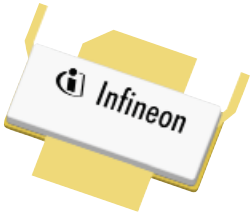
green Product

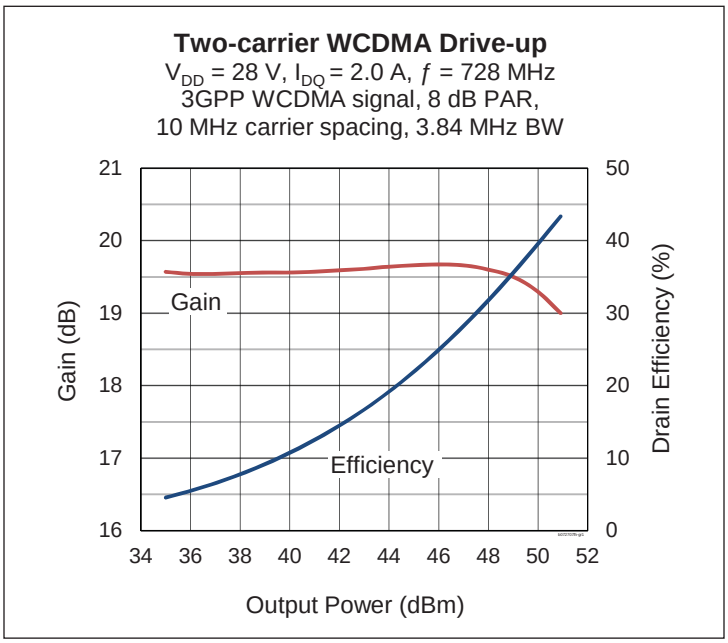
Thermally-Enhanced High Power RF LDMOS FET
270 W, 28 V, 728 – 768 MHz

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 Infineon's advanced LDMOS process, this device provides excellent thermal performance and superior reliability.



PTFB072707FH
Package H-34288-4/2



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_{1dB} = 320 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 Infineon production test fixture)
V_{DD} = 28 V, I_{DQ} = 2.0 A, P_{OUT} = 60 W average, f = 768 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°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 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1.0	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10.0	µA
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1.0	µA
On-State Resistance	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.05	—	Ω
Operating Gate Voltage	V_{DS} = 28 V, I_{DQ} = 2.0 A	V_{GS}	2.5	3.8	4.5	V

Maximum Ratings

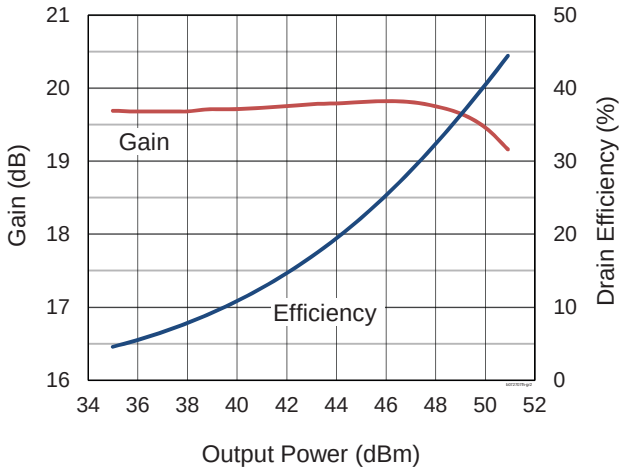
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–6 to +10	V
Junction Temperature	T_J	200	°C
Storage Temperature Range	T_{STG}	–40 to +150	°C
Thermal Resistance (T_{CASE} = 70°C, 240 W CW)	$R_{\theta JC}$	0.17	°C/W

Ordering Information

Type and Version	Order Code	Package and Description	Shipping
PTFB072707FH V1	PTFB072707FHV1XWSA1	H-34288-4/2, ceramic open-cavity, earless flange	Tray
PTFB072707FH V1 R250	PTFB072707FHV1R250XTMA1	H-34288-4/2, ceramic open-cavity, earless flange	Tape & reel

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

Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 2.0 A, f = 748 MHz,
3GPP WCDMA signal, 8 dB PAR,
10 MHz carrier spacing, 3.84 MHz BW



Two-carrier WCDMA Drive-up
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3GPP WCDMA signal, 8 dB PAR,
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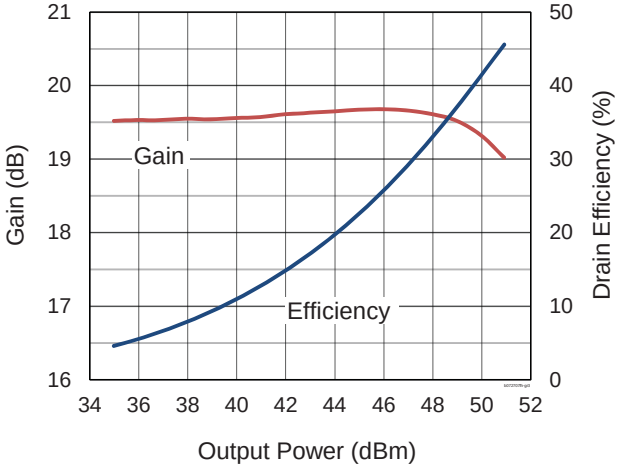
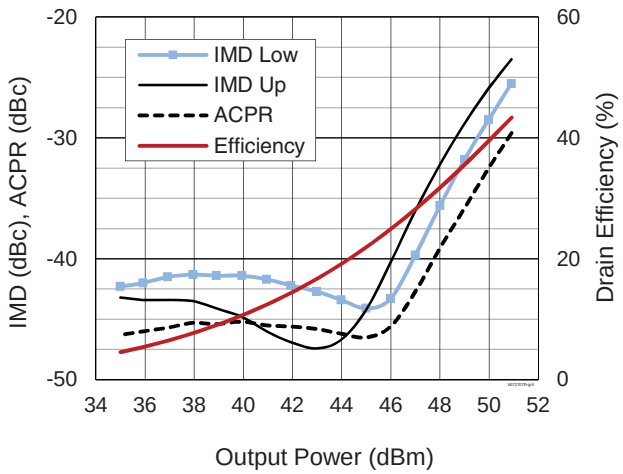


Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 2.0 A, f = 728 MHz
3GPP WCDMA signal, 8 dB PAR,
10 MHz carrier spacing, 3.84 MHz BW



Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 2.0 A, f = 748 MHz
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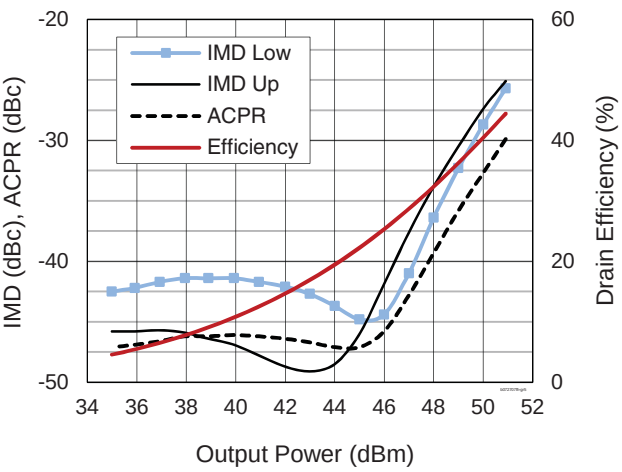
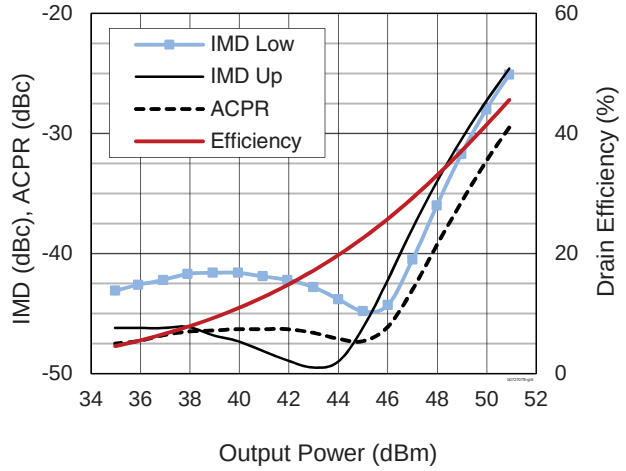
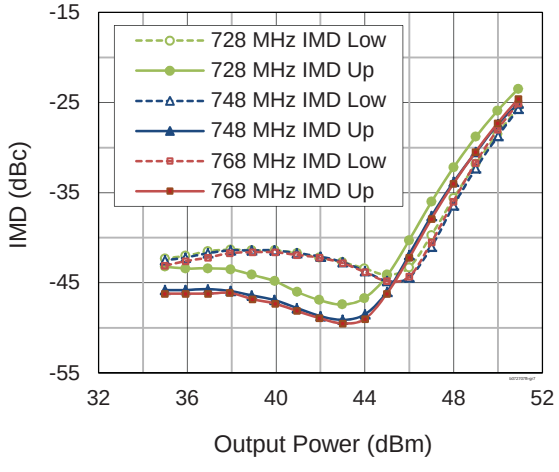


Typical Performance (cont.)

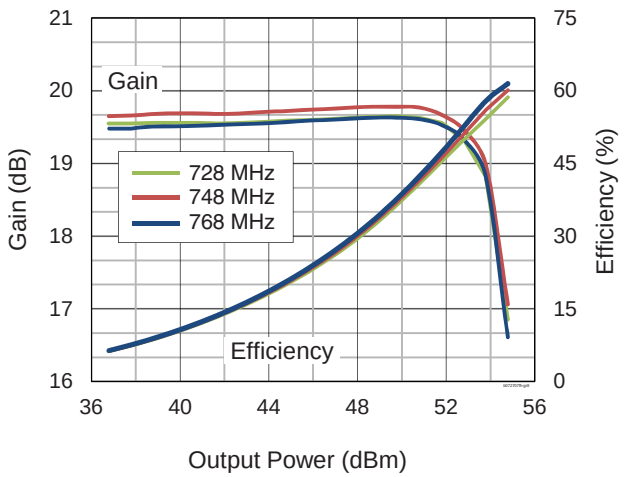
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 2.0 A, f = 768 MHz
3GPP WCDMA signal, 8 dB PAR,
10 MHz carrier spacing, 3.84 MHz BW



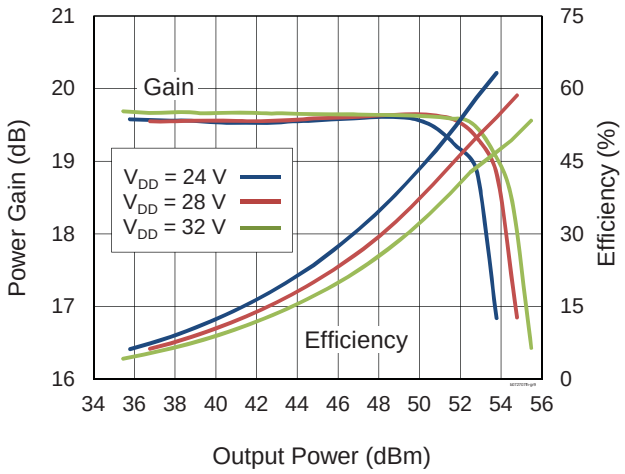
Two-carrier WCDMA Drive-up
V_{DD} = 28 V, I_{DQ} = 2.0 mA
3GPP WCDMA signal, 8 dB PAR,
10 MHz carrier spacing, 3.84 MHz BW



CW Performance
V_{DD} = 28 V, I_{DQ} = 2.0 A

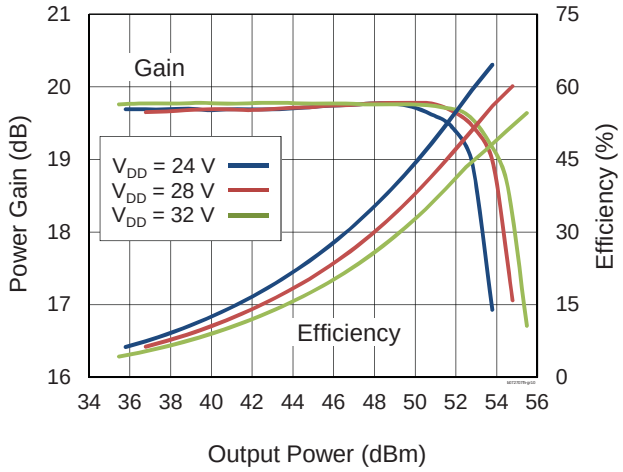


CW Performance
at selected supply voltage
I_{DQ} = 2.0 A, f = 728 MHz

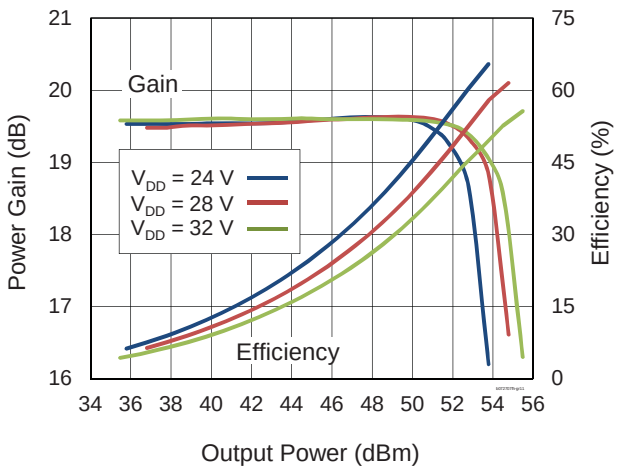


Typical Performance (cont.)

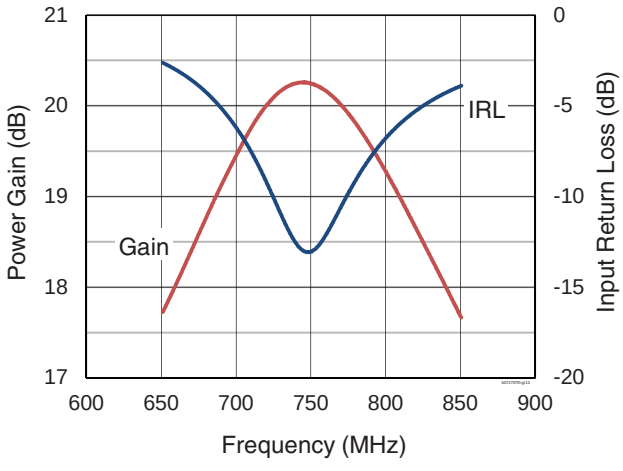
CW Performance
at selected supply voltage
I_{DQ} = 2.0 A, f = 748 MHz



CW Performance
at selected supply voltage
I_{DQ} = 2.0 A, f = 768 MHz

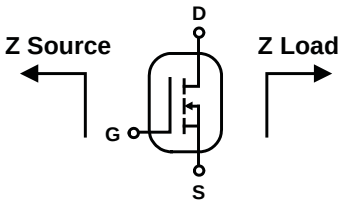


Small Signal CW Performance
V_{DD} = 28 V, I_{DQ} = 2.0 A



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 µsec, 10% duty cycle, 28 V, 2.0 A

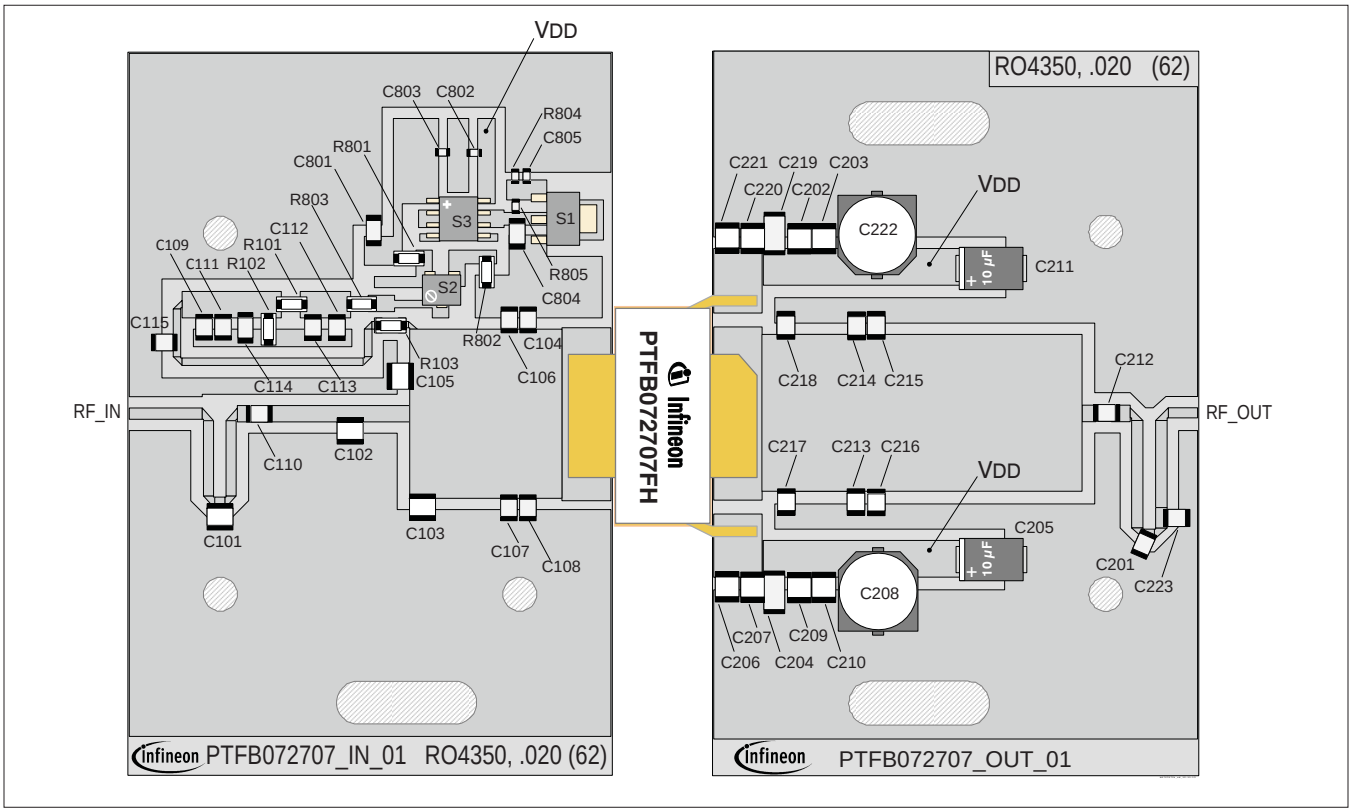
Class AB		P_{1dB}									
		Max Output Power					Max PAE				
Freq (MHz)	Zs (Ω)	Zl (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	PAE (%)	Zl (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	PAE (%)
728	0.54 – jj0.91	0.80 – j1.14	16.19	55.90	389	52.0	2.42 – j0.70	19.91	53.47	222	66.5
750	0.52 – j0.92	0.81 – j1.10	16.23	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 µsec, 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, ε_r = 3.66	Rogers 4350, 1 oz. copper
Find Gerber files for this test fixture on the Infineon Web site at (**http://www.infineon.com/rfpower**)		



Circuit assembly diagram (not to scale)

Components Information

Component	Description	Suggested 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	Suggested Manufacturer	P/N
Input (cont.)			
C801, C804	Chip capacitor, 0.1 µF	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 µF	Taiyo Yuden	UMK325C7106MM-T
C204, C219	Chip capacitor, 1 µF	AVX Corporation	2225PC105KAT1A
C205, C211	Chip capacitor, 10 µF	Garrett	281M5002106k
C208, C222	Capacitor, 100 µF	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

Package H-34288-4/2

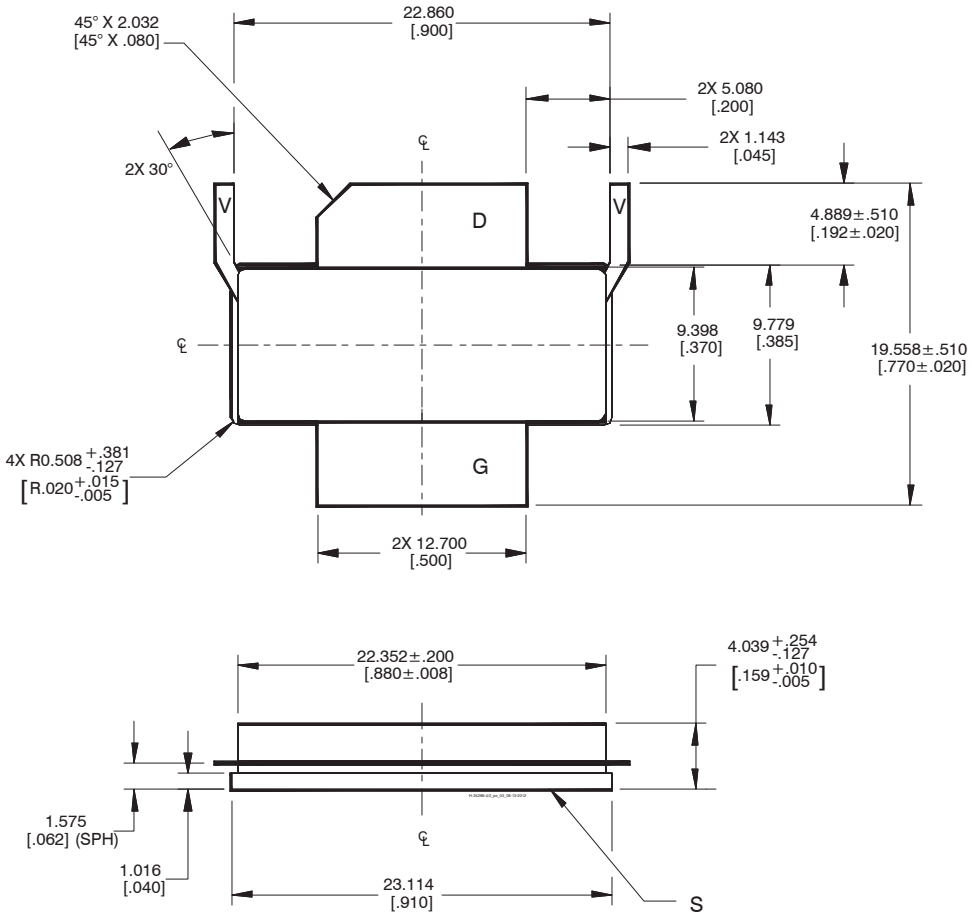


Diagram Notes—unless otherwise specified:

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; S (flange) - source; G - gate; V - V_{DD}.
5. Lead thickness: 0.10 + 0.051/–0.025 [.004 +.002/–.001].
6. Gold plating thickness: 0.25 micron [10 microinch] max.

Find the latest and most complete information about products and packaging at the Infineon Internet page
http://www.infineon.com/rfpower

Revision History: 2014-01-08 Data Sheet

Previous Version: 2010-12-21, Advance Specification

Page	Subjects (major changes since last revision)
all	Specifications and performance represent released product.

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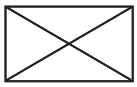

Edition 2014-01-08

Published by
Infineon Technologies AG
85579 Neubiberg, Germany

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