

1. General description

AC Thyristor Triac power switch in a TO263(D2PAK) surface mountable plastic package with self-protective clamping capabilities against low and high energy transients.

2. Features and benefits

- Clamping structure ensuring safe high over-voltage withstand capability
- Direct interfacing with low power drivers and microcontrollers
- Full cycle AC conduction
- Over-voltage withstand capability to IEC 61000-4-5
- Pin compatible with standard triacs
- Planar passivated for voltage ruggedness and reliability
- Protective self turn-on capability for high energy transients
- Safe clamping capability for low energy over-voltage transients
- Sensitive gate for easy logic level triggering
- Surface mountable package
- Triggering in three quadrants only
- Very high immunity to false turn-on by dV/dt

3. Applications

- AC fan, pump and compressor controls
- Highly inductive, resistive and safety loads
- Large and small appliances (White Goods)
- Reversing induction motor controls

4. Quick reference data

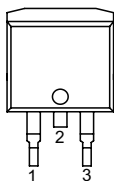
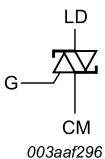
Table 1. Quick reference data

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	800	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 108\text{ °C}$; 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	-	-	51	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	-	56	A
T_j	junction temperature		-	-	125	°C
V_{PP}	peak pulse voltage	$T_j = 25\text{ °C}$; non-repetitive; off-state; Fig. 6	-	-	2	kV

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD+ G+; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8	-	-	10	mA
		$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD+ G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8	-	-	10	mA
		$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD- G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8	-	-	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 10	-	-	25	mA
V_T	on-state voltage	$I_T = 8\text{ A}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 11	-	-	1.7	V
V_{CL}	clamping voltage	$I_{CL} = 0.1\text{ mA}$; $t_p = 1\text{ ms}$; $T_J = 25\text{ }^\circ\text{C}$	850	-	-	V
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit; Fig. 13	500	-	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; (snubberless condition); gate open circuit; Fig. 14 ; Fig. 15	3.5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$; gate open circuit; Fig. 14 ; Fig. 15	5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 1\text{ V}/\mu\text{s}$; gate open circuit; Fig. 14 ; Fig. 15	10	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	CM	common		 003aaf296
2	LD	load		
3	G	gate		
mb	LD	mounting base; load		

6. Ordering information

Table 3. Ordering information

Type number	Package Name	Orderable part number	Packing method	Small packing quantity	Package version	Package issue date
ACTT6B-800E	TO263	ACTT6B-800EJ	Reel	800	TO263E	26-May-2017

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
$I_{\text{T(RMS)}}$	RMS on-state current	full sine wave; $T_{\text{mb}} \leq 108\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	6	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$; $t_{\text{p}} = 20\text{ ms}$; Fig 4 ; Fig 5	-	51	A
		full sine wave; $T_{\text{j(init)}} = 25\text{ °C}$; $t_{\text{p}} = 16.7\text{ ms}$	-	56	A
I^2t	I^2t for fusing	$t_{\text{p}} = 10\text{ ms}$; sine-wave pulse	-	13	A^2s
dI_{T}/dt	rate of rise of on-state current	$I_{\text{G}} = 20\text{ mA}$	-	100	$\text{A}/\mu\text{s}$
I_{GM}	peak gate current	$t_{\text{p}} = 20\text{ }\mu\text{s}$	-	2	A
P_{GM}	peak gate power		-	5	W
$P_{\text{G(AV)}}$	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	$^{\circ}\text{C}$
V_{pp}	peak pulse voltage	$T_{\text{j}} = 25\text{ °C}$; non-repetitive, off-state; Fig 6	-	2	kV

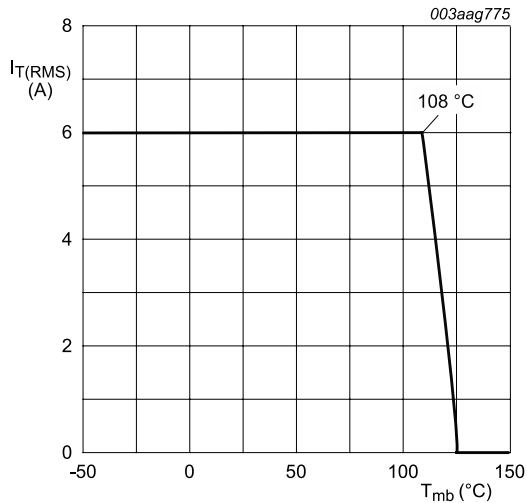
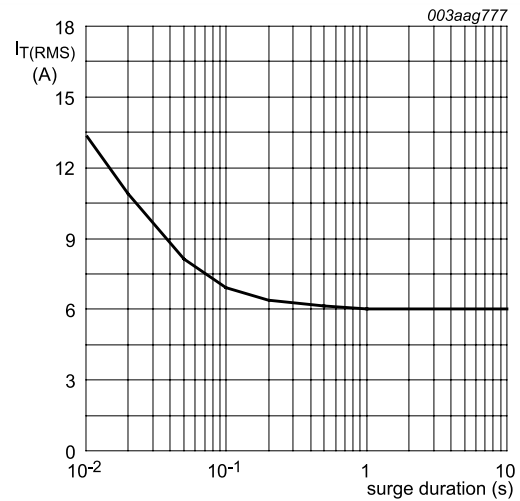


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



$f = 50\text{ Hz}$; $T_{\text{mb}} = 108\text{ °C}$

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

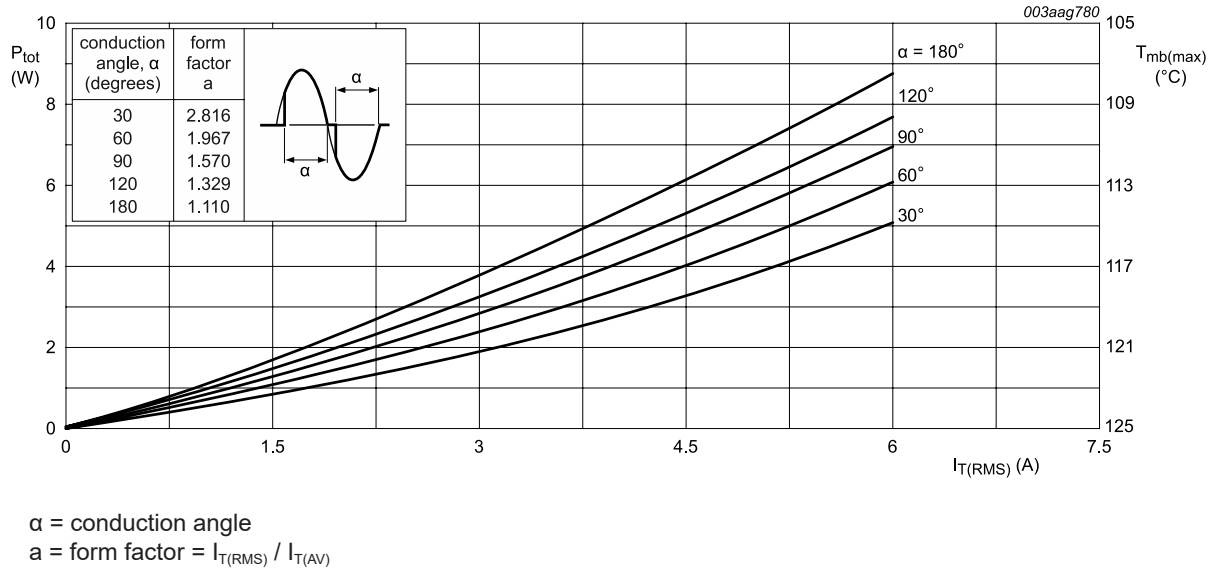


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

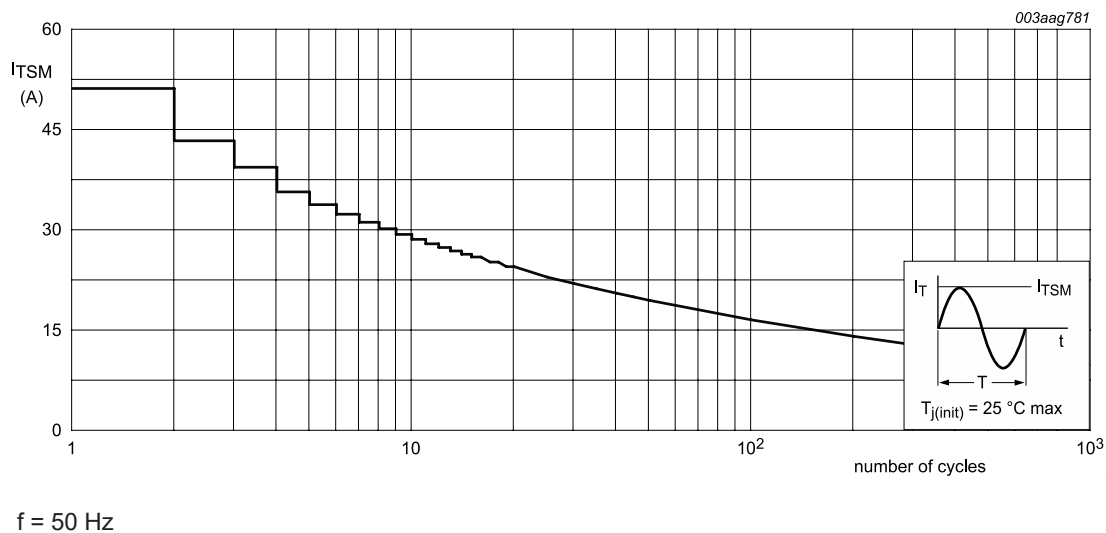
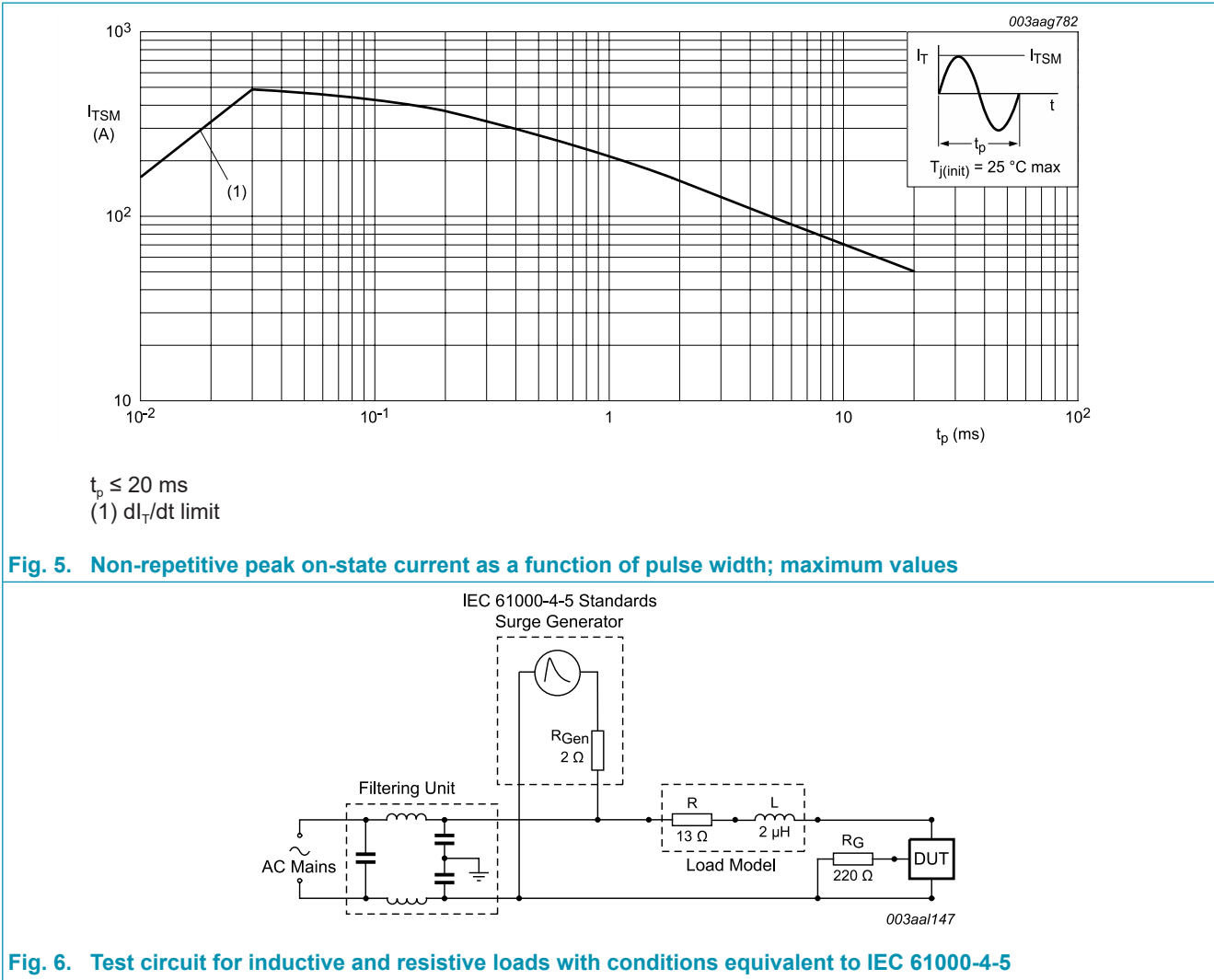


Fig. 4. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



8. Thermal characteristics

Table 5. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	full cycle; Fig. 7		-	-	2.4	K/W
		half cycle; Fig. 7		-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient free air	printed circuit board (FR4) mounted		-	55	-	K/W

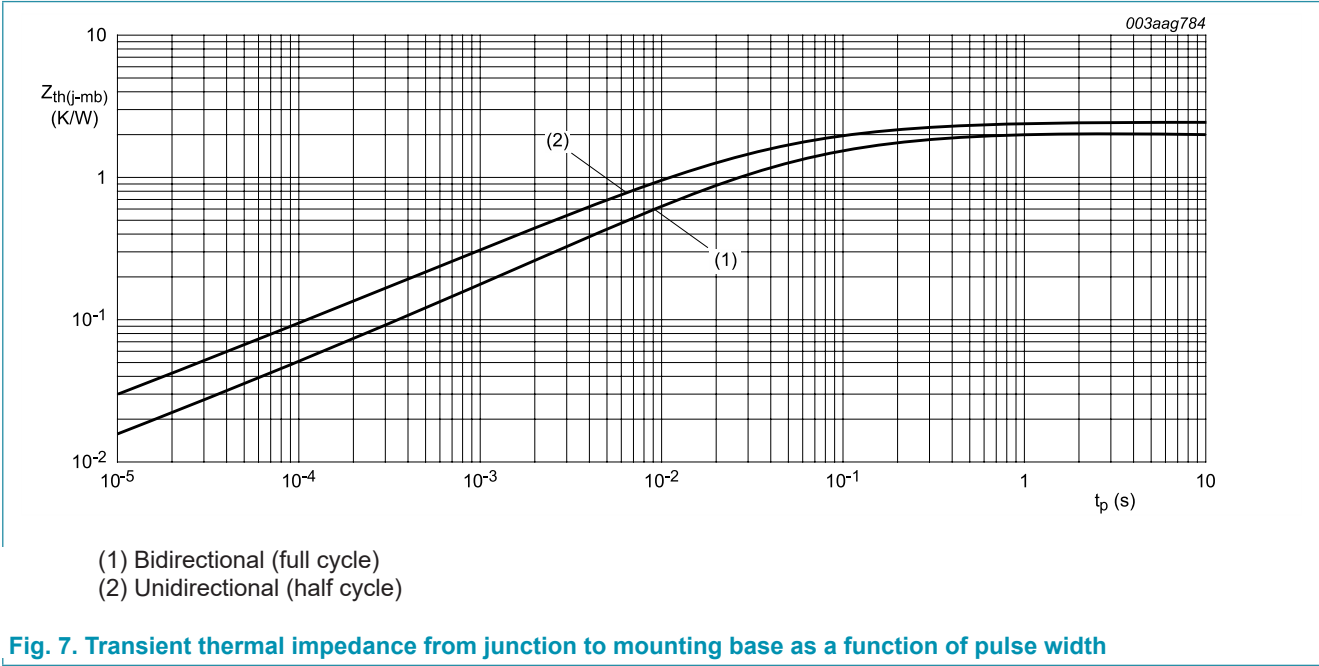
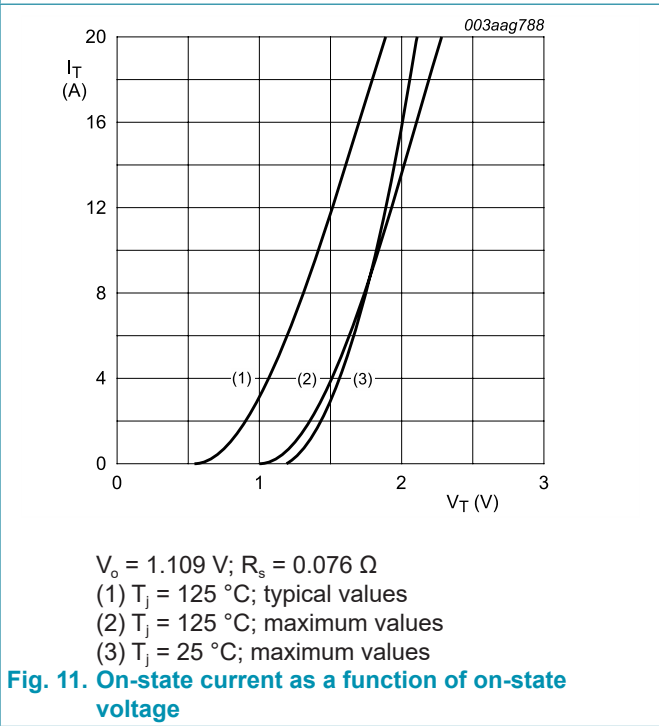
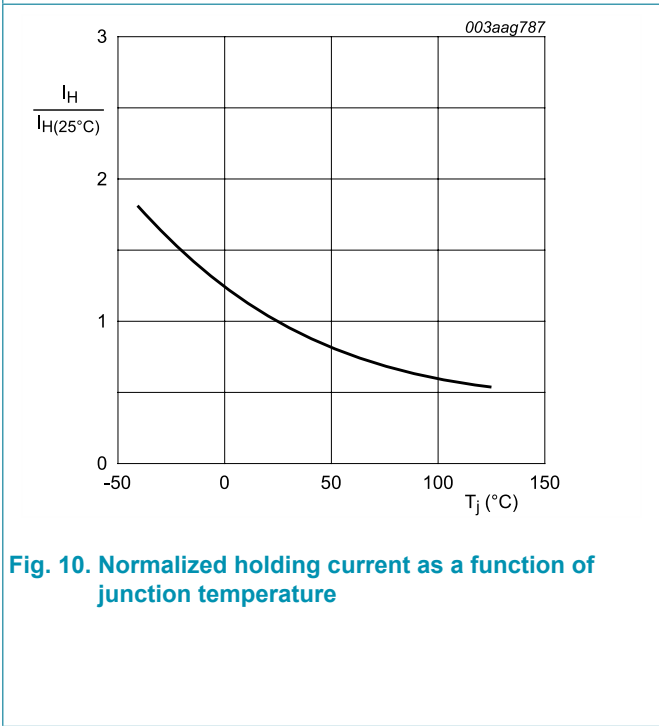
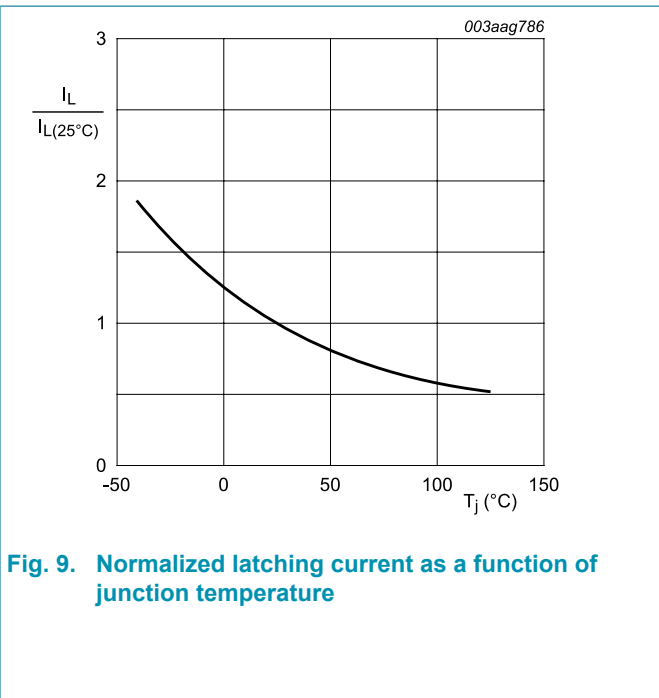
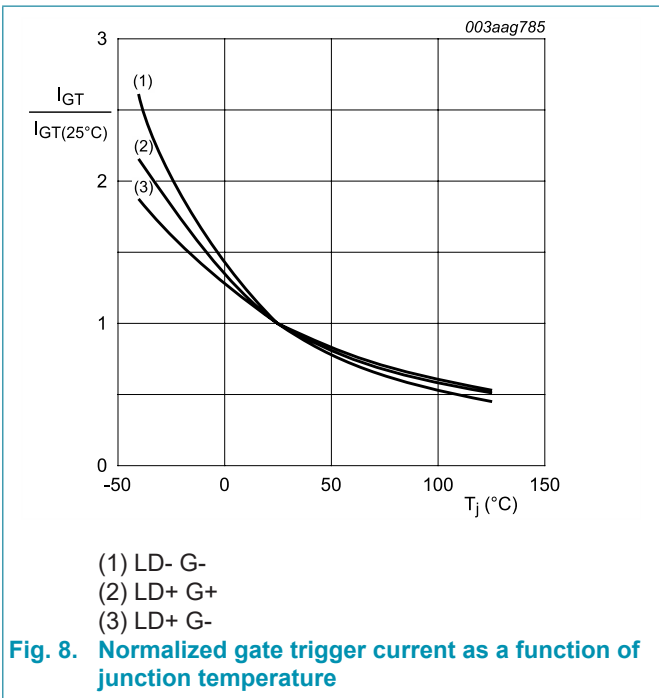


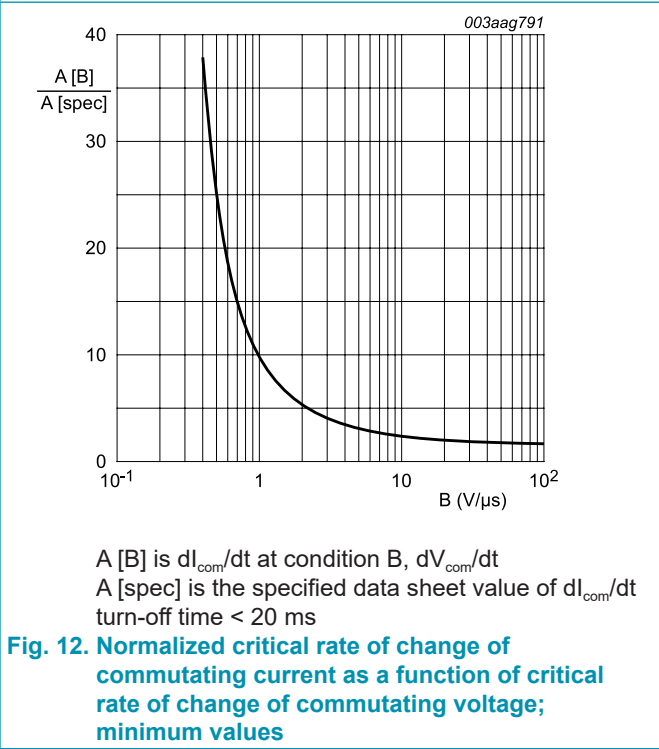
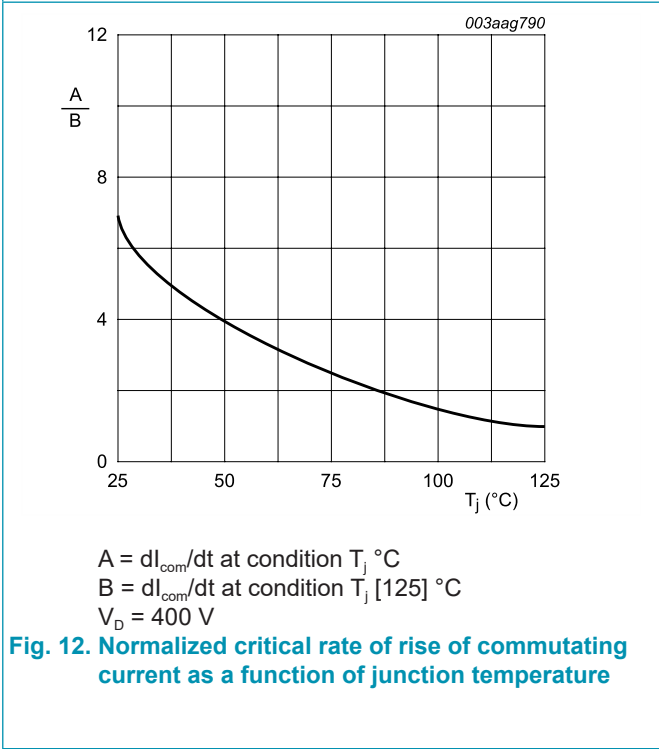
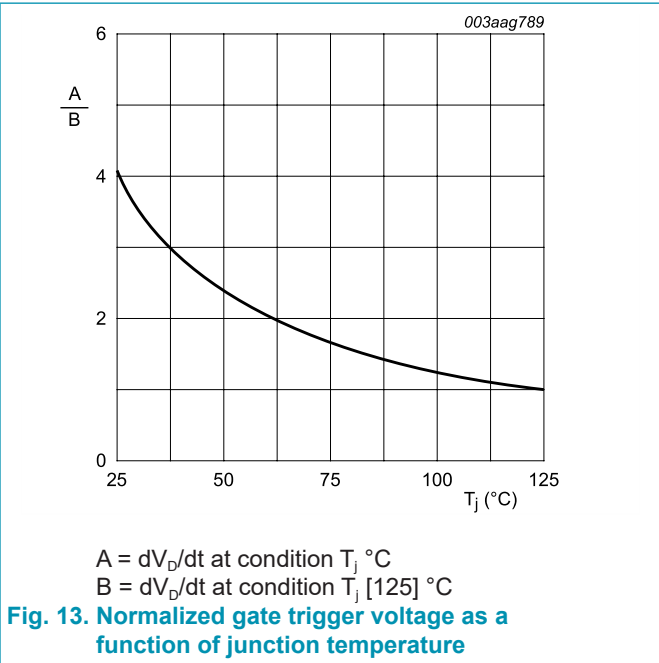
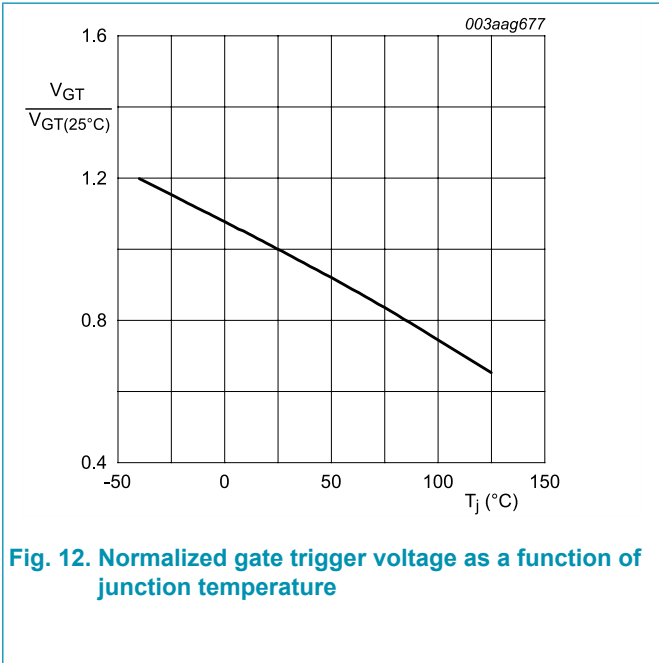
Fig. 7. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

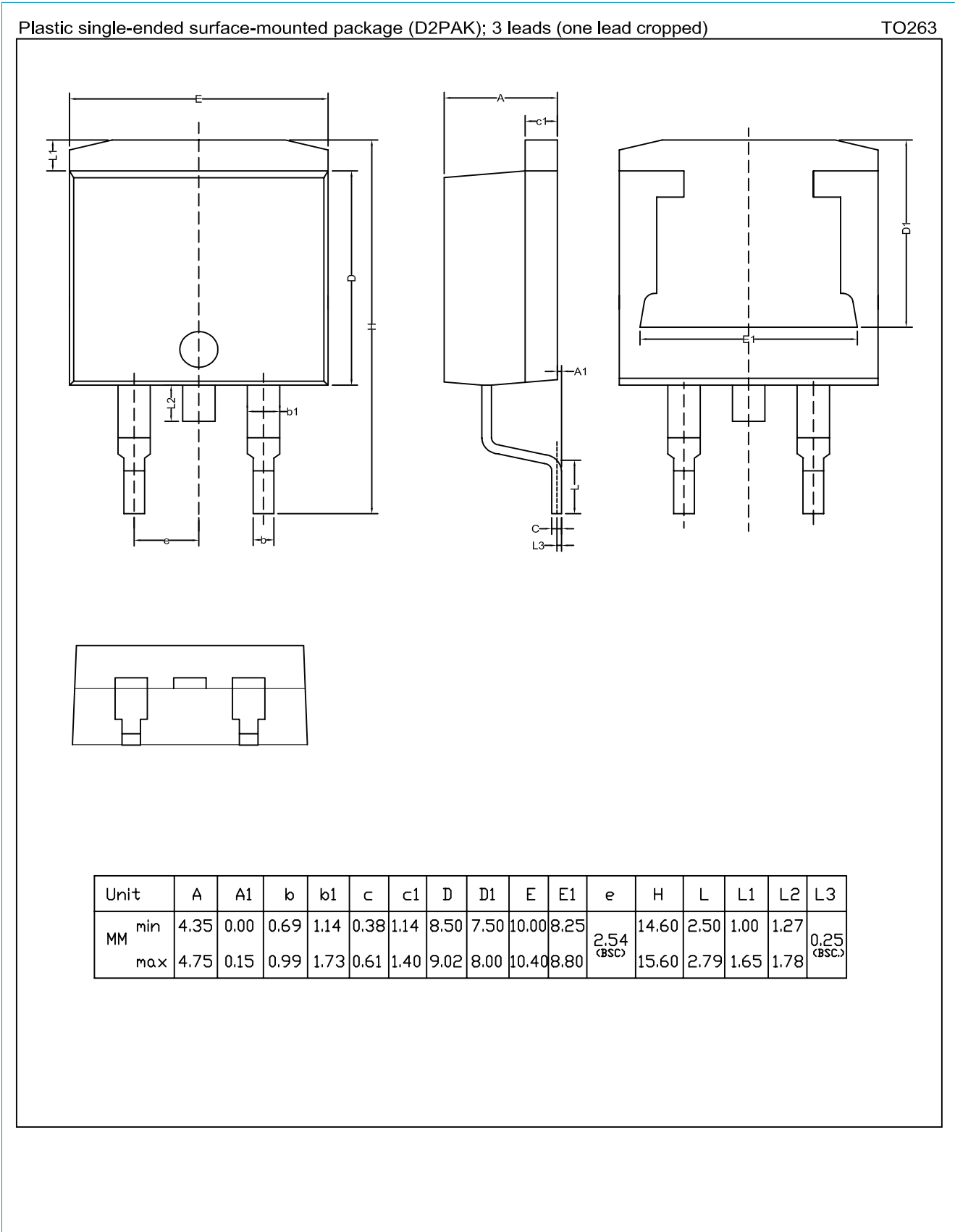
Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD+ G+; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8		-	-	10	mA
		$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD+ G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8		-	-	10	mA
		$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; LD- G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 8		-	-	10	mA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 100\text{ mA}$; LD+ G+; $T_J = 25\text{ }^\circ\text{C}$; Fig. 9		-	-	30	mA
		$V_D = 12\text{ V}$; $I_G = 100\text{ mA}$; LD+ G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 9		-	-	40	mA
		$V_D = 12\text{ V}$; $I_G = 100\text{ mA}$; LD- G-; $T_J = 25\text{ }^\circ\text{C}$; Fig. 9		-	-	30	mA
I_H	holding current	$V_D = 12\text{ V}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 10		-	-	25	mA
V_T	on-state voltage	$I_T = 8\text{ A}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 11		-	-	1.7	V
V_{GT}	gate trigger voltage	$V_D = 12\text{ V}$; $I_T = 100\text{ mA}$; $T_J = 25\text{ }^\circ\text{C}$; Fig. 12		-	0.8	1	V
		$V_D = 400\text{ V}$; $I_T = 100\text{ mA}$; $T_J = 125\text{ }^\circ\text{C}$; Fig. 12		0.2	0.45	-	V
I_D	off-state current	$V_D = 800\text{ V}$; $T_J = 25\text{ }^\circ\text{C}$		-	-	10	μA
		$V_D = 800\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$		-	-	0.5	mA
V_{CL}	clamping voltage	$I_{CL} = 0.1\text{ mA}$; $t_p = 1\text{ ms}$; $T_J = 25\text{ }^\circ\text{C}$		850	-	-	V
Dynamic characteristics							
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 536\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; ($V_{DM} = 67\%$ of V_{DRM}); exponential waveform; gate open circuit; Fig. 13		500	-	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 20\text{ V}/\mu\text{s}$; (snubberless condition); gate open circuit; Fig. 14 ; Fig. 15		3.5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 10\text{ V}/\mu\text{s}$; gate open circuit; Fig. 14 ; Fig. 15		5	-	-	A/ms
		$V_D = 400\text{ V}$; $T_J = 125\text{ }^\circ\text{C}$; $I_{T(RMS)} = 6\text{ A}$; $dV_{com}/dt = 1\text{ V}/\mu\text{s}$; gate open circuit; Fig. 14 ; Fig. 15		10	-	-	A/ms





10. Package outline



11. 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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Date of release: 25 April 2019