



BT137S-600G

4Q Triac

26 September 2013

Product data sheet

1. General description

Planar passivated four quadrant triac in a SOT428 (DPAK) surface-mountable plastic package intended for use in general purpose bidirectional switching and phase control applications.

2. Features and benefits

- High blocking voltage capability
- Least sensitive gate for highest noise immunity
- Planar passivated for voltage ruggedness and reliability
- Surface-mountable package
- Triggering in all four quadrants

3. Applications

- General purpose motor control
- General purpose switching

4. Quick reference data

Table 1. Quick reference data

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{DRM}	repetitive peak off-state voltage			-	-	600	V
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(\text{init})} = 25^\circ\text{C}$; $t_p = 20 \text{ ms}$; Fig. 4 ; Fig. 5		-	-	65	A
$I_{T(\text{RMS})}$	RMS on-state current	full sine wave; $T_{mb} \leq 102^\circ\text{C}$; Fig. 1 ; Fig. 2 ; Fig. 3		-	-	8	A
Static characteristics							
I_{GT}	gate trigger current	$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G+; $T_j = 25^\circ\text{C}$; Fig. 7		-	5	50	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2+ G-; $T_j = 25^\circ\text{C}$; Fig. 7		-	8	50	mA
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2- G-; $T_j = 25^\circ\text{C}$; Fig. 7		-	11	50	mA



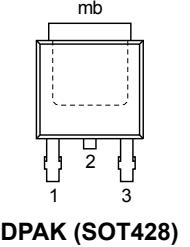
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Symbol	Parameter	Conditions		Min	Typ	Max	Unit
		$V_D = 12 \text{ V}$; $I_T = 0.1 \text{ A}$; T2- G+; $T_j = 25 \text{ }^\circ\text{C}$; Fig. 7		-	30	100	mA

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	 DPAK (SOT428)	

6. Ordering information

Table 3. Ordering information

Type number	Package		
	Name	Description	Version
BT137S-600G	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			-	600	V
$I_{T(RMS)}$	RMS on-state current	full sine wave; $T_{mb} \leq 102$ °C; Fig. 1 ; Fig. 2 ; Fig. 3		-	8	A
I_{TSM}	non-repetitive peak on-state current	full sine wave; $T_{j(init)} = 25$ °C; $t_p = 20$ ms; Fig. 4 ; Fig. 5		-	65	A
		full sine wave; $T_{j(init)} = 25$ °C; $t_p = 16.7$ ms		-	71	A
I^2t	I^2t for fusing	$t_p = 10$ ms; SIN		-	21	A^2s
dI_T/dt	rate of rise of on-state current	$I_T = 12$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/ μ s; T2+ G+		-	50	A/μ s
		$I_T = 12$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/ μ s; T2+ G-		-	50	A/μ s
		$I_T = 12$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/ μ s; T2- G-		-	50	A/μ s
		$I_T = 12$ A; $I_G = 0.2$ A; $dI_G/dt = 0.2$ A/ μ s; T2- G+		-	10	A/μ 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	°C
T_j	junction temperature			-	125	°C

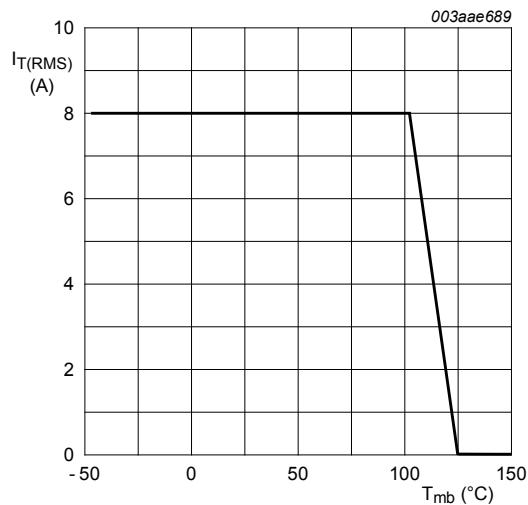
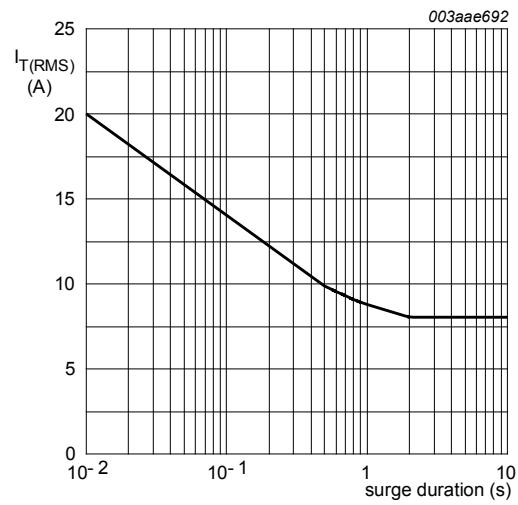


Fig. 1. RMS on-state current as a function of mounting base temperature; maximum values



f = 50 Hz

T_{mb} ≤ 102 °C

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

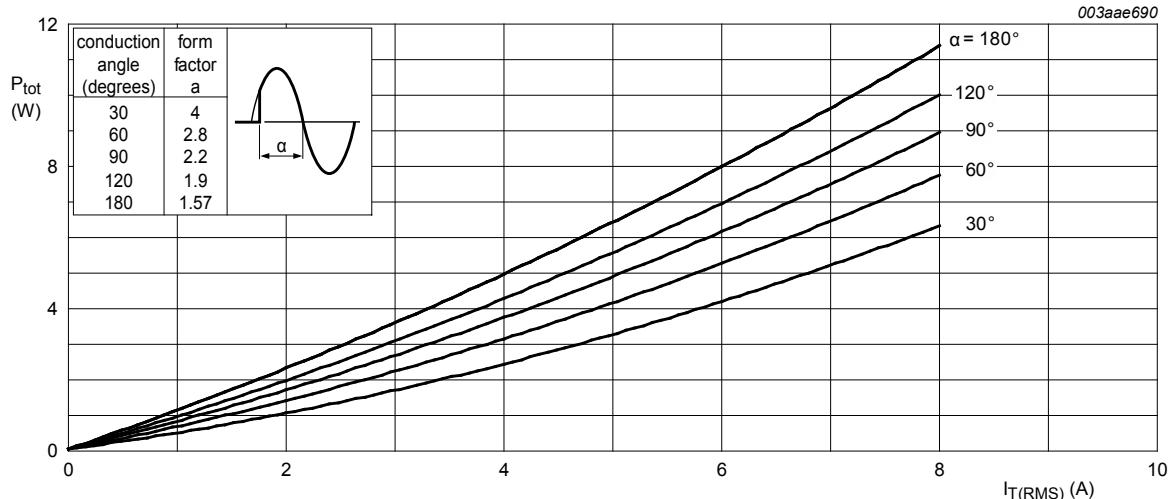


Fig. 3. Total power dissipation as a function of RMS on-state current; maximum values

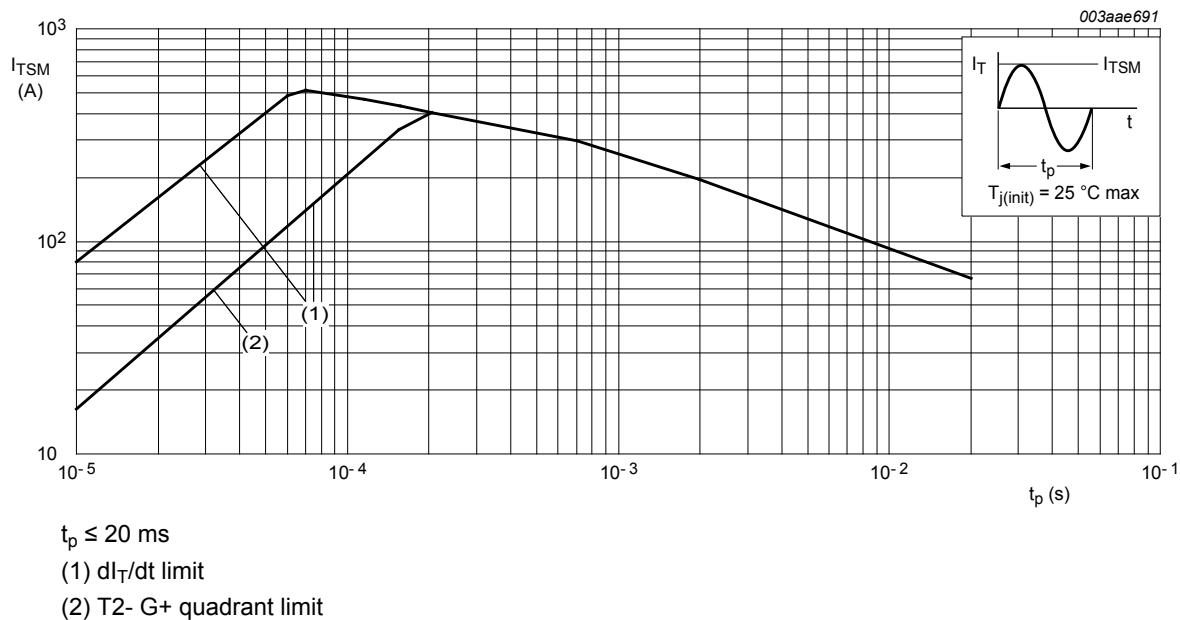


Fig. 4. Non-repetitive peak on-state current as a function of pulse width; maximum values

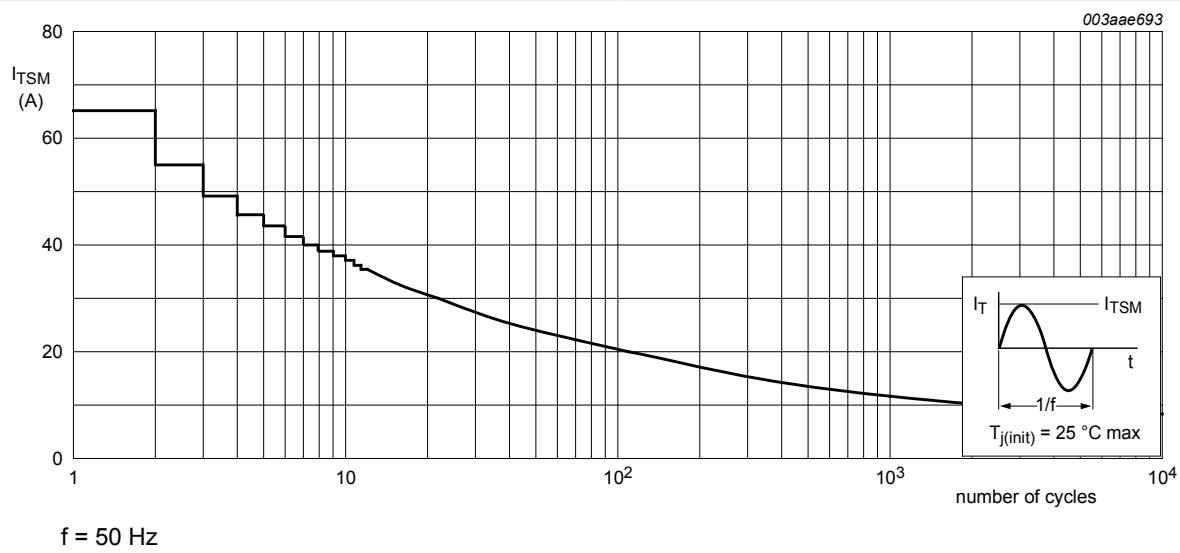


Fig. 5. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values

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	half cycle; Fig. 6	-	-	2.4	K/W
		full cycle; Fig. 6	-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	PCB (FR4) mounted; minimum pad sizes	-	75	-	K/W

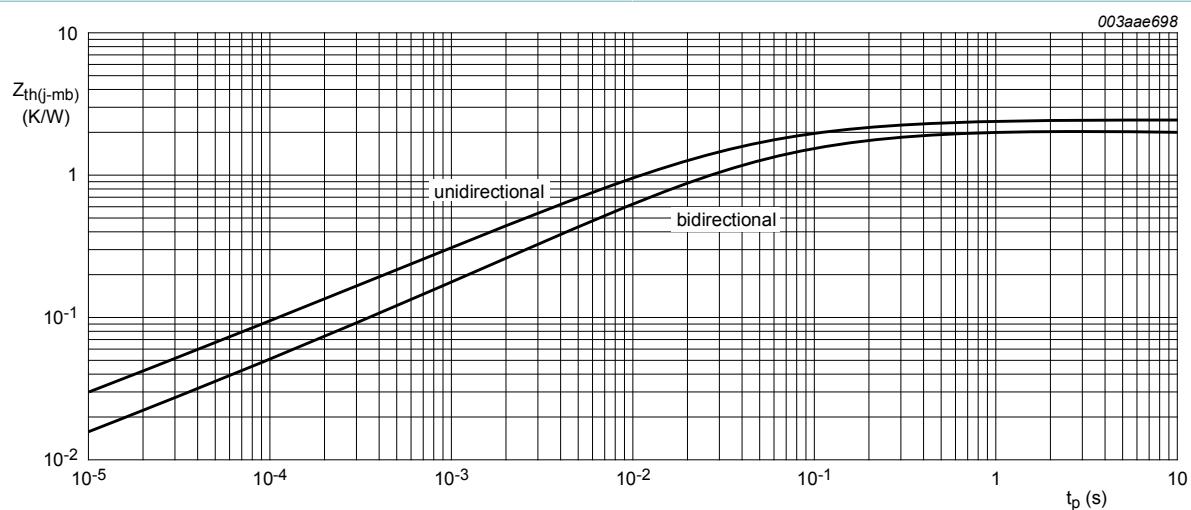
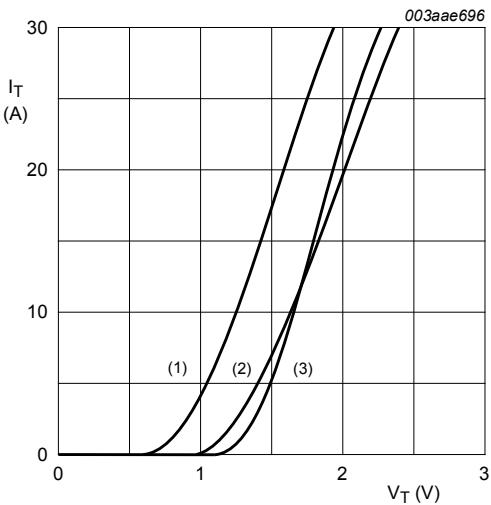
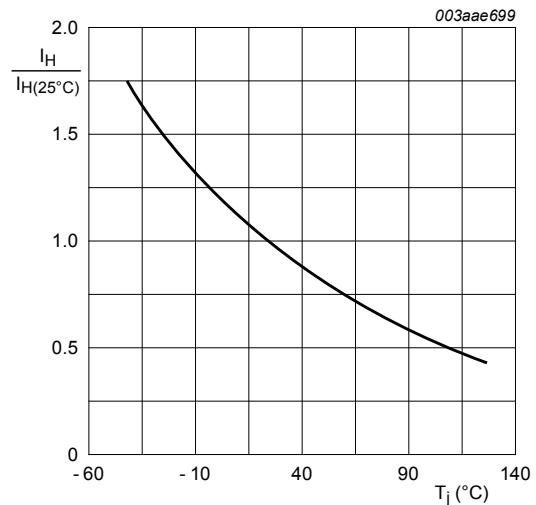
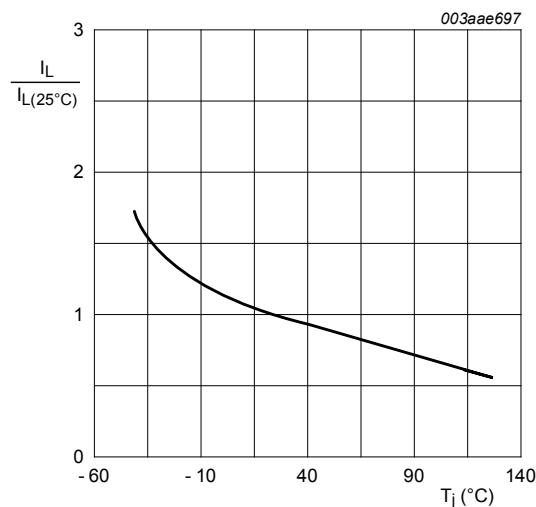
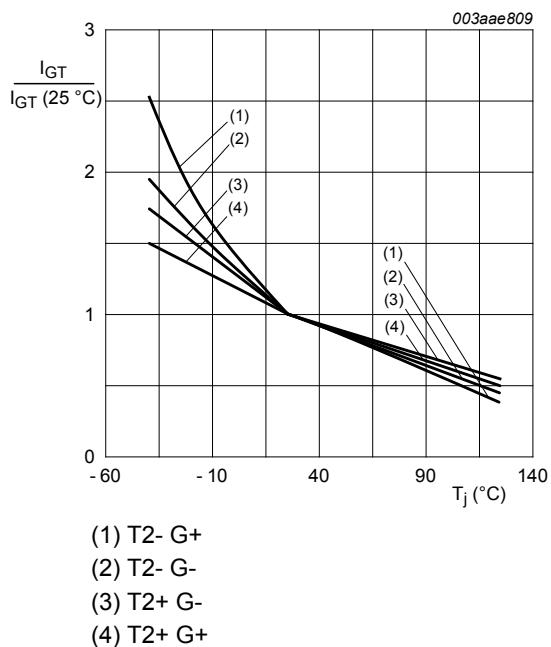


Fig. 6. Transient thermal impedance from junction to mounting base as a function of pulse width

9. Characteristics

Table 6. Characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
Static characteristics							
I _{GT}	gate trigger current	V _D = 12 V; I _T = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 7		-	5	50	mA
		V _D = 12 V; I _T = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 7		-	8	50	mA
		V _D = 12 V; I _T = 0.1 A; T2- G-; T _j = 25 °C; Fig. 7		-	11	50	mA
		V _D = 12 V; I _T = 0.1 A; T2- G+; T _j = 25 °C; Fig. 7		-	30	100	mA
I _L	latching current	V _D = 12 V; I _G = 0.1 A; T2+ G+; T _j = 25 °C; Fig. 8		-	7	45	mA
		V _D = 12 V; I _G = 0.1 A; T2+ G-; T _j = 25 °C; Fig. 8		-	16	60	mA
		V _D = 12 V; I _G = 0.1 A; T2- G-; T _j = 25 °C; Fig. 8		-	5	45	mA
		V _D = 12 V; I _G = 0.1 A; T2- G+; T _j = 25 °C; Fig. 8		-	7	60	mA
I _H	holding current	V _D = 12 V; T _j = 25 °C; Fig. 9		-	5	40	mA
V _T	on-state voltage	I _T = 10 A; T _j = 25 °C; Fig. 10		-	1.3	1.65	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 = 600 V; T _j = 125 °C		-	0.1	0.5	mA
Dynamic characteristics							
dV _D /dt	rate of rise of off-state voltage	V _{DM} = 402 V; T _j = 125 °C; (V _{DM} = 67% of V _{DRM}); exponential waveform; gate open circuit		200	250	-	V/μs
dV _{com} /dt	rate of change of commutating voltage	V _D = 400 V; T _j = 95 °C; dI _{com} /dt = 3.6 A/ms; I _T = 8 A; gate open circuit		10	20	-	V/μs
t _{gt}	gate-controlled turn-on time	I _{TM} = 12 A; V _D = 600 V; I _G = 0.1 mA; dI _G /dt = 5 A/μs		-	2	-	μs



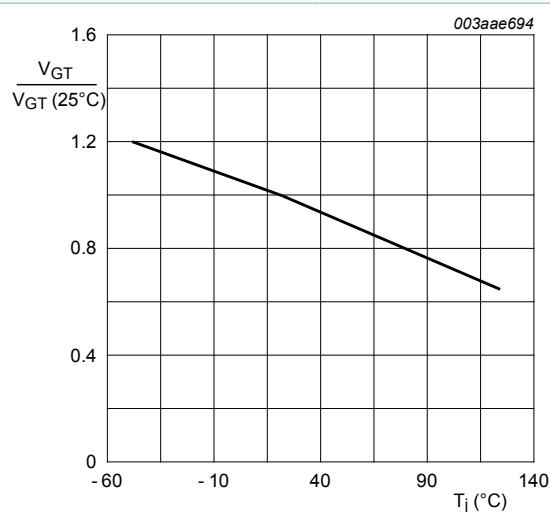
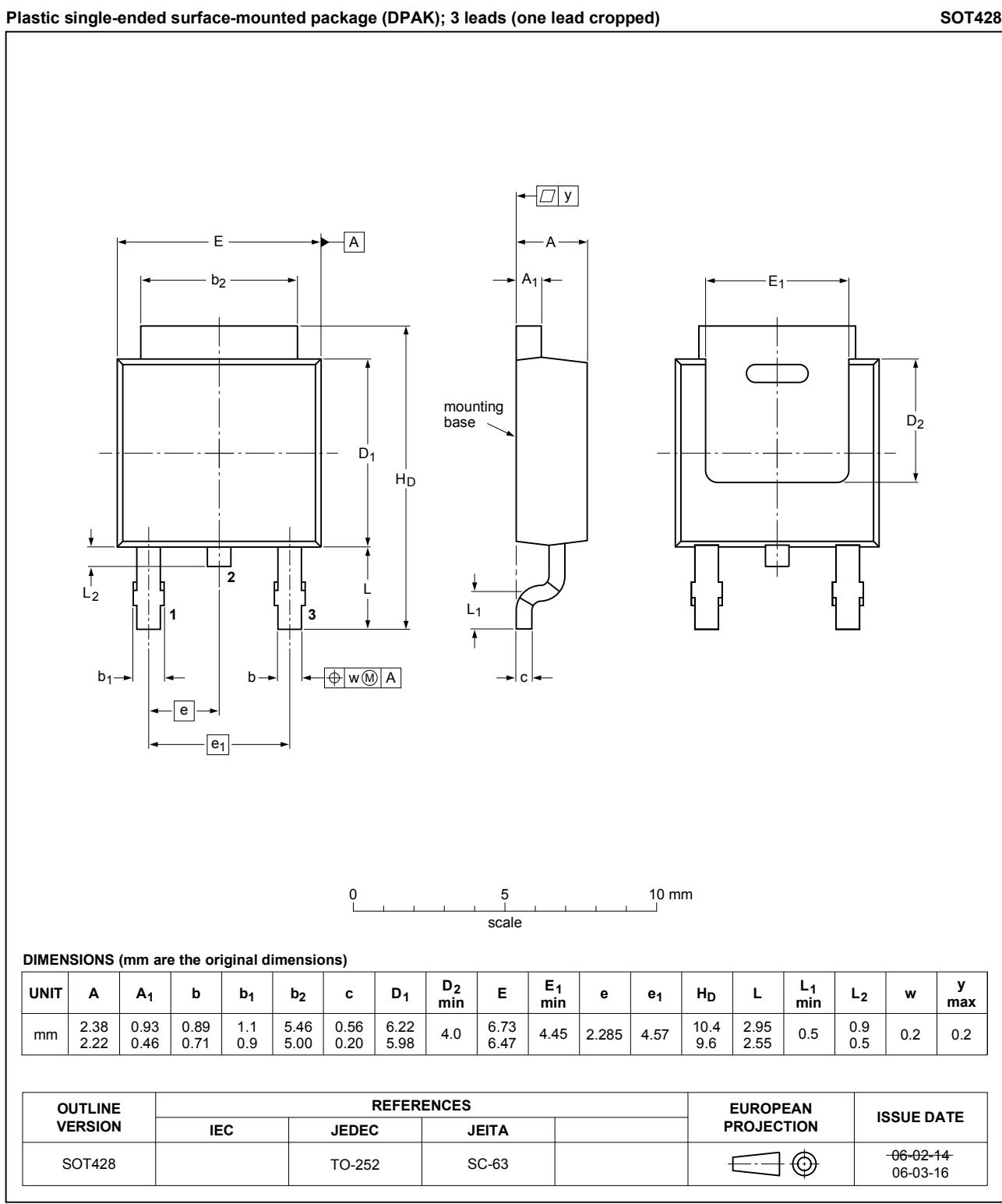


Fig. 11. Normalized gate trigger voltage as a function of junction temperature

10. Package outline



11. Soldering

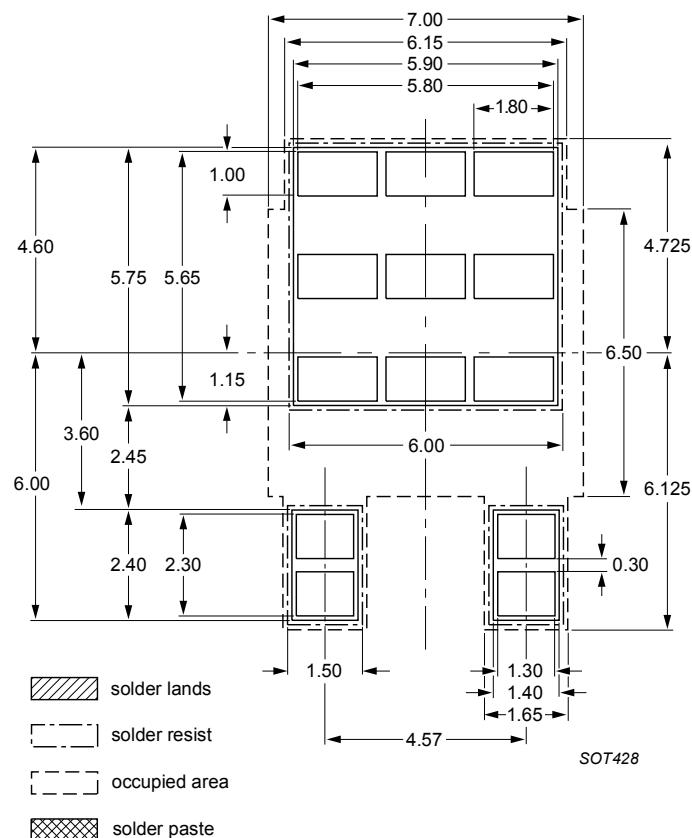


Fig. 13. Reflow soldering footprint for DPAK (SOT428)

12. Legal information

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Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
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