

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a TO220 plastic package intended for use in applications requiring very high inrush current capability, high thermal cycling performance and high junction temperature capability ($T_{j(max)} = 150\text{ °C}$).

2. Features and benefits

- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- Very high current surge capability
- Planar passivated for voltage ruggedness and reliability
- High thermal cycling performance
- High voltage capability

3. Applications

- Line rectifying 50/60 Hz
- Softstart AC motor control
- DC Motor control
- Power converter
- AC power control
- Lighting and temperature control
- Uninterruptible Power Supply (UPS)
- Solid State Relay (SSR)
- Traction battery charging

4. Quick reference data

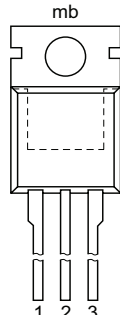

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak off-state voltage			800	V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 134\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		30	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig 4 ; Fig 5		400	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		440	A
T_j	operating junction temperature			150	°C

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ °C}$; Fig. 7		6	-	15	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 30\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10		-	1.10	1.30	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 150\text{ °C}$; exponential waveform; gate open circuit		1000	-	-	V/ μ s

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		 sym037
2	A	anode		
3	G	gate		
mb	A	mounting base; connected to anode		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
TYN30-800TN	TO220	TYN30-800TNQ	Tube	50	SOT78	13-Jun-2008

7. Marking

Table 4. Marking codes

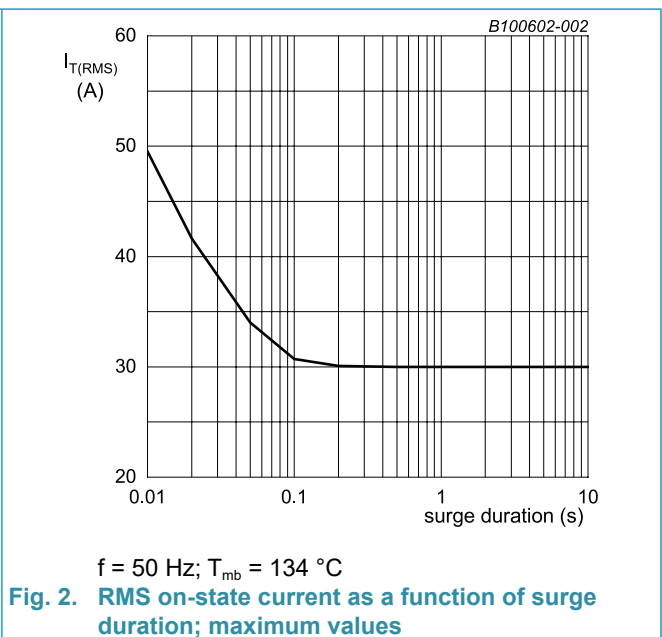
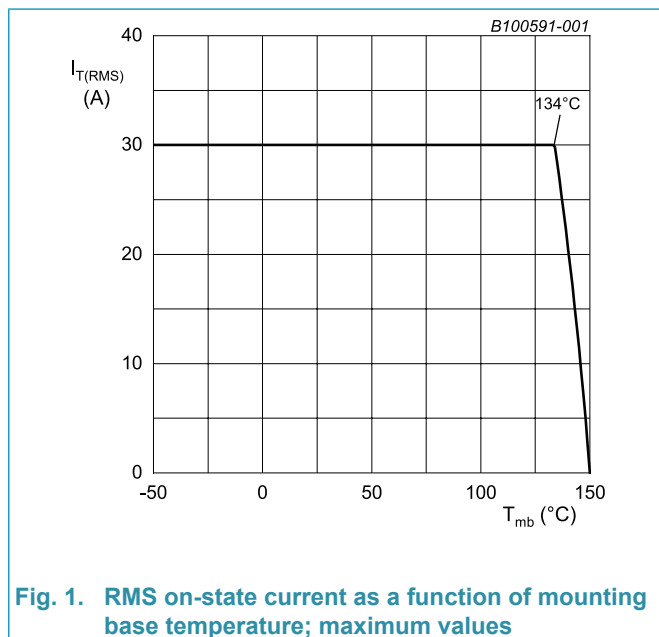
Type number	Marking codes	
	Assembly factory: A	Assembly factory: d
TYN30-800TN	TYN30 800TN PJAXxxx xx	TYN30 800TN PJdxxxx xx

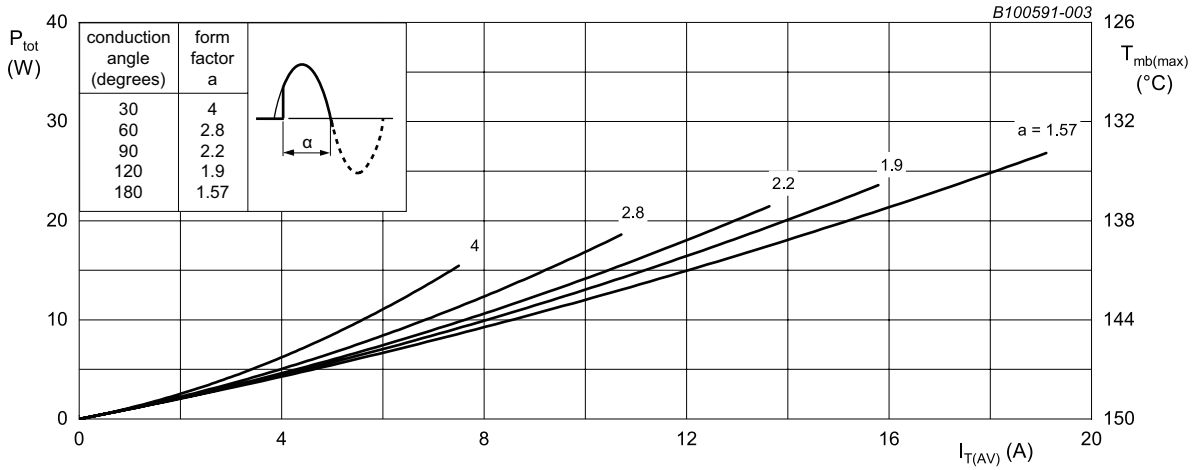
8. Limiting values

Table 5. Limiting values

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

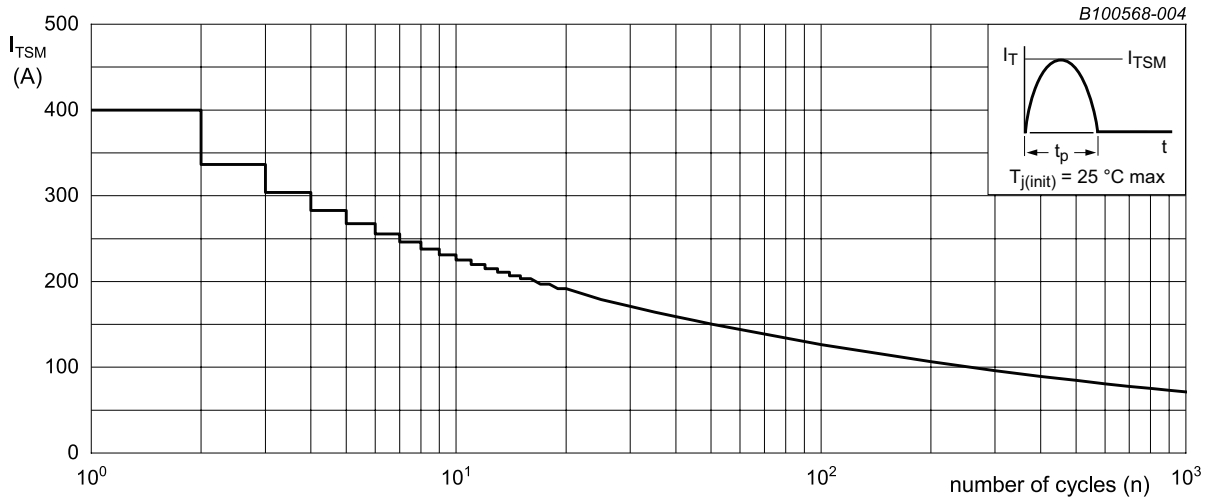
Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak off-state voltage			800	V
V_{RRM}	repetitive peak reverse voltage			800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 134\text{ }^{\circ}\text{C}$;		19	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 134\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		30	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig 4 ; Fig 5		400	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		440	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		800	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 30\text{ mA}$		500	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			5	A
V_{GM}	peak gate voltage			5	V
V_{RGM}	peak reverse gate voltage			7	V
P_{GM}	peak gate power			20	W
$P_{G(AV)}$	average gate power	over any 20 ms period		0.5	W
T_{stg}	storage temperature			-40 to 150	$^{\circ}\text{C}$
T_j	operating junction temperature			150	$^{\circ}\text{C}$





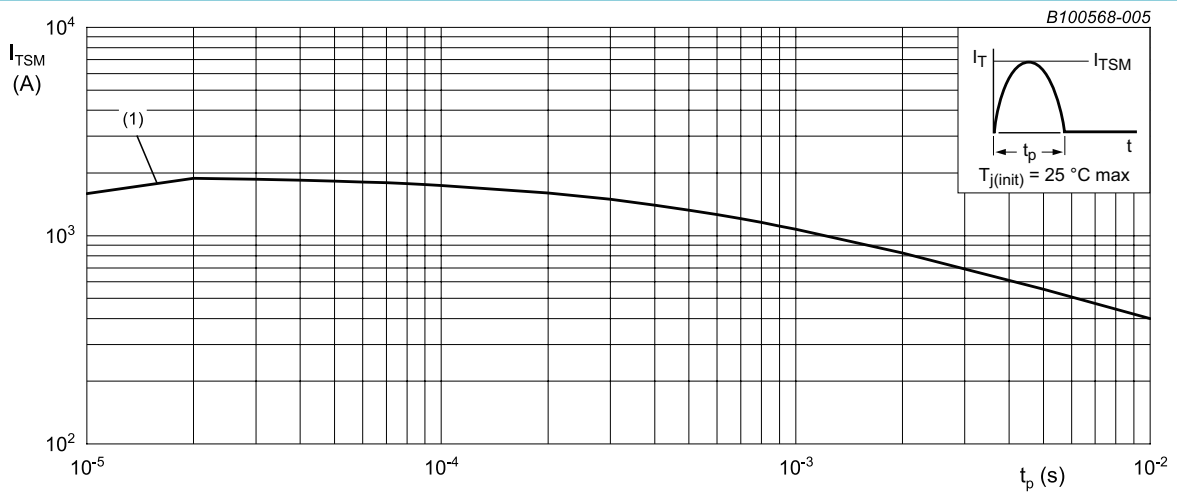
α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



f = 50 Hz

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



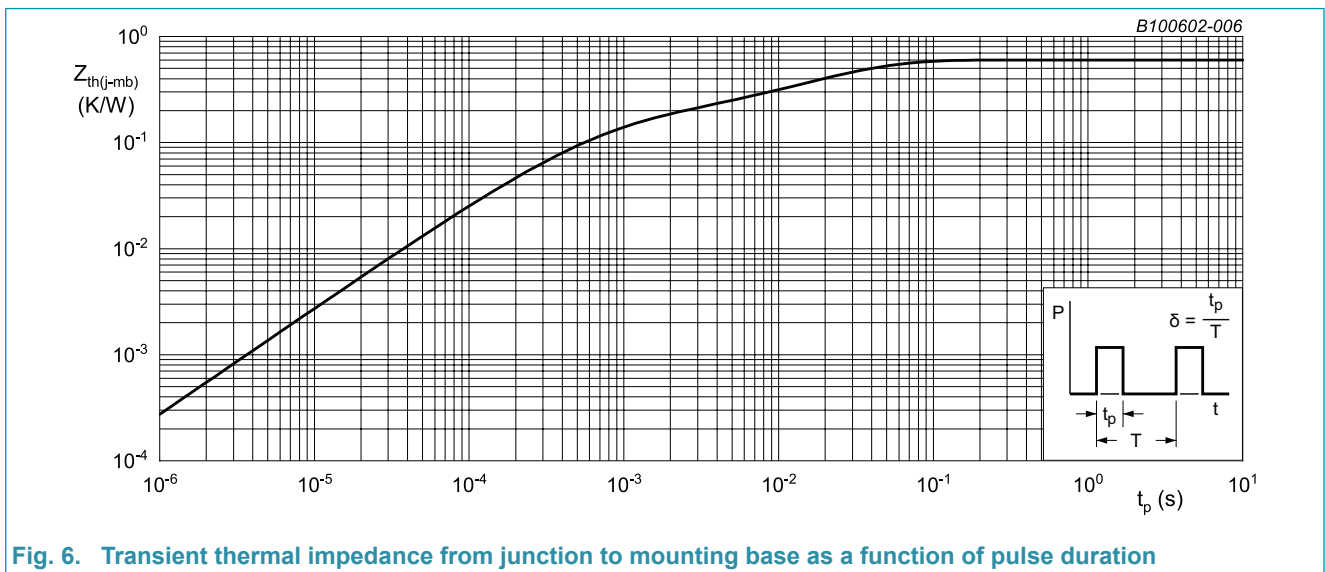
$t_p \leq 10$ ms
 (1) di_T/dt limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

9. Thermal characteristics

Table 6. Thermal characteristics

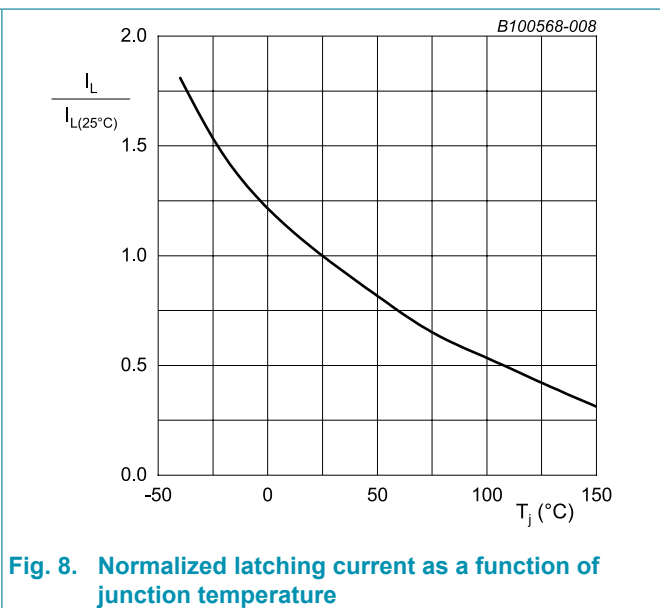
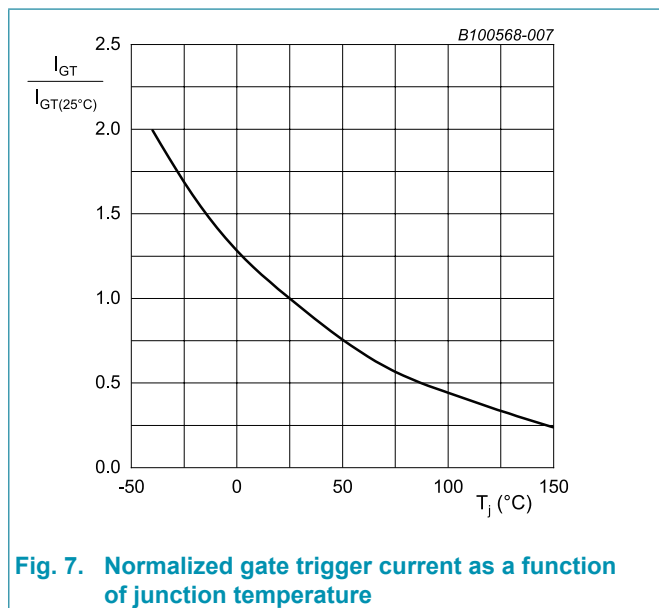
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig 6		-	-	0.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W



10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$; Fig. 7		6	-	15	mA
I_L	latching current	$V_D = 12\text{ V}; I_G = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$; Fig. 8		-	-	80	mA
I_H	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C}$; Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 30\text{ A}; T_j = 25\text{ }^\circ\text{C}$; Fig. 10		-	1.10	1.30	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$; Fig. 11		-	0.6	1	V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 150\text{ }^\circ\text{C}$		0.25	0.4	-	V
I_D	off-state current	$V_D = 800\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_D = 800\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	1	mA
I_R	reverse current	$V_R = 800\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_R = 800\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}; T_j = 150\text{ }^\circ\text{C}$; exponential waveform; gate open circuit		1000	-	-	V/ μs
		$V_{DM} = 536\text{ V}; T_j = 150\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		500	-	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 30\text{ A}; V_D = 800\text{ V}; I_G = 100\text{ mA}$; $di_G/dt = 5\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 536\text{ V}; T_j = 150\text{ }^\circ\text{C}$; $I_{TM} = 30\text{ A}$; $V_R = 25\text{ V}$; $di_T/dt = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 50\text{ V}/\mu\text{s}$		-	70	-	μs



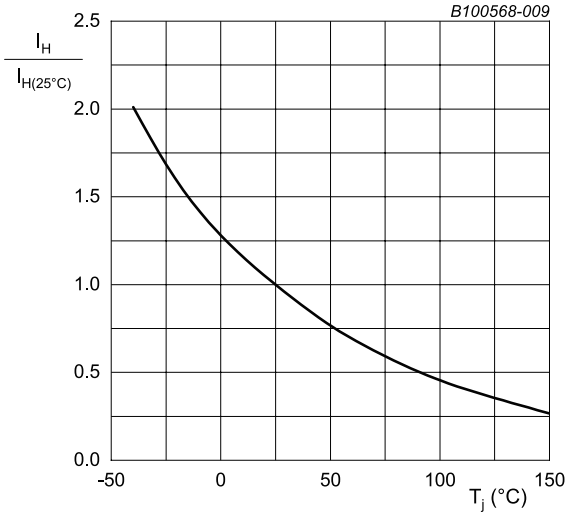
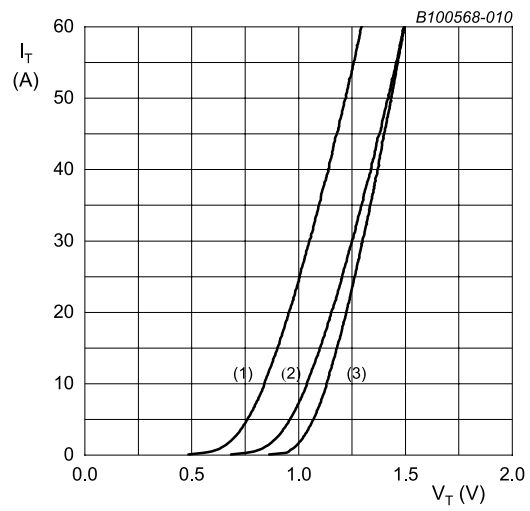


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 0.980 \text{ V}; R_s = 0.0090 \Omega$
 (1) $T_j = 150 \text{ }^\circ\text{C}$; typical values
 (2) $T_j = 150 \text{ }^\circ\text{C}$; maximum values
 (3) $T_j = 25 \text{ }^\circ\text{C}$; maximum values

Fig. 10. On-state current as a function of on-state voltage

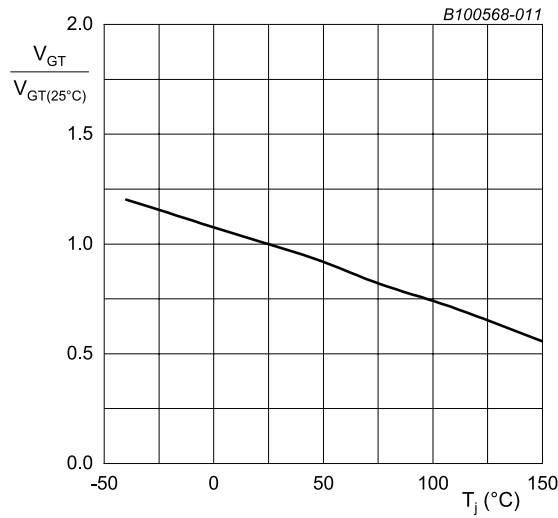


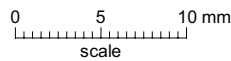
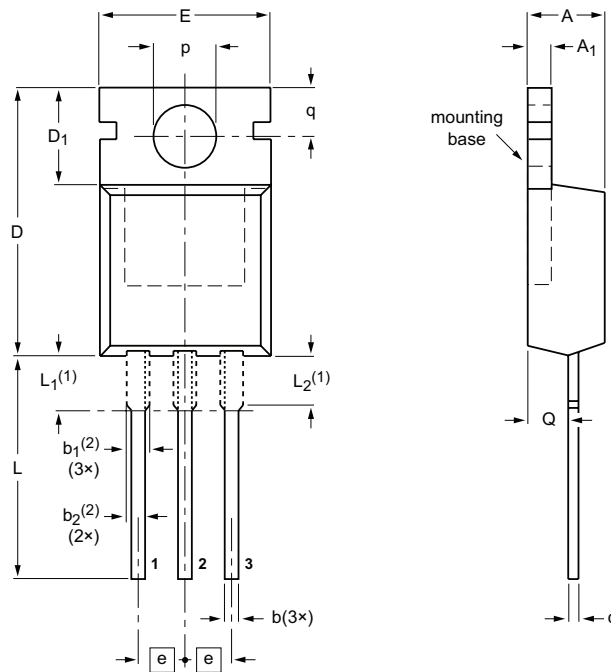
Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Assembly factory: A & d

Plastic single-ended package; heatsink mounted; 1 mounting hole; 3-lead TO-220AB

SOT78



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁ (²)	b ₂ (²)	c	D	D ₁	E	e	L	L ₁ (¹)	L ₂ (¹) max.	p	q	Q
mm	4.7 4.1	1.40 1.25	0.9 0.6	1.6 1.0	1.3 1.0	0.7 0.4	16.0 15.2	6.6 5.9	10.3 9.7	2.54	15.0 12.8	3.30 2.79	3.0	3.8 3.5	3.0 2.7	2.6 2.2

Notes

- 1. Lead shoulder designs may vary.
- 2. Dimension includes excess dambar.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT78		3-lead TO-220AB	SC-46		08-04-23 08-06-13

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".
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