

PRELIMINARY

Notice: This is not a final specification.
Some parametric limits are subject to change.

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC39V5964A

5.9~6.4GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC39V5964A is an internally impedance-matched GaAs power FET especially designed for use in 5.9~6.4 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

FEATURES

- Class A operation
- Internally matched to 50Ω system
- High output power
 $P_{1dB} = 8W$ (TYP) @ 5.9~6.4GHz
- High power gain
 $G_{LP} = 9$ dB (TYP) @ 5.9~6.4GHz
- High power added efficiency
 $\eta_{add} = 30\%$ (TYP) @ 5.9~6.4GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 28$ (dBm) S.C.L.

APPLICATION

Item-01: 5.9~6.4GHz band power amplifier

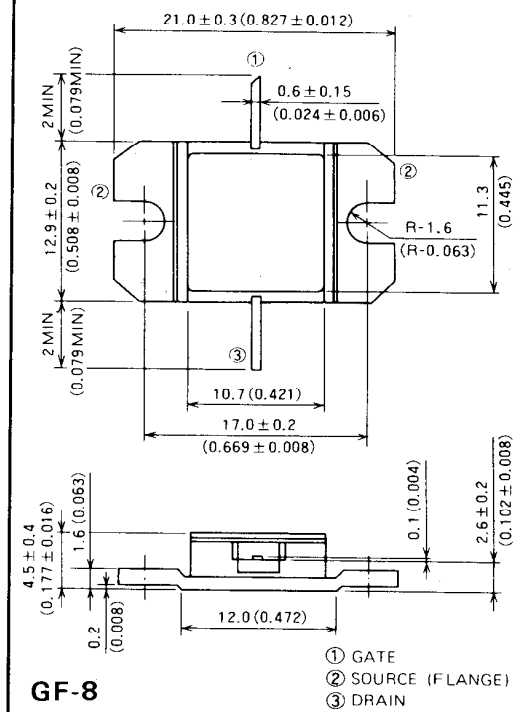
Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 2.4A$
- $R_g = 50\Omega$
- Refer to Bias Procedure

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

Symbol	Parameter	Ratings	Unit
V_{GDO}	Gate to drain voltage	-15	V
V_{GSO}	Gate to source voltage	-15	V
I_D	Drain current	7.5	A
I_{GR}	Reverse gate current	-20	mA
I_{GF}	Forward gate current	42	mA
P_T	Total power dissipation *1	42.8	W
T_{ch}	Channel temperature	175	$^\circ C$
T_{stg}	Storage temperature	-65 ~ +175	$^\circ C$

*1: $T_c = 25^\circ C$

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3V, V_{GS} = 0V$	—	—	7.5	A
g_m	Transconductance	$V_{DS} = 3V, I_D = 2.2A$	—	2	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3V, I_D = 20mA$	—	—	-4.5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 5.9 \sim 6.4GHz$	38	39	—	dBm
G_{LP}	Linear power gain		8	9	—	dB
I_D	Drain current		—	—	3.0	A
η_{add}	Power added efficiency		—	30	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_f method	—	—	3.5	$^\circ C/W$

*1: Item-51, 2-tone test $P_o = 28$ dBm Single Carrier Level $f = 6.4GHz$ $\Delta f = 10$ MHz. *2: Channel to case

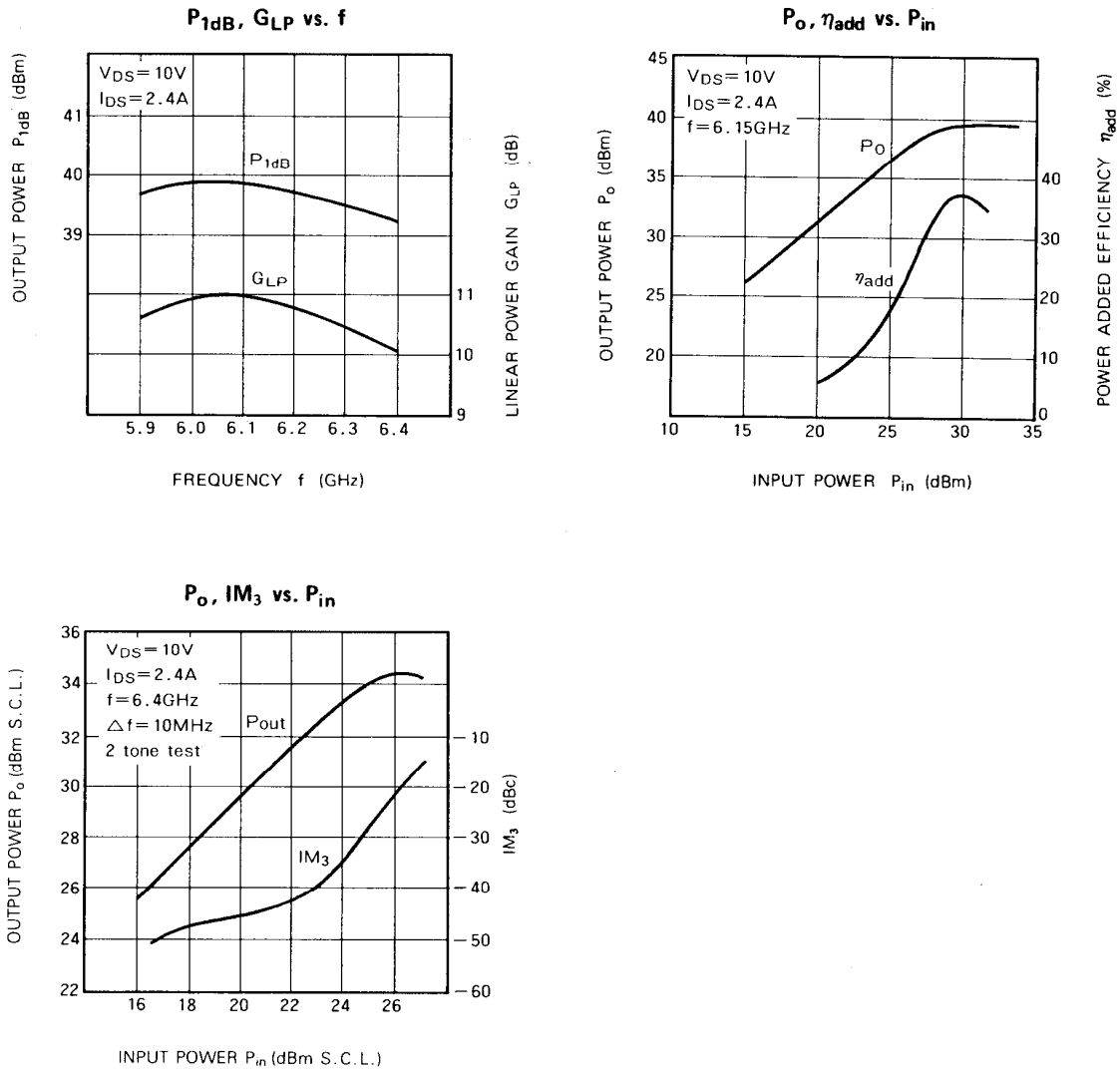
NOV. '97

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TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



S PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS} = 10\text{V}$, $I_{DS} = 2.4\text{A}$)

f (GHz)	S Parameters (TYP.)							
	S_{11}		S_{21}		S_{12}		S_{22}	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
5.9	0.32	-171	3.388	-23	0.079	-76	0.18	168
6.0	0.23	156	3.516	-41	0.084	-93	0.14	141
6.1	0.18	106	3.548	-58	0.088	-111	0.13	109
6.2	0.21	56	3.479	-75	0.089	-128	0.13	73
6.3	0.29	23	3.330	-92	0.087	-145	0.14	43
6.4	0.38	2	3.170	-108	0.086	-160	0.15	23