

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC40V3742A

3.7~4.2GHz BAND 10W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC40V3742A is an internally impedance-matched GaAs power FET especially designed for use in 3.7 ~ 4.2 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) @ 3.7 ~ 4.2 GHz
- High power gain
 $G_{LP} = 11$ dB (TYP) @ 3.7 ~ 4.2 GHz
- High power added efficiency
 $\eta_{add} = 33%$ (TYP) @ 3.7 ~ 4.2 GHz, 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 $R_{th(ch-c)} \leq 2.8^\circ C/W$

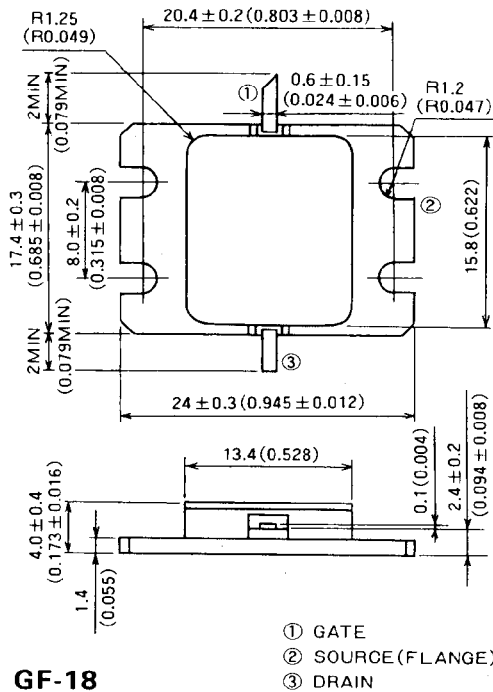
APPLICATION

- Item-01: 3.7 ~ 4.2 GHz 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
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	$V_{DS} = 3V, I_D = 40mA$	-2	-3	-4	V
P_{1dB}	Output power at 1dB gain compression	$V_{DS} = 10V, I_D = 2.4A, f = 3.7 \sim 4.2GHz$	39.5	40.5	—	dBm
G_{LP}	Linear power gain		10	11	—	dB
I_D	Drain current		—	3.0	—	A
η_{add}	Power added efficiency		—	33	—	%
IM_3	3rd order IM distortion *1		-42	-45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2		ΔV_f method	—	—	2.8

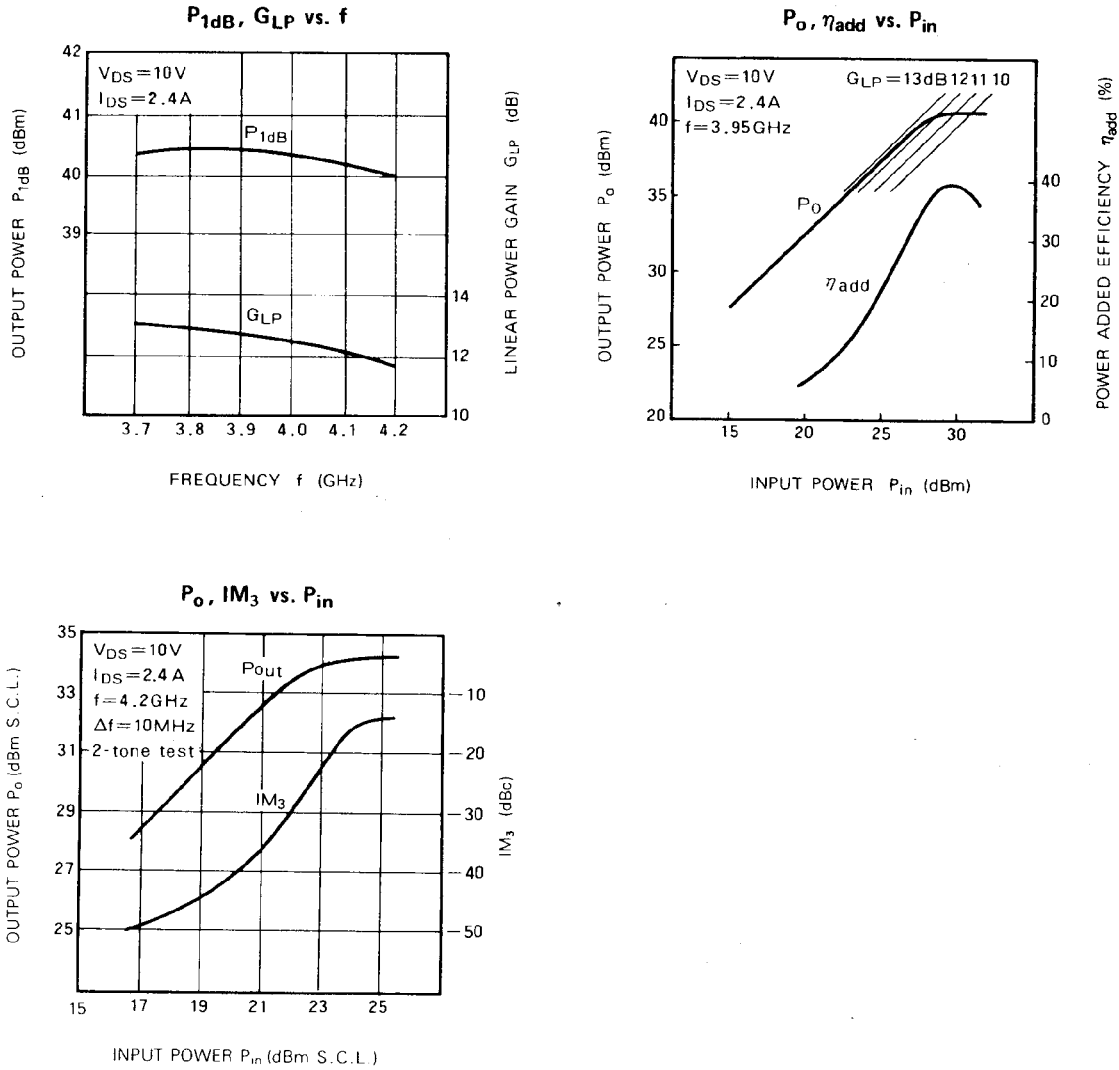
*1: Item-51, 2-tone test $P_o = 29$ dBm Single Carrier Level $f = 4.2$ GHz $\Delta f = 10$ MHz *2: Channel to case

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, VDS=10V, IDS=2.4A)

f (GHz)	S Parameters (TYP.)							
	S11		S21		S12		S22	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
3.7	0.40	-170.9	4.36	34.3	0.071	-24.8	0.32	-134.4
3.8	0.41	140.3	4.16	-6.5	0.072	-65.4	0.31	-171.2
3.9	0.40	92.6	4.04	-47.4	0.073	-106.6	0.29	-155.1
4.0	0.39	41.3	3.93	-88.0	0.073	-147.2	0.26	123.6
4.1	0.40	-15.1	3.80	-129.5	0.073	171.2	0.21	95.4
4.2	0.44	-76.5	3.60	-173.5	0.071	127.6	0.14	77.0