SILICON N-CHANNEL DUAL GATE MOS-FET

Depletion type field-effect transistor in a plastic X-package with source and substrate interconnected, intended for u.h.f. applications in television tuners 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.	20 V
Drain current	I_D	max.	30 mA
Total power dissipation up to T_{amb} = 75 °C	P_{tot}	max.	225 mW
Junction temperature	T_j	max.	150 °C
Transfer admittance at f = 1 kHz I_D = 10 mA; V_{DS} = 15 V; + $V_{G2\text{-}S}$ = 4 V	$\lvert y_{fs} \rvert$	typ.	18 mS
Input capacitance at gate 1; f = 1 MHz I_D = 10 mA; V_{DS} = 15 V; + $V_{G2\text{-}S}$ = 4 V	$C_{ig1\text{-}s}$	typ. max.	2.3 pF 2.6 pF
Feedback capacitance at f = 1 MHz I_D = 10 mA; V_{DS} = 15 V; + $V_{G2\text{-}S}$ = 4 V	C_{rs}	typ.	25 fF
Noise figure at G_S = 3.3 mS; B_S = B_S opt I_D = 10 mA; V_{DS} = 15 V; + $V_{G2\text{-}S}$ = 4 V; f = 800 MHz	F	typ.	1.8 dB

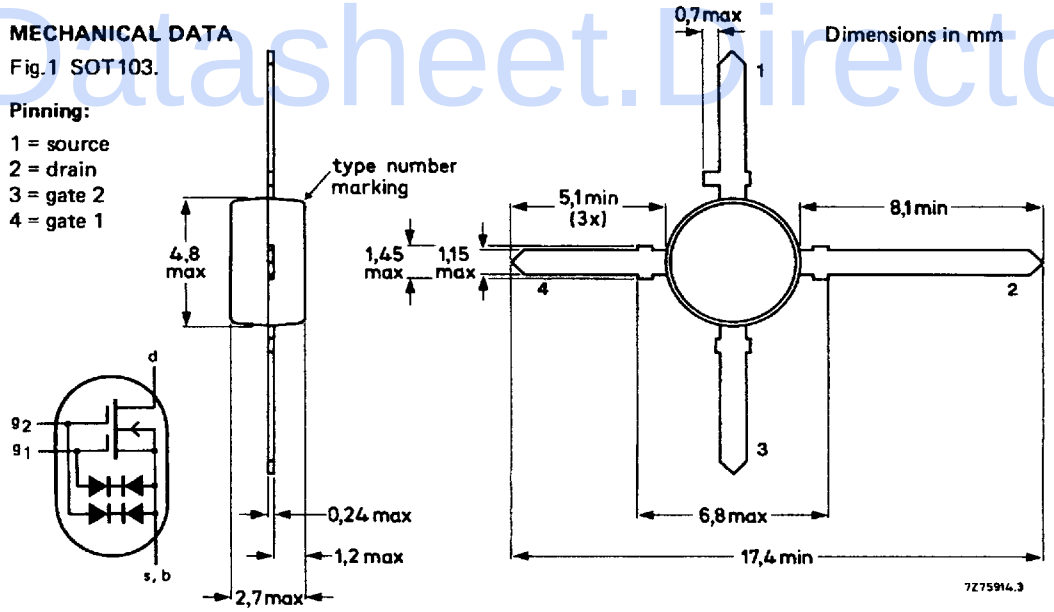
MECHANICAL DATA

Fig.1 SOT103.

Dimensions in mm

Pinning:

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



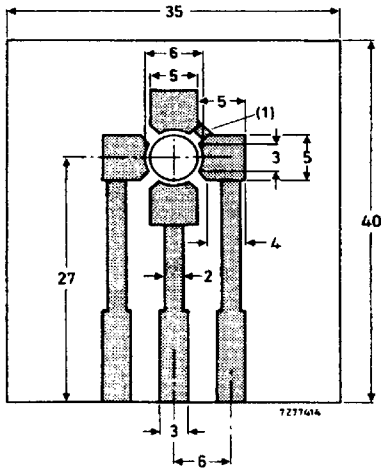
RATINGS

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

Drain-source voltage	V_{DS}	max.	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} = 75 °C	P_{tot}	max.	225 mW
Storage temperature range	T_{stg}	−65 to +	150 °C
Junction temperature	T_j	max.	150 °C

THERMAL RESISTANCE

From junction to ambient in free air mounted on the printed-circuit board (see Fig.2)	$R_{th\ j-a}$	=	335 K/W



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

Fig.2 Single-sided 35 μm 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 °C unless otherwise specified

Gate cut-off currents			
$\pm V_{G1\text{-}S}$ = 5 V; $V_{G2\text{-}S} = V_{DS}$ = 0	$\pm I_{G1\text{-}SS}$	max.	50 nA
$\pm V_{G2\text{-}S}$ = 5 V; $V_{G1\text{-}S} = V_{DS}$ = 0	$\pm I_{G2\text{-}SS}$	max.	50 nA
Gate-source breakdown voltages			
$\pm I_{G1\text{-}SS}$ = 10 mA; $V_{G2\text{-}S} = V_{DS}$ = 0	$\pm V_{(BR)G1\text{-}SS}$		6 to 20 V
$\pm I_{G2\text{-}SS}$ = 10 mA; $V_{G1\text{-}S} = V_{DS}$ = 0	$\pm V_{(BR)G2\text{-}SS}$		6 to 20 V
Drain current			
V_{DS} = 15 V; $V_{G1\text{-}S}$ = 0; + $V_{G2\text{-}S}$ = 4 V	I_{DSS}		4 to 20 mA
Gate-source cut-off voltages			
I_D = 20 μA; V_{DS} = 15 V; + $V_{G2\text{-}S}$ = 4 V	$-V_{(P)G1\text{-}S}$	max.	2.5 V
I_D = 20 μA; V_{DS} = 15 V; $V_{G1\text{-}S}$ = 0	$-V_{(P)G2\text{-}S}$	max.	2.0 V

DYNAMIC CHARACTERISTICS

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

Transfer admittance at f = 1 kHz	$\lvert y_{fs} \rvert$	min.	15 mS
		typ.	18 mS
Input capacitance at gate 1; f = 1 MHz	$C_{ig1\text{-}s}$	typ.	2.3 pF
		max.	2.6 pF
Input capacitance at gate 2; f = 1 MHz	$C_{ig2\text{-}s}$	typ.	1.1 pF
Feedback capacitance at f = 1 MHz	C_{rs}	typ.	25 fF
Output capacitance at f = 1 MHz	C_{os}	typ.	0.8 pF
Noise figure			
f = 200 MHz; G_S = 2 mS; $B_S = B_S$ opt	F	typ.	1.0 dB
f = 800 MHz; G_S = 3.3 mS; $B_S = B_S$ opt	F	typ.	1.8 dB
Power gain			
f = 200 MHz; G_S = 2 mS; G_L = 0.5 mS; B_S = opt; B_L = opt	G_p	typ.	25 dB
f = 800 MHz; G_S = 3.3 mS; G_L = 1 mS; B_S = opt; B_L = opt	G_p	typ.	18 dB

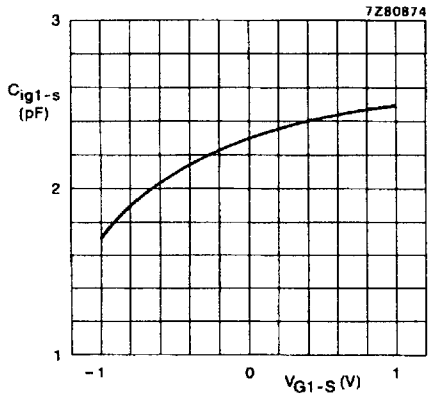


Fig.3 $V_{G2\text{-}S}$ = 4 V; V_{DS} = 15 V; f = 1 MHz; T_{amb} = 25 °C; typical values.

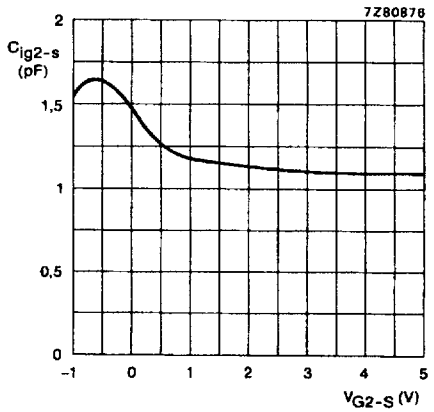


Fig.4 $V_{G1\text{-}S}$ = 0 V; V_{DS} = 15 V; f = 1 MHz; T_{amb} = 25 °C; typical values.

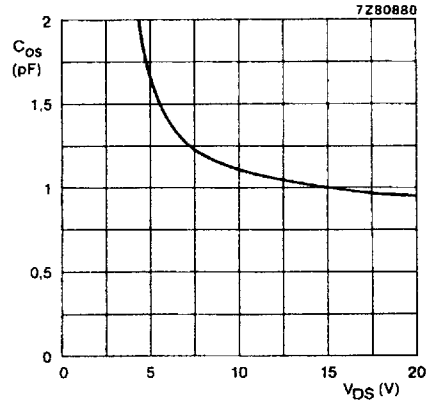


Fig. 5 V_{G2-S} = 4 V; I_D = 10 mA; f = 1 MHz; T_{amb} = 25 °C; typical values.

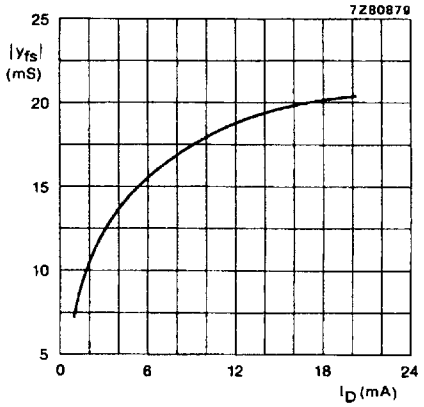


Fig. 6 V_{G2-S} = 4 V; V_{DS} = 15 V; f = 1 kHz; T_{amb} = 25 °C; typical values.

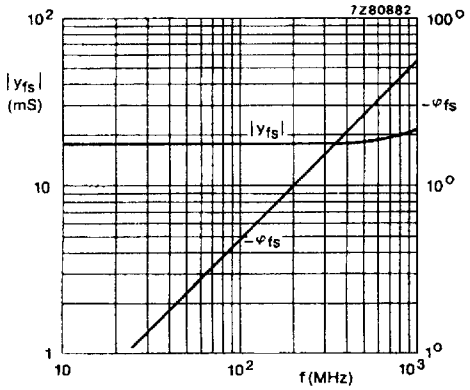


Fig. 7 V_{G2-S} = 4 V; V_{DS} = 15 V; I_D = 10 mA; T_{amb} = 25 °C; typical values.

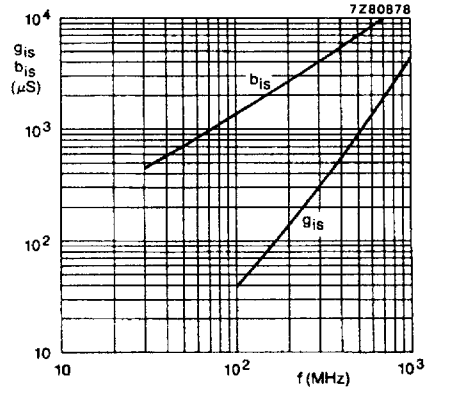


Fig. 8 V_{G2-S} = 4 V; V_{DS} = 15 V; I_D = 10 mA; T_{amb} = 25 °C; typical values.

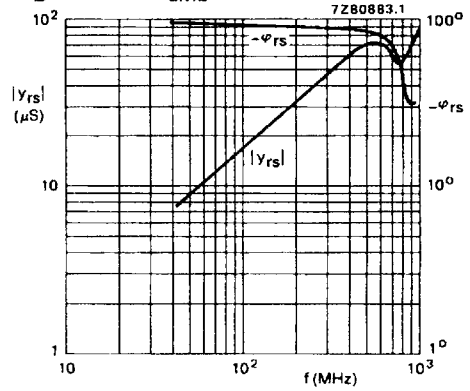


Fig. 9 V_{G2-S} = 4 V; V_{DS} = 15 V; I_D = 10 mA; T_{amb} = 25 °C; typical values.

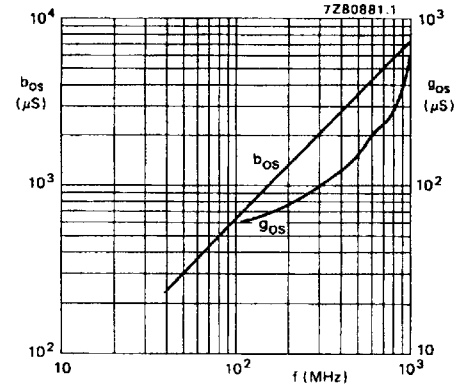


Fig. 10 V_{G2-S} = 4 V; V_{DS} = 15 V; I_D = 10 mA; T_{amb} = 25 °C; typical values.

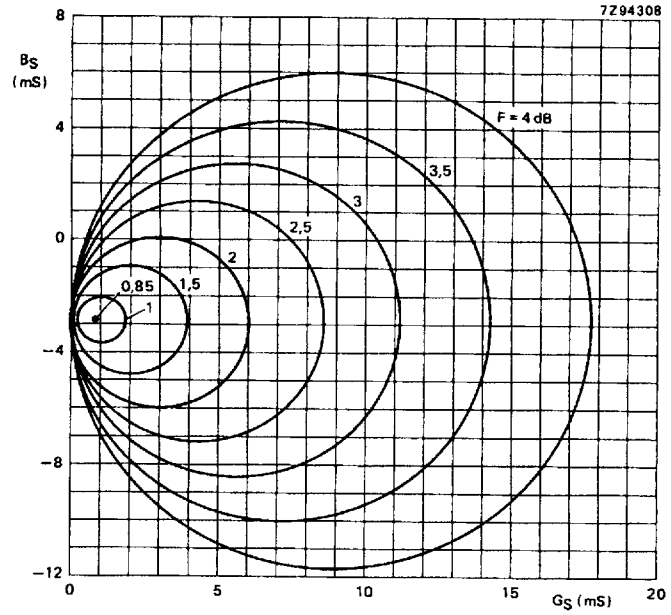


Fig. 11 $V_{G2\text{-}S}$ = 4 V; V_{DS} = 15 V; I_D = 10 mA; f = 200 MHz; T_{amb} = 25 °C; typical values.

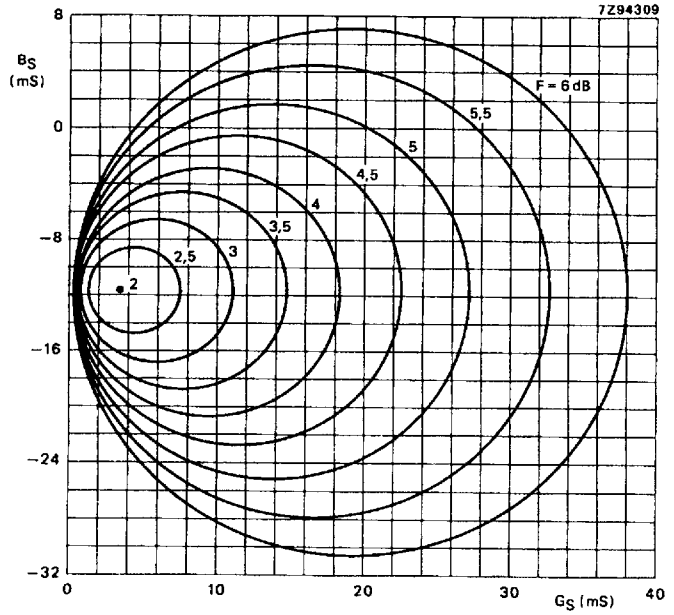


Fig. 12 $V_{G2\text{-}S}$ = 4 V; V_{DS} = 15 V; I_D = 10 mA; f = 800 MHz; T_{amb} = 25 °C; typical values.