

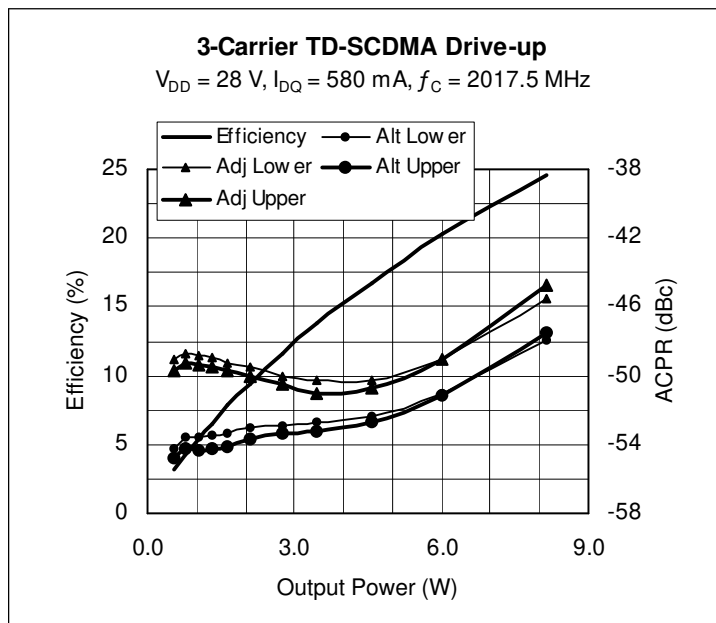
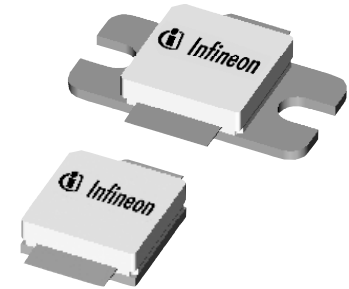
Thermally-Enhanced High Power RF LDMOS FETs 45 W, 2010 – 2025 MHz and 2110 – 2170 MHz

Description

The PTF210451E and PTF210451F are 45-watt internally-matched *GOLDMOS*® FETs intended for TD-SCDMA applications from 2010 to 2025 MHz, and WCDMA applications from 2110 to 2170 MHz. Thermally-enhanced packaging provides the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.

PTF210451E
 Package H-30265-2

PTF210451F
 Package H-31265-2



Features

- Thermally-enhanced packages, Pb-free and RoHS-compliant
- Internal matching for wideband performance
- Typical three-carrier TD-SCDMA performance
 - Average output power = 3 W
 - Gain = 14 dB
 - Efficiency = 12.5%
 - ACPR = -50 dBc
- Typical CW performance
 - Output power at P-1dB = 50 W
 - Linear gain = 14 dB
 - Efficiency = 53%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI Drift
- Capable of handling 10:1 VSWR @ 28 V, 45 W (CW) output power

RF Characteristics

WCDMA Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 11.5\text{ W AVG}$

$f_1 = 2140\text{ MHz}$, $f_2 = 2150\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Intermodulation Distortion	IMD	—	-37	—	dBc
Gain	G_{ps}	—	14	—	dB
Drain Efficiency	η_D	—	27	—	%

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$, $P_{OUT} = 45\text{ W PEP}$, $f = 2170\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	13	14	—	dB
Drain Efficiency	η_D	35	38	—	%
Intermodulation Distortion	IMD	—	-32	-30	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_D = 10\text{ }\mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.2	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 500\text{ mA}$	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

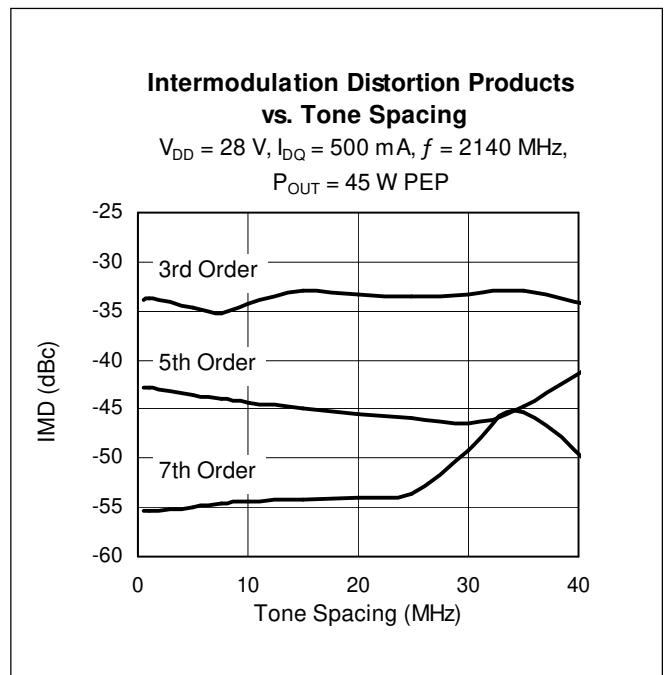
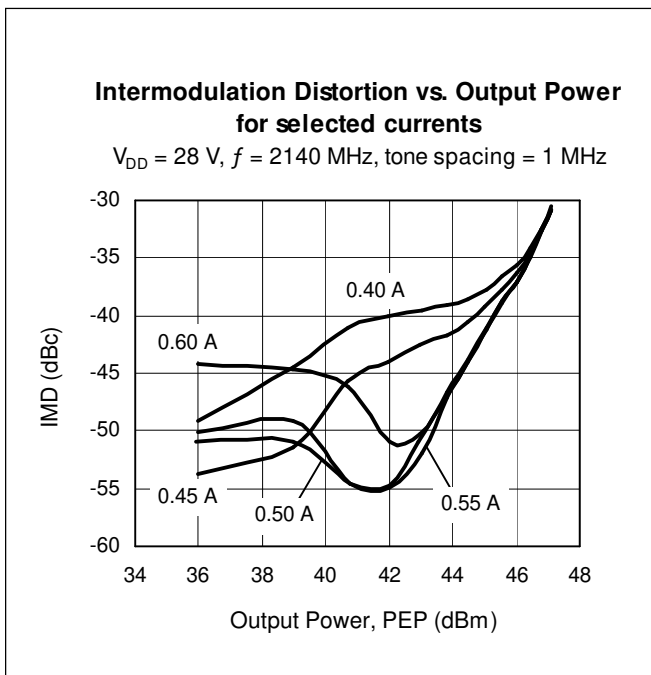
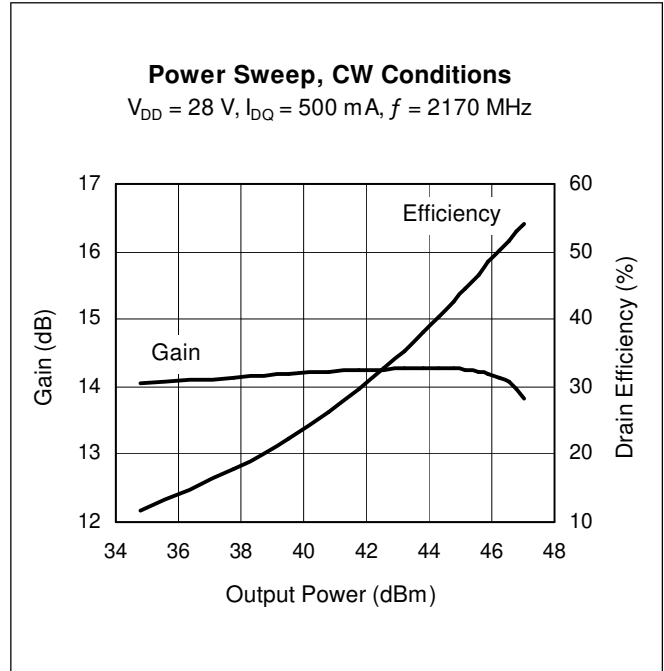
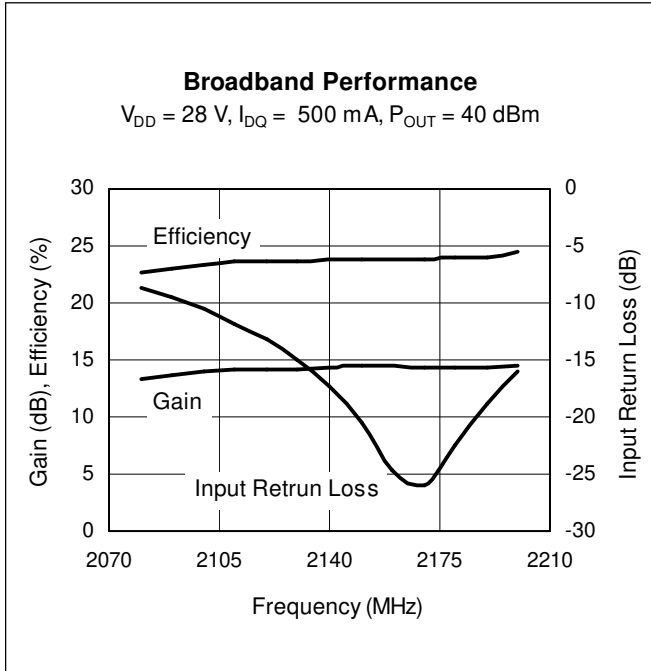
Maximum Ratings

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	175	W
Above 25 $^{\circ}\text{C}$ derate by		1.0	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 45 W CW)	$R_{\theta JC}$	1.0	$^{\circ}\text{C/W}$

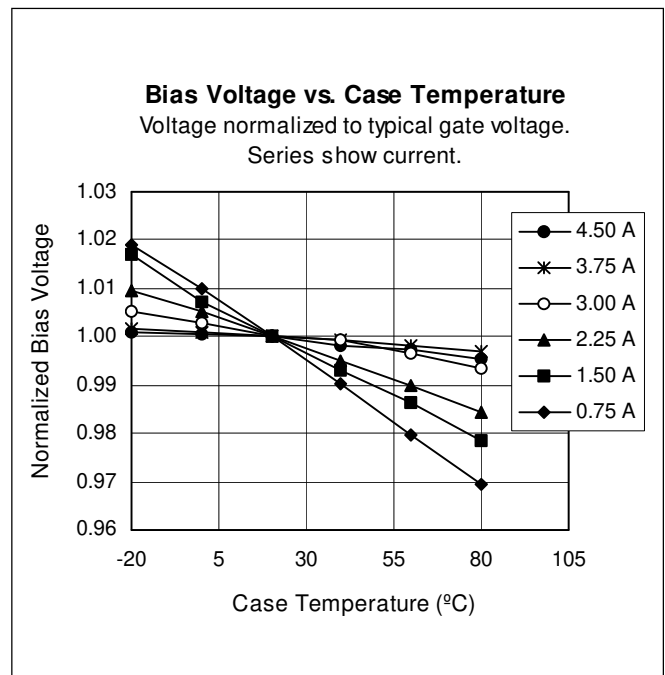
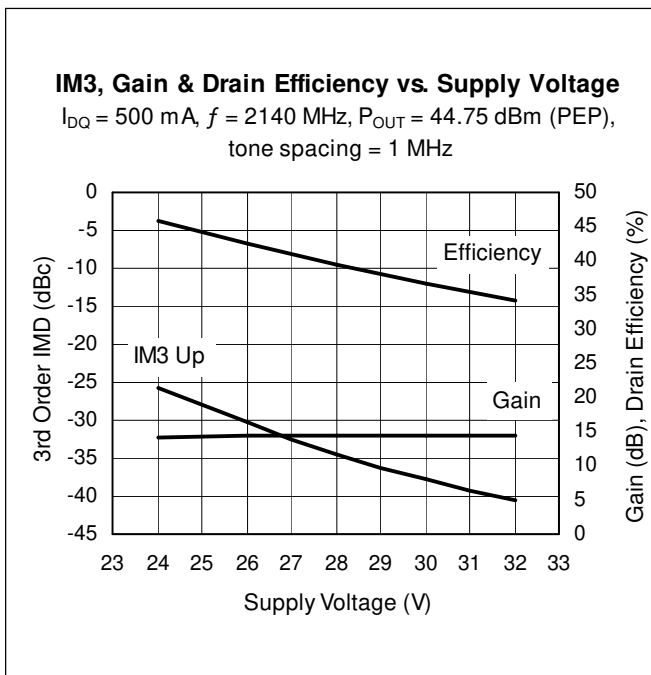
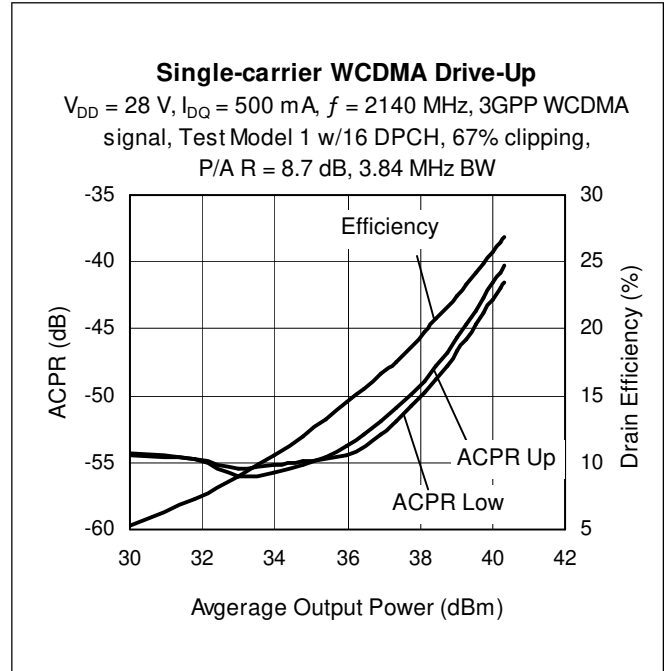
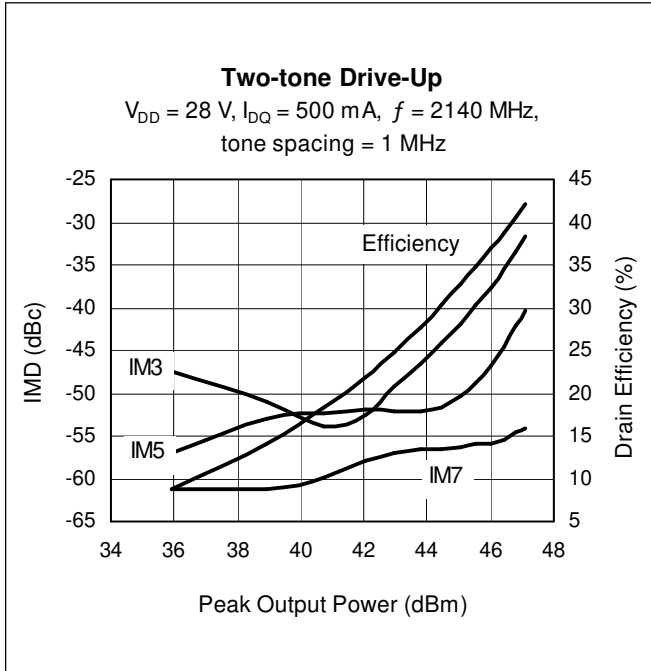
Ordering Information

Type and Version	Package Outline	Package Description	Marking
PTF210451E V1	H-30265-2	Thermally-enhanced slotted flange, single-ended	PTF210451E
PTF210451F V1	H-31265-2	Thermally-enhanced earless flange, single-ended	PTF210451F

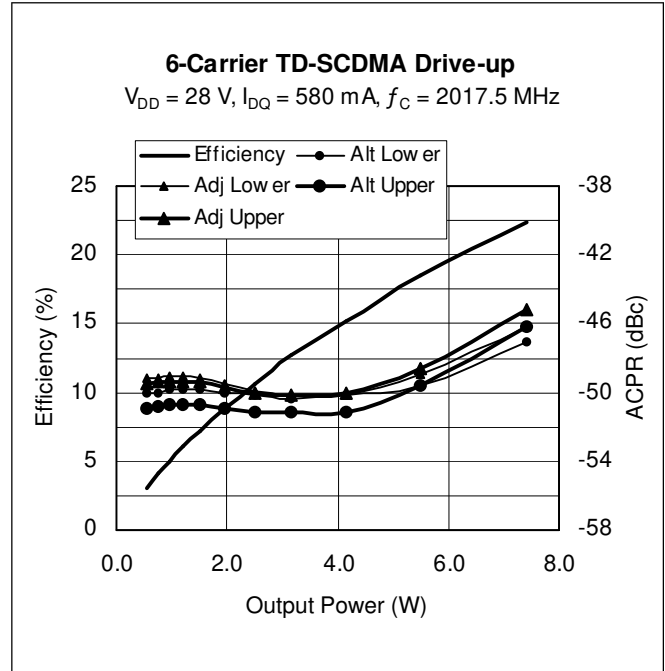
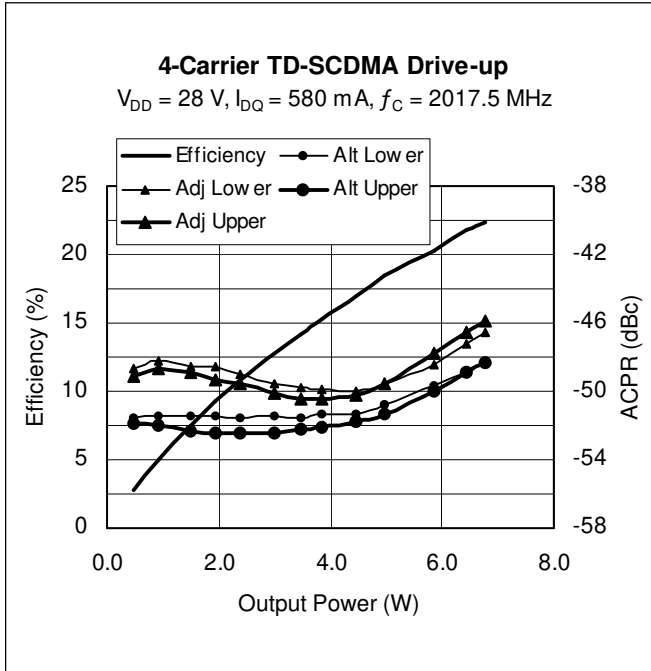
Typical Performance (data taken in production test fixture)



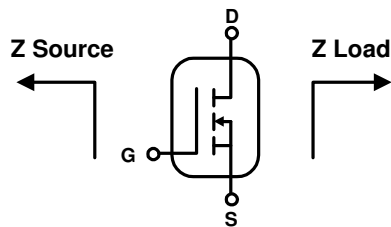
Typical Performance (cont.)



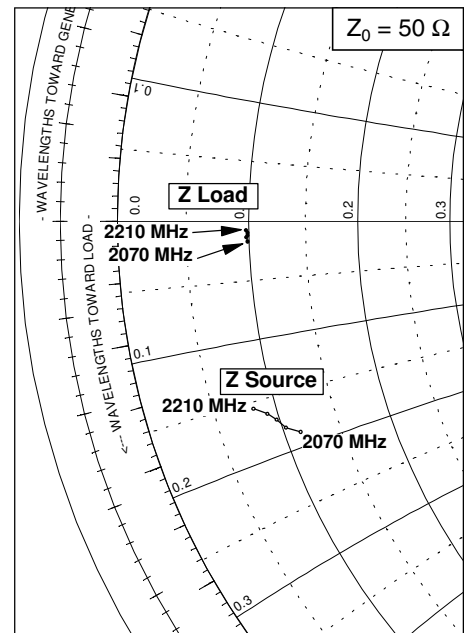
Typical Performance (cont.)



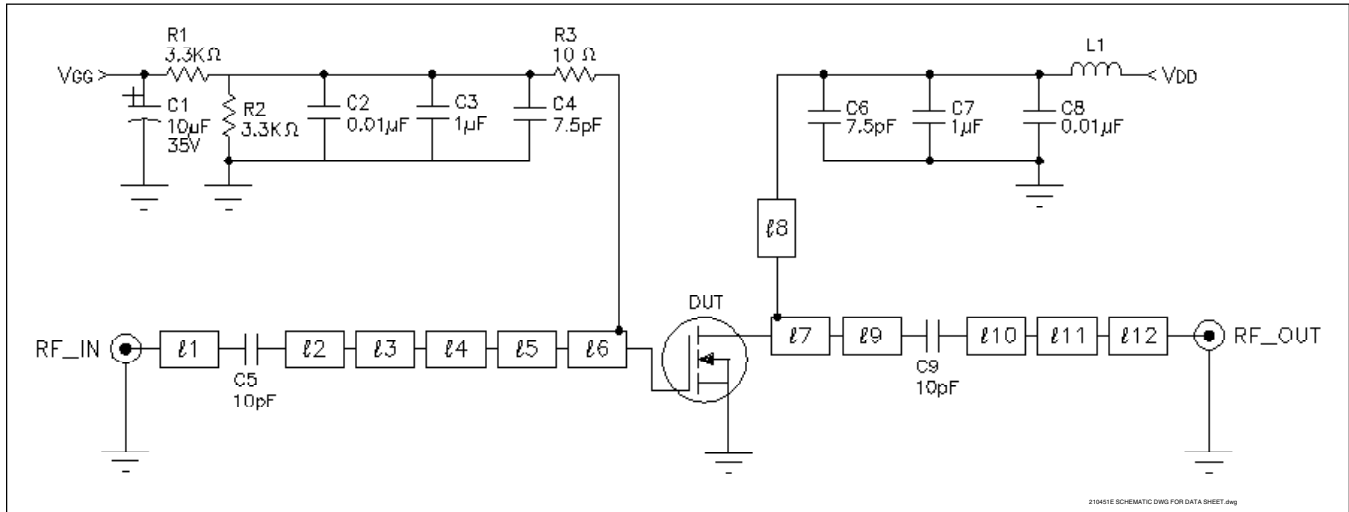
Broadband Circuit Impedance Data



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
2070	5.72	-9.36	4.94	-0.87
2110	5.17	-8.97	4.90	-0.69
2140	4.88	-8.52	4.96	-0.60
2170	4.59	-8.16	4.96	-0.49
2210	4.08	-7.79	4.88	-0.39



Test Circuit



Test circuit schematic for 2170 MHz

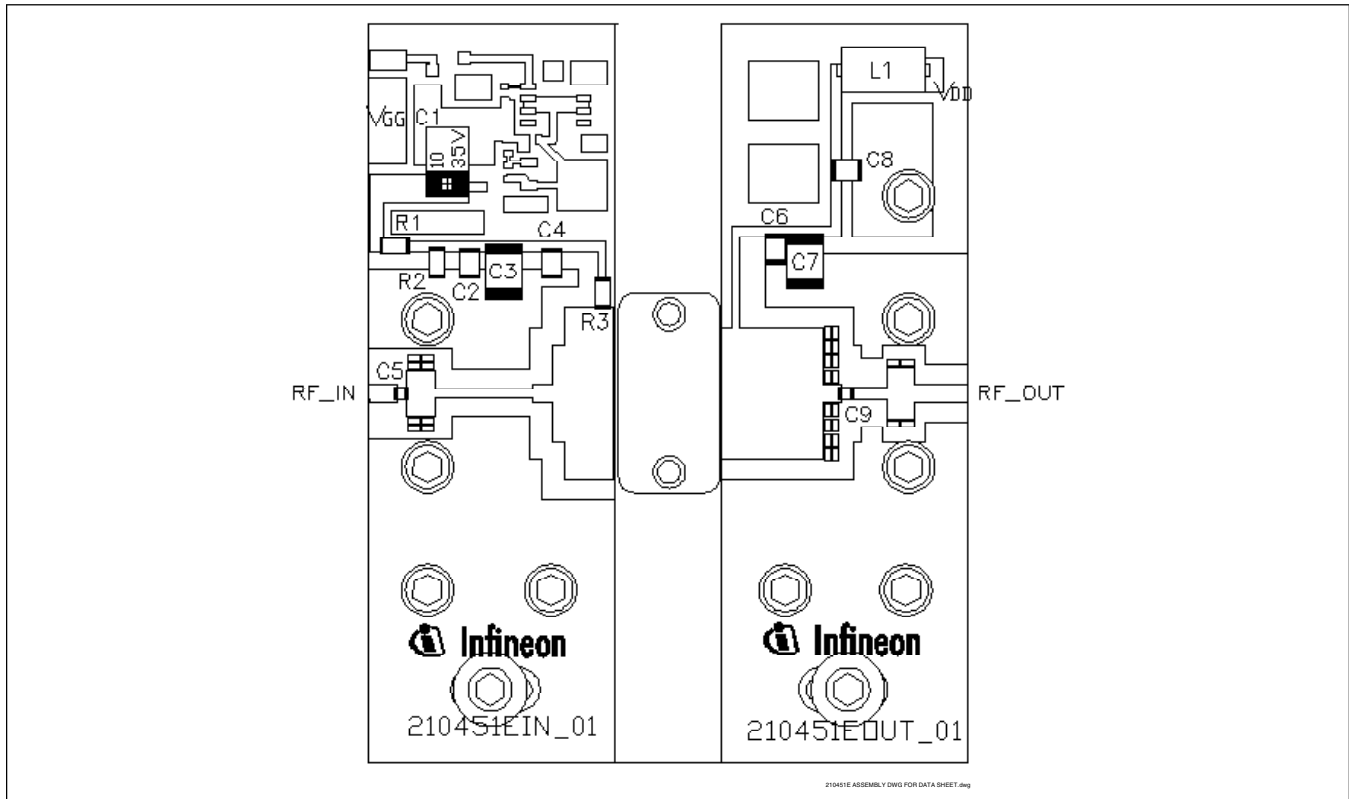
Circuit Assembly Information

DUT	PTF210451E or PTF210451F	LDMOS Transistor	
Circuit Board	0.79 mm [.031"] thick, $\epsilon_r = 4.5$	Rogers TMM4, 2 oz. copper	

Microstrip	Electrical Characteristics at 2170 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
l1	0.047 λ , 45 Ω	3.48 x 1.78	0.137 x 0.070
l2	0.040 λ , 23 Ω	2.87 x 4.57	0.113 x 0.180
l3	0.132 λ , 66 Ω	10.08 x 0.89	0.397 x 0.035
l4	0.028 λ , 45 Ω	2.08 x 1.78	0.082 x 0.070
l5	0.018 λ , 12 Ω	1.27 x 10.06	0.050 x 0.396
l6	0.074 λ , 7 Ω	4.98 x 17.68	0.196 x 0.696
l7	0.152 λ , 9 Ω	10.34 x 13.56	0.407 x 0.534
l8	0.257 λ , 68 Ω	19.76 x 0.84	0.778 x 0.033
l9	0.027 λ , 44 Ω	1.98 x 1.83	0.078 x 0.072
l10	0.056 λ , 56 Ω	4.22 x 1.22	0.166 x 0.048
l11	0.036 λ , 19 Ω	2.57 x 5.74	0.101 x 0.226
l12	0.076 λ , 44 Ω	5.64 x 1.80	0.222 x 0.071

¹Electrical Characteristics are rounded.

Test Circuit (cont.)

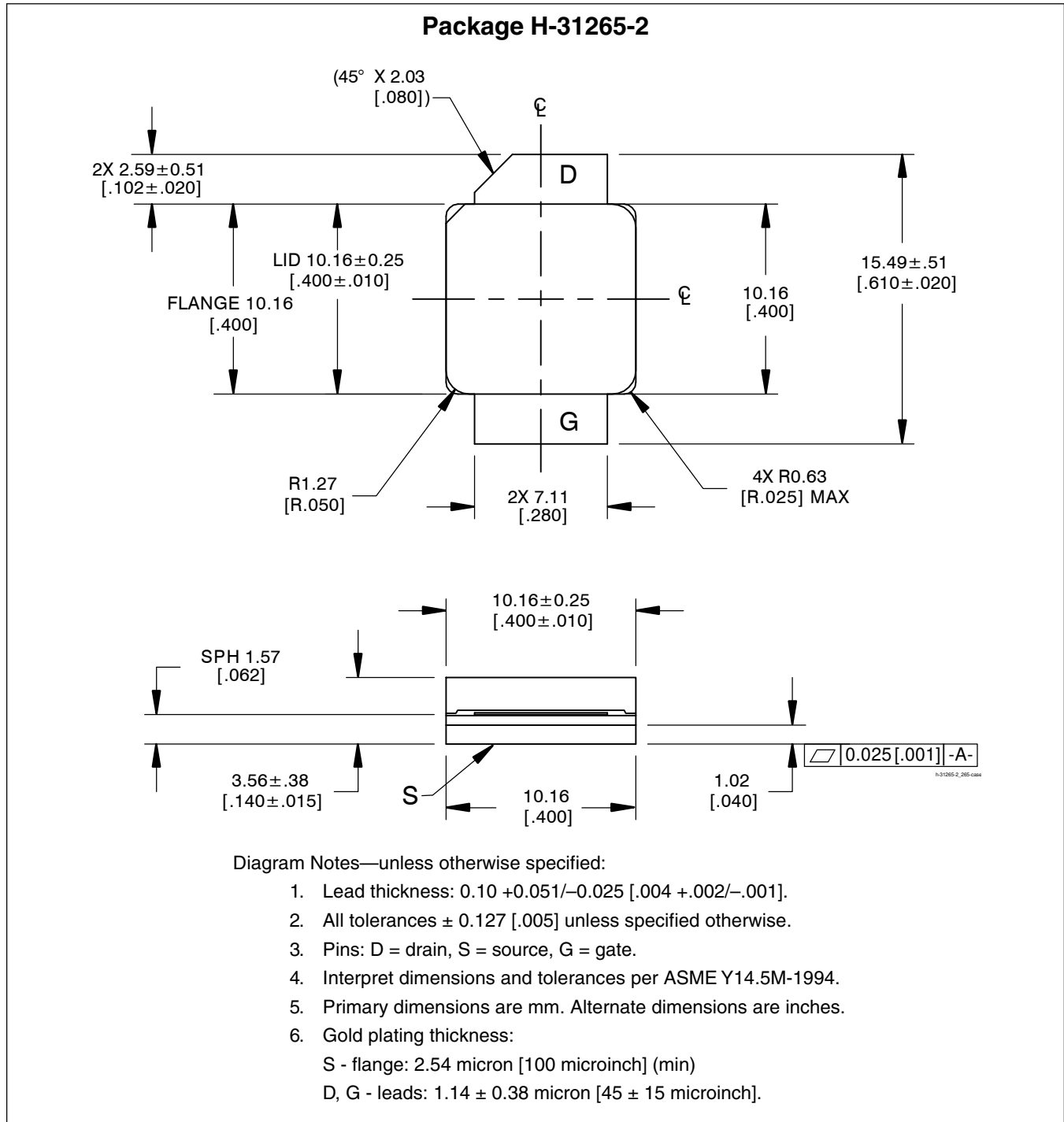


Test circuit assembly diagram* (not to scale)

Component	Description	Suggested Manufacturer	P/N or Comment
C1	Capacitor, 10 μ F, 35 V, Tant TE series	Digi-Key	PCS6106TR-ND, SMD
C2, C8	Capacitor, 0.01 μ F	ATC	X08J103AFB ATC 200B103MW
C3, C7	Capacitor, 1 μ F	ATC	X24L105BVC
C4, C6	Capacitor, 7.5 pF	ATC	100B 7R5
C5, C9	Capacitor, 10 pF	ATC	100A 100
L1	Ferrite Bead	Elne Magnetic	#BDS31314.6-452
R1, R2	Resistor, 3.3K ohm, 1/4 W	Digi-Key	P3.3K ECT-ND
R3	Resistor, 10 ohm, 1/4 W	Digi-Key	P10 ECT-ND

*Gerber files for this circuit available on request

Package Outline Specifications (cont.)



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

PTF210451EF

Confidential, Limited Internal Distribution

Revision History: 2008-02-13

Data Sheet

Previous Version: 2006-09-05, Data Sheet

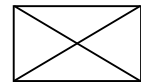
Page	Subjects (major changes since last revision)
all	Show PTF210451F as released.

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 2008-02-13

Published by
Infineon Technologies AG
81726 München, Germany
© Infineon Technologies AG 2003.
All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie"). 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.