PTFA091201GL
PTFA091201HL

green Product

Thermally-Enhanced High Power RF LDMOS FETs
120 W, 920 – 960 MHz

Description

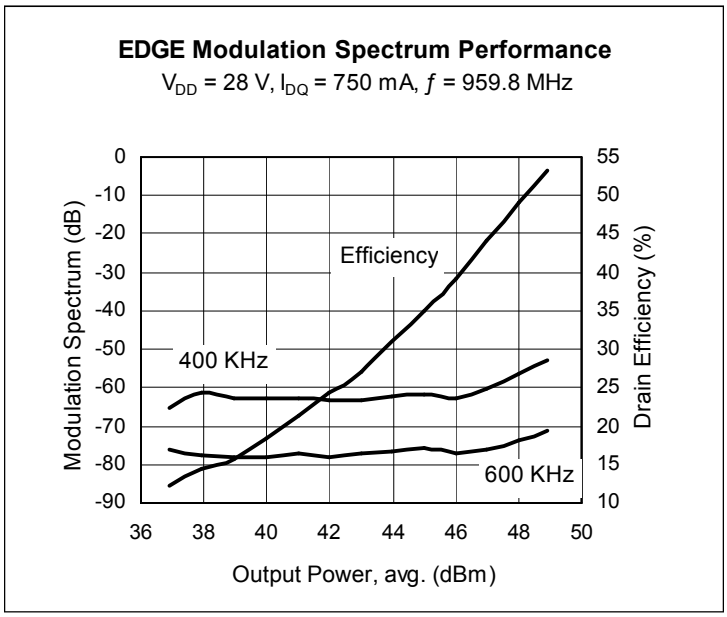
The PTFA091201GL and PTFA091201HL are 120-watt LDMOS FETs designed for ultra-linear GSM/EDGE power amplifier applications in the 920 to 960 MHz band. Features include input and output matching, and thermally-enhanced plastic open-cavity packages with copper flanges. Manufactured with Infineon's advanced LDMOS process, these devices provide excellent thermal performance and superior reliability.

PTFA091201GL
Package PG-63248-2



PTFA091201HL
Package PG-64248-2





Features

- Thermally-enhanced plastic open-cavity (EPOC™) packages with copper flanges, Pb-free and RoHS compliant
- Broadband internal matching
- Typical EDGE performance
  - Average output power = 50 W
  - Gain = 18.5 dB
  - Efficiency = 44%
- Typical CW performance
  - Output power at P–1dB = 135 W
  - Gain = 17 dB
  - Efficiency = 64%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 120 W (CW) output power

RF Characteristics

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

V_{DD} = 28 V, I_{DQ} = 750 mA, P_{OUT} = 50 W (AVG), f = 959.8 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Error Vector Magnitude	EVM (RMS)	—	2.5	—	%
Modulation Spectrum @ 400 kHz	ACPR	—	–60	—	dBc
Modulation Spectrum @ 600 kHz	ACPR	—	–74	—	dBc
Gain	G_{ps}	—	18.5	—	dB
Drain Efficiency	η_D	—	44	—	%

All published data at T_{CASE} = 25°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 V, I_{DQ} = 750 mA, P_{OUT} = 110 W PEP, f = 960 MHz, tone spacing = 1 MHz

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	18.0	18.5	—	dB
Drain Efficiency	η_D	45	48	—	%
Intermodulation Distortion	IMD	—	–28	–26	dBc

DC Characteristics

Characteristic	Conditions	Symbol	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.07	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 750 mA	V_{GS}	2.0	2.5	3.0	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	625	W
Above 25°C derate by		3.57	W/°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 120 W CW, soldered)	$R_{\theta JC}$	0.28	°C/W

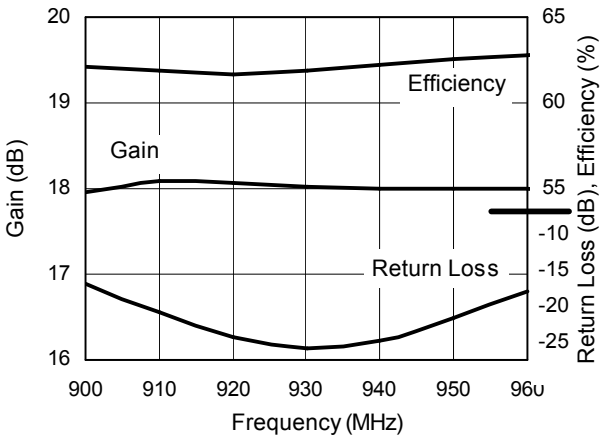
Ordering Information

Type and Version	Package	Package Description	Shipping	Marking
PTFA091201GL V1	PG-63248-2	Thermally-enhanced slotted flange, single-ended	Tray	PTFA091201GL
PTFA091201HL V1	PG-64248-2	Thermally-enhanced earless flange, single-ended	Tray	PTFA091201HL

Typical Performance (data taken in a production test fixture)

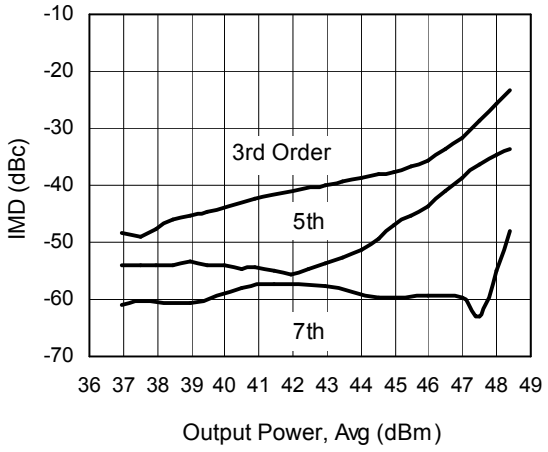
Broadband Performance

V_{DD} = 28 V, I_{DQ} = 750 mA, P_{OUT} = 120 W



Intermodulation Distortion vs. Output Power

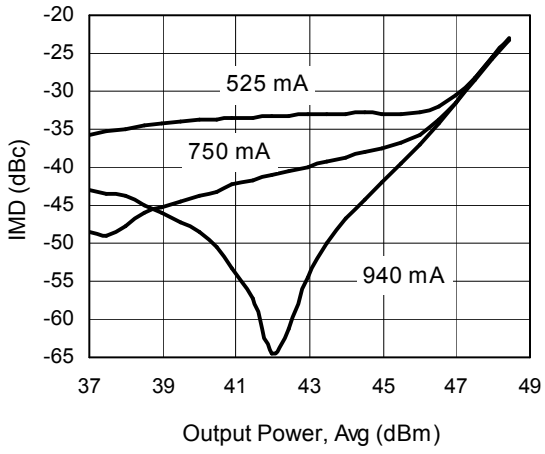
V_{DD} = 28 V, I_{DQ} = .750 mA, f_1 = 959 MHz, f_2 = 960 MHz



IM3 vs. Output Power at Selected Biases

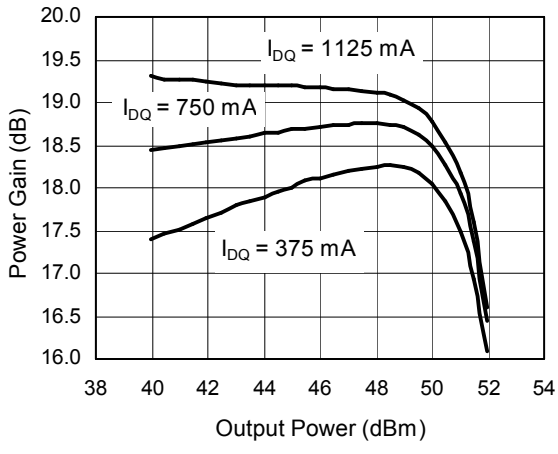
V_{DD} = 28 V, f_1 = 959 MHz, f_2 = 960 MHz

series show Idq



Gain vs. Output Power

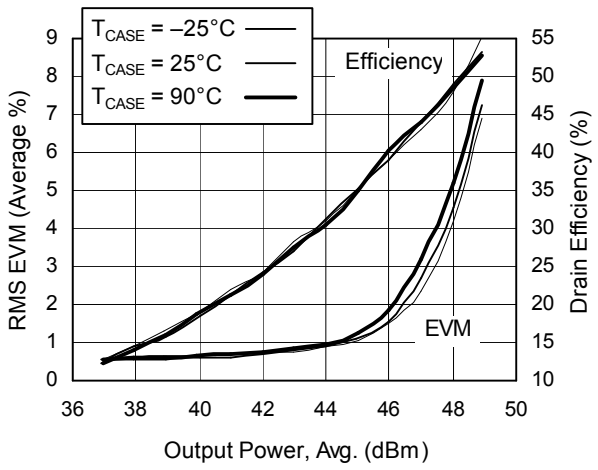
V_{DD} = 28 V, f = 960 MHz



Typical Performance (cont.)

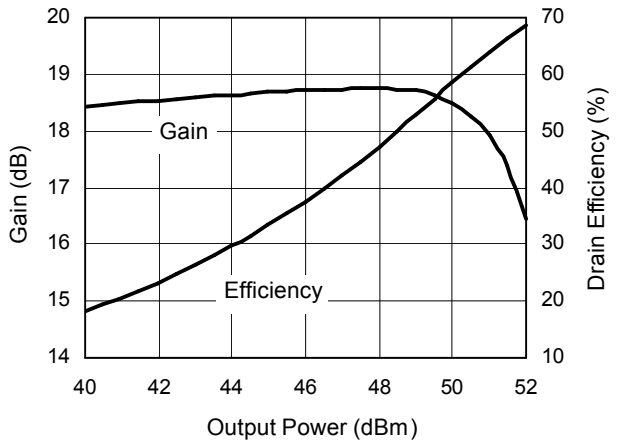
EDGE Performance

V_{DD} = 28 V, I_{DQ} = 750 mA, f = 959.8 MHz



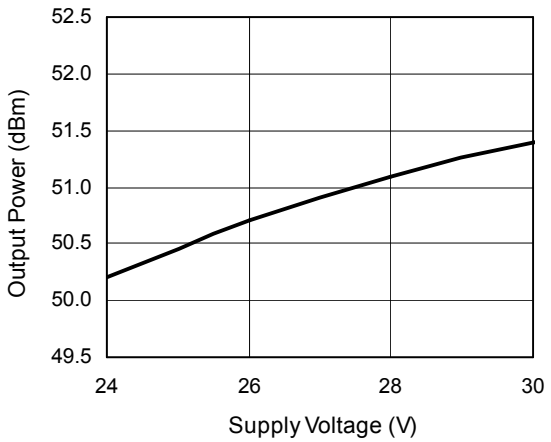
Gain & Efficiency vs. Output Power

V_{DD} = 28 V, I_{DQ} = 750 mA, f = 960 MHz



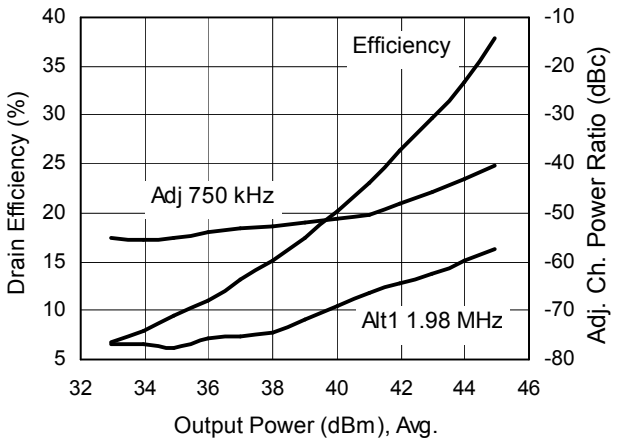
Output Power (P–1dB) vs. Supply Voltage

I_{DQ} = 750 mA, f = 960 MHz

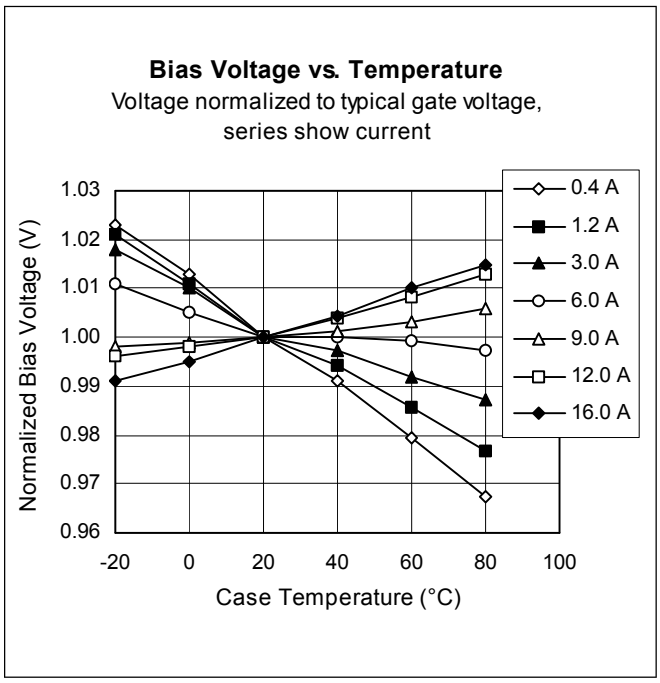


IS-95 CDMA Performance

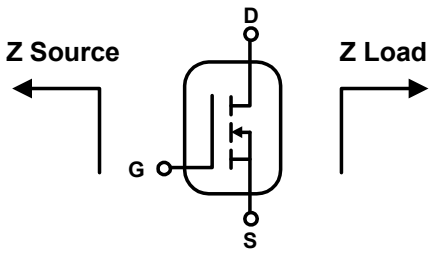
V_{DD} = 28 V, I_{DQ} = 750 mA, f = 960 MHz



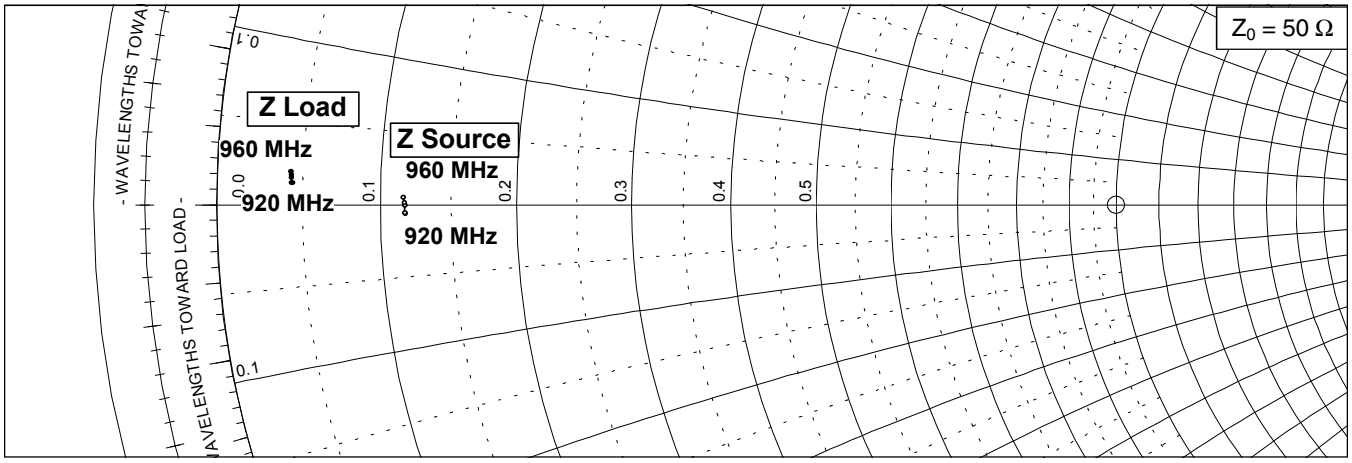
Typical Performance (cont.)



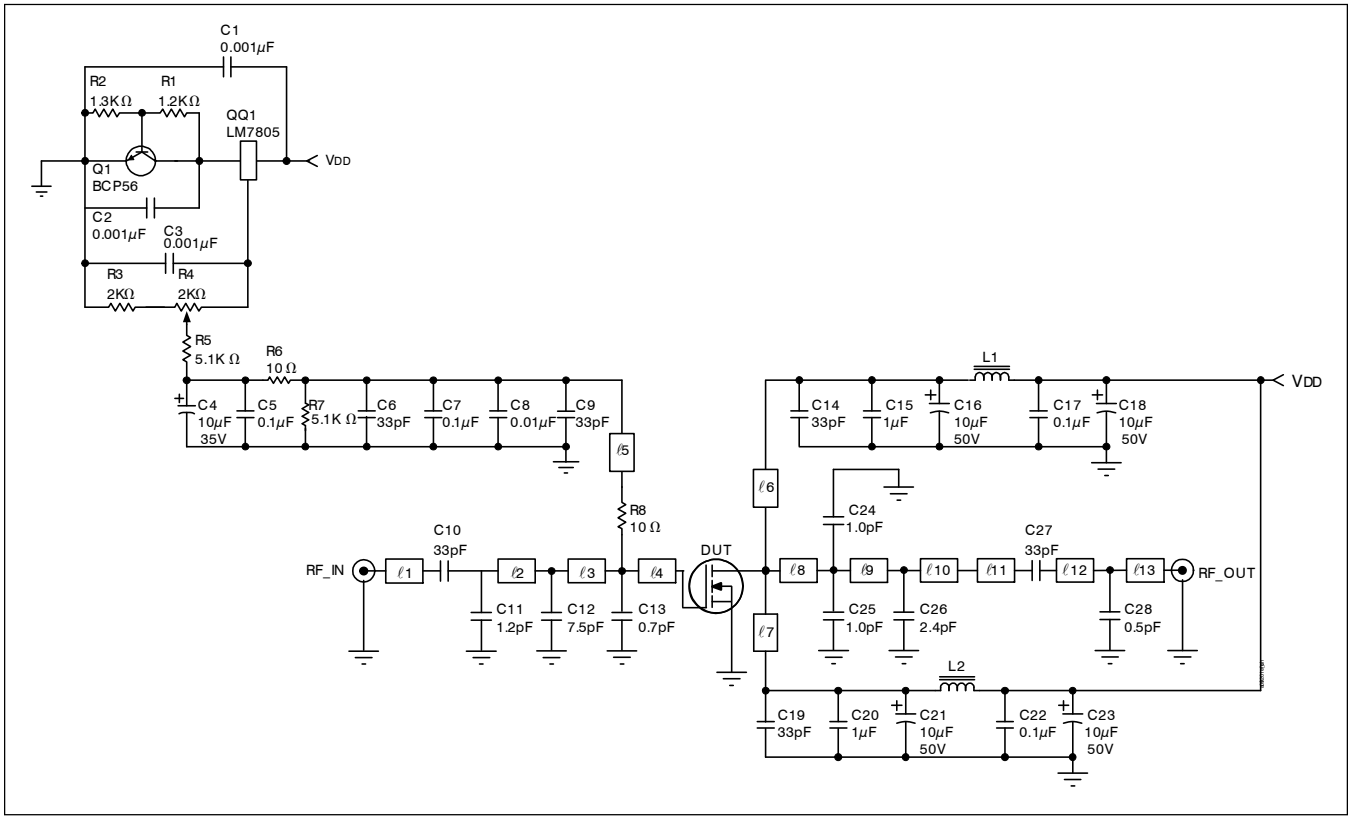
Broadband Circuit Impedance



Frequency	Z Source Ω		Z Load Ω	
MHz	R	jX	R	jX
920	5.86	–0.32	2.20	0.69
930	5.84	–0.27	2.17	0.69
940	5.85	–0.02	2.16	0.85
950	5.82	0.10	2.15	0.92
960	5.79	0.27	2.13	1.02



Reference Circuit



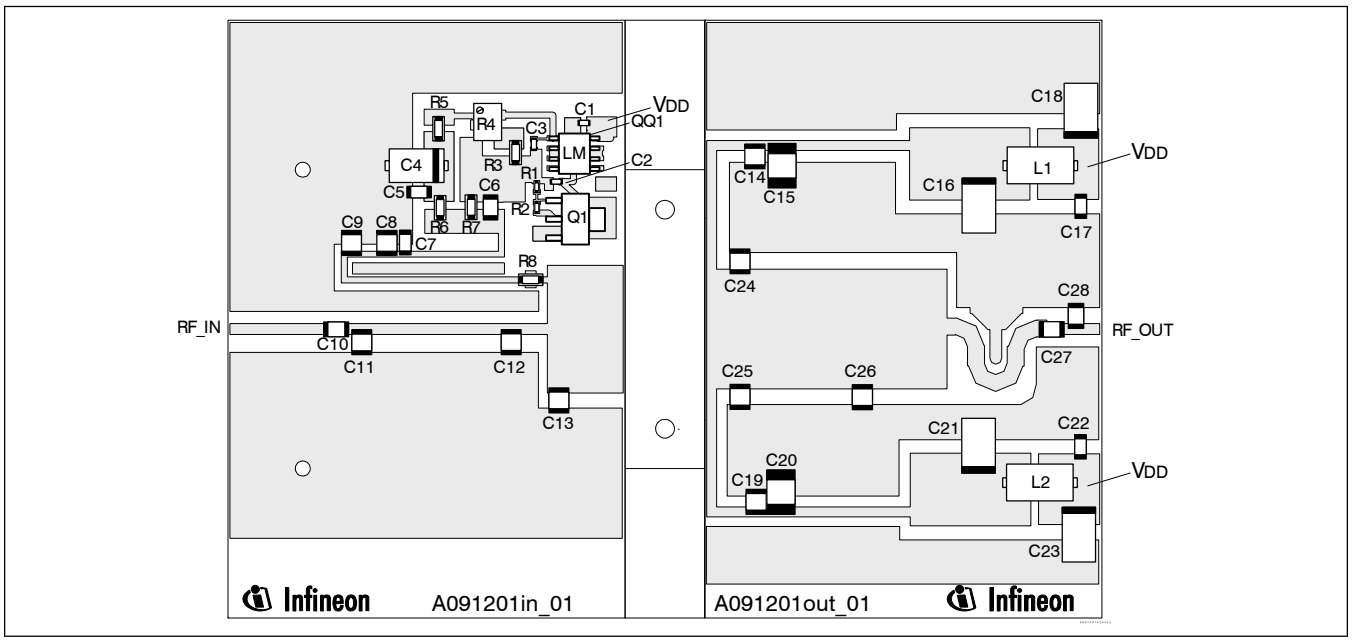
Reference circuit schematic for ƒ = 960 MHz

Circuit Assembly Information			
DUT	PTFA091201GL or PTFA091201HL		LDMOS Transistor
PCB	0.76 mm [.030"] thick, ε_r = 4.5	Rogers TMM4	2 oz. copper

Microstrip	Electrical Characteristics at 960 MHz[1]	Dimensions: L x W (mm)	Dimensions: L x W (in.)
ℓ1	0.072 λ, 50.0 Ω	12.27 x 1.40	0.483 x 0.055
ℓ2	0.115 λ, 50.0 Ω	19.53 x 1.40	0.769 x 0.055
ℓ3	0.029 λ, 50.0 Ω	5.08 x 1.40	0.200 x 0.055
ℓ4	0.062 λ, 7.5 Ω	9.53 x 16.15	0.375 x 0.636
ℓ5	0.149 λ, 70.0 Ω	26.31 x 0.71	1.036 x 0.028
ℓ6, ℓ7	0.122 λ, 55.0 Ω	20.96 x 1.17	0.825 x 0.046
ℓ8	0.027 λ, 7.9 Ω	4.06 x 15.24	0.160 x 0.600
ℓ9	0.103 λ, 7.9 Ω	15.75 x 15.24	0.620 x 0.600
ℓ10	0.072 λ, 7.9 Ω	11.02 x 15.24	0.434 x 0.600
ℓ11	0.155 λ, 38.0 Ω	25.78 x 2.13	1.015 x 0.084
ℓ12	0.013 λ, 50.0 Ω	2.24 x 1.40	0.088 x 0.055
ℓ13	0.015 λ, 50.0 Ω	2.59 x 1.40	0.102 x 0.055

[1]Electrical characteristics are rounded.

Reference Circuit (cont.)



*Reference circuit assembly diagram (not to scale)**

Component	Description	Suggested Manufacturer	P/N or Comment
C1, C2, C3	Capacitor, 0.001 µF	Digi-Key	PCC1772CT-ND
C4	Tantalum capacitor, 10 µF, 35 V	Digi-Key	399-1655-2-ND
C5, C7 C17, C22	Capacitor, 0.1 µF	Digi-Key	PCC104BCT-ND
C6, C9, C10, C14, C19, C27	Ceramic capacitor, 33 pF	ATC	100B 330
C8	Capacitor, 0.01 µF	ATC	200B 103
C11	Ceramic capacitor, 1.2 pF	ATC	100B 1R2
C12	Ceramic capacitor, 7.5 pF	ATC	100B 7R5
C13	Ceramic capacitor, 0.7 pF	ATC	100B 0R7
C15, C20	Capacitor, 1.0 µF	ATC	920C105
C16, C18, C21, C23	Tantalum capacitor, 10 µF, 50 V	Garrett Electronics	TPSE106K050R0400
C24, C25	Ceramic capacitor, 1.0 pF	ATC	100B 1R0
C26	Ceramic capacitor, 2.4 pF	ATC	100B 2R4
C28	Ceramic capacitor, 0.5 pF	ATC	100B 0R5
L1, L2	Ferrite, 8.9 mm	Elna Magnetics	BDS 4.6/3/8.9-4S2
Q1	Transistor	Infineon Technologies	BCP56
QQ1	Voltage regulator	National Semiconductor	LM7805
R1	Chip Resistor 1.2 k-ohms	Digi-Key	P1.2KGCT-ND
R2	Chip Resistor 1.3 k-ohms	Digi-Key	P1.3KGCT-ND
R3	Chip Resistor 2 k-ohms	Digi-Key	P2KECT-ND
R4	Potentiometer 2 k-ohms	Digi-Key	3224W-202ETR-ND
R5, R7	Chip Resistor 5.1 k-ohms	Digi-Key	P5.1KECT-ND
R6, R8	Chip Resistor 10 ohms	Digi-Key	P10ECT-ND

**Gerber files for this circuit available on request*

Package Outline Specifications

Package PG-63248-2

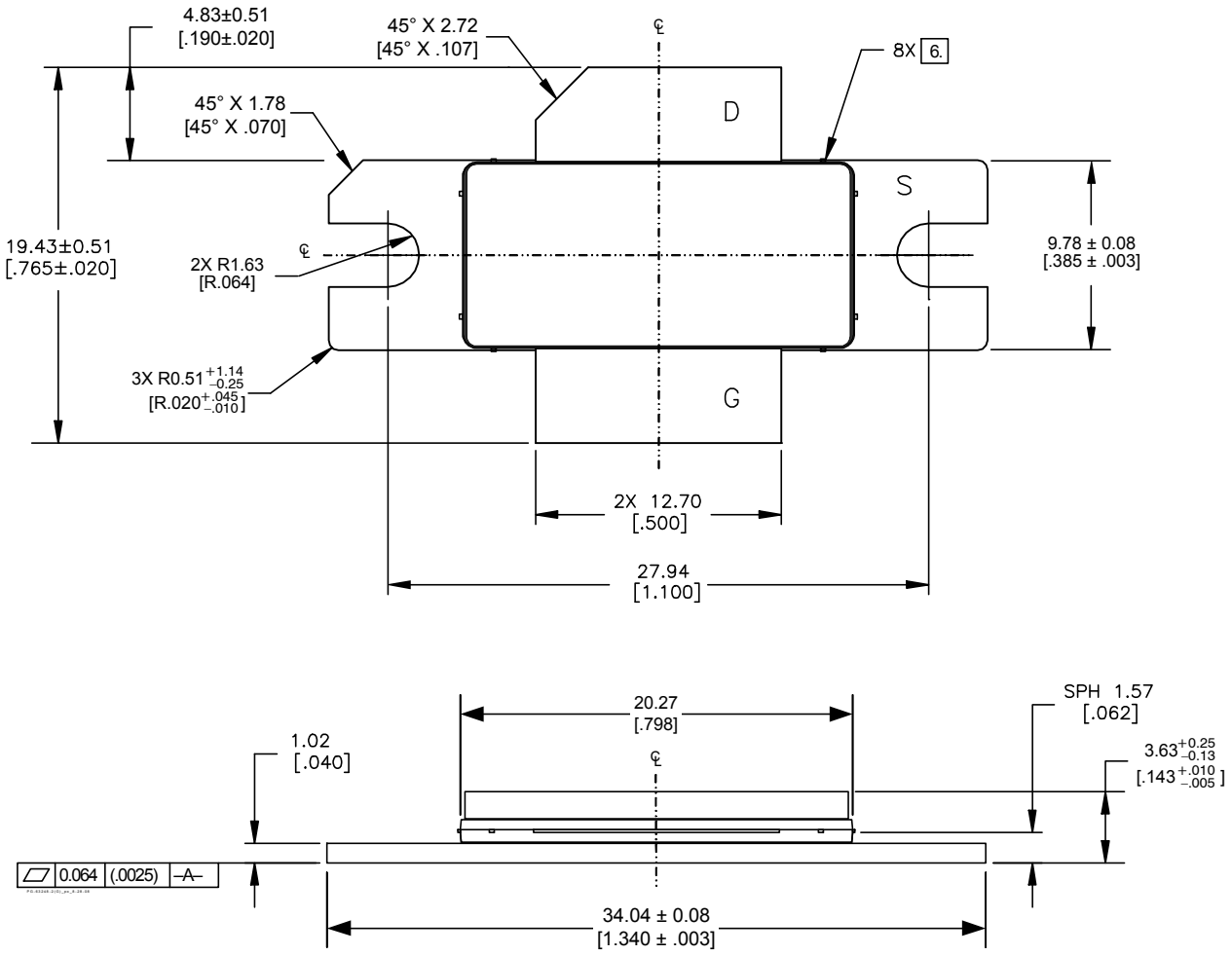


Diagram Notes—unless otherwise specified:

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 mm [.004 +0.002/–0.001 inch].
5. Gold plating thickness: < 0.254 micron [< 10 microinch]
6. Tabs may protrude 0.13 [.005] max from body.
7. All tolerances ± 0.127 [.005] unless specified otherwise.

Package Outline Specifications (cont.)

Package PG-64248-2

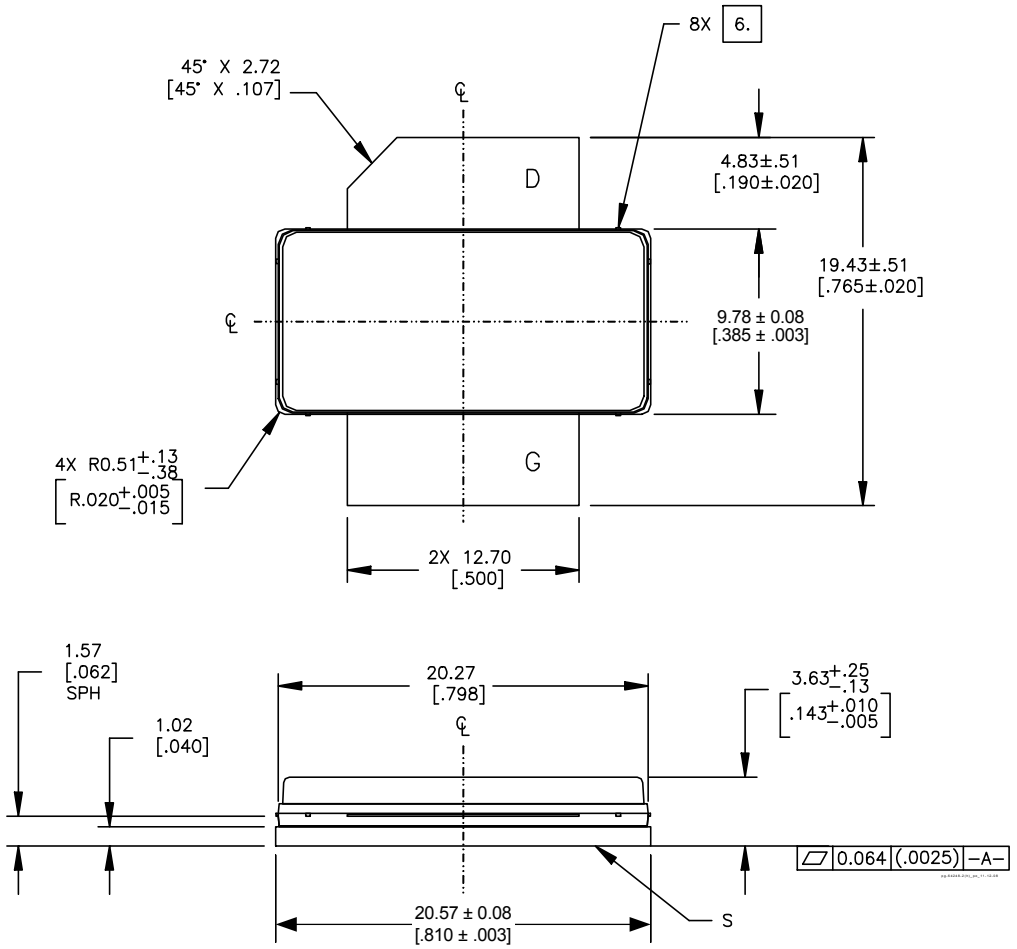


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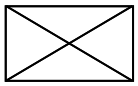
Revision History:	**2009-03-31**	Data Sheet
Previous Version:	2008-08-27, Data Sheet	
Page	Subjects (major changes since last revision)	
8, 9	Update package information	

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highpowerRF@infineon.com

To request other information, contact us at:
+1 877 465 3667 (1-877-GO-LDMOS) USA toll-free
or +1 408 776 0600 International



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