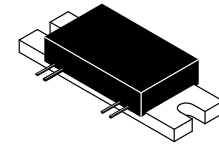


The RF MOSFET Line
RF Power Field Effect Amplifiers
N-Channel Enhancement-Mode Lateral MOSFETs

MHW1810-1
MHW1810-2

- Specified 26 Volts, 1805–1880 MHz, Class AB Characteristics
Output Power = 16 Watts CW Typ
Power Gain = 26 dB Typ @ 10 Watts (MHW1810-1)
Power Gain = 34 dB Typ @ 10 Watts (MHW1810-2)
Efficiency = 34% Min @ 10 Watts
- 50 Ω Input/Output System
- Designed for GSM Linearity Requirements

10 W, 1805–1880 MHz
RF POWER AMPLIFIER



CASE 301AW-02, STYLE 1

MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|----------------------------------|------------|--------------------------------|-------------|
| DC Supply Voltage | V_S | 28 | Vdc |
| DC Bias Voltage | V_{bias} | 28 | Vdc |
| RF Input Power | P_{in} | MHW1810-1: 21 MHW1810-2: 16 | dBm |
| RF Output Power | P_{out} | 20 | W |
| Operating Case Temperature Range | T_C | - 10 to +90 | $^{\circ}C$ |
| Storage Temperature Range | T_{stg} | - 30 to +100 | $^{\circ}C$ |

ELECTRICAL CHARACTERISTICS ($T_C = +25^{\circ}C$, $V_S = 26$ Vdc; $V_{bias} = 5$ Vdc; 50 Ω system, unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|-------------|---|----------|----------|------|
| Frequency Range | BW | 1805 | — | 1880 | MHz |
| Quiescent Current ($P_{in} = 0$ mW) | I_{DQ} | 100 | — | 150 | mA |
| Bias Current | I_{bias} | — | — | 2 | mA |
| Output Power at 1 dB Compression | P_{1dB} | 10 | 14 | — | W |
| Power Gain ($P_{out} = 10$ W) ($P_{out} = 10$ W) | G_p | MHW1810-1: 24 MHW1810-2: 32 | 26 34 | 28 36 | dB |
| Efficiency ($P_{out} = 10$ W) | η | 34 | — | — | % |
| Input VSWR ($P_{out} = 10$ W) | $VSWR_{in}$ | — | — | 1.8:1 | — |
| Harmonics at $2f_o$ ($P_{out} = 10$ W) | H_2 | — | — | - 35 | dBc |
| Harmonics at $3f_o$ ($P_{out} = 10$ W) | H_3 | — | — | - 45 | dBc |
| Reverse IMD; $P_{out} = 10$ W; Preverse = -40 dBc ($F_1 = F_0 \pm 200$ kHz @ -40 dBc) | IMD_r | — | — | - 50 | dBc |
| Load Mismatch Stress Load VSWR = 5:1, All Phase Angles | ψ | No Degradation in Output Power | | | |
| Stability ($P_{out} = 10$ mW to 10 W, $V_S \leq 26$ Vdc) Load VSWR = 5:1, All Phase Angles | — | All Spurious Outputs More Than 60 dB Below Desired Signal | | | |

NOTE – **CAUTION** – MOS devices are susceptible to damage from electrostatic charge. Reasonable precautions in handling and packaging MOS devices should be observed.

EXTREME CASE ELECTRICAL CHARACTERISTICS ($T_C = -10$ to $+85^\circ\text{C}$, $V_S = 23.5$ to 26 Vdc, $V_{\text{bias}} = 3$ to 26 Vdc, $50\ \Omega$ system, unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---------------------------|---|-----|------|------|
| Frequency Range | BW | 1805 | — | 1880 | MHz |
| Quiescent Current ($P_{\text{in}} = 0$ mW) | I_{DQ} | 100 | — | 160 | mA |
| Bias Current | I_{bias} | — | — | 2 | mA |
| Output Power at 1 dB Compression | $P_{1\text{dB}}$ | 8 | — | — | W |
| Power Gain Variation for a Given Part ($P_{\text{out}} = 10$ W) | G_p | — | 5 | 6.5 | dB |
| Efficiency ($P_{\text{out}} = 10$ W) | η | 32 | — | — | % |
| Input VSWR | VSWR_{in} | — | — | 2:1 | — |
| Harmonics at $2f_0$ | H_2 | — | — | -35 | dBc |
| Harmonics at $3f_0$ | H_3 | — | — | -45 | dBc |
| Reverse IMD; $P_{\text{out}} = 10$ W; Preverse = -40 dBc ($F_1 = F_0 \pm 200$ kHz @ -40 dBc) | IMD_r | — | — | -50 | dBc |
| Load Mismatch Stress Load VSWR = 5:1, All Phase Angles | ψ | No Degradation in Output Power | | | |
| Stability ($P_{\text{out}} = 10$ mW to 10 W, $V_S \leq 26$ Vdc) Load VSWR = 5:1, All Phase Angles | — | All Spurious Outputs More Than 60 dB Below Desired Signal | | | |

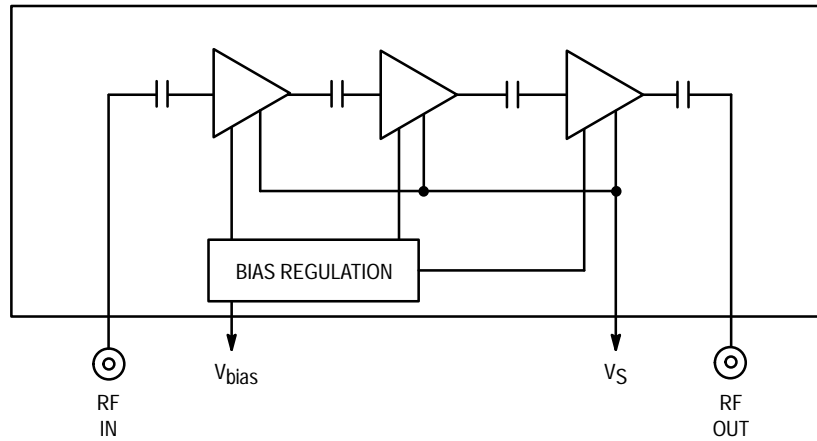


Figure 1. Internal Diagram

TYPICAL CHARACTERISTICS MHW1810-1

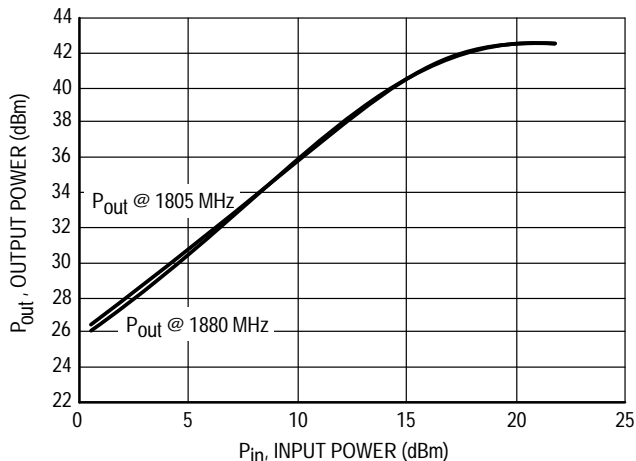


Figure 2. Output Power versus Input Power

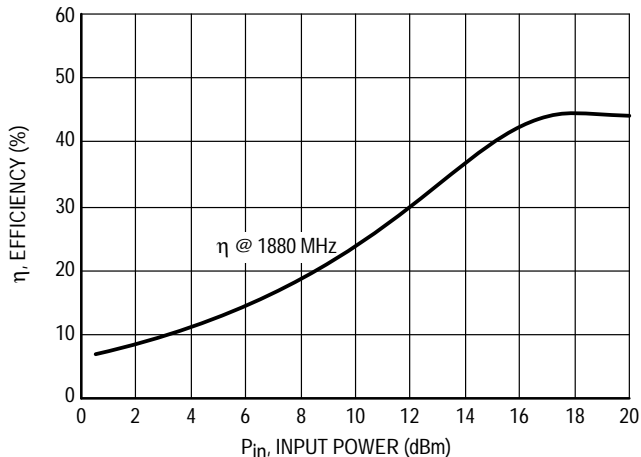


Figure 3. Efficiency versus Input Power

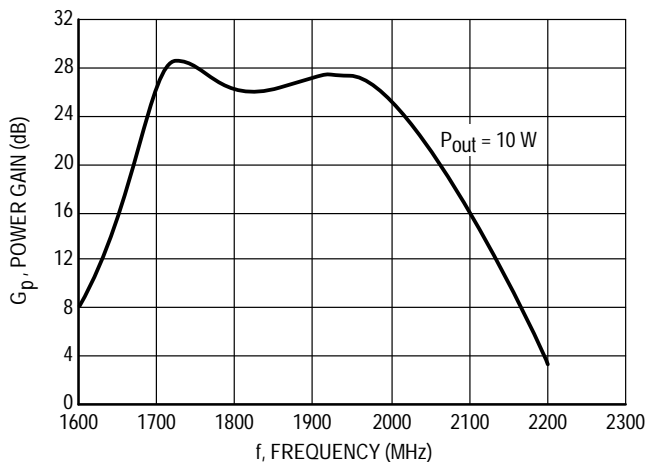


Figure 4. Power Gain versus Frequency

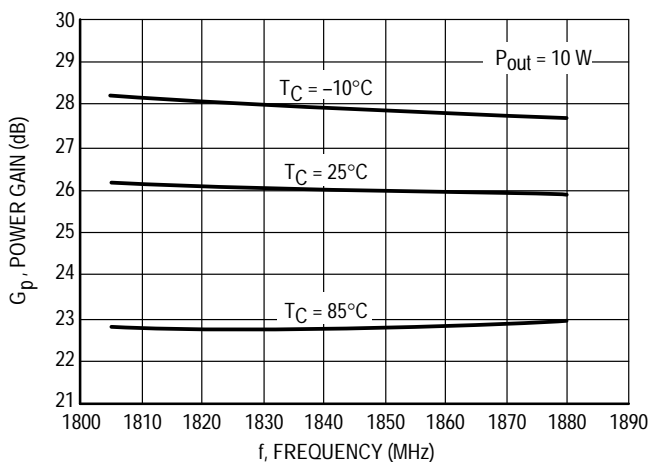


Figure 5. Gain versus Frequency

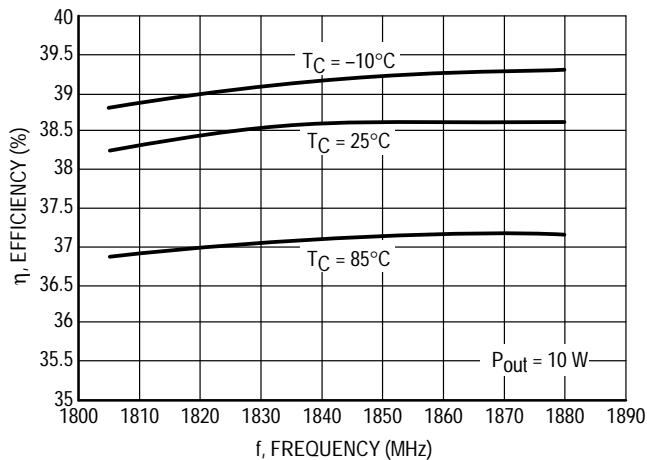


Figure 6. Efficiency versus Frequency

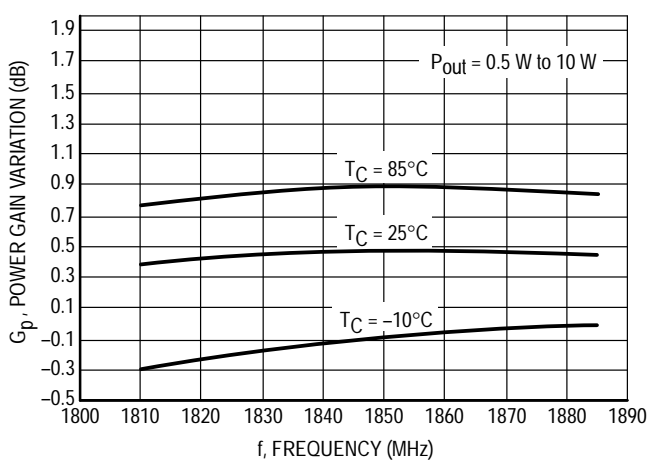


Figure 7. Power Gain Variation versus Frequency

TYPICAL CHARACTERISTICS
MHW1810-1

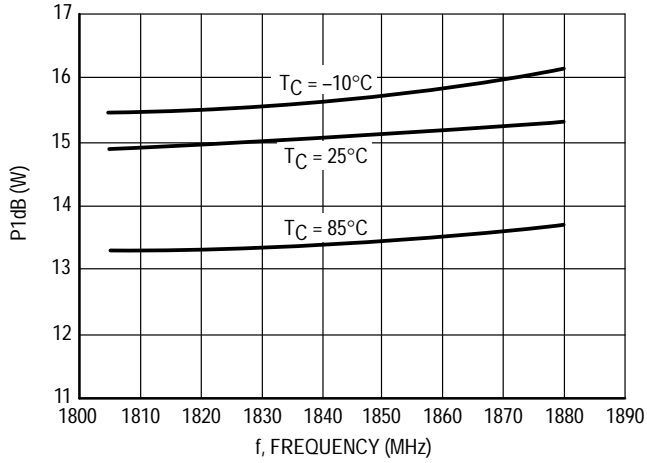


Figure 8. P1dB versus Frequency

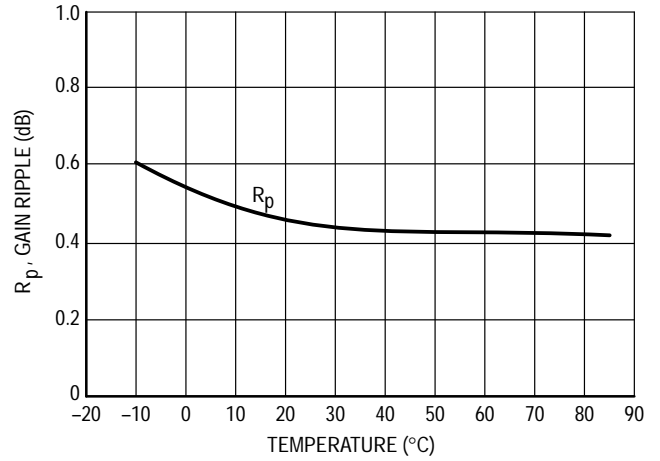


Figure 9. Gain Ripple versus Temperature

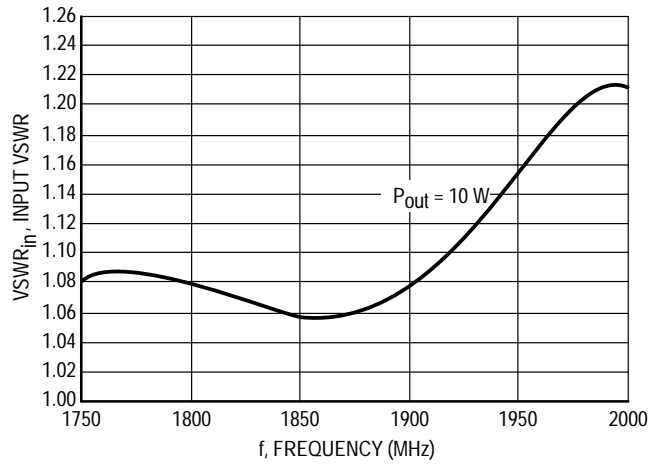


Figure 10. Input VSWR

TYPICAL CHARACTERISTICS MHW1810-2

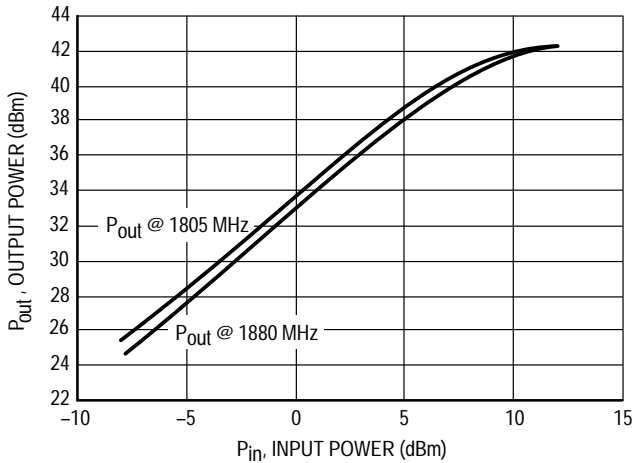


Figure 11. Output Power versus Input Power

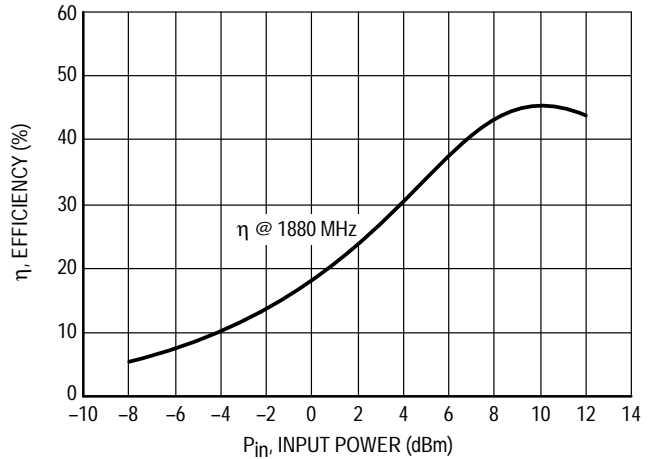


Figure 12. Efficiency versus Input Power

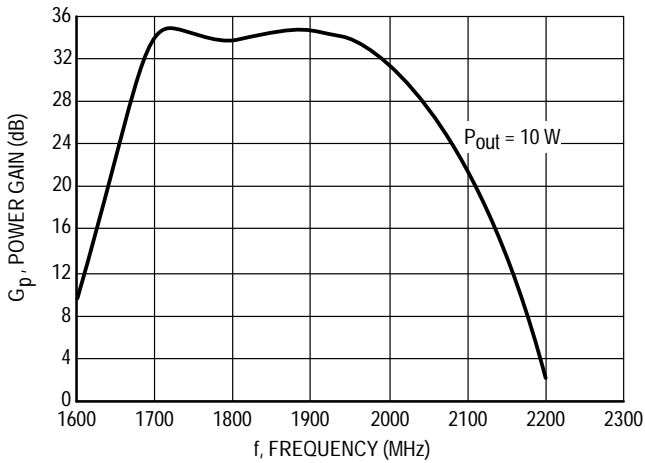


Figure 13. Power Gain versus Frequency

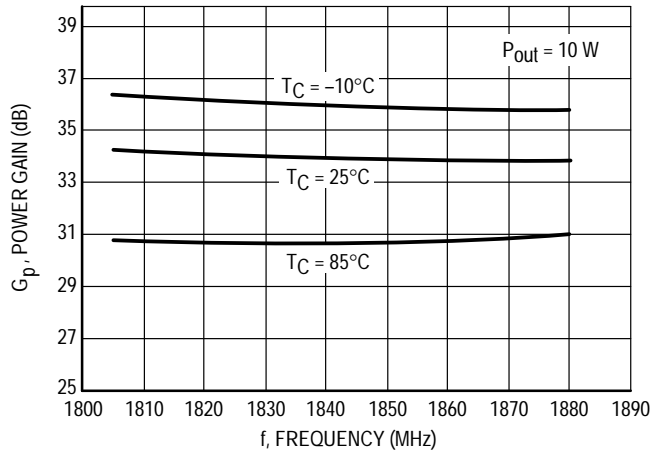


Figure 14. Gain versus Frequency

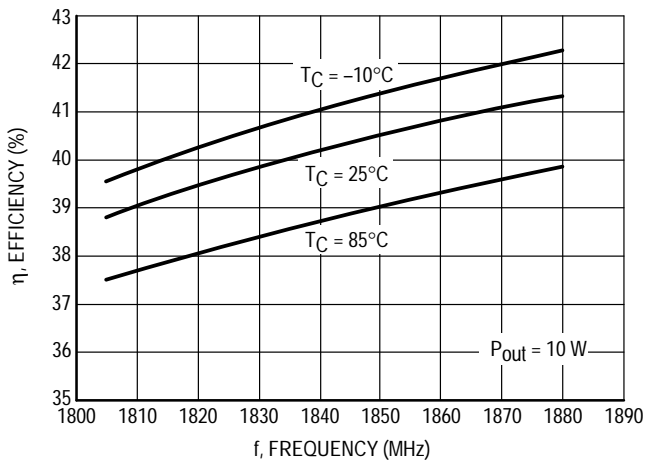


Figure 15. Efficiency versus Frequency

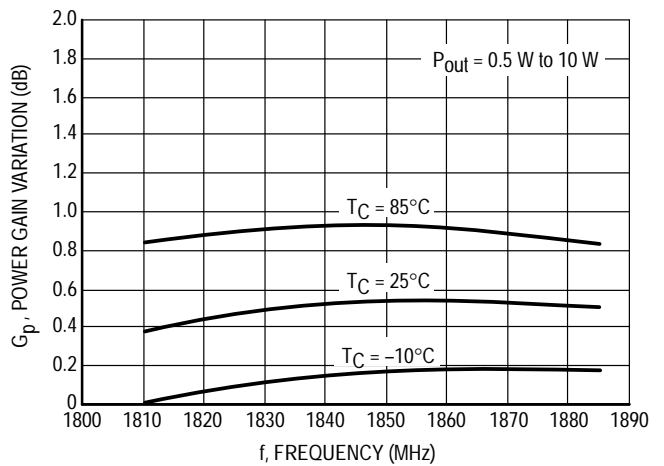


Figure 16. Power Gain Variation versus Frequency

TYPICAL CHARACTERISTICS
MHW1810-2

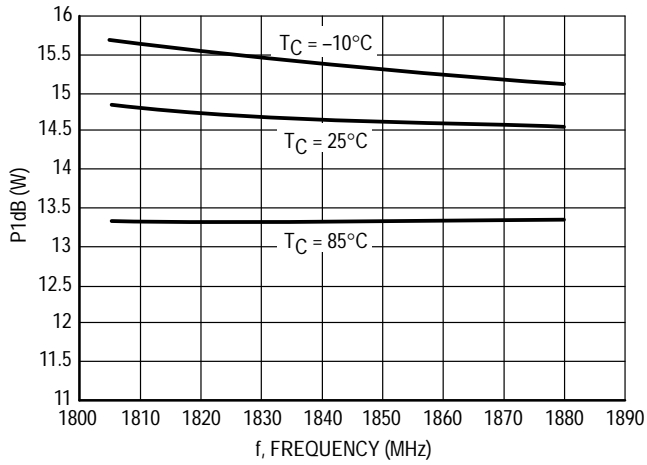


Figure 17. P1dB versus Frequency

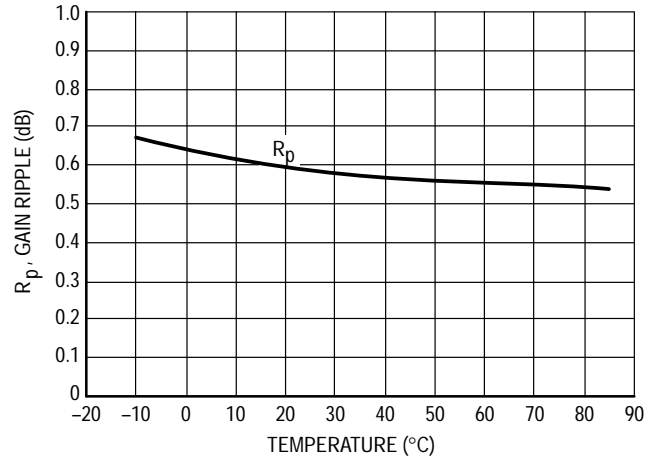


Figure 18. Gain Ripple versus Temperature

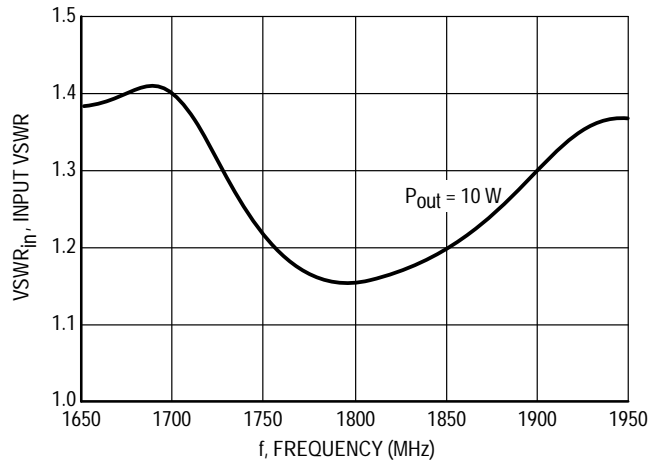
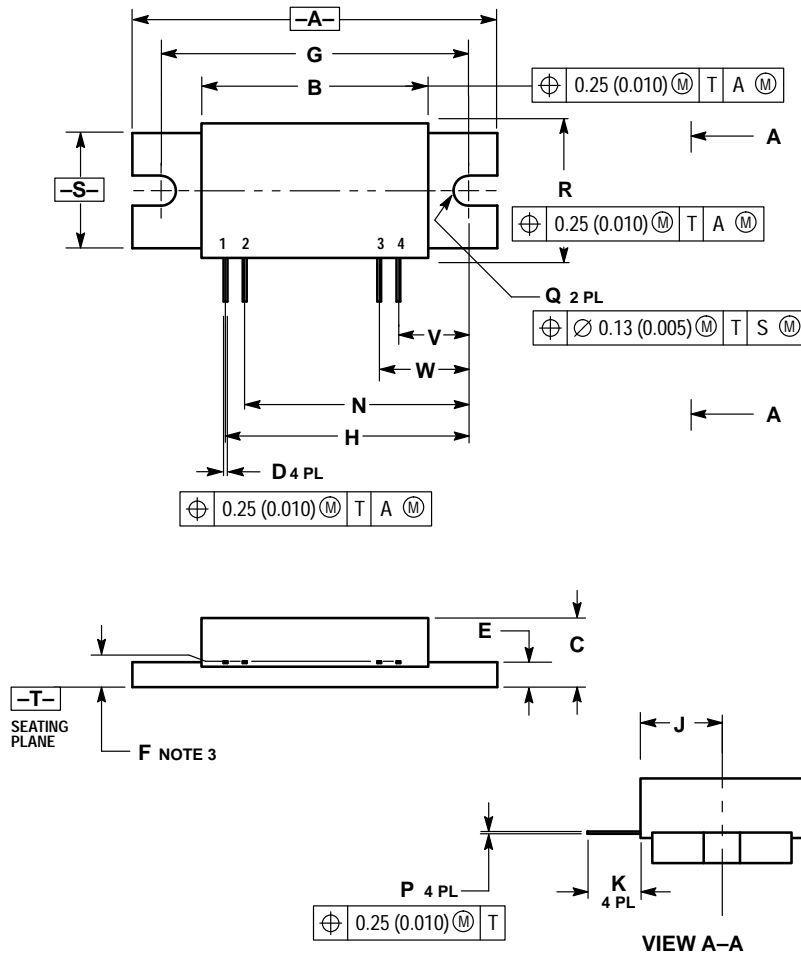


Figure 19. Input VSWR

PACKAGE DIMENSIONS



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION F IS FROM THE BOTTOM OF HEATSINK TO THE TOP OF THE LEAD.
4. DIMENSION P TO BE MEASURED AS LEAD EXITS COVER.
5. FLANGE FLATNESS 0.038 (0.0015) MAXIMUM CONVEX, 0.063 (0.0025) MAXIMUM CONCAVE.
6. ADHESIVE MATERIAL SHALL BE INCLUDED IN THE DIMENSIONS LISTED.

| DIM | INCHES | | MILLIMETERS | |
|-----|-----------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX |
| A | 1.890 | 1.910 | 48.01 | 48.51 |
| B | 1.170 | 1.190 | 29.72 | 30.22 |
| C | 0.350 | 0.376 | 8.89 | 9.55 |
| D | 0.018 | 0.022 | 0.46 | 0.55 |
| E | 0.115 | 0.135 | 2.92 | 3.42 |
| F | 0.170 BSC | | 4.31 BSC | |
| G | 1.600 BSC | | 40.64 BSC | |
| H | 1.265 BSC | | 32.13 BSC | |
| J | 0.325 | 0.375 | 8.25 | 9.52 |
| K | 0.225 | --- | 5.72 | --- |
| N | 1.165 BSC | | 29.59 BSC | |
| P | 0.010 REF | | 0.25 REF | |
| Q | 0.150 | 0.160 | 3.81 | 4.06 |
| R | 0.685 | 0.705 | 17.40 | 17.90 |
| S | 0.598 | 0.612 | 15.18 | 15.54 |
| V | 0.365 BSC | | 9.27 BSC | |
| W | 0.465 BSC | | 11.81 BSC | |

STYLE 1:

- PIN 1. RF IN
2. V BIAS
3. V SUPPLY
4. RF OUT

**CASE 301AW-02
ISSUE B**

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