

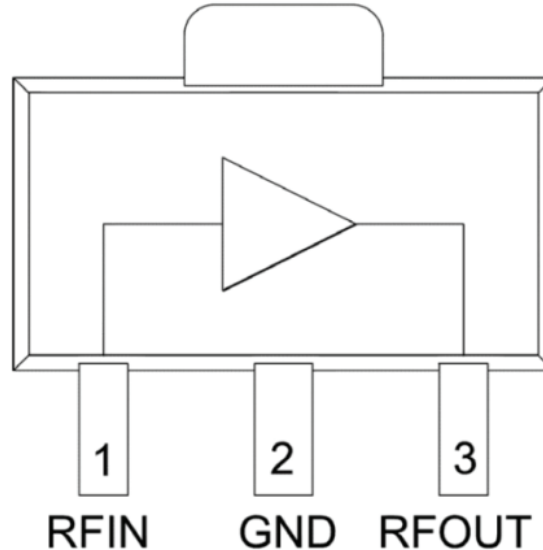


Features

- High Gain: 21dB
- High Linearity and Low Distortion
 - 41dBm OIP3 at 500MHz
 - -60dBc CSO
 - -87dBc CTB
- Single 8V Supply
- Noise Figure: 3dB at 500MHz
- SOT-89 Package

Applications

- Broadband 75Ω Gain Block
- CATV Distribution Amplifiers
- Pre-amplifier for CATV Multi-Dwelling Units



Functional Block Diagram

Product Description

RFMD's RFCA3306 is a high performance InGaP HBT MMIC amplifier designed to run from a single +8V supply, without the need for an external dropping resistor. The high gain, high linearity, and low distortion from 50MHz to 1000MHz make this part ideal for broadband cable applications. An integrated active bias circuit provides stable gain over temperature and process variations. It is offered in a small SOT-89 package and is RoHS compliant.

Ordering Information

| | |
|-----------------|---|
| RFCA3306SQ | Sample bag with 25 pieces |
| RFCA3306SR | 7" Reel with 100 pieces |
| RFCA3306TR13 | 13" Reel with 2500 pieces |
| RFCA3306PCK-410 | 50MHz to 1000MHz PCBA with 5-piece sample bag |

Absolute Maximum Ratings

| Parameter | Rating | Unit |
|---------------------------------------|-------------|------|
| Max Device Current (I_{CC}) | 170 | mA |
| Max Device Voltage (V_{CC}) | 9 | V |
| Max CW RF Input Power | 15 | dBm |
| Max Operating Junction Temp (T_J) | 170 | °C |
| Operating Temperature Range (T_L) | -40 to +85 | °C |
| Storage Temperature | -40 to +150 | °C |
| ESD Rating (HBM) | 1000V | |
| Moisture Sensitivity Level | MSL2 | |



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.

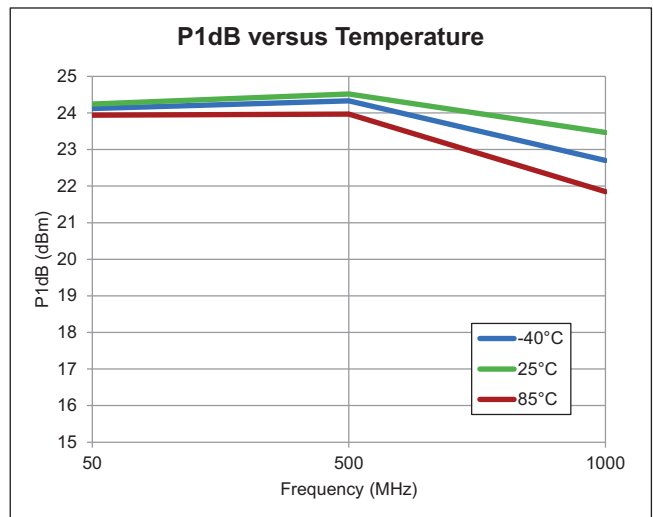
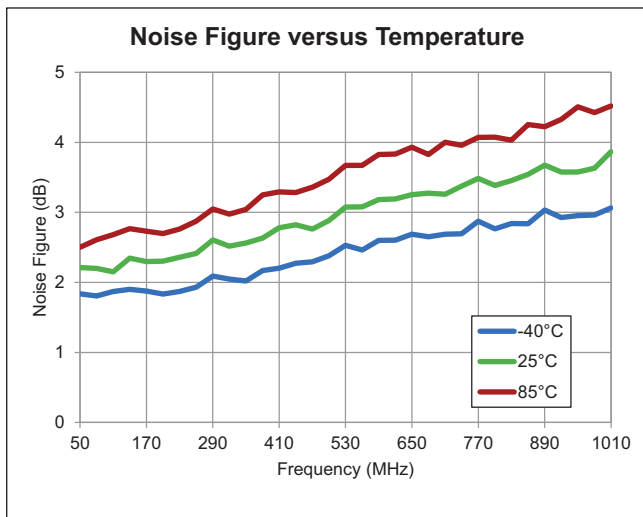
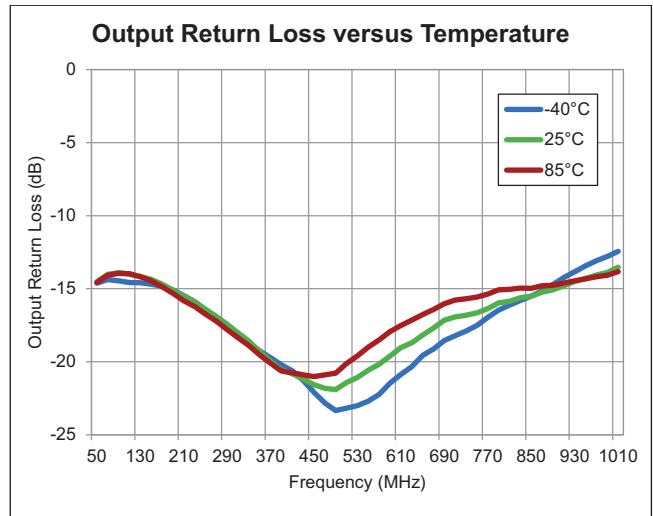
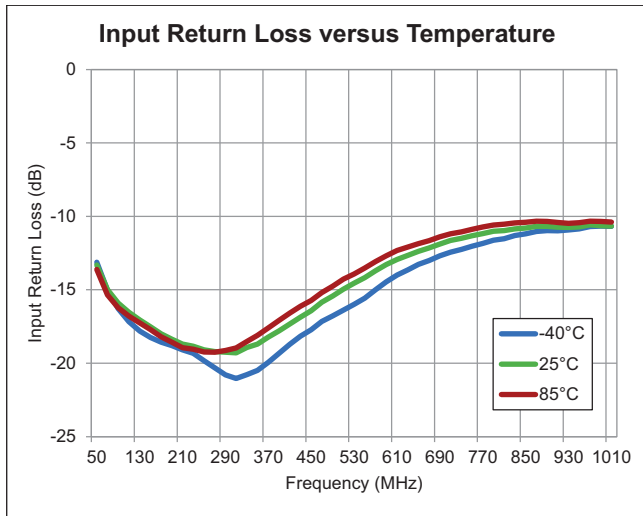
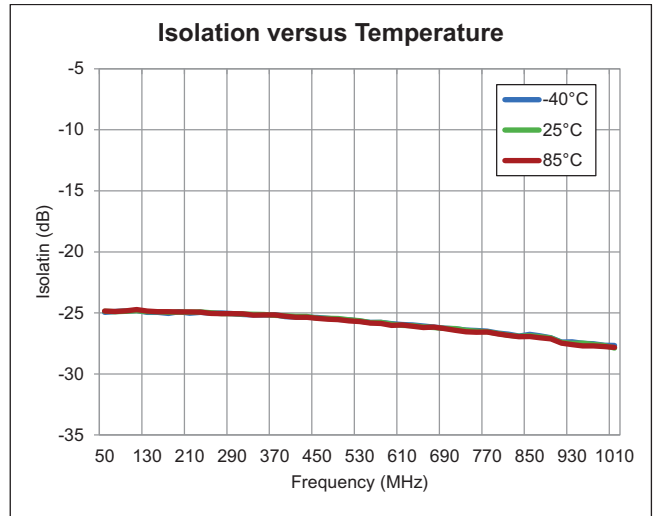
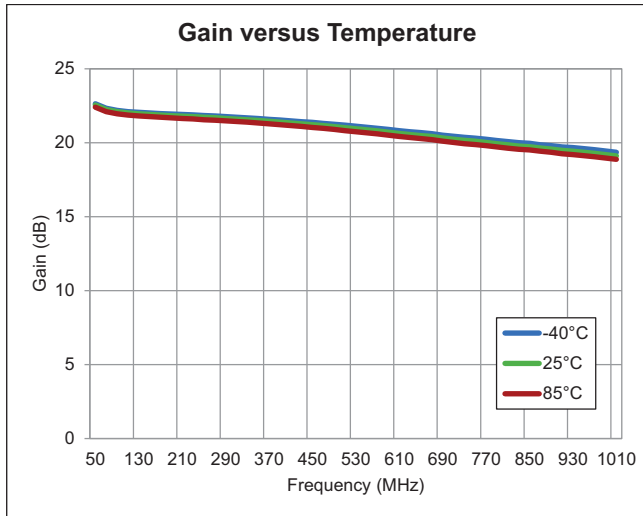
Notes:

1. The maximum ratings must all be met simultaneously.
2. $P_{DISS} = P_{DC} + P_{RFIN} - P_{RFOUT}$
3. $T_J = T_L + P_{DISS} * R_{TH}$

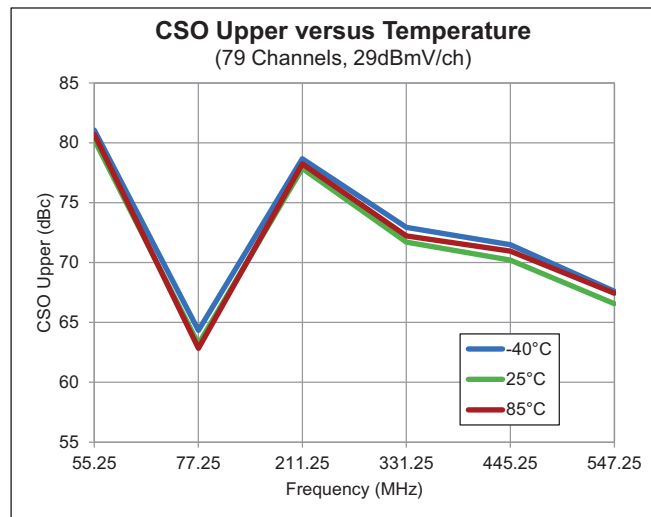
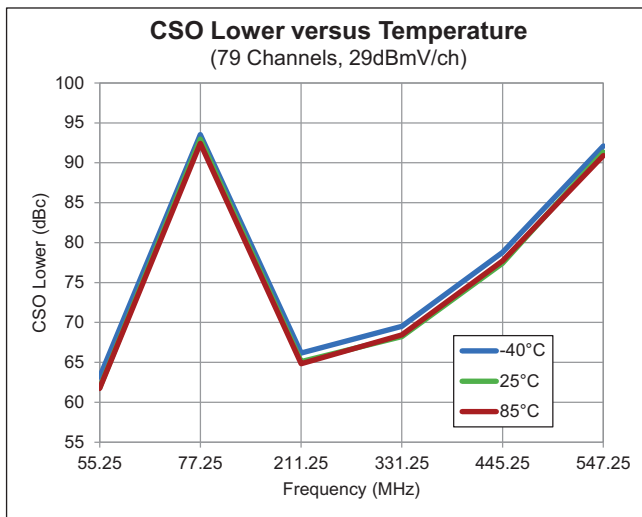
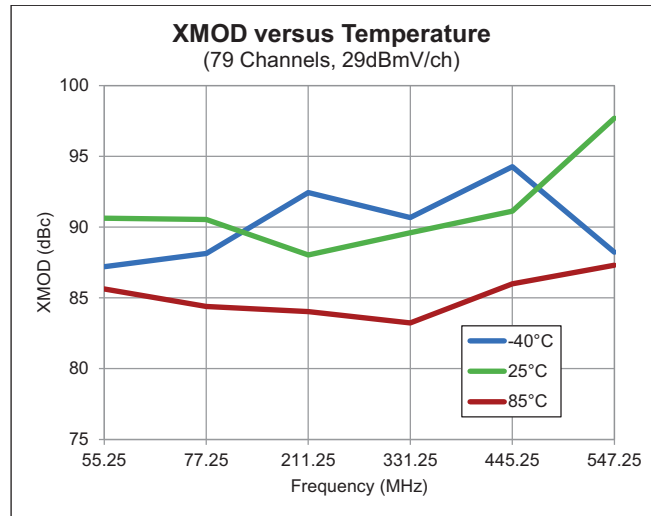
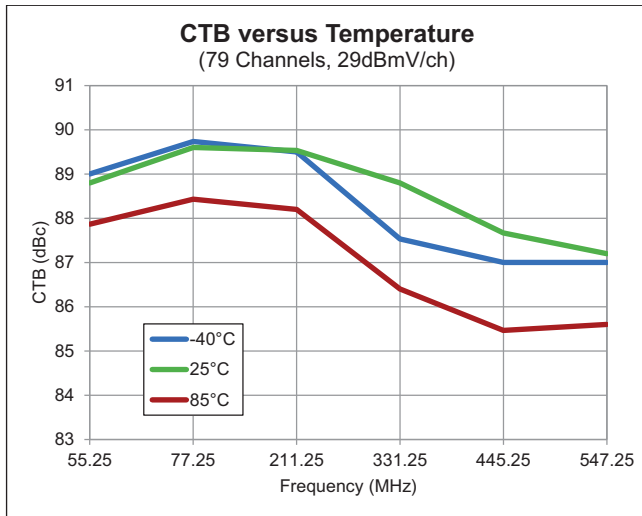
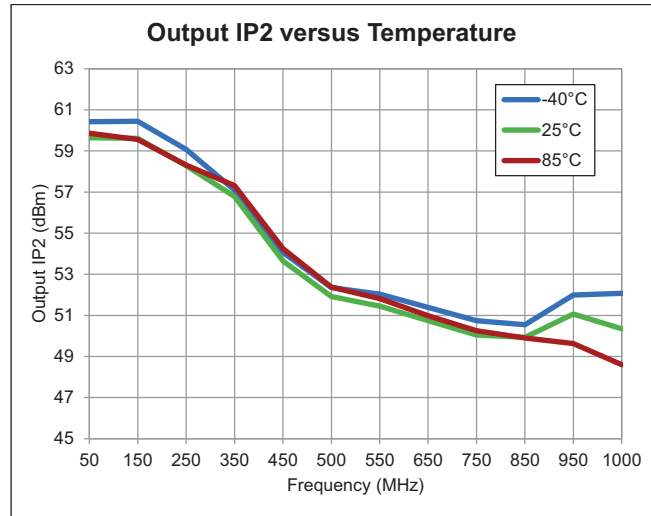
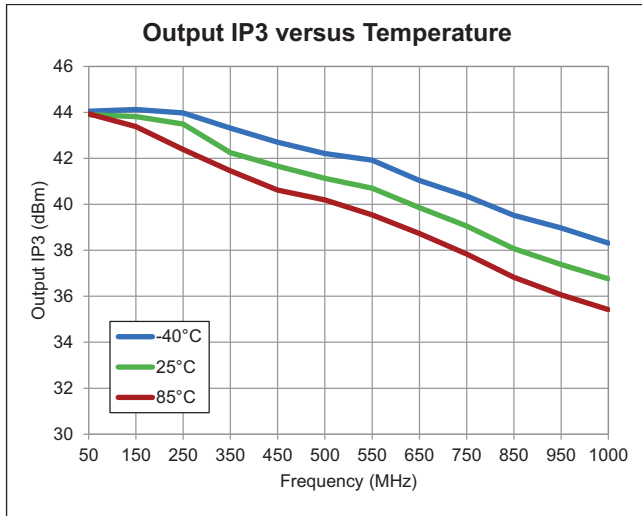
Nominal Operating Parameters

| Parameter | Specification | | | Unit | Condition |
|---------------------------------------|---------------|------|------|------|---|
| | Min. | Typ. | Max. | | |
| Overall (75Ω) | | | | | 50MHz to 1000MHz Application, $V_{CC} = 8.0V$, $I_D = 140mA$, $T_L = 25^\circ C$, $Z_S = Z_L = 75\Omega$ |
| Frequency Range | 50 | | 1000 | MHz | |
| Small Signal Gain | | 22 | | dB | 50MHz |
| | 20 | 21 | | dB | 500MHz |
| | | 18.5 | | dB | 1000MHz |
| Gain Flatness | | 3.5 | | dB | |
| P1dB | | 24.5 | | dBm | 50MHz to 1000MHz |
| Noise Figure | | 3 | | dBm | |
| Input Return Loss | | 13 | | dB | 50MHz |
| | | 10.5 | | dB | 1000MHz |
| Output Return Loss | | 14.5 | | dB | 50MHz |
| | | 13.8 | | dB | 1000MHz |
| Output IP3 | | 43.8 | | dBm | 50MHz, Tone Spacing = 6MHz, P_{OUT} per Tone = +5dBm |
| | 34 | 36.7 | | dBm | 1000MHz, Tone Spacing = 6MHz, P_{OUT} per Tone = +5dBm |
| Output IP2 | | 59.5 | | dBm | 50MHz, Tone Spacing = 30MHz, P_{OUT} per Tone = +0dBm |
| | | 50.4 | | dBm | 1000MHz, Tone Spacing = 30MHz, P_{OUT} per Tone = +0dBm |
| CSO | | -60 | | dBc | 79 Channels, +29dBmV/ch output |
| CTB | | -87 | | dBc | |
| XMOD | | -85 | | dBc | |
| Power Supply | | | | | 50MHz to 1000MHz Application, $T_L = 25^\circ C$, $Z_S = Z_L = 75\Omega$ |
| Device Operating Voltage (V_{CC}) | 7.5 | 8 | 8.5 | V | |
| Device Operating Current (I_{CC}) | 125 | 140 | 155 | mA | Quiescent, $V_{CC} = 8.0V$ |
| Thermal Resistance (R_{TH}) | | 53 | | °C/W | Junction to backside of PCB under the IC, $V_{CC} = 8.0V$ |

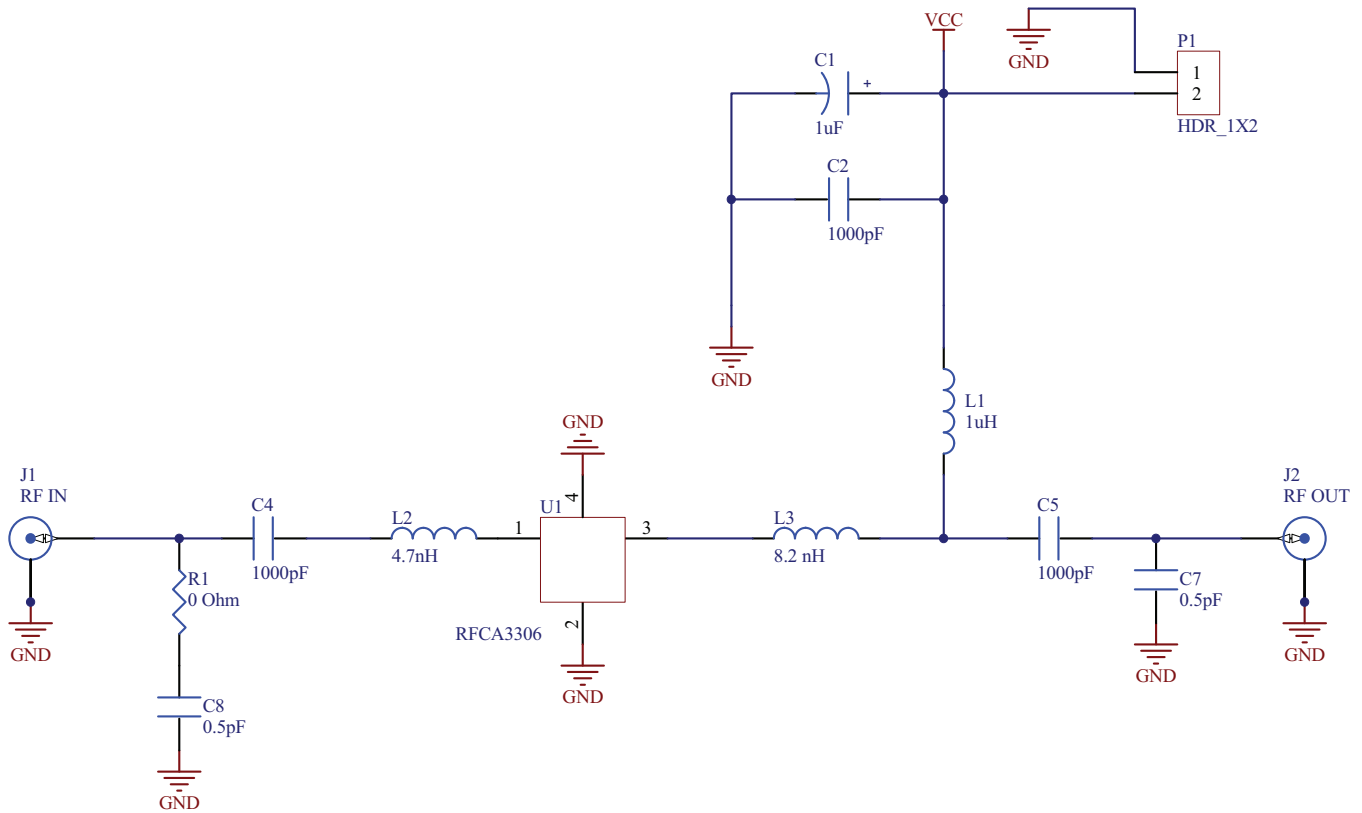
Typical Performance: $V_{CC} = 8.0V$



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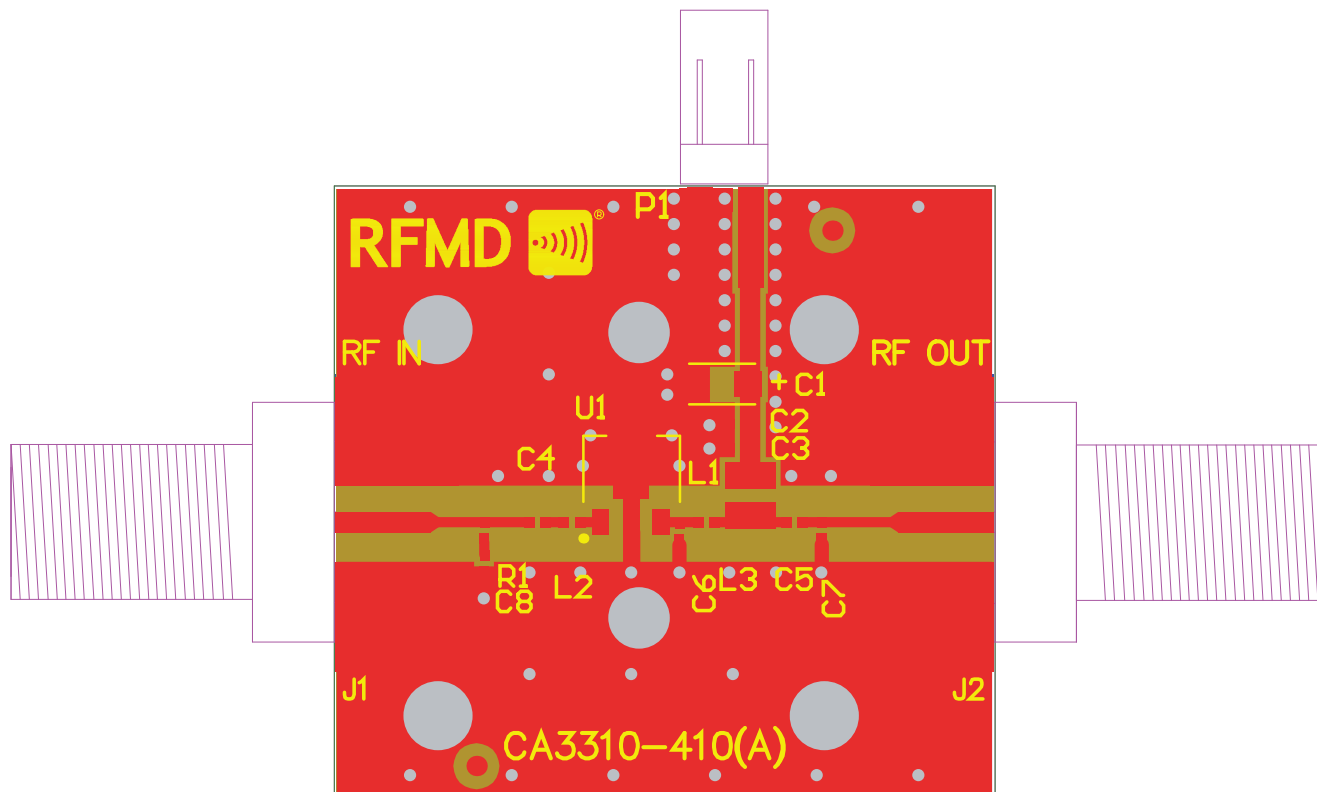
Evaluation Board Schematic



Evaluation Board Bill of Materials (BOM)

| Description | Reference Designator | Manufacturer | Manufacturer's P/N |
|---------------------------------------|----------------------|--------------------------------------|--------------------|
| CA3310 Evaluation Board | | Dynamic Details (DDI) Toronto | RFCA3310-410(A) |
| DUT | U1 | RFMD | RFCA3306SB |
| CONN, HDR, ST, 2-PIN, 0.100" | P1 | SAMTEC INC. | TSW-102-07-G-S |
| CONN, F FEM EDGE MOUNT, 75Ω, 0.068" | J1-J2 | Millimeter Wave Technologies, LLC | MW-846-C-DD-75 |
| IND, 1μH, 5%, W/W, 0805 | L1 | Coilcraft, Inc. | 0805LS-102XJLC |
| IND, 4.7nH, +/-0.3nH, M/L, 0402 | L2 | Murata Electronics | LQG15HN4N7S02D |
| IND, 8.2nH, 5%, M/L, 0402 | L3 | Murata Electronics | LQG15HN8N2J02D |
| CAP, 1000pF, 10%, 50V, X7R, 0402 | C2, C4-C5 | Murata Electronics | GRM155R71H102KA01D |
| CAP, 1μF, 10%, 16V, X7R, 1206 | C1 | Murata Electronics | GRM31MR71E105KA01L |
| CAP, 0.5pF, +/-0.1pF, 50V, HI-Q, 0402 | C7-C8 | Murata Electronics | GJM1555C1HR50BB01D |
| RES, 0Ω, 0402 | R1 | Kamaya, Inc | RMC1/16SJPTH |

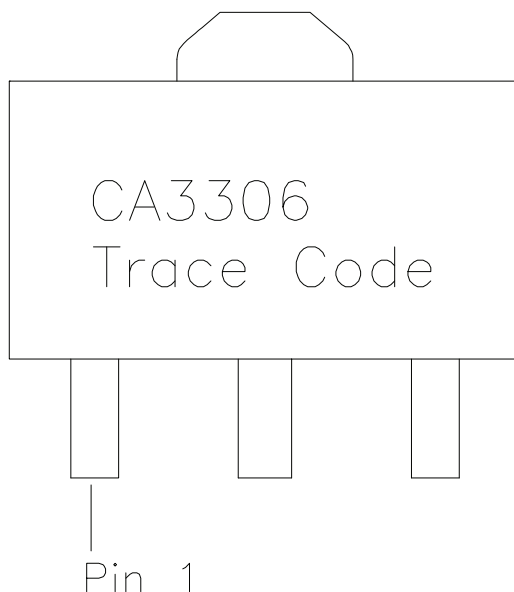
Evaluation Assembly Drawing



Pin Names and Descriptions

| Pin | Name | Description |
|-----|------------------|--|
| 1 | RFIN | RF Input. External DC-blocking capacitor is required. |
| 2 | GND | Connection to Ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible. |
| 3 | RFOUT/VCC | RF Output, Device Collector. DC voltage is present on this pin, therefore a DC blocking capacitor is necessary for proper operation. |
| 4 | GND | Connection to Ground. Use via holes for best performance to reduce lead inductance as close to ground leads as possible. |

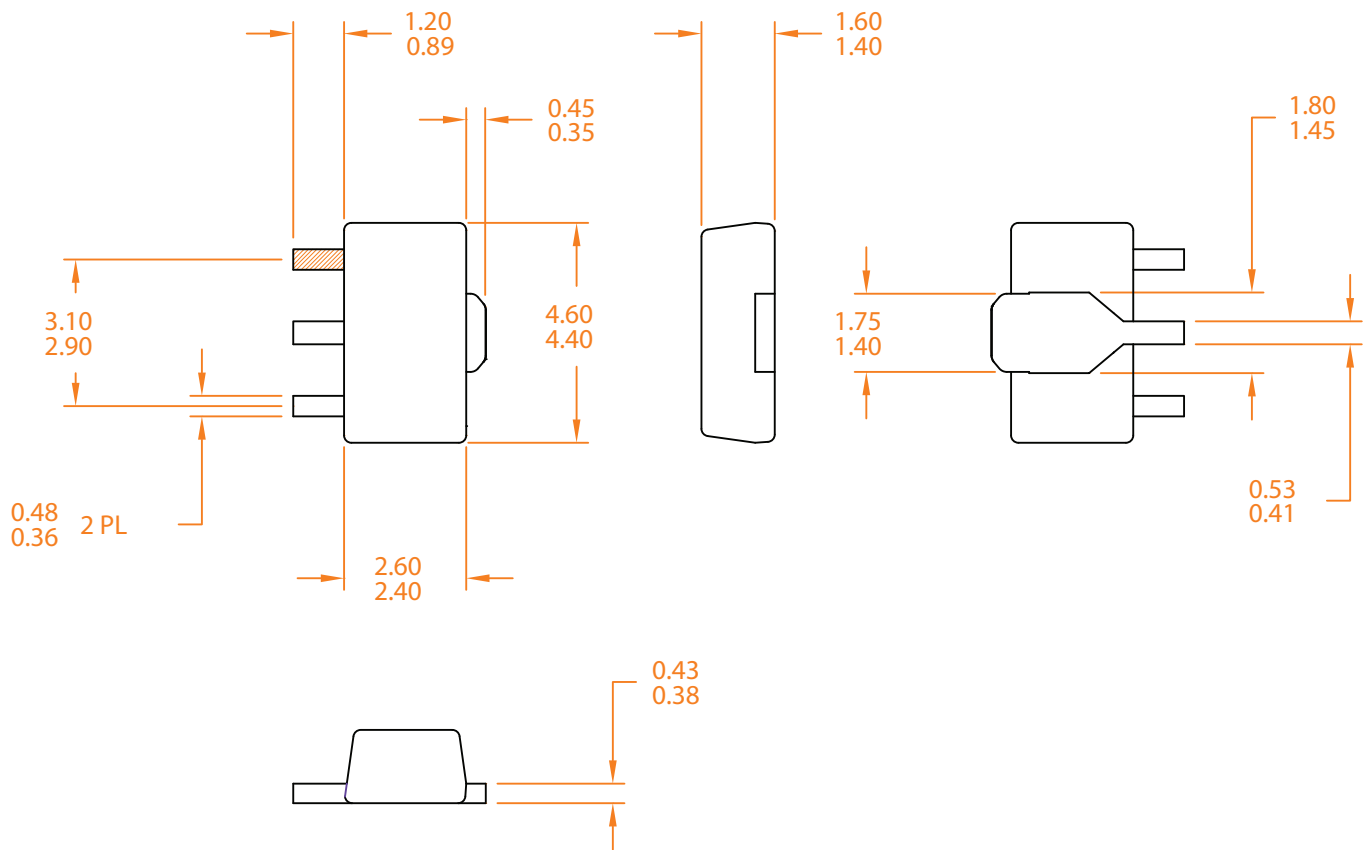
Branding Diagram



Refer to P.O. for
Trace Code

Package Drawing

Dimensions in millimeters



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Телефон: 8 (812) 309-75-97 (многоканальный)

Факс: 8 (812) 320-03-32

Электронная почта: ocean@oceanchips.ru

Web: <http://oceanchips.ru/>

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А