



IF/RF Low Cost Cascadable Modules

Selection Guide

Features

- Small Size
- Hermetic
- High Gain
- Modifiable Roll-off

Applications

- Gain Blocks
- Mixer Post/Pre-Amp
- Prototypes

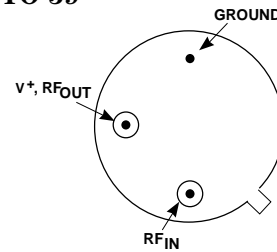
Description

The GPD and GPM amplifiers, available in TO-12 (4-pin) and TO-39 (3-pin) packages, are designed for applications which require the highest performance-to-cost ratio or where size is an important factor. Some versions are equipped with internal coupling and bypass capacitors, however the "60" Series requires external coupling and bypass capacitors. This gives the user freedom to set the low frequency roll-off as needed. The GPM modules contain Si MMICs, while the GPD modules are discrete hybrid devices. These amplifiers are excellent for IF amplification purposes such as mixer postamps.

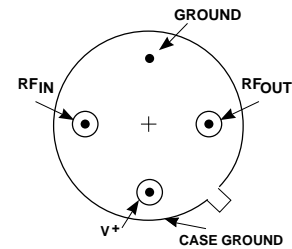
GPD Series GPM Series

Case Types

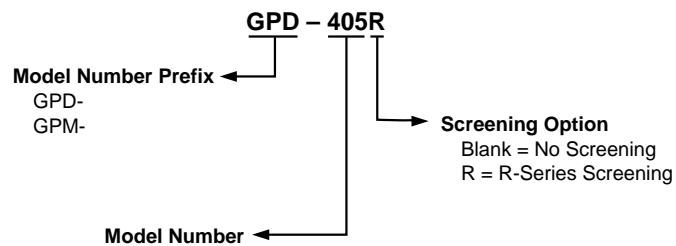
TO-39



TO-12



Product Options



GPD Series Low Cost Amplifiers, TO-39 Package¹

Typical Specifications at 25°C

| Model | Frequency Response (MHz) Minimum | Gain over 0° to 50°C | Gain ² over -55° to +85°C | Noise Figure (dB) Typical | Power Output at 1 dB Gain Compression (dBm) Typical | Gain Flatness (±dB) Typical | 3rd-Order Intercept Point (dBm) Typical | Input Power (±1% Reg.) | |
|---------|----------------------------------|----------------------|--------------------------------------|---------------------------|---|-----------------------------|---|------------------------|----------------------|
| | | (dB) Minimum | (dB) Minimum | | | | | Voltage (VDC) Typical | Current (mA) Typical |
| GPD-110 | 0.1-400 | — | 12 | 4.0 | -2.0 | 1.0 | +12 | 2.5 | 10 |
| GPD-120 | 0.1-400 | — | 13 | 5.5 | +8.0 | 1.0 | +24 | 5.5 | 25 |
| GPD-130 | 0.1-400 | — | 12 | 7.0 | +17.0 | 1.0 | +27 | 6.0 | 60 |
| GPD-310 | 0.1-1000 | 8 | 7 | 5.0 | -1.0 | 1.0 | +11 | 2.3 | 10 |
| GPD-311 | 0.1-1000 | 12 | 11 | 4.5 | +3.0 | 1.0 | +15 | 2.7 | 15 |
| GPD-321 | 0.1-1000 | 12 | 11 | 4.7 | +8.0 | 1.0 | +20 | 3.5 | 25 |
| GPD-320 | 0.1-1000 | 8 | 7 | 5.0 | +8.0 | 1.0 | +18 | 3.0 | 25 |
| GPD-331 | 0.1-1000 | 10 | 9 | 6.0 | +16.0 | 1.0 | +28 | 5.5 | 60 |
| GPD-330 | 0.1-1000 | 7 | 6 | 6.5 | +16.0 | 1.0 | +26 | 4.5 | 60 |
| GPD-410 | 0.1-1500 | 12 | 11 | 4.2 | +2.5 | 1.0 | +15 | 2.5 | 15 |
| GPD-420 | 0.1-1500 | 11 | 10 | 4.7 | +8.0 | 1.0 | +20 | 2.8 | 25 |
| GPD-430 | 0.1-1500 | 10 | 9 | 6.3 | +16.0 | 1.0 | +28 | 5.0 | 60 |

- Notes: 1. Three external capacitors (input, output coupling and RF bypass) are required to establish low frequency roll-off. An external bias resistor, with a value determined by the available bias voltage ($R_D = [V_{CC} - V_D] \div I_D$), where R_D is the value of the bias resistor (Ohms), V_{CC} is the available source voltage, V_D is the required device bias voltage (per specification) and I_D is the device current (per specification).
2. Military temperature conditions: -55° to +85°C

GPD Series Low Cost Amplifiers, TO-12 Package

Guaranteed Specifications at 0° to 50°C Case Temperature, Typical Values at 25°C

| Model | Frequency Response (MHz) Minimum | Gain (dB) | Gain ² (dB) | Noise Figure (dB) Typical | Power Output for 1 dB Gain Compression (dBm) Typical | Gain Flatness (±dB) Typical | 3rd-Order Intercept Point (dBm) Typical | Input Power (±1% Reg.) | |
|-----------------------------|----------------------------------|-----------|------------------------|---------------------------|--|-----------------------------|---|------------------------|----------------------|
| | | Minimum | Minimum | | | | | Voltage (VDC) Typical | Current (mA) Typical |
| GPD-201 | 5-200 | 30 | 26 | 3.0 | +5 | 1.0 | +13 | +15 | 30 |
| GPD-202 | 5-200 | 25 | 23 | 5.5 | +11 | 1.0 | +18 | +15 | 60 |
| GPD-251 | 5-200 | 25 | 23 | 4.0 | +1 | 1.0 | +10 | +5 | 30 |
| GPD-252 | 5-200 | 15 | 14 | 4.0 | 0 | 1.0 | +12 | +5 | 11 |
| GPD-401/-461 ¹ | 5-400 | 13 | 12 | 4.0 | -2 | 1.0 | +9 | +15 | 10 |
| GPD-411 | 5-400 | 12 | 11 | 3.0 | -6 | 1.0 | +4 | +15 | 7 |
| GPD-402/-462 ¹ | 5-400 | 13 | 12 | 8.0 | +8 | 1.0 | +18 | +15 | 24 |
| GPD-403/-463 ¹ | 5-400 | 9 | 8 | 7.5 | +16 | 1.0 | +25 | +24 | 65 |
| GPD-404/-464 ¹ | 5-400 | 9 | 8 | 7.5 | +17 | 1.0 | +26 | +15 | 70 |
| GPD-405 | 10-400 | 13 | 12 | 6.5 | +23 | 1.0 | +36 | +15 | 90 |
| GPM-552 | 5-500 | 33 | 32 | 4.5 | 0 | 0.2 | +14 | +15 | 34 |
| GPD-1001/-1061 ¹ | 5-1000 | 12 | 11 | 6.0 | 0 | 1.0 | +12 | +15 | 15 |
| GPD-1002/-1062 ¹ | 5-1000 | 12 | 11 | 7.0 | +6 | 1.0 | +16 | +15 | 27 |
| GPM-1052 | 5-1000 | 20 | 20 | 7.0 | +8 | 0.3 | +20 | +15 | 60 |
| GPD-1003/-1063 ¹ | 5-1000 | 10 | 9 | 7.0 | +14 | 1.0 | +25 | +15 | 55 |

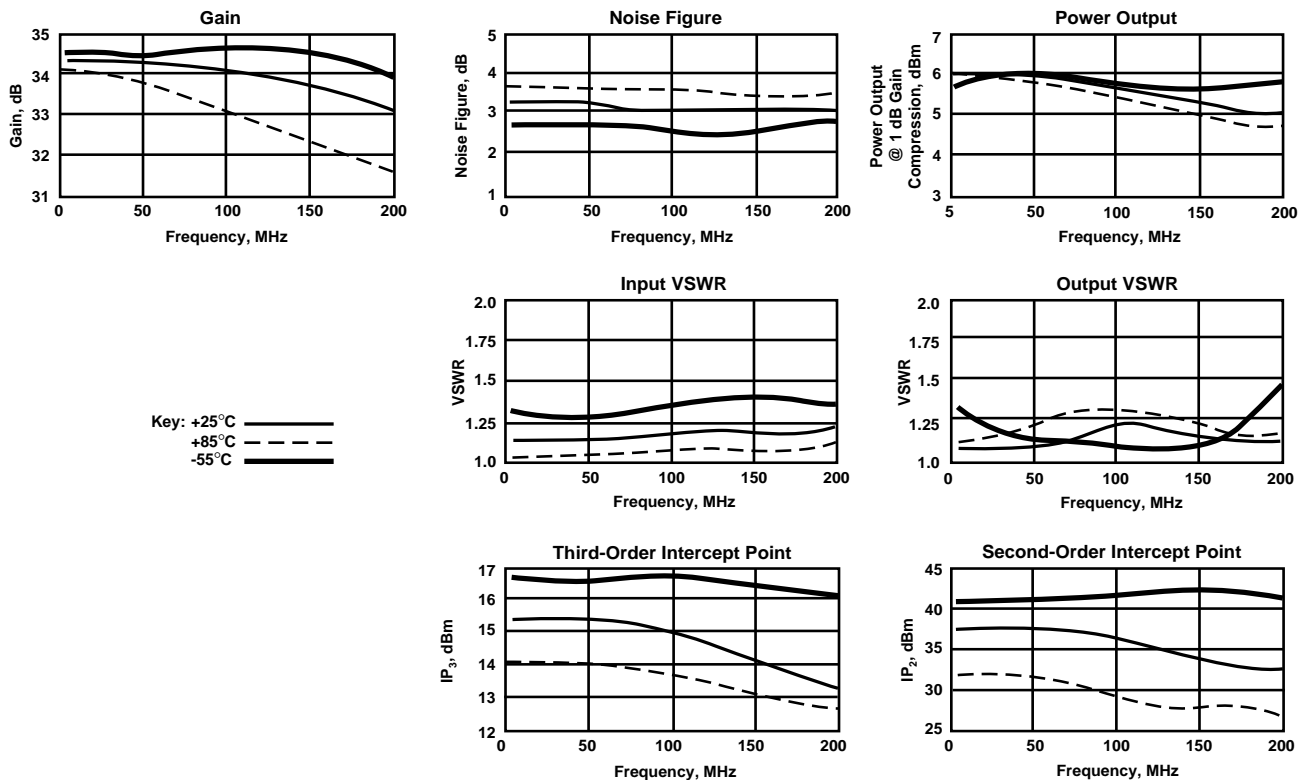
- Notes: 1. The 60 Series is the same as the standard series except that three external capacitors are required to establish low frequency roll-off.
2. Military temperature conditions: -55° to +85°C

Maximum Ratings and Thermal Characteristics Table

| Model | Maximum Ratings | | | | | Thermal Characteristics ¹ | | | | |
|----------------|--------------------|---------------------------------|---------------------------|--------------------|-------------------------------|--------------------------------------|--|--------------------------------------|--|----------------|
| | DC Voltage (Volts) | Continuous RF Input Power (dBm) | Operating Case Temp. (°C) | Storage Temp. (°C) | “R” Series Burn-In Temp. (°C) | q _{JC} (°C/W) | Active Transistor Power Dissipation (mW) | Junction Temp. Above Case Temp. (°C) | MTBF MIL-HDBK-217E, A _{UF} @ 90°C (Hrs) | Weight (Grams) |
| GPD-201 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 105/105 | 15/33 | 2/3 | 1,678,671 | 1.5 |
| GPD-202 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 105/105 | 69/116 | 7/12 | 1,621,478 | 1.5 |
| GPD-251 | +12 | +13 | -55 to +125 | -62 to +150 | +125 | 105/105 | 25/43 | 2/5 | 1,678,323 | 1.5 |
| GPD-252 | +12 | +13 | -55 to +125 | -62 to +150 | +125 | 105 | 20 | 2 | 2,000,470 | 1.5 |
| GPD-401/-461 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 90 | 14 | 2 | 2,045,316 (401) 2,388,527 (461) | 1.5 |
| GPD-402/-462 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 90 | 82 | 7 | 2,325,901 (402) 2,640,329 (462) | 1.5 |
| GPD-403/-463 | +25 | +13 | -55 to +125 | -62 to +150 | +125 | 85 | 275 | 23 | 3,058,127 (403) 3,602,215 (463) | 1.5 |
| GPD-404/-464 | +17 | +13 | -55 to +115 | -62 to +150 | +115 | 85 | 330 | 28 | 2,435,672 (404) 2,512,908 (464) | 1.5 |
| GPD-405 | +17 | +13 | -55 to +100 | -62 to +150 | +100 | 55 | 750 | 41 | 1,607,022 | 1.5 |
| GPD-411 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 105 ² | 24 ² | 3 ² | 1,608,303 | 1.5 |
| GPM-552 | +17 | +17 | -55 to +125 | -62 to +150 | +125 | 135/135 | 85/85 | 12/12 | — | 1.5 |
| GPD-1001/-1061 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 105 | 37 | 4 | 1,639,228 (1001) 1,910,397 (1061) | 1.5 |
| GPD-1002/-1062 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 105 | 82 | 9 | 1,639,228 (1002) 1,882,476 (1062) | 1.5 |
| GPD-1003/-1063 | +17 | +13 | -55 to +125 | -62 to +150 | +125 | 75 | 185 | 14 | 869,341 (1003) 2,101,101 (1063) | 1.5 |
| GPM-1052 | +17 | +17 | -55 to +125 | -62 to +150 | +125 | 130/130 | 125/175 | 16/23 | — | 1.5 |

Notes: 1. Values refer to 1st and 2nd stage transistors respectively.

GPD-201—5 to 200 MHz Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



GPD-201—5 to 200 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.22 | 34.08 | -21.48 | .03 | .00 | 1.38 | 45.05 |
| 150.0 | 1.24 | 33.63 | -31.73 | -.07 | .56 | 1.35 | 42.53 |
| 200.0 | 1.30 | 33.06 | -41.78 | .03 | .55 | 1.35 | 45.17 |
| 250.0 | 1.33 | 32.23 | -51.68 | | .52 | 1.35 | 44.14 |
| 300.0 | 1.39 | 31.33 | -60.39 | | .46 | 1.37 | 45.09 |
| 350.0 | 1.42 | 30.34 | -68.41 | | .40 | 1.41 | 42.90 |
| 400.0 | 1.46 | 29.22 | -74.90 | | .33 | 1.46 | 45.16 |
| 450.0 | 1.49 | 28.20 | -80.20 | | .28 | 1.51 | 42.67 |
| 500.0 | 1.51 | 27.05 | -84.95 | | .21 | 1.55 | 42.98 |
| 550.0 | 1.54 | 25.98 | -87.93 | | .18 | 1.59 | 43.16 |
| 600.0 | 1.56 | 25.02 | -91.38 | | .15 | 1.61 | 42.20 |
| 650.0 | 1.57 | 23.93 | -93.28 | | .08 | 1.64 | 41.70 |

S-Parameters

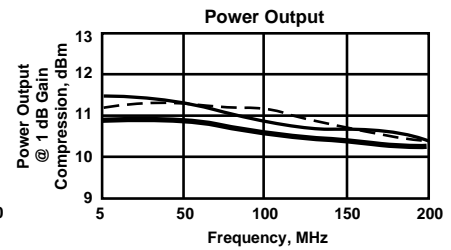
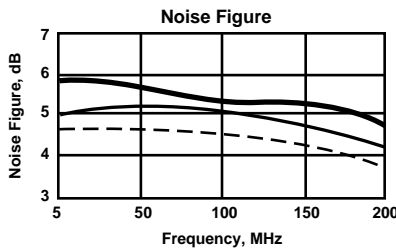
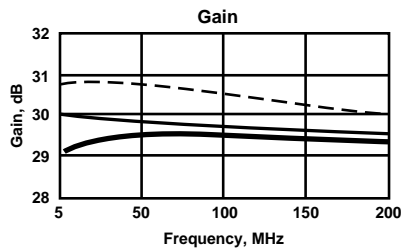
Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|-------|-----------------|------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .089 | -160.6 | 34.037 | -21.5 | -42.671 | 20.2 | .172 | -.6 |
| 150.00 | .105 | -151.2 | 33.599 | -31.7 | -45.997 | 38.9 | .153 | .8 |
| 200.00 | .128 | -152.6 | 33.063 | -41.6 | -45.886 | 28.4 | .150 | 6.5 |
| 250.00 | .144 | -153.4 | 32.220 | -51.6 | -44.026 | 30.1 | .148 | 13.7 |
| 300.00 | .162 | -156.8 | 31.300 | -60.1 | -43.385 | 56.6 | .159 | 19.6 |
| 350.00 | .173 | -159.8 | 30.270 | -68.4 | -43.056 | 76.0 | .171 | 22.6 |
| 400.00 | .187 | -163.6 | 29.200 | -74.7 | -41.723 | 80.0 | .186 | 22.8 |
| 450.00 | .199 | -167.2 | 28.195 | -80.2 | -43.575 | 79.7 | .204 | 21.9 |
| 500.00 | .206 | -170.2 | 27.005 | -84.7 | -43.475 | 100.7 | .216 | 20.4 |
| 550.00 | .214 | -174.7 | 25.949 | -87.7 | -42.361 | 109.1 | .227 | 17.7 |
| 600.00 | .218 | -177.3 | 24.986 | -91.3 | -41.674 | 113.8 | .235 | 15.0 |
| 650.00 | .224 | -179.3 | 23.911 | -93.2 | -41.737 | 124.4 | .242 | 11.7 |

GPD-202—5 to 200 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

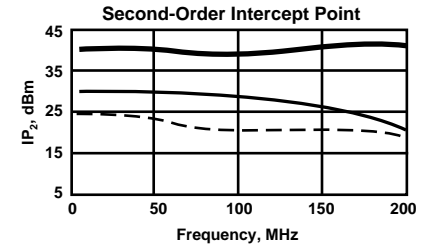
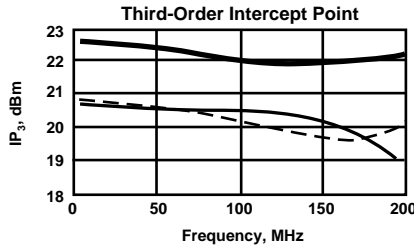
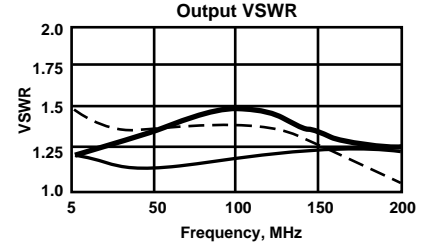
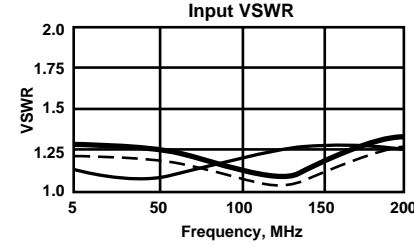
Key: +25°C ———
 +85°C - - - -
 -55°C ———



GPD-202—5 to 200 MHz (continued)

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———
 +85°C - - - -
 -55°C ———



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.12 | 30.00 | -16.42 | .10 | .00 | 1.17 | 58.12 |
| 150.0 | 1.17 | 29.68 | -24.50 | -.20 | .43 | 1.22 | 46.81 |
| 200.0 | 1.23 | 29.27 | -31.95 | .10 | .42 | 1.25 | 46.32 |
| 250.0 | 1.29 | 28.71 | -39.74 | | .40 | 1.30 | 47.00 |
| 300.0 | 1.34 | 28.08 | -46.54 | | .38 | 1.35 | 48.35 |
| 350.0 | 1.40 | 27.43 | -53.39 | | .35 | 1.39 | 45.49 |
| 400.0 | 1.45 | 26.61 | -59.25 | | .30 | 1.43 | 48.21 |
| 450.0 | 1.50 | 25.89 | -64.05 | | .26 | 1.47 | 46.06 |
| 500.0 | 1.53 | 25.03 | -68.45 | | .21 | 1.49 | 46.03 |
| 550.0 | 1.57 | 24.18 | -71.53 | | .19 | 1.51 | 44.99 |
| 600.0 | 1.61 | 23.41 | -75.32 | | .18 | 1.53 | 45.06 |
| 650.0 | 1.63 | 22.52 | -77.92 | | .11 | 1.54 | 44.21 |
| 700.0 | 1.65 | 21.77 | -79.36 | | .07 | 1.55 | 43.24 |
| 750.0 | 1.68 | 21.03 | -80.55 | | .07 | 1.55 | 43.10 |

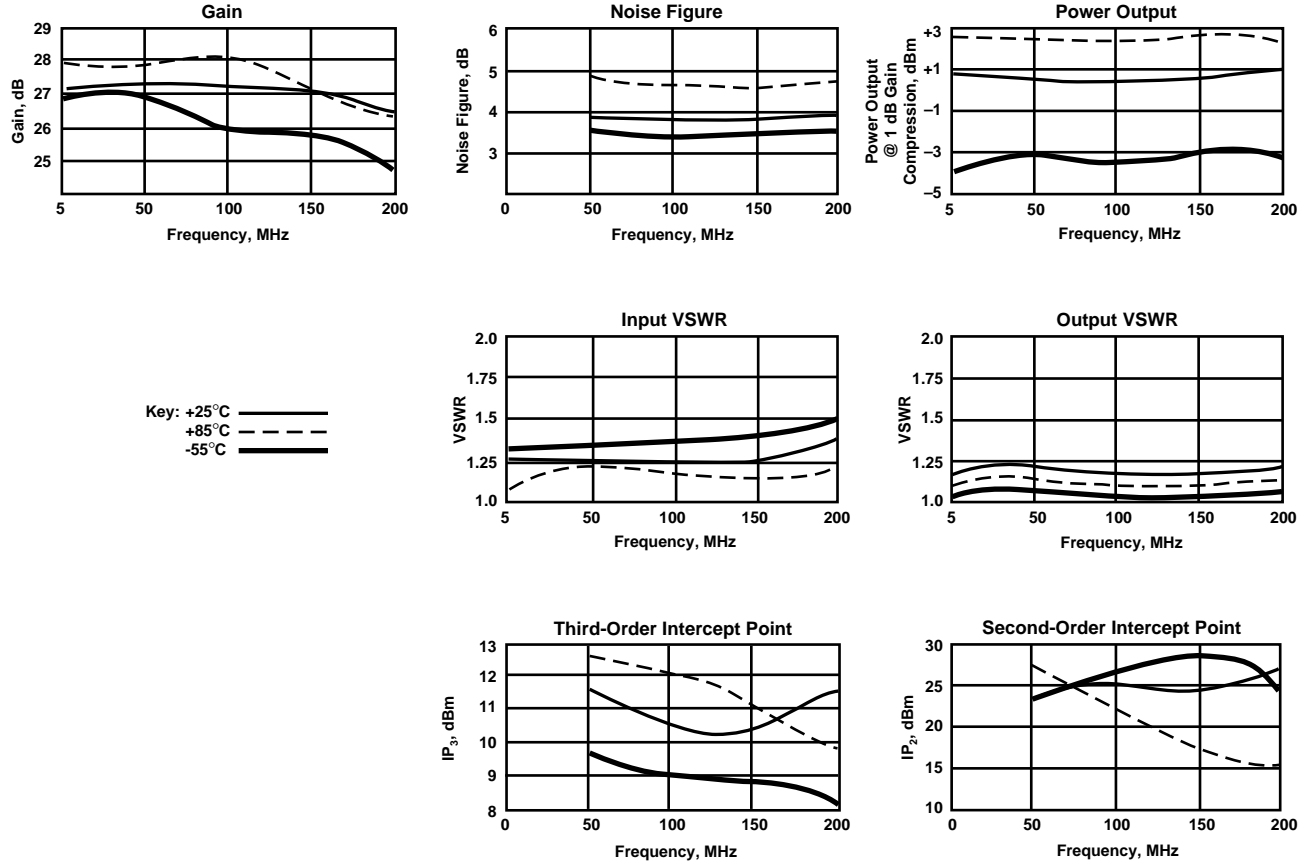
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|-------|-----------------|------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .053 | -93.5 | 29.974 | -16.5 | -47.603 | 33.3 | .087 | 22.5 |
| 150.00 | .078 | -97.9 | 29.675 | -24.5 | -45.367 | 7.5 | .101 | 32.5 |
| 200.00 | .103 | -105.1 | 29.286 | -31.8 | -46.409 | 14.1 | .118 | 36.0 |
| 250.00 | .127 | -114.3 | 28.726 | -39.8 | -47.945 | 63.9 | .130 | 38.2 |
| 300.00 | .150 | -120.9 | 28.084 | -46.4 | -45.731 | 52.9 | .150 | 38.0 |
| 350.00 | .168 | -126.8 | 27.376 | -53.5 | -45.001 | 66.9 | .163 | 37.4 |
| 400.00 | .186 | -133.4 | 26.609 | -59.1 | -44.254 | 77.6 | .175 | 35.8 |
| 450.00 | .201 | -139.3 | 25.889 | -64.1 | -45.714 | 91.1 | .188 | 33.7 |
| 500.00 | .214 | -144.3 | 25.004 | -68.2 | -46.501 | 95.0 | .197 | 31.3 |
| 550.00 | .224 | -149.3 | 24.177 | -71.4 | -44.719 | 109.6 | .205 | 27.9 |
| 600.00 | .234 | -153.8 | 23.397 | -75.3 | -43.458 | 112.8 | .211 | 25.3 |
| 650.00 | .244 | -157.0 | 22.526 | -77.9 | -42.576 | 129.7 | .213 | 21.7 |
| 700.00 | .252 | -161.3 | 21.772 | -79.2 | -44.257 | 145.0 | .216 | 18.8 |
| 750.00 | .260 | -165.0 | 21.026 | -80.4 | -42.019 | 148.5 | .217 | 14.8 |

GPD-251—5 to 200 MHz

Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 5.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.30 | 26.85 | -18.13 | .11 | .00 | 1.12 | 49.96 |
| 150.0 | 1.34 | 26.52 | -27.54 | -.23 | .50 | 1.12 | 49.00 |
| 200.0 | 1.43 | 26.01 | -36.25 | .11 | .47 | 1.14 | 44.42 |
| 250.0 | 1.50 | 25.41 | -44.49 | | .44 | 1.15 | 47.30 |
| 300.0 | 1.57 | 24.63 | -51.92 | | .40 | 1.16 | 48.12 |
| 350.0 | 1.63 | 23.87 | -58.94 | | .38 | 1.18 | 44.41 |
| 400.0 | 1.68 | 22.97 | -65.67 | | .32 | 1.19 | 47.34 |
| 450.0 | 1.73 | 22.04 | -70.41 | | .26 | 1.19 | 48.00 |
| 500.0 | 1.76 | 21.18 | -74.90 | | .23 | 1.19 | 49.28 |
| 550.0 | 1.79 | 20.19 | -78.51 | | .19 | 1.19 | 45.90 |
| 600.0 | 1.82 | 19.32 | -81.65 | | .15 | 1.18 | 46.52 |
| 650.0 | 1.83 | 18.46 | -83.95 | | .11 | 1.17 | 45.45 |
| 700.0 | 1.85 | 17.61 | -85.55 | | .07 | 1.17 | 46.48 |
| 750.0 | 1.87 | 16.81 | -86.49 | | .04 | 1.16 | 45.87 |

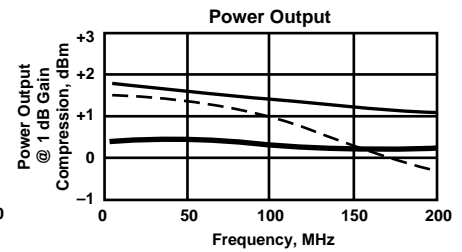
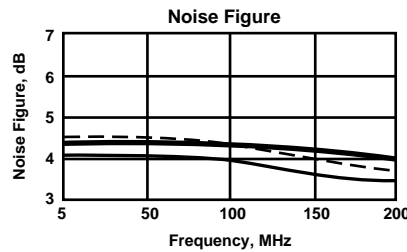
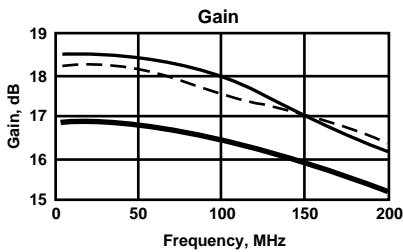
GPD-251—5 to 200 MHz (continued)
Automatic Network Analyzer Measurements

S-Parameters

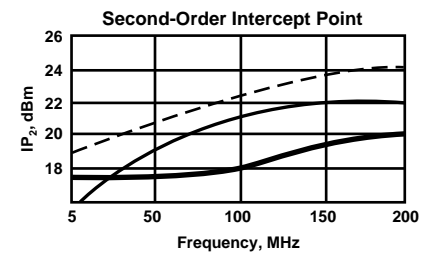
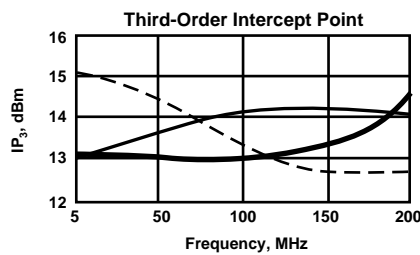
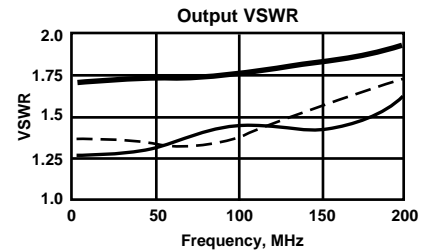
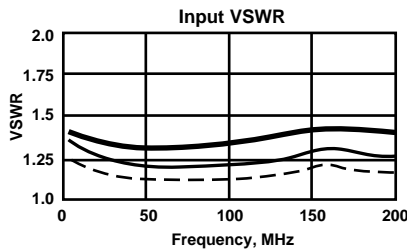
Bias = 5.00 Volts

| FREQUENCY MHz | S_{11} | | S_{21} | | S_{12} | | S_{22} | |
|------------------|----------|--------|----------|-------|----------|-------|----------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .139 | -162.5 | 27.137 | -18.5 | -44.479 | 38.4 | .050 | 175.0 |
| 150.00 | .159 | -154.9 | 26.804 | -28.2 | -47.583 | 20.7 | .058 | 170.5 |
| 200.00 | .185 | -156.6 | 26.299 | -36.7 | -48.131 | 16.6 | .066 | 161.4 |
| 250.00 | .206 | -159.2 | 25.656 | -45.2 | -47.285 | 55.0 | .073 | 152.3 |
| 300.00 | .227 | -162.4 | 24.852 | -52.4 | -44.079 | 39.6 | .079 | 142.0 |
| 350.00 | .249 | -166.4 | 24.046 | -59.7 | -46.115 | 68.9 | .085 | 133.8 |
| 400.00 | .264 | -170.0 | 23.168 | -66.3 | -44.291 | 66.4 | .089 | 125.7 |
| 450.00 | .271 | -173.8 | 22.228 | -71.2 | -47.319 | 68.9 | .086 | 117.8 |
| 500.00 | .278 | -178.1 | 21.313 | -75.4 | -47.221 | 82.0 | .089 | 110.9 |
| 550.00 | .288 | 177.5 | 20.337 | -79.1 | -47.594 | 104.2 | .087 | 104.6 |
| 600.00 | .297 | 175.1 | 19.458 | -82.2 | -44.654 | 101.1 | .086 | 98.6 |
| 650.00 | .298 | 173.5 | 18.598 | -84.7 | -45.687 | 129.1 | .082 | 92.7 |
| 700.00 | .290 | 170.1 | 17.711 | -85.9 | -45.548 | 123.8 | .078 | 86.8 |
| 750.00 | .296 | 165.8 | 16.899 | -86.8 | -44.792 | 138.8 | .075 | 81.3 |

GPD-252—5 to 200 MHz
Typical Performance Over Temperature (@ +5 VDC unless otherwise noted)



Key: +25°C ———
 +85°C - - - -
 -55°C ———



GPD-252—5 to 200 MHz

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 5.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.17 | 17.72 | 170.96 | .21 | .00 | 1.48 | 45.93 |
| 150.0 | 1.27 | 17.11 | 167.48 | -.43 | .16 | 1.44 | 37.18 |
| 200.0 | 1.24 | 16.47 | 165.32 | .21 | .08 | 1.59 | 38.02 |
| 250.0 | 1.24 | 15.74 | 164.43 | | 10.00 | 1.65 | 34.80 |
| 300.0 | 1.23 | 15.14 | 165.41 | | 19.95 | 1.73 | 34.26 |
| 350.0 | 1.24 | 14.43 | 166.16 | | 19.90 | 1.80 | 29.16 |
| 400.0 | 1.27 | 13.78 | 169.08 | | 19.88 | 1.84 | 27.98 |
| 450.0 | 1.30 | 13.23 | 170.54 | | 19.88 | 1.88 | 27.23 |
| 500.0 | 1.33 | 12.53 | 173.43 | | 19.83 | 1.92 | 26.82 |
| 550.0 | 1.35 | 12.11 | 176.61 | | 19.85 | 1.94 | 26.84 |
| 600.0 | 1.38 | 11.62 | 178.84 | | 19.82 | 1.98 | 26.63 |
| 650.0 | 1.43 | 11.06 | -176.94 | | 19.81 | 2.02 | 26.40 |
| 700.0 | 1.47 | 10.73 | -174.33 | | 19.85 | 2.06 | 26.18 |
| 750.0 | 1.51 | 10.33 | -171.41 | | 19.83 | 2.09 | 26.13 |

S-Parameters

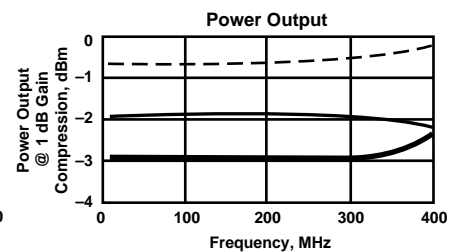
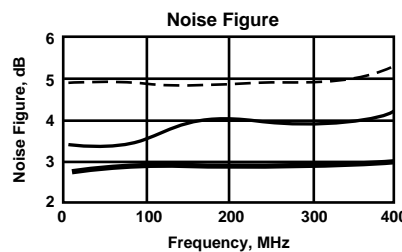
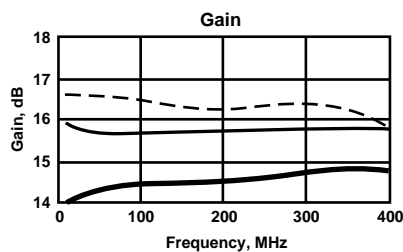
Bias = 5.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|-------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .095 | 174.6 | 17.662 | 170.2 | -26.104 | 21.1 | .163 | 28.8 |
| 150.0 | .095 | 177.6 | 17.021 | 167.3 | -25.690 | 29.1 | .204 | 26.8 |
| 200.0 | .093 | -178.2 | 16.449 | 165.7 | -25.590 | 36.2 | .228 | 22.4 |
| 250.0 | .097 | -174.3 | 15.644 | 164.8 | -25.752 | 44.2 | .250 | 19.1 |
| 300.0 | .107 | -175.0 | 15.066 | 165.5 | -25.551 | 51.8 | .269 | 14.8 |
| 350.0 | .121 | -171.0 | 14.409 | 166.3 | -25.690 | 60.5 | .288 | 11.5 |
| 400.0 | .130 | -171.4 | 13.793 | 169.3 | -25.566 | 69.6 | .297 | 7.8 |
| 450.0 | .136 | -171.8 | 13.213 | 170.4 | -25.902 | 79.1 | .307 | 4.1 |
| 500.0 | .146 | -174.8 | 12.501 | 173.2 | -25.790 | 86.4 | .315 | .8 |
| 550.0 | .163 | -179.2 | 12.106 | 176.3 | -25.933 | 96.0 | .322 | -2.6 |
| 600.0 | .180 | -178.7 | 11.591 | 178.7 | -25.795 | 106.1 | .328 | -6.5 |
| 650.0 | .188 | -178.3 | 11.007 | -177.2 | -25.731 | 115.1 | .338 | -10.0 |
| 700.0 | .191 | 178.8 | 10.668 | -174.9 | -25.587 | 125.0 | .347 | -12.7 |
| 750.0 | .202 | 175.5 | 10.246 | -171.8 | -25.558 | 134.1 | .352 | -16.1 |

GPD-401/461—5 to 400 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

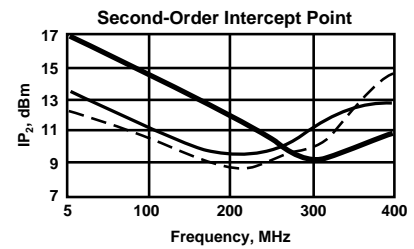
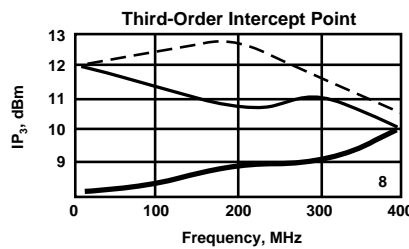
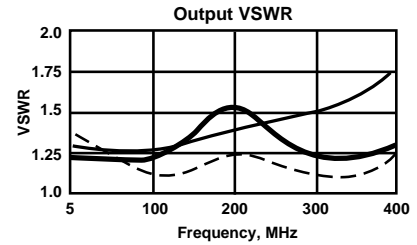
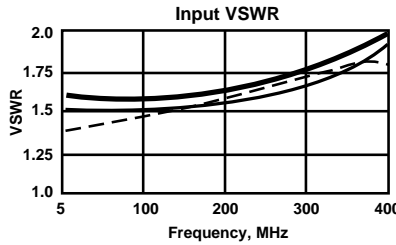
Key: +25°C ———
 +85°C - - - -
 -55°C ———



GPD-401/461—5 to 400 MHz (continued)

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———
 +85°C - - - -
 -55°C = = = =



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.52 | 15.67 | 173.87 | -.28 | .00 | 1.29 | 21.66 |
| 150.0 | 1.53 | 15.59 | 170.27 | -.06 | .19 | 1.33 | 21.44 |
| 200.0 | 1.56 | 15.63 | 167.02 | .51 | .22 | 1.38 | 21.20 |
| 250.0 | 1.61 | 15.64 | 162.47 | -.20 | .22 | 1.44 | 21.21 |
| 300.0 | 1.68 | 15.71 | 159.15 | .30 | .21 | 1.53 | 20.98 |
| 350.0 | 1.79 | 15.81 | 154.98 | -.04 | .23 | 1.63 | 20.79 |
| 400.0 | 1.93 | 15.68 | 150.97 | -.22 | .21 | 1.76 | 20.73 |
| 450.0 | 2.13 | 15.70 | 147.51 | | .25 | 1.92 | 20.67 |
| 500.0 | 2.39 | 15.56 | 141.80 | | .27 | 2.12 | 20.47 |
| 550.0 | 2.70 | 15.33 | 137.78 | | .27 | 2.33 | 20.28 |
| 600.0 | 3.08 | 15.26 | 132.21 | | .33 | 2.60 | 20.44 |
| 650.0 | 3.52 | 14.74 | 126.06 | | .29 | 2.91 | 20.34 |
| 700.0 | 3.99 | 14.25 | 121.67 | | .25 | 3.26 | 20.34 |
| 750.0 | 4.48 | 13.80 | 117.03 | | .28 | 3.59 | 20.42 |

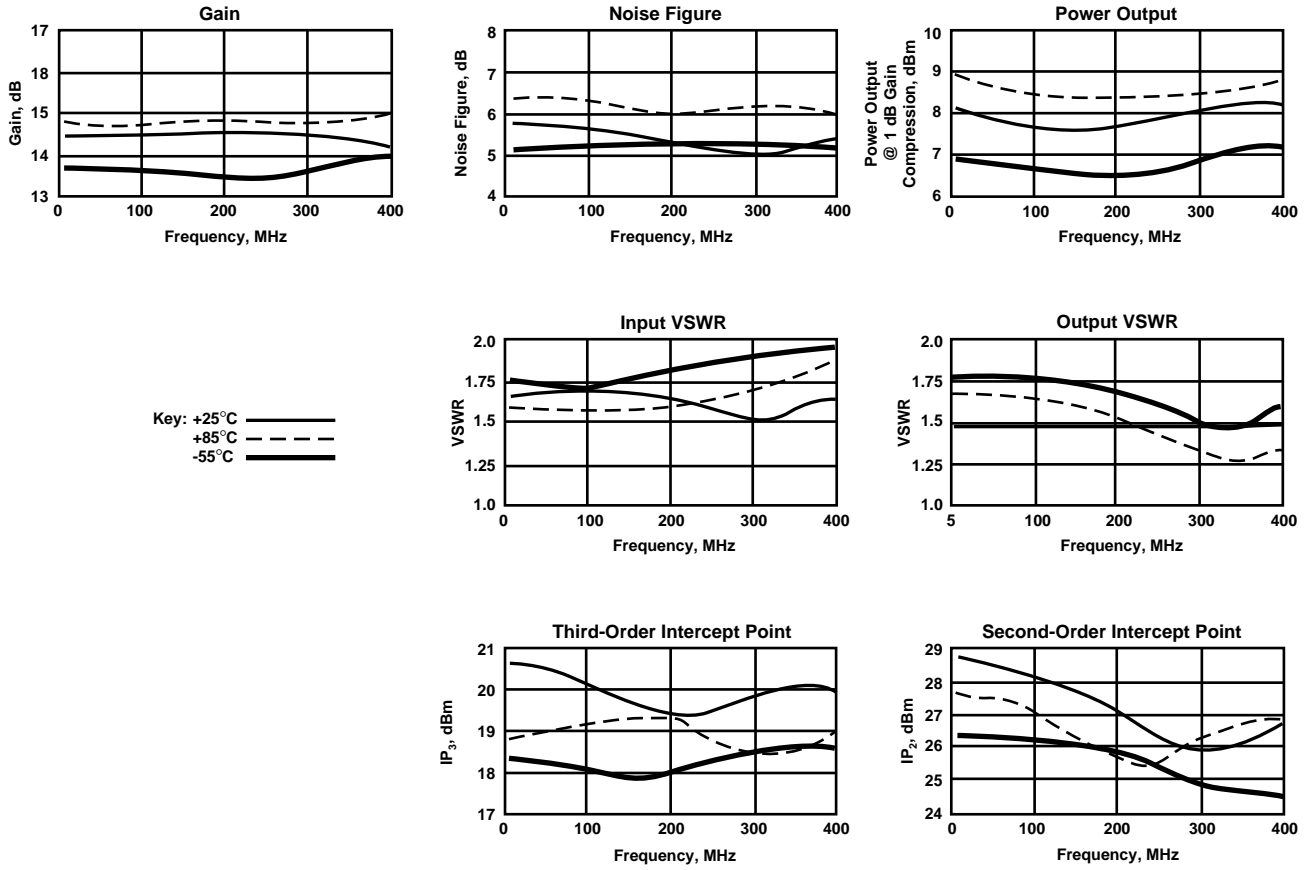
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .202 | -170.8 | 15.663 | 173.7 | -21.532 | 14.5 | .128 | 20.6 |
| 150.00 | .210 | -166.4 | 15.577 | 170.1 | -21.411 | 16.8 | .139 | 33.2 |
| 200.00 | .218 | -163.9 | 15.614 | 167.1 | -21.411 | 22.1 | .161 | 41.4 |
| 250.00 | .229 | -159.3 | 15.620 | 162.4 | -21.236 | 28.0 | .182 | 47.3 |
| 300.00 | .252 | -156.3 | 15.674 | 159.2 | -20.928 | 32.5 | .210 | 49.9 |
| 350.00 | .283 | -153.6 | 15.743 | 154.9 | -20.848 | 38.3 | .239 | 52.8 |
| 400.00 | .319 | -152.7 | 15.647 | 151.1 | -20.562 | 42.9 | .273 | 55.1 |
| 450.00 | .361 | -153.5 | 15.694 | 147.4 | -20.685 | 46.0 | .310 | 55.2 |
| 500.00 | .408 | -155.5 | 15.502 | 142.0 | -20.475 | 50.7 | .355 | 54.6 |
| 550.00 | .456 | -159.0 | 15.279 | 137.8 | -20.305 | 54.1 | .398 | 52.9 |
| 600.00 | .510 | -163.6 | 15.203 | 132.2 | -20.351 | 57.7 | .441 | 50.3 |
| 650.00 | .558 | -168.7 | 14.701 | 126.1 | -20.361 | 62.4 | .487 | 46.7 |
| 700.00 | .594 | -174.6 | 14.199 | 121.8 | -20.367 | 65.4 | .528 | 42.7 |
| 750.00 | .633 | -179.5 | 13.755 | 117.2 | -20.424 | 68.8 | .565 | 37.8 |

GPD-402/462—5 to 400 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.63 | 14.33 | 174.29 | .02 | .00 | 1.45 | 23.70 |
| 150.0 | 1.60 | 14.23 | 170.90 | .05 | .18 | 1.46 | 23.27 |
| 200.0 | 1.56 | 14.24 | 167.76 | .33 | .20 | 1.45 | 22.92 |
| 250.0 | 1.53 | 14.17 | 163.59 | -.40 | .20 | 1.45 | 22.76 |
| 300.0 | 1.53 | 14.23 | 160.48 | -.11 | .19 | 1.45 | 22.49 |
| 350.0 | 1.55 | 14.22 | 156.84 | -.32 | .18 | 1.47 | 22.00 |
| 400.0 | 1.58 | 14.09 | 154.18 | .43 | .17 | 1.51 | 21.79 |
| 450.0 | 1.68 | 14.11 | 150.88 | | .21 | 1.54 | 21.28 |
| 500.0 | 1.83 | 13.97 | 146.56 | | .21 | 1.61 | 21.01 |
| 550.0 | 2.06 | 13.81 | 143.23 | | .22 | 1.70 | 20.54 |
| 600.0 | 2.33 | 13.76 | 138.65 | | .26 | 1.82 | 20.37 |
| 650.0 | 2.67 | 13.38 | 133.97 | | .24 | 1.97 | 20.05 |
| 700.0 | 3.08 | 13.05 | 130.10 | | .22 | 2.15 | 19.79 |
| 750.0 | 3.60 | 12.74 | 126.17 | | .24 | 2.35 | 19.62 |
| 800.0 | 4.17 | 12.36 | 121.50 | | .22 | 2.58 | 19.88 |

GPD-402/462—5 to 400 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

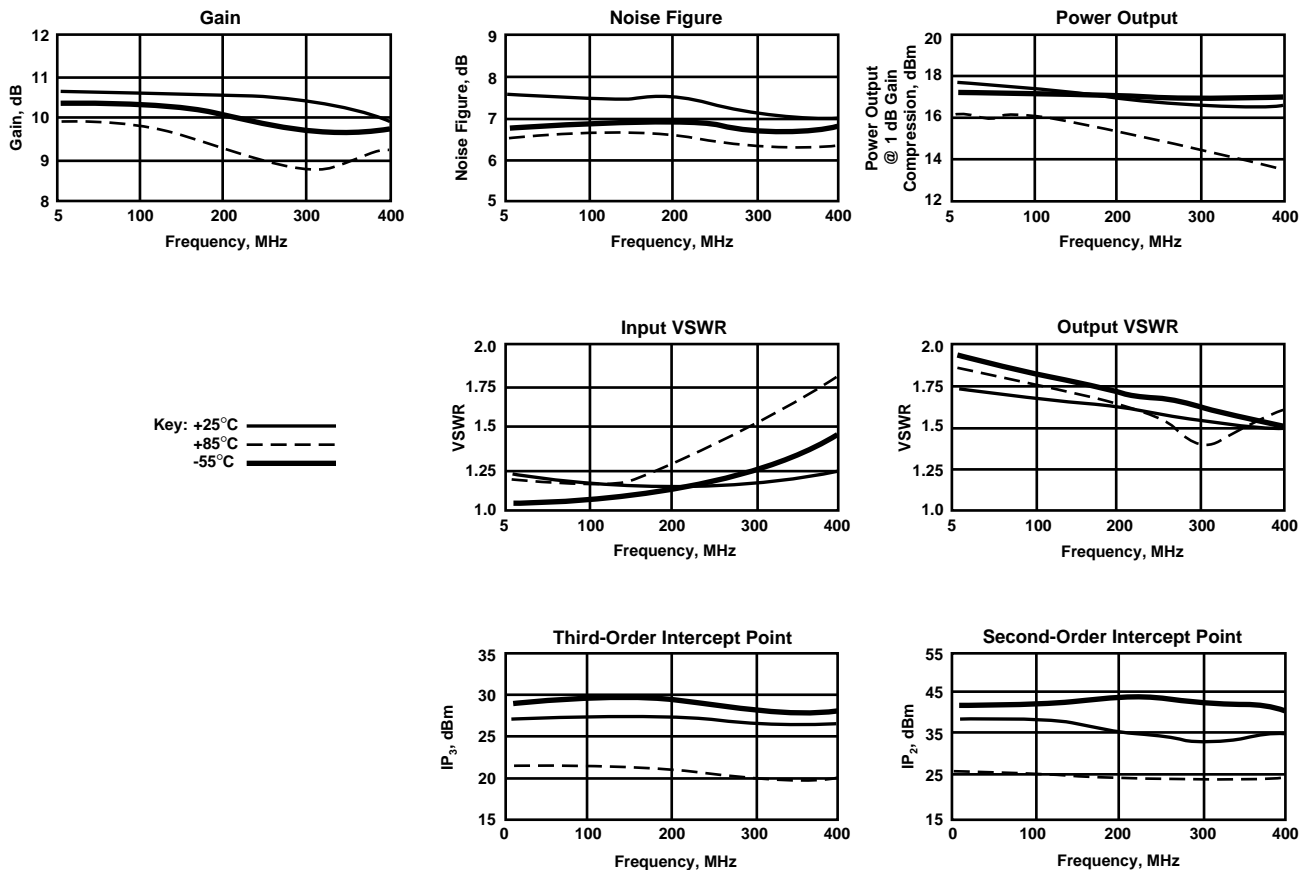
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .235 | -179.6 | 14.333 | 174.0 | -23.399 | 15.6 | .183 | 3.2 |
| 150.00 | .230 | -178.7 | 14.267 | 170.8 | -23.288 | 23.6 | .181 | 8.7 |
| 200.00 | .221 | -177.6 | 14.297 | 167.9 | -23.158 | 28.4 | .183 | 11.3 |
| 250.00 | .209 | -173.3 | 14.225 | 163.6 | -22.753 | 36.3 | .181 | 14.4 |
| 300.00 | .207 | -168.0 | 14.267 | 160.7 | -22.286 | 42.9 | .185 | 18.2 |
| 350.00 | .212 | -160.8 | 14.253 | 156.9 | -22.099 | 49.7 | .187 | 24.2 |
| 400.00 | .228 | -154.2 | 14.179 | 154.0 | -21.392 | 55.4 | .196 | 29.4 |
| 450.00 | .258 | -148.9 | 14.178 | 150.5 | -21.186 | 58.8 | .209 | 34.4 |
| 500.00 | .298 | -146.4 | 13.985 | 146.4 | -20.985 | 64.6 | .231 | 38.2 |
| 550.00 | .346 | -145.8 | 13.839 | 142.9 | -20.484 | 67.1 | .259 | 41.0 |
| 600.00 | .400 | -147.2 | 13.746 | 138.4 | -20.250 | 71.3 | .292 | 41.7 |
| 650.00 | .457 | -150.1 | 13.382 | 133.7 | -20.036 | 75.1 | .329 | 41.1 |
| 700.00 | .512 | -154.7 | 13.047 | 130.0 | -19.837 | 77.9 | .366 | 39.4 |
| 750.00 | .569 | -159.7 | 12.735 | 126.1 | -19.672 | 79.9 | .406 | 36.7 |
| 800.00 | .617 | -164.5 | 12.341 | 121.4 | -19.820 | 81.9 | .441 | 32.8 |

GPD-403/463—5 to 400 MHz

Typical Performance Over Temperature (@ +24 VDC unless otherwise noted)



GPD-403/463—5 to 400 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 24.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.07 | 10.50 | 176.22 | .39 | .00 | 1.65 | 20.66 |
| 150.0 | 1.10 | 10.37 | 174.17 | .56 | .15 | 1.63 | 20.24 |
| 200.0 | 1.12 | 10.33 | 170.97 | -.40 | .16 | 1.62 | 20.03 |
| 250.0 | 1.16 | 10.14 | 168.32 | -.83 | .13 | 1.60 | 19.76 |
| 300.0 | 1.19 | 10.14 | 166.45 | -.47 | .10 | 1.57 | 19.52 |
| 350.0 | 1.24 | 10.04 | 164.55 | -.13 | .09 | 1.55 | 19.09 |
| 400.0 | 1.28 | 9.95 | 163.35 | .88 | .08 | 1.51 | 18.72 |
| 450.0 | 1.33 | 9.79 | 161.56 | | .08 | 1.48 | 18.40 |
| 500.0 | 1.38 | 9.59 | 160.50 | | .07 | 1.45 | 18.10 |
| 550.0 | 1.45 | 9.46 | 158.96 | | .10 | 1.41 | 17.64 |
| 600.0 | 1.52 | 9.24 | 156.90 | | .08 | 1.39 | 17.26 |
| 650.0 | 1.61 | 9.05 | 155.95 | | .07 | 1.35 | 16.95 |
| 700.0 | 1.70 | 8.89 | 154.22 | | .10 | 1.32 | 16.50 |
| 750.0 | 1.81 | 8.64 | 152.36 | | .10 | 1.29 | 16.19 |
| 800.0 | 1.95 | 8.31 | 150.69 | | .08 | 1.28 | 16.00 |

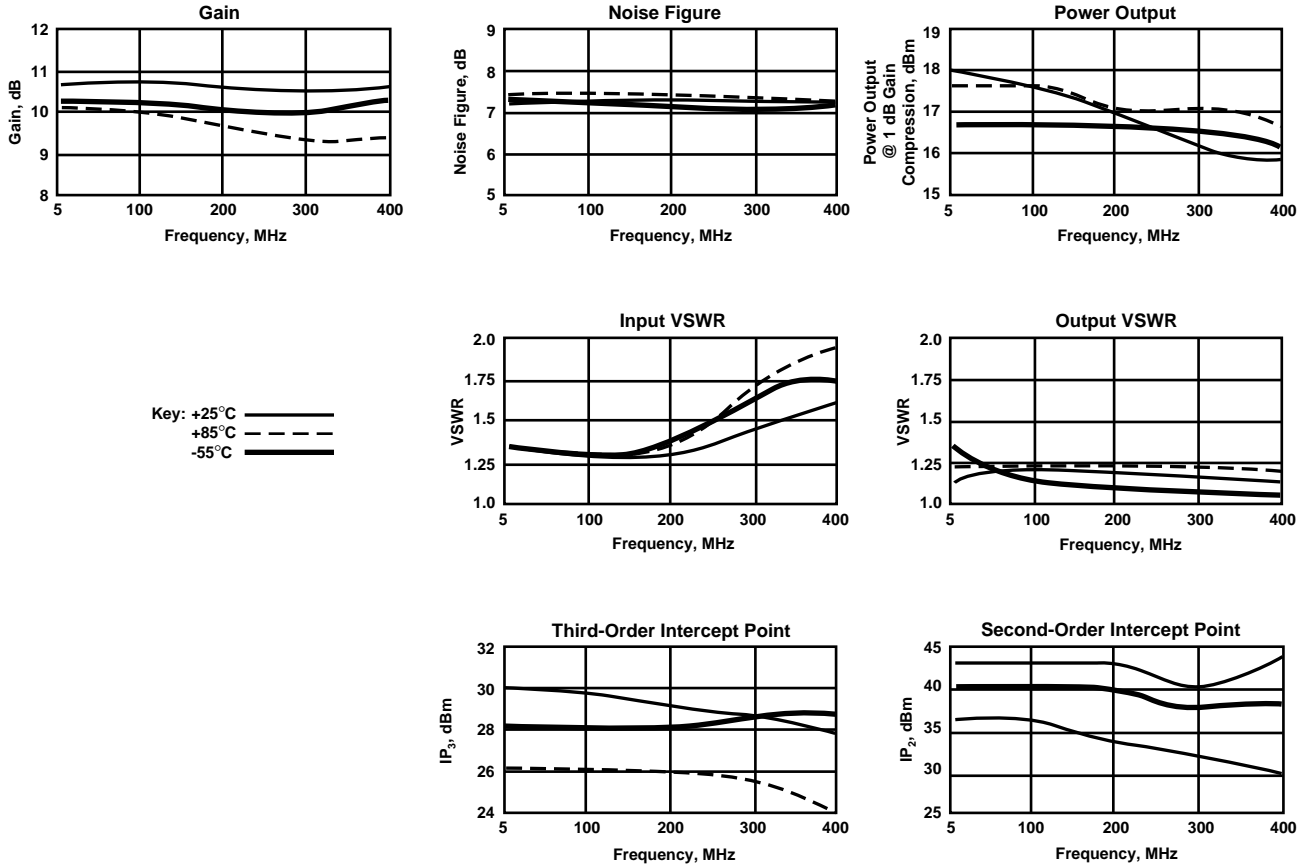
S-Parameters

Bias = 24.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .033 | -121.8 | 10.482 | 176.1 | -20.574 | 17.0 | .248 | -11.4 |
| 150.00 | .049 | -116.6 | 10.369 | 174.0 | -20.272 | 24.0 | .242 | -16.0 |
| 200.00 | .059 | -115.5 | 10.352 | 171.1 | -20.208 | 30.4 | .236 | -20.6 |
| 250.00 | .075 | -115.0 | 10.160 | 168.3 | -19.797 | 38.1 | .231 | -26.7 |
| 300.00 | .089 | -117.5 | 10.149 | 166.6 | -19.324 | 44.8 | .226 | -31.3 |
| 350.00 | .105 | -119.1 | 10.018 | 164.4 | -19.131 | 51.8 | .215 | -37.4 |
| 400.00 | .126 | -121.5 | 9.947 | 163.4 | -18.672 | 58.1 | .204 | -43.6 |
| 450.00 | .144 | -123.9 | 9.812 | 161.4 | -18.416 | 63.5 | .193 | -50.0 |
| 500.00 | .162 | -126.4 | 9.572 | 160.6 | -18.125 | 69.5 | .183 | -56.3 |
| 550.00 | .182 | -130.4 | 9.470 | 158.9 | -17.575 | 74.6 | .173 | -63.3 |
| 600.00 | .209 | -133.6 | 9.238 | 156.9 | -17.317 | 78.9 | .162 | -70.1 |
| 650.00 | .237 | -136.8 | 9.045 | 155.9 | -16.391 | 84.5 | .150 | -76.9 |
| 700.00 | .262 | -141.5 | 8.896 | 154.2 | -16.538 | 88.7 | .140 | -82.6 |
| 750.00 | .291 | -146.6 | 8.638 | 152.4 | -16.183 | 93.1 | .127 | -89.8 |
| 800.00 | .323 | -151.3 | 8.281 | 150.7 | -16.035 | 96.6 | .120 | -96.3 |

GPD-404/464—5 to 400 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.32 | 10.54 | 178.94 | .07 | .00 | 1.11 | 22.94 |
| 150.0 | 1.33 | 10.48 | 177.20 | -.07 | .07 | 1.10 | 22.53 |
| 200.0 | 1.36 | 10.48 | 176.26 | .55 | .10 | 1.09 | 22.11 |
| 250.0 | 1.40 | 10.44 | 173.60 | -.53 | .11 | 1.10 | 22.07 |
| 300.0 | 1.44 | 10.49 | 172.17 | -.39 | .07 | 1.08 | 21.80 |
| 350.0 | 1.50 | 10.56 | 171.03 | .04 | .07 | 1.09 | 21.43 |
| 400.0 | 1.57 | 10.59 | 169.72 | .31 | .07 | 1.10 | 21.09 |
| 450.0 | 1.66 | 10.55 | 168.68 | | .06 | 1.12 | 20.76 |
| 500.0 | 1.75 | 10.56 | 167.56 | | .08 | 1.14 | 20.52 |
| 550.0 | 1.90 | 10.46 | 165.67 | | .10 | 1.18 | 20.09 |
| 600.0 | 2.05 | 10.38 | 163.83 | | .11 | 1.22 | 19.87 |
| 650.0 | 2.23 | 10.32 | 161.76 | | .13 | 1.25 | 19.52 |
| 700.0 | 2.44 | 10.17 | 159.27 | | .13 | 1.28 | 19.16 |
| 750.0 | 2.72 | 9.94 | 156.96 | | .13 | 1.31 | 18.89 |

GPD-404/464—5 to 400 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

S-Parameters

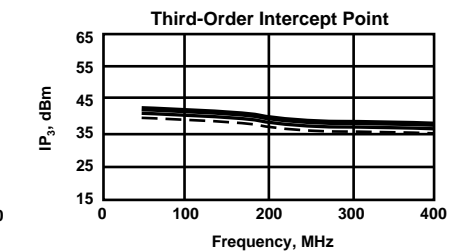
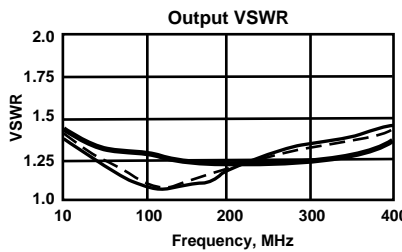
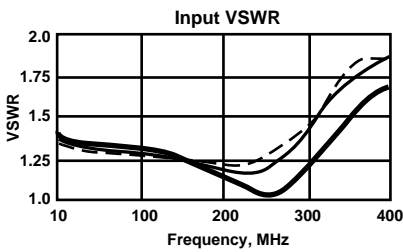
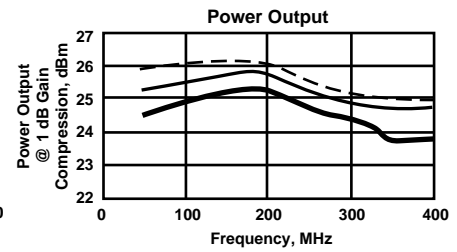
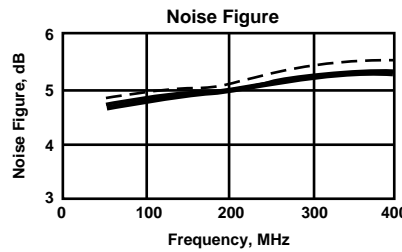
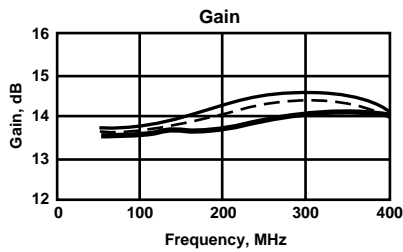
Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|--------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .134 | -164.2 | 10.510 | 178.5 | -22.866 | 13.7 | .053 | -22.2 |
| 150.00 | .142 | -158.3 | 10.495 | 176.9 | -22.529 | 21.5 | .051 | -32.2 |
| 200.00 | .153 | -155.0 | 10.485 | 176.3 | -22.392 | 28.5 | .044 | -42.6 |
| 250.00 | .163 | -150.7 | 10.466 | 173.4 | -21.934 | 35.5 | .043 | -60.8 |
| 300.00 | .181 | -147.2 | 10.488 | 172.1 | -21.655 | 41.8 | .043 | -76.1 |
| 350.00 | .199 | -144.4 | 10.519 | 170.9 | -21.382 | 47.4 | .042 | -100.2 |
| 400.00 | .222 | -142.7 | 10.578 | 169.8 | -20.861 | 54.1 | .046 | -123.8 |
| 450.00 | .247 | -142.3 | 10.548 | 168.6 | -20.826 | 58.2 | .056 | -141.5 |
| 500.00 | .277 | -142.3 | 10.518 | 167.6 | -20.497 | 64.2 | .065 | -156.4 |
| 550.00 | .308 | -143.0 | 10.458 | 165.6 | -19.989 | 68.7 | .081 | -170.0 |
| 600.00 | .343 | -144.5 | 10.363 | 163.8 | -19.753 | 73.0 | .096 | 179.2 |
| 650.00 | .381 | -146.5 | 10.318 | 161.7 | -19.460 | 78.4 | .110 | 170.6 |
| 700.00 | .421 | -149.8 | 10.161 | 159.3 | -19.193 | 81.3 | .124 | 162.3 |
| 750.00 | .465 | -153.5 | 9.929 | 157.0 | -18.834 | 84.9 | .133 | 154.1 |

GPD-405—10 to 400 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———
 +85°C - - - -
 -55°C = = = =



GPD-405—10 to 400 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

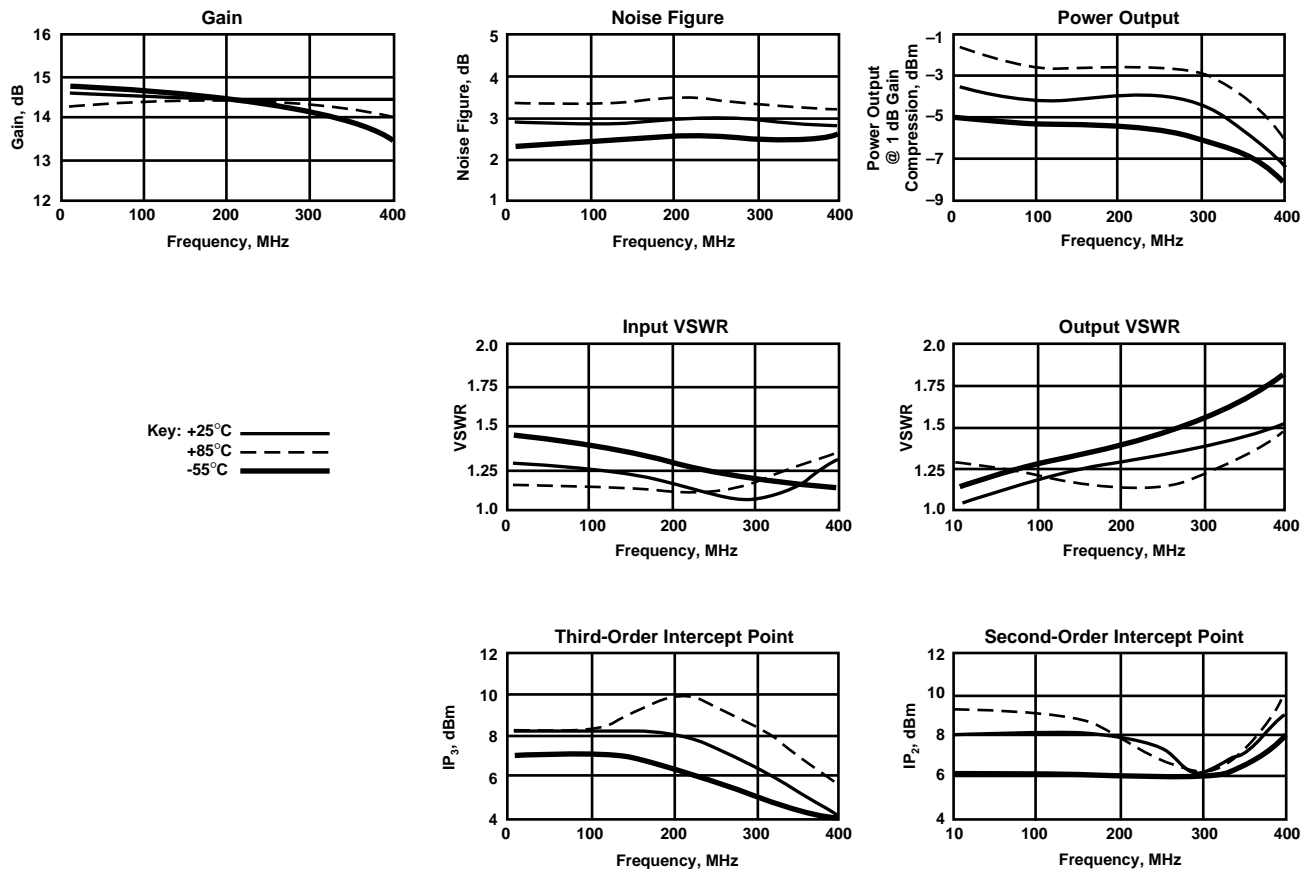
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|-------|-----------------|-------|-----------------|--------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .177 | 177.7 | 13.5 | 146.1 | -19.5 | -18.7 | .069 | -51.5 |
| 120.00 | .179 | 174.0 | 13.5 | 138.2 | -19.4 | -23.9 | .064 | -54.0 |
| 140.00 | .182 | 170.8 | 13.5 | 130.5 | -19.4 | -29.2 | .059 | -56.6 |
| 160.00 | .185 | 167.7 | 13.4 | 123.1 | -19.5 | -34.1 | .054 | -59.6 |
| 180.00 | .190 | 164.5 | 13.4 | 115.7 | -19.5 | -38.3 | .048 | -62.8 |
| 200.00 | .194 | 161.4 | 13.4 | 108.3 | -19.4 | -42.5 | .042 | -66.8 |
| 220.00 | .198 | 158.5 | 13.5 | 100.8 | -19.4 | -47.2 | .036 | -70.1 |
| 240.00 | .203 | 155.5 | 13.4 | 93.2 | -19.3 | -51.8 | .030 | -72.3 |
| 260.00 | .208 | 152.5 | 13.4 | 85.5 | -19.3 | -56.7 | .024 | -73.0 |
| 280.00 | .213 | 149.5 | 13.4 | 77.9 | -19.2 | -61.8 | .017 | -69.2 |
| 300.00 | .218 | 146.8 | 13.4 | 70.4 | -19.3 | -67.1 | .010 | -43.5 |
| 320.00 | .225 | 143.6 | 13.4 | 62.7 | -19.4 | -71.7 | .011 | +7.2 |
| 340.00 | .232 | 140.5 | 13.3 | 55.0 | -19.4 | -75.5 | .019 | +32.5 |
| 360.00 | .240 | 137.2 | 13.3 | 47.2 | -19.4 | -80.1 | .030 | +37.5 |
| 380.00 | .249 | 133.8 | 13.2 | 39.6 | -19.3 | -84.9 | .042 | +35.6 |
| 400.00 | .258 | 130.6 | 13.2 | 31.7 | -19.3 | -90.0 | .055 | +31.3 |
| 500.00 | .317 | 111.4 | 12.6 | -9.0 | -19.9 | -113.6 | .145 | -4.6 |
| 600.00 | .394 | 87.7 | 11.5 | -50.2 | -20.6 | -135.9 | .246 | -49.2 |
| 700.00 | .476 | 63.3 | 9.8 | -87.2 | -21.1 | -134.0 | .343 | -92.4 |

GPD-411—5 to 400 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



GPD-411—5 to 400 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.16 | 14.43 | 175.96 | .45 | .00 | 1.07 | 18.89 |
| 150.0 | 1.13 | 14.41 | 173.40 | .16 | .15 | 1.10 | 19.16 |
| 200.0 | 1.10 | 14.29 | 170.52 | -.44 | .14 | 1.15 | 19.03 |
| 250.0 | 1.10 | 14.28 | 168.36 | -.33 | .13 | 1.20 | 18.85 |
| 300.0 | 1.12 | 14.23 | 165.99 | -.43 | .11 | 1.28 | 18.88 |
| 350.0 | 1.19 | 14.20 | 164.26 | .11 | .10 | 1.37 | 18.59 |
| 400.0 | 1.32 | 14.25 | 162.37 | .48 | .16 | 1.48 | 18.42 |
| 450.0 | 1.52 | 14.18 | 158.38 | | .20 | 1.64 | 18.18 |
| 500.0 | 1.81 | 14.18 | 155.28 | | .25 | 1.87 | 18.08 |
| 550.0 | 2.30 | 14.30 | 149.36 | | .36 | 2.19 | 17.81 |
| 600.0 | 3.29 | 14.01 | 142.52 | | .42 | 2.64 | 18.00 |
| 650.0 | 5.62 | 13.78 | 134.30 | | .57 | 3.31 | 18.38 |
| 700.0 | 11.68 | 12.74 | 122.18 | | .64 | 4.43 | 19.33 |
| 750.0 | 33.90 | 10.82 | 111.34 | | .43 | 5.77 | 21.27 |

S-Parameters

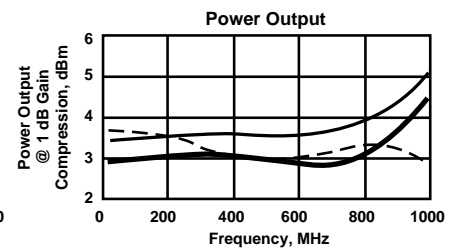
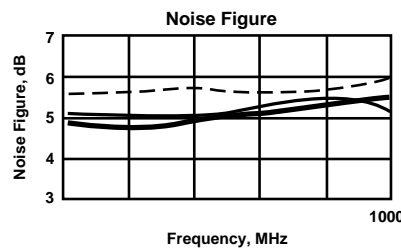
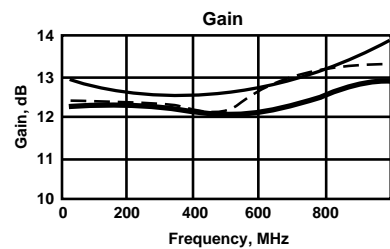
Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|-------|-----------------|--------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .115 | 161.8 | 14.519 | 175.6 | -19.416 | 9.5 | .077 | 3.7 |
| 150.00 | .103 | 148.8 | 14.369 | 173.3 | -19.099 | 13.9 | .087 | -4.6 |
| 200.00 | .080 | 138.6 | 14.309 | 170.8 | -19.092 | 16.5 | .104 | -14.0 |
| 250.00 | .058 | 119.0 | 14.233 | 168.2 | -18.857 | 20.5 | .129 | -20.5 |
| 300.00 | .039 | 77.3 | 14.239 | 166.1 | -18.869 | 24.2 | .150 | -30.7 |
| 350.00 | .055 | 10.4 | 14.208 | 163.9 | -18.565 | 26.4 | .180 | -40.9 |
| 400.00 | .104 | -18.9 | 14.240 | 161.7 | -18.388 | 28.8 | .214 | -51.0 |
| 450.00 | .175 | -35.7 | 14.104 | 157.7 | -18.086 | 29.4 | .252 | -62.4 |
| 500.00 | .266 | -49.1 | 14.058 | 154.7 | -17.961 | 28.8 | .304 | -72.5 |
| 550.00 | .387 | -61.9 | 14.128 | 148.9 | -17.553 | 26.1 | .368 | -83.2 |
| 600.00 | .528 | -75.7 | 13.762 | 142.3 | -17.693 | 19.0 | .442 | -94.6 |
| 650.00 | .696 | -91.4 | 13.447 | 135.0 | -18.240 | 12.3 | .523 | -106.1 |
| 700.00 | .855 | -108.8 | 12.485 | 124.3 | -19.094 | 1.4 | .610 | -119.7 |
| 750.00 | .979 | -127.6 | 10.764 | 114.0 | -21.247 | -12.1 | .681 | -133.0 |

GPD-1001/1061—5 to 1000 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

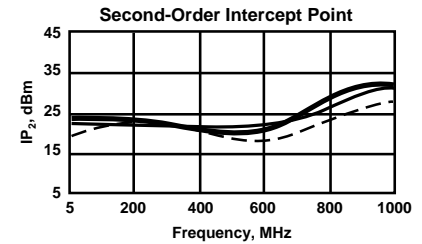
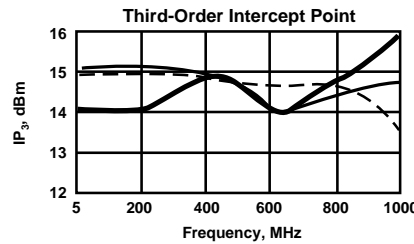
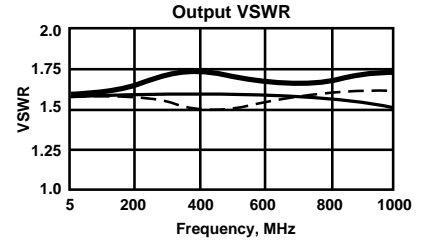
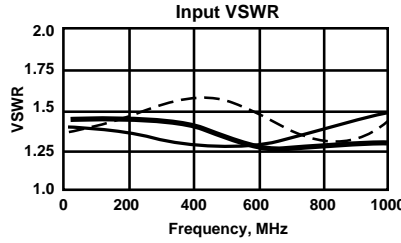
Key: +25°C ———
 +85°C - - - -
 -55°C ———



GPD-1001/1061—5 to 1000 MHz (continued)

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———
 +85°C - - - -
 -55°C ———



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.29 | 12.80 | 175.00 | -1.27 | .00 | 1.55 | 21.19 |
| 200.0 | 1.25 | 12.70 | 171.12 | -.70 | .15 | 1.57 | 20.80 |
| 300.0 | 1.20 | 12.70 | 165.90 | -.76 | .13 | 1.59 | 20.73 |
| 400.0 | 1.15 | 12.68 | 161.70 | .19 | .10 | 1.59 | 20.57 |
| 500.0 | 1.11 | 12.69 | 157.36 | .98 | .11 | 1.60 | 20.31 |
| 600.0 | 1.13 | 12.82 | 152.75 | 1.51 | .14 | 1.58 | 20.06 |
| 700.0 | 1.18 | 12.91 | 148.43 | 2.34 | .14 | 1.57 | 19.83 |
| 800.0 | 1.26 | 13.20 | 142.15 | 1.21 | .17 | 1.54 | 19.55 |
| 900.0 | 1.33 | 13.44 | 135.24 | -.56 | .25 | 1.48 | 19.29 |
| 1000.0 | 1.40 | 13.89 | 125.84 | -4.81 | .33 | 1.48 | 18.85 |
| 1100.0 | 1.66 | 14.25 | 110.43 | | .49 | 1.60 | 18.52 |
| 1200.0 | 2.65 | 14.09 | 88.12 | | .66 | 1.95 | 19.60 |
| 1300.0 | 5.16 | 11.75 | 67.01 | | .53 | 2.26 | 21.99 |

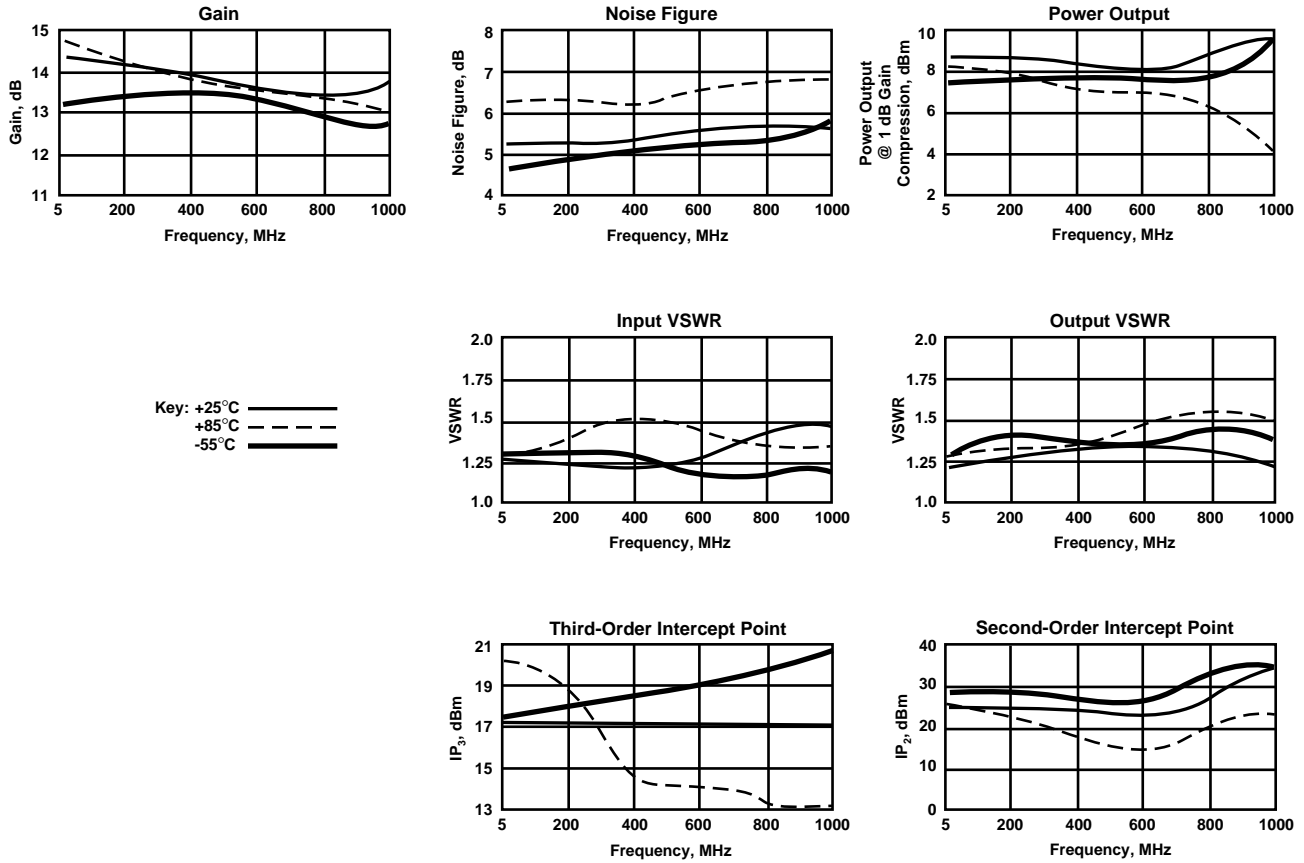
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .126 | 176.0 | 12.781 | 175.4 | -20.769 | 6.5 | .216 | .8 |
| 200.00 | .109 | 170.2 | 12.735 | 171.2 | -20.961 | 11.4 | .222 | 3.4 |
| 300.00 | .090 | 167.9 | 12.693 | 165.9 | -20.665 | 18.5 | .228 | 3.6 |
| 400.00 | .070 | 176.0 | 12.683 | 161.8 | -20.550 | 24.4 | .229 | 3.1 |
| 500.00 | .051 | -165.9 | 12.662 | 157.5 | -20.195 | 28.3 | .232 | .6 |
| 600.00 | .059 | -137.8 | 12.787 | 152.8 | -20.108 | 32.5 | .228 | -2.0 |
| 700.00 | .084 | -125.1 | 12.899 | 148.5 | -19.851 | 36.3 | .224 | -4.7 |
| 800.00 | .115 | -134.4 | 13.175 | 142.2 | -19.505 | 38.1 | .213 | -8.0 |
| 900.00 | .145 | -153.4 | 13.447 | 135.5 | -19.210 | 38.4 | .198 | -6.6 |
| 1000.00 | .170 | 169.8 | 13.865 | 126.0 | -18.813 | 37.5 | .195 | -.2 |
| 1100.00 | .247 | 112.2 | 14.251 | 110.7 | -18.550 | 32.7 | .234 | 7.1 |
| 1200.00 | .450 | 52.0 | 14.090 | 88.5 | -19.649 | 25.2 | .322 | -4 |
| 1300.00 | .675 | 2.7 | 11.730 | 67.1 | -21.993 | 21.1 | .390 | -19.1 |
| 1400.00 | .789 | -33.2 | 7.973 | 53.1 | -23.851 | 29.5 | .364 | -40.5 |
| 1500.00 | .831 | -54.8 | 4.163 | 50.8 | -24.626 | 37.0 | .302 | -53.1 |

GPD-1002/1062—5 to 1000 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.29 | 14.23 | 174.38 | -.16 | .00 | 1.26 | 24.09 |
| 200.0 | 1.26 | 14.06 | 167.94 | -.52 | .19 | 1.27 | 23.33 |
| 300.0 | 1.21 | 13.97 | 161.47 | -.93 | .16 | 1.29 | 23.49 |
| 400.0 | 1.17 | 13.83 | 156.06 | -.27 | .14 | 1.30 | 23.05 |
| 500.0 | 1.18 | 13.67 | 150.80 | .53 | .14 | 1.31 | 22.61 |
| 600.0 | 1.23 | 13.57 | 145.27 | 1.08 | .16 | 1.30 | 22.14 |
| 700.0 | 1.30 | 13.44 | 139.93 | 1.82 | .17 | 1.29 | 21.64 |
| 800.0 | 1.39 | 13.43 | 133.32 | 1.29 | .18 | 1.26 | 21.23 |
| 900.0 | 1.44 | 13.41 | 125.77 | -.18 | .26 | 1.20 | 20.79 |
| 1000.0 | 1.49 | 13.53 | 115.90 | -3.99 | .33 | 1.18 | 19.94 |
| 1100.0 | 1.76 | 13.51 | 100.99 | | .48 | 1.25 | 19.43 |
| 1200.0 | 2.74 | 12.87 | 80.86 | | .59 | 1.43 | 19.96 |
| 1300.0 | 5.08 | 10.21 | 60.92 | | .44 | 1.57 | 21.81 |

GPD-1002/1062—5 to 1000 MHz (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

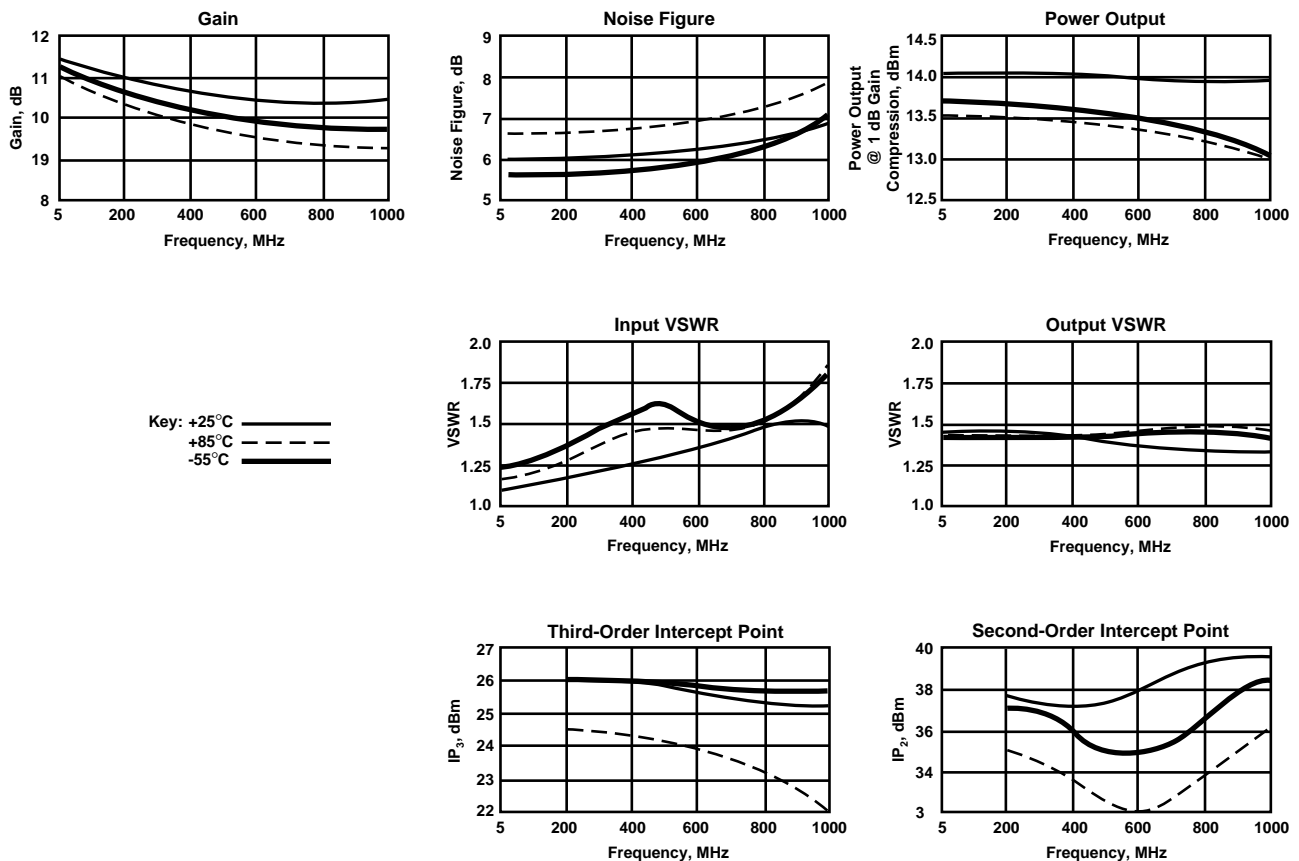
S-Parameters

Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .130 | 177.2 | 14.212 | 174.2 | -23.883 | 10.1 | .114 | 1.0 |
| 200.00 | .115 | 174.5 | 14.090 | 168.1 | -23.830 | 14.4 | .118 | 9.1 |
| 300.00 | .094 | 177.6 | 13.974 | 161.6 | -23.220 | 23.4 | .127 | 9.4 |
| 400.00 | .081 | -168.4 | 13.831 | 156.2 | -22.778 | 31.2 | .130 | 9.0 |
| 500.00 | .081 | -150.6 | 13.638 | 150.9 | -22.618 | 36.0 | .134 | 6.5 |
| 600.00 | .102 | -139.1 | 13.535 | 145.2 | -22.092 | 41.8 | .132 | 3.1 |
| 700.00 | .131 | -138.6 | 13.423 | 139.9 | -21.605 | 45.5 | .127 | -1.0 |
| 800.00 | .162 | -150.9 | 13.412 | 133.3 | -21.127 | 48.1 | .115 | -6.2 |
| 900.00 | .178 | -171.3 | 13.416 | 126.0 | -20.662 | 48.3 | .097 | -5.4 |
| 1000.00 | .197 | 151.2 | 13.496 | 116.0 | -19.983 | 47.6 | .084 | 10.0 |
| 1100.00 | .272 | 95.7 | 13.510 | 101.1 | -19.447 | 42.2 | .112 | 29.1 |
| 1200.00 | .462 | 40.7 | 12.865 | 81.0 | -20.066 | 34.7 | .175 | 19.4 |
| 1300.00 | .668 | -4.2 | 10.191 | 60.9 | -21.823 | 26.8 | .225 | -4.7 |
| 1400.00 | .793 | -37.1 | 6.343 | 51.1 | -24.091 | 28.3 | .213 | -28.4 |
| 1500.00 | .837 | -58.2 | 2.570 | 50.1 | -25.353 | 36.2 | .174 | -48.3 |

GPD-1003/1063—5 to 100 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



GPD-1003/1063 (continued)

Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.13 | 11.32 | 161.40 | -.60 | .00 | 1.46 | 22.29 |
| 200.0 | 1.17 | 11.18 | 141.34 | -1.28 | .54 | 1.43 | 22.12 |
| 300.0 | 1.23 | 11.14 | 122.54 | -.68 | .51 | 1.39 | 21.89 |
| 400.0 | 1.27 | 10.98 | 104.21 | .36 | .51 | 1.34 | 21.62 |
| 500.0 | 1.31 | 10.84 | 86.05 | 1.58 | .53 | 1.29 | 21.29 |
| 600.0 | 1.36 | 10.72 | 66.56 | 1.47 | .52 | 1.26 | 21.00 |
| 700.0 | 1.41 | 10.74 | 47.59 | 1.88 | .57 | 1.26 | 21.02 |
| 800.0 | 1.53 | 10.67 | 26.70 | .38 | .56 | 1.22 | 19.34 |
| 900.0 | 1.50 | 10.75 | 6.68 | -.23 | .59 | 1.24 | 18.98 |
| 1000.0 | 1.54 | 10.88 | -16.41 | -3.94 | .00 | 1.28 | 18.61 |

S-Parameters

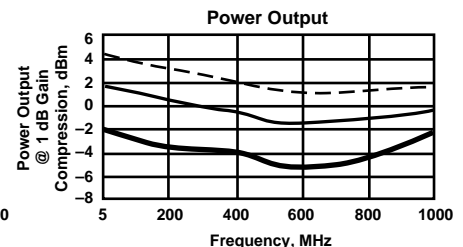
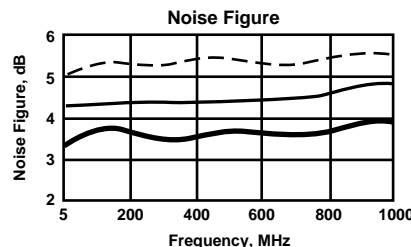
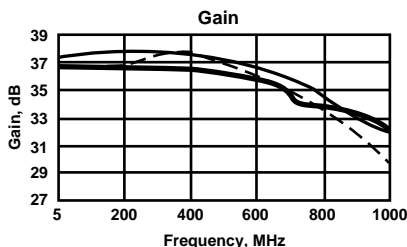
Bias = 15.00 Volts

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|-------|-----------------|------|-----------------|--------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .053 | -123.2 | 11.016 | 171.9 | -21.498 | 11.5 | .149 | -9.5 |
| 200.00 | .086 | -119.4 | 11.120 | 167.0 | -22.503 | 5.8 | .125 | -16.6 |
| 300.00 | .082 | -127.5 | 11.249 | 160.5 | -20.865 | 25.2 | .148 | -22.0 |
| 400.00 | .104 | -130.2 | 10.294 | 154.6 | -21.173 | 25.7 | .139 | -38.5 |
| 500.00 | .113 | -132.5 | 10.857 | 148.1 | -21.142 | 33.8 | .141 | -49.3 |
| 600.00 | .137 | -146.1 | 10.755 | 141.8 | -21.214 | 33.8 | .136 | -64.1 |
| 700.00 | .144 | -157.4 | 10.768 | 135.9 | -20.690 | 39.1 | .147 | -77.9 |
| 800.00 | .153 | -169.4 | 10.778 | 127.8 | -20.598 | 43.3 | .156 | -93.9 |
| 900.00 | .186 | 169.2 | 10.973 | 120.2 | -19.731 | 40.8 | .157 | -109.0 |
| 1000.00 | .207 | 136.3 | 11.218 | 109.3 | -18.887 | 36.1 | .160 | -128.3 |
| 1100.00 | .293 | 88.5 | 11.458 | 95.4 | -20.163 | 40.2 | .165 | -152.0 |
| 1200.00 | .455 | 32.3 | 10.592 | 76.2 | -19.339 | 31.5 | .144 | -175.6 |
| 1300.00 | .646 | -15.4 | 8.449 | 55.5 | -19.985 | 24.1 | .132 | 169.3 |
| 1400.00 | .763 | -50.0 | 5.442 | 43.9 | -21.462 | 20.9 | .133 | 154.4 |
| 1500.00 | .820 | -75.6 | 2.652 | 39.0 | -22.063 | 25.1 | .133 | 138.6 |
| 1800.00 | .862 | -94.2 | .174 | 37.8 | -22.710 | 30.6 | .145 | 117.1 |
| 1700.00 | .892 | -109.5 | -2.115 | 35.7 | -24.469 | 22.8 | .163 | 102.4 |

GPM-552—5 to 500 MHz

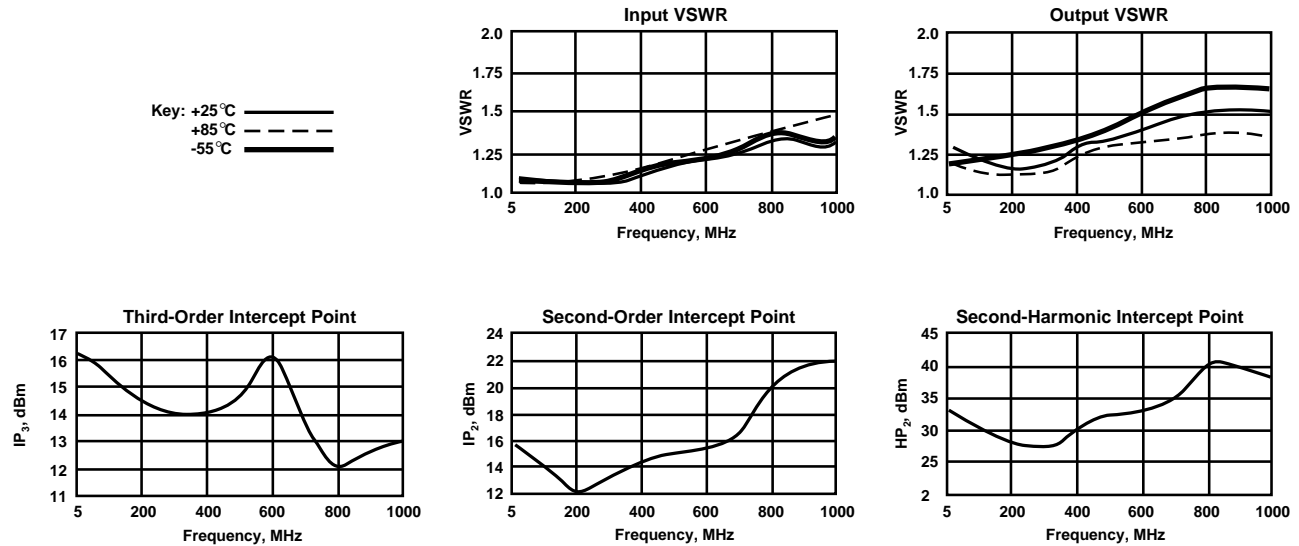
Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)

Key: +25°C ———
 +85°C - - - - -
 -55°C _____



GPM-552—5 to 500 MHz (continued)

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.06 | 37.36 | -2.73 | .00 | 1.13 | 46.24 |
| 150.0 | 1.06 | 37.39 | -.81 | .52 | 1.18 | 46.82 |
| 200.0 | 1.01 | 37.48 | .99 | .56 | 1.18 | 42.08 |
| 250.0 | 1.04 | 37.54 | 1.50 | .59 | 1.19 | 49.53 |
| 350.0 | 1.09 | 37.55 | 1.75 | .67 | 1.26 | 42.90 |
| 400.0 | 1.08 | 37.53 | .46 | .69 | 1.31 | 46.05 |
| 450.0 | 1.12 | 37.58 | -.54 | .71 | 1.33 | 44.11 |
| 500.0 | 1.14 | 37.58 | -2.72 | .73 | 1.36 | 43.15 |

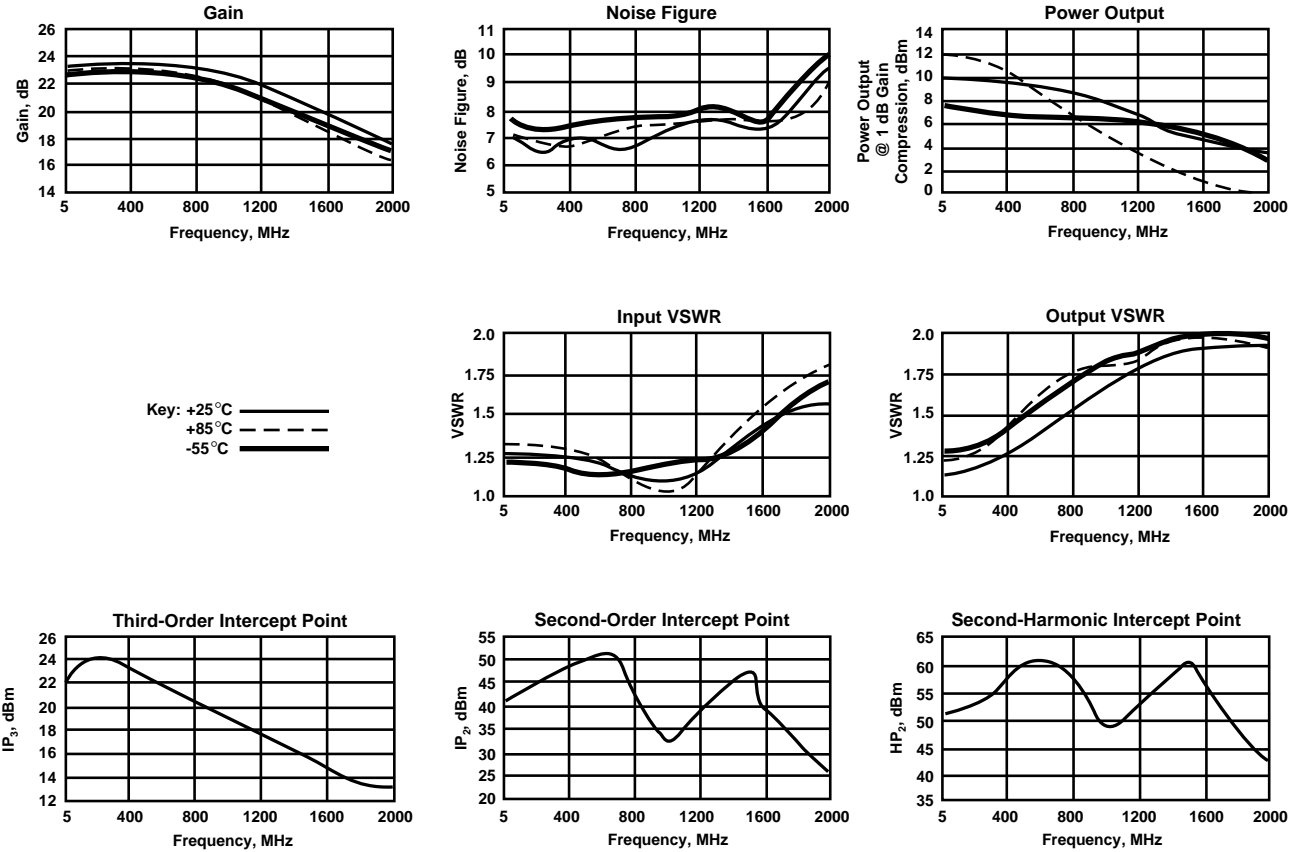
S-Parameters

Bias = 15.00 Volts, 31.80 mA

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|-------|-----------------|-------|-----------------|------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .023 | -45.3 | 38.196 | -13.4 | -43.252 | 9.0 | .092 | -17.3 |
| 150.00 | .041 | -20.9 | 38.216 | -21.2 | -44.382 | 34.7 | .075 | -23.9 |
| 200.00 | .022 | -28.8 | 38.317 | -28.5 | -46.343 | 22.8 | .076 | -22.7 |
| 250.00 | .041 | -17.8 | 38.378 | -36.1 | -47.346 | 35.2 | .080 | -21.0 |
| 300.00 | .023 | 16.3 | 38.387 | -44.4 | -45.052 | 36.7 | .086 | -21.8 |
| 350.00 | .045 | 7.1 | 38.338 | -53.1 | -45.824 | 42.7 | .103 | -28.9 |
| 400.00 | .048 | -3.8 | 38.267 | -62.4 | -43.623 | 56.2 | .120 | -33.1 |
| 450.00 | .061 | 19.3 | 38.156 | -72.0 | -44.366 | 45.5 | .135 | -41.0 |
| 500.00 | .075 | 23.3 | 38.074 | -81.7 | -43.714 | 51.5 | .145 | -46.5 |
| 550.00 | .080 | 17.2 | 37.911 | -91.7 | -43.756 | 48.8 | .156 | -52.7 |

GPM-1052—5 to 1000 MHz

Typical Performance Over Temperature (@ +15 VDC unless otherwise noted)



Automatic Network Analyzer Measurements (Typical production unit @ +25°C ambient)

Numerical Readings

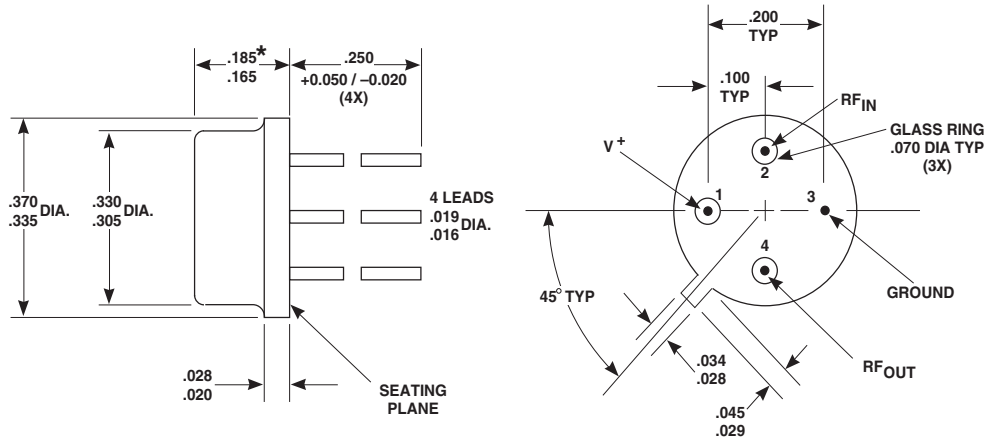
Bias = 15.00 Volts

| FREQUENCY MHz | VSWR IN | GAIN dB | PHASE DEGREES | PHASE DEV | GROUP DELAY ns | VSWR OUT | ISOLATION dB |
|------------------|------------|------------|------------------|--------------|-------------------|-------------|-----------------|
| 100.0 | 1.27 | 23.10 | -1.06 | .26 | .00 | 1.29 | 37.74 |
| 200.0 | 1.28 | 23.22 | -.53 | .05 | .91 | 1.34 | 38.26 |
| 300.0 | 1.26 | 23.26 | .50 | -.08 | .88 | 1.38 | 40.19 |
| 400.0 | 1.23 | 23.15 | .65 | -.04 | .91 | 1.45 | 37.94 |
| 500.0 | 1.20 | 23.07 | .27 | -.05 | .93 | 1.51 | 39.22 |
| 600.0 | 1.17 | 23.06 | .08 | -.12 | .91 | 1.57 | 38.89 |
| 700.0 | 1.14 | 22.95 | .18 | -.10 | .91 | 1.62 | 37.90 |
| 800.0 | 1.11 | 22.84 | .02 | -.08 | .92 | 1.68 | 37.89 |
| 900.0 | 1.10 | 22.66 | -.35 | .01 | .91 | 1.75 | 38.38 |
| 1000.0 | 1.08 | 22.29 | -.49 | .29 | .92 | 1.80 | 38.80 |

GPM-1052—5 to 1000 MHz (continued)**Automatic Network Analyzer Measurements** (Typical production unit @ +25°C ambient)**S-Parameters****Bias = 15.00 Volts**

| FREQUENCY MHz | S ₁₁ | | S ₂₁ | | S ₁₂ | | S ₂₂ | |
|------------------|-----------------|--------|-----------------|--------|-----------------|------|-----------------|-------|
| | Mag | Ang | dB | Ang | dB | Ang | Mag | Ang |
| 100.00 | .120 | 174.2 | 23.188 | -10.3 | -36.001 | .5 | .138 | -21.9 |
| 150.00 | .122 | 178.8 | 23.284 | -16.1 | -41.210 | 3.6 | .137 | -30.0 |
| 200.00 | .125 | -179.1 | 23.211 | -21.3 | -38.986 | -1.5 | .148 | -32.1 |
| 250.00 | .120 | -179.4 | 23.233 | -26.5 | -37.965 | 22.7 | .150 | -36.4 |
| 300.00 | .112 | -179.5 | 23.231 | -32.0 | -41.795 | 9.6 | .160 | -41.9 |
| 350.00 | .108 | -179.7 | 23.161 | -37.7 | -38.308 | 16.8 | .164 | -46.9 |
| 400.00 | .110 | -167.9 | 23.149 | -42.1 | -40.926 | 18.2 | .195 | -55.3 |
| 450.00 | .101 | -176.9 | 23.117 | -49.1 | -38.585 | 11.8 | .193 | -58.0 |
| 500.00 | .093 | -178.9 | 23.107 | -55.2 | -39.673 | 17.6 | .207 | -59.7 |
| 550.00 | .086 | -177.4 | 23.091 | -61.5 | -38.490 | 13.9 | .219 | -62.7 |
| 600.00 | .083 | -178.9 | 23.104 | -67.3 | -37.638 | 11.4 | .230 | -66.0 |
| 650.00 | .075 | -174.4 | 23.111 | -73.7 | -38.089 | 23.6 | .237 | -68.5 |
| 700.00 | .069 | -175.7 | 23.088 | -79.6 | -38.919 | 16.3 | .238 | -72.7 |
| 750.00 | .061 | -174.3 | 23.024 | -85.5 | -38.214 | 18.2 | .248 | -78.4 |
| 800.00 | .054 | -169.5 | 22.927 | -91.9 | -40.107 | 25.0 | .262 | -82.0 |
| 850.00 | .047 | -162.8 | 22.841 | -98.1 | -38.402 | 21.8 | .270 | -84.7 |
| 900.00 | .043 | -149.6 | 22.708 | -104.6 | -40.210 | 17.2 | .277 | -86.8 |
| 950.00 | .042 | -142.4 | 22.484 | -110.7 | -39.685 | 20.7 | .283 | -90.2 |
| 1000.00 | .042 | -134.0 | 22.286 | -116.3 | -37.621 | 38.5 | .291 | -91.8 |

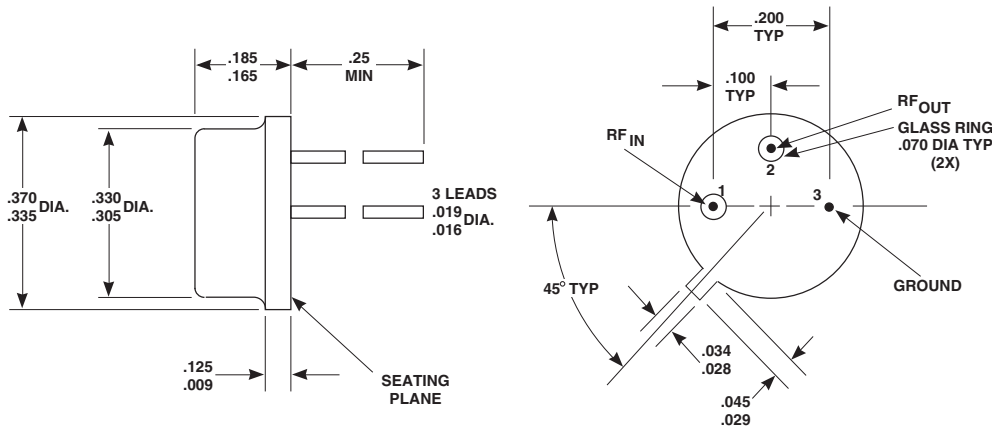
Case Drawings TO-12



APPROXIMATE WEIGHT 1.7 GRAMS

*NOTES (UNLESS OTHERWISE SPECIFIED):
 1. FOR GPD-405 (TO-12T CASE) THESE DIMENSIONS ARE: $\frac{.230}{.260}$
 2. DIMENSIONS ARE SPECIFIED IN INCHES

TO-39



APPROXIMATE WEIGHT 1.7 GRAMS

DIMENSIONS ARE SPECIFIED IN INCHES

NOTES (UNLESS OTHERWISE SPECIFIED):
 1. DIMENSIONS ARE SPECIFIED IN INCHES
 2. TOLERANCES: xx ± .02
 xxx ± .010

Contact Teledyne Microwave Solutions:
 650-691-9800
 650-962-6845 fax

Check for updates:
www.teledynemicrowave.com