

1. General description

Planar passivated Silicon Controlled Rectifier in a TO247 plastic package intended for use in applications requiring very high inrush current capability and high thermal cycling performance.

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

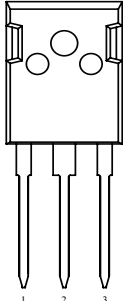
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			1200			V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 125\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		47			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		350			A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		385			A
T_j	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		-	-	50	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 9		-	-	80	mA
V_T	on-state voltage	$I_T = 30\text{ A}$; $T_j = 25\text{ °C}$; Fig. 11		-	-	1.30	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 804\text{ V}$; $T_j = 150\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); 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	 TO247	 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
BT153W-1200T	TO247	BT153W-1200TQ	Tube	30	TO247P	09-Mar-2023
					TO247N	20-July-2016

7. Marking

Table 4. Marking codes

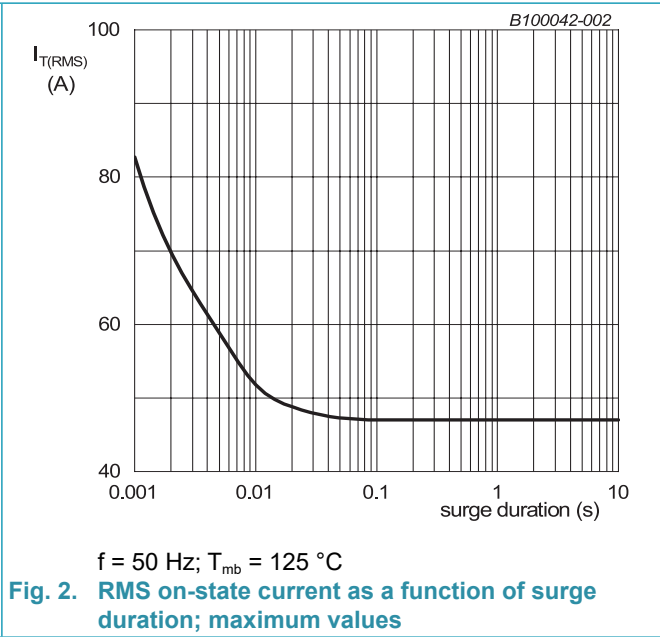
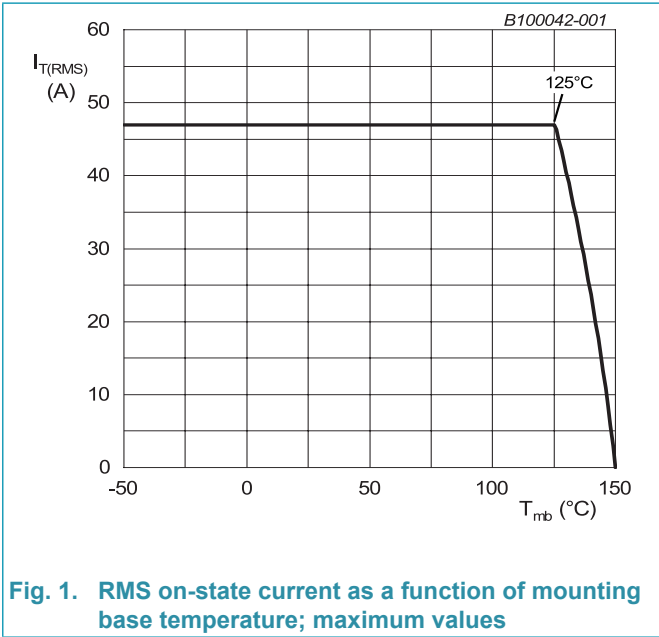
Type number	Marking codes	
	Assembly factory: P	Assembly factory: A
BT153W-1200T	BT153W 1200T PJPxxxx xx	BT153W 1200T PJAxxxx xx

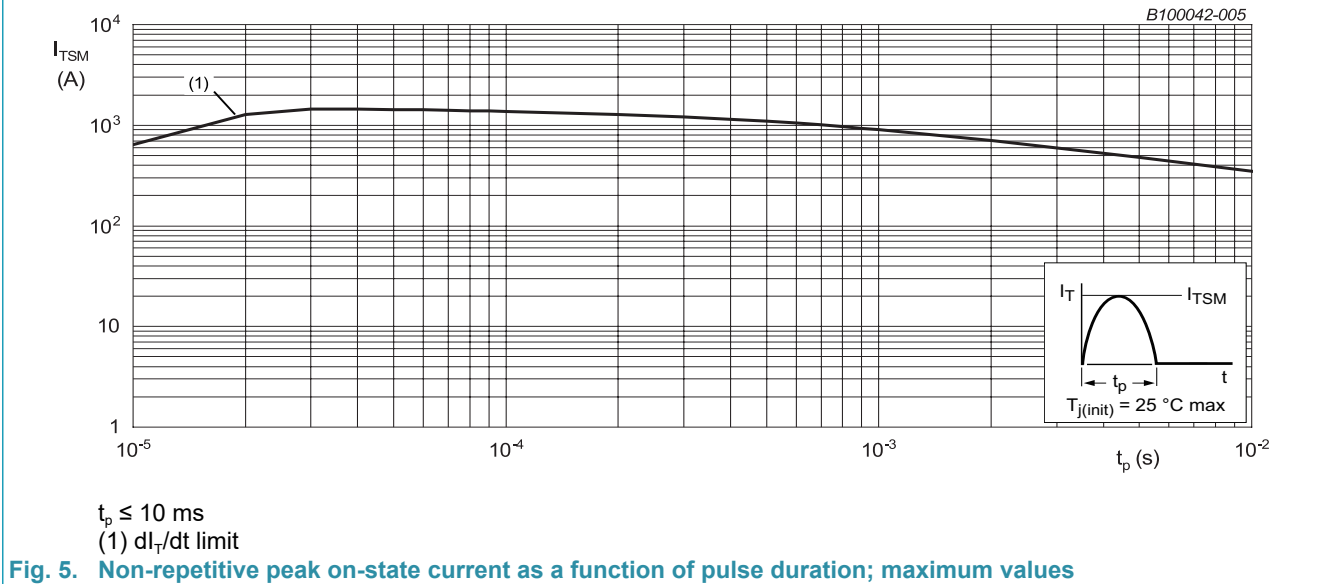
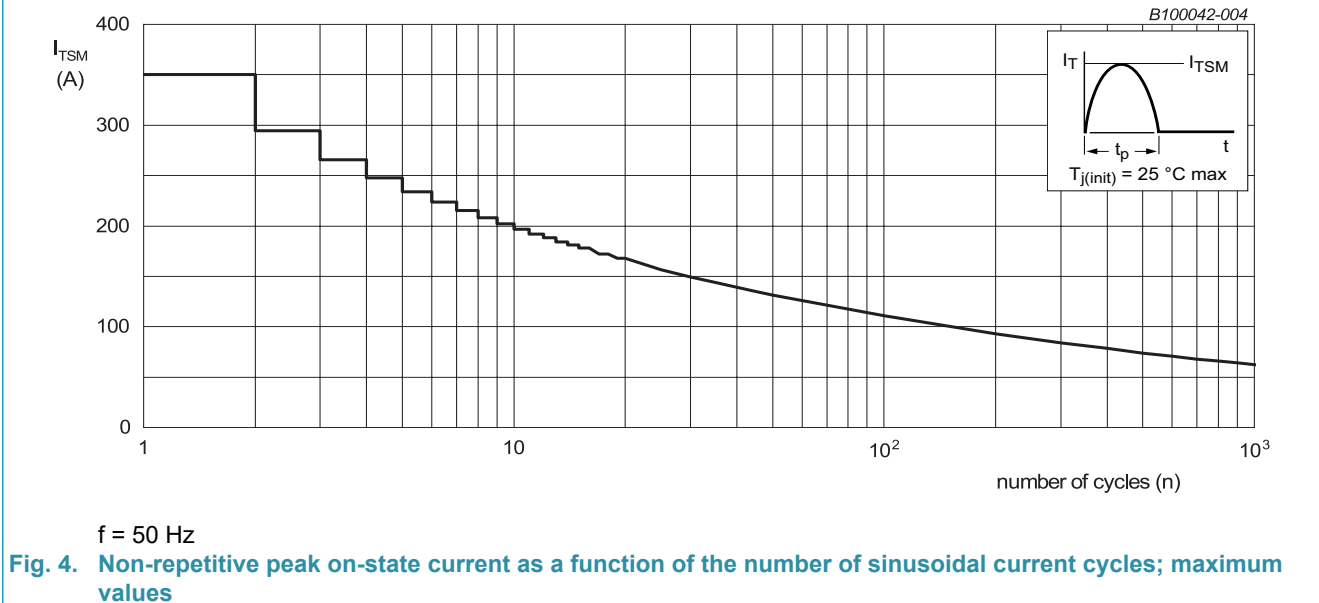
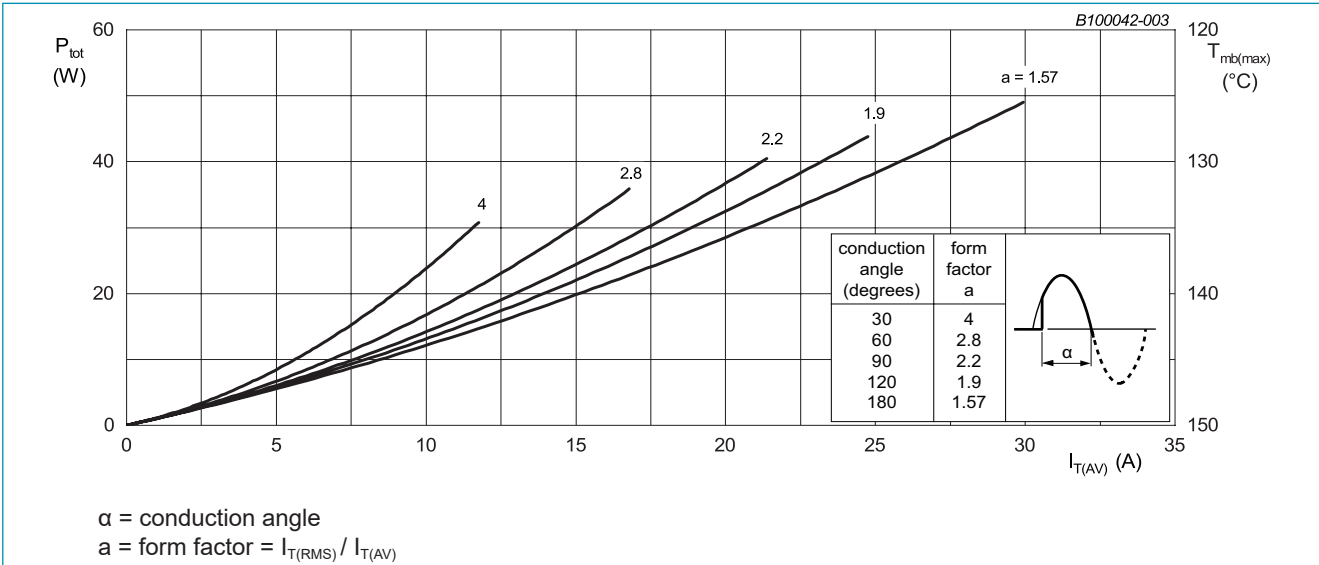
8. Limiting values

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			1200	V
V_{RRM}	repetitive peak reverse voltage			1200	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 125\text{ }^{\circ}\text{C}$;		30	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 125\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		47	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		350	A
		half sine wave; $T_{j(init)} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		385	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		612.5	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 100\text{ mA}$		200	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current			5	A
V_{GRM}	peak reverse gate voltage			5	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	junction temperature			150	$^{\circ}\text{C}$

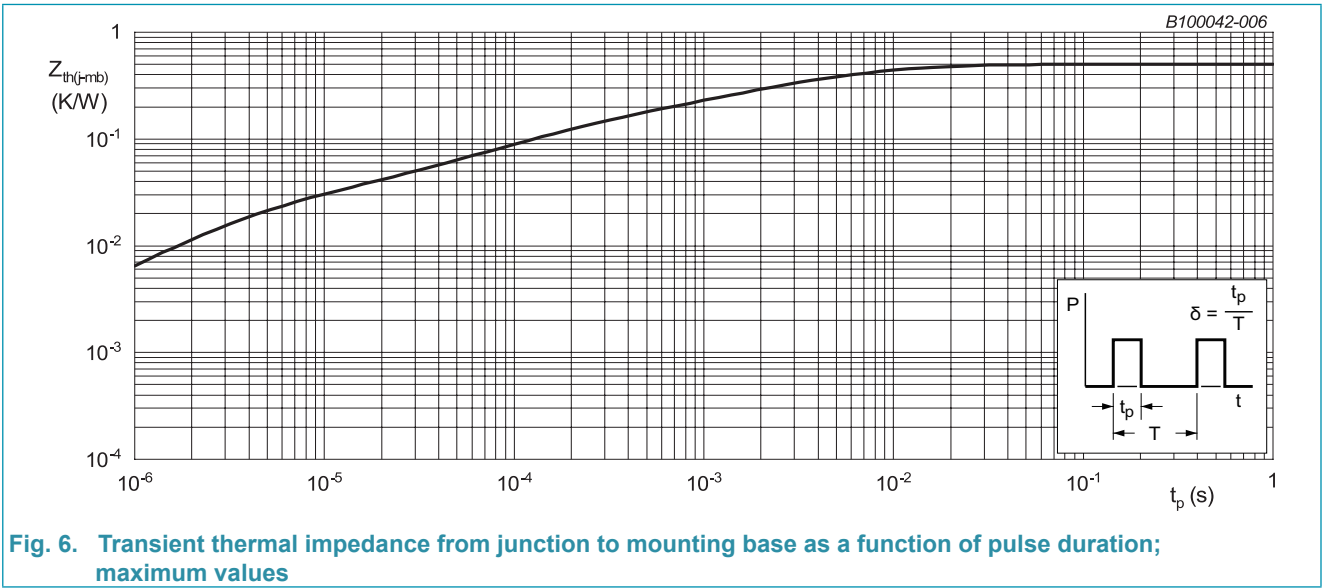




9. Thermal characteristics

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		-	-	0.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	50	-	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 V; I _T = 0.1 A; T _J = 25 °C; Fig. 7		-	-	50	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; 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 = 30 A; T _J = 25 °C; Fig. 11		-	-	1.30	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _J = 25 °C; Fig. 10		-	0.75	1.0	V
		V _D = 1200 V; I _T = 0.1 A; T _J = 150 °C		0.20	0.45	-	V
I _D	off-state current	V _D = 1200 V; T _J = 25 °C		-	-	10	μA
		V _D = 1200 V; T _J = 125 °C		-	-	2	mA
I _R	reverse current	V _D = 1200 V; T _J = 25 °C		-	-	10	μA
		V _D = 1200 V; T _J = 125 °C		-	-	2	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 804 V; T _J = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		1000	-	-	V/μs
t _{gt}	gate-controlled turn-on time	I _{TM} = 30 A; V _D = 800 V; I _G = 0.1 A; dI _G /dt = 5 A/μs; T _J = 25 °C		-	2	-	μs
t _q	commutated turn-off time	V _{DM} = 804 V; T _J = 125 °C; I _{TM} = 30 A; V _R = 25 V; (d _{IT} /d _i)M = 30 A/μs; dV _D /dt = 50 V/μs; (V _{DM} = 67% of V _{DRM})		-	70	-	μs

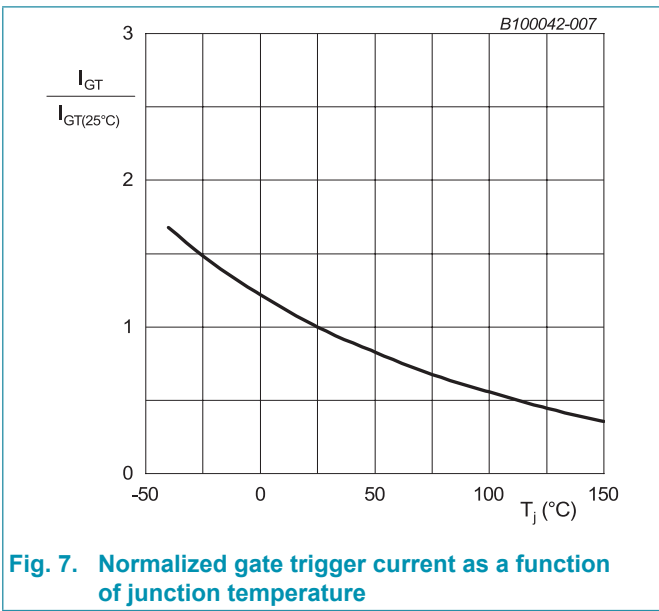


Fig. 7. Normalized gate trigger current as a function of junction temperature

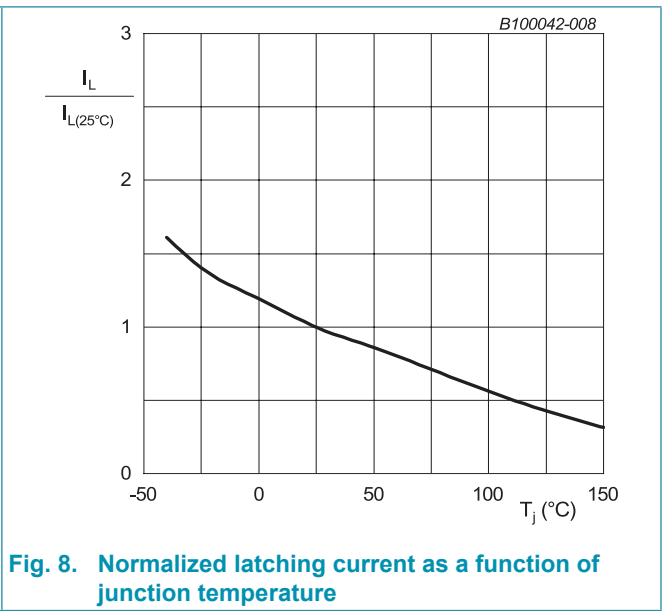


Fig. 8. Normalized latching current as a function of junction temperature

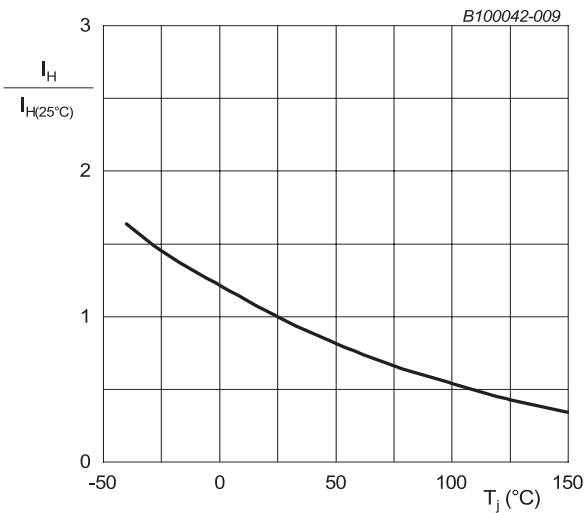


Fig. 9. Normalized holding current as a function of junction temperature

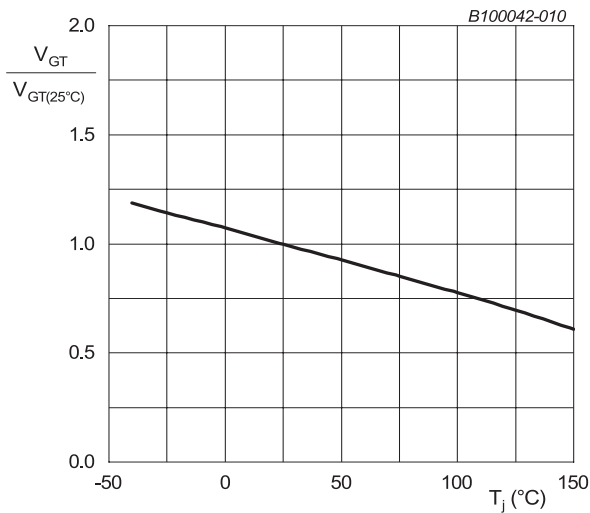
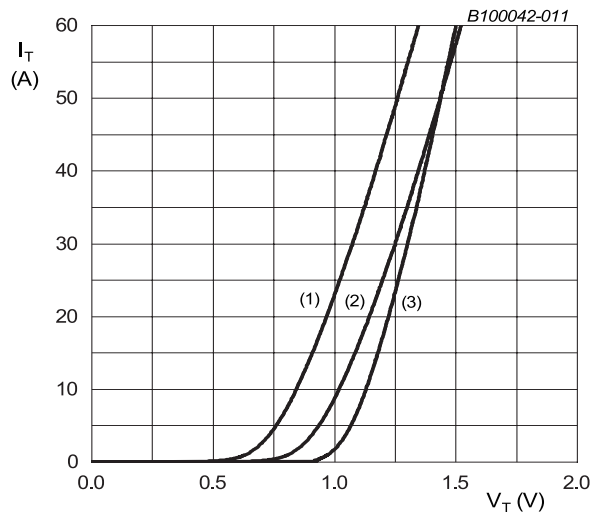


Fig. 10. Normalized gate trigger voltage as a function of junction temperature



$V_o = 1.002 \text{ V}; R_s = 0.0086 \text{ } \Omega$
(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

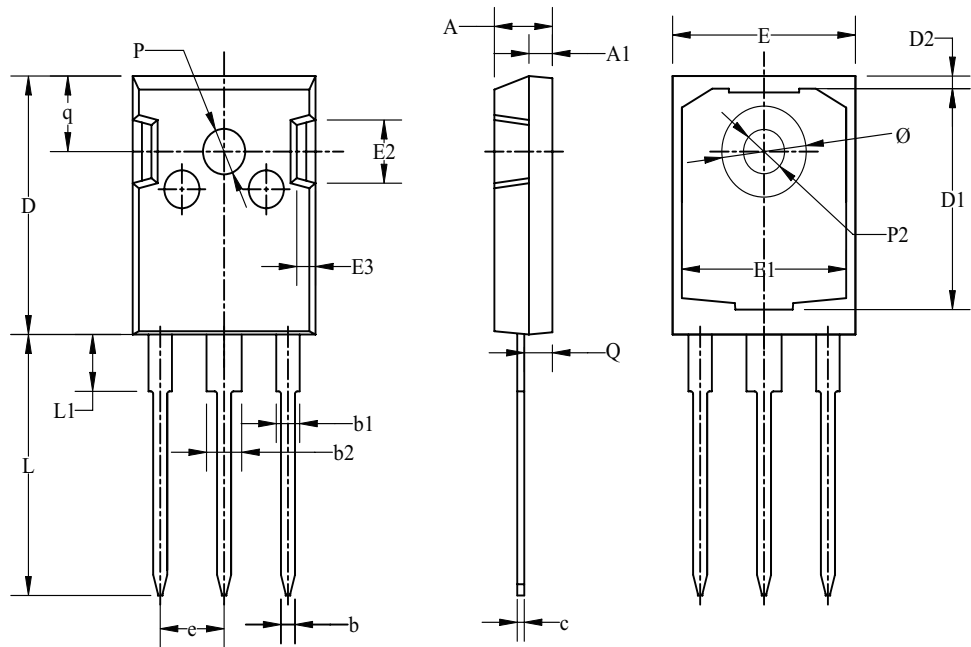
Fig. 11. On-state current as a function of on-state voltage

11. Package outline

Assembly factory: P

Plastic single-ended through-hole package; headsink mounted; 1 mounting hole; 3 leads TO-247

TO247

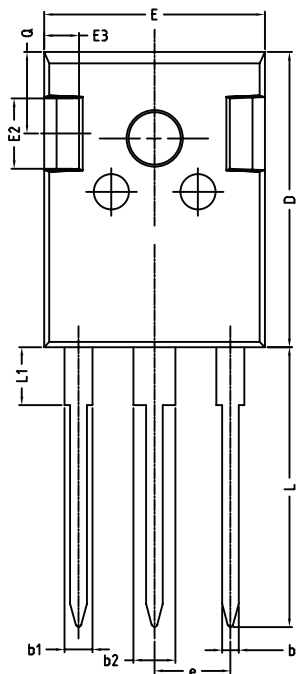


Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.70	4.95	5.20
A1	1.90	2.00	2.10
b	1.00	1.20	1.40
b1	1.80	2.00	2.20
b2	2.80	3.00	3.20
c	0.50	0.60	0.70
D	20.30	20.45	20.60
D1	17.28	17.48	17.68
D2	0.80	1.00	1.20
E	15.45	15.60	15.75
E1	13.82	14.02	14.22
E2	4.80	5.00	5.20
E3	1.40	1.60	1.80
e	5.45 BSC		
L	20.40	20.65	20.90
L1	4.25	4.50	4.75
P2	3.40	3.50	3.60
P	3.50	3.60	3.70
Q	2.20	2.40	2.60
q	5.78	5.98	6.18
Ø	7.10	7.19	7.30

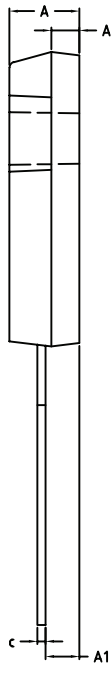
Assembly factory: A

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247

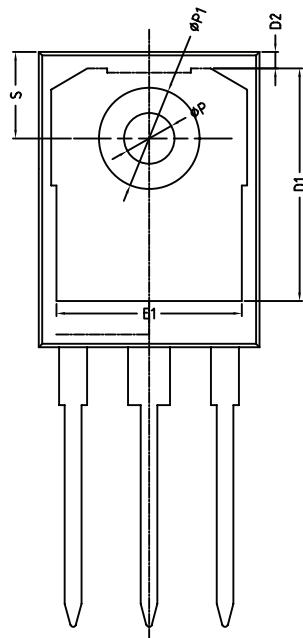
SOT429N



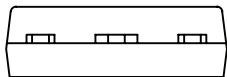
TOP VIEW



SIDE VIEW



BOTTOM VIEW



SIDE VIEW

UNIT	A	A1	A2	b	b1	b2	c	D	D1	D2	E	E1	E2	E3	e	L	L1	P	P1	Q	S
mm	MAX	5.20	2.60	2.10	1.40	2.20	3.20	0.70	21.10	16.85	1.35	15.90	13.50	5.20	2.60	20.10	4.75	3.70	7.40	6.00	6.25
	MIN	4.70	2.20	1.90	1.00	1.80	2.80	0.50	20.90	16.25	1.05	15.70	13.10	4.80	2.40	19.80	-	3.50	-	5.60	6.05

OUTLINE VERSION	REFERENCES				PROJECTION	ISSUE DATE
	IEC	JEDEC	EIA J			
SOT429N		TO-247				

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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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Date of release: 25 August 2025