WVMFA012P28A

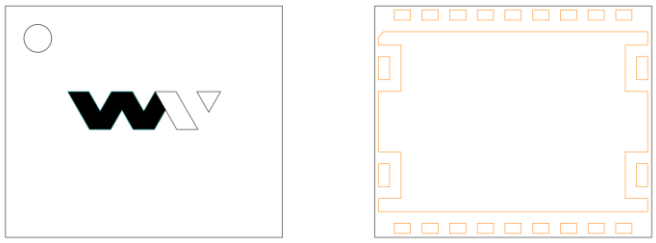
D-9

9 – 10 GHz 12W Front-end Module

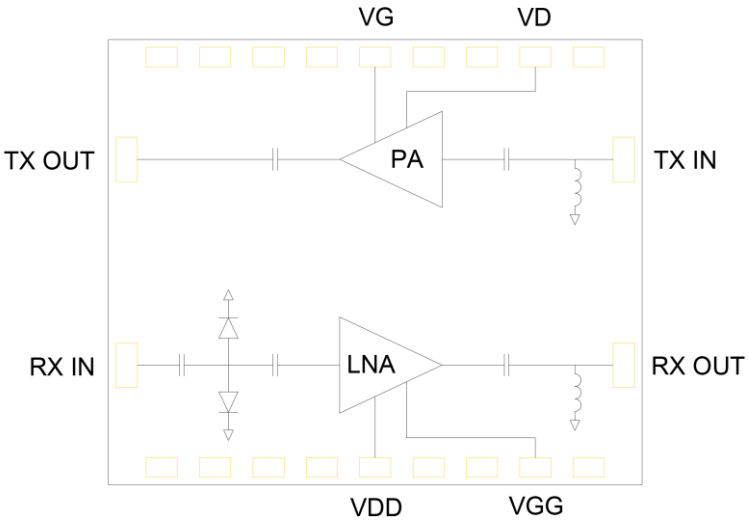
Features

- Frequency Range: 9.0 – 10.0 GHz
- TX Saturated Power: 12.0 W, Pulsed
- TX PAE: Typical 32.7 %
- TX Large Signal Gain: Typical 23.1 dB
- RX Noise Figure: Typical 1.7 dB
- RX Small Signal Gain: Typical 28.9 dB
- Package Dimension: 6 x 5 mm

Product Image



Block Diagram



Operating Conditions

Parameter	Units	Value
TX Drain Voltage(VD)	V	28
TX Drain Quiescent Current(IDQ)	mA	300
TX Gate Voltage(VG)	V	-2.5
RX Drain Voltage(VDD)	V	3.3
RX Drain Quiescent Current(IDDQ)	mA	100
RX Gate Voltage(VGG)	V	-0.5

Electrical Specifications

Parameter	Units	Min	Typ.	Max
Frequency Range	GHz	9.0	-	10.0
TX Saturated Power	W		12.0	
TX PAE	%		32.7	
TX Large Signal Gain	dB		23.1	
RX Noise Figure	dB		1.7	
RX Small Signal Gain	dB		28.9	

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Absolute Maximum Ratings

Parameter	Symbol	Value / Range
TX Drain Voltage	V_D	32 V
TX Gate Voltage	V_G	-10 to +2 V
TX Maximum Forward Gate Current	I_{GMAX}	TBD
RX Drain Voltage	V_{DD}	4 V
RX Gate Voltage	V_{GG}	0 V
RX Maximum Forward Gate Current	I_{GGMAX}	10 mA
Absolute Maximum Channel Temperature	T_{CH}	+225 ℃
Storage Temperature	T_{STG}	-65 ℃ to +150 ℃
Mounting Temperature		-

1) Case temperature T_{Case} =25 ℃
2) Wavice does not recommend sustained operation above maximum operating conditions.
3) Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

Recommended Operating Conditions

Parameter	Symbol	Value / Range
PA Drain Voltage	V_D	28 V
PA Drain Current	I_{DQ}	300 mA
LNA Drain Voltage	V_{DD}	3.3 V
LNA Drain Current	I_{DDQ}	100 mA
Case Operating Temperature		~40 ℃ to +85 ℃

1) Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.
2) Proper ESD(electrostatic discharge) control techniques should be used when handling these devices.

Thermal Characteristics

Parameter	Symbol	Units	Value	Test Conditions
Thermal Resistance using Infrared Measurement of Die Surface Temperature	R_{θ}(IR)	℃/W	TBD	-
Peak IR Surface Temperature	T_{CH}	℃	TBD	

1) Thermal resistance determined to the case temperature (85 ℃)
2) Channel temperature indicated is an IR scan equivalent temperature, Thermal resistance is calculated using this value.

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Electrical Specifications, Transmit

Parameter	Units	Min	Typ	Max
Saturated Output Power	dBm		42.1	
PAE @ P_{sat}	%		32.7	
Power Gain @ P_{sat}	dB		23.1	
Small Signal Gain	dB		28.1	
Input Return Loss	dB		7.9	
Output Return Loss	dB		10.6	

Test conditions, unless otherwise noted :

1) T_{case} = 25°C, V_D = 28 V, I_{DQ} = 300 mA, P_{IN} = 19 dBm, V_G = -2.5 V (Typ.)
2) Pulse details : 100 µsec Pulse width, 10% Duty cycle.

Electrical Specifications, Receive

Parameter	Units	Min	Typ	Max
Small Signal Gain	dB		28.9	
Noise Figure	dB		1.7	
Input Return Loss	dB		7.9	
Output Return Loss	dB		14.8	

Test conditions, unless otherwise noted :

1) T_{case} = 25°C, V_{DD} = 3.3 V, I_{DDQ} = 100 mA, V_{GG} = -0.5 V (Typ.)

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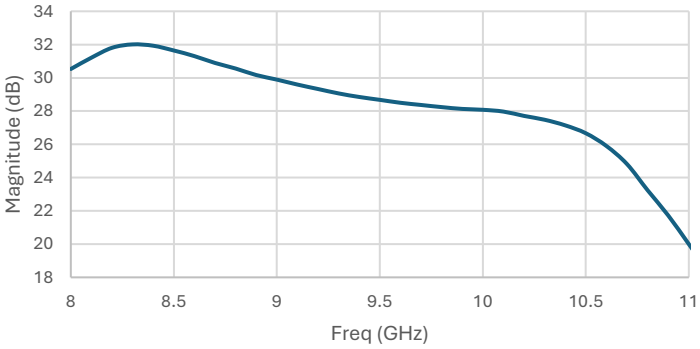
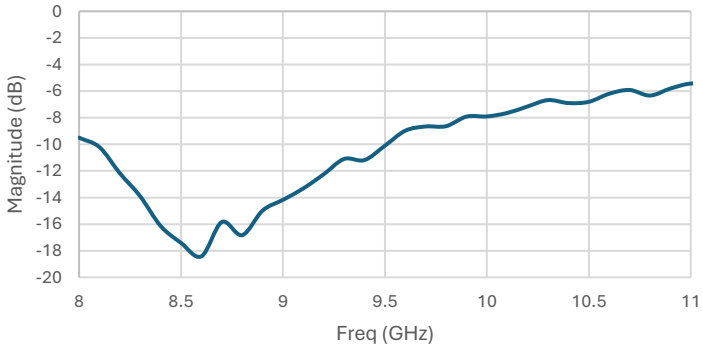
Performance Plots, Transmit | Small Signal

Test conditions, unless otherwise noted: T_{case} = +25 °C, V_D = 28 V, I_{DQ} = 300 mA

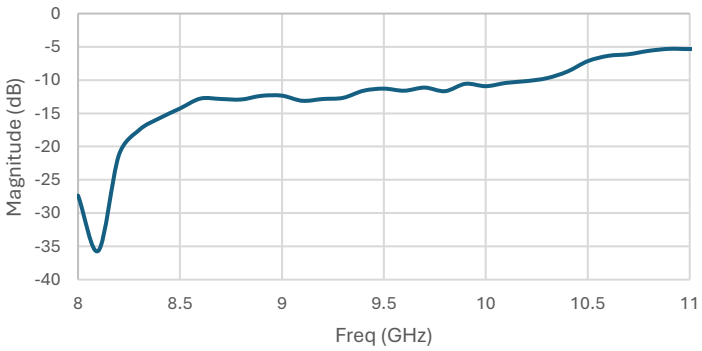
Small Signal Gain



Input Return Loss



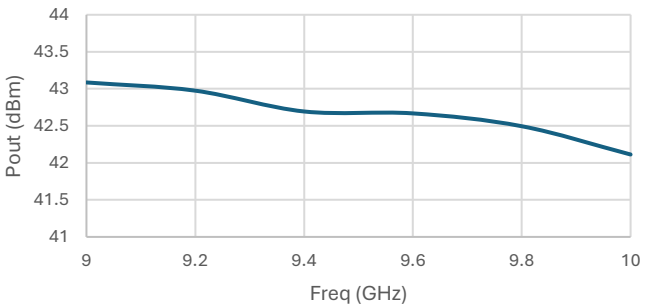
Output Return Loss



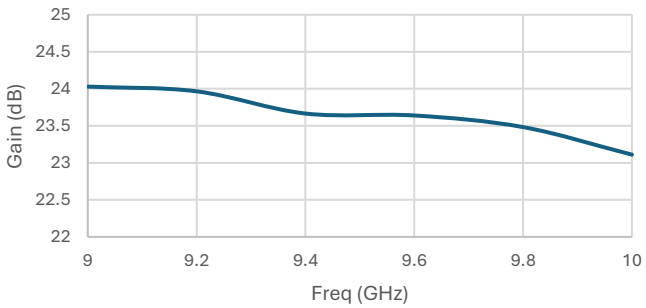
Performance Plots, Transmit | Large Signal

Test conditions, unless otherwise noted: T_{case} = +25 °C, V_D = 28 V, I_{DQ} = 300 mA,, P_{IN} = 19 dBm

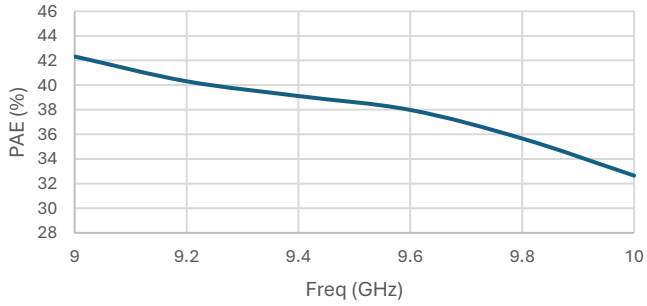
Pout vs. Frequency



Gain vs. Frequency



PAE vs. Frequency



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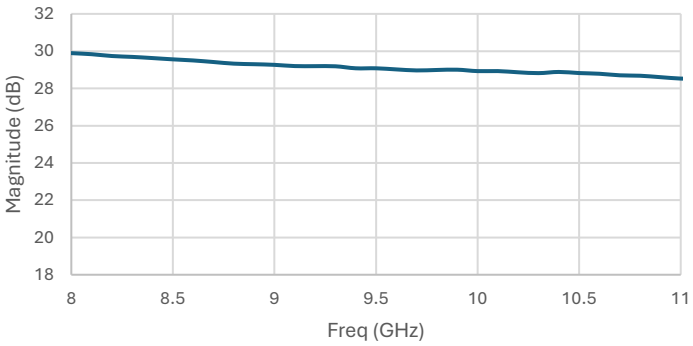
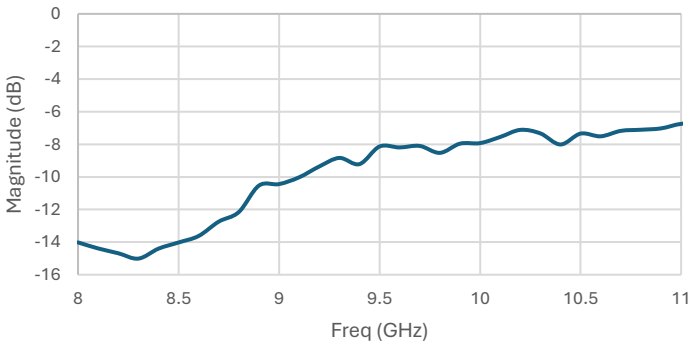
Performance Plots, Receive | Small Signal

Test conditions, unless otherwise noted: T_{case} = +25 °C, V_{DD} = 3.3 V, I_{DDQ} = 100 mA

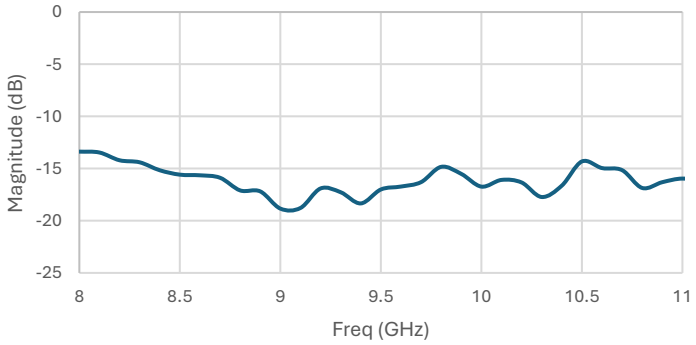
Small Signal Gain



Input Return Loss



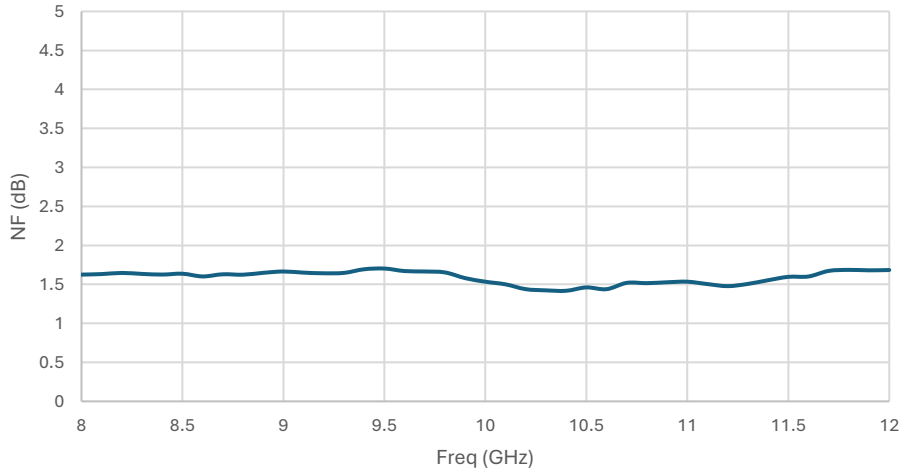
Output Return Loss



Performance Plots, Receive | Noise Figure

Test conditions, unless otherwise noted: T_{case} = +25 °C, V_{DD} = 3.3 V, I_{DDQ} = 100 mA

Noise Figure



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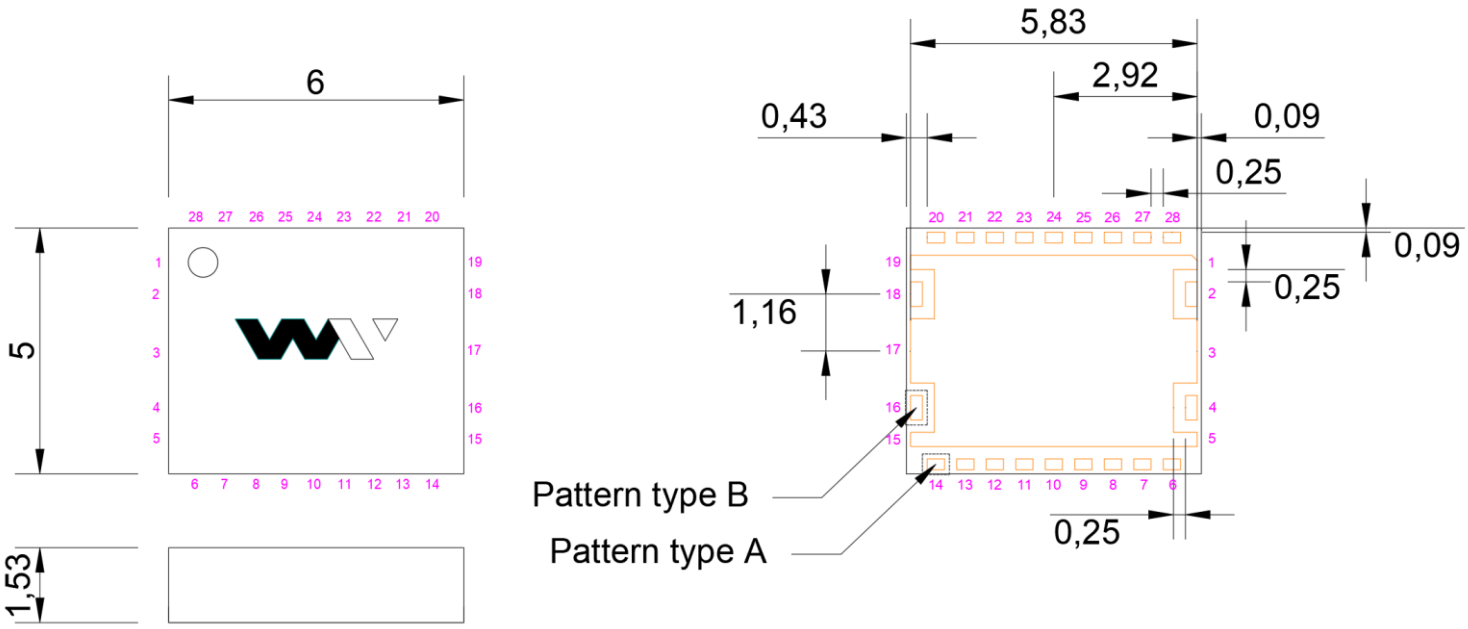
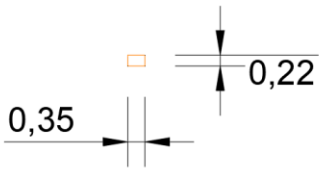
Package Dimension

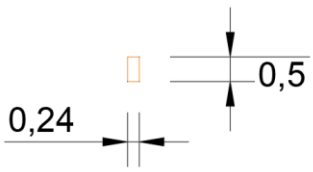
Notes:
1. All dimensions are in mm.
2. Dimension tolerances are ±0.1 mm



Pattern type A



Pattern type B



Pad No.	Label	Description
2	TXOUT	Transmit Output
4	RXIN	Receive Input
10	VDD	LNA Drain Voltage(Receive)
13	VGG	LNA Gate Voltage(Receive)
16	RXOUT	Receive Output
18	TXIN	Transmit Input
21	VD	PA Drain Voltage(Transmit)
24	VG	PA Drain Voltage(Transmit)
1, 3, 5, 6 – 9, 11, 12, 14, 15, 17, 19, 20, 22, 23, 25 – 28	GND	Ground