MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC40V6472A

PRELIMINARY

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

6.4~7.2GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V6472A is an internally impedance-matched GaAs power FET especially designed for use in 6.4~7.2 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) @ 6.4~7.2GHz
- High power gain
  G_{LP} = 8 dB (TYP) @ 6.4~7.2GHz
- High power added efficiency
  η_{add} = 30% (TYP) @ 6.4~7.2GHz, 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 $R_{th(ch-c)} \leqq 2.8°C/W$

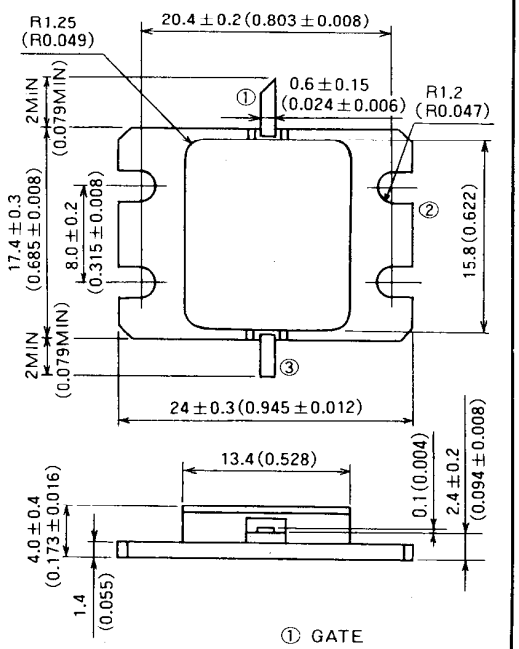
APPLICATION

Item-01: 6.4~7.2GHz 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	−2	−3	−4	V
P_{1dB}	Output power at 1dB gain compression	V_{DS}=10V, I_D=2.4A, f=6.4~7.2GHz	39.5	40.5	—	dBm
G_{LP}	Linear power gain		7	8	—	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	$\triangle V_f$ method	—	—	2.8	°C/W

*1: Item-51, 2-tone test P_o = 29 dBm Single Carrier Level f=7.2GHz Δf = 10 MHz. *2: Channel to case

MITSUBISHI ELECTRIC

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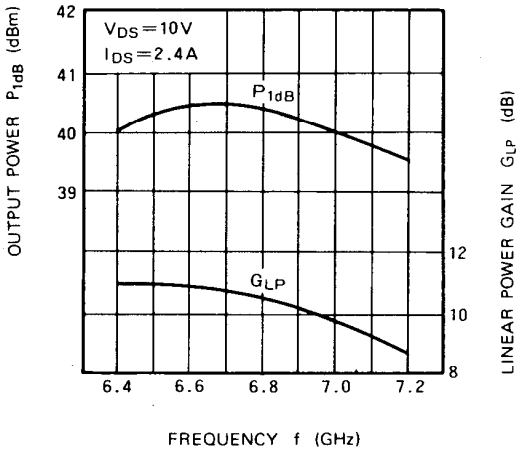
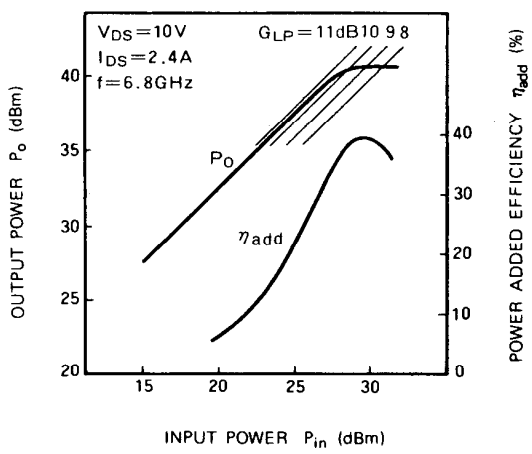
TYPICAL CHARACTERISTICS (Ta=25℃)

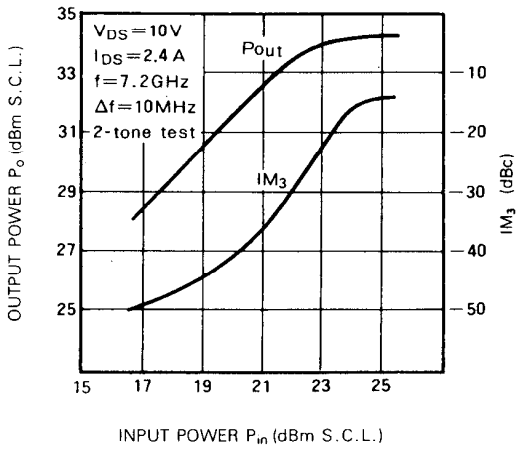
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



S PARAMETERS (Ta=25℃, VDS=10V, IDS=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.)
6.4	0.40	−170.9	3.51	34.3	0.071	− 24.8	0.32	−134.4
6.5	0.41	140.3	3.51	− 6.5	0.072	− 65.4	0.31	−171.2
6.6	0.40	92.6	3.47	− 47.4	0.073	−106.6	0.29	−155.1
6.7	0.39	41.3	3.43	− 88.0	0.073	−147.2	0.26	123.6
6.8	0.40	− 15.1	3.39	−129.5	0.073	171.2	0.21	95.4
6.9	0.44	− 76.5	3.27	−173.5	0.071	127.6	0.14	77.0
7.0	0.45	− 90.0	3.05	175.0	0.071	100.0	0.13	60.0
7.1	0.47	−110.0	2.92	165.0	0.070	80.0	0.15	50.0
7.2	0.49	−130.0	2.75	155.0	0.070	60.0	0.19	40.0