

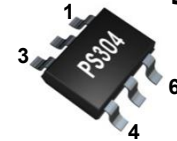
### Features

- ➔ DC - 3000MHz
- ➔ 22.0 dB Gain at 0.9GHz
- ➔ +15 dBm P1dB
- ➔ +27.5 dBm Output IP3
- ➔ Single Voltage Supply
- ➔ Lead-free / Green / RoHS-compliant SOT-363 Package

### Applications

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

### Functional Diagram



\* Marking : 24C / 34C

| Function      | Pin No. |
|---------------|---------|
| RF IN         | 3       |
| RF OUT / Bias | 6       |
| Ground        | 1,2,4,5 |

### Description

The PS304-63 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 PS304-63 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-363 packages.

### Specifications

| Symbol | Parameters                    | Units | Freq.                                     | Min. | Typ.                         | Max. |
|--------|-------------------------------|-------|---|------|------------------------------|------|
| S21    | Gain                          | dB    | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | 23.7<br>22.2<br>19.3<br>18.2 |      |
| S11    | Input Return Loss             | dB    | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | -18<br>-13<br>-14<br>-15     |      |
| S22    | Output Return Loss            | dB    | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | -15<br>-14<br>-12<br>-10     |      |
| P1dB   | Output Power @1dB compression | dBm   | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | 15.5<br>15.0<br>11.5<br>10.5 |      |
| OIP3   | Output Third Order intercept  | dBm   | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | 29.0<br>27.7<br>24.4<br>22.8 |      |
| NF     | Noise Figure                  | dB    | 75 MHz<br>900 MHz<br>1900 MHz<br>2300 MHz |      | 2.1<br>2.3<br>2.3<br>2.3     |      |
| V / I  | Device voltage / current      | V/mA  |   |      | 3.53/45                      |      |
| Rth    | Thermal Resistance            | °C/W  |   |      | 76                           |      |
| Tj     | Junction Temperature          | °C    |   |      | 98                           |      |

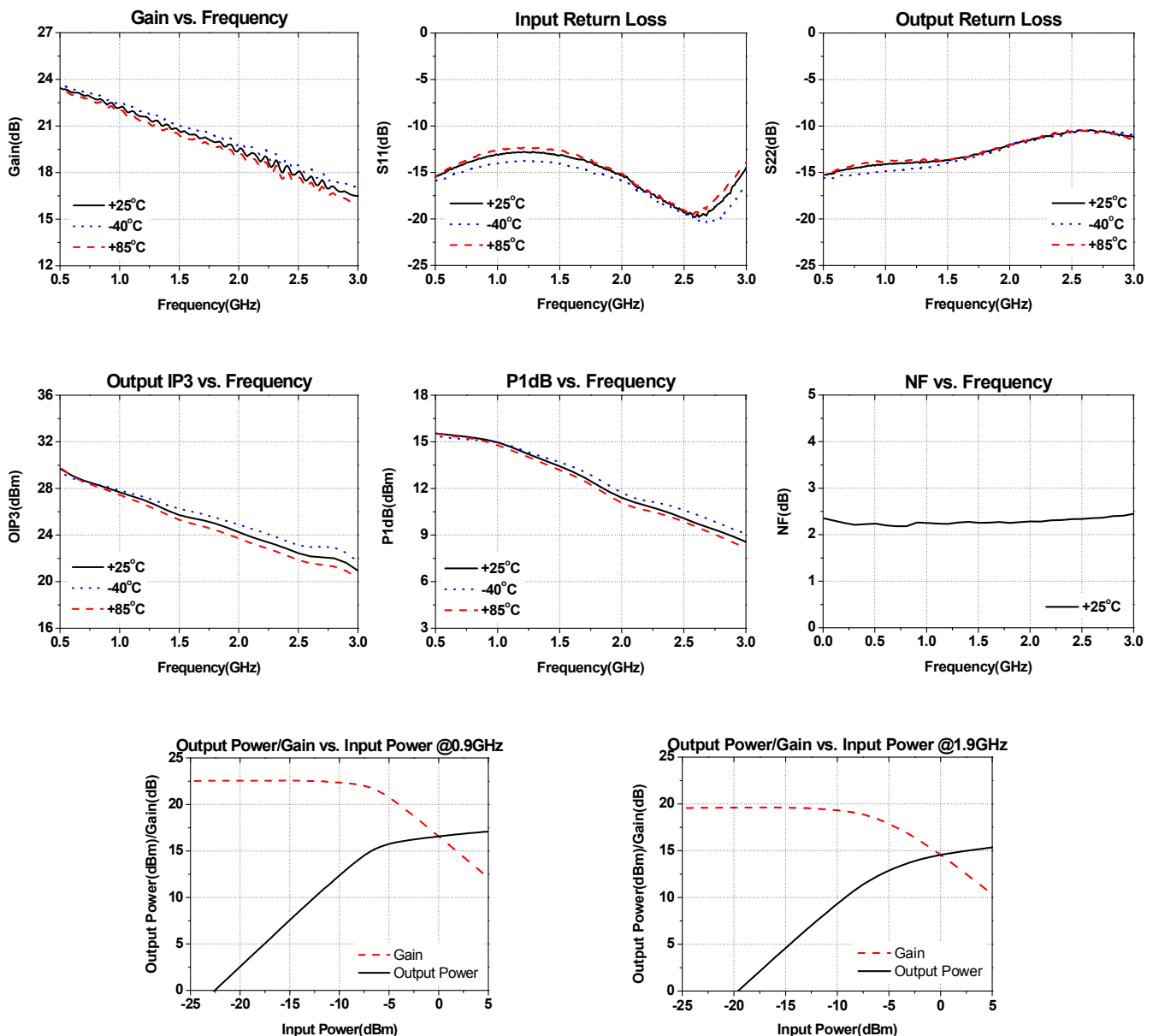
Test Conditions : T=25°C, Supply Voltage=+4.5V, Rbias=21ohm, 50ohm System, OIP3 measured with two tones at an output power of -5dBm/tone separated by 1MHz.

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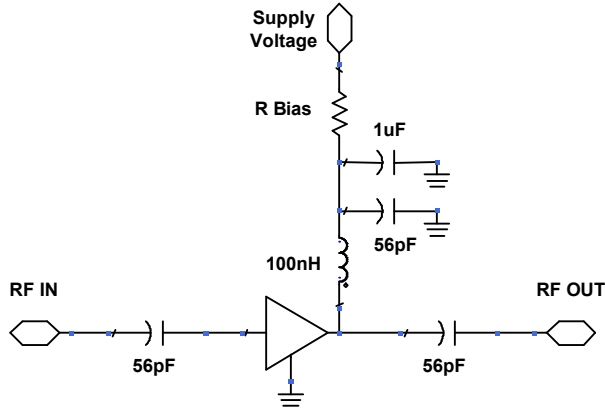
**Typical RF Performance for 900MHz Tuned Application Circuit**

Supply Bias Voltage = 4.5V, R(bias)= 21 ohm, Current= 44mA

| Frequency    | MHz | 500  | 900  | 1500 | 1900 | 2300 | 3000 |
|--------------|-----|------|------|------|------|------|------|
| S21          | dB  | 23.3 | 22.3 | 20.5 | 19.5 | 18.5 | 16.3 |
| S11          | dB  | -15  | -13  | -13  | -14  | -17  | -14  |
| S22          | dB  | -15  | -14  | -13  | -12  | -11  | -11  |
| P1dB         | dBm | 15.4 | 15.0 | 13.3 | 11.5 | 10.5 | 8.5  |
| OIP3         | dBm | 29.5 | 27.8 | 25.5 | 24.5 | 23.0 | 20.7 |
| Noise Figure | dB  | 2.2  | 2.3  | 2.3  | 2.3  | 2.3  | 2.5  |



**900MHz Tuned Application Circuit**



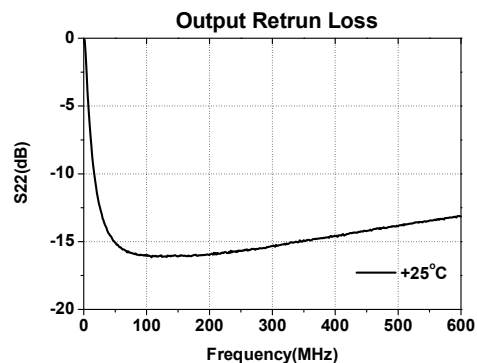
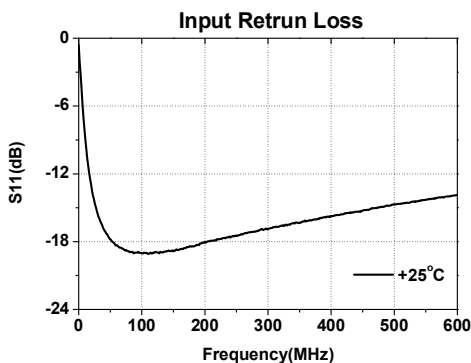
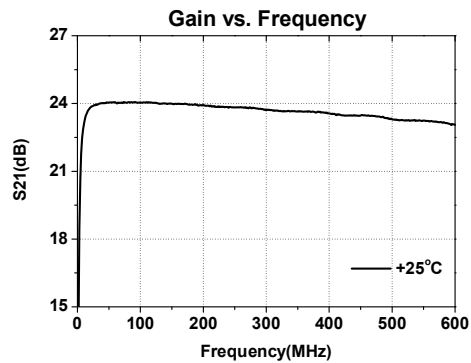
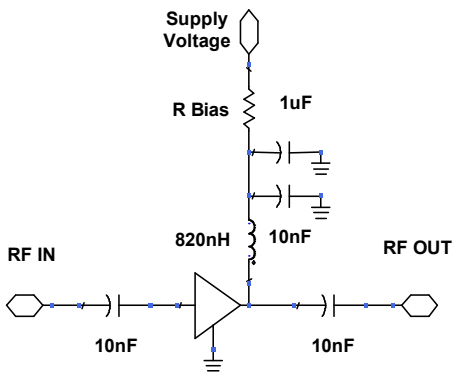
**Recommended Bias Values**

| Supply Voltage | R bias Value | Size |
|----------------|--------------|------|
| 4.5 V          | 21.0 Ω       | 0805 |
| 5 V            | 32.0 Ω       | 1210 |
| 6 V            | 53.5 Ω       | 1210 |
| 7 V            | 75.0 Ω       | 2010 |
| 8 V            | 97.0 Ω       | 2010 |
| 10 V           | 140.0 Ω      | 2010 |
| 12 V           | 183.0 Ω      | 2512 |

**Typical RF Performance for 50 -500MHz Tuned Application Circuit**

Supply Bias Voltage = 4.5V, R(bias)= 21ohm, Current= 44mA

| Frequency                | MHz | 75   | 125  | 300  | 500  |
|--------------------------|-----|------|------|------|------|
| S21 : Gain               | dB  | 23.8 | 23.8 | 23.5 | 23.0 |
| S11 : Input Return Loss  | dB  | -18  | -18  | -16  | -14  |
| S22 : Output Return Loss | dB  | -15  | -15  | -14  | -13  |
| Output P1dB              | dBm | 15.5 | 15.5 | 15.5 | 15.3 |
| Output IP3 @-5dBm        | dBm | 29.2 | 30.2 | 30.1 | 29.0 |
| Noise Figure             | dB  | 2.1  | 2.1  | 2.1  | 2.2  |

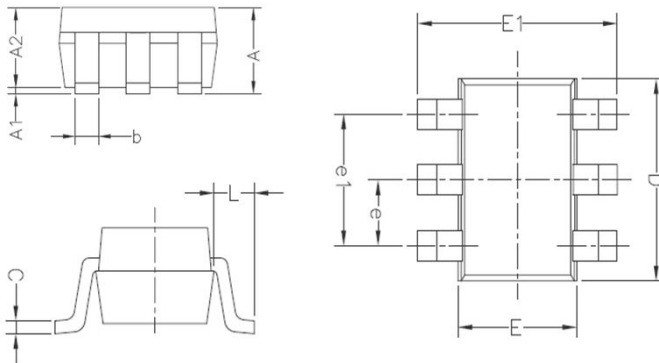


### Absolute Maximum Ratings

| Parameter                     | Rating      | Unit |
|-------------------------------|-------------|------|
| Supply Voltage                | +8          | V    |
| Supply Current                | 150         | mA   |
| RF Power Input                | 5           | dBm  |
| Storage Temperature           | -55 to +125 | °C   |
| Ambient Operating Temperature | -40 to +85  | °C   |

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

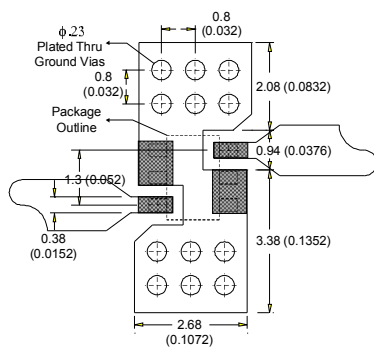
### Lead-free / RoHS Compliant / Green SOT-363 Package Outline



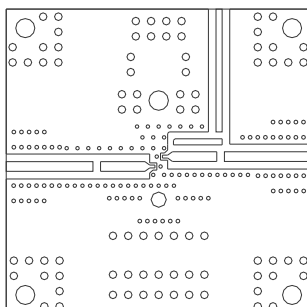
| Symbol | Millimeters |      | Inches    |      |
|--------|-------------|------|-----------|------|
|        | MIN.        | MAX. | MIN.      | MAX. |
| A      | 0.90        | 1.10 | .036      | .044 |
| A1     | 0.025       | 0.10 | .001      | .004 |
| A2     | 0.875       | 1.00 | .035      | .040 |
| b      | 0.20        | 0.40 | .008      | .016 |
| C      | 0.10        | 0.15 | .004      | .006 |
| D      | 1.90        | 2.10 | .076      | .084 |
| E      | 1.15        | 1.35 | .046      | .054 |
| E1     | 2.00        | 2.20 | .080      | .088 |
| e      | 0.65 BSC.   |      | .026 BSC. |      |
| e1     | 1.30 BSC.   |      | .052 BSC. |      |
| L      | 0.425 REF.  |      | .017 REF. |      |

Note:  
1.All dimensions are in millimeters, and the dimensions in inches are for reference only.  
2.1mm=40mils=0.04inches

### Land Pattern



### Evaluation Board Layout (4x4)



### 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 3 at +260°C Convection reflow, J-STD-020

### 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.

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