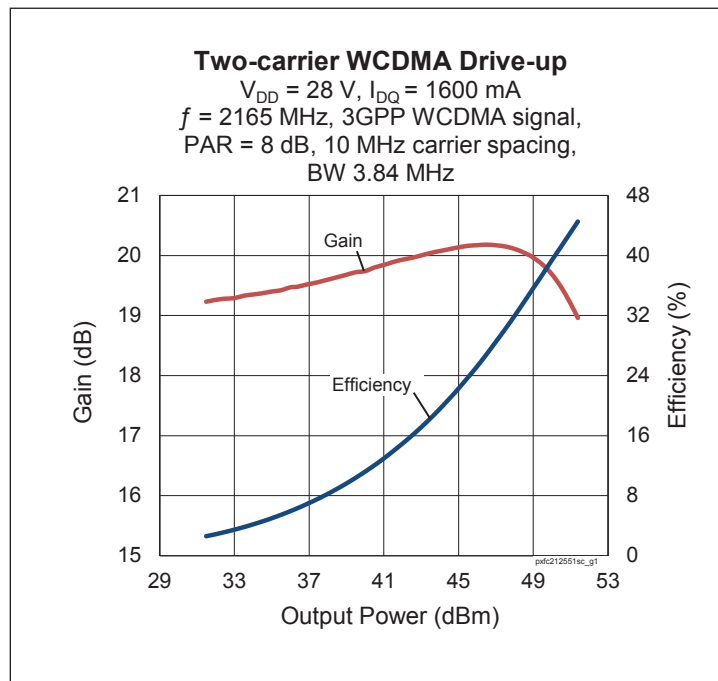
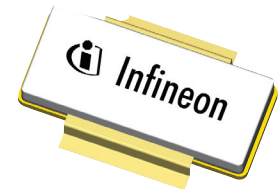


## Thermally-Enhanced High Power RF LDMOS FET 240 W, 28 V, 2110 – 2170 MHz

### Description

The PXFC212551SC is a 240-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 2110 to 2170 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PXFC212551SC  
Package H-37248H-2



### Features

- Broadband internal input and output matching
- Typical Pulsed CW performance, 2140 MHz, 28 V, 10  $\mu$ s pulse width, 10% duty cycle, Class AB
  - Output power at  $P_{1dB} = 240\text{ W}$
  - Efficiency = 50%
  - Gain = 19 dB
- Capable of handling 10:1 VSWR @28 V, 240 W (CW) output power
- Integrated ESD protection
- Human Body Model Class 2 (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

#### Two-carrier WCDMA Specifications (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 1600\text{ mA}$ ,  $P_{OUT} = 50\text{ W}$  avg,  $f_1 = 2160\text{ MHz}$ ,  $f_2 = 2170\text{ MHz}$ , 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

| Characteristic             | Symbol   | Min | Typ  | Max | Unit |
|----------------------------|----------|-----|------|-----|------|
| Gain                       | $G_{ps}$ | 19  | 20.5 | —   | dB   |
| Drain Efficiency           | $\eta_D$ | 25  | 28   | —   | %    |
| Intermodulation Distortion | IMD      | —   | -31  | -27 | dBc  |

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

**ESD:** Electrostatic discharge sensitive device—observe handling precautions!

## DC Characteristics

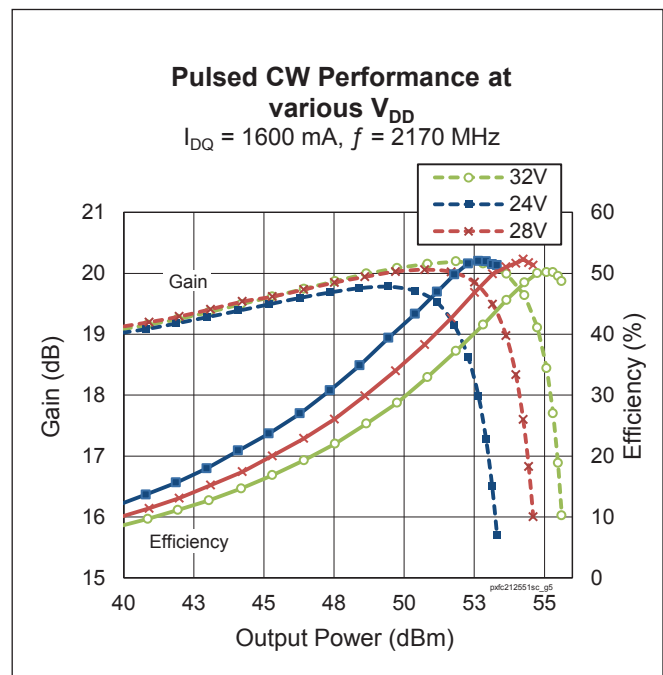
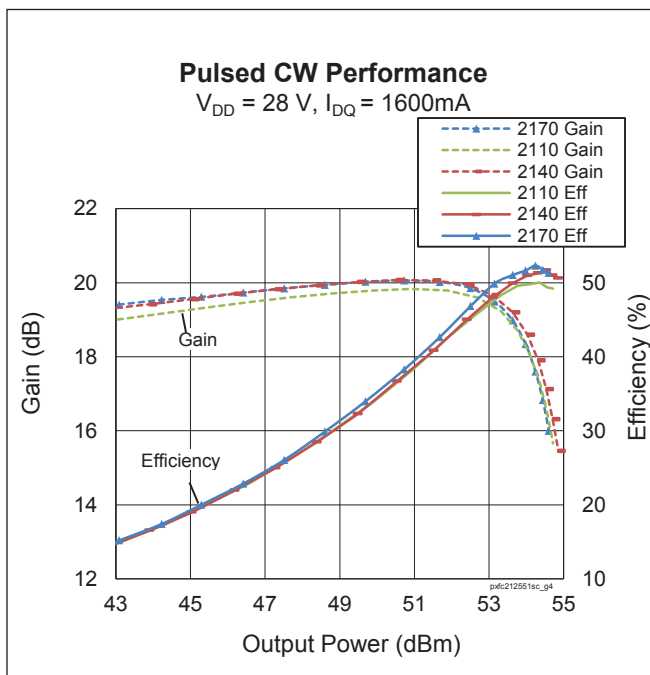
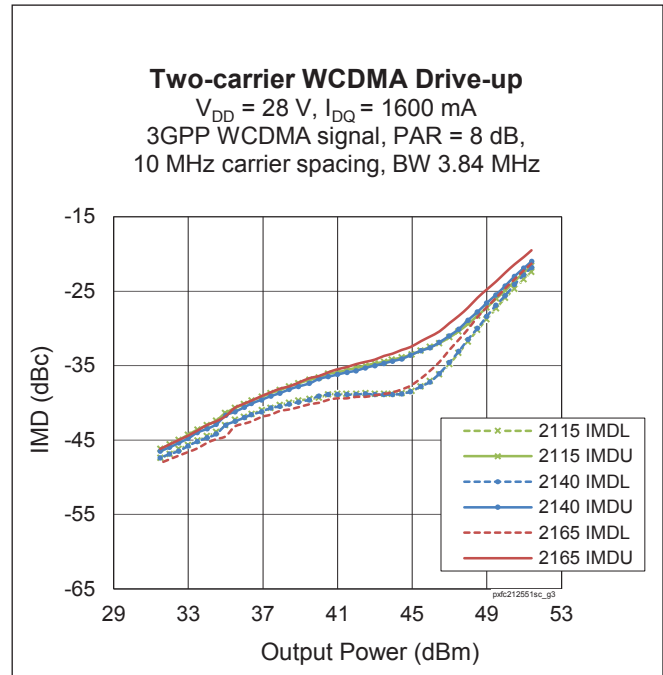
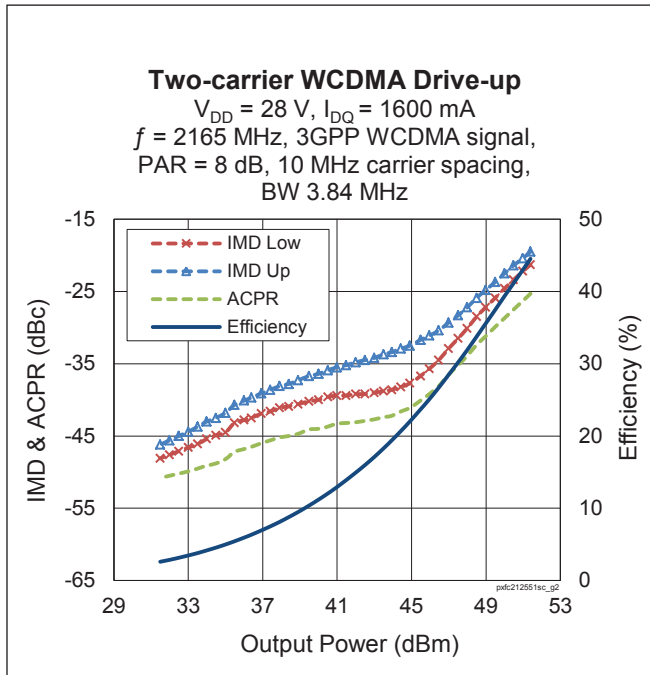
| Characteristic                 | Conditions                                         | Symbol        | Min | Typ  | Max | Unit          |
|--------------------------------|----------------------------------------------------|---------------|-----|------|-----|---------------|
| Drain-Source Breakdown 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   | $\mu\text{A}$ |
|                                | $V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$     | $I_{DSS}$     | —   | —    | 10  | $\mu\text{A}$ |
| Gate Leakage Current           | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$     | $I_{GSS}$     | —   | —    | 1   | $\mu\text{A}$ |
| On-State Resistance            | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$   | $R_{DS(on)}$  | —   | 0.05 | —   | $\Omega$      |
| Operating Gate Voltage         | $V_{DS} = 28\text{ V}$ , $I_{DQ} = 1600\text{ mA}$ | $V_{GS}$      | 2.3 | 2.64 | 2.9 | V             |

## Maximum Ratings

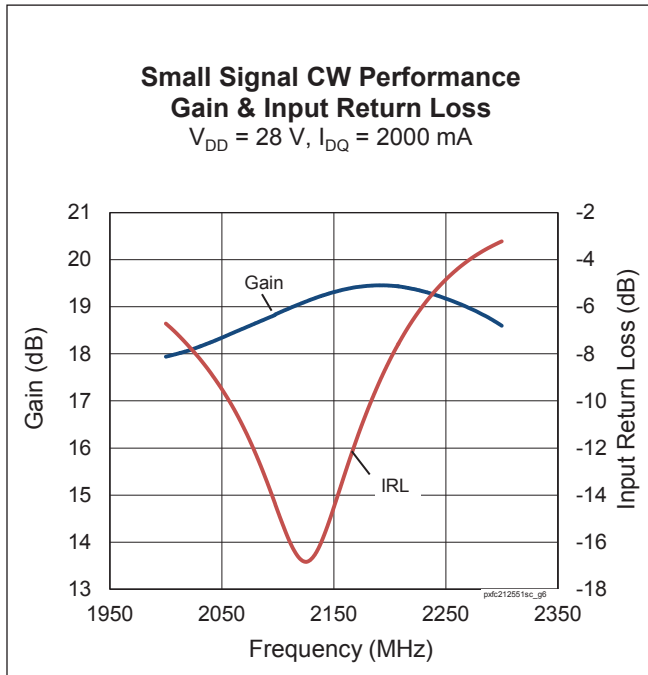
| Parameter                                                        | Symbol          | Value       | Unit                 |
|------------------------------------------------------------------|-----------------|-------------|----------------------|
| Drain-Source Voltage                                             | $V_{DSS}$       | 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 ( $T_{CASE} = 70^{\circ}\text{C}$ , 213 W CW) | $R_{\theta JC}$ | 0.322       | $^{\circ}\text{C/W}$ |

## Ordering Information

| Type and Version     | Order Code              | Package Description        | Shipping             |
|----------------------|-------------------------|----------------------------|----------------------|
| PXFC212551SC V1 R250 | PXFC212551SCV1R250XTMA1 | H-37248H-2, earless flange | Tape & Reel, 250 pcs |

**Typical Performance** (data taken in a production test fixture)


## Typical Performance (cont.)



## Load Pull Performance

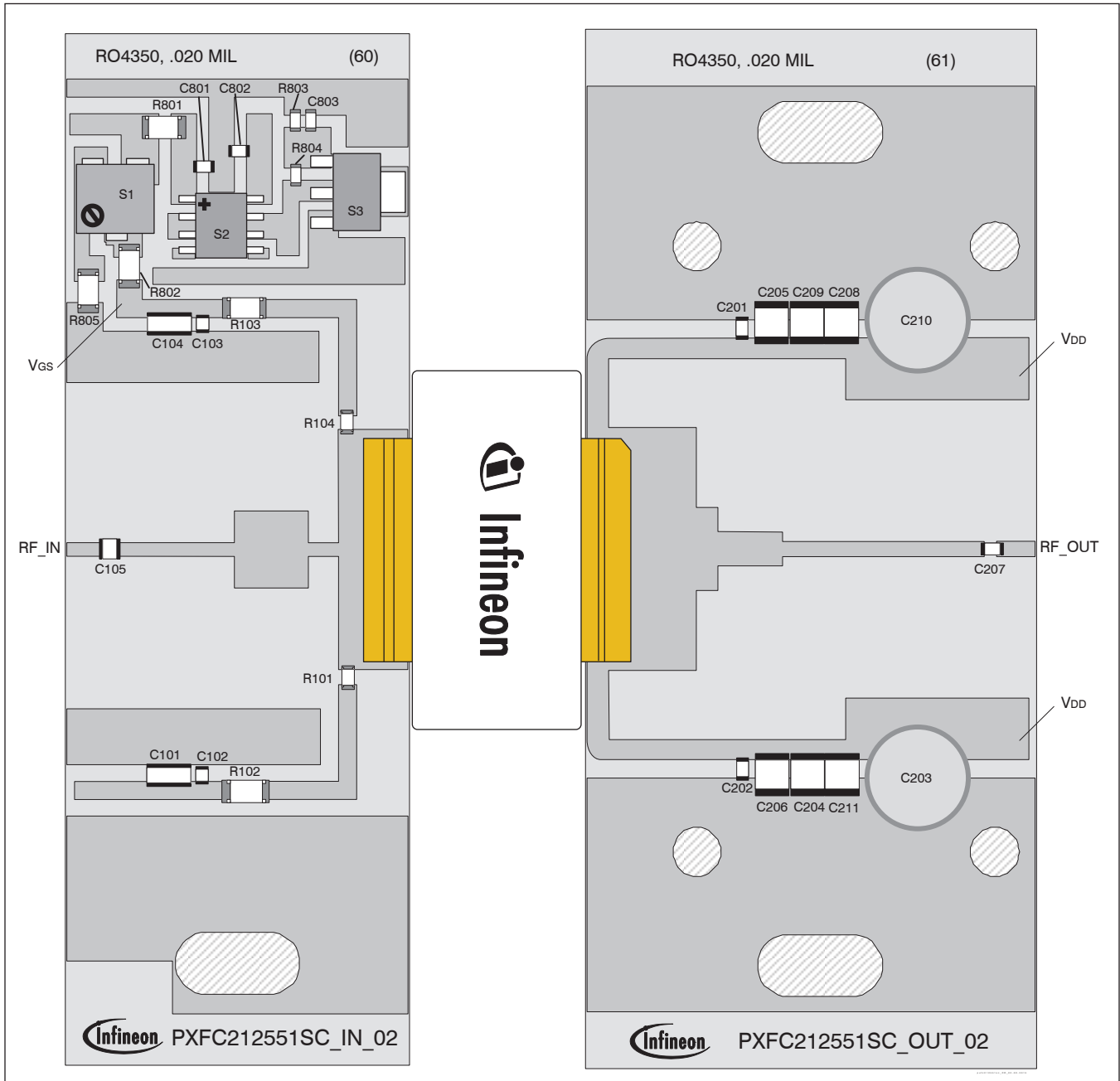
**Load Pull Performance** – Pulsed CW signal: 10  $\mu\text{s}$ , 10% duty cycle, 28 V,  $I_{DQ} = 1600\text{ mA}$

|                   |                                            | <b>P<sub>1dB</sub></b>                     |                  |                              |                            |                                |                                            |                  |                              |                            |                                |
|-------------------|--------------------------------------------|--------------------------------------------|------------------|------------------------------|----------------------------|--------------------------------|--------------------------------------------|------------------|------------------------------|----------------------------|--------------------------------|
|                   |                                            | <b>Max Output Power</b>                    |                  |                              |                            |                                | <b>Max Drain Efficiency</b>                |                  |                              |                            |                                |
| <b>Freq [MHz]</b> | <b>Z<sub>s</sub> [<math>\Omega</math>]</b> | <b>Z<sub>L</sub> [<math>\Omega</math>]</b> | <b>Gain [dB]</b> | <b>P<sub>OUT</sub> [dBm]</b> | <b>P<sub>OUT</sub> [W]</b> | <b><math>\eta_D</math> [%]</b> | <b>Z<sub>L</sub> [<math>\Omega</math>]</b> | <b>Gain [dB]</b> | <b>P<sub>OUT</sub> [dBm]</b> | <b>P<sub>OUT</sub> [W]</b> | <b><math>\eta_D</math> [%]</b> |
| 2110              | 4.92 – j5.64                               | 0.71 – j4.53                               | 18.0             | 54.7                         | 293                        | 50.8                           | 1.58 – j4.29                               | 20.1             | 53.2                         | 207                        | 60.9                           |
| 2140              | 5.68 – j5.11                               | 0.73 – j4.46                               | 18.8             | 54.6                         | 286                        | 51.1                           | 1.41 – j4.03                               | 20.8             | 53.2                         | 207                        | 61.1                           |
| 2170              | 6.75 – j2.91                               | 0.80 – j4.40                               | 18.7             | 54.4                         | 278                        | 50.9                           | 1.42 – j3.98                               | 20.4             | 53.3                         | 212                        | 59.1                           |

**Load Pull Performance** – Pulsed CW signal: 10  $\mu\text{s}$ , 10% duty cycle, 28 V,  $I_{DQ} = 90\text{ mA}$

|                   |                                            | <b>P<sub>1dB</sub></b>                     |                  |                              |                            |                                |                                            |                  |                              |                            |                                |
|-------------------|--------------------------------------------|--------------------------------------------|------------------|------------------------------|----------------------------|--------------------------------|--------------------------------------------|------------------|------------------------------|----------------------------|--------------------------------|
|                   |                                            | <b>Max Output Power</b>                    |                  |                              |                            |                                | <b>Max Drain Efficiency</b>                |                  |                              |                            |                                |
| <b>Freq [MHz]</b> | <b>Z<sub>s</sub> [<math>\Omega</math>]</b> | <b>Z<sub>L</sub> [<math>\Omega</math>]</b> | <b>Gain [dB]</b> | <b>P<sub>OUT</sub> [dBm]</b> | <b>P<sub>OUT</sub> [W]</b> | <b><math>\eta_D</math> [%]</b> | <b>Z<sub>L</sub> [<math>\Omega</math>]</b> | <b>Gain [dB]</b> | <b>P<sub>OUT</sub> [dBm]</b> | <b>P<sub>OUT</sub> [W]</b> | <b><math>\eta_D</math> [%]</b> |
| 2110              | 4.92 – j5.64                               | 0.66 – j4.58                               | 16.6             | 55.3                         | 338                        | 53.2                           | 1.59 – j4.35                               | 18.3             | 53.5                         | 226                        | 64.5                           |
| 2140              | 5.68 – j5.11                               | 0.65 – j4.53                               | 17.3             | 55.2                         | 329                        | 52.3                           | 1.49 – j4.09                               | 19.0             | 53.4                         | 220                        | 64.0                           |
| 2170              | 6.75 – j2.91                               | 0.70 – j4.52                               | 17.0             | 55.0                         | 315                        | 50.1                           | 1.36 – j3.75                               | 18.8             | 53.2                         | 211                        | 62.6                           |

## Reference Circuit , 2110 – 2170 MHz



Reference circuit assembly diagram (not to scale)

**Reference Circuit** (cont.)

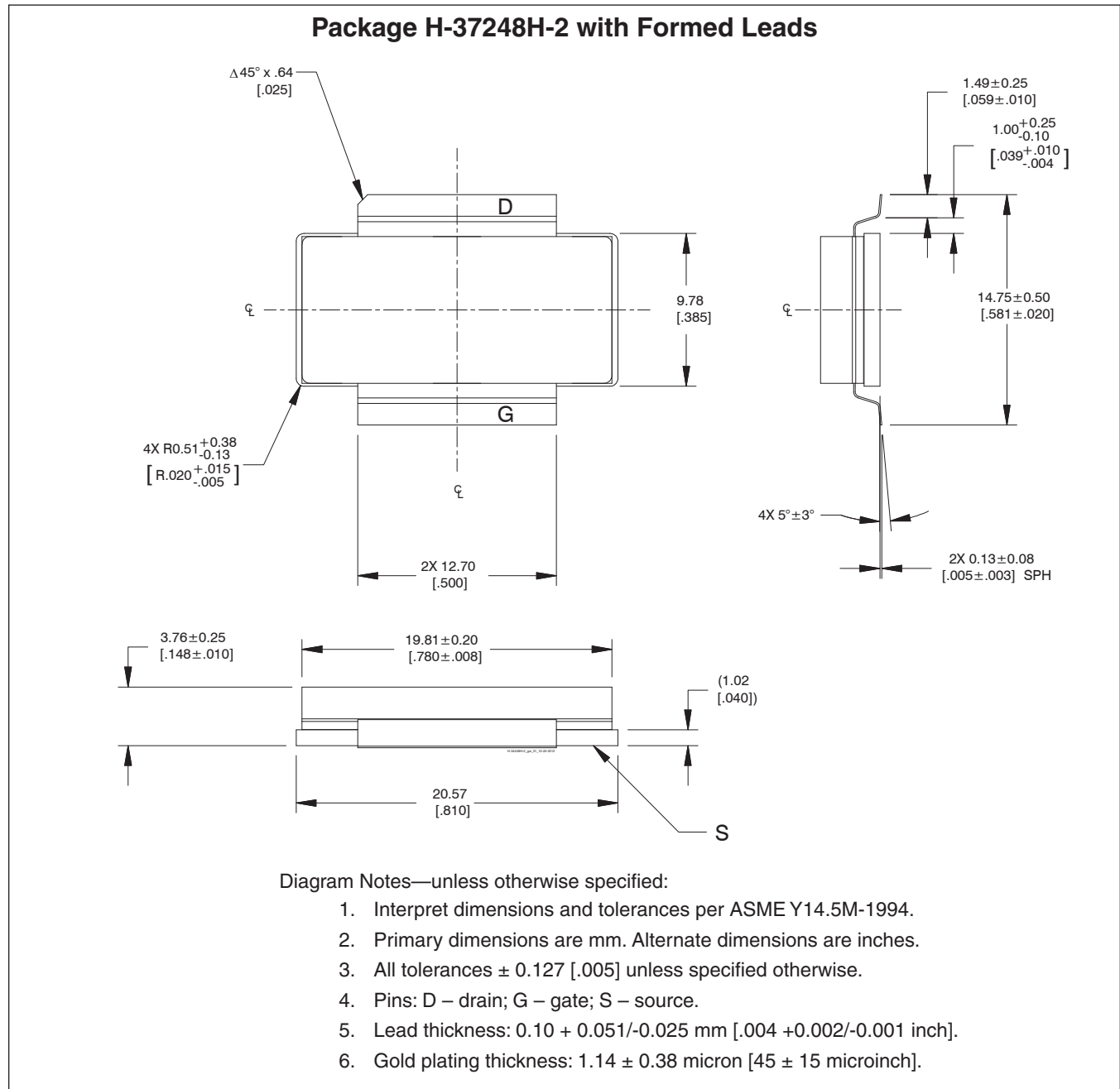
**Reference Circuit Assembly**

|                                                                                                                                                   |                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| DUT                                                                                                                                               | PXFC212551SC V1                                                                                 |
| Test Fixture Part No.                                                                                                                             | LTN/PXFC212551SC V1                                                                             |
| PCB                                                                                                                                               | Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ , $f = 2110 - 2170$ MHz |
| Find Gerber files for this test fixture on the Infineon Web site at <a href="http://www.infineon.com/rfpower">http://www.infineon.com/rfpower</a> |                                                                                                 |

**Components Information**

| Component                          | Description                | Manufacturer                    | P/N                |
|------------------------------------|----------------------------|---------------------------------|--------------------|
| <b>Input</b>                       |                            |                                 |                    |
| C101, C104                         | Capacitor, 10 $\mu$ F      | Murata                          | LLL31BC70G106MA01L |
| C102, C103                         | Capacitor, 15 pF           | ATC                             | ATC800A150JW150XB  |
| C105                               | Capacitor, 10 pF           | ATC                             | ATC800A100JW150XB  |
| C801, C802, C803                   | Capacitor, 1000 pF         | Panasonic Electronic Components | ECJ-1VB1H102K      |
| R101, R104, R802                   | Resistor, 10 $\Omega$      | Panasonic Electronic Components | ERJ-8GEYJ100V      |
| R102, R103                         | Resistor, 0.0 $\Omega$     | Panasonic Electronic Components | ERJ-8GEY0R00V      |
| R801, R805                         | Resistor, 2k $\Omega$      | Panasonic Electronic Components | ERJ-8GEYJ202V      |
| R803                               | Resistor, 1.3k $\Omega$    | Panasonic Electronic Components | ERJ-3GEYJ132V      |
| R804                               | Resistor, 1.2k $\Omega$    | Panasonic Electronic Components | ERJ-3GEYJ122V      |
| S1                                 | Potentiometer, 2k $\Omega$ | Bourns Inc.                     | 3224W-1-202E       |
| S2                                 | Voltage Regulator          | Texas Instruments               | LM78L05ACM         |
| S3                                 | Transistor                 | Infineon Technologies           | BCP56              |
| <b>Output</b>                      |                            |                                 |                    |
| C201, C202                         | Capacitor, 10 pF           | Garrett                         | 8051J100GBTTR      |
| C203, C210                         | Capacitor, 220 $\mu$ F     | Panasonic Electronic Components | EEE-FP1V221AP      |
| C204, C205, C206, C208, C209, C211 | Capacitor, 4.7 $\mu$ F     | Murata                          | GRM32ER71H475KA88  |
| C207                               | Capacitor, 33 pF           | ATC                             | ATC800A330JW150XB  |

## Package Outline Specifications



Find the latest and most complete information about products and packaging at the Infineon Internet page  
<http://www.infineon.com/rfpower>

## Revision History

| Revision | Date       | Data Sheet Type | Page       | Subjects (major changes since last revision)                                                                                                                                      |
|----------|------------|-----------------|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01       | 2014-05-12 | Advance         | All        | Data Sheet reflects advance specification for product development                                                                                                                 |
| 02       | 2014-05-16 | Advance         | All        | Corrected package to H-37248H-2 throughout                                                                                                                                        |
| 03       | 2015-02-26 | Production      | All<br>All | Data Sheet reflects released product specification<br>Revised all data and includes updated final specs, typical performance graphs, loadpull, reference circuit, package outline |
| 03.1     | 2015-04-13 | Production      | 1          | Include HBM classification in Features                                                                                                                                            |

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