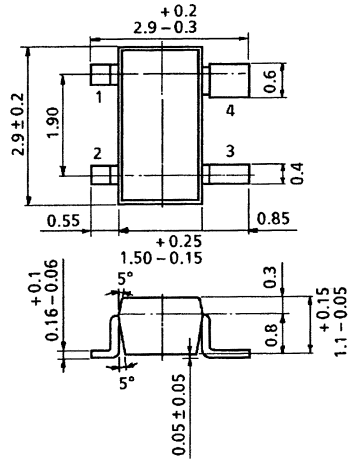
TOSHIBA Field Effect Transistor GaAs N-Channel Dual Gate MES Type

3SK240

TV Tuner, UHF RF Amplifier Applications

Unit: mm



1. GATE 1
2. GATE 2
3. DRAIN
4. SOURCE

JEDEC	—
JEITA	—
TOSHIBA	2-3J1A

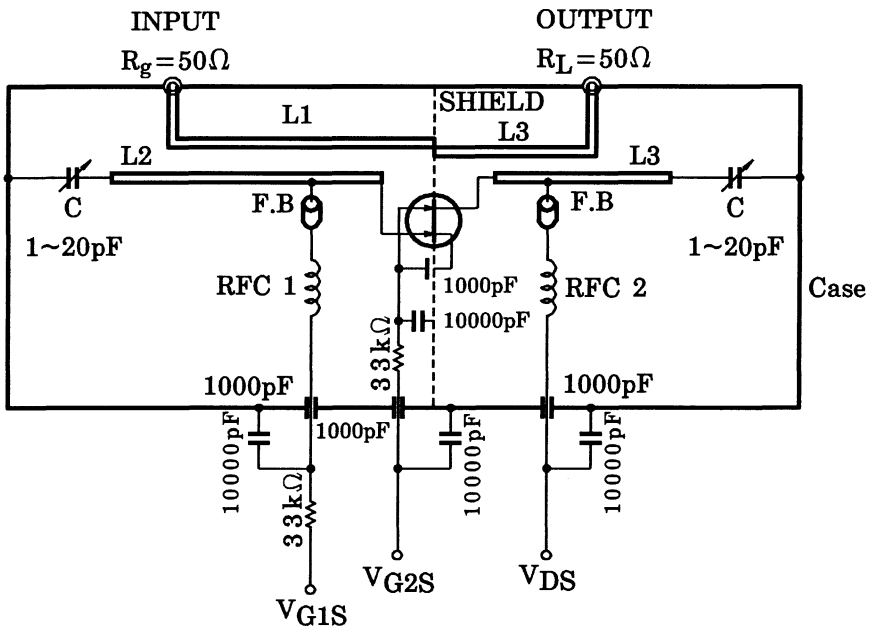
Weight: 0.013 g (typ.)

Maximum Ratings (Ta = 25°C)

Characteristics	Symbol	Rating	Unit
Gate 1-drain voltage	V_{G1D0}	−9	V
Gate 2-drain voltage	V_{G2D0}	−9	V
Gate 1-source voltage	V_{G1S}	−4	V
Gate 2-source voltage	V_{G2S}	−4	V
Gate 1 current	I_{G1}	1	mA
Gate 2 current	I_{G2}	1	mA
Power dissipation	P_D	150	mW
Channel temperature	T_{ch}	125	°C
Storage temperature range	T_{stg}	−55~125	°C

Electrical Characteristics (Ta = 25°C)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate 1 leakage current	I_{G1SS}	V_{DS} = 0, V_{G1S} = −3 V, V_{G2S} = 0	—	—	−4	μA
Gate 2 leakage current	I_{G2SS}	V_{DS} = 0, V_{G1S} = 0, V_{G2S} = −3 V	—	—	−4	μA
Drain current	I_{DSS}	V_{DS} = 3 V, V_{G1S} = 0, V_{G2S} = 0	6	—	20	mA
Gate 1-source cut-off voltage	$V_{G1S\ (OFF)}$	V_{DS} = 3 V, V_{G2S} = 0, I_D = 100 μA	−0.7	—	−1.8	V
Gate 2-source cut-off voltage	$V_{G2S\ (OFF)}$	V_{DS} = 3 V, V_{G1S} = 0, I_D = 100 μA	−0.7	—	−1.8	V
Forward transfer admittance	$\lvert Y_{fs} \rvert$	V_{DS} = 3 V, V_{G2S} = 1 V, I_D = 5 mA f = 1 kHz	—	19	—	mS
Input capacitance	C_{iss}	V_{DS} = 3 V, V_{G2S} = 1 V, I_D = 5 mA f = 1 kHz	—	0.6	1.4	pF
Reverse transfer capacitance	C_{rss}		—	0.013	0.030	pF
Power gain	G_{ps}	V_{DS} = 3 V, V_{G2S} = 1 V, I_D = 5 mA f = 800 MHz (Figure 1)	17	20.5	—	dB
Noise figure	NF		—	1.0	2.0	dB



L1~L4: ϕ1.0 mm silver plated copper wire

C: Air trimmer TTA25A200A (MURATA Manufacturing. Co., Ltd.)

RFC 1: ϕ0.35 mm copper wire 3 mm ID, 7 T

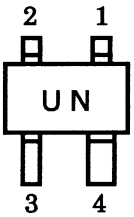
RFC 2: ϕ0.35 mm copper wire 3 mm ID, 10 T

Figure 1 800 MHz G_{ps}, NF Test Circuit

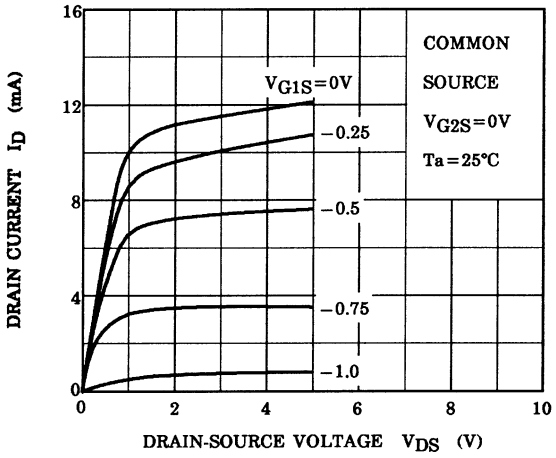
Caution

GaAs (gallium arsenide) is used in this product. The dust or vapor can be dangerous to humans. Do not break, cut, crush or dissolve chemically. Dispose of this product properly according to law. Do not intermingle with normal industrial or domestic waste.

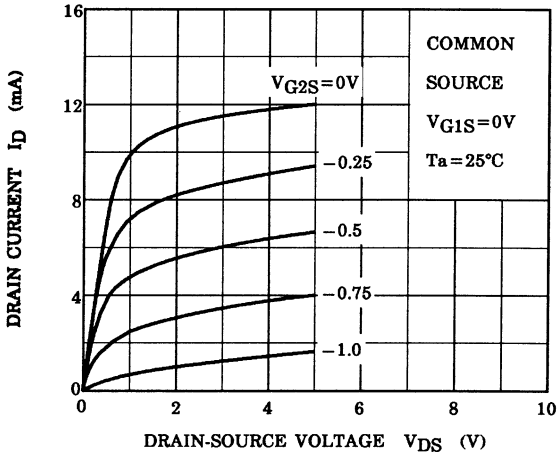
Marking



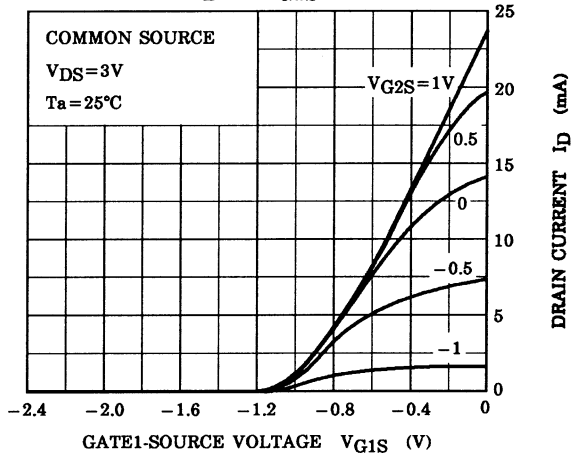
$I_D - V_{DS}$



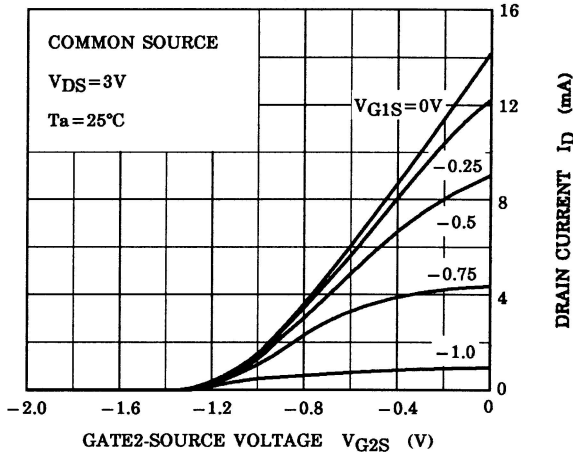
$I_D - V_{DS}$



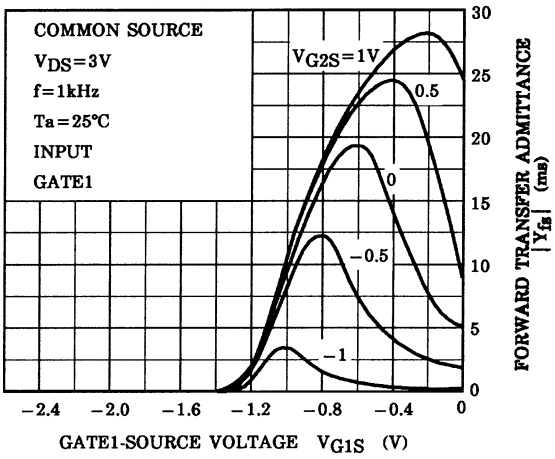
$I_D - V_{G1S}$



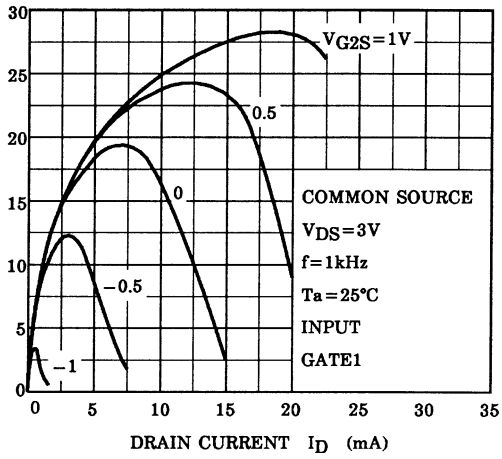
$I_D - V_{G2S}$



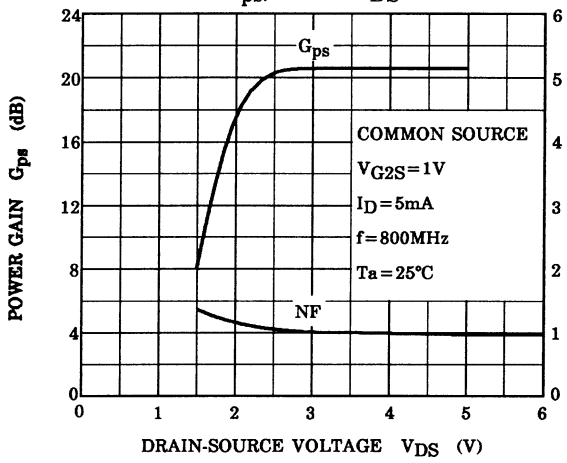
$|Y_{fs}| - V_{G1S}$



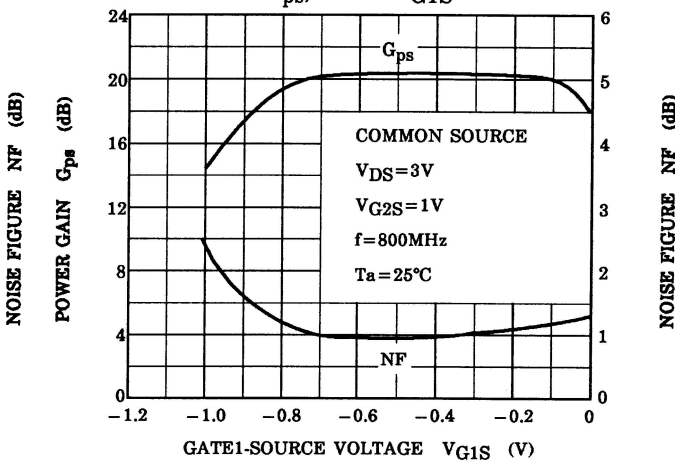
$|Y_{fs}| - I_D$



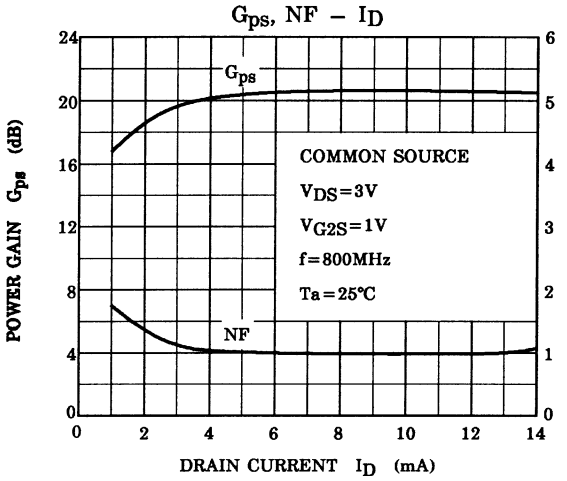
G_{ps}, NF – V_{DS}



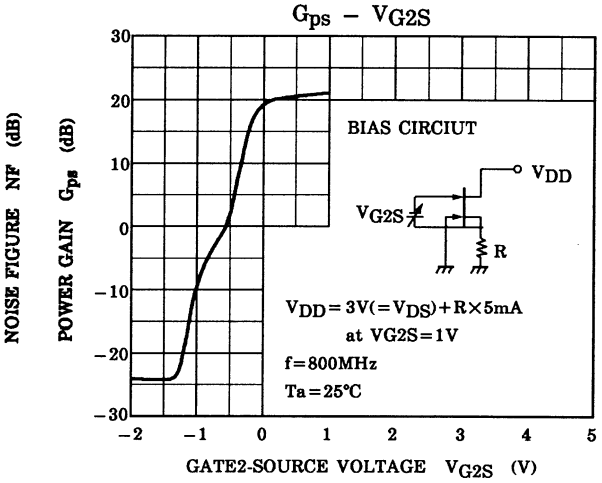
G_{ps}, NF – V_{G1S}



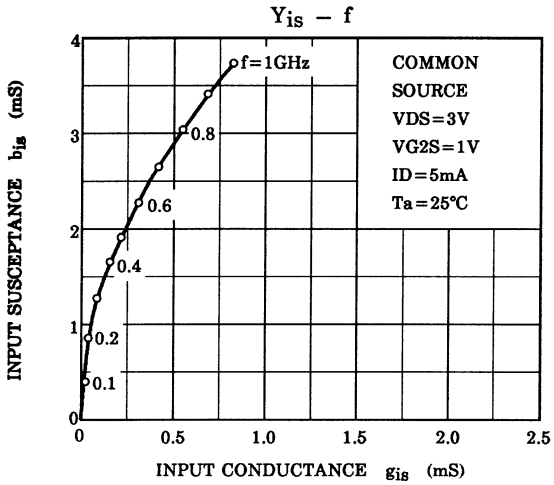
G_{ps}, NF – I_D



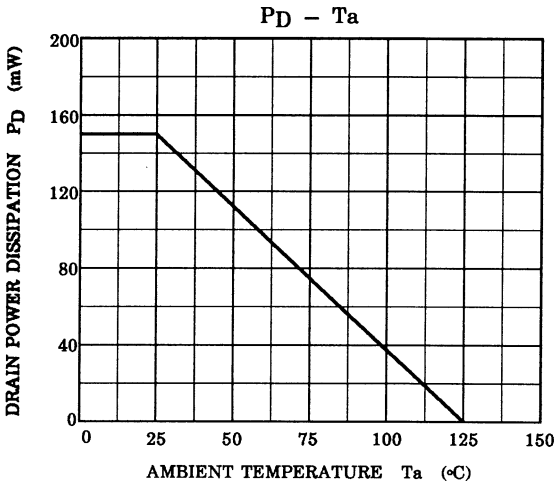
G_{ps} – V_{G2S}

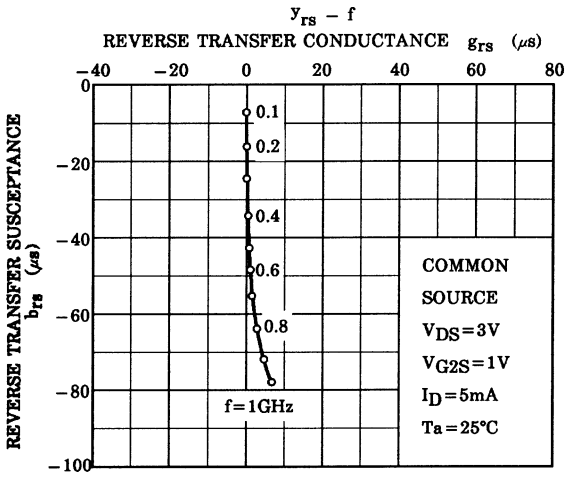


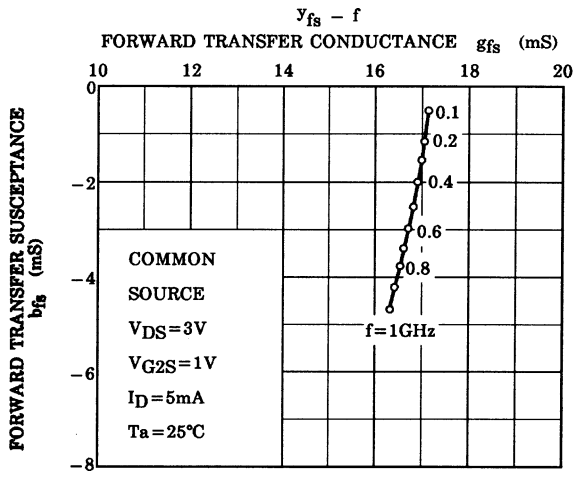
Y_{is} – f

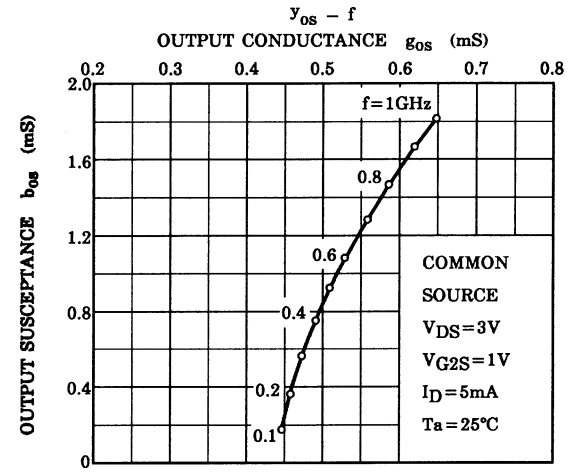


P_D – Ta




y_{rs} – f
REVERSE TRANSFER CONDUCTANCE g_{rs} (μs)
REVERSE TRANSFER SUSCEPTANCE b_{rs} (μs)
−40 −20 0 20 40 60 80
0 −20 −40 −60 −80 −100
0.1 0.2 0.4 0.6 0.8
f=1GHz
COMMON
SOURCE
V_{DS}=3V
V_{G2S}=1V
I_D=5mA
Ta=25°C


y_{fs} – f
FORWARD TRANSFER CONDUCTANCE g_{fs} (mS)
FORWARD TRANSFER SUSCEPTANCE b_{fs} (mS)
10 12 14 16 18 20
0 −2 −4 −6 −8
0.1 0.2 0.4 0.6 0.8
f=1GHz
COMMON
SOURCE
V_{DS}=3V
V_{G2S}=1V
I_D=5mA
Ta=25°C


y_{os} – f
OUTPUT CONDUCTANCE g_{os} (mS)
OUTPUT SUSCEPTANCE b_{os} (mS)
0.2 0.3 0.4 0.5 0.6 0.7 0.8
2.0 1.6 1.2 0.8 0.4 0
f=1GHz
0.8
0.6
0.4
0.2
0.1
COMMON
SOURCE
V_{DS}=3V
V_{G2S}=1V
I_D=5mA
Ta=25°C

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