

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC39V7785A

7.7~8.5GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC39V7785A 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

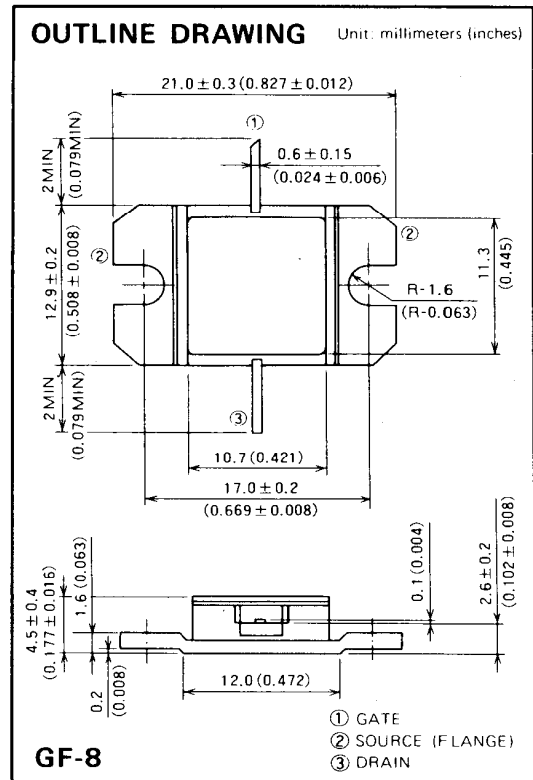
- Class A operation
- Internally matched to 50Ω system
- High output power
 $P_{1dB} = 8W$ (TYP) @ 7.7~8.5 GHz
- High power gain
 $G_{LP} = 7$ dB (TYP) @ 7.7~8.5GHz
- High power added efficiency
 $\eta_{add} = 27%$ (TYP) @ 7.7~8.5GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM_3 = -45$ dBc (TYP) @ $P_o = 28$ (dBm) S.C.L.

APPLICATION

- Item-01: 7.7~8.5GHz band power amplifier
- Item-51: Digital radio communication

QUALITY GRADE

- IG



ABSOLUTE MAXIMUM RATINGS (Ta = 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	7.5	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°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	—	—	7.5	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 = 20mA	—	—	-4.5	V
P _{1dB}	Output power at 1dB gain compression	V _{DS} = 10V, I _D = 2.4A, f = 7.7~8.5GHz	38	39	—	dBm
G _{LP}	Linear power gain		6	7	—	dB
I _D	Drain current		—	—	3.0	A
η _{add}	Power added efficiency		—	27	—	%
IM ₃	3rd order IM distortion *1		-42	-45	—	dBc
R _{th(ch-c)}	Thermal resistance *2		ΔV _f method	—	—	3.5

*1: Item-51, 2-tone test P_o = 28 dBm Single Carrier Level f = 8.5GHz Δf = 10 MHz. *2: Channel to case

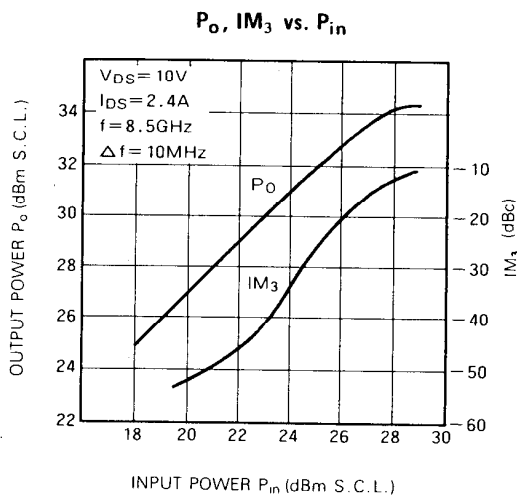
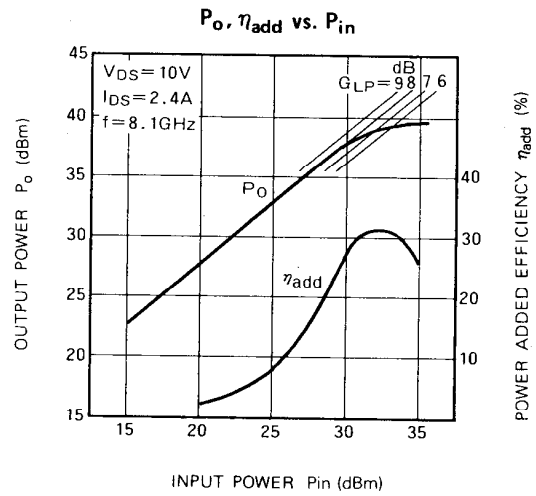
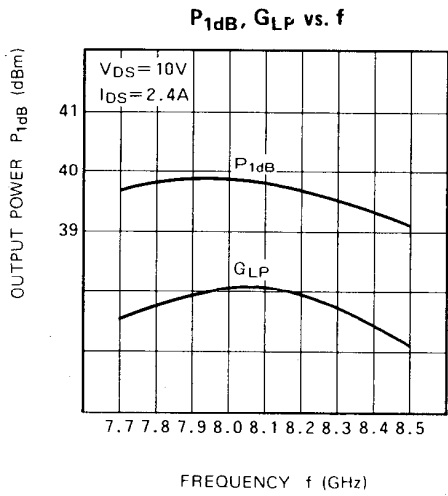
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TYPICAL CHARACTERISTICS (Ta=25°C)



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	0.45	24	2.40	-131	0.064	178	0.23	82
7.8	0.39	11	2.45	-145	0.068	167	0.21	76
7.9	0.35	-1	2.50	-161	0.072	156	0.20	70
8.0	0.33	-8	2.52	176	0.074	146	0.20	56
8.1	0.27	-40	2.51	162	0.077	131	0.19	46
8.2	0.24	-113	2.48	145	0.071	114	0.17	21
8.3	0.26	-161	2.42	121	0.069	91	0.15	12
8.4	0.31	146	2.34	103	0.068	77	0.15	-94
8.5	0.35	129	2.26	82	0.068	63	0.15	-146