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

MITSUBISHI SEMICONDUCTOR <GaAs FET>

MGFC45V5053

5.05~5.25GHz BAND 30W INTERNALLY MATCHED GaAs FET

DESCRIPTION

The MGFC45V5053 is an internally impedance-matched GaAs power FET especially designed for use in 5.05~5.25 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} = 30W(TYP)@5.05~5.25GHz
- High power gain
  G_{LP} = 10 dB (TYP) @5.05~5.25GHz
- High power added efficiency
  η_{add} = 40%(TYP) @5.05~5.25GHz, P_{1dB}
- Hermetically sealed metal-ceramic package
- Low distortion (Item: −51)
  IM3=−45dBc (TYP) @Po=34.5(dBm) S.C.L.

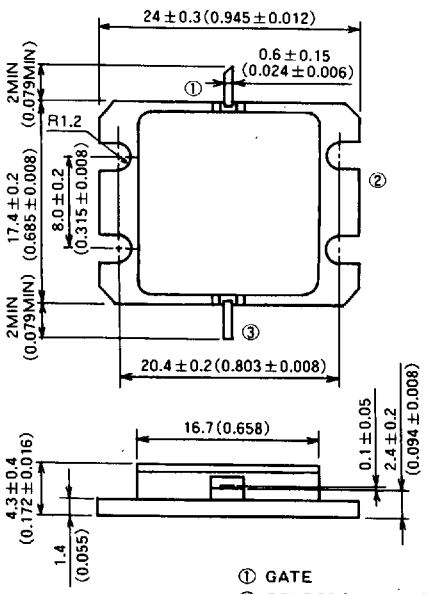
APPLICATION

Item-01: 5.05~5.25GHz band power amplifiers.
Item-51: Digital radio communication

QUALITY GRADE

- IG

OUTLINE DRAWING Unit: millimeters (inches)



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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	20	A
I_{GR}	Reverse gate current	−60	mA
I_{GF}	Forward gate current	126	mA
P_T	Total power dissipation *1	93	W
Tch	Channel temperature	175	°C
Tstg	Storage temperature	−65~+175	°C

*1: T_C = 25°C

RECOMMENDED BIAS CONDITIONS

- V_{DS}=10V
- I_D=6.2A
- Rg=25Ω
- Refer to Bias Procedure

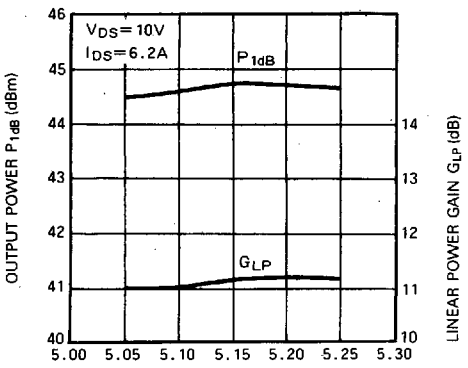
ELECTRICAL CHARACTERISTICS (Ta=25°C)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{DSS}	Saturated drain current	V_{DS}=3V, V_{GS}=0V	—	18	—	A
g_m	Transconductance	V_{DS}=3V, I_D=6.2A	—	6.5	—	S
$V_{GS(off)}$	Gate to source cut-off voltage	V_{DS}=3V, I_D=120mA	−2	—	−5	V
P_{1dB}	Output power at 1dB gain compression	V_{DS}=10V, I_D=6.2A, f=5.05~5.25GHz	44	44.7	—	dBm
G_{LP}	Linear power gain		9	10	—	dB
η_{add}	Power added efficiency		—	40	—	%
IM_3	3rd order IM distortion *1		−42	−45	—	dBc
$R_{th(ch-c)}$	Thermal resistance *2	ΔV_f method	—	—	1.6	°C/W

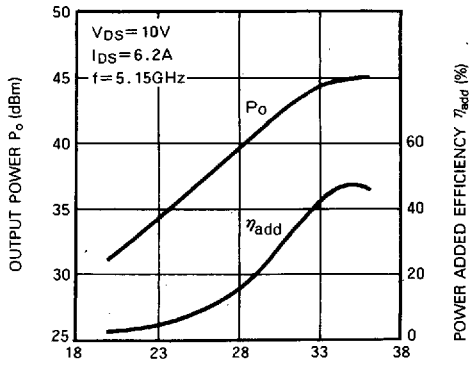
*1: Item-51, 2-tone test Po=34.5dBm Single Carrier Level f=5.25 Δf=5MHz. *2: Channel to case

TYPICAL CHARACTERISTICS (Ta=25℃)

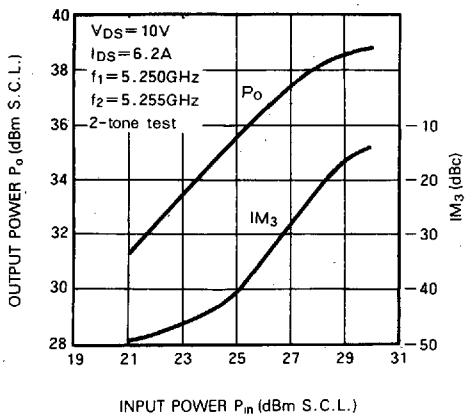
P_{1dB}, G_{LP} vs. f



P_o, η_{add} vs. P_{in}



P_o, IM_3 vs. P_{in}



S PARAMETERS (Ta=25℃, V_{DS}=10V, I_{DS}=6.2A)

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.)
5.05	0.49	36	3.48	− 72	0.054	−131	0.17	−148
5.10	0.45	24	3.48	− 83	0.056	−139	0.16	−168
5.15	0.41	10	3.47	− 94	0.061	−149	0.17	−180
5.20	0.36	− 6	3.46	−105	0.063	−163	0.17	164
5.25	0.33	−26	3.43	−116	0.061	−172	0.16	148