

# RF Power LDMOS Transistor

## N-Channel Enhancement-Mode Lateral MOSFET

This 63 W asymmetrical Doherty RF power LDMOS transistor is designed for cellular base station applications covering the frequency range of 1805 to 1995 MHz.

### 1800 MHz

- Typical Doherty Single-Carrier W-CDMA Characterization Performance:  $V_{DD} = 28$  Vdc,  $I_{DQA} = 1100$  mA,  $V_{GSB} = 1.45$  Vdc,  $P_{out} = 63$  W Avg., Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) | IRL (dB) |
|-----------|---------------|--------------|-----------------|------------|----------|
| 1805 MHz  | 15.1          | 47.3         | 7.6             | -33.2      | -13      |
| 1840 MHz  | 15.5          | 47.4         | 7.5             | -35.5      | -13      |
| 1880 MHz  | 15.0          | 46.7         | 7.3             | -38.5      | -12      |

### 1900 MHz

- Typical Doherty Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Vdc,  $I_{DQA} = 950$  mA,  $V_{GSB} = 1.3$  Vdc,  $P_{out} = 63$  W Avg., Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

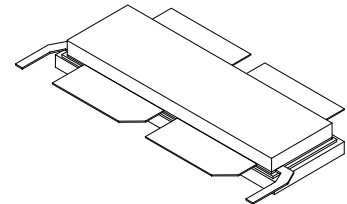
| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) | IRL (dB) |
|-----------|---------------|--------------|-----------------|------------|----------|
| 1930 MHz  | 15.3          | 48.4         | 7.6             | -30.3      | -18      |
| 1960 MHz  | 15.5          | 48.1         | 7.5             | -30.6      | -16      |
| 1995 MHz  | 15.4          | 47.8         | 7.4             | -31.2      | -12      |

### Features

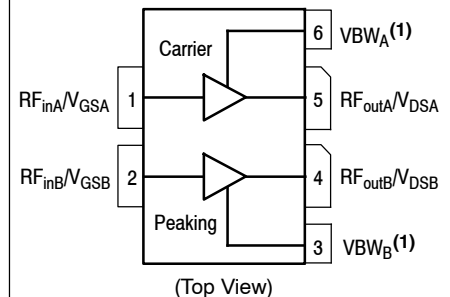
- Advanced High Performance In-Package Doherty
- Greater Negative Gate-Source Voltage Range for Improved Class C Operation
- Designed for Digital Predistortion Error Correction Systems
- In Tape and Reel. R6 Suffix = 150 Units, 56 mm Tape Width, 13-inch Reel.

## AFT18H356-24SR6

**1805–1995 MHz, 63 W AVG., 28 V  
AIRFAST RF POWER LDMOS  
TRANSISTOR**



NI-1230S-4L2L



**Figure 1. Pin Connections**

- Device cannot operate with the  $V_{DD}$  current supplied through pin 3 and pin 6.

**Table 1. Maximum Ratings**

| Rating                                                                     | Symbol    | Value       | Unit      |
|----------------------------------------------------------------------------|-----------|-------------|-----------|
| Drain-Source Voltage                                                       | $V_{DS}$  | -0.5, +65   | Vdc       |
| Gate-Source Voltage                                                        | $V_{GS}$  | -6.0, +10   | Vdc       |
| Operating Voltage                                                          | $V_{DD}$  | 32, +0      | Vdc       |
| Storage Temperature Range                                                  | $T_{stg}$ | -65 to +150 | °C        |
| Case Operating Temperature Range                                           | $T_C$     | -40 to +150 | °C        |
| Operating Junction Temperature Range (1,2)                                 | $T_J$     | -40 to +225 | °C        |
| CW Operation @ $T_C = 25^\circ\text{C}$<br>Derate above $25^\circ\text{C}$ | CW        | 289<br>1.9  | W<br>W/°C |

**Table 2. Thermal Characteristics**

| Characteristic                                                                                                                                                     | Symbol          | Value (2,3) | Unit |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|------|
| Thermal Resistance, Junction to Case<br>Case Temperature $77^\circ\text{C}$ , 63 W CW, 28 Vdc, $I_{DQA} = 1100\text{ mA}$ , $V_{GSB} = 1.45\text{ Vdc}$ , 1880 MHz | $R_{\theta JC}$ | 0.47        | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology                      | Class |
|---------------------------------------|-------|
| Human Body Model (per JESD22-A114)    | 2     |
| Machine Model (per EIA/JESD22-A115)   | B     |
| Charge Device Model (per JESD22-C101) | IV    |

**Table 4. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**Off Characteristics (4)**

|                                                                                                   |           |   |   |    |                 |
|---------------------------------------------------------------------------------------------------|-----------|---|---|----|-----------------|
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 65\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ ) | $I_{DSS}$ | — | — | 10 | $\mu\text{Adc}$ |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 28\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ ) | $I_{DSS}$ | — | — | 1  | $\mu\text{Adc}$ |
| Gate-Source Leakage Current<br>( $V_{GS} = 5\text{ Vdc}$ , $V_{DS} = 0\text{ Vdc}$ )              | $I_{GSS}$ | — | — | 1  | $\mu\text{Adc}$ |

**On Characteristics - Side A (4)**

|                                                                                                                   |              |     |     |     |     |
|-------------------------------------------------------------------------------------------------------------------|--------------|-----|-----|-----|-----|
| Gate Threshold Voltage<br>( $V_{DS} = 10\text{ Vdc}$ , $I_D = 146\text{ }\mu\text{Adc}$ )                         | $V_{GS(th)}$ | 1.6 | 2.1 | 2.6 | Vdc |
| Gate Quiescent Voltage<br>( $V_{DD} = 28\text{ Vdc}$ , $I_{DA} = 1100\text{ mAdc}$ , Measured in Functional Test) | $V_{GSA(Q)}$ | 2.4 | 2.9 | 3.4 | Vdc |
| Drain-Source On-Voltage<br>( $V_{GS} = 10\text{ Vdc}$ , $I_D = 1.5\text{ Adc}$ )                                  | $V_{DS(on)}$ | 0.1 | 0.2 | 0.3 | Vdc |

**On Characteristics - Side B (4)**

|                                                                                           |              |     |     |     |     |
|-------------------------------------------------------------------------------------------|--------------|-----|-----|-----|-----|
| Gate Threshold Voltage<br>( $V_{DS} = 10\text{ Vdc}$ , $I_D = 291\text{ }\mu\text{Adc}$ ) | $V_{GS(th)}$ | 1.6 | 2.1 | 2.6 | Vdc |
| Drain-Source On-Voltage<br>( $V_{GS} = 10\text{ Vdc}$ , $I_D = 2.9\text{ Adc}$ )          | $V_{DS(on)}$ | 0.1 | 0.2 | 0.3 | Vdc |

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.
3. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers*. Go to <http://www.freescale.com/rf>. Select Documentation/Application Notes – AN1955.
4. Each side of device measured separately.

(continued)

**Table 4 . Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (continued)

| Characteristic                                                                                                                                                                                                                                                                                                                                                                                                                  | Symbol   | Min  | Typ   | Max   | Unit |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|------|-------|-------|------|
| <b>Functional Tests</b> <sup>(1,2)</sup> (In Freescale Doherty Production Test Fixture, 50 ohm system) $V_{DD} = 28\text{ Vdc}$ , $I_{DQA} = 1100\text{ mA}$ , $V_{GSB} = 1.45\text{ V}$ , $P_{out} = 63\text{ W Avg.}$ , $f = 1880\text{ MHz}$ , Single-Carrier W-CDMA, IQ Magnitude Clipping, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @ $\pm 5\text{ MHz}$ Offset. |          |      |       |       |      |
| Power Gain                                                                                                                                                                                                                                                                                                                                                                                                                      | $G_{ps}$ | 14.5 | 15.0  | 17.0  | dB   |
| Drain Efficiency                                                                                                                                                                                                                                                                                                                                                                                                                | $\eta_D$ | 45.0 | 46.7  | —     | %    |
| Output Peak-to-Average Ratio @ 0.01% Probability on CCDF                                                                                                                                                                                                                                                                                                                                                                        | PAR      | 6.8  | 7.3   | —     | dB   |
| Adjacent Channel Power Ratio                                                                                                                                                                                                                                                                                                                                                                                                    | ACPR     | —    | -38.5 | -26.0 | dBc  |
| Input Return Loss                                                                                                                                                                                                                                                                                                                                                                                                               | IRL      | —    | -12   | -8    | dB   |

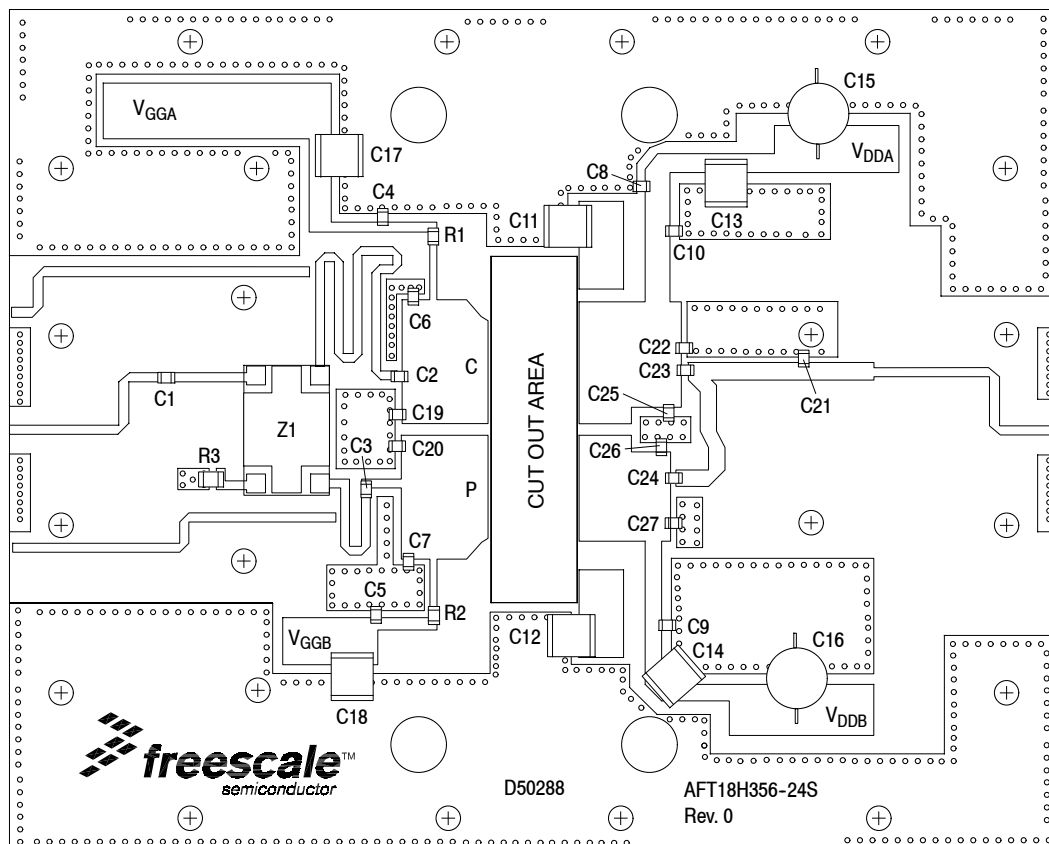
**Load Mismatch** <sup>(2)</sup> (In Freescale Doherty Test Fixture, 50 ohm system)  $I_{DQA} = 1100\text{ mA}$ ,  $V_{GSB} = 1.45\text{ Vdc}$ ,  $f = 1840\text{ MHz}$ , 1-Carrier W-CDMA, 3.84 MHz Channel Bandwidth Carriers. PAR = 9.9 dB @ 0.01% Probability on CCDF.

|                                                                                                         |                       |
|---------------------------------------------------------------------------------------------------------|-----------------------|
| VSWR 10:1 at 31 Vdc, 148 W W-CDMA Output Power (3 dB Input Overdrive from P1dB with W-CDMA Test Signal) | No Device Degradation |
|---------------------------------------------------------------------------------------------------------|-----------------------|

**Typical Performance** <sup>(2)</sup> (In Freescale Doherty Characterization Test Fixture, 50 ohm system)  $V_{DD} = 28\text{ Vdc}$ ,  $I_{DQA} = 1100\text{ mA}$ ,  $V_{GSB} = 1.45\text{ Vdc}$ , 1805–1880 MHz Bandwidth

|                                                                                                    |               |   |                      |   |       |
|----------------------------------------------------------------------------------------------------|---------------|---|----------------------|---|-------|
| $P_{out}$ @ 1 dB Compression Point, CW                                                             | P1dB          | — | 400 <sup>(3,4)</sup> | — | W     |
| $P_{out}$ @ 3 dB Compression Point <sup>(5)</sup>                                                  | P3dB          | — | 480                  | — | W     |
| AM/PM<br>(Maximum value measured at the P3dB compression point across the 1805–1880 MHz bandwidth) | $\Phi$        | — | -24                  | — | °     |
| VBW Resonance Point<br>(IMD Third Order Intermodulation Inflection Point)                          | $VBW_{res}$   | — | 80                   | — | MHz   |
| Gain Flatness in 75 MHz Bandwidth @ $P_{out} = 63\text{ W Avg.}$                                   | $G_F$         | — | 0.48                 | — | dB    |
| Gain Variation over Temperature<br>(-30°C to +85°C)                                                | $\Delta G$    | — | 0.02                 | — | dB/°C |
| Output Power Variation over Temperature<br>(-30°C to +85°C) <sup>(4)</sup>                         | $\Delta P1dB$ | — | 0.026                | — | dB/°C |

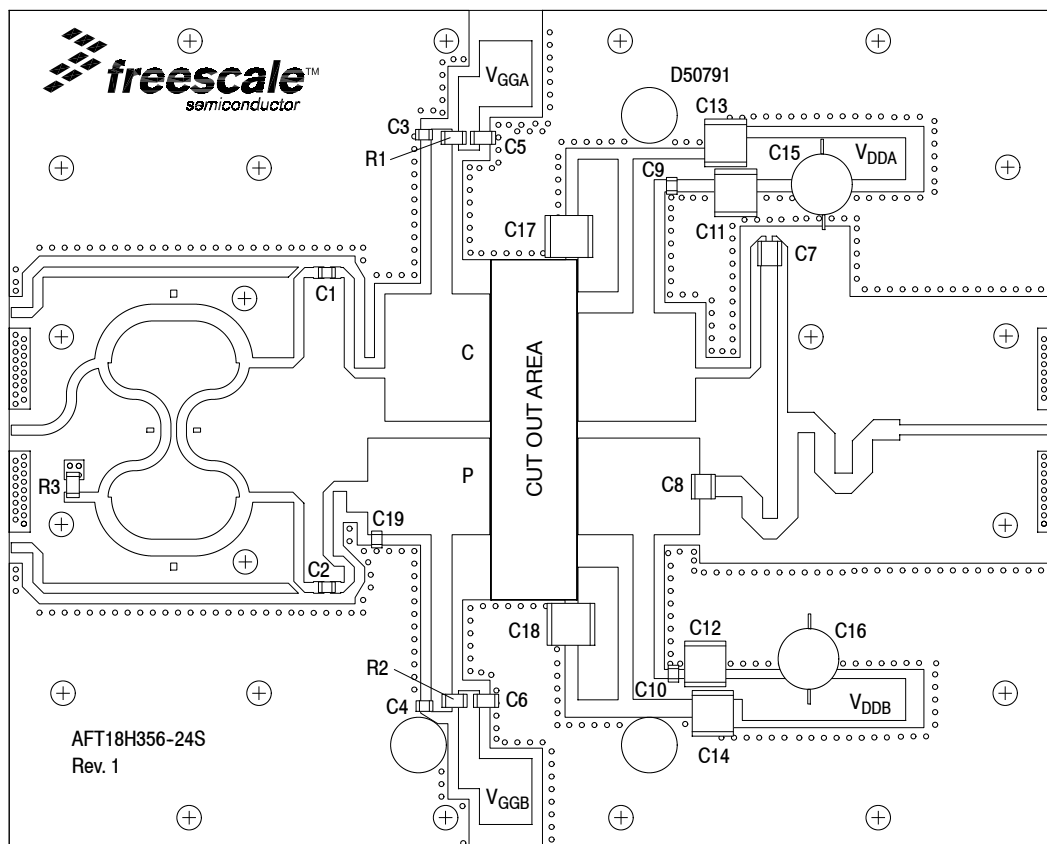
1. Part internally matched both on input and output.
2. Measurements made with device in an asymmetrical Doherty configuration.
3. Calculated from load pull P3dB measurements.
4. Exceeds recommended operating conditions. See CW operation data in Maximum Ratings table.
5.  $P3dB = P_{avg} + 7.0\text{ dB}$  where  $P_{avg}$  is the average output power measured using an unclipped W-CDMA single-carrier input signal where output PAR is compressed to 7.0 dB @ 0.01% probability on CCDF.



**Figure 2. AFT18H356-24SR6 Production Test Circuit Component Layout — 1805–1880 MHz**

**Table 5. AFT18H356-24SR6 Production Test Circuit Component Designations and Values — 1805–1880 MHz**

| Part                                      | Description                                 | Part Number          | Manufacturer |
|-------------------------------------------|---------------------------------------------|----------------------|--------------|
| C1, C2, C3, C4, C5, C8, C9, C10, C23, C24 | 18 $\mu$ F Chip Capacitors                  | GQM2195C2E180FB12D   | Murata       |
| C6, C19, C22, C25                         | 1.2 $\mu$ F Chip Capacitors                 | GQM2195C2E1R2BB12D   | Murata       |
| C7, C20                                   | 1.5 pF Chip Capacitors                      | GQM2195C2E1R5BB12D   | Murata       |
| C11, C12                                  | 4.7 $\mu$ F Chip Capacitors                 | GRM32ER71H475KA88B   | Murata       |
| C13, C14, C17, C18                        | 22 $\mu$ F Chip Capacitors                  | C5750Y5V1H226ZT      | TDK          |
| C15, C16                                  | 470 $\mu$ F, 63 V Electrolytic Capacitors   | MCGPR63V477M13X26-RH | Multicomp    |
| C21                                       | 0.6 pF Chip Capacitor                       | ATC600F0R6BT250XT    | ATC          |
| C26, C27                                  | 2.4 pF Chip Capacitors                      | GQM2195C2E2R4BB12D   | Murata       |
| R1, R2                                    | 2.2 $\Omega$ , 1/4 W Chip Resistors         | CRCW12062R20JNEA     | Vishay       |
| R3                                        | 50 $\Omega$ , 10 W Terminator Resistor      | 81A7031-50-5F        | Florida Labs |
| Z1                                        | 1900 MHz Band, 5 dB Directional Coupler     | XC1900A-05S          | Anaren       |
| PCB                                       | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D50288               | MTL          |

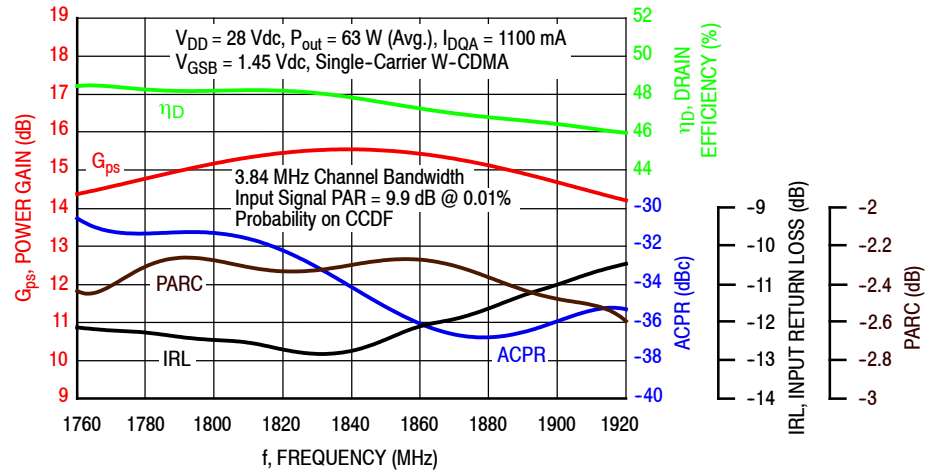


**Figure 3. AFT18H356-24SR6 Characterization Test Circuit Component Layout — 1805–1880 MHz**

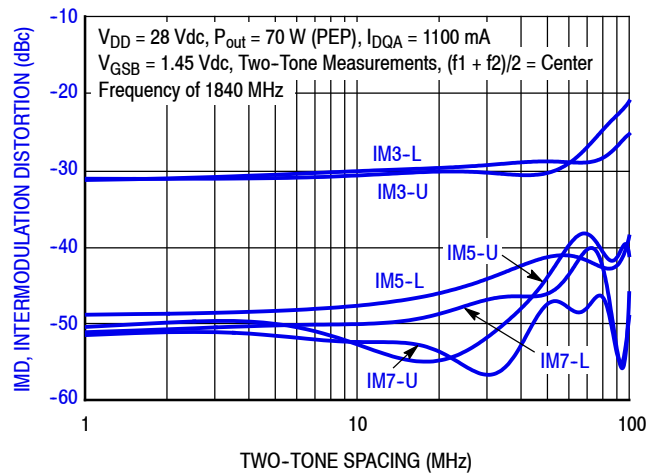
**Table 6. AFT18H356-24SR6 Characterization Test Circuit Component Designations and Values — 1805–1880 MHz**

| Part                    | Description                                 | Part Number          | Manufacturer |
|-------------------------|---------------------------------------------|----------------------|--------------|
| C1, C2, C3, C4, C9, C10 | 18 pF Chip Capacitors                       | GQM2195C2E180FB12D   | Murata       |
| C5, C6                  | 2.2 $\mu$ F Chip Capacitors                 | C1206C225K4RAC       | Kemet        |
| C7                      | 24 pF Chip Capacitor                        | ATC100B240JT500XT    | ATC          |
| C8                      | 10 pF Chip Capacitor                        | ATC100B100JT500XT    | ATC          |
| C11, C12                | 2.2 $\mu$ F Chip Capacitors                 | C1825C225J5RAC       | Kemet        |
| C13, C14                | 22 $\mu$ F Chip Capacitors                  | C5750Y5V1H226ZT      | TDK          |
| C15, C16                | 470 $\mu$ F, 63 V Electrolytic Capacitors   | MCGPR63V477M13X26-RH | Multicomp    |
| C17, C18                | 10 $\mu$ F Chip Capacitors                  | C5750X7S2A106M230KB  | TDK          |
| C19                     | 0.4 pF Chip Capacitor                       | ATC600F0R4BT250XT    | ATC          |
| R1, R2                  | 2.2 $\Omega$ , 1/4 W Chip Resistors         | CRCW12062R20JNEA     | Vishay       |
| R3                      | 50 $\Omega$ , 10 W Terminator Resistor      | 81A7031-50-5F        | Florida Labs |
| PCB                     | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D50791               | MTL          |

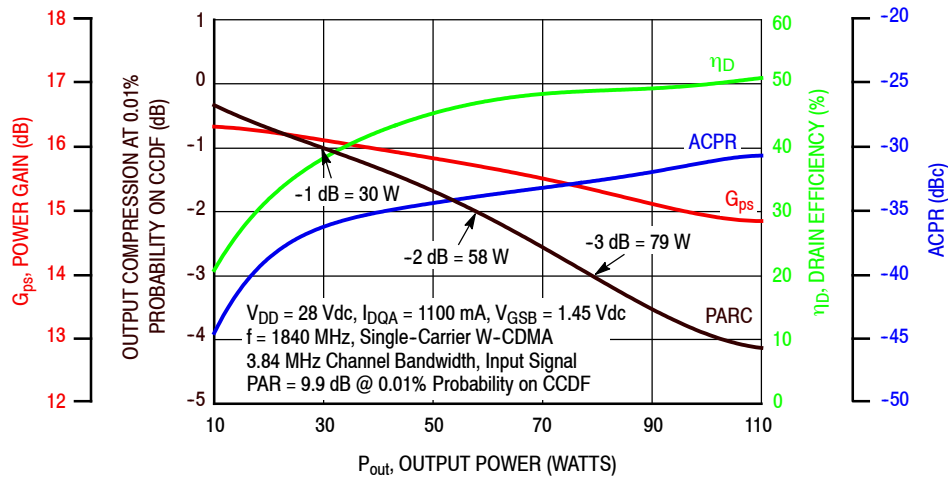
## TYPICAL CHARACTERISTICS — 1805–1880 MHz



**Figure 4. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 63$  Watts Avg.**

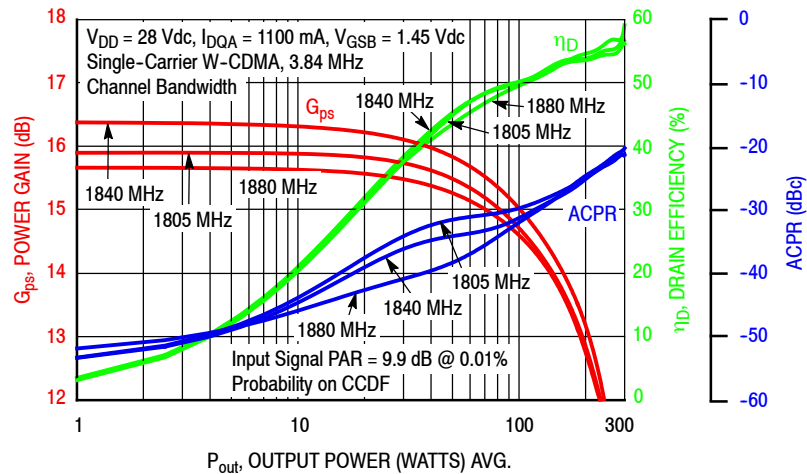


**Figure 5. Intermodulation Distortion Products versus Two-Tone Spacing**

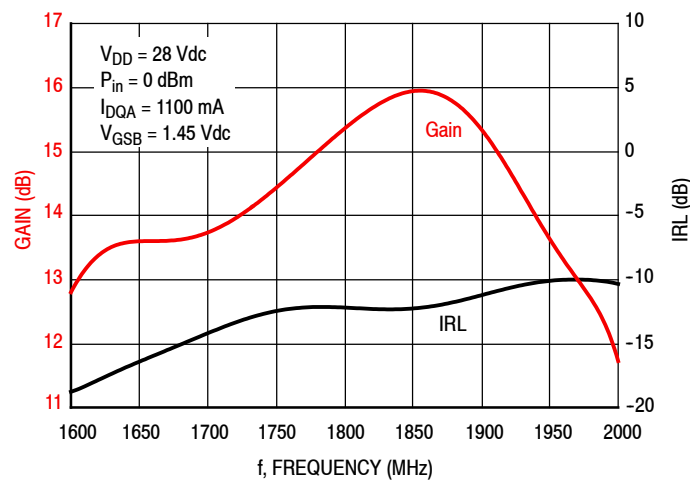


**Figure 6. Output Peak-to-Average Ratio Compression (PARC) versus Output Power**

## TYPICAL CHARACTERISTICS — 1805–1880 MHz



**Figure 7. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**



**Figure 8. Broadband Frequency Response**

**Table 7. Carrier Side Load Pull Performance — Maximum Power Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 777 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.20 – j4.69                        | 1.31 + j4.72                    | 1.12 – j4.80                            | 16.2      | 51.5  | 142 | 56.2            | –10          |
| 1840       | 1.35 – j4.79                        | 1.46 + j4.96                    | 1.10 – j4.89                            | 16.1      | 51.5  | 140 | 55.5            | –9           |
| 1880       | 1.61 – j4.95                        | 1.77 + j5.18                    | 1.10 – j4.93                            | 16.4      | 51.4  | 139 | 55.4            | –9           |

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.20 – j4.69                        | 1.20 + j4.92                    | 1.07 – j4.99                            | 13.9      | 52.3  | 169 | 57.2            | –15          |
| 1840       | 1.35 – j4.79                        | 1.36 + j5.19                    | 1.08 – j5.07                            | 13.9      | 52.2  | 166 | 56.6            | –15          |
| 1880       | 1.61 – j4.95                        | 1.69 + j5.47                    | 1.10 – j5.15                            | 14.1      | 52.1  | 163 | 55.9            | –15          |

(1) Load impedance for optimum P1dB power.

(2) Load impedance for optimum P3dB power.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.

**Table 8. Carrier Side Load Pull Performance — Maximum Drain Efficiency Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 777 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.20 – j4.69                        | 1.25 + j4.80                    | 2.59 – 3.98                             | 19.1      | 49.6  | 90  | 68.3            | –16          |
| 1840       | 1.35 – j4.79                        | 1.41 + j5.01                    | 2.49 – j4.11                            | 19.0      | 49.5  | 90  | 66.8            | –14          |
| 1880       | 1.61 – j4.95                        | 1.69 + j5.21                    | 2.30 – j4.09                            | 19.1      | 49.5  | 89  | 65.1            | –14          |

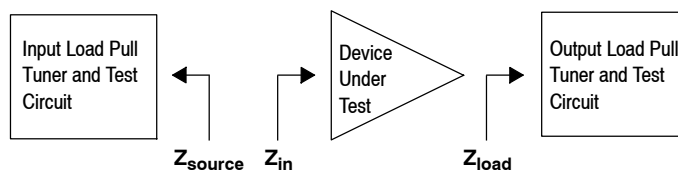
| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.20 – j4.69                        | 1.15 + j4.94                    | 2.51 – j4.15                            | 17.0      | 50.3  | 108 | 68.2            | –23          |
| 1840       | 1.35 – j4.79                        | 1.33 + j5.19                    | 2.45 – j4.29                            | 16.8      | 50.3  | 107 | 66.1            | –21          |
| 1880       | 1.61 – j4.95                        | 1.63 + j5.45                    | 2.22 – j4.17                            | 17.0      | 50.2  | 104 | 64.0            | –21          |

(1) Load impedance for optimum P1dB efficiency.

(2) Load impedance for optimum P3dB efficiency.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.




**Table 9. Peaking Side Load Pull Performance — Maximum Power Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.4 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.07 - j4.05                        | 0.98 + j4.30                    | 1.38 - j4.37                            | 14.0      | 54.6  | 291 | 58.2            | -27          |
| 1840       | 1.23 - j4.30                        | 1.24 + j4.67                    | 1.40 - j4.58                            | 13.8      | 54.7  | 293 | 57.4            | -26          |
| 1880       | 1.45 - j4.70                        | 1.76 + j5.14                    | 1.44 - j4.72                            | 13.8      | 54.6  | 288 | 56.5            | -28          |

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.07 - j4.05                        | 0.951 + j4.39                   | 1.98 - j3.71                            | 13.2      | 54.4  | 277 | 68.0            | -37          |
| 1840       | 1.23 - j4.30                        | 1.25 + j4.81                    | 1.83 - j4.08                            | 12.7      | 54.9  | 307 | 65.6            | -37          |
| 1880       | 1.45 - j4.70                        | 1.88 + j5.34                    | 2.11 - j4.65                            | 12.1      | 55.0  | 316 | 59.5            | -28          |

(1) Load impedance for optimum P1dB power.

(2) Load impedance for optimum P3dB power.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.

**Table 10. Peaking Side Load Pull Performance — Maximum Drain Efficiency Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.4 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.07 - j4.05                        | 0.853 + j4.24                   | 2.37 - j1.94                            | 15.4      | 51.6  | 145 | 73.1            | -36          |
| 1840       | 1.23 - j4.30                        | 1.08 + j4.59                    | 2.18 - j2.05                            | 15.4      | 51.6  | 144 | 73.1            | -36          |
| 1880       | 1.45 - j4.70                        | 1.55 + j5.03                    | 2.14 - j2.33                            | 15.3      | 51.8  | 150 | 72.0            | -36          |

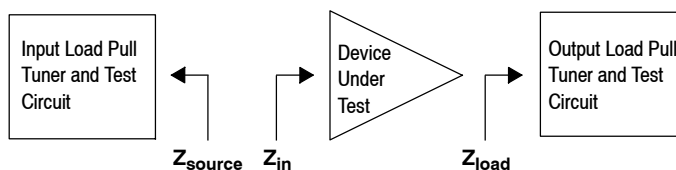
| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1805       | 1.07 - j4.05                        | 0.92 + j4.37                    | 2.53 - j2.47                            | 13.4      | 52.9  | 193 | 73.1            | -43          |
| 1840       | 1.23 - j4.30                        | 1.19 + j4.76                    | 2.34 - j2.65                            | 13.4      | 53.0  | 200 | 73.2            | -43          |
| 1880       | 1.45 - j4.70                        | 1.81 + j5.26                    | 2.89 - j3.68                            | 12.9      | 54.0  | 249 | 74.2            | -37          |

(1) Load impedance for optimum P1dB efficiency.

(2) Load impedance for optimum P3dB efficiency.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.


# P1dB - TYPICAL CARRIER SIDE LOAD PULL CONTOURS — 1840 MHz

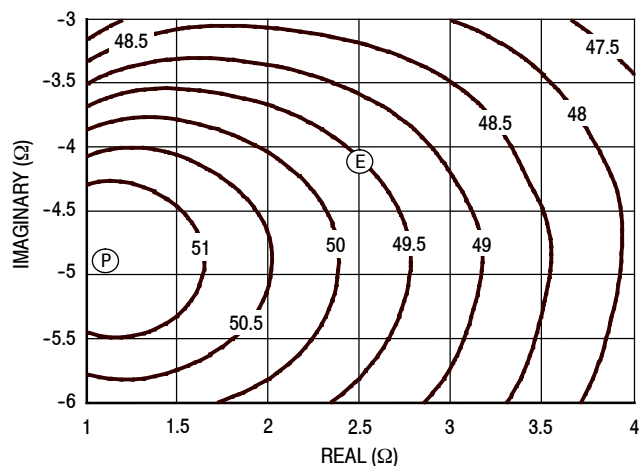


Figure 9. P1dB Load Pull Output Power Contours (dBm)

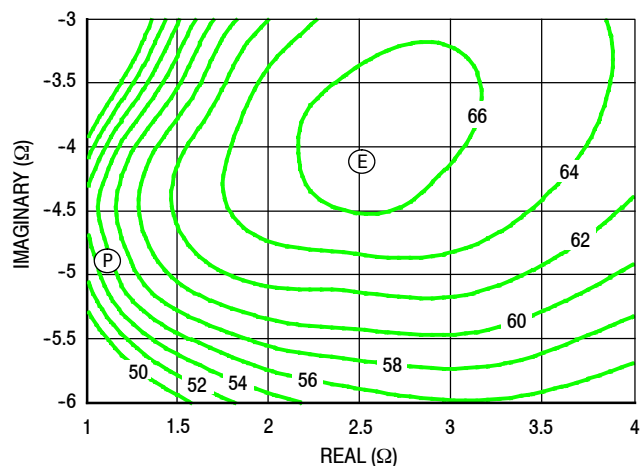


Figure 10. P1dB Load Pull Efficiency Contours (%)

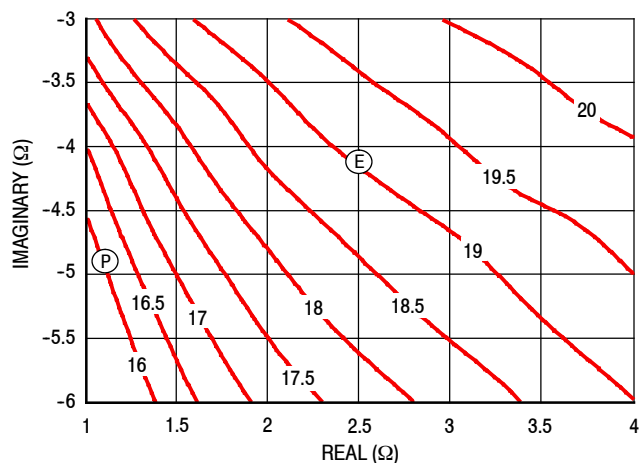


Figure 11. P1dB Load Pull Gain Contours (dB)

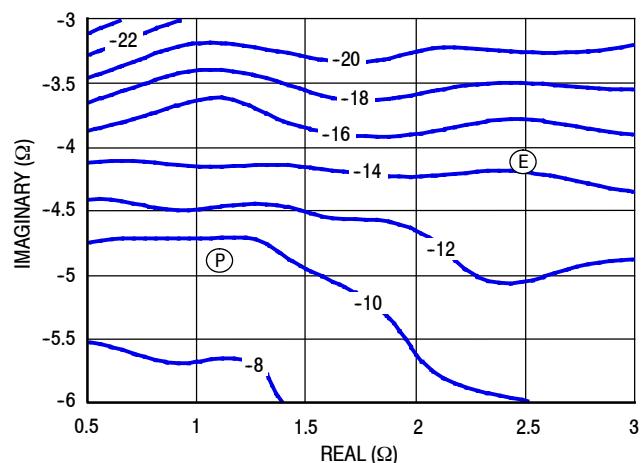


Figure 12. P1dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P3dB - TYPICAL CARRIER SIDE LOAD PULL CONTOURS — 1840 MHz

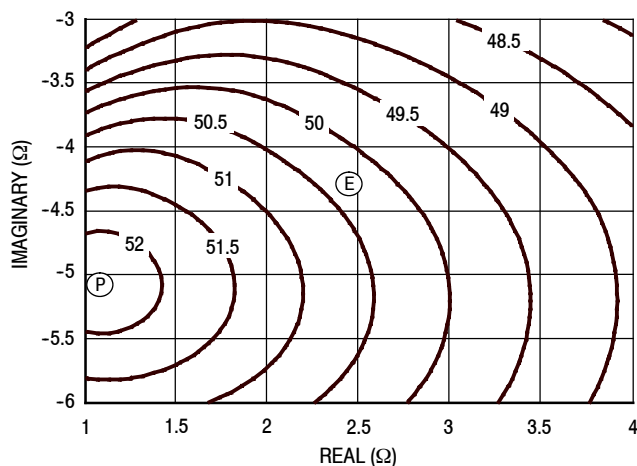


Figure 13. P3dB Load Pull Output Power Contours (dBm)

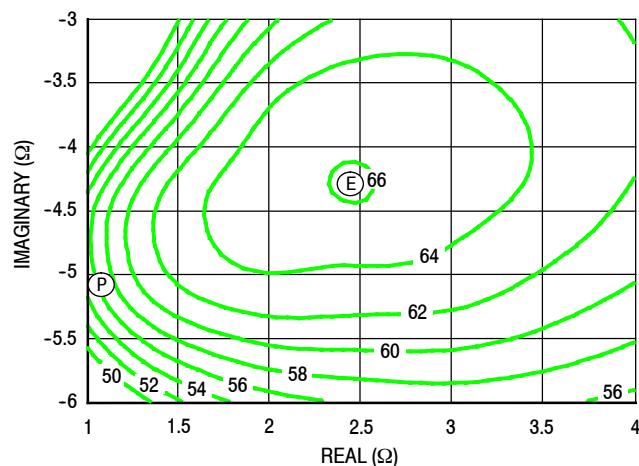


Figure 14. P3dB Load Pull Efficiency Contours (%)

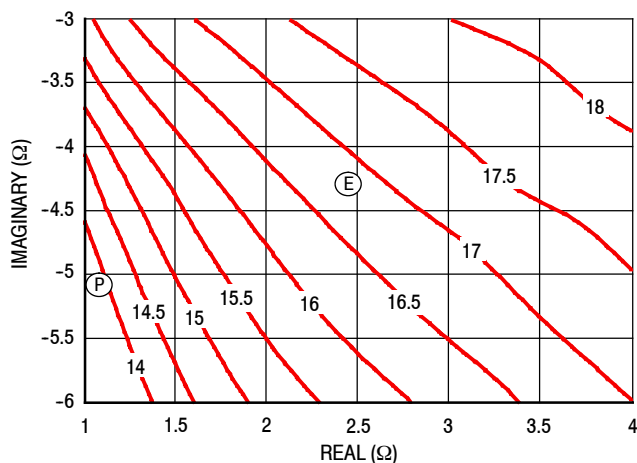


Figure 15. P3dB Load Pull Gain Contours (dB)

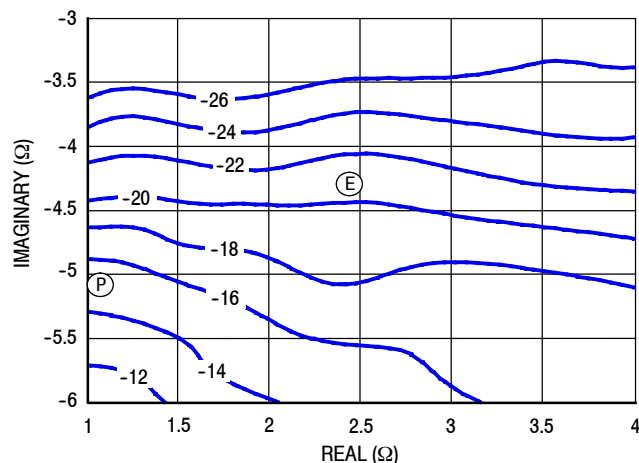


Figure 16. P3dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P1dB - TYPICAL PEAKING SIDE LOAD PULL CONTOURS — 1840 MHz

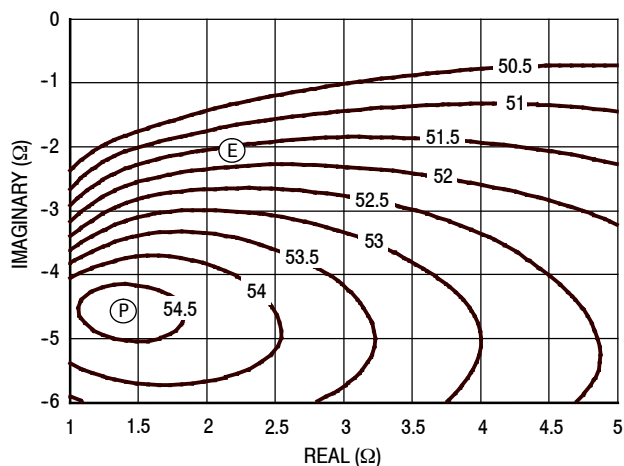


Figure 17. P1dB Load Pull Output Power Contours (dBm)

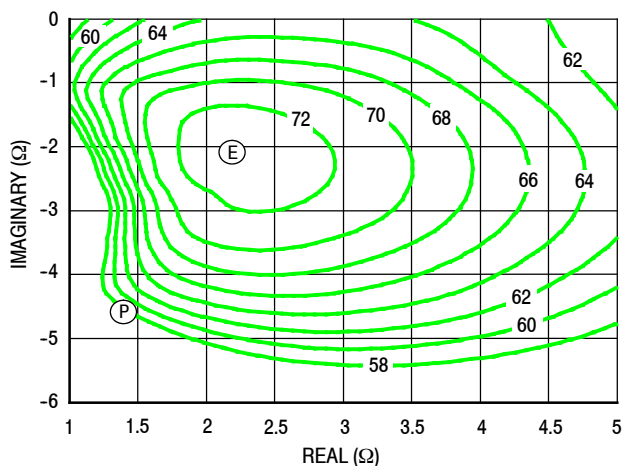


Figure 18. P1dB Load Pull Efficiency Contours (%)

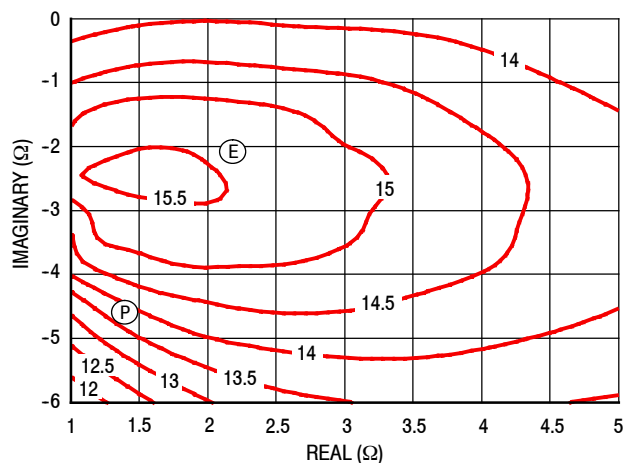


Figure 19. P1dB Load Pull Gain Contours (dB)

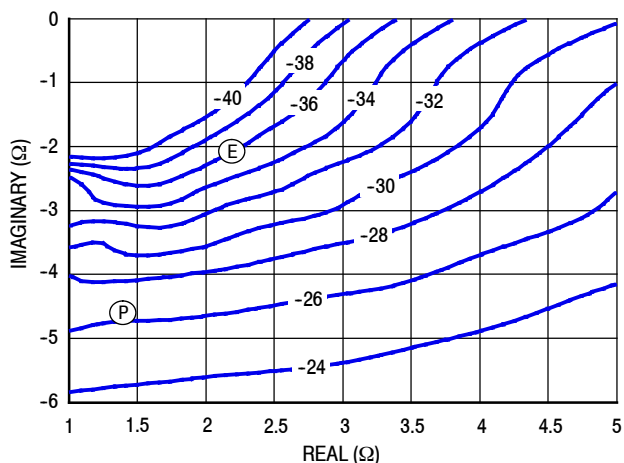


Figure 20. P1dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P3dB - TYPICAL PEAKING SIDE LOAD PULL CONTOURS — 1840 MHz

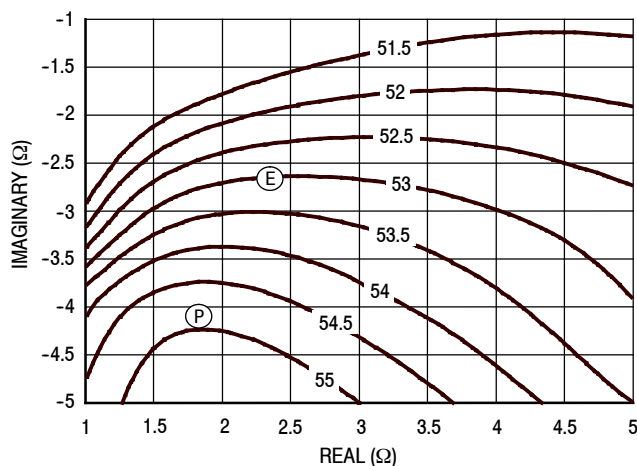


Figure 21. P3dB Load Pull Output Power Contours (dBm)

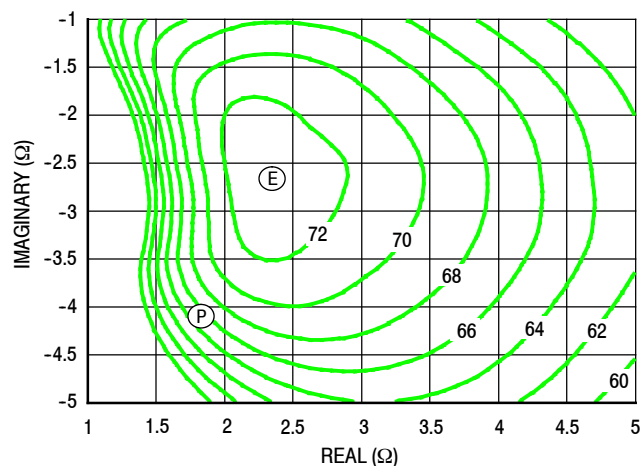


Figure 22. P3dB Load Pull Efficiency Contours (%)

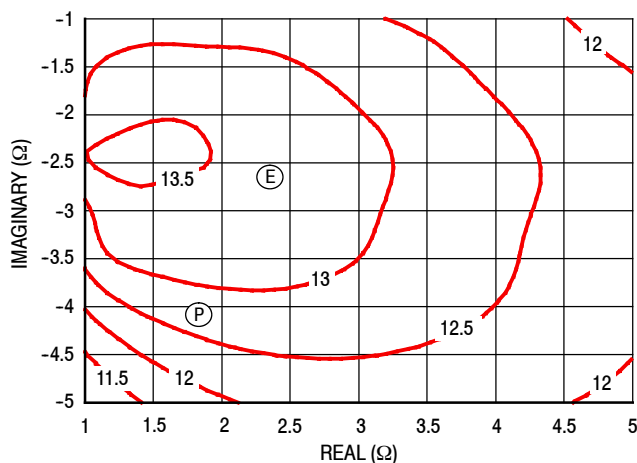


Figure 23. P3dB Load Pull Gain Contours (dB)

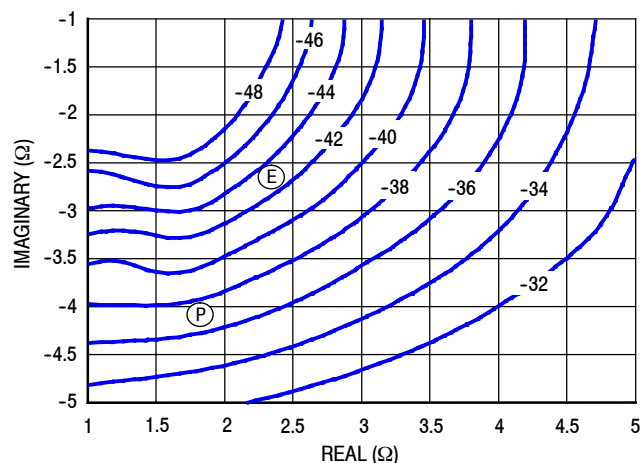
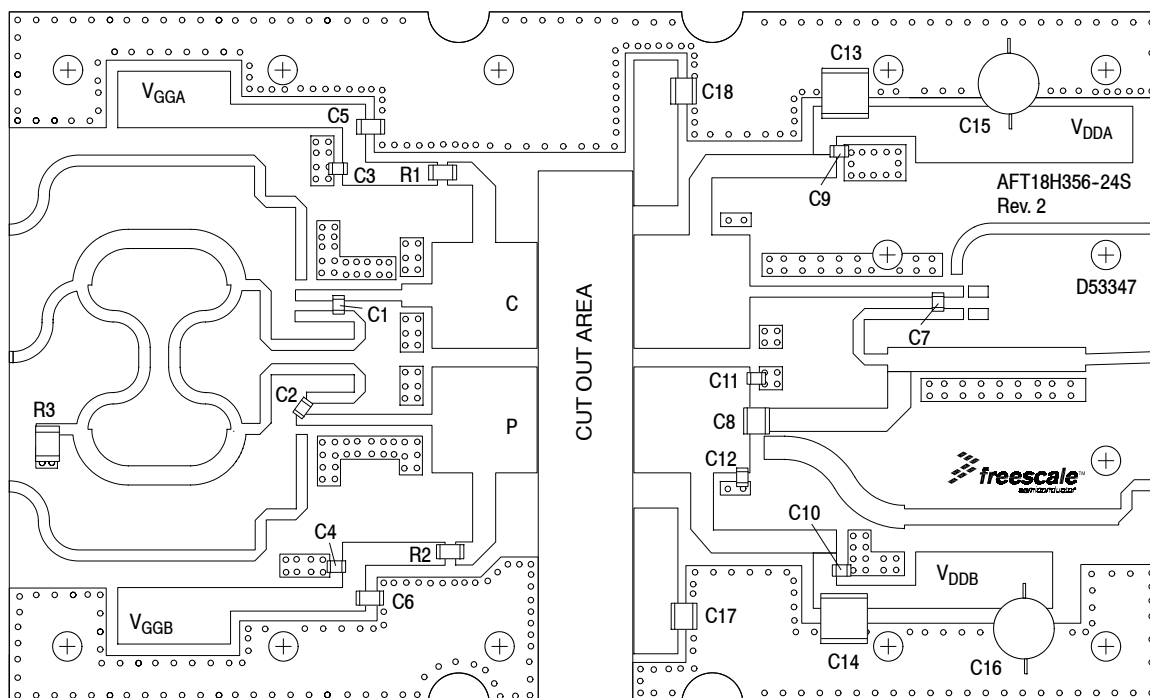


Figure 24. P3dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

# ALTERNATE CHARACTERIZATION — 1930–1995 MHz

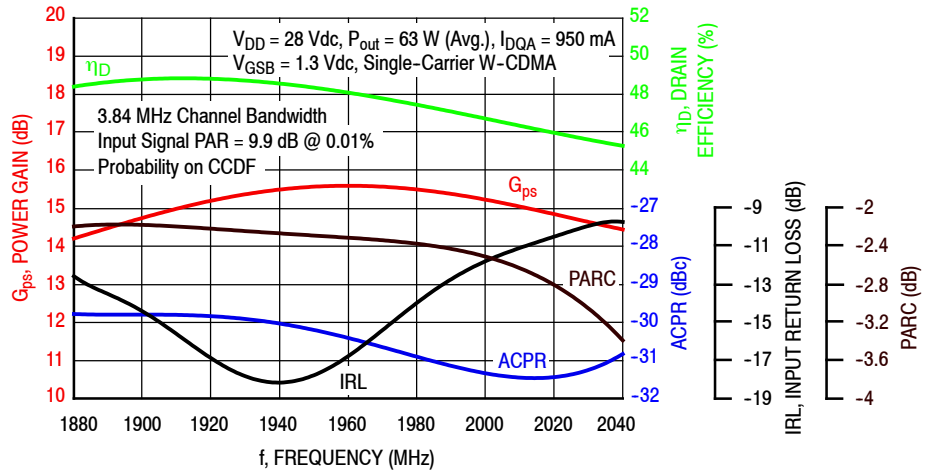


**Figure 25. AFT18H356-24SR6 Test Circuit Component Layout — 1930–1995 MHz**

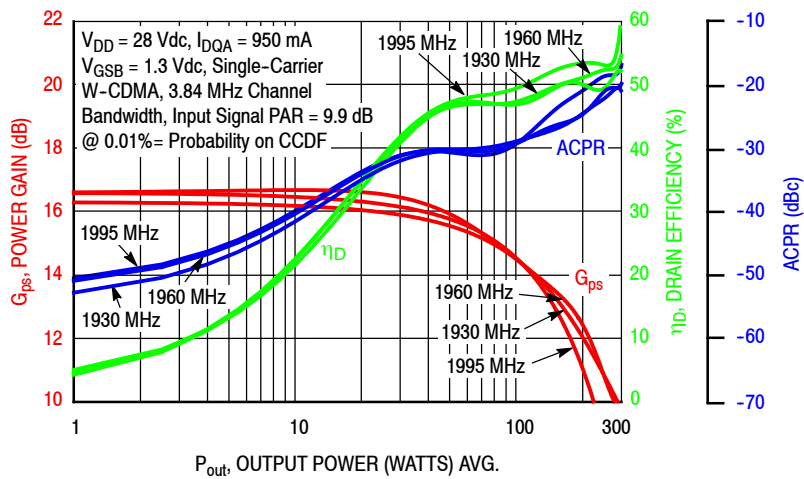
**Table 11. AFT18H356-24SR6 Test Circuit Component Designations and Values — 1930–1995 MHz**

| Part                        | Description                                 | Part Number          | Manufacturer    |
|-----------------------------|---------------------------------------------|----------------------|-----------------|
| C1, C2, C3, C4, C7, C9, C10 | 18 pF Chip Capacitors                       | GQM2195C2E180FB12D   | Murata          |
| C5, C6                      | 2.2 $\mu$ F Chip Capacitors                 | C1206C225K4RAC       | Kemet           |
| C8                          | 12 pF Chip Capacitor                        | ATC100B120JT500XT    | ATC             |
| C11, C12                    | 0.1 pF Chip Capacitors                      | ATC600F0R1BT250XT    | ATC             |
| C13, C14                    | 10 $\mu$ F Chip Capacitors                  | C5750X7S2A106M230KB  | TDK             |
| C15, C16                    | 470 $\mu$ F, 63 V Electrolytic Capacitors   | MCGPR63V477M13X26-RH | Multicomp       |
| C17, C18                    | 10 $\mu$ F Chip Capacitors                  | GRM32ER61H106KA12L   | Murata          |
| R1, R2                      | 2.2 $\Omega$ , 1/4 W Chip Resistors         | CRCW12062R20JNEA     | Vishay          |
| R3                          | 50 $\Omega$ , 10 W Chip Resistor            | 81A7031-50-5F        | Florida RF Labs |
| PCB                         | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D53347               | MTL             |

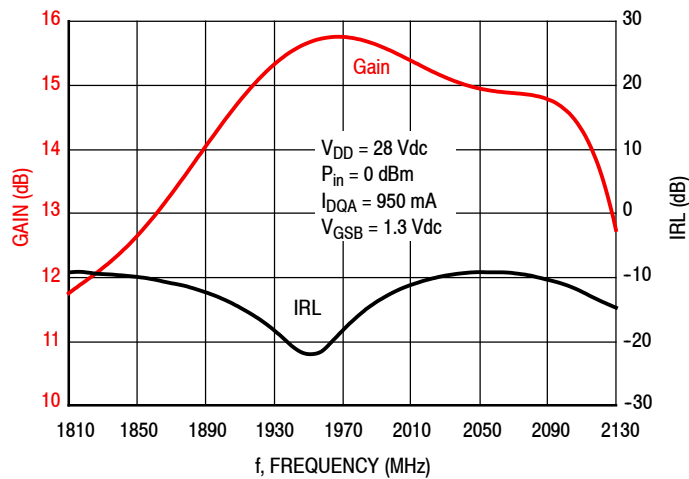
## TYPICAL CHARACTERISTICS — 1930–1995 MHz



**Figure 26. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 63$  Watts Avg.**



**Figure 27. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**



**Figure 28. Broadband Frequency Response**

**Table 12. Carrier Side Load Pull Performance — Maximum Power Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 775 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 1.98 - j5.37                        | 2.22 + j5.56                    | 1.13 - j5.10                            | 16.4      | 51.2  | 132 | 53.7            | -10          |
| 1960       | 2.08 - j5.43                        | 2.59 + j5.75                    | 1.11 - j5.19                            | 16.2      | 51.1  | 129 | 52.4            | -10          |
| 1995       | 2.42 - j5.68                        | 3.14 + j5.82                    | 1.10 - j5.38                            | 16.2      | 50.9  | 124 | 50.1            | -10          |

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 1.98 - j5.37                        | 2.20 + j5.93                    | 1.10 - j5.31                            | 14.1      | 51.9  | 155 | 53.4            | -16          |
| 1960       | 2.08 - j5.43                        | 2.64 + j6.19                    | 1.10 - j5.49                            | 13.8      | 51.8  | 151 | 51.2            | -15          |
| 1995       | 2.42 - j5.68                        | 3.29 + j6.34                    | 1.07 - j5.53                            | 13.9      | 51.6  | 146 | 49.9            | -15          |

(1) Load impedance for optimum P1dB power.

(2) Load impedance for optimum P3dB power.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.

**Table 13. Carrier Side Load Pull Performance — Maximum Drain Efficiency Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 775 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 1.98 - j5.37                        | 2.13 + j5.54                    | 2.20 - j4.31                            | 19.0      | 49.4  | 87  | 61.8            | -13          |
| 1960       | 2.08 - j5.43                        | 2.43 + j5.74                    | 2.15 - j4.14                            | 19.1      | 48.9  | 78  | 59.9            | -14          |
| 1995       | 2.42 - j5.68                        | 2.94 + j5.79                    | 2.15 - j4.62                            | 18.9      | 49.1  | 81  | 57.3            | -11          |

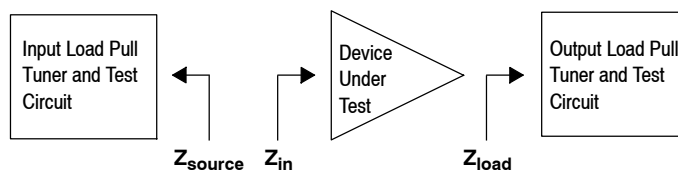
| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 1.98 - j5.37                        | 2.14 + j5.88                    | 2.08 - j4.39                            | 16.8      | 50.2  | 105 | 61.2            | -19          |
| 1960       | 2.08 - j5.43                        | 2.51 + j6.12                    | 1.91 - j4.22                            | 16.8      | 49.9  | 98  | 59.4            | -21          |
| 1995       | 2.42 - j5.68                        | 3.21 + j6.20                    | 2.11 - j4.65                            | 16.8      | 50.0  | 99  | 57.1            | -17          |

(1) Load impedance for optimum P1dB efficiency.

(2) Load impedance for optimum P3dB efficiency.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.




**Table 14. Peaking Side Load Pull Performance — Maximum Power Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.4 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 2.34 - j5.33                        | 3.02 + j6.08                    | 1.58 - j4.91                            | 13.9      | 54.5  | 285 | 56.8            | -28          |
| 1960       | 3.57 - j5.40                        | 4.37 + j6.41                    | 1.79 - j5.19                            | 13.8      | 54.5  | 281 | 55.9            | -27          |
| 1995       | 4.83 - j4.85                        | 6.83 + j5.71                    | 1.98 - j5.45                            | 13.8      | 54.4  | 276 | 55.5            | -26          |

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Output Power                        |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 2.34 - j5.33                        | 3.31 + j6.32                    | 1.96 - j5.00                            | 12.1      | 55.2  | 330 | 60.6            | -35          |
| 1960       | 3.57 - j5.40                        | 4.91 + j6.61                    | 1.98 - j5.29                            | 11.9      | 55.2  | 331 | 58.7            | -34          |
| 1995       | 4.83 - j4.85                        | 7.71 + j5.38                    | 2.23 - j5.91                            | 11.5      | 55.2  | 331 | 55.3            | -31          |

(1) Load impedance for optimum P1dB power.

(2) Load impedance for optimum P3dB power.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.

**Table 15. Peaking Side Load Pull Performance — Maximum Drain Efficiency Tuning**
 $V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.4 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P1dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 2.34 - j5.33                        | 2.65 + j5.93                    | 1.99 - j2.55                            | 15.2      | 51.8  | 151 | 71.0            | -35          |
| 1960       | 3.57 - j5.40                        | 3.82 + j6.34                    | 1.88 - j2.67                            | 15.1      | 51.7  | 147 | 70.1            | -35          |
| 1995       | 4.83 - j4.85                        | 6.03 + j5.96                    | 2.00 - j2.88                            | 15.0      | 51.8  | 152 | 69.7            | -33          |

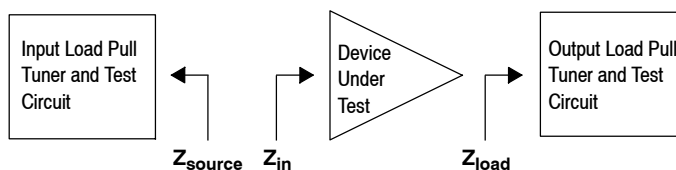
| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{in}}$<br>( $\Omega$ ) | Max Drain Efficiency                    |           |       |     |                 |              |
|------------|-------------------------------------|---------------------------------|-----------------------------------------|-----------|-------|-----|-----------------|--------------|
|            |                                     |                                 | P3dB                                    |           |       |     |                 |              |
|            |                                     |                                 | $Z_{\text{load}}^{(2)}$<br>( $\Omega$ ) | Gain (dB) | (dBm) | (W) | $\eta_D$<br>(%) | AM/PM<br>(°) |
| 1930       | 2.34 - j5.33                        | 3.03 + j6.23                    | 1.97 - j3.02                            | 13.3      | 53.0  | 200 | 70.7            | -44          |
| 1960       | 3.57 - j5.40                        | 4.45 + j6.62                    | 1.85 - j3.07                            | 13.2      | 52.8  | 189 | 69.6            | -44          |
| 1995       | 4.83 - j4.85                        | 7.11 + j5.78                    | 1.94 - j3.28                            | 13.1      | 52.9  | 196 | 69.7            | -42          |

(1) Load impedance for optimum P1dB efficiency.

(2) Load impedance for optimum P3dB efficiency.

 $Z_{\text{source}}$  = Measured impedance presented to the input of the device at the package reference plane.

 $Z_{\text{in}}$  = Impedance as measured from gate contact to ground.

 $Z_{\text{load}}$  = Measured impedance presented to the output of the device at the package reference plane.


## P1dB - TYPICAL CARRIER SIDE LOAD PULL CONTOURS — 1960 MHz

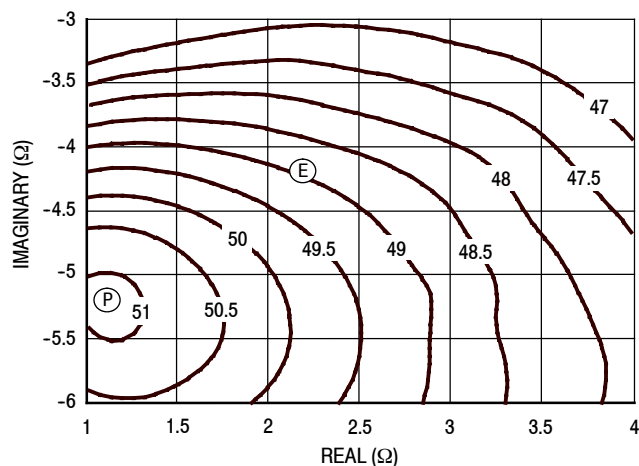


Figure 29. P1dB Load Pull Output Power Contours (dBm)

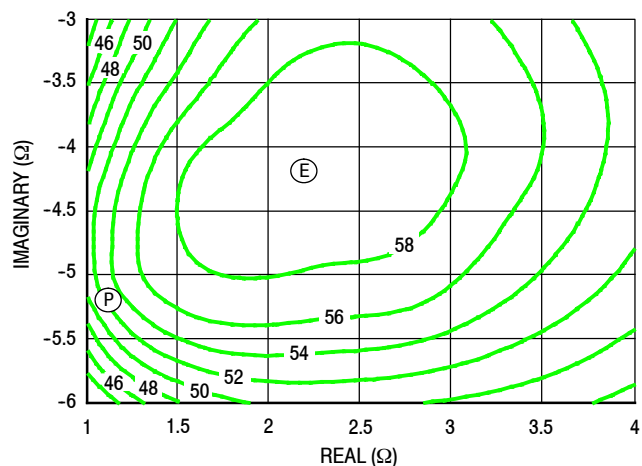


Figure 30. P1dB Load Pull Efficiency Contours (%)

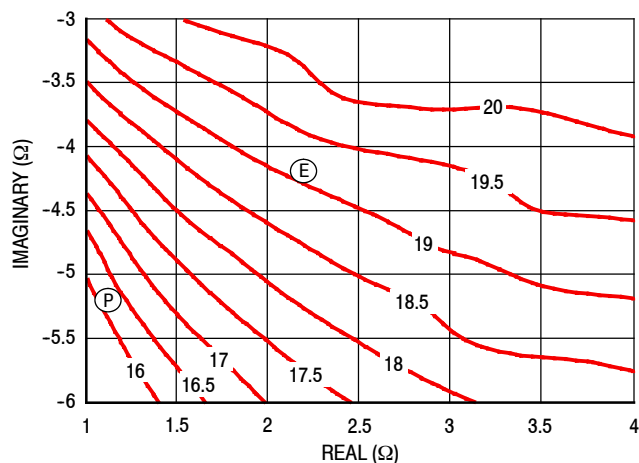


Figure 31. P1dB Load Pull Gain Contours (dB)

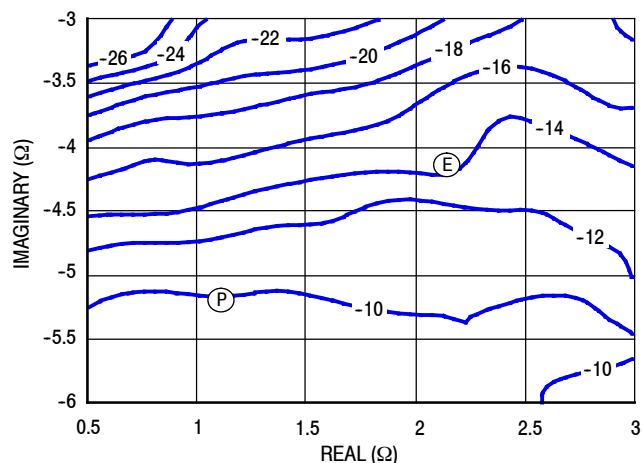


Figure 32. P1dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P3dB - TYPICAL CARRIER SIDE LOAD PULL CONTOURS — 1960 MHz

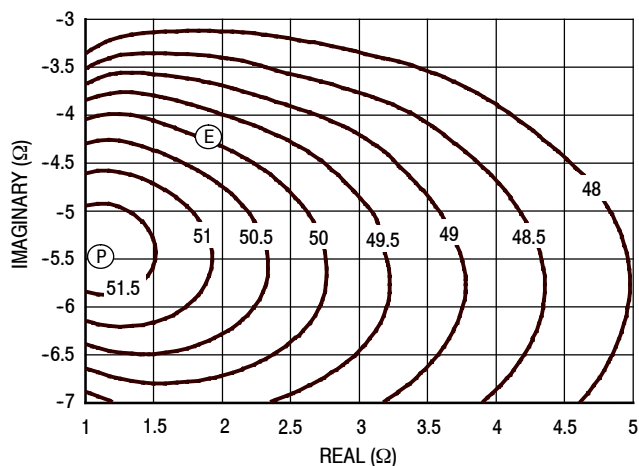


Figure 33. P3dB Load Pull Output Power Contours (dBm)

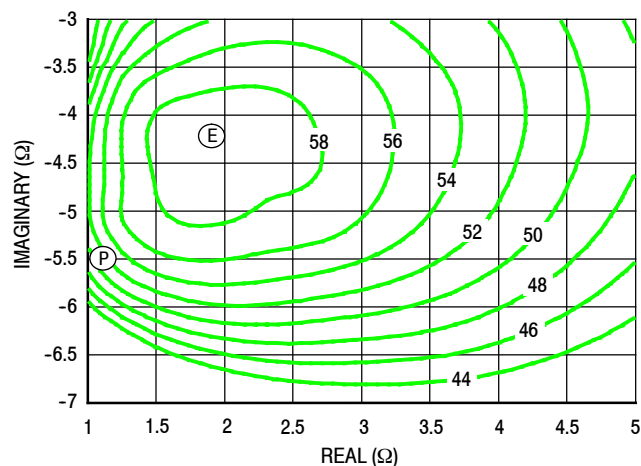


Figure 34. P3dB Load Pull Efficiency Contours (%)

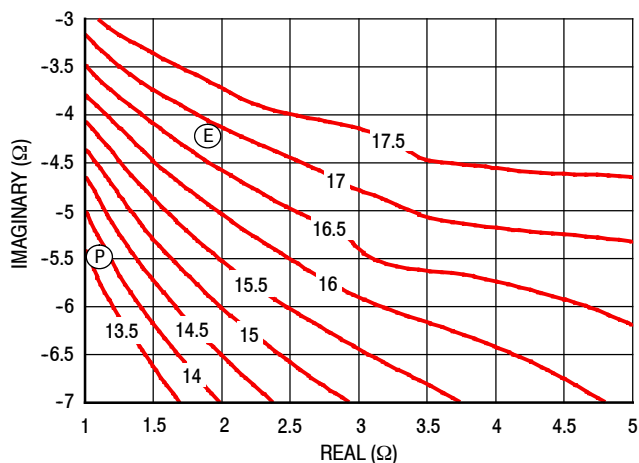


Figure 35. P3dB Load Pull Gain Contours (dB)

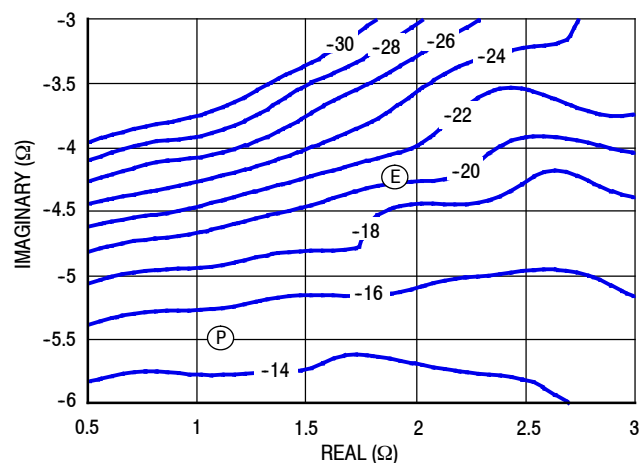


Figure 36. P3dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P1dB - TYPICAL PEAKING SIDE LOAD PULL CONTOURS — 1960 MHz

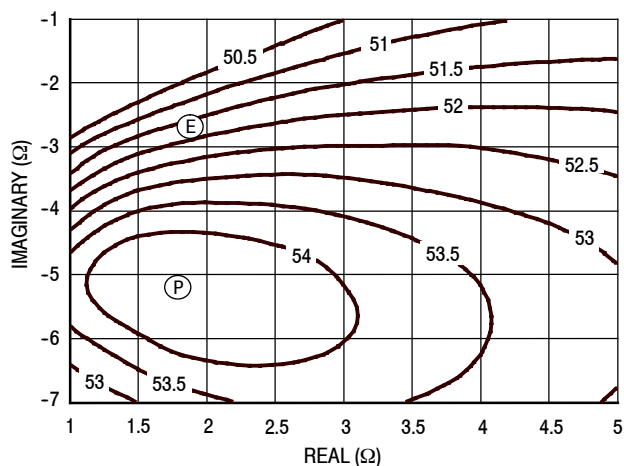


Figure 37. P1dB Load Pull Output Power Contours (dBm)

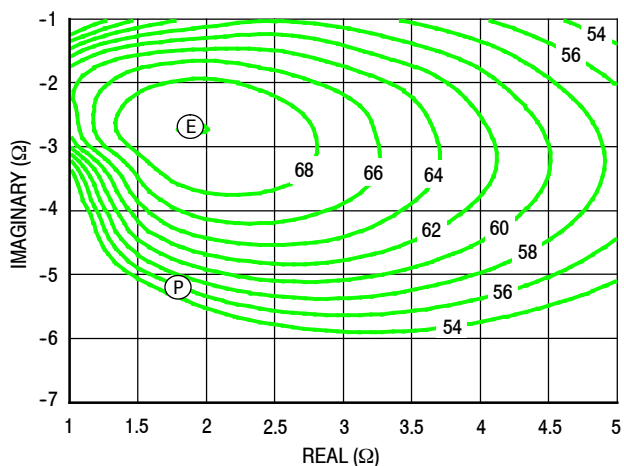


Figure 38. P1dB Load Pull Efficiency Contours (%)

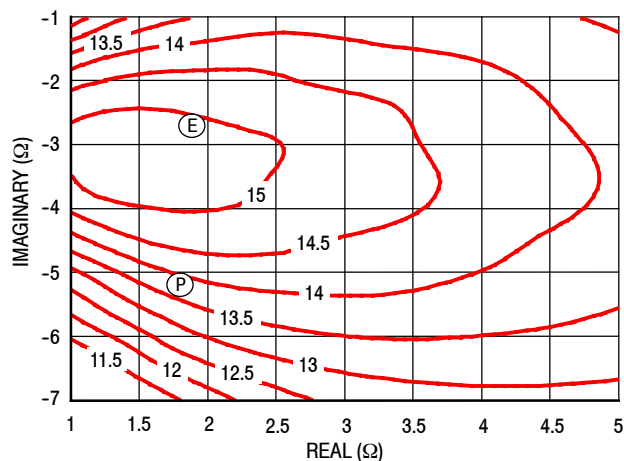


Figure 39. P1dB Load Pull Gain Contours (dB)

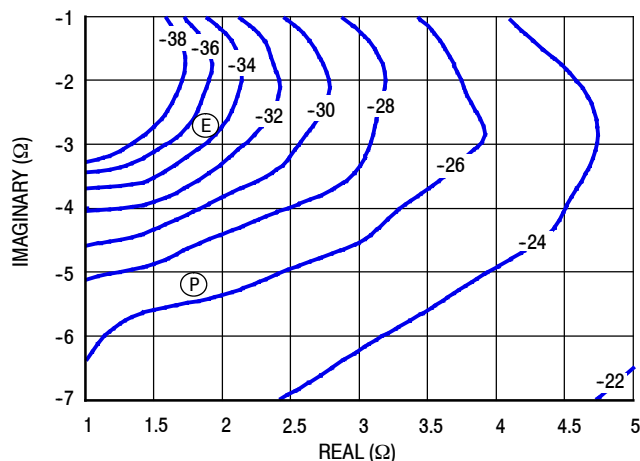


Figure 40. P1dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

## P3dB - TYPICAL PEAKING SIDE LOAD PULL CONTOURS — 1960 MHz

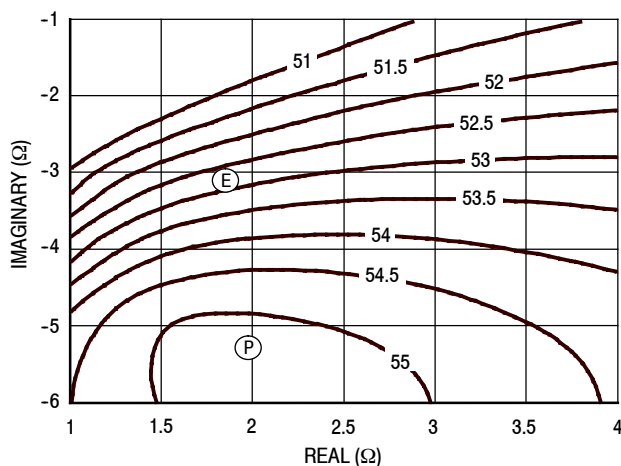


Figure 41. P3dB Load Pull Output Power Contours (dBm)

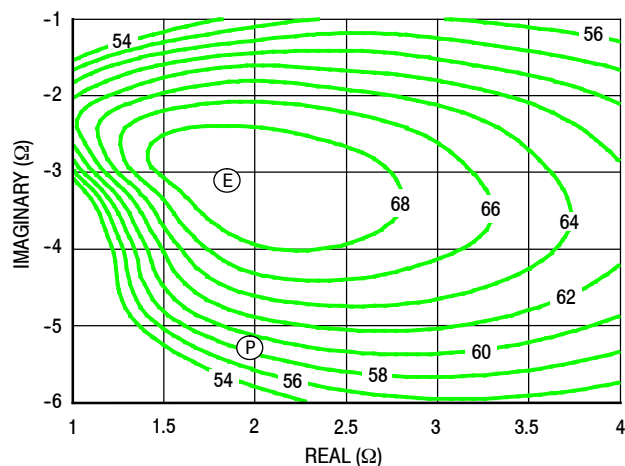


Figure 42. P3dB Load Pull Efficiency Contours (%)

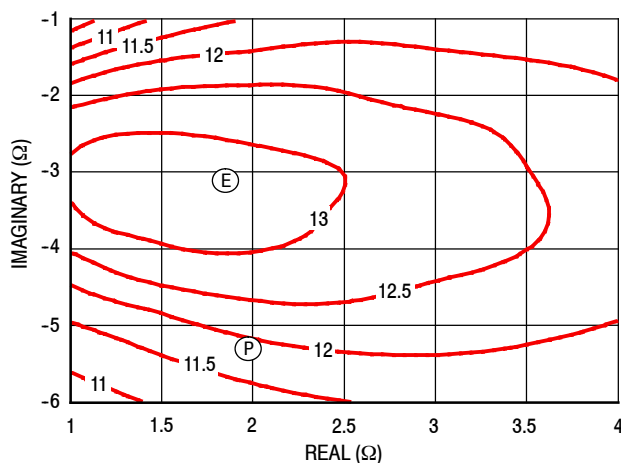


Figure 43. P3dB Load Pull Gain Contours (dB)

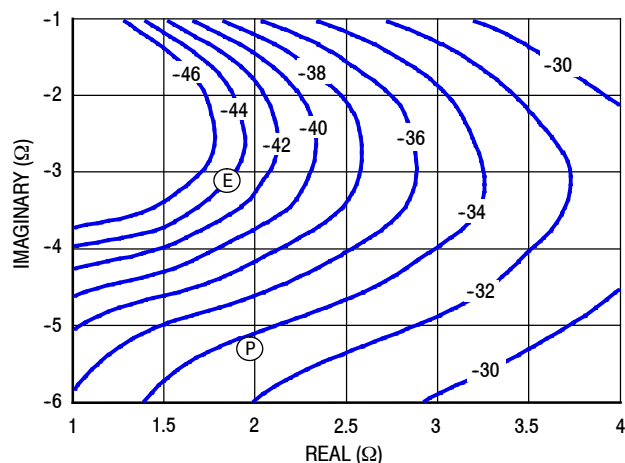
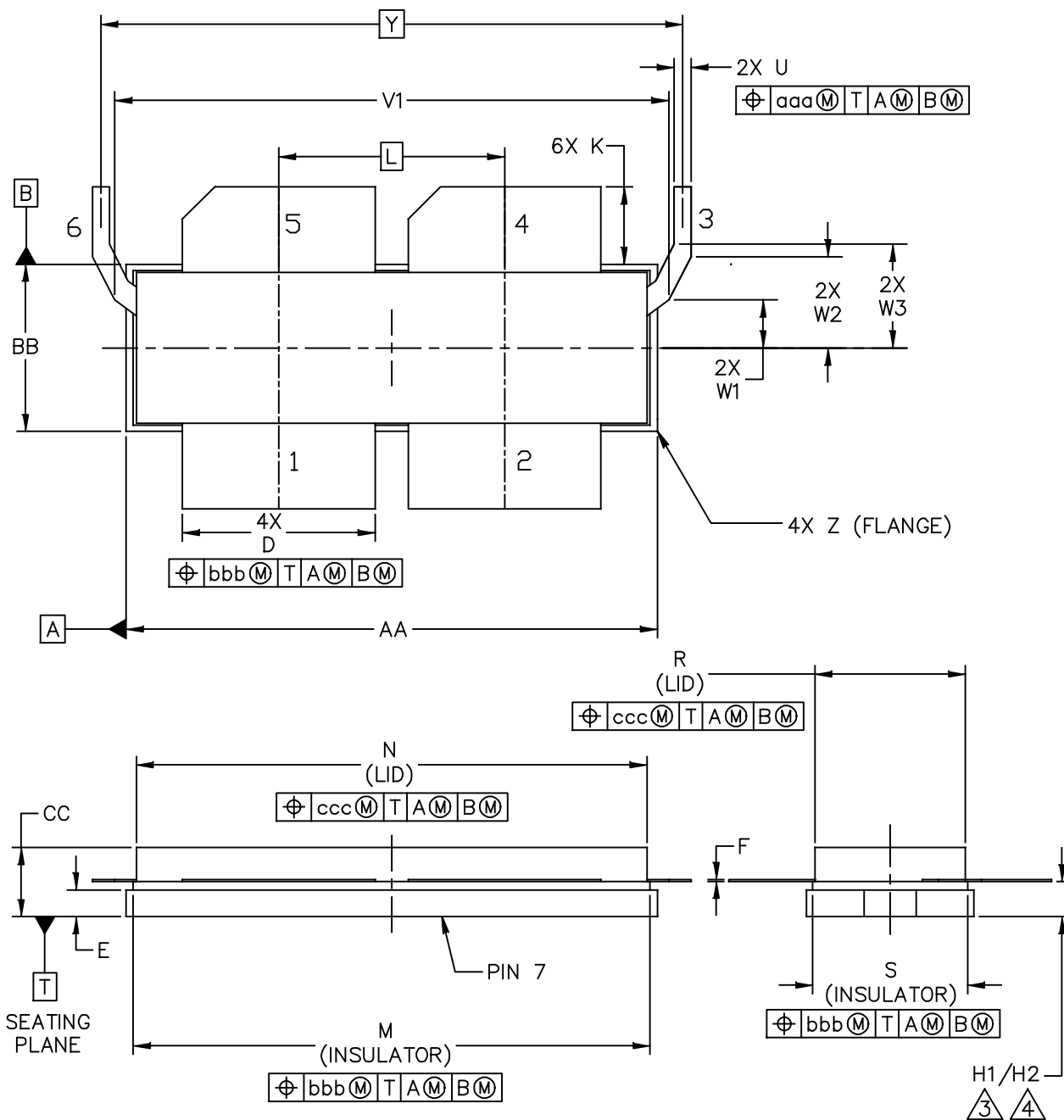


Figure 44. P3dB Load Pull AM/PM Contours (°)

**NOTE:** (P) = Maximum Output Power  
(E) = Maximum Drain Efficiency

- Gain
- Drain Efficiency
- Linearity
- Output Power

# PACKAGE DIMENSIONS



|                                                         |                          |                            |
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| NI-1230-4LS2L                                           | STANDARD: NON-JEDEC      |                            |
|                                                         |                          | 08 MAR 2013                |

NOTES:

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.
2. CONTROLLING DIMENSION: INCH



DIMENSIONS H1 AND H2 ARE MEASURED .030 INCH (0.762 MM) AWAY FROM FLANGE PARALLEL TO DATUM B. H1 APPLIES TO PINS 1, 2, 4 & 5. H2 APPLIES TO PINS 3 & 6.



TOLERANCE OF DIMENSION H2 IS TENTATIVE AND COULD CHANGE ONCE SUFFICIENT MANUFACTURING DATA IS AVAILABLE.

| DIM                                                     | INCH     |       | MILLIMETER         |       | DIM                                  | INCH                       |       | MILLIMETER |       |
|---------------------------------------------------------|----------|-------|--------------------|-------|--------------------------------------|----------------------------|-------|------------|-------|
|                                                         | MIN      | MAX   | MIN                | MAX   |                                      | MIN                        | MAX   | MIN        | MAX   |
| AA                                                      | 1.265    | 1.275 | 32.13              | 32.39 | N                                    | 1.218                      | 1.242 | 30.94      | 31.55 |
| BB                                                      | .395     | .405  | 10.03              | 10.29 | R                                    | .365                       | .375  | 9.27       | 9.53  |
| CC                                                      | .170     | .190  | 4.32               | 4.83  | S                                    | .365                       | .375  | 9.27       | 9.53  |
| D                                                       | .455     | .465  | 11.56              | 11.81 | U                                    | .035                       | .045  | 0.89       | 1.14  |
| E                                                       | .062     | .066  | 1.57               | 1.68  | V1                                   | 1.320                      | 1.330 | 33.53      | 33.78 |
| F                                                       | .004     | .007  | 0.10               | 0.18  | W1                                   | .110                       | .120  | 2.79       | 3.05  |
| H1                                                      | .082     | .090  | 2.08               | 2.29  | W2                                   | .213                       | .223  | 5.41       | 5.66  |
| H2                                                      | .078     | .094  | 1.98               | 2.39  | W3                                   | .243                       | .253  | 6.17       | 6.43  |
| K                                                       | .175     | .195  | 4.45               | 4.95  | Y                                    | 1.390 BSC                  |       | 35.31 BSC  |       |
| L                                                       | .540 BSC |       | 13.72 BSC          |       | Z                                    | R.000                      | R.040 | R0.00      | R1.02 |
| M                                                       | 1.219    | 1.241 | 30.96              | 31.52 | aaa                                  | .015                       |       | 0.38       |       |
|                                                         |          |       |                    |       | bbb                                  | .010                       |       | 0.25       |       |
|                                                         |          |       |                    |       | ccc                                  | .020                       |       | 0.51       |       |
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|                                                         |          |       |                    |       | STANDARD: NON-JEDEC                  |                            |       |            |       |
|                                                         |          |       |                    |       | 08 MAR 2013                          |                            |       |            |       |

## PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following resources to aid your design process.

### Application Notes

- AN1955: Thermal Measurement Methodology of RF Power Amplifiers

### Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

### Software

- Electromigration MTTF Calculator
- RF High Power Model
- .s2p File

### Development Tools

- Printed Circuit Boards

For Software and Tools, do a Part Number search at <http://www.freescale.com>, and select the “Part Number” link. Go to Software & Tools on the part’s Product Summary page to download the respective tool.

## REVISION HISTORY

The following table summarizes revisions to this document.

| Revision | Date      | Description                     |
|----------|-----------|---------------------------------|
| 1        | Mar. 2015 | • Initial Release of Data Sheet |



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