MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC42V4450A

PRELIMINARY

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

4.4~5.0GHz BAND 16W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC42V4450A is an internally impedance-matched GaAs power FET especially designed for use in 4.4~5.0 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} = 18W (TYP) @4.4~5.0GHz
- High power gain
  G_{LP} = 9 dB (TYP) @4.4~5.0GHz
- High power added efficiency
  η_{add} = 33%(TYP) @4.4~5.0GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion [Item: −51]
  IM3=−45dBc (TYP) @Po=31(dBm) S.C.L.
- Low thermal resistance $R_{th(ch-c)} \leqq 1.6$ (°C/W)

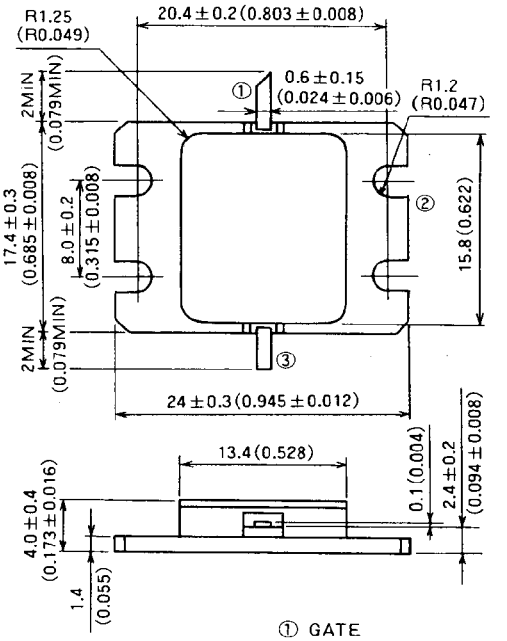
APPLICATION

Item-01: 4.4~5.0 GHz band power amplifiers.
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	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

RECOMMENDED BIAS CONDITIONS

- V_{DS}=10V
- I_D=4.5A
- Rg=25Ω
- 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	—	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 \fallingdotseq$4.5A, f=3.7~4.2GHz	41.5	42.5	—	dBm
G_{LP}	Linear power gain		8	9	—	dB
I_D	Drain current		—	4.5	—	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	—	—	1.6	°C/W

*1: Item-51, 2-tone test Po=31dBm Single Carrier Level f=5.0 Δf=10MHz. *2: Channel to case

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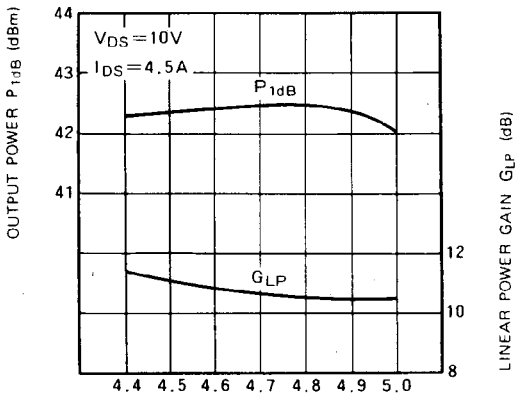
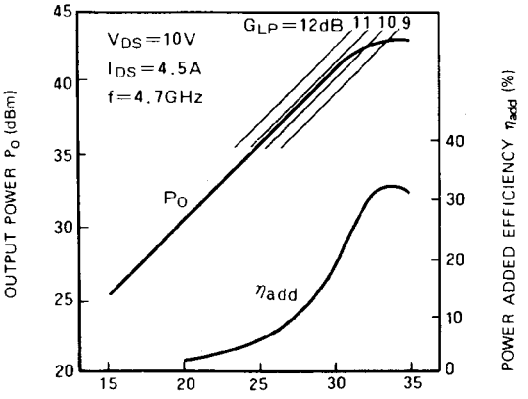
TYPICAL CHARACTERISTICS (T_a = 25°C)

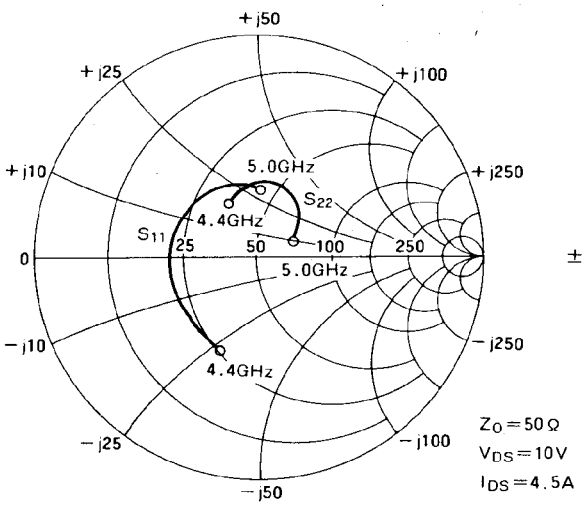
P_{1dB}, G_{LP} vs. f



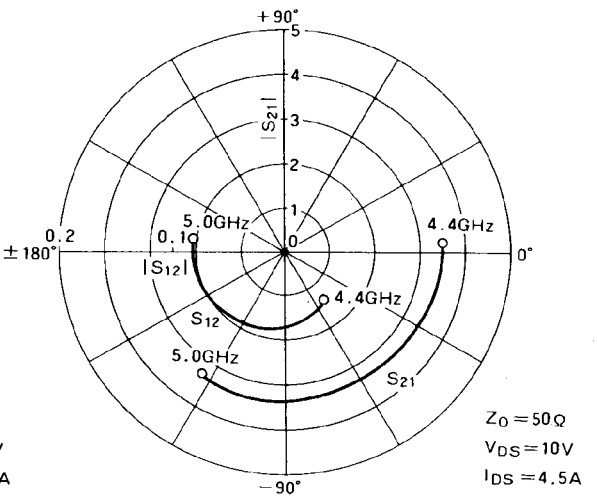
P_O, η_{add} vs. P_{in}



S_{11}, S_{22} vs. f



S_{21}, S_{12} vs.f



S PARAMETERS (T_a = 25°C, V_{DS} = 10V, I_{DS} = 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.)
4.4	0.46	−113	3.63	3	0.054	− 49	0.31	121
4.5	0.41	−156	3.50	− 20	0.063	− 78	0.33	101
4.6	0.40	−179	3.45	− 38	0.068	− 93	0.33	90
4.7	0.38	154	3.42	− 61	0.072	−123	0.33	79
4.8	0.37	135	3.38	− 77	0.075	−140	0.31	71
4.9	0.33	109	3.34	−101	0.078	−167	0.25	51
5.0	0.29	89	3.27	−122	0.079	172	0.17	22