



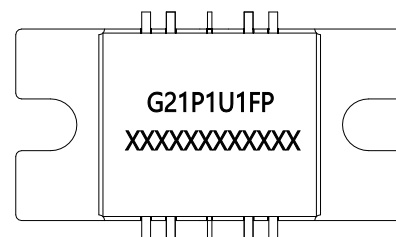
Product Features

- 5.9-6.4GHz GaN MMIC Power Amplifier
- Typical Small-signal Gain 28.8dB
- Typical Power Gain 20.5dB
- Typical Output Power 47.2dBm
- Typical PAE 45.3%
- 28-32V operation

* Above Typical values measured at 6.15GHz and 28V

Applications

- General Purpose
- Communication System
- Radar System
- Satellite Communication



Absolute Maximum Rating

Parameter	Symbol	Rating	Units	Conditions
Drain-Source Voltage	V _{DSS}	120	Volts	25°C
Gate-to-Source Voltage ³	V _{GS}	-10, +2	Volts	25°C
Storage Temperature ³	T _{STG}	-65, +150	°C	
Operating Junction Temperature ^{1,3}	T _J	225	°C	
Maximum Forward Gate Current ³	I _{GMAX}	10	mA	25°C
Maximum Drain Current ²	I _{DMAX}	1.04	A	I _d @ V _d =10V, V _g = 1V
Soldering Temperature ³	T _s	245	°C	

1. Continuous use at maximum temperature will affect MTTF.

2. Current limit for long term, reliable operation.

3. After additional updates.

Specifications (T_c=25°C, F₀=6.15GHz, V_{DD}=28V, I_{DQ}=430mA)

Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		28.8		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		20.5		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		47.2		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		45.3		%	P _{sat} @ I _{gs} =1mA

Specifications (T_c=25°C, F₀=6.15GHz, V_{DD}=32V, I_{DQ}=450mA)

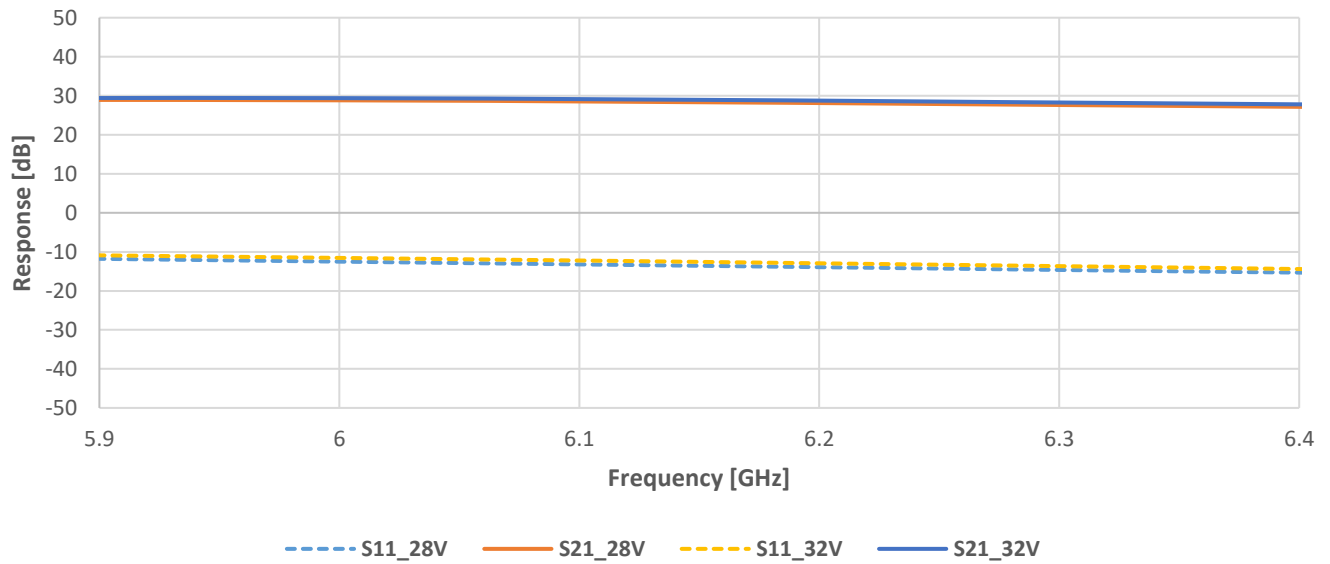
Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		29.4		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		21.2		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		47.8		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		41.9		%	P _{sat} @ I _{gs} =1mA



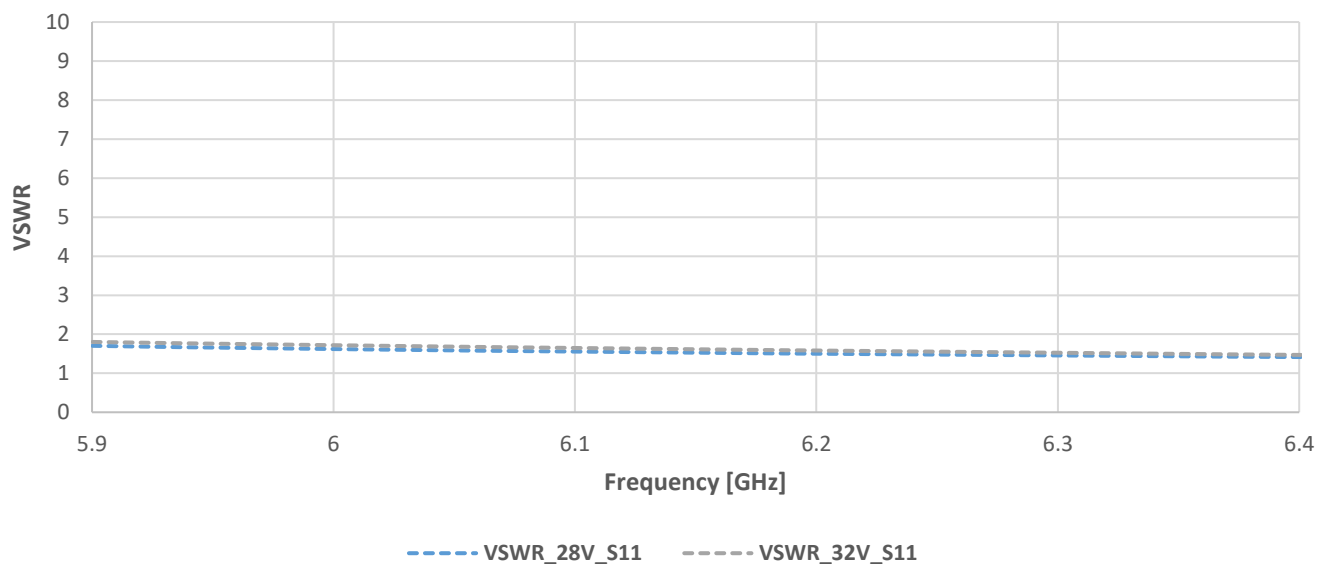
Small-Signal Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

Sparameter vs. Frequency



VSWR vs. Frequency



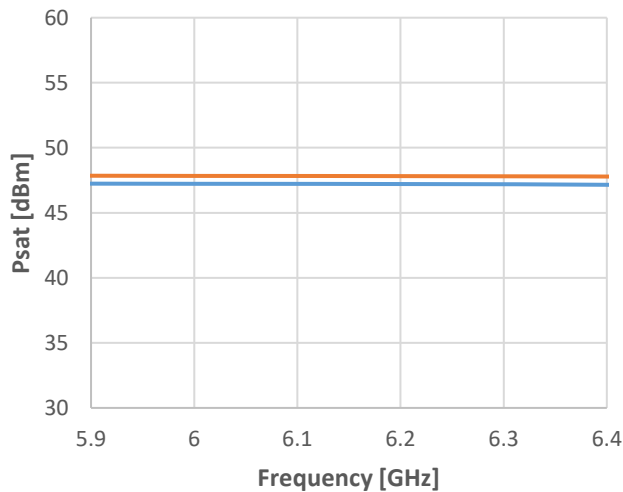


Psat, Id vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

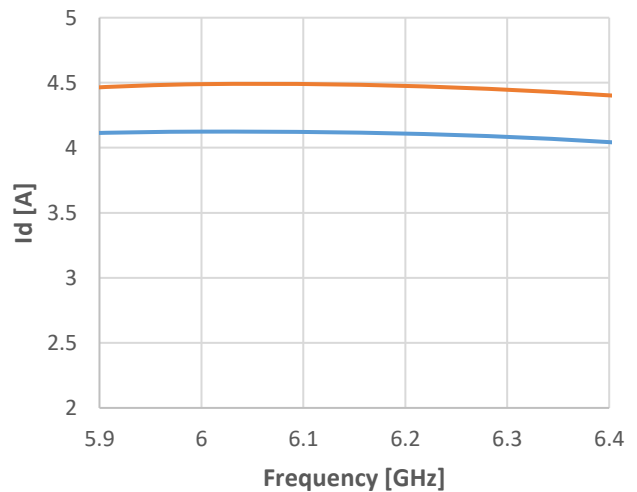
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

Psat vs. Frequency



— 28V_Pout — 32V_Pout

Id vs. Frequency



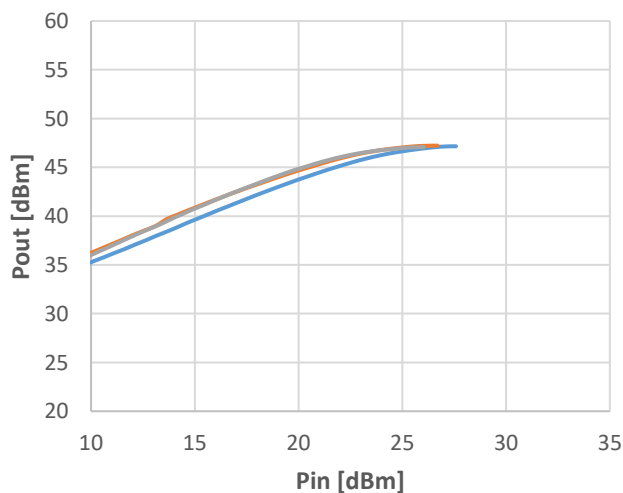
— 28V_Id — 32V_Id

Output Power (Pout) vs Input Power (Pin) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

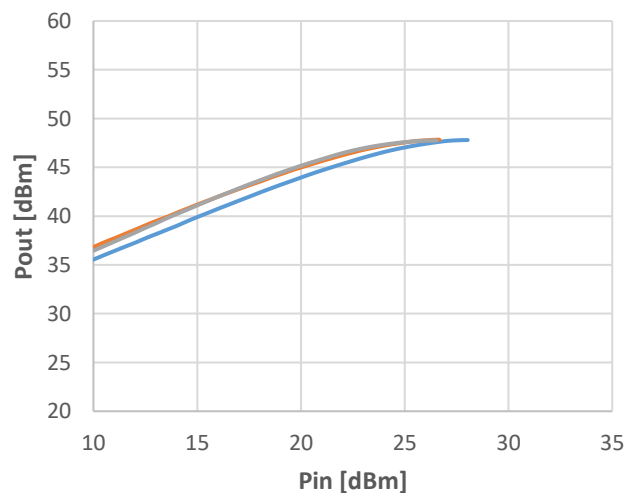
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

[28V] Pout vs. Pin



— 5.5 — 6 — 6.5

[32V] Pout vs. Pin



— 5.5 — 6 — 6.5

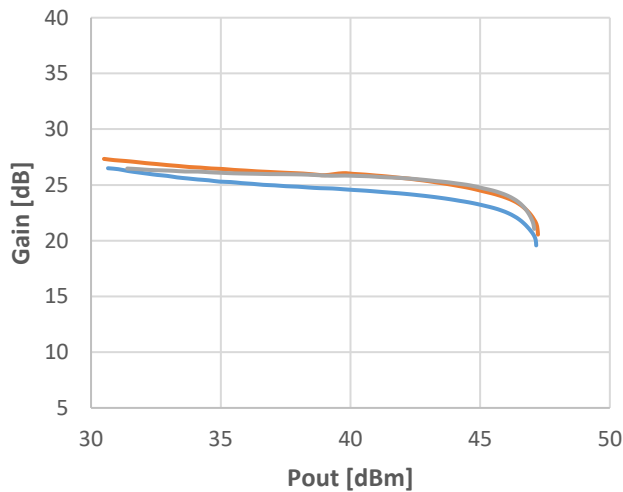


Gain vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

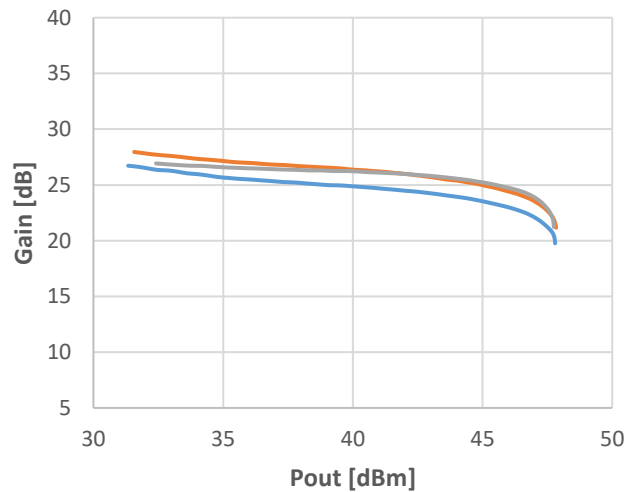
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

[28V] Gain vs. Pout



— 5.5 — 6 — 6.5

[32V] Gain vs. Pout



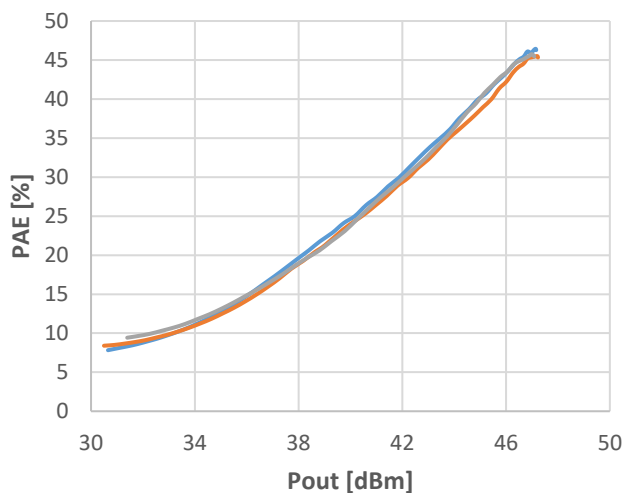
— 5.5 — 6 — 6.5

PAE vs Output Power (Pout) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

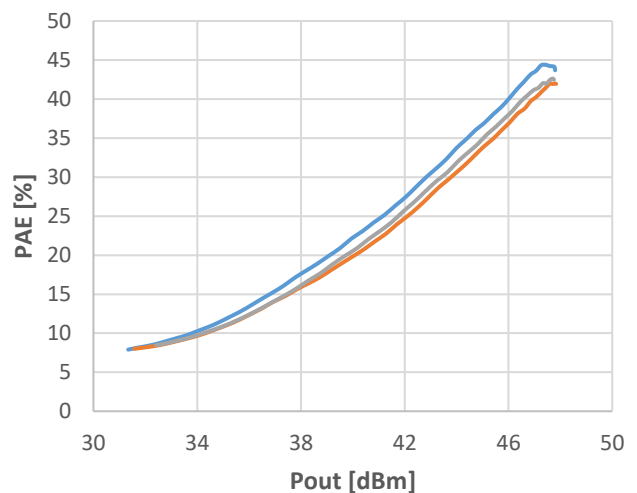
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)

[28V] PAE vs. Pout



— 5.5 — 6 — 6.5

[32V] PAE vs. Pout



— 5.5 — 6 — 6.5

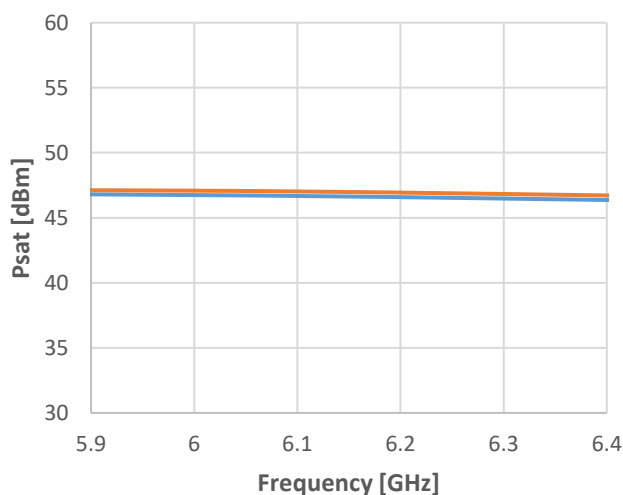


Psat, Id vs Frequency Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

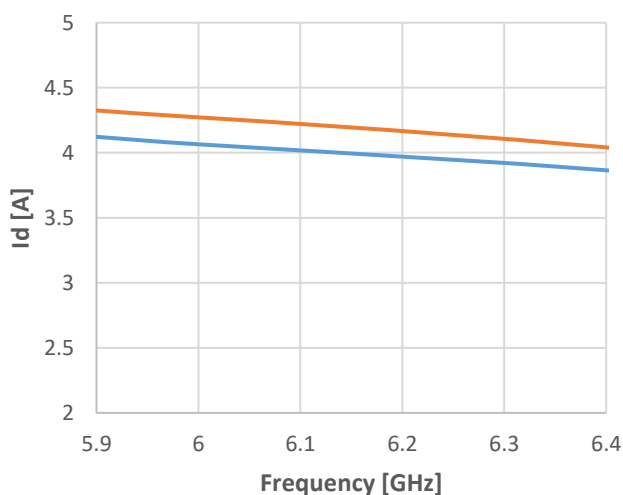
CW-Mode

Psat vs. Frequency



— 28V_Pout — 32V_Pout

Id vs. Frequency



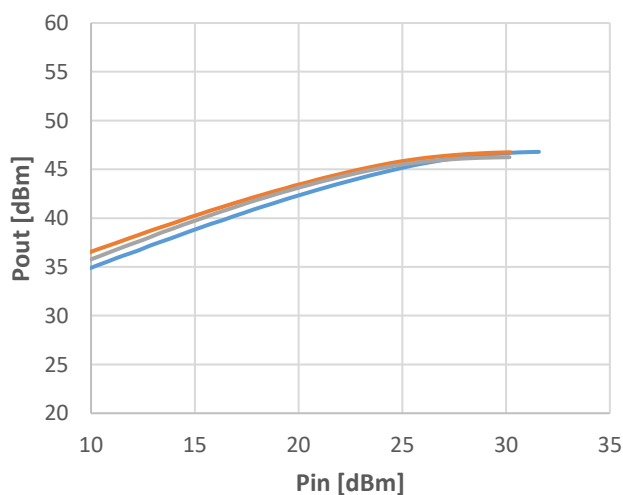
— 28V_Pout — 32V_Pout

Output Power (Pout) vs Input Power (Pin) Performance (Tc=25°C)

Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

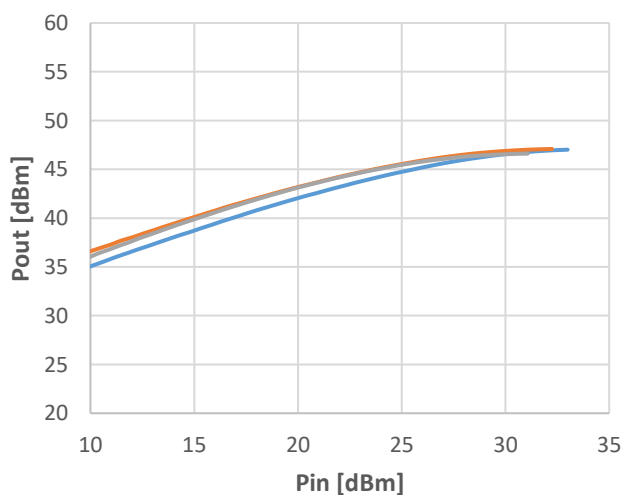
CW-Mode

[28V] Pout vs. Pin



— 5.5 — 6 — 6.5

[32V] Pout vs. Pin



— 5.5 — 6 — 6.5

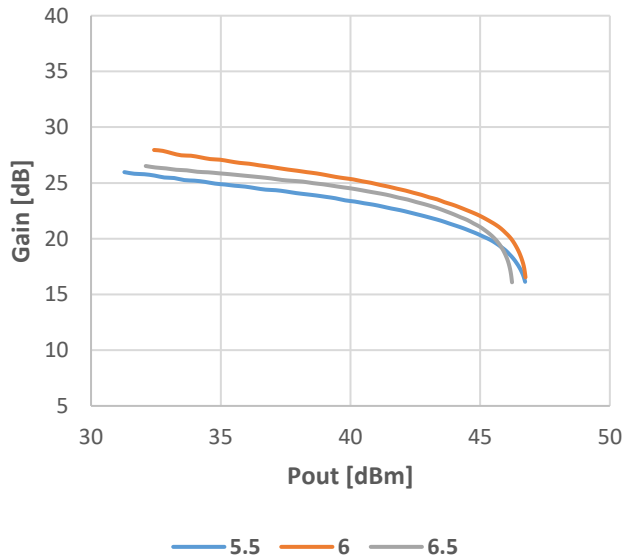


Gain vs Output Power (Pout) Performance (Tc=25°C)

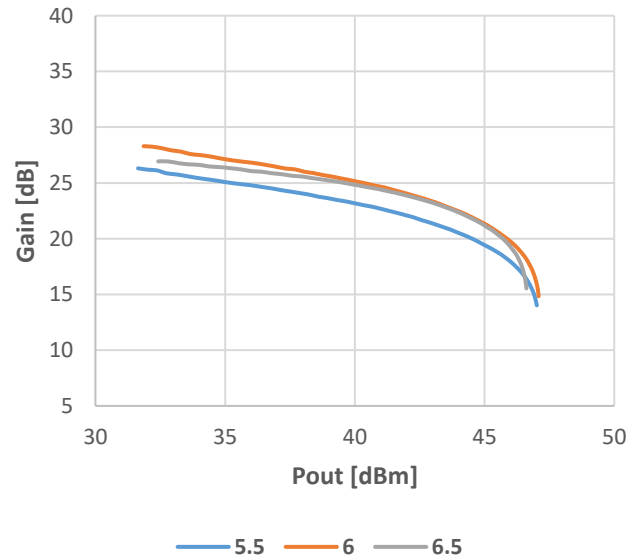
Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

CW-Mode

[28V] Gain vs. Pout



[32V] Gain vs. Pout

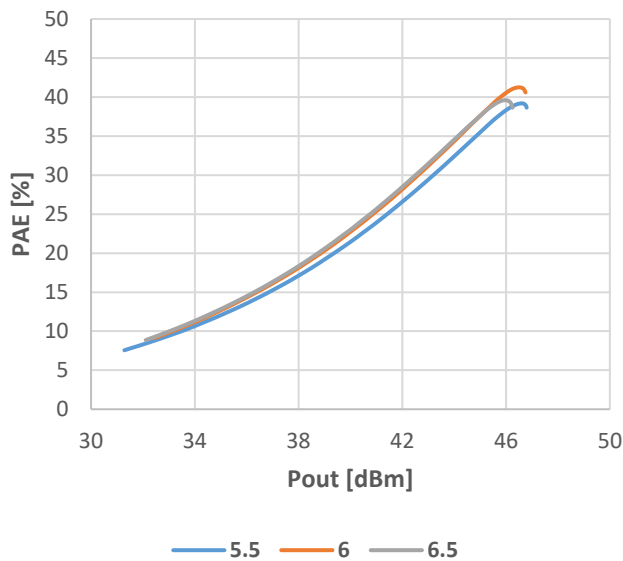


PAE vs Output Power (Pout) Performance (Tc=25°C)

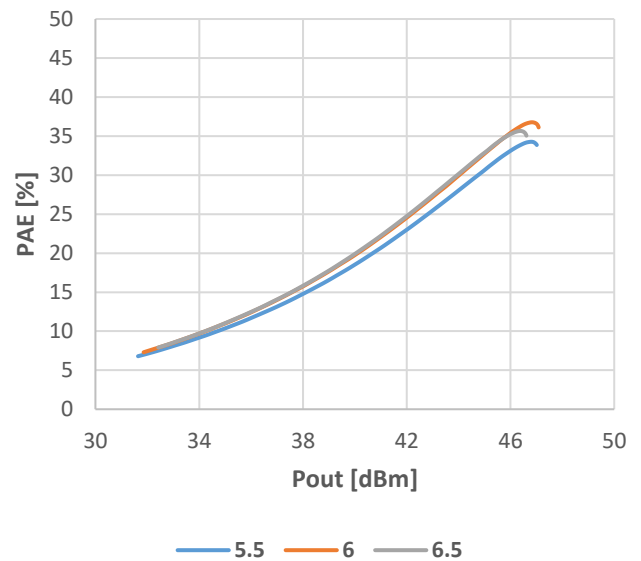
Drain Voltage= (28V IDQ=430mA), (32V IDQ=450mA)

CW-Mode

[28V] PAE vs. Pout



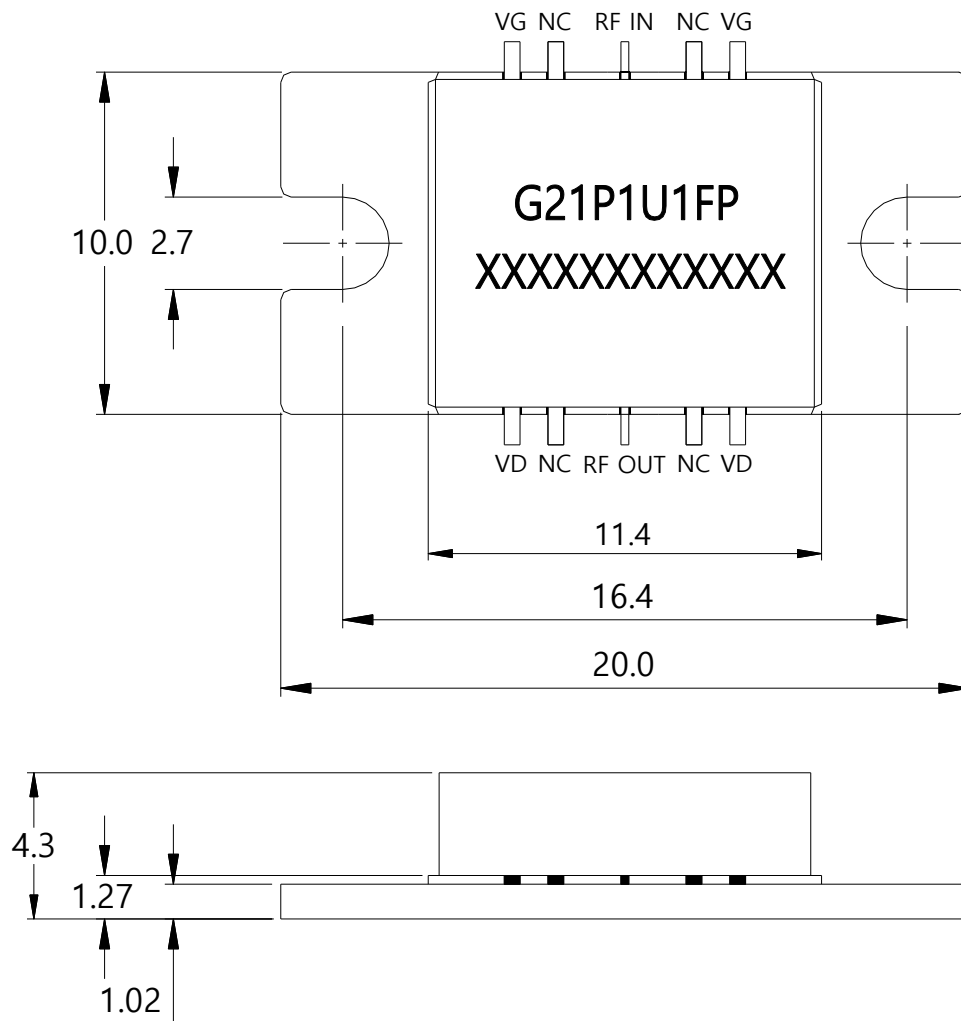
[32V] PAE vs. Pout





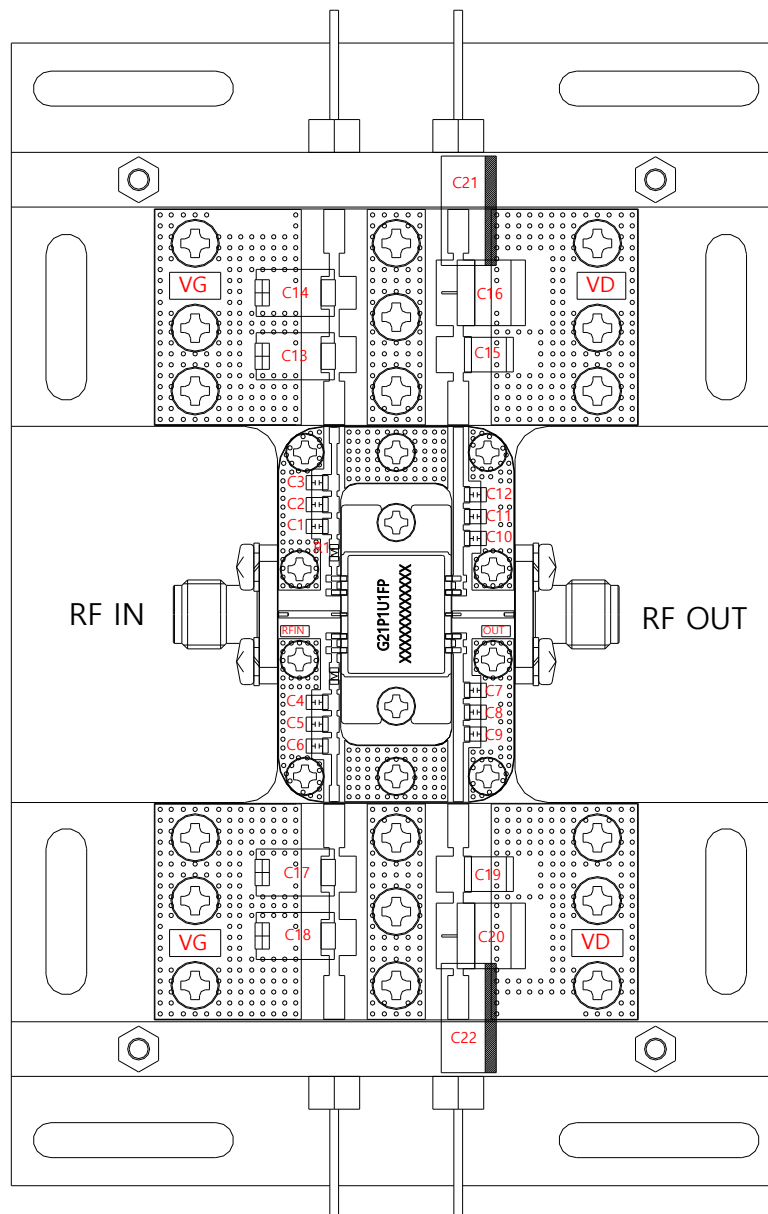
Product Dimension

- Product Type: MPKG, 10-lead bolt-down
- Unit: mm





Evaluation Board Circuit Outline





Bias Sequence

1. VG connection must be biased from both sides.
2. VD connection must be biased from both sides.
3. VG bias must be applied before VD

Test Condition

1. VD=28V, IDQ=430mA, VG=-2.35V
2. VD=32V, IDQ=450mA, VG=-2.35V

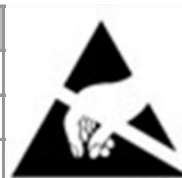
Evaluation Board Circuit Bill of Materials

Reference	Part Number	Value	Description	Package	Manufacturer	EA
C1, C4, C7, C10	251R15S101JV4E	100pF	High Q Capacitor	2012	Johanson	4
C2, C5, C8, C11	CL21B103KBANNNC	10nF	Ceramic Capacitor	2012	SAMSUNG	4
C3, C6, C9, C12	C2012X7S2A474K125AB	470nF	Ceramic Capacitor	2012	TDK	4
C13, C17	TAJD106K035RNJ	10uF	Tantalium Capacitor	7343	AVX	2
C14, C18	293D476X9016D2TE3	47uF	Tantalium Capacitor	7343	Vishay	2
C15, C19	251S43W474KVAE	470nF	High V Capacitor	4532	Johanson	2
C16, C20	22201C106KAT2A	10uF	Tantalium Capacitor	7360	Vishay	2
C21, C22	KMG 50V 47uF 6.3*11	47uF/50V	Aluminum Capacitor	-	SamYoung	2
R1,R2	RC1608J100SC	10Ω	Chip Resistor	1608	SAMSUNG	2
P1	RF PCB	-	RO4003C 12mil	-	Rogers	1
P2	DC PCB	-	RO4003C 12mil	-	Rogers	2
Q1	G21P1U1FP	-	GaN MMIC	-	WAVEPIA	1



Handling Precautions

Parameter	Classification	Standard
ESD - Human Body Model (HBM)	Class 1A	ANSI/ESDA/JEDEC JS-001-2017
ESD - Charge Device Model (CDM)	Class C2	ANSI/ESDA/JEDEC JS-002-2018
MSL - Moisture Sensitivity Level	N/A	



ATTENTION
Electrostatic
Sensitive Device

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web : www.wavepia.com
Tel : 82 - (0)31 - 8058 - 3374
Email : sales@wavepia.com

Important Notice

Specifications are subject to change without notice. WAVEPIA believes the information contained within this datasheet to be accurate and reliable. However, WAVEPIA assumes no responsibility or liability whatsoever for any of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user.

Customers should obtain and verify the latest relevant information before placing orders for WAVEPIA products. All operating parameters should be validated by customer's technical experts for each application. WAVEPIA products are not designed, intended, or authorized for the use as components or amplifiers in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the WAVEPIA product could result in personal injury or death. WAVEPIA products should not be used in applications for planning, construction, maintenance, or direct operation of a nuclear facility. Customers shall comply fully with all export administration and control laws and regulations of the Republic of Korea and/or other national or international (e.g., UN) laws and regulations as may be applicable to the export, re-export, resale of any WAVEPIA products.

Any unauthorized dissemination, distribution, copying or use of the information contained in this file is strictly prohibited.
All information contained in this file must be kept and treated as CONFIDENTIAL.