SILICON N-CHANNEL DUAL GATE MOS-FET

Depletion type field-effect transistor in a metal TO-72 envelope with source and substrate connected to the case, intended for a wide range of v.h.f. applications, such as v.h.f. television tuners, f.m. tuners, as well as for applications in communication, instrumentation and control.

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

The tetrode configuration, a series arrangement of two gate controlled channels, offers:
a) very low feedback capacitance providing the possibility of more than 40 dB gain control in r.f. amplifiers requiring negligible a.g.c. power.
b) excellent signal handling capability over the entire gain control range.
c) low noise figure combined with high gain.

QUICK REFERENCE DATA

Drain-source voltage	V_{DS}	max.	20 V
Drain current	I_D	max.	50 mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	300 mW
Junction temperature	T_j	max.	175 °C
Transfer admittance at f = 1 kHz I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	$\lvert y_{fs} \rvert$	typ.	15 mS
Input capacitance at gate 1; f = 1 MHz I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	C_{ig1-s}	typ.	5.5 pF
Feedback capacitance at f = 1 MHz I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	C_{rs}	typ.	30 fF
Noise figure at optimum source admittance I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V G_S = 1.2 mA; $-B_S$ = 5.7 mS; f = 200 MHz	F	typ.	2.3 dB

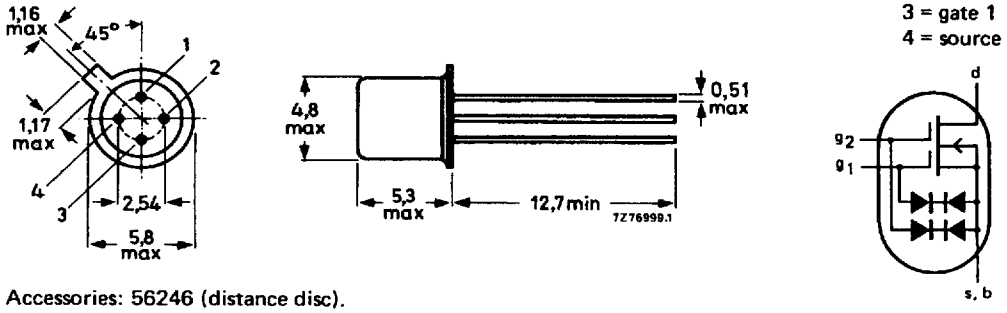
MECHANICAL DATA

Dimensions in mm

Fig.1 TO-72.

Source and substrate connected to the case.

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



Accessories: 56246 (distance disc).

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.	50	mA
Drain current (peak value)	I_{DM}	max.	100	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} = 25 °C	P_{tot}	max.	300	mW
Storage temperature range	T_{stg}	−65 to +	175	°C
Junction temperature	T_j	max.	175	°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j-a}$	=	500	K/W

STATIC CHARACTERISTICS

T_j = 25 °C

Gate cut-off currents			
$\pm V_{G1-S}$ = 5 V; V_{G2-S} = V_{DS} = 0	$\pm I_{G1-SS}$	max.	10 nA
$\pm V_{G1-S}$ = 5 V; V_{G2-S} = V_{DS} = 0; T_j = 150 °C	$\pm I_{G1-SS}$	max.	10 μA
$\pm V_{G2-S}$ = 5 V; V_{G1-S} = V_{DS} = 0	$\pm I_{G2-SS}$	max.	10 nA
$\pm V_{G2-S}$ = 5 V; V_{G1-S} = V_{DS} = 0; T_j = 150 °C	$\pm I_{G2-SS}$	max.	10 μA
Gate-source breakdown voltages			
$\pm I_{G1-SS}$ = 0.1 mA; V_{G2-S} = V_{DS} = 0	$\pm V_{(BR)G1-SS}$		6 to 20 V
$\pm I_{G2-SS}$ = 0.1 mA; V_{G1-S} = V_{DS} = 0	$\pm V_{(BR)G2-SS}$		6 to 20 V
Drain current			
V_{DS} = 10 V; V_{G1-S} = 0; + V_{G2-S} = 4 V	I_{DSS}		20 to 55 mA
Gate 1-source voltage			
I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V	$-V_{G1-SS}$		0.6 to 2.1 V
Gate-source cut-off voltages			
I_D = 10 μA; V_{DS} = 10 V; + V_{G2-S} = 4 V	$-V_{(P)G1-S}$		1.5 to 3.8 V
I_D = 10 μA; V_{DS} = 10 V; V_{G1-S} = 0	$-V_{(P)G2-S}$		1.5 to 3.4 V

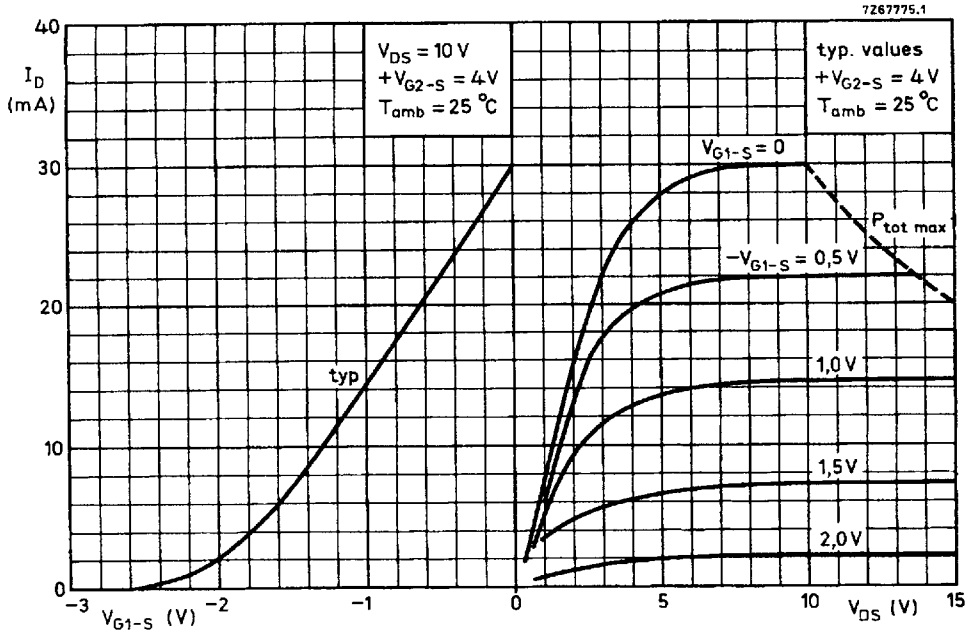
DYNAMIC CHARACTERISTICS

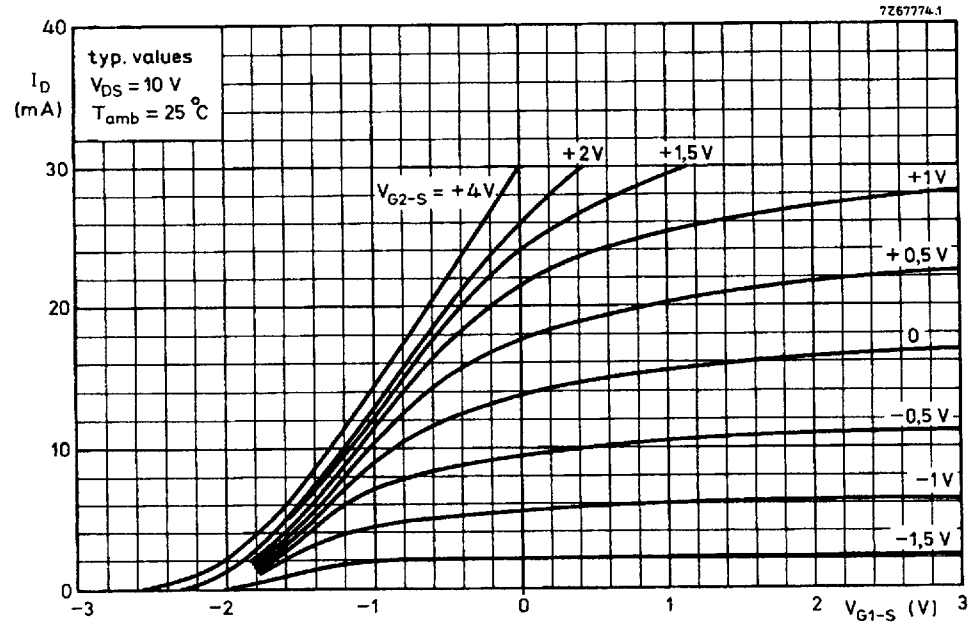
Measuring conditions (common source): I_D = 10 mA; V_{DS} = 10 V; + V_{G2-S} = 4 V; T_{amb} = 25 °C

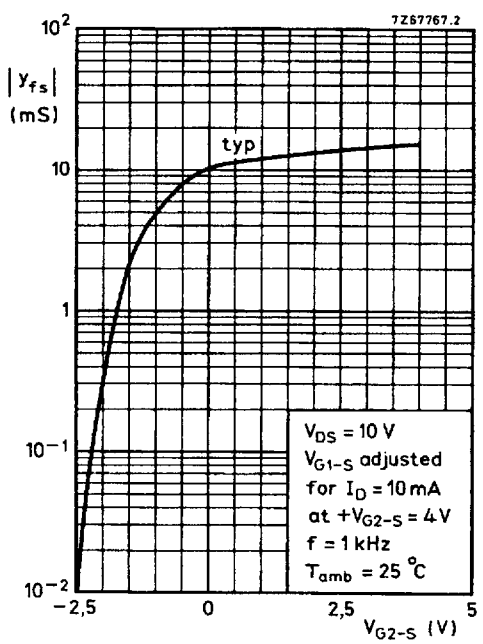
Transfer admittance at f = 1 kHz	$\lvert y_{fs} \rvert$	min.	12 mS
		typ.	15 mS
Input capacitance at gate 1; f = 1 MHz	C_{ig1-s}	typ.	5.5 pF
Feedback capacitance at f = 1 MHz	C_{rs}	typ.	30 fF
Output capacitance at f = 1 MHz	C_{os}	typ.	3.5 pF
Noise figure at optimum source admittance			
G_S = 0.95 mS; $-B_S$ = 5.0 mS; f = 100 MHz	F	typ.	1.9 dB
G_S = 1.20 mS; $-B_S$ = 5.7 mS; f = 200 MHz	F	typ.	2.3 dB
		max.	3.0 dB
Cross modulation at f = 200 MHz			
Wanted signal at f_o = 197.5 MHz			
Unwanted signal at f_{int} = 202.5 MHz			
Interference voltage at g_1 for K = 1%	V_{int}	typ.	100 mV (note 1)

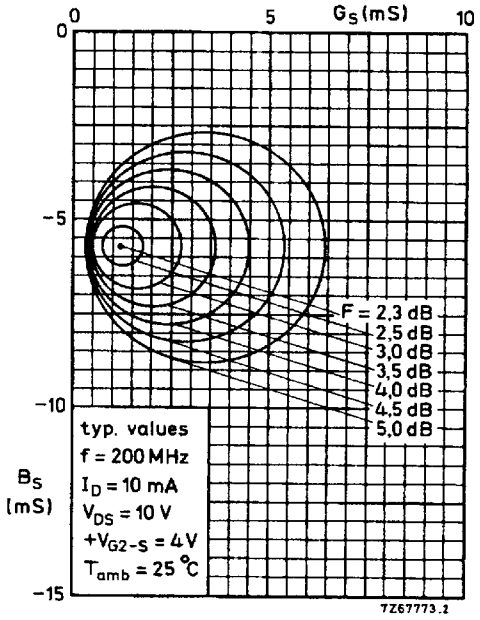
Note

1. Cross modulation is defined here as the voltage at g_1 of an unwanted signal with 80% modulation depth, giving 0.8% modulation depth on the wanted signal (a.m. definition).









circles of constant noise figure