PXAC210552MD

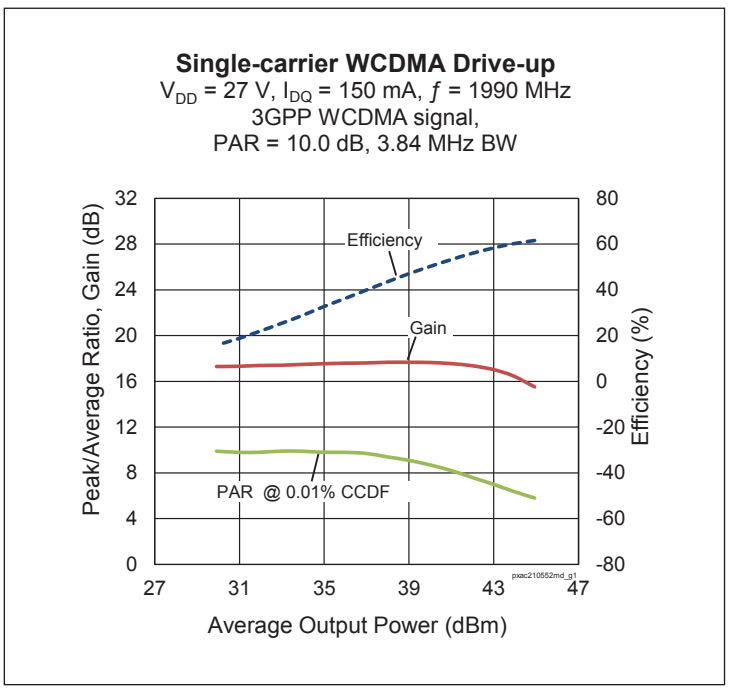
green Product

Thermally-Enhanced High Power RF LDMOS FET
55 W, 28 V, 1805 – 2170 MHz

Description

The PXAC210552MD is a 55-watt LDMOS FET with an asymmetrical design intended for use in multi-standard cellular power amplifier applications in the 1805 to 2170 MHz frequency band. Features include dual-path design, 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.

PXAC210552MD
Package PG-HB1DSO-4



Features

- Broadband internal input and output matching
- Asymmetrical Doherty design
  - Main : P_{1dB} = 20 W Typ
  - Peak : P_{1dB} = 35 W Typ
- Typical Pulsed CW performance, 1990 MHz, 28 V, Doherty Configuration
  - Output power at P_{1dB} = 40.7 W
  - Efficiency = 63.7 %
  - Gain = 16.7 dB
- Capable of handling 10:1 VSWR @27 V, 55 W (CW) output power
- Integrated ESD protection
- Human Body Model Class 1B (per ANSI/ESDA/JEDEC JS-001)
- Low thermal resistance
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Infineon Doherty test fixture)
V_{DD} = 27 V, I_{DQ} = 150mA, $V_{GS\ (Peak)}$ = 1.7 V, P_{OUT} = 8.5 W avg, f = 1995 MHz, 3GPP signal, channel bandwidth = 3.84 MHz, peak/average = 10 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Gain	G_{ps}	15.0	16	—	dB
Drain Efficiency	η_D	42.0	44.5	—	%
Adjancent Channel Power Ratio	ACPR	—	–33.75	–29.5	dBc

All published data at T_{CASE} = 25°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 V, I_{DS} = 10 mA	$V_{(BR)DSS}$	65	—	—	V
Drain Leakage Current	V_{DS} = 28 V, V_{GS} = 0 V	I_{DSS}	—	—	1	µA
	V_{DS} = 63 V, V_{GS} = 0 V	I_{DSS}	—	—	10	µA
Gate Leakage Current	V_{GS} = 10 V, V_{DS} = 0 V	I_{GSS}	—	—	1	µA
On-State Resistance (main)	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.38	—	Ω
(peak)	V_{GS} = 10 V, V_{DS} = 0.1 V	$R_{DS(on)}$	—	0.19	—	Ω
Operating Gate Voltage (main)	V_{DS} = 27 V, I_{DQ} = 0.15 A	V_{GS}	2.1	2.6	3.1	V
(peak)	V_{DS} = 27 V, I_{DQ} = 0 A	V_{GS}	1.23	1.73	2.23	V

Maximum Ratings

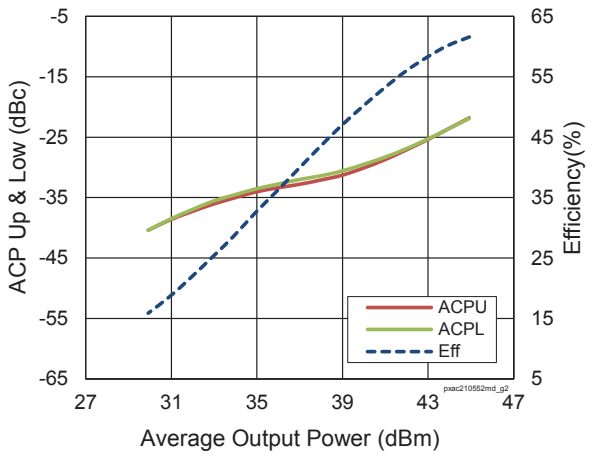
Parameter	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	65	V
Gate-Source Voltage	V_{GS}	–6 to +10	V
Operating Voltage	V_{DS}	0 to +32	V
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	°C
Thermal Resistance (T_{CASE} = 85°C, 8.5 W CW)	$R_{\theta JC}$	1.004	°C/W

Ordering Information

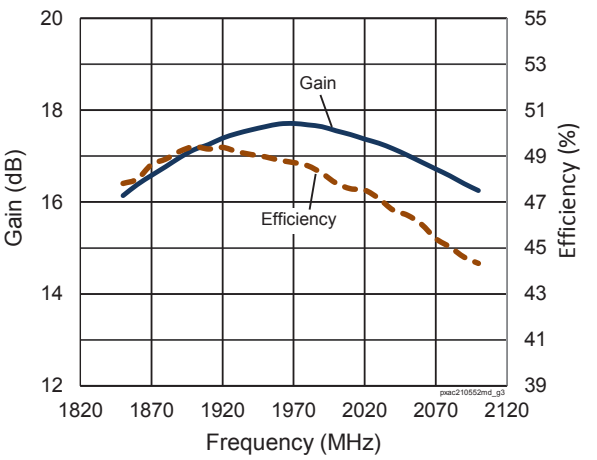
Type and Version	Order Code	Package Description	Shipping
PXAC210552MD V1 R5	PXAC210552MDV1R5XUMA1	PG-HB1DSO-4, earless flange	Tape & Reel, 500 pcs

Typical Performance (data taken in a production test fixture)

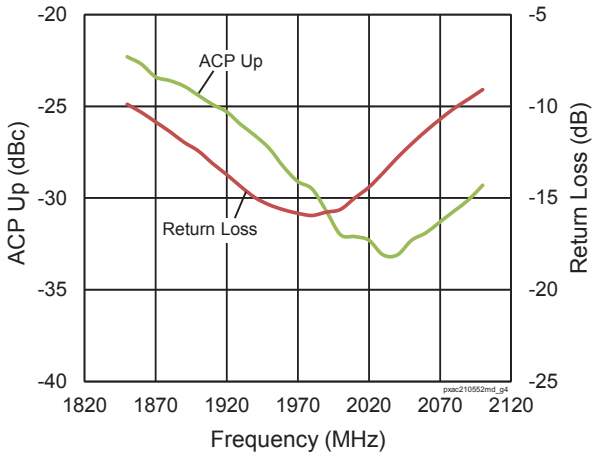
Single-carrier WCDMA Drive-up
V_{DD} = 27 V, I_{DQ} = 150 mA, f = 1990 MHz,
3GPP WCDMA signal, PAR = 10 dB,
BW = 3.84 MHz



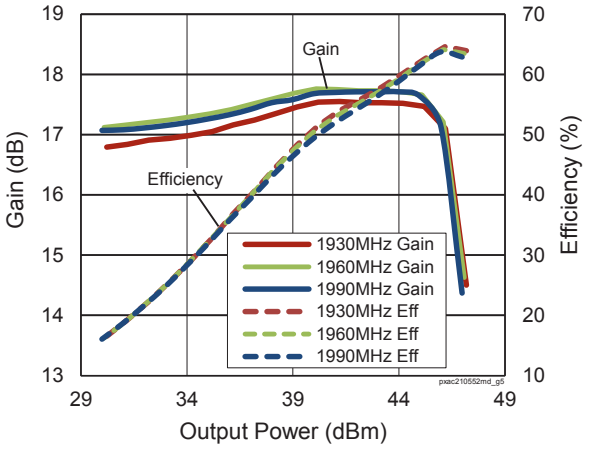
Single-carrier WCDMA Broadband Performance
V_{DD} = 27 V, I_{DQ} = 150 mA, P_{OUT} = 39.3 dBm,
3GPP WCDMA signal, PAR = 10 dB



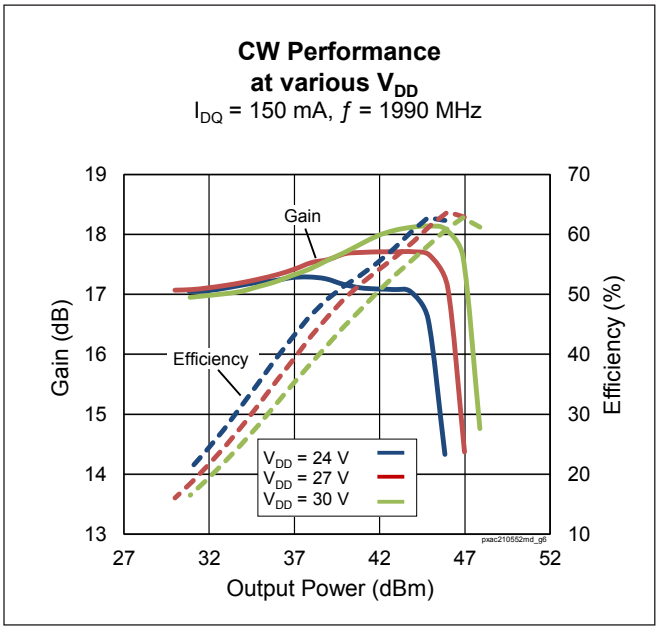
Single-carrier WCDMA Broadband Performance
V_{DD} = 27 V, I_{DQ} = 150 mA, P_{OUT} = 39.3 dBm,
3GPP WCDMA signal, PAR = 10 dB

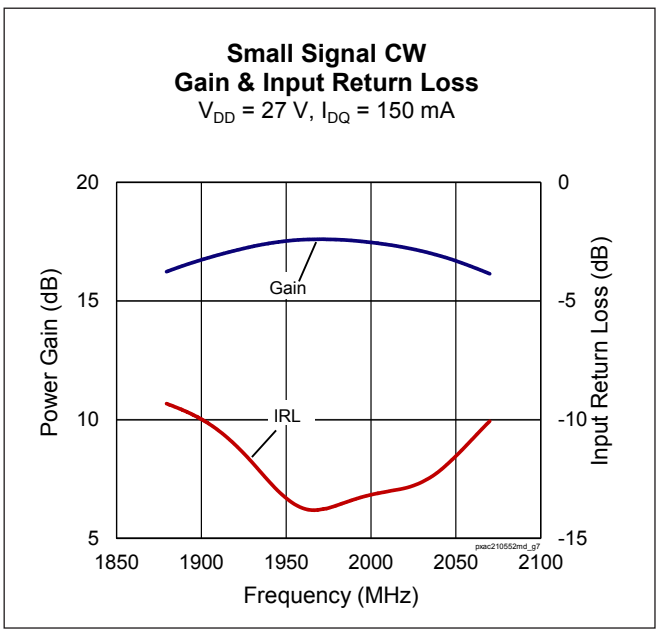


CW Performance
V_{DD} = 27 V, I_{DQ} = 150mA



Typical Performance (cont.)





Load Pull Performance

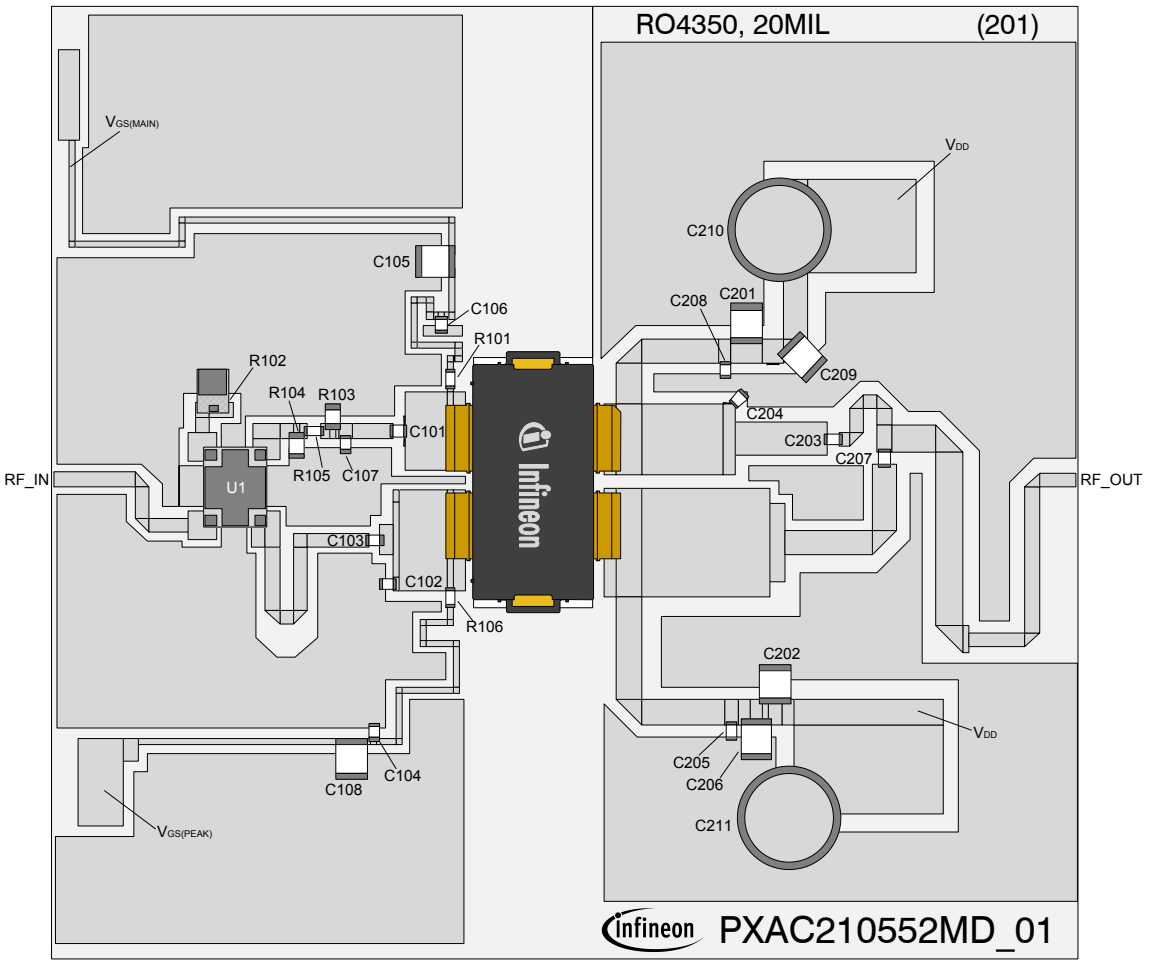
Main Side Load Pull Performance – Pulsed CW signal: 16 µs, 10% duty cycle, 28 V, I_{DQ} = 130 mA

		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 [%]
1930	4.0-j14.02	8.06-j8.08	19.7	44.10	25.7	57.4	12.71-j1.6	21.6	42.40	17.4	65.8
1960	5.8-j 15.08	7.01-j 6.81	19.4	44.10	25.7	55.4	11.28+j0.06	21.6	42.20	16.6	65.4
1990	4.22-j17.11	7.29-j7.28	19.6	44.00	25.1	55.2	10.46-j0.71	21.7	42.40	17.4	64.8
2110	4.0-j14.02	7.1-j7.83	19.3	44.00	25.1	56.4	7.89-j0.63	21.7	42.00	15.8	64.7
2140	5.8-j15.08	7.21-j8.59	19.3	44.20	26.3	56.0	7.6-j3.18	21.0	42.90	19.5	65.2
2170	4.22-j17.11	7.18-j8.9	19.2	44.00	25.1	54.9	7.05-j2.48	21.4	42.10	64.0	64.1

Peak Side Load Pull Performance – Pulsed CW signal: 16 µs, 10% duty cycle, 28 V, I_{DQ} = 250 mA

		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 [%]
1930	2.63-j8.36	3.21-j7.17	19.6	47.2	52.5	54.7	4.86-j3.72	22.0	45.30	33.9	65.4
1960	2.75-j8.79	3.07-j6.73	19.7	47.0	50.1	54.1	4.62-j3.84	22.1	45.10	32.4	63.5
1990	2.94-j8.93	3.09-j6.8	19.8	46.9	49.0	53.8	4.53-j3.83	22.3	44.90	30.9	63.0
2110	6.41-j10.53	3.23-j8.07	20.0	47.0	25.7	54.4	3.48-j5.04	22.4	45.10	32.4	63.4
2140	8.26-j10.26	3.28-j8.45	19.9	46.9	25.7	53.5	3.26-j5.24	22.6	44.90	30.9	63.6
2170	10.51-j5.44	2.78-j8.13	20.3	46.9	25.1	54.2	3.02-j5.67	22.6	44.90	30.9	61.9

Reference Circuit, 1805 – 2170 MHz



Reference circuit assembly diagram (not to scale)

Reference Circuit (cont.)

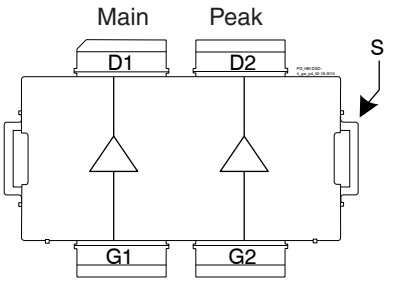
Reference Circuit Assembly

DUT	PXAC210552MD V1
Test Fixture Part No.	LTA/PXAC210522MD V1
PCB	Rogers 4350, 0.508 mm [0.020"] thick, 2 oz. copper, ε_r = 3.66, f = 1805 – 2170 MHz
Find Gerber files for this test fixture on the Infineon Web site at http://www.infineon.com/rfpower	

Components Information

Component	Description	Manufacturer	P/N
Input			
C101	Capacitor, 4.7 pF	ATC	ATC600F4R7CW250T
C102, C104, C106	Capacitor, 12 pF	ATC	ATC600F120JW250T
C103	Capacitor, 5.6 pF	ATC	ATC600F5R6CW250T
C105, C108	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C107	Capacitor, 2 pF	ATC	ATC600F2R0CW250T
R101, R106	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-3GEYJ100V
R102	Resistor, 50 ohms	Richardson	C8A50Z4A
R103, R104	Resistor, 470 ohms	Panasonic Electronic Components	ERJ-8GEYJ471V
R105	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-3GEYJ100V
U1	Hybrid Coupler	Anaren	X3C25P1-02S
Output			
C201, C202, C206, C209	Capacitor, 10 µF	Taiyo Yuden	UMK325C7106MM-T
C203	Capacitor, 2 pF	ATC	ATC600F2R0CW250T
C204	Capacitor, 0.2 pF	ATC	ATC600F0R2CW250T
C205, C207, C208	Capacitor, 12 pF	ATC	ATC600F120JW250T
C210, C211	Capacitor, 47 µF	Cornell Dubillier Electronnics (CDE)	SEK470M100ST

Pinout Diagram (top view)



Pin	Description
D1	Drain device 1 (Main)
D2	Drain device 2 (Peak)
G1	Gate device 1 (Main)
G2	Gate device 2 (Peak)
S	Source (flange)

Package Outline Specifications

Package PG-HB1DSO-4 with Formed Leads (top view)

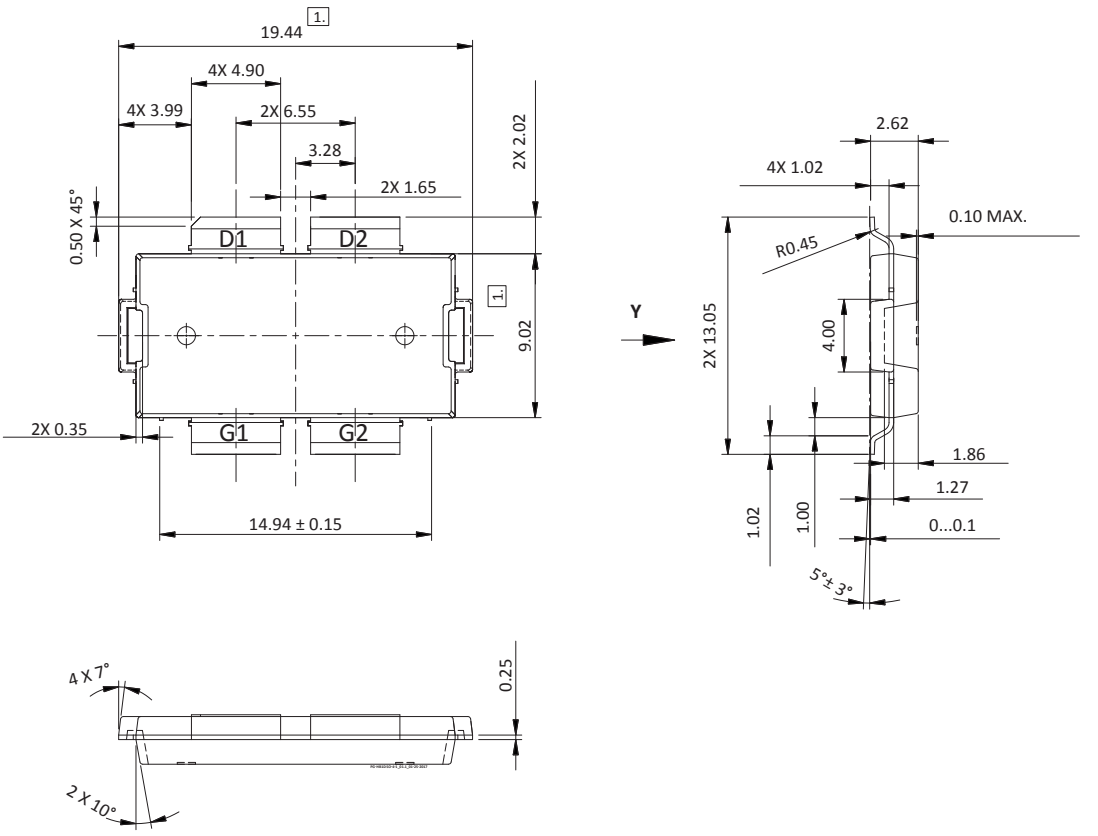
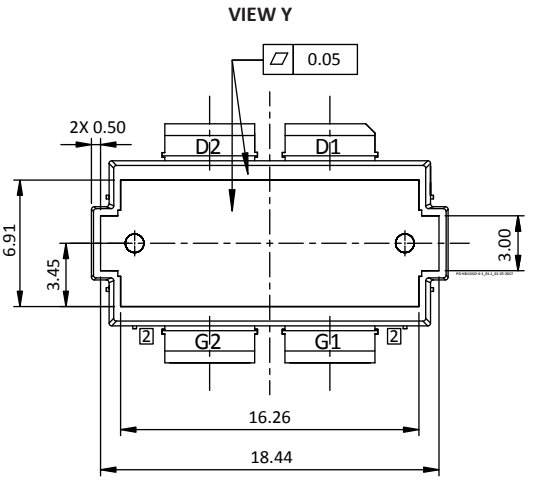


Diagram Notes—unless otherwise specified:

1. Mold/dam bar/metal protrusion of 0.30 mm max per side not included.
2. Metal protrusions are connected to source and shall not exceed 0.10 mm max.
3. Fillets and radii: all radii are 0.30 mm max.
4. Interpret dimensions and tolerances per ISO 8015.
5. Dimensions are mm.
6. All tolerances ± 0.1 mm unless specified otherwise.
7. All metal surfaces pre-plated, except area of cut.
8. Lead thickness: 0.25 mm.
9. Gold plating thickness: 0.25 micron [10 microinch] max.
10. Pins: D1, D2 – drain; G1, G2 – gate; S – source.

Package Outline Specifications

Package PG-HB1DSO-4 with Formed Leads (bottom view)



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

Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2015-07-24	Advance	All	Data Sheet reflects advance specification for product development
02	2016-04-01	Production	All All	Data Sheet reflects released product specification Revised all data and includes updated final specs, typical performance graphs, loadpull, reference circuit, package outline
03	2016-06-02	Production	1–4 5, 6 8, 9	Revised graphs, VSWR voltage number Labeled V_{DD}, V_{GG}, RF_{IN} and RF_{OUT} in reference circuit, corrected components information Corrected package name
03.1	2017-01-25	Production	8, 9	Revised typo package outline

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(highpowerRF@infineon.com)

To request other information, contact us at:
+1 877 465 3667 (1-877-GO-LDMOS) USA
or +1 408 776 0600 International

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