MGFC40V7785A

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 MGFC40V7785A 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

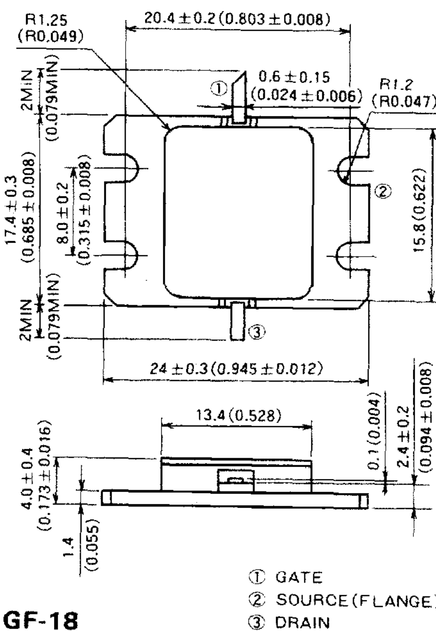
- Class A operation
- Internally matched to 50Ω system
- High output power
  P_{1dB} = 10W (TYP) @ 7.7~8.5 GHz
- High power gain
  G_{LP} = 7 dB (TYP) @ 7.7~8.5GHz
- High power added efficiency
  η_{add} = 25% (TYP) @ 7.7~8.5GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
  IM_3 = -45 dBc (TYP) @ P_o = 29 (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



RECOMMENDED BIAS CONDITIONS

- V_{DS} = 10V
- I_D = 2.4A
- Rg = 50Ω
- Refer to Bias Procedure

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

*1: T_C = 25°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Test conditions	Limits Min	Limits Typ	Limits Max	Unit
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	V
P_{1dB}	Output power at 1dB gain compression	V_{DS} = 10V, I_D = 2.4A, f = 7.7~8.5GHz	39.0	40.0	—	dBm
G_{LP}	Linear power gain		6	7	—	dB
I_D	Drain current		—	3.0	—	A
η_{add}	Power added efficiency		—	25	—	%
IM_3	3rd order IM distortion *1		−42	−45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔVf method	—	—	2.8	°C/W

*1: Item-51, 2-tone test P_o = 29 dBm Single Carrier Level f = 8.5GHz Δf = 10 MHz. *2: Channel to case

MITSUBISHI ELECTRIC

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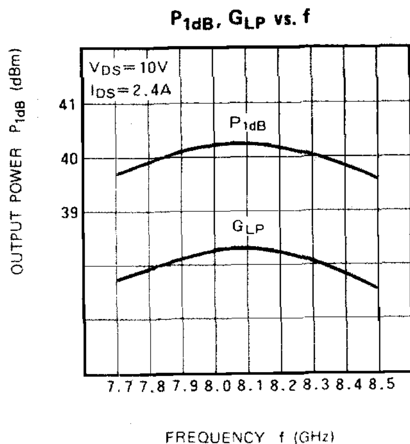
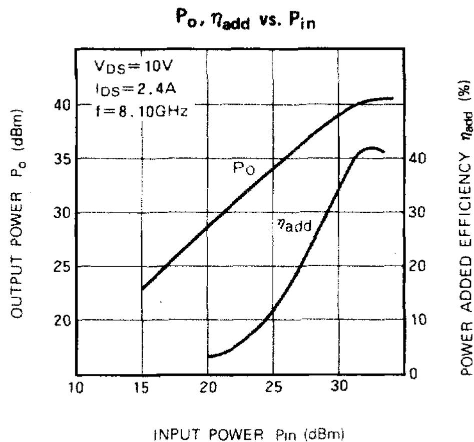
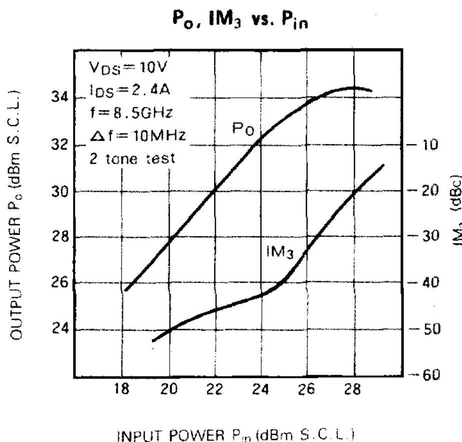
TYPICAL CHARACTERISTICS (Ta=25℃)







S PARAMETERS (Ta=25℃, 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	0.50	40	2.13	154	0.072	105	0.42	−17
7.8	0.46	31	2.20	140	0.076	93	0.37	−27
7.9	0.41	19	2.25	127	0.082	78	0.30	−39
8.0	0.34	6	2.28	113	0.085	63	0.22	−52
8.1	0.25	−13	2.29	99	0.084	48	0.15	−73
8.2	0.17	−42	2.32	83	0.087	33	0.10	−116
8.3	0.12	−104	2.32	66	0.090	16	0.11	167
8.4	0.18	−162	2.25	49	0.089	0	0.15	124
8.5	0.31	168	2.20	31	0.085	−19	0.20	96

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