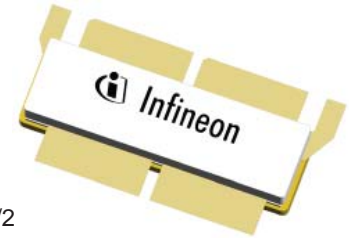


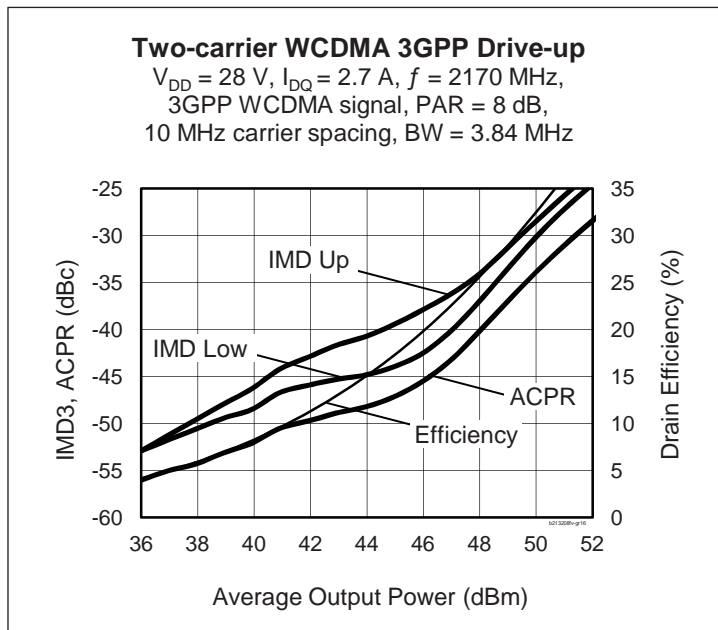
Thermally-Enhanced High Power RF LDMOS FET 320 W, 28 V, 2110 – 2170 MHz

Description

The PTFB213208SV is a 320-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 2110 to 2170 MHz frequency band. Features include input and output 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.



PTFB213208FV
Package H-37275G-6/2



Features

- Broadband internal matching
- Wide video bandwidth
- Typical pulsed CW performance, 2140 MHz, 28 V (combined outputs)
 - Output power @ $P_{1dB} = 343\text{ W}$
 - Efficiency = 54%
 - Gain = 16.5 dB
- Typical single-carrier WCDMA performance, 2140 MHz, 28 V
 - Output power = 50 dBm avg
 - Gain = 17 dB
 - Efficiency = 32%
- Capable of handling 10:1 VSWR @ 28 V, 320 W (CW) output power
- Integrated ESD protection
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 2.6\text{ A}$, $P_{OUT} = 85\text{ W}$ average, $f = 2170\text{ MHz}$
 3GPP WCDMA signal, 3.84 MHz channel bandwidth, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	Gps	15.75	17.0	—	dB
Drain Efficiency	η_D	29	31	—	%
Adjacent Channel Power Ratio	ACPR	—	-33	-29.5	dBc

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics (both sides)

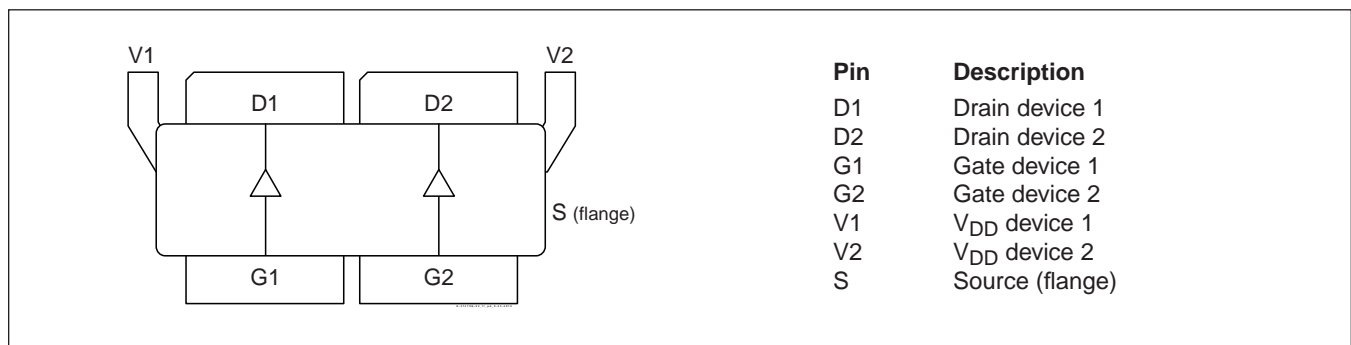
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 2.6\text{ A}$	V_{GS}	2.3	2.8	3.3	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

Maximum Ratings

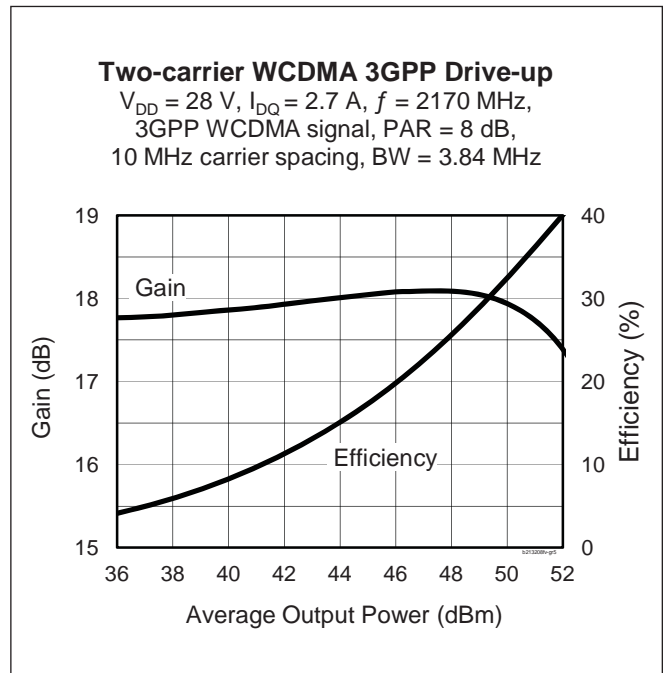
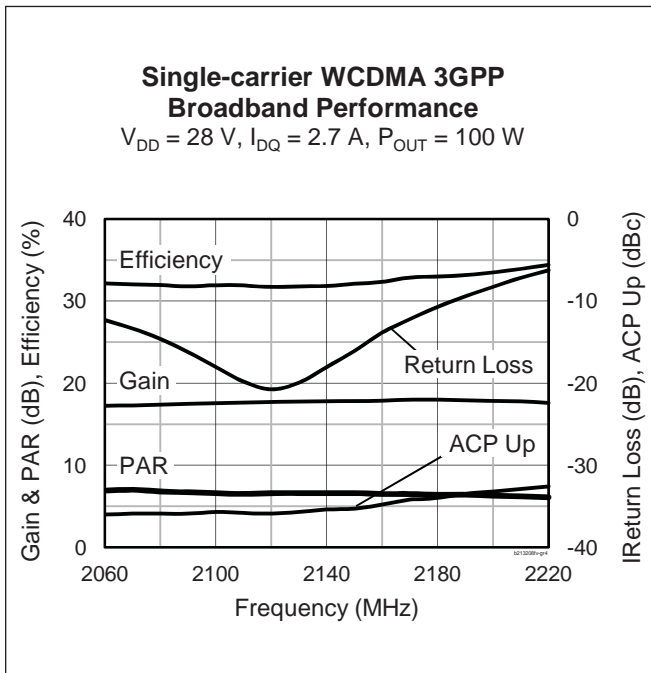
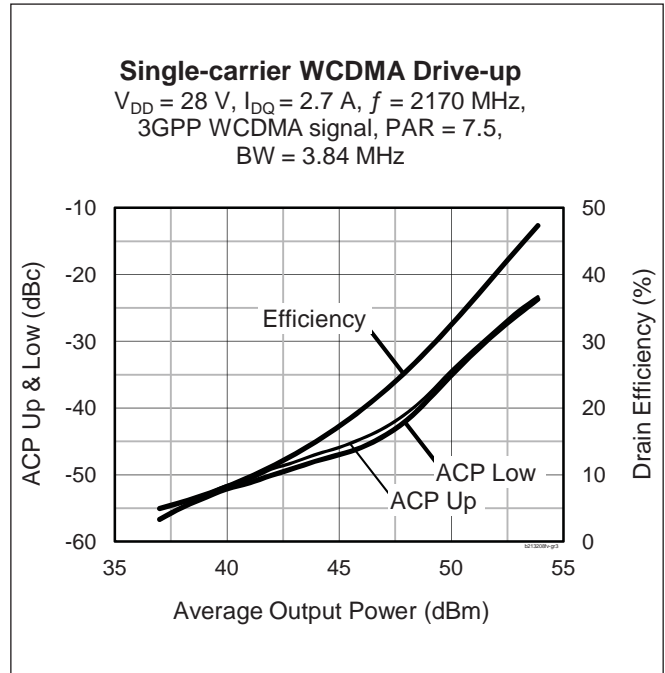
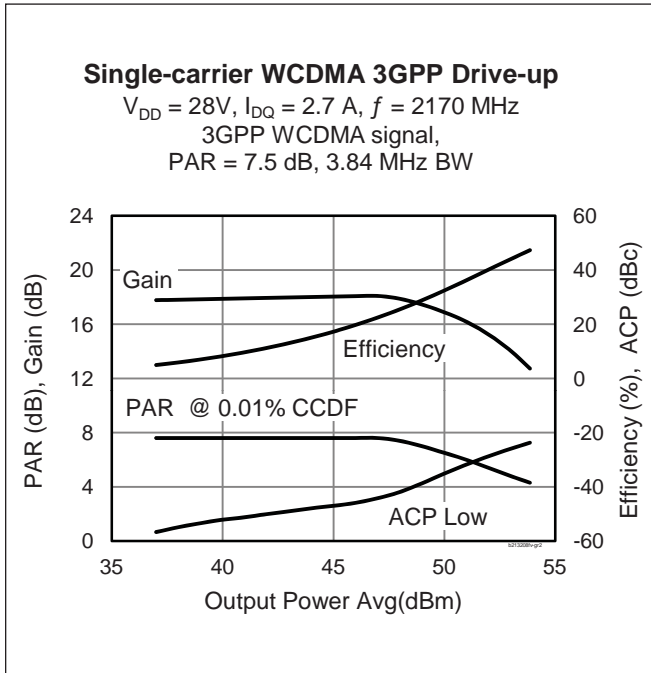
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	-6 to +10	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 28 V, 200 W CW)	$R_{\theta JC}$	0.20	$^{\circ}\text{C/W}$

Ordering Information

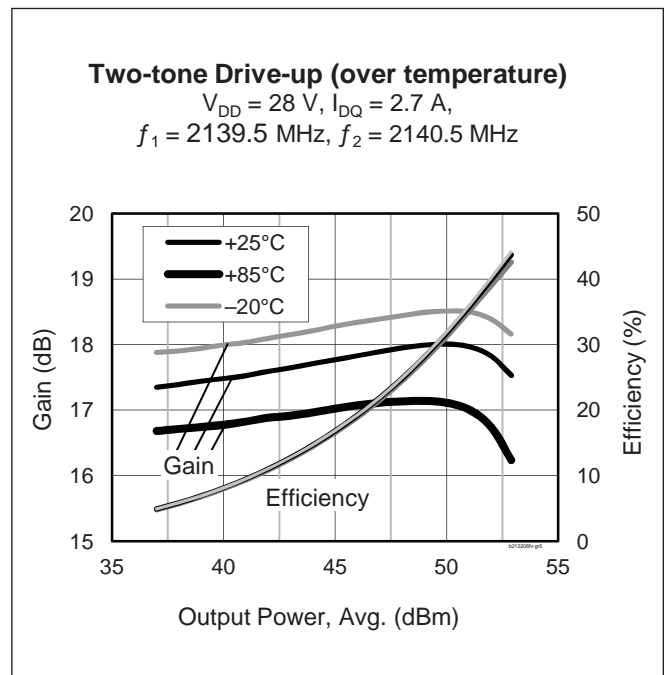
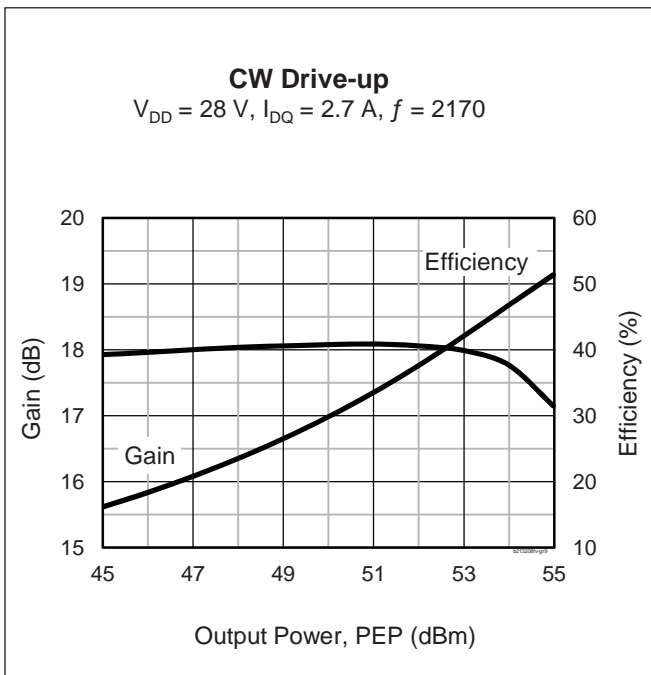
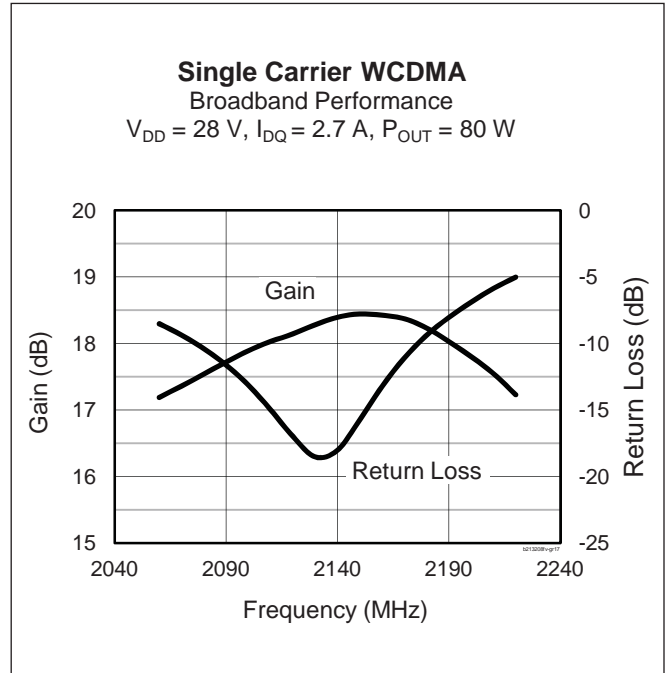
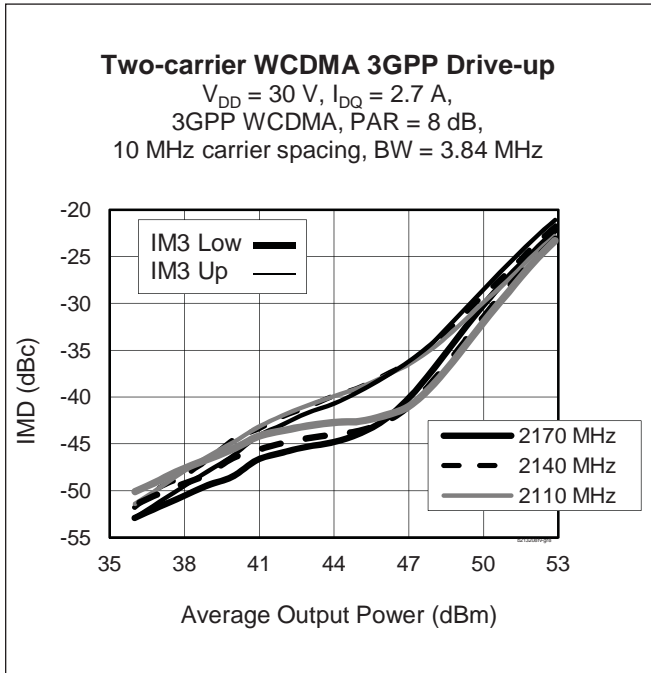
Type and Version	Order Code	Package Description	Shipping
PTFB213208FV V2 R0	PTFB213208FVV2R0XTMA1	H-37275G-6/2, ceramic open-cavity, push-pull earless	Tape & Reel, 50 pcs
PTFB213208FV V2 R2	PTFB213208FVV2R2XTMA1	H-37275G-6/2, ceramic open-cavity, push-pull earless	Tape & Reel, 250 pcs

Pinout Diagram (top view)


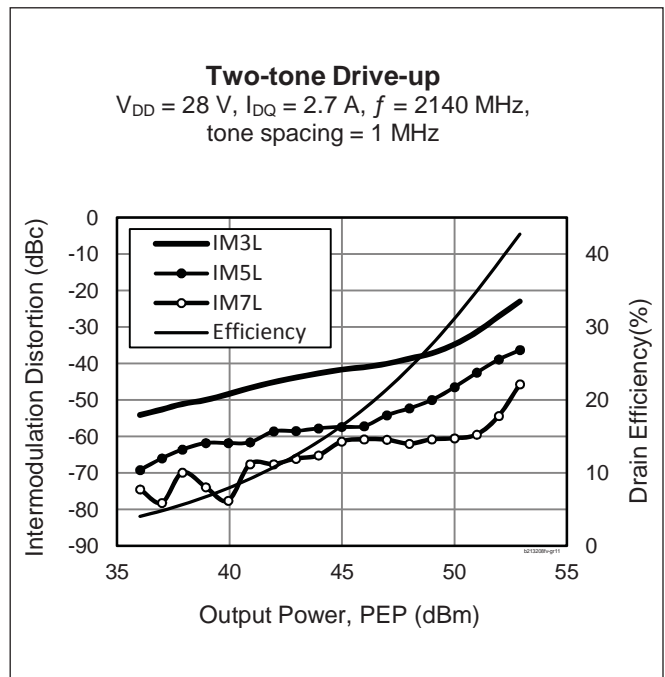
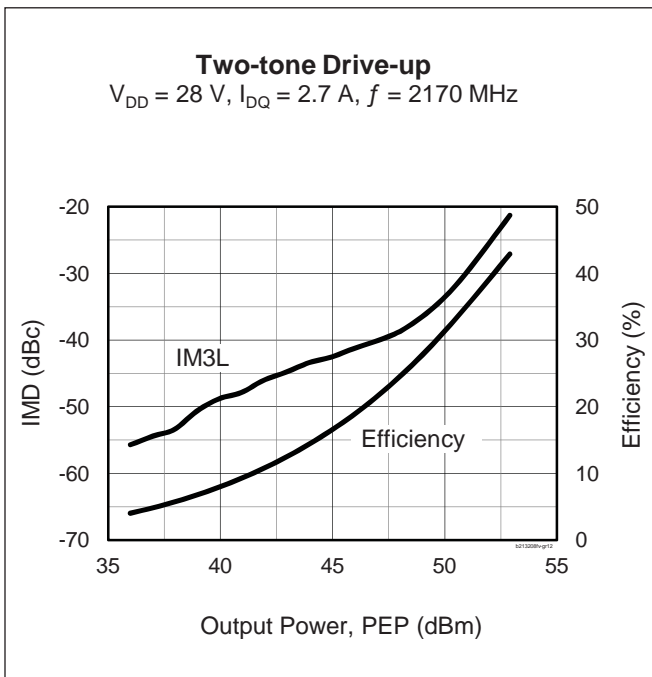
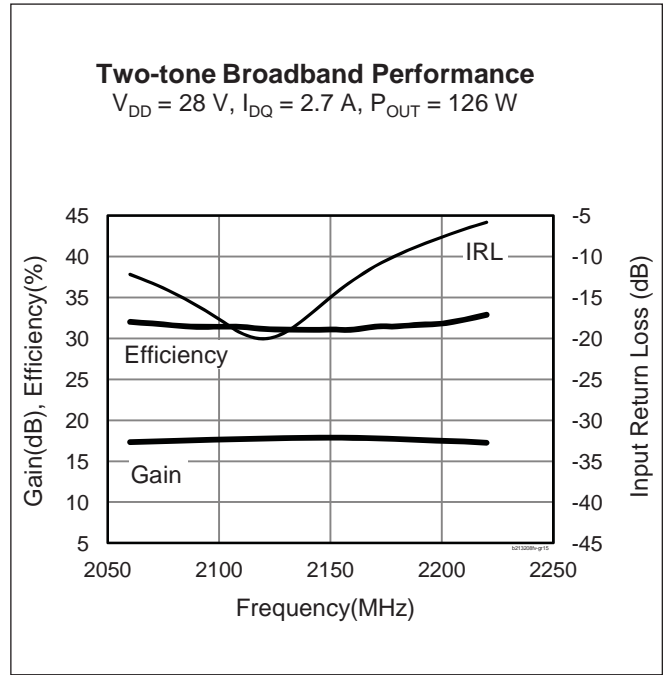
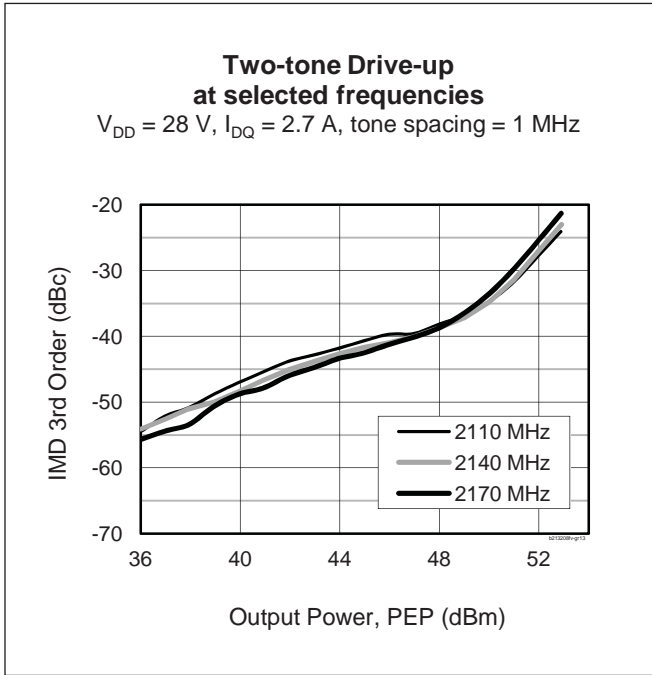
Typical Performance (data taken in an Infineon production test fixture)



Typical Performance (cont.)

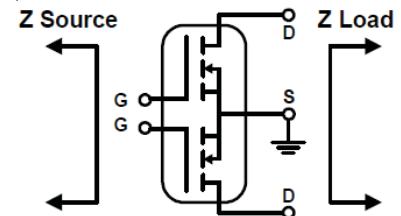


Typical Performance (cont.)



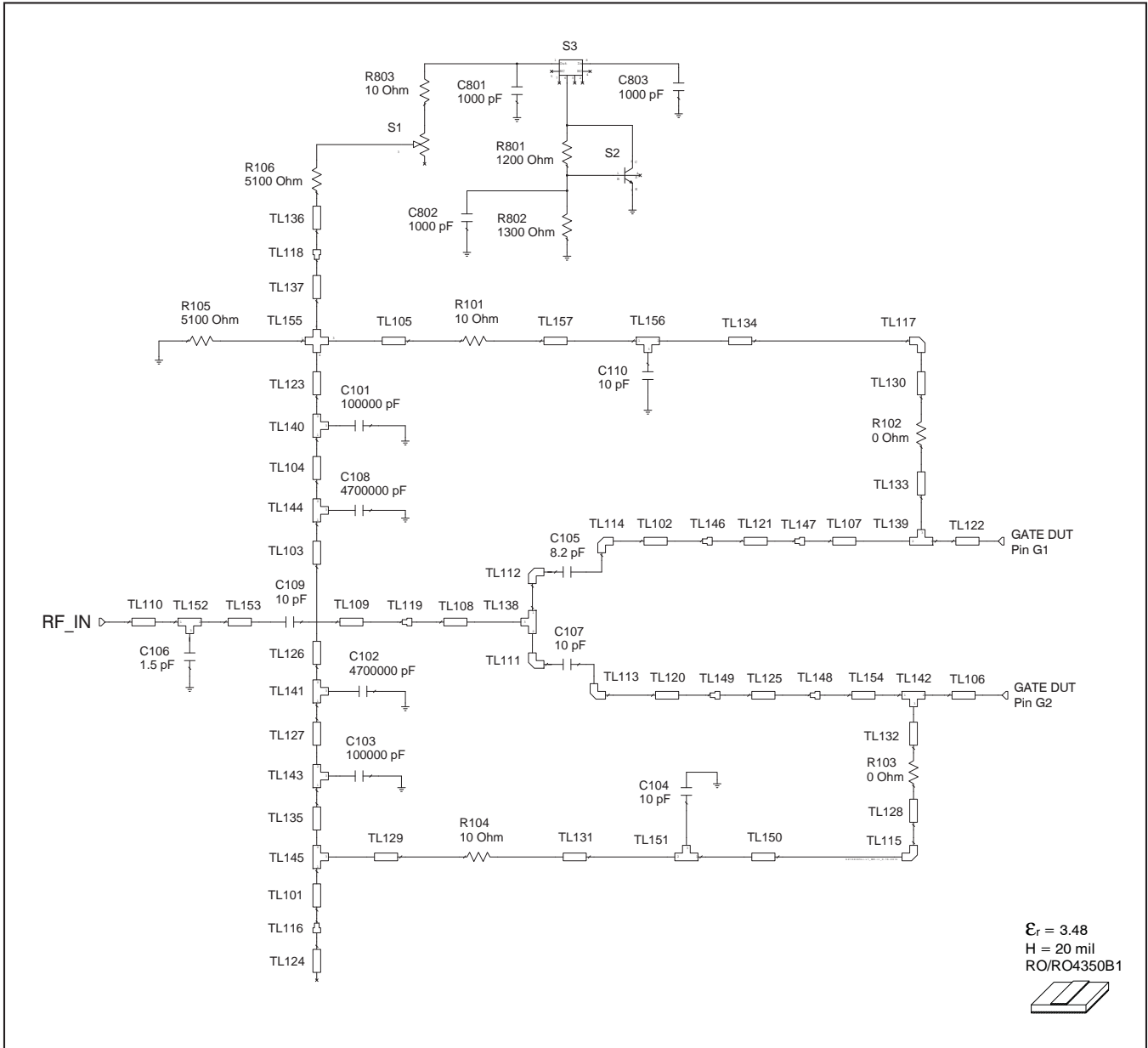
Broadband Circuit Impedance

Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
2100	3.34	-5.60	0.55	-1.99
2110	3.32	-5.61	0.55	-1.96
2120	3.30	-5.62	0.55	-1.94
2130	3.27	-5.63	0.54	-1.92
2140	3.24	-5.64	0.54	-1.89
2150	3.21	-5.65	0.54	-1.87
2160	3.18	-5.66	0.54	-1.85
2170	3.15	-5.67	0.54	-1.82
2180	3.11	-5.68	0.54	-1.80
2190	3.07	-5.69	0.54	-1.78
2200	3.03	-5.70	0.54	-1.75



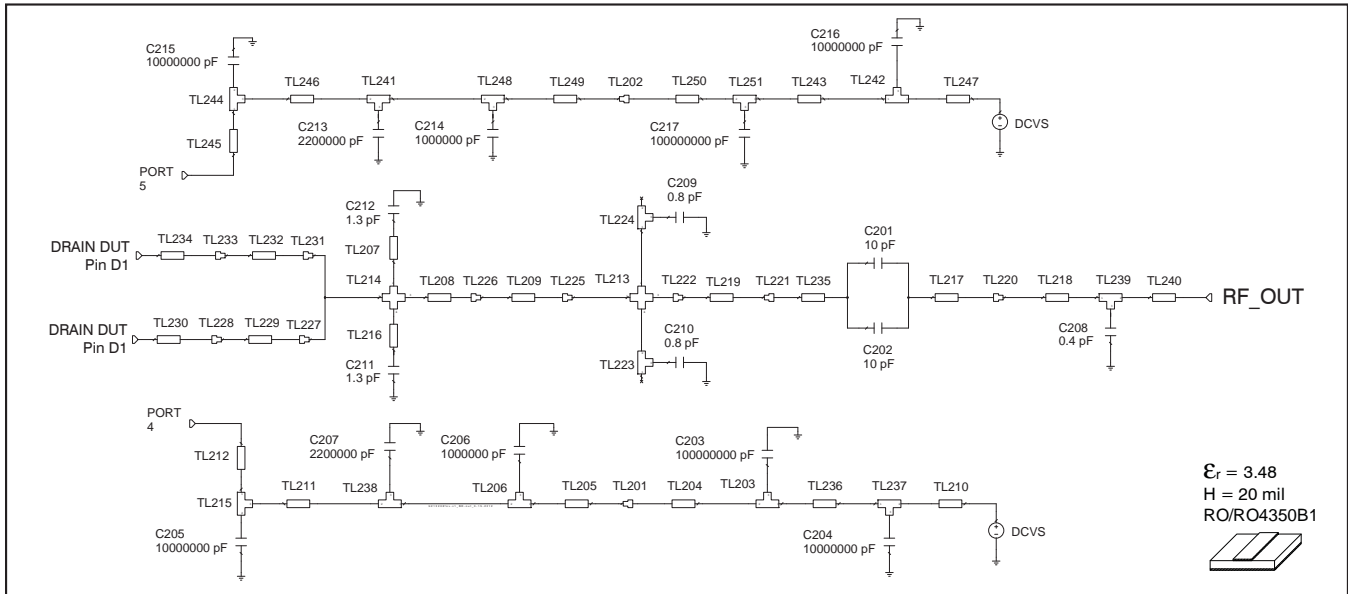
See next page for reference circuit information

Reference Circuit



Reference circuit input schematic for $f = 2170 \text{ MHz}$

Reference Circuit (cont.)



Reference circuit output schematic for $f = 2170$ MHz

Reference Circuit Assembly

DUT	PTFB213208FV
Test Fixture Part No.	LTN/PTFB213208FV
PCB	Rogers RO4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.48$
Find Gerber files for this test fixture on the Infineon Web site at www.infineon.com/rfpower	

Electrical Characteristics at 2170 MHz

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
Input			
TL101	0.006λ , 63.89 Ω	W = 0.76, L = 0.51	W = 30, L = 20
TL102, TL120	0.009λ , 28.85 Ω	W = 2.54, L = 0.76	W = 100, L = 30
TL103	0.156λ , 63.89 Ω	W = 0.76, L = 13.19	W = 30, L = 519
TL104	0.010λ , 63.89 Ω	W = 0.76, L = 0.81	W = 30, L = 32
TL105	0.020λ , 54.17 Ω	W = 1.02, L = 1.65	W = 40, L = 65
TL106, TL122	0.070λ , 7.29 Ω	W = 12.7, L = 5.36	W = 500, L = 211
TL107	0.017λ , 7.29 Ω	W = 12.7, L = 1.3	W = 500, L = 51
TL108	0.025λ , 32.6 Ω	W = 2.16, L = 2.03	W = 85, L = 80
TL109	0.060λ , 49.69 Ω	W = 1.17, L = 5.02	W = 46, L = 197
TL110	0.006λ , 49.69 Ω	W = 1.17, L = 0.51	W = 46, L = 20
TL121	0.023λ , 17.05 Ω	W = 4.88, L = 1.78	W = 192, L = 70
TL123	0.054λ , 63.89 Ω	W = 0.76, L = 4.57	W = 30, L = 180
TL124	0.016λ , 34.08 Ω	W = 2.03, L = 1.27	W = 80, L = 50
TL125	0.023λ , 17.05 Ω	W = 4.88, L = 1.78	W = 192, L = 70

table continued on next page

Reference Circuit (cont.)

Electrical Characteristics at 2170 MHz (Input cont.)

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
TL126	0.018 λ , 63.89 Ω	W = 0.76, L = 1.52	W = 30, L = 6
TL126	0.018 λ , 63.89 Ω	W = 0.76, L = 1.52	W = 30, L = 60
TL127	0.011 λ , 63.89 Ω	W = 0.76, L = 0.89	W = 30, L = 35
TL128, TL130	0.006 λ , 54.17 Ω	W = 1.02, L = 0.51	W = 40, L = 20
TL129	0.018 λ , 54.17 Ω	W = 1.02, L = 1.53	W = 40, L = 60
TL131	0.017 λ , 54.17 Ω	W = 1.02, L = 1.42	W = 40, L = 56
TL132, TL133	0.009 λ , 54.17 Ω	W = 1.02, L = 0.76	W = 40, L = 30
TL134	0.098 λ , 54.17 Ω	W = 1.02, L = 8.2	W = 40, L = 323
TL135	0.056 λ , 63.89 Ω	W = 0.76, L = 4.72	W = 30, L = 186
TL136	0.016 λ , 34.08 Ω	W = 2.03, L = 1.27	W = 80, L = 50
TL137	0.003 λ , 63.89 Ω	W = 0.76, L = 0.28	W = 30, L = 10
TL138	0.027 λ , 28.85 Ω	W1 = 2.54, W2 = 2.54, W3 = 2.16	W1 = 100, W2 = 100, W3 = 85
TL139, TL142	0.013 λ , 7.29 Ω	W1 = 12.7, W2 = 12.7, W3 = 1.02	W1 = 500, W2 = 500, W3 = 40
TL140, TL141, TL143, TL144	0.015 λ , 63.89 Ω	W1 = 0.76, W2 = 0.76, W3 = 1.27	W1 = 30, W2 = 30, W3 = 50
TL145	0.012 λ , 63.89 Ω	W1 = 0.76, W2 = 0.76, W3 = 1.02	W1 = 30, W2 = 30, W3 = 40
TL150	0.100 λ , 54.17 Ω	W = 1.02, L = 8.36	W = 40, L = 329
TL151, TL156	0.015 λ , 54.17 Ω	W1 = 1.02, W2 = 1.02, W3 = 1.27	W1 = 40, W2 = 40, W3 = 50
TL152	0.015 λ , 49.69 Ω	W1 = 1.17, W2 = 1.17, W3 = 1.27	W1 = 46, W2 = 46, W3 = 50
TL153	0.012 λ , 49.69 Ω	W = 1.17, L = 0.97	W = 46, L = 38
TL154	0.017 λ , 7.29 Ω	W = 12.7, L = 1.3	W = 500, L = 51
TL155	0.090 λ , 47.12 Ω	W1 = 1.27, W2 = 0.767, W3 = 1.27, W4 = 0.72	W1 = 50, W2 = 30, W3 = 50, W4 = 30
TL157	0.017 λ , 54.17 Ω	W = 1.02, L = 1.42	W = 40, L = 56

Output

TL203	0.026 λ , 11.57 Ω	W1 = 7.62, W2 = 7.62, W3 = 2.03	W1 = 300, W2 = 300, W3 = 80
TL204	0.028 λ , 11.57 Ω	W = 7.62, L = 2.18	W = 300, L = 86
TL205	0.089 λ , 20.93 Ω	W = 3.81, L = 7.11	W = 150, L = 280
TL206	0.029 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 2.29	W1 = 150, W2 = 150, W3 = 90
TL207, TL216	0 λ , 144.35 Ω	W = 0.03, L = 0.03	W = 1, L = 1
TL208	0.009 λ , 4.29 Ω	W = 22.35, L = 0.65	W = 880, L = 25
TL209	0.021 λ , 7.92 Ω	W = 11.61, L = 1.6	W = 457, L = 63
TL210	0.013 λ , 11.57 Ω	W = 7.62, L = 1.02	W = 300, L = 40
TL211	0.016 λ , 20.93 Ω	W = 3.81, L = 1.3	W = 150, L = 51
TL212	0.098 λ , 20.93 Ω	W = 3.81, L = 7.8	W = 150, L = 307
TL213	0.003 λ , 10.43 Ω	W1 = 8.56, W2 = 0.25, W3 = 8.56, W4 = 0.25	W1 = 337, W2 = 10, W3 = 337, W4 = 10
TL214	0.020 λ , 4.29 Ω	W1 = 22.35, W2 = 1.52, W3 = 22.35, W4 = 1.52	W1 = 880, W2 = 60, W3 = 880, W4 = 60
TL215	0.048 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 3.81	W1 = 150, W2 = 150, W3 = 150
TL217	0.016 λ , 20.93 Ω	W = 3.81, L = 1.27	W = 150, L = 50

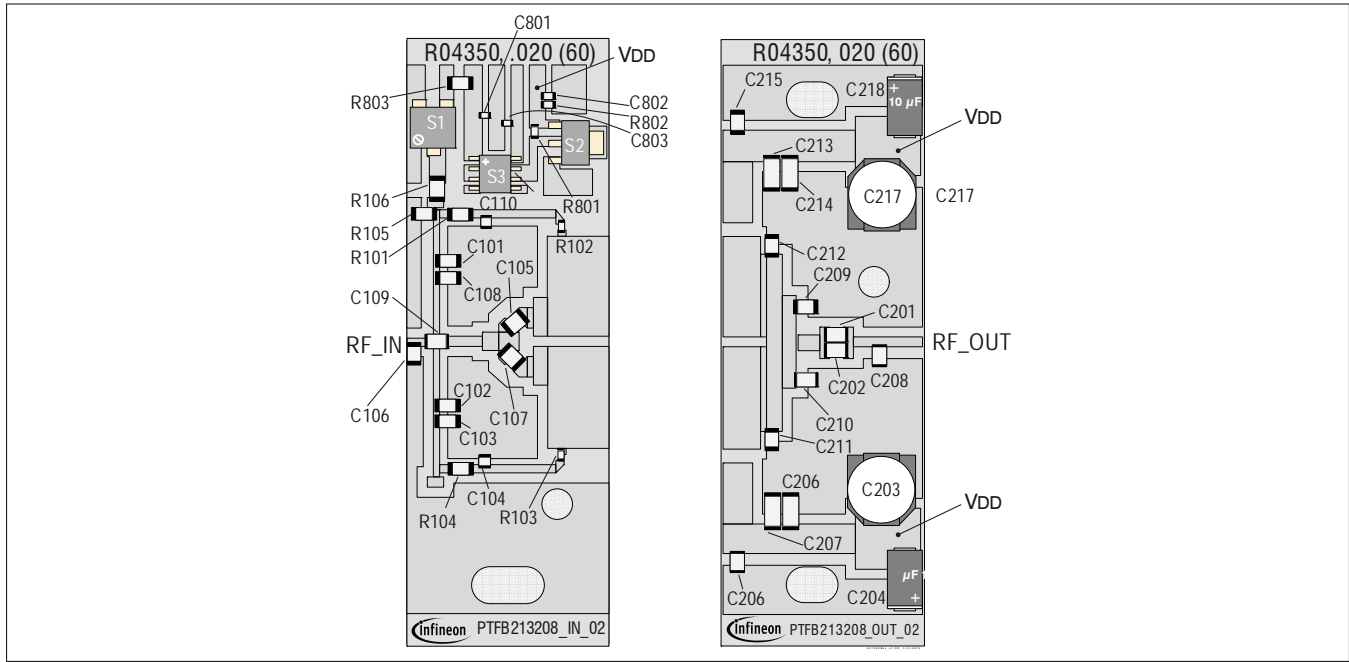
table continued on next page

Reference Circuit (cont.)

Electrical Characteristics at 2170 MHz (Output cont.)

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
TL218	0.033 λ , 47.12 Ω	W = 1.27, L = 2.74	W = 50, L = 108
TL219	0.035 λ , 34.72 Ω	W = 1.98, L = 2.84	W = 78, L = 112
TL223, TL224	0.017 λ , 102.05 Ω	W1 = 0.25, W2 = 0.25, W3 = 1.52	W1 = 10, W2 = 10, W3 = 60
TL229	0.008 λ , 8.64 Ω	W = 10.54, L = 0.65	W = 415, L = 25
TL230, TL234	0.063 λ , 7.29 Ω	W = 12.7, L = 4.8	W = 500, L = 189
TL232	0.008 λ , 8.64 Ω	W = 10.54, L = 0.65	W = 415, L = 25
TL235	0.016 λ , 20.93 Ω	W = 3.81, L = 1.27	W = 150, L = 50
TL236, TL243	0.012 λ , 11.57 Ω	W = 7.62, L = 0.94	W = 300, L = 37
TL237, TL242, TL251	0.026 λ , 11.57 Ω	W1 = 7.62, W2 = 7.62, W3 = 2.03	W1 = 300, W2 = 300, W3 = 80
TL238	0.029 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 2.29	W1 = 150, W2 = 150, W3 = 90
TL239	0.018 λ , 47.12 Ω	W1 = 1.27, W2 = 1.27, W3 = 1.52	W1 = 50, W2 = 50, W3 = 60
TL240	0.054 λ , 47.12 Ω	W = 1.27, L = 4.5	W = 50, L = 177
TL241	0.029 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 2.29	W1 = 150, W2 = 150, W3 = 90
TL244	0.048 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 3.81	W1 = 150, W2 = 150, W3 = 150
TL245	0.098 λ , 20.93 Ω	W = 3.81, L = 7.8	W = 150, L = 307
TL246	0.016 λ , 20.93 Ω	W = 3.81, L = 1.3	W = 150, L = 51
TL247	0.013 λ , 11.57 Ω	W = 7.62, L = 1.02	W = 300, L = 40
TL248	0.029 λ , 20.93 Ω	W1 = 3.81, W2 = 3.81, W3 = 2.29	W1 = 150, W2 = 150, W3 = 90
TL249	0.089 λ , 20.93 Ω	W = 3.81, L = 7.11	W = 150, L = 280
TL250	0.028 λ , 11.57 Ω	W = 7.62, L = 2.18	W = 300, L = 86

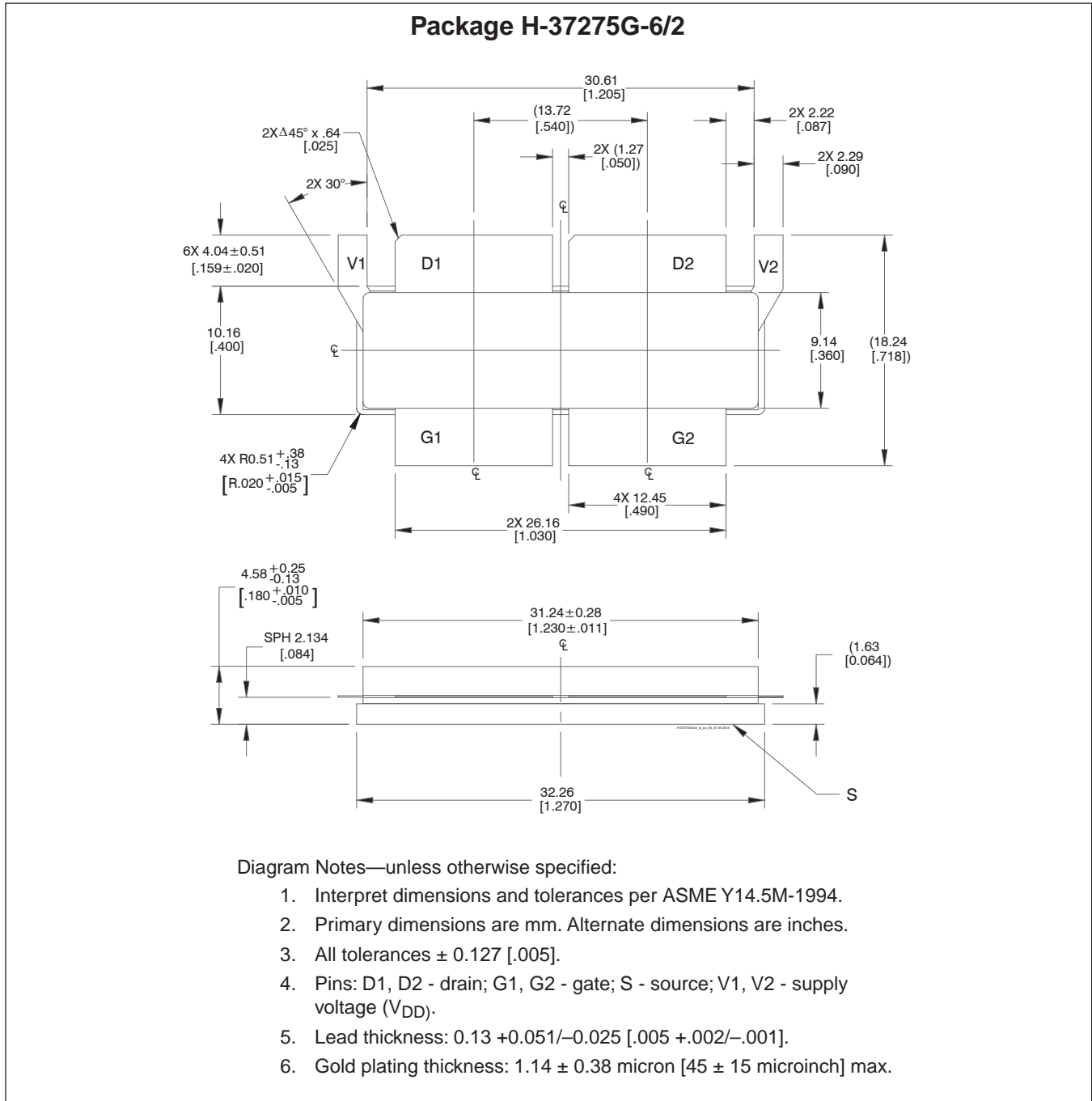
Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Component ID	Description	Supplier	P/N
Input			
C101, C102, C104	Chip capacitor, 300 pF	ATC	ATC100B301KW200X
C103, C108	Chip capacitor, 20 pF	ATC	ATC100B200KW500X
C105	Capacitor, 1 nF	Digi-Key	PCC1772CT-ND
C106	Capacitor, 1 nF	Digi-Key	PCC1772CT-ND
C107	Chip capacitor, 6.2 pF	ATC	ATC100B6R2CT500X
C109	Chip capacitor, 6.2 pF	ATC	ATC100B6R2CT500X
C801, C802, C803	Capacitor, 1000 pF	Digi-Key	PCC1772CT-ND
R101, R102, R103	Resistor, 5.6 Ω	Digi-Key	P5.6ECT-ND
R104, R105, R106	Resistor, 5.6 Ω	Digi-Key	P5.6ECT-ND
R107	Resistor, 1k Ω	Digi-Key	P1.0KECT-ND
Output			
C201	Chip capacitor, 10 pF	ATC	ATC100B100FW500XB
C202	Chip capacitor, 10 pF	ATC	ATC100B100FW500XB
C203	Capacitor, 100 nF	Digi-Key	PCE3718CT-ND
C204, C216	Capacitor, 10 nF	Digi-Key	TPSE106K050R0400
C205	Capacitor, 10 nF	Digi-Key	587-1818-2-ND
C206, C214	Chip capacitor, 1 nF	Digi-Key	445-1411-2-ND
C207, C213	Chip capacitor, 2.2 nF	Digi-Key	445-1447-2-ND
C208	Chip capacitor, 0.4 pF	ATC	ATC100B0R4BW500XB
C209, C210	Chip capacitor, 0.8 pF	ATC	ATC100B0R8BW500XB
C211, C212	Chip capacitor, 1.3 pF	ATC	ATC100B1R3BW500XB
C217	Capacitor, 100 nF	Digi-Key	PCE3718CT-ND

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

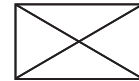
Revision	Date	Data Sheet	Page	Subjects (major changes at each revision)
01	2011-04-29	Advance	all	Advance information for proposed product.
02	2012-07-03	Data Sheet	all	Product released: Specifications updated, set; circuit and other information added.
03	2015-10-29	Data Sheet	1, 2, 12 2	Package changed to H-37275G-6/2. Shipping options: tray shipping no longer available, tape & reel only.

We Listen to Your Comments

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Please send your proposal (including a reference to this document) to:

highpowerRF@infineon.com

To request other information, contact us at:
+1 877 465 3667 (1-877-GO-LDMOS) USA
or +1 408 776 0600 International



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