MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC39V7785A

PRELIMINARY

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

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
  η_{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

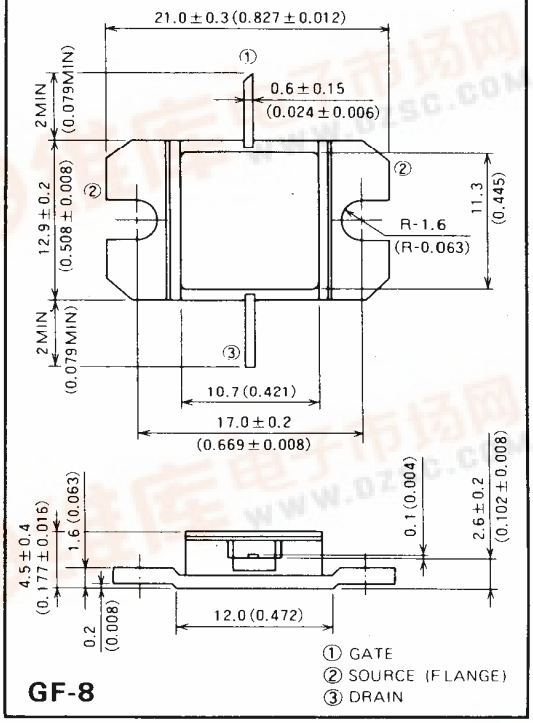
Item-01: 7.7~8.5GHz band power amplifier
Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



GF-8

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	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
Tch	Channel temperature	175	°C
Tstg	Storage temperature	−65~+175	°C

*1: T_C = 25°C

RECOMMENDED BIAS CONDITIONS

- V_{DS}=10V
- I_D=2.4A
- Rg=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	△V_f method	—	—	3.5	°C/W

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

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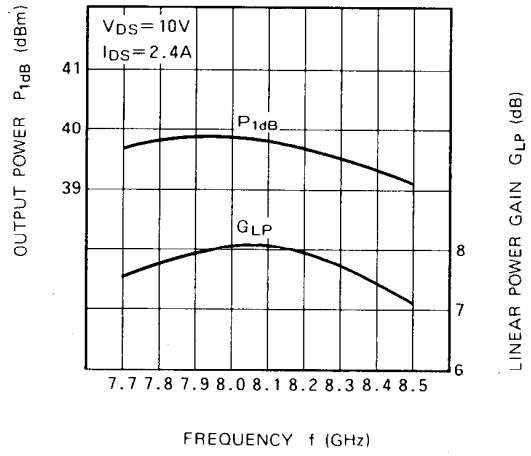
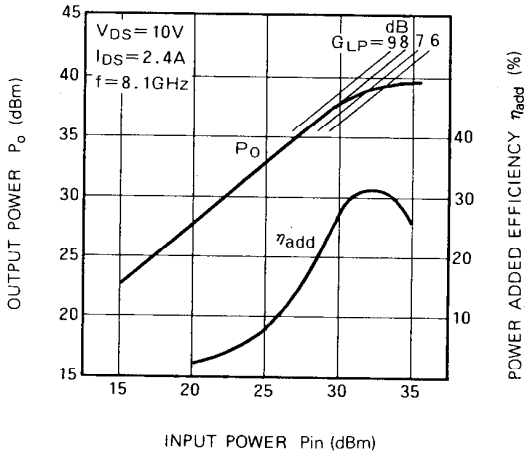
TYPICAL CHARACTERISTICS (Ta=25℃)

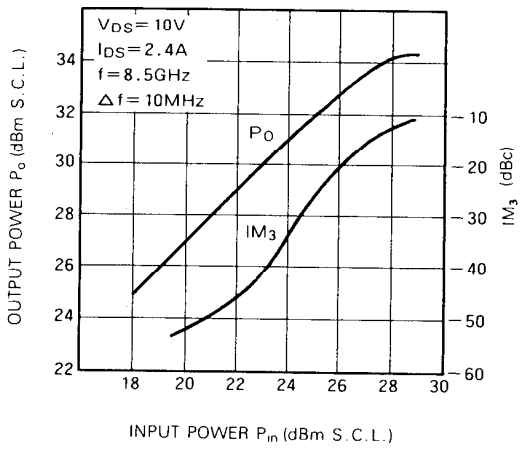
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



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