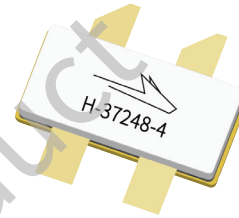


PXAC200902FC

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

Description

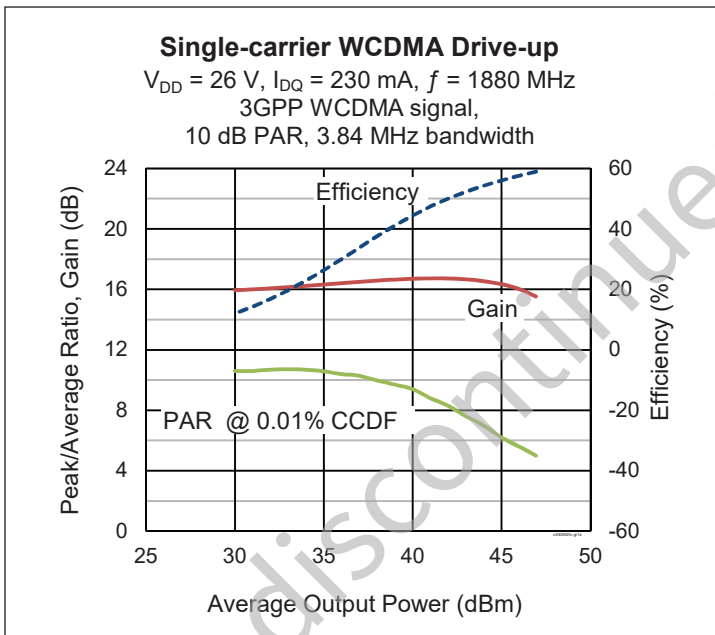
The PXAC200902FC is a 90-watt LDMOS FET with an asymmetric design intended for use in multi-standard cellular power amplifier applications in the 1805 to 2170 MHz frequency band. Features include dual path design, input and output matching, high gain and a thermally-enhanced push-pull package with earless 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)

$V_{DD} = 26\text{ V}$, $I_{DQ} = 230\text{ mA}$, $V_{GS(peak)} = 1.3\text{ V}$, $P_{OUT} = 15\text{ W avg}$, $f = 1920\text{ MHz}$, 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
	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	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
	$V_{DS} = 26\text{ V}$, $I_{DQ} = 0\text{ A}$	V_{GS}	0.80	1.30	1.80	V

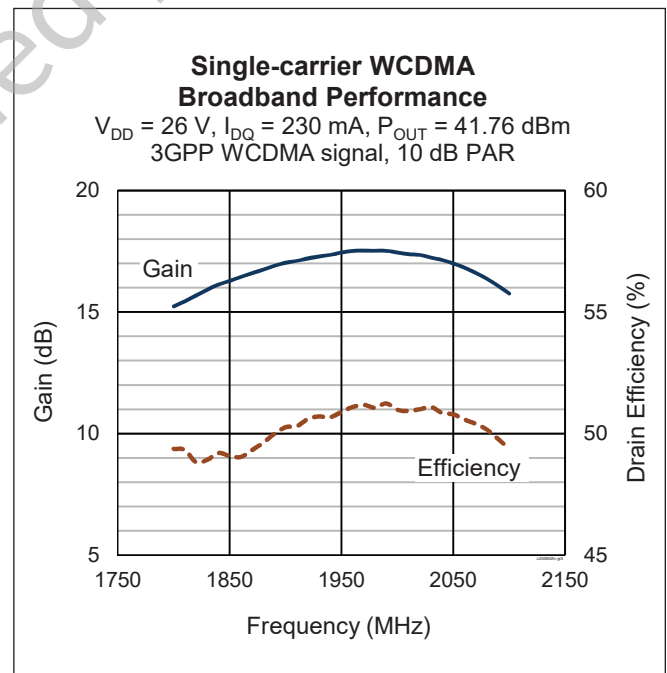
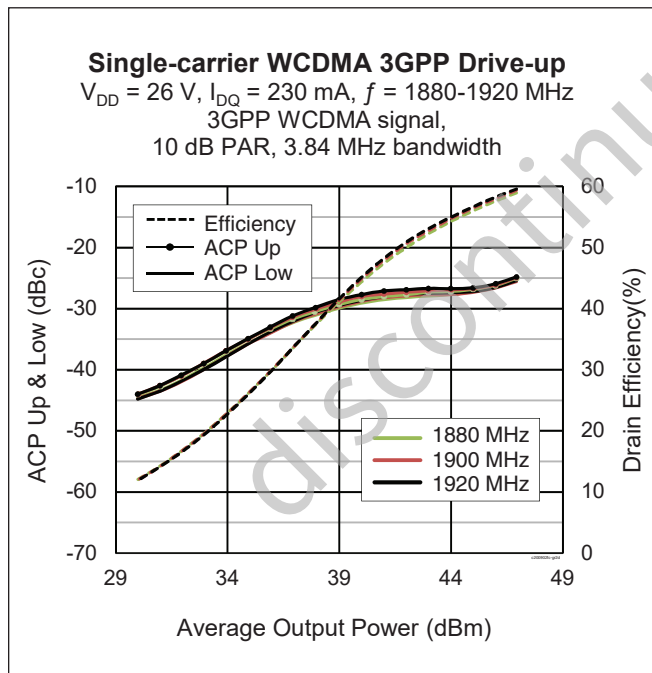
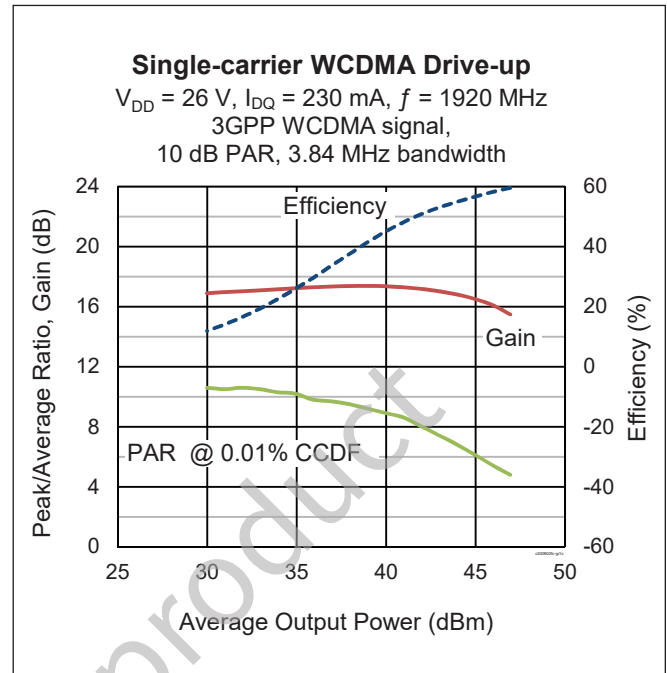
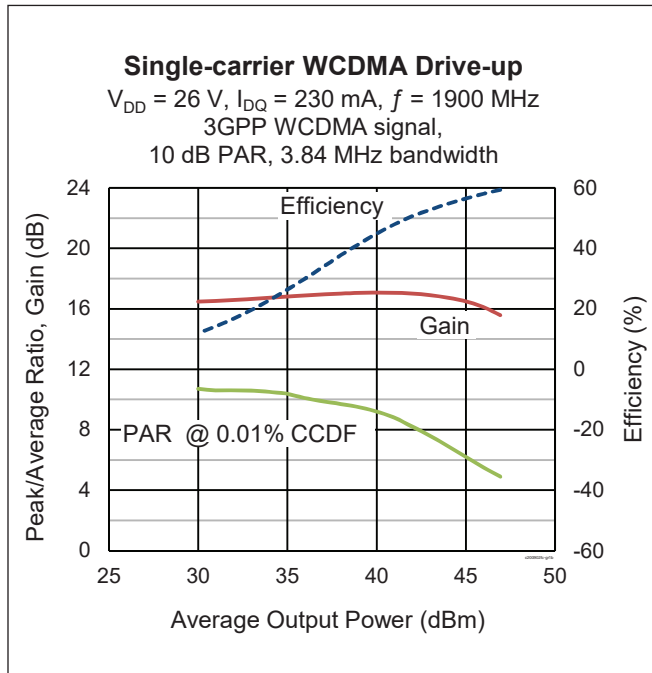
Maximum Ratings

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

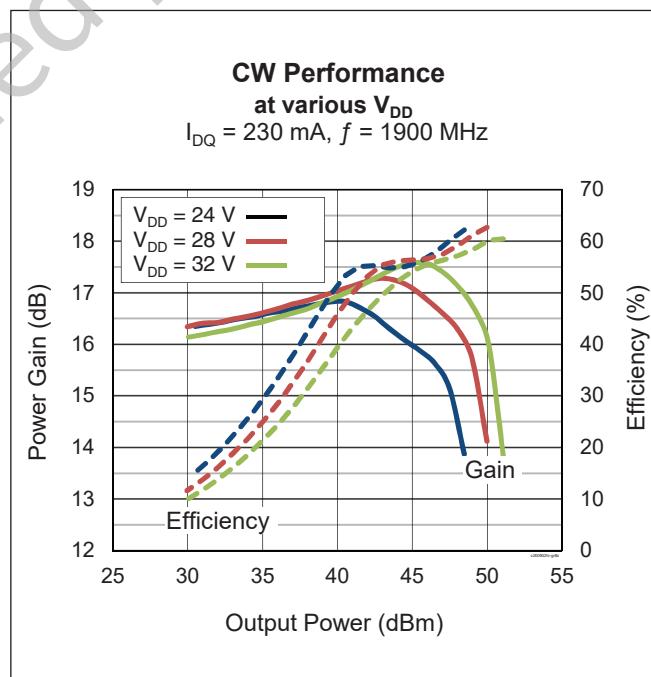
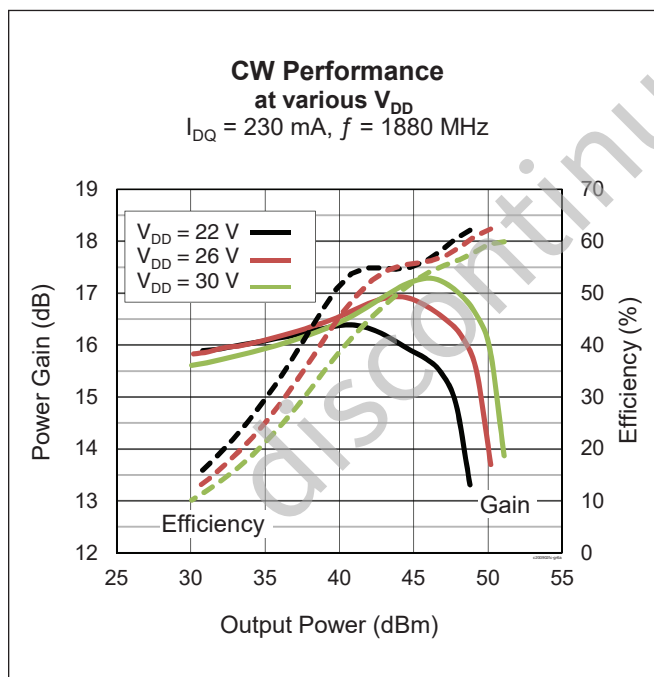
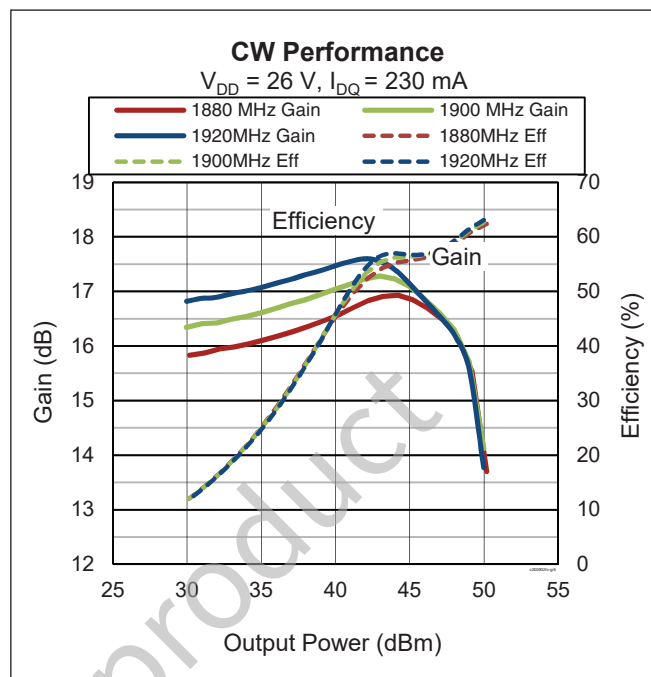
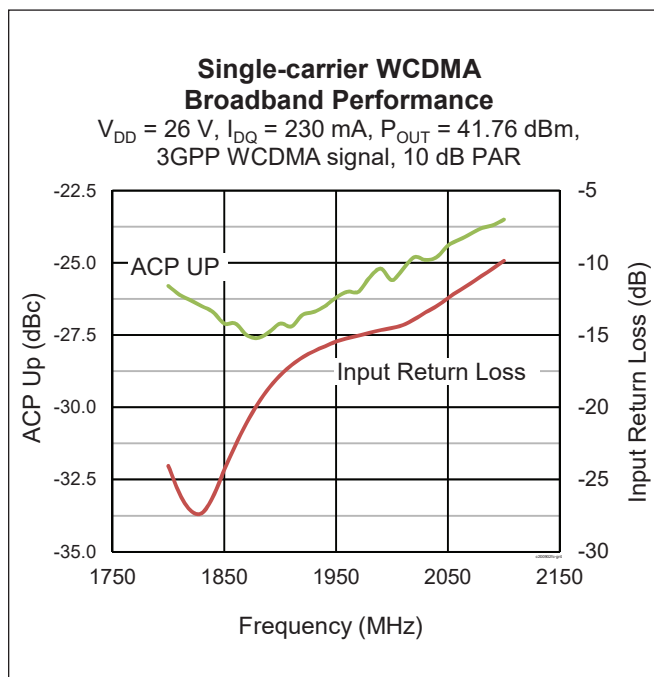
Ordering Information

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

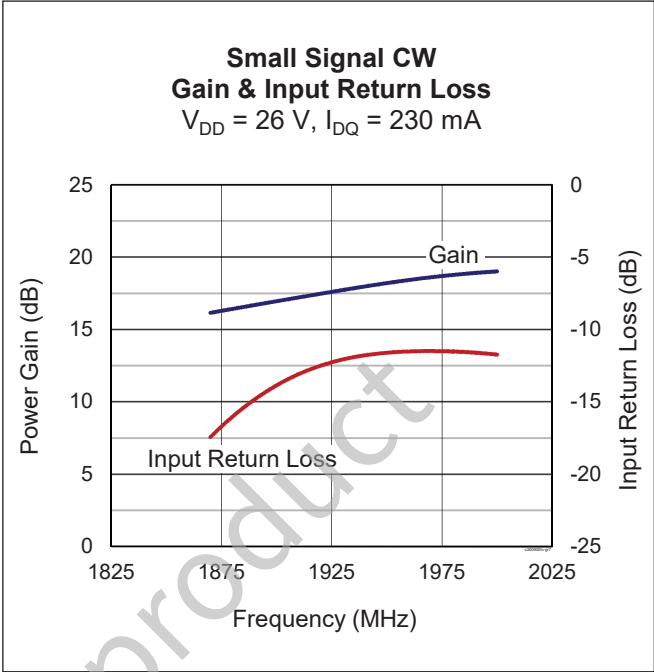
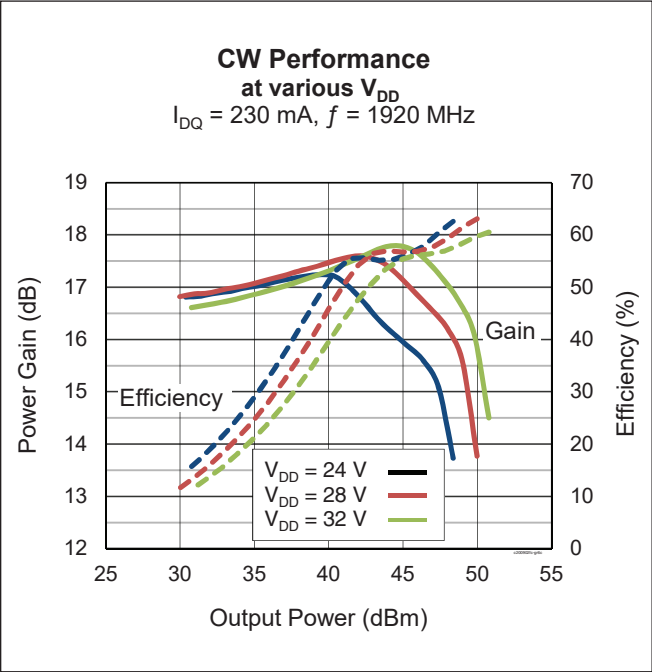
Typical Performance (data taken in a production Doherty test fixture)



Typical Performance (cont.)

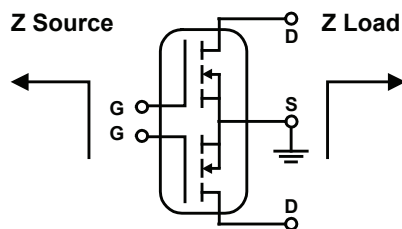


Typical Performance (cont.)



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

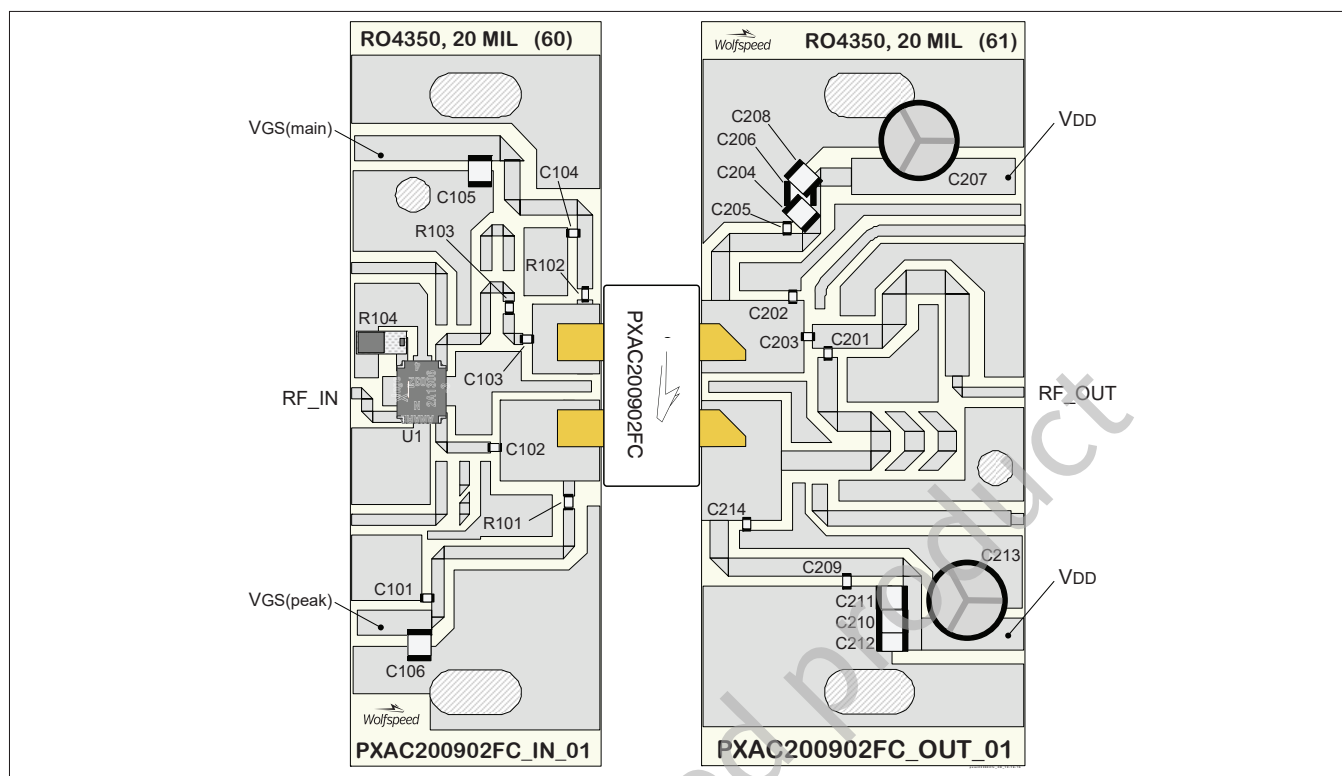
Class AB		P _{1dB}									
		Max Output Power					Max PAE				
Freq [MHz]	Z _s [Ω]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _l [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]
1880	3.46 – j8.04	3.21 – j6.17	19.3	48.4	69.2	56.8	3.21 – j6.17	22.3	45.96	39.4	68.6
1900	3.5 – j8.19	3.21 –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

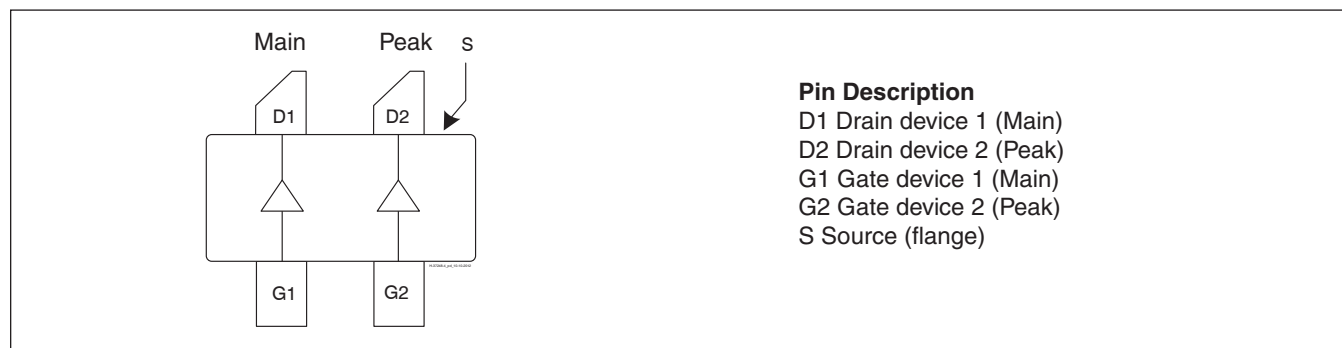
Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Components Information

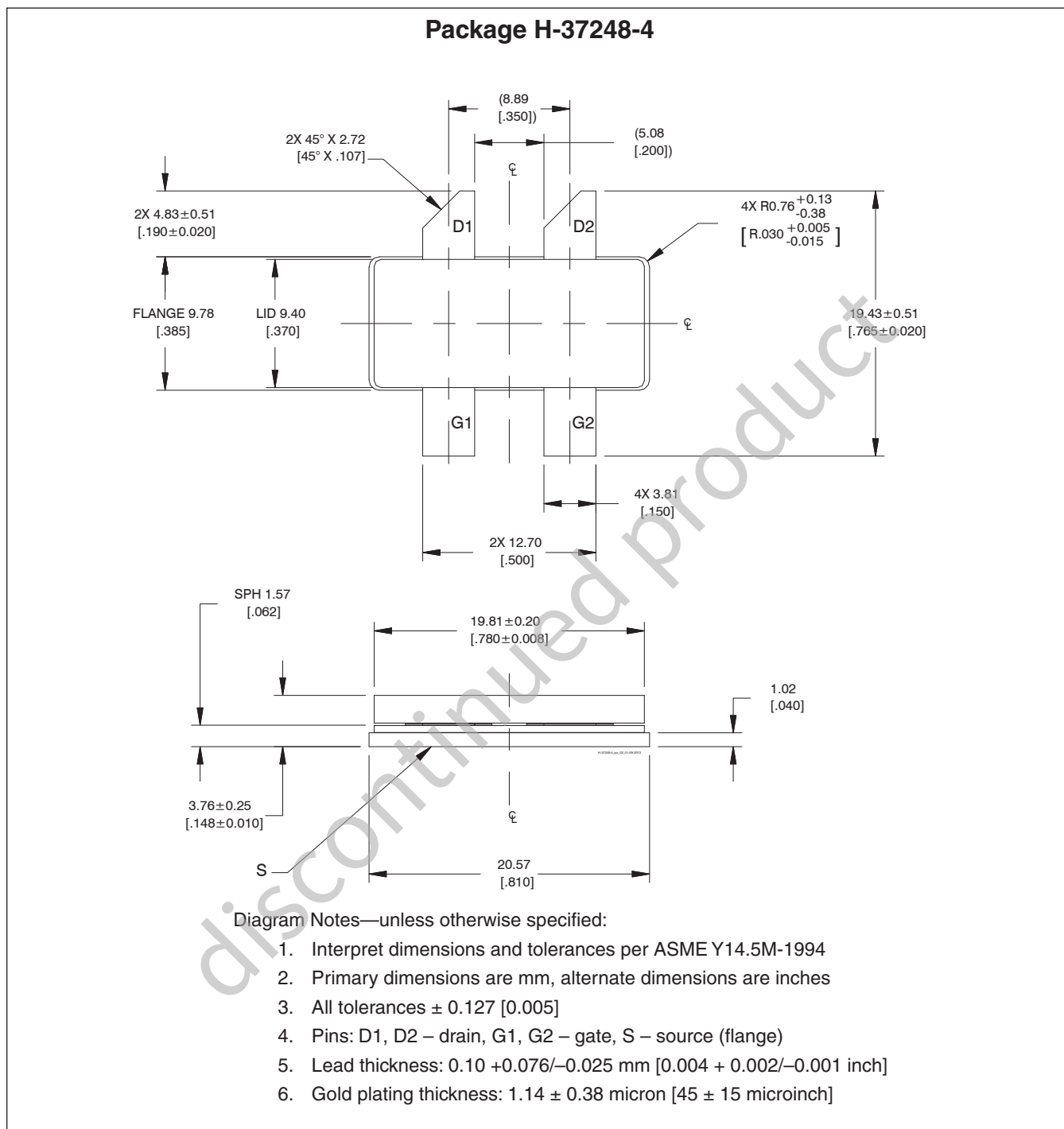
Component	Description	Manufacturer	P/N
In			
C101, C102, C104	Capacitor, 18 pF	ATC	ATC600F180JW250T
C103	Capacitor, 9.1 pF	ATC	ATC600F9R1JW250T
C105, C106	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
R101, R102	Resistor, 10 Ω	Panasonic	ERJ-8GEYJ100V
R103	Resistor, 5.6 Ω	Panasonic	ERJ-8RQJ5R6V
R104	Resistor, 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 μ F	Taiyo Yuden	UMK325C7106MM-T
C205, C209	Capacitor, 18 pF	ATC	ATC600F180JW250T
C207, C213	Capacitor, 220 μ F	Cornell Dubilier Electronics	SK221M050ST
C214	Capacitor, 1.6 pF	ATC	ATC600F1R6JW250T

Pinout Diagram (top view)

See next page for package outline specifications

discontinued product

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
04	2021-05-09	End of life	All	Product discontinued

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rfsales@cree.com

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