

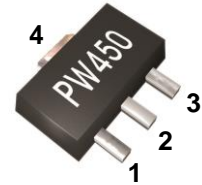
Features

- ➔ DC - 3000MHz
- ➔ 18 dB Gain at 0.9GHz
- ➔ +18.5 dBm P1dB
- ➔ +36 dBm Output IP3
- ➔ Single Voltage Supply
- ➔ Lead-free / Green / RoHS-compliant SOT-89 Package

Applications

- ➔ Broadband Gain Block
- ➔ Mobile Infrastructure
- ➔ Cellular, PCS, GSM, GPRS, WCDMA, WiBro
- ➔ W-LAN / DMB
- ➔ CATV / DBS
- ➔ RFID / Fixed Wireless

Functional Diagram



| Function | Pin No. |
|---------------|---------|
| RF IN | 1 |
| RF OUT / Bias | 3 |
| Ground | 2,4 |

Description

The PW450 is a high performance InGaP HBT MMIC Amplifier and consists of Darlington pair amplifiers. The amplifier features high linear performance, wideband operation, and high reliability. The PW450 operates from a single voltage supply and requires only two DC-blocking capacitors, a bias resistor and an inductor for operation. The device is a general purpose buffer amplifier that offers high dynamic range in a low cost surface-mountable plastic SOT-89 packages.

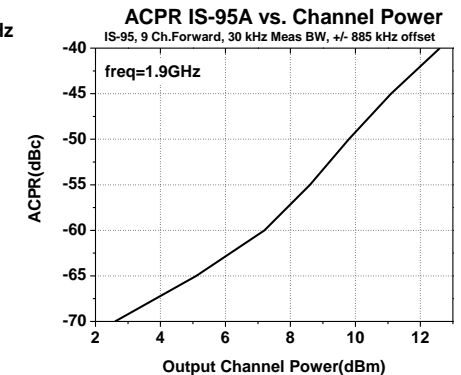
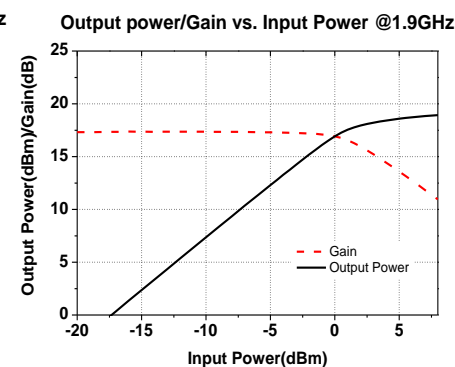
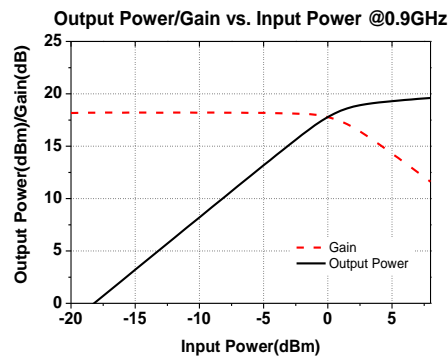
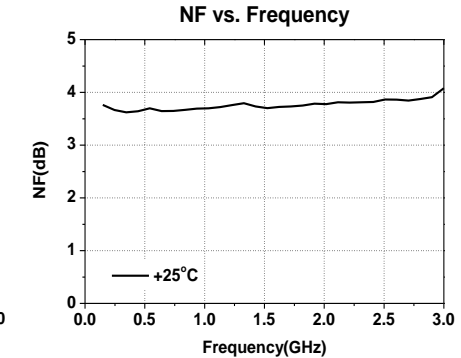
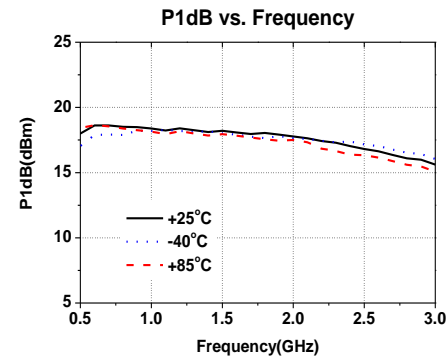
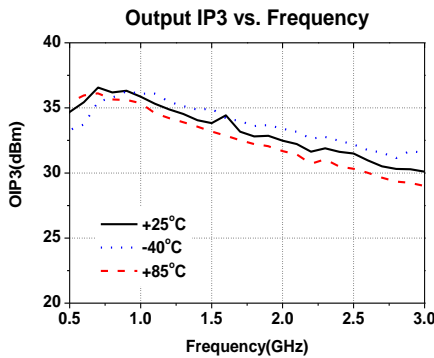
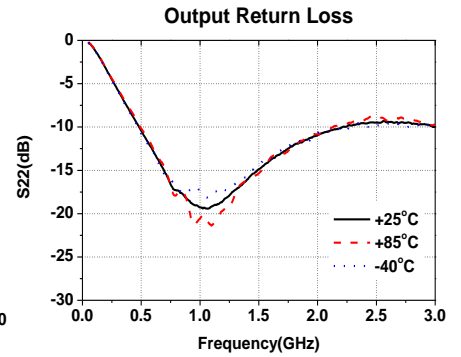
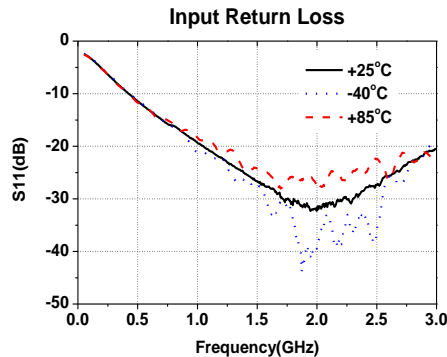
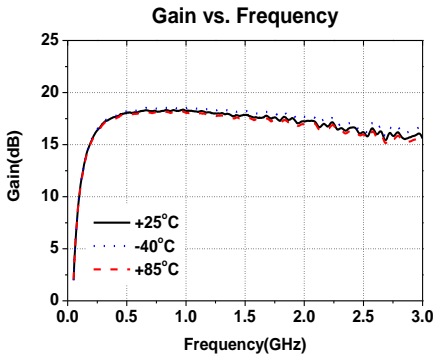
Specifications

| Symbol | Parameters | Units | Freq. | Min. | Typ. | Max. |
|--------|-------------------------------|-------|--|------|--------------------------------------|------|
| S21 | Gain | dB | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | 18.4 18.0 17.0 16.2 16.0 | |
| S11 | Input Return Loss | dB | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | -18 -17 -30 -26 -25 | |
| S22 | Output Return Loss | dB | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | -13 -25 -12 -10 -9 | |
| P1dB | Output Power @1dB compression | dBm | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | 19.0 18.5 17.8 17.3 16.5 | |
| OIP3 | Output Third Order intercept | dBm | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | 36 35.5 32.5 31.5 30.5 | |
| NF | Noise Figure | dB | 75MHz 900 MHz 1900 MHz 2300 MHz 2600 MHz | | 3.4 3.7 3.8 3.8 3.9 | |
| V / I | Device voltage / current | V/mA | | | 4.94/69 | |
| Rth | Thermal Resistance | °C/W | | | 57 | |

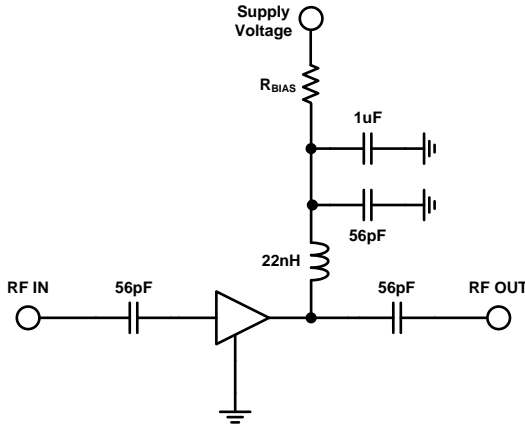
Test Conditions : T=25°C, Supply Voltage=+6V, Rbias=15ohm, 50ohm System, OIP3 measured with two tones at an output power of +3dBm/tone separated by 1MHz.

Typical RF Performance for 1.9GHz Tuned Application Circuit
Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 69mA

| Frequency | MHz | 500 | 900 | 1500 | 1900 | 2300 | 2600 | 3000 |
|--------------|-----|------|------|------|------|------|------|------|
| S21 | dB | 18.0 | 18.0 | 17.6 | 17.0 | 16.2 | 16.1 | 15.2 |
| S11 | dB | -12 | -17 | -24 | -30 | -26 | -25 | -20 |
| S22 | dB | -11 | -17 | -15 | -12 | -10 | -9 | -10 |
| P1dB | dBm | 18 | 18.4 | 18.2 | 17.8 | 17.3 | 16.6 | 16 |
| OIP3 | dBm | 34.7 | 35.5 | 33.5 | 32.5 | 31.5 | 30.5 | 30.0 |
| Noise Figure | dB | 3.6 | 3.7 | 3.7 | 3.8 | 3.8 | 3.9 | 4.0 |



1.9GHz Tuned Application Circuit



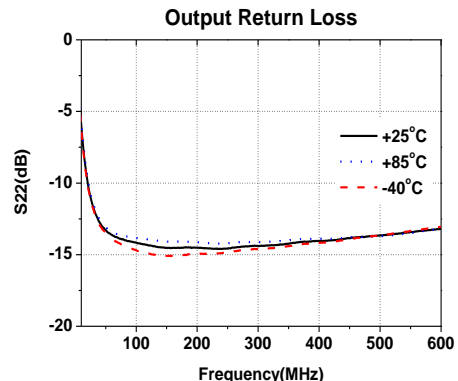
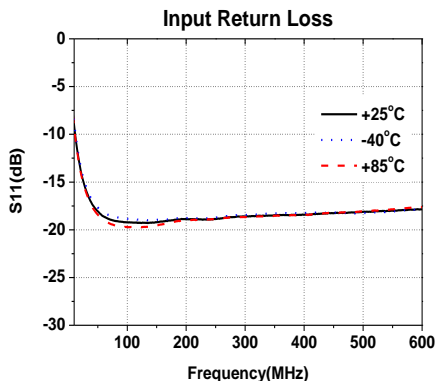
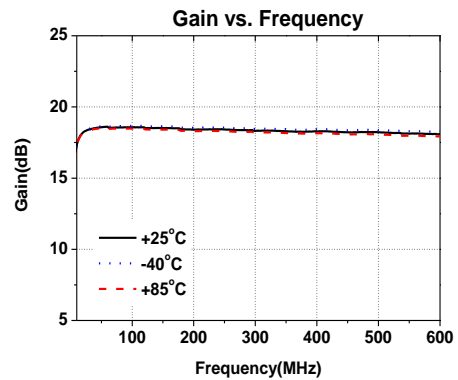
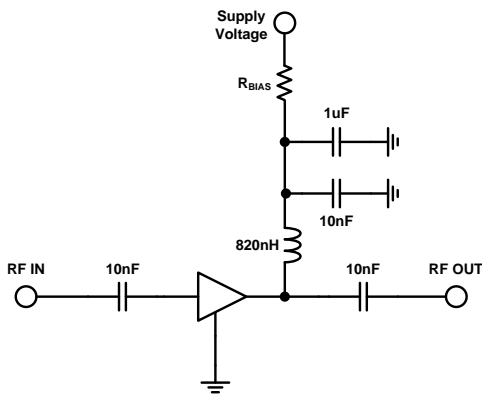
Recommended Bias Values

| Supply Voltage | R bias Value | Size |
|----------------|--------------|------|
| 5 V | 0.5 Ω | 0805 |
| 5.3 V | 5.1 Ω | 0805 |
| 6 V | 15 Ω | 0805 |
| 7 V | 30 Ω | 1210 |
| 8 V | 45 Ω | 1210 |
| 9 V | 58 Ω | 2010 |
| 10 V | 73 Ω | 2010 |
| 12 V | 100 Ω | 2512 |

Typical RF Performance for 50 -500MHz Tuned Application Circuit

Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 69mA

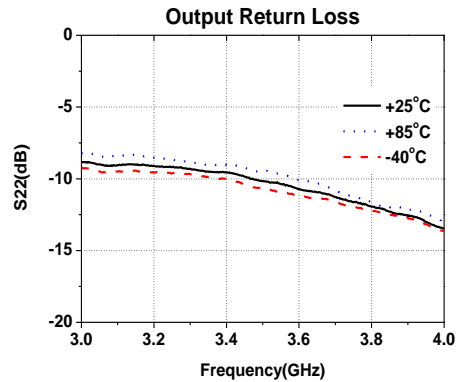
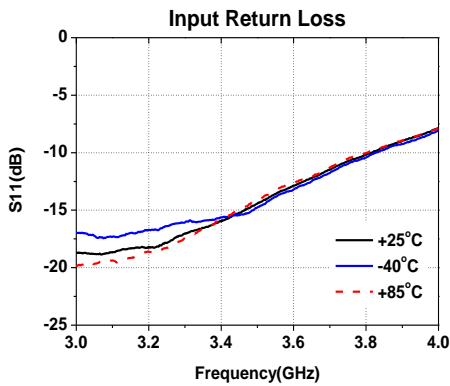
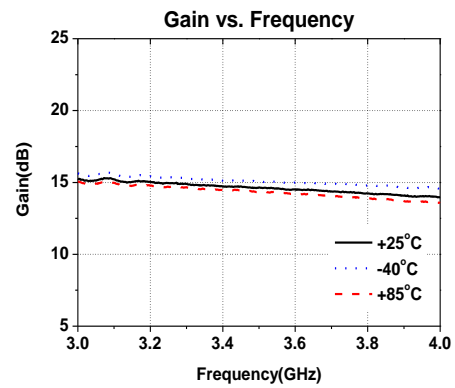
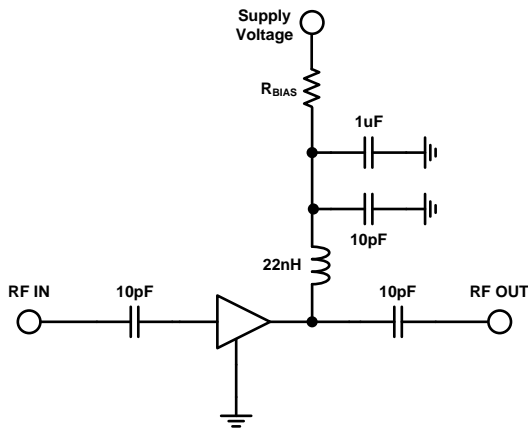
| Frequency | MHz | 75 | 125 | 300 | 500 |
|--------------------------|-----|------|------|------|------|
| S21 : Gain | dB | 18.5 | 18.5 | 18.3 | 18.2 |
| S11 : Input Return Loss | dB | -19 | -19 | -18 | -18 |
| S22 : Output Return Loss | dB | -14 | -14 | -14 | -13 |
| Output P1dB | dBm | 19.3 | 19.6 | 19.4 | 19.2 |
| Output IP3 @3dBm | dBm | 36.0 | 36.0 | 35.7 | 35.0 |
| Noise Figure | dB | 3.4 | 3.5 | 3.5 | 3.5 |



Typical RF Performance for 3500MHz Tuned Application Circuit

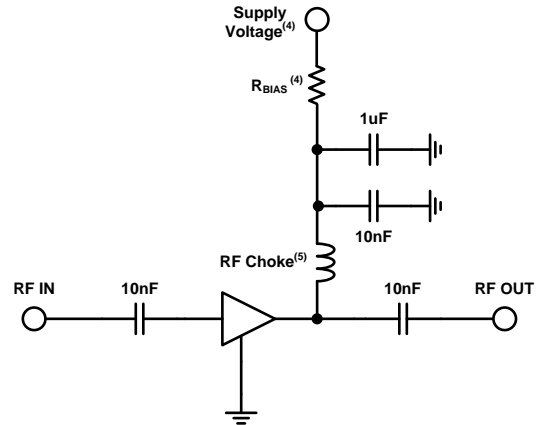
Supply Bias Voltage = 6V, R(bias)= 15 ohm, Current= 69mA

| Frequency | MHz | 3000 | 3500 | 4000 |
|--------------------------|-----|------|------|------|
| S21 : Gain | dB | 15.0 | 14.3 | 13.5 |
| S11 : Input Return Loss | dB | -18 | -14 | -8 |
| S22 : Output Return Loss | dB | -9 | -10 | -13 |
| Output P1dB | dBm | 15.5 | 14.2 | 13.8 |
| Output IP3 @3dBm | dBm | 29.0 | 27.7 | 27.0 |



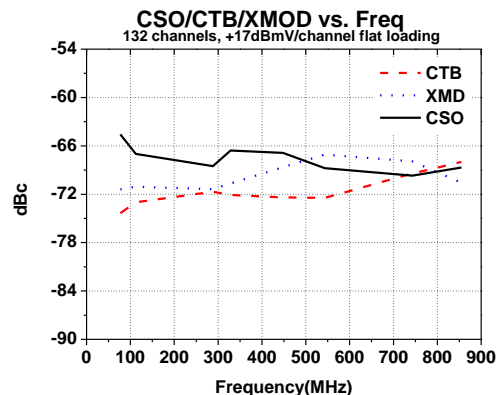
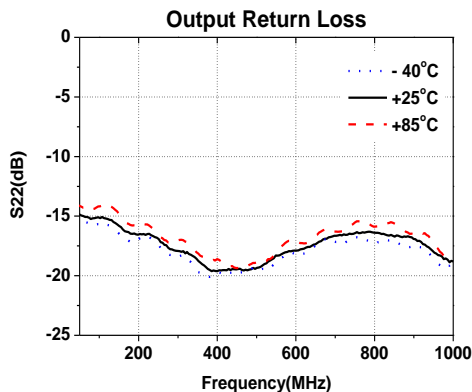
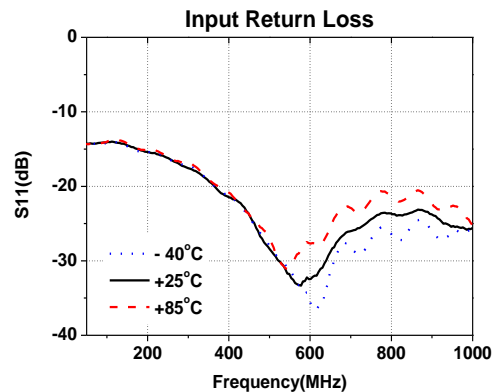
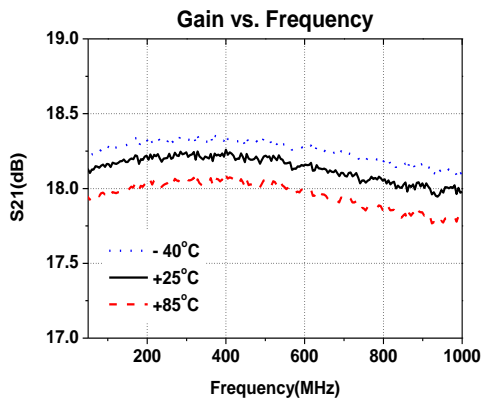
Typical RF Performance for 45 -1000MHz CATV Application(75Ω)⁽¹⁾

| Frequency | MHz | 50 | 450 | 870 |
|--|-----|------|------|-----|
| S21 : Gain | dB | 18.1 | 18.2 | 18 |
| S11 : Input Return Loss | dB | -14 | -24 | -23 |
| S22 : Output Return Loss | dB | -15 | -20 | -17 |
| Output P1dB | dBm | 19 | 19 | 19 |
| Output IP3 ⁽²⁾ | dBm | 35 | 35 | 34 |
| Composite Second Order, CSO ⁽³⁾ | dBc | 64 | 67 | 68 |
| Composite Triple Beat, CTB ⁽³⁾ | dBc | 74 | 72 | 68 |
| Cross Modulation, XMOD ⁽³⁾ | dBc | 71 | 68 | 71 |
| Noise Figure | dB | 3.4 | 3.5 | 3.5 |
| Current | mA | 70 | | |



1. Test Conditions : T=25°C, Supply Voltage=+6V, Rbias=15ohm, 75ohm System
2. OIP3 measured with two tones at an output power of +3dBm/tone separated by 1MHz.
3. 132 channels, 50-870MHz, +17dBmV/channel flat loading

4. Supply Voltage and R bias are refer to 'Recommended Bias Values' on page 3.
5. RF Choke is about 8.3uH. We recommend that wire of 0.2 phi radius wind 7 turns on toroidal core(size:4.0x1.5x2.0)
6. Measurement for our data sheet was made on 1.6mm thick FR-4 Board. And 75 ohm microstrip line

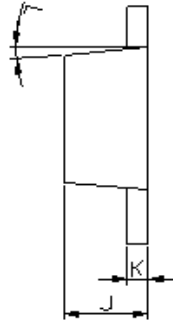
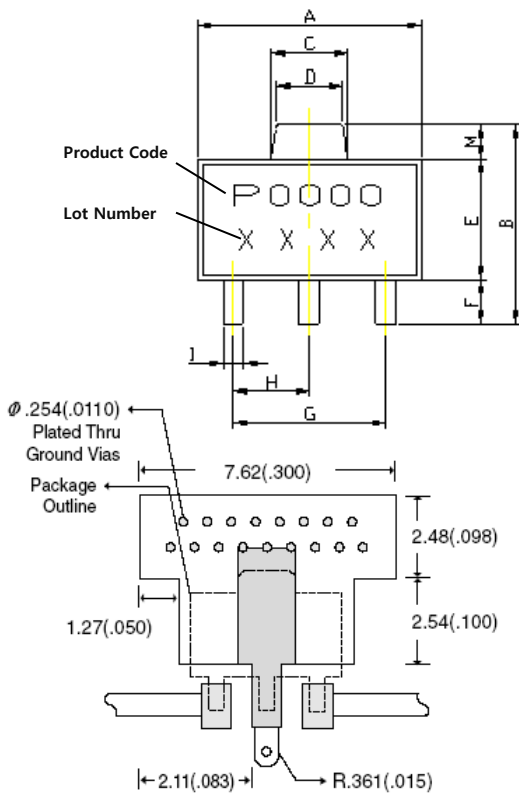


Absolute Maximum Ratings

| Parameter | Rating | Unit |
|--|-------------|------|
| Supply Voltage | +8 | V |
| Supply Current | 200 | mA |
| RF Power Input | 10 | dBm |
| Storage Temperature | -55 to +125 | °C |
| Ambient Operating Temperature | -40 to +85 | °C |
| Junction Temperature for >10 ⁶ hours MTTF | 187 | °C |

Operation of this device above any of these parameters may cause permanent damage.

Lead-free / RoHS Compliant / Green SOT-89 Package Outline

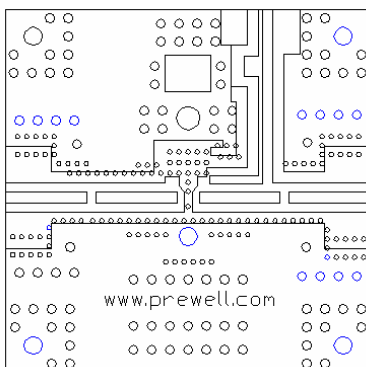


| REF | DIMENSIONS | |
|-----|-------------|------|
| | Millimeters | |
| | Min. | Max. |
| A | 4.40 | 4.60 |
| B | 4.05 | 4.25 |
| C | 1.50 | 1.70 |
| D | 1.30 | 1.50 |
| E | 2.40 | 2.60 |
| F | 0.89 | 1.20 |
| G | 3.00 | REF. |
| H | 1.50 | REF. |
| J | 0.40 | 0.52 |
| K | 1.40 | 1.60 |
| L | 0.35 | 0.41 |
| L | 5° TYP. | |
| M | 0.70 | REF. |

ESD / MSL Ratings

- ESD sensitive device. Observe Handling Precautions.
- ESD Rating : Class 2(Passes at 2000V min.) Human Body Model (HBM), JESD22-A114
- ESD Rating : Class IV (Passes at 1000V min.) Charged Device Model (CDM), JESD22-C101
- MSL (Moisture Sensitive Level) Rating : Level 1 at +260°C Convection reflow, J-STD-020

Evaluation Board Layout (4x4)



Mounting Instructions

- Use a large ground pad area with many plated through-holes as shown.
- We recommend 1 oz copper minimum.
- Measurement for our data sheet was made on 0.8mm thick FR-4 Board.
- Add as much copper as possible to inner and outer layers near the part to ensure optimal thermal performance.
- RF trace width depends on the board material and construction.
- Add mounting screws near the part to fasten the board to a heatsink.

<http://www.prewell.com>