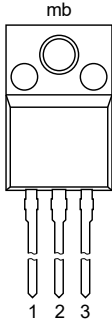


[illegible]

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 mb 1 2 3 TO-220F (SOT186A)	 A K G sym037
2	A	anode		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
TYN20X-800T	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A

7. Limiting values

Table 4. 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
V_{RRM}	repetitive peak reverse voltage		-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_h \leq 75^\circ\text{C}$; Fig. 1	-	12.7	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_h \leq 75^\circ\text{C}$; Fig. 2; Fig. 3	-	20	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 10\text{ ms}$; Fig. 4; Fig. 5	-	210	A
		half sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 8.3\text{ ms}$	-	231	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse	-	220.5	A^2s
dl_T/dt	rate of rise of on-state current	$I_G = 70\text{ mA}$	-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current		-	5	A
V_{RGM}	peak reverse 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	150	$^\circ\text{C}$
T_j	junction temperature		-	150	$^\circ\text{C}$

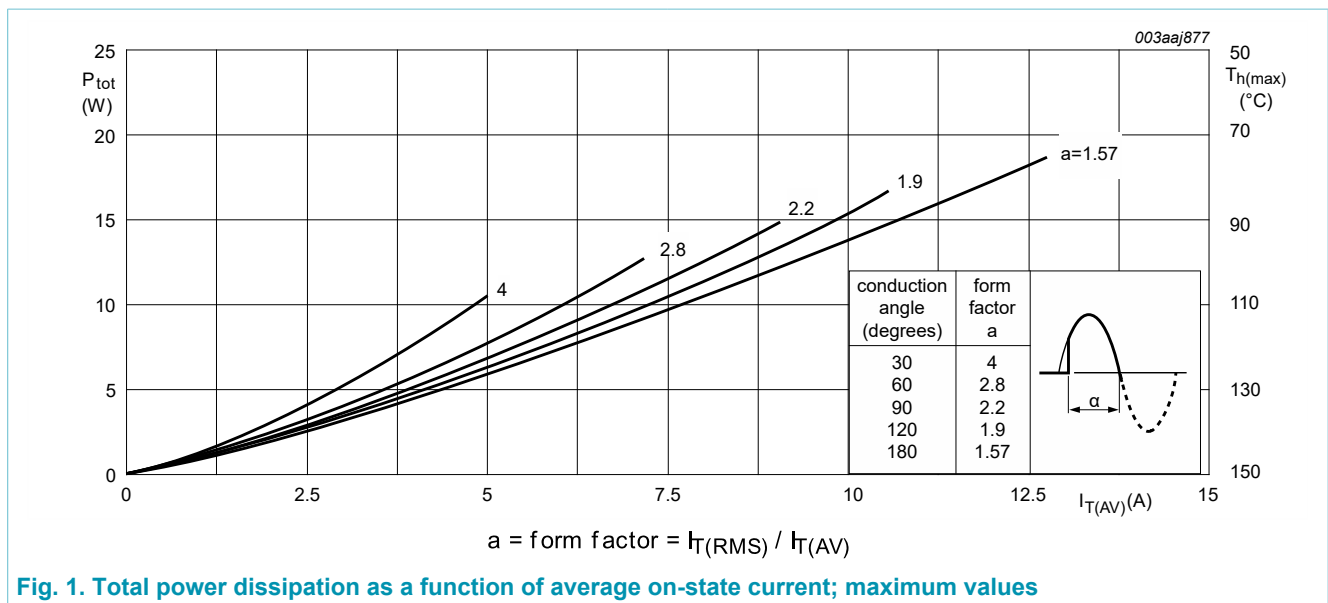


Fig. 1. Total power dissipation as a function of average on-state current; maximum values

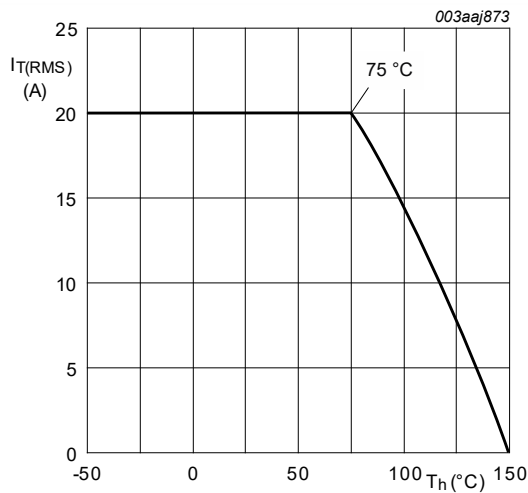
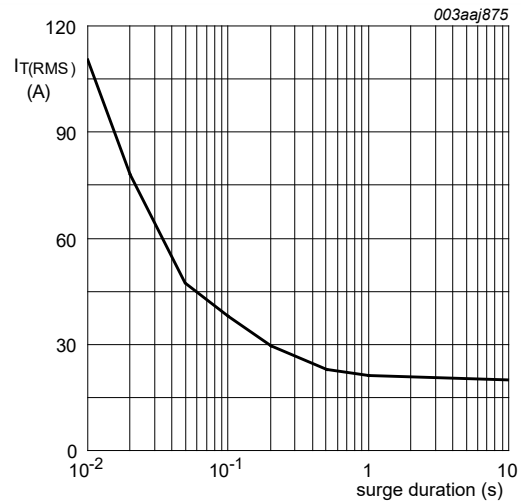
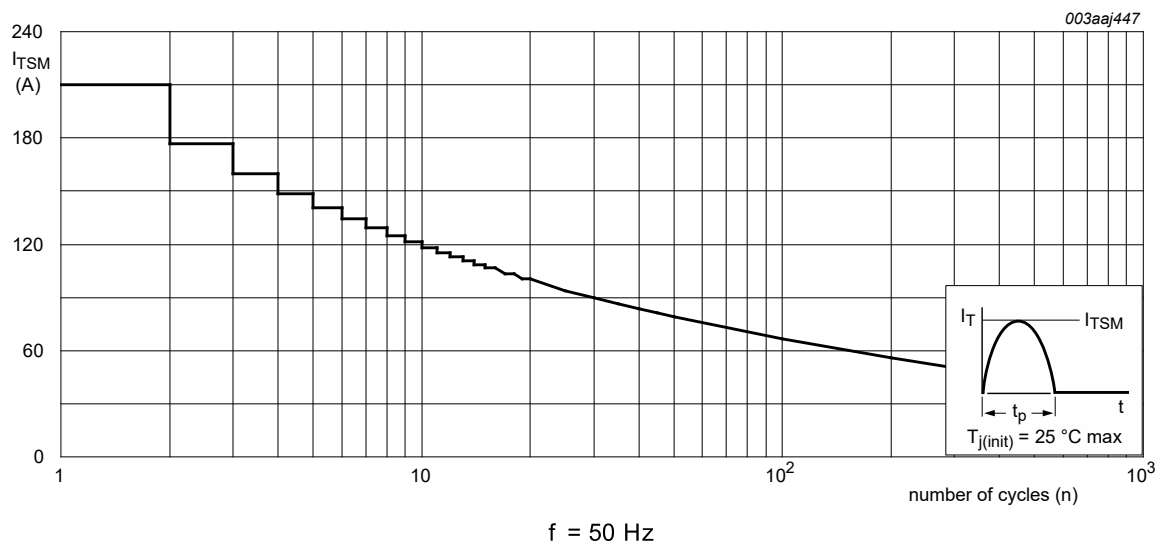


Fig. 2. RMS on-state current as a function of heatsink temperature; maximum values



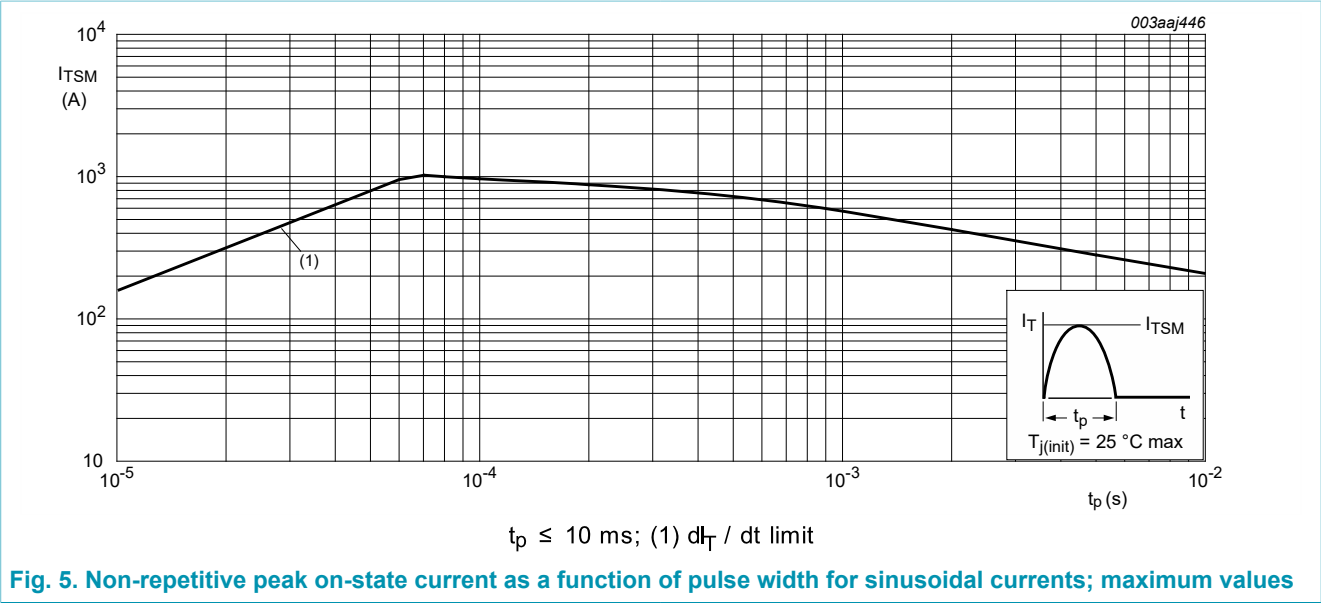
$f = 50 \text{ Hz}; T_h = 75 \text{ °C}$

Fig. 3. RMS on-state current as a function of surge duration; maximum values



$f = 50 \text{ Hz}$

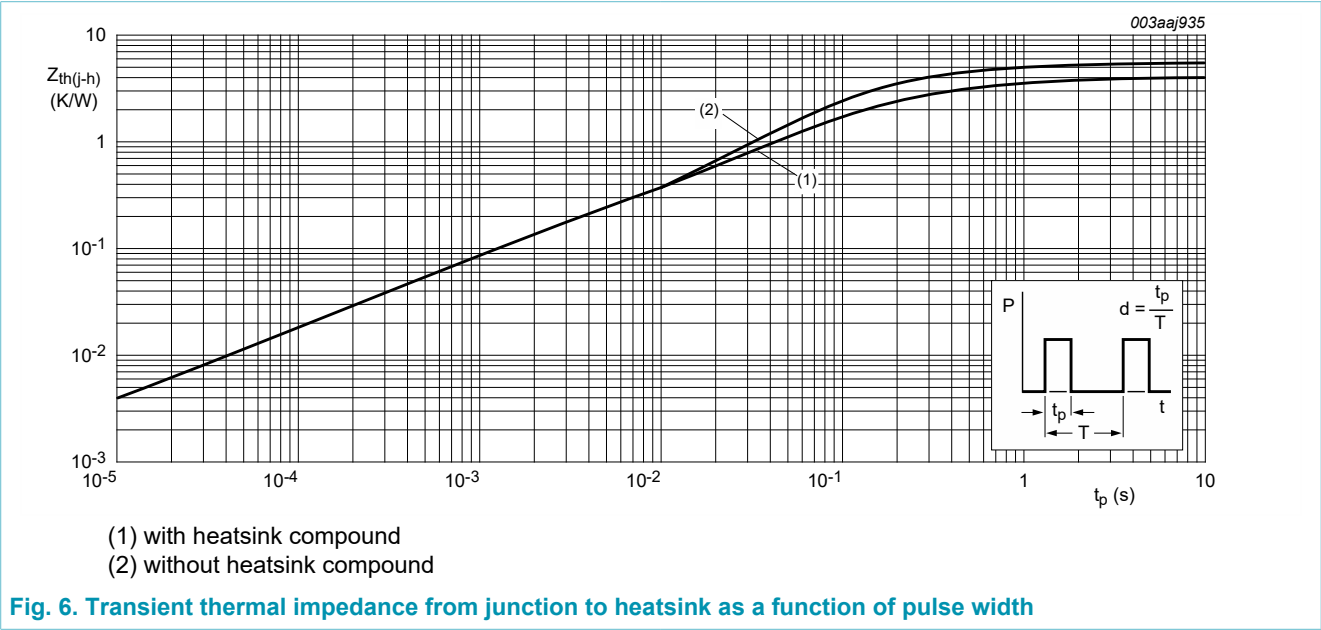
Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	with heatsink compound; Fig. 6	-	-	4	K/W
		without heatsink compound; Fig. 6	-	-	5.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air	-	55	-	K/W



9. Isolation characteristics

Table 6. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; sinusoidal waveform; clean and dust free; $50\text{ Hz} \leq f \leq 60\text{ Hz}$; $RH \leq 65\%$; $T_h = 25\text{ }^\circ\text{C}$	-	-	2500	V
C_{isol}	isolation capacitance	from anode to external heatsink; $f = 1\text{ MHz}$; $T_h = 25\text{ }^\circ\text{C}$	-	10	-	pF

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 7	-	4.5	32	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	-	21	60	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9	-	16	40	mA
V_T	on-state voltage	$I_T = 32\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10	-	1.2	1.5	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11	-	0.7	1.3	V
		$V_D = 400\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 150\text{ }^\circ\text{C}$; Fig. 11	0.2	0.4	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_j = 150\text{ }^\circ\text{C}$	-	0.2	1	mA
I_R	reverse current	$V_R = 800\text{ V}$; $T_j = 150\text{ }^\circ\text{C}$	-	0.2	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	$I_{TM} = 40\text{ A}$; $V_D = 800\text{ V}$; $I_G = 100\text{ mA}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$	-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 536\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{TM} = 20\text{ A}$; $V_R = 25\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 50\text{ V}/\mu\text{s}$; $R_{GK(ext{ext})} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM})	-	70	-	μs

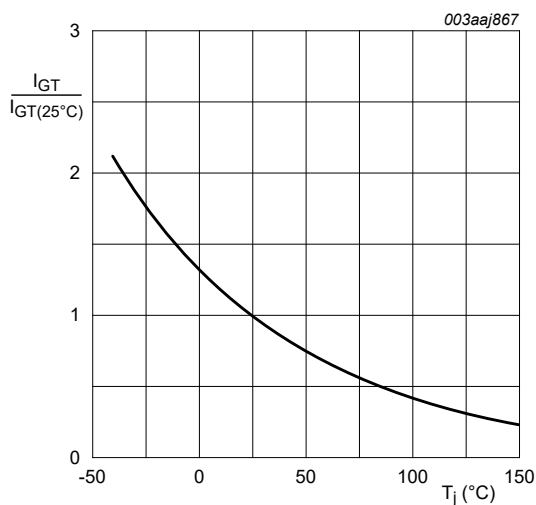


Fig. 7. Normalized gate trigger current as a function of junction temperature

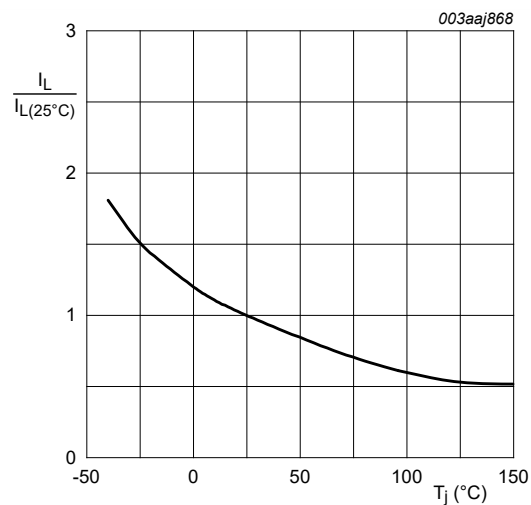


Fig. 8. Normalized latching current as a function of junction temperature

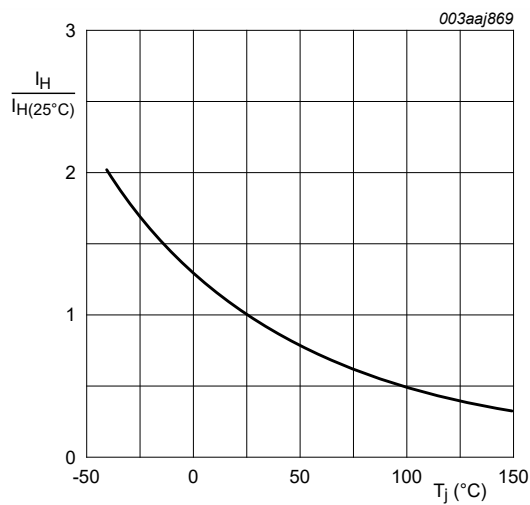


Fig. 9. Normalized holding current as a function of junction temperature

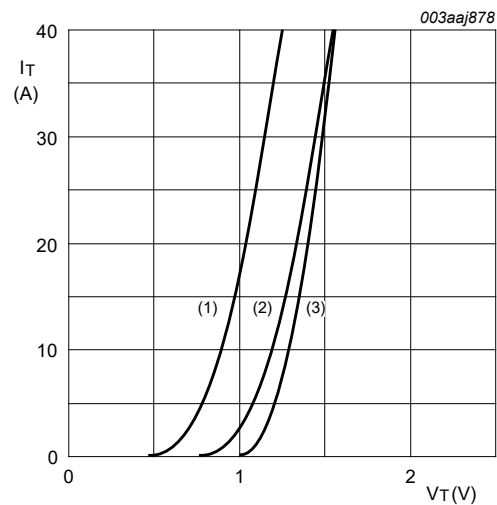


Fig. 10. On-state current as a function of on-state voltage

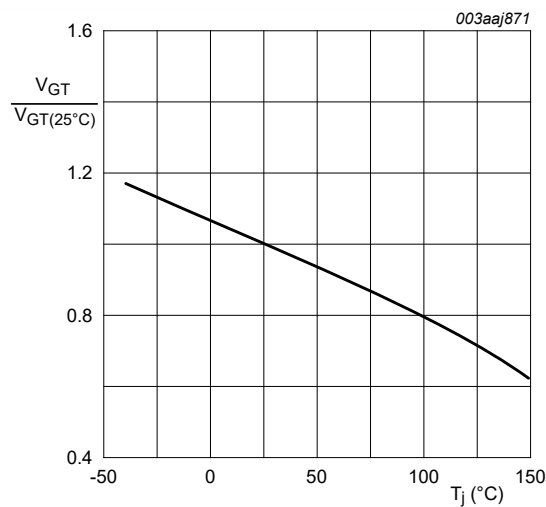
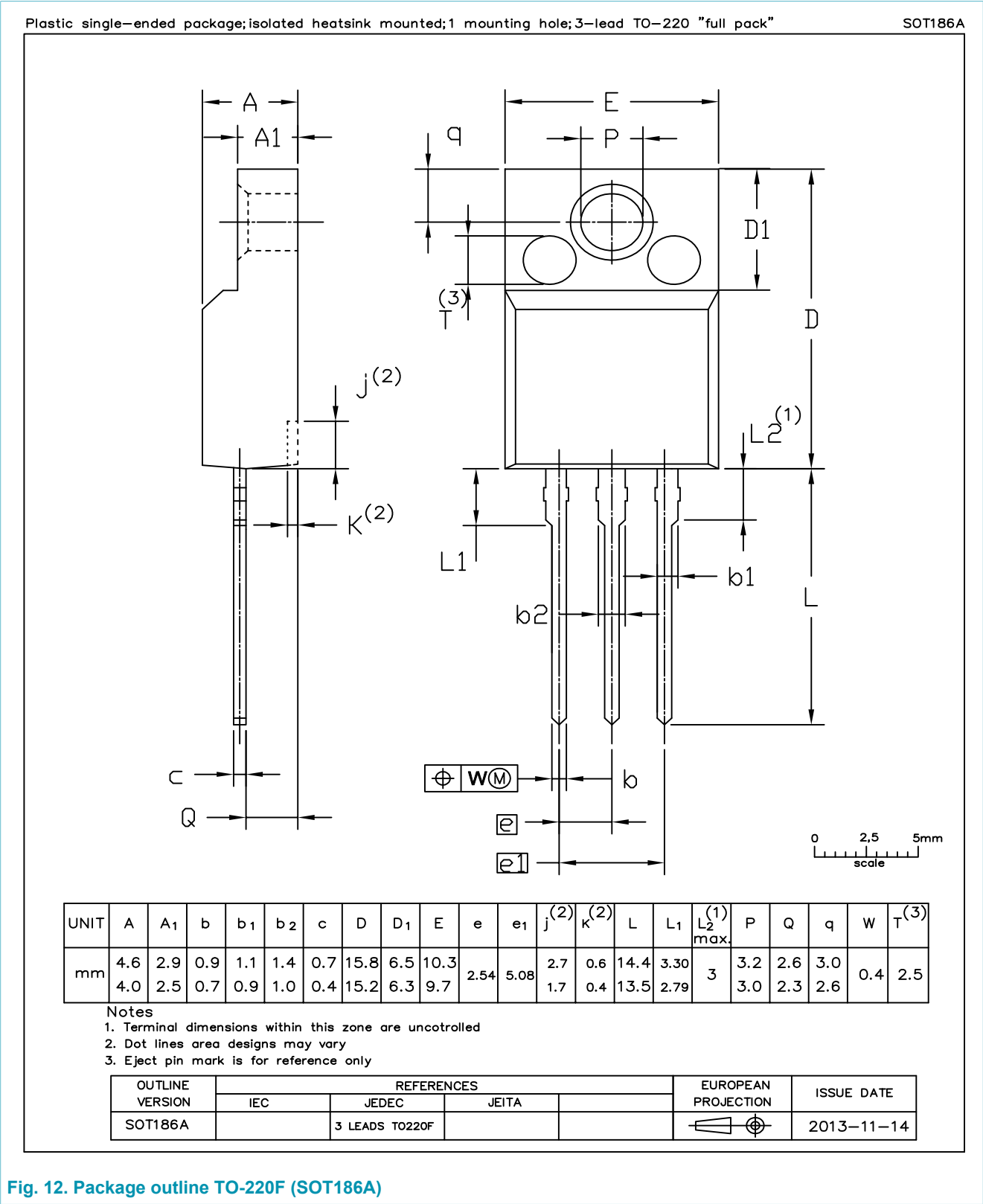


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline



12. Legal information

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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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