

1. General description

Planar passivated Silicon Controlled Rectifier (SCR) in a TO263 surface mountable plastic package intended for use in applications requiring very high inrush current capability and high bidirectional blocking voltage capability.

2. Features and benefits

- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- Planar passivated for voltage ruggedness and reliability
- High voltage capacity
- Very high current surge capability
- Surface mountable package

3. Applications

- DC motor control
- Power converter
- Solid State Relay (SSR)
- Uninterruptible Power Supply (UPS)

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
V_{RRM}	repetitive peak reverse 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		31			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		250			A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		275			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		-	-	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	$I_T = 20\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10		-	1.15	1.50	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	<p>TO-263 (D2PAK)</p> <p>N d</p>	<p>A K G sym037</p>
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
BT152B-1200T	TO263	BT152B-1200TJ	Reel	800	TO263N (N)	26-Sep-2016
					TO263d (d)	17-Mar-2023

7. Marking

Table 4. Marking codes

Type number	Marking codes	
	Assembly factory: N	Assembly factory: d
BT152B-1200T	BT152B 1200T PjNxxxx xx	BT152B 1200T Pjdxxxx 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; $T_{mb} \leq 125\text{ °C}$		20	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 125\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3		31	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		250	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ ms}$		275	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN		312.5	A ² s
di_T/dt	rate of rise of on-state current	$I_G = 60\text{ mA}$		150	A/ μ 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		0.5	W
T_{stg}	storage temperature			-40 to 150	°C
T_j	junction temperature			150	°C

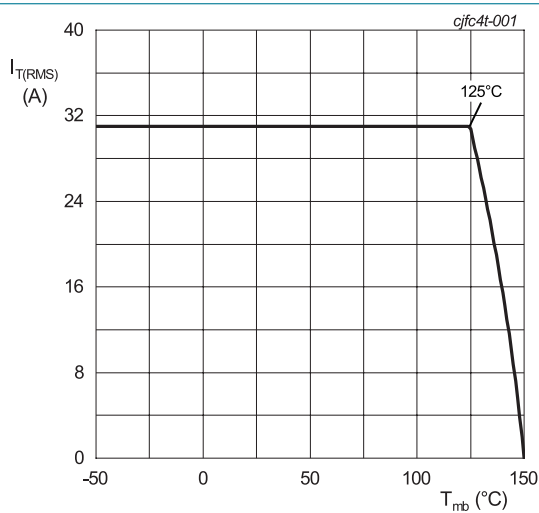


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values

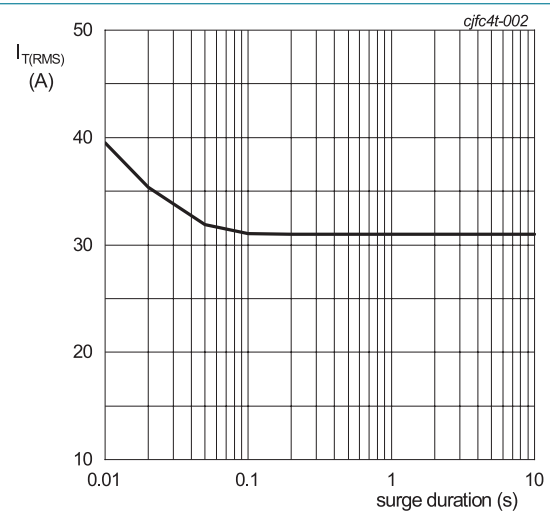
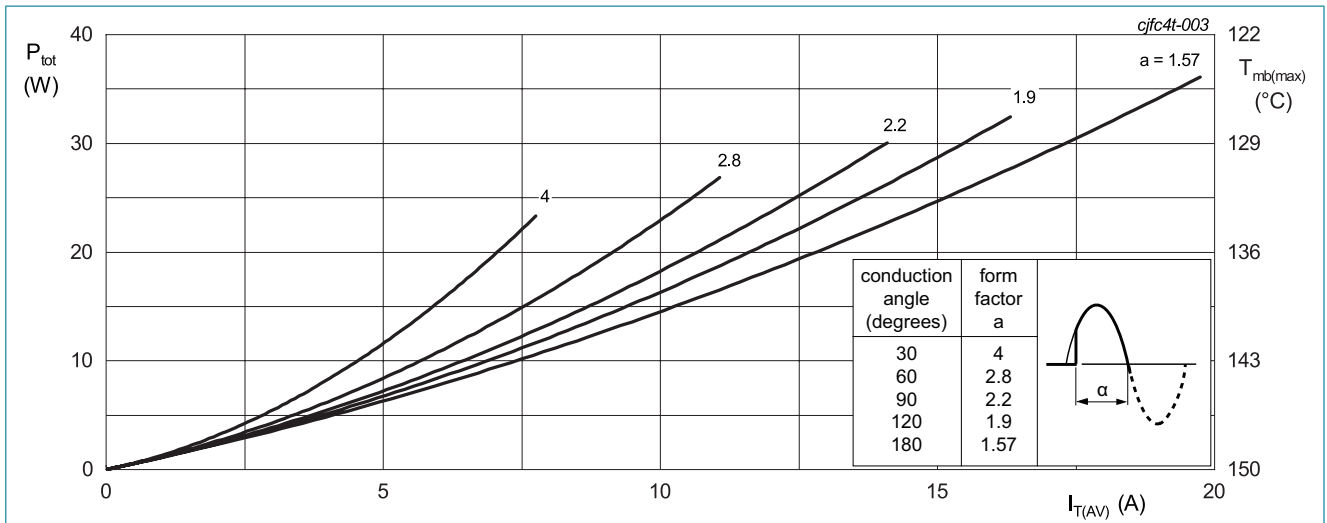
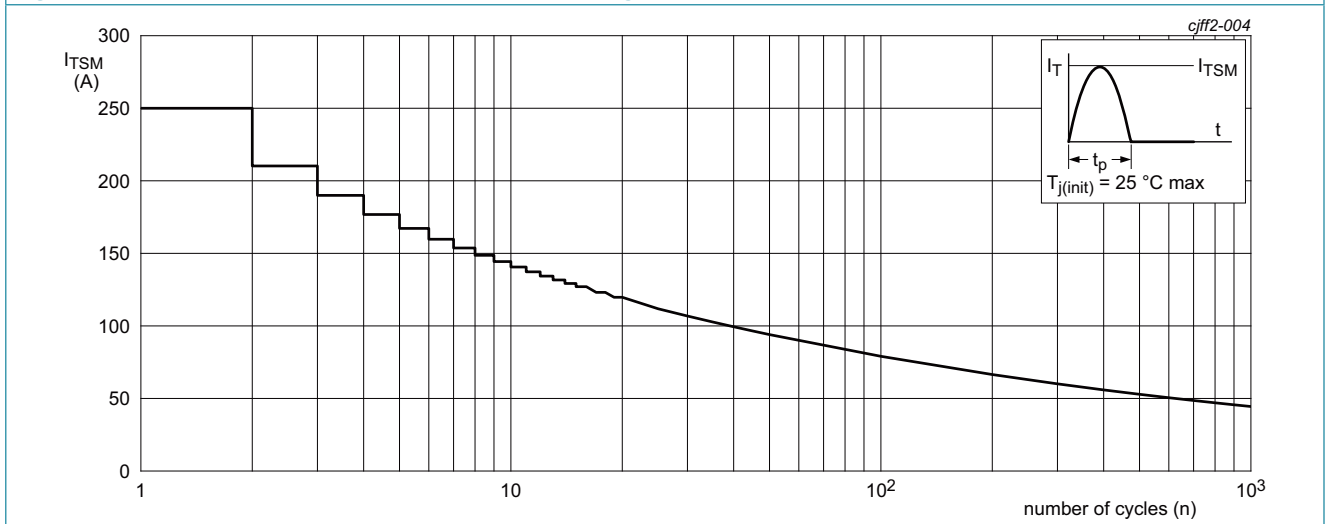


Fig. 2. RMS on-state current as a function of surge duration; maximum values
 $f = 50\text{ Hz}$; $T_{mb} = 125\text{ °C}$



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

Fig. 3. Total power dissipation as a function of average 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

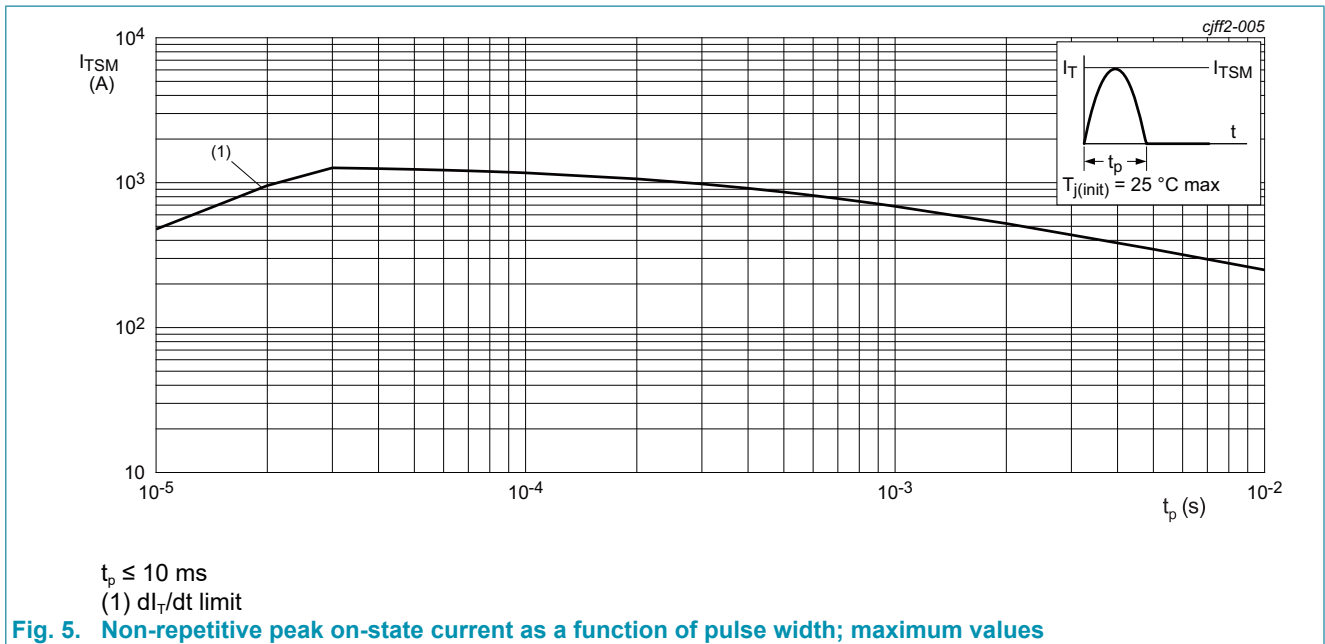


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

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		-	-	0.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	60	-	K/W

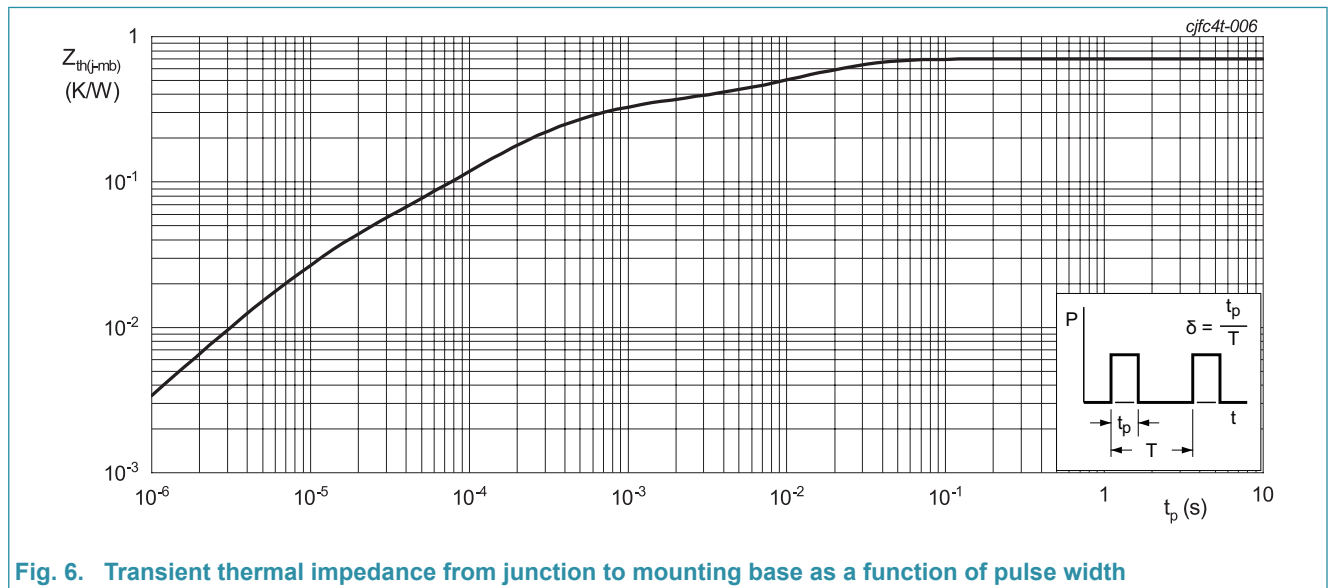
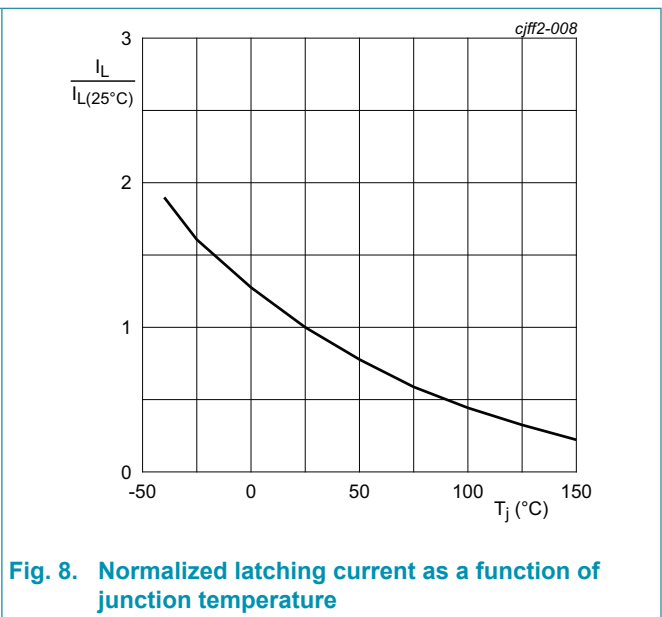
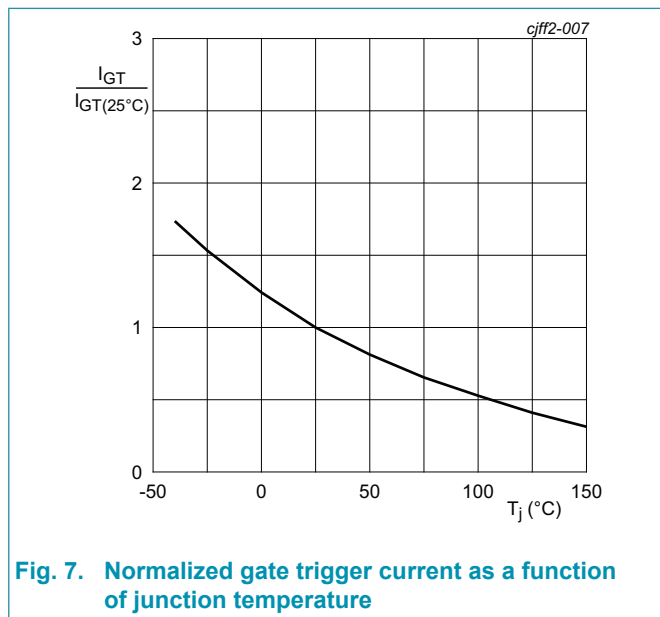


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

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		-	-	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	$I_T = 20\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 10		-	1.15	1.50	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	V
		$V_D = 1200\text{ V}; I_T = 0.1\text{ A}; T_j = 150\text{ }^\circ\text{C}$		0.25	0.4	-	V
I_D	off-state current	$V_D = 1200\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_D = 1200\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	2	mA
I_R	reverse current	$V_R = 1200\text{ V}; T_j = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_R = 1200\text{ V}; T_j = 150\text{ }^\circ\text{C}$		-	-	2	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 804\text{ V}; T_j = 150\text{ }^\circ\text{C}; (V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		1000	-	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 20\text{ A}; V_D = 800\text{ V}; I_G = 100\text{ mA}; dI_G/dt = 5\text{ A}/\mu\text{s}; T_j = 25\text{ }^\circ\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 804\text{ V}; T_j = 125\text{ }^\circ\text{C}; I_{TM} = 20\text{ A}; V_R = 25\text{ V}; (dI_T/dt)_M = 30\text{ A}/\mu\text{s}; dV_D/dt = 50\text{ V}/\mu\text{s}; (V_{DM} = 67\%$ of V_{DRM})		-	70	-	μs



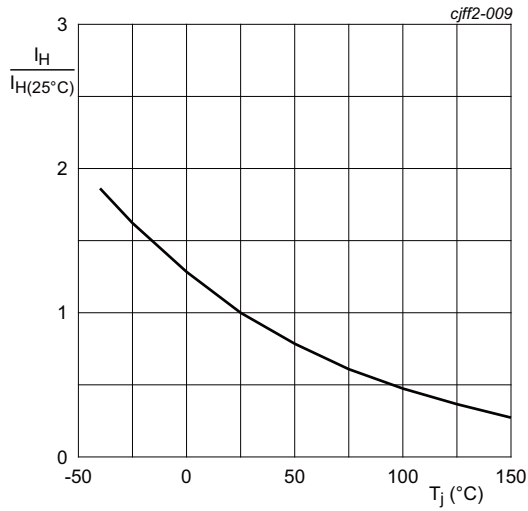
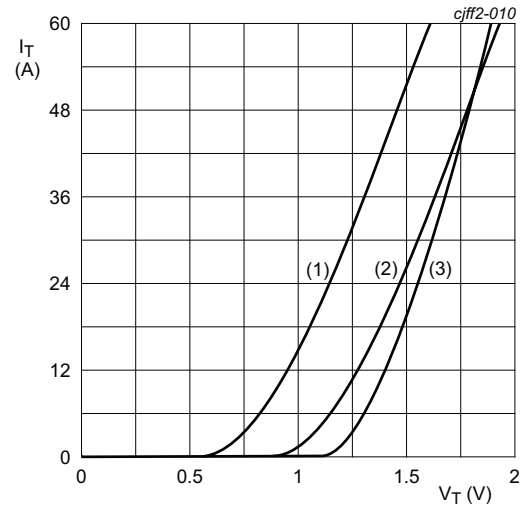


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.067 \text{ V}; R_s = 0.0156 \Omega$
 (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

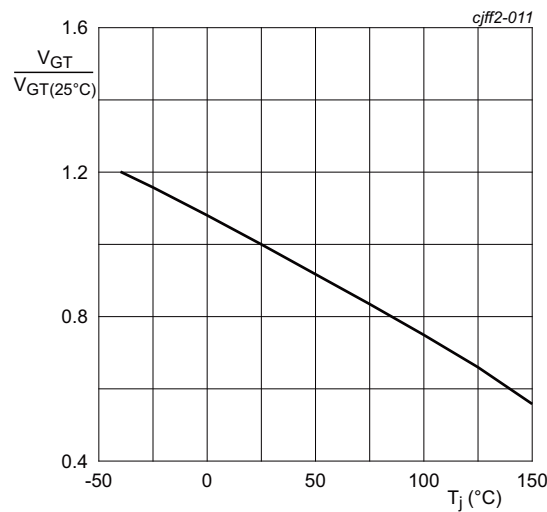
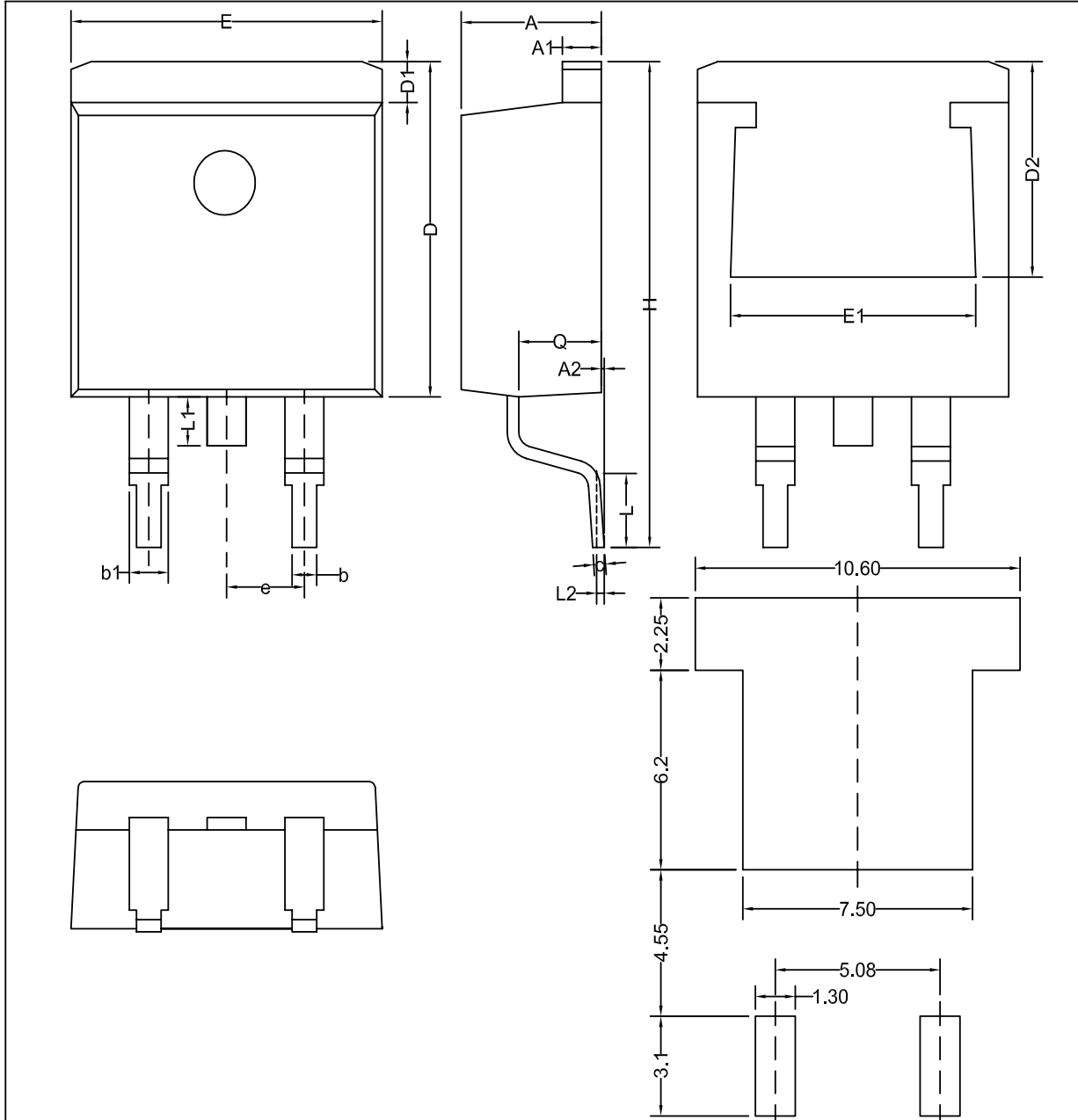


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Assembly factory: N

Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263



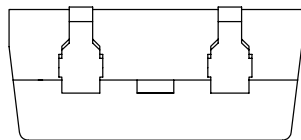
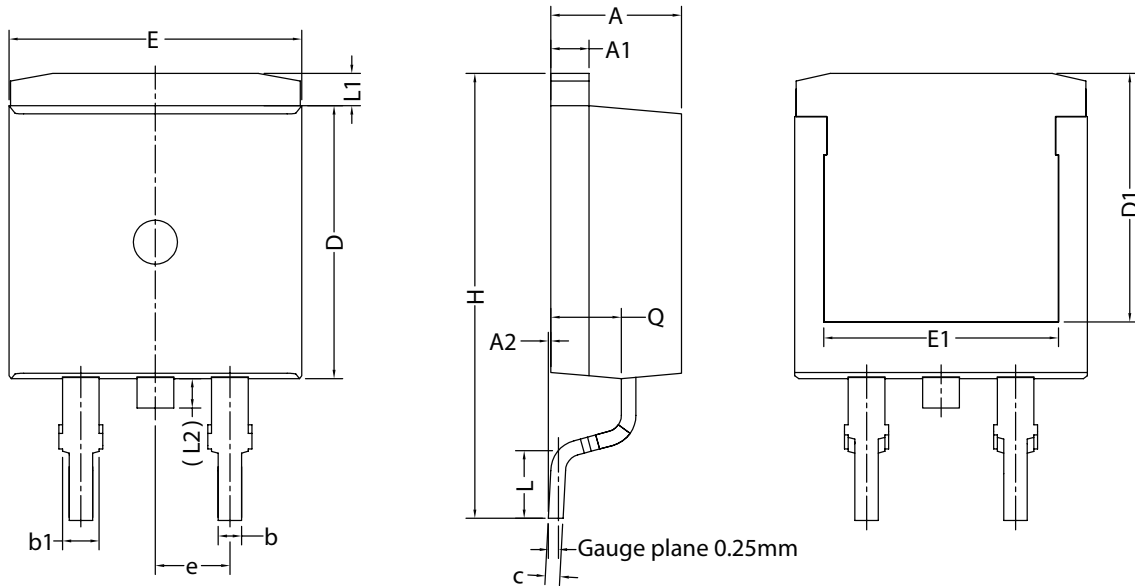
Recommended Footprint

Unit	A	A1	A2	b	b1	c	D	D1	D2	e	E	E1	H	L	L1	L2	Q
min	4.10	1.22	0.00	0.60	1.05	0.34	---	1.20	6.60	---	9.70	7.80	14.80	2.10	---	---	2.20
max	4.70	1.40	0.25	0.90	1.45	0.64	11.00	1.60	---	2.54 (BSC)	10.30	---	15.80	2.90	1.75	0.25 (BSC)	2.79

Assembly factory: d

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

T0263



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

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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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