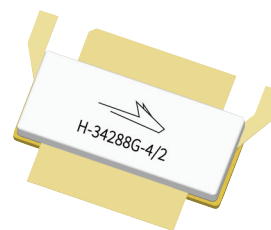


PTFB072707FH

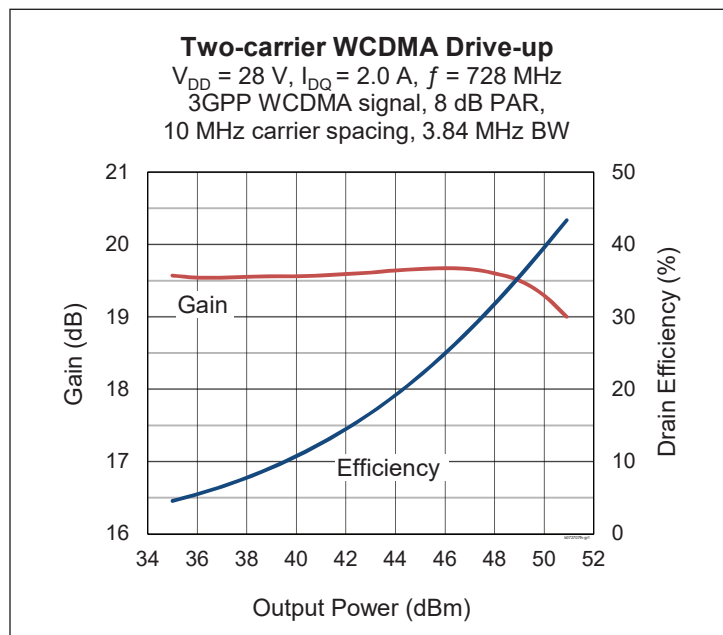
Thermally-Enhanced High Power RF LDMOS FET 270 W, 28 V, 728 – 768 MHz

Description

The PTFB072707FH is a 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.



PTFB072707FH
Package H-34288G-4/2



Features

- Broadband internal matching
- Wide video bandwidth
- Typical pulsed performance, 768 MHz, 28 V (10 μs pulse width, 10% duty cycle, class AB)
 - Output power at $P_{1\text{dB}} = 320\text{ W}$
 - Gain = 17.5 dB
 - Efficiency = 60%
- Integrated ESD protection: Human Body Model (HBM) Class 2 minimum (per JESD22-A114)
- Low thermal resistance
- RoHS compliant
- Capable of handling 5:1 VSWR @ 28 V, 270 W (CW) output power

RF Specifications

One-carrier WCDMA Characteristics (tested in Wolfspeed production test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ} = 2.0\text{ A}$, $P_{OUT} = 60\text{ W}$ average, $f = 768\text{ MHz}$. 3GPP signal: 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF.

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	18	18.5	—	dB
Drain Efficiency	η_D	38	39	—	%
Adjacent Channel Power Ratio	ACPR	—	-33	-32.5	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}	—	—	1.0	μA
	$V_{DS} = 63\text{ V}$, $V_{GS} = 0\text{ V}$	I_{DSS}	—	—	10.0	μA
Gate Leakage Current	$V_{GS} = 10\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	—	—	1.0	μA
On-State Resistance	$V_{GS} = 10\text{ V}$, $V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}$, $I_{DQ} = 2.0\text{ A}$	V_{GS}	2.5	3.8	4.5	V

Maximum Ratings

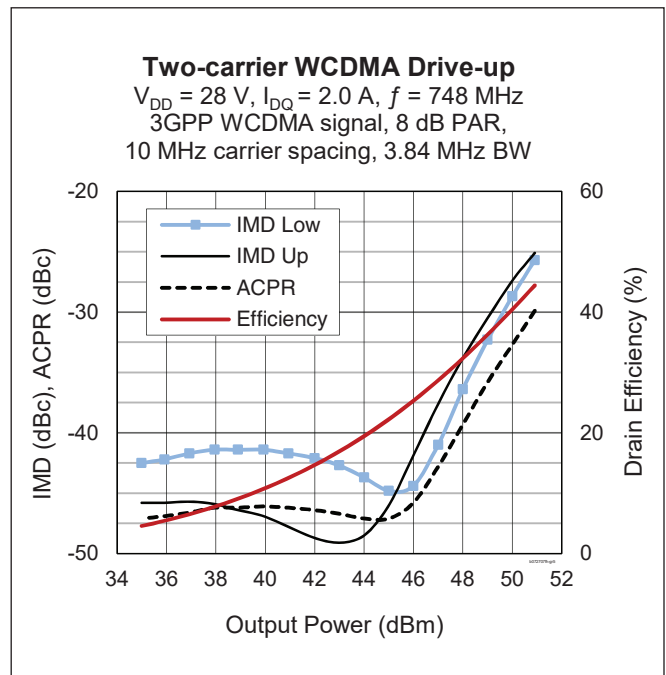
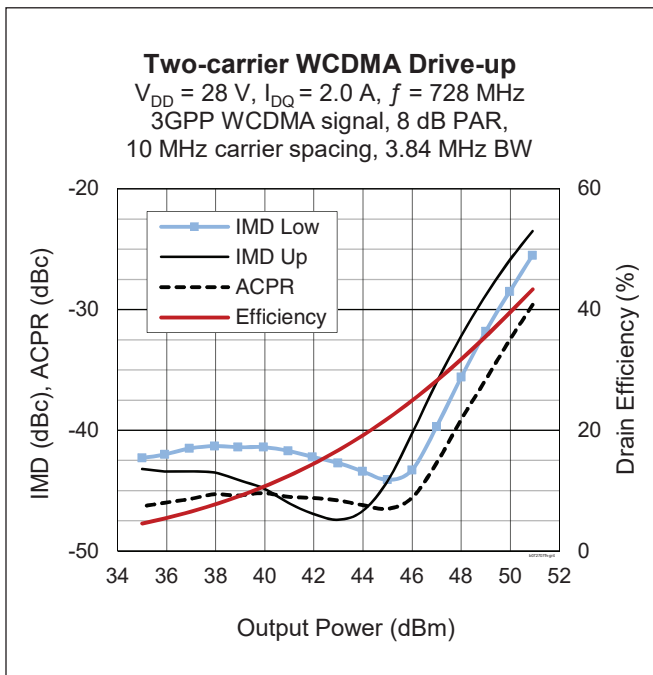
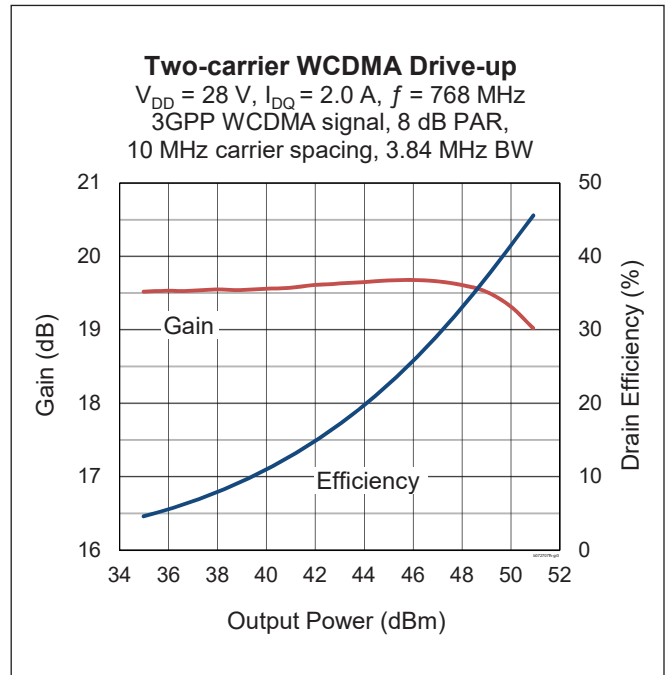
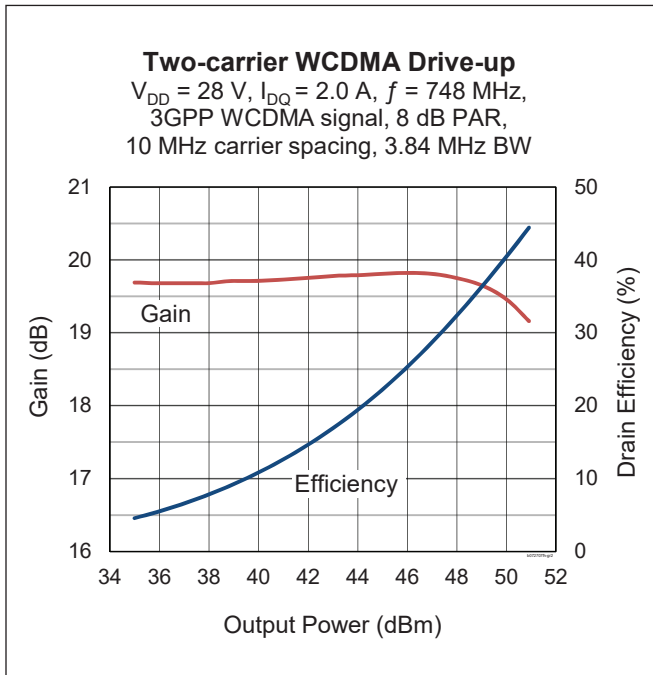
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	-6 to +10	V
Junction Temperature	T_J	200	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +150	$^{\circ}\text{C}$
Thermal Resistance ($T_{CASE} = 70^{\circ}\text{C}$, 240 W CW)	$R_{\theta JC}$	0.17	$^{\circ}\text{C/W}$

Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PTFB072707FH V1 R0	PTFB072707FH-V1-R0	H-34288G-4/2, ceramic open-cavity, earless flange	Tape & reel, 50 pcs
PTFB072707FH V1 R250	PTFB072707FH-V1-R250	H-34288G-4/2, ceramic open-cavity, earless flange	Tape & reel, 250 pcs

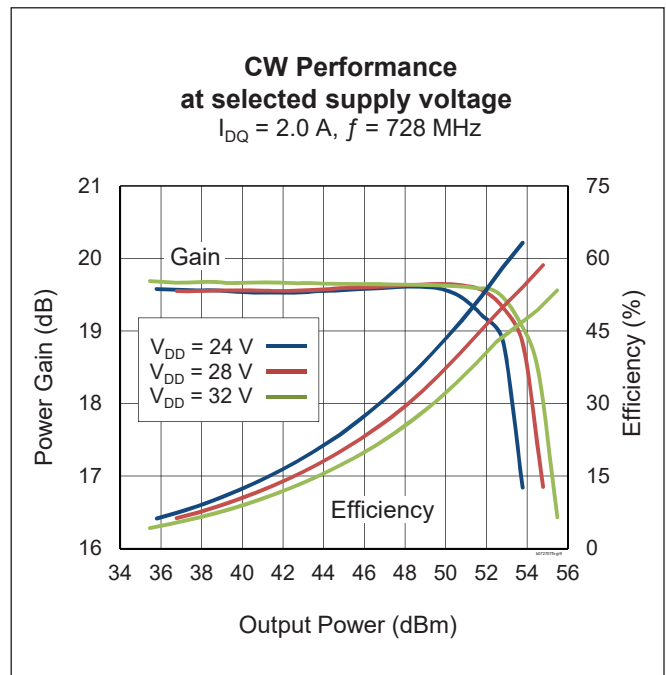
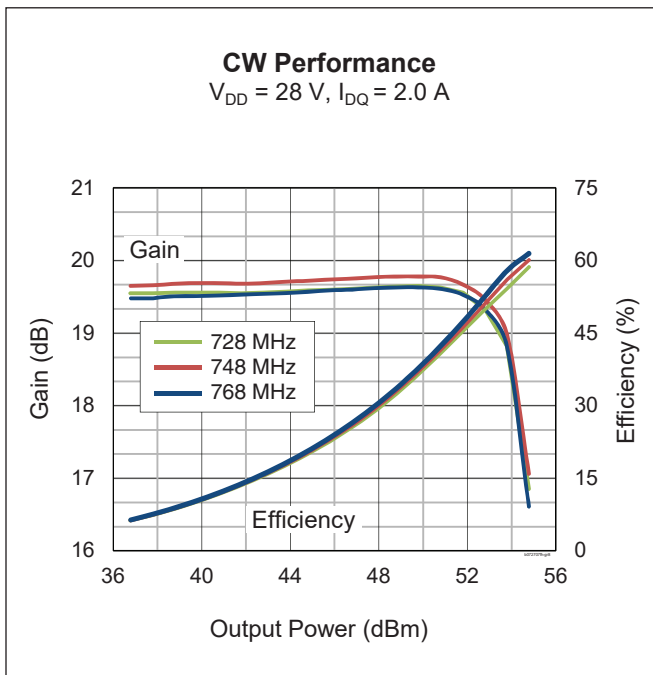
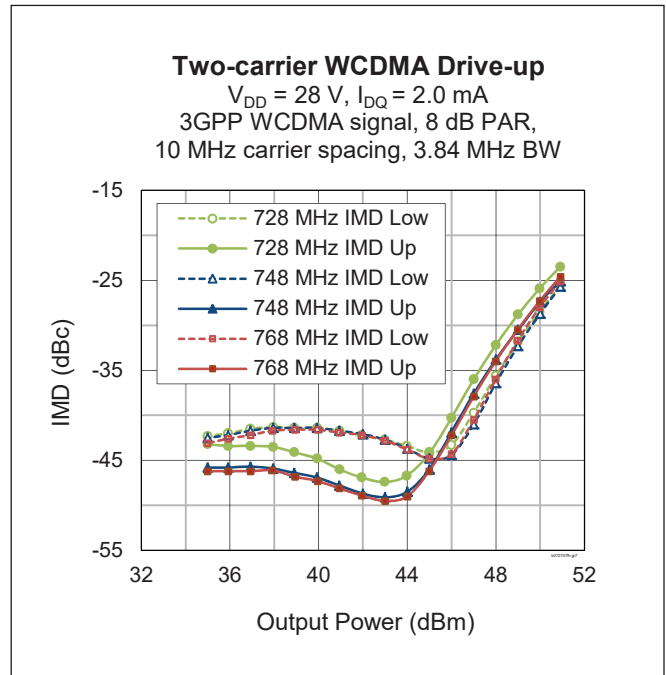
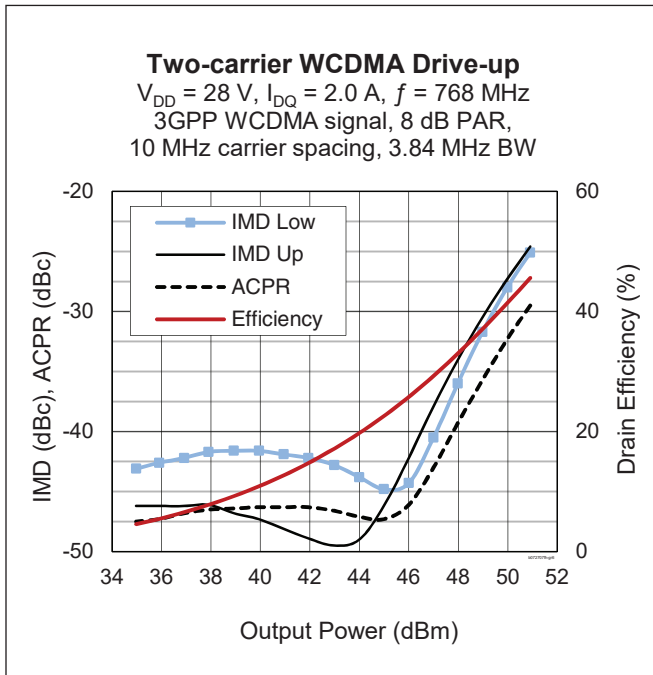


Typical Performance (data taken in an Wolfspeed production test fixture)



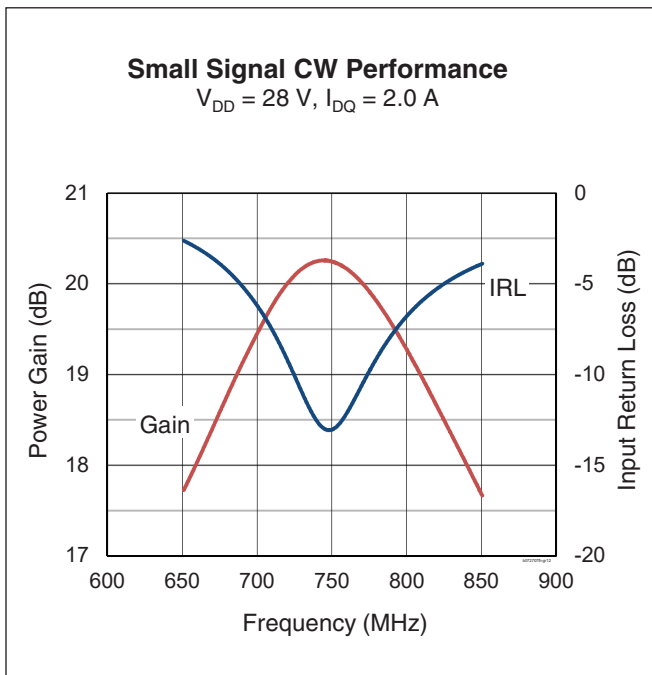
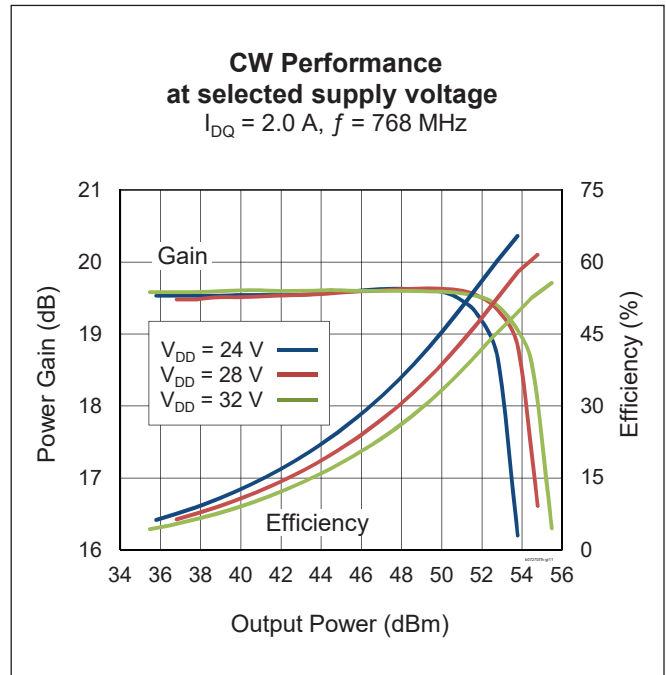
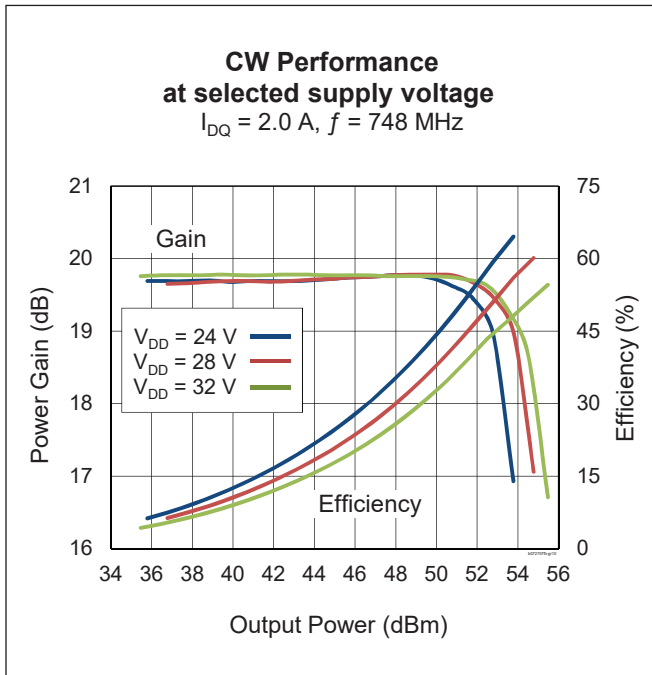


Typical Performance (cont.)



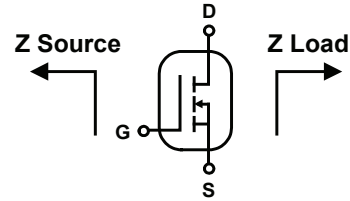


Typical Performance (cont.)



Broadband Circuit Impedance

Freq [MHz]	Z Source Ω		Z Load Ω	
	R	jX	R	jX
700	0.29	-0.64	0.80	-1.52
710	0.29	-0.57	0.81	-1.45
720	0.28	-0.51	0.82	-1.39
730	0.28	-0.44	0.83	-1.33
740	0.28	-0.38	0.84	-1.27
750	0.28	-0.32	0.85	-1.22
760	0.28	-0.25	0.86	-1.17
770	0.27	-0.19	0.88	-1.11
780	0.27	-0.13	0.89	-1.07
790	0.27	-0.06	0.89	-1.02
800	0.27	0.00	0.90	-0.97



Load Pull Performance

Pulsed CW signal: 10 μ sec, 10% duty cycle, 28 V, 2.0 A

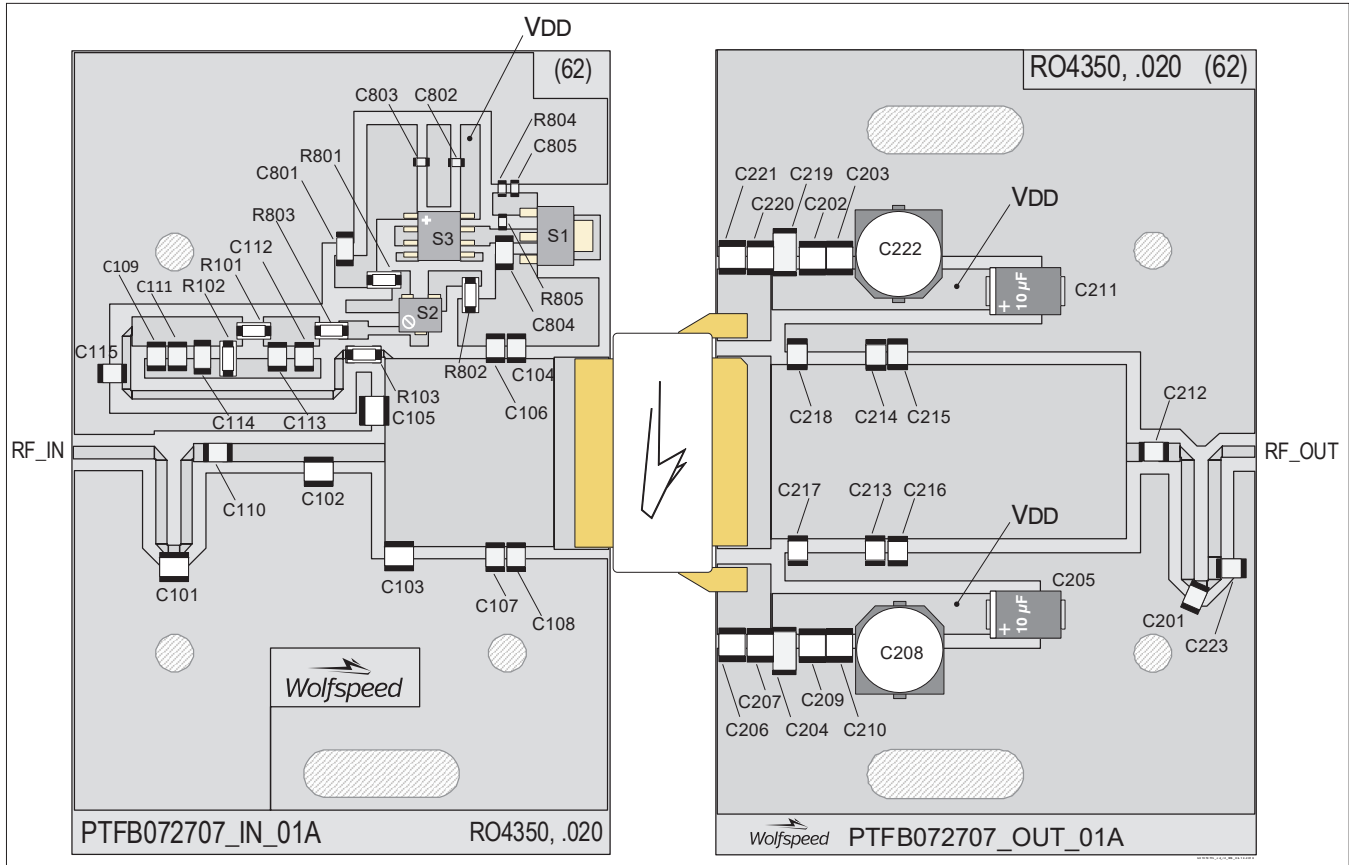
Class AB		P_{1dB}									
		Max Output Power					Max PAE				
Freq (MHz)	Zs (Ω)	Zl (Ω)	Gain (dB)	P _{OUT} (dBm)	P _{OUT} (W)	PAE (%)	Zl (Ω)	Gain (dB)	P _{OUT} (dBm)	P _{OUT} (W)	PAE (%)
728	0.54 - j0.91	0.80 - j1.14	16.19	55.90	389	52.0	2.42 - j0.70	19.91	53.47	222	66.5
750	0.52 - j0.92	0.81 - j1.10	16.23	55.70	372	51.6	2.22 - j1.03	19.06	53.48	223	64.1
758	0.44 - j0.80	0.82 - j1.08	16.97	55.66	368	52.2	2.41 - j0.72	19.97	53.16	208	66.2
778	0.44 - j0.93	0.84 - j1.12	17.00	55.39	346	50.5	2.37 - j0.39	20.10	52.61	182	64.4
803	0.50 - j0.90	0.83 - j1.07	16.92	55.37	344	51.9	2.54 - j0.04	20.33	52.00	158	66.5

Pulsed CW signal: 10 μ sec, 10% duty cycle, 28 V, 2.0 A

Class AB		P_{3dB}									
		Max Output Power					Max PAE				
Freq (MHz)	Zs (Ω)	Zl (Ω)	Gain (dB)	P _{OUT} (dBm)	P _{OUT} (W)	PAE (%)	Zl (Ω)	Gain (dB)	P _{OUT} (dBm)	P _{OUT} (W)	PAE (%)
728	0.54 - j0.91	0.81 - j1.26	17.86	56.52	449	55.4	2.42 - j0.76	14.21	53.93	247	65.8
750	0.52 - j0.92	0.81 - j1.21	17.03	56.37	433	54.7	2.20 - j1.09	14.22	54.13	259	65.6
758	0.44 - j0.80	0.85 - j1.22	17.68	56.37	433	56.8	2.21 - j1.03	15.07	54.06	255	66.3
778	0.44 - j0.93	0.87 - j1.23	17.74	56.13	410	54.4	2.16 - j1.01	15.08	54.05	254	66.4
803	0.50 - j0.90	0.88 - j1.30	18.33	56.07	404	55.1	2.54 - j0.04	14.97	52.65	183	67.2

Reference Circuit, tuned for 728 to 768 MHz

DUT	PTFB072707FH	
Test Fixture Part No.	LTN/PTFB072707FH V1	
PCB	0.508 mm [0.020"] thick, $\epsilon_r = 3.66$	Rogers 4350, 1 oz. copper
Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF		



Circuit assembly diagram (not to scale)

Components Information

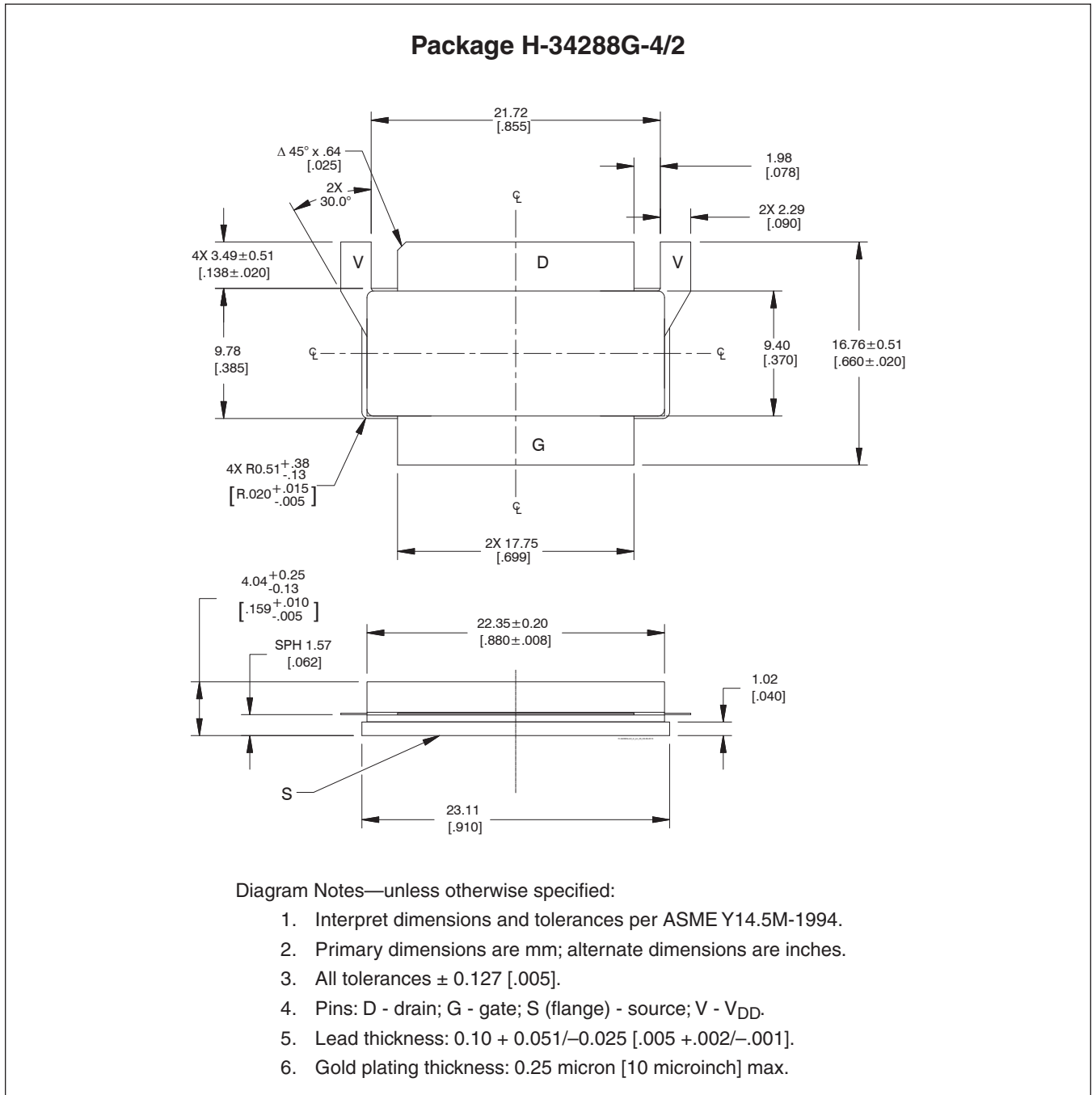
Component	Description	Manufacturer	P/N
Input			
C101	Chip capacitor, 1.7 pF	ATC	ATC100B1R7CW500XB
C102, C105	Chip capacitor, 5.6 pF	ATC	ATC100B5R6BW500XB
C103	Chip capacitor, 8.2 pF	ATC	ATC100B8R2CW500XB
C104, C106, C107, C108	Chip capacitor, 12 pF	ATC	ATC100B120JW500XB
C109	Chip capacitor, 33 pF	ATC	ATC100B330JW
C110, C115	Chip capacitor, 56 pF	ATC	ATC100B560JT
C111	Capacitor, 20000 pF	ATC	ATC200B203MW
C112	Capacitor, 10000 pF	ATC	ATC200B103MW
C113	Chip capacitor, 4.7 pF	ATC	ATC100B4R7CT
C114	Chip capacitor, 4.7 µF	Nichicon	F931C475MAA

table cont. next page

Reference Circuit (cont.)**Components Information** (cont.)

Component	Description	Manufacturer	P/N
Input (cont.)			
C801, C804	Chip capacitor, 0.1 μ F	Panasonic Electronic Components	ECJ-3VB1H104K
C802, C803, C805	Chip capacitor, 1000 pF	Panasonic	ECJ-1VB1H102K
R101, R103, R803	Resistor, 10 ohm	Panasonic	ERJ-8GEYJ100V
R102	Resistor, 5.1k ohm	Panasonic Electronic Components	ERJ-8GEYJ512V
R801	Resistor, 100 ohm	Panasonic Electronic Components	ERJ-8GEYJ101V
R802	Resistor, 1000 ohm	Panasonic Electronic Components	ERJ-8GEYJ102V
R804	Resistor, 1.3k ohm	Panasonic Electronic Components	ERJ-3GEYJ132V
R805	Resistor, 1.2k ohm	Panasonic Electronic Components	ERJ-3GEYJ122V
S1	Transistor	Fairchild Semiconductor	BCP56
S2	Potentiometer, 2k ohm	Bourns Inc.	3224W-1-202E
S3	Voltage regulator	Fairchild Semiconductor	LM7805
Output			
C201	Chip capacitor, 1 pF	ATC	ATC100B1R0CW500XB
C202, C203, C206, C207, C209, C210, C220, C221	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C204, C219	Chip capacitor, 1 μ F	AVX Corporation	2225PC105KAT1A
C205, C211	Chip capacitor, 10 μ F	Garrett	281M5002106k
C208, C222	Capacitor, 100 μ F	Panasonic	EEE-FP1V101AP
C212	Chip capacitor, 56 pF	ATC	ATC100B560JT
C213, C214	Chip capacitor, 3.6 pF	ATC	ATC100B3R6CW
C215, C216	Chip capacitor, 1.3 pF	ATC	ATC100B1R3CW
C217, C218	Chip capacitor, 2.2 pF	ATC	ATC100B2R2CW
C223	Chip capacitor, 3 pF	ATC	ATC100B3R0CW500XB

Package Outline Specifications



Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes at each revision)
01	2010-12-21	Advance	All	Proposed specifications for new product development.
02	2014-01-08	Data Sheet	All	Data Sheet for released product.
02.1	2016-06-15	Data Sheet	1, 2, 7, 9	Update package information to new configuration (same name), update ordering information
03	2018-06-13	Production	All	Converted to Wolfspeed Data Sheet

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Notes

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