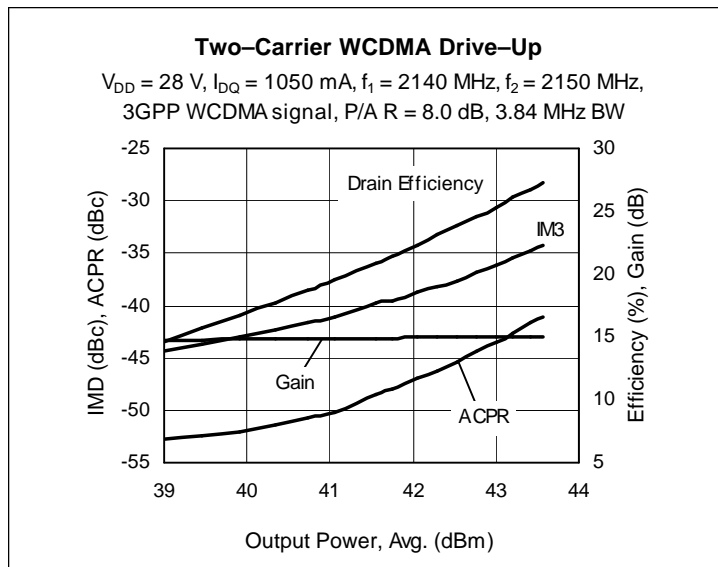


LDMOS RF Power Field Effect Transistor 90 W, 2110–2170 MHz

Description

The PTF210901 is an internally matched 90 W GOLDMOS FET intended for WCDMA applications from 2110 to 2170 MHz. Full gold metallization ensures excellent device lifetime and reliability.



Features

- Internal matching for wideband performance
- Typical two-carrier 3GPP WCDMA performance
 - Average output power = 19 W at -37 dBc
 - Efficiency = 25%
- Typical CW performance
 - Output power at P-1dB = 105 W
 - Gain = 15 dB
 - Efficiency = 53%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR at 28 V, 90 W (CW) output power



PTF210901E
Package 30248

ESD: Electrostatic discharge sensitive device — observe handling precautions!

RF Performance at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1050\text{ mA}$, $P_{OUT} = 19\text{ W AVG}$
 $f_1 = 2140\text{ MHz}$, $f_2 = 2150\text{ MHz}$, 3GPP signal, channel bandwidth 3.84 MHz, 8.0 dB peak/average @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Units
Intermodulation Distortion	IMD	—	-37	—	dBc
Gain	G_{ps}	—	15	—	dB
Drain Efficiency	η_D	—	25	—	%

Two-Tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1050\text{ mA}$, $P_{OUT} = 90\text{ W PEP}$, $f = 2170\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Gain	G_{ps}	13.5	15	—	dB
Drain Efficiency	η_D	36	38	—	%
Intermodulation Distortion	IMD	—	-30	-28	dBc

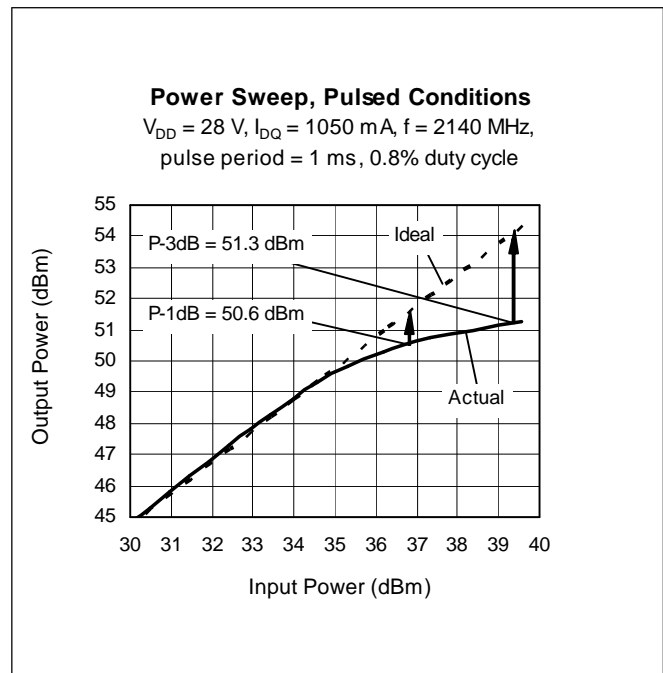
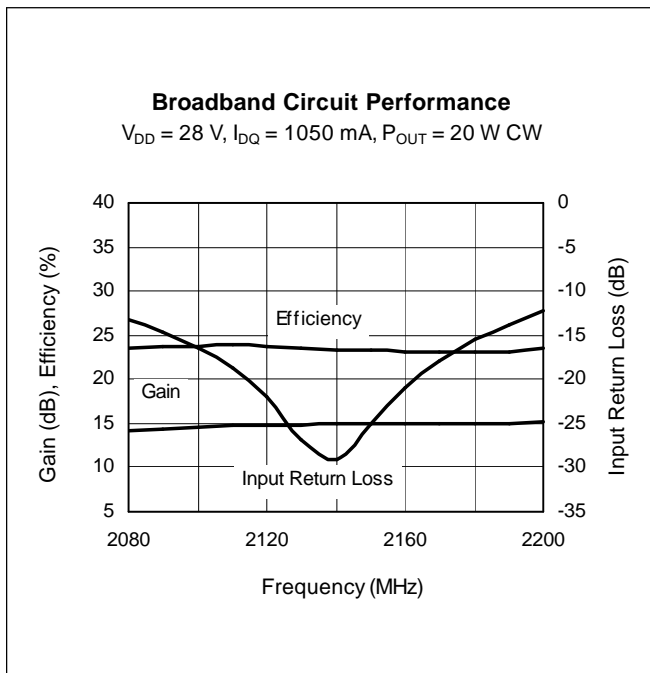
Electrical Characteristics at $T_{CASE} = 25^{\circ}C$ unless otherwise indicated

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain–Source Breakdown Voltage	$V_{GS} = 0 V, I_D = 10 \mu A$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28 V, V_{GS} = 0 V$	I_{DSS}	—	—	1.0	μA
On–State Resistance	$V_{GS} = 10 V, V_{DS} = 0.1 V$	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	$V_{DS} = 28 V, I_{DQ} = 1050 mA$	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	$V_{GS} = 10 V, V_{DS} = 0 V$	I_{GSS}	—	0.01	1.0	μA

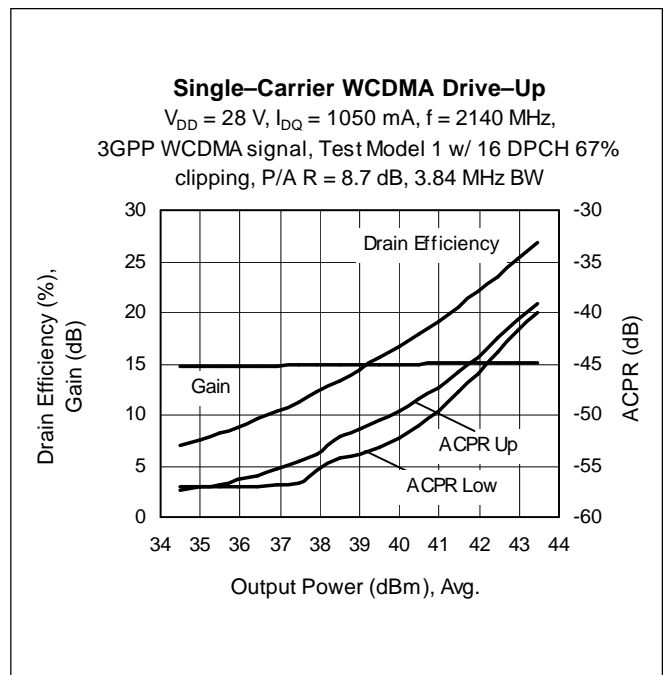
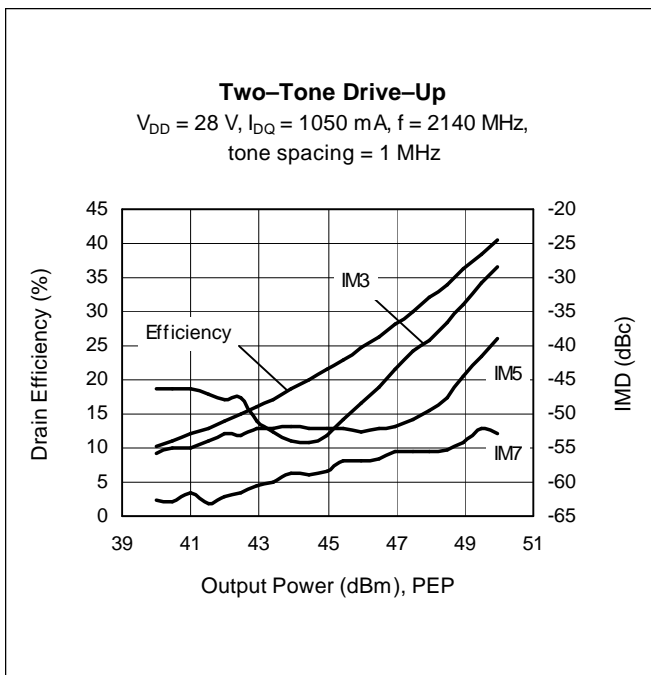
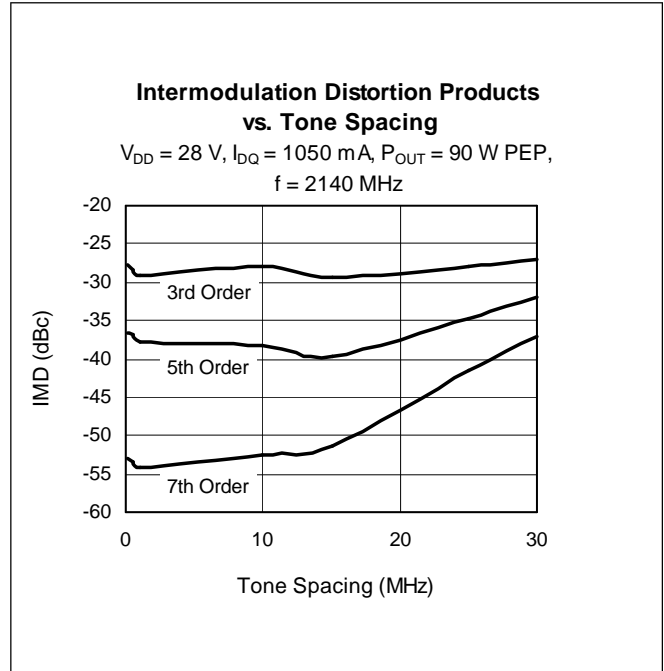
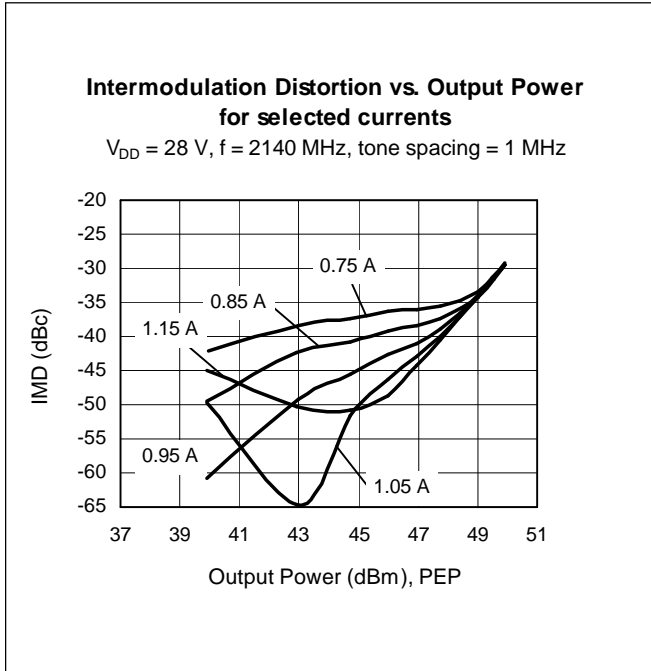
Maximum Ratings

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	$^{\circ}C$
Total Device Dissipation Above 25 $^{\circ}C$ derate by	P_D	389 2.22	W W/ $^{\circ}C$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}C$
Thermal Resistance ($T_{CASE} = 70^{\circ}C, 90 W CW$)	$R_{\theta JC}$	0.45	$^{\circ}C/W$

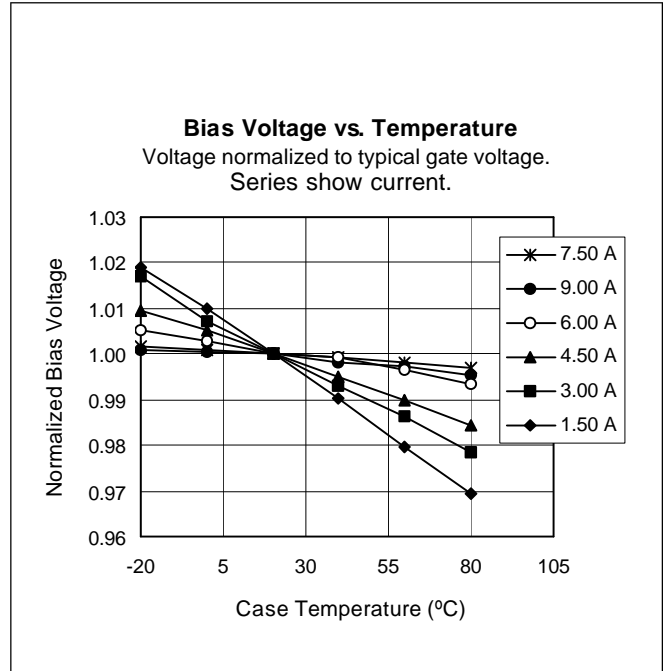
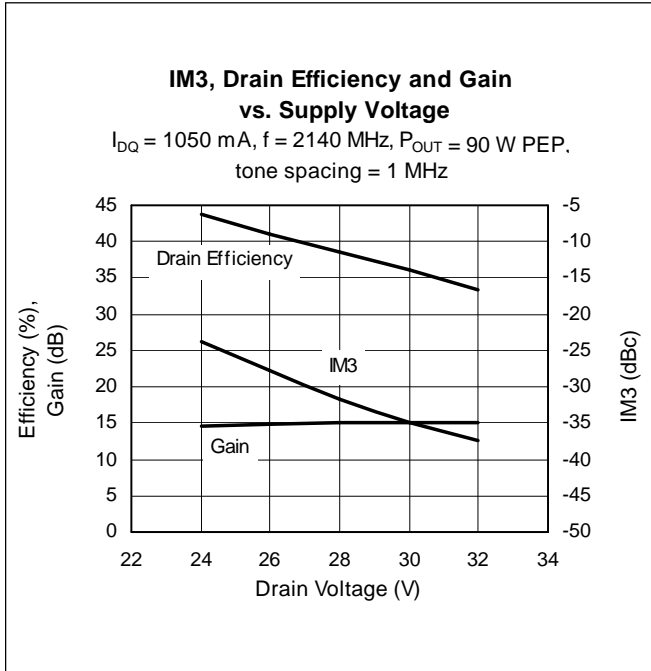
Typical Performance in broadband test fixture



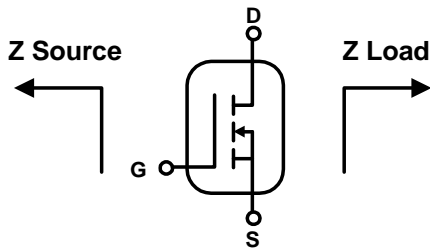
Typical Performance (cont.)



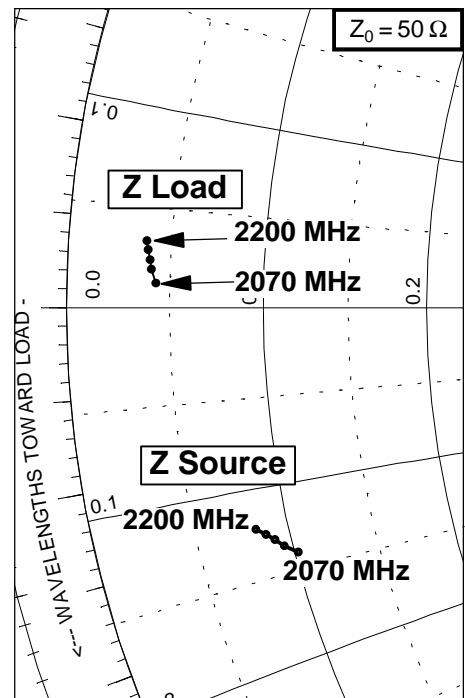
Typical Performance (cont.)



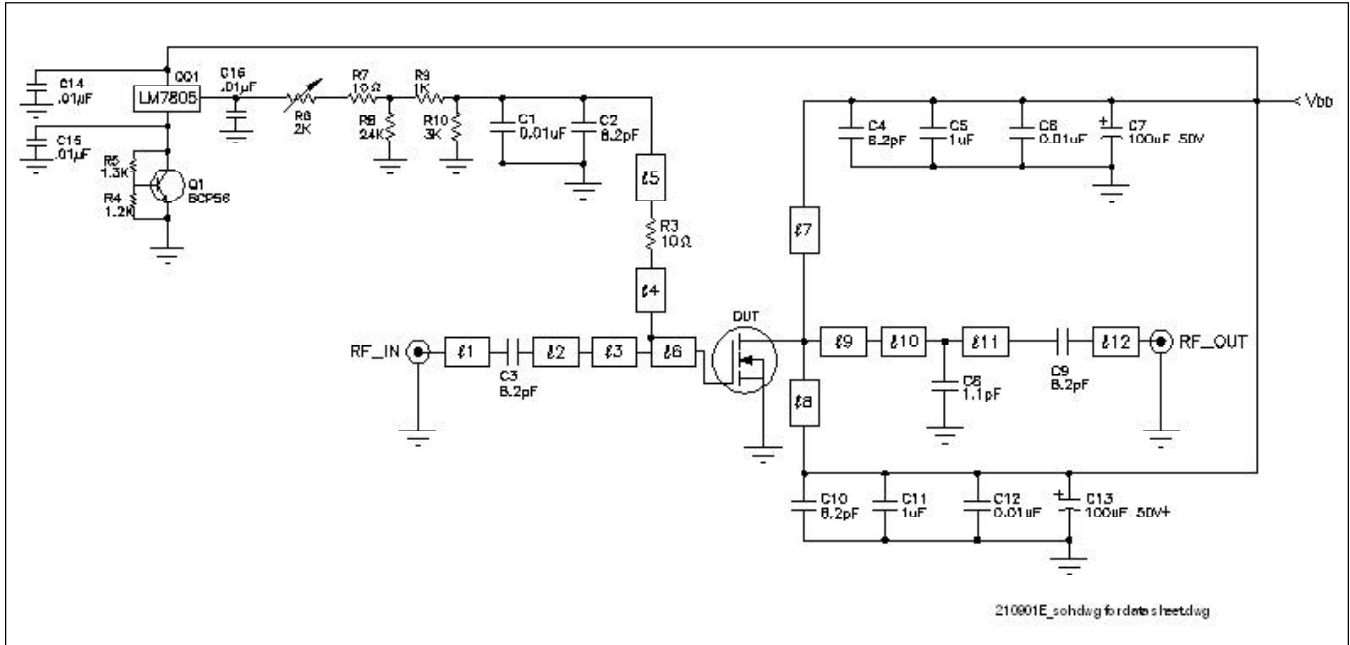
Broadband Circuit Impedance Data



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
2070	5.11	-7.00	2.14	0.62
2110	4.78	-6.74	2.03	0.97
2140	4.57	-6.50	1.99	1.21
2170	4.35	-6.30	1.92	1.45
2200	4.12	-6.11	1.88	1.67



Test Circuit



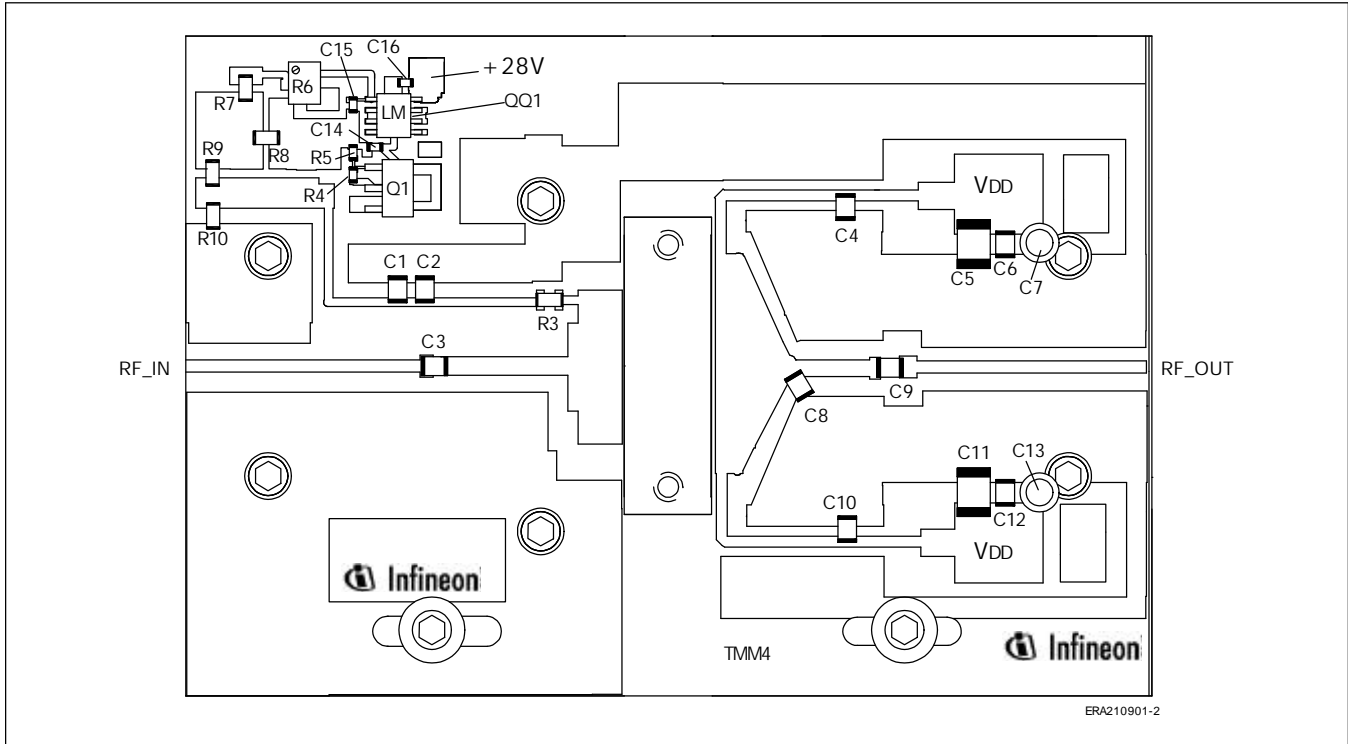
Reference Circuit Schematic for $f = 2140$ MHz

Circuit Information

DUT	PTF210901E	LDMOS Transistor	
PCB	0.76 mm [0.030"] thick, $\epsilon_r = 4.5$	2 oz. copper	TMM4

Microstrip	Value at 2140 MHz	Dimensions: L x W (mm.)	Dimensions: L x W (in.)
l_1	0.375λ , 50Ω	28.45 x 1.40	1.120 x 0.055
l_2	0.199λ , 39.2Ω	14.83 x 2.06	0.584 x 0.081
l_3	0.015λ , 11.5Ω	1.07 x 10.06	0.042 x 0.396
l_4	0.037λ , 60.4Ω	2.90 x 0.97	0.114 x 0.038
l_5	0.195λ , 60.4Ω	15.11 x 0.97	0.595 x 0.038
l_6	0.073λ , 7.5Ω	4.98 x 17.73	0.196 x 0.698
l_7, l_8	0.199λ , 55.4Ω	15.32 x 1.14	0.603 x 0.045
l_9	0.049λ , 4.98Ω	3.30 x 25.17	0.130 x 0.991
l_{10}	0.089λ , 4.98Ω	5.99 x 25.17	0.236 x 0.991
l_{11}	0.151λ , 41.9Ω	11.30 x 1.85	0.445 x 0.073
l_{12}	0.381λ , 50Ω	29.13 x 1.40	1.147 x 0.055

Test Circuit (cont.)



Reference Circuit¹ (not to scale)

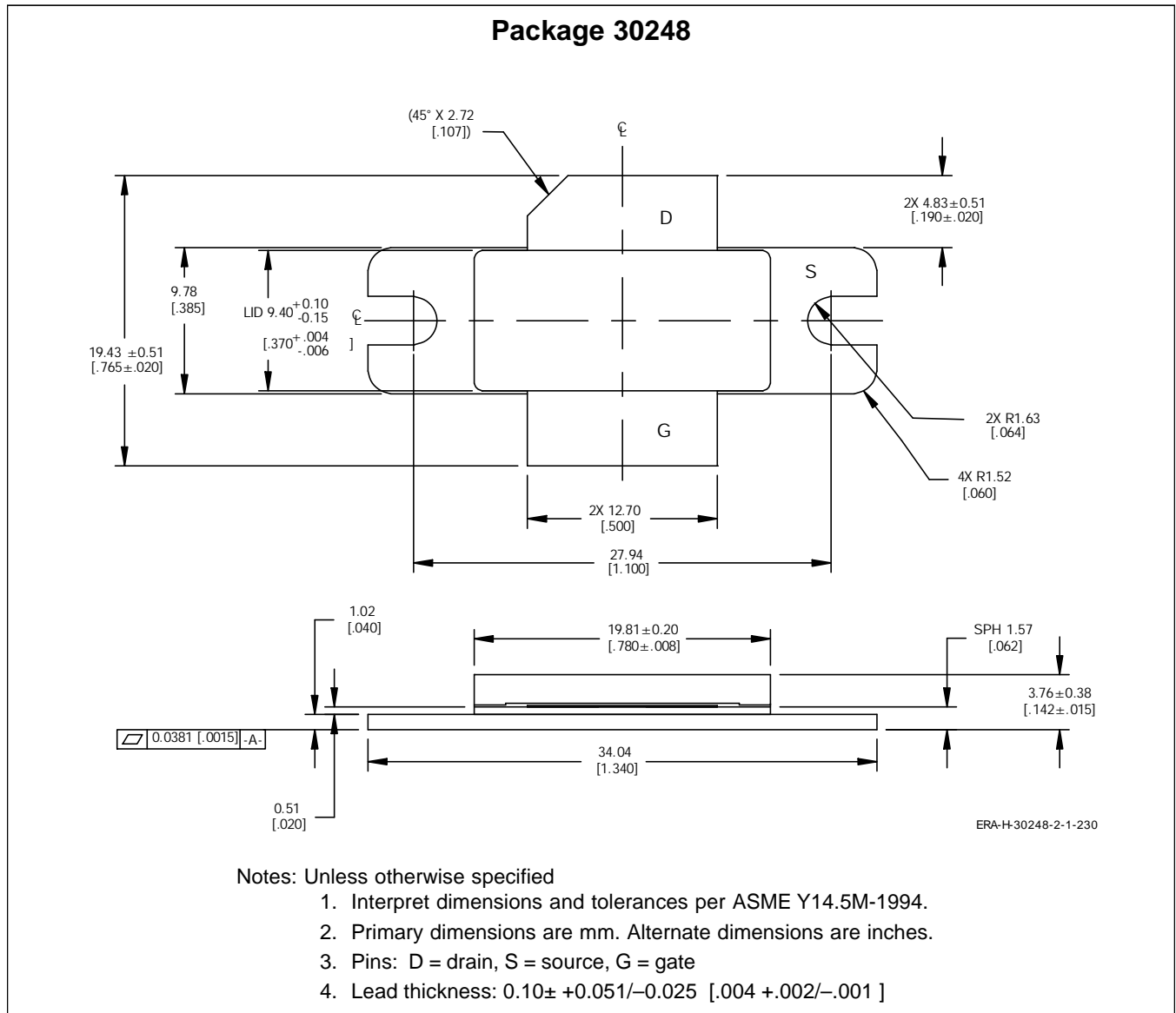
Component	Description	Manufacturer	P/N or Comment
C1, C6, C12	Capacitor, 0.01 μ F	Digi-Key	PCC1772CT-ND
C2, C3, C4, C9, C10	Capacitor, 8.2 pF	ATC	100B 8R2
C5, C11	Capacitor, 1 μ F, ceramic, 50 V	ATC	920DC105KW100
C7, C13	Capacitor, 100 μ F, 50 V, electrolytic	Digi-Key	P5182-ND
C8	Capacitor, 1.1 pF	ATC	100B OR6
C14, C15, C16	Capacitor, 0.01 μ F	Digi-Key	PCC1772CT-ND
QQ1	Voltage regulator	Digi-Key	LM 7805
Q1	Transistor	Infineon	BCP56
R1, R2	Resistor, 12K ohm, 1/4 W, 1206	Digi-Key	P12KECT-ND
R3	Resistor, 10 ohm, 1/4 W, 1206	Digi-Key	P10ECT-ND
R4	Resistor, 1.2K ohm, 1/10 W, 0603	Digi-Key	P1.2KGCT-ND
R5	Resistor, 1.3K ohm, 1/10 W, 0603	Digi-Key	P1.3KGCT-ND
R6	Resistor, variable 2K ohm, 4 W	Digi-Key	3224 W-202ETR-ND
R7	Resistor, 10 ohm, 1/4 W, 1206	Digi-Key	P10ECT-ND
R8	Resistor, 24K ohm, 1/4 W, 1206	Digi-Key	P24KECT-ND
R9	Resistor, 1K ohm, 1/4 W, 1206	Digi-Key	P1.0KECT-ND
R10	Resistor, 3K ohm, 1/4 W, 1206	Digi-Key	P3.0KECT-ND

¹Gerber Files for this circuit available on request.

Ordering Information

Type	Package Outline	Package Description	Marking
PTF210901E	30248	Thermally enhanced, with flange	PTF210901E

Package Outline Specifications



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

Revision History: 2004-01-16
Previous Version: 2003-12-22, Data Sheet

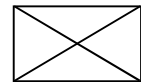
Page	Subjects (major changes since last revision)
5	Circuit schematic adjusted

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