

# Cellular Band RF Linear LDMOS Amplifier

Designed for ultra-linear amplifier applications in 50 ohm systems operating in the cellular frequency band. A silicon FET Class A design provides outstanding linearity and gain. In addition, the excellent group delay and phase linearity characteristics are ideal for the most demanding analog or digital modulation systems, such as TDMA and CDMA.

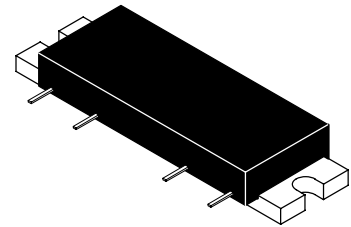
- Third Order Intercept: 50 dBm Typ
- Power Gain: 31 dB Typ (@ f = 880 MHz)
- Input and Output VSWR  $\leq$  1.5:1

## Features

- Excellent Phase Linearity and Group Delay Characteristics
- Ideal for Feedforward Base Station Applications
- For Use in TDMA and CDMA Multi-Carrier Applications
- N Suffix Indicates Lead-Free Terminations

**MHL9838N**

**800 - 925 MHz  
8.0 W, 31 dB  
RF LINEAR LDMOS AMPLIFIER**



**CASE 301AP-02, STYLE 1**

**Table 1. Absolute Maximum Ratings** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

| Rating                           | Symbol    | Value        | Unit             |
|----------------------------------|-----------|--------------|------------------|
| DC Supply Voltage                | $V_{DD}$  | 30           | Vdc              |
| RF Input Power                   | $P_{in}$  | +6           | dBm              |
| Storage Temperature Range        | $T_{stg}$ | - 40 to +100 | $^\circ\text{C}$ |
| Operating Case Temperature Range | $T_C$     | - 20 to +100 | $^\circ\text{C}$ |

**Table 2. Electrical Characteristics** ( $V_{DD} = 28 \text{ Vdc}$ ,  $T_C = 25^\circ\text{C}$ ; 50  $\Omega$  System)

| Characteristic                                     | Symbol    | Min  | Typ | Max  | Unit |
|----------------------------------------------------|-----------|------|-----|------|------|
| Supply Current                                     | $I_{DD}$  | —    | 770 | 800  | mA   |
| Power Gain (f = 880 MHz)                           | $G_p$     | 29.5 | 31  | 32.5 | dB   |
| Gain Flatness (f = 800 - 925 MHz)                  | $G_F$     | —    | 0.1 | 0.3  | dB   |
| Power Output @ 1 dB Compression (f = 880 MHz)      | $P_{1dB}$ | —    | 39  | —    | dBm  |
| Third Order Intercept (f1 = 879 MHz, f2 = 884 MHz) | ITO       | 49   | 50  | —    | dBm  |
| Noise Figure (f = 925 MHz)                         | NF        | —    | 3.7 | 4.5  | dB   |

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

## TYPICAL CHARACTERISTICS

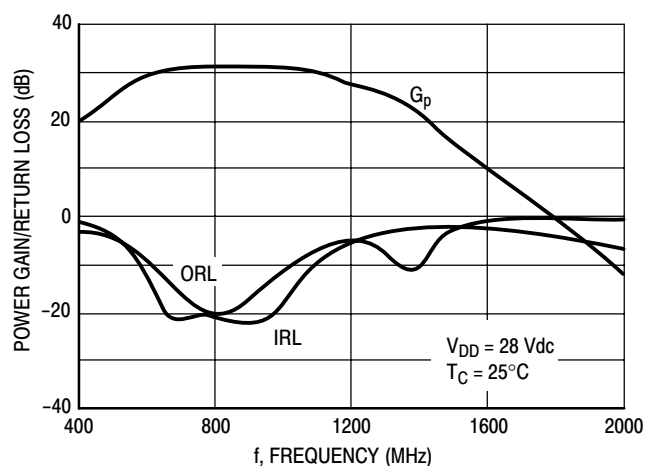


**Figure 1. Power Gain, Input Return Loss, Output Return Loss versus Frequency**

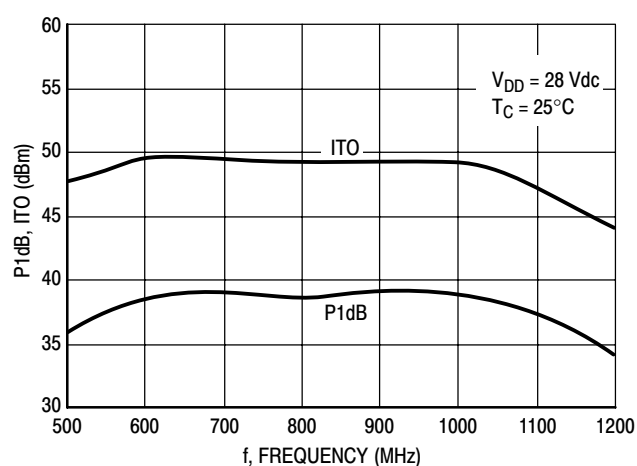


**Figure 2. P1dB, ITO versus Frequency**

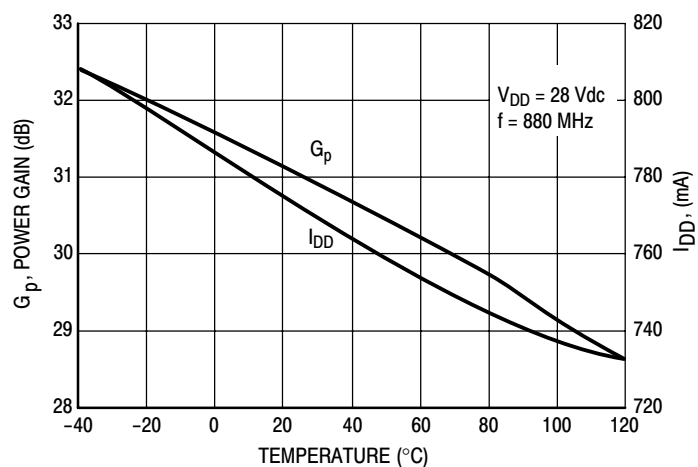


**Figure 3. Power Gain,  $I_{DD}$  versus Temperature**

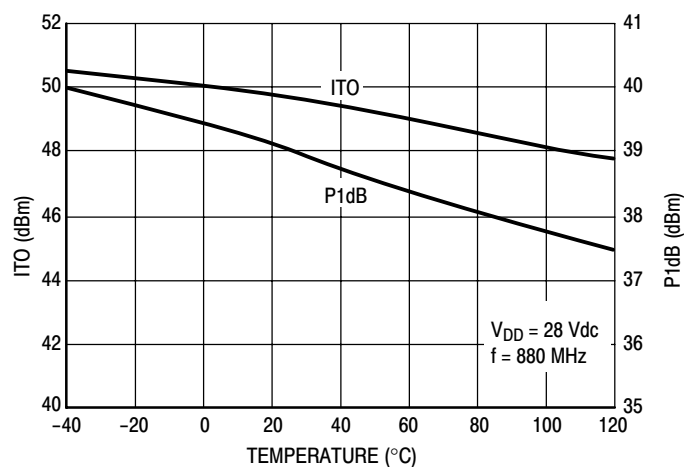


**Figure 4. ITO, P1dB versus Temperature**

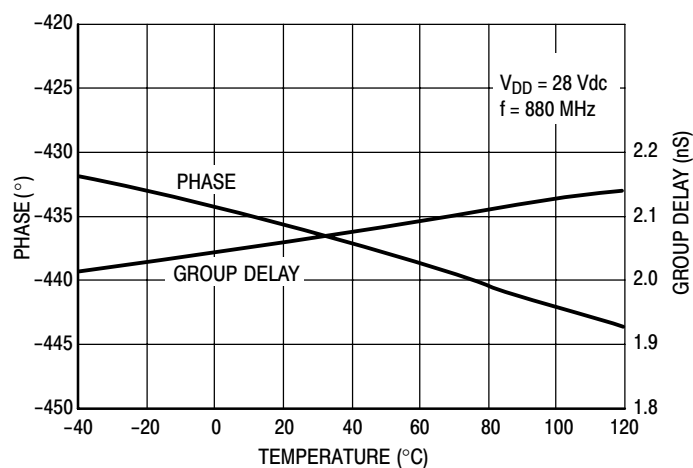


**Figure 5. Phase<sup>(1)</sup>, Group Delay<sup>(1)</sup> versus Temperature**

1. In Production Test Fixture

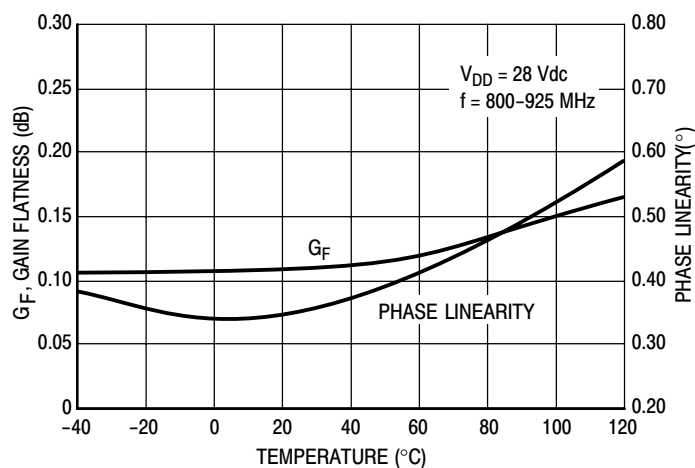


**Figure 6. Gain Flatness, Phase Linearity versus Temperature**

## TYPICAL CHARACTERISTICS

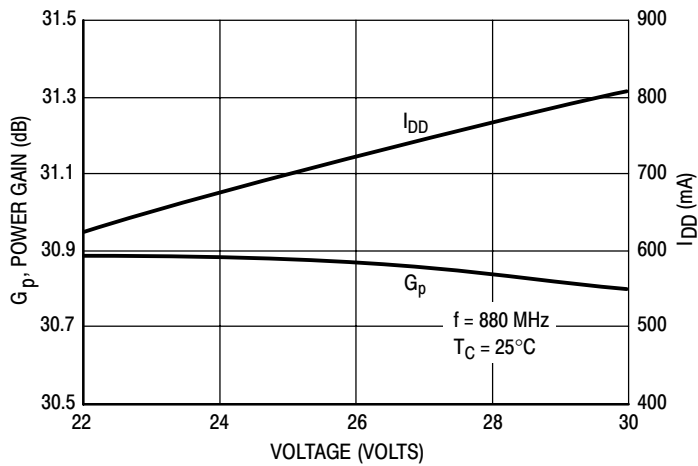


Figure 7. Power Gain,  $I_{DD}$  versus Voltage

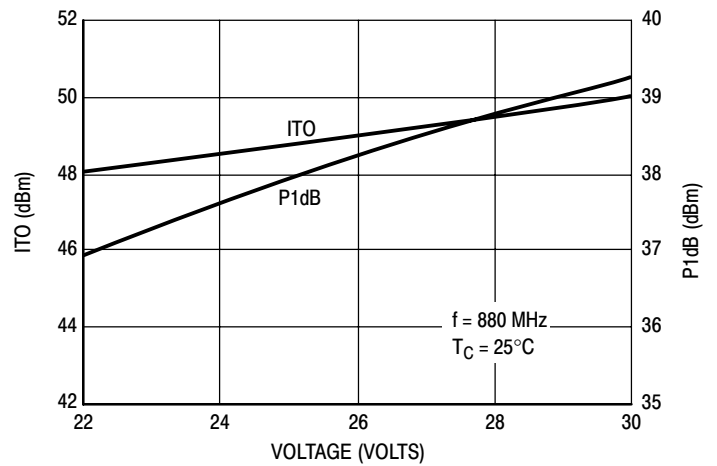


Figure 8. ITO, P1dB versus Voltage

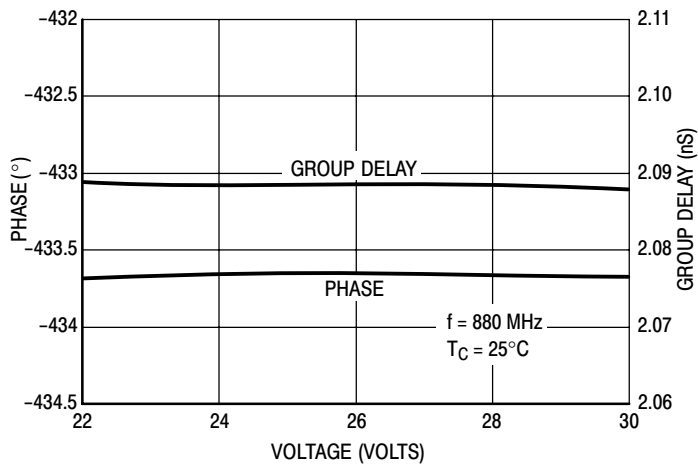


Figure 9. Phase<sup>(1)</sup>, Group Delay<sup>(1)</sup> versus Voltage

1. In Production Test Fixture

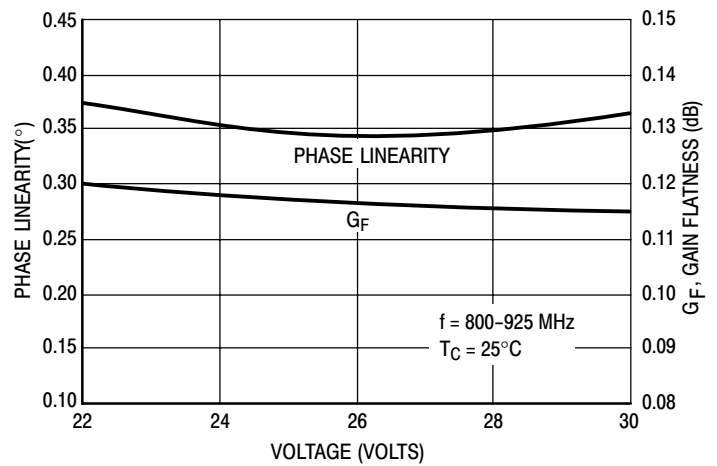
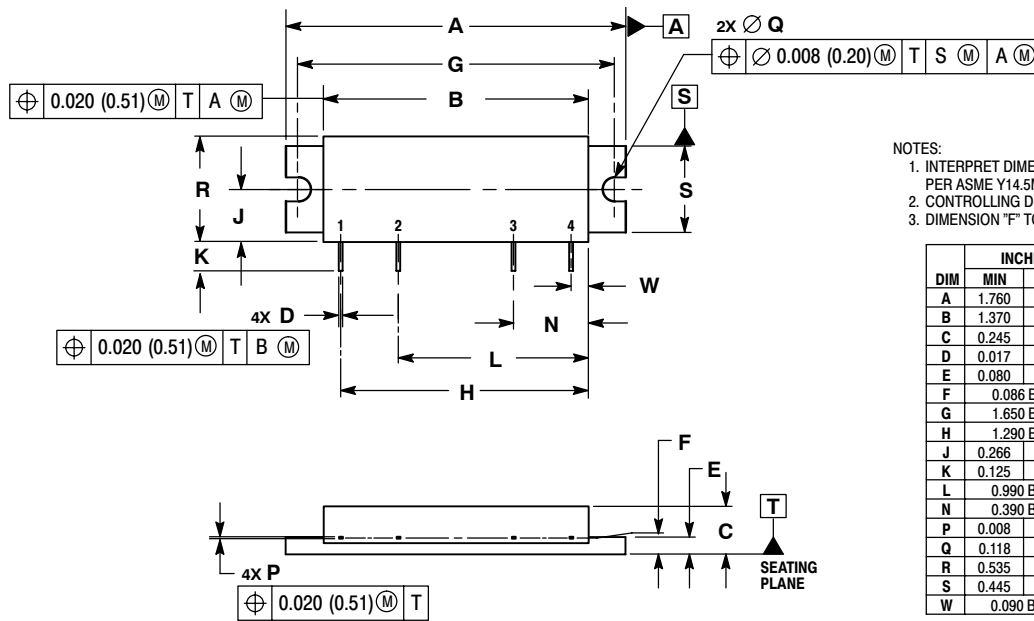


Figure 10. Phase Linearity, Gain Flatness versus Voltage

## PACKAGE DIMENSIONS



- NOTES:
1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
  2. CONTROLLING DIMENSION: INCH.
  3. DIMENSION "F" TO CENTER OF LEADS.

| DIM | INCHES    |       | MILLIMETERS |       |
|-----|-----------|-------|-------------|-------|
|     | MIN       | MAX   | MIN         | MAX   |
| A   | 1.760     | 1.780 | 44.70       | 45.21 |
| B   | 1.370     | 1.390 | 34.80       | 35.31 |
| C   | 0.245     | 0.265 | 6.22        | 6.73  |
| D   | 0.017     | 0.023 | 0.43        | 0.58  |
| E   | 0.080     | 0.100 | 2.03        | 2.54  |
| F   | 0.086 BSC |       | 2.18 BSC    |       |
| G   | 1.650 BSC |       | 41.91 BSC   |       |
| H   | 1.290 BSC |       | 32.77 BSC   |       |
| J   | 0.266     | 0.280 | 6.76        | 7.11  |
| K   | 0.125     | 0.165 | 3.18        | 4.19  |
| L   | 0.990 BSC |       | 25.15 BSC   |       |
| N   | 0.390 BSC |       | 9.91 BSC    |       |
| P   | 0.008     | 0.013 | 0.20        | 0.33  |
| Q   | 0.118     | 0.132 | 3.00        | 3.35  |
| R   | 0.535     | 0.555 | 13.59       | 14.10 |
| S   | 0.445     | 0.465 | 11.30       | 11.81 |
| W   | 0.090 BSC |       | 2.29 BSC    |       |

STYLE 1:  
 PIN 1: RF INPUT  
 2: VDD1  
 3: VDD2  
 4: RF OUTPUT  
 CASE: GROUND

**CASE 301AP-02  
 ISSUE E**

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