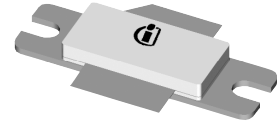


Thermally-Enhanced High Power RF LDMOS FETs 130 W, 869 – 960 MHz

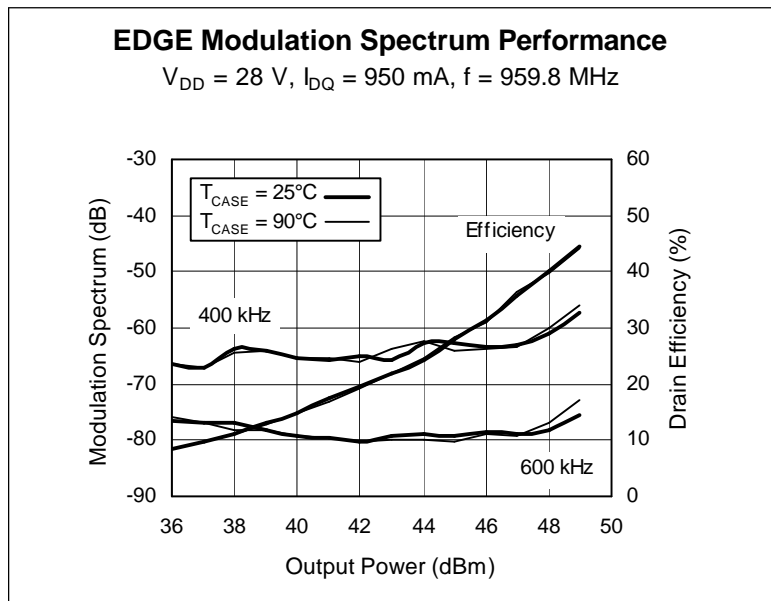
Description

The PTF081301E and PTF081301F are 130-watt, internally-matched GOLDMOS FETs intended for EDGE and CDMA applications in the 869 to 960 MHz bands. Thermally-enhanced packaging provides the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.

PTF081301E
Package 30248



PTF081301F
Package 31248



Features

- Thermally-enhanced packages
- Broadband internal matching
- Typical EDGE performance
 - Average output power = 65 W
 - Gain = 18 dB
 - Efficiency = 40%
- Typical CW performance
 - Output power at P-1dB = 150 W
 - Gain = 17 dB
 - Efficiency = 55%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 130 W (CW) output power

RF Characteristics

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 950\text{ mA}$, $P_{OUT} = 65\text{ W}$, $f = 959.8\text{ MHz}$

Characteristic	Symbol	Min	Typ	Max	Unit
Error Vector Magnitude	EVM (RMS)	—	2.5	—	%
Modulation Spectrum @ 400 kHz	ACPR	—	-62	—	dBc
Modulation Spectrum @ 600 kHz	ACPR	—	-74	—	dBc
Gain	G_{ps}	—	18	—	dB
Drain Efficiency	η_D	—	40	—	%

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)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 950\text{ mA}$, $P_{OUT} = 130\text{ W PEP}$, $f = 960\text{ MHz}$, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	17	18	—	dB
Drain Efficiency	η_D	40	42	—	%
Intermodulation Distortion	IMD	—	-32	-29	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	$V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ }\mu\text{A}$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $I_{DS} = 1\text{ A}$	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 950\text{ mA}$	V_{GS}	2.5	2.9	4.0	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA

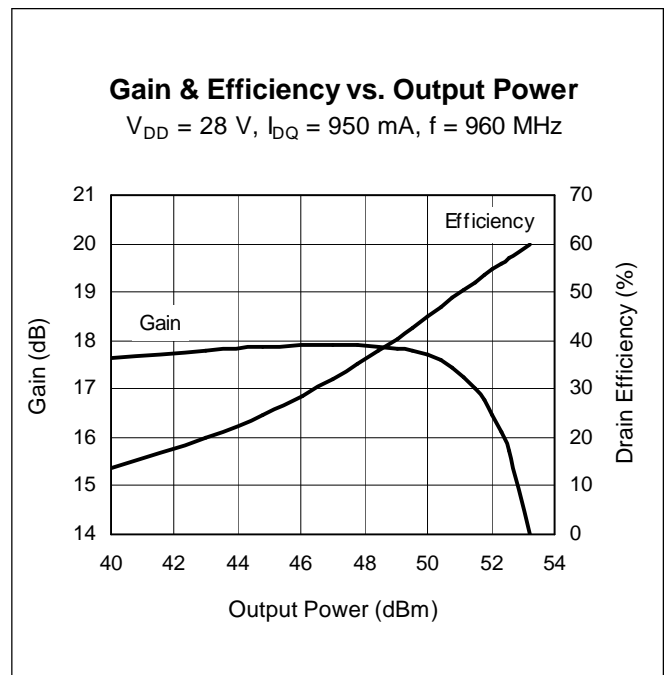
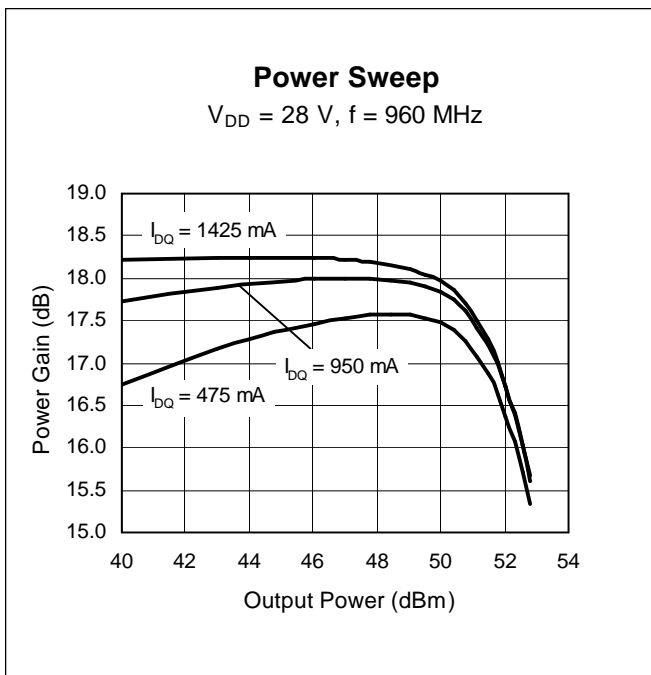
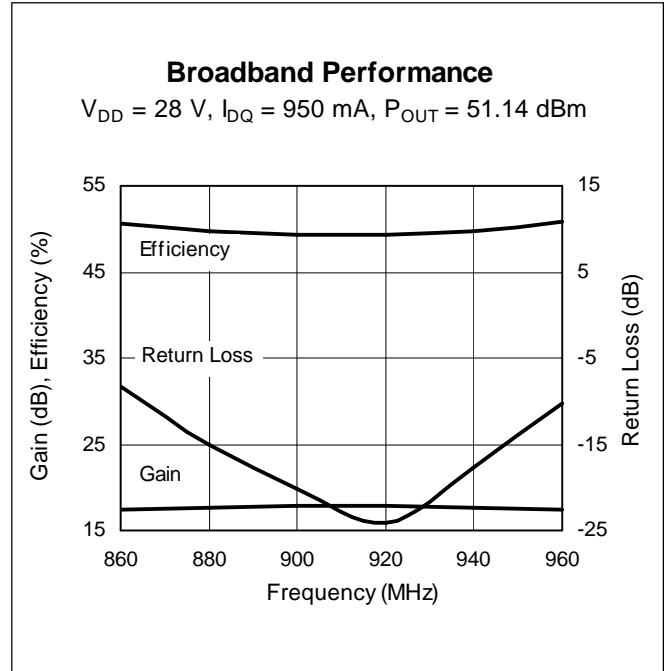
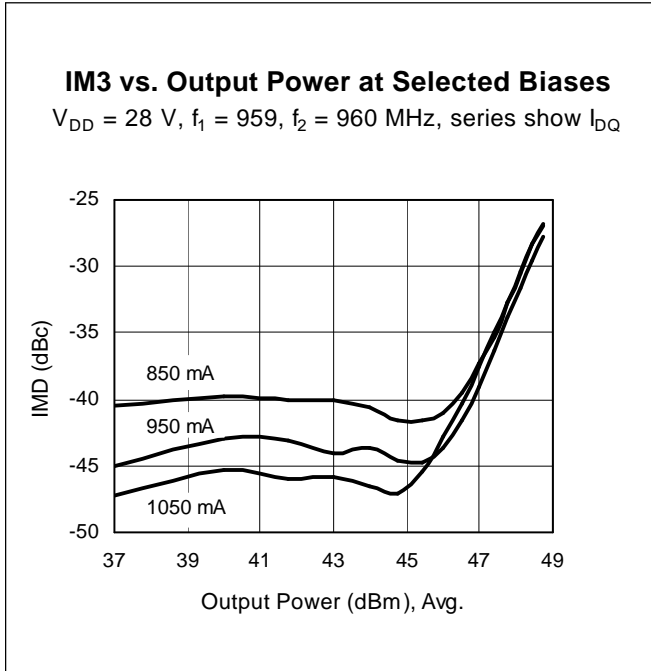
Maximum Ratings

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	473	W
Above 25 $^{\circ}\text{C}$ derate by		2.70	W/ $^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$)	$R_{\theta JC}$	0.37	$^{\circ}\text{C/W}$

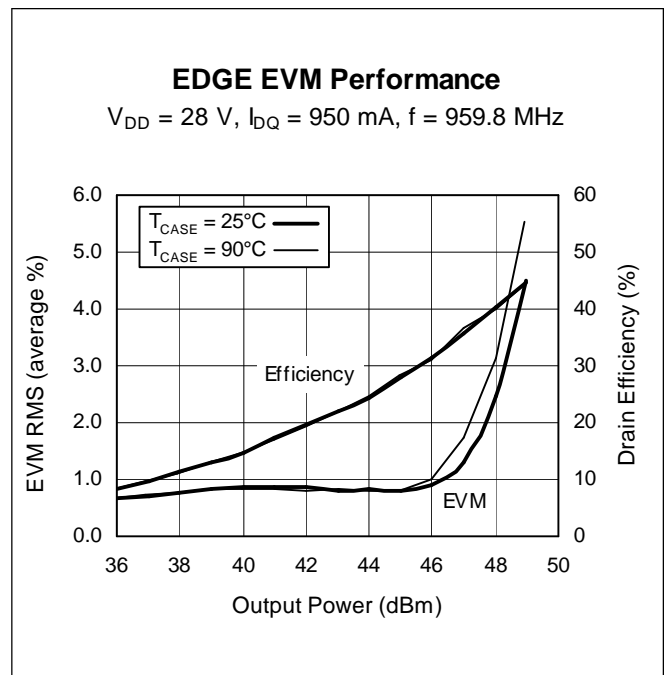
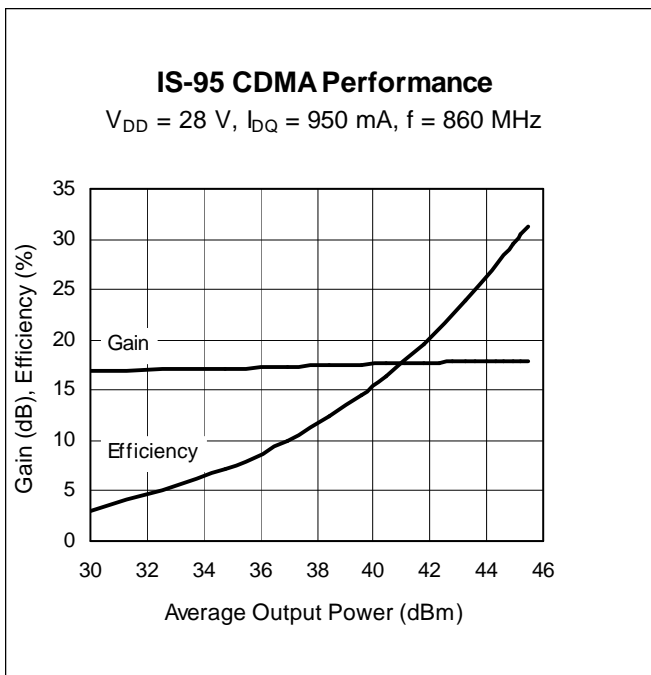
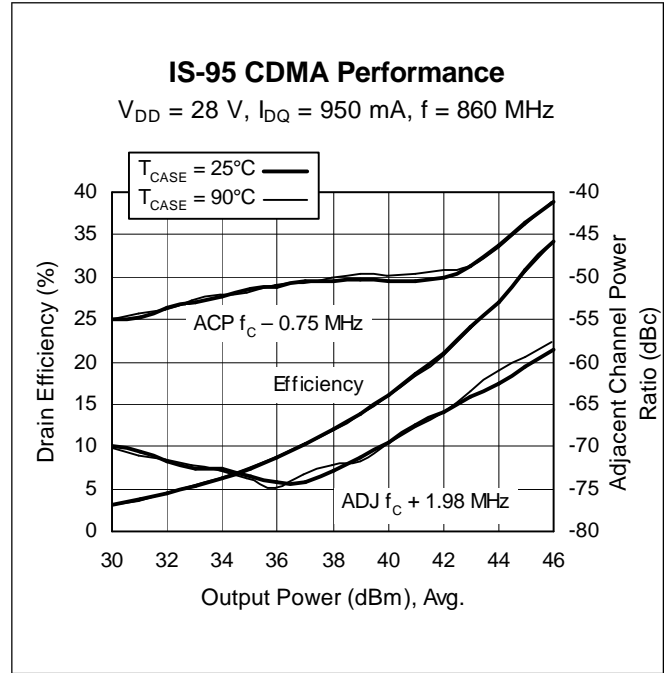
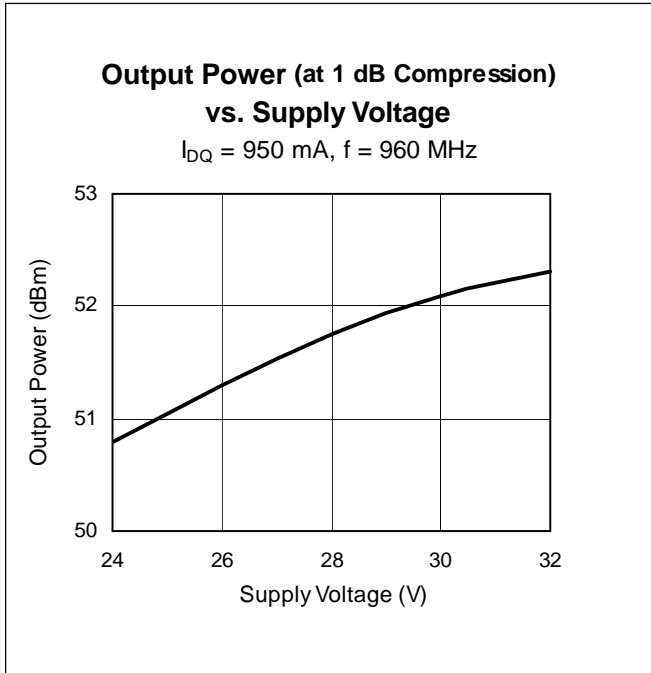
Ordering Information

Type	Package Outline	Package Description	Marking
PTF081301E	30248	Thermally-enhanced slotted flange, single-ended	PTF081301E
PTF081301F	31248	Thermally-enhanced earless flange, single-ended	PTF081301F

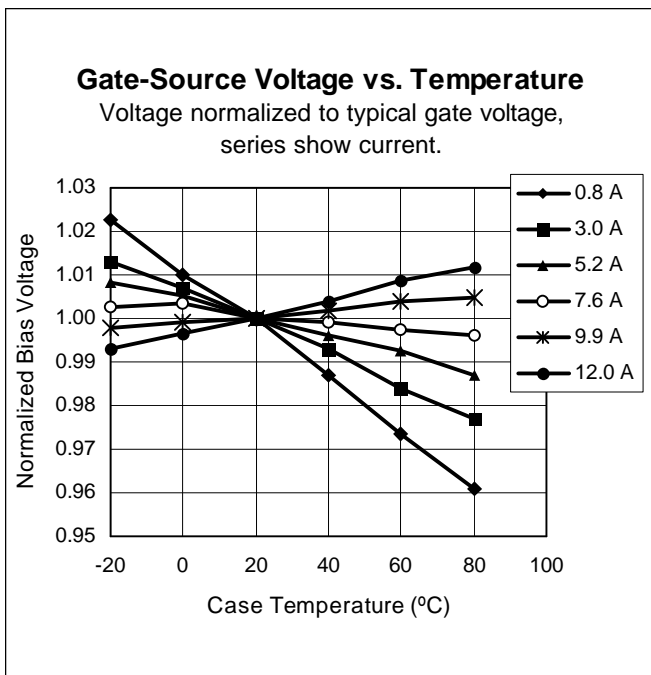
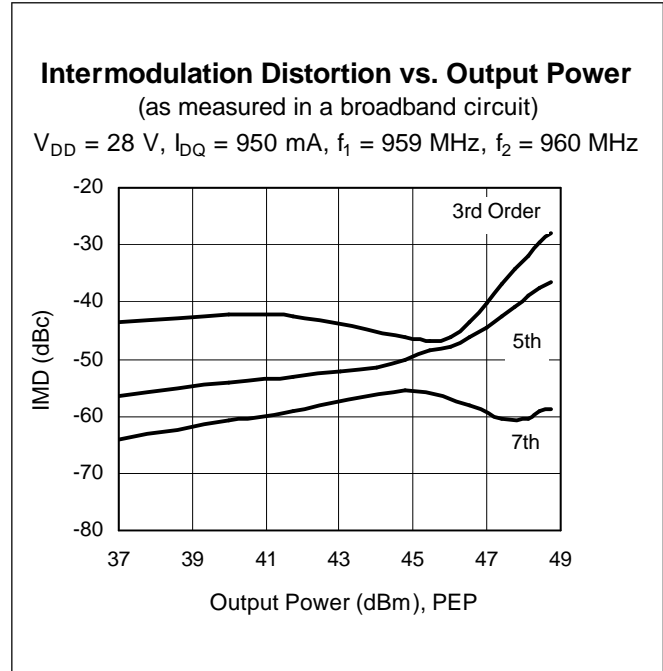
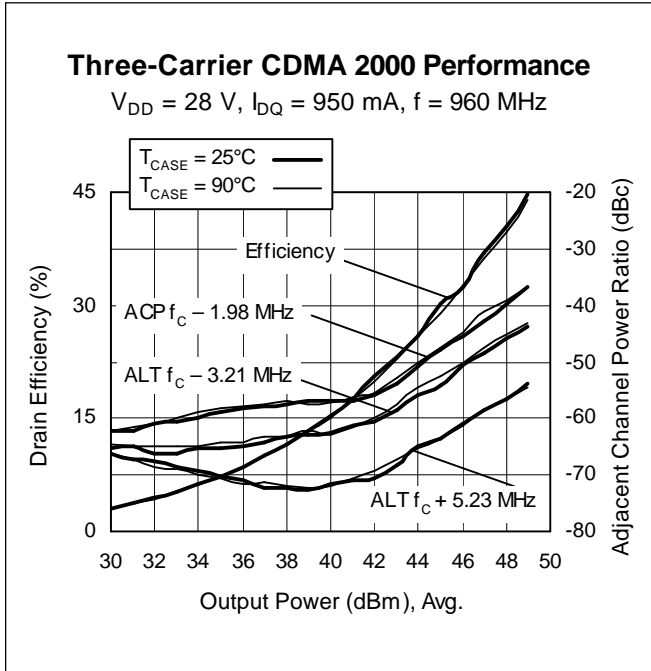
Typical Performance (measurements taken in production test fixture)



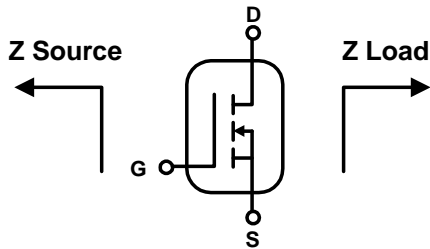
Typical Performance (cont.)



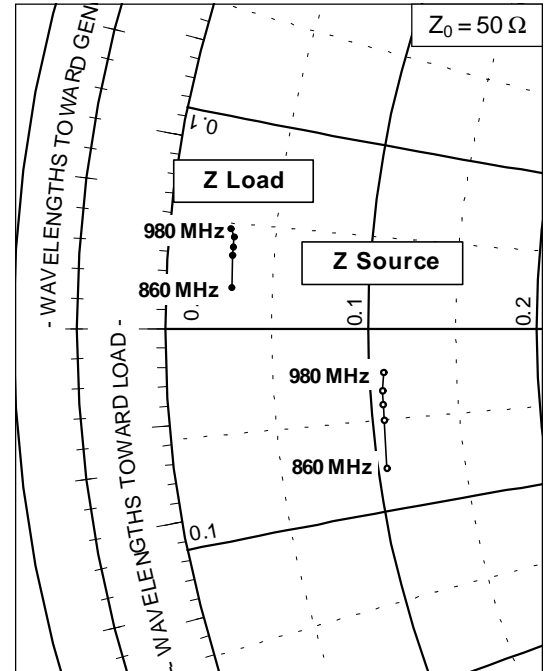
Typical Performance (cont.)



Broadband Circuit Impedance

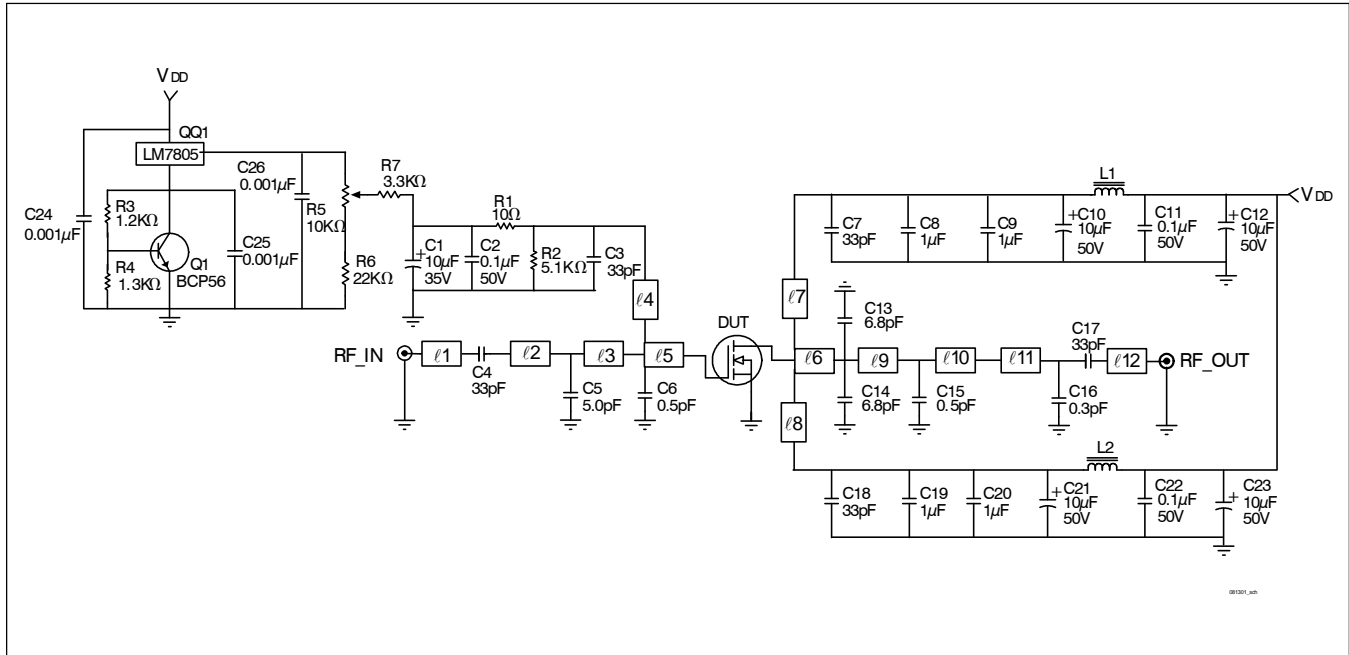


Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
860	5.35	-3.80	1.59	0.99
920	5.41	-2.54	1.56	1.74
940	5.43	-2.16	1.56	1.91
960	5.42	-1.70	1.56	2.15
980	5.48	-1.24	1.50	2.34



See next page for Reference Circuit

Reference Circuit



Reference Circuit Schematic for 960 MHz

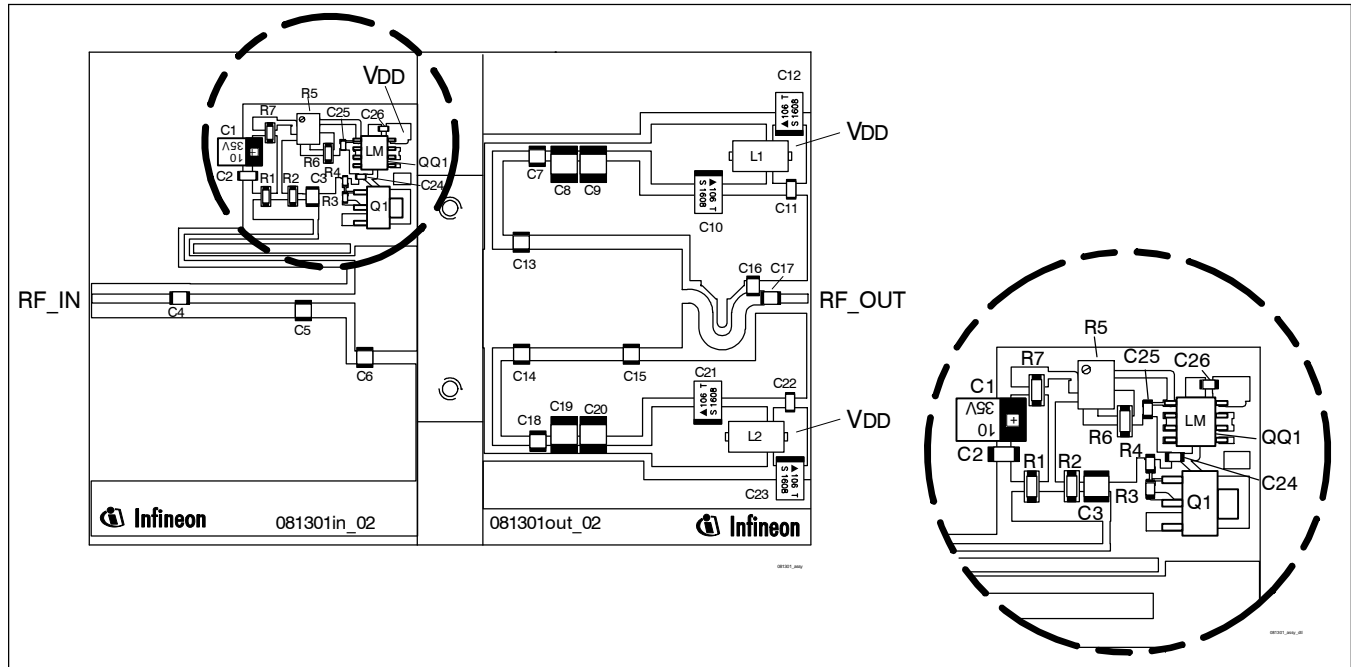
Circuit Assembly Information

DUT	PTF081301E or PTF081301F	LDMOS Transistor
PCB	0.76 mm [.030"] thick, $\epsilon_r = 4.5$	2 oz. copper Rogers TMM4

Microstrip	Electrical Characteristics at 960 MHz ¹	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.075 λ , 50.0 Ω	12.70 x 1.35	0.500 x 0.053
ℓ2	0.101 λ , 50.0 Ω	17.27 x 1.35	0.680 x 0.053
ℓ3	0.055 λ , 50.0 Ω	9.40 x 1.35	0.370 x 0.053
ℓ4	0.289 λ , 74.0 Ω	50.80 x 0.64	2.000 x 0.025
ℓ5	0.061 λ , 7.5 Ω	9.27 x 16.26	0.365 x 0.640
ℓ6	0.036 λ , 7.9 Ω	5.46 x 15.24	0.215 x 0.600
ℓ7, ℓ8	0.132 λ , 50.0 Ω	22.61 x 1.27	0.890 x 0.050
ℓ9	0.114 λ , 7.9 Ω	17.40 x 15.24	0.685 x 0.600
ℓ10	0.047 λ , 7.9 Ω	7.24 x 15.24	0.285 x 0.600
ℓ11	0.134 λ , 38.0 Ω	22.35 x 2.16	0.880 x 0.085
ℓ12	0.029 λ , 50.0 Ω	4.95 x 1.37	0.195 x 0.054

¹Electrical characteristics rounded

Reference Circuit (cont.)

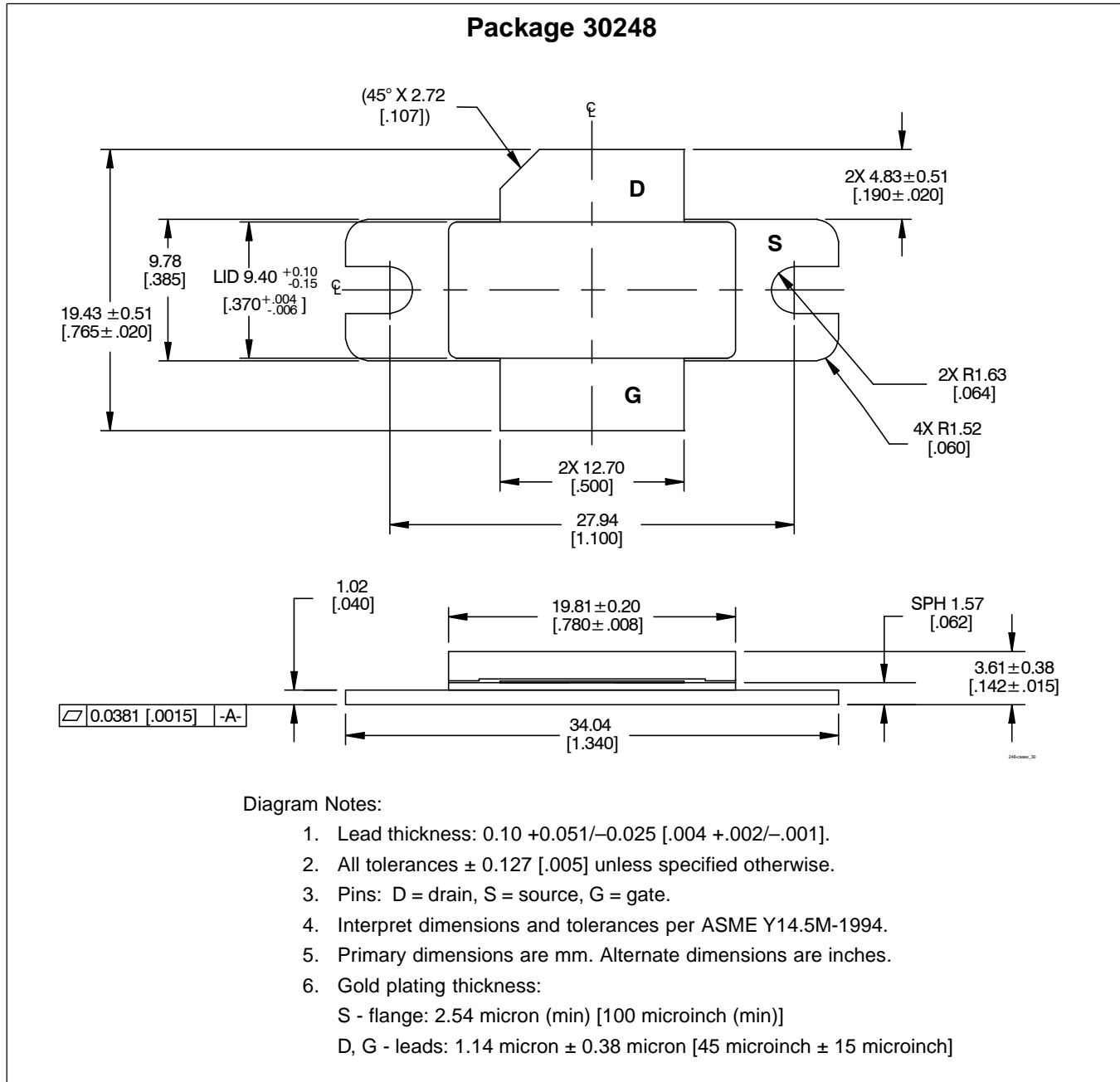


Reference Circuit* (not to scale)

Component	Description	Suggested Manufacturer	P/N or Comment
C1	Tantalum capacitor, TE Series, 10 μ F, 35 V	Digi-Key	PC56106-ND, SMD
C2, C11, C22	Capacitor, 0.1 μ F, 50 V, 1206	Digi-Key	PCC104BCT-ND
C3, C4, C7, C17, C18	Capacitor, 33 pF	ATC	100B 330
C5	Capacitor, 5.0 pF	ATC	100B 5R0
C6, C15	Capacitor, 0.5 pF	ATC	100B 0R5
C8, C9, C19, C20	Capacitor, 1 μ F, 50 V	Digi-Key	19528-ND
C10, C12, C21, C23	Tantalum cap, 10 μ F, 50 V, TPS Series, SMD	Garrett Electronics	TPSE106K050R0400
C13, C14	Capacitor, 6.8 pF	ATC	100B 6R8
C16	Capacitor, 0.3 pF	ATC	100B 0R3
C24, C25, C26	Capacitor, 0.001 μ F, 50 V, 0603	Digi-Key	PCC1772CT-ND
L1, L2	Ferrite, 6 mm	Ferroxcube	53/3/4.6-452
Q1	Transistor	Infineon	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Resistor, 10 ohms, 1/4 W, 1206	Digi-Key	P10ECT-ND
R2	Resistor, 5.1 k-ohms, 1/4 W, 1206	Digi-Key	5.1KECT-ND
R3	Resistor, 1.2 k-ohms, 1/10 W, 0603	Digi-Key	P1.2KGCT-ND
R4	Resistor, 1.3 k-ohms, 1/10 W, 0603	Digi-Key	P1.3KGCT-ND
R5	Potentiometer, 10 k-ohms, 0.25 W	Digi-Key	3224W-103ETR-ND
R6	Resistor, 22 k-ohms, 1/10 W, 0603	Digi-Key	P22KGCT-ND
R7	Resistor, 3.3 k-ohms, 1/4 W, 1206	Digi-Key	P3.3KECT-ND

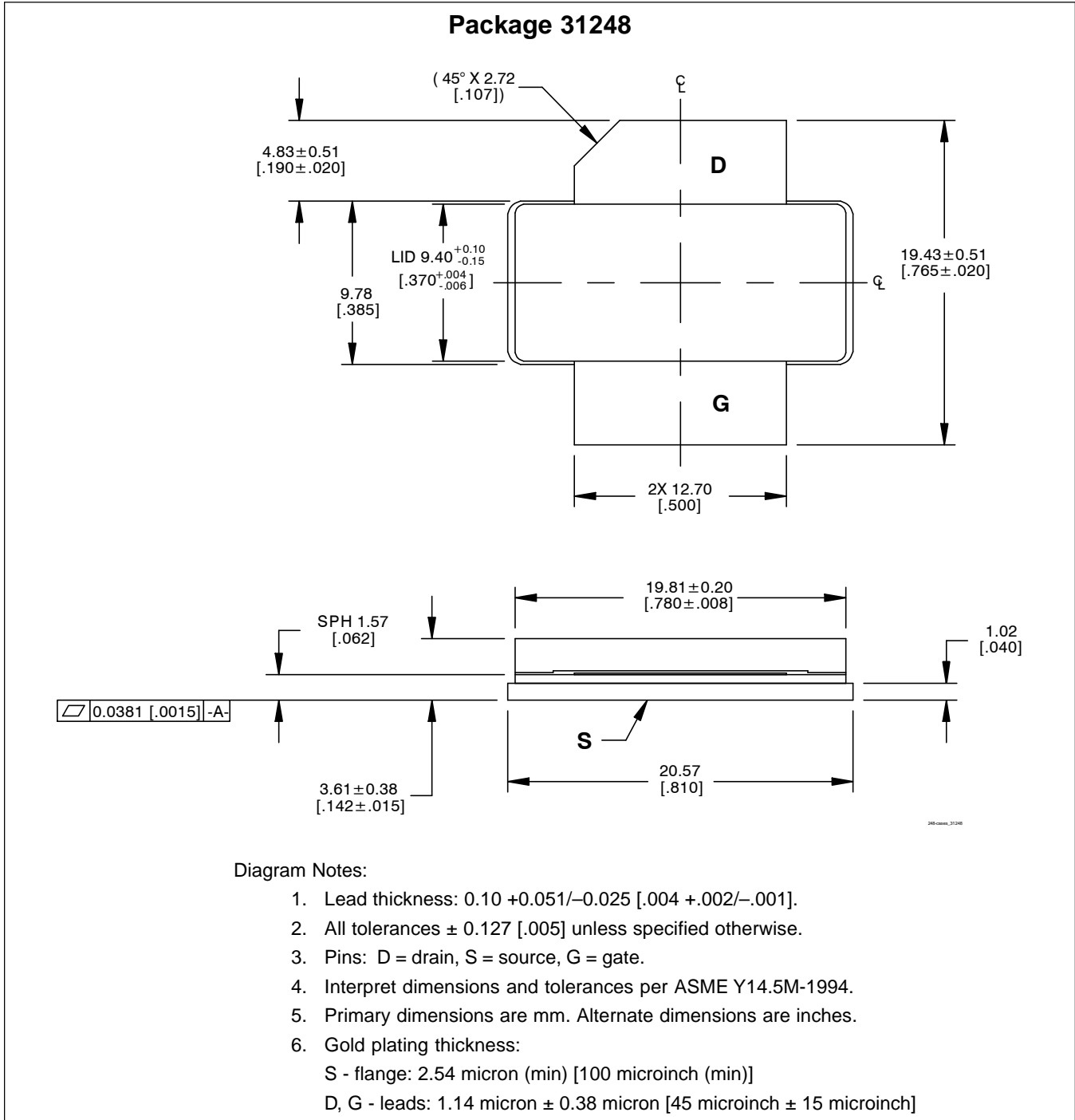
*Gerber files for this circuit are available on request.

Package Outline Specifications



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Package Outline Specifications (cont.)



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Revision History: 2005-05-02

Data Sheet

Previous Version: 2004-08-27, Data Sheet

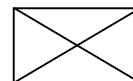
Page	Subjects (major changes since last revision)
1, 2	PTF081301F released
7, 8	Circuit descriptions
9, 10	Add and revise case outlines

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