

# MGFC40V7177A

**PRELIMINARY**

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

## 7.1~7.7GHz BAND 10W INTERNALLY MATCHED GaAs FET

### DESCRIPTION

The MGFC40V7177A is an internally impedance-matched GaAs power FET especially designed for use in 7.1~7.7 GHz band amplifiers. The hermetically sealed metal-ceramic package guarantees high reliability.

### FEATURES

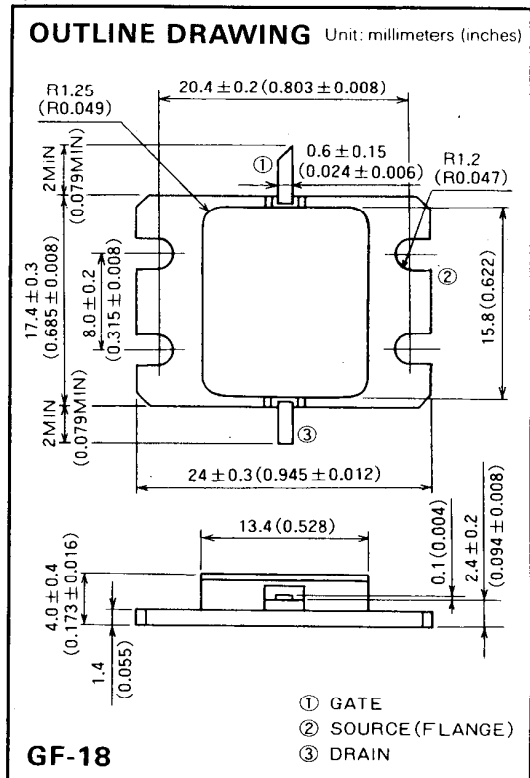
- Class A operation
- Internally matched to 50Ω system
- High output power  
 $P_{1dB} = 10W$  (TYP) @ 7.1~7.7 GHz
- High power gain  
 $G_{LP} = 8$  dB (TYP) @ 7.1~7.7GHz
- High power added efficiency  
 $\eta_{add} = 30\%$  (TYP) @ 7.1~7.7 GHz,  $P_{1dB}$
- Hermetically sealed metal-ceramic package
- 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: 7.1~7.7GHz band power amplifier
- Item-51: Digital radio communication

### QUALITY GRADE

- IG



### ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
V <sub>GD0</sub>	Gate to drain voltage	-15	V
V <sub>GSO</sub>	Gate to source voltage	-15	V
I <sub>D</sub>	Drain current	6	A
I <sub>GR</sub>	Reverse gate current	-20	mA
I <sub>GF</sub>	Forward gate current	42	mA
P <sub>T</sub>	Total power dissipation *1	53.5	W
T <sub>ch</sub>	Channel temperature	175	°C
T <sub>stg</sub>	Storage temperature	-65 ~ +175	°C

\*1: T<sub>c</sub> = 25°C

### RECOMMENDED BIAS CONDITIONS

- V<sub>DS</sub> = 10V
- I<sub>D</sub> = 2.4A
- R<sub>g</sub> = 50Ω
- Refer to Bias Procedure

### ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I <sub>DSS</sub>	Saturated drain current	V <sub>DS</sub> = 3V, V <sub>GS</sub> = 0V	—	4.5	6	A
g <sub>m</sub>	Transconductance	V <sub>DS</sub> = 3V, I <sub>D</sub> = 2.2A	—	2	—	S
V <sub>GS(off)</sub>	Gate to source cut-off voltage	V <sub>DS</sub> = 3V, I <sub>D</sub> = 40mA	-2	-3	-4	V
P <sub>1dB</sub>	Output power at 1dB gain compression	V <sub>DS</sub> = 10V, I <sub>D</sub> = 2.4A, f = 7.1~7.7GHz	39.0	40.0	—	dBm
G <sub>LP</sub>	Linear power gain		7	8	—	dB
I <sub>D</sub>	Drain current		—	3.0	—	A
η <sub>add</sub>	Power added efficiency		—	30	—	%
IM <sub>3</sub>	3rd order IM distortion *1		-42	-45	—	dBc
R <sub>th(ch-c)</sub>	Thermal resistance *2		ΔV <sub>I</sub> method	—	—	2.8

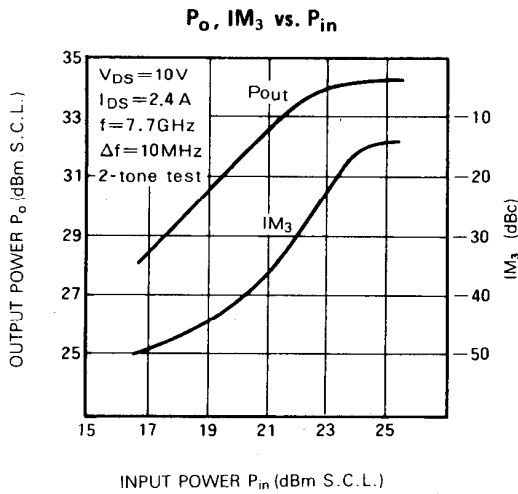
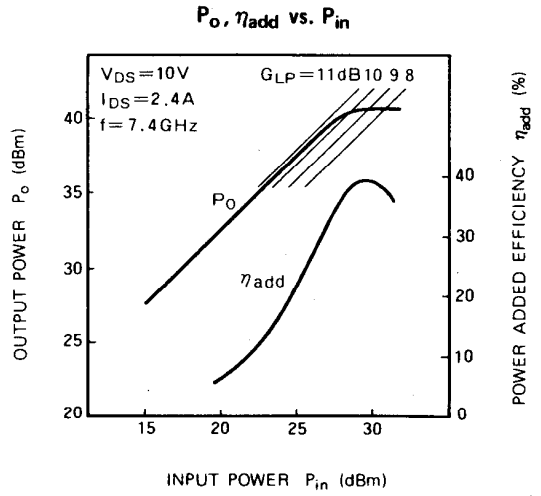
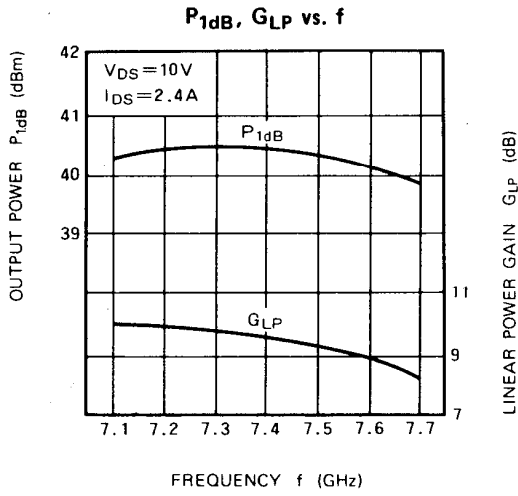
\*1: Item-51, 2-tone test P<sub>o</sub> = 29 dBm Single Carrier Level f = 7.7GHz Δf = 10 MHz. \*2: Channel to case

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**TYPICAL CHARACTERISTICS (Ta=25°C)**



**S PARAMETERS (Ta=25°C, V<sub>DS</sub>=10V, I<sub>DS</sub>=2.4A)**

f (GHz)	S Parameters (TYP.)							
	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
7.1	0.40	-170.9	3.16	34.3	0.071	-24.8	0.32	-134.4
7.2	0.41	140.3	3.13	-6.5	0.072	-65.4	0.31	-171.2
7.3	0.40	92.6	3.09	-47.4	0.073	-106.6	0.29	-155.1
7.4	0.39	41.3	3.05	-88.0	0.073	-147.2	0.26	123.6
7.5	0.40	-15.1	3.02	-129.5	0.073	171.2	0.21	95.4
7.6	0.44	-76.5	2.82	-173.5	0.071	127.6	0.14	77.0
7.7	0.45	-90.0	2.63	175.0	0.071	90.0	0.19	60.0