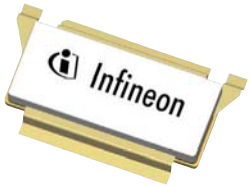
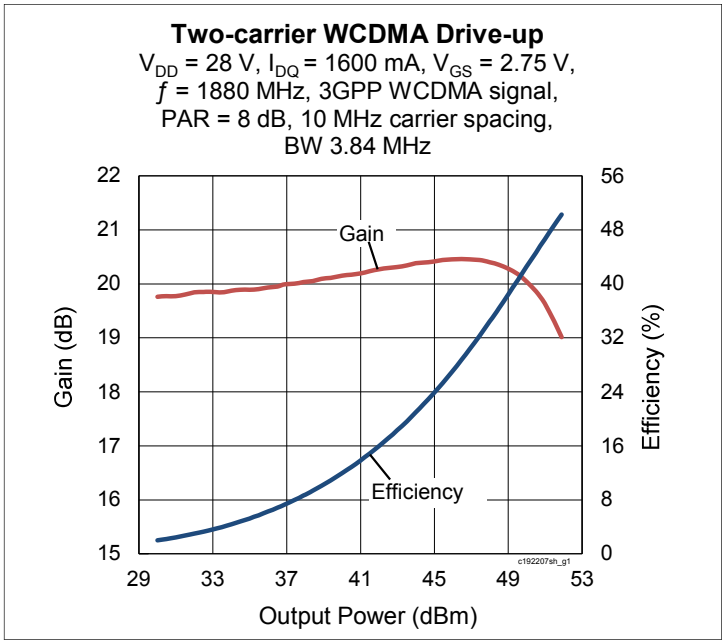
Thermally-Enhanced High Power RF LDMOS FET
220 W, 28 V, 1805 – 1990 MHz

Description

The PXFC192207SH 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 Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PXFC192207SH
Package H-37288G-4/2





Features

- Broadband internal input and output matching
- Typical Pulsed CW performance, 1880 MHz, 28 V, 10 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, 1880 MHz, 28 V, 10 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, 200 W (CW) output power
- Integrated ESD protection
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Two-carrier WCDMA Specifications (tested in Infineon 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
Gain	G_{ps}	19	20	—	dB
Drain Efficiency	η_D	29	30.5	—	%
Intermodulation Distortion	IMD	—	–32	–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} = 1600 mA	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

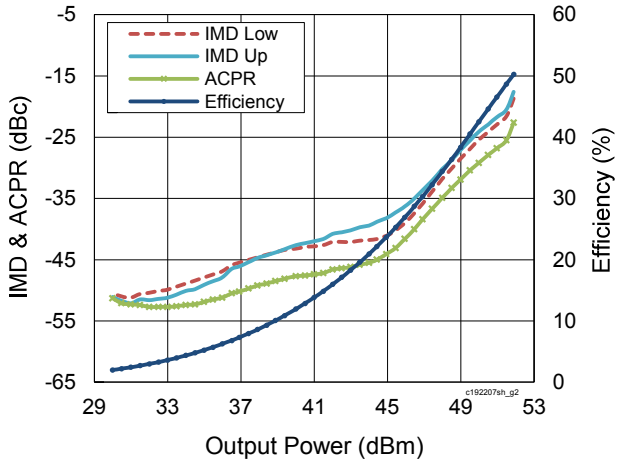
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–6 to +10	V
Operating Voltage	V_{DD}	0 to +32	V
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 200 W CW)	$R_{\theta JC}$	0.28	°C/W

Ordering Information

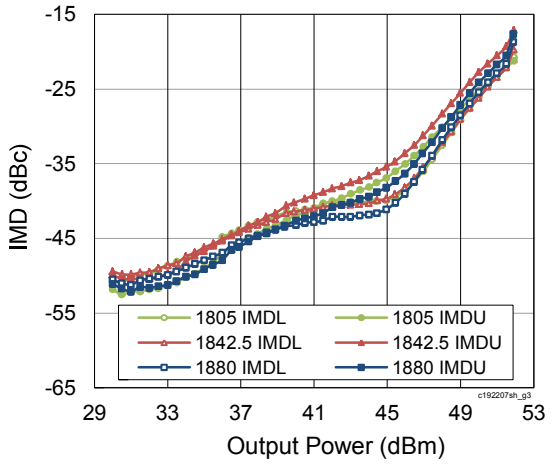
Type and Version	Order Code	Package Description	Shipping
PXFC192207SH V1 R250	PXFC192207SHV1R250XTMA1	H-37288G-4/2, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

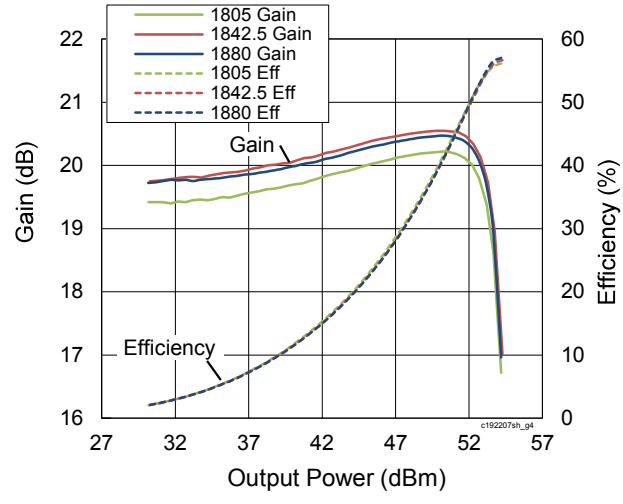
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 1600 mA, V_{GS} = 2.75 V,
f = 1880 MHz, 3GPP WCDMA signal,
PAR = 8 dB, 10 MHz carrier spacing,
BW 3.84 MHz



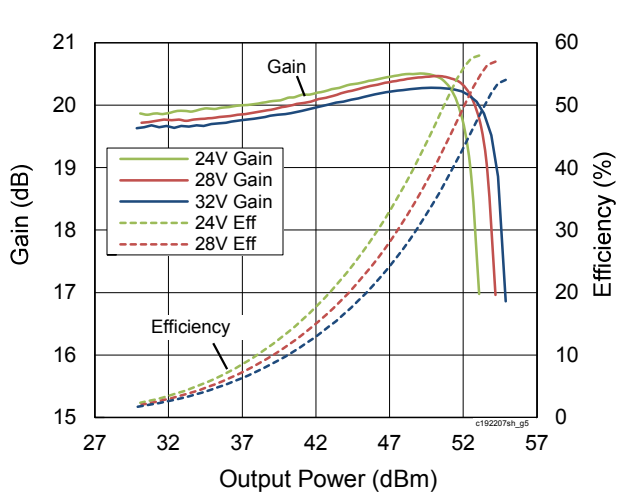
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 1600 mA, V_{GS} = 2.75V,
3GPP WCDMA signal, PAR = 8 dB,
10 MHz carrier spacing, BW 3.84 MHz



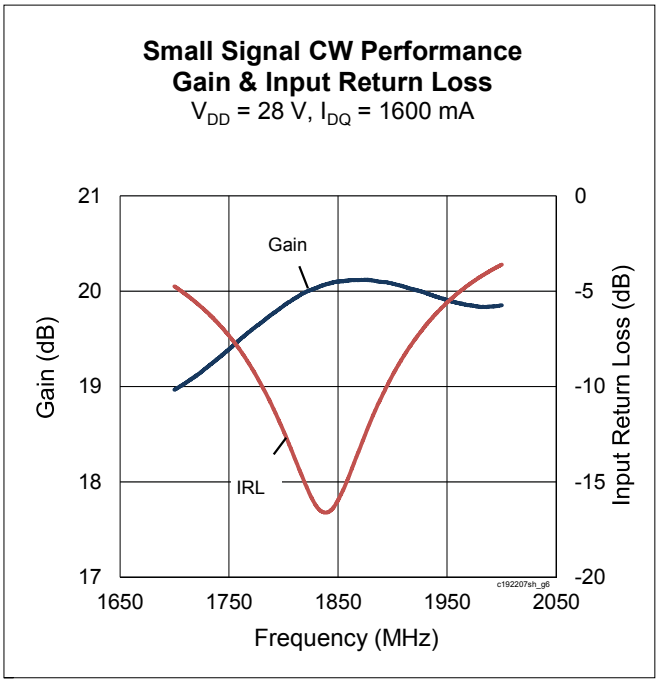
Pulsed CW Performance
V_{DD} = 28 V, I_{DQ} = 1600 mA



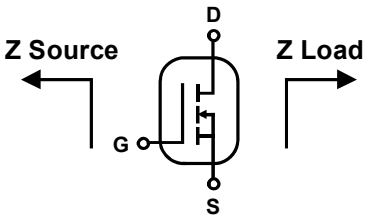
Pulsed CW Performance at various V_{DD}
I_{DQ} = 1600 mA, f = 1880 MHz



Typical Performance (cont.)



Broadband Circuit Impedance



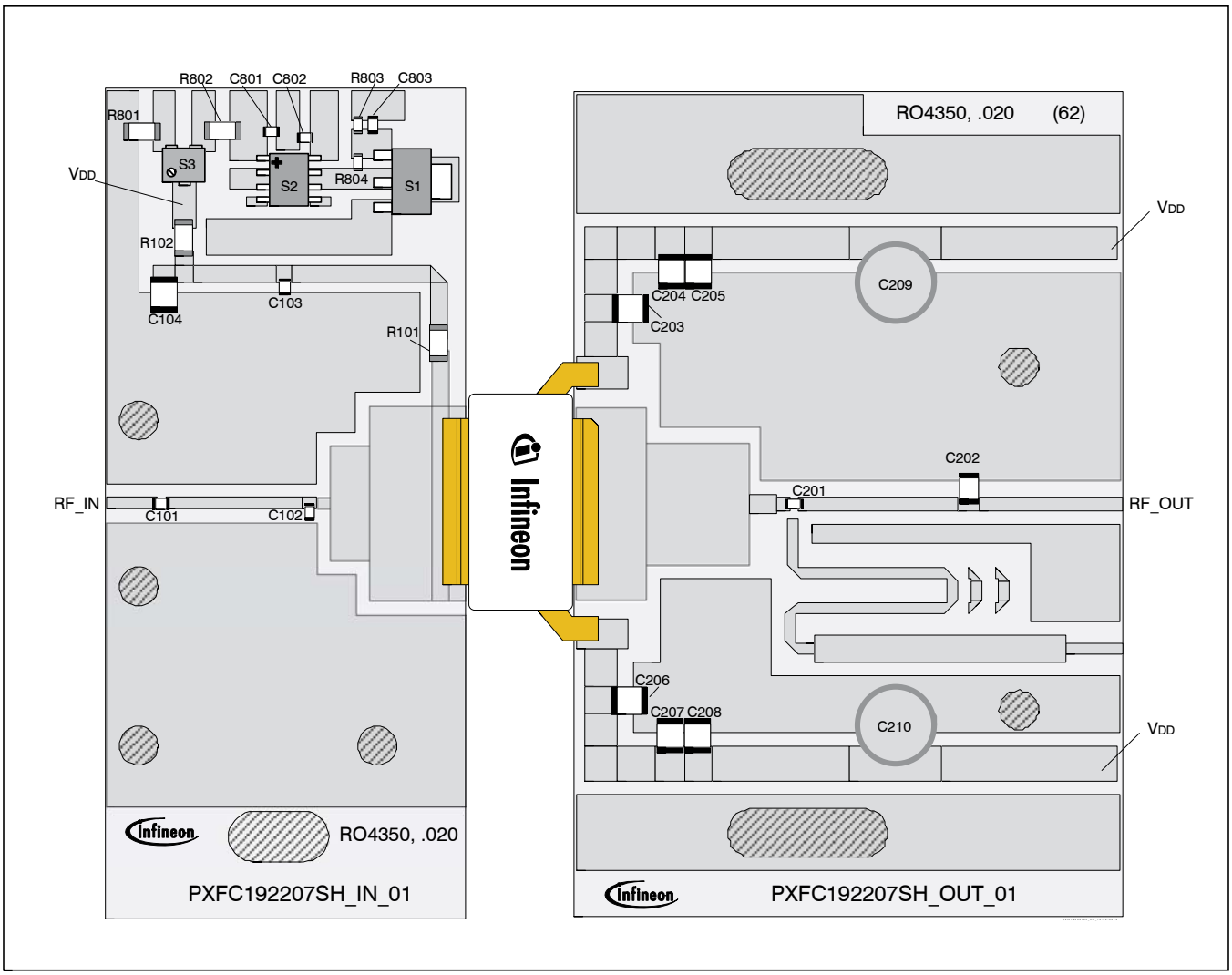
Freq [MHz]	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1805	1.57	–6.18	1.13	–3.50
1843	1.50	–5.97	1.11	–3.32
1880	1.42	–5.76	1.09	–3.18

Load Pull Performance

Main Side Load Pull Performance – Pulsed CW signal: 10 µs, 10% duty cycle, V_{DD} = 28 V, I_{DQ} = 1600 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	0.62 – j4.61	0.79 – j3.74	19.7	54.30	269	50.8	2.00 – j3.31	22.7	52.30	170	61.7
1880	1.25 – j5.48	0.82 – j3.85	19.9	54.40	275	52.8	1.62 – j3.45	22.1	53.00	200	62.1
1930	1.83 – j6.05	0.79 – j4.00	19.5	54.30	269	51.1	1.60 – j3.33	22.2	52.50	178	61.2
1990	3.23 – j6.50	0.81 – j4.14	20.1	54.10	257	51.4	1.40 – j3.31	22.7	52.00	158	60.1

Reference Circuit , 1805 – 1880 MHz



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

Reference Circuit Assembly

DUT	PXFC192207SH V1
Test Fixture Part No.	LTN/PXFC192207SH V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66, f = 1805 – 1880 MHz
Find Gerber files for this test fixture on the Infineon Web site at http://www.infineon.com/rfpower	

Components Information

Component	Description	Suggested Manufacturer	P/N
Input			
C101, C103	Capacitor, 33 pF	ATC	ATC800A330JT250
C102	Capacitor, 0.9 pF	ATC	ATC800A0R9CT250
C104	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
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	Capacitor, 33 pF	ATC	ATC800A330JT250
C202	Capacitor, 0.5 pF	ATC	ATC800B0R5CW500
C203, C204, C205, C206, C207, C208	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C209, C210	Capacitor, 220 µF	Panasonic Electronic Components	EEE-FP1V221AP

Package Outline Specifications

Package H-37288G-4/2

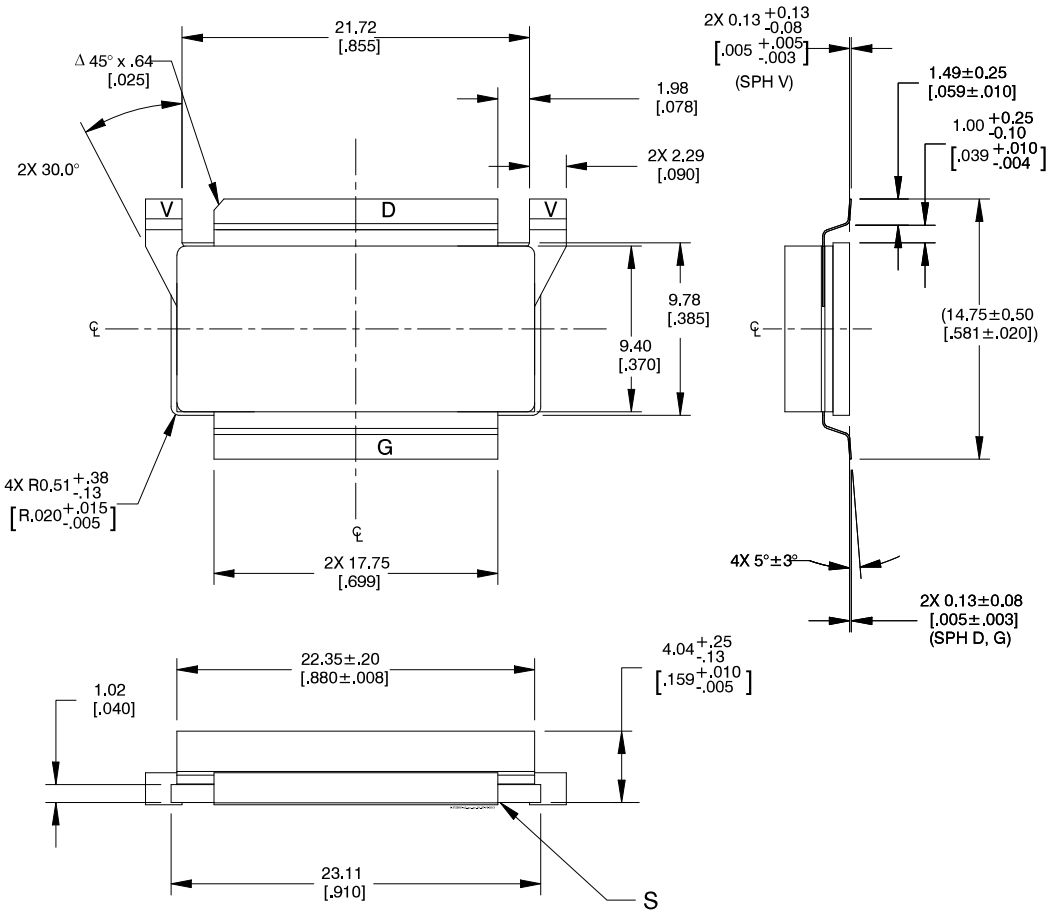


Diagram Notes—unless otherwise specified:

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].

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	2014-07-24	Advance	All	Data Sheet reflects advance specification for product development
02	2014-10-31	Production	All	Data Sheet reflects released product specification

We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all?
Your feedback will help us to continuously improve the quality of this document.
Please send your proposal (including a reference to this document) to:

highpowerRF@infineon.com

To request other information, contact us at:
+1 877 465 3667 (1-877-GO-LDMOS) USA
or +1 408 776 0600 International

Edition 2014-10-31

Published by
Infineon Technologies AG
85579 Neubiberg, Germany

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com/rfpower).

Warnings

Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.

Infineon Technologies components may be used in life-support devices or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.