

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

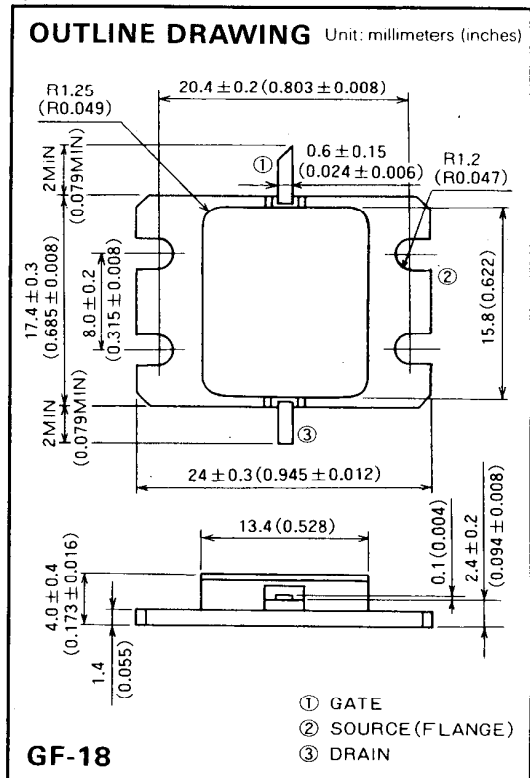
- Class A operation
- Internally matched to 50Ω system
- High output power
P_{1dB} = 10W (TYP) @ 7.1~7.7 GHz
- High power gain
G_{LP} = 8 dB (TYP) @ 7.1~7.7GHz
- High power added efficiency
η_{add} = 30% (TYP) @ 7.1~7.7 GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
IM₃ = -45 dBc (TYP) @ P_o = 29 (dBm) S.C.L.
- Low thermal resistance R_{th(ch-c)} ≤ 2.8°C/W

APPLICATION

- Item-01: 7.1~7.7 GHz band power amplifier
- Item-51: Digital radio communication

QUALITY GRADE

- IG



ABSOLUTE MAXIMUM RATINGS (T_a = 25°C)

Symbol	Parameter	Ratings	Unit
V _{GD0}	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
- R_g = 50Ω
- Refer to Bias Procedure

ELECTRICAL CHARACTERISTICS (T_a = 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 = 7.1~7.7GHz	39.0	40.0	—	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		ΔV _I method	—	—	2.8

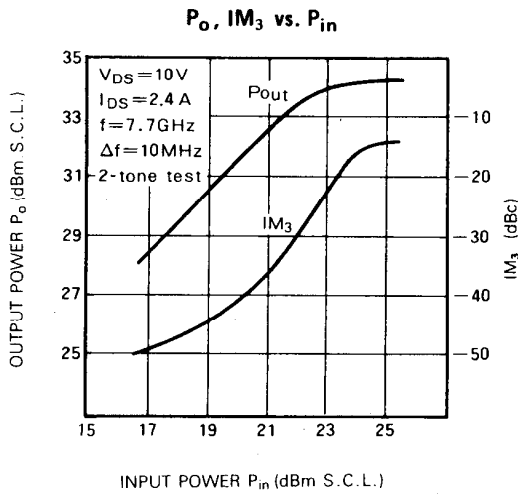
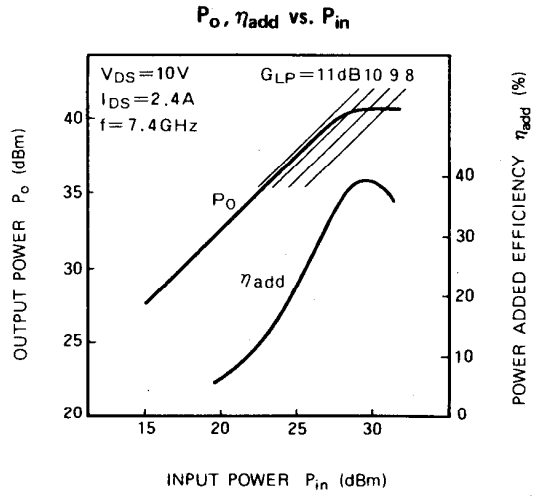
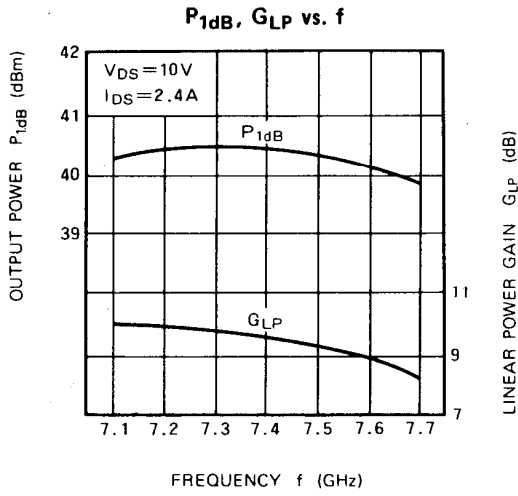
*1: Item-51, 2-tone test P_o = 29 dBm Single Carrier Level f = 7.7GHz Δf = 10 MHz. *2: Channel to case

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, V_{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.)
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