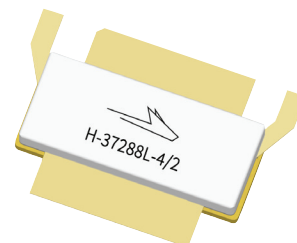


PTFB092707FH

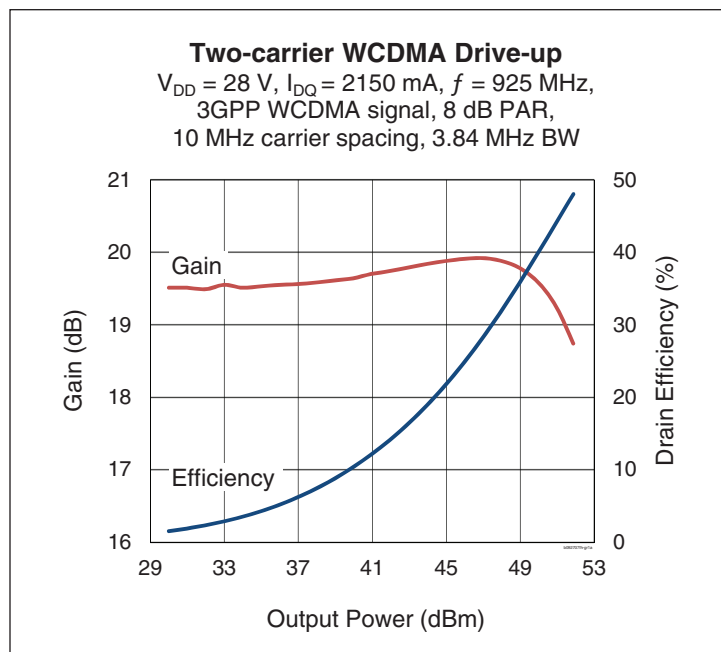
Thermally-Enhanced High Power RF LDMOS FET 270 W, 28 V, 925 – 960 MHz

Description

The PTFB092707FH is a 270-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications in the 925 to 960 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.



PTFB092707FH
Package H-37288L-4/2



Features

- Broadband internal input and output matching
- Typical pulsed CW performance (10 μs pulse width 10%, duty cycle, class AB), 960 MHz, 28 V
 - Output power at $P_{1\text{dB}} = 250\text{ W}$
 - Efficiency = 52%
 - Gain = 18.5 dB
- Typical single-carrier WCDMA performance, 960 MHz, 28 V, 7.5 dB PAR @ 0.01% CCDF,
 - Output power = 63 W
 - Efficiency = 33%
 - Gain = 19.5 dB
 - ACPR = -35 dBc @ 3.84 MHz
- Capable of handling 10:1 VSWR @ 28 V, 220 W (CW) output power
- Integrated ESD protection
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Two-carrier WCDMA Specifications (tested in Wolfspeed test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 2150\text{ mA}$, $P_{OUT} = 60\text{ W avg}$, $f = 960\text{ MHz}$, 3GPP signal, 3.84 MHz channel bandwidth, 8 dB peak/average @ 0.01% CCDF, 10 MHz spacing

| Characteristic | Symbol | Min | Typ | Max | Unit |
|----------------------------|----------|-----|-----|-----|------|
| Gain | G_{ps} | 18 | 19 | — | dB |
| Drain Efficiency | η_D | 28 | 29 | — | % |
| Intermodulation Distortion | IMD | — | -34 | -33 | dBc |

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

ESD: Electrostatic discharge sensitive device—observe handling precautions!

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 | 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 | $V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$ | $R_{DS(on)}$ | — | 0.05 | — | Ω |
| Operating Gate Voltage | $V_{DS} = 28\text{ V}, I_{DQ} = 2150\text{ mA}$ | V_{GS} | 2.5 | 3.9 | 4.5 | V |

Maximum Ratings

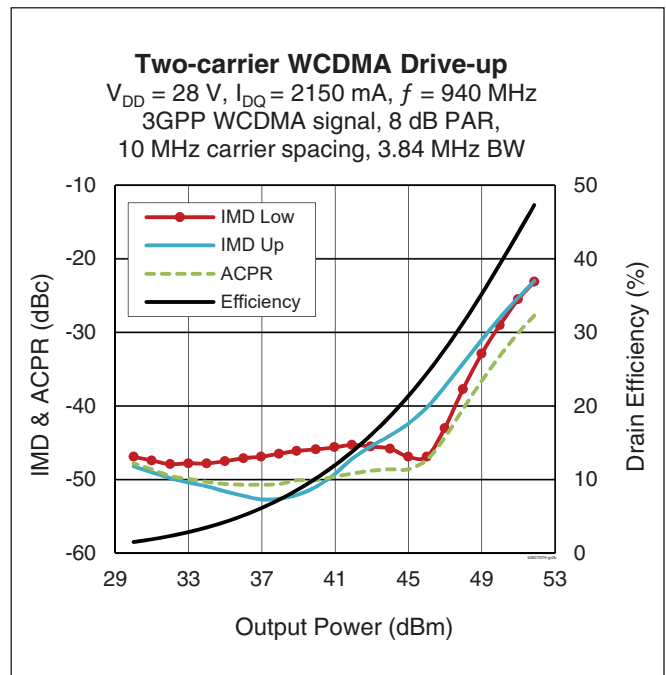
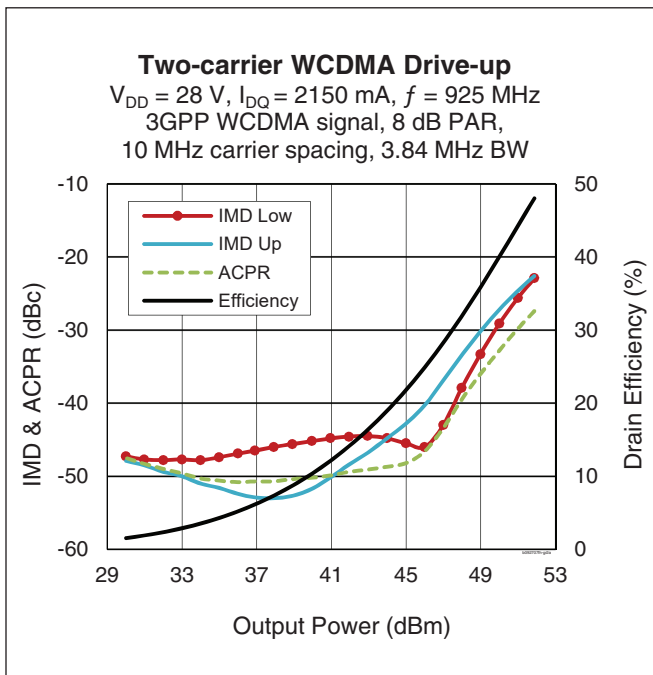
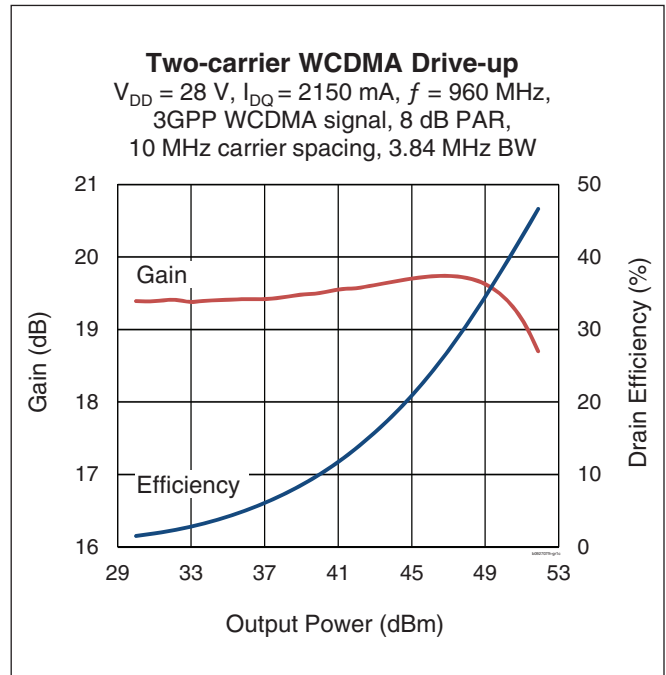
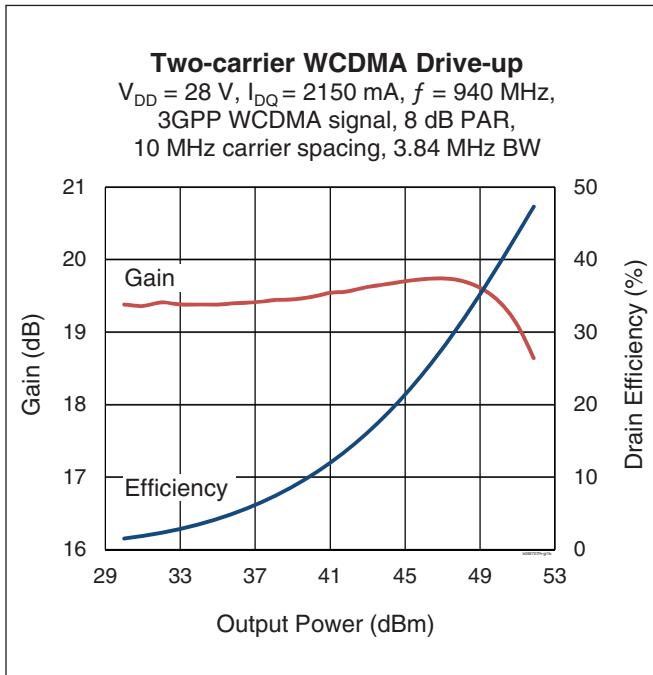
| Parameter | Symbol | Value | Unit |
|---|-----------------|-------------|----------------------|
| Drain-Source Voltage | V_{DSS} | 65 | V |
| Gate-Source Voltage | V_{GS} | -6 to +10 | V |
| Junction Temperature | T_J | 200 | $^{\circ}\text{C}$ |
| Storage Temperature Range | T_{STG} | -40 to +150 | $^{\circ}\text{C}$ |
| Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}, 220\text{ W CW}$) | $R_{\theta JC}$ | 0.214 | $^{\circ}\text{C/W}$ |

Ordering Information

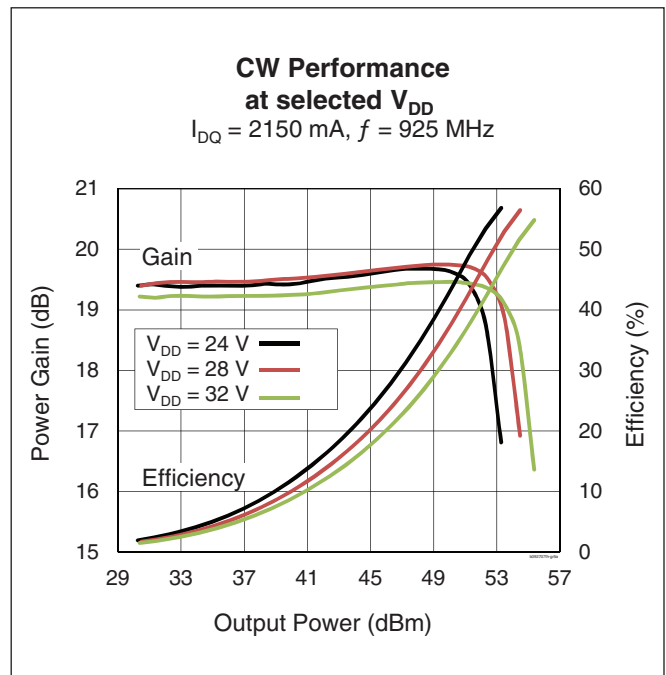
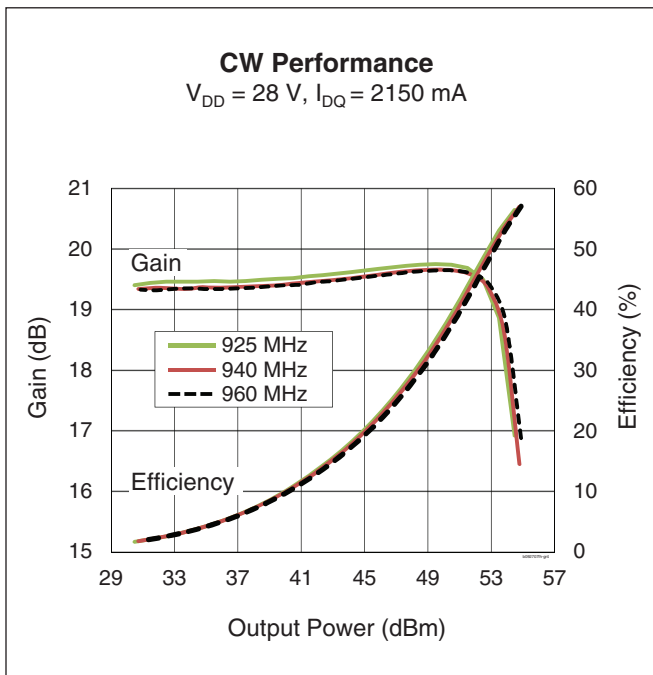
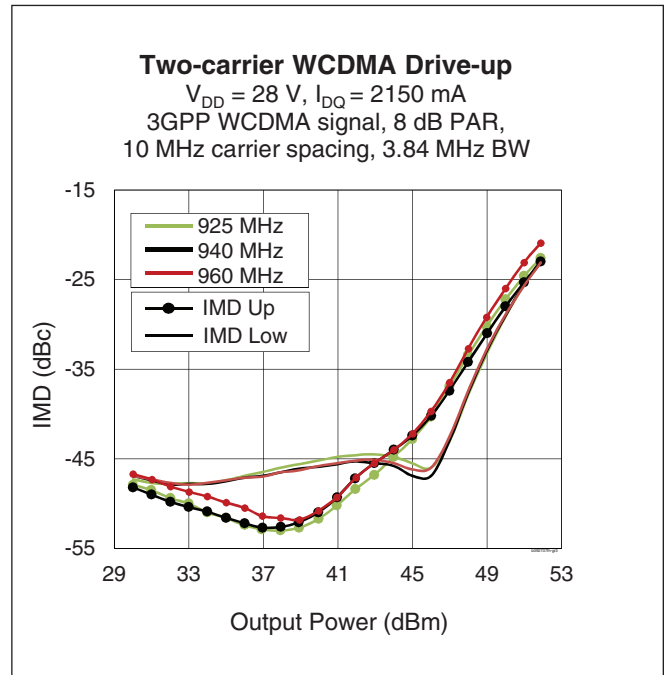
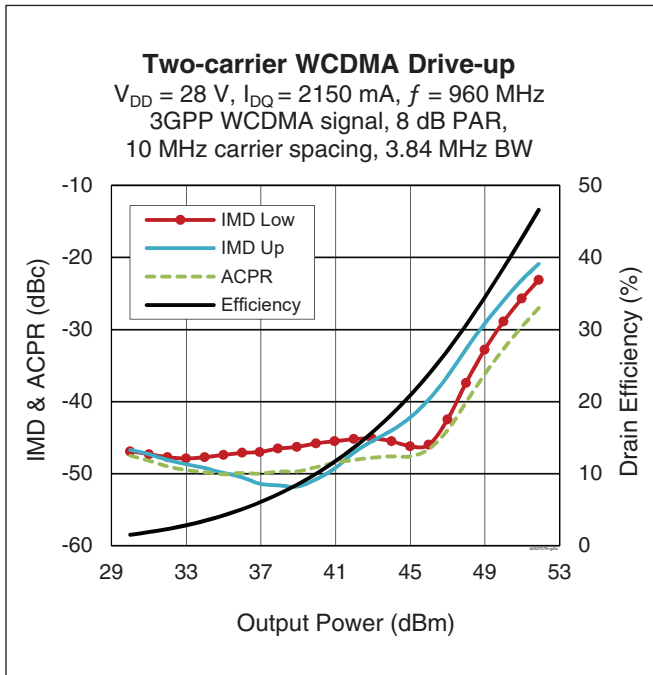
| Type and Version | Order Code | Package and Description | Shipping |
|----------------------|----------------------|------------------------------|----------------------|
| PTFB092707FH V1 R0 | PTFB092707FH-V1-R0 | H-37288L-4/2, earless flange | Tape & Reel, 50 pcs |
| PTFB092707FH V1 R250 | PTFB092707FH-V1-R250 | H-37288L-4/2, earless flange | Tape & Reel, 250 pcs |



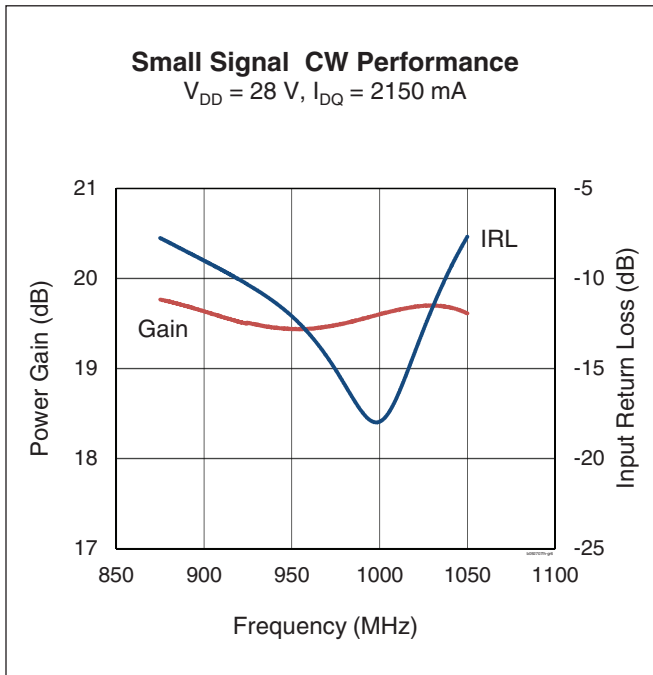
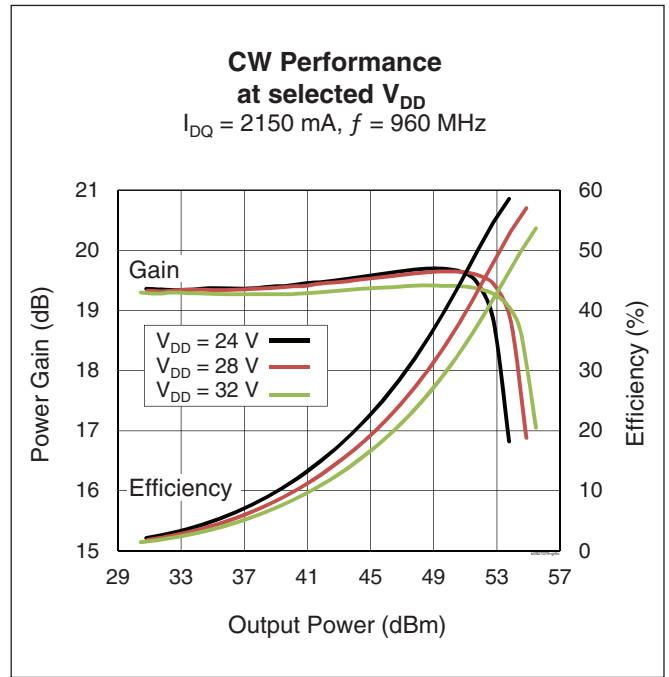
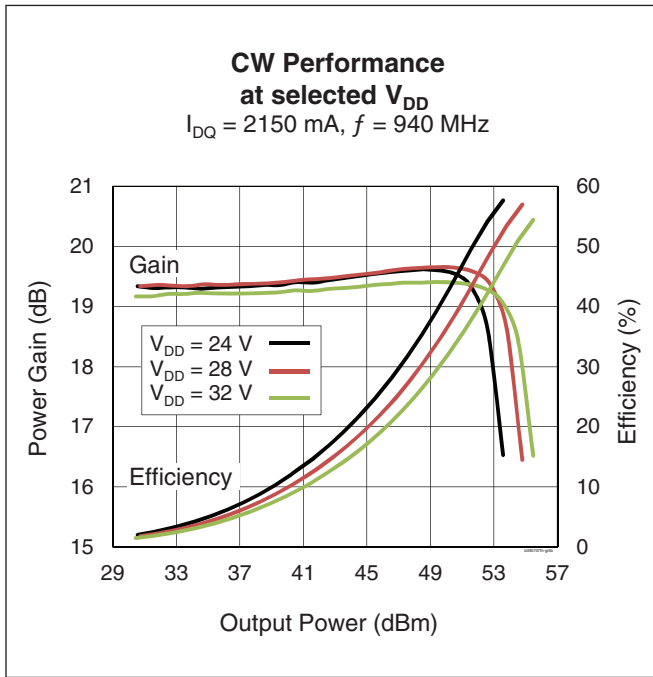
Typical Performance (data taken in an Wolfspeed test fixture)



Typical Performance (cont.)

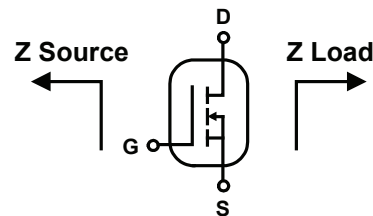


Typical Performance (cont.)



Broadband Circuit Impedance

| Frequency MHz | Z Source Ω | | Z Load Ω | |
|------------------|-------------------|-------|-----------------|-------|
| | R | jX | R | jX |
| 900 | 1.52 | -1.80 | 0.98 | -1.65 |
| 920 | 1.55 | -1.69 | 0.89 | -1.54 |
| 940 | 1.59 | -1.60 | 0.82 | -1.42 |
| 960 | 1.63 | -1.53 | 0.74 | -1.29 |
| 980 | 1.65 | -1.48 | 0.67 | -1.16 |



Load Pull Performance

Pulsed CW signal: 10 μ sec, 10% duty cycle, 28 V, 2.0 A

| Class AB | | P _{1dB} | | | | | | | | | |
|------------|-----------------------------|-----------------------------|-----------|------------------------|----------------------|---------|-----------------------------|-----------|------------------------|----------------------|---------|
| | | Max Output Power | | | | | Max PAE | | | | |
| Freq [MHz] | Z _s [Ω] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] | Z _l [Ω] | Gain [dB] | P _{OUT} [dBm] | P _{OUT} [W] | PAE [%] |
| 920 | 1.62 - j2.25 | 0.88 - j1.37 | 17.3 | 54.26 | 267 | 42.9 | 2.16 - j0.22 | 20.8 | 52.02 | 159 | 62.1 |
| 940 | 1.80 - j2.54 | 0.76 - j1.49 | 17.0 | 54.38 | 274 | 41.4 | 2.38 - j0.50 | 20.9 | 51.87 | 154 | 61.8 |
| 960 | 1.73 - j2.59 | 0.73 - j1.46 | 17.4 | 54.38 | 274 | 41.4 | 2.09 - j0.64 | 20.8 | 52.02 | 159 | 60.3 |

Reference Circuit, tuned for 925 – 960 MHz

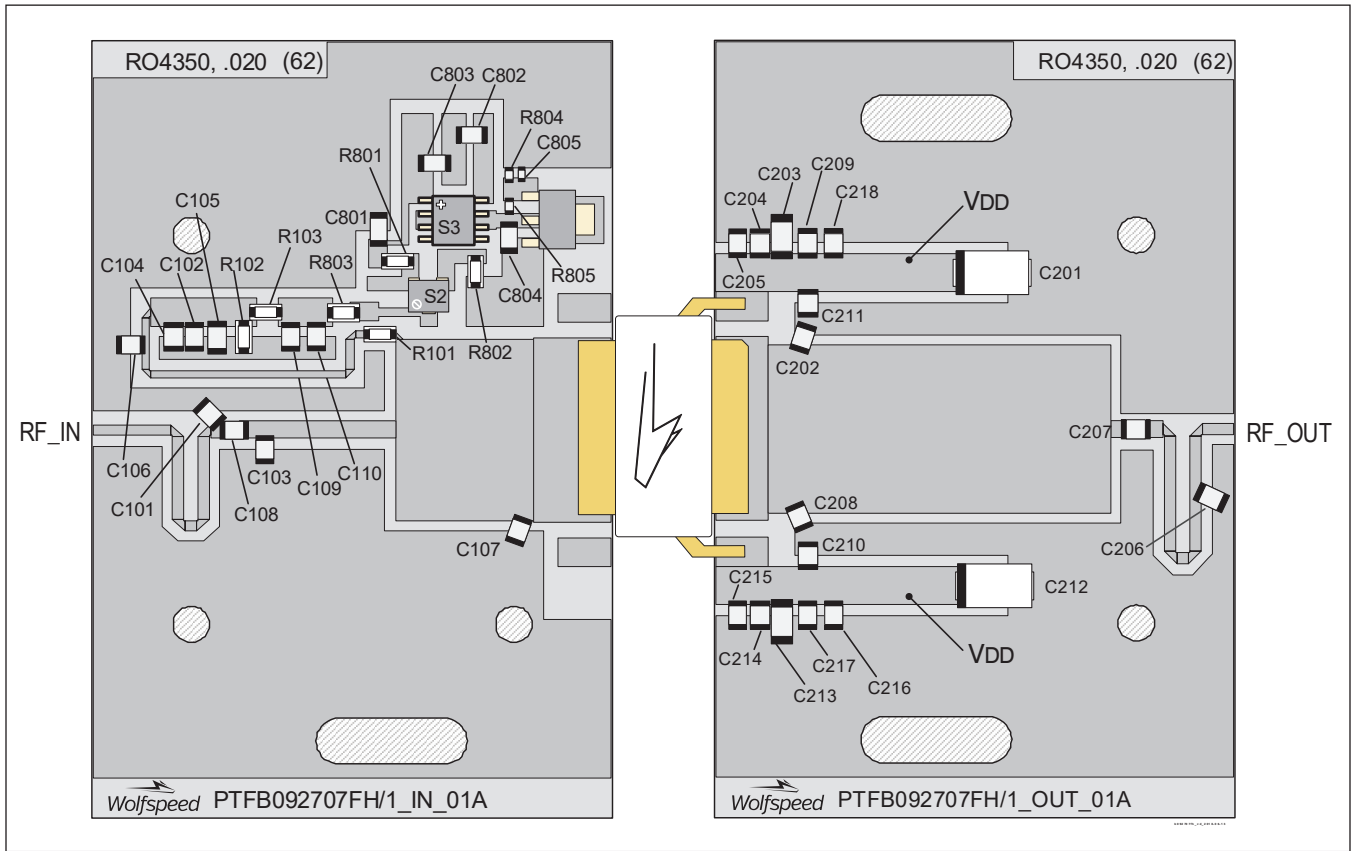
DUT PTFB092707FH V1

Reference Circuit Part No. LTN/PTFB092707FH V1

PCB Rogers 4350, 0.508 mm [.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$

Find Gerber files for this reference fixture on the Wolfspeed Web site (www.wolfspeed.com/RF)

Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Assembly Information

| Component | Description | Suggested Manufacturer | P/N |
|------------------|-------------------------------|---------------------------------|-------------------|
| Input | | | |
| C101 | Chip capacitor, 1 pF | ATC | ATC100B1R0CW500XB |
| C102 | Chip capacitor, 0.002 μ F | ATC | ATC200B203MW50X |
| C103 | Chip capacitor, 4.7 pF | ATC | ATC100B4R7CW500XB |
| C104 | Chip capacitor, 33 pF | ATC | ATC100B330JW |
| C105 | Capacitor 4.7 μ F | Nichicon | F931C475MAA |
| C106, C108 | Chip capacitor, 56 pF | ATC | ATC100B560JT |
| C107 | Chip capacitor, 12 pF | ATC | ATC100B120JW |
| C109 | Chip capacitor, 4.7 pF | ATC | ATC100B4R7CT |
| C110 | Chip capacitor, 0.01 μ F | ATC | ATC200B103MW50X |
| C801, C804 | Chip capacitor, 0.1 μ F | Panasonic Electronic Components | ECJ-3VB1H104K |
| C802, C803, C805 | Chip capacitor, 0.001 μ F | Panasonic | ECJ-1VB1H102K |
| R101, R801, R803 | Resistor, 10 Ω | Panasonic Electronic Components | ERJ-8GEYJ100V |
| R102, R103 | Resistor, 20 Ω | Panasonic Electronic Components | ERJ-8GEYJ200V |
| R802 | Resistor, 1k Ω | Panasonic Electronic Components | ERJ-8GEYJ102V |
| R804 | 1.3k ohms | Panasonic Electronic Components | ERJ-3GEYJ132V |
| R805 | 1.2k ohms | Panasonic Electronic Components | ERJ-3GEYJ122V |

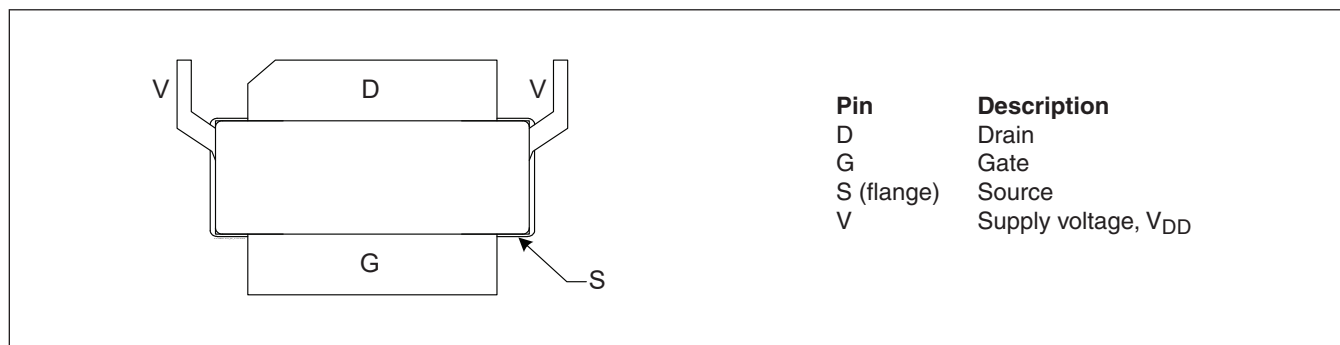
(table cont. next page)

Reference Circuit (cont.)**Assembly Information** (cont.)

| Component | Description | Suggested Manufacturer | P/N |
|-----------|----------------------------|-------------------------|--------------|
| S1 | Transistor | Fairchild Semiconductor | BCP56-10 |
| S2 | Potentiometer, 2k Ω | Bourns Inc. | 3224W-1-202E |
| S3 | Voltage regulator | Fairchild Semiconductor | LM7805 |

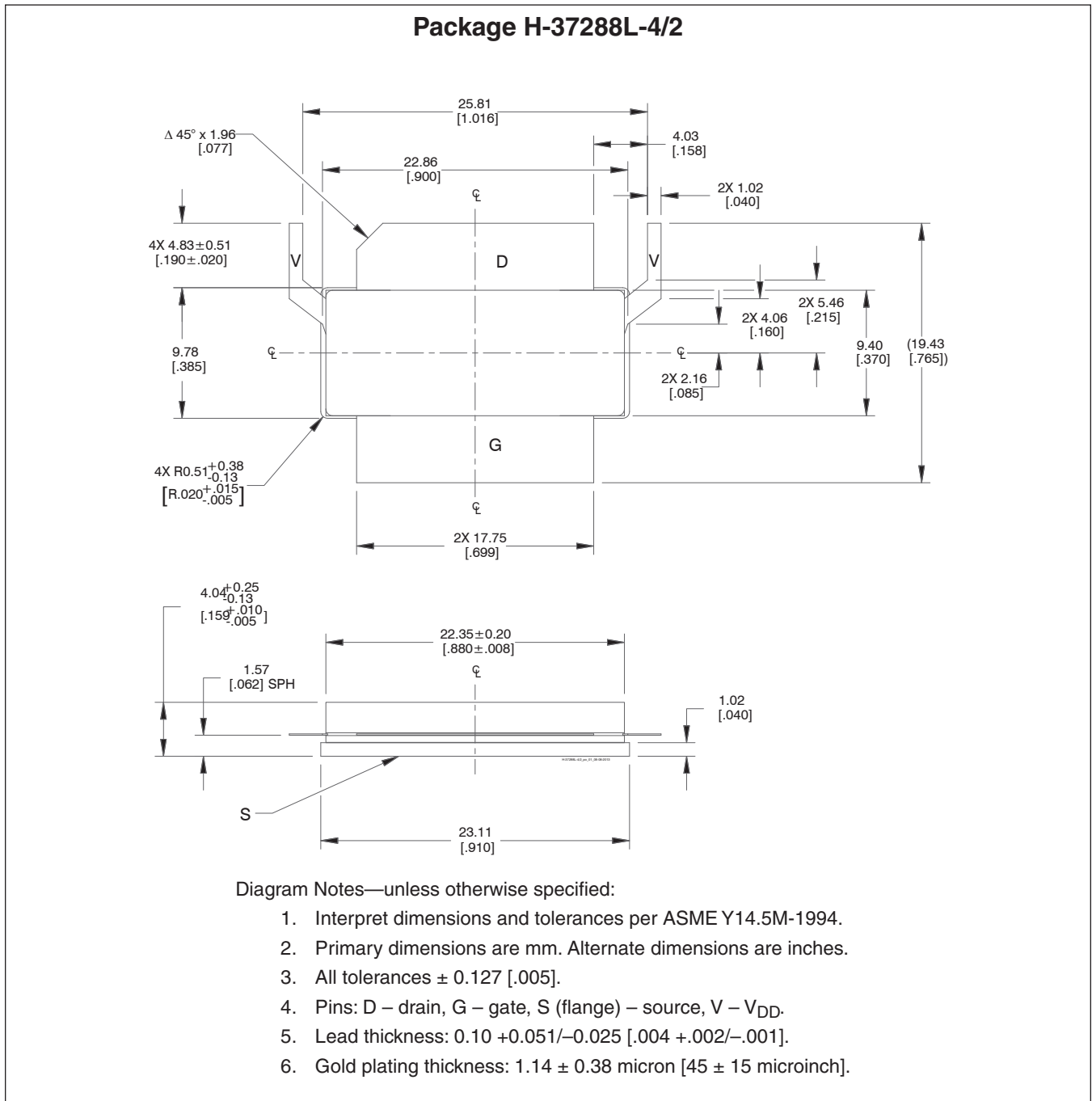
Output

| | | | |
|------------------------|--------------------------------------|----------------------------------|--------------------|
| C201, C212 | Chip capacitor, 10 μ F | Matsuo | 281M5002106K |
| C202 | Chip capacitor, 2.2 pF | ATC | ATC100B2R2CW |
| C203, C213 | Ceramic capacitor, 1 μ F, 250 V | AVX Corporation | 2225PC105KAT1A |
| C204, C205, C214, C215 | Capacitor, 10 μ F | Taiyo Yuden | UMK325C7106MM-T |
| C206 | Chip capacitor, 4.2 pF | ATC | ATC100B4R2CT |
| C207 | Chip capacitor, 56 pF | ATC | ATC100B560JT |
| C208 | Chip capacitor, 3.3 pF | ATC | ATC100B3R3CW |
| C209, C216, C217, C218 | Ceramic capacitor, 4.7 μ F, 50 V | Murata Electronics North America | GRM32ER71H475KA88L |
| C210, C211 | Capacitor, 10k pF | ATC | ATC200B103MW50X |

Pinout Diagram (top view)

Lead connections for PTFB092707FH

Package Outline Specifications



Revision History

| Revision | Date | Data Sheet Type | Page | Subjects (major changes since last revision) |
|----------|------------|-----------------|------|---|
| 01 | 2011-03-25 | Advance | All | New product, proposed only |
| 02 | 2014-02-25 | Advance | All | Package changed, revised all data |
| 03 | 2014-04-01 | Production | All | Data Sheet now represents production-released product specifications, including reference circuit and performance information |
| 03.1 | 2016-06-10 | Production | 2 | Updated ordering code to R0 |
| 04 | 2018-06-13 | Production | All | Converted to Wolfspeed Data Sheet |

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Notes

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JONHON

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ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).



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