



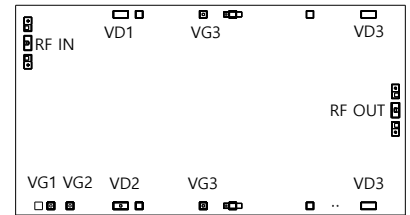
Product Features

- 9-12GHz GaN MMIC Power Amplifier
- Typical Small-signal Gain 27.7dB
- Typical Power Gain 20.4dB
- Typical Output Power 43.2dBm
- Typical PAE 48%
- 20V-22V operation

* Above Typical values measured at 10.5GHz and 20V

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=10.5GHz, V_{DD}=20V, I_{DQ}=326mA)

Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		27.7		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		20.4		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		43.2		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		48		%	P _{sat} @ I _{gs} =1mA

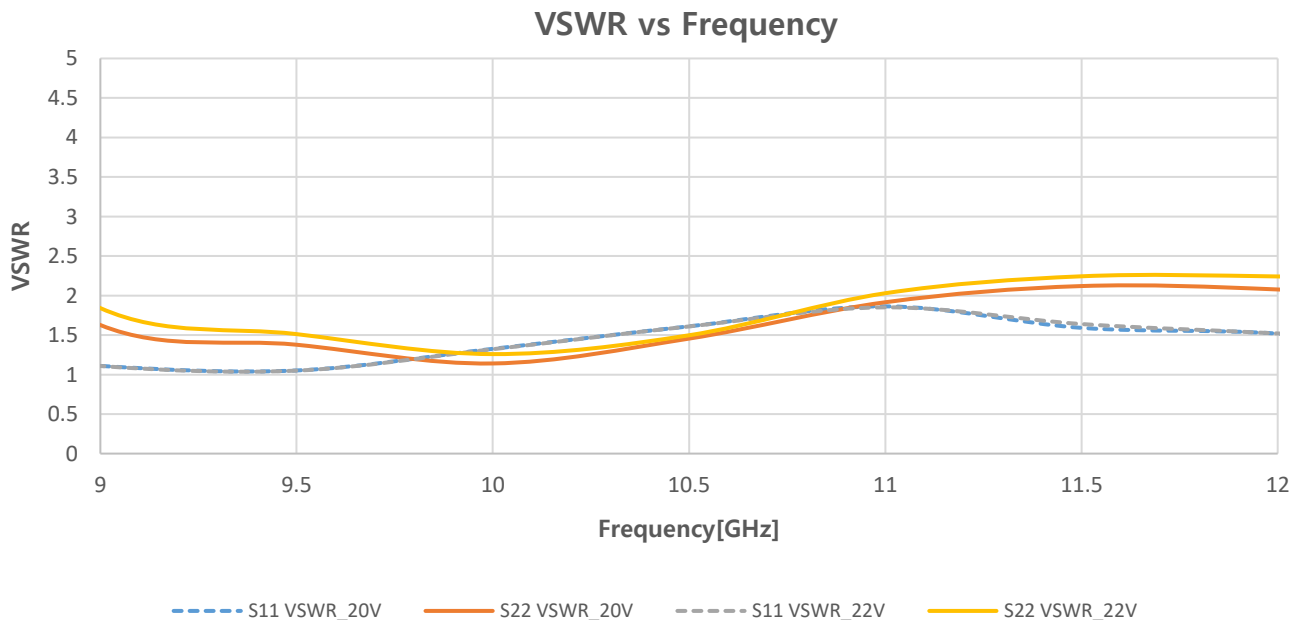
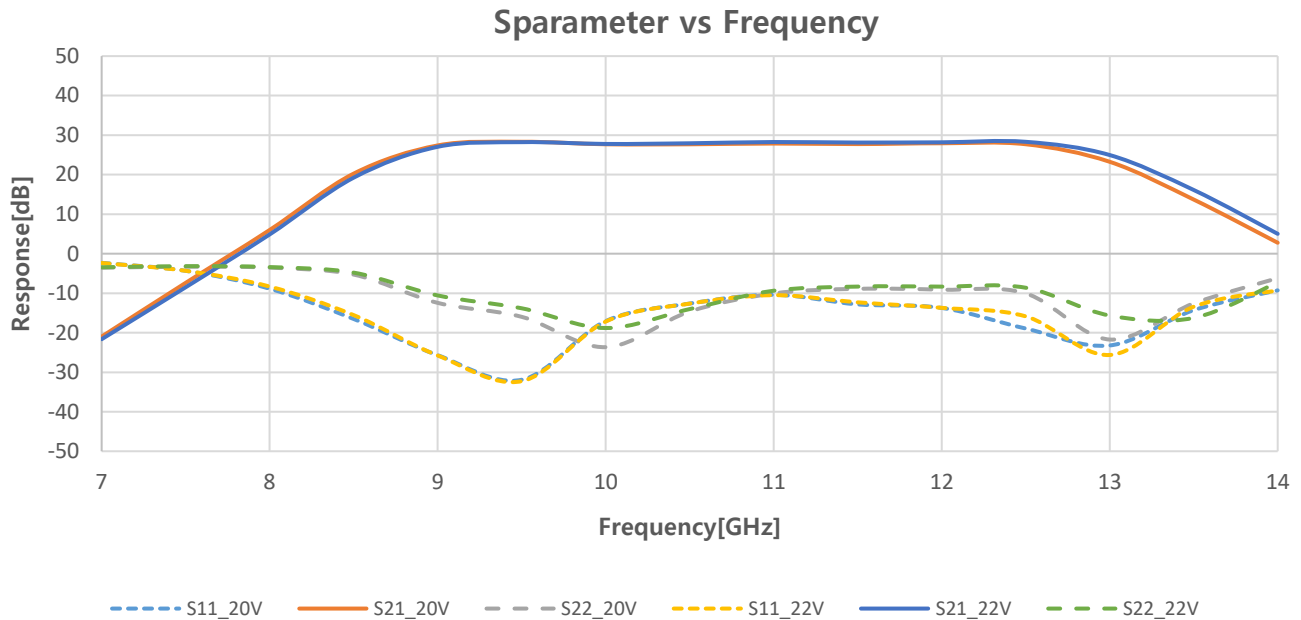
Specifications (T_c=25°C, F₀=10.5GHz, V_{DD}=22V, I_{DQ}=336mA)

Parameter	Symbol	MIN	TYP	MAX	Units	Conditions
Small Signal Gain	G		27.9		dB	Pulse Width=100μsec, Duty Cycle=10%
Power Gain	G _P		21.2		dB	P _{sat} @ I _{gs} =1mA
Saturated Output Power	P _{OUT}		44		dBm	P _{sat} @ I _{gs} =1mA
Power Added Efficiency	PAE		47.7		%	P _{sat} @ I _{gs} =1mA



Small-Signal Performance (Tc=25°C)

Drain Voltage= (20V IDQ=326mA), (22V IDQ=336mA)

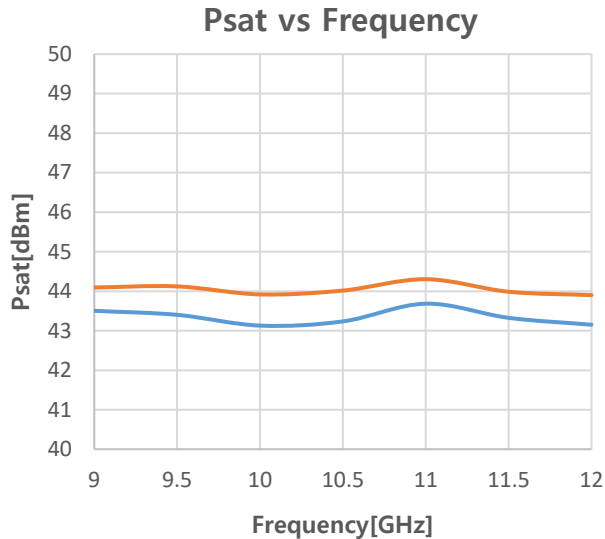




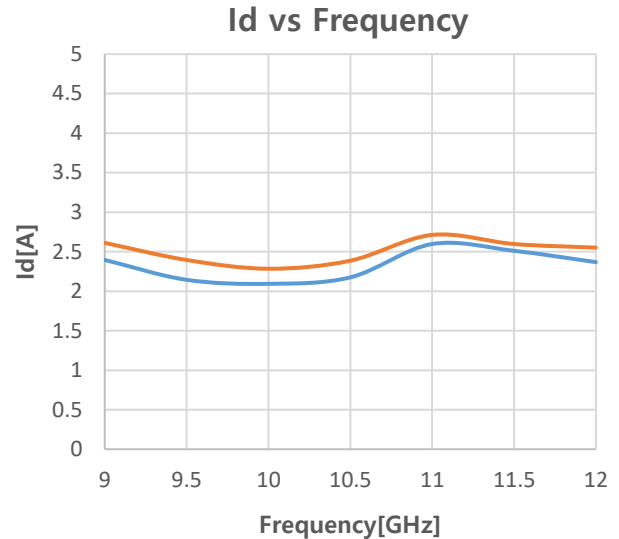
Psat, Id vs Frequency Performance (Tc=25°C)

Drain Voltage= (20V IDQ=326mA), (22V IDQ=336mA)

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



— PULSE_20V — PULSE_22V

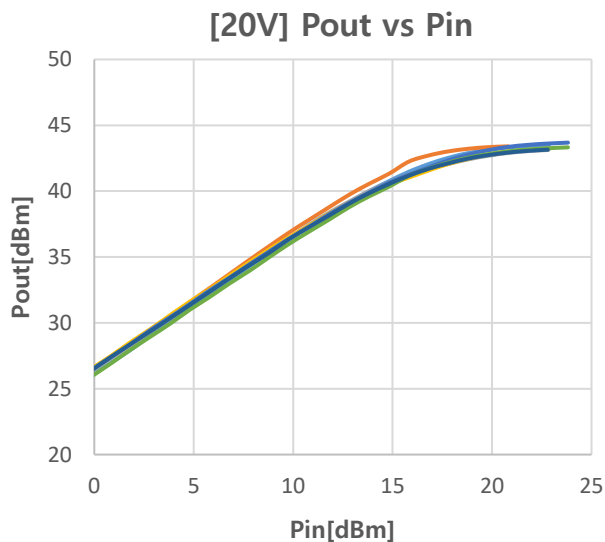


— PULSE_20V — PULSE_22V

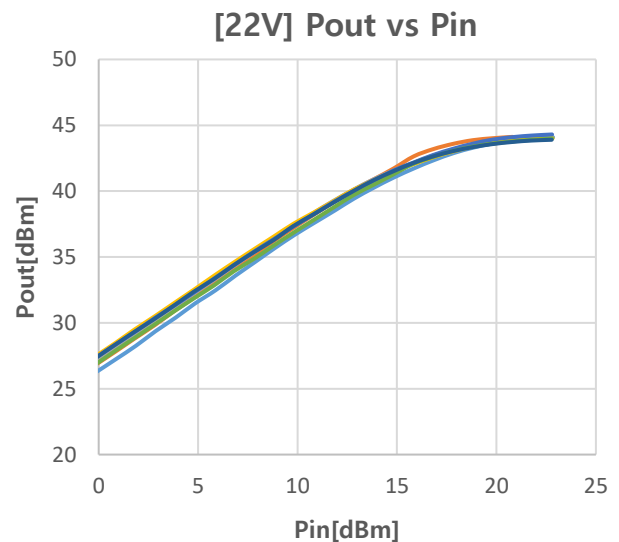
Output Power (Pout) vs Input Power (Pin) Performance (Tc=25°C)

Drain Voltage= (20V IDQ=326mA), (22V IDQ=336mA)

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



— 9 — 9.5 — 10 — 10.5
— 11 — 11.5 — 12



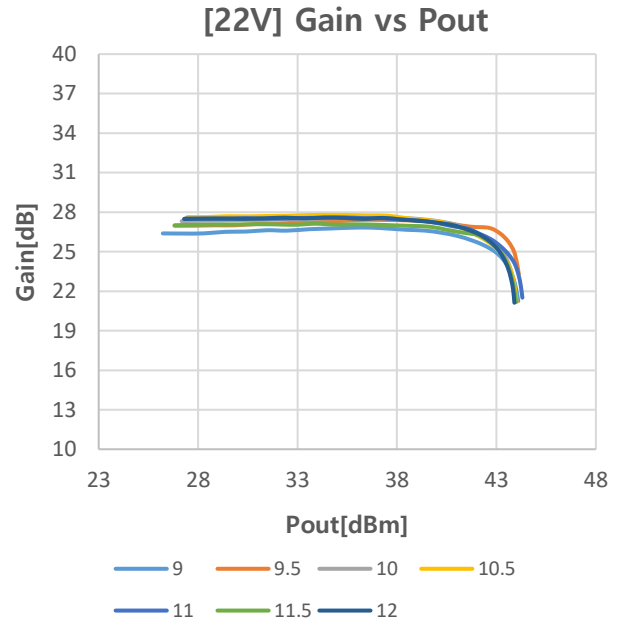
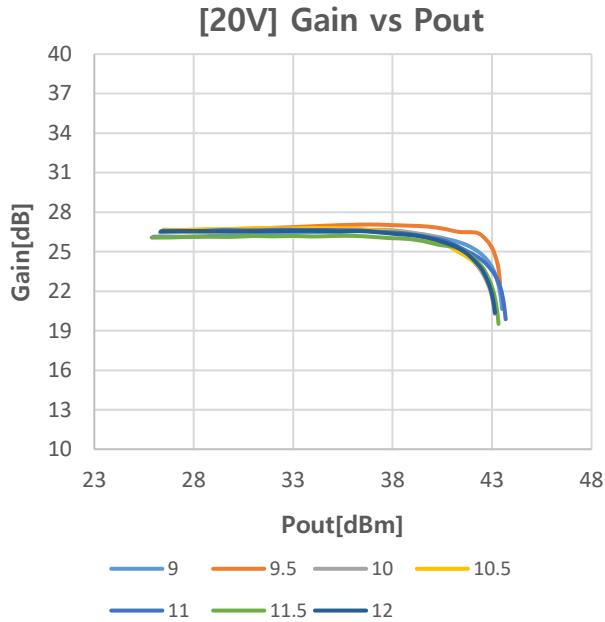
— 9 — 9.5 — 10 — 10.5
— 11 — 11.5 — 12



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

Drain Voltage= (20V IDQ=326mA), (22V IDQ=336mA)

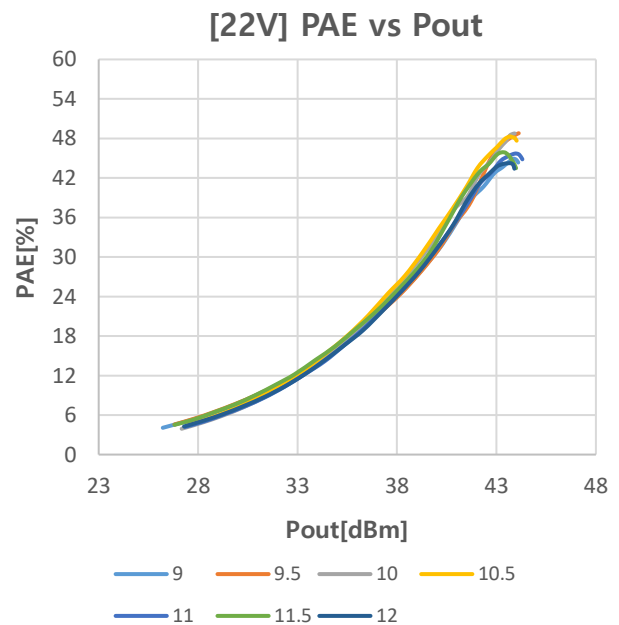
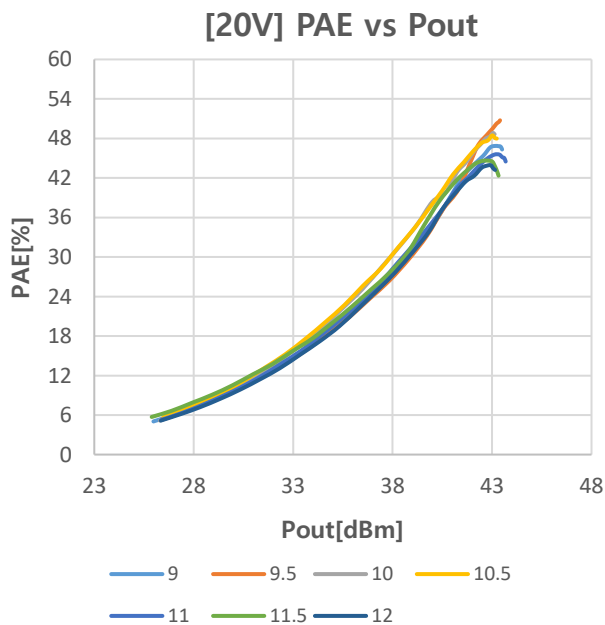
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)



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

Drain Voltage= (20V IDQ=326mA), (22V IDQ=336mA)

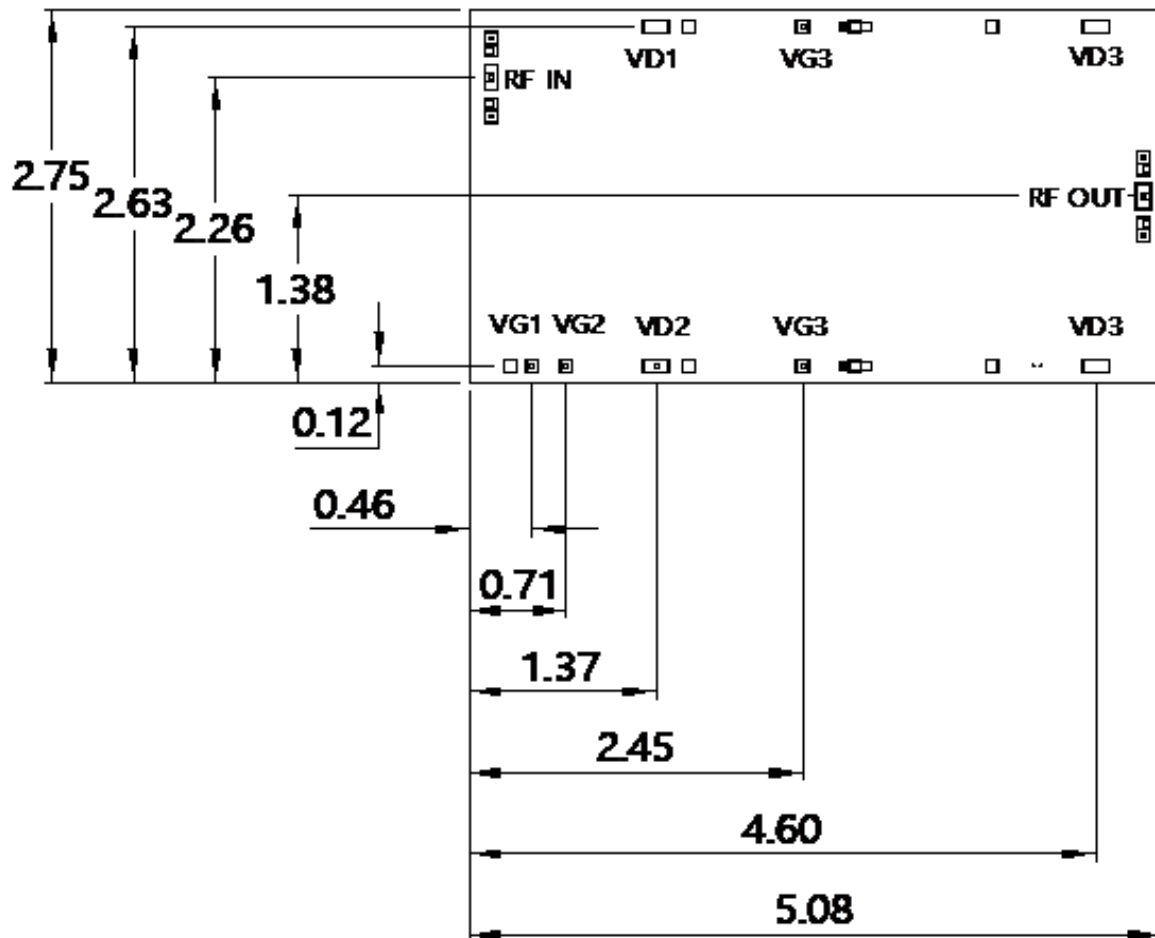
Pulse-Mode(Pulse Width=100μsec, Duty Cycle=10%)





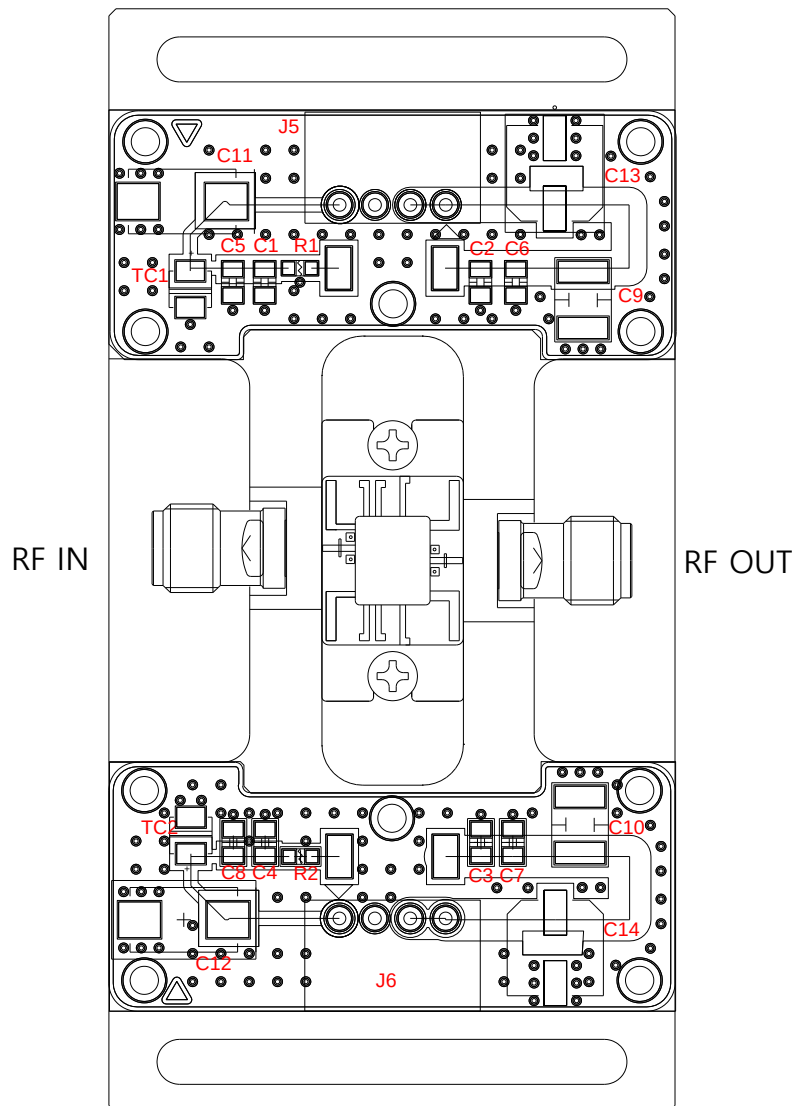
Product Dimension

- Product Type: Bare Die, leadless
- 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

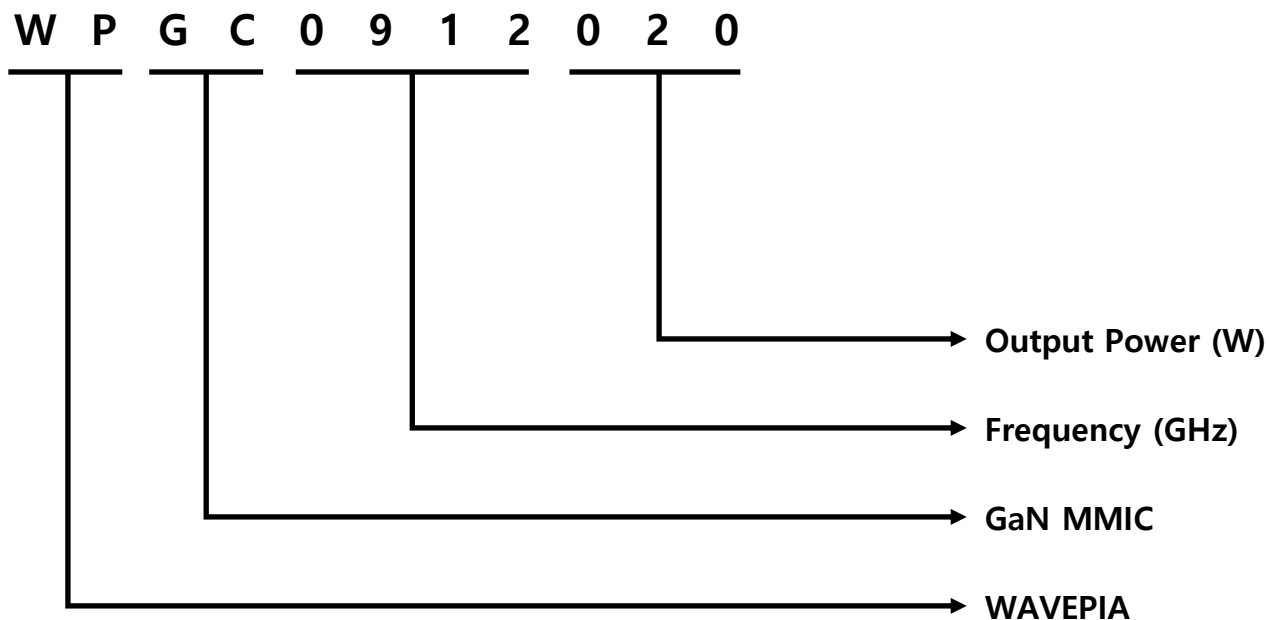
1. VD=20V, IDQ=326mA, VG=-3.27V
2. VD=22V, IDQ=336mA, VG=-3.27V

Evaluation Board Circuit Bill of Materials

Reference	Part Number	Value	Description	Package	Manufacturer	EA
C1,C2,C3,C4	251R15S101JV4E	100pF	High Q Capacitor	2012	Johanson	4
C5,C6,C7,C8	CL21B103KBANNNC	10nF	Ceramic Capacitor	2012	SAMSUNG	4
TC1,TC2	TAJA106K016RNJ	10uF	Tantalium Capacitor	3216	AVX	2
C11,C12	293D476X9016D2TE3	47uF	Tantalium Capacitor	7343	Vishay	2
C9,C10	251S43W474KVAE	470nF	High V Capacitor	4532	Johanson	2
C13,C14	KMG-50V-47uF-MAX	47uF/50V	Aluminum Capacitor	-	SamYoung	2
R1,R2	RC1608J100SC	10Ω	Chip Resistor	1608	SAMSUNG	2
P1	-	-	RO4003C 8mil	-	Rogers	1
Q1	WPGC0912020	-	GaN MMIC	-	WAVEPIA	1



Part Number System



Parameter	Value	Units
Lower Frequency	9	GHz
Upper Frequency	12	GHz
Output Power	20	W
Transistor Type	GaN MMIC	-
Package	Bare Die	-

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:

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