

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	Rating	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

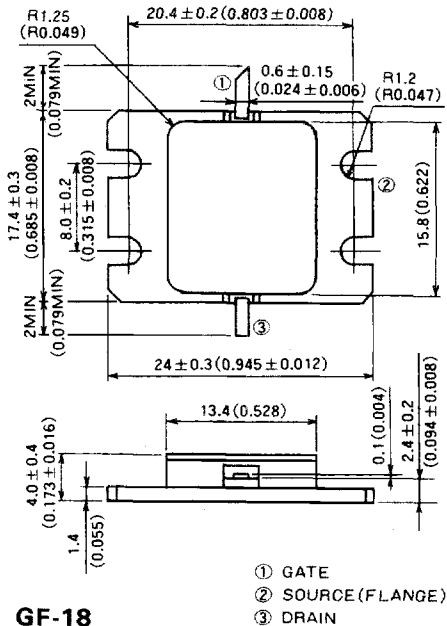
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

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)



GF-18

RECOMMENDED BIAS CONDITIONS

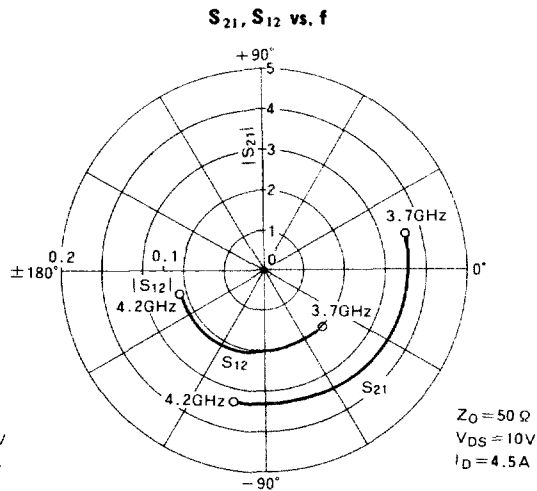
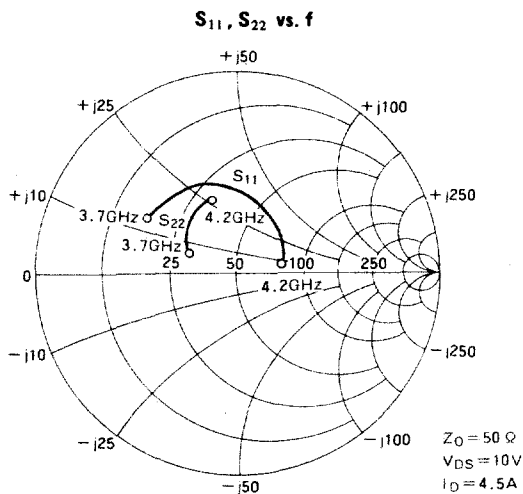
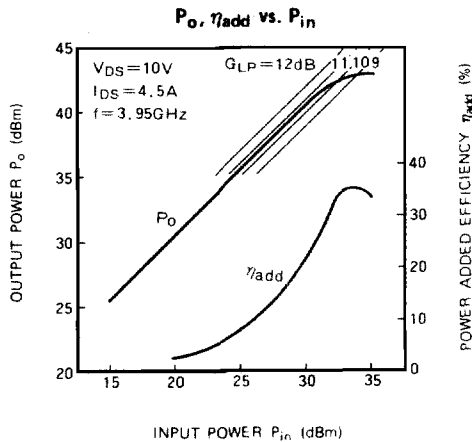
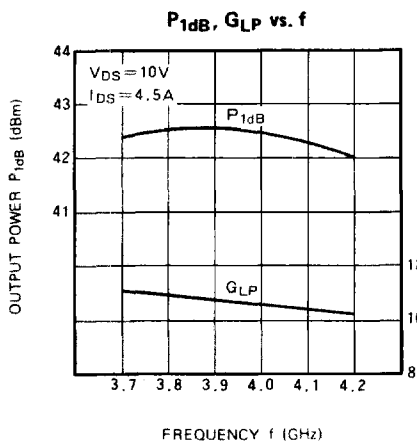
- V_{DS} = 10V
- I_D = 4.5A
- R_g = 25Ω
- Refer to Bias Procedure

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TYPICAL CHARACTERISTICS (Ta = 25°C)



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

f (GHz)	S Parameters (TYP.)							
	S_{11}		S_{21}		S_{12}		S_{22}	
	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