

# DATA SHEET

**BF908WR**  
N-channel dual-gate MOS-FET

Preliminary specification

1995 Apr 25



## N-channel dual-gate MOS-FET

BF908WR

## FEATURES

- High forward transfer admittance
- Short channel transistor with high forward transfer admittance to input capacitance ratio
- Low noise gain controlled amplifier up to 1 GHz.

## APPLICATIONS

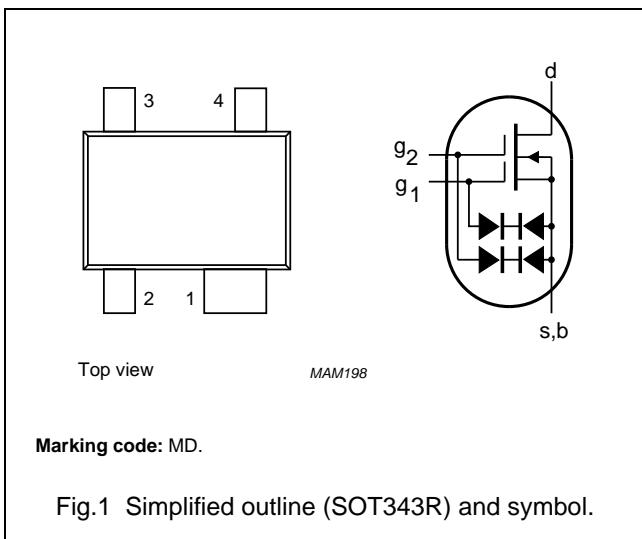
- VHF and UHF applications with 12 V supply voltage, such as television tuners and professional communications equipment.

## DESCRIPTION

Depletion type field effect transistor in a plastic microminiature SOT343R package. The transistor is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

## PINNING

PIN	SYMBOL	DESCRIPTION
1	s, b	source
2	d	drain
3	g <sub>2</sub>	gate 2
4	g <sub>1</sub>	gate 1



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>DS</sub>	drain-source voltage		—	—	12	V
I <sub>D</sub>	drain current		—	—	40	mA
P <sub>tot</sub>	total power dissipation		—	—	300	mW
T <sub>j</sub>	operating junction temperature		—	—	150	°C
y <sub>fs</sub>	forward transfer admittance		36	43	50	mS
C <sub>ig1-s</sub>	input capacitance at gate 1		2.4	3.1	4	pF
C <sub>rs</sub>	reverse transfer capacitance	f = 1 MHz	20	30	45	fF
F	noise figure	f = 800 MHz	—	1.5	2.5	dB

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{DS}$	drain-source voltage		–	12	V
$I_D$	drain current		–	40	mA
$I_{G1}$	gate 1 current		–	$\pm 10$	mA
$I_{G2}$	gate 2 current		–	$\pm 10$	mA
$P_{tot}$	total power dissipation	up to $T_{amb} = 45^\circ\text{C}$ ; see Fig.2; note 1	–	300	mW
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	operating junction temperature		–	+150	$^\circ\text{C}$

**Note**

1. Device mounted on a printed-circuit board.

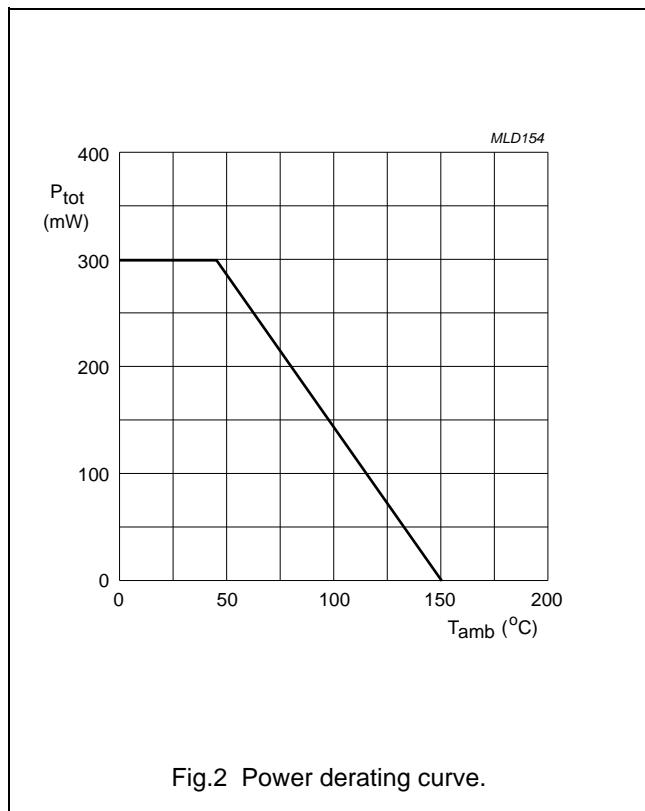


Fig.2 Power derating curve.

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## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	note 1	350	K/W
$R_{th\ j-s}$	thermal resistance from junction to soldering point	$T_s = 87^\circ\text{C}$ ; note 2	210	K/W

## Notes

1. Device mounted on a printed-circuit board.
2.  $T_s$  is the temperature at the soldering point of the source lead.

## STATIC CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)G1-SS}$	gate 1-source breakdown voltage	$V_{G2-S} = V_{DS} = 0$ ; $I_{G1-S} = 10\text{ mA}$	8	—	20	V
$V_{(BR)G2-SS}$	gate 2-source breakdown voltage	$V_{G1-S} = V_{DS} = 0$ ; $I_{G2-S} = 10\text{ mA}$	8	—	20	V
$V_{(P)G1-S}$	gate 1-source cut-off voltage	$V_{G2-S} = 4\text{ V}$ ; $V_{DS} = 8\text{ V}$ ; $I_D = 20\text{ }\mu\text{A}$	—	—	-2	V
$V_{(P)G2-S}$	gate 2-source cut-off voltage	$V_{G1-S} = 4\text{ V}$ ; $V_{DS} = 8\text{ V}$ ; $I_D = 20\text{ }\mu\text{A}$	—	—	-1.5	V
$I_{DSS}$	drain-source current	$V_{G2-S} = 4\text{ V}$ ; $V_{DS} = 8\text{ V}$ ; $V_{G1-S} = 0$	3	15	27	mA
$I_{G1-SS}$	gate 1 cut-off current	$V_{G2-S} = V_{DS} = 0$ ; $V_{G1-S} = 5\text{ V}$	—	—	50	nA
$I_{G2-SS}$	gate 2 cut-off current	$V_{G1-S} = V_{DS} = 0$ ; $V_{G2-S} = 5\text{ V}$	—	—	50	nA

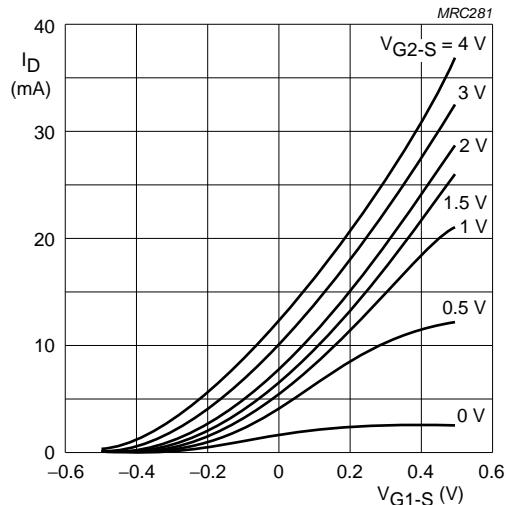
## DYNAMIC CHARACTERISTICS

Common source;  $T_{amb} = 25^\circ\text{C}$ ;  $V_{DS} = 8\text{ V}$ ;  $V_{G2-S} = 4\text{ V}$ ;  $I_D = 15\text{ mA}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$ y_{fs} $	forward transfer admittance	pulsed; $T_j = 25^\circ\text{C}$	36	43	50	mS
$C_{ig1-s}$	input capacitance at gate 1	$f = 1\text{ MHz}$	2.4	3.1	4	pF
$C_{ig2-s}$	input capacitance at gate 2	$f = 1\text{ MHz}$	1.2	1.8	2.5	pF
$C_{os}$	drain-source capacitance	$f = 1\text{ MHz}$	1.2	1.7	2.2	pF
$C_{rs}$	reverse transfer capacitance	$f = 1\text{ MHz}$	20	30	45	fF
$F$	noise figure	$f = 200\text{ MHz}$ ; $G_S = 2\text{ mS}$ ; $B_S = B_{Sopt}$	—	0.6	1.2	dB
		$f = 800\text{ MHz}$ ; $G_S = G_{Sopt}$ ; $B_S = B_{Sopt}$	—	1.5	2.5	dB

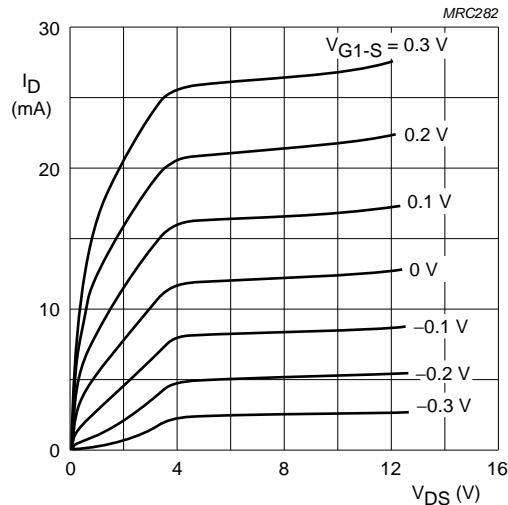
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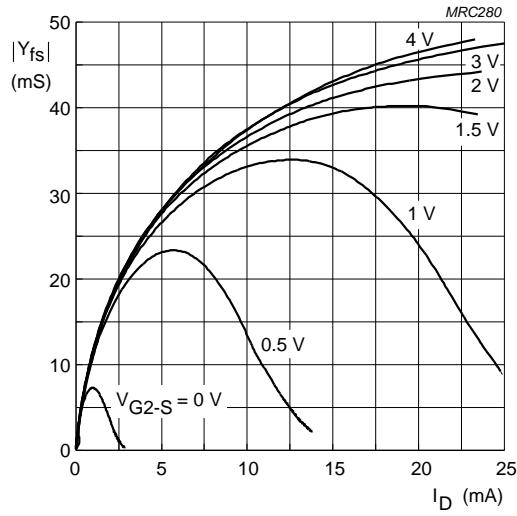
$V_{DS} = 8$  V.  
 $T_j = 25$  °C.

Fig.3 Transfer characteristics; typical values.



$V_{G2-S} = 4$  V.  
 $T_j = 25$  °C.

Fig.4 Output characteristics; typical values.



$V_{DS} = 8$  V.  
 $T_j = 25$  °C.

Fig.5 Forward transfer admittance as a function of drain current; typical values.

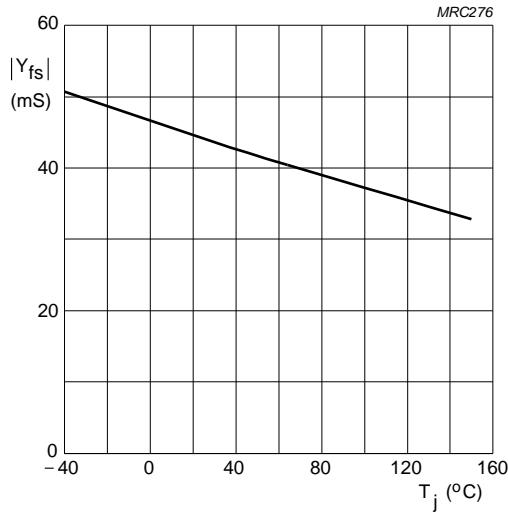


Fig.6 Forward transfer admittance as a function of junction temperature; typical values.

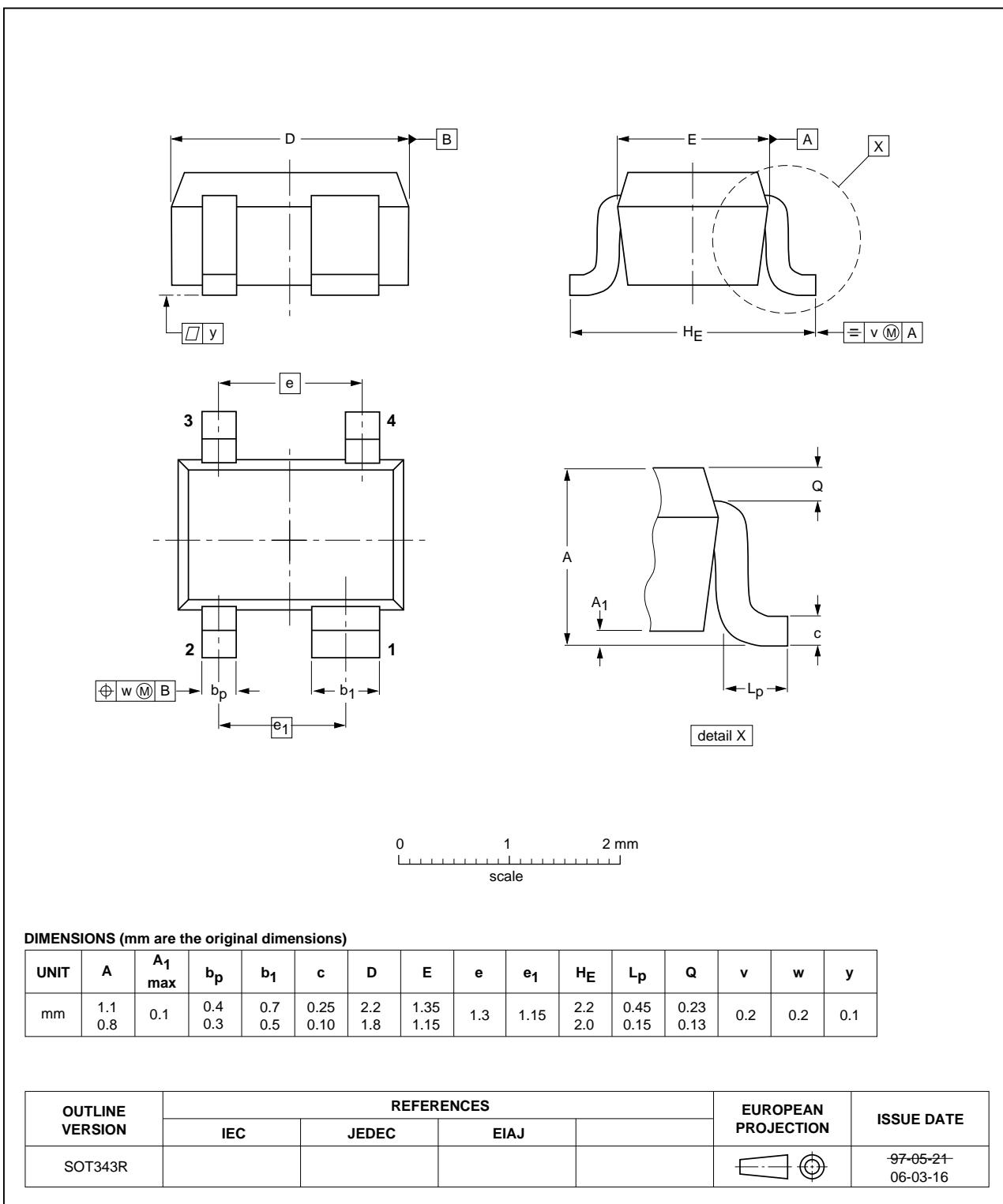
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## PACKAGE OUTLINE

Plastic surface-mounted package; reverse pinning; 4 leads

SOT343R



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## DATA SHEET STATUS

DOCUMENT STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	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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