DATA SHEET

BF994S
N-channel dual-gate MOS-FET

Product specification

July 1993

N-channel dual-gate MOS-FET BF994S

FEATURES

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

DESCRIPTION

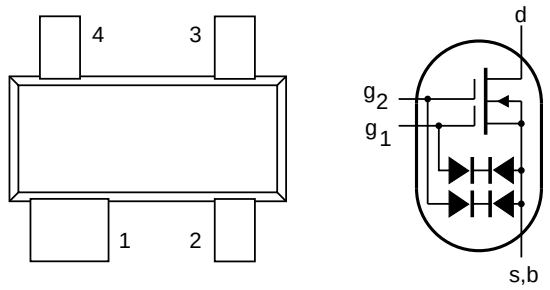
Depletion type field-effect transistor in a plastic SOT143 microminiature package with interconnected source and substrate.

APPLICATIONS

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

PINNING

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



Marking code: MGp.

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		–	30	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} = 15 V; $V_{G2\text{-}S}$ = 4 V	18	–	mS
$C_{ig1\text{-}s}$	input capacitance at gate 1	f = 1 MHz; I_D = 10 mA; V_{DS} = 15 V; $V_{G2\text{-}S}$ = 4 V	2.5	3	pF
C_{rs}	feedback capacitance	f = 1 MHz; I_D = 10 mA; V_{DS} = 15 V; $V_{G2\text{-}S}$ = 4 V	25	–	fF
F	noise figure	f = 200 MHz; G_S = 2 mS; $B_S = B_{Sopt}$; I_D = 10 mA; V_{DS} = 15 V; $V_{G2\text{-}S}$ = 4 V	1	–	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)		–	30	mA
$I_{D(AV)}$	average drain current		–	30	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 range		−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.

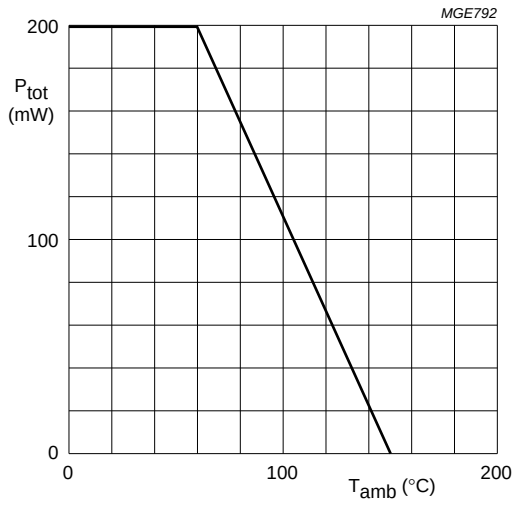


Fig.2 Power derating curve.

STATIC CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{G1-SS}	gate 1 cut-off currents	V_{G1-S} = ±5 V; V_{G2-S} = V_{DS} = 0	–	±50	nA
I_{G2-SS}	gate 2 cut-off currents	V_{G2-S} = ±5 V; V_{G1-S} = V_{DS} = 0	–	±50	nA
$V_{(BR)G1-SS}$	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
I_{DSS}	drain-source cut-off voltage	V_{DS} = 15 V; V_{G1-S} = 0; V_{G2-S} = 4 V	4	20	mA
$V_{(P)G1-S}$	gate 1-source cut-off voltage	I_D = 20 μA; V_{DS} = 15 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} = 15 V; V_{G1-S} = 0	–	–2	V

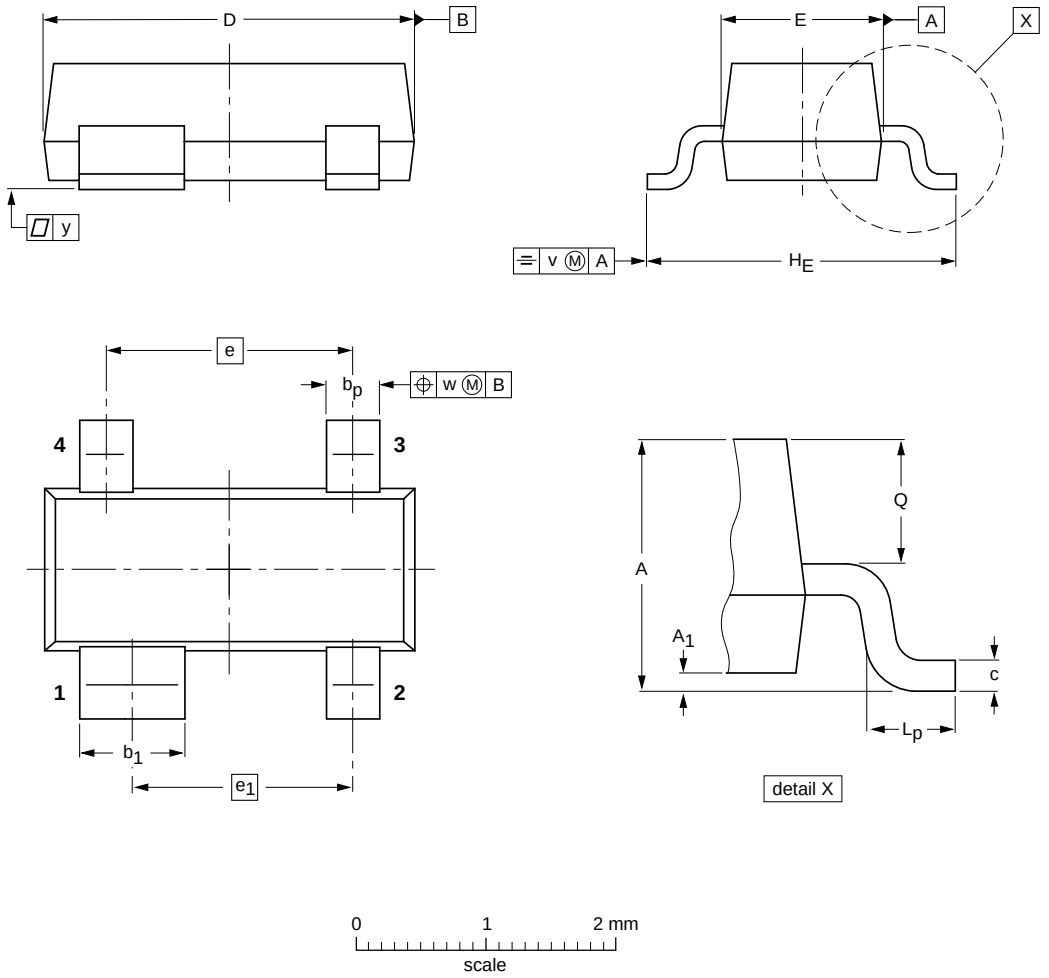
DYNAMIC CHARACTERISTICS

Measuring conditions (common source): I_D = 10 mA; V_{DS} = 15 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	15	18	–	mS
C_{ig1-s}	input capacitance at gate 1	f = 1 MHz	–	2.5	3	pF
C_{ig2-s}	input capacitance at gate 2	f = 1 MHz	–	1.2	–	pF
C_{rs}	feedback capacitance	f = 1 MHz	–	25	–	fF
C_{os}	output capacitance	f = 1 MHz	–	1	–	pF
F	noise figure	f = 200 MHz; G_S = 2 mS; B_S = B_{Sopt}	–	1	–	dB
G_p	power gain	f = 200 MHz; G_S = 2 mS; B_S = B_{Sopt}; G_L = 0.5 mS; B_L = B_{Lopt}	–	25	–	dB

PACKAGE OUTLINE

Plastic surface-mounted package; 4 leads **SOT143B**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	b_1	c	D	E	e	e_1	H_E	L_p	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	JEITA			
SOT143B						~~04-11-16~~ 06-03-16

DATA SHEET STATUS

DOCUMENT STATUS[1]	PRODUCT STATUS[2]	DEFINITION
Objective data sheet	Development	This document contains data from the objective specification for product development.
Preliminary data sheet	Qualification	This document contains data from the preliminary specification.
Product data sheet	Production	This document contains the product specification.

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This data sheet was changed to reflect the new company name NXP Semiconductors, including new legal definitions and disclaimers. No changes were made to the technical content, except for package outline drawings which were updated to the latest version.

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Printed in The Netherlands R77/02/pp8 Date of release:July 1993

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