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
  η_{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 $R_{th(ch-c)} \leqq 2.8$°C/W

APPLICATION

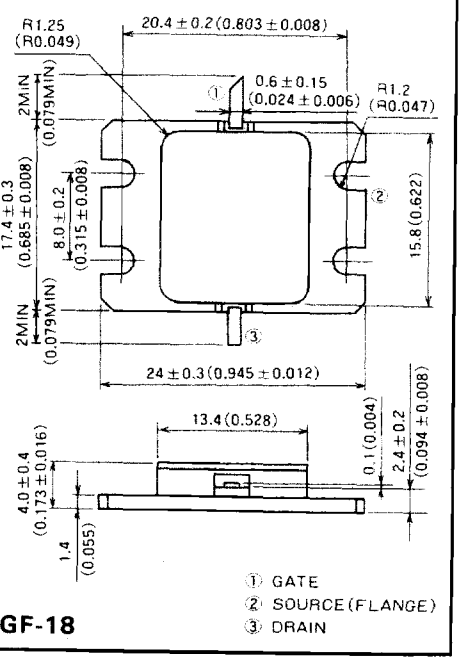
Item-01: 7.7~8.5GHz band power amplifier
Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING

Unit: millimeters (inches)



GF-18

ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Symbol	Parameter	Ratings	Unit
V_{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
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	—	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=7.7~8.5GHz	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
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_F method	—	—	2.8	°C/W

*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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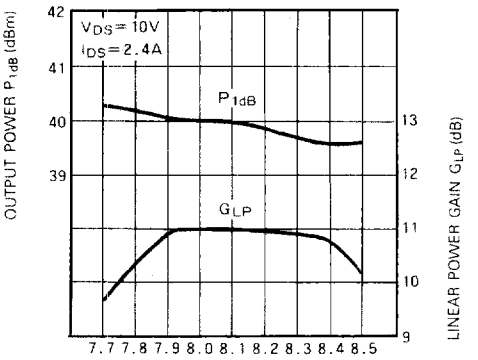
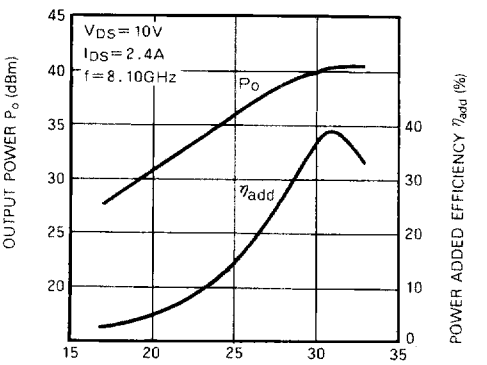
TYPICAL CHARACTERISTICS (Ta=25°C)

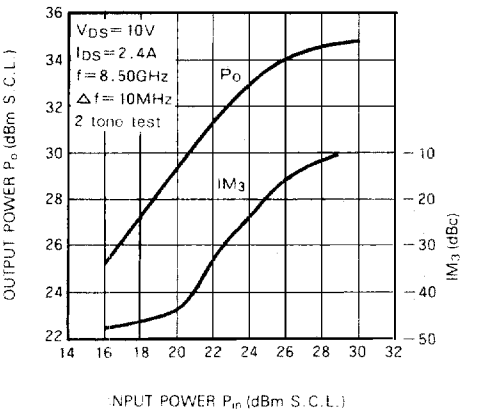
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



S PARAMETERS (Ta=25°C, VDS=10V, IDS=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

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