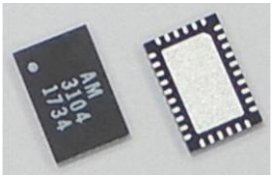
AM3104 – Filter Bank

Digitally Tunable 2.5 to 6.5 GHz Bandpass

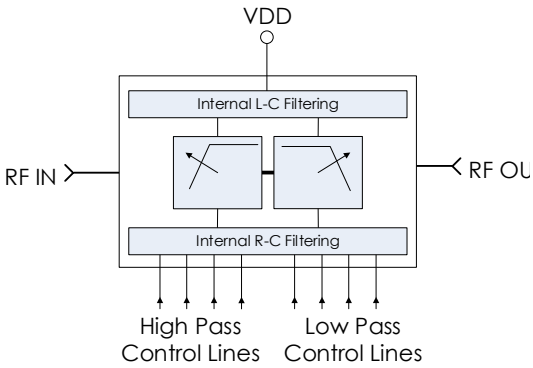


AM3104 is a miniature filter IC containing digitally tunable bandpass filters covering the 2.5 GHz to 6.5 GHz frequency range. Independent 4-bit digital control of the low-pass and high-pass corners provide control of both center frequency and bandwidth. AM3104 provides an excellent filtering solution for a receiver or transceiver requiring flexible center frequency and bandwidth, high dynamic range, and small size, weight, and power consumption.

FEATURES

- Digitally Tunable Bandpass Filters
- Independent LP and HP control
- 4-bit Control, 3V or 5V Logic
- +3.3V to +5.0V Supply
- Integrated Control Line Filtering
- 2.5 dB Insertion Loss
- 4.0 x 6.0 mm QFN Package
- +40 dBm Input IP3
- -40C to +85C Operation

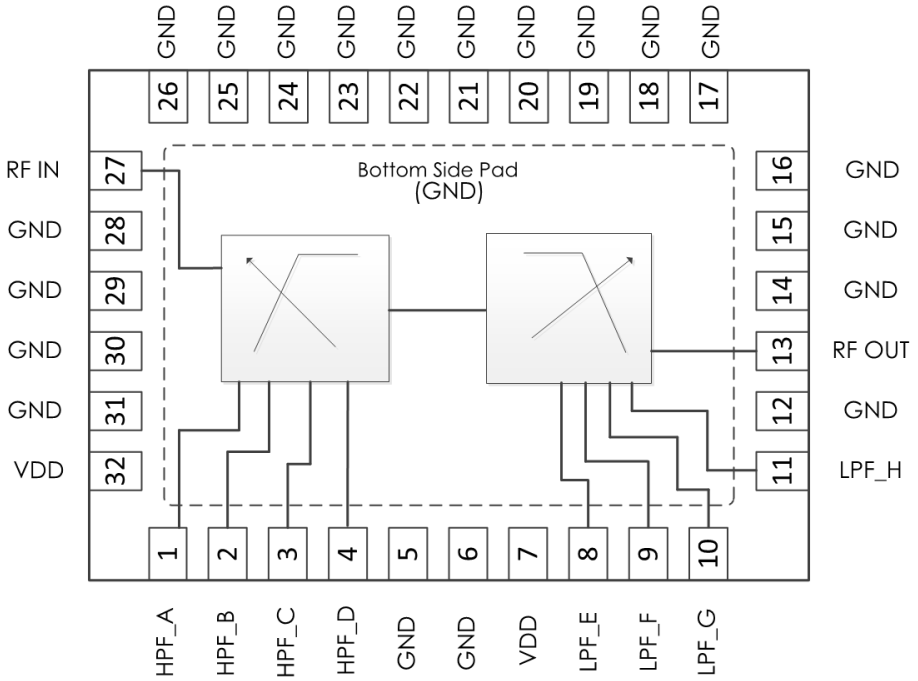
FUNCTIONAL DIAGRAM



Contents

REVISION HISTORY

Date	Revision	Notes
	5	Updated Format
September 10, 2025	6	Added Missing Data



PIN DEFINITIONS

Pin	Name	Function
1	HPF_A	High pass filter control A
2	HPF_B	High pass filter control B
3	HPF_C	High pass filter control C
4	HPF_D	High pass filter control D
5,6	GND	Ground
7	VDD	DC Power Input
8	LPF_E	Low pass filter control E
9	LPF_F	Low pass filter control F
10	LPF_G	Low pass filter control G
11	LPF_H	Low pass filter control H
12	GND	Ground
13	RF OUT	RF Output – 50 ohms – DC coupled. External DC block required.
14-26	GND	Ground
27	RF IN	RF Input – 50 ohms – DC coupled. External DC block required.
28-31	GND	Ground
32	VDD	DC Power Input

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 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	

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

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Min	Typical	Max
DC Supply Voltage	+3.1 V	+5 V	+5.2 V
DC Supply Current		2 mA	
Power Consumption		10 mW	
Logic Level Low	-0.1 V		+0.5V
Logic Level High	+2.0 V		+VDD

Recommended Operating Conditions

	Min	Typical	Max
DC Supply Voltage	+3.1V	+5 V	+5.2V
Operating Temperature	-40 C		+85 C
Storage Temperature	-50 C		+125 C

Timing Characteristics

Switching Time	Min	Typical	Max
Switching Speed		1 µs	

RF Performance

(T = 25 °C unless otherwise specified.)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		2.5 GHz		6.5 GHz
Insertion Loss			2.5dB	
Input IP3			+40dBm	

STATE TABLE

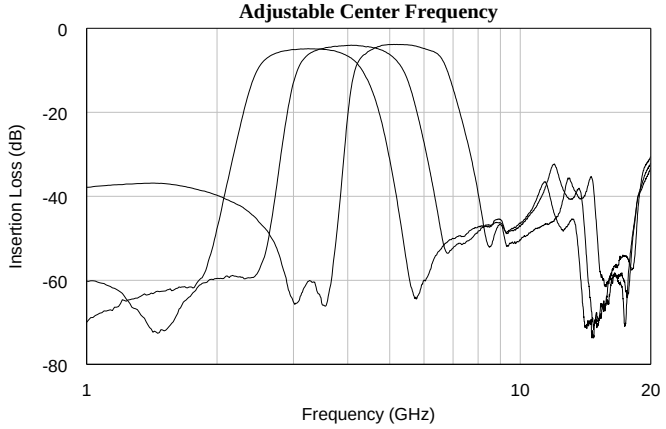
High Pass Control Lines				Typical Cutoff Freq. (GHz)
D	C	B	A	
L	L	L	L	2.50
L	L	L	H	2.53
L	L	H	L	2.56
L	L	H	H	2.59
L	H	L	L	2.61
L	H	L	H	2.64
L	H	H	L	2.70
L	H	H	H	2.74
H	L	L	L	2.85
H	L	L	H	2.93
H	L	H	L	3.06
H	L	H	H	3.20
H	H	L	L	3.26
H	H	L	H	3.47
H	H	H	L	3.84
H	H	H	H	4.36

Low Pass Control Lines				Typical Cutoff Freq. (GHz)
H	G	F	E	
L	L	L	L	3.50
L	L	L	H	3.60
L	L	H	L	3.68
L	L	H	H	3.79
L	H	L	L	3.89
L	H	L	H	4.04
L	H	H	L	4.15
L	H	H	H	4.31
H	L	L	L	4.54
H	L	L	H	4.74
H	L	H	L	4.97
H	L	H	H	5.22
H	H	L	L	5.47
H	H	L	H	5.84
H	H	H	L	6.22
H	H	H	H	6.75

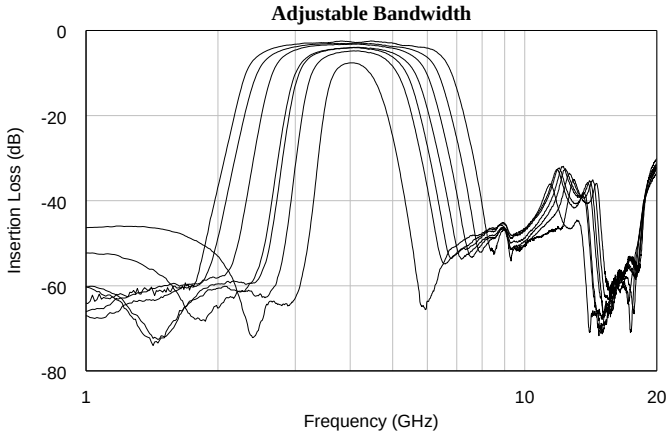
TYPICAL PERFORMANCE

(Only some of the available states shown for simplicity)

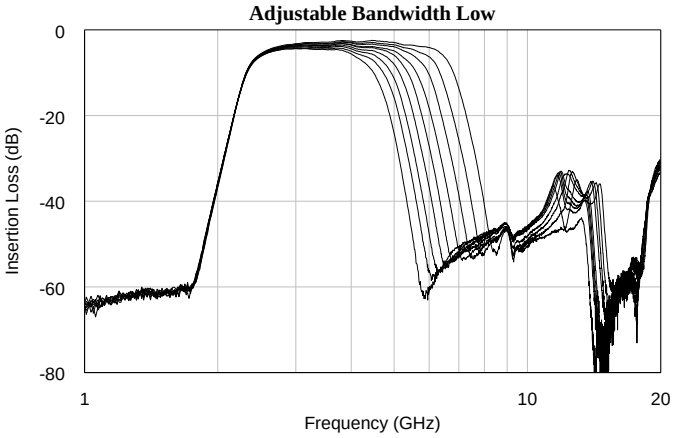
Adjustable Center Frequency



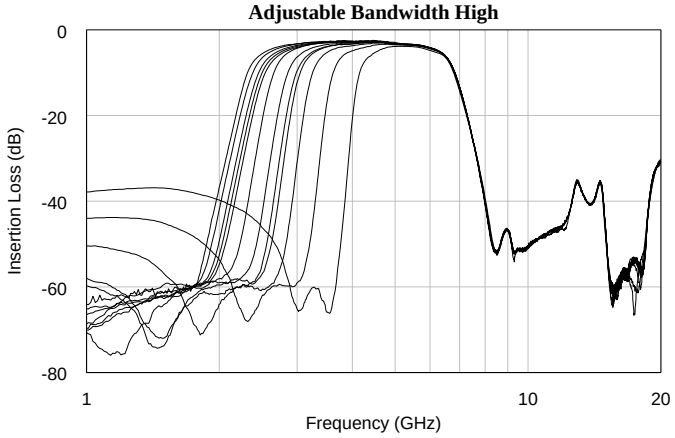
Adjustable Bandwidth



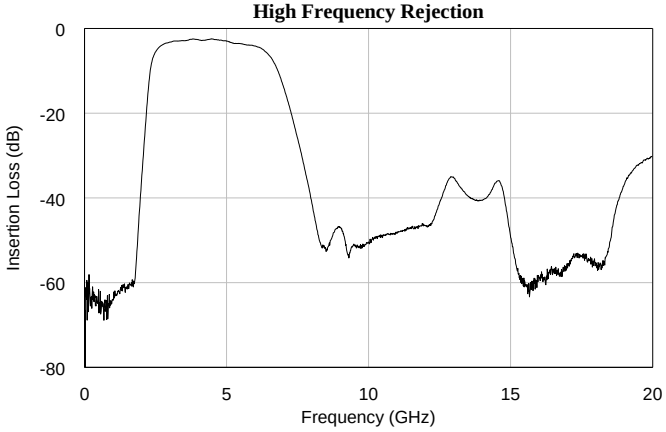
Adjustable Bandwidth Low



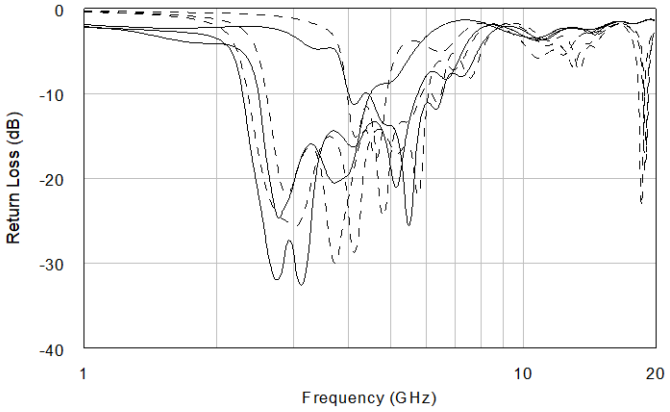
Adjustable Bandwidth High



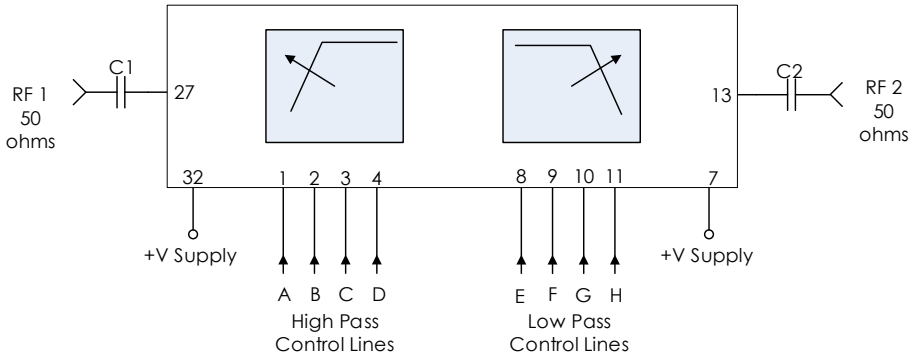
High Frequency Rejection



Return Loss



TYPICAL APPLICATION



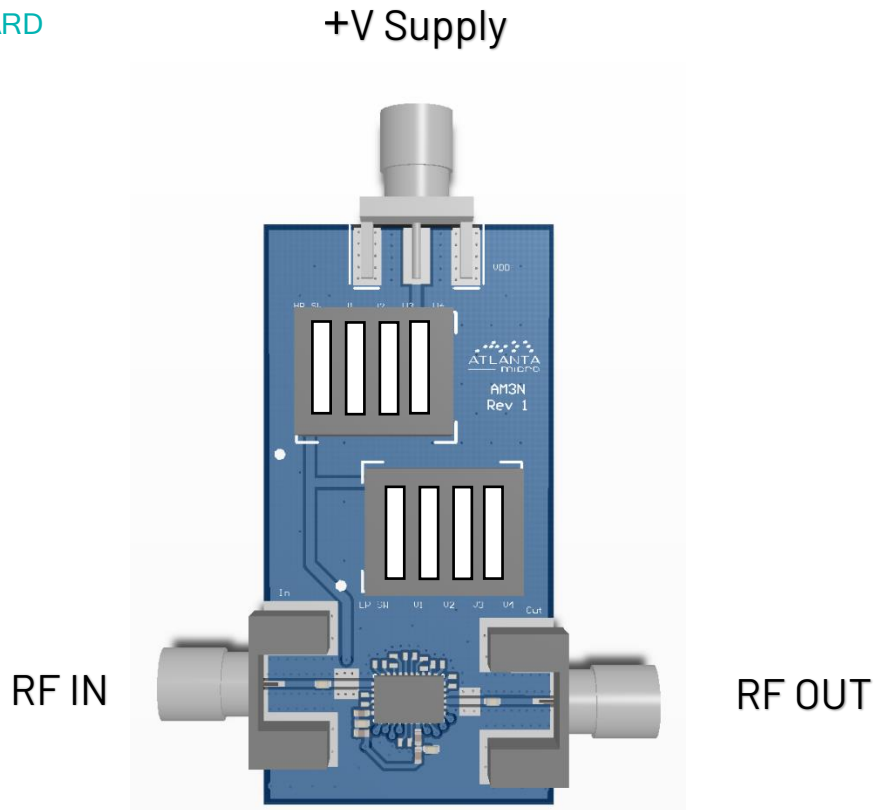
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 uF	0402BB104KW160	Passives Plus

Notes:

1. RF blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.
2. VDD and control lines filtered internally providing high-frequency isolation to 20+ GHz

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM3043	6.5 GHz to 17 GHz	Digitally Tunable Bandpass Filter
AM3045	3 GHz to 6 GHz	Digitally Tunable Bandpass Filter
AM3060	320 MHz to 6.5 GHz	Digitally Tunable Bandpass Filter
AM3063	6 GHz to 18 GHz	Digitally Tunable Bandpass Filter Bank
AM3065	6 GHz to 12 GHz	Digitally Tunable Bandpass Filter Bank
AM3066	18 GHz to 26.5 GHz	Digitally Tunable Bandpass Filter
AM3102	330 MHz to 1500 MHz	Digitally Tunable Bandpass Filter
AM3103	1 GHz to 3 GHz	Digitally Tunable Bandpass Filter

COMPONENT COMPLIANCE INFORMATION

RoHS: Mercury Systems, Inc. hereby certifies that all products comply with the EC Directive 2011/65/EC on the Restriction of Hazardous Substances, commonly known as EU-RoHS 6 and 10. All products supplied by Mercury shall be compliant with the European Directive 2011/65/EC based on the following substance list.

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)
Bis (2-ethylheyl) Phthalate (DEHP)	<1000 PPM (0.1% by weight)
Butyl Benzyl Phthalate (BBP)	<1000 PPM (0.1% by weight)
Dibutyl Phthalate (DBP)	<1000 PPM (0.1% by weight)
Diisobutyl Phthalate (DIBP)	<1000 PPM (0.1% by weight)

REACH: Mercury Systems, Inc. neither uses nor intentionally adds any of the substances considered to be a Substance of Very High Concern (SVHC) as defined by the EU Regulation (EC) No. 1907-2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH).

Conflict Materials: Mercury does not knowingly use materials that are sourced from the Democratic Republic of Congo (DRC) or any other known conflict regions. Mercury's supply chain is comprised of sources that are both environmentally and socially responsible. We periodically review this requirement with our vendors to ensure continued compliance.

Mercury takes its responsibility as a global partner seriously and will use due diligence within our supply chain to ensure all standards are met to the best of our knowledge.

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