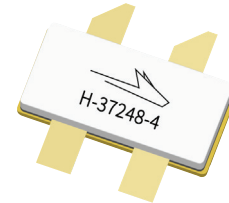


PTFC261402FC

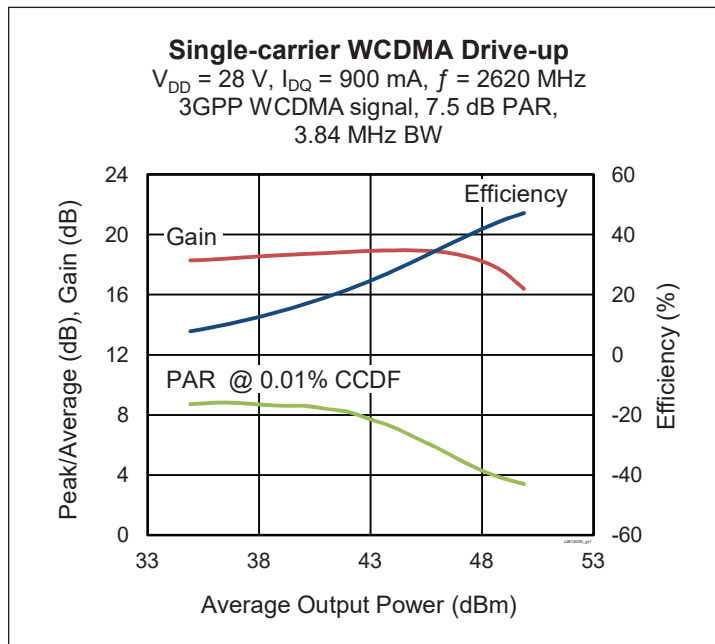
Thermally-Enhanced High Power RF LDMOS FET
140 W, 28 V, 2620 – 2690 MHz

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

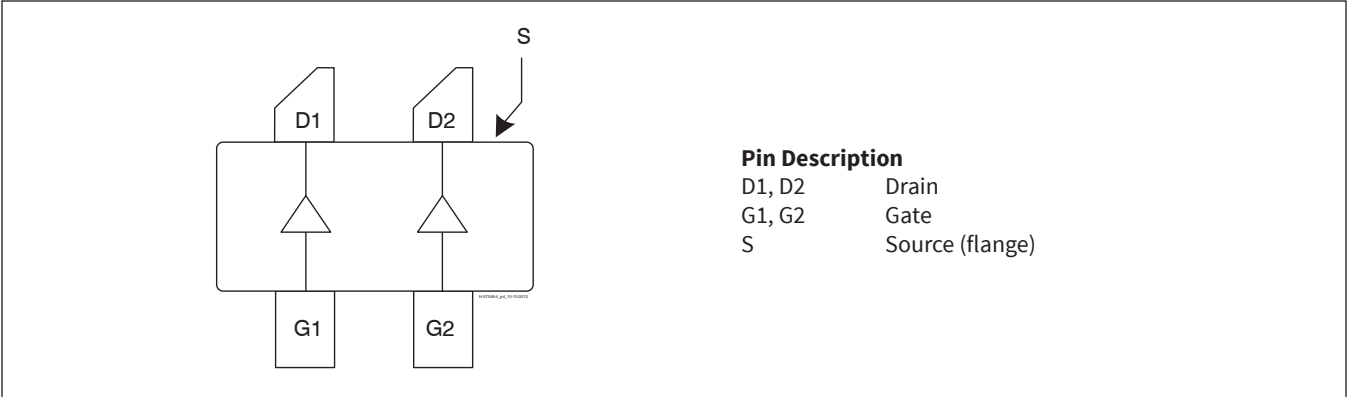
Maximum Ratings

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

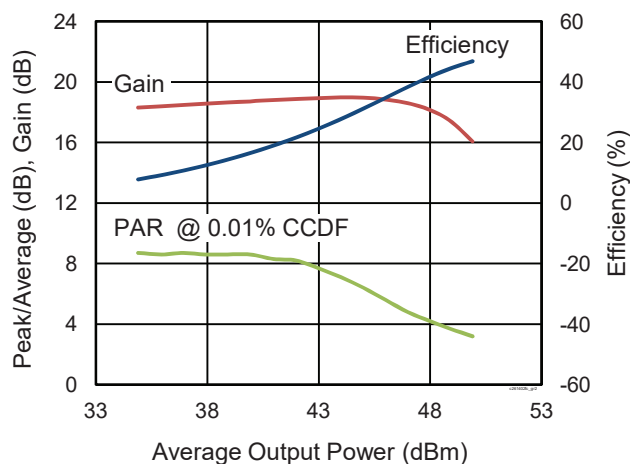


Lead connections for PTFC261402FC

Typical Performance (data taken in a production test fixture)

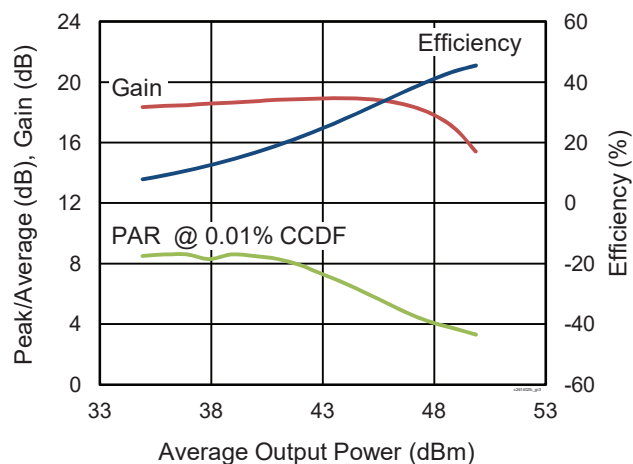
Single-carrier WCDMA Drive-up

$V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$, $f = 2655\text{ MHz}$
3GPP WCDMA signal, 7.5 dB PAR,
3.84 MHz BW



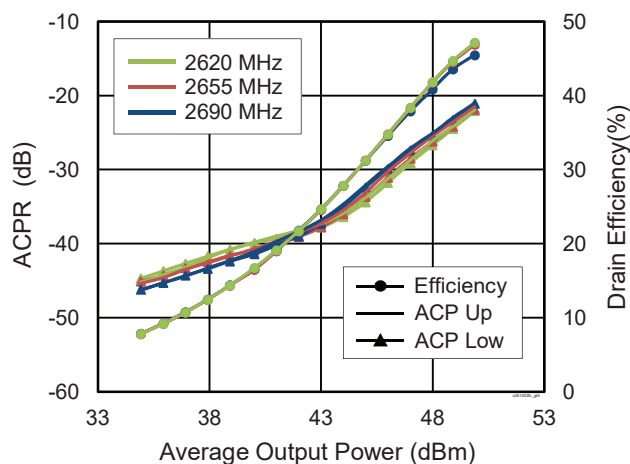
Single-carrier WCDMA Drive-up

$V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$, $f = 2690\text{ MHz}$
3GPP WCDMA signal, 7.5 dB PAR,
3.84 MHz BW



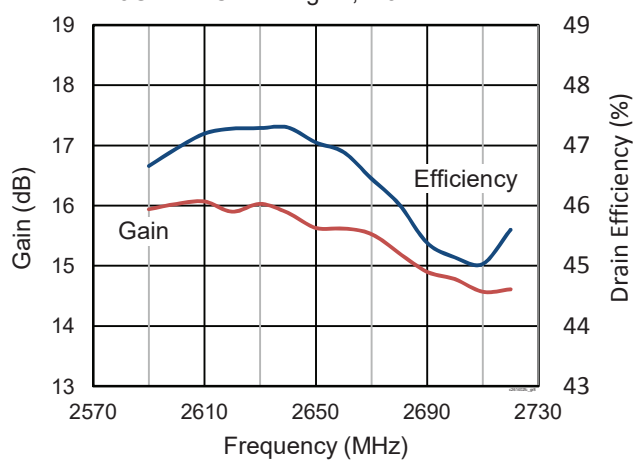
Single-carrier WCDMA 3GPP Drive-up

$V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$,
3GPP WCDMA signal, 7.5 dB PAR,
3.84 MHz BW



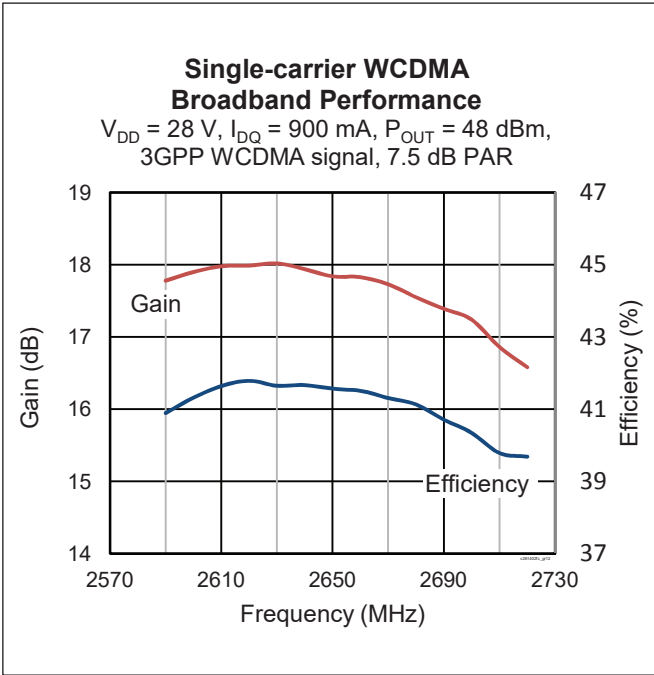
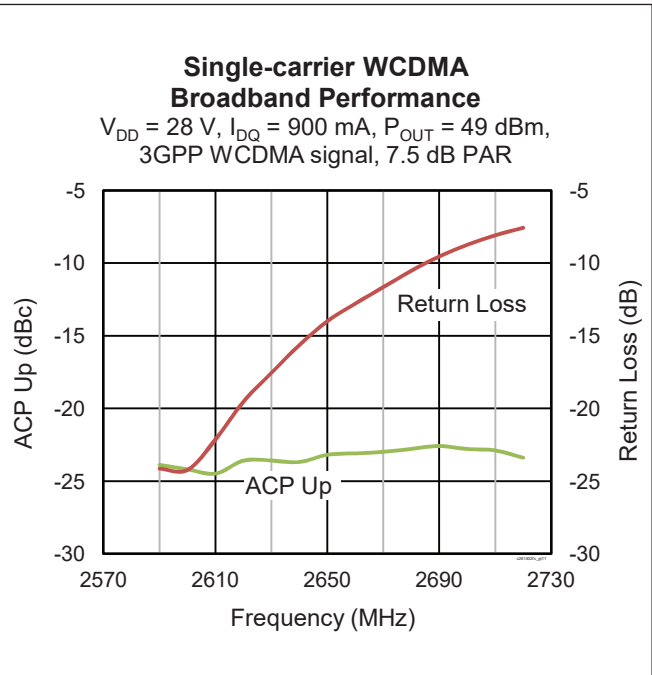
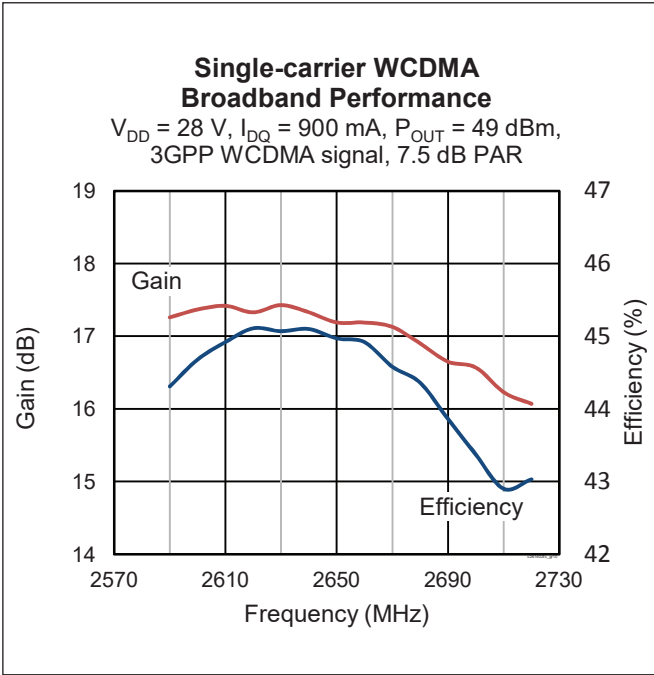
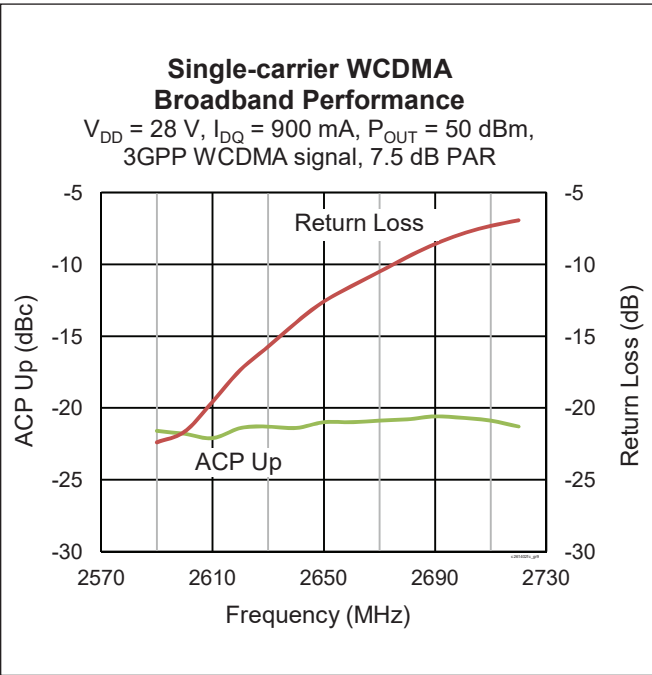
Single-carrier WCDMA Broadband Performance

$V_{DD} = 28\text{ V}$, $I_{DQ} = 900\text{ mA}$, $P_{OUT} = 50\text{ dBm}$,
3GPP WCDMA signal, 7.5 dB PAR

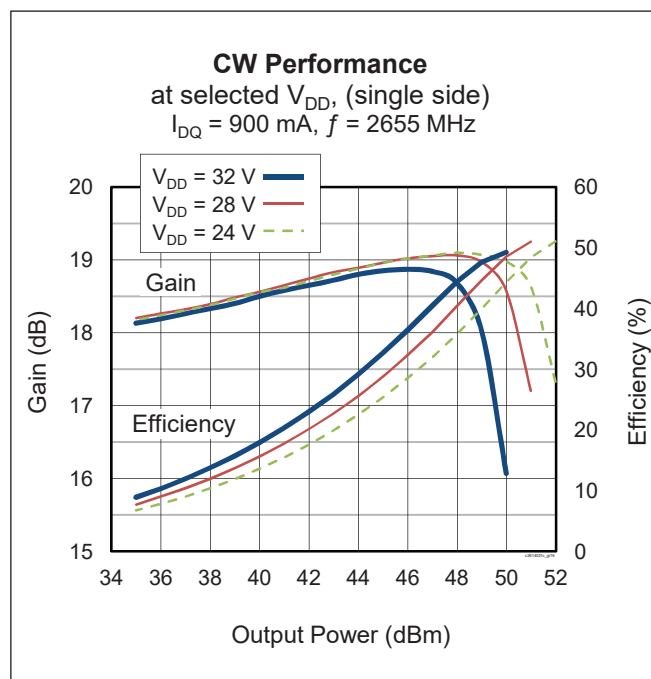
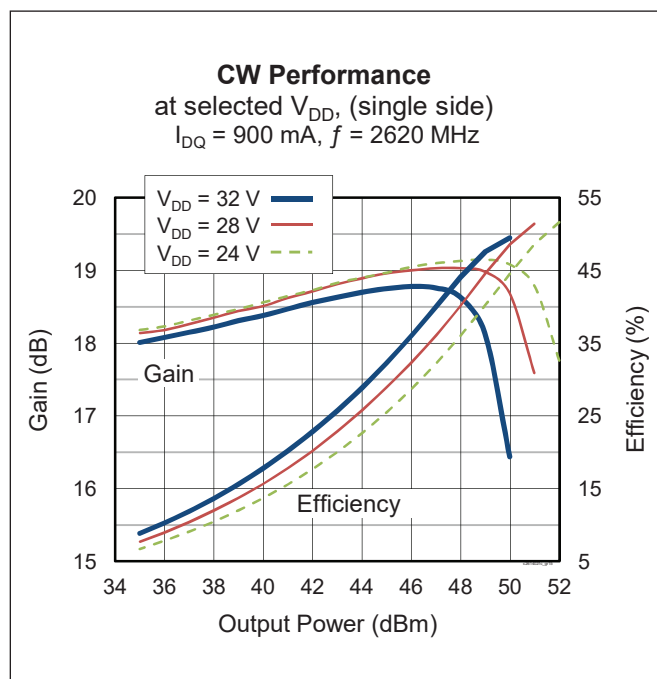
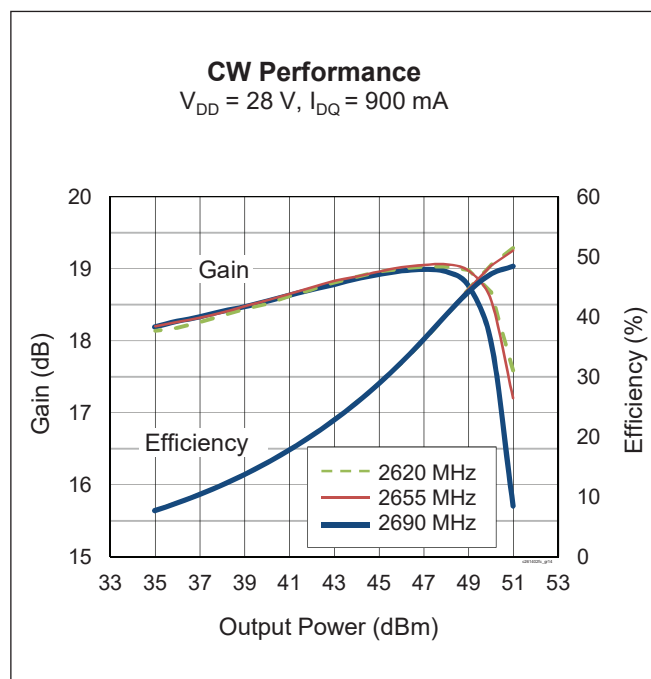
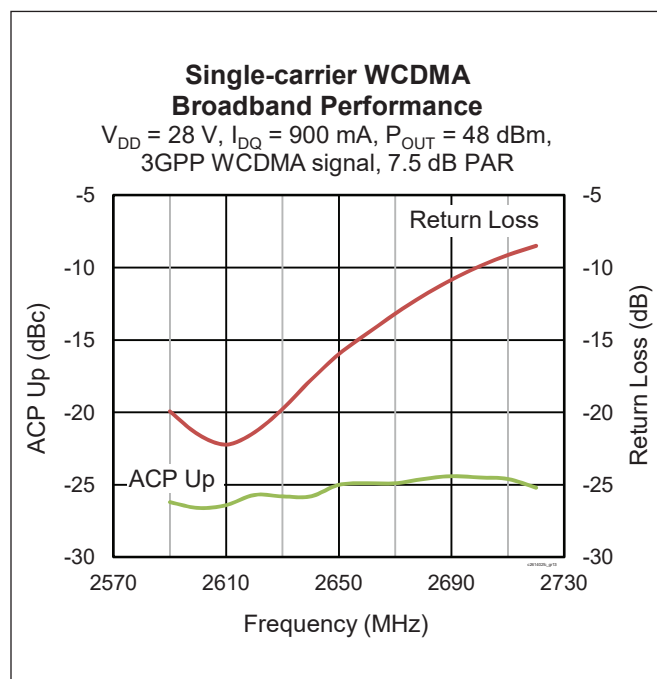




Typical Performance (cont.)

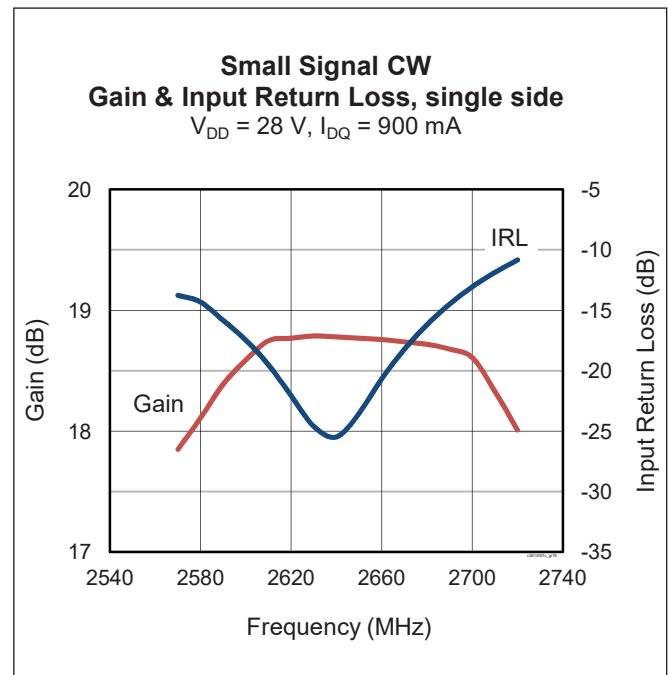
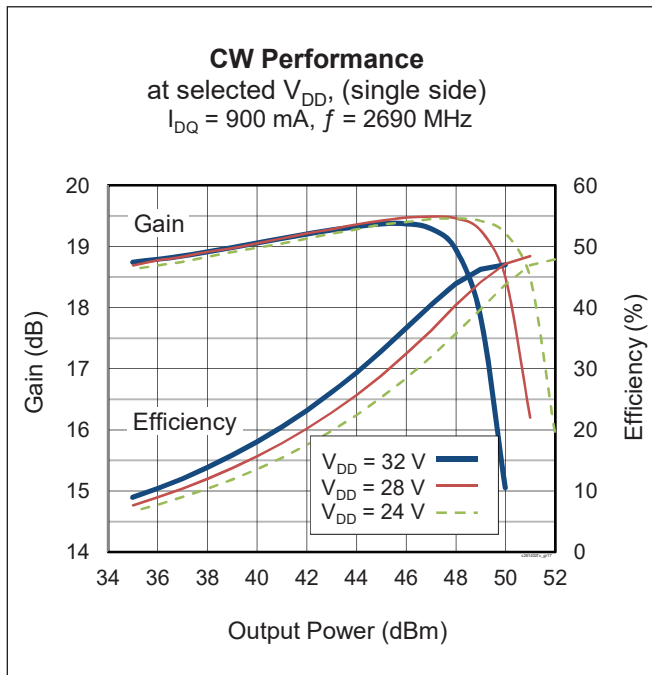


Typical Performance (cont.)

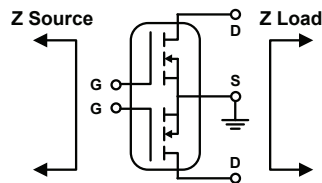




Typical Performance (cont.)



Load Pull Performance

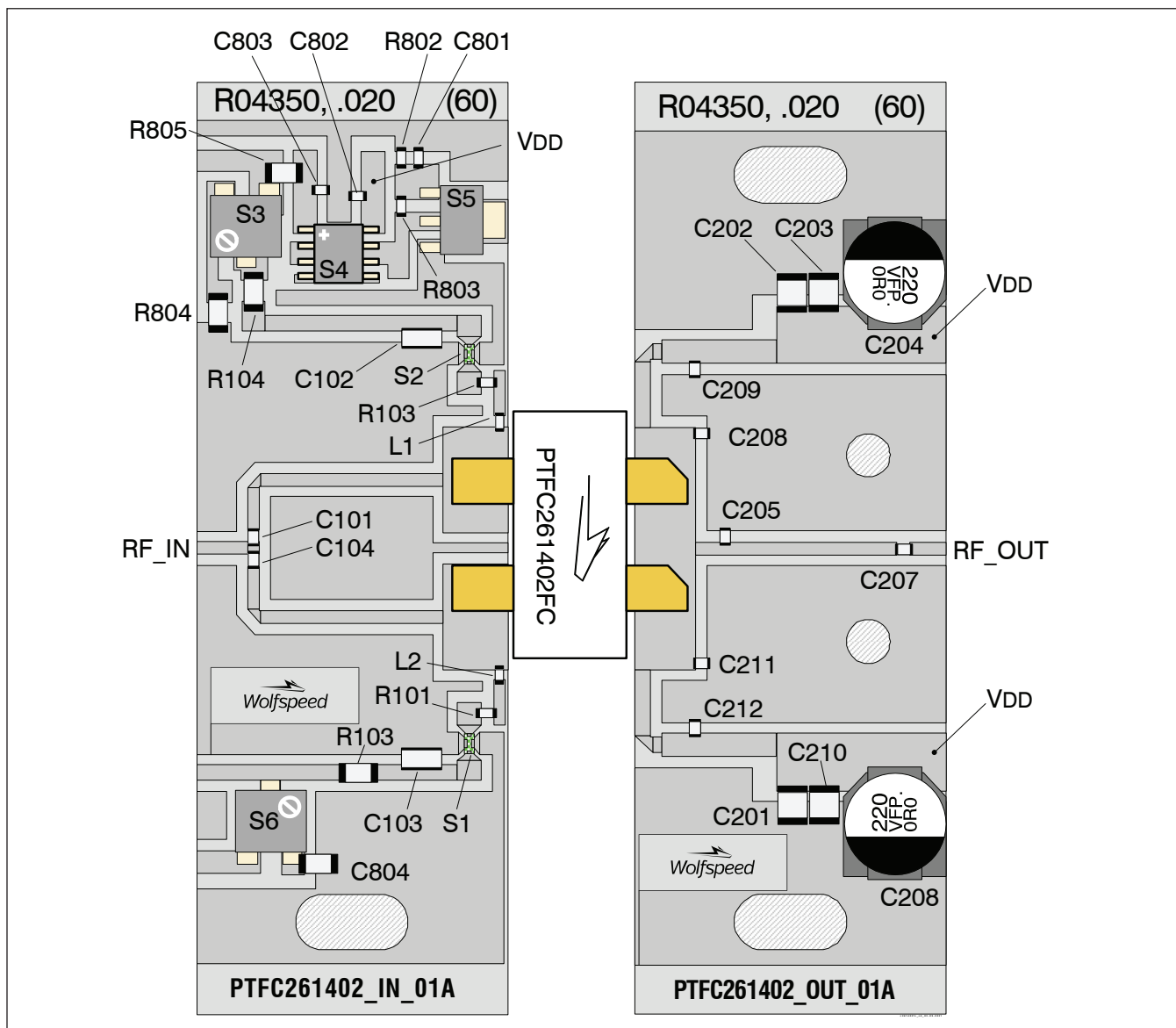


Single Side Load Pull Performance – Pulsed CW signal: 16 μ sec, 10% duty cycle; 28 V, 450 mA

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-V1
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)	



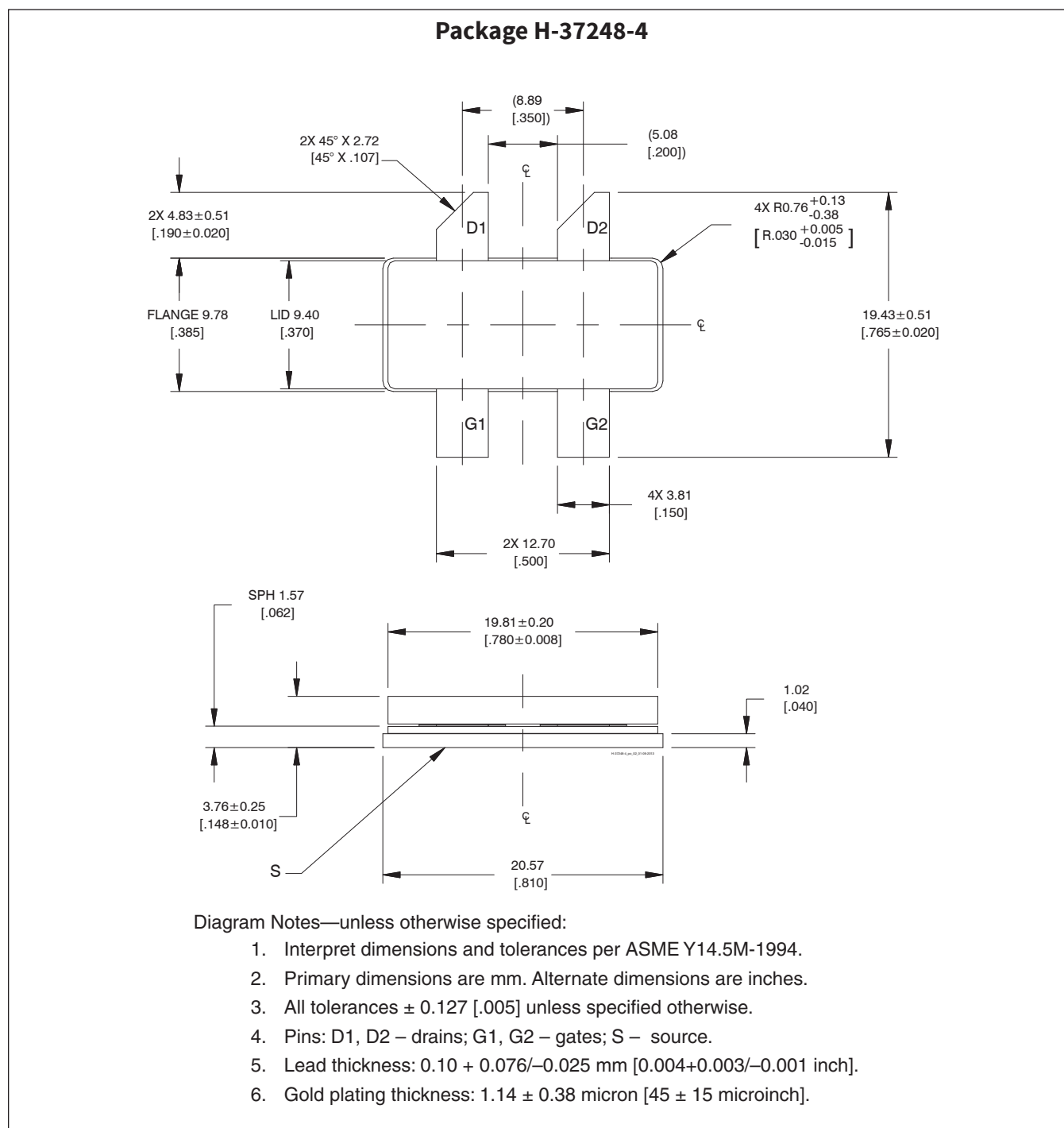
Reference circuit assembly diagram (not to scale)



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.
06.1	2021-03-09	Production	7	Updated reference circuit revision number

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