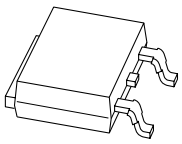


BT258S-800LT

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

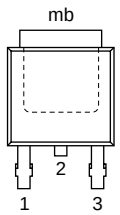
- General purpose switching and phase control
- Protection circuits for Switched-Mode Power Supplies (SMPS)
- Ignition circuits
- Protection circuits in lighting ballasts

1.4 Quick reference data

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

2. Pinning information

Table 1. Pinning

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

SOT428 (DPAK)

3. Ordering information

Table 2. Ordering information

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

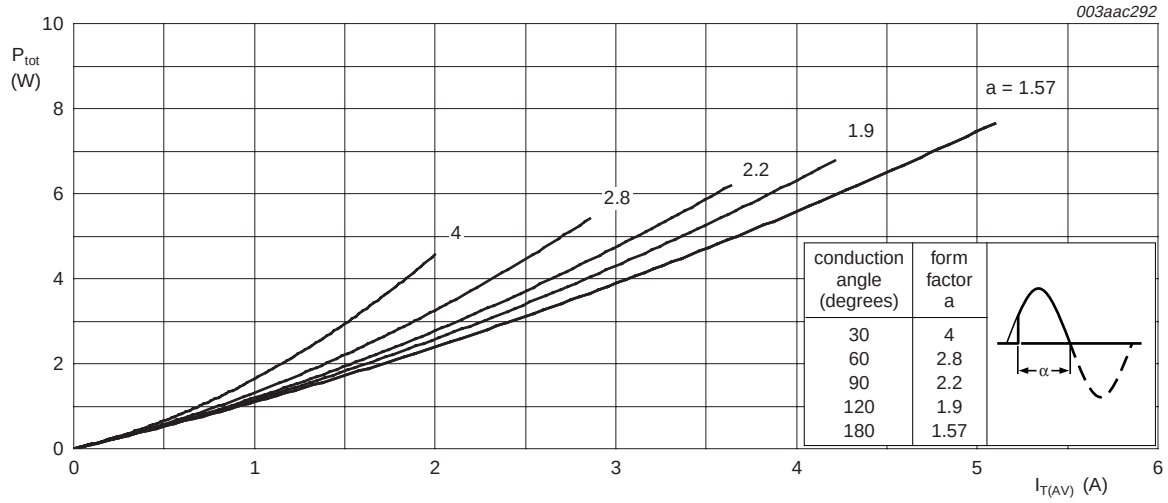
4. Limiting values

Table 3. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

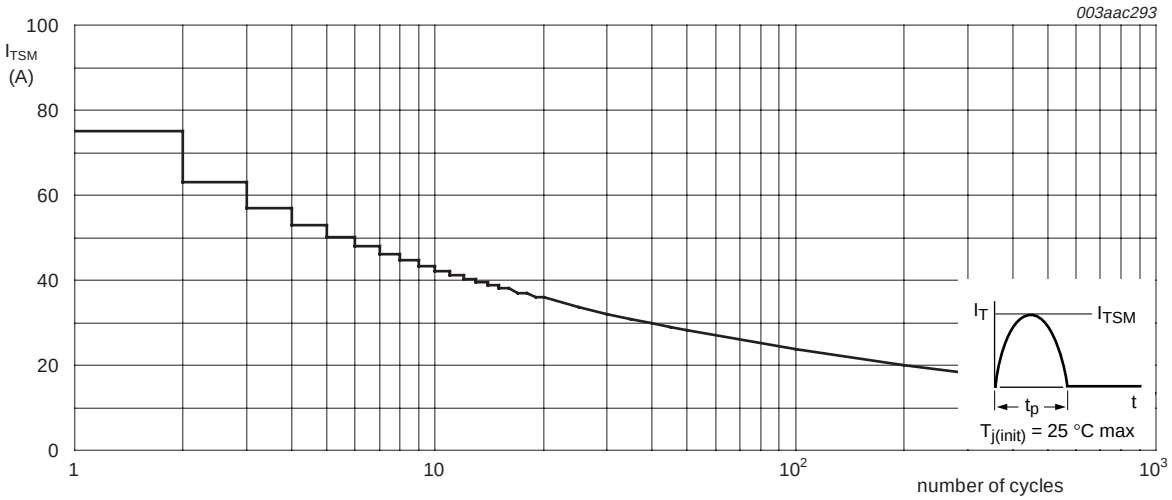
Symbol	Parameter	Conditions	Min	Max	Unit
V_{DRM}	repetitive peak off-state voltage		-	800	V
V_{RRM}	repetitive peak reverse voltage		-	800	V
$I_{T(AV)}$	average on-state current	half sine wave; $T_{mb} \leq 135$ °C; see Figure 1		5	A
$I_{T(RMS)}$	RMS on-state current	all conduction angles; see Figure 4 and 5	-	8	A
I_{TSM}	non-repetitive peak on-state current	half sine wave; $T_j = 25$ °C prior to surge; see Figure 2 and 3			
		t = 10 ms	-	75	A
		t = 8.3 ms	-	82	A
I^2t	I^2t for fusing	$t_p = 10$ ms	-	28	A^2s
dI_T/dt	rate of rise of on-state current	$I_{TM} = 10$ A; $I_G = 50$ mA; $dI_G/dt = 50$ mA/µs		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 $T_j = 110$ °C may require the use of a gate to cathode resistor of 1 kΩ or less.



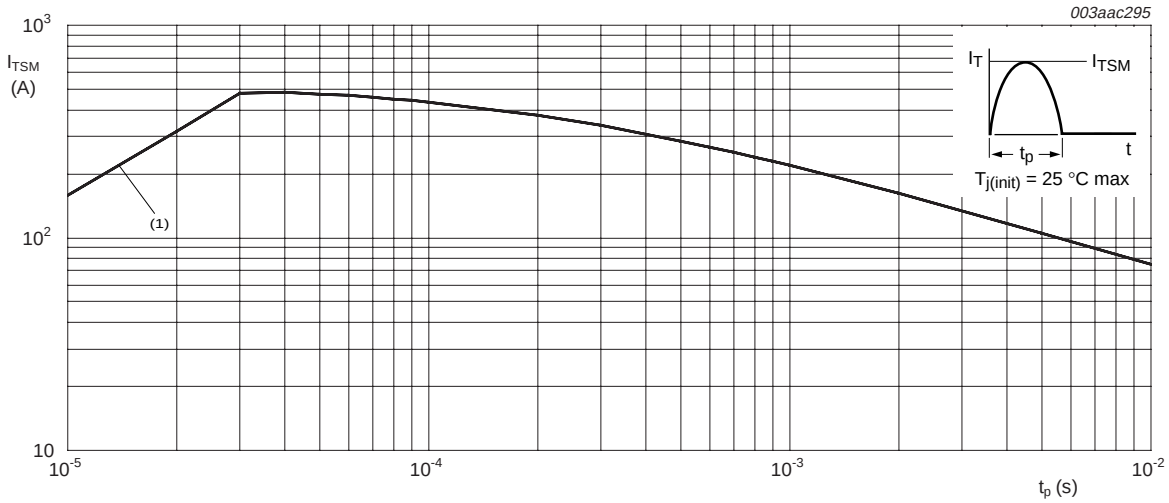
α = conduction angle

Fig 1. Total power dissipation as a function of average on-state current; maximum values



f = 50 Hz

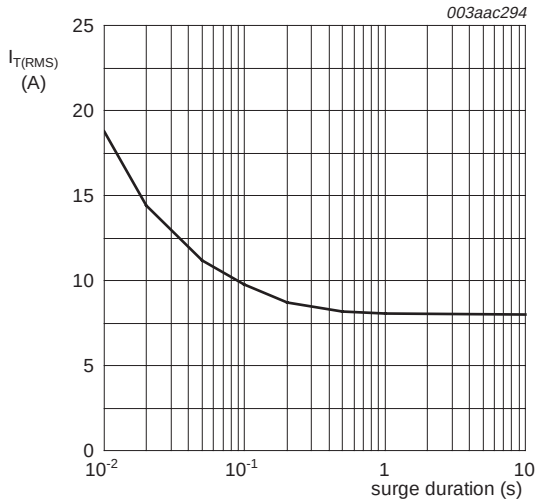
Fig 2. Non-repetitive peak on-state current as a function of the number of sinusoidal current cycles; maximum values



$t_p \leq 20$ ms

(1) dI_T/dt limit

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



f = 50 Hz

T_{mb} = 135 °C

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

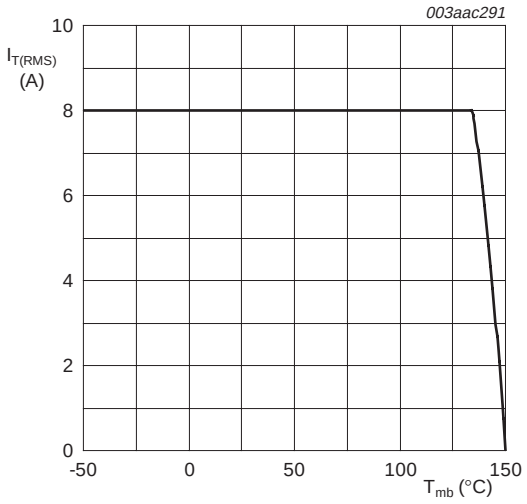


Fig 5. RMS on-state current as a function of mounting base temperature; maximum values

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.

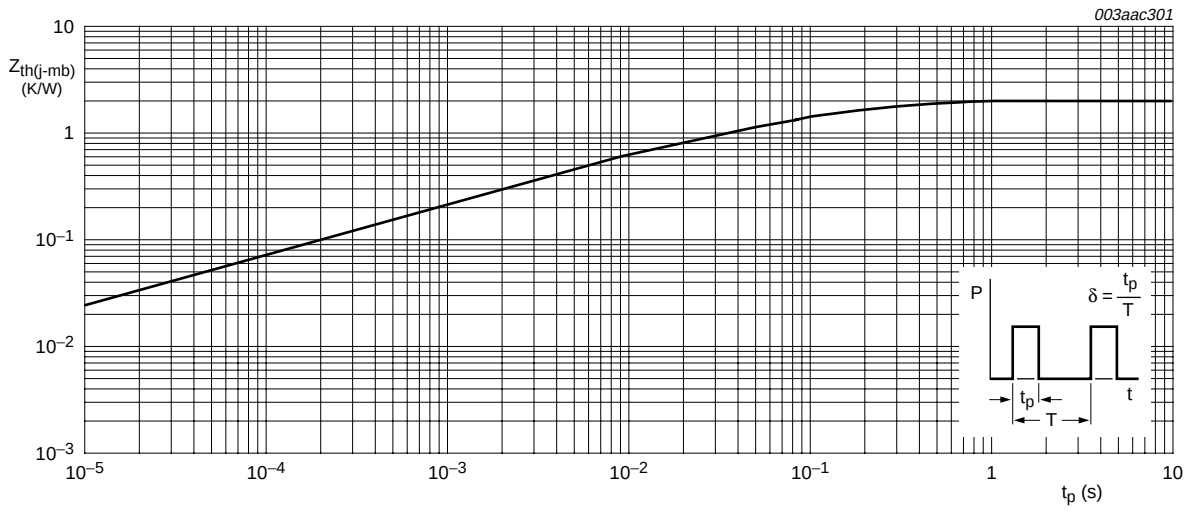


Fig 6. Transient thermal impedance from junction to mounting base as a function of pulse width

6. Characteristics

Table 5. Characteristics

T_j = 25 °C unless otherwise specified.

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

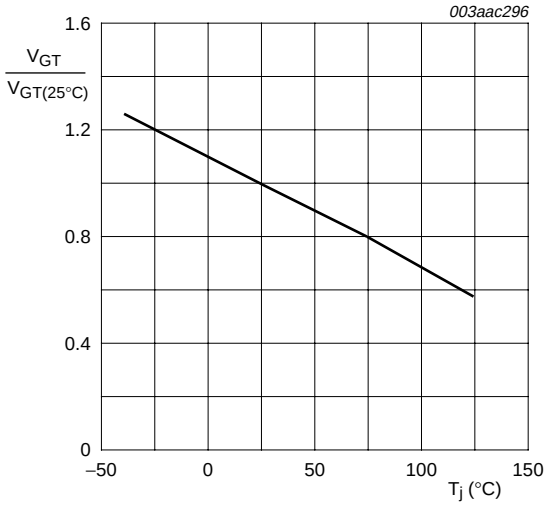


Fig 7. Normalized gate trigger voltage as a function of junction temperature

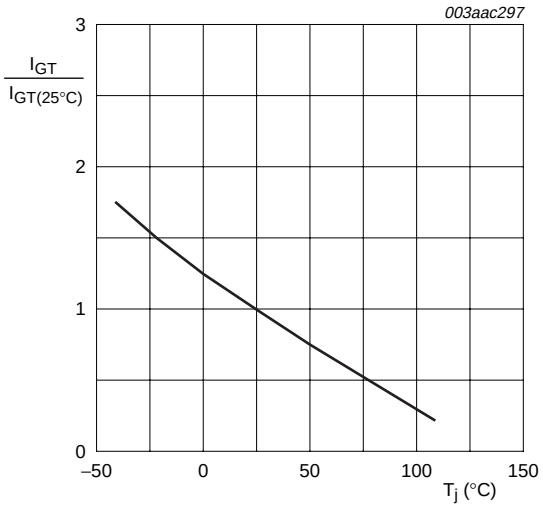
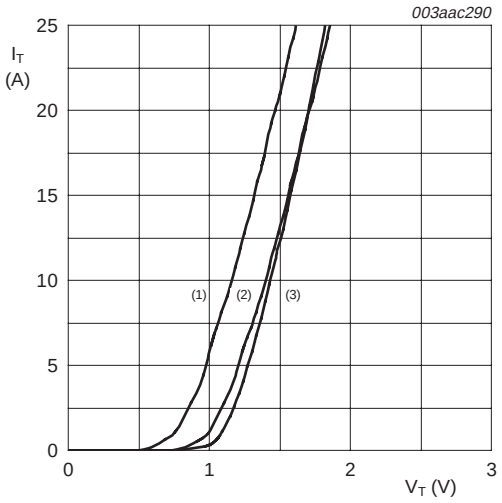


Fig 8. Normalized gate trigger current as a function of junction temperature



V_o = 1.0 V

R_s = 0.04 Ω

(1) T_j = 150 °C; typical values

(2) T_j = 150 °C; maximum values

(3) T_j = 25 °C; maximum values

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

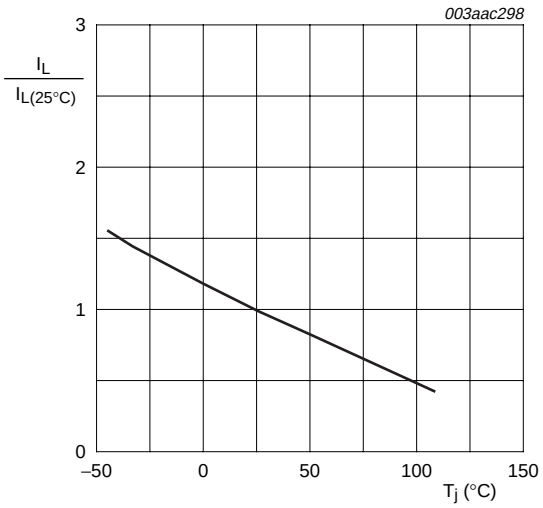


Fig 10. Normalized latching current as a function of junction temperature

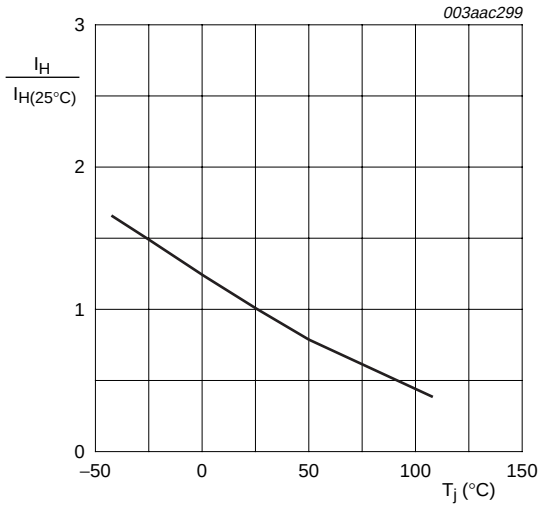
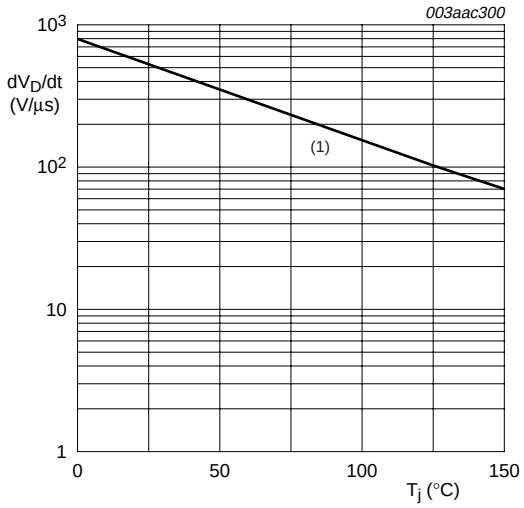


Fig 11. Normalized holding current as a function of junction temperature

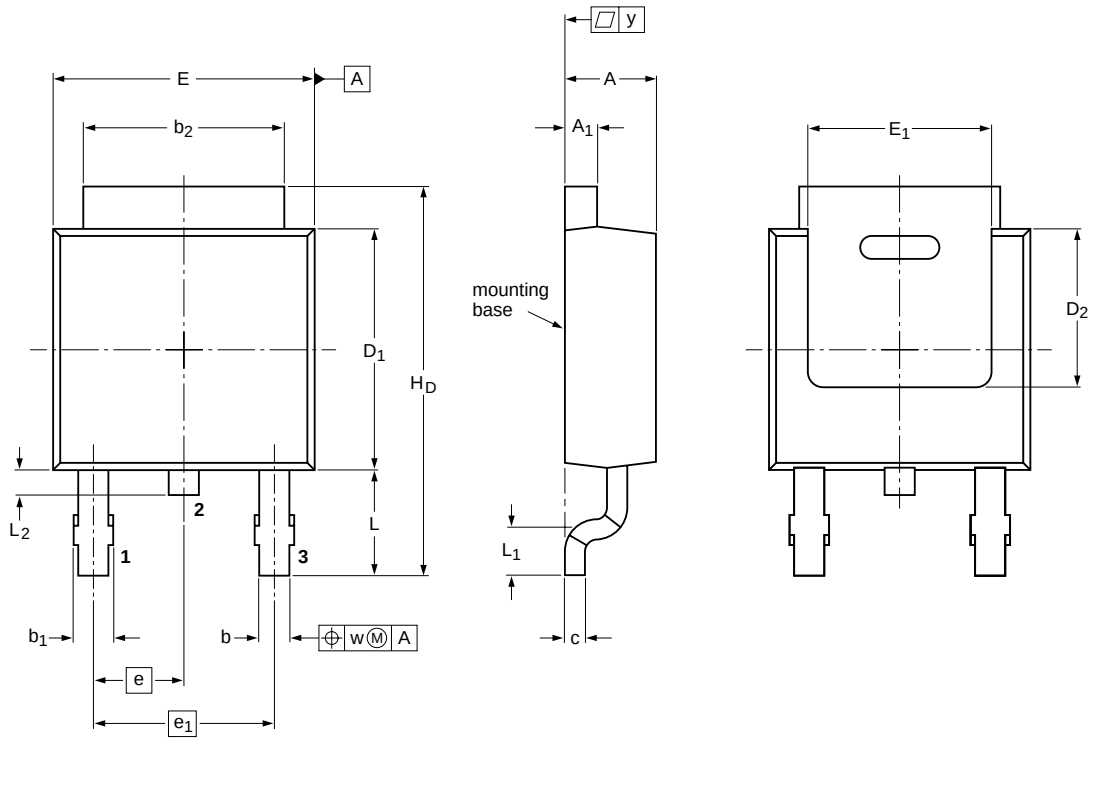


(1) R_{GK} = 100 Ω

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**



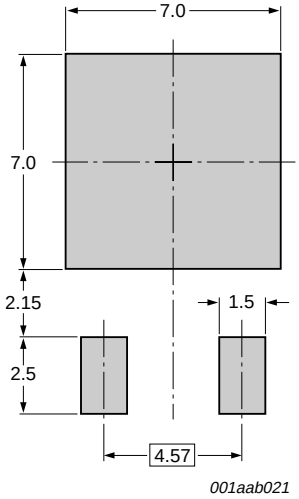
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b	b_1	b_2	c	D_1	D_2 min	E	E_1 min	e	e_1	H_D	L	L_1 min	L_2	w	y max
mm	2.38 2.22	0.93 0.46	0.89 0.71	1.1 0.9	5.46 5.00	0.56 0.20	6.22 5.98	4.0	6.73 6.47	4.45	2.285	4.57	10.4 9.6	2.95 2.55	0.5	0.9 0.5	0.2	0.2

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT428		TO-252	SC-63			~~06-02-14~~ 06-03-16

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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nxp.com.

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12. Contents

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