

INA-01100 Absolute Maximum Ratings

| Parameter | Absolute Maximum ^[1] |
|------------------------------------|---------------------------------|
| Device Current | 50 mA |
| Power Dissipation ^[2,3] | 400 mW |
| RF Input Power | +13 dBm |
| Junction Temperature | 200°C |
| Storage Temperature | -65 to 200°C |

Thermal Resistance:

$$\theta_{jc} = 60^\circ\text{C/W}$$

Notes:

1. Permanent damage may occur if any of these limits are exceeded.
2. $T_{\text{Mounting Surface}} (T_{\text{MS}}) = 25^\circ\text{C}$.
3. Derate at 16.7 mW/°C for $T_{\text{MS}} > 176^\circ\text{C}$.

INA-01100 Electrical Specifications^[1,3], $T_A = 25^\circ\text{C}$

| Symbol | Parameters and Test Conditions ^[2] : $I_d = 35 \text{ mA}$, $Z_o = 50 \Omega$ | Units | Min. | Typ. | Max. |
|-------------------|---|-------|------|-------|------|
| G _P | Power Gain ($ S_{21} ^2$) f = 100 MHz | dB | | 32.5 | |
| ΔG_P | Gain Flatness f = 10 to 250 MHz | dB | | ±0.5 | |
| f _{3 dB} | 3 dB Bandwidth | MHz | | 500 | |
| ISO | Reverse Isolation ($ S_{12} ^2$) f = 10 to 250 MHz | dB | | 39 | |
| VSWR | Input VSWR f = 10 to 250 MHz | | | 1.6:1 | |
| | Output VSWR f = 10 to 250 MHz | | | 1.5:1 | |
| NF | 50 Ω Noise Figure f = 100 MHz | dB | | 1.7 | |
| P _{1 dB} | Output Power at 1 dB Gain Compression f = 100 MHz | dBm | | 11 | |
| IP ₃ | Third Order Intercept Point f = 100 MHz | dBm | | 23 | |
| t _D | Group Delay f = 100 MHz | psec | | 200 | |
| V _d | Device Voltage | V | 4.0 | 5.5 | 7.0 |
| dV/dT | Device Voltage Temperature Coefficient | mV/°C | | +10 | |

Notes:

1. The recommended operating current range for this device is 30 to 40 mA. Typical performance as a function of current is on the following page.
2. RF performance of the chip is determined by packaging and testing 10 devices per wafer.
3. The values are the achievable performance for the INA-01100 mounted in a 70 mil stripline package.

INA-01100 Typical Scattering Parameters^[1] ($Z_o = 50 \Omega$, $T_A = 25^\circ\text{C}$, $V_{CC} = 35 \text{ mA}$)

| Freq. GHz | S ₁₁ | | S ₂₁ | | | S ₁₂ | | | S ₂₂ | | k |
|--------------|-----------------|------|-----------------|-------|------|-----------------|------|-----|-----------------|------|------|
| | Mag | Ang | dB | Mag | Ang | dB | Mag | Ang | Mag | Ang | |
| 0.01 | 0.09 | -16 | 32.7 | 43.4 | -1 | -38.5 | .012 | -1 | .18 | 1 | 1.17 |
| 0.05 | 0.10 | -27 | 32.7 | 43.1 | -10 | -38.6 | .012 | 15 | .19 | 5 | 1.18 |
| 0.10 | 0.11 | -5 | 32.4 | 41.9 | -20 | -38.4 | .012 | -8 | .20 | 10 | 1.17 |
| 0.20 | 0.14 | -80 | 31.6 | 38.0 | -37 | -38.6 | .012 | 4 | .24 | 14 | 1.22 |
| 0.30 | 0.18 | -98 | 30.5 | 33.7 | -52 | -38.8 | .011 | -10 | .27 | 15 | 1.31 |
| 0.40 | 0.20 | -110 | 29.4 | 29.6 | -65 | -39.6 | .011 | 2 | .30 | 10 | 1.51 |
| 0.50 | 0.22 | -115 | 28.4 | 26.2 | -75 | -38.6 | .012 | -12 | .32 | 6 | 1.48 |
| 0.60 | 0.24 | -120 | 27.4 | 23.4 | -84 | -39.1 | .011 | -7 | .34 | 1 | 1.67 |
| 0.80 | 0.27 | -124 | 25.7 | 19.3 | -100 | -38.3 | .012 | -6 | .36 | -11 | 1.76 |
| 1.00 | 0.30 | -127 | 24.3 | 16.3 | -115 | -36.1 | .016 | -5 | .36 | -22 | 1.58 |
| 1.5 | 0.44 | 165 | 21.8 | 12.37 | -179 | -33.6 | .020 | 42 | .19 | -69 | 1.75 |
| 2.0 | 0.44 | 154 | 17.9 | 7.88 | 146 | -33.0 | .022 | 42 | .13 | -106 | 2.42 |
| 2.5 | 0.46 | 148 | 14.6 | 5.36 | 121 | -30.6 | .029 | 36 | .12 | -151 | 2.63 |
| 3.0 | 0.48 | 139 | 11.4 | 3.71 | 96 | -30.0 | .032 | 45 | .10 | 159 | 3.31 |

Note:

1. S-parameters are de-embedded from 70 mil package measured data using the package model found in the DEVICE MODELS section of the *Communications Components Designer's Catalog*.

INA-01100 Typical Performance, $T_A = 25^\circ\text{C}$

(unless otherwise noted: The values are the achievable performance for the INA-01100 mounted in a 70 mil stripline package.)

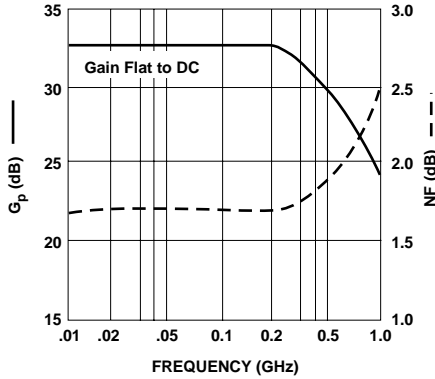


Figure 1. Typical Gain and Noise Figure vs. Frequency, $T_A = 25^\circ\text{C}$, $I_d = 35\text{ mA}$

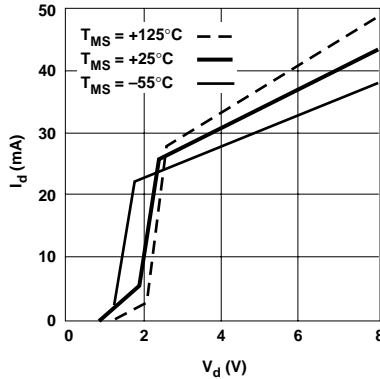


Figure 2. Device Current vs. Voltage.

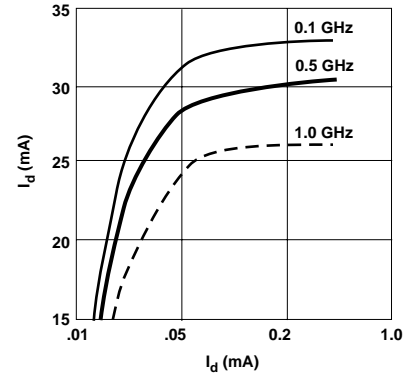


Figure 3. Power Gain vs. Current.

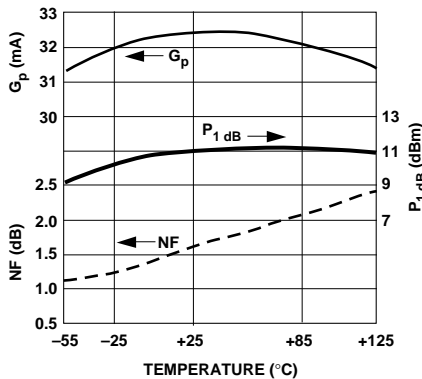


Figure 4. Output Power and 1 dB Gain Compression, NF and Power Gain vs. Case Temperature. $f = 0.1\text{ GHz}$, $I_d = 35\text{ mA}$.

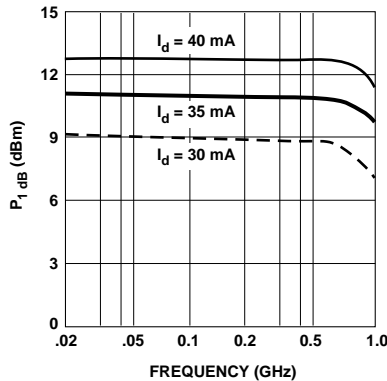


Figure 5. Output Power at 1 dB Gain Compression vs. Frequency.

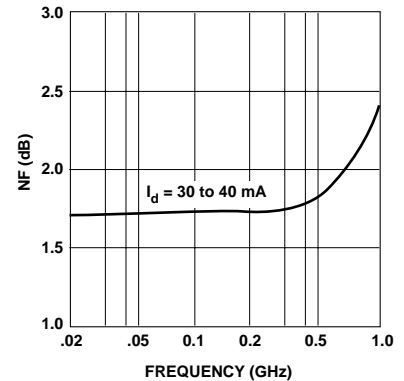
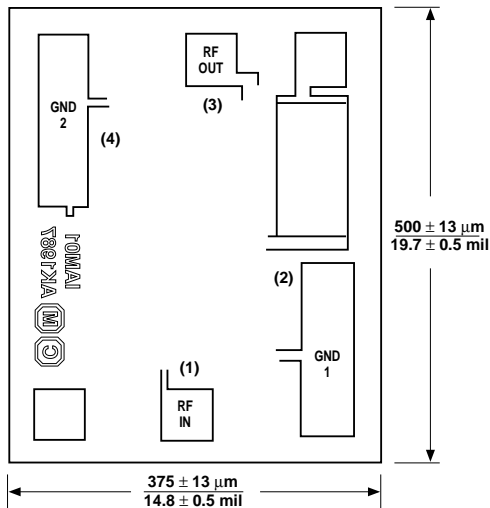


Figure 6. Noise Figure vs. Frequency.

INA-01100 Chip Dimensions



Chip thickness is $140\ \mu\text{m}/5.5\text{ mil}$. Bond Pads are $41\ \mu\text{m}/1.6\text{ mil}$ typical on each side. Note: Ground Bonding is Critical. Refer to Application Bulletin, "AB-0007: INA Bonding Configuration".