

DATA SHEET

BF989

N-channel dual-gate MOS-FET

Product specification
File under Discrete Semiconductors, SC07

April 1991

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FEATURES

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

APPLICATIONS

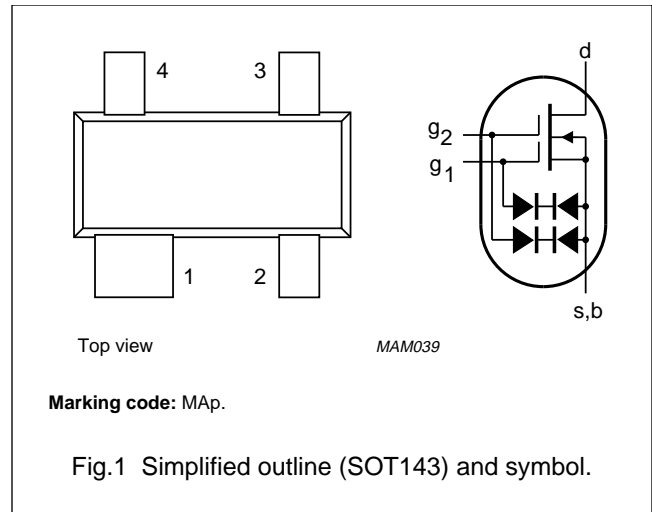
- UHF applications such as:
 - UHF television tuners
 - Professional communication equipment.

PINNING

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

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 = 7 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	12	–	mS
C _{ig1-s}	input capacitance at gate 1	f = 1 MHz; I _D = 7 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	1.8	–	pF
C _{rs}	feedback capacitance	f = 1 MHz; I _D = 7 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	25	–	fF
F	noise figure	f = 800 MHz; G _S = 2 mS; B _S = B _{Sopt} ; I _D = 7 mA; V _{DS} = 10 V; V _{G2-S} = 4 V	2.8	–	dB

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LIMITING VALUES

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

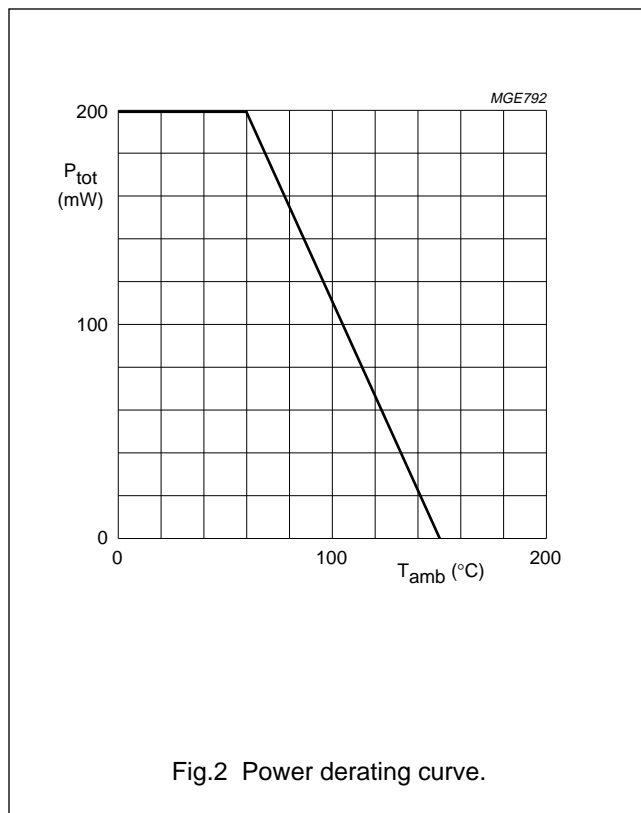
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	20	V
I_D	drain current (DC)		–	20	mA
$I_{D(AV)}$	average drain current		–	20	mA
I_{G1-S}	gate 1-source current		–	± 10	mA
I_{G2-S}	gate 2-source current		–	± 10	mA
P_{tot}	total power dissipation	up to $T_{amb} = 60\text{ }^\circ\text{C}$; 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 $8 \times 10 \times 0.7\text{ mm}$.



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STATIC CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{G1-SS}	gate 1 cut-off current	$V_{G1-S} = \pm 5\text{ V}; V_{G2-S} = V_{DS} = 0$	–	± 50	nA
I_{G2-SS}	gate 2 cut-off current	$V_{G2-S} = \pm 5\text{ V}; V_{G1-S} = V_{DS} = 0$	–	± 50	nA
I_{DSS}	drain-source cut-off voltage	$V_{DS} = 10\text{ V}; V_{G1-S} = 0; V_{G2-S} = 4\text{ V}$	2	20	mA
$V_{(BR)G1-SS}$	gate 1-source breakdown voltage	$I_{G1-SS} = \pm 10\text{ mA}; V_{G2-S} = V_{DS} = 0$	± 6	± 20	V
$V_{(BR)G2-SS}$	gate 2-source breakdown voltage	$I_{G2-SS} = \pm 10\text{ mA}; V_{G1-S} = V_{DS} = 0$	± 6	± 20	V
$V_{(P)G1-S}$	gate 1-source cut-off voltage	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 10\text{ V}; V_{G2-S} = 4\text{ V}$	–	–2.7	V
$V_{(P)G2-S}$	gate 2-source cut-off voltage	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 10\text{ V}; V_{G1-S} = 0$	–	–2.7	V

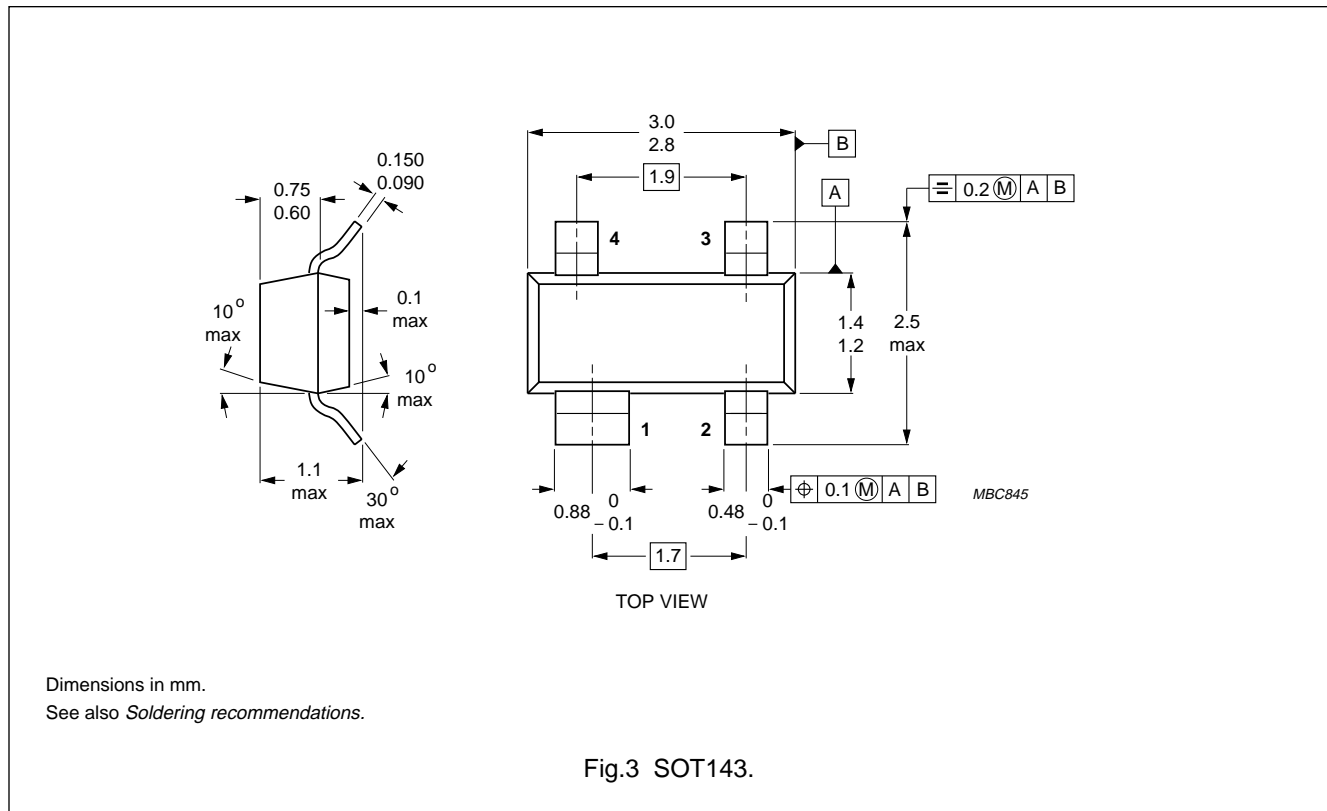
DYNAMIC CHARACTERISTICSMeasuring conditions (common source): $I_D = 7\text{ mA}; V_{DS} = 10\text{ V}; V_{G2-S} = 4\text{ V}; T_{amb} = 25\text{ °C}$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	UNIT
$ Y_{fs} $	transfer admittance	$f = 1\text{ kHz}$	9.5	12	mS
C_{ig1-s}	input capacitance at gate 1	$f = 1\text{ MHz}$	–	1.8	pF
C_{ig2-s}	input capacitance at gate 2	$f = 1\text{ MHz}$	–	1	pF
C_{rs}	feedback capacitance	$f = 1\text{ MHz}$	–	25	fF
C_{os}	output capacitance	$f = 1\text{ MHz}$	–	0.9	pF
F	noise figure	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}$	–	1.6	dB
		$f = 800\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}$	–	2.8	dB

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PACKAGE OUTLINE



DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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NOTES

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Printed in The Netherlands

117061/00/02/pp8

Date of release: April 1991

Document order number: 9397 750 01541

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