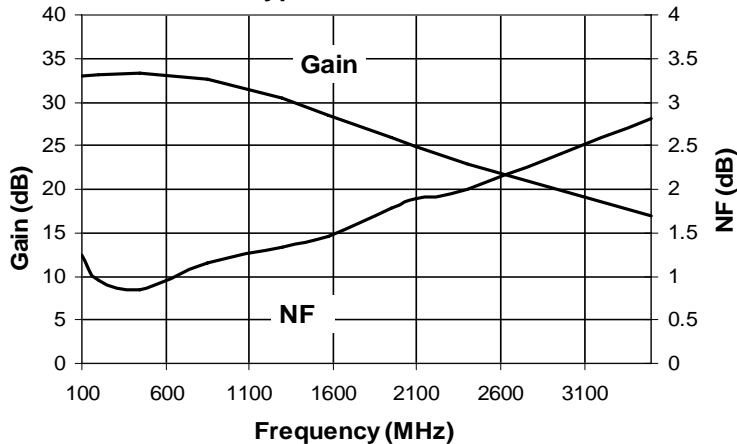




Product Description

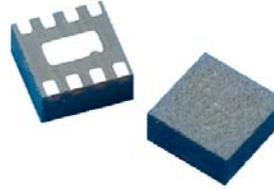
The SGL-0622Z is a low noise, high gain MMIC LNA designed for low power single-supply operation from 2.7-3.6V. Its Class-1C ESD protection and high input overdrive capability ensures rugged performance, while its integrated active bias circuit maintains robust stable bias over temperature and process beta variation. The SGL-0622Z is internally matched from 5-4000 MHz and requires only 4-5 external biasing components (DC blocks, bypass caps, inductive choke). The SGL-0622Z is fabricated using highly repeatable Silicon Germanium technology and is housed in a cost-effective RoHS/WEEE compliant QFN 2x2 miniature package.

Typical Performance



SGL-0622Z

5 - 4000 MHz Low Noise MMIC Amplifier Silicon Germanium



Product Features

- High Gain = 28dB @ 1575MHz
- Low Noise Figure = 1.5dB @ 1575MHz
- Low Power Consumption, 10.5mA @ 3.3V
- Battery Operation: 2.7-3.6V (Active Biased)
- Fully Integrated Matching
- Class-1C ESD Protection (>1000V HBM)
- High input overdrive capability, +18dBm
- RoHS/WEEE Compliant Miniature 2x2 QFN Package

Applications

- High Gain GPS Receivers
- ISM & WiMAX LNAs

| Symbol | Parameters | Units | Frequency | Min. | Typ. | Max. |
|----------------------|--------------------------------------|-------|--------------|------|------|------|
| S ₂₁ | Small Signal Gain | dB | 1.575 GHz | 25 | 28 | 31 |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| NF | Noise Figure | dB | 1.575 GHz | | 1.5 | 1.9 |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| P _{1dB} | Output Power at 1dB Compression | dBm | 1.575 GHz | 3.3 | 5.3 | |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| IIP ₃ | Input Third Order Intercept Point | dBm | 1.575 GHz | -16 | -13 | |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| IRL | Input Return Loss | dB | 1.575 GHz | 12 | 14.3 | |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| ORL | Output Return Loss | dB | 1.575 GHz | 6 | 9.5 | |
| | | | 2.44 GHz | | | |
| | | | 3.5 GHz | | | |
| S ₁₂ | Reverse Isolation | dB | 0.05 - 4 GHz | | -28 | |
| I _D | Operating Current | mA | | 7.5 | 10.5 | 12.5 |
| R _{TH, j-l} | Thermal Resistance (junction - lead) | °C/W | | | 150 | |

Test Conditions: V_{CC} = 3.3V I_D = 10.5mA Typ. IIP₃ Tone Spacing = 1MHz, P_{out} per tone = -15 dBm
T_L = 25°C Z_S = Z_L = 50 Ohms

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Typical RF Performance at Key Operating Frequencies (With Application Circuit)

| Symbol | Parameter | Unit | Frequency (MHz) | | | | | | | |
|------------------|-----------------------------------|------|-----------------|------|------|------|-------|------|-------|------|
| | | | 100 | 200 | 450 | 850 | 1575 | 1950 | 2440 | 3500 |
| S ₂₁ | Small Signal Gain | dB | 34.6 | 34.9 | 34.4 | 32.8 | 28.5 | 26.1 | 23.0 | 17.0 |
| IIP ₃ | Input Third Order Intercept Point | dBm | | | | | -13.0 | | -12.0 | -8.5 |
| P _{1dB} | Output at 1dB Compression | dBm | | | | | 5.3 | | 1.5 | -1.4 |
| S ₁₁ | Input Return Loss | dB | 15.1 | 20.0 | 12.6 | 16.0 | 14.3 | 12.8 | 12.0 | 10.0 |
| S ₂₂ | Output Return Loss | dB | 9.2 | 12.2 | 11.8 | 10.4 | 9.5 | 12.1 | 14.0 | 22.0 |
| S ₁₂ | Reverse Isolation | dB | 38.8 | 39.8 | 38.7 | 39.9 | 35.6 | 34.8 | 32.0 | 29.0 |
| NF | Noise Figure | dB | 1.25 | 0.96 | 0.84 | 1.16 | 1.50 | 1.78 | 2.01 | 2.81 |

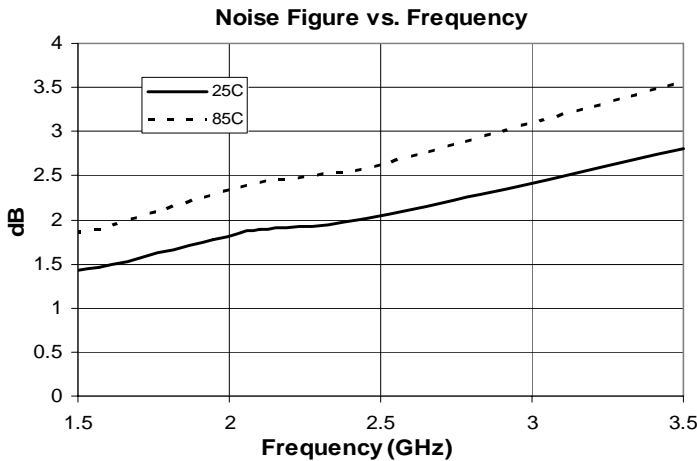
Test Conditions: V_{CC} = 3.3V I_D = 10.5 mA Typ. IIP₃ Tone Spacing = 1MHz, P_{out} per tone = -15 dBm
 T_L = 25°C Z_S = Z_L = 50 Ohms

Absolute Maximum Ratings

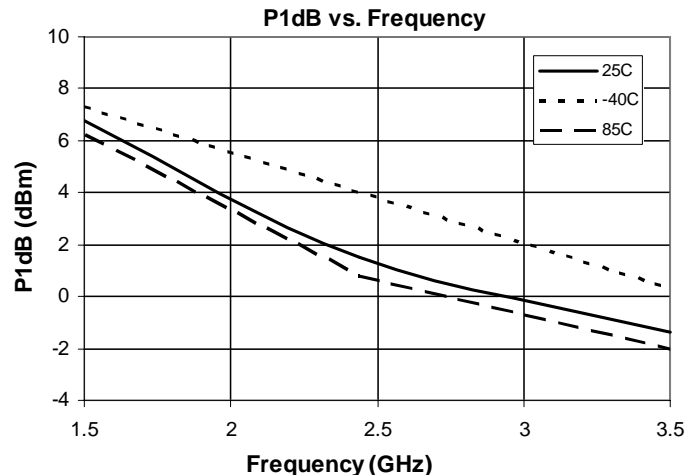
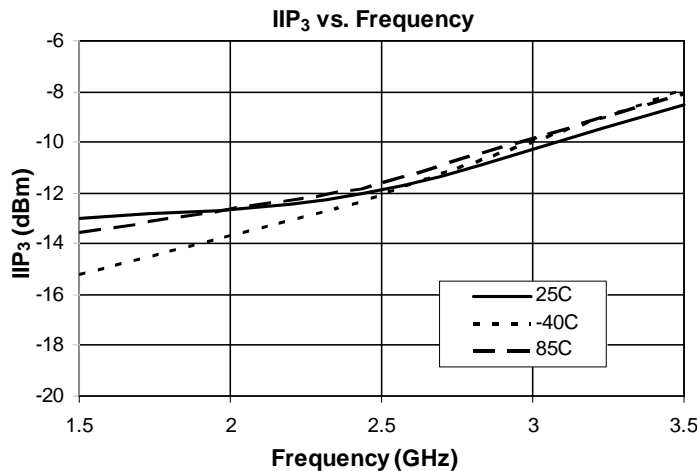
| Reliability & Qualification Information | | Parameter | | Absolute Limit | |
|---|--|-----------|--|---|--|
| Parameter | | Rating | | Parameter | |
| ESD Rating - Human Body Model (HBM) | | Class 1C | | Max Device Current (I _D) | |
| Moisture Sensitivity Level | | MSL 1 | | 20mA | |
| | | | | Max Device Voltage (V _D) | |
| | | | | 4 V | |
| | | | | Max. RF Input Power* (See Note) | |
| | | | | +18 dBm | |
| | | | | Max. Junction Temp. (T _J) | |
| | | | | +150°C | |
| | | | | Operating Temp. Range (T _L) | |
| | | | | -40°C to +85°C | |
| | | | | Max. Storage Temp. | |
| | | | | +150°C | |

This product qualification report can be downloaded at www.sirenza.com

***Note:** Load condition 1, Z_L = 50 Ohms
 Load condition 2, Z_L = 10:1 VSWR
 Operation of this device beyond any one of these limits may cause permanent damage. For reliable continuous operation, the device voltage and current must not exceed the maximum operating values specified in the table on page one.
 Bias Conditions should also satisfy the following expression:
 $I_D V_D < (T_J - T_L) / R_{TH, j-l} \quad T_L = T_{LEAD}$

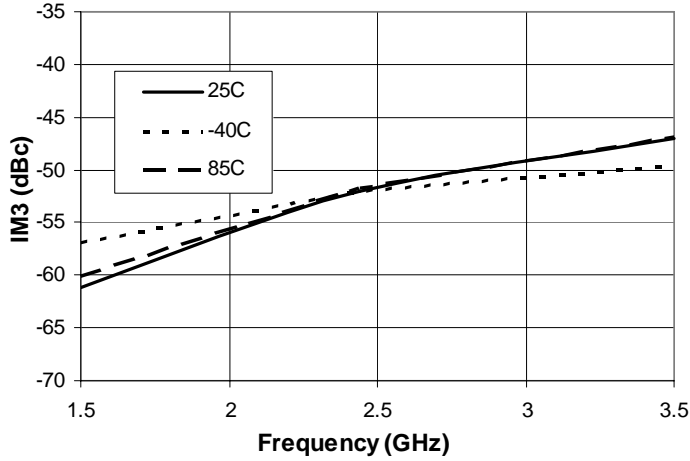


Caution: ESD sensitive
 Appropriate precautions in handling, packaging and testing devices must be observed.

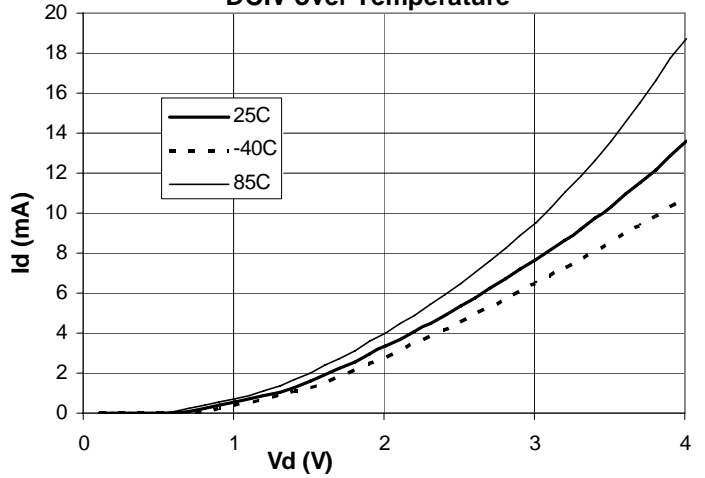


Application Circuit Data, $V_{CC} = 3.3V$, $I_D = 9mA$

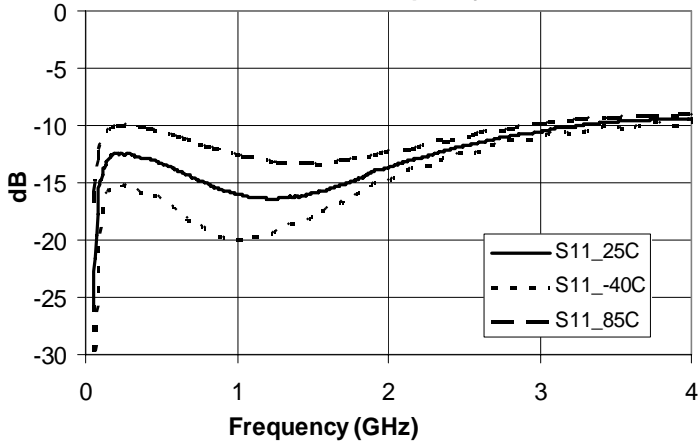
IM3 vs. Frequency



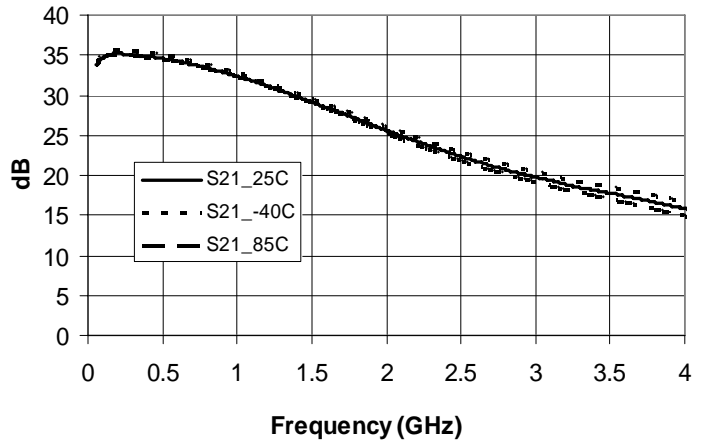
DCIV over Temperature



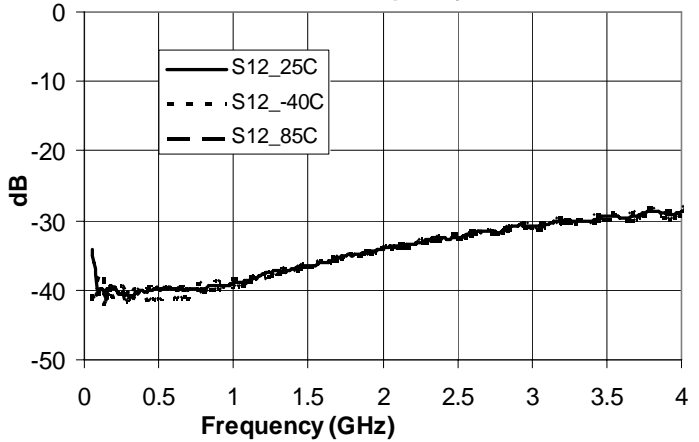
S11 vs. Frequency



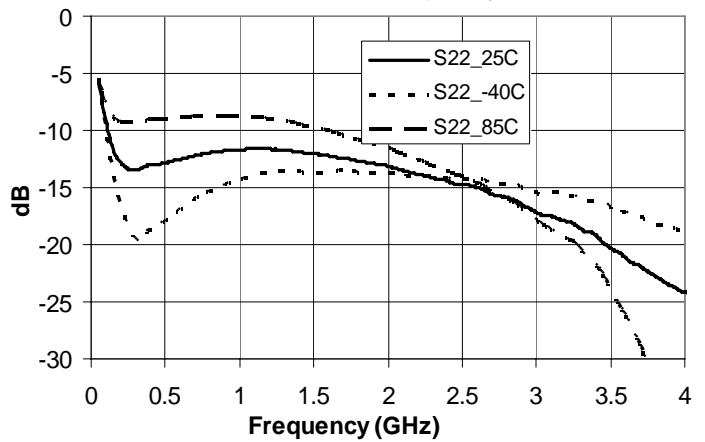
S21 vs. Frequency



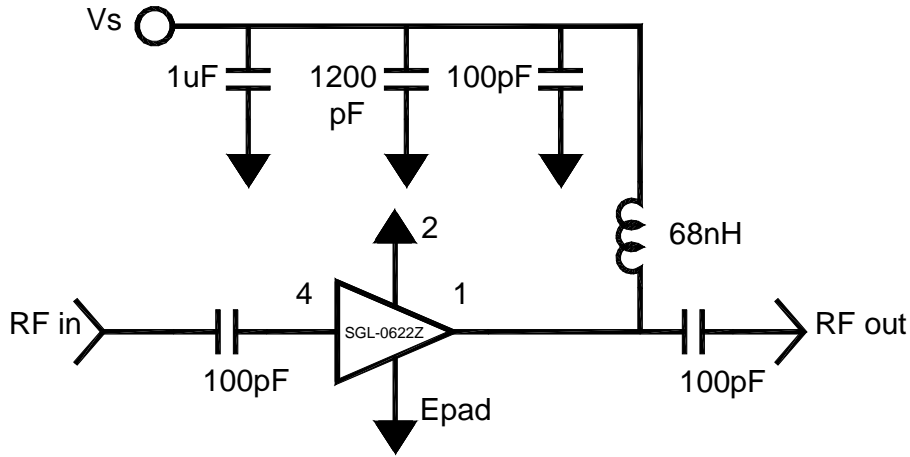
S12 vs. Frequency



S22 vs. Frequency



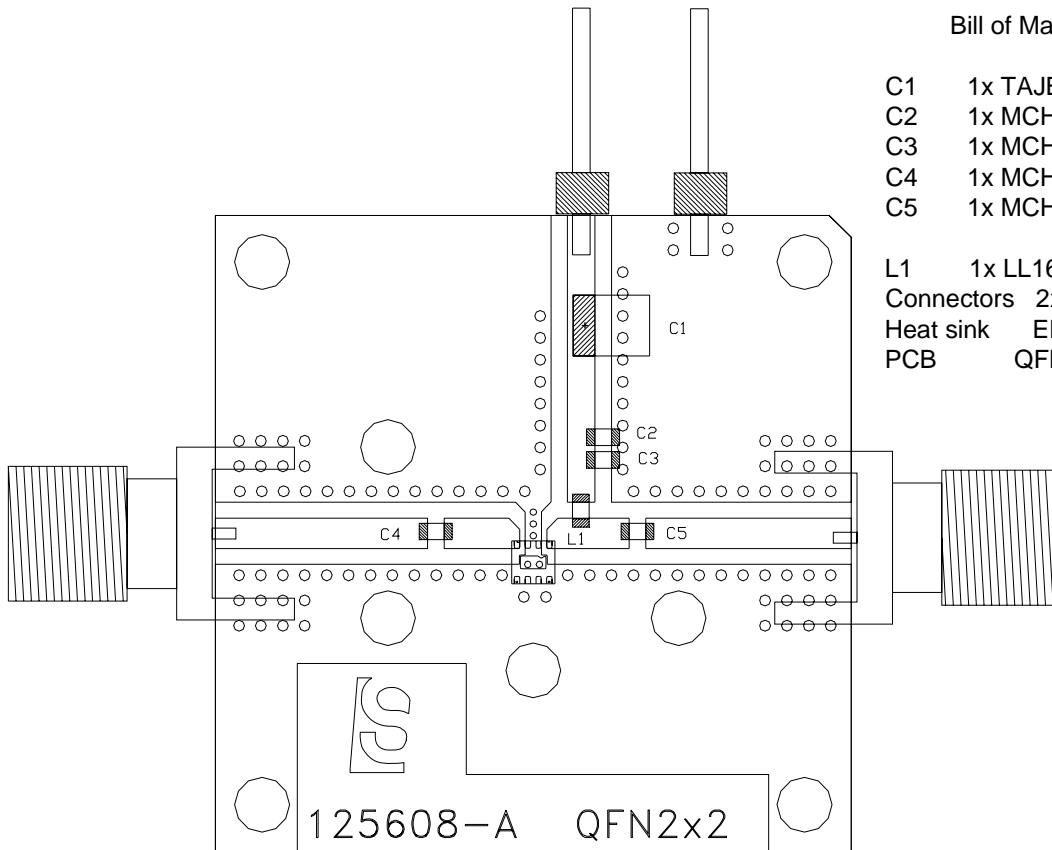
Application Schematic



Evaluation Board Layout

Bill of Materials

- C1 1x TAJB105KLRH Rohm 1.0uF
- C2 1x MCH185C122KK Rohm 1200pF
- C3 1x MCH185A101JK Rohm 100pF
- C4 1x MCH185A101JK Rohm 100pF
- C5 1x MCH185A101JK Rohm 100pF
- L1 1x LL1608-FS56NJ Toko 68nH
- Connectors 2x PSF-S01-1mm GigaLane Co.
- Heat sink EEF-102059
- PCB QFN2x2

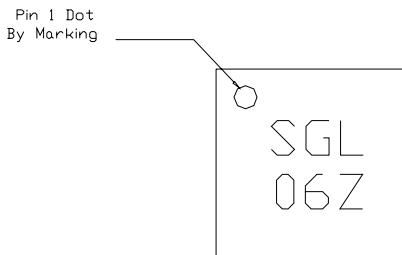


| Pin # | Function | Description |
|-----------|-----------------------|--|
| 1 | RF OUT/V _D | RF output and bias pin. Bias should be supplied to this pin through an external RF choke. (See application circuit) |
| 2 | GND | Connect to ground per application circuit drawing. |
| 3,5,6,7,8 | N/A | Not Used |
| 4 | RF IN | RF input pin. This pin requires the use of an external DC blocking capacitor as shown in the application schematics. |
| EPAD | GND | Exposed area on the bottom side of the package needs to be soldered to the ground plane of the board for thermal and RF performance. Vias should be located under the EPAD as shown in the recommended land pattern. |

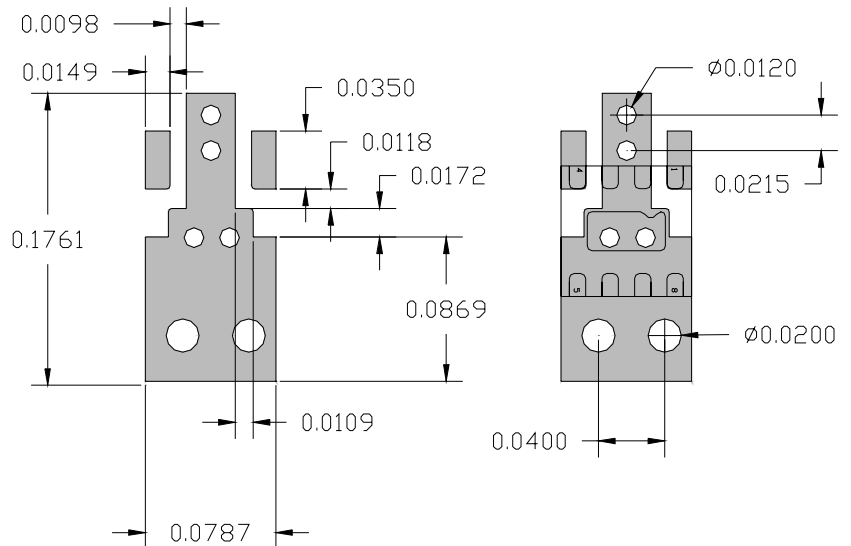
Part Number Ordering Information

| Part Number | Reel Size | Devices / Reel |
|-------------|-----------|----------------|
| SGL-0622Z | 7" | 3000 |

Part Identification



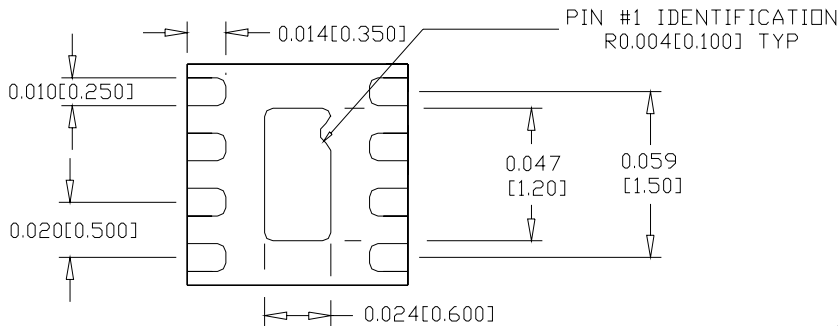
Suggested Pad Layout



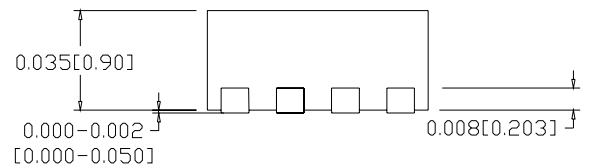
Nominal Package Dimensions

Dimensions in inches [millimeters]
Refer to drawing posted at www.sirenza.com for tolerances.

**Package Type:
2 x 2 QFN**



BOTTOM VIEW



SIDE VIEW