TYN100W-1200T

SCR

Rev.01 - 24 April 2024 — Product data sheet

1. General description

Planar passivated Silicon Controlled Rectifier in a TO247 (SOT429) plastic package intended for use in applications requiring very high inrush current capability and high thermal cycling performance.

2. Features and benefits

- High thermal cycling performance
- Planar passivated for voltage ruggedness and reliability
- High voltage capacity
- Very high current surge 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

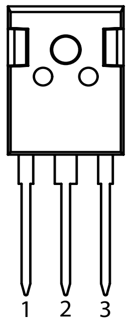
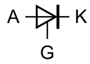
4. Quick reference data

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; $T_{mb} \leq 98$ °C; Fig. 1; Fig. 2; Fig. 3		160			A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25$ °C; $t_p = 10$ ms; Fig. 4; Fig. 5		1150			A
		half sine wave; $T_{j(init)} = 25$ °C; $t_p = 8.3$ ms		1265			A
T_j	junction temperature			-40 to 150			°C
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; Fig. 8		-	-	70	mA
I_H	holding current	$V_D = 12$ V; $T_j = 25$ °C; Fig. 10		-	-	200	mA
V_T	on-state voltage	$I_T = 100$ A; $T_j = 25$ °C; Fig. 11		-	-	1.37	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 804$ V; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; $R_{GK} = 100\ \Omega$; $T_j = 125$ °C		1500	-	-	V/µs
		$V_{DM} = 804$ V; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; $R_{GK} = 100\ \Omega$; $T_j = 150$ °C		1000	-	-	V/µs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		 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
TYN100W-1200T	TO247	TYN100W-1200TQ	Tube	30	TO247N	20-Jul-2016

7. Marking

Table 4. Marking codes

Type number	Marking codes
TYN100W-1200T	TYN100W 1200T

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} ≤ 98 °C;		100	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; T_{mb} ≤ 98 °C; Fig. 1; Fig. 2; Fig. 3		160	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(init)}$ = 25 °C; t_p = 10 ms; Fig. 4; Fig. 5		1150	A
		half sine wave; $T_{j(init)}$ = 25 °C; t_p = 8.3 ms		1265	A
I^2t	I^2t for fusing	t_p = 10 ms; sine-wave pulse		6612	A^2s
dI_T/dt	rate of rise of on-state current	I_G = 200 mA		150	A/µs
I_{GM}	peak gate current			8	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	junction temperature			-40 to 150	°C

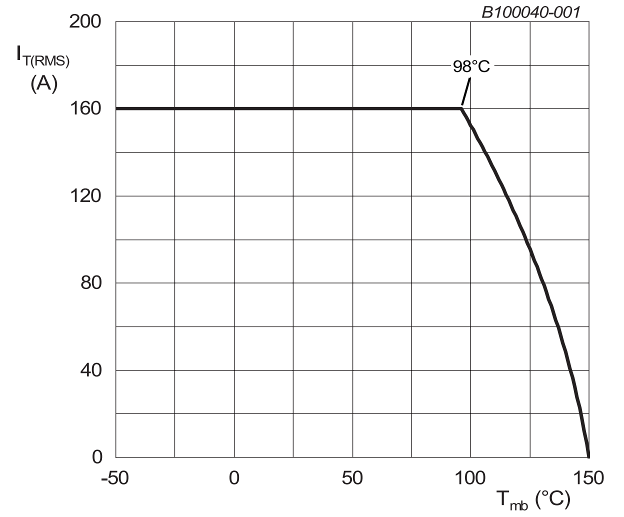
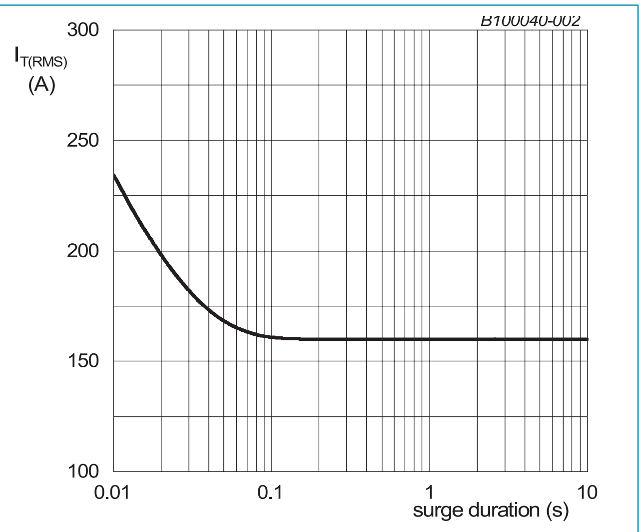
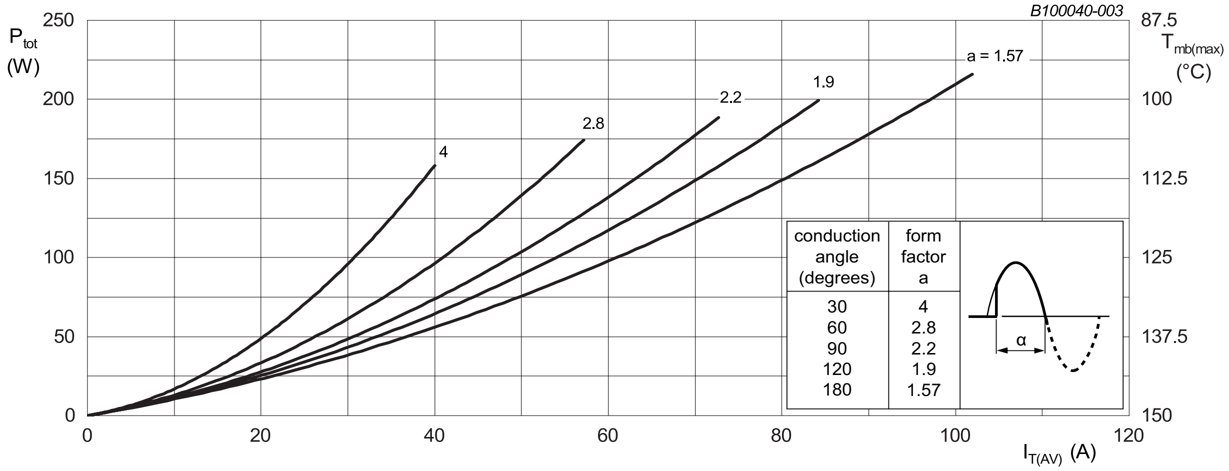


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz; T_{mb} = 98 °C

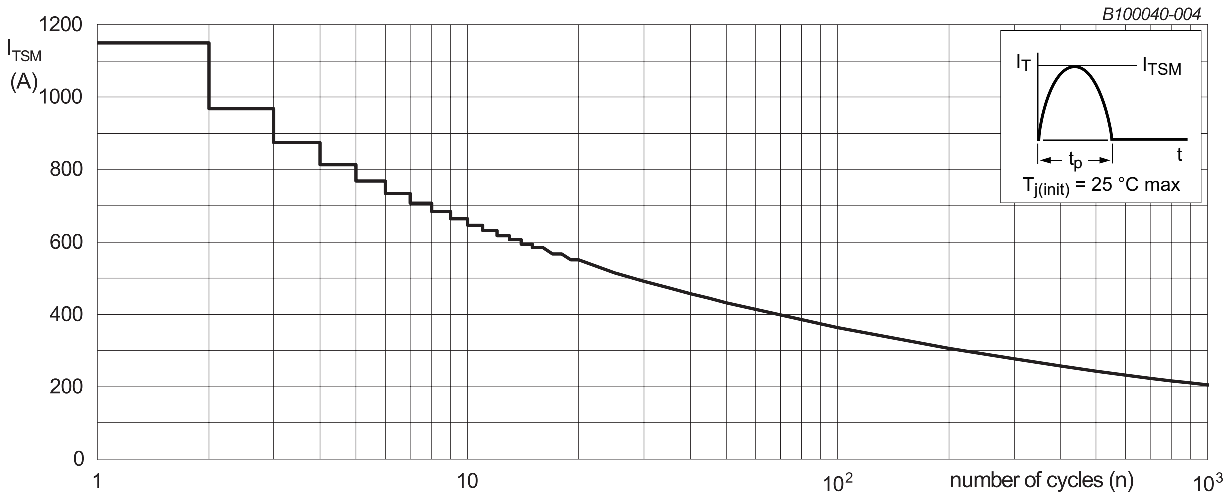
Fig. 2. RMS on-state current as a function of surge duration; maximum values



α = conduction angle

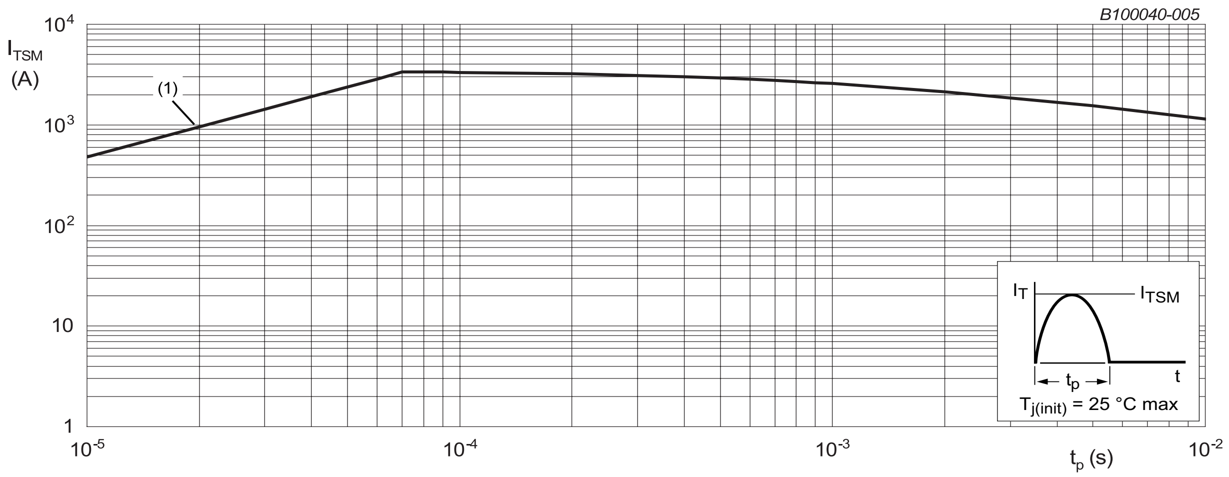
a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



f = 50 Hz

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



$t_p \leq 10$ ms

(1) dI_T/dt limit

Fig. 5. Non-repetitive peak on-state current as a function of pulse 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		-	-	0.25	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	50	-	K/W

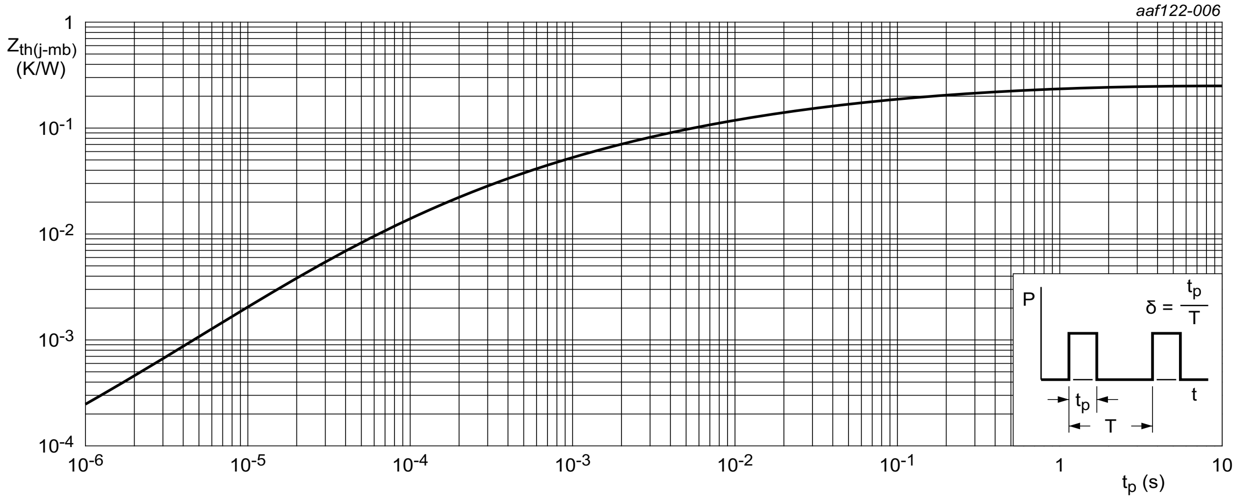


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

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; Fig. 8		-	-	70	mA
I_L	latching current	V_D = 12 V; I_G = 0.1 A; T_j = 25 °C; Fig. 9		-	-	300	mA
I_H	holding current	V_D = 12 V; T_j = 25 °C; Fig. 10		-	-	200	mA
V_T	on-state voltage	I_T = 100 A; T_j = 25 °C; Fig. 11		-	-	1.37	V
		I_T = 200 A; T_j = 25 °C; Fig. 11		-	-	1.76	V
V_{GT}	gate trigger voltage	V_D = 12 V; I_T = 0.1 A; T_j = 25 °C; Fig. 12		-	0.7	1.0	V
		V_D = 800 V; I_T = 0.1 A; T_j = 150 °C		0.25	0.40	-	V
I_D	off-state current	V_D =1200 V; T_j = 25 °C		-	-	10	µA
		V_D = 1200 V; T_j = 125 °C		-	-	5	mA
I_R	reverse current	V_D = 1200 V; T_j = 25 °C		-	-	10	µA
		V_D = 1200 V; T_j = 125 °C		-	-	5	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	V_{DM} = 804 V; (V_{DM} = 67% of V_{DRM}); exponential waveform; R_{GK} = 100 Ω; T_j = 125 °C		1500	-	-	V/µs
		V_{DM} = 804 V; (V_{DM} = 67% of V_{DRM}); exponential waveform; R_{GK} = 100 Ω; T_j = 150 °C		1000	-	-	V/µs
t_{gt}	gate-controlled turn-on time	I_{TM} = 40 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; (V_{DM} = 67% of V_{DRM}); I_{TM} = 20 A; V_R = 25 V; dV_D/dt = 50 V/µs; $R_{GK(ext)}$ = 100 Ω; T_j = 125 °C		-	-	150	µs

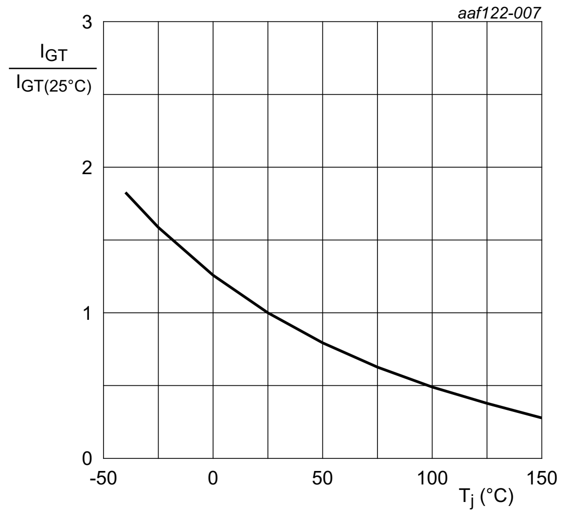


Fig. 7. Normalized gate trigger current as a function of junction temperature

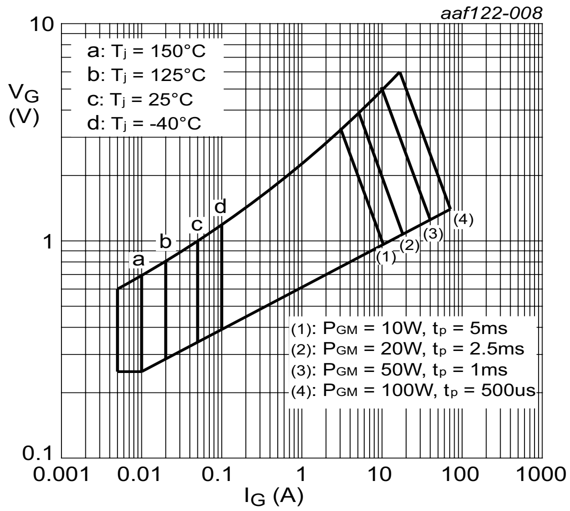


Fig. 8. Gate voltage as a function of gate current

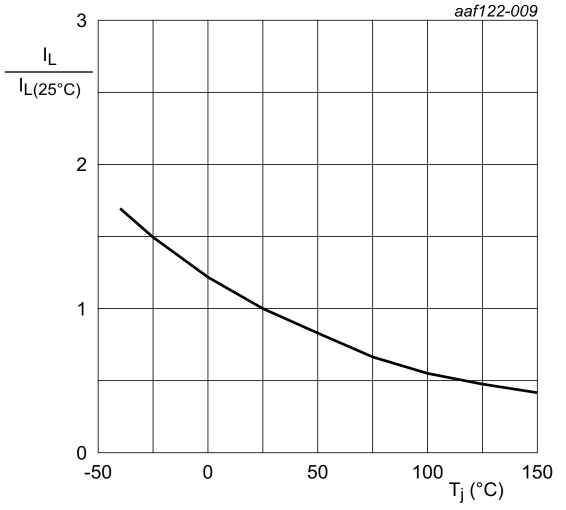


Fig. 9. Normalized latching current as a function of junction temperature

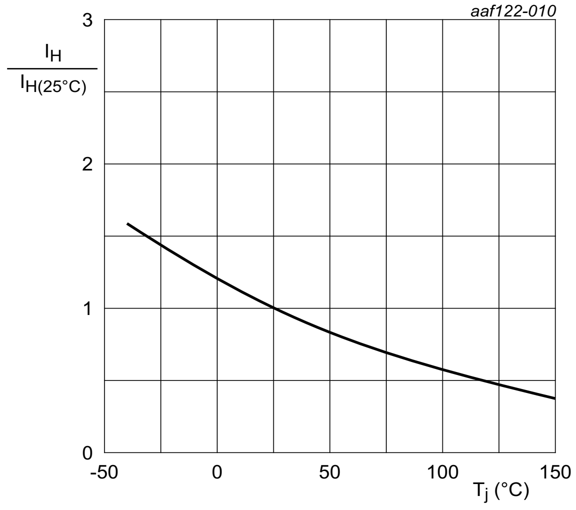
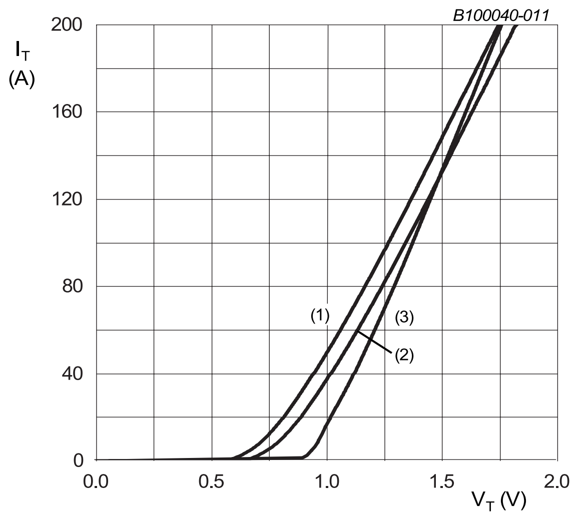


Fig. 10. Normalized holding current as a function of junction temperature



V_o = 0.872 V; R_s = 0.0047 Ω
(1) T_j = 150 °C; typical values
(2) T_j = 150 °C; maximum values
(3) T_j = 25 °C; maximum values

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

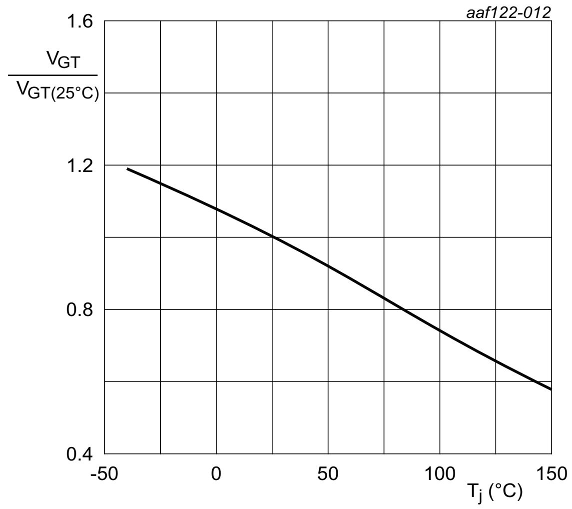
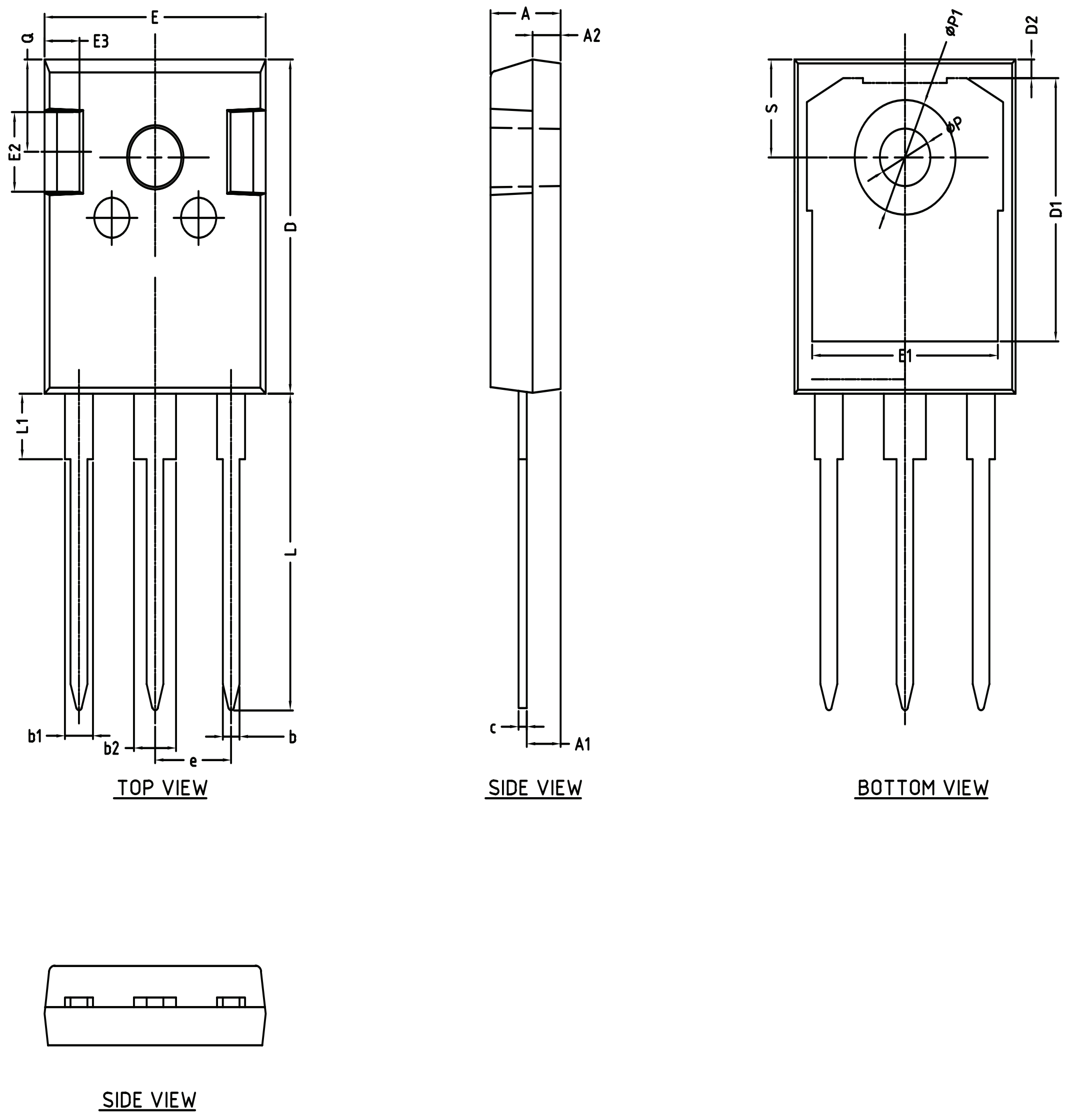


Fig. 12. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Plastic single-ended through-hole package; heatsink mounted; 1 mounting hole; 3-lead TO-247 SOT429N



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
	NOM															5.45						
	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	EIAJ			
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.

[1] Please consult the most recently issued document before initiating or completing a design.
[2] The term 'short data sheet' is explained in section "Definitions".
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