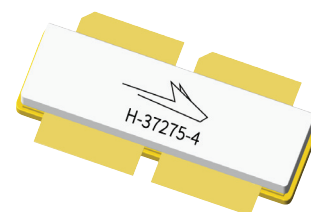


PXAC243502FV

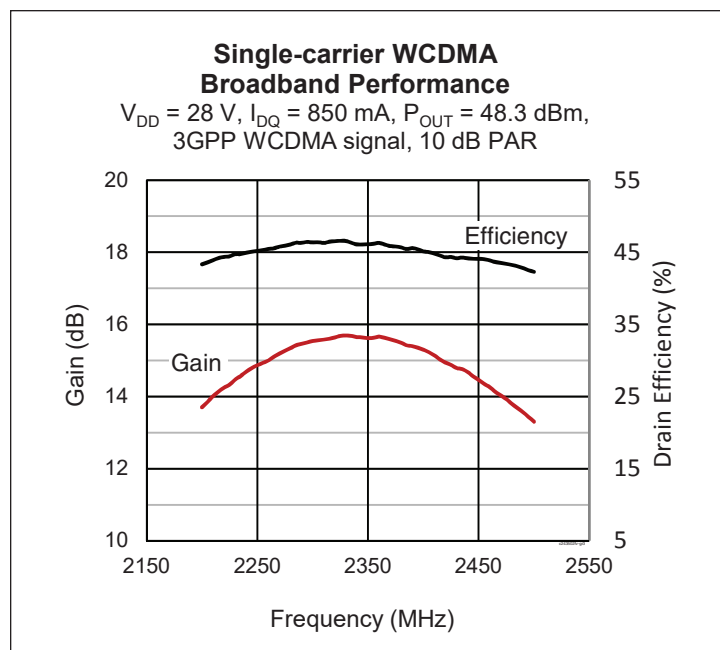
High Power RF LDMOS Field Effect Transistor 350 W, 28 V, 2300 – 2400 MHz

Description

The PXAC243502FV LDMOS FET is a 350-watt LDMOS FET designed for use in power amplifier applications in the 2300 MHz to 2400 MHz frequency band. Features include an asymmetric design with high gain and a thermally-enhanced package with earless flange. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PXAC243502FV
Package H-37275-4



Features

- Asymmetric design
 - Main: 150 W P_{1dB}
 - Peak: 200 W P_{1dB}
- Broadband internal matching
- CW performance at 2350 MHz, 28 V
 - Output power = 250 W P_{1dB}
 - Efficiency = 46%
 - Gain = 16 dB
- Integrated ESD protection
- Human Body Model Class 2 (per ANSI/ESDA/ JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS-compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed production test fixture in Doherty configuration)

$V_{DD} = 28\text{ V}$, $V_{GS(peak)} = 1.0\text{ V}$, $I_{DQ} = 850\text{ mA}$, $P_{OUT} = 68\text{ W avg}$, $f = 2400\text{ MHz}$
 3GPP WCDMA signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------|----------|------|------|-----|------|
| Gain | G_{ps} | 14.0 | 15.0 | — | dB |
| Drain Efficiency | η_D | 42 | 45 | — | % |
| Adjacent Channel Power Ratio | ACPR | — | -32 | -26 | dBc |

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|--|---------------|-----|-------|-----|---------------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$ | $V_{(BR)DSS}$ | 65 | — | — | V |
| Drain Leakage Current | $V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 1 | μA |
| | $V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 10 | μA |
| Gate Leakage Current | $V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$ | I_{GSS} | — | — | 1 | μA |
| On-State Resistance | main $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.088 | — | Ω |
| | peak $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.088 | — | Ω |
| Operating Gate Voltage | main $V_{DS} = 28\text{ V}$, $I_{DQ} = 850\text{ mA}$ | V_{GS} | 2.3 | 2.6 | 3.0 | V |
| | peak $V_{DS} = 28\text{ V}$, $I_{DQ} = 0\text{ mA}$ | V_{GS} | 0.8 | 1.2 | 1.6 | V |

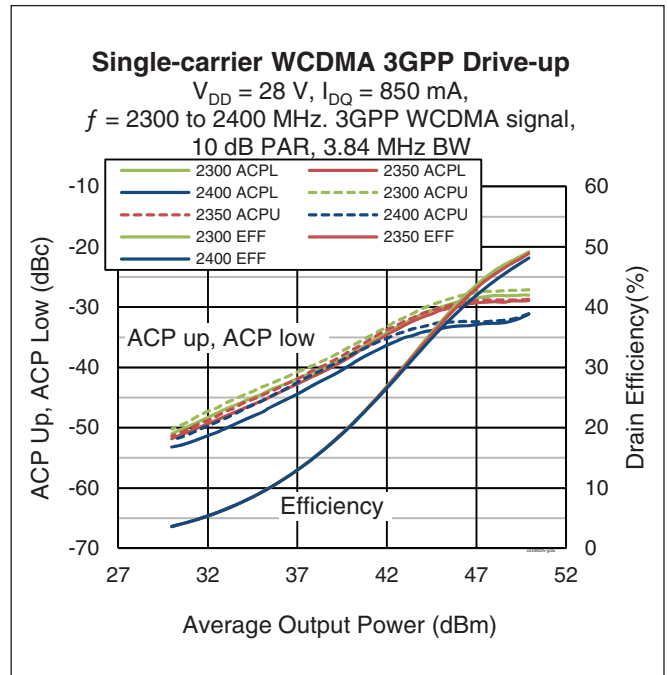
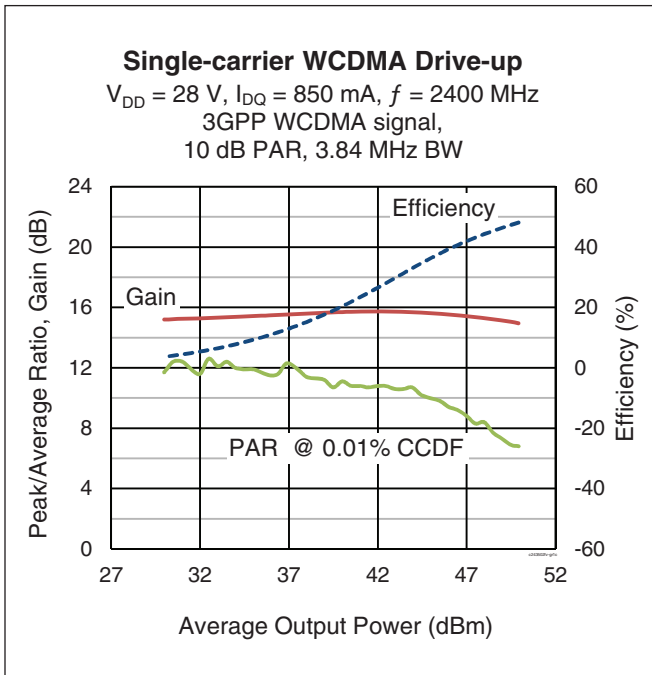
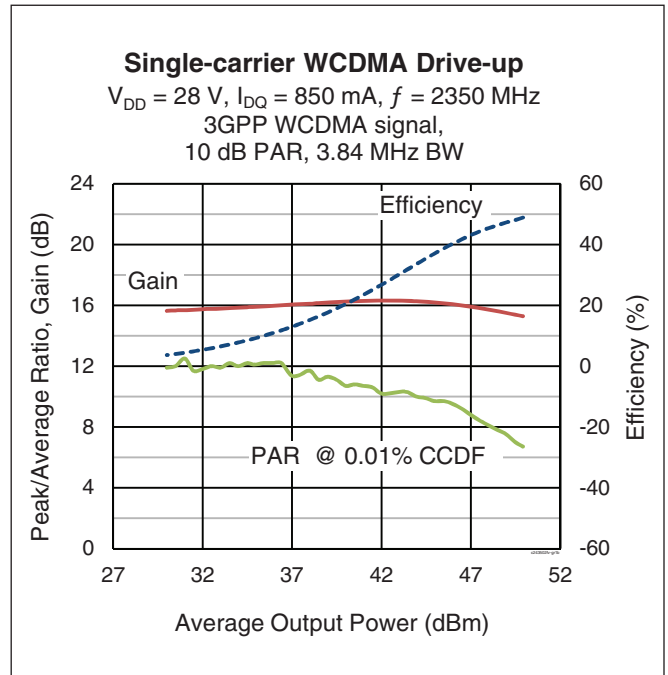
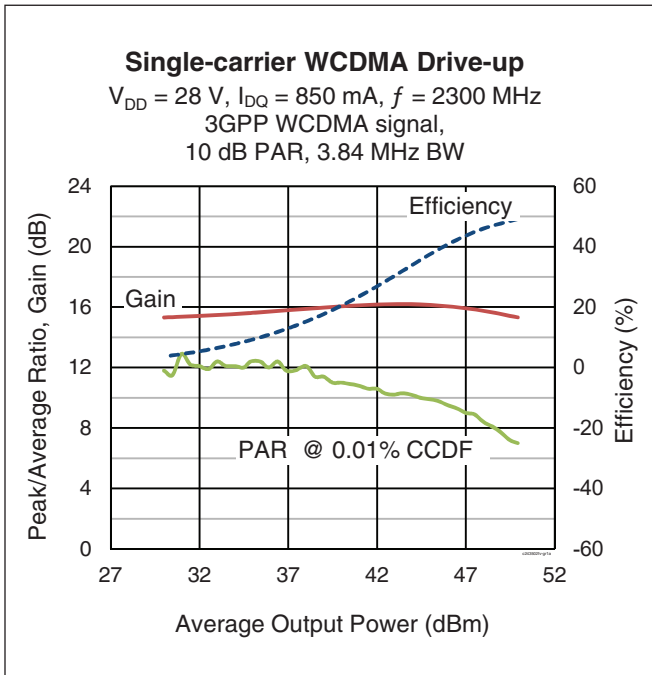
Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------------|-------------|----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -6 to +10 | V |
| Operating Voltage | V_{DD} | 0 to +32 | V |
| Junction Temperature | T_J | 225 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 250 W CW) | $R_{\theta JC}$ | 0.22 | $^{\circ}\text{C/W}$ |

Ordering Information

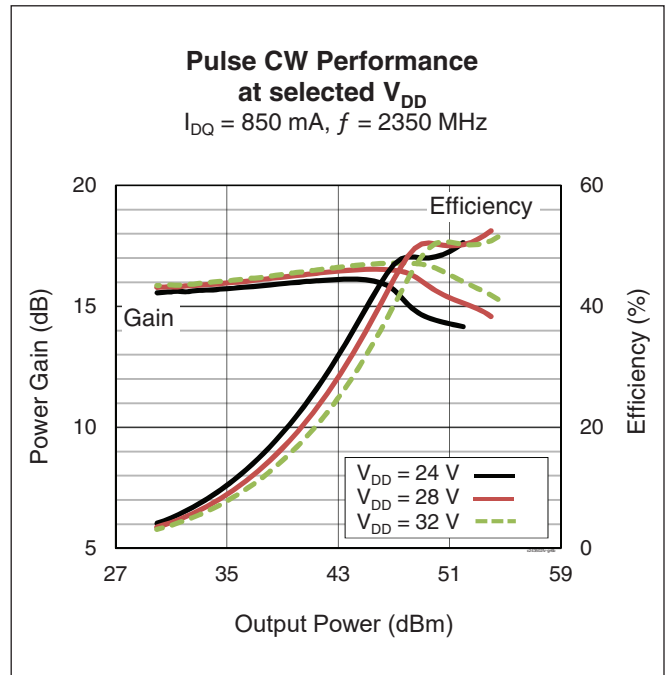
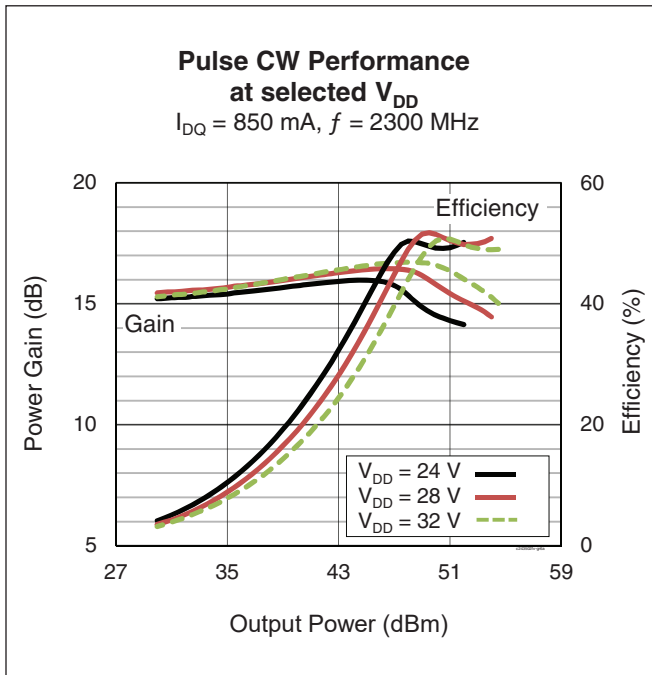
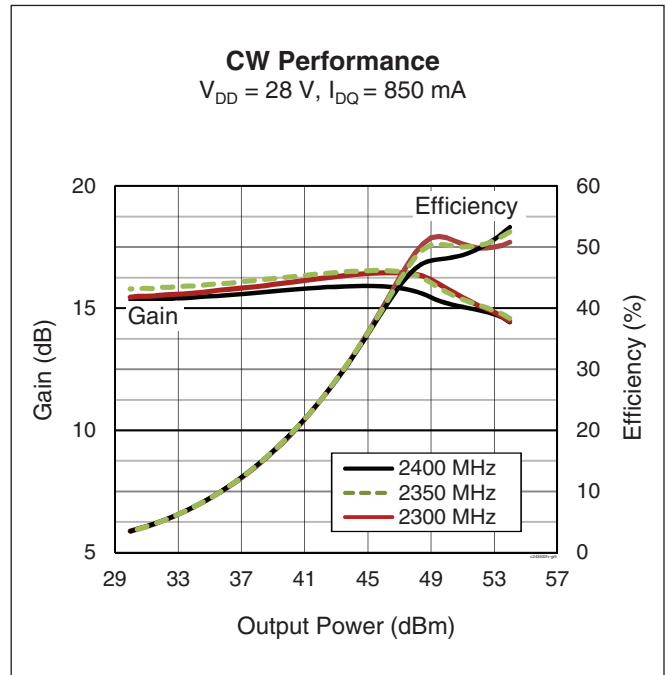
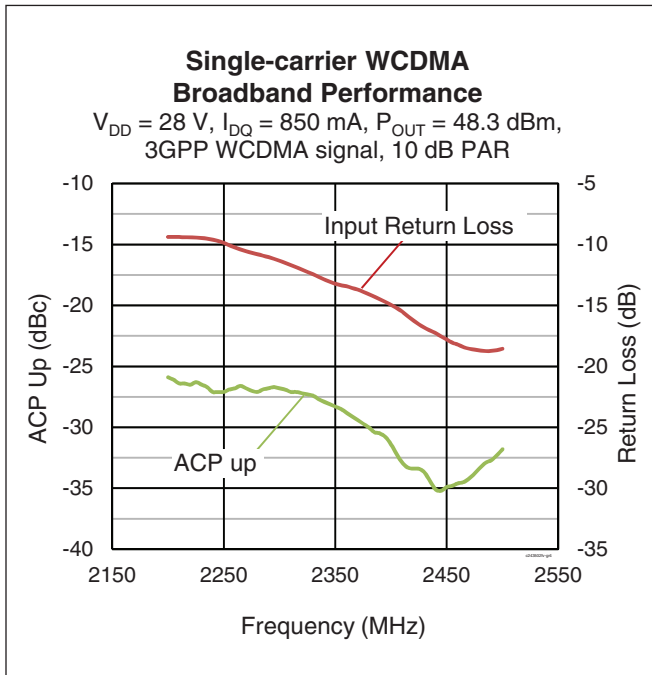
| Type and Version | Order Code | Package and Description | Shipping |
|----------------------|----------------------|-------------------------|----------------------|
| PXAC243502FV V1 R0 | PXAC243502FV-V1-R0 | H-37275-4 | Tape & Reel, 50 pcs |
| PXAC243502FV V1 R250 | PXAC243502FV-V1-R250 | H-37275-4 | Tape & Reel, 250 pcs |

Typical RF Performance (data taken in production test fixture)

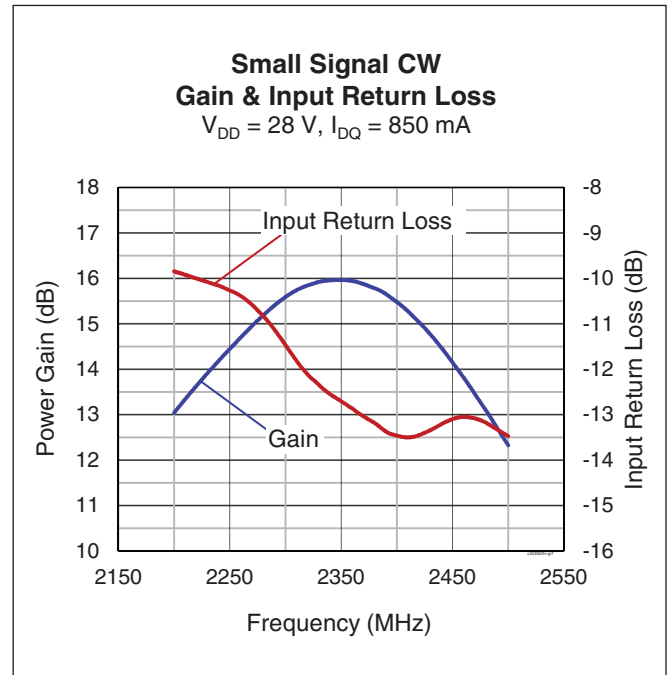
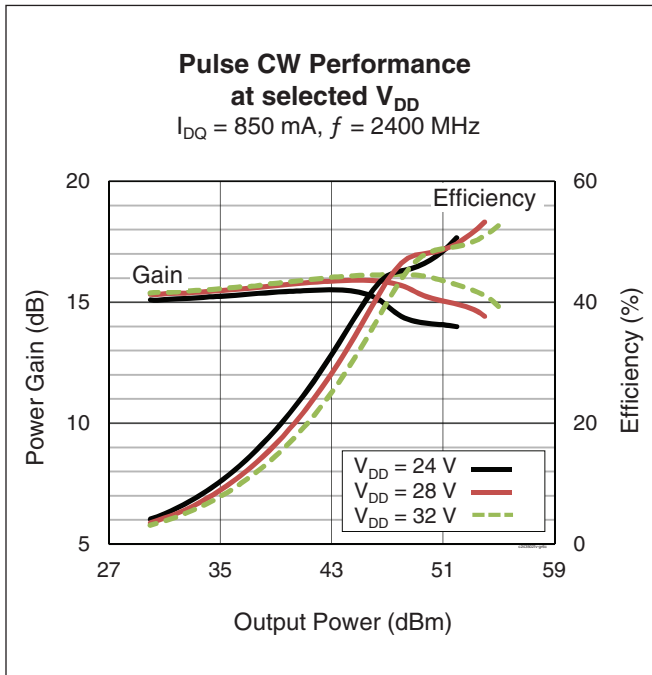




Typical RF Performance (cont.)



Typical RF Performance (cont.)



See next page for Load Pull Performance

Load Pull Performance

Main Side – Pulsed CW signal: 160 μ sec, 10% duty cycle; $V_{DD} = 28$ V, $I_{DQ} = 850$ mA

| Class AB | | P _{1dB} | | | | | | | | | |
|------------|-----------------------------|-----------------------------|-----------|------------------------|----------------------|---------|-----------------------------|-----------|------------------------|----------------------|---------|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | Z _s [Ω] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] |
| 2300 | 6.82 – j9.56 | 1.28 – j3.64 | 16.16 | 52.39 | 173.38 | 49.67 | 2.37 – j2.28 | 18.79 | 50.39 | 109.47 | 59.01 |
| 2350 | 8.29 – j9.42 | 1.25 – j3.62 | 16.44 | 52.20 | 165.96 | 49.05 | 1.97 – j2.50 | 18.63 | 50.66 | 116.49 | 57.37 |
| 2400 | 10.06 – j7.29 | 1.30 – j3.61 | 16.46 | 51.82 | 152.05 | 45.61 | 1.99 – j2.24 | 18.90 | 50.15 | 103.49 | 54.87 |

Peak Side – Pulsed CW signal: 160 μ sec, 10% duty cycle; $V_{DD} = 28$ V, $I_{DQ} = 1350$ mA

| Class AB | | P _{1dB} | | | | | | | | | |
|------------|-----------------------------|-----------------------------|-----------|------------------------|----------------------|---------|-----------------------------|-----------|------------------------|----------------------|---------|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | Z _s [Ω] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] |
| 2300 | 3.27 – j6.01 | 2.09 – j3.76 | 17.42 | 53.03 | 200.91 | 48.19 | 1.43 – j2.25 | 19.79 | 51.17 | 130.98 | 55.51 |
| 2350 | 4.08 – j6.00 | 2.03 – j3.86 | 17.54 | 52.77 | 189.23 | 45.76 | 1.33 – j2.63 | 19.82 | 51.31 | 135.33 | 53.60 |
| 2400 | 5.14 – j6.25 | 1.90 – j3.64 | 18.08 | 52.61 | 182.39 | 45.91 | 1.49 – j2.71 | 20.01 | 51.45 | 139.57 | 51.41 |

Peak Side – Pulsed CW signal: 160 μ sec, 10% duty cycle; $V_{DD} = 28$ V, $V_{GS(peak)} = 1.5$ V

| Class C | | P _{1dB} | | | | | | | | | |
|------------|-----------------------------|-----------------------------|-----------|------------------------|----------------------|---------|-----------------------------|-----------|------------------------|----------------------|---------|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | Z _s [Ω] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] |
| 2300 | 3.27 – j6.01 | 1.67 – j4.02 | 12.90 | 53.71 | 234.96 | 50.13 | 1.42 – j2.66 | 14.27 | 52.51 | 178.28 | 59.99 |
| 2350 | 4.08 – j6.00 | 1.62 – j4.07 | 13.16 | 53.57 | 227.51 | 50.21 | 1.37 – j2.69 | 14.53 | 51.75 | 149.62 | 58.18 |
| 2400 | 5.14 – j6.25 | 1.96 – j4.15 | 13.39 | 53.43 | 220.29 | 48.66 | 1.47 – j2.71 | 14.74 | 51.79 | 150.83 | 56.64 |

Reference Circuit, 2300 to 2400 MHz

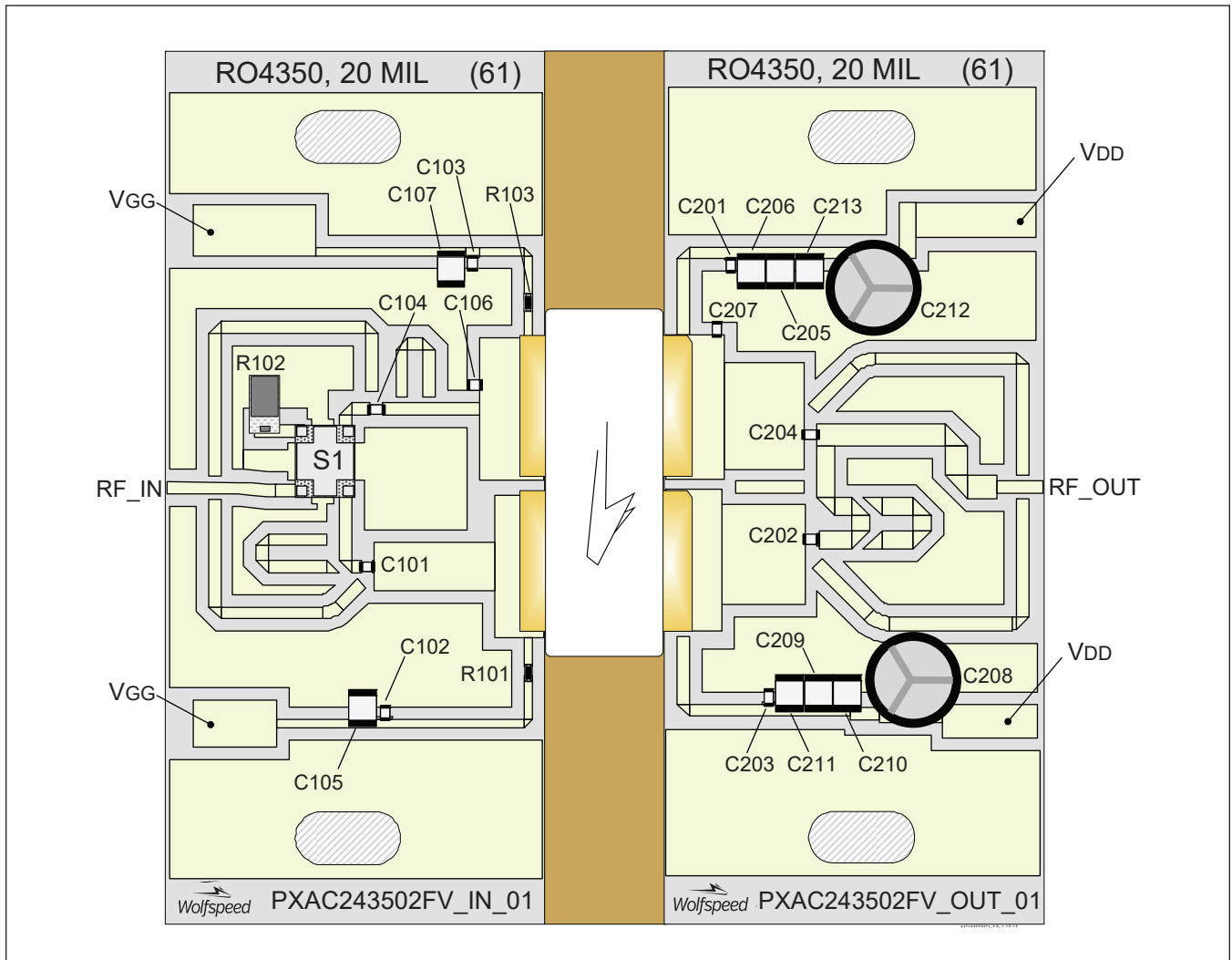
DUT PXAC243502FV V1

Test Fixture Part No. LTA/PXAC243502FV V1

PCB Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$

Find Gerber files for this reference fixture on the Wolfspeed Web site at (<http://www.wolfspeed.com/RF>)

Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Component Information

| Component | Description | Manufacturer | Part Number |
|------------------------|------------------------|---------------------------------|-------------------|
| Input | | | |
| C101, C102, C103, C104 | Capacitor, 15 pF | ATC | ATC600F150JT250XT |
| C105, C107 | Capacitor, 10 μ F | Taiyo Yuden | UMK325C7106MM-T |
| C106 | Capacitor, 0.5 pF | ATC | ATC600F0R5BT250XT |
| R101, R103 | Chip resistor, 10 ohms | Panasonic Electronic Components | ERJ-3GEYJ100V |
| R102 | Chip resistor, 50 ohms | Anaren | C16A50Z4 |
| S1 | Hybrid coupler | Anaren | X3C25P1-02S |

(table cont. next page)

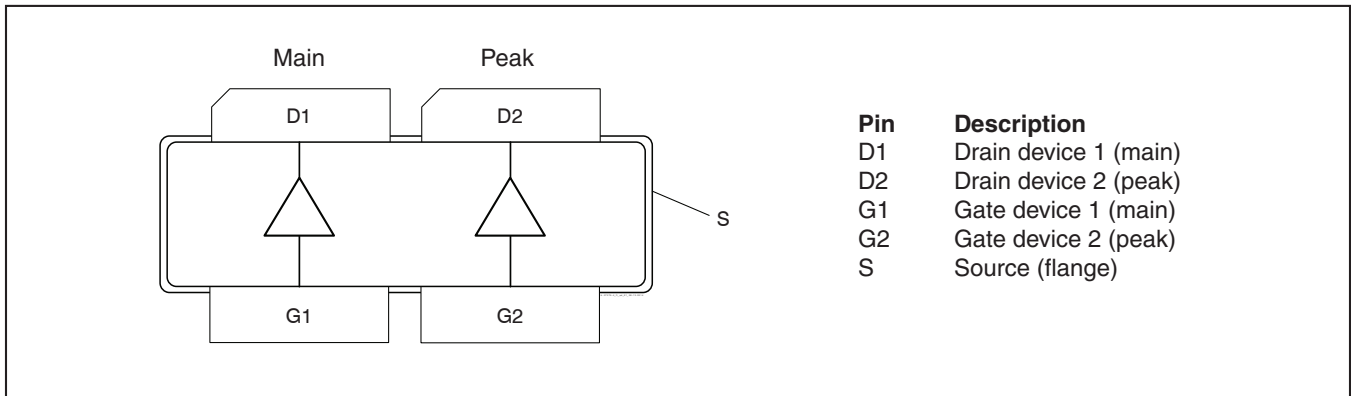


Reference Circuit (cont.)

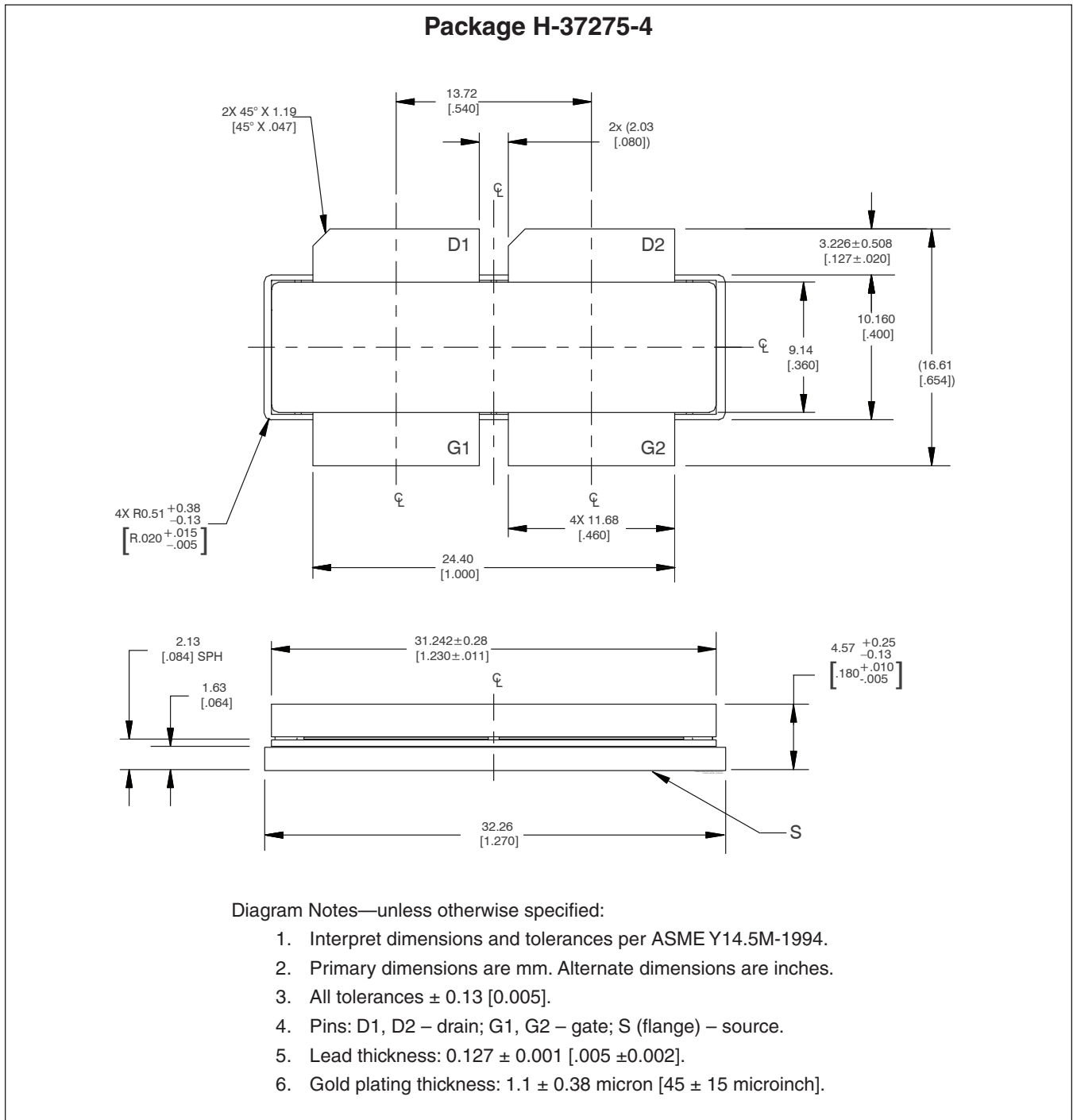
Component Information (cont.)

| Component | Description | Manufacturer | Part Number |
|------------------------------------|-------------------|---------------------------------|-------------------|
| Output | | | |
| C201, C203 | Capacitor, 15 pF | ATC | ATC600F150JT250XT |
| C207 | Capacitor, 0.8 pF | ATC | ATC600F0R8BT250XT |
| C204 | Capacitor, 3 pF | ATC | ATC600F3R0BT250XT |
| C202 | Capacitor, 3.9 pF | ATC | ATC600F3R9BT250XT |
| C205, C206, C209, C210, C211, C213 | Capacitor, 10 μF | Taiyo Yuden | UMK325C7106MM-T |
| C212, C208 | Capacitor, 220 μF | Panasonic Electronic Components | EEE-FP1V221AP |

Pinout Diagram (top view)



Package Outline Specifications



Revision History

| Revision | Date | Data Sheet Type | Page | Subjects (major changes since last revision) |
|----------|------------|-----------------|-------|--|
| 01 | 2013-03-05 | Advance | All | Proposed specification for new product development. |
| 02 | 2014-12-24 | Producton | All | Includes released-product specifications, including performance graphs and load pull data. |
| 03 | 2015-01-16 | Production | 6 – 8 | Include reference circuit information. |
| 03.1 | 2015-04-13 | Production | 1, 2 | Update RF and DC tables. Removed 1C WCDMA performance from Features, added HBM rating. Updated ordering table. |
| 03.2 | 2016-06-22 | Production | 2 | Updated ordering information. |
| 04 | 2018-07-03 | Production | All | Converted to Wolfspeed Data Sheet. |

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Notes

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JONHON

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