

BT258S-800LT

SCR logic level, high temperature

Rev. 01 — 2 September 2008

Product data sheet

1. Product profile

1.1 General description

Passivated sensitive gate Silicon-Controlled Rectifier in a SOT428 surface-mounted plastic package

1.2 Features

- Very sensitive gate
- Direct interfacing to logic level ICs
- High operating temperature
- Direct interfacing to low-power gate drive circuits

1.3 Applications

- General purpose switching and phase control
- Protection circuits for Switched-Mode Power Supplies (SMPS)
- Ignition circuits
- Protection circuits in lighting ballasts

1.4 Quick reference data

- $V_{DRM} \leq 800 \text{ V}$
- $V_{RRM} \leq 800 \text{ V}$
- $I_{TSM} \leq 75 \text{ A}$ ($t = 10 \text{ ms}$)
- $T_{j(max)} = 150 \text{ }^{\circ}\text{C}$
- $I_{GT} \leq 50 \text{ }\mu\text{A}$
- $I_{T(AV)} \leq 5 \text{ A}$
- $I_{T(RMS)} \leq 8 \text{ A}$

2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Graphic symbol
1	cathode (K)	SOT428 (DPAK)	sym037
2	anode (A)		
3	gate (G)		
mb	mounting base; connected to anode (A)		

3. Ordering information

Table 2. Ordering information

Type number	Package		Version
	Name	Description	
BT258S-800LT	DPAK	plastic single-ended surface-mounted package (DPAK); 3 leads (one lead cropped)	SOT428

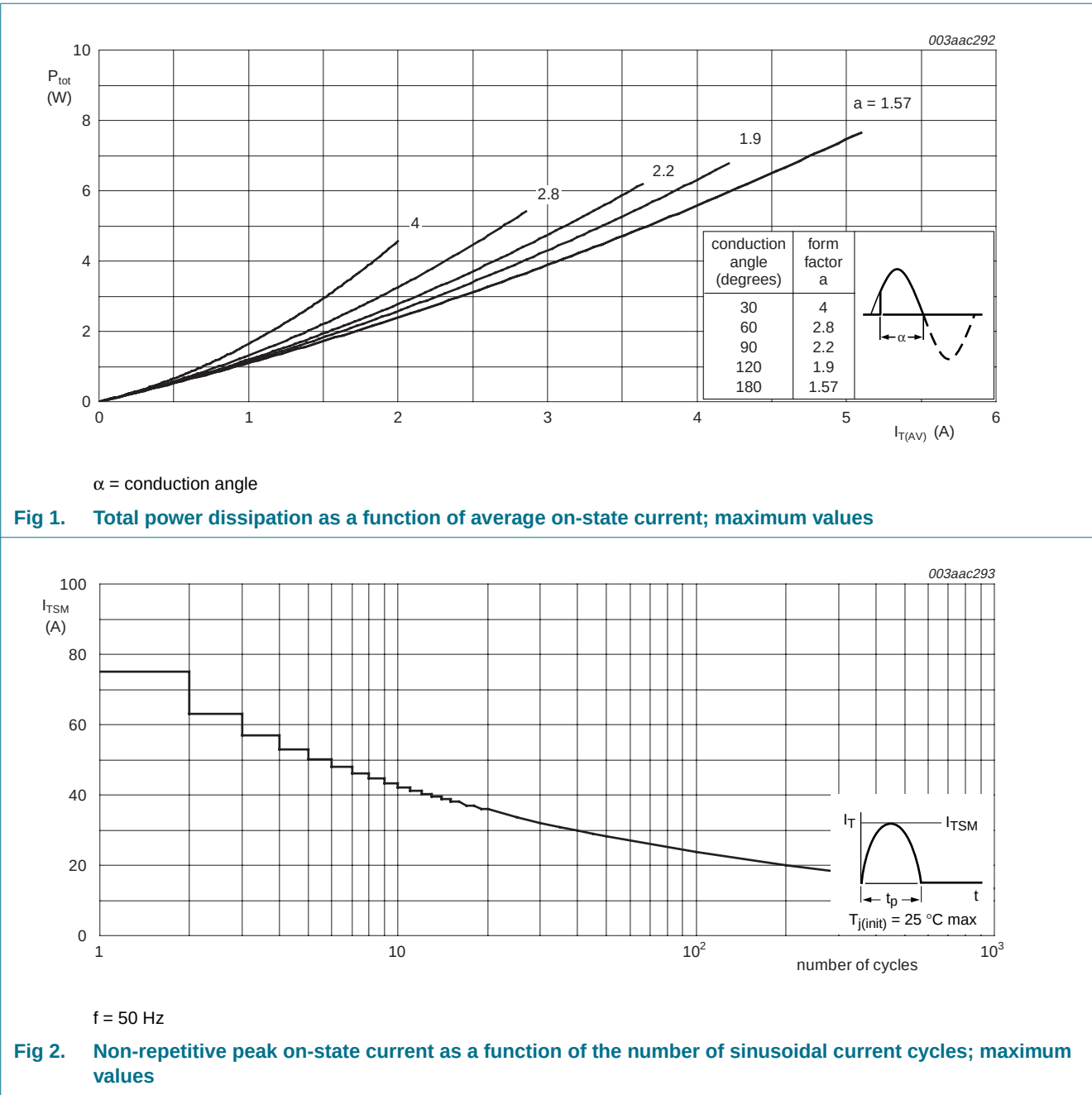
4. Limiting values

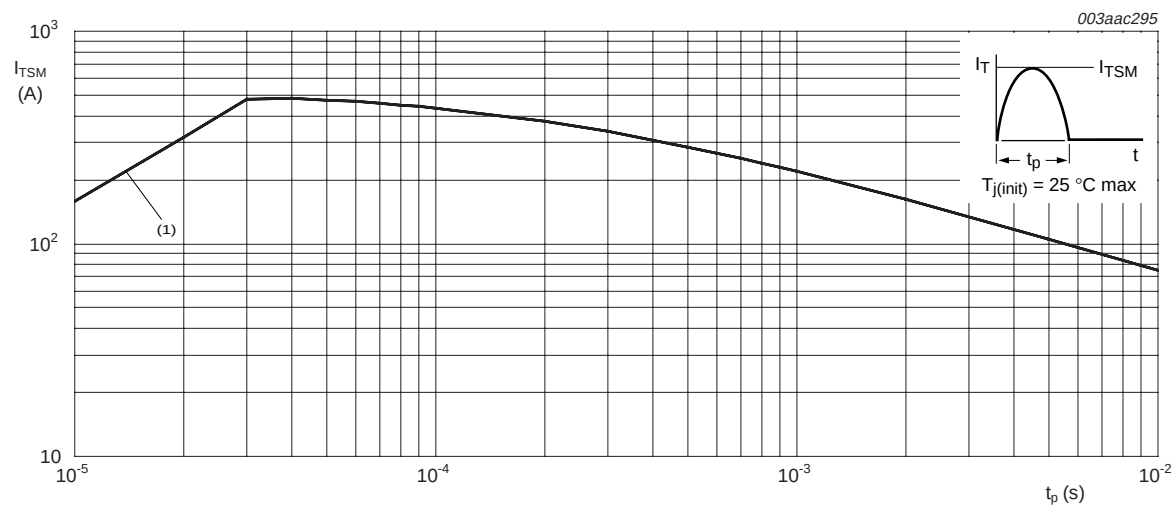
Table 3. Limiting values

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
V_{RRM}	repetitive peak reverse voltage		-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 135\text{ °C}$; see Figure 1		5	A
$I_{T(RMS)}$	RMS on-state current	all conduction angles; see Figure 4 and 5	-	8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_j = 25\text{ °C}$ prior to surge; see Figure 2 and 3			
		$t = 10\text{ ms}$	-	75	A
		$t = 8.3\text{ ms}$	-	82	A
I^2t	I^2t for fusing	$t_p = 10\text{ ms}$	-	28	A ² s
di_T/dt	rate of rise of on-state current	$I_{TM} = 10\text{ A}$; $I_G = 50\text{ mA}$; $di_G/dt = 50\text{ mA}/\mu\text{s}$		50	A/ μs
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	[1]	-	150	°C

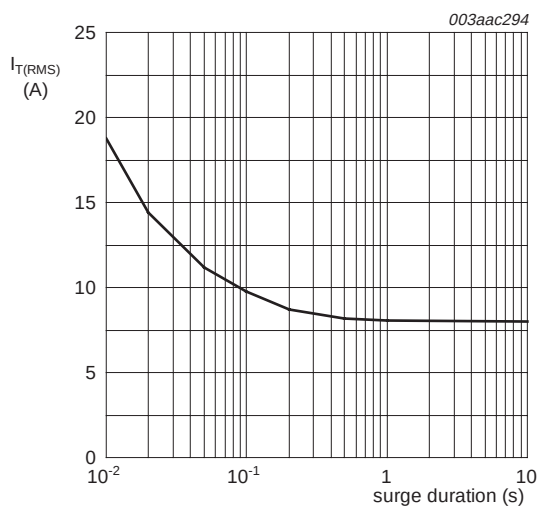
[1] Operation above $T_j = 110\text{ °C}$ may require the use of a gate to cathode resistor of 1 k Ω or less.





$t_p \leq 20\text{ ms}$
 (1) dI_T/dt limit

Fig 3. Non-repetitive peak on-state current as a function of pulse width; maximum values



$f = 50\text{ Hz}$
 $T_{mb} = 135\text{ }^{\circ}\text{C}$

Fig 4. RMS on-state current as a function of surge duration; maximum values

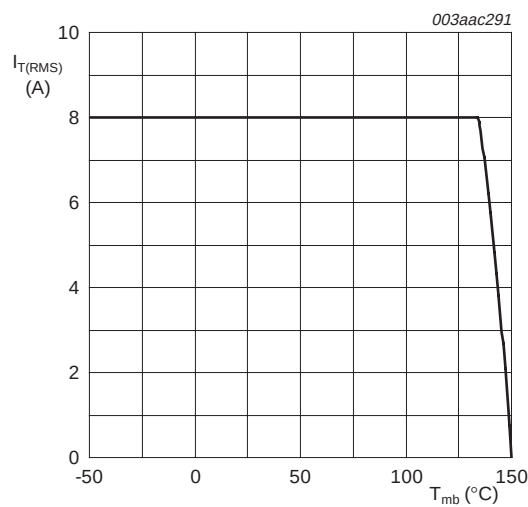


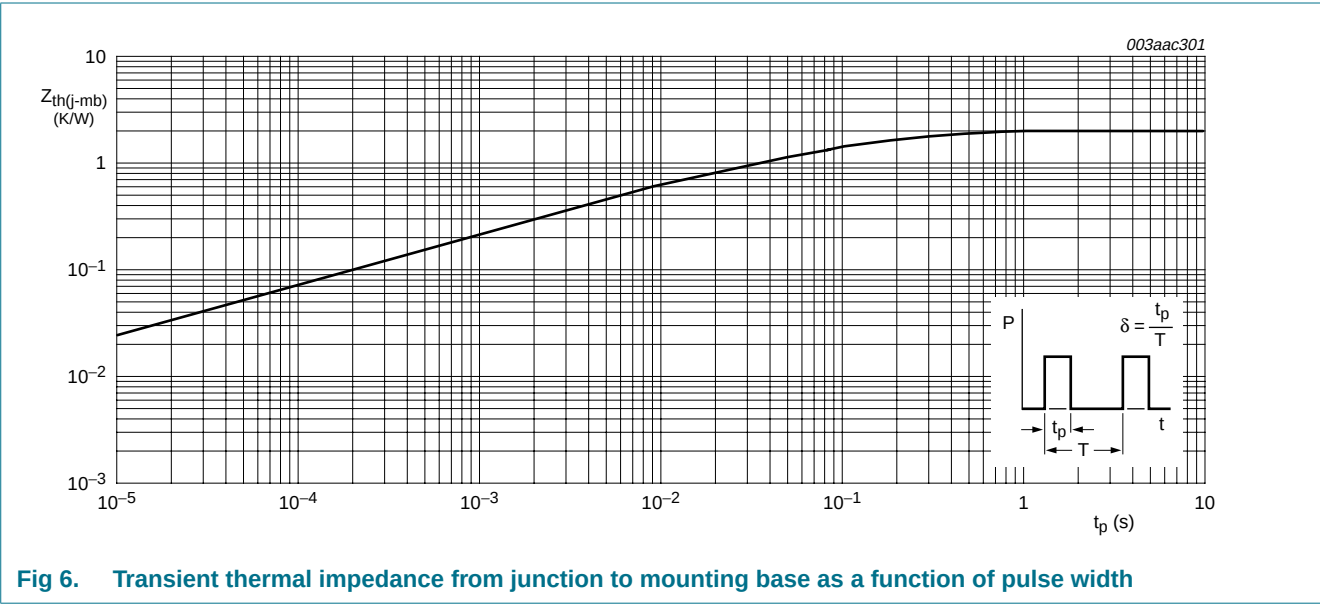
Fig 5. RMS on-state current as a function of mounting base temperature; maximum values

5. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{th(j-mb)}$	thermal resistance from junction to mounting base	see Figure 6	-	-	2	K/W
$R_{th(j-a)}$	thermal resistance from junction to ambient	in free air	[1] -	75	-	K/W

[1] Mounted on a FR4 printed-circuit board, single-sided copper, tin-plated and standard footprint; see [Figure 14](#).



6. Characteristics

Table 5. Characteristics

$T_j = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
I_{GT}	gate trigger current	$V_D = 12\text{ V}$; $I_T = 0.1\text{ A}$; see Figure 8	20	-	50	μA
I_L	latching current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; see Figure 10	-	0.4	10	mA
I_H	holding current	$V_D = 12\text{ V}$; $I_G = 0.1\text{ A}$; see Figure 11	-	0.3	6	mA
V_T	on-state voltage	$I_T = 16\text{ A}$; see Figure 9	-	1.3	1.6	V
V_{GT}	gate trigger voltage	$I_T = 0.1\text{ A}$; see Figure 7				
		$V_D = 12\text{ V}$	-	0.4	1.5	V
		$V_D = V_{DRM}$; $T_j = 110\text{ }^{\circ}\text{C}$	0.1	0.2	-	V
I_D	off-state current	$V_D = V_{DRM(max)}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	0.5	2.5	mA
I_R	reverse current	$V_R = V_{RRM(max)}$; $T_j = 150\text{ }^{\circ}\text{C}$	-	0.5	2.5	mA
Dynamic characteristics						
dV_D/dt	rate of rise of off-state voltage	$V_{DM} = 0.67 \times V_{DRM(max)}$; $T_j = 150\text{ }^{\circ}\text{C}$; exponential waveform; $R_{GK} = 100\text{ }\Omega$	35	70	-	V/ μs
t_{gt}	gate-controlled turn-on time	$I_{TM} = 10\text{ A}$; $V_D = V_{DRM(max)}$; $I_G = 5\text{ mA}$; $dI_G/dt = 0.2\text{ A}/\mu\text{s}$	-	2	-	μs

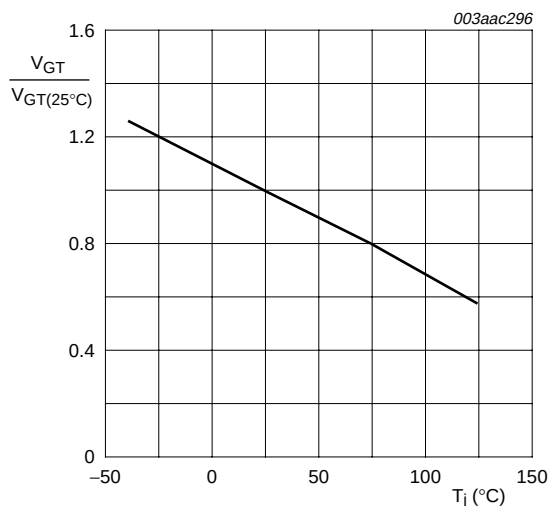


Fig 7. Normalized gate trigger voltage as a function of junction temperature

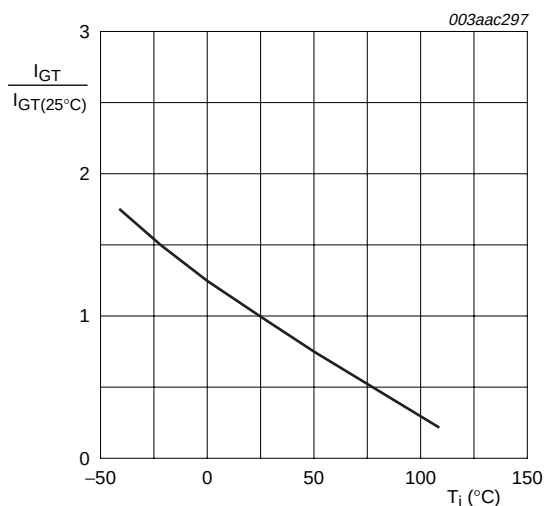
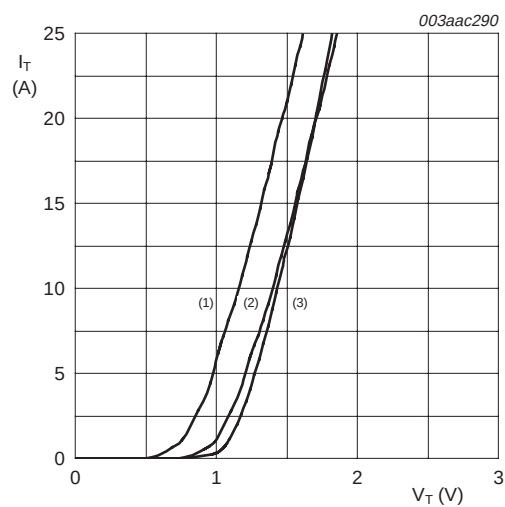


Fig 8. Normalized gate trigger current as a function of junction temperature



$V_0 = 1.0\text{ V}$
 $R_s = 0.04\ \Omega$
(1) $T_j = 150\text{ }^\circ\text{C}$; typical values
(2) $T_j = 150\text{ }^\circ\text{C}$; maximum values
(3) $T_j = 25\text{ }^\circ\text{C}$; maximum values

Fig 9. On-state current as a function of on-state voltage

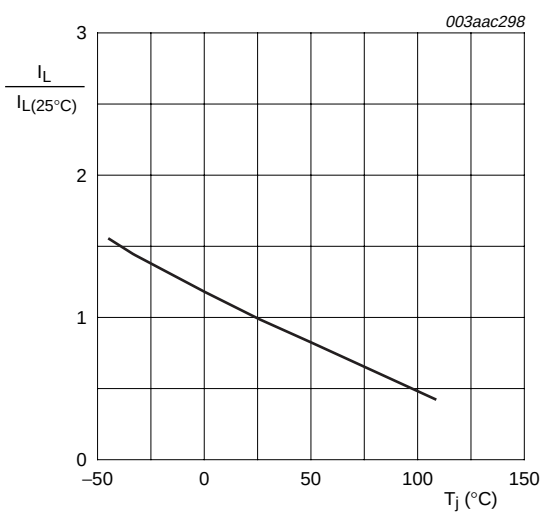


Fig 10. Normalized latching current as a function of junction temperature

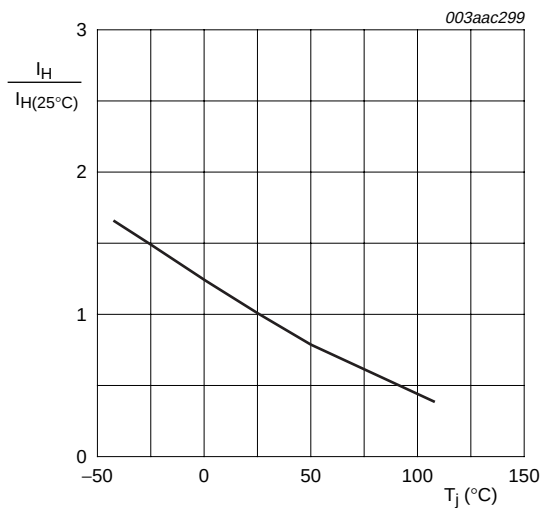
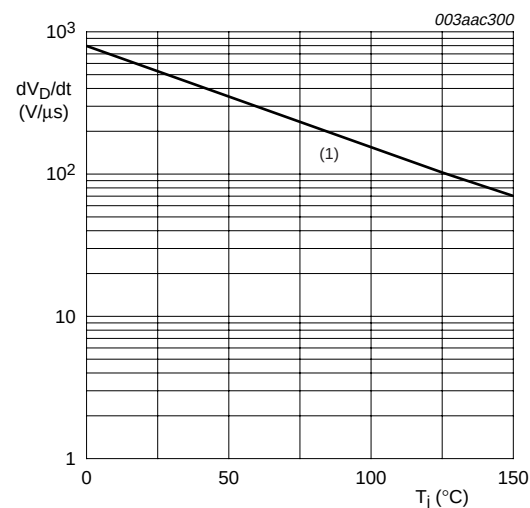


Fig 11. Normalized holding current as a function of junction temperature



(1) $R_{GK} = 100\ \Omega$

Fig 12. Critical rate of rise of off-state voltage as a function of junction temperature; typical values

7. Package outline

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

SOT428

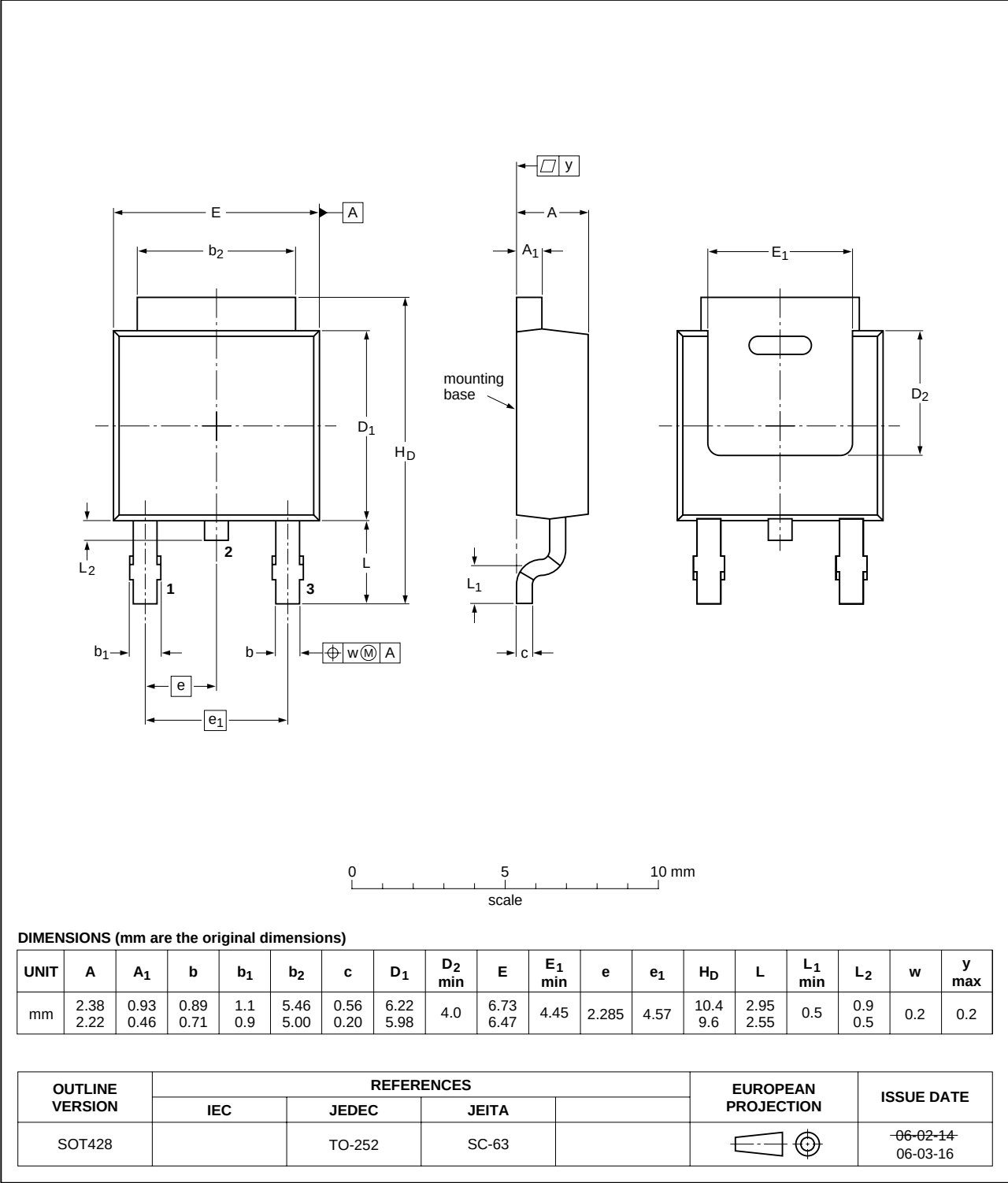
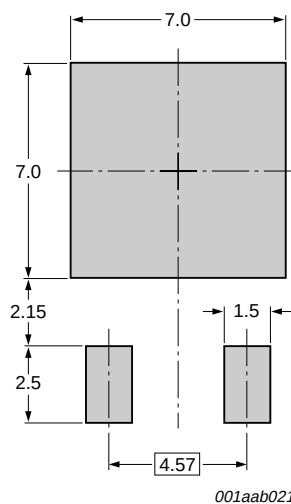


Fig 13. Package outline SOT428 (DPAK)

8. Mounting



Plastic meets requirements of UL94 V-O at 3.175 mm

Fig 14. SOT428: minimum pad sizes for surface-mounting

9. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BT258S-800LT_1	20080902	Product data sheet	-	-

10. Legal information

10.1 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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