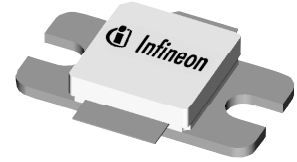


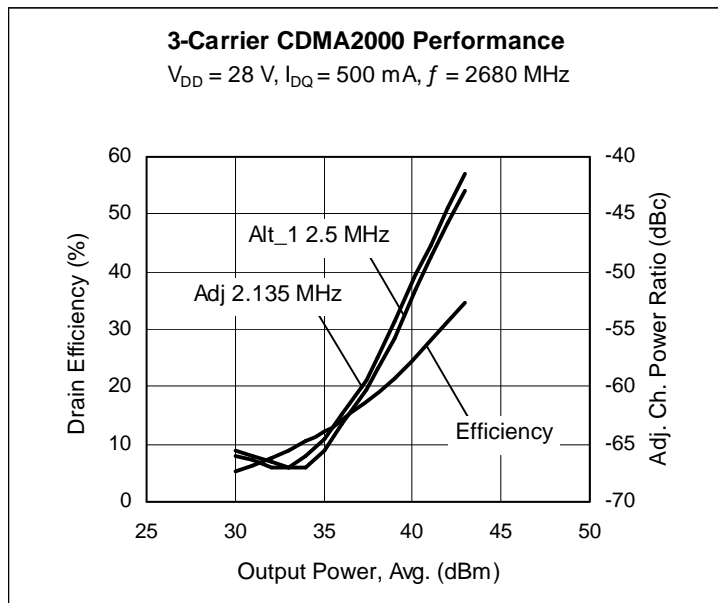
## Thermally-Enhanced High Power RF LDMOS FET 45 W, 2.62 – 2.68 GHz

### Description

The PTFA260451E is a thermally-enhanced 45-watt, internally-matched *GOLDMOS*® FET intended for CDMA2000, Super3G (3GPP TSG RAN), and WiMAX applications from 2.62 to 2.68 GHz. Thermally-enhanced packaging provide the coolest operation available. Full gold metallization ensures excellent device lifetime and reliability.



PTFA260451E  
Package H-30265-2



### Features

- Lead-free, RoHS-compliant and thermally-enhanced packaging
- Internal matching for wideband performance
- Typical three-carrier CDMA2000 performance
  - Average output power = 10 W
  - Gain = 14 dB
  - Efficiency = 24%
  - ACPR = -52 dBc
- Typical CW performance
  - Output power at P-1dB = 50 W
  - Efficiency = 46%
- 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 Performance

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

$V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 500\text{ mA}$ ,  $P_{OUT} = 10\text{ W AVG}$ ,  $f = 2680\text{ MHz}$

| Characteristic               | Symbol   | Min | Typ | Max | Unit |
|------------------------------|----------|-----|-----|-----|------|
| Adjacent Channel Power Ratio | ACPR     | —   | -45 | —   | dBc  |
| Gain                         | $G_{ps}$ | —   | 14  | —   | dB   |
| Drain Efficiency             | $\eta_D$ | —   | 24  | —   | %    |

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

**ESD:** Electrostatic discharge sensitive device—observe handling precautions!

**RF Performance** (cont.)

**Two-tone Measurements** (tested in Infineon test fixture)

 $V_{DD} = 28\text{ V}$ ,  $I_{DQ} = 500\text{ mA}$ ,  $P_{OUT} = 45\text{ W PEP}$ ,  $f = 2680\text{ MHz}$ , tone spacing = 1 MHz

| Characteristic             | Symbol   | Min  | Typ | Max | Unit |
|----------------------------|----------|------|-----|-----|------|
| Gain                       | $G_{ps}$ | 14.0 | 15  | —   | dB   |
| Drain Efficiency           | $\eta_D$ | 36   | 37  | —   | %    |
| Intermodulation Distortion | IMD      | —    | -30 | -28 | dBc  |

**DC Characteristics**

| Characteristic                 | Conditions  | Symbol        | Min | Typ  | Max  | Unit          |
|--------------------------------|---|---------------|-----|------|------|---------------|
| Drain-Source Breakdown Voltage | $V_{GS} = 0\text{ V}$ , $I_D = 10\text{ mA}$      | $V_{(BR)DSS}$ | 65  | —    | —    | V             |
| Drain Leakage Current          | $V_{DS} = 28\text{ V}$ , $V_{GS} = 0\text{ V}$    | $I_{DSS}$     | —   | —    | 1.0  | $\mu\text{A}$ |
|                                | $V_{DS} = 63\text{ V}$ , $V_{GS} = 0\text{ V}$    | $I_{DSS}$     | —   | —    | 10.0 | $\mu\text{A}$ |
| On-State Resistance            | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0.1\text{ V}$  | $R_{DS(on)}$  | —   | 0.16 | —    | $\Omega$      |
| Operating Gate Voltage         | $V_{DS} = 28\text{ V}$ , $I_{DQ} = 500\text{ mA}$ | $V_{GS}$      | 2.0 | 2.5  | 3    | V             |
| Gate Leakage Current           | $V_{GS} = 10\text{ V}$ , $V_{DS} = 0\text{ V}$    | $I_{GSS}$     | —   | —    | 1.0  | $\mu\text{A}$ |

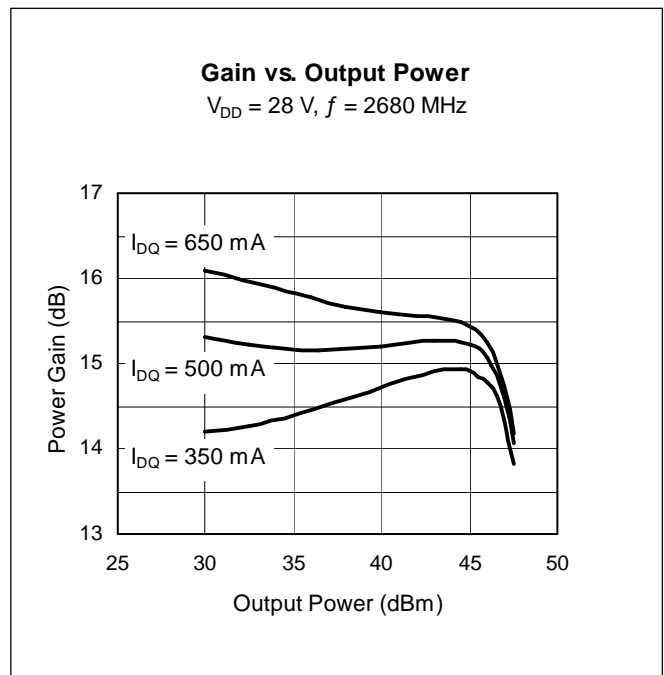
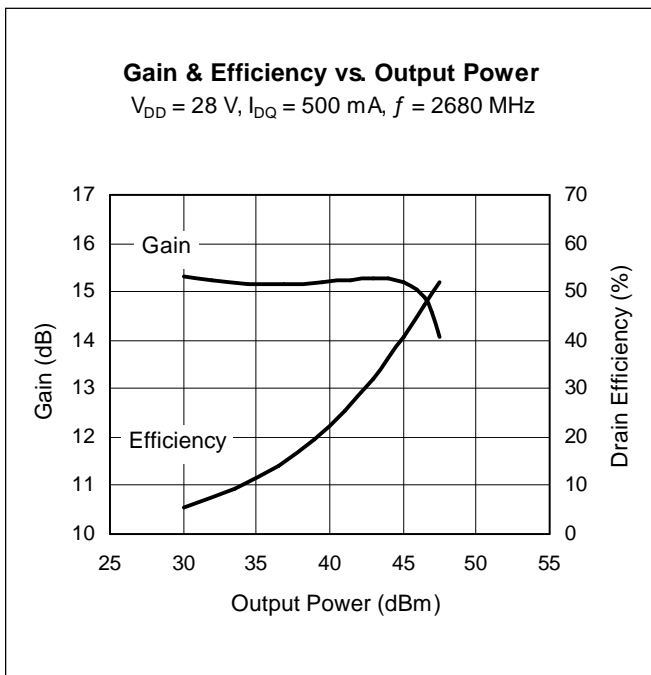
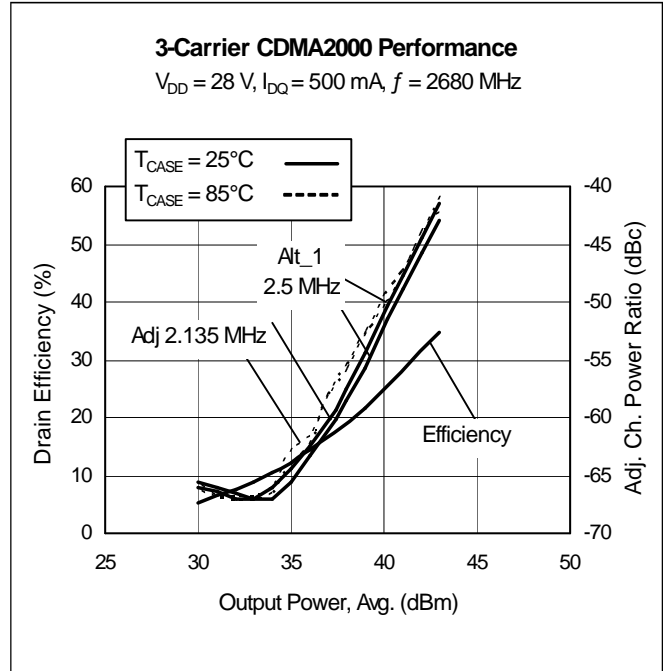
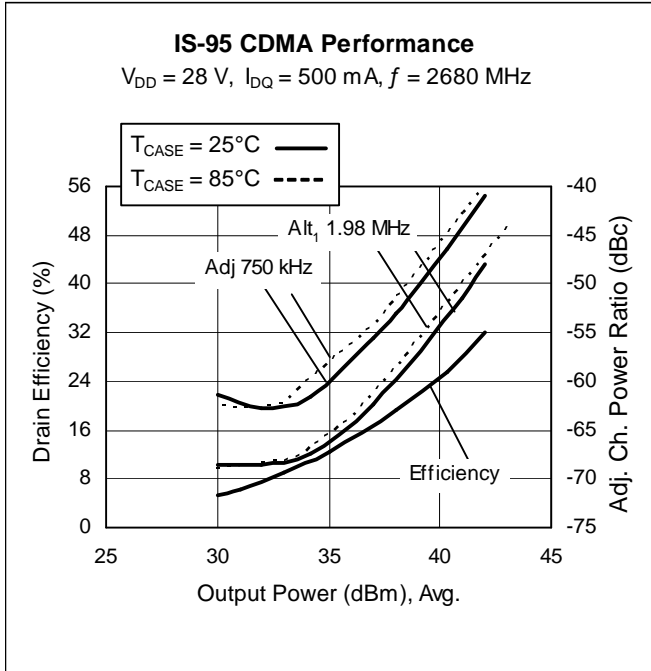
**Maximum Ratings**

| 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  | $P_D$           | 199                                   | W                    |
|   |                 | Above 25 $^{\circ}\text{C}$ derate by | 1.14                 |
| Storage Temperature Range                                       | $T_{STG}$       | -40 to +150                           | $^{\circ}\text{C}$   |
| Thermal Resistance ( $T_{CASE} = 70^{\circ}\text{C}$ , 45 W CW) | $R_{\theta JC}$ | 0.88                                  | $^{\circ}\text{C/W}$ |

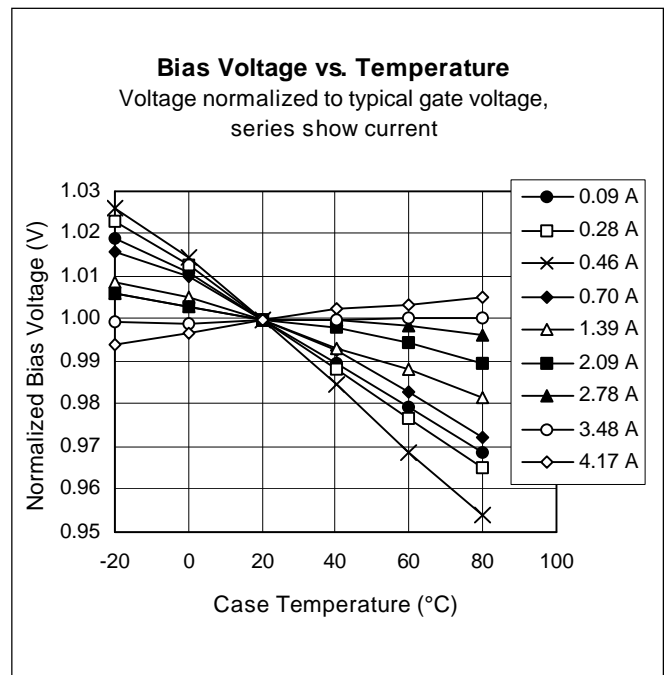
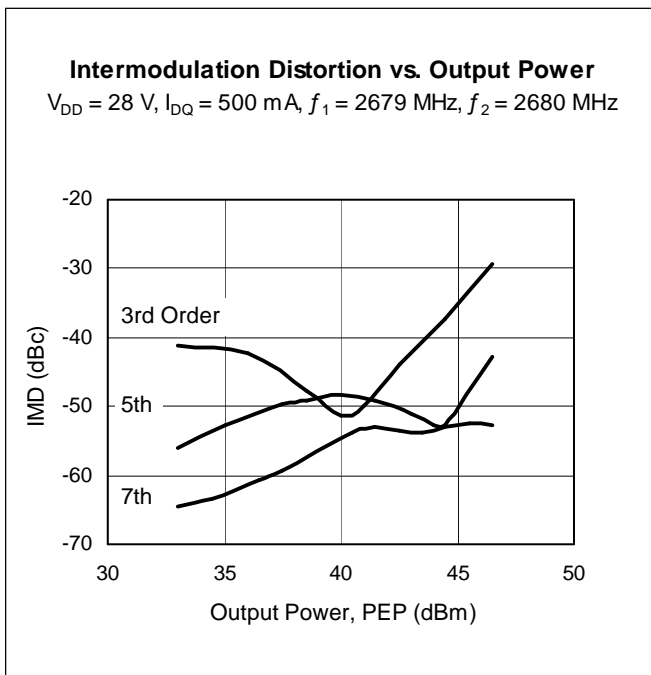
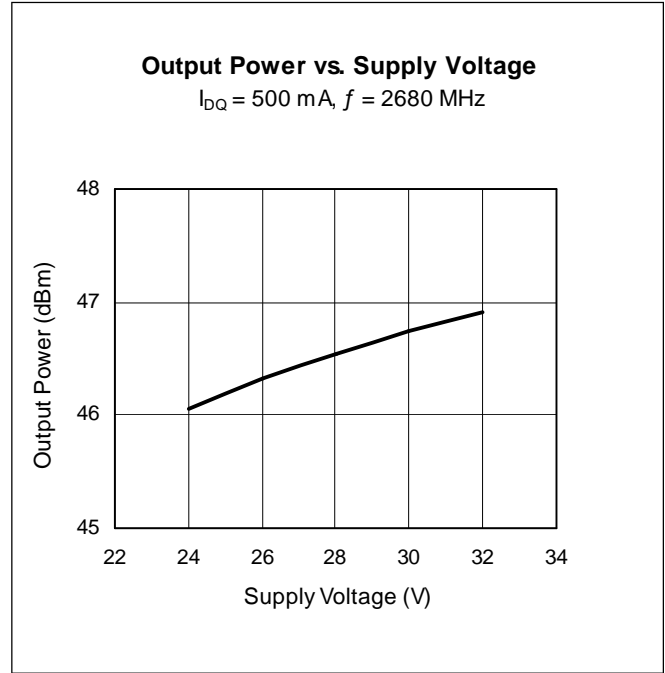
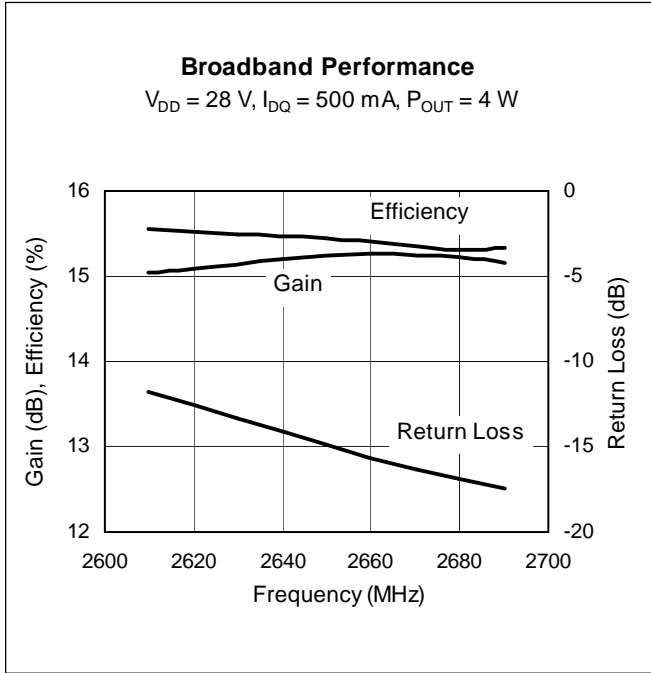
**Ordering Information**

| Type and Version | Package Outline | Package Description                             | Marking     |
|------------------|-----------------|---|-------------|
| PTFA260451E V1   | H-30265-2       | Thermally-enhanced slotted flange, single-ended | PTFA260451E |

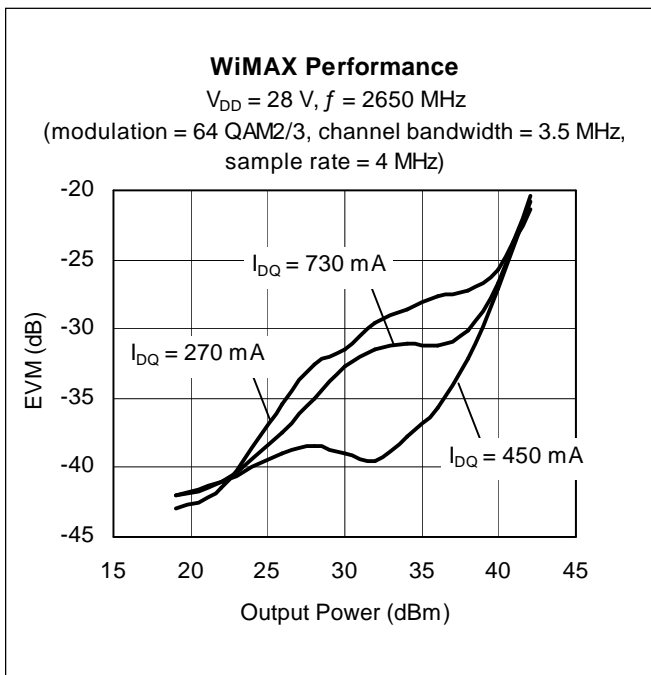
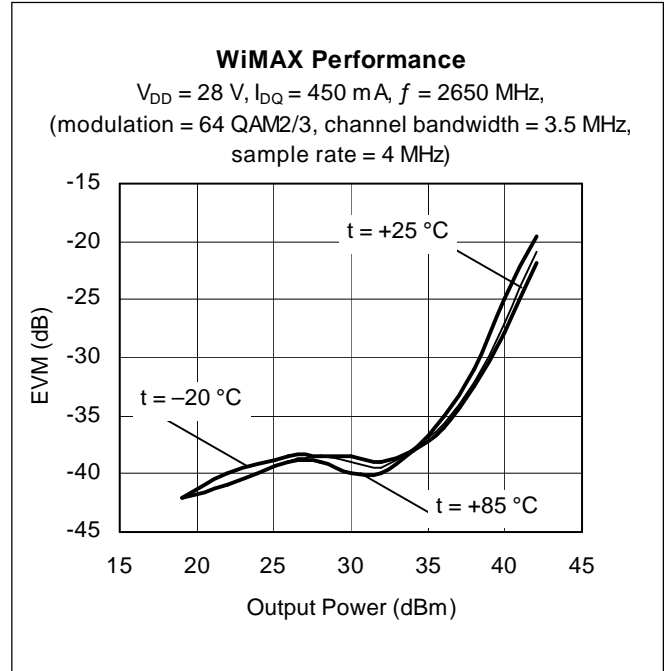
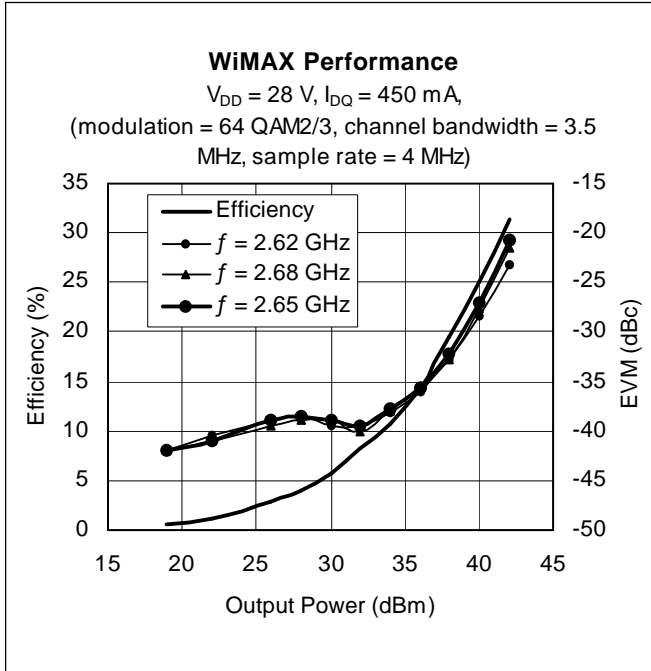
**Typical Performance** (data taken in production test fixture)



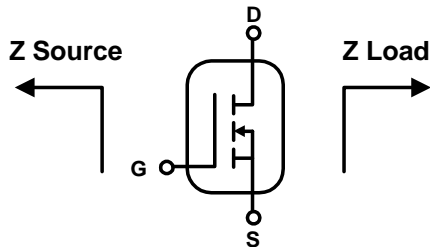
Typical Performance (cont.)



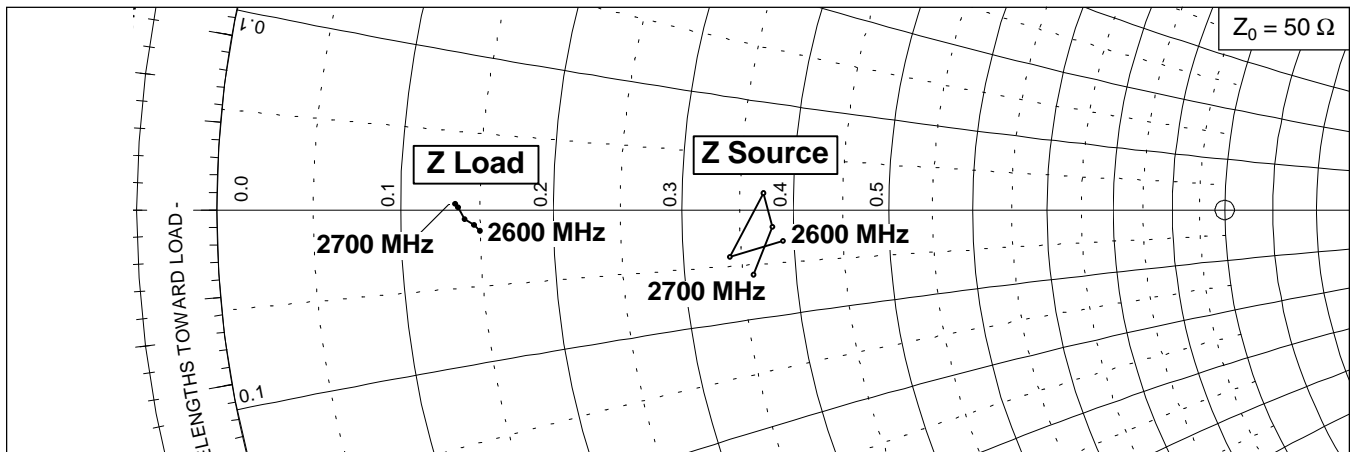
Typical WiMAX Performance



**Broadband Circuit Impedance**

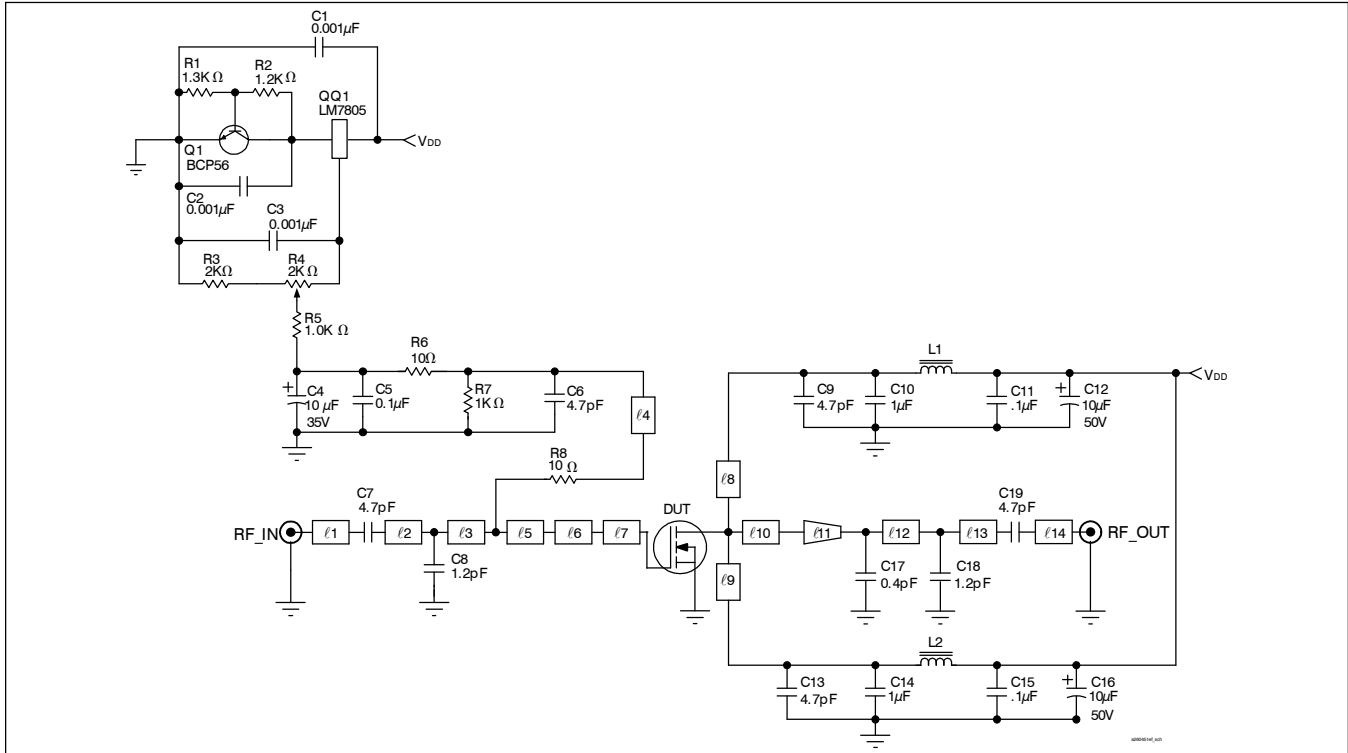


| Frequency<br>MHz | Z Source W |      | Z Load W |      |
|------------------|------------|------|----------|------|
|                  | R          | jX   | R        | jX   |
| 2600             | 19.5       | -1.5 | 7.5      | -0.7 |
| 2620             | 17.0       | -2.1 | 7.3      | -0.5 |
| 2650             | 18.6       | 0.8  | 7.0      | -0.3 |
| 2680             | 19.0       | -0.8 | 6.8      | 0.1  |
| 2700             | 18.0       | -3.0 | 6.7      | 0.2  |



See next page for reference circuit information

Reference Circuit



Reference circuit schematic for  $f = 2680$  MHz

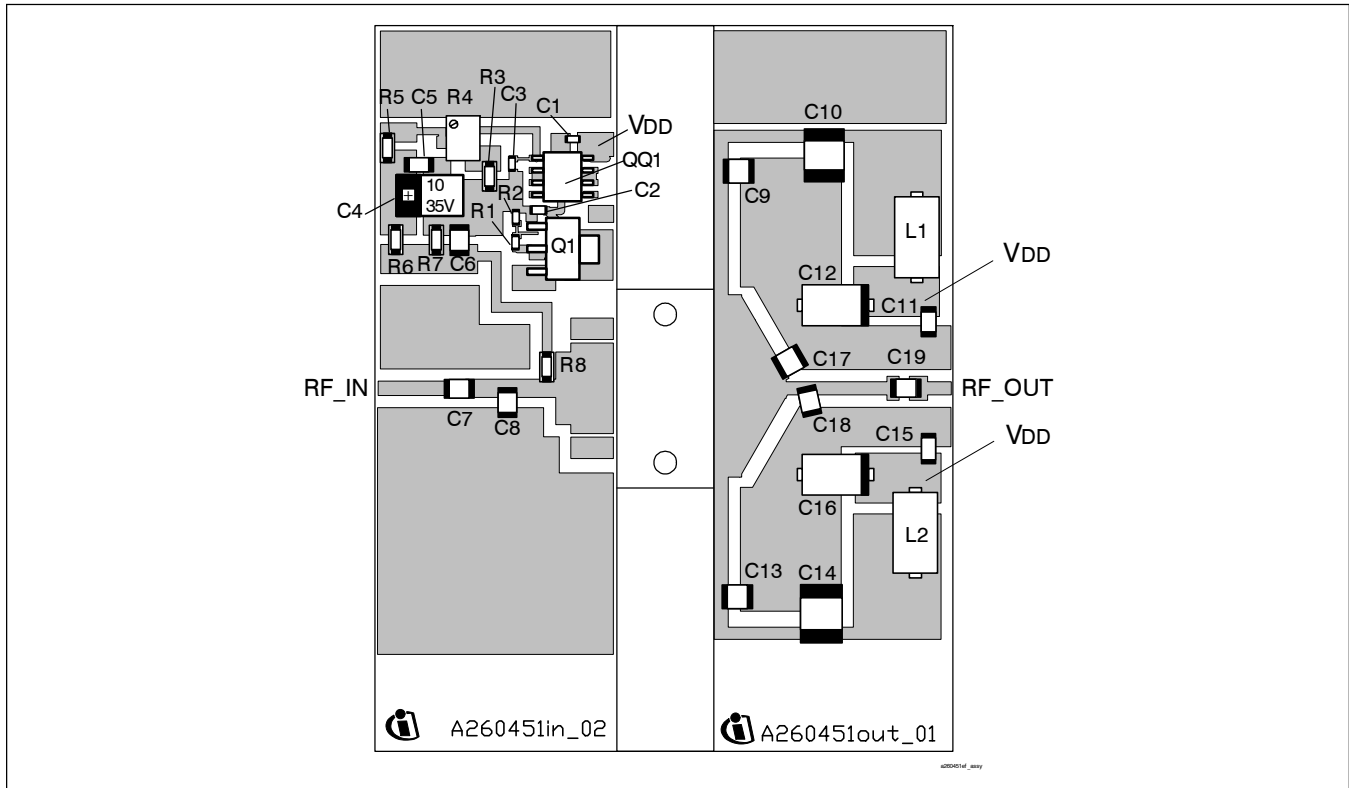
Circuit Assembly Information

|     |   |                  |              |
|-----|---|------------------|--------------|
| DUT | PTFA260451E                               | LDMOS Transistor |              |
| PCB | 0.76 mm [.030"] thick, $\epsilon_r = 4.5$ | Rogers TMM4      | 2 oz. copper |

| Microstrip  | Electrical Characteristics at 2680 MHz <sup>1</sup> | Dimensions: L x W (mm) | Dimensions: L x W (in.) |
|-------------|---|------------------------|-------------------------|
| l1          | 0.130 $\lambda$ , 50.0 $\Omega$                     | 7.87 x 1.47            | 0.310 x 0.058           |
| l2          | 0.061 $\lambda$ , 44.0 $\Omega$                     | 3.68 x 1.83            | 0.145 x 0.072           |
| l3          | 0.065 $\lambda$ , 44.0 $\Omega$                     | 3.91 x 1.83            | 0.154 x 0.072           |
| l4          | 0.299 $\lambda$ , 62.0 $\Omega$                     | 18.44 x 1.02           | 0.726 x 0.040           |
| l5          | 0.018 $\lambda$ , 44.0 $\Omega$                     | 1.09 x 1.83            | 0.043 x 0.072           |
| l6          | 0.029 $\lambda$ , 15.0 $\Omega$                     | 1.65 x 7.62            | 0.065 x 0.300           |
| l7          | 0.077 $\lambda$ , 12.5 $\Omega$                     | 4.32 x 9.45            | 0.170 x 0.372           |
| l8          | 0.234 $\lambda$ , 55.0 $\Omega$                     | 14.33 x 1.27           | 0.564 x 0.050           |
| l9          | 0.218 $\lambda$ , 55.0 $\Omega$                     | 13.36 x 1.27           | 0.526 x 0.050           |
| l10         | 0.050 $\lambda$ , 6.6 $\Omega$                      | 2.74 x 19.10           | 0.108 x 0.752           |
| l11 (taper) | 0.080 $\lambda$ , 6.6 $\Omega$ / 50.0 $\Omega$      | 4.90 x 19.10 / 1.32    | 0.193 x 0.752 / 0.052   |
| l12         | 0.053 $\lambda$ , 50.0 $\Omega$                     | 3.25 x 1.32            | 0.128 x 0.052           |
| l13         | 0.133 $\lambda$ , 50.0 $\Omega$                     | 8.13 x 1.32            | 0.320 x 0.052           |
| l14         | 0.070 $\lambda$ , 50.0 $\Omega$                     | 4.27 x 1.32            | 0.168 x 0.052           |

<sup>1</sup>Electrical characteristics are rounded.

Reference Circuit (cont.)



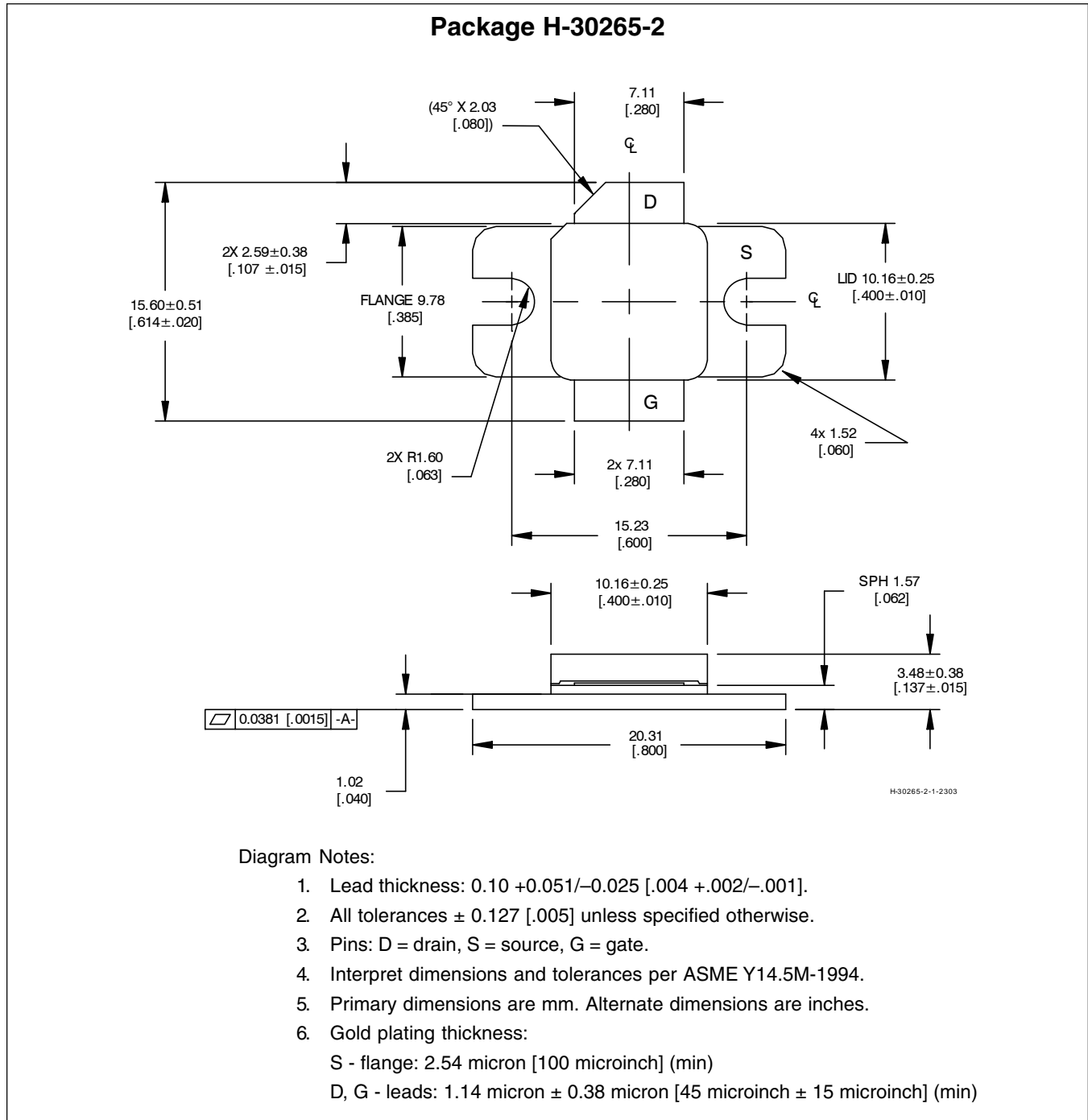
Reference circuit assembly diagram\* (not to scale)

| Component            | Description                          | Suggested Manufacturer | P/N or Comment   |
|----------------------|--------------------------------------|------------------------|------------------|
| C1, C2, C3           | Capacitor, 0.001 $\mu$ F             | Digi-Key               | PCC1772CT-ND     |
| C4                   | Tantalum capacitor, 10 $\mu$ F, 35 V | Digi-Key               | PCS6106TR-ND     |
| C5, C11, C15         | Capacitor, 0.1 $\mu$ F               | Digi-Key               | PCC104BCT-ND     |
| C6, C7, C9, C13, C19 | Ceramic capacitor, 4.7 pF            | ATC                    | 100B 4R7         |
| C8, C18              | Ceramic capacitor, 1.2 pF            | ATC                    | 100B 1R2         |
| C10, C14             | Capacitor, 1 $\mu$ F                 | ATC                    | 920C105KW        |
| C12, C16             | Tantalum capacitor, 10 $\mu$ F, 50 V | Garrett Electronics    | TPSE106K050R0400 |
| C17                  | Ceramic capacitor, 0.4 pF            | ATC                    | 100B 0R4         |
| Q1                   | Transistor                           | Infineon Technologies  | 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, 1 k-ohms              | Digi-Key               | P1.0KECT-ND      |
| R6, R8               | Chip resistor, 10 ohms               | Digi-Key               | P10ECT-ND        |
| L1, L2               | Ferrite                              | Philips                | BDS46/3.8.8-452  |

\*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>

Revision History: 2008-03-04 Data Sheet

Previous version: 2006-07-05, Data Sheet

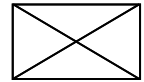
| Page | Subjects (major changes since last revision) |
|------|--|
| All  | Remove references to alternate products.     |
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