

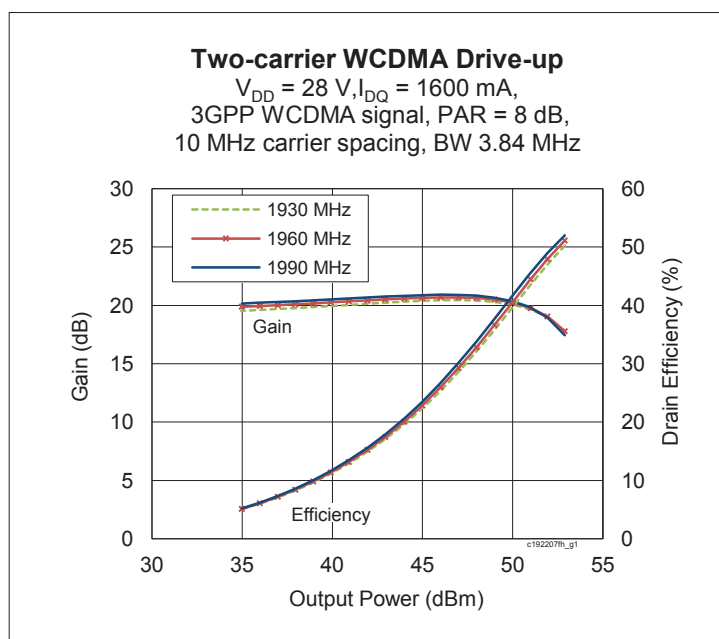
PXFC192207FH

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 μs 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 | η_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 | μA |
| | $V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 10 | μA |
| On-State Resistance | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.03 | — | Ω |
| 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 | μA |

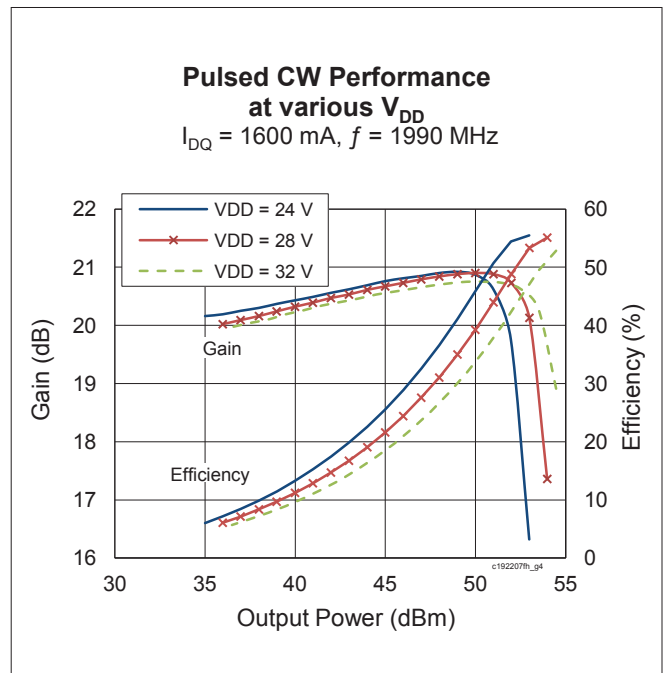
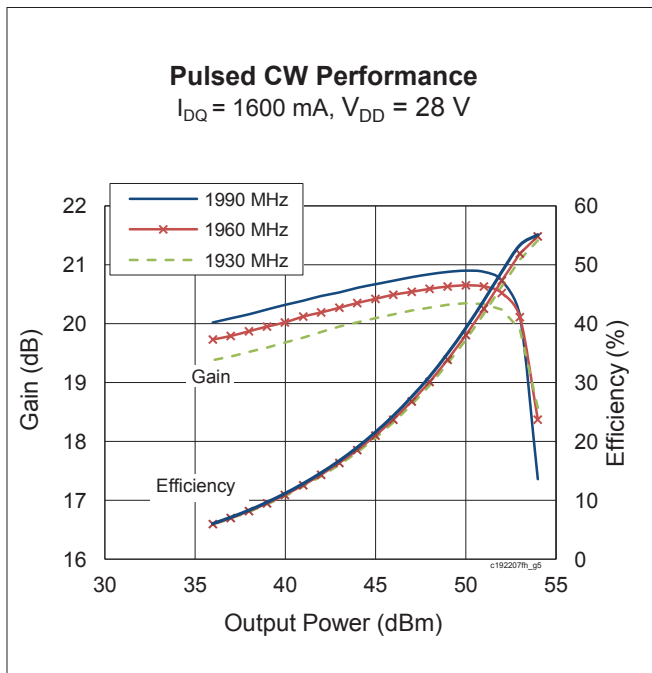
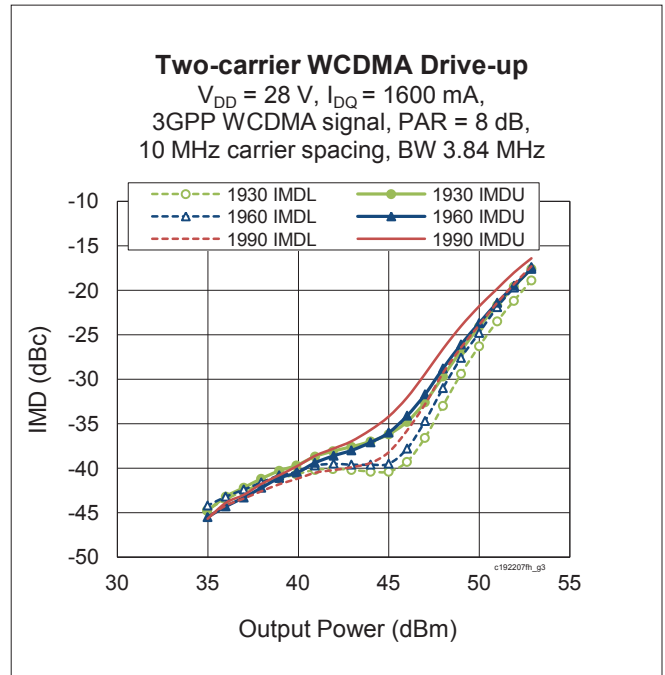
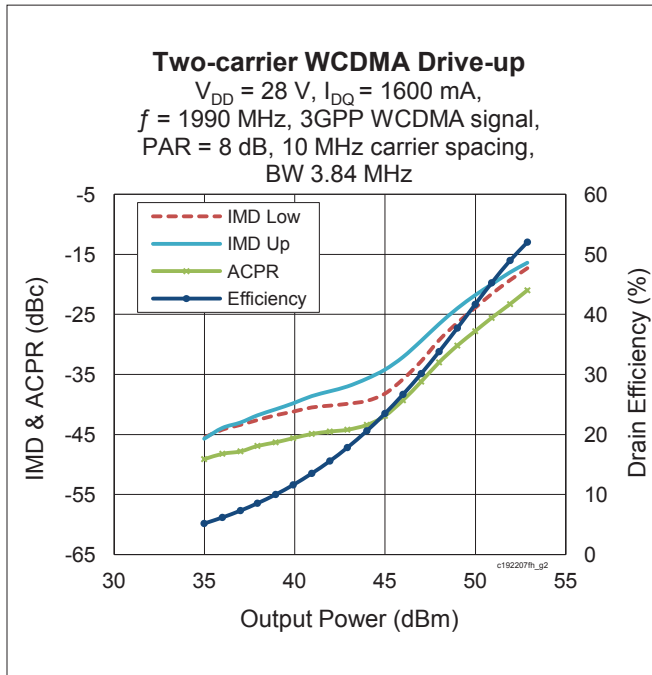
Maximum Ratings

| 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

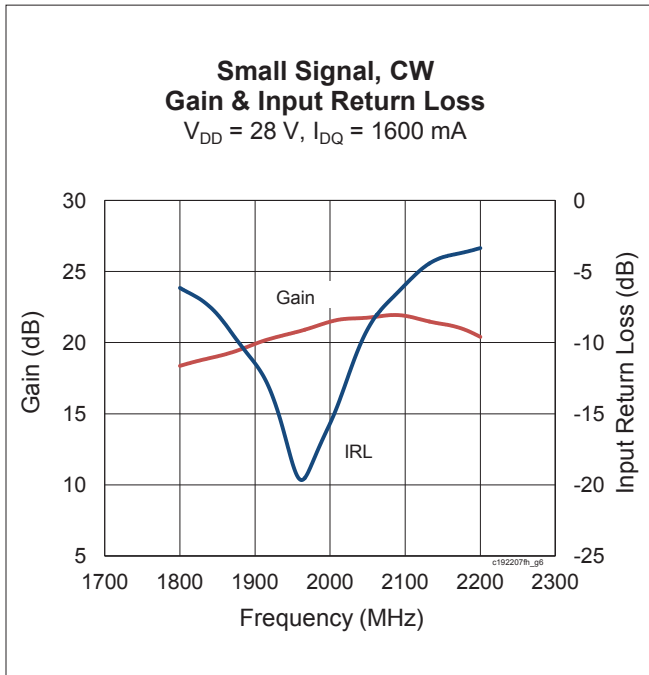
| Type and Version | Order Code | Package Description | Shipping |
|----------------------|----------------------|------------------------------|----------------------|
| PXFC192207FH V3 R0 | PXFC192207FH-V3-R0 | H-37288G-4/2, earless flange | Tape & Reel, 50 pcs |
| PXFC192207FH V3 R250 | PXFC192207FH-V3-R250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

Typical Performance (data taken in a production test fixture)



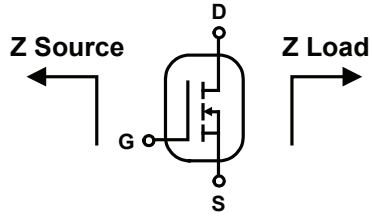


Typical Performance (cont.)



See next page for broadband circuit impedance

Broadband Circuit Impedance



| Freq [MHz] | Z Source Ω | | Z Load Ω | |
|------------|-------------------|-------|-----------------|-------|
| | 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 μ s, 10% duty cycle, 28 V, 1100 mA

| Freq [MHz] | Zs [Ω] | P _{1dB} | | | | | | | | | |
|------------|-----------------|------------------|-----------|------------------------|----------------------|---------|-----------------|-----------|------------------------|----------------------|---------|
| | | Max Output Power | | | | | Max PAE | | | | |
| | | ZI [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] | ZI [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] |
| 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 assembly diagram (not to scale)*

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 http://www.wolfspeed.com/RF | |

Components Information

| Component | Description | Suggested Manufacturer | P/N |
|------------------------------------|----------------------------|---------------------------------|-------------------|
| Input | | | |
| C101 | Capacitor, 10 μ 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 Ω | Panasonic Electronic Components | ERJ-8GEYJ100V |
| R802 | Resistor, 100 Ω | Panasonic Electronic Components | ERJ-8GEYJ101V |
| R803 | Resistor, 1300 Ω | Panasonic Electronic Components | ERJ-3GEYJ132V |
| R804 | Resistor, 1200 Ω | Panasonic Electronic Components | ERJ-3GEYJ122V |
| S1 | Transistor | Infineon Technologies | BCP56 |
| S2 | Voltage Regulator | Texas Instruments | LM78L05ACM |
| S3 | Potentiometer, 2k Ω | Bourns Inc. | 3224W-1-202E |
| Output | | | |
| C201, C202, C204, C206, C208, C209 | Capacitor, 10 μ F | Taiyo Yuden | UMK325C7106MM-T |
| C203, C207 | Capacitor, 220 μ F | Panasonic Electronic Components | EEE-FP1V221AP |
| C205 | Capacitor, 33 pF | ATC | ATC100A330JW150XB |



Package Outline Specifications

