Document Number: MRF13750H
Rev. 1, 01/2018

√RoHS

# RF Power LDMOS Transistors

## N-Channel Enhancement-Mode Lateral MOSFETs

**MRF13750H**
**MRF13750HS**

These 750 W CW transistors are designed for industrial, scientific and medical (ISM) applications in the 700 to 1300 MHz frequency range. The transistors are capable of CW or pulse power in narrowband operation.

**Typical Performance:** $V_{DD}$ = 50 Vdc

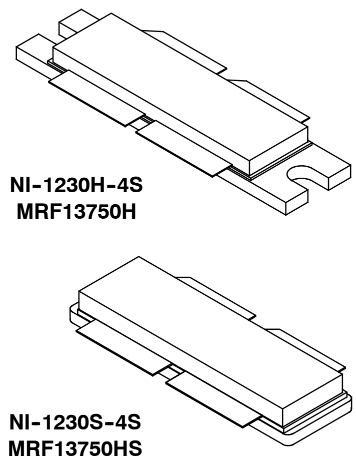
| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 915 (1) | CW | 750 | 19.3 | 67.1 |
| 915 (2) | Pulse (100 μsec, 10% Duty Cycle) | 850 | 20.5 | 69.2 |
| 1300 (3) | CW | 700 | 17.2 | 56.0 |

**Load Mismatch/Ruggedness**

| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage | Result |
|---|---|---|---|---|---|
| 915 (2) | Pulse (100 μsec, 10% Duty Cycle) | > 10:1 at all Phase Angles | 15.9 Peak (3 dB Overdrive) | 50 | No Device Degradation |

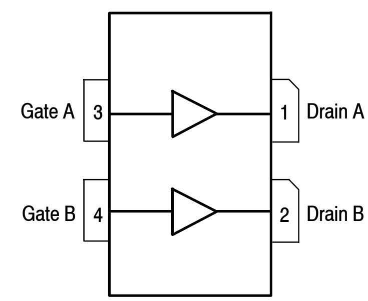
1. Measured in 915 MHz narrowband reference circuit (page 5).
2. Measured in 915 MHz narrowband production test fixture (page 11).
3. Measured in 1300 MHz narrowband reference circuit (page 8).

**700–1300 MHz, 750 W CW, 50 V**
**RF POWER LDMOS TRANSISTORS**



**NI-1230H-4S**
**MRF13750H**

**NI-1230S-4S**
**MRF13750HS**




(Top View)

Note: The backside of the package is the source terminal for the transistor.

**Figure 1. Pin Connections**

### Features

- Internally input pre-matched for ease of use
- Device can be used single-ended or in a push-pull configuration
- Characterized for 30 to 50 V
- Suitable for linear applications with appropriate biasing
- Integrated ESD protection
- Recommended driver: MRFE6VS25GN (25 W)
- Included in NXP product longevity program with assured supply for a minimum of 15 years after launch

### Typical Applications

- 915 MHz industrial heating/welding systems
- 1300 MHz particle accelerators

**Table 1. Maximum Ratings**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | –0.5, +105 | Vdc |
| Gate-Source Voltage | $V_{GS}$ | –6.0, +10 | Vdc |
| Operating Voltage | $V_{DD}$ | 55, +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 |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 1333<br>6.67 | W<br>W/°C |

**Table 2. Thermal Characteristics**

| Characteristic | Symbol | Value (2,3) | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case<br>CW: Case Temperature 82°C, 700 W CW, 50 Vdc, $I_{DQ(A+B)}$ = 150 mA, 915 MHz | $R_{\theta JC}$ | 0.15 | °C/W |
| Thermal Impedance, Junction to Case<br>Pulse: Case Temperature 76°C, 850 W Peak, 100 μsec Pulse Width,<br>10% Duty Cycle, 50 Vdc, $I_{DQ(A+B)}$ = 200 mA, 915 MHz | $Z_{\theta JC}$ | 0.014 | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology | Class |
|---|---|
| Human Body Model (per JESD22-A114) | 2, passes 2500 V |
| Charge Device Model (per JESD22-C101) | C3, passes 1200 V |

**Table 4. Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Off Characteristics (4)** | | | | | |
| Gate-Source Leakage Current<br>($V_{GS}$ = 5 Vdc, $V_{DS}$ = 0 Vdc) | $I_{GSS}$ | — | — | 1 | μAdc |
| Drain-Source Breakdown Voltage<br>($V_{GS}$ = 0 Vdc, $I_D$ = 10 μA) | $V_{(BR)DSS}$ | 105 | — | — | Vdc |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 55 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 1 | μAdc |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 105 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 10 | μAdc |
| **On Characteristics** | | | | | |
| Gate Threshold Voltage (4)<br>($V_{DS}$ = 10 Vdc, $I_D$ = 275 μAdc) | $V_{GS(th)}$ | 1.3 | 1.72 | 2.3 | Vdc |
| Gate Quiescent Voltage<br>($V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 200 mAdc, Measured in Functional Test) | $V_{GS(Q)}$ | 1.7 | 2.2 | 2.7 | Vdc |
| Drain-Source On-Voltage (4)<br>($V_{GS}$ = 10 Vdc, $I_D$ = 2.8 Adc) | $V_{DS(on)}$ | 0.1 | 0.23 | 0.6 | Vdc |
| **Dynamic Characteristics (4,5)** | | | | | |
| Reverse Transfer Capacitance<br>($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = 0 Vdc) | $C_{rss}$ | — | 1.94 | — | pF |
| Output Capacitance<br>($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = 0 Vdc) | $C_{oss}$ | — | 63.8 | — | pF |

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at http://www.nxp.com/RF/calculators.
3. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers.* Go to http://www.nxp.com/RF and search for AN1955.
4. Each side of device measured separately.
5. Part internally input pre-matched.

(continued)

**Table 4. Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted) **(continued)**

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Functional Tests** (In NXP Narrowband Production Test Fixture, 50 ohm system) $V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 200 mA, $P_{out}$ = 850 W Peak (85 W Avg.), f = 915 MHz, 100 μsec Pulse Width, 10% Duty Cycle | | | | | |
| Power Gain | $G_{ps}$ | 19.5 | 20.5 | 21.5 | dB |
| Drain Efficiency | $\eta_D$ | 66.0 | 69.2 | — | % |

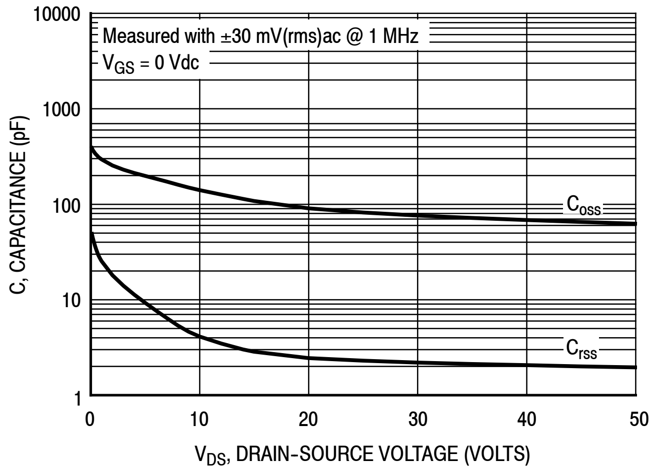
**Table 5. Load Mismatch/Ruggedness** (In NXP Narrowband Production Test Fixture, 50 ohm system) $I_{DQ(A+B)}$ = 200 mA

| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage, $V_{DD}$ | Result |
|---|---|---|---|---|---|
| 915 | Pulse (100 μsec, 10% Duty Cycle) | > 10:1 at all Phase Angles | 15.9 Peak (3 dB Overdrive) | 50 | No Device Degradation |

**Table 6. Ordering Information**

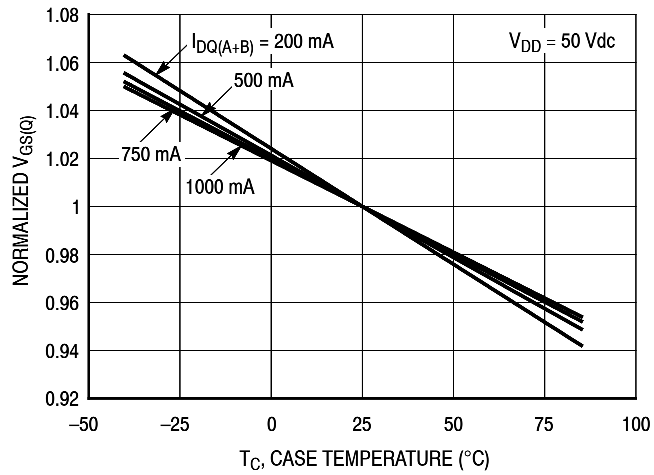
| Device | Tape and Reel Information | Package |
|---|---|---|
| MRF13750HR5 | R5 Suffix = 50 Units, 56 mm Tape Width, 13-inch Reel | NI-1230H-4S |
| MRF13750HSR5 | | NI-1230S-4S |

## TYPICAL CHARACTERISTICS



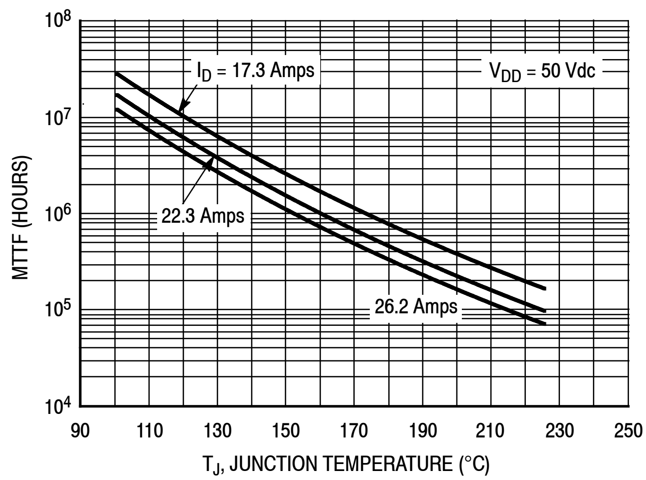

**Note:** Each side of device measured separately.

**Figure 2. Capacitance versus Drain-Source Voltage**




| $I_{DQ}$ (mA) | Slope (mV/°C) |
|---|---|
| 200 | –2.168 |
| 500 | –1.992 |
| 750 | –1.903 |
| 1000 | –1.854 |

**Figure 3. Normalized $V_{GS}$ versus Quiescent Current and Case Temperature**




**Note:** MTTF value represents the total cumulative operating time under indicated test conditions.

MTTF calculator available at http:/www.nxp.com/RF/calculators.

**Figure 4. MTTF versus Junction Temperature – CW**

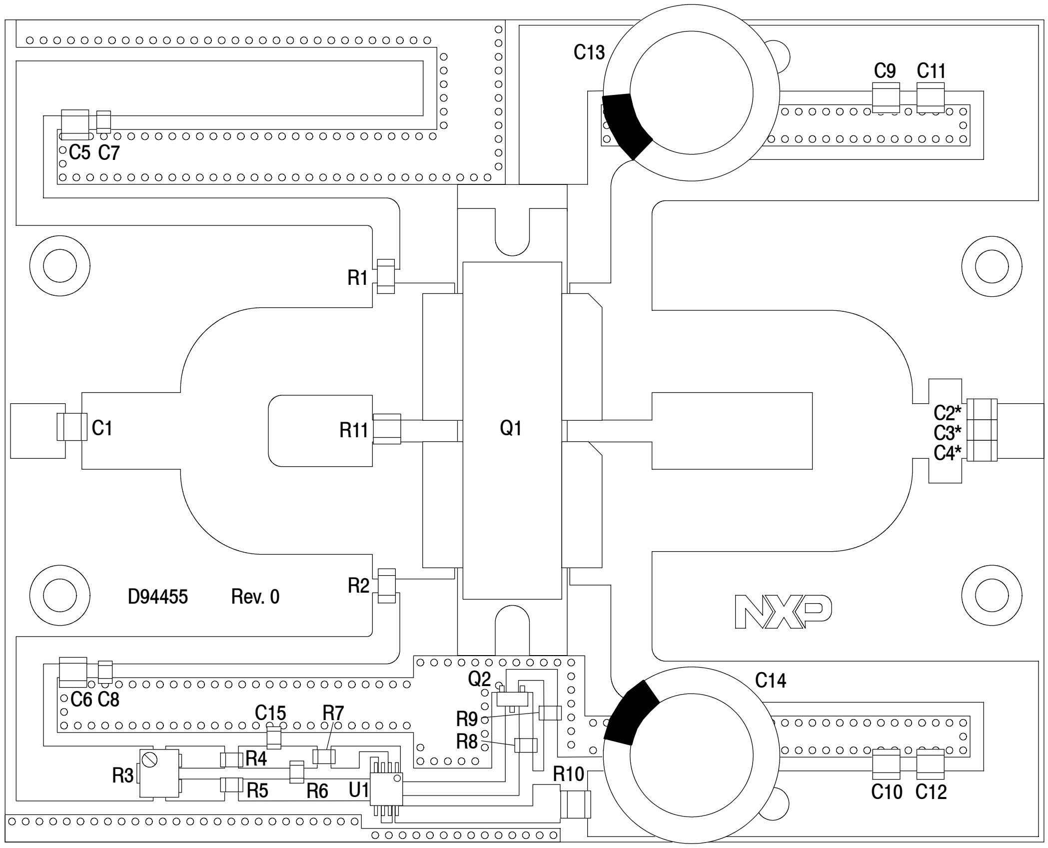
## 915 MHz NARROWBAND REFERENCE CIRCUIT – 3.0″ × 3.8″ (7.6 cm × 9.7 cm)

**Table 7. 915 MHz Narrowband Performance** (In NXP Reference Circuit, 50 ohm system)

$V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 150 mA, $P_{in}$ = 8.8 W

| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 915 | CW | 750 | 19.3 | 67.1 |

## 915 MHz NARROWBAND REFERENCE CIRCUIT – 3.0″ × 3.8″ (7.6 cm × 9.7 cm)

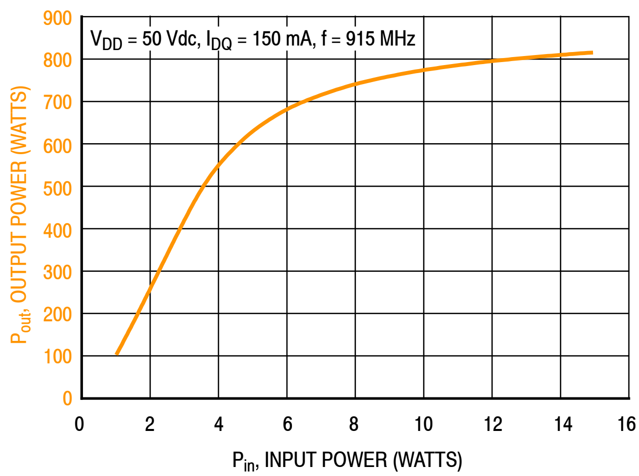



*C2, C3 and C4 are mounted vertically.

**Figure 5. MRF13750H Narrowband Reference Circuit Component Layout – 915 MHz**

**Table 8. MRF13750H Narrowband Reference Circuit Component Designations and Values – 915 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1, C2, C3, C4, C5, C6, C11, C12 | 47 pF Chip Capacitor | ATC100B470JT500XT | ATC |
| C7, C8, C15 | 1 μF Chip Capacitor | GRM21BR71H105KA12L | Murata |
| C9, C10 | 1000 pF Chip Capacitor | ATC100B102JT50XT | ATC |
| C13, C14 | 470 μF, 100 V Electrolytic Capacitor | MCGPR100V477M16X32-RH | Multicomp |
| Q1 | RF Power LDMOS Transistor | MRF13750H | NXP |
| Q2 | NPN Bipolar Transistor | BC847ALT1G | ON Semiconductor |
| R1, R2 | 10 Ω, 1/4 W Chip Resistor | CRCW120610R0JNEA | Vishay |
| R3 | 5 kΩ Multi-turn Cermet Trimmer Potentiometer | 3224W-1-502E | Bourns |
| R4 | 20 kΩ, 1/10 W Chip Resistor | RR1220P-203-B-T5 | Susumu |
| R5 | 4.7 kΩ, 1/10 W Chip Resistor | RR1220P-472-D | Susumu |
| R6, R8 | 1.2 kΩ, 1/8 W Chip Resistor | CRCW08051K20FKEA | Vishay |
| R7 | 10 Ω, 1/8 W Chip Resistor | CRCW080510R0FKEA | Vishay |
| R9 | 2.2 kΩ, 1/8 W Chip Resistor | CRCW08052K20JNEA | Vishay |
| R10 | 4.7 kΩ, 1/2 W Chip Resistor | CRCW12104K70FKEA | Vishay |
| R11 | 2 Ω, 1/2 W Chip Resistor | ERJ-14YJ2R0U | Panasonic |
| U1 | Voltage Regulator 5 V, Micro8 | LP2951ACDMR2G | ON Semiconductor |
| PCB | Rogers TC600, 0.025”, $\varepsilon_r$ = 6.15 | D94455 | MTL |




| f (MHz) | P1dB (W) | P3dB (W) |
|---|---|---|
| 915 | 690 | 800 |

**Figure 6. CW Output Power versus Input Power**

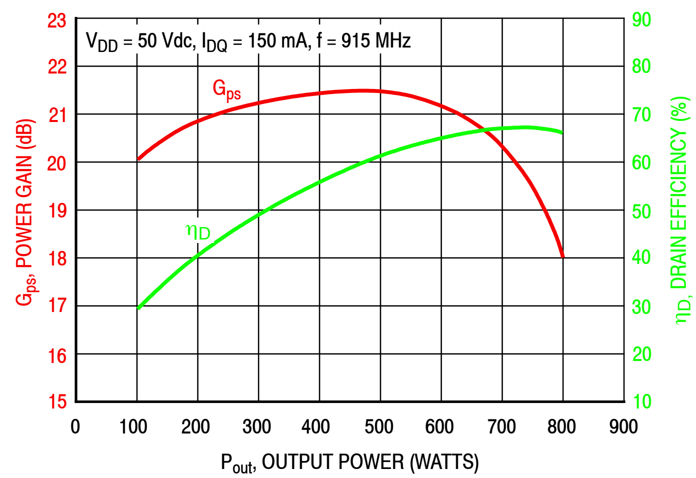



**Figure 7. Power Gain and Drain Efficiency versus CW Output Power**

| f MHz | $Z_{source}$ Ω | $Z_{load}$ Ω |
|---|---|---|
| 915 | 0.58 + j0.24 | 0.59 + j1.19 |

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

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

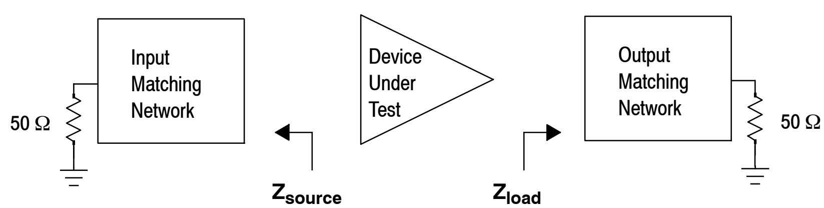



**Figure 8. Narrowband Series Equivalent Source and Load Impedance – 915 MHz**

## 1300 MHz NARROWBAND REFERENCE CIRCUIT – 3.0″ × 3.9″ (7.6 cm × 9.9 cm)

**Table 9. 1300 MHz Narrowband Performance** (In NXP Reference Circuit, 50 ohm system)
$V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 150 mA, $P_{in}$ = 11 W

| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 1300 | CW | 700 | 17.2 | 56.0 |

1300 MHz NARROWBAND REFERENCE CIRCUIT – 3.0″ × 3.9″ (7.6 cm × 9.9 cm)

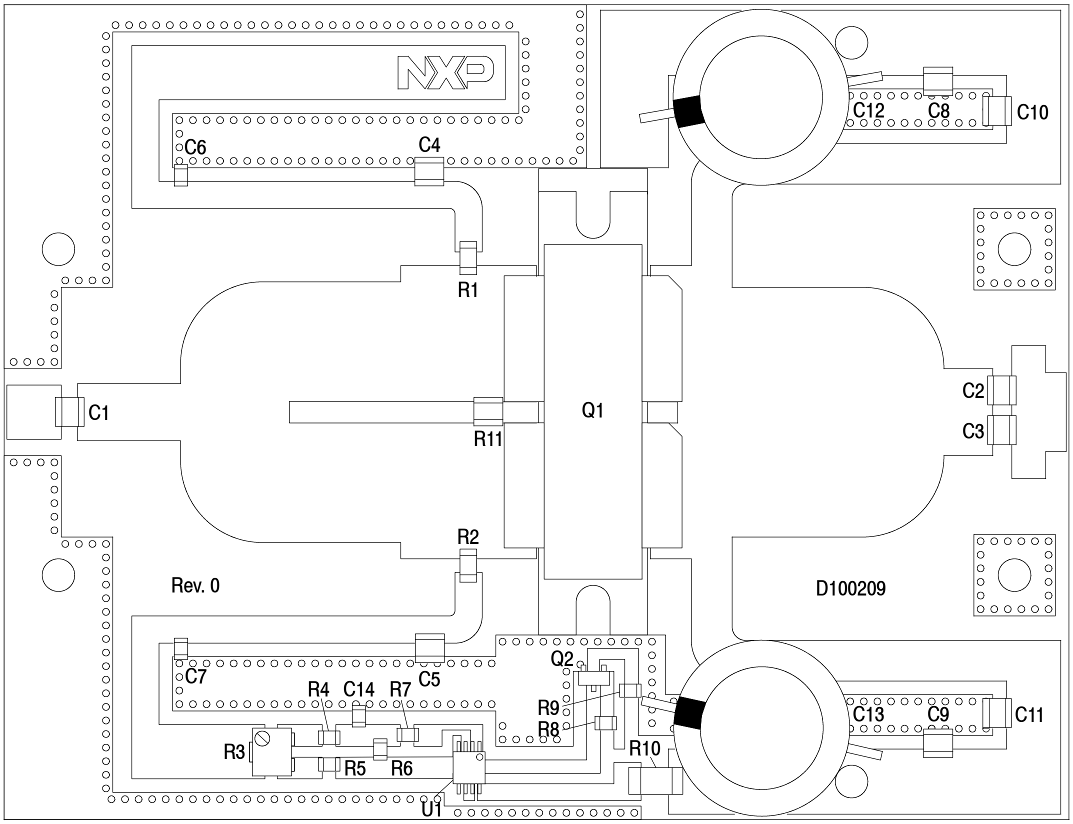
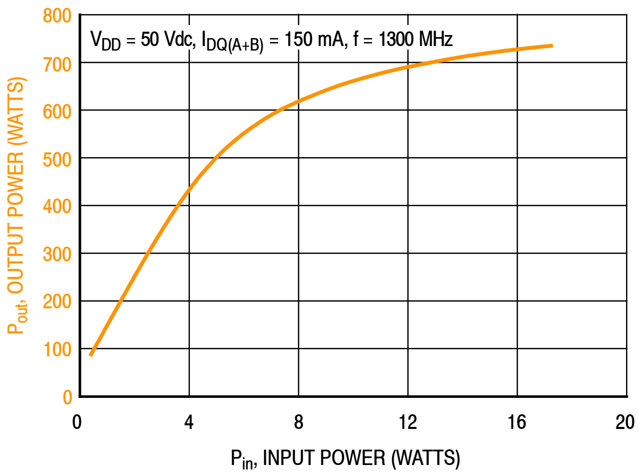



**Figure 9. MRF13750H Narrowband Reference Circuit Component Layout – 1300 MHz**

**Table 10. MRF13750H Narrowband Reference Circuit Component Designations and Values – 1300 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1, C4, C5, C10, C11 | 24 pF Chip Capacitor | ATC100B240JT500XT | ATC |
| C2, C3 | 18 pF Chip Capacitor | ATC100B180JT500XT | ATC |
| C6, C7, C14 | 1 μF Chip Capacitor | GRM21BR71H105KA12L | Murata |
| C8, C9 | 1000 pF Chip Capacitor | ATC100B102JT50XT | ATC |
| C12, C13 | 470 μF, 100 V Electrolytic Capacitor | MCGPR100V477M16X32-RH | Multicomp |
| R1, R2 | 10 Ω, 1/4 W Chip Resistor | CRCW120610R0JNEA | Vishay |
| R3 | 5 kΩ Multi-turn Cermet Trimmer Potentiometer | 3224W-1-502E | Bourns |
| R4 | 20 kΩ, 1/8 W Chip Resistor | CRCW080520K0FKEA | Vishay |
| R5 | 4.7 kΩ, 1/8 W Chip Resistor | CRCW08054K70FKEA | Vishay |
| R6, R8 | 1.2 kΩ, 1/8 W Chip Resistor | CRCW08051K20FKEA | Vishay |
| R7 | 10 Ω, 1/8 W Chip Resistor | CRCW080510R0FKEA | Vishay |
| R9 | 2.2 kΩ, 1/8 W Chip Resistor | CRCW08052K20JNEA | Vishay |
| R10 | 4.7 kΩ, 1/2 W Chip Resistor | CRCW12104K70FKEA | Vishay |
| R11 | 3.3 Ω, 1/2 W Chip Resistor | ERJ-14YJ3R3U | Panasonic |
| Q1 | RF Power LDMOS Transistor | MRF13750H | NXP |
| Q2 | NPN Bipolar Transistor | BC847ALT1G | ON Semiconductor |
| U1 | Voltage Regulator 5 V, Micro8 | LP2951ACDMR2G | ON Semiconductor |
| PCB | Arlon TC350, 0.020″, $\varepsilon_r$ = 3.5 | D100209 | MTL |

# TYPICAL CHARACTERISTICS – 1300 MHz NARROWBAND REFERENCE CIRCUIT




| f (MHz) | P1dB (W) | P3dB (W) |
|---|---|---|
| 1300 | 600 | 710 |

**Figure 10. CW Output Power versus Input Power**

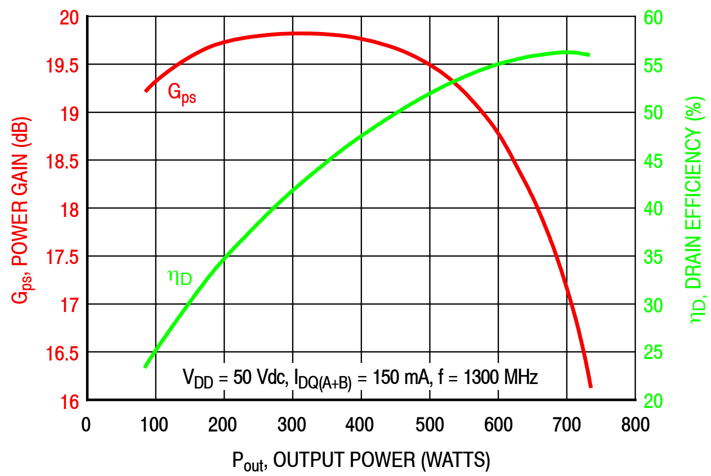



**Figure 11. Power Gain and Drain Efficiency versus CW Output Power**

| f MHz | $Z_{source}$ Ω | $Z_{load}$ Ω |
|---|---|---|
| 1300 | 0.64 + j1.92 | 0.39 + j0.92 |

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

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

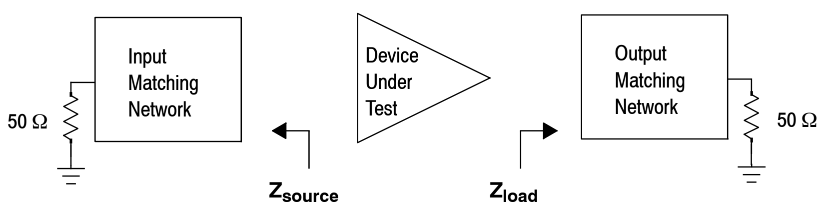
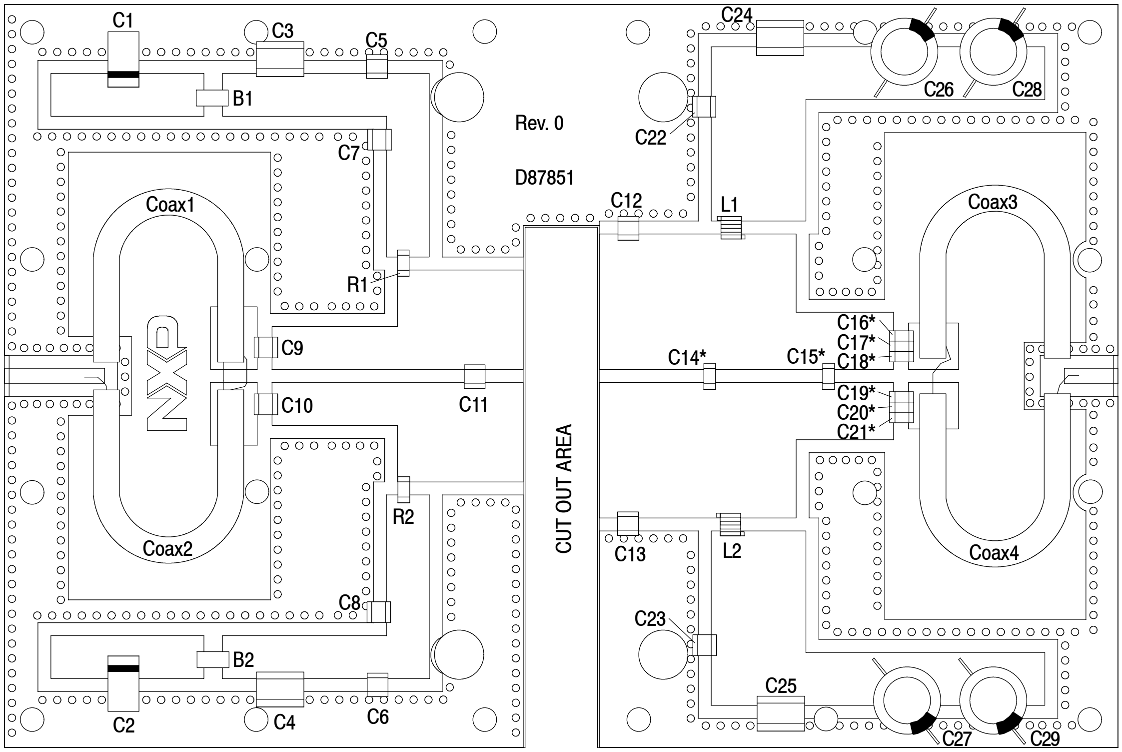



**Figure 12. Narrowband Series Equivalent Source and Load Impedance – 1300 MHz**

## 915 MHz NARROWBAND PRODUCTION TEST FIXTURE – 4.0″ × 6.0″ (10.2 cm × 15.2 cm)




*C14, C15, C16, C17, C18, C19, C20 and C21 are mounted vertically.

**Figure 13. MRF13750H Narrowband Production Test Fixture Component Layout – 915 MHz**

**Table 11. MRF13750H Narrowband Production Test Fixture Component Designations and Values – 915 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| B1, B2 | RF Bead, Short | 2743019447 | Fair-Rite |
| C1, C2 | 22 μF, 35 V Tantalum Capacitor | T491X226K035AT | Kemet |
| C3, C4 | 2.2 μF Chip Capacitor | C1825C225J5RAC | Kemet |
| C5, C6 | 0.1 μF Chip Capacitor | CDR33BX104AKWS | AVX |
| C7, C8, C22, C23 | 36 pF Chip Capacitor | ATC100B360JT500XT | ATC |
| C9, C10 | 10 pF Chip Capacitor | ATC100B100JT500XT | ATC |
| C11 | 13 pF Chip Capacitor | ATC100B130JT500XT | ATC |
| C12, C13 | 12 pF Chip Capacitor | ATC100B120JT500XT | ATC |
| C14, C15 | 7.5 pF Chip Capacitor | ATC100B7R5CT500XT | ATC |
| C16, C17, C18, C19, C20, C21 | 36 pF Chip Capacitor | ATC100B360JT500XT | ATC |
| C24, C25 | 0.01 μF Chip Capacitor | C1825C103K1GAC-TU | Kemet |
| C26, C27, C28, C29 | 470 μF, 63 V Electrolytic Capacitor | MCGPR63V477M13X26-RH | Multicomp |
| Coax1, 2, 3, 4 | 25 Ω, Semi Rigid Coax, 2.2″ Shield Length | UT-141C-25 | Micro Coax |
| L1, L2 | 5 nH Inductor | A02TKLC | Coilcraft |
| R1, R2 | 10 Ω, 3/4 W Chip Resistor | CRCW201010R0FKEF | Vishay |
| PCB | Arlon, AD255A, 0.03″, $\varepsilon_r$ = 2.55 | D87851 | MTL |

# TYPICAL CHARACTERISTICS – 915 MHz, $T_C$ = 25°C
# PRODUCTION TEST FIXTURE

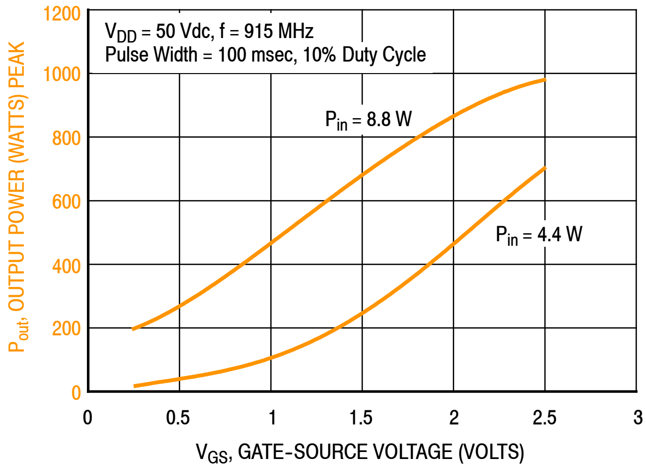
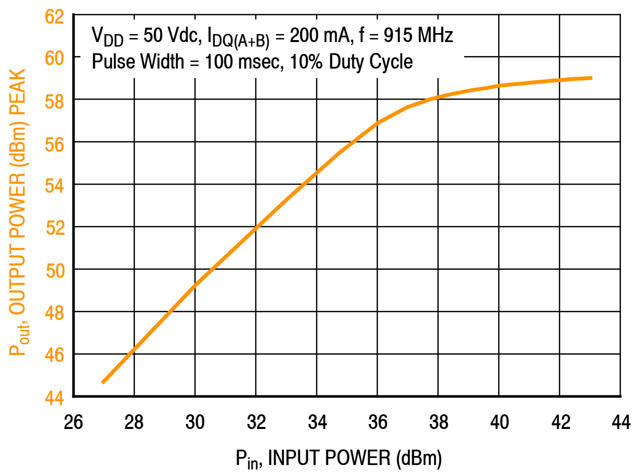



**Figure 14. Output Power versus Gate-Source Voltage at a Constant Input Power**




| f (MHz) | P1dB (W) | P3dB (W) |
|---|---|---|
| 915 | 802 | 912 |

**Figure 15. Output Power versus Input Power**

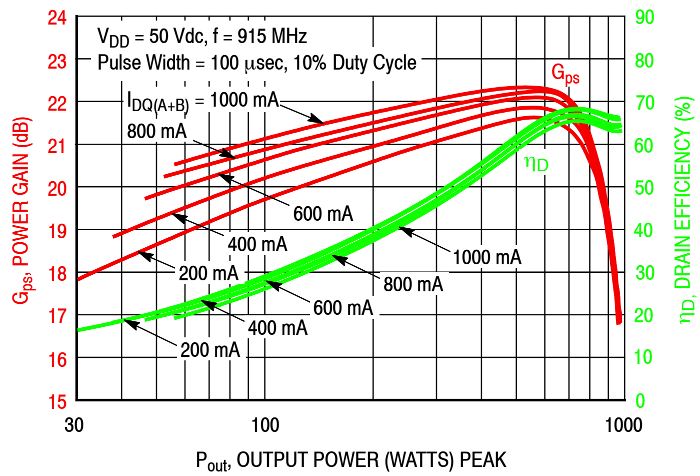



**Figure 16. Power Gain and Drain Efficiency versus Output Power and Quiescent Current**

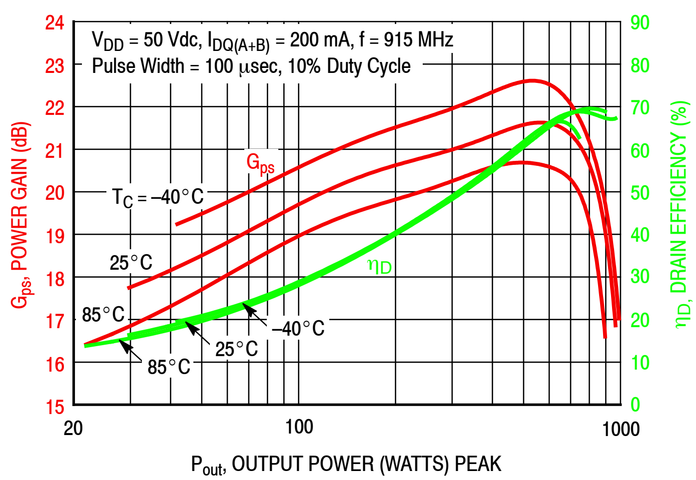



**Figure 17. Power Gain and Drain Efficiency versus Output Power**

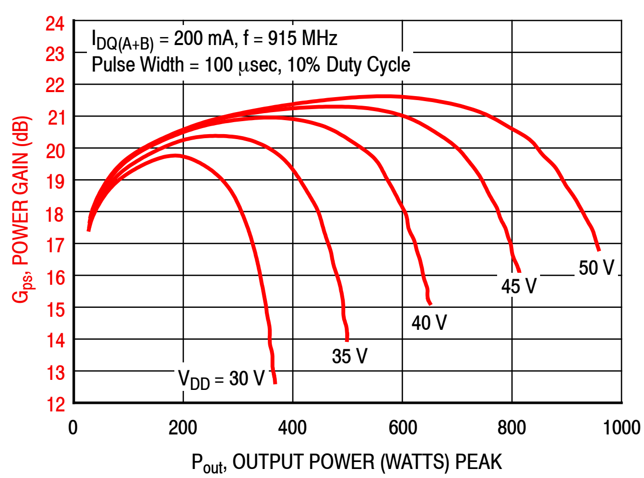



**Figure 18. Power Gain versus Output Power and Drain-Source Voltage**

## 915 MHz NARROWBAND PRODUCTION TEST FIXTURE

| f<br>MHz | $Z_{source}$<br>Ω | $Z_{load}$<br>Ω |
|---|---|---|
| 915 | 3.46 – j1.76 | 2.39 + j3.92 |

$Z_{source}$ = Test fixture impedance as measured from gate to gate, balanced configuration.

$Z_{load}$ = Test fixture impedance as measured from drain to drain, balanced configuration.

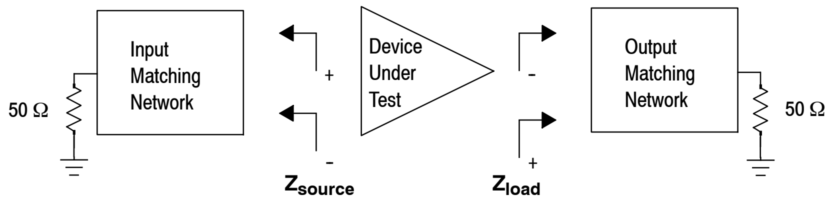
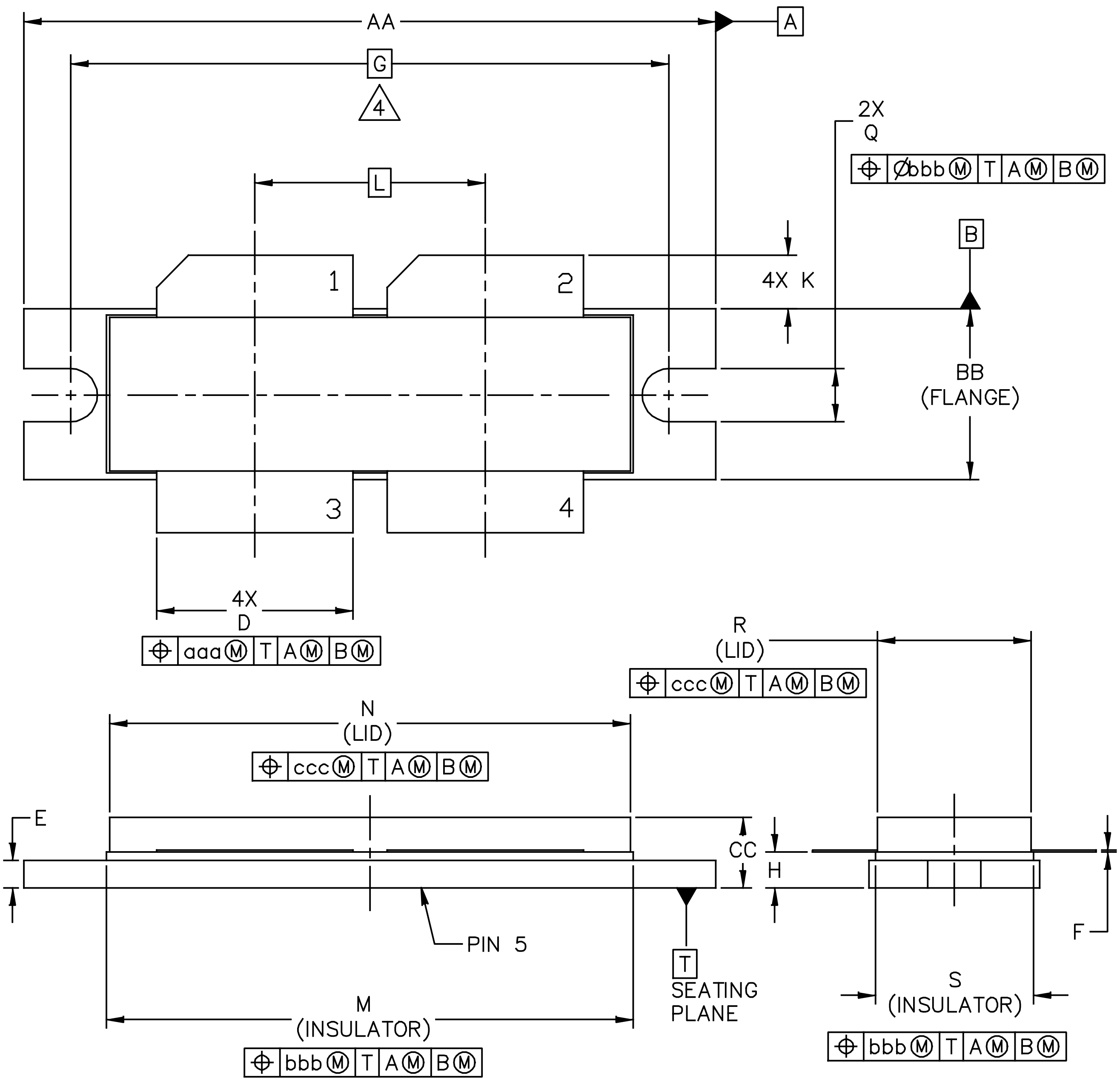



**Figure 19. Narrowband Series Equivalent Source and Load Impedance – 915 MHz**

## PACKAGE DIMENSIONS




| © NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: NI–1230–4H | DOCUMENT NO: 98ASB16977C | REV: G |
| | STANDARD: NON–JEDEC | |
| | SOT1787–1 | 03 MAR 2016 |

NOTES:

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH
3. DIMENSION H IS MEASURED .030 INCH (0.762 MM) AWAY FROM PACKAGE BODY.
4. RECOMMENDED BOLT CENTER DIMENSION OF 1.52 INCH (38.61 MM) BASED ON M3 SCREW.

| DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX | DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|---|---|---|---|---|
| AA | 1.615 | 1.625 | 41.02 | 41.28 | N | 1.218 | 1.242 | 30.94 | 31.55 |
| BB | .395 | .405 | 10.03 | 10.29 | Q | .120 | .130 | 3.05 | 3.30 |
| CC | .170 | .190 | 4.32 | 4.83 | R | .355 | .365 | 9.02 | 9.27 |
| D | .455 | .465 | 11.56 | 11.81 | S | .365 | .375 | 9.27 | 9.53 |
| E | .062 | .066 | 1.57 | 1.68 | | | | | |
| F | .004 | .007 | 0.10 | 0.18 | | | | | |
| G | 1.400 BSC | | 35.56 BSC | | aaa | .013 | | 0.33 | |
| H | .082 | .090 | 2.08 | 2.29 | bbb | .010 | | 0.25 | |
| K | .117 | .137 | 2.97 | 3.48 | ccc | .020 | | 0.51 | |
| L | .540 BSC | | 13.72 BSC | | | | | | |
| M | 1.219 | 1.241 | 30.96 | 31.52 | | | | | |



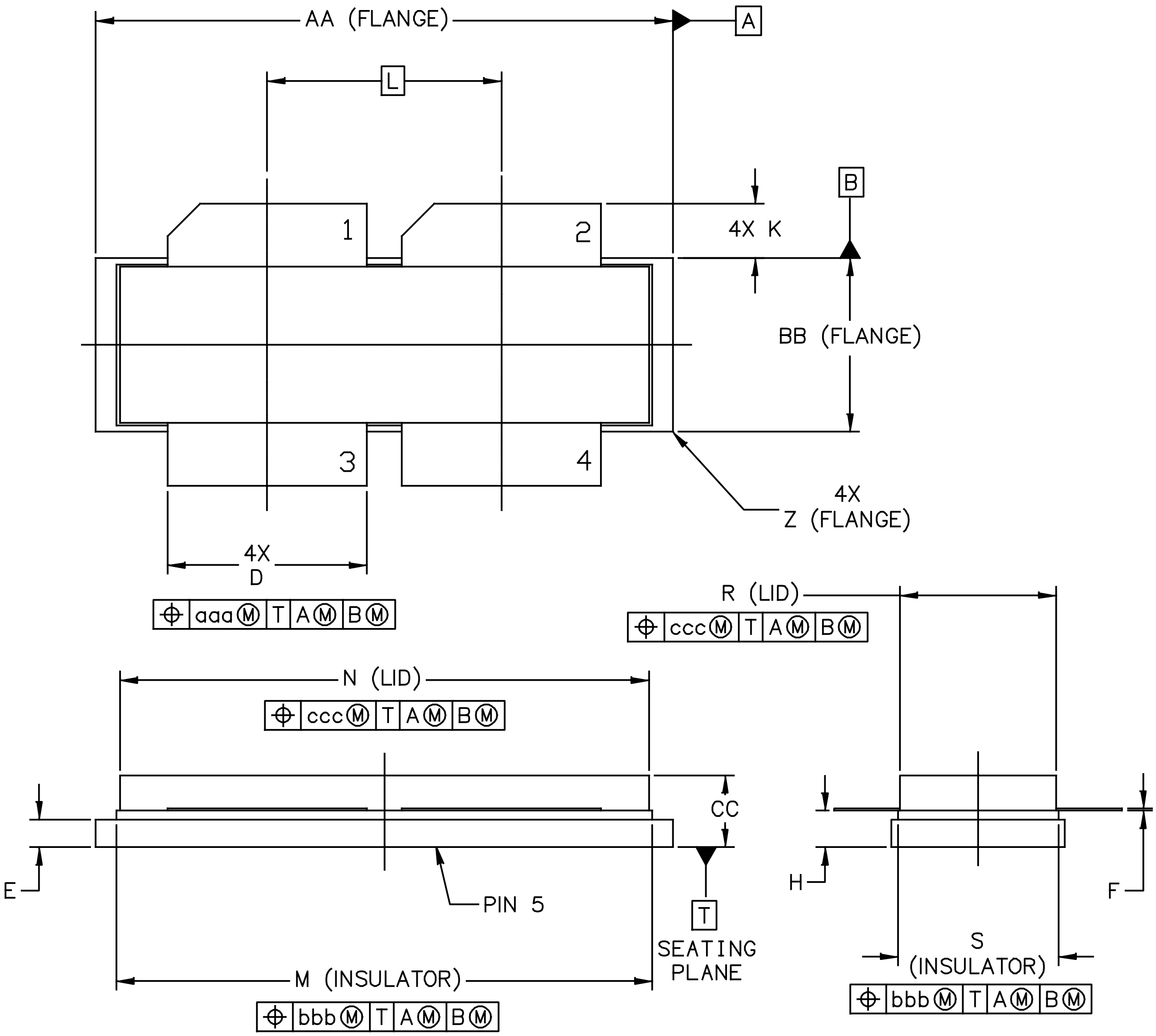
MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE

TITLE: NI-1230-4H

DOCUMENT NO: 98ASB16977C REV: G

STANDARD: NON-JEDEC

SOT1787-1 03 MAR 2016

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|---|---|---|
| TITLE: NI–1230–4S | DOCUMENT NO: 98ARB18247C REV: H | |
| | STANDARD: NON–JEDEC | |
| | SOT1829–1 19 FEB 2016 | |

NOTES:

1. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M–1994.

2. CONTROLLING DIMENSION: INCH

3. DIMENSION H IS MEASURED .030 INCH (0.762 MM) AWAY FROM PACKAGE BODY

| DIM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX | DIM | INCHES MIN | INCHES MAX | MILLIMETERS MIN | MILLIMETERS MAX |
|---|---|---|---|---|---|---|---|---|---|
| AA | 1.265 | 1.275 | 32.13 | 32.39 | R | .355 | .365 | 9.02 | 9.27 |
| BB | .395 | .405 | 10.03 | 10.29 | S | .365 | .375 | 9.27 | 9.53 |
| CC | .170 | .190 | 4.32 | 4.83 | Z | R.000 | R.040 | R0.00 | R1.02 |
| D | .455 | .465 | 11.56 | 11.81 | | | | | |
| E | .062 | .066 | 1.57 | 1.68 | aaa | .013 | | 0.33 | |
| F | .004 | .007 | 0.10 | 0.18 | bbb | .010 | | 0.25 | |
| H | .082 | .090 | 2.08 | 2.29 | ccc | .020 | | 0.51 | |
| K | .117 | .137 | 2.97 | 3.48 | | | | | |
| L | .540 BSC | | 13.72 BSC | | | | | | |
| M | 1.219 | 1.241 | 30.96 | 31.52 | | | | | |
| N | 1.218 | 1.242 | 30.94 | 31.55 | | | | | |

| | | |
|---|---|---|
|  | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
| TITLE: NI–1230–4S | DOCUMENT NO: 98ARB18247C | REV: H |
| | STANDARD: NON–JEDEC | |
| | SOT1829–1 | 19 FEB 2016 |

## PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following resources to aid your design process.

**Application Notes**

- AN1908: Solder Reflow Attach Method for High Power RF Devices in Air Cavity Packages
- 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

**To Download Resources Specific to a Given Part Number:**

1. Go to http://www.nxp.com/RF
2. Search by part number
3. Click part number link
4. Choose the desired resource from the drop down menu

## REVISION HISTORY

The following table summarizes revisions to this document.

| Revision | Date | Description |
|---|---|---|
| 0 | Dec. 2017 | • Initial release of data sheet |
| 1 | Jan. 2018 | • On Characteristics, $V_{GS(Q)}$: Min and Max values updated to reflect recent test results of the device, p. 2 |

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Document Number: MRF13750H
Rev. 1, 01/2018