

PRELIMINARY

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

MGFC40V7177B

7.1~7.7GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V7177B 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
 $G_{LP} = 9$ 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.
- Low thermal resistance $R_{th} \leq 2.8^\circ C/W$

APPLICATION

Item-01: 7.1~7.7 GHz band power amplifier

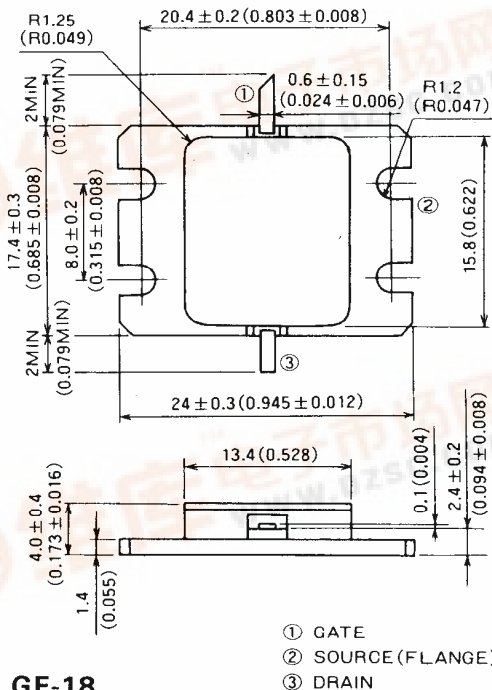
Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



GF-18

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	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	$^\circ C$
T_{stg}	Storage temperature	-65 ~ +175	$^\circ C$

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

RECOMMENDED BIAS CONDITIONS

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

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

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	$V_{DS} = 3V, V_{GS} = 0V$	—	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	-4.5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 7.1 \sim 7.7GHz$	38.0	40.0	—	dBm
G_{LP}	Linear power gain		8	9	—	dB
I_D	Drain current		—	3.0	—	A
η_{add}	Power added efficiency		—	28	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_f method	—	—	2.8	$^\circ C/W$

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

*2: Channel to case



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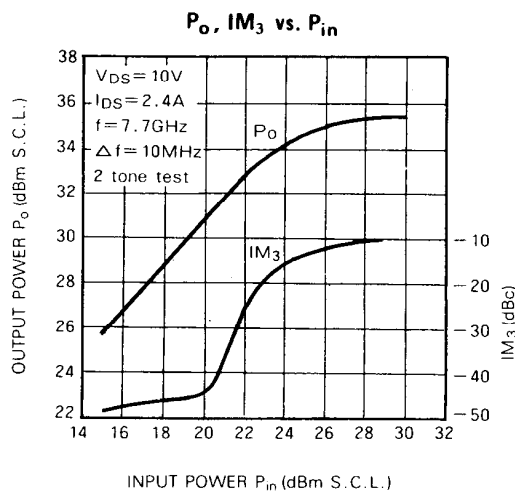
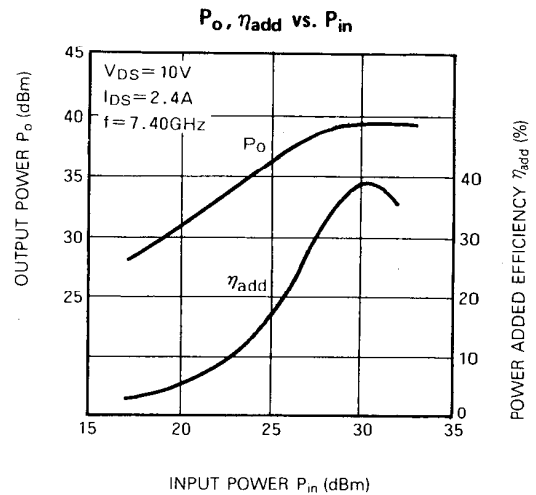
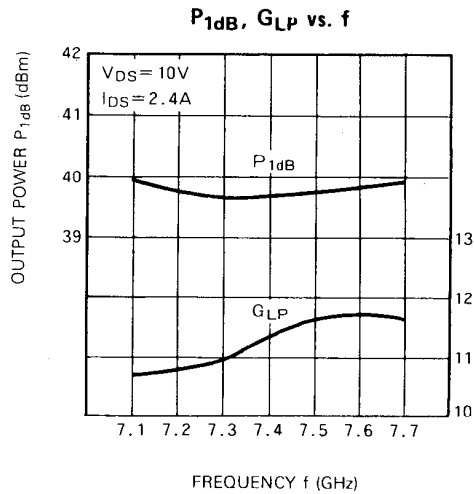
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MITSUBISHI SEMICONDUCTOR <GaAs FET>

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



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

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	0.66	49	2.96	131	0.094	72	0.36	- 86
7.2	0.63	32	3.04	115	0.099	59	0.30	- 106
7.3	0.63	14	3.10	99	0.107	39	0.23	- 128
7.4	0.61	- 4	3.13	82	0.112	23	0.19	- 155
7.5	0.55	- 18	3.14	66	0.107	7	0.18	173
7.6	0.52	- 36	3.16	49	0.113	- 7	0.19	133
7.7	0.45	- 51	3.20	31	0.114	- 26	0.21	98



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