

RF Power LDMOS Transistors

High Ruggedness N-Channel Enhancement-Mode Lateral MOSFETs

Designed for mobile two-way radio applications with frequencies from 764 to 941 MHz. The high gain, ruggedness and broadband performance of these devices make them ideal for large-signal, common source amplifier applications in mobile radio equipment.

Narrowband Performance

(In Freescale Test Circuit: 12.5 Vdc, $I_{DQ(A+B)} = 550$ mA, $T_A = 25^\circ\text{C}$, CW)

| Frequency (MHz) | G_{ps} (dB) | η_D (%) | P_{out} (W) |
|-----------------|---------------|--------------|---------------|
| 870 | 17.5 | 69.0 | 57 |

800 MHz Broadband Performance

(In Freescale Reference Circuit: 12.5 Vdc, $I_{DQ(A+B)} = 800$ mA, $P_{in} = 1.5$ W, $T_A = 25^\circ\text{C}$, CW)

| Frequency (MHz) | G_{ps} (dB) | η_D (%) | P_{out} (W) |
|-----------------|---------------|--------------|---------------|
| 764 | 16.1 | 56.0 | 61 |
| 816 | 15.8 | 58.0 | 57 |
| 870 | 15.7 | 61.0 | 56 |

Load Mismatch/Ruggedness

| Frequency (MHz) | Signal Type | VSWR | P_{in} (W) | Test Voltage | Result |
|-----------------|-------------|---------------------------|--------------------|--------------|-----------------------|
| 870 (1) | CW | >65:1 at all Phase Angles | 3 (3 dB Overdrive) | 17 | No Device Degradation |

1. Measured in 764-870 MHz broadband test circuit.

Features

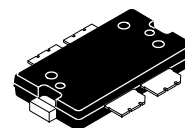
- Characterized for Operation from 764 to 941 MHz
- Integrated Input Matching Improves Broadband Performance
- Integrated ESD Protection
- Broadband — Full Power Across the Band (764-870 MHz)
- 225°C Capable Plastic Package
- Exceptional Thermal Performance
- Extreme Ruggedness
- High Linearity for: TETRA, SSB
- Cost-effective Over-molded Plastic Packaging
- In Tape and Reel. R1 Suffix = 500 Units, 44 mm Tape Width, 13-inch Reel.

Typical Applications

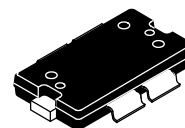
- Output Stage 800 MHz Band Mobile Radio
- Output Stage 700 MHz Band Mobile Radio

AFT09MP055NR1
AFT09MP055GNR1

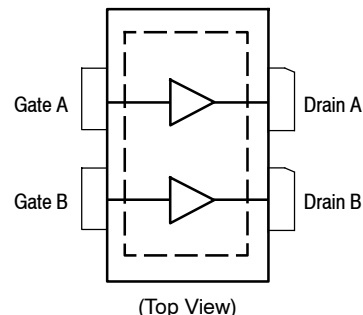
**764-941 MHz, 55 W, 12.5 V
BROADBAND
RF POWER LDMOS TRANSISTORS**



**TO-270WB-4
AFT09MP055NR1**



**TO-270WB-4 GULL
AFT09MP055GNR1**



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

Figure 1. Pin Connections

Table 1. Maximum Ratings

| Rating | Symbol | Value | Unit |
|--|-----------|-------------|-----------|
| Drain-Source Voltage | V_{DSS} | -0.5, +40 | Vdc |
| Gate-Source Voltage | V_{GS} | -6.0, +12 | Vdc |
| Operating Voltage | V_{DD} | 19, +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 @ $T_C = 25^\circ\text{C}$ Derate above 25°C | P_D | 625 3.13 | W W/°C |

Table 2. Thermal Characteristics

| Characteristic | Symbol | Value (2,3) | Unit |
|--|-----------------|-------------|------|
| Thermal Resistance, Junction to Case Case Temperature 78°C , 55 W CW, 12.5 Vdc, $I_{DQ(A+B)} = 550$ mA, 870 MHz | $R_{\theta JC}$ | 0.32 | °C/W |

Table 3. ESD Protection Characteristics

| Test Methodology | Class |
|---------------------------------------|-------------------|
| Human Body Model (per JESD22-A114) | 2, passes 2500 V |
| Machine Model (per EIA/JESD22-A115) | A, passes 150 V |
| Charge Device Model (per JESD22-C101) | 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 ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|--------------|-----|------|-----|------------------|
| Off Characteristics | | | | | |
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 40$ Vdc, $V_{GS} = 0$ Vdc) | I_{DSS} | — | — | 3 | μA dc |
| Zero Gate Voltage Drain Leakage Current ($V_{DS} = 12.5$ Vdc, $V_{GS} = 0$ Vdc) | I_{DSS} | — | — | 2 | μA dc |
| Gate-Source Leakage Current ($V_{GS} = 5$ Vdc, $V_{DS} = 0$ Vdc) | I_{GSS} | — | — | 1 | μA dc |
| On Characteristics | | | | | |
| Gate Threshold Voltage ($V_{DS} = 10$ Vdc, $I_D = 270$ μA dc) | $V_{GS(th)}$ | 1.6 | 2.1 | 2.6 | Vdc |
| Drain-Source On-Voltage ($V_{GS} = 10$ Vdc, $I_D = 2.85$ Adc) | $V_{DS(on)}$ | — | 0.14 | — | Vdc |
| Forward Transconductance (4) ($V_{GS} = 10$ Vdc, $I_D = 7.5$ Adc) | g_{fs} | — | 7 | — | S |

1. Continuous use at maximum temperature will affect MTTF.
2. MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.
3. Refer to AN1955, *Thermal Measurement Methodology of RF Power Amplifiers*. Go to <http://www.freescale.com/rf>. Select Documentation/Application Notes - AN1955.
4. Each side of device measured separately.

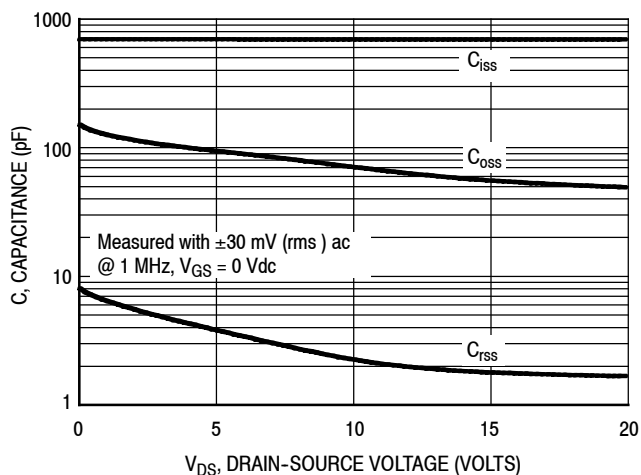
(continued)

Table 5. Electrical Characteristics ($T_A = 25^\circ\text{C}$ unless otherwise noted) **(continued)**

| Characteristic | Symbol | Min | Typ | Max | Unit |
|--|--------------------------|-----|------|-----|------|
| Dynamic Characteristics ⁽¹⁾ | | | | | |
| Reverse Transfer Capacitance ($V_{DS} = 12.5\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz, $V_{GS} = 0\text{ Vdc}$) | C_{rss} | — | 1.9 | — | pF |
| Output Capacitance ($V_{DS} = 12.5\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz, $V_{GS} = 0\text{ Vdc}$) | C_{oss} | — | 61 | — | pF |
| Input Capacitance ($V_{DS} = 12.5\text{ Vdc}$, $V_{GS} = 0\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz) | C_{iss} ⁽²⁾ | — | 690 | — | pF |
| Functional Tests ⁽³⁾ (In Freescale Narrowband Test Fixture, 50 ohm system) $V_{DD} = 12.5\text{ Vdc}$, $I_{DQ(A+B)} = 550\text{ mA}$, $P_{in} = 1\text{ W}$, $f = 870\text{ MHz}$ | | | | | |
| Common-Source Amplifier Output Power | P_{out} | — | 57 | — | W |
| Drain Efficiency | η_D | — | 69.0 | — | % |

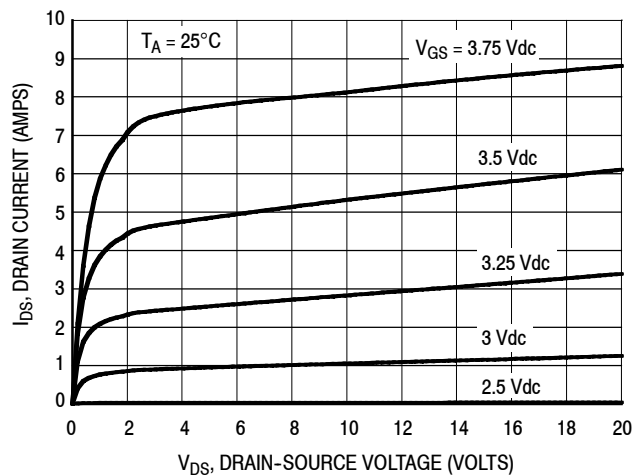
1. Each side of device measured separately.
2. Value includes input matching network.
3. Measurement made with device in straight lead configuration before any lead forming operation is applied. Lead forming is used for gull wing (GN) parts.

TYPICAL CHARACTERISTICS



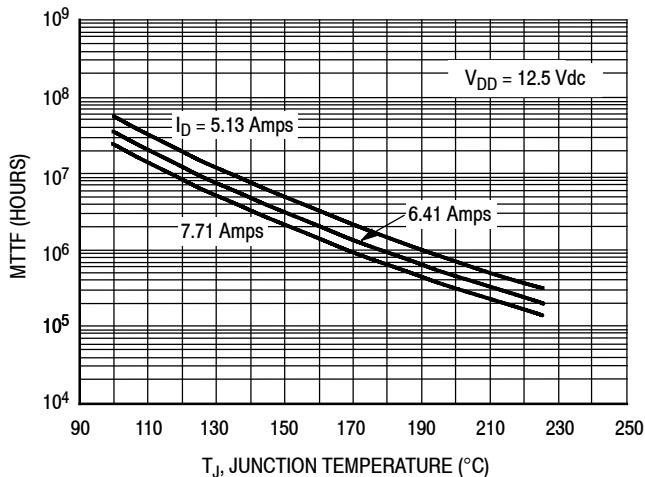
Note: Each side of device measured separately.
 C_{iss} value includes input matching network.

Figure 2. Capacitance versus Drain-Source Voltage



Note: Measured with both sides of the transistor tied together.

Figure 3. Drain Current versus Drain-Source Voltage



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

MTTF calculator available at <http://www.freescale.com/rf>. Select Software & Tools/Development Tools/Calculators to access MTTF calculators by product.

Figure 4. MTTF versus Junction Temperature - CW

870 MHz NARROWBAND PRODUCTION TEST FIXTURE

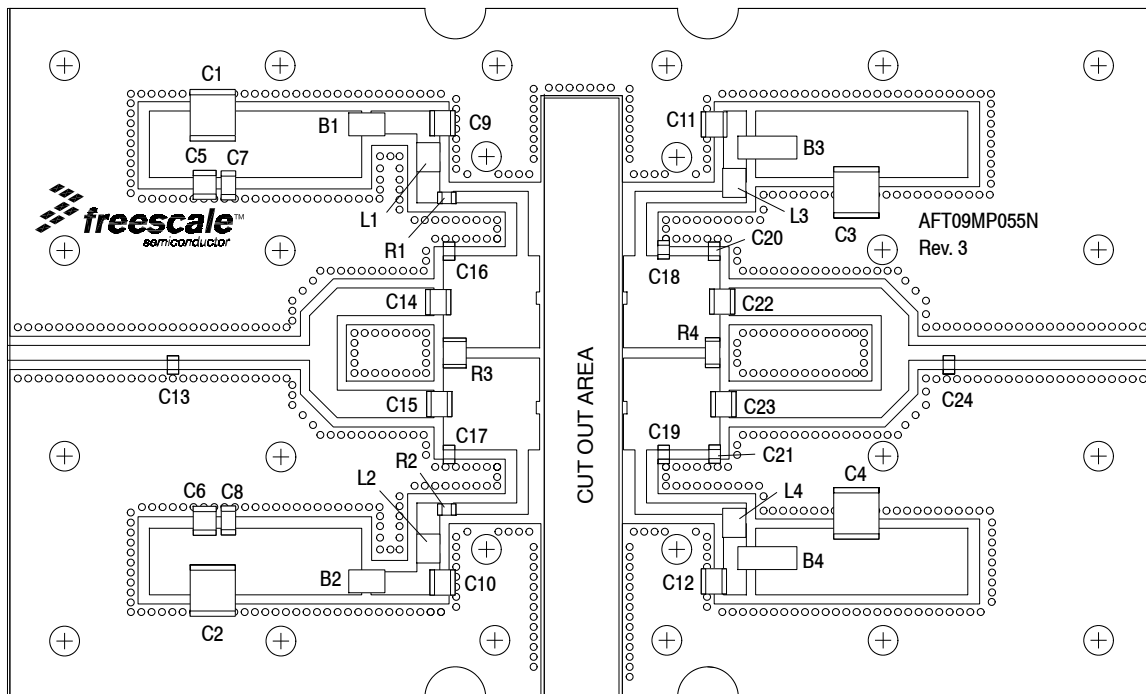


Figure 5. AFT09MP055NR1 Narrowband Test Circuit Component Layout — 870 MHz

Table 6. AFT09MP055NR1 Narrowband Test Circuit Component Designations and Values — 870 MHz

| Part | Description | Part Number | Manufacturer |
|--------------------|-----------------------------|--------------------|--------------|
| B1, B2 | RF Beads, Short | 2743019447 | Fair-Rite |
| B3, B4 | RF Beads, Long | 2743021447 | Fair-Rite |
| C1, C2, C3, C4 | 10 μ F Chip Capacitors | GRM55DR61H106KA88L | Murata |
| C5, C6 | 0.1 μ F Chip Capacitors | GRM32MR71H104JA01L | Murata |
| C7, C8 | 1 μ F Chip Capacitors | GRM31MR71H105KA88L | Murata |
| C9, C10 | 68 pF Chip Capacitors | ATC100B680JT500XT | ATC |
| C11, C12, C22, C23 | 56 pF Chip Capacitors | ATC100B560CT500XT | ATC |
| C13 | 7.5 pF Chip Capacitor | GQM2195C2E7R5BB15 | Murata |
| C14, C15 | 7.5 pF Chip Capacitors | ATC100B7R5CT500XT | ATC |
| C16, C17 | 12 pF Chip Capacitors | ATC600F120JT250XT | ATC |
| C18, C19, C20, C21 | 9.1 pF Chip Capacitors | GQM2195C2E9R1BB15 | Murata |
| C24 | 3 pF Chip Capacitor | ATC600F3R0BT250XT | ATC |
| L1, L2, L3, L4 | 2.5 nH Inductors | A01TKLC | Coilcraft |
| R1, R2 | 10 Ω Chip Resistors | CRCW120610R0JNEA | Vishay |
| R3 | 2.0 Ω Chip Resistor | ERJ-14YJ2R0U | Panasonic |
| R4 | 5.9 Ω Chip Resistor | CRCW12065R90FKEA | Vishay |
| PCB | 0.030", $\epsilon_r = 4.8$ | RF35A2 | Taconic |

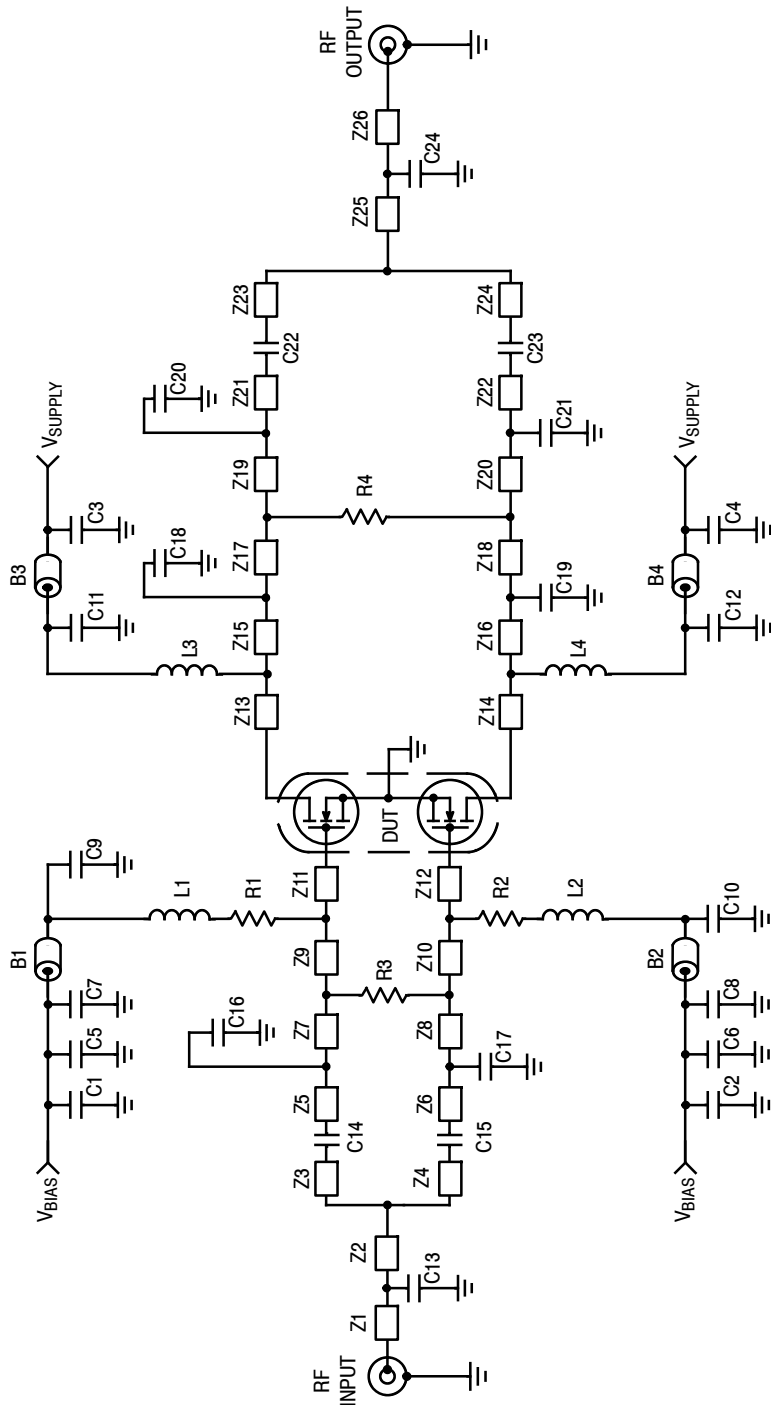


Figure 6. AFT09MP055NR1 Narrowband Test Circuit Schematic — 870 MHz

Table 7. AFT09MP055NR1 Narrowband Test Circuit Microstrips — 870 MHz

| Microstrip | Description | Microstrip | Description | Microstrip | Description |
|------------|----------------------------|------------|----------------------------|------------|----------------------------|
| Z1 | 0.721" x 0.065" Microstrip | Z9, Z10 | 0.295" x 0.400" Microstrip | Z19, Z20 | 0.007" x 0.400" Microstrip |
| Z2 | 0.595" x 0.065" Microstrip | Z11, Z12 | 0.075" x 0.400" Microstrip | Z21, Z22 | 0.025" x 0.400" Microstrip |
| Z3*, Z4* | 0.670" x 0.120" Microstrip | Z13, Z14 | 0.075" x 0.400" Microstrip | Z23*, Z24* | 0.885" x 0.120" Microstrip |
| Z5, Z6 | 0.025" x 0.400" Microstrip | Z15, Z16 | 0.100" x 0.400" Microstrip | Z25 | 0.175" x 0.065" Microstrip |
| Z7, Z8 | 0.025" x 0.400" Microstrip | Z17, Z18 | 0.213" x 0.400" Microstrip | Z26 | 0.901" x 0.065" Microstrip |

* Line length includes microstrip bends

TYPICAL CHARACTERISTICS — 870 MHz

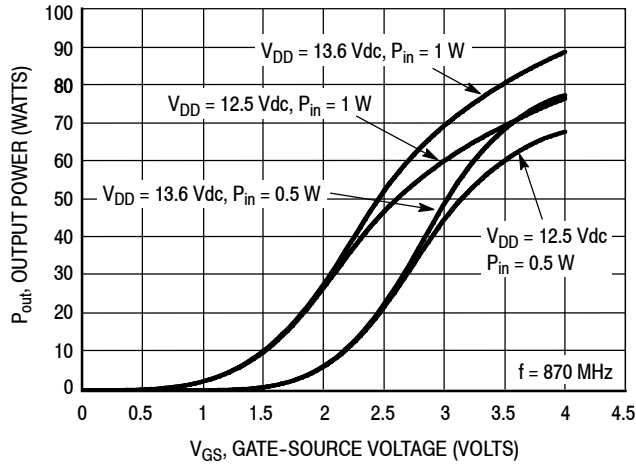


Figure 7. Output Power versus Gate-Source Voltage at a Constant Input Power

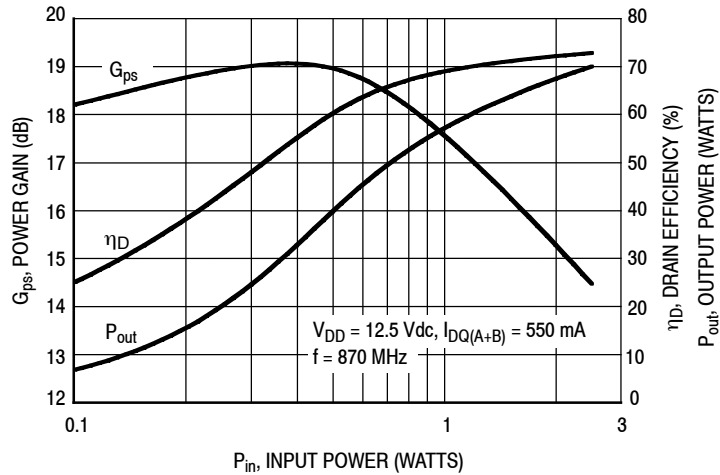


Figure 8. Power Gain, Drain Efficiency and Output Power versus Input Power

$V_{DD} = 12.5 \text{ Vdc}$, $I_{DQ(A+B)} = 550 \text{ mA}$, $P_{out} = 57 \text{ W Avg.}$

| f MHz | Z_{source} Ω | Z_{load} Ω |
|----------|--------------------------|------------------------|
| 870 | $1.40 - j1.00$ | $0.61 - j0.14$ |

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

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

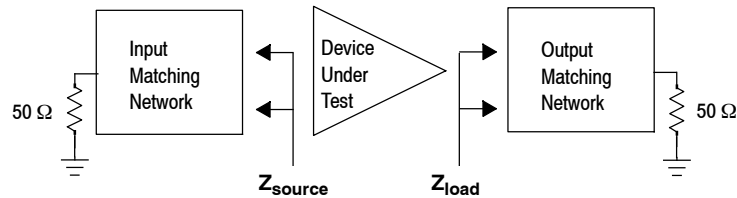


Figure 9. Narrowband Series Equivalent Source and Load Impedance — 870 MHz

764-870 MHz BROADBAND REFERENCE CIRCUIT

Table 8. 764-870 MHz Broadband Performance (In Freescale Reference Circuit, 50 ohm system)

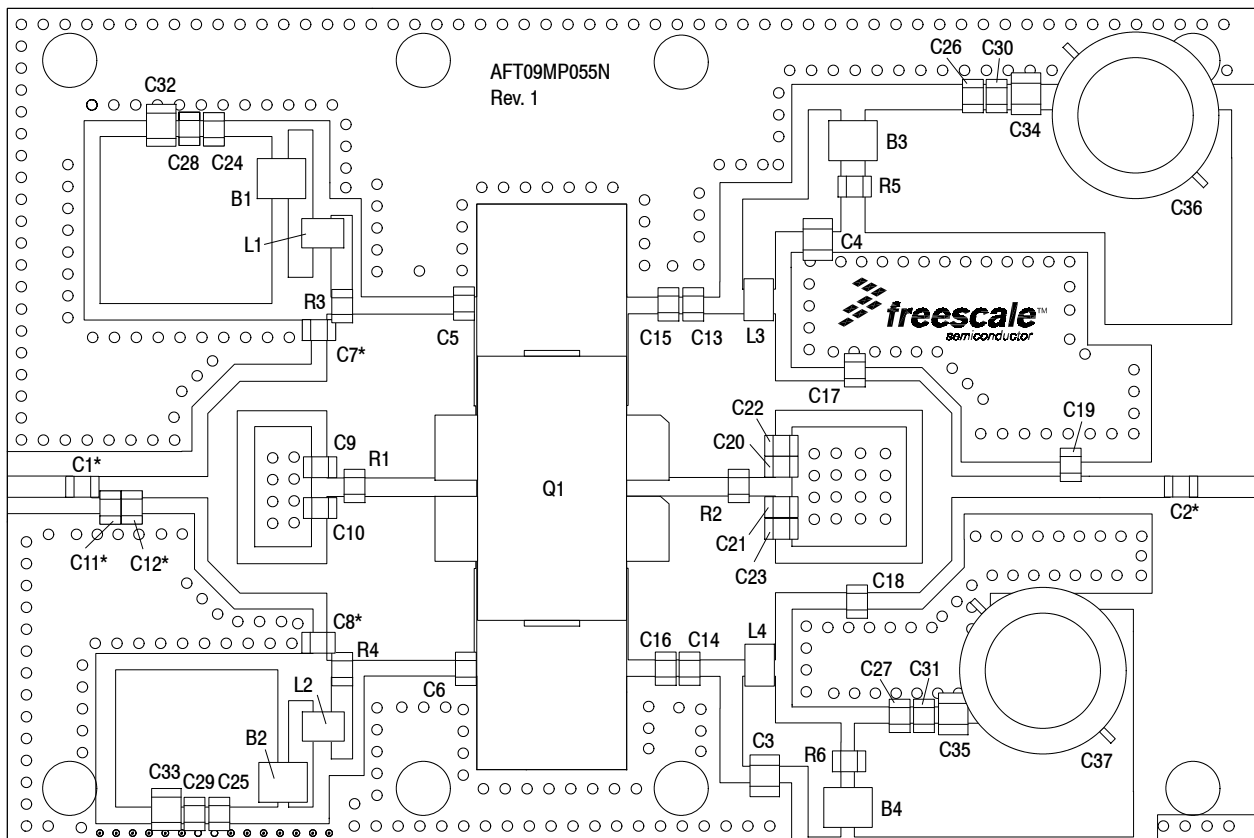
$V_{DD} = 12.5 \text{ Vdc}$, $I_{DQ(A+B)} = 800 \text{ mA}$, $P_{out} = 55 \text{ W}$, $T_A = 25^\circ\text{C}$, CW

| Frequency (MHz) | G_{ps} (dB) | η_D (%) | P_{out} (W) |
|-----------------|---------------|--------------|---------------|
| 764 | 16.6 | 54.2 | 55 |
| 816 | 16.0 | 59.2 | 55 |
| 870 | 15.8 | 61.1 | 55 |

Table 9. Load Mismatch/Ruggedness (In Freescale Reference Circuit)

| Frequency (MHz) | Signal Type | VSWR | P_{in} (W) | Test Voltage, V_{DD} | Result |
|-----------------|-------------|---------------------------|--------------------|------------------------|-----------------------|
| 764 | CW | >65:1 at all Phase Angles | 3 (3 dB Overdrive) | 15 | No Device Degradation |

764-870 MHz BROADBAND REFERENCE CIRCUIT



*C1, C2, C7, C8, C11 and C12 are mounted vertically.

Figure 10. AFT09MP055NR1 Broadband Reference Circuit Component Layout — 764-870 MHz

Table 10. AFT09MP055NR1 Broadband Reference Circuit Component Designations and Values — 764-870 MHz

| Part | Description | Part Number | Manufacturer |
|------------------------|---|----------------------|--------------|
| B1, B2, B3, B4 | RF Beads, Short | 2743019447 | Fair-Rite |
| C1, C2, C3, C4 | 56 pF Chip Capacitors | ATC100B560GT1500XT | ATC |
| C5, C6, C7, C8 | 10 pF Chip Capacitors | ATC600F100GT250XT | ATC |
| C9, C10 | 8.2 pF Chip Capacitors | ATC600F8R2JT250XT | ATC |
| C11 | 4.7 pF Chip Capacitor | ATC600F4R7GT250XT | ATC |
| C12 | 5.6 pF Chip Capacitor | ATC600F5R6GT250XT | ATC |
| C13, C14 | 15 pF Chip Capacitors | ATC600F150JT250XT | ATC |
| C15, C16, C17, C18 | 3.9 pF Chip Capacitors | ATC600F3R9GT250XT | ATC |
| C19 | 6.8 pF Chip Capacitor | ATC600F6R8GT250XT | ATC |
| C20, C21 | 2.2 pF Chip Capacitors | ATC600F2R2GT250XT | ATC |
| C22, C23 | 1.5 pF Chip Capacitors | ATC600F1R5GT250XT | ATC |
| C24, C25, C26, C27 | 0.1 μ F Chip Capacitors | GRM32MR71H104JA01L | Murata |
| C28, C29, C30, C31 | 1 μ F Chip Capacitors | GRM31MR71H105KA88L | Murata |
| C32, C33, C34, C35 | 10 μ F Chip Capacitors | GRM55DR61H106KA88L | Murata |
| C36, C37 | 470 μ F, 63 V Electrolytic Capacitors | MCGPR63V477M13X26-RH | Multicomp |
| L1, L2, L3, L4 | 12.5 nH Chip Inductors | A04TKLC | Coilcraft |
| Q1 | RF Power LDMOS Transistor | AFT09MP055NR1 | Freescale |
| R1, R2, R3, R4, R5, R6 | 10 Ω , Chip Resistors | CRCW201010R0FKEF | Vishay |
| PCB | 0.030", $\epsilon_r = 4.8$ | S1000-2 | Shengyi |

AFT09MP055NR1 AFT09MP055GNR1

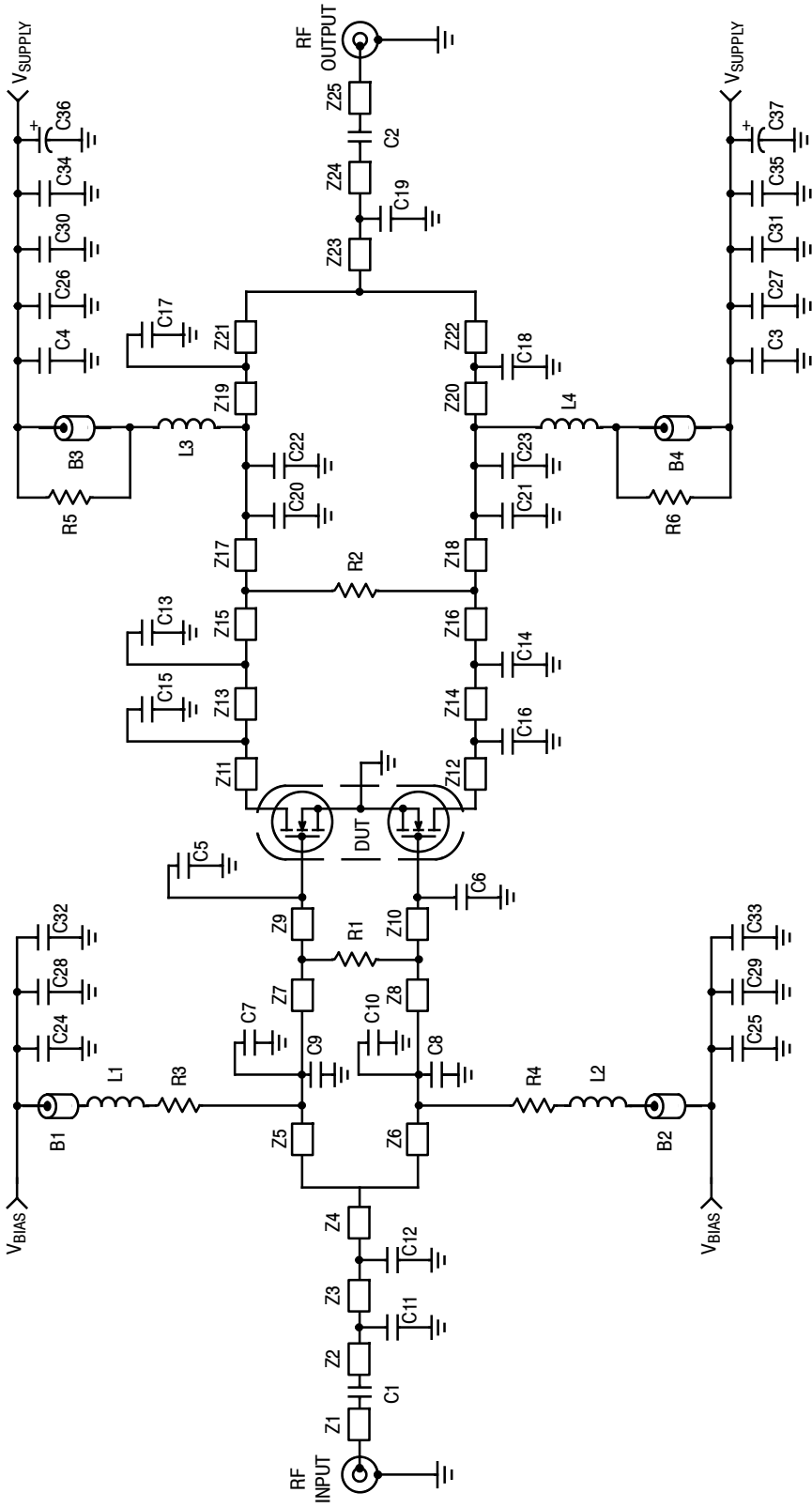


Figure 11. AFT09MP055NR1 Broadband Reference Circuit Schematic — 764-870 MHz

Table 11. AFT09MP055NR1 Broadband Reference Circuit Microstrips — 764-870 MHz

| Microstrip | Description | Microstrip | Description | Microstrip | Description |
|------------|----------------------------|------------|----------------------------|------------|----------------------------|
| Z1 | 0.157" x 0.051" Microstrip | Z9, Z10 | 0.319" x 0.393" Microstrip | Z19, Z20 | 0.190" x 0.071" Microstrip |
| Z2 | 0.043" x 0.051" Microstrip | Z11, Z12 | 0.097" x 0.393" Microstrip | Z21*, Z22* | 0.500" x 0.071" Microstrip |
| Z3 | 0.052" x 0.051" Microstrip | Z13, Z14 | 0.052" x 0.393" Microstrip | Z23 | 0.240" x 0.051" Microstrip |
| Z4 | 0.185" x 0.051" Microstrip | Z15, Z16 | 0.119" x 0.393" Microstrip | Z24 | 0.280" x 0.051" Microstrip |
| Z5*, Z6* | 0.408" x 0.071" Microstrip | Z17, Z18 | 0.083" x 0.393" Microstrip | Z25 | 0.157" x 0.051" Microstrip |
| Z7, Z8 | 0.035" x 0.393" Microstrip | | | | |

* Line length includes microstrip bends

TYPICAL CHARACTERISTICS — 764-870 MHz BROADBAND REFERENCE CIRCUIT

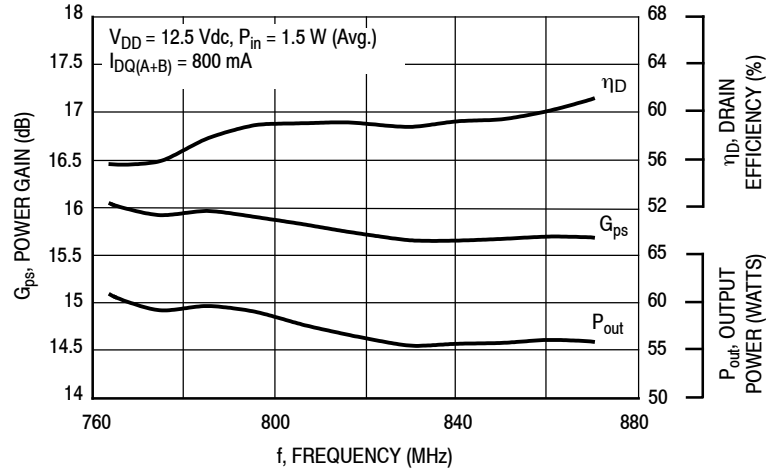


Figure 12. Power Gain, Output Power and Drain Efficiency versus Frequency at a Constant Input Power — 12.5 Vdc

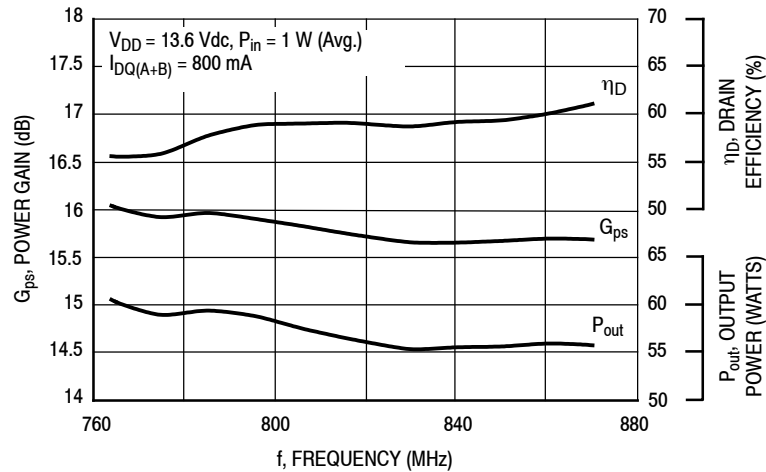


Figure 13. Power Gain, Output Power and Drain Efficiency versus Frequency at a Constant Input Power — 13.6 Vdc

TYPICAL CHARACTERISTICS — 764-870 MHz BROADBAND REFERENCE CIRCUIT

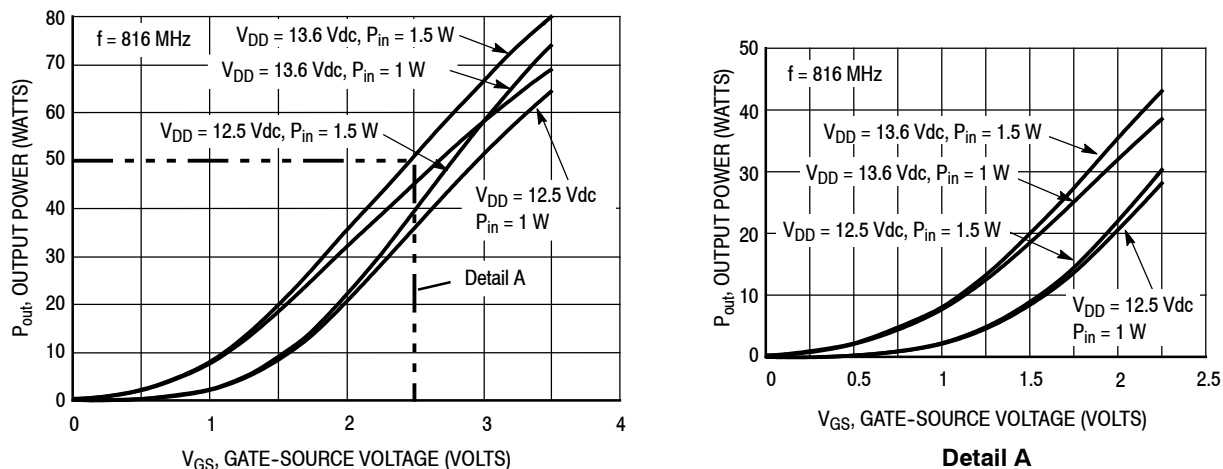


Figure 14. Output Power versus Gate-Source Voltage

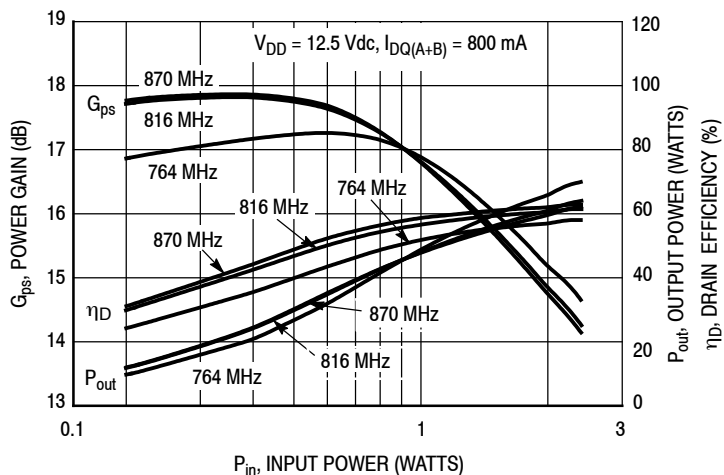
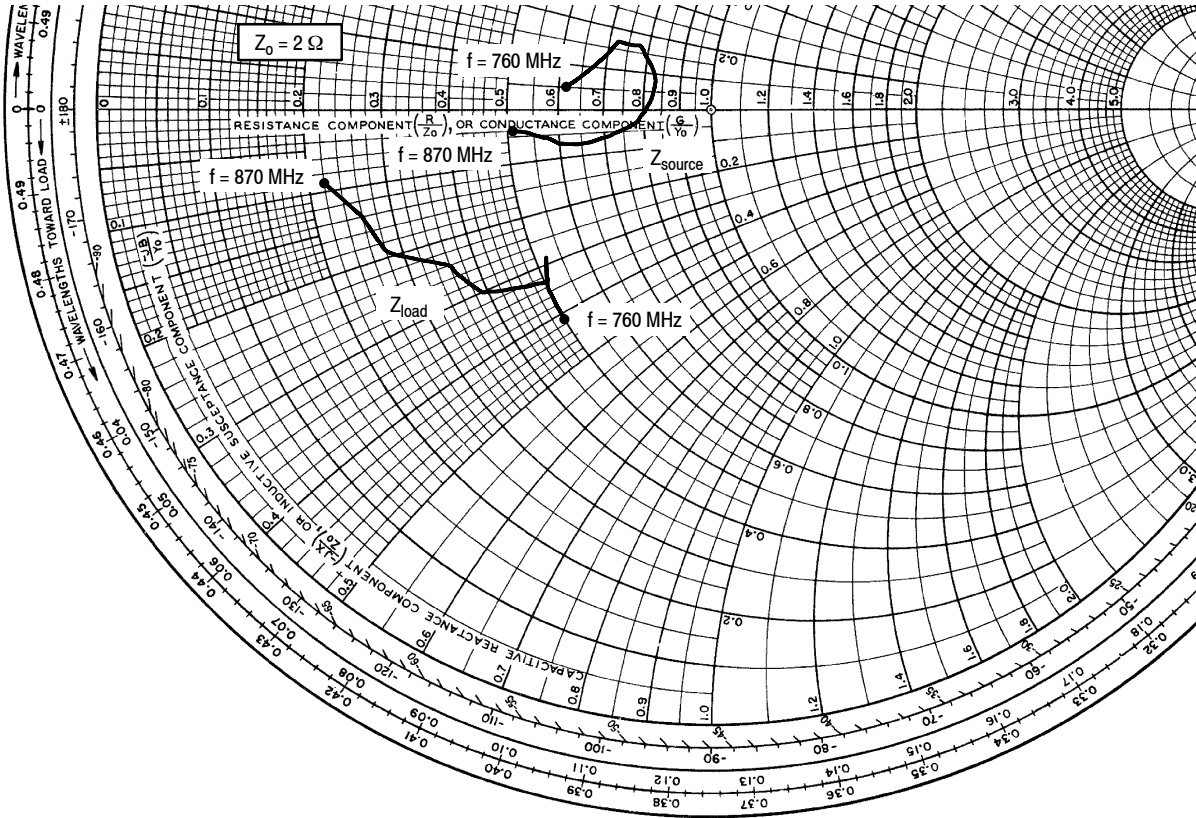


Figure 15. Power Gain, Output Power and Drain Efficiency versus Input Power and Frequency

764-870 MHz BROADBAND REFERENCE CIRCUIT



$V_{DD} = 12.5 \text{ Vdc}$, $I_{DQ(A+B)} = 800 \text{ mA}$, $P_{out} = 55 \text{ W Avg.}$

| f MHz | Z_{source} Ω | Z_{load} Ω |
|----------|--------------------------|------------------------|
| 760 | $1.24 + j0.09$ | $1.00 - j0.81$ |
| 770 | $1.30 + j0.15$ | $1.00 - j0.75$ |
| 780 | $1.35 + j0.21$ | $1.00 - j0.72$ |
| 790 | $1.43 + j0.34$ | $1.01 - j0.61$ |
| 800 | $1.54 + j0.34$ | $1.03 - j0.58$ |
| 810 | $1.66 + j0.18$ | $0.99 - j0.65$ |
| 820 | $1.63 + j0.06$ | $0.90 - j0.63$ |
| 830 | $1.55 - j0.07$ | $0.78 - j0.60$ |
| 840 | $1.42 - j0.12$ | $0.71 - j0.48$ |
| 850 | $1.21 - j0.13$ | $0.56 - j0.37$ |
| 860 | $1.15 - j0.12$ | $0.52 - j0.28$ |
| 870 | $1.01 - j0.10$ | $0.43 - j0.17$ |

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

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

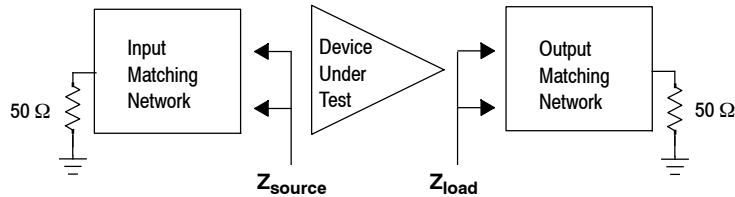
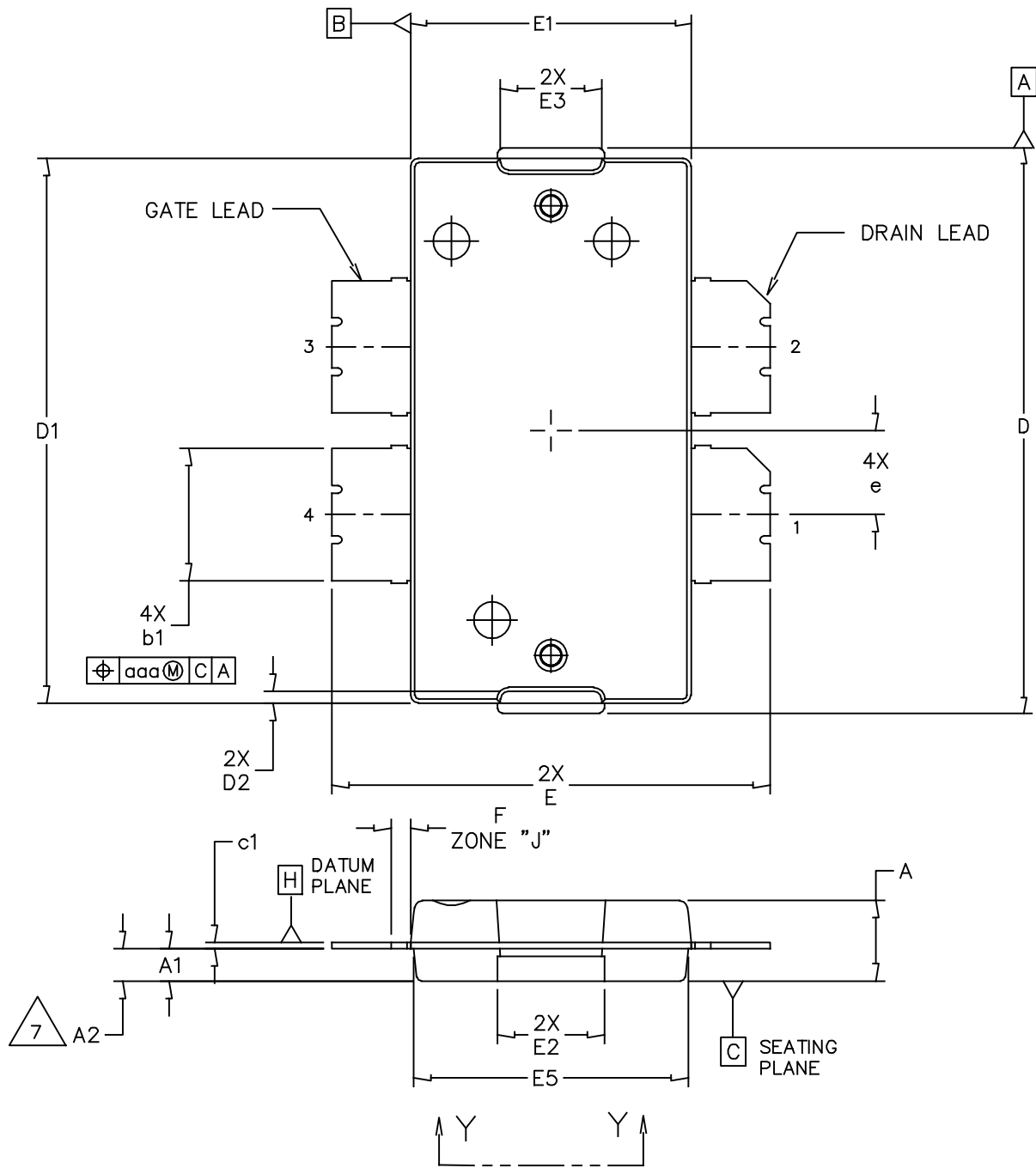
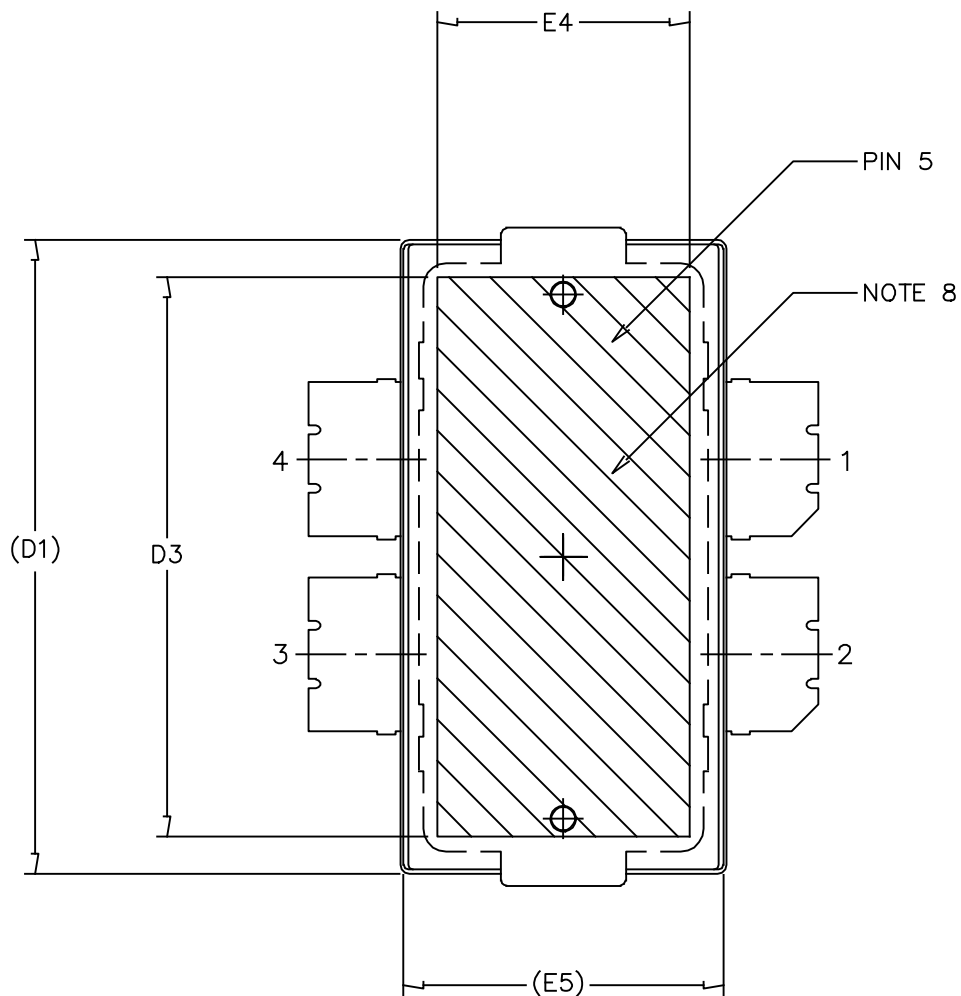


Figure 16. Broadband Series Equivalent Source and Load Impedance — 764-870 MHz

PACKAGE DIMENSIONS



| | | | |
|---|--------------------------|----------------------------|--|
| © FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED. | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE | |
| TITLE: TO-270 4 LEAD, WIDE BODY | DOCUMENT NO: 98ASA10577D | REV: D | |
| | CASE NUMBER: 1486-03 | 13 AUG 2007 | |
| | STANDARD: NON-JEDEC | | |



| | | | |
|---|--------------------|----------------------------|-------------|
| © FREESCALE SEMICONDUCTOR, INC. ALL RIGHTS RESERVED. | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE | |
| TITLE: TO-270 4 LEAD, WIDE BODY | | DOCUMENT NO: 98ASA10577D | REV: D |
| | | CASE NUMBER: 1486-03 | 13 AUG 2007 |
| | | STANDARD: NON-JEDEC | |

NOTES:

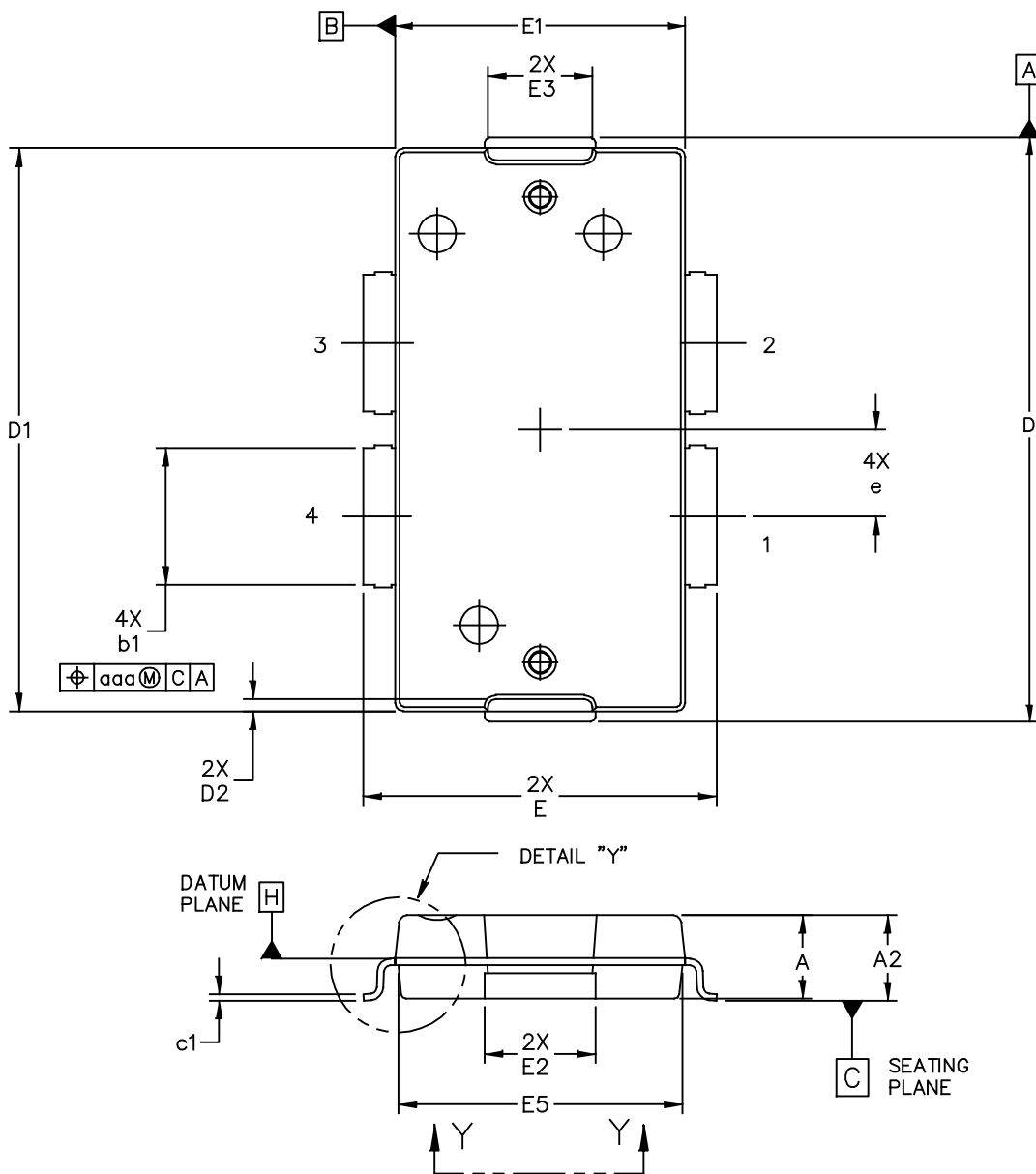
1. CONTROLLING DIMENSION: INCH
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE -H- IS LOCATED AT THE TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.
4. DIMENSIONS "D" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 PER SIDE. DIMENSIONS "D" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-.
5. DIMENSIONS "b1" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 TOTAL IN EXCESS OF THE "b1" DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. DATUMS -A- AND -B- TO BE DETERMINED AT DATUM PLANE -H-.
7. DIMENSION A2 APPLIES WITHIN ZONE "J" ONLY.
8. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG.

STYLE 1:

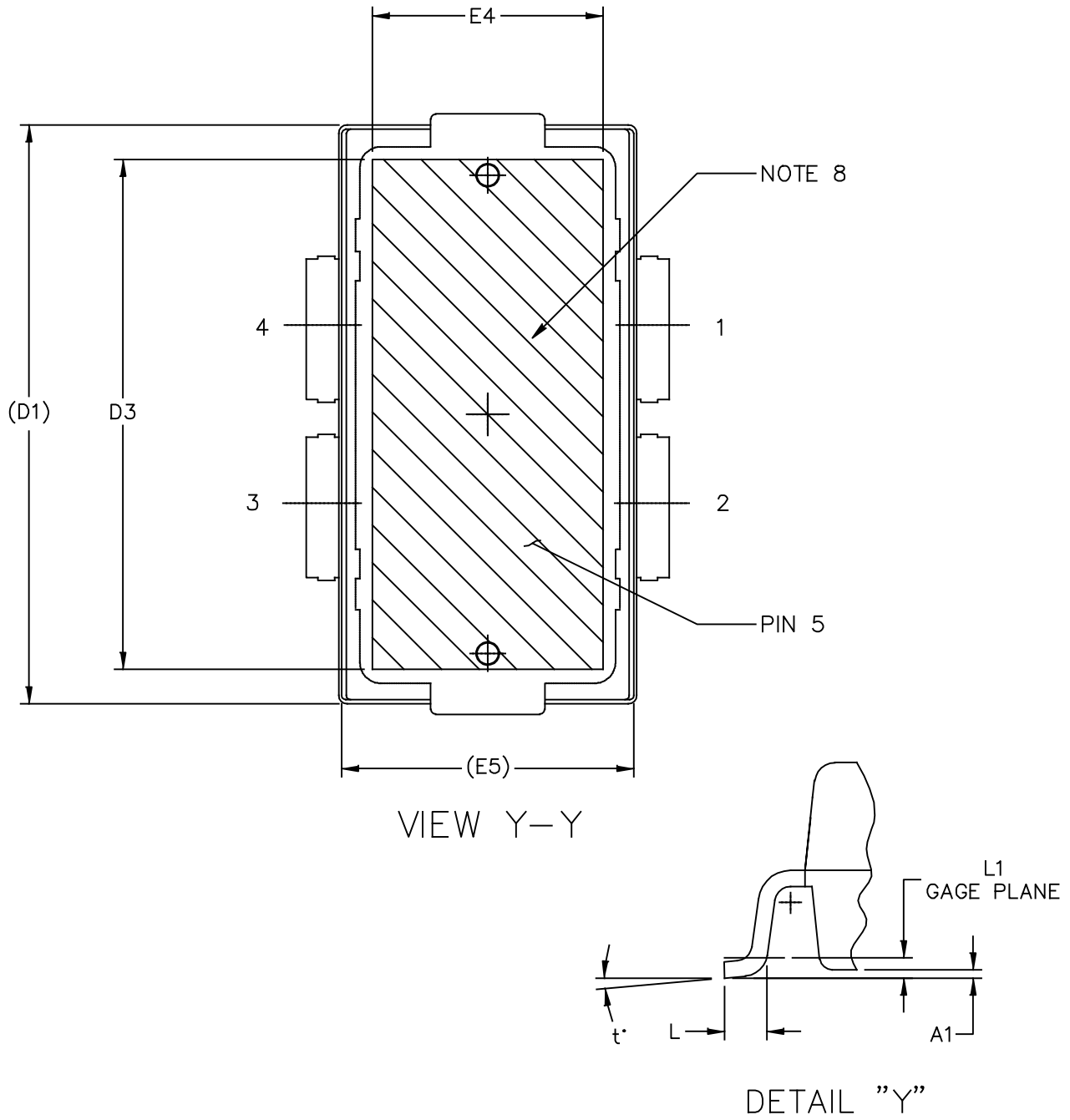
PIN 1 - DRAIN PIN 2 - DRAIN
 PIN 3 - GATE PIN 4 - GATE
 PIN 5 - SOURCE

| DIM | INCH | | MILLIMETER | | DIM | INCH | | MILLIMETER | |
|-----|------|------|------------|-------|-----|----------|------|------------|------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| A | .100 | .104 | 2.54 | 2.64 | F | .025 BSC | | 0.64 BSC | |
| A1 | .039 | .043 | 0.99 | 1.09 | b1 | .164 | .170 | 4.17 | 4.32 |
| A2 | .040 | .042 | 1.02 | 1.07 | c1 | .007 | .011 | .18 | .28 |
| D | .712 | .720 | 18.08 | 18.29 | e | .106 BSC | | 2.69 BSC | |
| D1 | .688 | .692 | 17.48 | 17.58 | aaa | .004 | | .10 | |
| D2 | .011 | .019 | 0.28 | 0.48 | | | | | |
| D3 | .600 | --- | 15.24 | --- | | | | | |
| E | .551 | .559 | 14 | 14.2 | | | | | |
| E1 | .353 | .357 | 8.97 | 9.07 | | | | | |
| E2 | .132 | .140 | 3.35 | 3.56 | | | | | |
| E3 | .124 | .132 | 3.15 | 3.35 | | | | | |
| E4 | .270 | --- | 6.86 | --- | | | | | |
| E5 | .346 | .350 | 8.79 | 8.89 | | | | | |

| | | | | | |
|---|--|--------------------|--------------------------|----------------------------|-------------|
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| TITLE: TO-270 4 LEAD WIDE BODY | | | DOCUMENT NO: 98ASA10577D | | REV: D |
| | | | CASE NUMBER: 1486-03 | | 13 AUG 2007 |
| | | | STANDARD: NON-JEDEC | | |



| | | | | | |
|---|--|---------------------------|--|----------------------------|--|
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| TITLE: TO-270 4 LEAD, WIDE BODY GULL WING | | DOCUMENT NO: 98ASA10578D | | REV: D | |
| | | CASE NUMBER: 1487-05 | | 03 AUG 2007 | |
| | | STANDARD: JEDEC TO-270 BB | | | |



| | | | |
|---|---------------------------|----------------------------|--|
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| TITLE: TO-270 4 LEAD, WIDE BODY GULL WING | DOCUMENT NO: 98ASA10578D | REV: D | |
| | CASE NUMBER: 1487-05 | 03 AUG 2007 | |
| | STANDARD: JEDEC TO-270 BB | | |

NOTES:

1. CONTROLLING DIMENSION: INCH
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE -H- IS LOCATED AT THE 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 (0.15) PER SIDE. DIMENSIONS "D" AND "E1" DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE -H-.
5. DIMENSION "b1" DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE .005 (0.13) TOTAL IN EXCESS OF THE "b1" DIMENSION AT MAXIMUM MATERIAL CONDITION.
6. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG.

STYLE 1:

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

| DIM | INCH | | MILLIMETER | | DIM | INCH | | MILLIMETER | |
|-----|------|-------|------------|-------|-----|----------|------|------------|------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| A | .100 | .104 | 2.54 | 2.64 | L | .018 | .024 | 0.46 | 0.61 |
| A1 | .001 | .004 | 0.02 | 0.10 | L1 | .01 BSC | | 0.25 BSC | |
| A2 | .101 | .108 | 2.56 | 2.74 | b1 | .164 | .170 | 4.17 | 4.32 |
| D | .712 | .720 | 18.08 | 18.29 | c1 | .007 | .011 | .18 | .28 |
| D1 | .688 | .692 | 17.48 | 17.58 | e | .106 BSC | | 2.69 BSC | |
| D2 | .011 | .019 | 0.28 | 0.48 | t | 2' | 8' | 2' | 8' |
| D3 | .600 | ----- | 15.24 | ----- | aaa | .004 | | 0.1 | |
| E | .429 | .437 | 10.90 | 11.10 | | | | | |
| E1 | .353 | .357 | 8.97 | 9.07 | | | | | |
| E2 | .132 | .140 | 3.35 | 3.56 | | | | | |
| E3 | .124 | .132 | 3.15 | 3.35 | | | | | |
| E4 | .270 | ----- | 6.86 | ----- | | | | | |
| E5 | .346 | .350 | 8.79 | 8.89 | | | | | |

| | | | | | |
|---|--|--------------------|---------------------------|----------------------------|-------------|
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| TITLE: TO-270 4 LEAD, WIDE BODY GULL WING | | | DOCUMENT NO: 98ASA10578D | | REV: D |
| | | | CASE NUMBER: 1487-05 | | 03 AUG 2007 |
| | | | STANDARD: JEDEC TO-270 BB | | |

PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following documents, software and tools to aid your design process.

Application Notes

- AN1955: Thermal Measurement Methodology of RF Power Amplifiers

Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

Software

- Electromigration MTTF Calculator
- RF High Power Model
- .s2p File

Development Tools

- Printed Circuit Boards

For Software and Tools, do a Part Number search at <http://www.freescale.com>, and select the “Part Number” link. Go to the Software & Tools tab on the part’s Product Summary page to download the respective tool.

REVISION HISTORY

The following table summarizes revisions to this document.

| Revision | Date | Description |
|----------|-----------|---------------------------------|
| 0 | July 2013 | • Initial Release of Data Sheet |

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