



BTA206X-800CT

3Q Hi-Com Triac

22 May 2014

Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT186A (TO-220F) "full pack" plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series CT" triac will commute the full RMS current at the maximum rated junction temperature ($T_j = 150\text{ °C}$) without the aid of a snubber. It is used where "high junction operating temperature capability" is required.

2. Features and benefits

- 3Q technology for improved noise immunity
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- High junction operating temperature capability
- High voltage capability
- Isolated mounting base package
- Planar passivated for voltage ruggedness and reliability
- Triggering in three quadrants only

3. Applications

- Applications subject to high temperature
- Electronic thermostats (heating and cooling)
- Motor controls for home appliances
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

4. Quick reference data

Table 1. Quick reference data

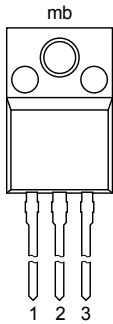
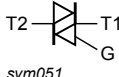
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	800	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25\text{ °C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	60	A
T_j	junction temperature		-	-	150	°C
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_n \leq 114\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	6	A



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 7	4	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7	4	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7	4	-	35	mA
Dynamic characteristics						
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit	500	-	-	V/μs
di _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 6 A; dV _{com} /dt = 20 V/μs; (snubberless condition); gate open circuit	10	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 <p style="text-align: center;">TO-220F (SOT186A)</p>	 <p style="text-align: center;"><i>sym051</i></p>
2	T2	main terminal 2		
3	G	gate		
mb	n.c.	mounting base; isolated		

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BTA206X-800CT	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A
BTA206X-800CT/L01	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A
BTA206X-800CT/L02	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A
BTA206X-800CT/L03	TO-220F	plastic single-ended package; isolated heatsink mounted; 1 mounting hole; 3-lead TO-220 "full pack"	SOT186A

7. Limiting values

Table 4. 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
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_h \leq 114\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	6	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	60	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	66	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	18	A^2s
di_T/dt	rate of rise of on-state current	$I_T = 10\text{ A}$; $I_G = 0.2\text{ A}$; $di_G/dt = 0.2\text{ A}/\mu s$	-	100	$A/\mu s$
I_{GM}	peak gate current		-	2	A
P_{GM}	peak gate power		-	5	W
$P_{G(AV)}$	average gate power	over any 20 ms period	-	0.5	W
T_{stg}	storage temperature		-40	150	$^{\circ}C$
T_j	junction temperature		-	150	$^{\circ}C$

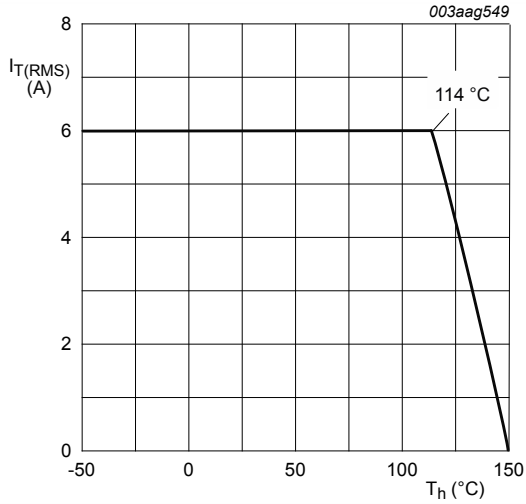
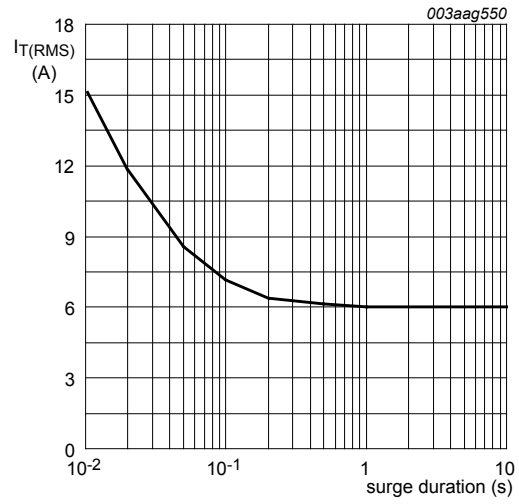


Fig. 1. RMS on-state current as a function of heatsink temperature; maximum values



f = 50 Hz; T_h = 114 °C

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

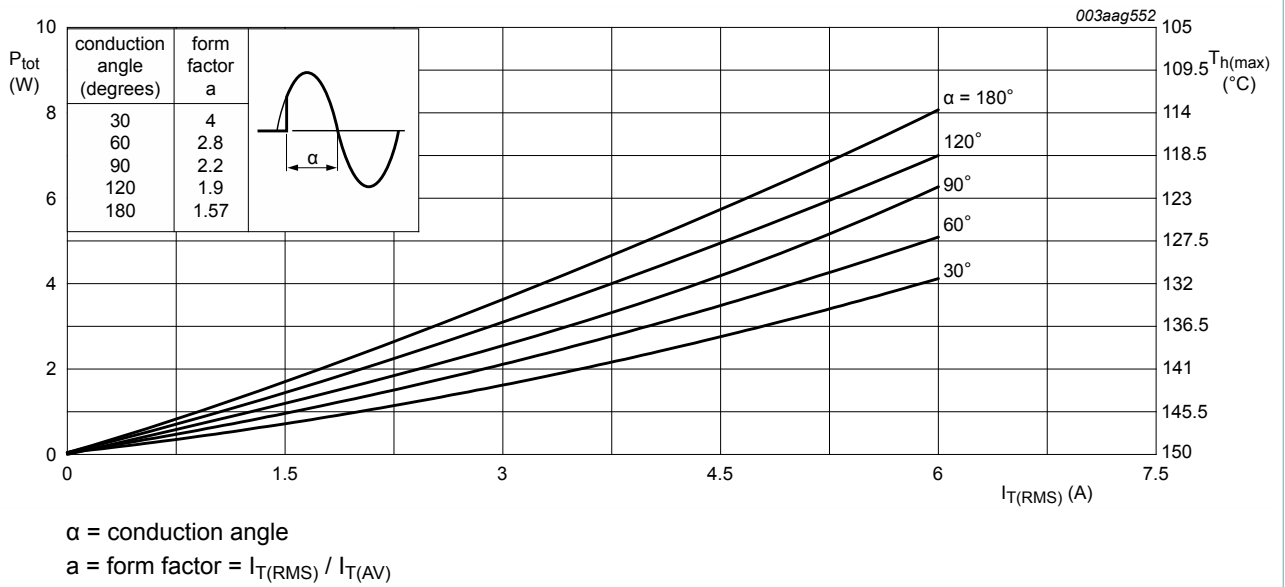


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

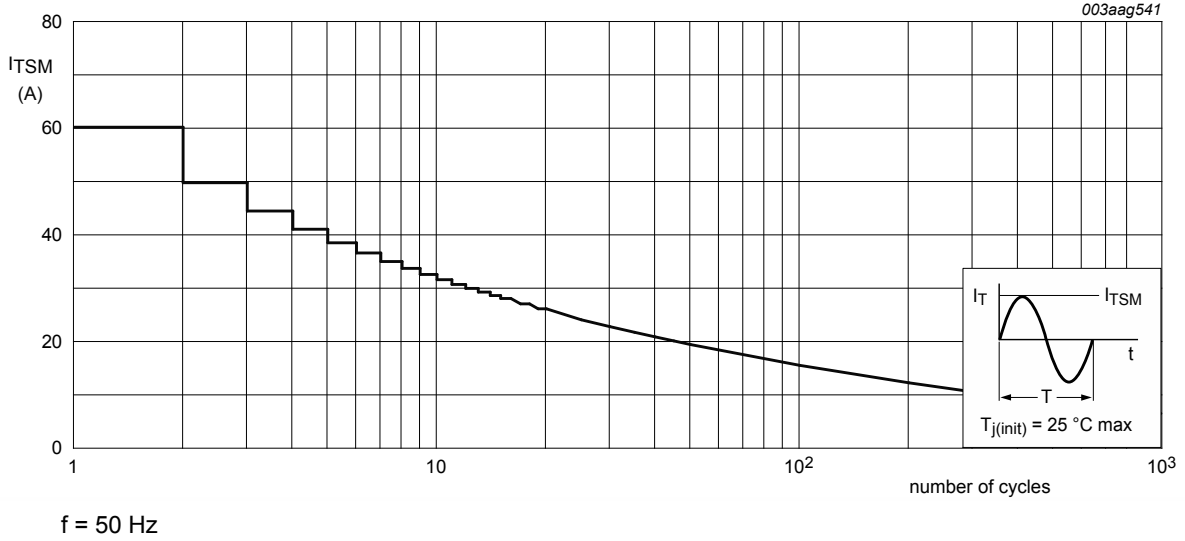


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

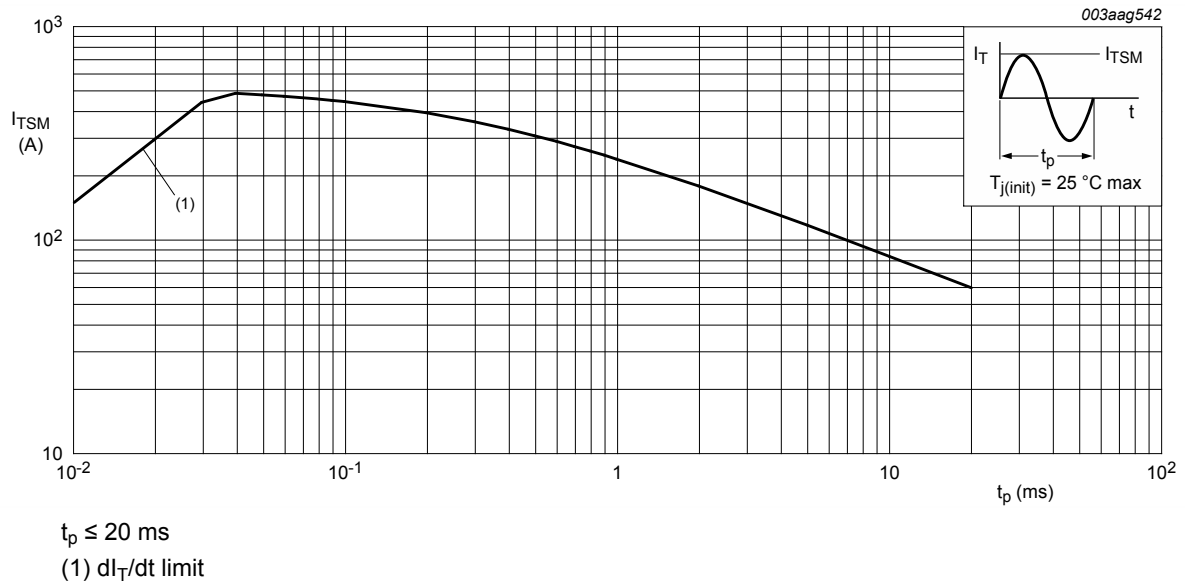
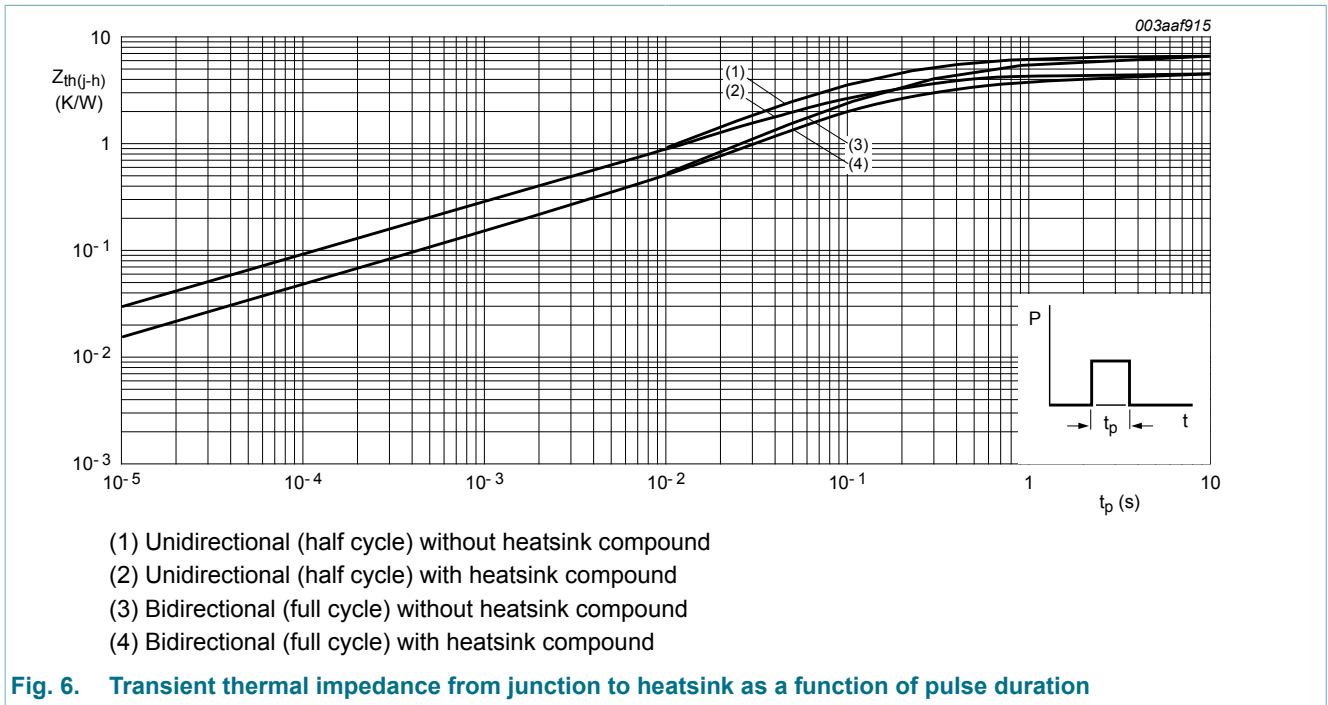


Fig. 5. Non-repetitive peak on-state current as a function of pulse width; maximum values

8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-h)}$	thermal resistance from junction to heatsink	full cycle or half cycle; with heatsink compound; Fig. 6	-	-	4.5	K/W
		full cycle or half cycle; without heatsink compound; Fig. 6	-	-	6.5	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	-	55	-	K/W



9. Isolation characteristics

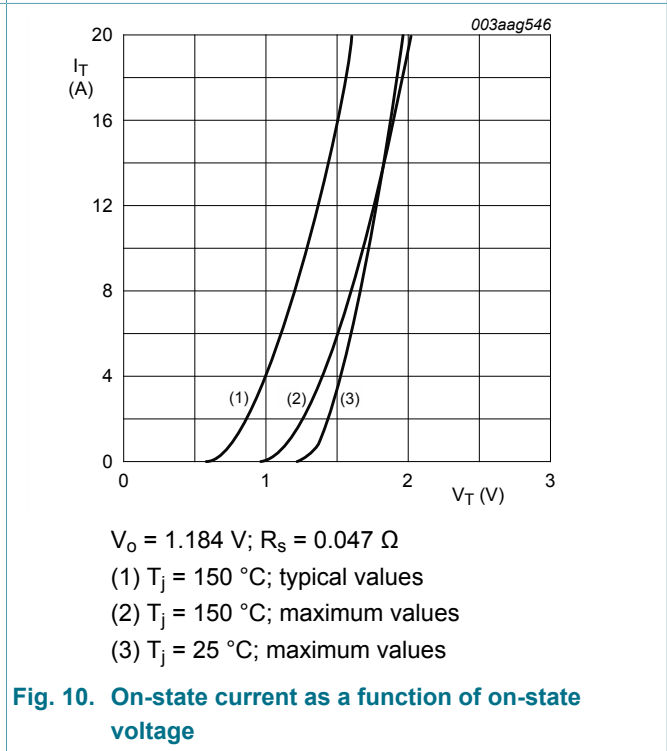
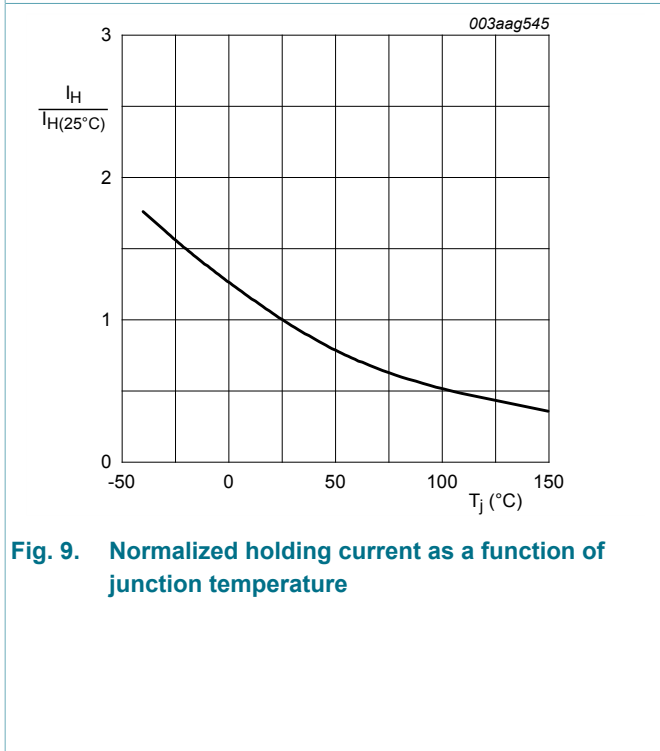
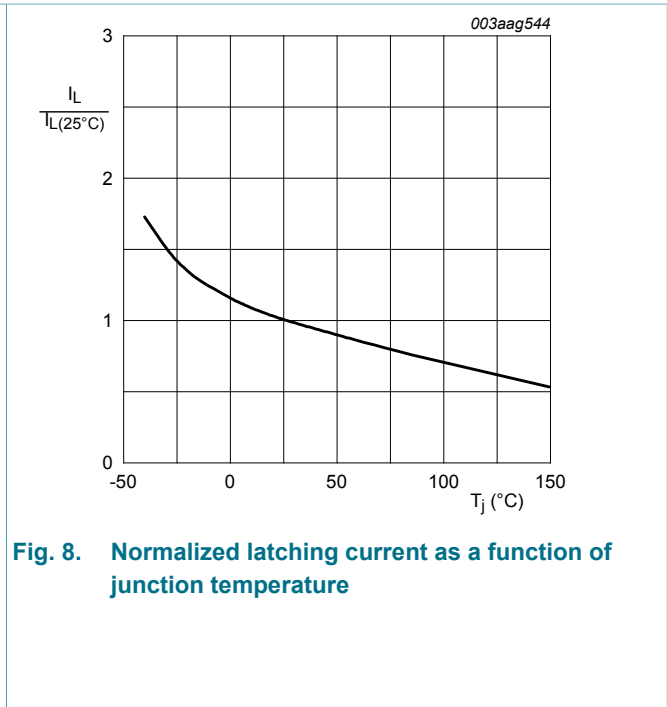
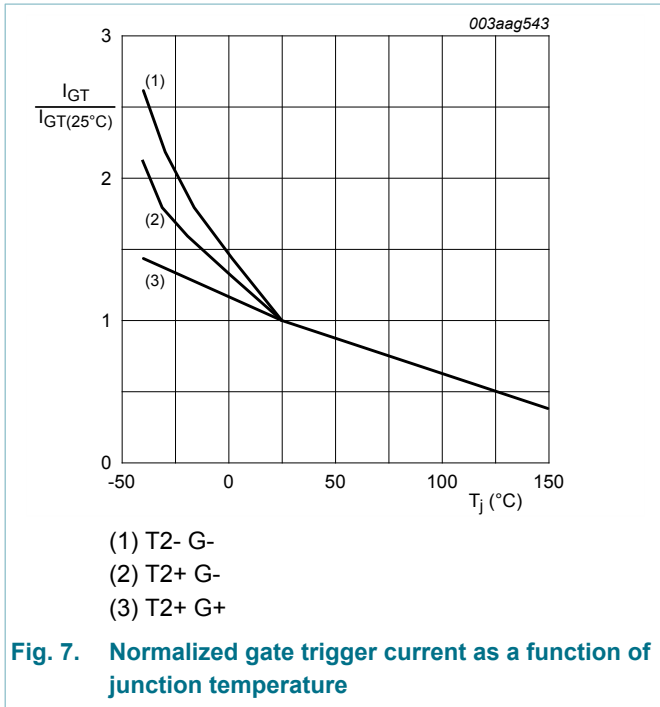
Table 6. Isolation characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$V_{isol(RMS)}$	RMS isolation voltage	from all terminals to external heatsink; sinusoidal waveform; clean and dust free; $50\text{ Hz} \leq f \leq 60\text{ Hz}$; $RH \leq 65\%$; $T_h = 25\text{ }^\circ\text{C}$	-	-	2500	V
C_{isol}	isolation capacitance	from main terminal 2 to external heatsink; $f = 1\text{ MHz}$; $T_h = 25\text{ }^\circ\text{C}$	-	10	-	pF

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 7	4	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7	4	-	35	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7	4	-	35	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 8	-	-	50	mA
		V _D = 12 V; I _G = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 8	-	-	60	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; Fig. 8	-	-	50	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 9	-	-	35	mA
V _T	on-state voltage	I _T = 7 A; Fig. 10	-	1.3	1.6	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _j = 25 °C; Fig. 11	-	0.8	1	V
		V _D = 400 V; I _T = 0.1 A; T _j = 150 °C	0.25	-	-	V
I _D	off-state current	V _D = 800 V; T _j = 150 °C	-	0.4	2	mA
Dynamic characteristics						
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 150 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit	500	-	-	V/μs
dI _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 6 A; dV _{com} /dt = 20 V/μs; (snubberless condition); gate open circuit	10	-	-	A/ms
		V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 6 A; dV _{com} /dt = 10 V/μs; gate open circuit	12	-	-	A/ms
		V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 6 A; dV _{com} /dt = 1 V/μs; gate open circuit	20	-	-	A/ms



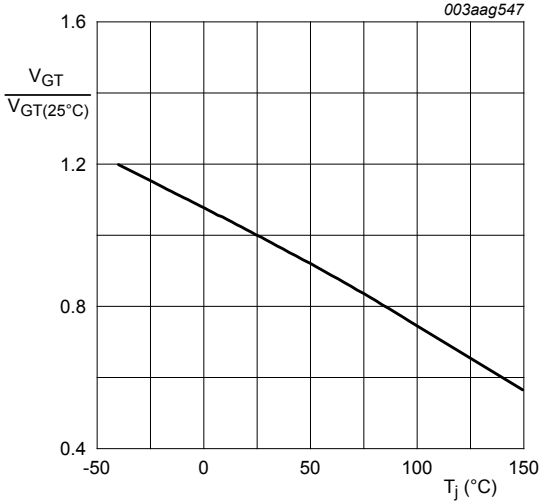
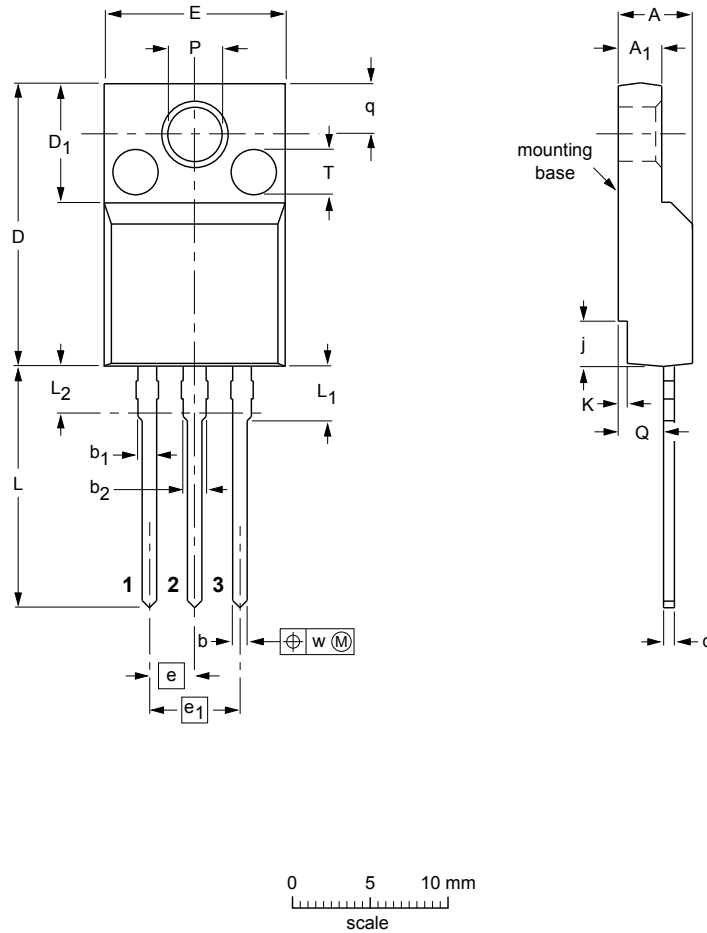


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

Plastic single-ended package; isolated heatsink mounted;
1 mounting hole; 3-lead TO-220 'full pack'

SOT186A



DIMENSIONS (mm are the original dimensions)

UNIT	A	A ₁	b	b ₁	b ₂	c	D	D ₁	E	e	e ₁	j	K	L	L ₁	L ₂ ⁽¹⁾ max.	P	Q	q	T ⁽²⁾	w
mm	4.6	2.9	0.9	1.1	1.4	0.7	15.8	6.5	10.3	2.54	5.08	2.7	0.6	14.4	3.30	3	3.2	2.6	3.0	2.5	0.4
	4.0	2.5	0.7	0.9	1.0	0.4	15.2	6.3	9.7			1.7	0.4	13.5	2.79		3.0	2.3	2.6		

Notes

- 1. Terminal dimensions within this zone are uncontrolled.
- 2. Both recesses are # 2.5 × 0.8 max. depth

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA		
SOT186A		3-lead TO-220F			02-04-09 06-02-14

Fig. 12. Package outline TO-220F (SOT186A)

12. Legal information

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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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Date of release: 22 May 2014