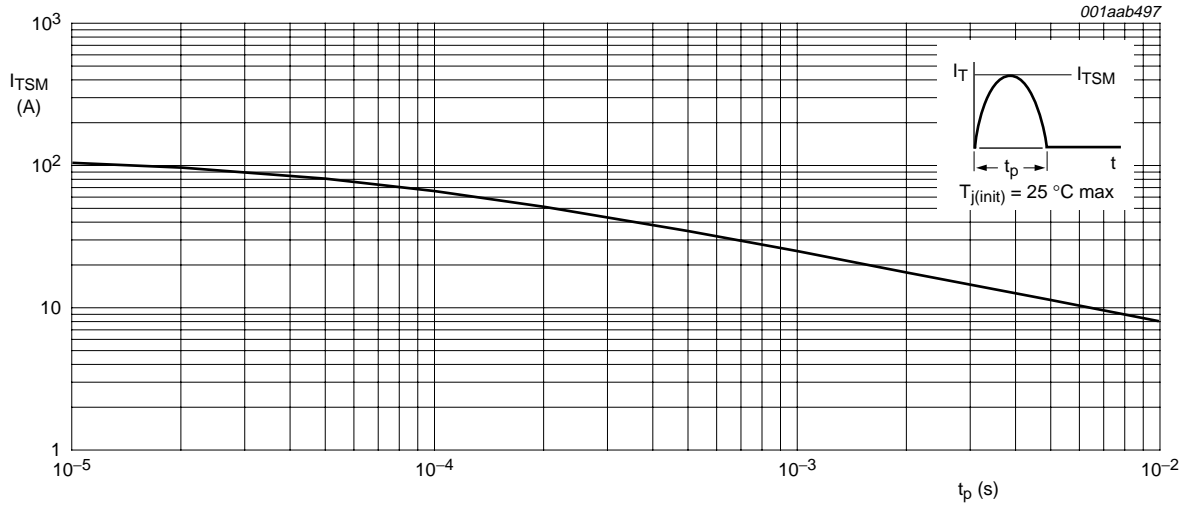
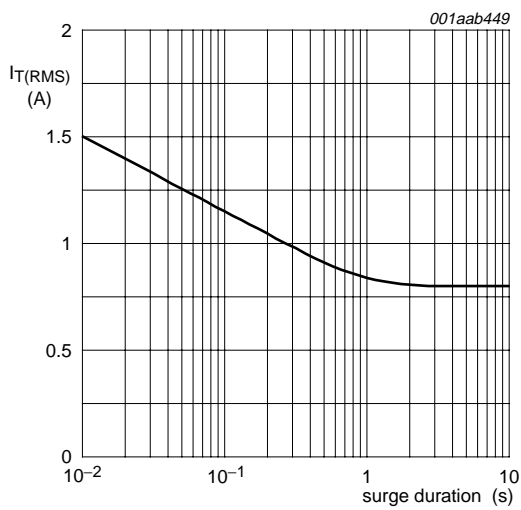


Fig 2. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



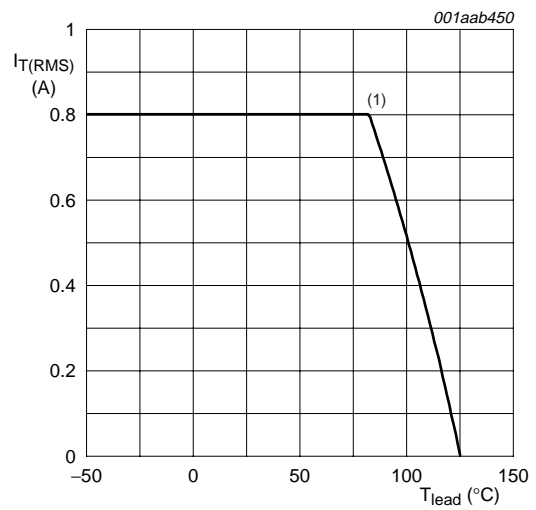
$t_p \leq 10\text{ ms}$

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



$f = 50\text{ Hz}$
 $T_{lead} = 83\text{ °C}$

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



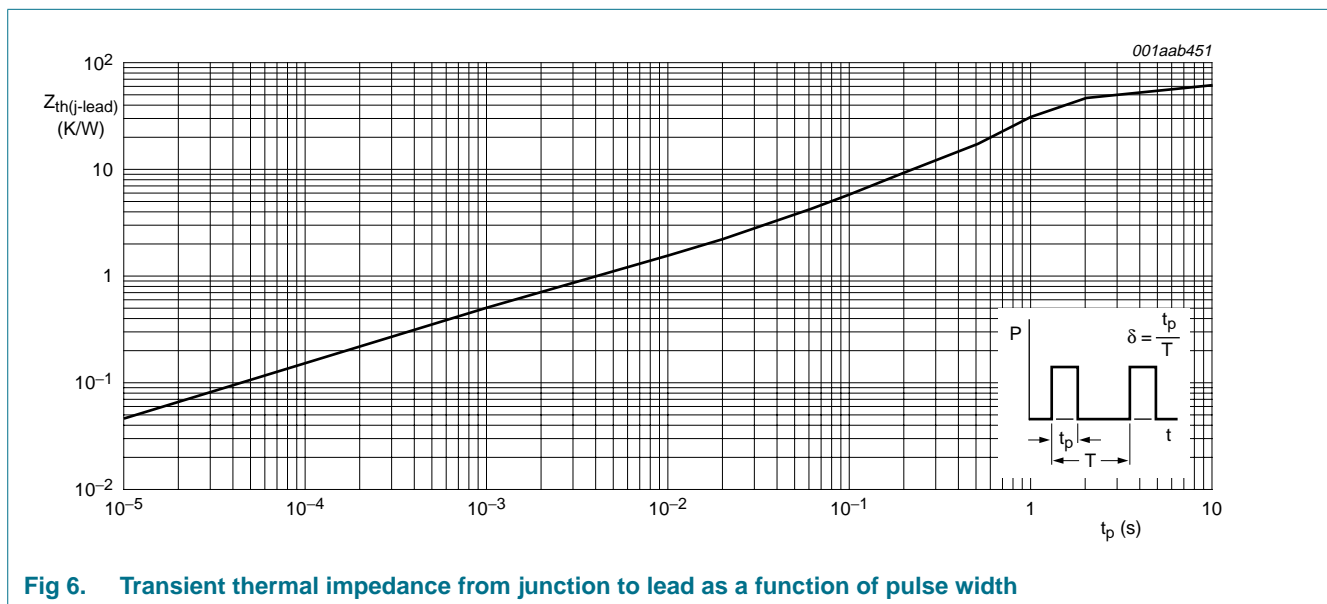
(1) $T_{lead} = 83\text{ °C}$

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	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

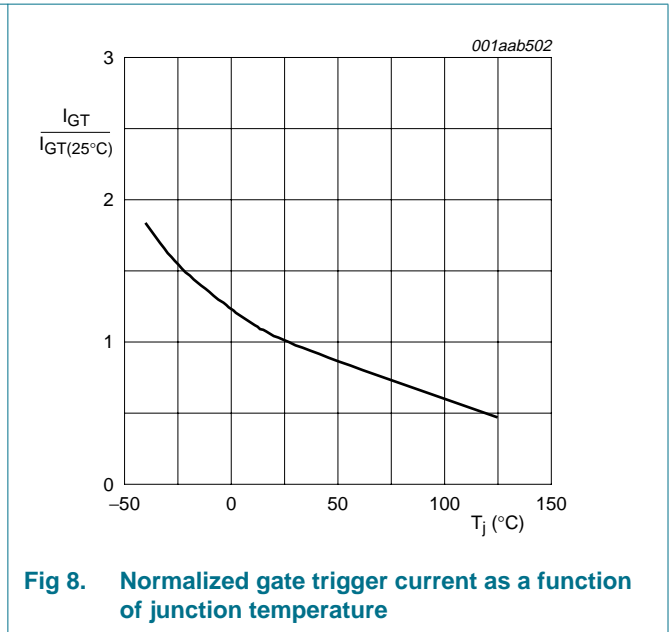
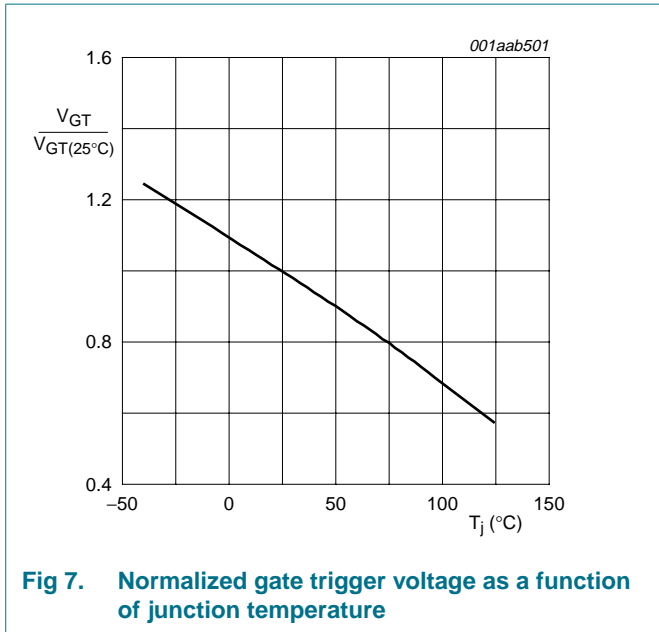


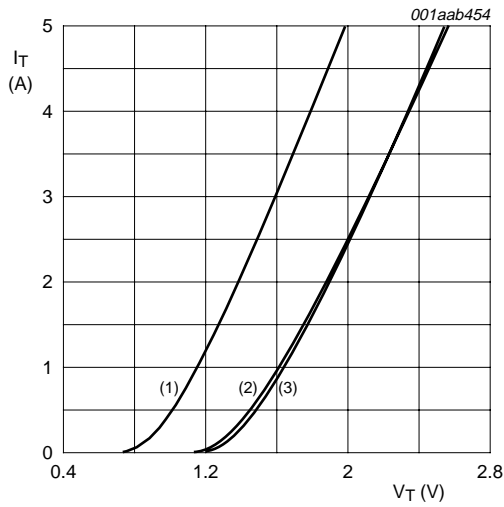
6. Characteristics

Table 5. Characteristics

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

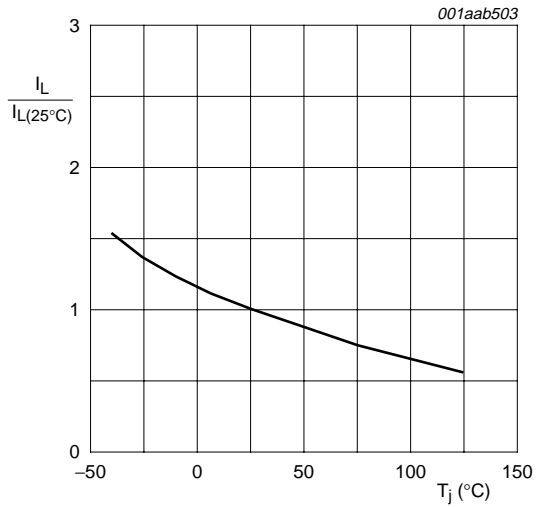
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; see Figure 8	-	50	200	μA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.5\text{ mA}$; $R_{GK} = 1\text{ k}\Omega$; see Figure 10	-	2	6	mA
I_H	holding current	$V_D = 12\text{ V}$; $I_G = 0.5\text{ mA}$; $R_{GK} = 1\text{ k}\Omega$; see Figure 11	-	2	5	mA
V_T	on-state voltage	$I_T = 1.2\text{ A}$; see Figure 9	-	1.25	1.7	V
V_{GT}	gate trigger voltage	$I_T = 10\text{ mA}$; see Figure 7	-	0.5	0.8	V
		$V_D = 12\text{ V}$	-	0.5	0.8	V
		$V_D = V_{DRM(max)}$; $T_j = 125\text{ }^\circ\text{C}$	0.2	0.3	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; $T_j = 125\text{ }^\circ\text{C}$; $R_{GK} = 1\text{ k}\Omega$	-	0.05	0.1	mA
Dynamic characteristics						
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; see Figure 12	-	-	-	-
		$R_{GK} = 1\text{ k}\Omega$	200	600	-	V/ μs
		gate open circuit	-	25	-	V/ μs





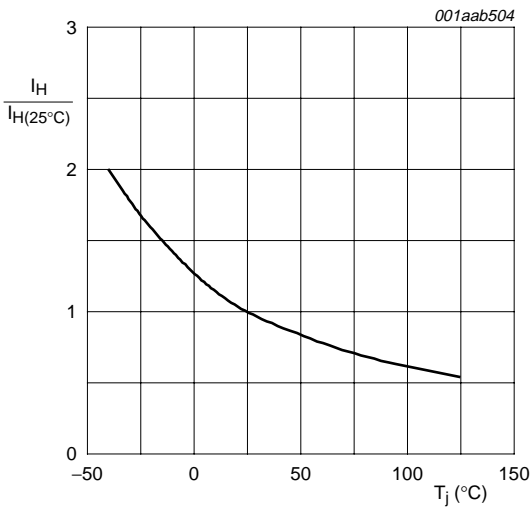
$V_o = 1.067\text{ V}$
 $R_s = 0.187\ \Omega$
 (1) $T_j = 125\text{ }^\circ\text{C}$; typical values
 (2) $T_j = 125\text{ }^\circ\text{C}$; maximum values
 (3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

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



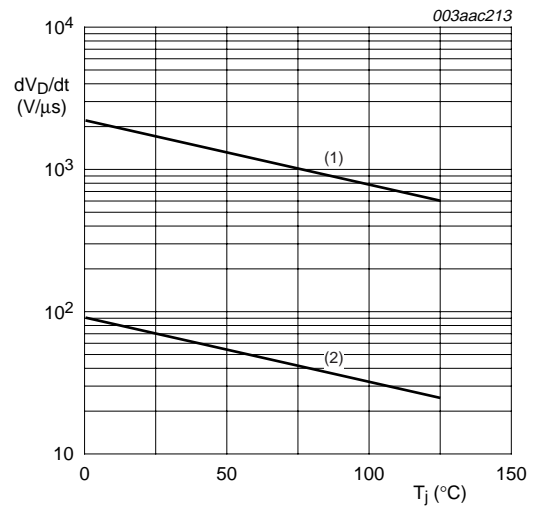
$R_{GK} = 1\text{ k}\Omega$

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



$R_{GK} = 1\text{ k}\Omega$

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



(1) $R_{GK} = 1\text{ k}\Omega$
 (2) Gate open-circuit

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

7. Package outline

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

SOT54

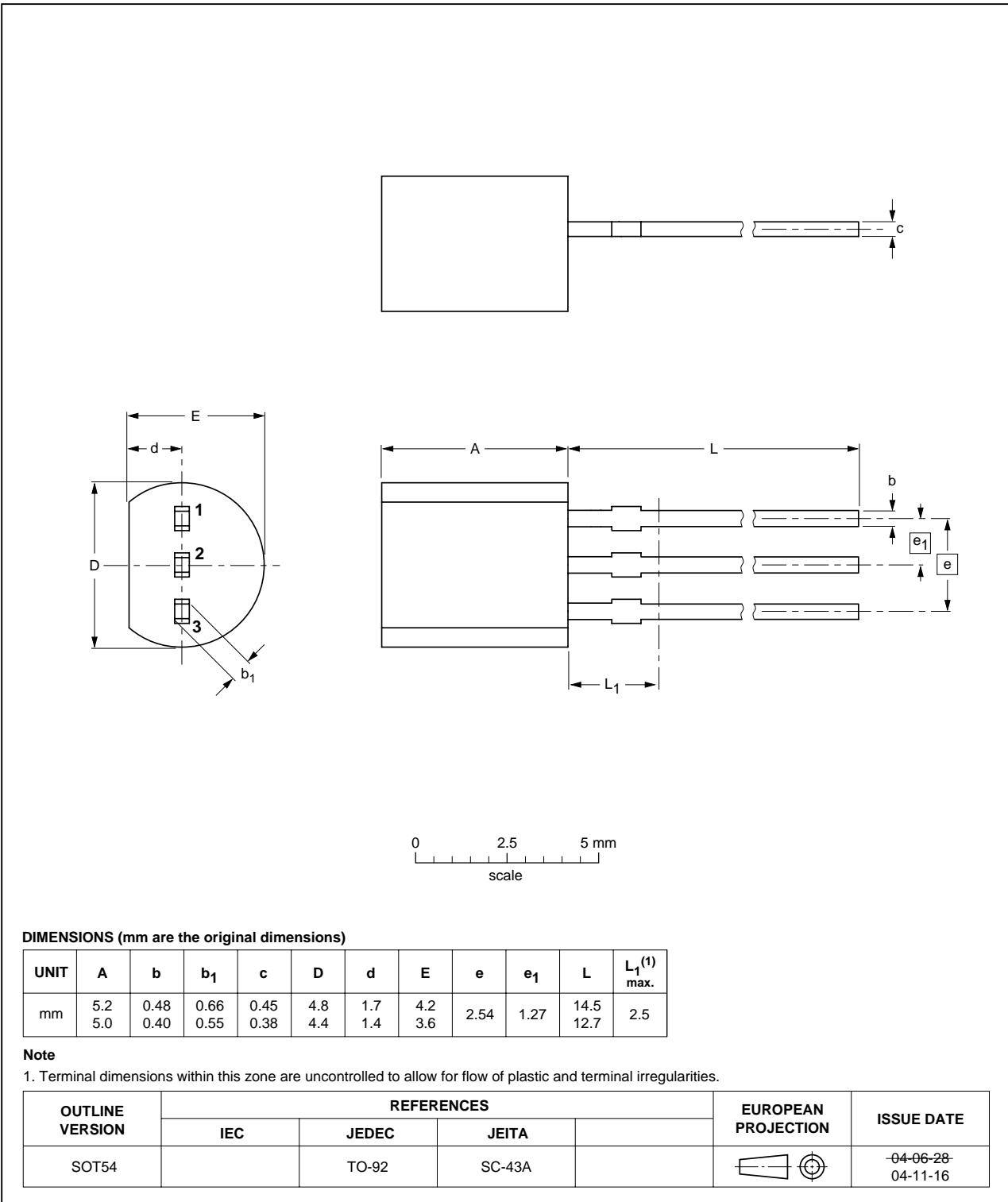


Fig 13. Package outline SOT54 (TO-92)

8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NXL0840_1	20080226	Product data sheet	-	-

9. Legal information

9.1 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.
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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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11. Contents

1	Product profile	1
1.1	General description	1
1.2	Features	1
1.3	Applications	1
1.4	Quick reference data	1
2	Pinning information	1
3	Ordering information	2
4	Limiting values	2
5	Thermal characteristics	5
6	Characteristics	6
7	Package outline	8
8	Revision history	9
9	Legal information	10
9.1	Data sheet status	10
9.2	Definitions	10
9.3	Disclaimers	10
9.4	Trademarks	10
10	Contact information	10
11	Contents	11

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Date of release: 26 February 2008

Document identifier: NXL0840_1