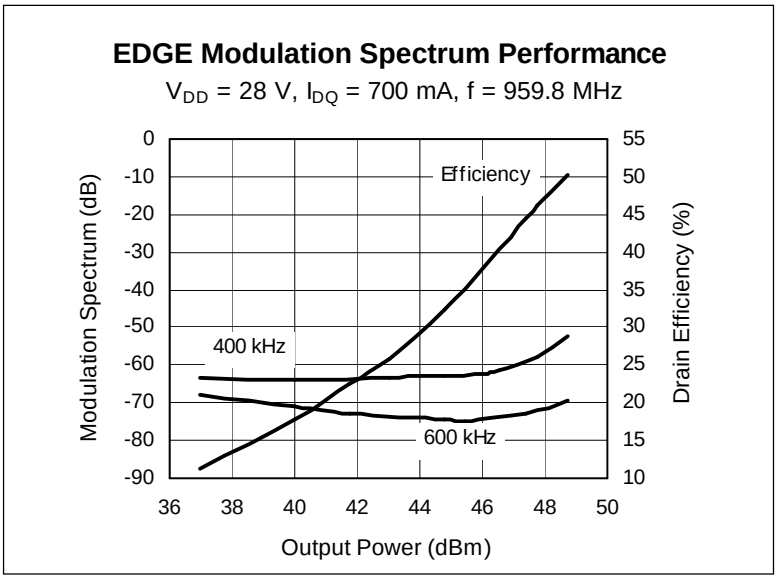
LDMOS RF Power Field Effect Transistor
90 W, 869–960 MHz

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°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} = 700 mA, P_{OUT} = 45 W, f = 959.8 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	—	%

Two–Tone Measurements (tested in Infineon test fixture)

V_{DD} = 28 V, I_{DQ} = 650 mA, P_{OUT} = 90 W PEP, f = 960 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

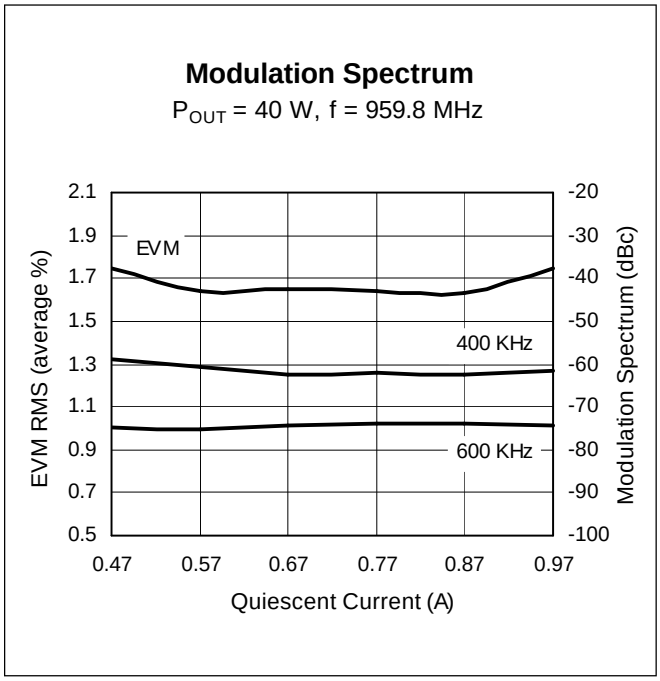
DC Characteristics at T_{CASE} = 25°C unless otherwise indicated

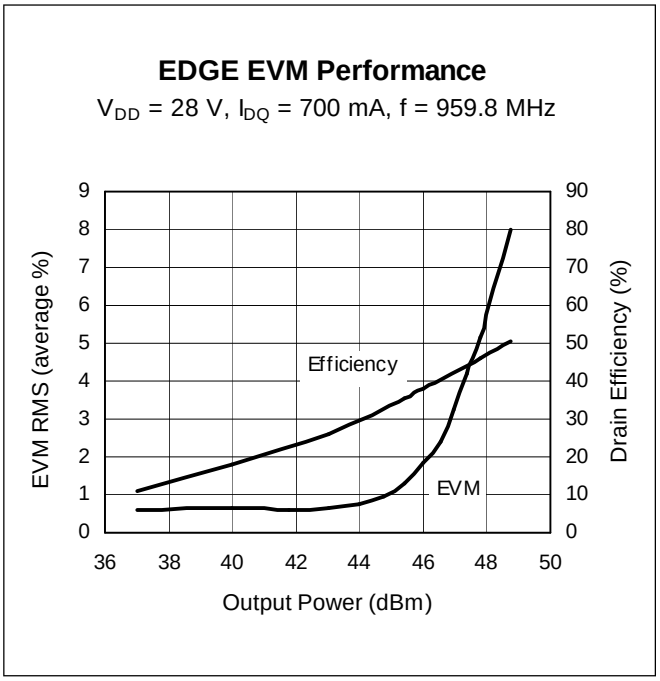
Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain–Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 µA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
On–State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.1	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 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	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	°C
Total Device Dissipation	P_D	335	W
Above 25°C derate by		1.9	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	0.52	°C/W

Typical Performance (measurements taken in production test fixture)

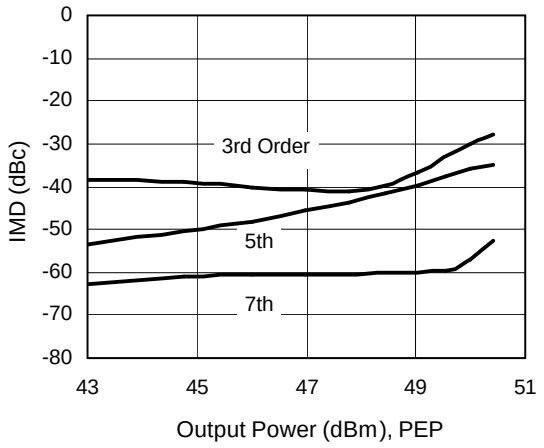




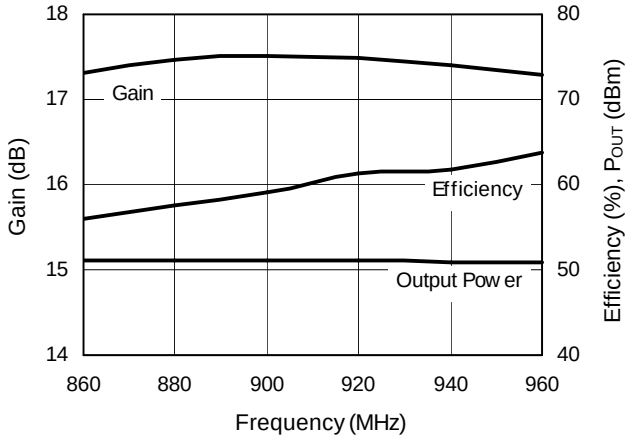
All published data at T_{CASE} = 25°C unless otherwise indicated.

Typical Performance (cont.)

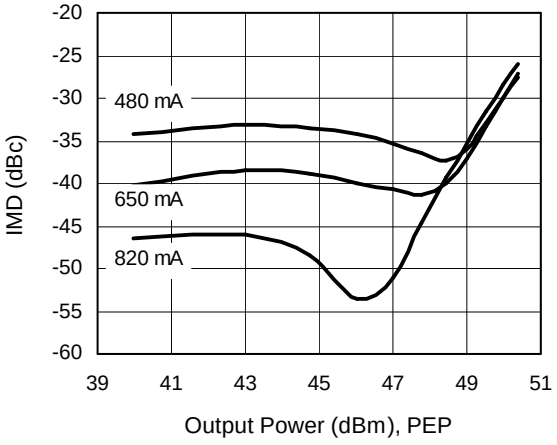
Intermodulation Distortion vs. Output Power
(as measured in a broadband circuit)
V_{DD} = 28 V, I_{DQ} = 650 mA, f_1 = 959 MHz, f_2 = 960 MHz



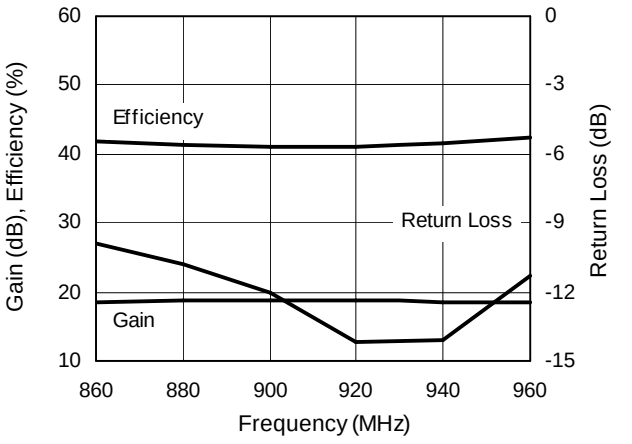
Typical P_{OUT}, Gain & Efficiency (at P-1dB)
vs. Frequency
V_{DD} = 28 V, I_{DQ} = 650 mA



IM3 vs. Output Power at Selected Biases
V_{DD} = 28 V, f_1 = 959, f_2 = 960 MHz



Broadband Performance
V_{DD} = 28 V, I_{DQ} = 650 mA, P_{OUT} = 45 W

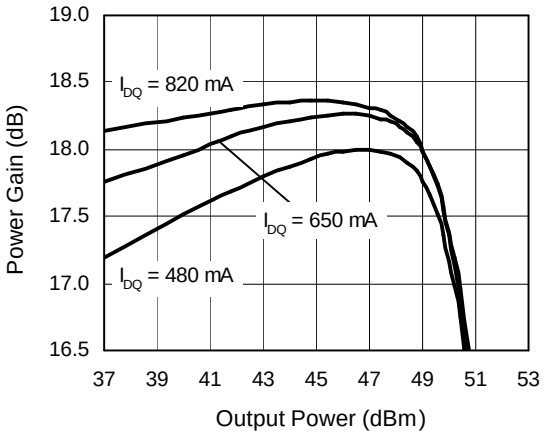


All published data at T_{CASE} = 25°C unless otherwise indicated.

Typical Performance (cont.)

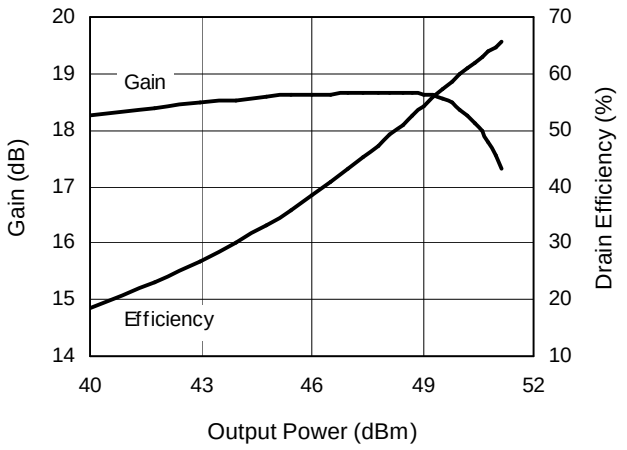
Power Sweep

V_{DD} = 28 V, f = 960 MHz



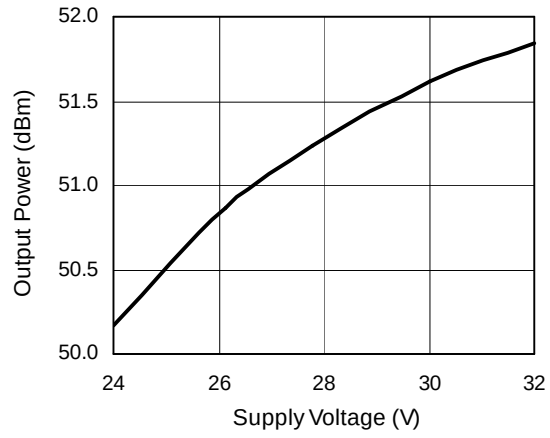
Gain & Efficiency vs. Output Power

V_{DD} = 28 V, I_{DQ} = 650 mA, f = 960 MHz



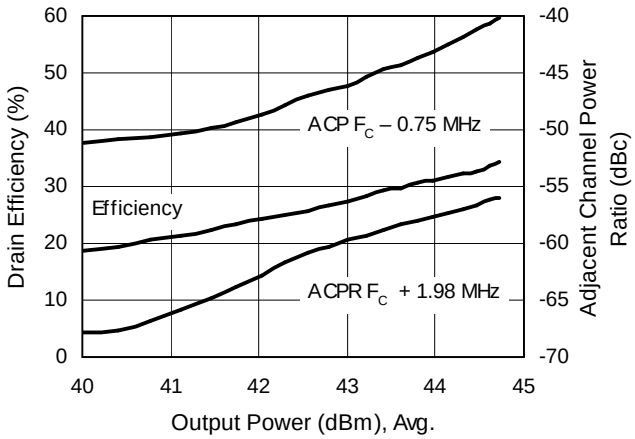
Output Power (at 1 dB Compression) vs. Supply Voltage

I_{DQ} = 650 mA, f = 960 MHz



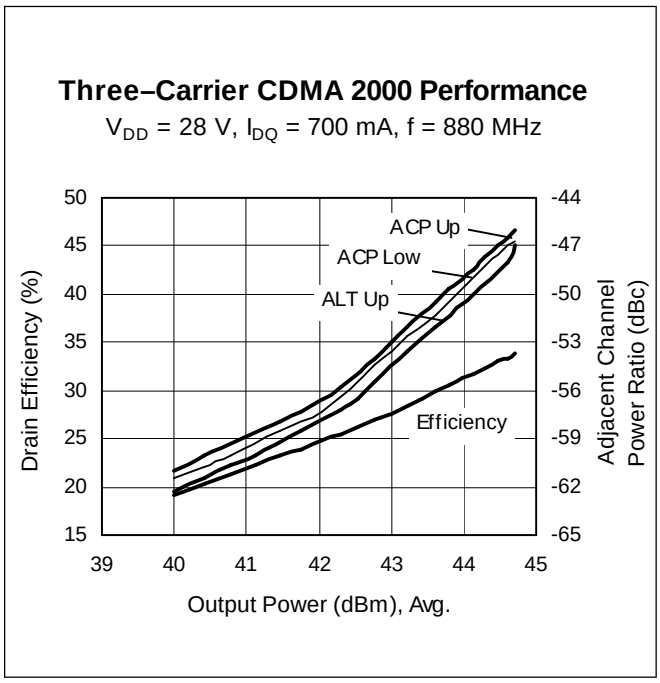
IS-95 CDMA Performance

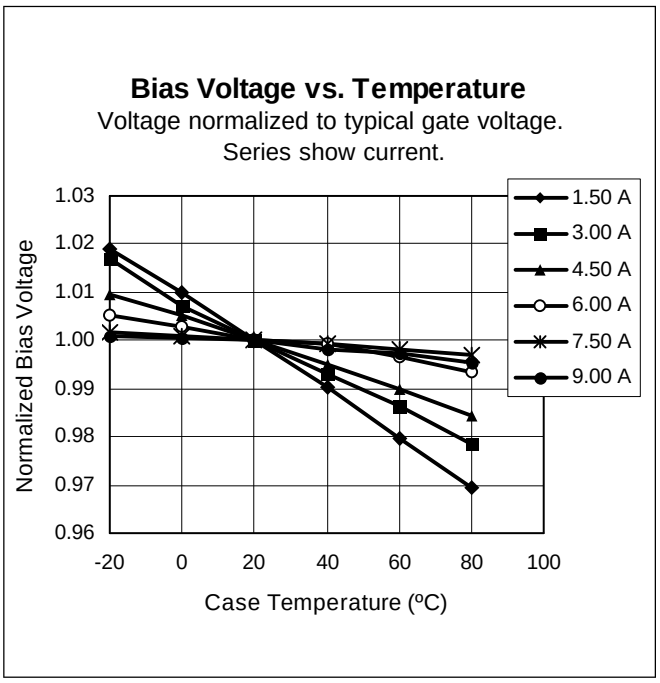
V_{DD} = 28 V, I_{DQ} = 700 mA, f = 880 MHz



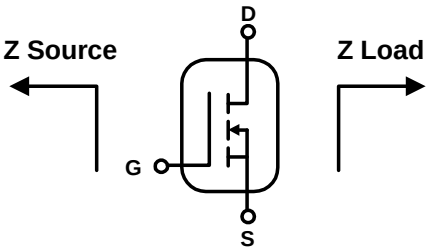
All published data at T_{CASE} = 25°C unless otherwise indicated.

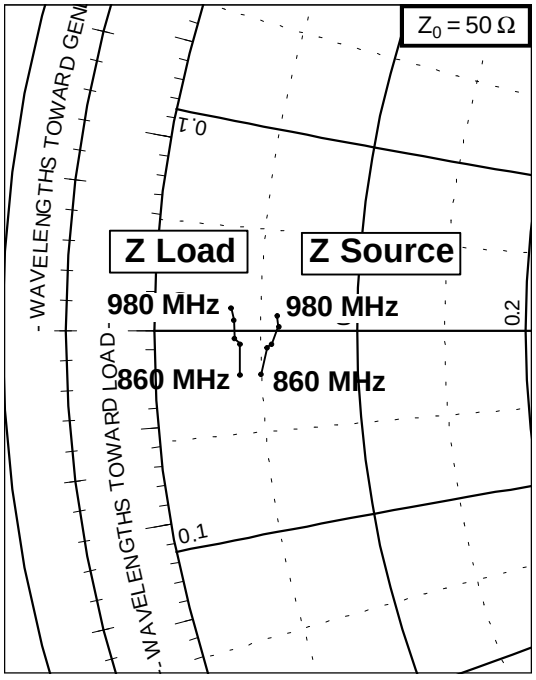
Typical Performance (cont.)





Broadband Circuit Impedance

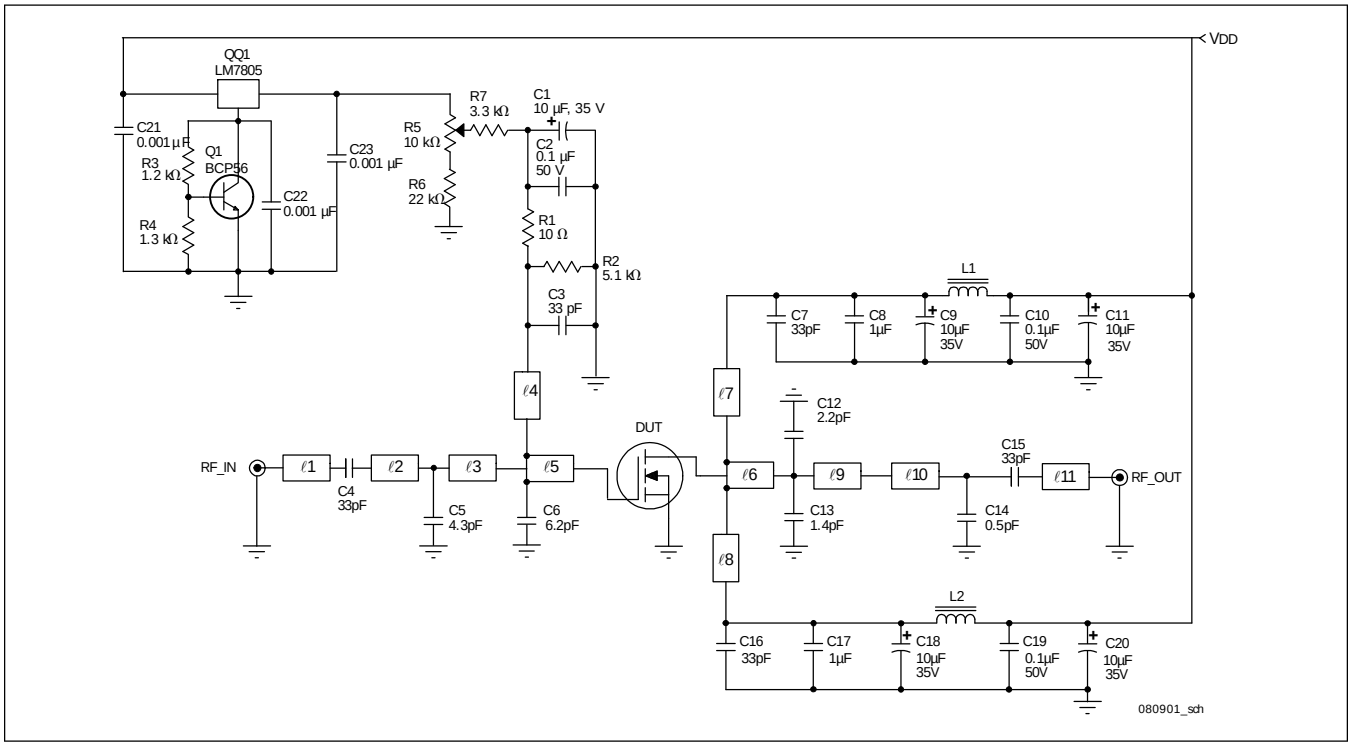




Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
860	2.50	–1.09	1.98	–1.08
920	2.67	–0.43	1.99	–0.32
940	2.79	–0.35	1.87	–0.21
960	2.94	0.12	1.85	0.27
980	2.91	0.37	1.79	0.53

All published data at T_{CASE} = 25°C unless otherwise indicated.

Test Circuit



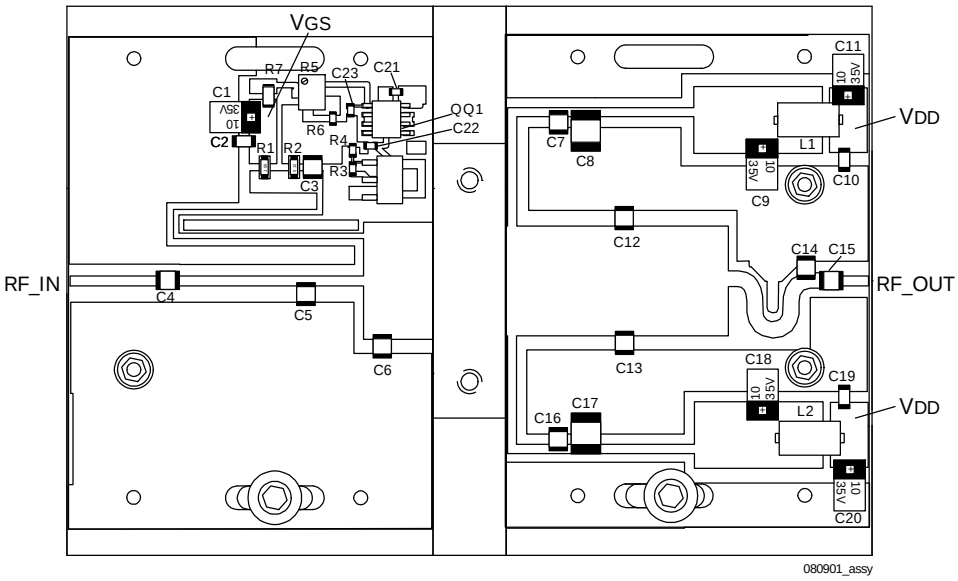
Test Circuit Schematic for 960 MHz

Circuit Assembly Information

DUT	PTF080901	LDMOS Transistor	
PCB	0.76 mm. [.030"] thick, ε_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 λ, 50 Ω	12.83 x 1.35	0.505 x 0.053
ℓ2	0.101 λ, 50 Ω	17.27 x 1.35	0.680 x 0.053
ℓ3	0.053 λ, 50 Ω	9.14 x 1.35	0.360 x 0.053
ℓ4	0.289 λ, 73.66 Ω	50.80 x 0.75	2.000 x 0.030
ℓ5	0.061 λ, 7.48 Ω	9.27 x 16.26	0.365 x 0.640
ℓ6	0.097 λ, 7.93 Ω	14.73 x 15.24	0.580 x 0.600
ℓ7, ℓ8	0.132 λ, 52.47 Ω	22.61 x 1.27	0.890 x 0.050
ℓ9	0.105 λ, 7.93 Ω	16.13 x 15.24	0.635 x 0.600
ℓ10	0.134 λ, 38.02 Ω	22.35 x 2.16	0.880 x 0.085
ℓ11	0.029 λ, 50 Ω	4.95 x 1.37	0.195 x 0.053

Test Circuit (cont.)



Reference Circuit[1] (not to scale)

Component	Description	Manufacturer	P/N or Comment
C1, C9, C11, C18, C20	Capacitor, 10 µF, 35 V	Digi-Key	Tantalum TE Series SMD PCS6106TR-ND
C2, C10, C19	Capacitor, 0.1 µF, 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 µ, 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 µF, 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

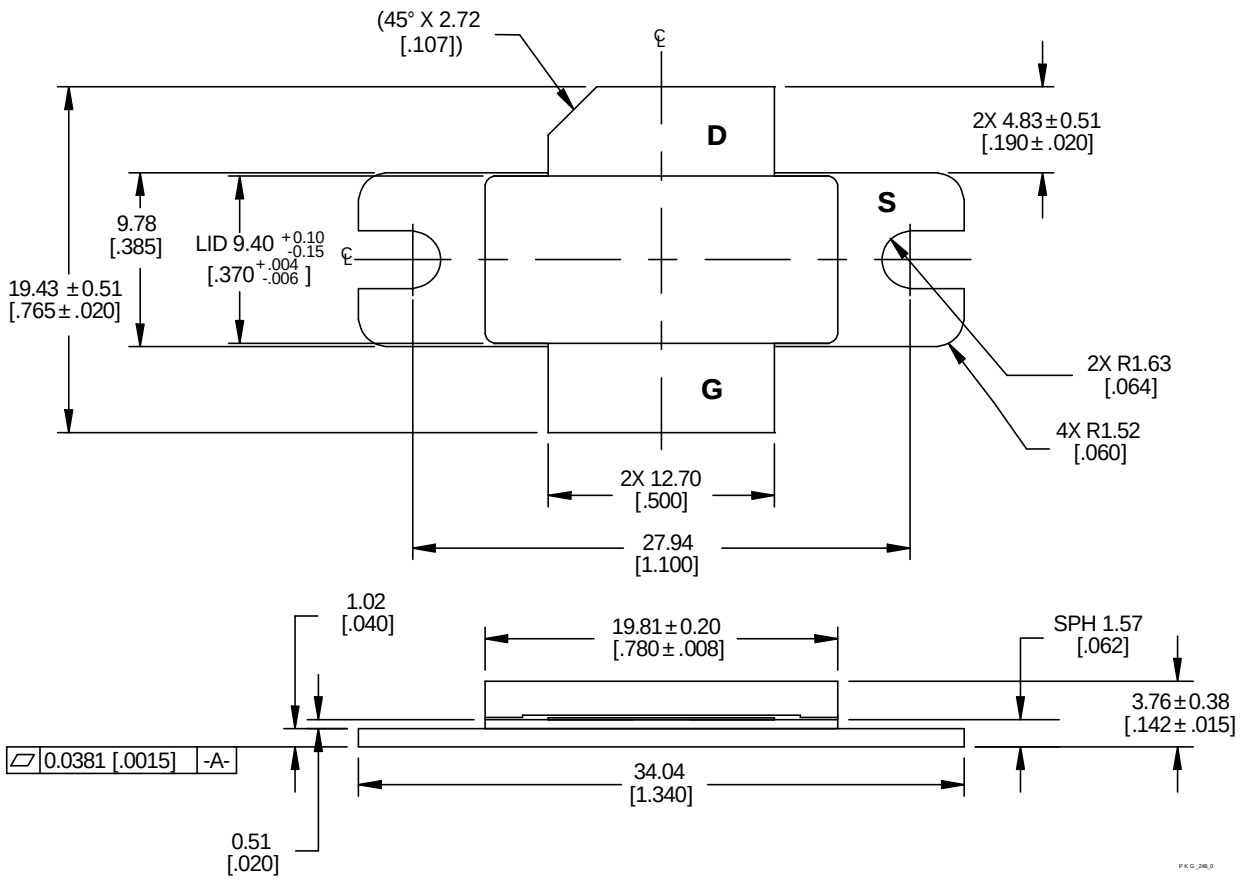
[1]Gerber files for this circuit are available on request.

Ordering Information

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

Package Outline Specifications

Package 30248



Notes: Unless otherwise specified

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. Pins: D = drain, S = source, G = gate
4. Lead thickness: 0.10 +0.051/–0.025 [.004 +.002/–.001]

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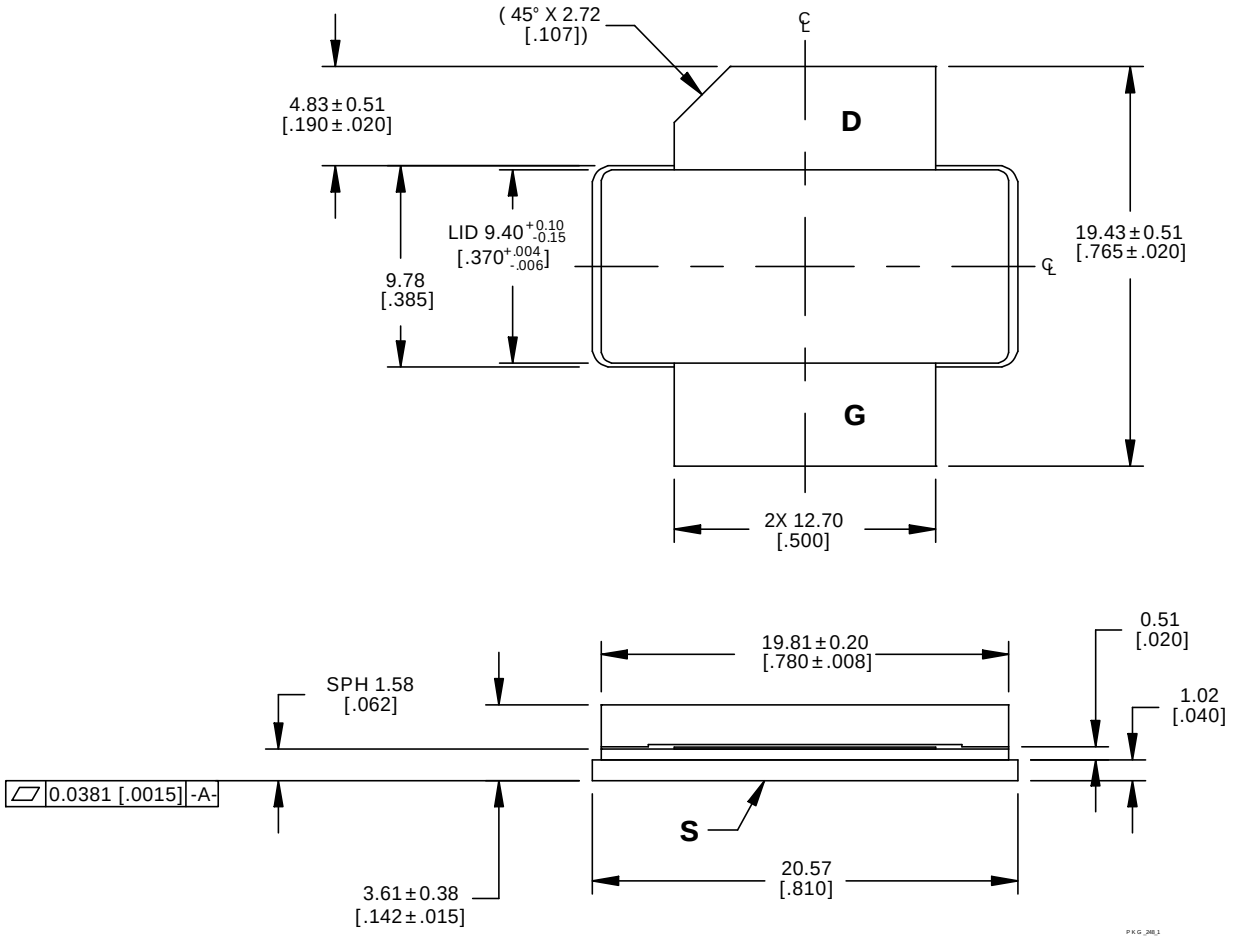
Package Outline Specifications

Package 31248



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PTF080901

Revision History:	**2004-04-05**	Data Sheet
Previous Version:	2004-01-02, Data Sheet	
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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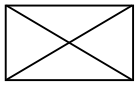

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