

## WR22 Low Noise Amplifier 33GHz ~ 50GHz



### Features

- Gain: 20dB Typical
- Noise Figure: 5.5dB Typical
- P1dB Output Power: +11dBm Typical
- Supply Voltage: +12V

### Typical Applications

- Wireless Infrastructure
- Military & Aerospace
- Test Instrument

Electrical Specifications,  $T_A = +25^\circ\text{C}$ ,  $V_{CC} = +12\text{V}$

| Parameter                                                                         | Min.                                                      | Typ.      | Max. | Min. | Typ.      | Max. | Units  |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------|-----------|------|------|-----------|------|--------|
| Frequency Range                                                                   | 33                                                        |           | 40   | 40   |           | 50   | GHz    |
| Gain                                                                              | 20                                                        | 25        |      | 18   | 23        |      | dB     |
| Gain Flatness                                                                     |                                                           | $\pm 1.5$ |      |      | $\pm 1.5$ |      | dB     |
| Gain Variation Over Temperature<br>( $-40^\circ\text{C} \sim +85^\circ\text{C}$ ) |                                                           | $\pm 2.0$ |      |      | $\pm 2.0$ |      | dB     |
| Noise Figure                                                                      |                                                           | 5.5       |      |      | 6.5       |      | dB     |
| Input Return loss                                                                 |                                                           | 10        |      |      | 10        |      | dB     |
| Output Return loss                                                                |                                                           | 10        |      |      | 10        |      | dB     |
| Output 1dB Compression Point (P1dB)                                               |                                                           | 10        |      |      | 8         |      | dBm    |
| Saturated Output Power (Psat)                                                     |                                                           | 12        |      |      | 10        |      | dBm    |
| Output Third Order Intercept (OIP3)                                               |                                                           | 18        |      |      | 16        |      | dBm    |
| Isolation S12                                                                     |                                                           | -50       |      |      | -50       |      | dB     |
| Supply Current ( $V_{CC}=+12\text{V}$ )                                           |                                                           | 200       | 250  |      | 200       | 250  | mA     |
| Weight                                                                            | 2.0 Max.                                                  |           |      |      |           |      | ounces |
| Impedance                                                                         | 50                                                        |           |      |      |           |      | Ohms   |
| Input / Output Connectors                                                         | WR22                                                      |           |      |      |           |      |        |
| Finish                                                                            | Gold Plated                                               |           |      |      |           |      |        |
| Material                                                                          | Aluminum                                                  |           |      |      |           |      |        |
| Package Sealing                                                                   | Epoxy Sealed (Standard)<br>Hermetically Sealed (Optional) |           |      |      |           |      |        |

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### Absolute Maximum Ratings

|                   |        |
|-------------------|--------|
| Operating Voltage | +15V   |
| RF Input Power    | -10dBm |

### Biasing Up Procedure

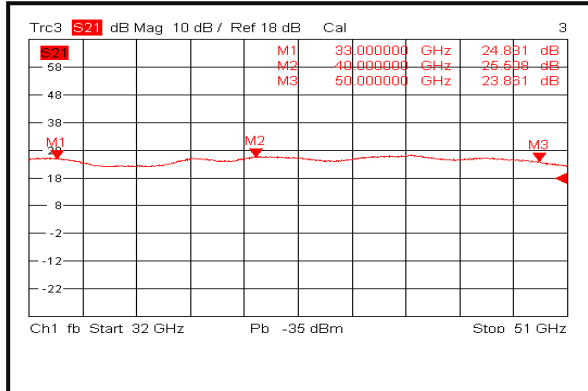
|                     |                          |
|---------------------|--------------------------|
| Step 1              | Connect Ground Pin       |
| Step 2              | Connect input and output |
| Step 3              | Connect +12V biasing     |
| Power OFF Procedure |                          |
| Step 1              | Turn off +12V biasing    |
| Step 2              | Remove RF connection     |
| Step 3              | Remove Ground.           |

### Environmental Specifications and Test Standards

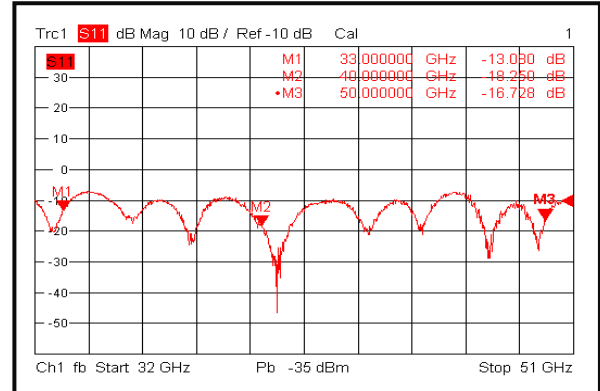
| Parameter                      | Description                                                                                                                                                                                                    |
|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational Temperature        | -40°C~+85°C<br>(Case Temperature)                                                                                                                                                                              |
| Storage Temperature            | -50°C~+105°C                                                                                                                                                                                                   |
| Thermal Shock                  | -40°C → +85°C<br>(5 Cycles / 10 hours)                                                                                                                                                                         |
| Random Vibration               | MIL-STD-202G<br>Table 214-I, Test Condition Letter C<br>1.5 Hours Per Axis                                                                                                                                     |
| High Temperature Burn In       | Temperature +85°C for 72 Hours                                                                                                                                                                                 |
| Shock                          | 1. Weight >20g, 50g half sine wave for 11ms, Speed variation 3.44m/s<br>2. Weight ≤20g, 100g Half sine wave for 6ms, Speed variation 3.75m/s<br>3. Total 18 times (6 directions, 3 repetitions per direction). |
| Altitude                       | Standard: 30,000 Ft (Epoxy Sealed Controlled Environment)<br>Optional: Hermetically Sealed (60,000 ft. 1.0 PSI min)                                                                                            |
| Hermetically Sealed (Optional) | MIL-STD-883 (For Hermetically Sealed Units)                                                                                                                                                                    |

## Typical Performance Plots

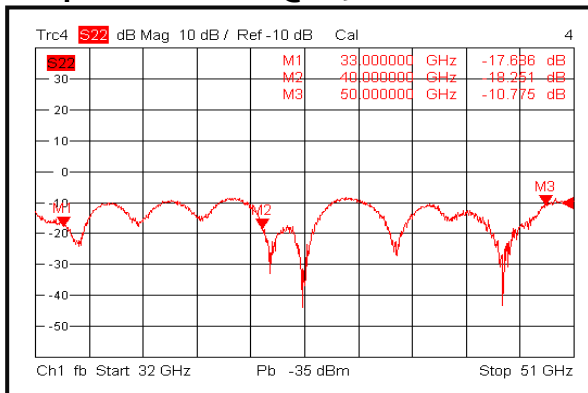
### Gain @+25°C



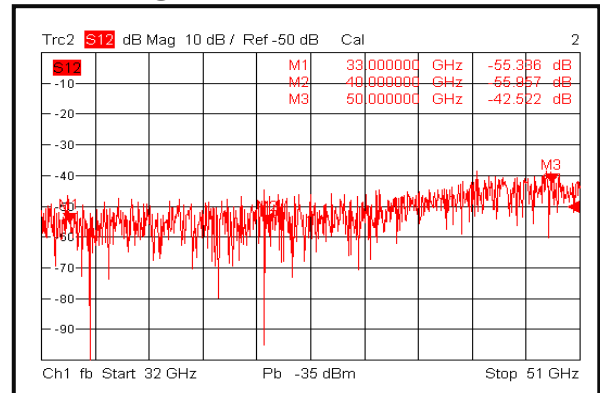
### Input Return loss @+25°C



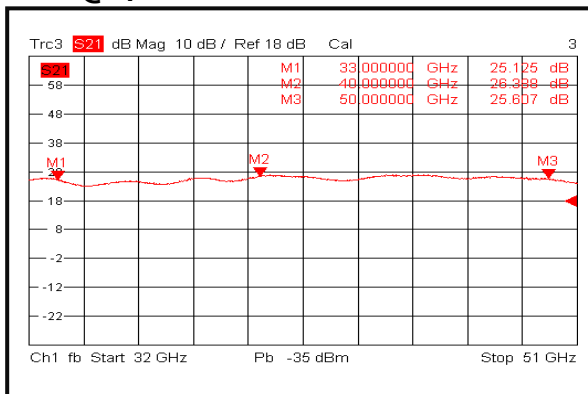
### Output Return loss @+25°C



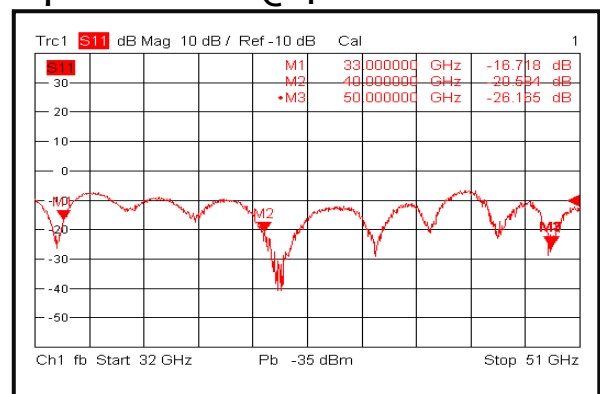
### Isolation @+25°C



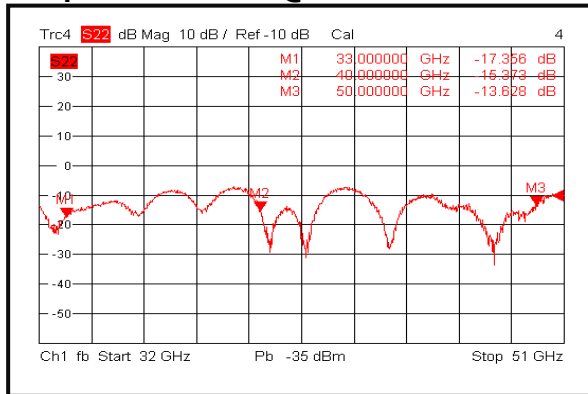
### Gain @-40°C



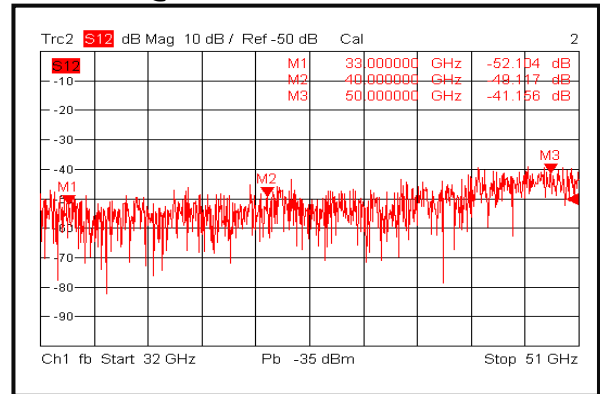
### Input Return loss @-40°C



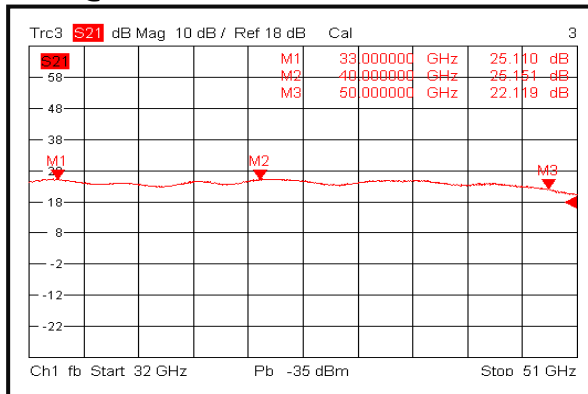
### Output Return loss @-40°C



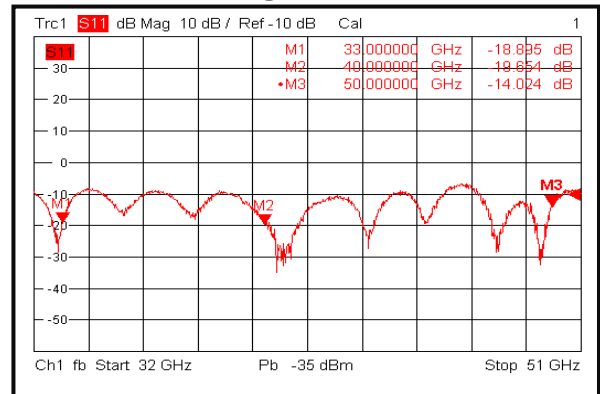
### Isolation @-40°C



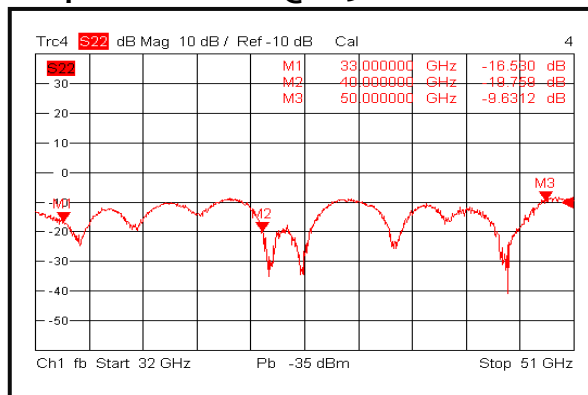
### Gain @+85°C



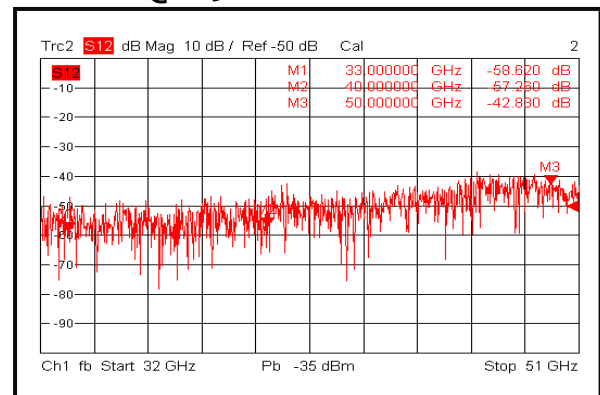
### Input Return loss @+85°C



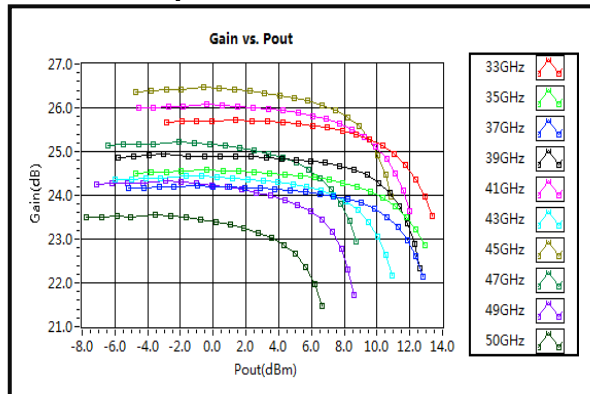
### Output Return loss @+85°C



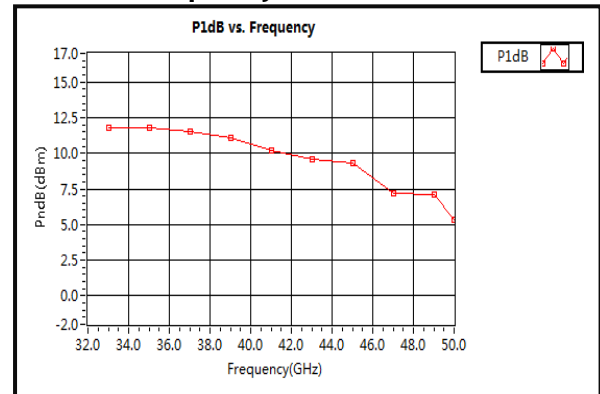
### Isolation @+85°C



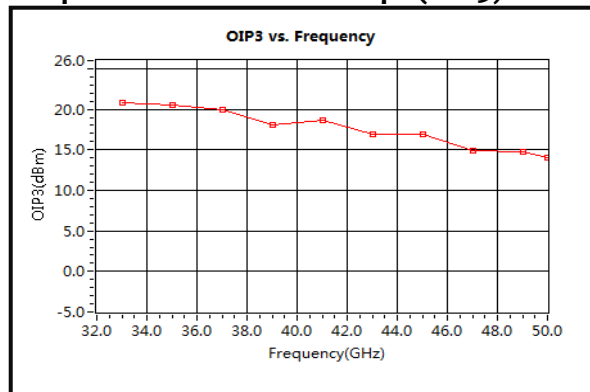
**Gain vs. Output Power**



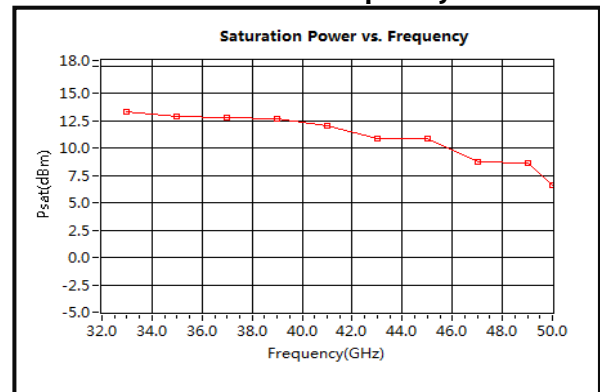
**P1dB vs. Frequency**



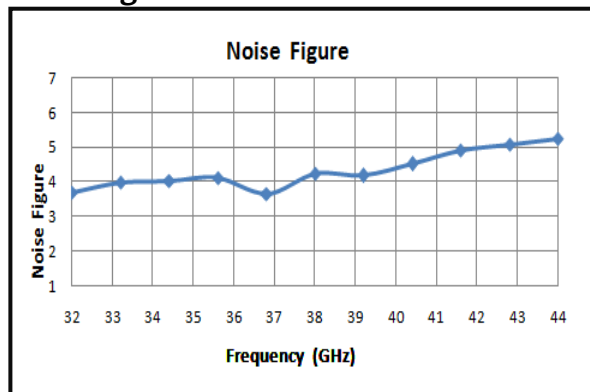
**Output Third Order Intercept (OIP3)**



**Saturation Power vs. Frequency**



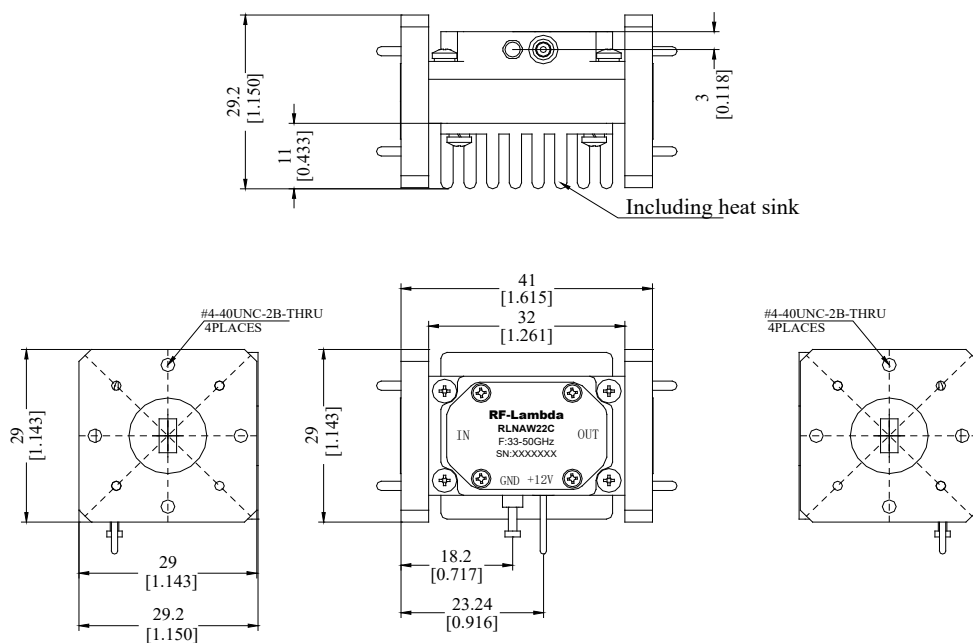
**Noise Figure**



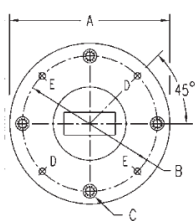
## Outline Drawing:

All Dimensions in mm [inches]

Housing Tolerances  $\pm 0.1$  [0.004]



| WR22       | WG23        | R400  |
|------------|-------------|-------|
| UG383/U    |             |       |
| Dimensions | inches      | mm    |
| A          | 1.13        | 28.85 |
| B          | 0.94        | 23.81 |
| C Holes    | 4-40 UNC-2B |       |
| D Holes    | 0.063       | 1.613 |
| E Dowels   | 0.061       | 1.555 |



**Heat Sink required during operation (Sold Separately)**



## Ordering Information

| Part No. | Description                       |
|----------|-----------------------------------|
| RLNAW22C | 33-50GHz WR22 Low Noise Amplifier |

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