

DATA SHEET

BF996S

N-channel dual-gate MOS-FET

Product specification

April 1991



N-channel dual-gate MOS-FET

BF996S

FEATURES

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

DESCRIPTION

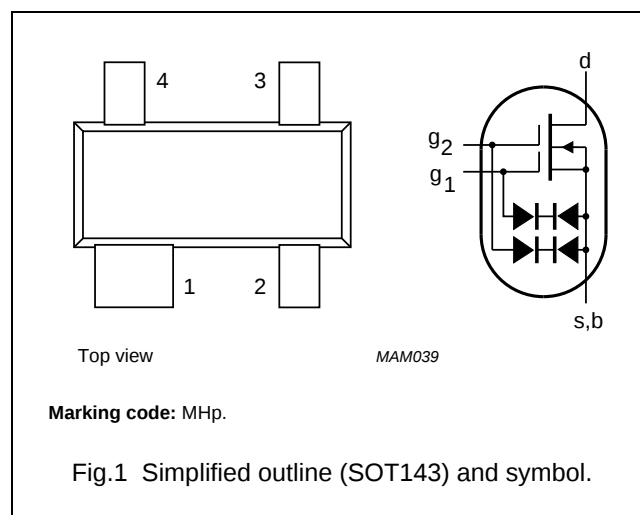
Depletion type field-effect transistor in a plastic SOT143 microminiature package with interconnected source and substrate.

APPLICATIONS

- RF applications such as:
 - UHF 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



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 $T_{amb} = 60\text{ }^{\circ}\text{C}$	—	200	mW
T_j	junction temperature		—	150	$^{\circ}\text{C}$
$ Y_{fs} $	transfer admittance	$f = 1\text{ kHz}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	18	—	mS
C_{ig-1s}	input capacitance at gate 1	$f = 1\text{ MHz}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	2.3	2.6	pF
C_{rs}	feedback capacitance	$f = 1\text{ MHz}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	25	—	fF
F	noise figure	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{GS-2} = 4\text{ V}$	1	—	dB

N-channel dual-gate MOS-FET

BF996S

LIMITING VALUES

In accordance 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		–	± 10	mA
I_{G2-S}	gate 2 source		–	± 10	mA
P_{tot}	total power dissipation	up to $T_{amb} = 60\text{ }^{\circ}\text{C}$; note 1	–	200	mW
T_{stg}	storage temperature range		–65	+150	$^{\circ}\text{C}$
T_j	junction temperature		–	150	$^{\circ}\text{C}$

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 $8 \times 10 \times 0.7\text{ mm}$.

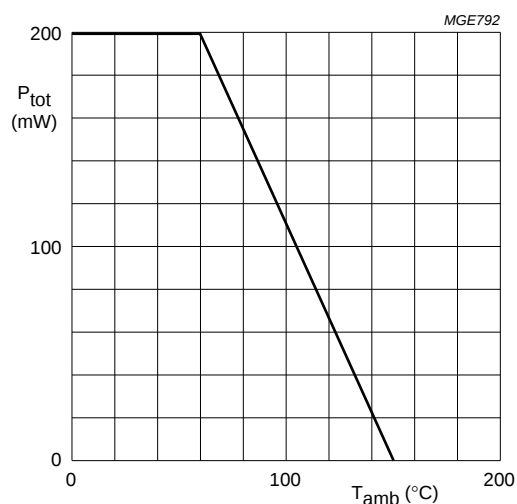


Fig.2 Power derating curve.

N-channel dual-gate MOS-FET

BF996S

STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{G1-SS}	gate cut-off current	$V_{G1-S} = \pm 5\text{ V}; V_{G2-S} = V_{DS} = 0$	–	± 50	nA
I_{G2-SS}	gate cut-off current	$V_{G2-S} = \pm 5\text{ V}; V_{G1-S} = V_{DS} = 0$	–	± 50	nA
$V_{(BR)G1-SS}$	gate-source breakdown voltage	$I_{G1-S} = \pm 10\text{ mA}; V_{G2-S} = V_{DS} = 0$	± 6	± 20	V
$V_{(BR)G2-SS}$	gate-source breakdown voltage	$I_{G2-S} = \pm 10\text{ mA}; V_{G1-S} = V_{DS} = 0$	± 6	± 20	V
I_{DSS}	drain current	$V_{DS} = 15\text{ V}; V_{G1-S} = 0; V_{G2-S} = 4\text{ V}$	4	20	mA
$V_{(P)G1-S}$	gate-source cut-off current	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	–	–2.5	V
$V_{(P)G2-S}$	gate-source cut-off current	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; V_{G1-S} = 0$	–	–2	V

DYNAMIC CHARACTERISTICS

Measuring conditions (common source): $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}; T_{amb} = 25\text{ }^{\circ}\text{C}$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$ Y_{fs} $	transfer admittance	$f = 1\text{ kHz}$	15	18	–	mS
C_{ig1-s}	input capacitance at gate 1	$f = 1\text{ MHz}$	–	2.3	2.6	pF
C_{ig2-s}	input capacitance at gate 2	$f = 1\text{ MHz}$	–	1.2	–	pF
C_{rs}	feedback capacitance	$f = 1\text{ MHz}$	–	25	–	fF
C_{os}	output capacitance	$f = 1\text{ MHz}$	–	0.8	–	pF
F	noise figure	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}$	–	1	–	dB
		$f = 800\text{ MHz}; G_S = 3.3\text{ mS}; B_S = B_{Sopt}$	–	1.8	–	dB
G_P	power gain	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}; G_L = 0.5\text{ mS}; B_L = B_{Lopt}$	–	25	–	dB
		$f = 800\text{ MHz}; G_S = 3.3\text{ mS}; B_S = B_{Sopt}; G_L = 1\text{ mS}; B_L = B_{Lopt}$	–	18	–	dB

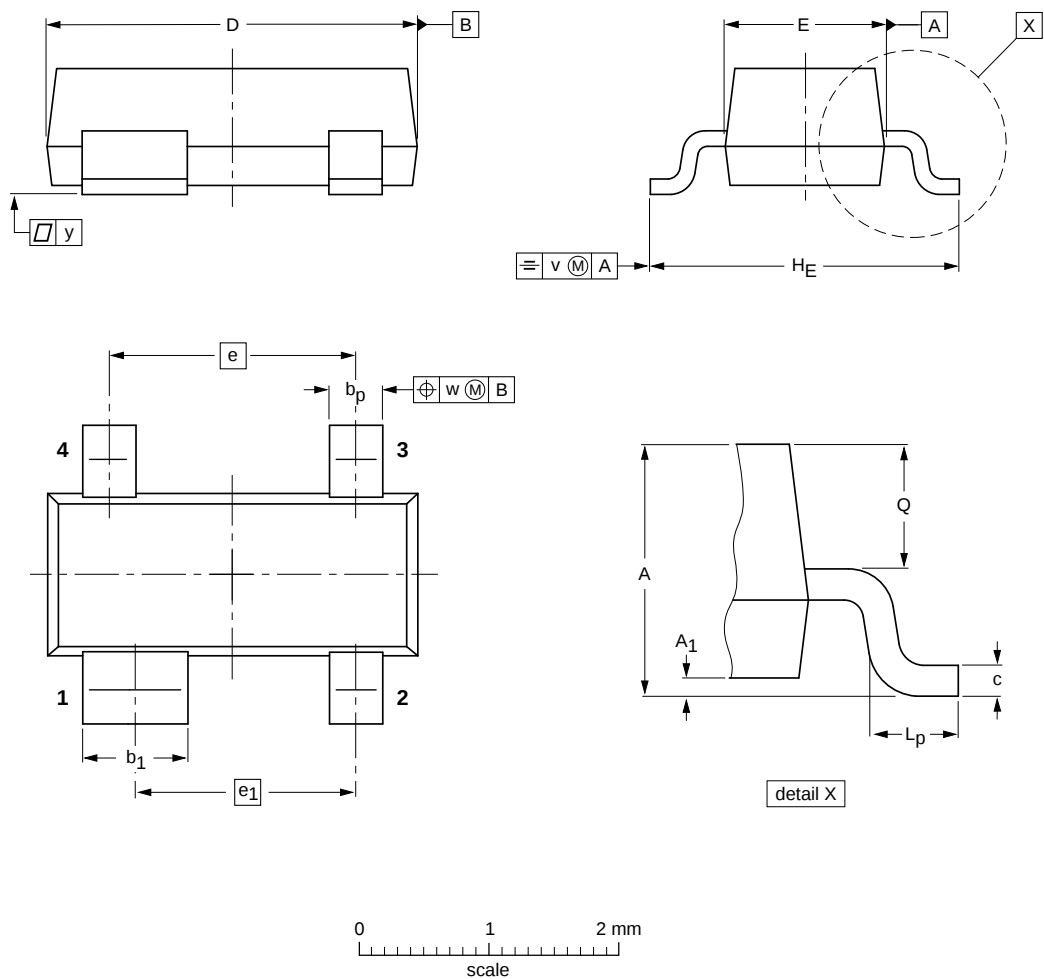
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BF996S

PACKAGE OUTLINE

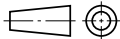
Plastic surface-mounted package; 4 leads

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

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BF996S

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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N-channel dual-gate MOS-FET

BF996S

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