

# RF Power Field Effect Transistors

## N-Channel Enhancement-Mode Lateral MOSFETs

Designed for W-CDMA and LTE base station applications with frequencies from 2110 to 2170 MHz. Can be used in Class AB and Class C for all typical cellular base station modulation formats.

- Typical Doherty Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Volts,  $I_{DQA} = 150$  mA,  $V_{GSB} = 1.1$  Vdc,  $P_{out} = 16$  Watts Avg., IQ Magnitude Clipping, Channel Bandwidth = 3.84 MHz, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.

| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) |
|-----------|---------------|--------------|-----------------|------------|
| 2110 MHz  | 14.1          | 46.7         | 8.3             | -30.6      |
| 2140 MHz  | 14.5          | 46.2         | 8.2             | -32.1      |
| 2170 MHz  | 14.4          | 45.7         | 8.1             | -33.6      |

- Capable of Handling 10:1 VSWR, @ 32 Vdc, 2140 MHz, 110 Watts CW Output Power (3 dB Input Overdrive from Rated  $P_{out}$ )
- Typical  $P_{out}$  @ 3 dB Compression Point  $\approx 100$  Watts (1)

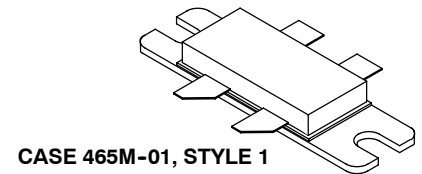
### Features

- Advanced High Performance In-Package Doherty
- Production Tested in a Doherty Configuration
- 100% PAR Tested for Guaranteed Output Power Capability
- Characterized with Large-Signal Load-Pull 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
- RoHS Compliant
- NI-780-4 in Tape and Reel. R3 Suffix = 250 Units, 56 mm Tape Width, 13 inch Reel. For R5 Tape and Reel option, see p. 13.
- NI-780S-4 in Tape and Reel. R3 Suffix = 250 Units, 32 mm Tape Width, 13 inch Reel. For R5 Tape and Reel option, see p. 13.

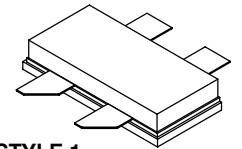
## MRF8HP21080HR3

## MRF8HP21080HSR3

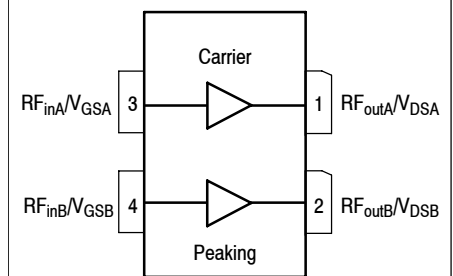
**2110-2170 MHz, 16 W AVG., 28 V**  
**W-CDMA, LTE**  
**LATERAL N-CHANNEL**  
**RF POWER MOSFETs**



**CASE 465M-01, STYLE 1**  
**NI-780-4**  
**MRF8HP21080HR3**



**CASE 465H-02, STYLE 1**  
**NI-780S-4**  
**MRF8HP21080HSR3**



(Top View)

**Figure 1. Pin Connections**

**Table 1. Maximum Ratings**

| Rating                                  | Symbol    | Value       | Unit |
|-----------------------------------------|-----------|-------------|------|
| Drain-Source Voltage                    | $V_{DSS}$ | -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              | $T_C$     | 150         | °C   |
| Operating Junction Temperature (2,3)    | $T_J$     | 225         | °C   |
| CW Operation @ $T_C = 25^\circ\text{C}$ | CW        | 220         | W    |
| Derate above $25^\circ\text{C}$         |           | 3.3         | W/°C |

- $P_{3dB} = P_{avg} + 7.0$  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.
- Continuous use at maximum temperature will affect MTTF.
- MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.

**Table 2. Thermal Characteristics**

| Characteristic                                                                                                                                                                                                                                 | Symbol          | Value (1,2) | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-------------|------|
| Thermal Resistance, Junction to Case<br>Case Temperature 77°C, 16 W CW, 28 Vdc, $I_{DQA} = 150$ mA, $V_{GSB} = 1.1$ Vdc, 2170 MHz<br>Case Temperature 81°C, 80 W CW <sup>(3)</sup> , 28 Vdc, $I_{DQA} = 150$ mA, $V_{GSB} = 1.1$ Vdc, 2170 MHz | $R_{\theta JC}$ | 1.0<br>0.61 | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology                      | Class         |
|---------------------------------------|---------------|
| Human Body Model (per JESD22-A114)    | 1C (Minimum)  |
| Machine Model (per EIA/JESD22-A115)   | A (Minimum)   |
| Charge Device Model (per JESD22-C101) | III (Minimum) |

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

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

**Off Characteristics <sup>(4)</sup>**

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

**On Characteristics - Side A <sup>(4)</sup>**

|                                                                                                |              |     |      |     |
|------------------------------------------------------------------------------------------------|--------------|-----|------|-----|
| Gate Threshold Voltage<br>( $V_{DS} = 10$ Vdc, $I_D = 100$ $\mu$ Adc)                          | $V_{GS(th)}$ | 1.1 | 2.0  | 2.6 |
| Gate Quiescent Voltage<br>( $V_{DD} = 28$ Vdc, $I_{DA} = 150$ mA, Measured in Functional Test) | $V_{GS(Q)}$  | 2.0 | 2.7  | 3.5 |
| Drain-Source On-Voltage<br>( $V_{GS} = 10$ Vdc, $I_D = 0.5$ Adc)                               | $V_{DS(on)}$ | 0.1 | 0.24 | 0.3 |

**On Characteristics - Side B <sup>(4)</sup>**

|                                                                      |              |     |      |     |
|----------------------------------------------------------------------|--------------|-----|------|-----|
| Gate Threshold Voltage<br>( $V_{DS} = 10$ Vdc, $I_D = 75$ $\mu$ Adc) | $V_{GS(th)}$ | 1.2 | 2.0  | 2.7 |
| Drain-Source On-Voltage<br>( $V_{GS} = 10$ Vdc, $I_D = 0.7$ Adc)     | $V_{DS(on)}$ | 0.1 | 0.24 | 0.3 |

**Functional Tests <sup>(5,6)</sup>** (In Freescale Doherty Test Fixture, 50 ohm system)  $V_{DD} = 28$  Vdc,  $I_{DQA} = 150$  mA,  $V_{GSB} = 1.1$  Vdc,  $P_{out} = 16$  W Avg.,  $f = 2170$  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 @  $\pm 5$  MHz Offset.

|                                                          |          |      |       |       |
|----------------------------------------------------------|----------|------|-------|-------|
| Power Gain                                               | $G_{ps}$ | 13.8 | 14.4  | 16.8  |
| Drain Efficiency                                         | $\eta_D$ | 42.4 | 45.7  | —     |
| Output Peak-to-Average Ratio @ 0.01% Probability on CCDF | PAR      | 7.3  | 8.1   | —     |
| Adjacent Channel Power Ratio                             | ACPR     | —    | -33.6 | -28.9 |
| Input Return Loss                                        | IRL      | —    | -17   | -9    |

1. MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.
2. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers*. Go to <http://www.freescale.com/rf>. Select Documentation/Application Notes - AN1955.
3. Exceeds recommended operating conditions. See CW operation data in Maximum Ratings table.
4. Each side of device measured separately.
5. Part internally matched both on input and output.
6. Measurement made with device in a Doherty configuration.

(continued)

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

**Typical Broadband Performance** <sup>(1)</sup> — (In Freescale Doherty Test Fixture, 50 ohm system)  $V_{DD} = 28\text{ Vdc}$ ,  $I_{DQA} = 150\text{ mA}$ ,  $V_{GSB} = 1.1\text{ Vdc}$ ,  $P_{out} = 16\text{ W Avg.}$ , 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.

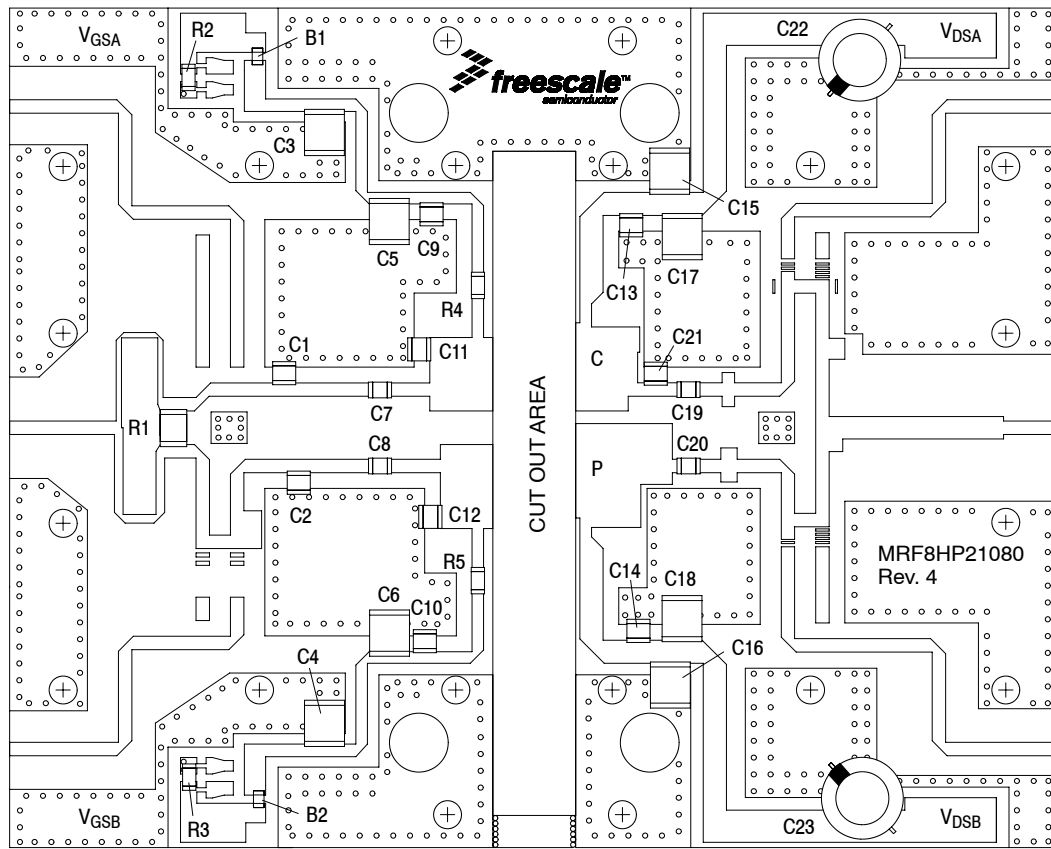
| Frequency | $G_{ps}$<br>(dB) | $\eta_D$<br>(%) | Output PAR<br>(dB) | ACPR<br>(dBc) | IRL<br>(dB) |
|-----------|------------------|-----------------|--------------------|---------------|-------------|
| 2110 MHz  | 14.1             | 46.7            | 8.3                | -30.6         | -17         |
| 2140 MHz  | 14.5             | 46.2            | 8.2                | -32.1         | -17         |
| 2170 MHz  | 14.4             | 45.7            | 8.1                | -33.6         | -18         |

**Typical Performances** <sup>(1)</sup> (In Freescale Doherty Test Fixture, 50 ohm system)  $V_{DD} = 28\text{ Vdc}$ ,  $I_{DQA} = 150\text{ mA}$ ,  $V_{GSB} = 1.1\text{ Vdc}$ , 2110–2170 MHz Bandwidth

| Characteristic                                                                                                                                                                     | Symbol               | Min | Typ   | Max | Unit                 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----|-------|-----|----------------------|
| $P_{out}$ @ 1 dB Compression Point, CW                                                                                                                                             | P1dB                 | —   | 60    | —   | W                    |
| $P_{out}$ @ 3 dB Compression Point <sup>(2)</sup>                                                                                                                                  | P3dB                 | —   | 100   | —   | W                    |
| IMD Symmetry @ 10 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 dB) | IMD <sub>sym</sub>   | —   | 40    | —   | MHz                  |
| VBW Resonance Point<br>(IMD Third Order Intermodulation Inflection Point)                                                                                                          | VBW <sub>res</sub>   | —   | 78    | —   | MHz                  |
| Gain Flatness in 60 MHz Bandwidth @ $P_{out} = 16\text{ W Avg.}$                                                                                                                   | $G_F$                | —   | 0.4   | —   | dB                   |
| Gain Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                                                                                                  | $\Delta G$           | —   | 0.012 | —   | dB/ $^\circ\text{C}$ |
| Output Power Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                                                                                          | $\Delta P1\text{dB}$ | —   | 0.01  | —   | dB/ $^\circ\text{C}$ |

1. Measurement made with device in a Doherty configuration.

2. 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.



\*C7, C8, C19 and C20 are mounted vertically.

**Figure 2. MRF8HP21080HR3(HSR3) Test Circuit Component Layout**

**Table 5. MRF8HP21080HR3(HSR3) Test Circuit Component Designations and Values**

| Part                                    | Description                               | Part Number        | Manufacturer       |
|-----------------------------------------|-------------------------------------------|--------------------|--------------------|
| B1, B2                                  | 30 $\Omega$ Ferrite Beads                 | MPZ2012S300A       | TDK                |
| C1, C2                                  | 1.6 pF Chip Capacitors                    | ATC100B1R6BT500XT  | ATC                |
| C3, C4, C5, C6, C15, C16, C17, C18      | 10 $\mu$ F, 50 V Chip Capacitors          | GRM55DR61H106KA88L | Murata             |
| C7*, C8*, C9, C10, C13, C14, C19*, C20* | 6.8 pF Chip Capacitors                    | ATC100B6R8CT500XT  | ATC                |
| C11                                     | 1.0 pF Chip Capacitor                     | ATC100B1R0BT500XT  | ATC                |
| C12                                     | 1.5 pF Chip Capacitor                     | ATC100B1R5BT500XT  | ATC                |
| C21                                     | 0.5 pF Chip Capacitor                     | ATC100B0R5BT500XT  | ATC                |
| C22, C23                                | 220 $\mu$ F, 50 V Electrolytic Capacitors | 227CKS050M         | Illinois Capacitor |
| R1                                      | 100 $\Omega$ , 4 W Chip Resistor          | CW12010T0100GBK    | ATC                |
| R2, R3                                  | 20 k $\Omega$ , 1/4 W Chip Resistors      | CRCW120620K0JNEA   | Vishay             |
| R4, R5                                  | 3 $\Omega$ , 1/4 W Chip Resistors         | CRCW12063R00FKEA   | Vishay             |
| PCB                                     | 0.030", $\epsilon_r = 3.5$                | R04350             | Rogers             |

## TYPICAL CHARACTERISTICS

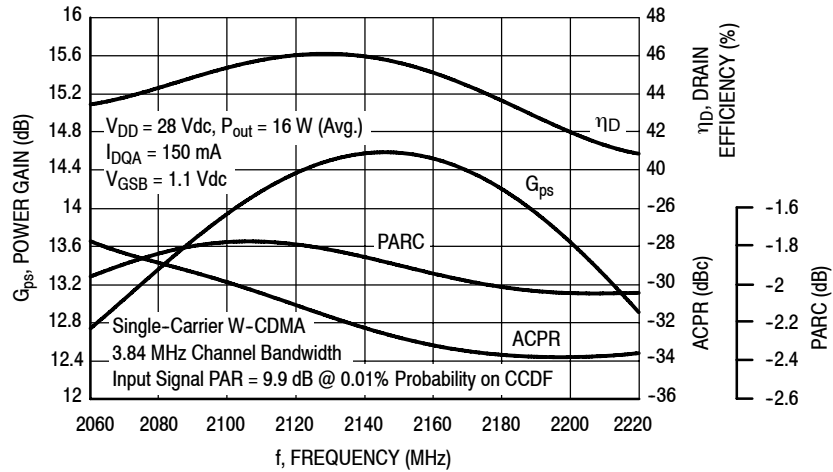


**Figure 3. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 16$  Watts Avg.**

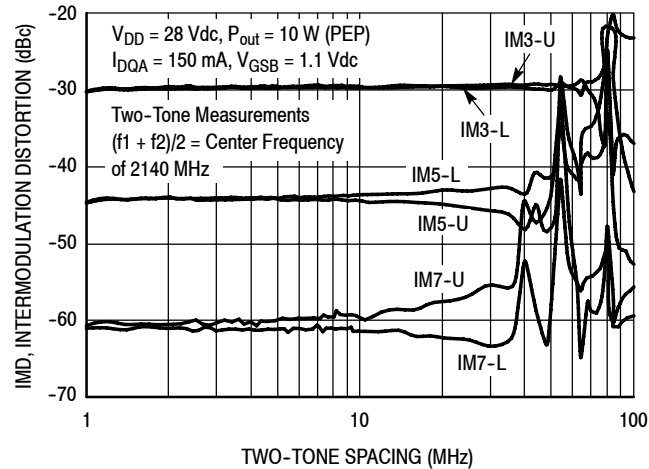


**Figure 4. Intermodulation Distortion Products versus Two-Tone Spacing**

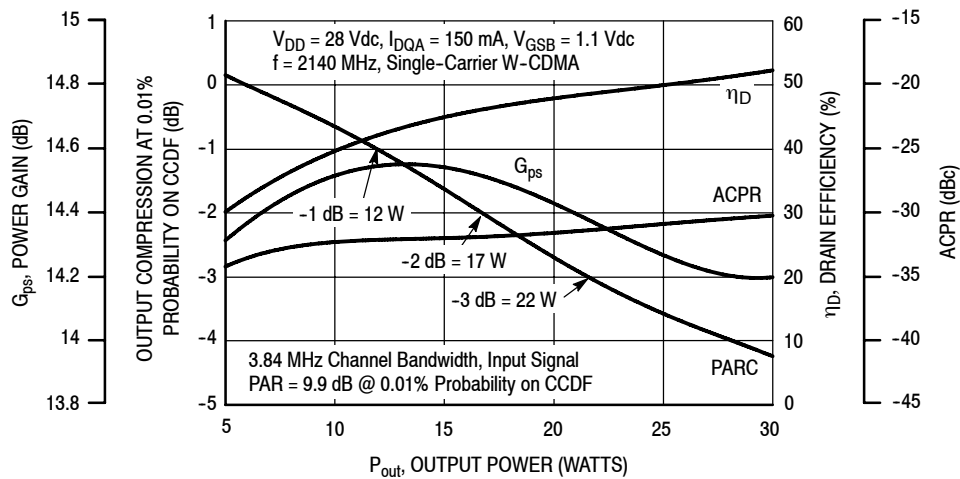


**Figure 5. Output Peak-to-Average Ratio Compression (PARC) versus Output Power**

## TYPICAL CHARACTERISTICS

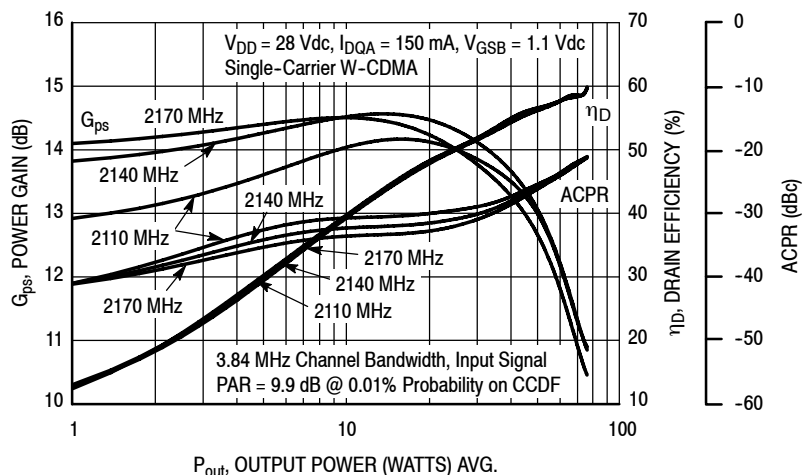


**Figure 6. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**

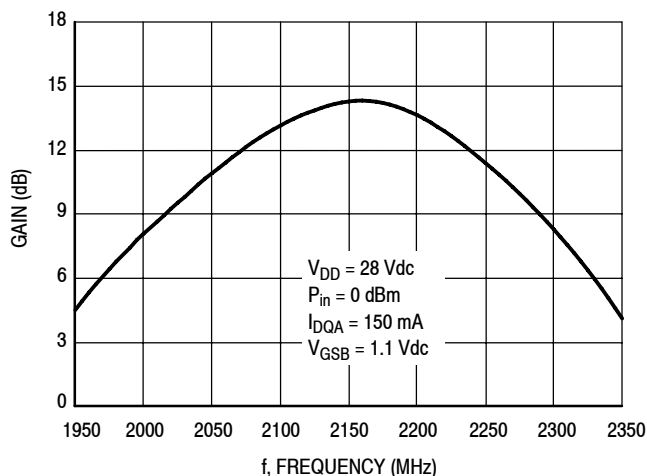


**Figure 7. Broadband Frequency Response**

## W-CDMA TEST SIGNAL

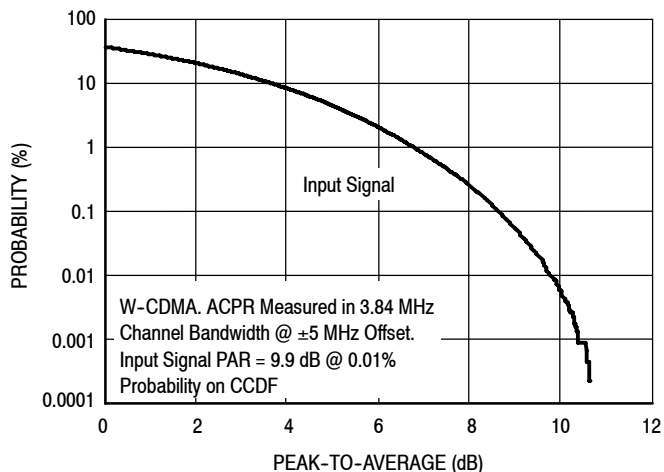


**Figure 8. CCDF W-CDMA IQ Magnitude Clipping, Single-Carrier Test Signal**

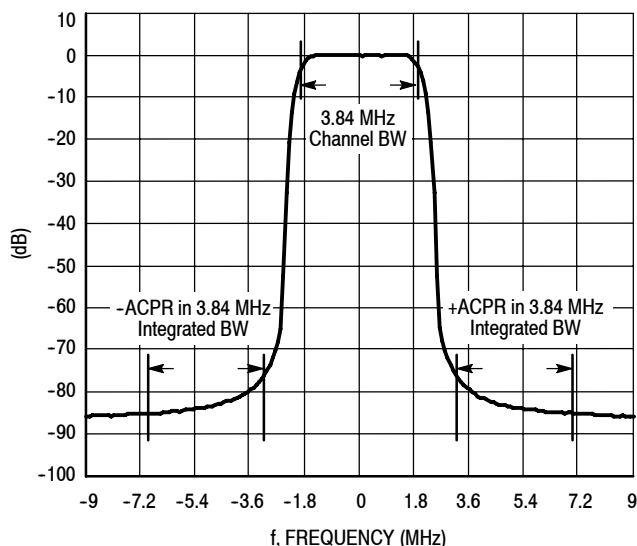


**Figure 9. Single-Carrier W-CDMA Spectrum**

$V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 150 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Max Output Power |     |              |       |     |              |
|------------|-------------------------------------|-----------------------------------------|------------------|-----|--------------|-------|-----|--------------|
|            |                                     |                                         | P1dB             |     |              | P3dB  |     |              |
|            |                                     |                                         | (dBm)            | (W) | $\eta_D$ (%) | (dBm) | (W) | $\eta_D$ (%) |
| 2110       | $6.97 - j14.8$                      | $6.61 - j11.5$                          | 47.2             | 53  | 57.1         | 48.0  | 63  | 57.4         |
| 2140       | $7.61 - j17.9$                      | $6.33 - j12.0$                          | 47.1             | 51  | 55.7         | 48.0  | 63  | 56.0         |
| 2170       | $6.68 - j18.7$                      | $6.41 - j11.2$                          | 46.9             | 49  | 54.5         | 47.9  | 62  | 56.1         |

(1) Load impedance for optimum P1dB power.

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

$Z_{\text{load}}$  = Impedance as measured from drain contact to ground.

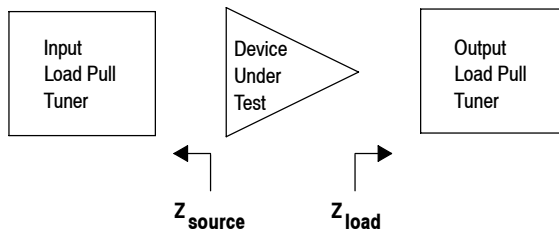


Figure 10. Carrier Side Load Pull Performance — Maximum P1dB Tuning

$V_{DD} = 28 \text{ Vdc}$ ,  $I_{DQA} = 150 \text{ mA}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Max Drain Efficiency |     |              |       |     |              |
|------------|-------------------------------------|-----------------------------------------|----------------------|-----|--------------|-------|-----|--------------|
|            |                                     |                                         | P1dB                 |     |              | P3dB  |     |              |
|            |                                     |                                         | (dBm)                | (W) | $\eta_D$ (%) | (dBm) | (W) | $\eta_D$ (%) |
| 2110       | $6.97 - j14.8$                      | $14.3 - j9.22$                          | 45.6                 | 36  | 65.1         | 46.7  | 47  | 65.9         |
| 2140       | $7.61 - j17.9$                      | $14.4 - j9.52$                          | 45.5                 | 36  | 64.2         | 46.7  | 47  | 65.1         |
| 2170       | $6.68 - j18.7$                      | $13.8 - j8.09$                          | 45.6                 | 36  | 63.9         | 46.6  | 46  | 65.9         |

(1) Load impedance for optimum P1dB efficiency.

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

$Z_{\text{load}}$  = Impedance as measured from drain contact to ground.

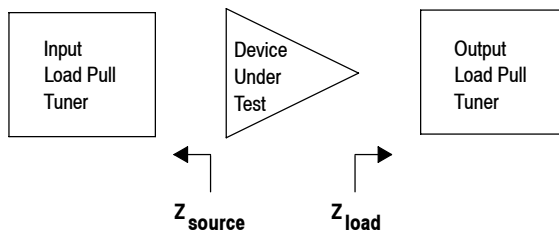


Figure 11. Carrier Side Load Pull Performance — Maximum Efficiency Tuning

$V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.1 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Max Output Power |     |              |       |     |              |
|------------|-------------------------------------|-----------------------------------------|------------------|-----|--------------|-------|-----|--------------|
|            |                                     |                                         | P1dB             |     |              | P3dB  |     |              |
|            |                                     |                                         | (dBm)            | (W) | $\eta_D$ (%) | (dBm) | (W) | $\eta_D$ (%) |
| 2110       | 4.73 - j9.34                        | 3.70 - j6.50                            | 48.6             | 72  | 60.2         | 49.3  | 85  | 61.1         |
| 2140       | 6.50 - j11.3                        | 3.39 - j6.80                            | 48.7             | 74  | 59.7         | 49.4  | 87  | 59.5         |
| 2170       | 7.08 - j13.3                        | 3.30 - j7.10                            | 48.6             | 72  | 59.1         | 49.4  | 87  | 59.0         |

(1) Load impedance for optimum P1dB power.

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

$Z_{\text{load}}$  = Impedance as measured from drain contact to ground.

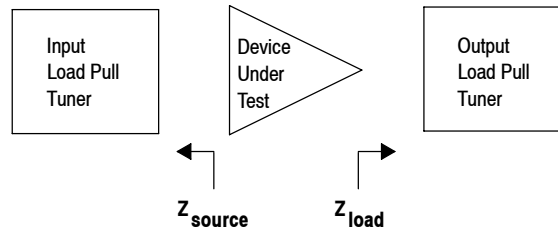


**Figure 12. Peaking Side Load Pull Performance — Maximum P1dB Tuning**

$V_{DD} = 28 \text{ Vdc}$ ,  $V_{GSB} = 1.1 \text{ Vdc}$ , Pulsed CW, 10  $\mu\text{sec}(\text{on})$ , 10% Duty Cycle

| f<br>(MHz) | $Z_{\text{source}}$<br>( $\Omega$ ) | $Z_{\text{load}}^{(1)}$<br>( $\Omega$ ) | Max Drain Efficiency |     |              |       |     |              |
|------------|-------------------------------------|-----------------------------------------|----------------------|-----|--------------|-------|-----|--------------|
|            |                                     |                                         | P1dB                 |     |              | P3dB  |     |              |
|            |                                     |                                         | (dBm)                | (W) | $\eta_D$ (%) | (dBm) | (W) | $\eta_D$ (%) |
| 2110       | 4.73 - j9.34                        | 8.22 - j9.10                            | 46.7                 | 47  | 70.6         | 47.5  | 56  | 70.5         |
| 2140       | 6.50 - j11.3                        | 9.00 - j8.20                            | 46.6                 | 46  | 71.0         | 47.4  | 55  | 70.4         |
| 2170       | 7.08 - j13.3                        | 9.10 - j7.55                            | 46.4                 | 44  | 69.6         | 47.9  | 62  | 69.0         |

(1) Load impedance for optimum P1dB efficiency.

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

$Z_{\text{load}}$  = Impedance as measured from drain contact to ground.

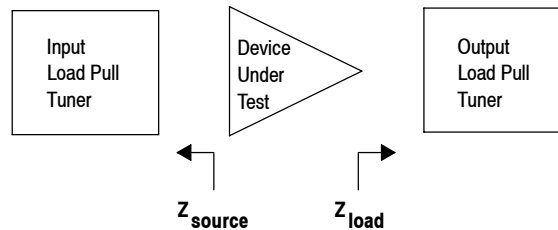
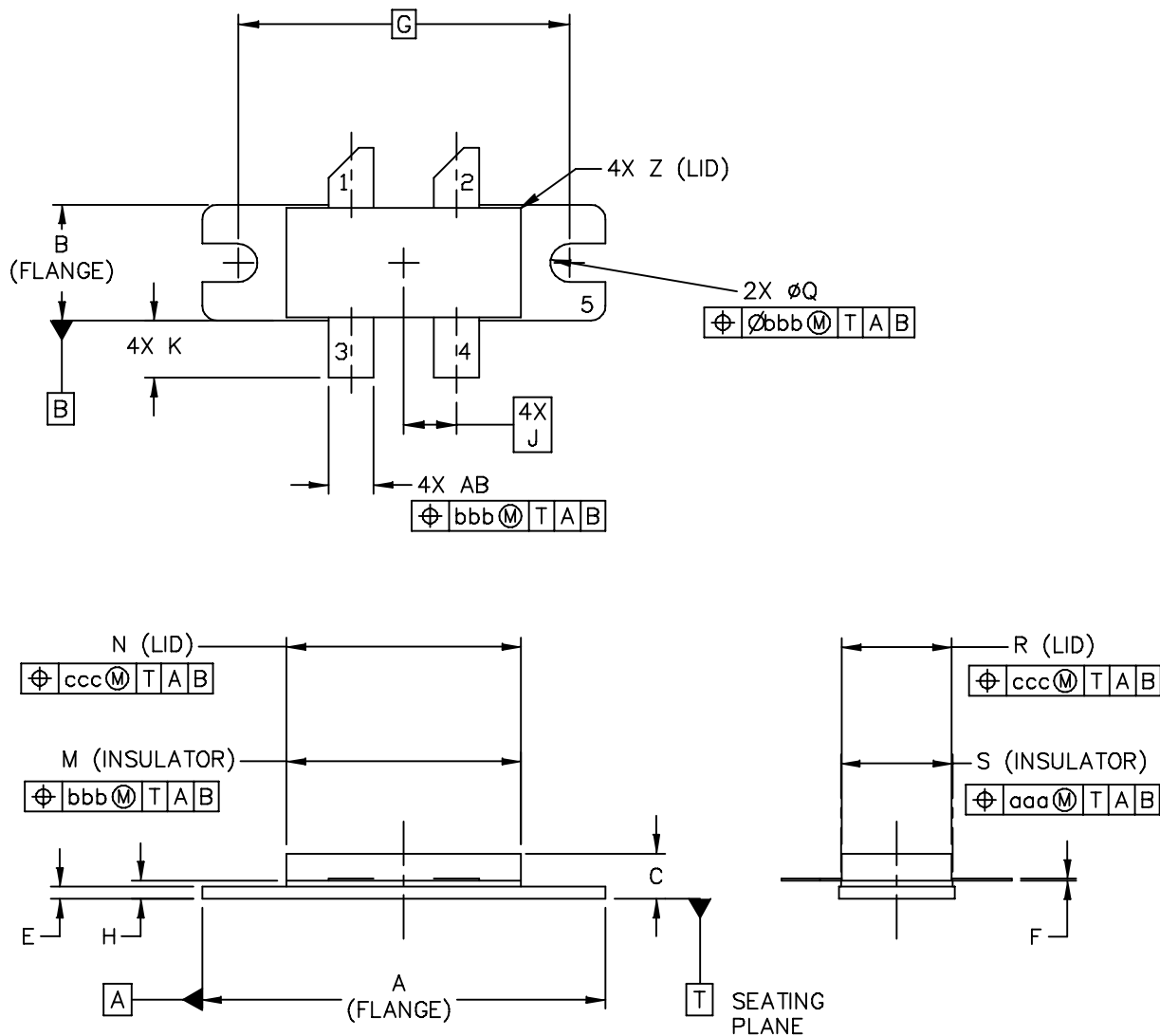


**Figure 13. Peaking Side Load Pull Performance — Maximum Efficiency Tuning**

# PACKAGE DIMENSIONS



|                                                         |                          |                            |  |
|---------------------------------------------------------|--------------------------|----------------------------|--|
| © FREESCALE SEMICONDUCTOR, INC.<br>ALL RIGHTS RESERVED. | MECHANICAL OUTLINE       | PRINT VERSION NOT TO SCALE |  |
| TITLE:<br><br>NI 780-4                                  | DOCUMENT NO: 98ASA10793D | REV: 0                     |  |
|                                                         | CASE NUMBER: 465M-01     | 27 MAR 2007                |  |
|                                                         | STANDARD: NON-JEDEC      |                            |  |

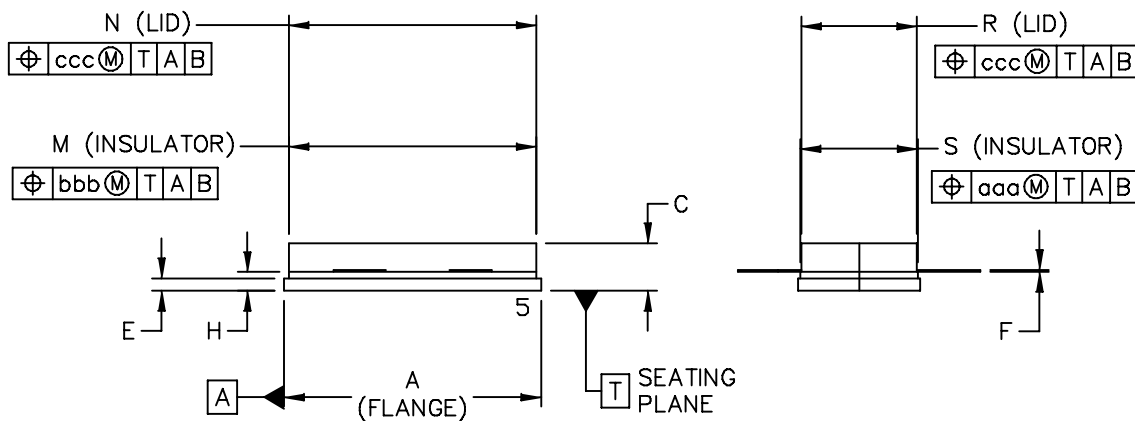
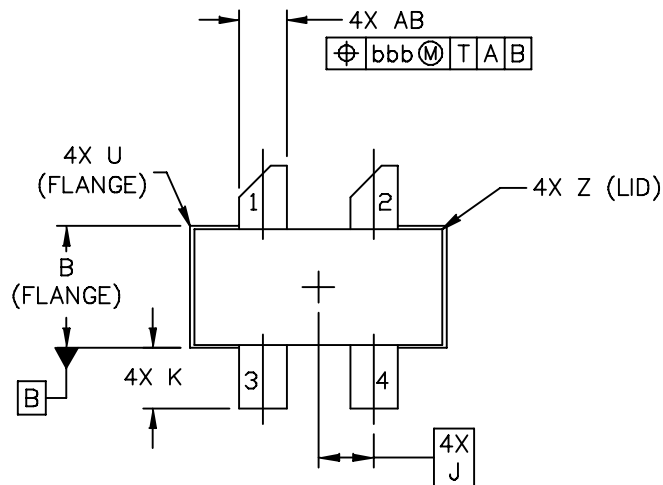
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION H IS MEASURED .030 (0.762) AWAY FROM PACKAGE BODY.

STYLE 1:

- PIN 1. DRAIN  
2. DRAIN  
3. GATE  
4. GATE  
5. SOURCE

| INCH                                                    |           |       | MILLIMETER         |       | INCH                     |                            |      | MILLIMETER  |      |
|---------------------------------------------------------|-----------|-------|--------------------|-------|--------------------------|----------------------------|------|-------------|------|
| DIM                                                     | MIN       | MAX   | MIN                | MAX   | DIM                      | MIN                        | MAX  | MIN         | MAX  |
| A                                                       | 1.335     | 1.345 | 33.91              | 34.16 | R                        | .365                       | .375 | 9.27        | 9.53 |
| B                                                       | .380      | .390  | 9.65               | 9.91  | S                        | .365                       | .375 | 9.27        | 9.52 |
| C                                                       | .125      | .170  | 3.18               | 4.32  | U                        |                            | .040 |             | 1.02 |
| E                                                       | .035      | .045  | 0.89               | 1.14  | Z                        |                            | .030 |             | 0.76 |
| F                                                       | .003      | .006  | 0.08               | 0.15  | AB                       | .145                       | .155 | 3.68        | 3.94 |
| G                                                       | 1.100 BSC |       | 27.94 BSC          |       |                          |                            |      |             |      |
| H                                                       | .057      | .067  | 1.45               | 1.7   | aaa                      | .005                       |      | 0.127       |      |
| J                                                       | .175 BSC  |       | 4.44 BSC           |       | bbb                      | .010                       |      | 0.254       |      |
| K                                                       | .170      | .210  | 4.32               | 5.33  | ccc                      | .015                       |      | 0.381       |      |
| M                                                       | .774      | .786  | 19.61              | 20.02 |                          |                            |      |             |      |
| N                                                       | .772      | .788  | 19.61              | 20.02 |                          |                            |      |             |      |
| Q                                                       | ø.118     | ø.138 | ø3                 | ø3.51 |                          |                            |      |             |      |
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|                                                         |  |                          |                            |
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|                                                         |  | CASE NUMBER: 465H-02     | 27 MAR 2007                |
|                                                         |  | STANDARD: NON-JEDEC      |                            |

# NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DELETED
4. DIMENSION H IS MEASURED .030 (0.762) AWAY FROM PACKAGE BODY.

## STYLE 1:

- PIN 1. DRAIN  
2. DRAIN  
3. GATE  
4. GATE  
5. SOURCE

| INCH                                                    |          |      | MILLIMETER         |       | INCH                     |                            |      | MILLIMETER  |        |
|---------------------------------------------------------|----------|------|--------------------|-------|--------------------------|----------------------------|------|-------------|--------|
| DIM                                                     | MIN      | MAX  | MIN                | MAX   | DIM                      | MIN                        | MAX  | MIN         | MAX    |
| A                                                       | .805     | .815 | 20.45              | 20.7  | U                        |                            | .040 |             | 1.02   |
| B                                                       | .380     | .390 | 9.65               | 9.91  | Z                        |                            | .030 |             | 0.76   |
| C                                                       | .125     | .170 | 3.18               | 4.32  | AB                       | .145                       | .155 | 3.68        | – 3.94 |
| E                                                       | .035     | .045 | 0.89               | 1.14  |                          |                            |      |             |        |
| F                                                       | .003     | .006 | 0.08               | 0.15  | aaa                      |                            | .005 |             | 0.127  |
| H                                                       | .057     | .067 | 1.45               | 1.7   | bbb                      |                            | .010 |             | 0.254  |
| J                                                       | .175 BSC |      | 4.44 BSC           |       | ccc                      |                            | .015 |             | 0.381  |
| K                                                       | .170     | .210 | 4.32               | 5.33  |                          |                            |      |             |        |
| M                                                       | .774     | .786 | 19.61              | 20.02 |                          |                            |      |             |        |
| N                                                       | .772     | .788 | 19.61              | 20.02 |                          |                            |      |             |        |
| R                                                       | .365     | .375 | 9.27               | 9.53  |                          |                            |      |             |        |
| S                                                       | .365     | .375 | 9.27               | 9.52  |                          |                            |      |             |        |
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|                                                         |          |      |                    |       | CASE NUMBER: 465H-02     |                            |      | 27 MAR 2007 |        |
|                                                         |          |      |                    |       | STANDARD: NON-JEDEC      |                            |      |             |        |

## PRODUCT DOCUMENTATION AND SOFTWARE

Refer to the following documents and software 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

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.

## R5 TAPE AND REEL OPTION

R5 Suffix = 50 Units, 56 mm Tape Width, 13 inch Reel.

The R5 tape and reel option for MRF8HP21080H and MRF8HP21080HS parts will be available for 2 years after release of MRF8HP21080H and MRF8HP21080HS. Freescale Semiconductor, Inc. reserves the right to limit the quantities that will be delivered in the R5 tape and reel option. At the end of the 2 year period customers who have purchased these devices in the R5 tape and reel option will be offered MRF8HP21080H and MRF8HP21080HS in the R3 tape and reel option.

## REVISION HISTORY

The following table summarizes revisions to this document.

| Revision | Date      | Description                     |
|----------|-----------|---------------------------------|
| 0        | June 2011 | • Initial Release of Data Sheet |

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