

## 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)

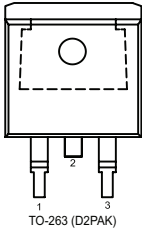

## 4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Values			Unit
Absolute maximum rating							
V <sub>RRM</sub>	repetitive peak reverse voltage			1200			V
I <sub>T(RMS)</sub>	RMS on-state current	half sine wave; T <sub>mb</sub> ≤ 119 °C; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		47			A
I <sub>TSM</sub>	non-repetitive peak on-state current	half sine wave; T <sub>J(init)</sub> = 25 °C; t <sub>p</sub> = 10 ms; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		350			A
		half sine wave; T <sub>J(init)</sub> = 25 °C; t <sub>p</sub> = 8.3 ms		385			A
T <sub>j</sub>	junction temperature			150			°C
Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
Static characteristics							
I <sub>GT</sub>	gate trigger current	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 7</a> ; <a href="#">Fig. 8</a>		-	-	50	mA
I <sub>H</sub>	holding current	V <sub>D</sub> = 12 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 10</a>		-	-	80	mA
V <sub>T</sub>	on-state voltage	I <sub>T</sub> = 30 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 11</a>		-	-	1.30	V
Dynamic characteristics							
dV <sub>D</sub> /dt	rate of rise of off-state voltage	V <sub>DM</sub> = 804 V; T <sub>j</sub> = 150 °C; (V <sub>DM</sub> = 67% of V <sub>DRM</sub> ); gate open circuit; exponential waveform		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
BT153B-1200T	TO263	BT153B-1200TJ	Reel	800	TO263N	26-Sep-2016

7. Marking

Table 4. Marking codes

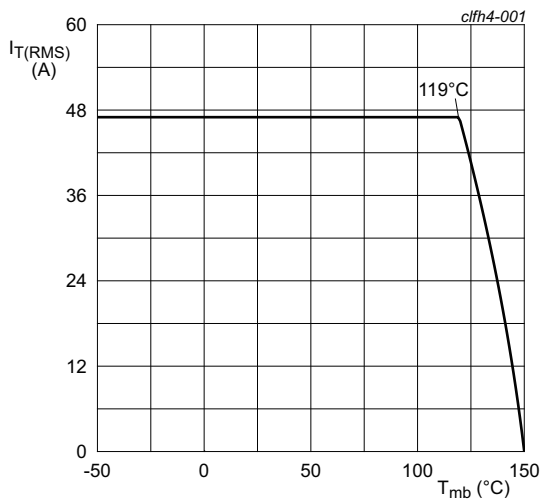
Type number	Marking codes
BT153B-1200T	BT153B 1200T

## 8. Limiting values

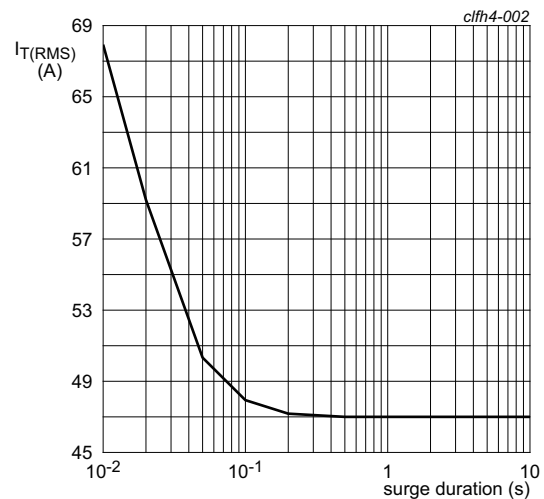
**Table 5. Limiting values**

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

Symbol	Parameter	Conditions	Notes	Values	Unit
$V_{\text{DRM}}$	repetitive peak off-state voltage			1200	V
$V_{\text{RRM}}$	repetitive peak reverse voltage			1200	V
$I_{\text{T(AV)}}$	average on-state current	half sine wave; $T_{\text{mb}} \leq 119\text{ }^{\circ}\text{C}$ ;		30	A
$I_{\text{T(RMS)}}$	RMS on-state current	half sine wave; $T_{\text{mb}} \leq 119\text{ }^{\circ}\text{C}$ ; <a href="#">Fig. 1</a> ; <a href="#">Fig. 2</a> ; <a href="#">Fig. 3</a>		47	A
$I_{\text{TSM}}$	non-repetitive peak on-state current	half sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 10\text{ ms}$ ; <a href="#">Fig. 4</a> ; <a href="#">Fig. 5</a>		350	A
		half sine wave; $T_{\text{J(init)}} = 25\text{ }^{\circ}\text{C}$ ; $t_{\text{p}} = 8.3\text{ ms}$		385	A
$I^2t$	$I^2t$ for fusing	$t_{\text{p}} = 10\text{ ms}$ ; sine wave		612.5	$\text{A}^2\text{s}$
$di_{\text{T}}/dt$	rate of rise of on-state current	$I_{\text{G}} = 100\text{ mA}$		150	$\text{A}/\mu\text{s}$
$I_{\text{GM}}$	peak gate current			5	A
$V_{\text{GM}}$	peak gate voltage			5	V
$P_{\text{GM}}$	peak gate power			20	W
$P_{\text{G(AV)}}$	average gate power	over any 20 ms period		0.5	W
$T_{\text{stg}}$	storage temperature			-40 to 150	$^{\circ}\text{C}$
$T_{\text{j}}$	junction temperature			150	$^{\circ}\text{C}$



**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**  
 $f = 50\text{ Hz}$ ;  $T_{\text{mb}} = 119\text{ }^{\circ}\text{C}$

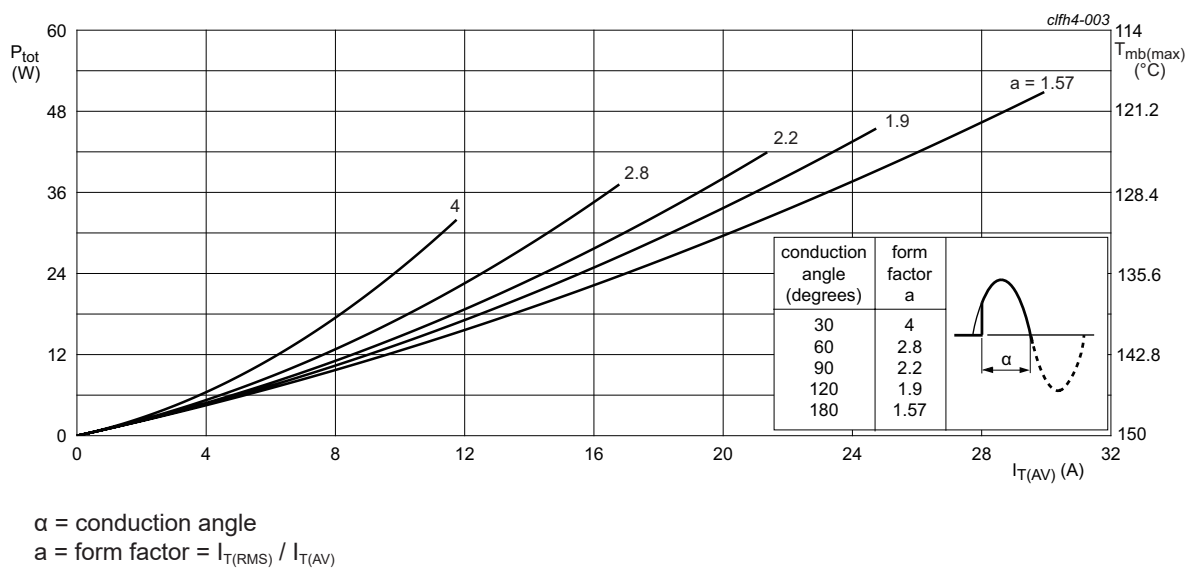


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

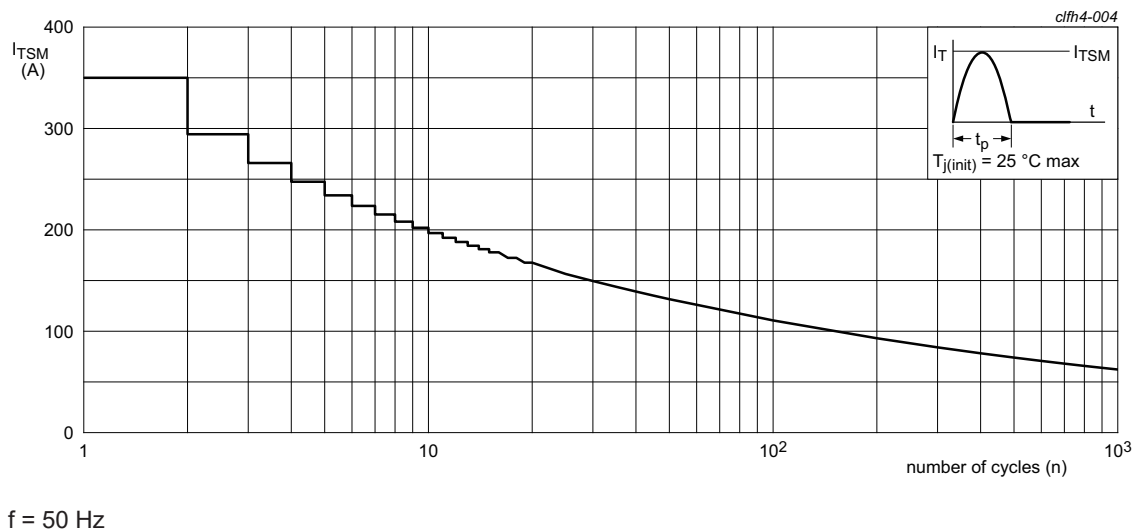


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

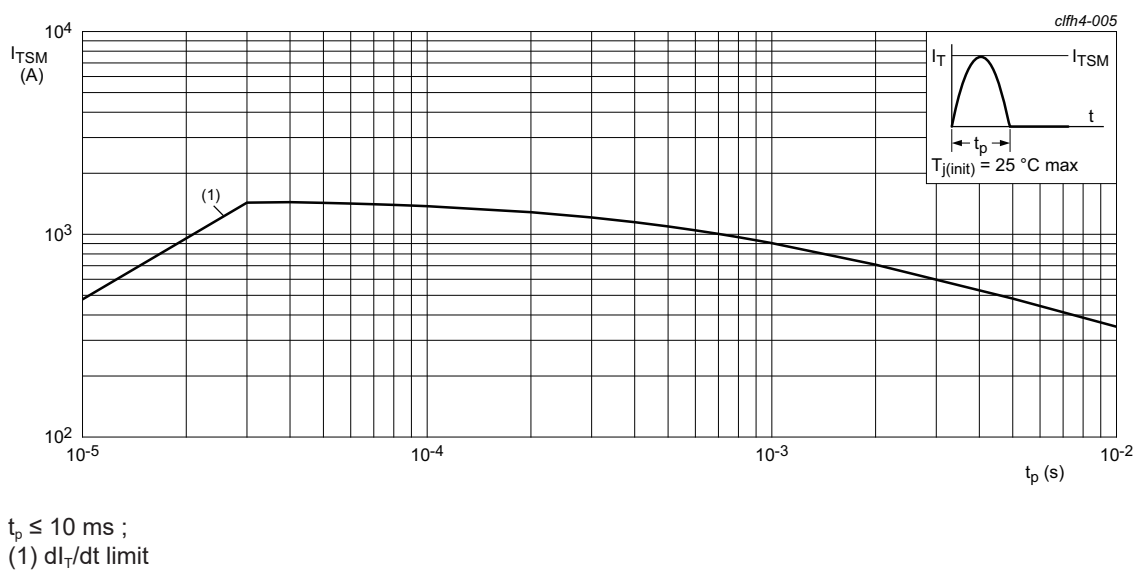


Fig. 5. Non-repetitive peak on-state current as a function of pulse duration; maximum values

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>		-	-	0.6	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	55	-	K/W

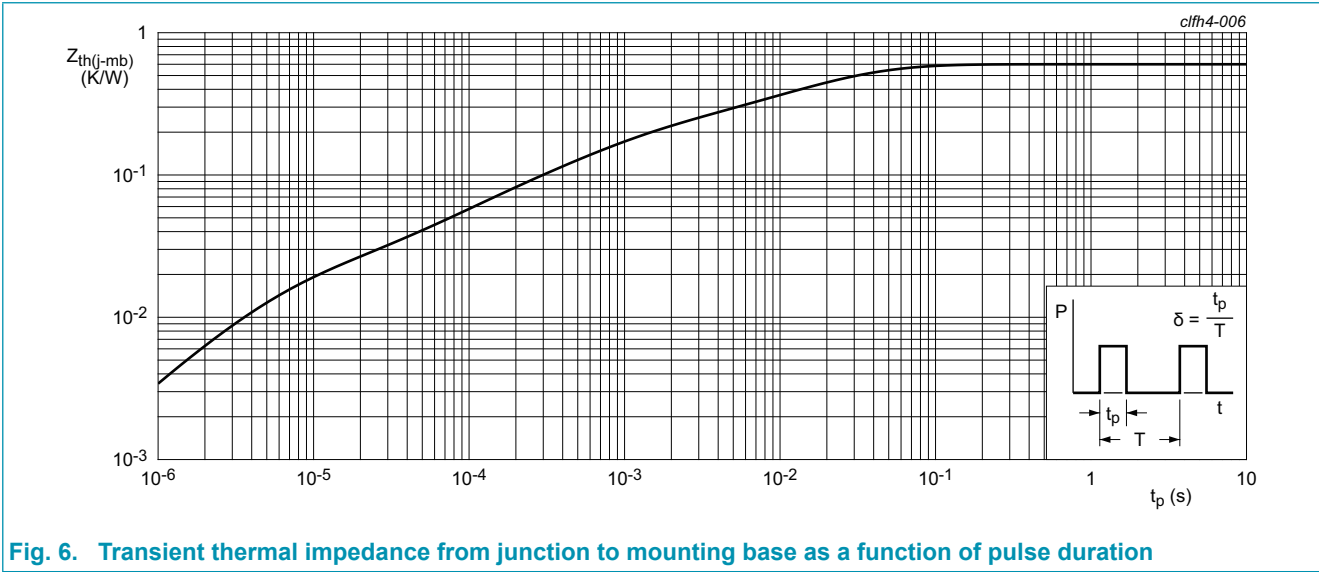
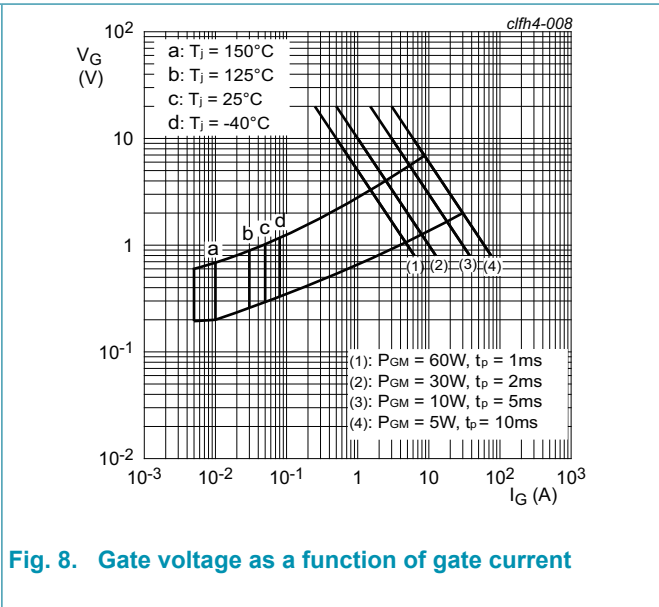
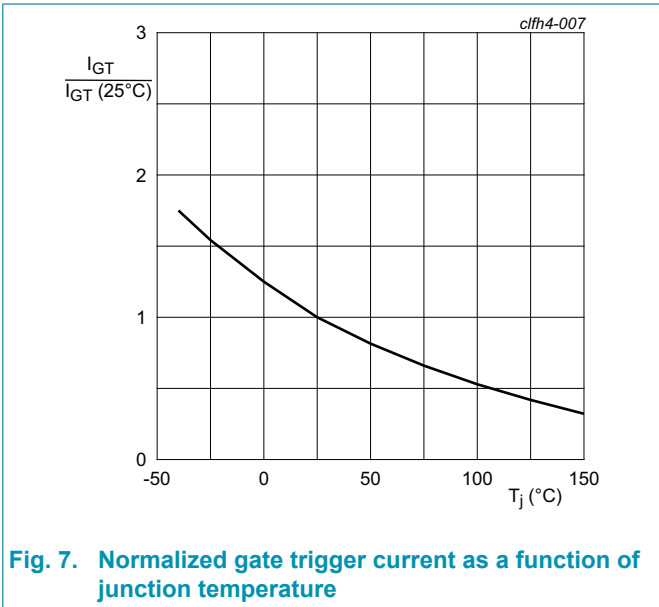


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse duration

# 10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I <sub>GT</sub>	gate trigger current	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 25 °C; <a href="#">Fig.7</a> ; <a href="#">Fig. 8</a>		-	-	50	mA
I <sub>L</sub>	latching current	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 9</a>		-	-	100	mA
I <sub>H</sub>	holding current	V <sub>D</sub> = 12 V; T <sub>j</sub> = 25 °C; <a href="#">Fig. 10</a>		-	-	80	mA
V <sub>T</sub>	on-state voltage	I <sub>T</sub> = 30 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 11</a>		-	-	1.30	V
V <sub>GT</sub>	gate trigger voltage	V <sub>D</sub> = 12 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 25 °C; <a href="#">Fig. 12</a>		-	0.75	1	V
		V <sub>D</sub> = 1200 V; I <sub>T</sub> = 0.1 A; T <sub>j</sub> = 150 °C		0.2	0.45	-	V
I <sub>D</sub>	off-state current	V <sub>D</sub> = 1200 V; T <sub>j</sub> = 25 °C		-	-	30	μA
		V <sub>D</sub> = 1200 V; T <sub>j</sub> = 125 °C		-	-	2	mA
I <sub>R</sub>	reverse current	V <sub>R</sub> = 1200 V; T <sub>j</sub> = 25 °C		-	-	30	μA
		V <sub>R</sub> = 1200 V; T <sub>j</sub> = 125 °C		-	-	2	mA
Dynamic characteristics							
dV <sub>D</sub> /dt	rate of rise of off-state voltage	V <sub>DM</sub> = 804 V; T <sub>j</sub> = 150 °C; (V <sub>DM</sub> = 67% of V <sub>DRM</sub> ); gate open circuit; exponential waveform		1000	-	-	V/μs
t <sub>gt</sub>	gate-controlled turn-on time	I <sub>TM</sub> = 30 A; V <sub>D</sub> = 800 V; I <sub>G</sub> = 100 mA; (dI <sub>G</sub> /dt) <sub>M</sub> = 5 A/μs; T <sub>j</sub> = 25 °C			2	-	μs
t <sub>q</sub>	commutated turn-off time	V <sub>DM</sub> = 804 V; T <sub>j</sub> = 125 °C; I <sub>TM</sub> = 30 A; V <sub>R</sub> = 25 V; dV <sub>D</sub> /dt = 50 V/μs; (dI <sub>T</sub> /dt) <sub>M</sub> = 30 A/μs; (V <sub>DM</sub> = 67% of V <sub>DRM</sub> )			70	-	μs



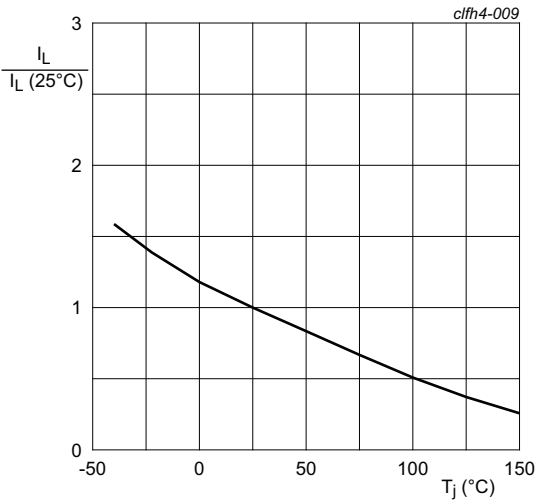


Fig. 9. Normalized latching current as a function of junction temperature

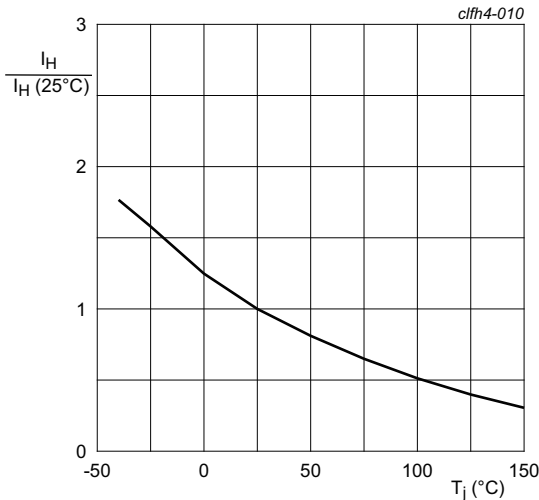
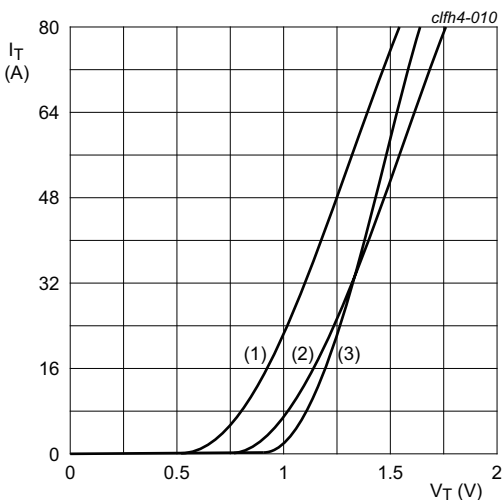


Fig. 10. Normalized holding current as a function of junction temperature



$V_o = 1.039\text{ V}; R_s = 0.0089\ \Omega$   
(1)  $T_J = 150^\circ\text{C}$ ; typical values  
(2)  $T_J = 150^\circ\text{C}$ ; maximum values  
(3)  $T_J = 25^\circ\text{C}$ ; maximum values

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

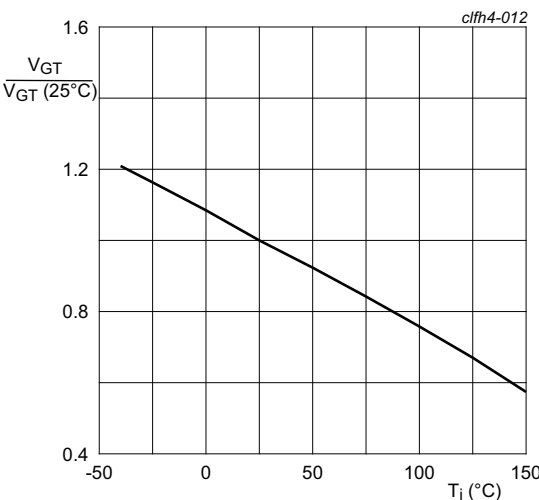
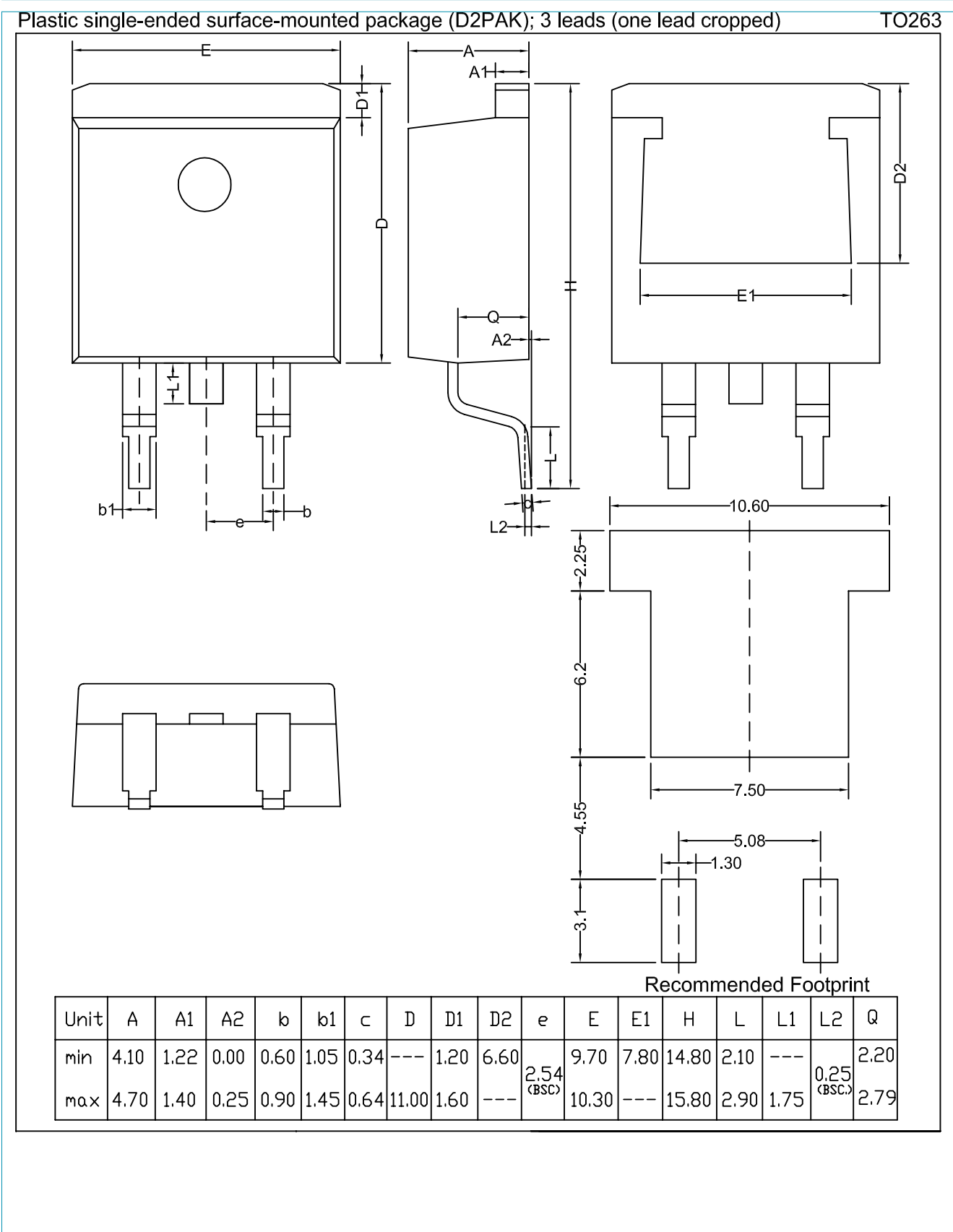


Fig. 12. Normalized gate trigger voltage as a function of junction temperature

11. Package outline





## 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.
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13. Contents

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 ..... 5

10. Characteristics..... 6

11. Package outline ..... 8

12. Legal information ..... 9

13. Contents ..... 11

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