

# BF992

Silicon N-channel dual gate MOS-FET

Rev. 04 — 21 November 2007

Product data sheet

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NXP Semiconductors

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APPLICATIONS

- VHF applications such as VHF television tuners and FM tuners with 12 V supply voltage. The device is also suitable for use in professional communications equipment.

DESCRIPTION

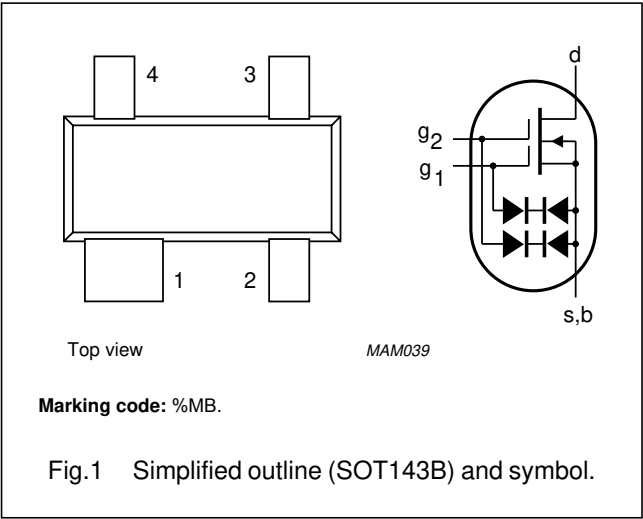
Depletion type field-effect transistor in a plastic micro-miniature SOT143B package with source and substrate interconnected.

The transistor is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

CAUTION
The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

PINNING

PIN	SYMBOL	DESCRIPTION
1	s, b	source
2	d	drain
3	g <sub>2</sub>	gate 2
4	g <sub>1</sub>	gate 1



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V <sub>DS</sub>	drain-source voltage (DC)		–	20	V
I <sub>D</sub>	drain current (DC)		–	40	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> = 60 °C	–	200	mW
Y <sub>fs</sub>	forward transfer admittance	f = 1 kHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V	25	–	mS
C <sub>ig1-s</sub>	input capacitance at gate 1	f = 1 MHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V	4	–	pF
C <sub>rs</sub>	reverse transfer capacitance	f = 1 MHz; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V	30	–	fF
F	noise figure	G <sub>S</sub> = 2 mS; I <sub>D</sub> = 15 mA; V <sub>DS</sub> = 10 V; V <sub>G2-S</sub> = 4 V; f = 200 MHz	1.2	–	dB
T <sub>j</sub>	operating junction temperature		–	150	°C

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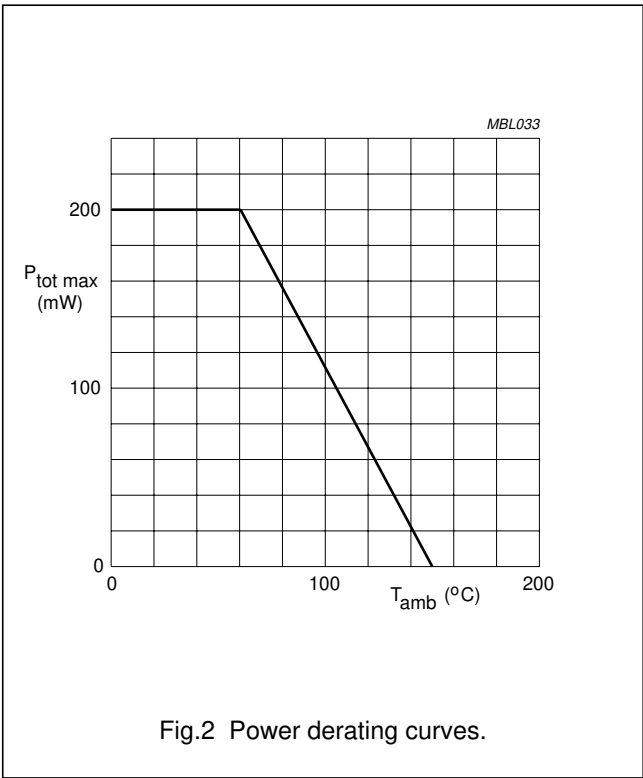
LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>DS</sub>	drain-source voltage		–	20	V
I <sub>D</sub>	drain current		–	40	mA
I <sub>G1</sub>	gate 1 current		–	±10	mA
I <sub>G2</sub>	gate 2 current		–	±10	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 60 °C; see Fig.2; note 1	–	200	mW
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	operating junction temperature		–	150	°C

Note

1. Device mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.



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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient in free air	note 1	460	K/W

## Note

1. Device mounted on a ceramic substrate, 8 mm × 10 mm × 0.7 mm.

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$\pm V_{(BR)G1-SS}$	gate 1-source breakdown voltage	$V_{G2-S} = V_{DS} = 0$ ; $I_{G1-SS} = \pm 10\ \text{mA}$	8	20	V
$\pm V_{(BR)G2-SS}$	gate 2-source breakdown voltage	$V_{G1-S} = V_{DS} = 0$ ; $I_{G2-SS} = \pm 10\ \text{mA}$	8	20	V
$-V_{(P)G1-S}$	gate 1-source cut-off voltage	$V_{G2-S} = 4\ \text{V}$ ; $V_{DS} = 10\ \text{V}$ ; $I_D = 20\ \mu\text{A}$	0.2	1.3	V
$-V_{(P)G2-S}$	gate 2-source cut-off voltage	$V_{G1-S} = 0$ ; $V_{DS} = 10\ \text{V}$ ; $I_D = 20\ \mu\text{A}$	0.2	1.1	V
$\pm I_{G1-SS}$	gate 1 cut-off current	$V_{G2-S} = V_{DS} = 0$ ; $V_{G1-S} = \pm 7\ \text{V}$	–	25	nA
$\pm I_{G2-SS}$	gate 2 cut-off current	$V_{G1-S} = V_{DS} = 0$ ; $V_{G2-S} = \pm 7\ \text{V}$	–	25	nA

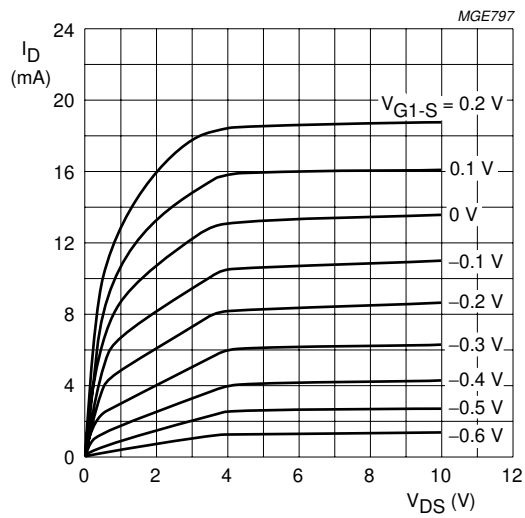
## DYNAMIC CHARACTERISTICS

Common source;  $T_{amb} = 25\ ^\circ\text{C}$ ;  $V_{DS} = 10\ \text{V}$ ;  $V_{G2-S} = 4\ \text{V}$ ;  $I_D = 15\ \text{mA}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$ y_{fs} $	forward transfer admittance		20	25	–	mS
$C_{ig1-s}$	input capacitance at gate 1	$f = 1\ \text{MHz}$	–	4	–	pF
$C_{ig2-s}$	input capacitance at gate 2	$f = 1\ \text{MHz}$	–	1.7	–	pF
$C_{os}$	output capacitance	$f = 1\ \text{MHz}$	–	2	–	pF
$C_{rs}$	reverse transfer capacitance	$f = 1\ \text{MHz}$	–	30	40	fF
F	noise figure	$f = 200\ \text{MHz}$ ; $G_S = 2\ \text{mS}$	–	1.2	–	dB

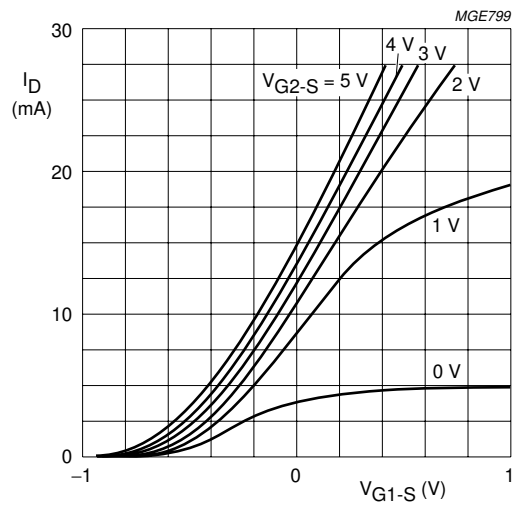
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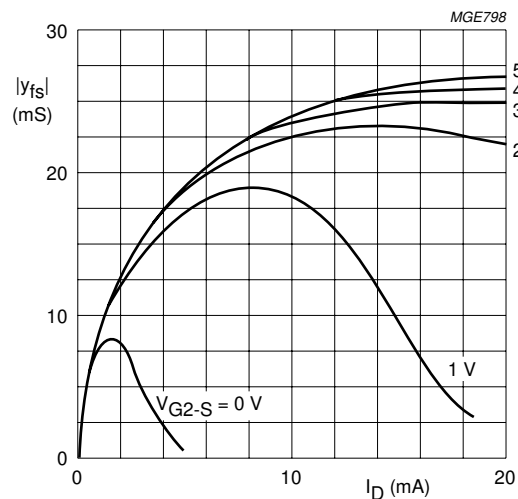
$V_{G2-S} = 4 \text{ V}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ .

Fig.3 Output characteristics; typical values.



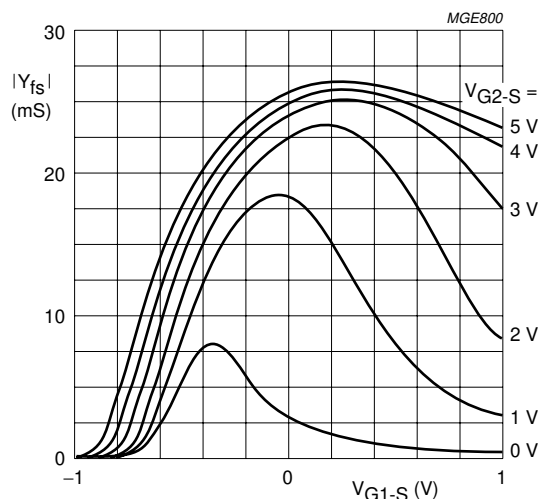
$V_{DS} = 10 \text{ V}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ .

Fig.4 Transfer characteristics; typical values.



$V_{DS} = 10 \text{ V}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ .

Fig.5 Forward transfer admittance as a function of drain current; typical values.

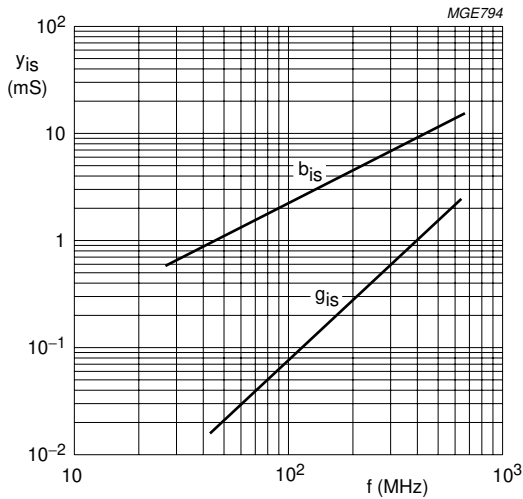


$V_{DS} = 10 \text{ V}$ ;  $T_j = 25 \text{ }^\circ\text{C}$ .

Fig.6 Forward transfer admittance as a function of gate 1-source voltage; typical values.

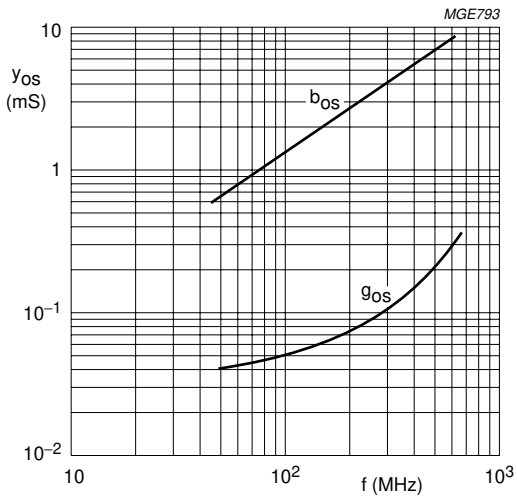
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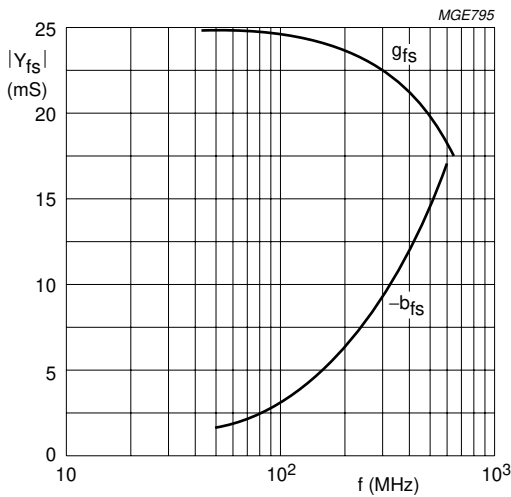
$V_{DS} = 10\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Fig.7 Input admittance as a function of frequency; typical values.



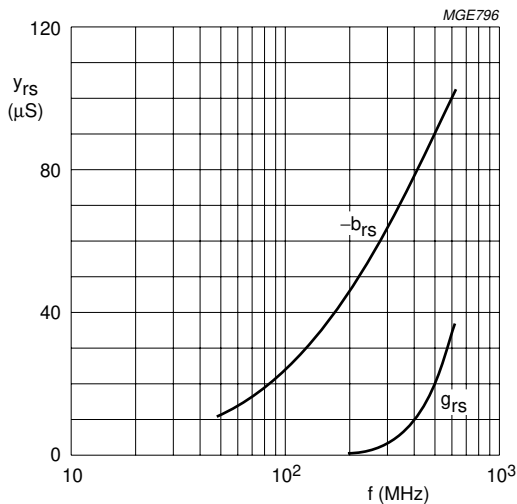
$V_{DS} = 10\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Fig.8 Output admittance as a function of frequency; typical values.



$V_{DS} = 10\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Fig.9 Forward transfer admittance as a function of frequency; typical values.



$V_{DS} = 10\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Fig.10 Reverse transfer admittance as a function of frequency; typical values.

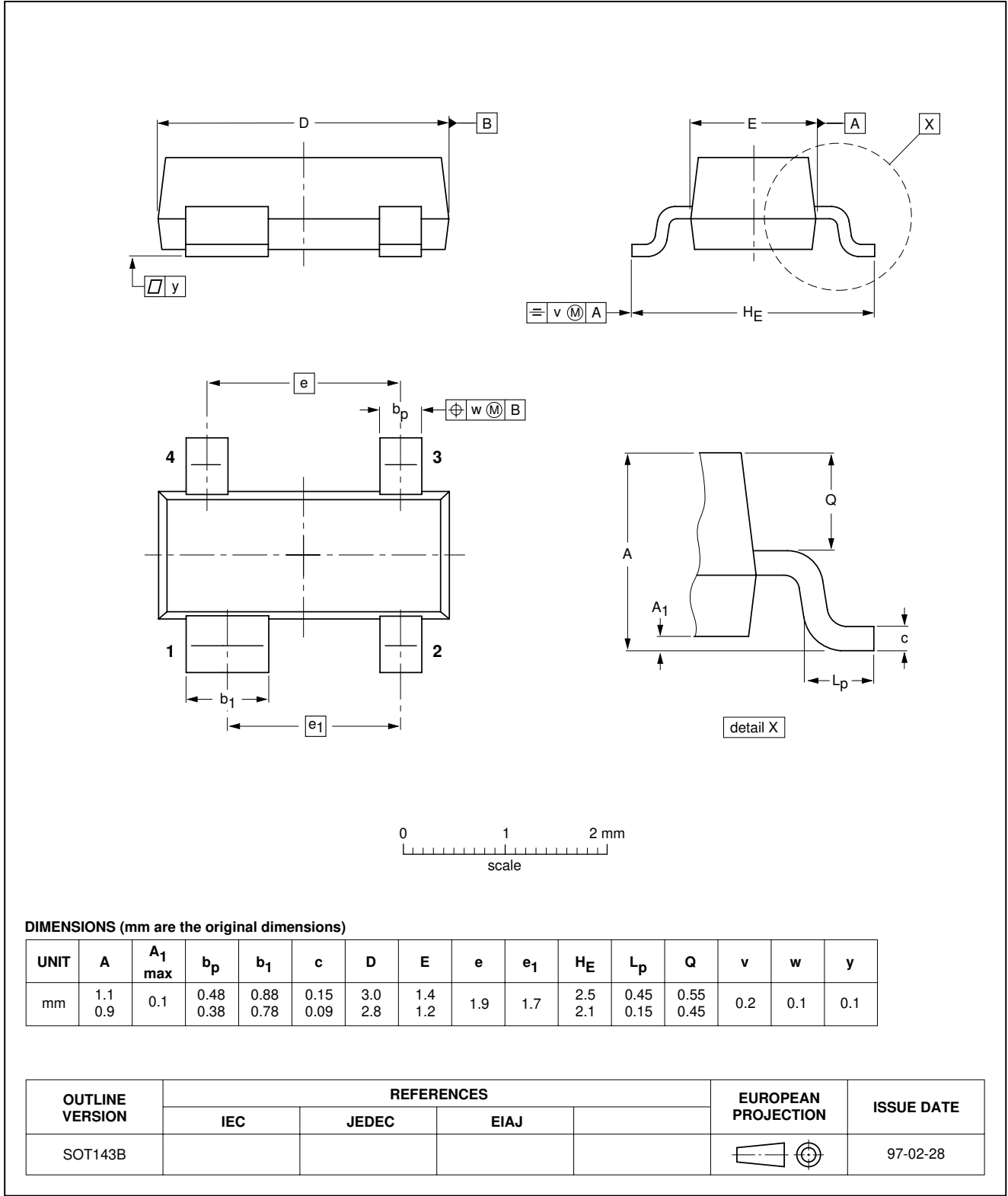
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PACKAGE OUTLINE

Plastic surface mounted package; 4 leads

SOT143B



## 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.

[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
BF992_N_4	20071121	Product data sheet	-	BF992_3
Modifications: <ul style="list-style-type: none"><li>• Fig. 1 on page 2; Figure note changed</li></ul>				
BF992_3 (9397 750 06013)	19990811	Product specification	-	BF992_2
BF992_2	19960730	Product specification	-	BF992_SF_1
BF992_SF_1	-	-	-	-

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