

# PXAC210552FC

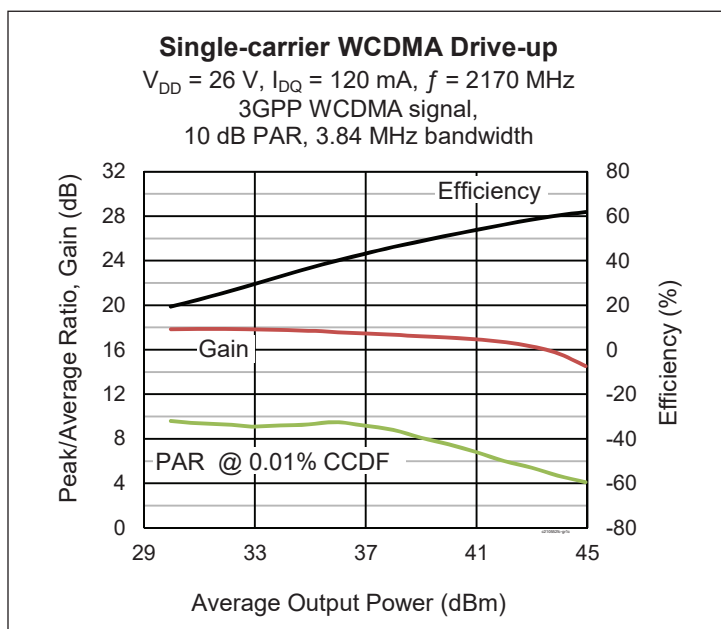
## Thermally-Enhanced High Power RF LDMOS FET 55 W, 28 V, 1805 – 2170 MHz

### Description

The PXAC210552FC is a 55-watt LDMOS FET with an asymmetric design for use in multi-standard cellular power amplifier applications in the 1805 to 2170 MHz frequency band. It features dual-path design, input and output matching, and a thermally-enhanced package with earless flange. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PXAC210552FC  
Package H-37248-4



### Features

- Broadband internal matching
- Asymmetric Doherty design
  - Main: P1dB = 20 W Typ
  - Peak: P1dB = 35 W Typ
- CW performance, 2170 MHz, 26 V
  - Output power at P<sub>1dB</sub> = 27 W
  - Gain = 17 dB
  - Efficiency = 59%
- Integrated ESD protection
- ESD: Human Body Model, Class 1B (per ANSI/ESDA/JEDEC JS-001)
- Capable of handling 10:1 VSWR @28 V, 55 W (CW) output power
- Low thermal resistance
- Pb-free and RoHS compliant

### RF Characteristics

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

$V_{DD} = 26\text{ V}$ ,  $V_{GS(peak)} = 1.5\text{ V}$ ,  $I_{DQ} = 120\text{ mA}$ ,  $P_{OUT} = 39\text{ dBm}$  average,  $f = 2170\text{ MHz}$ . 3GPP WCDMA signal: 3.84 MHz bandwidth, 10 dB PAR @0.01% CCDF.

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	$G_{ps}$	16	17.2	—	dB
Drain Efficiency	$\eta_D$	46	49	—	%
Adjacent Channel Power Ratio	ACPR	—	-29	-25	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 and 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	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	0.1	$\mu\text{A}$
On-state Resistance	(main) $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.38	—	$\Omega$
	(peak) $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.19	—	$\Omega$
Operating Gate Voltage	(main) $V_{DS} = 26\text{ V}, I_{DQ} = 120\text{ mA}$	$V_{GS}$	2.16	2.65	3.15	V
	(peak) $V_{DS} = 26\text{ V}, I_{DQ} = 0\text{ mA}$	$V_{GS}$	1.00	1.50	2.00	V

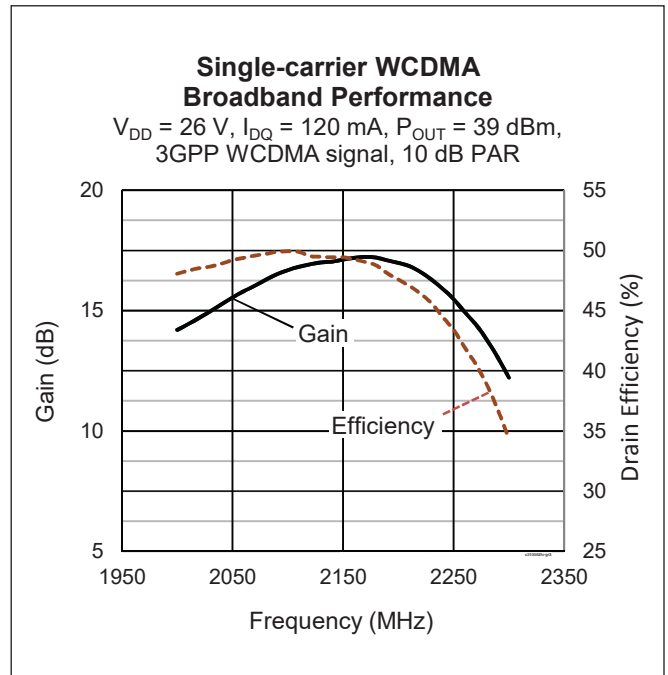
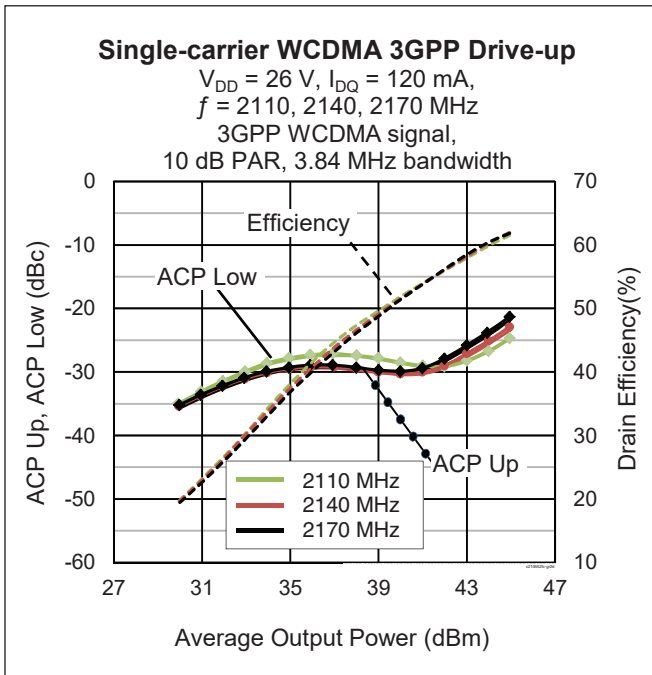
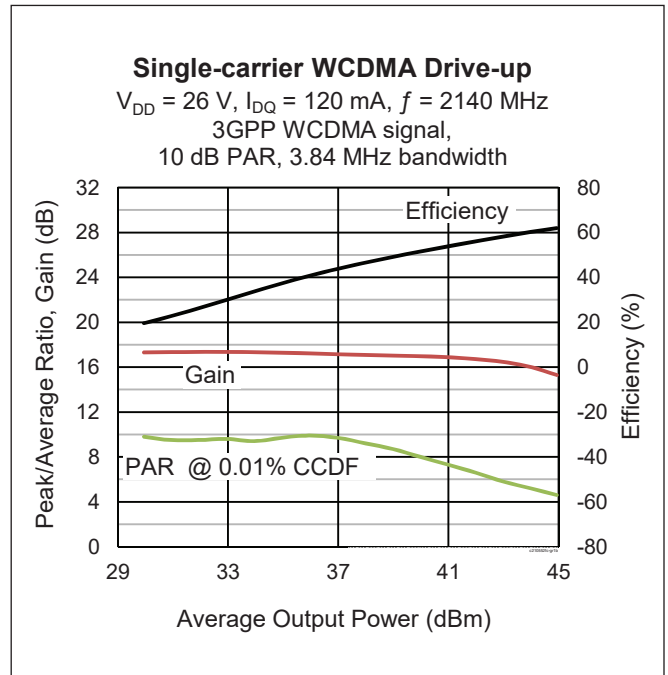
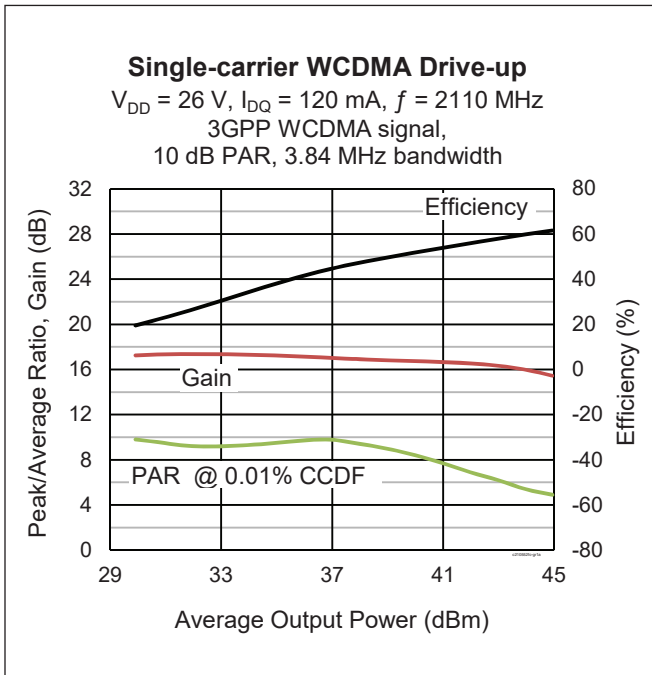
## Maximum Ratings

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 ( $T_{CASE} = 70^{\circ}\text{C}, 26\text{ V}, 8\text{ W CW}$ )	$R_{\theta JC}$	1.44	$^{\circ}\text{C/W}$

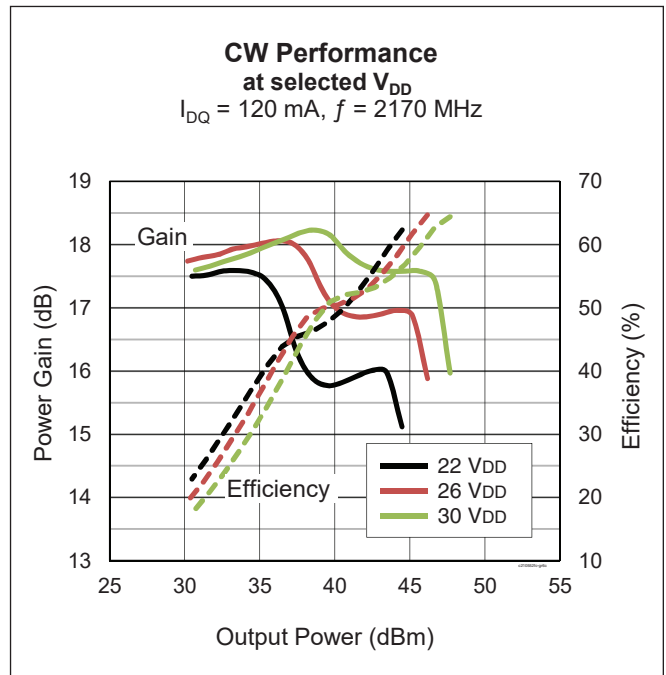
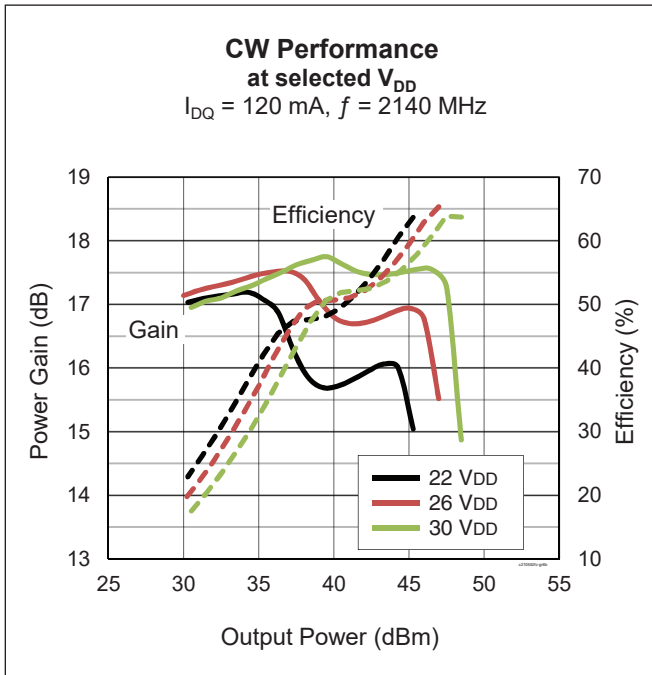
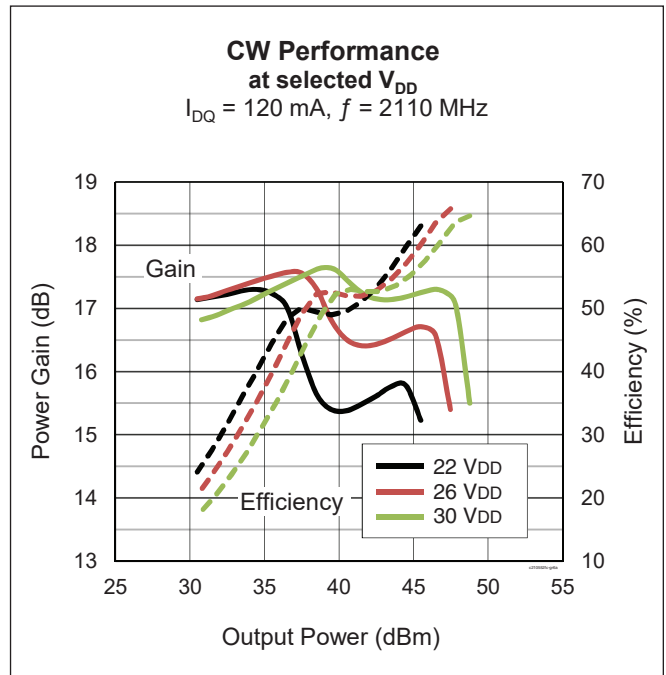
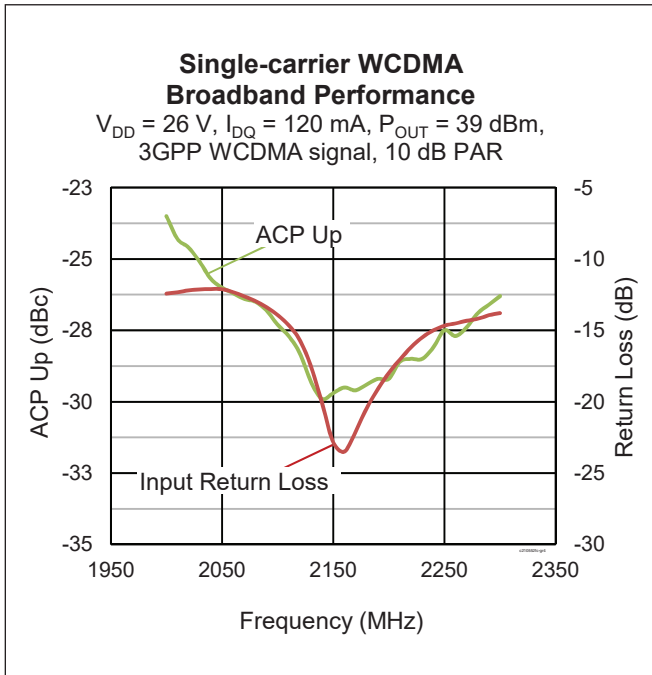
## Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PXAC210552FC V1 R0	PXAC210552FC-V1-R0	H-37248-4, ceramic open-cavity, earless	Tape & Reel, 50 pcs
PXAC210552FC V1 R2	PXAC210552FC-V1-R2	H-37248-4, ceramic open-cavity, earless	Tape & Reel, 250 pcs

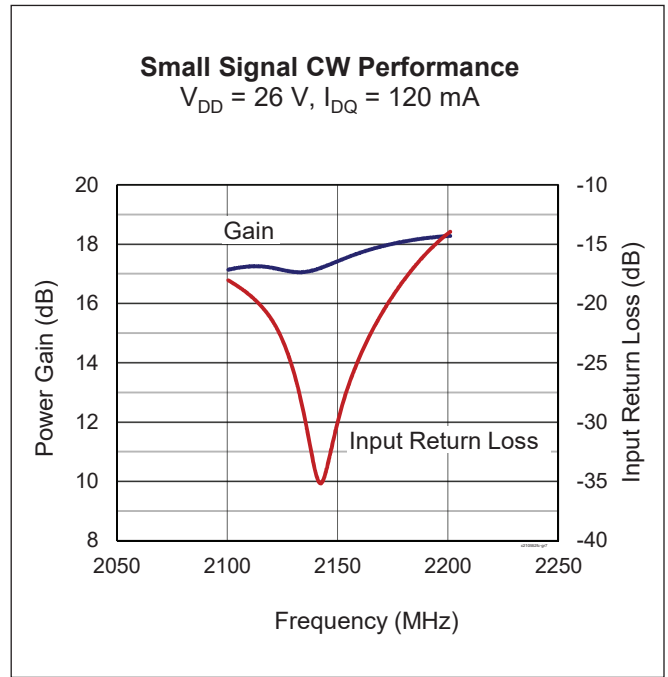
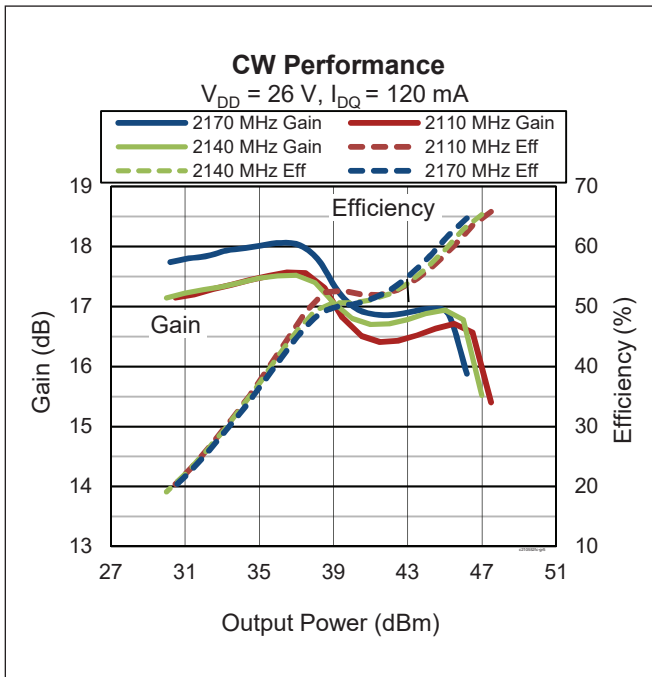
**Typical Performance** (data taken in Wolfspeed Doherty reference test fixture)



Typical Performance (cont.)



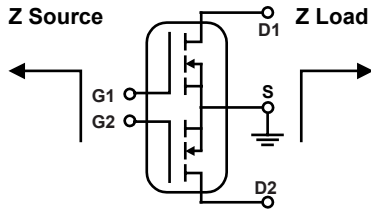
**Typical Performance** (cont.)



See next page for load pull information



### Load Pull Performance



Main side pulsed CW signal: 160  $\mu$ sec, 10% duty cycle,  $V_{DD} = 26$  V,  $I_{DQ} = 120$  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 [%]
2110	19.70 – j30.49	11.34 – j3.06	20.9	43.74	23.7	59.4	11.02 – j3.49	22.3	42.70	18.6	66.0
2140	17.03 – j36.14	9.73 – j2.15	20.9	43.48	22.3	58.6	9.78 – j3.58	22.9	42.26	16.8	64.6
2170	34.36 – j32.08	10.27 – j2.68	20.8	43.71	23.5	58.4	9.47 – j3.32	22.5	42.53	17.9	64.6

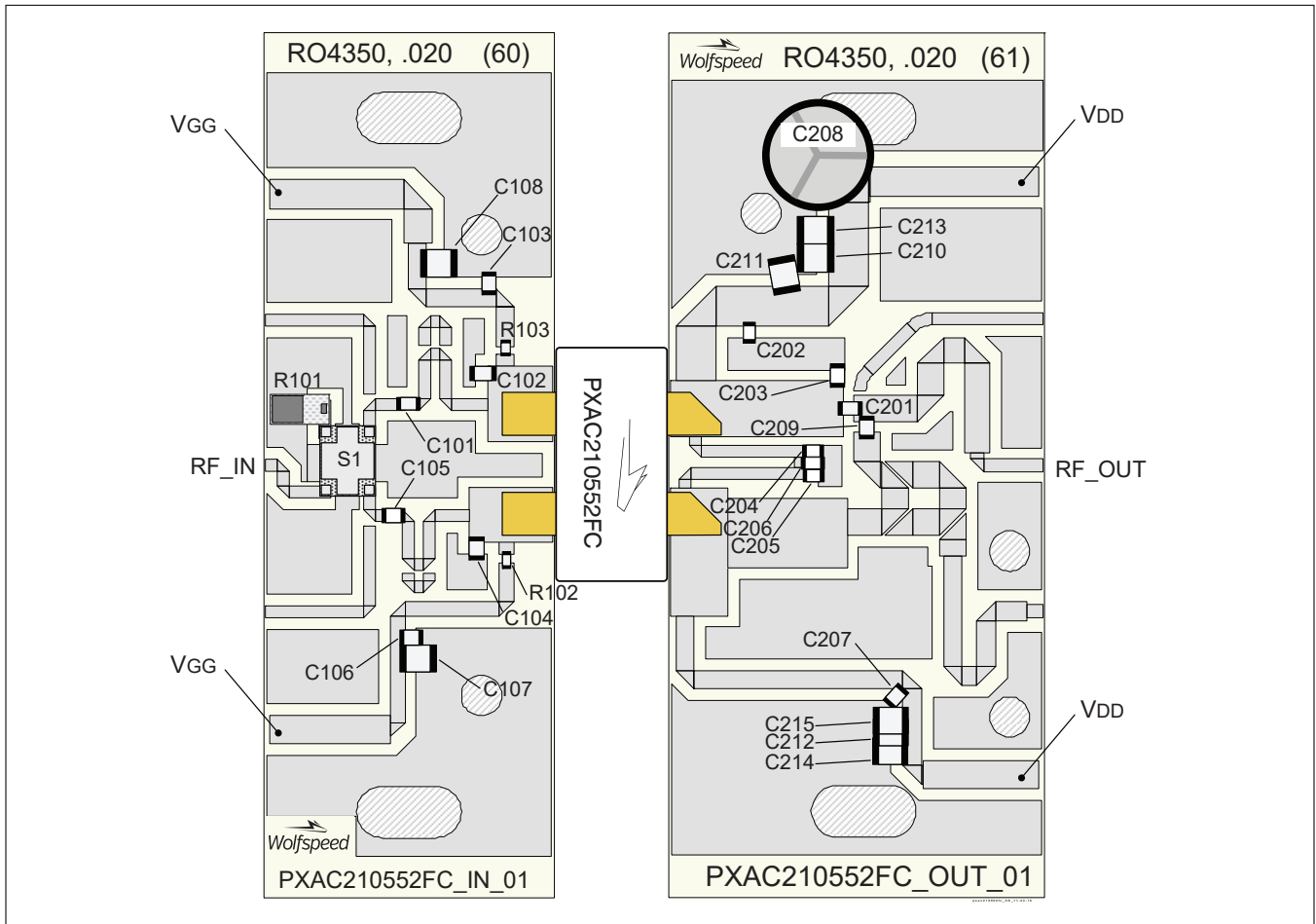
Peak side pulsed CW signal: 160  $\mu$ sec, 10% duty cycle,  $V_{DD} = 26$  V,  $V_{GS(peak)} = 1.5$  V

Class C		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 [%]
2110	9.80 – j12.90	3.28 – j4.71	15.5	47.56	57.0	60.7	4.00 – j1.52	16.5	45.6	36.3	71.8
2140	10.71 – j17.59	3.51 – j5.03	16.0	47.50	56.2	60.7	3.88 – j1.93	17.0	45.9	38.7	71.3
2170	15.51 – j13.51	3.58 – j5.14	15.6	47.53	56.6	60.0	3.69 – j1.47	16.6	45.4	34.9	70.9

### Reference Circuit, tuned for 2110 – 2170 MHz

DUT	PXAC210552FC
Test Fixture Part No.	LTA/PXAC210552FC V1
PCB	Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$
Find Gerber files for this reference fixture on the Wolfspeed Web site at <a href="http://www.wolfspeed.com/RF">www.wolfspeed.com/RF</a>	

**Reference Circuit** (cont.)



Reference circuit assembly diagram (not to scale)

**Component Information**

Component	Description	Manufacturer	P/N
<b>Input</b>			
C101, C103, C105, C106	Capacitor, 18 pF	ATC	ATC600F180GW250T
C102	Capacitor, 0.5 pF	ATC	ATC600F0R5CW250T
C104	Capacitor, 0.8 pF	ATC	ATC600F0R8CW250T
C107, C108	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
R101	Termination, 50 ohms	Anaren	C8A50Z4A
R102, R103	Resistor, 10 ohms	Panasonic	ERJ-3GEYJ100V
U1	Hybrid coupler	Anaren	X3C21P1-03S

*table continued next page*

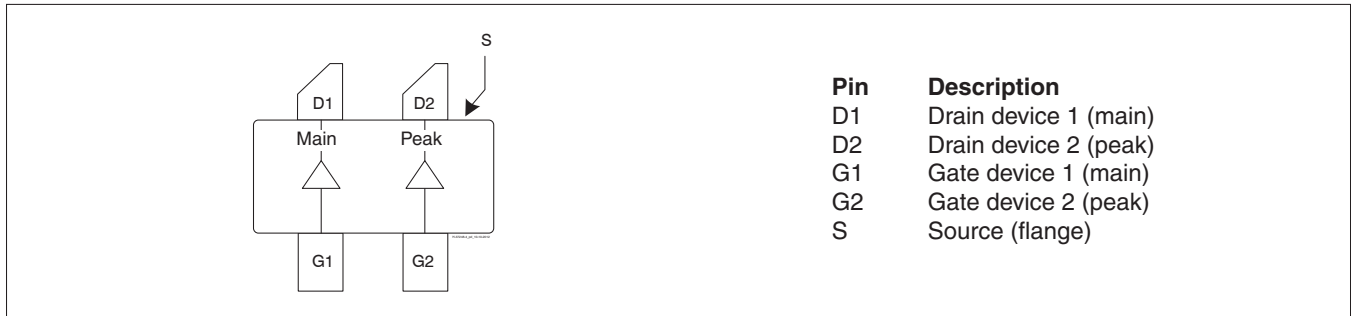


**Reference Circuit** (cont.)

**Component Information** (cont.)

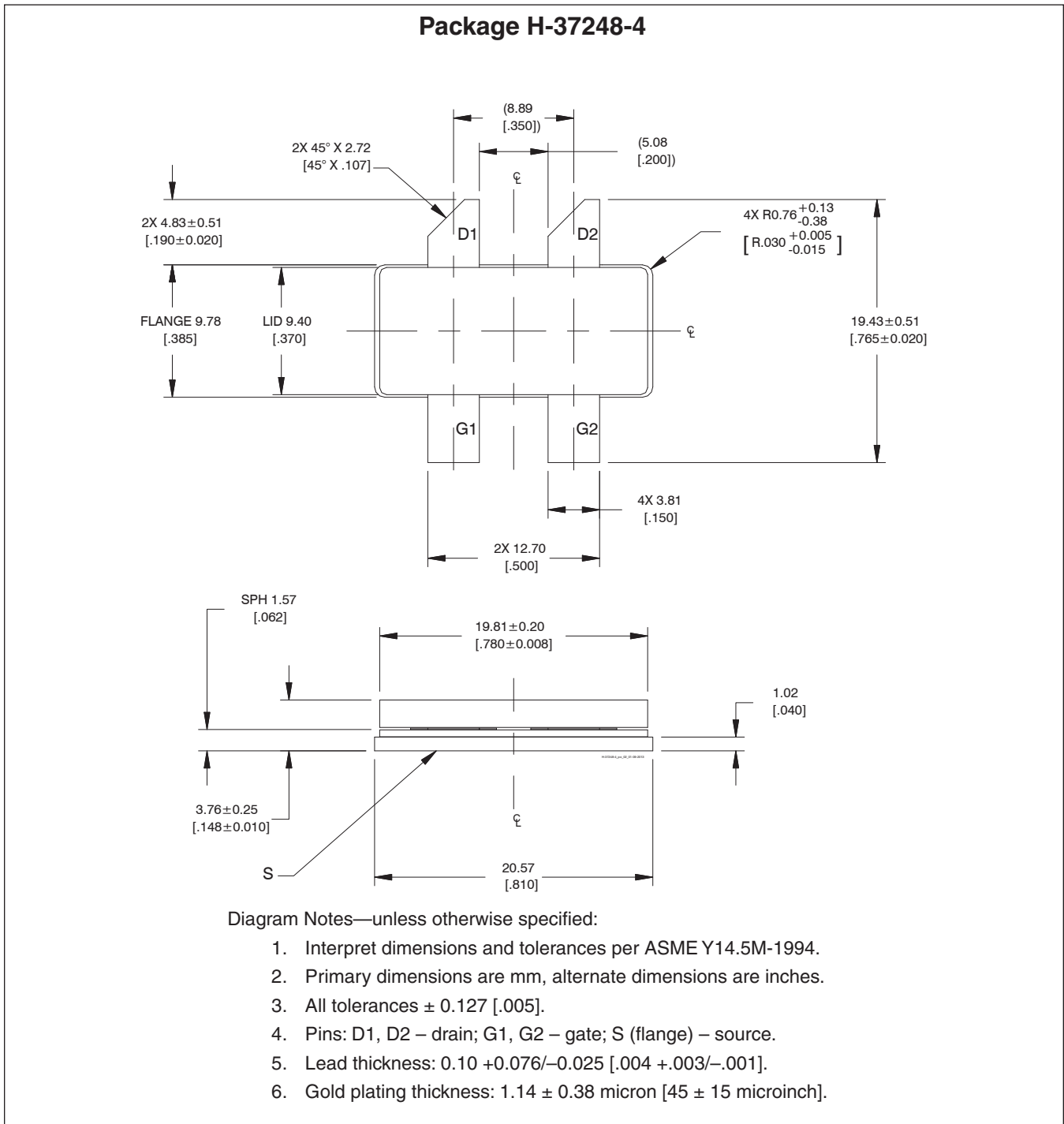
Component	Description	Manufacturer	P/N
<b>Output</b>			
C201	Capacitor, 5.1 pF	ATC	ATC600F5R1BW250T
C202, C204, C205, C207, C209	Capacitor, 18 pF	ATC	ATC600F180GW250T
C203	Capacitor, 0.8 pF	ATC	ATC600F0R8CW250T
C206	Capacitor, 0.1 μF	Panasonic	ECJ-3VB1H104K
C208	Capacitor, 220 μF	Cornell Dubilier Electronics (CDE)	SK221M050ST
C210, C211, C212 C213, C214, C215	Capacitor, 10 μF	Taiyo Yuden	UMK325C7106MM-T

**Pinout Diagram** (top view)





Package Outline Specifications



## Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2015-03-02	Advance	All	Proposed specification for new product development.
02	2015-12-04	Production	All	Information for production-released product, including firm specifications, operating performance, and reference circuit specifications.
03	2018-07-02	Production	All	Converted to Wolfspeed Data Sheet

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## Notes

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