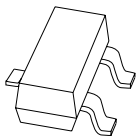


BSS84

P-channel enhancement mode vertical D-MOS transistor

Rev. 04 — 17 July 2007 Product data sheet

1. Product profile

1.1 General description

P-channel enhancement mode vertical D-MOS transistor in a SOT23 Surface-Mount Device (SMD) package.

1.2 Features

- Low threshold voltage
- High-speed switching
- Direct interface to CMOS and Transistor-Transistor Logic (TTL)
- No secondary breakdown

1.3 Applications

- Line current interrupter in telephone sets
- Relay, high-speed and line transformer drivers

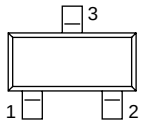
1.4 Quick reference data

- $V_{DS} \leq -50$ V
- $R_{DSon} \leq 10\ \Omega$
- $I_D \leq -130$ mA
- $P_{tot} \leq 250$ mW

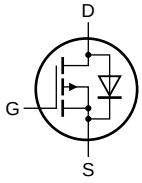
2. Pinning information

Table 1. Pinning

Pin	Description	Simplified outline	Symbol
1	gate (G)		
2	source (S)		
3	drain (D)		



SOT23 (TO-236AB)



001aaa025

3. Ordering information

Table 2. Ordering information

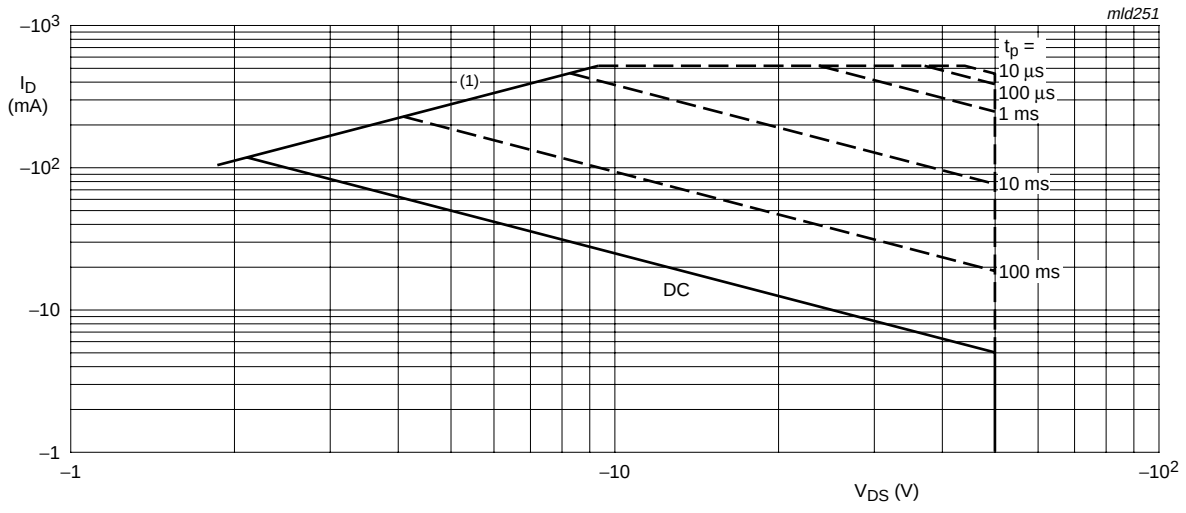
Type number	Package		
	Name	Description	Version
BSS84	TO-236AB	plastic surface-mounted package; 3 leads	SOT23

4. Limiting values

Table 3. Limiting values

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

Symbol	Parameter	Conditions	Min	Max	Unit
V_{DS}	drain-source voltage	25 °C ≤ T_j ≤ 150 °C	-	–50	V
V_{GS}	gate-source voltage		-	±20	V
I_D	drain current	T_{sp} = 25 °C; V_{GS} = –10 V; see Figure 1	-	–130	mA
		T_{sp} = 100 °C; V_{GS} = –10 V	-	–75	mA
I_{DM}	peak drain current	T_{sp} = 25 °C; pulsed; t_p ≤ 10 µs; see Figure 1	-	–520	mA
P_{tot}	total power dissipation	T_{sp} = 25 °C; see Figure 4	-	250	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–65	+150	°C



T_{sp} = 25 °C

(1) R_{DSon} limitation

Fig 1. Safe operating area; continuous and peak drain currents as a function of drain-source voltage

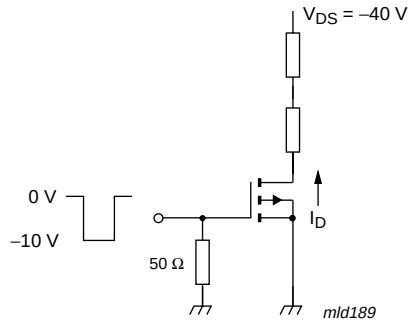


Fig 2. Switching time test circuit

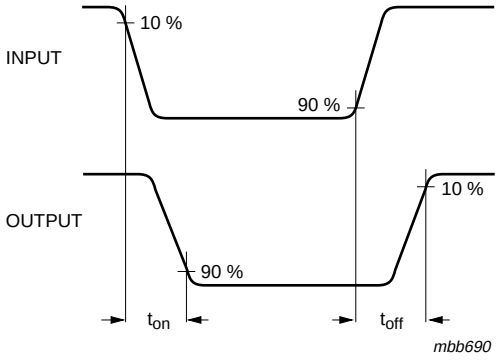


Fig 3. Input and output waveforms

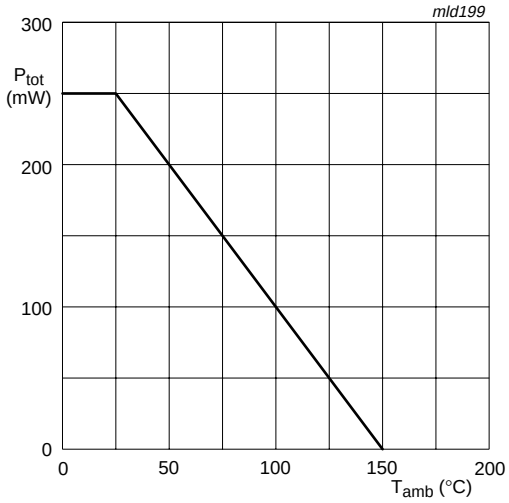


Fig 4. Power derating curve

5. Thermal characteristics

Table 4. Thermal characteristics

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{th(j-a)}$	thermal resistance from junction to ambient	see Figure 5	[1]	-	-	500	K/W

[1] Mounted on a printed-circuit board; vertical in still air

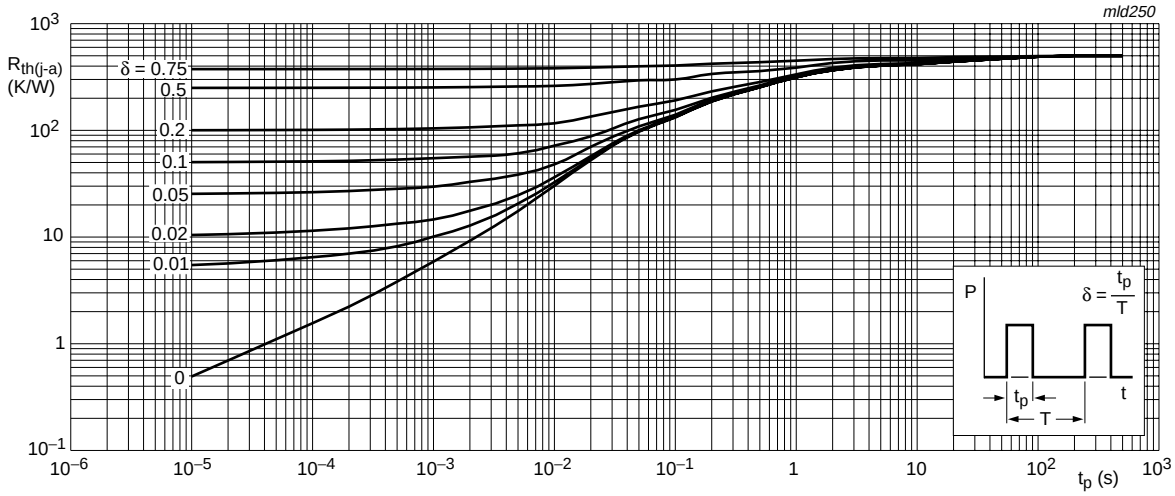


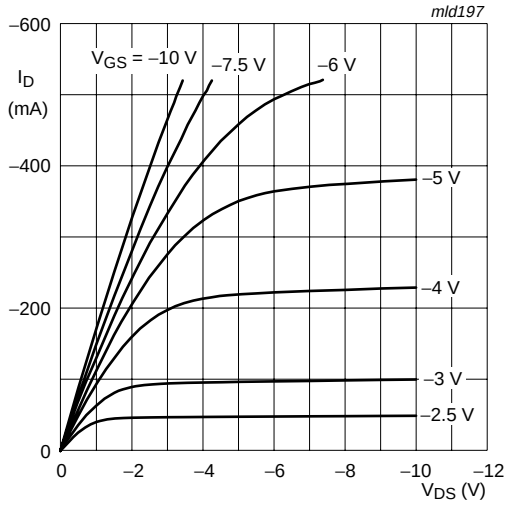
Fig 5. Transient thermal impedance from junction to ambient as a function of pulse duration

6. Characteristics

Table 5. Characteristics

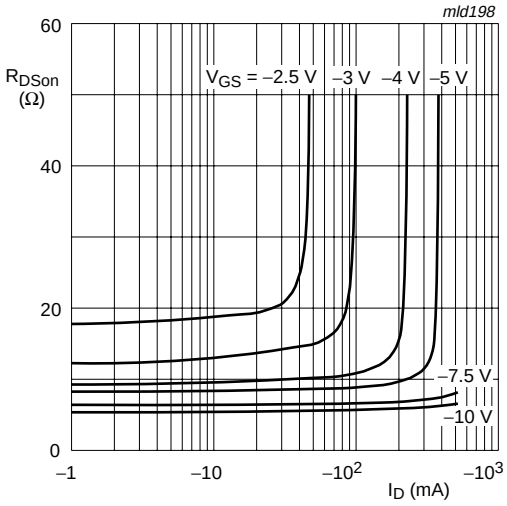
T_j = 25 °C unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Static characteristics						
$V_{(BR)DSS}$	drain-source breakdown voltage	I_D = –10 µA; V_{GS} = 0 V				
		T_j = 25 °C	–50	-	-	V
$V_{GS(th)}$	gate-source threshold voltage	I_D = –1 mA; V_{DS} = V_{GS}; see Figure 10				
		T_j = 25 °C	–0.8	-	–2	V
		T_j = –55 °C	-	-	–1.8	V
I_{DSS}	drain leakage current	V_{DS} = –40 V; V_{GS} = 0 V				
		T_j = 25 °C	-	-	–100	nA
		V_{DS} = –50 V; V_{GS} = 0 V				
		T_j = 25 °C	-	-	–10	µA
		T_j = 125 °C	-	-	–60	µA
I_{GSS}	gate leakage current	V_{GS} = ±20 V; V_{DS} = 0 V	-	-	±100	nA
R_{DSon}	drain-source on-state resistance	V_{GS} = –10 V; I_D = –130 mA; see Figure 7 and 9				
		T_j = 25 °C	-	6	10	Ω
Dynamic characteristics						
$\|Y_{fs}\|$	transfer admittance	V_{DS} = –25 V; I_D = –130 mA	50	-	-	mS
C_{iss}	input capacitance	V_{GS} = 0 V; V_{DS} = –25 V; f = 1 MHz; see Figure 11	-	25	45	pF
C_{oss}	output capacitance		-	15	25	pF
C_{rss}	reverse transfer capacitance		-	3.5	12	pF
t_{on}	turn-on time	V_{DS} = –40 V; V_{GS} = 0 V to –10 V; I_D = –200 mA; see Figure 2 and 3	-	3	-	ns
t_{off}	turn-off time	V_{DS} = –40 V; V_{GS} = –10 V to 0 V; I_D = –200 mA; see Figure 2 and 3	-	7	-	ns



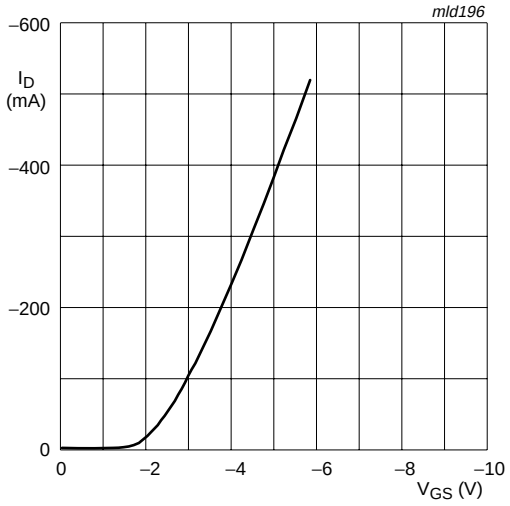
T_j = 25 °C

Fig 6. Output characteristics: drain current as a function of drain-source voltage; typical values



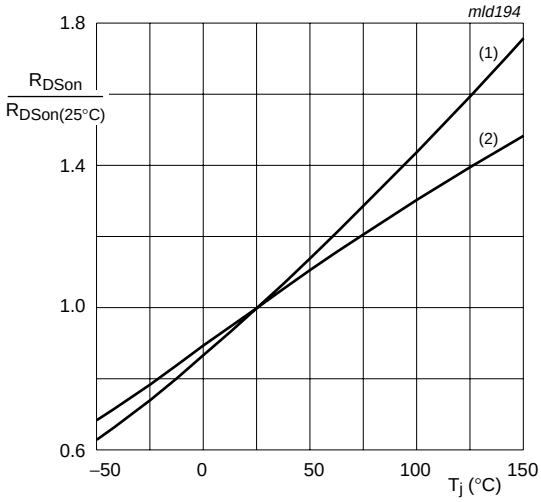
T_j = 25 °C

Fig 7. Drain-source on-state resistance as a function of drain current; typical values



T_j = 25 °C; V_{DS} = −10 V

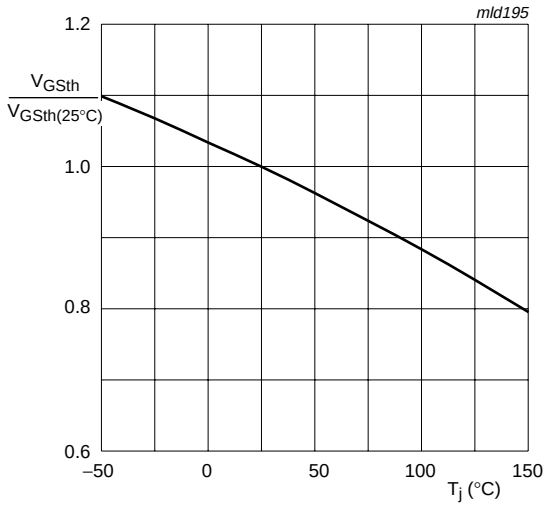
Fig 8. Transfer characteristics: drain current as a function of gate-source voltage; typical values



(1) I_D = −130 mA; V_{GS} = −10 V

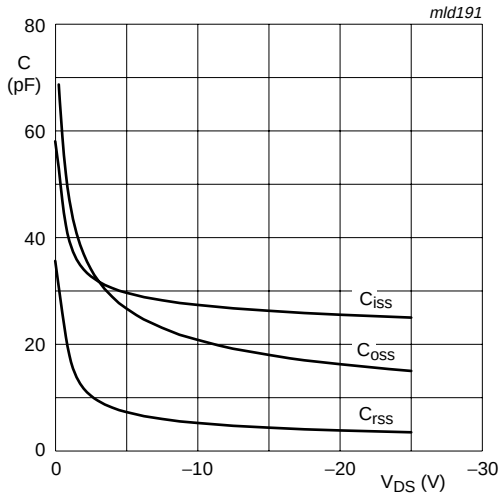
(2) I_D = −20 mA; V_{GS} = −2.4 V

Fig 9. Normalized drain-source on-state resistance factor as a function of junction temperature



I_D = –1 mA; V_{DS} = V_{GS}

Fig 10. Gate-source threshold voltage as a function of junction temperature

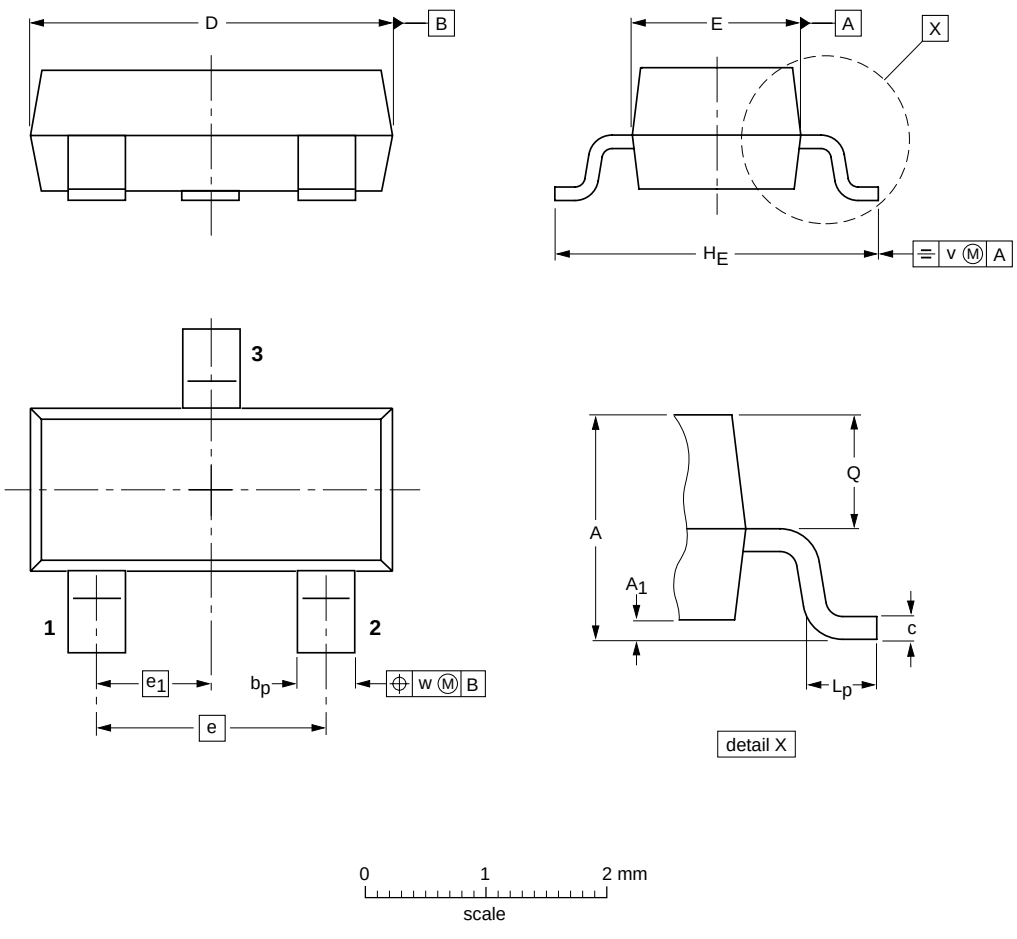


V_{GS} = 0 V; f = 1 MHz

Fig 11. Input, output and reverse transfer capacitances as a function of drain-source voltage; typical values

7. Package outline

Plastic surface-mounted package; 3 leads **SOT23**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT23		TO-236AB				~~04-11-04~~ 06-03-16

Fig 12. Package outline SOT23 (TO-236AB)

8. Revision history

Table 6. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BSS84_4	20070717	Product data sheet	-	BSS84_3
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Marking code has been removed.			
BSS84_3 (9397 750 11693)	20030804	Product specification	-	BSS84_2
BSS84_2 (9397 750 02333)	19970618	Product specification	-	BSS84_1
BSS84_1	19950407	Product specification	-	-

9. Legal information

9.1 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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