AM3255A – BPF Bank

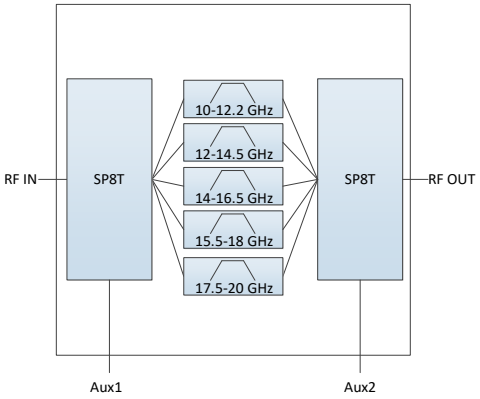
10 GHz to 20 GHz Bandpass Filter Bank

The AM3255A is a bandpass filter bank covering 10 GHz to 20 GHz in 5 bands of at least 2 GHz bandwidth each. The bank features filters with more than 30dBc rejection 10% away from the passband that make it ideal for LO filtering and transmit applications. With internal 50Ω matching in a 9mm QFN, the AM3255A represents a compact total PCB footprint suited for low SWaP applications.

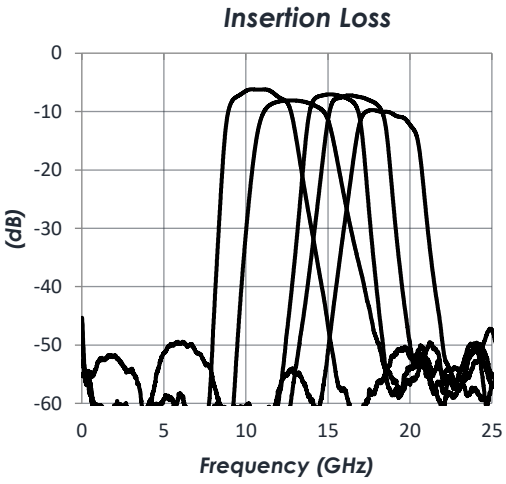
FEATURES

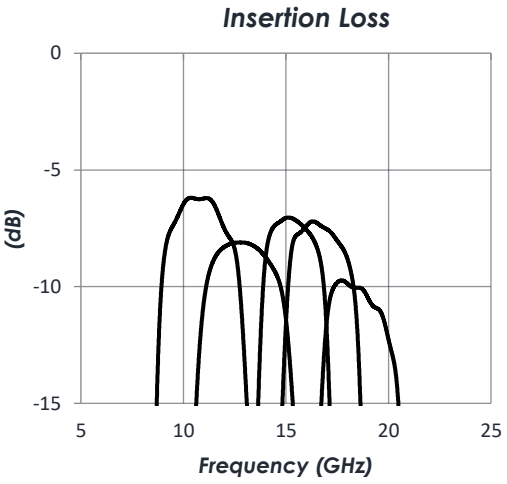
- Covers 10 to 20 GHz in 5 bands
- 8 dB Typical Insertion Loss
- Additional 10 GHz bypass path for low frequency extension
- +3.3V to +5.0V Supply
- +3.3V to +5.0V Control
- 9mm QFN Package
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



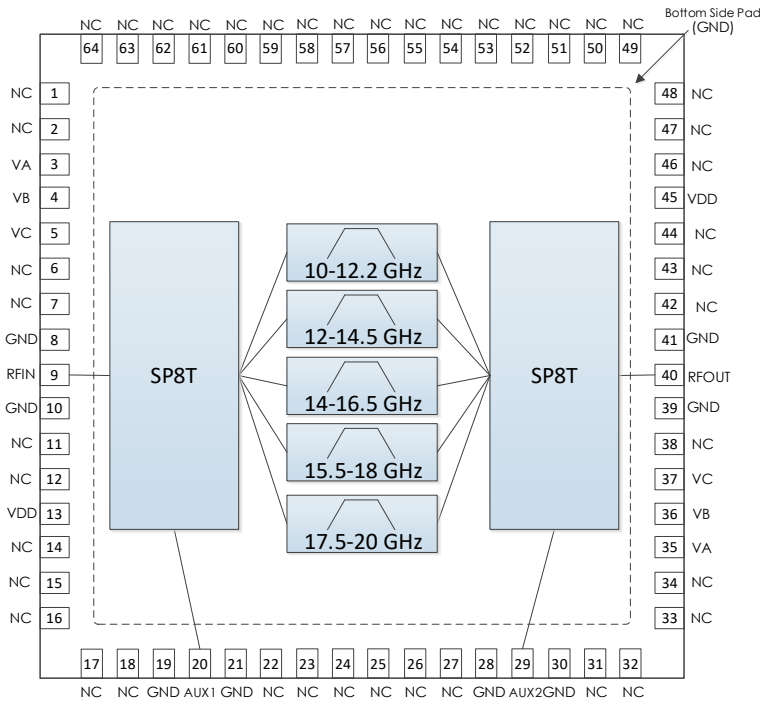


CONTENTS

REVISION HISTORY

Date	Revision	Notes
December 18, 2024	1	Initial Release.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1, 2	NC	No Connect
3	VA	Switch Control A
4	VB	Switch Control B
5	VC	Switch Control C
6	NC	No Connect
7,8	GND	Ground – Common
9	RF IN	RF Input – 50 Ohms – DC Coupled, External DC Blocking Cap Required
10	GND	Ground – Common
11,12	NC	No Connect
13	VDD	DC Power Input
14-18	NC	No Connect
19	GND	Ground – Common
20	AUX1	Filter Bypass Input Side – 50 Ohms – DC Coupled, External DC Blocking Cap Required
21	GND	Ground - Common
22-27	NC	No Connect

Pin	Name	Function
28	GND	Ground - Common
29	AUX2	Filter Bypass Output Side – 50 Ohms – DC Coupled, External DC Blocking Cap Required
30	GND	Ground - Common
31-34	NC	No Connect
35	VA	Switch Control A
36	VB	Switch Control B
37	VC	Switch Control C
38	NC	No Connect
39	GND	Ground - Common
40	RF Out	RF Output – 50 Ohms – DC Coupled, External DC Blocking Cap Required
41	GND	Ground - Common
42-44	NC	No Connect
45	VDD	DC Power Input
46-64	NC	No Connect
Note: NC pins may be grounded or left open		

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
RF Input Power		+27 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-55 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
Moisture Sensitivity Level	MSL 3	
ESD classification (HBM survivable)	Class 0A	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage		+3.3 V	+5.0 V
Operating Case Temperature	-40 C		+85 C

Thermal information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θJC)	80 C/W
Nominal Junction Temperature at +85C ambient	92 C
Channel Temperature to Maintain 1 Million Hour MTTF	105 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+3.0 V	+3.3 V	+5.2 V
DC Supply Current	VDD = +3.3V		26 mA	
	VDD = +5.0V		29 mA	
Power Dissipated	VDD = +3.3V		85.8 mW	
	VDD = +5.0V		145 mW	
Logic Level Low		-0.1 V		+0.5 V
Logic Level High		+2.0 V		+VDD V

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Insertion Loss	VDD = +3.3V			
	Band 1		6.2 dB	
	Band 2		8.2 dB	
	Band 3		7.0 dB	
	Band 4		7.4 dB	
	Band 5		11.5 dB	
	Bypass (Aux)		2.5 dB	
Return Loss	VDD = +3.3V		< -15 dB	

Param	Testing Conditions	Min	Typical	Max
Frequency Range				
	Bypass (Aux)	-		7 GHz
	Band 1	10 GHz		12.2 GHz
	Band 2	12 GHz		14.5 GHz
	Band 3	14 GHz		16.5 GHz
	Band 4	15.5 GHz		18 GHz
	Band 5	17.5 GHz		20 GHz

Timing Characteristics

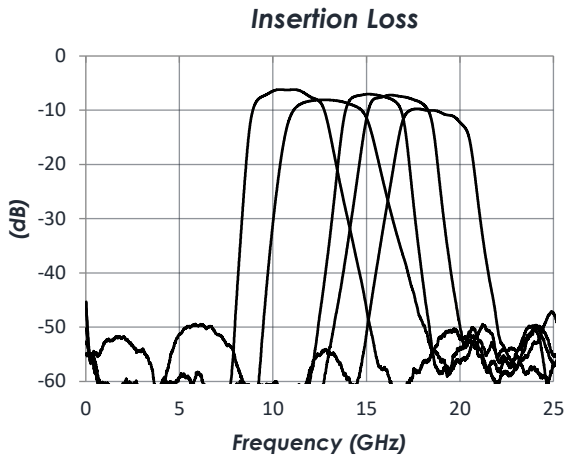
Parameter	Minimum	Typical	Maximum
Switching Speed – Rise Time		25 ns	
Switching Speed – Fall Time		15 ns	

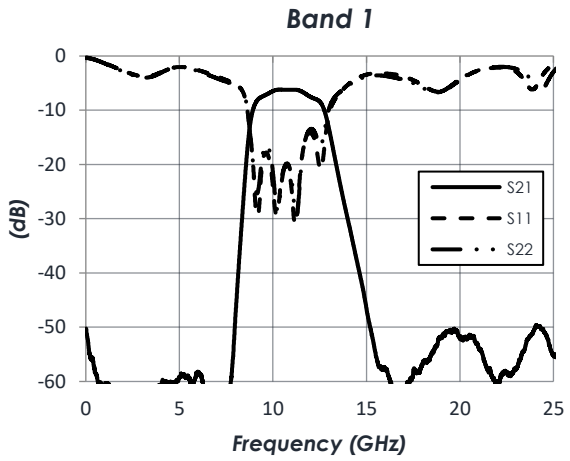
State Table

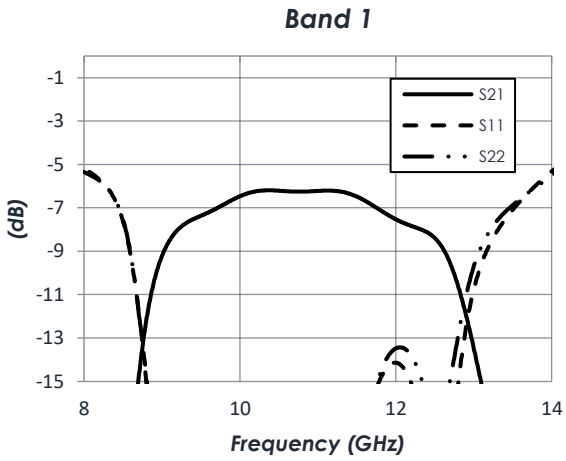
VA	VB	VC	Filter Band
L	L	L	Isolation
L	L	H	Band 2 - 12 to 14.5 GHz
L	H	L	Band 1 - 10 to 12.2 GHz
L	H	H	Band 3 – 14 to 16.5 GHz
H	L	L	Band 4 - 15.5 to 18 GHz
H	L	H	Isolation
H	H	L	Band 5 - 17.5 to 20 GHz
H	H	H	Bypass (Aux) path

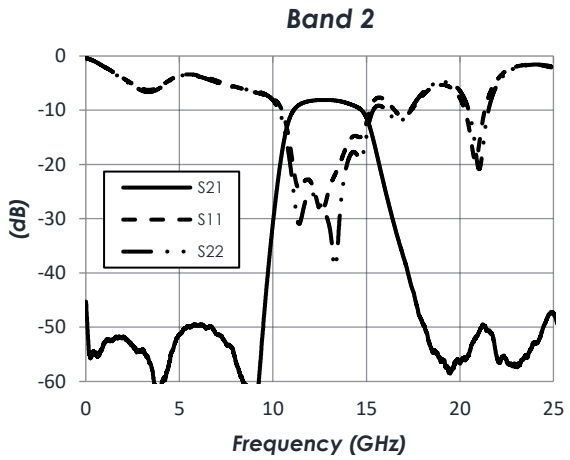
TYPICAL PERFORMANCE

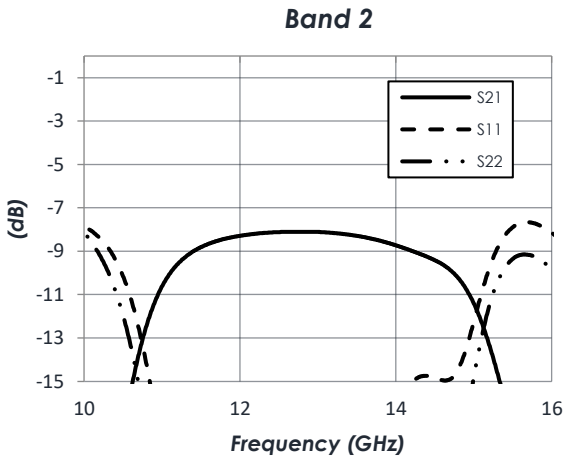
(T = 25 °C unless otherwise specified.)





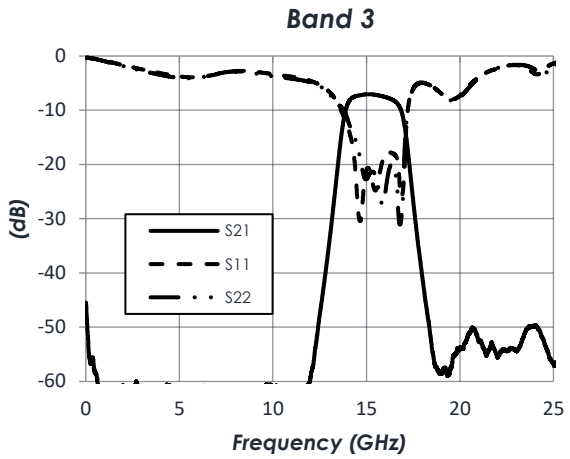


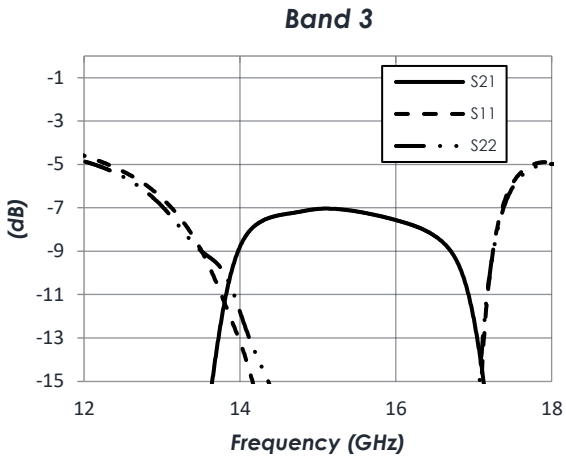


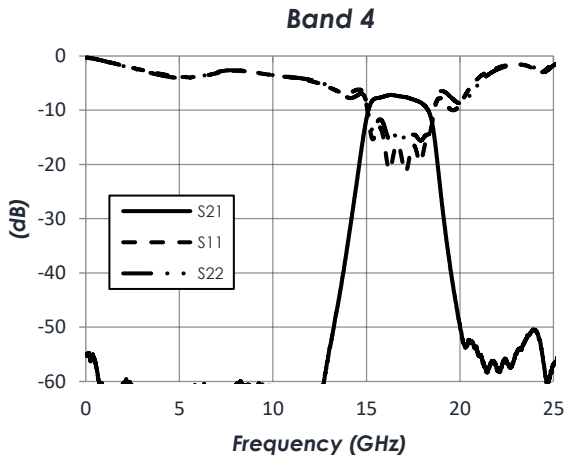


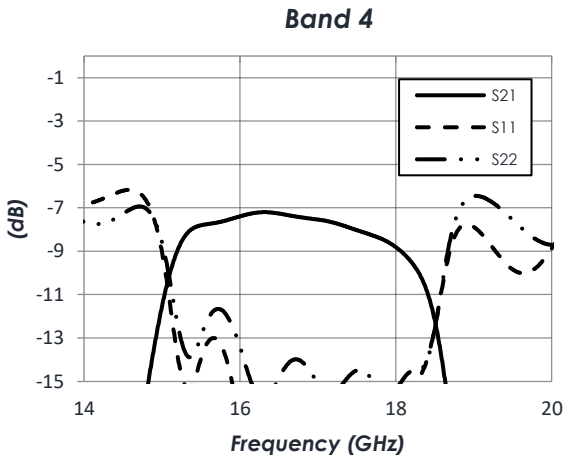
TYPICAL PERFORMANCE (CONTINUED)

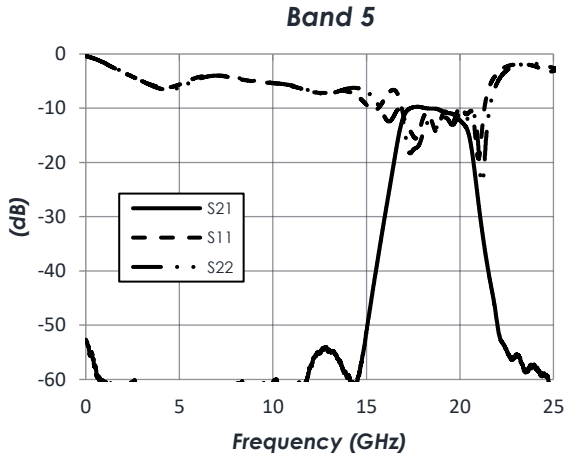
(T = 25 °C unless otherwise specified.)

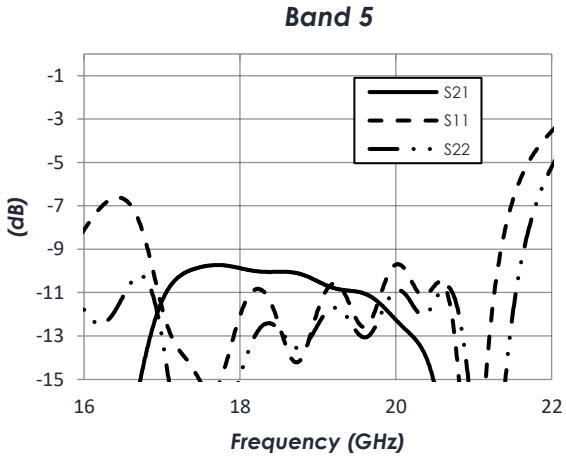






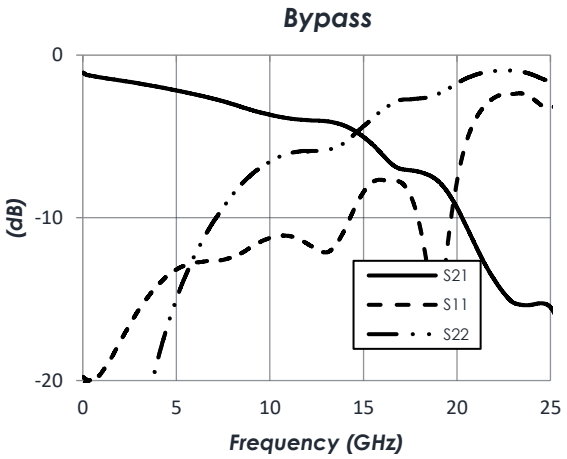


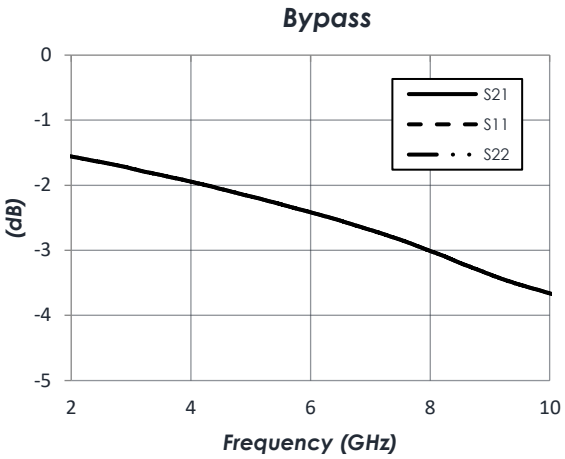




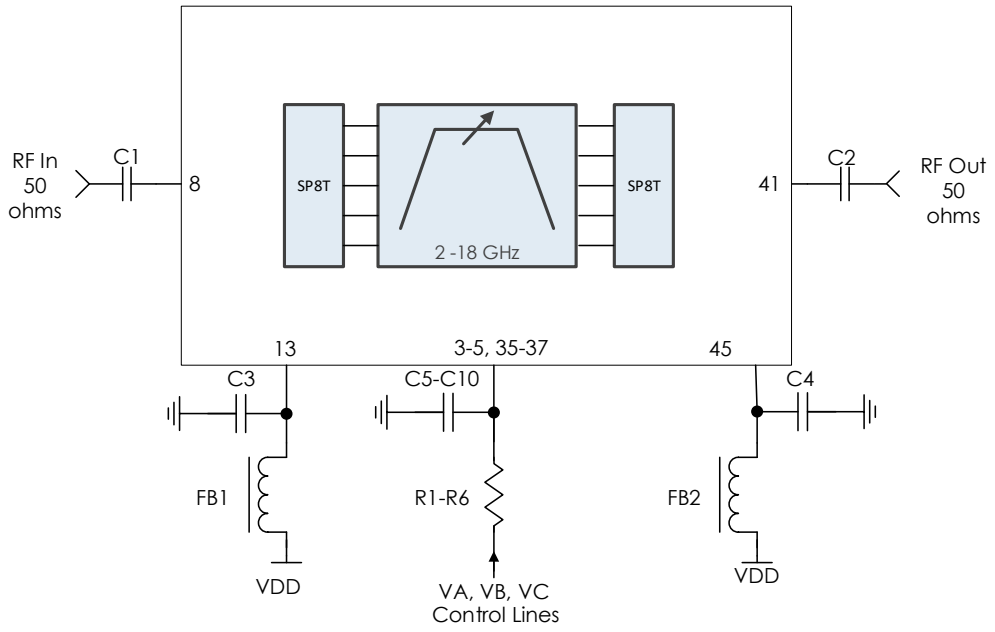
TYPICAL PERFORMANCE (CONTINUED)

(T = 25 °C unless otherwise specified.)





TYPICAL APPLICATION



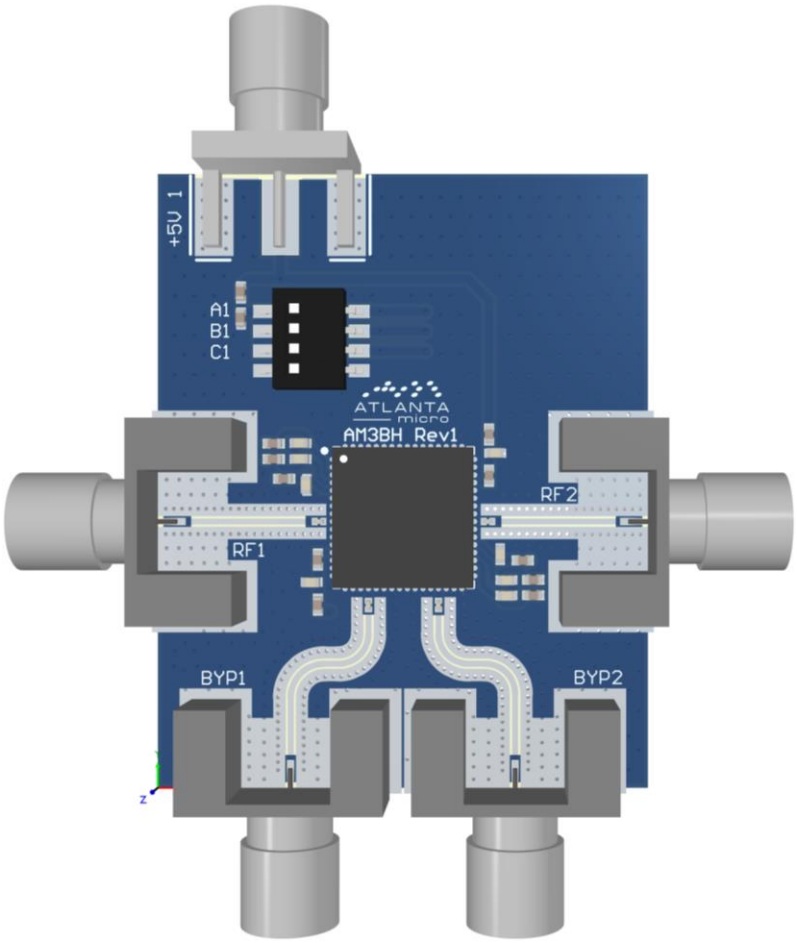
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 µF	0201BB104KW160	Passives Plus
C3-C10	0.1 µF	C1005X7R1H104K050BB	TDK
FB1, FB2		MMZ1005A222E	TDK
R1-R6	100 Ω	CRCW0402100RFKED	Vishay

Notes:

1. DC blocking capacitors should be low-loss, broadband capacitors for optimum performance.
2. Pins 3 and 35 can be tied together on board, following control line filtering.
3. Pins 4 and 36 can be tied together on board, following control line filtering.
4. Pins 5 and 37 can be tied together on board, following control line filtering.
5. Bypass capacitors (C5-C10) may limit switching speed. Reduce value as needed to achieve appropriate time constant.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM3153	6 GHz to 26.5 GHz	Digitally Tunable Bandpass Filter
AM3186	6 GHz to 26.5 GHz	Sub-Octave Bandpass Filter Bank
AM3194	6 GHz to 18 GHz	Sub-Octave Bandpass Filter Bank
AM3215	2 GHz to 18 GHz	Bandpass Preselector Filter Bank

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.

Corporate Headquarters

50 Minuteman Road
Andover, MA 01810 USA
+1 978.967.1401 tel
+1 866.627.6951 tel
+1 978.256.3599 fax

International Headquarters
Mercury International

Avenue Eugène-Lance, 38
PO Box 584
CH-1212 Grand-Lancy 1
Geneva, Switzerland
+41 22 884 5100 tel

Learn more
Visit: mrcy.com
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