

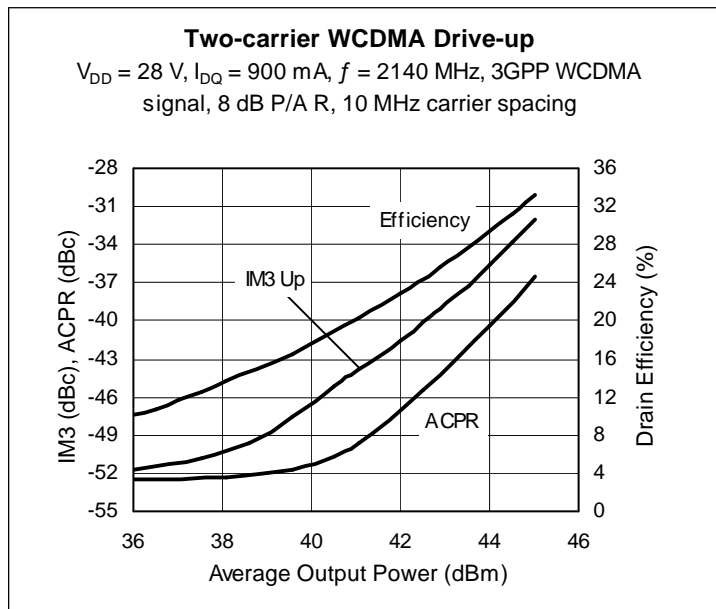
Thermally-Enhanced High Power RF LDMOS FET 100 W, 2110 – 2170 MHz

Description

The PTFA211001E is a thermally-enhanced, 100-watt, internally-matched **GOLDMOS®** FET intended for WCDMA applications. It is characterized for single- and two-carrier WCDMA operation from 2110 to 2170 MHz. Thermally-enhanced packaging provides the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.



PTFA211001E
Package H-30248-2



Features

- Thermally-enhanced package, Pb-free and RoHS-compliant
- Broadband internal matching
- Typical two-carrier WCDMA performance at 2140 MHz, 28 V
 - Average output power = 23 W
 - Linear Gain = 16 dB
 - Efficiency = 28.5%
 - Intermodulation distortion = -37 dBc
 - Adjacent channel power = -41 dBc
- Typical CW performance, 2170 MHz, 28 V
 - Output power at P-1dB = 125 W
 - Efficiency = 57%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 100 W (CW) output power

RF Characteristics

WCDMA Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 23\text{ W}$ average

$f_1 = 2135\text{ MHz}$, $f_2 = 2145\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15	16	—	dB
Drain Efficiency	η_D	27	28.5	—	%
Intermodulation Distortion	IMD	—	-37	-36	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	$V_{GS} = 0\text{ V}, I_{DS} = 10\ \mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.08	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ} = 900\text{ mA}$	V_{GS}	2.0	2.5	3.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

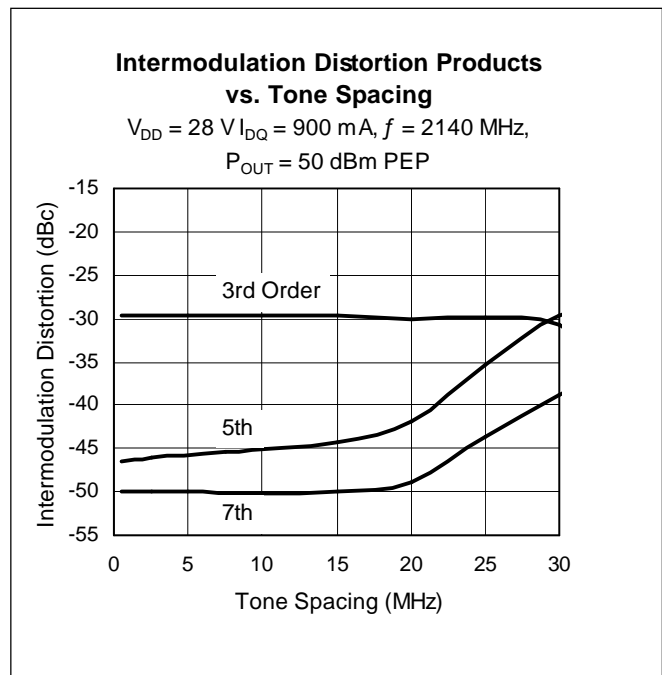
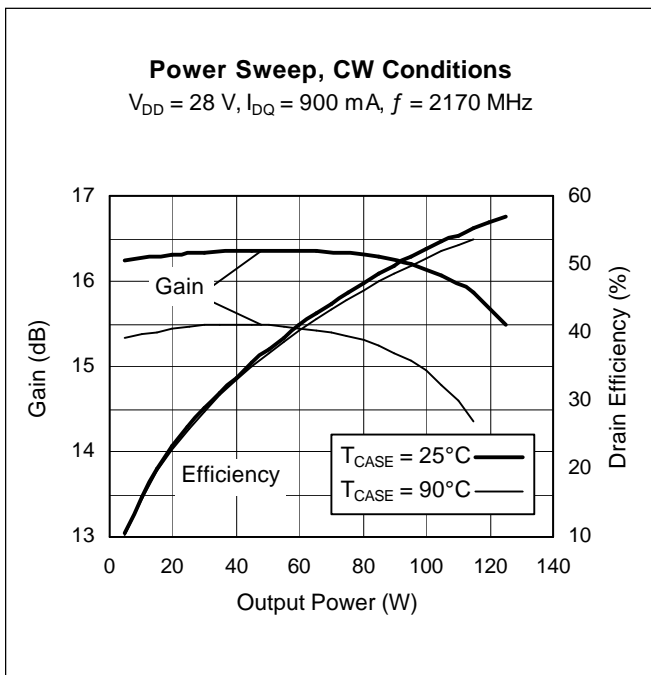
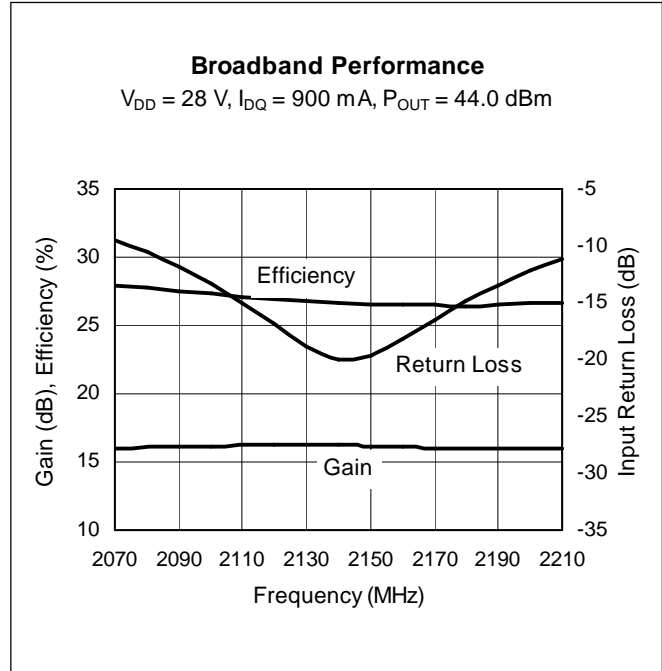
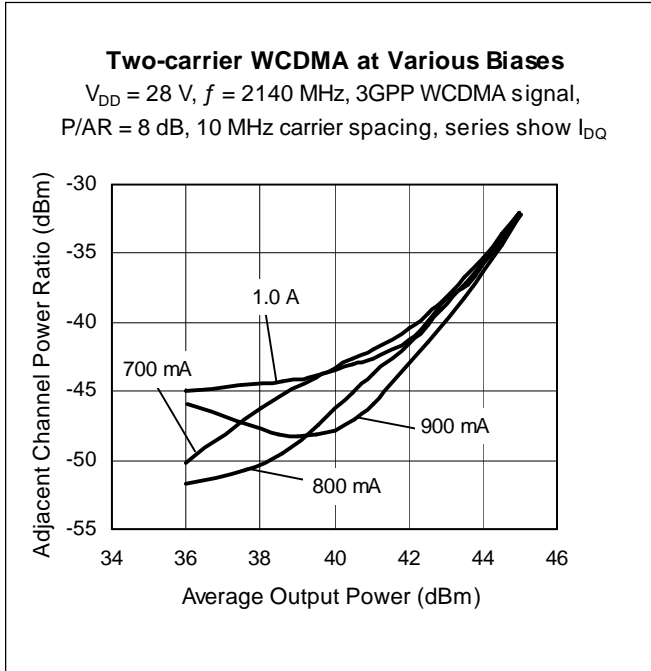
Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	-0.5 to +12	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Total Device Dissipation	P_D	417	W
Above 25 $^{\circ}\text{C}$ derate by		2.38	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}, 100\text{ W CW}$)	$R_{\theta JC}$	0.42	$^{\circ}\text{C/W}$

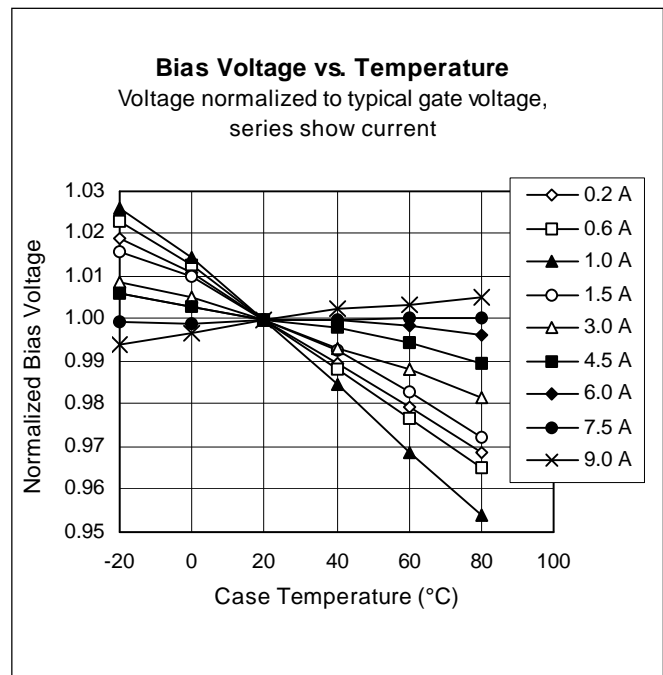
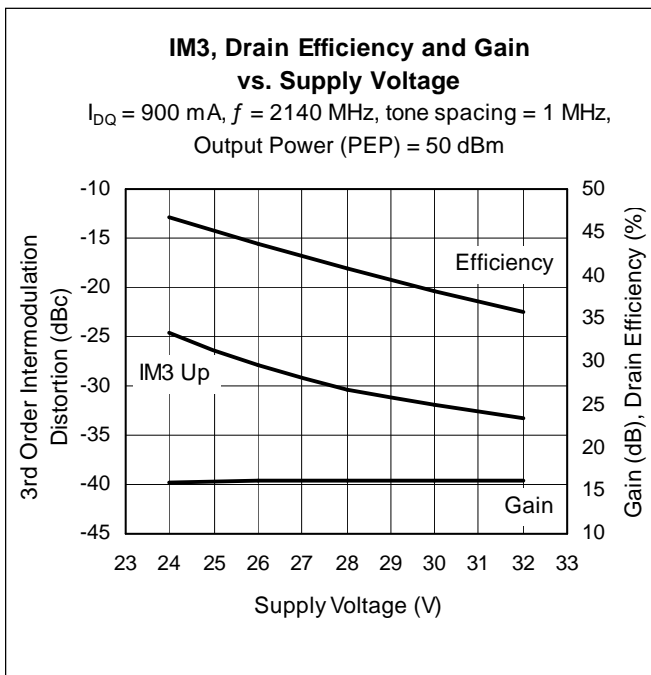
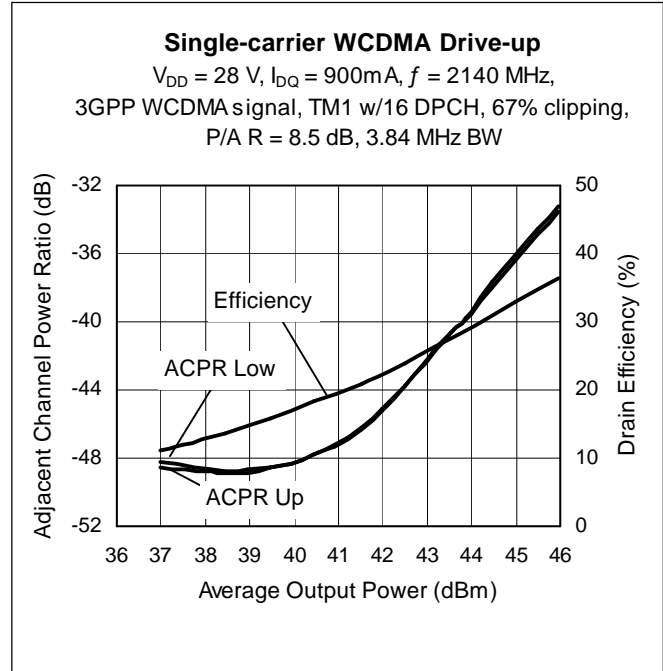
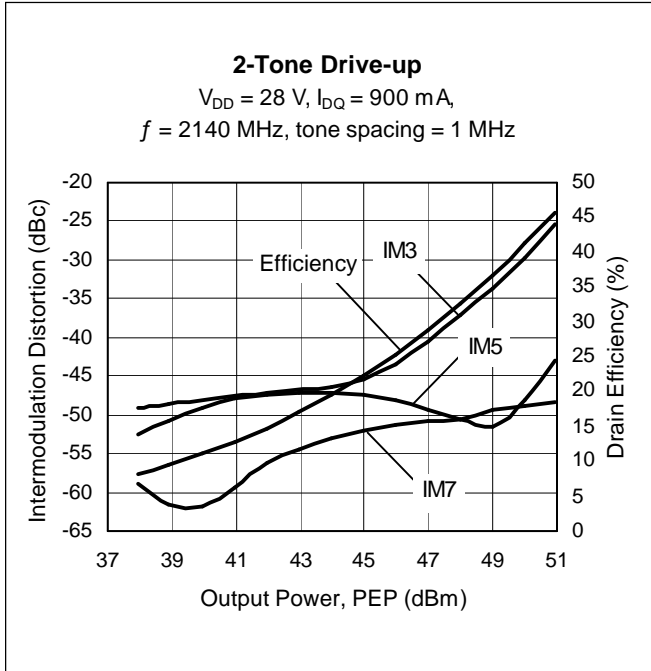
Ordering Information

Type and Version	Package Outline	Package Description	Marking
PTFA211001E V1	H-30248-2	Thermally-enhanced slotted flange, single-ended	PTFA211001E

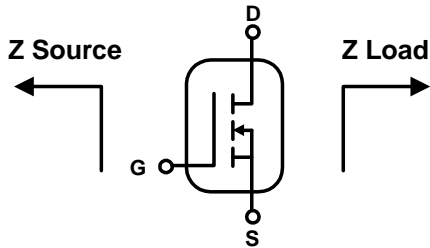
Typical Performance (data taken in a production test fixture)



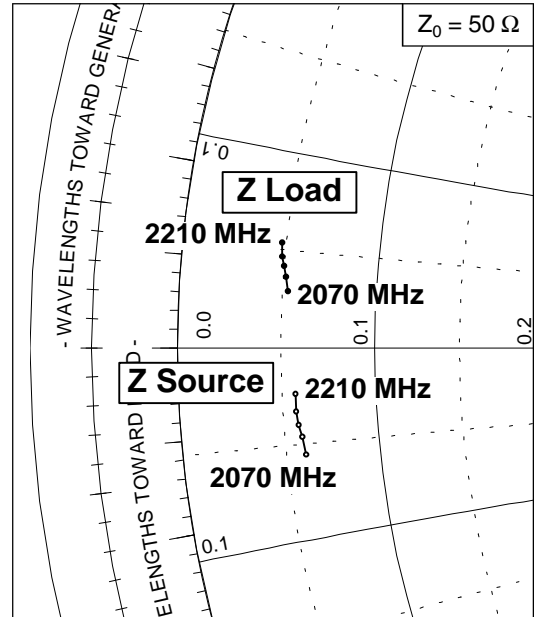
Typical Performance (cont.)



Broadband Circuit Impedance

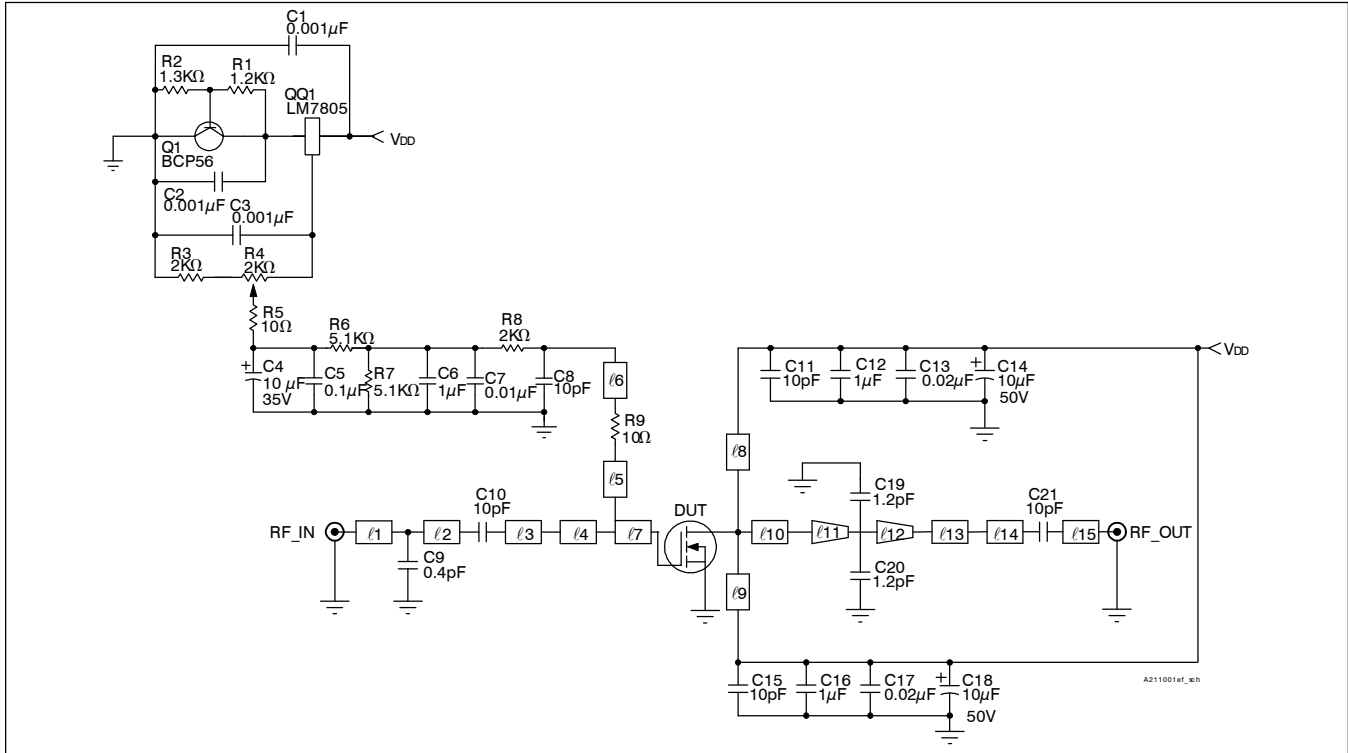


Frequency MHz	Z Source W		Z Load W	
	R	jX	R	jX
2070	3.02	-2.80	2.64	1.47
2110	2.96	-2.32	2.57	1.84
2140	2.89	-2.01	2.51	2.10
2170	2.84	-1.66	2.44	2.34
2210	2.85	-1.20	2.40	2.70



See next page for circuit information

Reference Circuit



Reference circuit schematic for $f = 2140$ MHz

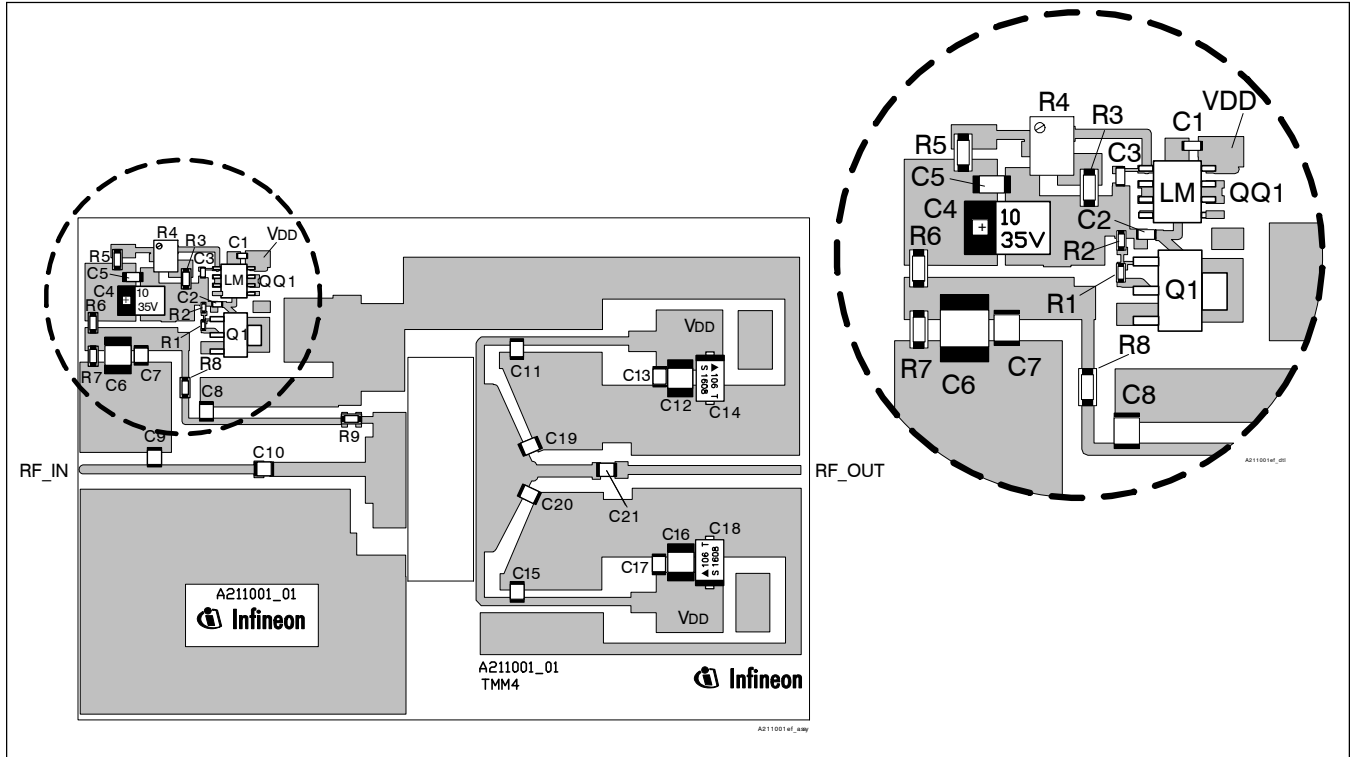
Circuit Assembly Information

DUT	PTFA211001E	LDMOS Transistor	
PCB	0.76 mm [.030"] thick, $\epsilon_r = 4.5$	Rogers TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 2140 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
l_1	0.130 λ , 52.0 Ω	9.96 x 1.30	0.392 x 0.051
l_2	0.235 λ , 52.0 Ω	18.01 x 1.30	0.709 x 0.051
l_3	0.191 λ , 39.0 Ω	14.30 x 2.08	0.563 x 0.082
l_4	0.018 λ , 11.5 Ω	1.22 x 10.03	0.048 x 0.395
l_5	0.024 λ , 64.0 Ω	1.88 x 0.89	0.074 x 0.035
l_6	0.261 λ , 64.0 Ω	20.32 x 0.89	0.800 x 0.035
l_7	0.073 λ , 7.0 Ω	4.98 x 17.68	0.196 x 0.696
l_8, l_9	0.170 λ , 55.0 Ω	13.08 x 1.17	0.515 x 0.046
l_{10}	0.043 λ , 5.0 Ω	2.95 x 25.40	0.116 x 1.000
l_{11} (taper)	0.059 λ , 5.0 Ω / 17.4 Ω	4.01 x 25.40 / 6.17	0.158 x 1.000 / 0.243
l_{12} (taper)	0.033 λ , 17.4 Ω / 42.0 Ω	2.36 x 6.17 / 1.83	0.093 x 0.243 / 0.072
l_{13}	0.124 λ , 42.0 Ω	9.30 x 1.83	0.366 x 0.072
l_{14}	0.381 λ , 50.0 Ω	29.11 x 1.37	1.146 x 0.054

¹Electrical characteristics are rounded.

Reference Circuit (cont.)

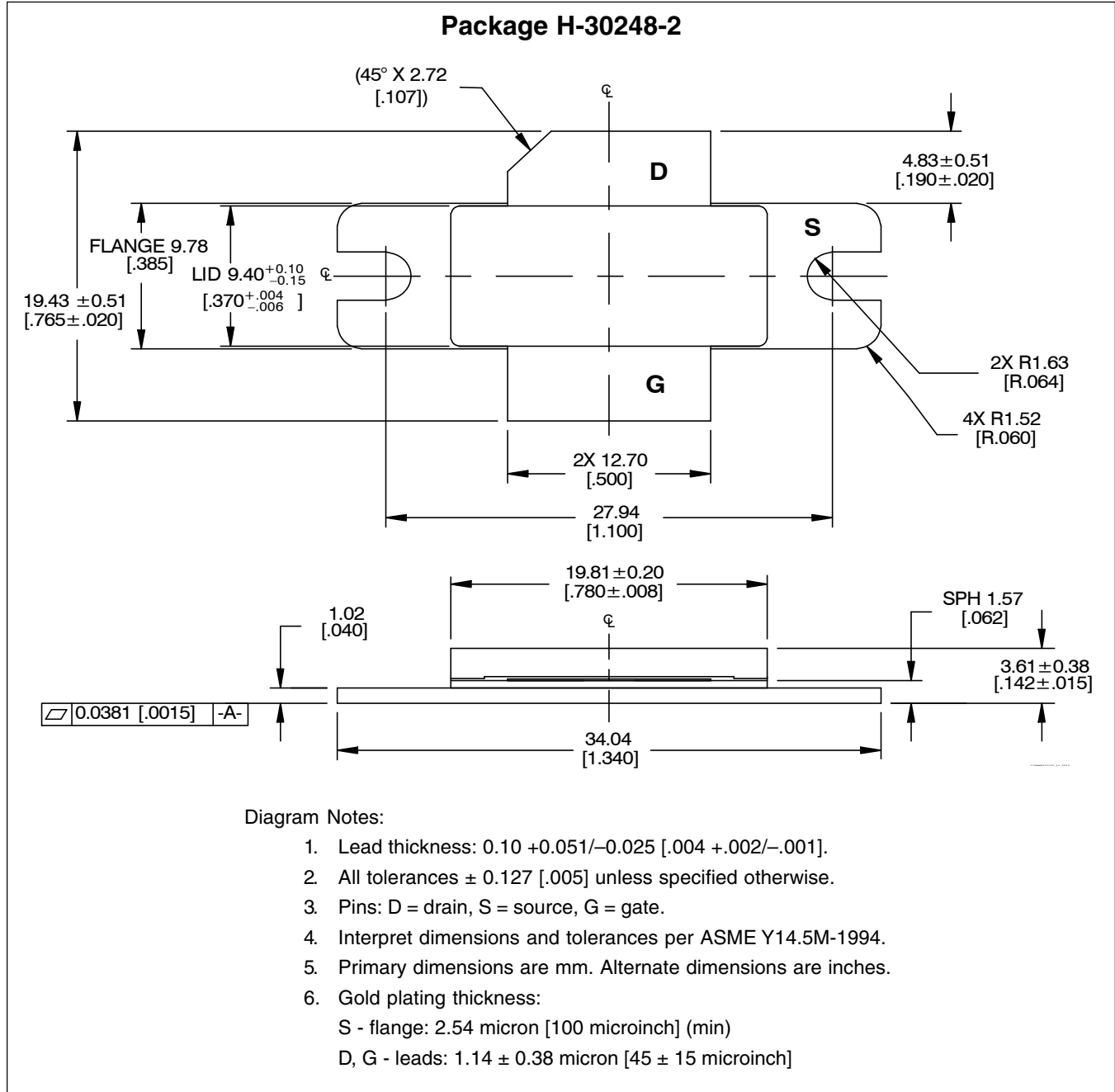


Reference circuit assembly diagram* (not to scale)

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 μ F	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 μ F, 35 V	Digi-Key	PCS6106TR-ND
C5	Capacitor, 0.1 μ F	Digi-Key	PCC104BCT-ND
C6, C12, C16	Capacitor, 1 μ F	ATC	920C105
C7	Capacitor, 0.01 μ F	Digi-Key	200B 103
C8, C10, C11, C15, C21	Ceramic capacitor, 10 pF	ATC	100B 100
C9	Ceramic capacitor, 0.4 pF	ATC	100B 0R4
C13, C17	Capacitor, 0.02 μ F	Digi-Key	200B203
C14, C18	Tantalum capacitor, 10 μ F, 50 V	Gerrette Electronics	TPS106K050R0400
C19, C20	Ceramic capacitor, 1.2 pF	ATC	100B 1R2
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip resistor 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip resistor 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3, R8	Chip resistor 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer, 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R9	Chip resistor 10 ohms	Digi-Key	P10ECT-ND
R6, R7	Chip resistor 5.1 k-ohms	Digi-Key	P5.1KECT-ND

¹Gerber Files for this circuit available on our Web site: www.infineon.com/rfpower

Package Outline Specifications



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

Previous Version: 2005-02-04, Data Sheet

Page	Subjects (major changes since last revision)
All	Remove references to alternate products.

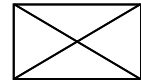
We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all? Your feedback will help us to continuously improve the quality of this document.

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



GOLDMOS® is a registered trademark of Infineon Technologies AG.

Edition 2008-03-04

Published by
Infineon Technologies AG
81726 München, Germany

© Infineon Technologies AG 2004.
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.infineon.com/rfpower).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.