

# BSS83

## MOSFET N-channel enhancement switching transistor

Rev. 03 — 21 November 2007

Product data sheet

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NXP Semiconductors

# MOSFET N-channel enhancement switching transistor

# BSS83

### DESCRIPTION

Symmetrical insulated-gate silicon MOS field-effect transistor of the N-channel enhancement mode type. The transistor is sealed in a SOT143 envelope and features a low ON resistance and low capacitances. The transistor is protected against excessive input voltages by integrated back-to-back diodes between gate and substrate.

### Marking code:

BSS83 = % M9

### APPLICATIONS

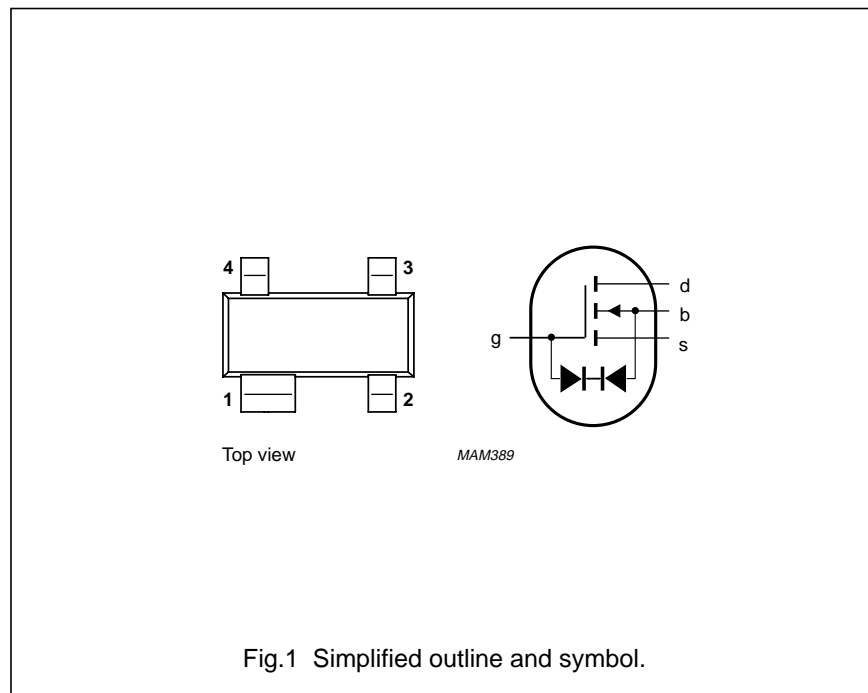
- analog and/or digital switch
- switch driver

### PINNING

- 1 = substrate (b)
- 2 = source
- 3 = drain
- 4 = gate

### Note

1. Drain and source are interchangeable.



### QUICK REFERENCE DATA

Drain-source voltage	$V_{DS}$	max.	10 V
Source-drain voltage	$V_{SD}$	max.	10 V
Drain-substrate voltage	$V_{DB}$	max.	15 V
Source-substrate voltage	$V_{SB}$	max.	15 V
Drain current (DC)	$I_D$	max.	50 mA
Total power dissipation up to $T_{amb} = 25\text{ }^\circ\text{C}$	$P_{tot}$	max.	230 mW
Gate-source threshold voltage			
$V_{DS} = V_{GS}; V_{SB} = 0;$			
$I_D = 1\text{ }\mu\text{A}$	$V_{GS(th)}$	>	0.1 V
		<	2.0 V
Drain-source ON-resistance			
$V_{GS} = 10\text{ V}; V_{SB} = 0; I_D = 0.1\text{ mA}$	$R_{DSon}$	<	45 $\Omega$
Feed-back capacitance			
$V_{GS} = V_{BS} = -15\text{ V};$			
$V_{DS} = 10\text{ V}; f = 1\text{ MHz}$	$C_{rss}$	typ.	0.6 pF

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**MOSFET N-channel enhancement switching transistor**

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**BSS83****RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$V_{DS}$	max.	10 V
Source-drain voltage	$V_{SD}$	max.	10 V
Drain-substrate voltage	$V_{DB}$	max.	15 V
Source-substrate voltage	$V_{SB}$	max.	15 V
Drain current (DC)	$I_D$	max.	50 mA
Total power dissipation up to $T_{amb} = 25\text{ °C}^{(1)}$	$P_{tot}$	max.	230 mW
Storage temperature range	$T_{stg}$		-65 to + 150 °C
Junction temperature	$T_j$	max.	125 °C

**THERMAL RESISTANCE**

From junction to ambient in free air <sup>(1)</sup>	$R_{th\ j-a}$	=	430 K/W
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## MOSFET N-channel enhancement switching transistor

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**CHARACTERISTICS** $T_{amb} = 25\text{ °C}$  unless otherwise specified

Drain-source breakdown voltage

$V_{GS} = V_{BS} = -5\text{ V}; I_D = 10\text{ nA}$

$V_{(BR)DSX} > 10\text{ V}$

Source-drain breakdown voltage

$V_{GD} = V_{BD} = -5\text{ V}; I_D = 10\text{ nA}$

$V_{(BR)SDX} > 10\text{ V}$

Drain-substrate breakdown voltage

$V_{GB} = 0; I_D = 10\text{ nA}; \text{open source}$

$V_{(BR)DBO} > 15\text{ V}$

Source-substrate breakdown voltage

$V_{GB} = 0; I_D = 10\text{ nA}; \text{open drain}$

$V_{(BR)SBO} > 15\text{ V}$

Drain-source leakage current

$V_{GS} = V_{BS} = -2\text{ V}; V_{DS} = 6,6\text{ V}$

$I_{D\text{Soff}} < 10\text{ nA}$

Source-drain leakage current

$V_{GD} = V_{BD} = -2\text{ V}; V_{SD} = 6,6\text{ V}$

$I_{S\text{Doff}} < 10\text{ nA}$

Forward transconductance at  $f = 1\text{ kHz}$ 

$V_{DS} = 10\text{ V}; V_{SB} = 0; I_D = 20\text{ mA}$

$g_{fs} > 10\text{ mS}$   
 $g_{fs} \text{ typ. } 15\text{ mS}$

Gate-source threshold voltage

$V_{DS} = V_{GS}; V_{SB} = 0; I_D = 1\text{ }\mu\text{A}$

$V_{GS(th)} > 0,1\text{ V}$   
 $V_{GS(th)} < 2,0\text{ V}$

Drain-source ON-resistance

$I_D = 0,1\text{ mA};$

$V_{GS} = 5\text{ V}; V_{SB} = 0$

$R_{DSon} < 70\text{ }\Omega$

$V_{GS} = 10\text{ V}; V_{SB} = 0$

$R_{DSon} < 45\text{ }\Omega$

$V_{GS} = 3,2\text{ V}; V_{SB} = 6,8\text{ V (see Fig.4)}$

$R_{DSon} \text{ typ. } 80\text{ }\Omega$

$R_{DSon} < 120\text{ }\Omega$

Gate-substrate zener voltages

$V_{DB} = V_{SB} = 0; -I_G = 10\text{ }\mu\text{A}$

$V_{Z(1)} > 12,5\text{ V}$

$V_{DB} = V_{SB} = 0; +I_G = 10\text{ }\mu\text{A}$

$V_{Z(2)} > 12,5\text{ V}$

Capacitances at  $f = 1\text{ MHz}$ 

$V_{GS} = V_{BS} = -15\text{ V}; V_{DS} = 10\text{ V}$

Feed-back capacitance

$C_{rss} \text{ typ. } 0,6\text{ pF}$

Input capacitance

$C_{iss} \text{ typ. } 1,5\text{ pF}$

Output capacitance

$C_{oss} \text{ typ. } 1,0\text{ pF}$

Switching times (see Fig.2)

$V_{DD} = 10\text{ V}; V_i = 5\text{ V}$

$t_{on} \text{ typ. } 1,0\text{ ns}$

$t_{off} \text{ typ. } 5,0\text{ ns}$

**Note**

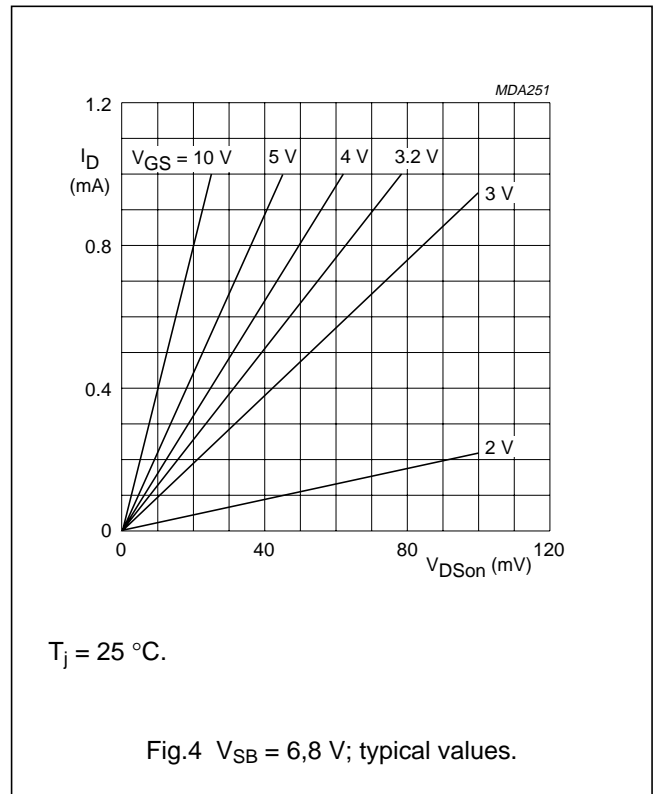
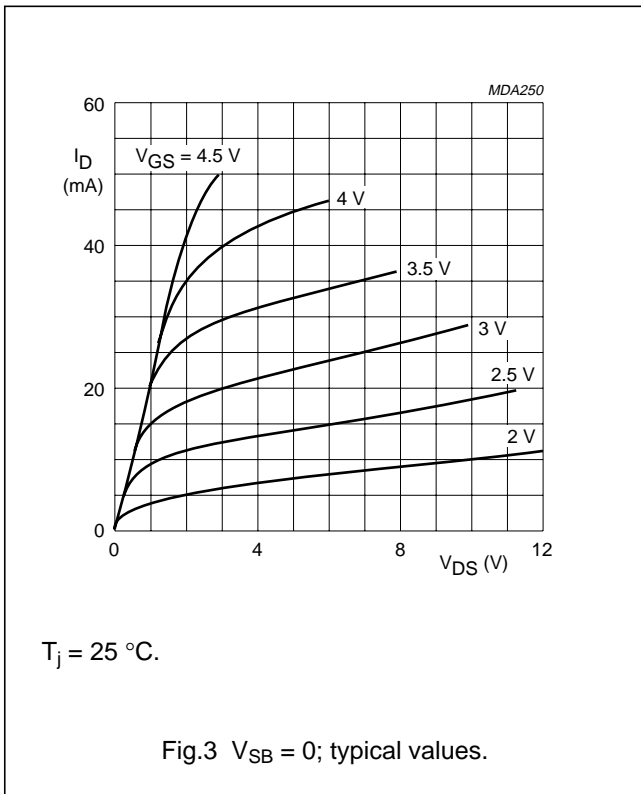
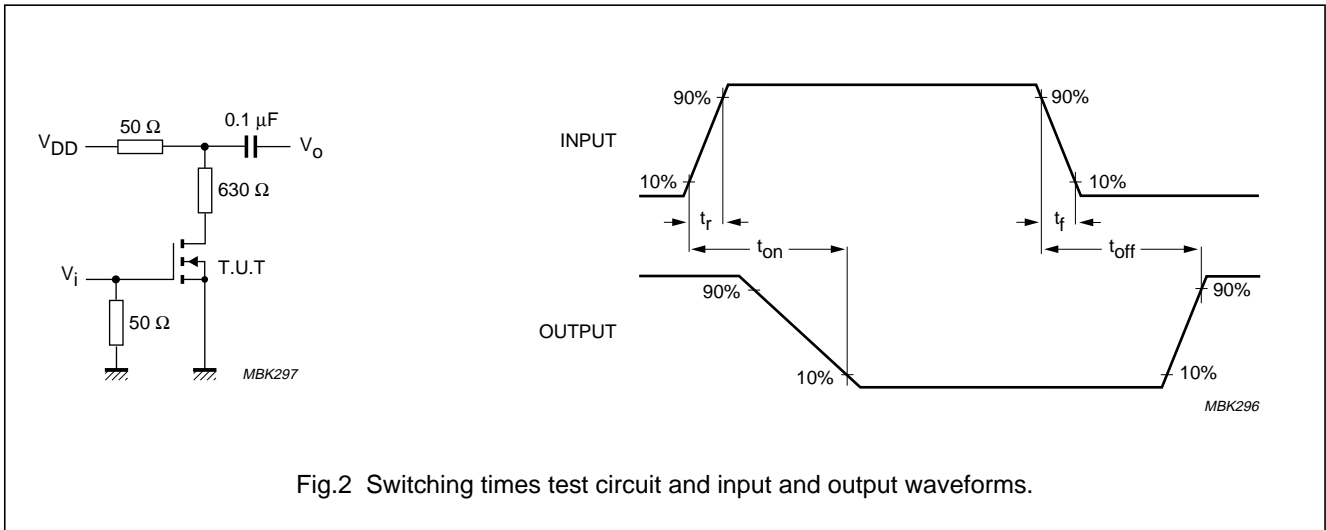
1. Device mounted on a ceramic substrate of  $8\text{ mm} \times 10\text{ mm} \times 0,7\text{ mm}$ .

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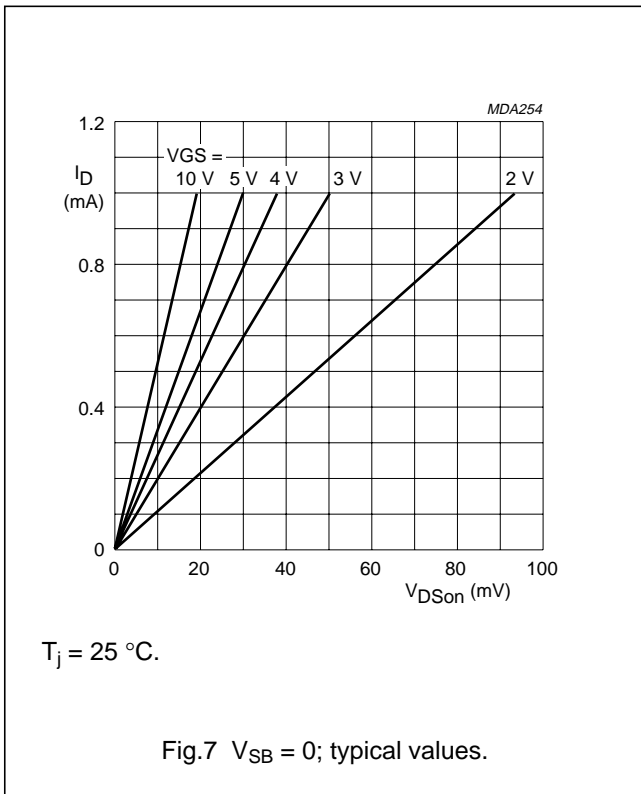
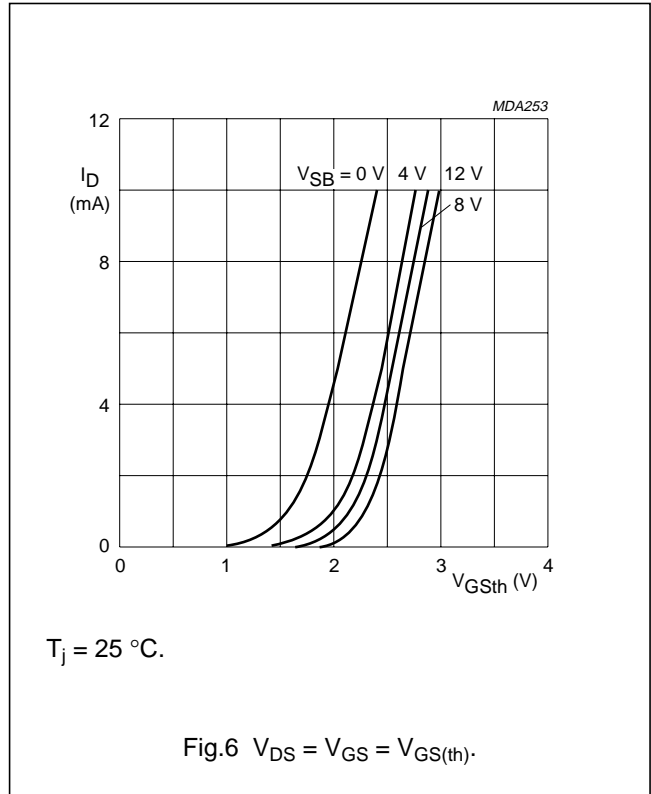
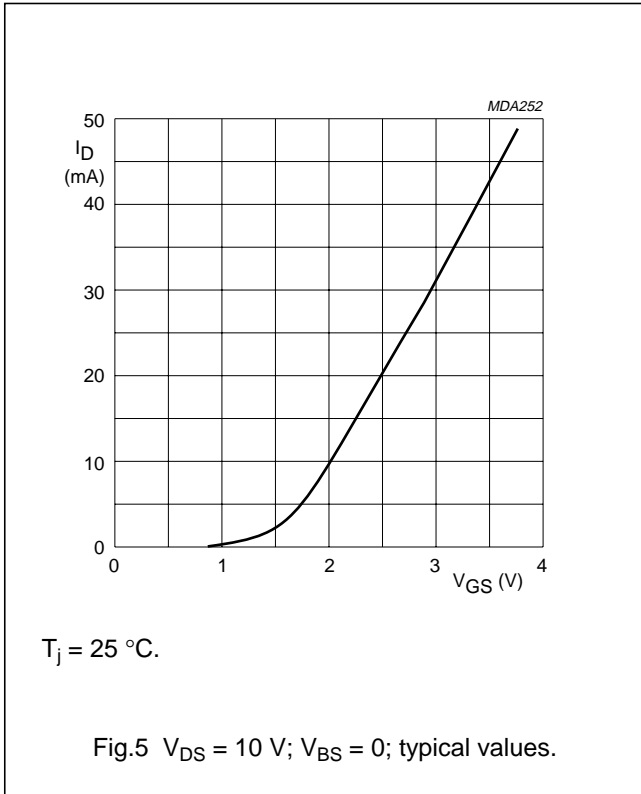
Pulse generator:

- $R_i = 50 \Omega$
- $t_r < 0,5 \text{ ns}$
- $t_f < 1,0 \text{ ns}$
- $t_p = 20 \text{ ns}$
- $\delta < 0,01$



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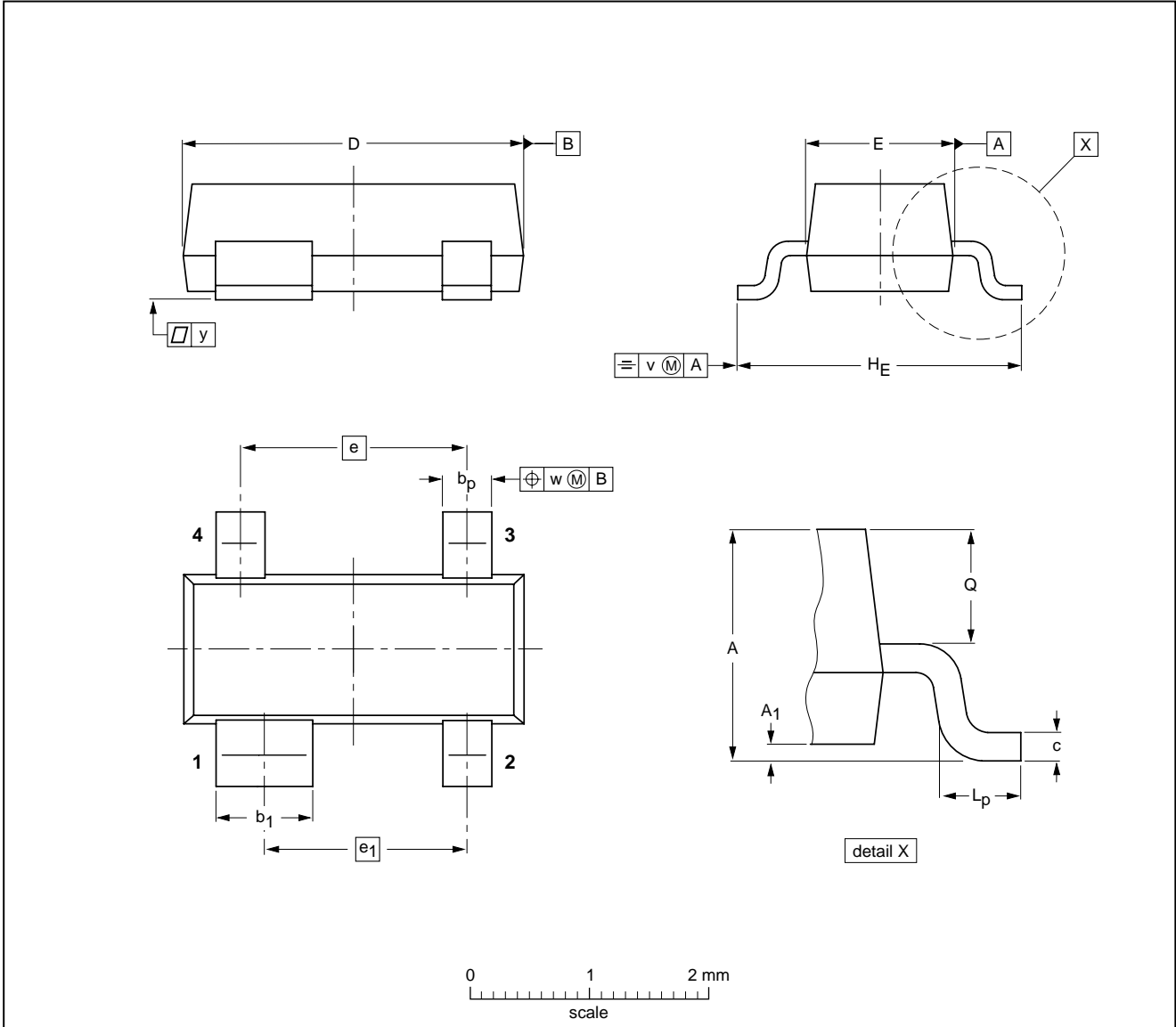
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PACKAGE OUTLINE

Plastic surface mounted package; 4 leads

SOT143B



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	b <sub>1</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.1 0.9	0.1	0.48 0.38	0.88 0.78	0.15 0.09	3.0 2.8	1.4 1.2	1.9	1.7	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT143B						97-02-28

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### Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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## Revision history

### Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BSS83_N_3	20071121	Product data sheet	-	BSS83_CNV_2
Modifications:	• Page 2; column 2; Marking code; row 1 changed			
BSS83_CNV_2	19910401	Product specification	-	-

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