

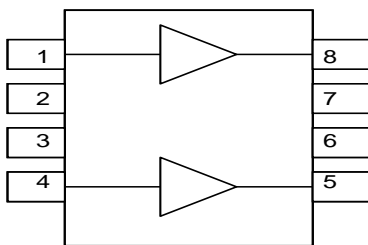
Product Overview

The QPB7464 is a GaAs pHEMT 75-ohm RF differential amplifier with an operating bandwidth from 47 MHz to 1.218 GHz. Featuring 12 dB of flat gain for use in Broadband DOCSIS 3.1 applications. This MMIC uses a 5-volt supply and is offered in an 8-pin SOIC.



SOIC-8 Package

Functional Block Diagram



Top View

Key Features

- 47 – 1218 MHz Bandwidth
- 75 Ω Impedance
- Meets DOCSIS 3.1 Output Requirements
- +5 V Supply Voltage
- 240 mA Current Consumption
- SOIC – 8 package
- +37 dBm OIP3
- +23.6 dBm OP1dB
- 12 dB Gain

Applications

- DOCSIS 3.1 systems
- HFC Optical Nodes and Amplifiers
- MDU Output
- Cable TV Network Equipment

Ordering Information

| Part Number | Description |
|---------------|---------------------------|
| QPB7464SB | Sample bag with 5 pieces |
| QPB7464SR | 7" Reel with 100 pieces |
| QPB7464TR13 | 13" Reel with 2500 pieces |
| QPB7464PCK401 | 47 – 1218 MHz PCBA |

Absolute Maximum Ratings

| Parameter | Rating |
|-----------------------------------|----------------|
| Supply Voltage (V_{DD}) | +10 V |
| Supply Current (I_{DD}) | 300 mA |
| Maximum Input Level (single tone) | +12 dBm |
| Operating Temperature Range | -40 to +100 °C |
| Storage Temperature Range | -65 to +165 °C |
| Maximum Junction Temperature | +150 °C |

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 condition to the device may reduce device reliability.

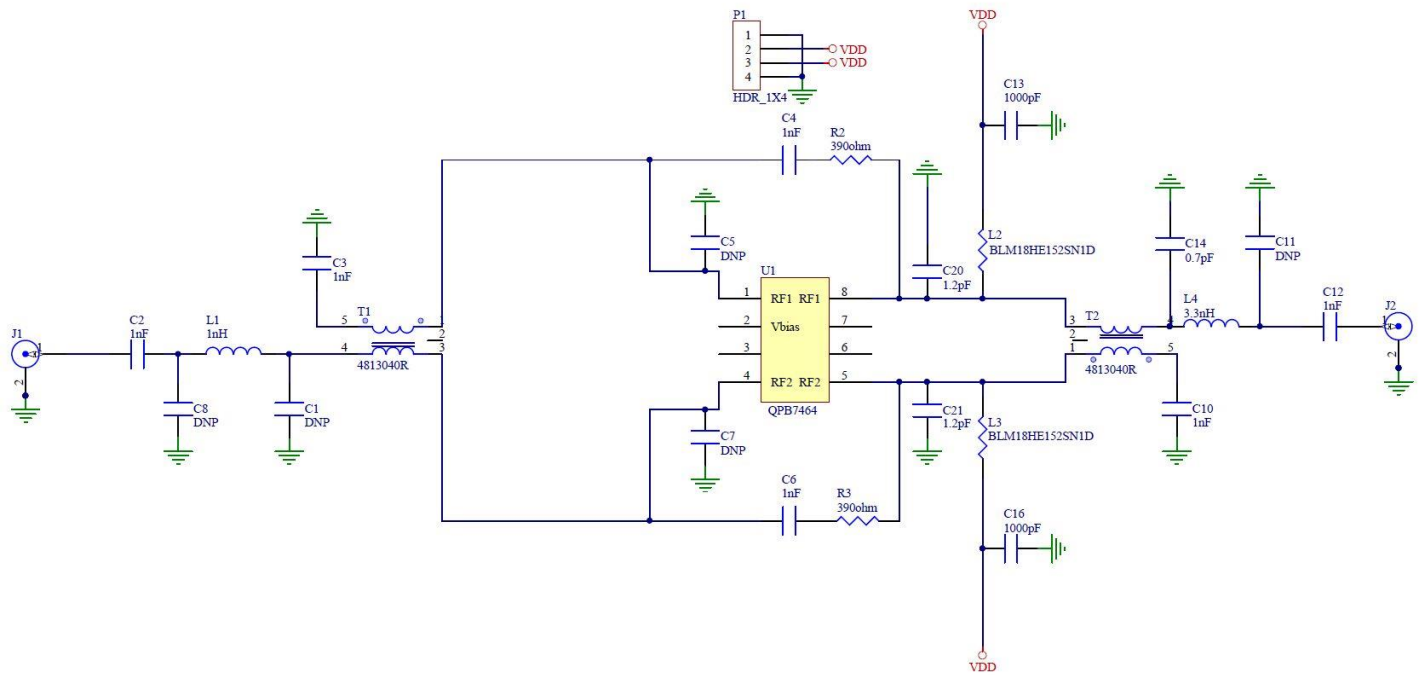
Electrical Specifications

| Parameter | Condition | Min | Typ | Max | Unit |
|-----------------------------|--|-----|---------|------|------|
| Supply Voltage (V_{DD}) | | | 5 | | V |
| Supply Current (I_{DD}) | | | 240 | | mA |
| Frequency Range | | 47 | | 1218 | MHz |
| Gain | 1218 MHz | | 12.3 | | dB |
| Gain Flatness | Max. deviation from line using least squares fit from 47 to 1218 MHz | | ± 0.1dB | | dB |
| Gain Slope | Gain (1218 MHz) – Gain (50 MHz) | | 0.2 | | dB |
| Reverse Isolation | | | 17.5 | | dB |
| Input Return Loss | | | 17.2 | | dB |
| Output Return Loss | | | 16.1 | | dB |
| Noise Figure | 1218 MHz | | 3.8 | | dB |
| OIP2 | Low band: 200 MHz, 30 MHz spacing, 6 dBm/tone | | 77.3 | | dBm |
| | High band: 1100 MHz, 30 MHz spacing, 6 dBm/tone | | 53.6 | | dBm |
| OIP3 | Low band: 200 MHz, 6 MHz spacing, 6 dBm/tone | | 40.1 | | dBm |
| | High band: 1100 MHz, 6 MHz spacing, 6 dBm/tone | | 39.3 | | dBm |
| Output P1dB | 1218 MHz | | 23.6 | | dBm |
| Thermal Resistance | Θ_{JC} (Junction to Case) | | 14 | | °C/W |

Notes:

1. Typical performance at these conditions: Temp = +25 °C, V_{DD} = +5 V, 75 Ω system, Full band unless otherwise noted

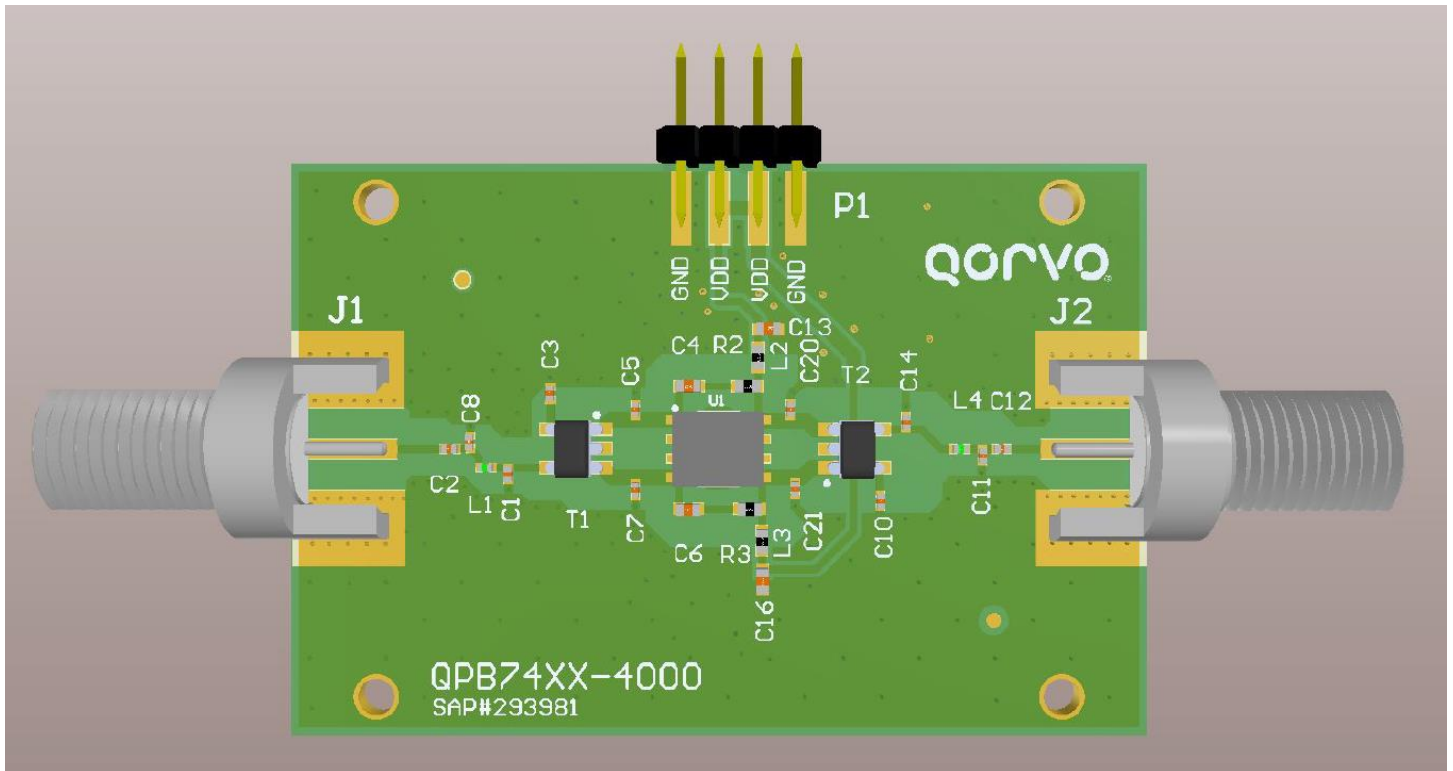
Evaluation Board Schematic



Evaluation Board Bill of Materials

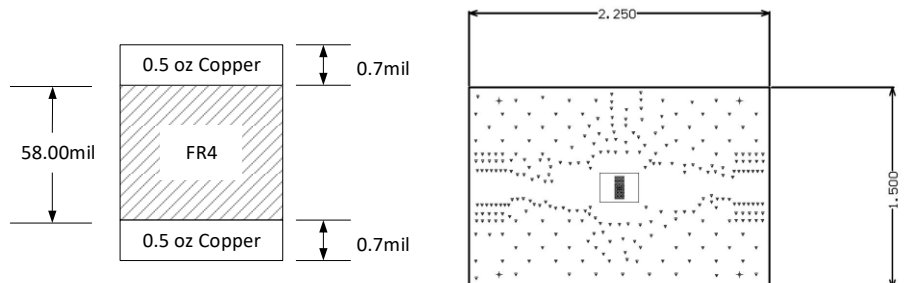
| Ref Designator | Description | Manufacturer | P/N |
|---------------------|---|-----------------------------------|--------------------|
| U1 | QPB7464 pHEMT Dual RF Amplifier | Qorvo | QPB7464 |
| PCB | QPB74XX-4000 | Viasystems Technologies Corp LLC | |
| C2, C3, C10, C12 | CAP, 1000 pF, 5 %, 50 V, C0G, 0402 | Murata Electronics | GRM1555C1H102JA01D |
| C4, C6, C13, C16 | CAP, 1000 pF, 50 V, 10%, 0603 | AVX Asia Ltd. | 06035C102KAT2A |
| C14 | CAP, 0.7 pF, +/-0.1 pF, 16 V, HI-Q, 0402 | Taiyo Uden PTE Ltd. | RV EVK105CH0R7BW-F |
| C20, C21 | CAP, 1.2 pF, +/-0.1 pF, 200 V, Hi-Q, 0402 | ATC | 600L1R2BT200T |
| J1, J2 | CONN, F FEM EDGE MOUNT, 75 Ω, 0.068" | Millimeter Wave Technologies, LLC | MW-846-C-DD-75 |
| L1 | IND, 1 nH, 5 %, W/W, 0402 | Coilcraft, Inc. | 0402CS-1N0XJLW |
| L2, L3 | FER, BEAD, 1500 Ω, 500 mA, 0603 | Murata Electronics | BLM18HE152SN1D |
| L4 | IND, 3.3 nH, 2 %, 1.7 A, W/W, 0402 | Coilcraft, Inc. | 0402HP-3N3XGLW |
| P1 | CONN, HDR, ST, FRCTN LOCK, 4-PIN | Molex | 22-23-2041 |
| R2, R3 | RES, 390 Ω, 5 %, 1/16W, 0603 | Panasonic | ERJ-3GEYJ391 |
| T1, T2 | Balun | Minntronix | 4813040R |
| C1, C5, C7, C8, C11 | Not Populated | | |

Evaluation Board Assembly Drawing

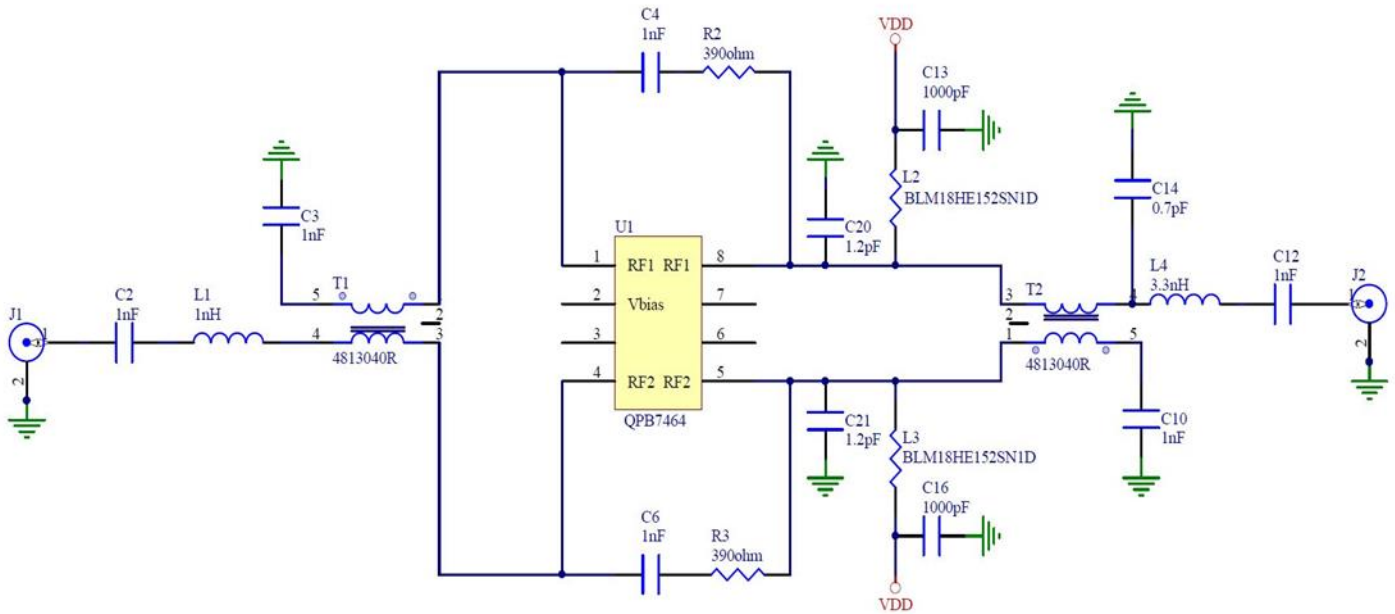


EVB PCB Material and Stack-up

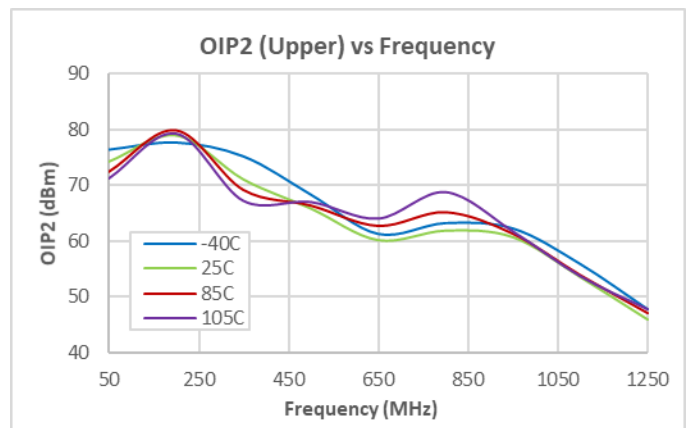
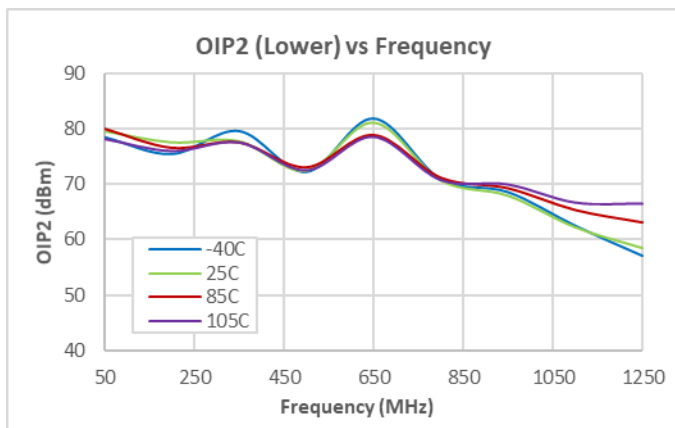
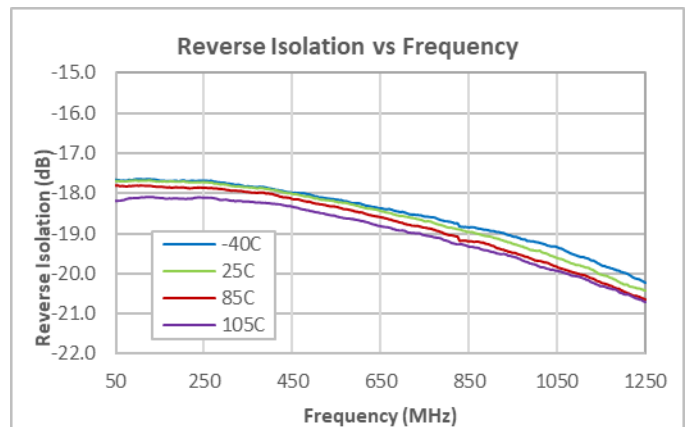
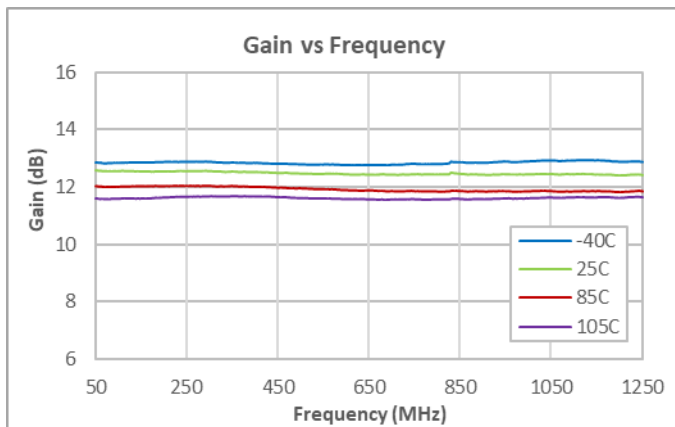
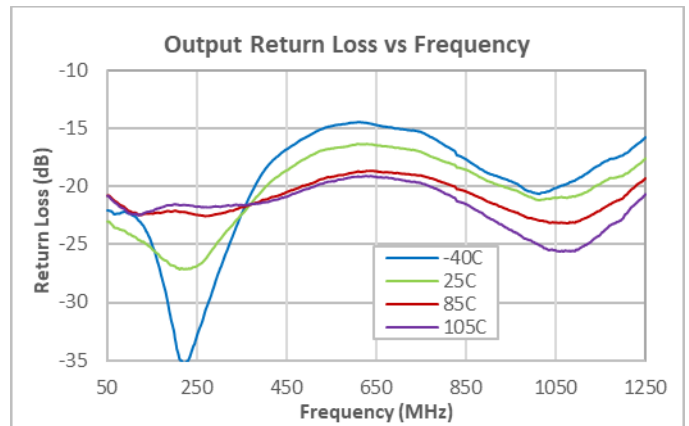
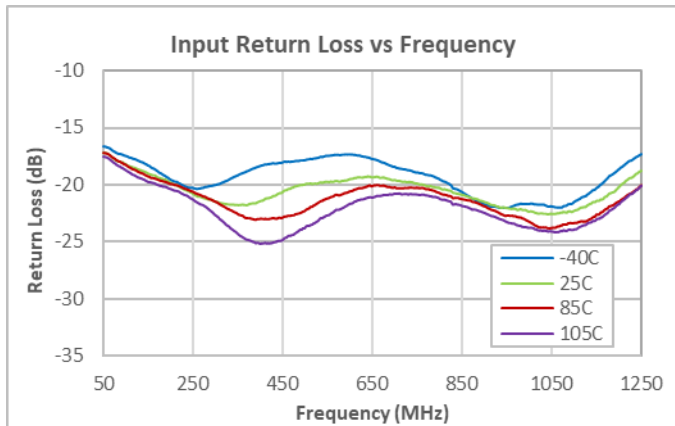
Board Material: 0.058" FR4, $\epsilon_r=4.2$
 Plating: 0.5oz Copper
 Board Dimension: 2.25" x 1.5"



Typical Application Schematic



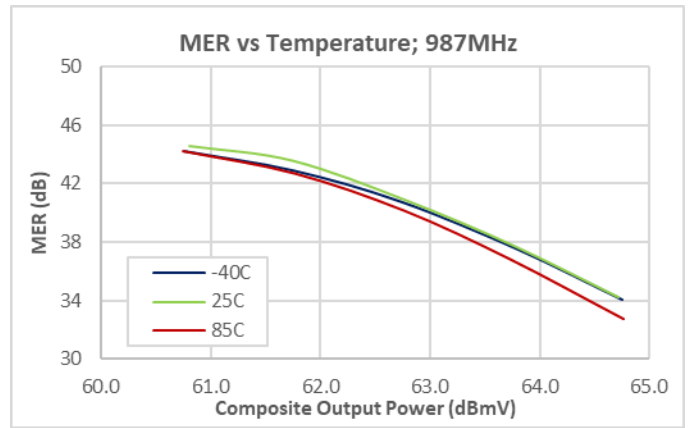
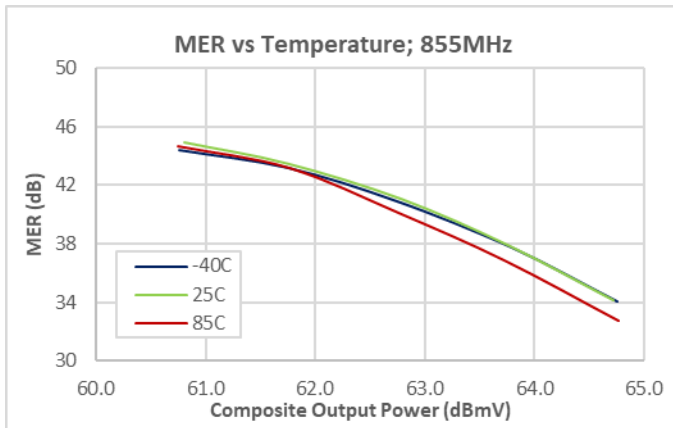
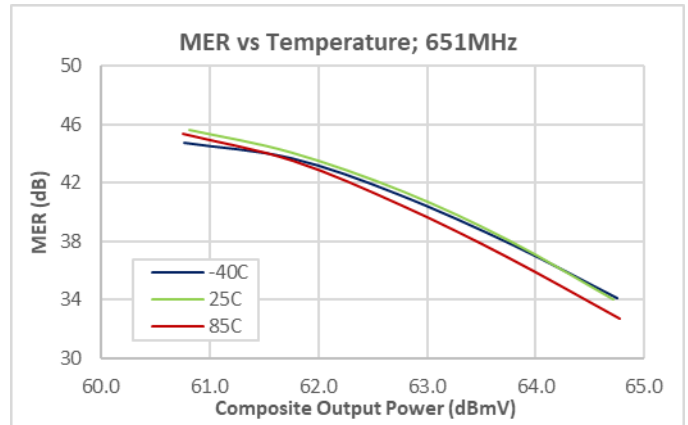
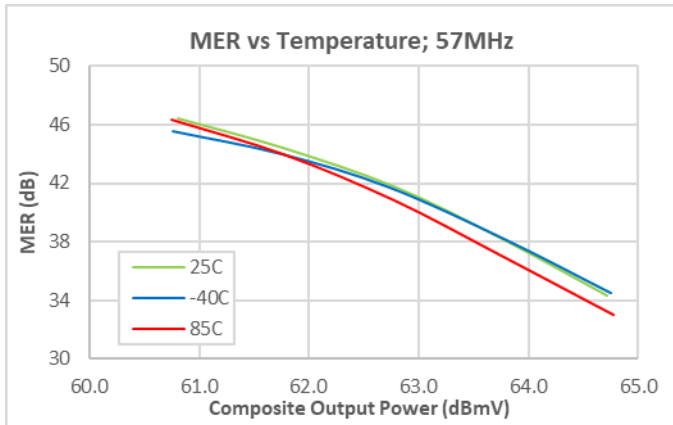
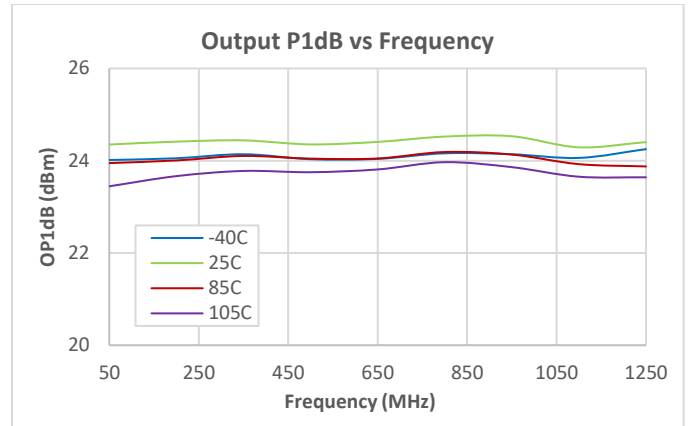
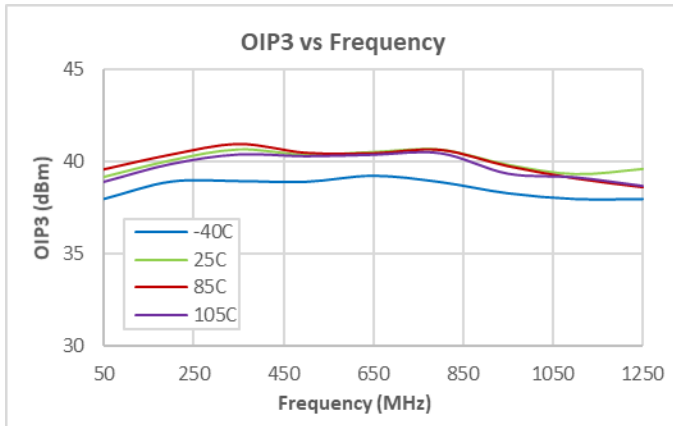
Performance Data



Test Conditions:

1. Test conditions unless otherwise noted: $V_{DD} = +5\text{ V}$, $Z_0 = 75\ \Omega$
2. OIP2: +6 dBm per Output Tone.

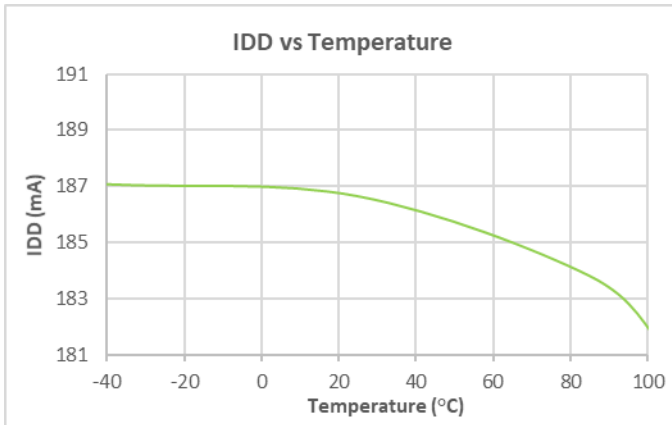
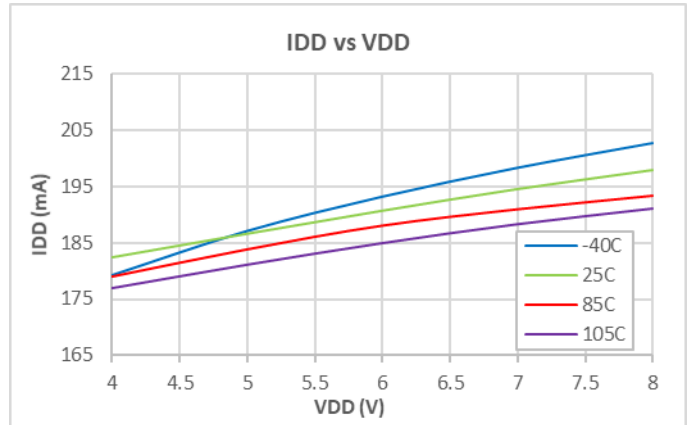
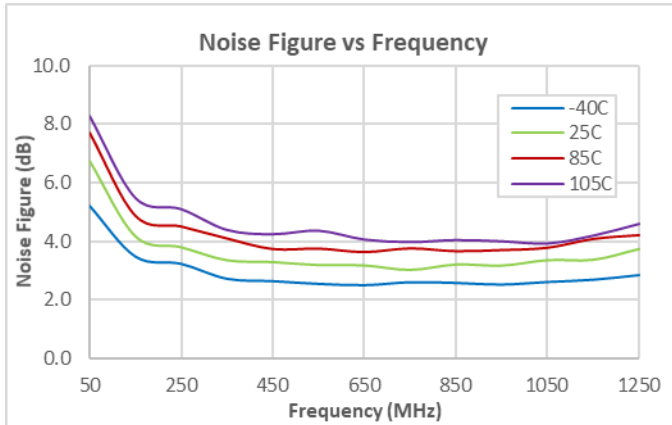
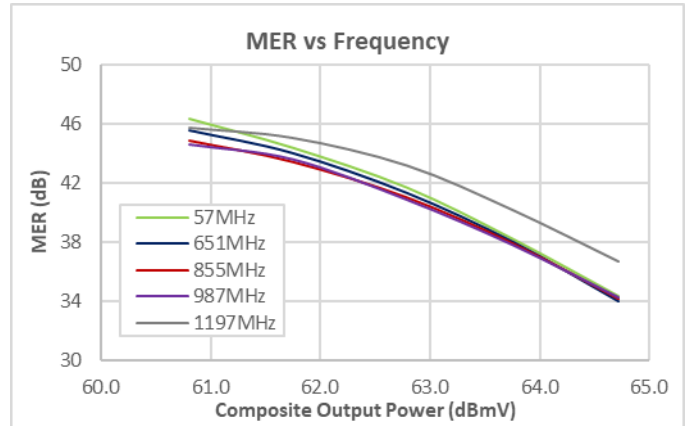
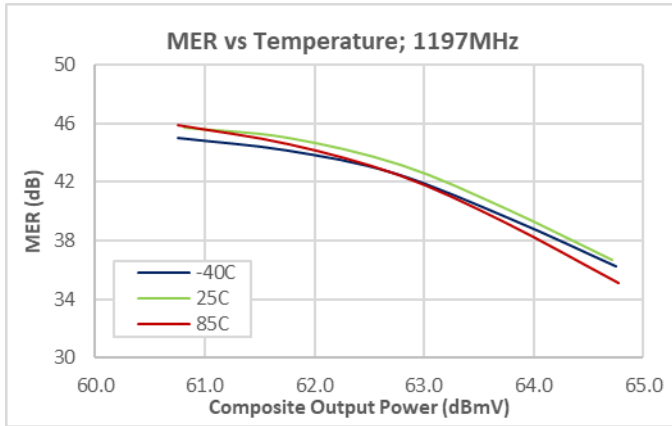
Performance Data (cont'd)



Test Conditions:

1. Test conditions unless otherwise noted: $V_{DD} = +5V$, $Z_o = 75\Omega$
2. OIP3: +6 dBm per Output Tone.
3. MER: 190 QAM256 Channels Flat Tilt, 57 – 1215 MHz, ITU-T J.83, Annex B

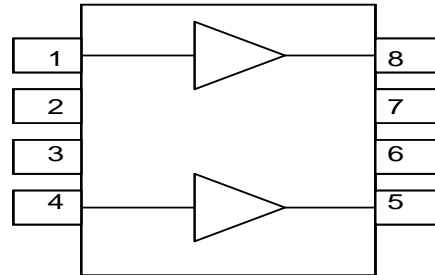
Performance Data (cont'd)



Test Conditions:

1. Test conditions unless otherwise noted: $V_{DD} = +5\text{ V}$, $Z_o = 75\Omega$
2. MER: 190 QAM256 Channels Flat Tilt, 57 – 1215 MHz, ITU-T J.83, Annex B

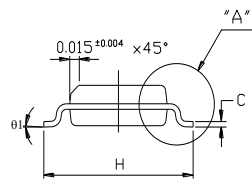
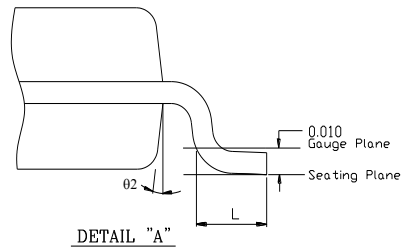
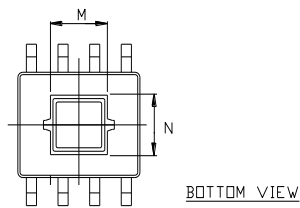
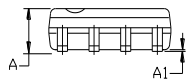
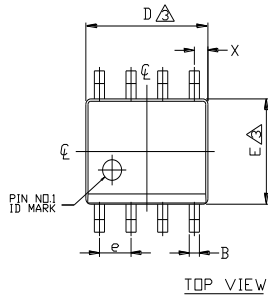
Pin Configuration and Description



Top View

| Pin Number | Label | Description |
|--------------|--------------------------------------|---|
| 1 | RF _{INA} | RF Input A. DC blocking capacitor required. |
| 2 | NC | Not Connected |
| 3 | NC | Not Connected |
| 4 | RF _{INB} | RF Input B. DC blocking capacitor required. |
| 5 | RF _{OUTB} / V _{DD} | RF Output B. |
| 6 | NC | Not Connected |
| 7 | NC | Not Connected |
| 8 | RF _{OUTA} / V _{DD} | RF Output A. |
| Backside Pad | RF/DC GND | Ground Slug |

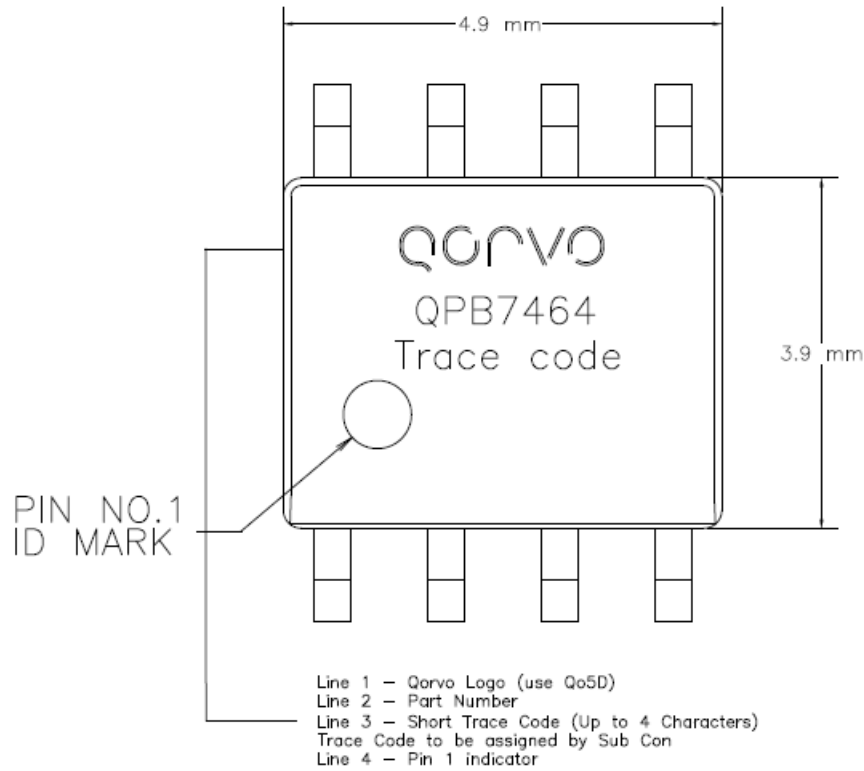
Package Outline



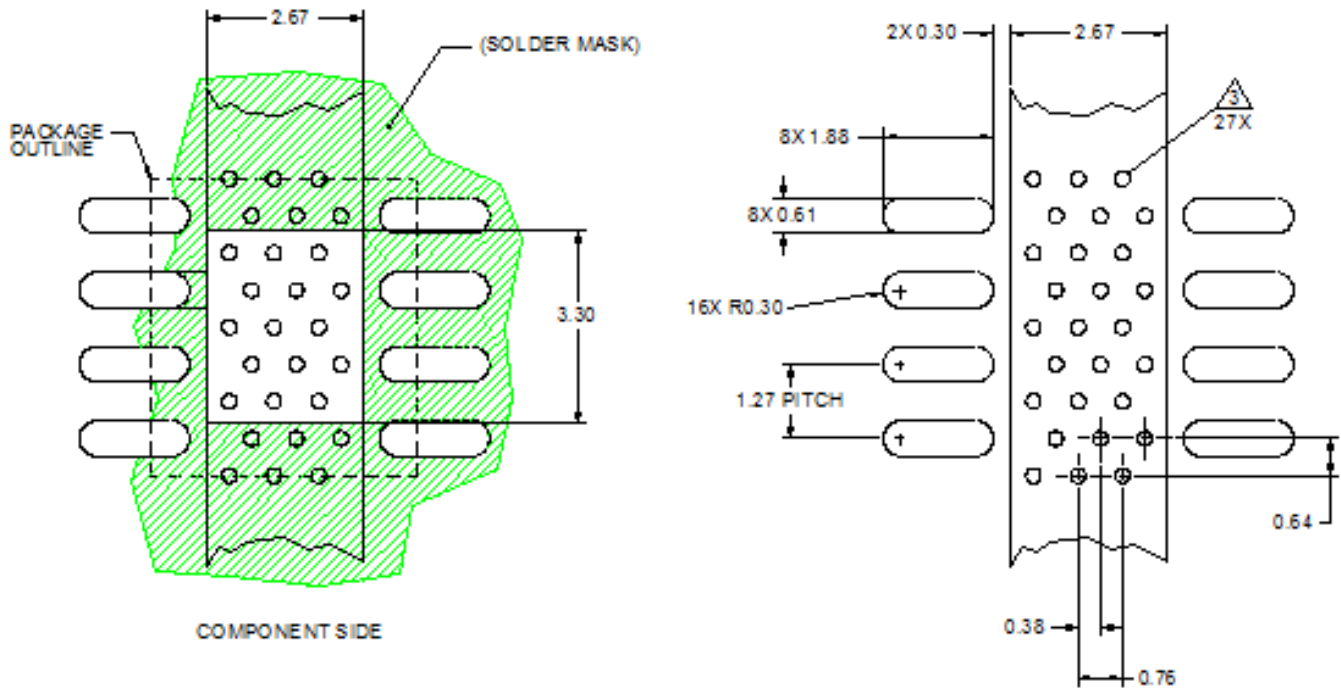
| SYMBOL | 8 SOIC | |
|--------|--------|--------|
| | MIN | MAX |
| A | 0.054 | 0.068 |
| A1 | 0.001 | 0.004 |
| B | 0.014 | 0.019 |
| D | 0.189 | 0.197 |
| E | 0.150 | 0.157 |
| H | 0.228 | 0.244 |
| M | 0.072 | 0.097 |
| N | 0.067 | 0.092 |
| e | 0.050 | BSC |
| C | 0.0070 | 0.0010 |
| L | 0.016 | 0.050 |
| X | 0.0215 | REF |
| θ1 | 0° | 8° |
| θ2 | 7° | BSC |

- NOTE :
1. All dimension are in inch
 2. Top package surface to be NiPdAu plating
 3. Bottom package surface to be NiPdAu plating
 4. Dimension are exclusive of mold flash and gate burr
 5. Foot length measurement is based on the gauge plane method

Package Marking



Recommended Mounting Pattern



Notes:

- All dimensions are in millimeters. Angles are in degrees.
- Use 0.5 oz. copper minimum for top and bottom layer metal.
- Vias are required under the backside paddle of this device for proper RF/DC grounding and thermal dissipation.
- We recommend a 0.35 mm (#80/.0135") diameter bit for drilling via holes and a final plated thru diameter of 0.25 mm (0.010")
- Ensure good package backside paddle solder attach for reliable operation and best electrical performance.

Handling Precautions

| Parameter | Rating | Standard |
|----------------------------------|------------------|--------------------------|
| ESD – Human Body Model (HBM) | Class 1A (500V) | ESDA / JEDEC JS-001-2014 |
| ESD – Charged Device Model (CDM) | Class C3 (1000V) | JEDEC JS-002-2014 |
| MSL – Moisture Sensitivity Level | Level 3 | IPC/JEDEC J-STD-020 |



Caution!
ESD-Sensitive Device

Solderability

Compatible with both lead-free (260 °C max. reflow temp.) and tin / lead (245 °C max. reflow temp.) soldering processes. Solder profiles available upon request.

Contact plating: NiPdAu

RoHS Compliance

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- SVHC Free



Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

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Web: www.qorvo.com

Email: customer.support@qorvo.com

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Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

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На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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