

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>
MGFC40V4450A

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
 $\eta_{add} = 32\%$ (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 $R_{th(ch-c)} \leq 2.8^\circ C/W$

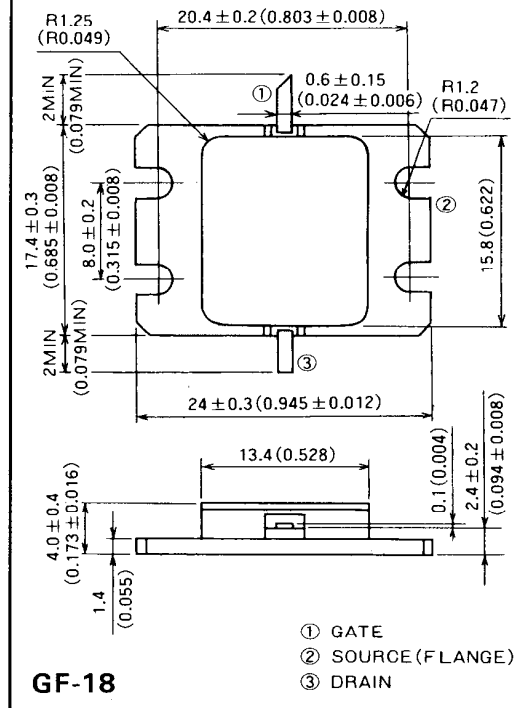
APPLICATION

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

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

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	$^\circ C$
T_{stg}	Storage temperature	-65 ~ +175	$^\circ C$

*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 ($T_a = 25^\circ C$)

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	$V_{DS} = 10V, I_D = 2.4A, f = 4.4 \sim 5.0GHz$	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	
$R_{th(ch-o)}$	Thermal resistance *2		ΔV_f method	—	—	2.8	$^\circ C/W$

*1: Item-51, 2-tone test $P_o = 29$ dBm Single Carrier Level $f = 5.0$ GHz $\Delta f = 10$ MHz

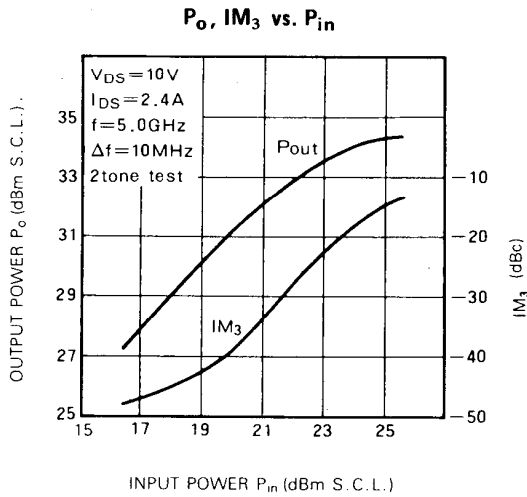
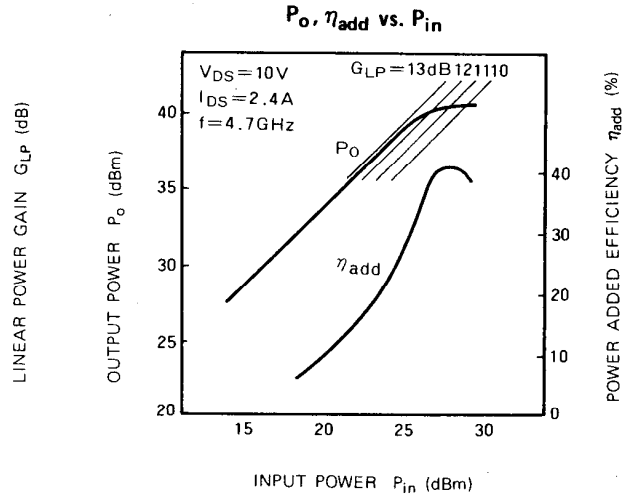
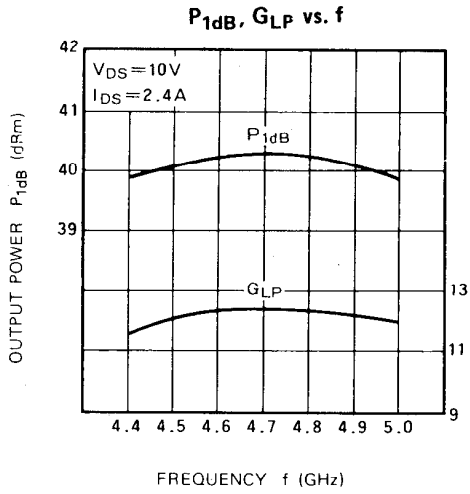
*2: Channel to case

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=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