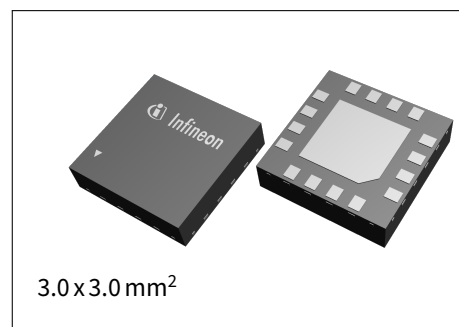


BGAP2S30A

Pre-Driver for Wireless Infrastructure Applications

1 Features

- Operation frequency range: 3300 to 4200MHz
- Gain: 35dB
- Output P1dB: 28.5dBm
- 50 Ω single-ended input and output
- 5V supply voltage
- TSNP-16 leadless package (3.0 x 3.0 mm²)
- BiCMOS Technology



2 Potential Applications

- 4G/5G
- Cellular Infrastructure
 - Massive MIMO systems
 - Small cells

3 Product Validation



Qualified for industrial applications according to the relevant tests of JEDEC47/20/22.

4 Description

The product is a stand-alone pre-driver in package. The pre-driver is a two-stage amplifier designed to be used in the 5G Tx line-up for base station applications as the pre-driver for the Doherty power amplifier. It has been designed in the INFINEON BiCMOS technology. Input and outputs are 50 Ω single-ended. The device configuration is shown in Fig. 1.

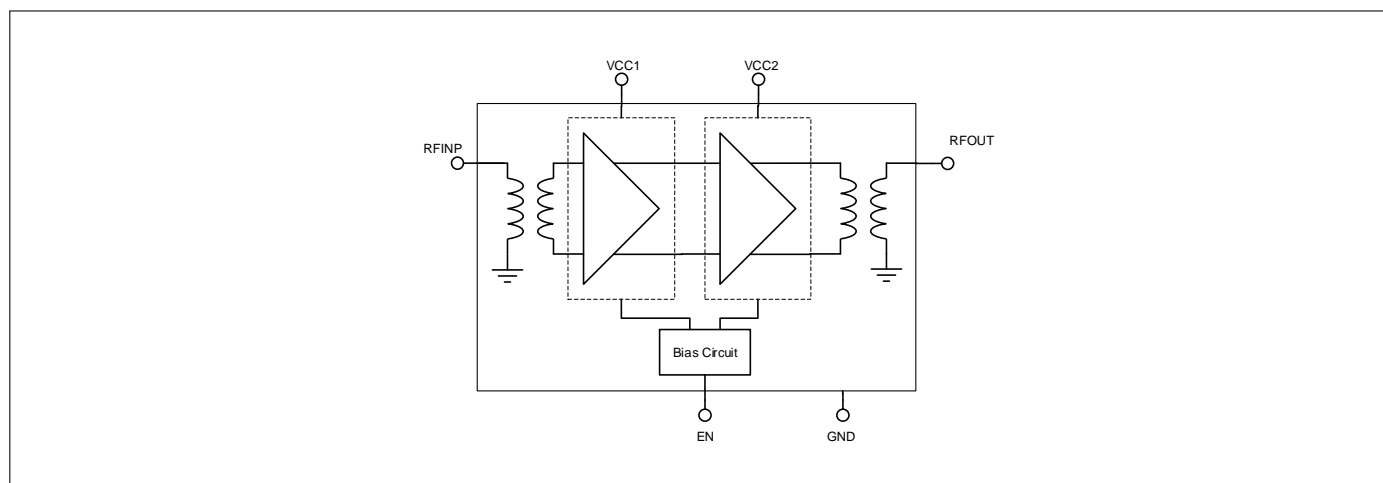


Figure 1: BGAP2S30A Block diagram

Product Name	Marking	Package
BGAP2S30A	BP2S3A YYWW(YY=year, WW=week)	PG-TSNP-16-12

Table of Contents

1 Features	1
2 Potential Applications	1
3 Product Validation	1
4 Description	1
5 Absolute Maximum Ratings	3
6 Electrical Characteristics	4
7 Application Information	5
8 Package Information	7

Absolute Maximum Ratings

5 Absolute Maximum Ratings

Table 1: Absolute Maximum Ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply Voltage	V_{CC}	-0.5	–	5.5	V	¹
Enable Voltage	V_{EN}	-0.4	–	4.0	V	–
Storage Temperature	T_{STG}	-45	–	150	°C	–
Junction Temperature	T_J	-40	–	170	°C	–
DC voltage on RF Ports	$V_{RF,DC}$	0	–	0	V	¹
RF Input Power CW	$P_{IN,CW}$	–	–	6	dBm	–
ESD Capability HBM ²	$V_{ESD,HBM}$	-1000	–	1000	V	–
ESD Capability CDM ³	$V_{ESD,CDM}$	-250	–	250	V	–

¹All voltages refer to GND-Nodes unless otherwise noted²Human Body Model ANSI/ESDA/JEDECJS-001 (R = 1.5kΩ, C = 100pF)³Field-Induced Charged-Device Model ANSI/ESDA/JEDECJS-002. Simulates charging/discharging events that occur in production equipment and processes. Potential for CDM ESD events occurs whenever there is metal-to-metal contact in manufacturing.

Warning: Stresses above the max. values listed here may cause permanent damage to the device. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the integrated circuit. Exposure to conditions at or below absolute maximum rating but above the specified maximum operation conditions may affect device reliability and life time. Functionality of the device might not be given under these conditions.

Table 2: Thermal Resistance

Parameter	Symbol	Value	Unit
Thermal Resistance - Junction - Solder pad (@25°C)	$R_{th,JS}$	19.6	°K/W

Table 3: Recommended Operating Conditions

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Supply Voltage	V_{CC}	4.75	–	5.25	V	–
Enable Voltage OFF	$V_{EN,OFF}$	0	–	0.63	V	–
Enable Voltage ON	$V_{EN,ON}$	1.17	–	3.6	V	–
Operating Temperature	T_A	-40	–	115	°C	Solder joint temperature

Power-up and power-down sequences

The following sequences are required to be respected during power-up/down of the device.

Power-up sequence: 1. VCC1 and VCC2 -> on; 2. EN -> on.

Power-down sequence: 1. EN -> off; 2. VCC1 and VCC2 -> off.

Deviating from these sequences may cause permanent damage.

6 Electrical Characteristics

Table 4: Electrical Characteristics. Test conditions (unless otherwise noted): T=25°C, V_{CC}=5V, f_{RF}=3.6GHz

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
RF Frequency	f_{RF}	3300	–	4200	MHz	–
Current Consumption OFF	$I_{CC,OFF}$	–	1.2	–	mA	–
Current Consumption ON	$I_{CC,ON}$	–	121	–	mA	No RF input signal
Input Return Loss	RL_{IN}	8	18	–	dB	–
Output Return Loss	RL_{OUT}	15	17	–	dB	–
Gain	G	34.1	35	–	dB	–
Gain Flatness	G_{FLAT}	–	–	0.4	dB	Defined in any 100MHz within band
Output P1dB	OP_{1dB}	28	28.5	–	dBm	–
Output IP3	OIP_3	33.7	34.1	–	dBm	$P_{IN1}=P_{IN2}=-25dBm, \Delta f=1MHz$
Adjacent Channel Leakage Ratio	$ACLR$	–	-48.6	-45	dBc	20MHz E-TM1.1 with 9.8 dB PAPR @Pout=15 dBm
Noise Figure	NF	–	3.2	3.7	dB	–
Switching ON Time	T_{ON}	–	0.45	0.5	μs	P _{OUT} to 90% of final value
Switching OFF Time	T_{OFF}	–	–	0.3	μs	Gain within <5% and power dissipation <10% than in ON state

7 Application Information

Pin Configuration and Function

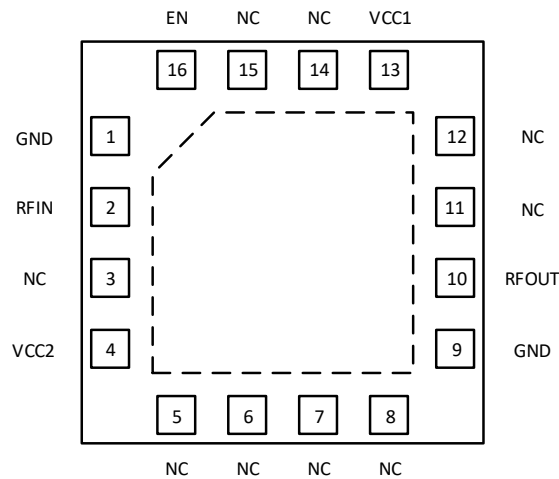


Figure 2: BGAP2S30A Pin Configuration - Top View

Table 5: Pin Definition and Function

Pin No.	Name	Function
1, 9	GND	Ground
2	RFIN	RF Input
4	VCC2	2 nd stage DC voltage supply
3, 5, 6, 7, 8, 11, 12, 14, 15	NC	Not connected internally. It can be either left floating or connected to ground
10	RFOUT	RF Output
13	VCC1	1 st stage DC voltage supply
16	EN	Chip enable
Backside Paddle	GND	Ground connection

BGAP2S30A

Pre-Driver for Wireless Infrastructure Applications

Application Information

Application Board Configuration

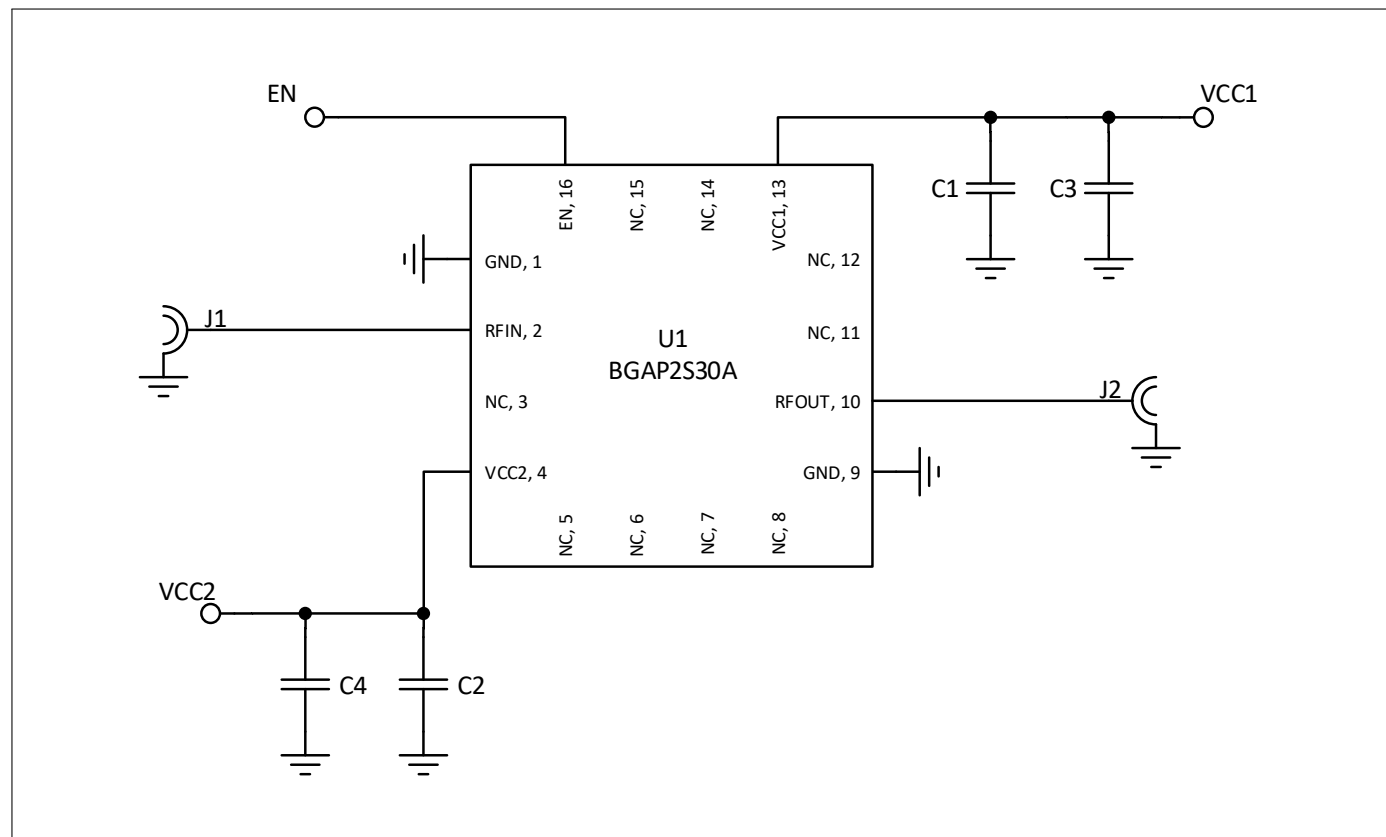


Figure 3: BGAP2S30A Application Schematic

Table 6: Bill of Materials Table

Name	Value	Description	Part Number	Manufacturer
C1, C2	10nF	Capacitor, X7R, 0402	–	Various
C3, C4	1uF	Capacitor, X7R, 0402	–	Various
J1, J2	–	Connector, SMA	–	Various
U1	–	Pre-driver, PG-TSNP-16-12	BGAP2S30A	Infineon

BGAP2S30A

Pre-Driver for Wireless Infrastructure Applications

Package Information

8 Package Information

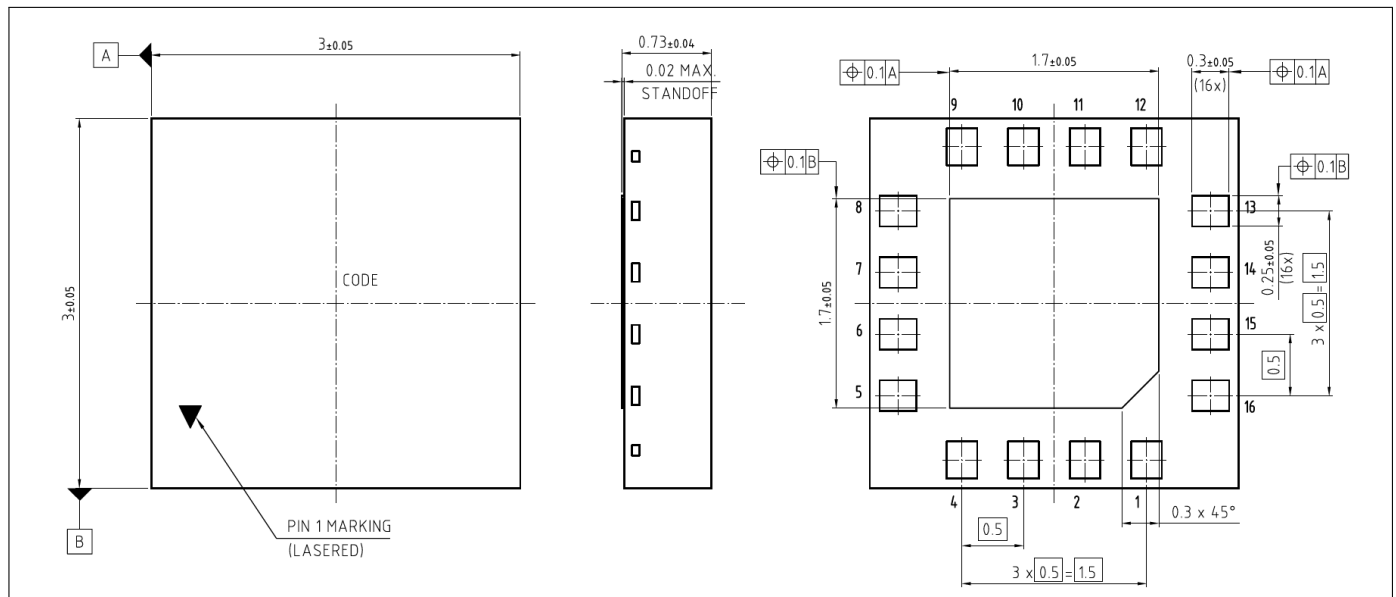


Figure 4: PG-TSNP-16-12 Package Outline (3.0mm x 3.0mm x 0.73mm)

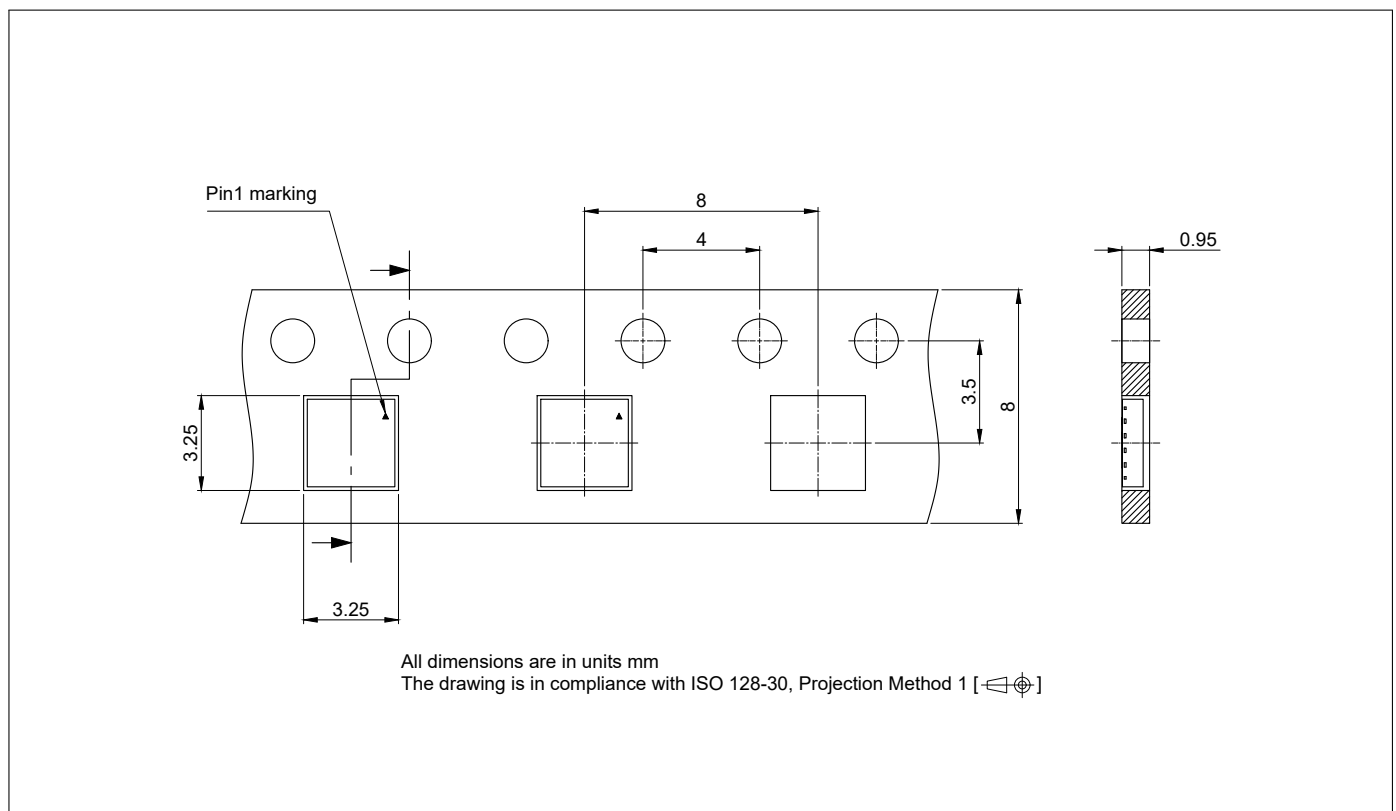


Figure 5: PG-TSNP-16-12 Carrier Tape

Revision History

Page or Item	Subjects (major changes since previous revision)
all	Preliminary, Revision v1.0 - 2023-06-01
all	Preliminary, Revision v1.1 - 2023-08-03 Package changed to 16-12

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

Edition 2023-08-03
Published by
Infineon Technologies AG
81726 Munich, Germany

© 2023 Infineon Technologies AG.
All Rights Reserved.

Do you have a question about any aspect of this document?
Email: erratum@infineon.com

Document reference
Doc_Number

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenhheitsgarantie"). With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party. In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications. The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

Infineon:

[BGAP2S30AE6327XTSA1](#)