MITSUBISHI SEMICONDUCTOR <GaAs FET>

FA12203

GaAs FET LOW NOISE AMPLIFIER MODULE

DESCRIPTION

The FA12203 is Low Noise, High Gain Amplifier Module used for the out door unit of 12 GHz DBS receiver.

This module is 2-stage low noise GaAs FET amplifier and operates only by controlling DRAIN current with GATE bias voltage.

FEATURES

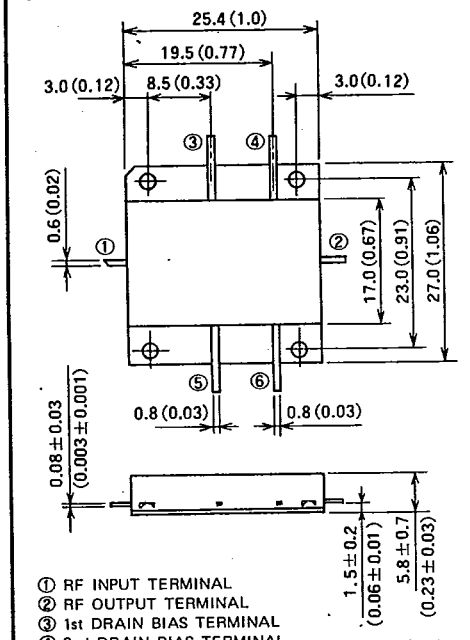
- High Gain, Low noise
  G_a = 18 dB (TYP.) @ 11.7 ~ 12.5 GHz
  NF = 2.4 dB (TYP.) @ 11.7 ~ 12.5 GHz
- Low Power Dissipation
  3V, 25 mA

QUALITY GRADE

- GG

OUTLINE DRAWING

Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Rating	Unit
V_{DD}	DC supply voltage (Note 1)	6	V
V_{GG}	GATE bias voltage (Note 2)	−6	V
I_D	Dissipation current	50	mA
Pin	Input power	−20	dBm
P_T	Total power dissipation (Note 3)	300	mW
$T_{a(OP)}$	Operating temperature	−30 ~ +60	°C
Tstg	Storage temperature	−40 ~ +70	°C

Note 1. V_{GG} = 0V
2. V_{DD} = 0V
3. Maximum power dissipation per one GaAs FET is 150mW.

ELECTRICAL CHARACTERISTICS (T_a=25°C)

Symbol	Parameter	Conditions	Limits			Units
			Min	Typ	Max	
Ga	Gain	V_{DD}=3V, I_{D1}=10mA, I_{D2}=15mA, Z_G=50Ω, Z_L=50Ω, f=11.7~12.5GHz	16	18		dB
NF	Noise figure			2.4	2.6	dB
ρin	Input VSWR			2.5	3.0	—
ρout	Output VSWR			2.3	2.5	—

I_{D1}: 1st stage DRAIN current I_{D2}: 2nd stage DRAIN current

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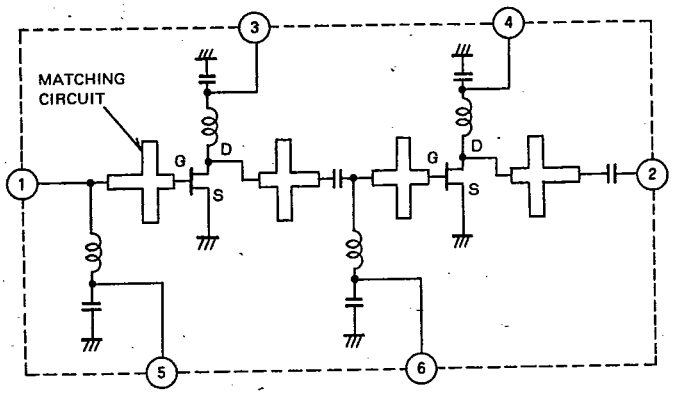
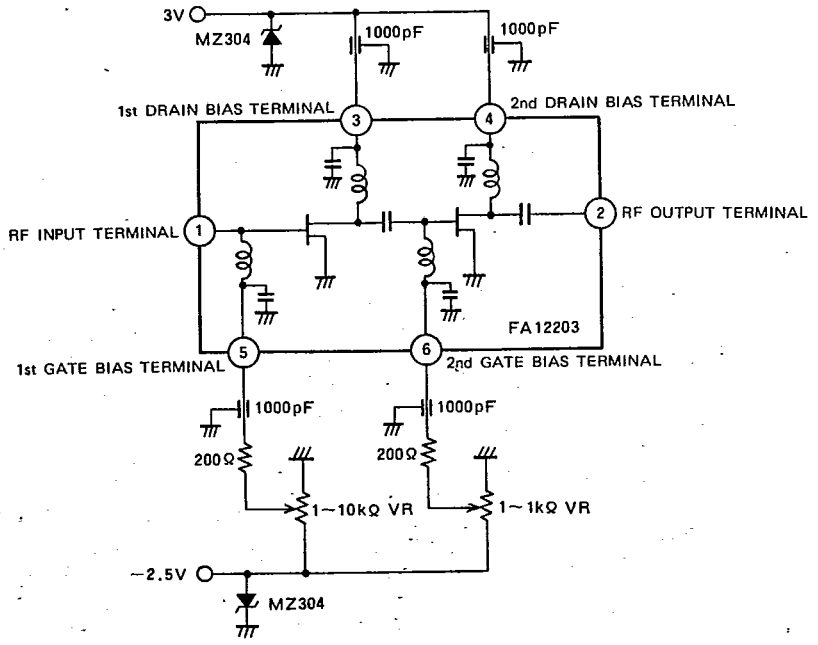
EQUIVALENT CIRCUIT



① RF INPUT TERMINAL
② RF OUTPUT TERMINAL
③ 1st DRAIN BIAS TERMINAL
④ 2nd DRAIN BIAS TERMINAL
⑤ 1st GATE BIAS TERMINAL
⑥ 2nd GATE BIAS TERMINAL

BIAS CIRCUIT



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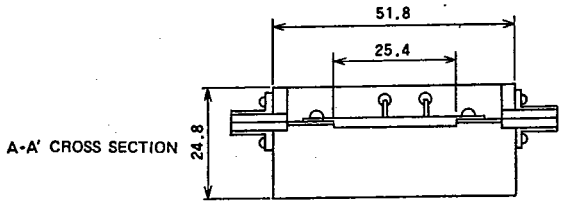
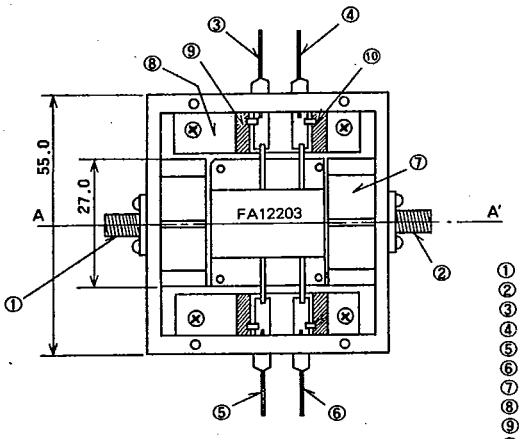
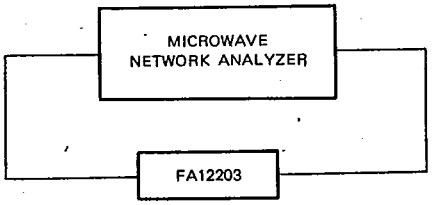
TEST FIXTURE

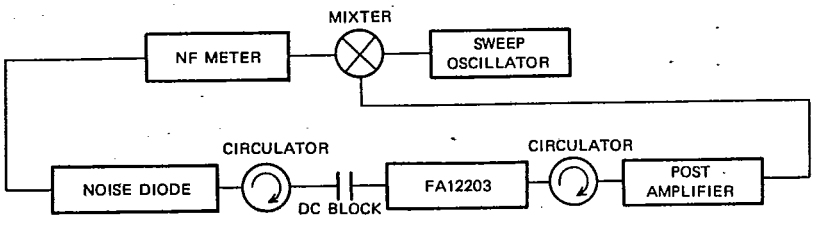




GAIN & VSWR TEST CIRCUIT



NF TEST CIRCUIT



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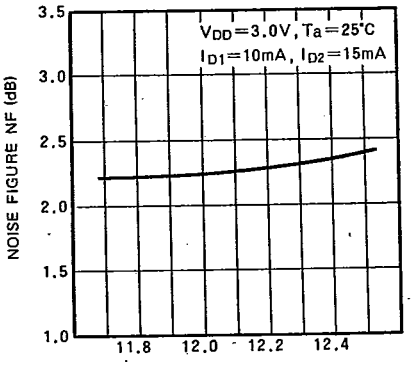
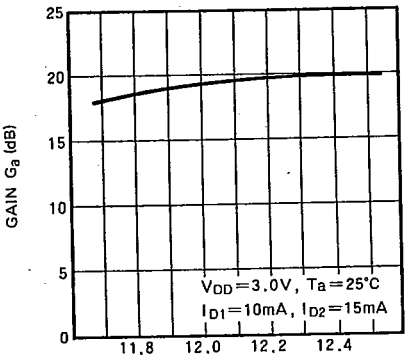
TYPICAL CHARACTERISTICS

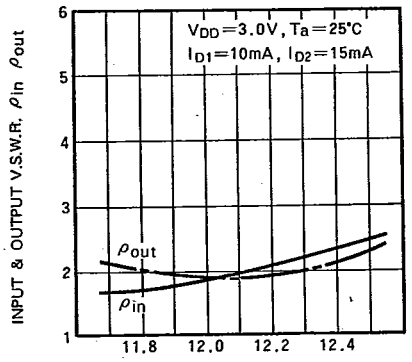
NF vs. f



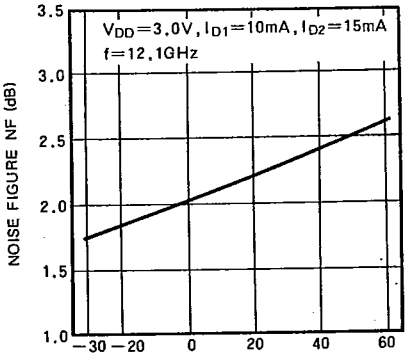
G_a va. f



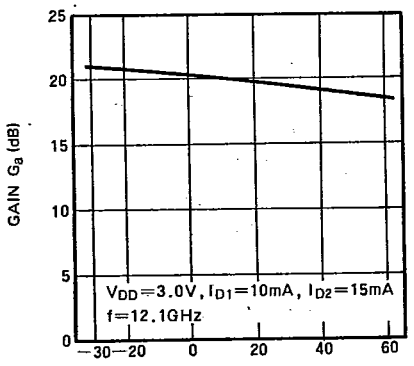
ρ_{in}, ρ_{out} vs. f



NF vs. T_a



G_a vs. T_a



MITSUBISHI ELECTRIC

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PRECAUTIONS

STORAGE
Keep the module in nitrogen or dry air until actual use.

HANDLING
It is necessary to earth the workdesk and test equipment when assembling and testing. The worker himself should be earthed by using an earthband, etc. Don't drop the module. If it has been dropped, don't use it.

ASSEMBLING
1. Screw the module on the case and connect the RF input and output (here after RF I/O) & bias terminals to another circuit. This module has not DC-block circuit for Gate bias at the RF input terminal in order to lower the input loss. Please use some DC-block circuit at the RF input terminal, in the case of using input circulator, etc..
2. Smooth the surface on which the module is installed; remove all foreign substances and projections. Wind the 4 screws evenly. Torque should be within 3kg-cm (max.).
3. Check if the soldering iron is earthed correctly when RF I/O & bias terminals are connected to another circuit, and don't let leak current run into the module.
4. Solder RF I/O & bias terminals for 5sec/part (max.) with a small amount by earthed 300°C iron head.
5. When remove flux, wipe the soldered parts by soaked gauze with alcohol solvent. Don't execute soak-cleaning or ultrasonic cleaning.

PROCEDURE
1. Earth all test equipments. When power is on, generating voltage, such as surge voltage, should be only within the maximum rating.
2. Apply negative bias voltage first, and then apply positive bias voltage.

GUARANTEED CHARACTERISTICS
All the graphic characteristics illustrated in this catalog are typical examples. The characteristics of individual devices as specified in the tables of absolute maximum ratings and electrical characteristics are guaranteed under the specified conditions.