

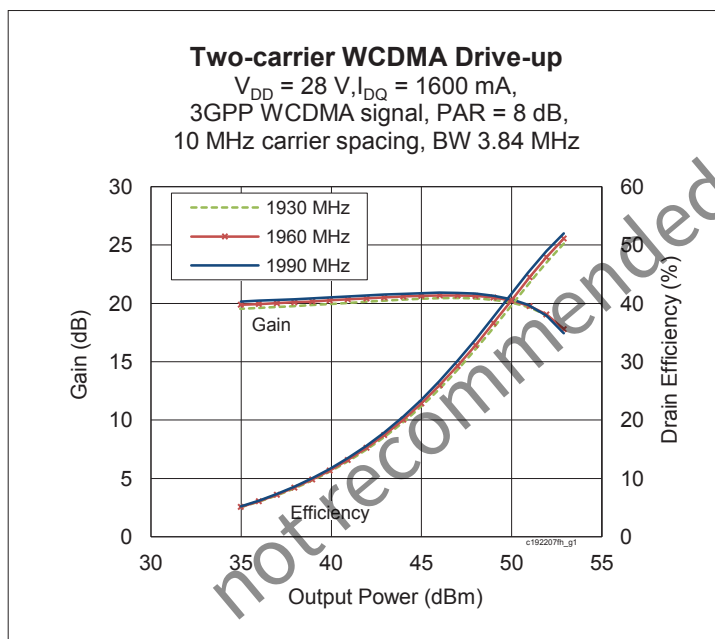
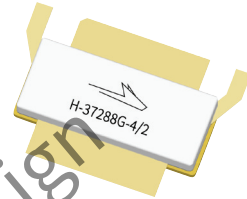
# PXFC192207FH

## Thermally-Enhanced High Power RF LDMOS FET 220 W, 28 V, 1805 – 1990 MHz

### Description

The PXFC192207FH is a 220-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 1805 to 1990 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PXFC192207FH  
Package H-37288G-4/2



### Features

- Broadband input and output matching
- Typical Pulsed CW performance, 1990 MHz, 28 V, 16  $\mu\text{s}$  pulse width, 10 % duty cycle, class AB
  - Output power at  $P_{1dB} = 220\text{ W}$
  - Efficiency = 55%
  - Gain = 20 dB
- Typical single-carrier WCDMA performance, 1990 MHz, 28 V, 9.9 dB PAR @ 0.01% CCDF
  - Output power = 50 W
  - Efficiency = 29%
  - Gain = 20 dB
  - ACPR = -34 dBc @ 5 MHz
- Capable of handling 10:1 VSWR @28 V, 220 W (CW) output power
- Integrated ESD protection : Human Body Model, Class 1C (per JESD22-A114)
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

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

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 1600\text{ mA}$ ,  $P_{OUT} = 50\text{ W}$  avg,  $f_1 = 1980\text{ MHz}$ ,  $f_2 = 1990\text{ MHz}$ , 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

| Characteristic             | Symbol   | Min | Typ   | Max | Unit |
|----------------------------|----------|-----|-------|-----|------|
| Linear Gain                | $G_{ps}$ | 19  | 20.5  | —   | dB   |
| Drain Efficiency           | $\eta_D$ | 29  | 32    | —   | %    |
| Intermodulation Distortion | IMD      | —   | -32.5 | -29 | 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  | $\mu\text{A}$ |
| On-State Resistance            | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$  | —   | 0.03 | —   | $\Omega$      |
| Operating Gate Voltage         | $V_{DS} = 28\text{ V}$ , $I_{DQ} = 1.6\text{ A}$ | $V_{GS}$      | 2.3 | 2.6  | 2.9 | V             |
| Gate Leakage Current           | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$   | $I_{GSS}$     | —   | —    | 1   | $\mu\text{A}$ |

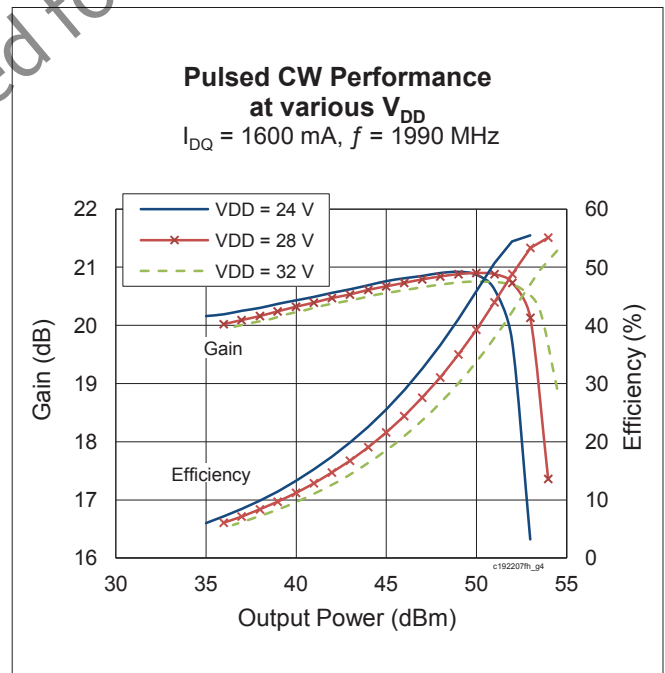
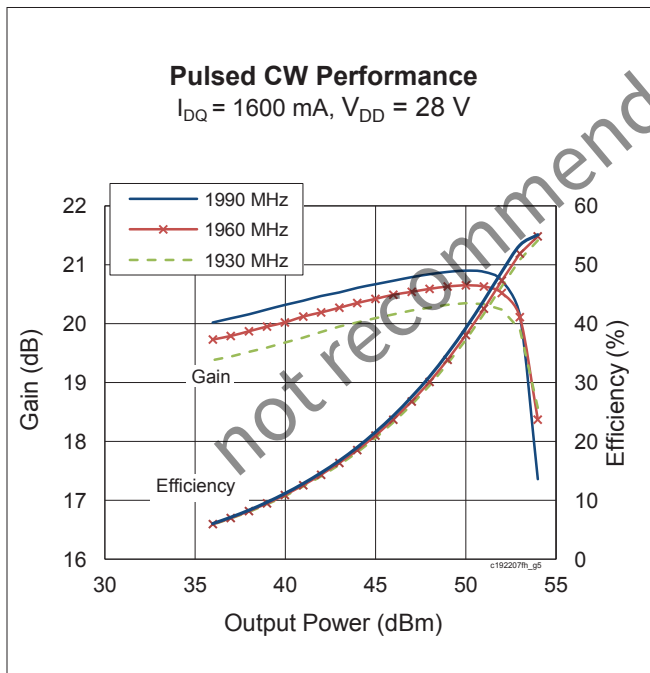
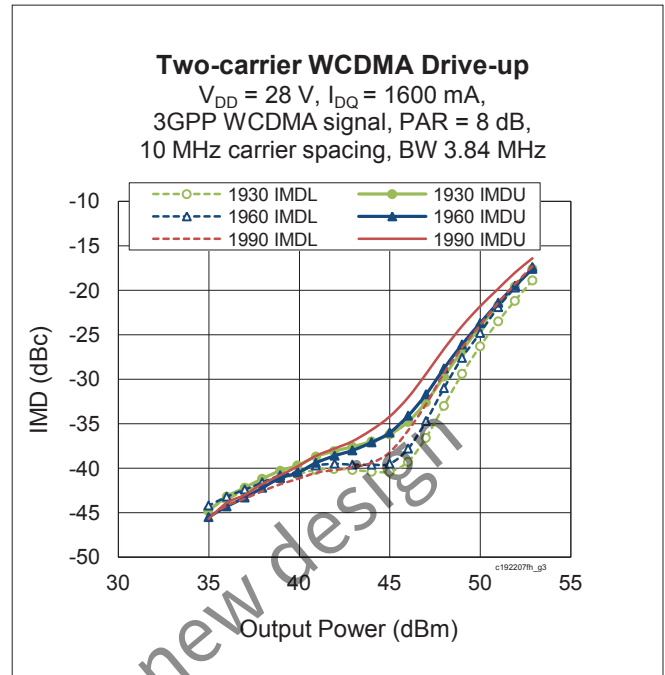
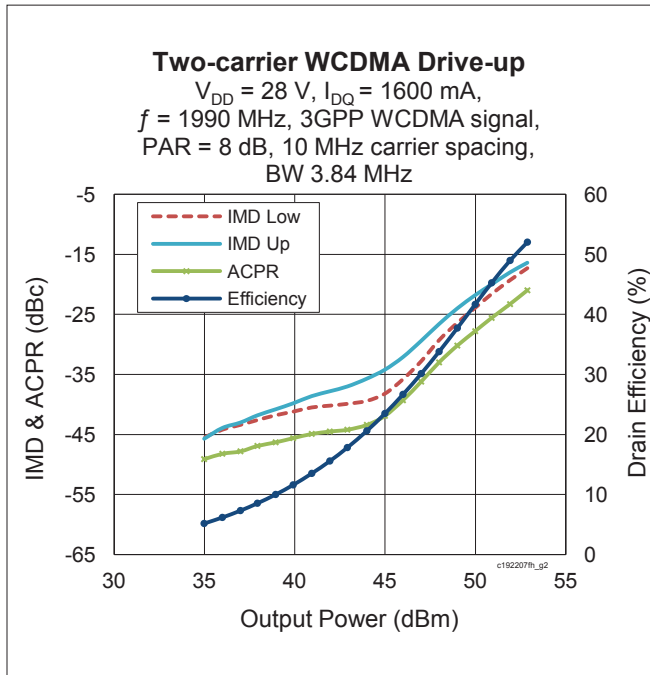
## Maximum Ratings

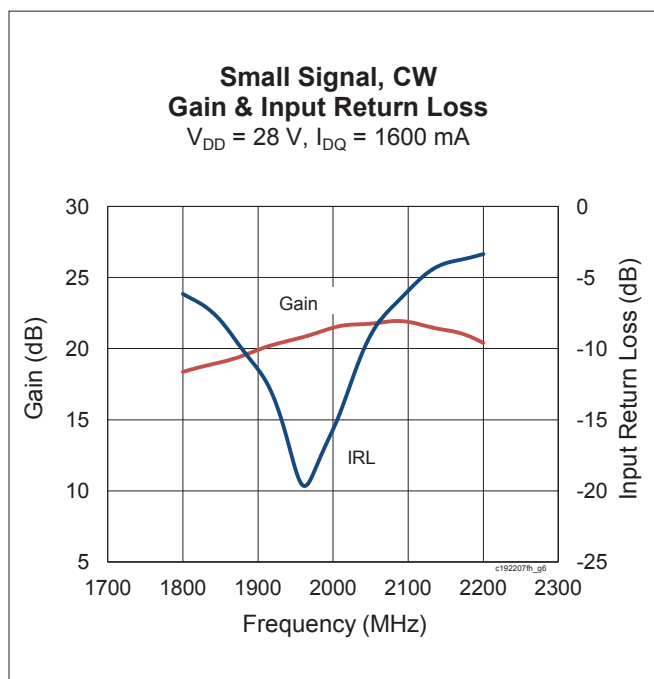
| Parameter                                                        | Symbol          | Value       | Unit                 |
|------------------------------------------------------------------|-----------------|-------------|----------------------|
| Drain-Source Voltage                                             | $V_{DSS}$       | 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 ( $T_{CASE} = 70^{\circ}\text{C}$ , 200 W CW) | $R_{\theta JC}$ | 0.28        | $^{\circ}\text{C/W}$ |

## Ordering Information

| Type and Version     | Order Code           | Package Description          | Shipping             |
|----------------------|----------------------|------------------------------|----------------------|
| PXFC192207FH V3 R0   | PXFC192207FH-V3-R0   | H-37288G-4/2, earless flange | Tape & Reel, 50 pcs  |
| PXFC192207FH V3 R250 | PXFC192207FH-V3-R250 | H-37288G-4/2, earless flange | Tape & Reel, 250 pcs |

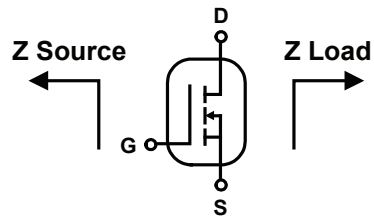
## Typical Performance (data taken in a production test fixture)



**Typical Performance** (cont.)

See next page for broadband circuit impedance

## Broadband Circuit Impedance



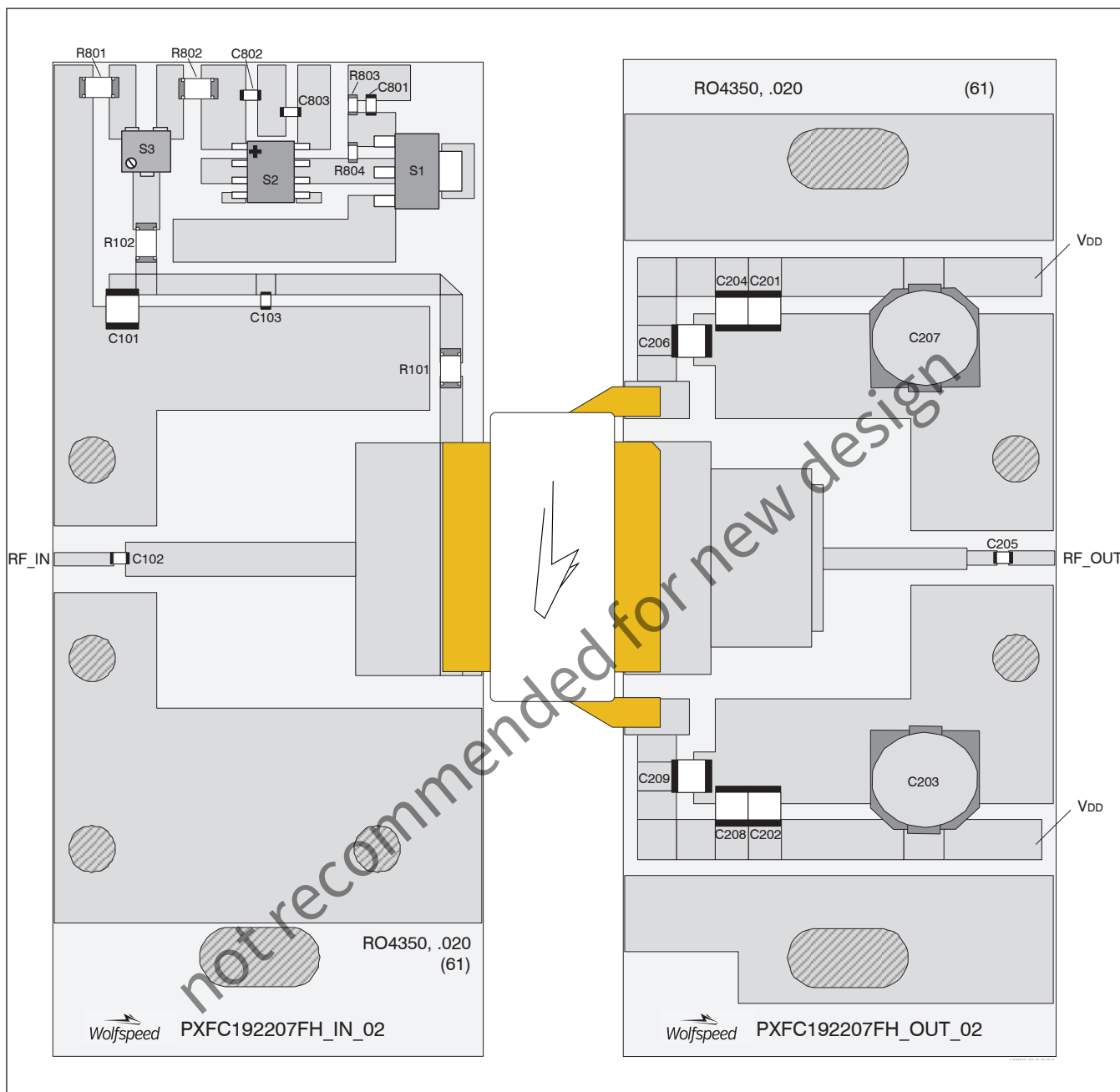
| Freq<br>[MHz] | Z Source $\Omega$ |       | Z Load $\Omega$ |       |
|---------------|-------------------|-------|-----------------|-------|
|               | R                 | jX    | R               | jX    |
| 1930          | 3.12              | -4.70 | 1.15            | -2.80 |
| 1960          | 3.11              | -4.62 | 1.14            | -2.69 |
| 1990          | 3.10              | -4.55 | 1.13            | -2.58 |

## Load Pull Performance

Each Side Load Pull Performance – Pulsed CW signal: 16  $\mu$ s, 10% duty cycle, 28 V, 1100 mA

| P <sub>1dB</sub> |                                |                                |              |                           |                         |            |                                |              |                           |                         |            |
|------------------|--------------------------------|--------------------------------|--------------|---------------------------|-------------------------|------------|--------------------------------|--------------|---------------------------|-------------------------|------------|
| Max Output Power |                                |                                |              |                           |                         |            | Max PAE                        |              |                           |                         |            |
| Freq<br>[MHz]    | Z <sub>s</sub><br>[ $\Omega$ ] | Z <sub>L</sub><br>[ $\Omega$ ] | Gain<br>[dB] | P <sub>OUT</sub><br>[dBm] | P <sub>OUT</sub><br>[W] | PAE<br>[%] | Z <sub>L</sub><br>[ $\Omega$ ] | Gain<br>[dB] | P <sub>OUT</sub><br>[dBm] | P <sub>OUT</sub><br>[W] | PAE<br>[%] |
| 1805             | 2.1-j3.4                       | 0.7-j2.4                       | 16.8         | 55.1                      | 324                     | 54.1       | 1.6-j1.9                       | 19.3         | 53.4                      | 219                     | 65.7       |
| 1880             | 2.1-j3.3                       | 0.7-j2.5                       | 17.6         | 55.0                      | 316                     | 54.4       | 1.6-j1.9                       | 20.3         | 53.0                      | 200                     | 65.0       |
| 1930             | 1.9-j3.7                       | 0.8-j2.6                       | 17.8         | 54.7                      | 295                     | 50.0       | 1.4-j2.0                       | 20.6         | 53.0                      | 200                     | 62.8       |
| 1990             | 3.8-j4.1                       | 0.7-j2.8                       | 18.4         | 54.6                      | 288                     | 50.8       | 1.4-j2.1                       | 21           | 52.8                      | 191                     | 61.7       |

# Reference Circuit , 1930 – 1990 MHz



**Reference Circuit** (cont.)**Reference Circuit Assembly**

|                                                                                                                                            |                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| DUT                                                                                                                                        | PXFC192207FH                                                                                    |
| Test Fixture Part No.                                                                                                                      | LTN/PXFC192207FH V3                                                                             |
| PCB                                                                                                                                        | Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ , $f = 1930 - 1990$ MHz |
| Find Gerber files for this test fixture on the Wolfspeed Web site at <a href="http://www.wolfspeed.com/RF">http://www.wolfspeed.com/RF</a> |                                                                                                 |

**Components Information**

| Component                          | Description                | Suggested Manufacturer          | P/N               |
|------------------------------------|----------------------------|---------------------------------|-------------------|
| <b>Input</b>                       |                            |                                 |                   |
| C101                               | Capacitor, 10 $\mu$ F      | Taiyo Yuden                     | UMK325C7106MM-T   |
| C102, C103                         | Capacitor, 33 pF           | ATC                             | ATC100A330JW150XB |
| C801, C802, C803                   | Capacitor, 1000 pF         | Panasonic Electronic Components | ECJ-1VB1H102K     |
| R101, R102, R801                   | Resistor, 10 $\Omega$      | Panasonic Electronic Components | ERJ-8GEYJ100V     |
| R802                               | Resistor, 100 $\Omega$     | Panasonic Electronic Components | ERJ-8GEYJ101V     |
| R803                               | Resistor, 1300 $\Omega$    | Panasonic Electronic Components | ERJ-3GEYJ132V     |
| R804                               | Resistor, 1200 $\Omega$    | Panasonic Electronic Components | ERJ-3GEYJ122V     |
| S1                                 | Transistor                 | Infineon Technologies           | BCP56             |
| S2                                 | Voltage Regulator          | Texas Instruments               | LM78L05ACM        |
| S3                                 | Potentiometer, 2k $\Omega$ | Bourns Inc.                     | 3224W-1-202E      |
| <b>Output</b>                      |                            |                                 |                   |
| C201, C202, C204, C206, C208, C209 | Capacitor, 10 $\mu$ F      | Taiyo Yuden                     | UMK325C7106MM-T   |
| C203, C207                         | Capacitor, 220 $\mu$ F     | Panasonic Electronic Components | EEE-FP1V221AP     |
| C205                               | Capacitor, 33 pF           | ATC                             | ATC100A330JW150XB |

## Package Outline Specifications

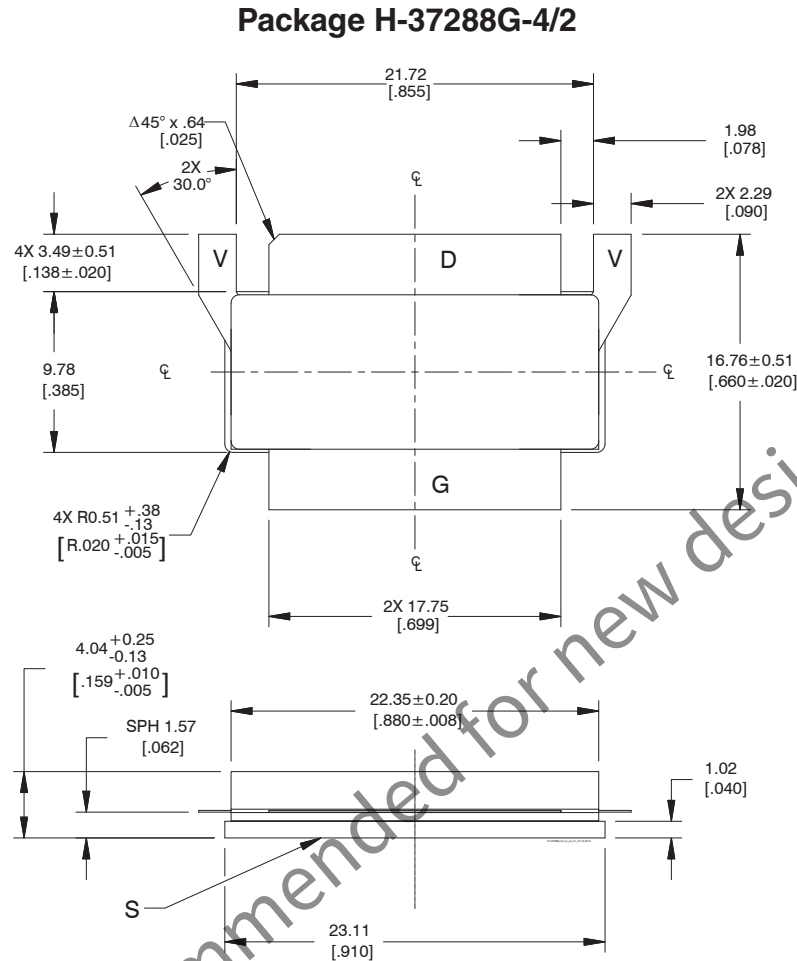


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances  $\pm 0.127$  [.005] unless specified otherwise.
4. Pins: D – drain; G – gate; S – source;  $V - V_{DD}$ .
5. Lead thickness:  $0.10 + 0.051/-0.025$  mm [.004 +0.002/-0.001 inch].
6. Gold plating thickness:  $1.14 \pm 0.38$  micron [ $45 \pm 15$  microinch].

## Revision History

| Revision | Date       | Data Sheet Type | Page                    | Subjects (major changes since last revision)                                                                                                                                                                                  |
|----------|------------|-----------------|-------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 01       | 2013-02-04 | Advance         | All                     | Data Sheet reflects advance specification for product development                                                                                                                                                             |
| 02       | 2013-04-29 | Production      | All                     | Data Sheet reflects released product specifications                                                                                                                                                                           |
| 03       | 2013-07-18 | Production      | All<br>1<br>2<br>7<br>8 | Updated package from V1 to V2 for general release<br>Updated package and revised efficiency in Two-carrier WCDMA specifications table<br>Updated ordering information table<br>Updated LTN version<br>Updated package outline |
| 04       | 2014-07-15 | Production      | All<br>1<br>2           | Updated package from V2 to V3 for general release<br>Updated Two-carrier WCDMA specifications table<br>Revised junction temperature in Maximum Ratings table                                                                  |
| 04.1     | 2016-06-22 | Production      | 2                       | Updated ordering information                                                                                                                                                                                                  |
| 05       | 2018-06-25 | Production      | All                     | Converted to Wolfspeed Data Sheet                                                                                                                                                                                             |

For more information, please contact:

4600 Silicon Drive  
Durham, North Carolina, USA 27703  
[www.wolfspeed.com/RF](http://www.wolfspeed.com/RF)

Sales Contact  
[RFSales@wolfspeed.com](mailto:RFSales@wolfspeed.com)

RF Product Marketing Contact  
[RFMarketing@wolfspeed.com](mailto:RFMarketing@wolfspeed.com)  
919.407.7816

## Notes

### Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.