

1. General description

Passivated thyristors in a plastic envelope suitable for surface mounting, intended for use in applications requiring high bidirectional blocking voltage capability and high thermal cycling performance.

2. Features and benefits

- High blocking voltage suitable for high voltage applications
- High thermal cycling performance

3. Applications

- General purpose switching
- Protection Circuits
- Motor control
- Industrial and domestic lighting

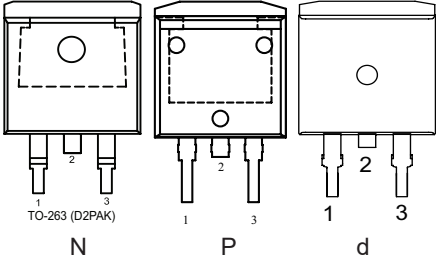
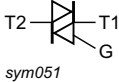
4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions	Notes	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	800	V
V_{RRM}	repetitive peak reverse voltage			-	-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 104\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig 3		-	-	13	A
$I_{T(RMS)}$	RMS on-state current			-	-	20	A
I_{TSM}	non-repetitive peak on-state current	$T_{j(init)} = 25\text{ °C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		-	-	200	A
		$T_{j(init)} = 25\text{ °C}$; $t_p = 8.3\text{ms}$		-	-	220	A
T_j	junction temperature			-	-	125	°C
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		-	3	32	mA
V_T	on-state voltage	$I_T = 40\text{ A}$; $T_j = 25\text{ °C}$; Fig. 10		-	1.45	1.75	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_j = 125\text{ °C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		200	300	-	V/ μs

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1		
2	T2	main terminal 2		
3	G	gate		
mb	T2	mounting base; main terminal 2		

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-800R	TO263	BT152B-800R,118	Reel	800	TO263N (N)	26-Sep-2016
					TO263P (P)	12-Jun-2023
					TO263d (d)	17-Mar-2023

7. Marking

Table 4. Marking codes

Type number	Marking codes		
	Assembly factory: N	Assembly factory: P	Assembly factory: d
BT152B-800R	BT152B 800R PJNxxxx xx	BT152B 800R PJPxxxx xx	BT152B 800R PJdxxxx xx

8. Limiting values

Table 5. Limiting values

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

Symbol	Parameter	Conditions		Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	800	V
V_{RRM}	repetitive peak reverse voltage			-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 104\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		-	13	A
$I_{T(RMS)}$	RMS on-state current			-	20	A
I_{TSM}	non-repetitive peak on-state current	$T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 10\text{ ms}$; Fig. 4 ; Fig. 5		-	200	A
		$T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 8.3\text{ ms}$		-	220	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse		-	200	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 65\text{ mA}$		-	200	$\text{A}/\mu\text{s}$
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	150	$^{\circ}\text{C}$
T_j	junction temperature			-	125	$^{\circ}\text{C}$

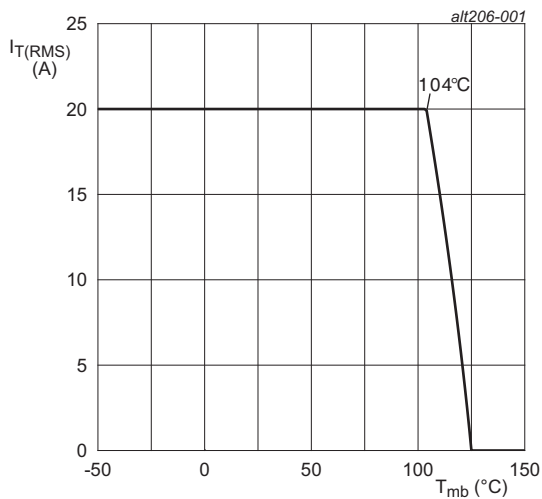
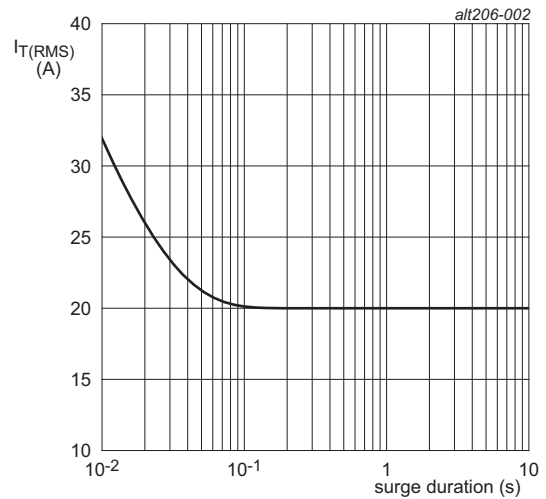
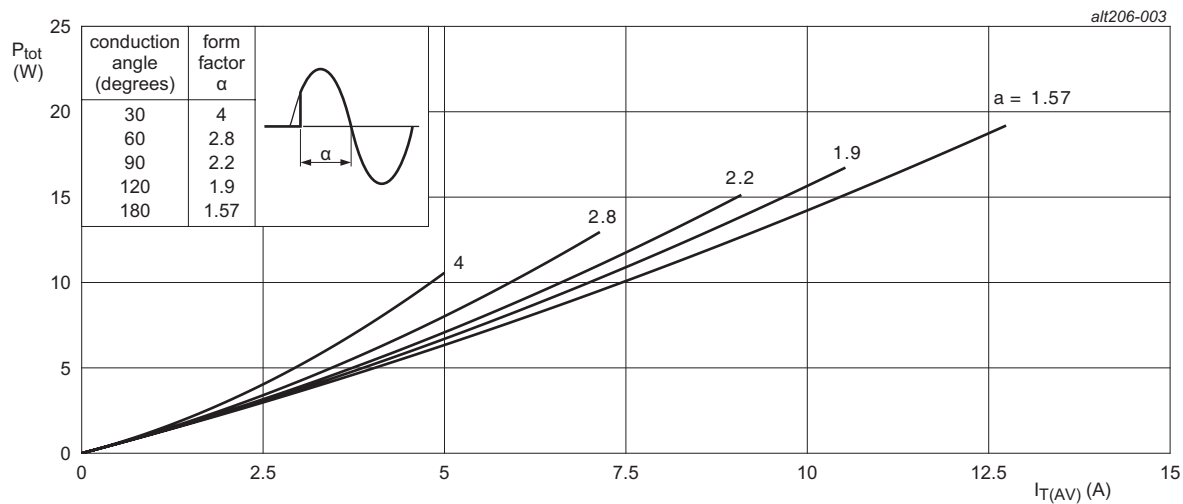


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



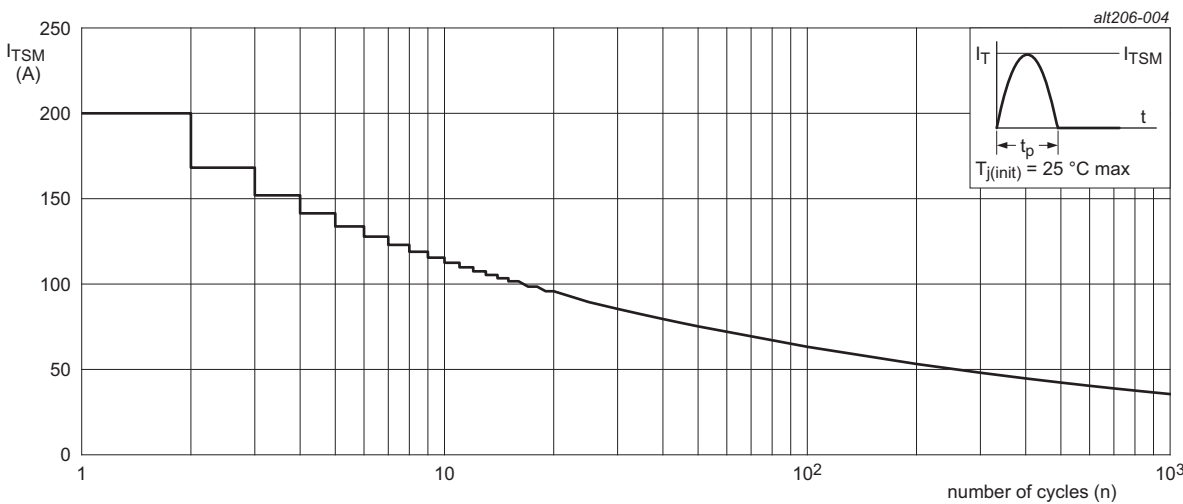
$f = 50\text{ Hz}$; $T_{mb} = 104\text{ }^{\circ}\text{C}$

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



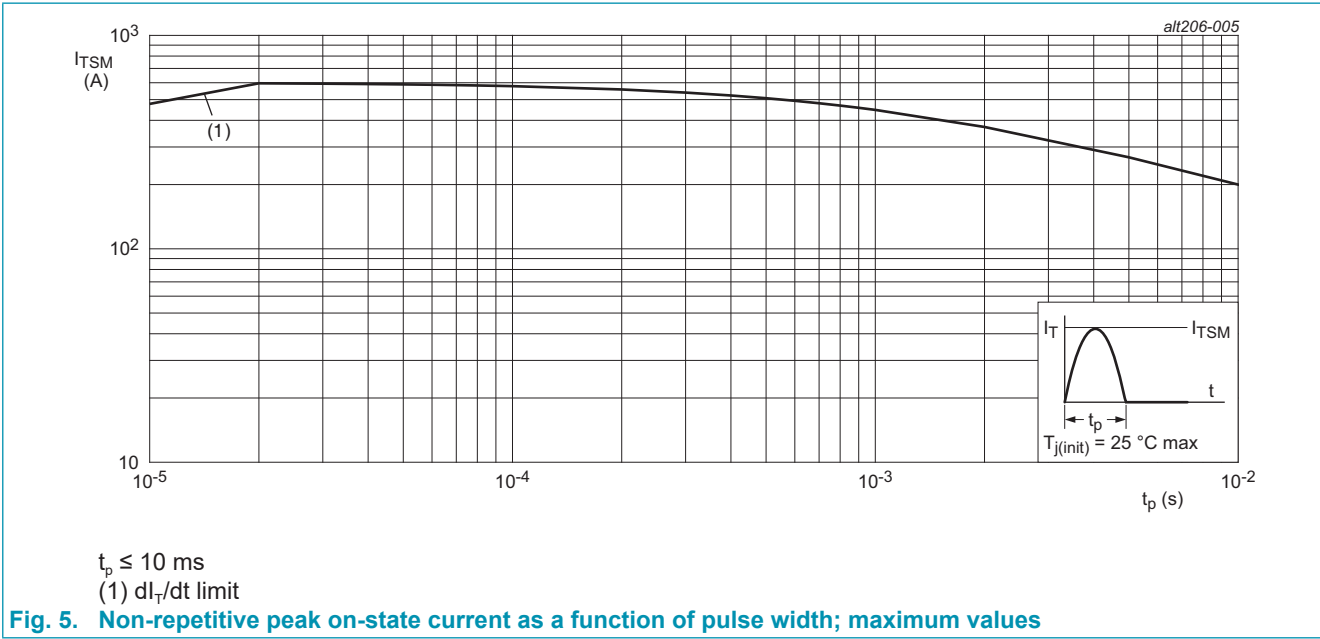
α = conduction angle
 a = form factor = $I_{T(RMS)} / I_{T(AV)}$

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



$f = 50\text{ Hz}$

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	Fig. 6		-	-	1.1	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	in free air		-	-	55	K/W

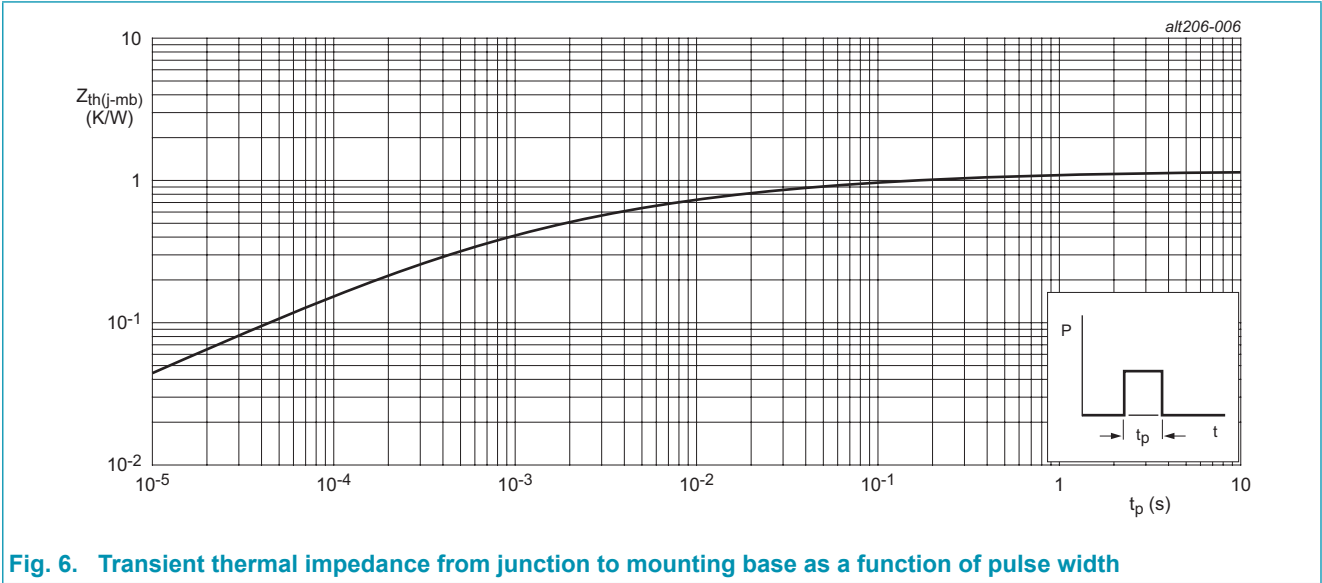


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions		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		-	3	32	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	$I_T = 40\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 10		-	1.45	1.75	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		-	0.6	1.5	V
		$V_D = 800\text{ V}$; $I_T = 0.1\text{ A}$; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 11		0.25	0.4	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.2	1	mA
I_R	reverse current	$V_R = 800\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$		-	0.2	1	mA
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit		200	300	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 40\text{ A}$; $V_D = 800\text{ V}$; $I_G = 0.1\text{ A}$; $dI_G/dt = 5\text{ A}/\mu\text{s}$; $T_j = 25\text{ }^{\circ}\text{C}$		-	2	-	μs
t_q	commutated turn-off time	$V_{DM} = 800\text{ V}$; $T_j = 125\text{ }^{\circ}\text{C}$; $I_{TM} = 50\text{ A}$; $V_R = 25\text{ V}$; $(dI_T/dt)_M = 30\text{ A}/\mu\text{s}$; $dV_D/dt = 50\text{ V}/\mu\text{s}$; $R_{GK} = 100\text{ }\Omega$; ($V_{DM} = 67\%$ of V_{DRM})		-	70	-	μs

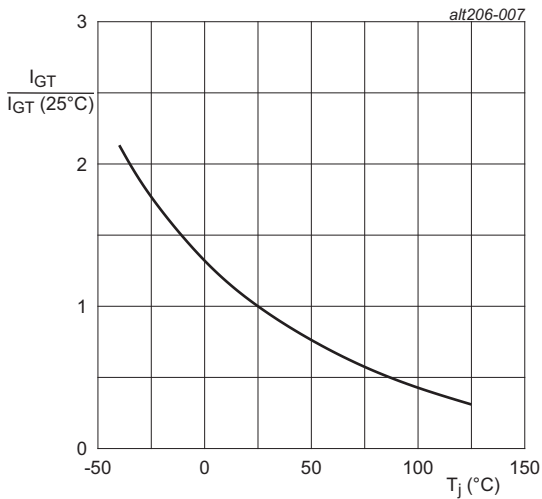


Fig. 7. Normalized gate trigger current as a function of junction temperature

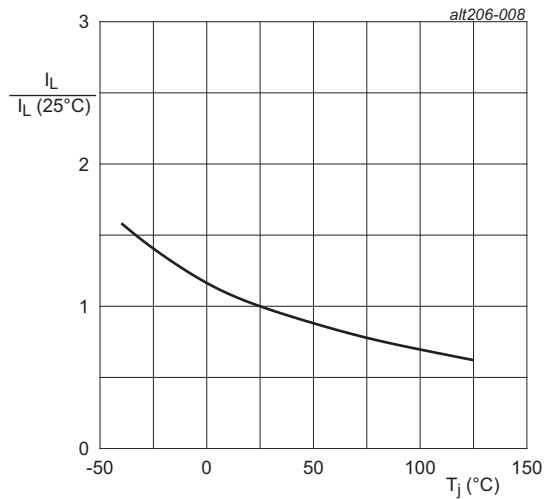


Fig. 8. Normalized latching current as a function of junction temperature

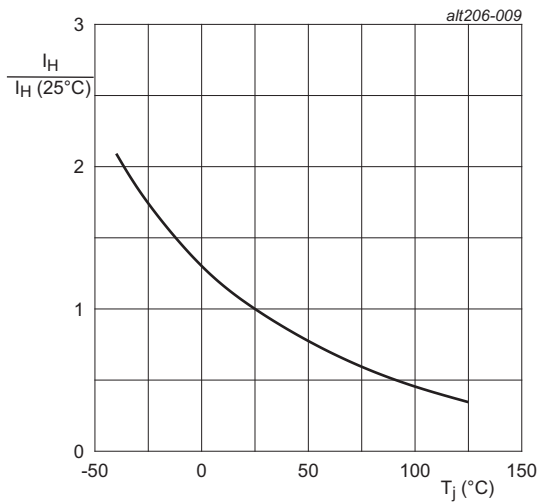
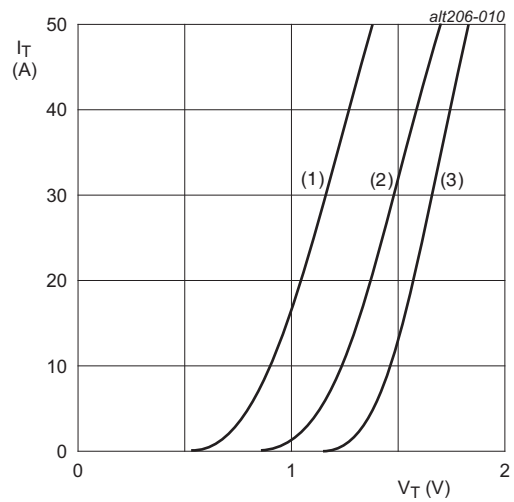


Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.114 \text{ V}$; $R_s = 0.0125 \Omega$
(1) $T_j = 125^\circ\text{C}$; typical values
(2) $T_j = 125^\circ\text{C}$; maximum values
(3) $T_j = 25^\circ\text{C}$; maximum values

Fig. 10. On-state current as a function of on-state voltage

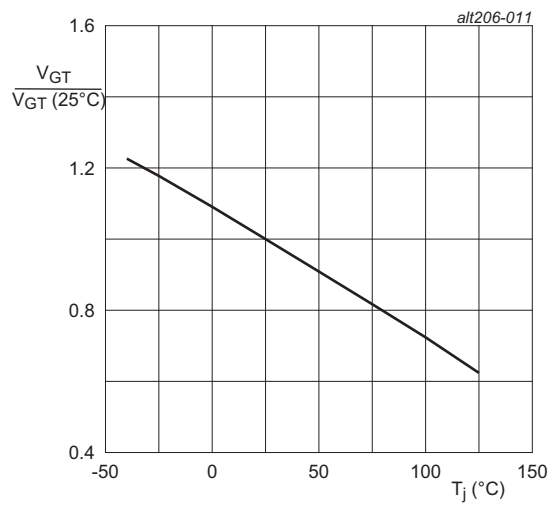
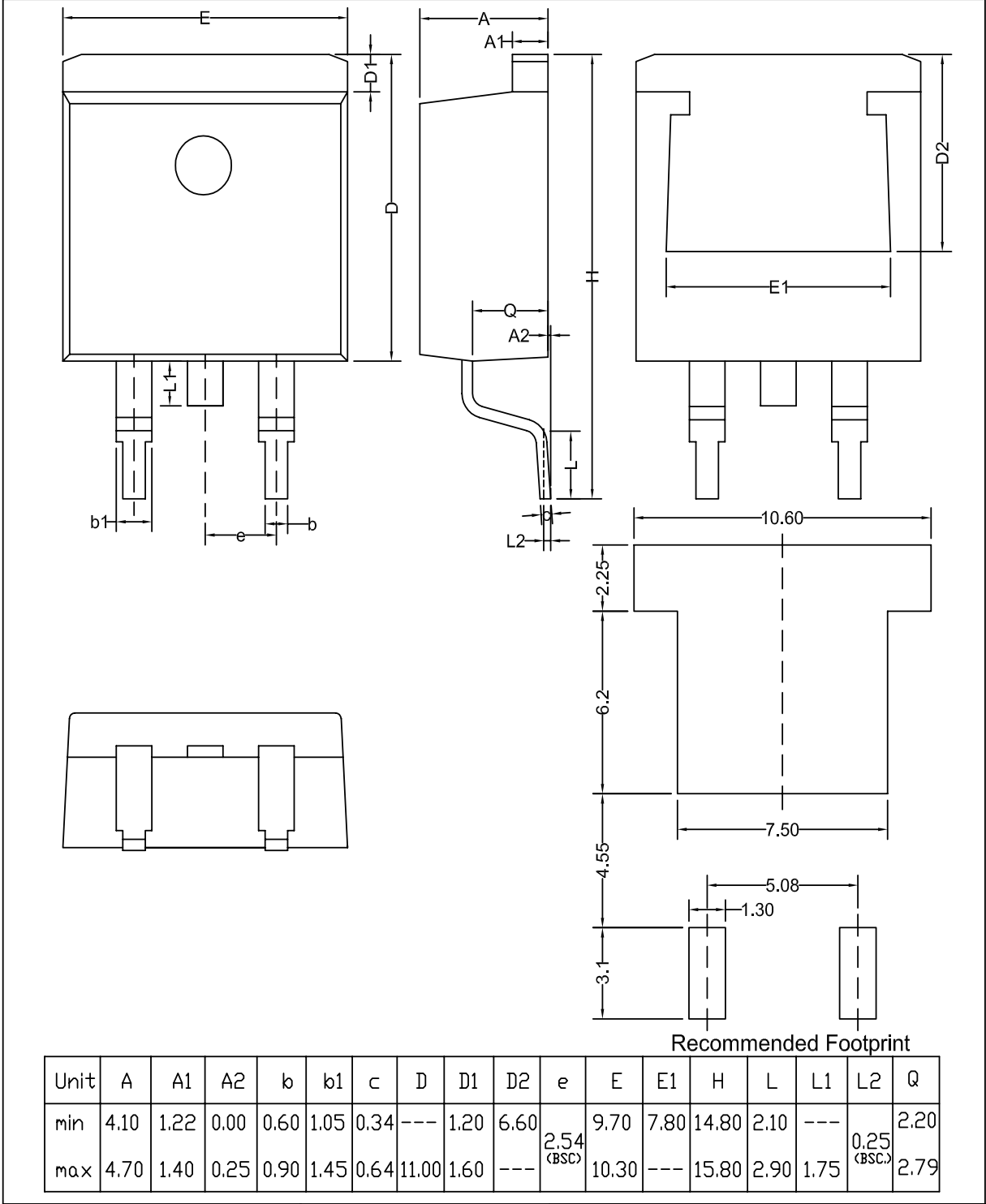


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Assembly factory: N

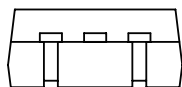
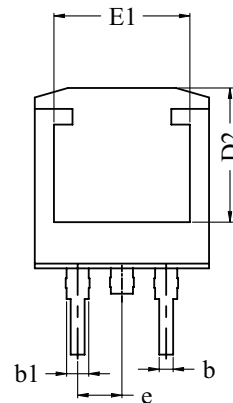
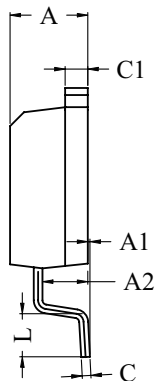
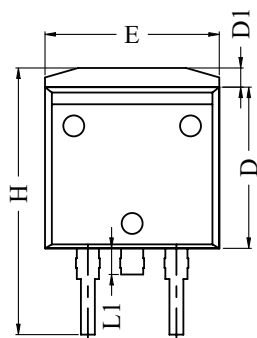
Plastic single-ended surface-mounted package (D2PAK); 3 leads (one lead cropped) TO263



Assembly factory: P

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

TO263

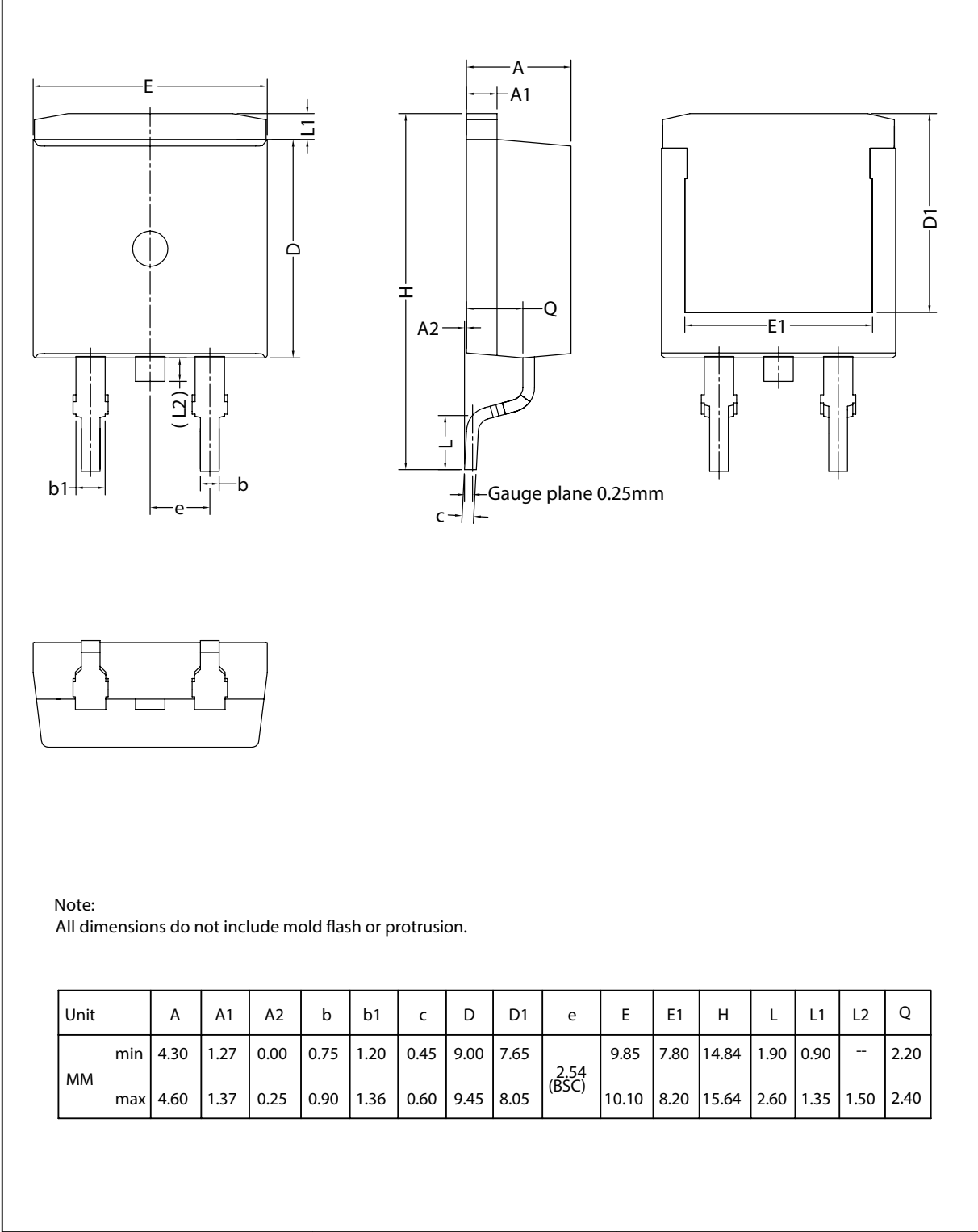


Dim	All Dimensions in Millimeters		
	Min	Typ	Max
A	4.30	4.46	4.60
A1	0	0.13	0.25
A2	2.50	2.60	2.70
b	0.70	0.80	0.90
b1	1.10	1.27	1.45
C	0.40	0.52	0.60
C1	1.17	1.30	1.40
D	9.10	9.25	9.40
D1	1.00	1.10	1.30
D2	7.40	7.70	8.00
E	9.80	10.00	10.20
E1	7.60	7.80	8.00
e	2.54 BSC		
H	14.80	15.30	15.80
L	2.10	2.47	2.80
L1	1.30	1.50	1.70

Assembly factory: d

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

TO263



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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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 6

10. Characteristics..... 7

11. Package outline 9

12. Legal information 12

13. Contents..... 14

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