

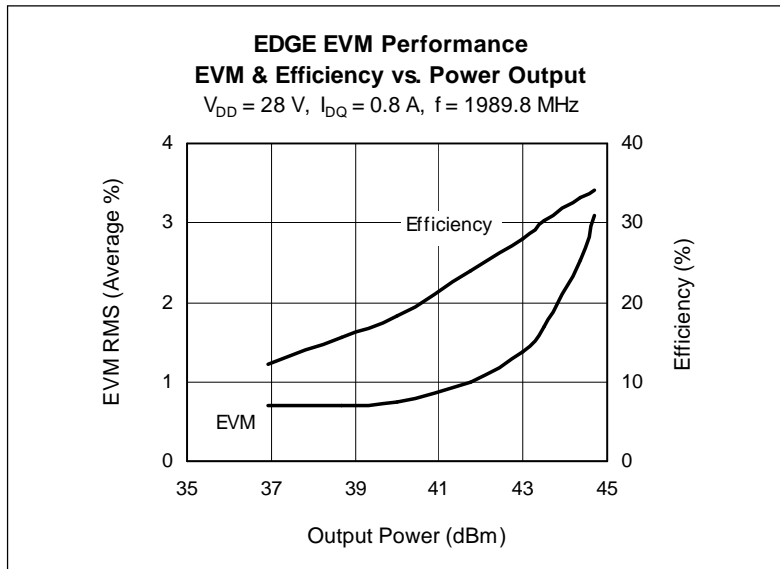
LDMOS Field Effect Transistor

60 W, DCS/PCS Band

1805–1880 MHz, 1930–1990 MHz

Description

The PTF180601 is a 60 W, internally matched *GOLDMOS* FET intended for EDGE applications in the DCS/PCS Band. Full gold metallization ensures excellent device lifetime and reliability.



Features

- Broadband internal matching
- Typical two-tone performance
 - Average output power = 30 W
 - Gain = 16.5 dB
 - Efficiency = 35%
- Typical CW performance
 - Output power at P-1dB = 75 W
 - Gain = 15.5 dB
 - Efficiency = 47%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI Drift
- Capable of handling 10:1 VSWR @ 28 V, 60 W (CW) output power

PTF180601C
Package 21248



PTF180601E
Package 30248



ESD: Electrostatic discharge sensitive device — observe handling precautions!

RF Characteristics at T_{CASE} = 25°C unless otherwise indicated

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

V_{DD} = 28 V, I_{DQ} = 800 mA, P_{OUT} = 22 W, f = 1989.8 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Error Vector Magnitude	EVM (RMS)	—	1.7	—	%
Modulation Spectrum @ 400 KHz	ACPR	—	-60	—	dBc
Modulation Spectrum @ 600 KHz	ACPR	—	-73	—	dBc
Gain	G _{ps}	—	16.5	—	dB
Drain Efficiency	η _D	—	32	—	%

Two-Tone Measurements (tested in Infineon test fixture)

V_{DD} = 28 V, I_{DQ} = 800 mA, P_{OUT} = 60 W PEP, f = 1930 MHz, Tone Spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Gain	G _{ps}	15	16.5	—	dB
Drain Efficiency	η _D	30	35	—	%
Intermodulation Distortion	IMD	—	-30	-28	dBc

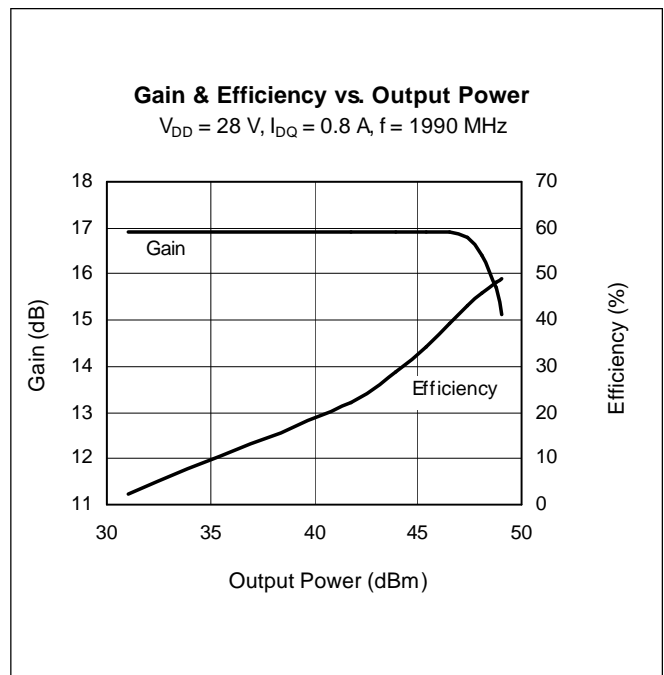
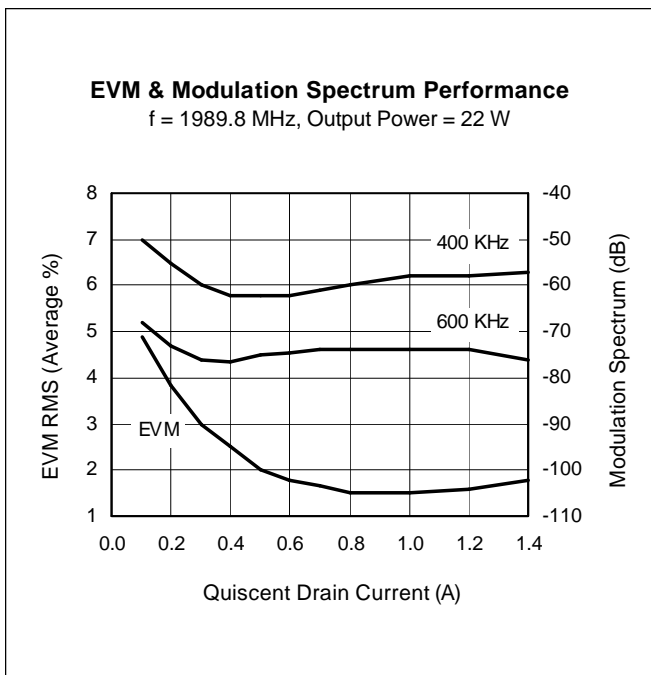
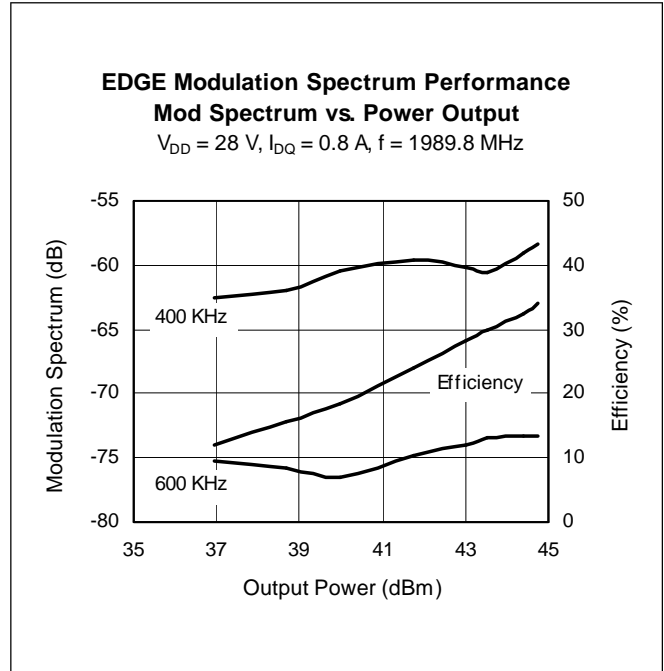
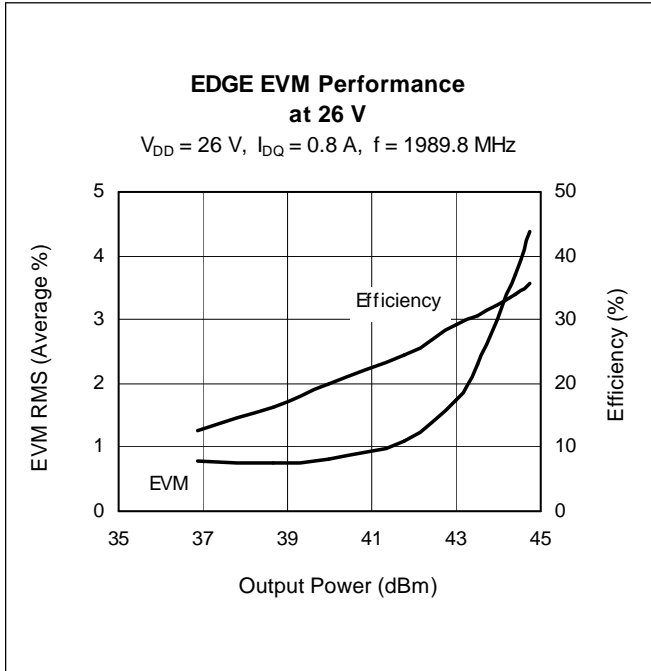
Electrical Characteristics at $T_{CASE} = 25^{\circ}C$ unless otherwise indicated

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
Drain–Source Breakdown Voltage	$V_{GS} = 0 V, I_{DS} = 10 \mu A$	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	$V_{DS} = 28 V, V_{GS} = 0 V$	I_{DSS}	—	—	1.0	μA
On–State Resistance	$V_{GS} = 10 V, V_{DS} = 0.1 V$	$R_{DS(on)}$	—	0.135	—	Ω
Operating Gate Voltage	$V_{DS} = 28 V, I_{DQ} = 800 mA$	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

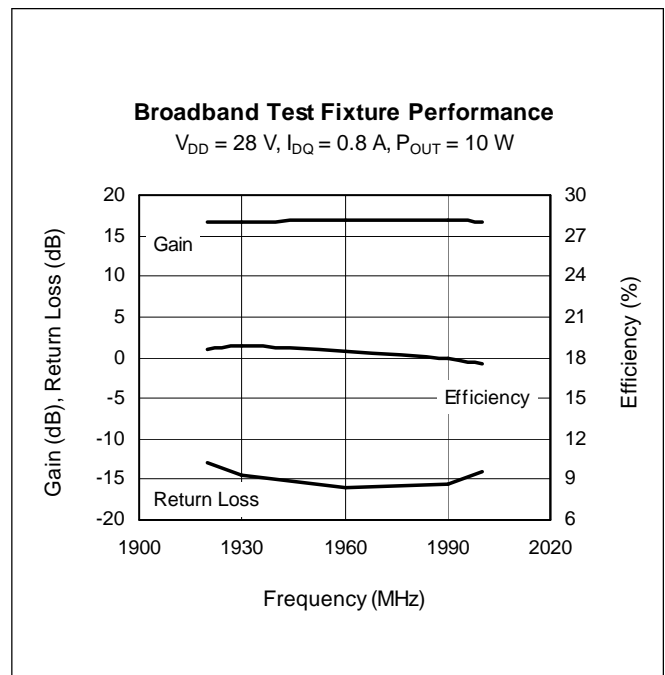
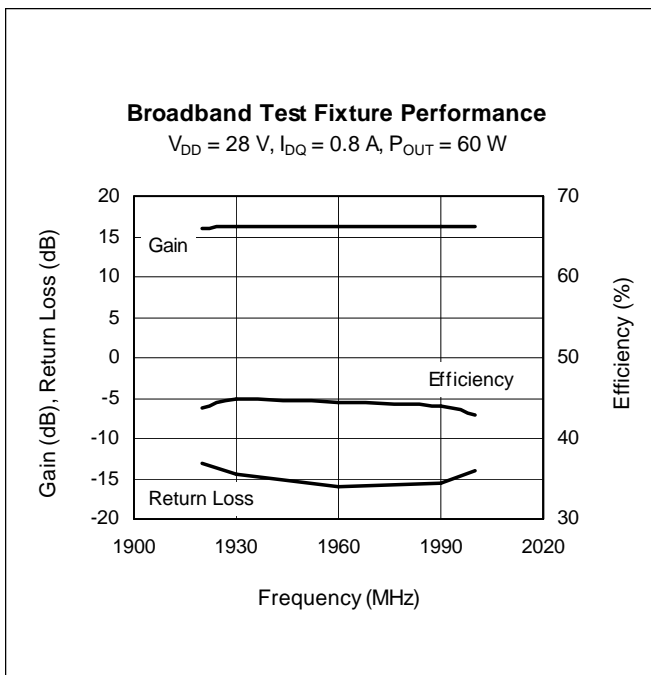
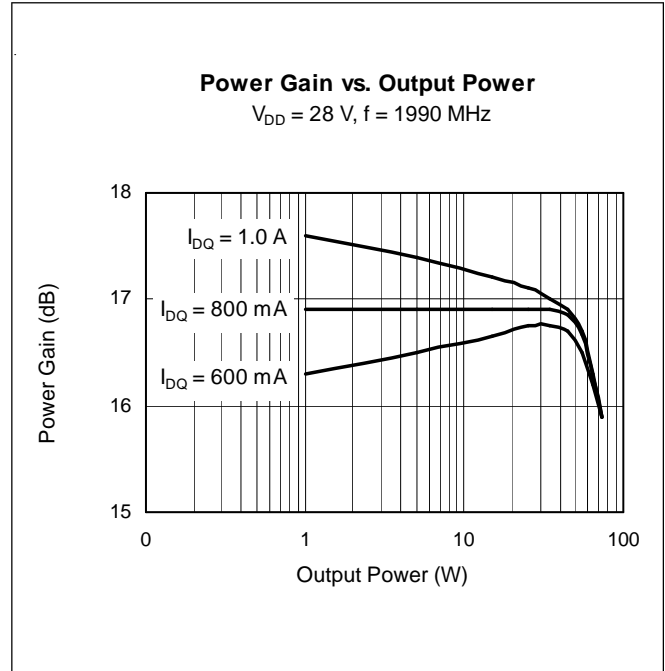
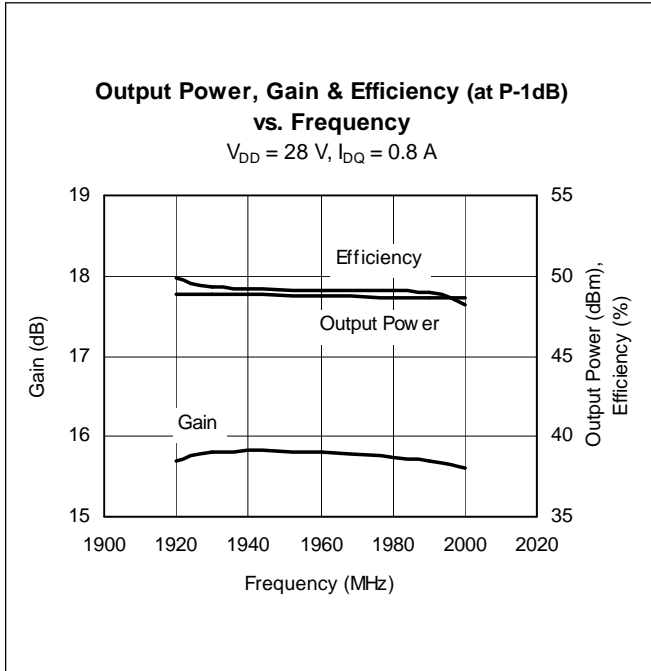
Maximum Ratings

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	PTF180601C	P_D	159	W
Above 25 $^{\circ}C$ derate by			0.91	W/ $^{\circ}C$
Total Device Dissipation	PTF180601E	P_D	180	W
Above 25 $^{\circ}C$ derate by			1.03	W/ $^{\circ}C$
Storage Temperature Range		T_{STG}	–40 to +150	$^{\circ}C$
Thermal Resistance	PTF180601C	$R_{\theta JC}$	1.1	$^{\circ}C/W$
($T_{CASE} = 70^{\circ}C, 60 W CW$)	PTF180601E		0.97	$^{\circ}C/W$

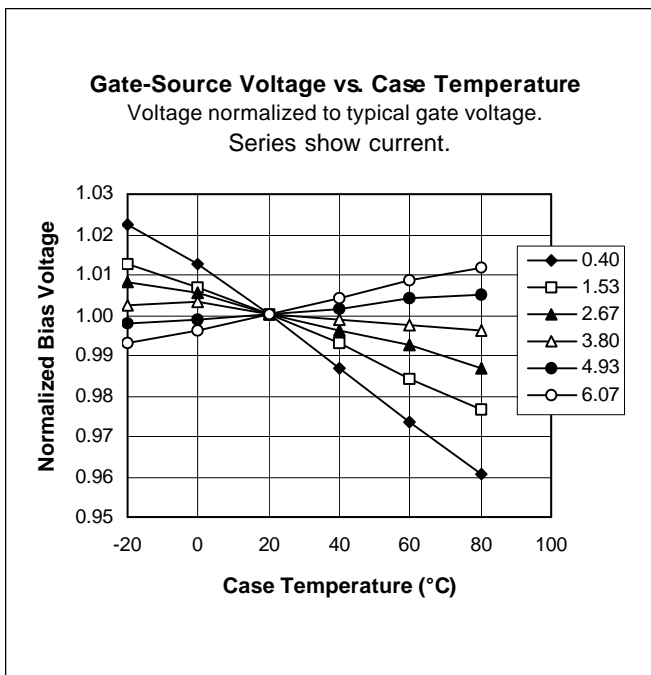
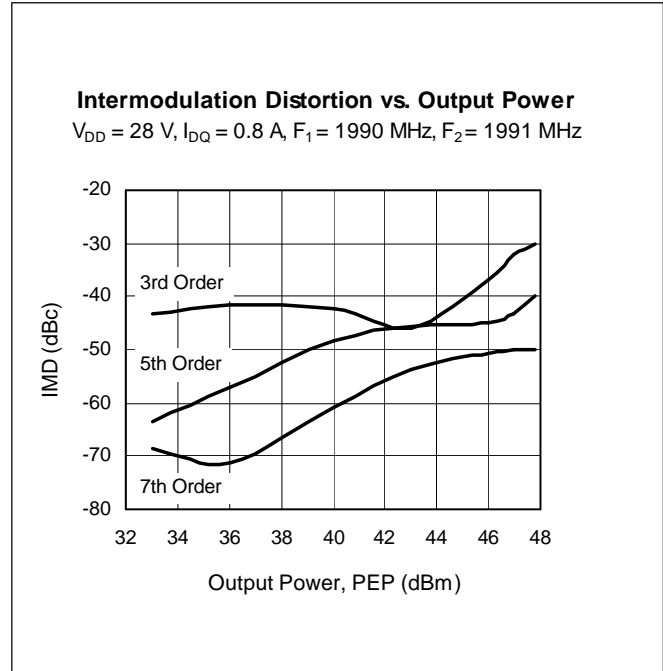
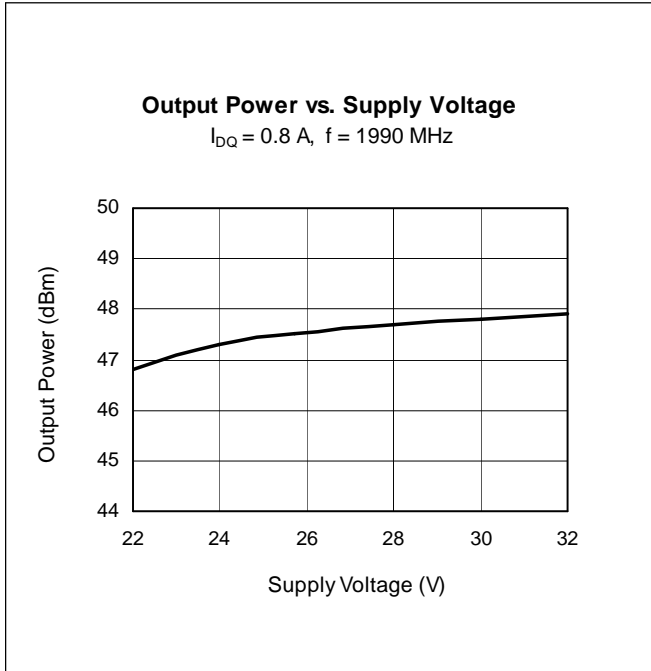
Typical Performance (measurements taken in production test fixture, at $T_{CASE} = 25^{\circ}C$ unless otherwise indicated)



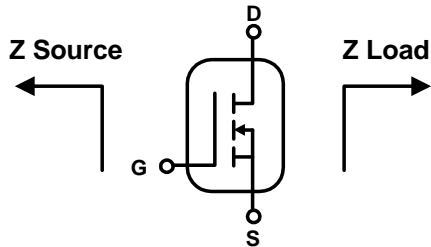
Typical Performance (cont.)



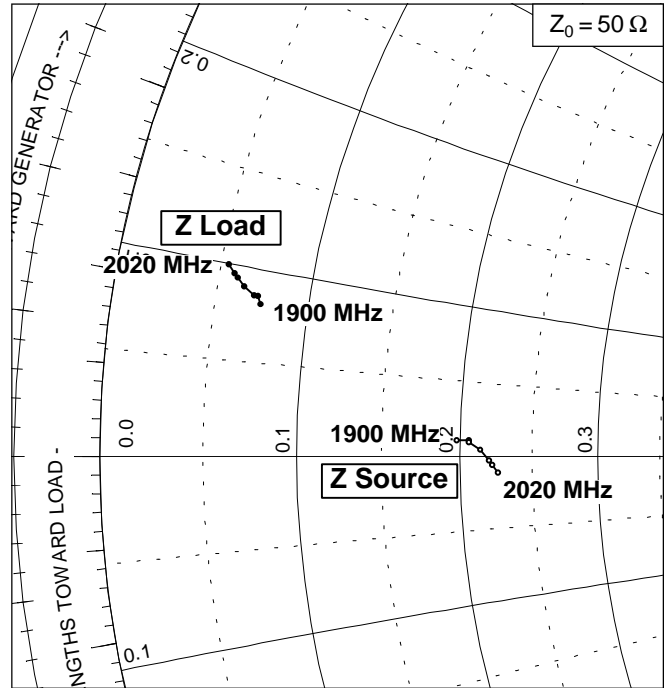
Typical Performance (cont.)



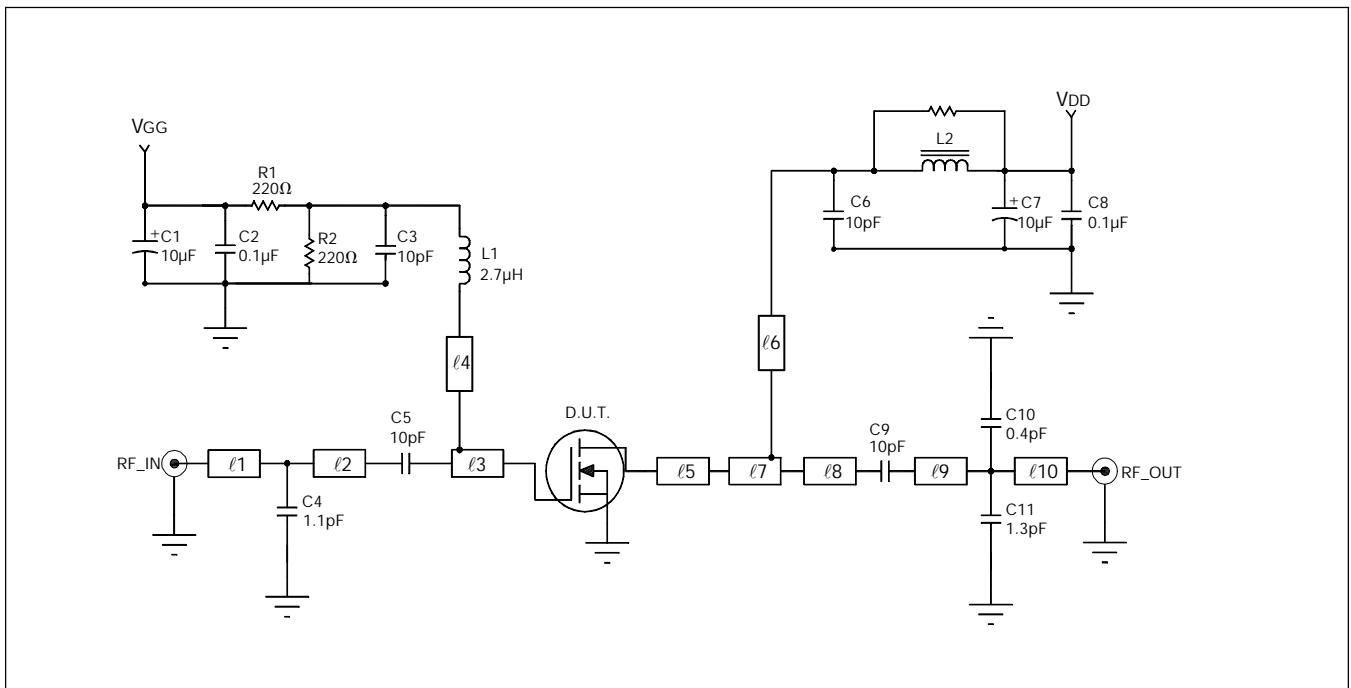
Broadband Circuit Impedance Data



Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1900	9.9	0.55	3.7	4.1
1920	10.3	0.56	3.6	4.3
1930	10.3	0.50	3.5	4.3
1960	10.7	0.23	3.2	4.5
1990	11.0	-0.15	3.0	4.7
2000	11.1	-0.30	2.9	4.8
2020	11.3	-0.58	2.7	5.0

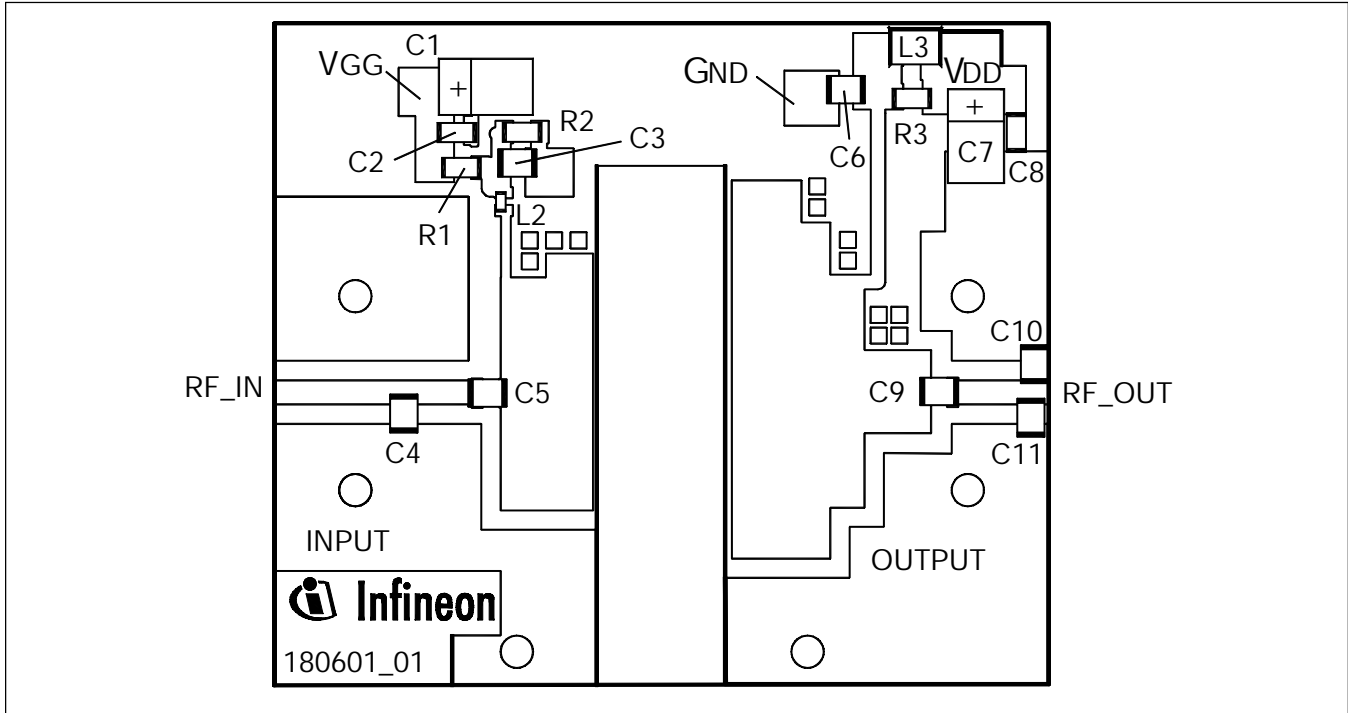


Reference Circuit



Reference Circuit Schematic for 1990 MHz

Reference Circuit (cont.)



Reference circuit¹ (not to scale)

Circuit Assembly Information

DUT	PTF180601	LDMOS Transistor	
PCB	1.27 mm [0.050"] thick, $\epsilon_r = 6.0$	TMM6	2 oz. copper, both sides

Microstrip	Electrical Characteristics at 1990 MHz	Dimensions: L x W (mm.)	Dimensions: L x W (in.)
l_1	$0.140 \lambda, 50 \Omega$	10.16 x 1.88	0.400 x 0.074
l_2	$0.068 \lambda, 50 \Omega$	4.95 x 1.88	0.195 x 0.074
l_3	$0.112 \lambda, 9.24 \Omega$	7.14 x 18.31	0.281 x 0.721
l_4	$0.064 \lambda, 78 \Omega$	4.83 x 0.76	0.190 x 0.030
l_5	$0.127 \lambda, 6.64 \Omega$	8.13 x 26.42	0.320 x 1.040
l_6	$0.206 \lambda, 65 \Omega$	15.24 x 1.14	0.600 x 0.045
l_7	$0.035 \lambda, 9 \Omega$	2.54 x 18.16	0.100 x 0.715
l_8	$0.077 \lambda, 21.87 \Omega$	5.26 x 6.53	0.207 x 0.257
l_9	$0.075 \lambda, 50 \Omega$	5.46 x 1.88	0.215 x 0.074
l_{10}	$0.023 \lambda, 50 \Omega$	1.65 x 1.88	0.065 x 0.074

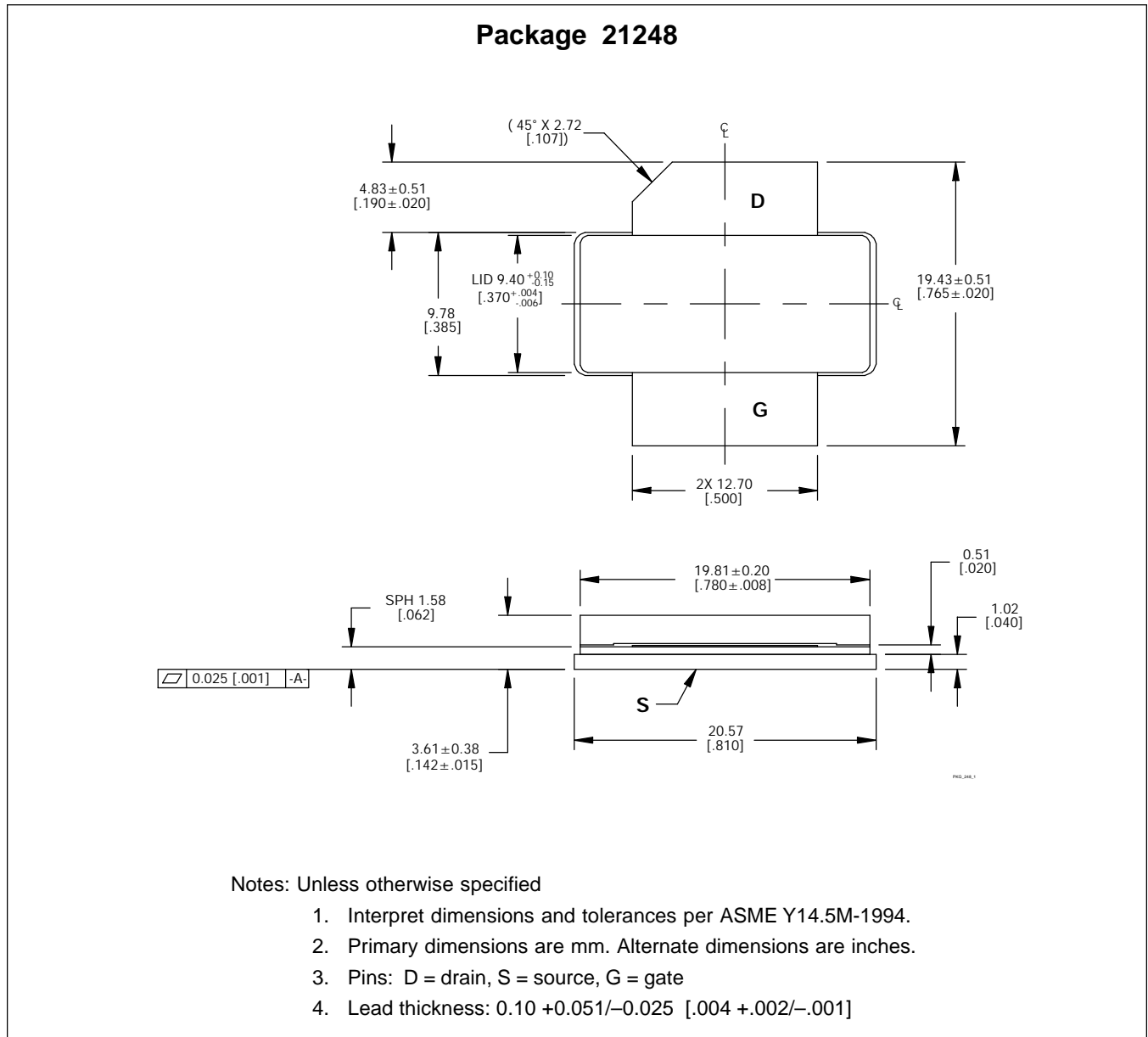
¹ Gerber files for this circuit are available on request.

Reference Circuit (cont.)

Component	Description	Manufacturer	P/N or Comment
C1, C7	Capacitor, 10 μ F, 35 V, SMD	Digi-Key	PCS6106TR-ND Tantalum TE Series
C2, C8	Capacitor, 0.1 μ F, 50 V	Digi-Key	PCC103BCT-ND
C3, C5, C6, C9	Capacitor, 10 pF	ATC	100B 100
C4	Capacitor, 1.1 pF	ATC	100B 1R1
C10	Capacitor, 0.4 pF	ATC	100B 0R4
C11	Capacitor, 1.3 pF	ATC	100B 1R3
L1	Chip Inductor, 2.7 μ H	Digi-Key	PCD1287CT-ND
L2	Ferrite, 6 mm	Philips	53/3/4.6-452
R1, R2	Resistor, 220 Ω	Digi-Key	P220ECT
R3	Resistor, 1.0 Ω	Digi-Key	1.0 PCT

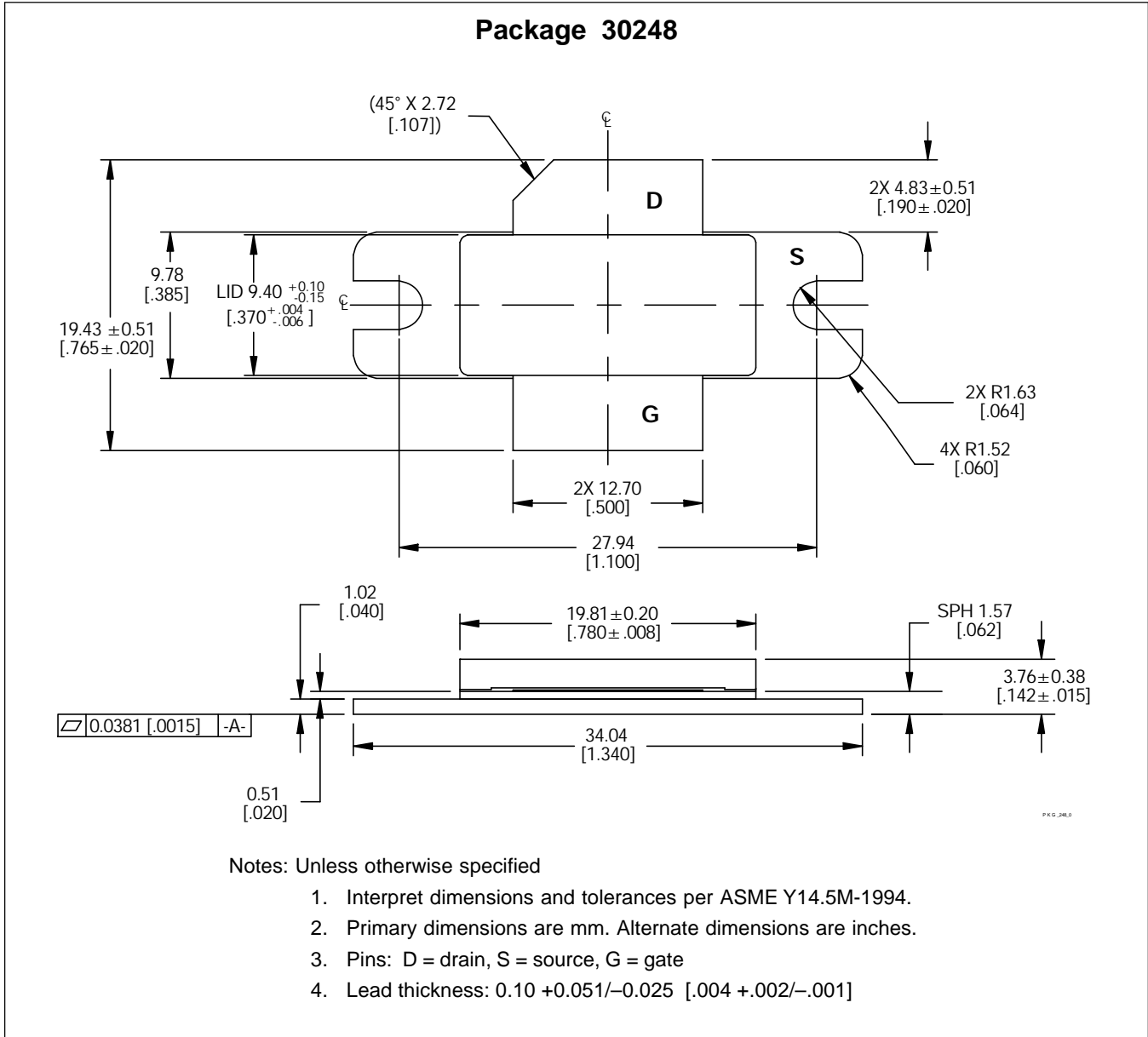
Package Outline Specifications

Type	Package Outline	Package Description	Marking
PTF180601C	21248	Earless ceramic	PTF180601C
PTF180601E	30248	Thermally enhanced, flange mount	PTF180601E



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Package Outline Specifications (cont.)



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PTF180601

Revision History: 2004-05-03

Previous Version: 2003-12-22, Data Sheet

Page	Subjects (major changes since last revision)
	PTF180601E added.

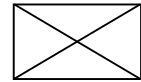
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