BHWM556

Production Datasheet

5GHz GaAs RF Front-End with LNA, Switch and Bypass

Description

BHWM556 is an RF Front-End IC in advanced GaAs E/D-PHEMT process that integrates an SPDT switch and low noise amplifier with bypass, for operation over a wide frequency range from around 4GHz to 6GHz. The device features on-chip impedance matching for all RF ports (in 5~6GHz band), and is offered in an ultra-compact, 1.5x1.5mm 8-Lead DFN (Dual Flat No-Lead) package. It has integrated ESD protection circuits on all I/O ports.

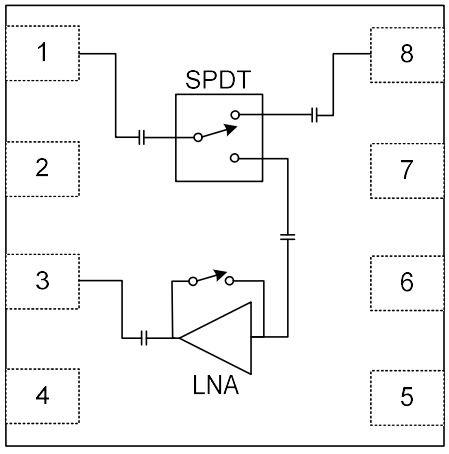
Key Features

- Advanced GaAs E/D PHEMT Process
- Tx Insertion Loss: 0.8dB
- LNA Current: 12mA
- Rx Gain: 10~11dB in 5~6GHz Band
- Low Rx NF: 1.7~1.8dB in 5~6GHz Band
- High Input P1dB: +3~+4dBm in 5~6GHz Band
- LNA Gain Step: 25dB
- Fully Matched RF Ports for 5~6GHz Band
- Ultra-Small 1.5x1.5mm DFN Package

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
- Generic 5GHz TDD Radio Designs

Functional Block and Package Information



1.5x1.5x0.45mm 8L DFN

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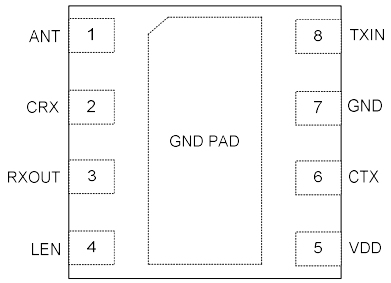
Pin Assignment and Pin Description



(Top "See-Through" View)

Pin #	Pin Name	Description
1	Ant	Antenna Port
2	CRX	Control Voltage for Rx Switch
3	RXOUT	LNA Output
4	LEN	Control Voltage for LNA
5	VDD	DC Supply Voltage for LNA
6	CTX	Control Voltage for Tx Switch
7	GND	Ground
8	TXIN	Tx Input to Antenna

Absolute Maximum Ratings

Parameter		Rating	Unit
Maximum Supply Voltage		5	V
Maximum Bias Voltage		3.6	V
Maximum Supply Current		50	mA
Maximum Input Power		+10	dBm
Junction Temperature		+150	^{o}C
Operation Temperature		-40 to +85	^{o}C
Storage Temperature		-40 to +150	^{o}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.

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Electrical Specifications: Receive (ANT to RXOUT)*

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		4		6	GHz
Operating Voltage		1.5	3.3	3.6	V
Quiescent Current	VDD=CRX=3.3V, No RF Input		12		mA
Small-Signal Gain	Pin=-30dBm, 5.85GHz		10		dB
Shutdown Current	VDD=3.3V, CRX=0V		0.3		uA
Noise Figure	5.15-5.85GHz		1.8		dB
Input P1dB	5.15-5.85GHz		+3		dBm
Input Return Loss	5.15-5.85GHz		13		dB
Output Return Loss	5.15-5.85GHz		8		dB
Isolation	5.15-5.85GHz		19		dB
LNA Gain Step	5.15-5.85GHz		25		dB

*Refer to BHWM556 Application Note for additional test data in details.

Electrical Specifications: Transmit (TXIN to ANT)*

Parameter	Condition	Specification			Unit
		Min.	Typ.	Max.	
Operating Frequency		4		6	GHz
Operating Voltage		1.5	3.3	3.6	V
Insertion Loss	VDD=CTX=3.3V		0.8		dB
Input P1dB			25		dBm
Input Return Loss			15		dB
Output Return Loss			12		dB
Isolation			25		dB

*Refer to BHWM556 Application Note for additional test data in details.

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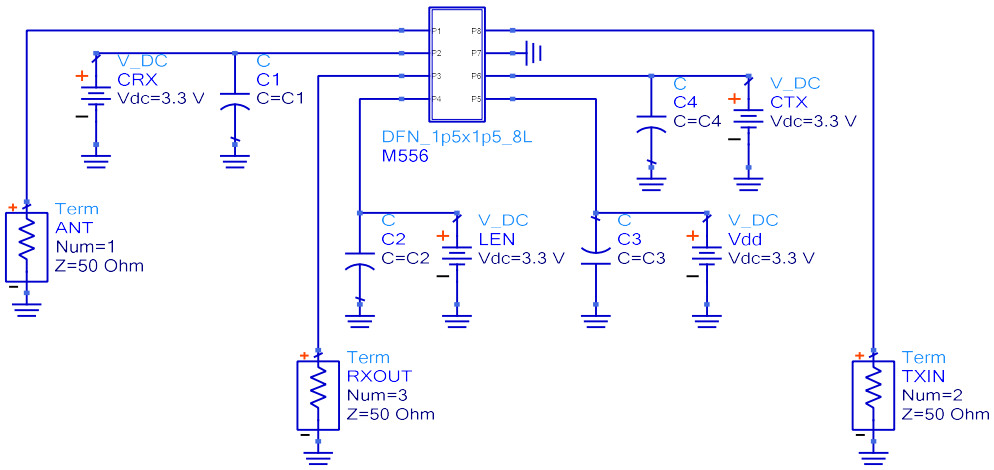
Logic Control

CRX (Pin 2)	LEN (Pin 4)	CTX (Pin 6)	Mode of Operation
0	0	0	All Off
1	1	0	Receive
1	0	0	Receive Bypass
0	0	1	Transmit

Application Schematic

(Refer to BHWM556 Application Note for Details)



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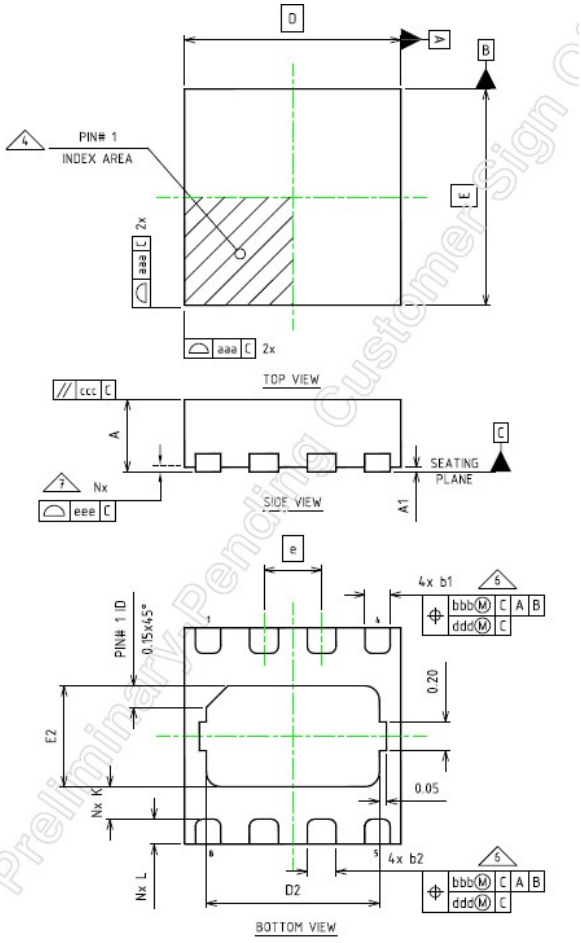
Package Drawing and Dimensions



Dimension Table							
Thickness / Symbol	X1			UT1			NOTE
	MINIMUM	NOMINAL	MAXIMUM	MINIMUM	NOMINAL	MAXIMUM	
A	0.41	0.45	0.50	0.45	0.50	0.55	
A1	0.00	0.02	0.05	0.00	0.02	0.05	
A3	---	0.127 Ref.	---	---	0.127 Ref.	---	
b1	0.125	0.175	0.225	0.125	0.175	0.225	6
b2	0.15	0.20	0.25	0.15	0.20	0.25	6
D	1.50 BSC			1.50 BSC			
E	1.50 BSC			1.50 BSC			
e	0.40 BSC			0.40 BSC			
D2	1.05	1.20	1.30	1.05	1.20	1.30	
E2	0.55	0.70	0.80	0.55	0.70	0.80	
K	0.15	---	---	0.15	---	---	
L	0.125	0.175	0.225	0.125	0.175	0.225	
aaa	0.05			0.05			
bbb	0.07			0.07			
ccc	0.10			0.10			
ddd	0.05			0.05			
eee	0.08			0.08			
N	8			8			3
ND	4			4			5
NOTES	1, 2						
PART NO.	441965						
LF DWG. NO.	CARSEM-HS08455 Rev A						

NOTE:

1. Dimensioning and tolerancing conform to ASME Y14.5-2009.
2. All dimensions are in millimeters.
3. N is the total number of terminals.
4. The location of the marked terminal #1 identifier is within the hatched area.
5. ND refer to the maximum number of terminals on D side.
6. Dimension b applies to the metalized terminal and is measured between 0.15mm and 0.30mm from the terminal tip. If the terminal has a radius on the other end of it, dimension b should not be measured in that radius area.
7. Coplanarity applies to the terminals and all other bottom surface metalization.

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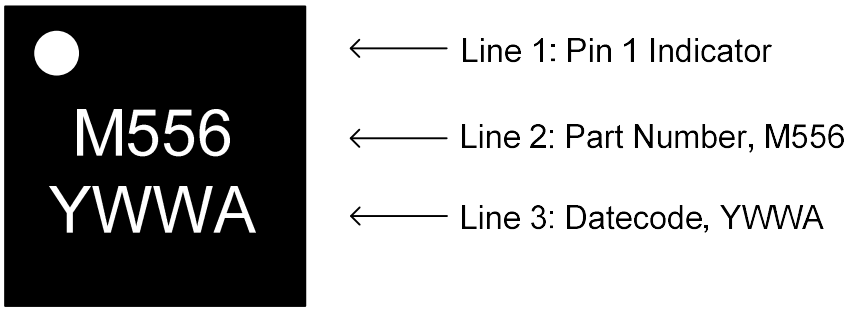
Package Marking



Date Code Description

Y: Year Code (e.g, 0 for 2020)

WW: Working Week (01~52)

A: Revision Code (Default=A)