

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. This "series CTN" triac will commute the full RMS current at the maximum rated junction temperature ($T_{j(max)} = 150\text{ °C}$) without the aid of a snubber. It is used in applications where "high junction operating temperature capability" is required.

2. Features and benefits

- Clamping structure ensuring safe high over-voltage withstand capability
- High junction operating temperature capability ($T_{j(max)} = 150\text{ °C}$)
- High minimum I_{GT} for guaranteed immunity to gate noise
- 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
- Less sensitive gate for high noise immunity
- Surface mountable package
- Triggering in three quadrants only
- Very high immunity to false turn-on by dV/dt and IEC 61000-4-4 fast transient
- Package meets UL94V0 flammability requirement
- Package is RoHS compliant

3. Applications

- AC fan, pump and compressor controls
- Highly inductive, resistive and safety loads
- Large and small appliances (White Goods)
- Reversing induction motor controls
- Applications subject to high temperature ($T_{j(max)} = 150\text{ °C}$)

4. Quick reference data

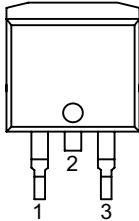
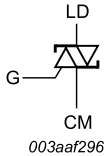
Table 1. Quick reference data

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; $T_{mb} \leq 131\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	8	A
T_j	junction temperature		-	-	150	°C
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	-	-	120	A
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 V; I _T = 100 mA; LD+ G+; T _j = 25 °C; Fig. 7	5	-	35	mA
		V _D = 12 V; I _T = 100 mA; LD+ G-; T _j = 25 °C; Fig. 7	5	-	35	mA
		V _D = 12 V; I _T = 100 mA; LD- G-; T _j = 25 °C; Fig. 7	5	-	35	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 10	-	-	40	mA
V _T	on-state voltage	I _T = 10 A; T _j = 25 °C; Fig. 11	-	-	1.5	V
V _{CL}	clamping voltage	I _{CL} = 0.1 mA; t _p = 1 ms; T _j = 25 °C	850	-	-	V
Dynamic characteristics						
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 536 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit	4000	-	-	V/μs
		V _{DM} = 536 V; T _j = 150 °C; exponential waveform; gate open circuit	2000	-	-	V/μs
di _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 8 A; dV _{com} /dt = 20 V/μs; snubberless condition; gate open circuit	12	-	-	A/ms
		V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 8 A; dV _{com} /dt = 10 V/μs; gate open circuit	15	-	-	A/ms
		V _D = 400 V; T _j = 150 °C; I _{T(RMS)} = 8 A; dV _{com} /dt = 1 V/μs; gate open circuit	20	-	-	A/ms

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	CM	common		
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
ACTT8B-800CTN	TO263	ACTT8B-800CTNJ	Reel	800	TO263E	26-May-2017

7. Marking

Table 4. Marking codes

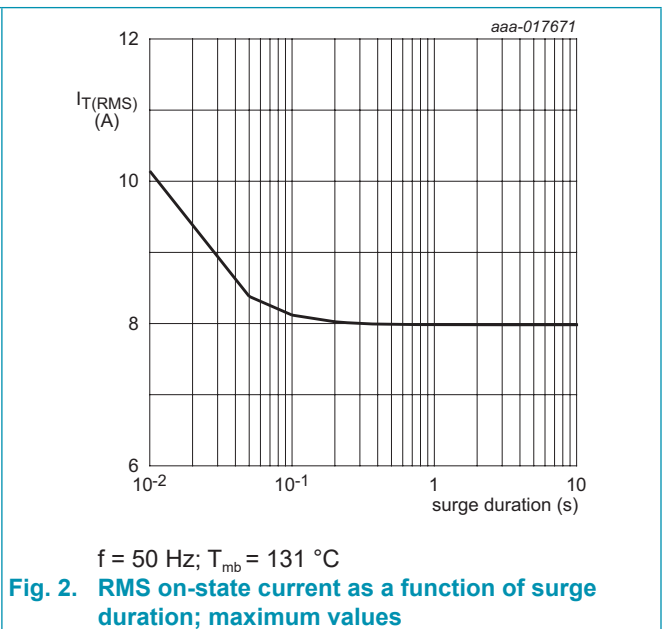
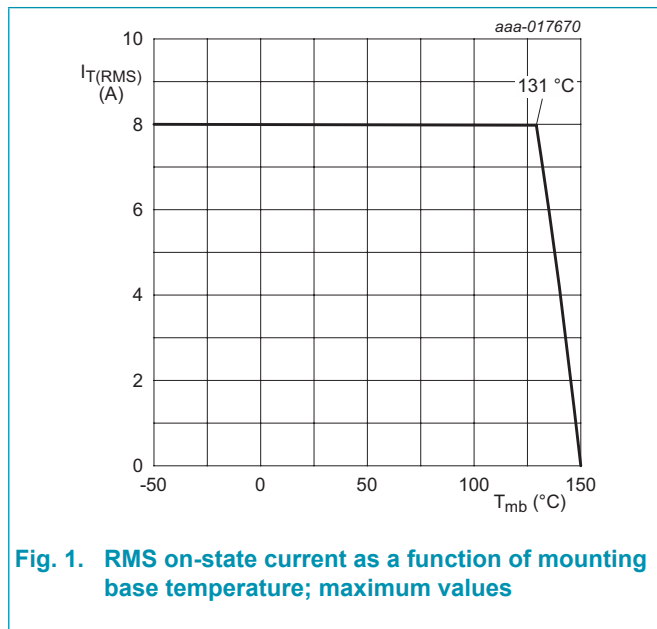
Type number	Marking codes
ACTT8B-800CTN	ACTT8B 800CTN

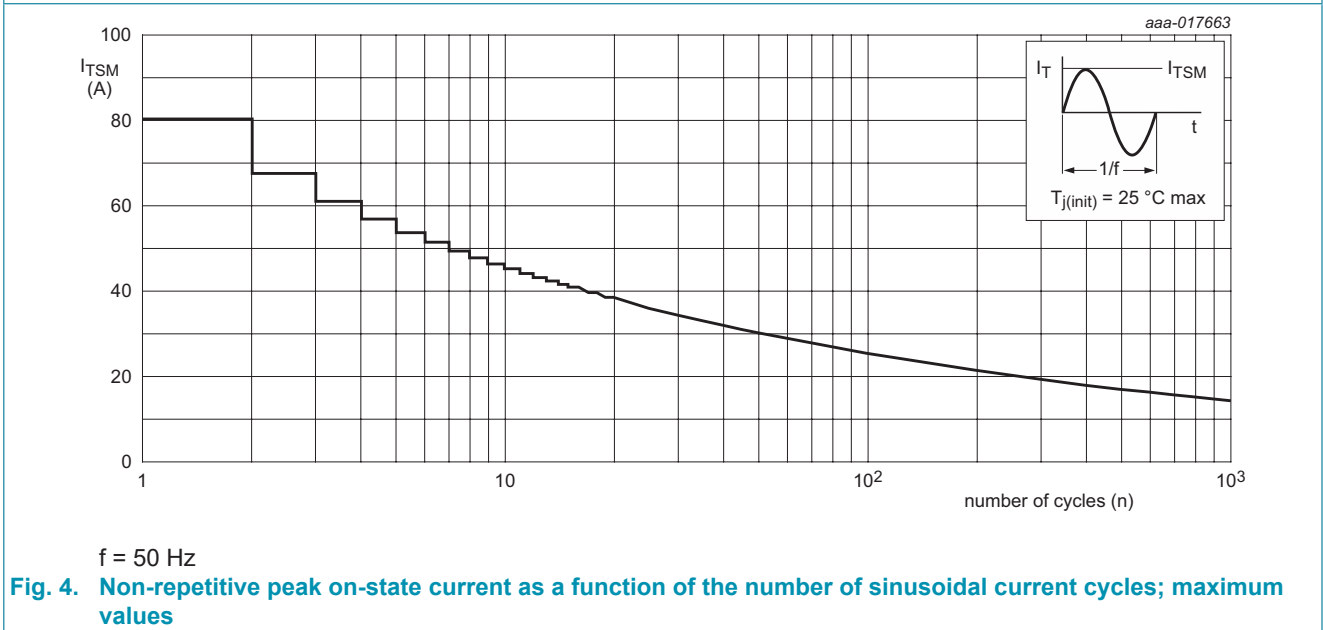
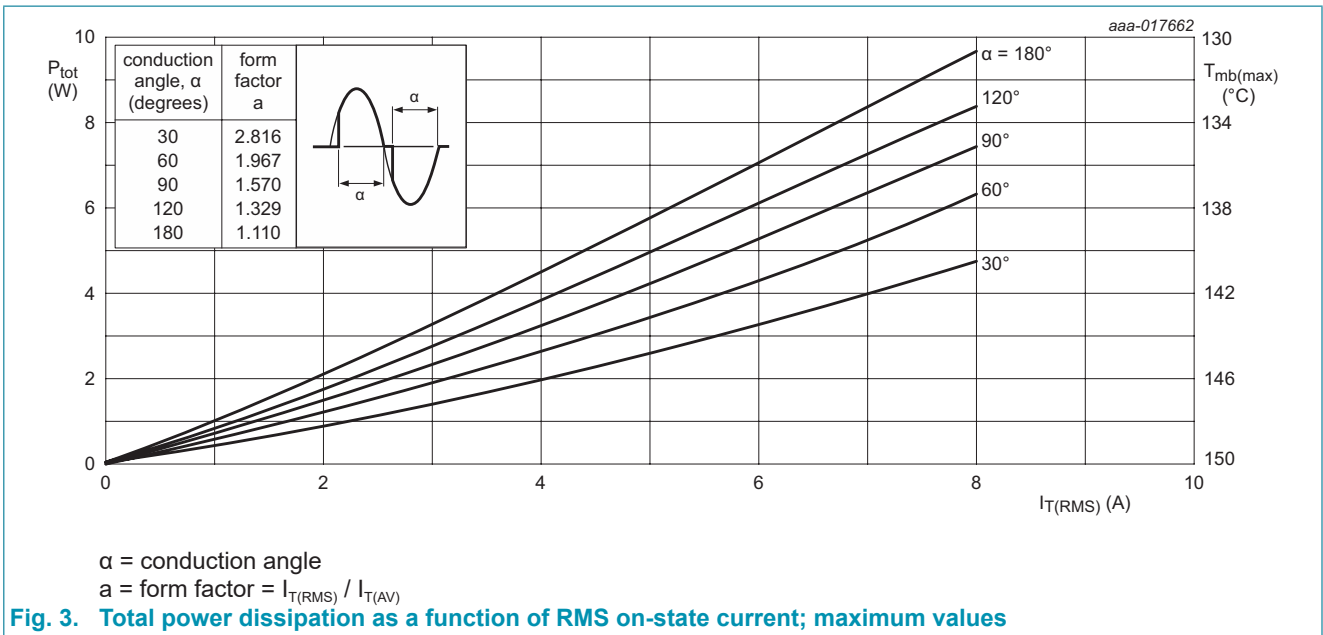
8. Limiting values

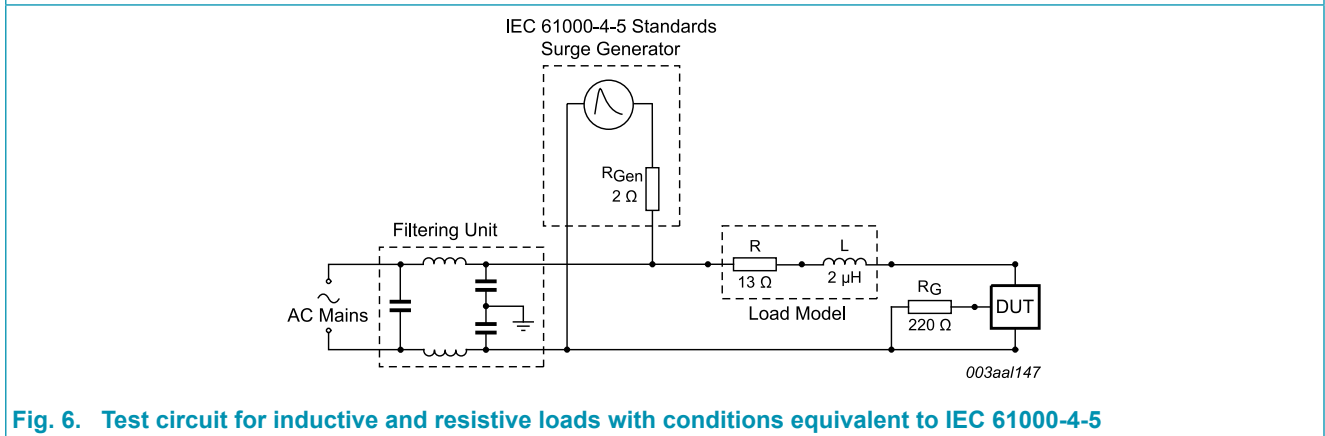
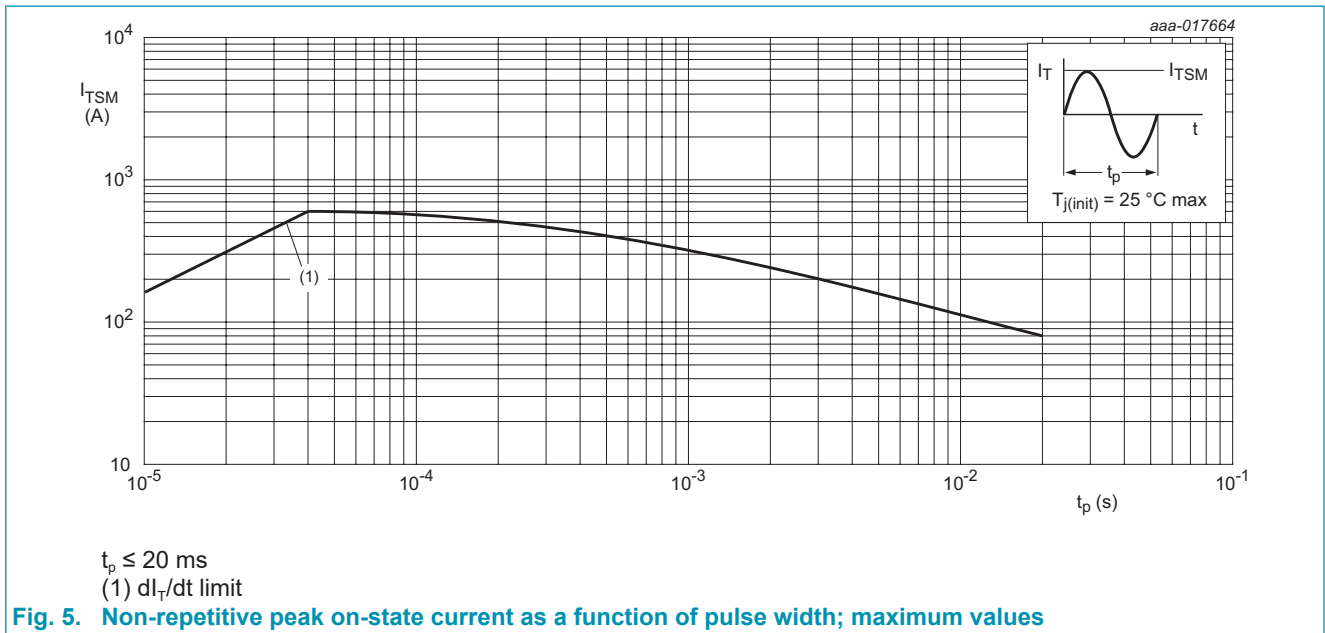
Table 5. Limiting values

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
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 131\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	8	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	-	80	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	88	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; sine-wave pulse	-	32	A^2s
di_T/dt	rate of rise of on-state current	$I_G = 70\text{ mA}$	-	100	$A/\mu s$
I_{GM}	peak gate current	$t_p = 20\text{ }\mu s$	-	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	$^{\circ}C$
V_{pp}	peak pulse voltage	$T_j = 25\text{ °C}$; non-repetitive, off-state; Fig 6	-	2	kV







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	full cycle; Fig. 7	-	-	2	K/W
		half cycle	-	-	2.4	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air; printed circuit board (FR4) mounted	-	55	-	K/W

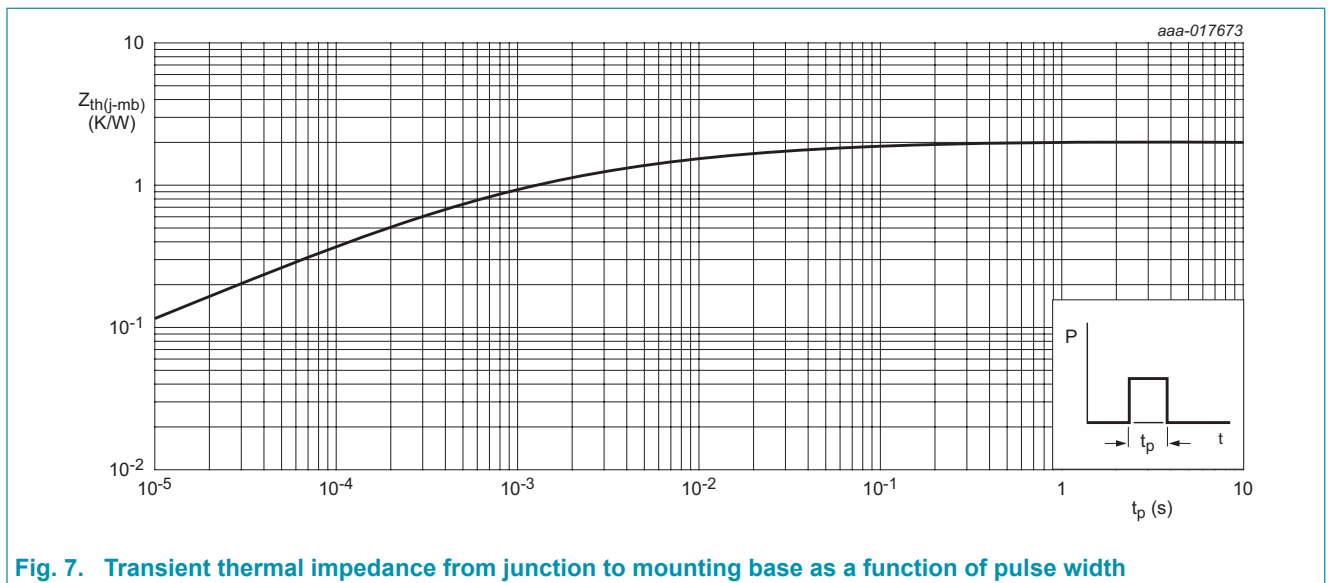
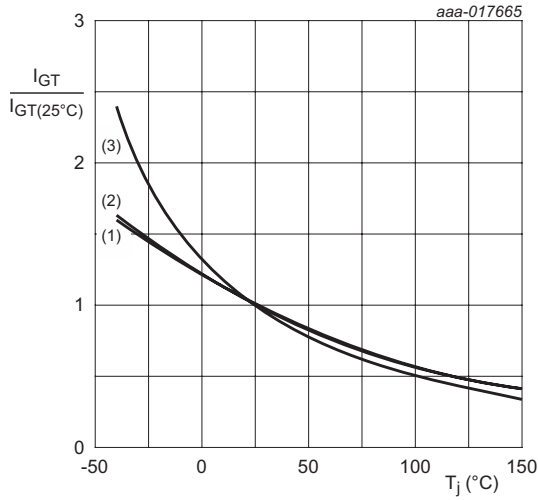


Fig. 7. Transient thermal impedance from junction to mounting base as a function of pulse width

10. Characteristics

Table 7. Characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}; I_T = 100\text{ mA}; T_2+ G+;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 8	5	-	35	mA
		$V_D = 12\text{ V}; I_T = 100\text{ mA}; T_2+ G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 8	5	-	35	mA
		$V_D = 12\text{ V}; I_T = 100\text{ mA}; T_2- G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 8	5	-	35	mA
I_L	latching current	$V_D = 12\text{ V}; I_G = 100\text{ mA}; T_2+ G+;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 9	-	-	50	mA
		$V_D = 12\text{ V}; I_G = 100\text{ mA}; T_2+ G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 9	-	-	60	mA
		$V_D = 12\text{ V}; I_G = 100\text{ mA}; T_2- G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 9	-	-	50	mA
I_H	holding current	$V_D = 12\text{ V}; T_j = 25\text{ }^\circ\text{C};$ Fig. 10	-	-	40	mA
V_T	on-state voltage	$I_T = 10\text{ A}; T_j = 25\text{ }^\circ\text{C};$ Fig. 11	-	-	1.5	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
		$V_D = 400\text{ V}; I_T = 100\text{ mA}; T_j = 150\text{ }^\circ\text{C}$	0.2	0.45	-	V
I_D	off-state current	$V_D = 800\text{ V}; T_j = 25\text{ }^\circ\text{C}$	-	-	10	mA
		$V_D = 800\text{ V}; T_j = 150\text{ }^\circ\text{C}$	-	-	2	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	4000	-	-	V/ μs
		$V_{DM} = 536\text{ V}; T_j = 150\text{ }^\circ\text{C};$ exponential waveform; gate open circuit	2000	-	-	V/ μs
dI_{com}/dt	rate of change of commutating current	$V_D = 400\text{ V}; T_j = 150\text{ }^\circ\text{C}; I_{T(RMS)} = 8\text{ A};$ $dV_{com}/dt = 20\text{ V}/\mu\text{s};$ snubberless condition; gate open circuit	12	-	-	A/ms
		$V_D = 400\text{ V}; T_j = 150\text{ }^\circ\text{C}; I_{T(RMS)} = 8\text{ A};$ $dV_{com}/dt = 10\text{ V}/\mu\text{s};$ gate open circuit	15	-	-	A/ms
		$V_D = 400\text{ V}; T_j = 150\text{ }^\circ\text{C}; I_{T(RMS)} = 8\text{ A};$ $dV_{com}/dt = 1\text{ V}/\mu\text{s};$ gate open circuit	20	-	-	A/ms



- (1) LD- G-
- (2) LD+ G+
- (3) LD+ G-

Fig. 8. Normalized gate trigger current as a function of junction temperature

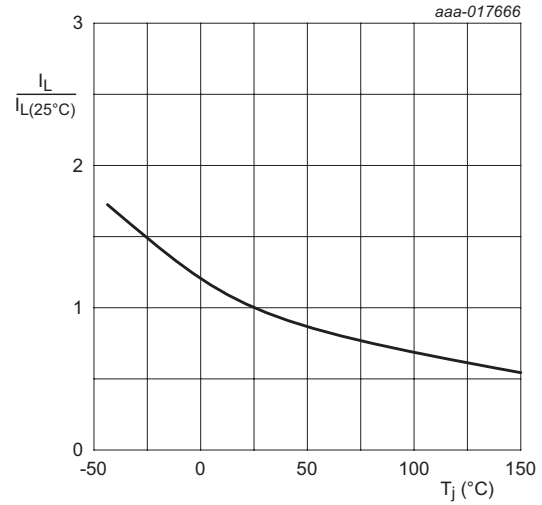


Fig. 9. Normalized latching current as a function of junction temperature

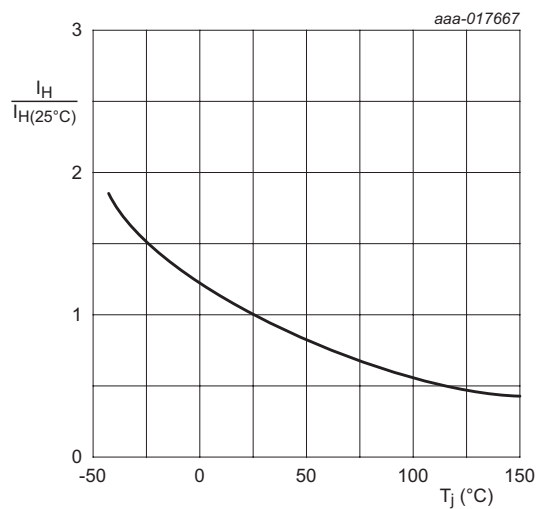
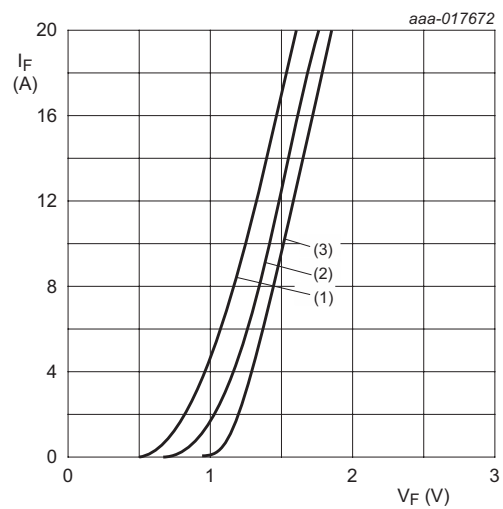


Fig. 10. Normalized holding current as a function of junction temperature



- $V_o = 1.089\text{ V}; R_s = 0.028\ \Omega$
- (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

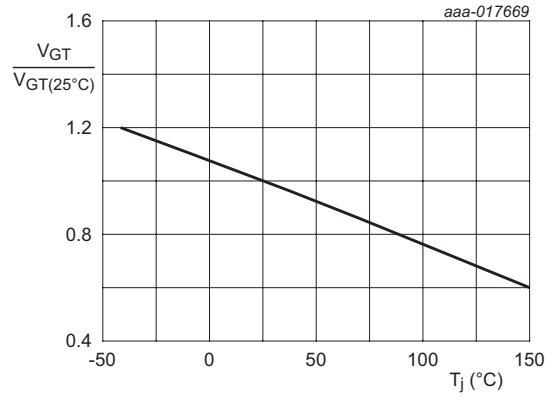
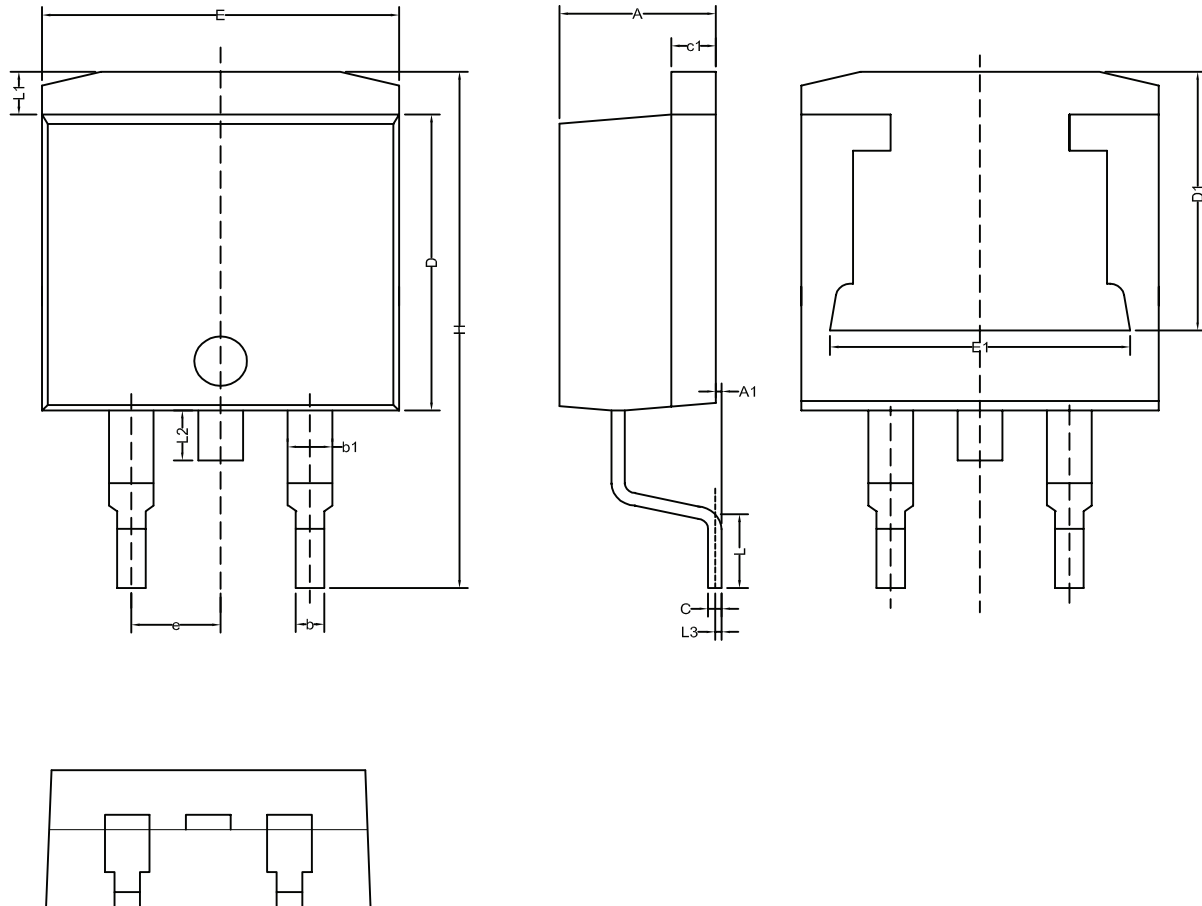


Fig. 12. Normalized gate trigger voltage as a function of junction temperature

11. Package outline

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

TO263



Unit	A	A1	b	b1	c	c1	D	D1	E	E1	e	H	L	L1	L2	L3
MM	min	4.35	0.00	0.69	1.14	0.38	1.14	8.50	7.50	10.00	8.25	14.60	2.50	1.00	1.27	
	max	4.75	0.15	0.99	1.73	0.61	1.40	9.02	8.00	10.40	8.80	15.60	2.79	1.65	1.78	0.25
											2.54					(BSC.)

12. Soldering

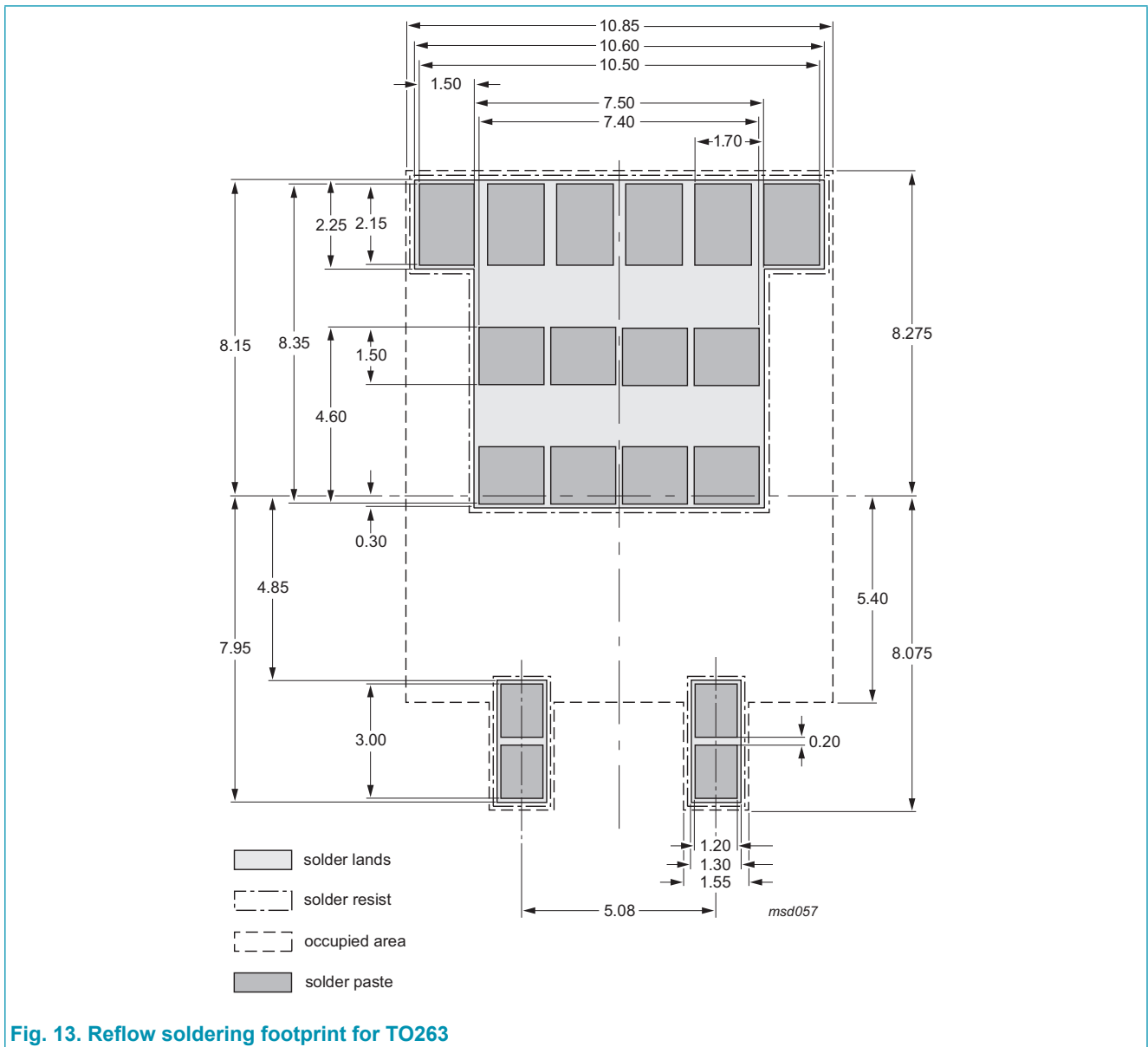


Fig. 13. Reflow soldering footprint for TO263

13. 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.

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- [2] The term 'short data sheet' is explained in section "Definitions".
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