

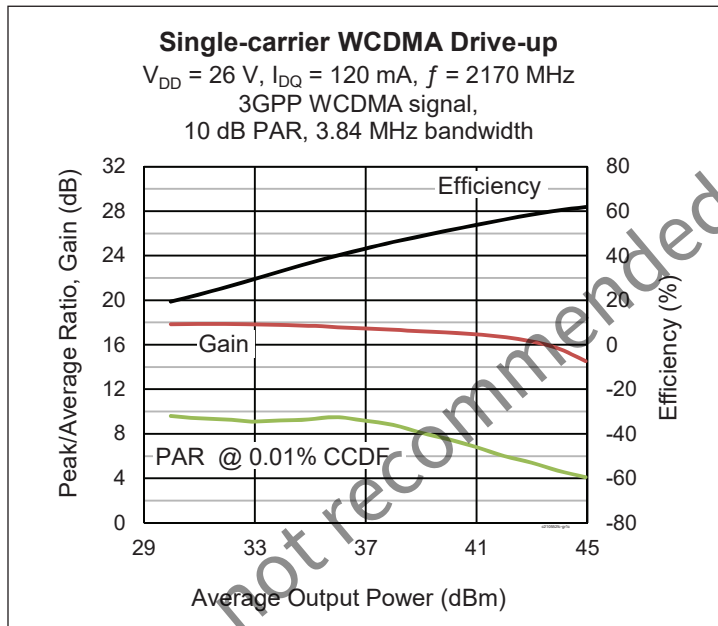
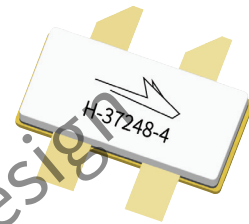
PXAC210552FC

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 P1dB = 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	η_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

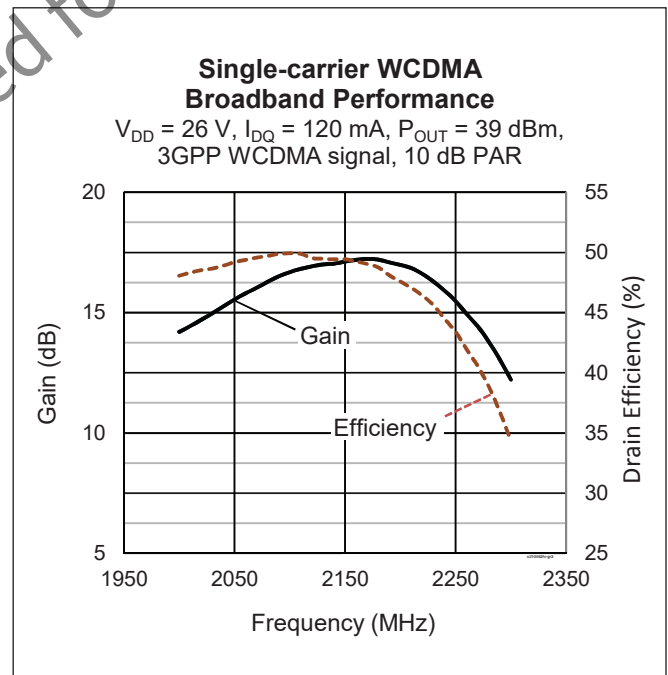
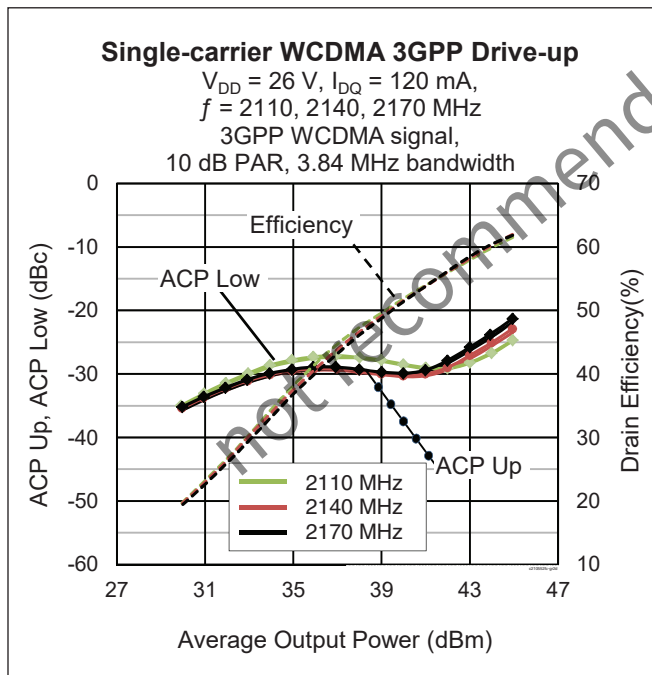
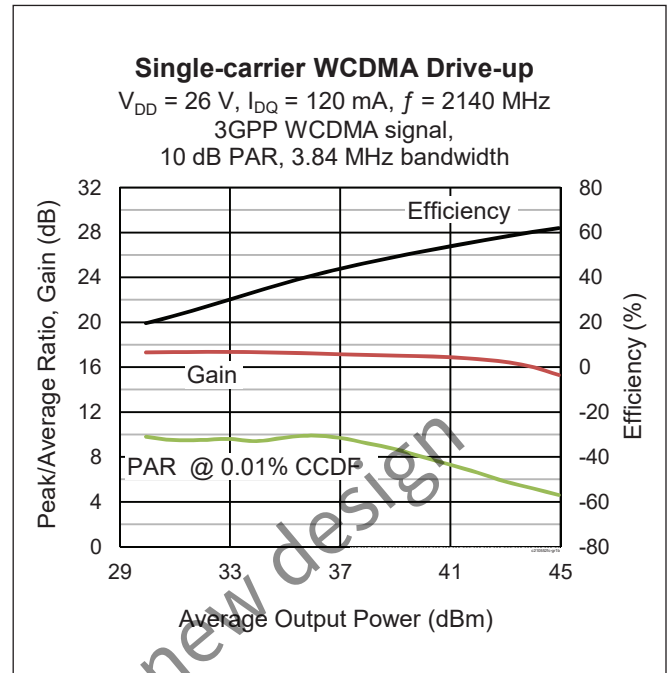
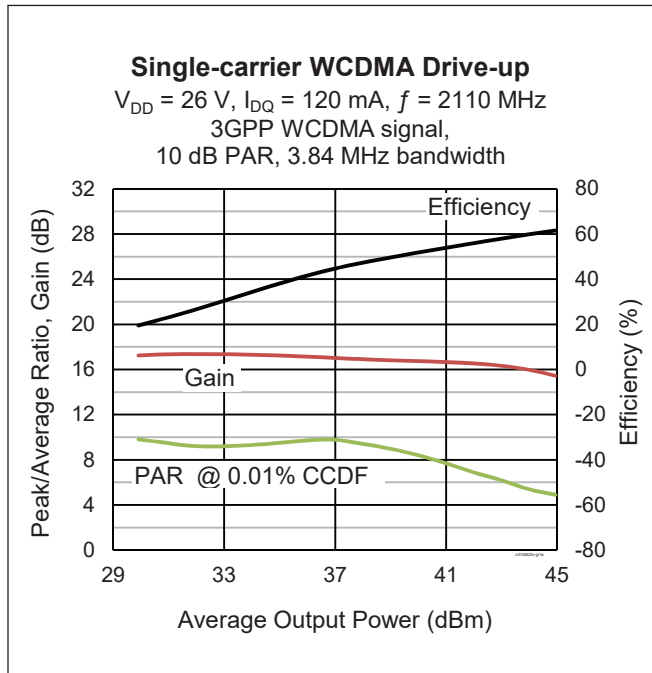
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current (main and peak)	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	0.1	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	0.1	μA
On-state Resistance	(main) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.38	—	Ω
	(peak) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.19	—	Ω
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

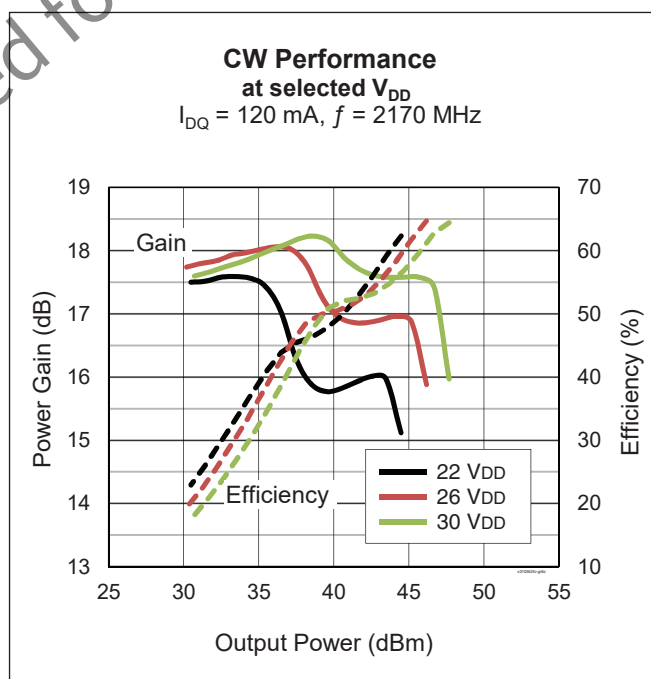
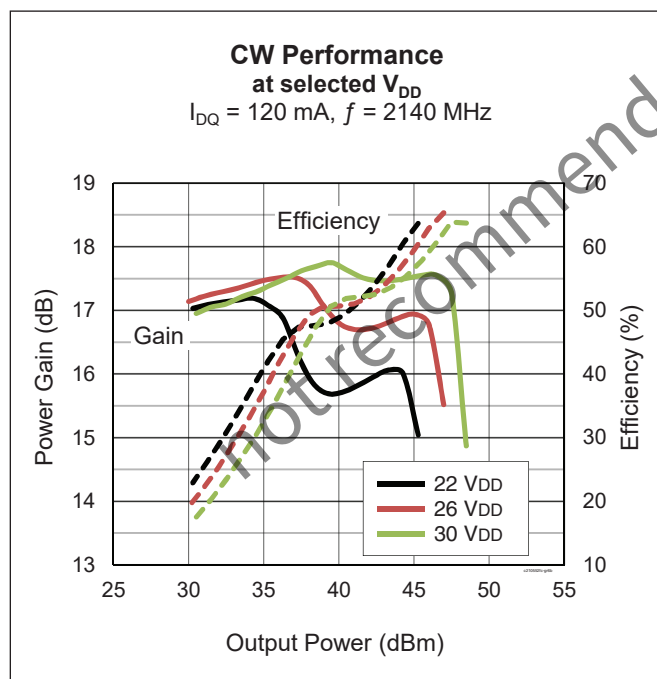
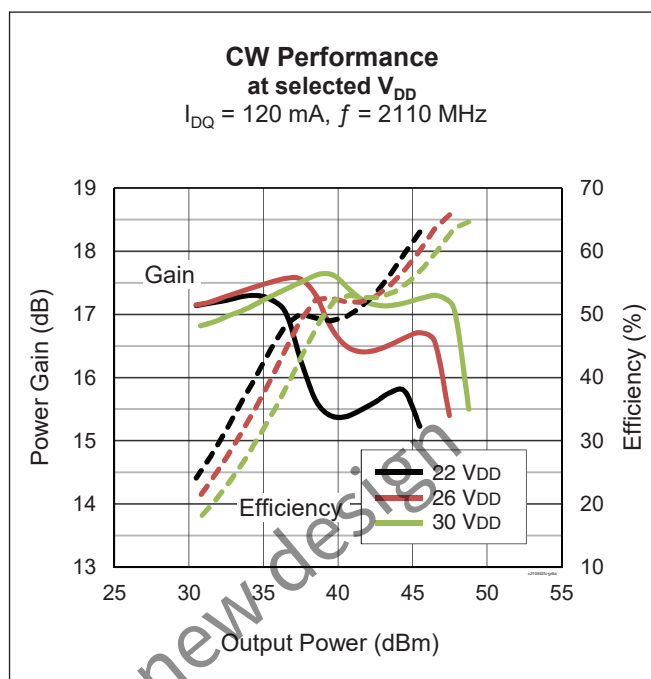
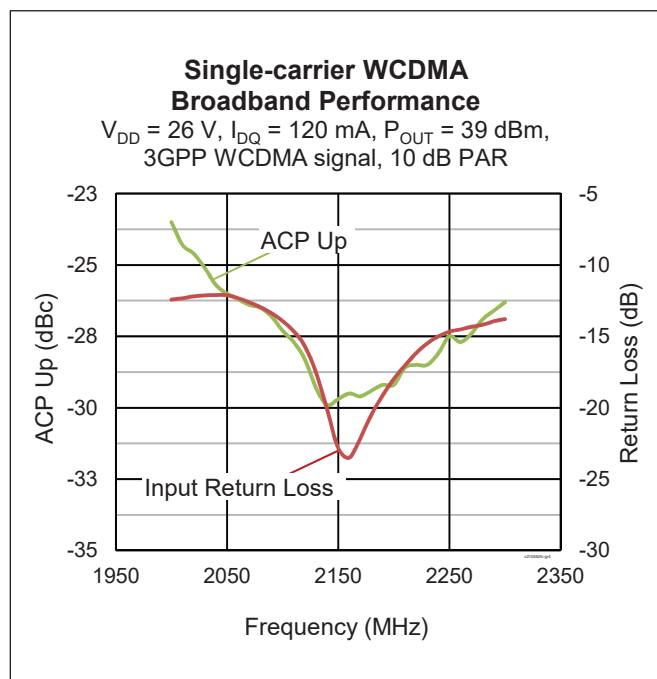
Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	65	V
Gate-source Voltage	V_{GS}	−6 to +10	V
Operating Voltage	V_{DD}	0 to +32	V
Junction Temperature	T_J	225	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	−65 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 26 V, 8 W CW)	$R_{\theta JC}$	1.44	$^{\circ}\text{C/W}$

Ordering Information

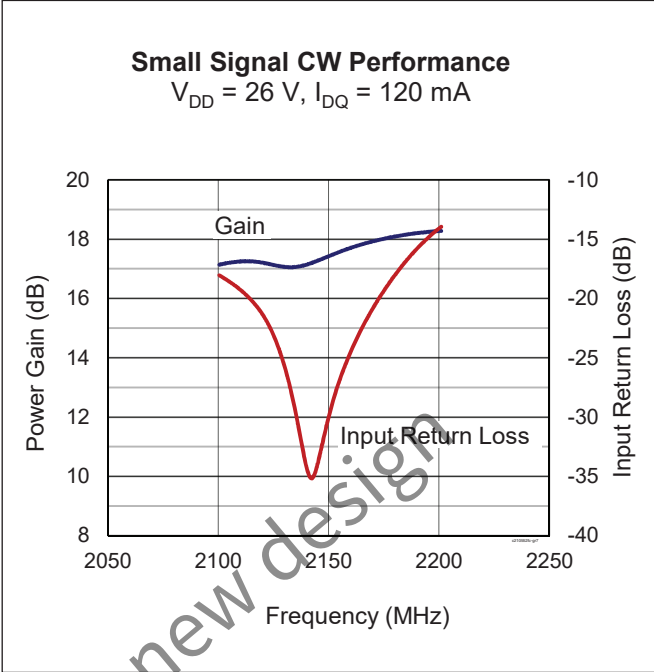
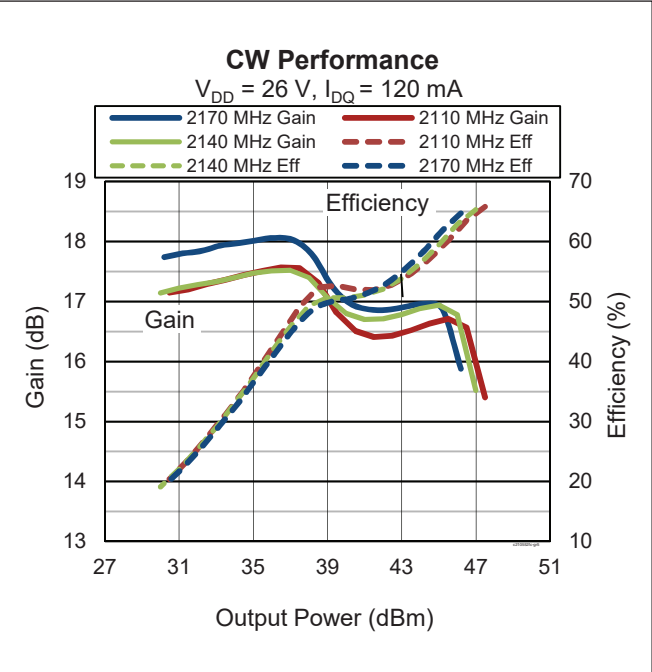
Type and Version	Order Code	Package and Description	Shipping
PXAC210552FC V1 R0	PXAC210552FC-V1-R0	H-37248-4, ceramic open-cavity, earless	Tape & Reel, 50 pcs
PXAC210552FC V1 R2	PXAC210552FC-V1-R2	H-37248-4, ceramic open-cavity, earless	Tape & Reel, 250 pcs

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


Typical Performance (cont.)

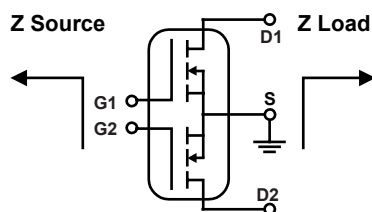


Typical Performance (cont.)



See next page for load pull information

Load Pull Performance



Main side pulsed CW signal: 160 μ sec, 10% duty cycle, $V_{DD} = 26$ V, $I_{DQ} = 120$ 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 [%]
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

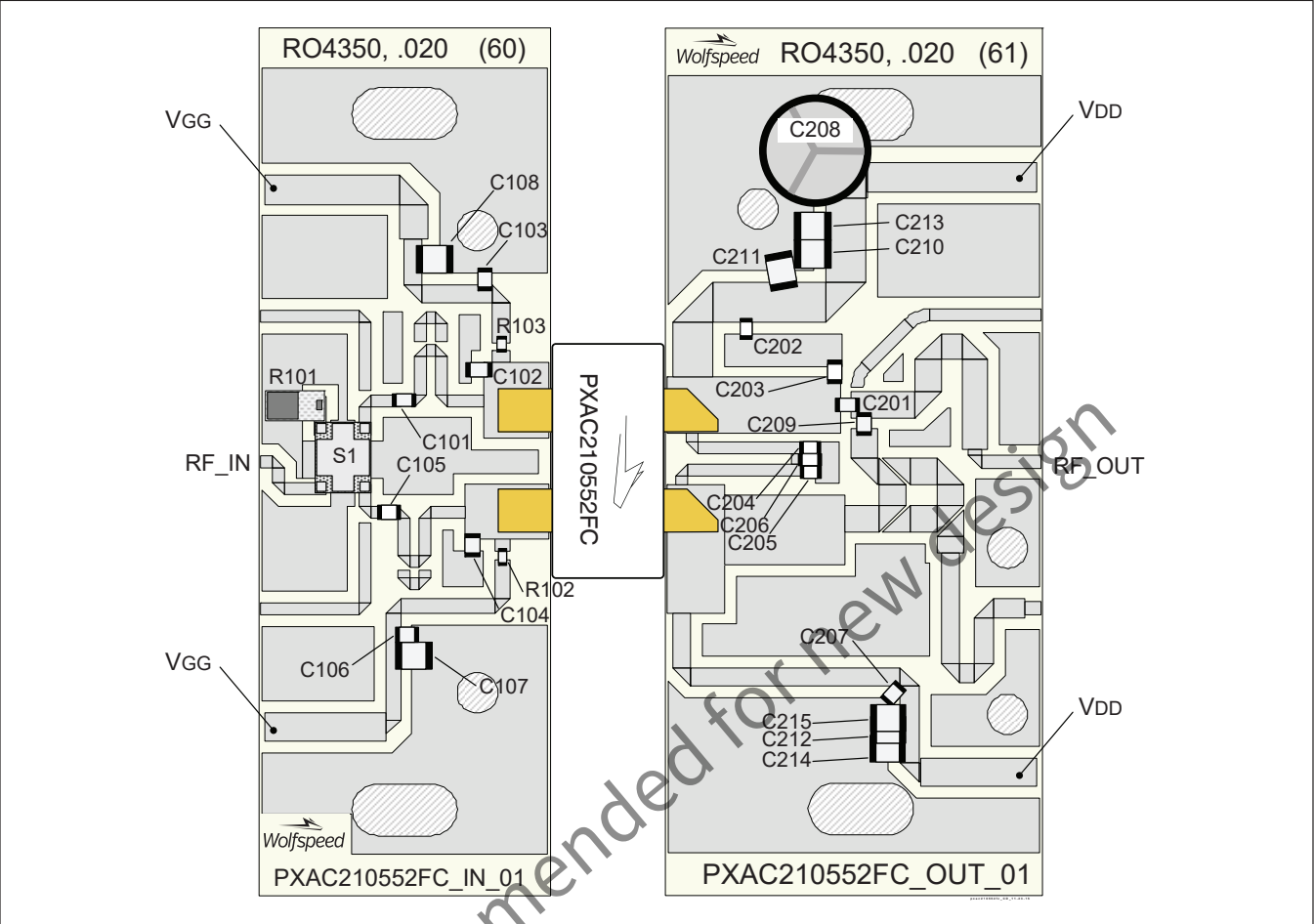
Peak side pulsed CW signal: 160 μ sec, 10% duty cycle, $V_{DD} = 26$ V, $V_{GS(peak)} = 1.5$ V

Class C		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 [%]
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 www.wolfspeed.com/Rf	

Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Component Information

Component	Description	Manufacturer	P/N
Input			
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 μ 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
Output			
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

Package H-37248-4

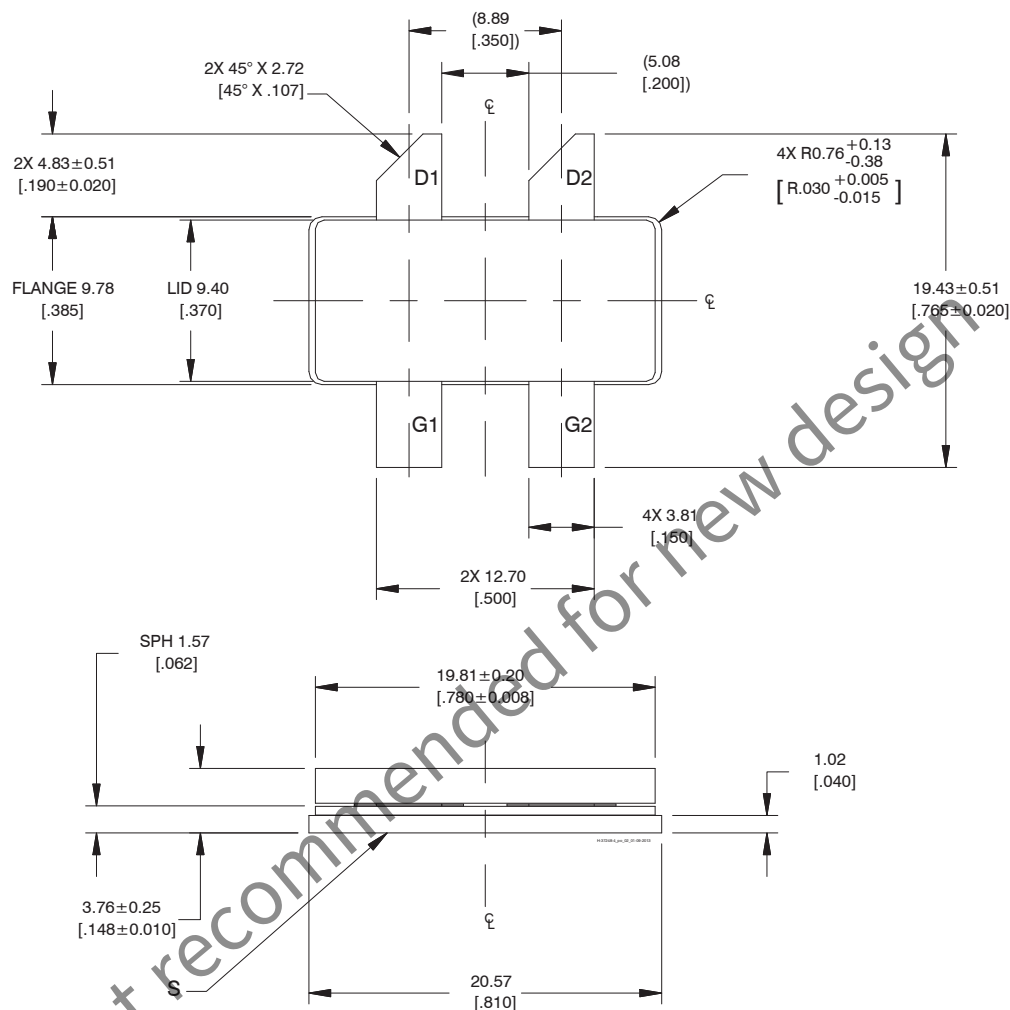


Diagram Notes—unless otherwise specified:

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].
4. Pins: D1, D2 – drain; G1, G2 – gate; S (flange) – source.
5. Lead thickness: 0.10 +0.076/–0.025 [.004 +.003/–.001].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

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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