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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



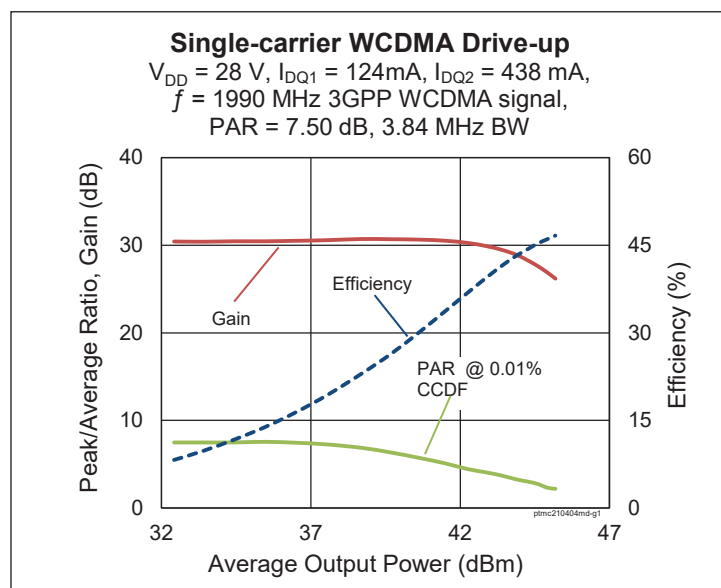
PTMC210404MD

Wideband LDMOS Two-stage Integrated Power Amplifier 2 x 20 W, 28 V, 1805 – 2200 MHz

Description

The PTMC210204MD is a wideband, two-stage LDMOS integrated amplifier intended for wideband driver applications. It has internal matching for operation from 1805 to 2200 MHz. It features on-chip matching high efficiency, and dual independent outputs with 20 W of output power each. It is available in a 14-lead plastic overmold package with gull wing leads.

Package PG-HB1DSO-14-1
(formed leads)



Features

- On-chip matching for broadband operation
- Typical pulsed CW performance, 1990 MHz, 28 V, combined outputs
 - Output power at $P_{1dB} = 37\text{ W}$
 - Linear Gain = 31.5 dB
 - Efficiency = 53.1%
- Capable of handling 10:1 VSWR @ 28 V, 37 W (CW) output power
- Integrated ESD protection
- Human Body Model Class 1B (per ANSI/ESDA/ JEDEC JS-001)
- Integrated temperature compensation
- Pb-free and RoHS compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed production test fixture)

$V_{DD} = 28\text{ V}$, $I_{DQ1(A+B)} = 63\text{ mA}$, $I_{DQ2(A+B)} = 219\text{ mA}$, $P_{OUT} = 5\text{ W}$ avg, $f = 1990\text{ MHz}$, 3GPP WCDMA signal, channel bandwidth = 3.84 MHz, peak/average = 7.5 dB @ 0.01% CCDF

Characteristic	Symbol	Min	Typ	Max	Unit
Linear Gain	G_{ps}	29	30	—	dB
Power Added Efficiency	PAE	17.5	18.5	—	%
Adjacent Channel Power Ratio	ACPR	—	-49.5	-47.5	dBc
Output PAR @ 0.01% CCDF	OPAR	7.0	7.2	—	dB

All published data at $T_{CASE} = 25^\circ\text{C}$ unless otherwise indicated

ESD: Electrostatic discharge sensitive device—observe handling precautions!

DC Characteristics

Stage 1	Conditions	Symbol	Min	Typ	Max	Unit
Drain Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	0.1	μA
	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	μA
Gate Leakage Current	$V_{GS} = 1\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	—	—	0.1	μA
On-state Resistance	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	1.5	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ1} = 63\text{ mA}$	V_{GS1}	—	2.7	—	V
Fixture Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ1} = 63\text{ mA}$	V_{GS1}	—	4.9	—	V

Stage 2	Conditions	Symbol	Min	Typ	Max	Unit
Drain-source Breakdown Voltage	$V_{GS} = 0\text{ V}, I_{DS} = 10\text{ mA}$	$V_{BR(DSS)}$	64	—	—	V
Drain Leakage Current	$V_{DS} = 28\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	0.1	μA
	$V_{DS} = 60\text{ V}, V_{GS} = 0\text{ V}$	I_{DSS}	—	—	1	μA
Gate Leakage Current	$V_{GS} = 1\text{ V}, V_{DS} = 0\text{ V}$	I_{GSS}	—	—	0.1	μA
On-state Resistance	$V_{GS} = 10\text{ V}, V_{DS} = 0.1\text{ V}$	$R_{DS(on)}$	—	1.5	—	Ω
Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ2} = 219\text{ mA}$	V_{GS2}	—	2.7	—	V
Fixture Operating Gate Voltage	$V_{DS} = 28\text{ V}, I_{DQ2} = 219\text{ mA}$	V_{GS2}	—	4.9	—	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	225	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-65 to +150	$^{\circ}\text{C}$
Operating Voltage	V_{DD}	0 to 32	V

Thermal Characteristics

Characteristic	Symbol	Value	Unit		
Thermal Resistance	Stage 1	($T_{CASE} = 70^{\circ}\text{C}, 37\text{ W CW}$)	$R_{\theta JC}$	6.7	$^{\circ}\text{C/W}$
	Stage 2	($T_{CASE} = 70^{\circ}\text{C}, 37\text{ W CW}$)	$R_{\theta JC}$	1.4	$^{\circ}\text{C/W}$

Moisture Sensitivity Level

Level	Test Standard	Package Temperature	Unit
3	IPC/JEDEC J-STD-020	260	$^{\circ}\text{C}$



Ordering Information

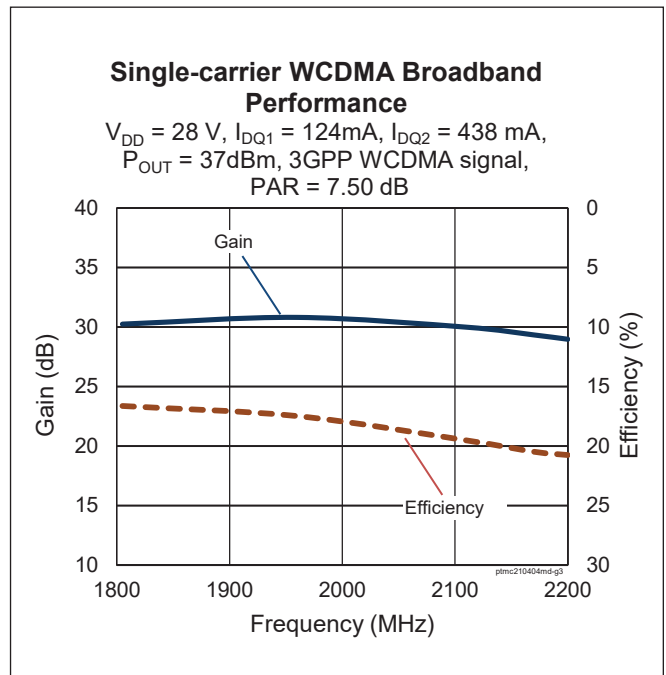
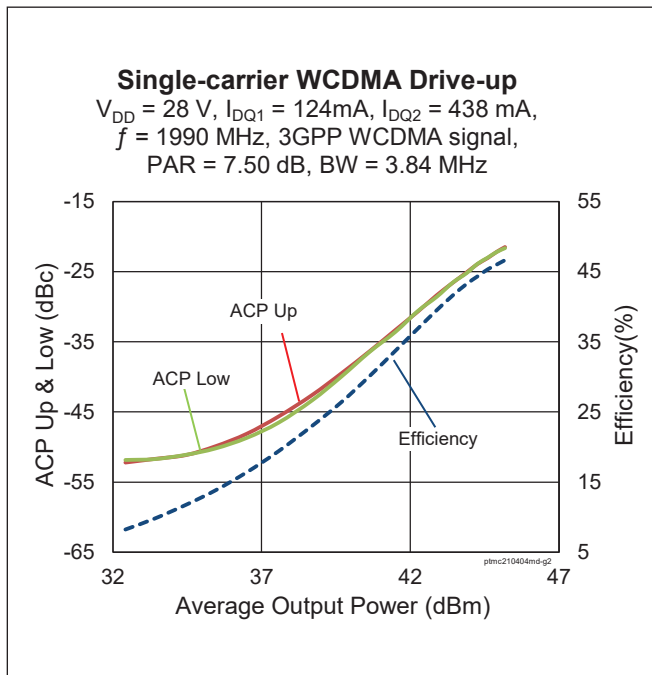
Type and Version	Order Code	Package and Description	Shipping
PTMC210404MD V1 R5	PTMC210404MD-V1-R5	PG-HB1DSO-14-1, 14-lead, overmold	Tape & Reel, 500 pcs

Evaluation Boards

Order Code	Frequency	Description
LTN/PTMC210404MD V1	1805 – 2200 MHz	Class AB with combined outputs, R04350, 0.508 mm thick

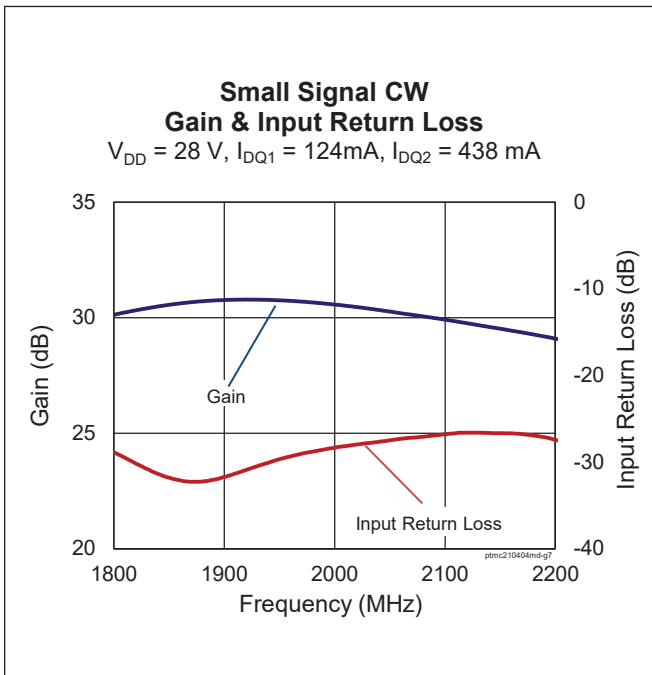
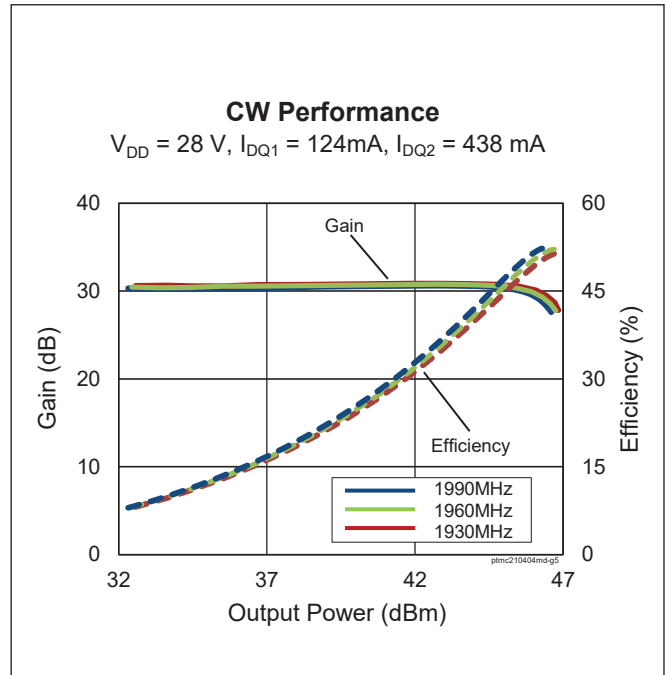
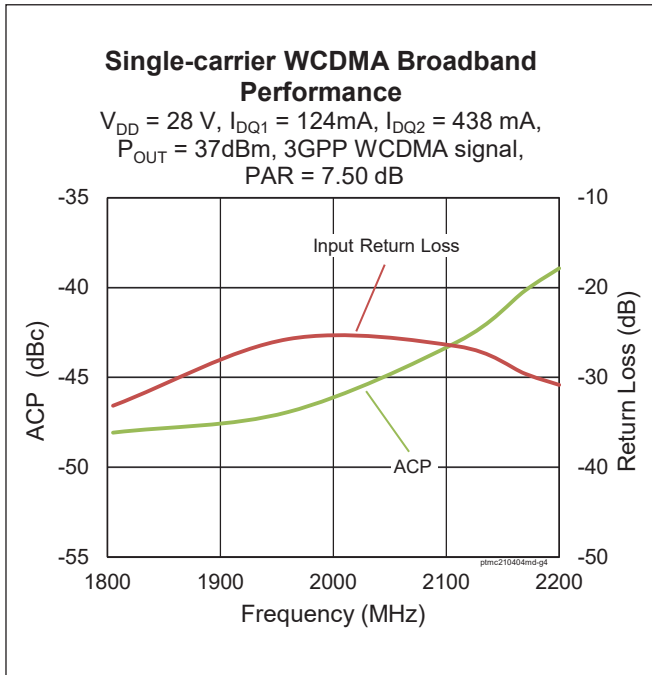
Find Gerber files for these reference fixtures on the Wolfspeed Web site at www.wolfspeed.com/RF

Typical RF Performance (data taken in production test fixture)





Typical Performance (cont.)

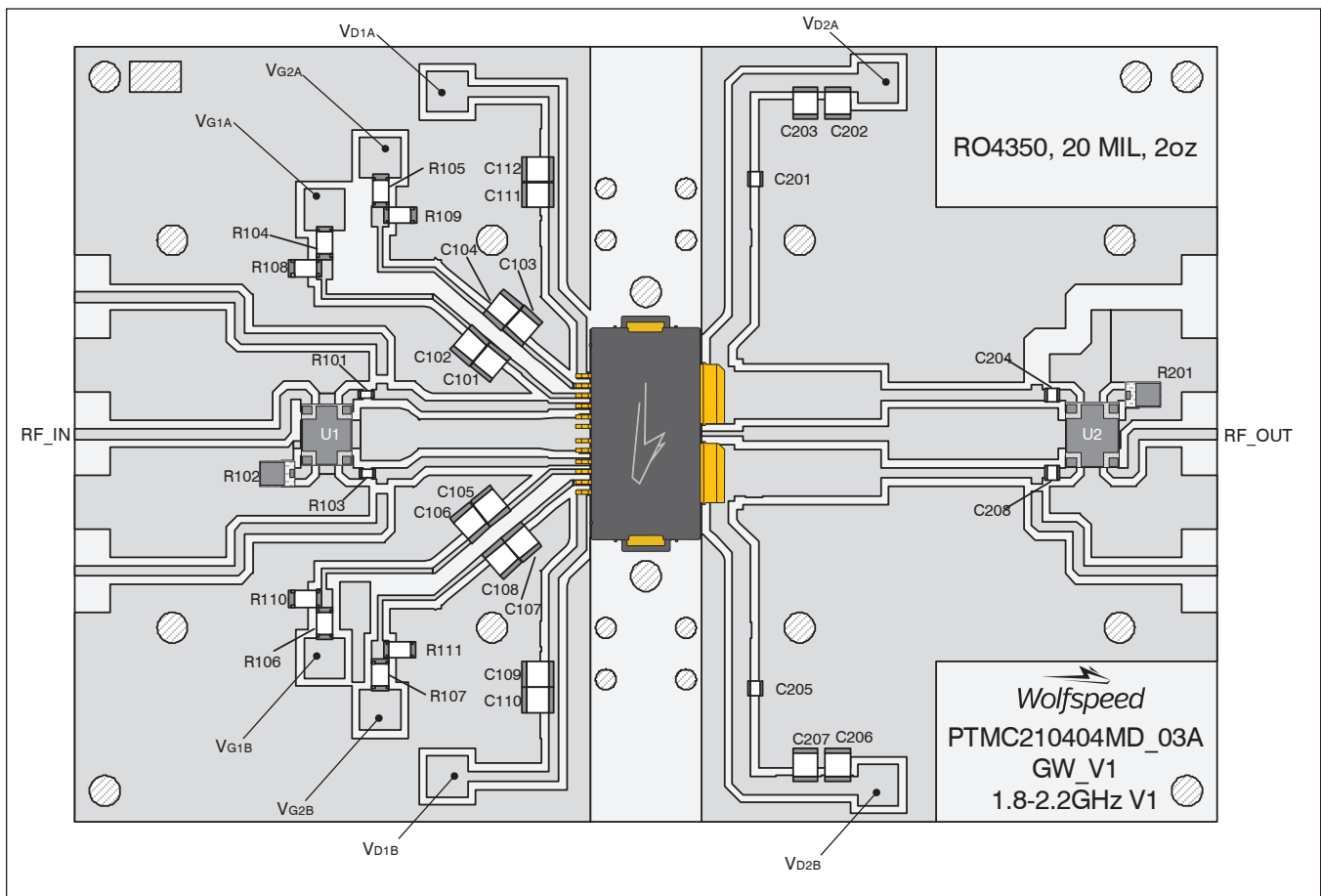


Load Pull Performance

Load Pull Performance – Pulsed CW signal: $V_{DD} = 28\text{ V}$, $I_{DQ1} = 63\text{ mA}$, $I_{DQ2} = 219\text{ mA}$, class AB, each side.

Freq [MHz]	Z_s [Ω]	P_{1dB}									
		Max Output Power					Max Drain Efficiency				
		Z_I [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]	Z_I [Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	PAE [%]
1805	49.8+j2.3	8.8-j6.30	29.8	43.8	23.8	51.2	13.4-j3.7	31.0	42.9	19.4	55.9
1960	49.9-j0.1	8.5-j8.20	29.5	43.8	23.9	50.5	10.9-j2.4	31.0	42.7	18.5	57.0
2170	51.9+j0.2	7.4-j7.60	27.9	43.9	24.3	51.8	7.10-j3.8	29.0	42.9	19.6	56.6
2200	49.3+j1.0	7.7-j7.70	27.6	43.8	23.8	51.5	6.90-j3.7	28.8	42.8	19.0	56.6

Reference Circuit, 1805 – 2200 MHz



Reference circuit assembly diagram (not to scale)



Reference Circuit (cont.)

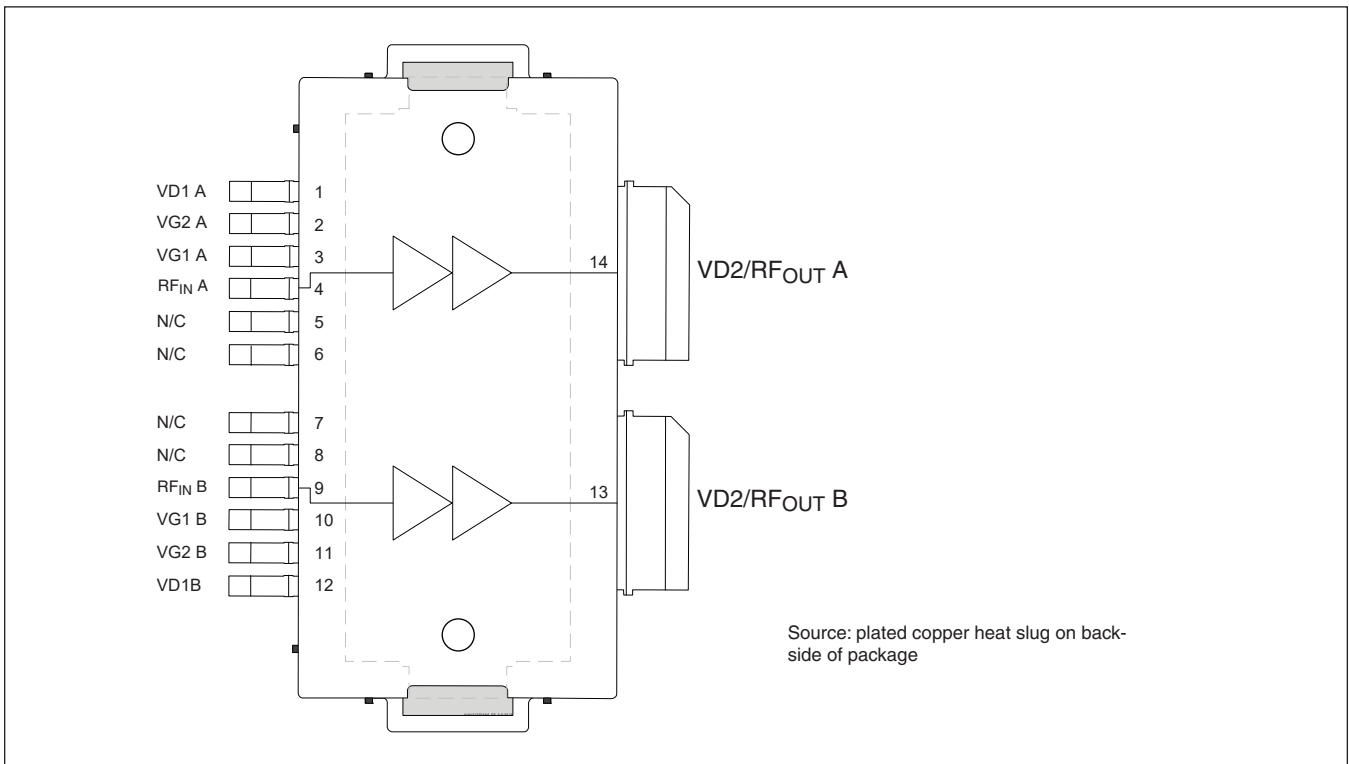
Reference Circuit Assembly

DUT	PTMC210404MD V1
Test Fixture Part No.	LTN/PTMC210404MD V1
PCB	Rogers 4350B, 0.508 mm [0.020"] thick, 2 oz. copper, $\epsilon_r = 3.66$, $f = 1805 - 2200$ MHz
Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF	

Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C103, C105, C107, C109, C111, C203, C207	Capacitor, 4.7 μ F	Murata Electronics North America	GRM32ER71H475KA88L
C102, C104, C106, C108, C110, C112, C202, C206	Capacitor, 10 μ F	Taiyo Yuden	UMK325C7106MM-T
C201, C204, C205, C208	Capacitor, 10 pF	ATC	ATC800A100JT250T
R101, R103	Resistor, 0.0 ohms	Panasonic Electronic Components	ERJ-3GEY0R00V
R102, R201	Resistor, 50 ohms	ANAREN	C8A50Z4A
R104, R105, R106, R107	Resistor, 1K ohms	Panasonic Electronic Components	ERJ-8GEYJ102V
R108, R109, R110, R111	Resistor, 4.3K ohms	Panasonic Electronic Components	ERJ-8GEYJ432V
U1, U2	Hybrid Coupler	ANAREN	X3C21P1-03S

Pinout Diagram



Package Outline Specifications

Package PG-HB1DSO-14-1
(formed leads)

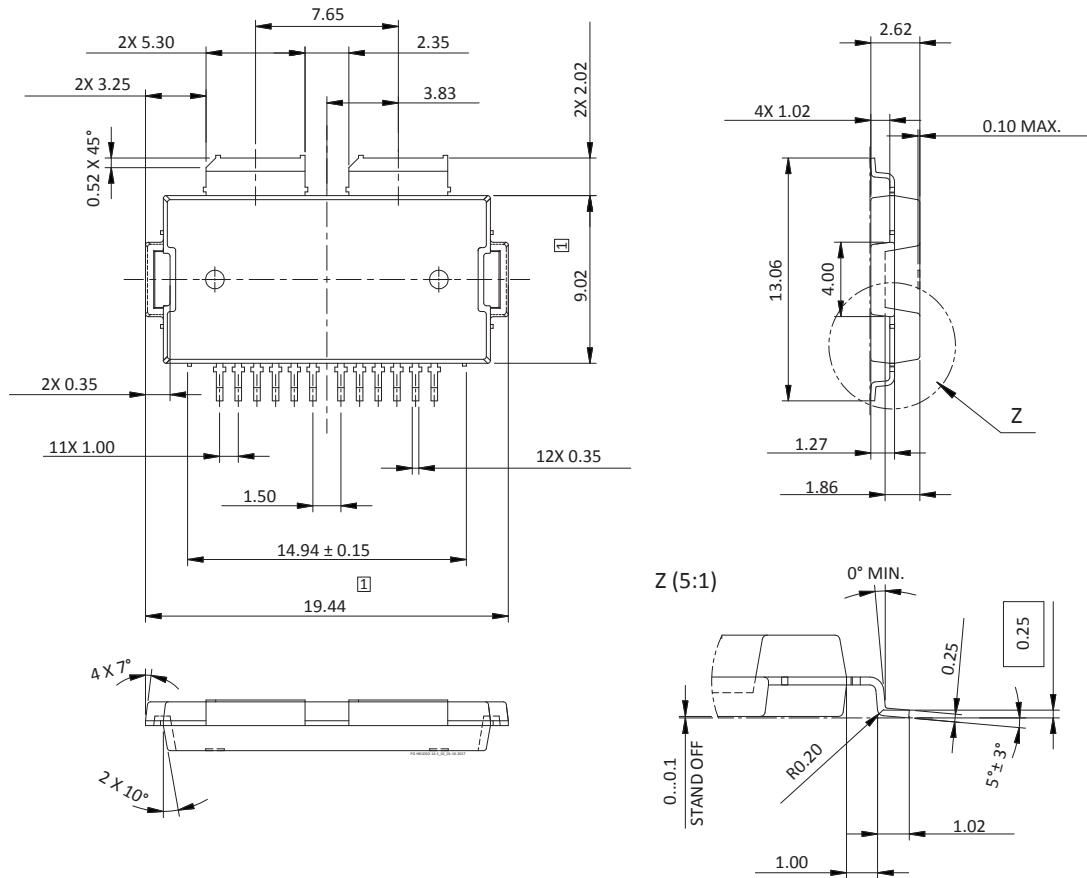


Diagram Notes—unless otherwise specified:

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 max.

Package Outline Specifications (cont.)

Package PG-HB1DSO-14-1 (formed leads, bottom side)

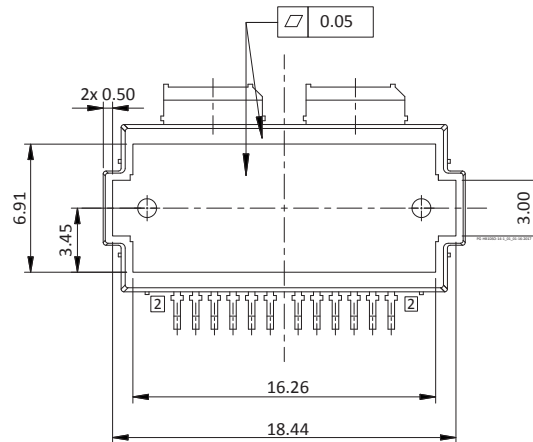


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5. Dimensions are mm.
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8. Lead thickness: 0.25 mm.
9. Gold plating thickness: 0.25 micron max.

Revision History

Revision	Date	Data Sheet Type	Page	Subjects (major changes since last revision)
01	2017-01-20	Advance	All	Target specifications for proposed product.
02	2017-05-11	Production	All	Data Sheet reflects released product specification
03	2018-05-21	Production	All	Converted to Wolfspeed Data Sheet

For more information, please contact:

4600 Silicon Drive
Durham, North Carolina, USA 27703
www.wolfspeed.com/RF

Sales Contact
RFSales@wolfspeed.com

RF Product Marketing Contact
RFMarketing@wolfspeed.com
919.407.7816

Notes

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