

1. General description

Planar passivated four quadrant triac in a ITO3P package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This triac will commutate the full RMS current at the maximum rated junction temperature ($T_{j(max)} = 150\text{ °C}$). It is used in applications where "high junction operating temperature capability" is required.

2. Features and benefits

- High current TRIAC
- Low thermal resistance
- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- Insulated tab rated at 2500 V rms

3. Applications

- High current / high surge applications
- High power / industrial controls -- e.g. heating, motors, lighting

4. Quick reference data

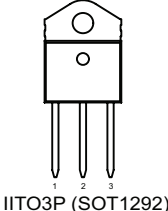
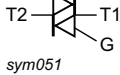
Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
Absolute maximum rating				
V_{DRM}	repetitive peak off-state voltage		800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 96\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	45	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $t_p = 20\text{ ms}$; $T_{j(init)} = 25\text{ °C}$; Fig. 4 ; Fig. 5	450	A
		full sine wave; $t_p = 16.7\text{ ms}$; $T_{j(init)} = 25\text{ °C}$	495	A
T_j	junction temperature		150	°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	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G- $T_J = 25\text{ }^\circ\text{C}$; Fig. 7	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G- $T_J = 25\text{ }^\circ\text{C}$; Fig. 7	-	-	50	mA
		$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2- G+ $T_J = 25\text{ }^\circ\text{C}$; Fig. 7	-	-	70	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 9	-	-	80	mA
V_T	on-state voltage	$I_T = 63.6\text{ A}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 10	-	1.3	1.6	V
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit	750	-	-	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
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 20\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit	20	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 150\text{ }^\circ\text{C}$; $I_{T(RMS)} = 20\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; gate open circuit	10	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 ITO3P (SOT1292)	 sym051
2	T2	main terminal 2		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
BTA45-800B	IITO3P	BTA45-800BQ	Tube	30	SOT1292	21-Jul-2017

7. Marking

Table 4. Marking codes

Type number	Marking codes
BTA45-800B	BTA45-800B

8. Limiting values

Table 4. Limiting values

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

Symbol	Parameter	Conditions	Values	Unit
V_{DRM}	repetitive peak off-state voltage		800	V
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{mb}} \leq 96^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	45	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $t_p = 20 \text{ ms}$; $T_{\text{j(init)}} = 25^{\circ}\text{C}$; Fig. 4 ; Fig. 5	450	A
		full sine wave; $t_p = 16.7 \text{ ms}$; $T_{\text{j(init)}} = 25^{\circ}\text{C}$;	495	A
I^2t	I^2t for fusing	$t_p = 10 \text{ ms}$; sine wave	1012.5	A^2s
di_{T}/dt	rate of rise of on-state current	$I_{\text{G}} = 150 \text{ mA}$	150	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current	$t_p = 20 \mu\text{s}$	8	A
P_{GM}	peak gate power	$t_p = 20 \mu\text{s}$	40	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period	1	W
T_{stg}	storage temperature		-40 to 150	$^{\circ}\text{C}$
T_{j}	junction temperature		150	$^{\circ}\text{C}$

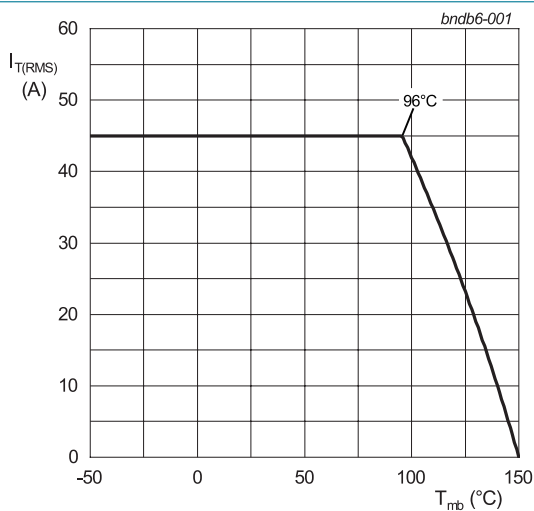


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

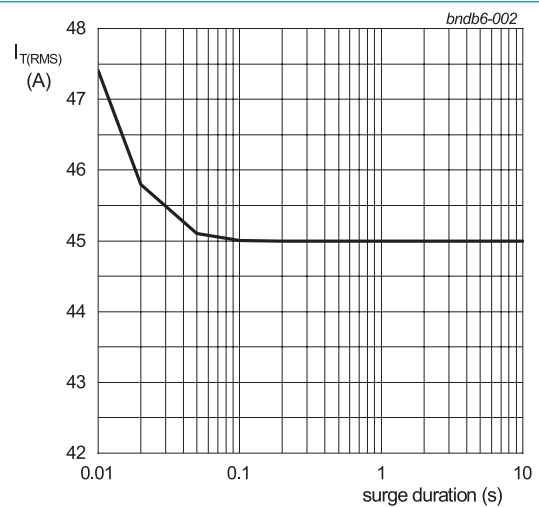
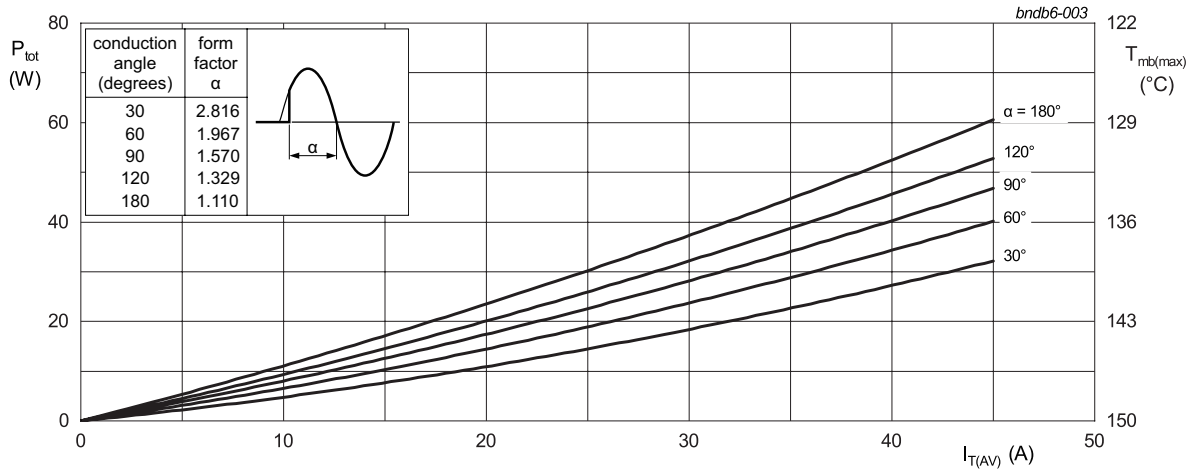
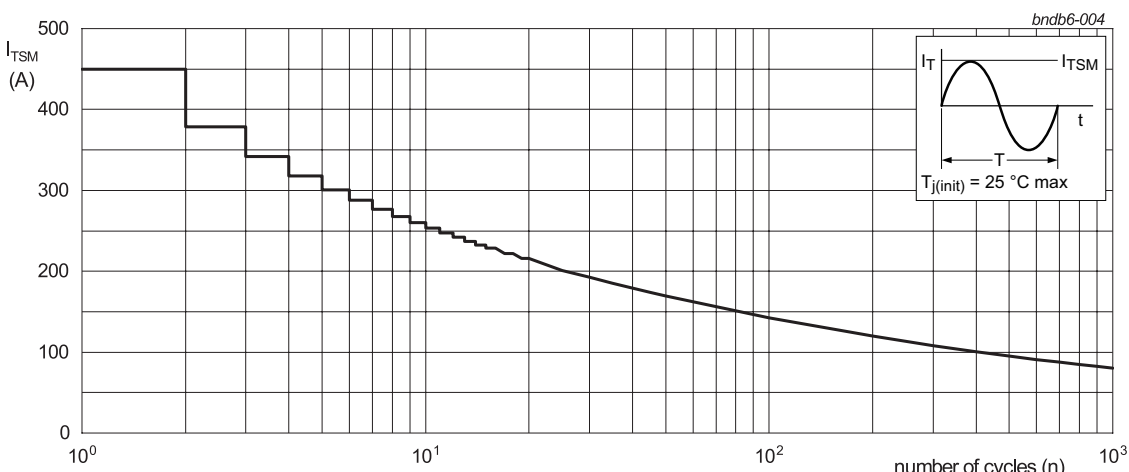


Fig. 2. RMS on-state current as a function of surge duration; maximum values



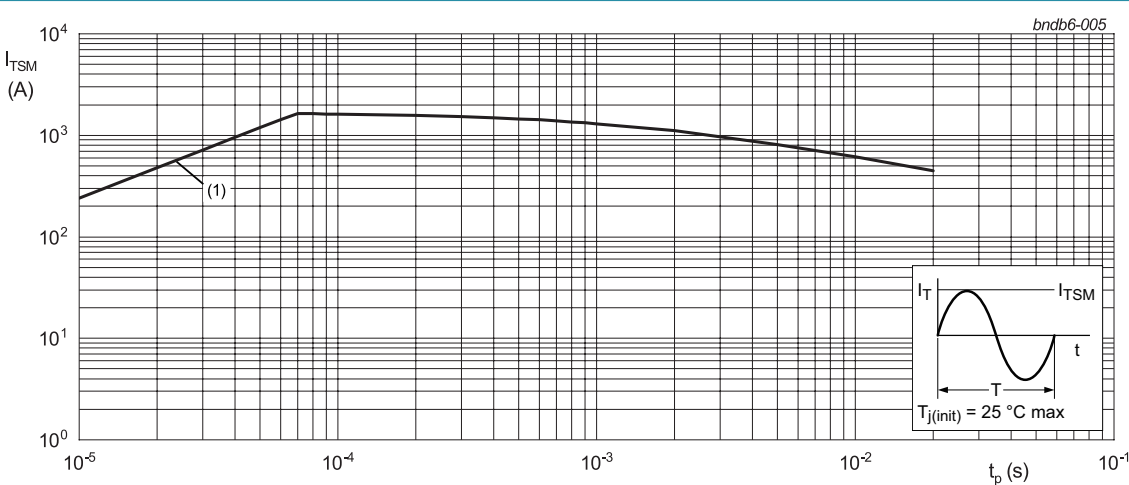
α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



$f = 50\text{ Hz}$

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



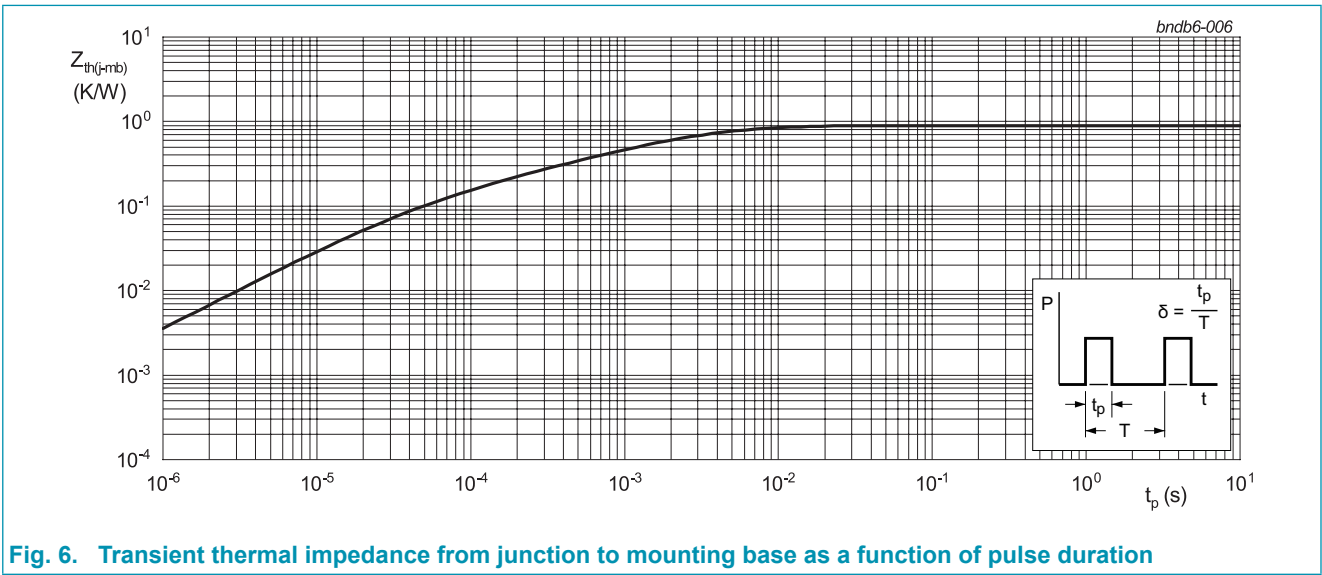
$t_p \leq 20\text{ ms}$;
(1) dI_T/dt limit

Fig. 5. Total power dissipation as a function of RMS on-state current; maximum values

9. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	Fig. 6		-	-	0.9	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	50	-	K/W



10. Isolation characteristics

Table 6. Isolation characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminal to external heatsink; sinusoidal waveform; clean and dust free; 50 Hz $\leq f \leq$ 60 Hz; RH \leq 65 %; $T_h = 25\text{ }^{\circ}\text{C}$		-	-	2500	V

11. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 7		-	-	50	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7		-	-	50	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7		-	-	50	mA
		V _D = 12 V; I _T = 0.1 A; T2- G+; T _j = 25 °C; Fig. 7		-	-	70	mA
I _L	latching current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 8		-	-	100	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 8		-	-	160	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 8		-	-	100	mA
		V _D = 12 V; I _T = 0.1 A; T2- G+; T _j = 25 °C; Fig. 8		-	-	100	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 9		-	-	80	mA
V _T	on-state voltage	I _T = 63.6 A; T _j = 25 °C; Fig. 10		-	1.3	1.6	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _j = 25 °C; Fig. 11		-	0.8	1.3	V
		V _D = 400 V; I _T = 0.1 A; T _j = 150 °C; Fig. 11		0.2	0.45	-	V
I _D	off-state current	V _D = 800 V; T _j = 25 °C		-	-	10	μA
		V _D = 800 V; T _j = 150 °C		-	-	2.5	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		750	-	-	V/μs
		V _{DM} = 536 V; T _j = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		500	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 20A; dV _{com} /dt = 20 V/μs; gate open circuit		20	-	-	A/ms
		V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 20A; dV _{com} /dt = 20 V/μs; gate open circuit		10	-	-	A/ms

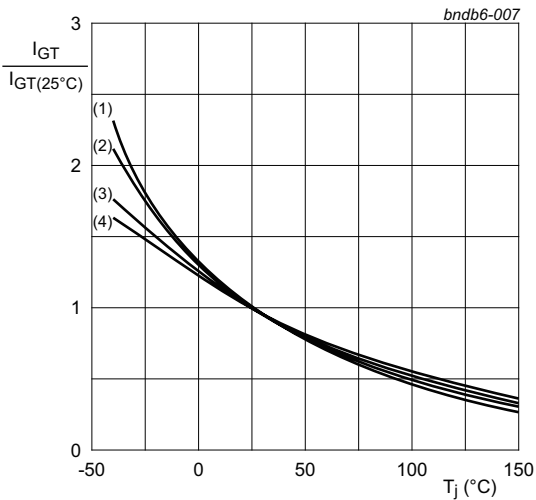


Fig. 7. Normalized gate trigger current as a function of junction temperature

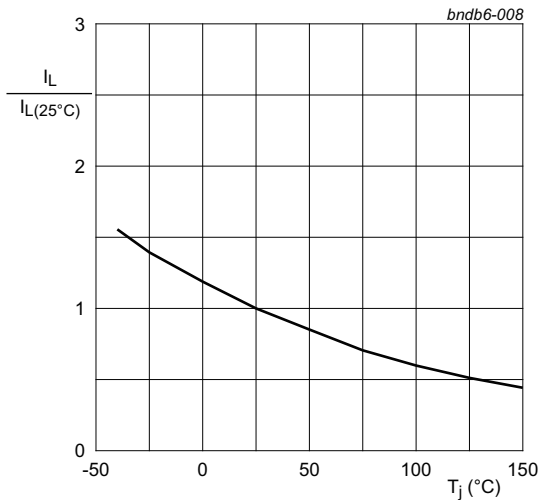


Fig. 8. Normalized latching current as a function of junction temperature

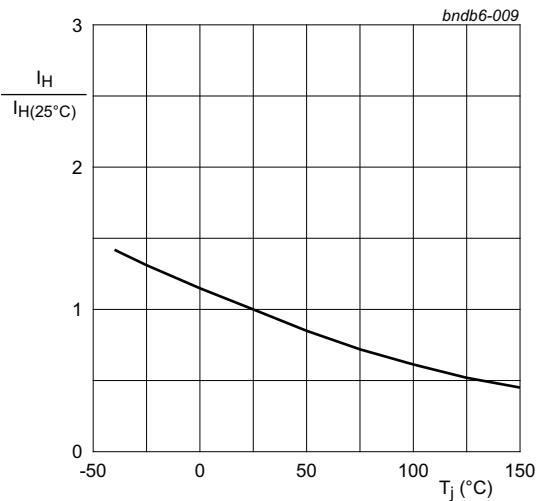
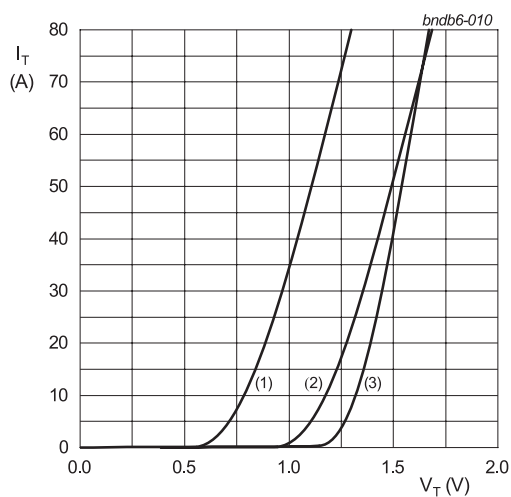


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.155 \text{ V}; R_s = 0.0068 \Omega$
(1) $T_j = 150^{\circ}\text{C}$; typical values
(2) $T_j = 150^{\circ}\text{C}$; maximum values
(3) $T_j = 25^{\circ}\text{C}$; maximum values
Fig. 10. On-state current as a function of on-state voltage

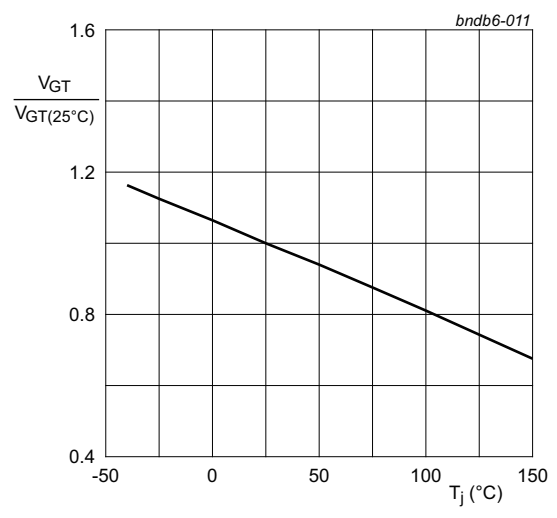
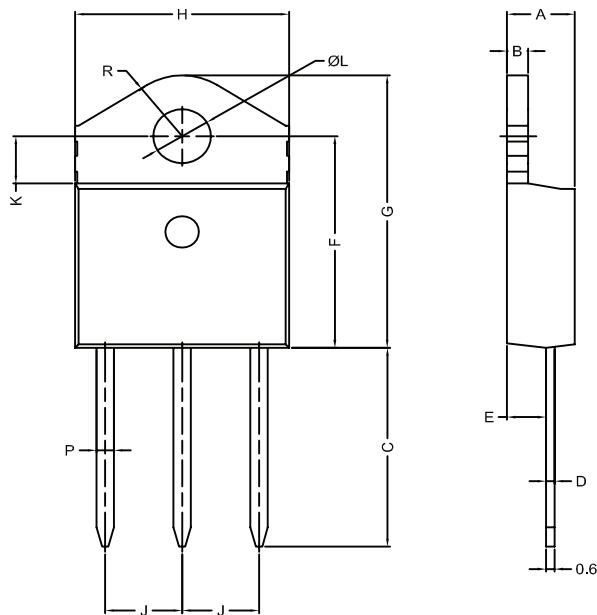


Fig. 11. Normalized gate trigger voltage as a function of junction temperature


12. Package outline

Plastic single-ended through-hole package; isolated heatsink mounted; 1 mounting hole; 3 -lead TO3P

SOT1292



Unit		A	B	C	D	E	F	G	H	J	K	L	P	R
mm	min	4.75	1.45	14.35	0.50	2.70	15.80	20.40	15.10	5.40	3.40	4.08	1.20	4.6 (typ.)
	max	4.95	1.55	15.60	0.70	2.90	16.50	21.10	15.50	5.65	3.65	4.17	1.40	

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT1292		-				

13. 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.
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Product [short] data sheet	Production	This document contains the product specification.

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