

MGFC40V5964

5.9~6.4GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V5964 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
 $P_{1dB} = 10W$ (TYP) @ 5.9~6.4GHz
- High power gain
 $G_{LP} = 8$ dB (TYP) @ 5.9~6.4GHz
- High power added efficiency
 $\eta_{add} = 32\%$ (TYP) @ 5.9~6.4GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 29$ (dBm) S.C.L.

APPLICATION

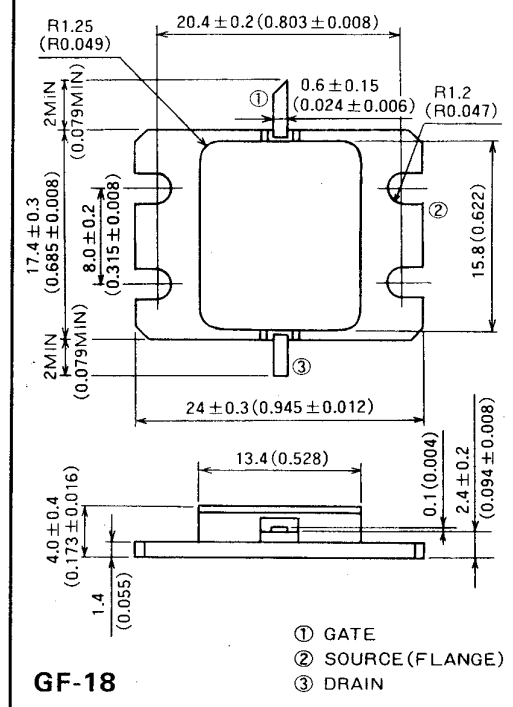
Item-01: 5.9~6.4GHz band power amplifier

Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Parameter	Rated	Unit
V_{GD0}	Gate to drain voltage	-15	V
V_{GS0}	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	42.8	W
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	-65 ~ +175	°C

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

RECOMMENDED BIAS CONDITIONS

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

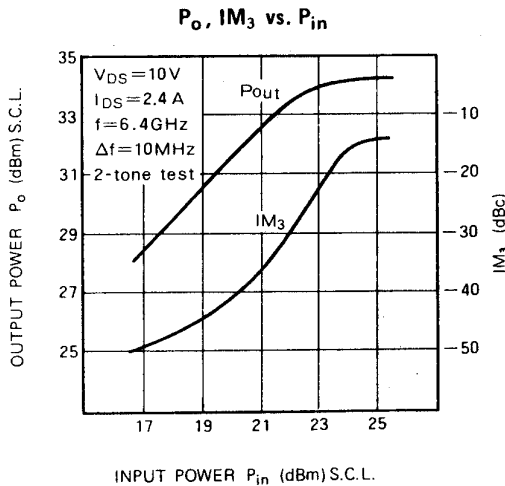
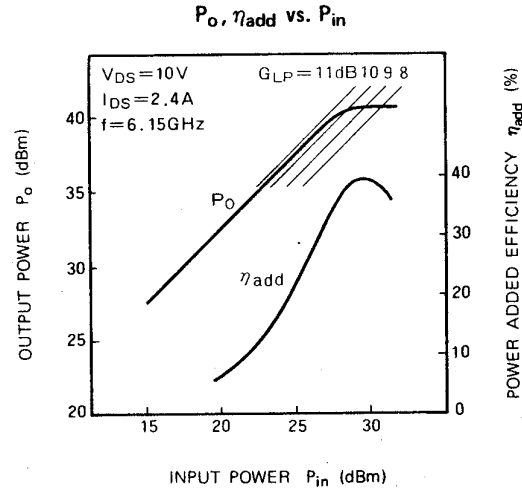
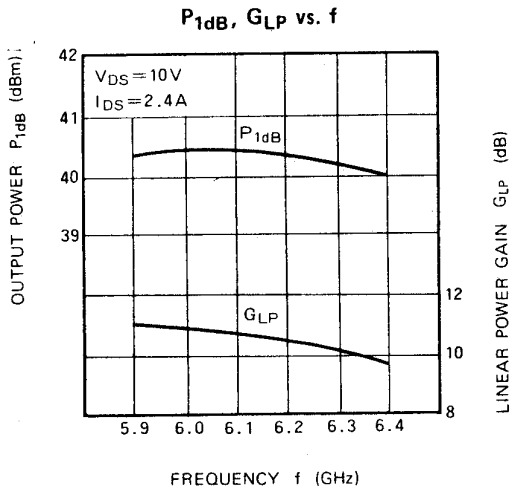
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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	$V_{DS} = 10V, I_D = 2.4A, f = 5.9 \sim 6.4GHz$	39.5	40.5	—	dBm	
G_{LP}	Linear power gain		8	9	—	dB	
I_D	Drain current		—	2.4	—	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	—	—	3.5	°C/W

*1: Item-51, 2-tone test $P_o = 29$ dBm Single Carrier Level $f = 6.4GHz$ $\Delta f = 10$ MHz. *2: Channel to case

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TYPICAL CHARACTERISTICS



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

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.)
5.9	0.40	-170.9	3.59	34.3	0.071	-24.8	0.32	-134.4
6.0	0.41	140.3	3.55	-6.5	0.072	-65.4	0.31	-171.2
6.1	0.40	92.6	3.47	-47.4	0.073	-106.6	0.29	-155.1
6.2	0.39	41.3	3.35	-88.0	0.073	-147.2	0.26	123.6
6.3	0.40	-15.1	3.24	-129.5	0.073	171.2	0.21	95.4
6.4	0.44	-76.5	3.09	-173.5	0.071	127.6	0.14	77.0