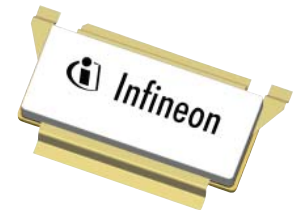


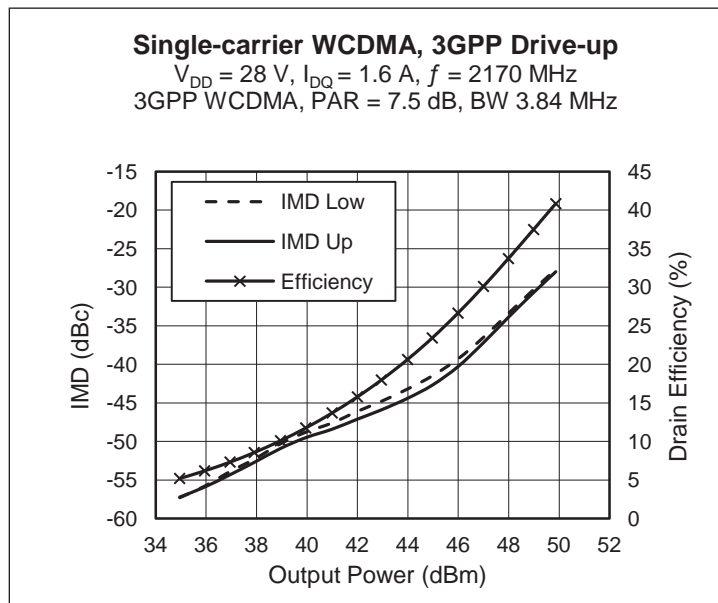
Thermally-Enhanced High Power RF LDMOS FET 200 W, 28 V, 2110 – 2170 MHz

Description

The PTFB212507SH is a 200-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.



PTFB212507SH
Package H-37288G-4/2



Features

- Broadband internal matching
- Wide video bandwidth
- Typical two-carrier WCDMA performance, 2170 MHz, 28 V, 3GPP signal, PAR = 8 dB, 10 MHz carrier spacing
 - Average output power = 40 W
 - Linear gain = 18 dB
 - Efficiency = 27%
 - Intermodulation distortion = -35 dBc
 - Adjacent channel power = -39 dBc
- Typical CW performance, 2170 MHz, 28 V
 - Output power at P_{1dB} = 200 W
 - Efficiency = 52%
 - Gain = 17 dB
- Capable of handling 10:1 VSWR @28 V, 200 W (CW) output power
- Integrated ESD protection
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

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

$V_{DD} = 30\text{ V}$, $I_{DQ} = 1850\text{ mA}$, $P_{OUT} = 50\text{ W avg}$, $f = 2170\text{ MHz}$. 3GPP signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	G_{ps}	16.75	18	19	dB
Drain Efficiency	η_D	25	27.5	—	%
Adjacent Channel Power Ratio	ACPR	—	-36.5	-32	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}	—	—	0.1	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
Gate Leakage Current	$V_{GS} = 12\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 1.6\text{ A}$	V_{GS}	—	2.85	—	V

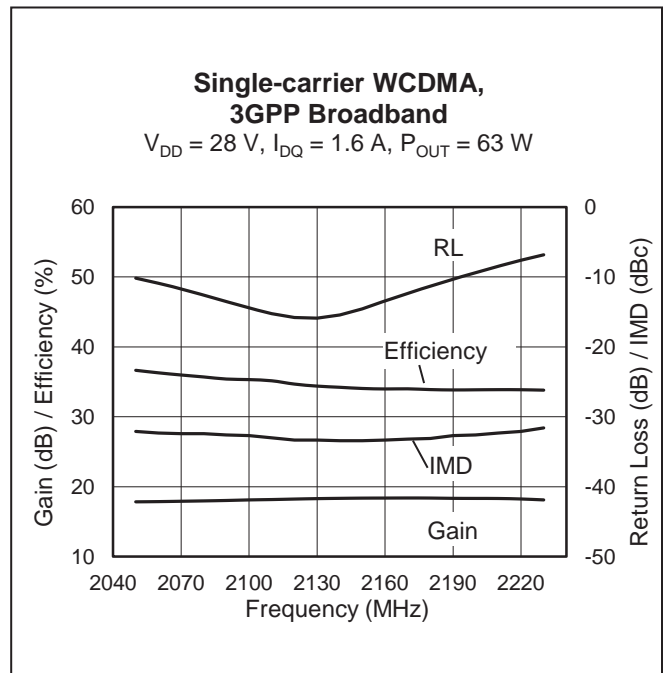
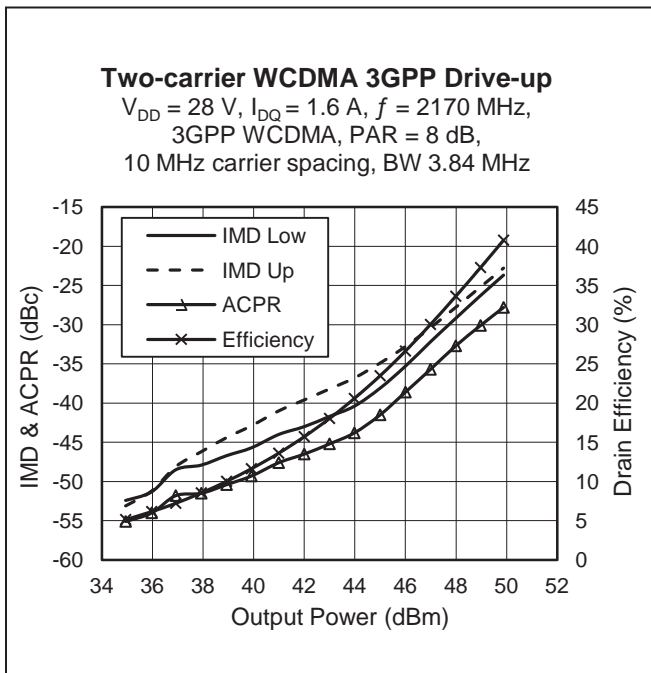
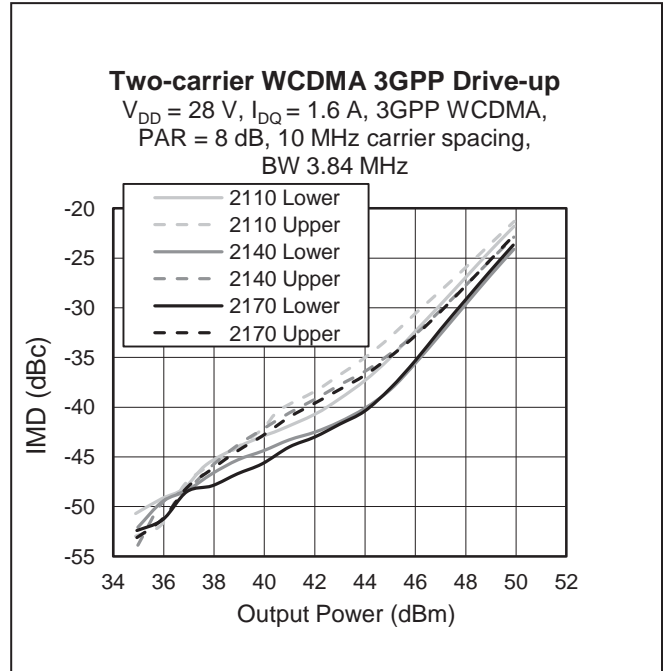
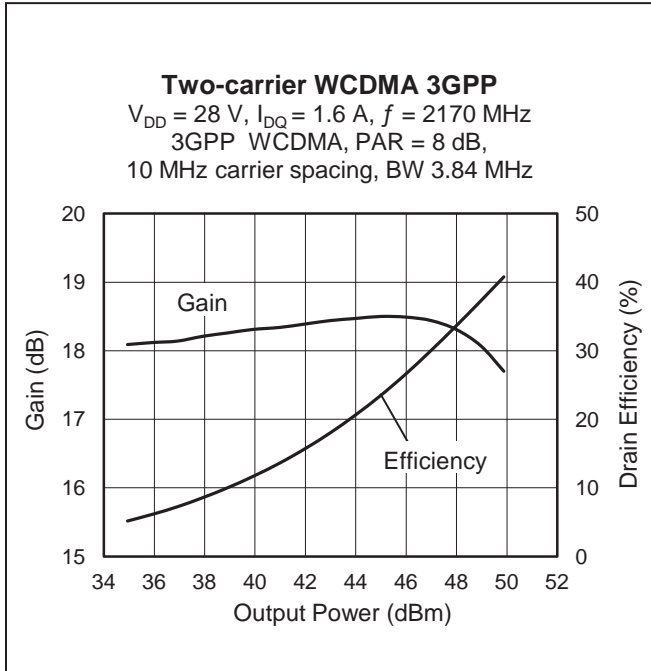
Maximum Ratings

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 ($T_{CASE} = 70^{\circ}\text{C}$, 30 V V_{DD} , 200 W CW)	$R_{\theta JC}$	0.26	$^{\circ}\text{C/W}$

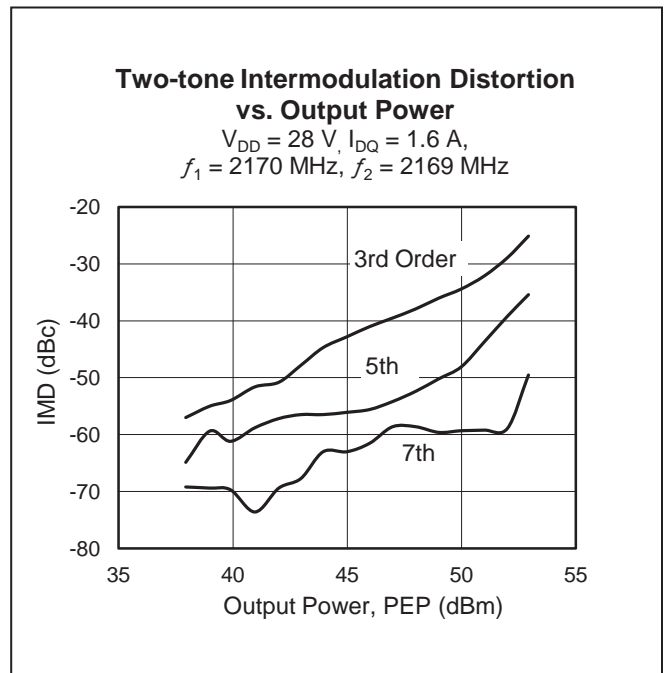
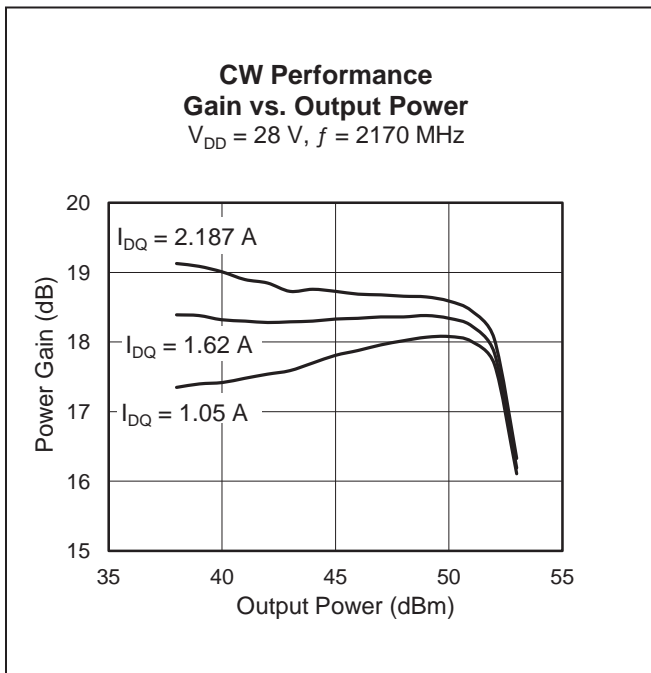
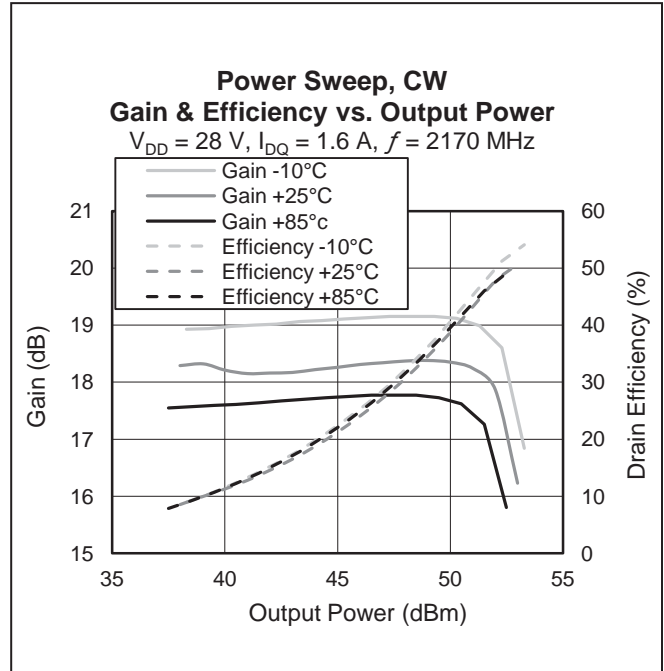
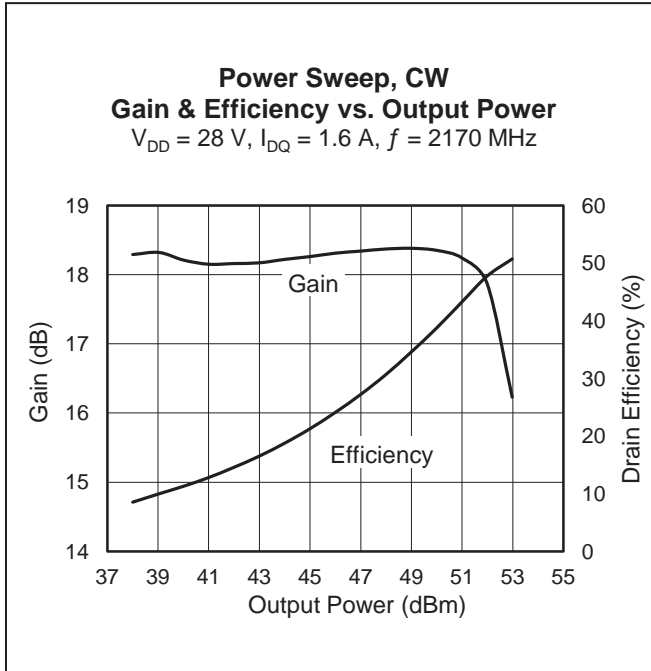
Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PTFB212507SH V2 R2	PTFB212507SHV2R2XTMA1	H-37288G-4/2, ceramic open-cavity, formed leads	Tape & Reel, 250 pcs

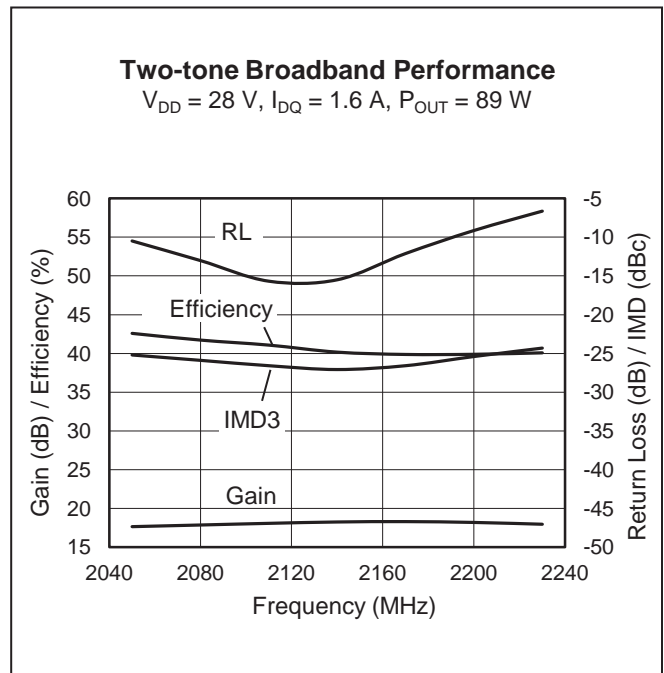
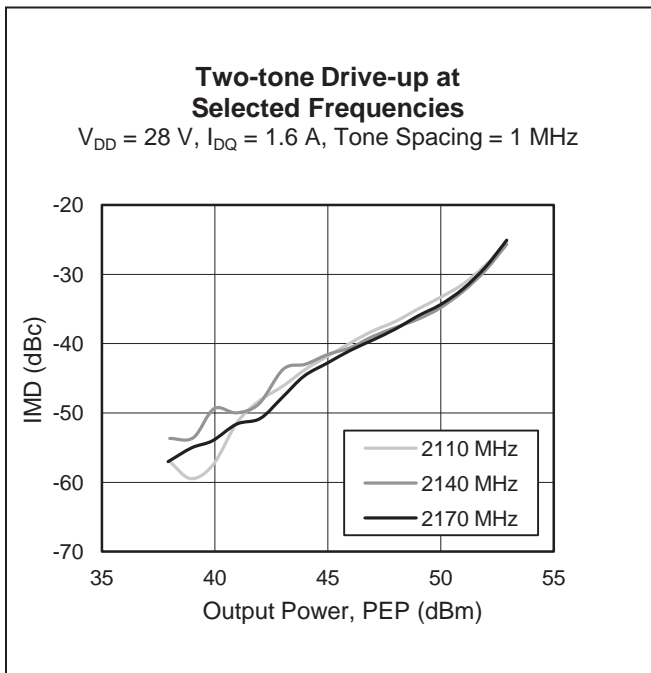
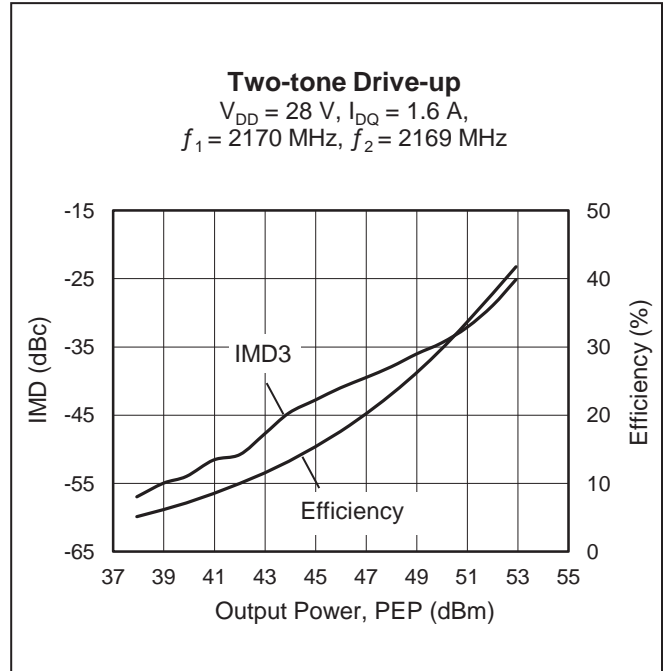
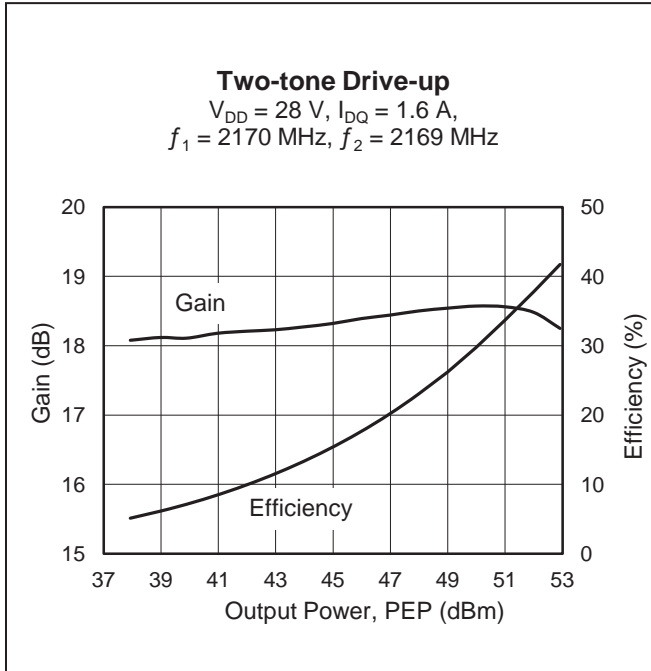
Typical Performance (data taken in a production test fixture)



Typical Performance (cont.)

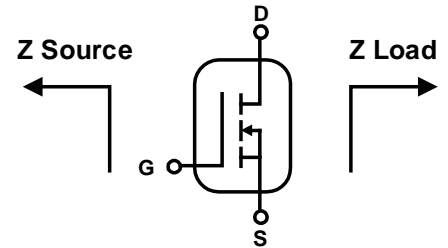


Typical Performance (cont.)



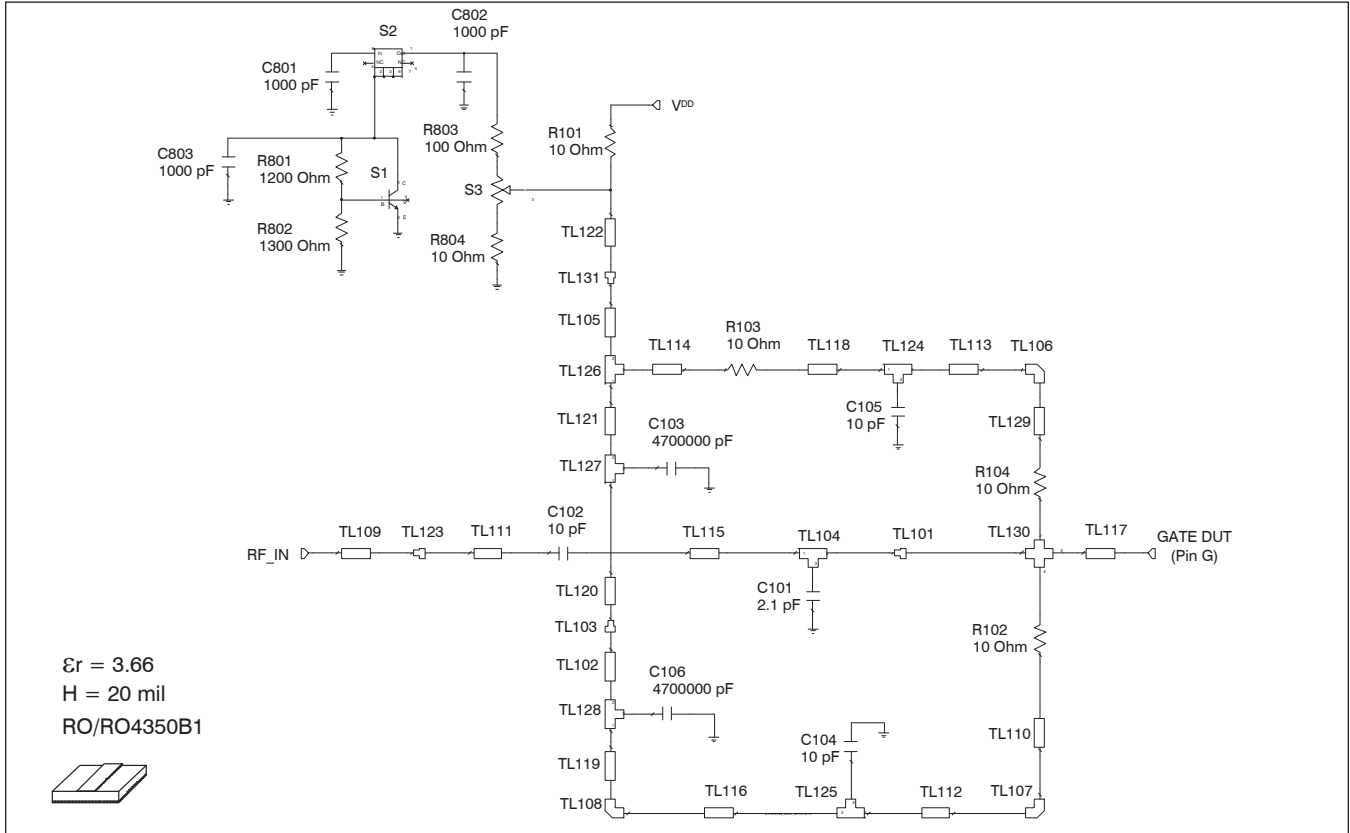
Broadband Circuit Impedance

Frequency	Z Source Ω		Z Load Ω	
	R	jX	R	jX
2080	2.89	-6.50	1.58	-4.39
2110	2.74	-6.29	1.55	-4.29
2140	5.61	-6.09	1.52	-4.20
2170	2.48	-5.89	1.49	-4.11
2200	2.37	-5.70	1.45	-4.02

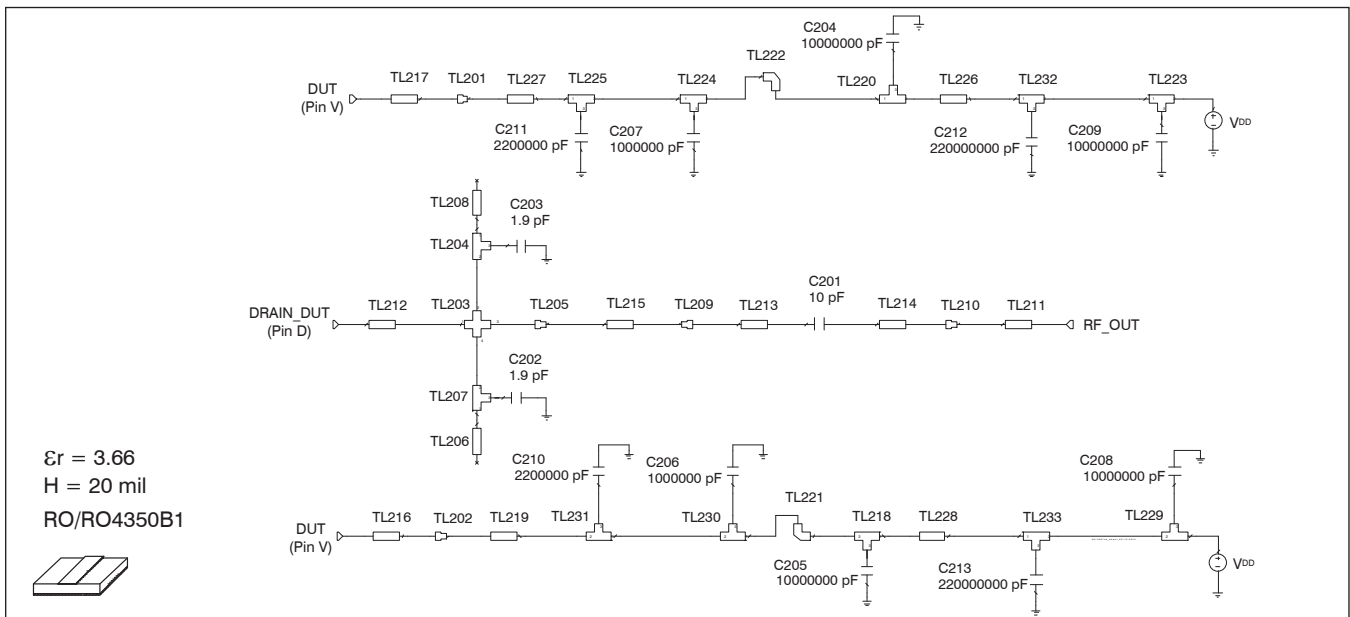


See next page for reference circuit information

Reference Circuit



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



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

Reference Circuit (cont.)

Reference Circuit Assembly

DUT	PTFB212507SH-V2
Test Fixture Part No.	LTN/PTFB212507SH
PCB	Rogers 4350, 0.508 mm [0.020"] 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>

Electrical Characteristics at 2170 MHz

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
Input			
TL101		W1 = 19.050, W2 = 1.270	W1 = 750, W2 = 50
TL102	0.017 λ , 54.17 Ω	W = 1.016, L = 1.448	W = 40, L = 57
TL103		W1 = 0.762, W2 = 1.016	W1 = 30, W2 = 40
TL104	0.015 λ , 47.12 Ω	W1 = 1.270, W2 = 1.270, W3 = 1.270	W1 = 50, W2 = 50, W3 = 50
TL105	0.018 λ , 54.17 Ω	W = 1.016, L = 1.524	W = 40, L = 60
TL106, TL107, TL108		W = 1.016,	W = 40
TL109	0.032 λ , 47.12 Ω	W = 1.270, L = 2.652	W = 50, L = 104
TL110, TL129	0.014 λ , 54.17 Ω	W = 1.016, L = 1.143	W = 40, L = 45
TL111	0.016 λ , 31.24 Ω	W = 2.286, L = 1.270	W = 90, L = 50
TL112, TL113	0.095 λ , 54.17 Ω	W = 1.016, L = 8.001	W = 40, L = 315
TL114	0.015 λ , 54.17 Ω	W = 1.016, L = 1.270	W = 40, L = 50
TL115	0.154 λ , 47.12 Ω	W = 1.270, L = 12.802	W = 50, L = 504
TL116	0.058 λ , 54.17 Ω	W = 1.016, L = 4.831	W = 40, L = 190
TL117	0.060 λ , 4.99 Ω	W = 19.050, L = 4.572	W = 750, L = 180
TL118	0.030 λ , 54.17 Ω	W = 1.016, L = 2.540	W = 40, L = 100
TL119	0.044 λ , 54.17 Ω	W = 1.016, L = 3.670	W = 40, L = 145
TL120	0.149 λ , 63.89 Ω	W = 0.762, L = 12.581	W = 30, L = 495
TL121	0.044 λ , 63.89 Ω	W = 0.762, L = 3.759	W = 30, L = 148
TL122	0.031 λ , 34.72 Ω	W = 1.981, L = 2.540	W = 78, L = 100
TL123		W1 = 1.270, W2 = 2.286	W1 = 50, W2 = 90
TL124, TL125	0.015 λ , 54.17 Ω	W1 = 1.016, W2 = 1.016, W3 = 1.270	W1 = 40, W2 = 40, W3 = 50
TL126	0.012 λ , 54.17 Ω	W1 = 1.016, W2 = 1.270, W3 = 1.016	W1 = 40, W2 = 50, W3 = 40
TL127	0.012 λ , 63.89 Ω	W1 = 0.762, W2 = 0.762, W3 = 1.016	W1 = 30, W2 = 30, W3 = 40
TL128	0.012 λ , 54.17 Ω	W1 = 1.016, W2 = 1.016, W3 = 1.016	W1 = 40, W2 = 40, W3 = 40
TL130		W1 = 19.050, W2 = 1.016, W3 = 19.050 W4 = 1.016	W1 = 750, W2 = 40, W3 = 750, W4 = 40
TL131		W1 = 1.016, W2 = 1.981	W1 = 40, W2 = 78

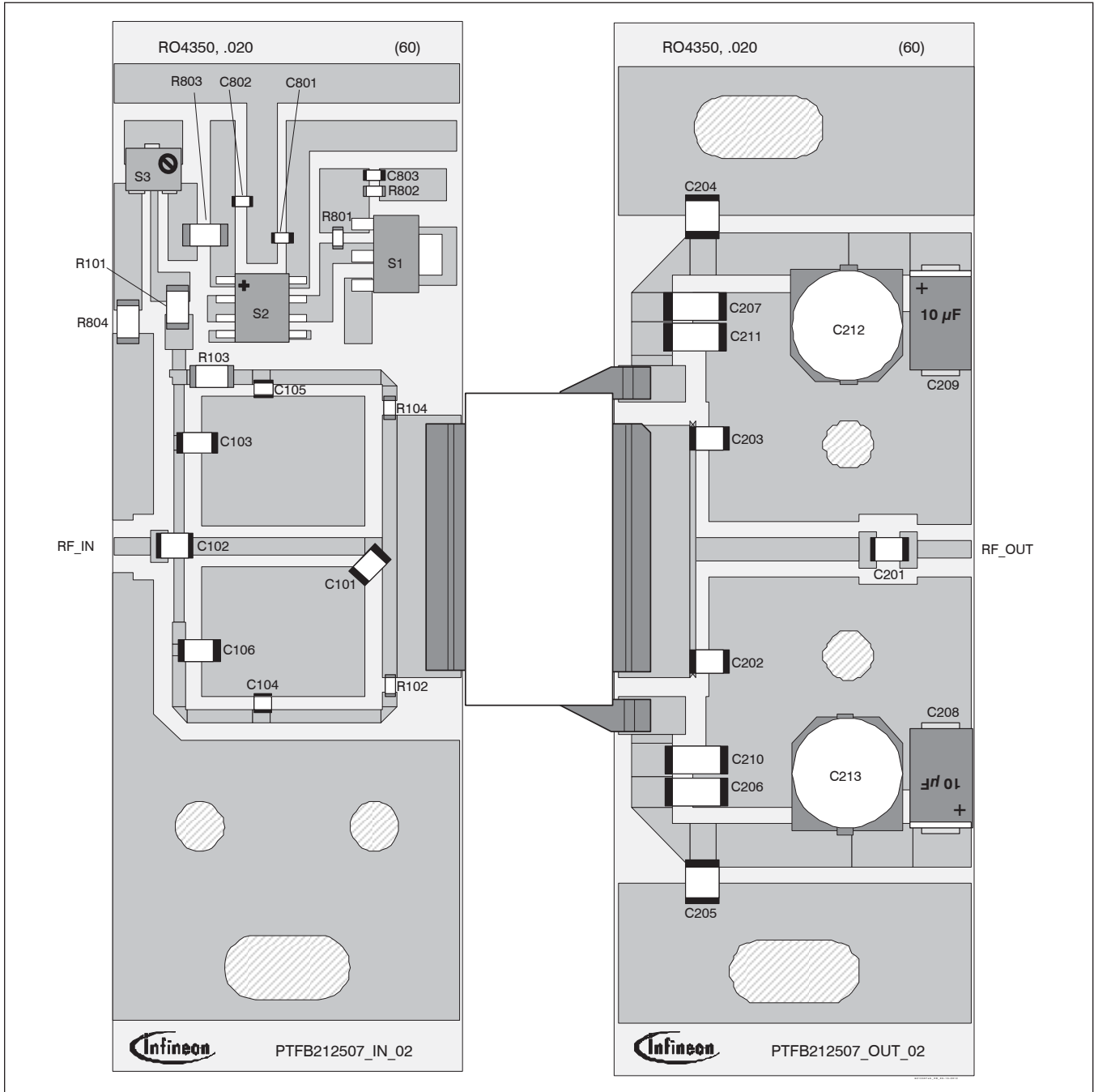
table continued on page 9

Reference Circuit (cont.)

Electrical Characteristics at 2170 MHz

Transmission Line	Electrical Characteristics	Dimensions: mm	Dimensions: mils
Output			
TL201		W1 = 3.048, W2 = 4.877	W1 = 120, W2 = 192
TL202		W1 = 3.048, W2 = 4.928	W1 = 120, W2 = 194
TL203		W1 = 14.992, W2 = 0.508, W3 = 14.992 W4 = 0.508	W1 = 590, W2 = 20, W3 = 590, W4 = 20
TL204, TL207	0.015 λ , 78.27 Ω	W1 = 0.508, W2 = 0.508, W3 = 1.270	W1 = 20, W2 = 20, W3 = 50
TL205		W1 = 18.263, W2 = 1.651	W1 = 719, W2 = 65
TL206	0.004 λ , 78.27 Ω	W = 0.508, L = 0.366	W = 20, L = 14
TL208	0.004 λ , 78.27 Ω	W = 0.508, L = 0.363	W = 20, L = 14
TL209		W1 = 1.651, W2 = 2.540	W1 = 65, W2 = 100
TL210		W1 = 1.270, W2 = 2.540	W1 = 50, W2 = 100
TL211	0.047 λ , 47.12 Ω	W = 1.270, L = 3.912	W = 50, L = 154
TL212	0.067 λ , 5.19 Ω	W = 18.263, L = 5.080	W = 719, L = 200
TL213, TL214	0.016 λ , 28.85 Ω	W = 2.540, L = 1.270	W = 100, L = 50
TL215	0.141 λ , 39.51 Ω	W = 1.651, L = 11.582	W = 65, L = 456
TL216	0.036 λ , 16.90 Ω	W = 4.928, L = 2.794	W = 194, L = 110
TL217	0.035 λ , 17.05 Ω	W = 4.877, L = 2.794	W = 192, L = 110
TL218, TL220	0.023 λ , 25.04 Ω	W1 = 3.048, W2 = 3.048, W3 = 1.829	W1 = 120, W2 = 120, W3 = 72
TL219, TL227	0.010 λ , 25.04 Ω	W = 3.048, L = 0.762	W = 120, L = 30
TL221, TL222		W = 3.048	W = 120
TL223, TL229, TL232, TL233	0.054 λ , 25.04 Ω	W1 = 3.048, W2 = 3.048, W3 = 4.318	W1 = 120, W2 = 120, W3 = 170
TL224, TL225, TL230, TL231	0.029 λ , 25.04 Ω	W1 = 3.048, W2 = 3.048, W3 = 2.286	W1 = 120, W2 = 120, W3 = 90
TL226, TL228	0.119 λ , 25.04 Ω	W = 3.048, L = 9.576	W = 120, L = 377

Reference Circuit (cont.)



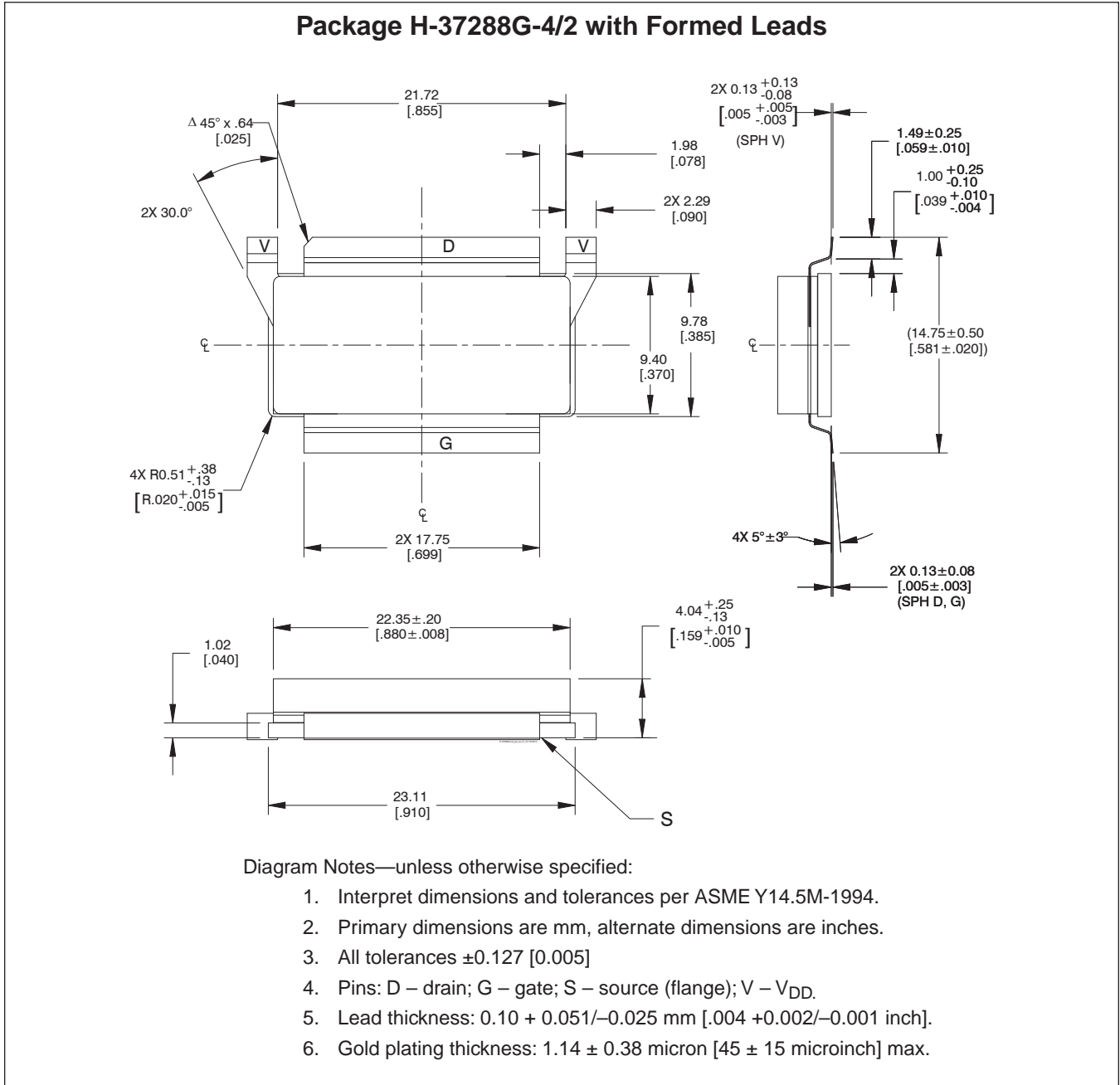
Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

Components Information

Component	Description	Supplier	P/N
Input			
C101	Chip capacitor, 2.1 pF	ATC	ATC100B2R1CW500XB
C102	Chip capacitor, 10 pF	ATC	ATC100B100CW500XB
C103, C106	Chip capacitor, 4.7 μF	Digi-Key	493-2372-2-ND
C104, C105	Chip capacitor, 10 pF	ATC	ATC100A100JW500XB
C801, C802, C803	Capacitor, 1000 pF	Digi-Key	PCC1772CT-ND
R101, R103, R804	Resistor, 10 Ohm	Digi-Key	P10ECT-ND
R102, R104	Resistor, 10 Ohm	Digi-Key	P10GCT-ND
R801	Resistor, 1200 Ohm	Digi-Key	P1.2KGCT-ND
R802	Resistor, 1300 Ohm	Digi-Key	P1.3KGCT-ND
R803	Resistor, 100 Ohm	Digi-Key	P101ECT-ND
S1	Transistor	Digi-Key	BCP56
S2	Voltage Regulator	Digi-Key	LM78L05ACM-ND
S3	Potentiometer, 2k ohm	Digi-Key	3224W-202ECT-ND
Output			
C201	Chip capacitor, 10 pF	ATC	ATC100A100GW150XB
C202, C203	Chip capacitor, 1.9 pF	ATC	ATC100B1R9CW500XB
C204, C205	Capacitor, 10 μF	Digi-Key	587-1818-2-ND
C206, C207	Chip capacitor, 1 μF	Digi-Key	445-1411-2-ND
C208, C209	Capacitor, 10 μF	Digi-Key	281M5002106K
C210, C211	Chip capacitor, 2.2 μF	Digi-Key	445-1447-2-ND
C212, C213	Capacitor, 220 μF	Digi-Key	PCE4444TR-ND

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

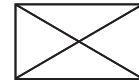
Revision	Date	Data Sheet	Page	Subjects (major changes at each revision)
01	2012-01-23	Advance	all	Proposed specification for new product development.
02	2012-05-16	Production	all	All specifications finalized, circuit and performance information added.
03	2015-10-30	Production	1, 2, 12	Package changed from H-34288G-4/2 to H-37288G-4/2.

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Edition 2015-10-30

Published by
Infineon Technologies AG
85579 Neubiberg, Germany

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