

DATA SHEET

BF997 N-channel dual-gate MOS-FET

Product specification
File under Discrete Semiconductors, SC07

April 1991

N-channel dual-gate MOS-FET

BF997

FEATURES

- Protected against excessive input voltage surges by integrated back-to-back diodes between gates and source
- Integrated drain resistance to suppress oscillation in the frequency range greater than 1 GHz.

APPLICATIONS

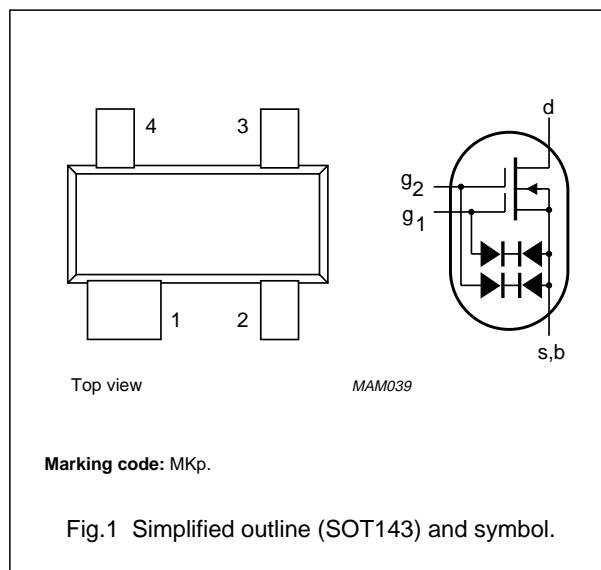
- UHF and VHF applications such as:
 - UHF/VHF television tuners
 - Professional communication equipment
- Especially intended for use in pre-amplifiers in CATV tuners with a large tuning range up to 500 MHz.

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		–	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_{ig1-s}	input capacitance at gate 1	$f = 1\text{ MHz}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	2.5	–	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	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}; I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	1	–	dB

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LIMITING VALUES

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

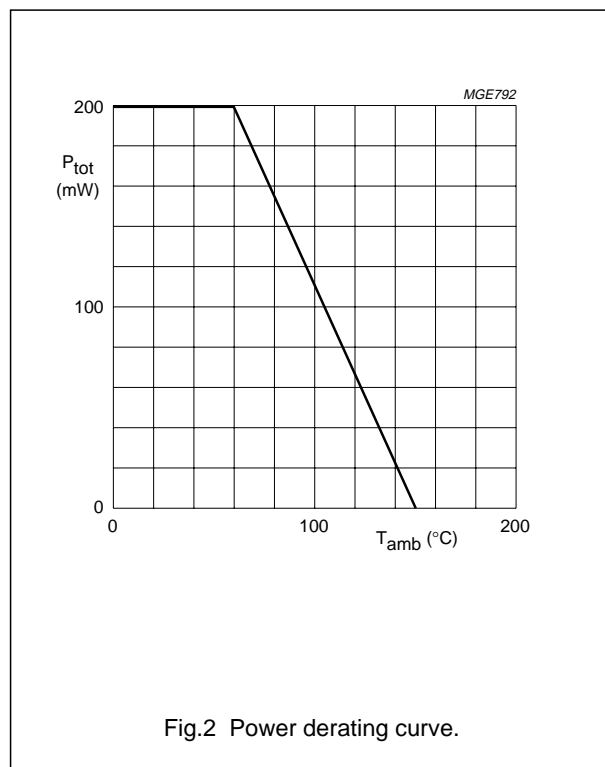
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{DS}	drain-source voltage		–	20	V
I_D	drain current (DC)		–	30	mA
$I_{D(AV)}$	average drain current		–	30	mA
I_{G1-S}	gate 1-source current		–	± 10	mA
I_{G2-S}	gate 2-source current		–	± 10	mA
P_{tot}	total power dissipation	up to $T_{amb} = 60\text{ }^\circ\text{C}$; note 1	–	200	mW
T_{stg}	storage temperature		–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 $8 \times 10 \times 0.7$ 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	$V_{G1-S} = \pm 5\text{ V}; V_{G2-S} = V_{DS} = 0$	–	± 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
$V_{(BR)G1-SS}$	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	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}$	–	–2.5	V
$V_{(P)G2-S}$	gate 2-source cut-off voltage	$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; V_{G1-S} = 0$	–	–2	V
I_{DSS}	drain-source cut-off voltage	$V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}; V_{G1-S} = 0$	2	20	mA

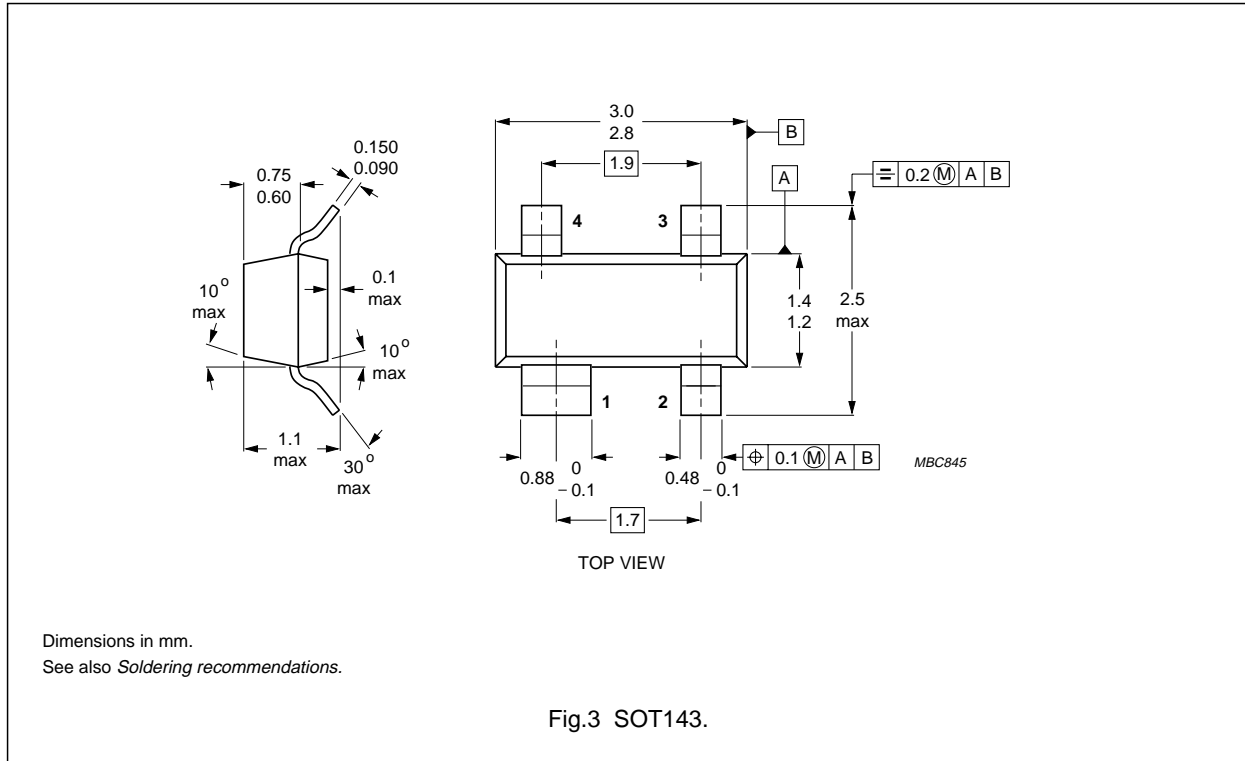
DYNAMIC CHARACTERISTICSMeasuring conditions (common source): $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; V_{G2-S} = 4\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}$.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	UNIT
$ Y_{fs} $	transfer admittance	$f = 1\text{ kHz}$	15	18	mS
C_{ig1-s}	input capacitance at gate 1	$f = 1\text{ MHz}$	–	2.5	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	$f = 1\text{ MHz}$	–	1	pF
F	noise figure	$f = 200\text{ MHz}; G_S = 2\text{ mS}; B_S = B_{Sopt}$	–	1	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

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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.	

LIFE SUPPORT APPLICATIONS

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.