

PTFC261402FC

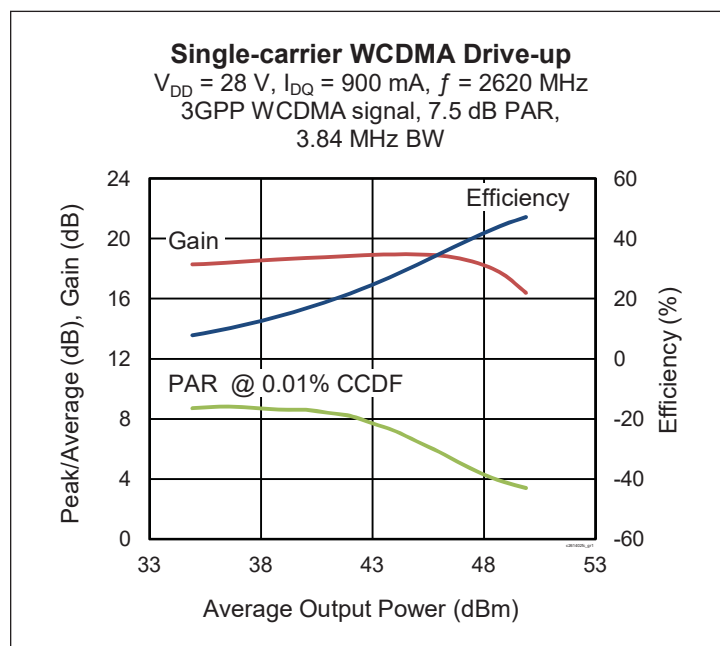
Thermally-Enhanced High Power RF LDMOS FET 140 W, 28 V, 2620 – 2690 MHz

Description

The PTFC261402FC is a 140-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 2620 to 2690 MHz frequency band. Features include input and output matching, high gain and thermally-enhanced package with earless flange. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTFC261402FC
Package H-37248-4



Features

- Broadband internal matching
- Wide video bandwidth
- Typical pulsed CW performance, 2655 MHz, 28 V (combined outputs)
 - Output power at $P_{1dB} = 140\text{ W}$
 - Efficiency = 50%
 - Gain = 16.5 dB
- Typical single-carrier WCDMA performance, 2655 MHz, 28 V
 - Output power = 46 dBm avg
 - Gain = 17.5 dB
 - Efficiency = 30.5%
- Capable of handling 10:1 VSWR @ 28 V, 140 W (CW) output power
- Integrated ESD protection
- Human Body Model Class 1C (per ANSI/ESDA/ JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (combined outputs, tested in Wolfspeed production test fixture)
 $V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 28\text{ W avg}$, $f = 2655\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

| Characteristic | Symbol | Min | Typ | Max | Unit |
|------------------------------|----------|------|-----|-----|------|
| Gain | G_{ps} | 17 | 18 | — | dB |
| Drain Efficiency | η_D | 23.5 | 25 | — | % |
| Adjacent Channel Power Ratio | ACPR | — | -34 | -31 | dBc |

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!



DC Characteristics (each 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 | $V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 1 | μA |
| | $V_{DS} = 63\text{ V}, V_{GS} = 0\text{ V}$ | I_{DSS} | — | — | 10 | μA |
| Gate Leakage Current | $V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$ | I_{GSS} | — | — | 1 | μA |
| On-State Resistance | $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.1 | — | Ω |
| Operating Gate Voltage | $V_{DS} = 28\text{ V}, I_{DQ} = 900\text{ mA}$ | V_{GS} | — | 2.5 | — | V |

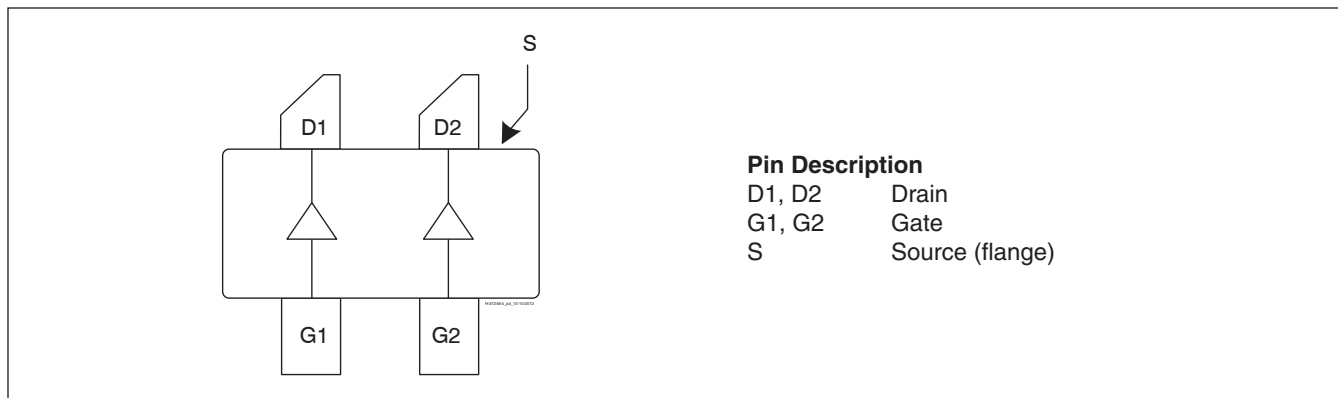
Maximum Ratings

| Parameter | Symbol | Value | Unit |
|---|-----------------|-------------|----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -6 to +10 | V |
| Operating Voltage | V_{DD} | 0 to +32 | V |
| Junction Temperature | T_J | 225 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -65 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}, 140\text{ W CW}$) | $R_{\theta JC}$ | 0.30 | $^{\circ}\text{C/W}$ |

Ordering Information

| Type and Version | Order Code | Package and Description | Shipping |
|----------------------|----------------------|--|----------------------|
| PTFC261402FC V1 R0 | PTFC261402FC-V1-R0 | Thermally-enhanced earless flange, push-pull | Tape & Reel, 50 pcs |
| PTFC261402FC V1 R250 | PTFC261402FC-V1-R250 | Thermally-enhanced earless flange, push-pull | Tape & Reel, 250 pcs |

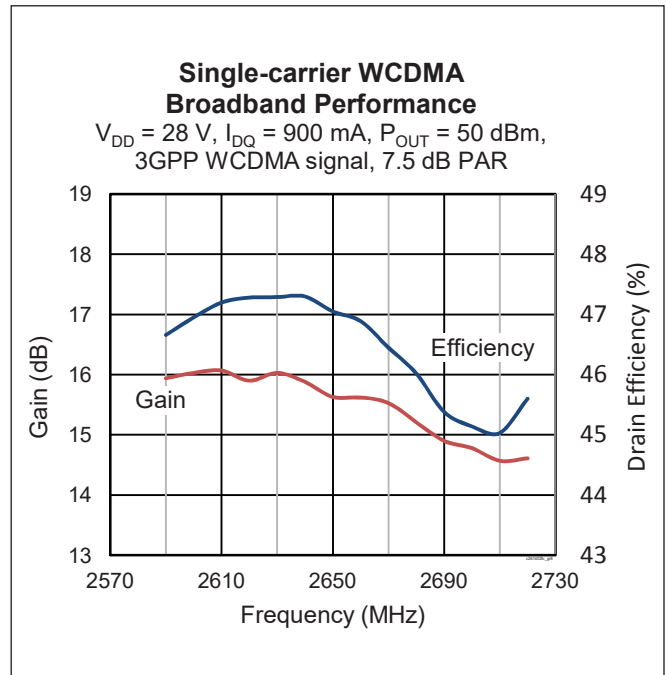
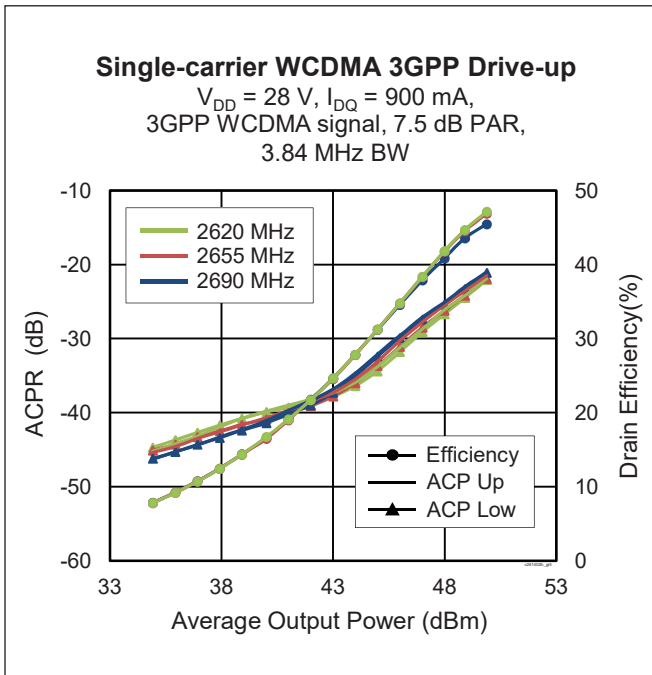
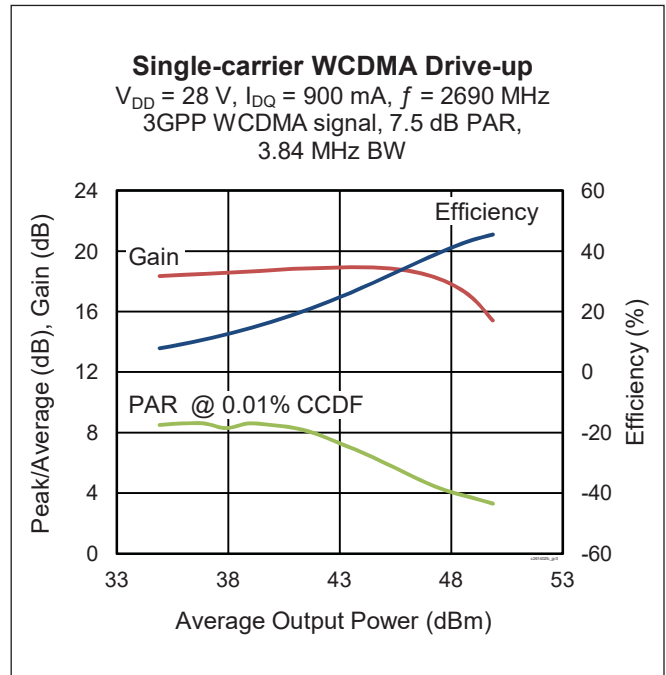
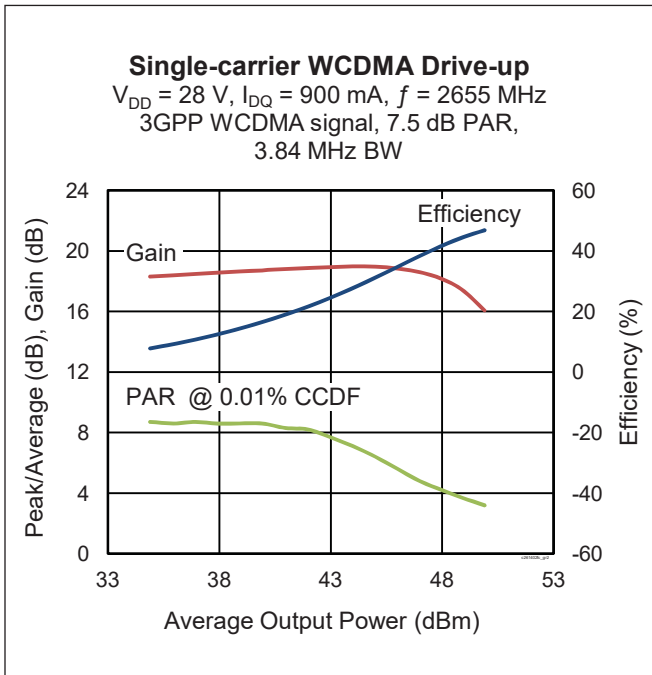
Pinout Diagram



Lead connections for PTFC261402FC

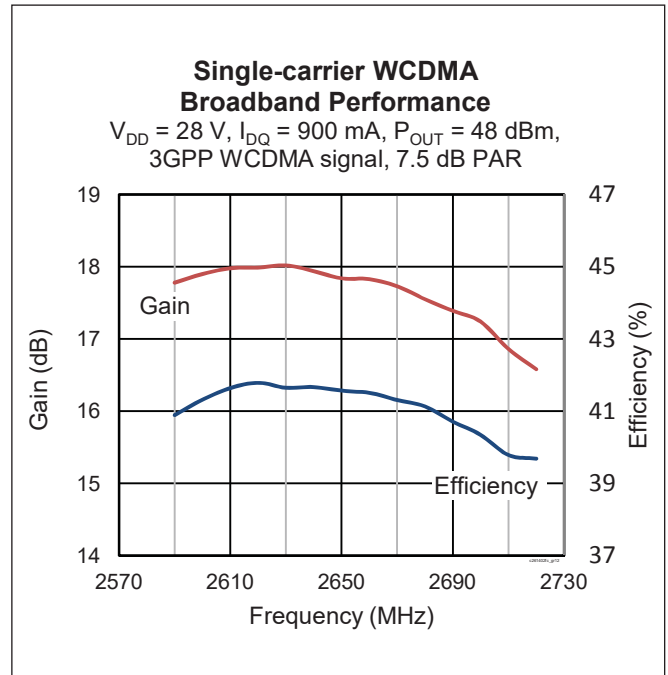
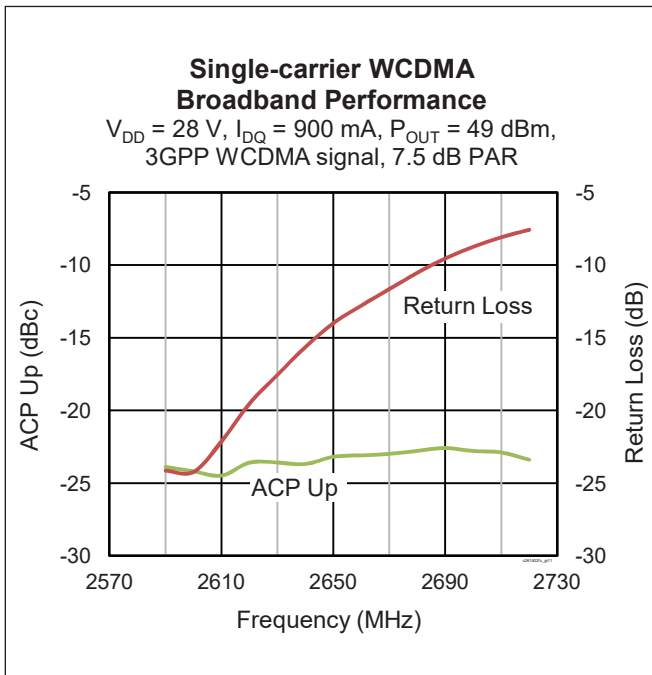
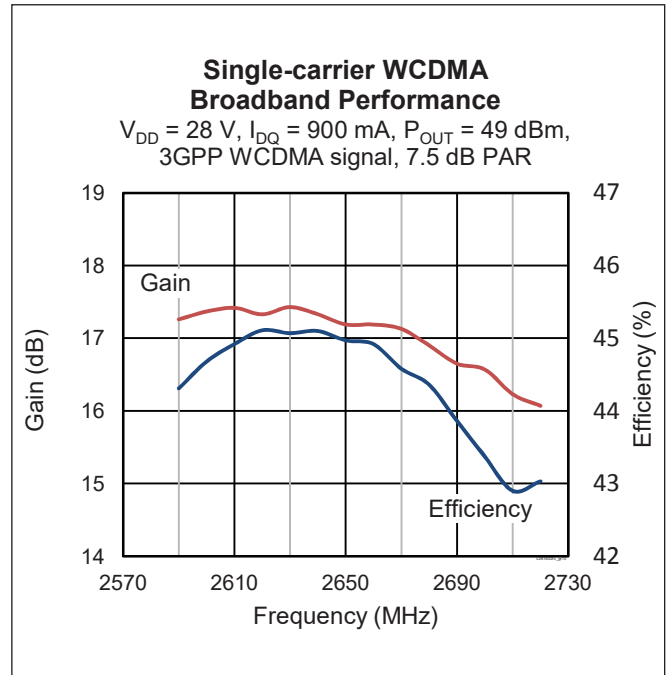
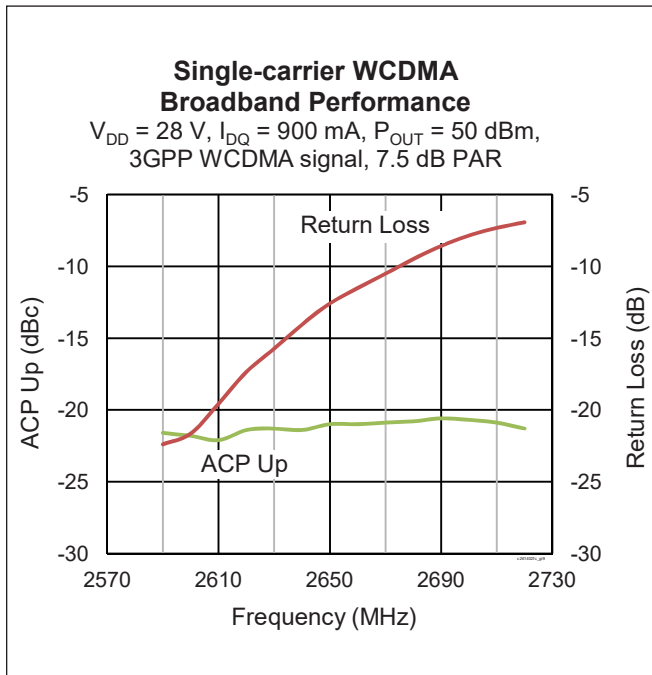


Typical Performance (data taken in a production test fixture)

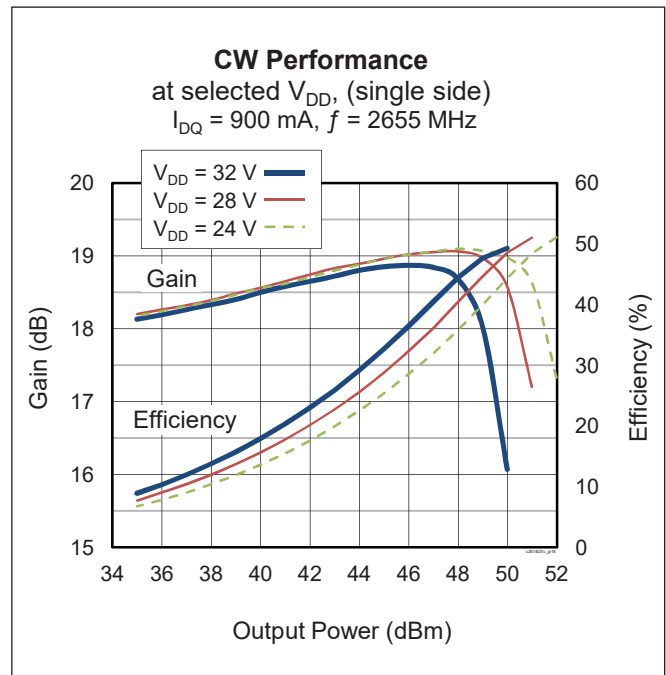
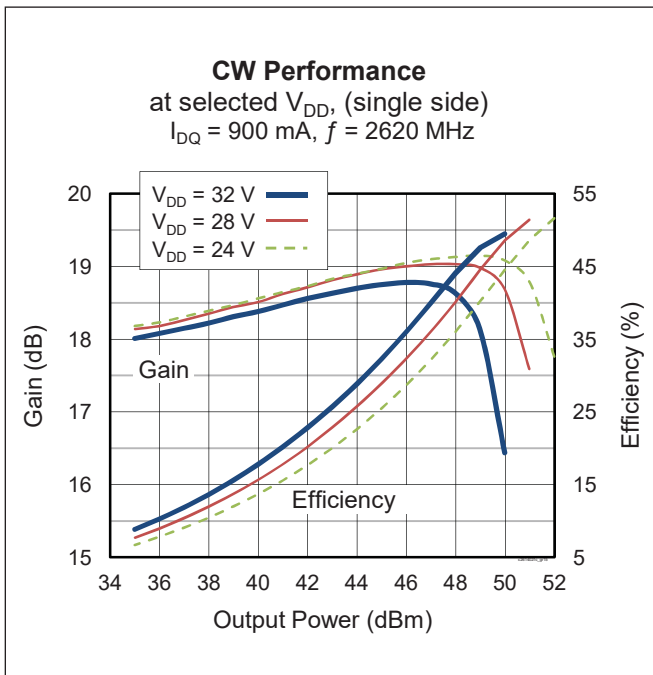
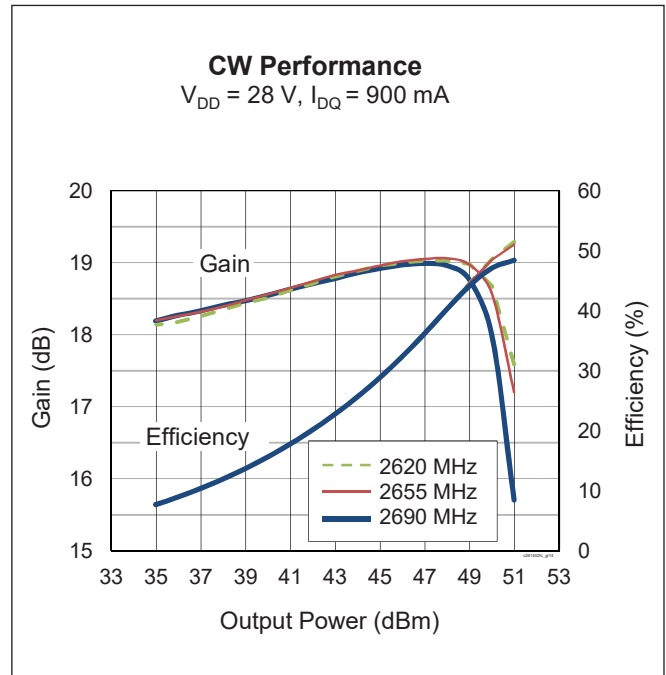
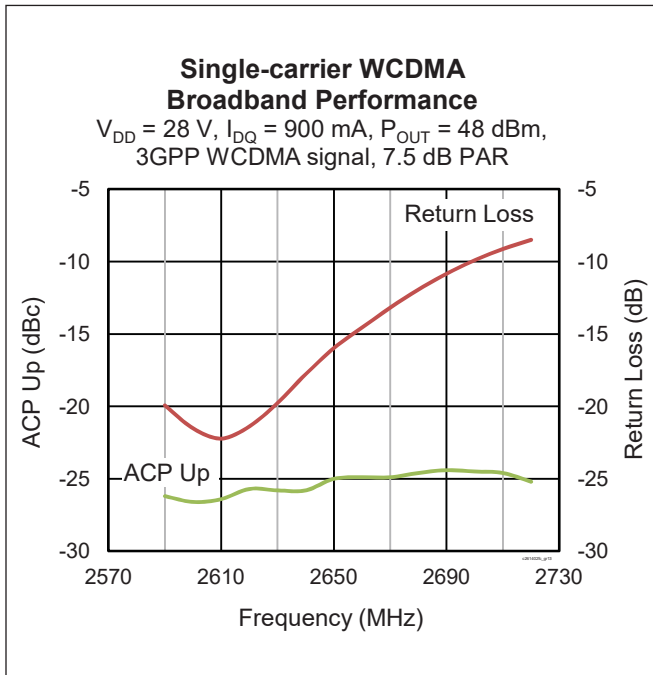




Typical Performance (cont.)

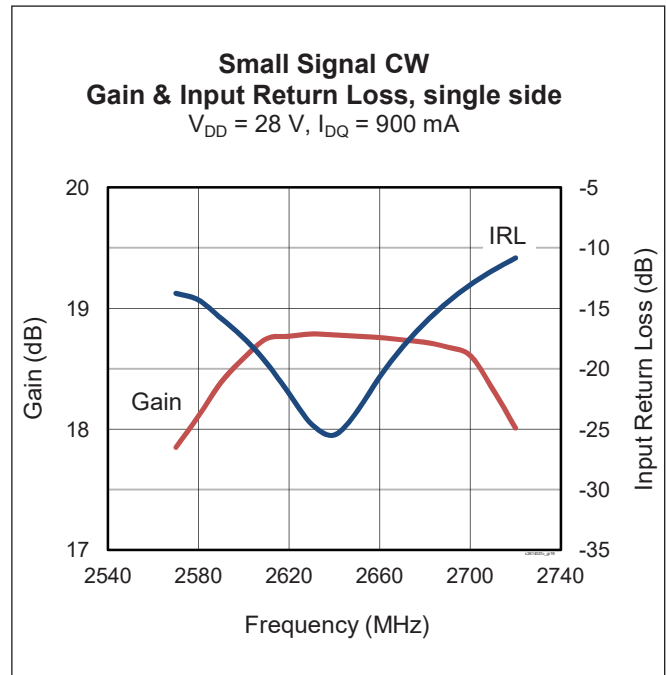
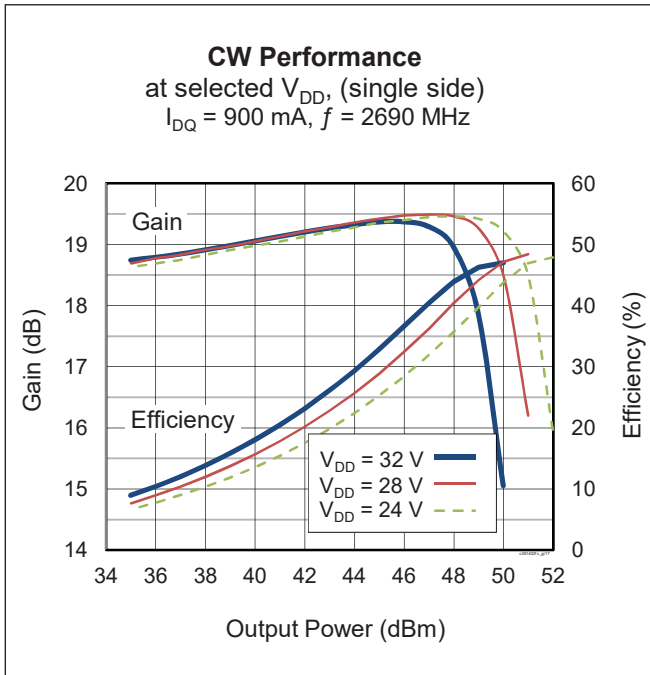


Typical Performance (cont.)

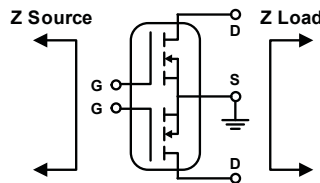




Typical Performance (cont.)



Load Pull Performance

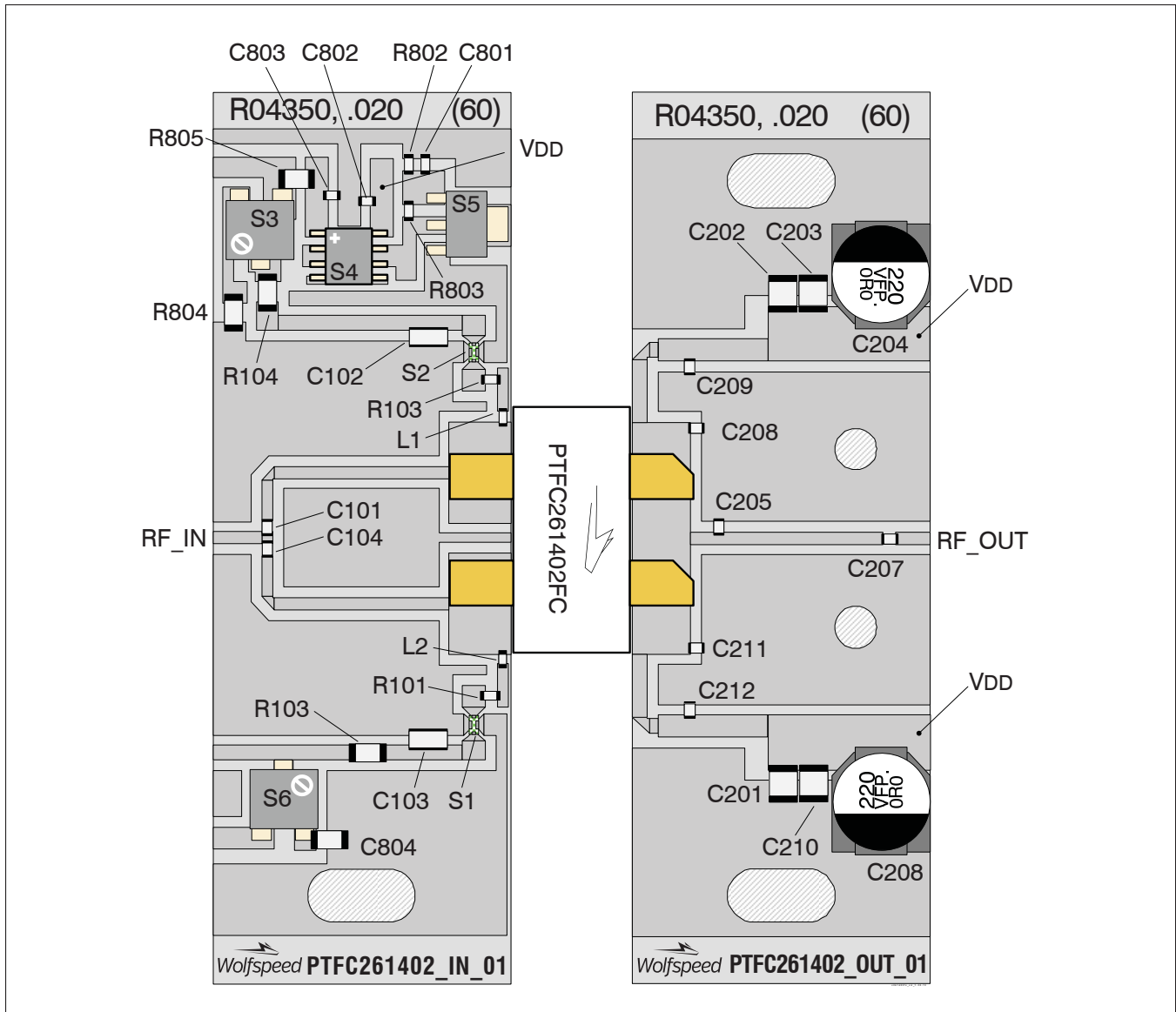


Single Side Load Pull Performance – Pulsed CW signal: 16 μsec , 10% duty cycle; 28 V, 450 mA

| Class AB | | P_{1dB} | | | | | | | | | |
|------------|----------------|------------------|-----------|-----------------|---------------|-------|--------------|-----------|-----------------|---------------|-------|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | $Z_s \Omega$ | $Z_l \Omega$ | Gain [dB] | P_{OUT} [dBm] | P_{OUT} [W] | PAE % | $Z_l \Omega$ | Gain [dB] | P_{OUT} [dBm] | P_{OUT} [W] | PAE % |
| 2620 | $12.1 - j1.0$ | $2.0 - j8.8$ | 15.8 | 50.01 | 100 | 53.9 | $3.8 - j7.4$ | 18 | 48.39 | 69 | 60.2 |
| 2655 | $15.7 - j0.2$ | $2.0 - j9.0$ | 15.7 | 49.98 | 99 | 53.2 | $3.5 - j7.7$ | 17.9 | 48.50 | 71 | 59.5 |
| 2690 | $17.8 - j12.4$ | $2.0 - j9.2$ | 15.7 | 49.79 | 95 | 51.3 | $3.6 - j7.8$ | 18.1 | 48.38 | 69 | 58.8 |

Reference Circuit

| | |
|---|--|
| DUT | PTFC261402FC |
| Test Fixture Part No. | LTN/PTFC261402FC |
| PCB | Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ |
| Find Gerber files for this test fixture on the Wolfspeed Web site at (www.wolfspeed.com/RF) | |



Reference circuit assembly diagram (not to scale)

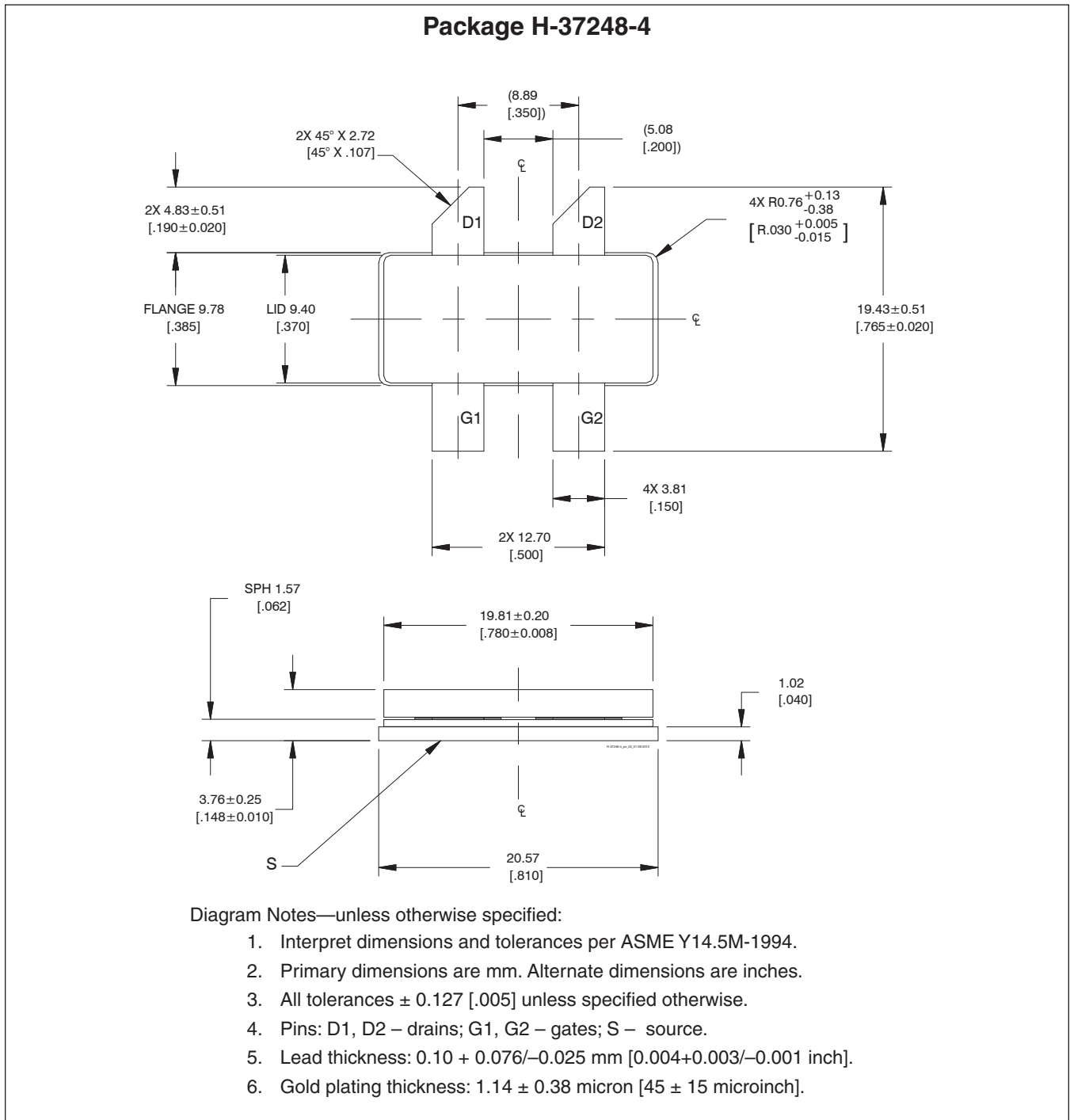


Reference Circuit (cont.)

Components Information

| Component | Description | Suggested Supplier | P/N |
|------------------------|--------------------------------------|----------------------------------|--------------------|
| Input | | | |
| C101, C104 | Chip capacitor, 10 pF | ATC | ATC800A100JT |
| C102, C103 | Capacitor, 10 μ F | Murata Electronics North America | LLL31BC70G106MA01L |
| C801, C802, C803 | Capacitor, 1 nF | Panasonic | ECJ-1VB1H102K |
| L1, L2 | Chip inductor, 47 nH | Coilcraft | 0603HP-47NXJLU |
| R101, R102 | Resistor, 10 W | Panasonic Electronic Components | ERJ-3GEYJ100V |
| R103, R104 | Resistor, 10 W | Panasonic Electronic Components | ERJ-8GEYJ100V |
| R801, R804 | Resistor, 1k W | Panasonic Electronic Components | ERJ-8GEYJ102V |
| R802 | Resistor, 1.3k W | Panasonic Electronic Components | ERJ-3GEYJ132V |
| R803 | Resistor, 1.2k W | Panasonic Electronic Components | ERJ-3GEYJ122V |
| S1, S2 | High frequency EMI filter, 1 μ F | Murata Electronics North America | NFM18PS105R0J3D |
| S3 | Potentiometer, 2k Ω | Bourns Inc. | 3224W-1-202E |
| S4 | Voltage Regulator | National Semiconductor | LM7805 |
| S5 | Transistor | Infineon Technologies | BCP56 |
| Output | | | |
| C201, C202, C203, C210 | Capacitor, 10 μ F | Taiyo Yuden | UMK325C7106MM-T |
| C204, C208 | Electrolytic capacitor, 220 μ F | Panasonic Electronic Components | EEE-FP1V221AP |
| C205, C206 | Chip capacitor, 1 pF | ATC | ATC800A1R2BT |
| C206, C211 | Chip capacitor, 2 pF | ATC | ATC800A1R6BT |
| C207 | Chip capacitor, 8 pF | ATC | ATC800A8R2CT |
| C209, C212 | Chip capacitor, 10 pF | ATC | ATC800A100JT |

Package Outline Specifications



Revision History

| Revision | Date | Data Sheet Type | Page | Subjects (major changes since last revision) |
|----------|------------|-----------------|--------|---|
| 01 | 2011-11-10 | Advance | All | Data Sheet reflects advance specification for product development. |
| 02 | 2012-04-27 | Preliminary | 1, 2 | Specifications updated. |
| 03 | 2012-06-01 | Advance | All | Reformat to Advance Specification—Marketing survey only. |
| 04 | 2014-02-14 | Production | All | Data Sheet reflects released product specification. |
| 05 | 2016-06-21 | Production | 1 2 | Added ESD rating Maximum junction temperature raised to 225 °C, updated ordering info. |
| 06 | 2018-07-03 | Production | All | Converted to Wolfspeed Data Sheet. |

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Notes

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