

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

MGFK50G3745

Ku band internally matched power GaN HEMT
13.75 - 14.5 GHz BAND / 100W

DESCRIPTION

The MGFK50G3745, GaN HEMT with an N-channel schottky gate, is designed for Ku-band applications.

FEATURES

- High voltage operation : VDS=24V
- High output power : Po=50dBm (TYP.) @Pin=45dBm
- High efficiency : PAE=30% (TYP.) @Pin=45dBm
- 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=2.4A • Rg=10Ω

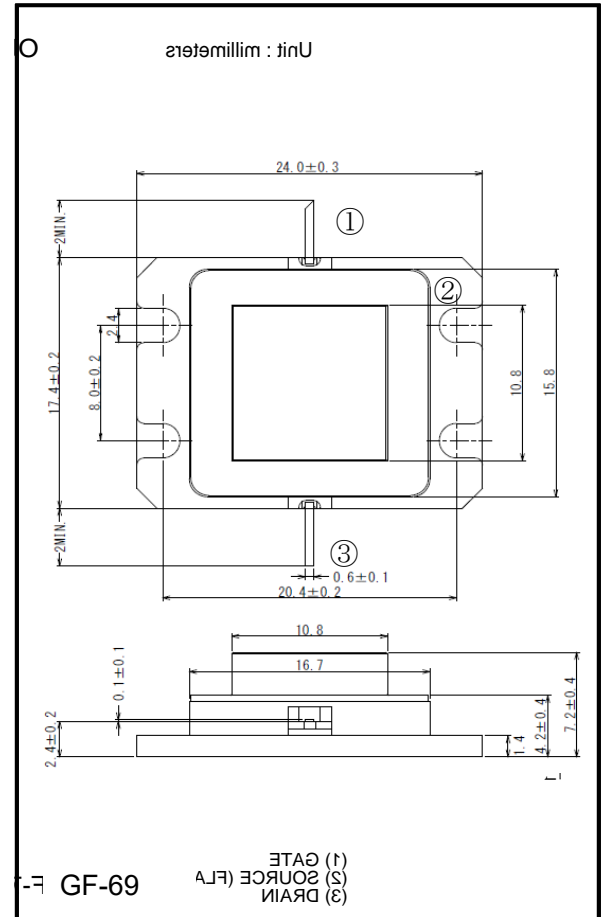
Absolute maximum ratings (Ta=25°C)

Symbol	Parameter	Ratings	Unit
Vgso	Gate to Source Voltage	-10	V
Vds	Drain to source voltage at Operating	27	V
IGF	Forward gate current	160	mA
IGR	Reverse gate current	-48	mA
PT*1	Total power dissipation	375	W
Pin	Input power	47	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	°C
Vds	Drain to source voltage	24	V
IDQ	Drain current without RF drive	2.4	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=48mA	-1	-	-5	V
Output Power	Pout *2	VDS=24V, ID(RF off)=2.4A	49.0	50	-	dBm
Power added efficiency	PAE *2	f=13.75 – 14.5GHz	-	30	-	%
Linear power gain	GLP *3	*2 : Pin=45dBm	8	10	-	dB
3 rd Order Intermodulation distortion	IM3 *4	*3 : Pin=25dBm	-	-25	-	dBc
		*4 : Two-tone Test, Po=41dBm (Single Carrier Level) Δf=5MHz(IM3)				
Thermal resistance	Rth(ch-c) *5	ΔVf method	-	0.4	0.6	°C/W

*5 : Channel-case

Specifications are subject to change without notice

ESD *6	Class 0	-199~
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*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=2.4A)

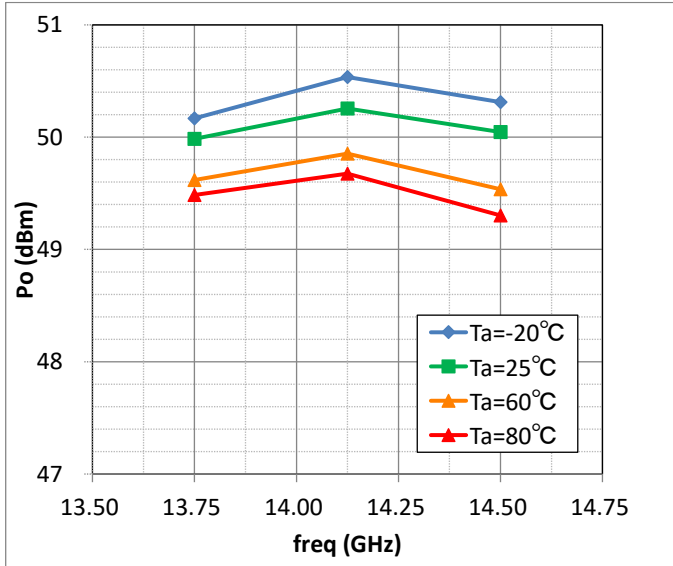


Fig.1-1 Po@Pin=45dBm vs. Freq.

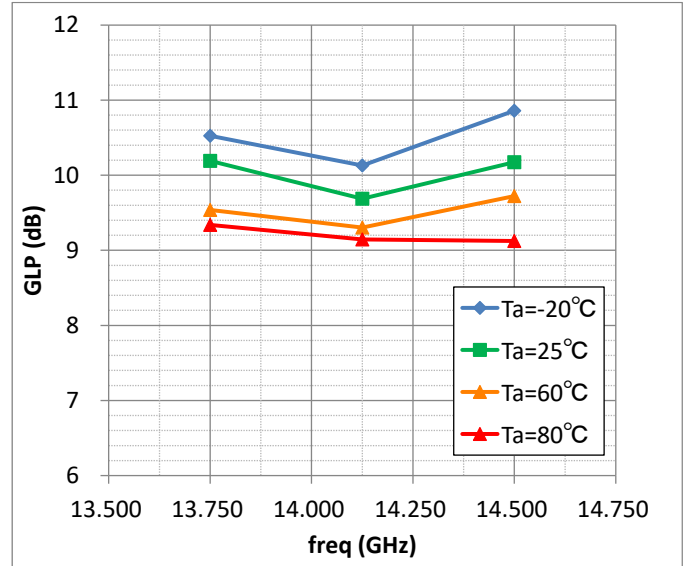


Fig.1-2 GLP@Pin=25dBm vs. Freq.

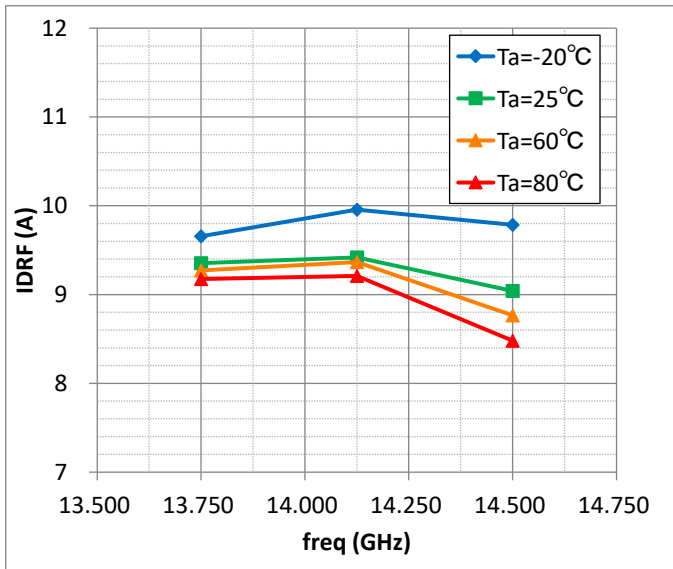


Fig.1-3 ID(RF)@Pin=45dBm vs. Freq.

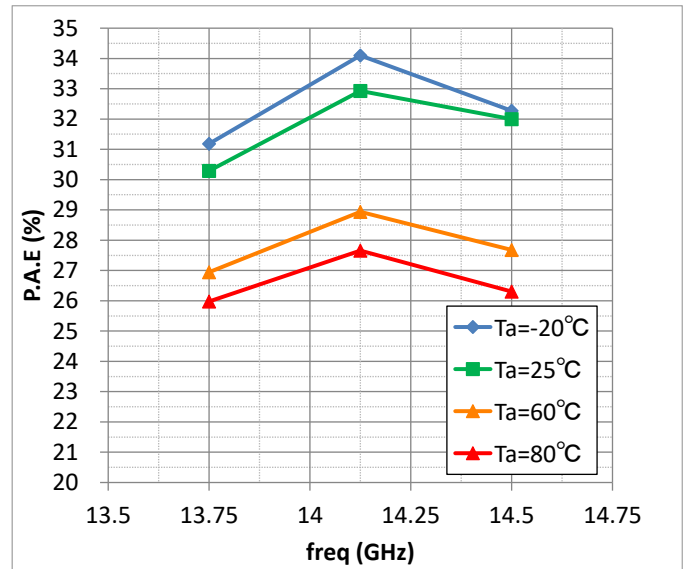


Fig.1-4 PAE@Pin=45dBm vs. Freq.

Measurement Condition:

VDS=24 V, Idq=2.4A

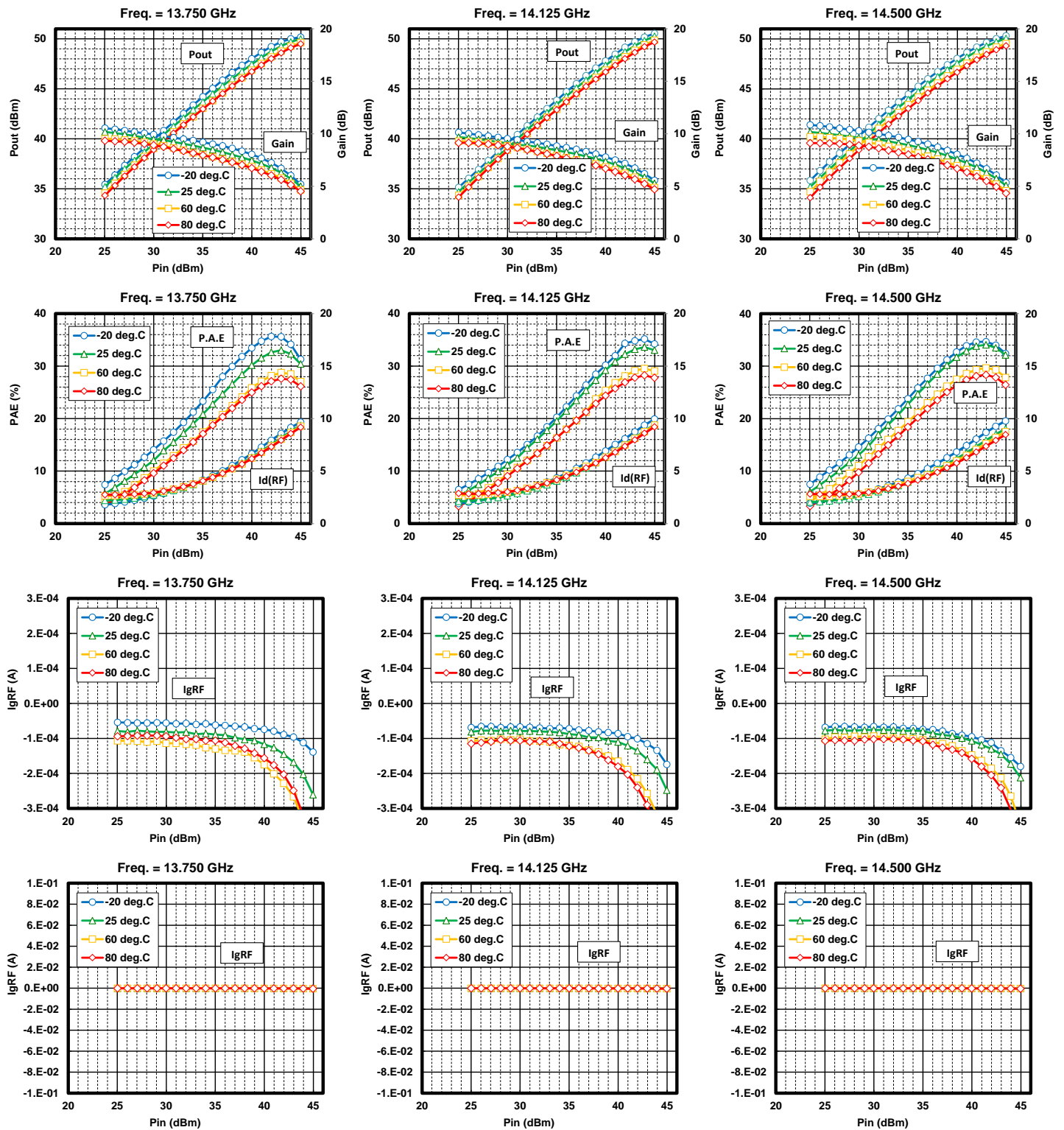
Rg=10Ω

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2. Pin – Pout / Gain / PAE / IDRF / IGRF Characteristics (VDS=24V, Idq=2.4A, Rg=10Ω)



13.75GHz

f=14.125GHz

f=14.5GHz

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

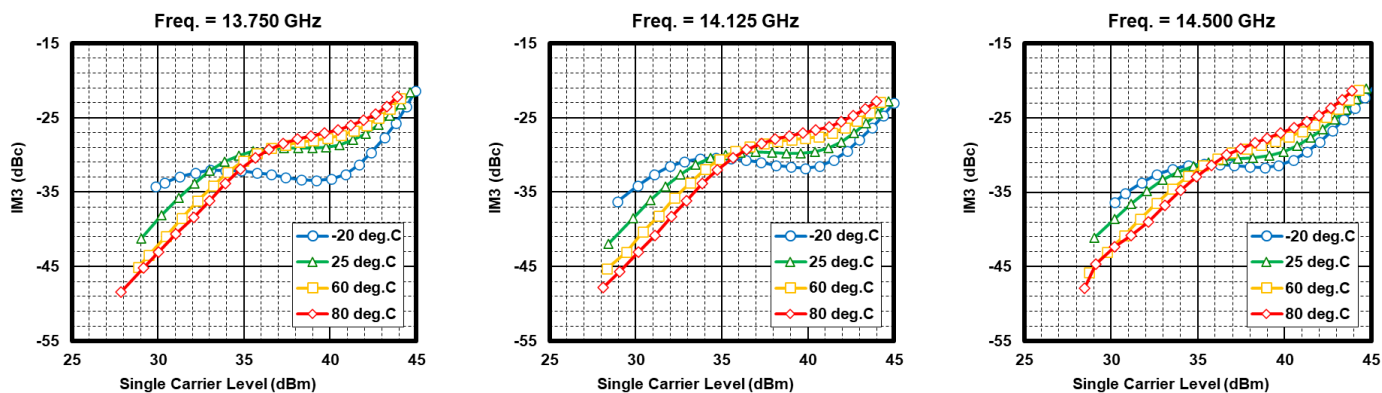
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3. TWO-TONE Characteristics

VDS=24V, Idq=2.4A, Rg=10Ω, Δf=5MHz



f=13.75GHz

f=14.125GHz

f=14.5GHz

Fig.3 Pout vs IM3

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CTHA-210709-06