



50 MHz to 400 MHz CASCADEABLE AMPLIFIER

FEATURES

- High Dynamic Range
 - $OIP_3 = 36 \text{ dBm}$
 - $NF < 4.5 \text{ dB}$
- Single-Supply Voltage
- High Speed
 - $V_S = 3 \text{ V to } 5 \text{ V}$
 - $I_S = \text{Adjustable}$
- Input/Output Impedance
 - 50Ω

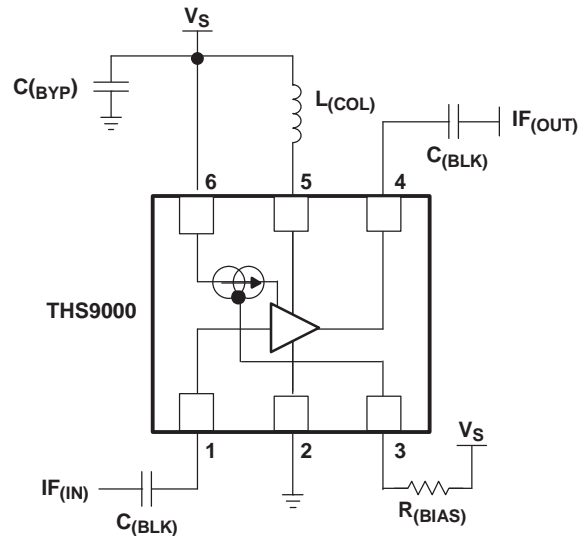
APPLICATIONS

- IF Amplifiers
 - TDMA: GSM, IS-136, EDGE/UWE-136
 - CDMA: IS-95, UMTS, CDMA2000
 - Wireless Local Loops
 - Wireless LAN: IEEE802.11

DESCRIPTION

The THS9000 is a medium power, cascadeable, gain block optimized for high IF frequencies. The amplifier incorporates internal impedance matching to 50Ω . The part mounted on the standard EVM achieves greater than 15-dB input and output return loss from 50 MHz to 325 MHz with $V_S = 5 \text{ V}$, $R_{(\text{BIAS})} = 237 \Omega$, $L_{(\text{COL})} = 470 \text{ nH}$. Design requires only two dc-blocking capacitors, one power-supply bypass capacitor, one RF choke, and one bias resistor.

FUNCTIONAL BLOCK DIAGRAM



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PowerPAD is a trademark of Texas Instruments Incorporated.
All other trademarks are the property of their respective owners.



These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

AVAILABLE OPTIONS

| PACKAGED DEVICE ⁽¹⁾ | PACKAGE TYPE | TRANSPORT MEDIA, QUANTITY |
|--------------------------------|--------------------------|---------------------------|
| THS9000DRWT | 2 × 2 QFN ⁽²⁾ | Tape and Reel, 250 |
| THS9000DRWR | | Tape and Reel, 3000 |

- (1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI Web site at www.ti.com.
 (2) The PowerPAD™ is electrically isolated from all other pins.

ABSOLUTE MAXIMUM RATINGS

Over operating free-air temperature (unless otherwise noted)⁽¹⁾

| | THS9000 | UNIT | |
|--|--|------|---|
| Supply voltage, GND to V _S | 5.5 | V | |
| Input voltage | GND to V _S | | |
| Continuous power dissipation | See Dissipation Rating table | | |
| Maximum junction temperature, T _J | +150 | °C | |
| Maximum junction temperature, continuous operation, long term reliability, T _J ⁽²⁾ | +125 | °C | |
| Storage temperature, T _{stg} | –65 to +150 | °C | |
| Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds | +300 | °C | |
| ESD Ratings: | HBM | 2000 | V |
| | CDM | 1500 | V |
| | MM | 100 | V |

- (1) The absolute maximum ratings under any condition is limited by the constraints of the silicon process. Stresses above these ratings may cause permanent damage. Exposure to absolute maximum conditions for extended periods may degrade device reliability. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those specified is not implied.
 (2) The maximum junction temperature for continuous operation is limited by package constraints. Operation above this temperature may result in reduced reliability and/or lifetime of the device.

DISSIPATION RATING TABLE

| PACKAGE | θ_{JA} (°C/W) | POWER RATING ⁽¹⁾ | |
|-----------------------|-------------------------|-----------------------------|------------------------|
| | | T _A ≤ +25°C | T _A = +85°C |
| DRW ⁽²⁾⁽³⁾ | 91 | 1.1 W | 440 mW |

- (1) Power rating is determined with a junction temperature of +125°C. Thermal management of the final PCB should strive to keep the junction temperature at or below +125°C for best performance.
 (2) This data was taken using the JEDEC standard High-K test PCB.
 (3) The THS9000 incorporates a PowerPAD on the underside of the chip. This acts as a heatsink and must be connected to a thermally dissipating plane for proper power dissipation. Failure to do so may result in exceeding the maximum junction temperature, which could permanently damage the device. See TI Technical Brief [SLMA002](#) for more information about utilizing the PowerPAD thermally-enhanced package.

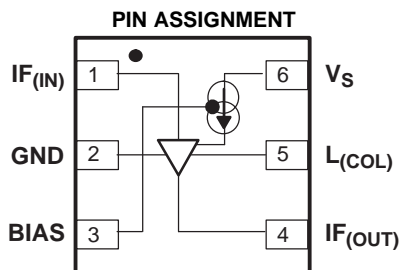
RECOMMENDED OPERATING CONDITIONS

| | MIN | NOM | MAX | UNIT |
|--|-----|-----|-----|------|
| Supply voltage | 2.7 | | 5 | V |
| Operating free-air temperature, T _A | –40 | | +85 | °C |
| Supply current | | 100 | | mA |

ELECTRICAL CHARACTERISTICS

 Typical Performance ($V_S = 5\text{ V}$, $R_{(\text{BIAS})} = 237\ \Omega$, $L_{(\text{COL})} = 470\text{ nH}$) (unless otherwise noted)

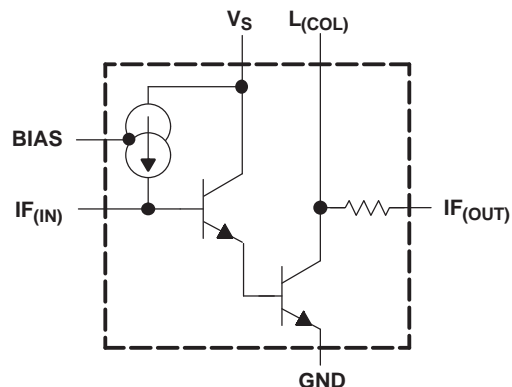
| PARAMETER | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|--------------------|----------------------|-----|------|-----|-------|
| Gain | $f = 50\text{ MHz}$ | | 15.9 | | dB |
| | $f = 350\text{ MHz}$ | | 15.6 | | |
| OIP ₃ | $f = 50\text{ MHz}$ | | 36 | | dBm |
| | $f = 350\text{ MHz}$ | | 35 | | |
| 1-dB compression | $f = 50\text{ MHz}$ | | 20.8 | | dBm |
| | $f = 350\text{ MHz}$ | | 20.6 | | |
| Input return loss | $f = 50\text{ MHz}$ | | 15 | | dB |
| | $f = 350\text{ MHz}$ | | 19.7 | | |
| Output return loss | $f = 50\text{ MHz}$ | | 17.2 | | dB |
| | $f = 350\text{ MHz}$ | | 15.1 | | |
| Reverse isolation | $f = 50\text{ MHz}$ | | 21 | | dB |
| | $f = 350\text{ MHz}$ | | 20 | | |
| Noise figure | $f = 50\text{ MHz}$ | | 3.6 | | dB |
| | $f = 350\text{ MHz}$ | | 4 | | |



Terminal Functions

| PIN NUMBERS | NAME | DESCRIPTION |
|-------------|---------------------|---------------------------------|
| 1 | IF _(IN) | Signal input |
| 2 | GND | Negative power-supply input |
| 3 | BIAS | Bias current adjustment input |
| 4 | IF _(OUT) | Signal output |
| 5 | L _(COL) | Output transistor load inductor |
| 6 | V _S | Positive power-supply input |

SIMPLIFIED SCHEMATIC



TYPICAL CHARACTERISTICS

TABLE OF GRAPHS

| | FIGURE |
|--------------------------------------|--------|
| S21 Frequency response | 1 |
| S22 Frequency response | 2 |
| S11 Frequency response | 3 |
| S12 Frequency response | 4 |
| S21 vs $R_{(Bias)}$ | 5 |
| Output power vs Input power | 6 |
| OIP ₂ vs Frequency | 7 |
| Noise figure vs Frequency | 8 |
| OIP ₃ vs Frequency | 9 |
| I_S Supply current vs $R_{(Bias)}$ | 10 |
| S21 Frequency response | 11 |
| S22 Frequency response | 12 |
| S11 Frequency response | 13 |
| S12 Frequency response | 14 |
| Noise figure vs Frequency | 15 |
| OIP ₂ vs Frequency | 16 |
| Output power vs Input power | 17 |
| OIP ₃ vs Frequency | 18 |

S-Parameters of THS9000 as mounted on the EVM with $V_S = 5\text{ V}$, $R_{(BIAS)} = 237\ \Omega$, and $L_{(COL)} = 68\text{ nH}$ to 470 nH at room temperature.

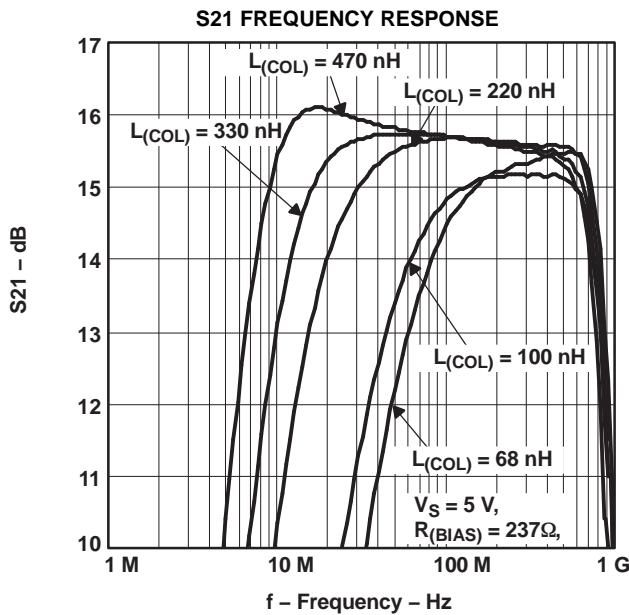


Figure 1.

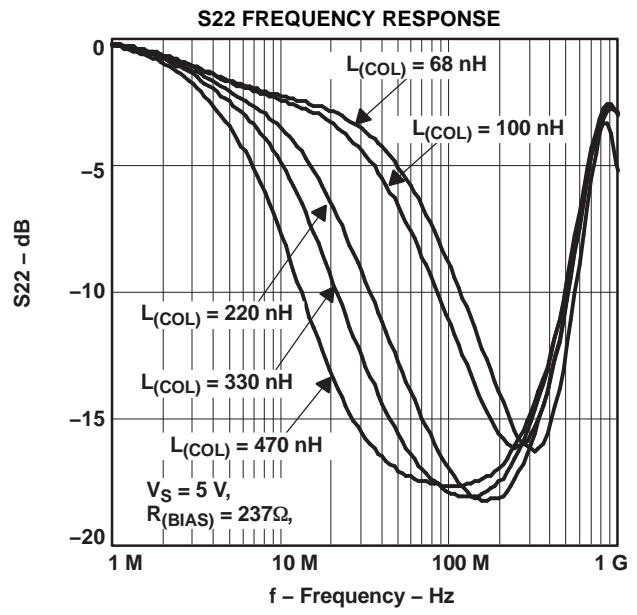


Figure 2.

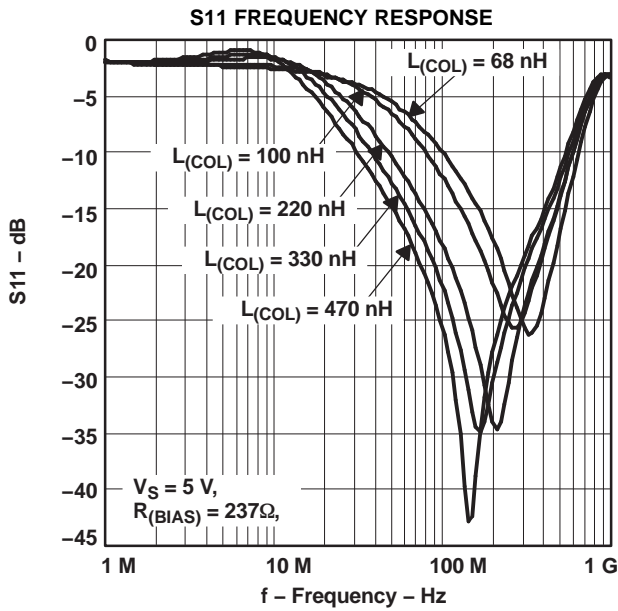


Figure 3.

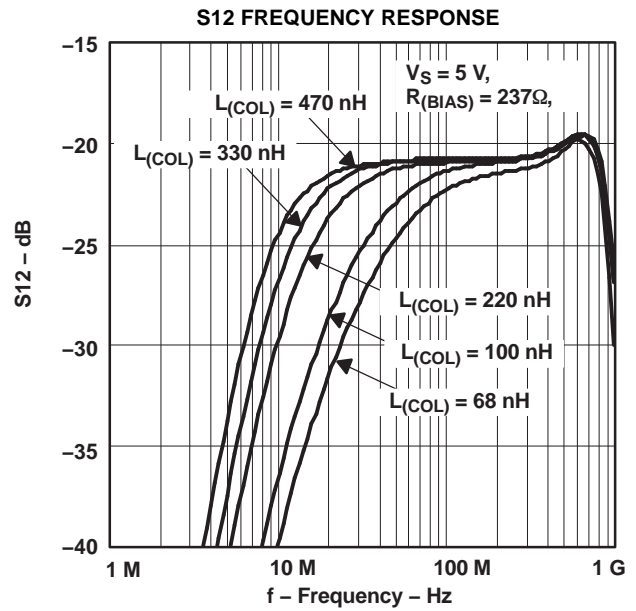


Figure 4.

S-Parameters of THS9000 as mounted on the EVM with $V_S = 3\text{ V}$ and 5 V , $R_{(BIAS)} = \text{various}$, and $L_{(COL)} = 470\text{ nH}$ at room temp.

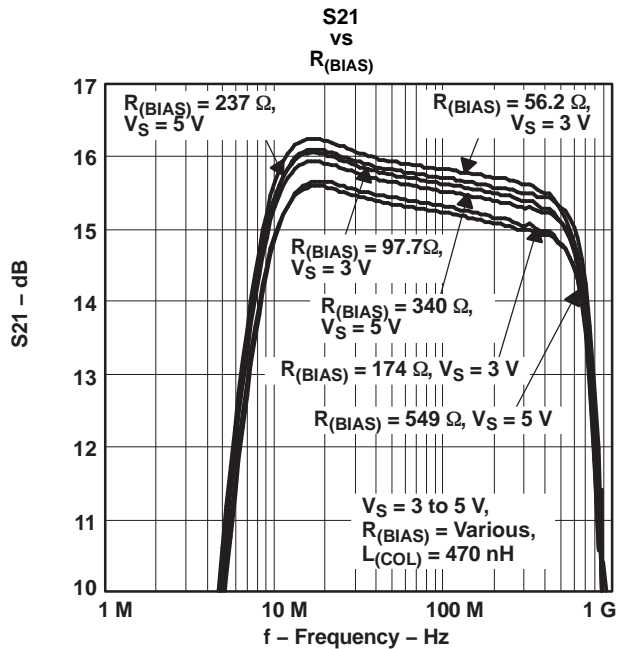


Figure 5.

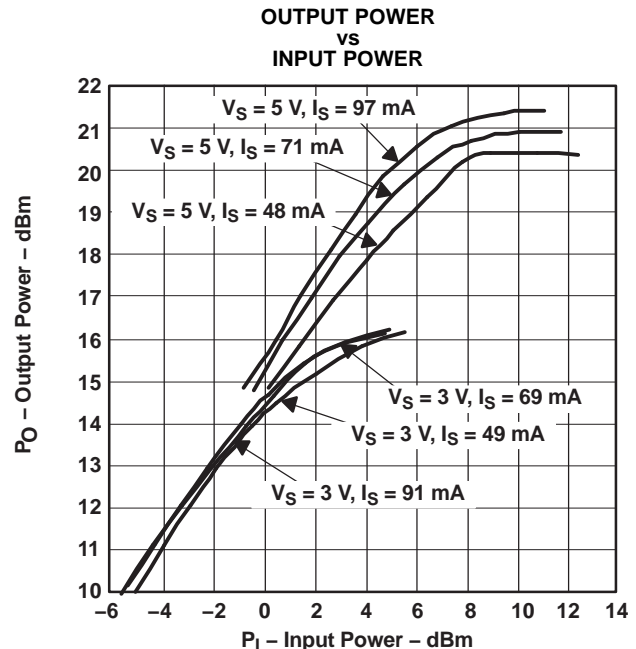


Figure 6.

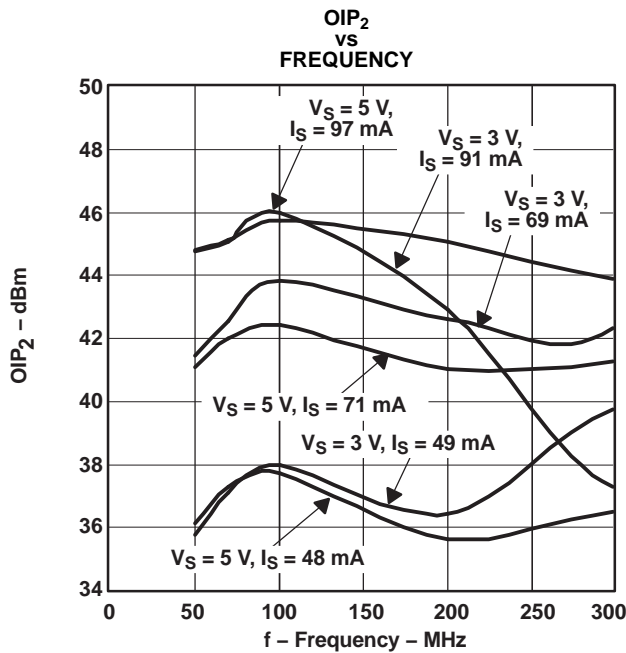


Figure 7.

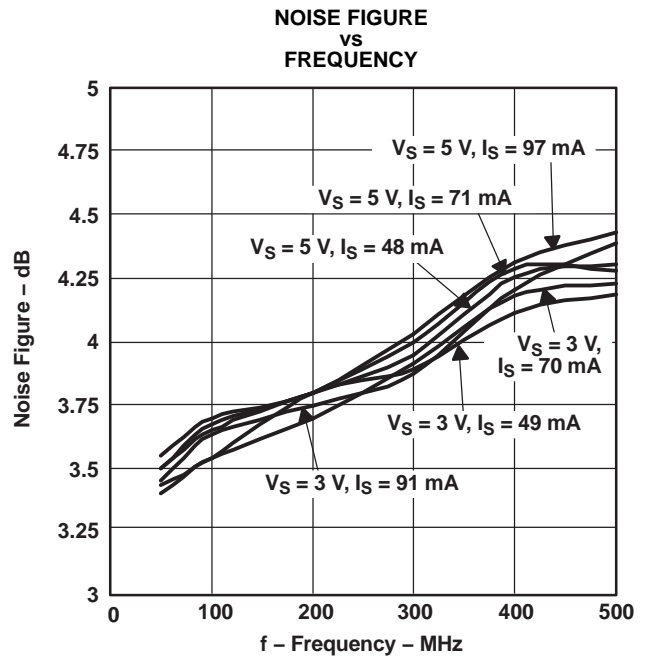


Figure 8.

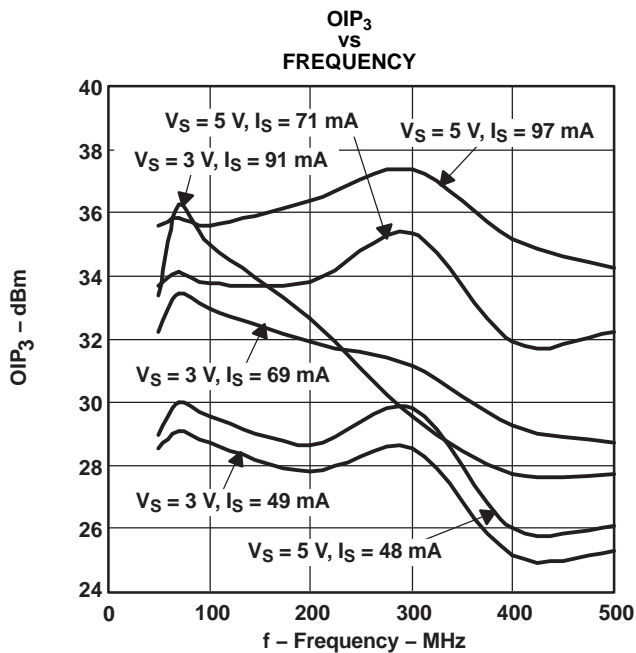


Figure 9.

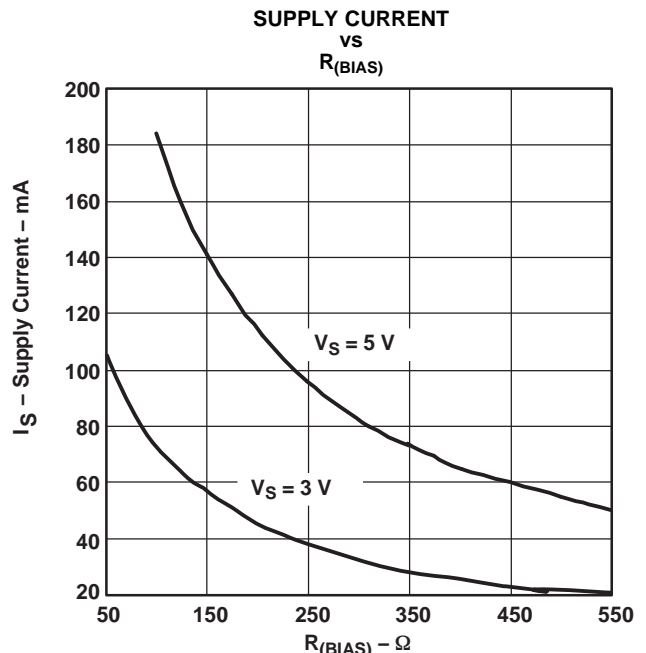


Figure 10.

THS9000 as mounted on the EVM with $V_S = 5\text{ V}$, $R_{(\text{BIAS})} = 237\ \Omega$, and $L_{(\text{COL})} = 470\text{ nH}$ at $+40^\circ\text{C}$, $+25^\circ\text{C}$, and $+85^\circ\text{C}$.

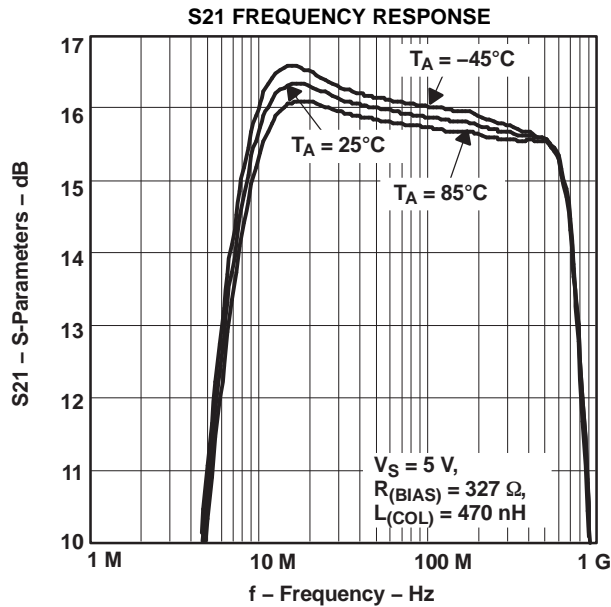


Figure 11.

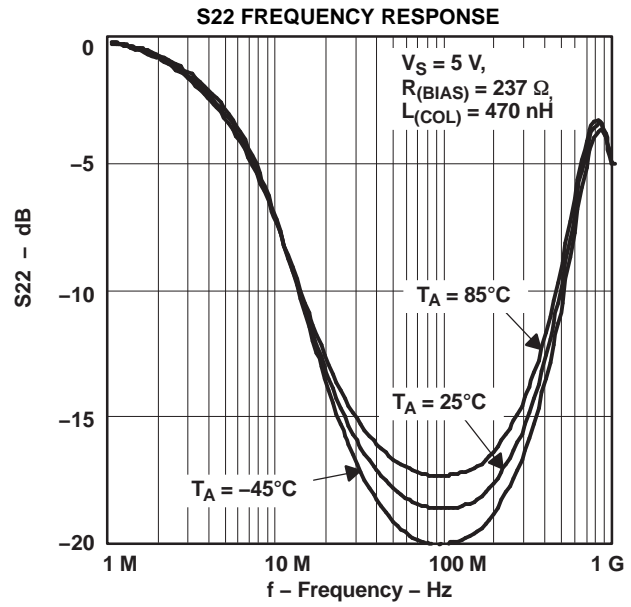


Figure 12.

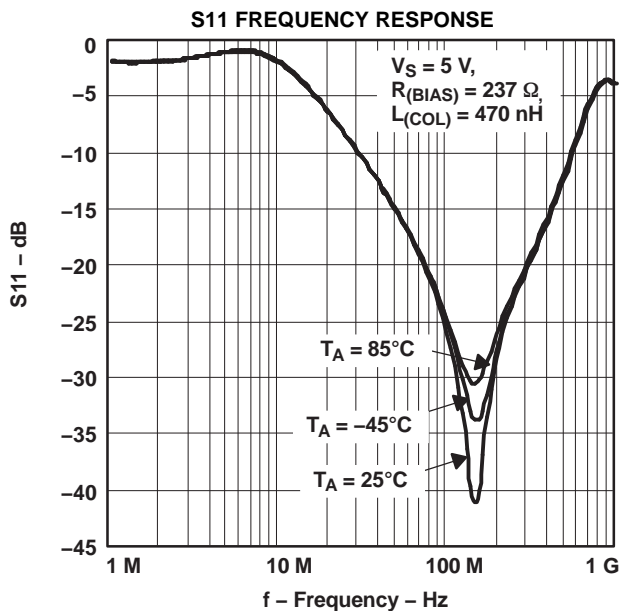


Figure 13.

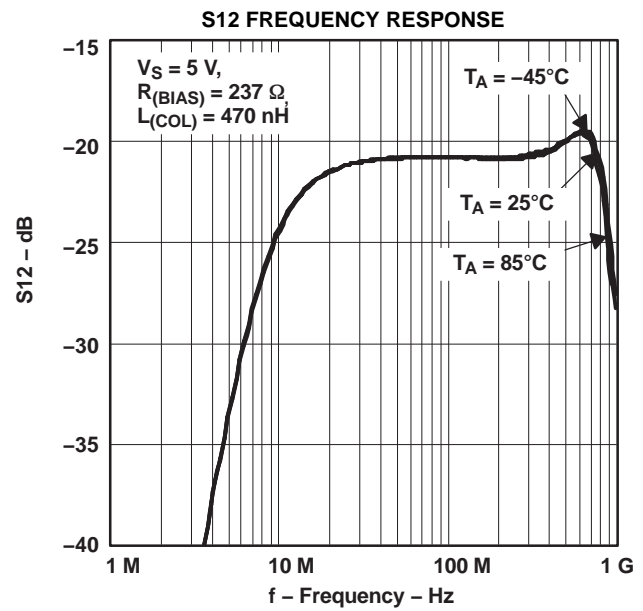


Figure 14.

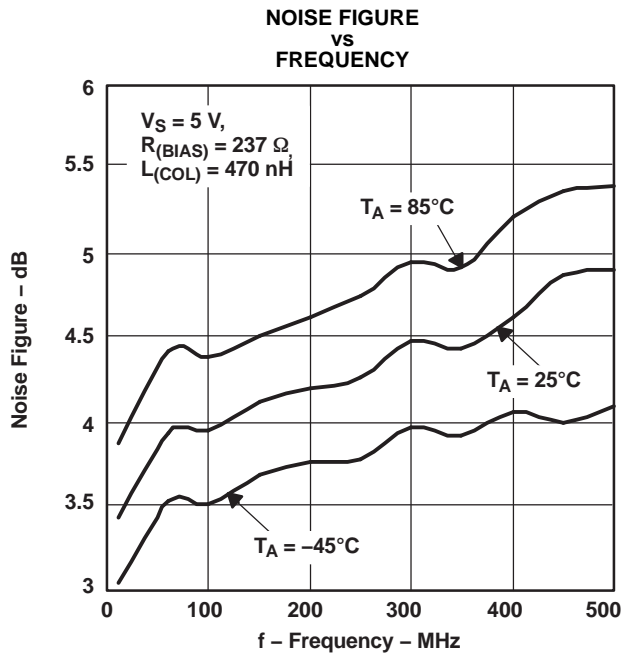


Figure 15.

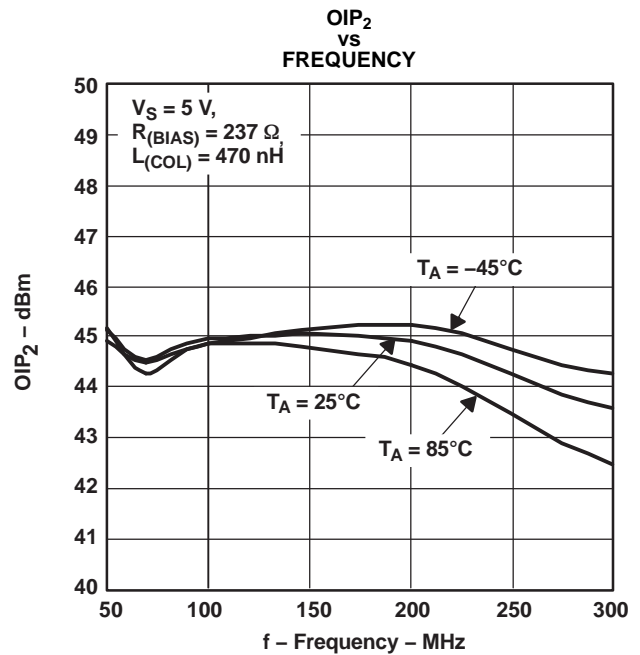


Figure 16.

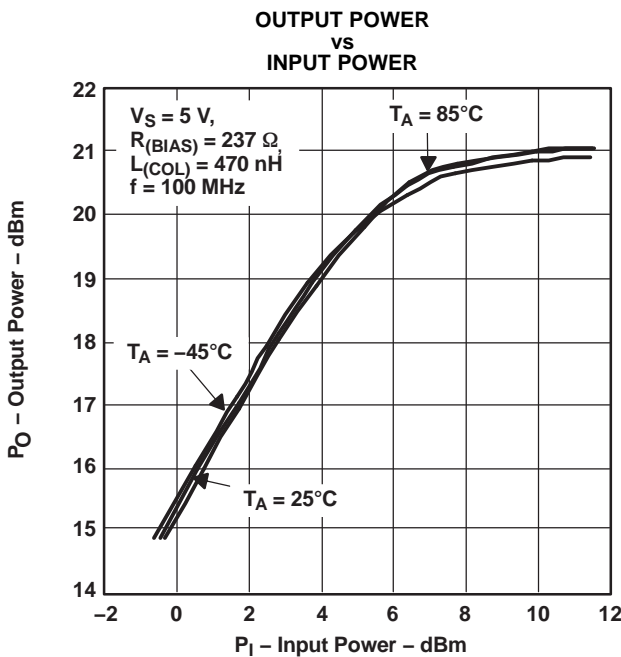


Figure 17.

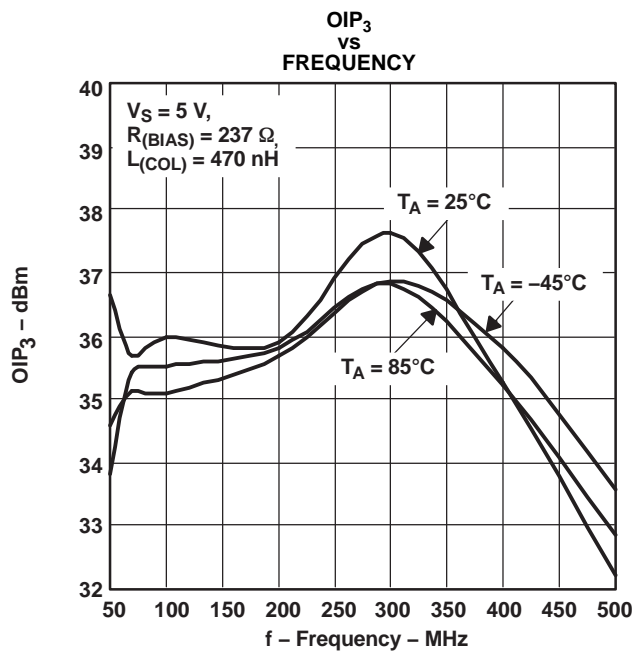


Figure 18.

TYPICAL CHARACTERISTICS

S-Parameters Tables of THS9000 with EVM De-Embedded

$V_S = 5\text{ V}$, $R_{(\text{BIAS})} = 237\ \Omega$, $L_{(\text{COL})} = 470\ \text{nH}$

| FREQUENCY (MHz) | S21 | | S11 | | S22 | | S12 | |
|--------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | GAIN (dB) | PHASE (°) | GAIN (dB) | PHASE (°) | GAIN (dB) | PHASE (°) | GAIN (dB) | PHASE (°) |
| 1.0 | -4.2 | -169.5 | -2.4 | -0.9 | -1.9 | 158.1 | -63.1 | 167.0 |
| 5.0 | 11.3 | -124.5 | -1.5 | -14.5 | -2.6 | 138.0 | -32.9 | 122.4 |
| 10.2 | 15.8 | -147.8 | -2.2 | -42.3 | -5.0 | 101.0 | -24.0 | 80.4 |
| 19.7 | 16.4 | -169.4 | -6.5 | -69.7 | -10.5 | 66.6 | -21.3 | 41.6 |
| 50.1 | 16.0 | 177.2 | -15.6 | -91.4 | -16.7 | 30.1 | -20.7 | 14.4 |
| 69.7 | 15.9 | 173.5 | -19.8 | -97.7 | -17.8 | 17.7 | -20.7 | 9.1 |
| 102.4 | 15.9 | 168.4 | -26.9 | -102.6 | -18.2 | 4.3 | -20.7 | 4.4 |
| 150.5 | 15.8 | 162.0 | -39.0 | 14.1 | -18.1 | -8.6 | -20.7 | -0.7 |
| 198.1 | 15.7 | 155.8 | -27.6 | 50.8 | -17.4 | -19.6 | -20.7 | -1.7 |
| 246.9 | 15.7 | 149.6 | -23.7 | 40.6 | -16.4 | -26.7 | -20.7 | -3.5 |
| 307.6 | 15.6 | 141.9 | -19.8 | 33.1 | -14.9 | -37.2 | -20.6 | -5.7 |
| 362.8 | 15.6 | 134.7 | -17.3 | 24.7 | -13.3 | -44.3 | -20.4 | -7.7 |
| 405.0 | 15.6 | 129.2 | -15.5 | 20.3 | -12.1 | -51.0 | -20.2 | -10.0 |
| 452.2 | 15.6 | 122.3 | -13.8 | 14.7 | -10.6 | -58.1 | -19.9 | -12.5 |
| 504.7 | 15.5 | 114.9 | -11.8 | 6.3 | -9.0 | -66.5 | -19.7 | -16.2 |
| 563.4 | 15.4 | 105.8 | -9.7 | -2.9 | -7.2 | -77.5 | -19.4 | -22.4 |
| 595.3 | 15.3 | 100.5 | -8.6 | -9.1 | -6.3 | -83.6 | -19.3 | -26.2 |
| 664.5 | 14.9 | 88.7 | -6.3 | -24.2 | -4.4 | -99.7 | -19.3 | -36.7 |
| 702.1 | 14.6 | 81.0 | -5.3 | -33.2 | -3.7 | -109.2 | -19.6 | -43.4 |
| 741.8 | 14.1 | 76.3 | -4.4 | -42.9 | -3.0 | -118.8 | -19.9 | -50.2 |
| 828.1 | 12.7 | 60.2 | -2.9 | -65.5 | -2.3 | -142.8 | -21.7 | -69.2 |
| 874.9 | 11.2 | 51.0 | -2.5 | -77.9 | -2.5 | -155.0 | -23.6 | -75.0 |
| 924.4 | 10.1 | 50.2 | -2.4 | -90.4 | -3.1 | -166.0 | -25.8 | -85.2 |
| 976.7 | 8.8 | 51.8 | -2.5 | -100.7 | -4.3 | -173.7 | -28.4 | -78.9 |
| 1031.9 | 9.2 | 58.2 | -2.6 | -108.7 | -4.7 | -175.2 | -29.7 | -68.7 |
| 1090.3 | 8.9 | 48.0 | -2.5 | -115.2 | -4.4 | -164.7 | -31.4 | -69.1 |
| 1151.9 | 8.8 | 39.9 | -2.3 | -123.3 | -3.5 | -175.4 | -33.6 | -83.4 |
| 1217.1 | 8.0 | 27.7 | -2.1 | -132.0 | -3.0 | 175.3 | -38.2 | -81.4 |
| 1285.9 | 7.0 | 30.5 | -2.0 | -140.7 | -2.8 | 168.7 | -42.3 | -25.5 |
| 1358.6 | 5.6 | 20.6 | -1.9 | -149.4 | -2.9 | 159.1 | -42.2 | 41.6 |
| 1435.5 | 4.3 | 19.5 | -1.8 | -159.4 | -3.0 | 151.3 | -38.7 | 63.3 |
| 1516.6 | 3.4 | 17.7 | -1.9 | -168.3 | -3.2 | 144.7 | -33.6 | 62.4 |
| 1602.4 | 2.8 | 16.5 | -2.0 | -177.2 | -3.5 | 138.2 | -30.5 | 59.6 |
| 1693.0 | 2.2 | 8.6 | -2.1 | 174.0 | -3.8 | 131.4 | -28.1 | 56.2 |
| 1788.8 | 1.4 | -0.7 | -2.2 | 165.4 | -4.1 | 124.6 | -26.2 | 50.4 |
| 1889.9 | 0.5 | -4.1 | -2.3 | 157.0 | -4.5 | 118.2 | -24.7 | 42.4 |
| 1996.8 | -0.6 | -4.5 | -2.6 | 150.0 | -4.9 | 111.2 | -24.2 | 39.5 |

APPLICATION INFORMATION

The THS9000 is a medium power, cascadeable, amplifier optimized for high intermediate frequencies in radios. The amplifier is unconditionally stable and the design requires only two dc-blocking capacitors, one power-supply bypass capacitor, one RF choke, and one bias resistor. Refer to Figure 25 for the circuit diagram.

The THS9000 operates with a power-supply voltage ranging from 2.5 V to 5.5 V.

The value of $R_{(BIAS)}$ sets the bias current to the amplifier. Refer to Figure 10. This allows the designer to trade-off linearity versus power consumption. $R_{(BIAS)}$ can be removed without damage to the device.

Component selection of $C_{(BYP)}$, C_{IN} , and C_{OUT} is not critical. The values shown in Figure 25 were used for all the data shown in this data sheet.

The amplifier incorporates internal impedance matching to 50 Ω that can be adjusted for various frequencies of operation by proper selection of $L_{(COL)}$.

Figure 19 shows the s-parameters of the part mounted on the standard EVM with $V_S = 5$ V, $R_{(BIAS)} = 237$ Ω , and $L_{(COL)} = 470$ nH. With this configuration, the part is very broadband, and achieves greater than 15-dB input and output return loss from 50 MHz to 325 MHz.

Figure 20 shows the S-parameters of the part mounted on the standard EVM with $V_S = 5$ V, $R_{(BIAS)} = 237$ Ω , and $L_{(COL)} = 68$ nH. With this configuration, the part achieves greater than 15-dB input and output return loss from 250 MHz to 400 MHz.

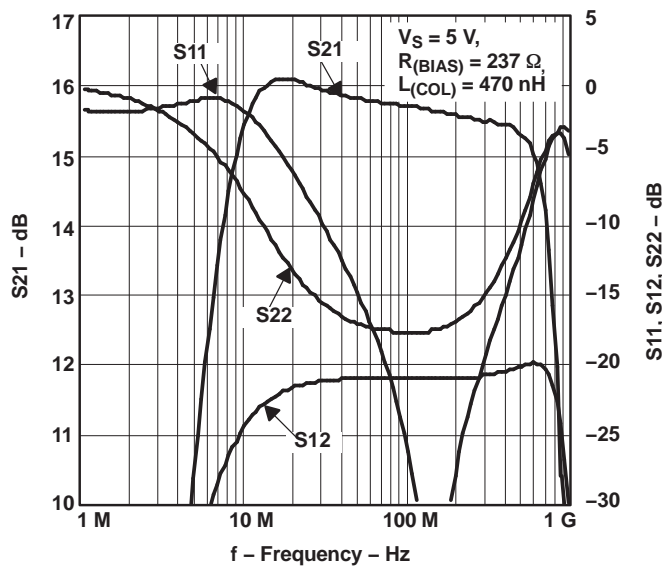


Figure 19. S-Parameters of THS9000 mounted on the standard EVM with $V_S = 5$ V, $R_{(BIAS)} = 237$ Ω , and $L_{(COL)} = 470$ nH

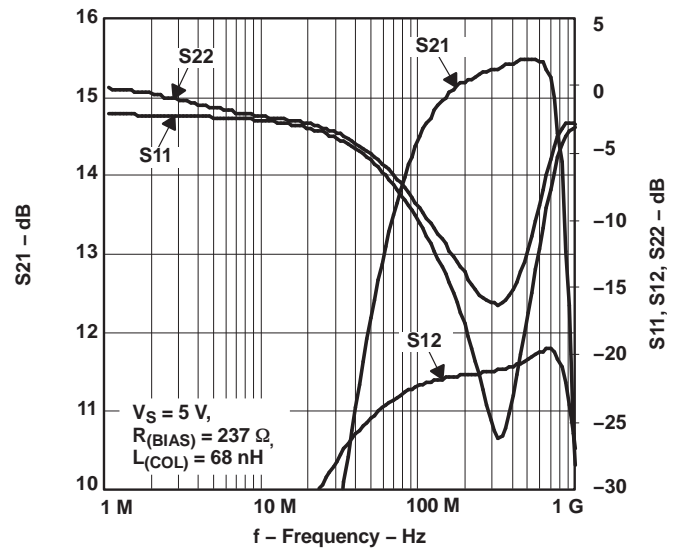


Figure 20. S-Parameters of THS9000 mounted on the standard EVM with $V_S = 5$ V, $R_{(BIAS)} = 237$ Ω , and $L_{(COL)} = 68$ nH

Figure 21 shows an example of a single conversion receiver architecture and where the THS9000 would typically be used.

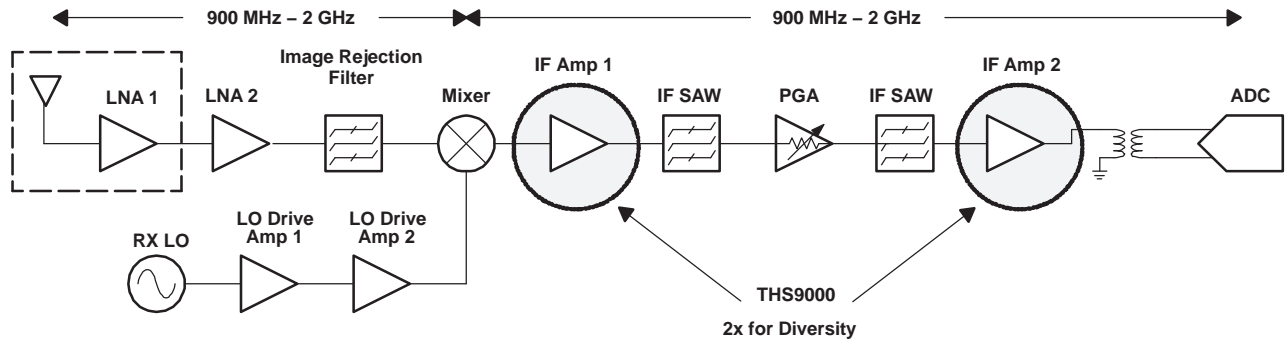


Figure 21. Example Single Conversion Receiver Architecture

Figure 22 shows an example of a dual conversion receiver architecture and where the THS9000 would typically be used.

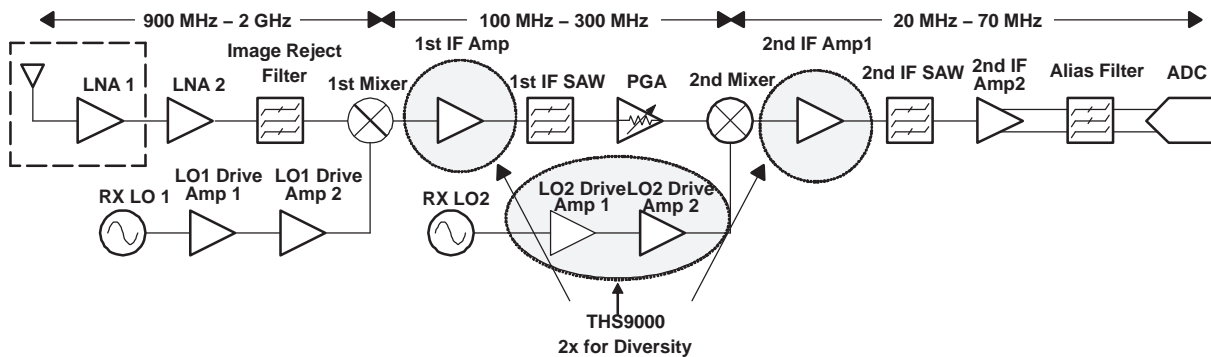


Figure 22. Example Dual Conversion Receiver Architecture

Figure 23 shows an example of a dual conversion transmitter architecture and where the THS9000 would typically be used.

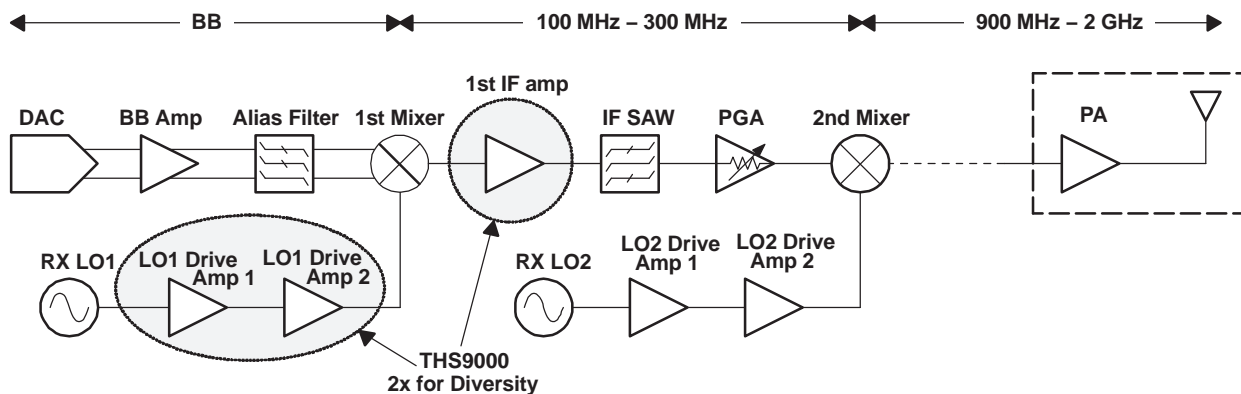
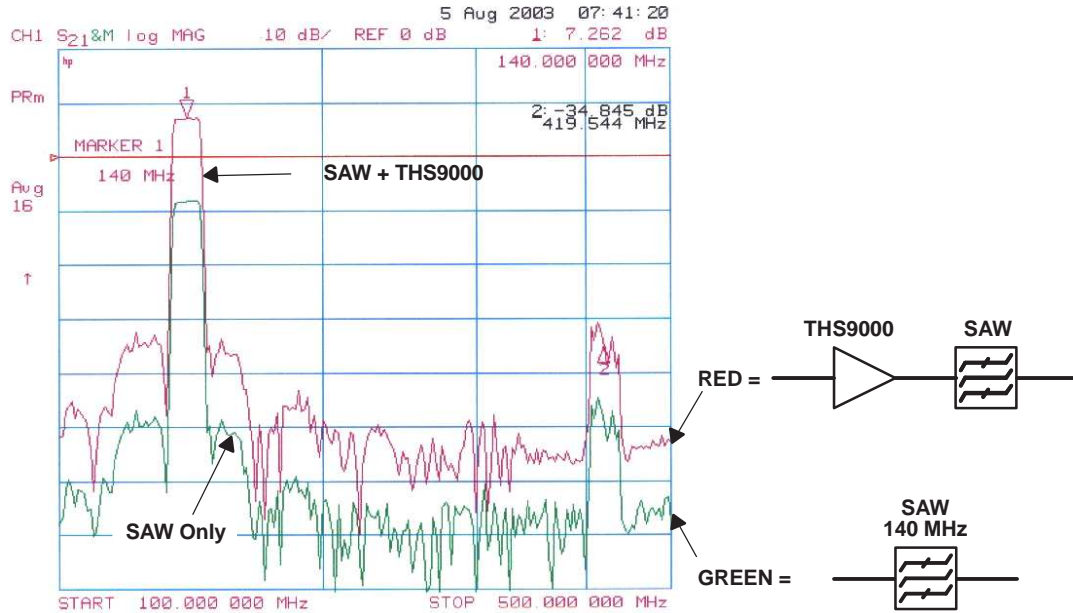


Figure 23. Example Dual Conversion Transmitter Architecture

Figure 24 shows the THS9000 and Sawtek #854916 SAW filter frequency response along with the frequency response of the SAW filter alone. The SAW filter has a center frequency of 140 MHz with 10-MHz bandwidth and 8-dB insertion loss. It can be seen that the frequency response with the THS9000 is the same as with the SAW except for a 15-dB gain. The THS9000 is mounted on the standard EVM with $V_S = 5\text{ V}$, $R_{(BIAS)} = 237\ \Omega$, and $L_{(COL)} = 470\text{ nH}$. Note the amplifier does not add artifacts to the signal.



140 MHz SAW: Sawtek #854916

Figure 24. Frequency Response of the THS9000 and SAW Filter, and SAW Filter Only

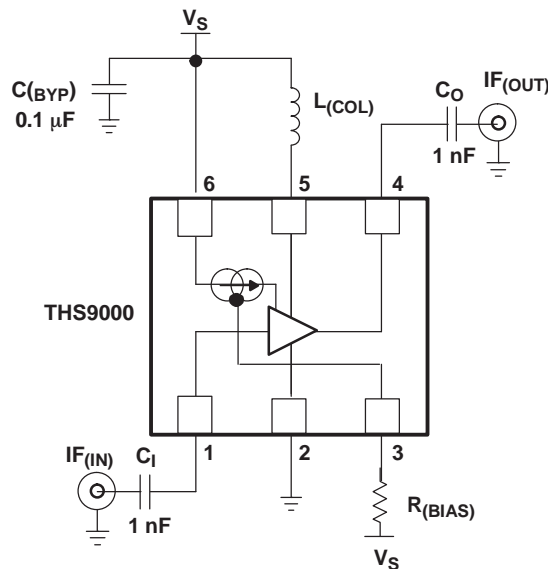


Figure 25. THS9000 Recommended Circuit (used for all tests)

Evaluation Module

Table 1 is the bill of materials, and [Figure 26](#) and [Figure 27](#) show the EVM layout.

Bill Of Materials

| ITEM | DESCRIPTION | REF DES | QTY | PART NUMBER ⁽¹⁾ |
|------|--------------------------------------|---------|-----|-----------------------------|
| 1 | Cap, 0.1 μ F, ceramic, X7R, 50 V | C1 | 1 | (AVX) 08055C104KAT2A |
| 2 | Cap, 1000 pF, ceramic, NPO, 100 V | C2, C3 | 2 | (AVX) 08051A102JAT2A |
| 3 | Inductor, 470 nH, 5% | L1 | 1 | (Coilcraft) 0805CS-471XJBC |
| 4 | Resistor, 237 Ω , 1/8 W, 1% | R1 | 1 | (Phycomp) 9C08052A2370FKHFT |
| 5 | Open | TR1 | 1 | |
| 6 | Jack, banana receptance, 0.25" dia. | J3, J4 | 2 | (SPC) 813 |
| 7 | Connector, edge, SMA PCB jack | J1, J2 | 2 | (Johnson) 142-0701-801 |
| 8 | Standoff, 4-40 Hex, 0.625" Length | | 4 | (KEYSTONE) 1808 |
| 9 | Screw, Phillips, 4-40, .250" | | 4 | SHR-0440-016-SN |
| 10 | IC, THS9000 | U1 | 1 | (TI) THS9000DRD |
| 11 | Board, printed-circuit | | 1 | (TI) EDGE # 6453521 Rev.A |

(1) The manufacturer's part numbers are used for test purposes only.

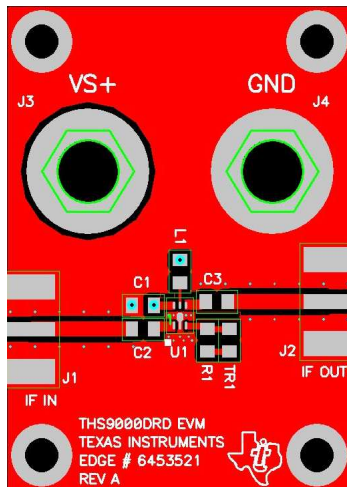


Figure 26. EVM Top Layout

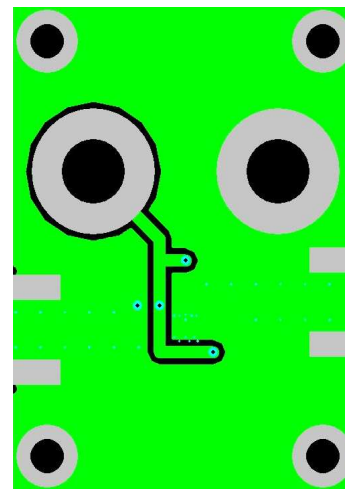


Figure 27. EVM Bottom Layout

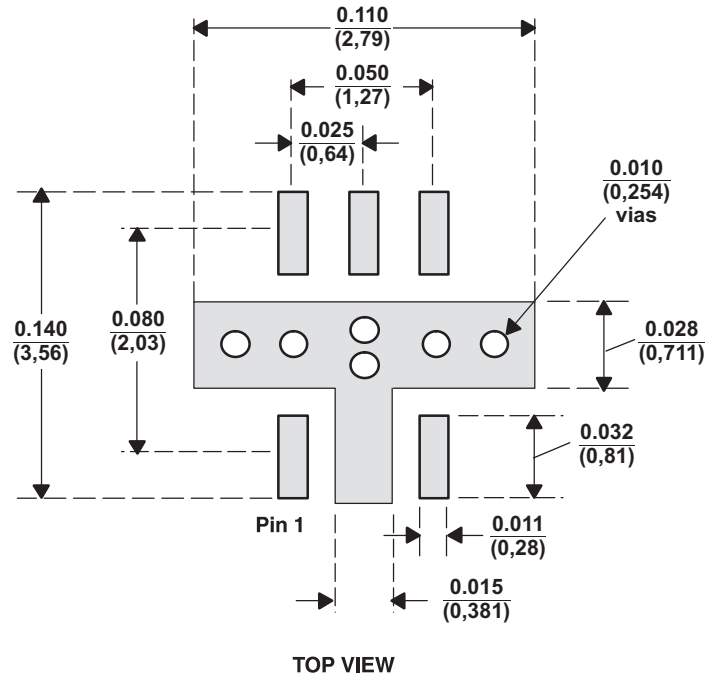


Figure 28. THS9000 Recommended Footprint dimensions are in inches (millimeters)

Revision History

| Changes from Revision C (February 2007) to Revision D | Page |
|--|------|
| • Removed the DRD ordering options from the <i>Available Options</i> table | 2 |
| • Formatted the Absolute Maximum Ratings table to current standards..... | 2 |
| • Deleted DRD row from the <i>Dissipation Rating</i> table..... | 2 |

PACKAGING INFORMATION

| Orderable Device | Status ⁽¹⁾ | Package Type | Package Drawing | Pins | Package Qty | Eco Plan ⁽²⁾ | Lead/Ball Finish | MSL Peak Temp ⁽³⁾ |
|------------------|-----------------------|--------------|-----------------|------|-------------|-------------------------|------------------|------------------------------|
| THS9000DRDR | OBSOLETE | SON | DRD | 6 | | TBD | Call TI | Call TI |
| THS9000DRDT | OBSOLETE | SON | DRD | 6 | | TBD | Call TI | Call TI |
| THS9000DRWR | ACTIVE | SON | DRW | 6 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| THS9000DRWRG4 | ACTIVE | SON | DRW | 6 | 3000 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| THS9000DRWT | ACTIVE | SON | DRW | 6 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |
| THS9000DRWTG4 | ACTIVE | SON | DRW | 6 | 250 | Green (RoHS & no Sb/Br) | CU NIPDAU | Level-2-260C-1 YEAR |

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

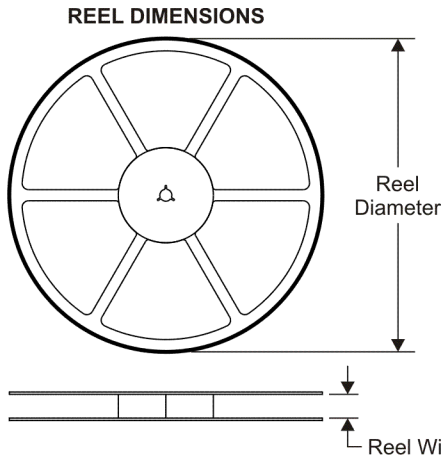
Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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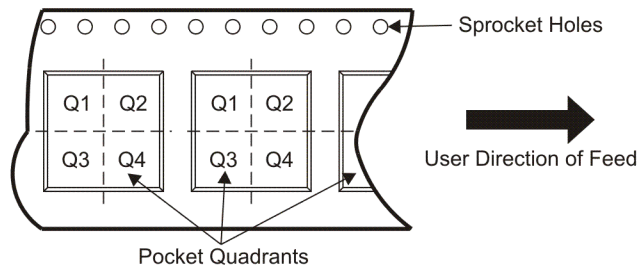
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TAPE AND REEL INFORMATION



| | |
|----|---|
| A0 | Dimension designed to accommodate the component width |
| B0 | Dimension designed to accommodate the component length |
| K0 | Dimension designed to accommodate the component thickness |
| W | Overall width of the carrier tape |
| P1 | Pitch between successive cavity centers |

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|-------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| THS9000DRWR | SON | DRW | 6 | 3000 | 177.8 | 8.4 | 2.35 | 2.33 | 1.14 | 4.0 | 8.0 | Q2 |
| THS9000DRWT | SON | DRW | 6 | 250 | 177.8 | 8.4 | 2.35 | 2.33 | 1.14 | 4.0 | 8.0 | Q2 |

TAPE AND REEL BOX DIMENSIONS

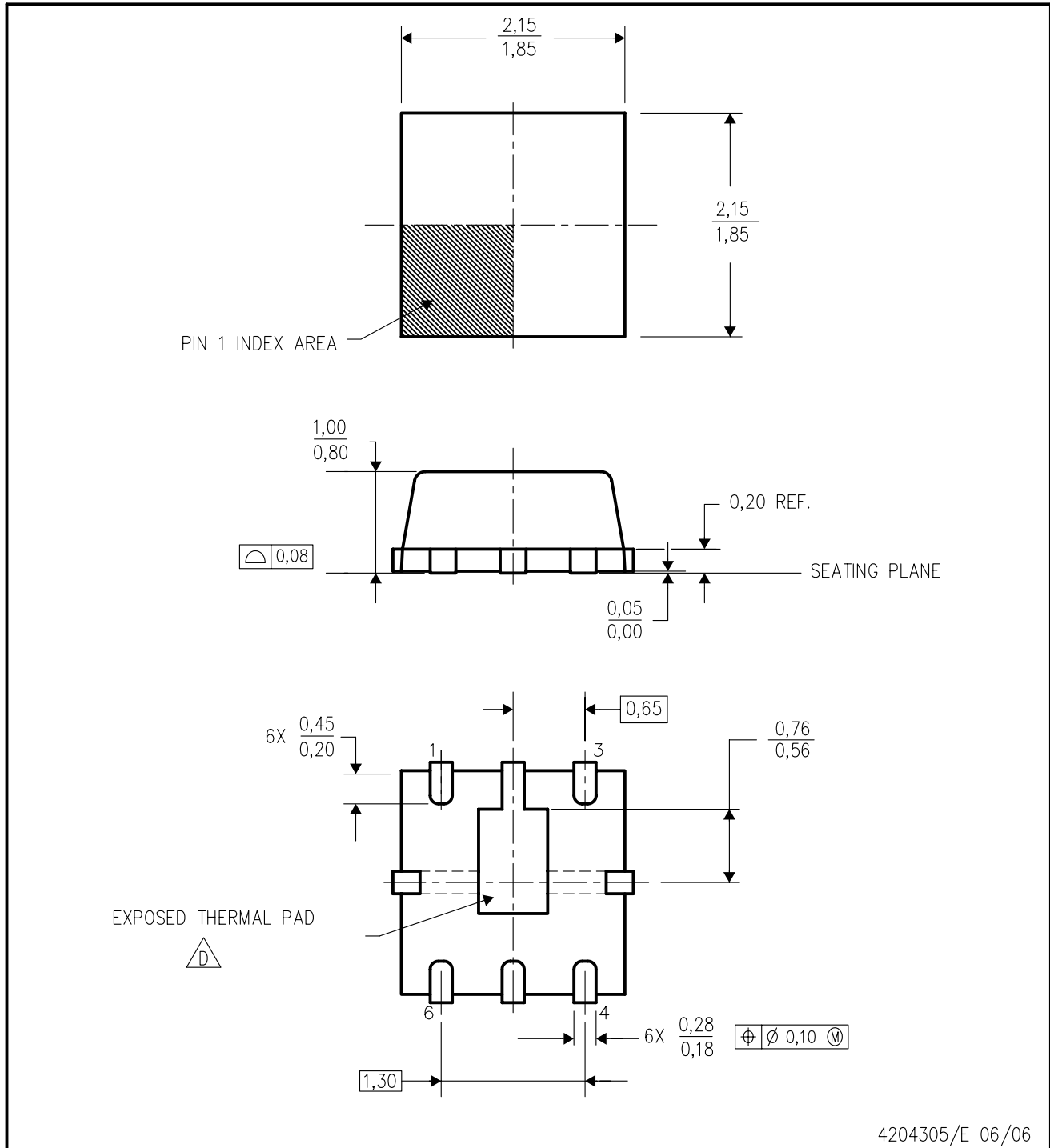


*All dimensions are nominal


| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|-------------|--------------|-----------------|------|------|-------------|------------|-------------|
| THS9000DRWR | SON | DRW | 6 | 3000 | 187.0 | 187.0 | 25.6 |
| THS9000DRWT | SON | DRW | 6 | 250 | 187.0 | 187.0 | 25.6 |

DRD (S-PDSO-N6)

PLASTIC SMALL OUTLINE



4204305/E 06/06

- NOTES:
- A. All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M-1994.
 - B. This drawing is subject to change without notice.
 - C. Small Outline No-Lead (SON) package configuration.
-  The package thermal pad must be soldered to the board for thermal and mechanical performance. See the Product Data Sheet for details regarding the exposed thermal pad dimensions.

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