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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.

APPLICATIONS

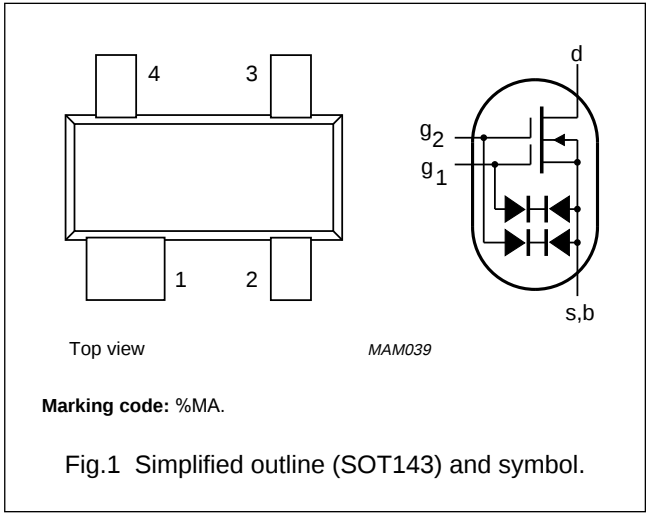
- VHF applications such as:
 - VHF television tuners and FM tuners
 - Professional communication equipment.

PINNING

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

DESCRIPTION

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



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
Y _{fs}	transfer admittance	f = 1 kHz; I _D = 10 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	14	–	mS
C _{ig1-s}	input capacitance at gate 1	f = 1 MHz; I _D = 10 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	2.1	–	pF
C _{rs}	feedback capacitance	f = 1 MHz; I _D = 10 mA; V _{DS} = 10 V; V _{G2-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-S} = 4 V	1	2	dB

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LIMITING VALUES

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

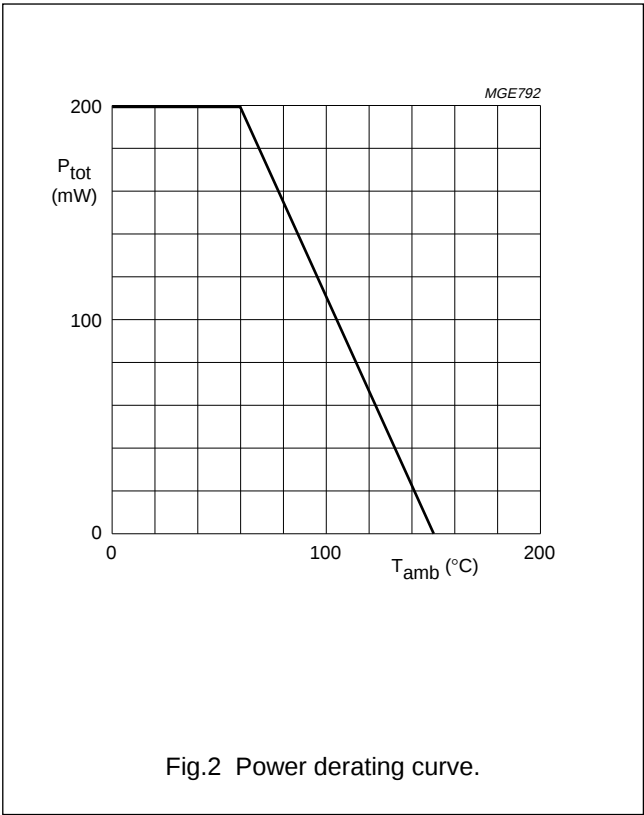
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{DS}	drain-source voltage		–	20	V
I _D	drain current (DC)		–	20	mA
I _{D(AV)}	average drain current		–	20	mA
I _{G1-S}	gate 1-source current		–	±10	mA
I _{G2-S}	gate 2-source current		–	±10	mA
P _{tot}	total power dissipation	up to T _{amb} = 60 °C; note 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 × 10 × 0.7 mm.



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STATIC CHARACTERISTICS

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

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

DYNAMIC CHARACTERISTICS

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

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

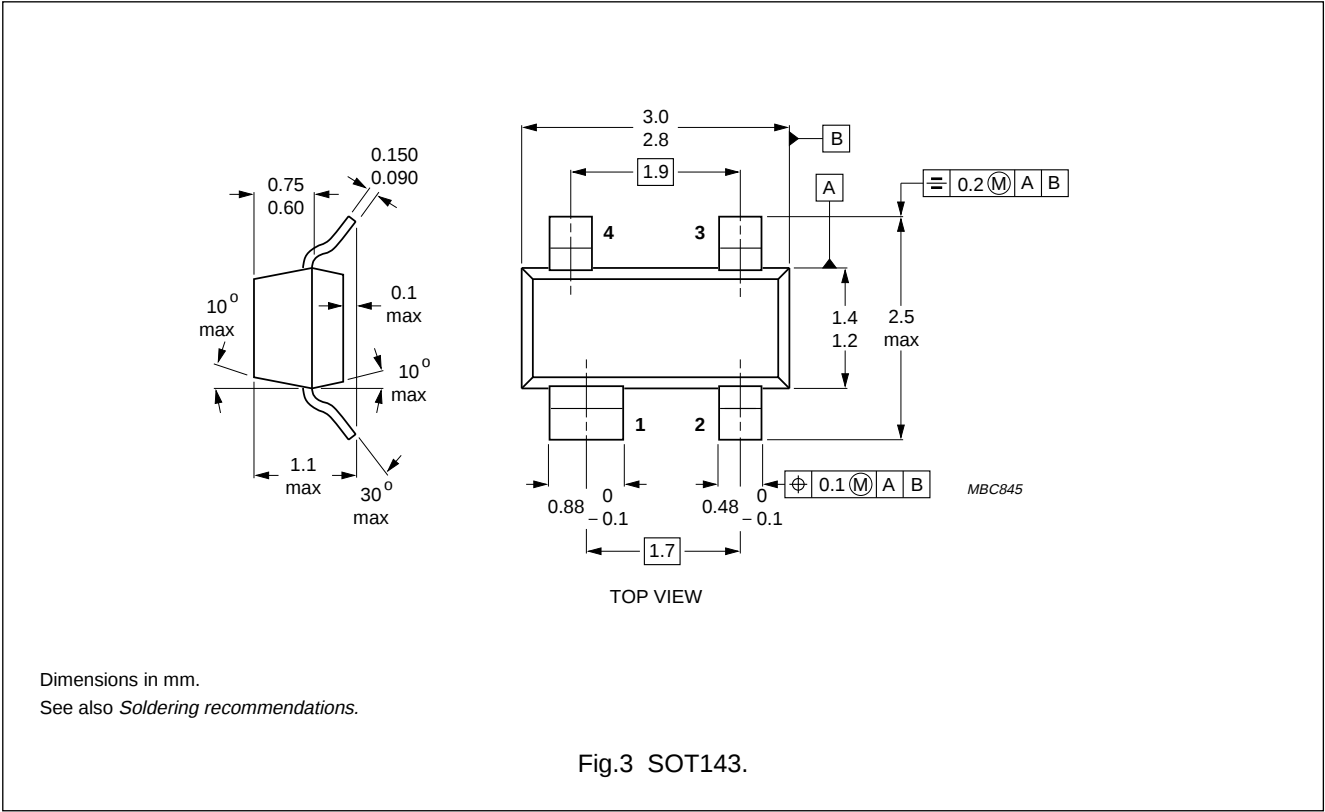
Note

1. Crystal mounted in a SOT103 package.

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PACKAGE OUTLINE



Legal information

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".

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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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