



# RF Power LDMOS Transistors

## N-Channel Enhancement-Mode Lateral MOSFETs

These RF power transistors are designed for pulse applications operating at 960 to 1215 MHz. These devices are suitable for use in defense and commercial pulse applications with large duty cycles and long pulses, such as IFF, secondary surveillance radars, ADS-B transponders, DME and other complex pulse chains.

**Typical Performance:** In 1030–1090 MHz reference circuit,  $I_{DQ(A+B)} = 100$  mA

| Frequency (MHz) (1) | Signal Type                            | V <sub>DD</sub> (V) | P <sub>out</sub> (W) | G <sub>ps</sub> (dB) | η <sub>D</sub> (%) |
|---------------------|--|---------------------|----------------------|----------------------|--------------------|
| 1030                | Pulse<br>(128 μsec,<br>10% Duty Cycle) | 50                  | 800 Peak             | 17.5                 | 52.1               |
| 1090                |  |                     | 700 Peak             | 19.0                 | 56.1               |
| 1030                |  | 52                  | 850 Peak             | 17.5                 | 51.7               |
| 1090                |  |                     | 770 Peak             | 19.2                 | 56.1               |

**Typical Performance:** In 960–1215 MHz reference circuit,  $I_{DQ(A+B)} = 100$  mA

| Frequency (MHz) | Signal Type                           | V <sub>DD</sub> (V) | P <sub>out</sub> (W) | G <sub>ps</sub> (dB) | η <sub>D</sub> (%) |
|-----------------|---------------------------------------|---------------------|----------------------|----------------------|--------------------|
| 960             | Pulse<br>(128 μsec,<br>4% Duty Cycle) | 50                  | 747 Peak             | 16.7                 | 50.8               |
| 1030            |                                       |                     | 713 Peak             | 16.5                 | 49.7               |
| 1090            |                                       |                     | 700 Peak             | 16.5                 | 47.1               |
| 1215            |                                       |                     | 704 Peak             | 16.5                 | 54.5               |

**Typical Performance:** In 1030 MHz narrowband production test fixture,  $I_{DQ(A+B)} = 100$  mA

| Frequency (MHz) | Signal Type                            | V <sub>DD</sub> (V) | P <sub>out</sub> (W) | G <sub>ps</sub> (dB) | η <sub>D</sub> (%) |
|-----------------|--|---------------------|----------------------|----------------------|--------------------|
| 1030 (2)        | Pulse<br>(128 μsec,<br>10% Duty Cycle) | 50                  | 730 Peak             | 19.2                 | 58.5               |

### Narrowband Load Mismatch/Ruggedness

| Frequency (MHz) | Signal Type                            | VSWR                       | P <sub>in</sub> (W)        | Test Voltage | Result                |
|-----------------|--|----------------------------|----------------------------|--------------|-----------------------|
| 1030 (2)        | Pulse<br>(128 μsec,<br>10% Duty Cycle) | > 20:1 at All Phase Angles | 17.2 Peak (3 dB Overdrive) | 50           | No Device Degradation |

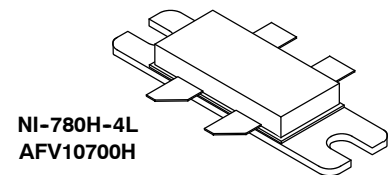
1. Measured in 1030–1090 MHz reference circuit (page 5).
2. Measured in 1030 MHz narrowband production test fixture (page 9).

### Features

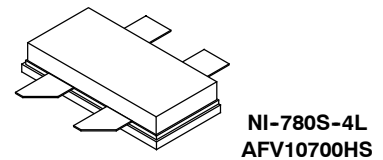
- Internally input and output matched for broadband operation and ease of use
- Device can be used in a single-ended, push-pull or quadrature configuration
- Qualified up to a maximum of 55 V<sub>DD</sub> operation
- High ruggedness, handles > 20:1 VSWR
- Integrated ESD protection with greater negative gate-source voltage range for improved Class C operation and gate voltage pulsing
- Recommended drivers: MRFE6VS25N (25 W) or MRF6V10010N (10 W)
- Included in NXP product longevity program with assured supply for a minimum of 15 years after launch

**AFV10700H**  
**AFV10700HS**  
**AFV10700GS**

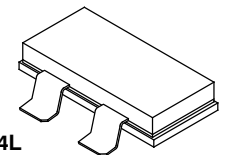
**960–1215 MHz, 700 W PEAK, 52 V**  
**AIRFAST RF POWER LDMOS**  
**TRANSISTORS**



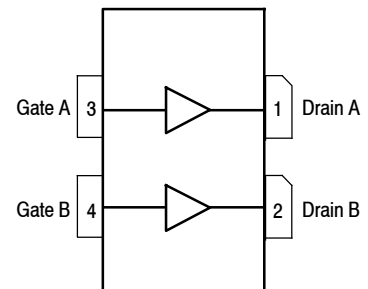
NI-780H-4L  
AFV10700H



NI-780S-4L  
AFV10700HS



NI-780GS-4L  
AFV10700GS



(Top View)

Note: The 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, +105  | Vdc       |
| Gate-Source Voltage  | $V_{GS}$  | -6.0, +10   | Vdc       |
| Operating Voltage  | $V_{DD}$  | 55, +0      | Vdc       |
| Storage Temperature Range  | $T_{stg}$ | -65 to +150 | °C        |
| Case Operating Temperature Range   | $T_C$     | -55 to +150 | °C        |
| Operating Junction Temperature Range (1,2)                               | $T_J$     | -55 to +225 | °C        |
| Total Device Dissipation @ $T_C = 25^\circ\text{C}$<br>Derate above 25°C | $P_D$     | 526<br>2.63 | W<br>W/°C |

**Table 2. Thermal Characteristics**

| Characteristic  | Symbol          | Value (2,3) | Unit |
|---|-----------------|-------------|------|
| Thermal Impedance, Junction to Case<br>Pulse: Case Temperature 75°C, 730 W Peak, 128 $\mu\text{sec}$ Pulse Width,<br>10% Duty Cycle, 50 Vdc, $I_{DQ(A+B)} = 100\text{ mA}$ , 1030 MHz | $Z_{\theta JC}$ | 0.030       | °C/W |

**Table 3. ESD Protection Characteristics**

| Test Methodology                      | Class             |
|---------------------------------------|-------------------|
| Human Body Model (per JESD22-A114)    | 2, passes 2000 V  |
| Charge Device Model (per JESD22-C101) | C3, passes 2000 V |

**Table 4. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------|--------|-----|-----|-----|------|
|----------------|--------|-----|-----|-----|------|

**Off Characteristics (4)**

|  |               |     |   |    |                 |
|--|---------------|-----|---|----|-----------------|
| Gate-Source Leakage Current<br>( $V_{GS} = 5\text{ Vdc}$ , $V_{DS} = 0\text{ Vdc}$ )               | $I_{GSS}$     | —   | — | 1  | $\mu\text{Adc}$ |
| Drain-Source Breakdown Voltage<br>( $V_{GS} = 0\text{ Vdc}$ , $I_D = 10\ \mu\text{A}$ )            | $V_{(BR)DSS}$ | 105 | — | —  | Vdc             |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 50\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ )  | $I_{DSS}$     | —   | — | 1  | $\mu\text{Adc}$ |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 105\text{ Vdc}$ , $V_{GS} = 0\text{ Vdc}$ ) | $I_{DSS}$     | —   | — | 10 | $\mu\text{Adc}$ |

**On Characteristics**

|   |              |     |      |     |     |
|---|--------------|-----|------|-----|-----|
| Gate Threshold Voltage (4)<br>( $V_{DS} = 10\text{ Vdc}$ , $I_D = 260\ \mu\text{Adc}$ )                               | $V_{GS(th)}$ | 1.3 | 1.8  | 2.3 | Vdc |
| Gate Quiescent Voltage<br>( $V_{DD} = 50\text{ Vdc}$ , $I_{DQ(A+B)} = 100\text{ mAdc}$ , Measured in Functional Test) | $V_{GS(Q)}$  | 1.6 | 2.1  | 2.6 | Vdc |
| Drain-Source On-Voltage (4)<br>( $V_{GS} = 10\text{ Vdc}$ , $I_D = 2.6\text{ Adc}$ )                                  | $V_{DS(on)}$ | —   | 0.28 | —   | Vdc |

**Dynamic Characteristics (4,5)**

|   |           |   |      |   |    |
|---|-----------|---|------|---|----|
| Reverse Transfer Capacitance<br>( $V_{DS} = 50\text{ Vdc} \pm 30\text{ mV(rms)ac}$ @ 1 MHz, $V_{GS} = 0\text{ Vdc}$ ) | $C_{rss}$ | — | 1.16 | — | pF |
|---|-----------|---|------|---|----|

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

(continued)

**Table 4. Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  unless otherwise noted) (continued)

| Characteristic   | Symbol   | Min  | Typ  | Max  | Unit |
|--|----------|------|------|------|------|
| <b>Functional Tests</b> (In NXP Narrowband Production Test Fixture, 50 ohm system) $V_{DD} = 50\text{ Vdc}$ , $I_{DQ(A+B)} = 100\text{ mA}$ , $P_{out} = 730\text{ W Peak}$ (73 W Avg.), $f = 1030\text{ MHz}$ , 128 $\mu\text{sec}$ Pulse Width, 10% Duty Cycle |          |      |      |      |      |
| Power Gain   | $G_{ps}$ | 18.0 | 19.2 | 21.0 | dB   |
| Drain Efficiency   | $\eta_D$ | 54.5 | 58.5 | —    | %    |
| Input Return Loss  | IRL      | —    | -15  | -9   | dB   |

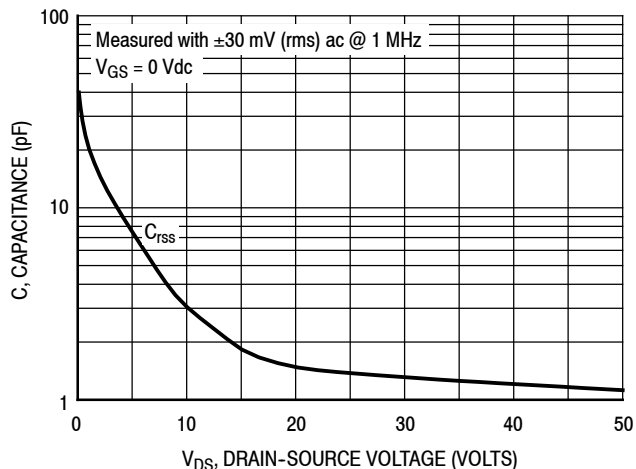
**Load Mismatch/Ruggedness** (In NXP Narrowband Production Test Fixture, 50 ohm system)  $I_{DQ(A+B)} = 100\text{ mA}$ 

| Frequency (MHz) | Signal Type  | VSWR                       | $P_{in}$ (W)                  | Test Voltage, $V_{DD}$ | Result                |
|-----------------|--|----------------------------|-------------------------------|------------------------|-----------------------|
| 1030            | Pulse<br>(128 $\mu\text{sec}$ ,<br>10% Duty Cycle) | > 20:1 at All Phase Angles | 17.2 Peak<br>(3 dB Overdrive) | 50                     | No Device Degradation |

**Table 5. Ordering Information**

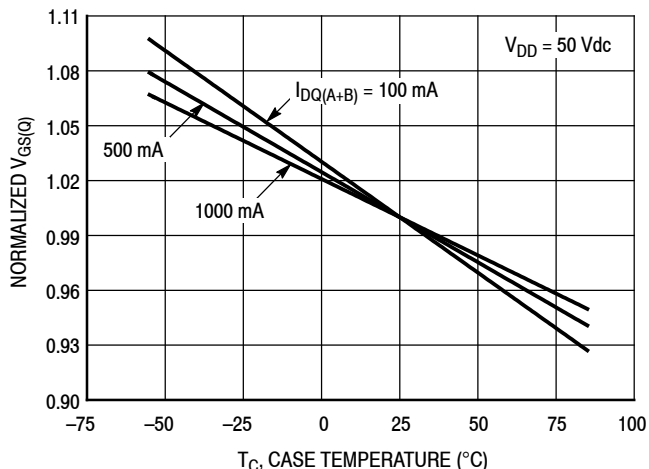
| Device       | Tape and Reel Information                            | Package     |
|--------------|--|-------------|
| AFV10700HR5  | R5 Suffix = 50 Units, 56 mm Tape Width, 13-inch Reel | NI-780H-4L  |
| AFV10700HSR5 | R5 Suffix = 50 Units, 32 mm Tape Width, 13-inch Reel | NI-780S-4L  |
| AFV10700GSR5 |  | NI-780GS-4L |

## TYPICAL CHARACTERISTICS



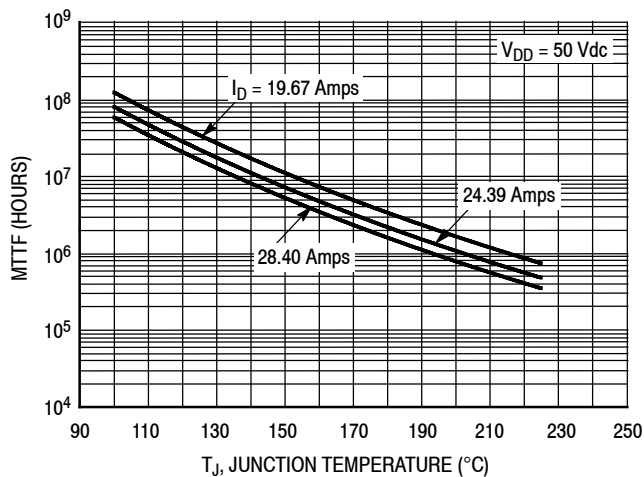
**Note:** Each side of device measured separately.

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



| $I_{DQ}$ (mA) | Slope (mV/°C) |
|---------------|---------------|
| 100           | -2.73         |
| 500           | -2.39         |
| 1500          | -2.09         |

**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>.

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

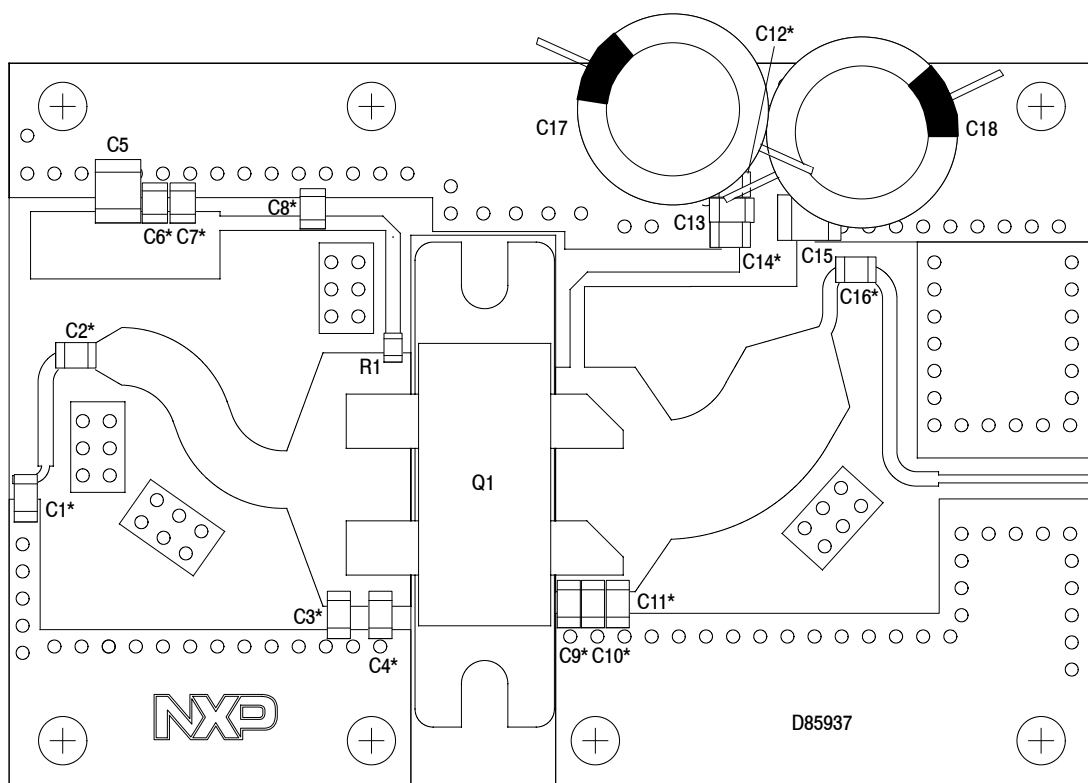
## 1030–1090 MHz REFERENCE CIRCUIT – 2.0" x 3.0" (5.1 cm x 7.6 cm)

**Table 6. 1030–1090 MHz Performance** (In NXP Reference Circuit, 50 ohm system)  $I_{DQ(A+B)} = 100 \text{ mA}$

| Frequency (MHz) | Signal Type                              | V <sub>DD</sub> (V) | P <sub>out</sub> (W) | G <sub>ps</sub> (dB) | $\eta_D$ (%) |
|-----------------|--|---------------------|----------------------|----------------------|--------------|
| 1030            | Pulse<br>(128 $\mu$ sec, 10% Duty Cycle) | 50                  | 800 Peak             | 17.5                 | 52.1         |
| 1090            |  |                     | 700 Peak             | 19.0                 | 56.1         |
| 1030            |  | 52                  | 850 Peak             | 17.5                 | 51.7         |
| 1090            |  |                     | 770 Peak             | 19.2                 | 56.1         |

**NOTE:** Size of the matching area: 1.3" x 2.6" (3.3 cm x 6.6 cm)

1030–1090 MHz REFERENCE CIRCUIT – 2.0" × 3.0" (5.1 cm × 7.6 cm)



\*C1, C2, C3, C4, C6, C7, C8, C9, C10, C11, C12, C14 and C16 are mounted vertically.

Figure 5. AFV10700H Reference Circuit Component Layout – 1030–1090 MHz

Table 7. AFV10700H Reference Circuit Component Designations and Values – 1030–1090 MHz

| Part        | Description                               | Part Number          | Manufacturer |
|-------------|---|----------------------|--------------|
| C1          | 1.5 pF Chip Capacitor                     | ATC800B1R5BT500XT    | ATC          |
| C2, C8, C14 | 39 pF Chip Capacitor                      | ATC800B390JT500XT    | ATC          |
| C3, C4      | 4.3 pF Chip Capacitor                     | ATC800B4R3CT500XT    | ATC          |
| C5, C15     | 2.2 μF Chip Capacitor                     | C3225X7R2A225K230AB  | TDK          |
| C6, C12     | 1000 pF Chip Capacitor                    | ATC800B102JT50XT     | ATC          |
| C7          | 100 pF Chip Capacitor                     | ATC800B101JT500XT    | ATC          |
| C9          | 4.7 pF Chip Capacitor                     | ATC800B4R7CT500XT    | ATC          |
| C10, C11    | 3.3 pF Chip Capacitor                     | ATC800B3R3CT500XT    | ATC          |
| C13         | 1.0 μF Chip Capacitor                     | GRM31CR72A105KA01L   | Murata       |
| C16         | 270 pF Chip Capacitor                     | ATC800B271JT200XT    | ATC          |
| C17, C18    | 470 μF, 63 V Electrolytic Capacitor       | MCGPR63V477M13X26–RH | Multicom     |
| Q1          | RF High Power LDMOS Transistor            | AFV10700H            | NXP          |
| R1          | 22 Ω, 1/8 W Chip Resistor                 | RK73H2ATTD22R0F      | KAO Speer    |
| PCB         | Rogers RO3010 0.025", $\epsilon_r = 11.2$ | D85937               | MTL          |

TYPICAL CHARACTERISTICS – 1030–1090 MHz  
REFERENCE CIRCUIT

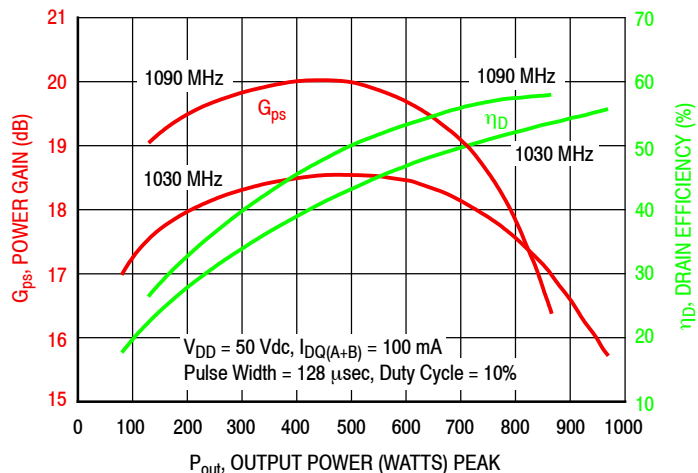


Figure 6. Power Gain and Drain Efficiency versus Output Power – 50 V

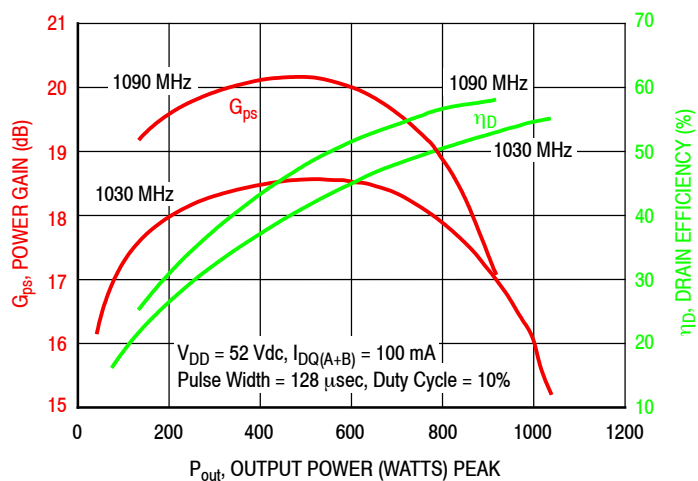
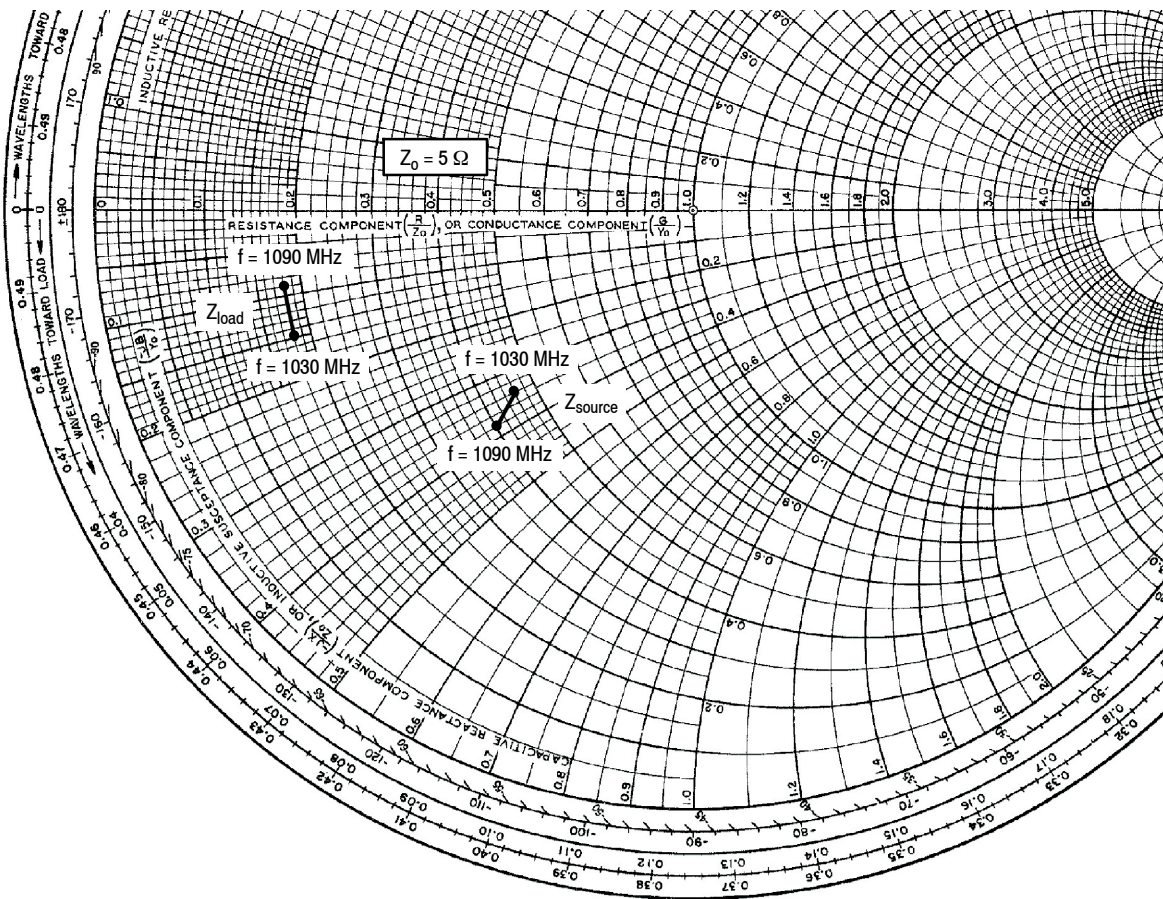


Figure 7. Power Gain and Drain Efficiency versus Output Power – 52 V

# 1030–1090 MHz REFERENCE CIRCUIT



| f<br>MHz | Z <sub>source</sub><br>Ω | Z <sub>load</sub><br>Ω |
|----------|--------------------------|------------------------|
| 1030     | 2.3 – j1.7               | 0.91 – j0.76           |
| 1090     | 2.0 – j1.9               | 0.88 – j0.47           |

Z<sub>source</sub> = Test circuit impedance as measured from gate to ground.

Z<sub>load</sub> = Test circuit impedance as measured from drain to ground.

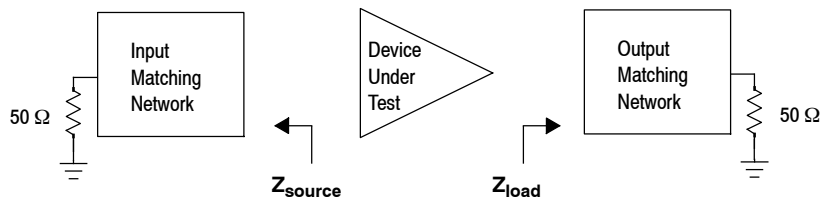
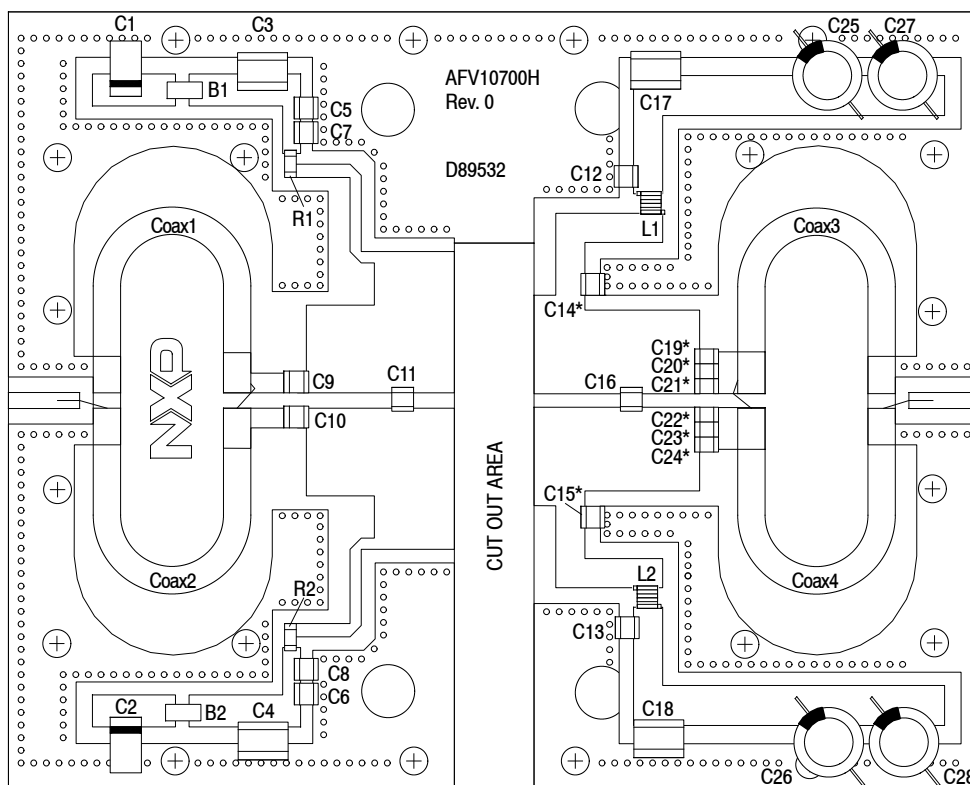


Figure 8. Series Equivalent Source and Load Impedance – 1030–1090 MHz



1030 MHz NARROWBAND PRODUCTION TEST FIXTURE – 4.0" x 5.0" (10.2 cm x 12.7 cm)



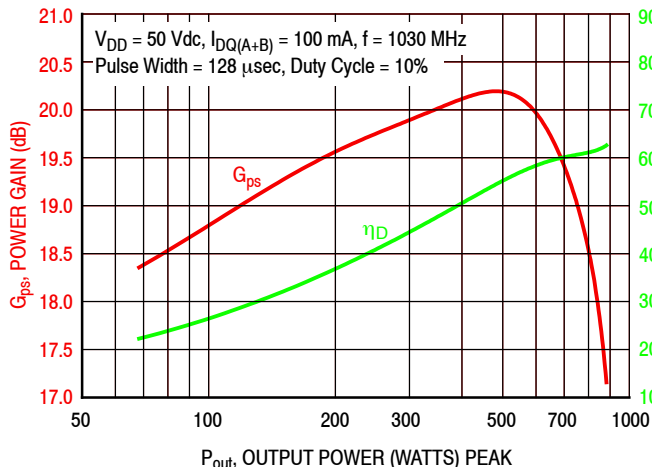
\*C14, C15, C19, C20, C21, C22, C23 and C24 are mounted vertically.

Figure 9. AFV10700H Narrowband Test Circuit Component Layout – 1030 MHz

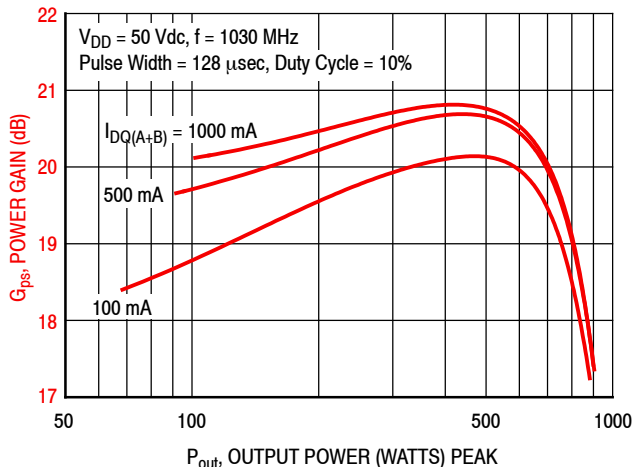
Table 8. AFV10700H Narrowband Test Circuit Component Designations and Values – 1030 MHz

| Part                                 | Description                                       | Part Number          | Manufacturer  |
|--------------------------------------|---|----------------------|---------------|
| B1, B2                               | Short RF Bead                                     | 2743019447           | Fair-Rite     |
| C1, C2                               | 22 $\mu$ F, 35 V Tantalum Capacitor               | T491X226K035AT       | Kemet         |
| C3, C4                               | 2.2 $\mu$ F Chip Capacitor                        | C1825C225J5RAC       | Kemet         |
| C5, C6                               | 0.1 $\mu$ F Chip Capacitor                        | CDR33BX104AKWS       | AVX           |
| C7, C8, C19, C20, C21, C22, C23, C24 | 43 pF Chip Capacitor                              | ATC100B430JT500XT    | ATC           |
| C9, C10                              | 3.3 pF Chip Capacitor                             | ATC100B3R3CT500XT    | ATC           |
| C11                                  | 0.7 pF Chip Capacitor                             | ATC100B0R7BT500XT    | ATC           |
| C12, C13                             | 36 pF Chip Capacitor                              | ATC100B360JT500XT    | ATC           |
| C14, C15                             | 5.1 pF Chip Capacitor                             | ATC100B5R1CT500XT    | ATC           |
| C16                                  | 5.6 pF Chip Capacitor                             | ATC100B5R6CT500XT    | ATC           |
| C17, C18                             | 0.01 $\mu$ F Chip Capacitor                       | C1825C103K1GACTU     | Kemet         |
| C25, C26, C27, C28                   | 470 $\mu$ F, 63 V Electrolytic Capacitor          | MCGPR63V477M13X26-RH | Multicomp     |
| Coax1, Coax2, Coax3, Coax4           | 35 $\Omega$ , Semi Rigid Coax 1.98" Shield Length | HSF-141-35-C         | Hongsen Cable |
| L1, L2                               | 12 nH Inductor, 3 Turns                           | GA3094-ALC           | Coilcraft     |
| R1, R2                               | 5.6 $\Omega$ , 1/4 W Chip Resistor                | CRCW12065R60FKEA     | Vishay        |
| PCB                                  | Arlon, AD255A, 0.03", $\epsilon_r = 2.55$         | D89532               | MTL           |

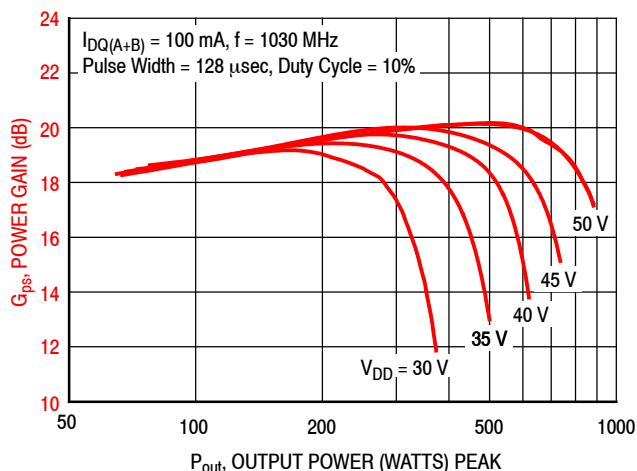
**TYPICAL CHARACTERISTICS – 1030 MHz,  $T_C = 25^\circ\text{C}$   
PRODUCTION TEST FIXTURE**



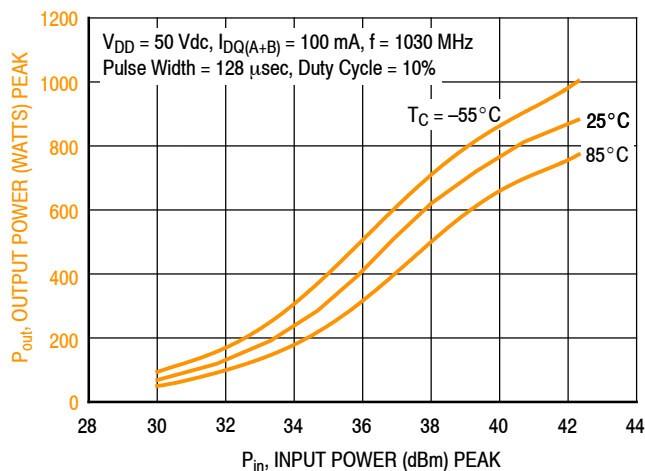
**Figure 10. Power Gain and Drain Efficiency versus Output Power**



**Figure 11. Power Gain versus Output Power and Quiescent Drain Current**

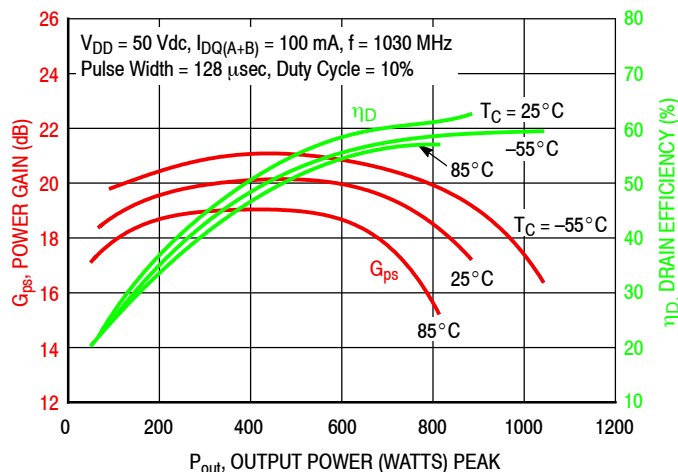


**Figure 12. Power Gain versus Output Power and Drain Voltage**



| f (MHz) | P1dB (W) | P3dB (W) |
|---------|----------|----------|
| 1030    | 740      | 883      |

**Figure 13. Output Power versus Input Power**



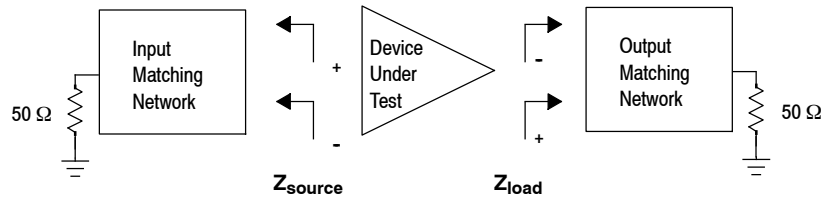
**Figure 14. Power Gain and Drain Efficiency versus Output Power**

## 1030 MHz NARROWBAND PRODUCTION TEST FIXTURE

| f<br>MHz | $Z_{\text{source}}$<br>$\Omega$ | $Z_{\text{load}}$<br>$\Omega$ |
|----------|---------------------------------|-------------------------------|
| 1030     | $4.0 - j6.9$                    | $3.9 - j1.4$                  |

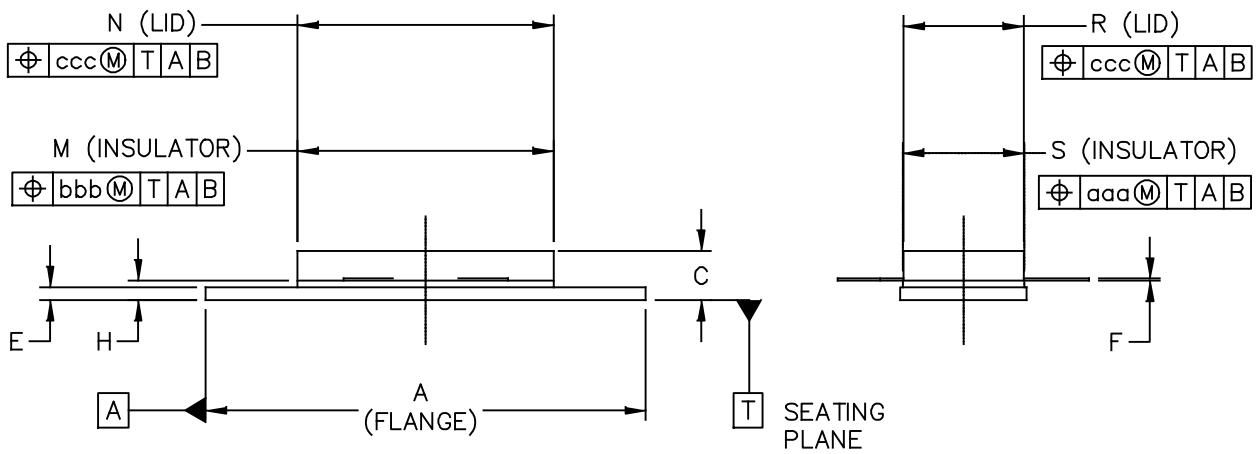
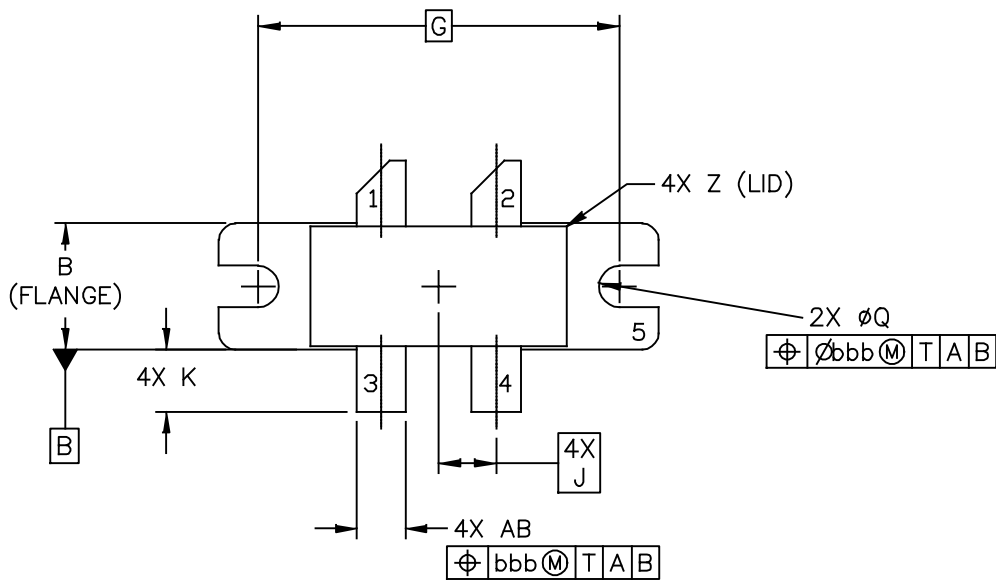
$Z_{\text{source}}$  = Test circuit impedance as measured from gate to gate, balanced configuration.

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



**Figure 15. Series Equivalent Source and Load Impedance – 1030 MHz**

### PACKAGE DIMENSIONS



|  |                          |                            |
|--|--------------------------|----------------------------|
| © NXP SEMICONDUCTORS N.V.<br>ALL RIGHTS RESERVED | MECHANICAL OUTLINE       | PRINT VERSION NOT TO SCALE |
| TITLE:<br><br>NI 780-4                           | DOCUMENT NO: 98ASA10793D | REV: A                     |
|  | STANDARD: NON-JEDEC      |                            |
|  | SOT1827-1                | 17 MAR 2016                |

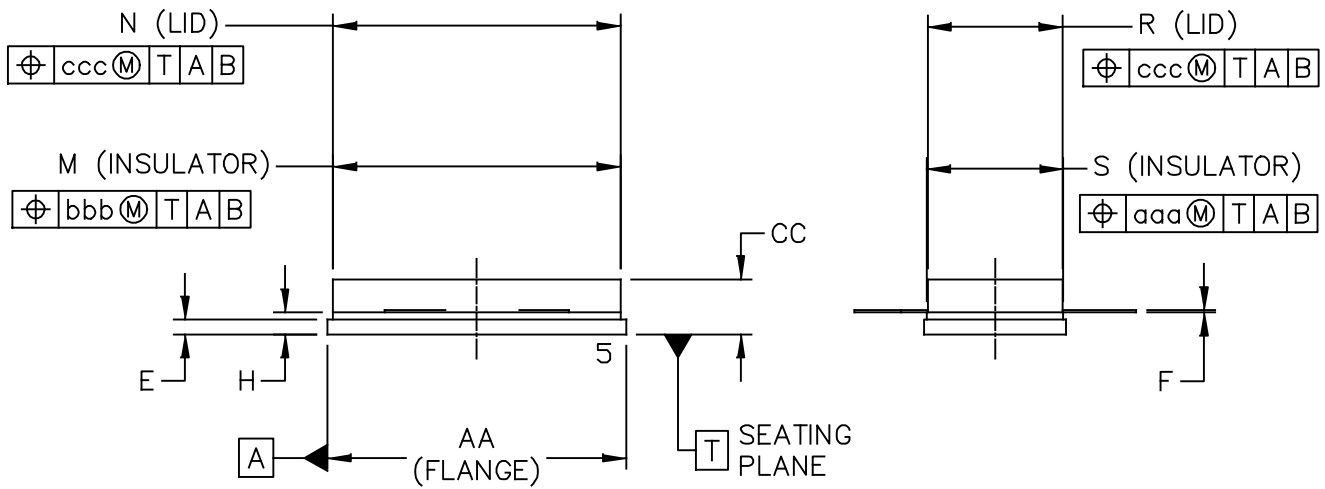
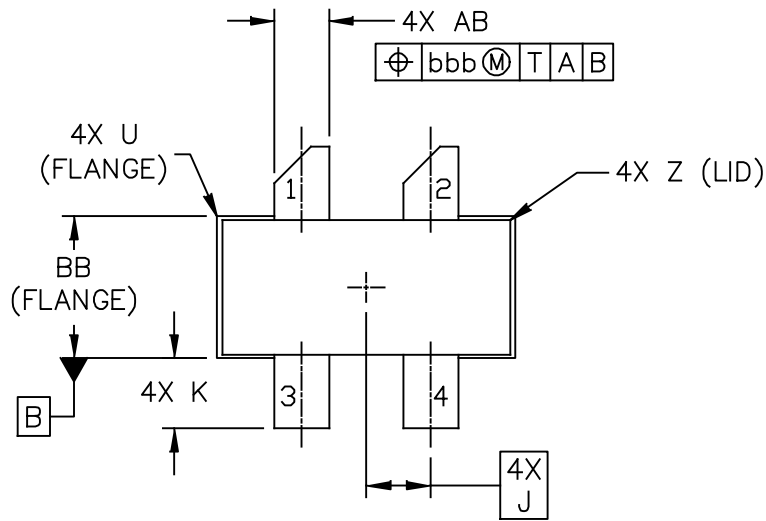
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION H IS MEASURED .030 (0.762) AWAY FROM PACKAGE BODY.

STYLE 1:

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

| DIM   | INCH      |       | MILLIMETER         |       | DIM                                  | INCH                       |      | MILLIMETER  |       |
|---|-----------|-------|--------------------|-------|--------------------------------------|----------------------------|------|-------------|-------|
|   | MIN       | MAX   | MIN                | MAX   |                                      | MIN                        | MAX  | MIN         | MAX   |
| A   | 1.335     | 1.345 | 33.91              | 34.16 | R                                    | .365                       | .375 | 9.27        | 9.53  |
| B   | .380      | .390  | 9.65               | 9.91  | S                                    | .365                       | .375 | 9.27        | 9.52  |
| C   | .125      | .170  | 3.18               | 4.32  | U                                    |                            | .040 |             | 1.02  |
| E   | .035      | .045  | 0.89               | 1.14  | Z                                    |                            | .030 |             | 0.76  |
| F   | .003      | .006  | 0.08               | 0.15  | AB                                   | .145                       | .155 | 3.68        | 3.94  |
| G   | 1.100 BSC |       | 27.94 BSC          |       |                                      |                            |      |             |       |
| H   | .057      | .067  | 1.45               | 1.7   | aaa                                  |                            | .005 |             | 0.127 |
| J   | .175 BSC  |       | 4.44 BSC           |       | bbb                                  |                            | .010 |             | 0.254 |
| K   | .170      | .210  | 4.32               | 5.33  | ccc                                  |                            | .015 |             | 0.381 |
| M   | .774      | .786  | 19.61              | 20.02 |                                      |                            |      |             |       |
| N   | .772      | .788  | 19.61              | 20.02 |                                      |                            |      |             |       |
| Q   | Ø.118     | Ø.138 | Ø3                 | Ø3.51 |                                      |                            |      |             |       |
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| TITLE:<br><br>NI 780-4                            |           |       |                    |       | DOCUMENT NO: 98ASA10793D      REV: A |                            |      |             |       |
|   |           |       |                    |       | STANDARD: NON-JEDEC                  |                            |      |             |       |
|   |           |       |                    |       | SOT1827-1                            |                            |      | 17 MAR 2016 |       |

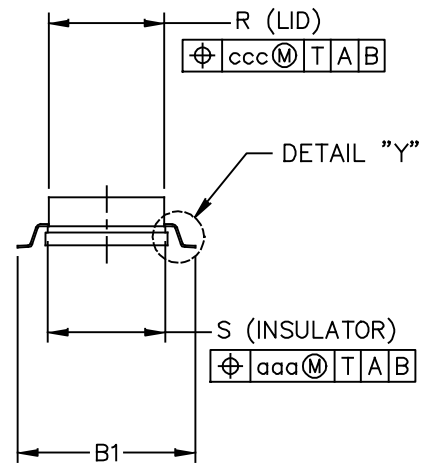
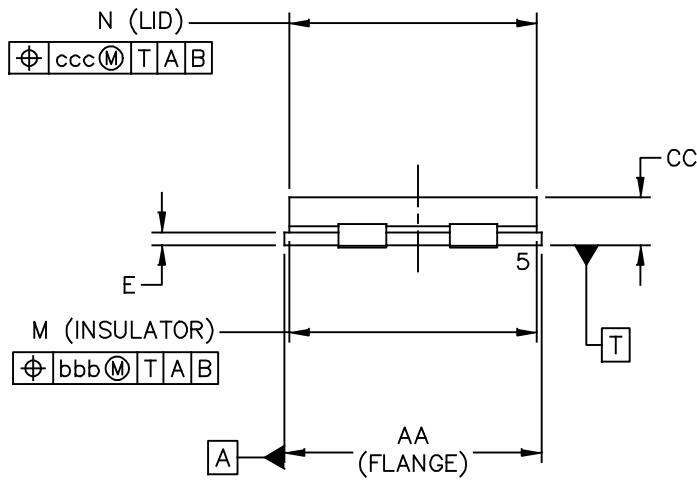
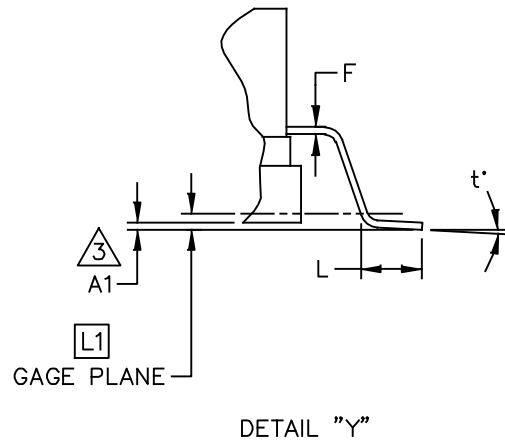
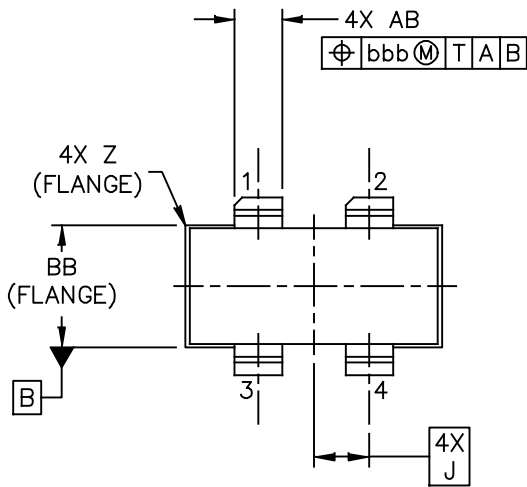


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| TITLE:<br><br>NI-780S-4L                         | DOCUMENT NO: 98ASA10718D<br>STANDARD: NON-JEDEC<br>SOT1826-1 | REV: C<br><br>01 AUG 2016  |

NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.
3. DELETED
4. DIMENSION H IS MEASURED .030 (0.762) AWAY FROM FLANGE TO CLEAR EPOXY FLOW OUT PARALLEL TO DATUM B.

| DIM   | INCH     |      | MILLIMETER         |       | DIM                                  | INCH                       |             | MILLIMETER |        |  |
|---|----------|------|--------------------|-------|--------------------------------------|----------------------------|-------------|------------|--------|--|
|   | MIN      | MAX  | MIN                | MAX   |                                      | MIN                        | MAX         | MIN        | MAX    |  |
| AA  | .805     | .815 | 20.45              | 20.70 | U                                    |                            | .040        |            | 1.02   |  |
| BB  | .382     | .388 | 9.70               | 9.86  | Z                                    |                            | .030        |            | 0.76   |  |
| CC  | .125     | .170 | 3.18               | 4.32  | AB                                   | .145                       | .155        | 3.68       | - 3.94 |  |
| E   | .035     | .045 | 0.89               | 1.14  |                                      |                            |             |            |        |  |
| F   | .003     | .006 | 0.08               | 0.15  | aaa                                  |                            | .005        |            | 0.127  |  |
| H   | .057     | .067 | 1.45               | 1.70  | bbb                                  |                            | .010        |            | 0.254  |  |
| J   | .175 BSC |      | 4.44 BSC           |       | ccc                                  |                            | .015        |            | 0.381  |  |
| K   | .170     | .210 | 4.32               | 5.33  |                                      |                            |             |            |        |  |
| M   | .774     | .786 | 19.61              | 20.02 |                                      |                            |             |            |        |  |
| N   | .772     | .788 | 19.61              | 20.02 |                                      |                            |             |            |        |  |
| R   | .365     | .375 | 9.27               | 9.53  |                                      |                            |             |            |        |  |
| S   | .365     | .375 | 9.27               | 9.52  |                                      |                            |             |            |        |  |
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| TITLE:  |          |      |                    |       | DOCUMENT NO: 98ASA10718D      REV: C |                            |             |            |        |  |
| NI-780S-4L  |          |      |                    |       | STANDARD: NON-JEDEC                  |                            |             |            |        |  |
|   |          |      |                    |       | SOT1826-1                            |                            | 01 AUG 2016 |            |        |  |



|  |                          |                            |
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| TITLE:<br><br>NI-780GS-4L                        | DOCUMENT NO: 98ASA00238D | REV: C                     |
|  | STANDARD: NON-JEDEC      |                            |
|  | SOT1805-1                | 23 FEB 2016                |



NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1994.
2. CONTROLLING DIMENSION: INCH.

3. DIMENSION A1 IS MEASURED WITH REFERENCE TO DATUM T. THE POSITIVE VALUE IMPLIES THAT THE PACKAGE BOTTOM IS HIGHER THAN THE LEAD BOTTOM.

| DIM | INCH     |      | MILLIMETER |       | DIM | INCH  |       | MILLIMETER |       |
|-----|----------|------|------------|-------|-----|-------|-------|------------|-------|
|     | MIN      | MAX  | MIN        | MAX   |     | MIN   | MAX   | MIN        | MAX   |
| AA  | .805     | .815 | 20.45      | 20.70 | Z   | R.000 | R.040 | R0.00      | R1.02 |
| A1  | .002     | .008 | 0.05       | 0.20  | AB  | .145  | .155  | 3.68       | 3.94  |
| BB  | .380     | .390 | 9.65       | 9.91  | t°  | 0°    | 8°    | 0°         | 8°    |
| B1  | .546     | .562 | 13.87      | 14.27 | aaa | .005  |       | 0.13       |       |
| CC  | .125     | .170 | 3.18       | 4.32  | bbb | .010  |       | 0.25       |       |
| E   | .035     | .045 | 0.89       | 1.14  | ccc | .015  |       | 0.38       |       |
| F   | .003     | .006 | 0.08       | 0.15  |     |       |       |            |       |
| L   | .038     | .046 | 0.97       | 1.17  |     |       |       |            |       |
| L1  | .010 BSC |      | 0.25 BSC   |       |     |       |       |            |       |
| J   | .175 BSC |      | 4.44 BSC   |       |     |       |       |            |       |
| M   | .774     | .786 | 19.66      | 19.96 |     |       |       |            |       |
| N   | .772     | .788 | 19.61      | 20.02 |     |       |       |            |       |
| R   | .365     | .375 | 9.27       | 9.53  |     |       |       |            |       |
| S   | .365     | .375 | 9.27       | 9.53  |     |       |       |            |       |

|   |  |                          |                            |
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| TITLE:  |  | DOCUMENT NO: 98ASA00238D | REV: C                     |
| NI-780GS-4L                                       |  | STANDARD: NON-JEDEC      |                            |
|   |  | SOT1805-1                | 23 FEB 2016                |

## PRODUCT DOCUMENTATION, SOFTWARE AND TOOLS

Refer to the following resources to aid your design process.

### Application Notes

- AN1908: Solder Reflow Attach Method for High Power RF Devices in Air Cavity Packages
- AN1955: Thermal Measurement Methodology of RF Power Amplifiers

### Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

### Software

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

### Development Tools

- Printed Circuit Boards

## REVISION HISTORY

The following table summarizes revisions to this document.

| Revision | Date      | Description   |
|----------|-----------|---|
| 0        | May 2017  | <ul style="list-style-type: none"><li>• Initial release of data sheet</li></ul>   |
| 1        | Jan. 2018 | <ul style="list-style-type: none"><li>• Added part number AFV10700GS, p. 1</li><li>• Production test fixture, Typical Characteristic graphs: clarified temperature condition, p. 10</li><li>• Added NI-780GS-4L package isometric, p. 1, and Mechanical Outline, pp. 16–17</li></ul>  |
| 2        | Aug. 2019 | <ul style="list-style-type: none"><li>• Overview copy and device description: updated to reflect frequency band operation from 960–1215 MHz, p. 1</li><li>• Typical Performance table: added 960–1215 MHz performance data, p. 1</li><li>• Table 6, 1030–1090 Component Layout Parts List: updated the part number and description for C16 and R1, p. 6</li></ul> |

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