

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC40V7785A

7.7~8.5GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V7785A is an internally impedance-matched GaAs power FET especially designed for use in 7.7~8.5 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) @ 7.7~8.5 GHz
- High power gain
 $G_{LP} = 7$ dB (TYP) @ 7.7~8.5GHz
- High power added efficiency
 $\eta_{add} = 25\%$ (TYP) @ 7.7~8.5GHz, 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 $R_{th(ch-c)} \leq 2.8^\circ C/W$

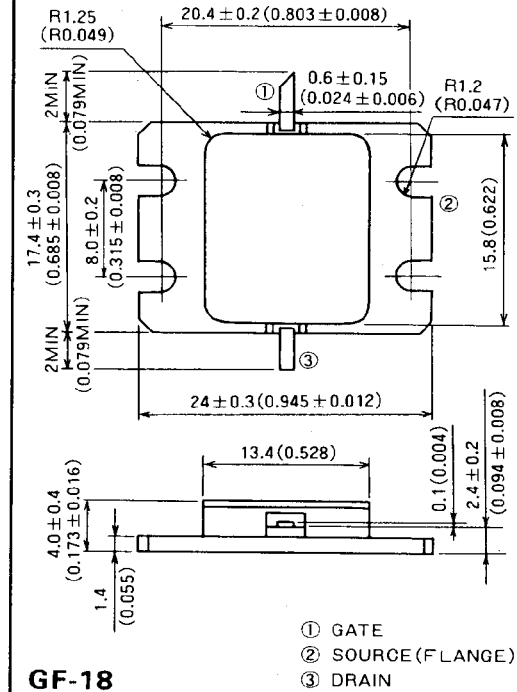
APPLICATION

- Item-01: 7.7~8.5GHz 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	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 (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 = 7.7~8.5GHz	39.0	40.0	—	dBm	
G _{LP}	Linear power gain		6	7	—	dB	
I _D	Drain current		—	3.0	—	A	
η _{add}	Power added efficiency		—	25	—	%	
IM ₃	3rd order IM distortion *1		-42	-45	—	dBc	
R _{th(ch-c)}	Thermal resistance *2		ΔV _f method	—	—	2.8	°C/W

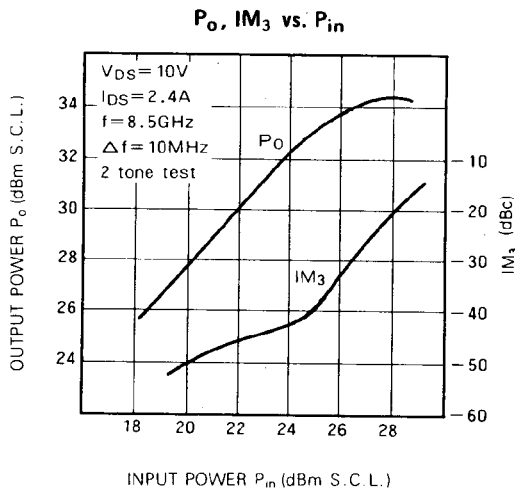
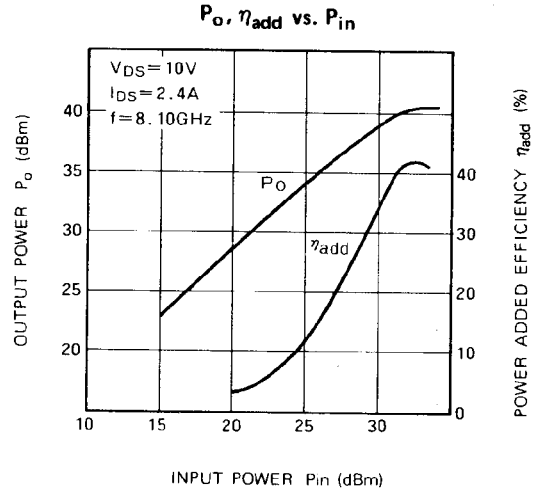
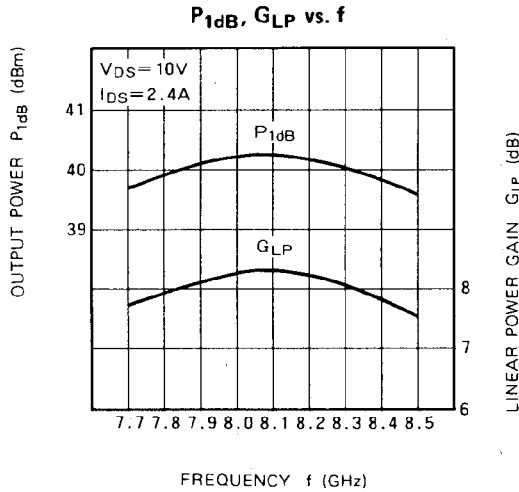
*1: Item-51, 2-tone test P_o = 29 dBm Single Carrier Level f = 8.5GHz Δf = 10 MHz. *2: Channel to case

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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.)
7.7	0.50	40	2.13	154	0.072	105	0.42	-17
7.8	0.46	31	2.20	140	0.076	93	0.37	-27
7.9	0.41	19	2.25	127	0.082	78	0.30	-39
8.0	0.34	6	2.28	113	0.085	63	0.22	-52
8.1	0.25	-13	2.29	99	0.084	48	0.15	-73
8.2	0.17	-42	2.32	83	0.087	33	0.10	-116
8.3	0.12	-104	2.32	66	0.090	16	0.11	167
8.4	0.18	-162	2.25	49	0.089	0	0.15	124
8.5	0.31	168	2.20	31	0.085	-19	0.20	96