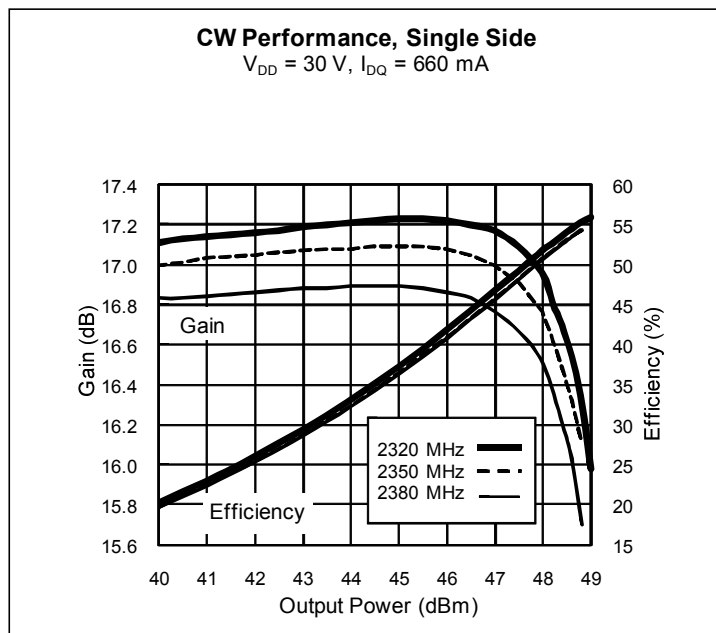


High Power RF LDMOS Field Effect Transistor 140 W, 2300 – 2400 MHz

Description

The PTFB241402F integrates two LDMOS FETs into one open-cavity ceramic package. It is designed for cellular amplifier applications in the 2300 to 2400 MHz frequency band. Manufactured with Infineon's advanced LDMOS process, this device offers excellent thermal performance and superior reliability.

PTFB241402F
Package H-37248-4



Features

- Broadband internal matching
- Typical CW performance, single side
 - Output power (1dB compression) = 70 W
 - Efficiency = 55%
- Increased negative gate-source voltage range for improved performance in Doherty amplifiers
- Integrated ESD protection
- Excellent thermal stability
- Capable of handling 10:1 VSWR @ 30 V, 70 W (CW) output power
- Pb-free and RoHS compliant

RF Characteristics

Two-tone Measurements (tested in Infineon test fixture, combined outputs)
 $V_{DD} = 30\text{ V}$, $I_{DQ} = 1200\text{ mA}$, $P_{OUT} = 110\text{ W PEP}$, $f = 2370\text{ MHz}$, tone spacing = 1 MHz

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------|----------|------|-----|-----|------|
| Gain | G_{ps} | 16.5 | 17 | — | dB |
| Drain Efficiency | η_D | 34.5 | 37 | — | % |
| Intermodulation Distortion | IMD | — | -32 | -30 | dBc |

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics (single side)

| 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 | $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 1.0 | μA |
| Drain Leakage Current | $V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 10.0 | μA |
| On-State Resistance | $V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.3 | — | Ω |
| Operating Gate Voltage | $V_{DS} = 30\text{ V}$, $I_{DQ} = 660\text{ mA}$ | V_{GS} | 2.3 | 2.8 | 3.3 | V |
| Gate Leakage Current | $V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$ | I_{GSS} | — | — | 1.0 | μA |

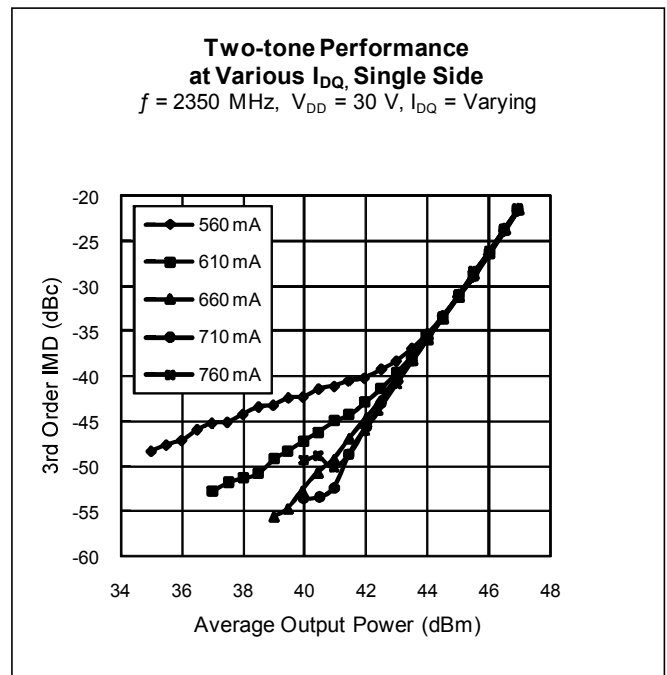
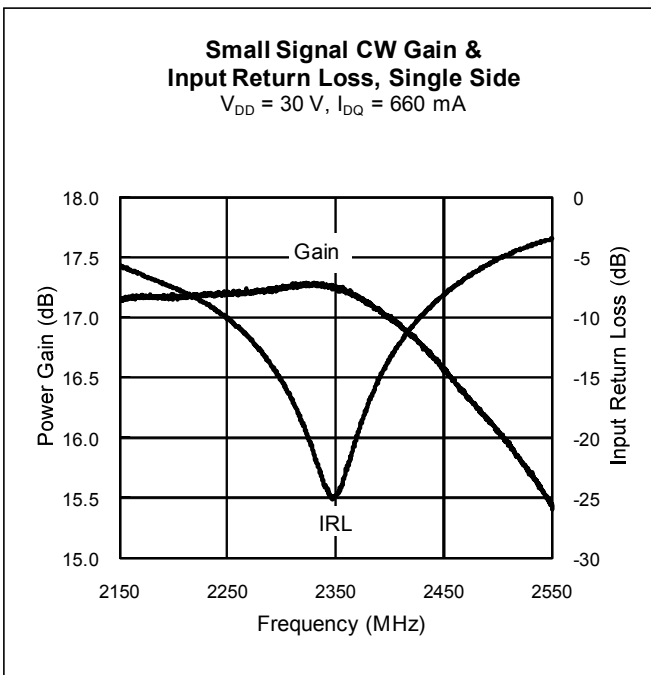
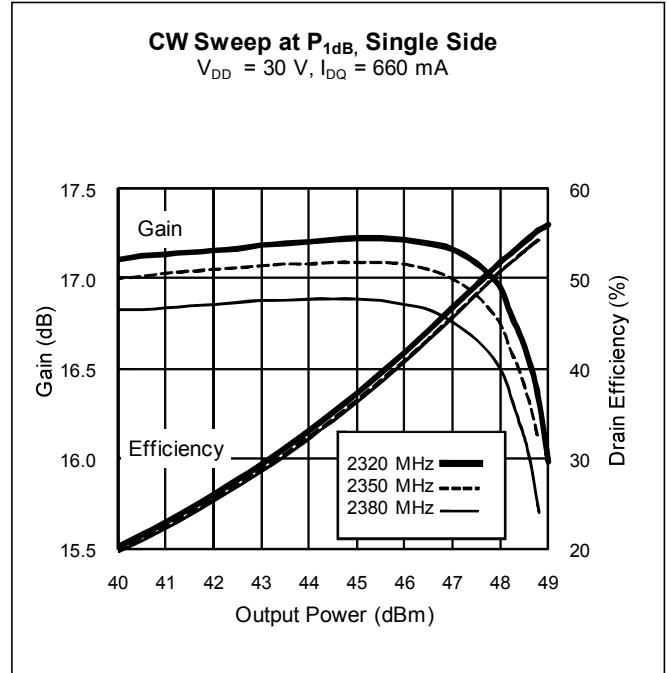
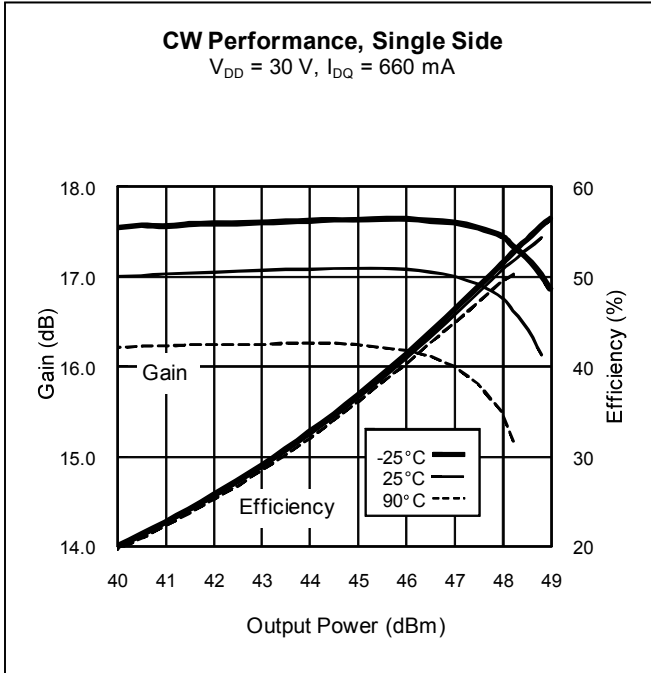
Maximum Ratings

| Parameter | Symbol | Value | Unit |
|--|-----------------|-------------|----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -6 to +10 | V |
| Junction Temperature | T_J | 200 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -40 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 140 W CW) | $R_{\theta JC}$ | 0.38 | $^{\circ}\text{C/W}$ |

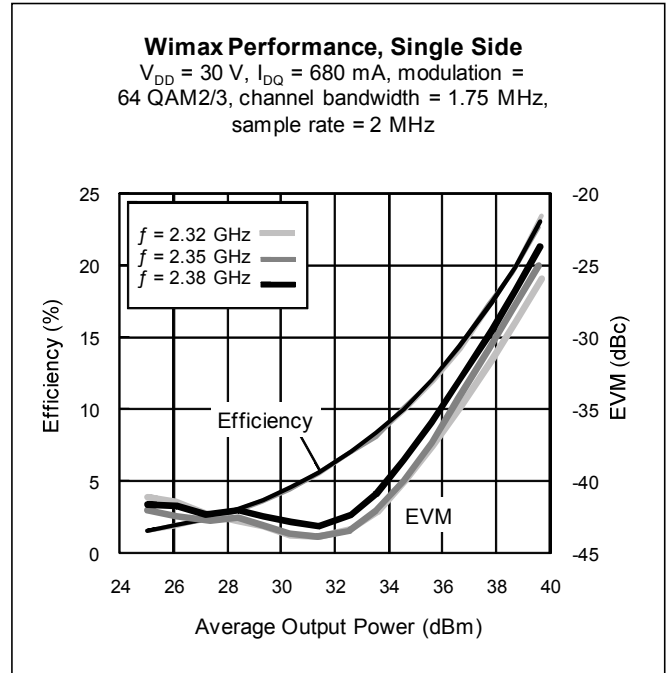
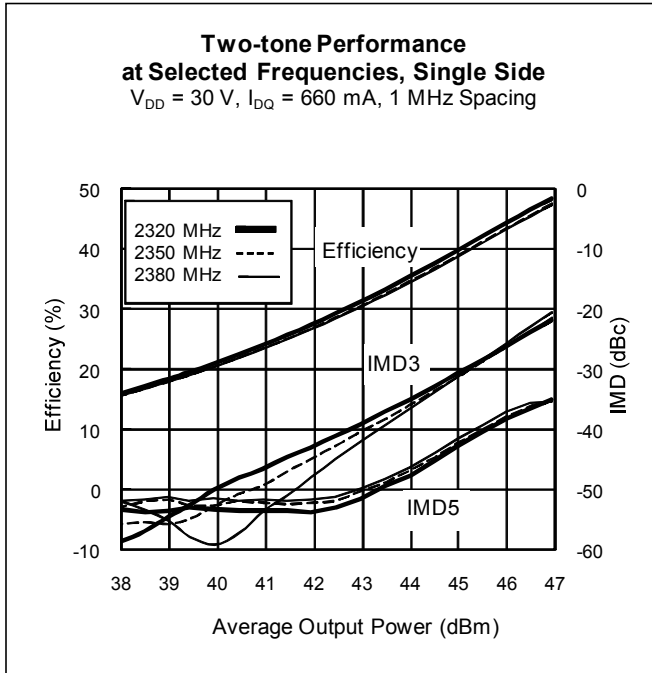
Ordering Information

| Type and Version | Order Code | Package Description | Shipping |
|---------------------|------------------------|---------------------------|----------------------|
| PTFB241402F V1 R0 | PTFB241402FV1R0XTMA1 | H-37248-4, earless flange | Tape & Reel, 50 pcs |
| PTFB241402F V1 R250 | PTFB241402FV1R250XTMA1 | H-37248-4, earless flange | Tape & Reel, 250 pcs |

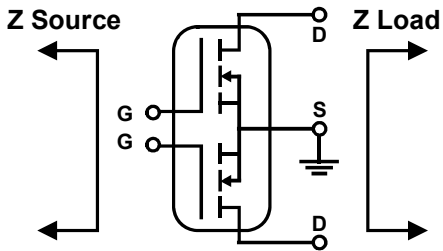
Typical Performance (data taken in a production test fixture)



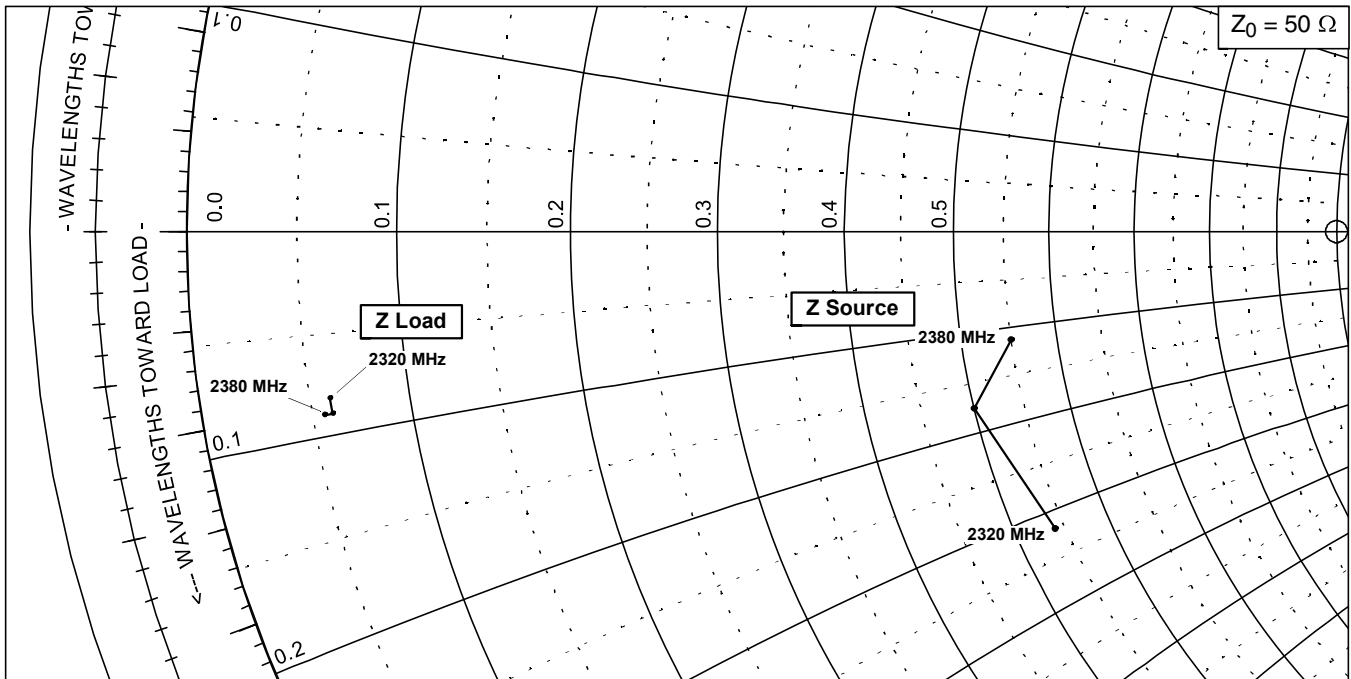
Typical Performance (cont.)



Broadband Circuit Impedance

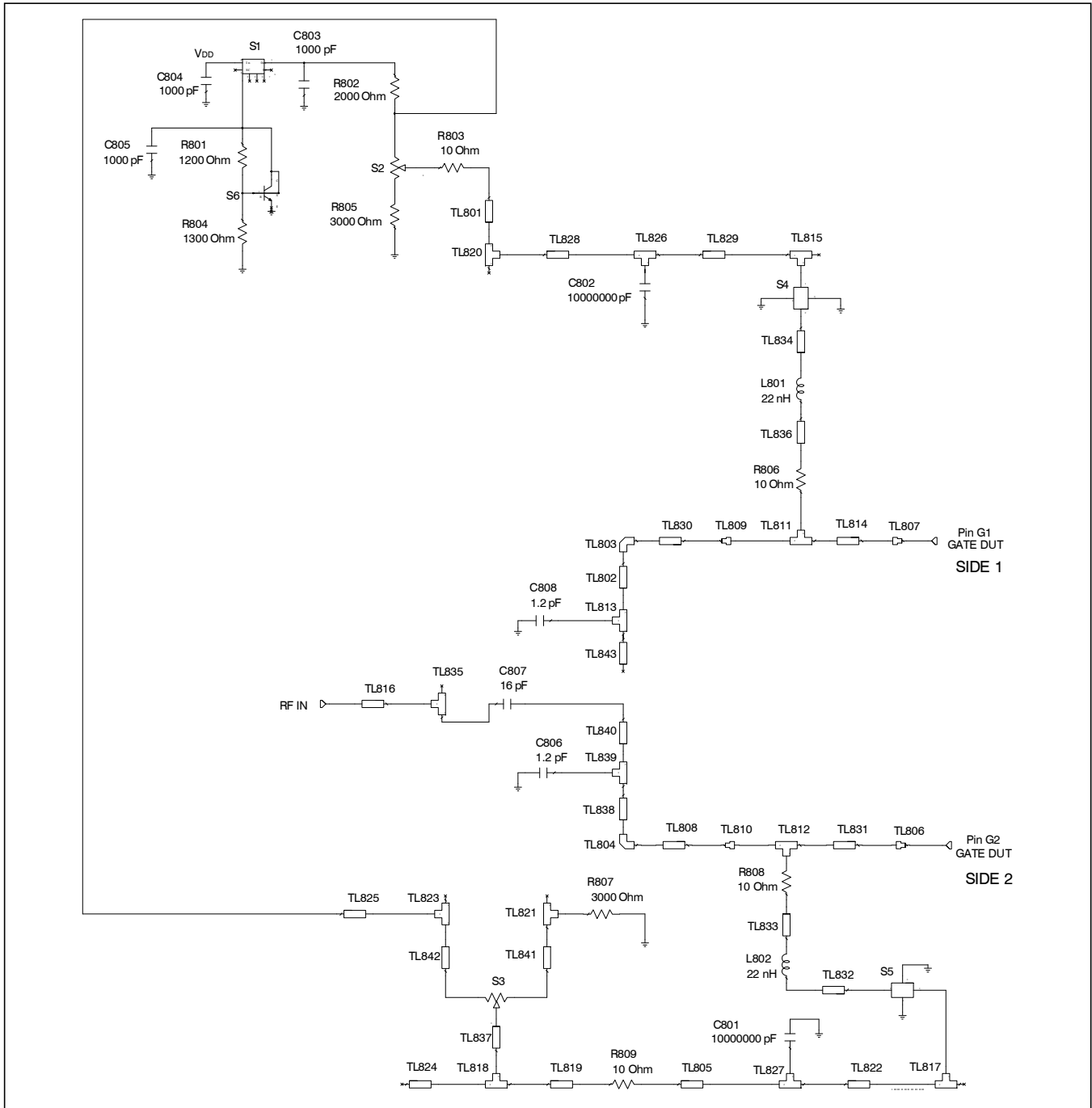


| Frequency MHz | Z Source Ω | | Z Load Ω | |
|------------------|-------------------|-------|-----------------|------|
| | R | jX | R | jX |
| 2320 | 27.0 | -16.0 | 3.0 | -4.1 |
| 2350 | 25.0 | -8.8 | 3.0 | -4.5 |
| 2380 | 27.5 | -5.7 | 2.8 | -4.5 |



Reference Circuit

This reference circuit is designed to test only one side at a time. This block diagram shows the configuration for testing Side 2. To test Side 1, move capacitors C807 and C901 to close the circuit to Side 1.



Reference circuit input schematic for $f = 2380 \text{ MHz}$

Reference Circuit (cont.)

| Description | |
|-------------|---|
| DUT | PTFB241402F |
| PCB | 0.508 mm [.020"] thick, $\epsilon_r = 3.66$, Rogers 4350, 1 oz. copper |

Electrical Characteristics at 2380 MHz

| Transmission Line | Electrical Characteristics | Dimensions: mm | Dimensions: mils |
|--|----------------------------------|------------------------------------|-----------------------------|
| Input | | | |
| TL801 | 0.114 λ , 35.71 Ω | W = 1.905, L = 8.479 | W = 75, L = 334 |
| TL802, TL838 | 0.005 λ , 51.98 Ω | W = 1.087, L = 0.356 | W = 43, L = 14 |
| TL803, TL804 | | W = 1.087 | W = 43 |
| TL805 | 0.063 λ , 35.71 Ω | W = 1.905, L = 4.674 | W = 75, L = 184 |
| TL806, TL807 | | W1 = 3.810, W2 = 5.842 | W1 = 150, W2 = 230 |
| TL808 | 0.094 λ , 51.98 Ω | W = 1.087, L = 7.163 | W = 43, L = 282 |
| TL809 | | W1 = 1.087, W2 = 1.087 | W1 = 43, W2 = 43 |
| TL810 | | W1 = 1.087, W2 = 5.842 | W1 = 43, W2 = 230 |
| TL811, TL812 | 0.011 λ , 14.61 Ω | W1 = 5.842, W2 = 5.842, W3 = 0.762 | W1 = 230, W2 = 230, W3 = 30 |
| TL813, TL839 | 0.018 λ , 51.98 Ω | W1 = 1.087, W2 = 1.087, W3 = 1.397 | W1 = 43, W2 = 43, W3 = 55 |
| TL814 | 0.066 λ , 14.61 Ω | W = 5.842, L = 4.699 | W = 230, L = 185 |
| TL815, TL817, TL818, TL820, TL821, TL823 | 0.026 λ , 35.71 Ω | W1 = 1.905, W2 = 1.905, W3 = 1.905 | W1 = 75, W2 = 75, W3 = 75 |
| TL816 | 0.146 λ , 51.98 Ω | W = 1.087, L = 11.118 | W = 43, L = 438 |
| TL819 | 0.068 λ , 35.71 Ω | W = 1.905, L = 5.080 | W = 75, L = 200 |
| TL822, TL829 | 0.029 λ , 35.71 Ω | W = 1.905, L = 2.184 | W = 75, L = 86 |
| TL824, TL837 | 0.033 λ , 35.71 Ω | W = 1.905, L = 2.477 | W = 75, L = 98 |
| TL825 | 0.010 λ , 35.71 Ω | W = 1.905, L = 0.711 | W = 75, L = 28 |
| TL826, TL827 | 0.010 λ , 35.71 Ω | W1 = 1.905, W2 = 1.905, W3 = 0.762 | W1 = 75, W2 = 75, W3 = 30 |
| TL828 | 0.146 λ , 35.71 Ω | W = 1.905, L = 10.897 | W = 75, L = 429 |
| TL830 | 0.094 λ , 51.98 Ω | W = 1.087, L = 7.163 | W = 43, L = 282 |
| TL831 | 0.066 λ , 14.61 Ω | W = 5.842, L = 4.699 | W = 230, L = 185 |
| TL832, TL834 | 0.027 λ , 35.71 Ω | W = 1.905, L = 2.032 | W = 75, L = 80 |
| TL833 | 0.036 λ , 35.71 Ω | W = 1.905, L = 2.705 | W = 75, L = 107 |
| TL835 | 0.014 λ , 44.26 Ω | W1 = 1.397, W2 = 1.397, W3 = 1.087 | W1 = 55, W2 = 55, W3 = 43 |
| TL836 | 0.032 λ , 35.71 Ω | W = 1.905, L = 2.408 | W = 75, L = 95 |
| TL840, TL843 | 0.010 λ , 51.98 Ω | W = 1.087, L = 0.762 | W = 43, L = 30 |
| TL841, TL842 | 0.026 λ , 35.71 Ω | W = 1.905, L = 1.905 | W = 75, L = 75 |

table continued on page 9

Reference Circuit (cont.)
Electrical Characteristics at 2380 MHz

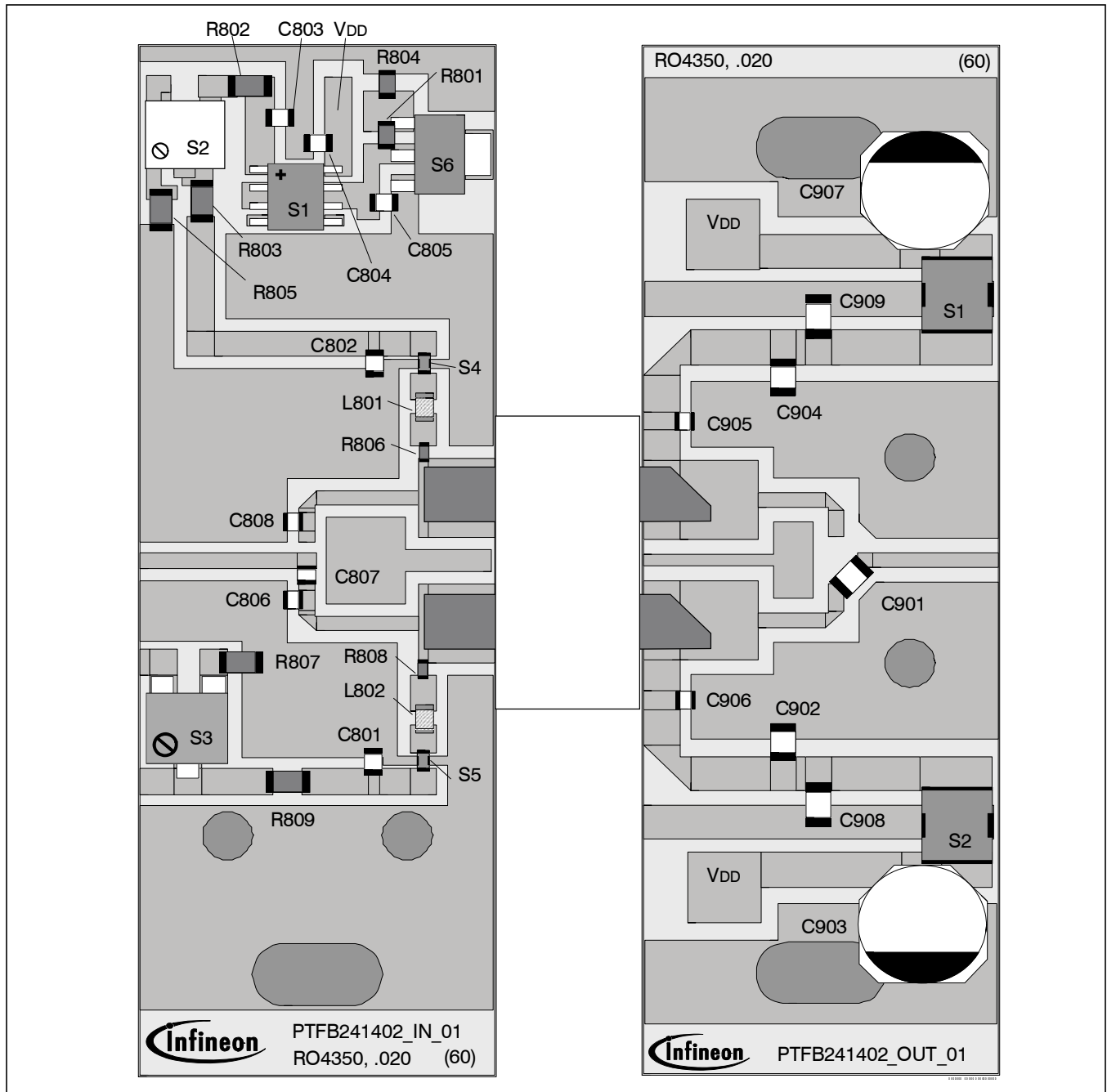
| Transmission Line | Electrical Characteristics | Dimensions: mm | Dimensions: mils |
|------------------------------|-----------------------------------|---|--------------------------------|
| Output | | | |
| TL901, TL902 | 0.077 λ , 28.85 Ω | W = 2.540, L = 5.690 | W = 100, L = 24 |
| TL903 | 0.031 λ , 28.85 Ω | W = 2.540, L = 2.286 | W = 100, L = 90 |
| TL904 | 0.036 λ , 28.85 Ω | W = 2.540, L = 2.667 | W = 100, L = 105 |
| TL905, TL931 | 0.019 λ , 28.85 Ω | W1 = 2.540, W2 = 2.540, W3 = 1.397 | W1 = 100, W2 = 100, W3 = 55 |
| TL906 | 0.078 λ , 14.61 Ω | W = 5.842, L = 5.588 | W = 230, L = 220 |
| TL907 | | W1 = 0.003, W2 = 0.003, Offset = 0.001 | W1 = 3, W2 = 102, Offset = 50 |
| TL908, TL909 | 0.069 λ , 28.85 Ω | W1 = 2.540, W2 = 2.540, W3 = 5.080 | W1 = 100, W2 = 100, W3 = 200 |
| TL910 | 0.063 λ , 51.98 Ω | W = 1.087, L = 4.826 | W = 43, L = 190 |
| TL911, TL912 | | W = 1.087 | W = 43 |
| TL913, TL914 | | W1 = 1.087, W2 = 5.842 | W1 = 43, W2 = 230 |
| TL915 | 0.078 λ , 14.61 Ω | W = 5.842, L = 5.588 | W = 230, L = 220 |
| TL916, TL925 | | W1 = 3.810, W2 = 5.842 | W1 = 150, W2 = 230 |
| TL917 | 0.063 λ , 51.98 Ω | W = 1.087, L = 4.826 | W = 43, L = 190 |
| TL918 | 0.014 λ , 51.98 Ω | W1 = 1.087, W2 = 1.087, W3 = 1.087 | W1 = 43, W2 = 43, W3 = 43 |
| TL919, TL920 | 0.027 λ , 51.98 Ω | W = 1.087, L = 2.032 | W = 43, L = 80 |
| TL921 | 0.117 λ , 51.98 Ω | W = 1.087, L = 8.890 | W = 43, L = 350 |
| TL922, TL940 | 0.009 λ , 28.85 Ω | W = 2.540, L = 0.655 | W = 100, L = 26 |
| TL923, TL926, TL942 TL944 | 0.025 λ , 28.85 Ω | W1 = 2.540, W2 = 2.540, W3 = 1.829 | W1 = 100, W2 = 100, W3 = 72 |
| TL924 | 0.031 λ , 28.85 Ω | W = 2.540, L = 2.286 | W = 100, L = 90 |
| TL927, TL929 | | W = 2.540 | W = 100 |
| TL928, TL941 | 0.086 λ , 28.85 Ω | W = 2.540, L = 6.363 | W = 100, L = 251 |
| TL930 | 0.036 λ , 28.85 Ω | W = 2.540, L = 2.667 | W = 100, L = 105 |
| TL932, TL936 | 0.073 λ , 16.19 Ω | W = 5.182, L = 5.207 | W = 204, L = 205 |
| TL933, TL937 | 0.050 λ , 28.85 Ω | W = 2.540, L = 3.670 | W = 100, L = 145 |
| TL934, TL939 | 0.038 λ , 28.85 Ω | W1 = 2.540, W2 = 2.540, W3 = 2.794 | W1 = 100, W2 = 100, W3 = 110 |
| TL935, TL938 | 0.136 λ , 28.85 Ω | W = 2.540, L = 10.020 | W = 100, L = 395 |
| TL943 | | W1 = 0.003, W2 = 0.003, Offset = -0.001 | W1 = 3, W2 = 102, Offset = -50 |
| TL945, TL946 | 0.036 λ , 14.61 Ω | W1 = 5.842, W2 = 5.842, W3 = 2.540 | W1 = 230, W2 = 230, W3 = 100 |

Reference Circuit (cont.)

Circuit Assembly Information

Test Fixture Part No. LTN/PTFB241402F

Find Gerber files for this test fixture on the Infineon Web site at <http://www.infineon.com/rfpower>



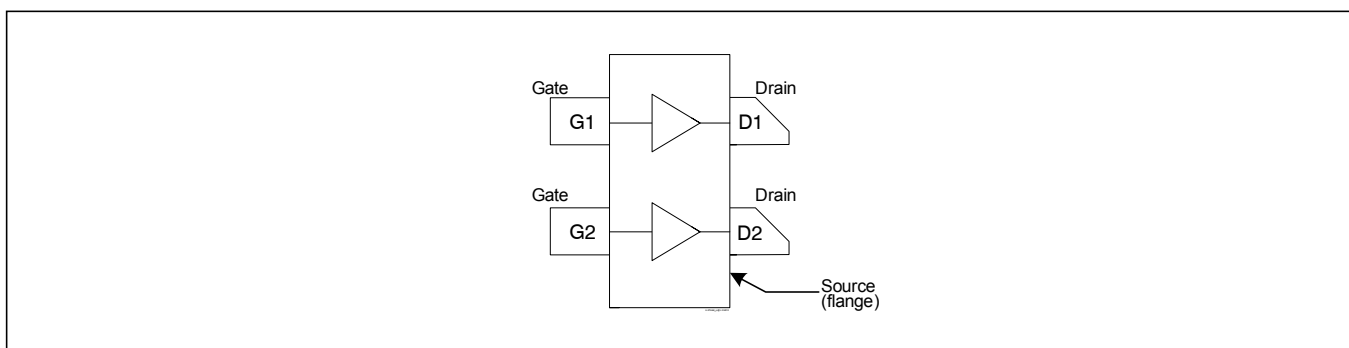
Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

Components Information

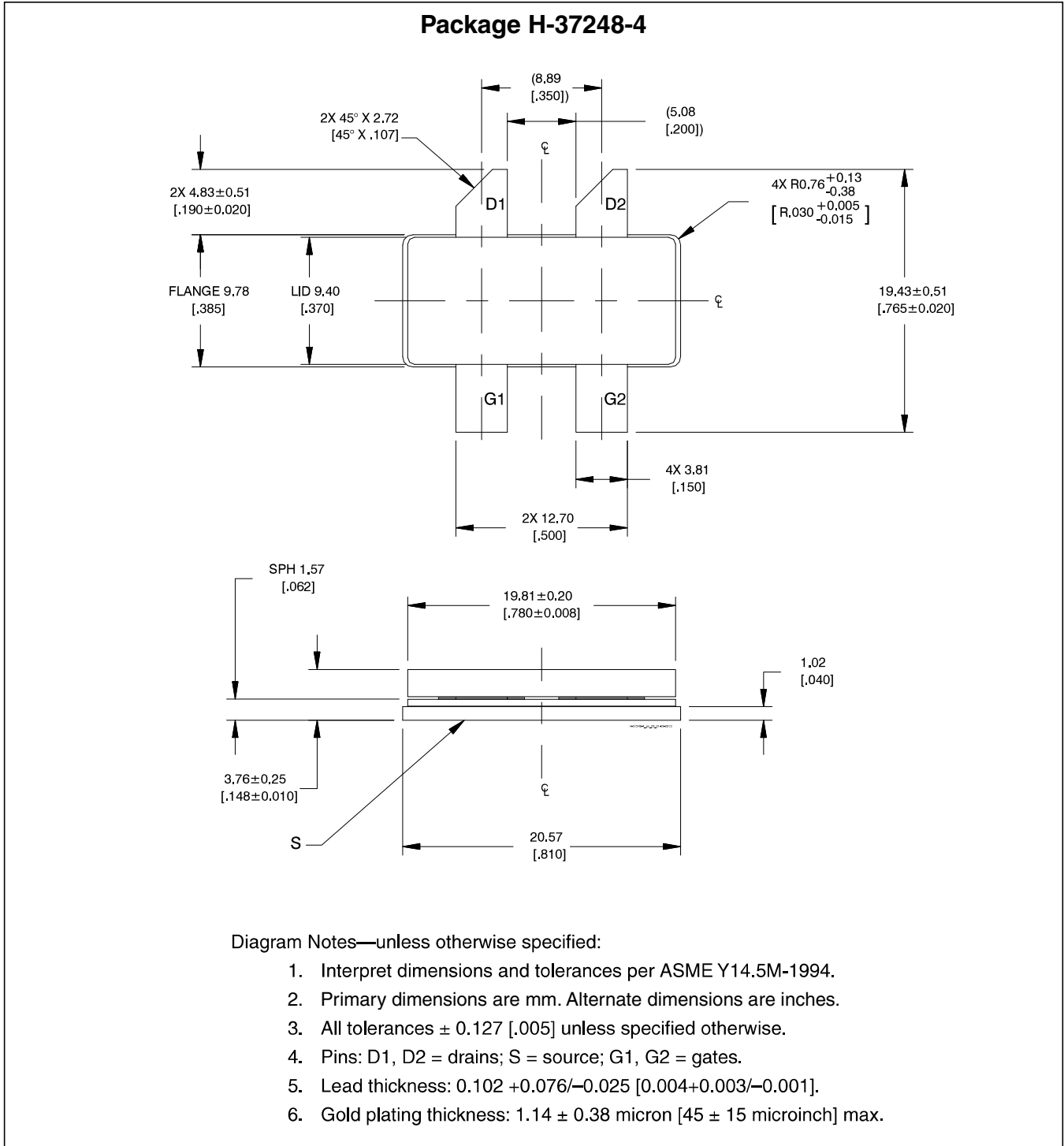
| Component | Description | Suggested Manufacturer | P/N |
|------------------|--|------------------------|-------------------|
| Input | | | |
| C801, C802 | Capacitor, 10 μ F | Digi-Key | 490-3905-6-ND |
| C803, C804, C805 | Capacitor, 1000 pF | Digi-Key | PCC1772CT-ND |
| C806, C808 | Chip capacitor, 1.2 pF | ATC | ATC100A1R2BW150XB |
| C807 | Chip capacitor, 16 pF | ATC | ATC100A160FW150XB |
| L801, L802 | Inductor, 22 nH | Digi-Key | TKS2349CT-ND |
| R801 | Resistor, 1200 Ω | Digi-Key | P1.2KGCT-ND |
| R802 | Resistor, 2000 Ω | Digi-Key | P2.0KECT-ND |
| R803, R809 | Resistor, 10 Ω | Digi-Key | P10ECT-ND |
| R804 | Resistor, 1300 Ω | Digi-Key | P1.3KGCT-ND |
| R805, R807 | Resistor, 3000 Ω | Digi-Key | P3.0KECT-ND |
| R806, R808 | Resistor, 10 Ω | Digi-Key | P10GCT-ND |
| S1 | Voltage Regulator | National Semiconductor | LM7805 |
| S2, S3 | Potentiometer, 2k Ω | Digi-Key | 3224W-202ECT-ND |
| S4, S5 | EMI filter, 2 - 4 A, 0.1 - 2.2 μ F | Murata | NFM18P |
| S6 | Transistor | Infineon Technologies | BCP56 |
| Output | | | |
| C901, C902, C904 | Chip capacitor, 7.5 pF | ATC | ATC100B7R5BW500XB |
| C903, C907 | Capacitor, 100 μ F | Digi-Key | PCE3718CT-ND |
| C905, C906 | Chip capacitor, 2.4 pF | ATC | ATC100A2R4BW150XB |
| C908, C909 | Capacitor, 10 μ F | Digi-Key | 490-1891-2-ND |
| S1, S2 | EMI filter, 6 A, 1.5 μ F | Murata | NFM55P |

Pinout Diagram



Lead connections for PTFB241402F

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: 2016-06-15 Data Sheet

Previous Version: 2011-04-04, Data Sheet

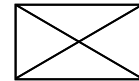
| Page | Subjects (major changes since last revision) |
|------|--|
| 2 | Updated ordering information |
| | |
| | |
| | |

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