

1. General description

Planar passivated Silicon Controlled Rectifier in a SOT1292(IITO3P) plastic package intended for use in applications requiring very high inrush current capability and high thermal cycling performance. It is used in applications where "high junction operating temperature capability" ($T_{j(max)} = 150\text{ °C}$) is required.

2. Features and benefits

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

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
- Applications subject to high temperature ($T_{j(max)} = 150\text{ °C}$)

4. Quick reference data

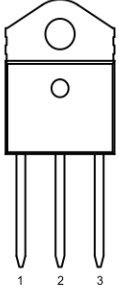
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	1200	V
V_{RRM}	repetitive peak reverse voltage		-	-	1200	V
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	-	-	650	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$	-	-	715	A
T_j	junction temperature		-	-	150	°C
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 73\text{ °C}$	-	-	50	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 73\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	79	A

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; Fig. 8	-	-	50	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 800\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform	1500	-	-	V/ μs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode	 IITO3P (SOT1292)	 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
BT155Z-1200T	IITO3P	plastic single-ended through-hole package; isolated heatsink mounted; 1 mounting hole; 3-lead TO3P	SOT1292

7. Marking

Table 4. Marking codes

Type number	Marking code
BT155Z-1200T	BT155Z-1200T

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		-	1200	V
V_{RRM}	repetitive peak reverse voltage		-	1200	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 73\text{ }^{\circ}\text{C}$	-	50	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 73\text{ }^{\circ}\text{C}$; Fig. 1; Fig. 2; Fig. 3	-	79	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	-	650	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$	-	715	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse	-	2113	A ² s
di_T/dt	rate of rise of on-state current	$I_G = 200\text{ mA}$	-	150	A/ μs
I_{GM}	peak gate current		-	8	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	$^{\circ}\text{C}$

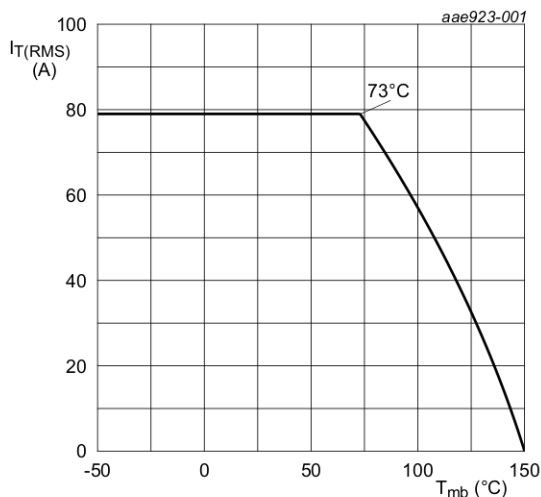
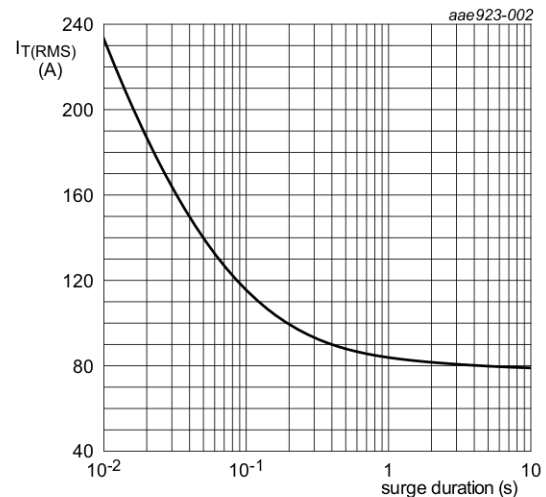
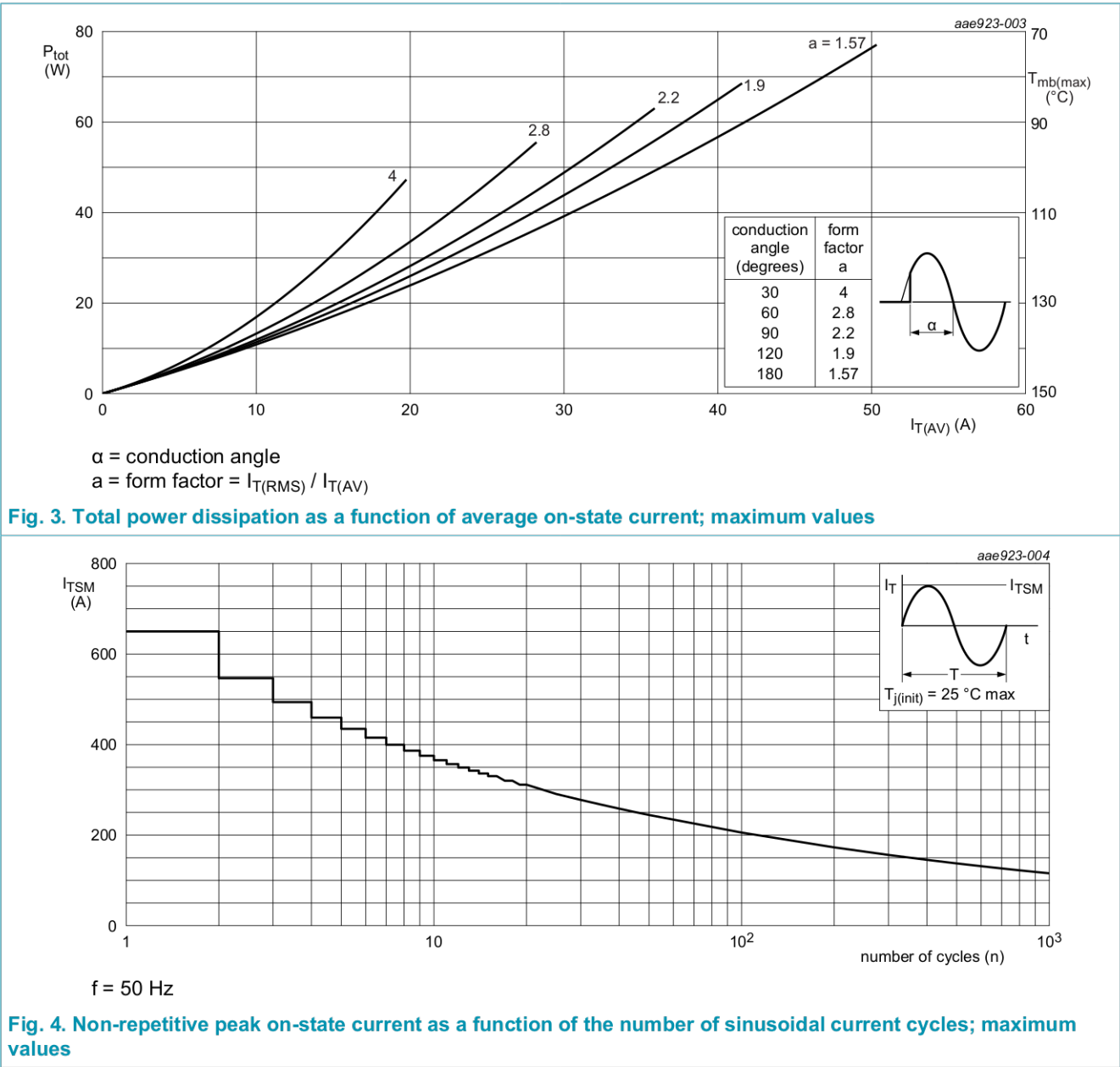


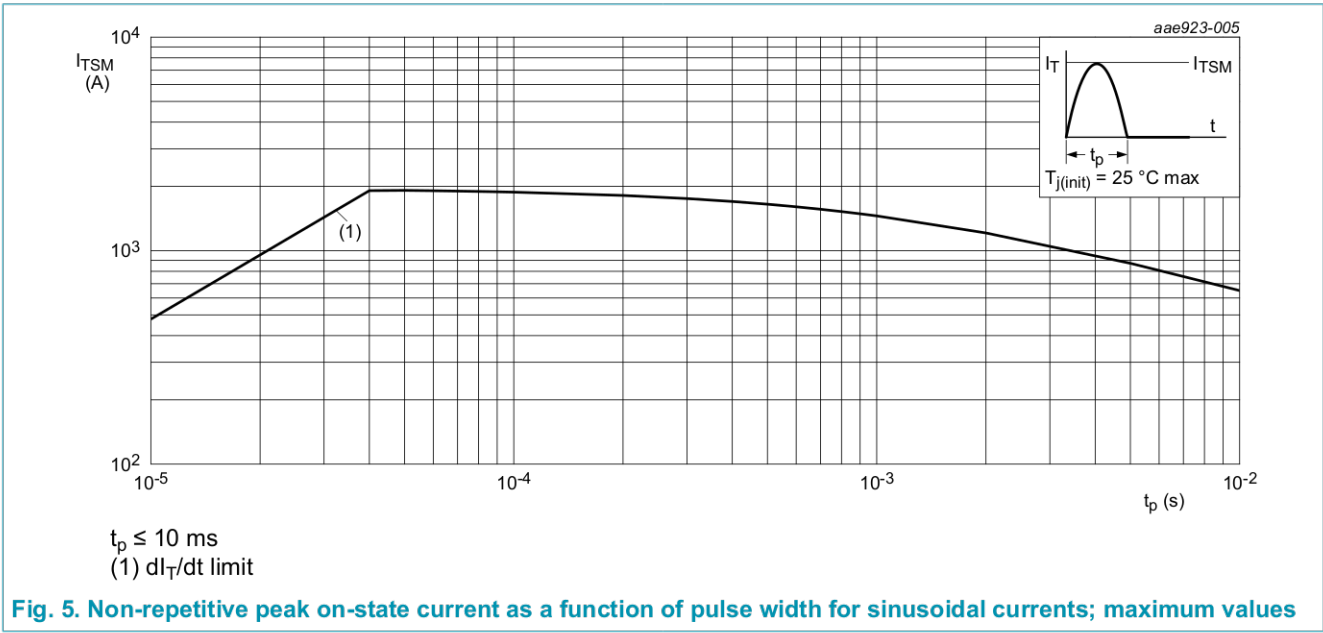
Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



$f = 50\text{ Hz}$; $T_{mb} = 73\text{ }^{\circ}\text{C}$

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





9. Thermal characteristics

Table 6. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle; Fig. 6		-	-	1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	50	-	K/W

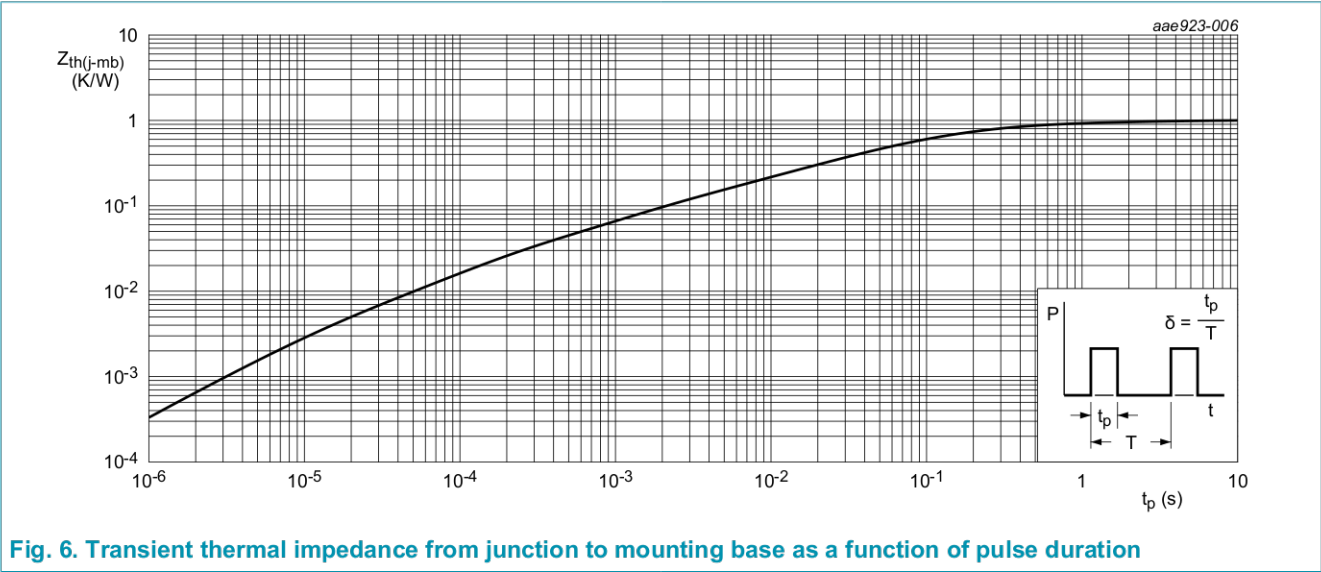


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

10. Isolation characteristics

Table 7. 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; $50\text{ Hz} \leq f \leq 60\text{ Hz}$; $RH \leq 65\%$; $T_{mb} = 25\text{ }^{\circ}\text{C}$		-	-	2500	V

11. Characteristics

Table 8. 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; Fig. 8		-	-	50	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 9		-	-	300	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 10		-	-	200	mA
V_T	on-state voltage	$I_T = 50\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11		-	-	1.3	V
		$I_T = 90\text{ A}$; $T_j = 25\text{ }^\circ\text{C}$; Fig. 11		-	-	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. 12		-	0.7	1	V
		$V_D = 800\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 125\text{ }^\circ\text{C}$; Fig. 12		0.25	0.4	-	V
I_D	off-state current	$V_D = 1200\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	-	3	mA
I_R	reverse current	$V_R = 1200\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$		-	-	3	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 800\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform		1500	-	-	V/ μs
		$V_{DM} = 800\text{ V}$; $T_j = 150\text{ }^\circ\text{C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform		1000	-	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 40\text{ A}$; $V_D = 800\text{ V}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 804\text{ V}$; $T_j = 125\text{ }^\circ\text{C}$; $I_{TM} = 20\text{ A}$; $V_R = 25\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 50\text{ V}/\mu\text{s}$; $R_{GK(ext)} = 100\text{ k}\Omega$; ($V_{DM} = 67\%$ of V_{DRM})		-	150	-	μs

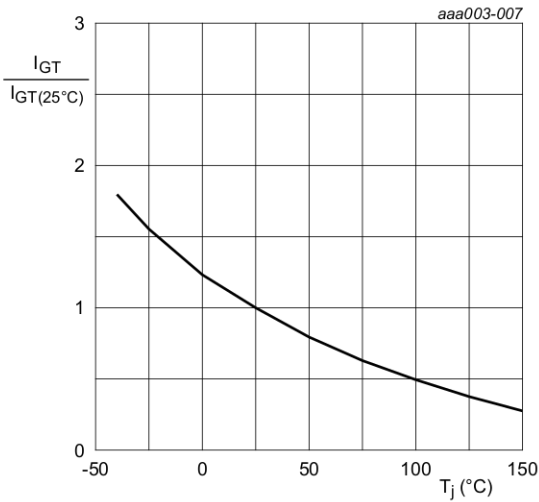


Fig. 7. Normalized gate trigger current as a function of junction temperature

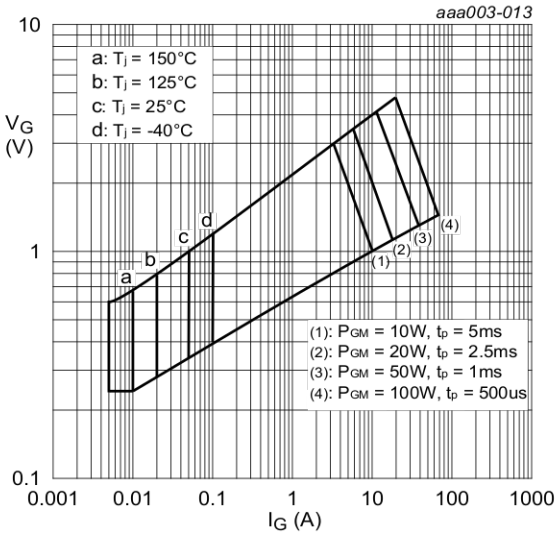


Fig. 8. Gate voltage as a function of gate current

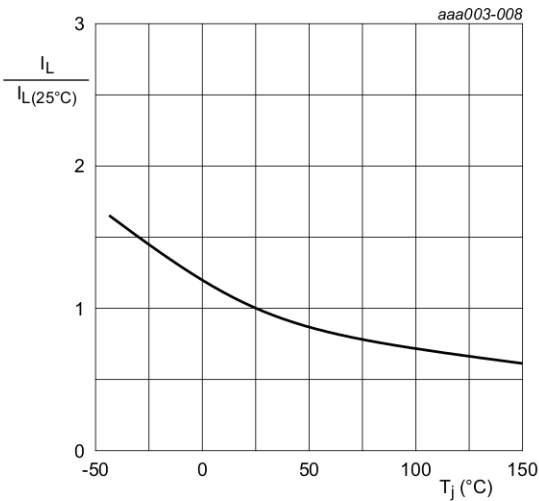


Fig. 9. Normalized latching current as a function of junction temperature

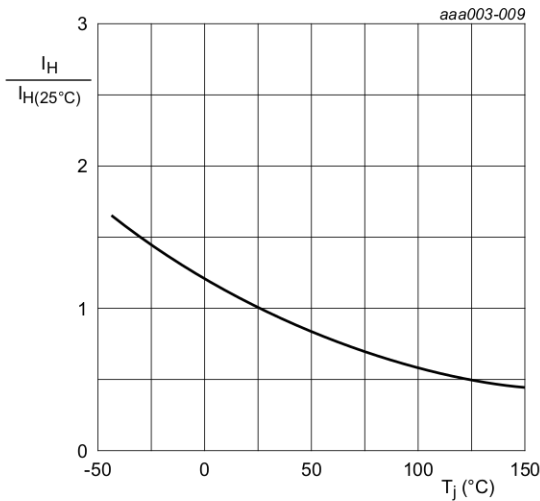
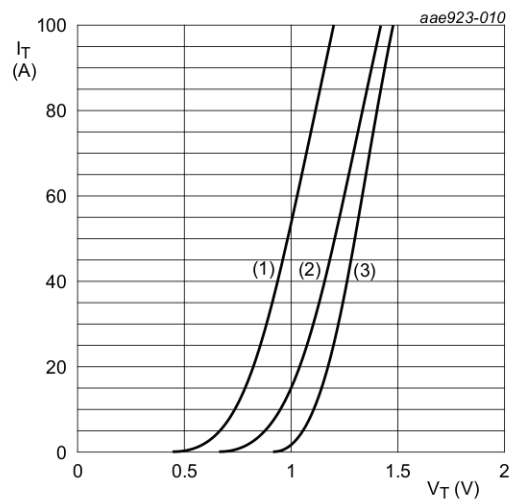


Fig. 10. Normalized holding current as a function of junction temperature



$V_o = 0.974\text{ V}$; $R_s = 0.0045\text{ }\Omega$
(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. 11. On-state current as a function of on-state voltage

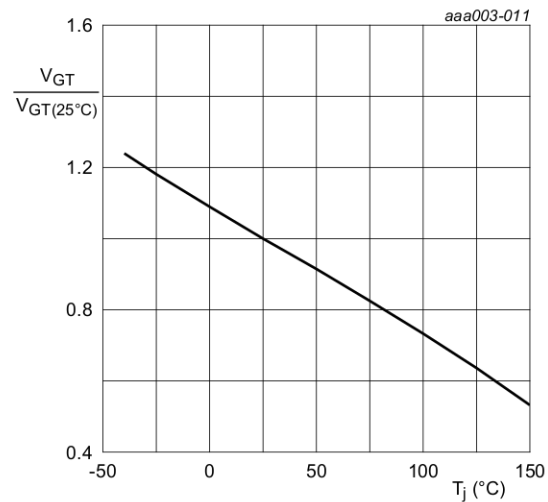


Fig. 12. Normalized gate trigger voltage as a function of junction temperature

12. Package outline

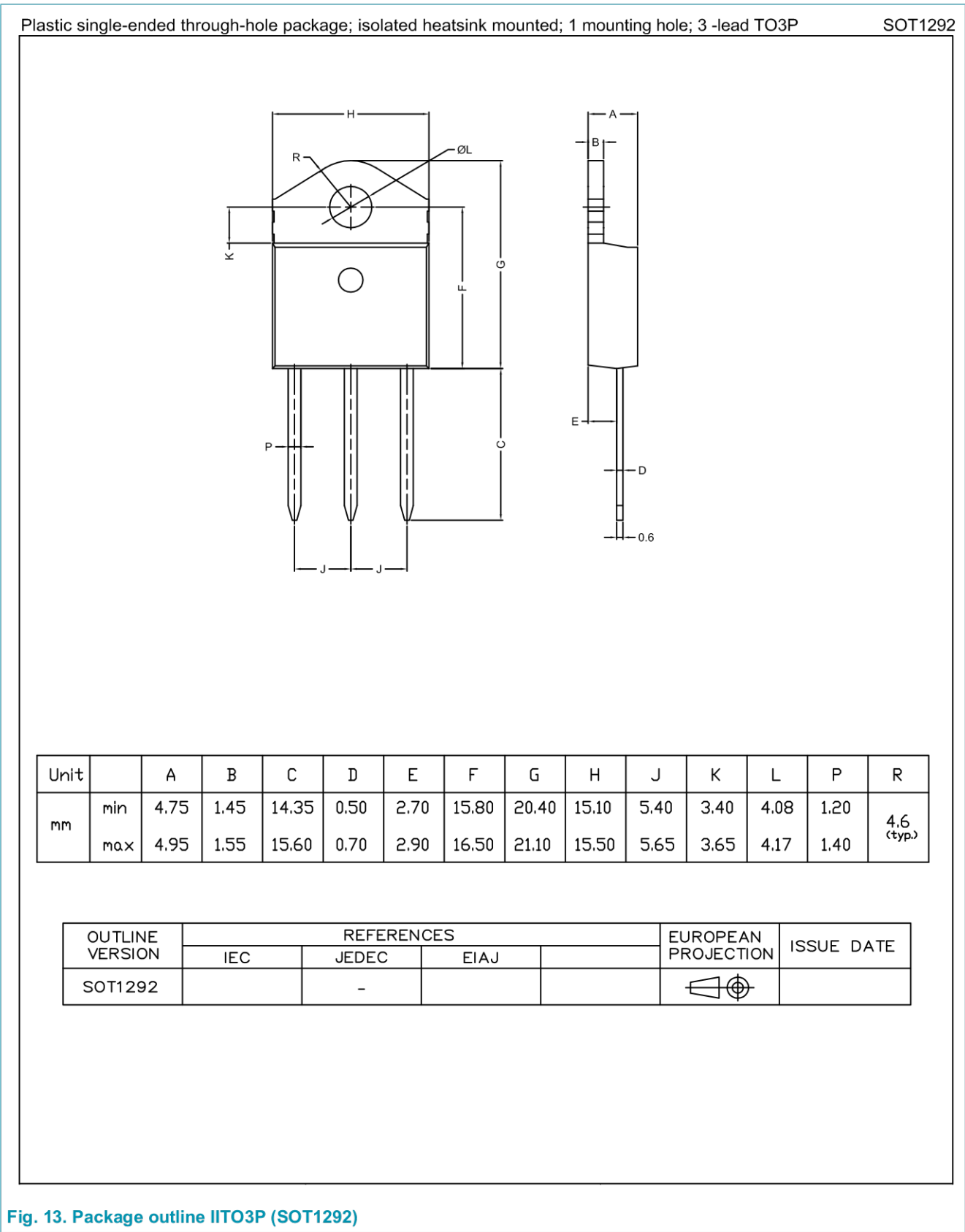


Fig. 13. Package outline ITO3P (SOT1292)

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.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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