

# 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

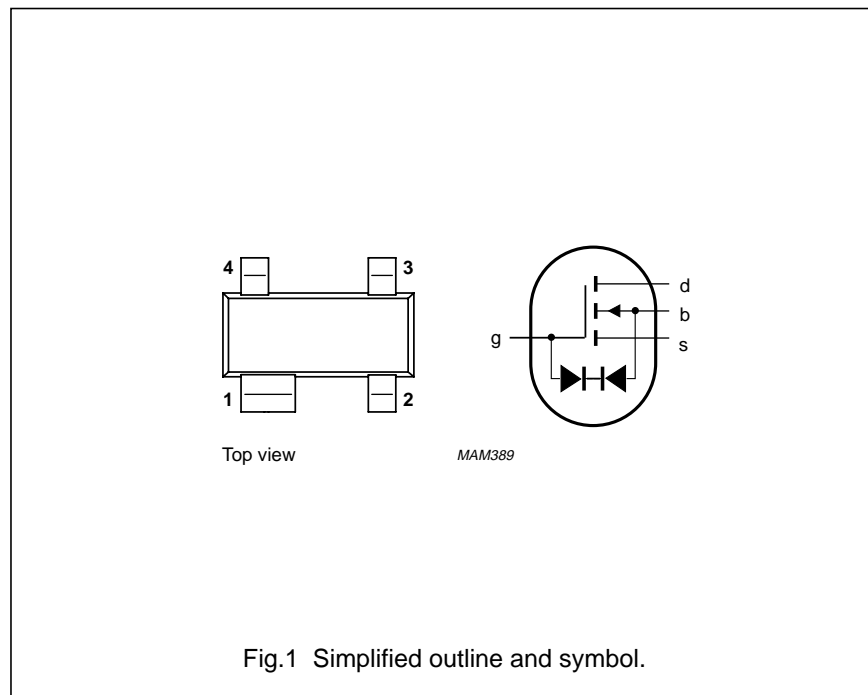
- analog and/or digital switch
- switch driver

### 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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**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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**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 V
Source-drain breakdown voltage $V_{GD} = V_{BD} = -5\text{ V}; I_D = 10\text{ nA}$	$V_{(BR)SDX}$	>	10 V
Drain-substrate breakdown voltage $V_{GB} = 0; I_D = 10\text{ nA};$ open source	$V_{(BR)DBO}$	>	15 V
Source-substrate breakdown voltage $V_{GB} = 0; I_D = 10\text{ nA};$ open drain	$V_{(BR)SBO}$	>	15 V
Drain-source leakage current $V_{GS} = V_{BS} = -2\text{ V}; V_{DS} = 6,6\text{ V}$	$I_{D\text{Soff}}$	<	10 nA
Source-drain leakage current $V_{GD} = V_{BD} = -2\text{ V}; V_{SD} = 6,6\text{ V}$	$I_{S\text{Doff}}$	<	10 nA
Forward transconductance at $f = 1\text{ kHz}$ $V_{DS} = 10\text{ V}; V_{SB} = 0; I_D = 20\text{ mA}$	$g_{fs}$	> typ.	10 mS 15 mS
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 $I_D = 0,1\text{ mA};$ $V_{GS} = 5\text{ V}; V_{SB} = 0$ $V_{GS} = 10\text{ V}; V_{SB} = 0$ $V_{GS} = 3,2\text{ V}; V_{SB} = 6,8\text{ V}$ (see Fig.4)	$R_{DSon}$	< < typ. <	70 $\Omega$ 45 $\Omega$ 80 $\Omega$ 120 $\Omega$
Gate-substrate zener voltages $V_{DB} = V_{SB} = 0; -I_G = 10\text{ }\mu\text{A}$ $V_{DB} = V_{SB} = 0; +I_G = 10\text{ }\mu\text{A}$	$V_{Z(1)}$ $V_{Z(2)}$	> >	12,5 V 12,5 V
Capacitances at $f = 1\text{ MHz}$ $V_{GS} = V_{BS} = -15\text{ V}; V_{DS} = 10\text{ V}$			
Feed-back capacitance	$C_{rss}$	typ.	0,6 pF
Input capacitance	$C_{iss}$	typ.	1,5 pF
Output capacitance	$C_{oss}$	typ.	1,0 pF
Switching times (see Fig.2) $V_{DD} = 10\text{ V}; V_i = 5\text{ V}$	$t_{on}$ $t_{off}$	typ. typ.	1,0 ns 5,0 ns

**Note**

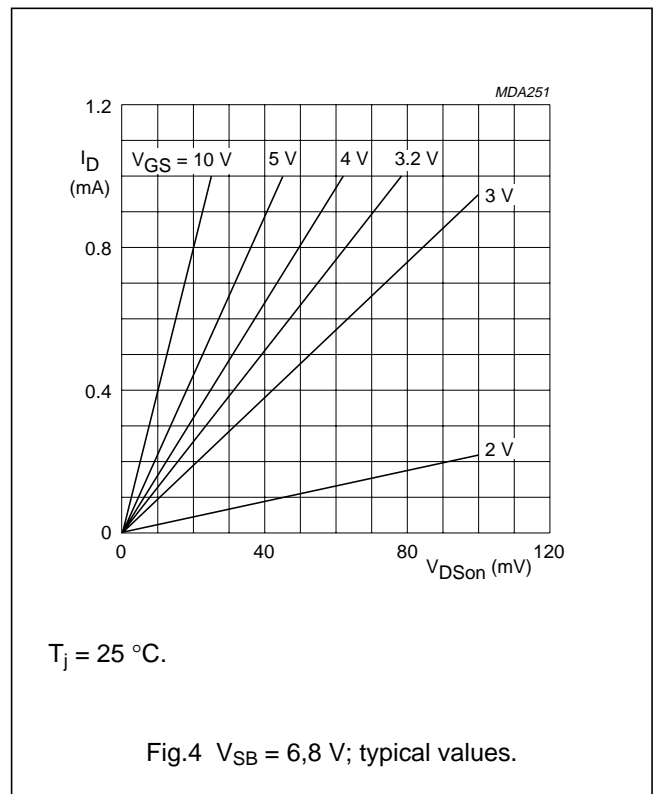
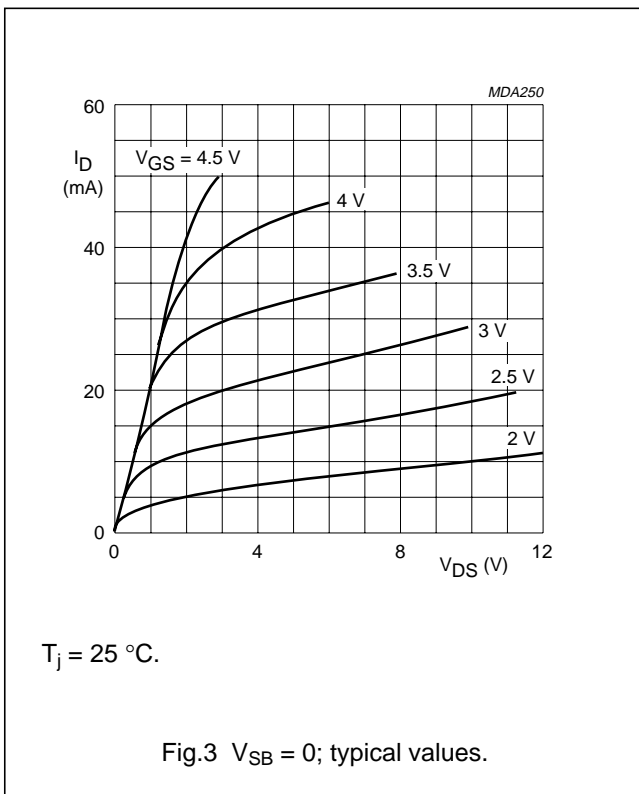
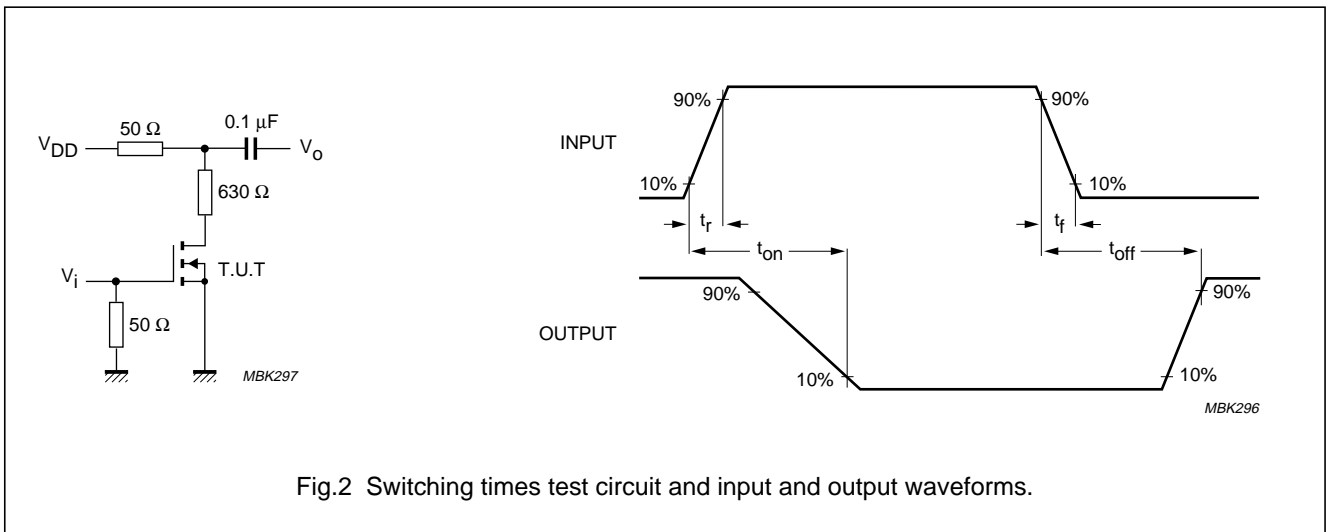
1. Device mounted on a ceramic substrate of  $8\text{ mm} \times 10\text{ mm} \times 0,7\text{ mm}$ .

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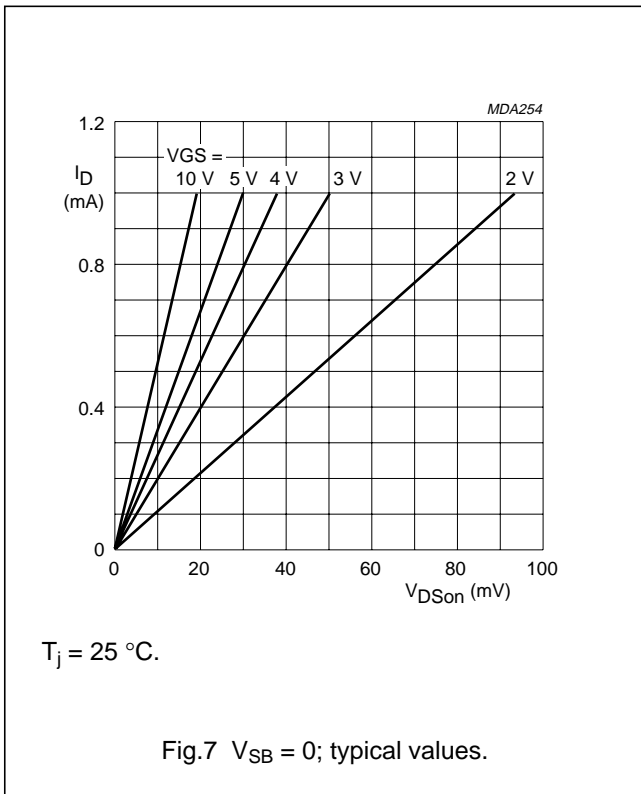
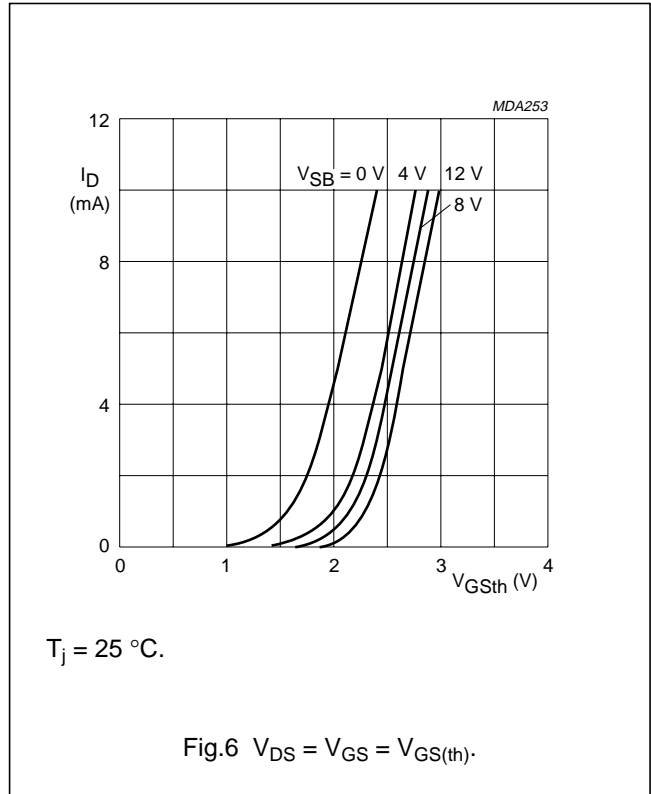
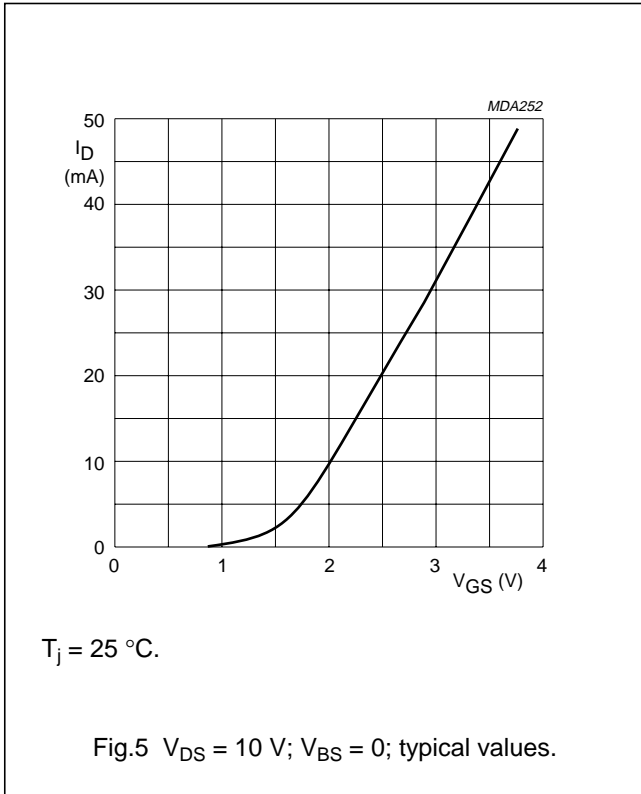
Pulse generator:

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



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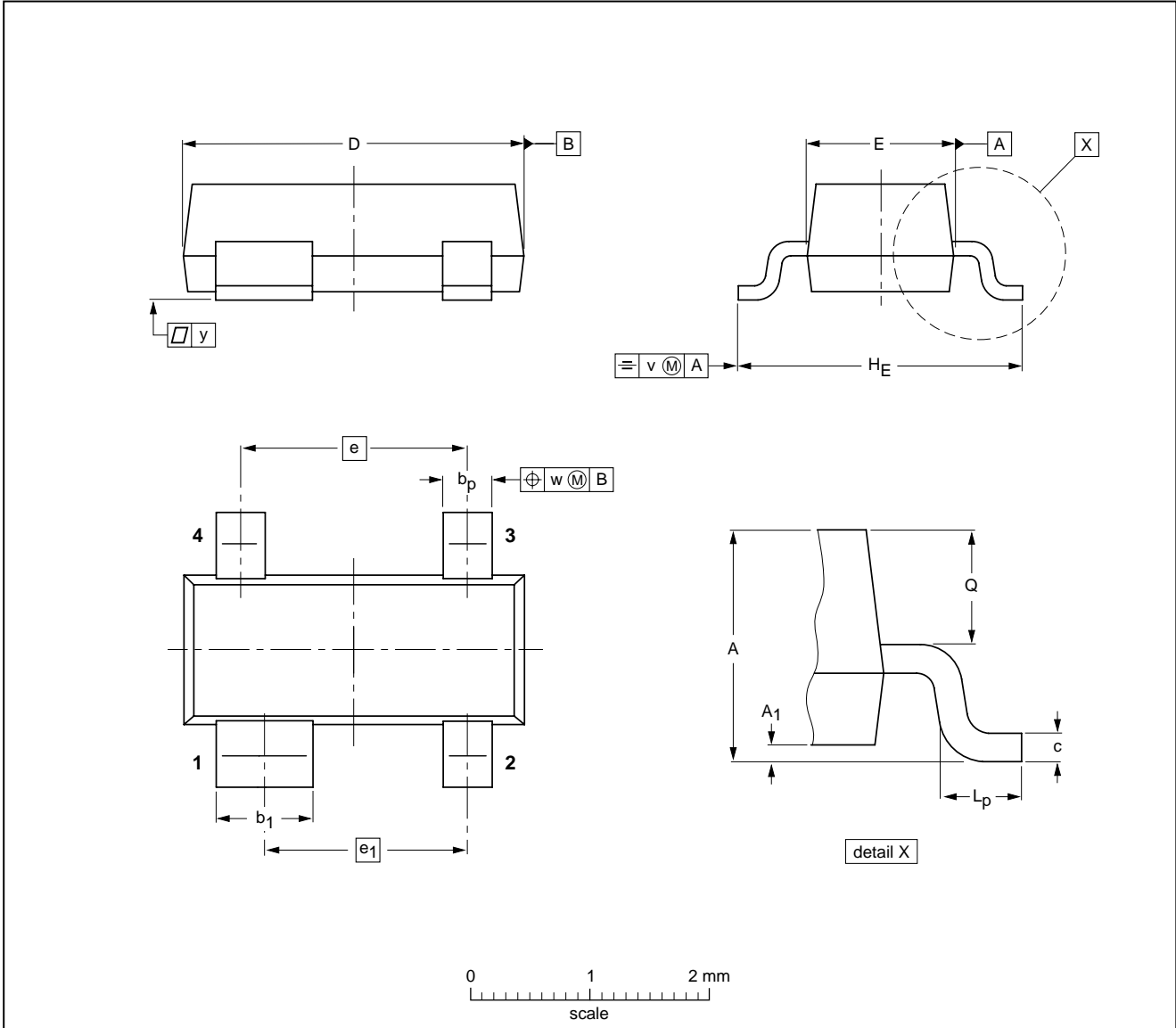
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PACKAGE OUTLINE

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

## Legal information

### 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.

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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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