

## 1. General description

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

## 2. Features and benefits

- High junction operating temperature capability
- High thermal cycling performance
- High voltage capability
- Planar passivated for voltage ruggedness and reliability
- High bidirectional blocking voltage capability
- Surface mountable package
- Very high current surge capability

## 3. Applications

- Ignition circuits
- Motor control
- Protection circuits e.g. SMPS inrush current
- Voltage regulation
- Crowbar protection

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Values	Unit
$V_{DRM}$	repetitive peak off-state voltage		600	V
$V_{RRM}$	repetitive peak reverse voltage		600	V
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 10\text{ ms}$ ; <a href="#">Fig 4</a> ; <a href="#">Fig 5</a>	180	A
		half sine wave; $T_{j(init)} = 25\text{ °C}$ ; $t_p = 8.3\text{ ms}$	198	A
$T_j$	junction temperature		150	°C
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$ ; <a href="#">Fig 1</a>	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133\text{ °C}$ ; <a href="#">Fig 2</a> ; <a href="#">Fig 3</a>	16	A

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}$ ; $I_T = 0.1\text{ A}$ ; $T_j = 25\text{ °C}$ ; <a href="#">Fig 7</a>	1.5	-	6	mA
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}$ ; $T_j = 125\text{ °C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit	300	-	-	V/ $\mu$ s

## 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
TYN16B-600CT	TO263	TYN16B-600CTJ	Reel	800	TO263N (N)	28-Sep-2016
	TO263d (d)				17-Mar-2023	

## 7. Marking

Table 4. Marking codes

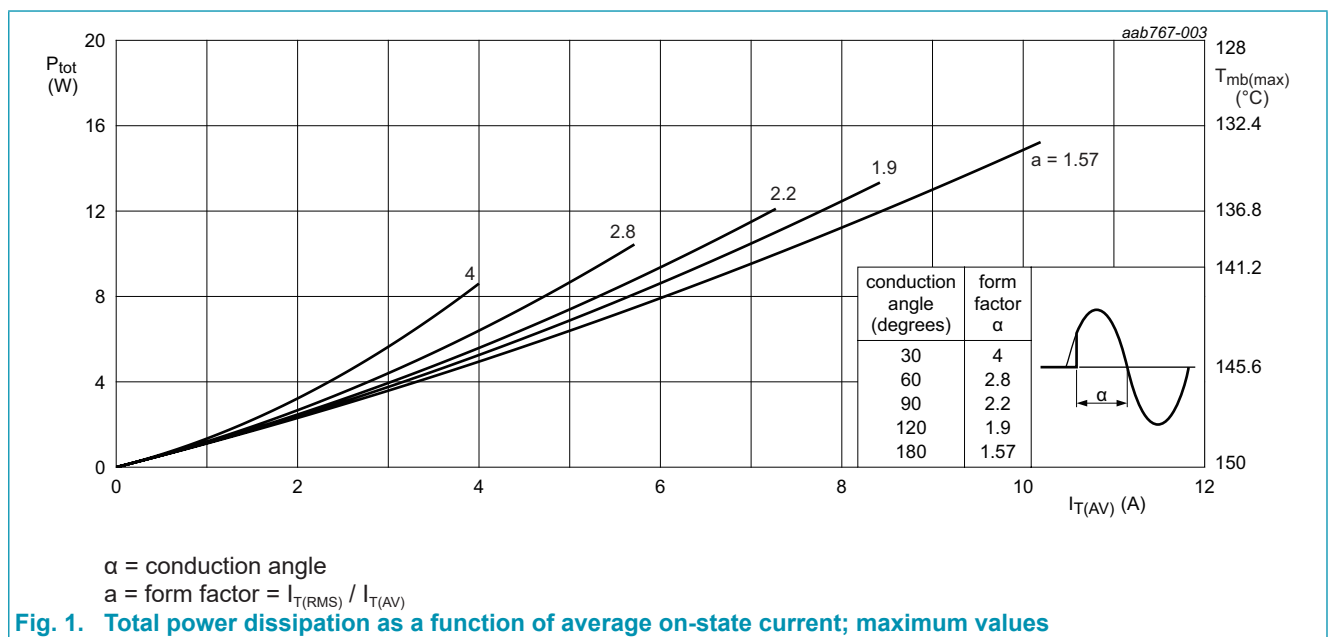
Type number	Marking codes	
	Assembly factory: N	Assembly factory: d
TYN16B-600CT	TYN16B 600CT PJNxxxx xx	TYN16B 600CT PJdxxxx xx

## 8. Limiting values

**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Values	Unit
$V_{DRM}$	repetitive peak off-state voltage		600	V
$V_{RRM}$	repetitive peak reverse voltage		600	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 133\text{ }^{\circ}\text{C}$ ; <a href="#">Fig 1</a>	10.2	A
$I_{T(RMS)}$	RMS on-state current	half sine wave; $T_{mb} \leq 133\text{ }^{\circ}\text{C}$ ; <a href="#">Fig 2</a> ; <a href="#">Fig 3</a>	16	A
$I_{TSM}$	non-repetitive peak on-state current	half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 10\text{ ms}$ ; <a href="#">Fig 4</a> ; <a href="#">Fig 5</a>	180	A
		half sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$ ; $t_p = 8.3\text{ ms}$	198	A
$I^2t$	$I^2t$ for fusing	$t_p = 10\text{ ms}$ ; sine-wave pulse	162	$\text{A}^2\text{s}$
$di_T/dt$	rate of rise of on-state current	$I_G = 30\text{ mA}$	50	$\text{A}/\mu\text{s}$
$I_{GM}$	peak gate current		4	A
$V_{RGM}$	peak reverse gate voltage		5	V
$P_{GM}$	peak gate power		10	W
$P_{G(AV)}$	average gate power	over any 20 ms period	1	W
$T_{stg}$	storage temperature		-40 to 150	$^{\circ}\text{C}$
$T_j$	junction temperature		150	$^{\circ}\text{C}$



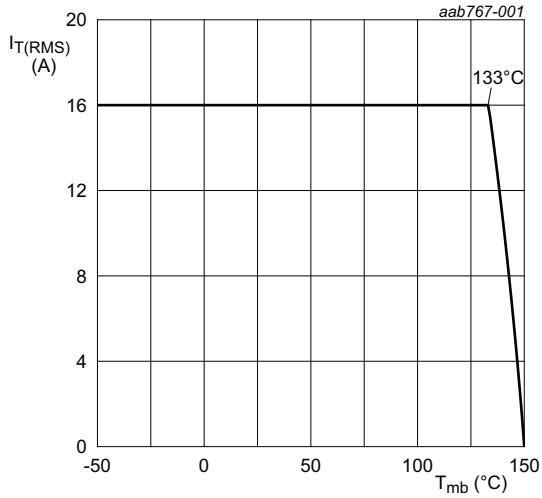
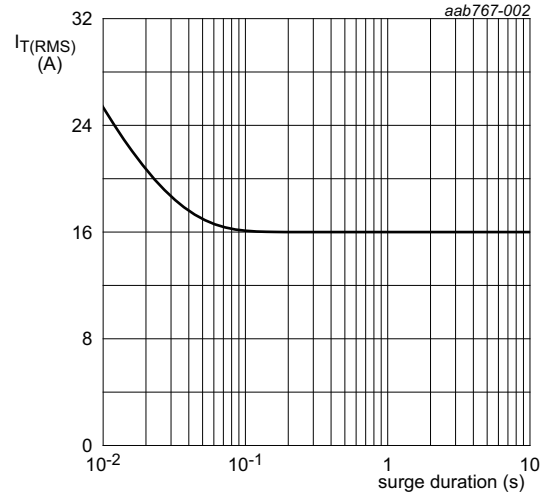
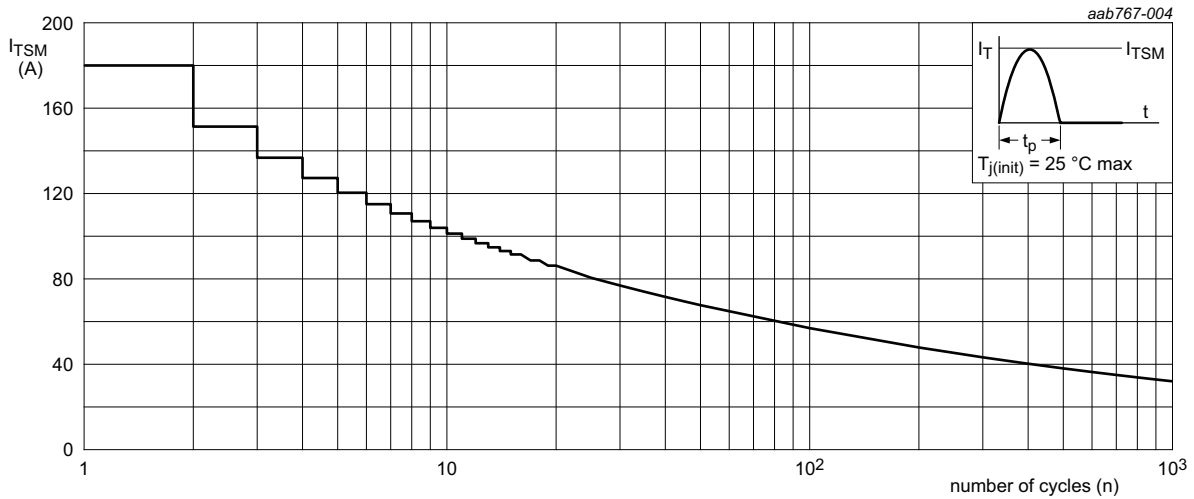


Fig. 2. RMS on-state current as a function of mounting base temperature; maximum values



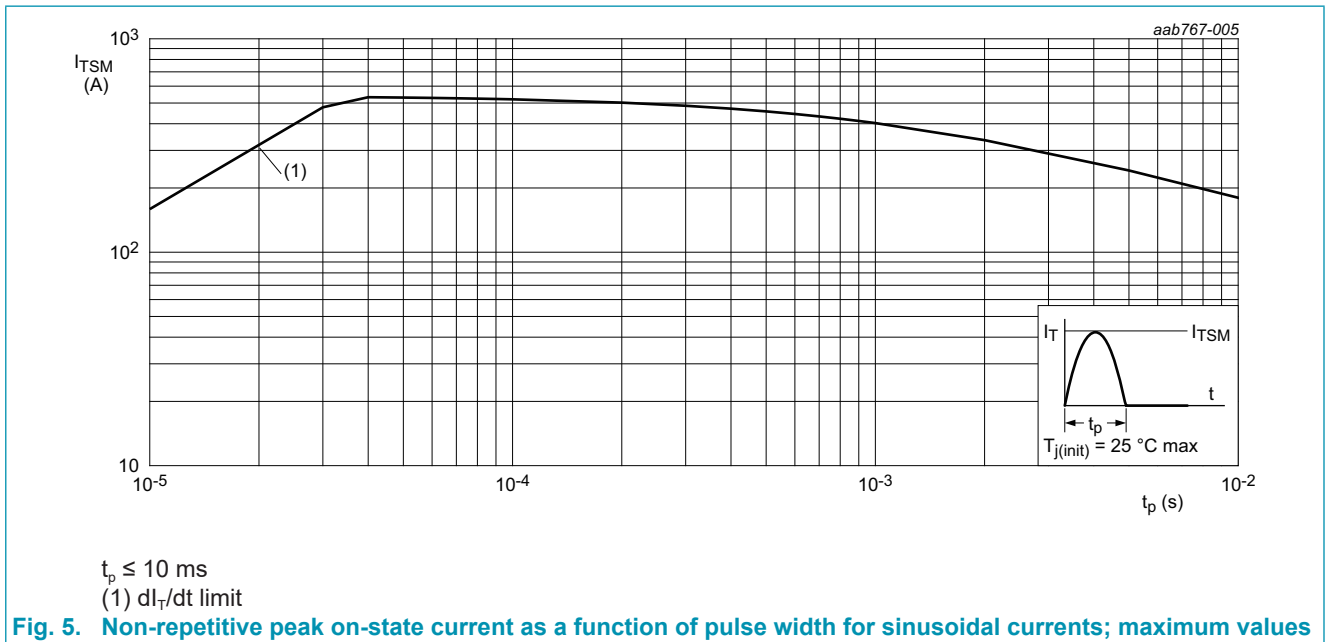
f = 50 Hz;  $T_{mb} = 133$  °C

Fig. 3. RMS on-state current as a function of surge duration; 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



## 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	<a href="#">Fig. 6</a>	-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	minimum footprint, FR4 board	-	55	-	K/W

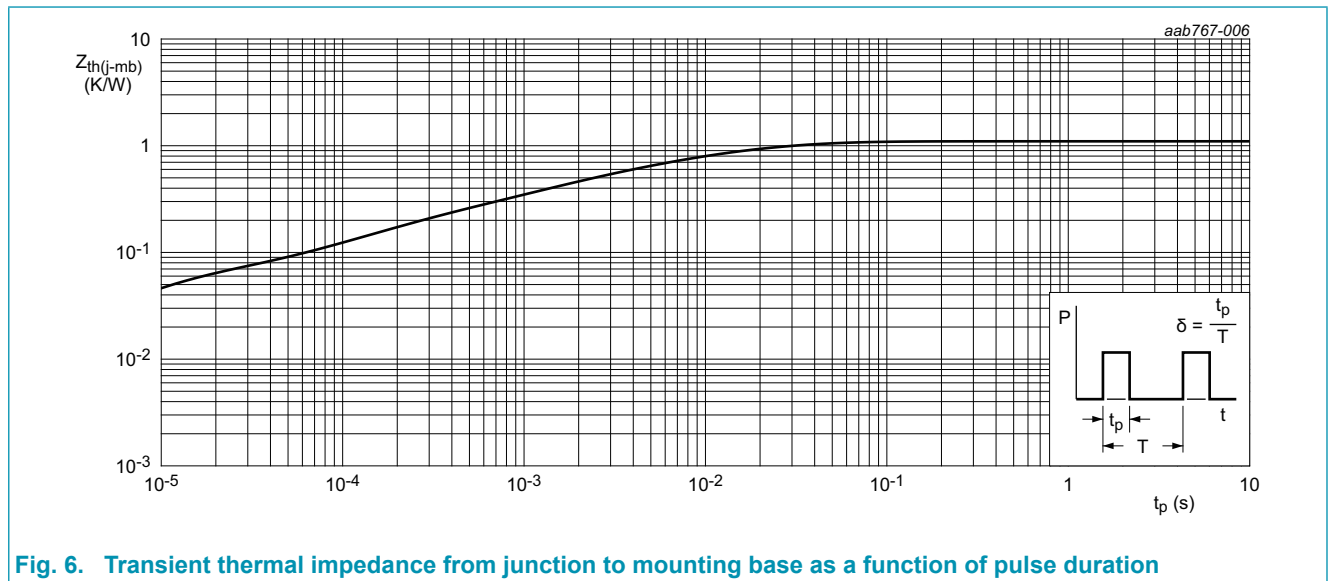


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

## 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Static characteristics</b>						
$I_{GT}$	gate trigger current	$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T_j = 25\text{ }^\circ\text{C}$ ; Fig. 7	1.5	-	6	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	-	-	60	mA
$I_H$	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C}$ ; Fig. 9	-	-	40	mA
$V_T$	on-state voltage	$I_T = 32\text{ A}; T_j = 25\text{ }^\circ\text{C}$ ; Fig. 10	-	1.2	1.6	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	1.3	V
		$V_D = 400\text{ V}; I_T = 0.1\text{ A}; T_j = 150\text{ }^\circ\text{C}$	0.2	0.4	-	V
$I_D$	off-state current	$V_D = 600\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	1	mA
$I_R$	reverse current	$V_R = 600\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	1	mA
<b>Dynamic characteristics</b>						
$dV_D/dt$	rate of rise of off-state voltage	$V_{DM} = 402\text{ V}; T_j = 125\text{ }^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit	300	-	-	V/ $\mu\text{s}$
		$V_{DM} = 402\text{ V}; T_j = 150\text{ }^\circ\text{C}$ ; ( $V_{DM} = 67\%$ of $V_{DRM}$ ); exponential waveform; gate open circuit	100	-	-	V/ $\mu\text{s}$

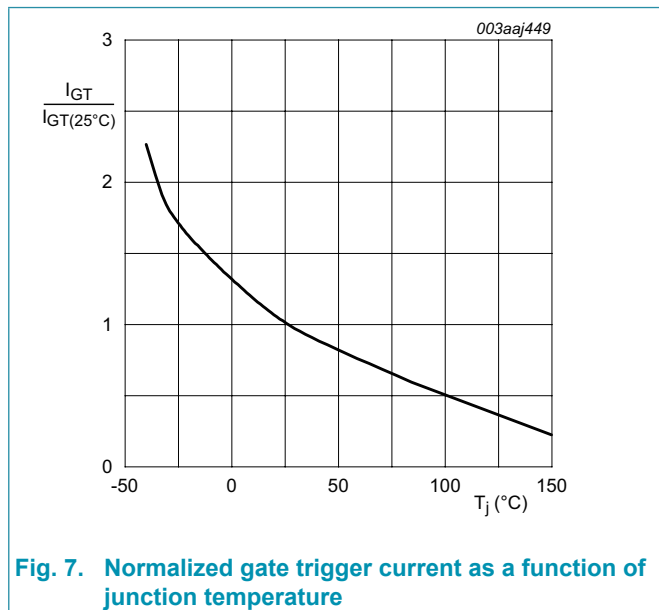


Fig. 7. Normalized gate trigger current as a function of junction temperature

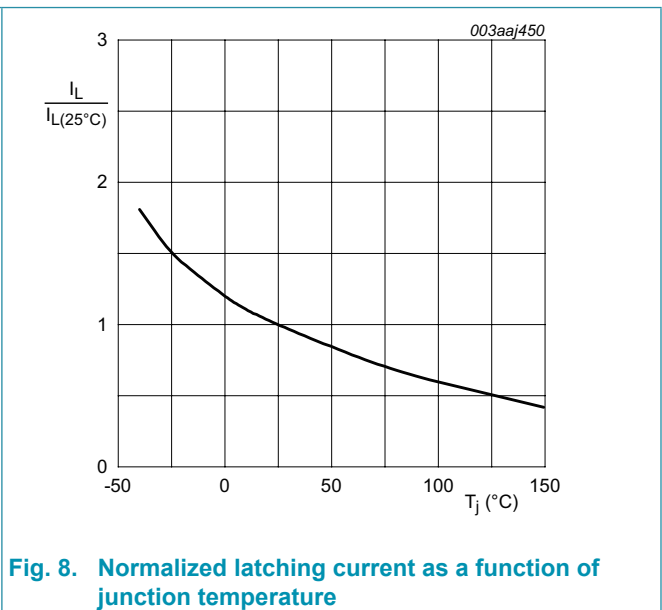


Fig. 8. Normalized latching current as a function of junction temperature

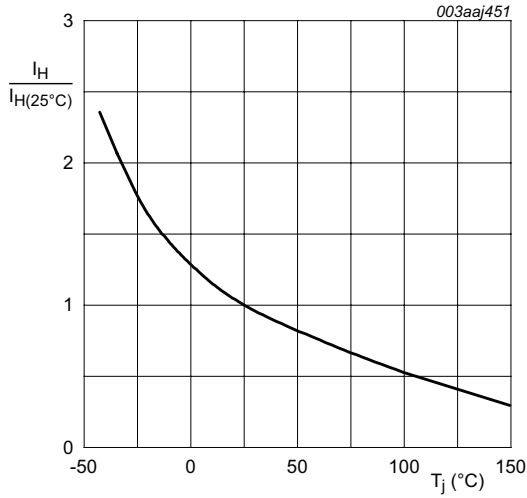
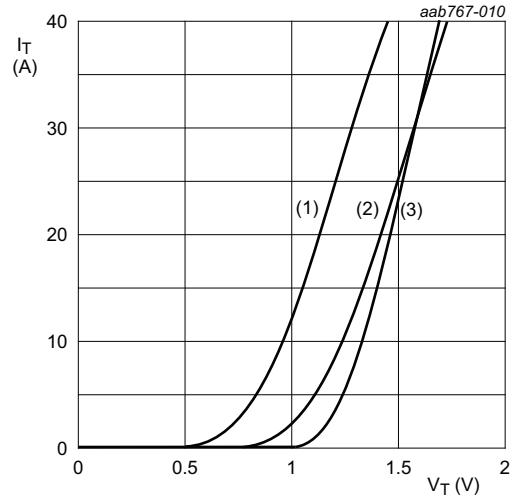


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.071 \text{ V}; R_s = 0.0169 \Omega$   
 (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

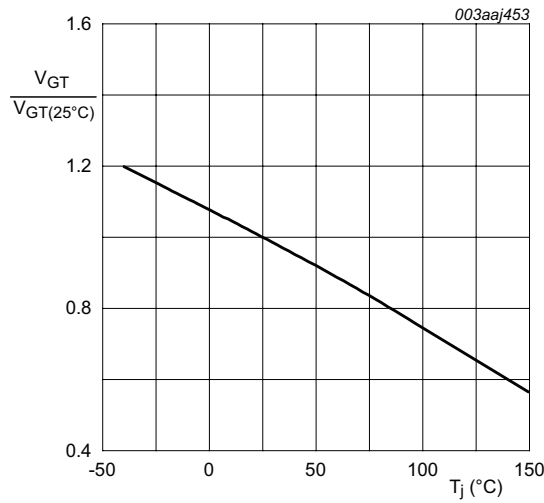
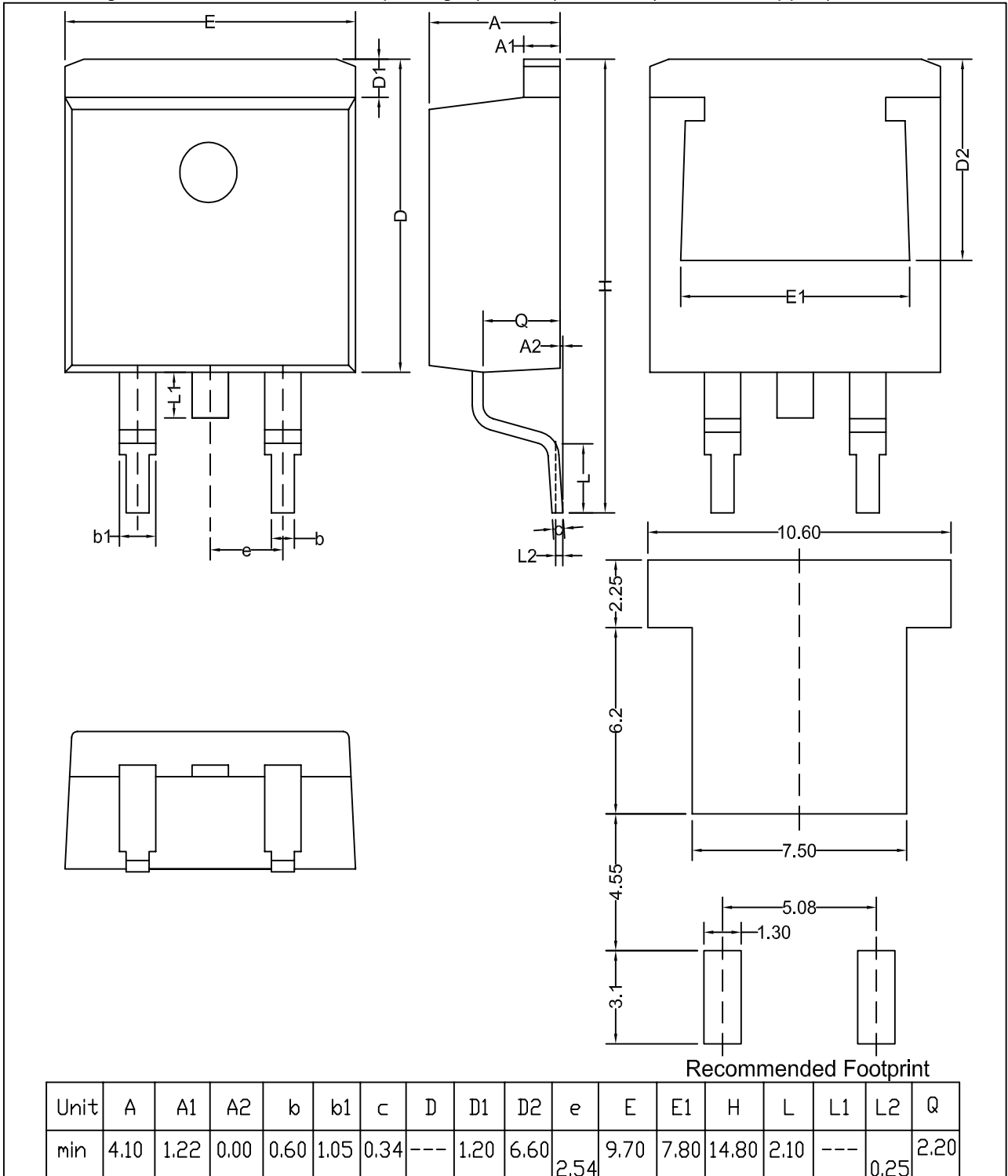


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

### 11. Package outline

Assembly factory: N

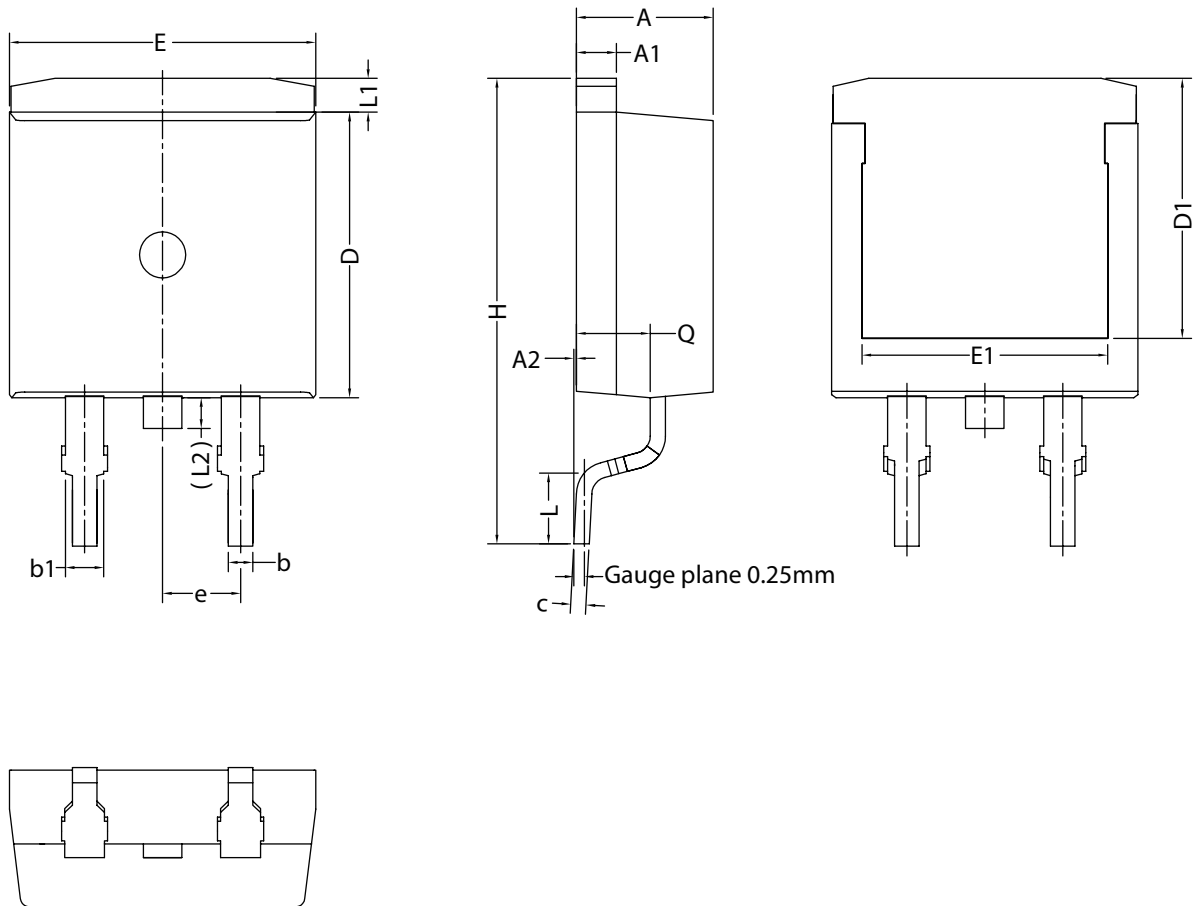
Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263



Assembly factory: d

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	2.54 (BSC)	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

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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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### 13. Contents

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- 1. General description..... 1
- 2. Features and benefits ..... 1
- 3. Applications ..... 1
- 4. Quick reference data ..... 1
- 5. Pinning information..... 2
- 6. Ordering information..... 2
- 7. Marking..... 2
- 8. Limiting values ..... 3
- 9. Thermal characteristics ..... 6
- 10. Characteristics..... 7
- 11. Package outline ..... 9
- 12. Legal information ..... 11
- 13. Contents..... 13

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