BF991

N-channel dual-gate MOS-FET

Rev. 03 — 20 November 2007 Product data sheet

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NXP Semiconductors

N-channel dual-gate MOS-FET BF991

FEATURES

- Protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

DESCRIPTION

Depletion type field-effect transistor in a plastic SOT143 microminiature package with interconnected source and substrate.

APPLICATIONS

- VHF applications such as:
  - VHF television tuners and FM tuners
  - Professional communication equipment.

PINNING

PIN	SYMBOL	DESCRIPTION
1	s, b	source
2	d	drain
3	g_2	gate 2
4	g_1	gate 1

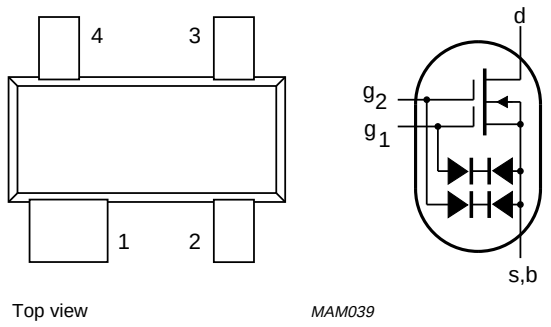

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Fig.1 Simplified outline (SOT143) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	TYP.	MAX.	UNIT
V_{DS}	drain-source voltage		–	20	V
I_D	drain current		–	20	mA
P_{tot}	total power dissipation	up to T_{amb} = 60 °C	–	200	mW
T_j	junction temperature		–	150	°C
$\lvert Y_{fs} \rvert$	transfer admittance	f = 1 kHz; I_D = 10 mA; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V	14	–	mS
$C_{ig1\text{-}s}$	input capacitance at gate 1	f = 1 MHz; I_D = 10 mA; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V	2.1	–	pF
C_{rs}	feedback capacitance	f = 1 MHz; I_D = 10 mA; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V	20	–	fF
F	noise figure	f = 200 MHz; G_S = 2 mS; $B_S = B_{Sopt}$; I_D = 10 mA; V_{DS} = 10 V; $V_{G2\text{-}S}$ = 4 V	1	2	dB

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	20	V
I_D	drain current (DC)		–	20	mA
$I_{D(AV)}$	average drain current		–	20	mA
I_{G1-S}	gate 1-source current		–	±10	mA
I_{G2-S}	gate 2-source current		–	±10	mA
P_{tot}	total power dissipation	up to T_{amb} = 60 °C; note 1	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C

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 to the Limiting values and the Thermal characteristics

1. Device mounted on a ceramic substrate of $8 \times 10 \times 0.7$ mm.

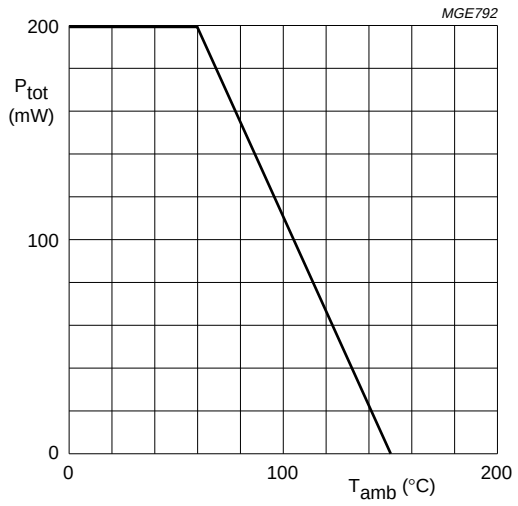


Fig.2 Power derating curve.

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{G1-SS}	gate 1 cut-off current	V_{G1-S} = 5 V; V_{G2-S} = V_{DS} = 0	–	50	nA
I_{G2-SS}	gate 2 cut-off current	V_{G2-S} = 5 V; V_{G1-S} = V_{DS} = 0	–	50	nA
I_{DSS}	drain current	V_{DS} = 10 V; V_{G1-S} = 0; V_{G2-S} = 4 V	4	25	mA
$V_{(BR)G1-SS}$	gate 1-source breakdown voltage	I_{G1-SS} = 10 mA; V_{G2-S} = V_{DS} = 0	6	20	V
$V_{(BR)G2-SS}$	gate 2-source breakdown voltage	I_{G2-SS} = 10 mA; V_{G1-S} = V_{DS} = 0	6	20	V
$V_{(P)G1-S}$	gate 1-source cut-off voltage	I_D = 20 μA; V_{DS} = 10 V; V_{G2-S} = 4 V	–	–2.5	V
$V_{(P)G2-S}$	gate 2-source cut-off voltage	I_D = 20 μA; V_{DS} = 10 V; V_{G1-S} = 0	–	–2.5	V

DYNAMIC CHARACTERISTICS

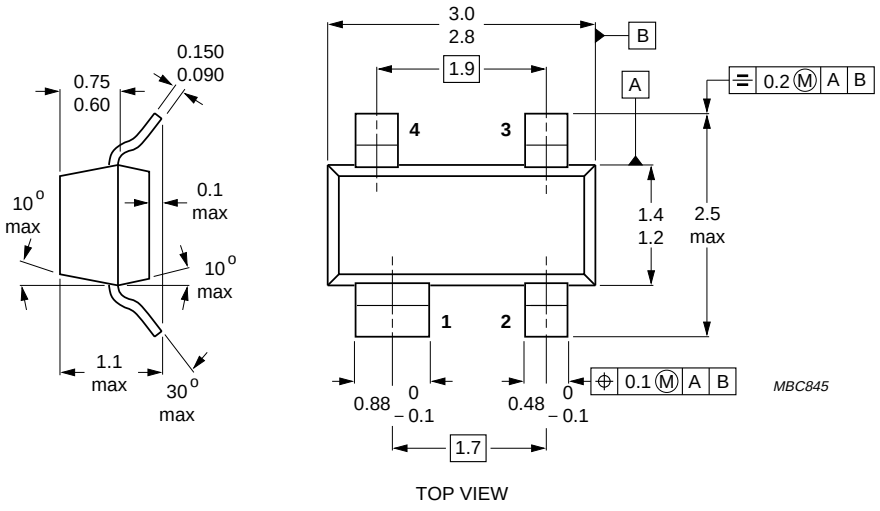
Measuring conditions (common source): I_D = 10 mA; V_{DS} = 10 V; V_{G2-S} = 4 V; T_{amb} = 25 °C.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$\lvert Y_{fs} \rvert$	transfer admittance	f = 1 kHz	10	14	–	mS
C_{ig1-s}	input capacitance at gate 1	f = 1 MHz	–	2.1	–	pF
C_{ig2-s}	input capacitance at gate 2	f = 1 MHz	–	1	–	pF
C_{rs}	feedback capacitance	f = 1 MHz	–	20	–	fF
C_{os}	output capacitance	f = 1 MHz	–	1.1	–	pF
F	noise figure	f = 100 MHz; G_S = 1 mS; B_S = B_{Sopt}	–	0.7	1.7	dB
		f = 200 MHz; G_S = 2 mS; B_S = B_{Sopt}	–	1	2	dB
G_{tr}	transducer gain; note 1	f = 100 MHz; G_S = 1 mS; B_S = B_{Sopt}; G_L = 0.5 mS; B_L = B_{Lopt}	–	29	–	dB
		f = 200 MHz; G_S = 2 mS; B_S = B_{Sopt}; G_L = 0.5 mS; B_L = B_{Lopt}	–	26	–	dB

Note

1. Crystal mounted in a SOT103 package.

PACKAGE OUTLINE



Dimensions in mm.

See also *Soldering recommendations.*

Fig.3 SOT143.

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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.
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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
BF991_N_3	20071120	Product data sheet	-	BF991_2
Modifications:	• Fig. 1 on page 2; Figure note changed			
BF991_2	19910401	Product specification	-	BF991_SF_1
BF991_SF_1	-	-	-	-

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