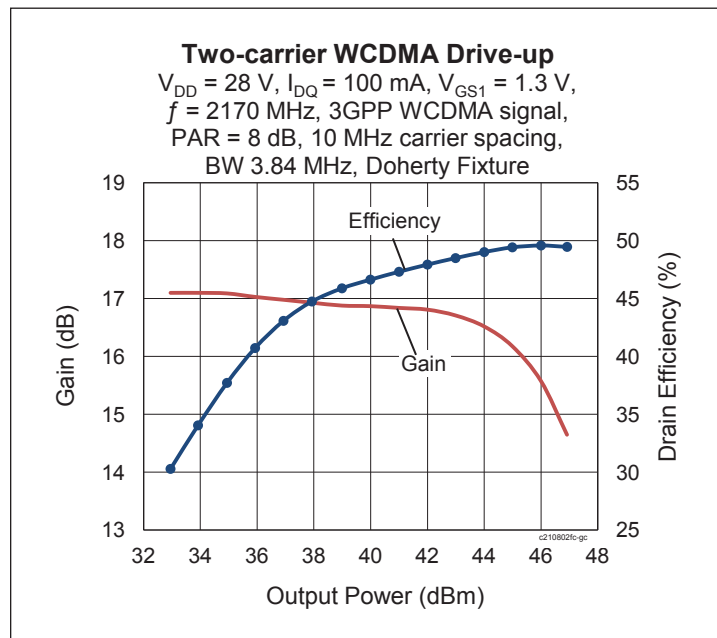


Thermally-Enhanced High Power RF LDMOS FET 80 W, 28 V, 2110 – 2170 MHz

Description

The PTAC210802FC is an 80-watt LDMOS FET with an asymmetrical design intended for use in multi-standard cellular power amplifier applications in the 2110 to 2170 MHz frequency band. Features include dual-path design, input matching, high gain and thermally-enhanced package with earless flange. Manufactured with Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PTAC210802FC
Package H-37248-4



Features

- Asymmetrical design
 - Main : P1dB = 19 W Typ
 - Peak : P1dB = 60 W Typ
- Broadband internal matching
- Wide video bandwidth
- Typical CW pulsed performance, 2170 MHz, 28 V (Doherty fixture)
 - Output power @ P_{3dB} = 75 W
 - Efficiency = 48%
 - Gain @ P_{3dB} = 14 dB
- Capable of handling 10:1 VSWR @ 28 V, 80 W (CW) output power
- Integrated ESD protection : Human Body Model, Class 1C (per JESD22-A114)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Two-carrier WCDMA Specifications (tested in Infineon Doherty test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 85\text{ mA}$, $V_{GS1} = 1.3\text{ V}$, $P_{OUT} = 5\text{ W avg}$, $f_1 = 2165\text{ MHz}$, $f_2 = 2175\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF, 10 MHz carrier spacing

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	G_{ps}	15	17	—	dB
Drain Efficiency	η_D	39	43	—	%
Intermodulation Distortion	IMD	—	-31	-26	dBc

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics (each side)

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	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10	μA
On-State Resistance	(main) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.6	—	Ω
	(peak) $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.19	—	Ω
Operating Gate Voltage	(main) $V_{DS} = 28\text{ V}$, $I_{DQ} = 0.1\text{ A}$	V_{GS}	—	2.6	—	V
Operating Gate Voltage	(peak) $V_{DS} = 28\text{ V}$, $I_{DQ} = 0\text{ A}$	V_{GS}	—	1.35	—	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1	μA

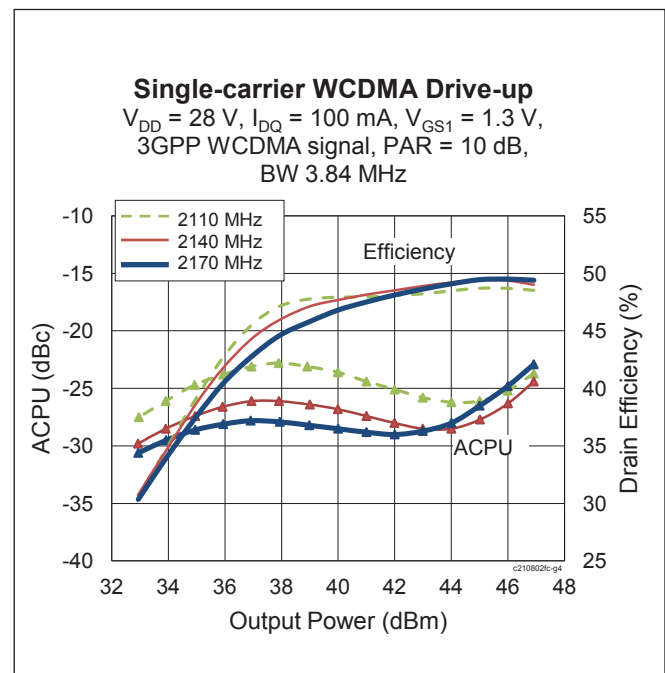
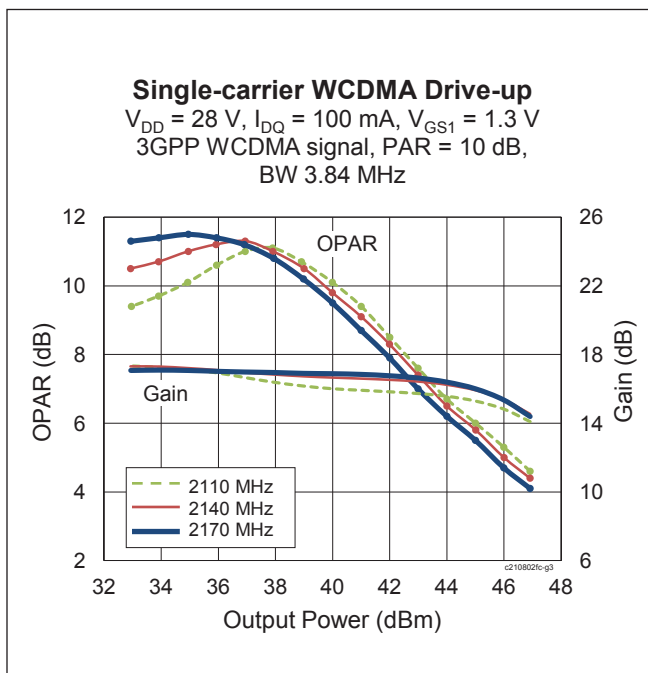
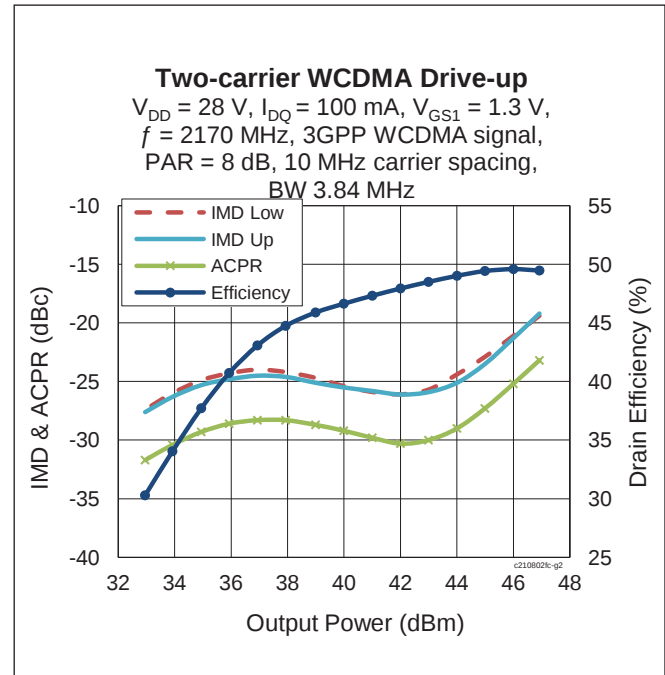
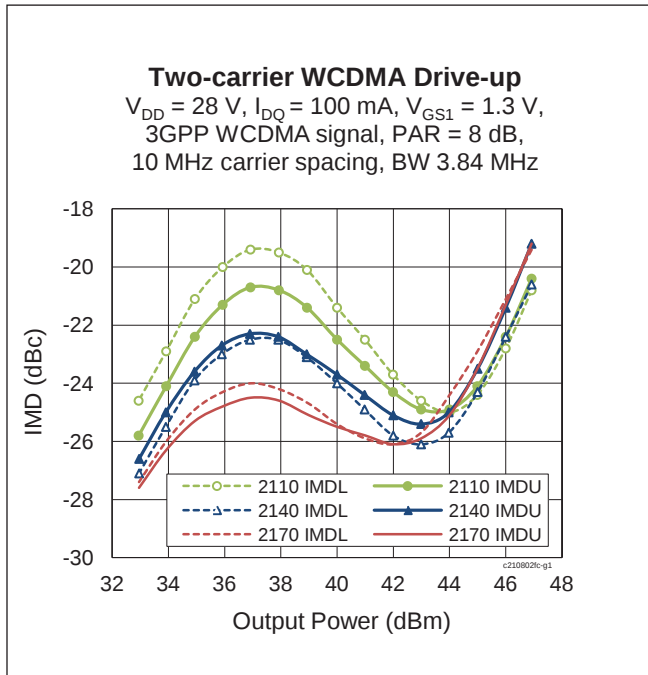
Maximum Ratings

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, $T_{CASE} = 70^{\circ}\text{C}$, 19 W CW)	$R_{\theta JC}$	2.5	$^{\circ}\text{C/W}$
Thermal Resistance (peak, $T_{CASE} = 70^{\circ}\text{C}$, 60 W CW)	$R_{\theta JC}$	0.8	$^{\circ}\text{C/W}$

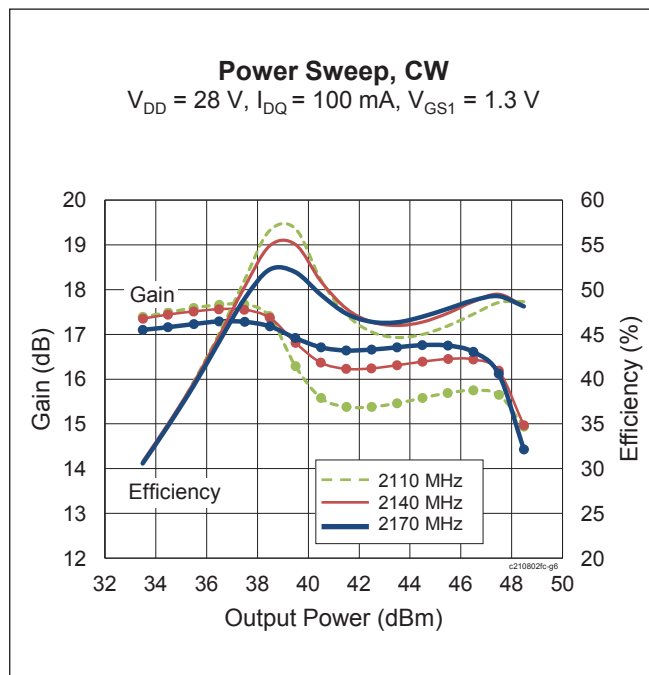
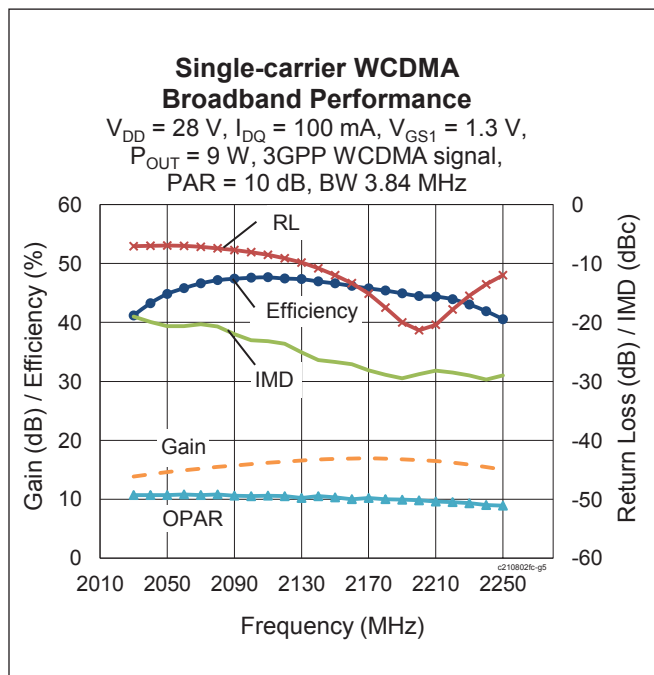
Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTAC210802FC V1	PTAC210802FCV1XWSA1	H-37248-4, earless flange	Tray
PTAC210802FC V1 R250	PTAC210802FCV1R250XTMA1	H-37248-4, earless flange	Tape & Reel, 250 pcs

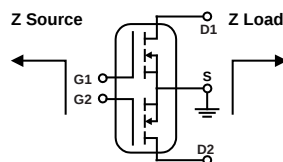
Typical Performance (data taken in a production Doherty test fixture)



Typical Performance (cont.)



Load Pull Performance



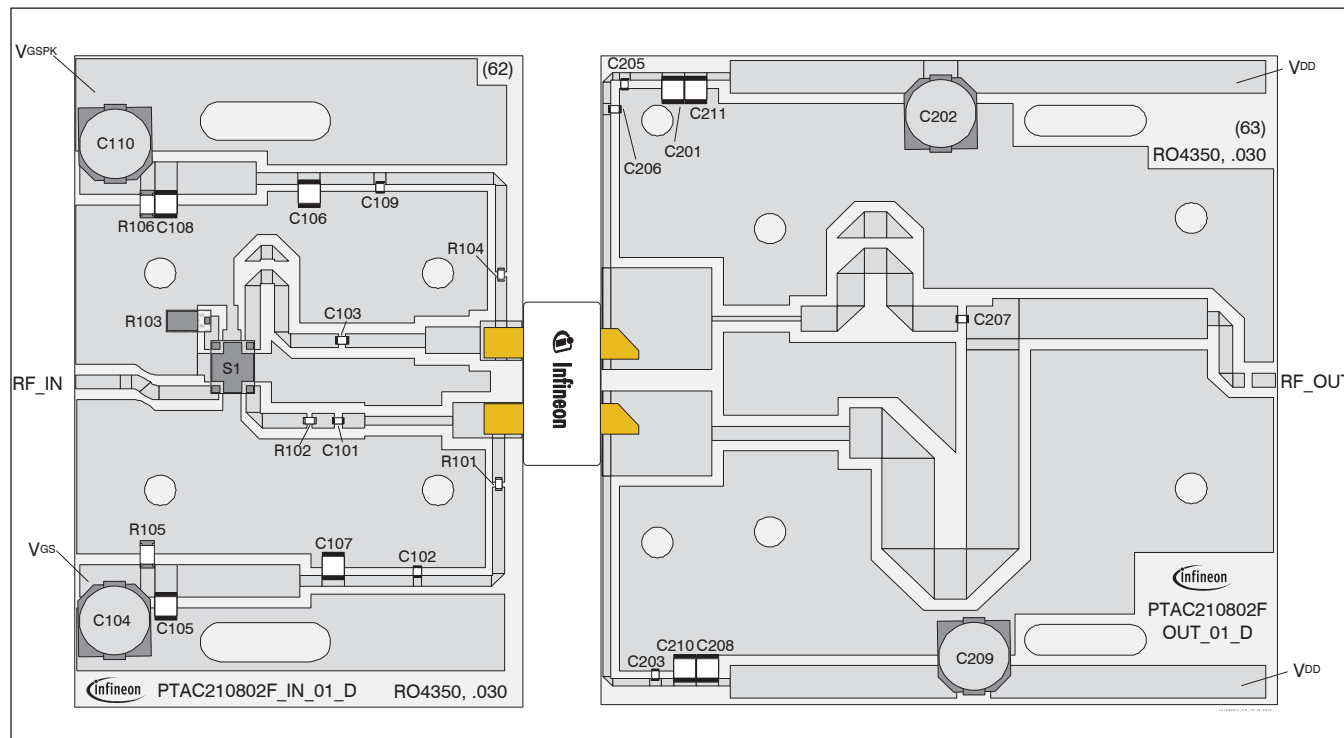
Main Side Load Pull Performance – Pulsed CW signal: 16 μsec , 10% duty cycle; $V_{DD} = 28\text{ V}$, 100 mA

Freq [MHz]	Z_s [Ω]	P_{1dB}									
		Max Output Power					Max PAE				
		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	$28.4 - j28.1$	$15.1 - j11.9$	20.8	43.40	22	50	$4.6 - j5.2$	23.6	41.3	13	68.1
2140	$32.4 - j27.7$	$7.7 - j10$	22.0	43.50	22	61	$4.15 - j6$	23.9	41.3	13	71.9
2170	$45.1 - j33.3$	$10.8 - j10.6$	21.6	43.64	23	58	$5.2 - j7.2$	23.4	42.1	16	68.6

Peak Side Load Pull Performance – Pulsed CW signal: 16 μsec , 10% duty cycle; $V_{DD} = 28\text{ V}$, $V_{GS1} = 1.41\text{ V}$, Doherty Class C

Freq [MHz]	Z_s [Ω]	P_{3dB}									
		Max Output Power					Max PAE				
		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	$14.8 - j14.6$	$2.4 - j7.4$	14.1	49.60	91	62.0	$1.6 - j6.0$	15.3	48.3	68	72.5
2140	$20.6 - j13.6$	$2.7 - j7.8$	14.0	49.50	89	58.8	$1.8 - j6.5$	15.2	48.7	74	68.5
2170	$24.5 - j9.8$	$2.6 - j8.1$	13.9	49.60	91	57.7	$2.0 - j6.6$	15.3	48.6	72	67.9

Reference Circuit



Reference circuit assembly diagram (not to scale)*

Reference Circuit Assembly

DUT PTAC210802FC

Test Fixture Part No. LTA/PTAC210802FC

PCB Rogers 4350, 0.762 mm [0.030"] thick, 2 oz. copper, $\epsilon_r = 3.66$

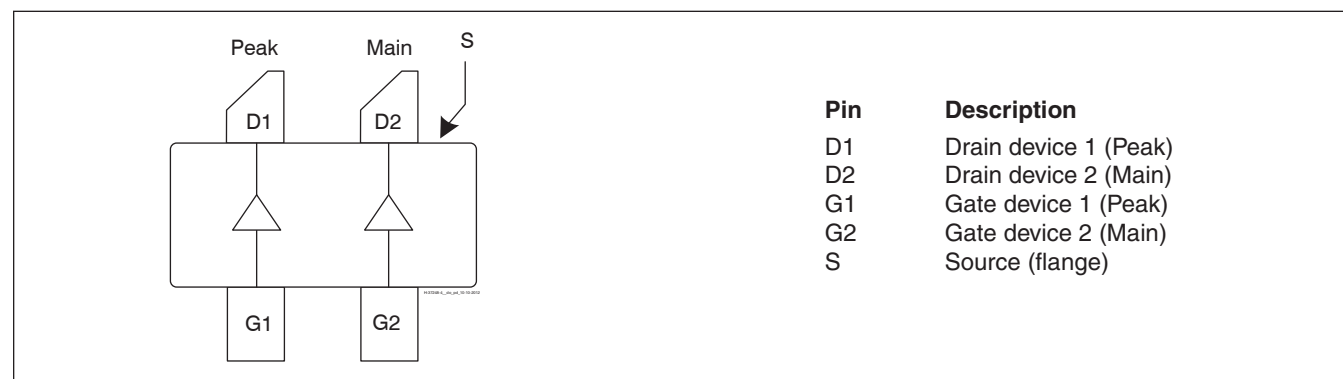
Find Gerber files for this test fixture on the Infineon Web site at <http://www.infineon.com/rfpower>

Reference Circuit (cont.)

Components Information

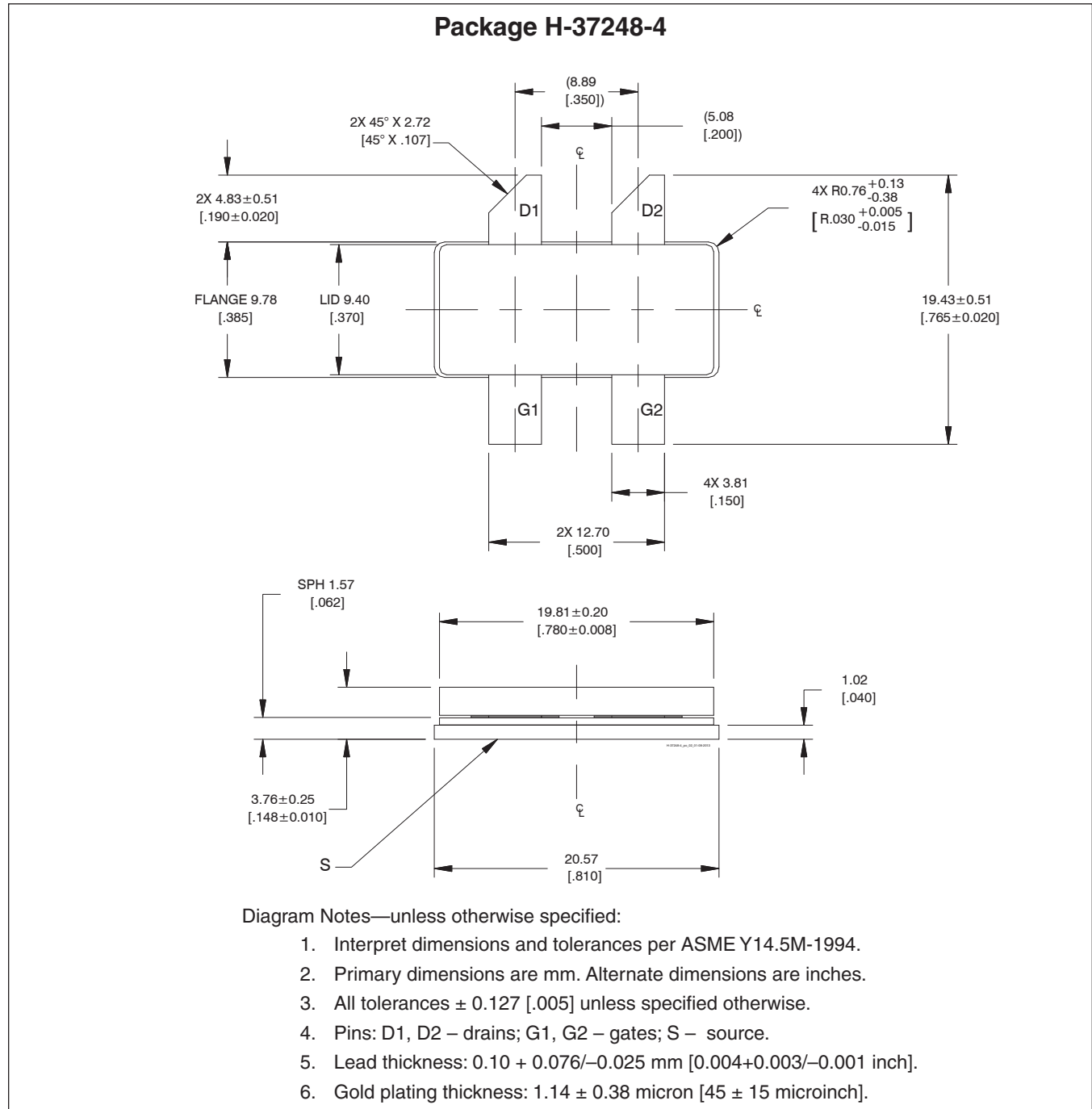
Component	Description	Suggested Supplier	P/N
Input			
C101, C102, C103, C109	Chip capacitor, 24 pF	ATC	ATC800A240JT250XB
C104, C110	Capacitor, 100 μ F	Digi-Key	PCE4442TR-ND
C105, C108	Chip capacitor, 0.1 μ F	Digi-Key	399-1267-2-ND
C106, C107	Capacitor, 10 μ F	Digi-Key	587-1818-2-ND
R101, R102, R104	Resistor, 10 Ω	Digi-Key	P10GCT-ND
R103	Resistor, 50 Ω	Anaren	C16A50Z4
R105, R106	Resistor, 1000 Ω	Digi-Key	P1.0KECT-ND
S1	Hybrid coupler	Anaren	X3C21P1-03S
Output			
C201, C208, C210, C211	Capacitor, 10 μ F	Digi-Key	587-1818-2-ND
C202, C209	Capacitor, 220 μ F	Digi-Key	PCE4444TR-ND
C203, C204, C205, C206, C207	Chip capacitor, 24 pF	ATC	ATC800A240JT250XB

Pinout Diagram (top view)



Lead connections for PTAC210802FC

Package Outline Specifications



Find the latest and most complete information about products and packaging at the Infineon Internet page
<http://www.infineon.com/rfpower>

Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2013-06-11	Advance	All	Data Sheet reflects advance specification for product development
01.1	2012-06-12	Advance	2	Updated power level measured for thermal data
02	2013-10-17	Production	All	Data Sheet reflects released product specification
03	2013-12-17	Production	1 2 7	Added ESD classification, revised two-carrier WCDMA Specifications Added operating voltage in Maximum Ratings table Updated package outline
04	2014-05-14	Production	2	Revised junction temperature in Maximum Ratings table

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