



Thermally-Enhanced High Power RF LDMOS FETs 100 W, 1805 – 1880 MHz

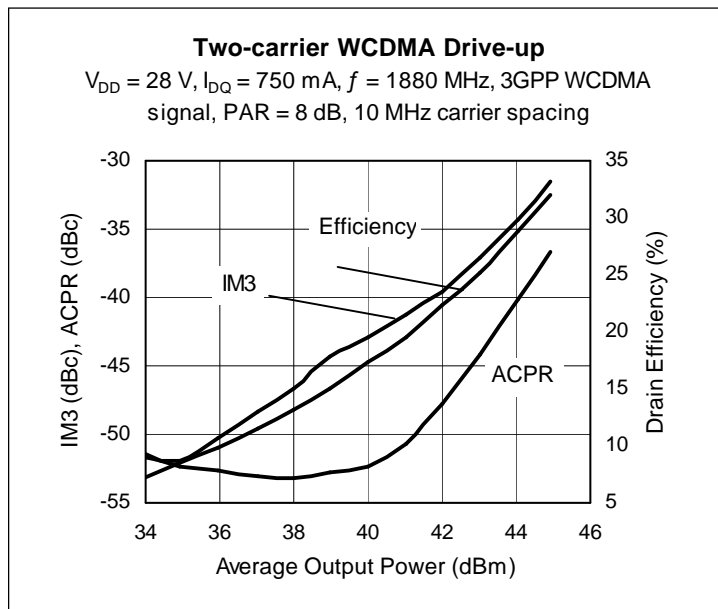
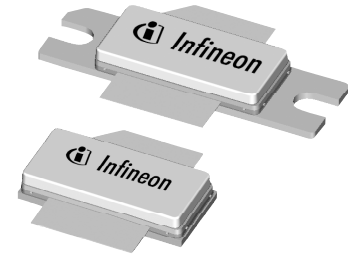
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Description

The PTFA181001GL and PTFA181001HL are 100-watt LDMOS FETs designed for EDGE and WCDMA power amplifier applications in the 1805 to 1880 MHz band. Features include input and output matching, and thermally-enhanced open-cavity packages with copper flanges. Manufactured with Infineon's advanced LDMOS process, these devices provide excellent thermal performance and superior reliability.

PTFA181001GL*
Package PG-63248-2

PTFA181001HL*
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 at 1879.8 MHz, 28 V
 - Average output power = 45 W
 - Linear Gain = 16.5 dB
 - Efficiency = 36%
 - EVM RMS = 1.8%
- Typical CW performance, 1880 MHz, 28 V
 - Output power at P-1dB = 120 W
 - Gain 15.5 dB
 - Efficiency = 52%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability
- Capable of handling 10:1 VSWR @ 28 V, 100 W (CW) output power

RF Characteristics

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

$V_{DD} = 28\text{ V}$, $I_{DQ} = 750\text{ mA}$, $P_{OUT} = 45\text{ W (AVG)}$, $f = 1879.8\text{ MHz}$

| Characteristic | Symbol | Min | Typ | Max | Unit |
|-------------------------------|----------|-----|------|-----|------|
| Error Vector Magnitude | RMS EVM | — | 1.8 | — | % |
| Modulation Spectrum @ 400 KHz | ACPR | — | -61 | — | dBc |
| Modulation Spectrum @ 600 KHz | ACPR | — | -73 | — | dBc |
| Gain | G_{ps} | — | 16.5 | — | dB |
| Drain Efficiency | η_D | — | 36 | — | % |

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

*See Infineon distributor for future availability.

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 750\text{ mA}$, $P_{OUT} = 100\text{ W PEP}$, $f = 1850\text{ MHz}$, tone spacing = 1 MHz

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------|----------|-----|------|-----|------|
| Gain | G_{ps} | — | 16.5 | — | dB |
| Drain Efficiency | η_D | — | 41 | — | % |
| Intermodulation Distortion | IMD | — | -30 | — | dBc |

DC Characteristics

| Characteristic | Conditions | Symbol | Min | Typ | Max | Unit |
|--------------------------------|--|---------------|-----|-------|------|---------------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}$, $I_{DS} = 10\text{ mA}$ | $V_{(BR)DSS}$ | 65 | — | — | V |
| Drain Leakage Current | $V_{DS} = 28\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 1.0 | μA |
| | $V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 10.0 | μA |
| On-State Resistance | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.085 | — | Ω |
| Operating Gate Voltage | $V_{DS} = 28\text{ V}$, $I_D = 750\text{ mA}$ | V_{GS} | 2.0 | 2.5 | 3.0 | V |
| Gate Leakage Current | $V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$ | I_{GSS} | — | — | 1.0 | μA |

Maximum Ratings

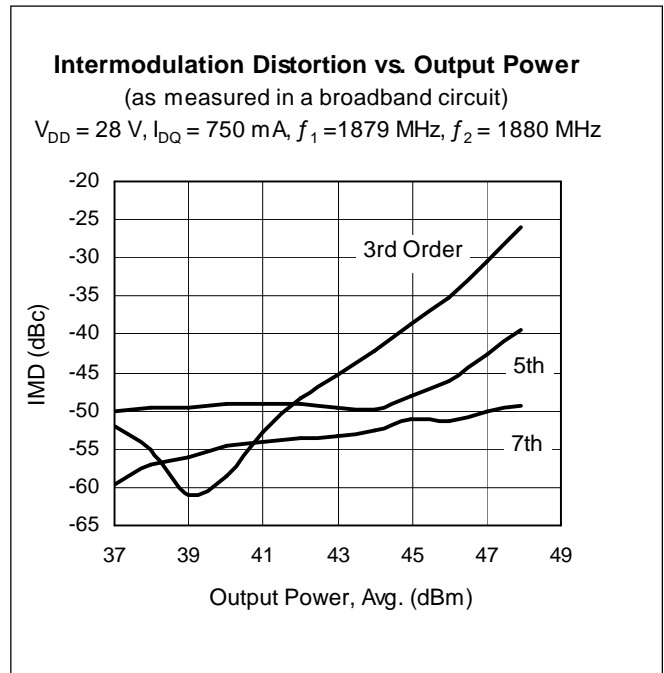
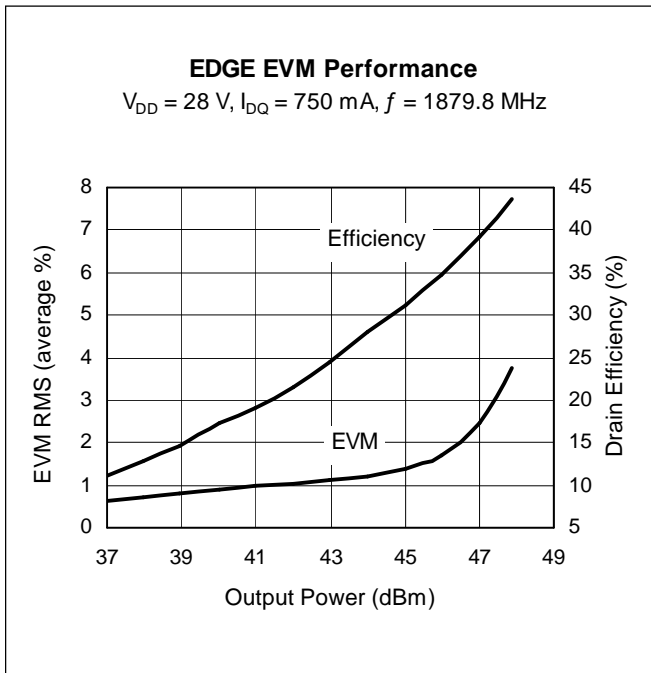
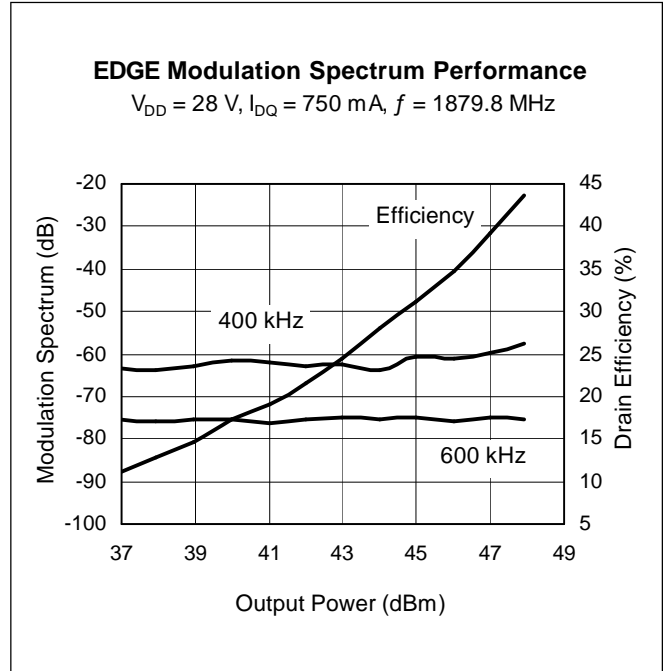
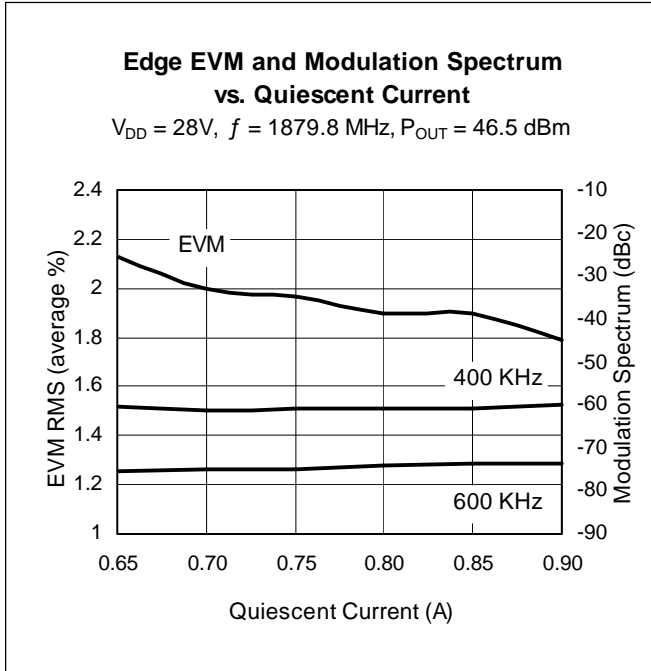
| Parameter | Symbol | Value | Unit |
|---|-----------------|-------------|-----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -0.5 to +12 | V |
| Junction Temperature | T_J | 200 | $^{\circ}\text{C}$ |
| Total Device Dissipation Above 25 $^{\circ}\text{C}$ derate by | P_D | TBD | W |
| | | TBD | W/ $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -40 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 100 W CW) | $R_{\theta JC}$ | TBD | $^{\circ}\text{C/W}$ |

Ordering Information

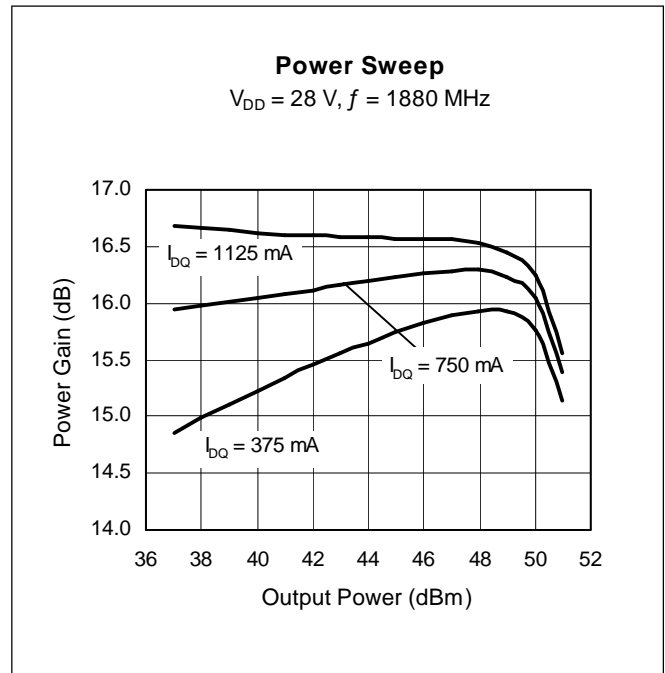
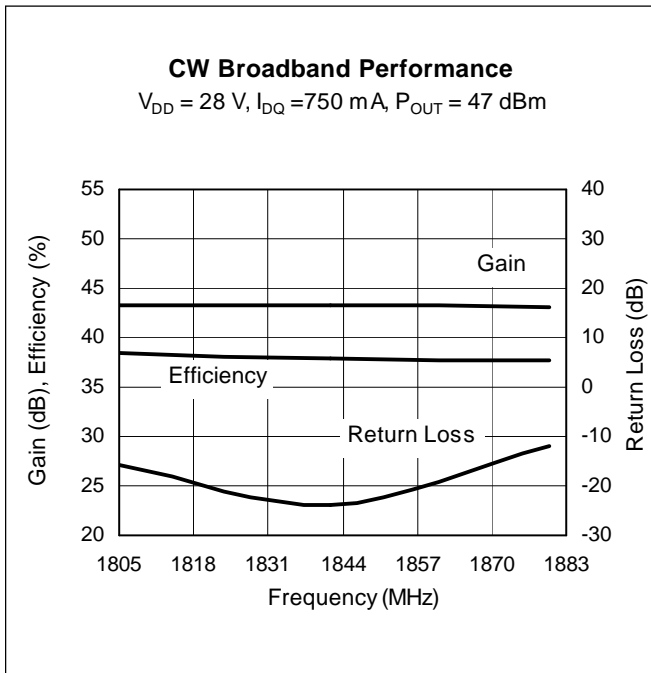
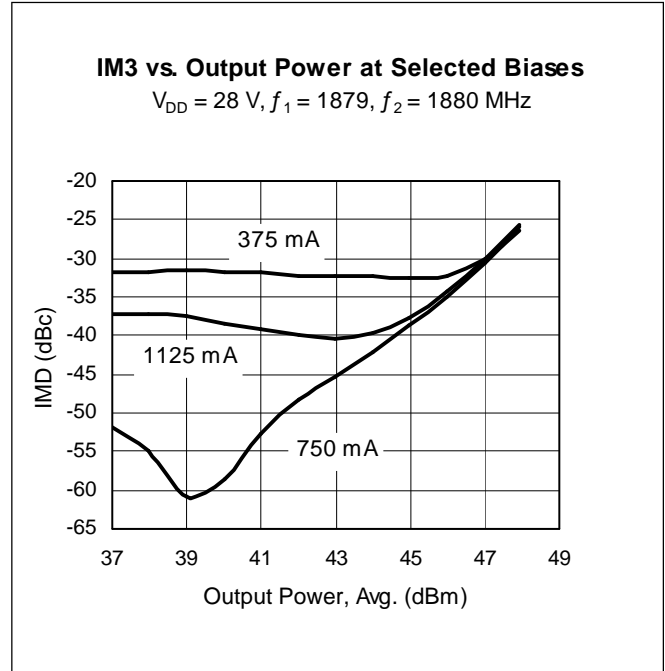
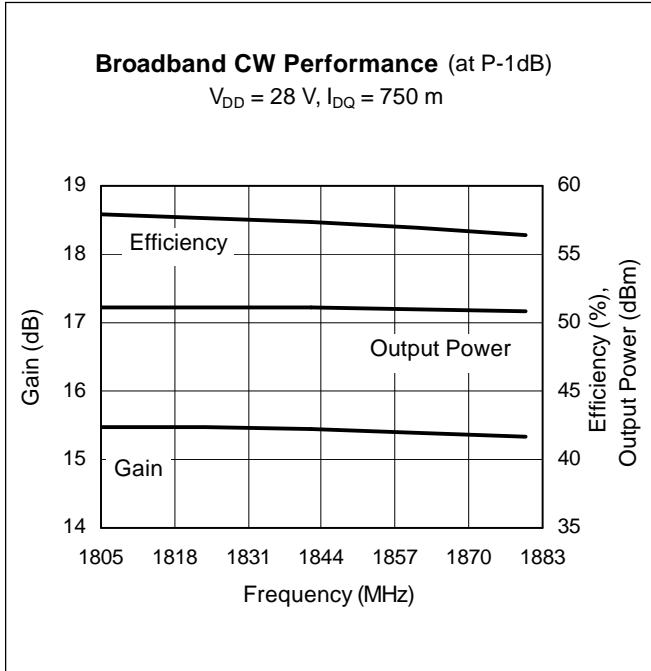
| Type and Version | Package Type | Package Description | Shipping | Marking |
|------------------|--------------|---|----------|--------------|
| PTFA181001GL* V1 | PG-63248-2 | Thermally-enhanced, plastic open-cavity, slotted flange, single-ended | Tray | PTFA181001GL |
| PTFA181001HL* V1 | PG-64248-2 | Thermally-enhanced, plastic open-cavity, earless flange, single-ended | Tray | PTFA181001HL |

*See Infineon distributor for future availability.

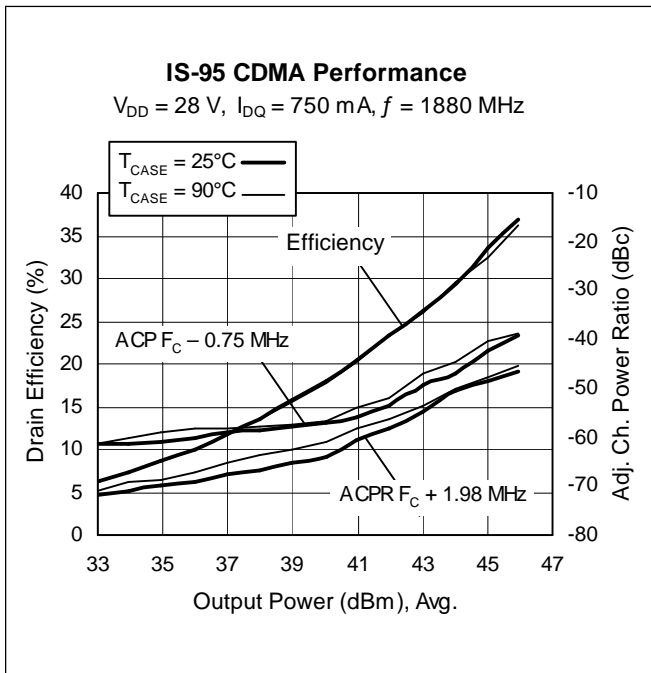
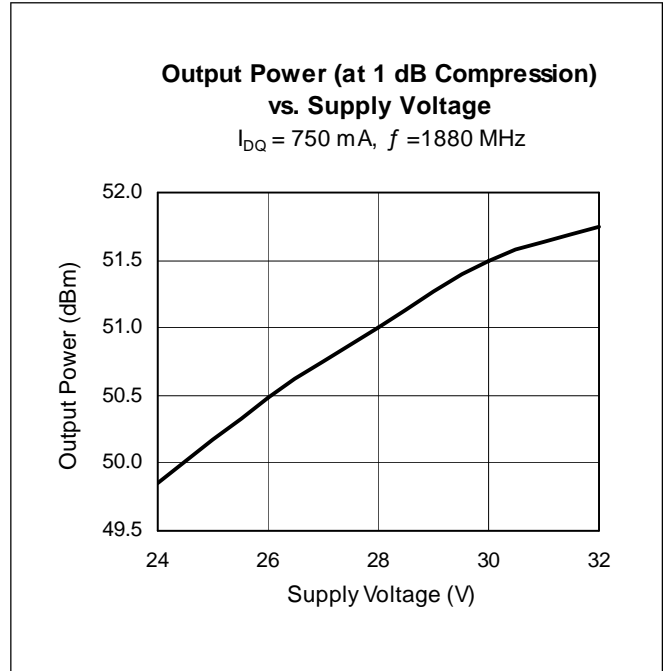
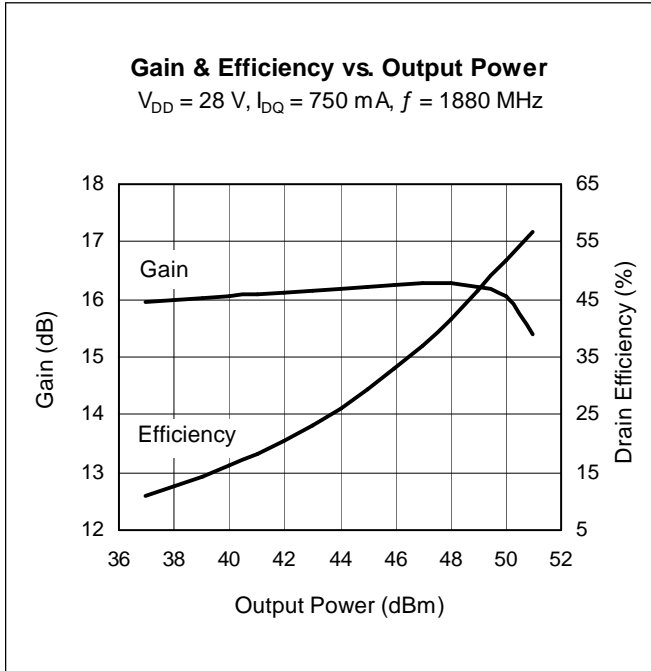
Typical Performance (data taken in a production test fixture)



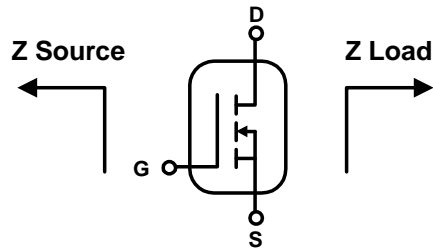
Typical Performance (cont.)



Typical Performance (cont.)



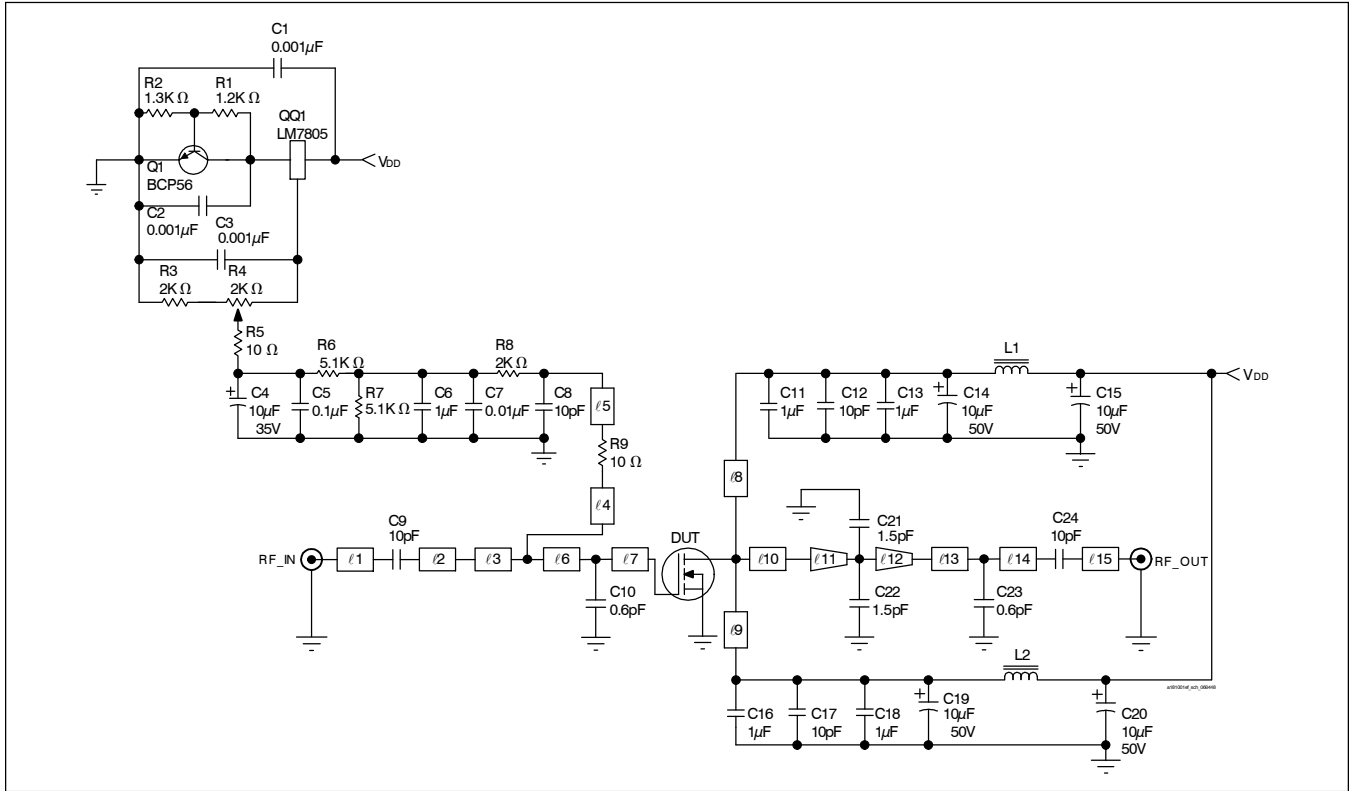
Broadband Circuit Impedance



| Frequency MHz | Z Source W | | Z Load W | |
|------------------|------------|-------|----------|-------|
| | R | jX | R | jX |
| 1805 | 4.62 | -6.23 | 1.50 | -3.87 |
| 1830 | 4.18 | -6.10 | 1.51 | -3.46 |
| 1850 | 4.20 | -6.13 | 1.50 | -3.16 |
| 1860 | 4.58 | -6.20 | 1.49 | -3.00 |
| 1880 | 4.42 | -6.36 | 1.48 | -2.62 |

See next page for reference circuit

Reference Circuit



Reference circuit schematic for $f = 1880 \text{ MHz}$

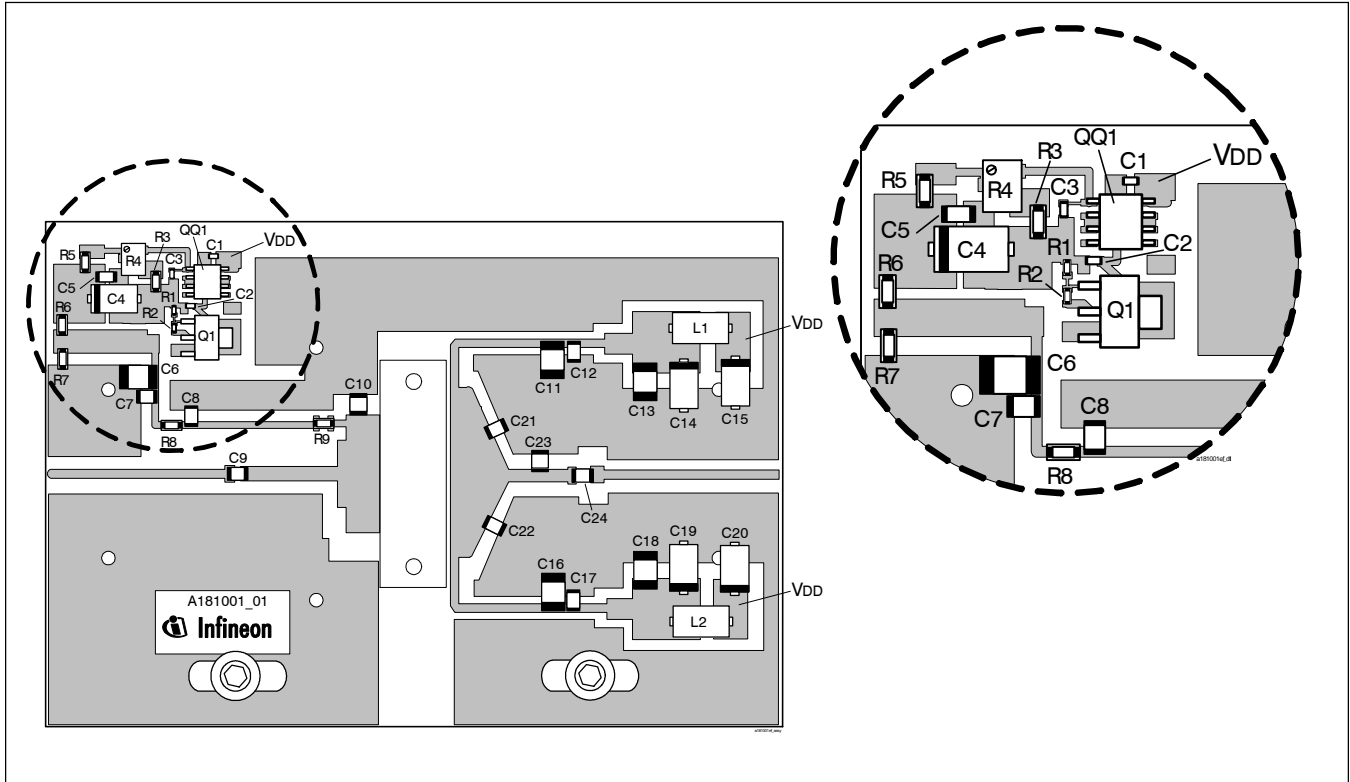
Circuit Assembly Information

| | | | |
|-----|---|------------------|--------------|
| DUT | PTFA181001GL or PTFA181001HL | LDMOS Transistor | |
| PCB | 0.76 mm [.030"] thick, $\epsilon_r = 4.5$ | Rogers TMM4 | 2 oz. copper |

| Microstrip | Electrical Characteristics at 1880 MHz ¹ | Dimensions: L x W (mm) | Dimensions: L x W (in.) |
|-------------|---|------------------------|-------------------------|
| l1 | 0.314 λ , 50.0 Ω | 27.43 x 1.37 | 1.080 x 0.054 |
| l2 | 0.172 λ , 38.0 Ω | 14.73 x 2.16 | 0.580 x 0.085 |
| l3 | 0.016 λ , 11.4 Ω | 1.27 x 10.16 | 0.050 x 0.400 |
| l4 | 0.024 λ , 60.0 Ω | 2.24 x 0.99 | 0.088 x 0.039 |
| l5 | 0.218 λ , 60.0 Ω | 19.33 x 0.99 | 0.761 x 0.039 |
| l6 | 0.019 λ , 6.9 Ω | 1.52 x 17.78 | 0.060 x 0.700 |
| l7 | 0.044 λ , 6.9 Ω | 3.43 x 17.78 | 0.135 x 0.700 |
| l8, l9 | 0.233 λ , 53.0 Ω | 20.45 x 1.24 | 0.805 x 0.049 |
| l10 | 0.039 λ , 4.9 Ω | 3.10 x 25.65 | 0.122 x 1.010 |
| l11 (taper) | 0.037 λ , 4.9 Ω / 10.3 Ω | 2.92 x 25.65 / 11.43 | 0.115 x 1.010 / 0.450 |
| l12 (taper) | 0.033 λ , 10.3 Ω / 41.0 Ω | 2.79 x 11.43 / 1.91 | 0.110 x 0.450 / 0.075 |
| l13 | 0.069 λ , 41.0 Ω | 6.35 x 1.91 | 0.250 x 0.075 |
| l14 | 0.038 λ , 41.0 Ω | 3.25 x 1.91 | 0.128 x 0.075 |
| l15 | 0.331 λ , 50.0 Ω | 28.98 x 1.37 | 1.141 x 0.054 |

¹Electrical characteristics are rounded.

Reference Circuit (cont.)

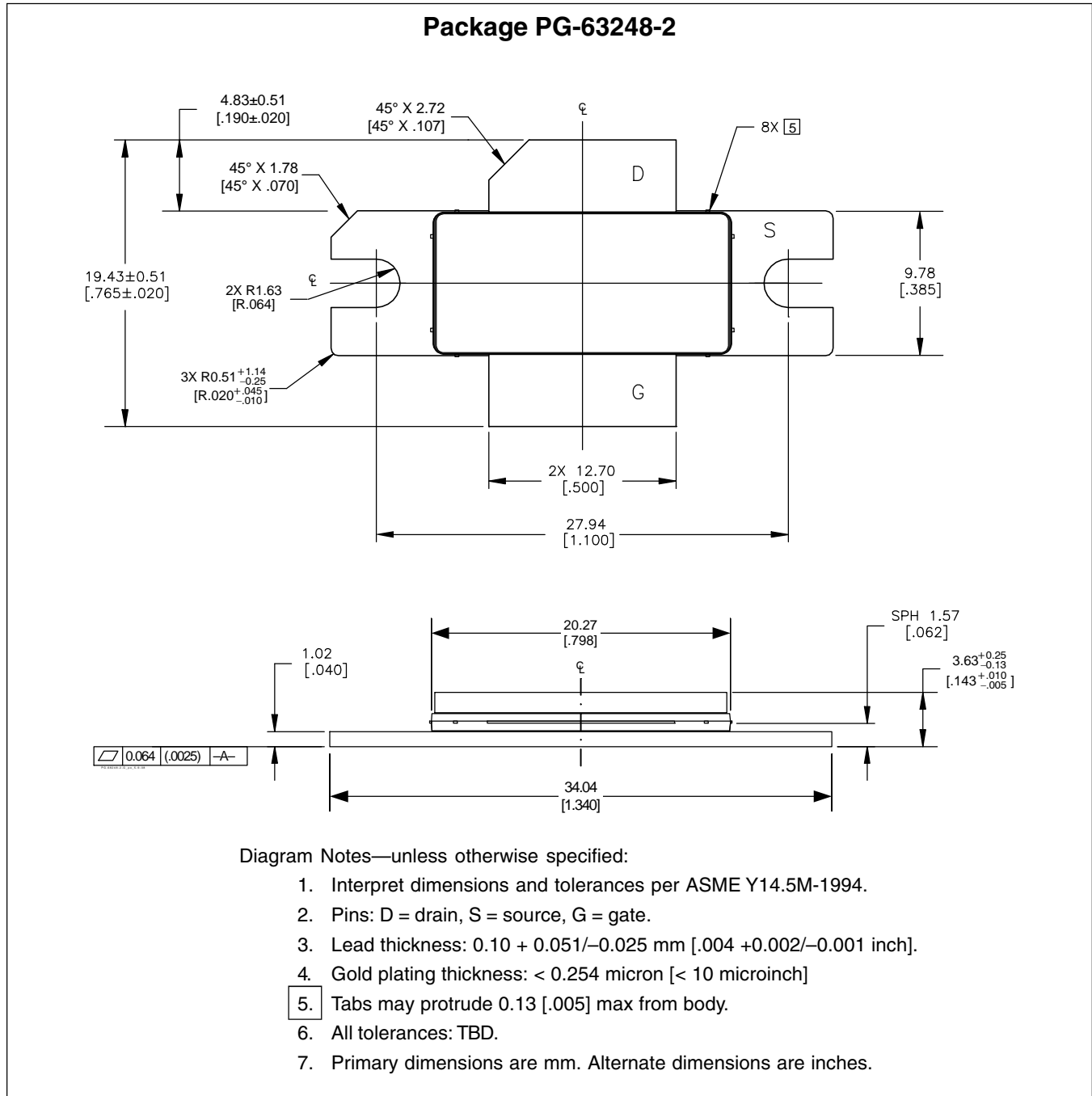


Reference circuit assembly diagram* (not to scale)

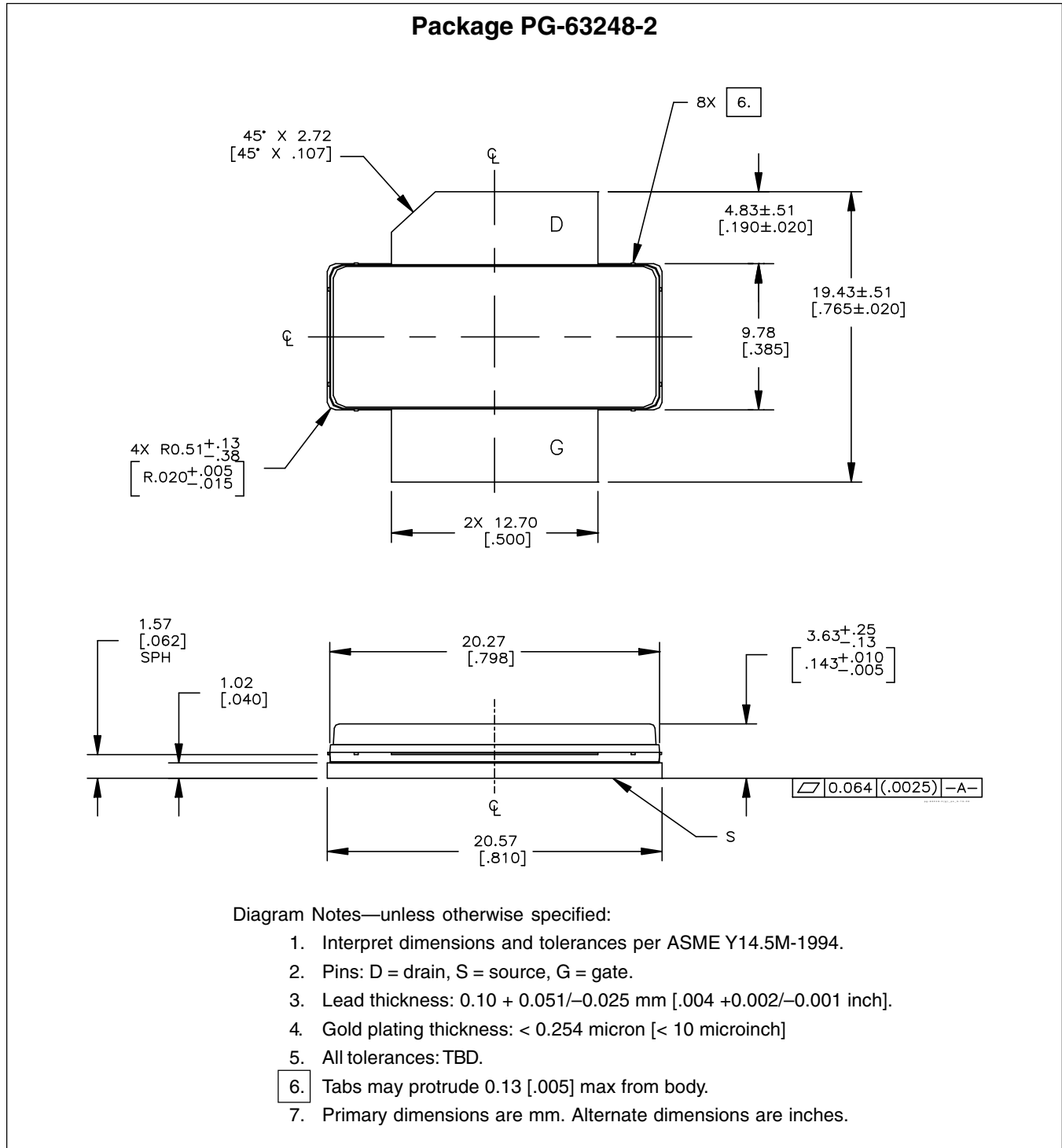
| Component | Description | Suggested Manufacturer | P/N or Comment |
|------------------------|--------------------------------------|------------------------|-------------------|
| C1, C2, C3 | Capacitor, 0.001 μ F | Digi-Key | PCC1772CT-ND |
| C4 | Tantalum capacitor, 10 μ F, 35 V | Digi-Key | 399-1655-2-ND |
| C5 | Capacitor, 0.1 μ F | Digi-Key | PCC104BCT-ND |
| C6, C11, C13, C16, C18 | Capacitor, 1.0 μ F | ATC | 920C105 |
| C7 | Capacitor, 0.01 μ F | ATC | 200B 103 |
| C8, C9, C12, C17, C24 | Ceramic capacitor, 10 pF | ATC | 100B 100 |
| C10, C23 | Ceramic capacitor, 0.6 pF | ATC | 100B 0R6 |
| C14, C15, C19, C20 | Tantalum capacitor, 10 μ F, 50 V | Garrett Electronics | TPSE106K050R0400 |
| C21, C22 | Ceramic capacitor, 1.5 pF | ATC | 100B 1R5 |
| L1, L2 | Ferrite, 8.9 mm | Elna Magnetics | BDS 4.6/3/8.9-4S2 |
| Q1 | Transistor | Infinion 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, R8 | Chip Resistor 2 k-ohms | Digi-Key | P2KECT-ND |
| R4 | Potentiometer 2 k-ohms | Digi-Key | 3224W-202ETR-ND |
| R5, R9 | Chip Resistor 10 ohms | Digi-Key | P10ECT-ND |
| R6, R7 | Chip Resistor 5.1 k-ohms | Digi-Key | P5.1KECT-ND |

*Gerber files for this circuit available on request

Package Outline Specifications



Package Outline Specifications (cont.)



Find the latest and most complete information about products and packaging at the Infineon Internet page
<http://www.infineon.com/rfpower>

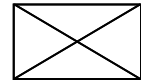
| Page | Subjects (major changes since last revision) |
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