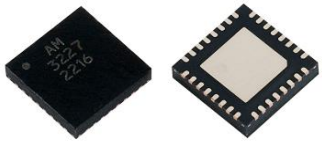
AM3227 – Filter Bank

5 to 20 GHz Tunable Filter Bank

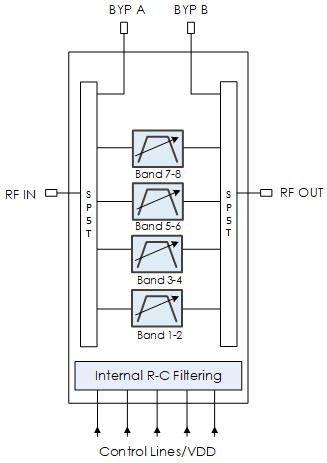


AM3227 is a tunable filter bank covering the 5 GHz to 20 GHz frequency range. The filter bank contains 8 bandpass filters with full 1 GHz overlap as well as an integrated, low-loss filter bypass path. AM3227 is packaged in a 5mm QFN package and operates over the -40C to +85C temperature range.

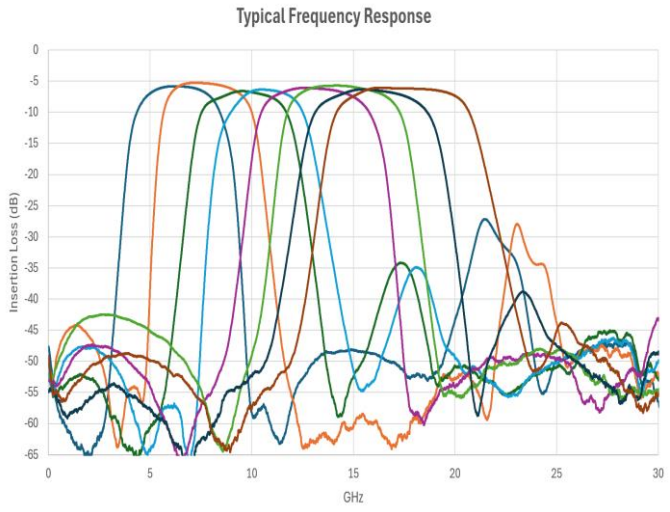
FEATURES

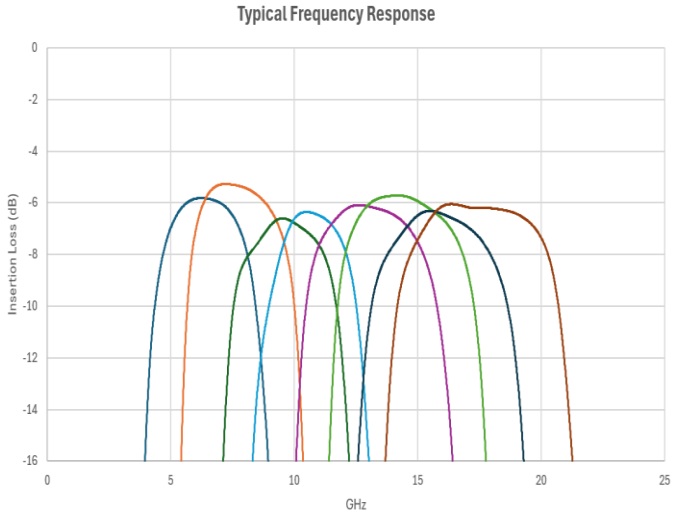
- 5-20GHz Tunable Filter
- Integrated Switches
- Integrated Control Line Filtering
- 6 dB Insertion Loss
- 20 GHz Bypass Path
- +36 dBm IIP3
- +3.3 V or +5.0 V Supply
- +3.3 V to +5.0 V Control
- -40 °C to +85 °C Operation
- 5mm QFN Package

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



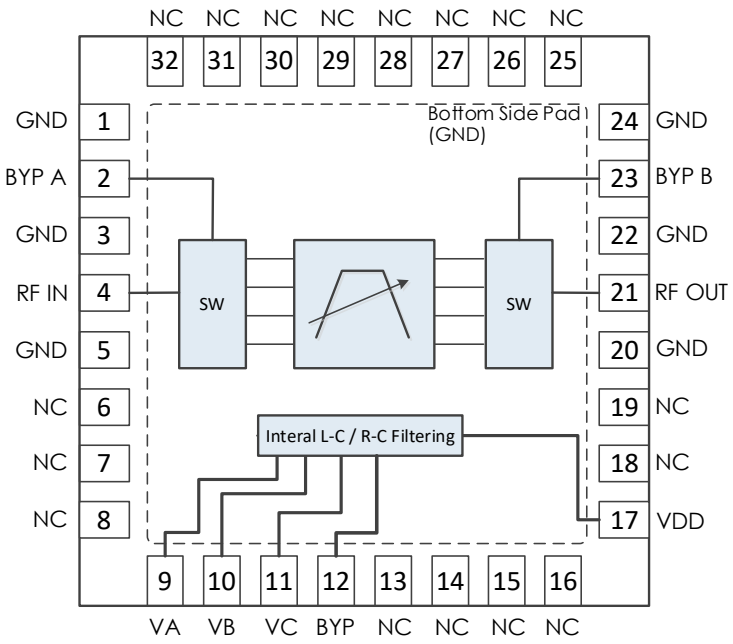


CONTENTS

REVISION HISTORY

Date	Revision	Notes
6/10/2020	1	Initial Release
7/24/2025	2	Updated Plots for new revision of component, updated datasheet format

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	GND	Ground – Common
2	BYP A	Filter Bypass A – 50 Ohms – DC Coupled, External DC Blocking Cap Required
3	GND	Ground – Common
4	RF In	RF Input – 50 Ohms – DC Coupled, External DC Blocking Cap Required
5	GND	Ground – Common
6-8	NC	Not connected*
9	VA	Switch Control A
10	VB	Switch Control B
11	VC	Switch Control C
12	BYP	Bypass select
13-16	NC	Not connected*
17	VDD	DC Power Input
18-19	NC	Not connected*
20	GND	Ground - Common
21	RF Out	RF Output – 50 Ohms – DC Coupled, External DC Blocking Cap Required
22	GND	Ground – Common
23	BYP B	Filter Bypass B – 50 Ohms – DC Coupled, External DC Blocking Cap Required
24-32	NC	Not connected*
Bottom Pad	GND	Ground – Common

***NC pins may be grounded or left open. It is recommended to ground these pins.**

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6.0 V
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	

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+3.0 V	+5.0 V	+5.2 V
Operating Case Temperature	-40 C		+85 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+3.0 V	+5.0 V	+5.2 V
DC Supply Current	VDD = +5.0 V		7 mA	
Power Dissipated	VDD = +5.0 V		35 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		5 GHz		20 GHz
Insertion Loss	VDD = +5.0 V, Band 1		-5.8 dB	
	VDD = +5.0 V, Band 2		-5.3 dB	
	VDD = +5.0 V, Band 3		-6.6 dB	
	VDD = +5.0 V, Band 4		-6.4 dB	
	VDD = +5.0 V, Band 5		-6.0 dB	
	VDD = +5.0 V, Band 6		-5.7 dB	
	VDD = +5.0 V, Band 7		-6.3 dB	
	VDD = +5.0 V, Band 8		-6.1 dB	
Return Loss	VDD = +5.0 V		< -12 dB	
Input IP3	VDD = +5.0 V		+38 dBm	

Timing Characteristics

(T = 25 °C unless otherwise specified)

	Minimum	Typical	Maximum
Band Switching Speed		40 ns	

Note: Timing characteristics measured from 50% control to 90% RF.

State Table

(T = 25 °C unless otherwise specified)

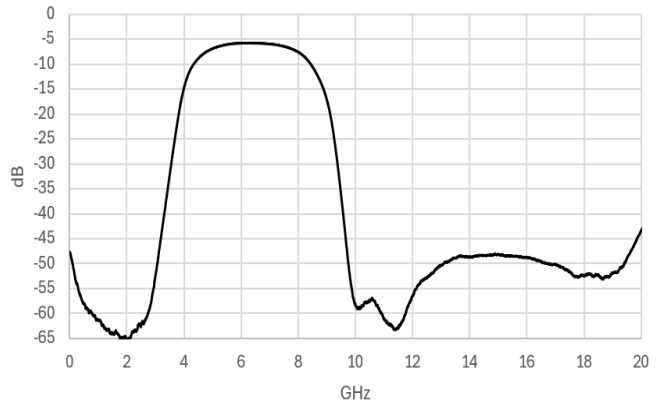
VA	VB	VC	Bypass	Filter Band
X	X	X	H	Bypass Enabled
L	L	L	L	5.7 – 7.9GHz
H	L	L	L	6.9 – 9.6 GHz
L	H	L	L	8.6 – 11.2 GHz
H	H	L	L	10.2 – 12.5 GHz
L	L	H	L	11.4 – 13.8 GHz
H	L	H	L	12.8 – 15.3 GHz
L	H	H	L	14.3 – 16.7 GHz
H	H	H	L	15.7 – 20 GHz

Note: X = Don't Care

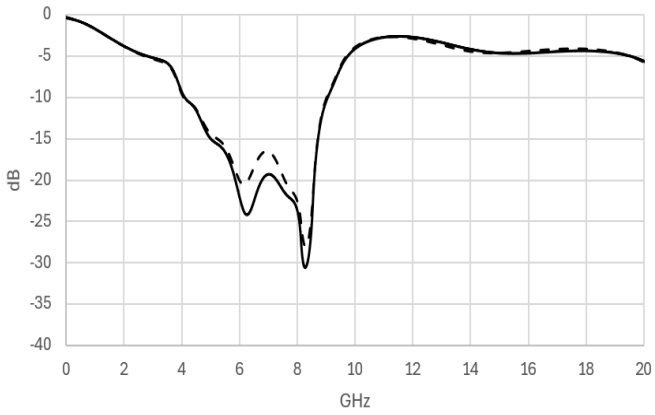
TYPICAL PERFORMANCE

(VDD = 5.0 V, T = 25°C unless otherwise specified)

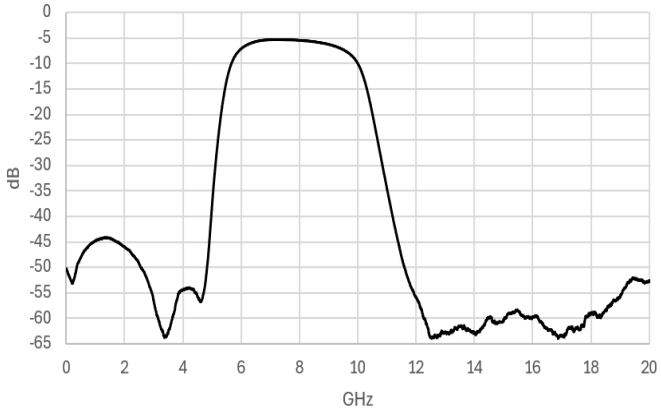
Band 1 Insertion Loss



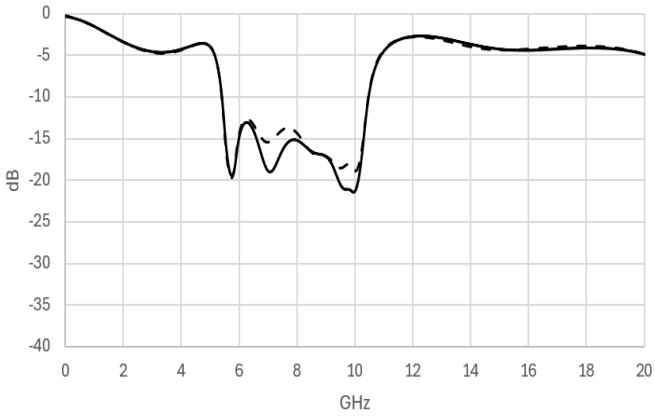
Band 1 Return Loss



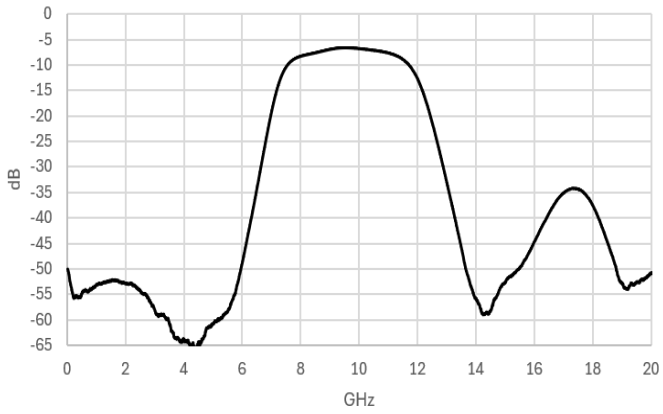
Band 2 Insertion Loss



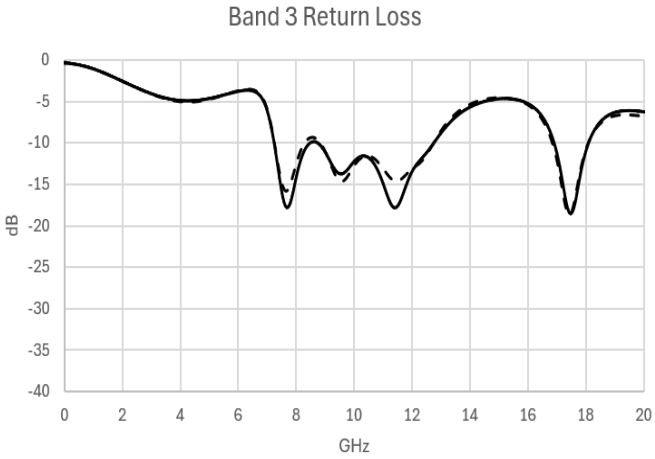
Band 2 Return Loss



Band 3 Insertion Loss



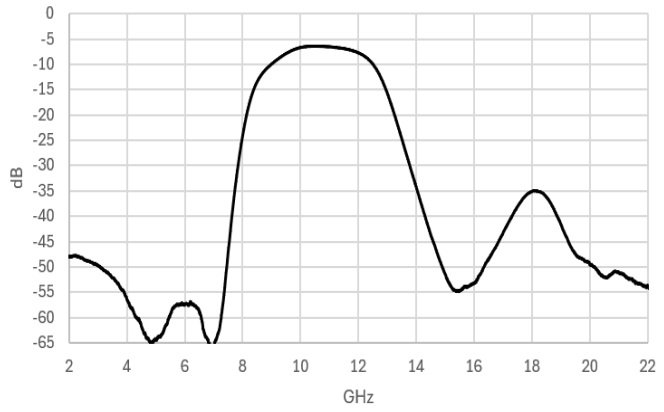
Band 3 Return Loss



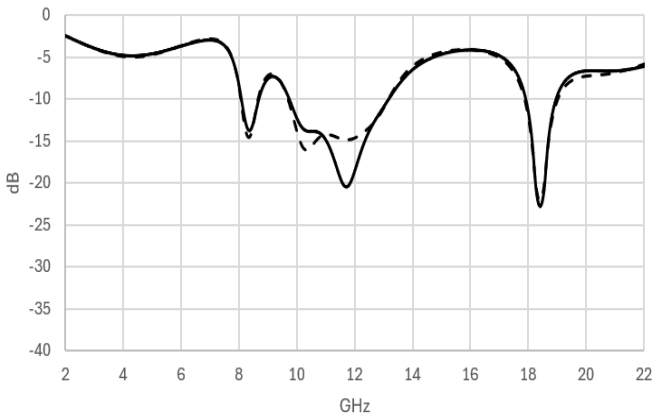
TYPICAL PERFORMANCE (CONTINUED)

(VDD = 5.0 V, T = 25°C unless otherwise specified)

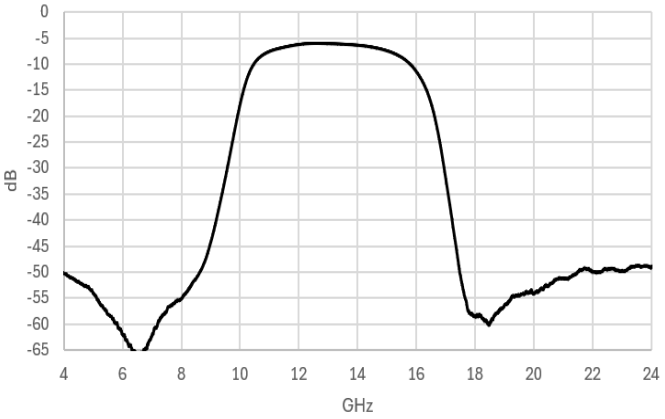
Band 4 Insertion Loss



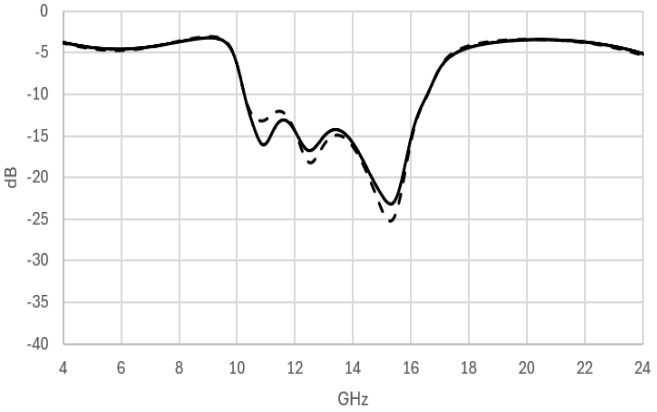
Band 4 Return Loss



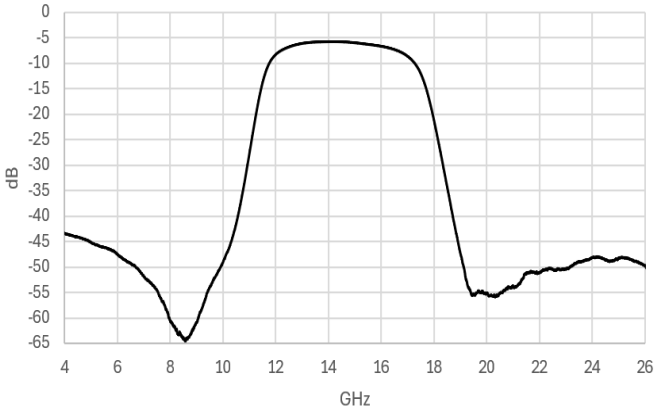
Band 5 Insertion Loss



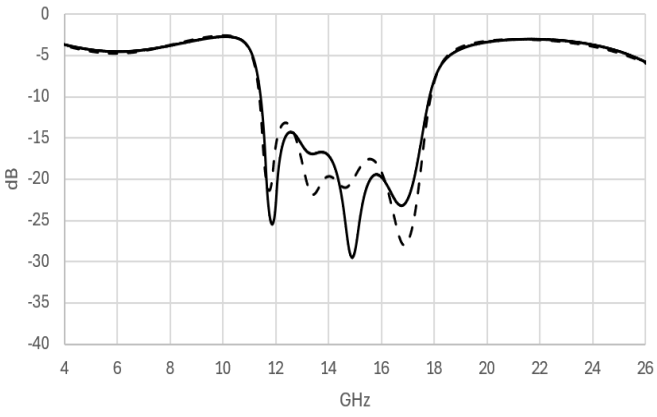
Band 5 Return Loss



Band 6 Insertion Loss



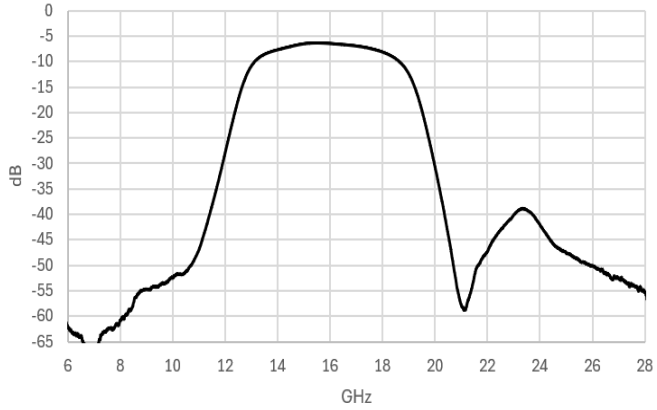
Band 6 Return Loss



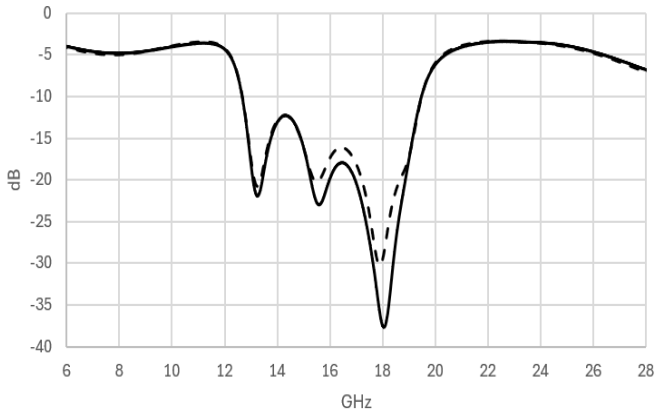
TYPICAL PERFORMANCE (CONTINUED)

(VDD = 5.0 V, T = 25°C unless otherwise specified)

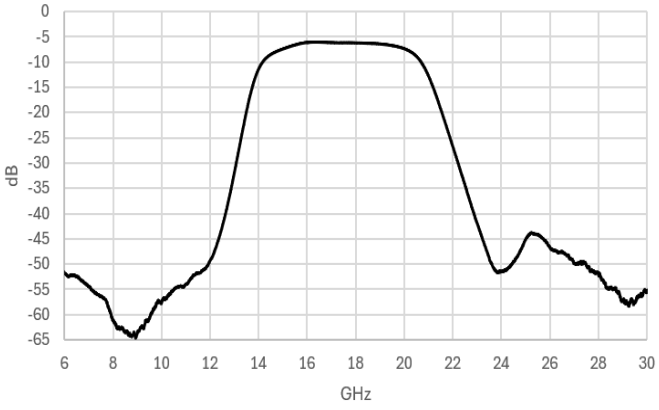
Band 7 Insertion Loss



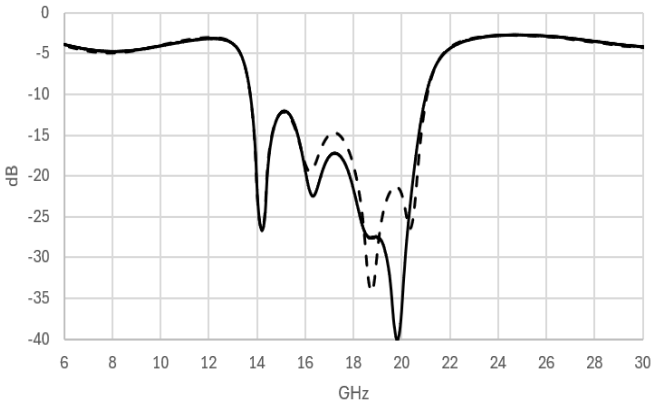
Band 7 Return Loss



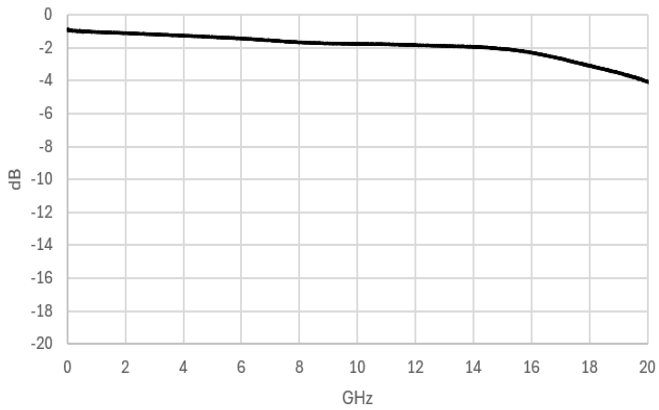
Band 8 Insertion Loss



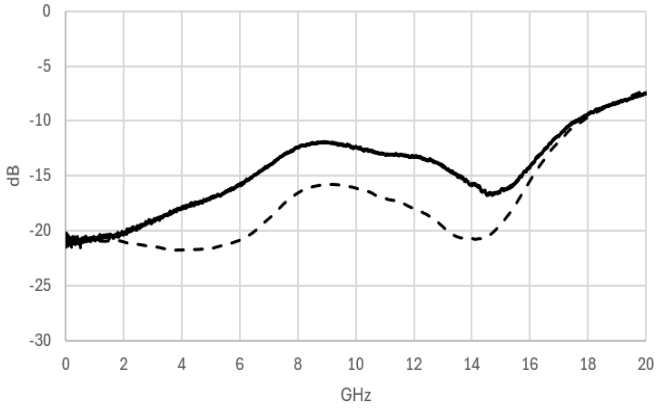
Band 8 Return Loss



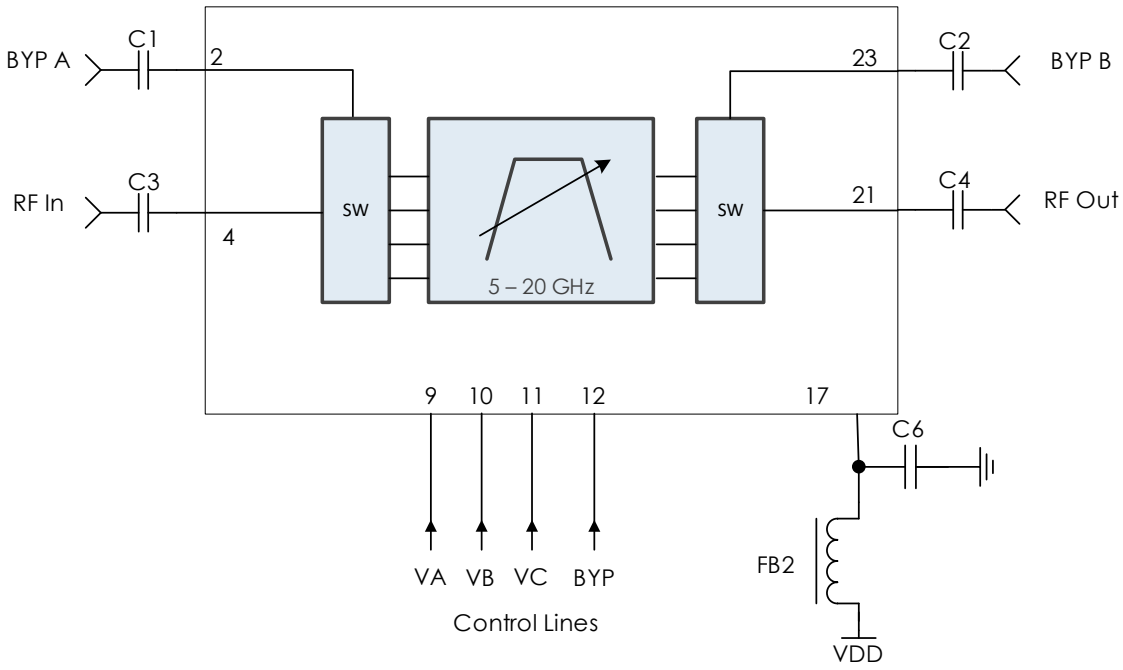
Bypass A Insertion Loss



Bypass A Return Loss



TYPICAL APPLICATION



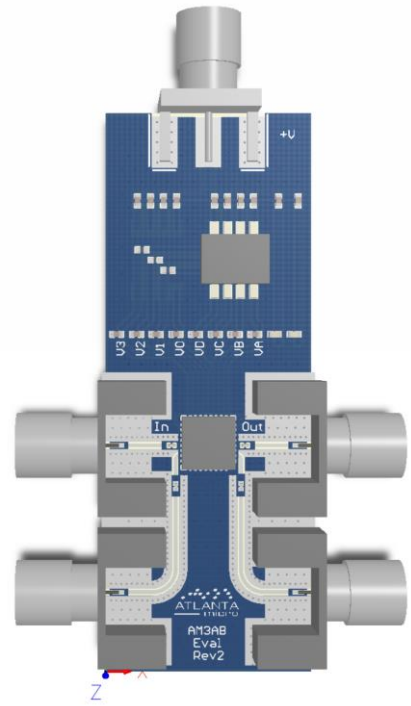
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1 – C4	0.1 µF	0201BB104KW160	Passive Plus
FB2	-	MMZ1005A222E	TDK
C6	0.1 µF	C1005X7R1H104K050BB	TDK

Note:

1. Control lines are filtered internally providing high frequency isolation.
2. DC blocking capacitors should be low-loss, broadband capacitors for optimum performance.
3. Additional R-C filtering may be added to control lines for additional isolation.

EVALUATION PC BOARD



RELATED PARTS

Part Number				Description
AM3025A	0.4 GHz	to	6.0 GHz	Sub-Octave Bandpass Filter Bank
AM3152	0.4 GHz	to	8.0 GHz	Digitally Tunable Bandpass Filter Bank
AM3153	6.0 GHz	to	26.5 GHz	Digitally Tunable Bandpass Filter Bank
AM3186	6.0 GHz	to	26.5 GHz	Sub-Octave Bandpass Filter Bank
AM3257	4.0 GHz	to	20.0 GHz	Sub-Octave Bandpass Filter Bank
AM3275	5.5 GHz	to	18.0 GHz	Digitally Tunable 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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