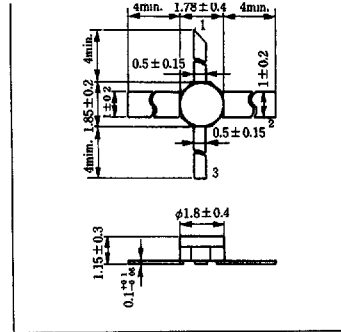


GaAsN-Channel HEMT SHF Converter RF Amplifier

■ OUTLINE DRAWING HITACHI/(OPTOELECTRONICS)



■ FEATURES

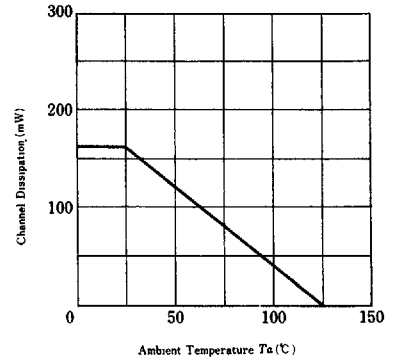
- Low Noise, High Gain
- NF=1.0dB typ. Ga=11dB typ. (f =12GHz)

■ ABSOLUTE MAXIMUM RATING (Ta = 25°C)

Item	Symbol	Ratings	Unit
Drain to Source Voltage	V_{DS}	4	V
Gate to Source Voltage	V_{GS}	-3	V
Gate to Drain Voltage	V_{GD}	-3	V
Drain Current	I_D	60	mA
Channel Dissipation	P_{ch}	160	mW
Channel Temperature	T_{ch}	125	°C
Storage Temperature	T_{stg}	-55 ~ +125	°C

The absolute maximum ratings are limiting values, to be applied individually, beyond which the device may be permanently damaged. Functional operation under any of these conditions is not guaranteed. Exposing a circuit to its absolute maximum rating for extended periods of time may affect the device's reliability.

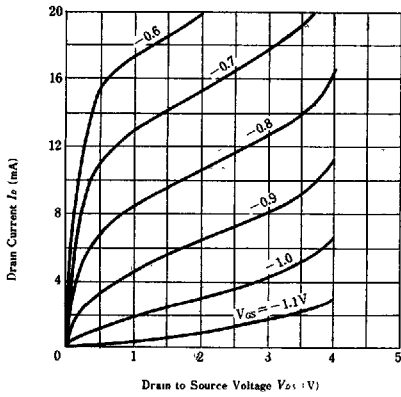
MUXIMUM CHANNEL DISSIPATION CURVE



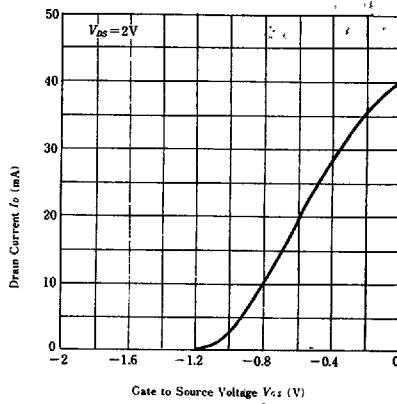
■ ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Item	Symbol	Test Condition	min.	typ.	max.	単位
Gate to Source Leakage Current	I_{GSS}	$V_{GS} = -3, V_{DS} = 0$	—	—	-10	μA
Drain Current	I_{DSS}	$V_{DS} = 2V, V_{GS} = 0$ (Pulse Test)	12	—	60	mA
Gate to Source Cutoff Voltage	$V_{GS(off)}$	$V_{DS} = 2V, I_D = 100\mu A$	-0.3	—	-2.5	V
Forward Transfer Admittance	$ y_{fs} $	$V_{DS} = 2V, I_D = 10mA, f = 1kHz$	30	45	—	mS
Noise Figure	NF	$V_{DS} = 2V, I_D = 10mA, f = 12GHz.$	—	1.0	1.3	dB
Associated Gain	Ga		9	11	—	dB

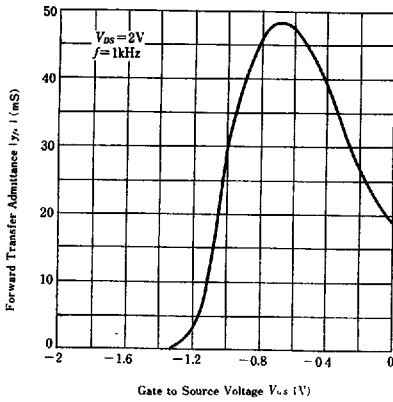
TYPICAL OUTPUT CHARACTERISTICS



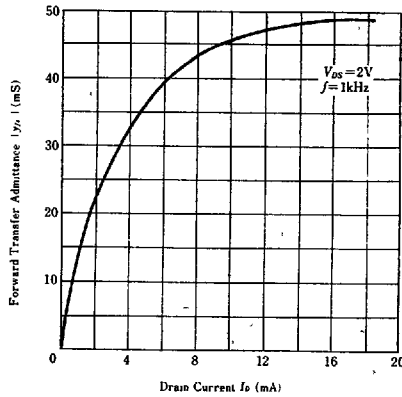
GATE TO SOURCE VOLTAGE



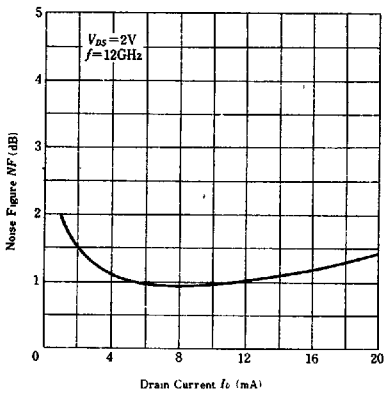
FORWARD TRANSFER ADMITTANCE VS. GATE TO SOURCE VOLTAGE



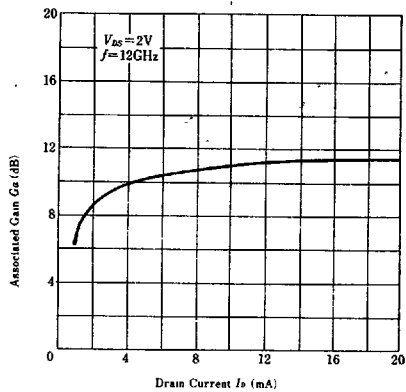
FORWARD TRANSFER ADMITTANCE VS. DRAIN CURRENT



NOISE FIGURE VS. DRAIN CURRENT



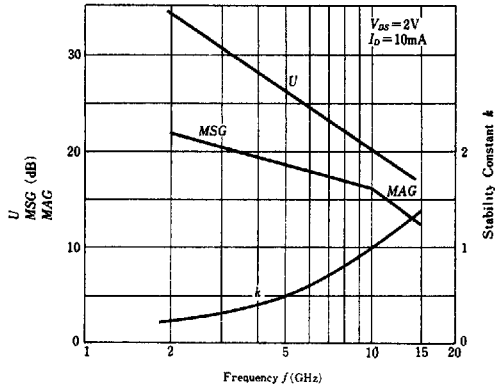
ASSOCIATED GAIN VS. DRAIN CURRENT



U, MSG, MAG, K VS. FREQUENCY

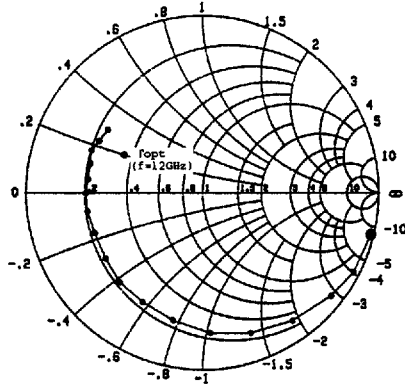
HITACHI/(OPTOELECTRONICS)

T-31-25

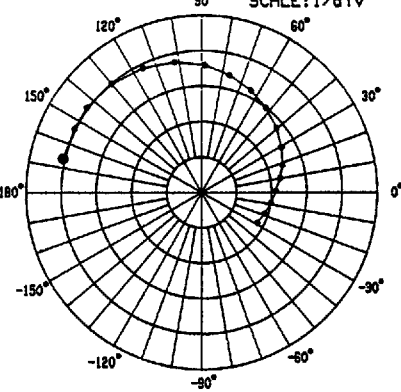


S PARAMETERS

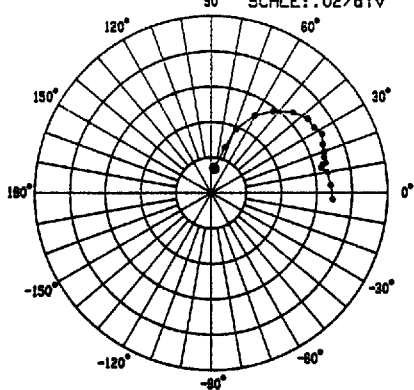
S11-FREQUENCY



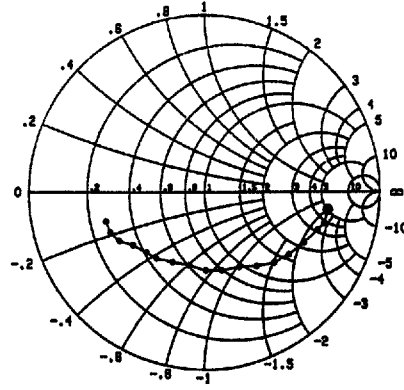
S21-FREQUENCY



S12-FREQUENCY



S22-FREQUENCY



8



S-PARAMETERS ($T_a=25^\circ\text{C}$, $V_{DS}=2\text{V}$, $I_D=10\text{mA}$)

HITACHI/(OPTOELECTRONICS)

T-31-25

f (GHz)	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
1	0.983	- 13.9	4.054	166.4	0.014	82.8	0.710	- 8.0
2	0.966	-- 27.6	4.034	153.6	0.027	73.3	0.706	- 14.4
3	0.933	- 38.5	4.046	143.9	0.039	68.6	0.679	- 18.1
4	0.884	- 54.7	3.990	130.0	0.050	60.7	0.634	- 26.4
5	0.838	- 71.0	3.884	115.7	0.058	52.6	0.594	- 35.9
6	0.793	- 86.8	3.754	102.0	0.065	44.4	0.561	- 45.1
7	0.739	-103.2	3.586	88.6	0.069	37.2	0.511	- 54.3
8	0.704	-118.8	3.396	76.7	0.069	32.2	0.463	- 64.7
9	0.688	-132.9	3.185	64.1	0.071	27.7	0.450	- 77.4
10	0.663	--146.0	2.992	52.4	0.069	23.3	0.440	- 89.0
11	0.651	-159.6	2.788	40.4	0.068	19.7	0.420	-101.6
12	0.660	-170.8	2.600	29.3	0.067	17.2	0.433	-114.9
13	0.663	-179.8	2.442	18.4	0.067	14.6	0.462	-126.5
14	0.653	173.2	2.272	10.2	0.065	13.9	0.472	-134.3
15	0.657	165.4	2.117	1.2	0.064	12.6	0.504	-143.9
16	0.673	159.2	2.005	- 8.5	0.067	9.8	0.556	-150.6
17	0.654	153.5	1.888	-18.4	0.068	3.7	0.581	-157.2
18	0.642	146.4	1.804	-28.2	0.069	- 3.0	0.584	-163.8

(Γ_{opt})

Frequency (GHz)	Γ _{opt}	∠Γ _{opt} (deg.)
8	0.513	88.1
10	0.541	118.1
12	0.472	-154.5
14	0.477	-179.6
16	0.540	169.1
18	0.589	156.6