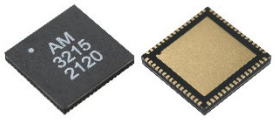
AM3215 – Preselector

2 GHz to 18 GHz Bandpass Filter Bank

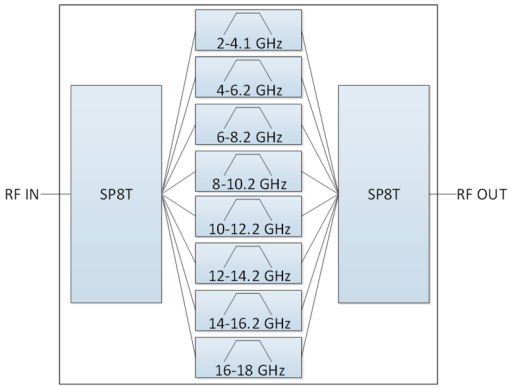


The AM3215 is a broadband eight-way bandpass filter bank offering low loss and high rejection from 2 GHz to 18 GHz. Each band delivers 2 GHz of bandwidth. With internal 50Ω matching and packaged in a 9mm QFN, the AM3215 represents a compact total PCB footprint, the AM3215 is suited for low SWaP applications.

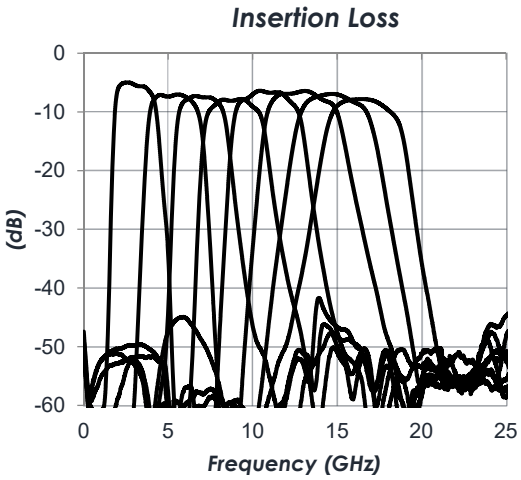
FEATURES

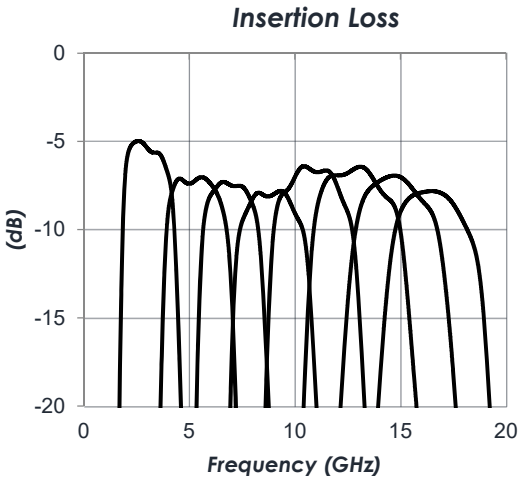
- Broadband, 2 to 18 GHz
- +3.3V to +5.0V Supply
- +3.3V to +5.0V Control
- 7.5 dB Insertion Loss
- 17 dB Return Loss
- +15 dBm P1dB
- 9mm QFN Package
- -40C to +185C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



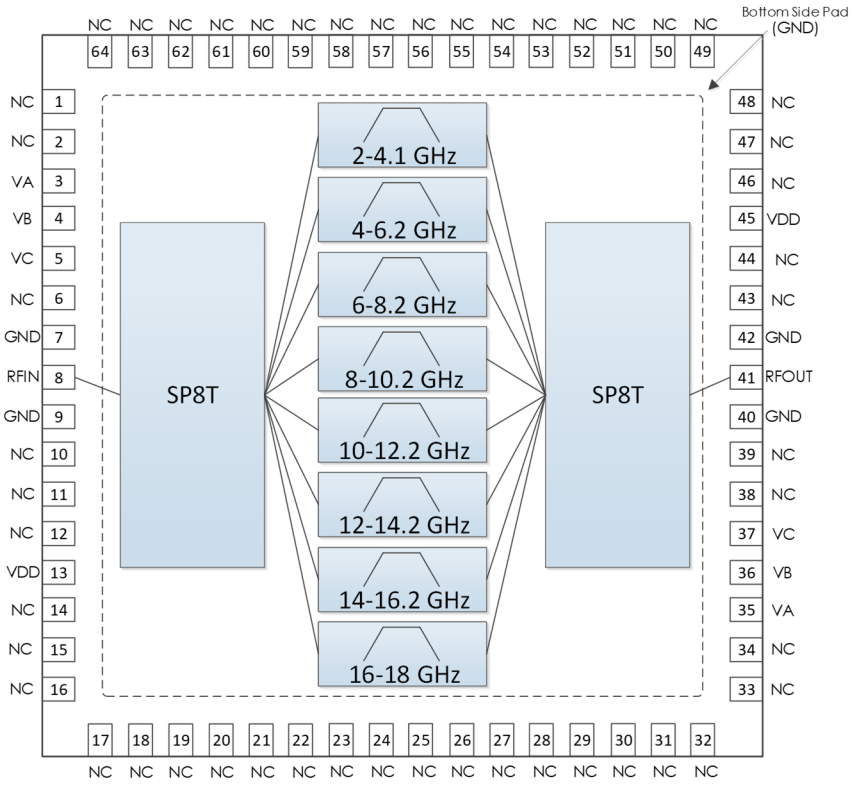


CONTENTS

REVISION HISTORY

Date	Revision	Notes
May 26, 2021	1	Initial Release.
August 2, 2021	2	Corrected Logic Table.
October 19, 2021	3	Corrected Pinout Definitions.
December 17, 2021	4	Updated MSL Rating.
January 31, 2022	5	Updated Typical Application Diagram.
July 22, 2024	6	Changed to Mercury branding. No content changes.

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	GND	Ground – Common
8	RF IN	RF Input – 50 Ohms – DC Coupled, External DC Blocking Cap Required
9	GND	Ground – Common
10-12	NC	No Connect
13	VDD	DC Power Input
14-34	NC	No Connect
35	VA	Switch Control A

Pin	Name	Function
36	VB	Switch Control B
37	VC	Switch Control C
38, 39	NC	No Connect
40	GND	Ground – Common
41	RF OUT	RF Output – 50 Ohms – DC Coupled, External DC Blocking Cap Required
42	GND	Ground – Common
43, 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 1A	

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

Recommended Operating Conditions

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

Thermal information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θJC)	100 C/W
Nominal Junction Temperature at +85C ambient	88 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
Frequency Range		2 GHz		18 GHz
Insertion Loss	VDD = +3.3V, Band 1		5.5 dB	
	VDD = +3.3V, Band 2		7.4 dB	
	VDD = +3.3V, Band 3		7.5 dB	
	VDD = +3.3V, Band 4		7.9 dB	
	VDD = +3.3V, Band 5		6.9 dB	
	VDD = +3.3V, Band 6		7.0 dB	
	VDD = +3.3V, Band 7		7.6 dB	
	VDD = +3.3V, Band 8		8.2 dB	
Return Loss	VDD = +3.3V		< -15 dB	

Timing Characteristics

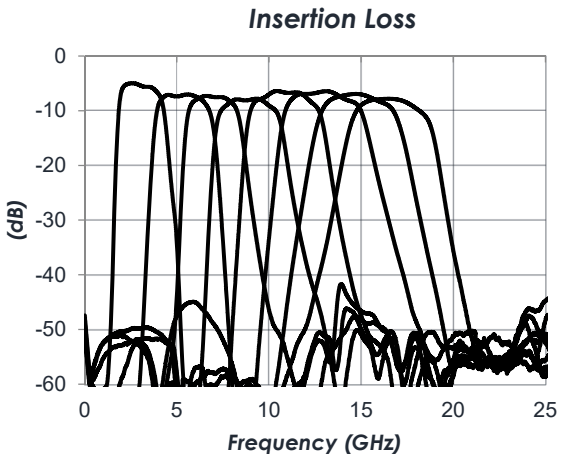
Parameter	Minimum	Typical	Maximum
Switching Speed – Rise Time		25 ns	
Switching Speed – Fall Time		15 ns	

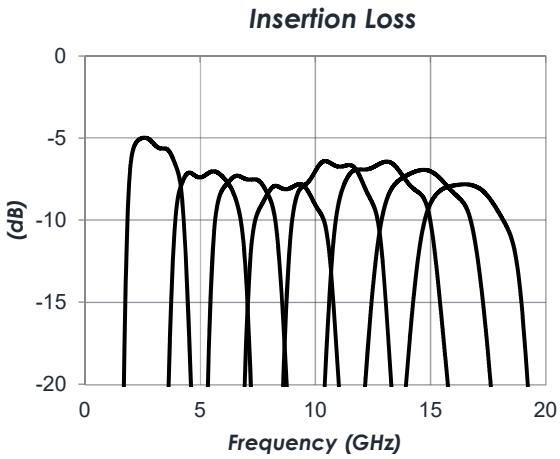
State Table

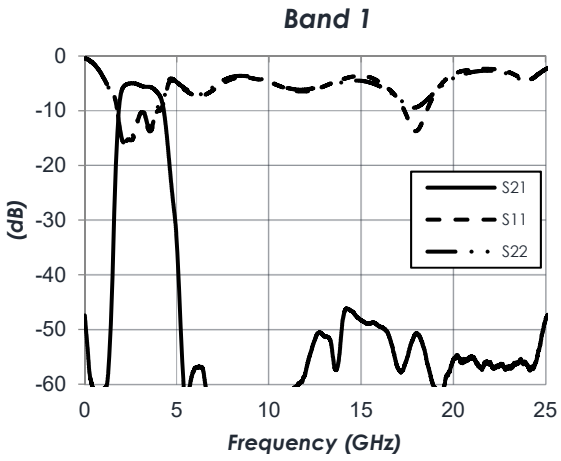
VC	VB	VA	Filter Band
L	L	L	8.0 – 10.2 GHz
L	L	H	12.0 – 14.2 GHz
L	H	L	14.0 – 16.2 GHz
L	H	H	4.0 – 6.2 GHz
H	L	L	6.0 – 8.2 GHz
H	L	H	16.0 – 18.0 GHz
H	H	L	10.0 – 12.2 GHz
H	H	H	2.0 – 4.1 GHz

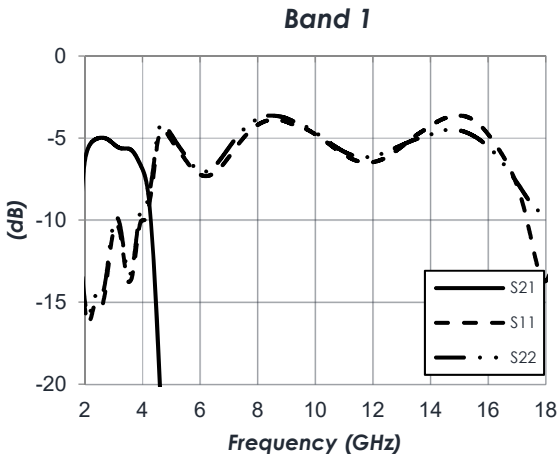
TYPICAL PERFORMANCE

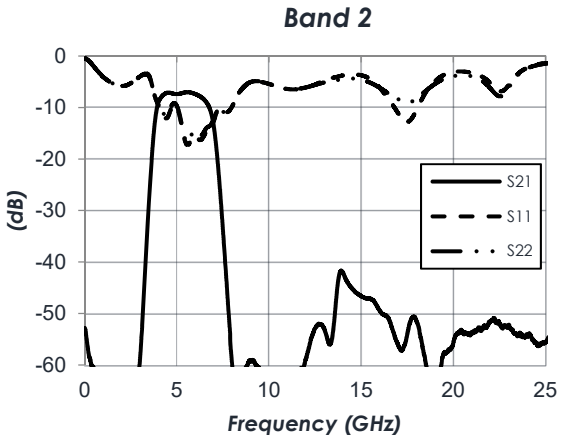
(T = 25 °C unless otherwise specified.)

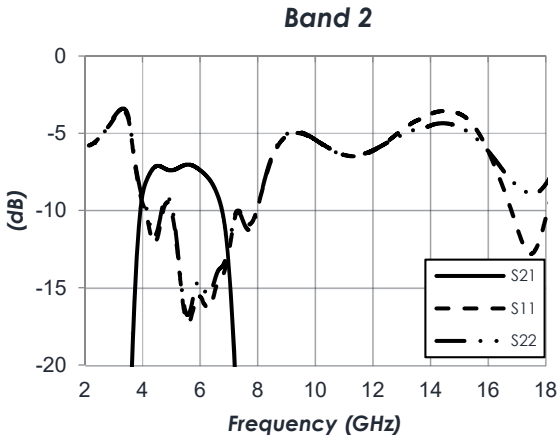






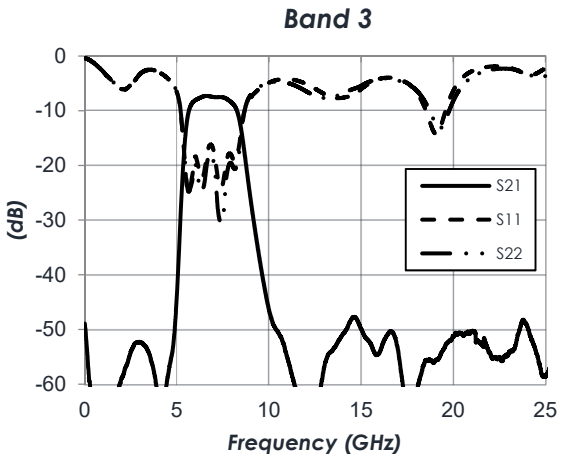


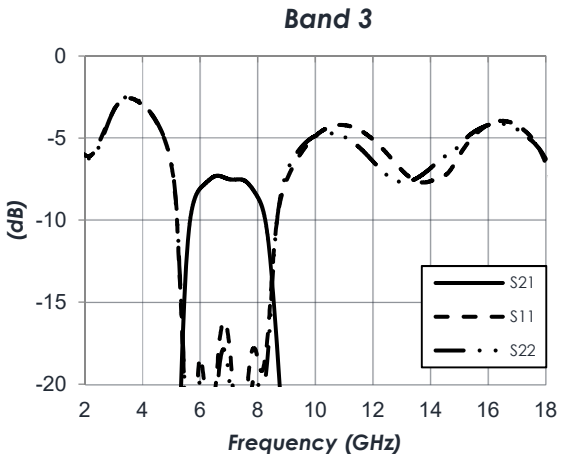


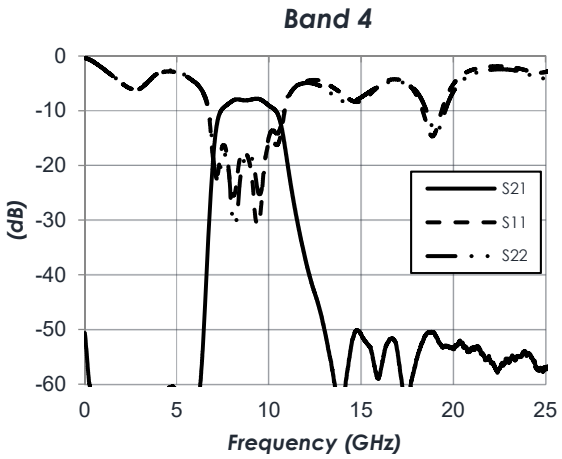


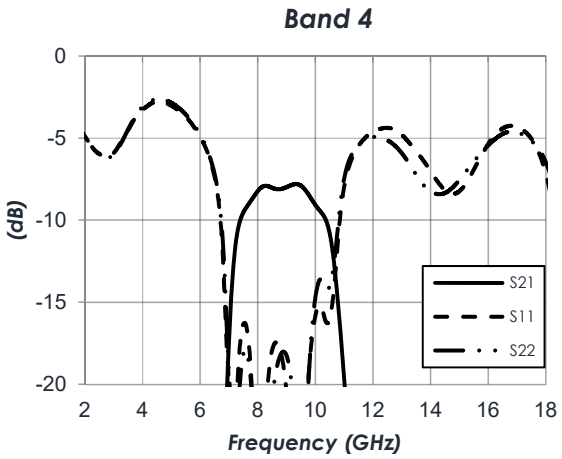
TYPICAL PERFORMANCE (CONTINUED)

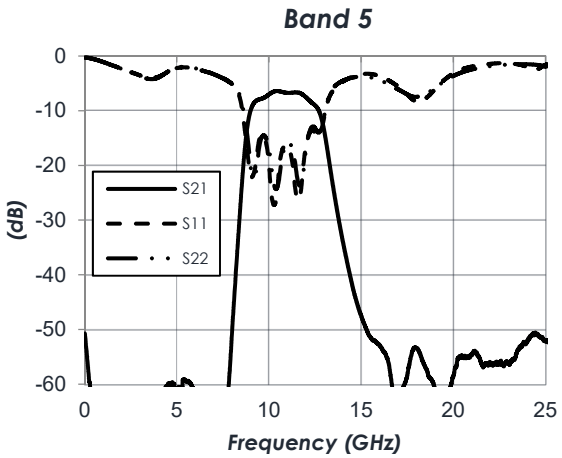
(T = 25 °C unless otherwise specified.)

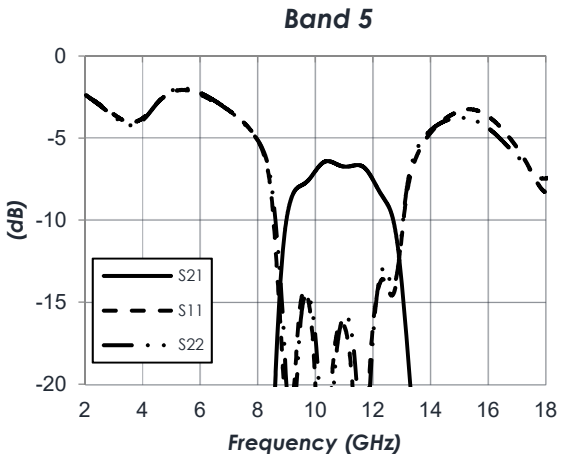












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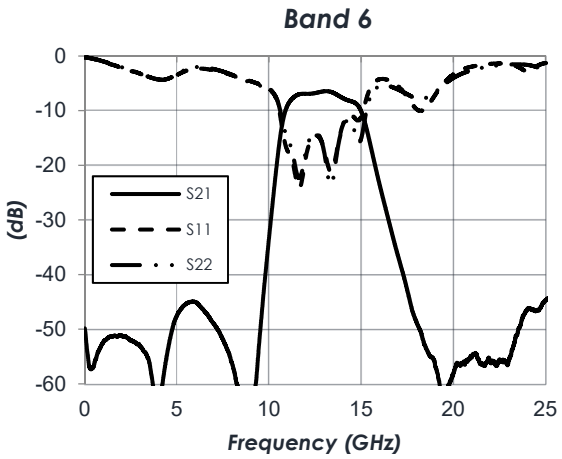

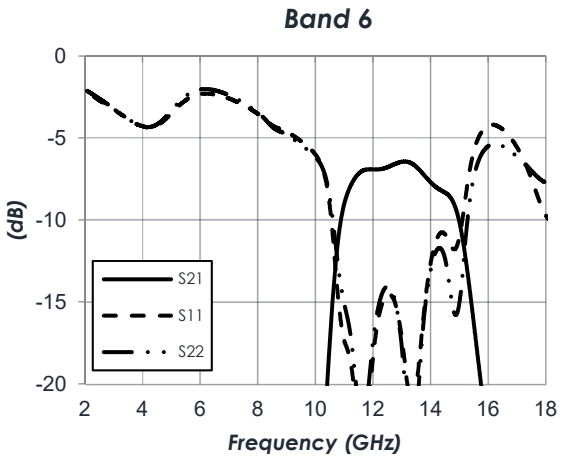

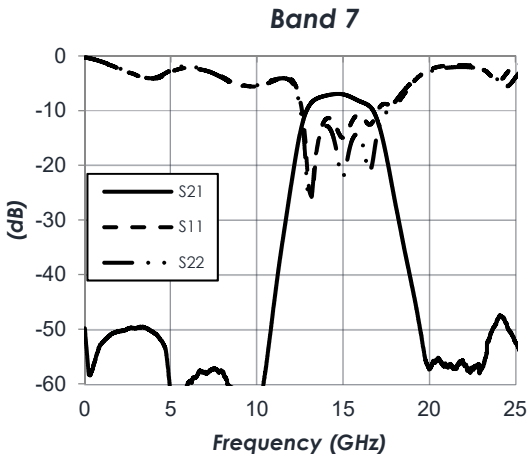

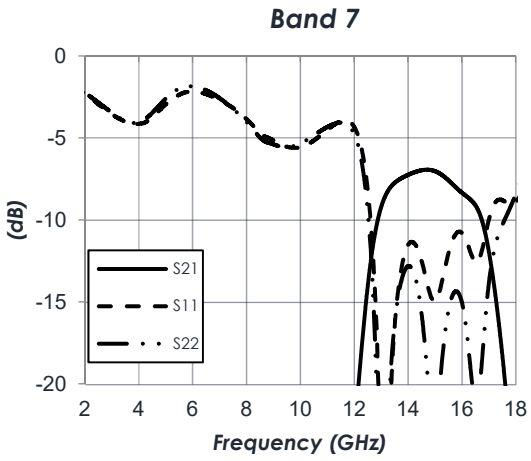

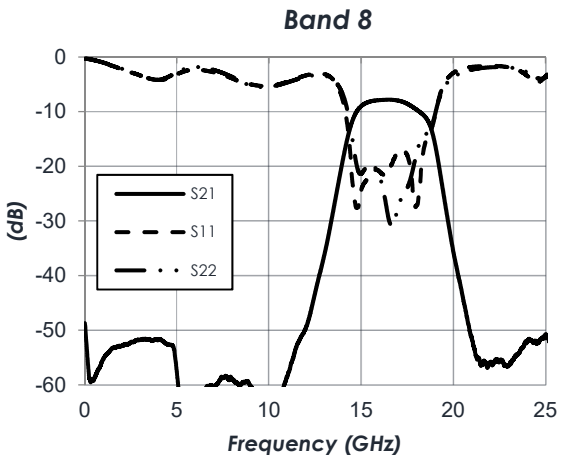

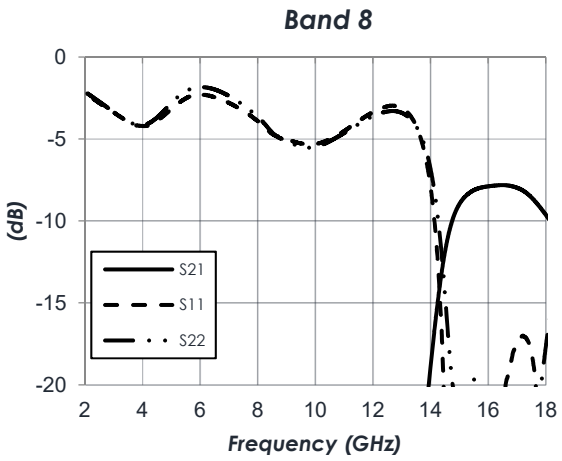

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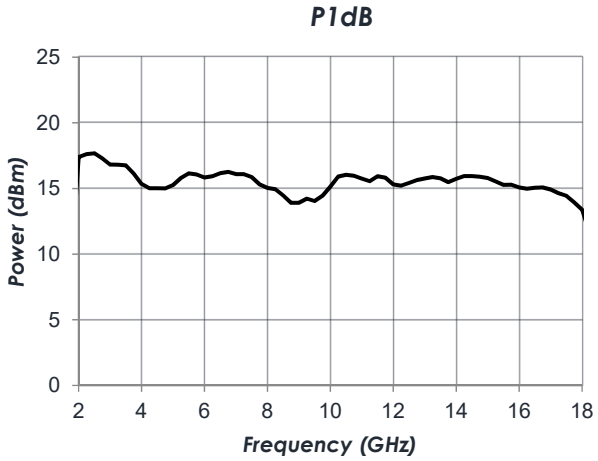
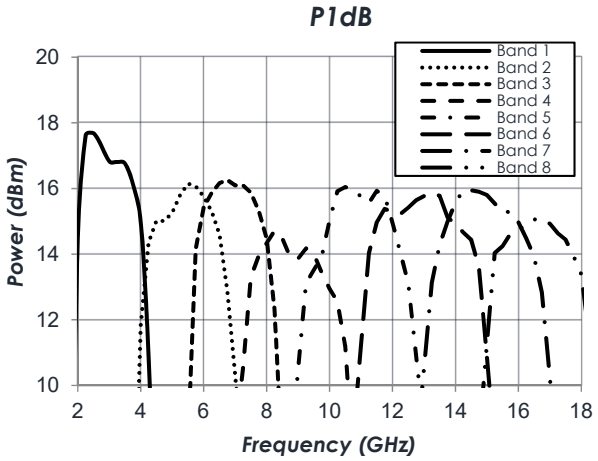
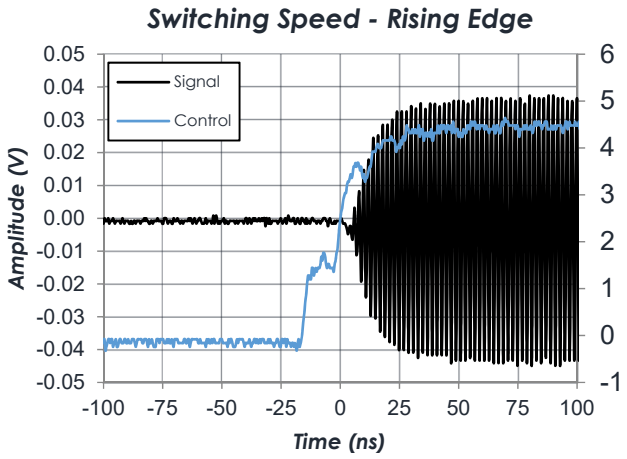
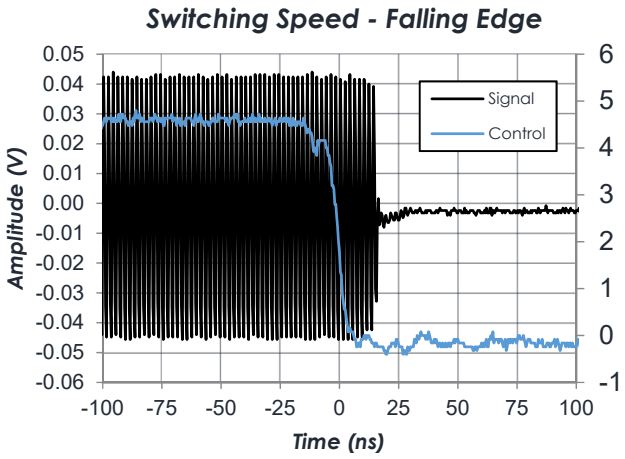
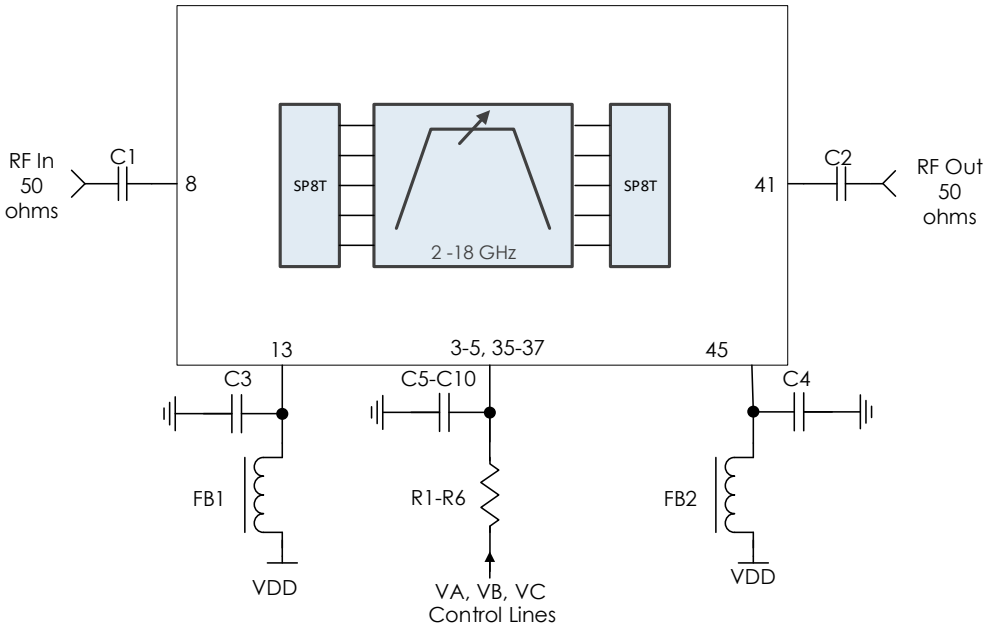








TYPICAL APPLICATION



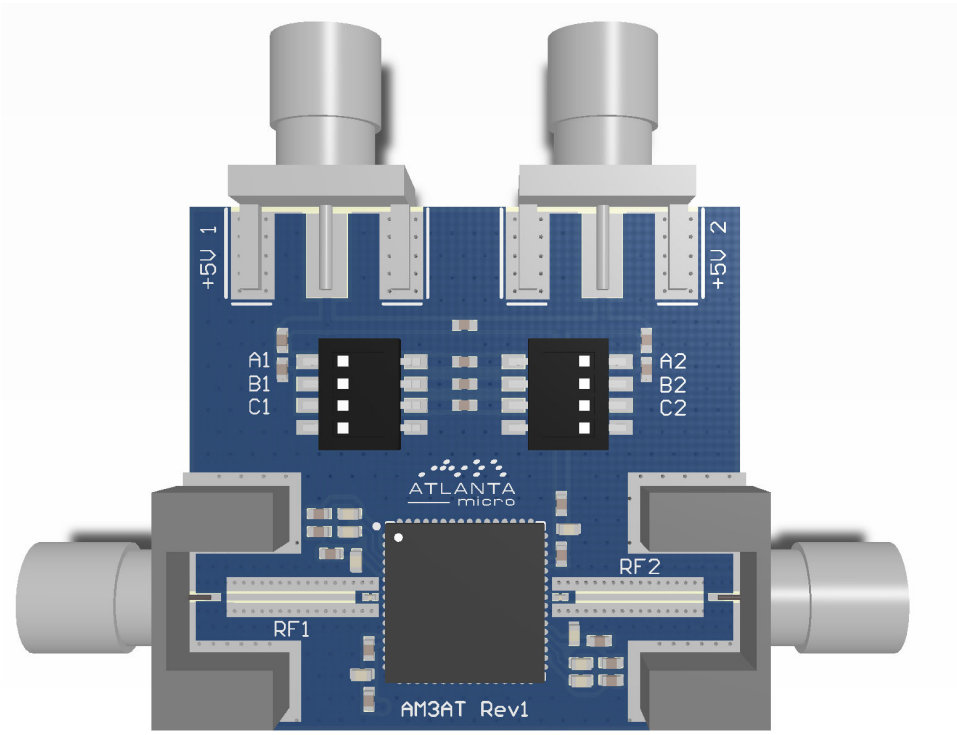
Recommended Component List (or Equivalent)

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

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 (CrVl)	<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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