



**THE DATASHEET OF  
A2T27S020NR1**





# RF Power LDMOS Transistors

## N-Channel Enhancement-Mode Lateral MOSFETs

These 2.5 W RF power LDMOS transistors are designed for cellular base station applications covering the frequency range of 400 to 2700 MHz.

- Typical Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Vdc,  $I_{DQ} = 185$  mA,  $P_{out} = 2.5$  W Avg., Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.(1)

### 1800 MHz

| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) | IRL (dB) |
|-----------|---------------|--------------|-----------------|------------|----------|
| 1805 MHz  | 20.8          | 20.9         | 9.4             | -44.6      | -9       |
| 1840 MHz  | 21.1          | 20.9         | 9.3             | -45.6      | -16      |
| 1880 MHz  | 20.7          | 20.6         | 9.1             | -45.5      | -13      |

- Typical Single-Carrier W-CDMA Performance:  $V_{DD} = 28$  Vdc,  $I_{DQ} = 185$  mA,  $P_{out} = 2.5$  W Avg., Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF.(1)

### 2100 MHz

| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) | IRL (dB) |
|-----------|---------------|--------------|-----------------|------------|----------|
| 2110 MHz  | 19.5          | 20.1         | 9.3             | -46.4      | -10      |
| 2140 MHz  | 19.8          | 19.8         | 9.0             | -45.0      | -13      |
| 2170 MHz  | 19.7          | 20.1         | 8.9             | -44.9      | -11      |

### 2600 MHz

| Frequency | $G_{ps}$ (dB) | $\eta_D$ (%) | Output PAR (dB) | ACPR (dBc) | IRL (dB) |
|-----------|---------------|--------------|-----------------|------------|----------|
| 2575 MHz  | 17.6          | 20.3         | 9.3             | -44.2      | -8       |
| 2605 MHz  | 18.6          | 20.4         | 9.0             | -41.3      | -10      |
| 2635 MHz  | 18.0          | 20.1         | 8.6             | -40.7      | -6       |

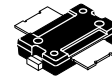
1. All data measured in fixture with device soldered to heatsink.

### Features

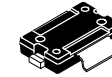
- Greater negative gate-source voltage range for improved Class C operation
- Designed for digital predistortion error correction systems
- Universal broadband driver

## A2T27S020NR1 A2T27S020GNR1

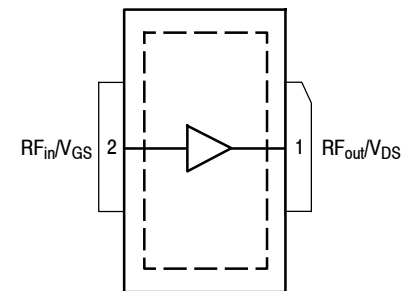
400–2700 MHz, 2.5 W AVG., 28 V  
 AIRFAST RF POWER LDMOS  
 TRANSISTORS



TO-270-2  
 PLASTIC  
 A2T27S020NR1



TO-270G-2  
 PLASTIC  
 A2T27S020GNR1



(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, +65   | Vdc  |
| Gate-Source Voltage                        | $V_{GS}$  | -6.0, +10   | Vdc  |
| Operating Voltage                          | $V_{DD}$  | 32, +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   |

**Table 2. Thermal Characteristics**

| Characteristic   | Symbol          | Value (2,3) | Unit |
|--|-----------------|-------------|------|
| Thermal Resistance, Junction to Case<br>Case Temperature 71.8°C, 2.5 W CW, 28 Vdc, $I_{DQ} = 185$ mA, 1842.5 MHz | $R_{\theta JC}$ | 1.6         | °C/W |

**Table 3. ESD Protection Characteristics**

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

**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            |
|---|--------------|-----|-----|-----|-----------------|
| <b>Off Characteristics</b>  |              |     |     |     |                 |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 65$ Vdc, $V_{GS} = 0$ Vdc)             | $I_{DSS}$    | —   | —   | 10  | $\mu\text{Adc}$ |
| Zero Gate Voltage Drain Leakage Current<br>( $V_{DS} = 32$ Vdc, $V_{GS} = 0$ Vdc)             | $I_{DSS}$    | —   | —   | 1   | $\mu\text{Adc}$ |
| Gate-Source Leakage Current<br>( $V_{GS} = 5$ Vdc, $V_{DS} = 0$ Vdc)                          | $I_{GSS}$    | —   | —   | 1   | $\mu\text{Adc}$ |
| <b>On Characteristics</b>   |              |     |     |     |                 |
| Gate Threshold Voltage<br>( $V_{DS} = 10$ Vdc, $I_D = 24.2$ $\mu\text{Adc}$ )                 | $V_{GS(th)}$ | 0.8 | 1.2 | 1.6 | Vdc             |
| Gate Quiescent Voltage<br>( $V_{DD} = 28$ Vdc, $I_D = 185$ mAdc, Measured in Functional Test) | $V_{GS(Q)}$  | 1.5 | 1.8 | 2.3 | Vdc             |
| Drain-Source On-Voltage<br>( $V_{GS} = 10$ Vdc, $I_D = 242$ mAdc)                             | $V_{DS(on)}$ | 0   | 0.1 | 0.2 | Vdc             |

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.

(continued)

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

| Characteristic   | Symbol   | Min  | Typ   | Max   | Unit |
|--|----------|------|-------|-------|------|
| <b>Functional Tests</b> (In NXP Test Fixture, 50 ohm system) $V_{DD} = 28\text{ Vdc}$ , $I_{DQ} = 185\text{ mA}$ , $P_{out} = 2.5\text{ W Avg.}$ , $f = 1842.5\text{ MHz}$ , Single-Carrier W-CDMA, IQ Magnitude Clipping, Input Signal PAR = 9.9 dB @ 0.01% Probability on CCDF. ACPR measured in 3.84 MHz Channel Bandwidth @ $\pm 5\text{ MHz}$ Offset. |          |      |       |       |      |
| Power Gain   | $G_{ps}$ | 20.0 | 21.0  | 23.0  | dB   |
| Drain Efficiency   | $\eta_D$ | 19.4 | 20.8  | —     | %    |
| Output Peak-to-Average Ratio @ 0.01% Probability on CCDF   | PAR      | 8.8  | 9.2   | —     | dB   |
| Adjacent Channel Power Ratio   | ACPR     | —    | -45.3 | -42.0 | dBc  |
| Input Return Loss  | IRL      | —    | -17   | -5    | dB   |

**Load Mismatch** (In NXP Test Fixture, 50 ohm system)  $I_{DQ} = 185\text{ mA}$ ,  $f = 1842.5\text{ MHz}$ 

|  |                       |
|--|-----------------------|
| VSWR 10:1 at 32 Vdc, 28 W CW Output Power<br>(3 dB Input Overdrive from 20 W CW Rated Power) | No Device Degradation |
|--|-----------------------|

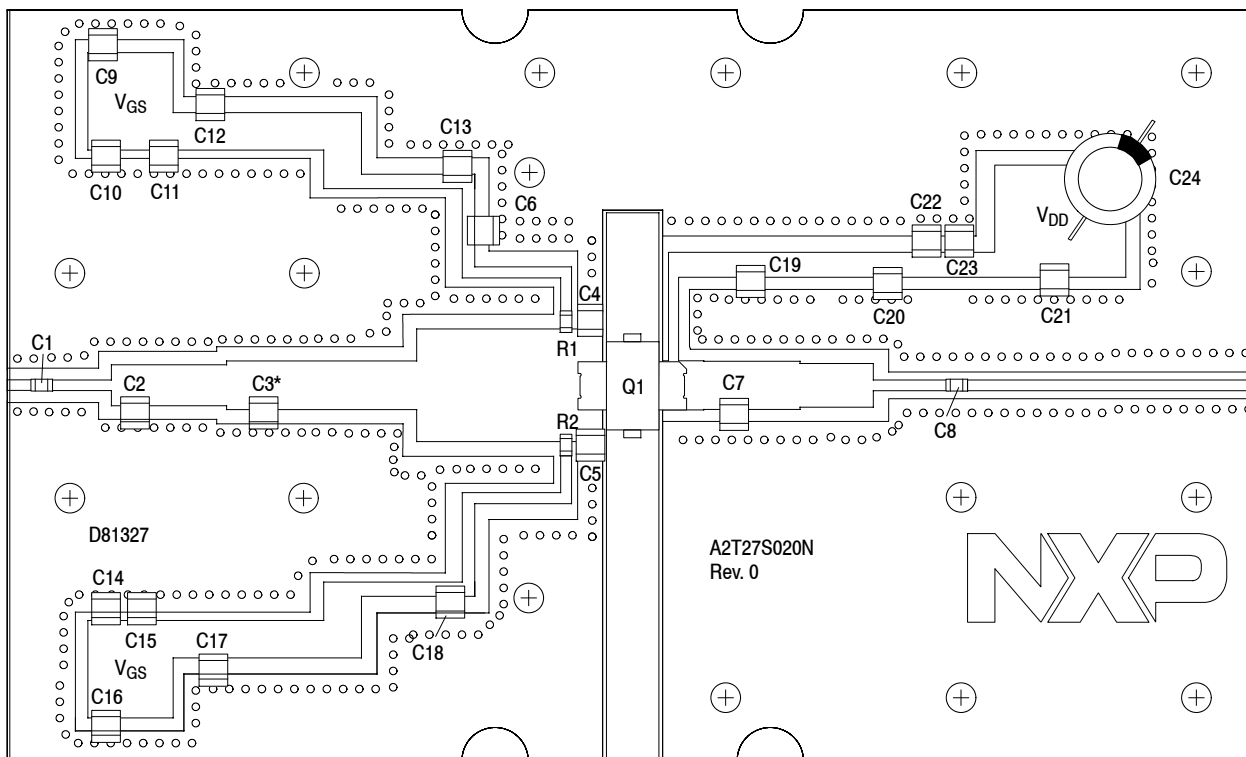
**Typical Performance** (1) (In NXP Test Fixture, 50 ohm system)  $V_{DD} = 28\text{ Vdc}$ ,  $I_{DQ} = 185\text{ mA}$ , 1805–1880 MHz Bandwidth

|   |               |   |       |   |                      |
|---|---------------|---|-------|---|----------------------|
| $P_{out}$ @ 1 dB Compression Point, CW  | P1dB          | — | 20    | — | W                    |
| AM/PM<br>(Maximum value measured at the P3dB compression point across the 1805–1880 MHz frequency range.) | $\Phi$        | — | -11   | — | $^\circ$             |
| VBW Resonance Point<br>(IMD Third Order Intermodulation Inflection Point)                                 | $VBW_{res}$   | — | 100   | — | MHz                  |
| Gain Flatness in 75 MHz Bandwidth @ $P_{out} = 2.5\text{ W Avg.}$   | $G_F$         | — | 0.4   | — | dB                   |
| Gain Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                         | $\Delta G$    | — | 0.012 | — | dB/ $^\circ\text{C}$ |
| Output Power Variation over Temperature<br>( $-30^\circ\text{C}$ to $+85^\circ\text{C}$ )                 | $\Delta P1dB$ | — | 0.003 | — | dB/ $^\circ\text{C}$ |

**Table 6. Ordering Information**

| Device        | Tape and Reel Information                             | Package   |
|---------------|---|-----------|
| A2T27S020NR1  | R1 Suffix = 500 Units, 24 mm Tape Width, 13-inch Reel | TO-270-2  |
| A2T27S020GNR1 |   | TO-270G-2 |

1. All data measured in fixture with device soldered to heatsink.



\*C3 is mounted vertically.

Note: All data measured in fixture with device soldered to heatsink.

**Figure 2. A2T27S020NR1 Test Circuit Component Layout — 1805–1880 MHz**

**Table 7. A2T27S020NR1 Test Circuit Component Designations and Values — 1805–1880 MHz**

| Part          | Description                                 | Part Number          | Manufacturer |
|---------------|---|----------------------|--------------|
| C1            | 1.8 pF Chip Capacitor                       | ATC600F1R8BT250XT    | ATC          |
| C2            | 1 pF Chip Capacitor                         | ATC100B1R0BT500XT    | ATC          |
| C3, C7        | 3 pF Chip Capacitor                         | ATC100B3R0CT500XT    | ATC          |
| C4, C5        | 2 pF Chip Capacitor                         | ATC100B2R0BT500XT    | ATC          |
| C6            | 6.8 pF Chip Capacitor                       | ATC600F6R8BT250XT    | ATC          |
| C8            | 2.4 pF Chip Capacitor                       | ATC600F2R4BT250XT    | ATC          |
| C9, C16       | 22 $\mu$ F, 35 V Tantalum Capacitor         | T491X226K035AT       | Kemet        |
| C10, C14, C21 | 2.2 $\mu$ F Chip Capacitor                  | C1825C225J5RACTU     | Kemet        |
| C11, C15, C23 | 0.1 $\mu$ F Chip Capacitor                  | CDR33BX104AKWS       | AVX          |
| C12, C17, C22 | 220 nF Chip Capacitor                       | C1812C224K5RACTU     | Kemet        |
| C13, C18, C20 | 2.2 $\mu$ F Chip Capacitor                  | C3225X7R1H225K250AB  | TDK          |
| C19           | 6.8 pF Chip Capacitor                       | ATC100B6R8CT500XT    | ATC          |
| C24           | 470 $\mu$ F, 63 V Electrolytic Capacitor    | MCGPR63V477M13X26-RH | Multicomp    |
| Q1            | RF Power LD MOS Transistor                  | A2T27S020N           | NXP          |
| R1, R2        | 2.2 $\Omega$ , 1/4 W Chip Resistor          | CRCW12062R20JNEA     | Vishay       |
| PCB           | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D81327               | Rogers       |

### TYPICAL CHARACTERISTICS — 1805–1880 MHz

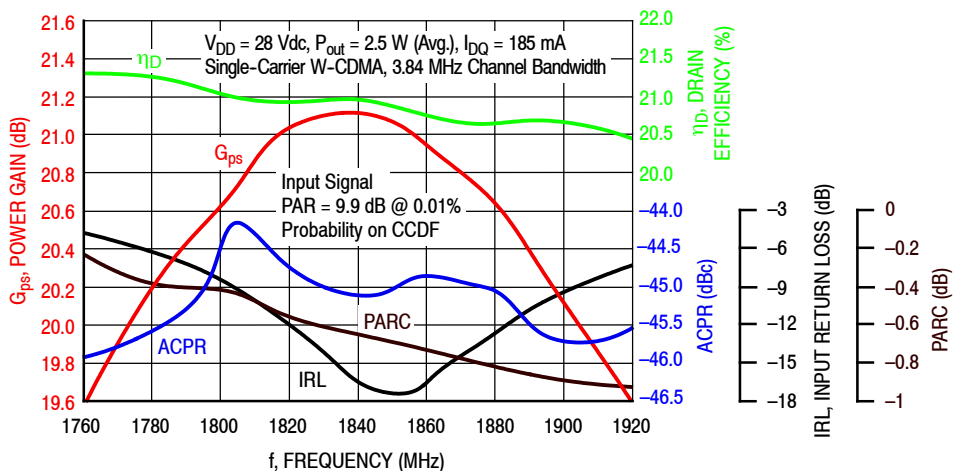


Figure 3. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 2.5$  Watts Avg.

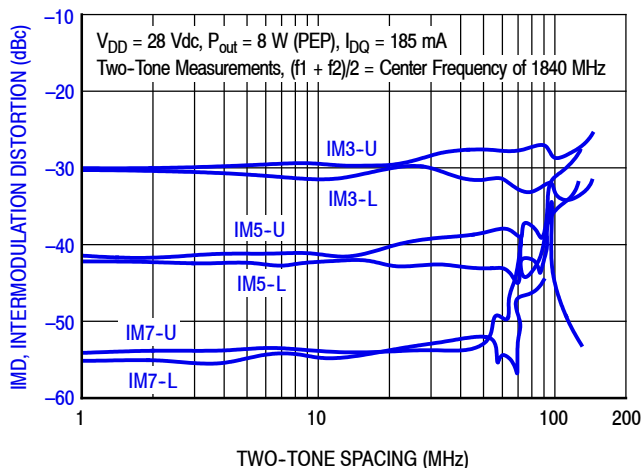


Figure 4. Intermodulation Distortion Products versus Two-Tone Spacing

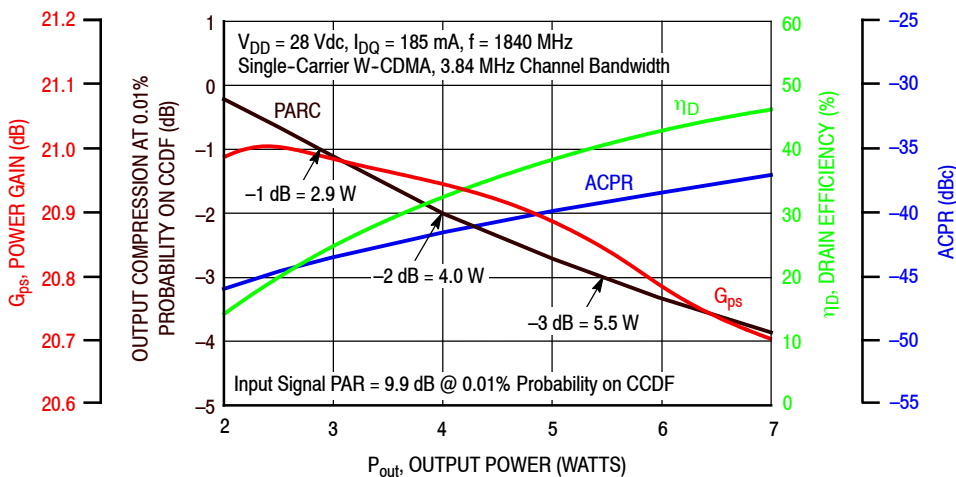
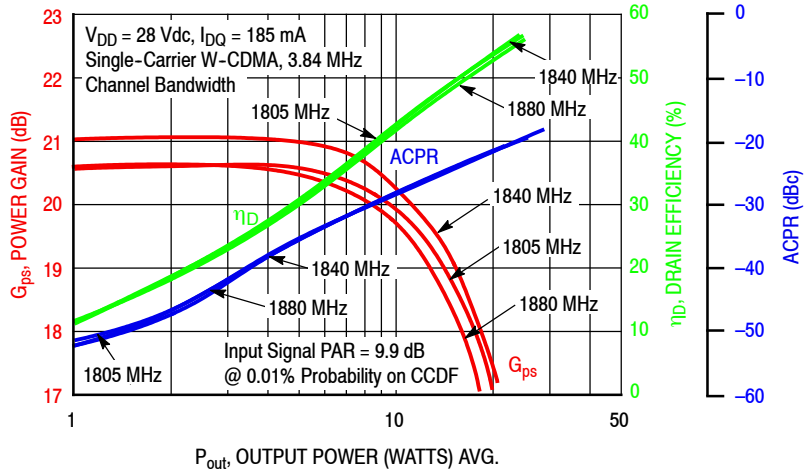
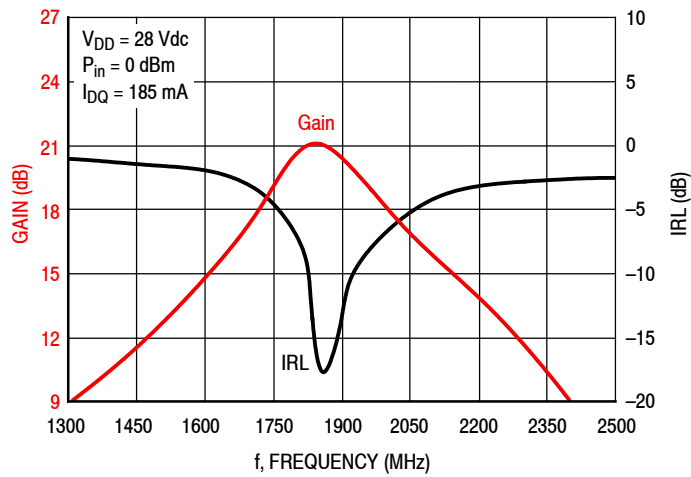


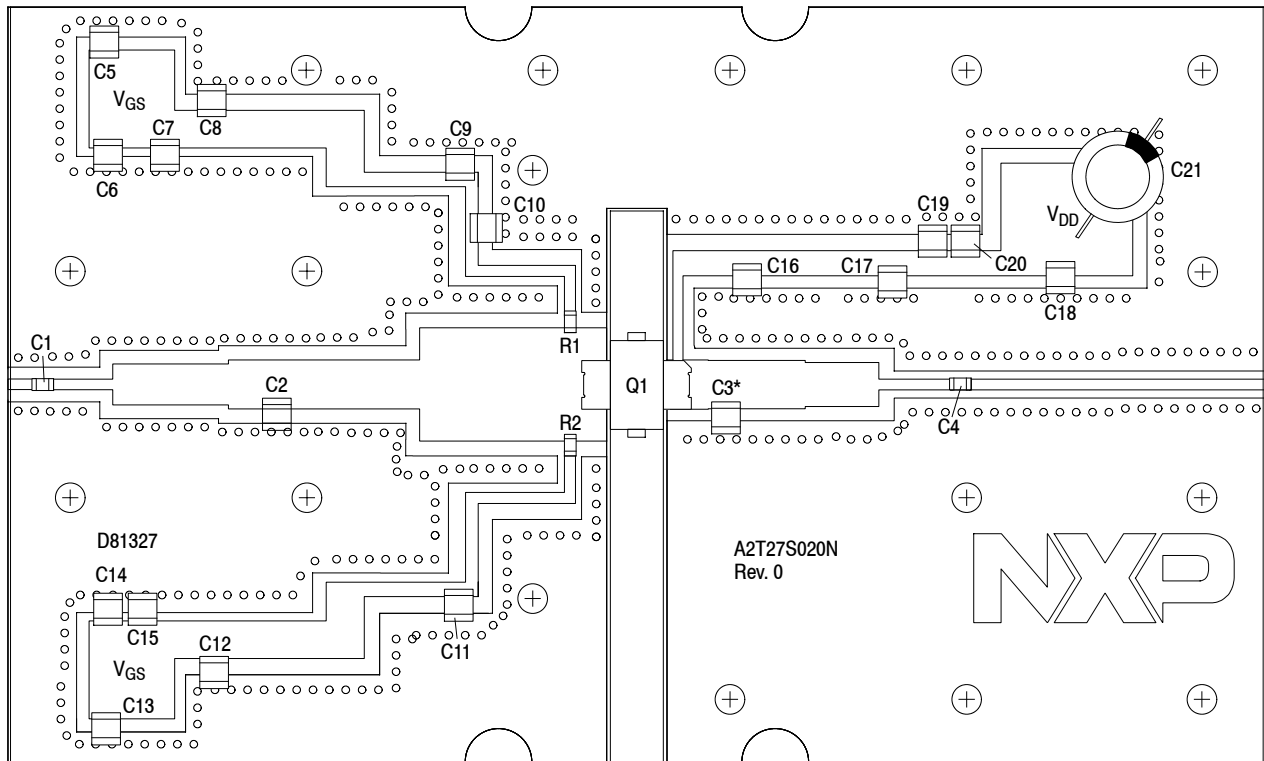
Figure 5. Output Peak-to-Average Ratio Compression (PARC) versus Output Power



**Figure 6. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**



**Figure 7. Broadband Frequency Response**



\*C3 is mounted vertically.

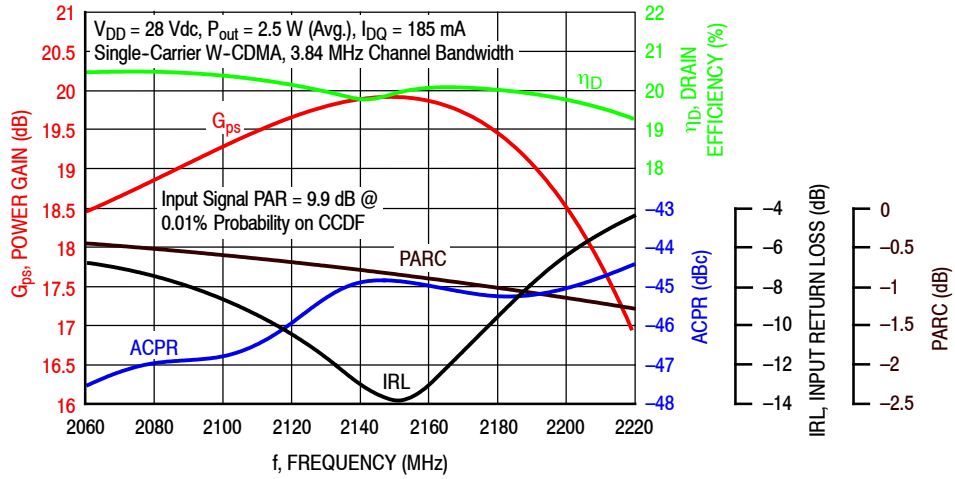
Note: All data measured in fixture with device soldered to heatsink.

**Figure 8. A2T27S020NR1 Test Circuit Component Layout — 2110–2170 MHz**

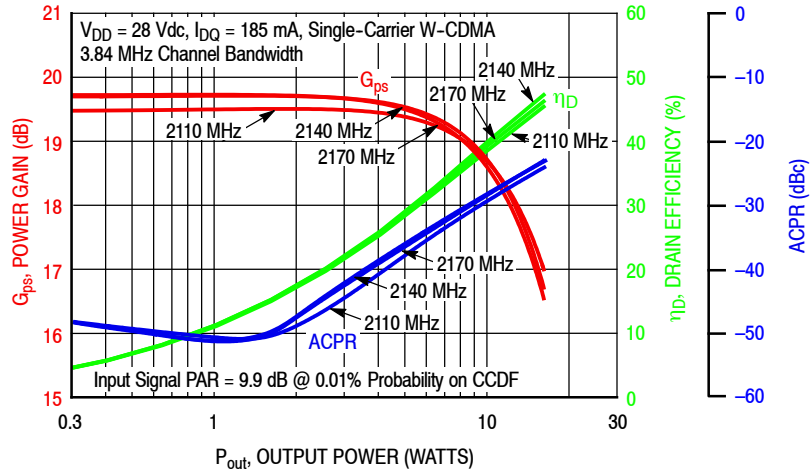
**Table 8. A2T27S020NR1 Test Circuit Component Designations and Values — 2110–2170 MHz**

| Part         | Description                                 | Part Number          | Manufacturer |
|--------------|---|----------------------|--------------|
| C1           | 1.8 pF Chip Capacitor                       | ATC600F1R8BT250XT    | ATC          |
| C2           | 4.3 pF Chip Capacitor                       | ATC100B4R3CT500XT    | ATC          |
| C3           | 2.7 pF Chip Capacitor                       | ATC100B2R7BT500XT    | ATC          |
| C4           | 2.4 pF Chip Capacitor                       | ATC600F2R4BT250XT    | ATC          |
| C5, C13      | 22 $\mu$ F, 35 V Tantalum Capacitor         | T491X226K035AT       | Kemet        |
| C6, C14, C18 | 2.2 $\mu$ F Chip Capacitor                  | C1825C225J5RACTU     | Kemet        |
| C7, C15, C20 | 0.1 $\mu$ F Chip Capacitor                  | CDR33BX104AKWS       | AVX          |
| C8, C12, C19 | 220 nF Chip Capacitor                       | C1812C224K5RACTU     | Kemet        |
| C9, C11, C17 | 2.2 $\mu$ F Chip Capacitor                  | C3225X7R1H225K250AB  | TDK          |
| C10, C16     | 6.8 pF Chip Capacitor                       | ATC100B6R8CT500XT    | ATC          |
| C21          | 470 $\mu$ F, 63 V Electrolytic Capacitor    | MCGPR63V477M13X26-RH | Multicomp    |
| Q1           | RF Power LDMOS Transistor                   | A2T27S020N           | NXP          |
| R1, R2       | 2.2 $\Omega$ , 1/4 W Chip Resistor          | CRCW12062R20JNEA     | Vishay       |
| PCB          | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D81327               | Rogers       |

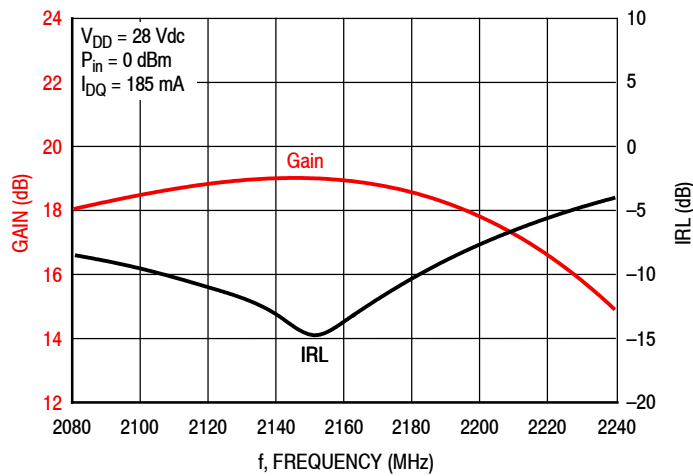
**TYPICAL CHARACTERISTICS — 2110–2170 MHz**



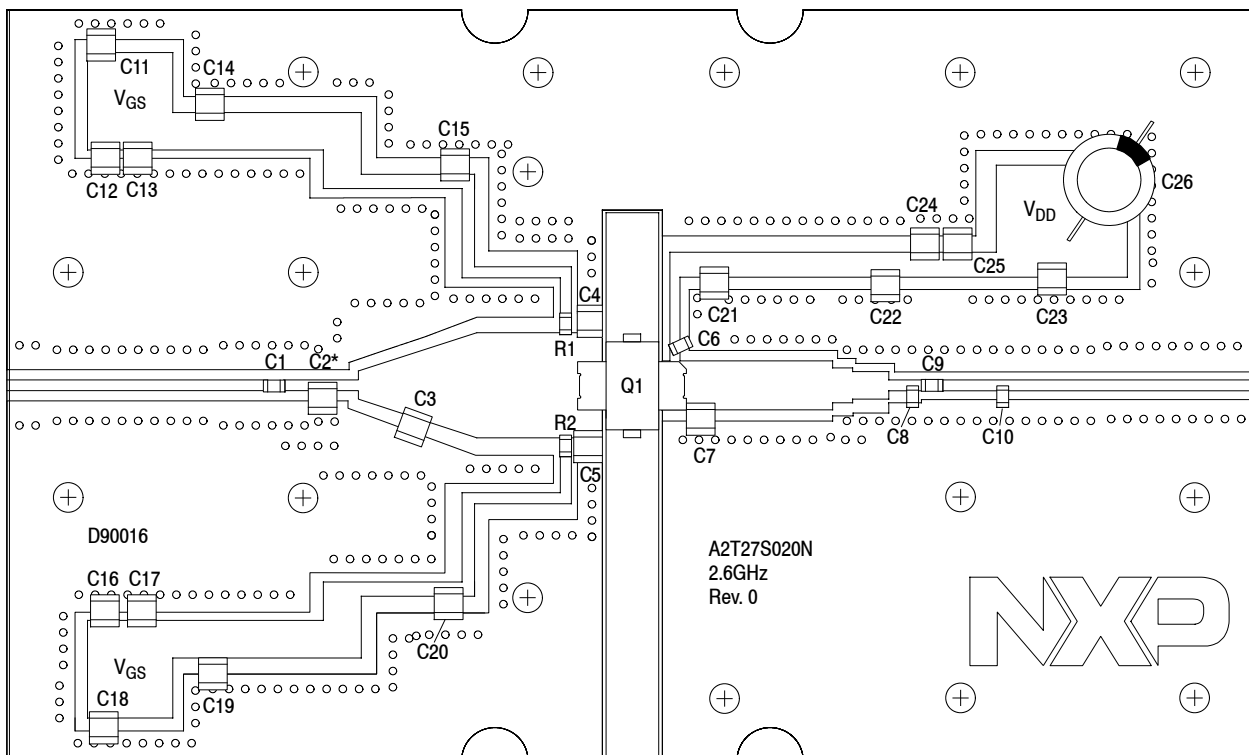
**Figure 9. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 2.5$  Watts Avg.**



**Figure 10. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power**



**Figure 11. Broadband Frequency Response**



\*C2 is mounted vertically.

Note: All data measured in fixture with device soldered to heatsink.

Figure 12. A2T27S020NR1 Test Circuit Component Layout — 2575–2635 MHz

Table 9. A2T27S020NR1 Test Circuit Component Designations and Values — 2575–2635 MHz

| Part          | Description                                 | Part Number          | Manufacturer |
|---------------|---|----------------------|--------------|
| C1            | 7.5 pF Chip Capacitor                       | ATC600F7R5BT250XT    | ATC          |
| C2            | 1 pF Chip Capacitor                         | ATC100B1R0BT500XT    | ATC          |
| C3            | 2.4 pF Chip Capacitor                       | ATC600S2R4BT250XT    | ATC          |
| C4, C5, C7    | 1.5 pF Chip Capacitor                       | ATC100B1R5BT500XT    | ATC          |
| C6            | 2.2 pF Chip Capacitor                       | ATC600F2R2BT250XT    | ATC          |
| C8            | 0.75 pF Chip Capacitor                      | GQM2195C2ER75BB12D   | Murata       |
| C9            | 6.8 pF Chip Capacitor                       | ATC600F6R8BT250XT    | ATC          |
| C10           | 1.2 pF Chip Capacitor                       | ATC600F1R2BT250XT    | ATC          |
| C11, C18      | 22 $\mu$ F, 35 V Tantalum Capacitor         | T491X226K035AT       | Kemet        |
| C12, C16, C23 | 2.2 $\mu$ F Chip Capacitor                  | C1825C225J5RAC-TV    | Kemet        |
| C13, C17, C25 | 0.1 $\mu$ F Chip Capacitor                  | CDR33BX104AKWS       | AVX          |
| C14, C19, C24 | 220 nF Chip Capacitor                       | C1812C224K5RAC-TV    | Kemet        |
| C15, C20, C22 | 2.2 $\mu$ F Chip Capacitor                  | C3225X7R1H225K       | TDK          |
| C21           | 6.8 pF Chip Capacitor                       | ATC100B6R8CT500XT    | ATC          |
| C26           | 470 $\mu$ F, 63 V Electrolytic Capacitor    | MCGPR63V477M13X26-RH | Multicomp    |
| Q1            | RF Power LDMOS Transistor                   | A2T27S020N           | NXP          |
| R1, R2        | 2.2 $\Omega$ , 1/4 W Chip Resistor          | CRCW12062R20JNEA     | Vishay       |
| PCB           | Rogers RO4350B, 0.020", $\epsilon_r = 3.66$ | D90016               | MTL          |

TYPICAL CHARACTERISTICS — 2575–2635 MHz

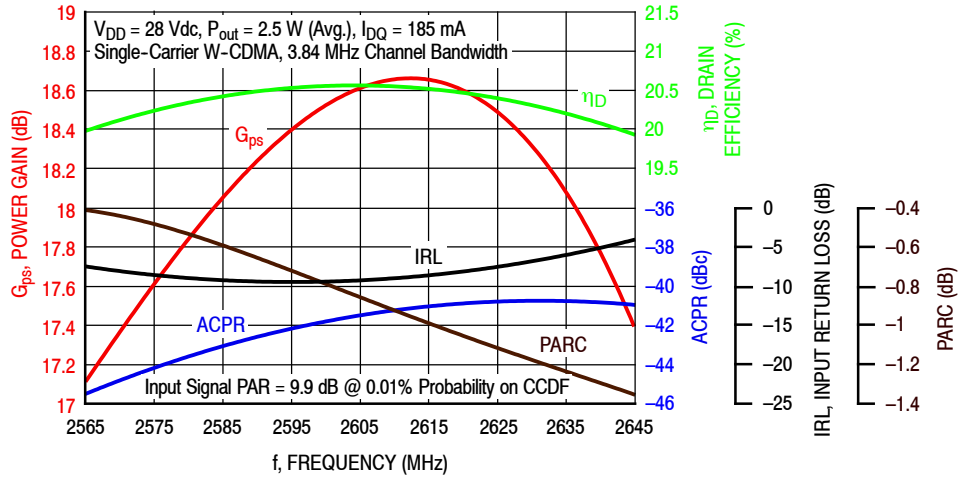


Figure 13. Single-Carrier Output Peak-to-Average Ratio Compression (PARC) Broadband Performance @  $P_{out} = 2.5$  Watts Avg.

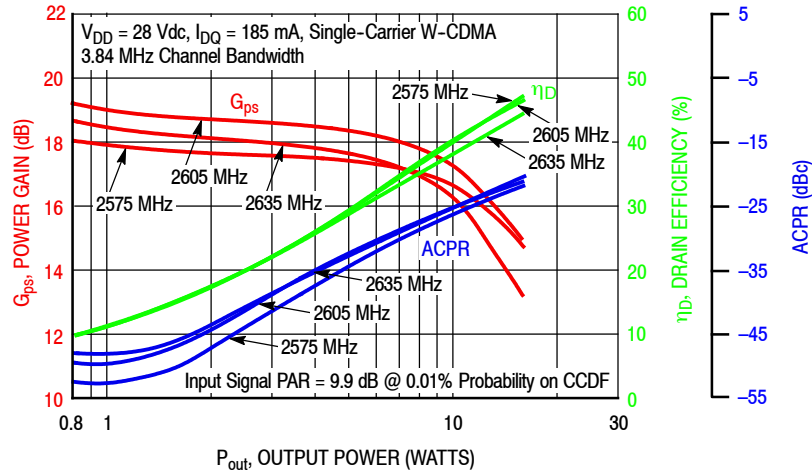


Figure 14. Single-Carrier W-CDMA Power Gain, Drain Efficiency and ACPR versus Output Power

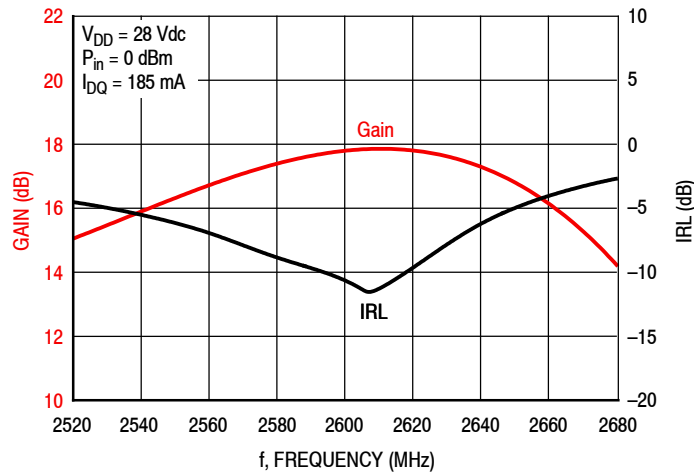
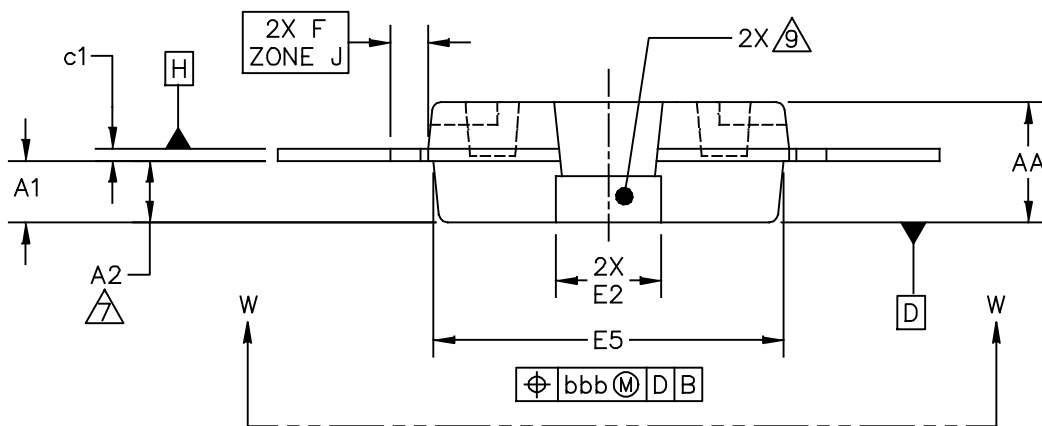
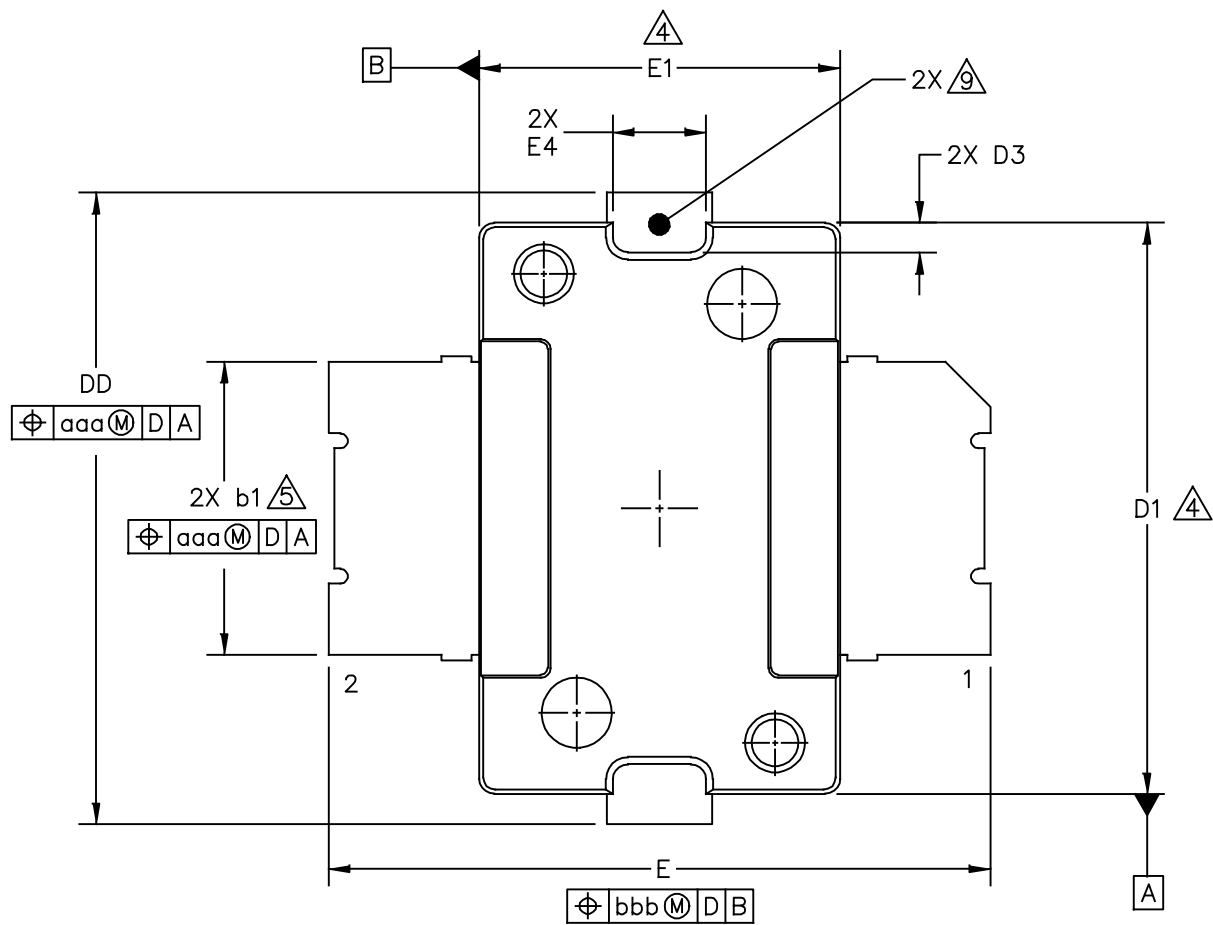


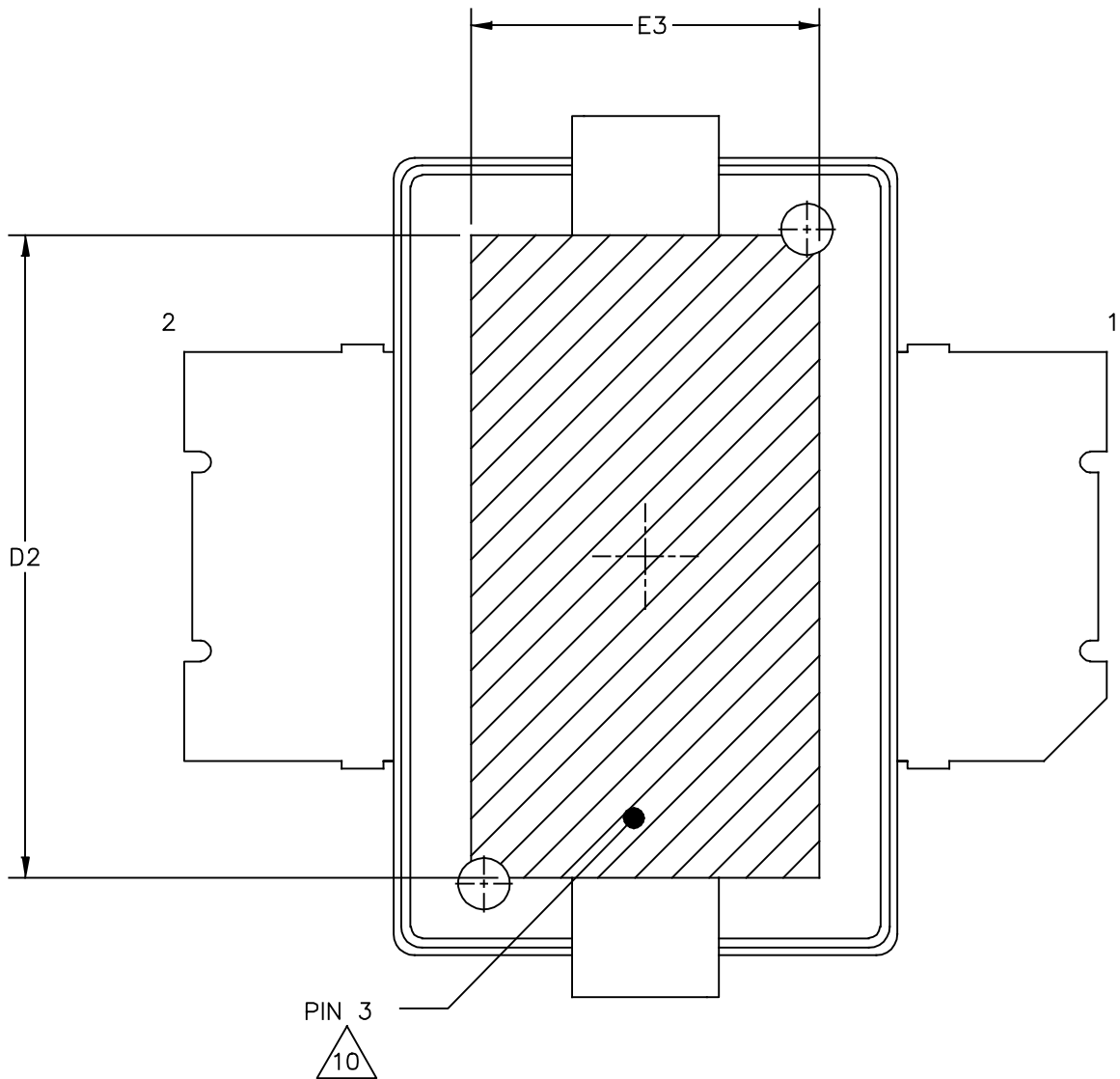
Figure 15. Broadband Frequency Response

# PACKAGE DIMENSIONS



|  |                          |                            |
|--|--------------------------|----------------------------|
| © NXP SEMICONDUCTORS N.V.<br>ALL RIGHTS RESERVED | MECHANICAL OUTLINE       | PRINT VERSION NOT TO SCALE |
| TITLE:<br><br>TO-270-2                           | DOCUMENT NO: 98ASH98117A | REV: R                     |
|  | STANDARD: NON-JEDEC      |                            |
|  | SOT1732-1                | 22 FEB 2016                |

A2T27S020NR1 A2T27S020GNR1



VIEW W-W  
BOTTOM VIEW

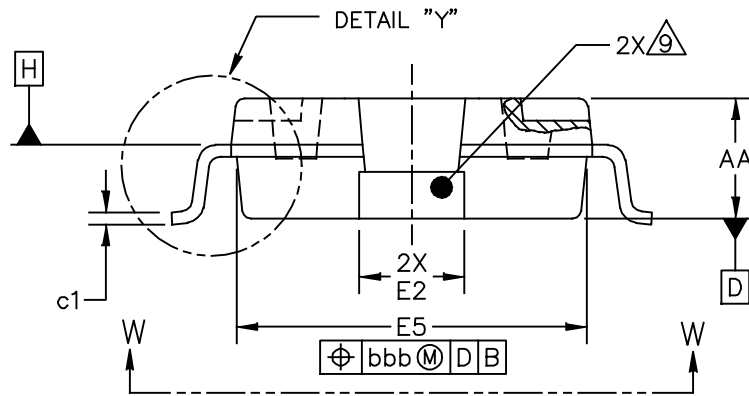
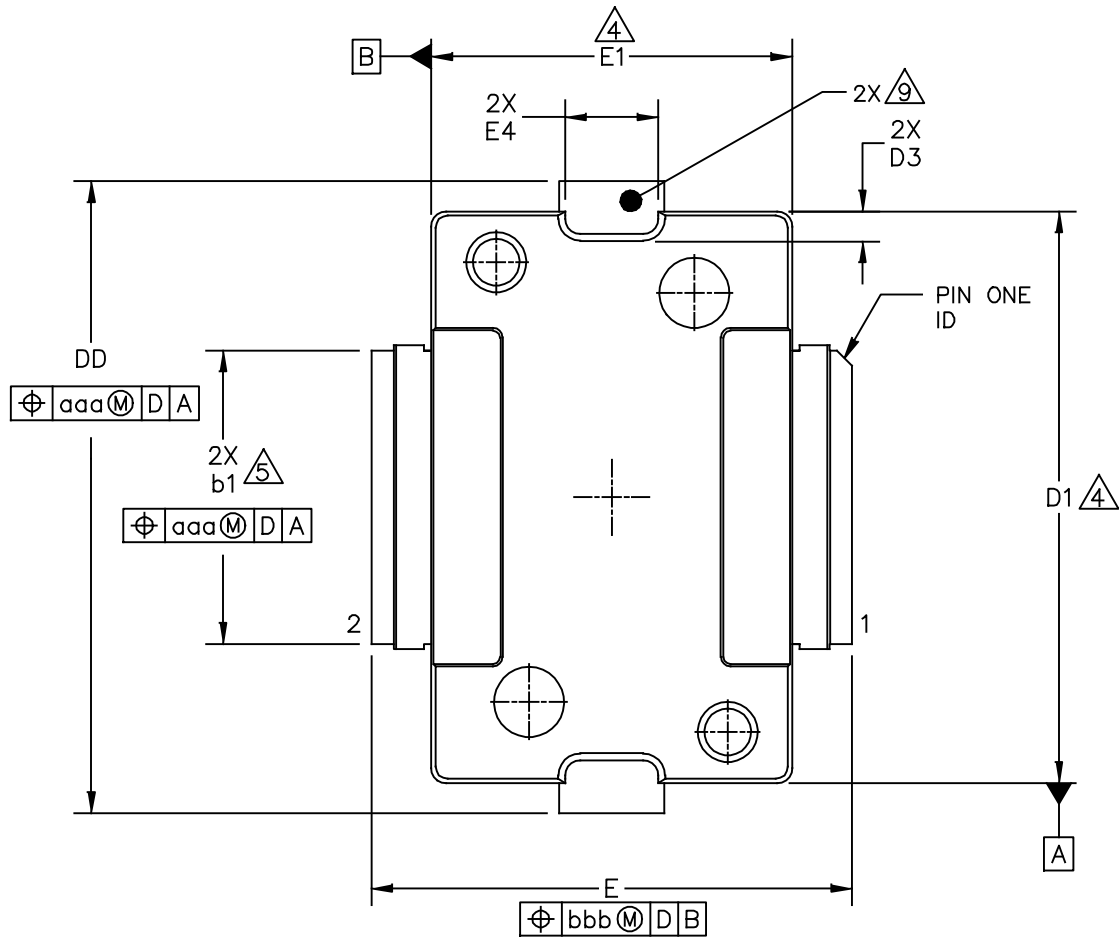
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|--|--------------------|----------------------------|-------------|
| © NXP SEMICONDUCTORS N.V.<br>ALL RIGHTS RESERVED | MECHANICAL OUTLINE | PRINT VERSION NOT TO SCALE |             |
| TITLE:<br><br>TO-270-2                           |                    | DOCUMENT NO: 98ASH98117A   | REV: R      |
|  |                    | STANDARD: NON-JEDEC        |             |
|  |                    | SOT1732-1                  | 22 FEB 2016 |

NOTES:

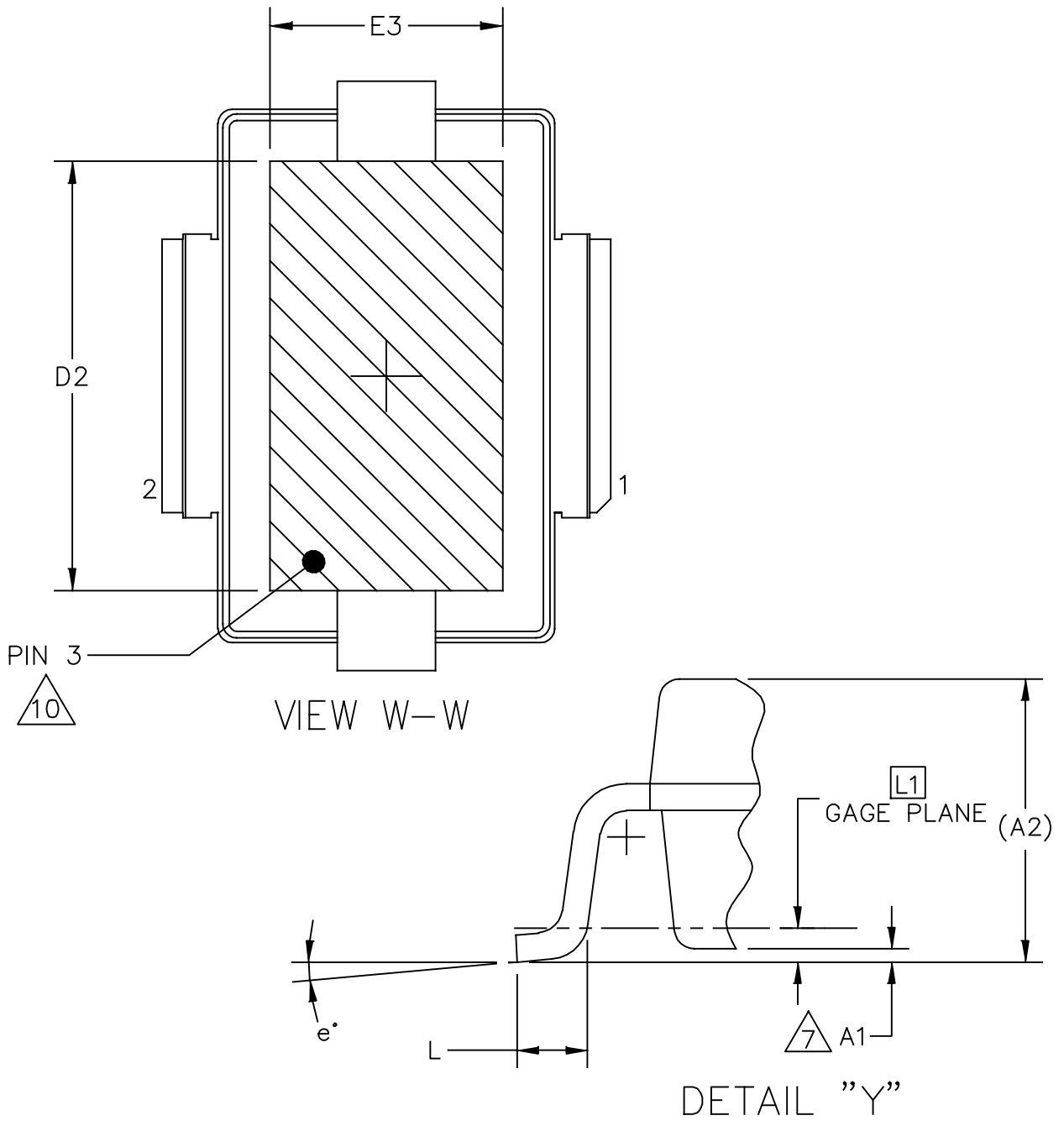
1. CONTROLLING DIMENSION: INCH
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994.
3. DATUM PLANE H IS LOCATED AT TOP OF LEAD AND IS COINCIDENT WITH THE LEAD WHERE THE LEAD EXITS THE PLASTIC BODY AT THE TOP OF THE PARTING LINE.
4. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 INCH (0.15 MM) PER SIDE. DIMENSIONS D1 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 INCH (0.13 MM) 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. DIMENSIONS DD AND E2 DO NOT INCLUDE MOLD PROTRUSION. OVERALL LENGTH INCLUDING MOLD PROTRUSION SHOULD NOT EXCEED 0.430 INCH (10.92 MM) FOR DIMENSION DD AND 0.080 INCH (2.03 MM) FOR DIMENSION E2. DIMENSIONS DD AND E2 DO INCLUDE MOLD MISMATCH AND ARE DETERMINED AT DATUM PLANE D.
9. THESE SURFACES OF THE HEAT SLUG ARE NOT PART OF THE SOLDERABLE SURFACES AND MAY REMAIN UNPLATED.
10. HATCHING REPRESENTS THE EXPOSED AREA OF THE HEAT SLUG. DIMENSIONS D2 AND E3 REPRESENT THE VALUES BETWEEN THE TWO OPPOSITE POINTS ALONG THE EDGES OF EXPOSED AREA OF THE HEAT SLUG.

| DIM | INCH |      | MILLIMETER |       | DIM | INCH     |      | MILLIMETER |      |
|-----|------|------|------------|-------|-----|----------|------|------------|------|
|     | MIN  | MAX  | MIN        | MAX   |     | MIN      | MAX  | MIN        | MAX  |
| AA  | .078 | .082 | 1.98       | 2.08  | E4  | .058     | .066 | 1.47       | 1.68 |
| A1  | .039 | .043 | 0.99       | 1.09  | E5  | .231     | .235 | 5.87       | 5.97 |
| A2  | .040 | .042 | 1.02       | 1.07  | F   | .025 BSC |      | 0.64 BSC   |      |
| DD  | .416 | .424 | 10.57      | 10.77 | b1  | .193     | .199 | 4.90       | 5.06 |
| D1  | .378 | .382 | 9.60       | 9.70  | c1  | .007     | .011 | 0.18       | 0.28 |
| D2  | .290 | ---- | 7.37       | ----  | aaa | .004     |      | 0.10       |      |
| D3  | .016 | .024 | 0.41       | 0.61  | bbb | .008     |      | 0.20       |      |
| E   | .436 | .444 | 11.07      | 11.28 |     |          |      |            |      |
| E1  | .238 | .242 | 6.04       | 6.15  |     |          |      |            |      |
| E2  | .066 | .074 | 1.68       | 1.88  |     |          |      |            |      |
| E3  | .150 | ---- | 3.81       | ----  |     |          |      |            |      |

|  |  |                                      |                            |
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|  |  | STANDARD: NON-JEDEC                  |                            |
|  |  | SOT1732-1                            | 22 FEB 2016                |



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|  | STANDARD: JEDEC TO-270 BA |                            |
|  | SOT1731-1                 | 28 MAR 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 "D1" AND "E1" DO NOT INCLUDE MOLD PROTRUSION. ALLOWABLE PROTRUSION IS .006 INCH (0.15MM) PER SIDE. DIMENSIONS "D1 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 INCH (0.13 MM) 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 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.

8. DIMENSIONS DD AND E2 DO NOT INCLUDE MOLD PROTRUSION. OVERALL LENGTH INCLUDING MOLD PROTRUSION SHOULD NOT EXCEED 0.430 INCH (10.92 MM) FOR DIMENSION DD AND 0.080 INCH (2.03 MM) FOR DIMENSION E2.

9. THESE SURFACES OF THE HEAT SLUG ARE NOT PART OF THE SOLDERABLE SURFACES AND MAY REMAIN UNPLATED.

10. HATCHING REPRESENTS THE EXPOSED AND SOLDERABLE AREA OF THE HEAT SLUG. DIMENSIONS D2 AND E3 REPRESENT THE VALUES BETWEEN THE TWO OPPOSITE POINTS ALONG THE EDGES OF EXPOSED AREA OF THE HEAT SLUG.

| DIM | INCH   |      | MILLIMETER |       | DIM | INCH     |      | MILLIMETER |      |
|-----|--------|------|------------|-------|-----|----------|------|------------|------|
|     | MIN    | MAX  | MIN        | MAX   |     | MIN      | MAX  | MIN        | MAX  |
| AA  | .078   | .082 | 1.98       | 2.08  | L   | .018     | .024 | 0.46       | 0.61 |
| A1  | .001   | .004 | 0.03       | 0.10  | L1  | .010 BSC |      | 0.25 BSC   |      |
| A2  | (.083) |      | (2.11)     |       | b1  | .193     | .199 | 4.90       | 5.06 |
| DD  | .416   | .424 | 10.57      | 10.77 | c1  | .007     | .011 | 0.18       | 0.28 |
| D1  | .378   | .382 | 9.60       | 9.70  | e   | 2'       | 8'   | 2'         | 8'   |
| D2  | .290   | -    | 7.37       | -     | aaa | .004     |      | 0.10       |      |
| D3  | .016   | .024 | 0.41       | 0.61  | bbb | .008     |      | 0.20       |      |
| E   | .316   | .324 | 8.03       | 8.23  |     |          |      |            |      |
| E1  | .238   | .242 | 6.04       | 6.15  |     |          |      |            |      |
| E2  | .066   | .074 | 1.68       | 1.88  |     |          |      |            |      |
| E3  | .150   | -    | 3.81       | -     |     |          |      |            |      |
| E4  | .058   | .066 | 1.47       | 1.68  |     |          |      |            |      |
| E5  | .231   | .235 | 5.87       | 5.97  |     |          |      |            |      |

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MECHANICAL OUTLINE

PRINT VERSION NOT TO SCALE

TITLE:

TO-270G-2

DOCUMENT NO: 98ASA99301D

REV: D

STANDARD: JEDEC TO-270 BA

SOT1731-1

28 MAR 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
- AN3789: Clamping of High Power RF Transistors and RFICs in Over-Molded Plastic Packages

### Engineering Bulletins

- EB212: Using Data Sheet Impedances for RF LDMOS Devices

### Software

- Electromigration MTTF Calculator
- .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        | Mar. 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>• Frequency band performance tables, 2100 and 2600 MHz: data values updated to reflect true capability of the device, p. 1</li><li>• 1805–1880 MHz, 2110–2170 MHz and 2575–2635 MHz performance data tables and circuit component layouts: updated to show all data measured in fixture with device soldered to heatsink, pp. 1, 3, 4, 7, 9</li><li>• 2110–2170 MHz Typical Characteristic performance graphs: performance graphs added to data sheet, p. 8</li><li>• 2575–2635 MHz Typical Characteristic performance graphs: performance graphs added to data sheet, p. 10</li></ul> |
| 2        | Mar. 2019 | <ul style="list-style-type: none"><li>• Fig. 1, Pin Connections, corrected Drain (Pin 1) and Gate (Pin 2) to reflect correct pin numbers, p. 1</li></ul>   |

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