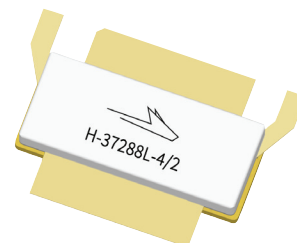


# PTFB092707FH

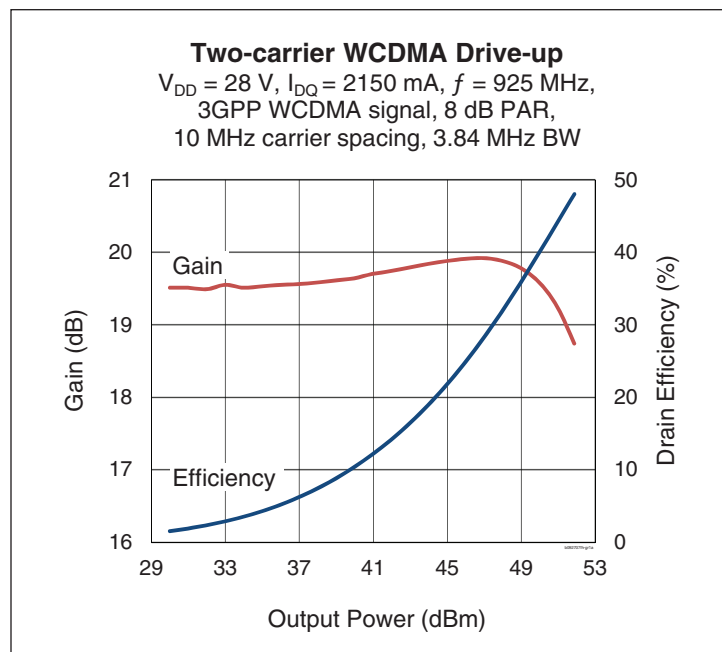
## Thermally-Enhanced High Power RF LDMOS FET 270 W, 28 V, 925 – 960 MHz

### 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  $\mu\text{s}$  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	$\eta_D$	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	$\mu\text{A}$
	$V_{DS} = 63\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	10	$\mu\text{A}$
Gate Leakage Current	$V_{GS} = 10\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	—	—	1	$\mu\text{A}$
On-State Resistance	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	$\Omega$
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ} = 2150\text{ mA}$	$V_{GS}$	2.5	3.9	4.5	V

## Maximum Ratings

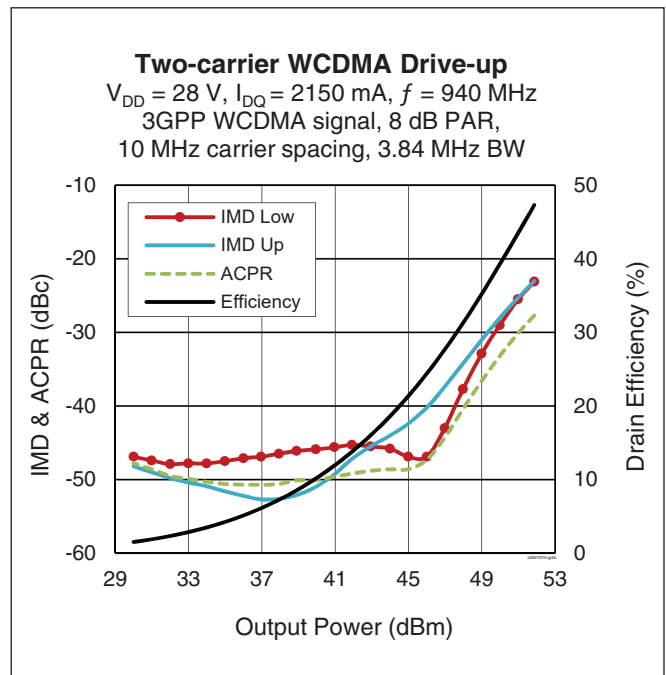
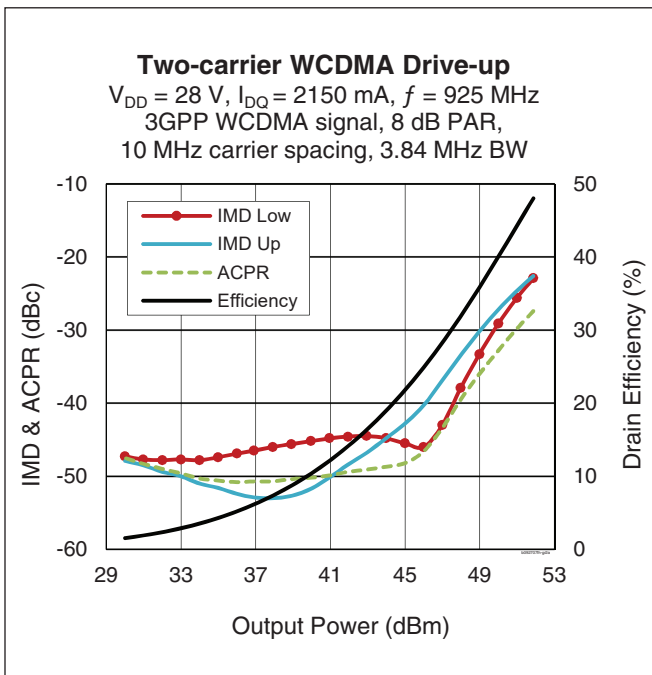
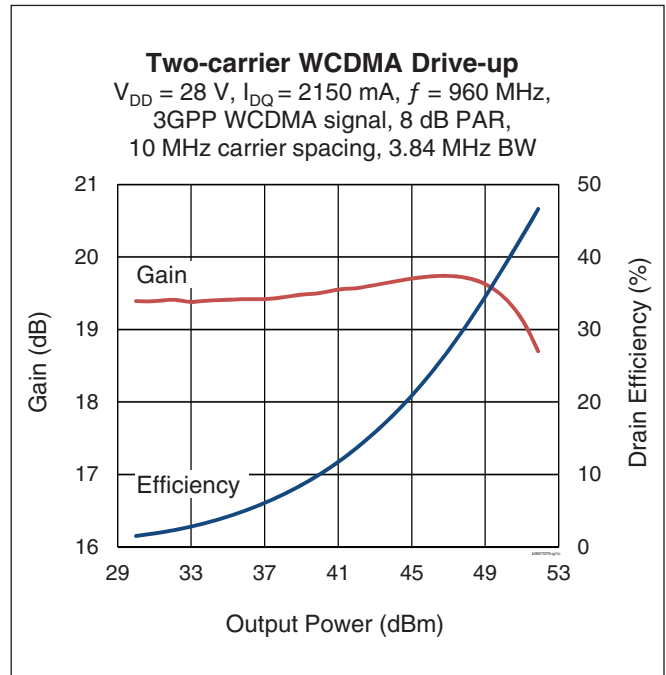
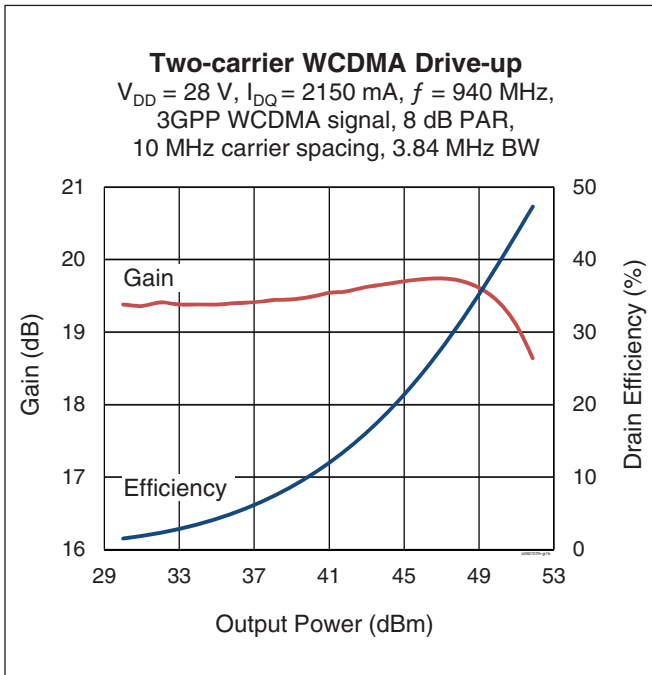
Parameter	Symbol	Value	Unit
Drain-Source Voltage	$V_{DSS}$	65	V
Gate-Source Voltage	$V_{GS}$	-6 to +10	V
Junction Temperature	$T_J$	200	$^{\circ}\text{C}$
Storage Temperature Range	$T_{STG}$	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ( $T_{CASE} = 70^{\circ}\text{C}, 220\text{ W CW}$ )	$R_{\theta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

## Ordering Information

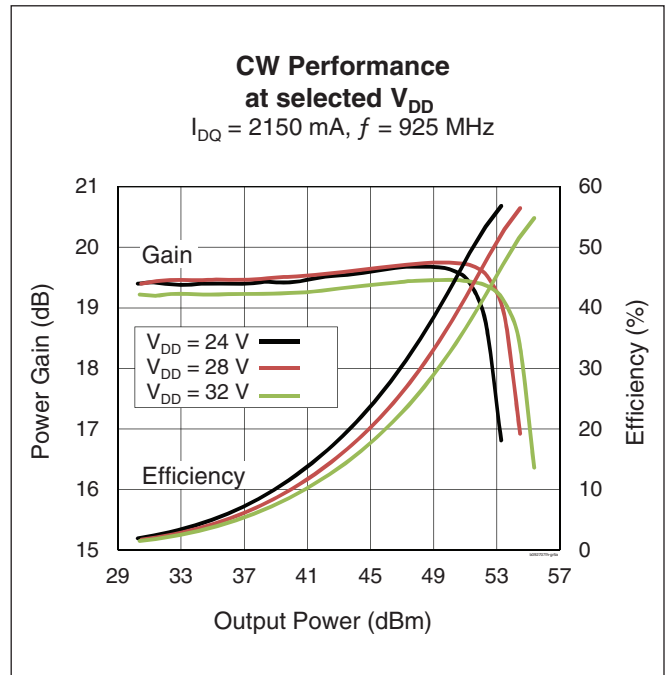
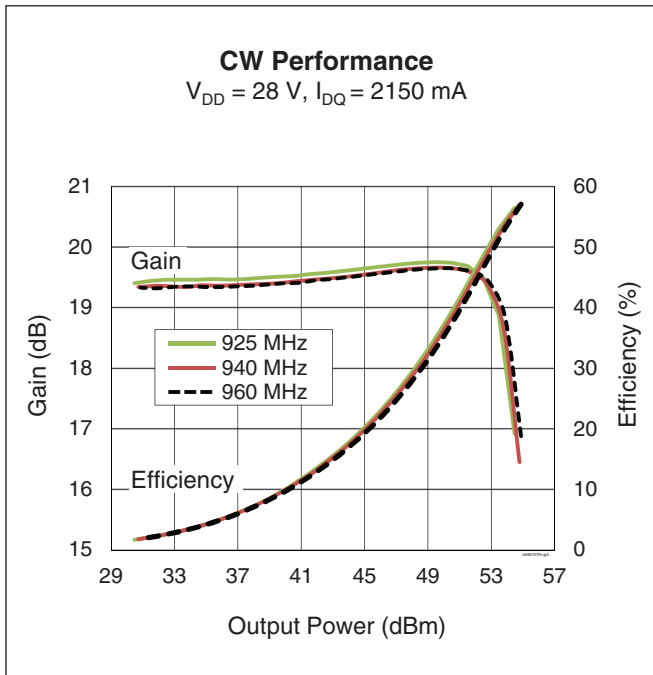
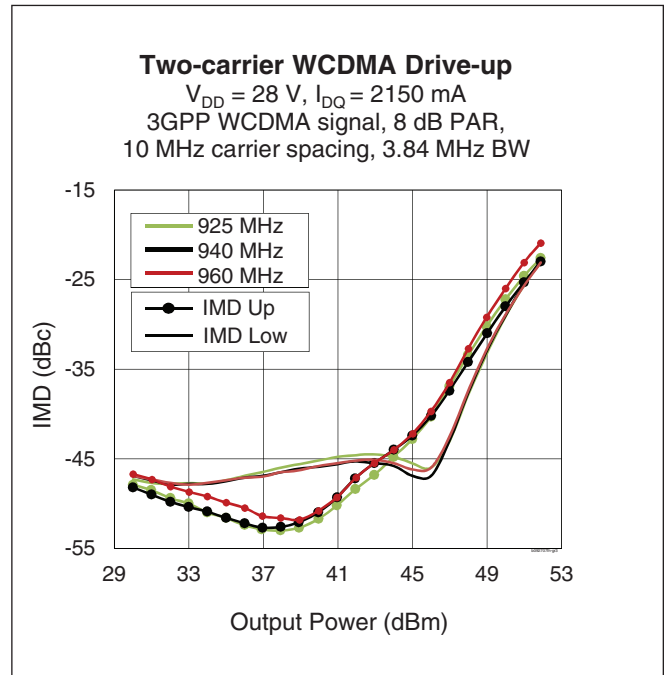
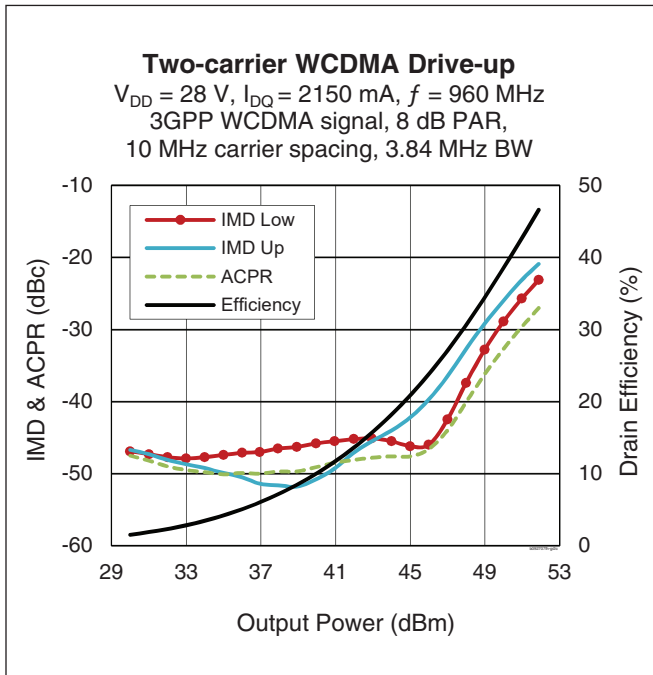
Type and Version	Order Code	Package and Description	Shipping
PTFB092707FH V1 R0	PTFB092707FH-V1-R0	H-37288L-4/2, earless flange	Tape & Reel, 50 pcs
PTFB092707FH V1 R250	PTFB092707FH-V1-R250	H-37288L-4/2, earless flange	Tape & Reel, 250 pcs



**Typical Performance** (data taken in an Wolfspeed test fixture)

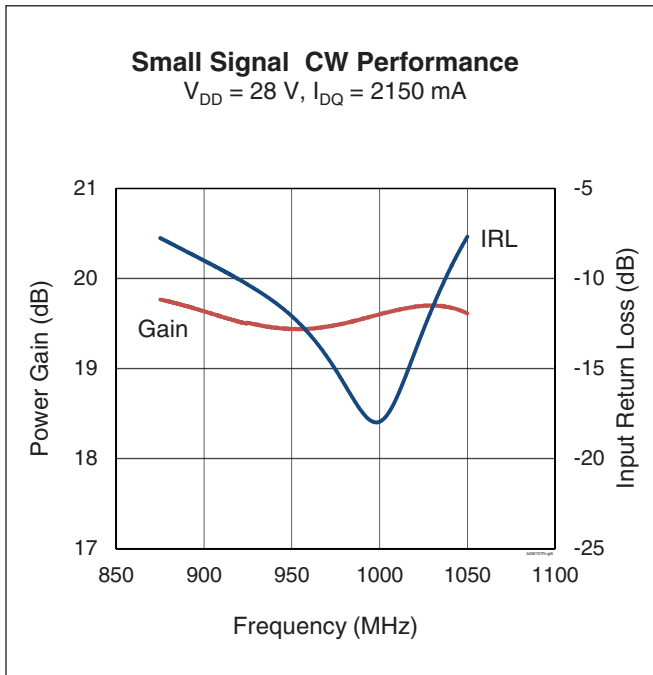
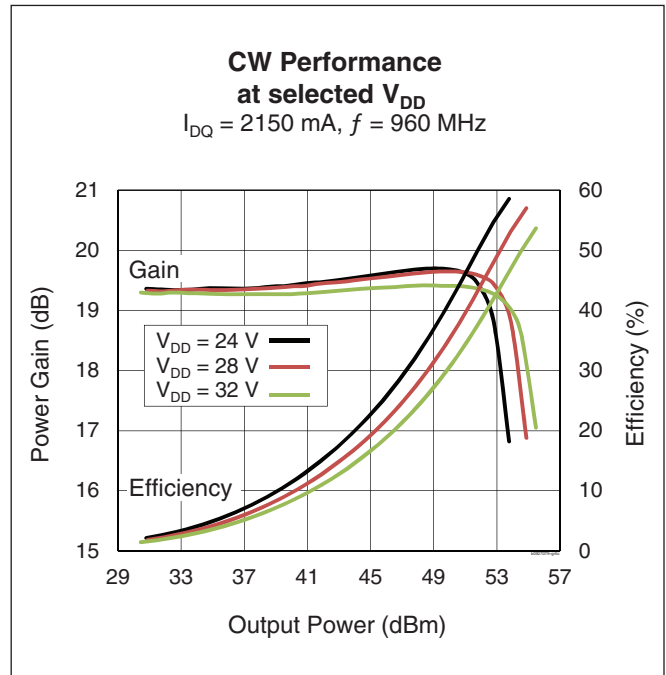
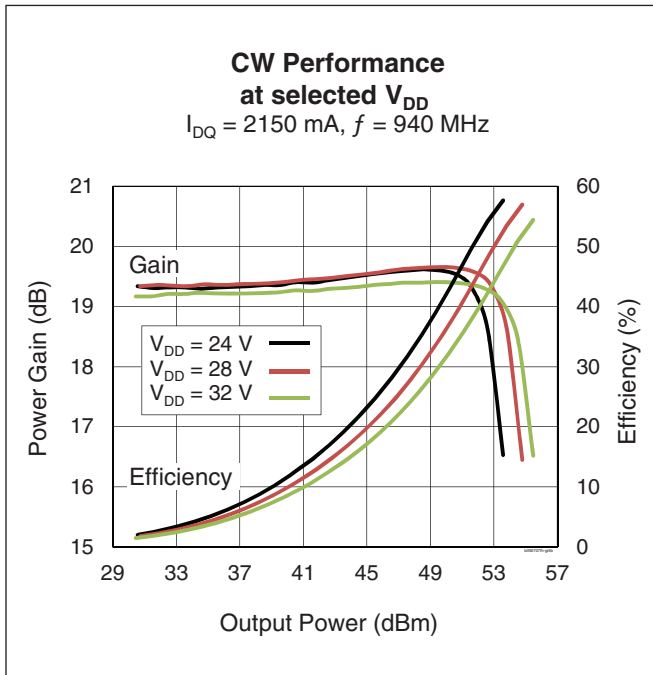


Typical Performance (cont.)



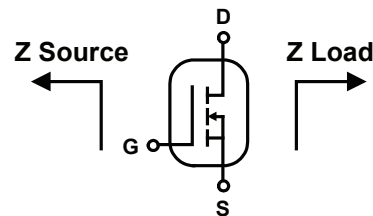


**Typical Performance (cont.)**



## Broadband Circuit Impedance

Frequency MHz	Z Source $\Omega$		Z Load $\Omega$	
	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  $\mu$ sec, 10% duty cycle, 28 V, 2.0 A

Class AB		P <sub>1dB</sub>									
		Max Output Power					Max PAE				
Freq [MHz]	Z <sub>s</sub> [ $\Omega$ ]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [W]	PAE [%]	Z <sub>l</sub> [ $\Omega$ ]	Gain [dB]	P <sub>OUT</sub> [dBm]	P <sub>OUT</sub> [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

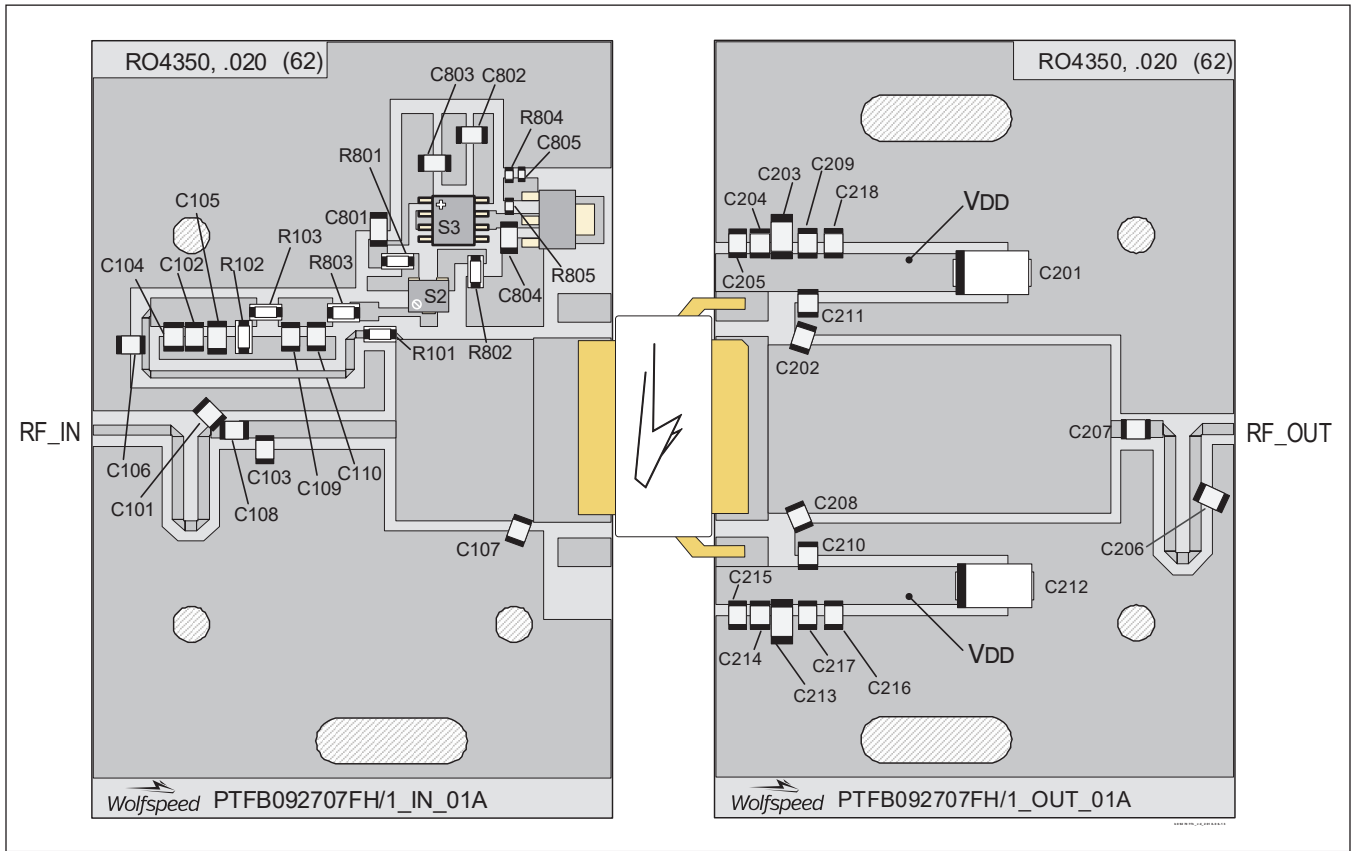
DUT PTFB092707FH V1

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](http://www.wolfspeed.com/RF))

Reference Circuit (cont.)



Reference circuit assembly diagram (not to scale)

Assembly Information

Component	Description	Suggested Manufacturer	P/N
<b>Input</b>			
C101	Chip capacitor, 1 pF	ATC	ATC100B1R0CW500XB
C102	Chip capacitor, 0.002 $\mu$ F	ATC	ATC200B203MW50X
C103	Chip capacitor, 4.7 pF	ATC	ATC100B4R7CW500XB
C104	Chip capacitor, 33 pF	ATC	ATC100B330JW
C105	Capacitor 4.7 $\mu$ 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 $\mu$ F	ATC	ATC200B103MW50X
C801, C804	Chip capacitor, 0.1 $\mu$ F	Panasonic Electronic Components	ECJ-3VB1H104K
C802, C803, C805	Chip capacitor, 0.001 $\mu$ F	Panasonic	ECJ-1VB1H102K
R101, R801, R803	Resistor, 10 $\Omega$	Panasonic Electronic Components	ERJ-8GEYJ100V
R102, R103	Resistor, 20 $\Omega$	Panasonic Electronic Components	ERJ-8GEYJ200V
R802	Resistor, 1k $\Omega$	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.)

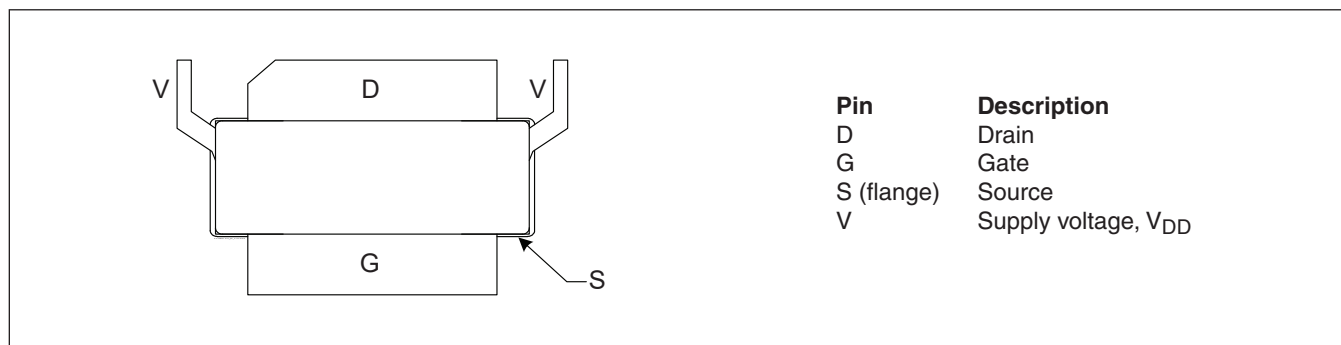
**Assembly Information** (cont.)

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 μF	Matsuo	281M5002106K
C202	Chip capacitor, 2.2 pF	ATC	ATC100B2R2CW
C203, C213	Ceramic capacitor, 1 μF, 250 V	AVX Corporation	2225PC105KAT1A
C204, C205, C214, C215	Capacitor, 10 μF	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 μF, 50 V	Murata Electronics North America	GRM32ER71H475KA88L
C210, C211	Capacitor, 10k pF	ATC	ATC200B103MW50X

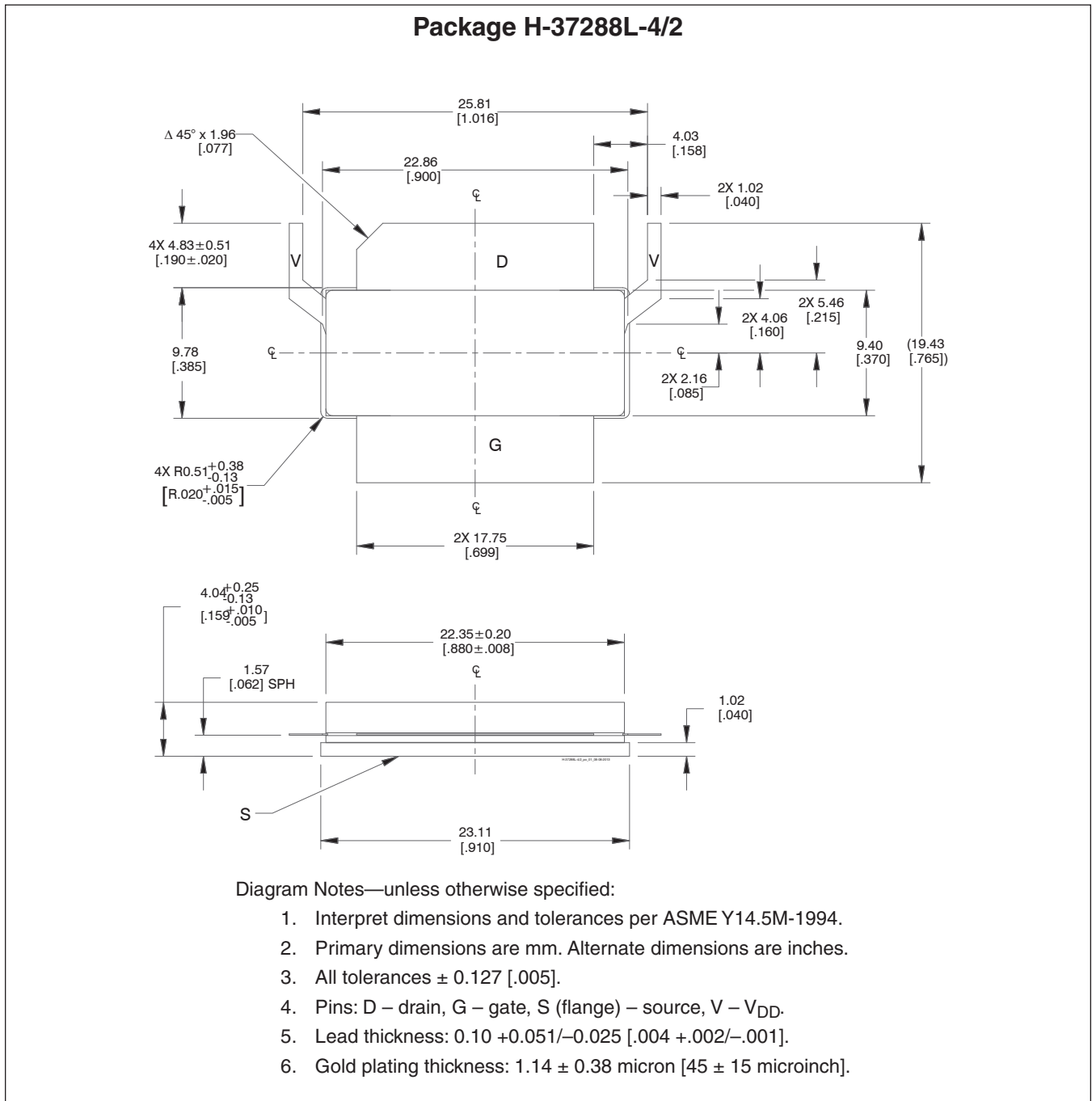
**Pinout Diagram** (top view)



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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