# 24 GHz to 34 GHz, GaAs, MMIC, Subharmonic SMT Mixer

Data Sheet **HMC798ALC4**

## FEATURES

- Single positive supply: 5 V at 97 mA
- Conversion loss: 10 dB typical at 24 GHz to 30 GHz, 10.5 dB typical at 30 GHz to 34 GHz (upconverter)
- Input IP3: 17.5 dBm typical at 24 GHz to 30 GHz, 20 dBm typical at 30 GHz to 34 GHz (upconverter)
- 2 × LO to RF isolation: 36 dB typical at 30 GHz to 34 GHz
- Wide IF bandwidth: dc to 4 GHz
- LO drive level: 4 dBm input
- Subharmonically pumped 2 × LO
- RoHS compliant, 24-terminal, 3.90 mm × 3.90 mm, ceramic LCC package

## APPLICATIONS

- Microwave and very small aperture terminal (VSAT) radios
- Test equipment
- Point to point radios
- Satellite communications (SATCOM)
- Military electronic warfare (EW), electronic countermeasure (ECM), and command, control, communications and intelligence (C3I)

## FUNCTIONAL BLOCK DIAGRAM

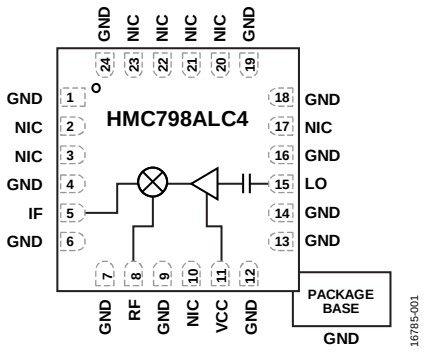


*Figure 1.*

## GENERAL DESCRIPTION

The HMC798ALC4 is a 24 GHz to 34 GHz subharmonically pumped (×2) MMIC mixer with an integrated LO amplifier housed in a leadless, RoHS compliant LCC package. The HMC798ALC4 can be used as an upconverter or downconverter between 24 GHz and 34 GHz.

The 2 × LO to radio frequency (RF) isolation is typically 30 dB in a 24 GHz to 30 GHz frequency range and 36 dB in a 30 GHz to 34 GHz frequency range, eliminating the need for additional filtering. The LO amplifier is single bias at a 5 V dc with a typical 4 dBm LO drive level requirement The HMC798ALC4 eliminates the need for wire bonding, allowing use of surface-mount technology (SMT) manufacturing techniques.

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## REVISION HISTORY

**6/2018—Revision 0: Initial Version**

# SPECIFICATIONS

$V_{CC}$ = 5 V, $T_A$ = 25°C, upconverter ($IF_{IN}$) = 1 GHz at −10 dBm, LO = 4 dBm, upper side band. All measurements performed as an upconverter, unless otherwise noted, on the evaluation printed circuit board (PCB).

**Table 1.**

| Parameter | Symbol | Test Conditions/Comments | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| FREQUENCY RANGE | | | | | | |
| RF | | | 24 | | 34 | GHz |
| LO Input | | | 12 | | 18 | GHz |
| IF | | | DC | | 4 | GHz |
| SUPPLY CURRENT | $I_{CC}$ | | | 97 | 125 | mA |
| SUPPLY VOLTAGE | $V_{CC}$ | | 4.75 | 5 | 5.25 | V |
| LO DRIVE LEVELS | | | 0 | 4 | 6 | dBm |
| 24 GHz to 30 GHz PERFORMANCE | | | | | | |
| Upconverter | $IF_{IN}$ | | | | | |
| Conversion Loss | | | | 10 | 12.5 | dB |
| Input Third-Order Intercept | IP3 | | 12.5 | 17.5 | | dBm |
| Input 1 dB Compression Point | P1dB | | | 6 | | dBm |
| Downconverter | IF | | | | | |
| Conversion Loss | | | | 11 | | dB |
| Input Third-Order Intercept | IP3 | | | 23 | | dBm |
| Input Second-Order Intercept | IP2 | | | 50 | | dBm |
| Input 1 dB Compression Point | P1dB | | | 14 | | dBm |
| Isolation | | | | | | |
| RF to IF | | | | 30 | | dB |
| 2 × LO to RF | | | 22 | 31 | | dB |
| 2 × LO to IF | | | | 26.5 | | dB |
| 30 GHz to 34 GHz PERFORMANCE | | | | | | |
| Upconverter | $IF_{IN}$ | | | | | |
| Conversion Loss | | | | 10.5 | 13.5 | dB |
| Input Third-Order Intercept | IP3 | | 15 | 20 | | dBm |
| Input 1 dB Compression Point | P1dB | | | 9 | | dBm |
| Downconverter | IF | | | | | |
| Conversion Loss | | | | 10.5 | | dB |
| Input Third-Order Intercept | IP3 | | | 25 | | dBm |
| Input Second-Order Intercept | IP2 | | | 43 | | dBm |
| Input 1 dB Compression Point | P1dB | | | 15 | | dBm |
| Isolation | | | | | | |
| RF to IF | | | | 32 | | dB |
| 2 × LO to RF | | | 25 | 36 | | dB |
| 2 × LO to IF | | | | 27 | | dB |

# ABSOLUTE MAXIMUM RATINGS

**Table 2.**

| Parameter | Rating |
|---|---|
| RF Input Power | 13 dBm |
| LO Input Power | 10 dBm |
| IF Input Power | 13 dBm |
| IF Source or Sink Current | 3 mA |
| $V_{CC}$ Supply Voltage | 5.5 V |
| Peak Reflow Temperature | 260°C |
| Maximum Junction Temperature ($T_J$) | 175°C |
| Lifetime at Maximum ($T_J$) | $1 \times 10^6$ hrs |
| Moisture Sensitivity Level (MSL)[1] | MSL3 |
| Continuous Power Dissipation, $P_{DISS}$ ($T_A$ = 85°C, Derate 8.33 mW/°C Above 85°C) | 750 mW |
| Operating Temperature Range | −40°C to +85°C |
| Storage Temperature Range | −65°C to +150°C |
| Lead Temperature Range | −65°C to +150°C |
| Electrostatic Discharge (ESD) Sensitivity | |
| Human Body Model (HBM) | 250 V |
| Field Induced Charged Device Model (FICDM) | 250 V |

[1] Based on IPC/JEDEC J-STD-20 MSL classifications.

Stresses at or above those listed under Absolute Maximum Ratings may cause permanent damage to the product. This is a stress rating only; functional operation of the product at these or any other conditions above those indicated in the operational section of this specification is not implied. Operation beyond the maximum operating conditions for extended periods may affect product reliability.

## THERMAL RESISTANCE

Thermal performance is directly linked to printed circuit board (PCB) design and operating environment. Careful attention to PCB thermal design is required.

$\theta_{JA}$ is the natural convection junction to ambient thermal resistance measured in a one cubic foot sealed enclosure. $\theta_{JC}$ is the junction to case thermal resistance.

**Table 3. Thermal Resistance**

| Package Type | $\theta_{JA}$ | $\theta_{JC}$ | Unit |
|---|---|---|---|
| E-24-1[1] | 120 | 119 | °C/W |

[1] See JEDEC Standard JESD51-2 for additional information on optimizing the thermal impedance (PCB with 3 × 3 vias).

## ESD CAUTION



**ESD (electrostatic discharge) sensitive device.** Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

# PIN CONFIGURATION AND FUNCTION DESCRIPTIONS

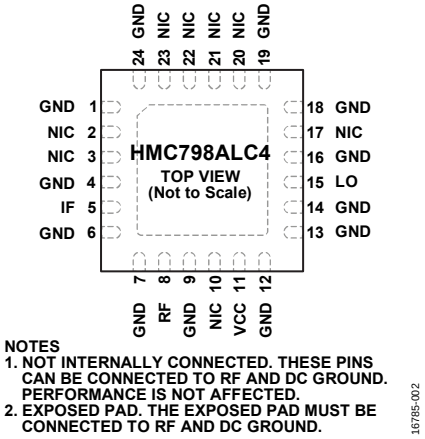


*Figure 2. Pin Configuration*

**Table 4. Pin Function Descriptions**

| Pin No. | Mnemonic | Description |
|---|---|---|
| 1, 4, 6, 7, 9, 12, 13, 14, 16, 18, 19, 24 | GND | Ground. These pins and package bottom must be connected to RF and dc ground. |
| 2, 3, 10, 17, 20, 21, 22, 23 | NIC | Not Internally Connected. These pins can be connected to RF and dc ground. Performance is not affected. |
| 5 | IF | Intermediate Frequency Port. This pin is dc-coupled. For applications not requiring operation to dc, dc block this port externally using a series capacitor of a value chosen to pass the necessary IF frequency range. For operation to dc, this pin must not source or sink more than 3 mA of current or die malfunction and possible die failure may result. |
| 8 | RF | Radio Frequency Port. This pin is dc-coupled and matched to 50 Ω. |
| 11 | $V_{CC}$ | Power Supply for the LO Amplifier. |
| 15 | LO | Local Oscillator Port. This pin is ac-coupled and matched to 50 Ω. |
| 25 | EPAD | Exposed Pad. The exposed pad must be connected to RF and dc ground. |

## INTERFACE SCHEMATICS




*Figure 3. GND Interface Schematic*

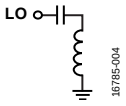


*Figure 4. LO Interface Schematic*

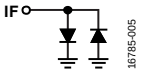


*Figure 5. IF Interface Schematic*

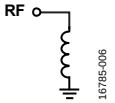


*Figure 6. RF Interface Schematic*

# TYPICAL PERFORMANCE CHARACTERISTICS

## UPCONVERTER PERFORMANCE

### *$IF_{IN}$ = 1 GHz, Upper Sideband*

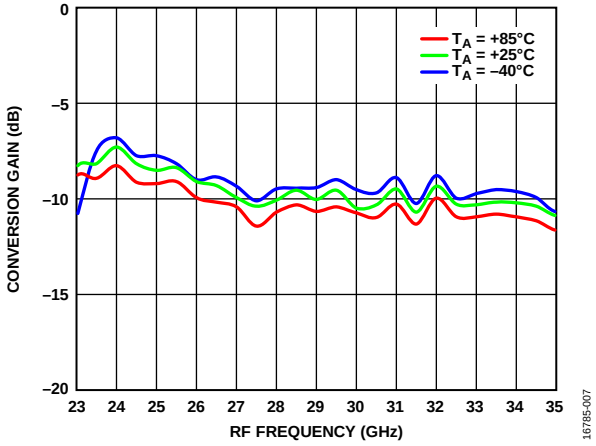


*Figure 7. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm*

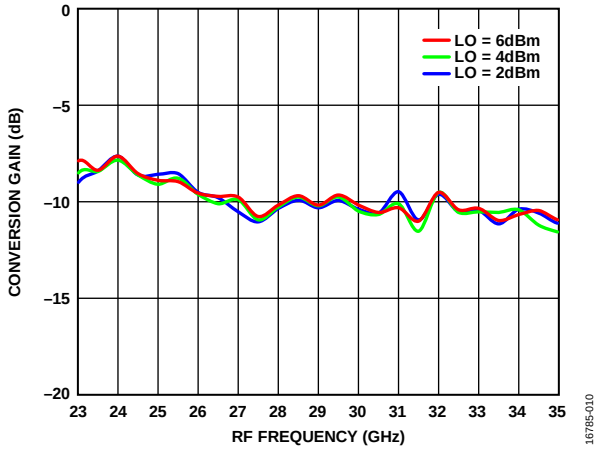


*Figure 10. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

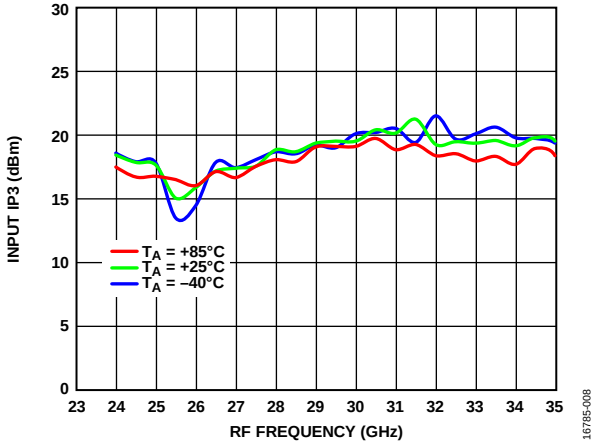


*Figure 8. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

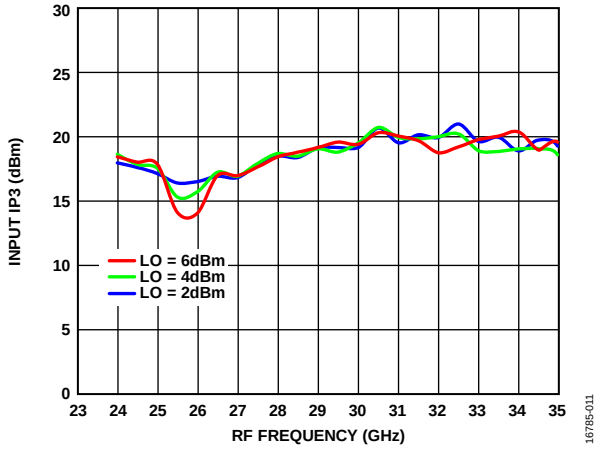


*Figure 11. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

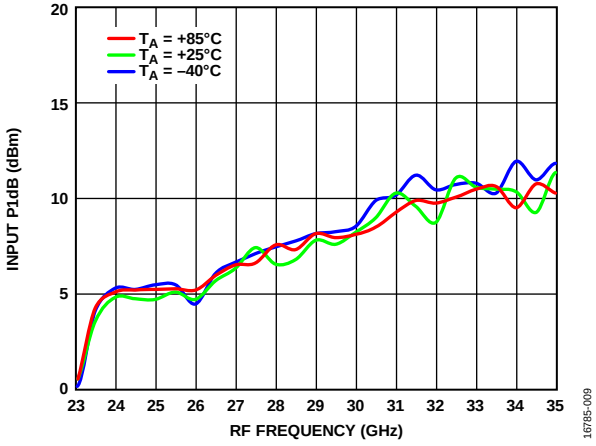


*Figure 9. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm*

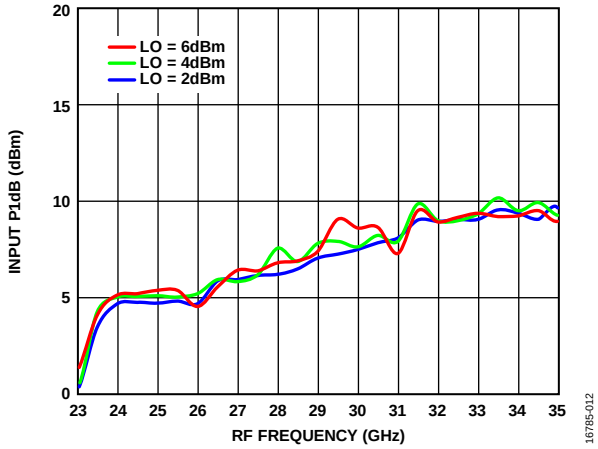


*Figure 12. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### $IF_{IN}$ = 1 GHz, Lower Sideband

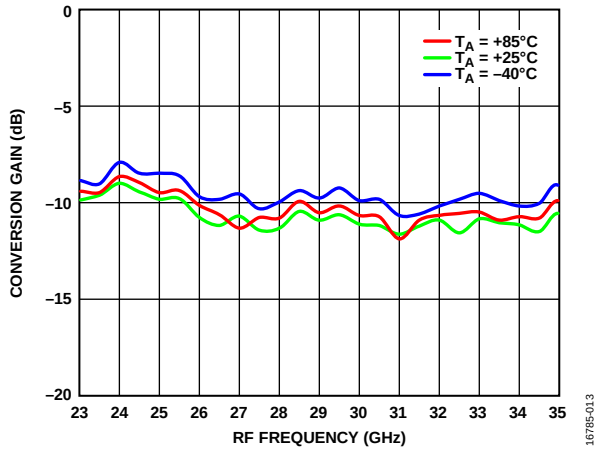


Figure 13. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm

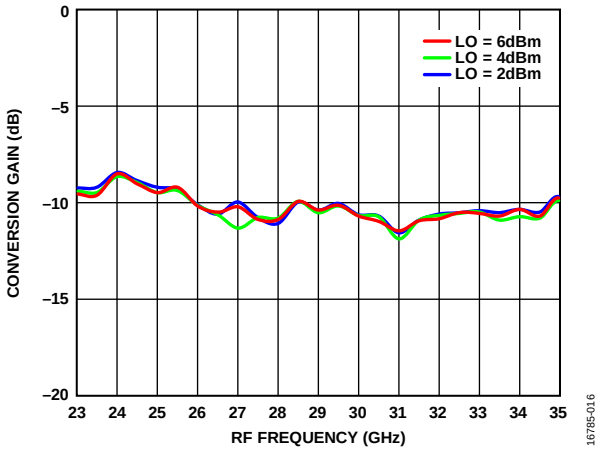


Figure 16. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

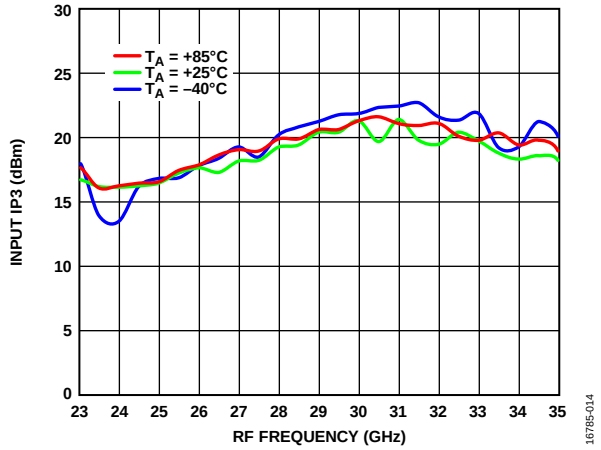


Figure 14. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm

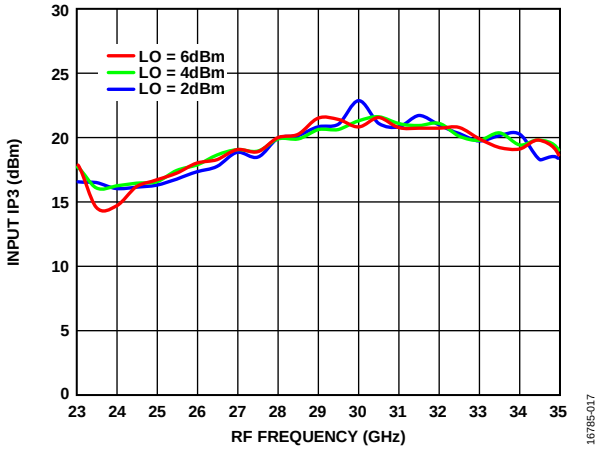


Figure 17. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

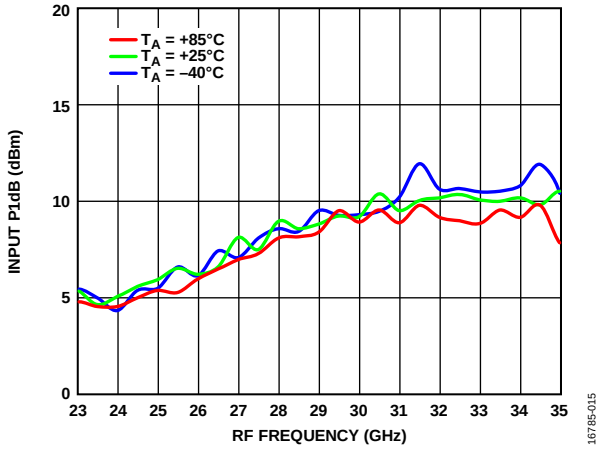


Figure 15. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm

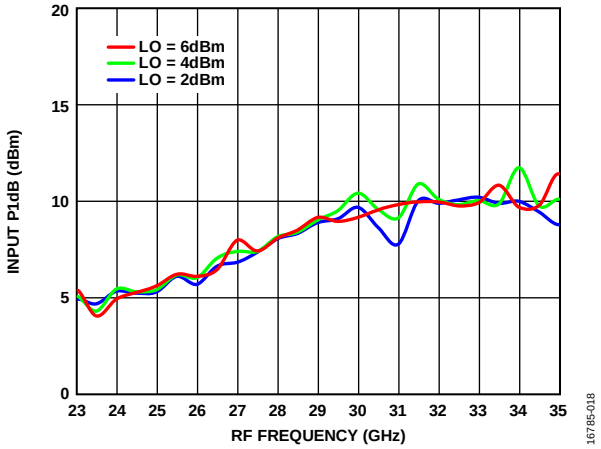


Figure 18. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

### $IF_{IN}$ = 3.75 GHz, Upper Sideband

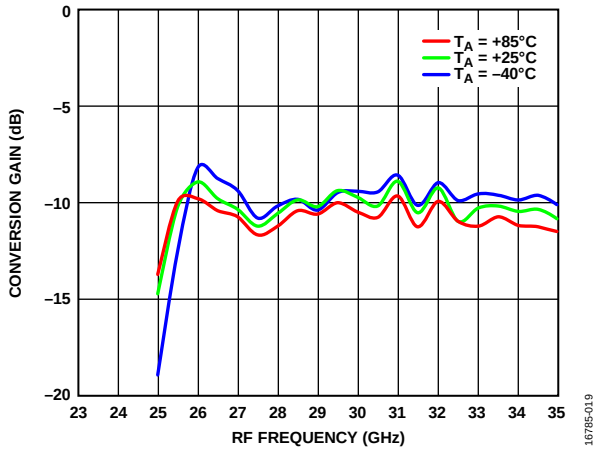


Figure 19. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm

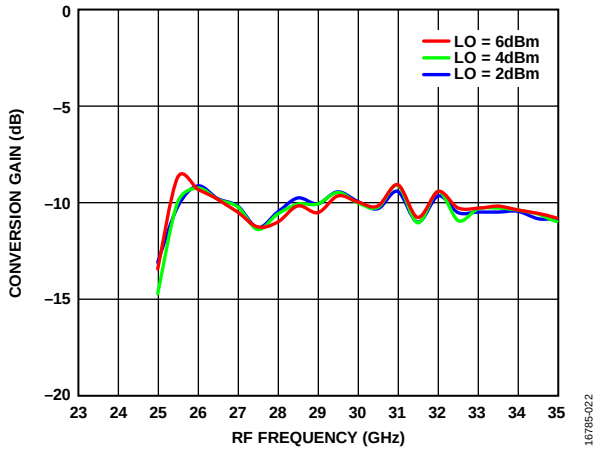


Figure 22. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

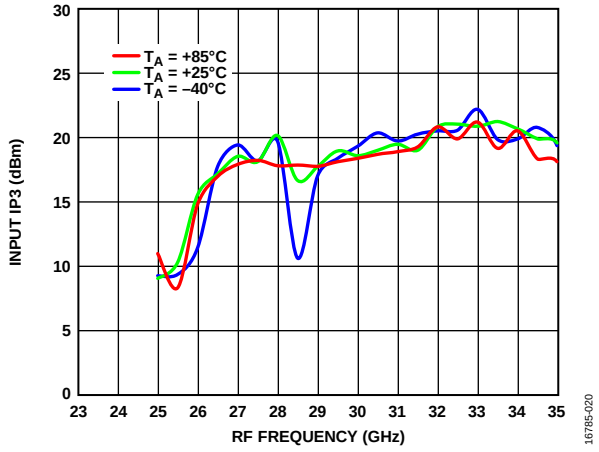


Figure 20. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm

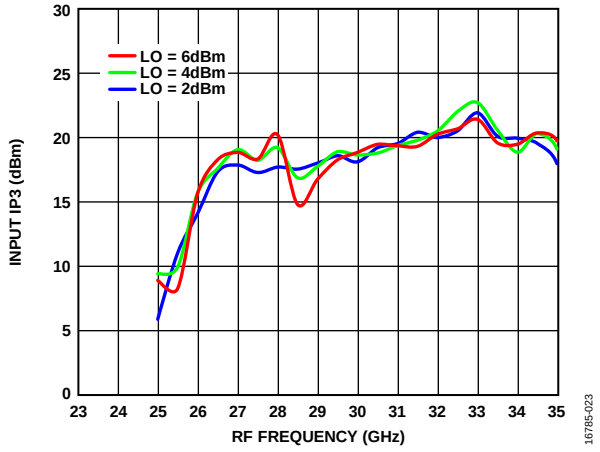


Figure 23. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

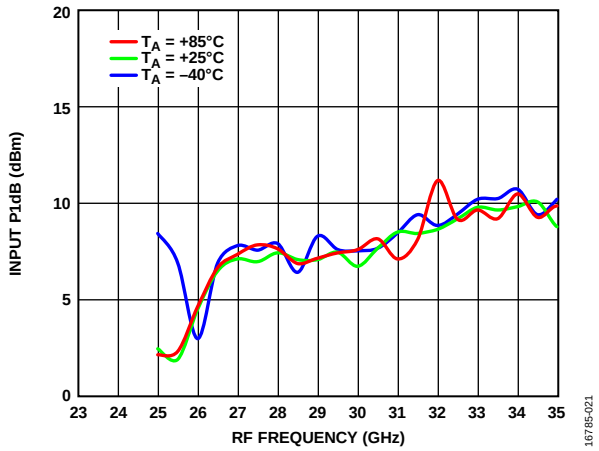


Figure 21. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm

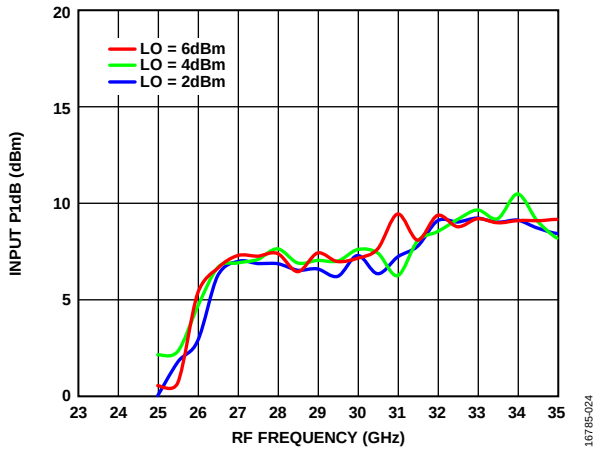


Figure 24. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

### $IF_{IN}$ = 3.75 GHz, Lower Sideband

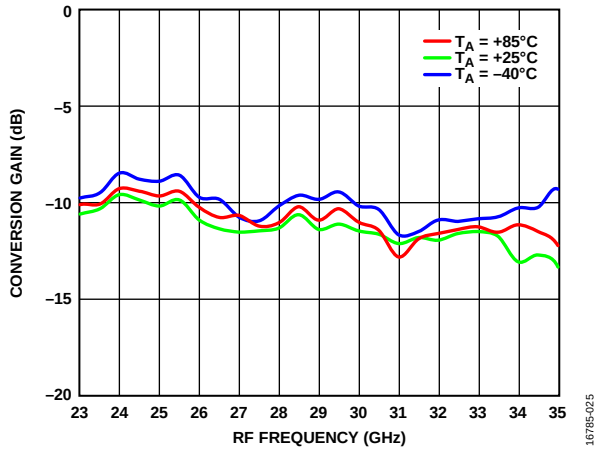


Figure 25. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm

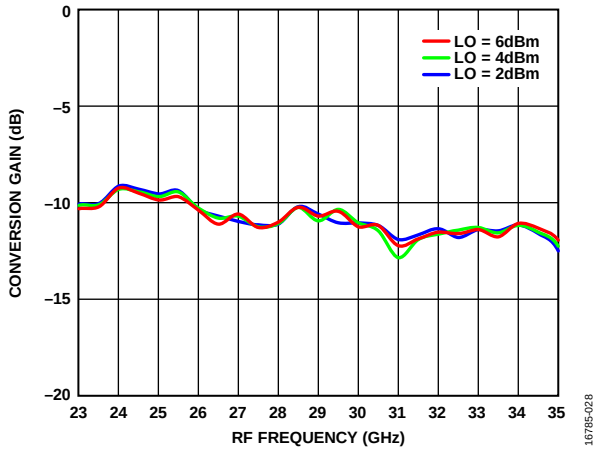


Figure 28. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

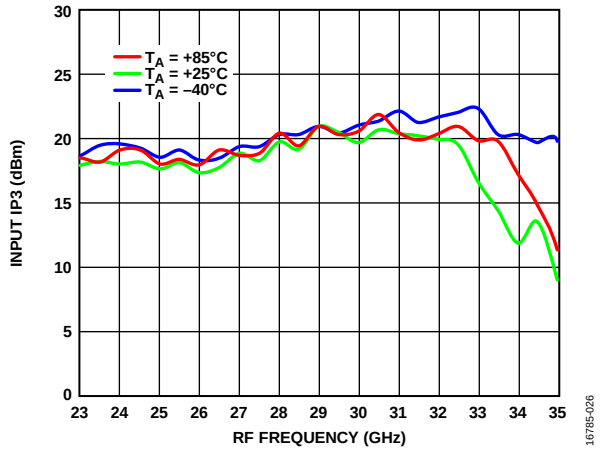


Figure 26. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm

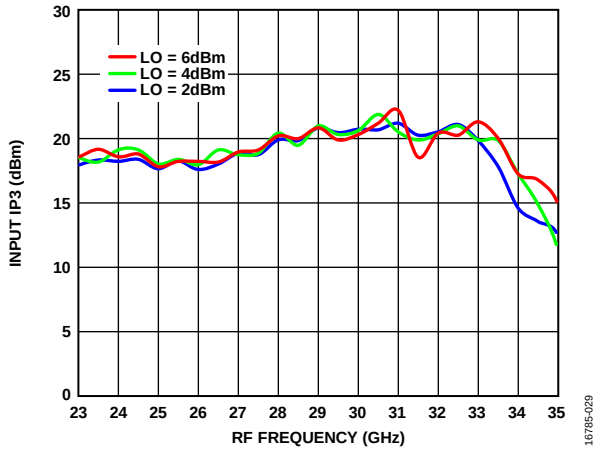


Figure 29. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

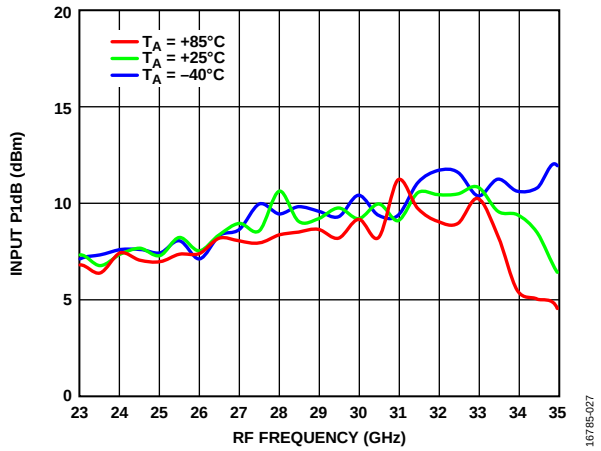


Figure 27. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm

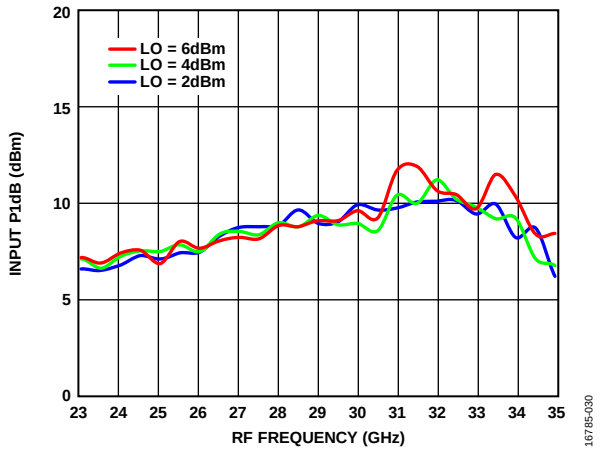


Figure 30. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

## DOWNCONVERTER PERFORMANCE

### *IF = 1 GHz, Upper Sideband (Low-Side LO)*

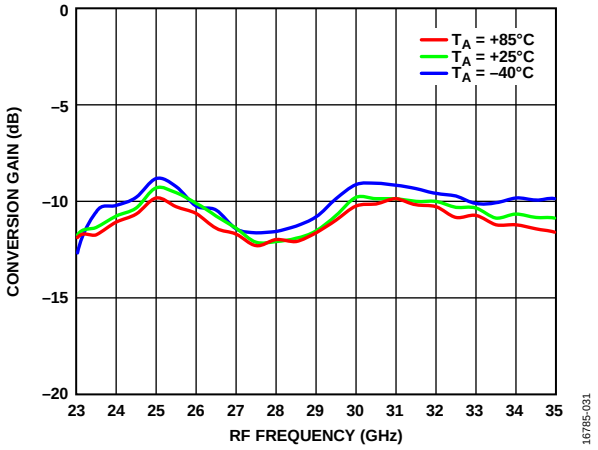


*Figure 31. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm*

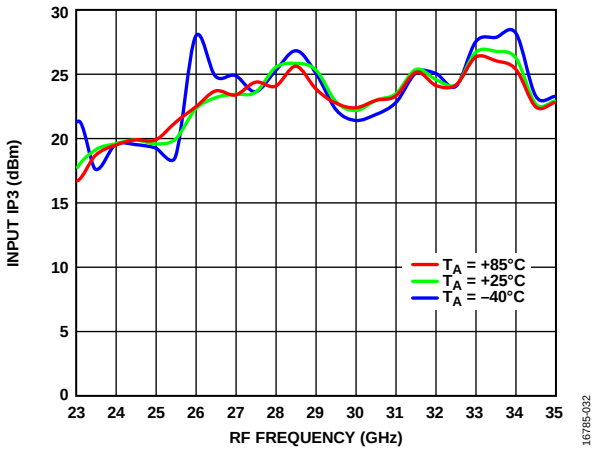


*Figure 32. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

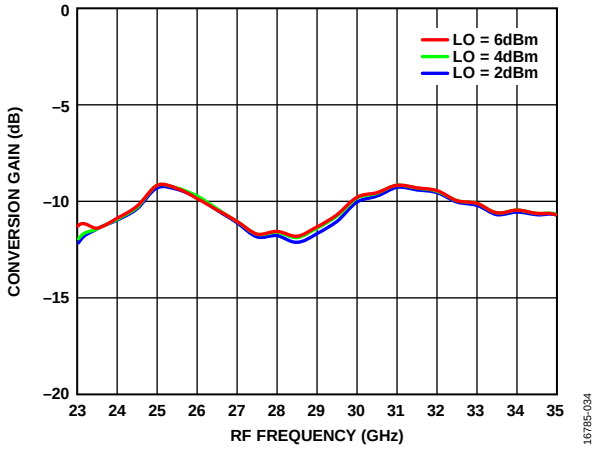


*Figure 33. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

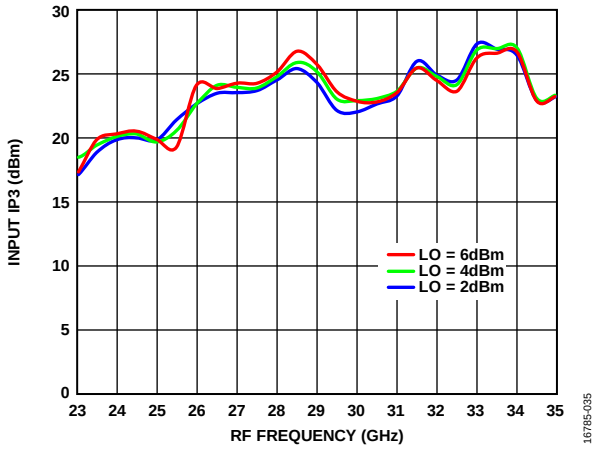


*Figure 34. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *Downconverter IP2 and P1dB, Upper Sideband (Low-Side LO)*

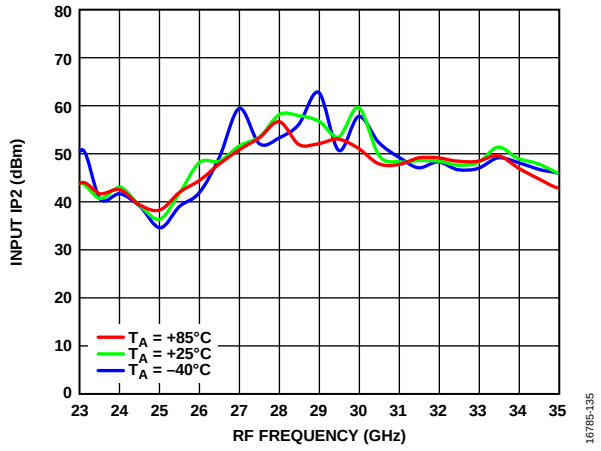


*Figure 35. Input IP2 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

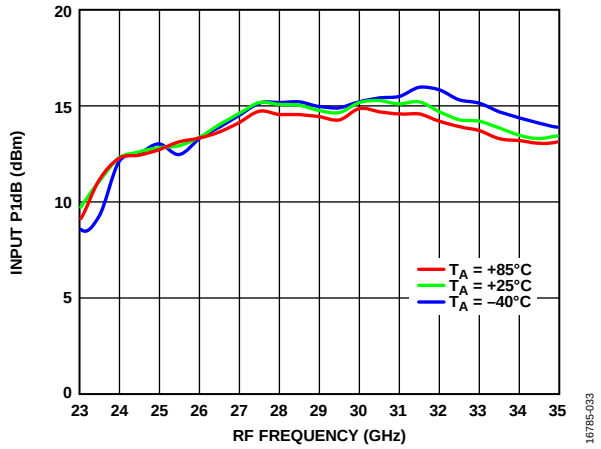


*Figure 36. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm*

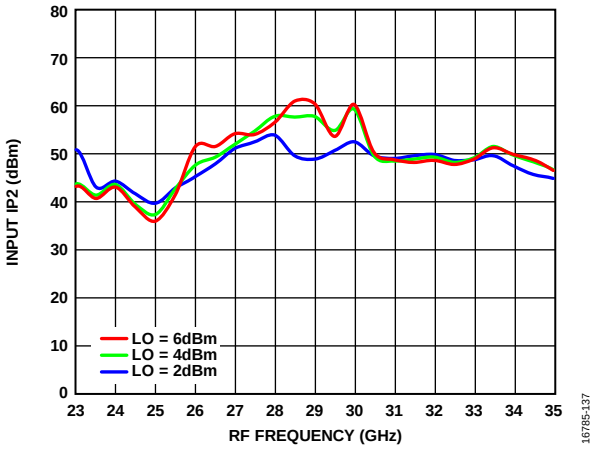


*Figure 37. Input IP2 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

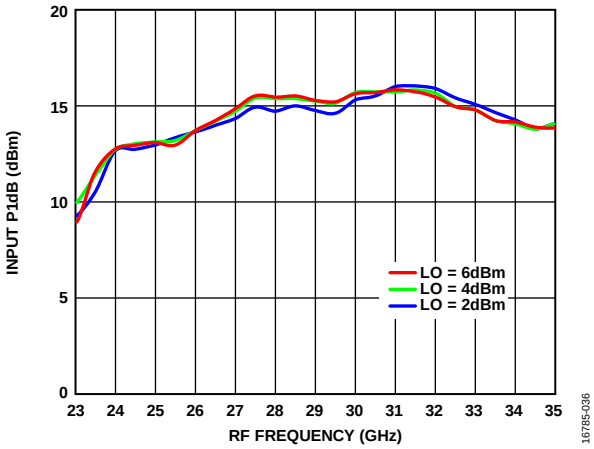


*Figure 38. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *IF = 1 GHz, Lower Sideband (High-Side LO)*

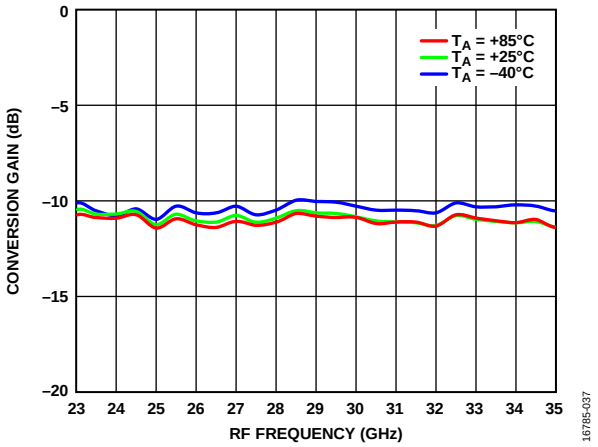


*Figure 39. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm*

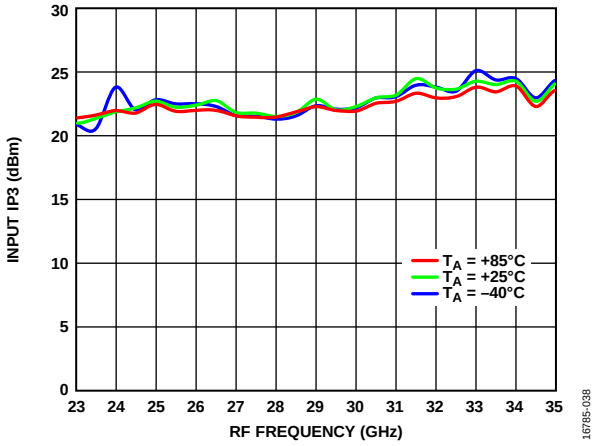


*Figure 40. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

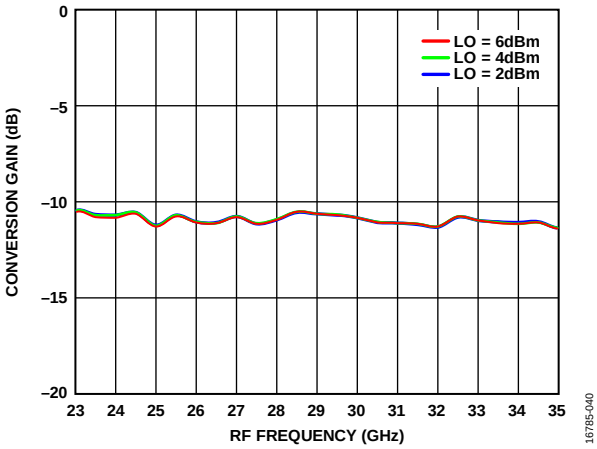


*Figure 41. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

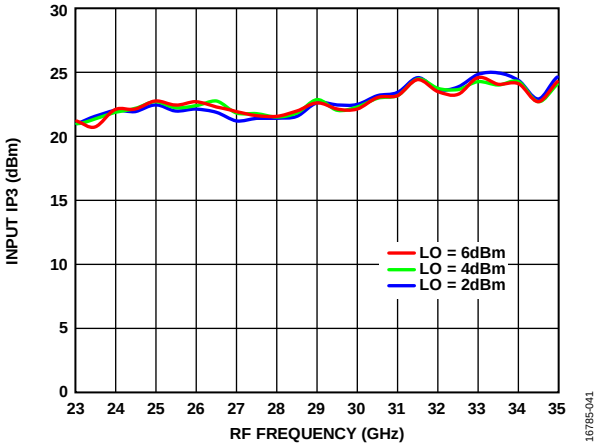


*Figure 42. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *Downconverter IP2 and P1dB, Lower Sideband (High-Side LO)*

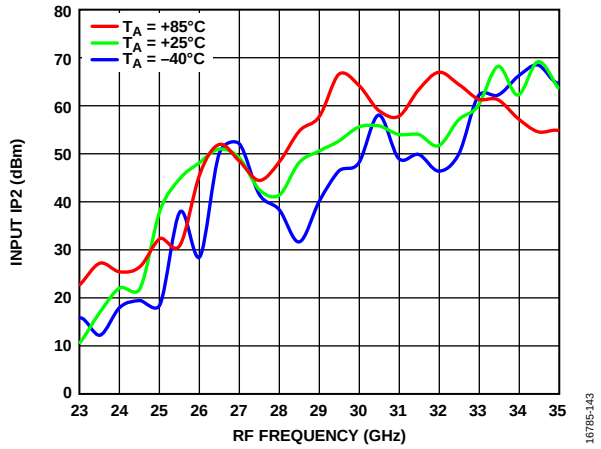


*Figure 43. Input IP2 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

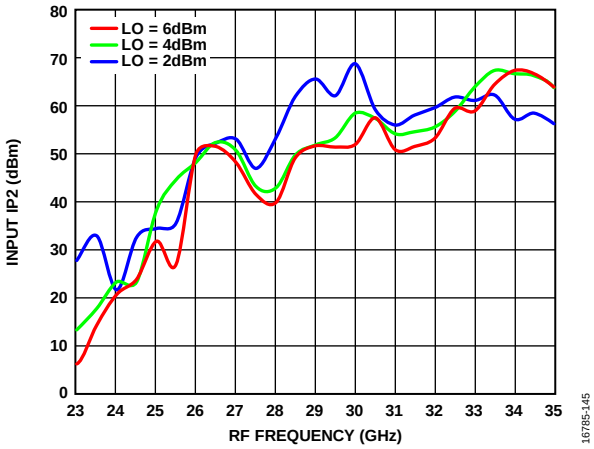


*Figure 45. Input IP2 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

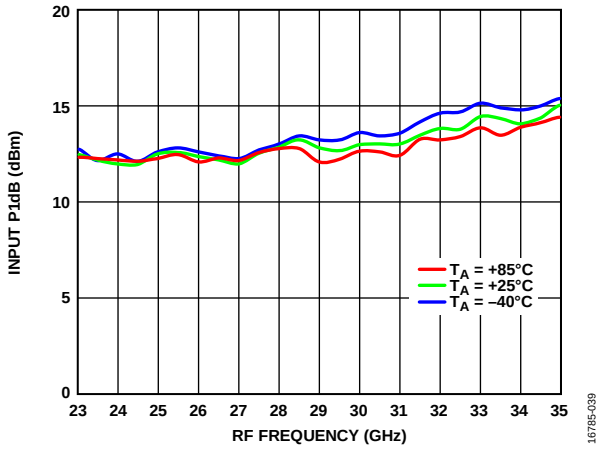


*Figure 44. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm*

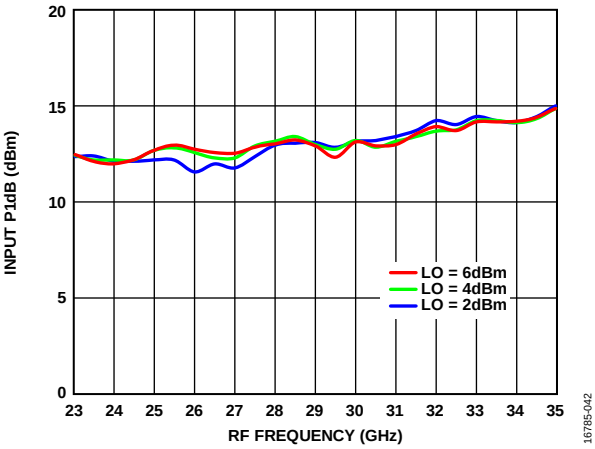


*Figure 46. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *IF = 3.75 GHz, Upper Sideband (Low-Side LO)*

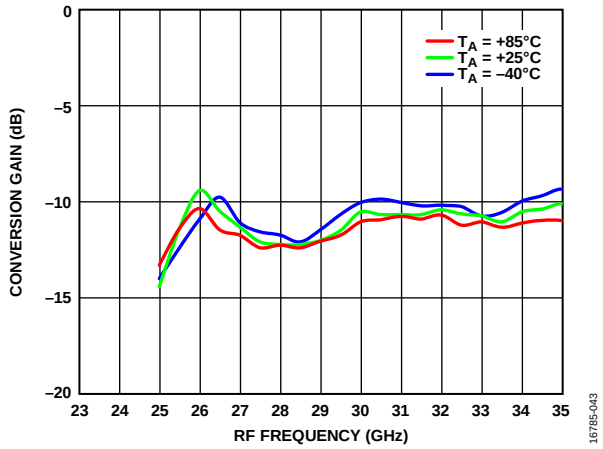


*Figure 47. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm*

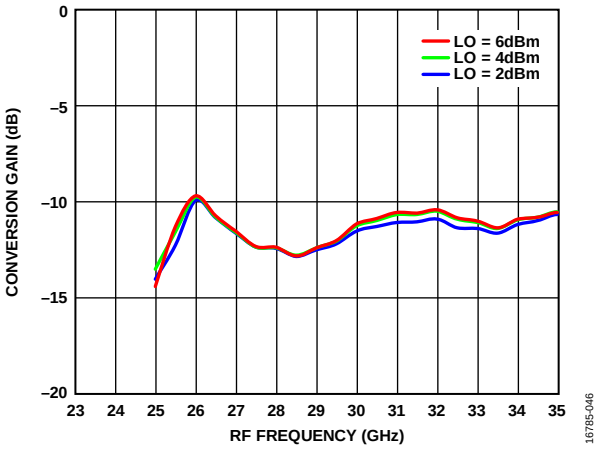


*Figure 49. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

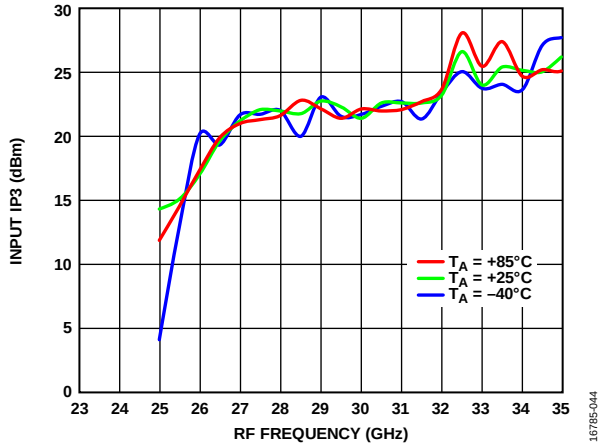


*Figure 48. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

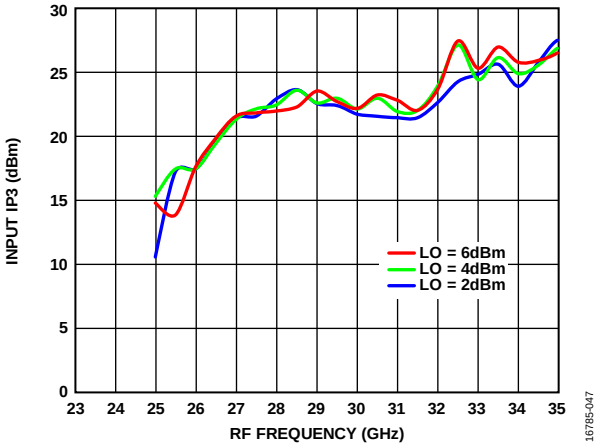


*Figure 50. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *Downconverter IP2 and P1dB, Upper Sideband (Low-Side LO)*

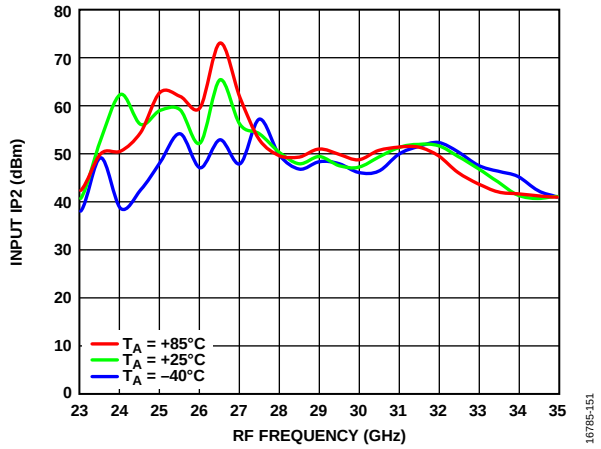


*Figure 51. Input IP2 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

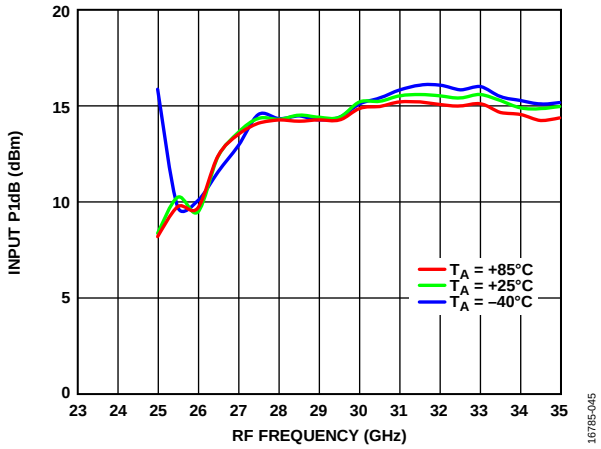


*Figure 52. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm*

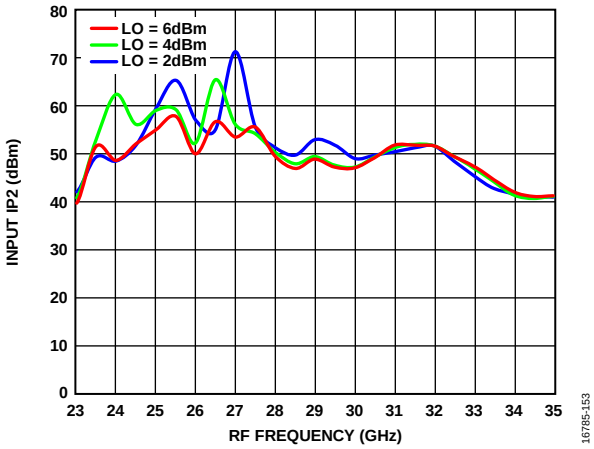


*Figure 53. Input IP2 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

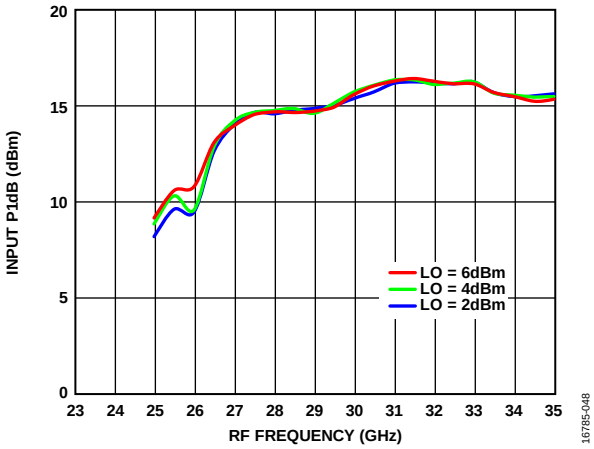


*Figure 54. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *IF = 3.75 GHz, Lower Sideband (High-Side LO)*

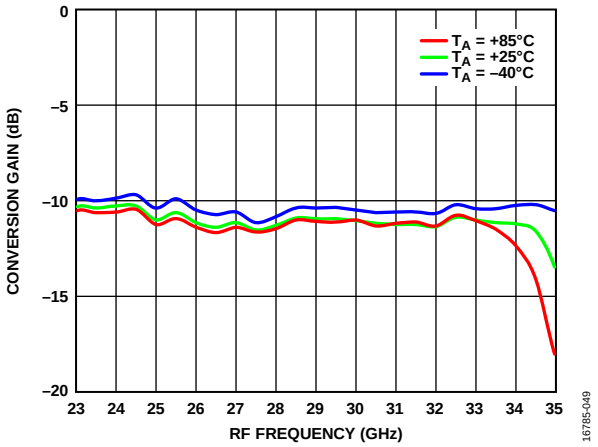


*Figure 55. Conversion Gain vs. RF Frequency at Various Temperatures, LO = 4 dBm*

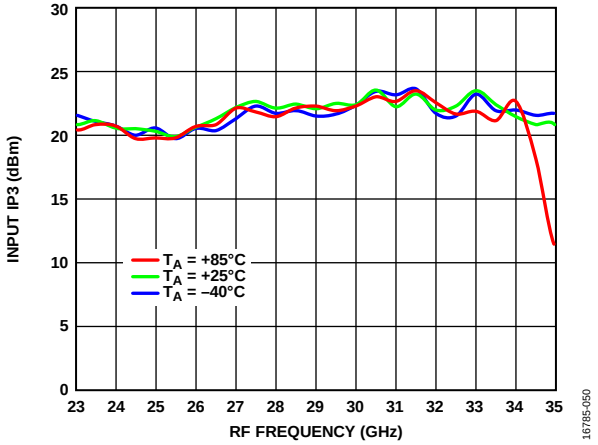


*Figure 56. Input IP3 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

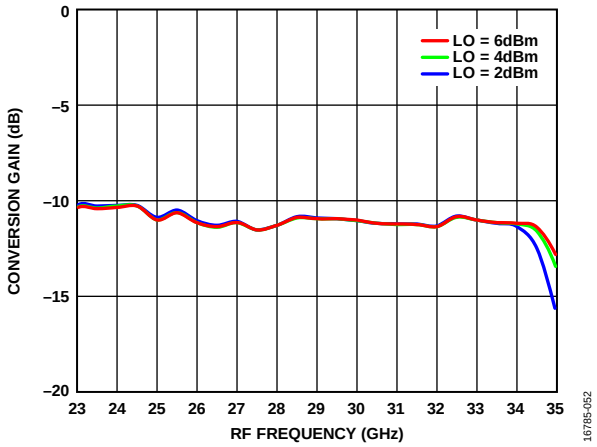


*Figure 57. Conversion Gain vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

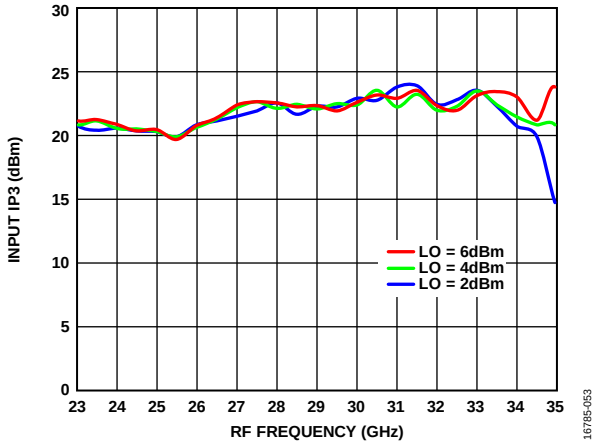


*Figure 58. Input IP3 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

### *Downconverter IP2 and P1dB, Lower Sideband (High-Side LO)*

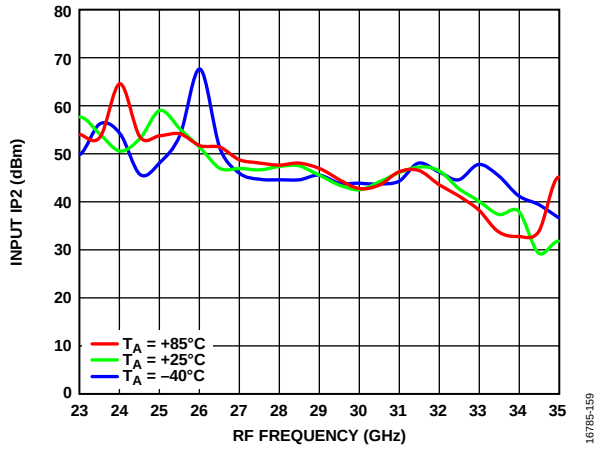


*Figure 59. Input IP2 vs. RF Frequency at Various Temperatures, LO = 4 dBm*

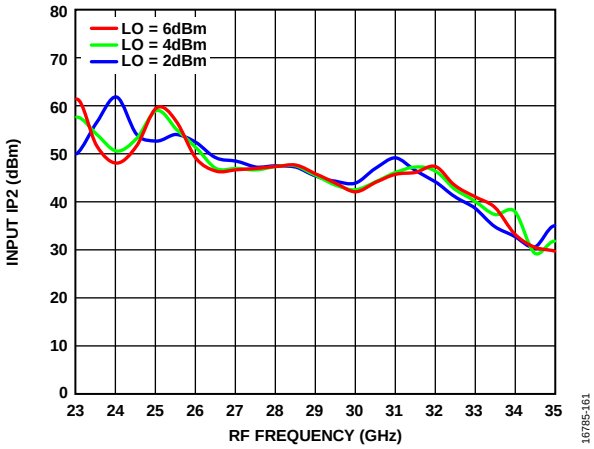


*Figure 61. Input IP2 vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

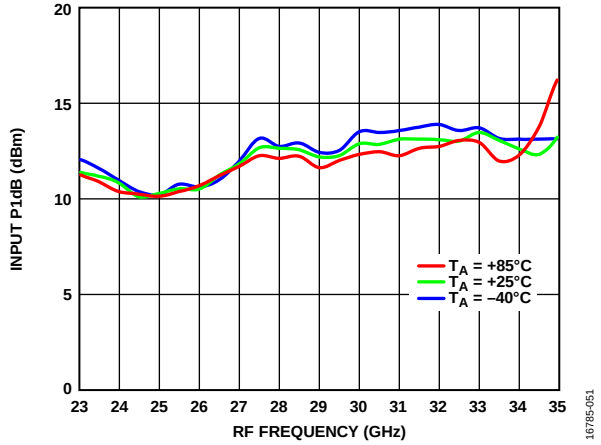


*Figure 60. Input P1dB vs. RF Frequency at Various Temperatures, LO = 4 dBm*

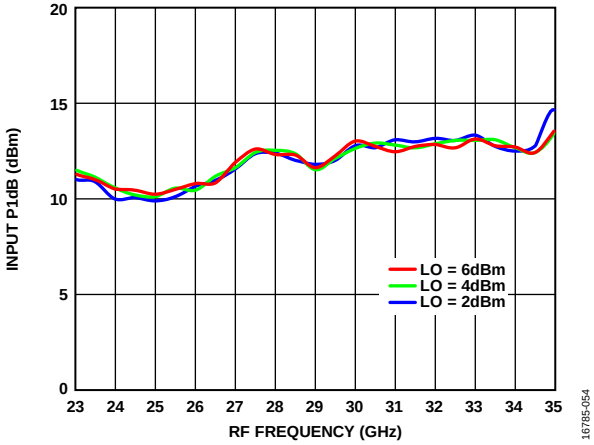


*Figure 62. Input P1dB vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C*

## ISOLATION AND RETURN LOSS

Upconverter performance at $IF_{IN}$ = 1 GHz, upper sideband.

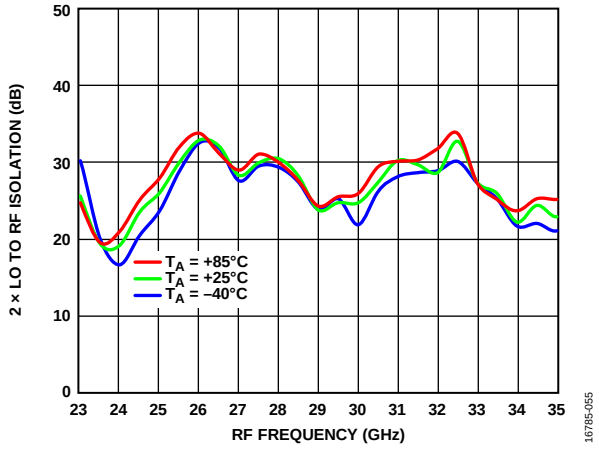


Figure 63. 2 × LO to RF Isolation vs. RF Frequency at Various Temperatures, LO = 4 dBm

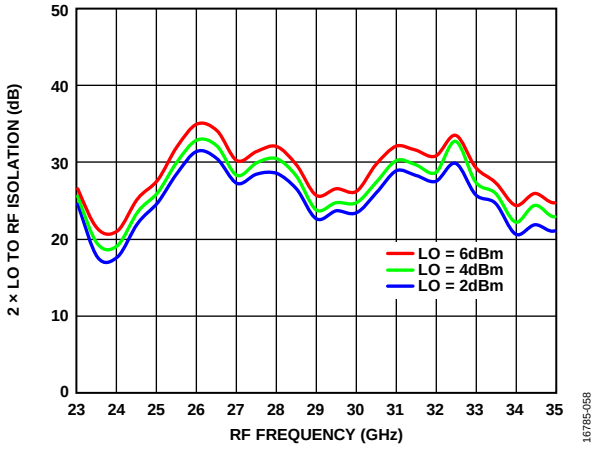


Figure 66. 2 × LO to RF Isolation vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

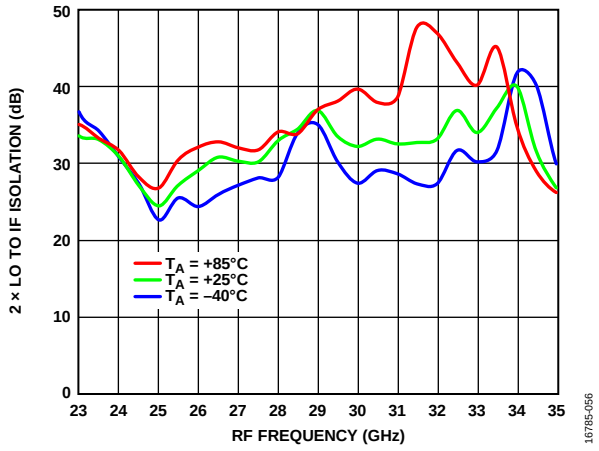


Figure 64. 2 × LO to IF Isolation vs. RF Frequency at Various Temperatures, LO = 4 dBm

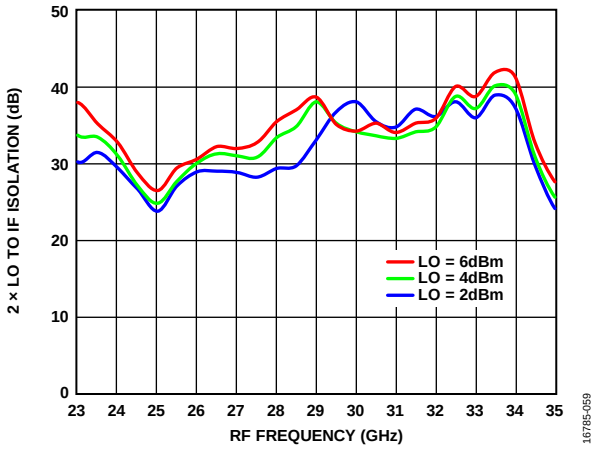


Figure 67. 2 × LO to IF Isolation vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

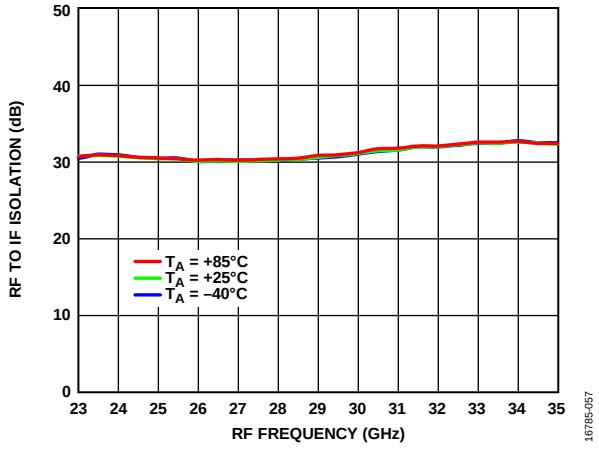


Figure 65. RF to IF Isolation vs. RF Frequency at Various Temperatures, LO = 4 dBm

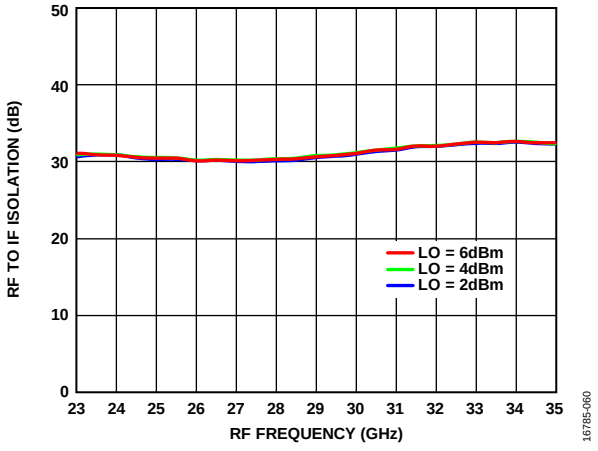


Figure 68. RF to IF Isolation vs. RF Frequency at Various LO Power Levels, $T_A$ = 25°C

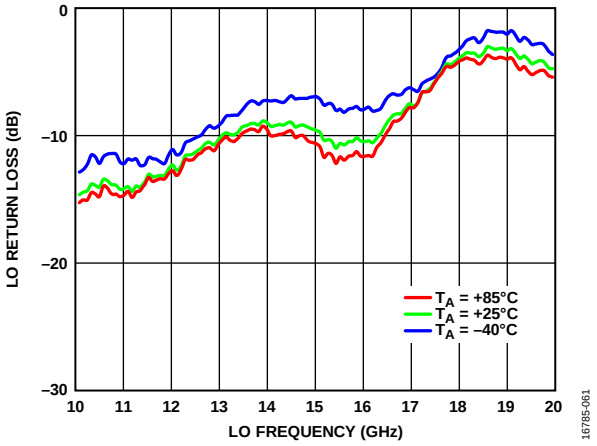


Figure 69. LO Return Loss vs. LO Frequency at Various Temperatures, LO = 4 dBm

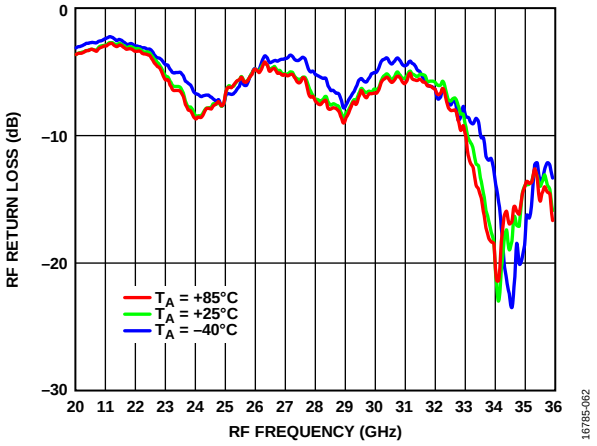


Figure 70. RF Return Loss vs. RF Frequency at Various Temperatures, LO = 14 GHz at 4 dBm

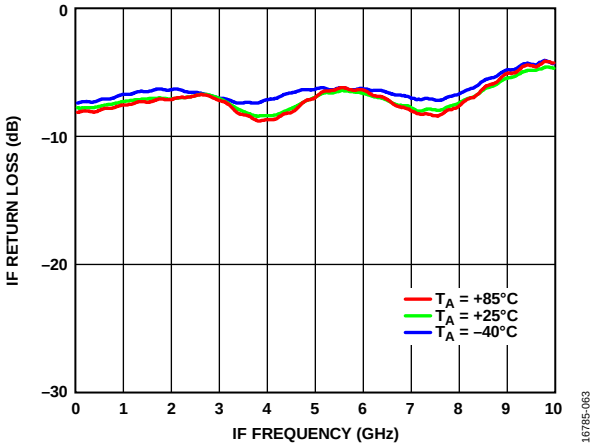


Figure 71. IF Return Loss vs. IF Frequency at Various Temperatures, LO = 14 GHz at 4 dBm

## IF BANDWIDTH—DOWNCONVERTER, UPPER SIDEBAND

LO frequency = 8 GHz.

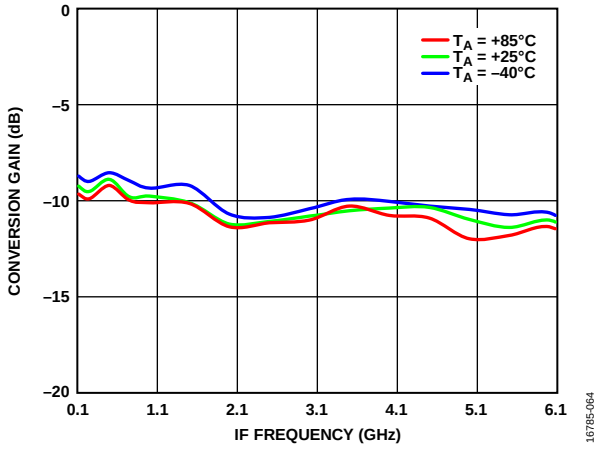


*Figure 72. Conversion Gain vs. IF Frequency at Various Temperatures, LO = 4 dBm*

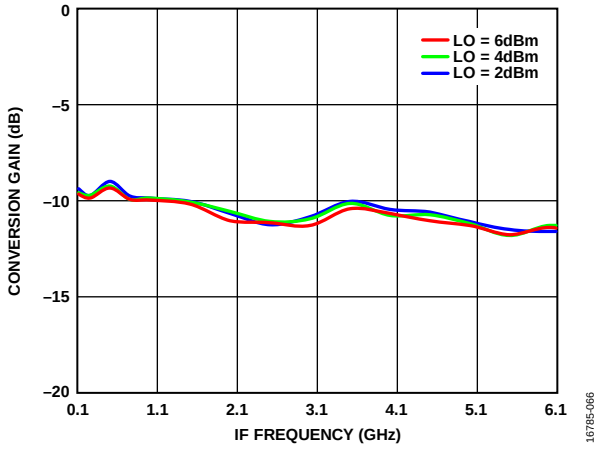


*Figure 74. Conversion Gain vs. IF Frequency at Various LO Power Levels, $T_A$ = 25°C*

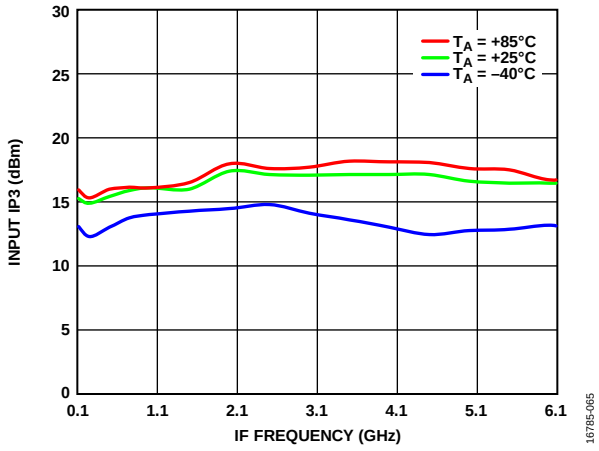


*Figure 73. Input IP3 vs. IF Frequency at Various Temperatures, LO = 4 dBm*

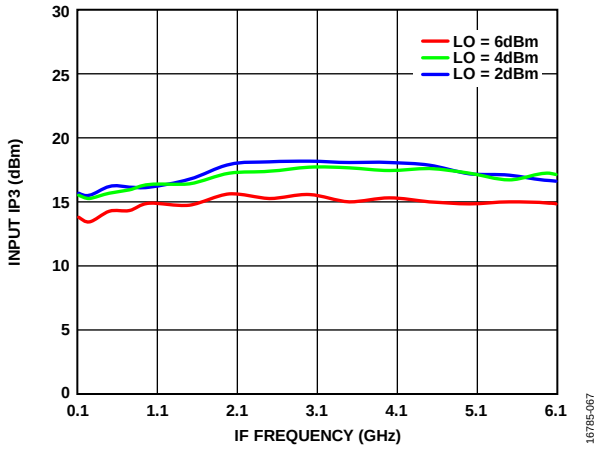


*Figure 75. Input IP3 vs. IF Frequency at Various LO Power Levels, $T_A$ = 25°C*

## IF BANDWIDTH—DOWNCONVERTER, LOWER SIDEBAND

LO frequency = 13 GHz.

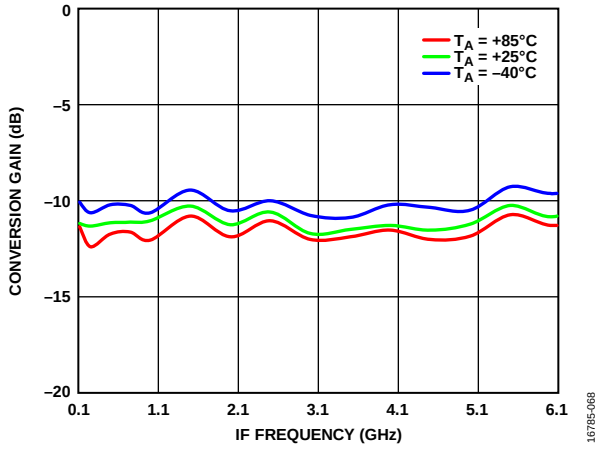


*Figure 76. Conversion Gain vs. IF Frequency at Various Temperatures, LO = 4 dBm*

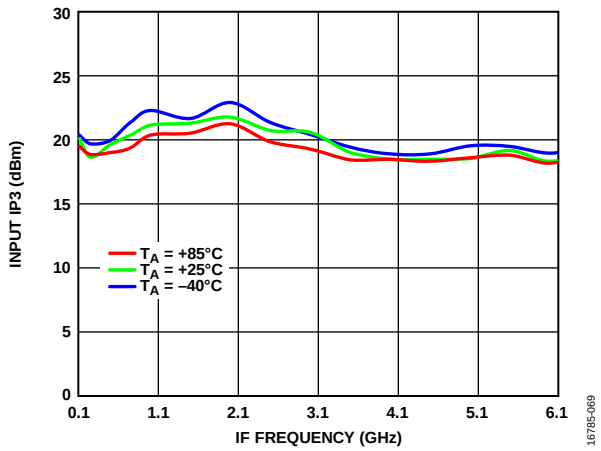


*Figure 77. Input IP3 vs. IF Frequency at Various Temperatures, LO = 4 dBm*

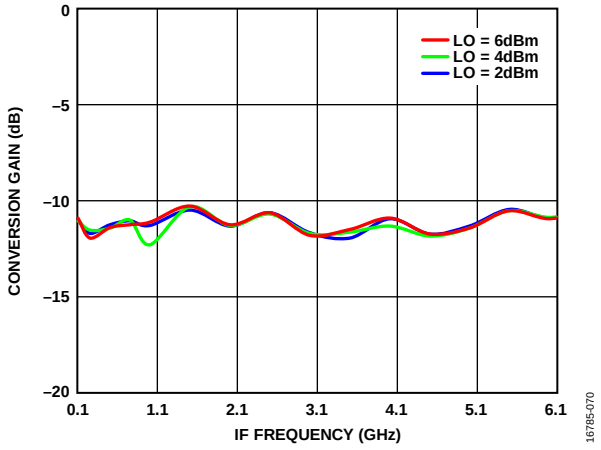


*Figure 78. Conversion Gain vs. IF Frequency at Various LO Power Levels, $T_A$ = 25°C*

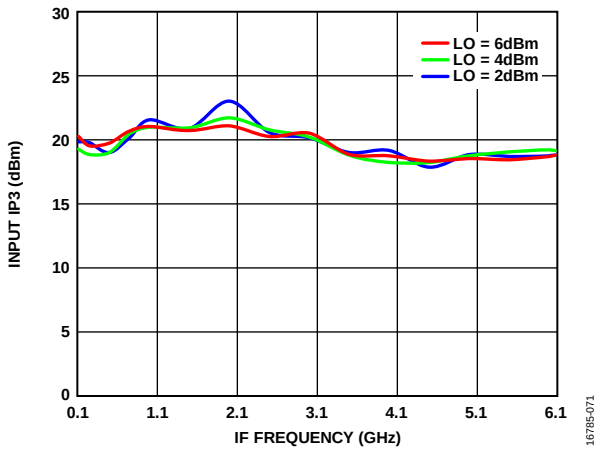


*Figure 79. Input IP3 vs. IF Frequency at Various LO Power Levels, $T_A$ = 25°C*

## SPURIOUS AND HARMONICS PERFORMANCE

### *M × N Spurious Outputs*

#### Downconversion, Upper Sideband

Spur values are (M × RF) − (N × LO). RF = 10.1 GHz, LO = 10 GHz, RF power = −10 dBm, and LO power = 13 dBm. Mixer spurious products are measured in dBc from the IF output power level. N/A means not applicable.

| | | N × LO | | | | |
|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** |
| **M × RF** | **0** | 0 | 25 | 3 | N/A | N/A |
| | **1** | 18 | 28 | 0 | 25 | 47 |
| | **2** | N/A | N/A | 63 | 75 | 71 |
| | **3** | N/A | N/A | N/A | N/A | 72 |
| | **4** | N/A | N/A | N/A | N/A | N/A |

#### Downconversion, Lower Sideband

Spur values are (M × RF) − (N × LO). RF = 14 GHz, LO = 14.1 GHz, RF power = −10 dBm, and LO power = 13 dBm. Mixer spurious products are measured in dBc from the IF output power level. N/A means not applicable.

| | | N × LO | | | | |
|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** |
| **M × RF** | **0** | 0 | 18 | 0 | N/A | N/A |
| | **1** | 22 | 33 | 0 | 30 | 48 |
| | **2** | N/A | N/A | 58 | 75 | 62 |
| | **3** | N/A | N/A | N/A | N/A | 70 |
| | **4** | N/A | N/A | N/A | N/A | N/A |

#### Upconversion, Upper Sideband

Spur values are (M × $IF_{IN}$) + (N × LO). $IF_{IN}$ = 0.1 GHz, LO = 10 GHz, RF power = −10 dBm, and LO power = 13 dBm. Mixer spurious products are measured in dBc from the RF output power level. N/A means not applicable.

| | | N × LO | | | | |
|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** |
| **M × $IF_{IN}$** | **−5** | 75 | 77 | 74 | 70 | N/A |
| | **−4** | 80 | 79 | 73 | 70 | N/A |
| | **−3** | 83 | 77 | 63 | 71 | N/A |
| | **−2** | 85 | 78 | 44 | 74 | N/A |
| | **−1** | 49 | 39 | 3 | 53 | N/A |
| | **0** | 0 | 12 | 14 | 0 | N/A |
| | **+1** | 50 | 36 | 0 | 53 | N/A |
| | **+2** | 83 | 73 | 44 | 73 | N/A |
| | **+3** | 81 | 77 | 68 | 71 | N/A |
| | **+4** | 77 | 78 | 73 | 70 | N/A |
| | **+5** | 78 | 77 | 72 | 69 | N/A |

#### Upconversion, Lower Sideband

Spur values are (M × $IF_{IN}$) + (N × LO). $IF_{IN}$ = 0.1 GHz, LO = 14.1 GHz, RF power = −10 dBm, and LO power = 13 dBm. Mixer spurious products are measured in dBc from the RF output power level. N/A means not applicable.

| | | N × LO | | | | |
|---|---|---|---|---|---|---|
| | | **0** | **1** | **2** | **3** | **4** |
| **M × $IF_{IN}$** | **−5** | 76 | 76 | 68 | N/A | N/A |
| | **−4** | 76 | 77 | 72 | N/A | N/A |
| | **−3** | 80 | 77 | 69 | N/A | N/A |
| | **−2** | 82 | 75 | 40 | N/A | N/A |
| | **−1** | 53 | 45 | 0 | N/A | N/A |
| | **0** | 0 | 24 | 8 | N/A | N/A |
| | **+1** | 53 | 41 | 0 | N/A | N/A |
| | **+2** | 82 | 73 | 44 | N/A | N/A |
| | **+3** | 79 | 74 | 63 | N/A | N/A |
| | **+4** | 79 | 73 | 65 | N/A | N/A |
| | **+5** | 75 | 73 | 68 | N/A | N/A |

# THEORY OF OPERATION

The HMC798ALC4 is a subharmonically pumped (×2) MMIC mixer with an integrated LO amplifier that can be used as an upconverter or a downconverter from 24 GHz to 34 GHz. The LO amplifier is single bias at a 5 V dc with a typical 4 dBm LO drive level.

When used as a downconverter, the HMC798ALC4 downconverts radio frequencies between 24 GHz and 34 GHz to intermediate frequencies between dc and 4 GHz.

When used as an upconverter, the mixer up converts IF between dc and 4 GHz to RF between 24 GHz and 34 GHz.

# APPLICATIONS INFORMATION

## TYPICAL APPLICATION CIRCUIT

Figure 80 shows the typical application circuit for the HMC798ALC4. The integrated LO amplifier is single bias at 5 V with a typical 4 dBm input. Place capacitors as close as possible to the pin to decouple the power supply. The LO and RF pins are internally ac-coupled. The IF pin is internally dc-coupled. When IF operation to dc is not required, use of an external series capacitor is recommended, of a value chosen to pass the necessary IF frequency range. When IF operation to dc is required, do not exceed the IF source or sink current rating specified in the Absolute Maximum Ratings section.

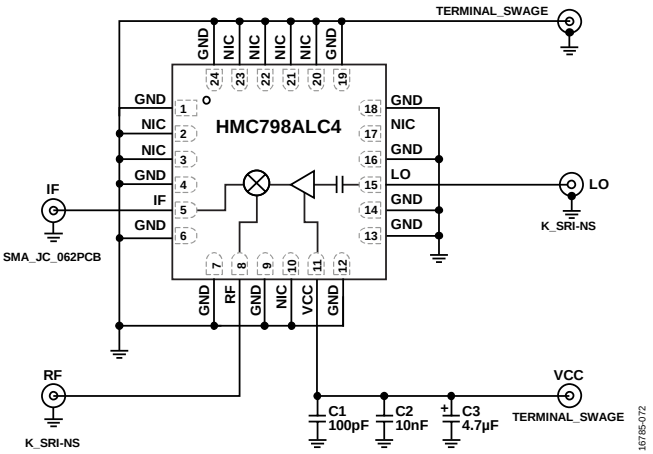


*Figure 80. Typical Application Circuit*

## EVALUATION PCB INFORMATION

Use RF circuit design techniques for the circuit board used in the application. Ensure that signal lines have 50 Ω impedance, and connect the package ground leads and the exposed pad directly to the ground plane (see Figure 81). Use a sufficient number of via holes to connect the top and bottom ground planes. The evaluation circuit board shown in Figure 81 is available from Analog Devices, Inc., upon request.

**Table 5. List of Materials for Evaluation PCB EV1HMC798ALC4**

| Item | Description |
|---|---|
| J1 | Johnson Surface-Mount Type A (SMA) connector |
| J2, J3 | SRI 2.92 mm connector |
| U1 | HMC798ALC4 |
| PCB[1] | 126598-1 evaluation board |
| C1 | C0G, 0402, 100 pF capacitor |
| C2 | X7R, 0603, 10000 pF capacitor |
| C3 | SMD, 3216, 4.7 µF capacitor |

[1] 126598-1 is the raw bare PCB identifier. Reference EV1HMC798ALC4 when ordering the complete evaluation PCB.

## SOLDERING INFORMATION AND RECOMMENDED LAND PATTERN

Figure 81 shows the recommended land pattern for the HMC798ALC4. The HMC798ALC4 is contained in a 3.90 mm × 3.90 mm, 24-terminal, ceramic LCC package with an exposed ground pad (EPAD). This exposed pad is internally connected to the ground of the chip. To minimize thermal impedance and ensure electrical performance, solder the exposed pad to the low impedance ground plane on the PCB. It is recommended that the ground planes on all layers under the exposed pad be stitched together with vias to further reduce thermal impedance. The land pattern on the HMC798ALC4 evaluation board provides a simulated thermal resistance ($\theta_{JC}$) of 119°C/W.

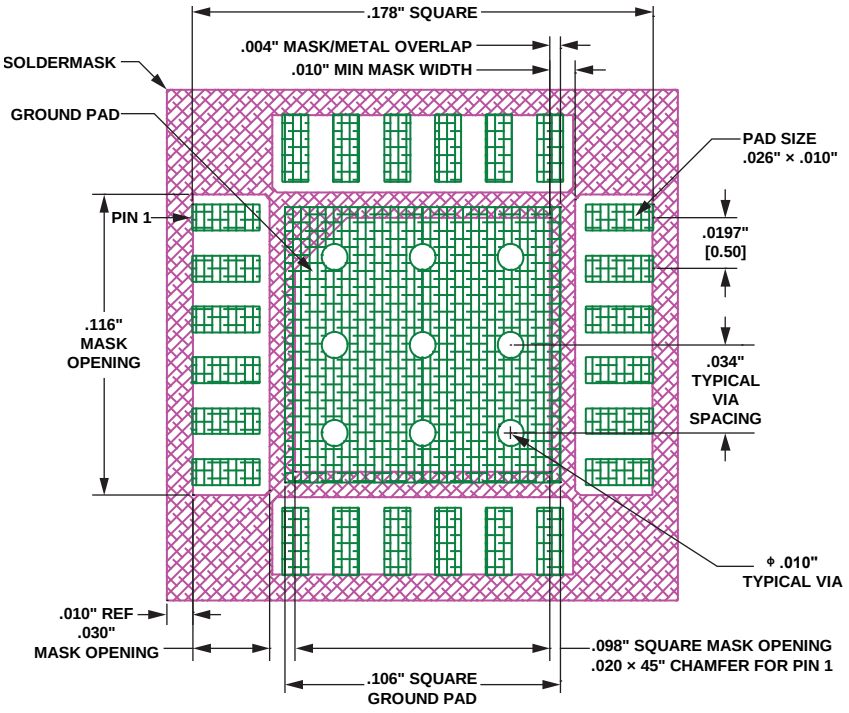


*Figure 81. Evaluation Board Land Pattern for the HMC798ALC4 Package*

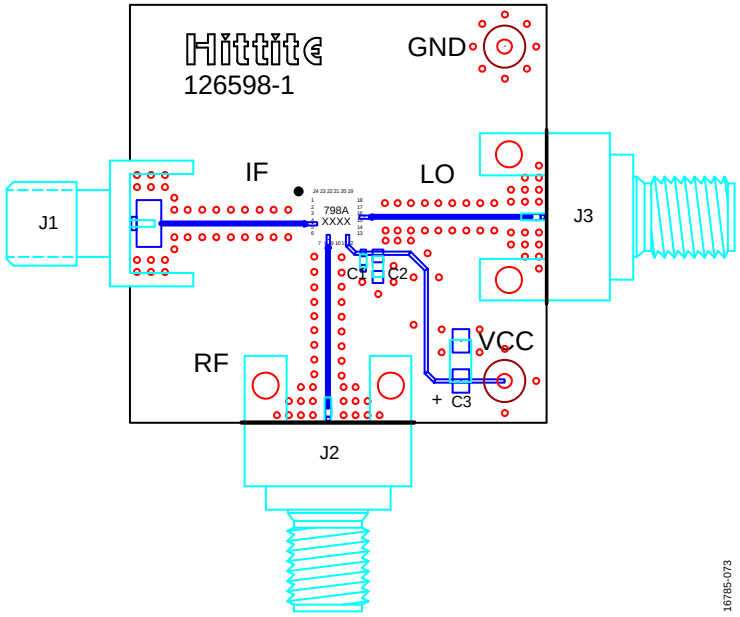


*Figure 82. Evaluation PCB Top Layer*

# OUTLINE DIMENSIONS

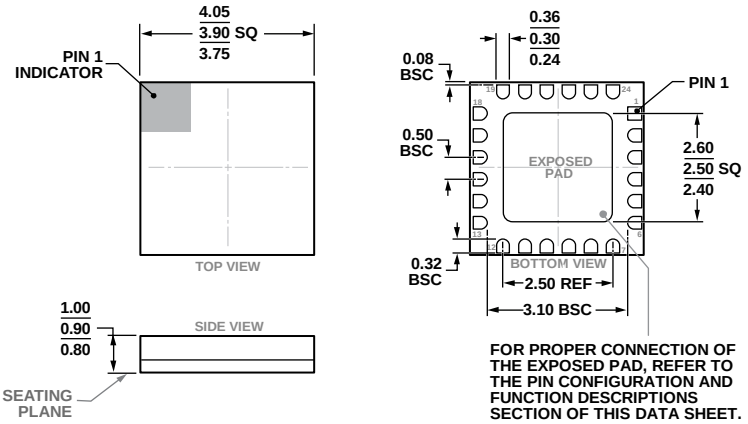


*Figure 83. 24-Terminal Ceramic Leadless Chip Carrier [LCC]*
*(E-24-1)*
*Dimensions shown in millimeters*

## ORDERING GUIDE

| Model[1] | Temperature Range | MSL Rating[2] | Package Description | Package Option |
|---|---|---|---|---|
| HMC798ALC4 | −40°C to +85°C | MSL3 | 24-Terminal Ceramic Leadless Chip Carrier [LCC] | E-24-1 |
| HMC798ALC4TR | −40°C to +85°C | MSL3 | 24-Terminal Ceramic Leadless Chip Carrier [LCC] | E-24-1 |
| HMC798ALC4TR-R5 | −40°C to +85°C | MSL3 | 24-Terminal Ceramic Leadless Chip Carrier [LCC] | E-24-1 |
| EV1HMC798ALC4 | | | Evaluation PCB Assembly | |

[1] All models are RoHS compliant parts.
[2] The peak reflow temperature is 260°C. See the Absolute Maximum Ratings section, Table 2.

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