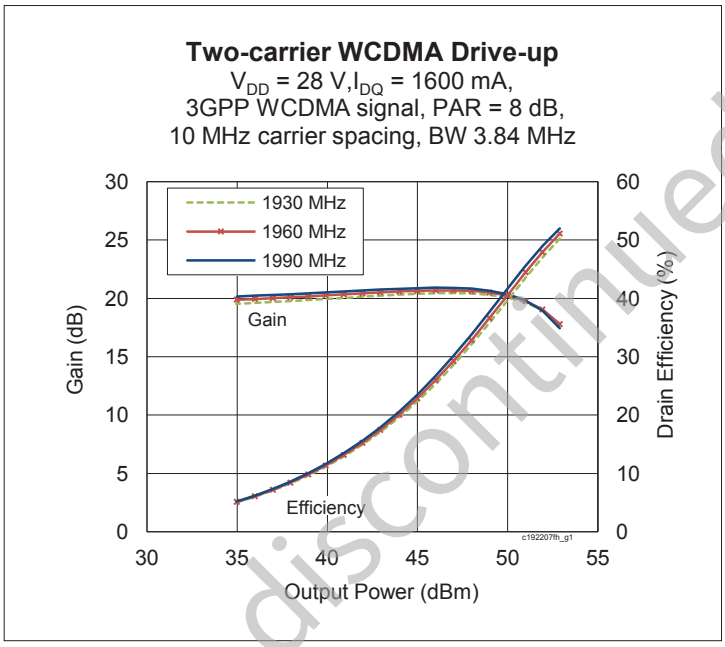
PXFC192207FH

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 W
  - Efficiency = 55%
  - Gain = 20 dB
- Typical single-carrier WCDMA performance, 1990 MHz, 28 V, 9.9 dB PAR @ 0.01% CCDR
  - 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 V, I_{DQ} = 1600 mA, P_{OUT} = 50 W avg, f_1 = 1980 MHz, f_2 = 1990 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°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 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.03	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 1.6 A	V_{GS}	2.3	2.6	2.9	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1	µA

Maximum Ratings

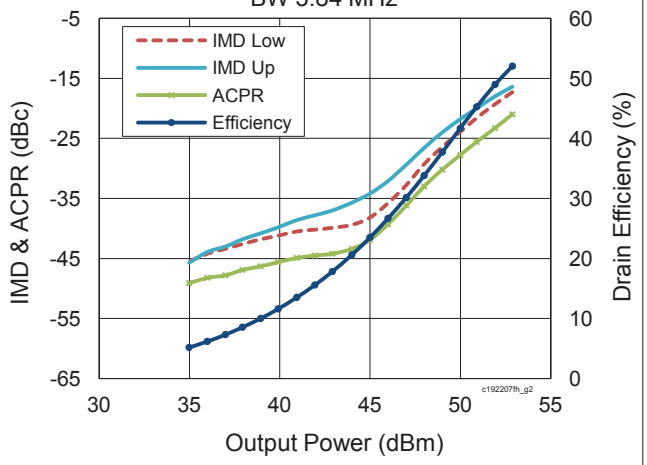
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–6 to +10	V
Operating Voltage	V_{DD}	0 to +32	V
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 200 W CW)	$R_{\theta JC}$	0.28	°C/W

Ordering Information

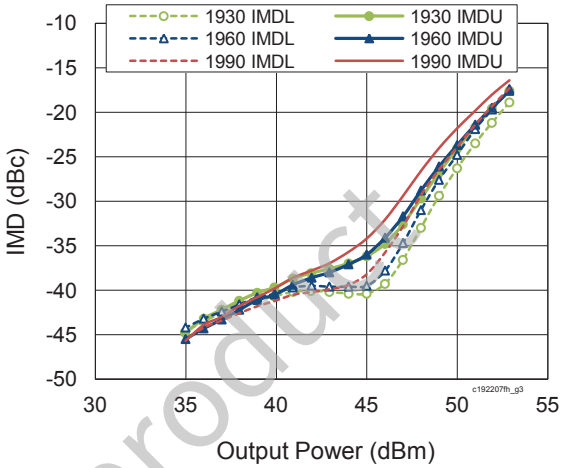
Type and Version	Order Code	Package Description	Shipping
PXFC192207FH V3 R0	PXFC192207FH-V3-R0	H-37288G-4/2, earless flange	Tape & Reel, 50 pcs
PXFC192207FH V3 R250	PXFC192207FH-V3-R250	H-37288G-4/2, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

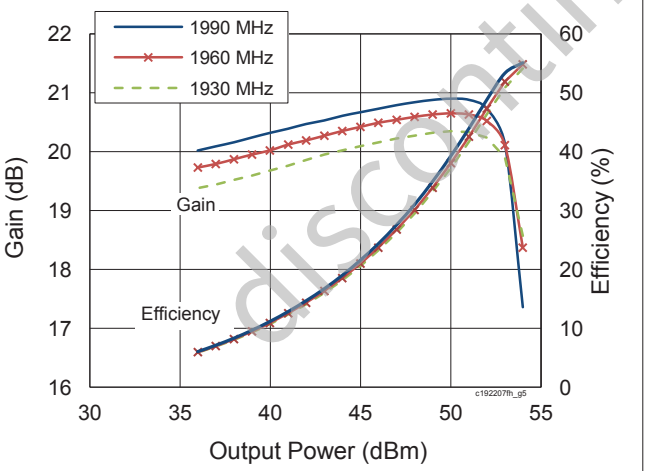
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 1600 mA,
f = 1990 MHz, 3GPP WCDMA signal,
PAR = 8 dB, 10 MHz carrier spacing,
BW 3.84 MHz



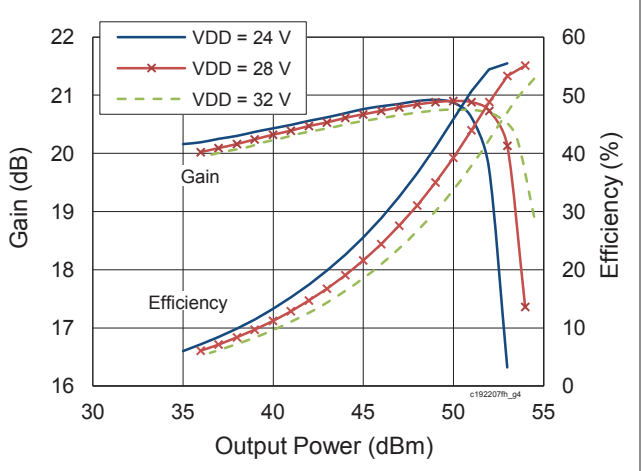
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 1600 mA,
3GPP WCDMA signal, PAR = 8 dB,
10 MHz carrier spacing, BW 3.84 MHz



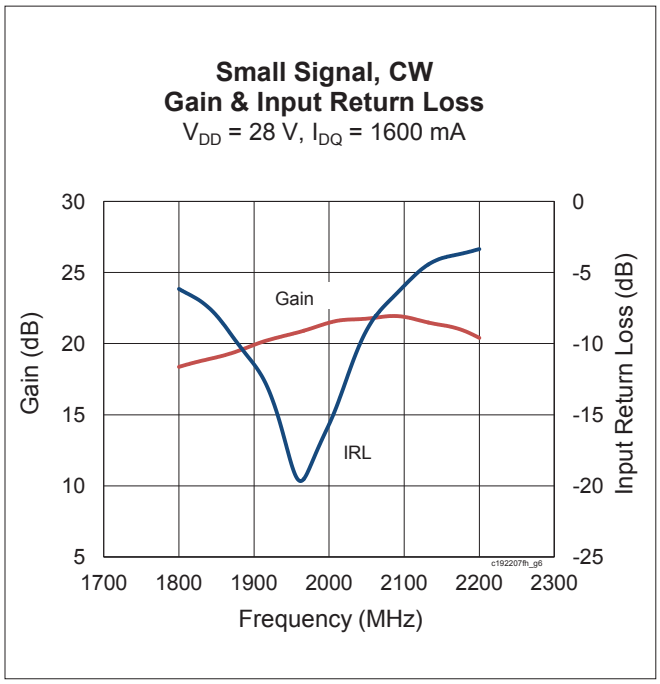
Pulsed CW Performance
I_{DQ} = 1600 mA, V_{DD} = 28 V



Pulsed CW Performance at various V_{DD}
I_{DQ} = 1600 mA, f = 1990 MHz

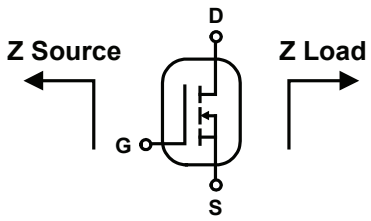


Typical Performance (cont.)



See next page for broadband circuit impdedance

Broadband Circuit Impedance



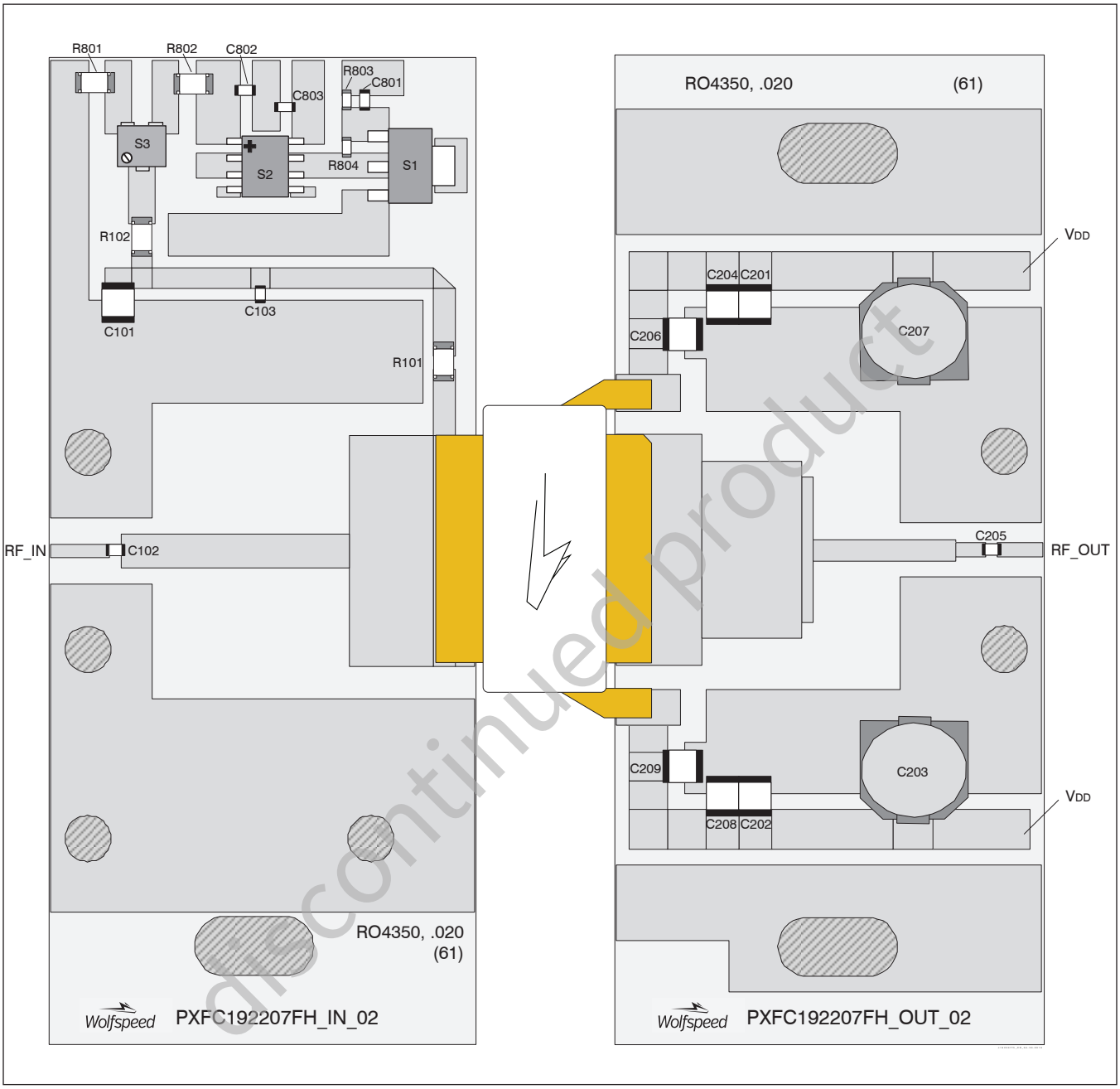
Freq [MHz]	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1930	3.12	–4.70	1.15	–2.80
1960	3.11	–4.62	1.14	–2.69
1990	3.10	–4.55	1.13	–2.58

Load Pull Performance

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

		P_{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Zs [Ω]	Zl [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Zl [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, ε_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 µF	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 µF	Taiyo Yuden	UMK325C7106MM-T
C203, C207	Capacitor, 220 µF	Panasonic Electronic Components	EEE-FP1V221AP
C205	Capacitor, 33 pF	ATC	ATC100A330JW150XB

Package Outline Specifications

Package H-37288G-4/2

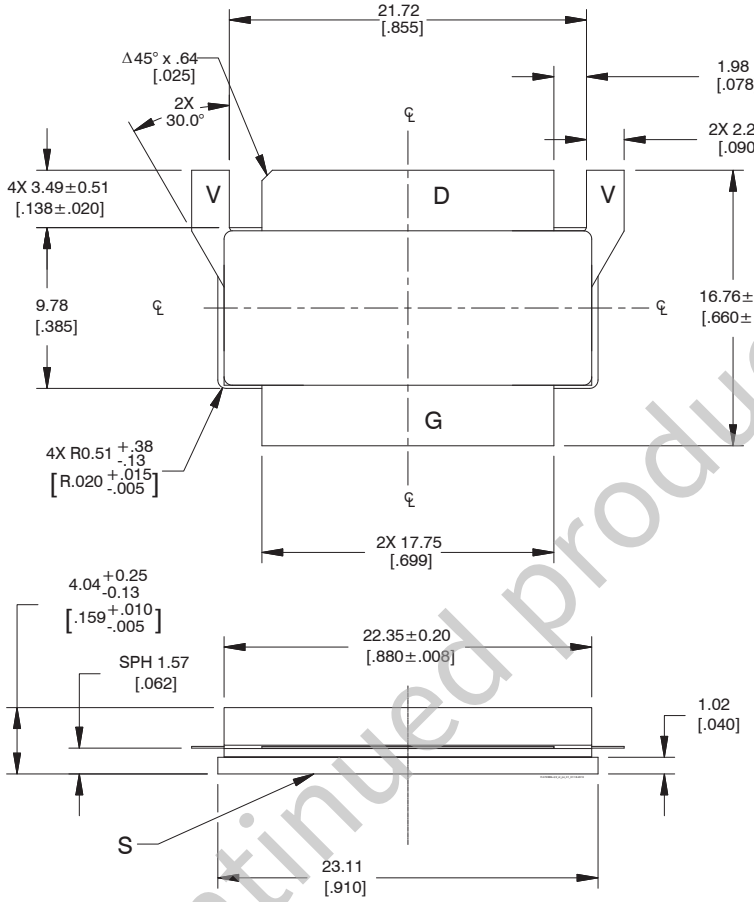


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 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 ± 0.38 micron [45 ± 15 microinch].

For more information, please contact:

4600 Silicon Drive
Durham, NC 27703 USA
Tel: +1.919.313.5300
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com

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