

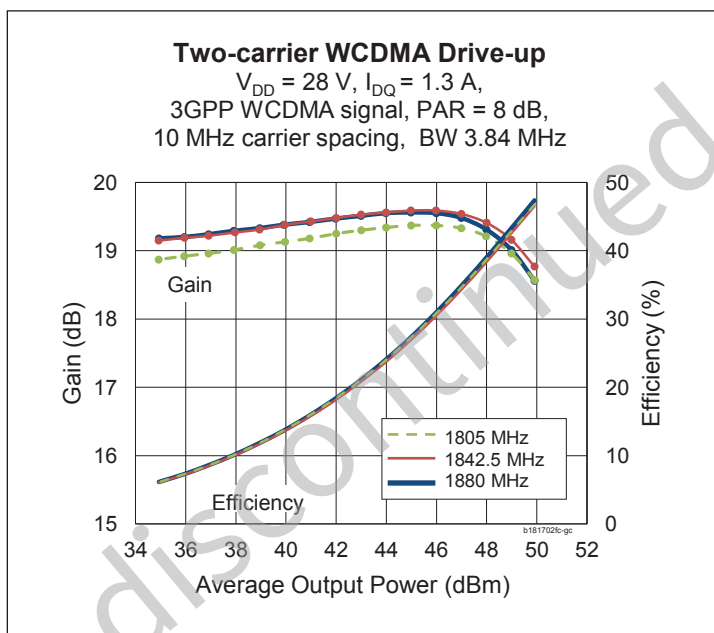
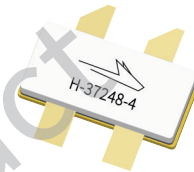
PTFB181702FC

Thermally-Enhanced High Power RF LDMOS FET 170 W, 28 V, 1805 – 1880 MHz

Description

The PTFB181702FC is a 170-watt LDMOS FET intended for use in multi-standard cellular power amplifier applications. Features include input and output matching, high gain and thermally-enhanced package with earless flanges. Manufactured with Wolfspeed's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.

PTFB181702FC
Package H-37248-4



Features

- Broadband internal matching
- Typical CW performance, 1842 MHz, 28 V
 - Output power at $P_{1dB} = 180\text{ W}$
 - Efficiency = 58%
 - Gain = 18.5 dB
- Capable of handling 10:1 VSWR @ 28 V, 170 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)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1300\text{ mA}$, $P_{OUT} = 30\text{ W}$ avg, $f_1 = 1870\text{ MHz}$, $f_2 = 1880\text{ MHz}$, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 8 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	G_{ps}	18	19	—	dB
Drain Efficiency	η_D	24	26	—	%
Intermodulation Distortion	IMD	—	-35	-33	dBc

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
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.11	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 650\text{ mA}$	V_{GS}	2.5	3.0	3.5	V
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1	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 ($T_{CASE} = 70^{\circ}\text{C}$, 170 W CW)	$R_{\theta JC}$	0.27	$^{\circ}\text{C/W}$

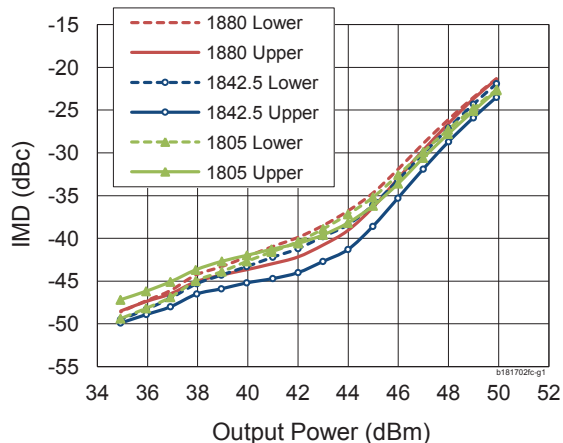
Ordering Information

Type and Version	Order Code	Package Description	Shipping
PTFB181702FC V1 R0	PTFB181702FC-V1-R0	H-37248-4, earless flange	Tape & Reel, 50 pcs
PTFB181702FC V1 R250	PTFB181702FC-V1-R250	H-37248-4, earless flange	Tape & Reel, 250 pcs

Typical Performance (data taken in a production test fixture)

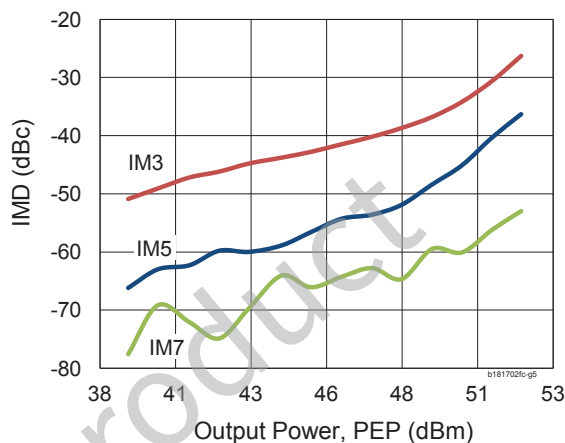
Two-carrier WCDMA Drive-up

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.3\text{ A}$,
3GPP WCDMA signal, PAR = 8 dB,
10 MHz carrier spacing, BW 3.84 MHz



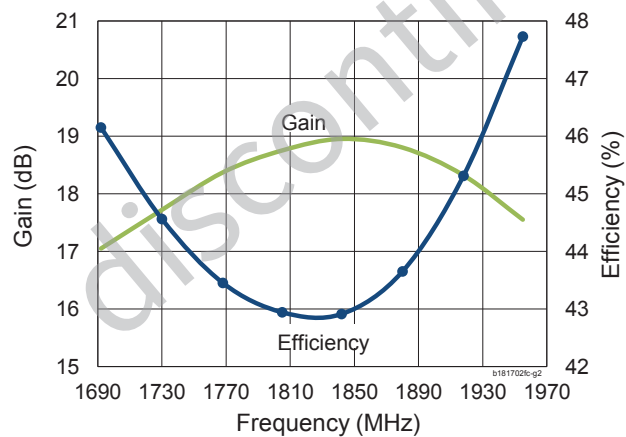
Two-tone Intermodulation Distortion vs. Output Power

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.3\text{ A}$,
 $f_1 = 1880\text{ MHz}$, $f_2 = 1879\text{ MHz}$



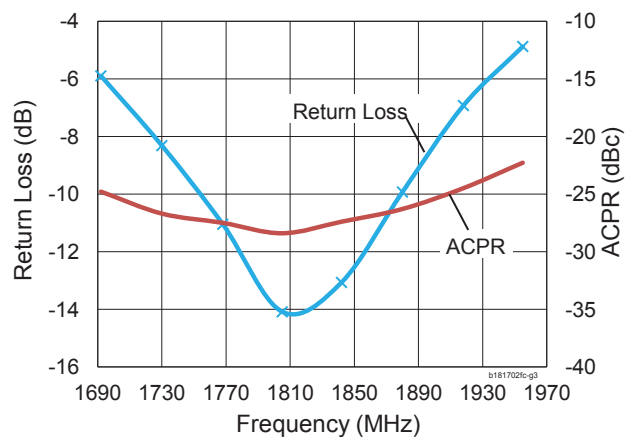
Single-carrier Broadband Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.3\text{ A}$, $P_{OUT} = 80\text{ W}$,
3GPP WCDMA signal, PAR = 10 dB

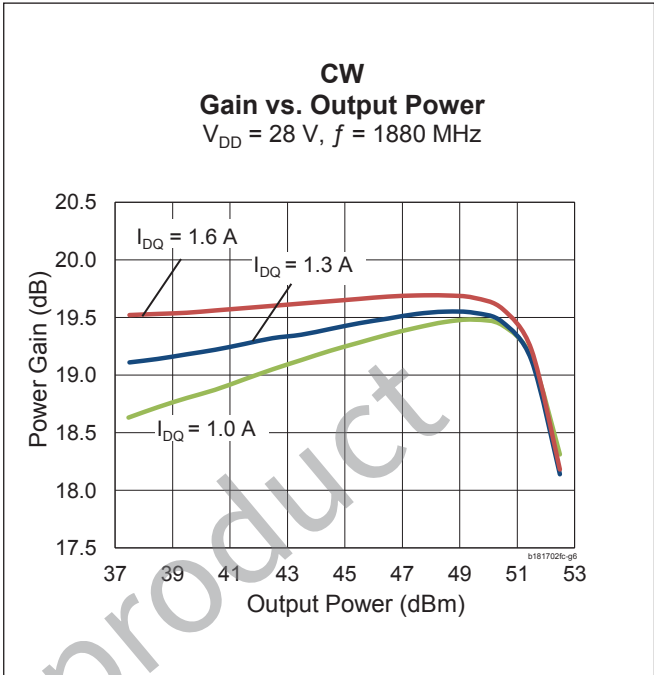
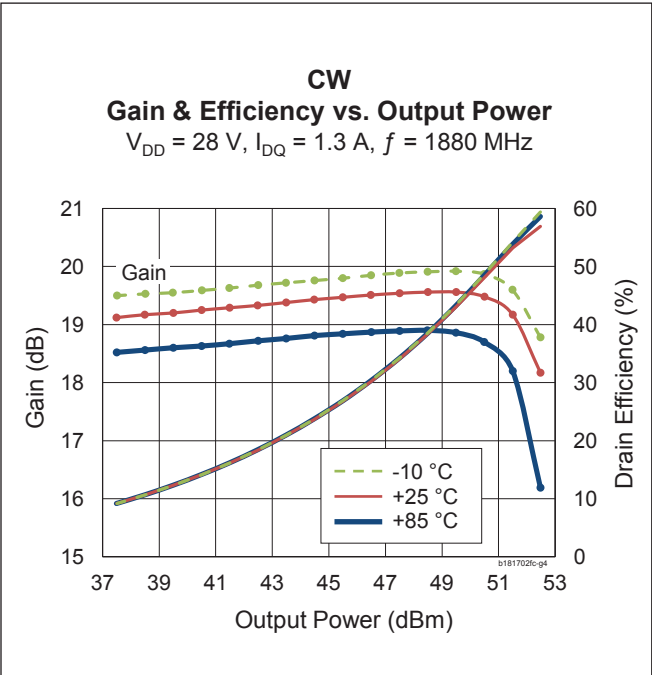


Single-carrier Broadband Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 1.3\text{ A}$, $P_{OUT} = 80\text{ W}$,
3GPP WCDMA signal, PAR = 10 dB

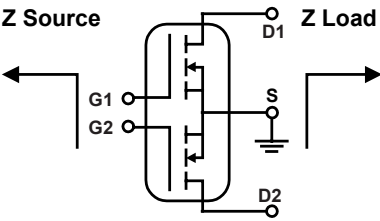


Typical Performance (cont.)

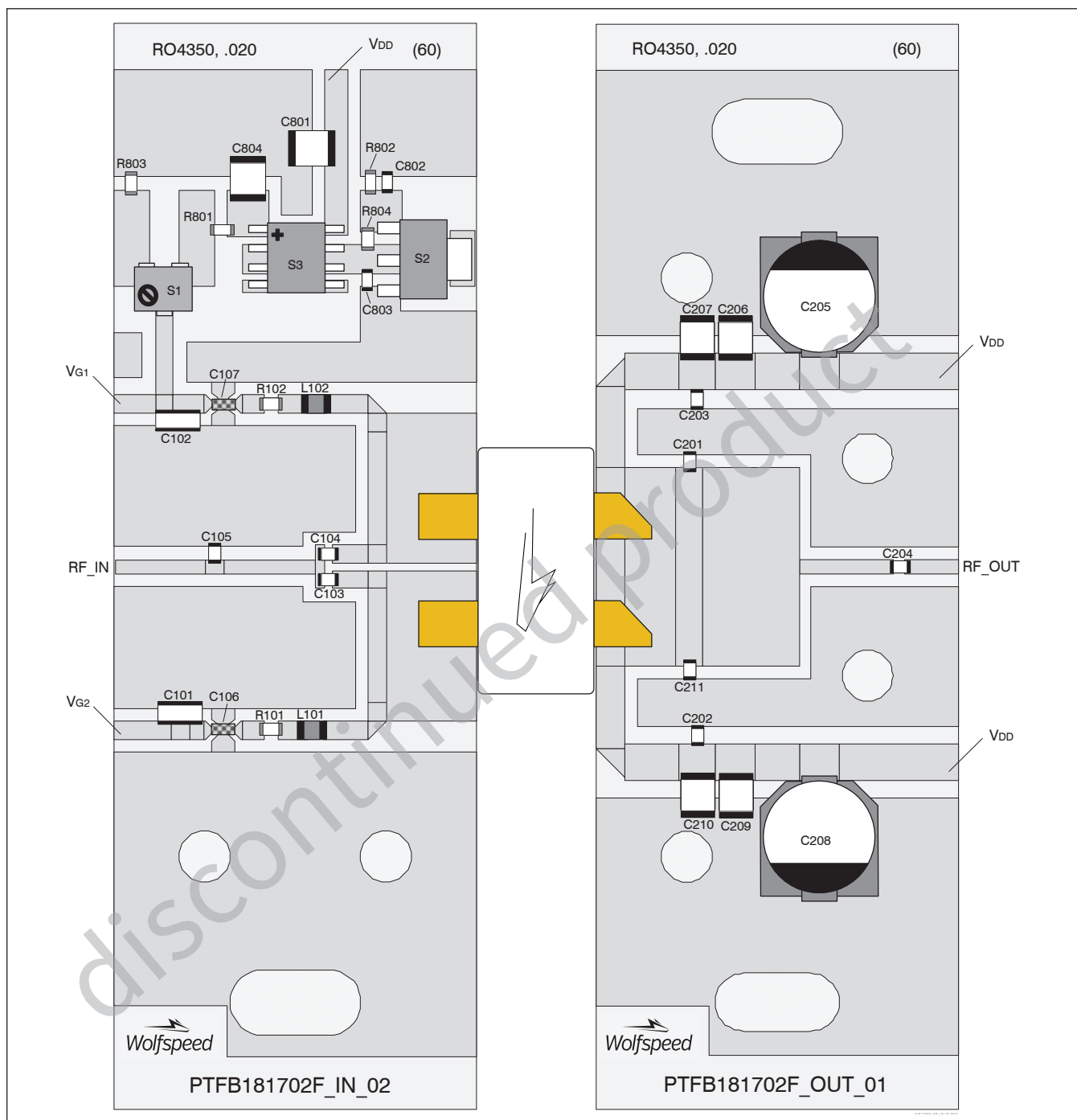


Broadband Circuit Impedance

Frequency MHz	Z Source Ω		Z Load Ω	
	R	jX	R	jX
1805	2.99	-6.14	1.87	-4.46
1825	2.99	-6.08	1.52	-4.50
1845	3.00	-6.03	1.35	-4.34
1865	3.00	-5.97	1.25	-4.19
1880	3.00	-5.94	1.20	-4.08



Reference Circuit



Reference circuit assembly diagram (not to scale)*

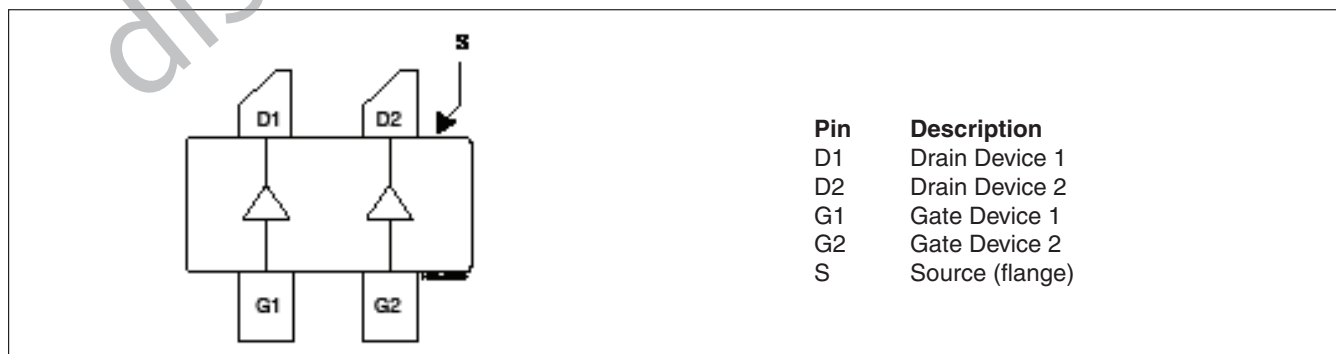
Reference Circuit (cont.)**Reference Circuit Assembly**

DUT PTFB181702FC

Test Fixture Part No. LTN/PTFB181702FC

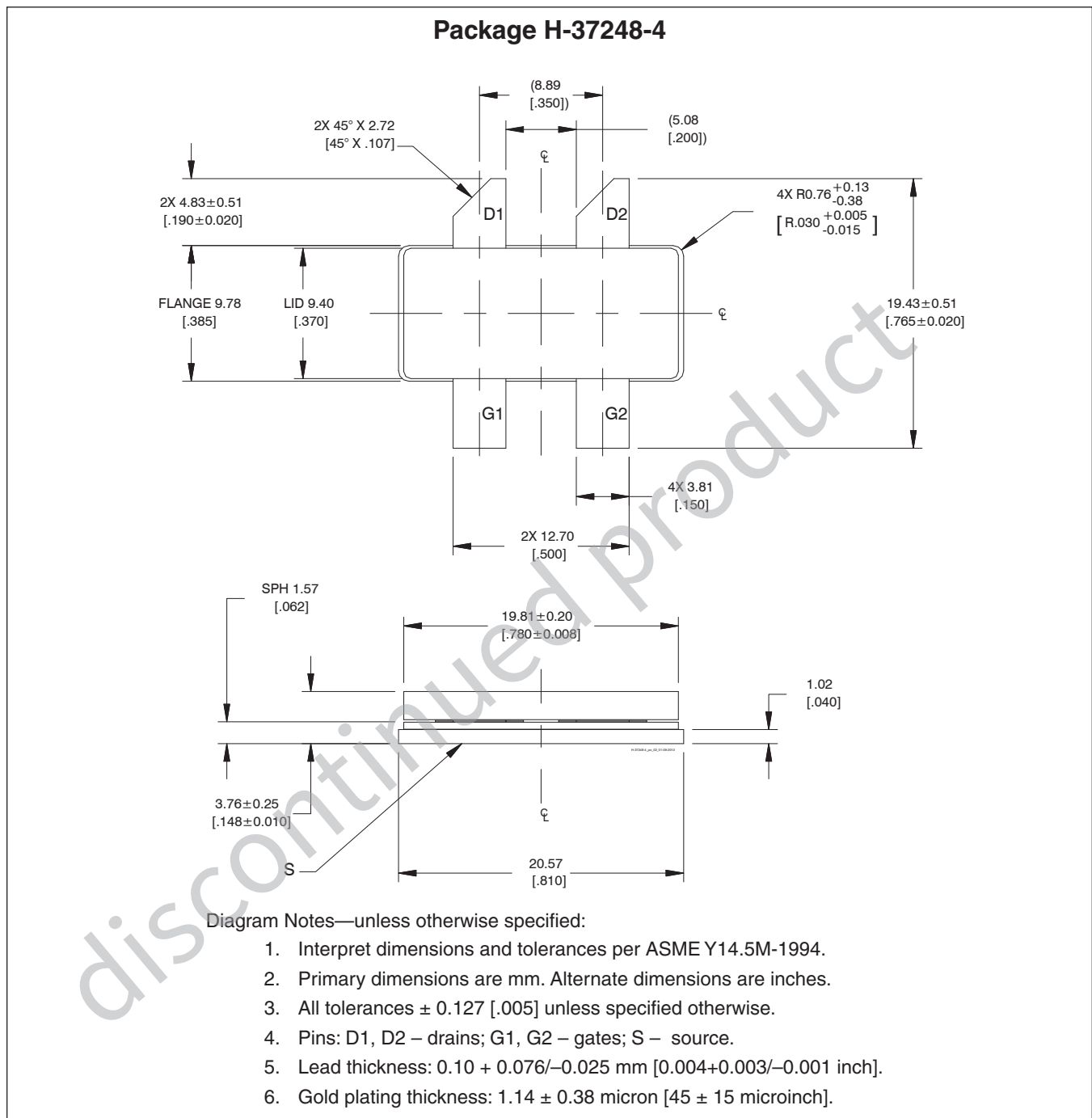
PCB Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$ Find Gerber files for this test fixture on the Wolfspeed Web site at <http://www.wolfspeed.com/RF>**Components Information**

Component	Description	Suggested Supplier	P/N
Input			
C101, C102	Capacitor, 10 μ F	Digi-Key	490-4393-2-ND
C103, C104	Capacitor, 18 pF	ATC	ATC800A180JT250XT
C105	Capacitor, 1.5 pF	ATC	ATC800A1R5BT250XT
C106, C107	EMI Suppression Capacitor	Digi-Key	NFM18PS105R0J3D-ND
C801, C804	Capacitor, 10 μ F	Digi-Key	587-1818-2-ND
C802	Chip capacitor, 1000 pF	Digi-Key	PCC1772CT-ND
C803	Capacitor, 1 μ F	Digi-Key	490-4736-2-ND
L101, L102	Inductor, 27.3 nH	Coilcraft	0908SQ-27NGLB
R101, R102, R803	Resistor, 10 ohm	Digi-Key	P10GTR-ND
R801	Resistor, 100 ohm	Digi-Key	P100GTR-ND
R802	Resistor, 1300 ohm	Digi-Key	P1.3KGTR-ND
R804	Resistor, 1200 ohm	Digi-Key	P1.2KGTR-ND
S1	Potentiometer, 2k Ω	Digi-Key	3224W-202ECT-ND
S2	Transistor	Digi-Key	BCP56-ND
S3	Voltage Regulator	Digi-Key	LM7805
Output			
C201, C211	Chip capacitor, 1.2 pF	ATC	ATC800A1R2BT250XT
C202, C203, C204	Chip capacitor, 18 pF	ATC	ATC800A180JT250XT
C205, C208	Capacitor, 220 μ F	Digi-Key	PCE4444TR-ND
C206, C207, C209, C210	Capacitor, 10 μ F	Digi-Key	587-1818-2-ND

Pinout Diagram (top view)

Lead connections for PTFB181702FC

Package Outline Specifications



Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2012-05-29	Advance	All	Data Sheet reflects advance specification for product development
02	2012-10-15	Advance	All	Data sheet reflects released product specifications
02.1	2016-06-10	Production	2, 7	Updated ordering code to R0, revised package outline-minor changes
03	2018-02-21	Production	All	Not recommended for new design
04	2018-08-20	Production	All	Converted to Wolfspeed data sheet
05	2020-06-02	End of life	All	Product discontinued

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

Disclaimer

Specifications are subject to change without notice. Cree, Inc. believes the information contained within this data sheet to be accurate and reliable. However, no responsibility is assumed by Cree for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Cree. Cree makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose. "Typical" parameters are the average values expected by Cree in large quantities and are provided for information purposes only. These values can and do vary in different applications and actual performance can vary over time. All operating parameters should be validated by customer's technical experts for each application. Cree products are not designed, intended or authorized for use as components in applications intended for surgical implant into the body or to support or sustain life, in applications in which the failure of the Cree product could result in personal injury or death or in applications for planning, construction, maintenance or direct operation of a nuclear facility.