**NXP Semiconductors**
Technical Data

Document Number: MRF1K50N
Rev. 0, 11/2016

# RF Power LDMOS Transistors

## High Ruggedness N-Channel Enhancement-Mode Lateral MOSFETs

**MRF1K50N**
**MRF1K50GN**

**1.8–500 MHz, 1500 W CW, 50 V WIDEBAND RF POWER LDMOS TRANSISTORS**

These high ruggedness devices are designed for use in high VSWR industrial, scientific and medical applications, as well as radio and VHF TV broadcast, sub-GHz aerospace and mobile radio applications. Their unmatched input and output design allows for wide frequency range use from 1.8 to 500 MHz.

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

| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 87.5-108 (1,2) | CW | 1421 CW | 23.1 | 83.2 |
| 230 (3,4) | Pulse (100 μsec, 20% Duty Cycle) | 1500 Peak | 23.4 | 75.1 |

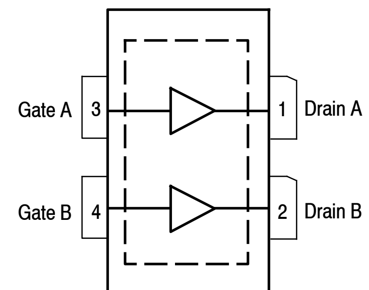
**Load Mismatch/Ruggedness**

| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage | Result |
|---|---|---|---|---|---|
| 230 (3) | Pulse (100 μsec, 20% Duty Cycle) | > 65:1 at all Phase Angles | 15 Peak (3 dB Overdrive) | 50 | No Device Degradation |

1. Data from 87.5–108 MHz broadband reference circuit (page 5).
2. The values shown are the center band performance numbers across the indicated frequency range.
3. Data from 230 MHz narrowband production test fixture (page 11).
4. All data measured in fixture with device soldered to heatsink.

OM-1230-4L
PLASTIC
MRF1K50N

OM-1230G-4L
PLASTIC
MRF1K50GN




(Top View)

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

**Figure 1. Pin Connections**

### Features

- High drain-source avalanche energy absorption capability
- Unmatched input and output allowing wide frequency range utilization
- Device can be used single-ended or in a push-pull configuration
- Characterized from 30 to 50 V for ease of use
- Suitable for linear application
- Integrated ESD protection with greater negative gate-source voltage range for improved Class C operation
- Recommended driver: MRFE6VS25N (25 W)

### Typical Applications

- Industrial, Scientific, Medical (ISM)
  - Laser generation
  - Plasma etching
  - Particle accelerators
  - MRI and other medical applications
  - Industrial heating, welding and drying systems
- Broadcast
  - Radio broadcast
  - VHF TV broadcast
- Aerospace
  - VHF omnidirectional range (VOR)
  - HF and VHF communications
  - Weather radar
- Mobile Radio
  - VHF and UHF base stations

© 2016 NXP B.V.

**Table 1. Maximum Ratings**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Drain-Source Voltage | $V_{DSS}$ | –0.5, +133 | Vdc |
| Gate-Source Voltage | $V_{GS}$ | –6.0, +10 | Vdc |
| Operating Voltage | $V_{DD}$ | 50 | 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 | $P_D$ | 2941<br>14.71 | W<br>W/°C |

**Table 2. Thermal Characteristics**

| Characteristic | Symbol | Value (2,3) | Unit |
|---|---|---|---|
| Thermal Resistance, Junction to Case<br>CW: Case Temperature 80°C, 1500 W CW, 50 Vdc, $I_{DQ(A+B)}$ = 200 mA, 98 MHz | $R_{\theta JC}$ | 0.068 | °C/W |
| Thermal Impedance, Junction to Case<br>Pulse: Case Temperature 75°C, 1500 W Peak, 100 μsec Pulse Width, 20% Duty Cycle,<br>50 Vdc, $I_{DQ(A+B)}$ = 100 mA, 230 MHz | $Z_{\theta JC}$ | 0.015 | °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 2000 V |

**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** ($T_A$ = 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, $I_D$ = 100 mAdc) | $V_{(BR)DSS}$ | 133 | — | — | Vdc |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 50 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 10 | μAdc |
| Zero Gate Voltage Drain Leakage Current<br>($V_{DS}$ = 133 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 100 | mAdc |
| **On Characteristics** | | | | | |
| Gate Threshold Voltage (4)<br>($V_{DS}$ = 10 Vdc, $I_D$ = 2130 μAdc) | $V_{GS(th)}$ | 1.7 | 2.2 | 2.7 | Vdc |
| Gate Quiescent Voltage<br>($V_{DD}$ = 50 Vdc, $I_{D(A+B)}$ = 100 mAdc, Measured in Functional Test) | $V_{GS(Q)}$ | 1.9 | 2.4 | 2.9 | Vdc |
| Drain-Source On-Voltage (4)<br>($V_{GS}$ = 10 Vdc, $I_D$ = 2.4 Adc) | $V_{DS(on)}$ | — | 0.15 | — | Vdc |
| Forward Transconductance (4)<br>($V_{DS}$ = 10 Vdc, $I_D$ = 36 Adc) | $g_{fs}$ | — | 33.5 | — | S |

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.

(continued)

**Table 5. Electrical Characteristics** ($T_A$ = 25°C unless otherwise noted) **(continued)**

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| **Dynamic Characteristics** [1] | | | | | |
| Reverse Transfer Capacitance ($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = 0 Vdc) | $C_{rss}$ | — | 5.77 | — | pF |
| Output Capacitance ($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = 0 Vdc) | $C_{oss}$ | — | 219 | — | pF |
| Input Capacitance ($V_{DS}$ = 50 Vdc, $V_{GS}$ = 0 Vdc ± 30 mV(rms)ac @ 1 MHz) | $C_{iss}$ | — | 683 | — | pF |
| **Functional Tests** [2,3] (In NXP Production Test Fixture, 50 ohm system) $V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 100 mA, $P_{out}$ = 1500 W Peak (300 W Avg.), f = 230 MHz, 100 μsec Pulse Width, 20% Duty Cycle | | | | | |
| Power Gain | $G_{ps}$ | 21.5 | 23.0 | 25.0 | dB |
| Drain Efficiency | $\eta_D$ | 68.0 | 73.0 | — | % |
| Input Return Loss | IRL | — | –16 | –9 | dB |

**Table 6. Load Mismatch/Ruggedness** (In NXP Production Test Fixture, 50 ohm system) $I_{DQ(A+B)}$ = 100 mA

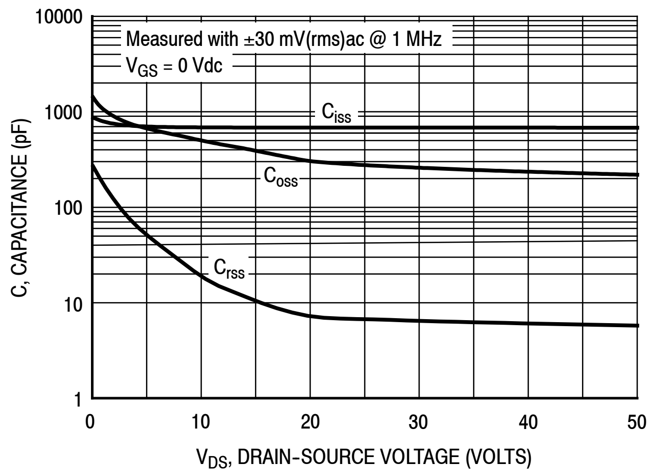
| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage, $V_{DD}$ | Result |
|---|---|---|---|---|---|
| 230 | Pulse (100 μsec, 20% Duty Cycle) | > 65:1 at all Phase Angles | 15 Peak (3 dB Overdrive) | 50 | No Device Degradation |

**Table 7. Ordering Information**

| Device | Tape and Reel Information | Package |
|---|---|---|
| MRF1K50NR5 | R5 Suffix = 50 Units, 56 mm Tape Width, 13-inch Reel | OM-1230-4L |
| MRF1K50GNR5 | | OM-1230G-4L |

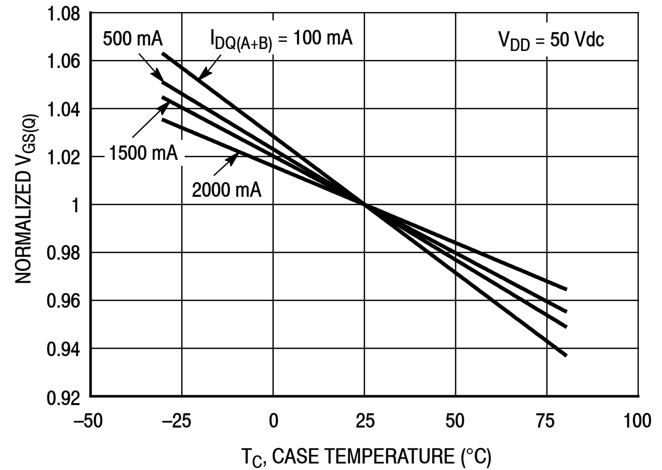
1. Each side of device measured separately.
2. Devices tested without thermal grease or solder under the transistor.
3. Measurements made with device in straight lead configuration before any lead forming operation is applied. Lead forming is used for gull wing (GN) parts.

## TYPICAL CHARACTERISTICS



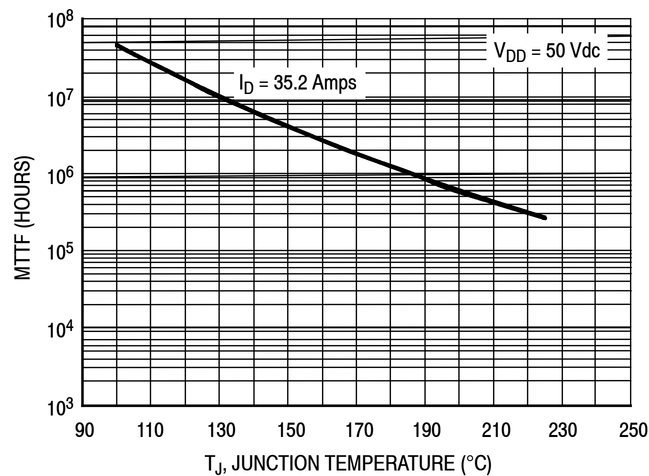

**Note:** Each side of device measured separately.

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




| $I_{DQ}$ (mA) | Slope (mV/°C) |
|---|---|
| 100 | –2.76 |
| 500 | –2.38 |
| 1500 | –2.20 |
| 2000 | –1.76 |

**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**

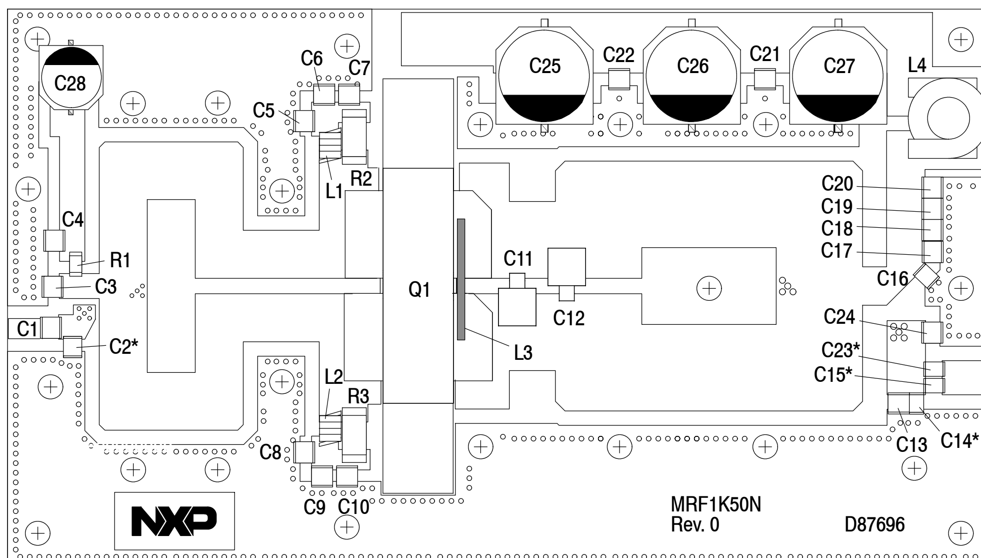
## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT

**Table 8. 87.5–108 MHz Broadband Performance** (In NXP Reference Circuit, 50 ohm system)

$V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 200 mA, $P_{in}$ = 7 W, CW

| Frequency (MHz) | $G_{ps}$ (dB) | $\eta_D$ (%) | $P_{out}$ (W) |
|---|---|---|---|
| 87.5 | 22.5 | 81.7 | 1257 |
| 98 | 23.1 | 83.2 | 1421 |
| 108 | 22.8 | 79.1 | 1328 |

## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT — 2.88″ × 5.12″ (73 mm × 130 mm)




*C2, C14, C15 and C23 are mounted vertically.
Note: Q1 leads are soldered to the PCB with L3 soldered directly on top of the drain leads.

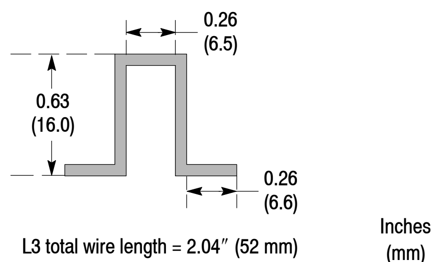



**Figure 5. MRF1K50N 87.5–108 MHz Broadband Reference Circuit Component Layout**

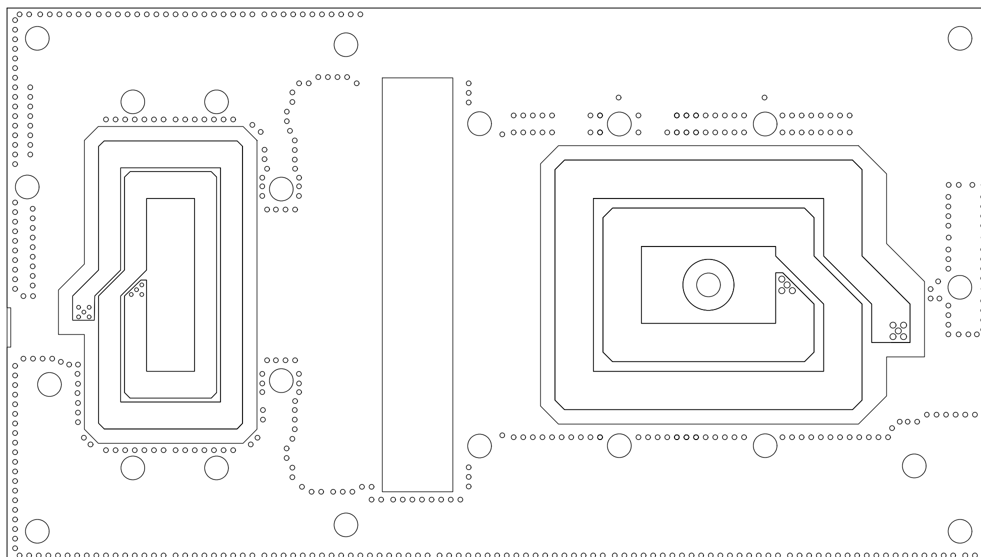


**Figure 6. MRF1K50N 87.5–108 MHz Broadband Reference Circuit Component Layout — Bottom**

## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT

**Table 9. MRF1K50N Broadband Reference Circuit Component Designations and Values — 87.5–108 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1, C3, C6, C9, C18, C19, C20, C21, C22 | 1000 pF Chip Capacitors | ATC100B102JT50XT | ATC |
| C2 | 33 pF Chip Capacitor | ATC100B330JT500XT | ATC |
| C4, C5, C8 | 10,000 pF Chip Capacitors | ATC200B103KT50XT | ATC |
| C7, C10, C15, C16, C17, C23 | 470 pF Chip Capacitors | ATC100B471JT200XT | ATC |
| C11 | 91 pF, 300 V Mica Capacitor | MIN02-002EC910J-F | CDE |
| C12 | 56 pF, 300 V Mica Capacitor | MIN02-002DC560J-F | CDE |
| C13 | 2.2 pF Chip Capacitor | ATC100B2R2JT500XT | ATC |
| C14, C24 | 12 pF Chip Capacitors | ATC100B120GT500XT | ATC |
| C25, C26, C27 | 220 μF, 100 V Electrolytic Capacitors | EEV-FK1A221M | Panasonic |
| C28 | 22 μF, 35 V Electrolytic Capacitor | UUD1V220MCL1GS | Nichicon |
| L1, L2 | 17.5 nH Inductors, 6 Turns | B06TJLC | Coilcraft |
| L3 | 1.5 mm Non-Tarnish Silver Plated Copper Wire | SP1500NT-001 | Scientific Wire Company |
| L4 | 22 nH Inductor | 1212VS-22NMEB | Coilcraft |
| Q1 | RF Power LDMOS Transistor | MRF1K50N | NXP |
| R1 | 10 Ω, 1/4 W Chip Resistor | CRCW120610R0JNEA | Vishay |
| R2, R3 | 33 Ω, 2 W Chip Resistors | 1-2176070-3 | TE Connectivity |
| PCB | Arlon TC350 0.030″, $\varepsilon_r$ = 3.5 | D87696 | MTL |

Note: Refer to MRF1K50N's printed circuit boards and schematics to download the 87.5–108 MHz heatsink drawing.

## TYPICAL CHARACTERISTICS — 87.5–108 MHz BROADBAND REFERENCE CIRCUIT

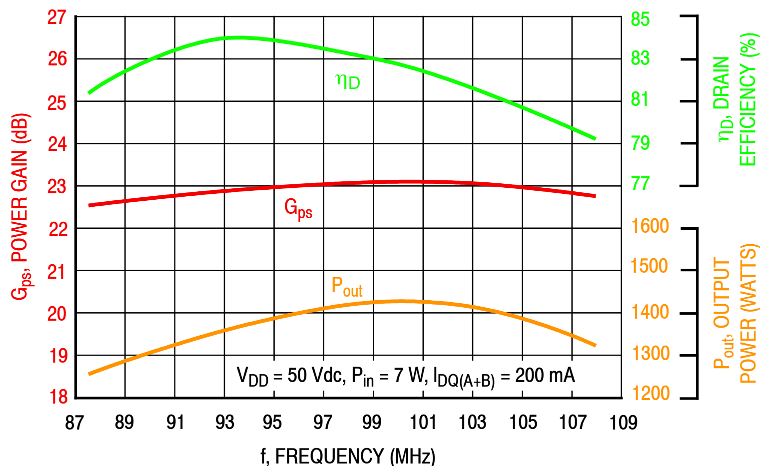



**Figure 7. Power Gain, Drain Efficiency and CW Output Power versus Frequency at a Constant Input Power**

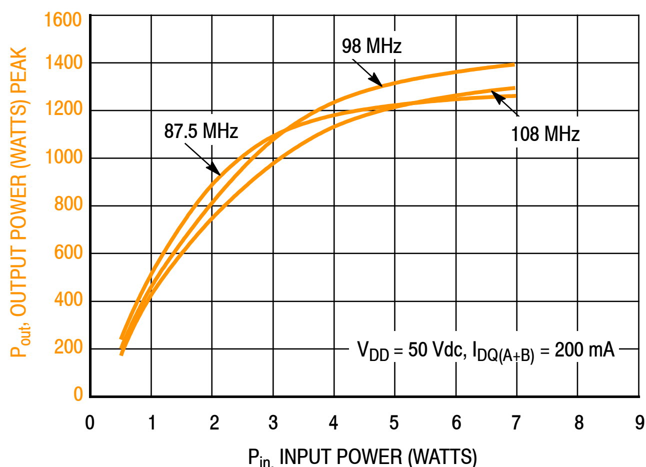



**Figure 8. CW Output Power versus Input Power and Frequency**

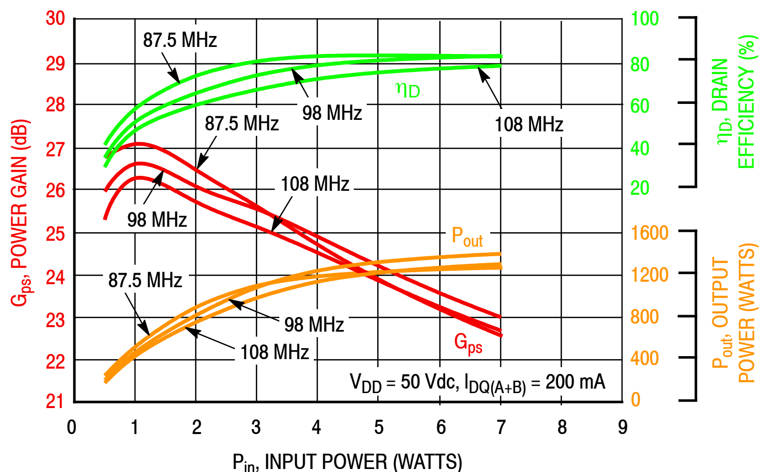
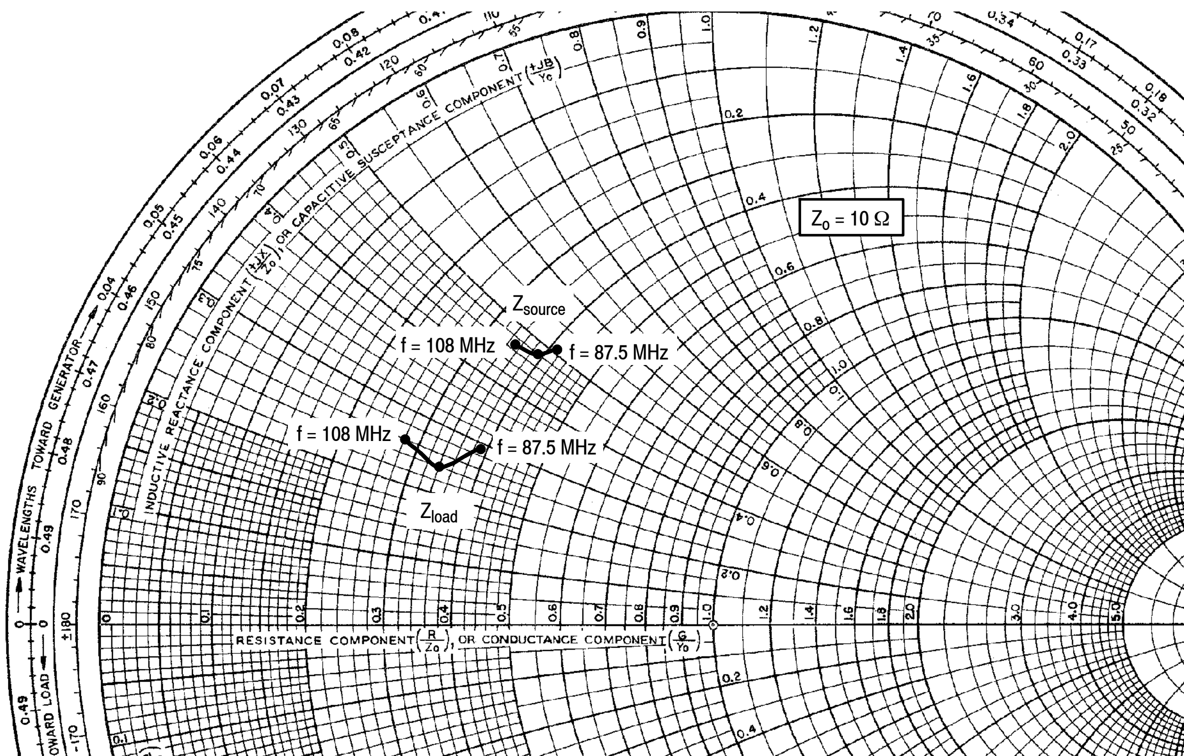



**Figure 9. Power Gain, Drain Efficiency and CW Output Power versus Input Power and Frequency**




| f<br>MHz | $Z_{source}$<br>Ω | $Z_{load}$<br>Ω |
|---|---|---|
| 87.5 | 4.07 + j5.13 | 3.92 + j2.89 |
| 98 | 3.93 + j4.84 | 3.39 + j2.35 |
| 108 | 3.50 + j4.72 | 2.83 + j2.56 |

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

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

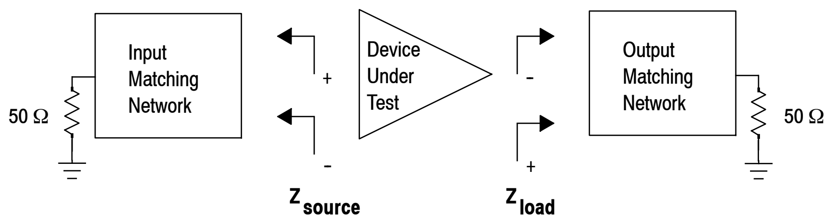
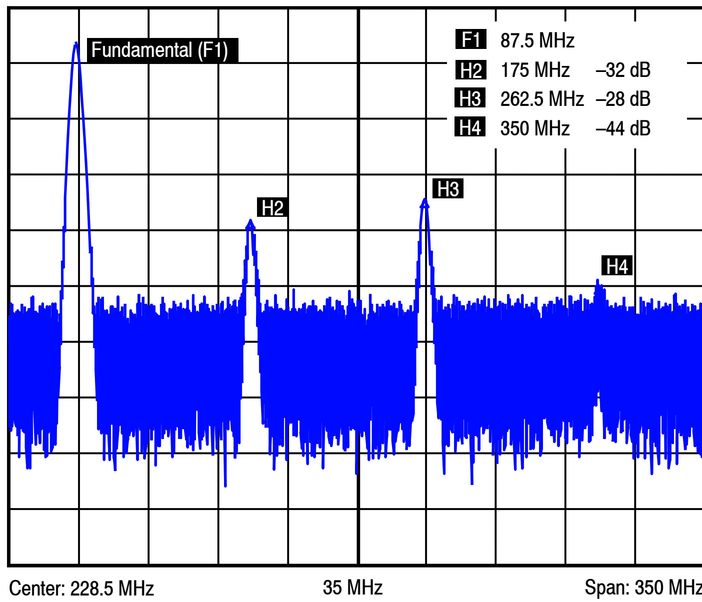



**Figure 10. Broadband Series Equivalent Source and Load Impedance — 87.5–108 MHz**

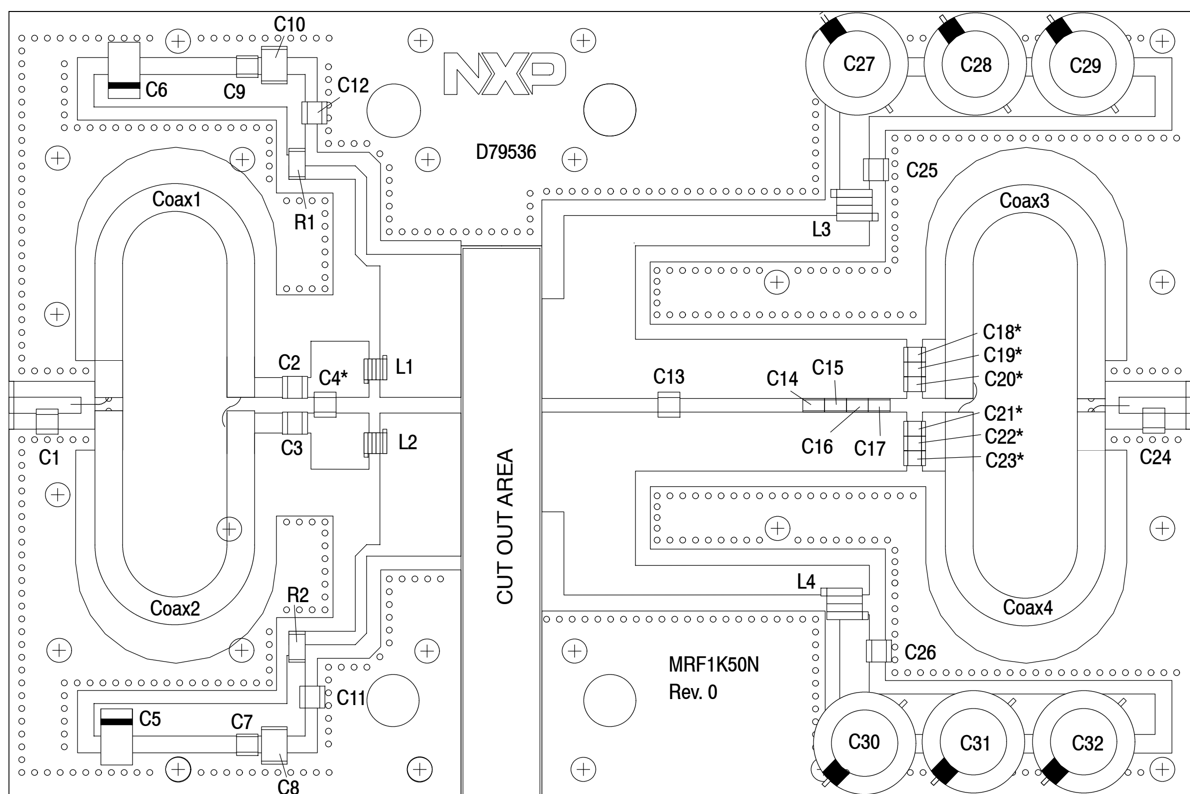
## HARMONIC MEASUREMENTS — 87.5–108 MHz BROADBAND REFERENCE CIRCUIT




| H2 (175 MHz) | H3 (262.5 MHz) | H4 (350 MHz) |
|---|---|---|
| –32 dB | –28 dB | –44 dB |

**Figure 11. 87.5 MHz Harmonics @ 1200 W CW**

## 230 MHz NARROWBAND PRODUCTION TEST FIXTURE — 6.0″ × 4.0″ (152 mm × 102 mm)




*C4, C18, C19, C20, C21, C22 and C23 are mounted vertically.

**Figure 12. MRF1K50N Narrowband Test Circuit Component Layout — 230 MHz**

**Table 10. MRF1K50N Narrowband Test Circuit Component Designations and Values — 230 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1, C2, C3 | 22 pF Chip Capacitors | ATC100B220JT500XT | ATC |
| C4 | 27 pF Chip Capacitor | ATC100B270JT500XT | ATC |
| C5, C6 | 22 μF, 35 V Tantalum Capacitors | T491X226K035AT | Kemet |
| C7, C9 | 0.1 μF Chip Capacitors | CDR33BX104AKWS | AVX |
| C8, C10 | 220 nF Chip Capacitors | C1812C224K5RACTU | Kemet |
| C11, C12, C25, C26 | 1000 pF Chip Capacitors | ATC100B102JT50XT | ATC |
| C13 | 51 pF Chip Capacitor | ATC100B510JT500XT | ATC |
| C14 | 24 pF Chip Capacitor | ATC800R240JT500XT | ATC |
| C15, C16, C17 | 20 pF Chip Capacitors | ATC800R200JT500XT | ATC |
| C18, C19, C20, C21, C22, C23 | 240 pF Chip Capacitors | ATC100B241JT200XT | ATC |
| C24 | 8.2 pF Chip Capacitor | ATC100B8R2CT500XT | ATC |
| C27, C28, C29, C30, C31, C32 | 470 μF, 63 V Electrolytic Capacitors | MCGPR63V477M13X26-RH | Multicomp |
| Coax1, 2, 3, 4 | 25 Ω Semi Rigid Coax Cables, 2.2″ Shield Length | UT-141C-25 | Micro-Coax |
| L1, L2 | 5 nH Inductors | A02TKLC | Coilcraft |
| L3, L4 | 6.6 nH Inductors | GA3093-ALC | Coilcraft |
| R1, R2 | 10 Ω, 1/4 W Chip Resistors | CRCW120610R0JNEA | Vishay |
| PCB | Arlon AD255A 0.030″, $\varepsilon_r$ = 2.55 | D79536 | MTL |

## TYPICAL CHARACTERISTICS — 230 MHz
## PRODUCTION TEST FIXTURE

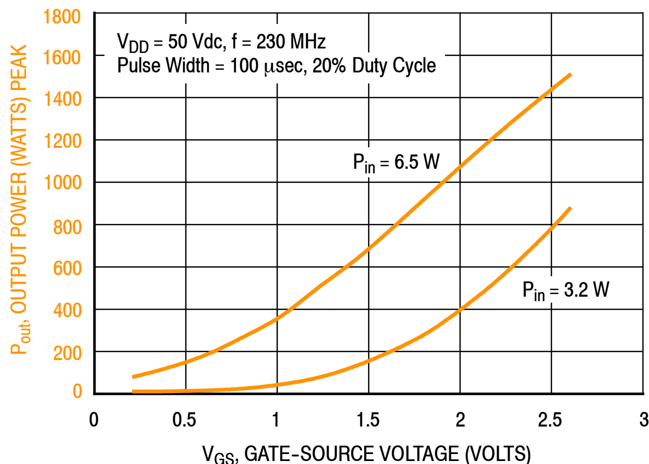
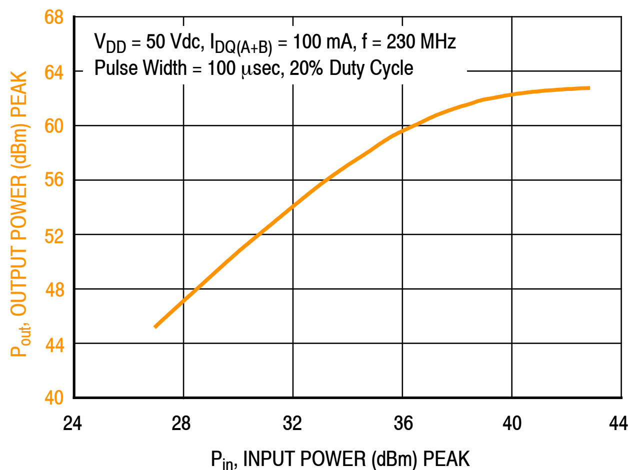



**Figure 13. Output Power versus Gate-Source Voltage at a Constant Input Power**




| f (MHz) | P1dB (W) | P3dB (W) |
|---|---|---|
| 230 | 1629 | 1857 |

**Figure 14. Output Power versus Input Power**

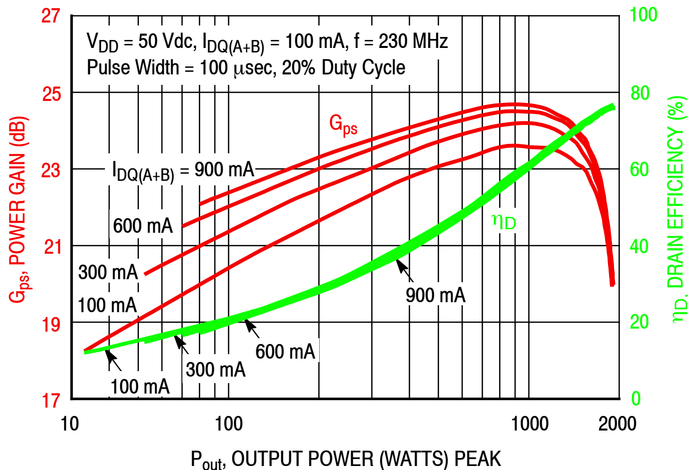



**Figure 15. Power Gain and Drain Efficiency versus Output Power and Quiescent Current**

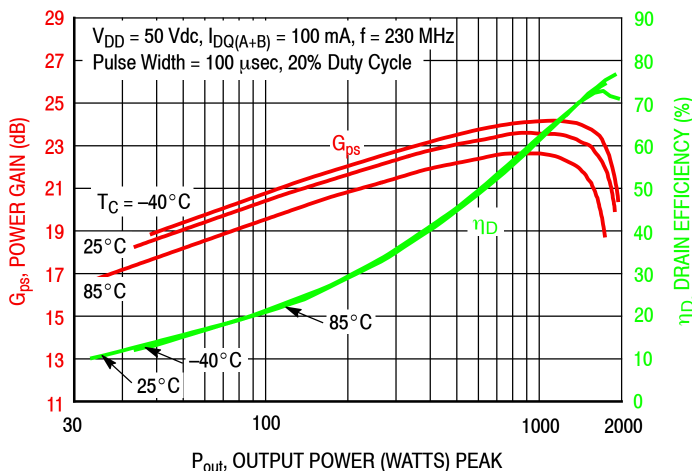



**Figure 16. Power Gain and Drain Efficiency versus Output Power**

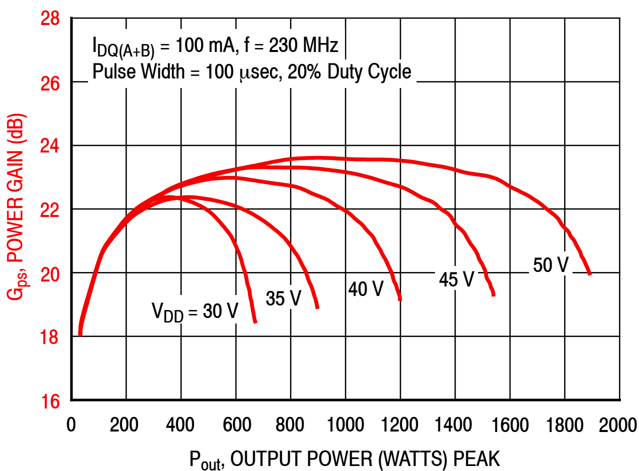



**Figure 17. Power Gain versus Output Power and Drain-Source Voltage**

## 230 MHz NARROWBAND PRODUCTION TEST FIXTURE

| f<br>MHz | $Z_{source}$<br>Ω | $Z_{load}$<br>Ω |
|---|---|---|
| 230 | 1.0 + j2.0 | 1.7 + j0.9 |

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

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

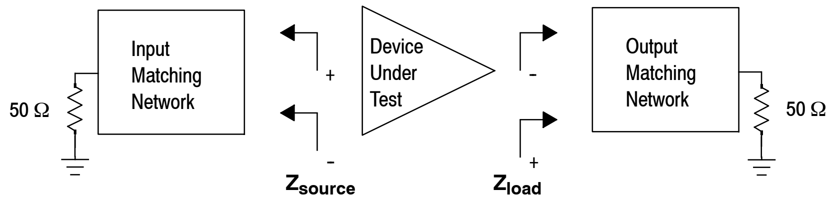
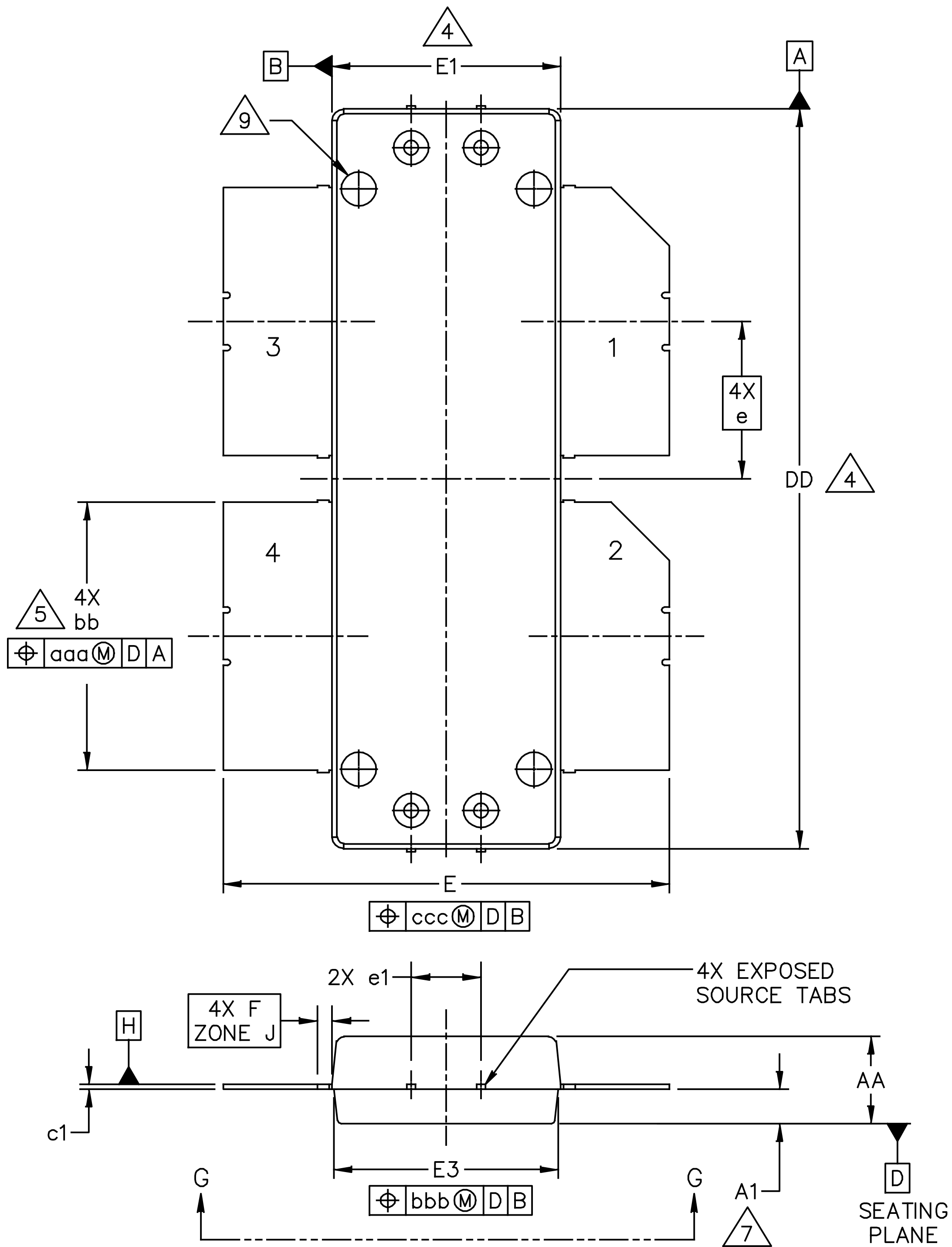


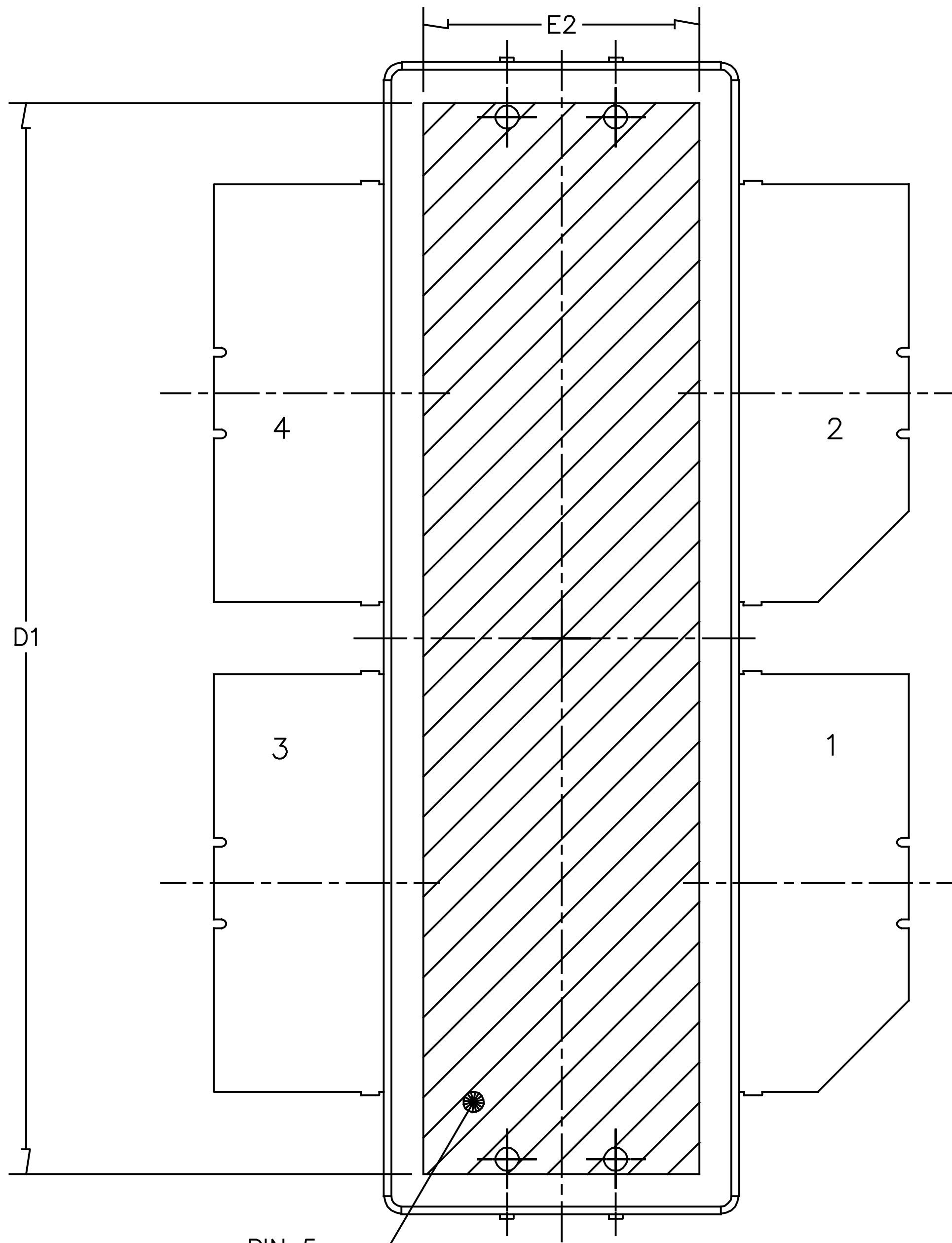

**Figure 18. Narrowband Series Equivalent Source and Load Impedance — 230 MHz**

## PACKAGE DIMENSIONS




© NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED

| MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|
| TITLE: OM–1230–4L | DOCUMENT NO: 98ASA00506D REV: C |
| | STANDARD: NON–JEDEC |
| | SOT1816–1 08 FEB 2016 |




| © NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: OM–1230–4L | DOCUMENT NO: 98ASA00506D REV: C | |
| | STANDARD: NON–JEDEC | |
| | SOT1816–1 08 FEB 2016 | |

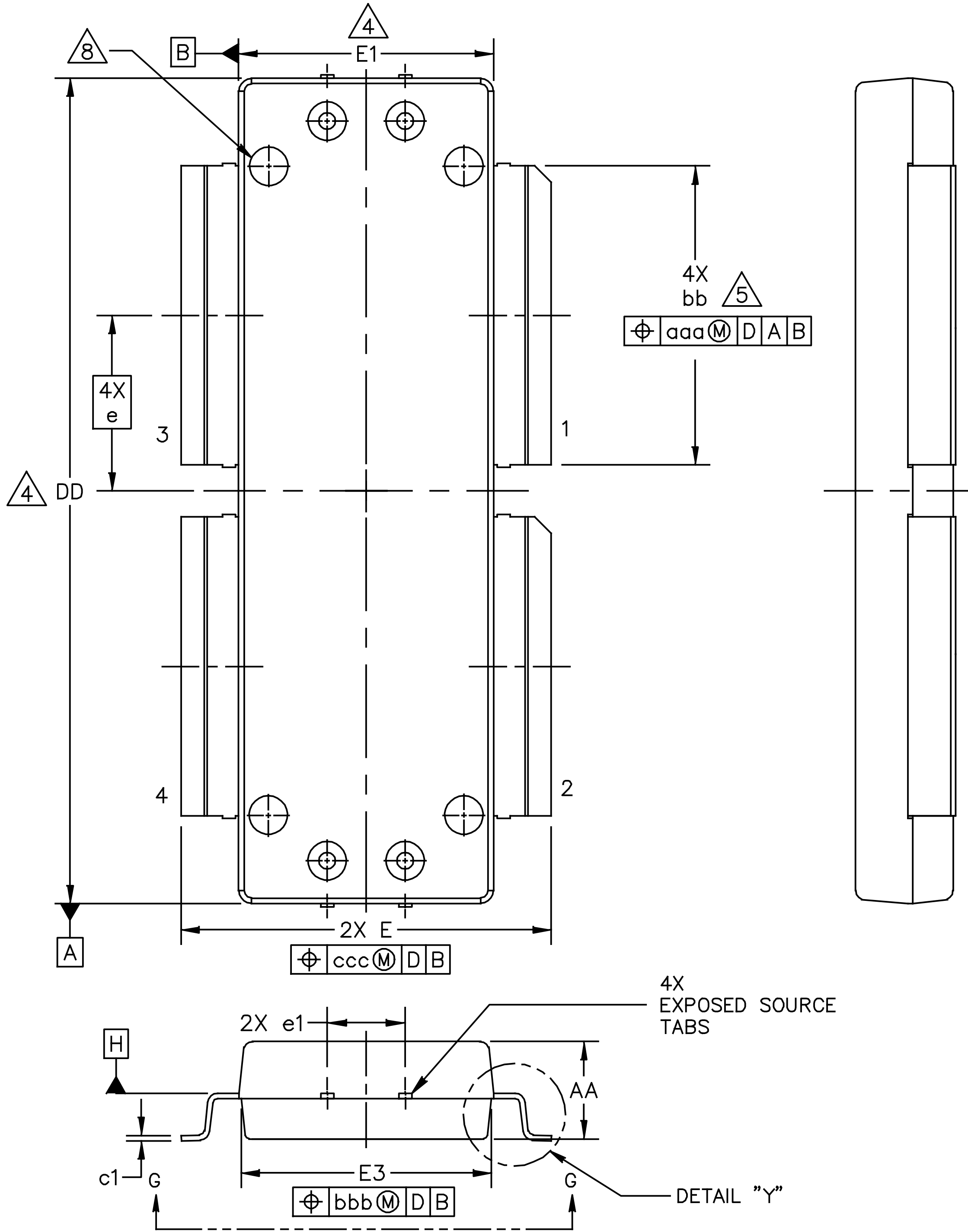
NOTES:

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 DD AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 INCH (0.15 MM) PER SIDE. DIMENSIONS DD AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.
5. DIMENSION bb DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 INCH (0.13 MM) TOTAL IN EXCESS OF THE bb 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.
9. DIMPLED HOLE REPRESENTS INPUT SIDE.

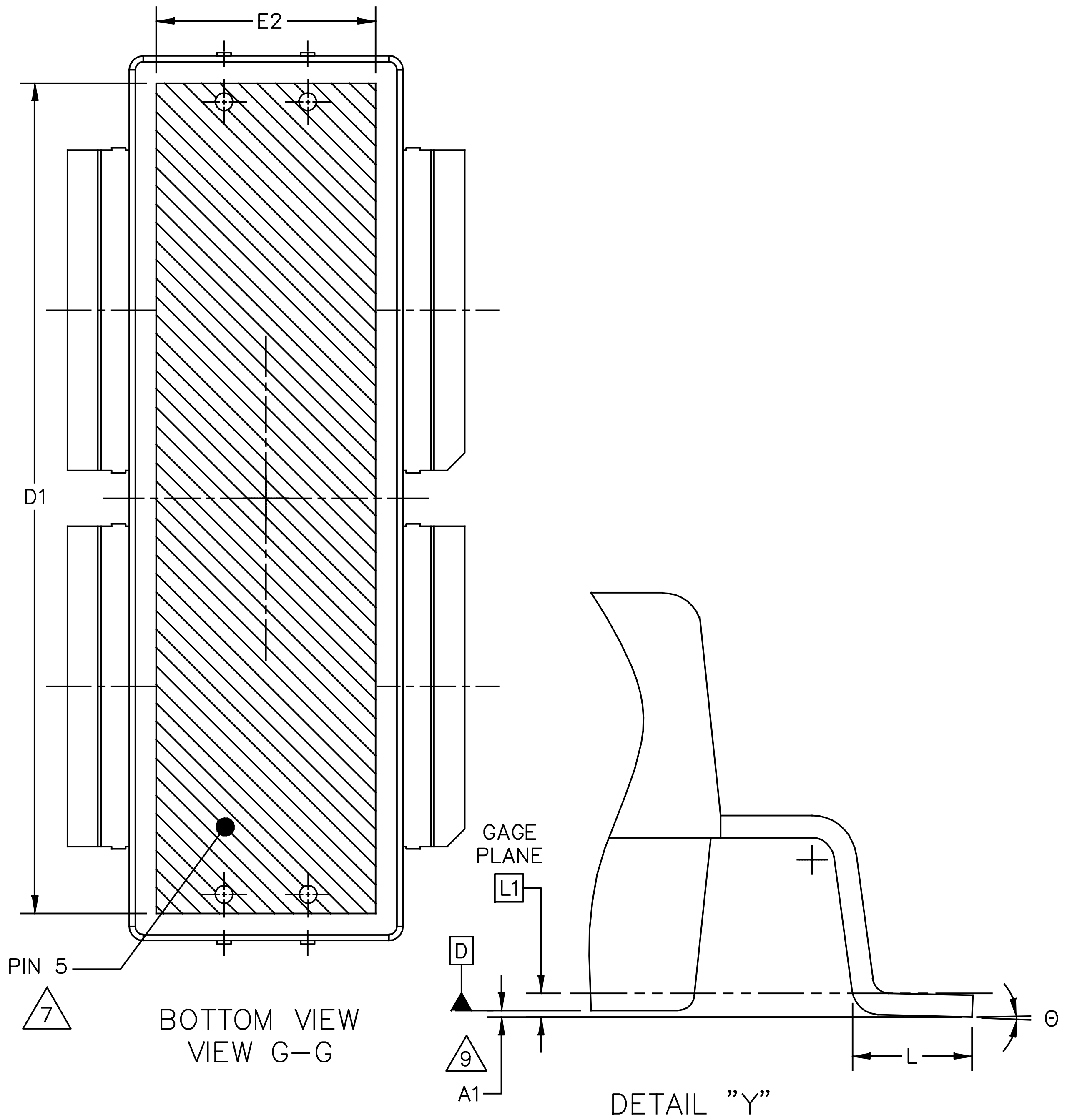
| | INCH | | MILLIMETER | | | INCH | | MILLIMETER | |
|---|---|---|---|---|---|---|---|---|---|
| DIM | MIN | MAX | MIN | MAX | DIM | MIN | MAX | MIN | MAX |
| AA | .148 | .152 | 3.76 | 3.86 | bb | .457 | .463 | 11.61 | 11.76 |
| A1 | .059 | .065 | 1.50 | 1.65 | c1 | .007 | .011 | 0.18 | 0.28 |
| DD | 1.267 | 1.273 | 32.18 | 32.33 | e | .270 BSC | | 6.86 BSC | |
| D1 | 1.180 | ---- | 29.97 | ---- | e1 | .116 | .124 | 2.95 | 3.15 |
| E | .762 | .770 | 19.35 | 19.56 | | | | | |
| E1 | .390 | .394 | 9.91 | 10.01 | aaa | .004 | | 0.10 | |
| E2 | .306 | ---- | 7.77 | ---- | bbb | .006 | | 0.15 | |
| E3 | .383 | .387 | 9.73 | 9.83 | ccc | .010 | | 0.25 | |
| F | .025 BSC | | 0.635 BSC | | | | | | |

© NXP SEMICONDUCTORS N.V.
ALL RIGHTS RESERVED

| MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|
| TITLE: OM–1230–4L | DOCUMENT NO: 98ASA00506D REV: C |
| | STANDARD: NON–JEDEC |
| | SOT1816–1 08 FEB 2016 |




| © NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: OM–1230G–4L | DOCUMENT NO: 98ASA00818D REV: B | |
| | STANDARD: NON–JEDEC | |
| | SOT1824–1 18 FEB 2016 | |




| © NXP SEMICONDUCTORS N.V. ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: OM–1230G–4L | DOCUMENT NO: 98ASA00818D | REV: B |
| | STANDARD: NON–JEDEC | |
| | SOT1824–1 | 18 FEB 2016 |

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 DD AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 INCH (0.15 MM) PER SIDE. DIMENSIONS DD AND E1 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE H.

5. DIMENSION bb DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 INCH (0.13 MM) TOTAL IN EXCESS OF THE bb DIMENSION AT MAXIMUM MATERIAL CONDITION.

6. DATUMS A AND B TO BE DETERMINED AT DATUM PLANE H.

7. HATCHING REPRESENTS THE EXPOSED AND SOLDERABLE 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.

8. DIMPLED HOLE REPRESENTS INPUT SIDE.

9. DIMENSION A1 IS MEASURED WITH REFERENCE TO DATUM D. THE POSITIVE VALUE IMPLIES THAT THE BOTTOM OF THE PACKAGE IS HIGHER THAN THE BOTTOM OF THE LEAD.

| DIM | INCH | | MILLIMETER | | DIM | INCH | | MILLIMETER | |
|---|---|---|---|---|---|---|---|---|---|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| AA | .148 | .152 | 3.76 | 3.86 | bb | .457 | .463 | 11.61 | 11.76 |
| A1 | –.003 | .003 | –0.08 | 0.08 | c1 | .007 | .011 | 0.18 | 0.28 |
| DD | 1.267 | 1.273 | 32.18 | 32.33 | e | .270 BSC | | 6.86 BSC | |
| D1 | 1.180 | ---- | 29.97 | ---- | e1 | .116 | .124 | 2.95 | 3.15 |
| E | .563 | .575 | 14.30 | 14.61 | Θ | 0° | 8° | 0° | 8° |
| E1 | .390 | .394 | 9.91 | 10.01 | aaa | .004 | | 0.10 | |
| E2 | .306 | ---- | 7.77 | ---- | bbb | .006 | | 0.15 | |
| E3 | .383 | .387 | 9.73 | 9.83 | ccc | .010 | | 0.25 | |
| L | .034 | .046 | 0.86 | 1.17 | | | | | |
| L1 | .010 BSC | | 0.25 BSC | | | | | | |

© NXP SEMICONDUCTORS N.V.
ALL RIGHTS RESERVED

| MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|
| TITLE: OM–1230G–4L | DOCUMENT NO: 98ASA00818D REV: B |
| | STANDARD: NON–JEDEC |
| | SOT1824–1 18 FEB 2016 |

## PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following resources to aid your design process.

**Application Notes**

- AN1907: Solder Reflow Attach Method for High Power RF Devices in Over-Molded Plastic 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 | Nov. 2016 | • Initial Release of Data Sheet |

*How to Reach Us:*

**Home Page:**
nxp.com

**Web Support:**
nxp.com/support

Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document. NXP reserves the right to make changes without further notice to any products herein.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including "typicals," must be validated for each customer application by customer's technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: nxp.com/SalesTermsandConditions.

NXP, the NXP logo, Freescale, and the Freescale logo are trademarks of NXP B.V.
All other product or service names are the property of their respective owners.
© 2016 NXP B.V.

Document Number: MRF1K50N
Rev. 0, 11/2016