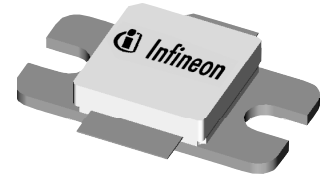


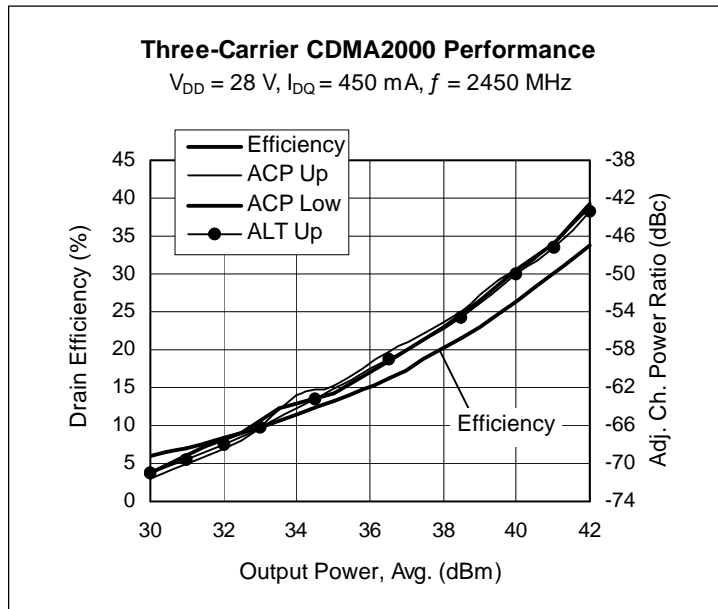
Thermally-Enhanced High Power RF LDMOS FET 45 W, 2420 – 2480 MHz

Description

The PTFA240451E is a thermally-enhanced, 45-watt, internally-matched **GOLDMOS**[®] FET intended for CDMA2000 and WiMAX applications from 2420 to 2480 MHz. Thermally-enhanced packaging provides the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.



PTFA240451E
Package H-30265-2



Features

- Thermally-enhanced, lead-free and RoHS-compliant packaging
- Broadband internal matching
- Typical two-carrier CDMA performance at 2450 MHz, 28 V
 - Average output power = 10 W
 - Linear Gain = 14 dB
 - Efficiency = 27%
 - Adjacent channel power = -45 dBc
- Typical CW performance, 2450 MHz, 28 V
 - Output power at P-1dB = 50 W
 - Efficiency = 54%
- Integrated ESD protection: Human Body Model, Class 2 (minimum)
- Excellent thermal stability, low HCI drift
- Capable of handling 10:1 VSWR @ 28 V, 45 W (CW) output power

RF Characteristics

3-Carrier CDMA2000 Measurements (not subject to production test—verified by design/characterization in Infineon test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT} = 14\text{ W}$ average, $f = 2450\text{ MHz}$, channel bandwidth = 3.75 MHz; ACPR measured in 30 kHz bandwidth at $f_C \pm 2.135\text{ MHz}$ offset

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------|----------|-----|-----|-----|------|
| Gain | G_{ps} | — | 14 | — | dB |
| Drain Efficiency | η_D | — | 31 | — | % |
| Adjacent Channel Power Ratio | ACPR | — | -45 | — | dBc |

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

RF Characteristics (cont.)

Two-tone Measurements (tested in Infineon test fixture)

 $V_{DD} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$, $P_{OUT} = 45\text{ W PEP}$, $f = 2480\text{ MHz}$, tone spacing = 1 MHz

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------|----------|------|-----|-----|------|
| Gain | G_{ps} | 13.5 | 14 | — | dB |
| Drain Efficiency | η_D | 39 | 40 | — | % |
| Intermodulation Distortion | IMD | — | -30 | -28 | 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 | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.17 | — | Ω |
| Operating Gate Voltage | $V_{DS} = 28\text{ V}$, $I_{DQ} = 450\text{ mA}$ | 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 |

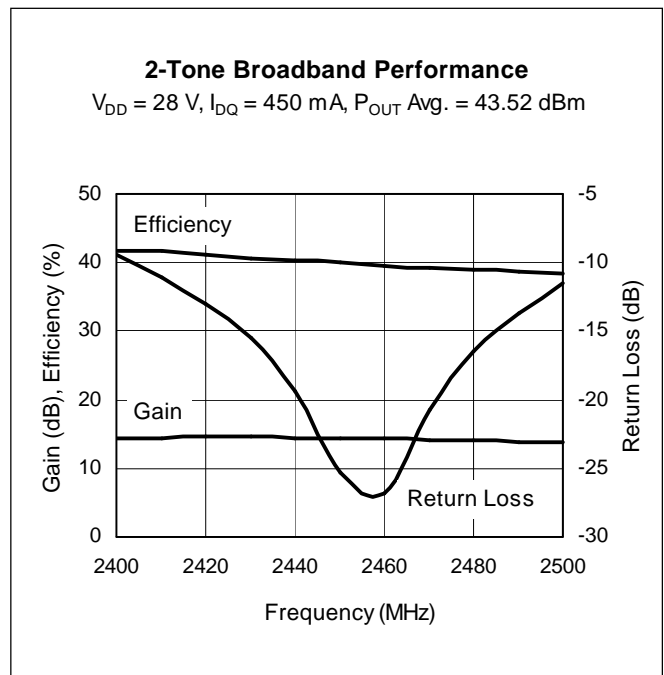
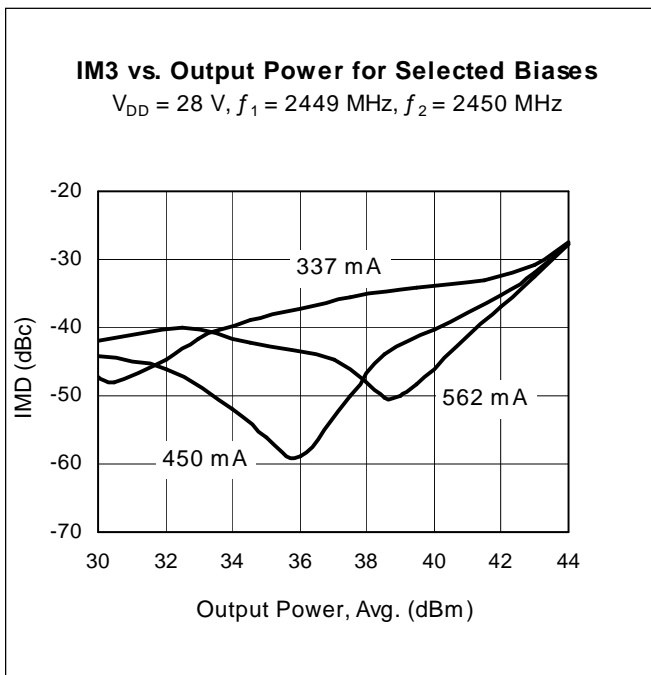
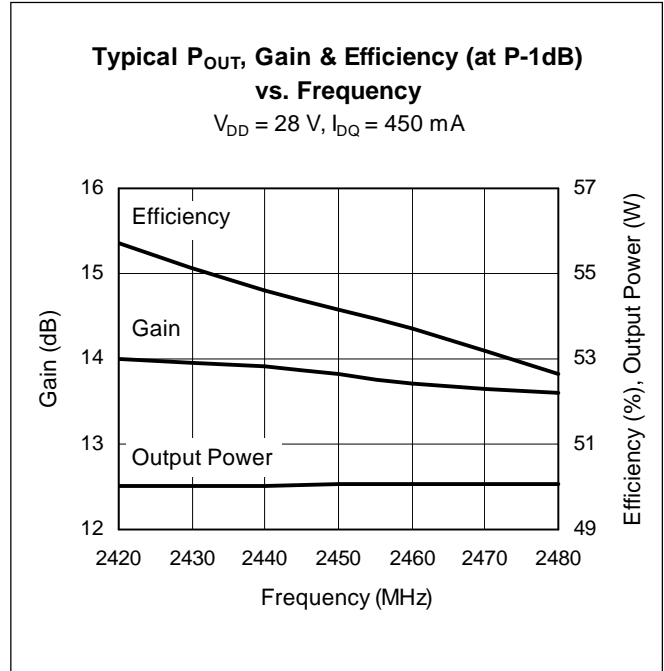
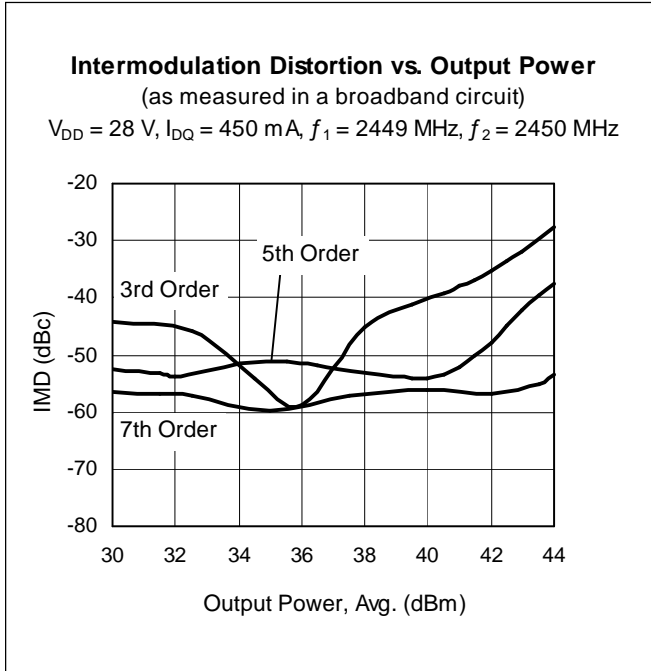
Maximum Ratings

| 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 | P_D | 196 | W |
| | | Above 25 $^{\circ}\text{C}$ derate by | 1.12 |
| Storage Temperature Range | T_{STG} | -40 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 45 W CW) | $R_{\theta JC}$ | 0.89 | $^{\circ}\text{C/W}$ |

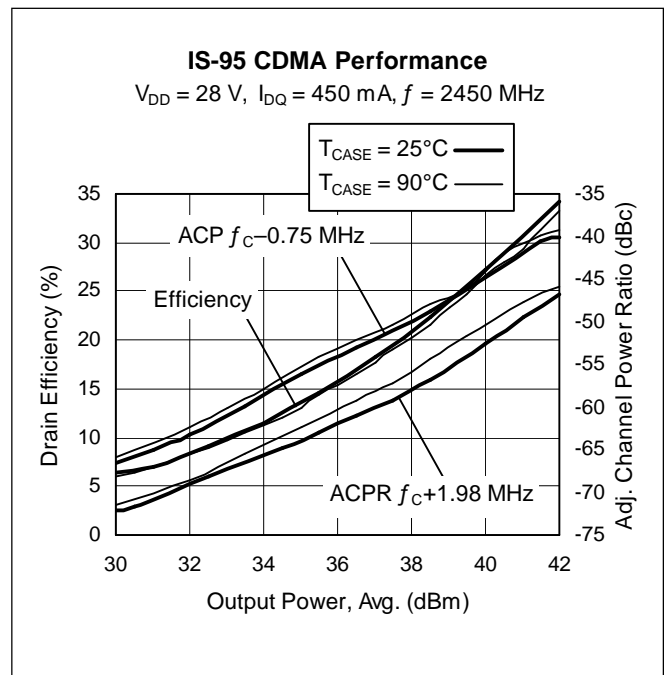
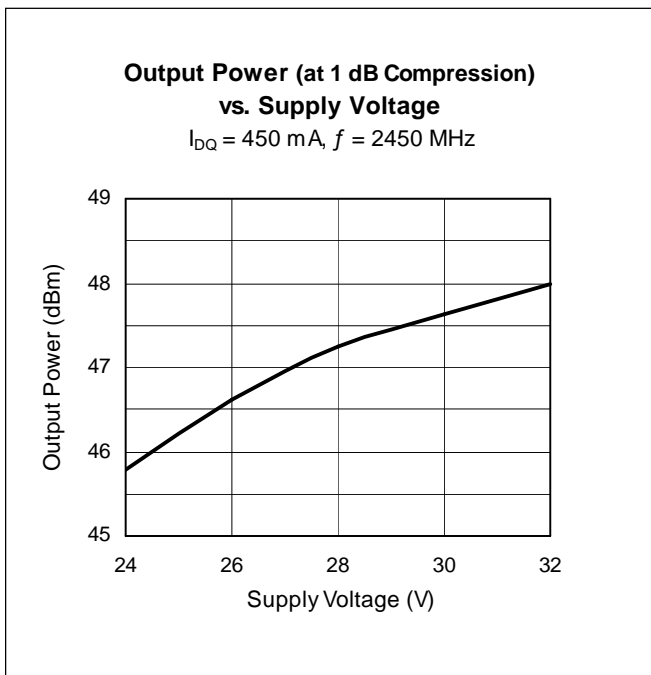
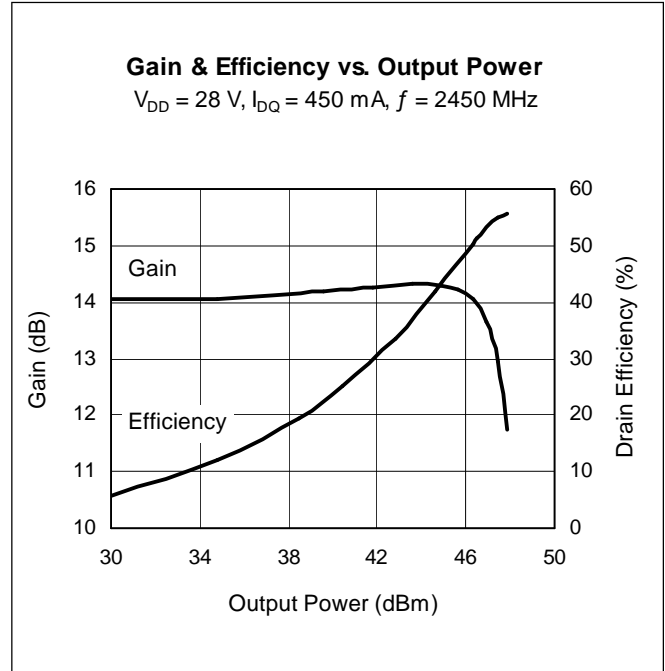
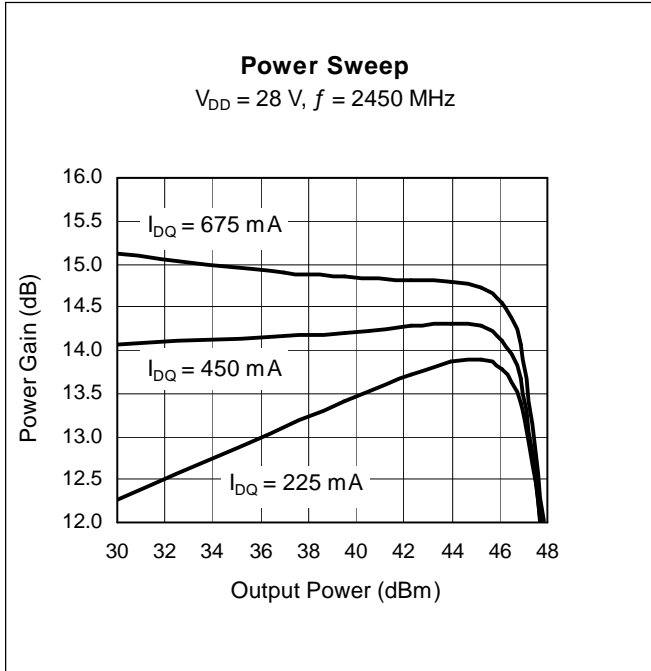
Ordering Information

| Type and Version | Package Outline | Package Description | Marking |
|------------------|-----------------|---|-------------|
| PTFA240451E V1 | H-30265-2 | Thermally-enhanced slotted flange, single-ended | PTFA240451E |

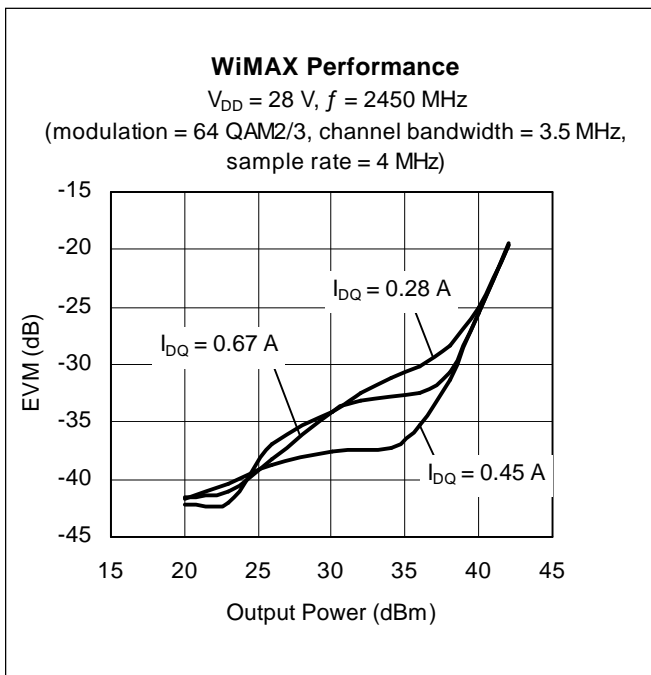
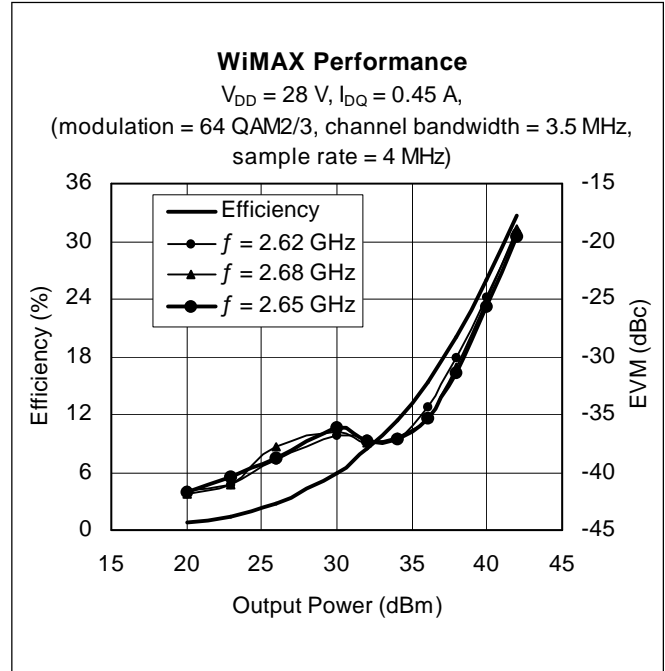
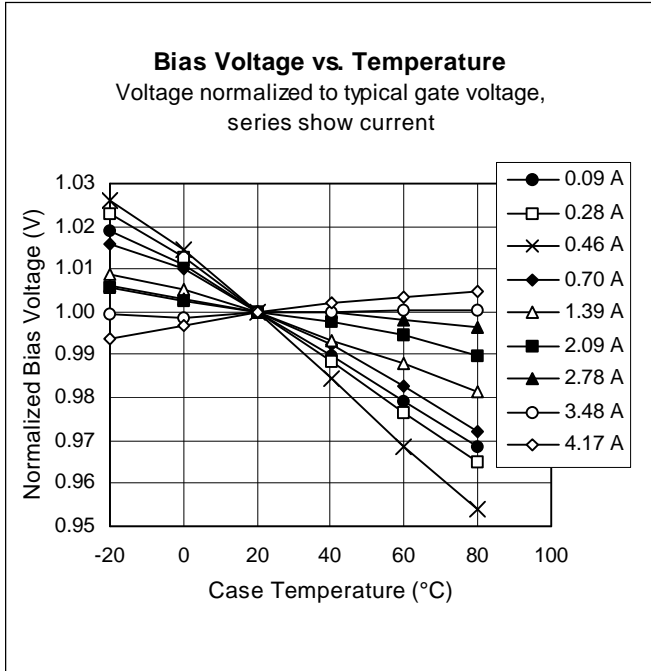
Typical Performance (data taken in a production test fixture)



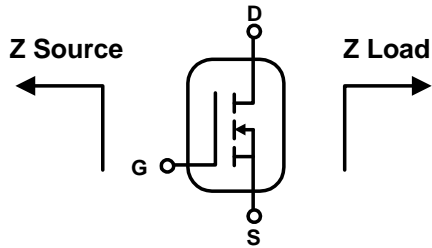
Typical Performance (cont.)



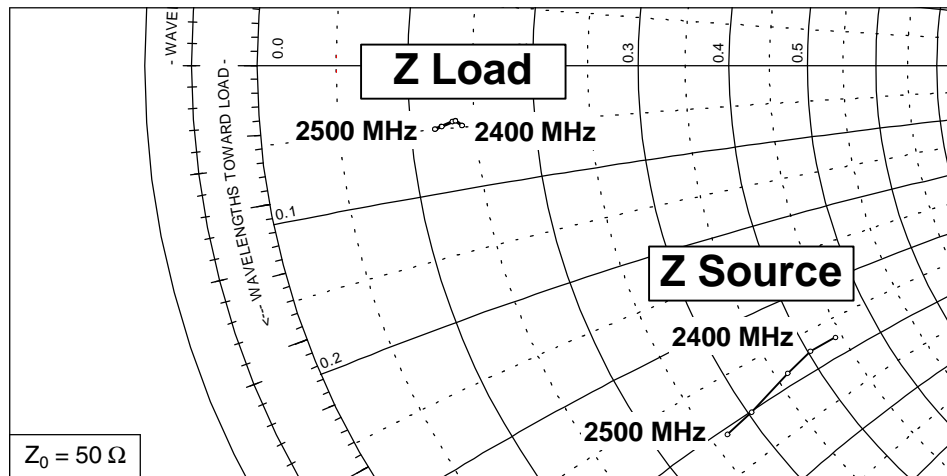
Typical Performance (cont.)



Broadband Circuit Impedance

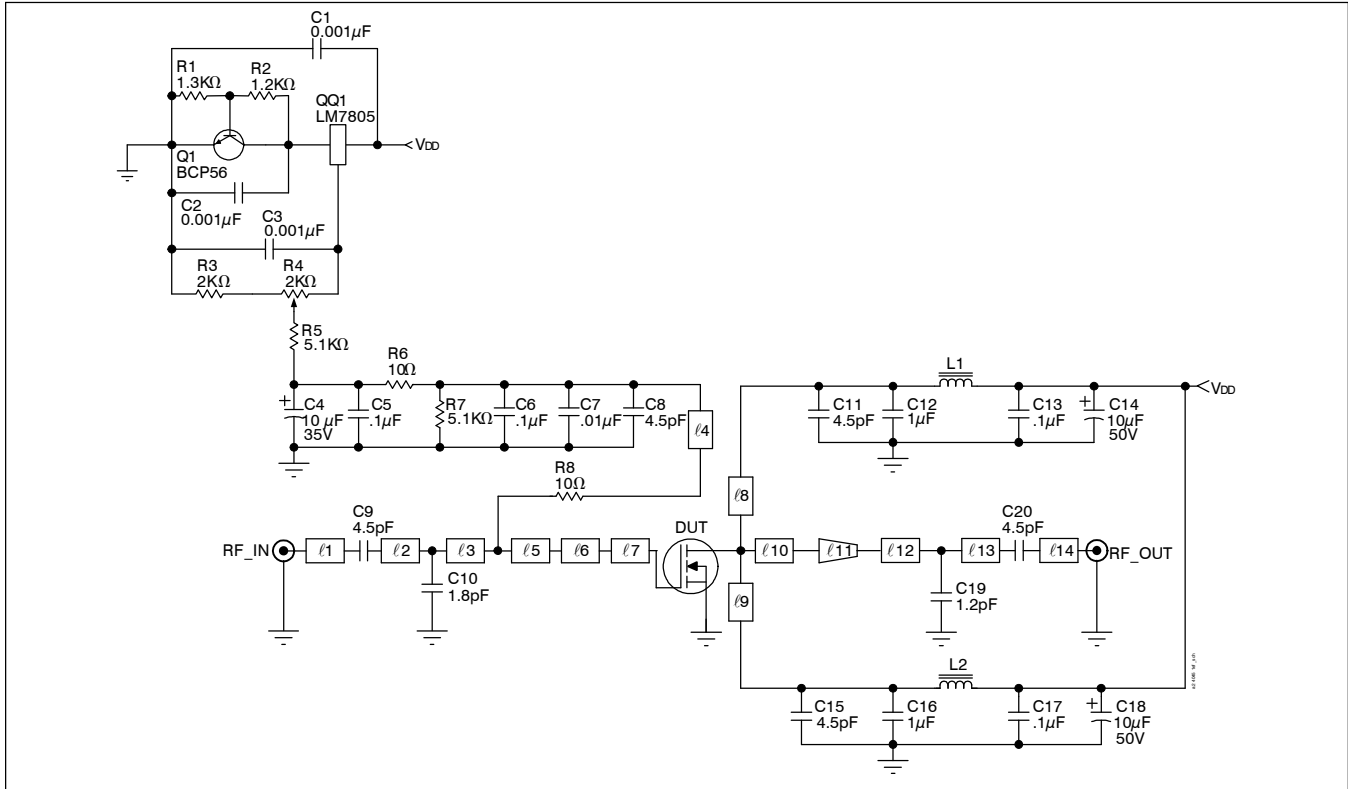


| Frequency MHz | Z Source W | | Z Load W | |
|------------------|------------|--------|----------|-------|
| | R | jX | R | jX |
| 2400 | 22.12 | -18.74 | 6.98 | -2.35 |
| 2420 | 20.27 | -18.71 | 6.73 | -2.14 |
| 2450 | 18.30 | -19.18 | 6.61 | -2.17 |
| 2480 | 15.24 | -19.95 | 6.17 | -2.32 |
| 2500 | 13.45 | -20.19 | 5.92 | -2.41 |



See next page for circuit information

Reference Circuit



Reference circuit schematic for $f = 2480 \text{ MHz}$

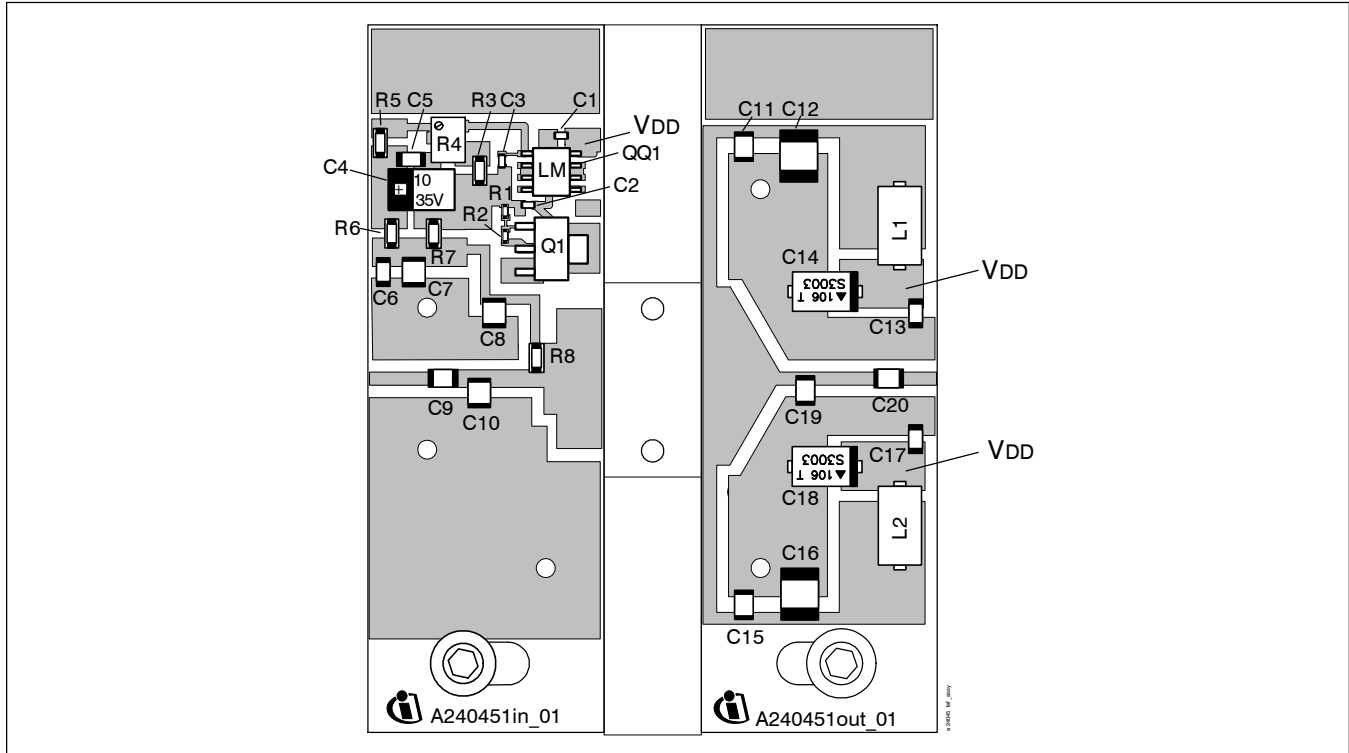
Circuit Assembly Information

| | | | |
|-----|---|------------------|--------------|
| DUT | PTFA240451E | LDMOS Transistor | |
| PCB | 0.76 mm [.030"] thick, $\epsilon_r = 4.5$ | Rogers TMM4 | 2 oz. copper |

| Microstrip | Electrical Characteristics at 2480 MHz ¹ | Dimensions: L x W (mm) | Dimensions: L x W (in.) |
|------------------|---|------------------------|-------------------------|
| l_1 | 0.102λ , 50.0 Ω | 6.68 x 1.40 | 0.263 x 0.055 |
| l_2 | 0.050λ , 44.0 Ω | 3.12 x 1.78 | 0.123 x 0.070 |
| l_3 | 0.094λ , 44.0 Ω | 6.10 x 1.78 | 0.240 x 0.070 |
| l_4 | 0.148λ , 64.0 Ω | 9.86 x 0.89 | 0.388 x 0.035 |
| l_5 | 0.016λ , 44.0 Ω | 1.04 x 1.78 | 0.041 x 0.070 |
| l_6 | 0.021λ , 14.7 Ω | 1.35 x 7.62 | 0.053 x 0.300 |
| l_7 | 0.080λ , 8.2 Ω | 4.78 x 14.86 | 0.188 x 0.585 |
| l_8, l_9 | 0.295λ , 50.0 Ω | 19.30 x 1.40 | 0.760 x 0.055 |
| l_{10} | 0.049λ , 6.5 Ω | 2.84 x 19.05 | 0.112 x 0.750 |
| l_{11} (taper) | 0.079λ , 6.5 Ω / 50.0 Ω | 5.16 x 19.05 / 1.40 | 0.203 x 0.750 / 0.055 |
| l_{12} | 0.045λ , 50.0 Ω | 2.95 x 1.40 | 0.116 x 0.055 |
| l_{13} | 0.117λ , 50.0 Ω | 7.62 x 1.40 | 0.300 x 0.055 |
| l_{14} | 0.058λ , 50.0 Ω | 3.81 x 1.40 | 0.150 x 0.055 |

¹Electrical characteristics are rounded.

Reference Circuit (cont.)

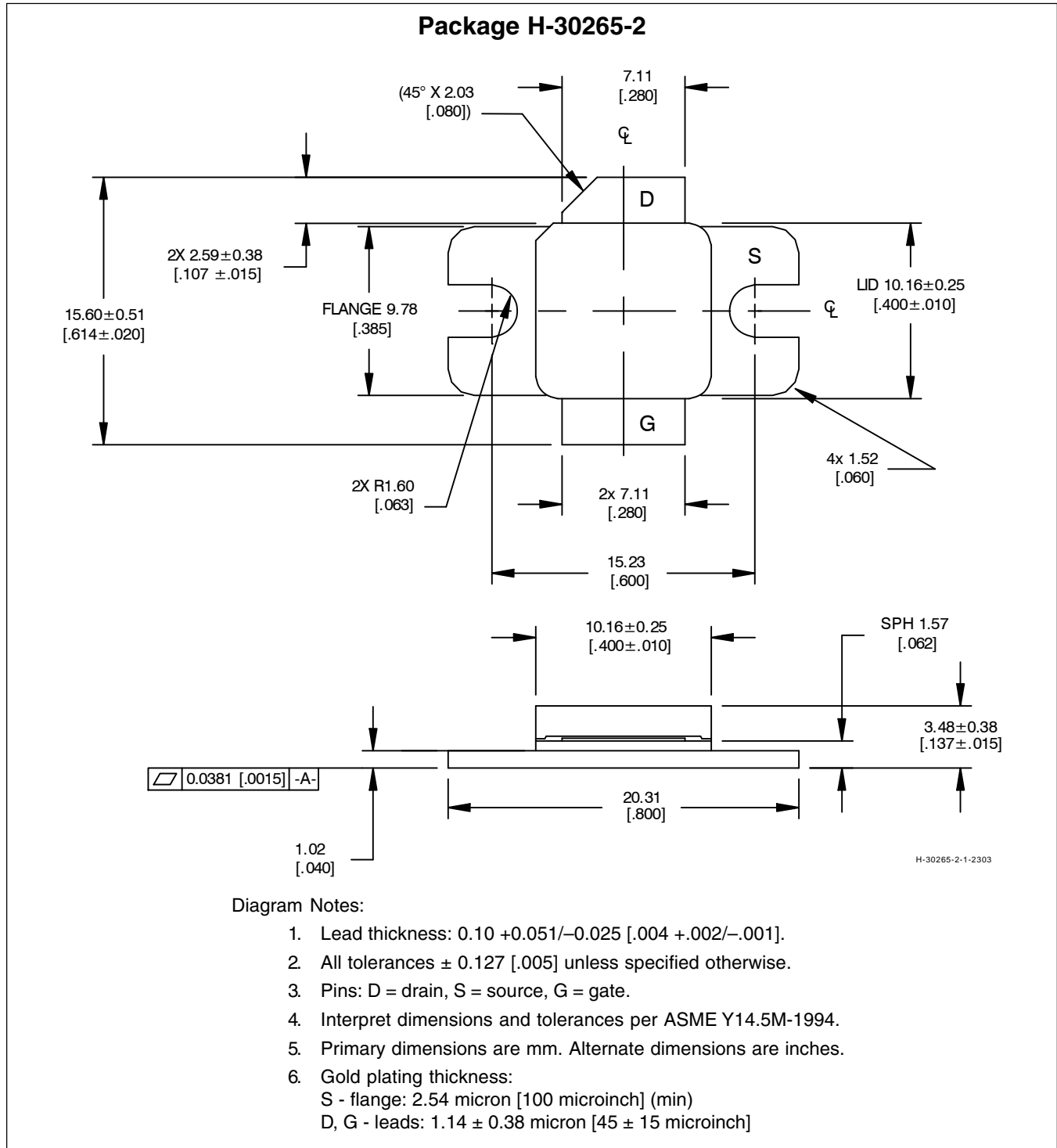


Reference circuit assembly diagram* (not to scale)

| 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 | PCS6106TR-ND |
| C5, C6, C13, C17 | Capacitor, 0.1 μ F | Digi-Key | PCC104BCT-ND |
| C7 | Ceramic capacitor, 0.01 μ F | ATC | 200B 103 |
| C8, C9, C11, C15, C20 | Ceramic capacitor, 4.5 pF | ATC | 100B 4R5 |
| C10 | Ceramic capacitor, 1.8 pF | ATC | 100B 1R8 |
| C12, C16 | Capacitor, 1 μ F | ATC | 920C105KW |
| C14, C18 | Tantalum capacitor, 10 μ F, 50 V | Garrett Electronics | TPSE106K050R0400 |
| C19 | Ceramic capacitor, 1.2 pF | ATC | 100B 1R2 |
| L1, L2 | Ferrite | Philips | BDS46/3.8.8-452 |
| Q1 | Transistor | Infineon | BCP56 |
| QQ1 | Voltage regulator | National Semiconductor | LM7805 |
| R1 | Chip resistor, 1.3 k-ohms | Digi-Key | P1.3KGCT-ND |
| R2 | Chip resistor, 1.2 k-ohms | Digi-Key | P1.2KGCT-ND |
| R3 | Chip resistor, 2 k-ohms | Digi-Key | P2.0KECT-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



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

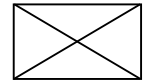
| Page | Subjects (major changes since last revision) |
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| All | Remove references to alternate products. |
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