

# PTFC261402FC

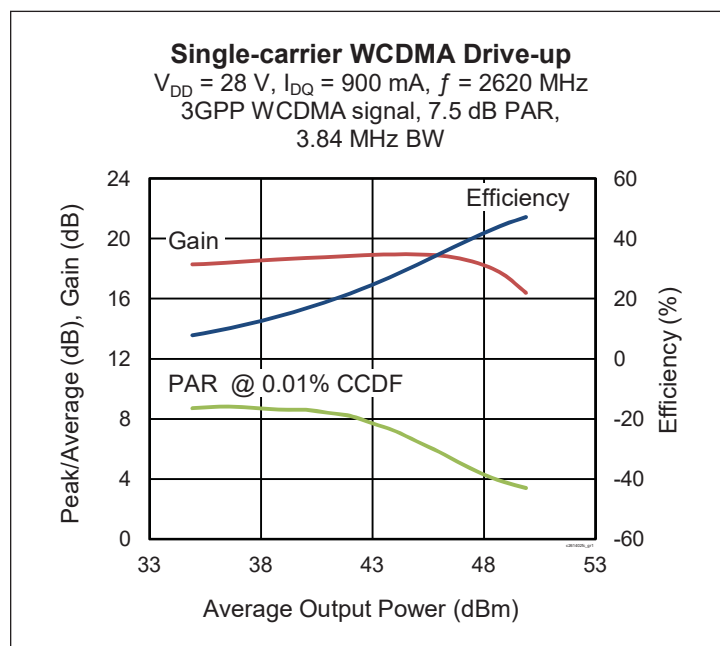
## Thermally-Enhanced High Power RF LDMOS FET 140 W, 28 V, 2620 – 2690 MHz

### 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	$\eta_D$	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	$\mu\text{A}$
	$V_{DS} = 63\text{ V}, V_{GS} = 0\text{ V}$	$I_{DSS}$	—	—	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	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.1	—	$\Omega$
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ} = 900\text{ mA}$	$V_{GS}$	—	2.5	—	V

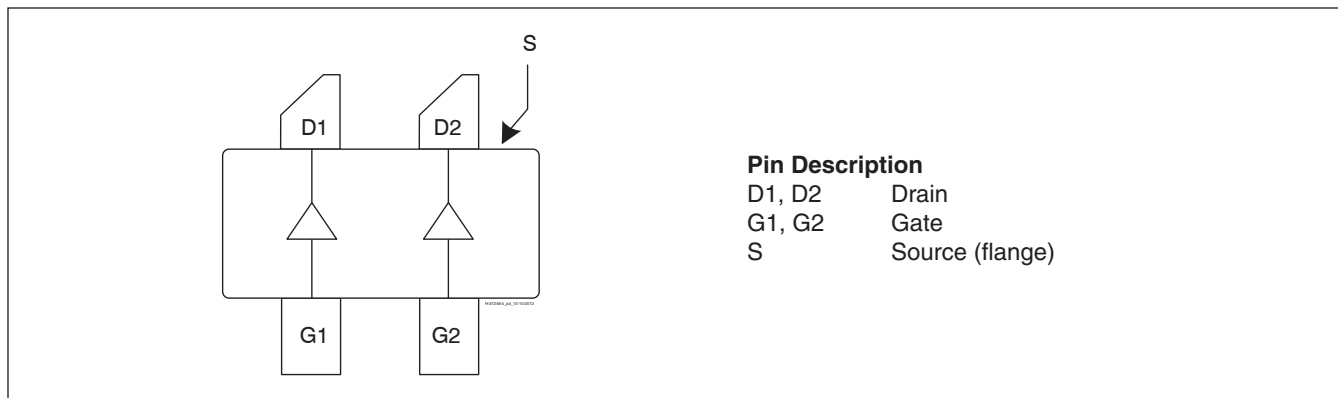
**Maximum Ratings**

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**

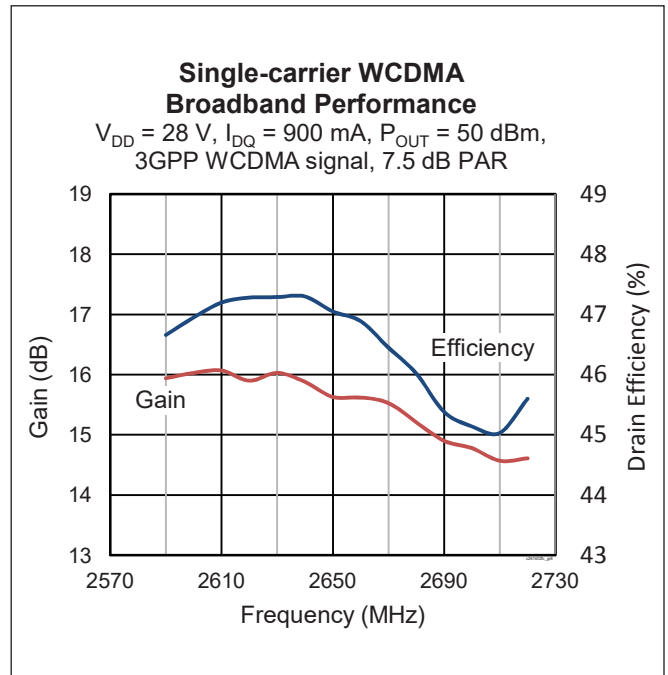
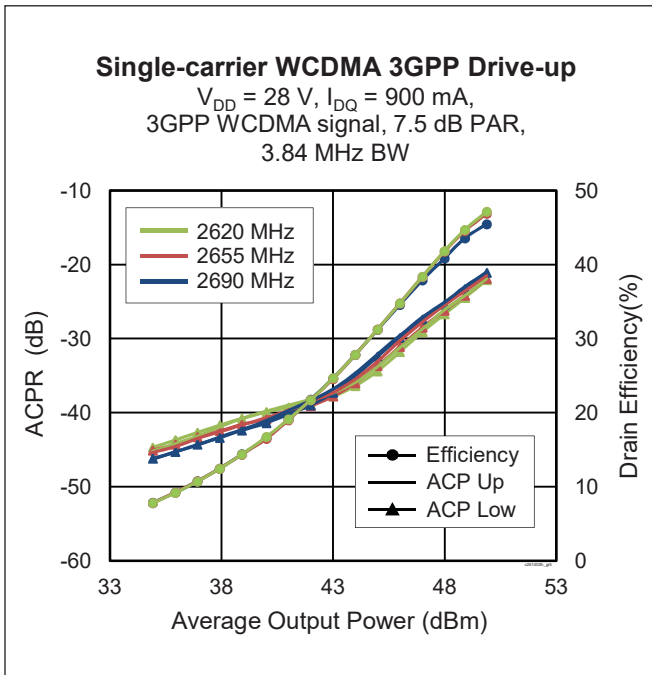
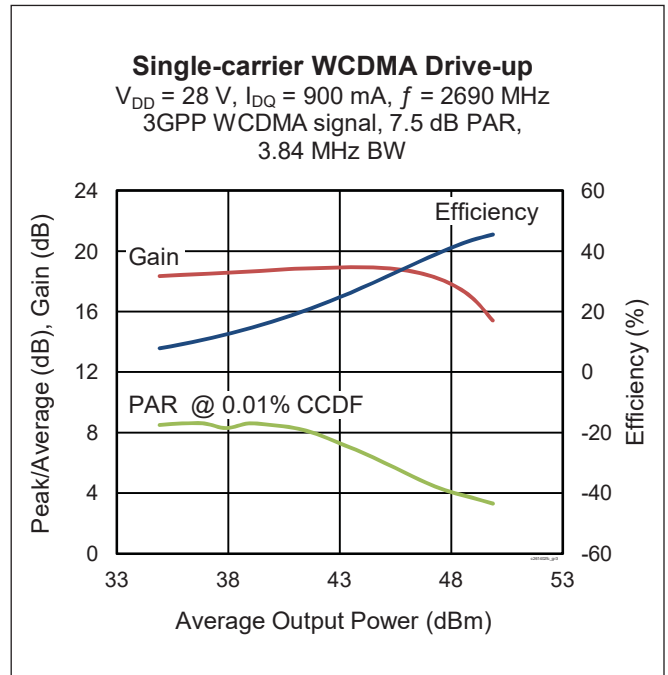
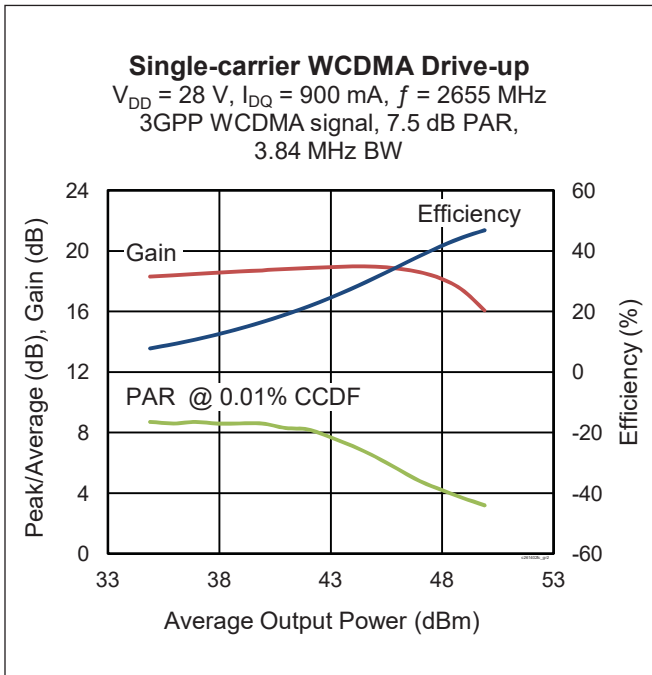
Type and Version	Order Code	Package and Description	Shipping
PTFC261402FC V1 R0	PTFC261402FC-V1-R0	Thermally-enhanced earless flange, push-pull	Tape & Reel, 50 pcs
PTFC261402FC V1 R250	PTFC261402FC-V1-R250	Thermally-enhanced earless flange, push-pull	Tape & Reel, 250 pcs

**Pinout Diagram**



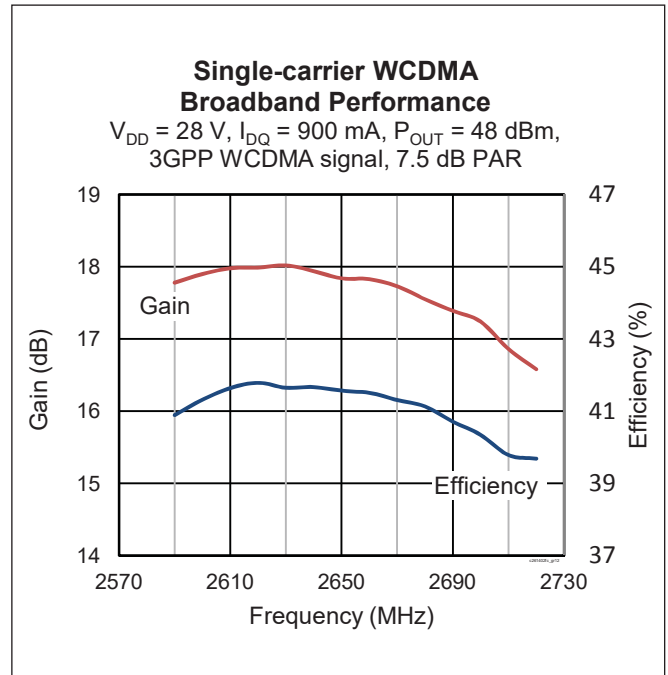
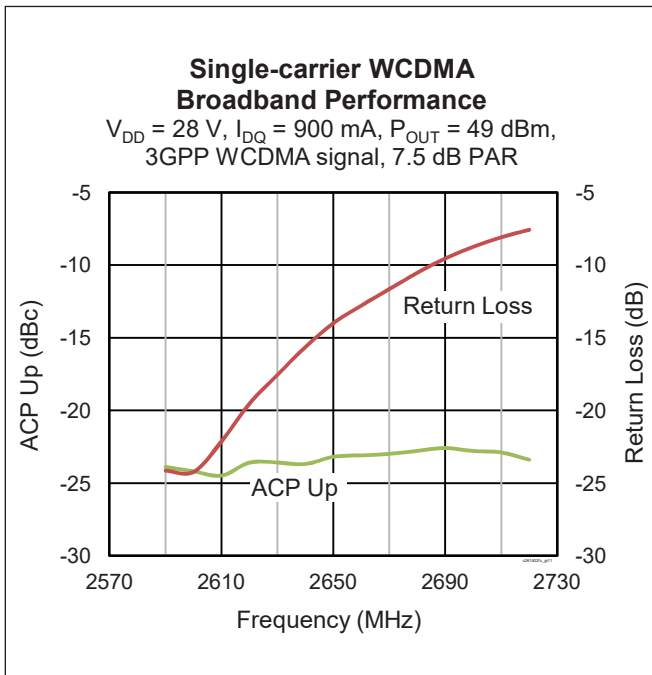
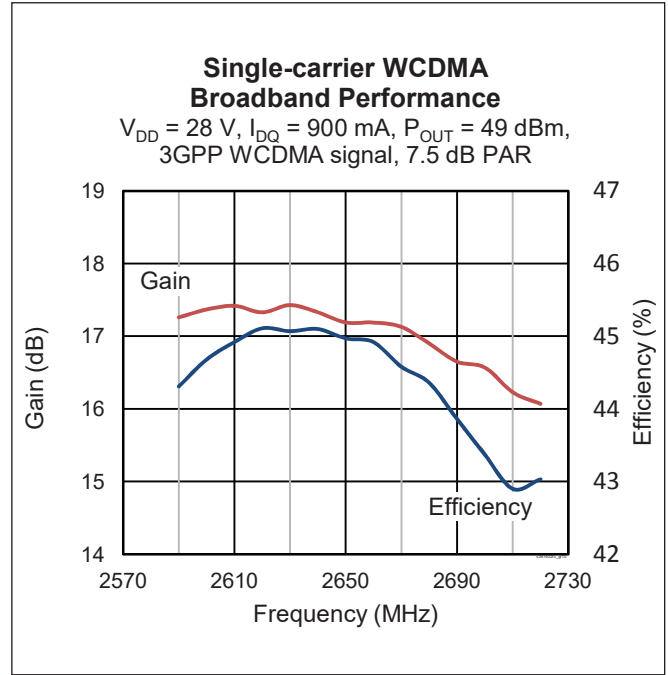
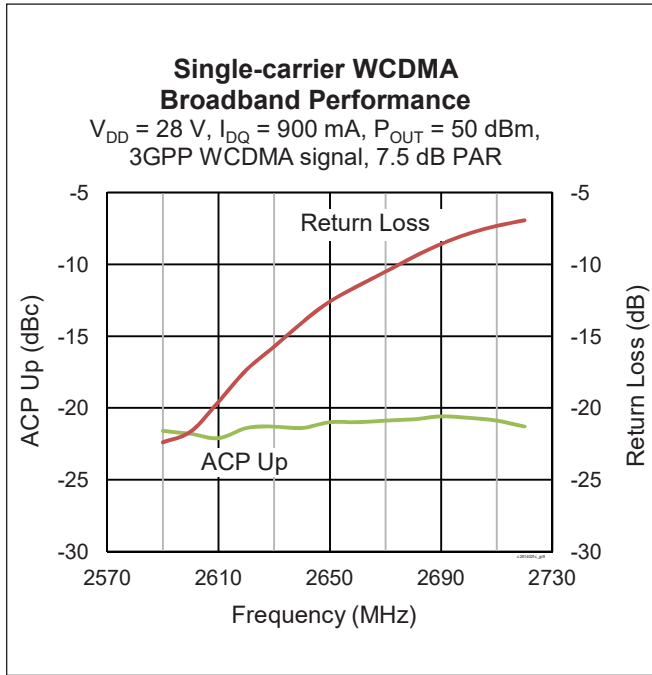
Lead connections for PTFC261402FC

**Typical Performance** (data taken in a production test fixture)

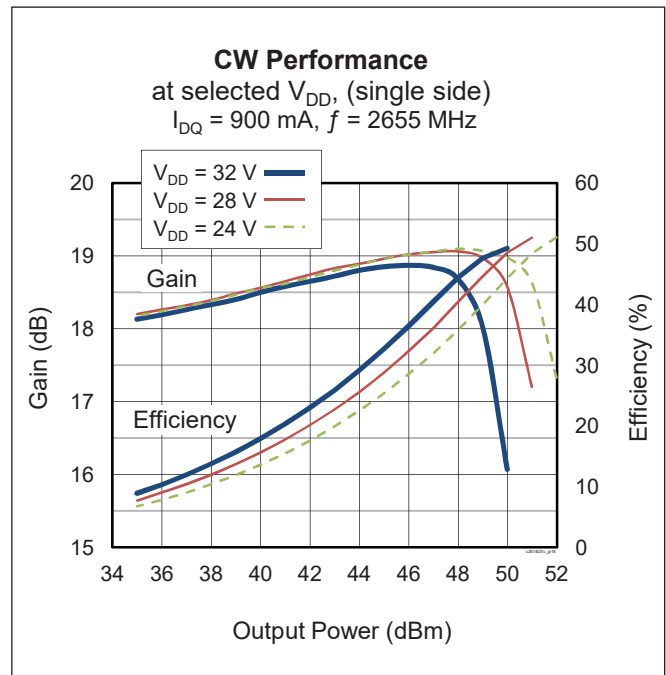
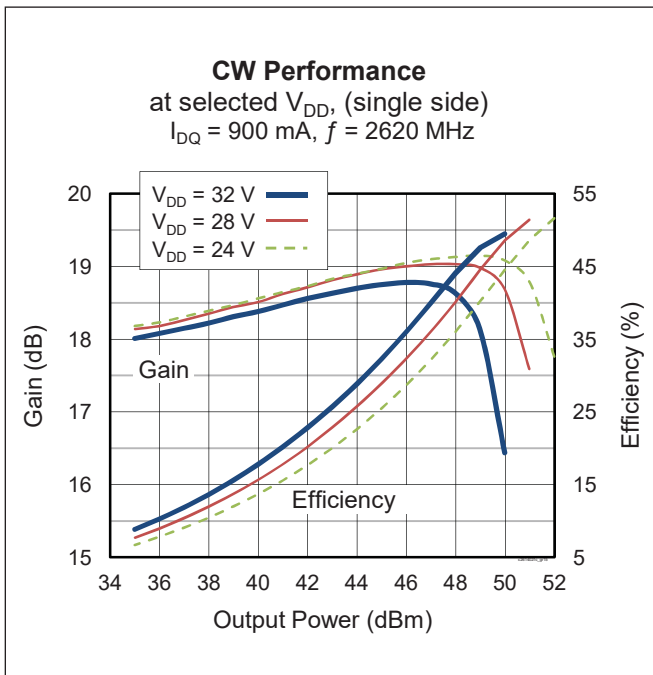
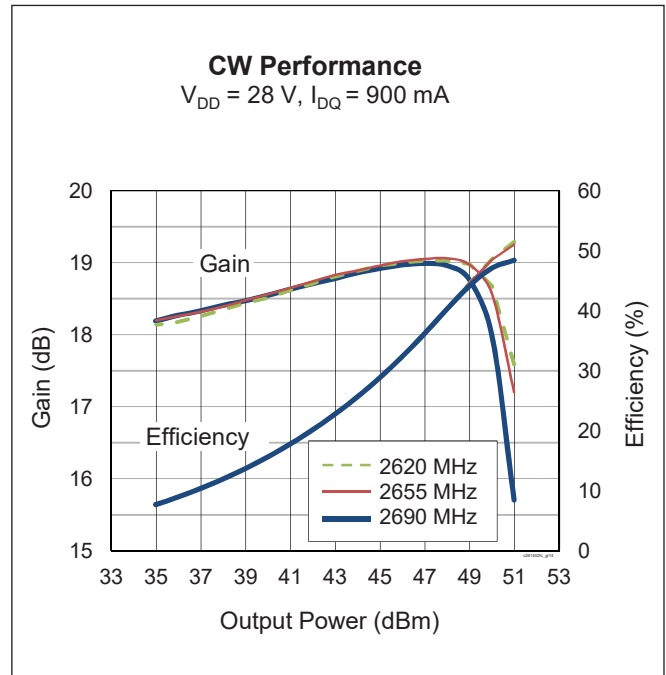
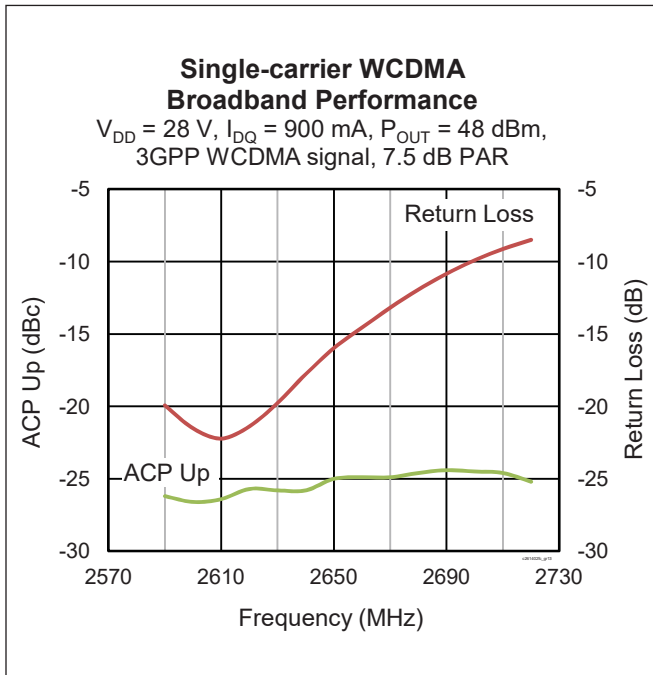




**Typical Performance** (cont.)

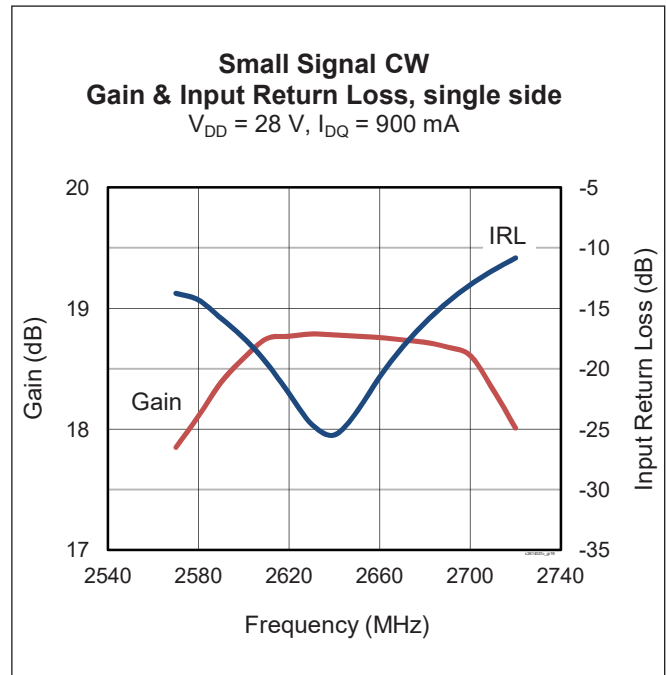
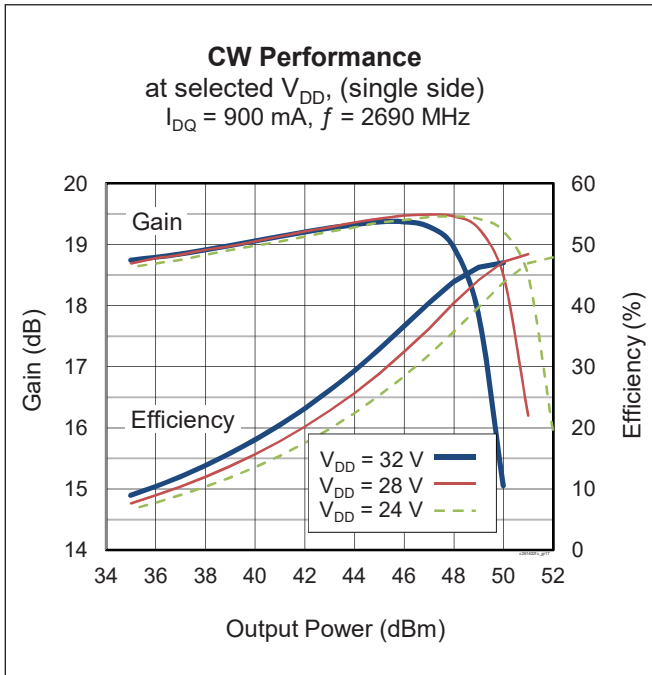


Typical Performance (cont.)

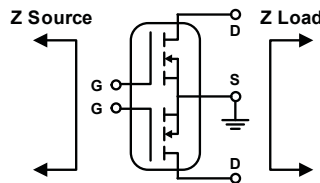




**Typical Performance (cont.)**



**Load Pull Performance**

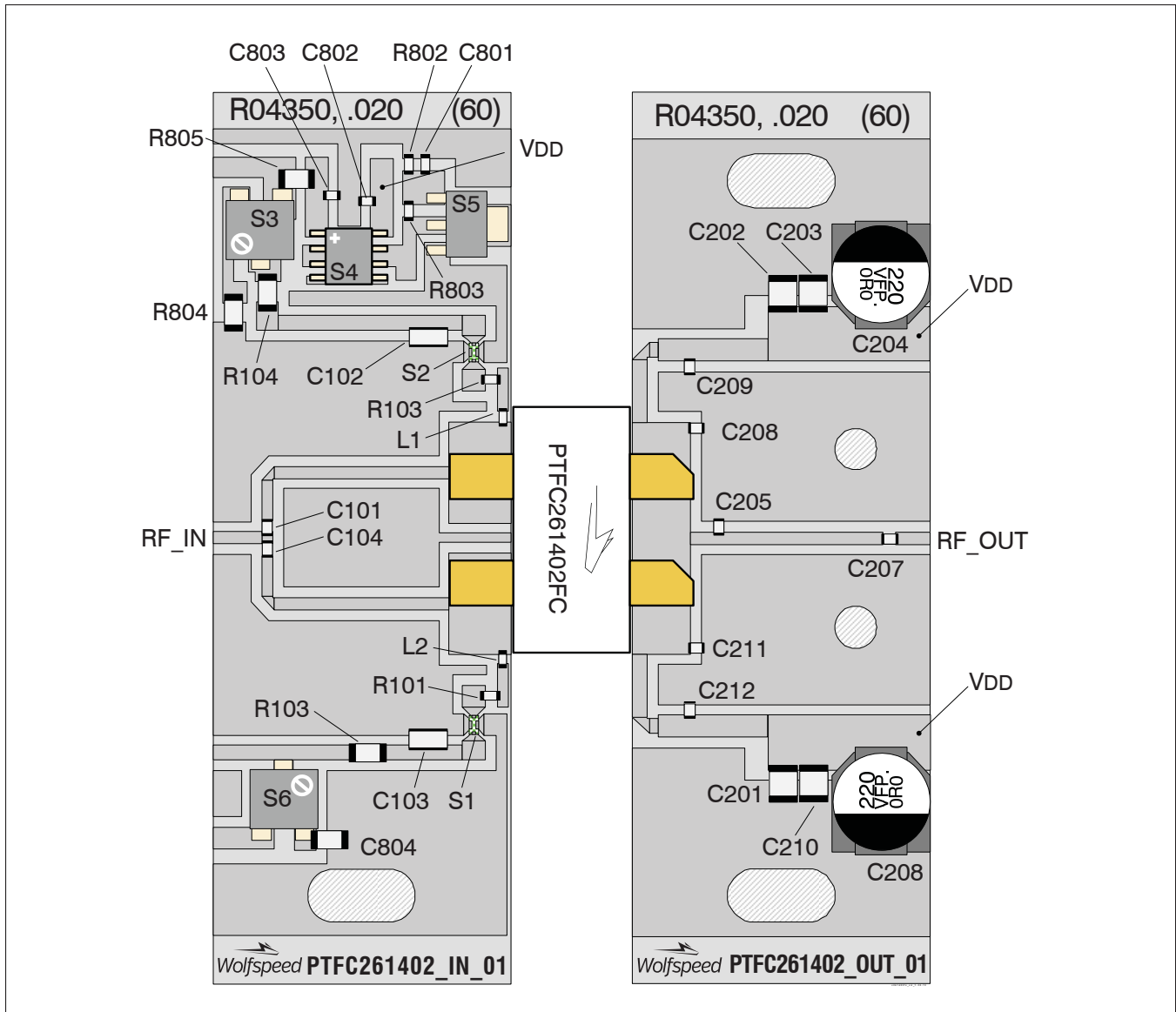


**Single Side Load Pull Performance – Pulsed CW signal: 16  $\mu\text{sec}$ , 10% duty cycle; 28 V, 450 mA**

Class AB		$P_{1\text{dB}}$									
		Max Output Power					Max PAE				
Freq [MHz]	$Z_s \Omega$	$Z_l \Omega$	Gain [dB]	$P_{\text{OUT}}$ [dBm]	$P_{\text{OUT}}$ [W]	PAE %	$Z_l \Omega$	Gain [dB]	$P_{\text{OUT}}$ [dBm]	$P_{\text{OUT}}$ [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
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 ( <a href="http://www.wolfspeed.com/RF">www.wolfspeed.com/RF</a> )	



Reference circuit assembly diagram (not to scale)



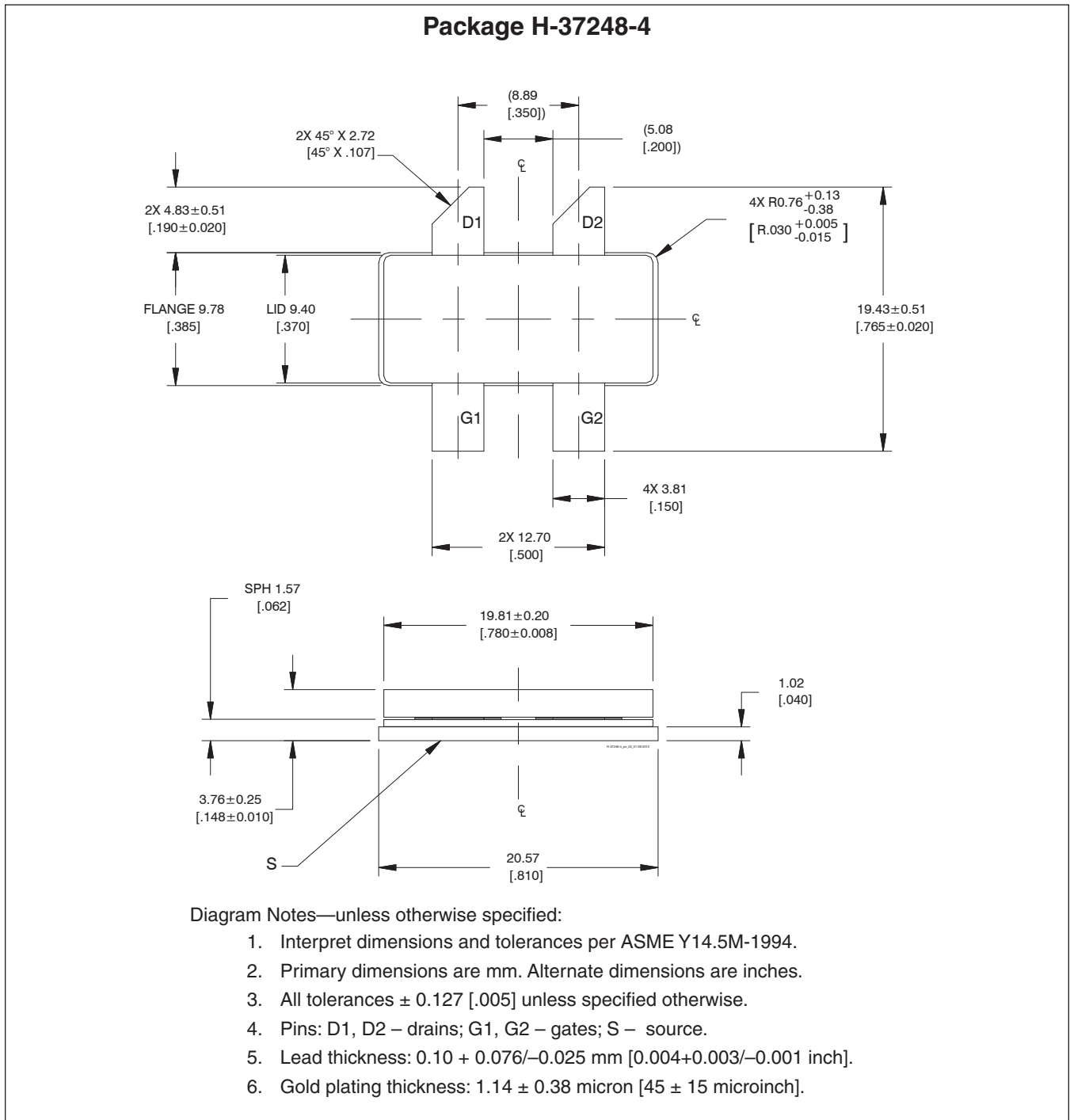
## Reference Circuit (cont.)

### Components Information

Component	Description	Suggested Supplier	P/N
<b>Input</b>			
C101, C104	Chip capacitor, 10 pF	ATC	ATC800A100JT
C102, C103	Capacitor, 10 $\mu$ 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 $\mu$ F	Murata Electronics North America	NFM18PS105R0J3D
S3	Potentiometer, 2k $\Omega$	Bourns Inc.	3224W-1-202E
S4	Voltage Regulator	National Semiconductor	LM7805
S5	Transistor	Infineon Technologies	BCP56
<b>Output</b>			
C201, C202, C203, C210	Capacitor, 10 $\mu$ F	Taiyo Yuden	UMK325C7106MM-T
C204, C208	Electrolytic capacitor, 220 $\mu$ 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.

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## Notes

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