



BHW Technologies (博泓微科技有限公司)



Advanced RF IC, Antenna, Filter, RF Front-End
and Wireless System Solutions

BHW AppNote #008

High-Power 5.8GHz RF Front-End Solution Using BHWA555 and
BHWM552 for ETC, V2X and Wireless Video

Rev. 1.3, 11/17/2020

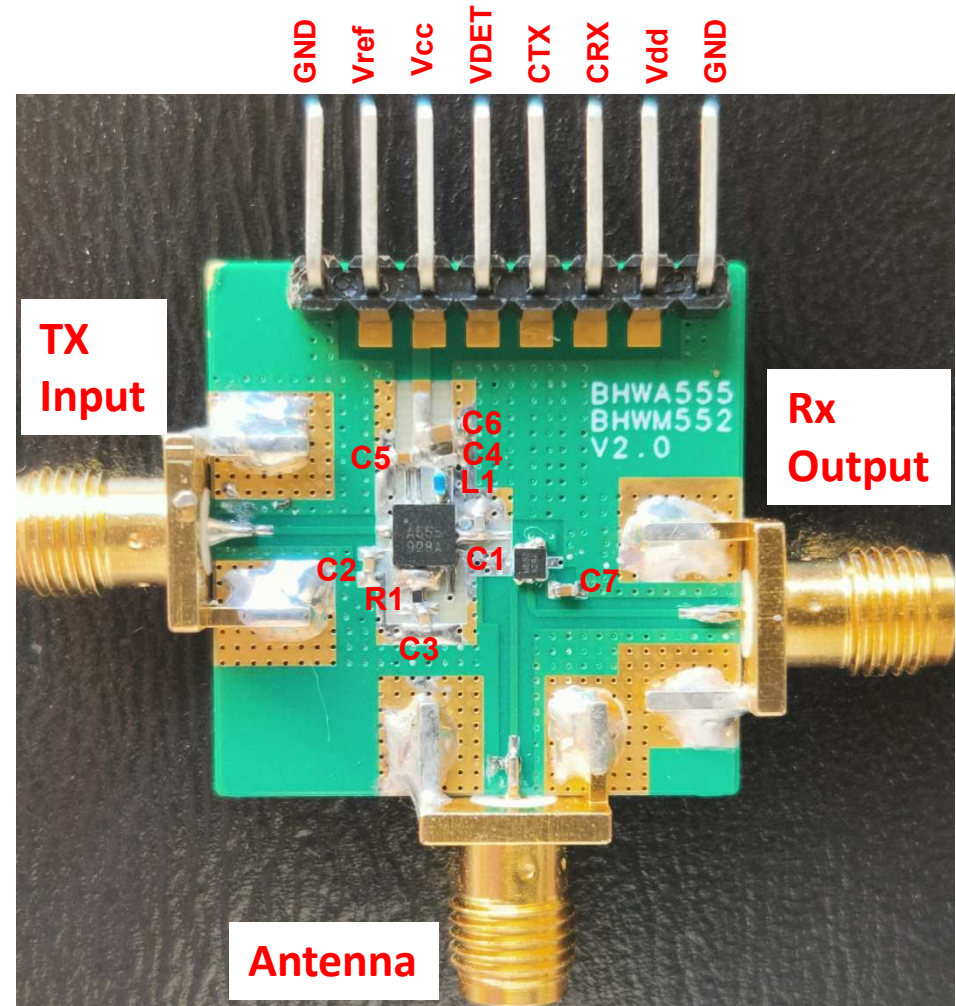
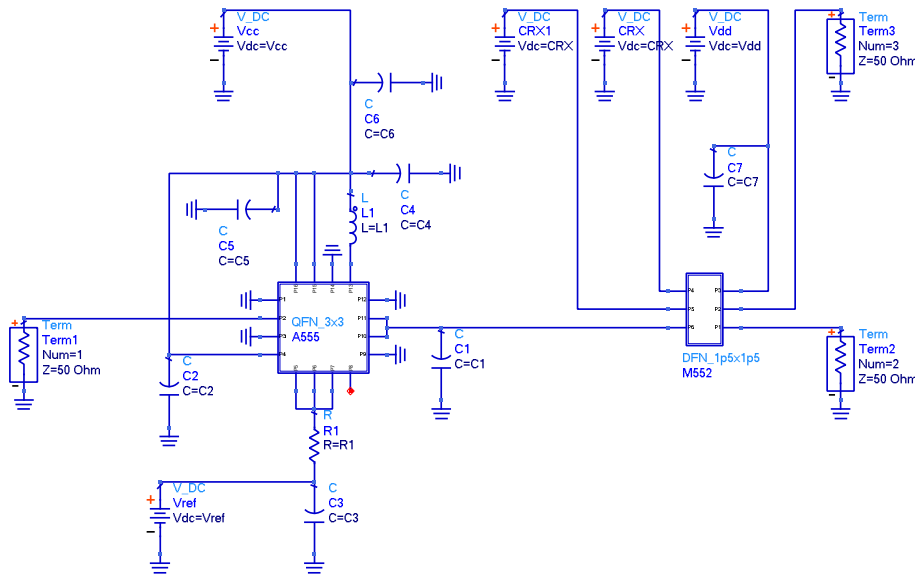
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BHWA555 & BHWM552 Combo EVB



BHWA555 & BHWM552 Combo EVB Tuned for 5.85GHz Applications

Application Schematic



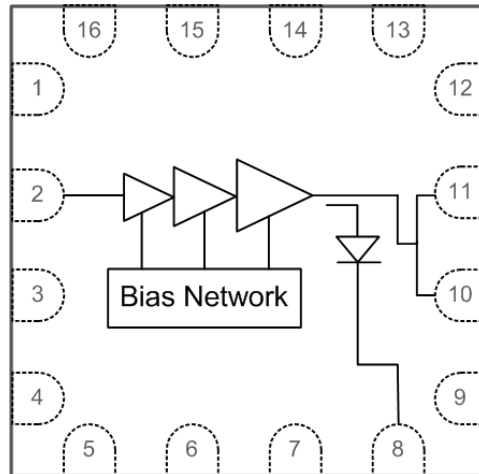
Recommended BOM for 5.85GHz Operation:

- Capacitors: C1=1pF, C2=C3=1nF, C4=220pF, C5=0.1uF, C6=C7=1uF; C1 at ~1mm from Package Output Edge
- Bias Inductor: L1=3.9nH
- Bias Resistor: R1=750 Ohm for $I_{cq} \sim 150\text{mA}$ at $V_{cc}=V_{ref}=5\text{V}$. Other bias settings available upon request
- Power detection circuit not included. Information available upon request.

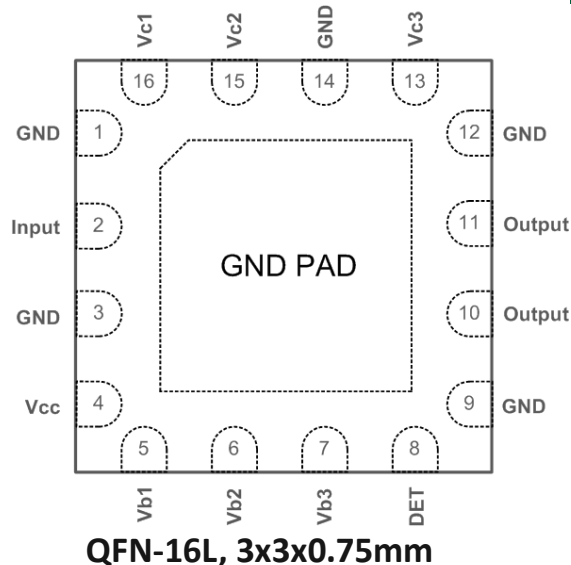
BHWA555 Wideband One-Watt Power Amplifier



Functional Block Diagram



Package Pin-Out (Top "See-Through" View)



Product Overview:

- Advanced GaAs/InGaP HBT Process
- 4-6GHz Operation Frequency Range
- Single Supply 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 Power: Up to +30.5dBm at 5.85GHz
- High PAE: Up to 30.5% at 5.85GHz
- Full On-Chip Match at Input Port
- Simple Output Match with 1 Capacitor Only
- Integrated ESD Protection
- Compact, Industry-Standard 3x3mm QFN Package

Applications:

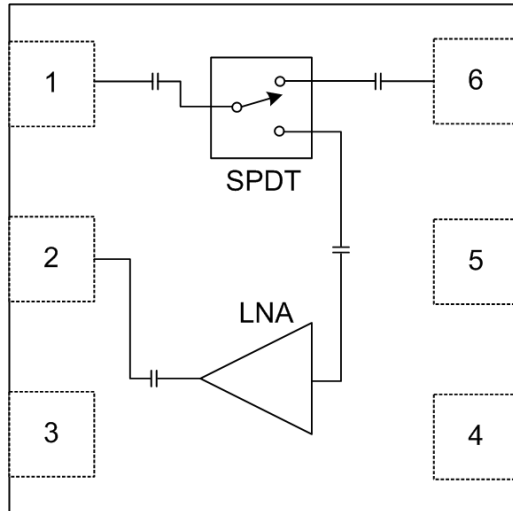
- Wi-Fi IEEE 802.11 5.15-5.85GHz Products
- UWB B2/B3/B5/B7 Products
- 5G Band N79 4.4-5GHz Driver
- Remote Control for Drones/UAVs/Toys
- Wireless Audio/Video in 5-6GHz
- Generic Amplifier for 4-6GHz Radios

Note: BHWA555 features a flexible circuit topology and can be tuned for optimal performance in any of the sub-bands from 4 to 6GHz with simple adjustment of its bias resistor and matching capacitor. Contact BHW team for info or support.

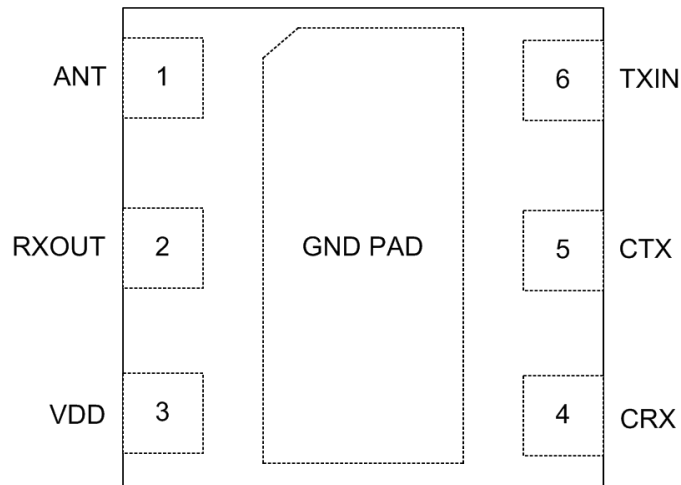
BHWM552 5GHz LNA+SW Rx FE IC



Functional Block Diagram



Package Pin-Out (Top "See-Through" View)



DFN-6L 1.5x1.5x0.55mm



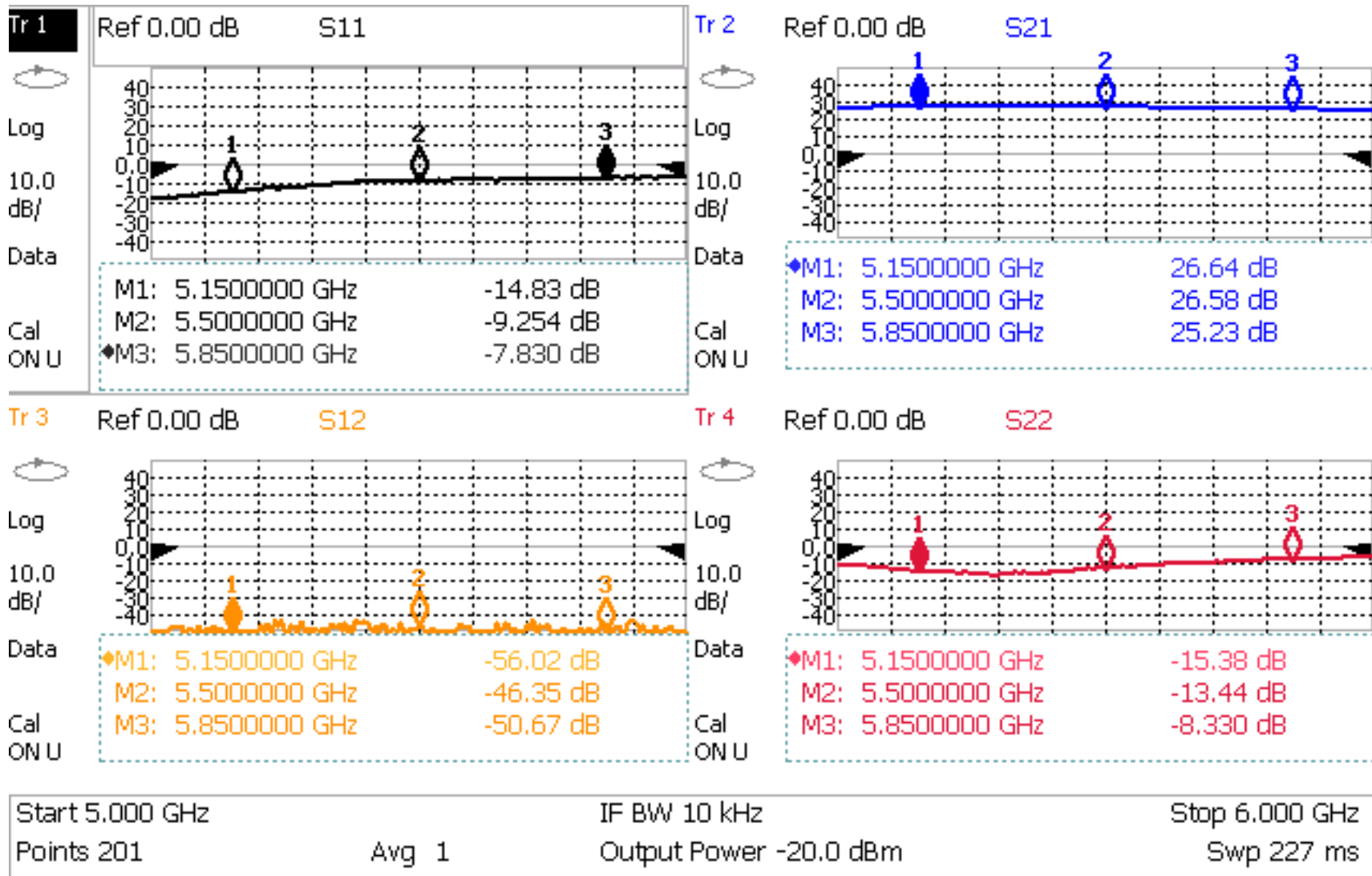
Product Overview:

- Advanced GaAs E/D-pHMET Process
- 4-6GHz Operation
- Low Tx Insertion Loss: ~0.8dB
- Low Rx Noise Figure: ~1.6dB
- Low LNA Current: ~14mA
- Rx Gain: ~10dB at 5GHz
- Input P1dB: ~+3dBm at 5.5GHz
- Fully Matched Input & Output Ports (for 5GHz)
- Integrated DC Block Capacitors on all RF Ports
- Minimal External Components
- ESD Protection on All I/O Pins: 500V HBM
- Ultra-Small 1.5x1.5mm DFN Package

Applications:

- Wi-Fi IEEE 802.11 5.15-5.85GHz Products
- UWB B2/B3/B5/B7 Products
- 5G Band N79 4.4-5GHz Driver
- Remote Control for Drones/UAVs/Toys
- Wireless Audio/Video in 5-6GHz
- Generic Amplifier for 4-6GHz Radios

BHWA555 & M552 Combo EVB Tx S-Parameter



Notes:

- Bias Setting: Vcc=Vref=5V, Icq~150mA; Vdd=CTX=3.3V, CRX=0V
- Measured S21 includes PCB and SMA connector losses (~0.5dB at 5.85GHz)

BHW RF Front-End AppNote Library



For further information, please email to support@bhwtechnologies.com, or contact your local BHW Sales Rep or Distributor. We will send you the complete AppNote as well as additional related information.

In addition to standard datasheets and EVB/BOM info, BHW publishes an AppNote series that address various topics on RF front-end design and performance over a wide frequency range from 300MHz to 6GHz, as an effort to assist customers in developing cutting-edge, cost-competitive products:

- BHW AppNote #001 - Cross-Over Cascade of BHWM253 to Boost Tx Power and Rx Sensitivity of BLE and 2.4GHz IoT
- BHW AppNote #002 - Accurate Benchmark of GNSS CN0 Using the Power-Splitter Method
- BHW AppNote #003 - Boosting Wi-Fi Tx Power and Rx Sensitivity with BHWA251 and BHWM252
- BHW AppNote #004 - UHF 900MHz RF Front-End Solution Using BHWA251 Half-Watt PA and BHWL160 Sub-1dB-NF LNA
- BHW AppNote #005 - Sub-1GHz Applications of BHWA350 2-in-1 Wideband Fully Matched Amplifier
- BHW AppNote #006 - Low-Noise High-IIP3 LNB Architecture for Dual-Band High-Precision GNSS Using Cascade of BHWL160
- BHW AppNote #007 - UWB RF Front-End Solution Using BHWA350 and BHWM552
- BHW AppNote #008 - High-Power 5.8GHz RF Front-End Solution Using BHWA555 and BHWM552 for ETC, V2X and Wireless Video
- BHW AppNote #009 - 5.8GHz RF Front-End Using BHWA350 and BHWM552 for Wireless Audio
- BHW AppNote #010 - Multi-Constellation GNSS Active Antenna Using BHWL161 Cascade and Single-Fed Dual-Band Antenna
- BHW AppNote #011 - BHWL161 Super-Compact Low-Power Low Noise Amplifier for Range Extension of 2.4GHz BLE, RC and IoT
- BHW AppNote #012 - Enabling Cost-Effective High-Precision GNSS Using BHWL160 and Linear-Polarization PCB Antenna
- BHW AppNote #013 - Enabling Long-Range BLE AoA&AoD for High-Precision Indoor Positioning with BHW GaAs RF Front-End ICs
- BHW AppNote #014 - Designing Ultra Low-Power High-Performance GNSS Products Using BHWL160 GaAs PHEMT LNA
- BHW AppNote #015 - BHWL161 GNSS Full-Band High-Performance LNA in Super-Compact 1x1mm DFN with Relaxed Pin Pitch
- BHW AppNote #016 - Improving GNSS NF Measurement Accuracy Using Broadband LNA BHWL161 as Pre-Amp
- BHW AppNote #017 - High-Efficiency, Low-NF 2.4GHz Front-End Solution for BLE & IoT Using BHWA251 and BHWM252
- BHW AppNote #018 - Optimizing BHWA555 Wideband One-Watt PA for Long-Range 5.8GHz Transmitter Applications
- BHW AppNote #019 - Miniature 2.4GHz RF Front-End with Integrated Chip Antenna and BHWM253 for TWS and IoT
- BHW AppNote #020 - Doubling the Range for BLE Music Streaming with BHW250L Active Integrated Antenna (AIA)