MGFC42V5964A

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

5.9~6.4GHz BAND 16W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC42V5964A is an internally impedance-matched GaAs power FET especailly 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} = 18W (TYP) @ 5.9 ~ 6.4 GHz
- High power gain
  G_{LP} = 9 dB (TYP) @ 5.9 ~ 6.4 GHz
- High power added efficiency
  η_{add} = 33% (TYP) @ 5.9 ~ 6.4 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  IM_3 = -45 dBc (TYP) @ P_o = 31 (dBm) S.C.L.
- Low thermal resistance $R_{th(ch-c)} \leqq 1.6$ (°C/W)

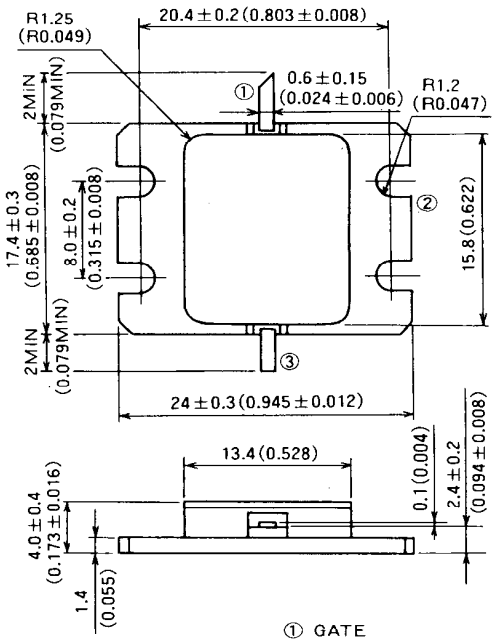
APPLICATION

Item -01: 5.9 ~ 6.4 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	12	A
I_{GR}	Reverse gate current	−40	mA
I_{GF}	Forward gate current	84	mA
P_T	Total power dissipation *1	93.7	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=4.5A
- Rg=25Ω
- 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	—	9	12	A
g_m	Transconductance	V_{DS}=3V, I_D=4.4A	—	4	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=3V, I_D=80mA	−2	−3	−4	V
P_{1dB}	Output power at 1dB gain compression	V_{DS}=10V, I_D=4.5A, f=5.9~6.4GHz	41.5	42.5	—	dBm
G_{LP}	Linear power gain		8	9	—	dB
I_D	Drain current		—	4.5	—	A
η_{add}	Power added efficiency		—	33	—	%
IM_3	3rd order IM distortion *1		−42	−45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_f method	—	—	1.6	°C/W

*1: Item-51, 2-tone test P_o = 31 dBm Single Carrier Level f = 6.4 GHz Δf = 10 MHz. *2: Channel to case

MITSUBISHI ELECTRIC

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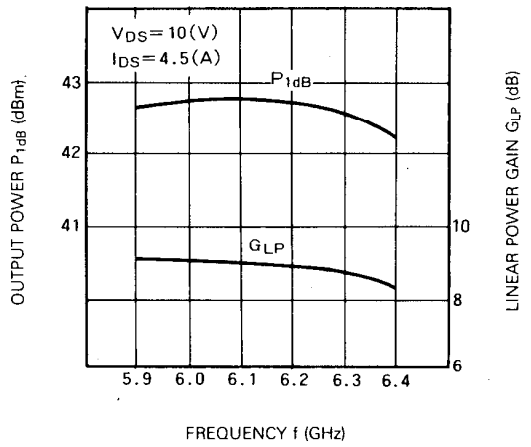
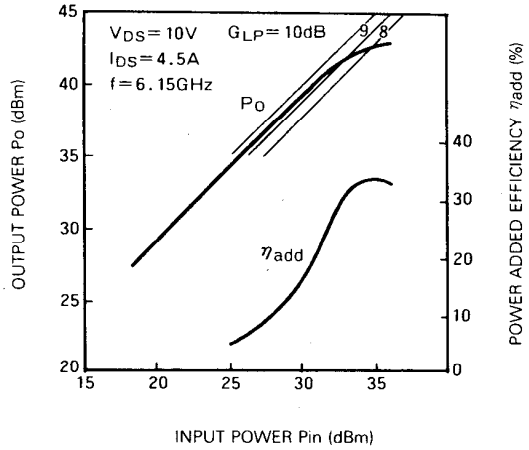
TYPICAL CHARACTERISTICS (Ta=25℃)

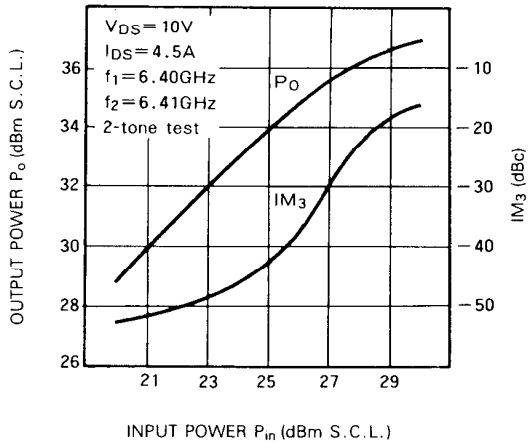
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



S PARAMETERS (Ta=25℃, V_{DS}=10V, I_{DS}=4.5A)

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	0.36	82	2.99	− 74	0.071	−133	0.26	80
6.0	0.35	56	2.95	− 91	0.071	−151	0.32	72
6.1	0.35	34	2.91	−108	0.072	−167	0.35	65
6.2	0.35	14	2.88	−124	0.078	177	0.37	58
6.3	0.34	− 4	2.81	−140	0.079	161	0.41	53
6.4	0.33	−23	2.72	−157	0.079	146	0.43	48