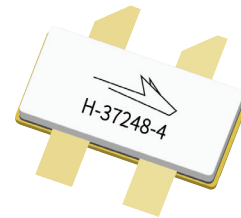


# PXAC200902FC

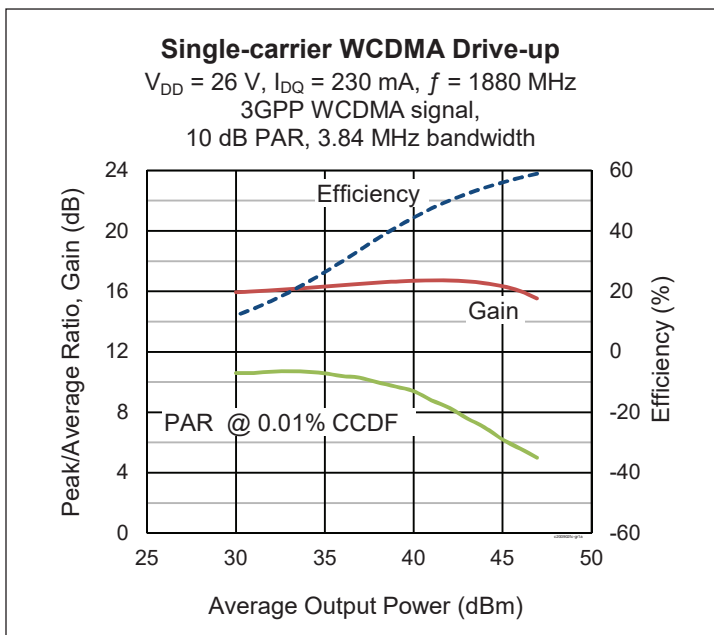
## Thermally-Enhanced High Power RF LDMOS FET 90 W, 28 V, 1805 – 2170 MHz

### Description

The PXAC200902FC is a 90-watt LDMOS FET with an asymmetric design intended for use in multi-standard cellular power amplifier applications in the 1805 to 2170 MHz frequency band. Features include dual path design, input and output matching, high gain and a thermally-enhanced push-pull package with earless flange. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PXAC200902FC  
Package H-37248-4



### Features

- Broadband internal input and output matching
- Asymmetric Doherty design
  - Main: P1dB = 35 W Typ
  - Peak: P1dB = 55 W Typ
- Typical CW performance, 1920 MHz, 26 V,
  - Output power at P1dB = 50 W
  - Efficiency = 58%
  - Gain = 16.6 dB
- Capable of handling 10:1 VSWR @28 V, 90 W (CW) output power
- Integrated ESD protection
- ESD Rating: Human Body Model, Class 1C (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

#### Single-carrier WCDMA Specifications (tested in Wolfspeed Doherty test fixture)

$V_{DD} = 26\text{ V}$ ,  $I_{DQ} = 230\text{ mA}$ ,  $V_{GS(\text{peak})} = 1.3\text{ V}$ ,  $P_{OUT} = 15\text{ W avg}$ ,  $f = 1920\text{ MHz}$ , 3GPP WCDMA signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	$G_{ps}$	16.5	17.2	—	dB
Drain Efficiency	$\eta_D$	45.0	50.3	—	%
Adjacent Channel Power Ratio	ACPR	—	-27.0	-25.5	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 (main & peak)	$V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	0.1	$\mu\text{A}$
	$V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	1.0	$\mu\text{A}$
Gate Leakage Current (main & peak)	$V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	0.1	$\mu\text{A}$
On-State Resistance	(main) $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.22	—	$\Omega$
	(peak) $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.16	—	$\Omega$
Operating Gate Voltage	(main) $V_{DS} = 26\text{ V}$ , $I_{DQ} = 230\text{ mA}$	$V_{GS}$	2.15	2.65	3.15	V
	(peak) $V_{DS} = 26\text{ V}$ , $I_{DQ} = 0\text{ A}$	$V_{GS}$	0.80	1.30	1.80	V

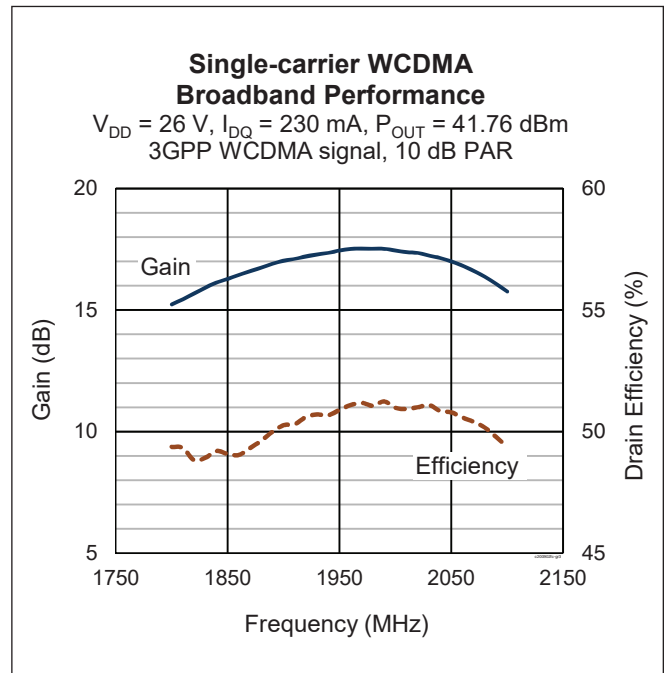
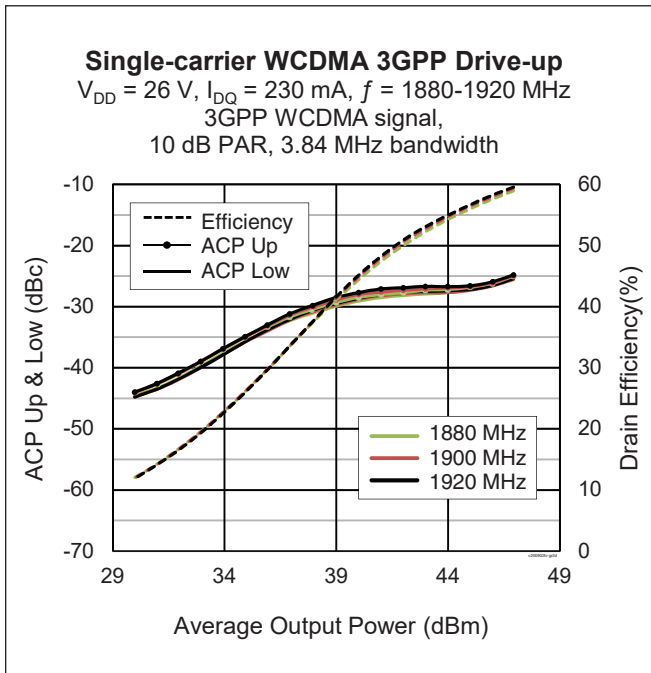
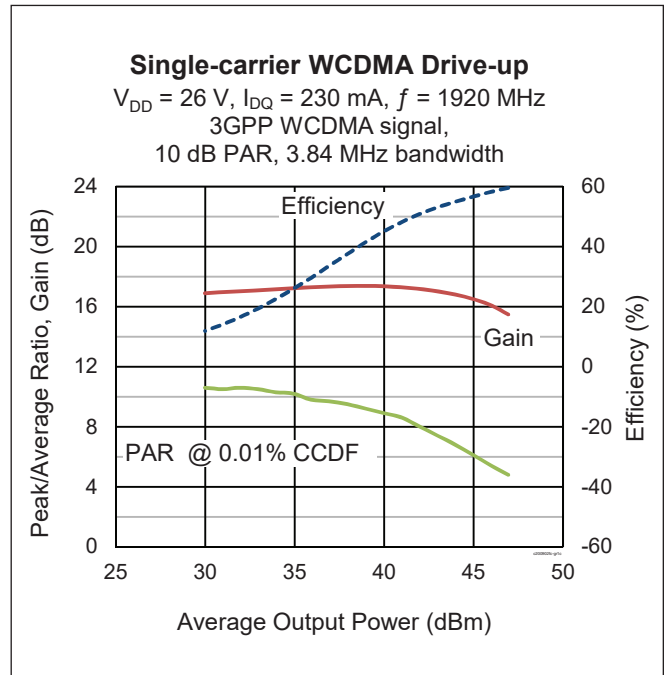
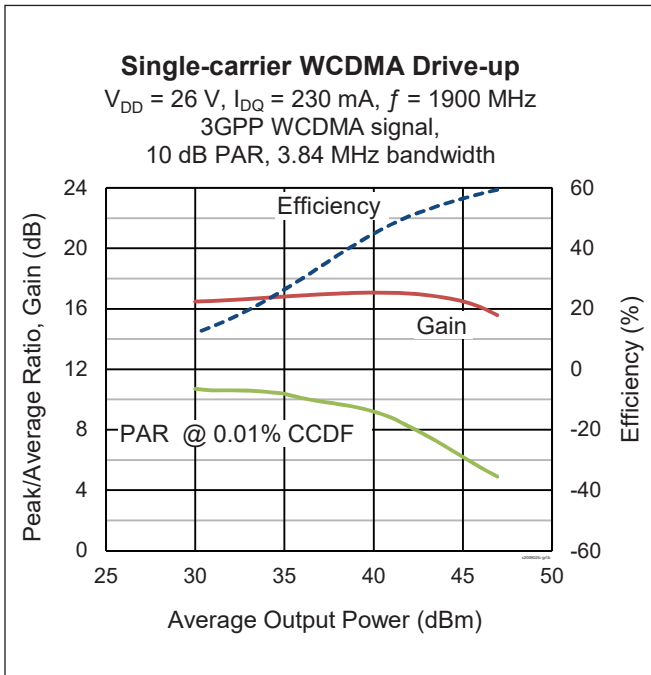
## Maximum Ratings

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 Main ( $T_{CASE} = 70^{\circ}\text{C}$ , $26\text{ V}$ , $I_{DQ} = 230\text{ mA}$ , $15\text{ W CW}$ )	$R_{\theta JC}$	1.75	$^{\circ}\text{C/W}$
	Peak ( $T_{CASE} = 70^{\circ}\text{C}$ , $26\text{ V}$ , $V_{GS} = 1.3\text{ V}$ , $41\text{ W CW}$ )	$R_{\theta JC}$	0.76

## Ordering Information

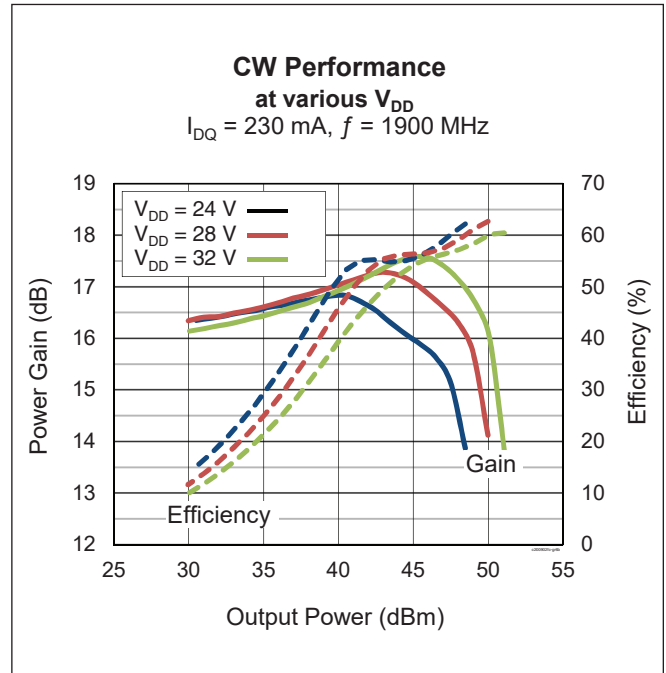
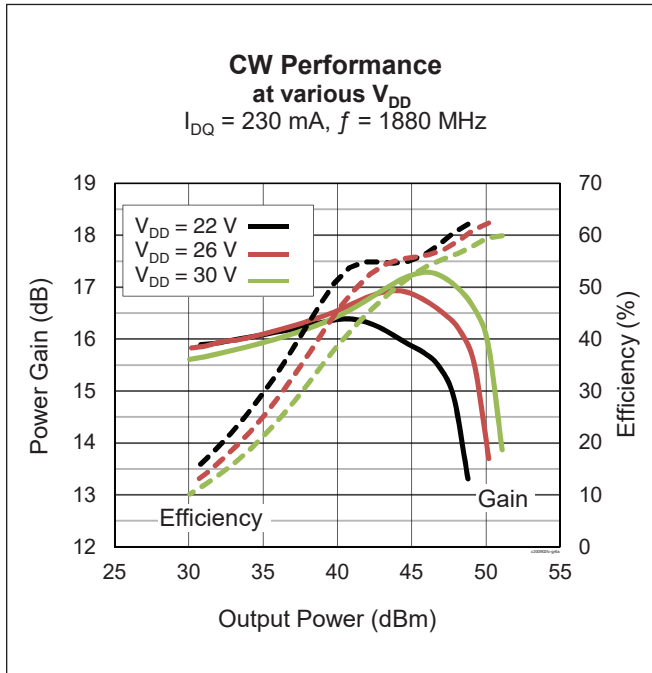
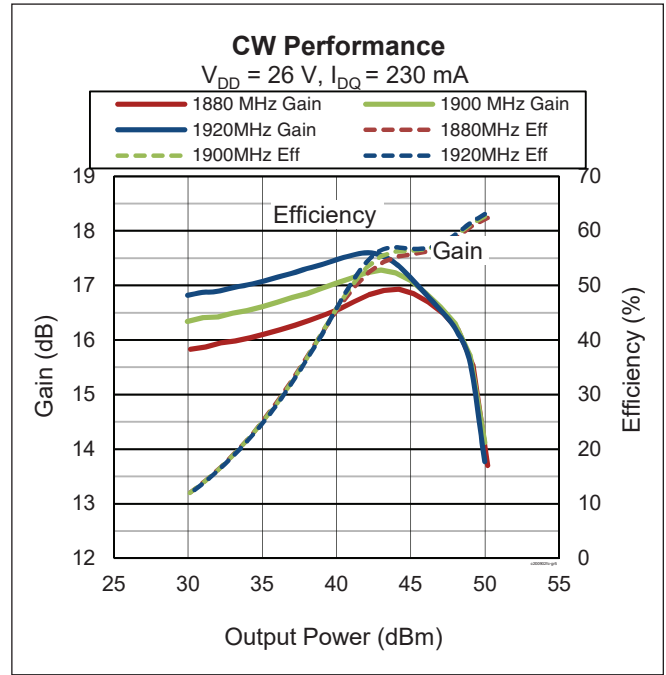
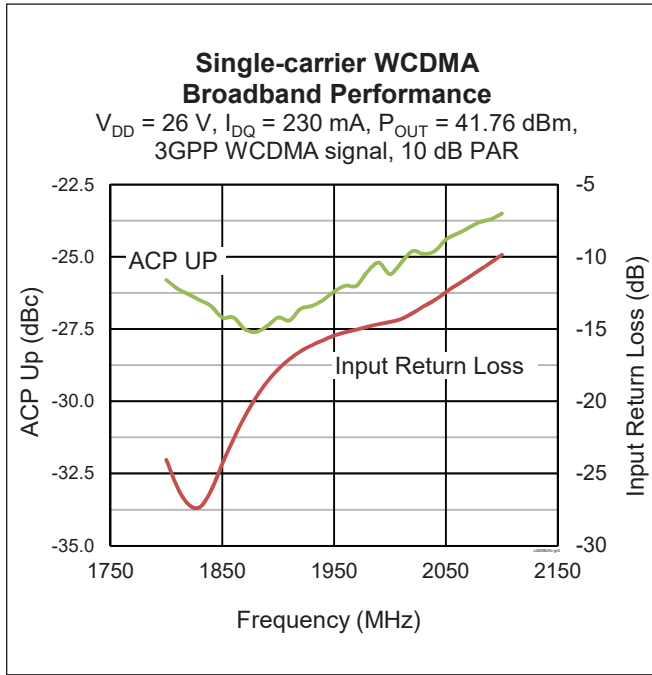
Type and Version	Order Code	Package and Description	Shipping
PXAC200902FC V1 R0	PXAC200902FC-V1-R0	H-37248-4, ceramic open cavity push-pull, earless flange	Tape & Reel, 50 pcs
PXAC200902FC V1 R2	PXAC200902FC-V1-R2	H-37248-4, ceramic open cavity push-pull, earless flange	Tape & Reel, 250 pcs

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



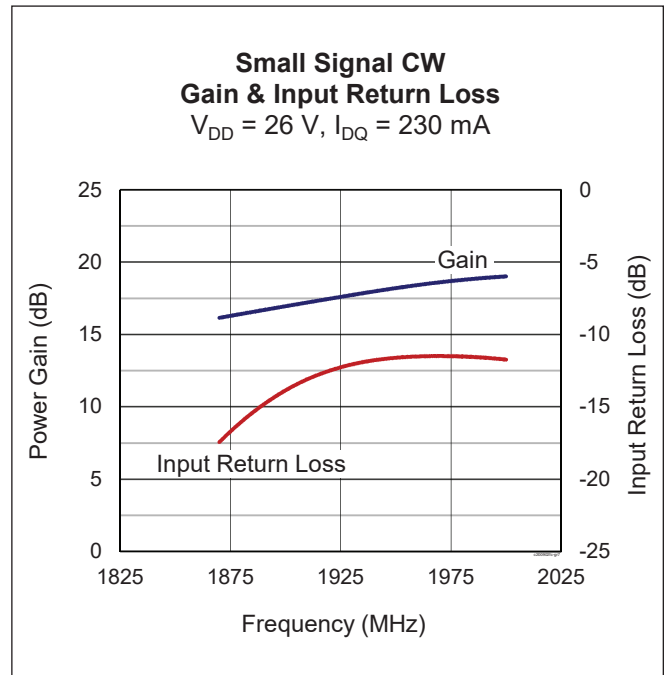
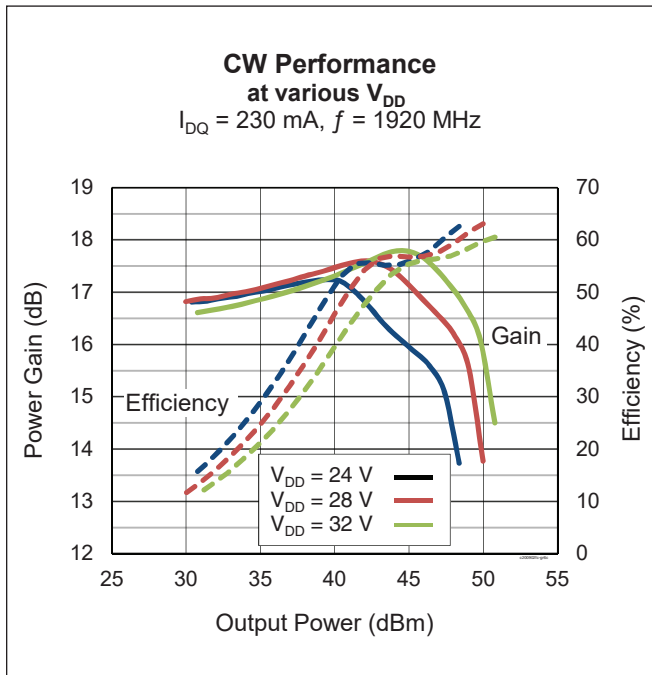


**Typical Performance (cont.)**





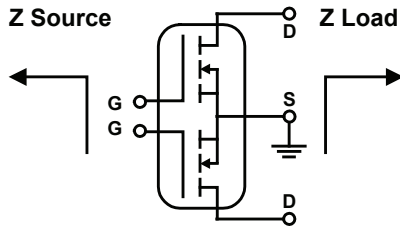
**Typical Performance (cont.)**



See next page for load pull information



### Load Pull Performance



**Main side load pull, pulsed CW signal:** 160  $\mu$ s, 10% duty cycle,  $V_{DD} = 28$  V,  $I_{DQ} = 230$  mA

Class AB		P <sub>1dB</sub>										
		Max Output Power					Max PAE					
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	
1880	8.89 – j15.56	6.31 – j9.65	19.5	46.76	47.4	57.3	12.29 – j4.78	21.8	44.96	31.3	68.5	
1900	9.25 – j15.69	5.47 – j10.96	18.8	46.4	43.7	49.8	12.17 – j5.25	21.9	44.62	29	64.1	
1920	12.83 – j18.84	6.42 – j10.7	19.5	46.6	45.7	55.7	11.76 – j4.27	22.0	44.6	28.8	66.5	

**Peak side load pull, pulsed CW signal:** 160  $\mu$ s, 10% duty cycle,  $V_{DD} = 28$  V,  $I_{DQ} = 280$  mA

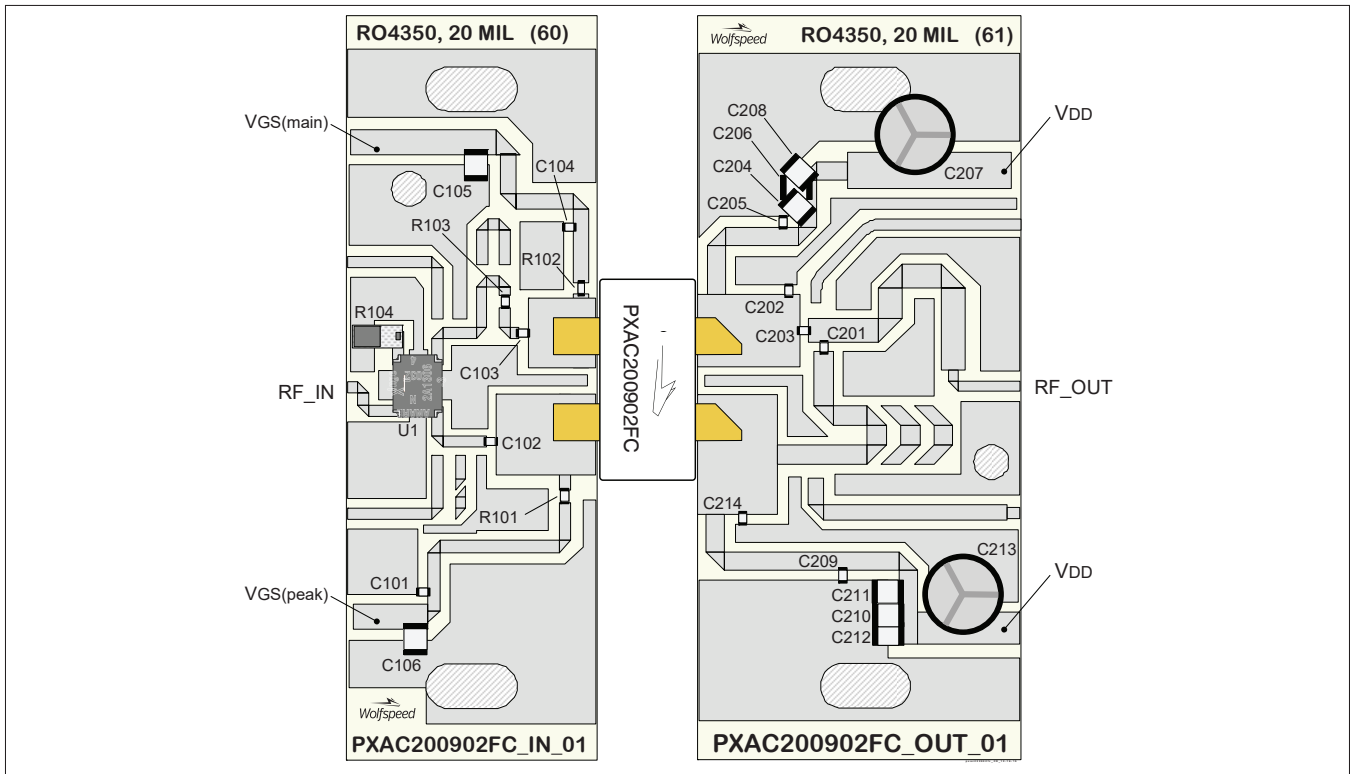
Class AB		P <sub>1dB</sub>										
		Max Output Power					Max PAE					
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	
1880	3.46 – j8.04	3.21 – j6.17	19.3	48.4	69.2	56.8	3.21 – j6.17	22.3	45.96	39.4	68.6	
1900	3.5 – j8.19	3.21 – j6.44	19.3	48.1	64.6	53.8	6.2 – j3.08	22.1	45.9	38.9	64.3	
1920	4.29 – j9.3	3.03 – j6.35	19.3	48.3	67.6	54.6	5.33 – j3.12	21.9	46.3	42.7	66.0	

### Reference Circuit Assembly, 1880 – 1920 MHz

DUT	PXAC200902FC V1
Reference Circuit No.	LTA/PXAC200902FC V1
Order Code	LTA/PXAC200902FC V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$

Find Gerber files for this test fixture on the Wolfspeed Web site at <http://www.wolfspeed.com/RF>

Reference Circuit (cont.)



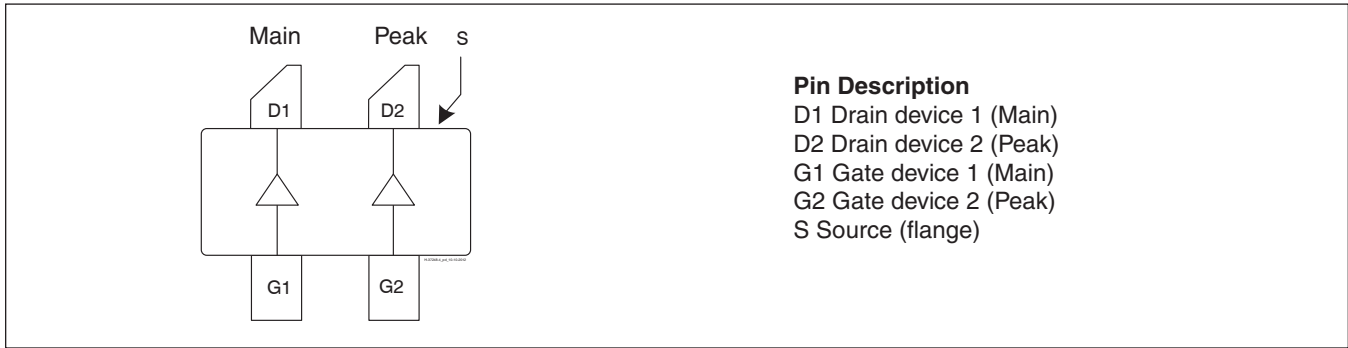
Reference circuit assembly diagram (not to scale)

Components Information

Component	Description	Manufacturer	P/N
<b>In</b>			
C101, C102, C104	Capacitor, 18 pF	ATC	ATC600F180JW250T
C103	Capacitor, 9.1 pF	ATC	ATC600F9R1JW250T
C105, C106	Capacitor, 10 μF	Taiyo Yuden	UMK325C7106MM-T
R101, R102	Resistor, 10 Ω	Panasonic	ERJ-8GEYJ100V
R103	Resistor, 5.6 Ω	Panasonic	ERJ-8RQJ5R6V
R104	Resistor, 50 Ω	Anaren	C8A50Z4A
U1	Hybrid Coupler	Anaren	X3C19P1-03S
<b>Out</b>			
C201	Capacitor, 15 pF	ATC	ATC600F150JW250T
C202	Capacitor, 0.7 pF	ATC	ATC600F0R7CW250T
C203	Capacitor, 10 pF	ATC	ATC600F100JW250T
C204, C206, C208, C210, C211, C212	Capacitor, 10 μF	Taiyo Yuden	UMK325C7106MM-T
C205, C209	Capacitor, 18 pF	ATC	ATC600F180JW250T
C207, C213	Capacitor, 220 μF	Cornell Dubilier Electronics	SK221M050ST
C214	Capacitor, 1.6 pF	ATC	ATC600F1R6JW250T



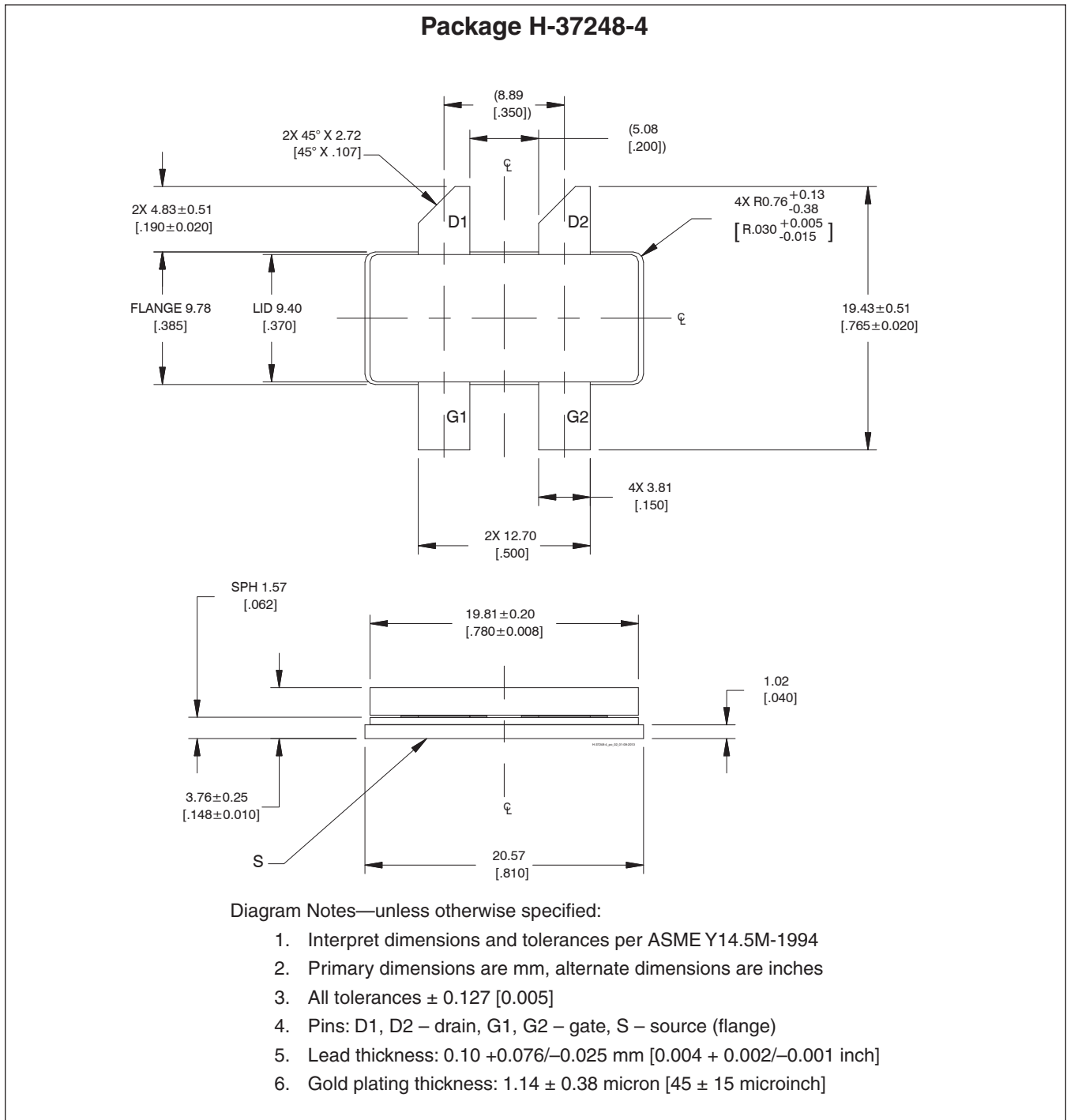
**Pinout Diagram** (top view)



**See next page for package outline specifications**



Package Outline Specifications



## Revision History

01	2015-06-08	Advance	All	First Data Sheet for this released product.
02	2015-10-27	Production	All	Updated and firm specifications for released product.
02.1	2016-02-11	Production	All	Updated Order Code and Reference Circuit MHz
03	2018-06-29	Production	All	Converted to Wolfspeed Data Sheet

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## Notes

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