

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a ITO220 package intended for use in applications requiring good bidirectional blocking voltage and high surge current capability and high junction temperature capability ($T_{j(max)} = 150\text{ °C}$)

2. Features and benefits

- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- High bidirectional blocking voltage capability
- Very high current surge capability
- High thermal cycling performance
- Planar passivated for voltage ruggedness and reliability
- Internally insulated package
- Isolated mounting base with 2500 V_(RMS) isolation

3. Applications

- Capacitive Discharge Ignition (CDI)
- Crowbar protection
- Inrush protection
- Motor control
- Regulator rectifier

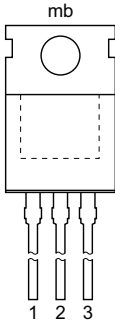

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			600			V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 126\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		20			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		200			A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		220			A
T_j	operating junction temperature			-40 to 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		2	-	6	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 9		-	-	40	mA
V_T	on-state voltage	$I_T = 20\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10		-	-	1.37	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$; $T_j = 150\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; $R_{GK} = 100\text{ }\Omega$		500	-	-	V/ μ s

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
2	A	anode		
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
TYN20Y-600TNF	IITO220	TYN20Y-600TNFQ	Tube	50	SOT78D	10-July-2007

7. Marking

Table 4. Marking codes

Type number	Marking codes
TYN20Y-600TNF	TYN20Y 600TNF

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			600	V
V_{RRM}	repetitive peak reverse voltage			600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 126\text{ °C}$;		13	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 126\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		20	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		200	A
		half sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		220	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		200	A ² s
di_T/dt	rate of rise of on-state current	$I_G = 20\text{ mA}$		200	A/ μ s
I_{GM}	peak gate current			5	A
V_{GM}	peak gate voltage			5	V
P_{GM}	peak gate power			20	W
$P_{G(AV)}$	average gate power	over any 20 ms period		1	W
T_{stg}	storage temperature			-40 to 150	°C
T_j	operating junction temperature			-40 to 150	°C

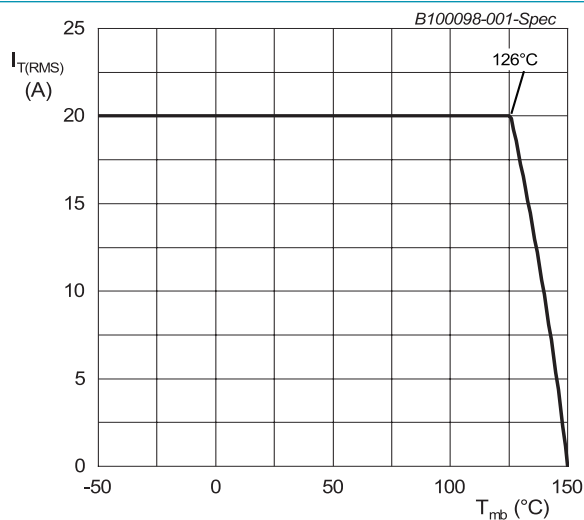
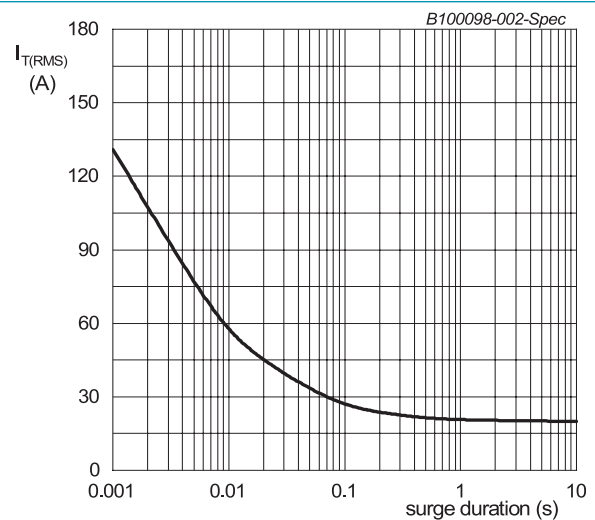
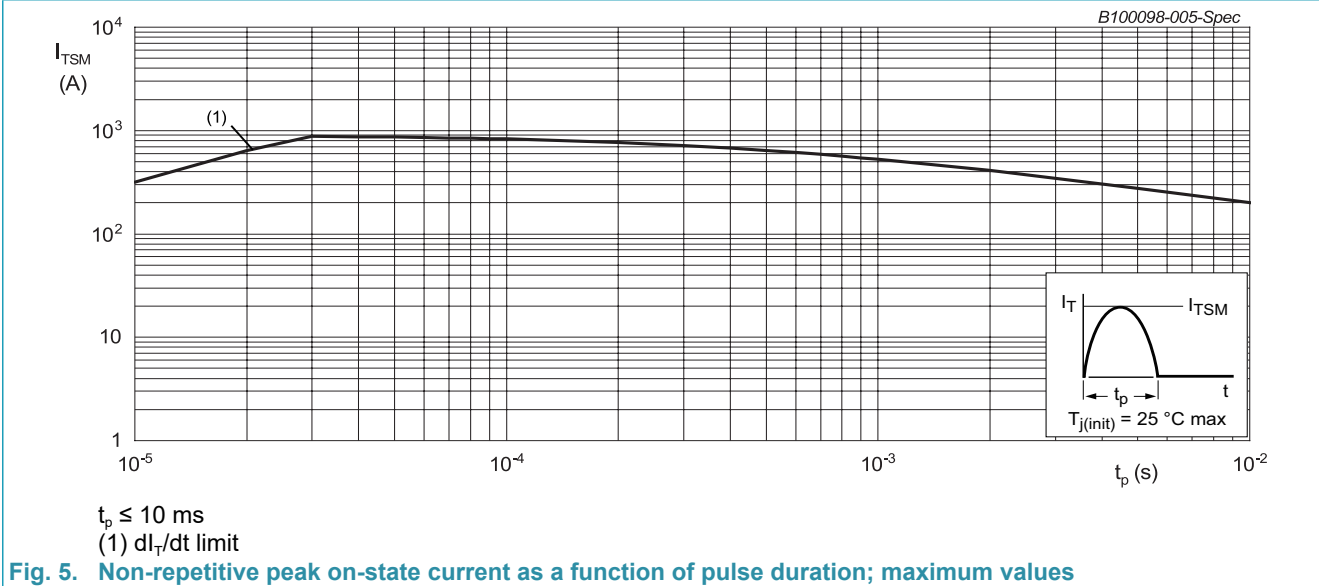
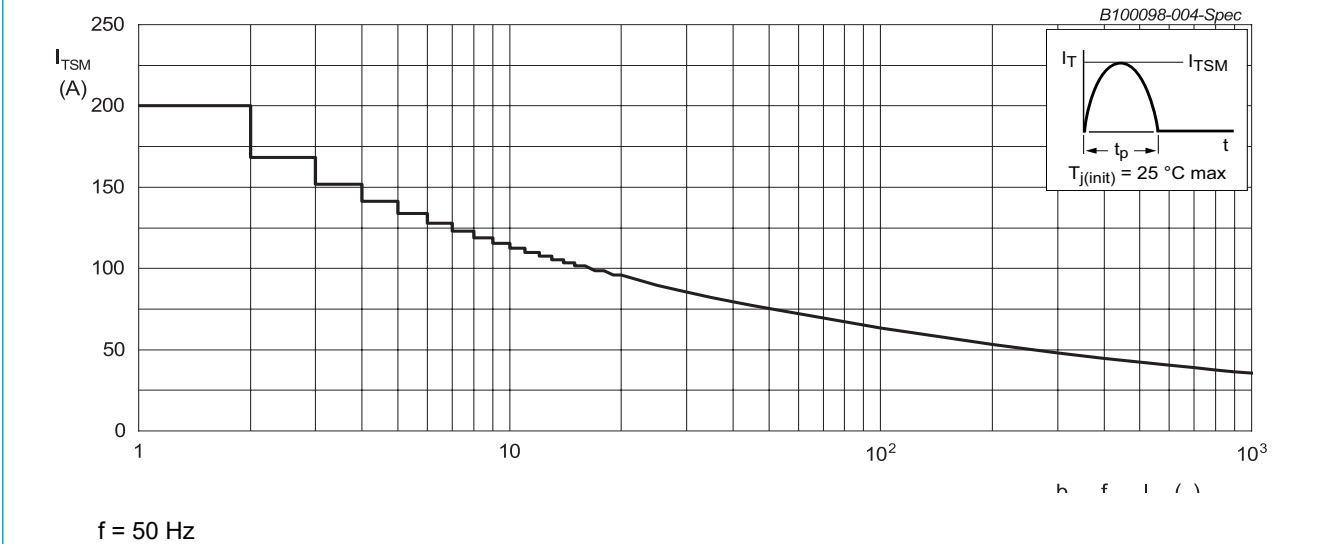
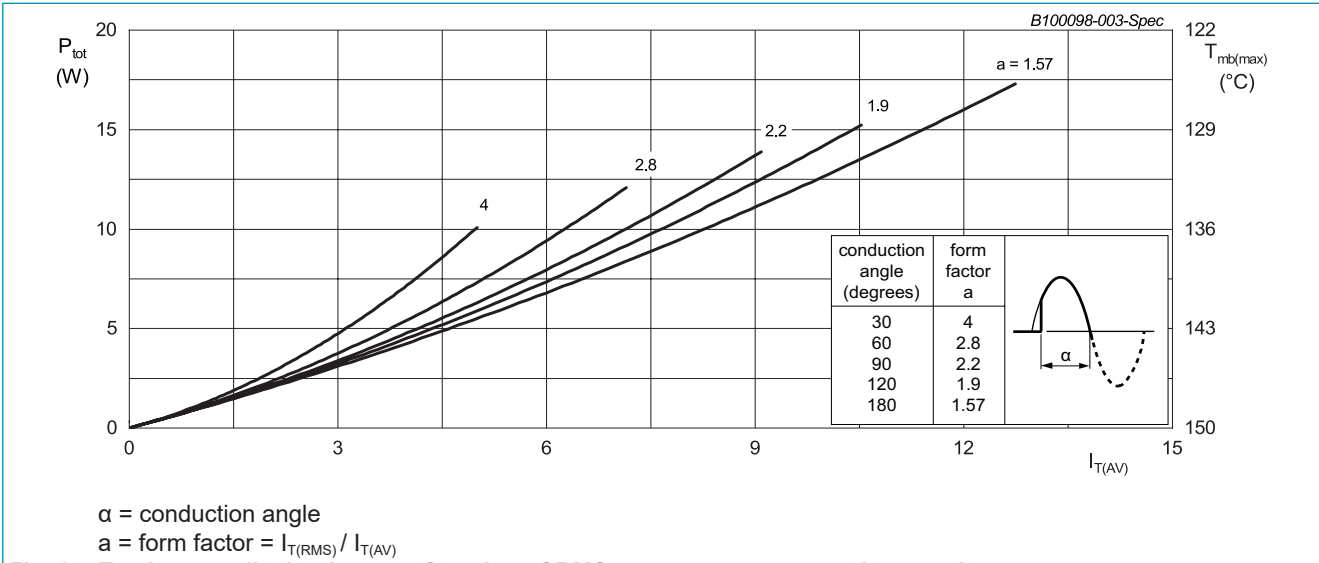


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



$f = 50\text{ Hz}$; $T_{mb} = 126\text{ °C}$

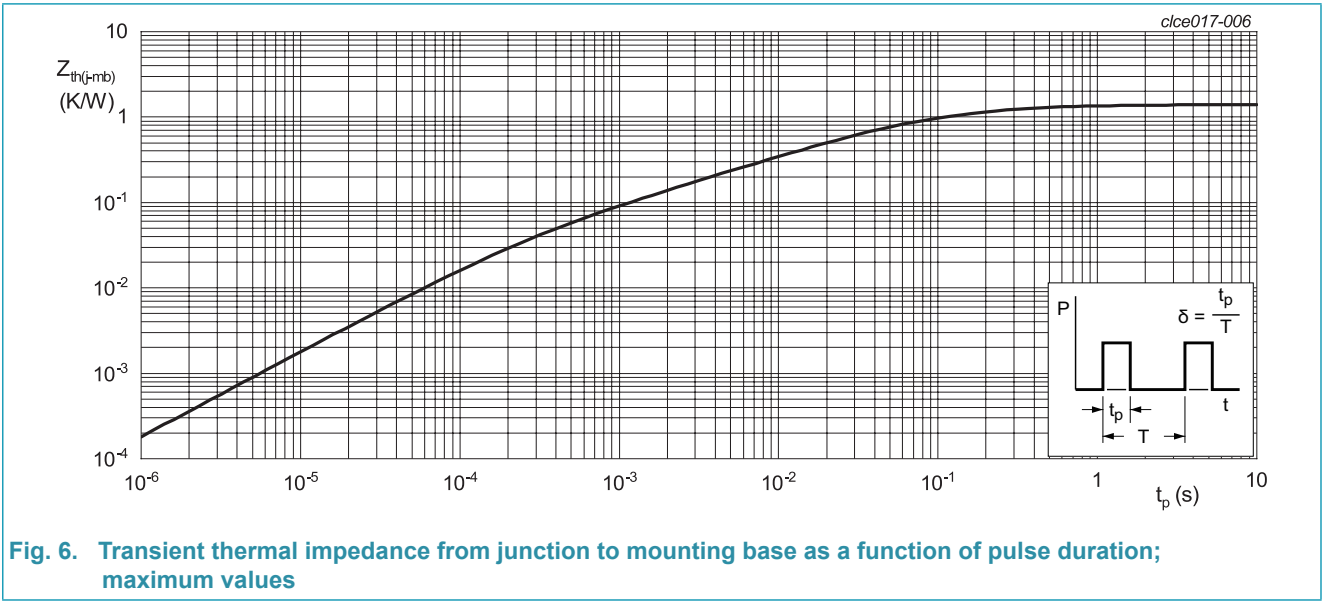
Fig. 2. RMS on-state current as a function of surge duration; maximum values



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		-	-	1.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W



10. Isolation characteristics

Table 7. Isolation characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	50 Hz $\leq f \leq$ 60 Hz; RH \leq 65 %; from all pins to external heatsink; sinusoidal waveform; clean and dust free		-	-	2500	V
C_{isol}	isolation capacitance	from cathode to external heatsink		-	10	-	pF

11. Characteristics

Table 8. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C; Fig. 7		2	-	6	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T _J = 25 °C; Fig. 8		-	-	60	mA
I _H	holding current	V _D = 12 V; T _J = 25 °C; Fig. 9		-	-	40	mA
V _T	on-state voltage	I _T = 20 A; T _J = 25 °C; Fig. 10		-	-	1.37	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C; Fig. 11		-	0.8	1	V
		V _D = 400 V; I _T = 0.1 A; T _J = 125 °C		0.25	0.45	-	V
V _{GR}	gate reverse voltage	I _{RG} = 100 mA		10	-	-	V
I _D	off-state current	V _D = 600 V; T _J = 25 °C		-	-	10	μA
		V _D = 600 V; T _J = 150 °C		-	-	2	mA
I _R	reverse current	V _D = 600 V; T _J = 25 °C		-	-	10	μA
		V _D = 600 V; T _J = 150 °C		-	-	2	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 402 V; T _J = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; R _{GK} = 100 Ω		500	-	-	V/μs
t _{gt}	gate-controlled turn-on time	I _{TM} = 16 A; V _D = 600 V; I _G = 20 mA; di _G /dt = 5 A/μs; T _J = 25 °C		-	2	-	μs
t _q	commutated turn-off time	I _{TM} = 2 A; t _p = 50 μs; dV/dt = 5 V/μs; di/dt = 30 A/μs		-	-	12	μs

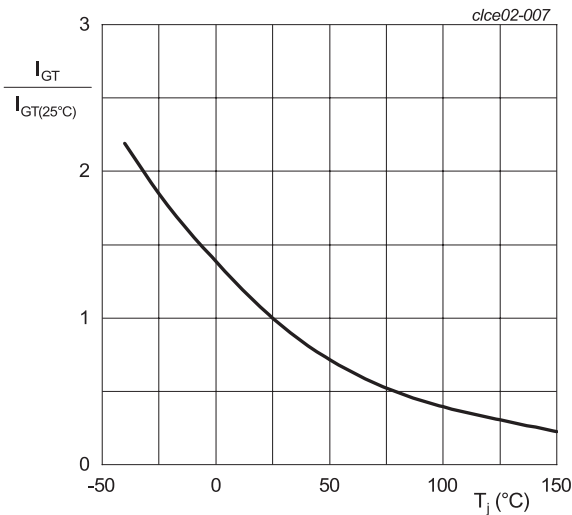


Fig. 7. Normalized gate trigger current as a function of junction temperature

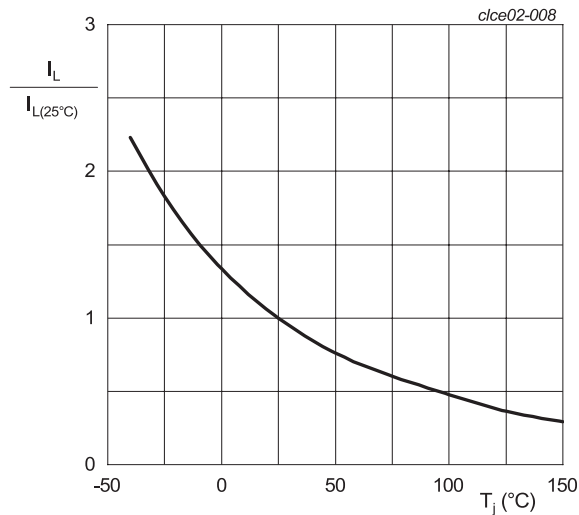


Fig. 8. Normalized latching current as a function of junction temperature

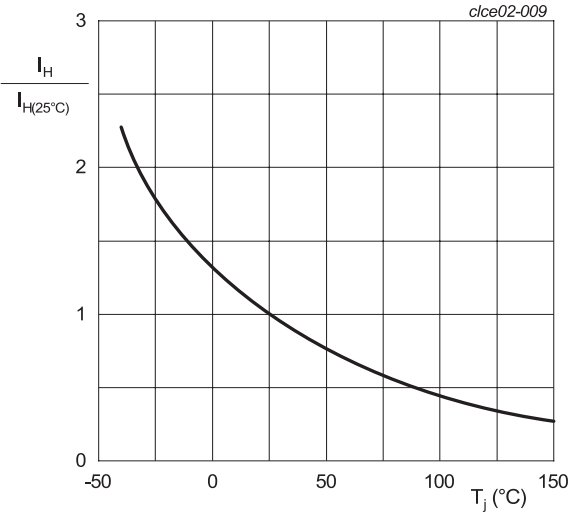
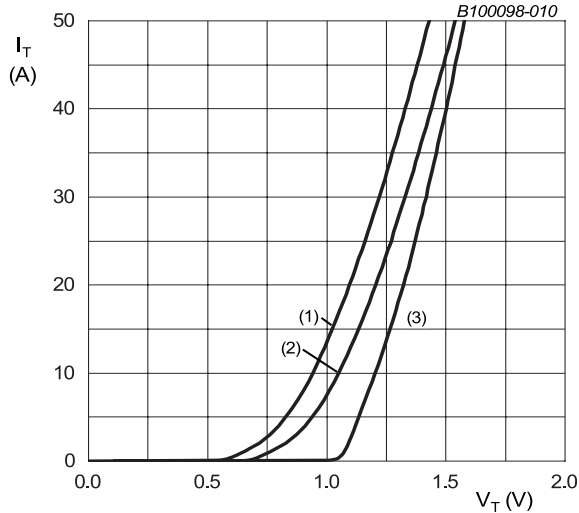


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 0.934\text{ V}$; $R_s = 0.0135\ \Omega$
(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

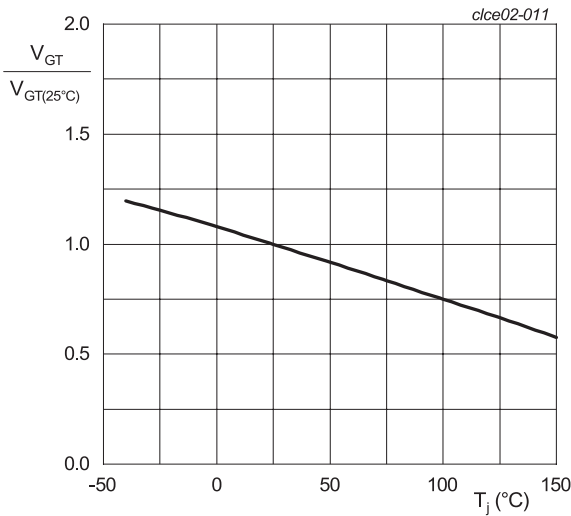
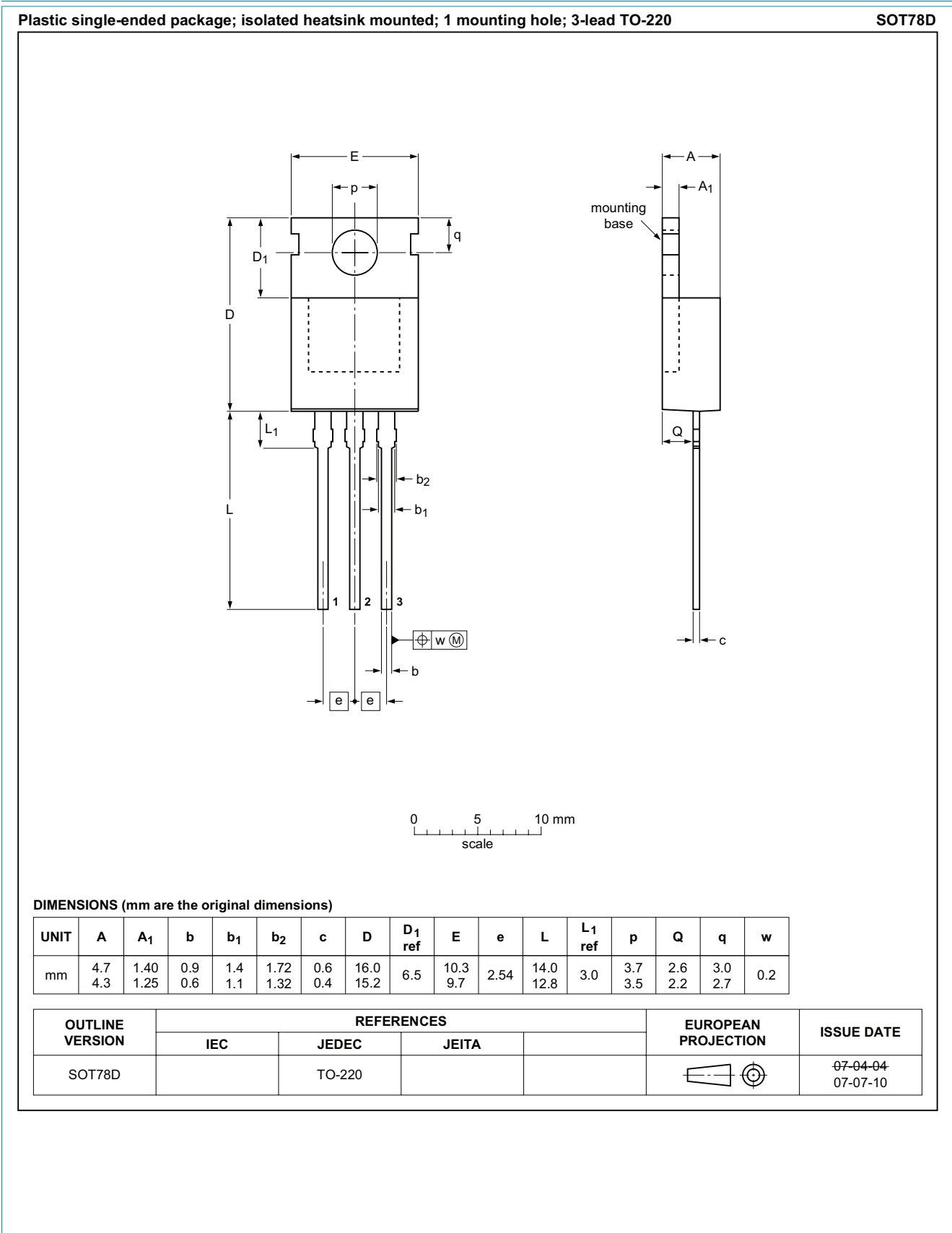


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

12. Package outline



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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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- [2] The term 'short data sheet' is explained in section "Definitions".
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