

PRELIMINARY

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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC42V3742A

3.7~4.2GHz BAND 16W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC42V3742A 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
 $P_{1dB} = 18\text{ W (TYP) @ } 3.7 \sim 4.2\text{ GHz}$
- High power gain
 $G_{LP} = 10\text{ dB (TYP) @ } 3.7 \sim 4.2\text{ GHz}$
- High power added efficiency
 $\eta_{add} = 34\% \text{ (TYP) @ } 3.7 \sim 4.2\text{ GHz, } P_{1dB}$
- Hermetically sealed metal-ceramic package
- Low distortion [Item: -51]
 $IM3 = -45\text{ dBc (TYP) @ } P_o = 31\text{ (dBm) S.C.L.}$
- Low thermal resistance $R_{th(ch-c)} \leq 1.6 \text{ (}^\circ\text{C/W)}$

APPLICATION

Item-01: 3.7~4.2 GHz band power amplifiers.
Item-51: Digital radio communication.

QUALITY GRADE

- IG

ABSOLUTE MAXIMUM RATINGS (Ta = 25°C)

Symbol	Parameter	Ratings	Unit
V _{GD0}	Gate to drain voltage	-15	V
V _{GS0}	Gate to source voltage	-15	V
I _D	Drain current	12	A
I _{GR}	Reverse gate current	-40	mA
I _{GF}	Forward gate current	+84	mA
P _T	Total power dissipation *1	93.7	W
T _{ch}	Channel temperature	175	°C
T _{stg}	Storage temperature	-65 ~ +175	°C

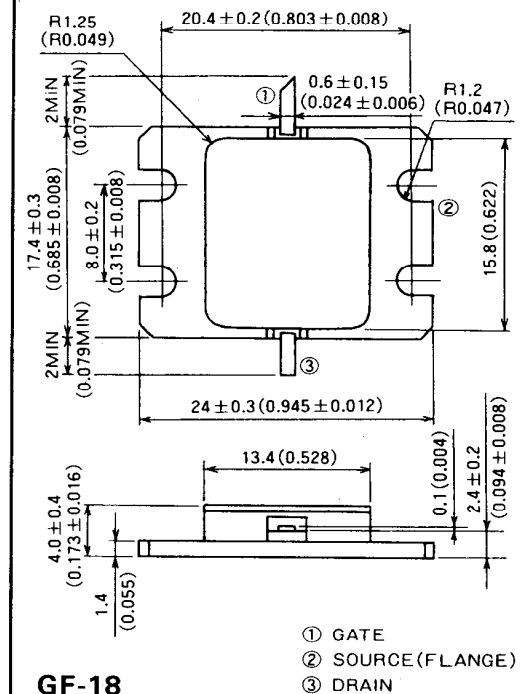
*1: T_c = 25°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I _{DSS}	Saturated drain current	V _{DS} = 3V, V _{GS} = 0V	—	9	12	A
g _m	Transconductance	V _{DS} = 3V, I _D = 4.4A	—	4	—	S
V _{GS(off)}	Gate to source cut-off voltage	V _{DS} = 3V, I _D = 80mA	-2	-3	-4	V
P _{1dB}	Output power at 1dB gain compression	V _{DS} = 10V, I _D = 4.5A, f = 3.7~4.2GHz	41.5	42.5	—	dBm
G _{LP}	Linear power gain		9	10	—	dB
I _D	Drain current		—	4.5	—	A
η _{add}	Power added efficiency		—	34	—	%
IM ₃	3rd order IM distortion *1		-42	-45	—	dBc
R _{th(ch-c)}	Thermal resistance *2		ΔV _f method	—	—	1.6

*1: Item-51, 2-tone test P_o = 31dBm Single Carrier Level f = 4.2GHz Δf = 10MHz, *2: Channel to case

OUTLINE DRAWING Unit: millimeters (inches)



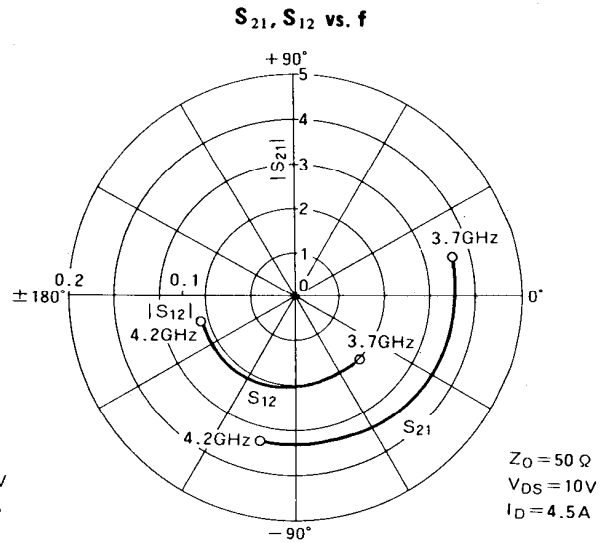
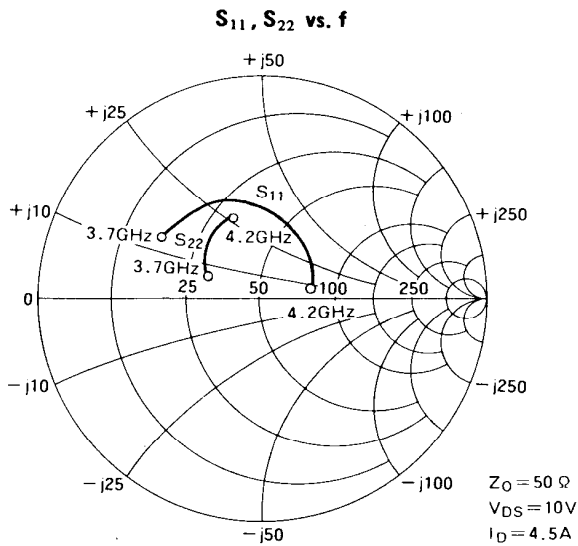
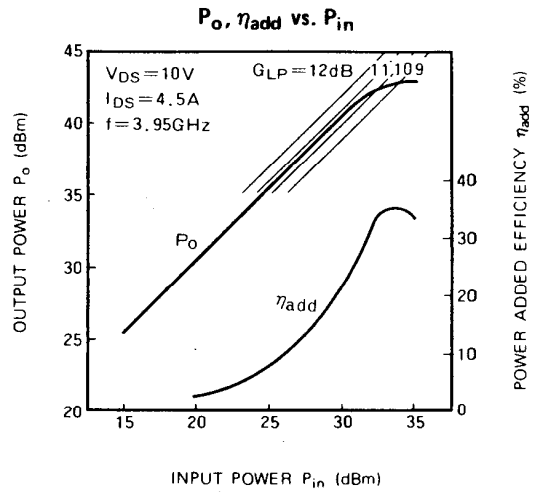
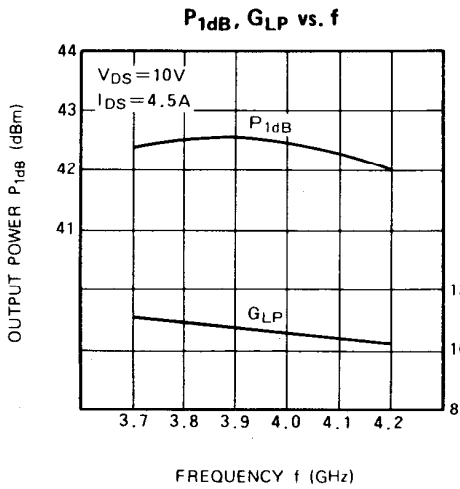
RECOMMENDED BIAS CONDITIONS

- V_{DS} = 10V
- I_D = 4.5A
- R_g = 25Ω
- Refer to Bias Procedure

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TYPICAL CHARACTERISTICS (Ta=25°C)



S PARAMETERS (Ta=25°C, VDS=10V, IDS=4.5A)

f (GHz)	S Parameters (TYP.)							
	S11		S21		S12		S22	
	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)	Magn.	Angle (deg.)
3.7	0.51	149	3.65	13	0.080	48	0.26	159
3.8	0.49	129	3.55	-9	0.080	72	0.32	148
3.9	0.47	110	3.50	-34	0.083	97	0.34	138
4.0	0.41	90	3.48	-54	0.086	117	0.37	129
4.1	0.33	54	3.39	-77	0.084	139	0.38	119
4.2	0.24	11	3.31	-103	0.086	163	0.38	108