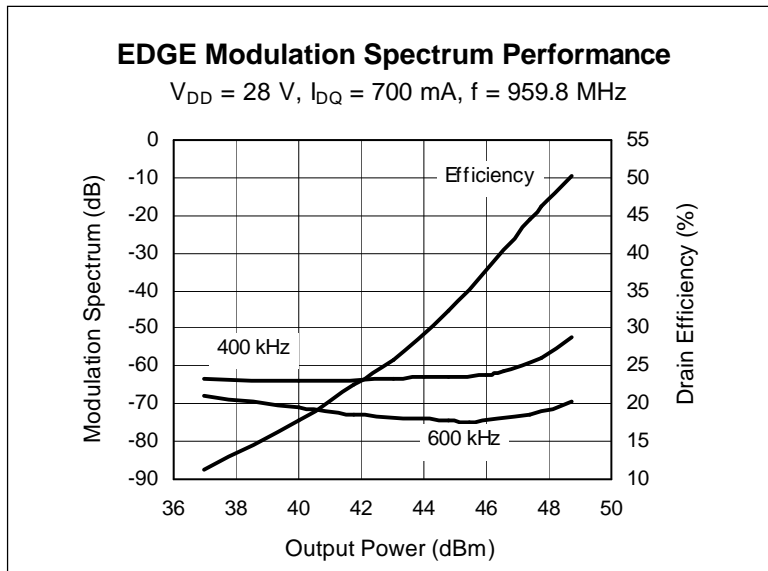


# LDMOS RF Power Field Effect Transistor 90 W, 869–960 MHz

## Description

The PTF080901 is a 90 W, internally matched *GOLDMOS* FET intended for EDGE and CDMA applications in the 860 to 960 MHz band. Full gold metallization ensures excellent device lifetime and reliability.



## Features

- Broadband internal matching
- Typical EDGE performance
  - Average output power = 45 W
  - Gain = 18 dB
  - Efficiency = 40%
- Typical CW performance
  - Output power at P-1dB = 120 W
  - Gain = 17 dB
  - Efficiency = 60%
- Integrated ESD protection: Human Body Model, Class 1 (minimum)
- Excellent thermal stability
- Low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 90 W (CW) output power

PTF080901E  
Package 30248



PTF080901F  
Package 31248

**ESD:** Electrostatic discharge sensitive device—observe handling precautions!

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

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

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 700\text{ mA}$ ,  $P_{OUT} = 45\text{ W}$ ,  $f = 959.8\text{ MHz}$

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	$\eta_D$	—	40	—	%

### Two-Tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 650\text{ mA}$ ,  $P_{OUT} = 90\text{ W PEP}$ ,  $f = 960\text{ MHz}$ , tone spacing = 1 MHz

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

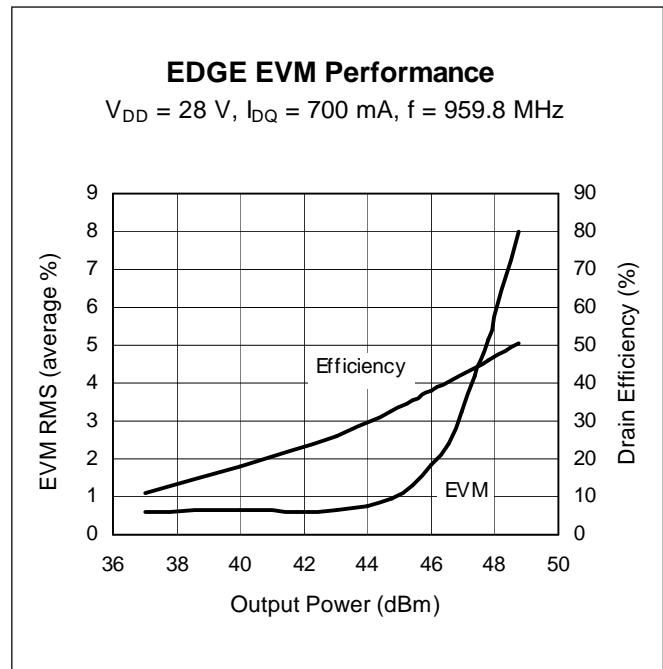
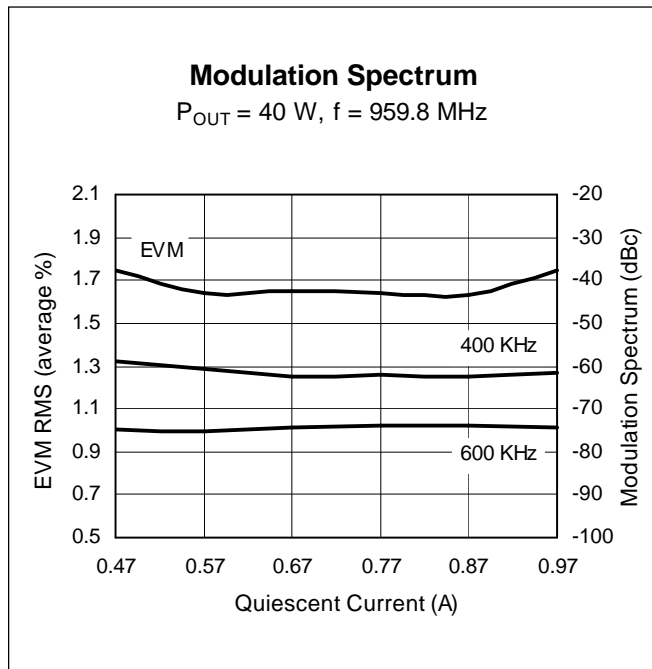
**DC Characteristics** at  $T_{CASE} = 25^{\circ}C$  unless otherwise indicated

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
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	$\mu A$
On–State Resistance	$V_{GS} = 10 V, V_{DS} = 0.1 V$	$R_{DS(on)}$	—	0.1	—	$\Omega$
Operating Gate Voltage	$V_{DS} = 28 V, I_{DQ} = 650 mA$	$V_{GS}$	2.5	3.2	4	V
Gate Leakage Current	$V_{GS} = 10 V, V_{DS} = 0 V$	$I_{GSS}$	—	—	1.0	$\mu A$

**Maximum Ratings**

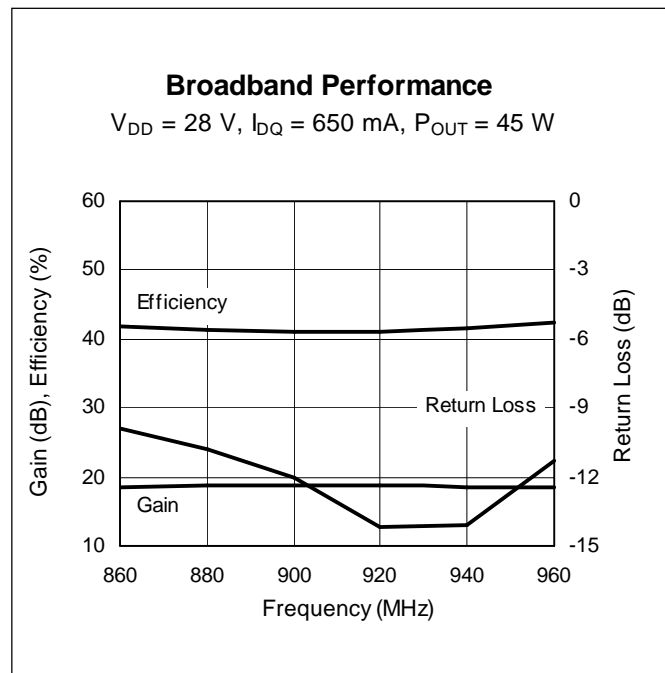
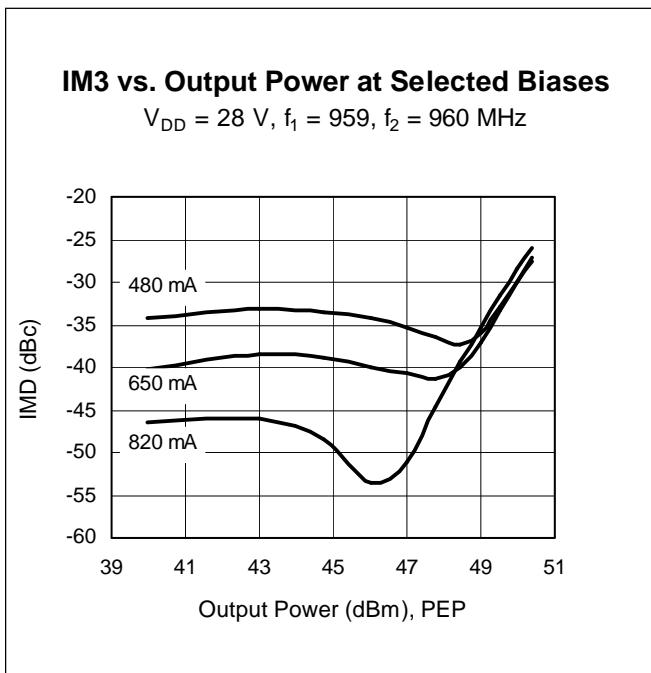
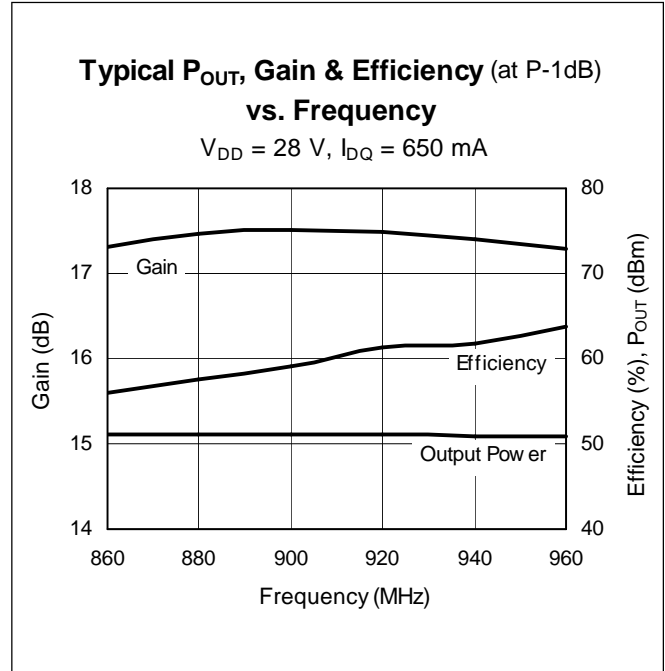
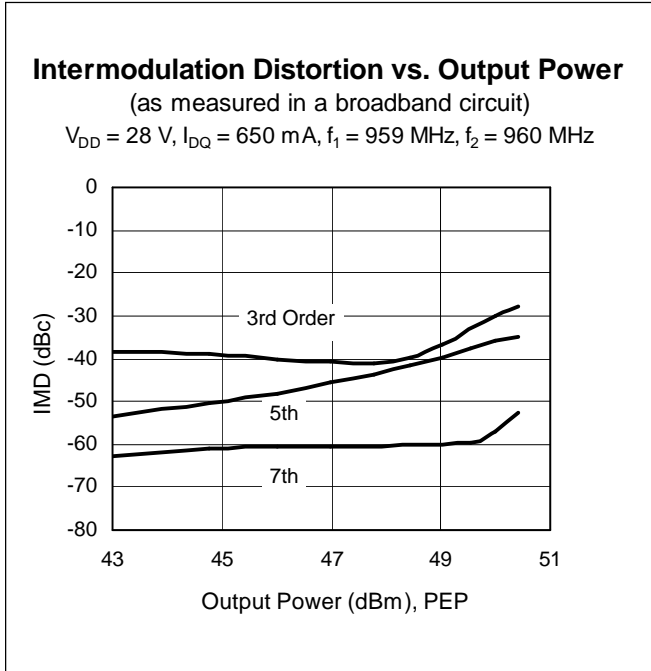
Parameter	Symbol	Value	Unit
Drain–Source Voltage	$V_{DSS}$	65	V
Gate–Source Voltage	$V_{GS}$	-0.5 to +12	V
Junction Temperature	$T_J$	200	$^{\circ}C$
Total Device Dissipation Above 25 $^{\circ}C$ derate by	$P_D$	335 1.9	W W/ $^{\circ}C$
Storage Temperature Range	$T_{STG}$	-40 to +150	$^{\circ}C$
Thermal Resistance ( $T_{CASE} = 70^{\circ}C$ )	$R_{\theta JC}$	0.52	$^{\circ}C/W$

**Typical Performance** (measurements taken in production test fixture)



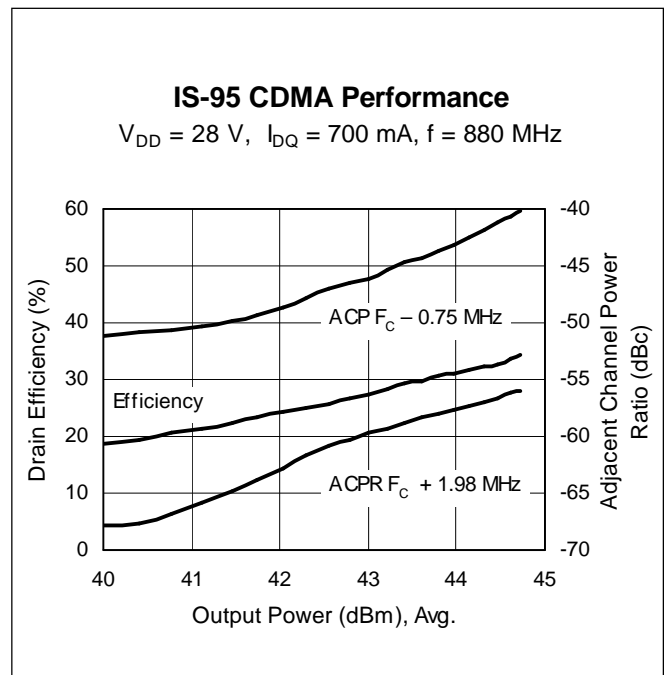
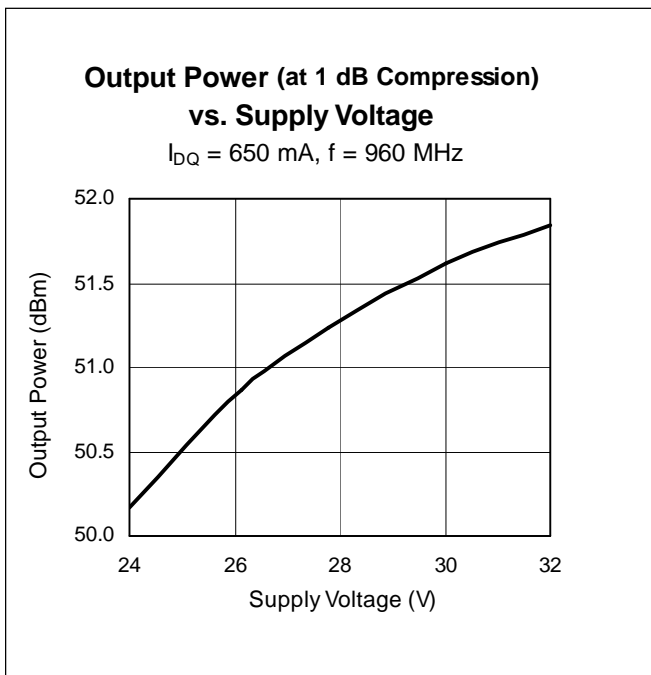
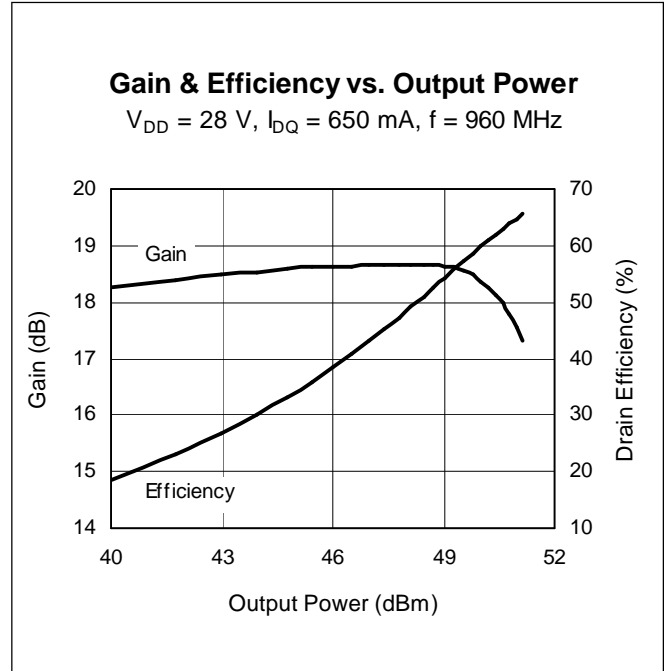
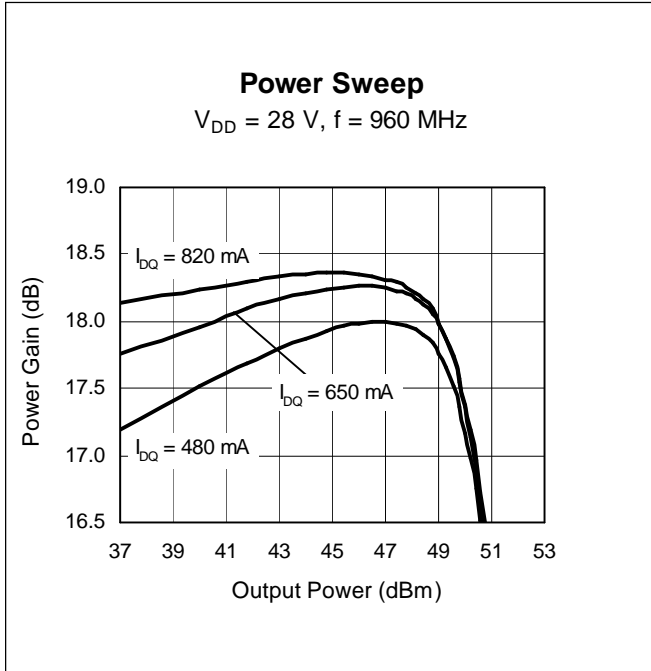
All published data at  $T_{CASE} = 25^{\circ}C$  unless otherwise indicated.

Typical Performance (cont.)



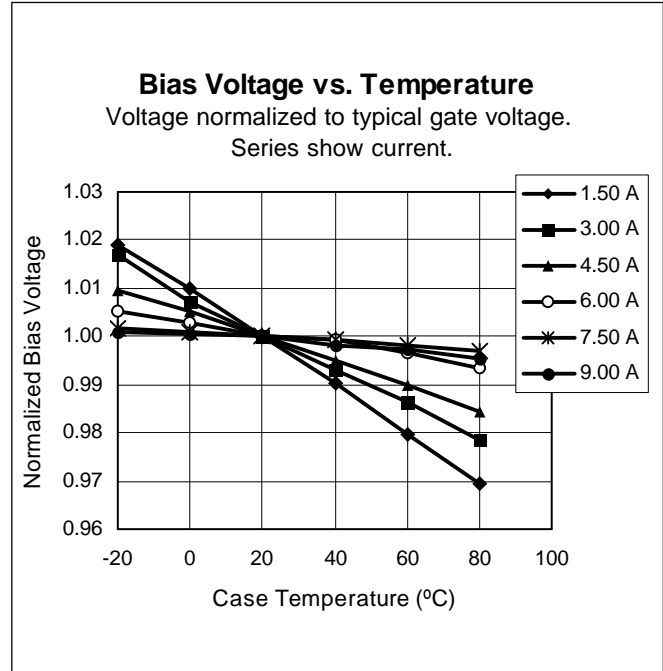
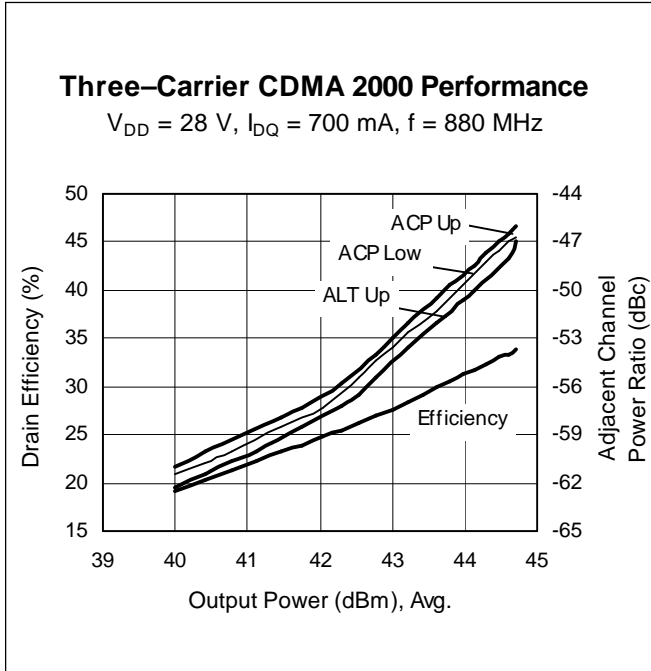
All published data at  $T_{CASE} = 25^\circ\text{C}$  unless otherwise indicated.

Typical Performance (cont.)

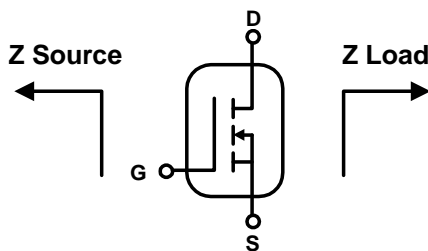


All published data at  $T_{CASE} = 25^\circ\text{C}$  unless otherwise indicated.

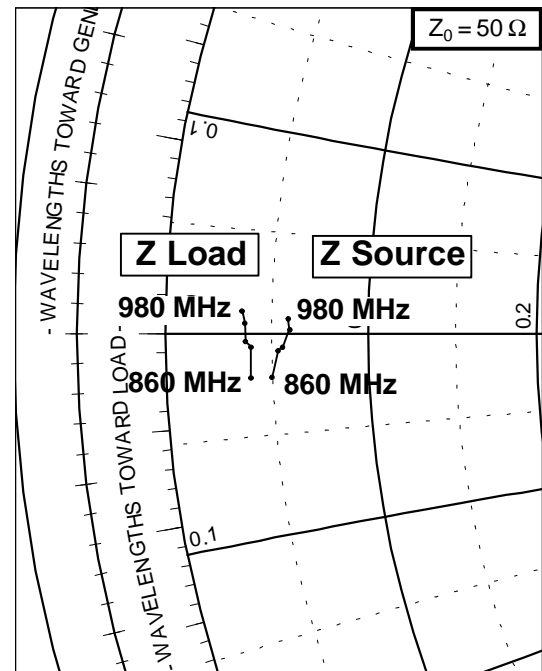
Typical Performance (cont.)



Broadband Circuit Impedance

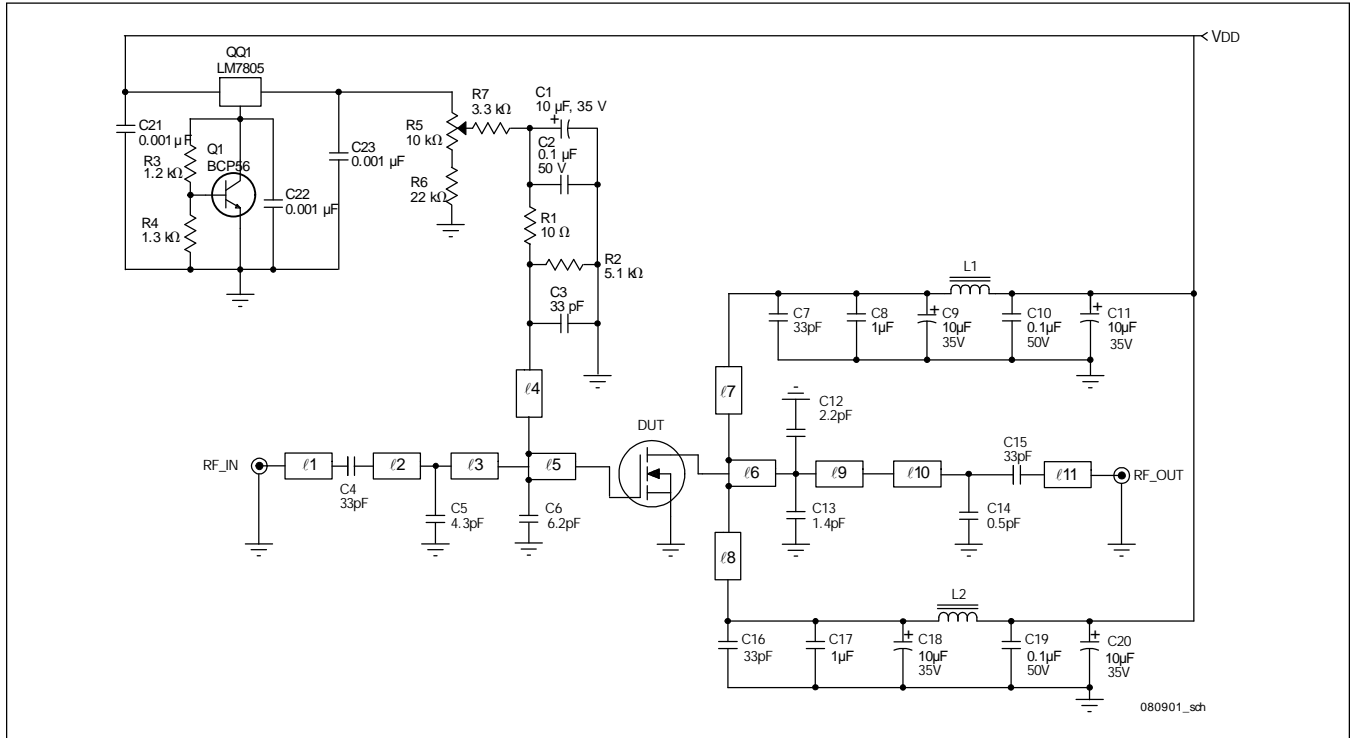


Frequency MHz	Z Source $\Omega$		Z Load $\Omega$	
	R	$jX$	R	$jX$
860	2.50	-1.09	1.98	-1.08
920	2.67	-0.43	1.99	-0.32
940	2.79	-0.35	1.87	-0.21
960	2.94	0.12	1.85	0.27
980	2.91	0.37	1.79	0.53



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

Test Circuit



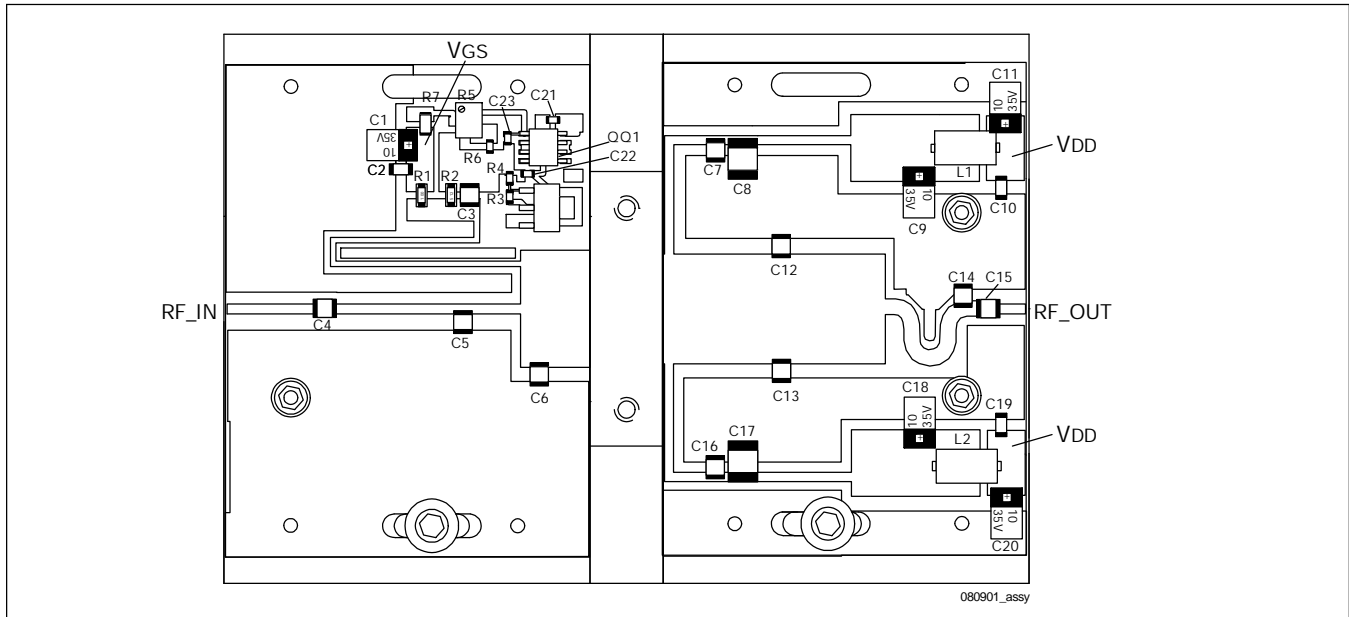
Test Circuit Schematic for 960 MHz

Circuit Assembly Information

DUT	PTF080901	LDMOS Transistor	
PCB	0.76 mm. [.030"] thick, $\epsilon_r = 4.5$	2 oz. copper	Rogers TMM4

Microstrip	Electrical Characteristics at 960 MHz	Dimensions: L x W (mm.)	Dimensions: L x W (in.)
l1	0.075 $\lambda$ , 50 $\Omega$	12.83 x 1.35	0.505 x 0.053
l2	0.101 $\lambda$ , 50 $\Omega$	17.27 x 1.35	0.680 x 0.053
l3	0.053 $\lambda$ , 50 $\Omega$	9.14 x 1.35	0.360 x 0.053
l4	0.289 $\lambda$ , 73.66 $\Omega$	50.80 x 0.75	2.000 x 0.030
l5	0.061 $\lambda$ , 7.48 $\Omega$	9.27 x 16.26	0.365 x 0.640
l6	0.097 $\lambda$ , 7.93 $\Omega$	14.73 x 15.24	0.580 x 0.600
l7, l8	0.132 $\lambda$ , 52.47 $\Omega$	22.61 x 1.27	0.890 x 0.050
l9	0.105 $\lambda$ , 7.93 $\Omega$	16.13 x 15.24	0.635 x 0.600
l10	0.134 $\lambda$ , 38.02 $\Omega$	22.35 x 2.16	0.880 x 0.085
l11	0.029 $\lambda$ , 50 $\Omega$	4.95 x 1.37	0.195 x 0.053

**Test Circuit** (cont.)



Reference Circuit<sup>1</sup> (not to scale)

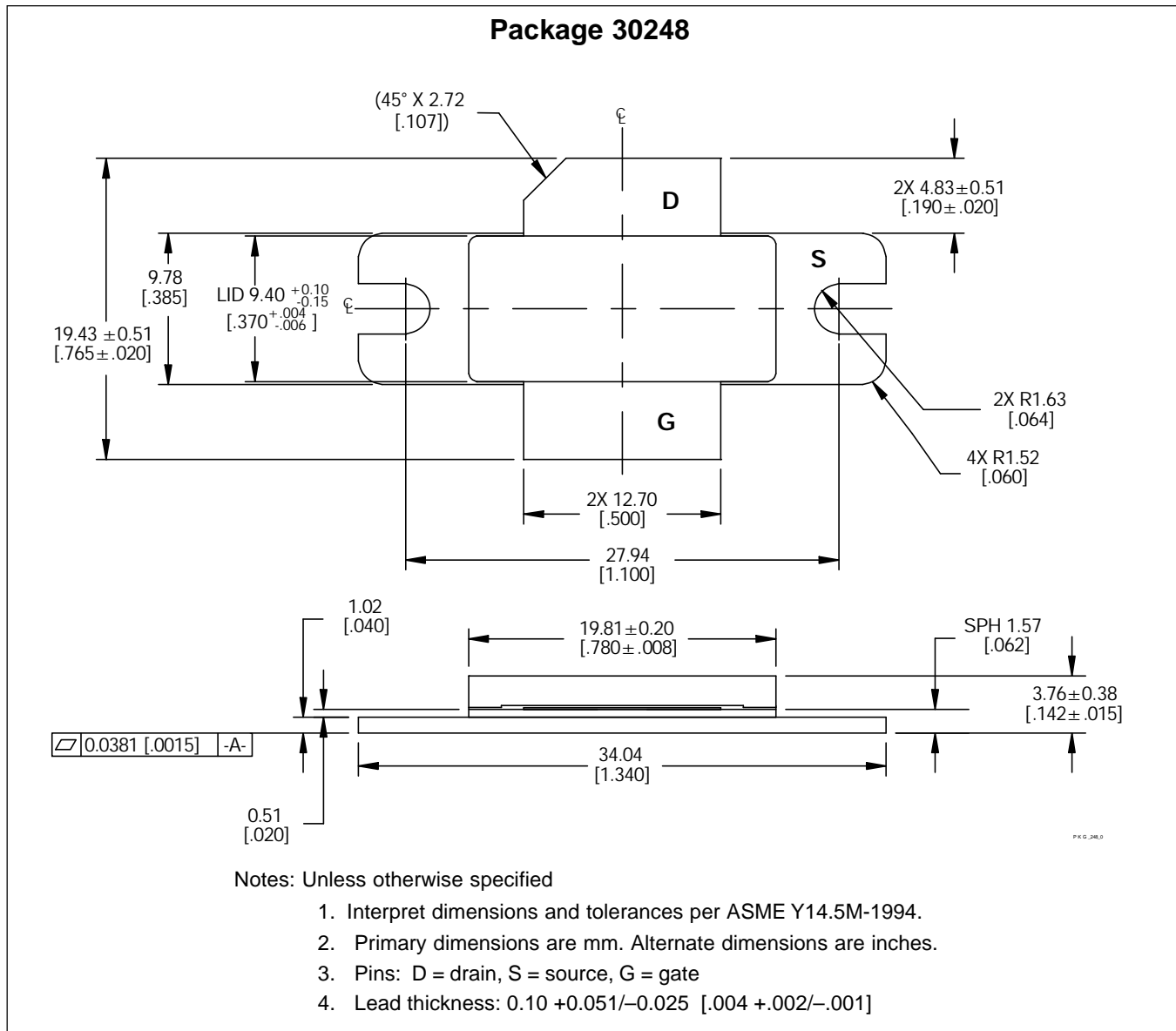
Component	Description	Manufacturer	P/N or Comment
C1, C9, C11, C18, C20	Capacitor, 10 $\mu$ F, 35 V	Digi-Key	Tantalum TE Series SMD PCS6106TR-ND
C2, C10, C19	Capacitor, 0.1 $\mu$ F, 50 V	Digi-Key	P4525-ND
C3, C4, C7, C15, C16	Capacitor, 33 pF	ATC	100B 330
C5	Capacitor, 4.3 pF	ATC	100B 4R3
C6	Capacitor, 6.2 pF	ATC	100B 6R2
C8, C17	Capacitor, 1 $\mu$ , 50 V	Digi-Key	19528-ND
C12	Capacitor, 2.2 pF	ATC	100B 2R2
C13	Capacitor, 1.4 pF	ATC	100B 1R4
C14	Capacitor, 0.5 pF	ATC	100B 0R5
C21, C22, C23	Capacitor, 0.001 $\mu$ F, 50 V, 0603	Digi-Key	PCC1772CT-ND
L1, L2	Ferrite, 6 mm	Philips	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	P5.1KECT-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	Resistor, Variable, 10 k-ohms, 1/4 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

<sup>1</sup>Gerber files for this circuit are available on request.

**Ordering Information**

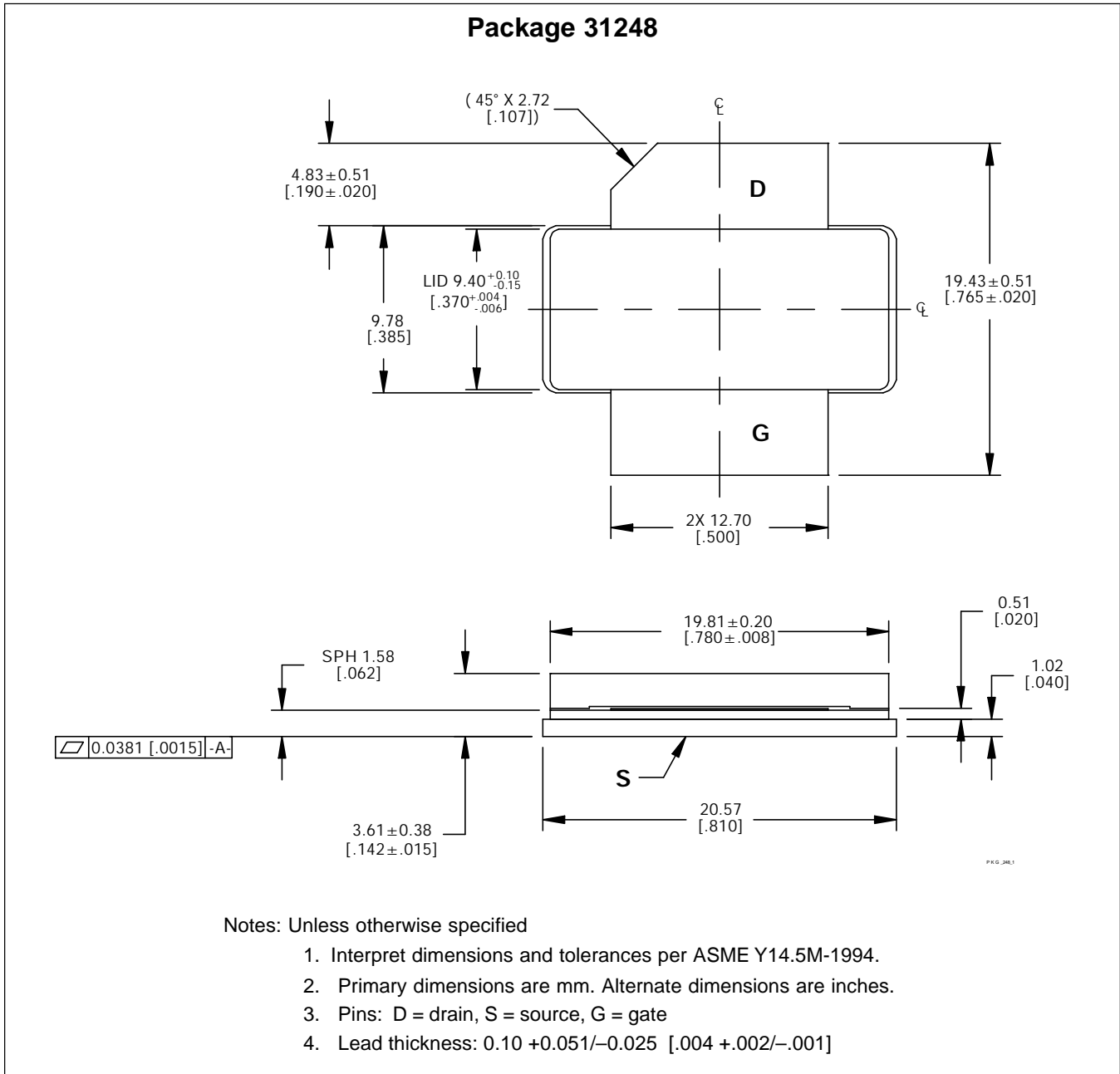
Type	Package Outline	Package Description	Marking
PTF080901E	30248	Thermally enhanced, flange mount	PTF080901E
PTF080901F	31248	Thermally enhanced, earless	PTF080901F

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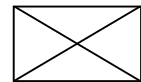
Page	Subjects (major changes since last revision)
1,8,9	Add information about PTF080901F, new package outline diagrams
6,7	Circuit information updated.

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+1 877 465 3667 (1-877-GOLDMOS) USA  
or +1 408 776 0600 International



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