



BTA204S-1000C

3Q Hi-Com Triac

11 August 2014

Product data sheet

1. General description

Planar passivated high commutation three quadrant triac in a SOT428 (DPAK) surface-mountable plastic package intended for use in circuits where high static and dynamic dV/dt and high dI/dt can occur. This "series C" triac will commute the full rated RMS current at the maximum rated junction temperature without the aid of a snubber.

2. Features and benefits

- 3Q technology for improved noise immunity
- High blocking voltage capability
- High commutation capability with maximum false trigger immunity
- High immunity to false turn-on by dV/dt
- Less sensitive gate for high noise immunity
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in three quadrants only

3. Applications

- General purpose motor control circuits
- Home appliances
- Rectifier-fed DC inductive loads e.g. DC motors and solenoids

4. Quick reference data

Table 1. Quick reference data

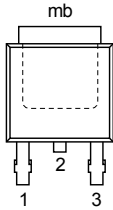

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	-	1000	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25\text{ }^{\circ}\text{C}$; $t_p = 20\text{ ms}$; Fig. 4 ; Fig. 5	-	-	25	A
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 107\text{ }^{\circ}\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	-	4	A
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; T2+ G+; $T_j = 25\text{ }^{\circ}\text{C}$; Fig. 7	2	6	35	mA



Symbol	Parameter	Conditions	Min	Typ	Max	Unit
		$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2+ G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 7	2	8	35	mA
		$V_D = 12\text{ V}; I_T = 0.1\text{ A}; T2- G-;$ $T_j = 25\text{ }^\circ\text{C};$ Fig. 7	2	20	35	mA

5. Pinning information

Table 2. Pinning information

Pin	Symbol	Description	Simplified outline	Graphic symbol
1	T1	main terminal 1	 <p style="text-align: center;">DPAK (SOT428)</p>	 <p style="text-align: center;"><i>sym051</i></p>
2	T2	main terminal 2[1]		
3	G	gate		
mb	T2	mounting base; main terminal 2		

[1] It is not possible to connect to pin 2 of the SOT428 package.

6. Ordering information

Table 3. Ordering information

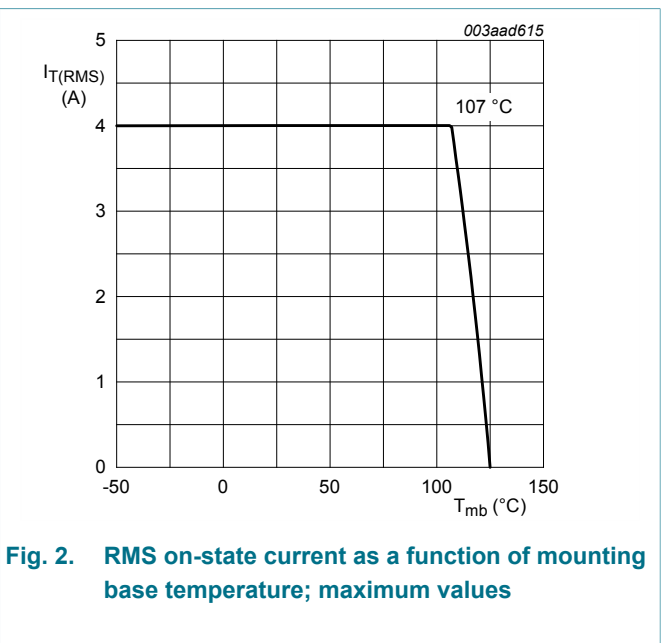
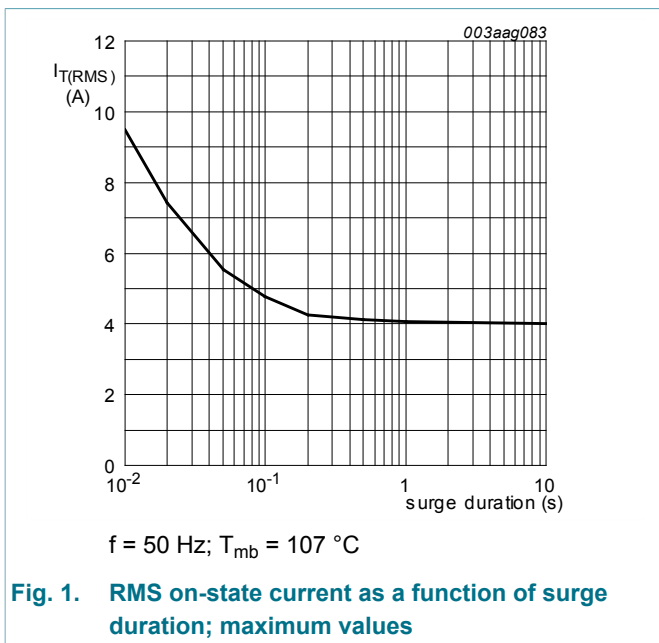
Type number	Package		
	Name	Description	Version
BTA204S-1000C	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

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		-	1000	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 107\text{ °C}$; Fig. 1 ; Fig. 2 ; Fig. 3	-	4	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	-	25	A
		full sine wave; $T_{j(init)} = 25\text{ °C}$; $t_p = 16.7\text{ ms}$	-	27	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$; SIN	-	3.1	A^2s
dl_T/dt	rate of rise of on-state current	$I_T = 6\text{ A}$; $I_G = 0.2\text{ A}$; $dI_G/dt = 0.2\text{ A}/\mu s$	-	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		-	125	$^{\circ}C$



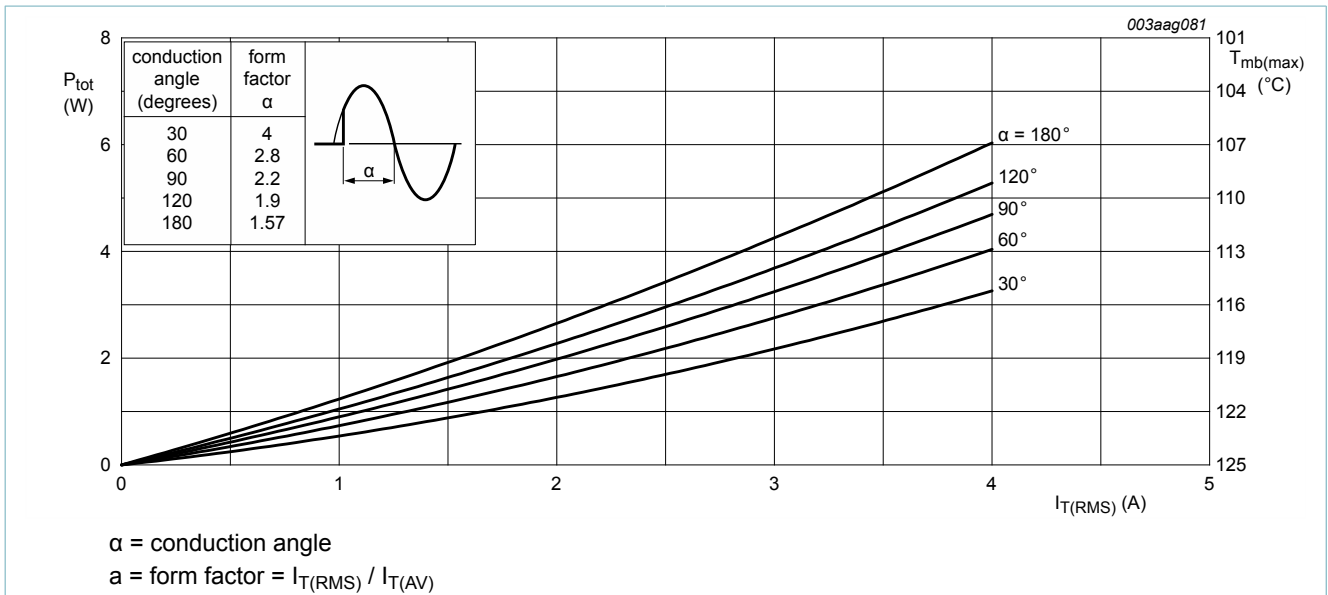


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

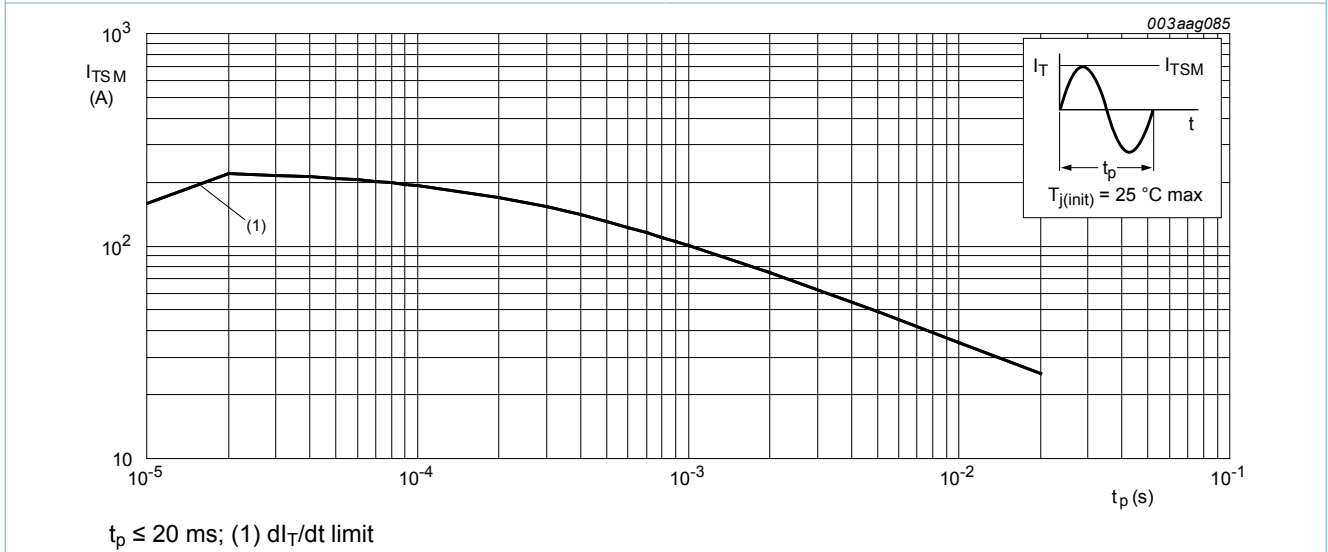
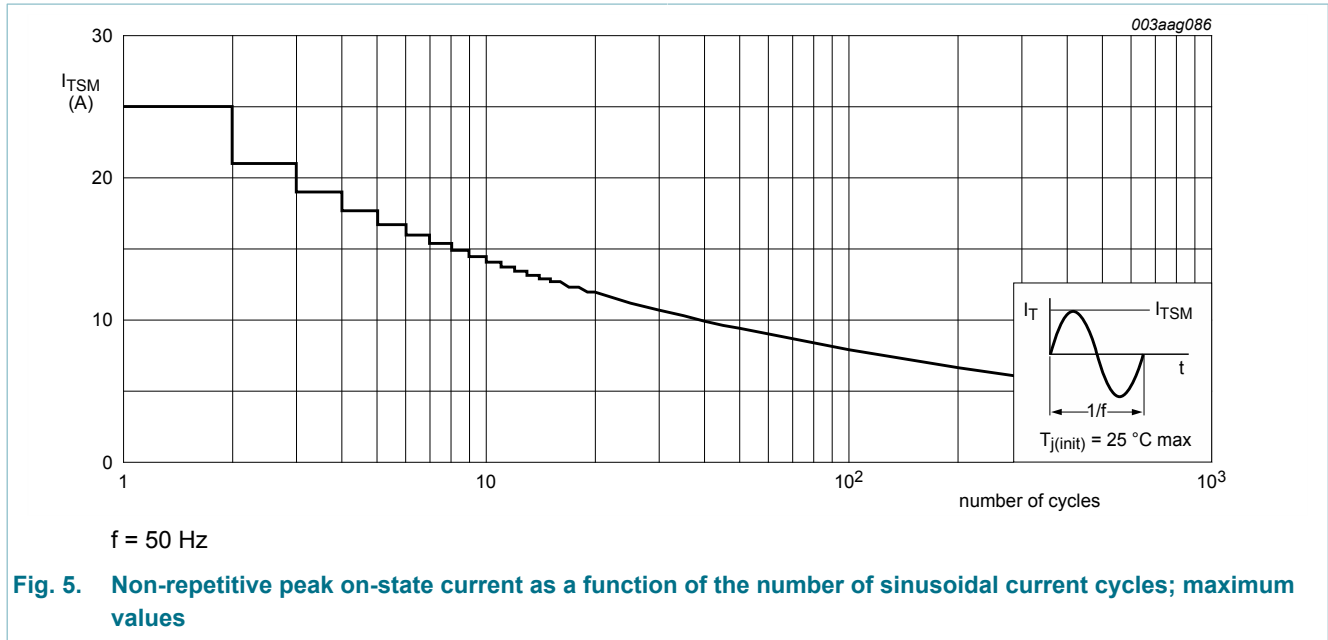


Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

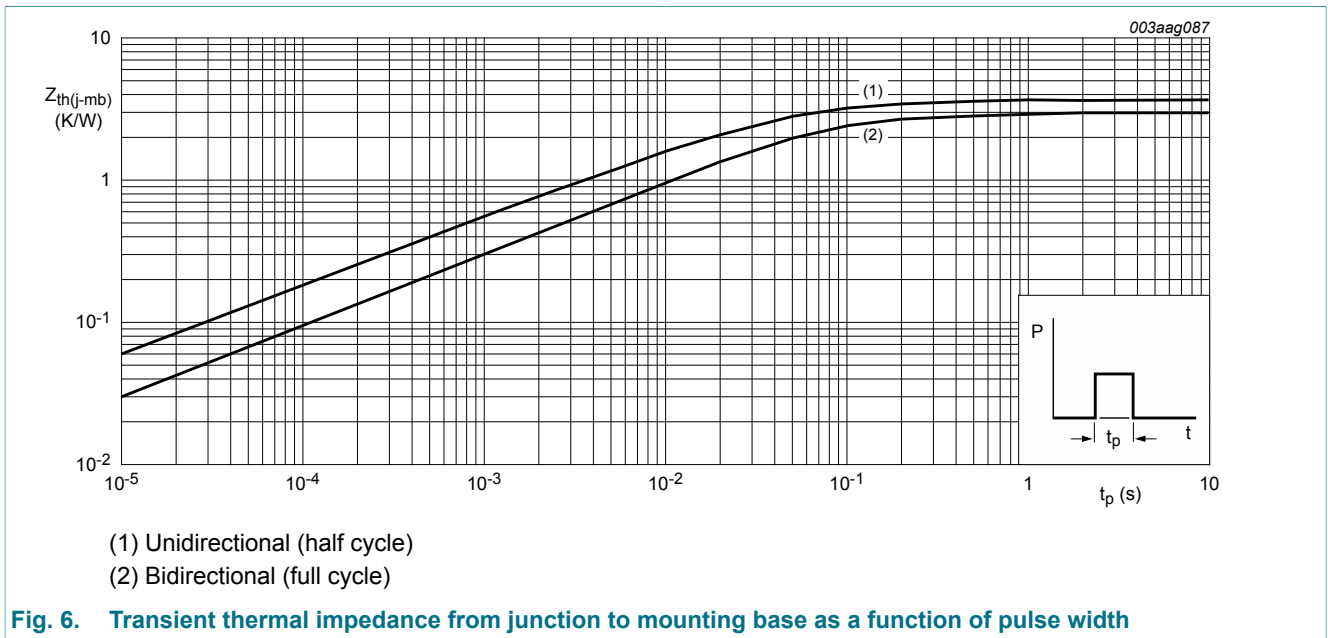


8. Thermal characteristics

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. 6	-	-	3	K/W
		half cycle; Fig. 6	-	-	3.7	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	[1]	-	75	-	K/W

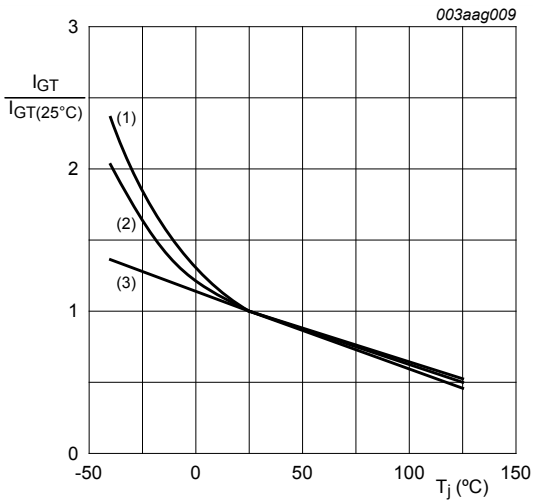
[1] Device mounted on an FR4 Printed-Circuit Board (PCB), single-sided copper, tin-plated and standard footprint.



9. Characteristics

Table 6. 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	2	6	35	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7	2	8	35	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7	2	20	35	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 8	-	-	20	mA
		V _D = 12 V; I _G = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 8	-	-	30	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; Fig. 8	-	-	20	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 9	-	-	20	mA
V _T	on-state voltage	I _T = 5 A; T _j = 25 °C; Fig. 10	-	1.4	1.7	V
V _{GT}	gate trigger voltage	V _D = 12 V; I _T = 0.1 A; T _j = 25 °C; Fig. 11	-	0.7	1	V
		V _D = 400 V; I _T = 0.1 A; T _j = 125 °C; Fig. 11	0.25	0.4	-	V
I _D	off-state current	V _D = 1000 V; T _j = 125 °C	-	0.1	0.5	mA
Dynamic characteristics						
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 670 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit	1000	1500	-	V/μs
di _{com} /dt	rate of change of commutating current	V _D = 400 V; T _j = 125 °C; I _{T(RMS)} = 4 A; dV _{com} /dt = 20 V/μs; (snubberless condition); gate open circuit	3	30	-	A/ms



- (1) T2- G-
- (2) T2+ G-
- (3) T2+ G+

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

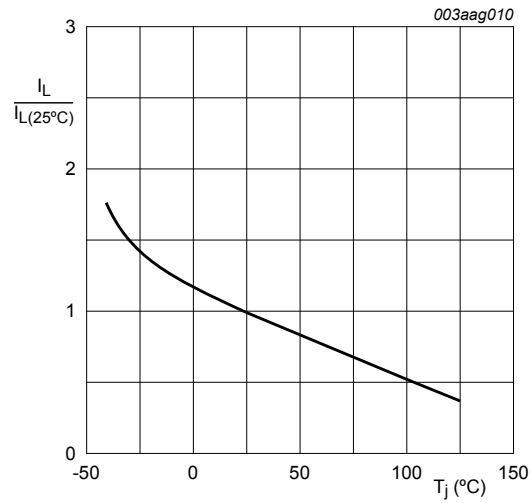


Fig. 8. Normalized latching current as a function of junction temperature

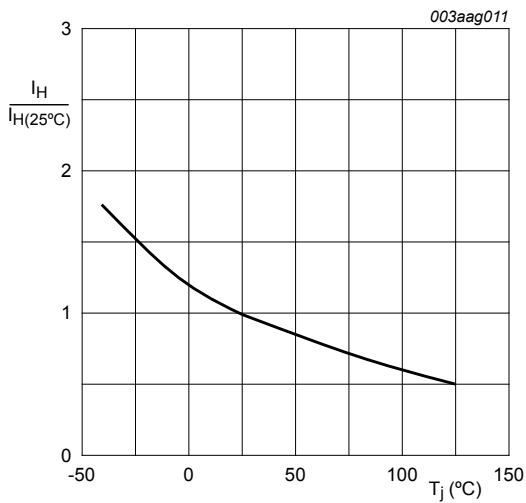
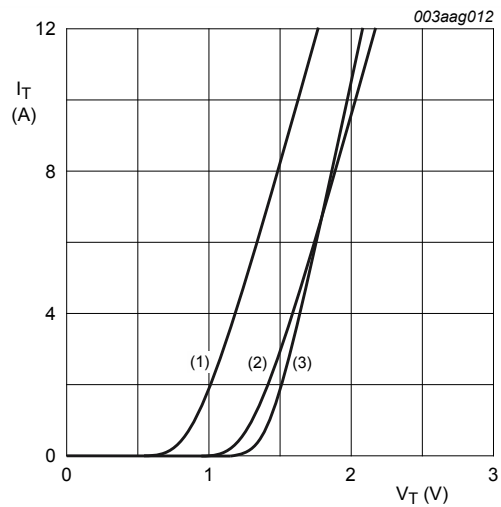


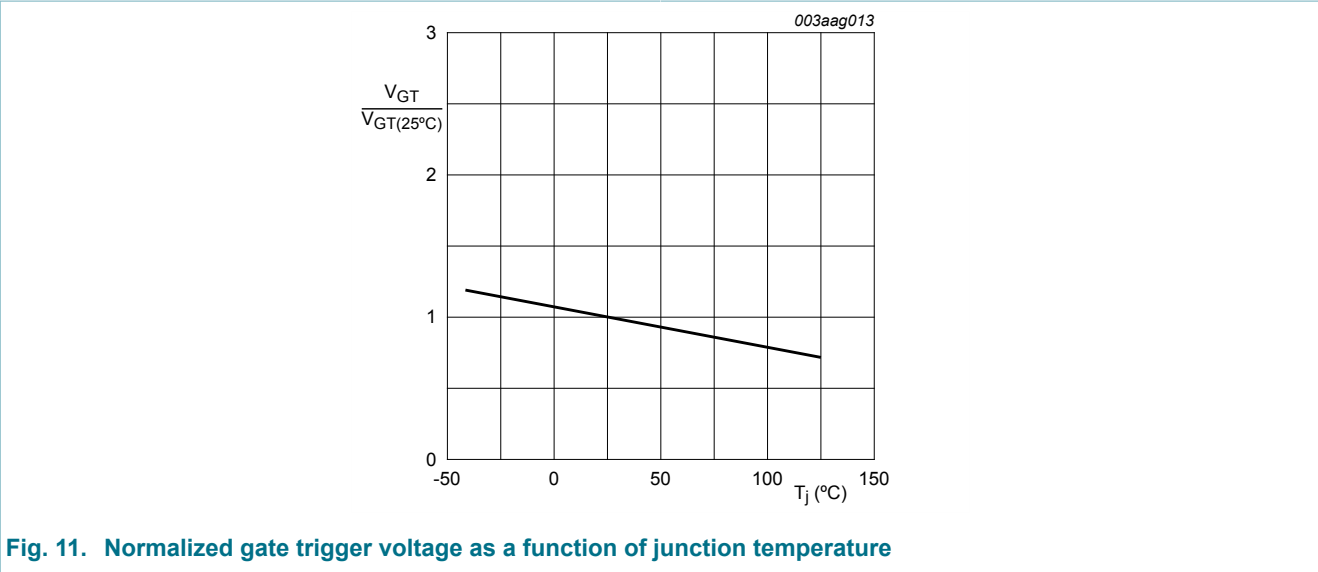
Fig. 9. Normalized holding current as a function of junction temperature



$V_o = 1.22 \text{ V}; R_s = 0.04 \Omega$

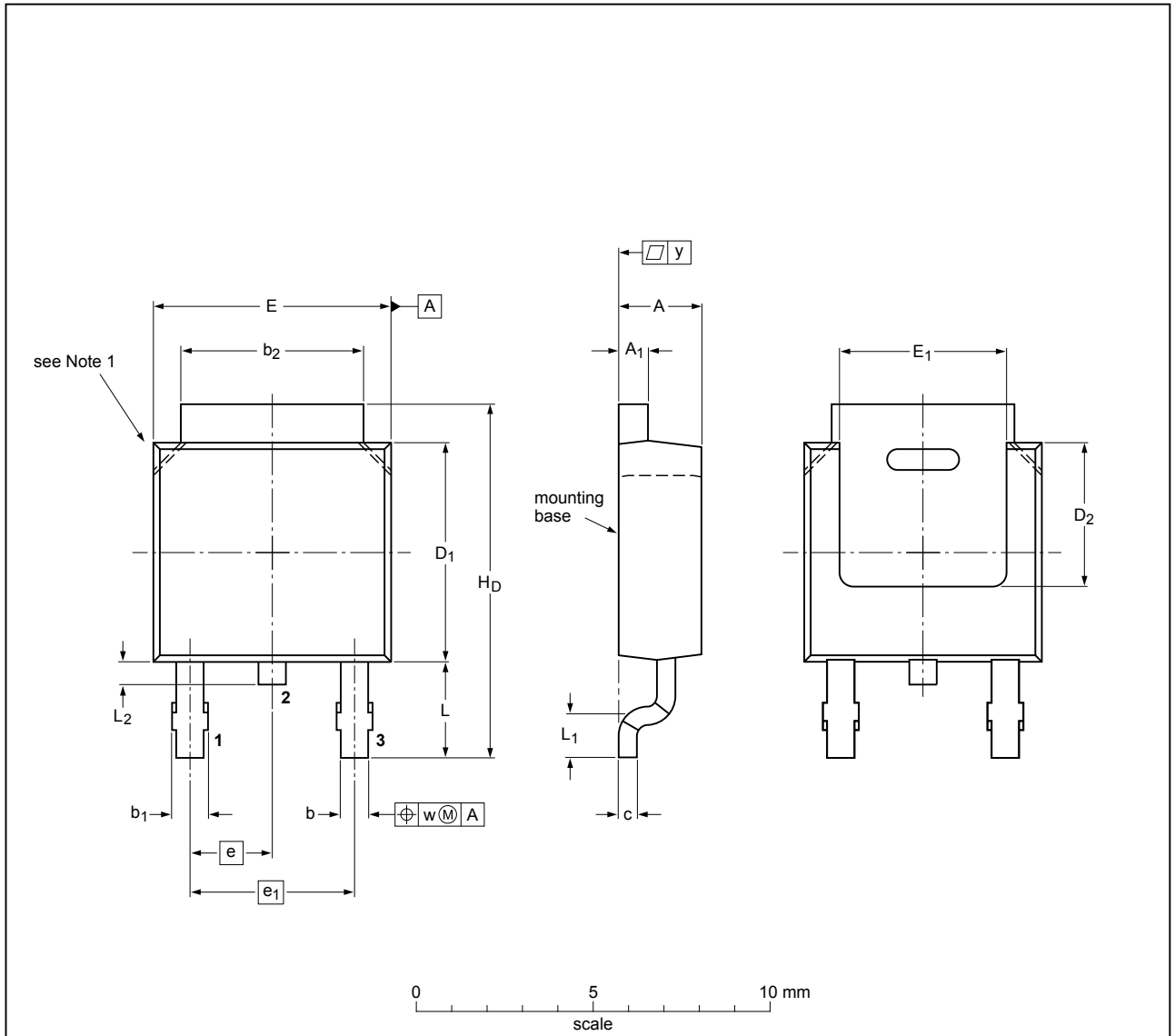
- (1) $T_j = 125^\circ\text{C}$; typical values
- (2) $T_j = 125^\circ\text{C}$; maximum values
- (3) $T_j = 25^\circ\text{C}$; maximum values

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



10. Package outline

Plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped) SOT428



Dimensions (mm are the original dimensions)

Unit	A	A ₁	b	b ₁	b ₂	c	D ₁	D ₂	E	E ₁	e	e ₁	H _D	L	L ₁	L ₂	w	y
max	2.38	0.93	0.89	1.1	5.46	0.56	6.22		6.73				10.4	2.95		0.9		0.2
nom											2.285	4.57					0.2	
min	2.22	0.46	0.71	0.9	5.00	0.20	5.98	4.0	6.47	4.45			9.6	2.55	0.5	0.5		

Note

1. Plastic body may have 45° chamfer.

sot428_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT428		TO-252	SC-63			06-03-16 14-06-10

Fig. 12. Package outline DPAK (SOT428)

11. Soldering

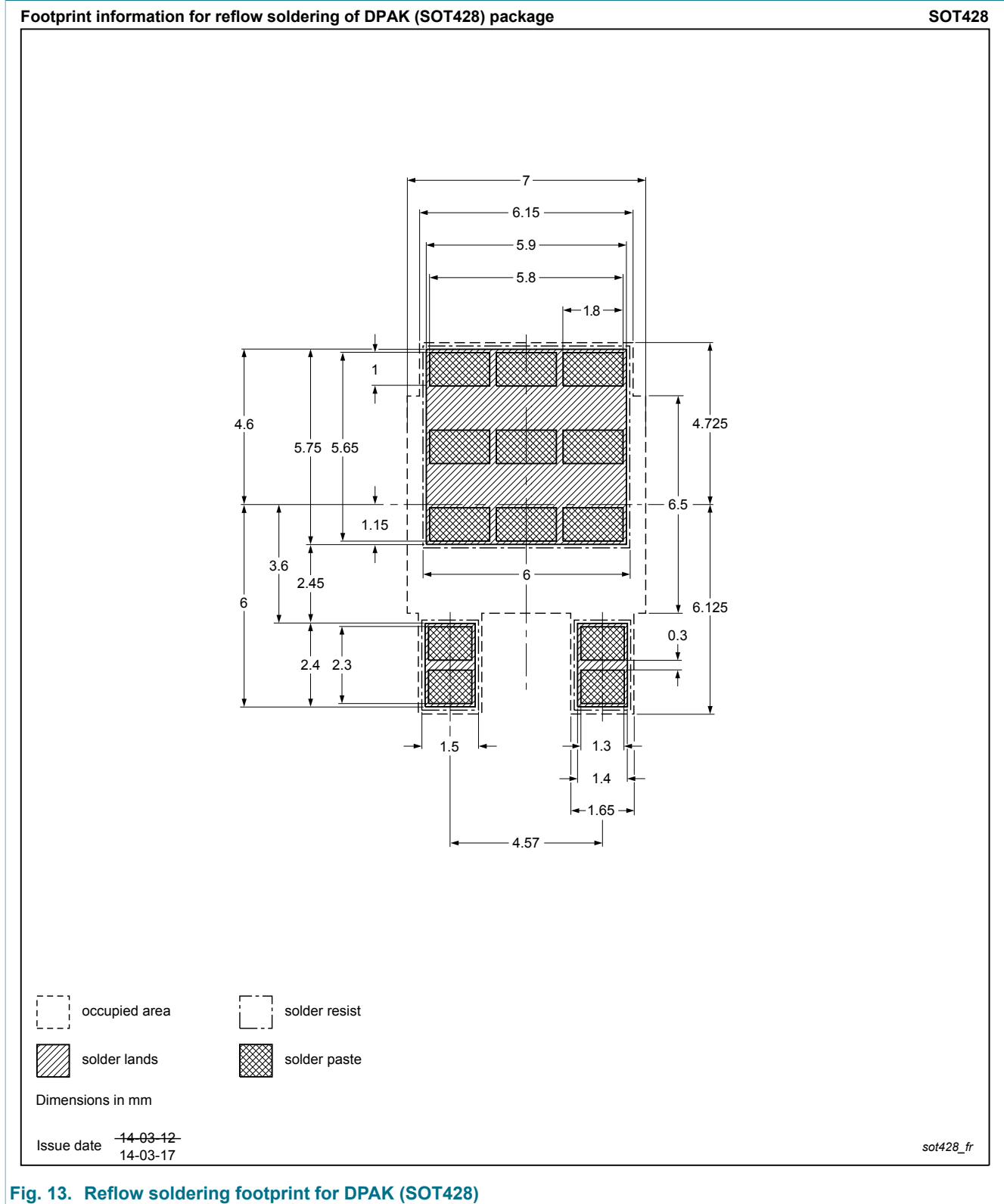


Fig. 13. Reflow soldering footprint for DPAK (SOT428)

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Document status [1][2]	Product status [3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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