

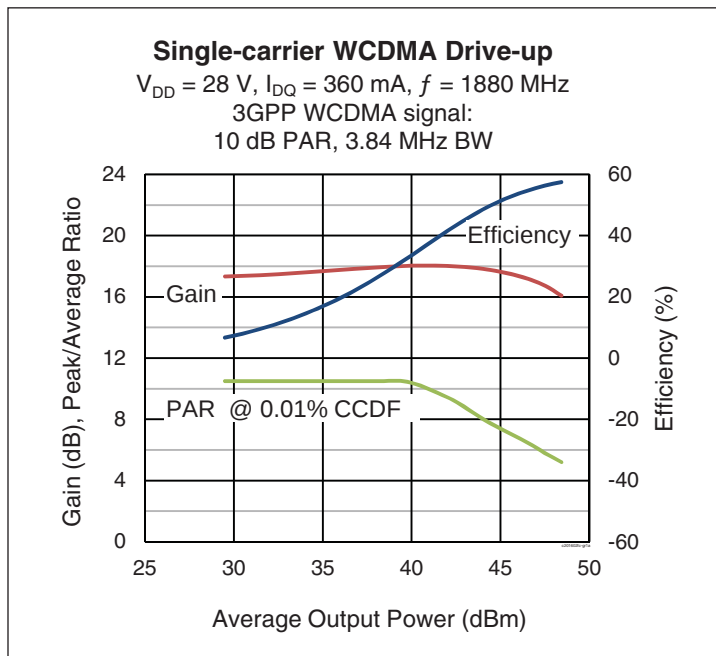
Thermally-Enhanced High Power RF LDMOS FET 140 W, 28 V, 1880 – 1920 MHz, 2010 – 2025 MHz

Description

The PXAC201602FC is a 140-watt LDMOS FET for use in multi-standard cellular power amplifier applications in the 1880 to 1920 MHz and 2010 to 2025 MHz frequency bands. Its asymmetric and dual-path design make it ideal for Doherty amplifier designs. It features input and output matching, and a thermally-enhanced package with earless flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PXAC201602FC
Package H-37248-4



Features

- Asymmetric Doherty design
 - Main: 55 W Typ (P_{1dB})
 - Peak: 85 W Typ (P_{1dB})
- Broadband internal matching
- Pulsed CW performance, 1960 MHz, 28 V
 - Output power at $P_{1dB} = 100\text{ W}$
 - Gain = 18 dB
 - Efficiency = 55%
- 1-carrier WCDMA performance, 1900 MHz, 28 V
 - Average output power = 43.5 dBm
 - Gain = 18.5 dB
 - Efficiency = 49%
- Capable of handling 10:1 VSWR @ 28 V, 140 W (CW) output power
- Integrated ESD protection, Human Body Model Class 1C (per JESD22-A114)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Specifications

Single-carrier WCDMA Characteristics (tested in Infineon Doherty test fixture)

$V_{DD} = 28\text{ V}$, $V_{GSPK(main)} = 2.71\text{ V}$, $I_{DQ} = 247\text{ mA}$, $P_{OUT} = 22.4\text{ W}$ average, $f = 2025\text{ MHz}$. 3GPP WCDMA signal: 3.84 MHz bandwidth, 10 dB PAR @ 0.01% CCDF.

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	16	17.7	—	dB
Drain Efficiency	η_D	41	44	—	%
Adjacent Channel Power Ratio	ACPR	—	-28	-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	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA
On-state Resistance	(main) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.175	—	Ω
	(peak) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.175	—	Ω
Operating Gate Voltage	(main) $V_{DS} = 28\text{ V}$, $I_{DQ} = 360\text{ mA}$	V_{GS}	2.5	2.71	2.8	V
	(peak) $V_{DS} = 1.2\text{ V}$, $I_{DQ} = 0\text{ A}$	V_{GS}	0.9	1.2	1.5	V

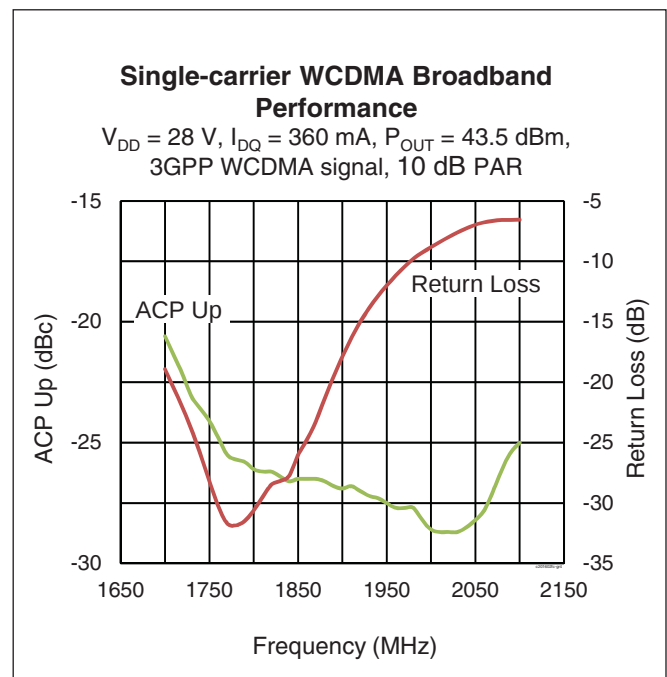
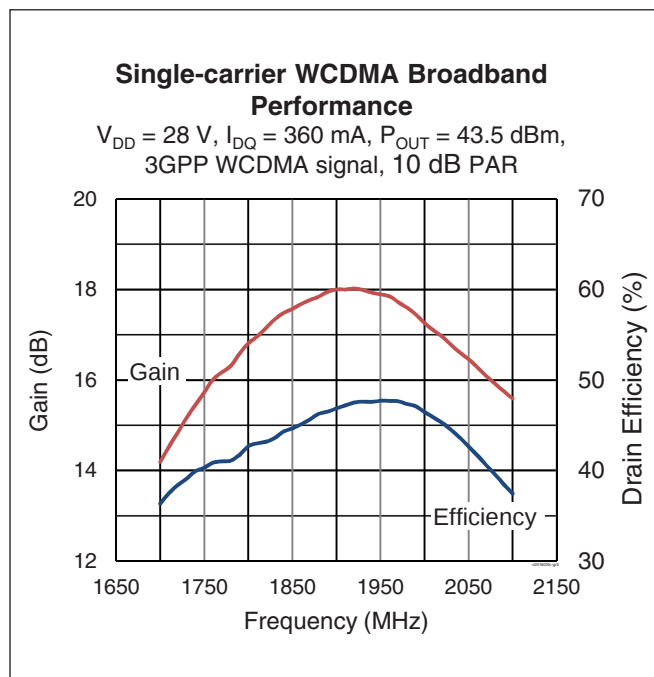
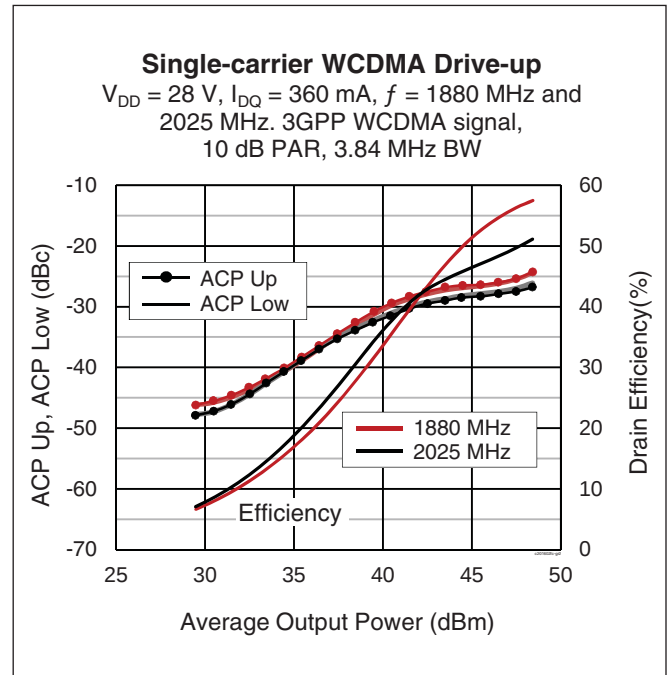
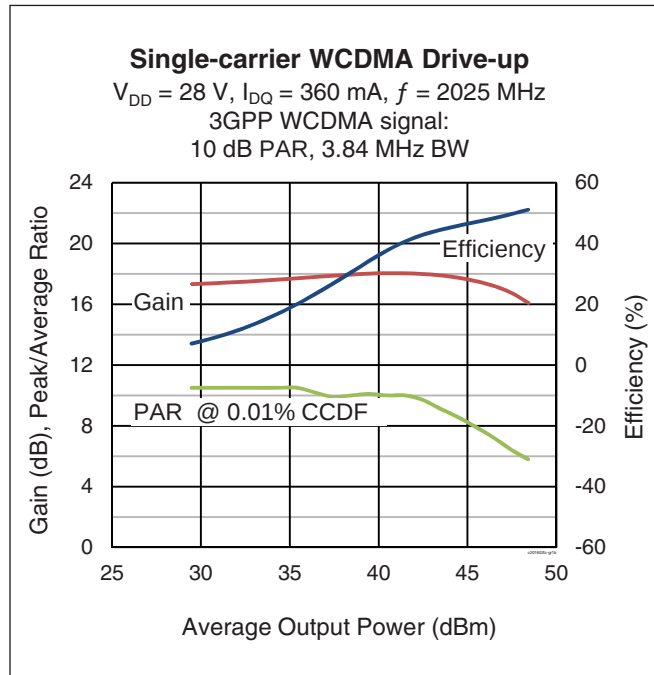
Maximum Ratings

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 (Doherty, $T_{CASE} = 70^{\circ}\text{C}$, 100 W CW)	$R_{\theta JC}$	0.48	$^{\circ}\text{C/W}$

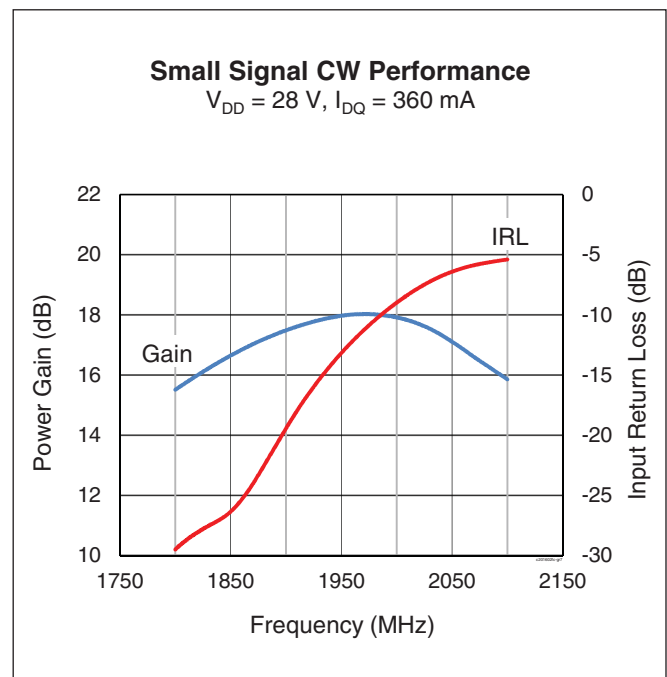
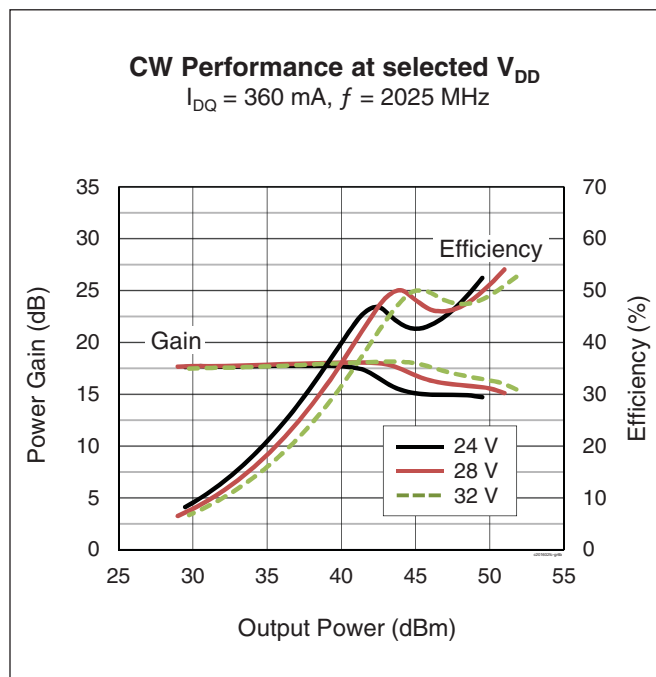
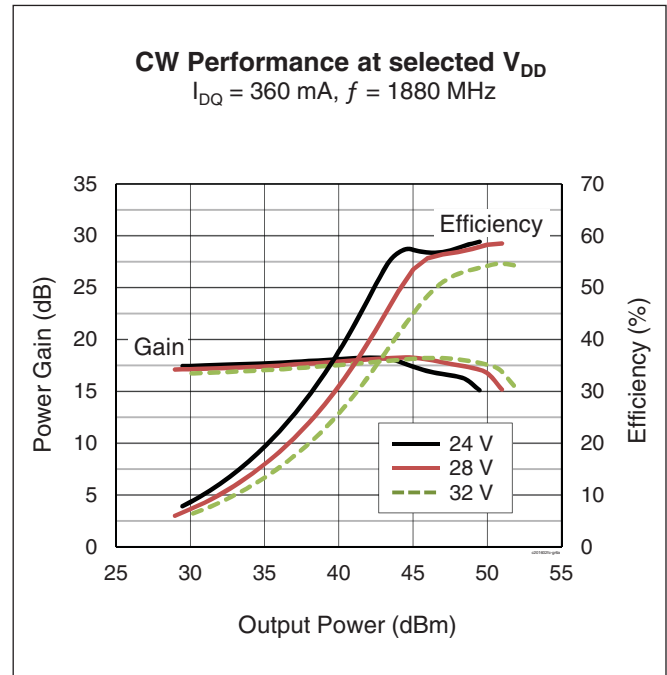
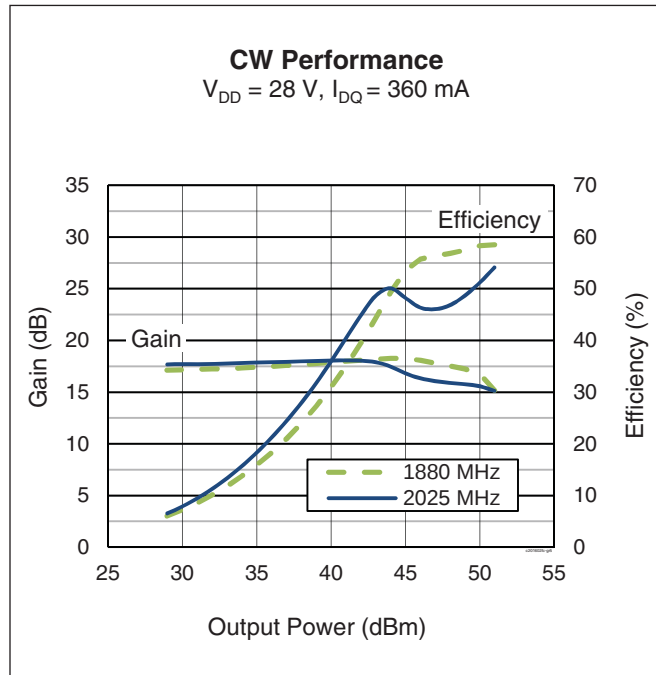
Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PXAC201602FC V1	PXAC201602FCV1XWSA1	H-37248-4, ceramic open-cavity, earless	Tray
PXAC201602FC V1 R250	PXAC201602FCV1R250XTMA1	H-37248-4, ceramic open-cavity, earless	Tape & Reel, 250 pcs

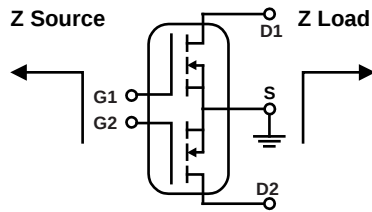
Typical Performance (data taken in a reference test fixture)



Typical Performance (cont.)



Load Pull Performance



Main side pulsed CW signal: 160 μ sec, 10% duty cycle; 28 V, 360 mA

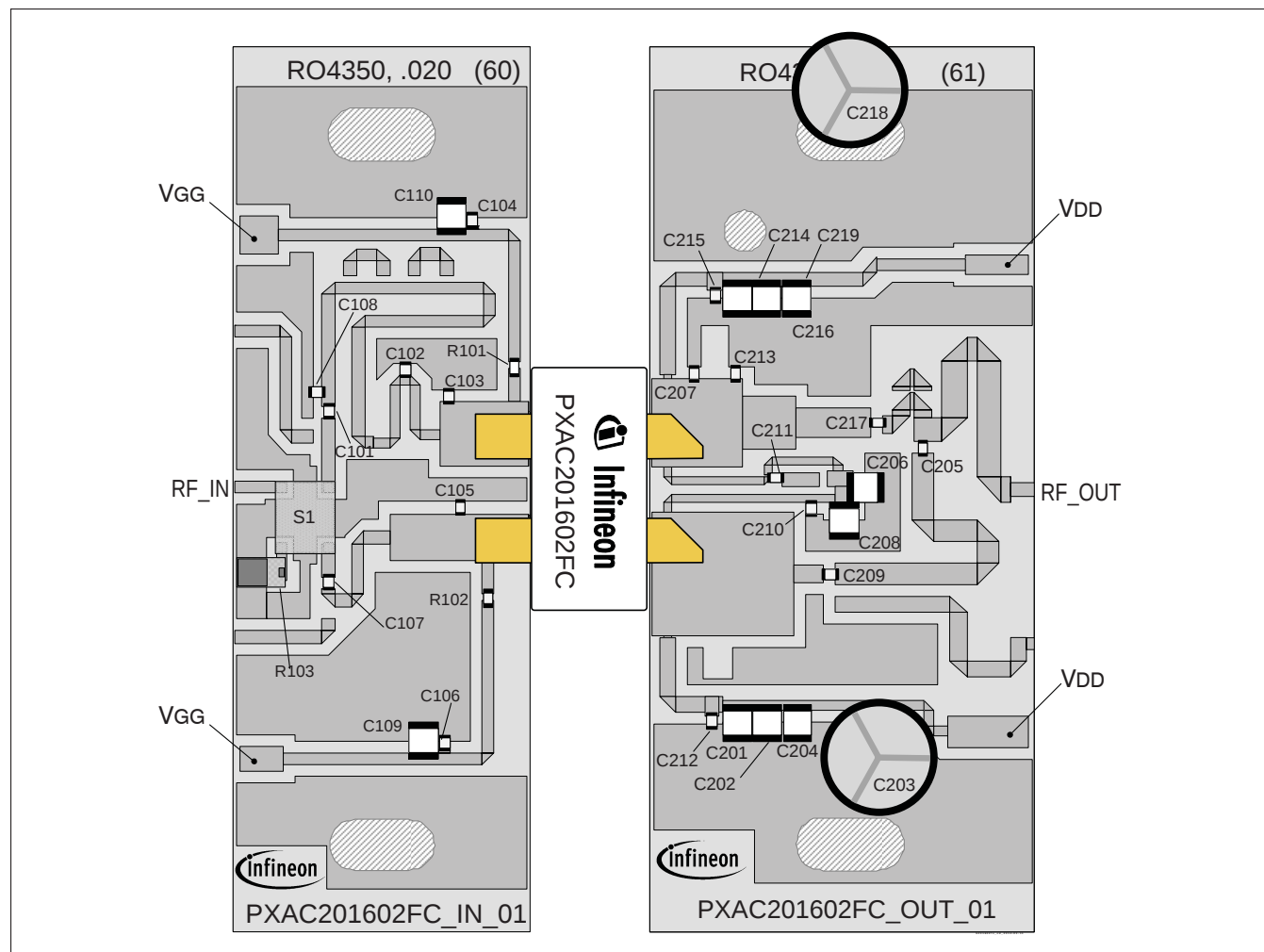
Class AB		P _{1dB}									
		Max Output Power					Max PAE				
		Z _I [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _I [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]
Freq [MHz]	Z _s [Ω]										
1880	3.88 – j12.84	3.96 – j4.18	20.01	48.39	69.02	54.18	7.54 – j1.33	22.43	46.72	46.99	65.35
1900	5.30 – j12.89	4.14 – j4.36	20.21	48.1	64.57	53.31	7.70 – j1.56	22.38	46.36	43.25	61.53
1920	5.84 – j14.94	4.13 – j4.48	20.33	48.32	67.92	55.15	7.03 – j0.76	22.6	46.41	43.75	63.54
2010	11.80 – j17.15	3.84 – j4.53	20.31	48.36	68.55	55.74	5.79 – j0.62	22.76	46.22	41.88	64.2
2025	12.09 – j16.26	3.99 – j4.73	20.4	48.14	65.16	54.0.3	5.26 – j0.81	22.7	46.17	41.40	62.49

Peak side pulsed CW signal: 160 μ sec, 10% duty cycle; 28 V, 540 mA

Class AB		P _{1dB}									
		Max Output Power					Max PAE				
		Z _I [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _I [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]
Freq [MHz]	Z _s [Ω]										
1880	4.62 – j9.02	2.53 – j4.95	19.44	50.31	107.40	54.66	5.39 – j2.83	22.15	48.15	65.31	64.38
1900	5.10 – j8.97	2.65 – j4.91	19.87	49.97	99.31	53.40	4.50 – j3.28	21.90	48.47	70.31	61.18
1920	6.65 – j8.28	2.587 – j5.03	19.82	50.07	101.62	53.76	4.31 – j3.12	21.93	48.54	71.45	62.86
2010	10.61 – j5.85	2.48 – j5.17	20.19	50.19	104.47	53.45	3.80 – j3.47	22.46	48.61	72.61	63.49
2025	12.35 – j5.04	2.48 – j5.64	20.34	50.09	102.09	52.31	3.83 – j3.38	22.70	48.26	66.99	61.23

Reference Circuit, tuned for 1800 – 2200 MHz

DUT	PXAC201602FC V1
Reference Circuit Part No.	LTA/PXAC201602FC 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 Infineon Web site at (www.infineon.com/rfpower)	

Reference Circuit (cont.)


Reference circuit assembly diagram (not to scale)

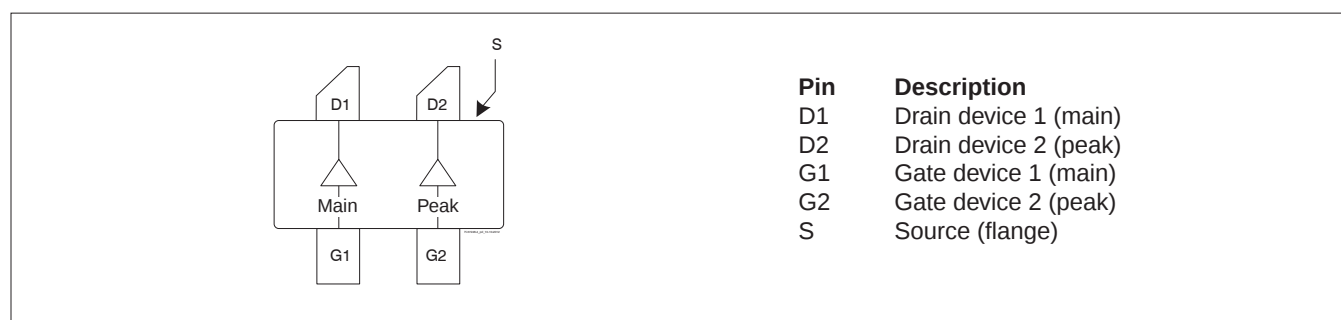
Assembly Information

Component	Description	Suggested Manufacturer	P/N
Input			
C101, C104, C106, C107	Chip capacitor, 18 pF	ATC	ATC800A180JT250T
C102	Chip capacitor, 0.4 pF	ATC	ATC600F0R4BT
C103	Chip capacitor, 1.6 pF	ATC	ATC600F1R6BT
C105	Chip capacitor, 2.4 pF	ATC	ATC800A2R4BT250T
C108	Chip capacitor, 0.3 pF	ATC	ATC600F0R3BT
C109, C110	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
R101, R102	Resistor, 10 Ohm	Panasonic Electronic Components	ERJ-3GEYJ100V
R103	Resistor, 50 Ohm	Anaren	C16A50Z4
S1	Directional coupler	Anaren	X3C21P1-04S

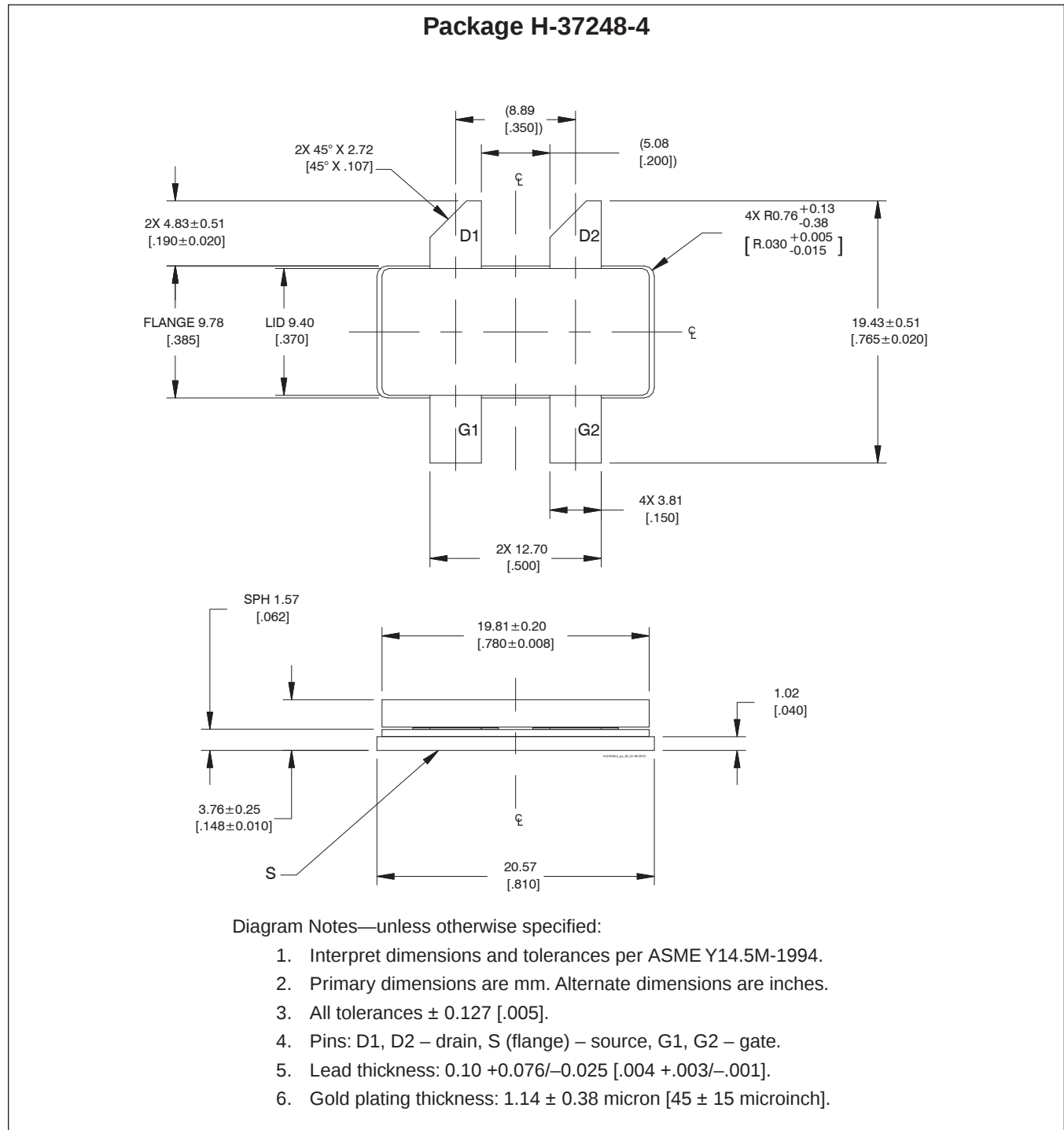
Reference Circuit (cont.)

Assembly Information (cont.)

Component	Description	Suggested Manufacturer	P/N
Output			
C201, C202, C204, C206, C208, C214, C216, C219	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C203, C218	Capacitor, 220 μ F, 50 V	Cornell Dubilier Electronics (CDE)	SK221M050ST
C205, C210, C211, C212, C215	Chip capacitor, 18 pF	ATC	ATC800A180JT250T
C207	Chip capacitor, 1.5 pF	ATC	ATC600F1R5BT
C209	Chip capacitor, 2.4 pF	ATC	ATC800A2R4BT250T
C213	Chip capacitor, 1.2 pF	ATC	ATC600F1R2BT
C217	Chip capacitor, 2.2 pF	ATC	ATC800A2R2BT250T

Pinout Diagram (top view)


Package Outline Specifications



Find the latest and most complete information about products and packaging at the Infineon Internet page (www.infineon.com/rfpower)

Revision History

Revision	Date	Data Sheet	Page	Subjects (major changes since last revision)
01	2014-02-21	Advance	All	New product, proposed only
01.1	2014-02-25	Advance	2	Added thermal resistance information
02	2014-03-14	Production	All	Data Sheet now represents production-released product specifications, including reference circuit and performance information

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