Freescale Semiconductor
Technical Data

Document Number: MRFE6VP6600N
Rev. 0, 5/2015

RoHS

# RF Power LDMOS Transistors

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

**MRFE6VP6600N**
**MRFE6VP6600GN**

**1.8–600 MHz, 600 W CW, 50 V WIDEBAND RF POWER LDMOS TRANSISTORS**

These high ruggedness devices are designed for use in high VSWR industrial, medical, broadcast, aerospace, and mobile radio applications. Their unmatched input and output design allows for wide frequency range use from 1.8 to 600 MHz.

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

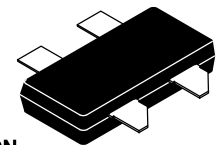
| Frequency (MHz) | Signal Type | $P_{out}$ (W) | $G_{ps}$ (dB) | $\eta_D$ (%) |
|---|---|---|---|---|
| 87.5–108 (1,3) | CW | 600 CW | 24.0 | 81.8 |
| 230 (2) | Pulse (100 μsec, 20% Duty Cycle) | 600 Peak | 24.7 | 73.5 |

**Load Mismatch/Ruggedness**

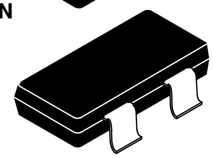
| Frequency (MHz) | Signal Type | VSWR | $P_{in}$ (W) | Test Voltage | Result |
|---|---|---|---|---|---|
| 230 (2) | Pulse (100 μsec, 20% Duty Cycle) | > 65:1 at all Phase Angles | 4.0 Peak (3 dB Overdrive) | 50 | No Device Degradation |

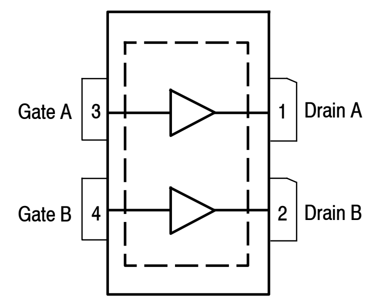
1. Measured in 87.5–108 MHz broadband reference circuit.
2. Measured in 230 MHz narrowband production test circuit.
3. The values shown are the center band performance numbers across the indicated frequency range.

OM-780-4L
PLASTIC
MRFE6VP6600N



OM-780G-4L
PLASTIC
MRFE6VP6600GN






(Top View)

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

**Figure 1. Pin Connections**

### Features

- Unmatched Input and Output Allowing Wide Frequency Range Utilization
- Device can be used Single-Ended or in a Push-Pull Configuration
- Qualified up to a Maximum of 50 $V_{DD}$ Operation
- Characterized from 30 to 50 V for Extended Power Range
- Suitable for Linear Application with Appropriate Biasing
- Integrated ESD Protection with Greater Negative Gate-Source Voltage Range for Improved Class C Operation
- Characterized with Series Equivalent Large-Signal Impedance Parameters
- Recommended drivers: AFT05MS004N (4 W) or MRFE6VS25N (25 W)

### Typical Applications

- Broadcast
  - FM broadcast
  - HF and VHF broadcast
- Industrial, Scientific, Medical (ISM)
  - $CO_2$ laser generation
  - Plasma etching
  - Particle accelerators (synchrotrons)
  - MRI
  - Industrial heating/welding
- Aerospace
  - VHF omnidirectional range (VOR)
  - Weather radar
- Mobile Radio
  - HF and VHF communications
  - PMR base stations

**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 |
| 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 |

**Table 2. Thermal Characteristics**

| Characteristic | Symbol | Value (2,3) | Unit |
|---|---|---|---|
| Thermal Impedance, Junction to Case<br>Pulse: Case Temperature 78°C, 600 W Pulse, 100 μsec Pulse Width, 20% Duty Cycle, $I_{DQ(A+B)}$ = 100 mA, 230 MHz | $Z_{\theta JC}$ | 0.033 | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology | Class |
|---|---|
| Human Body Model (per JESD22-A114) | Class 2, passes 2500 V |
| Machine Model (per EIA/JESD22-A115) | Class B, passes 200 V |
| Charge Device Model (per JESD22-C101) | Class IV, 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 ($V_{GS}$ = 5 Vdc, $V_{DS}$ = 0 Vdc) | $I_{GSS}$ | — | — | 1 | μAdc |
| Drain-Source Breakdown Voltage ($V_{GS}$ = 0 Vdc, $I_D$ = 50 mAdc) | $V_{(BR)DSS}$ | 133 | — | — | Vdc |
| Zero Gate Voltage Drain Leakage Current ($V_{DS}$ = 50 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 10 | μAdc |
| Zero Gate Voltage Drain Leakage Current ($V_{DS}$ = 100 Vdc, $V_{GS}$ = 0 Vdc) | $I_{DSS}$ | — | — | 20 | μAdc |
| **On Characteristics** | | | | | |
| Gate Threshold Voltage (4) ($V_{DS}$ = 10 Vdc, $I_D$ = 888 μAdc) | $V_{GS(th)}$ | 1.7 | 2.2 | 2.7 | Vdc |
| Gate Quiescent Voltage ($V_{DD}$ = 50 Vdc, $I_D$ = 100 mAdc, Measured in Functional Test) | $V_{GS(Q)}$ | 2.0 | 2.6 | 3.0 | Vdc |
| Drain-Source On-Voltage (4) ($V_{GS}$ = 10 Vdc, $I_D$ = 1 Adc) | $V_{DS(on)}$ | — | 0.2 | — | Vdc |
| Forward Transconductance (4) ($V_{DS}$ = 10 Vdc, $I_D$ = 30 Adc) | $g_{fs}$ | — | 28.0 | — | S |

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at http://www.freescale.com/rf/calculators.
3. AN1955 – *Thermal Measurement Methodology of RF Power Amplifiers.* Go to http://www.freescale.com/rf and search 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) | $C_{rss}$ | — | 2.4 | — | pF |
| Output Capacitance ($V_{DS}$ = 50 Vdc ± 30 mV(rms)ac @ 1 MHz, $V_{GS}$ = 0 Vdc) | $C_{oss}$ | — | 98 | — | pF |
| Input Capacitance ($V_{DS}$ = 50 Vdc, $V_{GS}$ = 0 Vdc ± 30 mV(rms)ac @ 1 MHz) | $C_{iss}$ | — | 290 | — | pF |
| **Functional Tests** (2) (In Freescale Production Test Fixture, 50 ohm system) $V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 100 mA, $P_{out}$ = 600 W Peak (120 W Avg.), f = 230 MHz, 100 μsec Pulse Width, 20% Duty Cycle | | | | | |
| Power Gain | $G_{ps}$ | 23.3 | 24.7 | 26.6 | dB |
| Drain Efficiency | $\eta_D$ | 70 | 73.5 | — | % |
| Input Return Loss | IRL | — | –15 | –9 | dB |

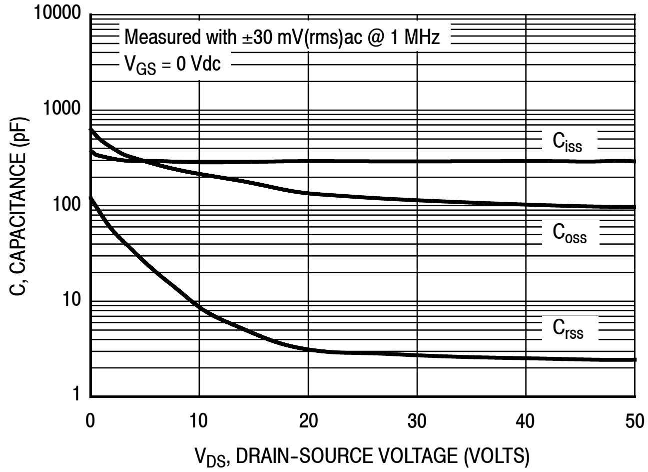
**Table 6. Load Mismatch/Ruggedness** (In Freescale Production Test Fixture, 50 ohm system) $I_{DQ(A+B)}$ = 100 mA

| 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 | 4.0 Peak (3 dB Overdrive) | 50 | No Device Degradation |

**Table 7. Ordering Information**

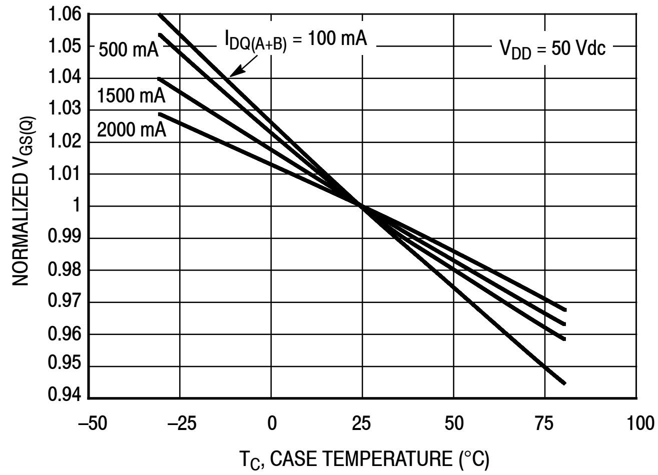
| Device | Tape and Reel Information | Package |
|---|---|---|
| MRFE6VP6600NR3 | R3 Suffix = 250 Units, 32 mm Tape Width, 13-inch Reel | OM-780-4L |
| MRFE6VP6600GNR3 | | OM-780G-4L |

1. Each side of device measured separately.
2. Measurements made with device in straight lead configuration before any lead forming operation is applied. Lead forming is used for gull wing (GN) parts.




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

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




| $I_{DQ}$ (mA) | Slope (mV/°C) |
|---|---|
| 100 | –2.554 |
| 500 | –2.254 |
| 1500 | –1.973 |
| 2000 | –1.573 |

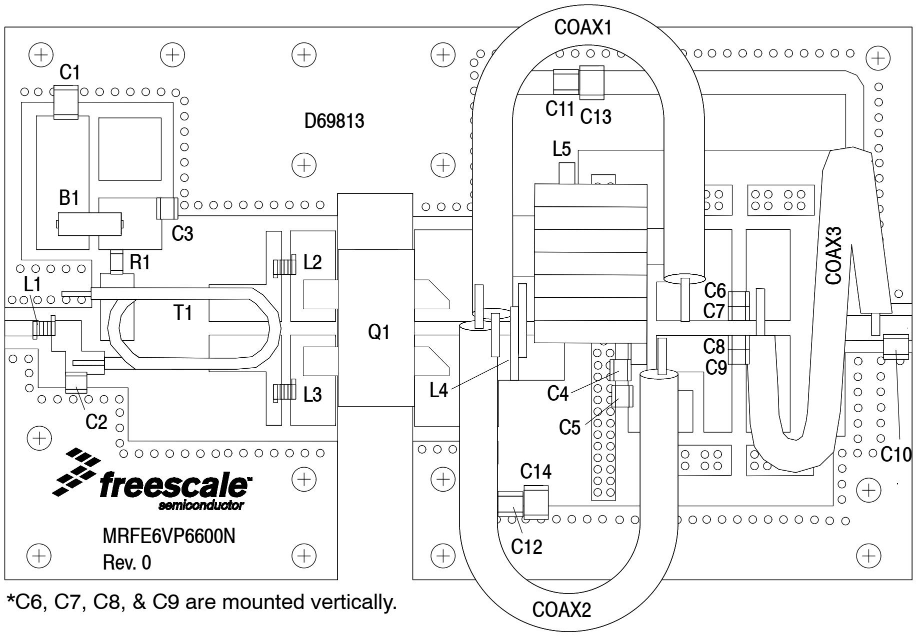
**Figure 3. Normalized $V_{GS}$ versus Quiescent Current and Case Temperature**

## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT — 4.73″ × 2.88″ (12.0 cm × 7.32 cm)

**Table 8. 87.5–108 MHz Broadband Performance** (In Freescale Reference Circuit, 50 ohm system)
$V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 150 mA, $P_{in}$ = 3 W, CW

| Frequency (MHz) | $G_{ps}$ (dB) | $\eta_D$ (%) | $P_{out}$ (W) |
|---|---|---|---|
| 87.5 | 23.8 | 82.4 | 722 |
| 98 | 24.0 | 81.8 | 746 |
| 108 | 23.5 | 80.9 | 679 |

## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT — 4.73″ × 2.88″ (12.0 cm × 7.32 cm)




*C6, C7, C8, & C9 are mounted vertically.

**Figure 4. MRFE6VP6600N 87.5–108 MHz Broadband Reference Circuit Component Layout**

**Table 9. MRFE6VP6600N 87.5–108 MHz Broadband Reference Circuit Component Designations and Values**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| B1 | 95 Ω, 100 MHz, Long RF Bead | 2743021447 | Fair-Rite |
| C1 | 6.8 μF Chip Capacitor | C4532X7R1H685M250KB | TDK |
| C2 | 33 pF Chip Capacitor | ATC100B330JT500XT | ATC |
| C3, C6, C7, C8, C9, C11, C12 | 1000 pF Chip Capacitors | ATC100B102JT50XT | ATC |
| C4, C5 | 470 pF Chip Capacitors | ATC100B471JT200XT | ATC |
| C10 | 8.2 pF Chip Capacitor | ATC100B8R2CT500XT | ATC |
| C13, C14 | 2.2 μF Chip Capacitors | HMK432B7225KM-T | Taiyo Yuden |
| Coax1, Coax2 | Coax Cable, 12 Ω, 4.72″ (12 cm) Shield Length | TC-12 | Communication Concepts, RF Power Systems |
| Coax3 | Coax Cable, 50 Ω, 6.69″ (17 cm) Shield Length, 2 Loops, ≈ 0.750″ (19 mm) ∅ (FEP) | Sucoform 141 | Huber & Suhner |
| L1 | 100 nH Inductor | 1812SMS-R10JLC | Coilcraft |
| L2, L3 | 8.0 nH, 3 Turn Inductors | A03TKLC | Coilcraft |
| L4 | 2 Turns, #14 AWG Copper Loop, ID = 0.26″ (7 mm) Inductor, Hand Wound | Copper Wire | |
| L5 | 7 Turns, #14 AWG Copper Loop, ID = 0.39″ (10 mm) Inductor, Hand Wound | Copper Wire | |
| Q1 | RF Power LDMOS Transistor | MRFE6VP6600NR3 | Freescale |
| R1 | 11 Ω, 1/4 W Chip Resistor | CRCW120611R0FKEA | Vishay |
| T1 | TUI-LF-9 Transformer | TUI-LF-9 | Communication Concepts, RF Power Systems |
| PCB | Arlon TC-350, $\varepsilon_r$ = 3.50, 0.03″ | D69813 | Shenzhen Multilayer PCB Technology Co. |

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

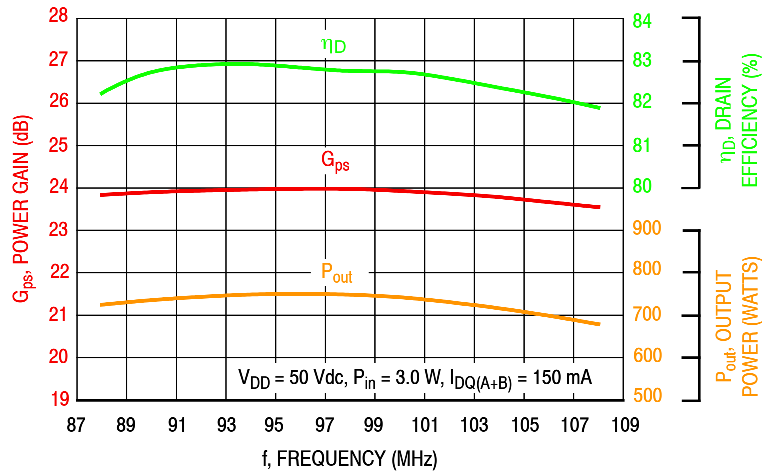



**Figure 5. Power Gain, Pout and Drain Efficiency versus Frequency**

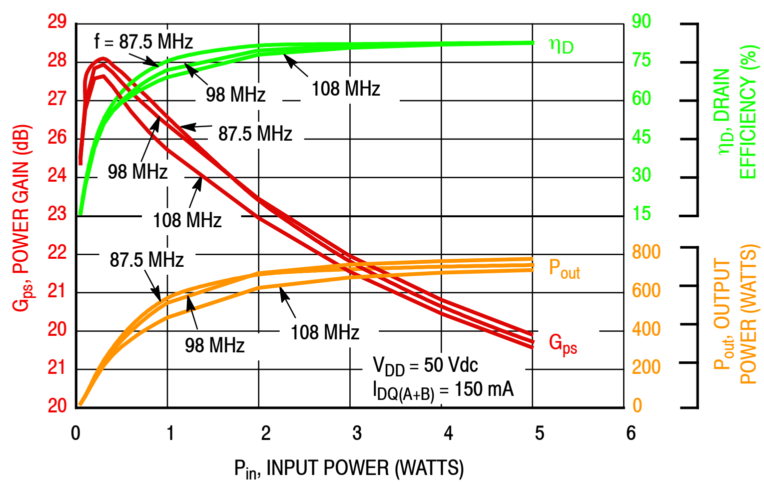
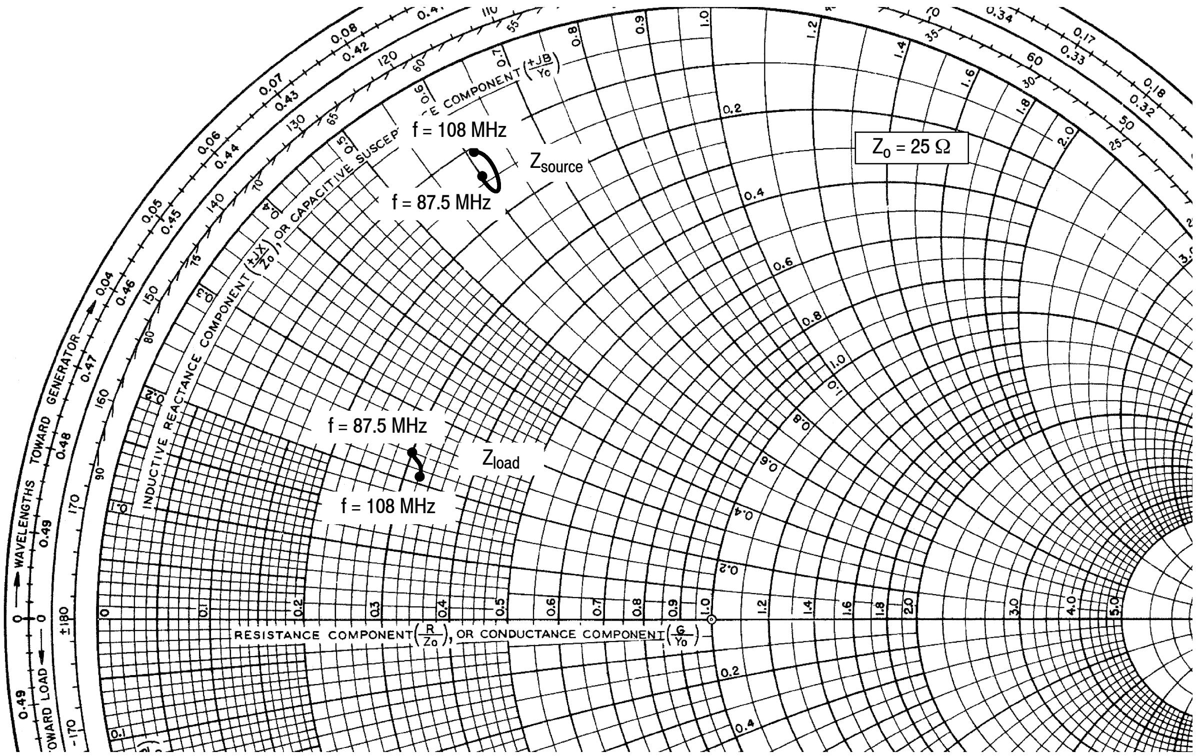



**Figure 6. Power Gain, Drain Efficiency and CW Output Power versus Input Power and Frequency**

## 87.5–108 MHz BROADBAND REFERENCE CIRCUIT




| f MHz | $Z_{source}$ Ω | $Z_{load}$ Ω |
|---|---|---|
| 87.5 | 3.4 + j15.0 | 7.5 + j6.12 |
| 98 | 3.9 + j14.9 | 7.9 + j5.57 |
| 108 | 2.8 + j15.3 | 8.0 + j5.19 |

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

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

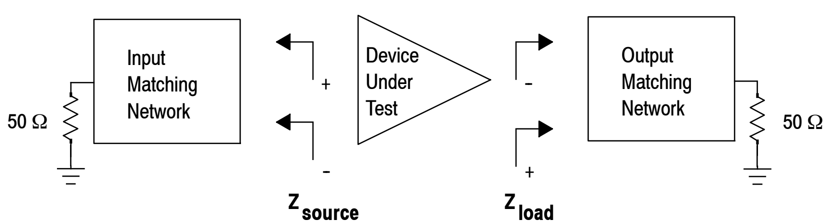



**Figure 7. Broadband Series Equivalent Source and Load Impedance — 87.5–108 MHz**

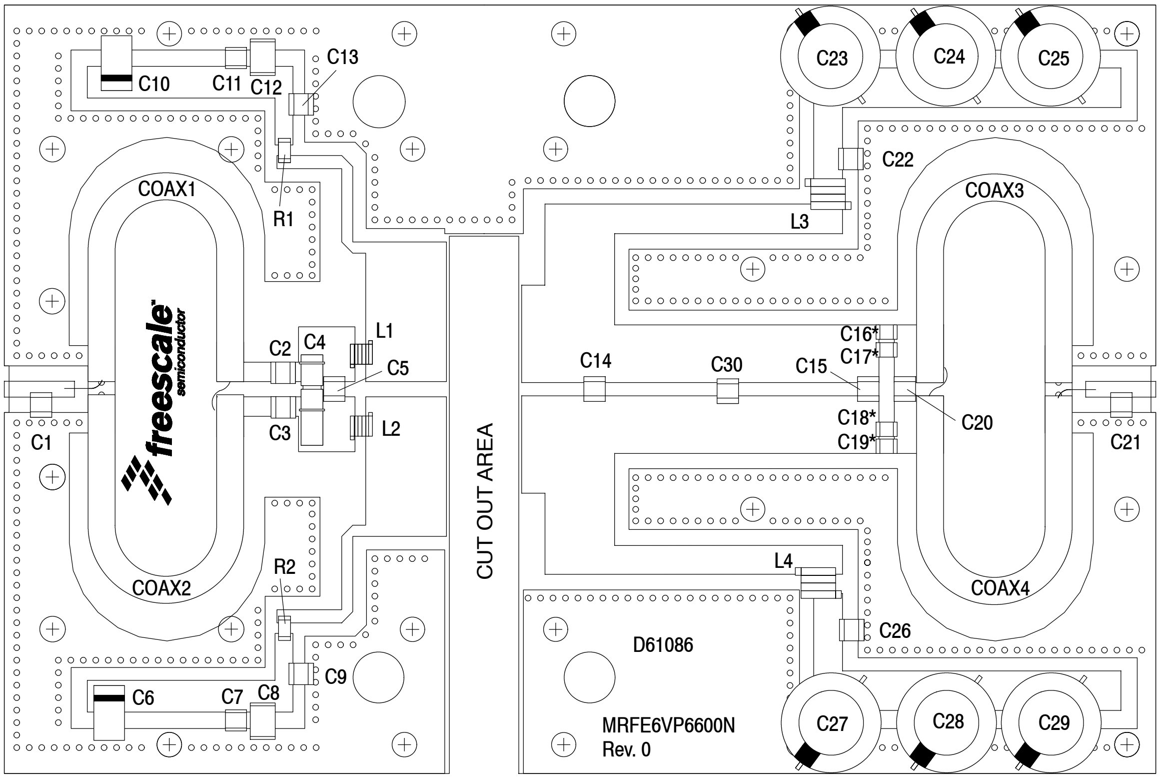
## 230 MHz NARROWBAND PRODUCTION TEST FIXTURE — 4″ × 6″ (10.16 cm × 15.24 cm)

**Table 10. 230 MHz Narrowband Performance** [1] $V_{DD}$ = 50 Vdc, $I_{DQ(A+B)}$ = 100 mA, $P_{out}$ = 600 W Peak (120 W Avg.), f = 230 MHz, 100 μsec Pulse Width, 20% Duty Cycle

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Power Gain | $G_{ps}$ | 23.3 | 24.7 | 26.6 | dB |
| Drain Efficiency | $\eta_D$ | 70 | 73.5 | — | % |
| Input Return Loss | IRL | — | –15 | –9 | dB |

1. Measurements made with device in straight lead configuration before any lead forming operation is applied. Lead forming is used for gull wing (GN) parts.

230 MHz NARROWBAND PRODUCTION TEST FIXTURE — 4″ × 6″ (10.16 cm × 15.24 cm)




* C16, C17, C18, and C19 are vertically mounted

**Figure 8. MRFE6VP6600N Narrowband Test Circuit Component Layout — 230 MHz**

**Table 11. MRFE6VP6600N Narrowband Test Circuit Component Designations and Values — 230 MHz**

| Part | Description | Part Number | Manufacturer |
|---|---|---|---|
| C1 | 12 pF Chip Capacitor | ATC100B120JT500XT | ATC |
| C2, C3 | 27 pF Chip Capacitors | ATC100B270JT500XT | ATC |
| C4 | 0.8–8.0 pF Variable Capacitor, Gigatrim | 27291SL | Johanson |
| C5 | 33 pF Chip Capacitor | ATC100B330JT500XT | ATC |
| C6, C10 | 22 μF, 35 V Tantalum Capacitors | T491X226K035AT | Kemet |
| C7, C11 | 0.1 μF Chip Capacitors | CDR33BX104AKWS | AVX |
| C8, C12 | 220 nF Chip Capacitors | C1812C224K5RAC-TU | Kemet |
| C9, C13, C22, C26 | 1000 pF Chip Capacitors | ATC100B102JT50XT | ATC |
| C14,C20 | 39 pF Chip Capacitors | ATC100B390JT500XT | ATC |
| C15 | 30 pF Chip Capacitor | ATC100B300JT500XT | ATC |
| C16, C17, C18, C19 | 240 pF Chip Capacitors | ATC100B241JT200XT | ATC |
| C21 | 13 pF Chip Capacitor | ATC100B130JT500XT | ATC |
| C23, C24, C25, C27, C28, C29 | 470 μF, 63 V Electrolytic Capacitors | MCGPR63V477M13X26-RH | Multicomp |
| C30 | 16 pF Chip Capacitor | ATC100B160JT500XT | ATC |
| Coax1, 2, 3, 4 | 25 Ω Semi-Rigid Coax, 2.2″ (5.6 mm) 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 | D61086 | MTL |

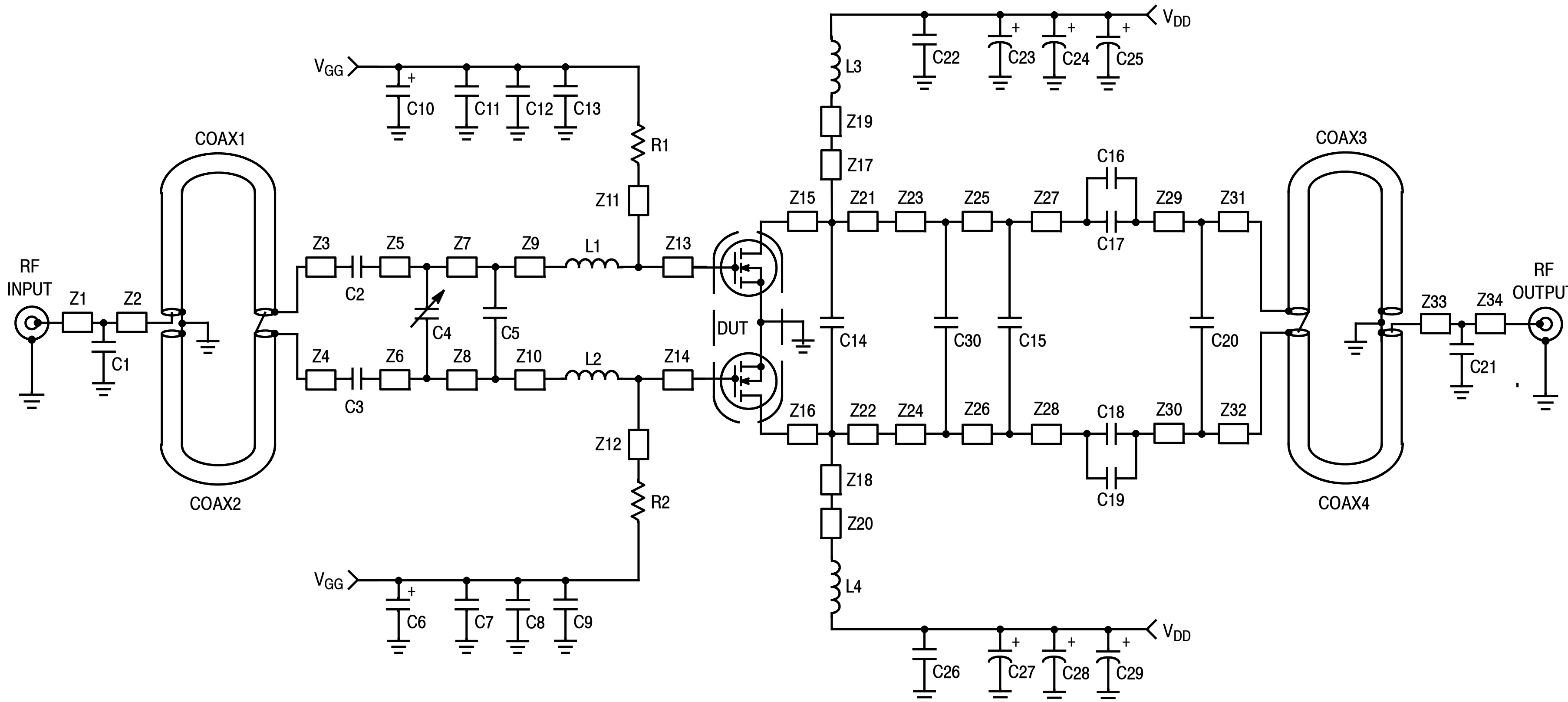



**Figure 9. MRFE6VP6600N Narrowband Test Circuit Schematic — 230 MHz**

**Table 12. MRFE6VP6600N Narrowband Test Circuit Microstrips — 230 MHz**

| Microstrip | Description | Microstrip | Description |
|---|---|---|---|
| Z1 | 0.192″ × 0.082″ Microstrip | Z19*, Z20* | 1.187″ × 0.154″ Microstrip |
| Z2 | 0.175″ × 0.082″ Microstrip | Z21, Z22 | 0.104″ × 0.507″ Microstrip |
| Z3, Z4 | 0.170″ × 0.100″ Microstrip | Z23, Z24 | 0.590″ × 0.300″ Microstrip |
| Z5, Z6 | 0.116″ × 0.285″ Microstrip | Z25, Z26 | 0.731″ × 0.300″ Microstrip |
| Z7, Z8 | 0.116″ × 0.285″ Microstrip | Z27, Z28 | 0.056″ × 0.300″ Microstrip |
| Z9, Z10 | 0.108″ × 0.285″ Microstrip | Z29, Z30 | 0.055″ × 0.300″ Microstrip |
| Z11*, Z12* | 0.872″ × 0.058″ Microstrip | Z31, Z32 | 0.061″ × 0.300″ Microstrip |
| Z13, Z14 | 0.412″ × 0.726″ Microstrip | Z33 | 0.186″ × 0.082″ Microstrip |
| Z15, Z16 | 0.371″ × 0.507″ Microstrip | Z34 | 0.179″ × 0.082″ Microstrip |
| Z17*, Z18* | 0.422″ × 0.363″ Microstrip | | |

* Line lengths include microstrip bends

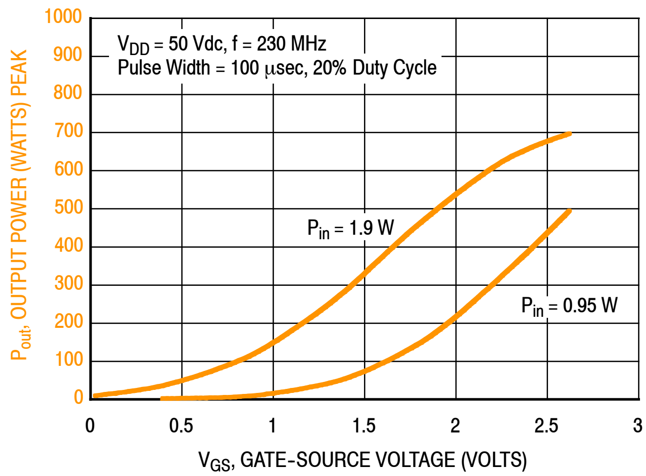
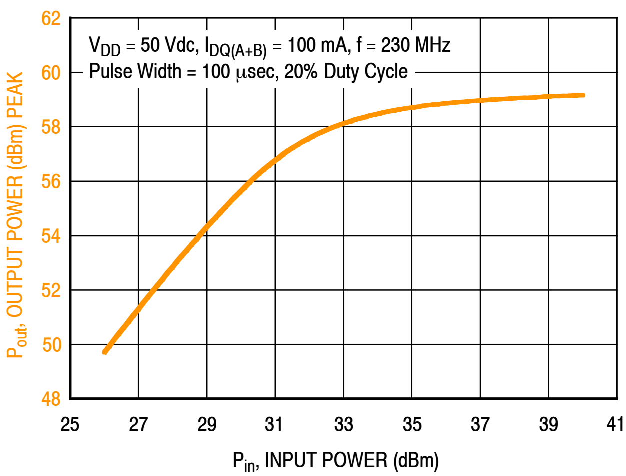



**Figure 10. Output Power versus Gate-Source Voltage at a Constant Input Power**




| f (MHz) | P1dB (W) | P3dB (W) |
|---|---|---|
| 230 | 682 | 771 |

**Figure 11. Output Power versus Input Power**

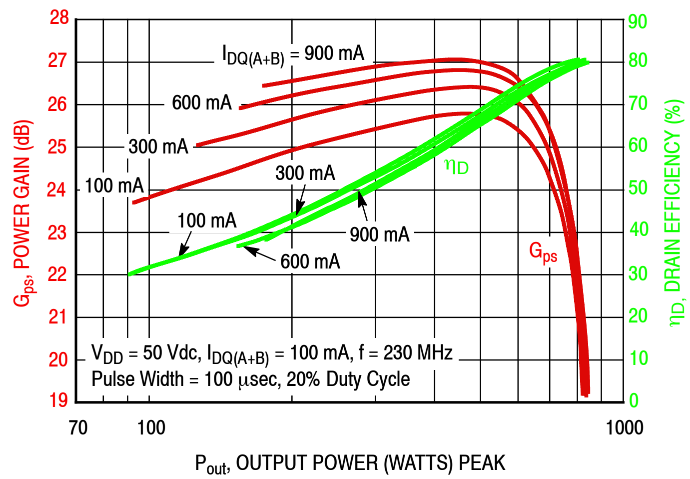



**Figure 12. Power Gain and Drain Efficiency versus Output Power and Quiescent Current**

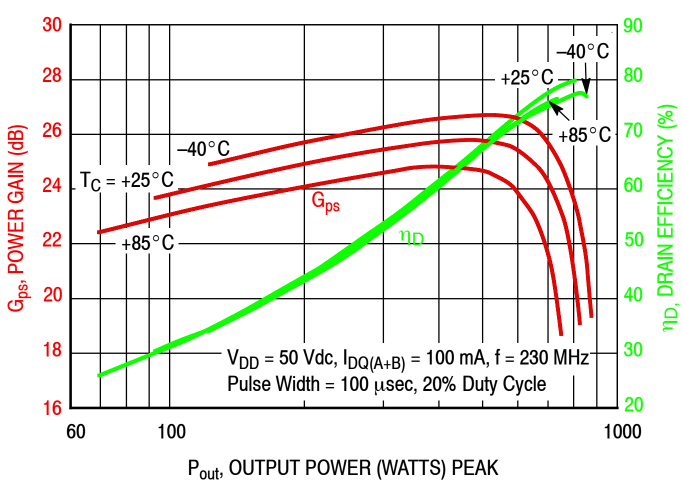



**Figure 13. Power Gain and Drain Efficiency versus Pulse Output Power**

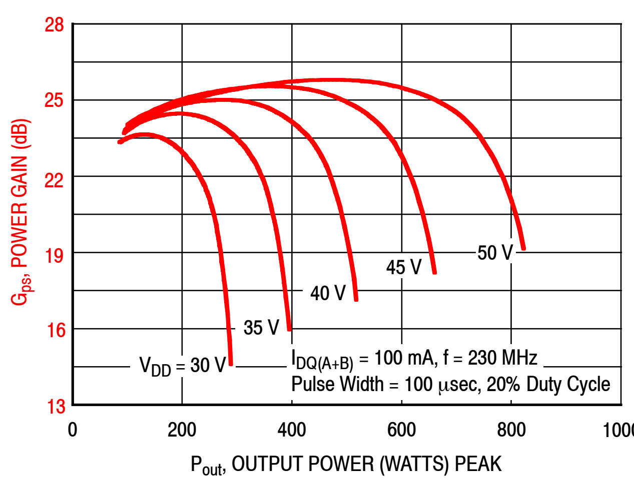



**Figure 14. Power Gain versus Output Power and Drain-Source Voltage**

## 230 MHz NARROWBAND PRODUCTION TEST FIXTURE

| f MHz | $Z_{source}$ Ω | $Z_{load}$ Ω |
|---|---|---|
| 230 | 1.9 + j4.8 | 4.0 + j4.0 |

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

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

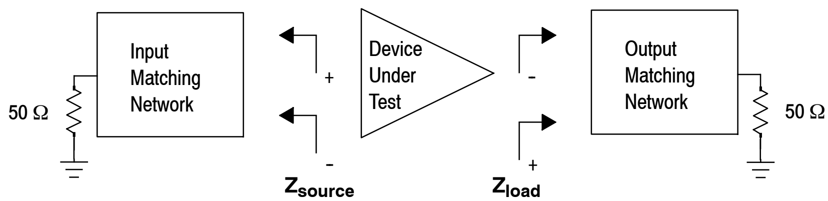
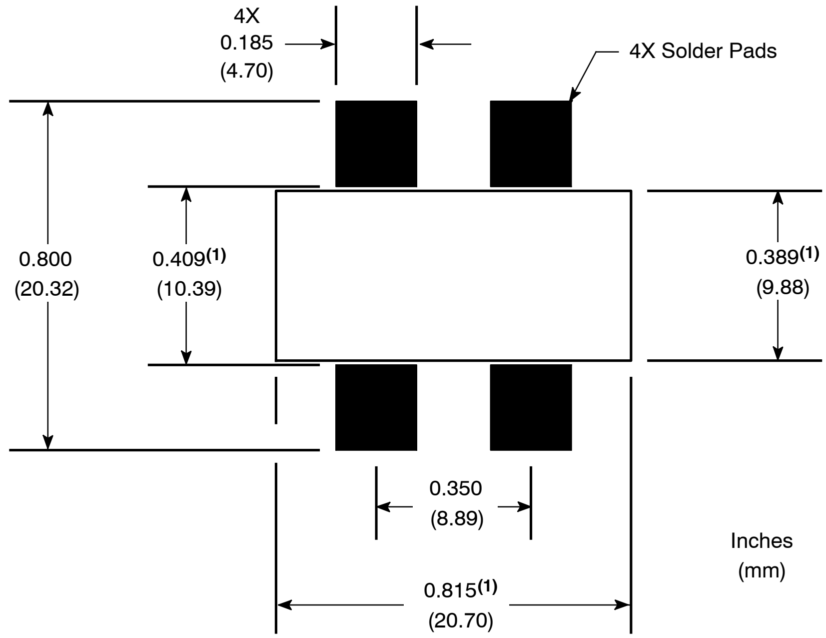



**Figure 15. Narrowband Series Equivalent Source and Load Impedance — 230 MHz**




1. Slot dimensions are minimum dimensions and exclude milling tolerances.

**Figure 16. PCB Pad Layout for OM-780-4L**

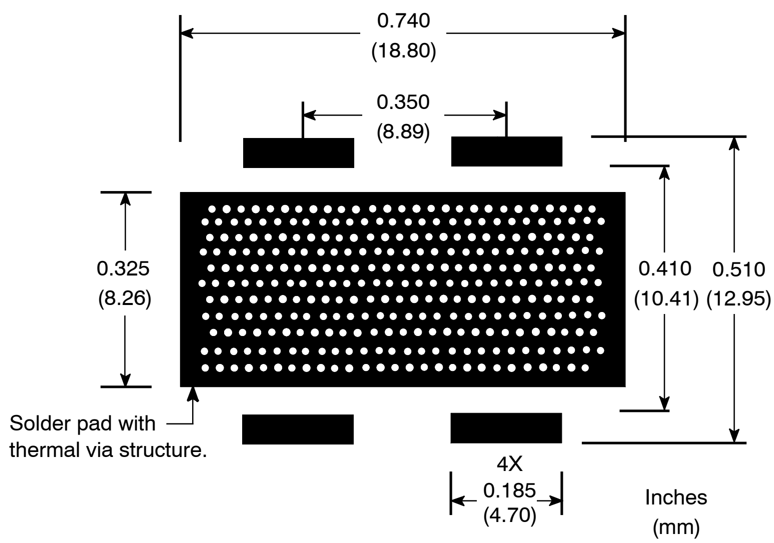
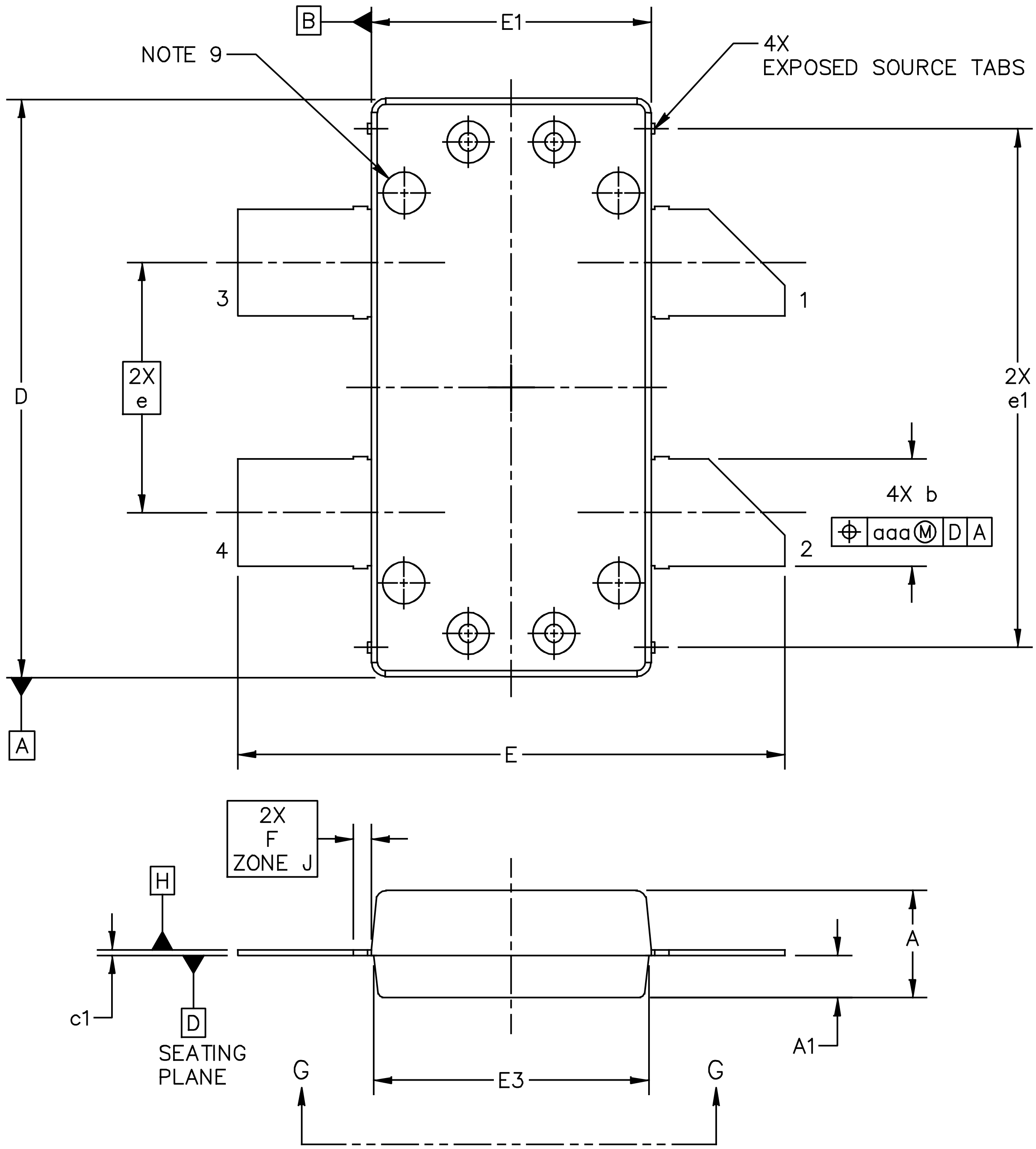
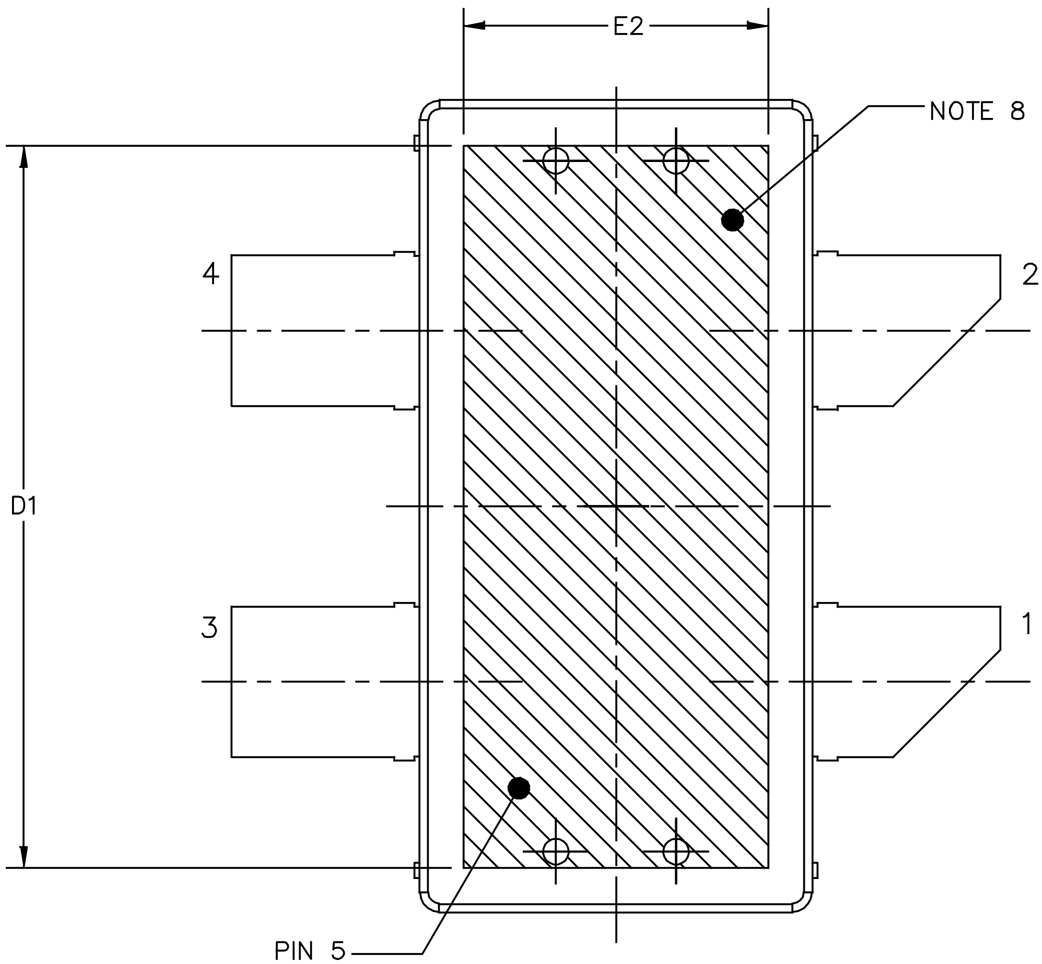



**Figure 17. PCB Pad Layout for OM-780G-4L**

## PACKAGE DIMENSIONS




| © FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED. | MECHANICAL OUTLINE | | PRINT VERSION NOT TO SCALE |
|---|---|---|---|
| TITLE: OM780–4 STRAIGHT LEAD | DOCUMENT NO: 98ASA10833D | | REV: A |
| | CASE NUMBER: 2023–02 | | 10 FEB 2010 |
| | STANDARD: NON–JEDEC | | |




BOTTOM VIEW
VIEW G–G

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|---|---|---|---|
| TITLE: OM780–4 STRAIGHT LEAD | DOCUMENT NO: 98ASA10833D | | REV: A |
| | CASE NUMBER: 2023–02 | | 10 FEB 2010 |
| | STANDARD: NON–JEDEC | | |

NOTES:

1. CONTROLLING DIMENSION: INCH

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

3. DATUM PLANE –H– IS LOCATED AT TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.

4. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 PER SIDE. DIMENSIONS "D AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE –H–.

5. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.

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

7. DIMENSION A1 APPLIES WITHIN ZONE "J" ONLY.

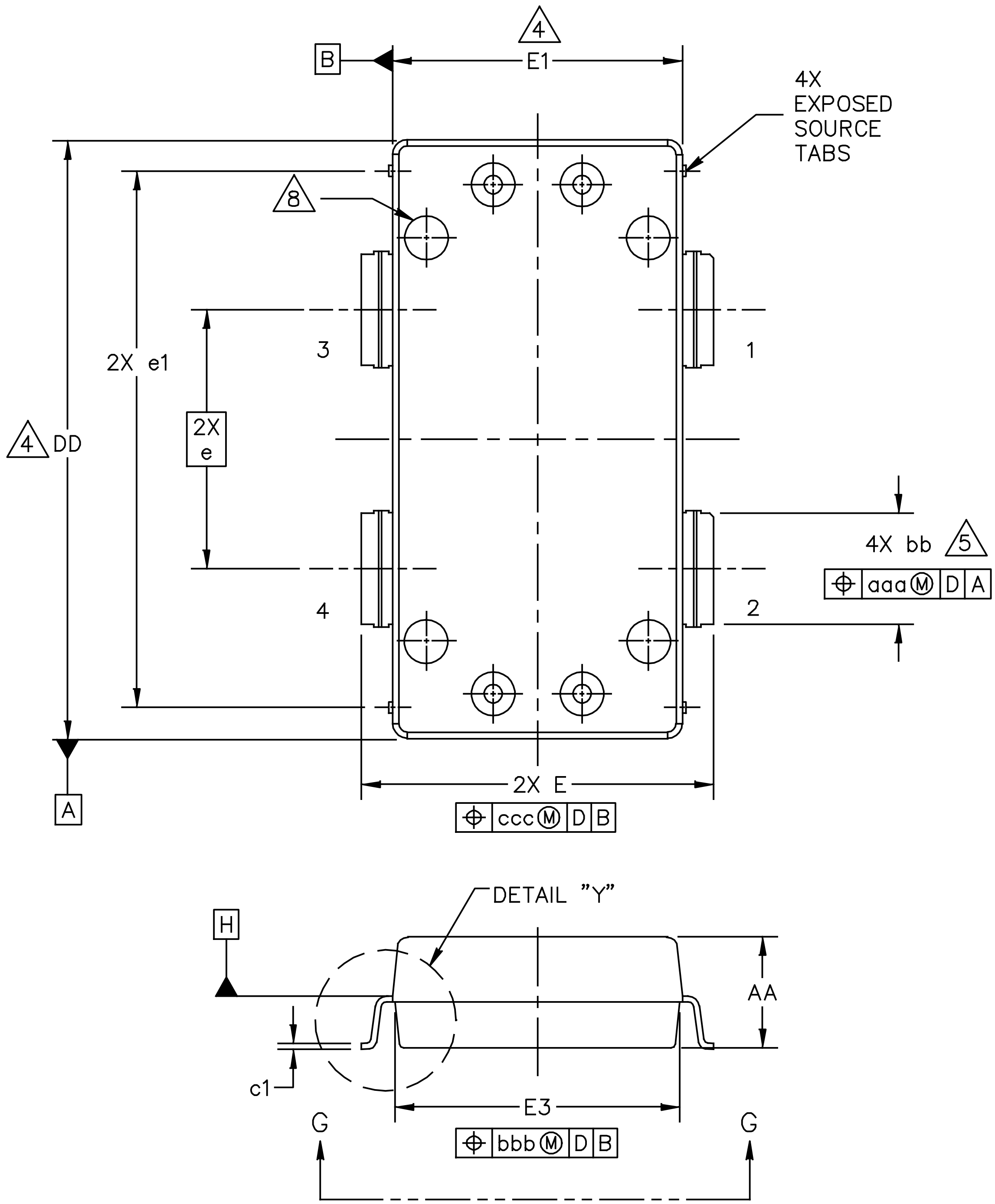
8. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG. THE DIMENSIONS D1 AND E2 REPRESENT THE VALUES BETWEEN THE TWO OPPOSITE POINTS ALONG THE EDGES OF EXPOSED AREA OF HEAT SLUG.

9. DIMPLED HOLE REPRESENTS INPUT SIDE.

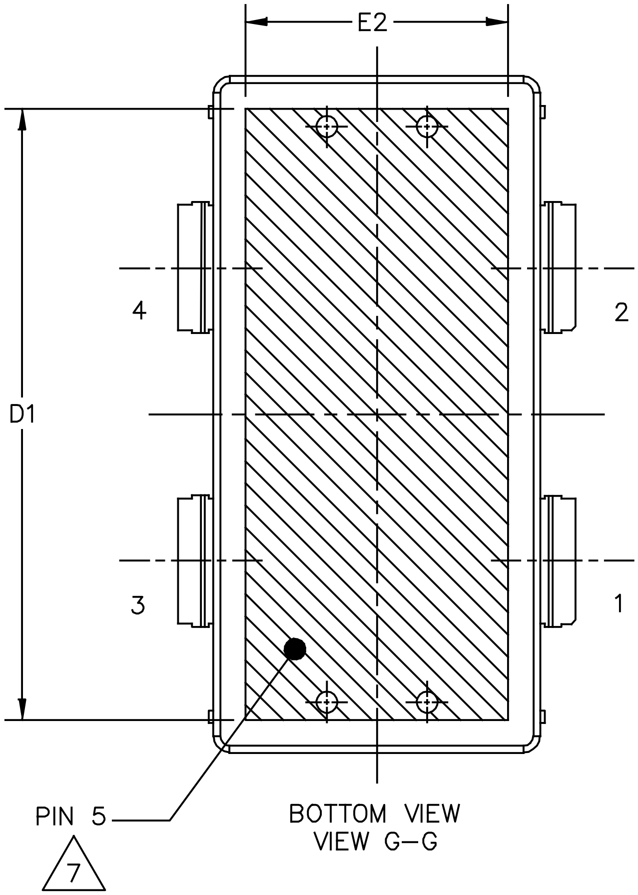
| DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX | DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|---|---|---|---|---|
| A | 0.148 | .152 | 3.76 | 3.86 | b | .147 | .153 | 3.73 | 3.89 |
| A1 | .059 | .065 | 1.50 | 1.65 | c1 | .007 | .011 | 0.18 | 0.28 |
| D | .808 | .812 | 20.52 | 20.62 | e | .350 BSC | | 8.89 BSC | |
| D1 | .720 | ---- | 18.29 | ---- | e1 | .721 | .729 | 18.31 | 18.52 |
| E | .762 | .770 | 19.36 | 19.56 | | | | | |
| E1 | .390 | .394 | 9.91 | 10.01 | aaa | .004 | | 0.10 | |
| E2 | .306 | ---- | 7.77 | ---- | | | | | |
| E3 | .383 | .387 | 9.72 | 9.83 | | | | | |
| F | .025 BSC | | 0.635 BSC | | | | | | |

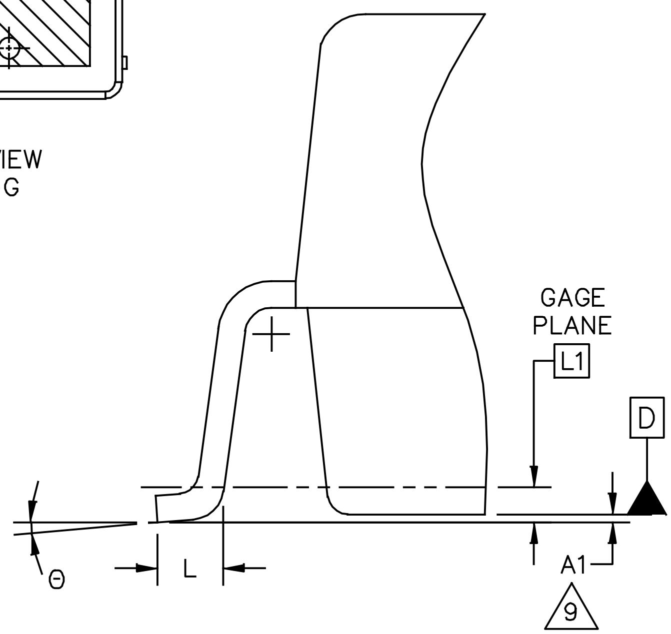
| | | |
|---|---|---|
|  | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
| TITLE: OM780–4 STRAIGHT LEAD | DOCUMENT NO: 98ASA10833D | REV: A |
| | CASE NUMBER: 2023–02 | 10 FEB 2010 |
| | STANDARD: NON–JEDEC | |

## PACKAGE DIMENSIONS




|  | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |
|---|---|---|
| TITLE: OM–780G–4L | DOCUMENT NO: 98ASA10834D REV: D | |
| | STANDARD: NON–JEDEC | |
| | 14 NOV 2013 | |




DETAIL "Y"

| | | |
|---|---|---|
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| TITLE: OM–780G–4L | DOCUMENT NO: 98ASA10834D REV: D | |
| | STANDARD: NON–JEDEC | |
| | 14 NOV 2013 | |

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 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 PACKAGE IS HIGHER THAN THE BOTTOM OF THE LEAD.

| DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX | DIM | INCH MIN | INCH MAX | MILLIMETER MIN | MILLIMETER MAX |
|---|---|---|---|---|---|---|---|---|---|
| AA | .148 | .152 | 3.76 | 3.86 | bb | .147 | .153 | 3.73 | 3.89 |
| A1 | −.002 | .002 | −0.05 | 0.05 | c1 | .007 | .011 | 0.18 | 0.28 |
| DD | .808 | .812 | 20.52 | 20.62 | e | 0.350 BSC | | 8.89 BSC | |
| D1 | .720 | ---- | 18.29 | ---- | e1 | .721 | .729 | 18.31 | 18.52 |
| E | .470 | .482 | 11.94 | 12.24 | 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 | .018 | .024 | 0.46 | 0.61 | | | | | |
| L1 | .010 BSC | | 0.25 BSC | | | | | | |



MECHANICAL OUTLINE

PRINT VERSION NOT TO SCALE

TITLE:

OM-780G-4L

DOCUMENT NO: 98ASA10834D REV: D

STANDARD: NON-JEDEC

14 NOV 2013

## 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

**White Paper**

- RFPLASTICWP: Designing with Plastic RF Power Transistors

**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.freescale.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 |

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Rev. 0, 5/2015