MGFC40V4450A

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

4.4~5.0GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V4450A 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} = 10W (TYP) @ 4.4 ~ 5.0 GHz
- High power gain
  G_{LP} = 10 dB (TYP) @ 4.4 ~ 5.0 GHz
- High power added efficiency
  η_{add} = 32% (TYP) @ 4.4 ~ 5.0 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  IM_3 = -45 dBc (TYP) @ P_o = 29 (dBm) S.C.L.
- Low thermal resistance $R_{th(ch-c)} \leqq 2.8°C/W$

APPLICATION

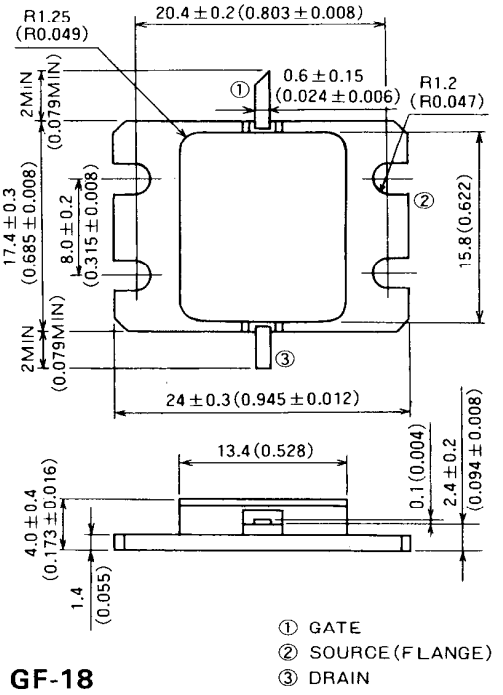
Item -01: 4.4 ~ 5.0 GHz band power amplifier
Item -51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



GF-18

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	6	A
I_{GR}	Reverse gate current	−20	mA
I_{GF}	Forward gate current	42	mA
P_T	Total power dissipation *1	53.5	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	—	4.5	6	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=40mA	—	−3	−4	V
P_{1dB}	Output power at 1dB gain compression	V_{DS}=10V, I_D=2.4A, f=4.4~5.0GHz	39.5	40.5	—	dBm
G_{LP}	Linear power gain		9	10	—	dB
I_D	Drain current		—	3.0	—	A
η_{add}	Power added efficiency		—	32	—	%
IM_3	3rd order IM distortion *1		−42	−45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_f method	—	—	2.8	°C/W

*1: Item-51, 2-tone test P_o = 29 dBm Single Carrier Level f = 5.0 GHz Δf = 10 MHz *2: Channel to case

MITSUBISHI ELECTRIC

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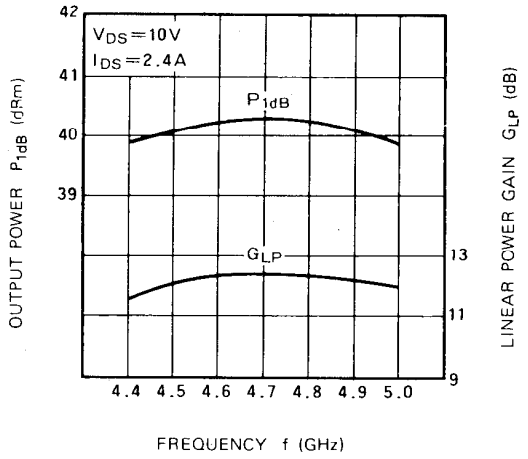
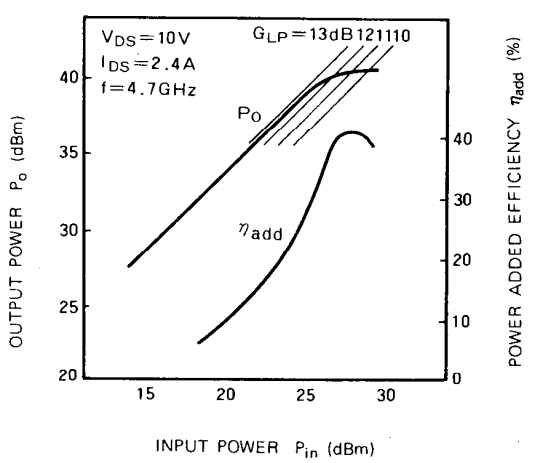
TYPICAL CHARACTERISTICS (T_a=25°C)

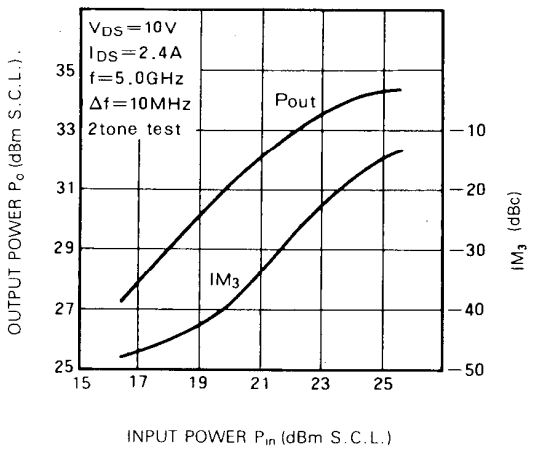
P_{1dB}, G_{LP} vs. f



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	0.53	80.6	3.71	− 88.6	0.062	−142.5	0.23	174.1
4.5	0.48	40.3	3.85	−126.6	0.067	178.3	0.20	128.7
4.6	0.41	− 1.4	3.96	−165.5	0.073	139.7	0.18	80.0
4.7	0.31	− 47.6	4.07	154.2	0.077	100.2	0.17	29.8
4.8	0.20	−109.9	4.08	112.7	0.081	59.4	0.15	− 22.7
4.9	0.18	153.5	3.67	69.6	0.082	17.9	0.12	− 77.5
5.0	0.31	78.9	3.66	26.7	0.079	− 24.5	0.07	−148.9