MITSUBISHI ELECTRIC

< GaN HEMT for satellite communication (SATCOM) earth station>

MGFK48G3745

Ku band internally matched power GaN HEMT
13.75 − 14.5 GHz BAND / 70W

DESCRIPTION

The MGFK48G3745, GaN HEMT with an N-channel schottky gate, is designed for Ku-band applications.

FEATURES

- High voltage operation : VDS=24V
- High output power : Po=48.3dBm (TYP.) @Pin=42dBm
- High efficiency : PAE=33% (TYP.) @Pin=42dBm
- Designed for use in Class AB linear amplifiers

APPLICATION

- Amplifier for Ku-band SATCOM

QUALITY

- General & Industrial

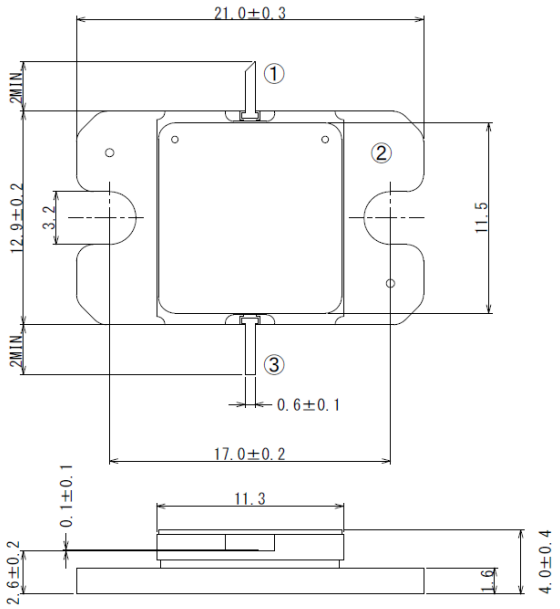
Packaging

- Individual case

RECOMMENDED BIAS CONDITIONS

- Vds=24V
- Ids=1.44A
- Rg=13.3Ω

OUTLINE DRAWING Unit : millimeters



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Absolute maximum ratings (Ta=25°C)

Symbol	Parameter	Ratings	Unit
Vgso	Gate to Source Voltage	-10	V
Vds	Drain to source voltage at Operating	27	V
IGF	Forward gate current	100	mA
IGR	Reverse gate current	-24	mA
τ	Screw torque	49	N・cm
PT*1	Total power dissipation	225	W
Pin	Input power	44	dBm
Tch	Channel temperature	250	°C
Tstg	Storage temperature	-55 to +125	°C

*1:Tc=25°C

Recommended operating Condition

Symbol	Parameter	Limit	Unit
Tc	Maximum case operating temperature	85	℃
Vds	Drain to source voltage	24	V
IDQ	Drain current without RF drive	1.44	A

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Electrical characteristics (Ta=25°C)

Parameter	Symbol	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
Gate to source cut-off voltage	VGS(off)	VDS=24V,ID=28.8mA	-1	-	-5	V
Output Power	Pout *2	VDS=24V,ID(RF off)=1.44A f=13.75 – 14.5GHz *2 : Pin=42dBm *3 : Pin=27dBm *4 : Two-tone Test,Po=39.3dBm (Single Carrier Level) Δ f=5MHz(IM3)	47.3	48.3	-	dBm
Power added efficiency	PAE *2		-	33	-	%
Linear power gain	GLP *3		9	12	-	dB
3rd Order Intermodulation distortion	IM3 *4		-	-25	-	dBc
Thermal resistance	Rth(ch-c) *5	Δ Vf method	-	0.8	1.0	°C/W

*5 :Channel-case

Specifications are subject to change without notice

ESD *6	Class 0	-199~

*6 :Based on EIAJ ED-4701 C-111A(C=100pF,R=1.5kΩ)

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1. Po / GLP / PAE / IDRF vs. freq
(Temperature Dependence @ IDQ=1.44A)

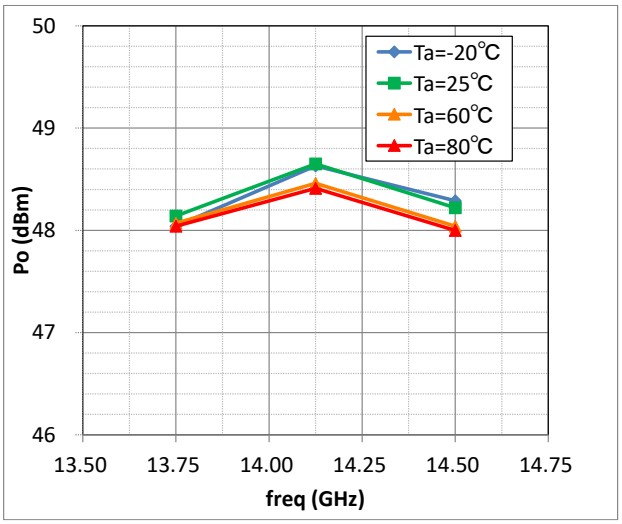


Fig.1-1 Po@Pin=42dBm vs. Freq.

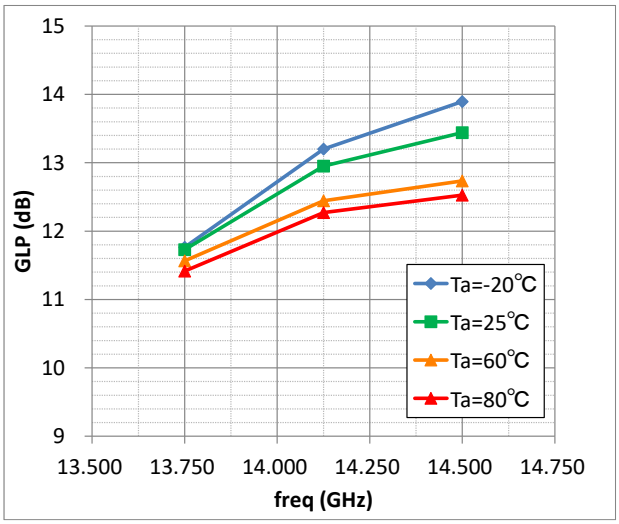


Fig.1-2 GLP@Pin=20dBm vs. Freq.

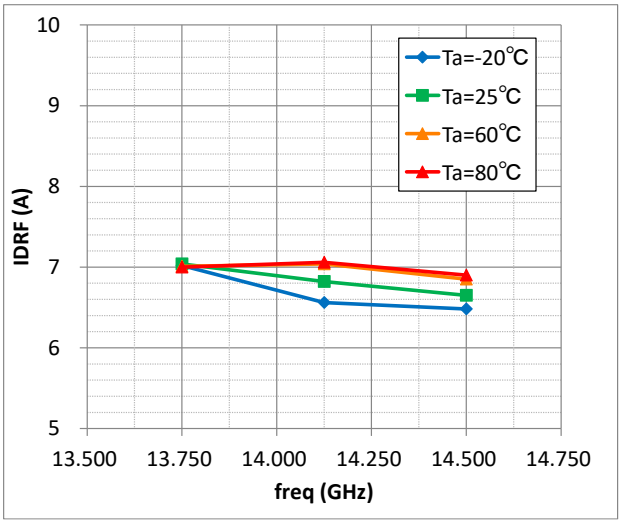


Fig.1-3 ID(RF)@Pin=42dBm vs. Freq.

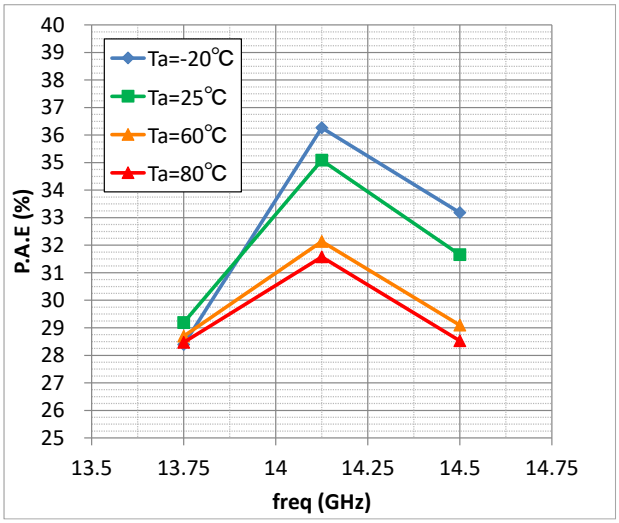
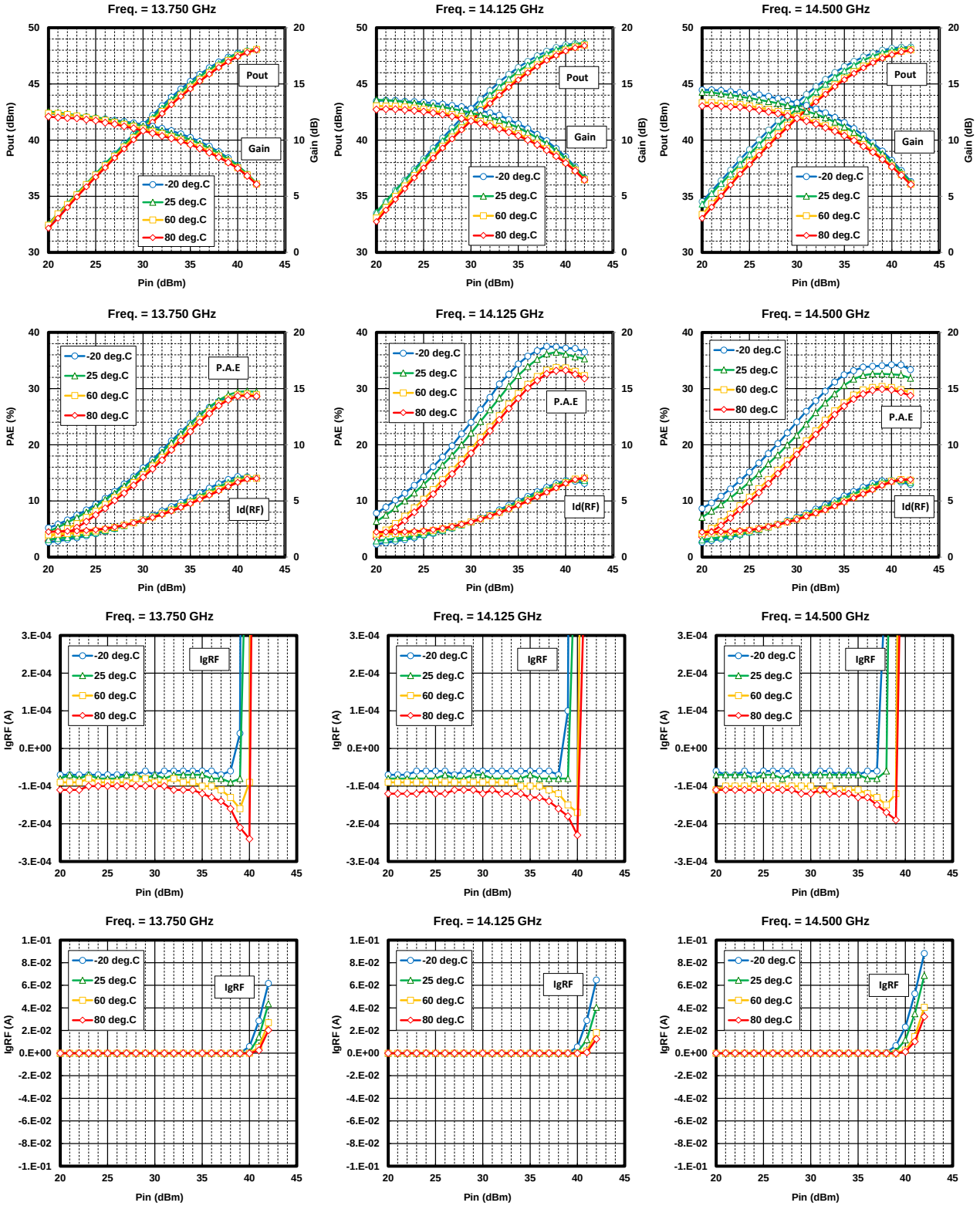


Fig.1-4 PAE@Pin=42dBm vs. Freq.

Measurement Condition:
VDS=24 V, Idq=1.44A
Rg=13.3Ω

2. Pin – Pout / Gain / PAE / IDRF / IGRF Characteristics (VDS=24V, Idq=1.44A)



13.75GHz **f=14.125GHz** **f=14.5GHz**

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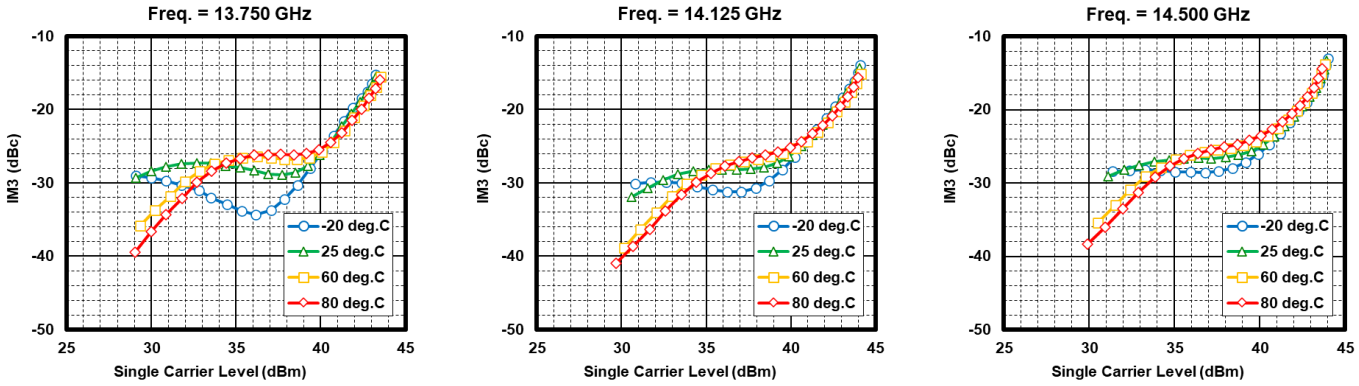
Fig.2 Pin vs Pout / Gain / PAE / IDRF / IGRF

3. TWO-TONE Characteristics

Ta=25℃, VDS=24V, Idq=1.44A, Rg=13.3ohm, Δf=5MHz



f=13.75GHz **f=14.125GHz** **f=14.5GHz**

Fig.3 Pout vs IM3

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