

## SILICON N-CHANNEL DUAL GATE MOS-FET

Depletion type field-effect transistor in a plastic SOT143 microminiature envelope with source and substrate interconnected and intended for VHF applications in television tuners. The device is also suitable for use in professional communication equipment.

This MOS-FET tetrode is protected against excessive input voltage surges by integrated back-to-back diodes between gates and source.

### QUICK REFERENCE DATA

Drain-source voltage	$V_{DS}$	max.	20 V
Drain current	$I_D$	max.	30 mA
Total power dissipation up to $T_{amb} = 60\text{ }^\circ\text{C}$	$P_{tot}$	max.	200 mW
Junction temperature	$T_j$	max.	150 $^\circ\text{C}$
Transfer admittance at $f = 1\text{ kHz}$ $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; +V_{G2-S} = 4\text{ V}$	$ y_{fs} $	typ.	18 mS
Input capacitance at gate 1; $f = 1\text{ MHz}$ $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; +V_{G2-S} = 4\text{ V}$	$C_{ig1-s}$	typ. max.	2.5 pF 3.0 pF
Feedback capacitance at $f = 1\text{ MHz}$ $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; +V_{G2-S} = 4\text{ V}$	$C_{rs}$	typ.	25 fF
Noise figure at $G_S = 2\text{ mS}; B_S = B_S\text{ opt}$ $I_D = 10\text{ mA}; V_{DS} = 15\text{ V}; +V_{G2-S} = 4\text{ V}; f = 200\text{ MHz}$	F	typ.	1.0 dB

### MECHANICAL DATA

Fig.1 SOT143.

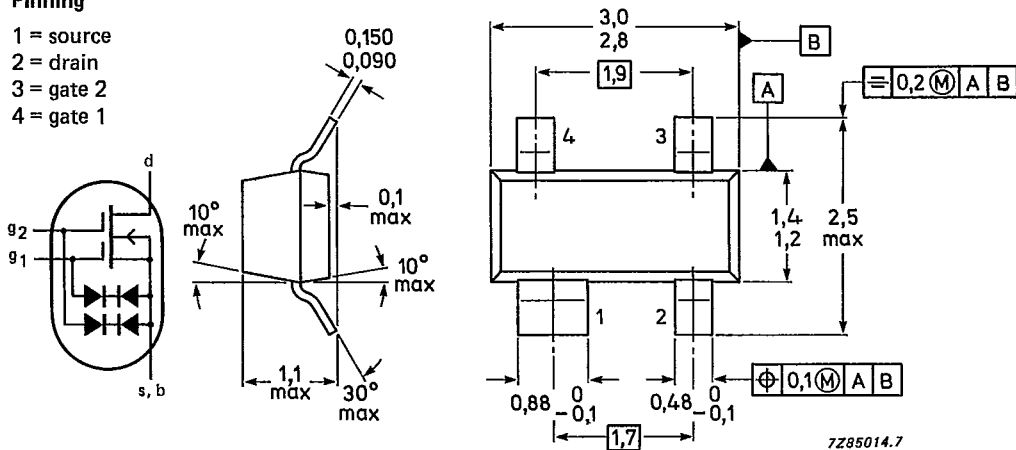
Dimensions in mm

Marking code

BF994S = MGp

#### Pinning

- 1 = source
- 2 = drain
- 3 = gate 2
- 4 = gate 1



7285014.7

TOP VIEW

**RATINGS**

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Drain-source voltage	$V_{DS}$	max.	20 V
Drain current (DC or average)	$I_D$	max.	30 mA
Gate 1-source current	$\pm I_{G1-S}$	max.	10 mA
Gate 2-source current	$\pm I_{G2-S}$	max.	10 mA
Total power dissipation up to $T_{amb} = 60\text{ }^\circ\text{C}$ (note 1)	$P_{tot}$	max.	200 mW
Storage temperature	$T_{stg}$		-65 to + 150 $^\circ\text{C}$
Junction temperature	$T_j$	max.	150 $^\circ\text{C}$

**THERMAL RESISTANCE**

From junction to ambient in free air (note 1)	$R_{th\ j-a}$	=	460 K/W
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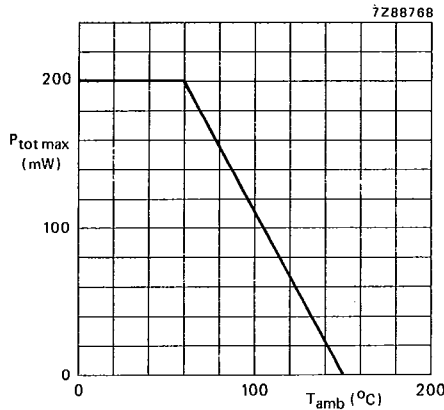


Fig. 2 Power derating curve.

**Note**

1. Device mounted on a ceramic substrate of 8 mm x 10 mm x 0.7 mm.

**STATIC CHARACTERISTICS**

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

**Gate cut-off currents**

$\pm V_{G1-S} = 5\text{ V}; V_{G2-S} = V_{DS} = 0$	$\pm I_{G1-SS}$	max.	50 nA
$\pm V_{G2-S} = 5\text{ V}; V_{G1-S} = V_{DS} = 0$	$\pm I_{G2-SS}$	max.	50 nA

**Gate-source breakdown voltages**

$\pm I_{G1-S} = 10\text{ mA}; V_{G2-S} = V_{DS} = 0$	$\pm V_{(BR)G1-SS}$	6 to 20 V
$\pm I_{G2-S} = 10\text{ mA}; V_{G1-S} = V_{DS} = 0$	$\pm V_{(BR)G2-SS}$	6 to 20 V

**Drain current**

$V_{DS} = 15\text{ V}; V_{G1-S} = 0; V_{G2-S} = 4\text{ V}$	$I_{DSS}$	4 to 20 mA
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**Gate-source cut-off voltages**

$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; +V_{G2-S} = 4\text{ V}$	$-V_{(P)G1-S}$	max.	2.5 V
$I_D = 20\text{ }\mu\text{A}; V_{DS} = 15\text{ V}; V_{G1-S} = 0$	$-V_{(P)G2-S}$	max.	2.0 V

**DYNAMIC CHARACTERISTICS**

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

Transfer admittance at $f = 1\text{ kHz}$	$ y_{fs} $	min.	15 mS
		typ.	18 mS
Input capacitance at gate 1: $f = 1\text{ MHz}$	$C_{ig1-s}$	typ.	2.5 pF
		max.	3.0 pF
Input capacitance at gate 2: $f = 1\text{ MHz}$	$C_{ig2-s}$	typ.	1.2 pF
Feedback capacitance at $f = 1\text{ MHz}$	$C_{rs}$	typ.	25 fF
Output capacitance at $f = 1\text{ MHz}$	$C_{os}$	typ.	1.0 pF
Noise figure at $G_S = 2\text{ mS}; B_S = B_S\text{ opt}; f = 200\text{ MHz}$	F	typ.	1.0 dB
Power gain at $G_S = 2\text{ mS}; B_S = B_S\text{ opt}$ $G_L = 0.5\text{ mS}; B_L = B_L\text{ opt}; f = 200\text{ MHz}$	$G_p$	typ.	25 dB