BF908; BF908R

Dual-gate MOS-FETs

Rev. 03 — 14 November 2007 Product data sheet

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Dual-gate MOS-FETs BF908; BF908R

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.

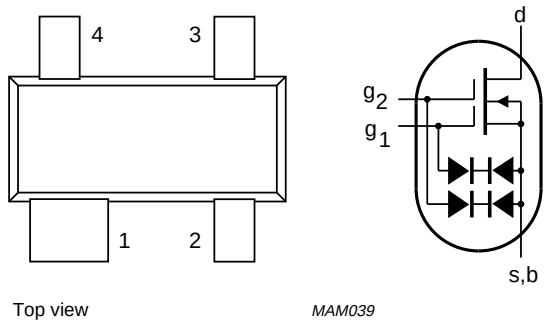
DESCRIPTION

Depletion type field-effect transistor in a plastic microminiature SOT143 or SOT143R package. The transistors are protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

CAUTION
The device is supplied in an antistatic package. The gate-source input must be protected against static discharge during transport or handling.

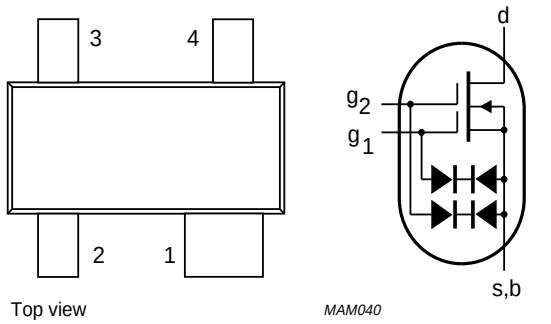
PINNING

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



BF908 marking code: %M1.

Fig.1 Simplified outline (SOT143) and symbol; BF908.



BF908R marking code: %M2.

Fig.2 Simplified outline (SOT143R) and symbol; BF908R.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{DS}	drain-source voltage		–	–	12	V
I_D	drain current		–	–	40	mA
P_{tot}	total power dissipation		–	–	200	mW
T_j	operating junction temperature		–	–	150	°C
$\lvert y_{fs} \rvert$	forward transfer admittance		36	43	50	mS
$C_{ig1\text{-}s}$	input capacitance at gate 1		2.4	3.1	4	pF
C_{rs}	reverse transfer capacitance	f = 1 MHz	20	30	45	pF
F	noise figure	f = 800 MHz	–	1.5	2.5	dB

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
$\pm I_{G1}$	gate 1 current		–	10	mA
$\pm I_{G2}$	gate 2 current		–	10	mA
P_{tot}	total power dissipation	see Fig.3; note 1			
	BF908	up to T_{amb} = 50 °C	–	200	mW
	BF908R	up to T_{amb} = 40 °C	–	200	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	operating junction temperature		–	150	°C

Note

1. Device mounted on a printed-circuit board.

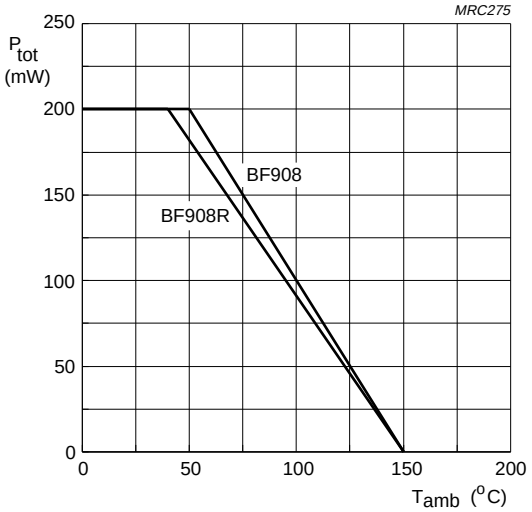


Fig.3 Power derating curves.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1		
	BF908		500	K/W
	BF908R		550	K/W

Note

1. Device mounted on a printed-circuit board.

STATIC CHARACTERISTICS

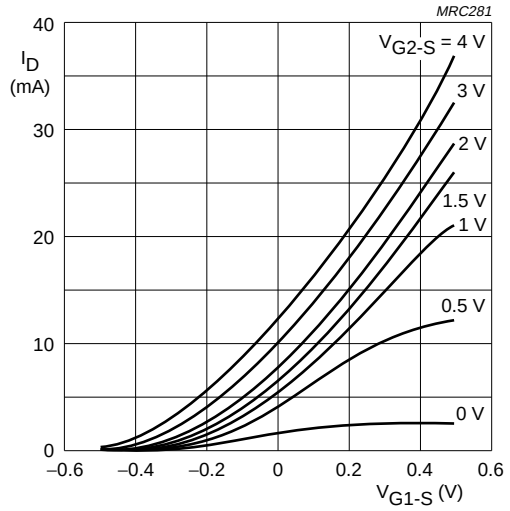
T_j = 25 °C; unless otherwise specified.

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

DYNAMIC CHARACTERISTICS

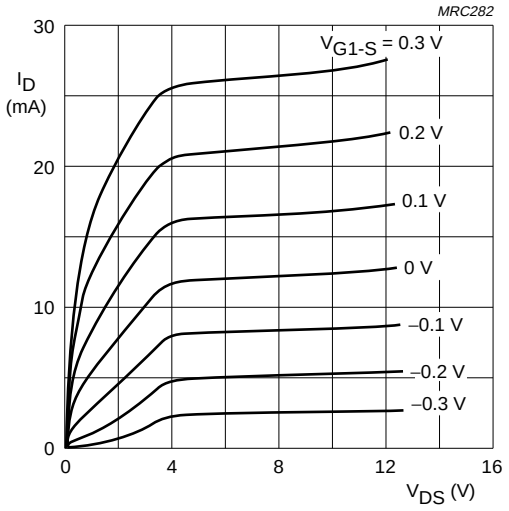
Common source; T_{amb} = 25 °C; V_{DS} = 8 V; $V_{G2\text{-}S}$ = 4 V; I_D = 15 mA; unless otherwise specified.

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



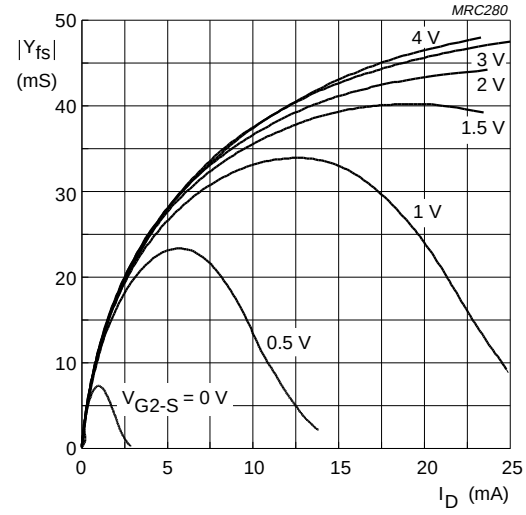
V_{DS} = 8 V; T_j = 25 °C.

Fig.4 Transfer characteristics; typical values.



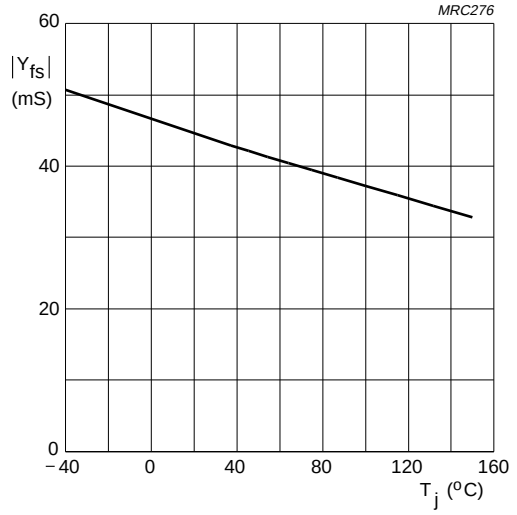
V_{G2-S} = 4 V; T_j = 25 °C.

Fig.5 Output characteristics; typical values.



V_{DS} = 8 V; T_j = 25 °C.

Fig.6 Forward transfer admittance as a function of drain current; typical values.



V_{DS} = 8 V; V_{G2-S} = 4 V; I_D = 15 mA.

Fig.7 Forward transfer admittance as a function of junction temperature; typical values.

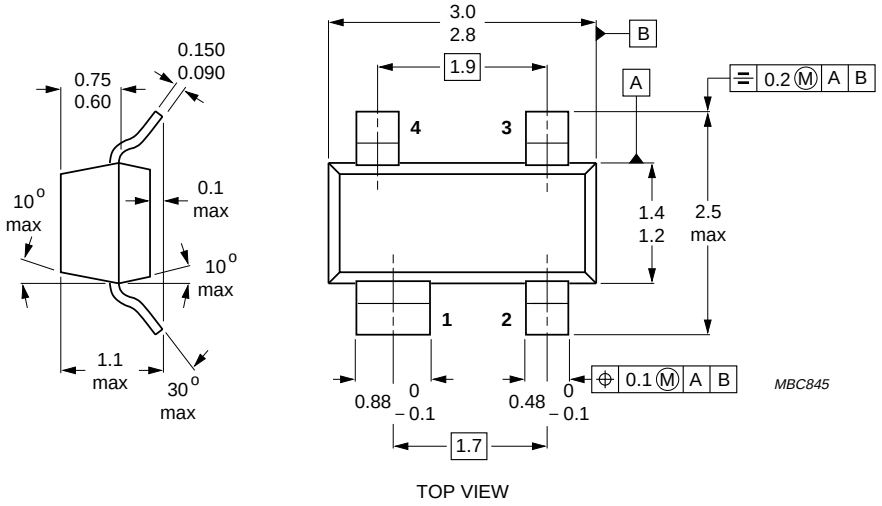
Table 1 Scattering parameters

f (MHz)	s_{11}		s_{21}		s_{12}		s_{22}	
	MAGNITUDE (ratio)	ANGLE (deg)	MAGNITUDE (ratio)	ANGLE (deg)	MAGNITUDE (ratio)	ANGLE (deg)	MAGNITUDE (ratio)	ANGLE (deg)
V_{DS} = 8 V; $V_{G2\text{-}S}$ = 4 V; I_D = 10 mA; T_{amb} = 25 °C.								
50	0.998	–5.1	3.537	173.5	0.001	98.2	0.996	–2.4
100	0.994	–10.4	3.502	167.7	0.001	88.8	0.994	–4.9
200	0.979	–20.8	3.450	154.9	0.003	74.6	0.987	–9.5
300	0.962	–30.3	3.318	143.7	0.004	69.5	0.983	–13.9
400	0.939	–40.1	3.234	131.9	0.005	65.6	0.980	–18.5
500	0.914	–49.1	3.093	120.7	0.006	64.4	0.974	–22.8
600	0.892	–57.1	2.912	111.1	0.005	63.1	0.969	–27.0
700	0.865	–64.4	2.774	101.0	0.005	65.2	0.966	–31.2
800	0.837	–71.6	2.616	91.4	0.004	70.8	0.965	–35.4
900	0.811	–78.1	2.479	81.9	0.004	87.4	0.965	–39.4
1000	0.785	–84.5	3.329	72.5	0.003	108.0	0.966	–43.7
V_{DS} = 8 V; $V_{G2\text{-}S}$ = 4 V; I_D = 15 mA; T_{amb} = 25 °C.								
50	0.998	–5.3	3.983	173.4	0.001	95.5	0.994	–2.4
100	0.994	–10.9	3.943	167.5	0.001	93.6	0.991	–5.0
200	0.976	–21.6	3.878	154.7	0.003	74.3	0.984	–9.7
300	0.957	–31.7	3.722	143.3	0.004	70.0	0.979	–14.2
400	0.934	–41.7	3.614	131.6	0.005	63.5	0.975	–18.8
500	0.907	–51.1	3.446	120.4	0.006	62.2	0.969	–23.2
600	0.885	–59.1	3.240	110.9	0.005	59.6	0.964	–27.4
700	0.851	–66.8	3.072	100.9	0.005	64.8	0.961	–31.6
800	0.826	–73.9	2.891	91.3	0.004	67.8	0.959	–35.9
900	0.797	–80.7	2.733	81.9	0.004	85.0	0.958	–40.0
1000	0.773	–87.0	2.569	72.8	0.004	102.9	0.958	–44.2

Table 2 Noise data

f (MHz)	F_{min} (dB)	Γ_{opt}		r_n
		(ratio)	(deg)	
V_{DS} = 8 V; $V_{G2\text{-}S}$ = 4 V; I_D = 10 mA; T_{amb} = 25 °C.				
800	1.50	0.720	56.7	0.580
V_{DS} = 8 V; $V_{G2\text{-}S}$ = 4 V; I_D = 15 mA; T_{amb} = 25 °C.				
800	1.50	0.700	59.2	0.520

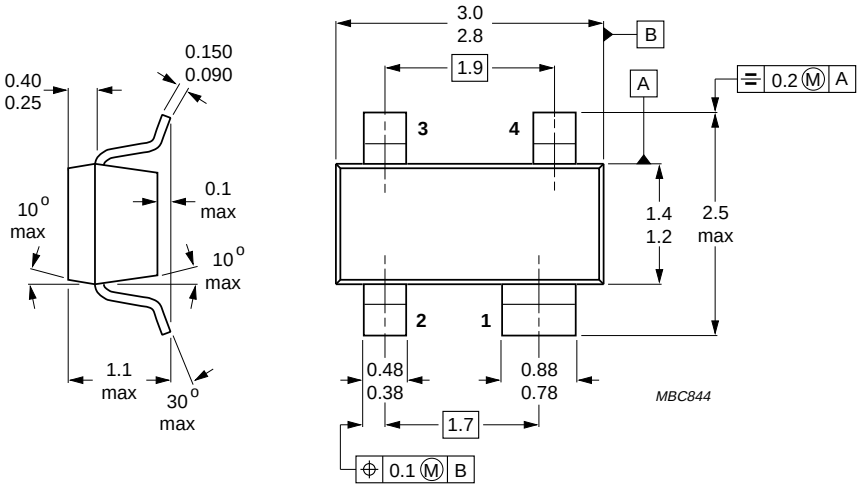
PACKAGE OUTLINES



TOP VIEW

Dimensions in mm.

Fig.8 SOT143.



TOP VIEW

Dimensions in mm.

Fig.9 SOT143R.

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Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
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[2] The term 'short data sheet' is explained in section "Definitions".

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Revision history

Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
BF908-R_N_3	20071114	Product data sheet	-	BF908-R_2
Modifications:	• Fig. 1 and 2 on page 2; Figure note changed			
BF908-R_2	19960730	Product specification	-	BF908R_1
BF908R_1	-	-	-	-

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