MGFC39V4450A

PRELIMINARY

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

4.4~5.0GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC39V4450A is an internally impedance-matched GaAs power FET especially designed for use in 4.4 ~ 5.0 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) @ 4.4 ~ 5.0 GHz
- High power gain
  G_{LP} = 9 dB (TYP) @ 4.4 ~ 5.0 GHz
- High power added efficiency
  η_{add} = 30% (TYP) @ 4.4 ~ 5.0 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  IM_3 = -45 dBc (TYP) @ P_o = 28 (dBm) S.C.L.

APPLICATION

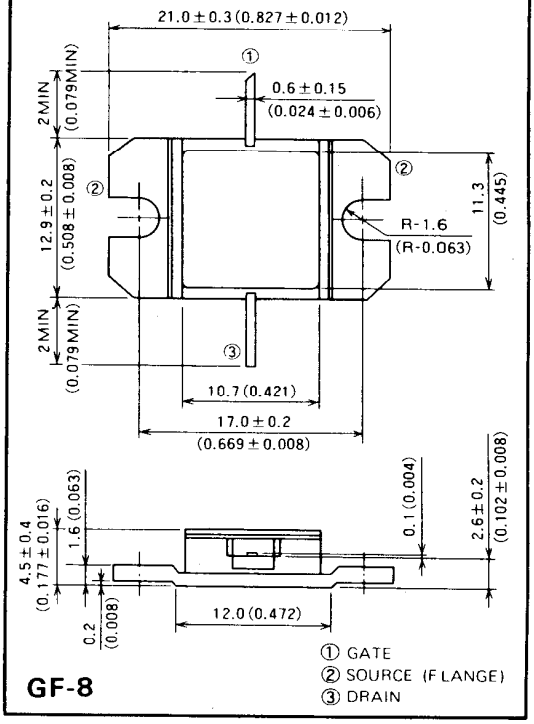
Item -01: 4.4 ~ 5.0 GHz band power amplifier
Item -51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS (Ta=25°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	°C
T_{stg}	Storage temperature	−65 ~ +175	°C

*1: T_C = 25°C

RECOMMENDED BIAS CONDITIONS

- V_{DS}=10V
- I_D=2.4A
- Rg=50Ω
- Refer to Bias Procedure

ELECTRICAL CHARACTERISTICS (Ta=25°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=4.4~5.0GHz	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	°C/W

*1: Item-51, 2-tone test P_o = 28 dBm Single Carrier Level f = 5.0 GHz Δf = 10 MHz *2: Channel to case

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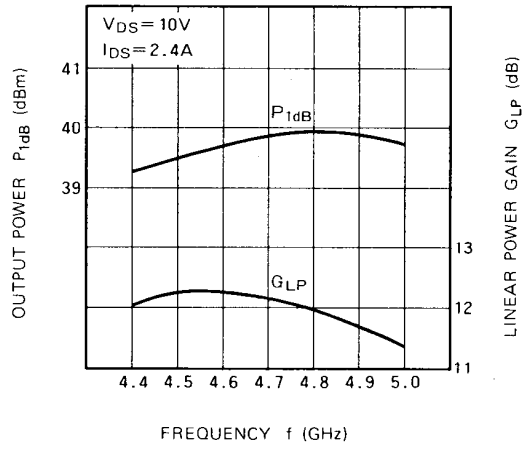
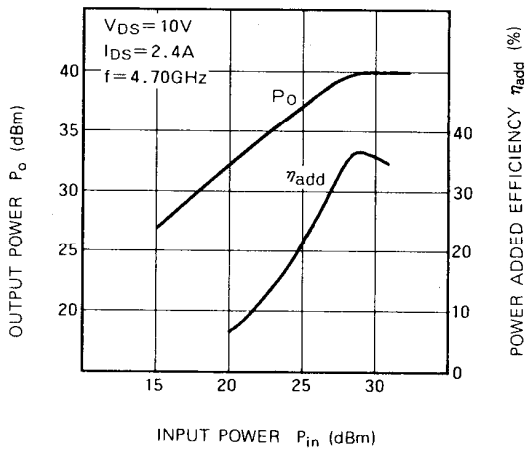
TYPICAL CHARACTERISTICS (T_a=25°C)

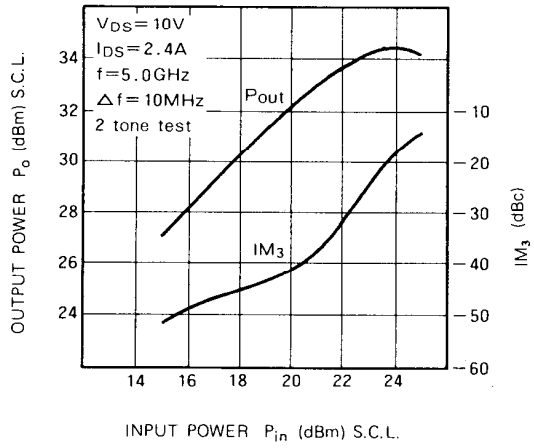
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



S PARAMETERS (T_a=25°C, V_{DS}=10V, I_{DS}=2.4A)

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.)
4.4	0.48	−176	4.140	21	0.084	− 38	0.13	−115
4.5	0.48	157	4.202	1	0.089	− 59	0.14	−158
4.6	0.46	131	4.173	− 21	0.093	− 80	0.16	175
4.7	0.43	104	4.088	− 42	0.094	− 99	0.18	155
4.8	0.37	72	3.976	− 64	0.096	−120	0.18	139
4.9	0.32	31	3.824	− 86	0.098	−141	0.15	122
5.0	0.34	− 16	3.673	−109	0.096	−163	0.09	97

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