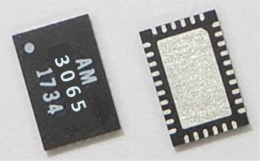
AM3065 – Filter Bank

Digitally Tunable 6.0 to 12.0 GHz Bandpass

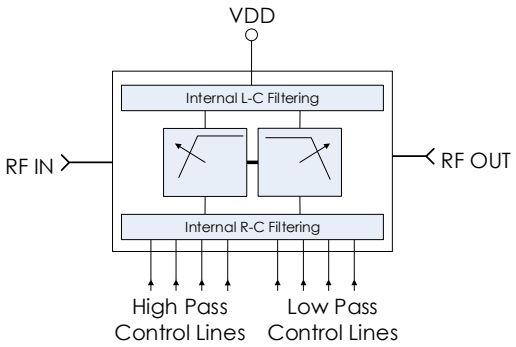


The AM3065 is a miniature filter IC containing digitally tunable bandpass filters covering the 6.0 GHz to 12.0 GHz frequency range. Separate low-pass and high-pass tuning voltages provide independent control of both center frequency and bandwidth. AM3065 provides an excellent filtering solution for a receiver or transceiver requiring flexible center frequency and bandwidth, high dynamic range, and small size, weight, and power consumption.

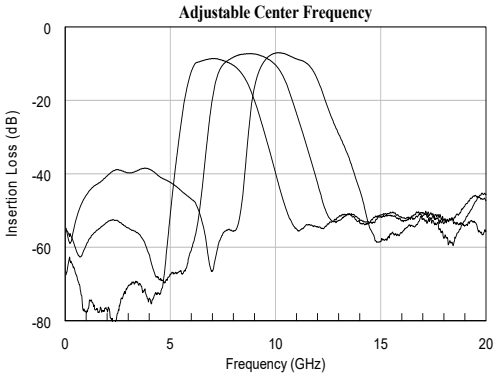
FEATURES

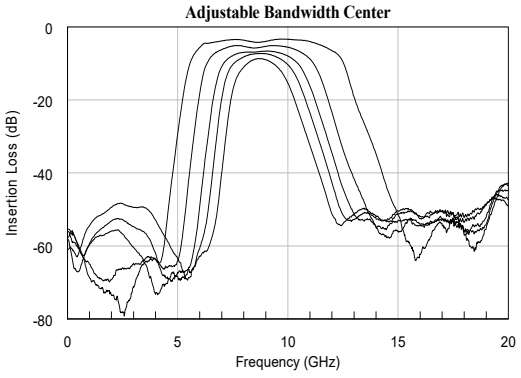
- Digitally Tunable Bandpass Filters
- Independent LP and HP Control
- Integrated Control Line Filtering
- +3.3V to +5.0V Supply
- 4.0 dB Insertion Loss
- +40dBm Input IP3
- +24 dBm Input P1dB
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



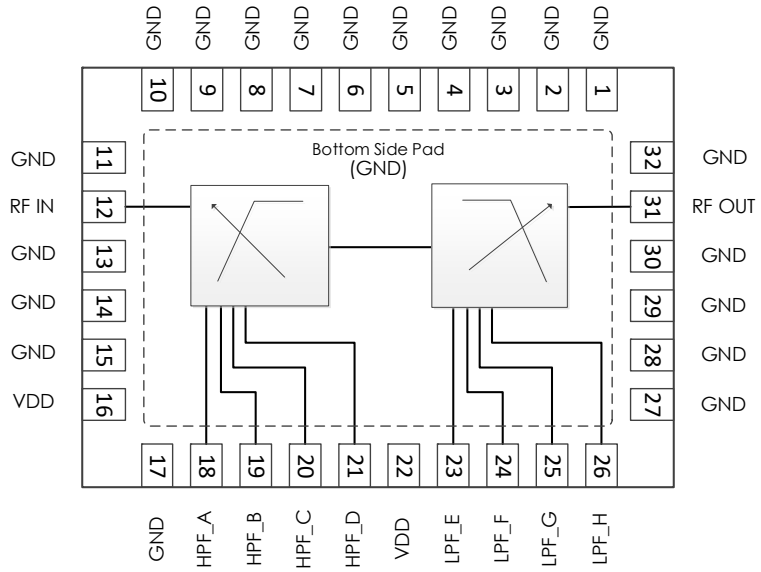


CONTENTS

REVISION HISTORY

Date	Revision	Notes
February 6, 2018	1	Initial Release
February 8, 2018	2	Part Picture and Additional Descriptors Added.
April 19, 2018	3	Control Table Added.
June 19, 2018	4	Updated for New Datasheet Format with More Comprehensive Part Information.
January 29, 2019	5	Labeled Evaluation Board Switches.
June 13, 2024	6	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1-11	GND	Ground
12	RF IN	RF Input – 50 ohms – DC Coupled, External DC Block Required
13-15	GND	Ground
16	VDD	DC Power Input
17	GND	Ground
18	HPF_A	High Pass Filter Control Bit A
19	HPF_B	High Pass Filter Control Bit B
20	HPF_C	High Pass Filter Control Bit C
21	HPF_D	High Pass Filter Control Bit D
22	VDD	DC Power Input
23	LPF_E	Low Pass Filter Control Bit E
24	LPF_F	Low Pass Filter Control Bit F
25	LPF_G	Low Pass Filter Control Bit G
26	LPF_H	Low Pass Filter Control Bit H
27-30	GND	Ground
31	RF OUT	RF Output – 50 Ohms – DC Coupled. External DC Block Required
32	GND	Ground
Case GND	GND	Ground

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	-50C	+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. Devices subjected to conditions outside of what is recommended for extended periods may affect device reliability.

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+3.0 V	+5.0 V	+5.2 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

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	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+3.0 V	+5.0 V	+5.2 V
DC Supply Current	VDD = +5.0 V		2 mA	
Power Dissipated	VDD = +5.0 V		10 mW	
Logic Level Low		-0.1 V		+0.5 V
Logic Level High		+2.0 V		+VDD V

Timing Characteristics

Switching Time	Minimum	Typical	Maximum
Switching Speed		1 µs	

Note: Switching speed defined as 50% control to 10%/90% RF. Measurements made with no control line filtering.

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		6.0 GHz		12.0 GHz
Insertion Loss	f = 6.5 GHz		4.3 dB	
	f = 9.5 GHz		3.3 dB	
	f = 11.5 GHz		5.0 dB	
Return Loss	f = 6.5 GHz		17.4 dB	
	f = 9.5 GHz		20.1 dB	
	f = 11.5 GHz		16.8 dB	
Output IP3			+40 dBm	
Input P1dB			+24 dBm	

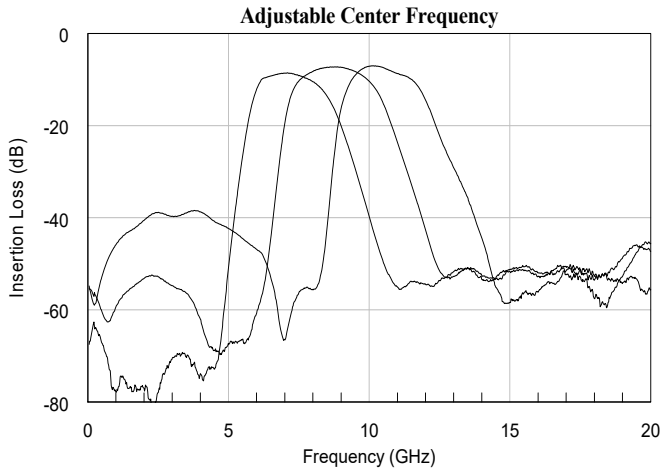
State Table

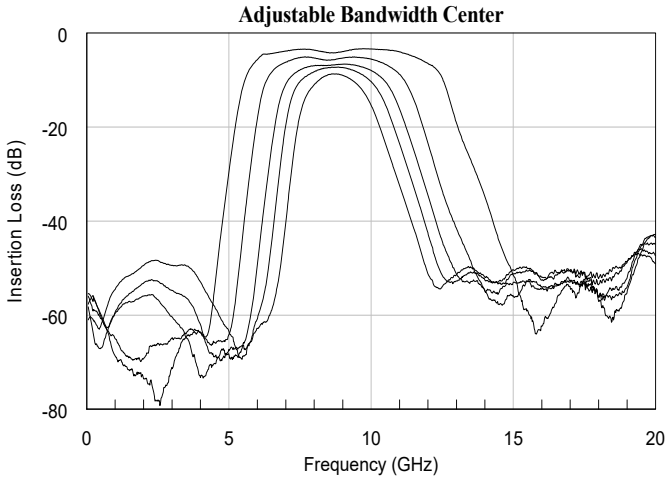
High Pass Control Lines				Typical Cutoff Frequency (GHz)
D	C	B	A	
L	L	L	L	6.00
L	L	L	H	6.07
L	L	H	L	6.19
L	L	H	H	6.30
L	H	L	L	6.41
L	H	L	H	6.55
L	H	H	L	6.76
L	H	H	H	6.85
H	L	L	L	6.95
H	L	L	H	7.05
H	L	H	L	7.31
H	L	H	H	7.58
H	H	L	L	7.96
H	H	L	H	8.40
H	H	H	L	9.10
H	H	H	H	9.87

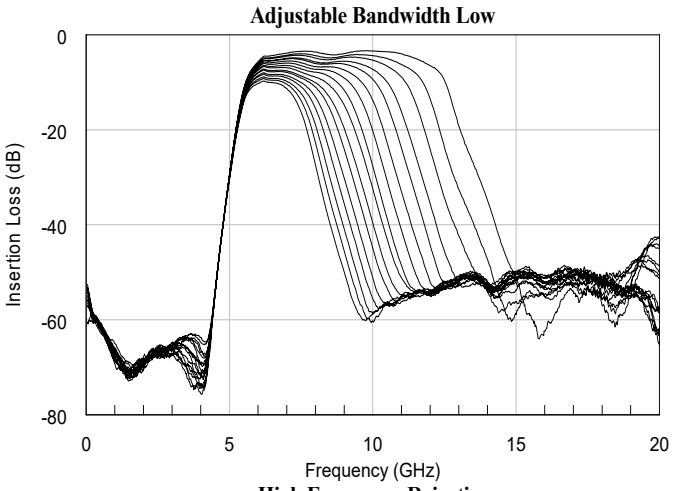
Low Pass Control Lines				Typical Cutoff Frequency (GHz)
D	C	B	A	
L	L	L	L	5.84
L	L	L	H	6.04
L	L	H	L	6.11
L	L	H	H	6.34
L	H	L	L	6.52
L	H	L	H	6.69
L	H	H	L	6.79
L	H	H	H	7.14
H	L	L	L	7.71
H	L	L	H	8.19
H	L	H	L	8.88
H	L	H	H	9.47
H	H	L	L	9.96
H	H	L	H	10.66
H	H	H	L	11.36
H	H	H	H	12.52

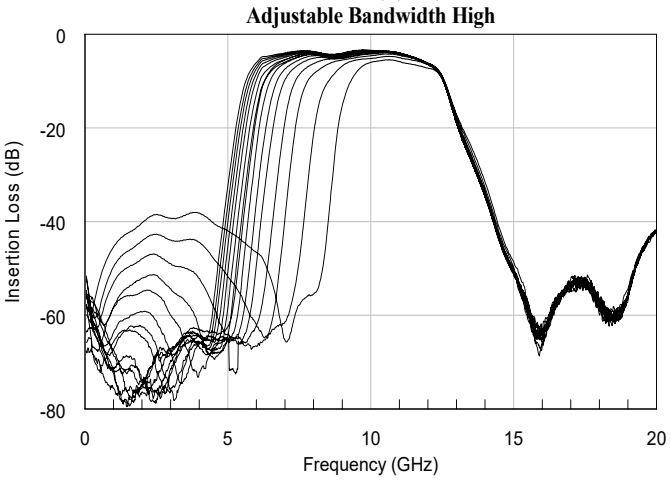
TYPICAL PERFORMANCE

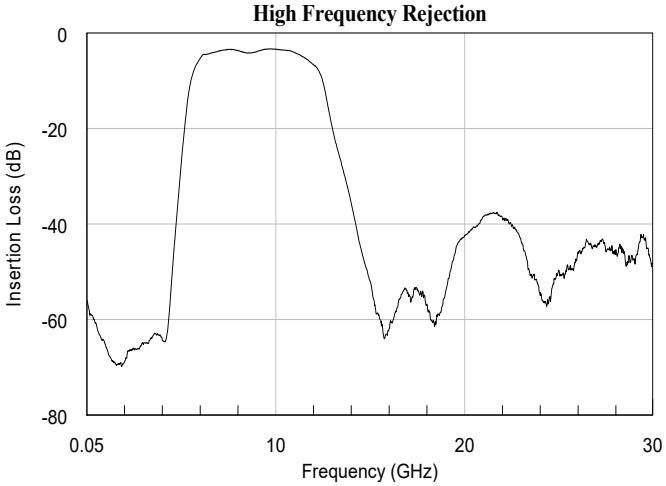
(Note: Only some states shown for simplicity)

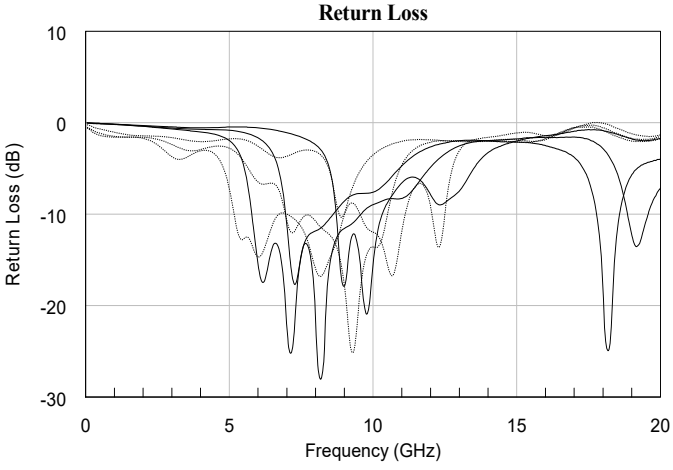




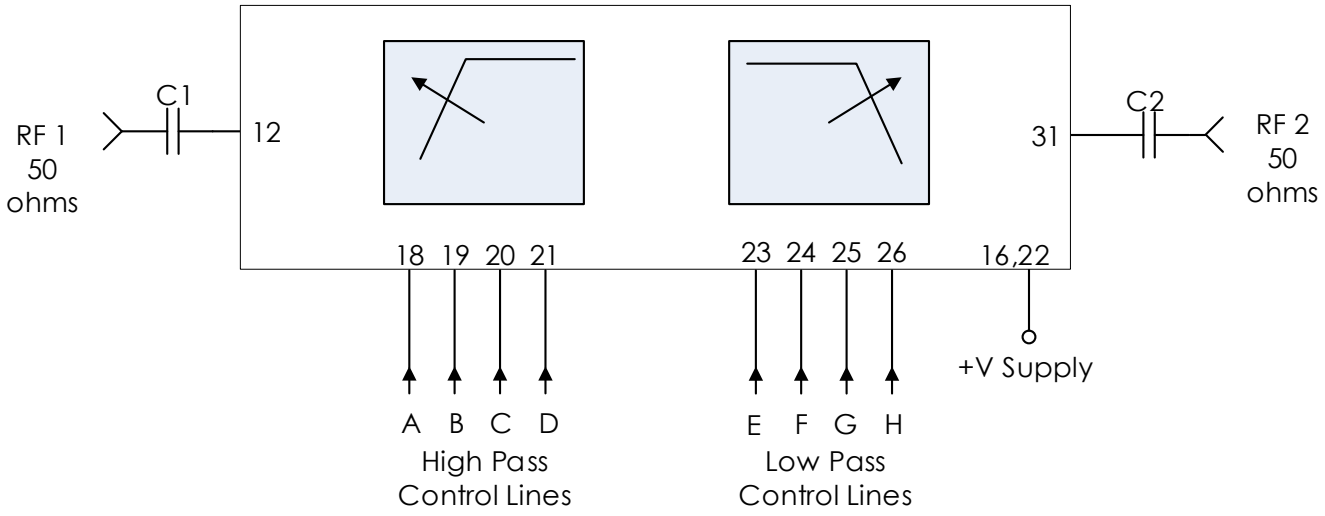








TYPICAL APPLICATION



Recommended Component List (or Equivalent)

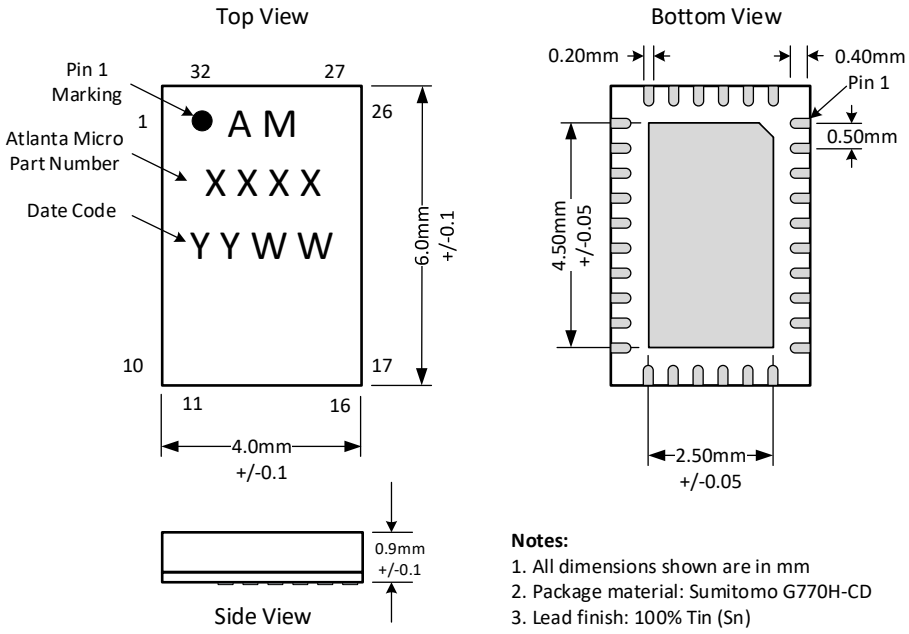
Part	Value	Part Number	Manufacturer
C1, C2	0.1 µF	0402BB104KW160	Passives Plus

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.

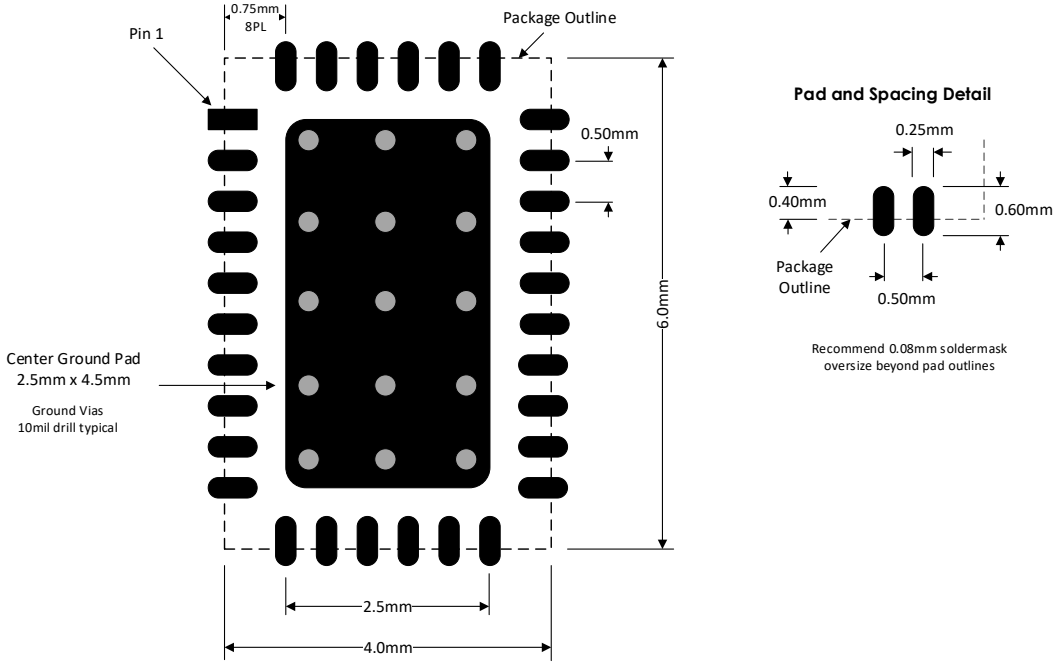
PACKAGE DETAILS

Package Drawing

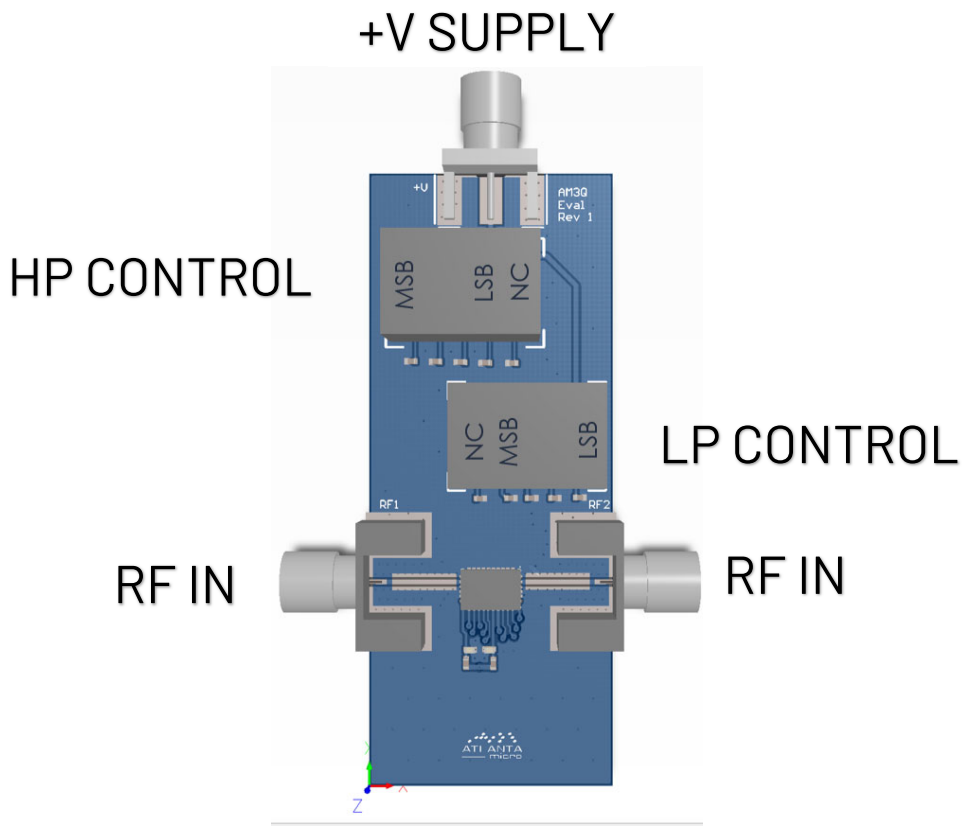


Notes:
1. All dimensions shown are in mm
2. Package material: Sumitomo G770H-CD
3. Lead finish: 100% Tin (Sn)

Recommended Footprint



EVALUATION PC BOARD



RELATED PARTS

Part Number	Description
AM3043	7.0 GHz – 15.5 GHz Digitally Tunable Bandpass Filter
AM3045	3.5 GHz – 5.5 GHz Digitally Tunable Bandpass Filter
AM3060	400 MHz – 6.5 GHz Digitally Tunable Bandpass Filter
AM3063	6.0 GHz – 18.0 GHz Digitally Tunable Bandpass Filter Bank
AM3066	18.0 GHz – 26.5 GHz Digitally Tunable Bandpass Filter Bank
AM3102	330 MHz – 1.2 GHz Digitally Tunable Bandpass Filter
AM3103	1.0 GHz – 3.0 GHz Digitally Tunable Bandpass Filter
AM3104	2.5 GHz – 6.5 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)

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).

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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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