**NXP Semiconductors**
Technical Data

Document Number: MMRF5014H
Rev. 3, 05/2018

# RF Power GaN Transistor

This 125 W CW RF power transistor is optimized for wideband operation up to 2700 MHz and includes input matching for extended bandwidth performance. With its high gain and high ruggedness, this device is ideally suited for CW, pulse and wideband RF applications.

This part is characterized and performance is guaranteed for applications operating in the 1–2700 MHz band. There is no guarantee of performance when this part is used in applications designed outside of these frequencies.

**Typical Narrowband Performance:** $V_{DD}$ = 50 Vdc, $I_{DQ}$ = 350 mA, $T_A$ = 25°C

| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 2500 (1) | CW | 125 CW | 16.0 | 64.2 |
| 2500 (1) | Pulse (100 μsec, 20% Duty Cycle) | 125 Peak | 18.0 | 66.8 |

**Typical Wideband Performance:** $V_{DD}$ = 50 Vdc, $T_A$ = 25°C

| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (2) (dB) | $\eta_D$ (2) (%) |
|---|---|---|---|---|
| 200–2500 (3) | CW | 100 CW | 12.0 | 40.0 |
| 1300–1900 (4) | CW | 125 CW | 14.5 | 45.0 |

**Load Mismatch/Ruggedness**

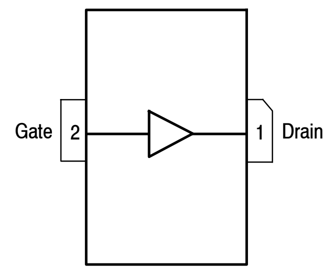
| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage | Result |
|---|---|---|---|---|---|
| 2500 (1) | Pulse (100 μsec, 20% Duty Cycle) | > 20:1 at All Phase Angles | 5.0 Peak (3 dB Overdrive) | 50 | No Device Degradation |

1. Measured in 2500 MHz narrowband test circuit.
2. The values shown are the minimum measured performance numbers across the indicated frequency range.
3. Measured in 200–2500 MHz broadband reference circuit.
4. Measured in 1300–1900 MHz broadband reference circuit.

**MMRF5014H**

**1–2700 MHz, 125 W CW, 50 V WIDEBAND RF POWER GaN TRANSISTOR**

**NI-360H-2SB**




(Top View)

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

**Figure 1. Pin Connections**

## Features

- Advanced GaN on SiC, offering high power density
- Decade bandwidth performance
- Low thermal resistance
- Input matched for extended wideband performance
- High ruggedness: > 20:1 VSWR

## Typical Applications

- Ideal for military end-use applications, including the following:
  - Narrowband and multi-octave wideband amplifiers
  - Radar
  - Jammers
  - EMC testing
- Also suitable for commercial applications, including the following:
  - Public mobile radios, including emergency service radios
  - Industrial, scientific and medical
  - Wideband laboratory amplifiers
  - Wireless cellular infrastructure

**Table 1. Maximum Ratings**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | 125 | Vdc |
| Gate-Source Voltage | $V_{GS}$ | –8, 0 | Vdc |
| Operating Voltage | $V_{DD}$ | 0 to +50 | Vdc |
| Maximum Forward Gate Current @ $T_C$ = 25°C | $I_{GMAX}$ | 18 | mA |
| Storage Temperature Range | $T_{stg}$ | –65 to +150 | °C |
| Case Operating Temperature Range | $T_C$ | –55 to +150 | °C |
| Operating Junction Temperature Range | $T_J$ | –55 to +225 | °C |
| Absolute Maximum Channel Temperature (1) | $T_{MAX}$ | 350 | °C |
| Total Device Dissipation @ $T_C$ = 25°C<br>Derate above 25°C | $P_D$ | 232<br>1.16 | W<br>W/°C |

**Table 2. Thermal Characteristics**

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Thermal Resistance by Infrared Measurement, Active Die Surface-to-Case<br>CW: Case Temperature 82°C, 125 W CW, 50 Vdc, $I_{DQ}$ = 350 mA, 2500 MHz | $R_{\theta JC}$ (IR) | 0.86 (2) | °C/W |
| Thermal Resistance by Finite Element Analysis, Channel-to-Case<br>Case Temperature 85°C, $P_D$ = 85 W | $R_{\theta CHC}$<br>(FEA) | 1.48 (3) | °C/W |
| Thermal Impedance by Infrared Measurement, Junction-to-Case<br>Pulse: Case Temperature 58°C, 125 W Peak, 100 μsec Pulse Width,<br>20% Duty Cycle, 50 Vdc, $I_{DQ}$ = 350 mA, 2500 MHz | $Z_{\theta JC}$ (IR) | 0.21 | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology | Class |
|---|---|
| Human Body Model (per JESD22-A114) | 1B, passes 500 V |
| Machine Model (per EIA/JESD22-A115) | A, passes 100 V |
| Charge Device Model (per JESD22-C101) | IV, passes 2000 V |

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Off Characteristics** | | | | | |
| Drain Leakage Current<br>($V_{GS}$ = –8 Vdc, $V_{DS}$ = 10 Vdc) | $I_{DSS}$ | — | — | 5 | mAdc |
| Drain-Source Breakdown Voltage<br>($V_{GS}$ = –8 Vdc, $I_D$ = 25 mAdc) | $V_{(BR)DSS}$ | 150 | — | — | Vdc |
| **On Characteristics** | | | | | |
| Gate Threshold Voltage<br>($V_{DS}$ = 10 Vdc, $I_D$ = 25 mAdc) | $V_{GS(th)}$ | –3.8 | –2.9 | –2.3 | Vdc |
| Gate Quiescent Voltage<br>($V_{DS}$ = 50 Vdc, $I_D$ = 350 mAdc, Measured in Functional Test) | $V_{GS(Q)}$ | –3.2 | –2.7 | –2.2 | Vdc |
| **Dynamic Characteristics** | | | | | |
| Reverse Transfer Capacitance<br>($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = –4 Vdc) | $C_{rss}$ | — | 1.0 | — | pF |
| Output Capacitance<br>($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = –4 Vdc) | $C_{oss}$ | — | 7.7 | — | pF |
| Input Capacitance (4)<br>($V_{DS}$ = 50 Vdc, $V_{GS}$ = –4 Vdc ± 30 mV(rms)ac @ 1 MHz) | $C_{iss}$ | — | 51.0 | — | pF |

1. Reliability tests were conducted at 225°C. Operation with $T_{MAX}$ at 350°C will reduce median time to failure.
2. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers.* Go to http://www.nxp.com/RF and search for AN1955.
3. $R_{\theta JC}$ (FEA) must be used for purposes related to reliability and limitations on maximum junction temperature. MTTF may be estimated by the expression MTTF (hours) = $10^{[A + B/(T + 273)]}$, where *T* is the junction temperature in degrees Celsius, *A* = –8.44 and *B* = 7210.
4. Part internally input matched.

(continued)

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

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Functional Tests** (In NXP Test Fixture, 50 ohm system) $V_{DD}$ = 50 Vdc, $I_{DQ}$ = 350 mA, $P_{out}$ = 125 W Peak (25 W Avg.), f = 2500 MHz, 100 μsec Pulse Width, 20% Duty Cycle. **[See note on correct biasing sequence.]** | | | | | |
| Power Gain | $G_{ps}$ | 17.0 | 18.0 | 20.0 | dB |
| Drain Efficiency | $\eta_D$ | 64.3 | 66.8 | — | % |
| Input Return Loss | IRL | — | –12 | –9 | dB |

**Load Mismatch/Ruggedness** (In NXP Test Fixture, 50 ohm system) $I_{DQ}$ = 350 mA

| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage, $V_{DD}$ | Result |
|---|---|---|---|---|---|
| 2500 | Pulse (100 μsec, 20% Duty Cycle) | > 20:1 at All Phase Angles | 5.0 Peak (3 dB Overdrive) | 50 | No Device Degradation |

**Table 5. Ordering Information**

| Device | Tape and Reel Information | Package |
|---|---|---|
| MMRF5014HR5 | R5 Suffix = 50 Units, 32 mm Tape Width, 13-inch Reel | NI-360H-2SB |

## NOTE: Correct Biasing Sequence for GaN Depletion Mode Transistors

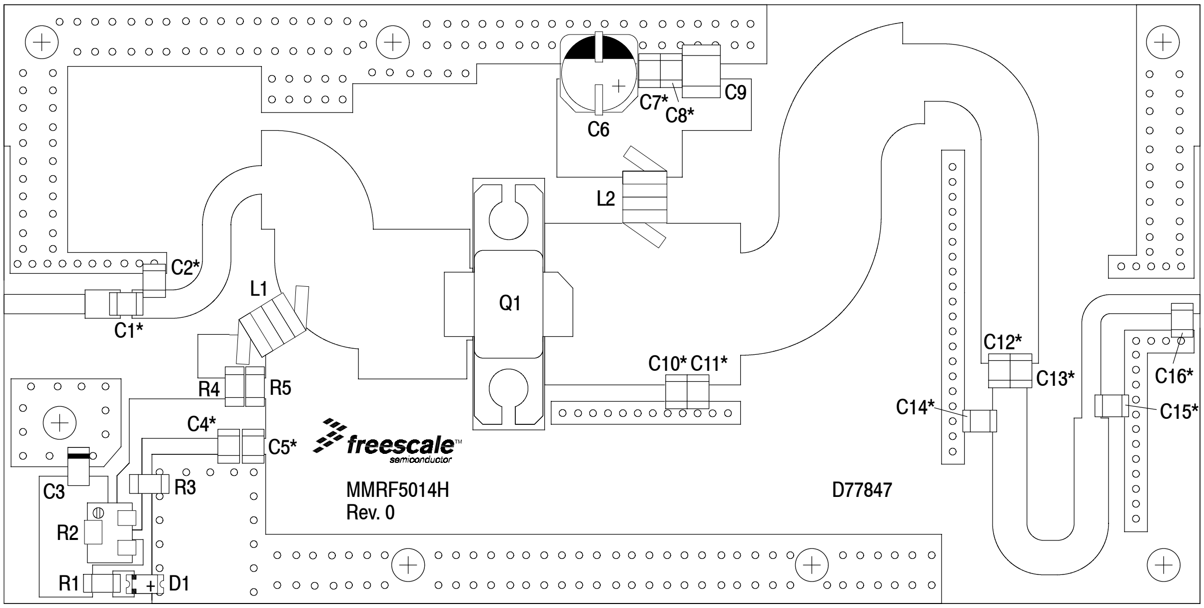
### Turning the device ON

1. Set $V_{GS}$ to –5 V
2. Turn on $V_{DS}$ to nominal supply voltage (50 V)
3. Increase $V_{GS}$ until $I_{DS}$ current is attained
4. Apply RF input power to desired level

### Turning the device OFF

1. Turn RF power off
2. Reduce $V_{GS}$ down to –5 V
3. Reduce $V_{DS}$ down to 0 V (Adequate time must be allowed for $V_{DS}$ to reduce to 0 V to prevent severe damage to device.)
4. Turn off $V_{GS}$

## 500–2500 MHz WIDEBAND REFERENCE CIRCUIT — 2.0″ × 4.0″ (5.1 cm × 10.2 cm)




*C1, C2, C4, C5, C7, C8, C10, C11, C12, C13, C14, C15 and C16 are mounted vertically.

**Figure 2. MMRF5014H Wideband Reference Circuit Component Layout — 500–2500 MHz**

**Table 6. MMRF5014H Wideband Reference Circuit Component Designations and Values — 500–2500 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1, C5, C7 | 33 pF Chip Capacitors | ATC800B330JT500XT | ATC |
| C2 | 0.4 pF Chip Capacitor | ATC800B0R4BT500XT | ATC |
| C3 | 2.2 μF, 16 V Tantalum Capacitor | T491A225K016AT | Kemet |
| C4, C8 | 1000 pF Chip Capacitors | ATC800B102JT50XT | ATC |
| C6 | 220 μF, 50 V Electrolytic Capacitor | EEV-HA1H221P | Panasonic-ECG |
| C9 | 2.2 μF Chip Capacitor | HMK432B7225KM-T | Taiyo Yuden |
| C10, C11 | 0.8 pF Chip Capacitors | ATC800B0R8BT500XT | ATC |
| C12, C13 | 9.1 pF Chip Capacitors | ATC800B9R1BT500XT | ATC |
| C14, C16 | 0.5 pF Chip Capacitors | ATC800B0R5BT500XT | ATC |
| C15 | 0.2 pF Chip Capacitor | ATC800B0R2BT500XT | ATC |
| D1 | LED Green Diffused 1206, SMD | LGN971-KN-1 | OSRAM |
| L1 | 33 nH Inductor | 1812SMS-33NJLC | Coilcraft |
| L2 | 17.5 nH Inductor, 5 Turns | GA3095-ALC | Coilcraft |
| Q1 | RF Power GaN Transistor | MMRF5014H | NXP |
| R1 | 75 Ω, 1/4 W Chip Resistor | CRCW120675R0FKEA | Vishay |
| R2 | 500 Ω Trimming Potentiometer, 11 Turns | 3224W-1-501E | Bourns |
| R3 | 470 Ω, 1/4 W Chip Resistor | CRCW1206470RFKEA | Vishay |
| R4, R5 | 39 Ω, 1/4 W Chip Resistors | CRCW120639R0FKEA | Vishay |
| PCB | Rogers RO4350B 0.030″, $\varepsilon_r$ = 3.66 | D77847 | MTL |

Note: Refer to MMRF5014H's printed circuit boards and schematics to download the 500–2500 MHz heatsink drawing.

## TYPICAL CHARACTERISTICS — 500–2500 MHz WIDEBAND REFERENCE CIRCUIT

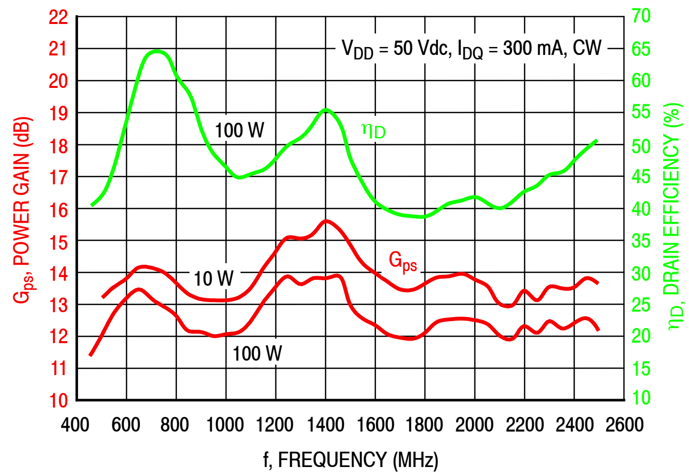
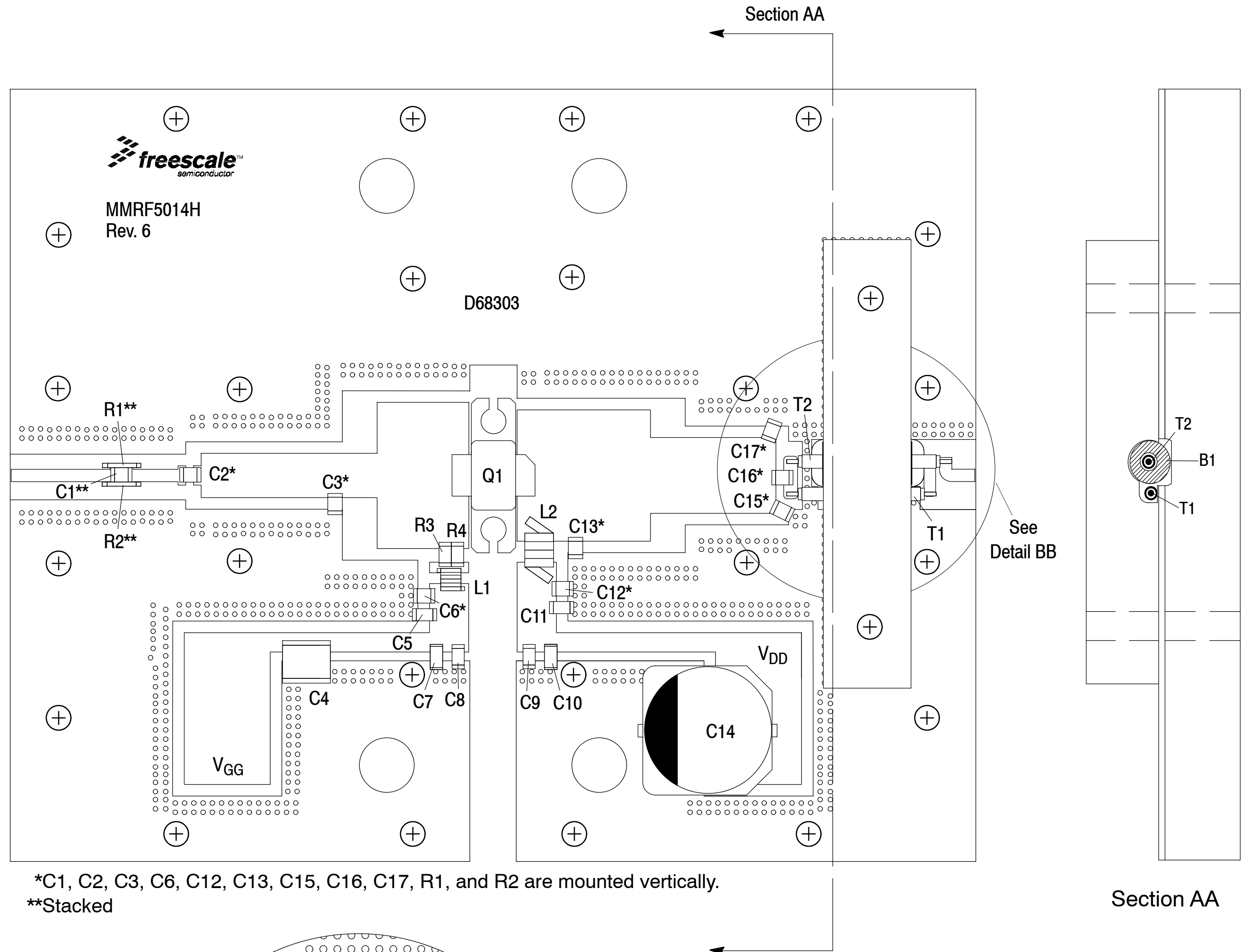



**Figure 3. 500–2500 MHz Wideband Circuit Performance**




*C1, C2, C3, C6, C12, C13, C15, C16, C17, R1, and R2 are mounted vertically.
**Stacked

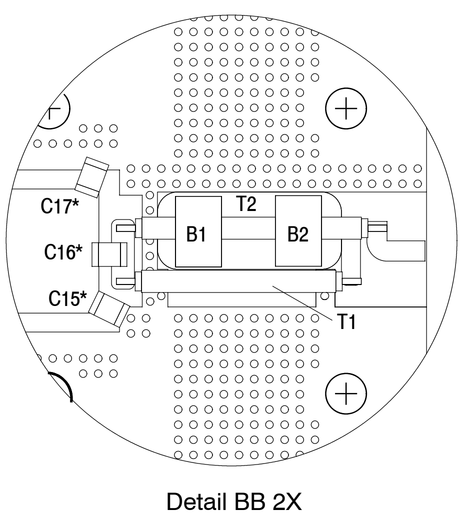



**Figure 4. MMRF5014H Wideband Reference Circuit Component Layout — 200–2500 MHz**

**Table 7. MMRF5014H Wideband Reference Circuit Component Designations and Values — 200–2500 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| B1, B2 | Ferrite Beads | T22-6 | Micro Metals |
| C1 | 56 pF Chip Capacitor | ATC800B560JT500XT | ATC |
| C2 | 75 pF Chip Capacitor | ATC800B750JT500XT | ATC |
| C3 | 1.6 pF Chip Capacitor | ATC800B1R6BT500XT | ATC |
| C4 | 6.8 μF Chip Capacitor | C4532X7R1H685K | TDK |
| C5, C8, C9, C11 | 0.015 μF Chip Capacitors | GRM319R72A153KA01D | Murata |
| C6, C12 | 5.6 pF Chip Capacitors | ATC800B5R6BT500XT | ATC |
| C7, C10 | 1 μF Chip Capacitors | GRM31CR72A105KAO1L | Murata |
| C13 | 1.4 pF Chip Capacitor | ATC800B1R4BT500XT | ATC |
| C14 | 220 μF, 100 V Electrolytic Capacitor | EEV-FK2A221M | Panasonic-ECG |
| C15, C17 | 0.9 pF Chip Capacitors | ATC800B0R9BT500XT | ATC |
| C16 | 47 pF Chip Capacitor | ATC800B470JT500XT | ATC |
| L1 | 12.5 nH Inductor, 4 Turns | A04TJLC | Coilcraft |
| L2 | 22 nH Inductor | 1812SMS-22NJLC | Coilcraft |
| Q1 | RF Power GaN Transistor | MMRF5014H | NXP |
| R1, R2 | 10 Ω, 3/4 W Chip Resistors | CRCW201010R0FKEF | Vishay |
| R3, R4 | 39 Ω, 1/4 W Chip Resistors | CRCW120639R0FKEA | Vishay |
| T1 | 25 Ω Semi Rigid Coax, 0.770″ Shield Length | UT-070-25 | Micro-Coax |
| T2 | 25 Ω Semi Rigid Coax, 0.850″ Shield Length | UT-070-25 | Micro-Coax |
| PCB | Rogers RO4350B, 0.030″, $\varepsilon_r$ = 3.66 | D68303 | MTL |

Note: Refer to MMRF5014H's printed circuit boards and schematics to download the 200–2500 MHz heatsink drawing.

## TYPICAL CHARACTERISTICS — 200–2500 MHz WIDEBAND REFERENCE CIRCUIT

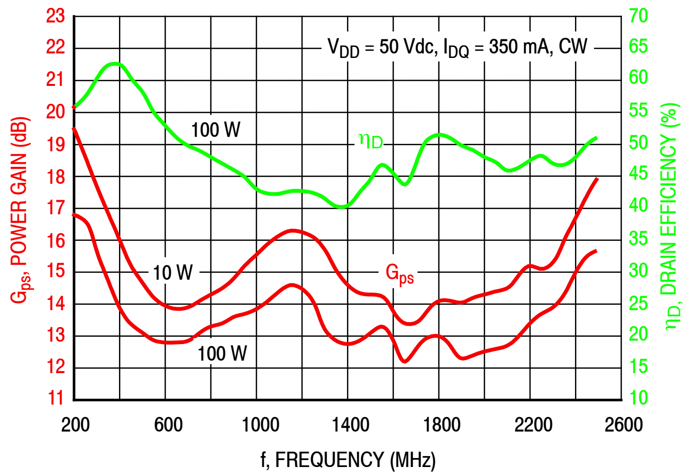



**Figure 5. 200–2500 MHz Wideband Circuit Performance**

**Narrowband Performance and Impedance Information** ($T_C$ = 25°C)

The measured input and output impedances are presented to the input of the device at the package reference plane. Measurements are performed in NXP narrowband fixture tuned at 500, 1000, 1500, 2000 and 2500 MHz.

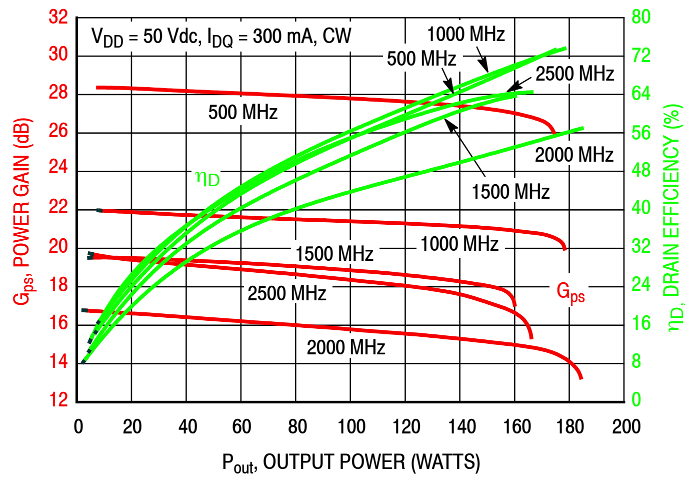



**Figure 6. Power Gain and Drain Efficiency versus CW Output Power**

| f MHz | $Z_{source}$ Ω | $Z_{load}$ Ω |
|---|---|---|
| 500 | 1.3 + j3.9 | 5.9 + j3.5 |
| 1000 | 1.0 + j0.3 | 5.5 + j2.9 |
| 1500 | 0.8 – j0.5 | 3.4 + j2.0 |
| 2000 | 1.2 – j2.0 | 4.7 + j0.3 |
| 2500 | 2.7 – j3.8 | 3.7 + j1.4 |

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

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

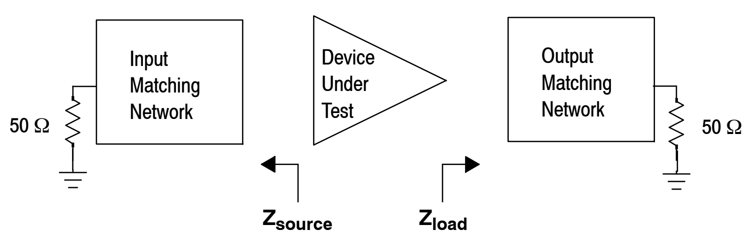
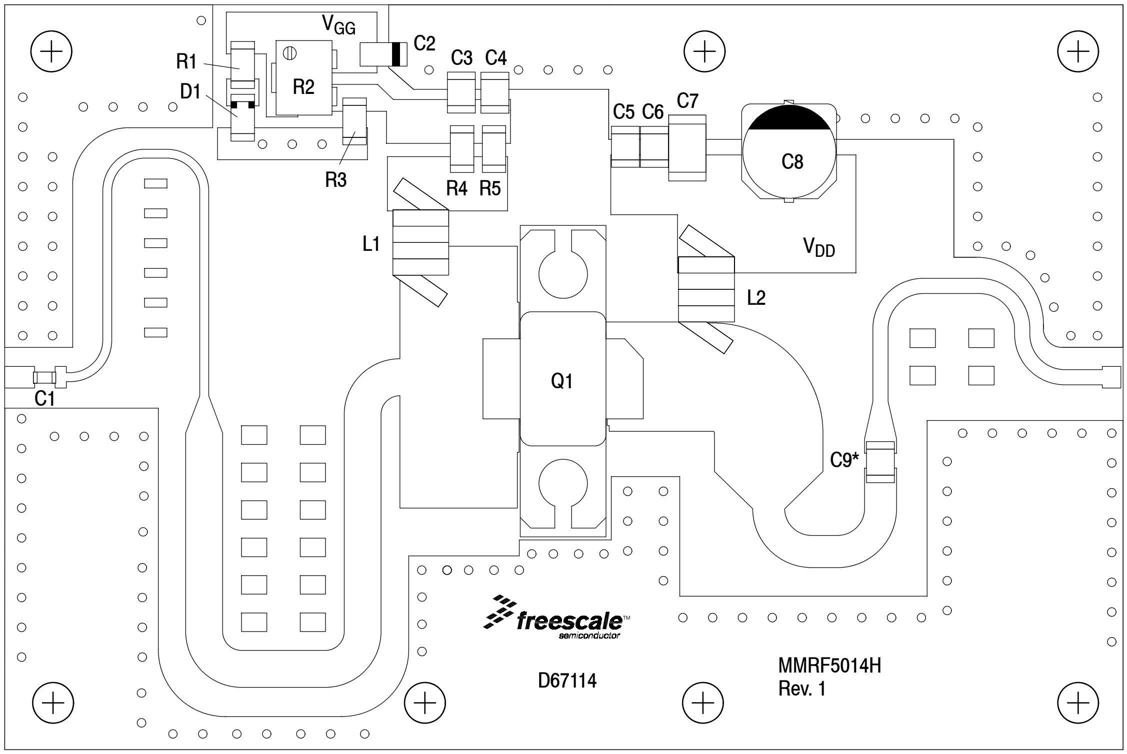



**Figure 7. Narrowband Fixtures: Series Equivalent Source and Load Impedances**

## 1300–1900 MHz WIDEBAND REFERENCE CIRCUIT — 2.0″ × 3.0″ (5.1 cm × 7.6 cm)




*C9 is mounted vertically.

**Figure 8. MMRF5014H Wideband Reference Circuit Component Layout — 1300–1900 MHz**

**Table 8. MMRF5014H Wideband Reference Circuit Component Designations and Values — 1300–1900 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1 | 18 pF Chip Capacitor | ATC600S180CT250XT | ATC |
| C2 | 2.2 μF Tantalum Capacitor | T491A225K016AT | Kemet |
| C3, C6 | 1000 pF Chip Capacitors | ATC800B102JT50XT | ATC |
| C4, C5 | 33 pF Chip Capacitors | ATC800B330JT500XT | ATC |
| C7 | 2.2 μF Chip Capacitor | HMK432B7225KM-T | Taiyo Tuden |
| C8 | 47 μF, 100 V Electrolytic Capacitor | 476KXM050M | Panasonic-ECG |
| C9 | 9.1 pF Chip Capacitor | ATC800B9R1BT500XT | ATC |
| D1 | LED Green Diffused 1206, SMD | LGN971-KN-1 | OSRAM |
| Q1 | RF Power GaN Transistor | MMRF5014H | NXP |
| R1 | 75 Ω, 1/4 W Chip Resistor | CRCW120675R0FKEA | Vishay |
| R2 | 5 kΩ Trimming Potentiometer, 11 Turns | 3224W-1-502E | Bourns |
| R3 | 5 kΩ, 1/4 W Chip Resistor | CRCW12065K00FKEA | Vishay |
| R4, R5 | 39 Ω, 1/4 W Chip Resistors | CRCW120639R0FKEA | Vishay |
| L1, L2 | 33 nH Inductors | 1812SMS-33NJLC | Coilcraft |
| PCB | Rogers 3010, 0.025″, $\varepsilon_r$ = 10.2 | D67114 | MTL |

## TYPICAL CHARACTERISTICS — 1300–1900 MHz WIDEBAND REFERENCE CIRCUIT

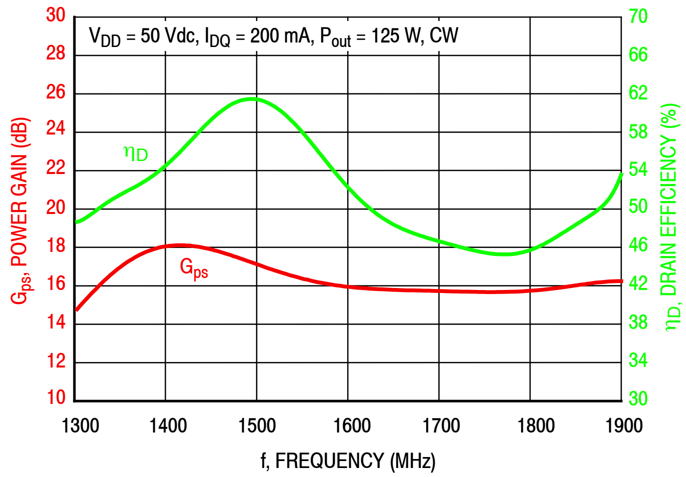



**Figure 9. Power Gain and Drain Efficiency versus Frequency**

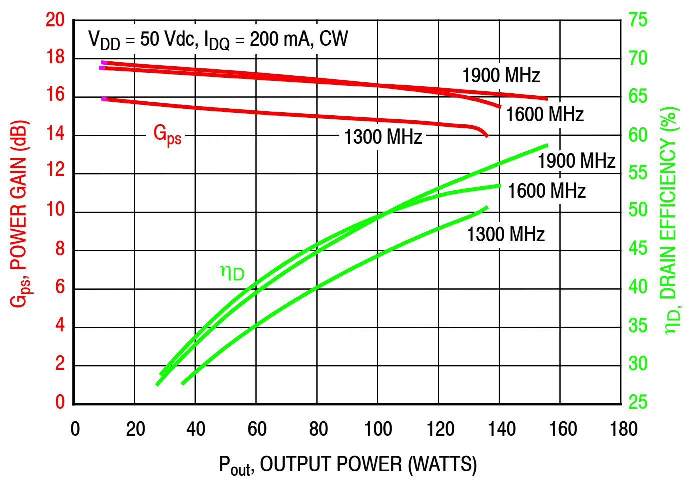



**Figure 10. Power Gain and Drain Efficiency versus CW Output Power**

## 2500 MHz NARROWBAND PRODUCTION TEST FIXTURE — 4.0″ × 5.0″ (10.2 cm × 12.7 cm)

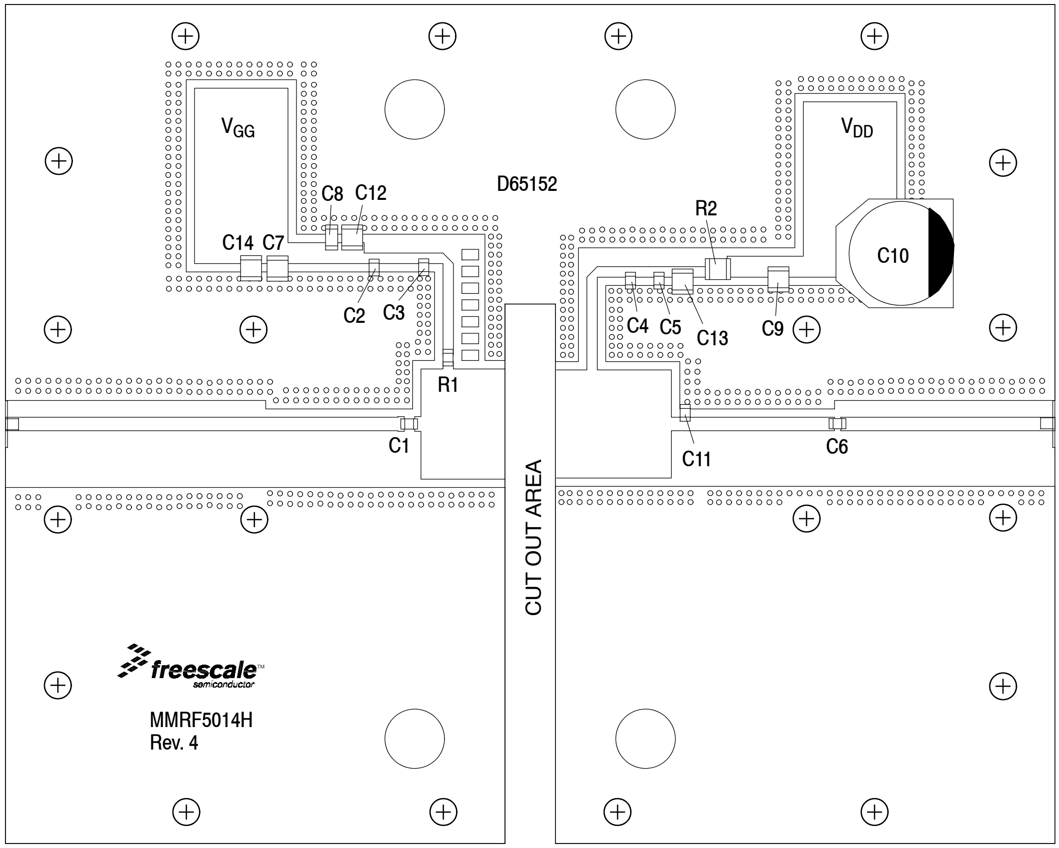



**Figure 11. MMRF5014H Narrowband Test Circuit Component Layout — 2500 MHz**

**Table 9. MMRF5014H Narrowband Test Circuit Component Designations and Values — 2500 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1 | 3.9 pF Chip Capacitor | ATC600F3R9BT250XT | ATC |
| C2, C3, C4, C5, C6 | 12 pF Chip Capacitors | ATC600F120JT250XT | ATC |
| C7, C14 | 4.7 μF Chip Capacitors | C4532X7R1H475K200KB | TDK |
| C8 | 0.1 μF Chip Capacitor | GRM319R72A104KA01D | Murata |
| C9 | 1.0 μF Chip Capacitor | GRM32CR72A105KA35L | Murata |
| C10 | 220 μF, 100 V Electrolytic Capacitor | EEV-FK2A221M | Panasonic-ECG |
| C11 | 1 pF Chip Capacitor | ATC600F1R0BT250XT | ATC |
| C12, C13 | 1000 pF Chip Capacitors | ATC800B102JT50XT | ATC |
| R1 | 56 Ω, 1/4 W Chip Resistor | CRCW120656R0FKEA | Vishay |
| R2 | 0 Ω, 5 A Chip Resistor | CRCW12100000Z0EA | Vishay |
| PCB | Rogers RO4350B, 0.030″, $\varepsilon_r$ = 3.66 | D65152 | MTL |

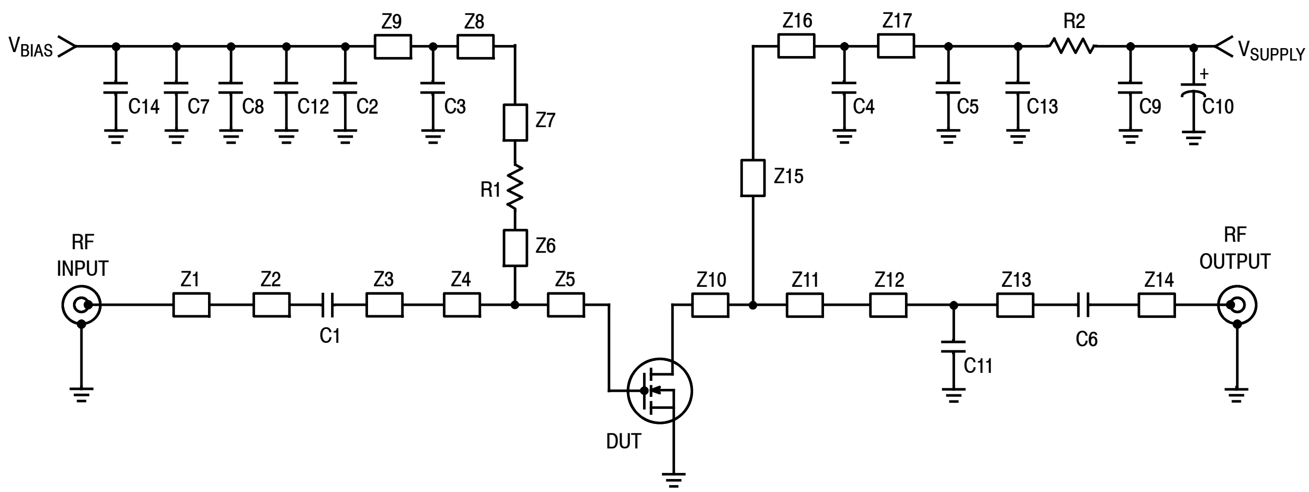



**Figure 12. MMRF5014H Narrowband Test Circuit Schematic — 2500 MHz**

**Table 10. MMRF5014H Narrowband Test Circuit Microstrips — 2500 MHz**

| Microstrip | Description | Microstrip | Description |
|---|---|---|---|
| Z1 | 1.870″ × 0.064″ Microstrip | Z10 | 0.145″ × 0.515″ Microstrip |
| Z2, Z3 | 0.030″ × 0.070″ Microstrip | Z11 | 0.353″ × 0.515″ Microstrip |
| Z4 | 0.105″ × 0.525″ Microstrip | Z12 | 0.040″ × 0.064″ Microstrip |
| Z5* | 0.240″ × 0.525″ Microstrip | Z13 | 0.687″ × 0.064″ Microstrip |
| Z6 | 0.037″ × 0.050″ Microstrip | Z14 | 1.020″ × 0.064″ Microstrip |
| Z7 | 0.465″ × 0.050″ Microstrip | Z15 | 0.468″ × 0.050″ Microstrip |
| Z8 | 0.090″ × 0.050″ Microstrip | Z16 | 0.158″ × 0.050″ Microstrip |
| Z9 | 0.190″ × 0.050″ Microstrip | Z17 | 0.078″ × 0.050″ Microstrip |

* Line length include microstrip bends

## TYPICAL CHARACTERISTICS — 2500 MHz

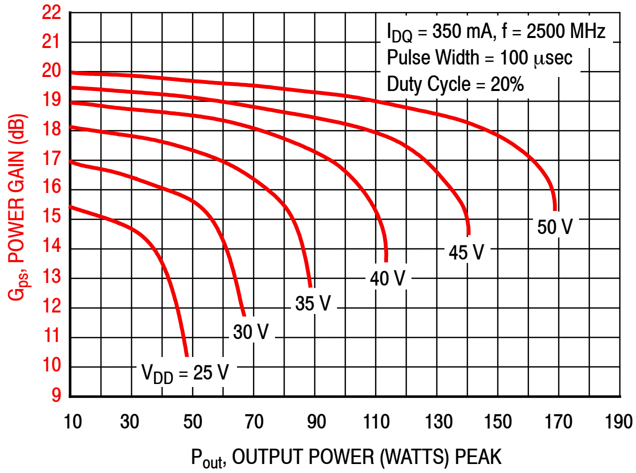



**Figure 13. Power Gain versus Output Power and Drain Voltage (1)**

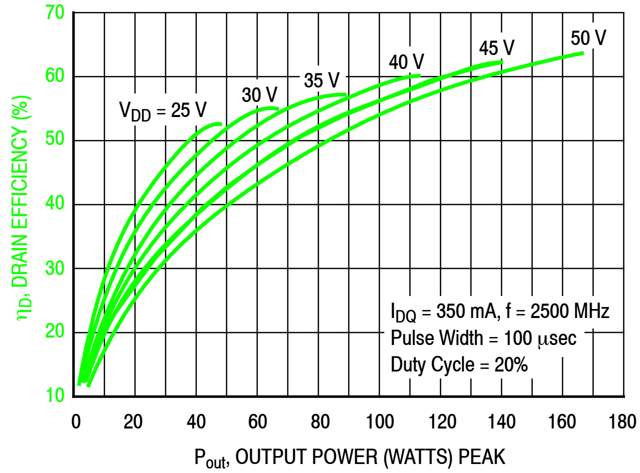



**Figure 14. Drain Efficiency versus Output Power and Drain Voltage (1)**

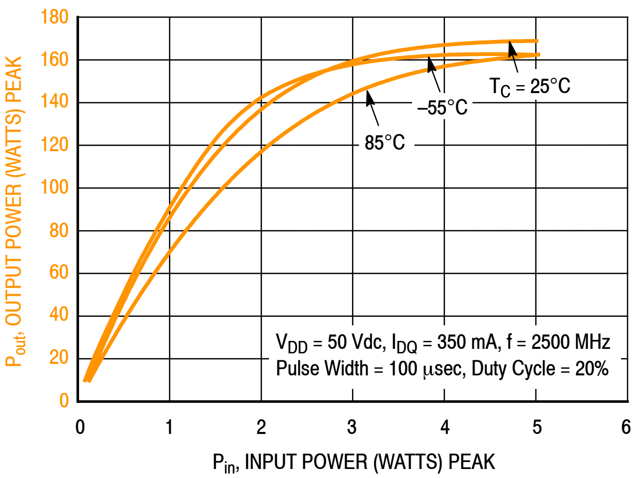



**Figure 15. Output Power versus Input Power (1)**

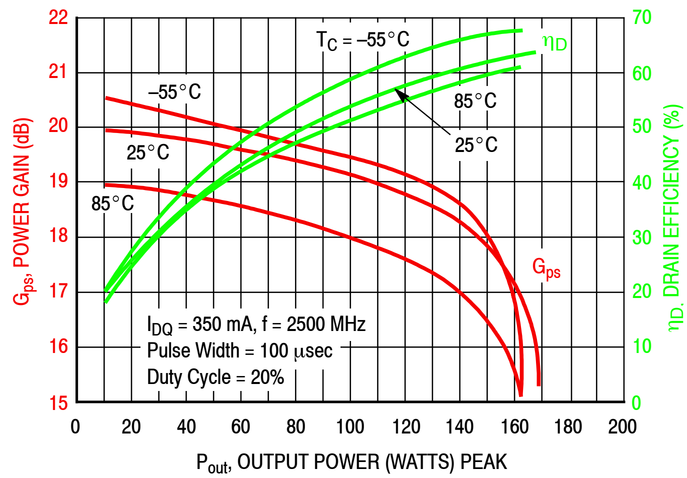
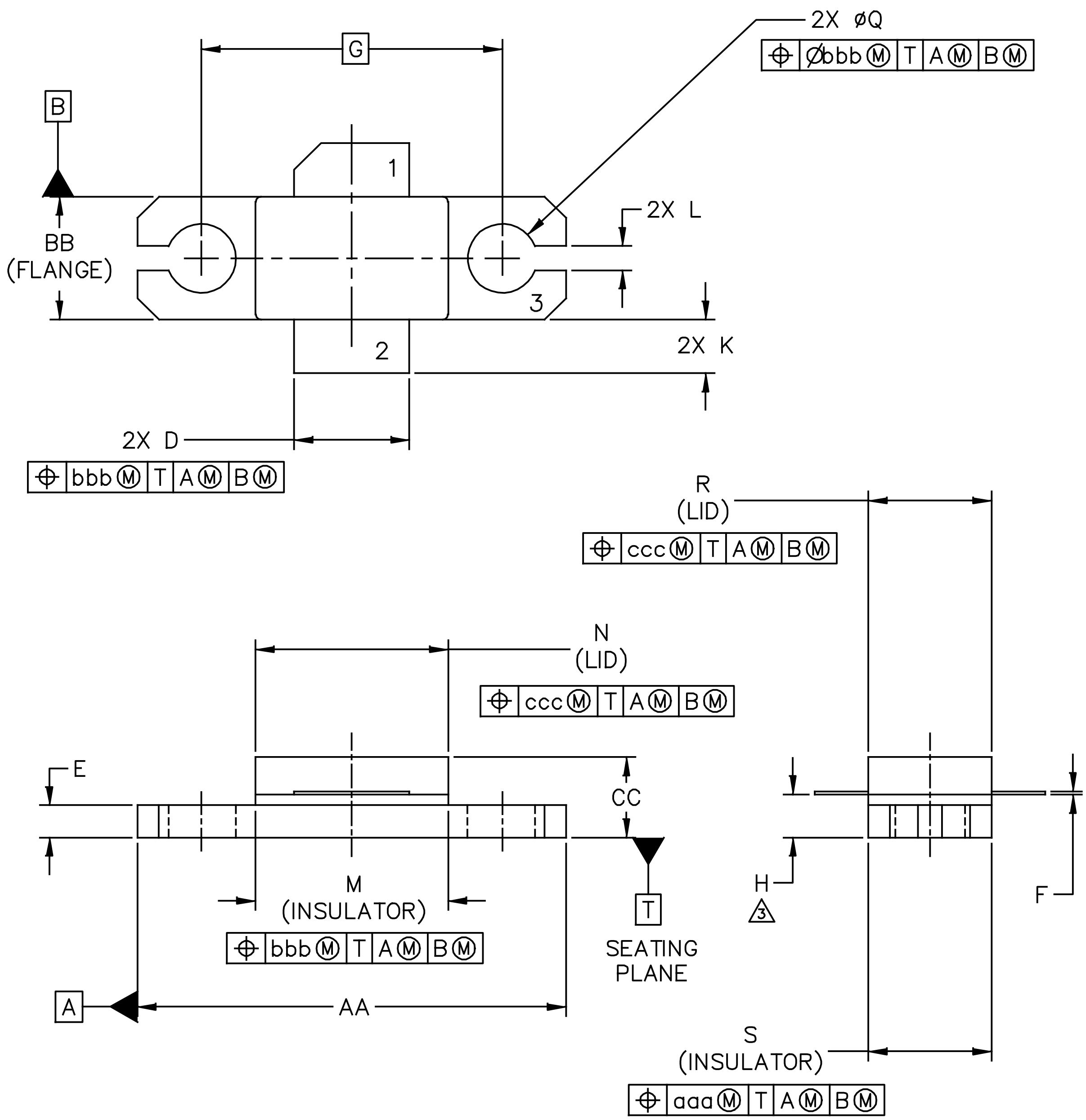



**Figure 16. Power Gain and Drain Efficiency versus Output Power (1)**

**1. Circuit tuned for maximum power.**

## PACKAGE DIMENSIONS




| © NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: NI–360H–2SB | DOCUMENT NO: 98ASA00795D | REV: A |
| | STANDARD: NON–JEDEC | |
| | SOT1791–1 | 17 FEB 2016 |

Pin 1. Drain
2. Gate
3. Source

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 THE FLANGE TO CLEAR THE EPOXY FLOW OUT REGION PARALLEL TO DATUM B.

| DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX | DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|---|---|---|---|---|
| AA | .795 | .805 | 20.19 | 20.45 | N | .357 | .363 | 9.07 | 9.22 |
| BB | .225 | .235 | 5.72 | 5.97 | Q | .125 | .135 | 3.18 | 3.43 |
| CC | .125 | .175 | 3.18 | 4.45 | R | .227 | .233 | 5.77 | 5.92 |
| D | .210 | .220 | 5.33 | 5.59 | S | .225 | .235 | 5.72 | 5.97 |
| E | .055 | .065 | 1.40 | 1.65 | | | | | |
| F | .004 | .006 | 0.10 | 0.15 | aaa | .005 | | 0.13 | |
| G | .562 BSC | | 14.28 BSC | | bbb | .010 | | 0.25 | |
| H | .077 | .087 | 1.96 | 2.21 | ccc | .015 | | 0.38 | |
| K | .085 | .115 | 2.16 | 2.92 | | | | | |
| L | .040 | .050 | 1.02 | 1.27 | | | | | |
| M | .355 | .365 | 9.02 | 9.27 | | | | | |



MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE

TITLE: NI–360H–2SB

DOCUMENT NO: 98ASA00795D REV: A

STANDARD: NON–JEDEC

SOT1791–1 17 FEB 2016

## PRODUCT DOCUMENTATION AND TOOLS

Refer to the following resources to aid your design process.

**Application Notes**

- AN1955: Thermal Measurement Methodology of RF Power Amplifiers

**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 | May 2015 | • Initial Release of Data Sheet |
| 1 | Sept. 2015 | • Table 1, Maximum Ratings: added Maximum Forward Gate Current, p. 2<br>• Table 4, Electrical Characteristics: changed Load Mismatch/Ruggedness signal type to pulse to reflect correct modulation signal, p. 3 |
| 2 | Apr. 2017 | • Biasing sequence for GaN depletion mode transistors: revised note to clarify correct biasing sequence for GaN parts, p. 3<br>• 500–2500 MHz wideband reference circuit: added performance data and graph, reference circuit component layout and component designations, pp. 4–5 |
| 3 | May 2018 | • Table 2, Thermal Characteristics: updated to include $R_{\theta CHC}$ (FEA) data, p. 2 |

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- Подбор аналогов;
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