

## SILICON N-CHANNEL DUAL GATE MOS-FET

Depletion type field-effect transistor in a plastic X-package with source and substrate interconnected. Intended for UHF applications, such as UHF television tuners, with 12 V supply voltage and 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.	18 V
Drain current (DC)	$I_D$	max.	30 mA
Total power dissipation up to $T_{amb} = 75\text{ }^{\circ}\text{C}$	$P_{tot}$	max.	225 mW
Junction temperature	$T_j$	max.	150 $^{\circ}\text{C}$
Transfer admittance at $f = 1\text{ kHz}$ $I_D = 10\text{ mA}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}$	$ y_{fs} $	typ.	19 mS
Input capacitance at gate 1; $f = 1\text{ MHz}$	$C_{ig1-s}$	typ. max.	2.6 pF 3.0 pF
Feedback capacitance at $f = 1\text{ MHz}$ $I_D = 10\text{ mA}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}$	$C_{rs}$	typ.	25 fF
Noise figure at $G_S = 5\text{ mS}; B_S = B_S\text{ opt}$ $I_D = 10\text{ mA}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}; f = 800\text{ MHz}$	F	typ.	2.0 dB

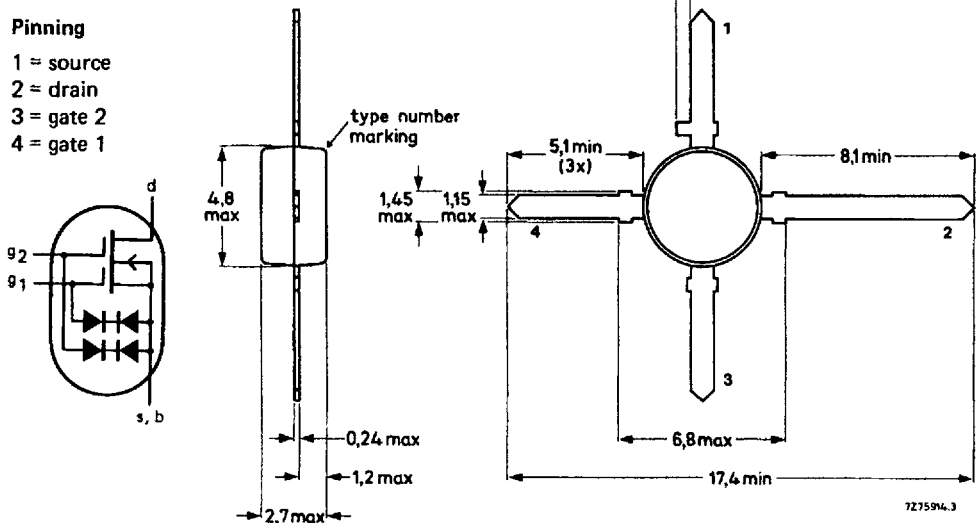
### MECHANICAL DATA

Dimensions in mm

Fig.1 SOT103.

#### Pinning

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



## RATINGS

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

Drain-source voltage	$V_{DS}$	max.	18 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 $T_{amb} = 75\text{ }^\circ\text{C}$	$P_{tot}$	max.	225 mW
Storage temperature range	$T_{stg}$		$-65\text{ to }+150\text{ }^\circ\text{C}$
Junction temperature	$T_j$	max.	150 $^\circ\text{C}$

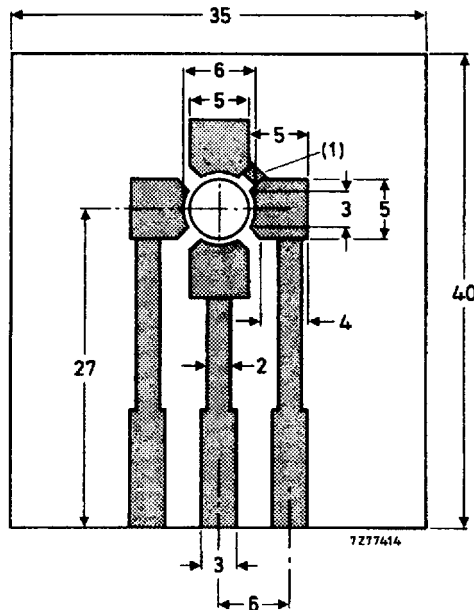
## THERMAL RESISTANCE

From junction to ambient in free air

mounted on the printed-circuit board (see Fig.2)

$$R_{thj-a} = 335\text{ K/W}$$

Dimensions in mm



(1) Connection made by a strip or Cu wire.

Fig.2 Single-sided 35  $\mu\text{m}$  Cu-clad epoxy fibre-glass printed-circuit board, thickness 1.5 mm. Tracks are fully tin-lead plated. Board in horizontal position for  $R_{th}$  measurement.

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

Gate cut-off currents

$\pm V_{G1-S} = 7\text{ V}; V_{G2-S} = V_{DS} = 0$

$\pm I_{G1-SS}$  max. 25 nA

$\pm V_{G2-S} = 7\text{ V}; V_{G1-S} = V_{DS} = 0$

$\pm I_{G2-SS}$  max. 25 nA

Gate-source breakdown voltages

$\pm I_{G1-SS} = 10\text{ mA}; V_{G2-S} = V_{DS} = 0$

$\pm V_{(BR)G1-SS}$  8 to 20 V

$\pm I_{G2-SS} = 10\text{ mA}; V_{G1-S} = V_{DS} = 0$

$\pm V_{(BR)G2-SS}$  8 to 20 V

Gate-source cut-off voltages

$I_D = 20\text{ }\mu\text{A}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}$

$-V_{(P)G1-S}$  min. 0.2 V

max. 1.3 V

$I_D = 20\text{ }\mu\text{A}; V_{DS} = 10\text{ V}; V_{G1-S} = 0$

$-V_{(P)G2-S}$  min. 0.2 V

max. 1.1 V

**DYNAMIC CHARACTERISTICS**Measuring conditions (common source):  $I_D = 10\text{ mA}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}; T_{amb} = 25\text{ }^\circ\text{C}$ Transfer admittance at  $f = 1\text{ kHz}$ 

$|y_{fs}|$  min. 18 mS

typ. 19 mS

Input capacitance at gate 1;  $f = 1\text{ MHz}$ 

$C_{ig1-s}$  typ. 2.6 pF

max. 3.0 pF

Feedback capacitance at  $f = 1\text{ MHz}$ 

$C_{rs}$  typ. 25 fF

max. 35 fF

Output capacitance at  $f = 1\text{ MHz}$ 

$C_{os}$  typ. 1.1 pF

Noise figure at  $f = 800\text{ MHz}; G_S = 5\text{ mS}; B_S = B_S\text{ opt}$ 

F typ. 2.0 dB

max. 3.0 dB

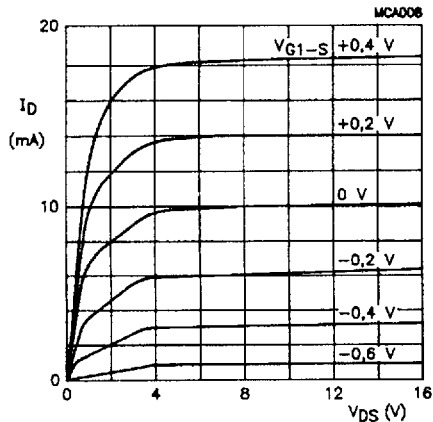


Fig.3 Output characteristics.  
 $V_{G2-S} = 4 \text{ V}$ ;  $T_{amb} = 25 \text{ }^\circ\text{C}$ .

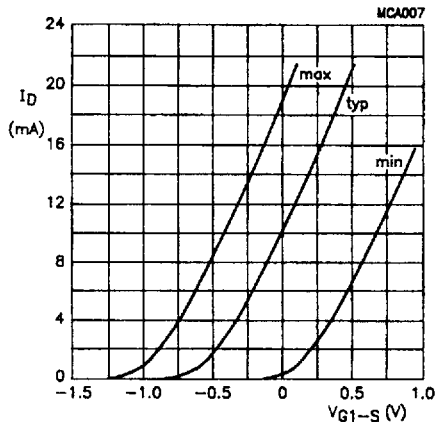


Fig.4 Transfer characteristics.  
 $V_{DS} = 10 \text{ V}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

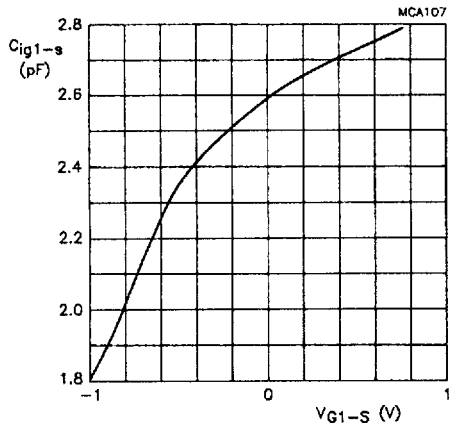


Fig.5 Gate 1 input capacitance as a function of gate 1 source voltage;  
 $f = 1 \text{ MHz}$ ;  $V_{DS} = 10 \text{ V}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

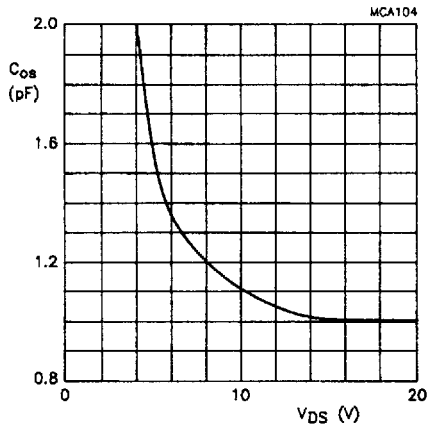


Fig.6 Output capacitance as a function of drain voltage;  $f = 1 \text{ MHz}$ ;  
 $I_D = 10 \text{ mA}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

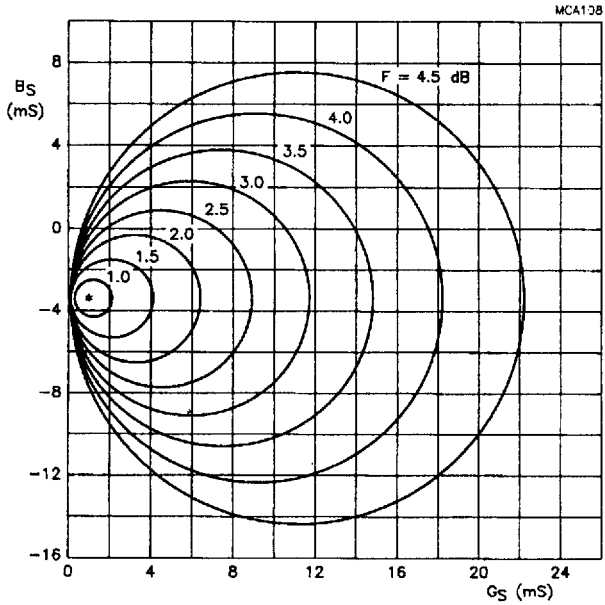


Fig.7 Circles of constant noise figures;  $f = 200 \text{ MHz}$ ;  
 $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ ;  $V_{\text{DS}} = 10 \text{ V}$ ;  $V_{\text{G2-S}} = 4 \text{ V}$ ;  $I_{\text{D}} = 10 \text{ mA}$ .

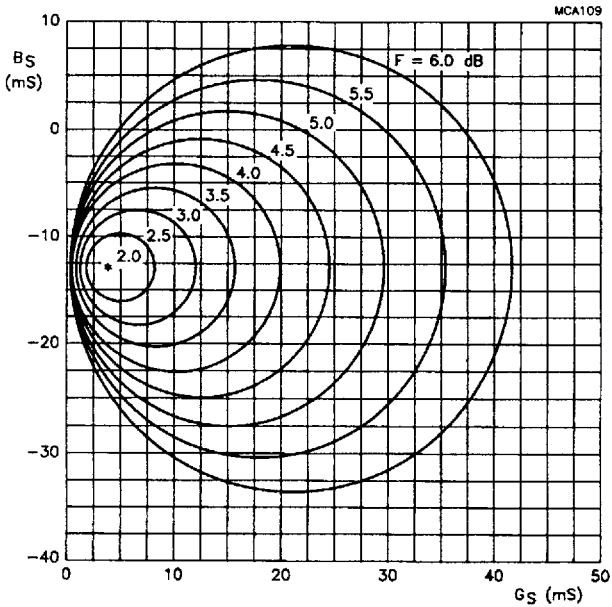


Fig.8 Circles of constant noise figures;  $f = 800 \text{ MHz}$ ;  
 $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$ ;  $V_{\text{DS}} = 10 \text{ V}$ ;  $V_{\text{G2-S}} = 4 \text{ V}$ ;  $I_{\text{D}} = 10 \text{ mA}$ .

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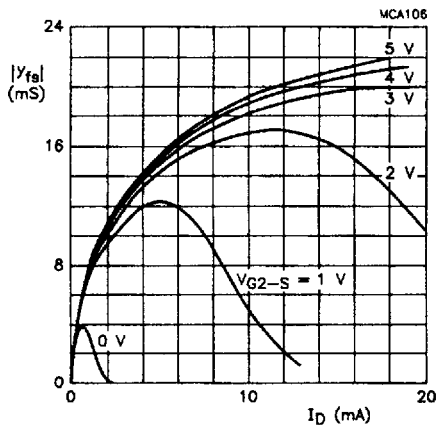


Fig.9 Forward transfer admittance as a function of drain current;  $f = 1$  kHz;  $V_{DS} = 10$  V;  $T_{amb} = 25$  °C.

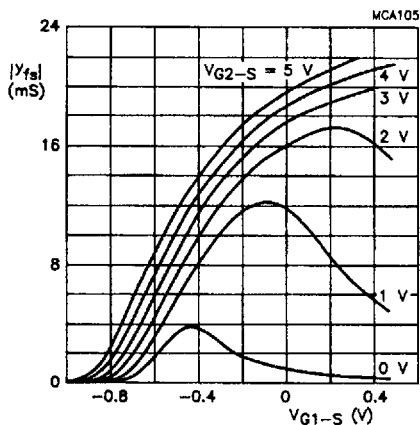


Fig.10 Forward transfer admittance as a function of gate 1 source voltage;  $f = 1$  kHz;  $V_{DS} = 10$  V;  $T_{amb} = 25$  °C.