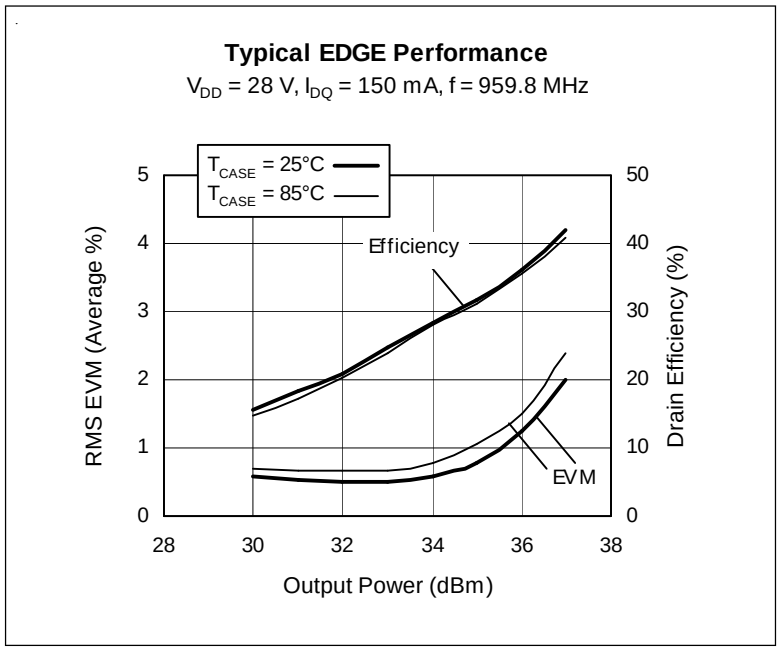
Thermally-Enhanced High Power RF LDMOS FET
10 W, 860 – 960 MHz

Description

The PTF080101S is a 10-watt, internally-matched *GOLDMOS* FET intended for EDGE and CDMA applications in the 860 to 960 MHz band. Thermally-enhanced packaging provides the coolest operation possible. Full gold metallization ensures excellent device lifetime and reliability.

PTF080101S
Package 32259



Features

- Thermally-enhanced packaging
- Broadband internal matching
- Typical EDGE performance
  - Average output power = 5 W
  - Gain = 18.5 dB
  - Efficiency = 38%
- Typical CW performance
  - Output power at P–1dB = 13 W
  - Gain = 17.5 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, 10 W (CW) output power

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} = 150 mA, P_{OUT} = 5.0 W, f = 959.8 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Error Vector Magnitude	EVM (RMS)	—	2.0	—	%
Modulation Spectrum @ 400 kHz	ACPR	—	–61	—	dBc
Modulation Spectrum @ 600 kHz	ACPR	—	–71	—	dBc
Gain	G_{ps}	—	18.5	—	dB
Drain Efficiency	η_D	—	38	—	%

RF Characteristics (cont.)

Two-Tone Measurements (tested in Infineon test fixture)

V_{DD} = 28 V, I_{DQ} = 150 mA, P_{OUT} = 10 W PEP, f = 960 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Units
Gain	G_{ps}	18.0	18.5	—	dB
Drain Efficiency	η_D	36.0	38	—	%
Intermodulation Distortion	IMD	—	–32	–30	dBc

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

Characteristic	Conditions	Symbol	Min	Typ	Max	Units
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, I_{DS} = 0.1 A	$R_{DS(on)}$	—	0.83	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 150 mA	V_{GS}	2.5	3.2	4.0	V
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA

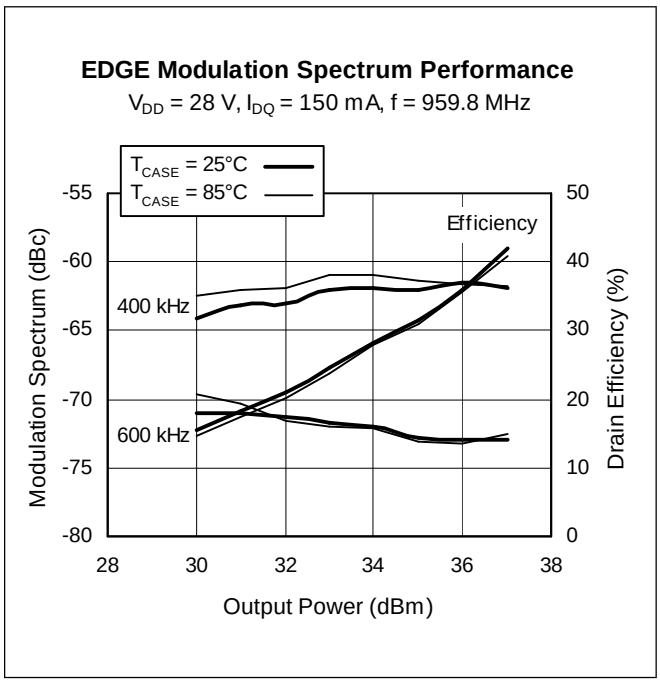
Maximum Ratings

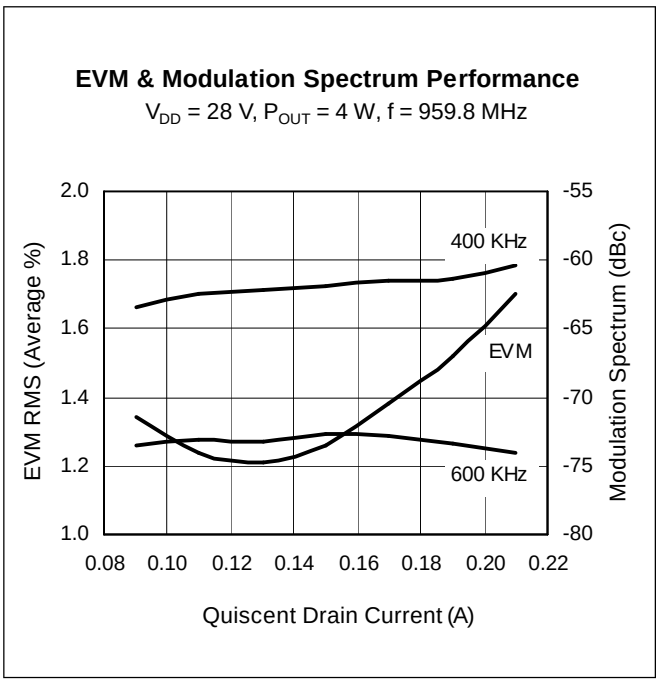
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–0.5 to +12	V
Junction Temperature	T_J	200	°C
Total Device Dissipation	P_D	58	W
Above 25°C derate by		0.333	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C)	$R_{\theta JC}$	3.0	°C/W

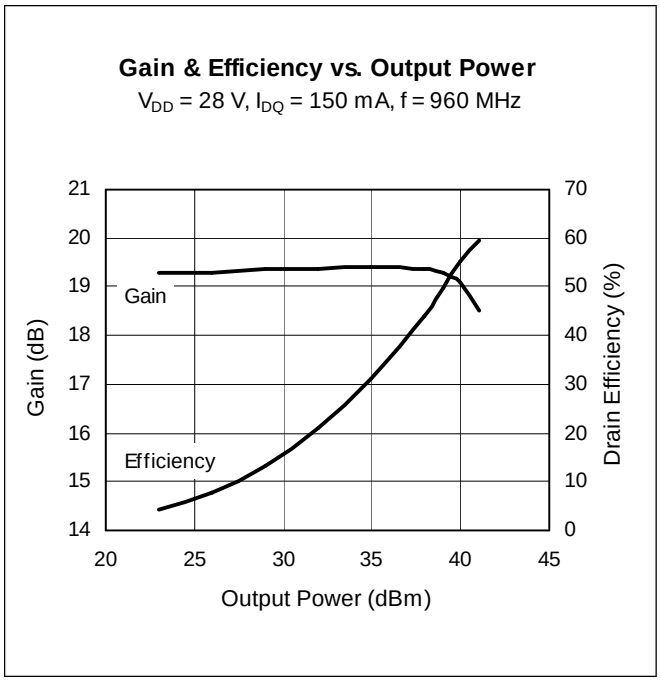
Ordering Information

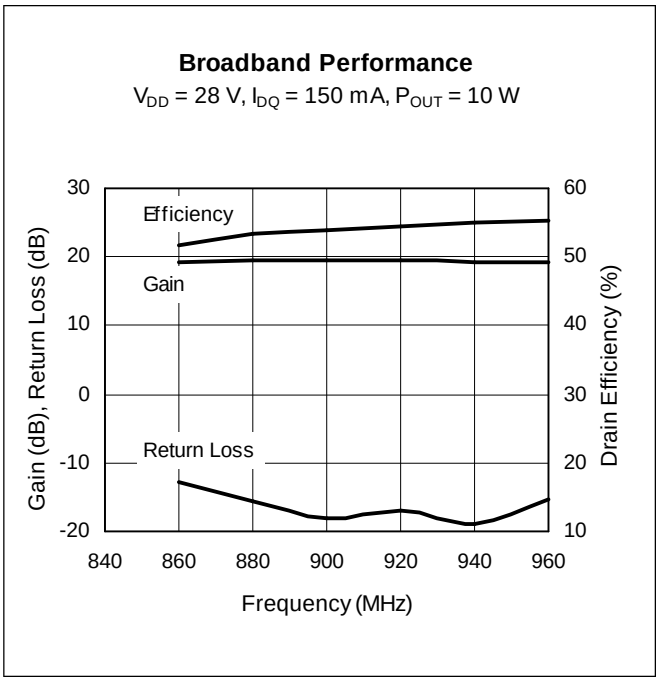
Type	Package Outline	Package Description	Marking
PTF080101S	32259	Thermally-enhanced SMD, single-ended	PTF080101S

Typical Performance (measurements taken in production test fixture)







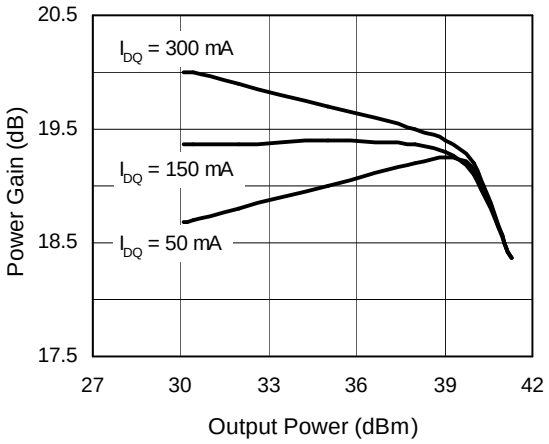


All published data at T_{CASE} = 25°C unless otherwise indicated

Typical Performance (cont.)

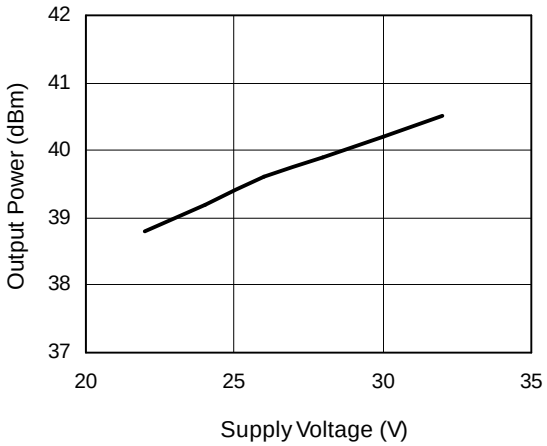
Gain vs. Output Power

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



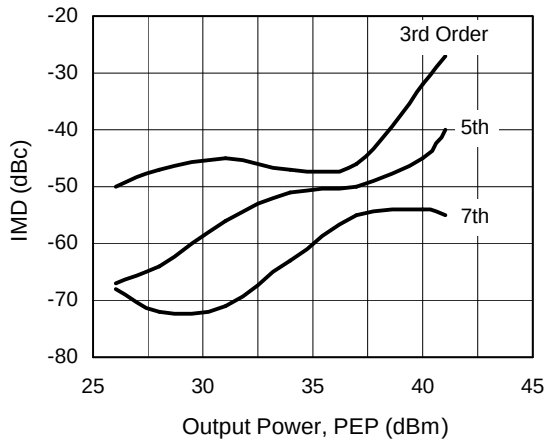
Output Power vs. Supply Voltage

I_{DQ} = 150 mA, f = 960 MHz



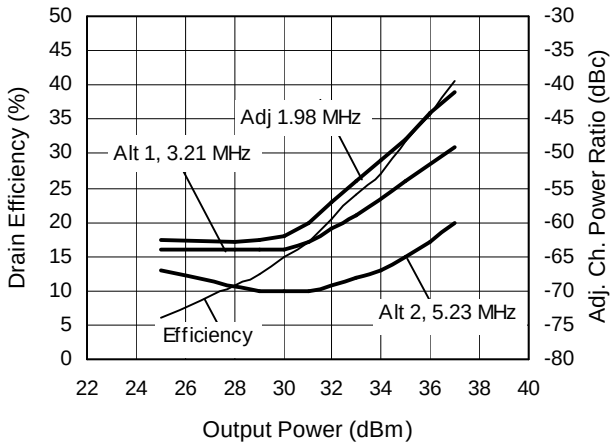
Intermodulation Distortion vs. Output Power

V_{DD} = 28 V, I_{DQ} = 150 mA, f_1 = 959 MHz, f_2 = 960 MHz

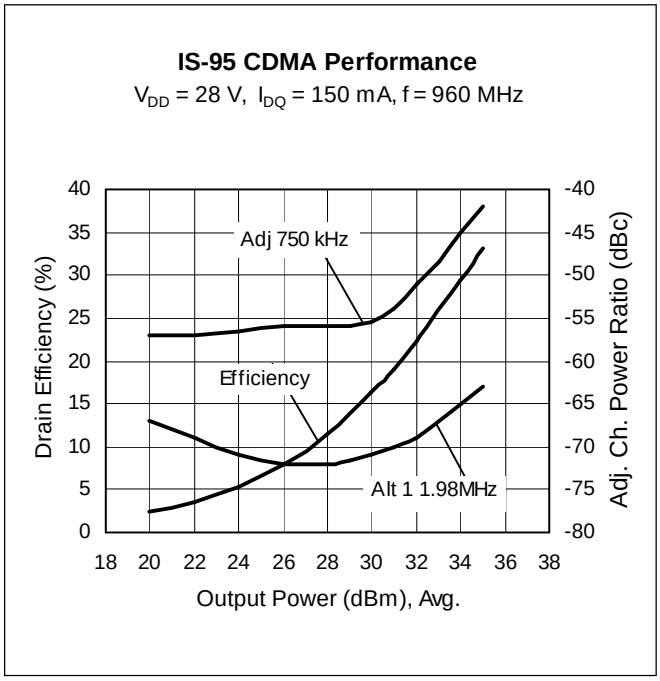


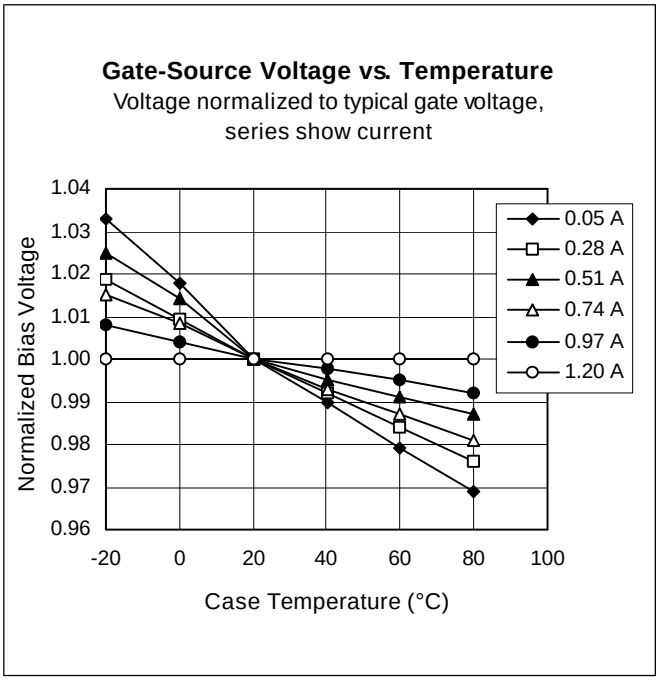
3-Carrier CDMA 2000 Performance

V_{DD} = 28 V, I_{DQ} = 150 mA, f = 960 MHz

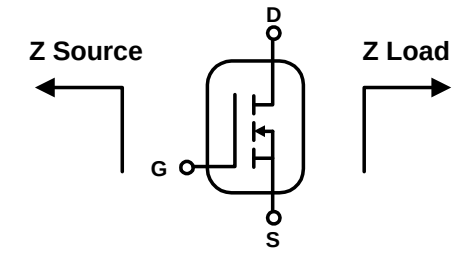


Typical Performance (cont.)

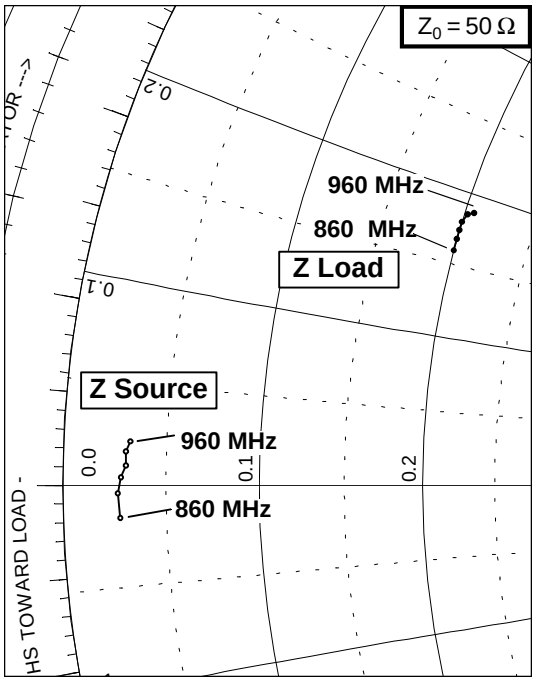




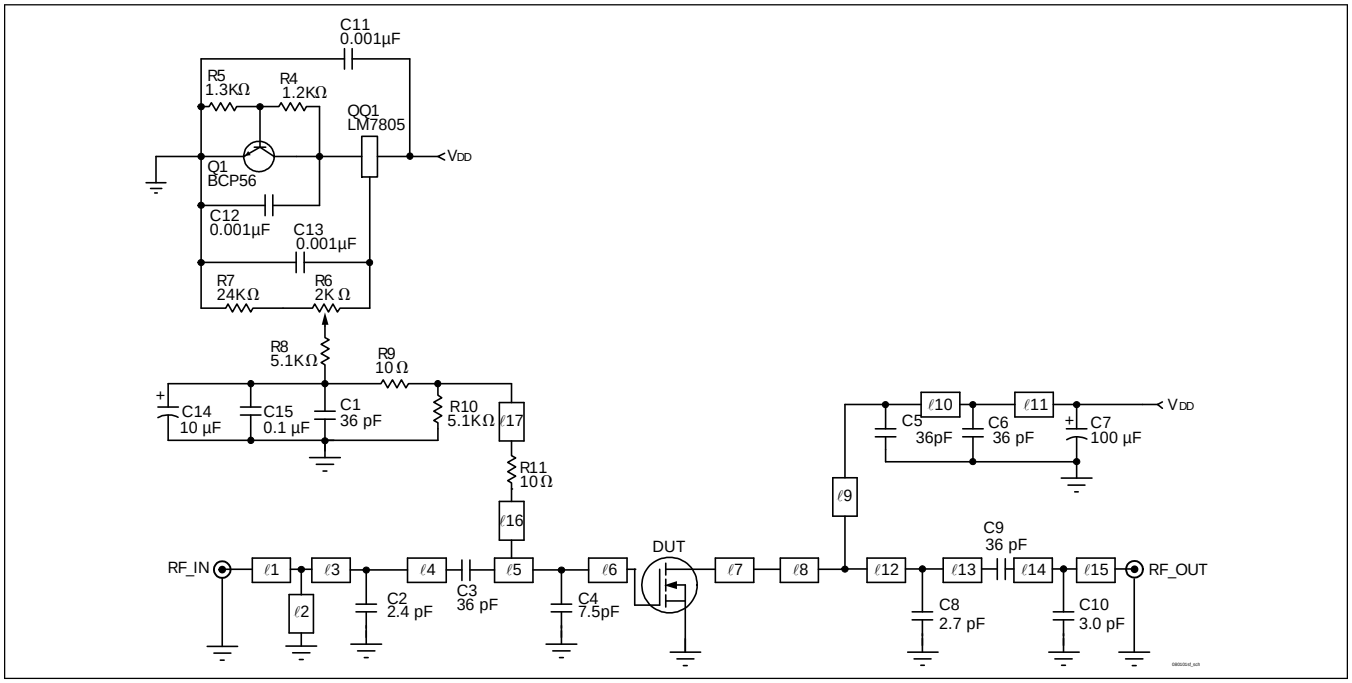
Broadband Circuit Impedance



Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
860	1.4	–0.8	10.0	8.0
880	1.3	–0.2	10.0	8.4
900	1.4	0.2	10.0	8.7
920	1.5	0.5	10.0	9.0
940	1.5	1.0	10.1	9.3
960	1.6	1.1	10.3	9.4



Reference Circuit



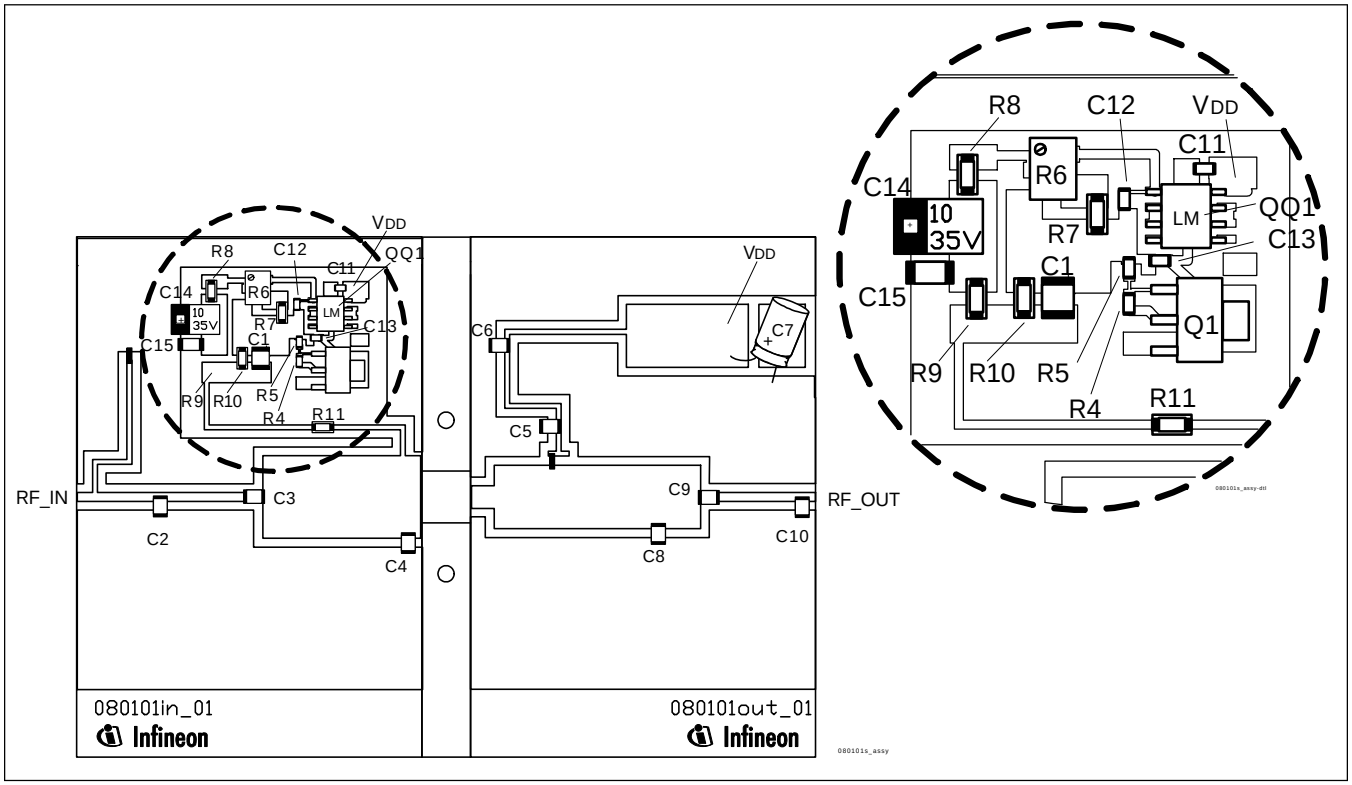
Reference Circuit Schematic for 960 MHz

Circuit Assembly Information			
DUT	PTF080101S	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	0.023 λ, 50.0 Ω	3.68 x 1.27	0.145 x 0.050
ℓ2	0.172 λ, 16.0 Ω	25.40 x 0.64	1.000 x 0.025
ℓ3	0.044 λ, 50.0 Ω	6.99 x 1.27	0.275 x 0.050
ℓ4	0.084 λ, 50.0 Ω	13.46 x 1.27	0.530 x 0.050
ℓ5	0.149 λ, 9.3 Ω	21.46 x 11.94	0.845 x 0.470
ℓ6	0.010 λ, 9.3 Ω	1.52 x 11.94	0.060 x 0.470
ℓ7	0.023 λ, 27.0 Ω	3.56 x 3.25	0.140 x 0.128
ℓ8	0.065 λ, 11.9 Ω	9.53 x 9.02	0.375 x 0.355
ℓ9	0.031 λ, 70.0 Ω	5.08 x 0.64	0.200 x 0.025
ℓ10	0.108 λ, 70.0 Ω	17.78 x 0.64	0.700 x 0.025
ℓ11	0.108 λ, 70.0 Ω	17.78 x 0.64	0.700 x 0.025
ℓ12	0.094 λ, 11.9 Ω	13.72 x 9.02	0.540 x 0.355
ℓ13	0.041 λ, 11.9 Ω	5.97 x 9.02	0.235 x 0.355
ℓ14	0.078 λ, 50.0 Ω	12.45 x 1.27	0.490 x 0.050
ℓ15	0.011 λ, 50.0 Ω	1.78 x 1.27	0.070 x 0.050
ℓ16	0.076 λ, 70.0 Ω	11.18 x 0.64	0.440 x 0.025
ℓ17	0.165 λ, 70.0 Ω	24.38 x 0.64	0.960 x 0.025

**Electrical characteristics are rounded.*

Reference Circuit (cont.)



Reference Circuit[1] (not to scale)

Component	Description	Manufacturer	P/N or Comment
C2	Capacitor, 2.4 pF	ATC	100B 2R4
C1, C3, C5, C6, C9	Capacitor, 36 pF	ATC	100B 360
C4	Capacitor, 7.5 pF	ATC	100B 7R5
C7	Capacitor, 100 µF,50 V	Digi-Key	P5182-ND
C8	Capacitor, 2.7 pF	ATC	100B 2R7
C10	Capacitor, 3.0 pF	ATC	100B 3R0
C11, C12, C13	Capacitor, 0.001 µF	Digi-Key	PCC1772CT-ND
C14	Capacitor, 10 µF, 35 V	Digi-Key	PCS6106TR-ND
C15	Capacitor, 0.1 µF	Digi-Key	P4525-ND
Q1	Transistor	National Semiconductor	BCP56
QQ1	Voltage Regulator	Infineon	LM7805
R1, R2, R3	Resistor, 220 ohm, 1/4W	Digi-Key	220QBK
R4	Resistor 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R5	Resistor 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R6	Potentiometer 2 k-ohms	Digi-Key	3224W-202ETR-ND
R7	Resistor 24 k-ohms	Digi-Key	P24KECT-ND
R8, R10	Resistor 5.1 k-ohms	Digi-Key	P5.1KECT-ND
R9, R11	Resistor, 10 ohms	Digi-Key	P10ECT-ND

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

Package Outline Specifications

Package 32259

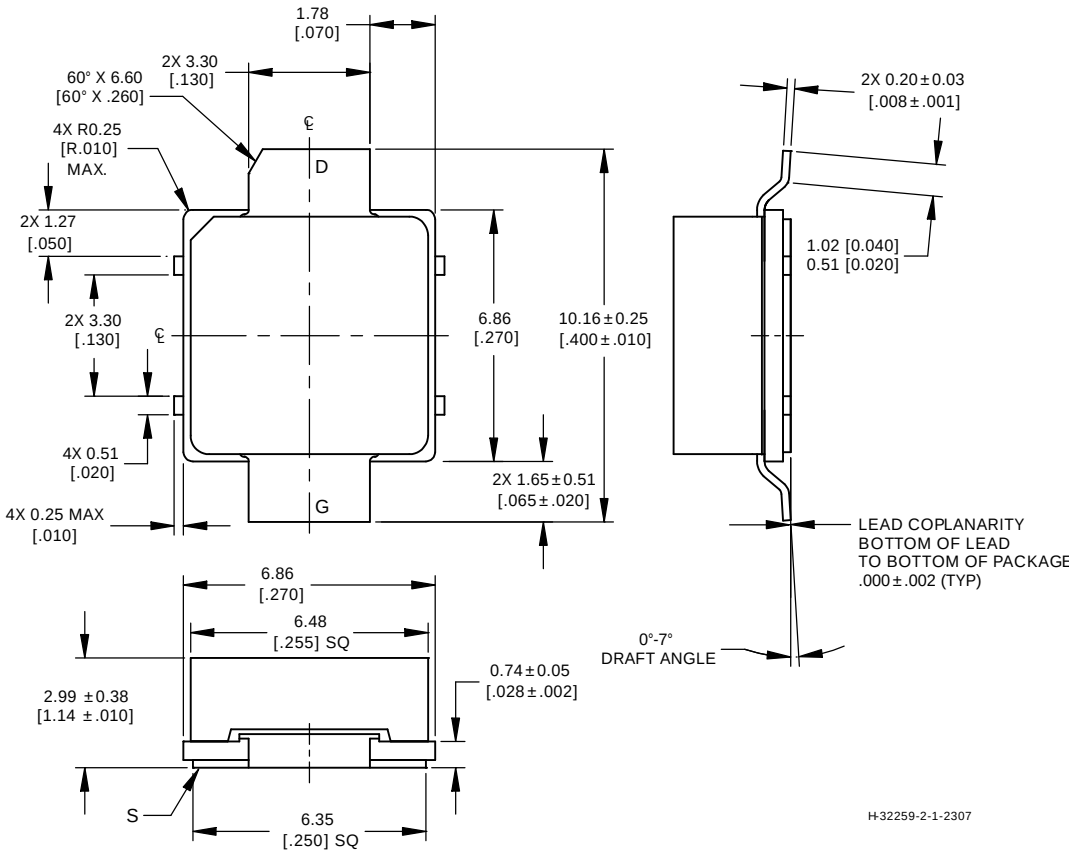


Diagram Notes:

1. Lead thickness: 0.21 ±0.03 [.008 ± .001].
2. All tolerances ± 0.127 [.005] unless specified otherwise.
3. Pins: D = drain, S = source, G = gate.
4. Interpret dimensions and tolerances per ASME Y14.5M-1994.
5. Primary dimensions are mm. Alternate dimensions are inches.

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PTF080101S

Revision History:	2004-10-05	Data Sheet
Previous Version:	2004-08-23, Preliminary Data Sheet	
Page	Subjects (major changes since last revision)	
	Add specification data and information, remove Preliminary Status	

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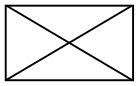

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