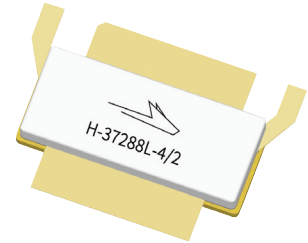


PTFB092707FH

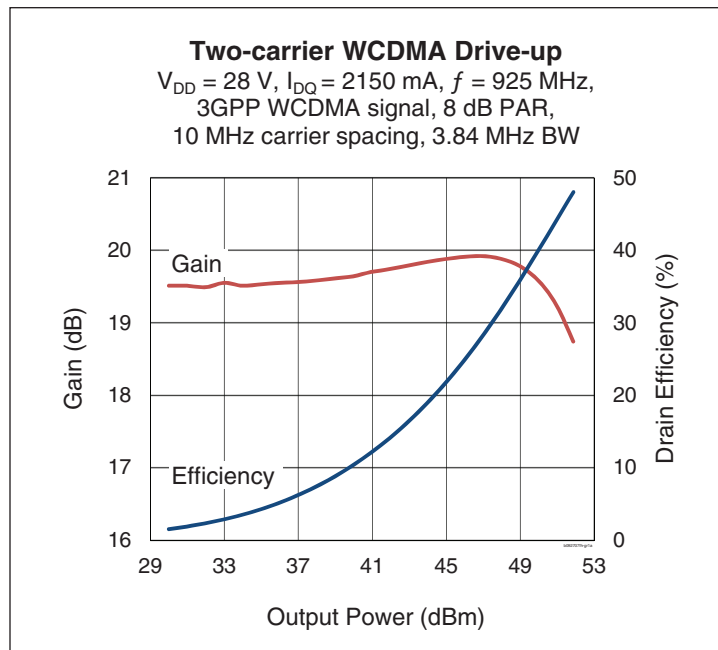
Thermally-Enhanced High Power RF LDMOS FET 270 W, 28 V, 925 – 960 MHz

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

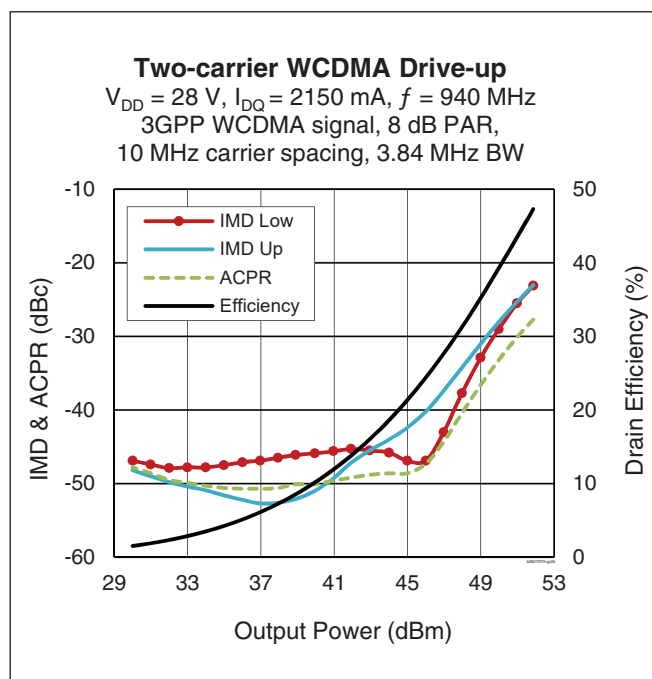
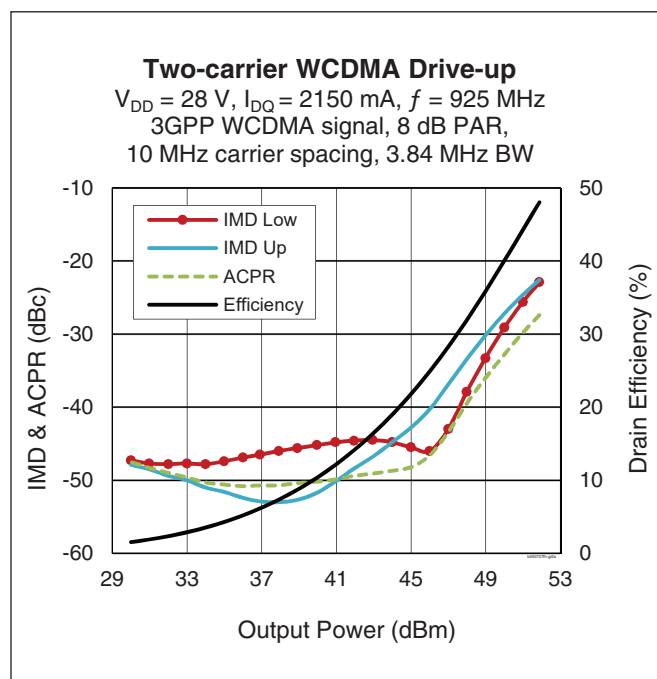
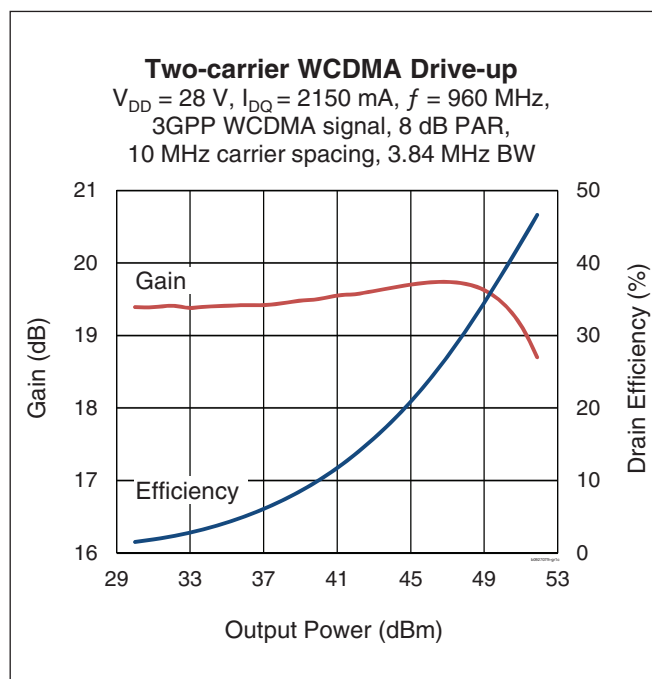
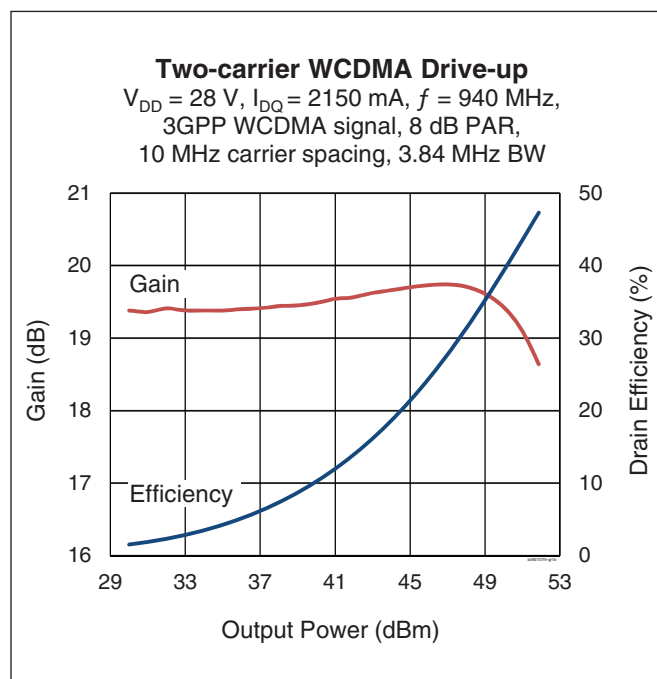
Maximum Ratings

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 W CW)	$R_{\theta JC}$	0.214	$^{\circ}\text{C/W}$

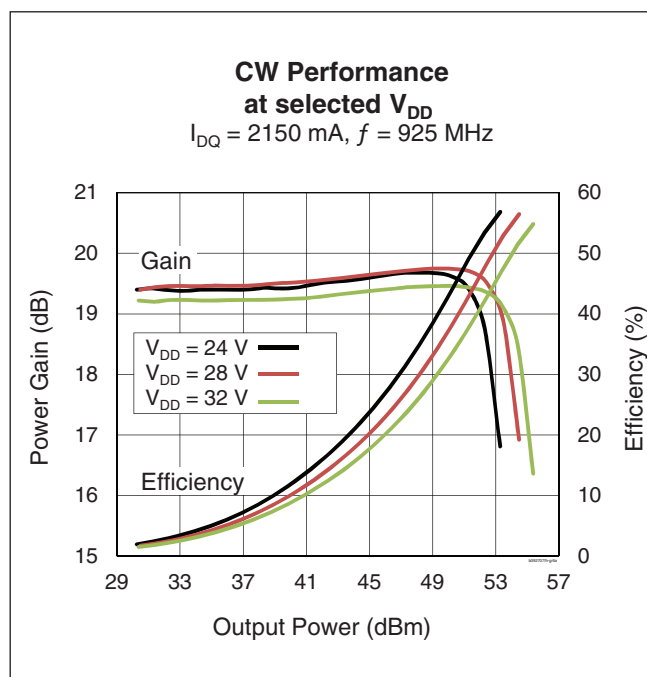
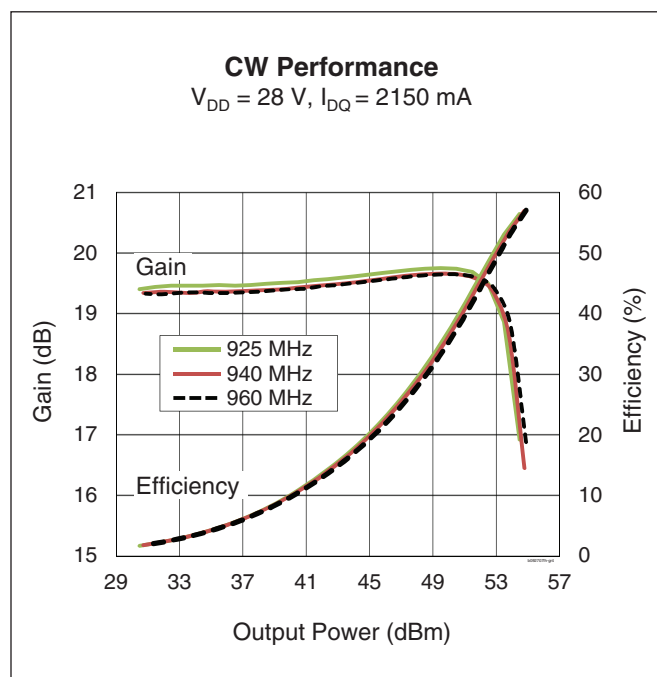
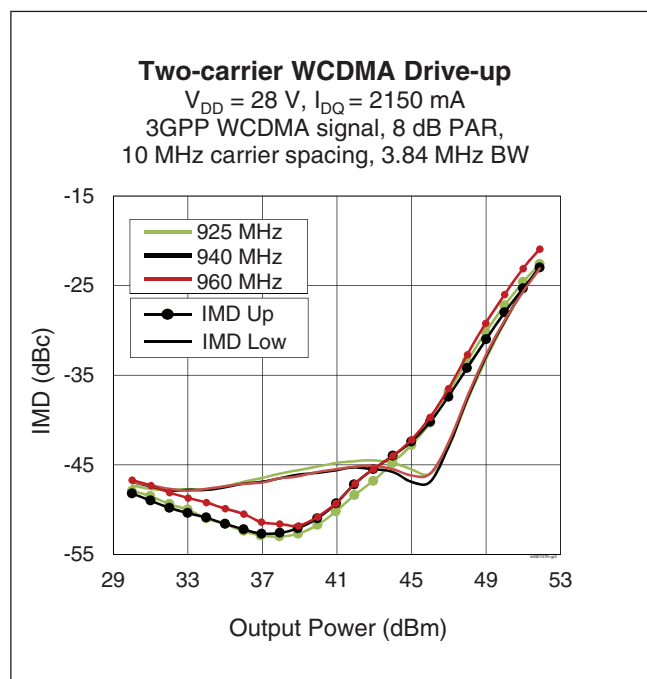
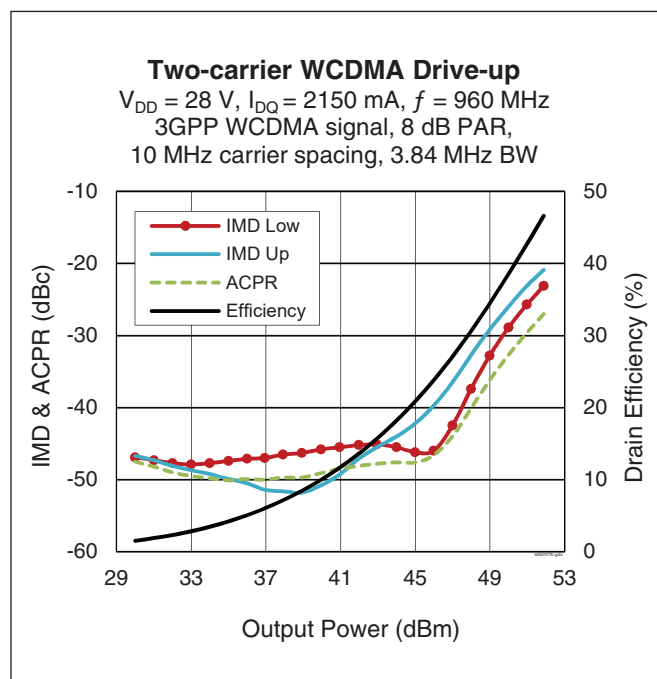
Ordering Information

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

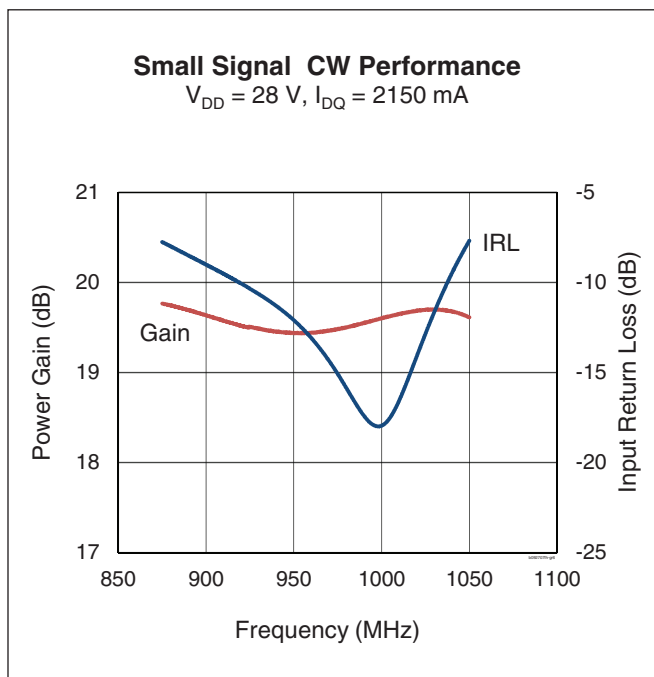
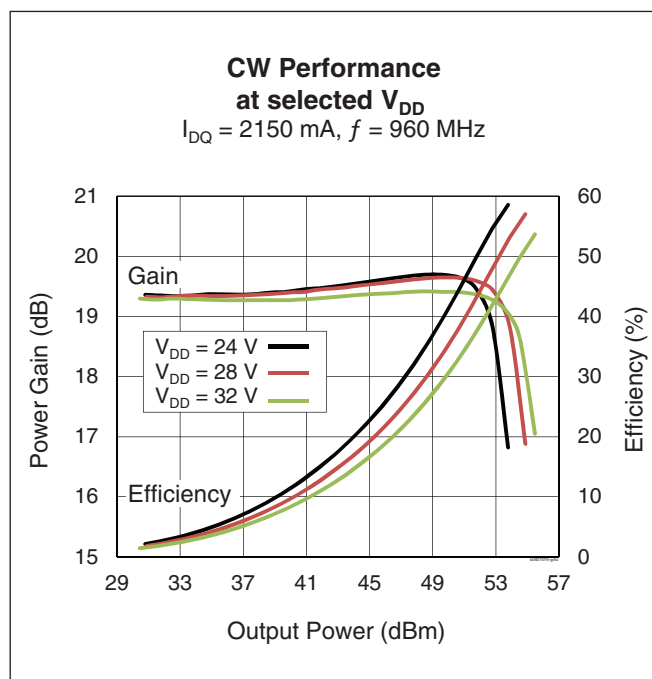
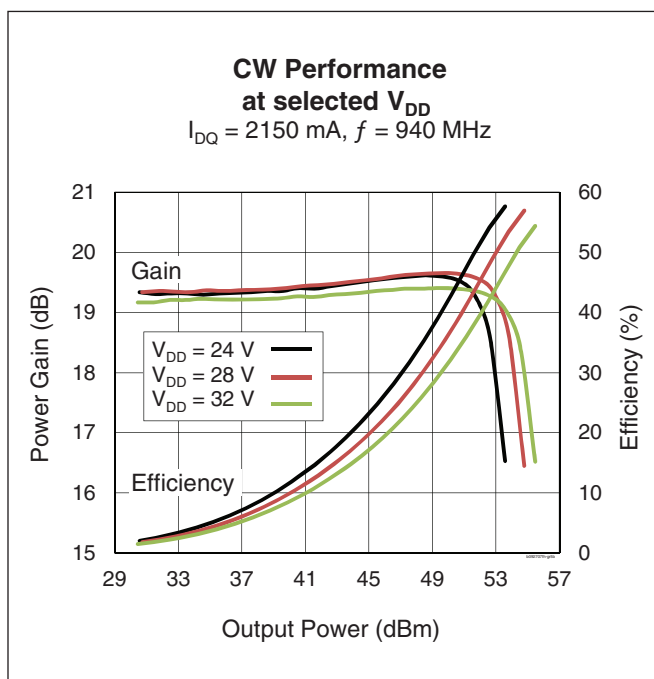
Typical Performance (data taken in an Wolfspeed test fixture)



Typical Performance (cont.)

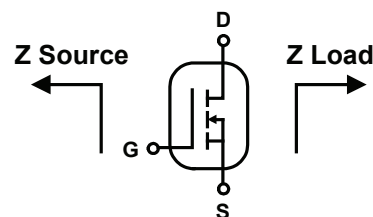


Typical Performance (cont.)



Broadband Circuit Impedance

Frequency	Z Source Ω		Z Load Ω	
MHz	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				
		Z _I [Ω]	Gain [dB]	P _{OUT} [dBm]	P _{OUT} [W]	PAE [%]	Z _I [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

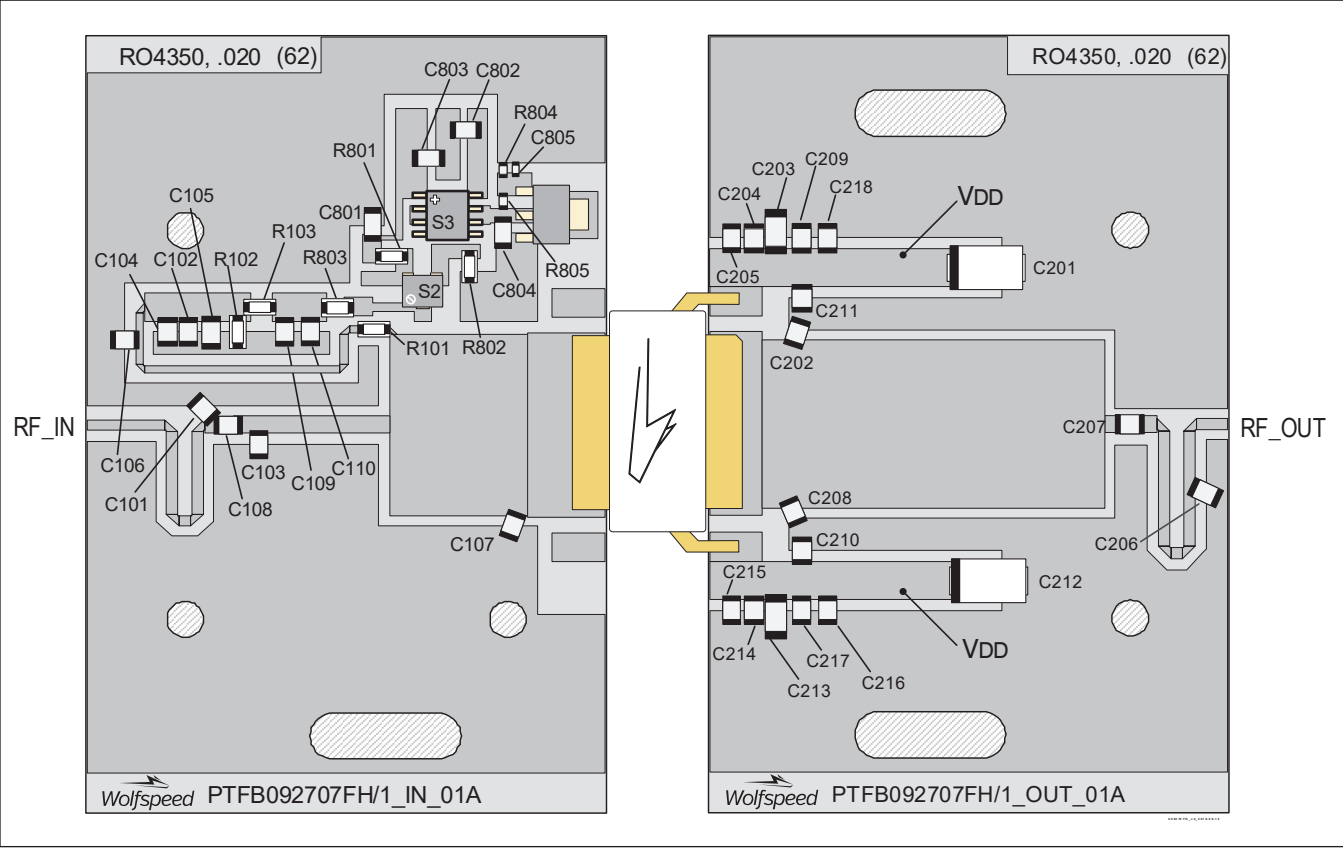
DUT PTFB092707FH V1

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.)

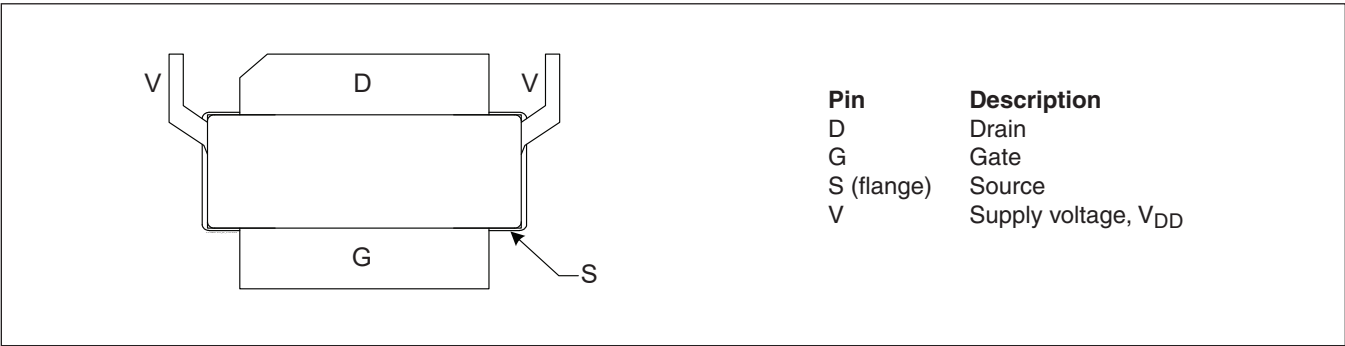
Assembly Information (cont.)

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

Package H-37288L-4/2

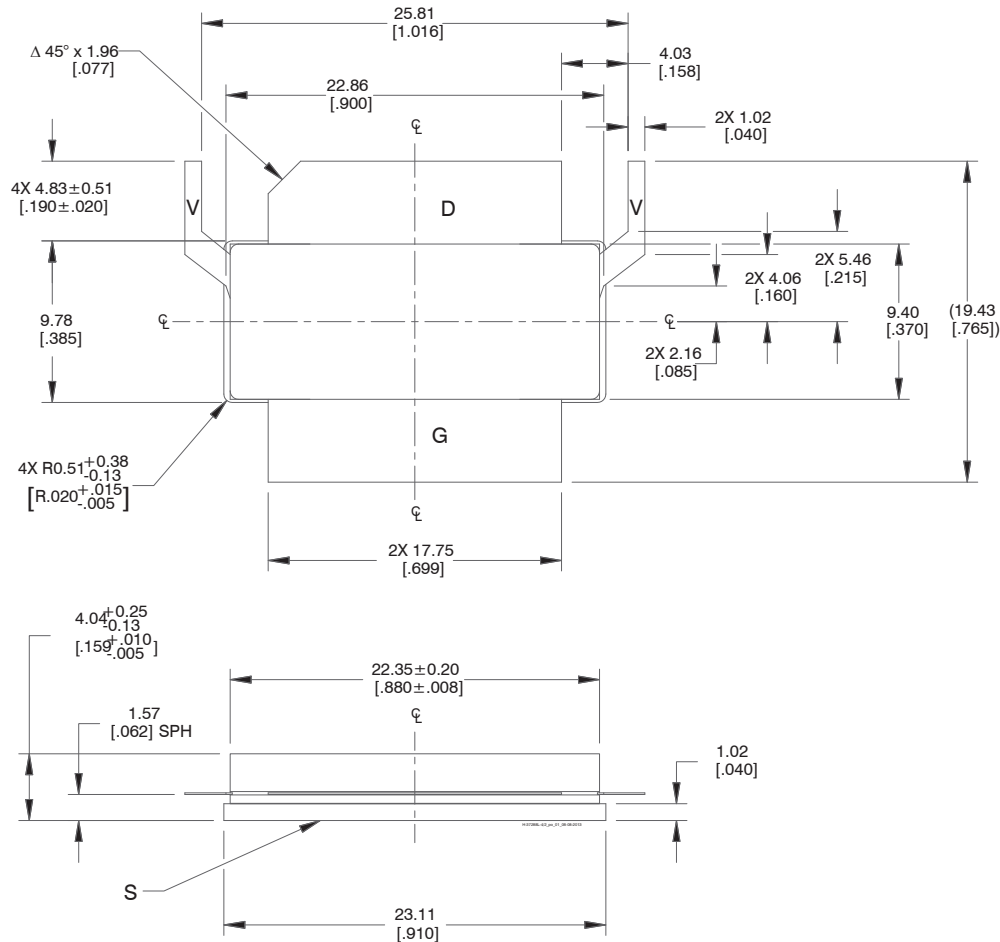


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005].
4. Pins: D – drain, G – gate, S (flange) – source, V – V_{DD}.
5. Lead thickness: $0.10 + 0.051/-0.025$ [.004 + .002/- .001].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 $\pm$ 15 microinch].

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

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com
919.407.7816

Notes

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