

# RF Power Field Effect Transistor

## N-Channel Enhancement-Mode Lateral MOSFET

Designed for CDMA base station applications with frequencies from 700 to 1000 MHz. Can be used in Class AB and Class C for all typical cellular base station modulation formats.

- Typical Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Volts,  $I_{DQ} = 800$  mA,  $P_{out} = 33$  Watts Avg., IQ Magnitude Clipping, Channel Bandwidth = 3.84 MHz, Input Signal PAR = 7.5 dB @ 0.01% Probability on CCDF.

| Frequency | $G_{ps}$<br>(dB) | $\eta_D$<br>(%) | Output PAR<br>(dB) | ACPR<br>(dBc) |
|-----------|------------------|-----------------|--------------------|---------------|
| 920 MHz   | 20.1             | 34.6            | 6.3                | -37.2         |
| 940 MHz   | 20.0             | 34.3            | 6.3                | -37.3         |
| 960 MHz   | 19.8             | 34.2            | 6.3                | -37.4         |

- Capable of Handling 10:1 VSWR, @ 32 Vdc, 940 MHz, 120 Watts CW Output Power (3 dB Input Overdrive from Rated  $P_{out}$ ), Designed for Enhanced Ruggedness
- Typical  $P_{out}$  @ 1 dB Compression Point  $\approx$  120 Watts CW

### 880 MHz

- Typical Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Volts,  $I_{DQ} = 800$  mA,  $P_{out} = 33$  Watts Avg., IQ Magnitude Clipping, Channel Bandwidth = 3.84 MHz, Input Signal PAR = 7.5 dB @ 0.01% Probability on CCDF.

| Frequency | $G_{ps}$<br>(dB) | $\eta_D$<br>(%) | Output PAR<br>(dB) | ACPR<br>(dBc) |
|-----------|------------------|-----------------|--------------------|---------------|
| 865 MHz   | 20.8             | 35.0            | 6.2                | -37.1         |
| 880 MHz   | 20.8             | 35.0            | 6.2                | -37.5         |
| 895 MHz   | 20.6             | 34.8            | 6.2                | -38.0         |

### Features

- 100% PAR Tested for Guaranteed Output Power Capability
- Characterized with Series Equivalent Large-Signal Impedance Parameters and Common Source S-Parameters
- Internally Matched for Ease of Use
- Integrated ESD Protection
- Greater Negative Gate-Source Voltage Range for Improved Class C Operation
- Designed for Digital Predistortion Error Correction Systems
- Optimized for Doherty Applications
- 225°C Capable Plastic Package
- RoHS Compliant
- In Tape and Reel. R3 Suffix = 250 Units per 32 mm, 13 inch Reel.

**Table 1. Maximum Ratings**

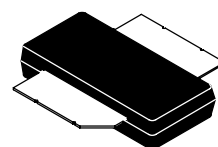
| Rating                               | Symbol    | Value       | Unit |
|--------------------------------------|-----------|-------------|------|
| Drain-Source Voltage                 | $V_{DSS}$ | -0.5, +70   | Vdc  |
| Gate-Source Voltage                  | $V_{GS}$  | -6.0, +10   | Vdc  |
| Operating Voltage                    | $V_{DD}$  | 32, +0      | Vdc  |
| Storage Temperature Range            | $T_{stg}$ | -65 to +150 | °C   |
| Case Operating Temperature           | $T_C$     | 150         | °C   |
| Operating Junction Temperature (1,2) | $T_J$     | 225         | °C   |

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.

**MRF8S9120NR3**

**865-960 MHz, 33 W AVG., 28 V  
SINGLE W-CDMA  
LATERAL N-CHANNEL  
RF POWER MOSFET**



**CASE 2021-03, STYLE 1  
OM-780-2  
PLASTIC**

**Table 2. Thermal Characteristics**

| Characteristic                                                                                                                                                                                  | Symbol           | Value (1,2)  | Unit |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|--------------|------|
| Thermal Resistance, Junction to Case<br>Case Temperature 76°C, 33 W CW, 28 Vdc, I <sub>DQ</sub> = 800 mA, 960 MHz<br>Case Temperature 76°C, 120 W CW, 28 Vdc, I <sub>DQ</sub> = 800 mA, 960 MHz | R <sub>θJC</sub> | 0.62<br>0.51 | °C/W |

**Table 3. ESD Protection Characteristics**

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

**Table 4. Moisture Sensitivity Level**

| Test Methodology                     | Rating | Package Peak Temperature | Unit |
|--------------------------------------|--------|--------------------------|------|
| Per JESD22-A113, IPC/JEDEC J-STD-020 | 3      | 260                      | °C   |

**Table 5. Electrical Characteristics** (T<sub>A</sub> = 25°C unless otherwise noted)

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

**Off Characteristics**

|                                                                                                |                  |   |   |    |      |
|------------------------------------------------------------------------------------------------|------------------|---|---|----|------|
| Zero Gate Voltage Drain Leakage Current<br>(V <sub>DS</sub> = 70 Vdc, V <sub>GS</sub> = 0 Vdc) | I <sub>DSS</sub> | — | — | 10 | μAdc |
| Zero Gate Voltage Drain Leakage Current<br>(V <sub>DS</sub> = 28 Vdc, V <sub>GS</sub> = 0 Vdc) | I <sub>DSS</sub> | — | — | 1  | μAdc |
| Gate–Source Leakage Current<br>(V <sub>GS</sub> = 5 Vdc, V <sub>DS</sub> = 0 Vdc)              | I <sub>GSS</sub> | — | — | 1  | μAdc |

**On Characteristics**

|                                                                                                              |                     |     |     |     |     |
|--------------------------------------------------------------------------------------------------------------|---------------------|-----|-----|-----|-----|
| Gate Threshold Voltage<br>(V <sub>DS</sub> = 10 Vdc, I <sub>D</sub> = 460 μAdc)                              | V <sub>GS(th)</sub> | 1.4 | 2.2 | 2.9 | Vdc |
| Gate Quiescent Voltage<br>(V <sub>DD</sub> = 28 Vdc, I <sub>D</sub> = 800 mAdc, Measured in Functional Test) | V <sub>GS(Q)</sub>  | 2.3 | 3.1 | 3.8 | Vdc |
| Drain–Source On–Voltage<br>(V <sub>GS</sub> = 10 Vdc, I <sub>D</sub> = 2 Adc)                                | V <sub>DS(on)</sub> | 0.1 | 0.2 | 0.3 | Vdc |

**Functional Tests** <sup>(3)</sup> (In Freescale Test Fixture, 50 ohm system) V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 800 mA, P<sub>out</sub> = 33 W Avg., f = 960 MHz, Single–Carrier W–CDMA, IQ Magnitude Clipping, Input Signal PAR = 7.5 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @ ±5 MHz Offset.

|                                                          |                 |      |       |       |     |
|----------------------------------------------------------|-----------------|------|-------|-------|-----|
| Power Gain                                               | G <sub>ps</sub> | 19.0 | 19.8  | 22.0  | dB  |
| Drain Efficiency                                         | η <sub>D</sub>  | 33.0 | 34.2  | —     | %   |
| Output Peak–to–Average Ratio @ 0.01% Probability on CCDF | PAR             | 6.0  | 6.3   | —     | dB  |
| Adjacent Channel Power Ratio                             | ACPR            | —    | –37.4 | –36.4 | dBc |
| Input Return Loss                                        | IRL             | —    | –20   | –12   | dB  |

**Typical Broadband Performance** (In Freescale Test Fixture, 50 ohm system) V<sub>DD</sub> = 28 Vdc, I<sub>DQ</sub> = 800 mA, P<sub>out</sub> = 33 W Avg., Single–Carrier W–CDMA, IQ Magnitude Clipping, Input Signal PAR = 7.5 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @ ±5 MHz Offset.

| Frequency | G <sub>ps</sub><br>(dB) | η <sub>D</sub><br>(%) | Output PAR<br>(dB) | ACPR<br>(dBc) | IRL<br>(dB) |
|-----------|-------------------------|-----------------------|--------------------|---------------|-------------|
| 920 MHz   | 20.1                    | 34.6                  | 6.3                | –37.2         | –14         |
| 940 MHz   | 20.0                    | 34.3                  | 6.3                | –37.3         | –24         |
| 960 MHz   | 19.8                    | 34.2                  | 6.3                | –37.4         | –20         |

- MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.
- Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers*. Go to <http://www.freescale.com/rf>. Select Documentation/Application Notes – AN1955.
- Part internally matched both on input and output.

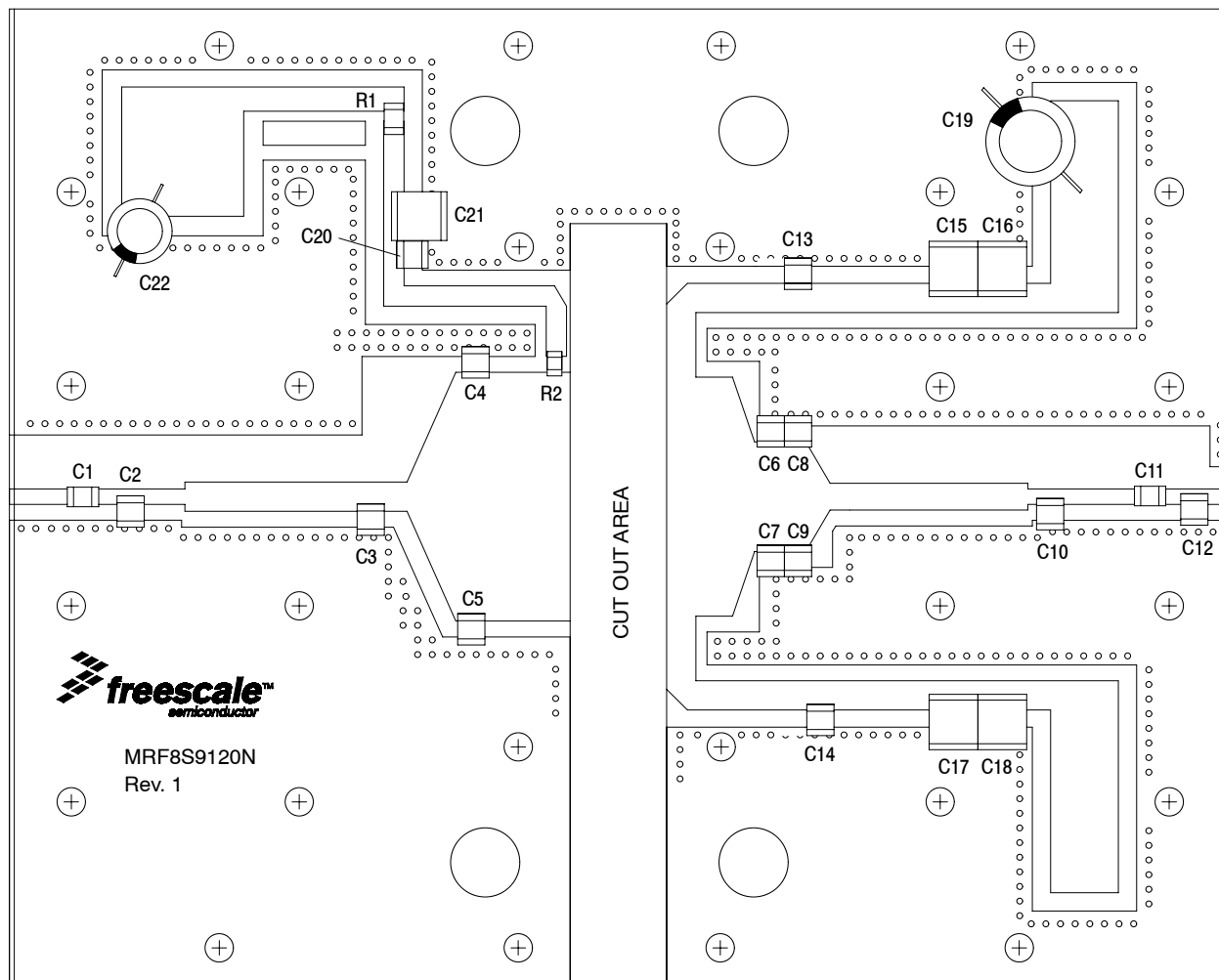
(continued)

**Table 5. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (continued)

| Characteristic                                                                                                                                                                               | Symbol               | Min | Typ   | Max | Unit                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|-------|-----|----------------------|
| <b>Typical Performances</b> (In Freescale Test Fixture, 50 ohm system) $V_{DD} = 28\text{ Vdc}$ , $I_{DQ} = 800\text{ mA}$ , 920-960 MHz Bandwidth                                           |                      |     |       |     |                      |
| $P_{out}$ @ 1 dB Compression Point, CW                                                                                                                                                       | P1dB                 | —   | 120   | —   | W                    |
| IMD Symmetry @ 52 W PEP, $P_{out}$ where IMD Third Order Intermodulation $\cong 30\text{ dBc}$<br>(Delta IMD Third Order Intermodulation between Upper and Lower Sidebands $> 2\text{ dB}$ ) | IMD <sub>sym</sub>   | —   | 16    | —   | MHz                  |
| VBW Resonance Point<br>(IMD Third Order Intermodulation Inflection Point)                                                                                                                    | VBW <sub>res</sub>   | —   | 46    | —   | MHz                  |
| Gain Flatness in 40 MHz Bandwidth @ $P_{out} = 33\text{ W Avg.}$                                                                                                                             | $G_F$                | —   | 0.3   | —   | dB                   |
| Gain Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                                                                                                            | $\Delta G$           | —   | 0.016 | —   | dB/ $^\circ\text{C}$ |
| Output Power Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                                                                                                    | $\Delta P1\text{dB}$ | —   | 0.002 | —   | dB/ $^\circ\text{C}$ |

**Typical Broadband Performance — 880 MHz** (In Freescale 880 MHz Test Fixture, 50 ohm system)  $V_{DD} = 28\text{ Vdc}$ ,  $I_{DQ} = 800\text{ mA}$ ,  $P_{out} = 33\text{ W Avg.}$ , Single-Carrier W-CDMA, IQ Magnitude Clipping, Input Signal PAR = 7.5 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @  $\pm 5\text{ MHz}$  Offset.

| Frequency | $G_{ps}$<br>(dB) | $\eta_D$<br>(%) | Output PAR<br>(dB) | ACPR<br>(dBc) | IRL<br>(dB) |
|-----------|------------------|-----------------|--------------------|---------------|-------------|
| 865 MHz   | 20.8             | 35.0            | 6.2                | -37.1         | -12         |
| 880 MHz   | 20.8             | 35.0            | 6.2                | -37.5         | -13         |
| 895 MHz   | 20.6             | 34.8            | 6.2                | -38.0         | -13         |

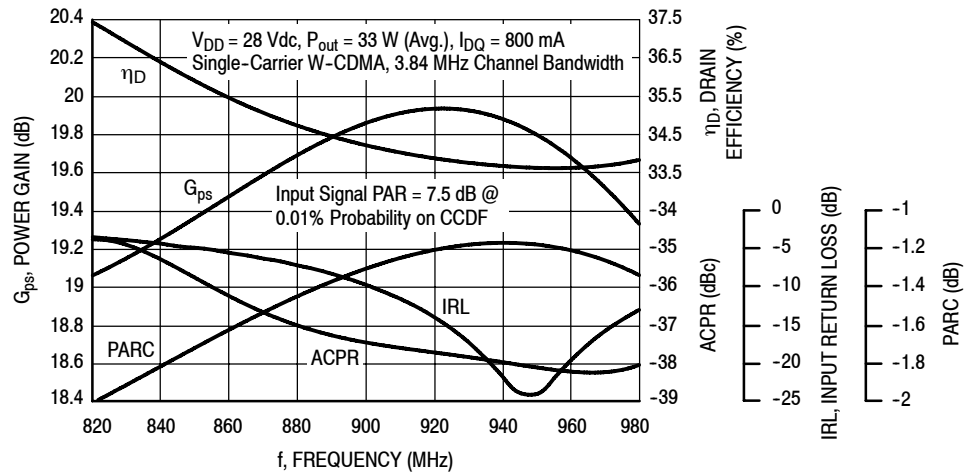


**Figure 1. MRF8S9120NR3 Test Circuit Component Layout**

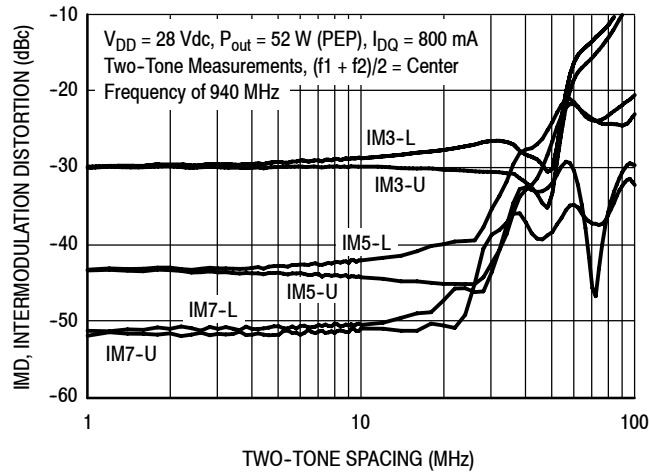
**Table 6. MRF8S9120NR3 Test Circuit Component Designations and Values**

| Part                    | Description                        | Part Number          | Manufacturer       |
|-------------------------|------------------------------------|----------------------|--------------------|
| C1, C11, C20            | 39 pF Chip Capacitors              | ATC100B390JT500XT    | ATC                |
| C2                      | 1.8 pF Chip Capacitor              | ATC100B1R8BT500XT    | ATC                |
| C3                      | 2.0 pF Chip Capacitor              | ATC100B2R0BT500XT    | ATC                |
| C4, C10                 | 2.7 pF Chip Capacitors             | ATC100B2R7BT500XT    | ATC                |
| C5                      | 6.8 pF Chip Capacitor              | ATC100B6R8CT500XT    | ATC                |
| C6, C7                  | 7.5 pF Chip Capacitors             | ATC100B7R5CT500XT    | ATC                |
| C8, C9                  | 2.2 pF Chip Capacitors             | ATC100B2R2JT500XT    | ATC                |
| C12                     | 0.8 pF Chip Capacitor              | ATC100B0R8BT500XT    | ATC                |
| C13, C14                | 43 pF Chip Capacitors              | ATC100B430JT500XT    | ATC                |
| C15, C16, C17, C18, C21 | 10 $\mu$ F Chip Capacitors         | GRM55DR61H106KA88L   | Murata             |
| C19                     | 470 $\mu$ F, 63 V Chip Capacitor   | MCGPR63V477M13X26-RH | Multicomp          |
| C22                     | 47 $\mu$ F, 50 V Chip Capacitor    | 476KXM050M           | Illinois Capacitor |
| R1                      | 3.3 $\Omega$ , 1/4 W Chip Resistor | P3.3VCT-ND           | Panasonic          |
| R2                      | 10 $\Omega$ , 1/4 W Chip Resistor  | CRCW120610R0JNEA     | Vishay             |
| PCB                     | 0.030", $\epsilon_r = 3.5$         | RF-35A2              | Taconic            |

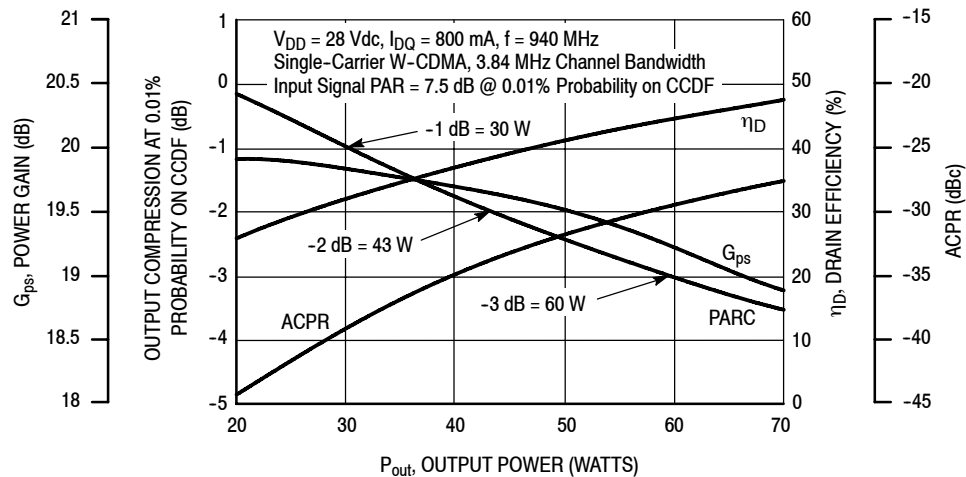
## TYPICAL CHARACTERISTICS



**Figure 2. Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 33$  Watts Avg.**

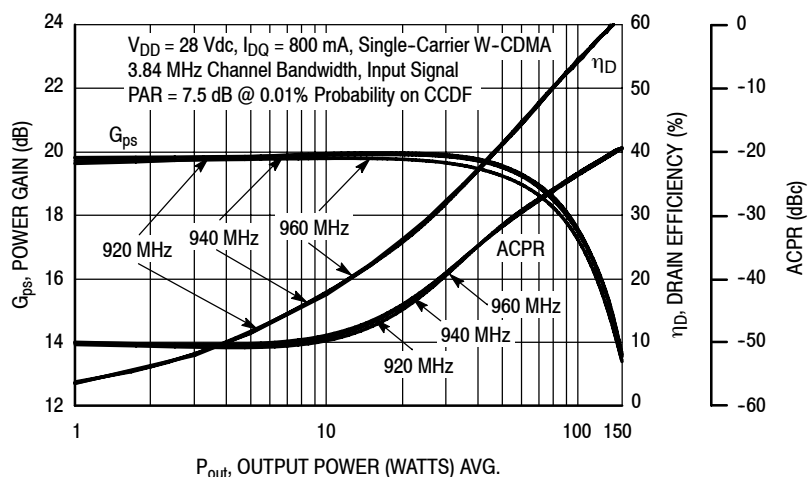


**Figure 3. Intermodulation Distortion Products versus Two-Tone Spacing**

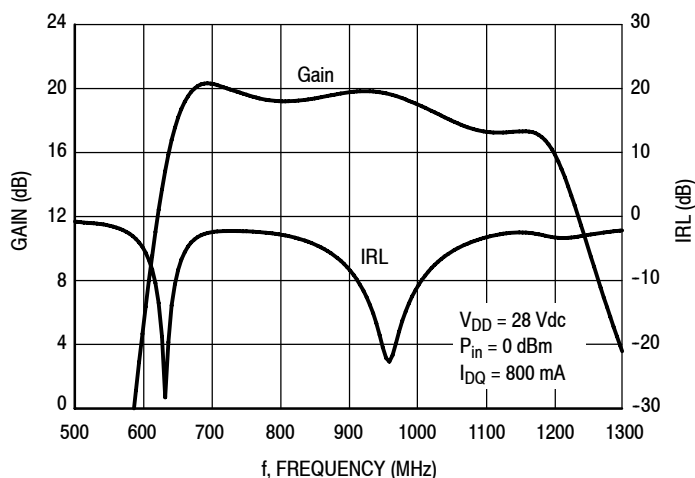


**Figure 4. Output Peak-to-Average Ratio Compression (PARC) versus Output Power**

## TYPICAL CHARACTERISTICS

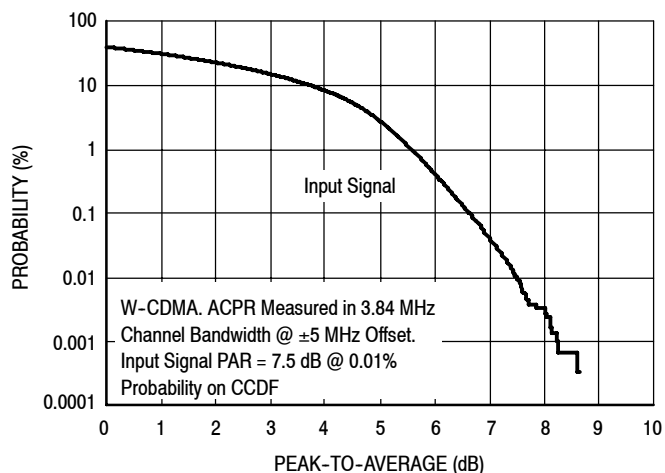


**Figure 5. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**

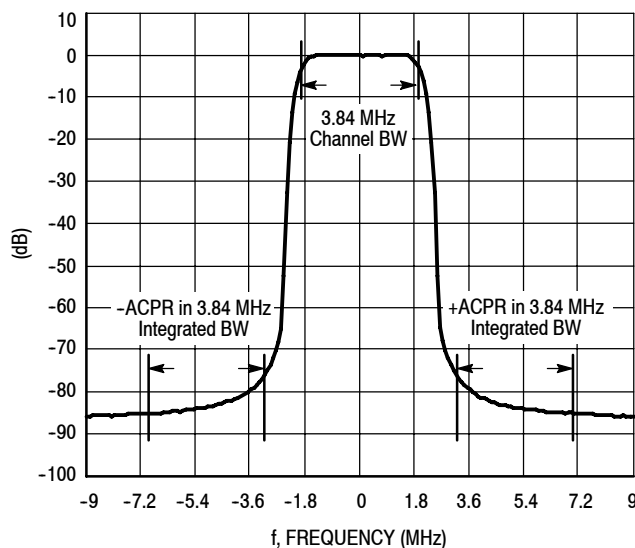


**Figure 6. Broadband Frequency Response**

## W-CDMA TEST SIGNAL



**Figure 7. CCDF W-CDMA IQ Magnitude Clipping, Single-Carrier Test Signal**



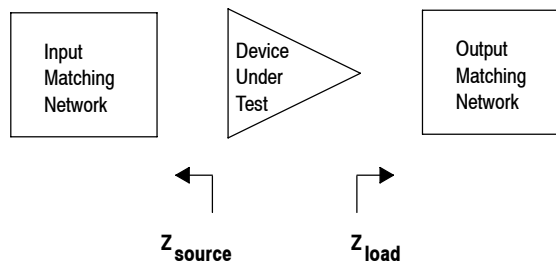
**Figure 8. Single-Carrier W-CDMA Spectrum**

$V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQ} = 800 \text{ mA}$ ,  $P_{out} = 33 \text{ W Avg.}$

| f<br>MHz | $Z_{source}$<br>$\Omega$ | $Z_{load}$<br>$\Omega$ |
|----------|--------------------------|------------------------|
| 820      | $2.75 - j0.48$           | $3.19 + j0.87$         |
| 840      | $2.67 - j0.21$           | $2.95 + j1.16$         |
| 860      | $2.61 - j0.06$           | $2.73 + j1.45$         |
| 880      | $2.56 + j0.32$           | $2.54 + j1.74$         |
| 900      | $2.51 + j0.56$           | $2.36 + j2.01$         |
| 920      | $2.48 + j0.80$           | $2.19 + j2.29$         |
| 940      | $2.43 + j1.03$           | $2.03 + j2.57$         |
| 960      | $2.39 + j1.24$           | $1.89 + j2.85$         |
| 980      | $2.36 + j1.46$           | $1.77 + j3.12$         |

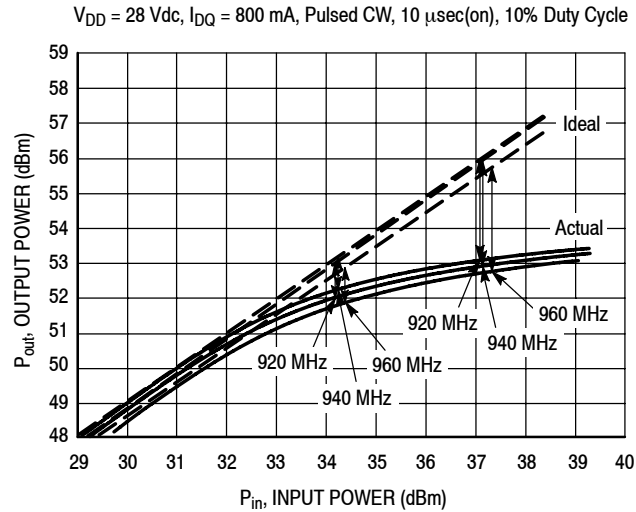
$Z_{source}$  = Test circuit impedance as measured from gate to ground.

$Z_{load}$  = Test circuit impedance as measured from drain to ground.



**Figure 9. Series Equivalent Source and Load Impedance**

## ALTERNATIVE PEAK TUNE LOAD PULL CHARACTERISTICS

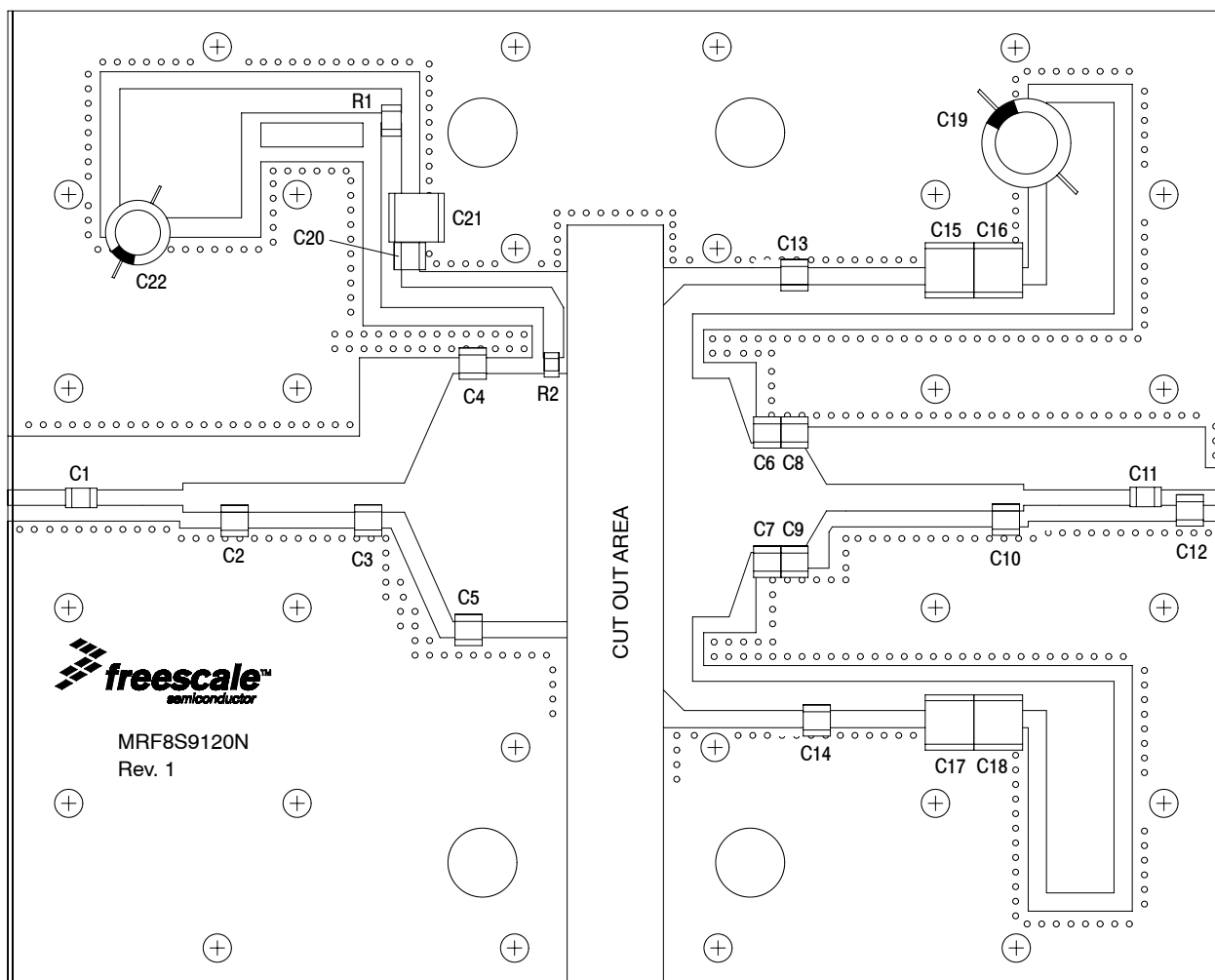


| f<br>(MHz) | P1dB  |      | P3dB  |      |
|------------|-------|------|-------|------|
|            | Watts | dBm  | Watts | dBm  |
| 920        | 168   | 52.3 | 202   | 53.1 |
| 940        | 160   | 52.0 | 195   | 52.9 |
| 960        | 154   | 51.9 | 188   | 52.7 |

Test Impedances per Compression Level

| f<br>(MHz) |      | $Z_{\text{source}}$<br>$\Omega$ | $Z_{\text{load}}$<br>$\Omega$ |
|------------|------|---------------------------------|-------------------------------|
| 920        | P1dB | $1.45 - j2.02$                  | $1.28 - j2.39$                |
| 940        | P1dB | $1.78 - j1.81$                  | $1.35 - j2.74$                |
| 960        | P1dB | $1.78 - j2.35$                  | $1.33 - j2.99$                |

**Figure 10. Pulsed CW Output Power  
versus Input Power @ 28 V**

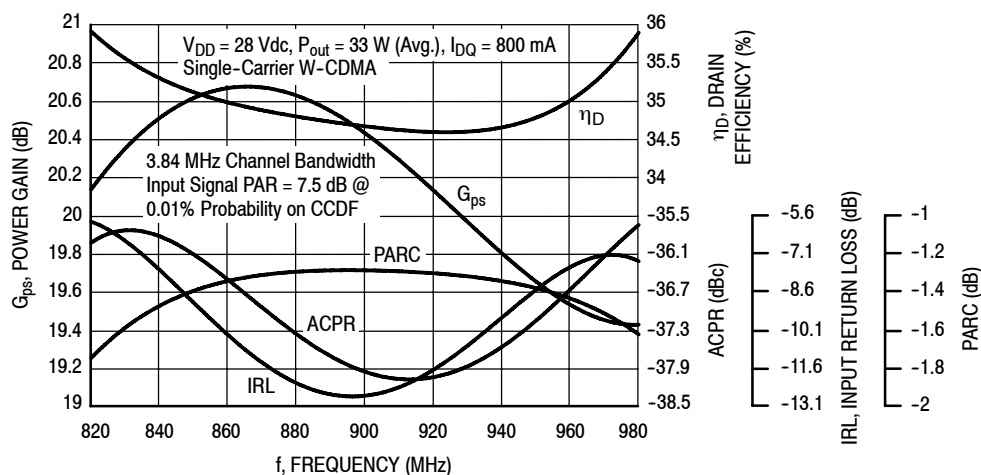


**Figure 11. MRF8S9120NR3 Test Circuit Component Layout — 880 MHz**

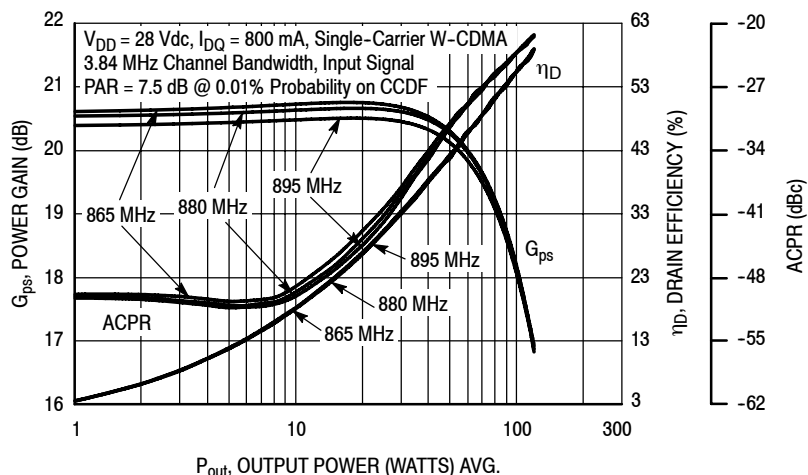
**Table 7. MRF8S9120NR3 Test Circuit Component Designations and Values — 880 MHz**

| Part                    | Description                              | Part Number          | Manufacturer       |
|-------------------------|------------------------------------------|----------------------|--------------------|
| C1, C11, C20            | 47 pF Chip Capacitors                    | ATC100B470JT500XT    | ATC                |
| C2, C3, C4              | 3.3 pF Chip Capacitors                   | ATC100B3R3BT500XT    | ATC                |
| C5, C6, C7              | 7.5 pF Chip Capacitors                   | ATC100B7R5CT500XT    | ATC                |
| C8, C9                  | 2.2 pF Chip Capacitors                   | ATC100B2R2JT500XT    | ATC                |
| C10                     | 2.7 pF Chip Capacitor                    | ATC100B2R7BT500XT    | ATC                |
| C12                     | 0.8 pF Chip Capacitor                    | ATC100B0R8BT500XT    | ATC                |
| C13, C14                | 43 pF Chip Capacitors                    | ATC100B430JT500XT    | ATC                |
| C15, C16, C17, C18, C21 | 10 $\mu$ F Chip Capacitors               | GRM55DR61H106KA88L   | Murata             |
| C19                     | 470 $\mu$ F, 63 V Electrolytic Capacitor | MCGPR63V477M13X26-RH | Multicomp          |
| C22                     | 47 $\mu$ F, 50 V Electrolytic Capacitor  | 476KXM050M           | Illinois Capacitor |
| R1                      | 3.3 $\Omega$ , 1/4 W Chip Resistor       | P3.3VCT-ND           | Panasonic          |
| R2                      | 10 $\Omega$ , 1/4 W Chip Resistor        | CRCW120610R0JNEA     | Vishay             |
| PCB                     | 0.030", $\epsilon_r = 3.5$               | RF-35A2              | Taconic            |

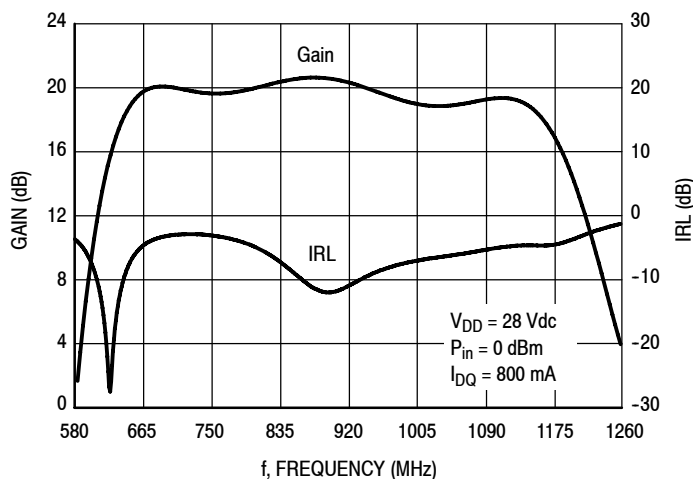
## TYPICAL CHARACTERISTICS — 880 MHz



**Figure 12. Output Peak-to-Average Ratio Compression (PARC)  
Broadband Performance @  $P_{out} = 33$  Watts Avg.**



**Figure 13. Single-Carrier W-CDMA Power Gain, Drain  
Efficiency and ACPR versus Output Power**



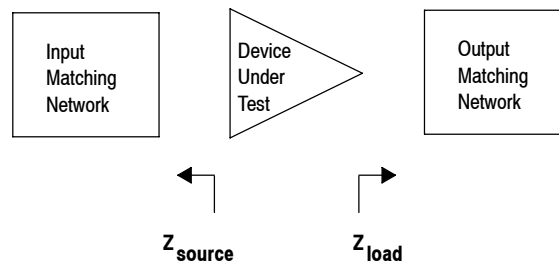
**Figure 14. Broadband Frequency Response**

$V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQ} = 800 \text{ mA}$ ,  $P_{out} = 33 \text{ W Avg.}$

| f<br>MHz | $Z_{source}$<br>$\Omega$ | $Z_{load}$<br>$\Omega$ |
|----------|--------------------------|------------------------|
| 820      | $2.25 + j0.89$           | $2.83 + j1.30$         |
| 840      | $2.28 + j1.18$           | $2.67 + j1.58$         |
| 860      | $2.33 + j1.45$           | $2.52 + j1.87$         |
| 880      | $2.39 + j1.72$           | $2.38 + j1.15$         |
| 900      | $2.45 + j1.95$           | $2.24 + j2.41$         |
| 920      | $2.53 + j2.18$           | $2.12 + j2.68$         |
| 940      | $2.60 + j2.38$           | $1.99 + j2.96$         |
| 960      | $2.68 + j2.55$           | $1.86 + j3.24$         |
| 980      | $2.77 + j2.71$           | $1.75 + j3.53$         |

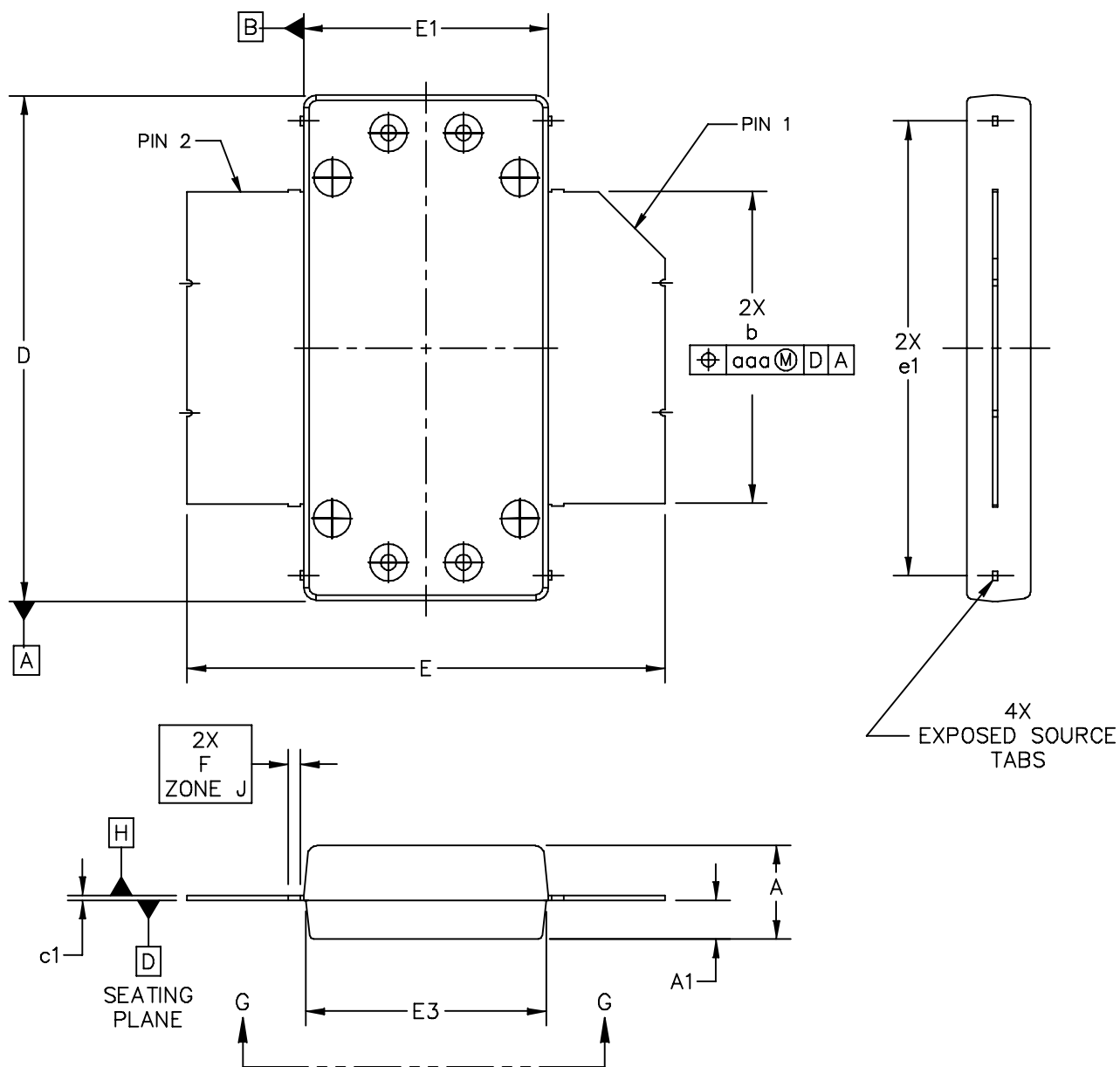
$Z_{source}$  = Test circuit impedance as measured from gate to ground.

$Z_{load}$  = Test circuit impedance as measured from drain to ground.

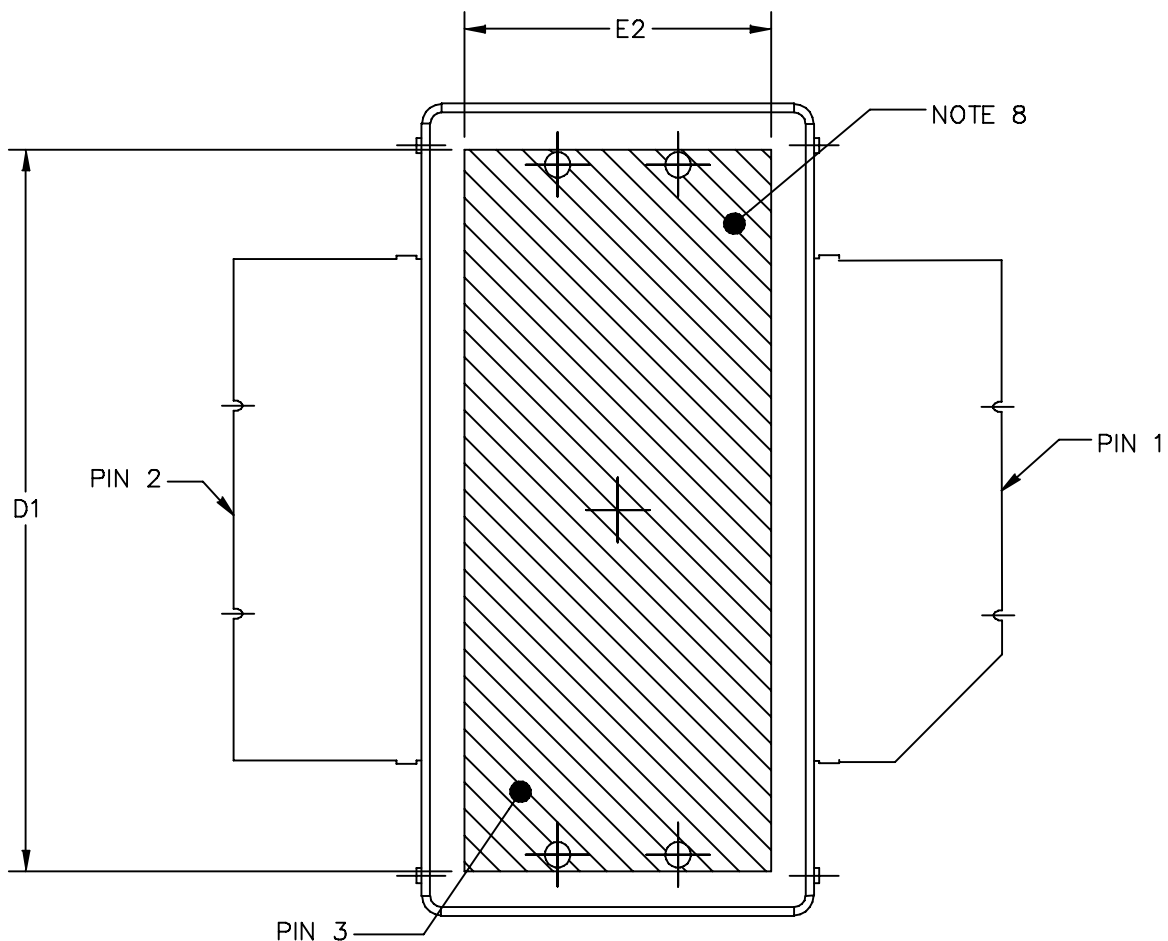


**Figure 15. Series Equivalent Source and Load Impedance — 880 MHz**

# PACKAGE DIMENSIONS



|                                                         |  |                          |                            |
|---------------------------------------------------------|--|--------------------------|----------------------------|
| © FREESCALE SEMICONDUCTOR, INC.<br>ALL RIGHTS RESERVED. |  | MECHANICAL OUTLINE       | PRINT VERSION NOT TO SCALE |
| TITLE:<br><br>OM780-2<br>STRAIGHT LEAD                  |  | DOCUMENT NO: 98ASA10831D | REV: B                     |
|                                                         |  | CASE NUMBER: 2021-03     | 22 OCT 2009                |
|                                                         |  | STANDARD: NON-JEDEC      |                            |



BOTTOM VIEW  
VIEW G-G

|                                                         |                          |                    |                            |
|---------------------------------------------------------|--------------------------|--------------------|----------------------------|
| © FREESCALE SEMICONDUCTOR, INC.<br>ALL RIGHTS RESERVED. |                          | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
| TITLE:<br><br>OM780-2<br>STRAIGHT LEAD                  | DOCUMENT NO: 98ASA10831D |                    | REV: B                     |
|                                                         | CASE NUMBER: 2021-03     |                    | 22 OCT 2009                |
|                                                         | STANDARD: NON-JEDEC      |                    |                            |

# NOTES:

1. CONTROLLING DIMENSION: INCH
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE -H- IS LOCATED AT TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.
4. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 PER SIDE. DIMENSIONS "D AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-.
5. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. DATUMS -A- AND -B- TO BE DETERMINED AT DATUM PLANE -H-.
7. DIMENSION A1 APPLIES WITHIN ZONE "J" ONLY
8. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG. THE DIMENSIONS D1 AND E2 REPRESENT THE VALUES BETWEEN THE TWO OPPOSITE POINTS ALONG THE EDGES OF EXPOSED AREA OF HEAT SLUG.

## STYLE 1:

PIN 1 - DRAIN  
PIN 2 - GATE  
PIN 3 - SOURCE

| INCH                                                    |          |      | MILLIMETER |                    | INCH                     |      |                            | MILLIMETER  |       |
|---------------------------------------------------------|----------|------|------------|--------------------|--------------------------|------|----------------------------|-------------|-------|
| DIM                                                     | MIN      | MAX  | MIN        | MAX                | DIM                      | MIN  | MAX                        | MIN         | MAX   |
| A                                                       | 0.148    | .152 | 3.76       | 3.86               | b                        | .497 | .503                       | 12.62       | 12.78 |
| A1                                                      | .059     | .065 | 1.50       | 1.65               | c1                       | .007 | .011                       | 0.18        | 0.28  |
| D                                                       | .808     | .812 | 20.52      | 20.62              | e1                       | .721 | .729                       | 18.31       | 18.52 |
| D1                                                      | .720     | ---- | 18.29      | ----               | aaa                      | .004 | 0.10                       |             |       |
| E                                                       | .762     | .770 | 19.36      | 19.56              |                          |      |                            |             |       |
| E1                                                      | .390     | .394 | 9.91       | 10.01              |                          |      |                            |             |       |
| E2                                                      | .306     | ---- | 7.77       | ----               |                          |      |                            |             |       |
| E3                                                      | .383     | .387 | 9.73       | 9.83               |                          |      |                            |             |       |
| F                                                       | .025 BSC |      | 0.635 BSC  |                    |                          |      |                            |             |       |
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| TITLE:<br><br>OM780-2<br>STRAIGHT LEAD                  |          |      |            |                    | DOCUMENT NO: 98ASA10831D |      |                            | REV: B      |       |
|                                                         |          |      |            |                    | CASE NUMBER: 2021-03     |      |                            | 22 OCT 2009 |       |
|                                                         |          |      |            |                    | STANDARD: NON-JEDEC      |      |                            |             |       |

## PRODUCT DOCUMENTATION AND SOFTWARE

Refer to the following documents, tools and software to aid your design process.

### Application Notes

- AN1907: Solder Reflow Attach Method for High Power RF Devices in Plastic Packages
- AN1955: Thermal Measurement Methodology of RF Power Amplifiers
- AN3789: Clamping of High Power RF Transistors and RFICs in Over-Molded Plastic Packages

### Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

### Software

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

For Software, do a Part Number search at <http://www.freescale.com>, and select the “Part Number” link. Go to the Software & Tools tab 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                     |
|----------|------------|---------------------------------|
| 0        | Sept. 2010 | • Initial Release of Data Sheet |

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