

## 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

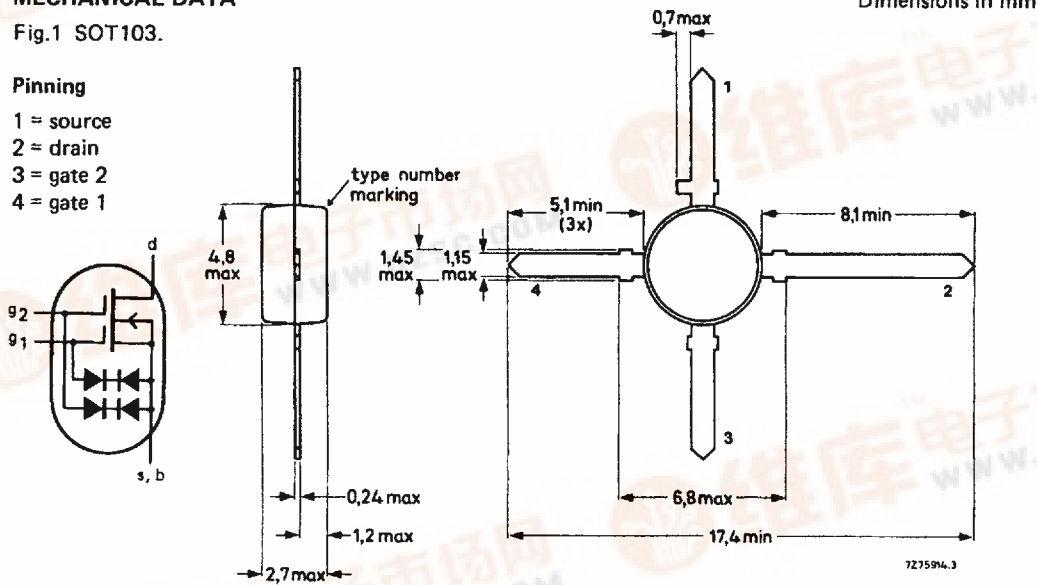
Drain-source voltage	$V_{DS}$	max.	18 V
Drain current (DC)	$I_D$	max.	30 mA
Total power dissipation up to $T_{amb} = 75^\circ\text{C}$	$P_{tot}$	max.	225 mW
Junction temperature	$T_j$	max.	150 $^\circ\text{C}$
Transfer admittance at $f = 1\text{ kHz}$ $I_D = 10\text{ mA}; V_{DS} = 10\text{ V}; +V_{G2-S} = 4\text{ V}$	$ y_{fs} $	typ.	19 mS
Input capacitance at gate 1; $f = 1\text{ MHz}$	$C_{ig1-s}$	typ.	2.6 pF
		max.	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

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 to + 150 $^\circ\text{C}$
Junction temperature	$T_j$	max.	150 $^\circ\text{C}$

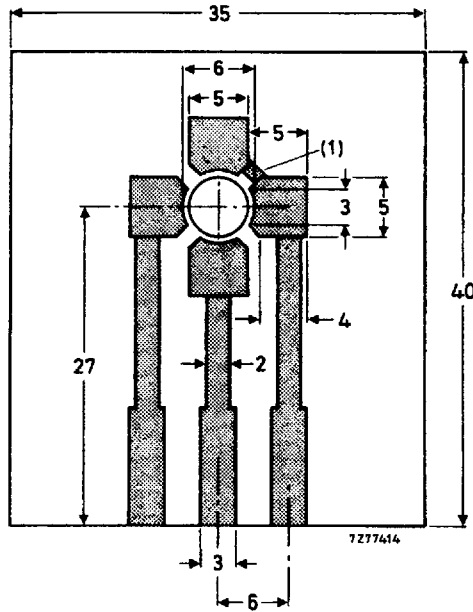
**THERMAL RESISTANCE**

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

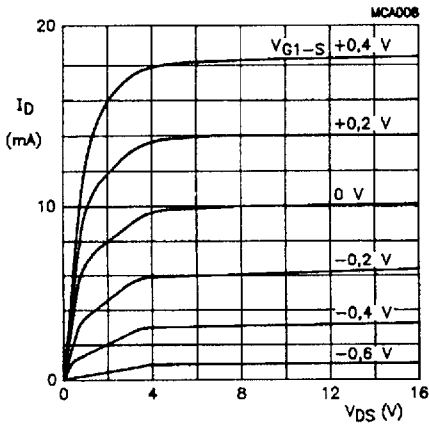


Fig.3 Output characteristics.  
 $V_{G2-S} = 4 \text{ V}$ ;  $T_{amb} = 25 \text{ }^\circ\text{C}$ .

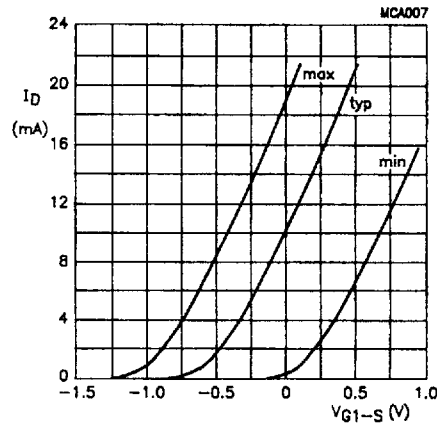


Fig.4 Transfer characteristics.  
 $V_{DS} = 10 \text{ V}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

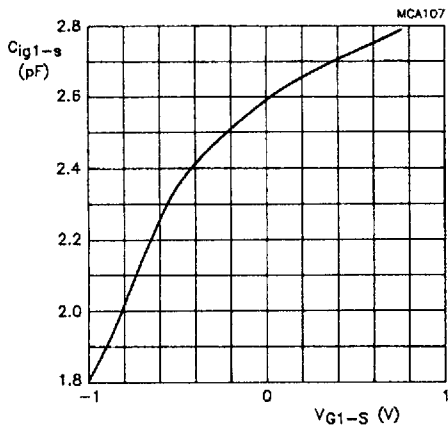


Fig.5 Gate 1 input capacitance as a function of gate 1 source voltage;  
 $f = 1 \text{ MHz}$ ;  $V_{DS} = 10 \text{ V}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

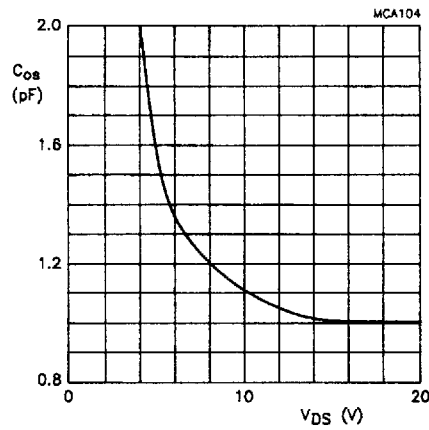


Fig.6 Output capacitance as a function of drain voltage;  $f = 1 \text{ MHz}$ ;  
 $I_D = 10 \text{ mA}$ ;  $V_{G2-S} = 4 \text{ V}$ ;  
 $T_{amb} = 25 \text{ }^\circ\text{C}$ .

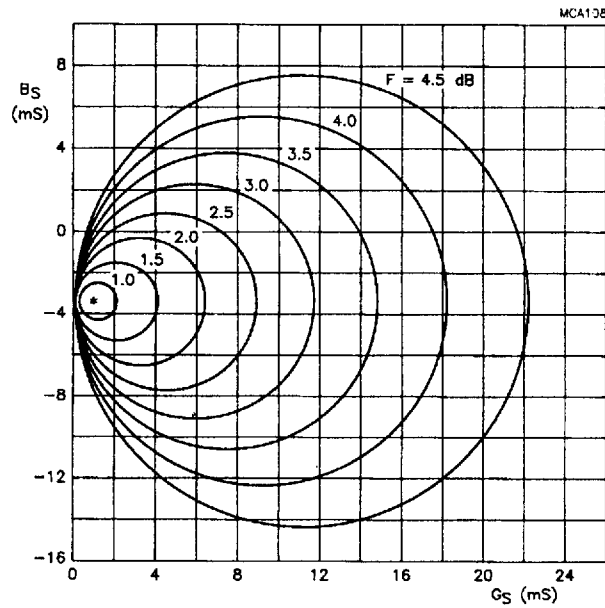


Fig.7 Circles of constant noise figures;  $f = 200$  MHz;  
 $T_{amb} = 25$  °C;  $V_{DS} = 10$  V;  $V_{G2-S} = 4$  V;  $I_D = 10$  mA.

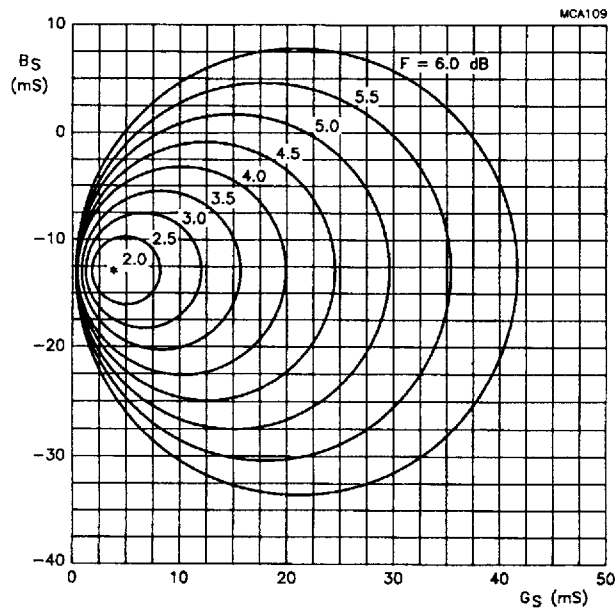


Fig.8 Circles of constant noise figures;  $f = 800$  MHz;  
 $T_{amb} = 25$  °C;  $V_{DS} = 10$  V;  $V_{G2-S} = 4$  V;  $I_D = 10$  mA.

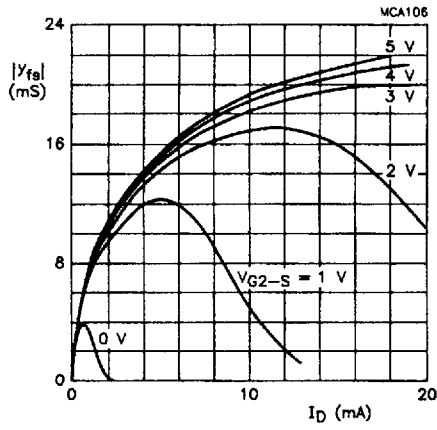


Fig.9 Forward transfer admittance as a function of drain current;  $f = 1$  kHz;  $V_{DS} = 10$  V;  $T_{amb} = 25$  °C.

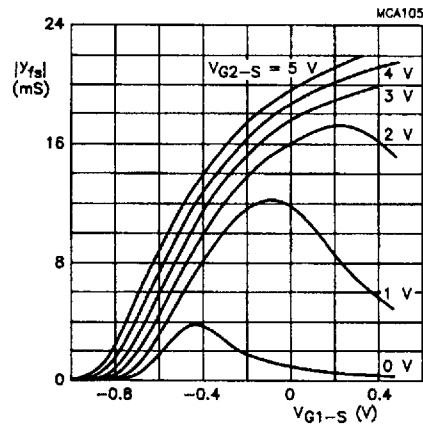


Fig.10 Forward transfer admittance as a function of gate 1 source voltage;  $f = 1$  kHz;  $V_{DS} = 10$  V;  $T_{amb} = 25$  °C.