

MGFC40V7785B

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

7.7~8.5GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V7785B 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
 $G_{LP} = 8$ dB (TYP) @ 7.7~8.5GHz
- High power added efficiency
 $\eta_{add} = 26%$ (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.
- Low thermal resistance $R_{th(ch-c)} \leq 2.8^\circ C/W$

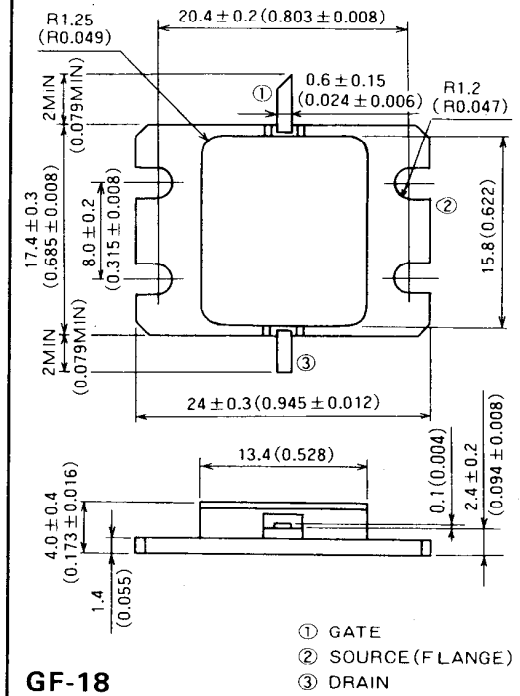
APPLICATION

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

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



GF-18

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	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: $T_c = 25^\circ C$

RECOMMENDED BIAS CONDITIONS

- $V_{DS} = 10V$
- $I_D = 2.4A$
- $R_g = 50\Omega$
- 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	$V_{DS} = 3V, I_D = 40mA$	—	-3	-4.5	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 7.7 \sim 8.5GHz$	38.0	40.0	—	dBm
G_{LP}	Linear power gain		7	8	—	dB
I_D	Drain current		—	3.0	—	A
η_{add}	Power added efficiency		—	26	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-o)}$	Thermal resistance *2		ΔV_f method	—	—	2.8

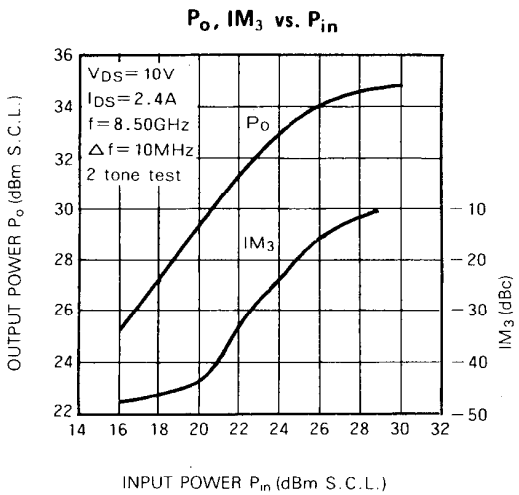
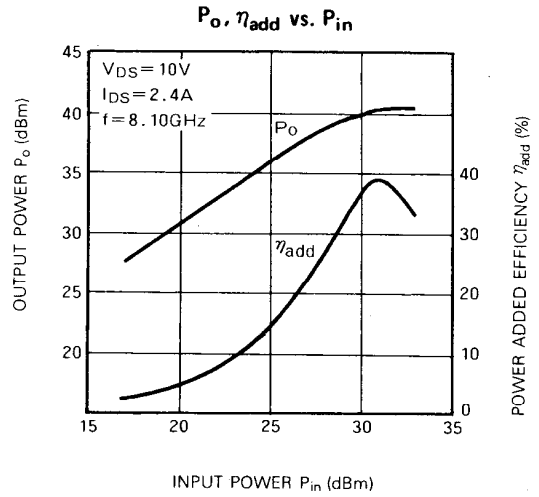
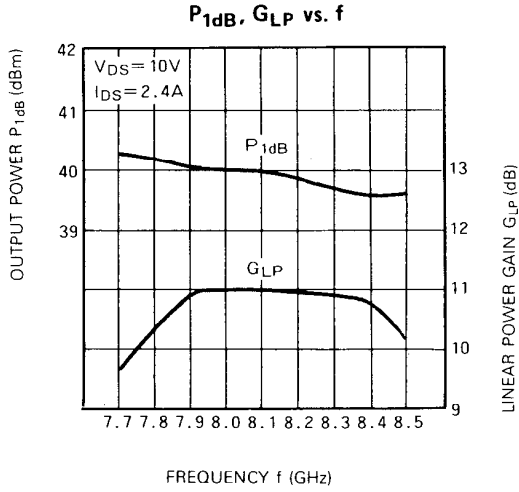
*1: Item-51, 2-tone test $P_o = 28$ dBm Single Carrier Level $f = 8.5GHz$ $\Delta f = 10$ MHz. *2: Channel to case

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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	0.63	9	3.03	155	0.103	96	0.37	-23
7.8	0.63	-5	3.81	142	0.107	84	0.35	-33
7.9	0.61	-17	3.11	129	0.109	70	0.32	-42
8.0	0.59	-33	3.20	115	0.115	56	0.26	-53
8.1	0.54	-50	3.33	99	0.115	42	0.21	-69
8.2	0.49	-72	3.41	84	0.125	29	0.16	-89
8.3	0.43	-99	3.49	66	0.129	11	0.09	-131
8.4	0.39	-136	3.48	48	0.130	-8	0.10	139
8.5	0.41	-176	3.33	58	0.126	-26	0.21	103