

# UMTS Band RF Linear LDMOS Amplifier

Designed for Class AB amplifier applications in 50 ohm systems operating in the UMTS frequency band. A silicon FET design provides outstanding linearity and gain. In addition, the excellent group delay and phase linearity characteristics are ideal for digital modulation systems.

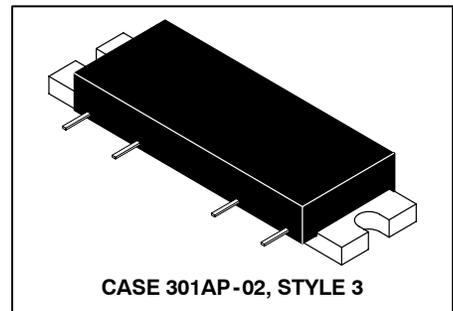
- Typical W-CDMA Performance for  $V_{DD} = 28$  Volts,  $V_{bias} = 8$  Volts,  $I_{DQ} = 550$  mA, Channel Bandwidth = 3.84 MHz, Adjacent Channels at  $\pm 5$  MHz, ACPR Measured in 3.84 MHz Bandwidth. Peak/Avg. = 8.5 dB @ 0.01% Probability on CCDF, 3GPP Test Model 1, 64 DTCH.
- Adjacent Channel Power: -50 dBc @ 30 dBm, 5 MHz Channel Spacing
- Power Gain: 23.7 dB Min (@  $f = 2140$  MHz)
- 0.2 dB Typical Gain Flatness

### Features

- Excellent Phase Linearity and Group Delay Characteristics
- Ideal for Feedforward Base Station Applications
- N Suffix Indicates Lead-Free Terminations

**MHPA21010N**

**2110-2170 MHz  
 10 W, 23.7 dB  
 RF HIGH POWER LDMOS AMPLIFIER**



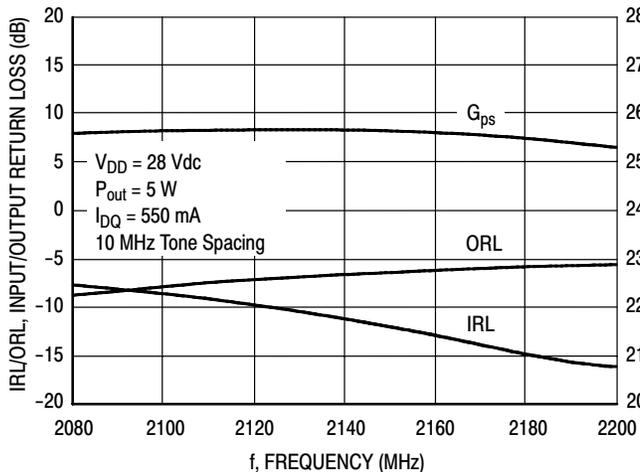
**Table 1. Maximum Ratings** ( $T_C = 25^\circ\text{C}$  unless otherwise noted)

| Rating                             | Symbol    | Value       | Unit             |
|------------------------------------|-----------|-------------|------------------|
| DC Supply Voltage                  | $V_{DD}$  | 30          | Vdc              |
| RF Input Power (Single Carrier CW) | $P_{in}$  | +20         | dBm              |
| Storage Temperature Range          | $T_{stg}$ | -40 to +100 | $^\circ\text{C}$ |
| Operating Case Temperature Range   | $T_C$     | -20 to +100 | $^\circ\text{C}$ |
| Quiescent Bias Current             | $I_{DQ}$  | 750         | mA               |

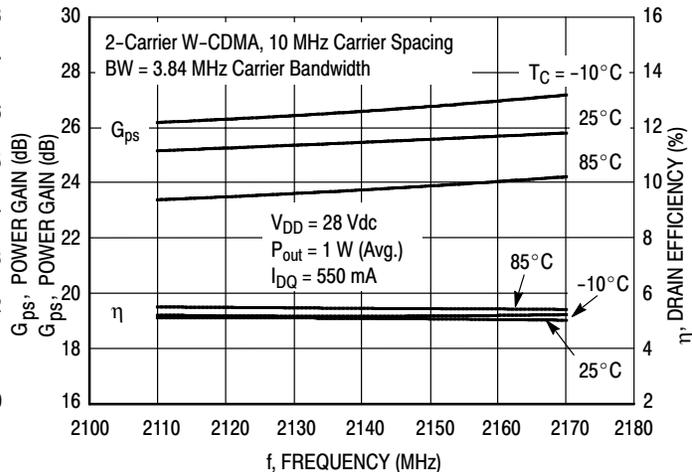
**Table 2. Electrical Characteristics** ( $V_{DD} = 28$  Vdc,  $V_{BIAS} \cong 8$  V Set for Supply Current of 550 mA,  $T_C = 25^\circ\text{C}$ , 50  $\Omega$  System)

| Characteristic                                                                     | Symbol      | Min  | Typ   | Max | Unit |
|------------------------------------------------------------------------------------|-------------|------|-------|-----|------|
| Supply Current                                                                     | $I_{DD}$    | —    | 550   | —   | mA   |
| Power Gain (f = 2140 MHz)                                                          | $G_p$       | 23.7 | 25    | —   | dB   |
| Gain Flatness (f = 2110 - 2170 MHz)                                                | $G_F$       | —    | 0.2   | 0.6 | dB   |
| Power Output @ 1 dB Comp. (f = 2140 MHz)                                           | $P_{1dB}$   | —    | 41.5  | —   | dBm  |
| Input VSWR (f = 2110 - 2170 MHz)                                                   | $VSWR_{in}$ | —    | 1.5:1 | 2:1 |      |
| Noise Figure (f = 2140 MHz)                                                        | NF          | —    | —     | 10  | dB   |
| Adjacent Channel Power Rejection @ 30 dBm Avg., 3.84 MHz BW, 5 MHz Channel Spacing | ACPR        | —    | -55   | -50 | dBc  |

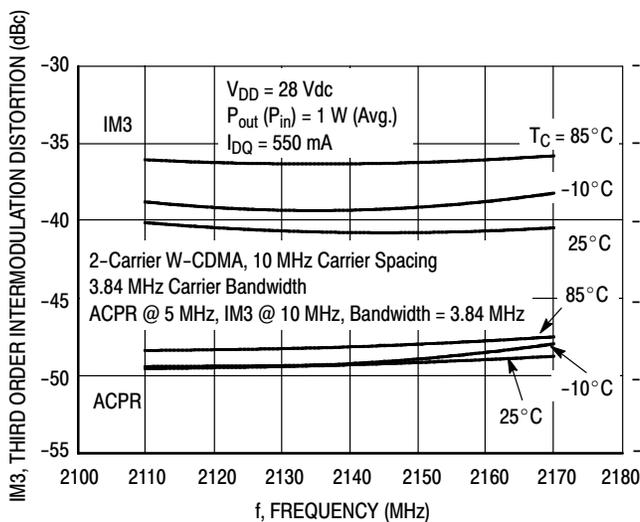
## TYPICAL CHARACTERISTICS



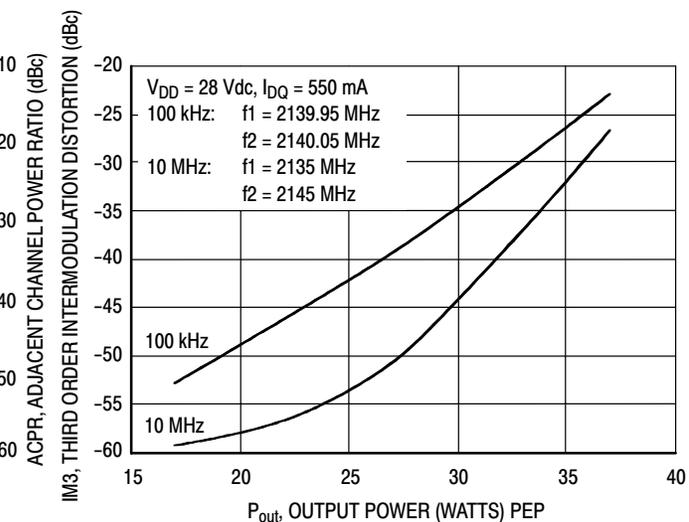
**Figure 1. Two-Tone Power Gain, Input Return Loss and Output Return Loss versus Frequency**



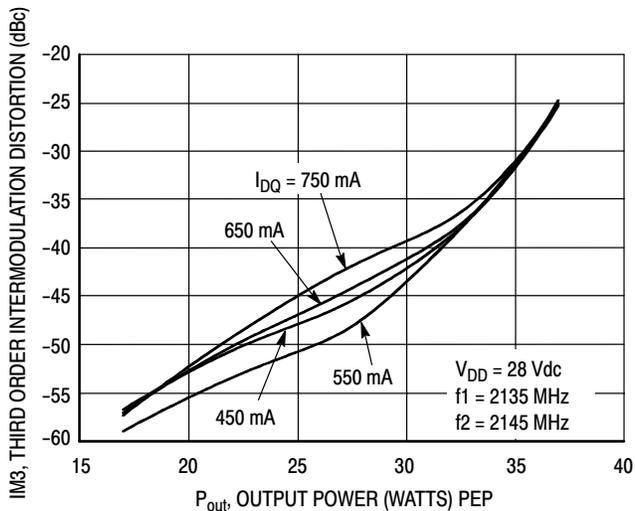
**Figure 2. 2-Carrier W-CDMA Power Gain and Efficiency versus Frequency**



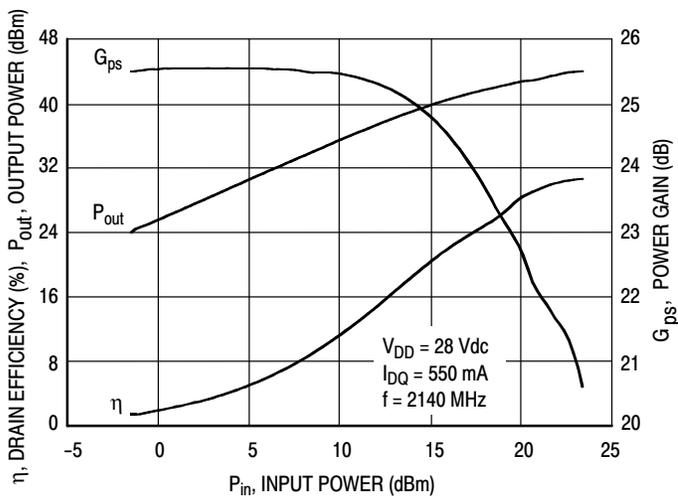
**Figure 3. 2-Carrier W-CDMA IM3 and ACPR versus Frequency**



**Figure 4. Two-Tone W-CDMA IM3 versus Output Power**

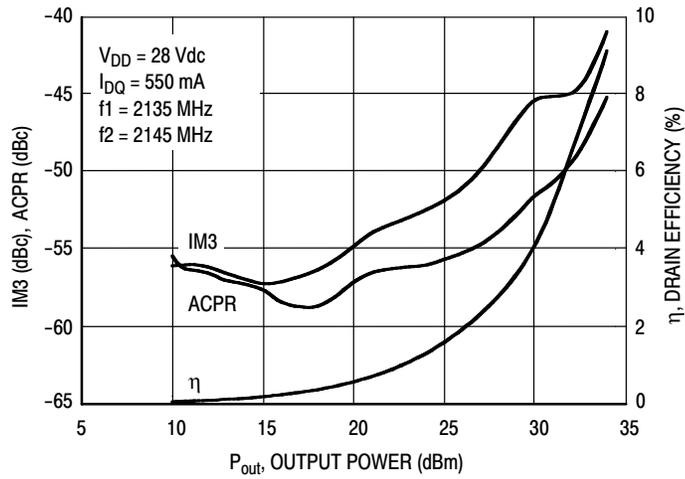


**Figure 5. Third Order Intermodulation Distortion versus Output Power**



**Figure 6. CW Output Power, Efficiency and Gain versus Input Power**

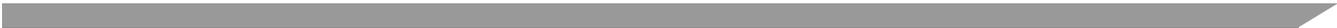
## TYPICAL CHARACTERISTICS



**Figure 7. 2-Carrier W-CDMA ACPR, IM3 and Efficiency versus Output Power**



# NOTES

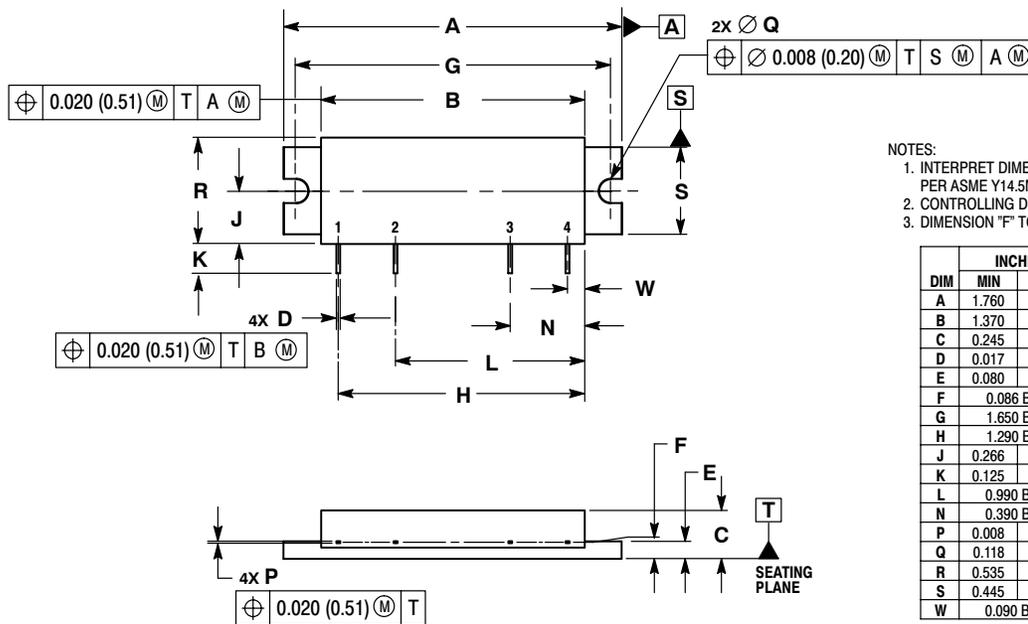


# NOTES



# NOTES

## 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 3:
- PIN 1. RF INPUT
  - VBIAS
  - VDD
  - RF OUTPUT
- CASE: GROUND

### CASE 301AP-02 ISSUE E

Note:  $V_{DD}$  (Pin 3) should always be applied before  $V_{BIAS}$  (Pin 2).

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