

# AM3139 – Filter Bank

## Analog Tunable 2.5 GHz to 6 GHz Notch

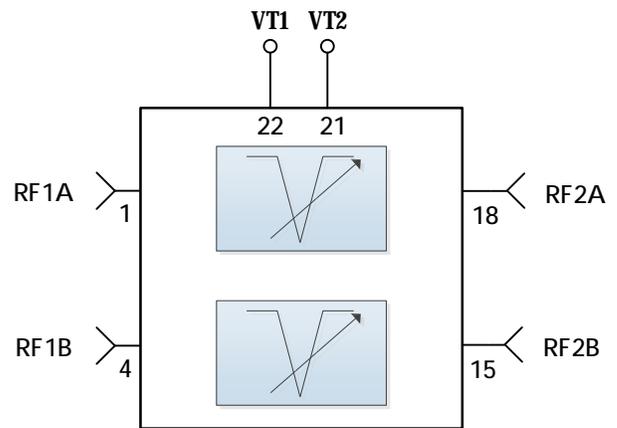
### Description

AM3139 is an analog voltage-tunable notch filter bank covering the 2.5 GHz to 6.0 GHz frequency range. The AM3139 offers two MMIC chips covering 2.5 GHz to 4.5 GHz and 3.4 GHz to 6.0 GHz for fine granularity within the AM3139’s operating range. Two separate tune voltages provide precise control of center frequency and notch bandwidth. The AM3139 provides an excellent filtering solution for a receiver or transceiver requiring flexible center frequency removal, high dynamic range, low insertion loss, and small size, low weight, and low power consumption (low SWAP).

### Features

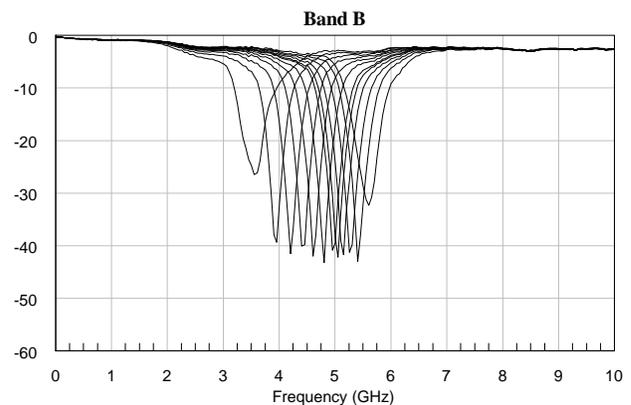
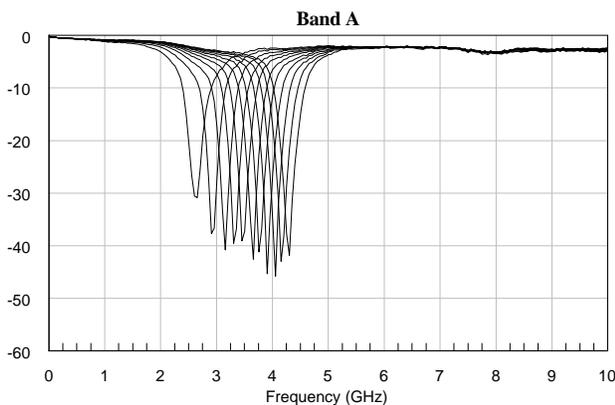
- Analog Tuning
- 2.3 dB Typical Insertion Loss
- 40+ dB Typical Rejection
- BW 20% of Tuned Frequency, TYP
- 0.0V to +6.0V Tuning Voltage Range
- 4mm QFN Package
- -40C to +85C Operation

### Functional Diagram



### Characteristic Performance

(Note: Only some states shown for simplicity)



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### Revision History

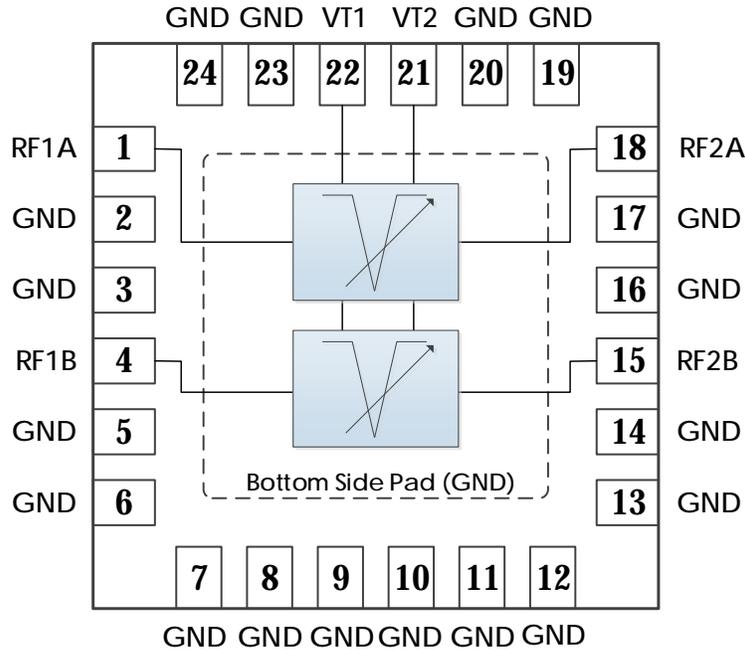
Date	Revision Number	Notes
January 24, 2019	1	Initial Release
May 14, 2019	1A	Front Page Graphs Corrected

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## Pin Layout and Definitions



Pin Number	Pin Name	Pin Function
1	RF1A	RF1A 2.5 GHz to 4.5 GHz – 50 Ohms – DC Coupled, External Blocking Capacitor Required
2, 3	GND	Ground - Common
4	RF1B	RF1B 3.4 GHz to 6.0 GHz – 50 Ohms – DC Coupled, External Blocking Capacitor Required
5 - 14	GND	Ground - Common
15	RF2B	RF2B 3.4 GHz to 6.0 GHz – 50 Ohms – DC Coupled, External Blocking Capacitor Required
16, 17	GND	Ground - Common
18	RF2A	RF2A 2.5 GHz to 4.5 GHz – 50 Ohms – DC Coupled, External Blocking Capacitor Required
19, 20	GND	Ground - Common
21	VT2	Notch Tune Voltage 2
22	VT1	Notch Tune Voltage 1
23, 24	GND	Ground - Common
Bottom Pad	GND	Ground – Common

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## Specifications

### Absolute Maximum Ratings

	Minimum	Maximum
DC Control Voltage	0.0 V	+10.0 V
RF Input Power		+27 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50 C	+150 C

**Note:** Any device operation beyond the Absolute Maximum Ratings may result in permanent damage to the device. The values listed in this table are extremes and do not imply functional operation of the device at these or any other conditions beyond what is listed under Recommended Operating Conditions. Any part subjected to conditions outside of what is recommended for an extended amount of time may suffer from reliability concerns.

### Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	MSL 3	



Atlanta Micro products are electrostatic sensitive.  
Follow safe handling practices to avoid damage

### Recommended Operating Conditions

	Minimum	Typical	Maximum
DC Control Voltage	0.0 V		+6.0 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

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## Analog Tunable 2.5 GHz to 6 GHz Notch

### DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Control Voltage		0.0 V		+6.0 V
DC Control Current			< 1mA	

### RF Performance

(T = 25 °C unless otherwise specified)

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		2.5 GHz		6.0 GHz
Insertion Loss			2.3 dB	
Notch Depth			40 dB	
Return Loss			10 dB	

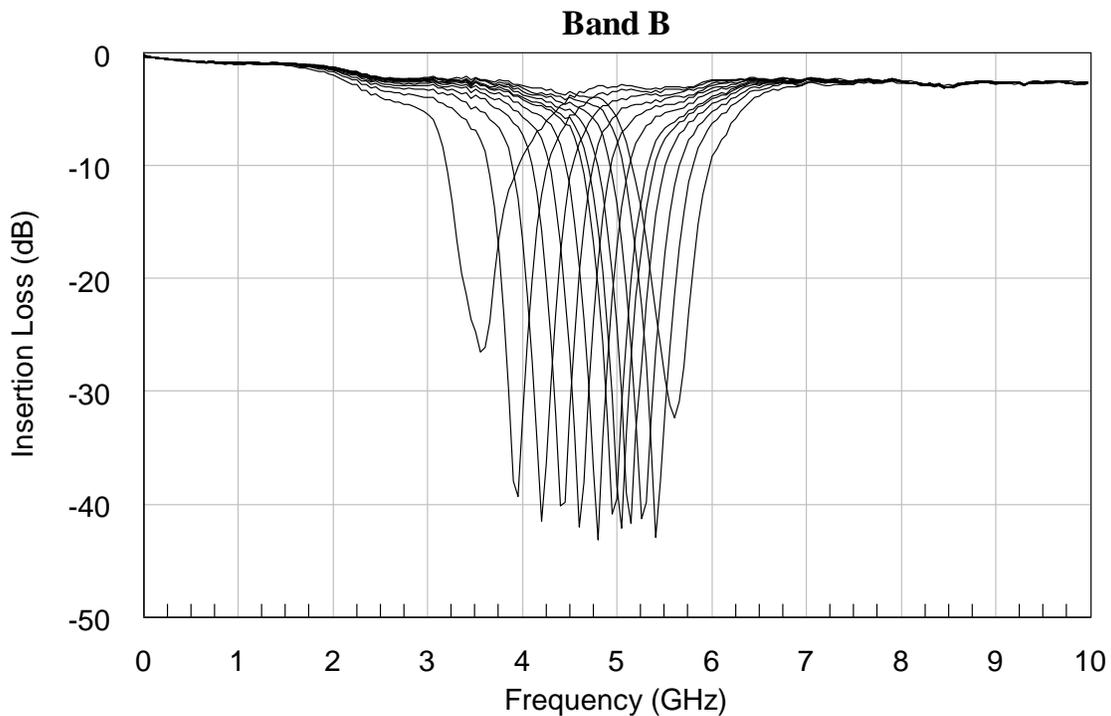
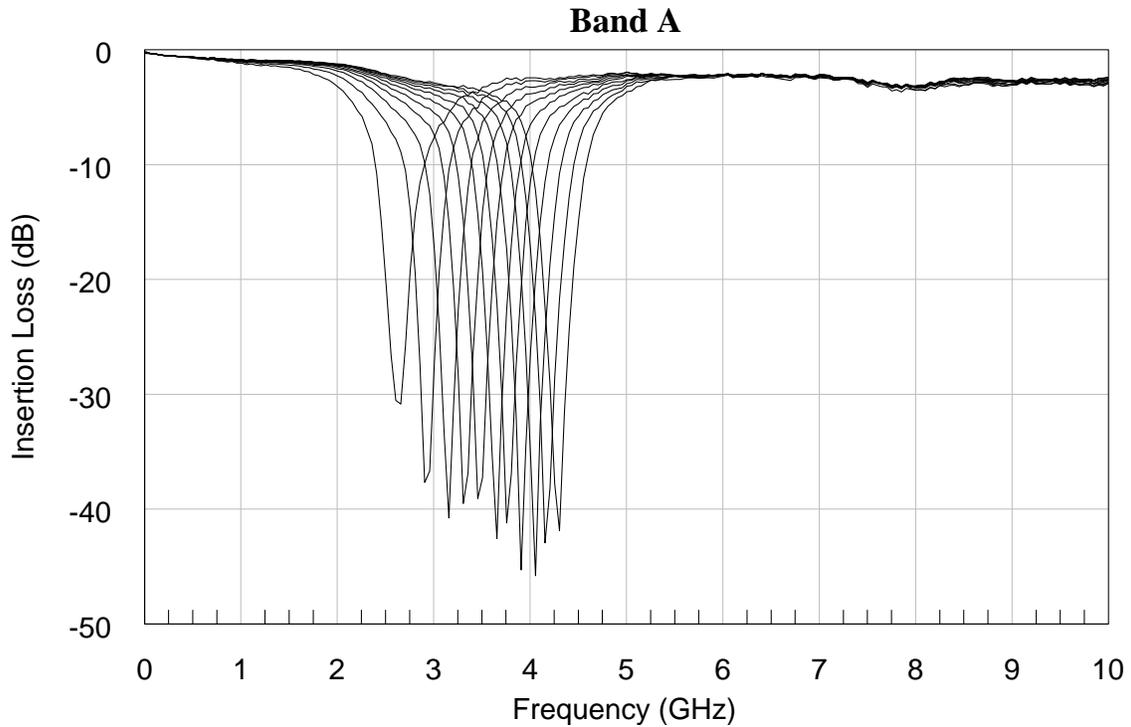
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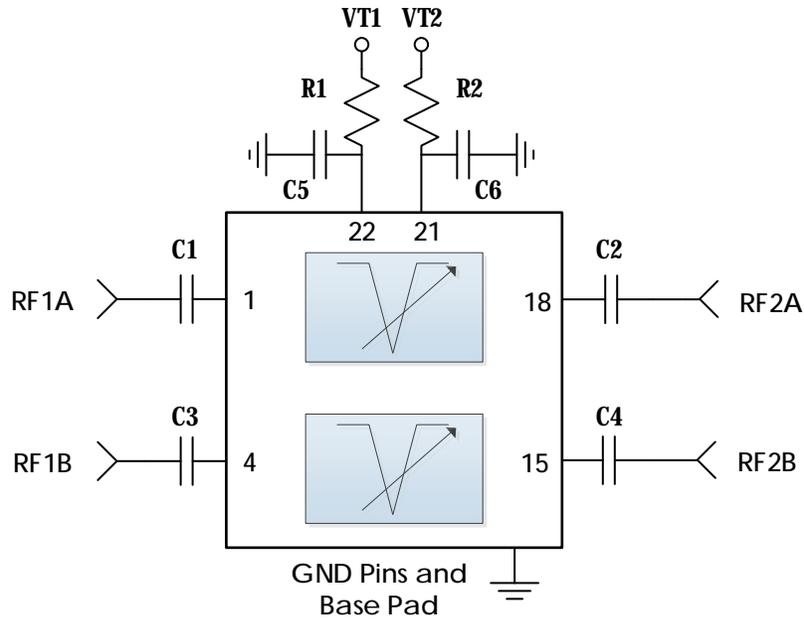
### Typical Performance

(Note: Only some states shown for simplicity)



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### Typical Application



### Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1 – C4	0.1 $\mu$ F	0201BB104KW160	Passives Plus
C5, C6	0.1 $\mu$ F	C1005X7R1H104K050BB	TDK
R1, R2	100 $\Omega$	CRCW0402100RFKED	Vishay

### Notes:

1. RC filtering on control lines is recommended to prevent digital noise from coupling to RF path.
  - a. Select tune voltage line RC filter values based on desired logic source decoupling and switching speed.

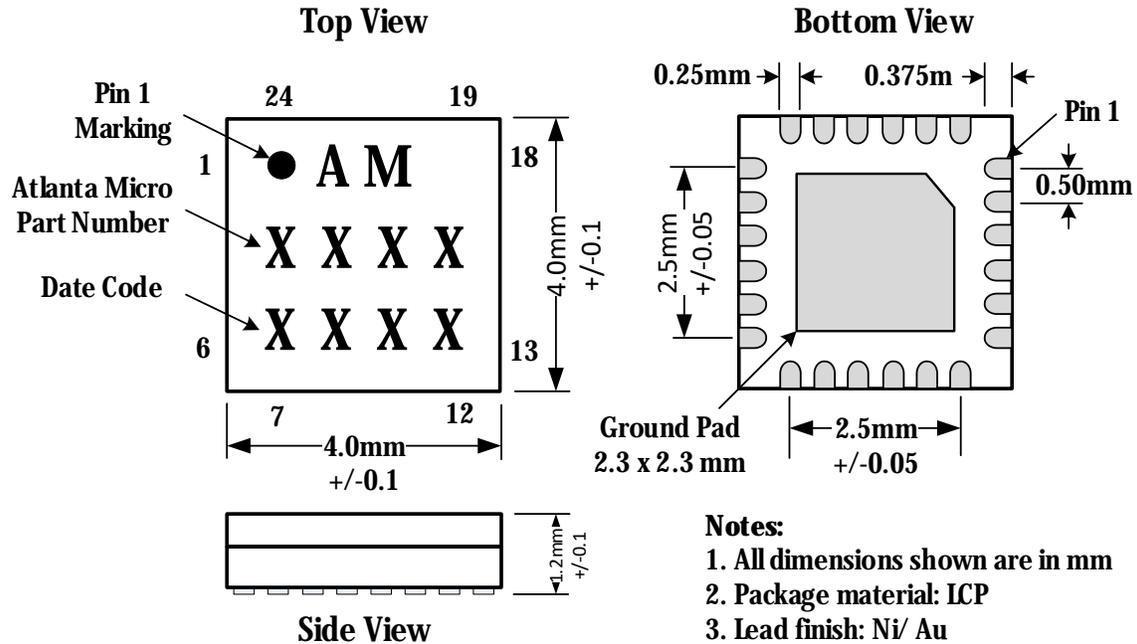
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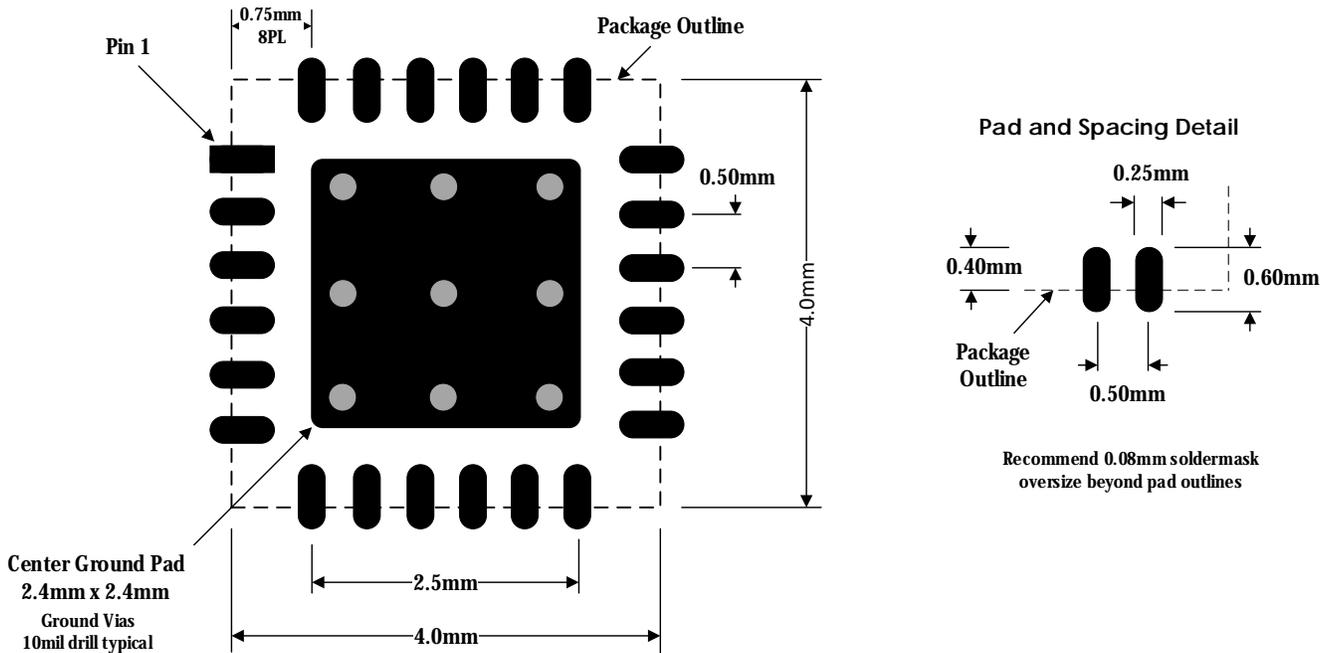
Analog Tunable 2.5 GHz to 6 GHz Notch

## Package Details

### Package Drawing



### Recommended Footprint

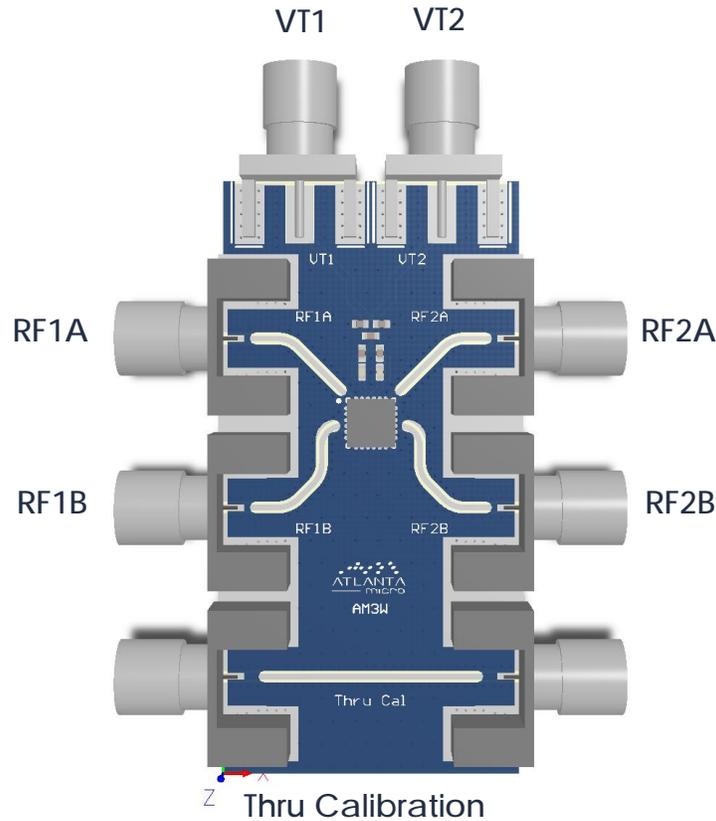


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## Evaluation PC Board



## Related Parts

Part Number	Description
AM3129	0.7 GHz to 6 GHz Switched Analog Tunable Notch Bank
AM3137	0.7 GHz to 2 GHz Analog Tunable Notch Filter Bank
AM3138	1.3 GHz to 3.25 GHz Analog Tunable Notch Filter Bank
AM3089	2 GHz to 18 GHz Switched Analog Tunable BPF Bank
AM3134	2 GHz to 4.5 GHz Analog Tunable Bandpass Filter Bank
AM3135	3.5 GHz to 9 GHz Analog Tunable Bandpass Filter Bank
AM3136	8 GHz to 19 GHz Analog Tunable Bandpass Filter Bank

### Component Compliance Information

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Substance List	Allowable Maximum Concentration
Lead (Pb)	<1000 PPM (0.1% by weight)
Mercury (Hg)	<1000 PPM (0.1% by weight)
Cadmium (Cd)	<75 PPM (0.0075% by weight)
Hexavalent Chromium (CrVI)	<1000 PPM (0.1% by weight)
Polybrominated Biphenyls (PBB)	<1000 PPM (0.1% by weight)
Polybrominated Diphenyl ethers (PBDE)	<1000 PPM (0.1% by weight)
Decabromodiphenyl Deca BDE	<1000 PPM (0.1% by weight)

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