



Wideband 4-6GHz 1-Watt High-Efficiency Power Amplifier

Description

BHWA555 is a wideband, high-gain, high-efficiency power amplifier designed in advanced GaAs/InGaP process, capable of delivering up to 1-watt output power in the 4-6GHz frequency band. It features full on-chip input impedance match, and requires one capacitor only for output match for most use cases. It also integrates active bias circuitry, power detector and ESD protection circuits. BHWA555 is highly flexible and can be optimized to work over a wide range of supply voltage and bias current, to meet customer requirements with best efficiency. The device is housed in a compact 3x3mm, 16-Lead QFN (Quad Flat No-Lead) package.

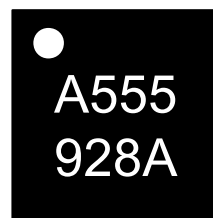
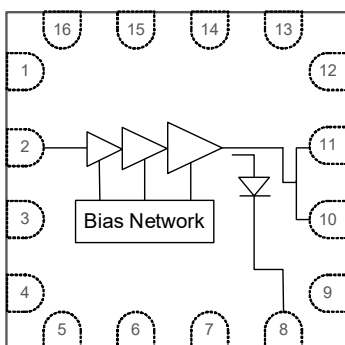
Key Features

- Advanced GaAs/InGaP HBT Process
- Frequency Range: 4~6GHz Operational
- Supply Voltage: 3~5V Selectable
- Bias Current: 30~200mA Adjustable
- Power Gain: Up to 28dB at 5.85GHz
- Output P1dB: Up to +28.5dBm at 5.85GHz
- Saturated Output: Up to +30.5dBm at 5.85GHz
- High PAE: Up to 30.5% at 5.85GHz
- Integrated ESD Protection

Key Applications

- Wi-Fi IEEE 802.11ax/ac/n/a Systems
- Ultra-Wide Band (UWB) Systems
- Electronic Toll Collection (ETC) Systems
- UAV/Drones
- 5.8GHz Wireless Audio/Video
- Remote Control
- 5G Driver Amplifier
- Generic 5GHz Radio Designs

Functional Block and Package Information

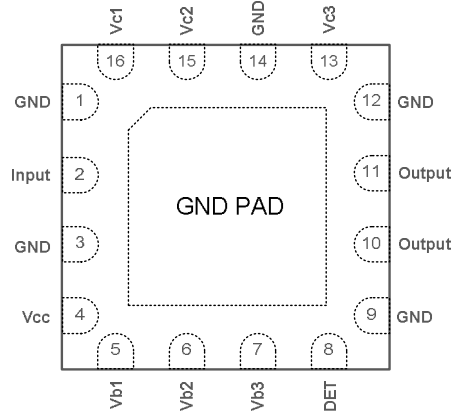


3x3x0.75mm 16L QFN



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Pin Assignment and Pin Description



(Top “See-Through” View)

Pin Number	Pin Name	Description
1,3,9,12,14	GND	Not Connected Internally. Can be Grounded on PCB.
2	Input	RF Input to the PA
4	Vcc	DC Supply Voltage for the PA Bias Network
5	Vb1	Bias Control Pin for 1 st Stage of the PA
6	Vb2	Bias Control Pin for 2 nd Stage of the PA
7	Vb3	Bias Control Pin for 3 rd Stage of the PA
8	DET	Power Detector Output
10,11	Output	RF Output of the PA
13	Vc3	DC Supply Voltage for 3 rd Stage of the PA
15	Vc2	DC Supply Voltage for 2 nd Stage of the PA
16	Vc1	DC Supply Voltage for 1 st Stage of the PA



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Absolute Maximum Ratings

Parameter		Rating	Unit
Maximum Supply Voltage		5.5	V
Maximum Bias Voltage		5.5	V
Maximum Supply Current		650	mA
Maximum Input Power		+10	dBm
Junction Temperature		+150	°C
Operation Temperature		-40 to +85	°C
Storage Temperature		-40 to +150	°C
Moisture Sensitivity Level		MSL1	

Note: Do not exceed any single or combination of the above parameters. Sustained operation at or above the Absolute Maximum Ratings may result in permanent damage to the device. Maximum Input Power Rating assumes 50-Ohm load impedance.

A Special Note on Heat Dissipation Strategy for High-Power Product Design:

While BHWA555 is capable of delivering slightly over 1 watt maximum power with best-class PAE inside a small 3x3mm QFN package, care must be taken in order to take full advantage of its power capability without causing concerns over long-term reliability in the field.

The junction-to-case and junction-to-ambient thermal resistance of BHWA555 is approximately 3°C/W and 40°C/W, respectively, for a normal RF4 PCB design without dedicated heat sink provision. At ambient temperature (25°C), BHWA555 can dissipate ~3W DC power (600mA at 5V) without violating the 150°C maximum junction temperature rating. This dissipation power is the total DC power minus the RF output power at CW. For many applications which have duty-cycles much lower than 100%, the average current allowance will be higher, depending on the actual duty-cycle.

For commercial/industrial applications with 85°C maximum temperature rating, especially outdoor products working in extremely harsh environments, it is highly recommended that a good heat dissipation strategy is implemented, either applying thermal pad on top of the PA, or adding heat sink at backside of the PCB underneath the PA. This is particularly critical when using BHWA555 at 5V for Continuous Wave (CW) operation. Contact support@bhwtechnologies.com for further details and technical support.



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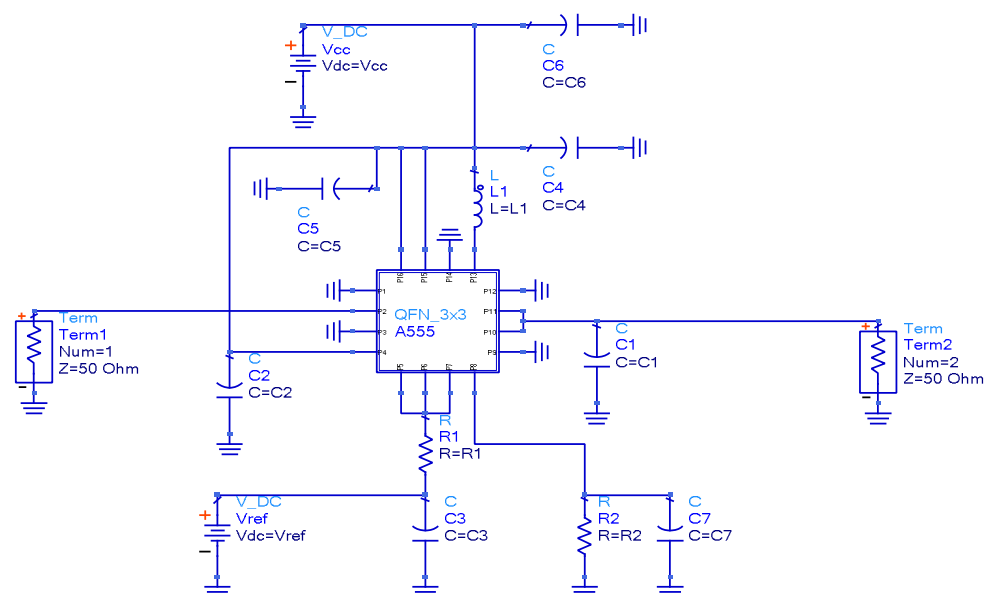
Electrical Specifications*:

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		4		6	GHz
Operation Supply Voltage		3	5	5.25	V
Quiescent Current	V _{cc} =5V, V _{ref} =5V, No RF		150		mA
Bias Control Current	V _{cc} =5V, V _{ref} =5V		3		mA
Power Gain	5.85GHz		28		dB
Output P1dB	5.85GHz		+28.5		dBm
Saturated Output Power	5.85GHz		+30.5		dBm
Total Current	V _{cc} =5V, P _{out} =+30dBm, CW		650		mA
Peak PAE	V _{cc} =5V, P _{out} =+30dBm, CW		30.5		%
Input Return Loss	P _{in} =-30dBm		10		dB
Output Return Loss	P _{in} =-30dBm		10		dB

*Refer to BHWA555 Application Note for additional test data in details.

Application Schematic

(Refer to BHWA555 Application Note for Details)





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Package Marking



← Line 1: Pin 1 Indicator

← Line 2: Part Number, A555

← Line 3: Datecode, YWWA

Date Code Description

Y: Year Code (e.g, 9 for 2019)

WW: Working Week (01~52)

A: Revision Code (Default=A)