

1. General description

Planar passivated very sensitive gate four quadrant triac in a TO92 plastic package. This very sensitive gate "series D" triac is intended for interfacing with low power drivers including microcontrollers.

2. Features and benefits

- High blocking voltage capability
- Very sensitive gate
- Planar passivated for voltage ruggedness and reliability
- Triggering in all four quadrants
- Direct interfacing to logic level ICs
- Direct interfacing with low power gate drivers and microcontrollers

3. Applications

- General purpose low power motor control
- General purpose switching and phase control
- Air conditioner indoor fan control

4. Quick reference data

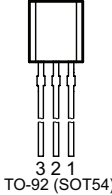
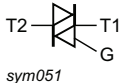
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Absolute maximum rating						
V_{DRM}	repetitive peak off-state voltage		-	-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{lead} \leq 51.2 \text{ }^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(initial)} = 25 \text{ }^\circ\text{C}$; $t_p = 20 \text{ ms}$; Fig. 4 ; Fig. 5	-	-	12.5	A
		full sine wave; $T_{j(initial)} = 25 \text{ }^\circ\text{C}$; $t_p = 16.7 \text{ ms}$	-	-	13.7	A
T_j	junction temperature		-	-	125	$^\circ\text{C}$
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G+; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7	-	-	5	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G-; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7	-	-	5	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2- G-; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7	-	-	5	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2- G+; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7	-	-	7	mA

I_H	holding current	$V_D = 12\text{ V}; T_j = 25\text{ °C};$ Fig. 9	-	1.3	10	mA
V_T	on-state voltage	$I_T = 1.4\text{ A}; T_j = 25\text{ °C};$ Fig. 10	-	1.2	1.5	V
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Dynamic characteristics						
dV_{D}/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}; T_j = 125\text{ °C}; (V_{DM} = 67\%$ of V_{DRM}); exponential waveform; $R_{GT1(ext)} = 1\text{ k}\Omega$	20	-	-	V/ μ s
dV_{com}/dt	rate of change of commutating voltage	$V_D = 400\text{ V}; T_j = 125\text{ °C}; dI_{com}/dt = 0.5\text{ A/ms}; I_T = 1\text{ A};$ gate open circuit	3	-	-	V/ μ s

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T2	main terminal 2		 sym051
2	G	gate		
3	T1	main terminal 1		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BT131-800D	TO92	BT131-600D,112	Bulk	1000	SOT54	14-Nov-2013
BT131-800D	TO92	BT131-600D,412	Bulk	1000	SOT54	14-Nov-2013
BT131-800D	TO92	BT131-600D,116	Reel	2000	SOT54	14-Nov-2013
BT131-800D/L01	TO92	BT131-600D/L01EP	Bulk	500	SOT54/L01	14-Nov-2013

7. Marking

Table 4. Marking codes

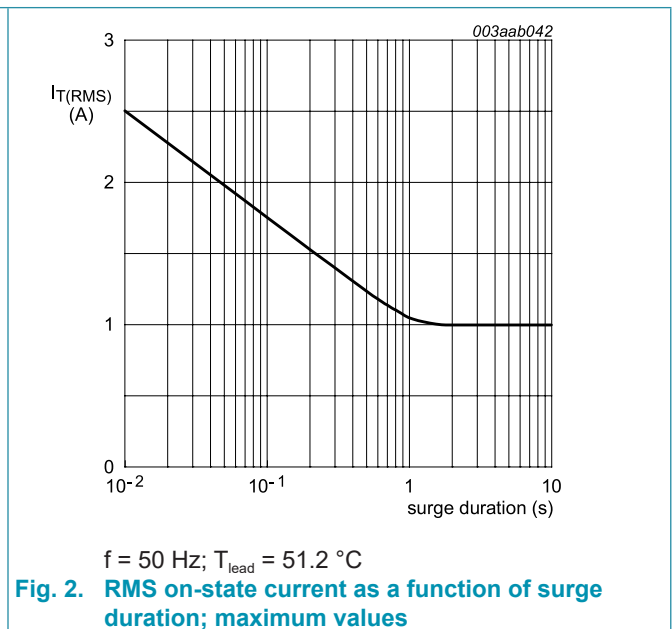
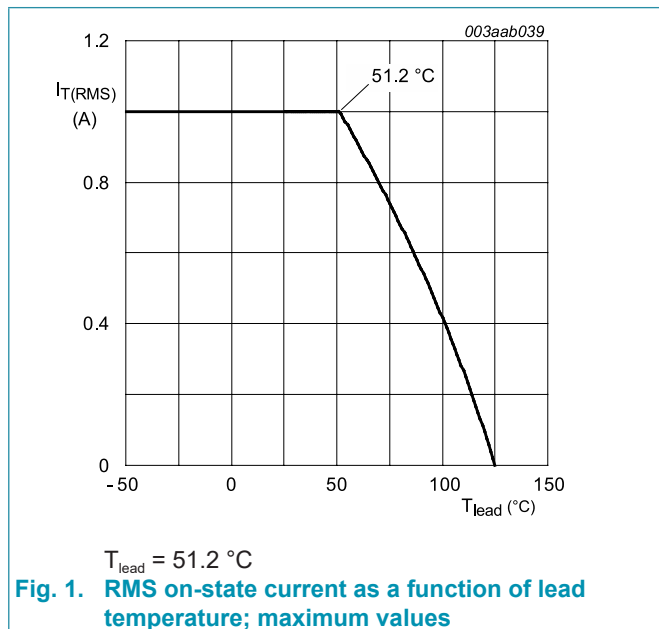
Type number	Marking codes
BT131-800D	131-8D

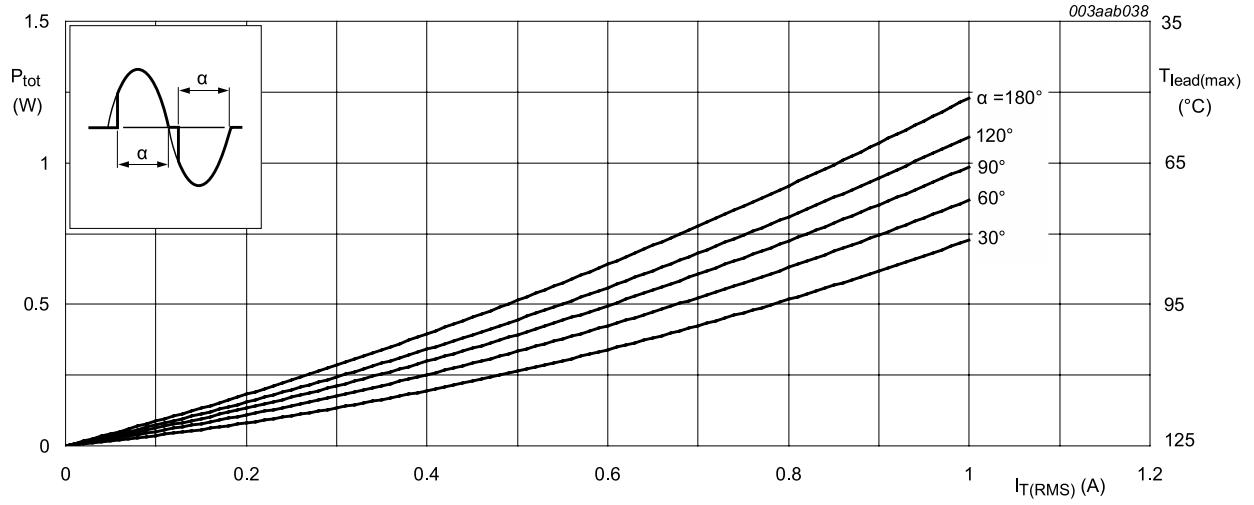
8. Limiting values

Table 5. Limiting values

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

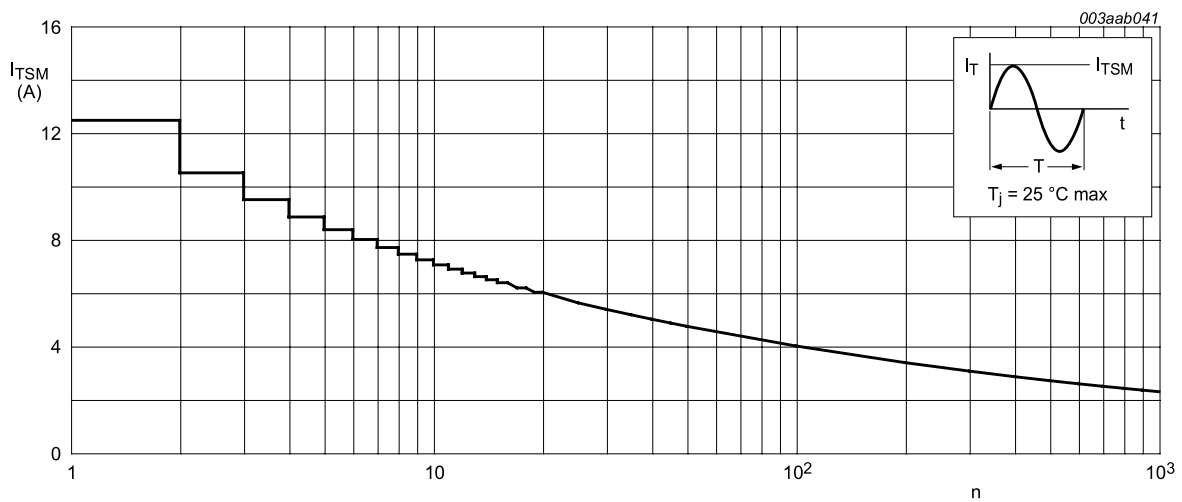
Symbol	Parameter	Conditions	Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{lead} \leq 51.2\text{ °C}$; Fig 1 ; Fig 2 ; Fig 3	-	1	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 20\text{ ms}$; Fig 4 ; Fig 5	-	12.5	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	13.7	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	0.78	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 10\text{ mA}$	-	50	$A/\mu s$
		$I_G = 10\text{ mA}$	-	50	$A/\mu s$
		$I_G = 10\text{ mA}$	-	50	$A/\mu s$
		$I_G = 14\text{ mA}$	-	10	$A/\mu s$
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_{stg}	storage temperature		-40	150	$^{\circ}C$
T_j	junction temperature		-	125	$^{\circ}C$





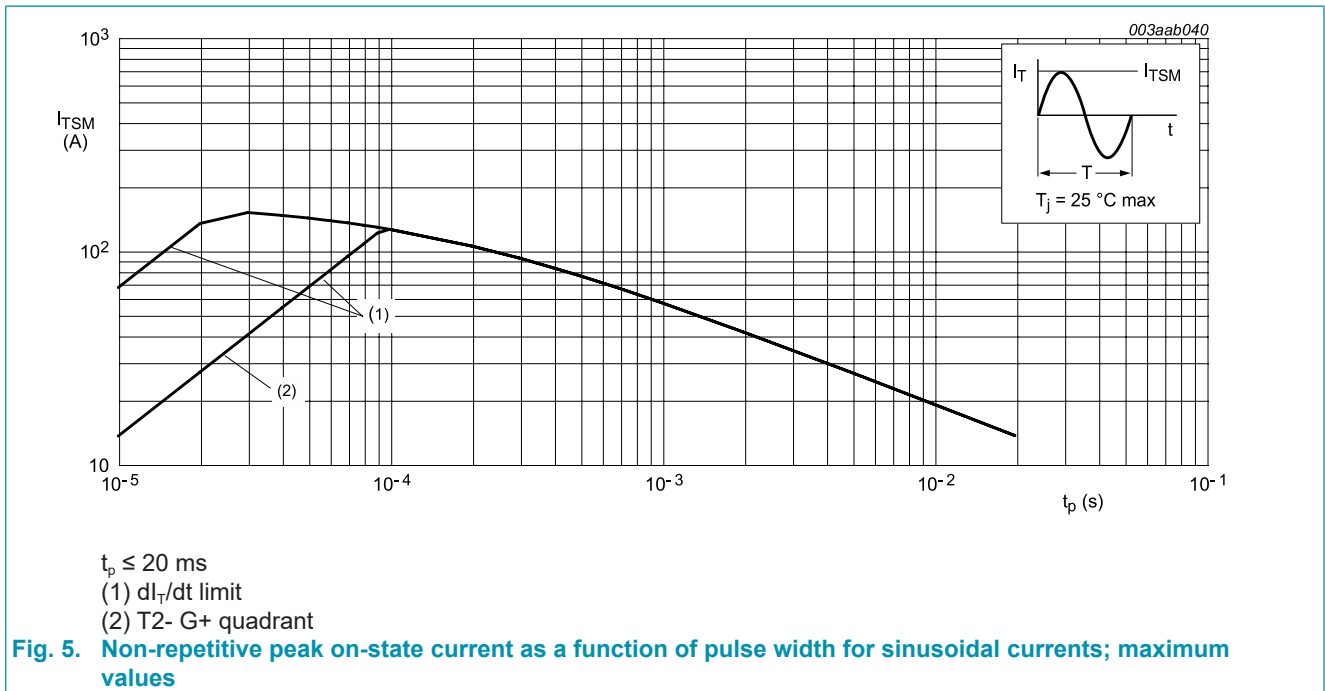
α = conduction angle

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



$f = 50\text{ Hz}$

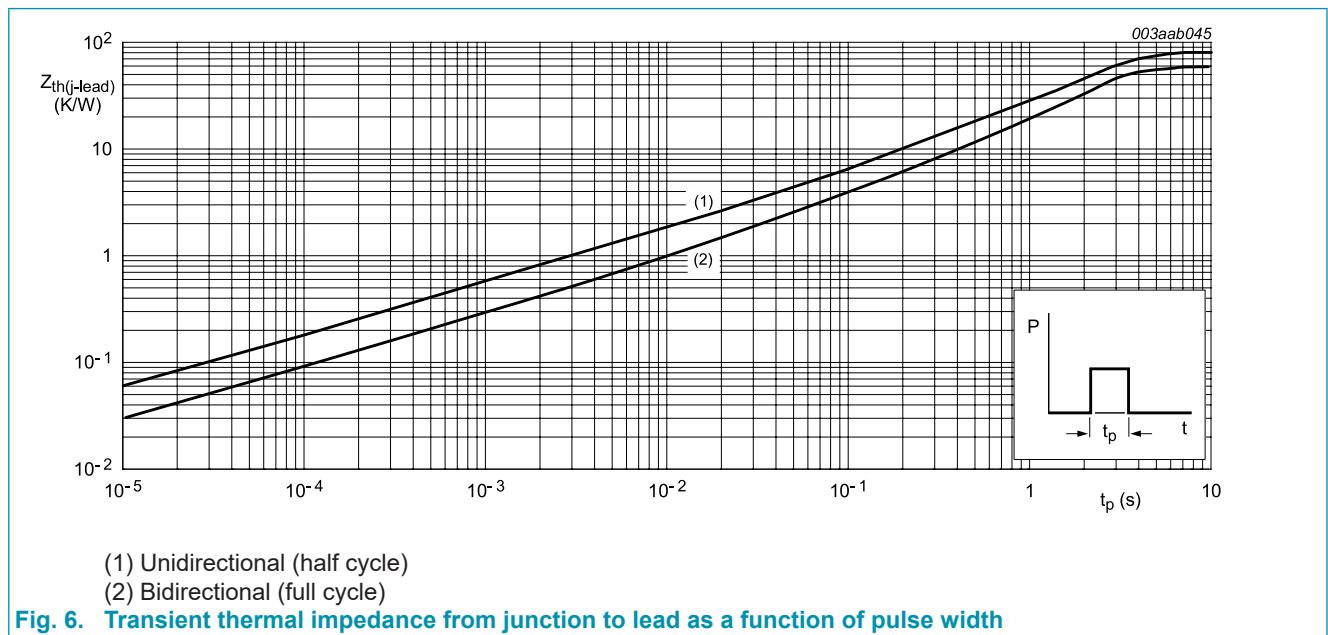
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



9. Thermal characteristics

Table 6. Thermal characteristics

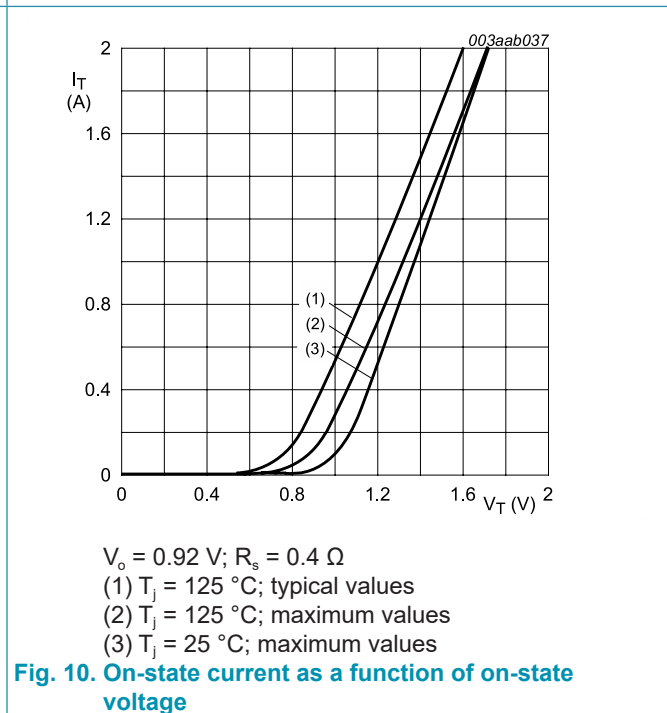
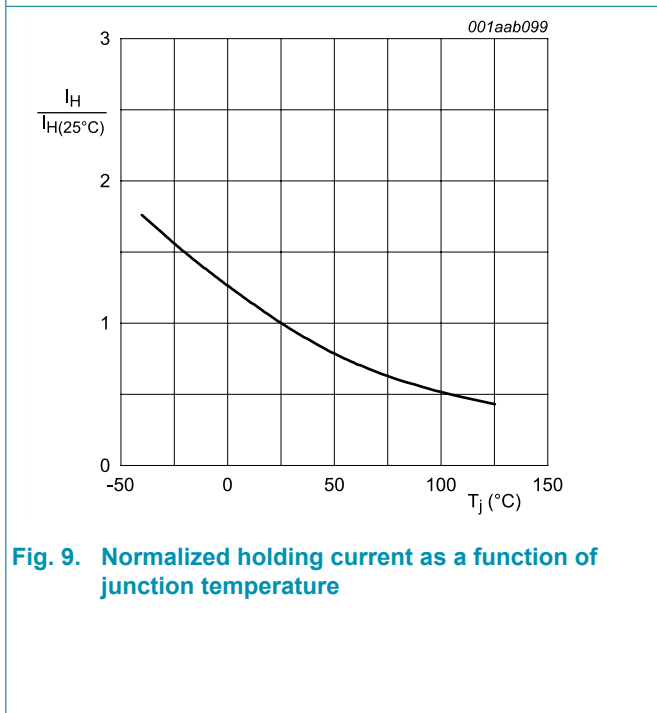
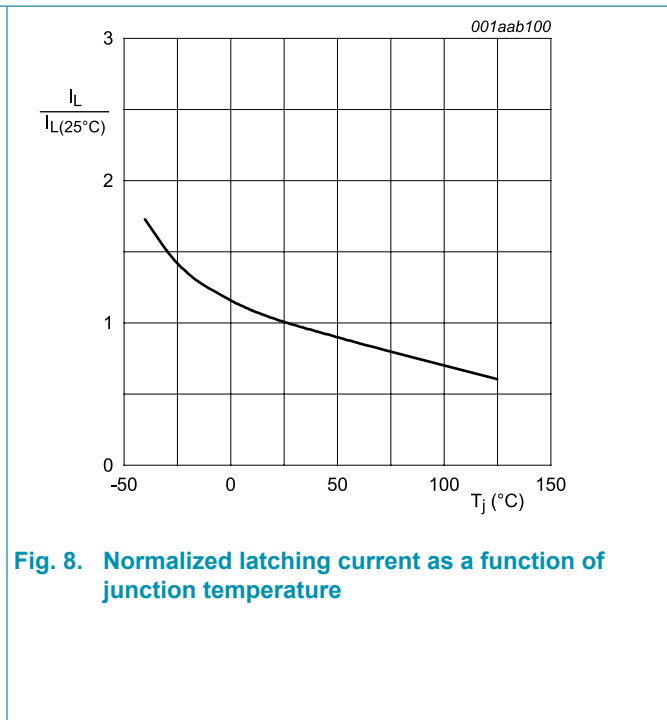
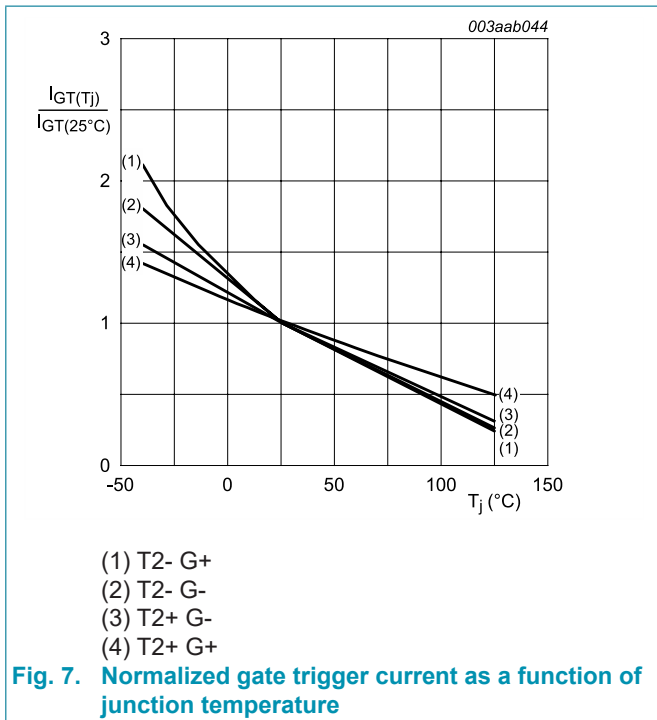
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-lead)}$	thermal resistance from junction to lead	full cycle; Fig 6	-	-	60	K/W
		half cycle; Fig 6	-	-	80	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board mounted: lead length = 4 mm	-	150	-	K/W

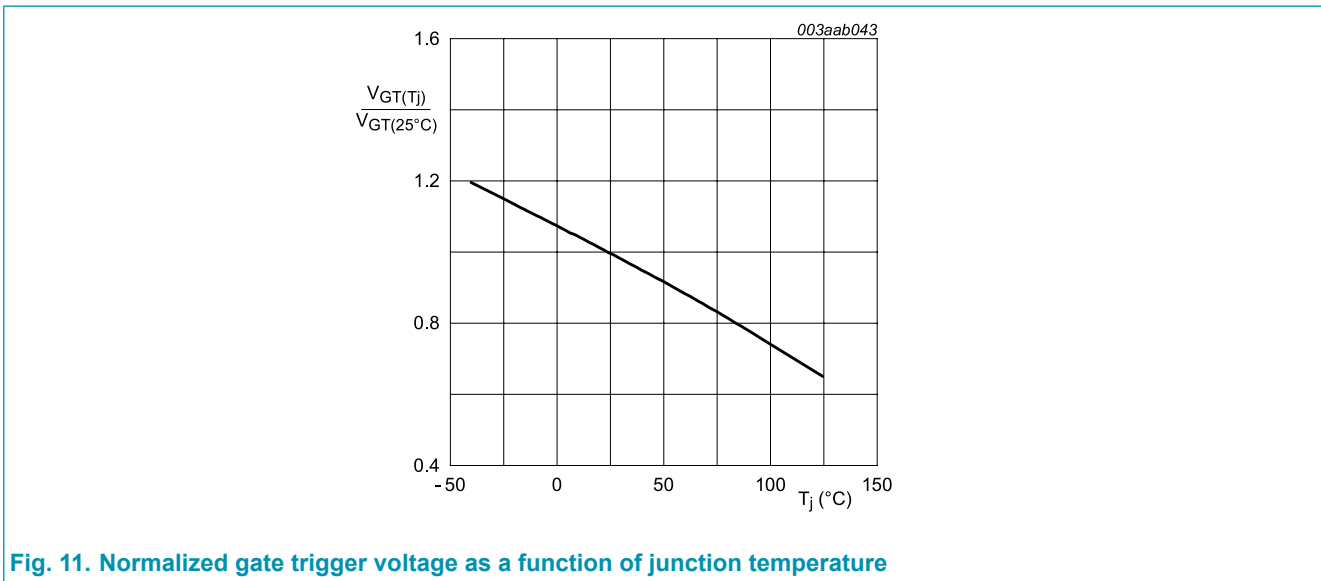


10. Characteristics

Table 7. Characteristics

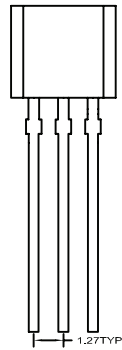
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_J = 25\text{ °C}$; Fig. 7	-	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G-; $T_J = 25\text{ °C}$; Fig. 7	-	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G-; $T_J = 25\text{ °C}$; Fig. 7	-	-	5	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G+; $T_J = 25\text{ °C}$; Fig. 7	-	-	7	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G+; $T_J = 25\text{ °C}$; Fig. 8	-	-	10	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2+ G-; $T_J = 25\text{ °C}$; Fig. 8	-	-	20	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G-; $T_J = 25\text{ °C}$; Fig. 8	-	-	10	mA
		$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; T2- G+; $T_J = 25\text{ °C}$; Fig. 8	-	-	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ °C}$; Fig. 9	-	1.3	10	mA
V_T	on-state voltage	$I_T = 1.4\text{ A}$; $T_J = 25\text{ °C}$; Fig. 10	-	1.2	1.5	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_J = 25\text{ °C}$; Fig. 11	-	0.7	1	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_J = 125\text{ °C}$	0.2	0.3	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_J = 125\text{ °C}$	-	0.1	0.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_J = 125\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; $R_{GT1(ext)} = 1\text{ k}\Omega$	20	-	-	V/ μ s
dV_{com}/dt	rate of change of commutating voltage	$V_D = 400\text{ V}$; $T_J = 125\text{ °C}$; $dI_{com}/dt = 0.5\text{ A/ms}$; $I_T = 1\text{ A}$; gate open circuit	3	-	-	V/ μ s
t_{gt}	gate-controlled turn-on time	$I_{TM} = 1.5\text{ A}$; $V_D = 800\text{ V}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$	-	2	-	μ s



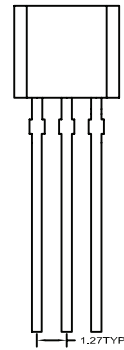


11. Package outline

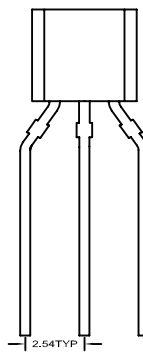
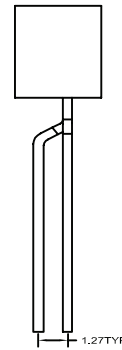
SOT54 PACKAGE OUTLINE



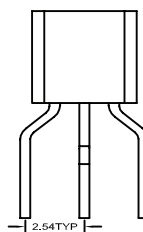
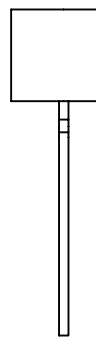
SOT54
Bulk Pack - 412



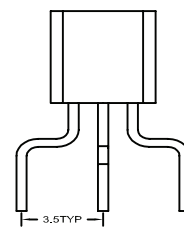
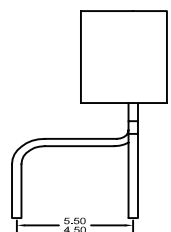
SOT54 LEADS ON CIRCLE
Bulk Pack - 112



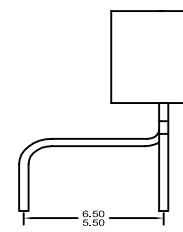
SOT54 WIDE PITCH
Tape/ Reel Pack - 116
Ammo Pack - 126



SOT54 LEAD BEND L01
Bulk Pack - 412



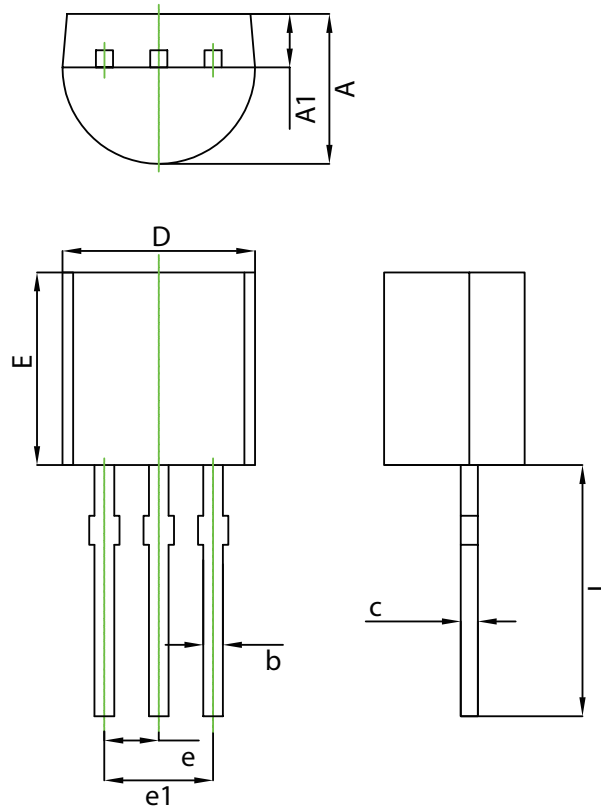
SOT54 LEAD BEND L02
Bulk Pack - 412



Remark: Detailed dimensions refer to POD drawing.

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

TO92



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	3.300	3.700	0.130	0.146
A1	1.100	1.400	0.043	0.055
b	0.380	0.550	0.015	0.022
c	0.360	0.510	0.014	0.020
D	4.300	4.700	0.169	0.185
E	4.300	4.700	0.169	0.185
e	1.270 TYP.		0.050 TYP.	
e1	2.440	2.640	0.096	0.104
L	14.100	14.500	0.555	0.571

12. Legal information

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.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.ween-semi.com>.

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For sales office addresses, please send an email to: salesaddresses@ween-semi.com

Date of release: 19 October 2021
