

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a TO263 (D2PAK) surface mountable plastic package intended for use in applications requiring very high inrush current capability, high thermal cycling performance and high junction temperature capability ($T_{j(max)} = 150\text{ °C}$)

2. Features and benefits

- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- Very high current surge capability
- Planar passivated for voltage ruggedness and reliability
- High turn-on current rise $di_T/dt = 200\text{ A}/\mu\text{s}$
- High noise immunity $dV_D/dt = 1000\text{ V}/\mu\text{s}$ up to 150 °C
- High thermal cycling performance
- High voltage capability

3. Applications

- Ignition circuits
- Protection circuits e.g. SMPS inrush current
- Motor control circuits and starters
- Voltage regulation
- Solid state relays
- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)

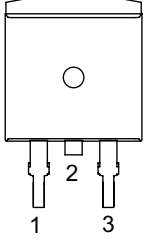

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{DRM}	repetitive peak off-state voltage			800			V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 132\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		50			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		500			A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		550			A
T_j	junction temperature			-40 to 150			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ °C}$; Fig. 7		5	-	35	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_j = 25\text{ °C}$; Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 100\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10		-	-	1.70	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_j = 150\text{ °C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		1000	-	-	V/ μs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	K	cathode		
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
TYN50B-800TN	TO263	TYN50B-800TNJ	Reel	800	TO263d	17-Mar-2023

7. Marking

Table 4. Marking codes

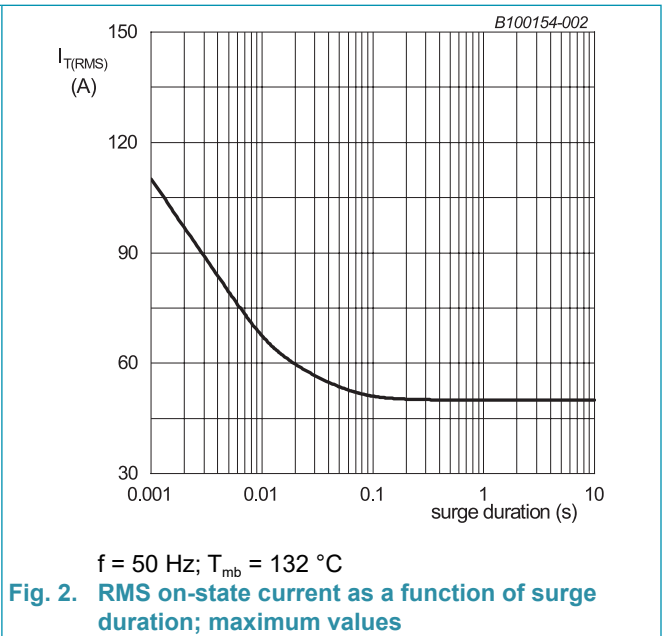
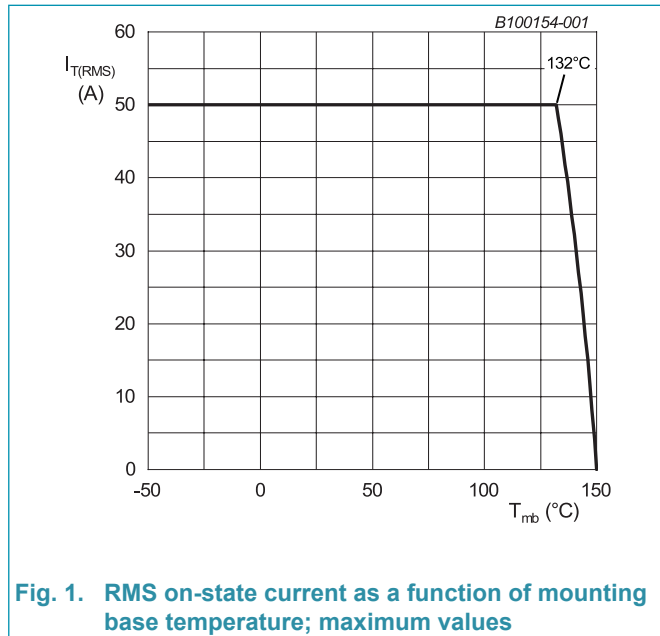
Type number	Marking codes
TYN50B-800TN	TYN50B 800TN

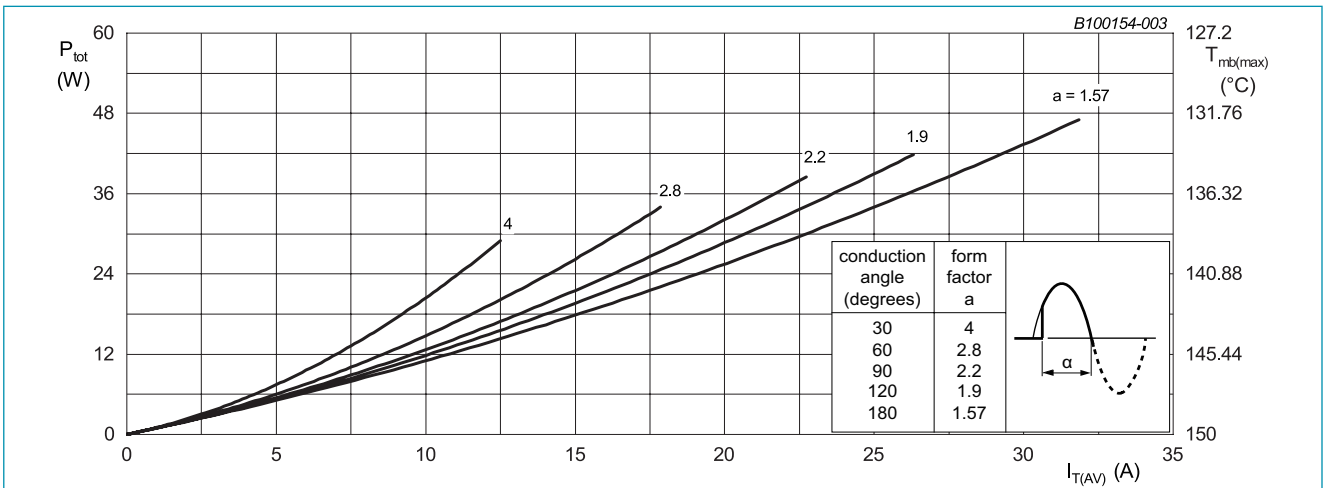
8. Limiting values

Table 5. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

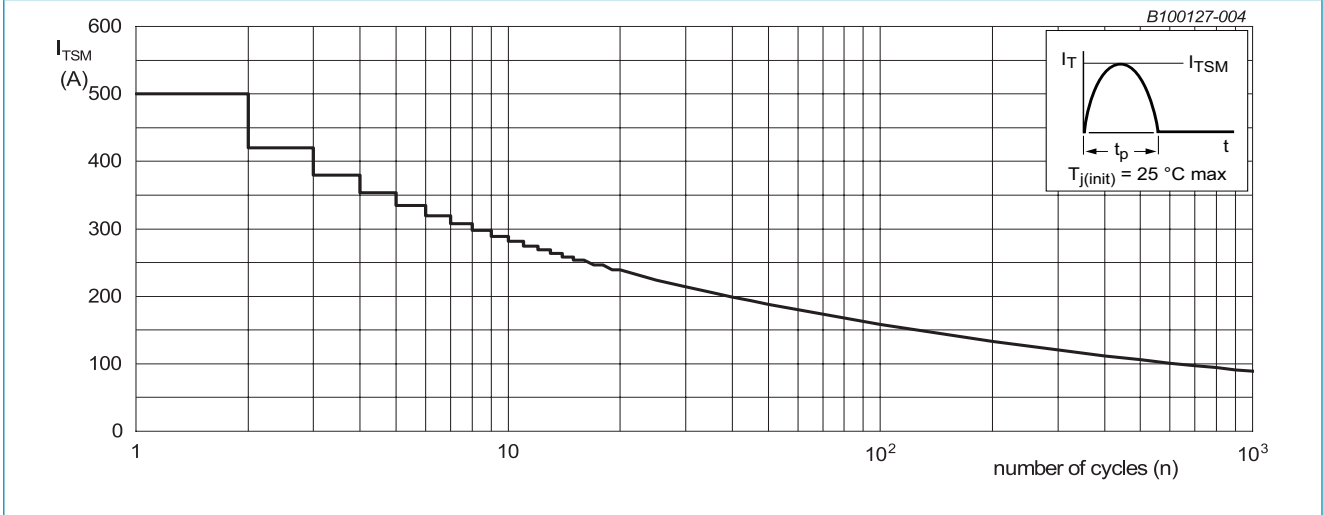
Symbol	Parameter	Conditions	Notes	Values	Unit
V_{DRM}	repetitive peak off-state voltage			800	V
V_{RRM}	repetitive peak reverse voltage			800	V
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 132\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		50	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		500	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		550	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		1250	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 70\text{ mA}$		200	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current	$t_p = 20\text{ }\mu\text{s}$		5	A
V_{GM}	peak gate voltage	$t_p = 20\text{ }\mu\text{s}$		5	V
P_{GM}	peak gate power	$T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ }\mu\text{s}$		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			-40 to 150	$^{\circ}\text{C}$





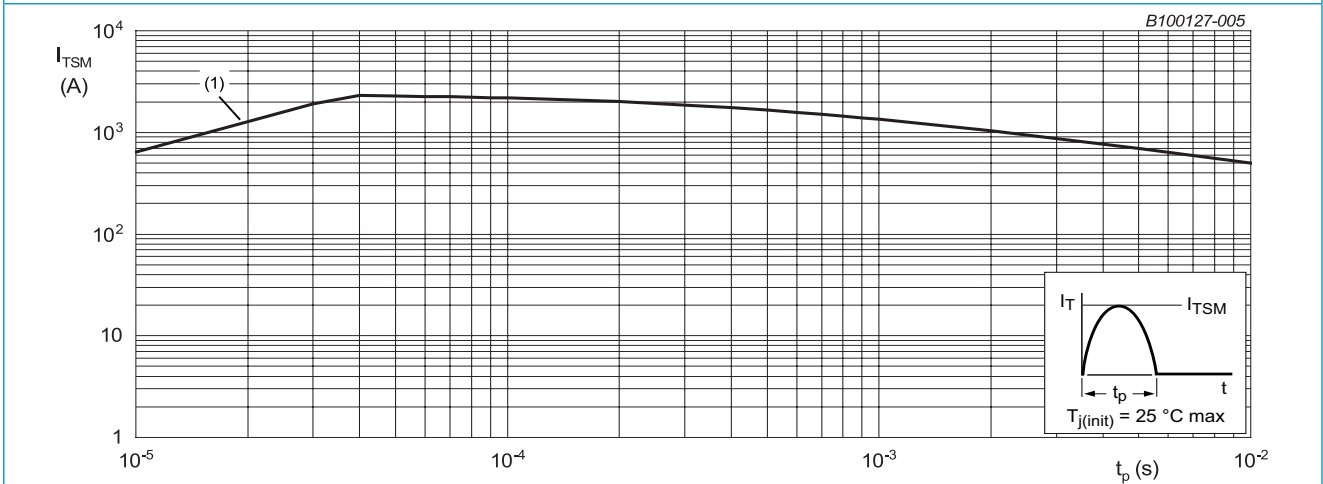
α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



$f = 50 \text{ Hz}$

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



$t_p \leq 10 \text{ ms}$
 (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		-	-	0.38	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air		-	60	-	K/W

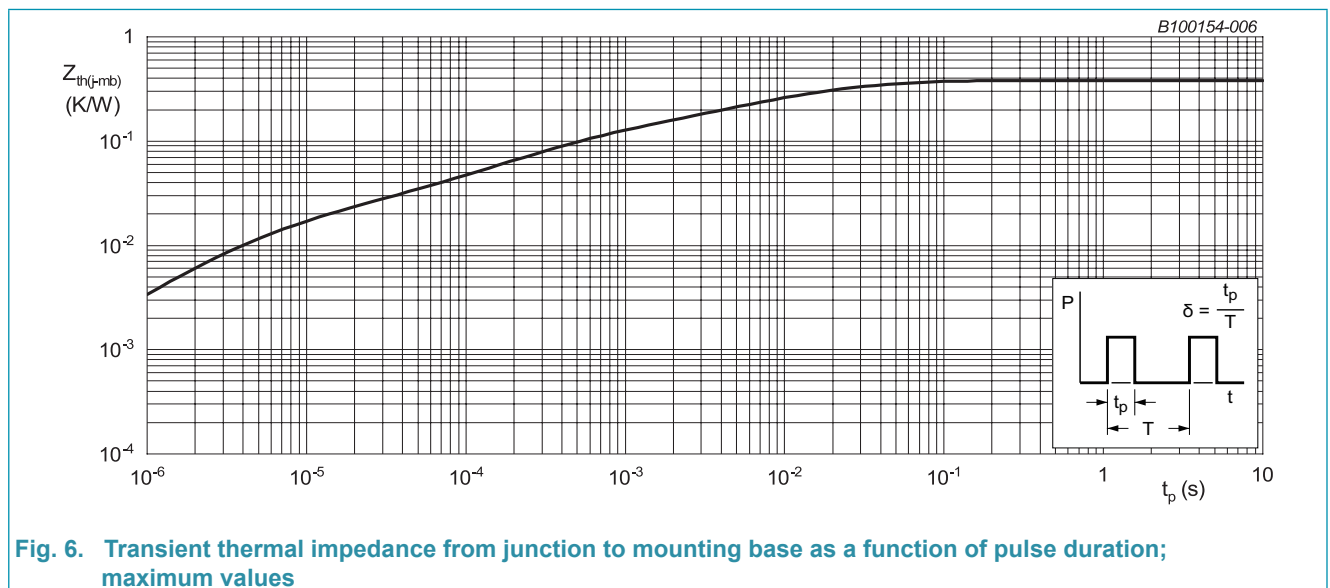


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration; maximum values

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 7		5	-	35	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		-	-	80	mA
I_H	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C};$ Fig. 9		-	-	60	mA
V_T	on-state voltage	$I_T = 100\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 10		-	-	1.70	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	1.0	V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 150\text{ }^\circ\text{C}$		0.25	0.40	-	V
I_D	off-state current	$V_D = 800\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_D = 800\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	2	mA
I_R	reverse current	$V_D = 800\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_D = 800\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	2	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}; T_j = 150\text{ }^\circ\text{C}; (V_{DM} = 67\% \text{ of } V_{DRM});$ exponential waveform; gate open circuit		1000	-	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 80\text{ A}; V_D = 800\text{ V}; I_G = 0.1\text{ A};$ $dI_G/dt = 0.2\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 536\text{ V}; T_j = 150\text{ }^\circ\text{C}; I_{TM} = 40\text{ A};$ $V_R = 25\text{ V}; (dI_T/dt)M = 30\text{ A}/\mu\text{s};$ $dV_D/dt = 50\text{ V}/\mu\text{s}; (V_{DM} = 67\% \text{ of } V_{DRM});$		-	70	-	μs

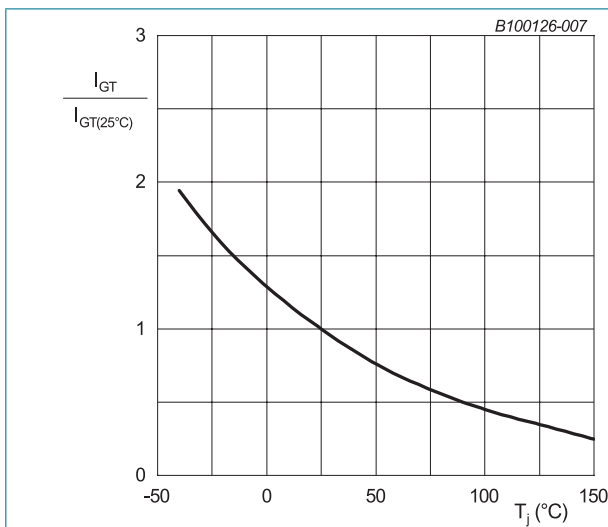


Fig. 7. Normalized gate trigger current as a function of junction temperature

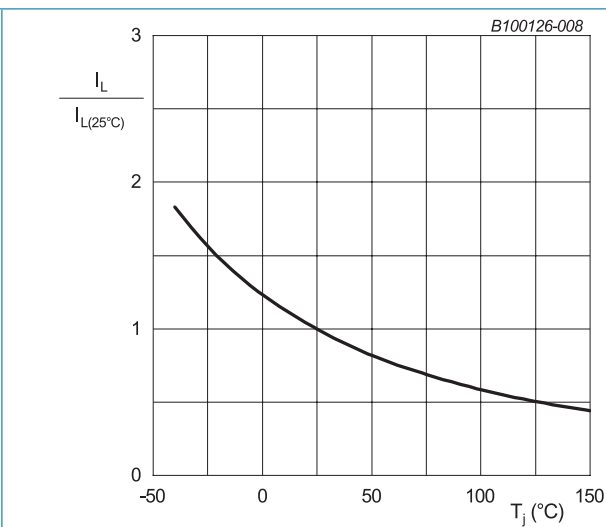


Fig. 8. Normalized latching current as a function of junction temperature

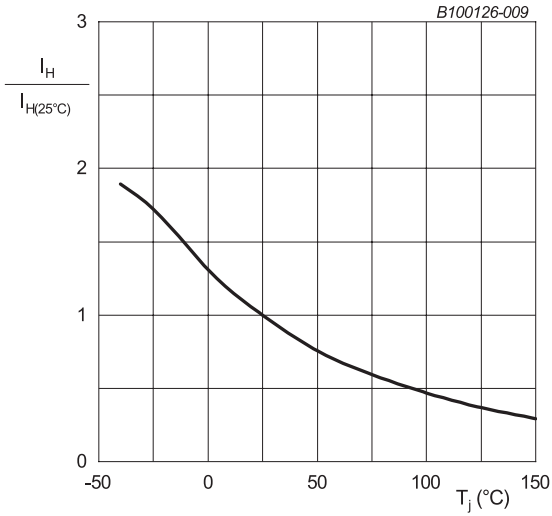
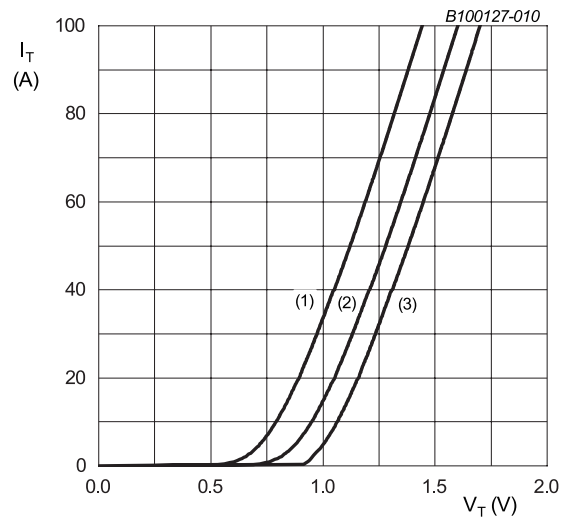


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 0.932 \text{ V}; R_s = 0.0069 \Omega$
 (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. 10. On-state current as a function of on-state voltage

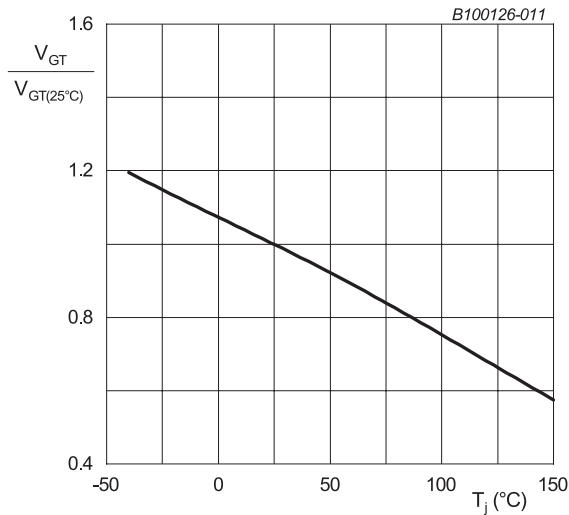
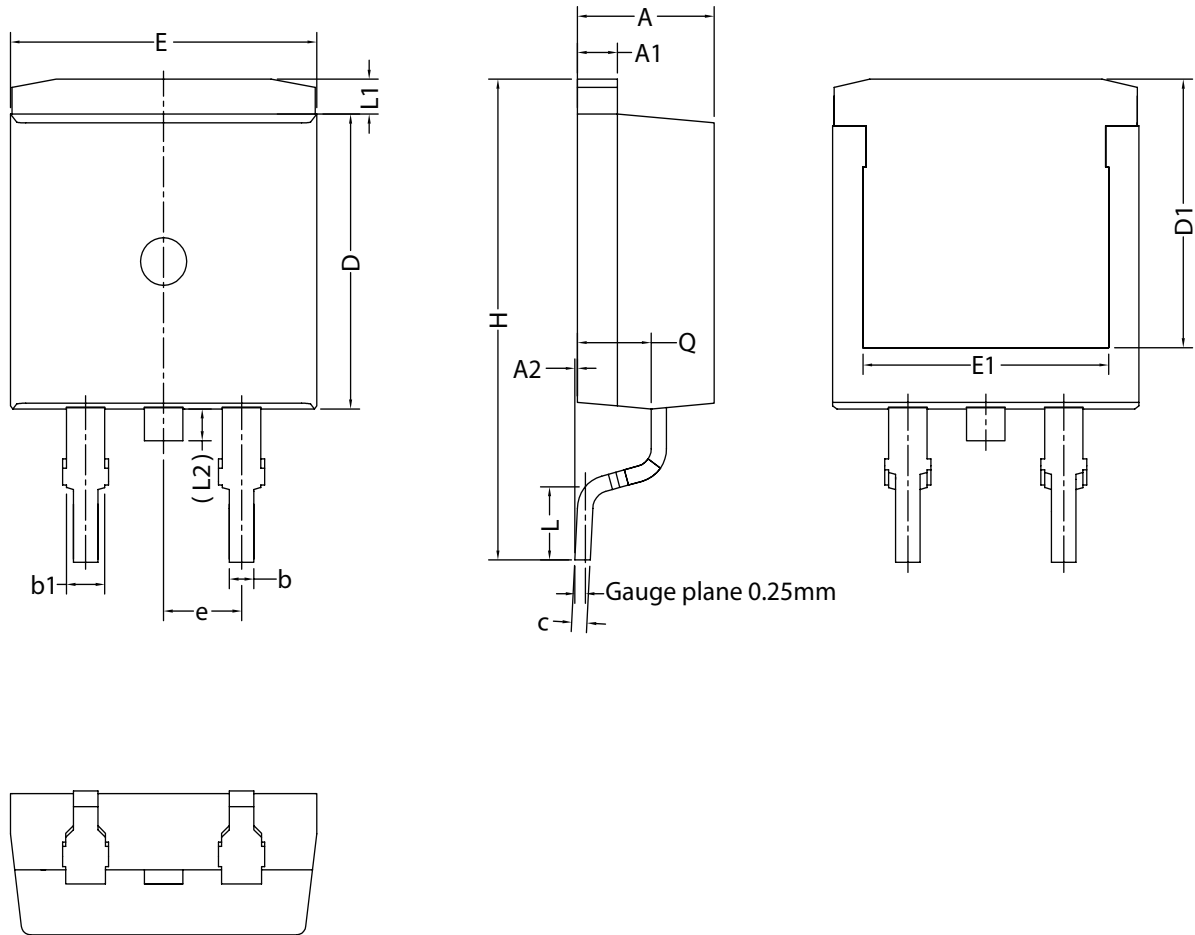


Fig. 10. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Plastic single-ended surface-mounted package (D2PAK);

TO263



Note:
All dimensions do not include mold flash or protrusion.

Unit	A	A1	A2	b	b1	c	D	D1	e	E	E1	H	L	L1	L2	Q
MM	min	4.30	1.27	0.00	0.75	1.20	0.45	9.00	7.65	9.85	7.80	14.84	1.90	0.90	--	2.20
	max	4.60	1.37	0.25	0.90	1.36	0.60	9.45	8.05	10.10	8.20	15.64	2.60	1.35	1.50	2.40

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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