

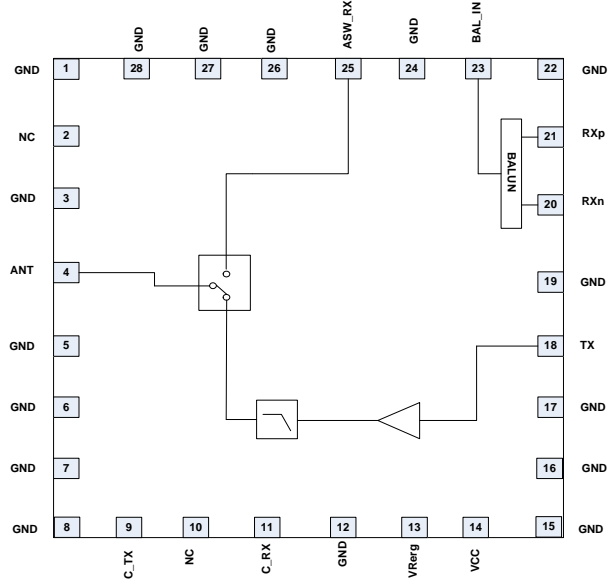


Features

- Tx Output Power: 30dBm
- Separate 50Ω Tx/Rx Transceiver Interface
- Optional 100Ω Rx Differential Transceiver Interface
- Rx Insertion Loss: 1dB

Applications

- Wireless Automated Metering
- Wireless Alarm Systems
- Portable Battery Powered Equipment
- Smart Energy
- 868MHz/900MHz ISM Band Application
- Single Chip RF Front End Module



Functional Block Diagram

Product Description

This module is intended for 868MHz and 915MHz AMR solutions. The FEM provides separate ports for Rx/Tx paths, single-ended Tx and single-ended Rx or Rx differential port, and single port antenna connection. The PA section provides a nominal output power of 30dBm. The device is provided in a 5.5mm x 5.0mm, 28-pin package.

Ordering Information

| | |
|---------------|--|
| RF6569SB | Standard 5-piece bag |
| RF6569SQ | Standard 25-piece bag |
| RF6569SR | Standard 100-piece reel |
| RF6569TR7 | Standard 750-piece reel |
| RF6569TR13 | Standard 2500-piece reel |
| RF6569PCK-410 | Fully Assembled Evaluation Board and 5-piece bag |

Optimum Technology Matching® Applied

- | | | | |
|---|--------------------------------------|--|------------------------------------|
| <input type="checkbox"/> GaAs HBT | <input type="checkbox"/> SiGe BiCMOS | <input checked="" type="checkbox"/> GaAs pHEMT | <input type="checkbox"/> GaN HEMT |
| <input type="checkbox"/> GaAs MESFET | <input type="checkbox"/> Si BiCMOS | <input type="checkbox"/> Si CMOS | <input type="checkbox"/> BiFET HBT |
| <input checked="" type="checkbox"/> InGaP HBT | <input type="checkbox"/> SiGe HBT | <input type="checkbox"/> Si BJT | <input type="checkbox"/> SOI |

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Absolute Maximum Ratings

| Parameter | Rating | Unit |
|---------------------------|-----------|--------------------|
| Battery Voltage | 5 | V |
| RF Port Impedance | 50 | Ω |
| Operating Temperature | -40 to 85 | $^{\circ}\text{C}$ |
| Storage Temperature | -40 to 85 | $^{\circ}\text{C}$ |
| ESD, HBM (RF pins) | 500 | V |
| ESD, HBM (All pins) | 500 | V |
| ESD, CDN (RF pins) | 500 | V |
| ESD, CDM (all pins) | 500 | V |
| MSL | MSL 3 | |
| Maximum Input Power to PA | +20 | dBm |



Caution! ESD sensitive device.

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. Specified typical performance or functional operation of the device under Absolute Maximum Rating conditions is not implied.

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RFMD Green: RoHS compliant per EU Directive 2002/95/EC, halogen free per IEC 61249-2-21, < 1000ppm each of antimony trioxide in polymeric materials and red phosphorus as a flame retardant, and <2% antimony in solder.

| Parameter | Specification | | | Unit | Condition |
|--------------------------------|---------------|------------|------|-----------------------------|---|
| | Min. | Typ. | Max. | | |
| Frequency | 868 | 902 to 928 | | MHz | |
| RF Port Impedance | | 50 | | Ω | |
| Total Leakage Current | | 1 | | μA | $V_{\text{CC}} = 3.6\text{V}, V_{\text{REG}} = 0\text{V}$ |
| ESD, HBM | 500 | | | V | RF pins |
| | 500 | | | V | All other pins |
| ESD, CDM | 500 | | | V | RF pins |
| | 500 | | | V | All other pins |
| PA Section | | | | | $V_{\text{CC}} = 3.6\text{V}, V_{\text{REG}} = 3.4\text{V}, C_{\text{TX}} = 3.4\text{V}, C_{\text{RX}} = 0\text{V}, \text{Temperature} = 25^{\circ}\text{C}; P_{\text{OUT}} = 30\text{dBm}$. Unless otherwise specified. |
| CW P_{OUT} Saturation | 30 | 31 | 32 | dBm | |
| Large Signal Gain | 12 | 15 | | dB | |
| Thermal Resistance | 23 | | | $^{\circ}\text{C}/\text{W}$ | $V_{\text{CC}} = 3.6\text{V}, V_{\text{REG}} = 3.4\text{V}, C_{\text{TX}} = 3.4\text{V}, C_{\text{RX}} = 0\text{V}, T_{\text{REF}} = 85^{\circ}\text{C}, P_{\text{OUT}} = 30\text{dBm}$ |
| 2Fo | -40 | -35 | | dBc | |
| 3Fo to 10Fo | | -75 | -72 | dBc | |
| Input Return Loss | | 18 | | dB | |
| Battery Voltage | 3.3 | 3.6 | 4.0 | V | V_{CC} |
| Battery Current | 550 | 680 | 850 | mA | |
| Quiescent Current | | 200 | | mA | No RF |
| Power Down Current | | 0.3 | 2 | μA | $V_{\text{CC}} = 3.6, V_{\text{REG}} = 0\text{V}$ |
| V_{REG} | 3.1 | 3.4 | 3.8 | V | V_{CC} to 0.2V |
| V_{REG} Current | | 3 | 4 | mA | |
| RX Section | | | | | $V_{\text{CC}} = 3.6\text{V}, V_{\text{REG}} = 0\text{V}, C_{\text{TX}} = 0\text{V}, C_{\text{RX}} = 3.4\text{V}, \text{Temperature} = 25^{\circ}\text{C}$; Unless otherwise specified. |
| Noise Figure | | 0.7 | 1 | dB | |
| Input IP3 | 12 | 18 | | dBm | |
| Input Return Loss | 10 | | | dB | |
| Output Return Loss | 10 | | | dB | |

| Parameter | Specification | | | Unit | Condition |
|-------------------------------|---------------|------|------|------|--|
| | Min. | Typ. | Max. | | |
| Antenna Switch Section | | | | | |
| Isolation | 20 | | | dB | Any used port to any unused port |
| Logic Voltage, High | 3.1 | 3.4 | 3.8 | V | All Logic I/Os, V _{BAT} to 0.2V |
| Logic Voltage, Low | 0.0 | 0.2 | 0.4 | V | All Logic I/Os |
| Logic Current, High | | 5 | 15 | μA | All Logic I/Os |
| Logic Current, Low | | 0.4 | | μA | All Logic I/Os |

| Operating Mode | Module Logic Truth Table | |
|----------------|--------------------------|------|
| | C_TX | C_RX |
| TX-ANT | 1 | 0 |
| RX-ANT | 0 | 1 |

NOTES:

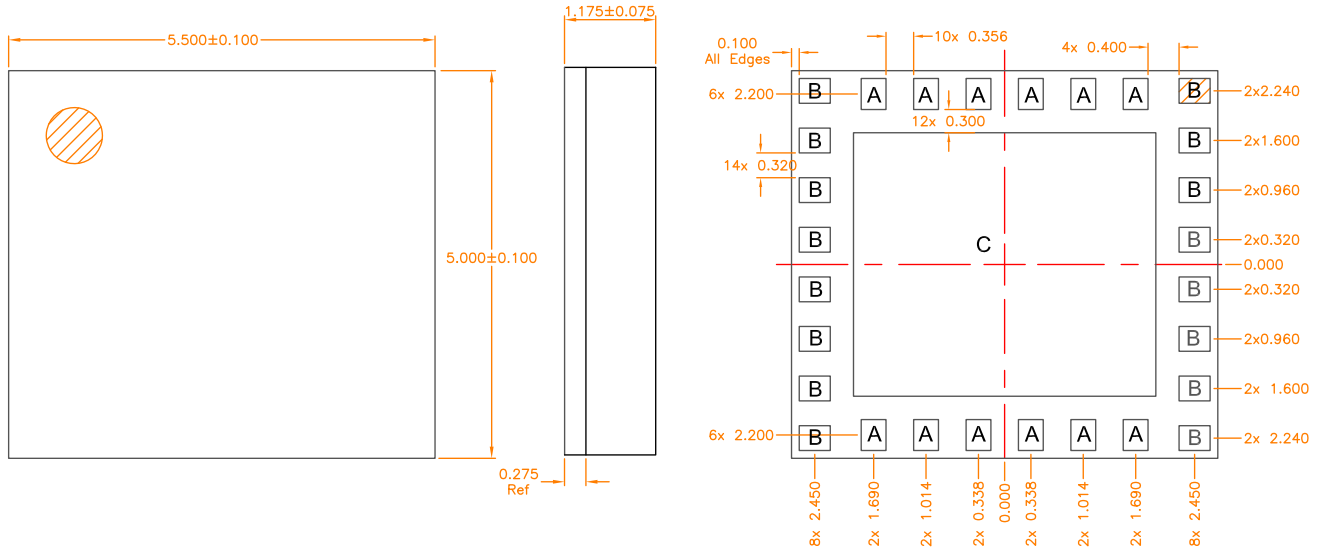
*Switch Control Logic High = Min 3.1V to Max 3.8V

*Switch Control Logic Low = Min 0.0V to Max 0.4V

Pin Names and Descriptions

| Pin | Name | Description |
|-----|--------|---|
| 1 | GND | Ground |
| 2 | NC | |
| 3 | GND | Ground |
| 4 | ANT | Antenna Connect Port |
| 5 | GND | Ground |
| 6 | GND | Ground |
| 7 | GND | Ground |
| 8 | GND | Ground |
| 9 | C_TX | Transmit Selection Control Line |
| 10 | NC | |
| 11 | C_RX | Receive Selection Control Line |
| 12 | GND | Ground |
| 13 | VREG | Power Amplifier Bias Control. V_{CC} to 0.2V = ON, 0V = OFF |
| 14 | VCC | Power Amplifier Supply Voltage |
| 15 | GND | Ground |
| 16 | GND | Ground |
| 17 | GND | Ground |
| 18 | TX | Transmit Port |
| 19 | GND | Ground |
| 20 | RFn | Receive Port neg |
| 21 | RXp | Receive Port pos |
| 22 | GND | Ground |
| 23 | BAL_IN | Input to Balun |
| 24 | GND | Ground |
| 25 | ASW_RX | Antenna Switched Rx Output |
| 26 | GND | Ground |
| 27 | GND | Ground |
| 28 | GND | Ground |

Package Drawing



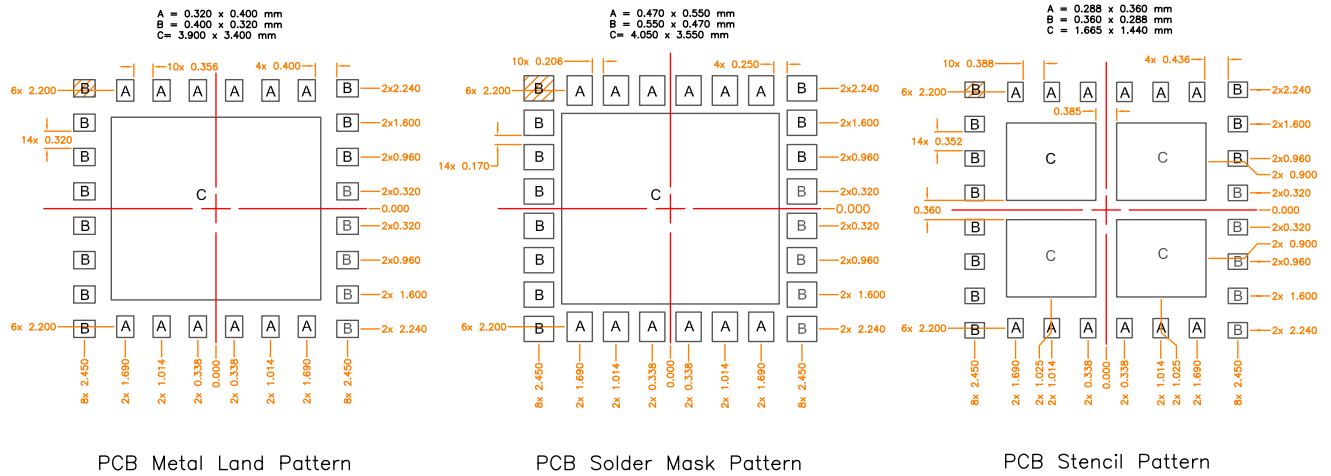
Notes:

1. Shaded area represents Pin 1 location.

A = 0.320 x 0.400 mm
 B = 0.400 x 0.320 mm
 C = 3.900 x 3.400 mm

All units in μm .

PCB Design Requirements



PCB Metal Land Pattern

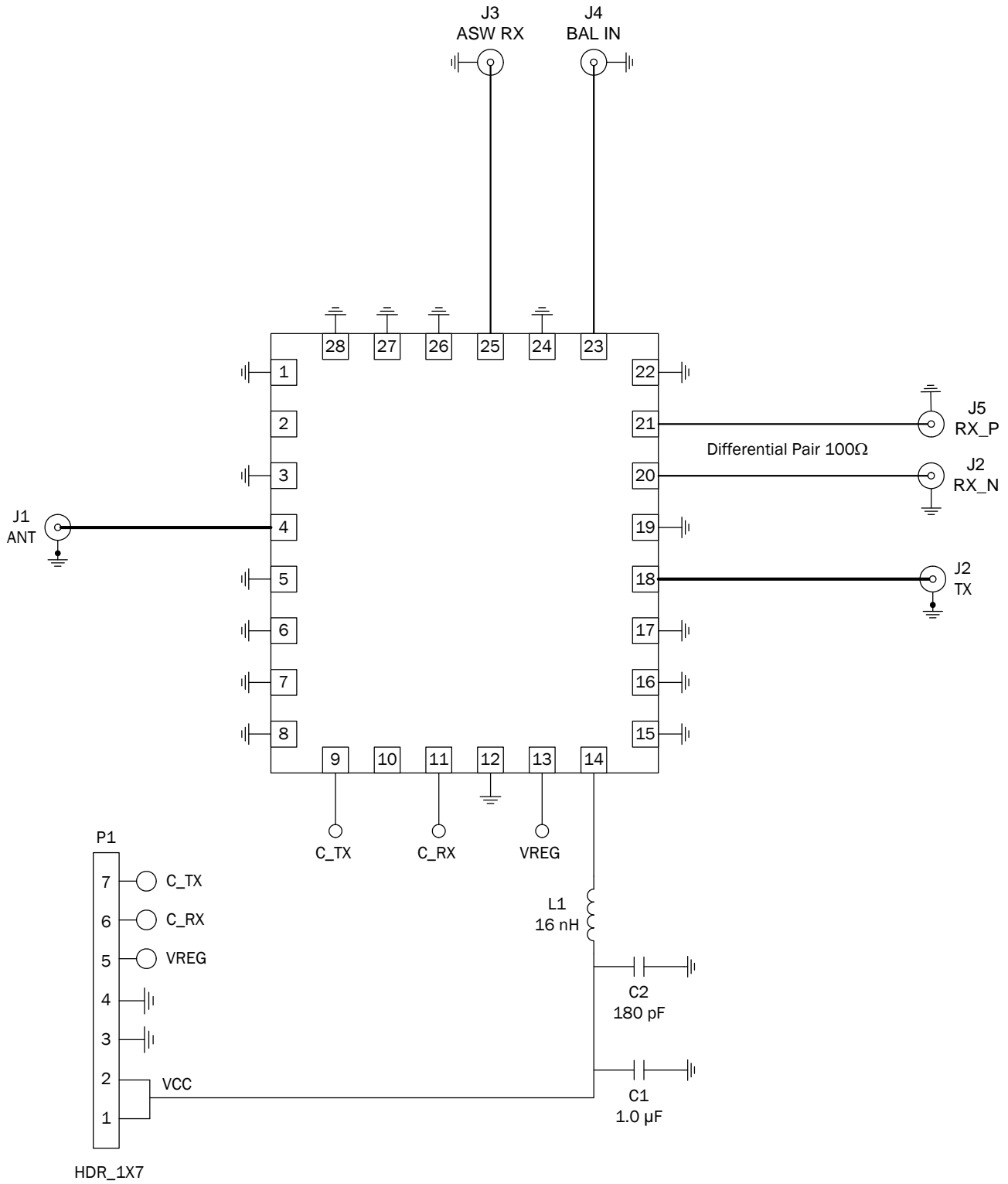
PCB Solder Mask Pattern

PCB Stencil Pattern

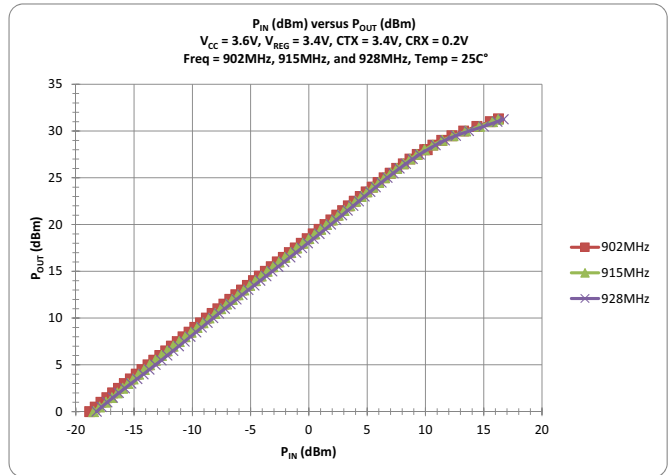
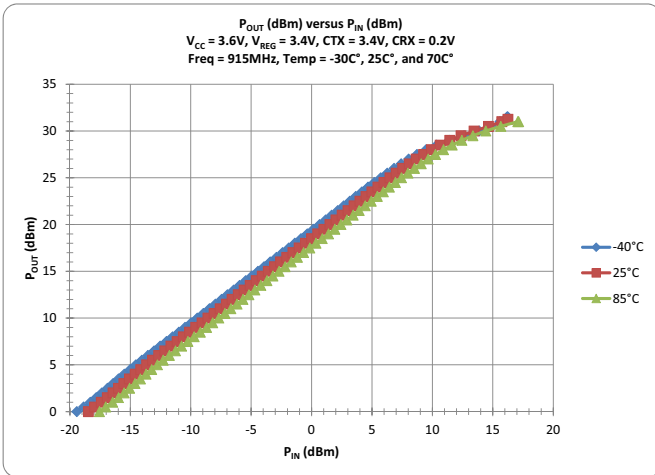
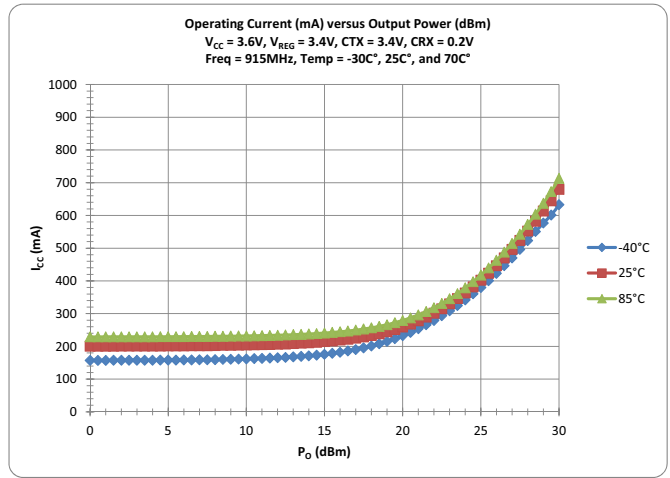
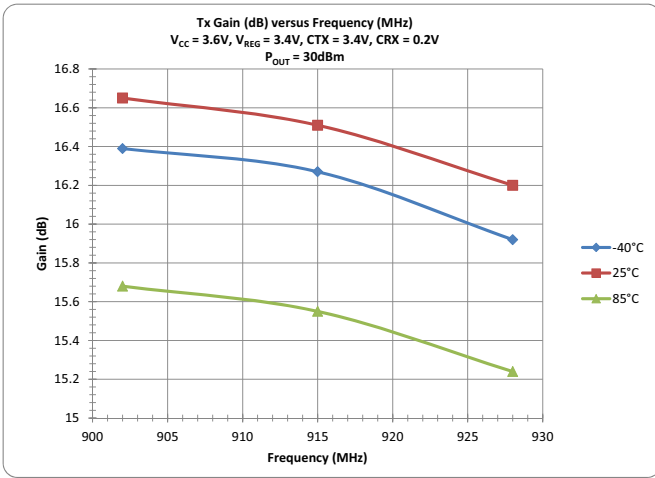
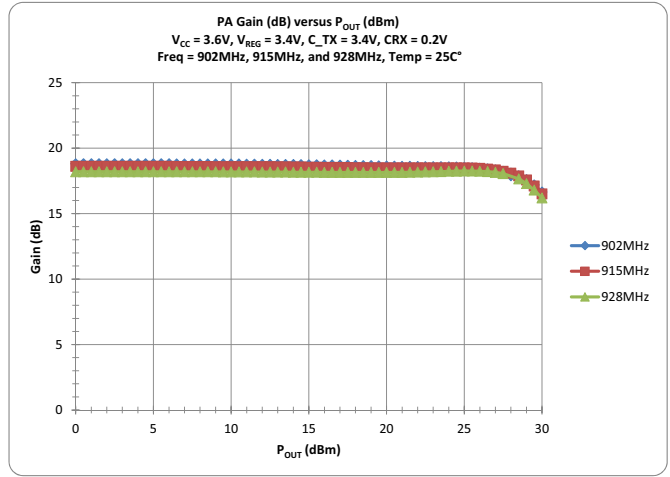
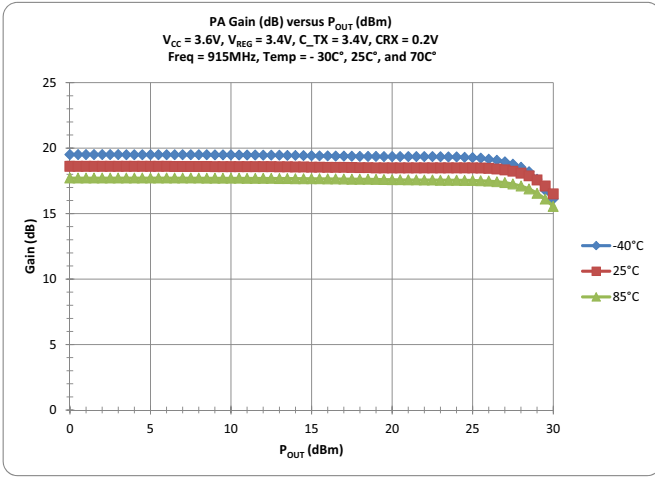
Notes:

1. Shaded area represents Pin 1 location.

Application Schematic



Typical Performance



Typical Performance

