

PRELIMINARY

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

MGFC39V7177A

7.1~7.7GHz BAND 8W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC39V7177A 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
 $P_{1dB} = 8W$ (TYP) @ 7.1~7.7 GHz
- High power gain
 $G_{LP} = 8$ dB (TYP) @ 7.1~7.7GHz
- High power added efficiency
 $\eta_{add} = 28\%$ (TYP) @ 7.1~7.7 GHz, 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: 7.1~7.7 GHz band power amplifier
Item-51: Digital radio communication

QUALITY GRADE

- IG

ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ C$)

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
T_{ch}	Channel temperature	175	°C
T_{stg}	Storage temperature	-65 ~ +175	°C

*1: $T_c = 25^\circ C$

ELECTRICAL CHARACTERISTICS ($T_a = 25^\circ C$)

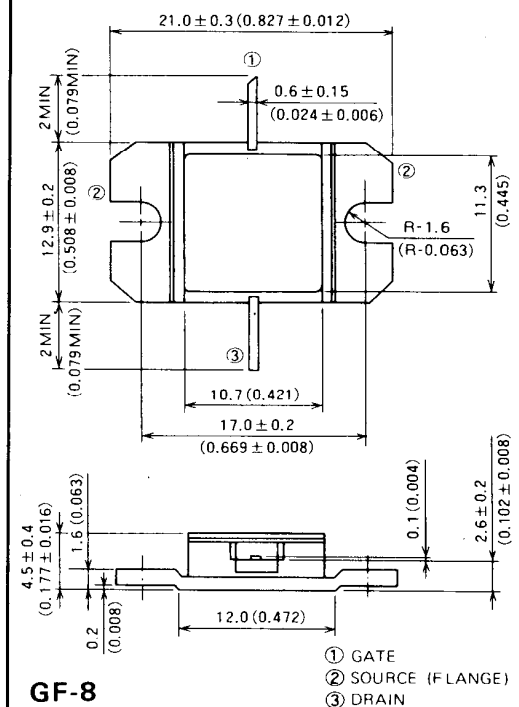
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3V, V_{GS} = 0V$	—	—	7.5	A
g_m	Transconductance	$V_{DS} = 3V, I_D = 2.2A$	—	2	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	$V_{DS} = 3V, I_D = 20mA$	—	—	-4.5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 7.1 \sim 7.7GHz$	38	39	—	dBm
G_{LP}	Linear power gain		7	8	—	dB
I_D	Drain current		—	—	3.0	A
η_{add}	Power added efficiency		—	28	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-o)}$	Thermal resistance *2	ΔV_f method	—	—	3.5	°C/W

*1: Item-51, 2-tone test $P_o = 28$ dBm Single Carrier Level $f = 7.7$ GHz $\Delta f = 10$ MHz.

*2: Channel to case

OUTLINE DRAWING

Unit: millimeters (inches)



GF-8

RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 2.4A$
- $R_g = 50\Omega$
- Refer to Bias Procedure

PRELIMINARY

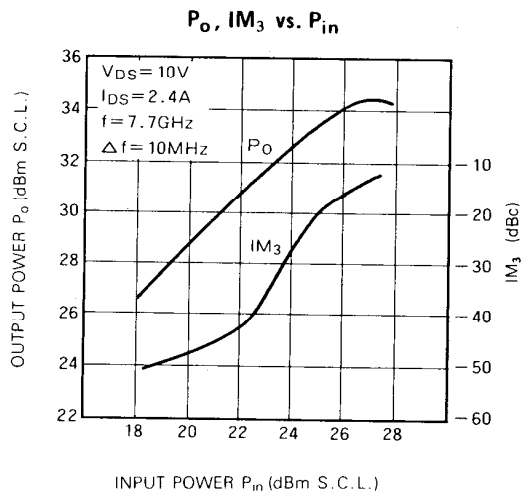
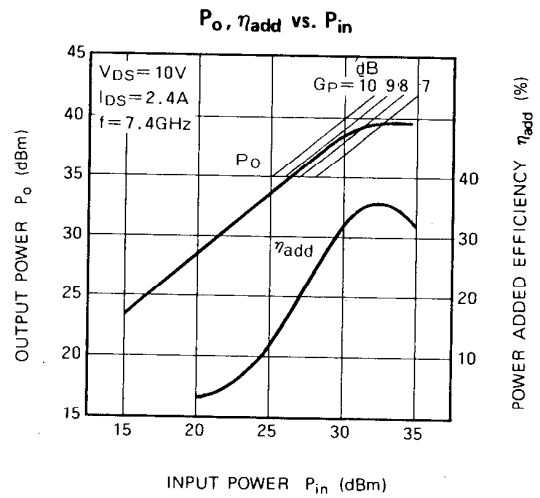
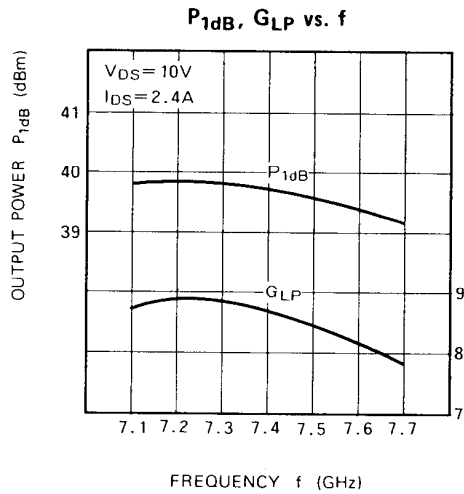
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MITSUBISHI SEMICONDUCTOR <GaAs FET>

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TYPICAL CHARACTERISTICS ($T_a = 25^\circ\text{C}$)



S PARAMETERS ($T_a = 25^\circ\text{C}$, $V_{DS}=10V$, $I_{DS}=2.4A$)

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	0.43	53	2.69	-71	0.056	-103	0.35	-91
7.2	0.39	35	2.74	-86	0.061	-119	0.30	-103
7.3	0.35	16	2.71	-101	0.064	-133	0.25	-119
7.4	0.26	-9	2.68	-118	0.067	-150	0.21	-137
7.5	0.22	-46	2.65	-134	0.070	-167	0.19	-157
7.6	0.21	-106	2.55	-153	0.071	175	0.16	-177
7.7	0.30	-150	2.49	-171	0.068	158	0.16	167