

PXAC200902FC

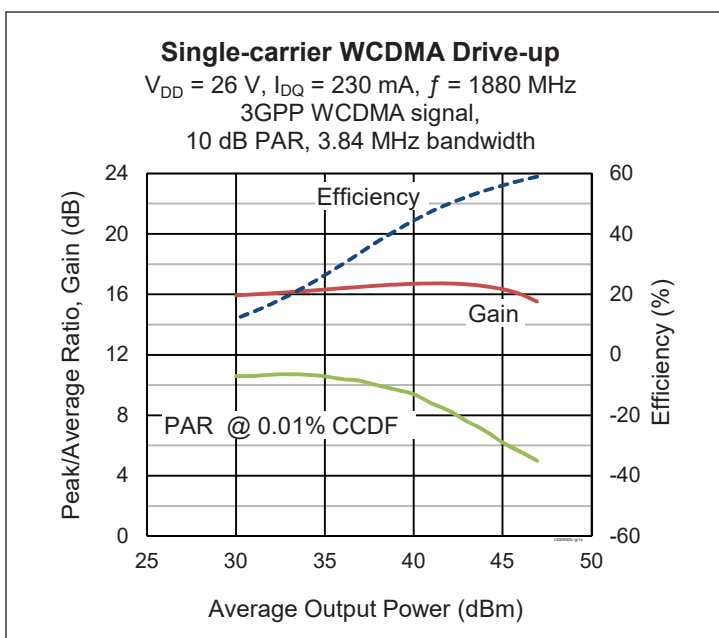
Thermally-Enhanced High Power RF LDMOS FET 90 W, 28 V, 1805 – 2170 MHz

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: P_{1dB} = 35 W Typ
 - Peak: P_{1dB} = 55 W Typ
- Typical CW performance, 1920 MHz, 26 V,
 - Output power at P_{1dB} = 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)

$V_{DD} = 26\text{ V}$, $I_{DQ} = 230\text{ mA}$, $V_{GS(peak)} = 1.3\text{ V}$, $P_{OUT} = 15\text{ W avg}$, $f = 1920\text{ MHz}$, 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	η_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	μA
	$V_{DS} = 63\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
Gate Leakage Current (main & peak)	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	—	—	0.1	μA
On-State Resistance	(main) $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.22	—	Ω
	(peak) $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.16	—	Ω
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

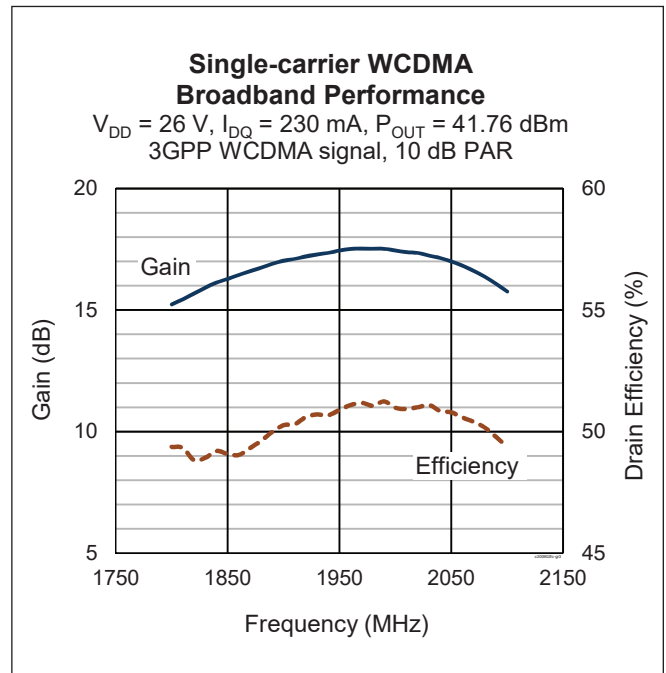
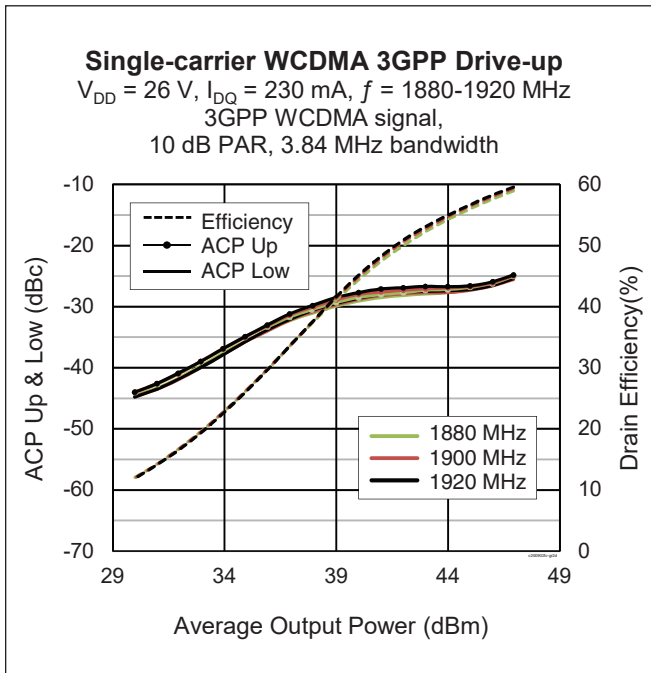
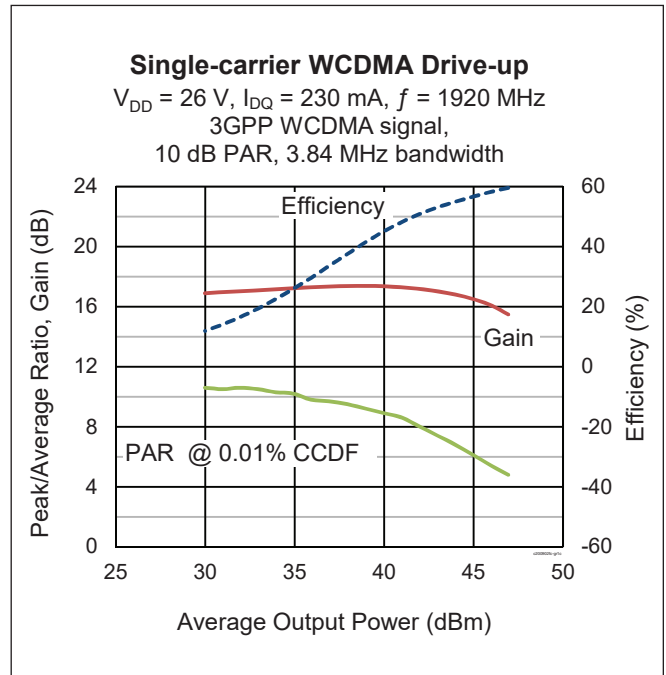
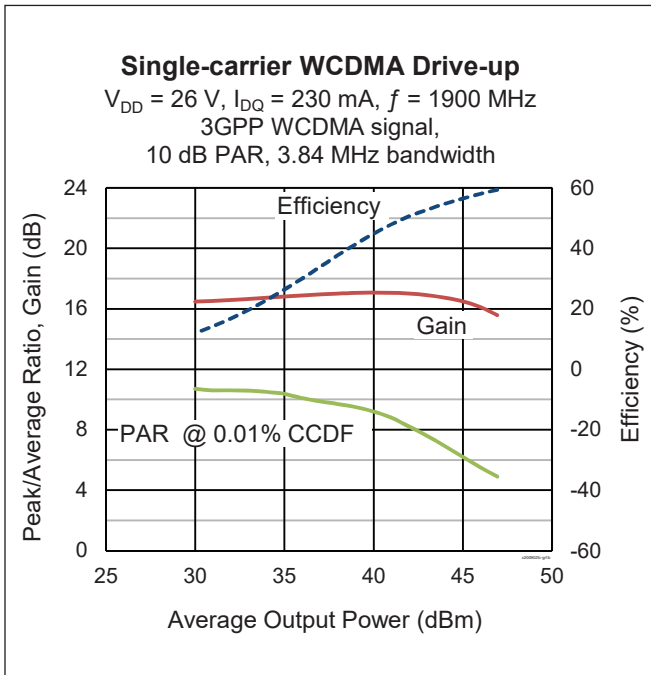
Maximum Ratings

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

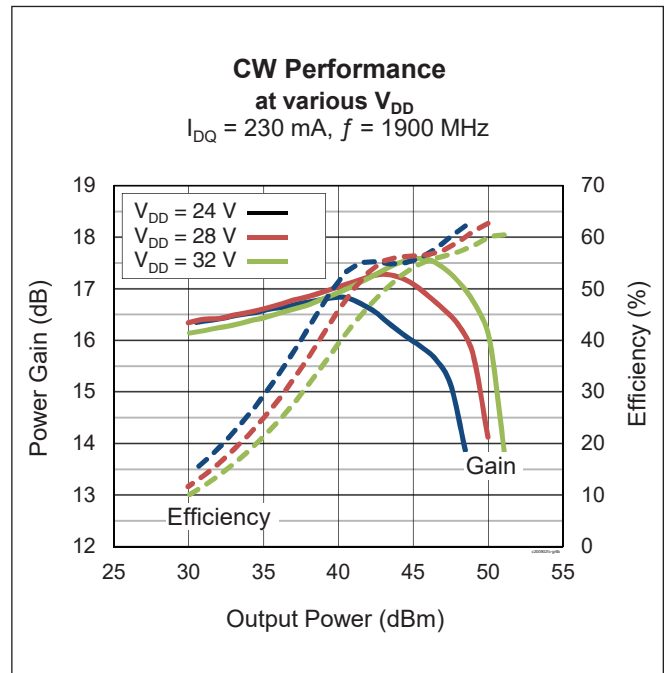
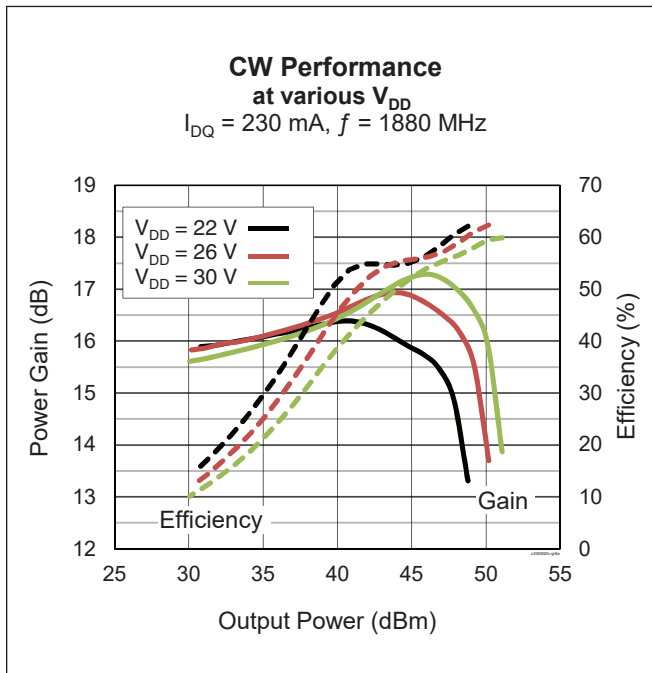
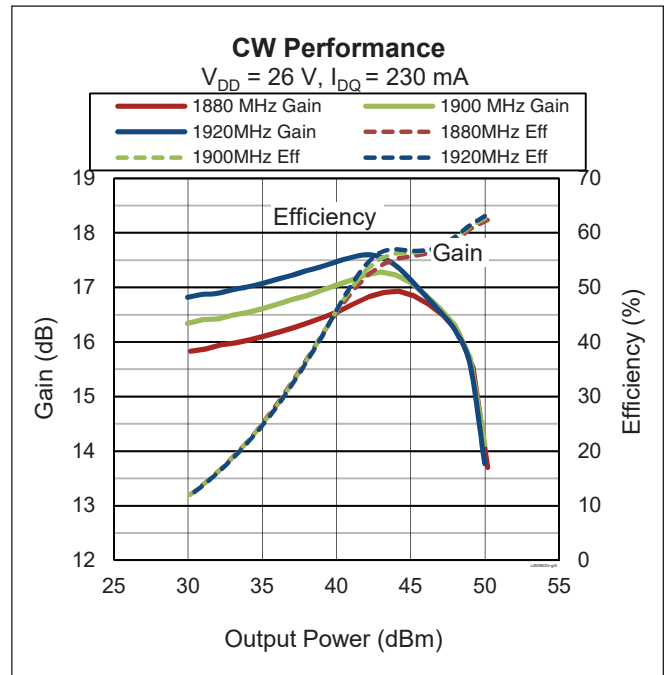
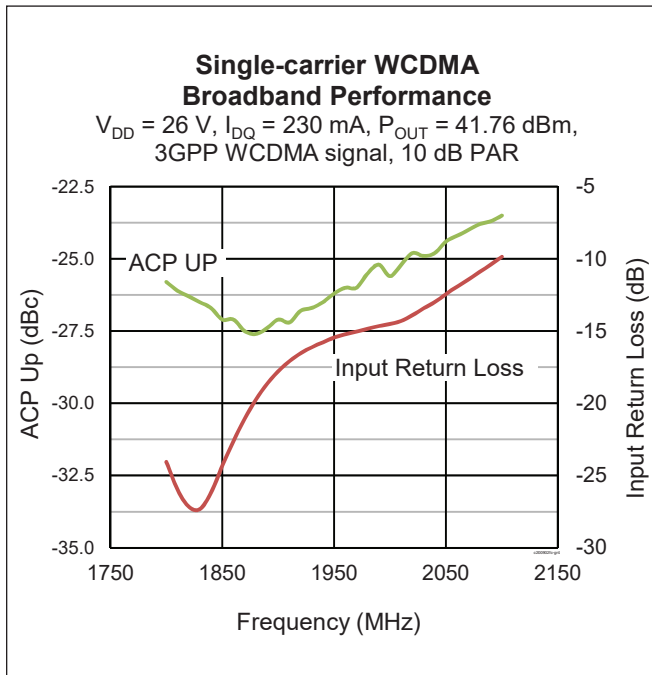
Type and Version	Order Code	Package and Description	Shipping
PXAC200902FC V1 R0	PXAC200902FC-V1-R0	H-37248-4, ceramic open cavity push-pull, earless flange	Tape & Reel, 50 pcs
PXAC200902FC V1 R2	PXAC200902FC-V1-R2	H-37248-4, ceramic open cavity push-pull, earless flange	Tape & Reel, 250 pcs

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



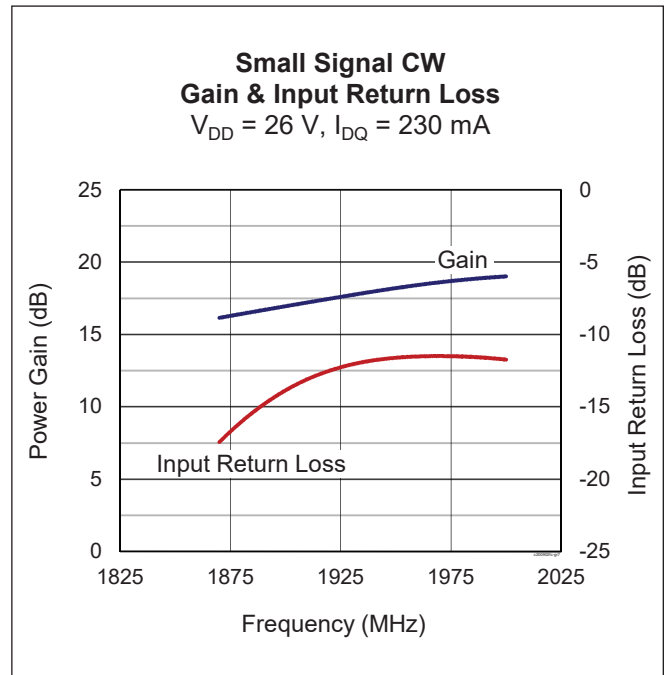
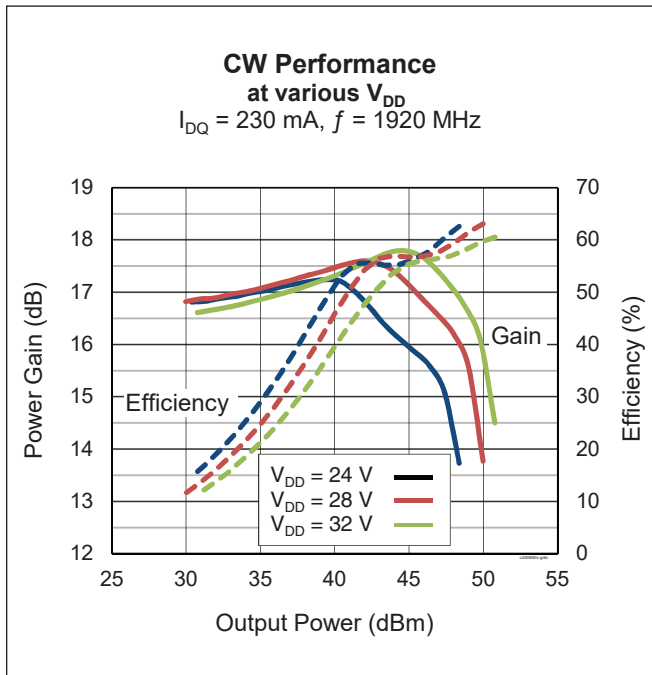


Typical Performance (cont.)





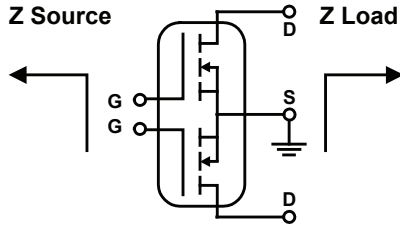
Typical Performance (cont.)



See next page for load pull information



Load Pull Performance



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

Class AB		P _{1dB}										
		Max Output Power					Max PAE					
Freq [MHz]	Z _s [Ω]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [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 μ s, 10% duty cycle, $V_{DD} = 28$ V, $I_{DQ} = 280$ mA

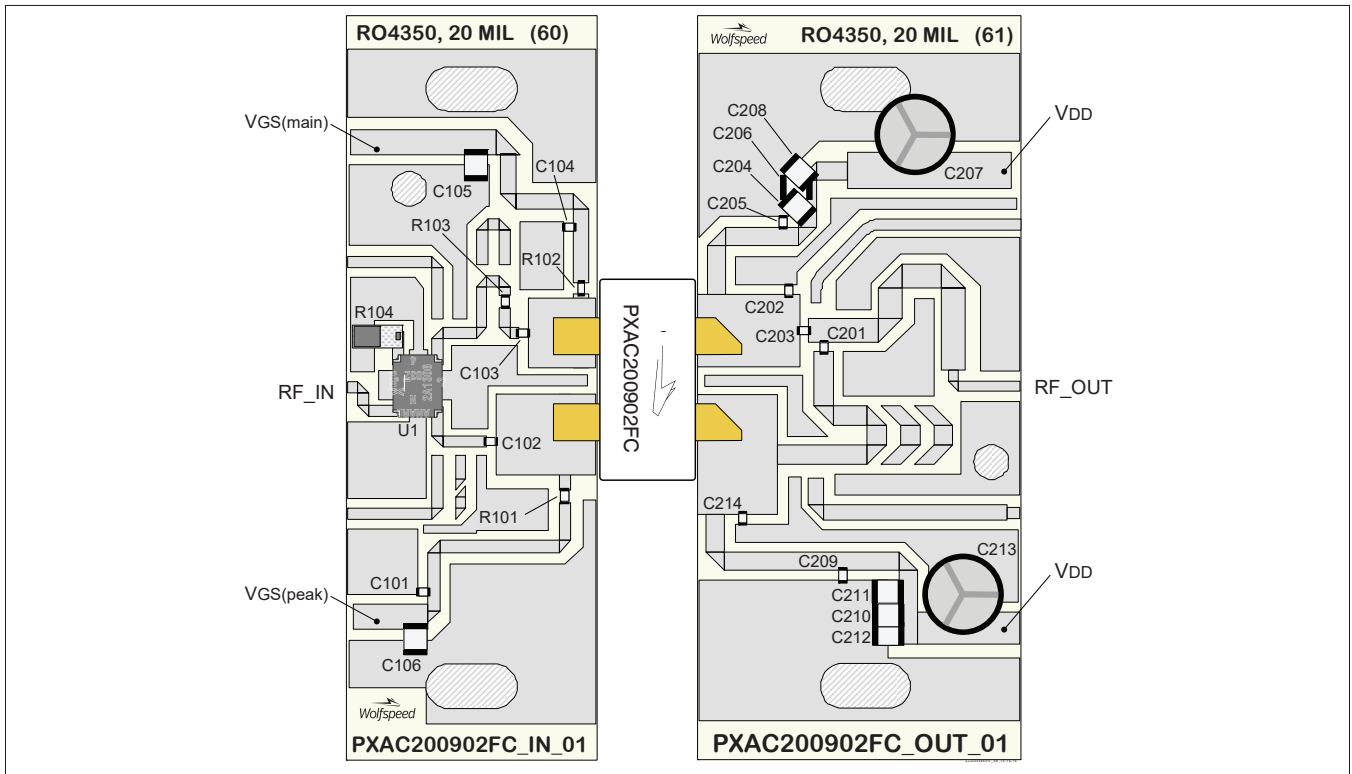
Class AB		P _{1dB}										
		Max Output Power					Max PAE					
Freq [MHz]	Z _s [Ω]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	
1880	3.46 – j8.04	3.21 – j6.17	19.3	48.4	69.2	56.8	3.21 – j6.17	22.3	45.96	39.4	68.6	
1900	3.5 – j8.19	3.21 – 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.)



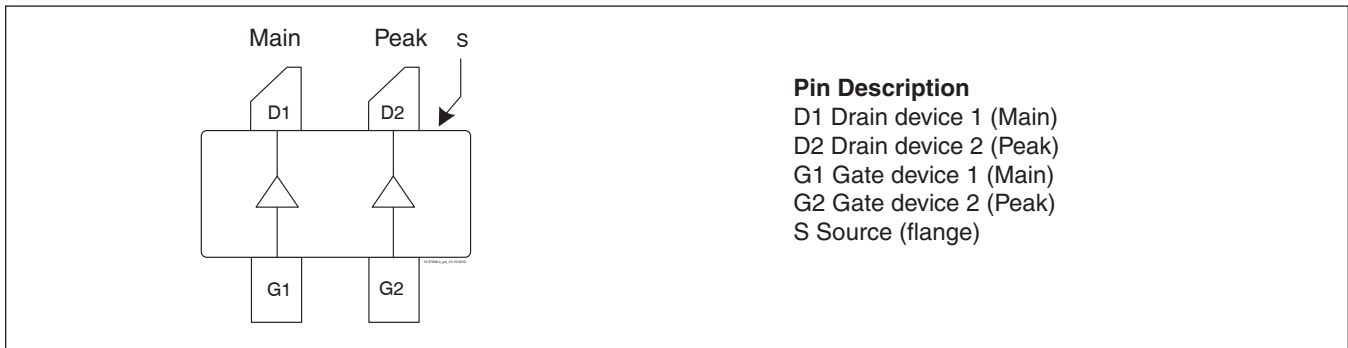
Reference circuit assembly diagram (not to scale)

Components Information

Component	Description	Manufacturer	P/N
In			
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
Out			
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

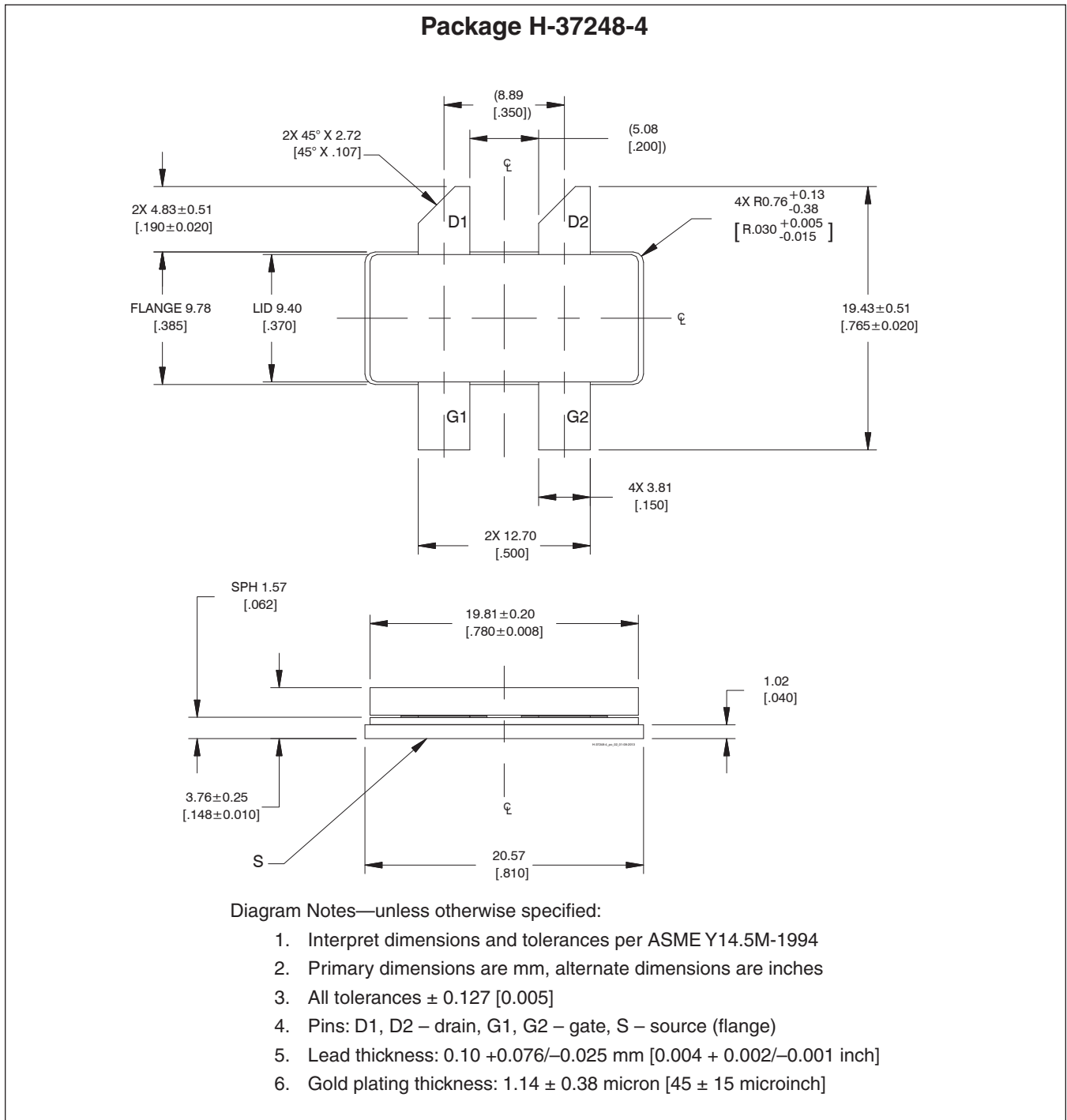


Pinout Diagram (top view)



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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