



IMPORTANT NOTICE

10 December 2015

1. Global joint venture starts operations as WeEn Semiconductors

Dear customer,

As from November 9th, 2015 NXP Semiconductors N.V. and Beijing JianGuang Asset Management Co. Ltd established Bipolar Power joint venture (JV), **WeEn Semiconductors**, which will be used in future Bipolar Power documents together with new contact details.

In this document where the previous NXP references remain, please use the new links as shown below.

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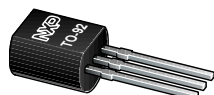
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Thank you for your cooperation and understanding,

WeEn Semiconductors



BT169D

SCR

19 March 2014

Product data sheet

1. General description

Planar passivated Silicon Controlled Rectifier with sensitive gate in a SOT54 (TO-92) plastic package. This SCR is designed to be interfaced directly to microcontrollers, logic ICs and other low power gate trigger circuits.

2. Features and benefits

- Planar passivated for voltage ruggedness and reliability
- Sensitive gate
- Direct triggering from low power gate circuits and logic ICs

3. Applications

- Ignition circuits
- Lighting ballasts
- Protection circuits
- Switched Mode Power Supplies

4. Quick reference data

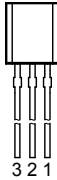
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	400	V
V_{RRM}	repetitive peak reverse voltage		-	-	400	V
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{\text{j(init)}} = 25\text{ }^{\circ}\text{C}$; $t_{\text{p}} = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	-	8	A
$I_{\text{T(AV)}}$	average on-state current	half sine wave; $T_{\text{lead}} \leq 83\text{ }^{\circ}\text{C}$; Fig. 1	-	-	0.5	A
$I_{\text{T(RMS)}}$	RMS on-state current	half sine wave; $T_{\text{lead}} \leq 83\text{ }^{\circ}\text{C}$; Fig. 2 ; Fig. 3	-	-	0.8	A
Static characteristics						
I_{GT}	gate trigger current	$V_{\text{D}} = 12\text{ V}$; $I_{\text{T}} = 10\text{ mA}$; $T_{\text{j}} = 25\text{ }^{\circ}\text{C}$; Fig. 7	-	50	200	μA



5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	A	anode	 TO-92 (SOT54)	 sym037
2	G	gate		
3	K	cathode		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT169D	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54
BT169D/01	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54
BT169D/DG	TO-92	plastic single-ended leaded (through hole) package; 3 leads	SOT54

7. Marking

Table 4. Marking codes

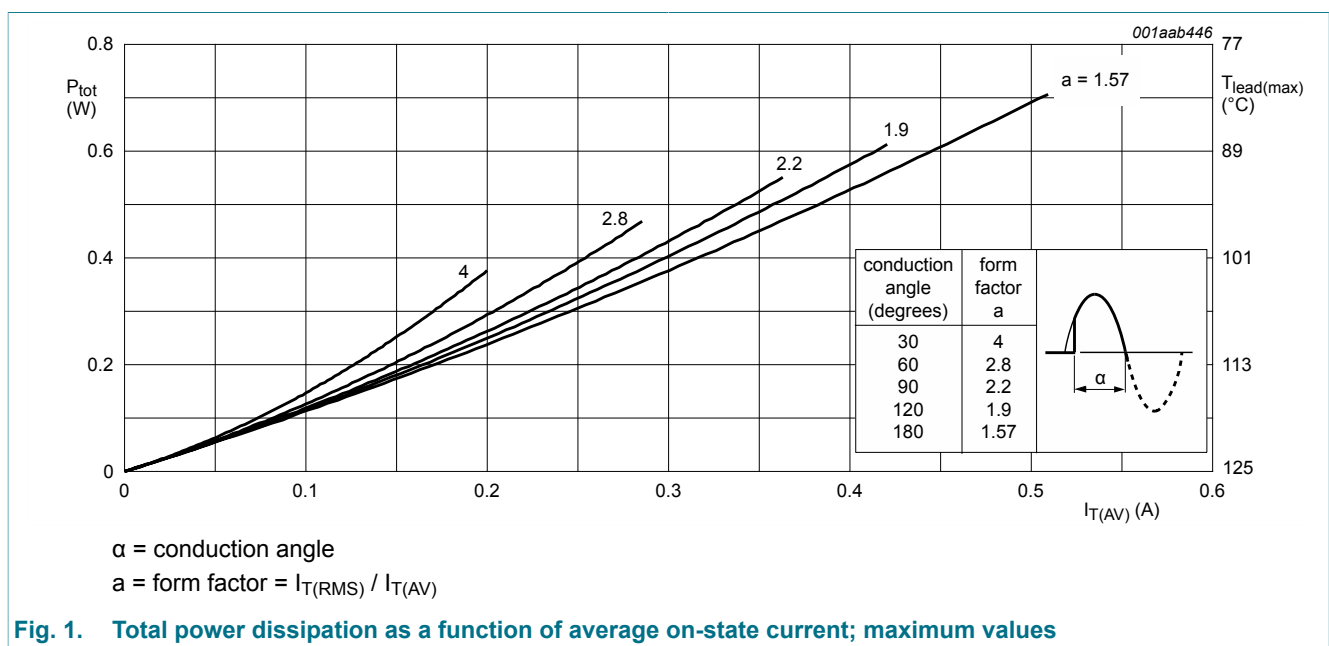
Type number	Marking code
BT169D	BT169DH
BT169D/01	BT169D
BT169D/DG	BT169DH

8. Limiting values

Table 5. 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
V_{RRM}	repetitive peak reverse voltage		-	400	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{lead} \leq 83\text{ }^{\circ}\text{C}$; Fig. 1	-	0.5	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{lead} \leq 83\text{ }^{\circ}\text{C}$; Fig. 2 ; Fig. 3	-	0.8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5	-	8	A
		half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$	-	9	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	0.32	A^2s
di_T/dt	rate of rise of on-state current	$I_T = 2\text{ A}$; $I_G = 10\text{ mA}$; $di_G/dt = 100\text{ mA}/\mu\text{s}$	-	50	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current		-	1	A
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	$^{\circ}\text{C}$
T_j	junction temperature		-	125	$^{\circ}\text{C}$



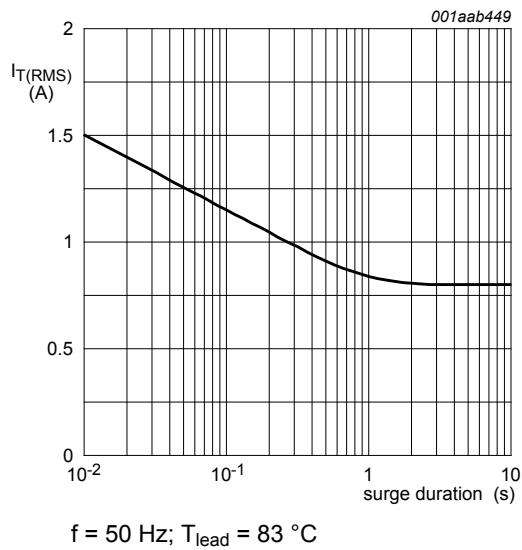


Fig. 2. RMS on-state current as a function of surge duration for sinusoidal currents

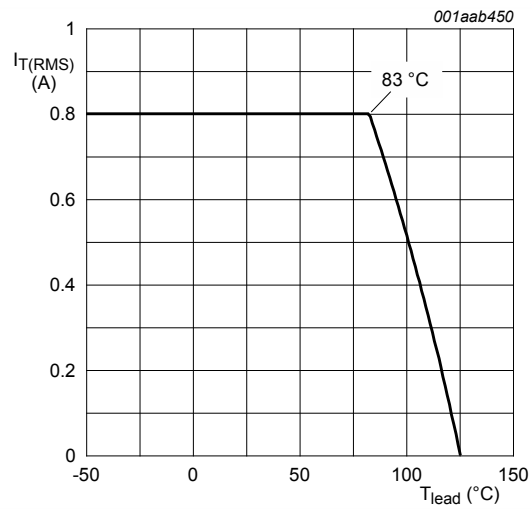


Fig. 3. RMS on-state current as a function of lead temperature; maximum values

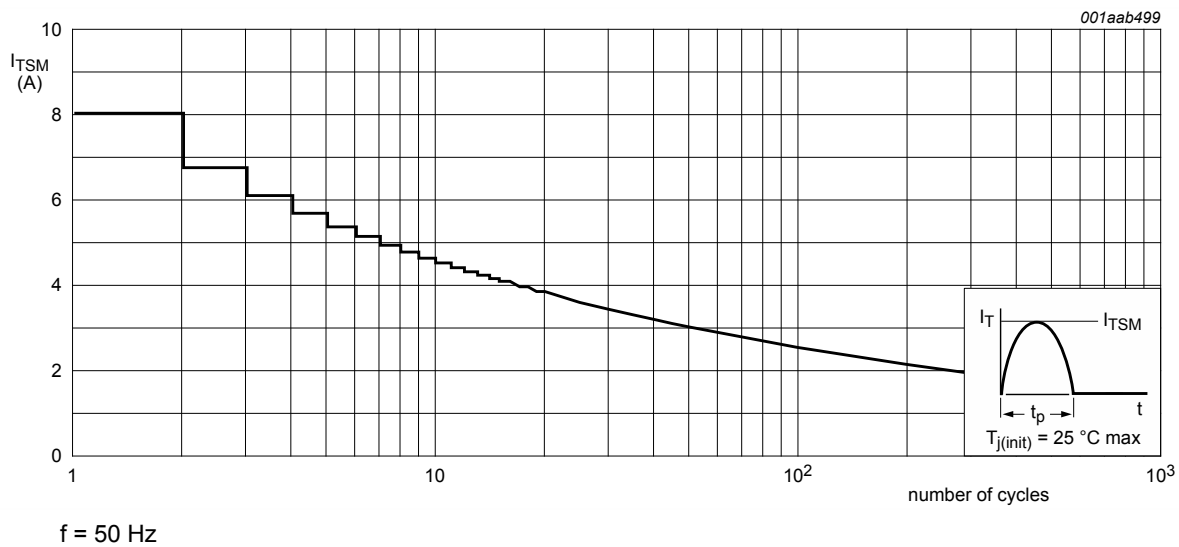
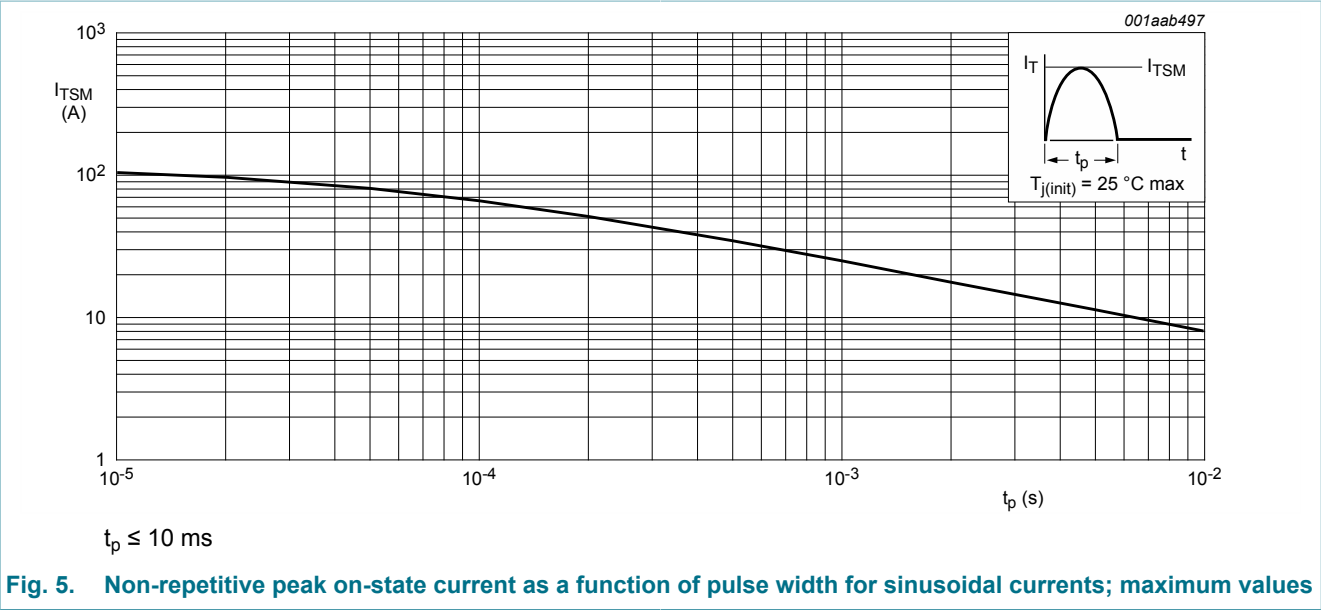


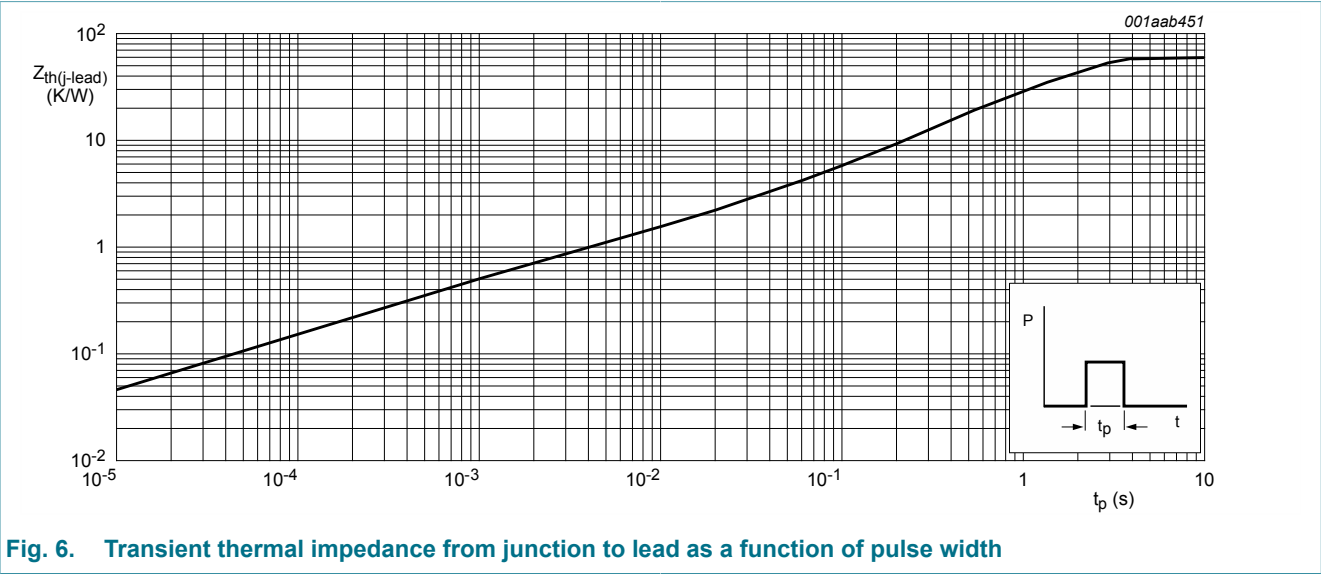
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



9. Thermal characteristics

Table 6. Thermal characteristics

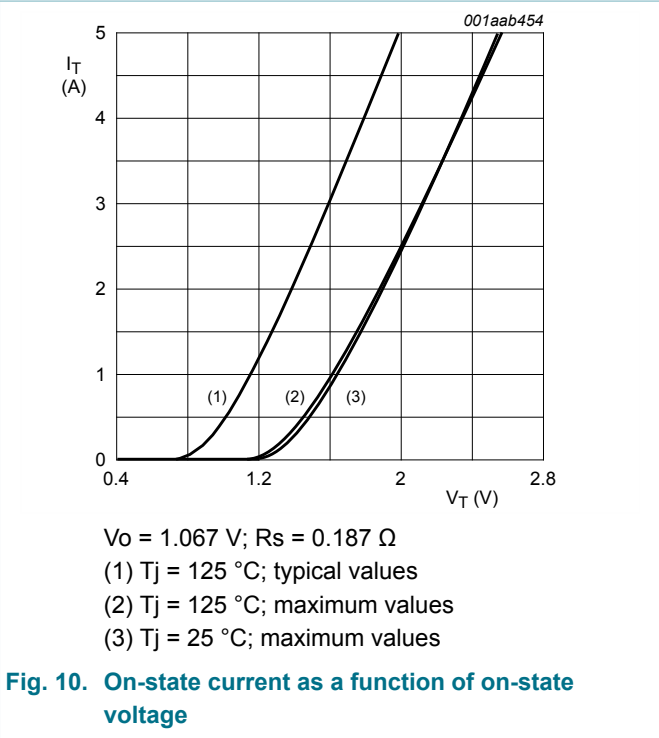
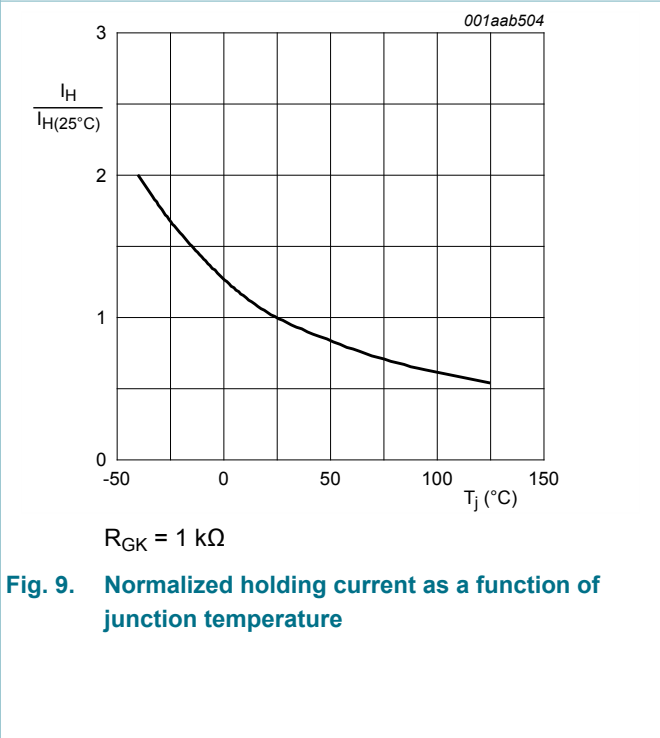
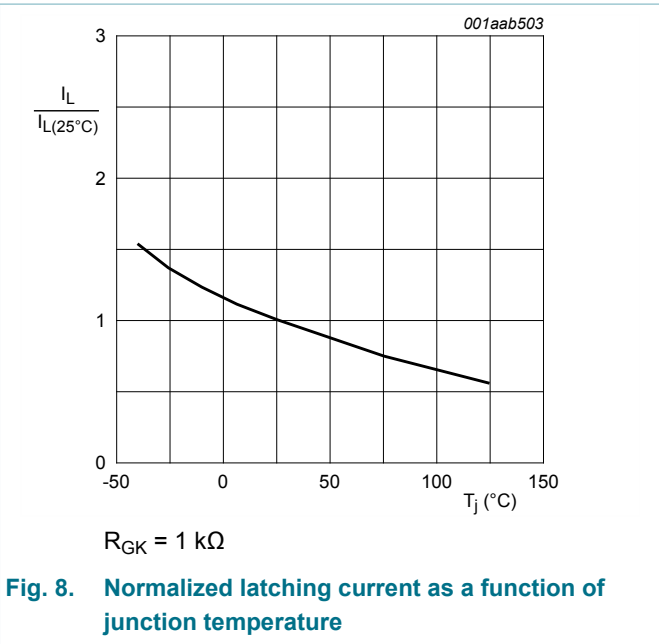
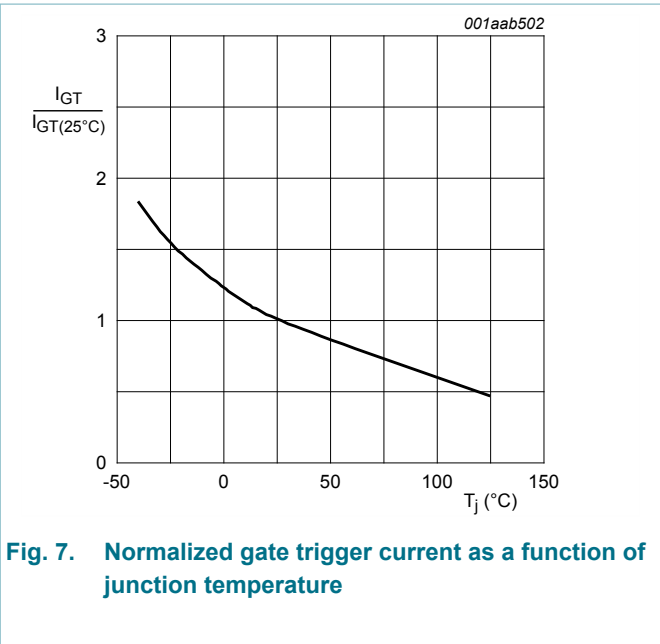
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	Fig. 6	-	-	60	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	printed circuit board mounted: lead length = 4 mm	-	150	-	K/W

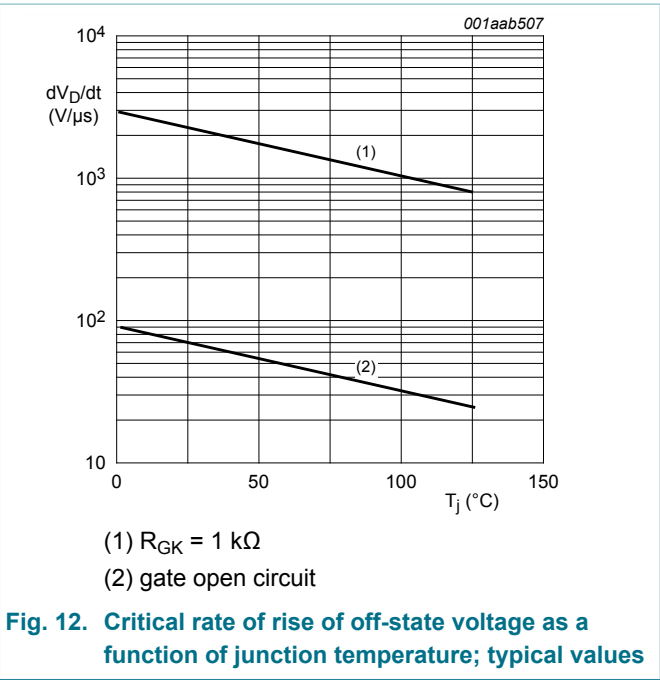
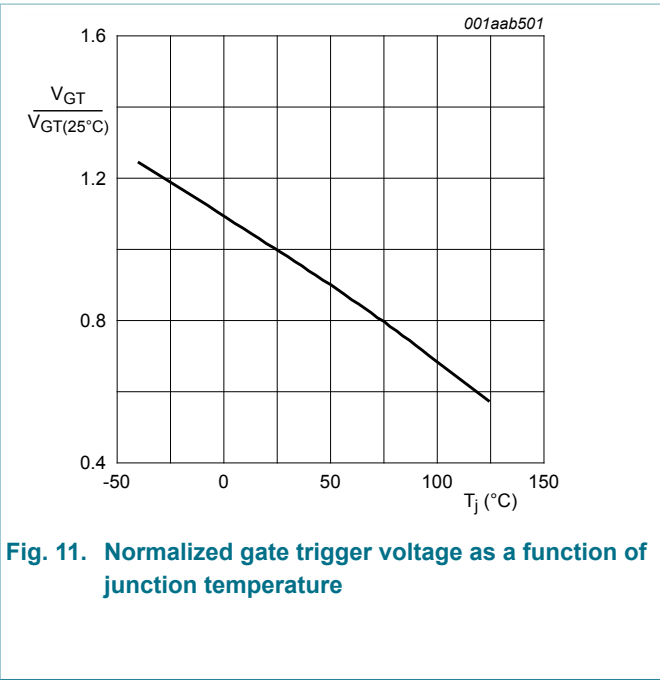


10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7		-	50	200	μA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.5\text{ mA}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 8		-	2	6	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9		-	2	5	mA
V_T	on-state voltage	$I_T = 1.2\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10		-	1.25	1.7	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11		-	0.5	0.8	V
		$V_D = 400\text{ V}$; $I_T = 10\text{ mA}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 11		0.2	0.3	-	V
I_D	off-state current	$V_D = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	0.05	0.1	mA
I_R	reverse current	$V_R = 400\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	0.05	0.1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 268\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $R_{GK} = 1\text{ k}\Omega$; exponential waveform; Fig. 12		500	800	-	V/ μs
		$V_{DM} = 268\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; exponential waveform; gate open circuit; Fig. 12		-	25	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 2\text{ A}$; $V_D = 400\text{ V}$; $I_G = 10\text{ mA}$; $dI_G/dt = 0.1\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 268\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{TM} = 1.6\text{ A}$; $V_R = 35\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 2\text{ V}/\mu\text{s}$; $R_{GK} = 1\text{ k}\Omega$		-	100	-	μs





11. Package outline

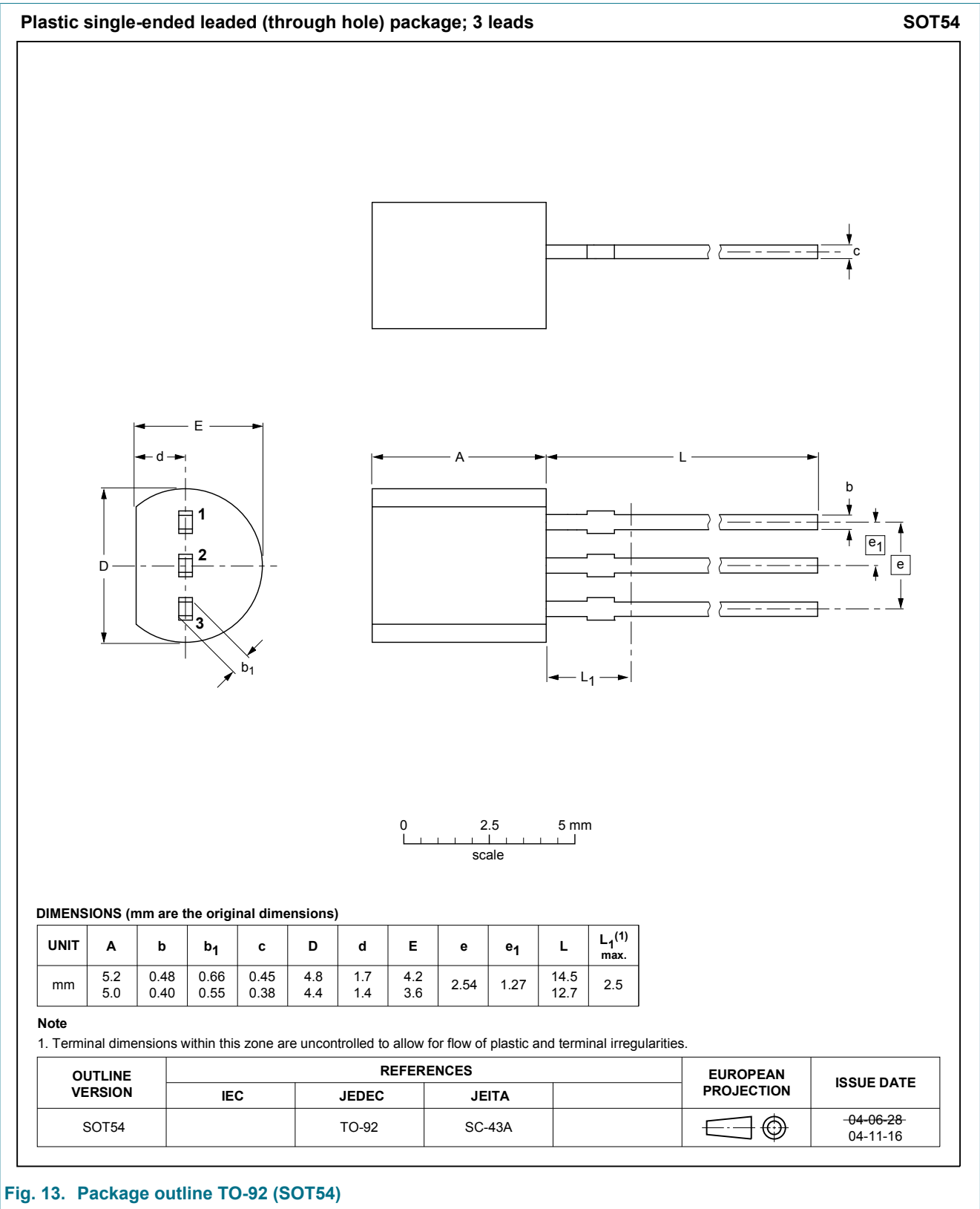


Fig. 13. Package outline TO-92 (SOT54)

12. Legal information

12.1 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.

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