



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

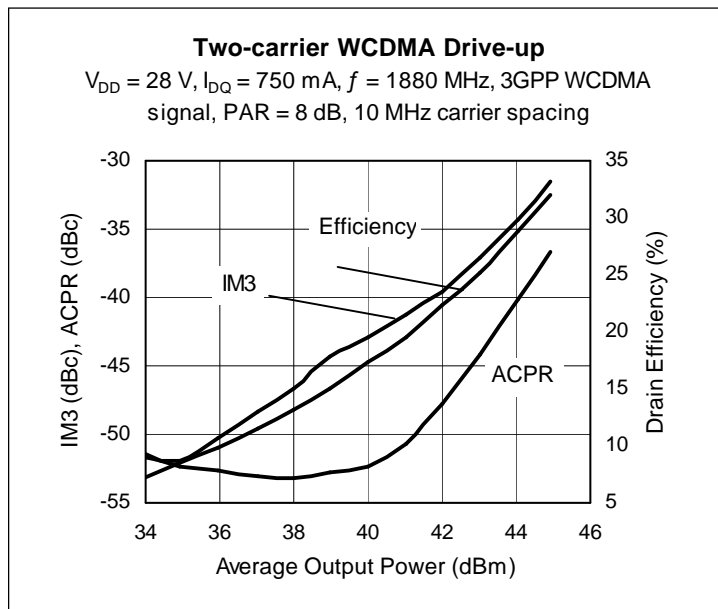
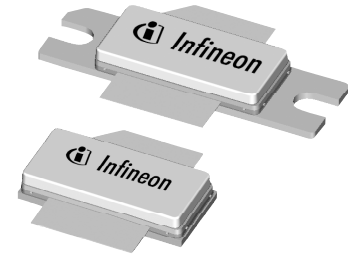
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Description

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

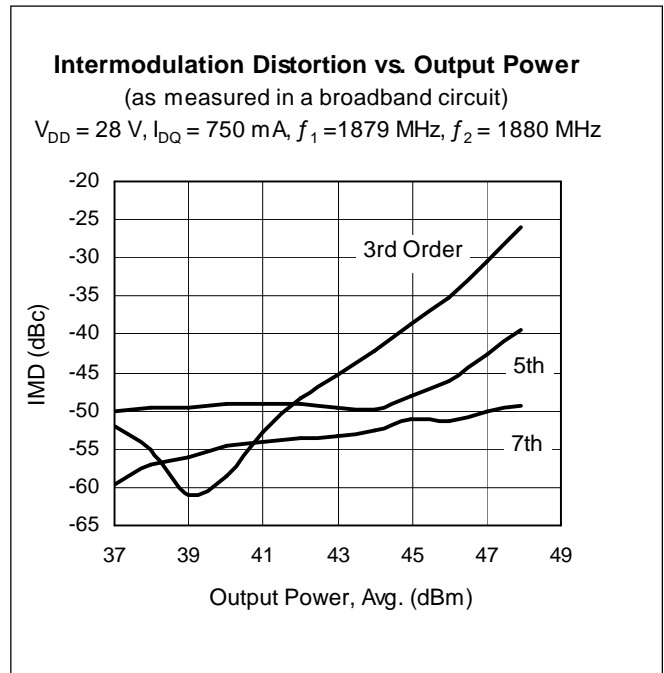
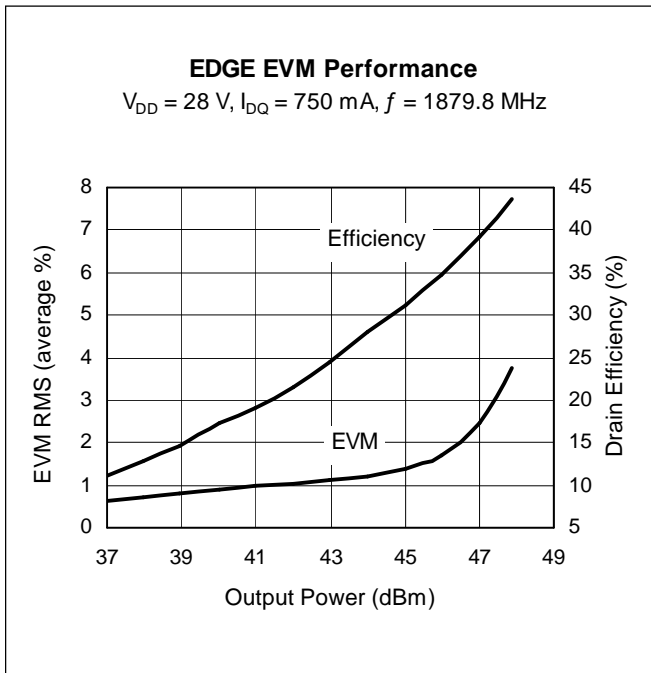
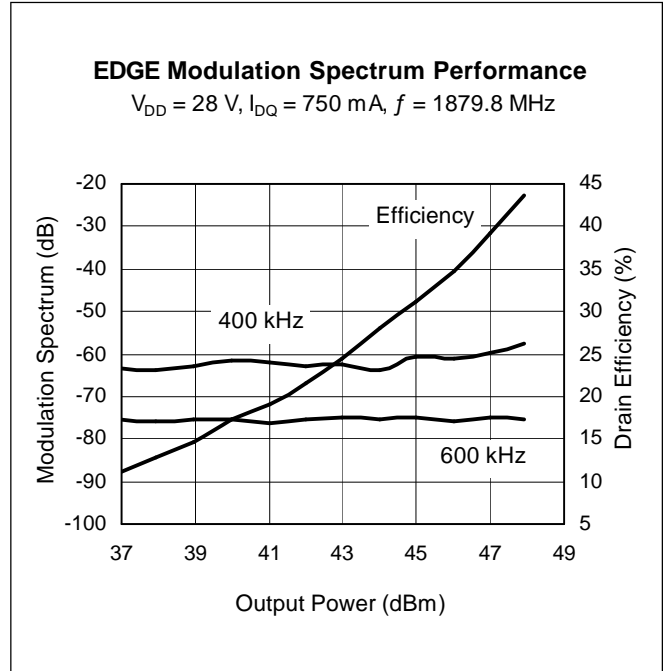
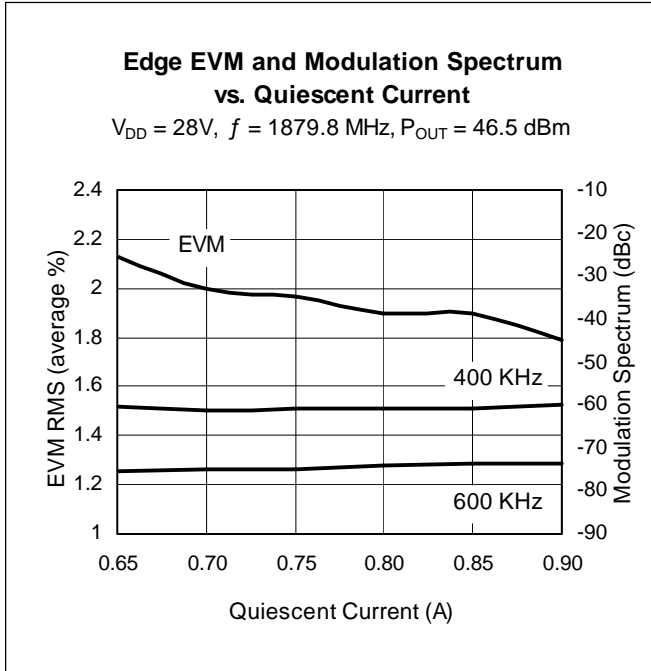
| Parameter | Symbol | Value | Unit |
|---|-----------------|-------------|-----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -0.5 to +12 | V |
| Junction Temperature | T_J | 200 | $^{\circ}\text{C}$ |
| Total Device Dissipation Above 25 $^{\circ}\text{C}$ 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

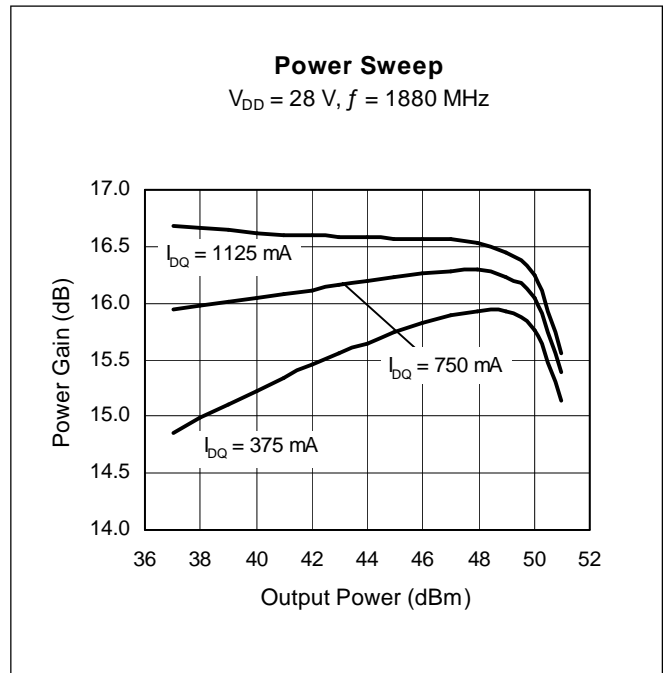
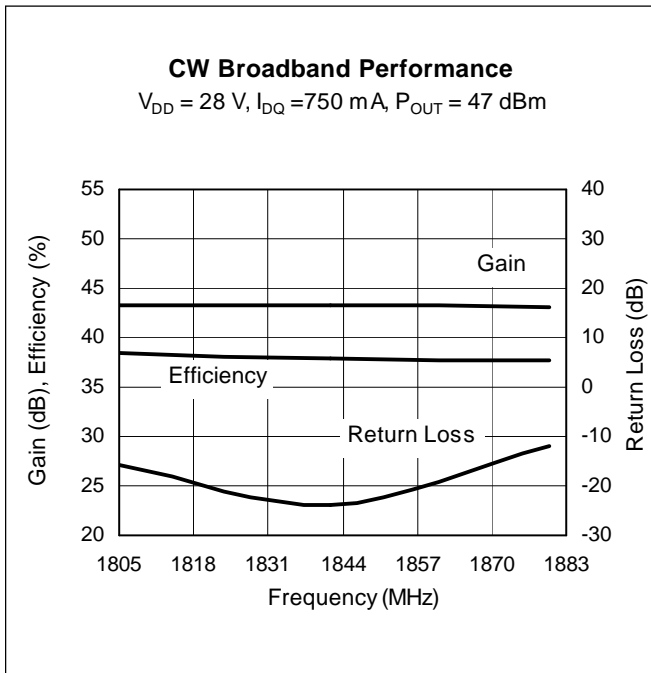
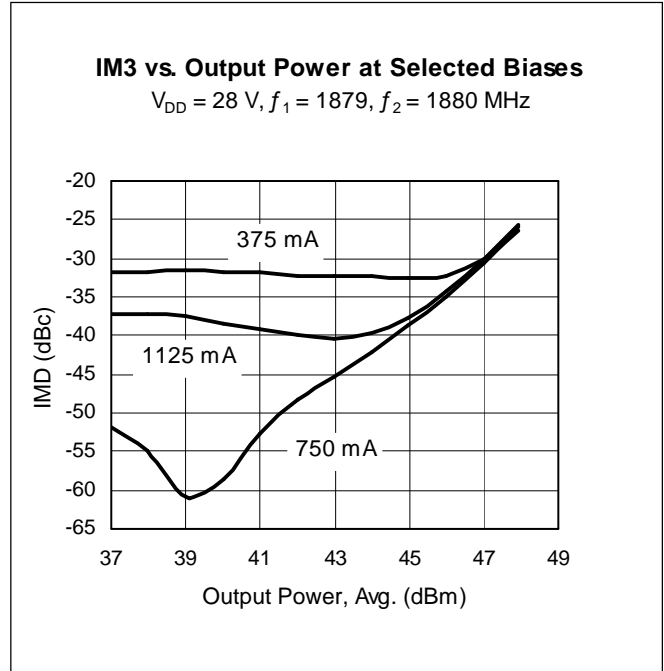
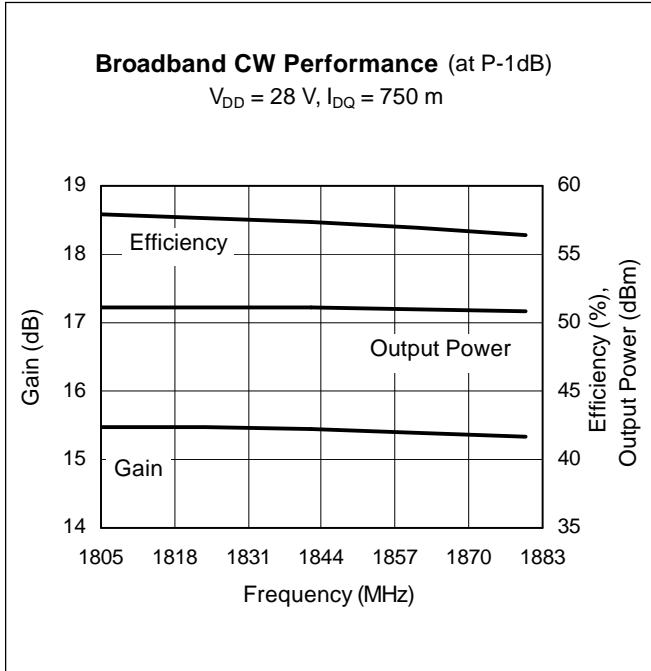
| Type and Version | Package Type | Package Description | Shipping | Marking |
|------------------|--------------|---|----------|--------------|
| PTFA181001GL* V1 | PG-63248-2 | Thermally-enhanced, plastic open-cavity, slotted flange, single-ended | Tray | PTFA181001GL |
| PTFA181001HL* V1 | PG-64248-2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

*See Infineon distributor for future availability.

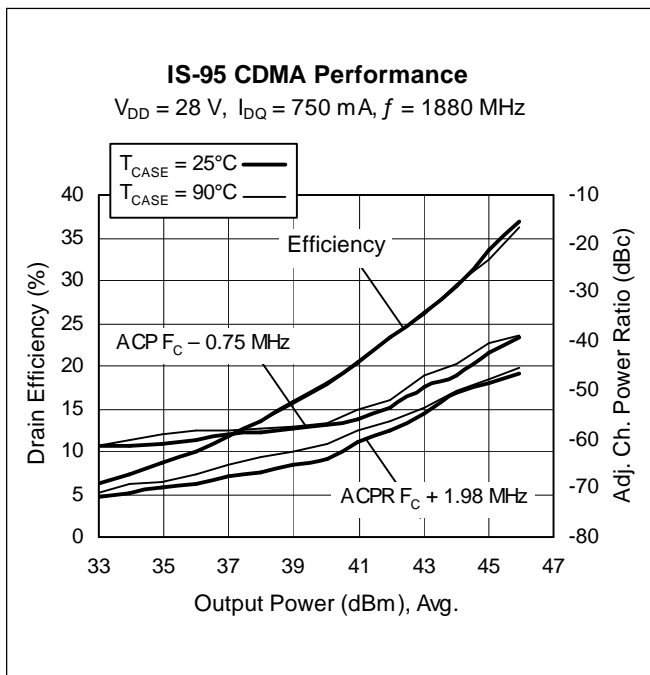
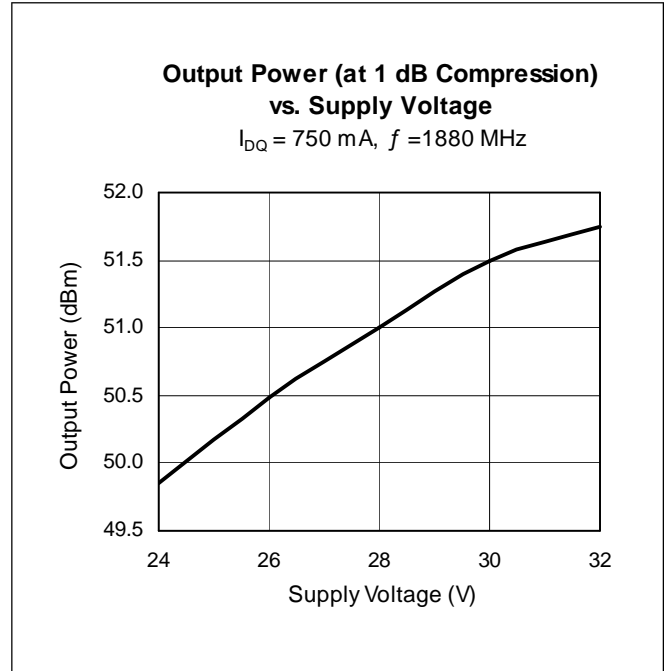
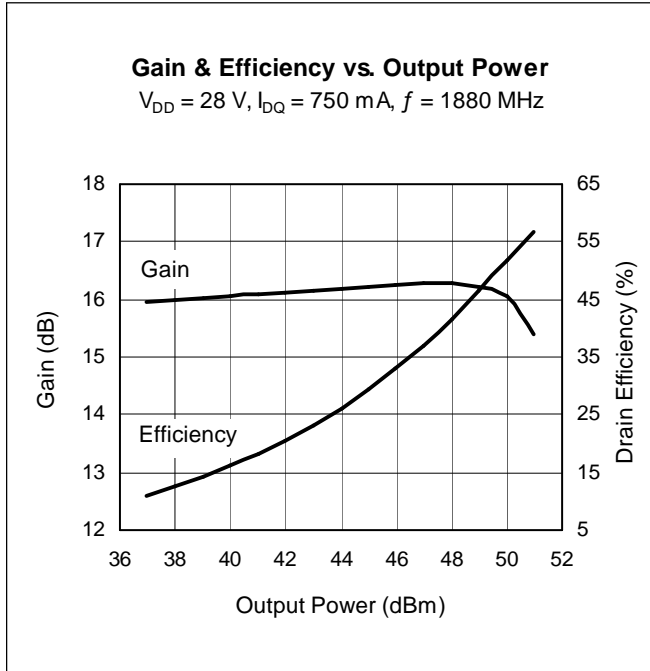
Typical Performance (data taken in a production test fixture)



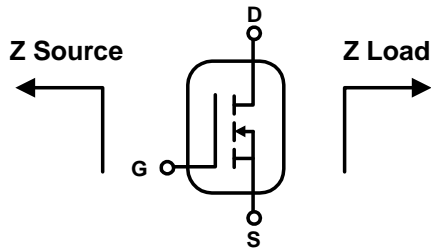
Typical Performance (cont.)



Typical Performance (cont.)



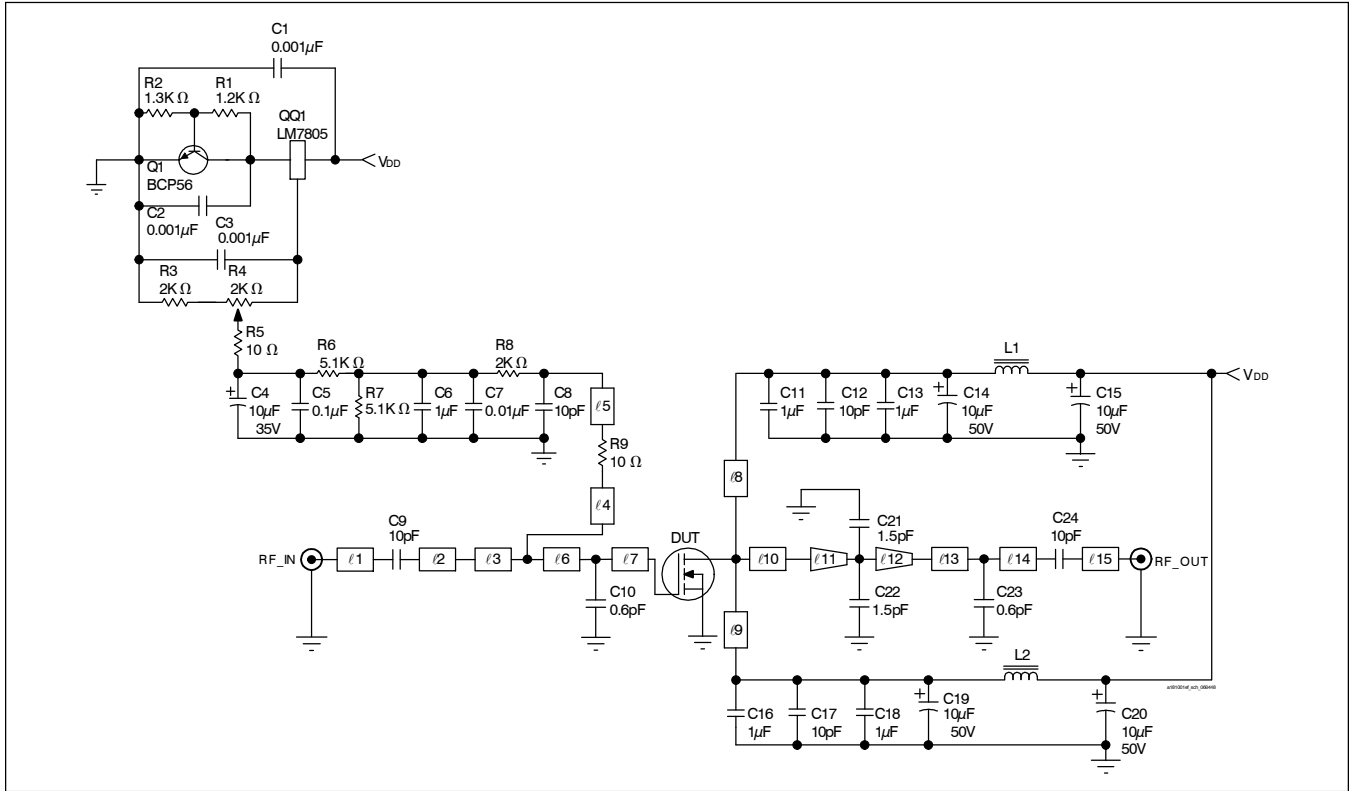
Broadband Circuit Impedance



| 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 $f = 1880 \text{ MHz}$

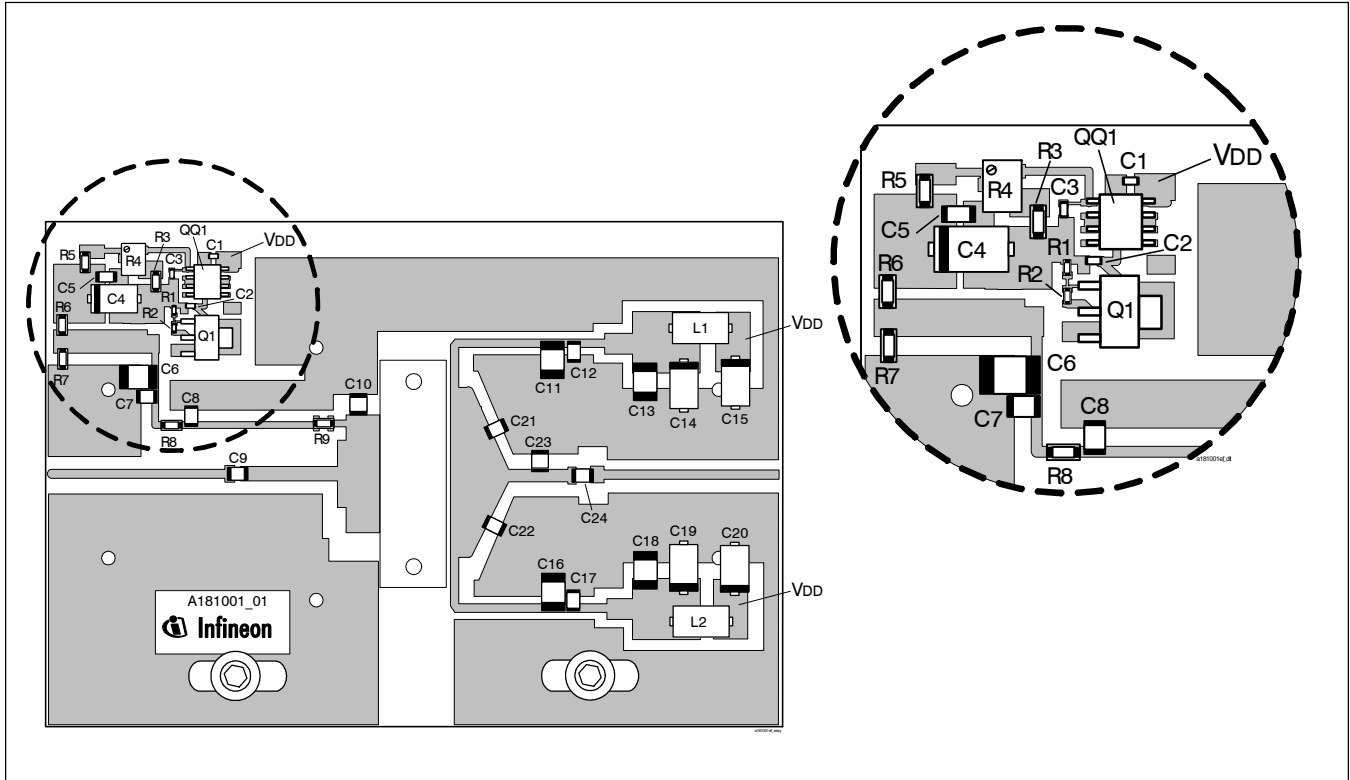
Circuit Assembly Information

| | | | |
|-----|---|------------------|--------------|
| 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.)

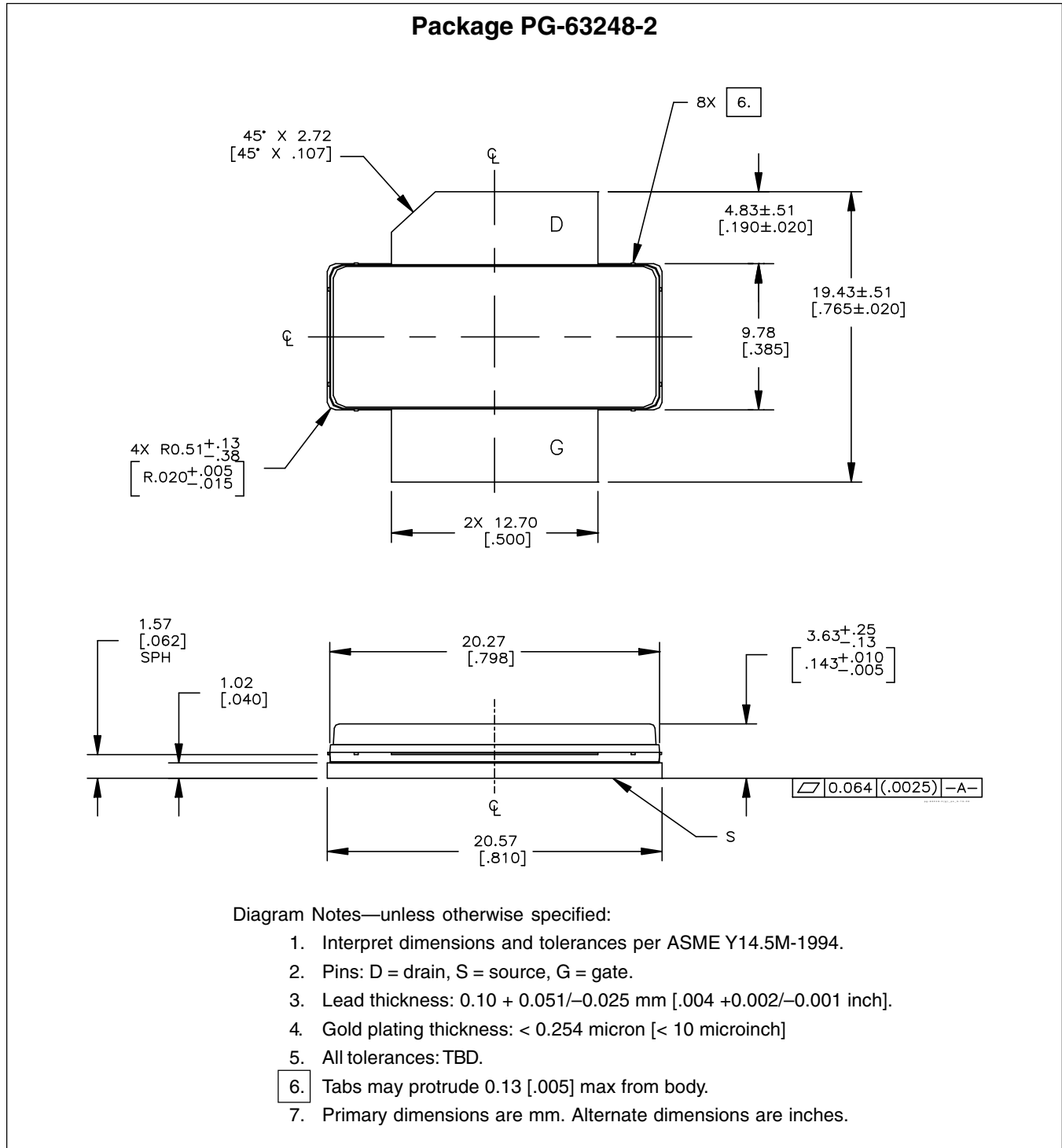


Reference circuit assembly diagram* (not to scale)

| 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 (cont.)



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

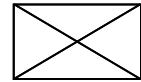
| Page | Subjects (major changes since last revision) |
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