

AM3063 – Filter Bank

Digitally Tunable 6 to 18 GHz Bandpass

Description

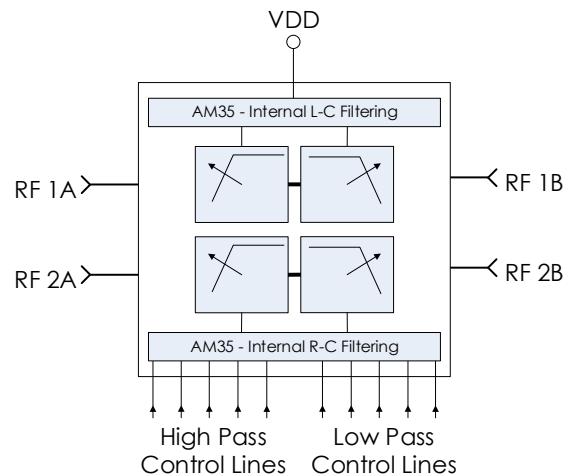
AM3063 is a miniature filter IC containing digitally tunable bandpass filters covering the 6.0 GHz to 18.0 GHz frequency range. Separate low-pass and high-pass control lines provide independent control of both center frequency and bandwidth. Power and Control lines are internally filtered using Atlanta Micro's AM35 filter chip. AM3063 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
- +3.3V to +5.0V Supply
- 4.0 dB Insertion Loss
- Integrated Power and Control Line Filtering (See AM35 Datasheet)
- 6mm QFN Package
- +40 dBm Input IP3
- -40C to +85C Operation

Functional Diagram



Characteristic Performance

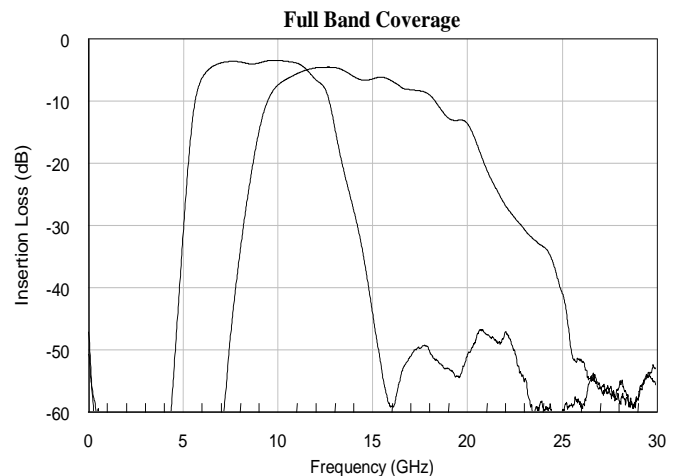
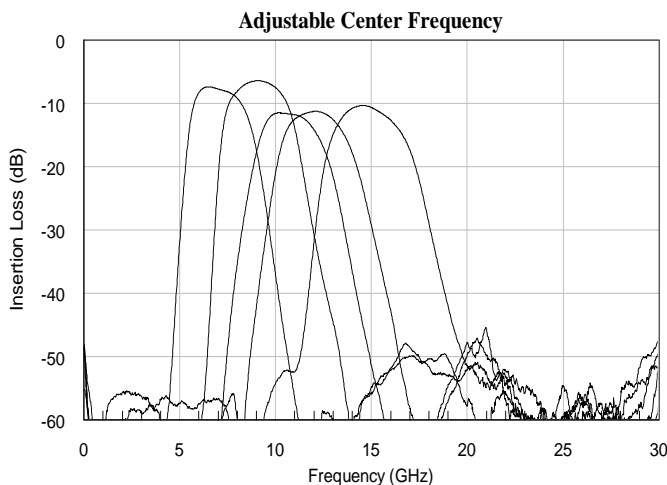


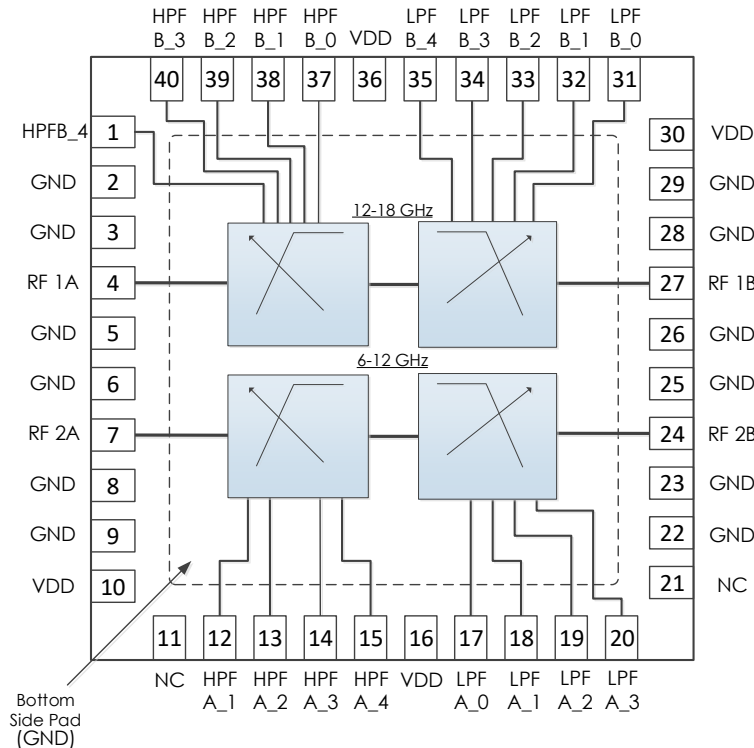
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Revision History

Date	Revision Number	Notes
March 30, 2018	1	Preliminary Release
May 9, 2018	2	Updated for new datasheet format
August 17, 2018	3	Specifications Updated
August 22, 2018	3A	Various Pictures Updated
January 15, 2019	4	Various Notes Updated
March 14, 2019	5	Updated State Table
July 17, 2019	6	Various Notes Added, Component Compliance Information Updated, Footprint Corrected.

Pin Layout and Definitions



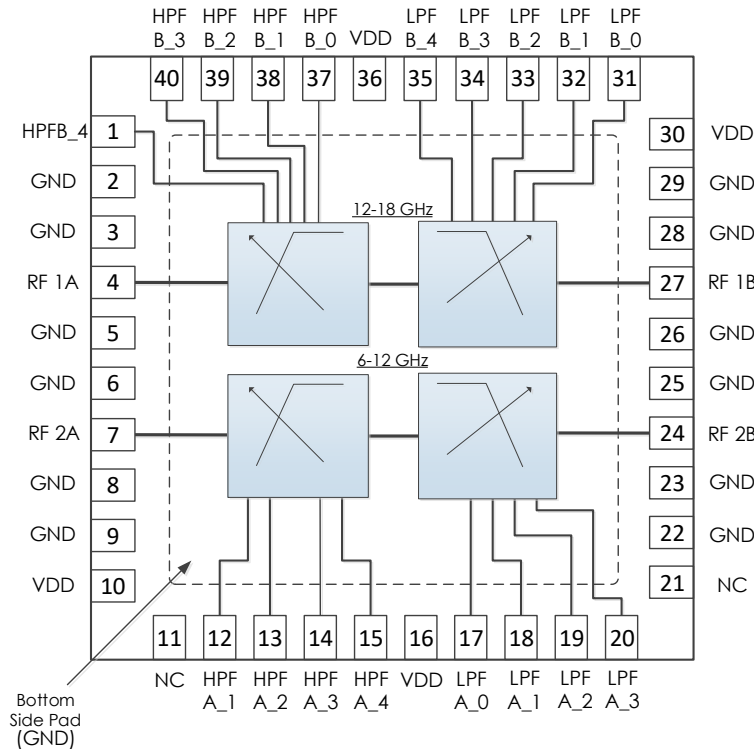
Pin Number	Pin Name	Pin Function
1	HPFB_4	12-18 GHz HPF control bit 4
2,3	GND	Ground – Common
4	RF1A	12-18 GHz RF Port 1 – 50 ohms – DC coupled – DC blocking capacitor required*
5,6	GND	Ground – Common
7	RF2A	6-12 GHz RF Port 1 – 50 ohms – DC coupled – DC blocking capacitor required*
8,9	GND	Ground – Common
10	VDD	DC Supply
11	HPFA_0	6-12 GHz HPF control bit 0 (reserved for future use)
12	HPFA_1	6-12 GHz HPF control bit 1
13	HPFA_2	6-12 GHz HPF control bit 2
14	HPFA_3	6-12 GHz HPF control bit 3
15	HPFA_4	6-12 GHz HPF control bit 4
16	VDD	DC Supply
17	LPFA_0	6-12 GHz LPF control bit 0
18	LPFA_1	6-12 GHz LPF control bit 1
19	LPFA_2	6-12 GHz LPF control bit 2
20	LPFA_3	6-12 GHz LPF control bit 3
21	LPFA_4	6-12 GHz LPF control bit 4 (reserved for future use)

***Note:** DC blocking caps not required if in series with other Atlanta Micro parts of the same reference voltage.

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Pin Layout and Definitions (continued)



Pin Number	Pin Name	Pin Function
22,23	GND	Ground – Common
24	RF2B	6-12 GHz RF Port 2 – 50 ohms – DC coupled – DC blocking capacitor required*
25,26	GND	Ground – Common
27	RF2A	12-18 GHz RF Port 2 – 50 ohms – DC coupled – DC blocking capacitor required*
28,29	GND	Ground - Common
30	VDD	DC Supply
31	LPFB_0	12-18 GHz LPF control bit 0
32	LPFB_1	12-18 GHz LPF control bit 1
33	LPFB_2	12-18 GHz LPF control bit 2
34	LPFB_3	12-18 GHz LPF control bit 3
35	LPFB_4	12-18 GHz LPF control bit 4
36	VDD	DC Supply
37	HPFB_0	12-18 GHz HPF control bit 0
38	HPFB_1	12-18 GHz HPF control bit 1
39	HPFB_2	12-18 GHz HPF control bit 2
40	HPFB_3	12-18 GHz HPF control bit 3
Case GND	GND	Ground - Common

***Note:** DC blocking caps not required if in series with other Atlanta Micro parts of the same reference voltage.

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Specifications

Absolute Maximum Ratings

	Minimum	Maximum
Supply Input Voltage	-0.3 V	+6.0 V
RF Input Power		+27dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50 C	+150 C

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	MSL 3	



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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+2.7V	+5.0 V	
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

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DC Electrical Characteristics

Parameter	Testing Conditions	Minimum	Typical	Maximum
DC Supply Voltage		+2.7 V	+5.0 V	
DC Supply Current	VDD = +5.0V		2mA	
Power Dissipated	VDD = +5.0V		10mW	
Logic Level Low		-0.1V		+0.5V
Logic Level High		+2.0V		+VDD

*Power and Control lines are internally filtered. See AM35 datasheet for performance details.

RF Performance

Parameter	Testing Conditions	Minimum	Typical	Maximum
Frequency Range		6.0 GHz		18.0 GHz
Insertion Loss	f = 6.0 GHz		5.9 dB	
	f = 10.0 GHz		3.5 dB	
	f = 12.0 GHz		4.6 dB	
	f = 18.0 GHz		5.9 dB	
Return Loss	f = 6.0 GHz		27.0 dB	
	f = 10.0 GHz		17.5 dB	
	f = 12.0 GHz		25.6 dB	
	f = 18.0 GHz		12.86 dB	
Input IP3			+40 dBm	

Timing Characteristics

Parameter	Minimum	Typical	Maximum
Switching Speed		1 μ s	

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State Tables

6 - 12 GHz High Pass Control Lines

A_4	A_3	A_2	A_1	Typical Cutoff Frequency (GHz)
L	L	L	L	6.00
L	L	L	H	6.05
L	L	H	L	6.15
L	L	H	H	6.20
L	H	L	L	6.35
L	H	L	H	6.40
L	H	H	L	6.60
L	H	H	H	6.70
H	L	L	L	6.75
H	L	L	H	6.90
H	L	H	L	7.30
H	L	H	H	7.40
H	H	L	L	7.90
H	H	L	H	8.35
H	H	H	L	8.90
H	H	H	H	9.50

6 - 12 GHz Low Pass Control Lines

A_3	A_2	A_1	A_0	Typical Cutoff Frequency (GHz)
L	L	L	L	7.30
L	L	L	H	7.45
L	L	H	L	7.60
L	L	H	H	7.75
L	H	L	L	7.90
L	H	L	H	8.10
L	H	H	L	8.25
L	H	H	H	8.50
H	L	L	L	8.85
H	L	L	H	9.15
H	L	H	L	9.50
H	L	H	H	9.90
H	H	L	L	10.30
H	H	L	H	10.90
H	H	H	L	11.40
H	H	H	H	12.35

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State Tables (continued)

12 – 18 GHz High Pass Control Lines					Typical Cutoff Frequency (GHz)
B_4	B_3	B_2	B_1	B_0	
L	L	L	L	L	9.95
L	L	L	L	H	10.00
L	L	L	H	L	10.05
L	L	L	H	H	10.10
L	L	H	L	L	10.15
L	L	H	L	H	10.20
L	L	H	H	L	10.30
L	L	H	H	H	10.35
L	H	L	L	L	10.40
L	H	L	L	H	10.45
L	H	L	H	L	10.50
L	H	L	H	H	10.60
L	H	H	L	L	10.70
L	H	H	L	H	10.80
L	H	H	H	L	10.85
L	H	H	H	H	10.90
H	L	L	L	L	11.10
H	L	L	L	H	11.25
H	L	L	H	L	11.40
H	L	L	H	H	11.50
H	L	H	L	L	11.65
H	L	H	L	H	11.90
H	L	H	H	L	12.10
H	L	H	H	H	12.40
H	H	L	L	L	12.65
H	H	L	L	H	13.00
H	H	L	H	L	13.30
H	H	L	H	H	13.70
H	H	H	L	L	14.15
H	H	H	L	H	14.70
H	H	H	H	L	15.30
H	H	H	H	H	15.85

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State Tables (continued)

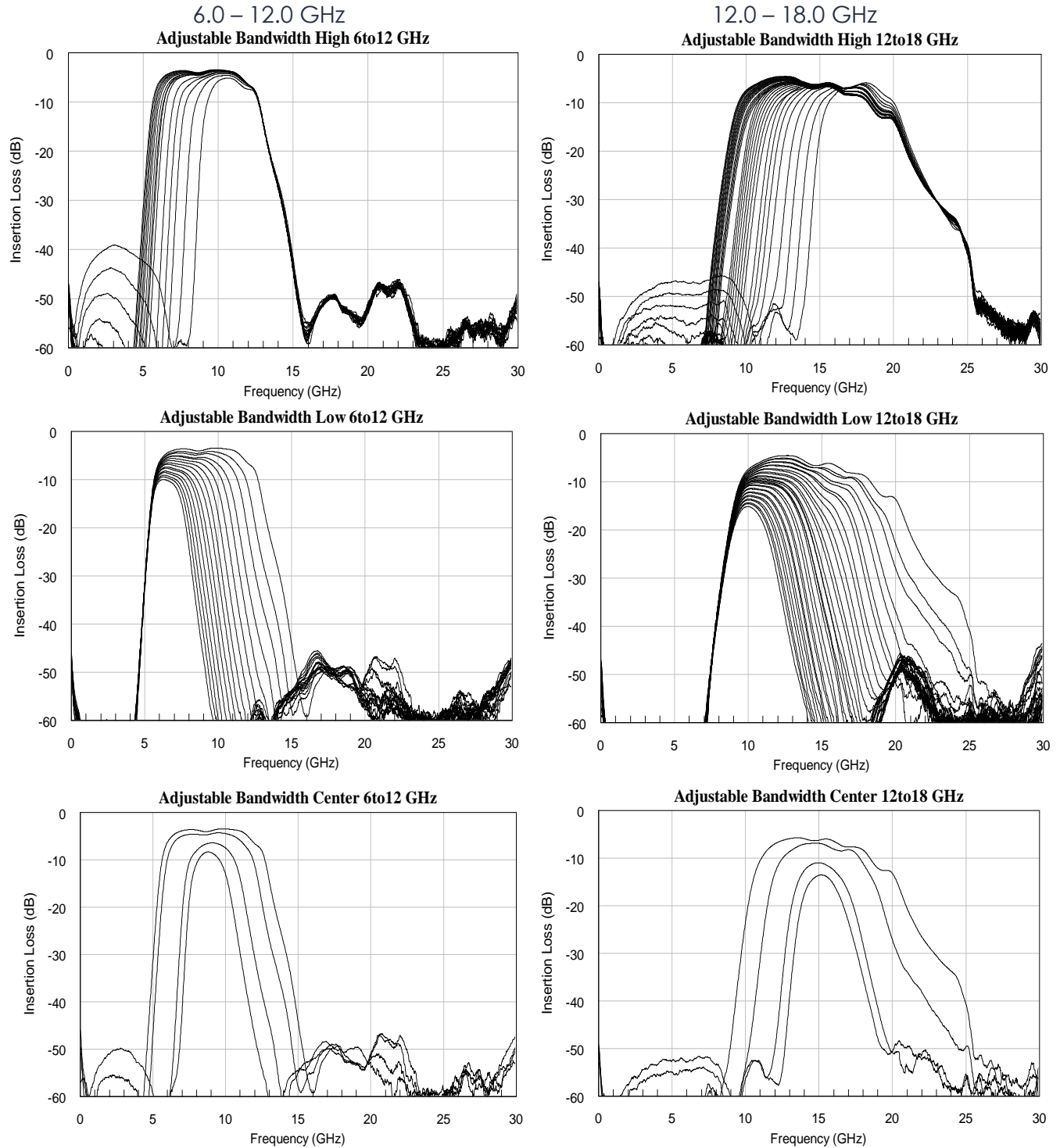
12 – 18 GHz Low Pass Control Lines					Typical Cutoff Frequency (GHz)
B_4	B_3	B_2	B_1	B_0	
L	L	L	L	L	10.80
L	L	L	L	H	10.90
L	L	L	H	L	11.00
L	L	L	H	H	11.10
L	L	H	L	L	11.20
L	L	H	L	H	11.35
L	L	H	H	L	11.45
L	L	H	H	H	11.60
L	H	L	L	L	11.70
L	H	L	L	H	12.00
L	H	L	H	L	12.10
L	H	L	H	H	12.50
L	H	H	L	L	12.65
L	H	H	L	H	12.90
L	H	H	H	L	13.00
L	H	H	H	H	13.15
H	L	L	L	L	12.95
H	L	L	L	H	13.20
H	L	L	H	L	13.30
H	L	L	H	H	13.45
H	L	H	L	L	13.55
H	L	H	L	H	13.75
H	L	H	H	L	13.90
H	L	H	H	H	14.50
H	H	L	L	L	15.50
H	H	L	L	H	15.75
H	H	L	H	L	16.15
H	H	L	H	H	16.25
H	H	H	L	L	16.50
H	H	H	L	H	17.00
H	H	H	H	L	18.00
H	H	H	H	H	19.50

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Typical Performance

*Note: Only some states shown for simplicity



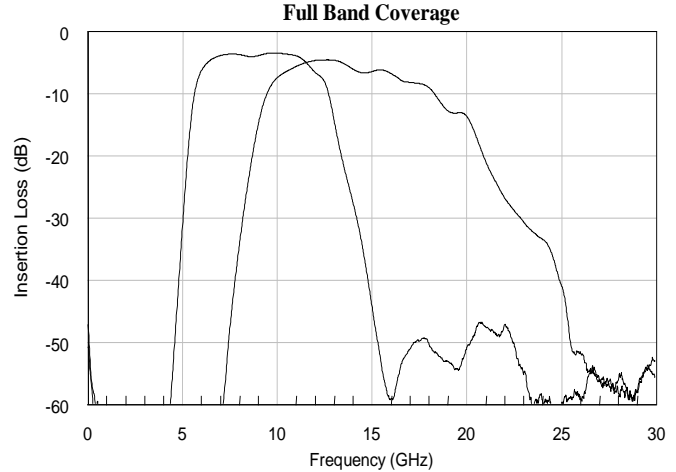
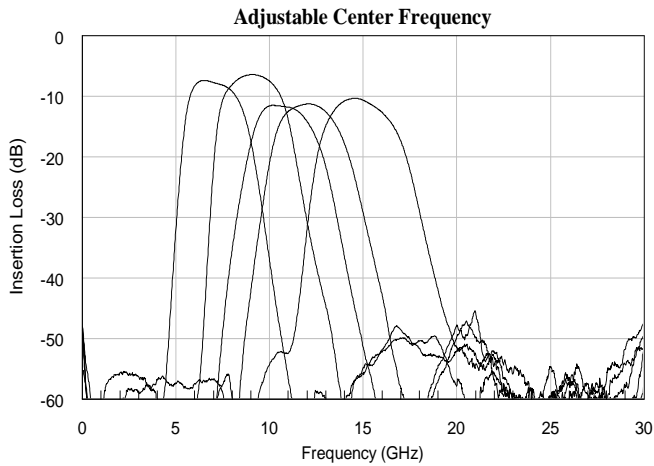
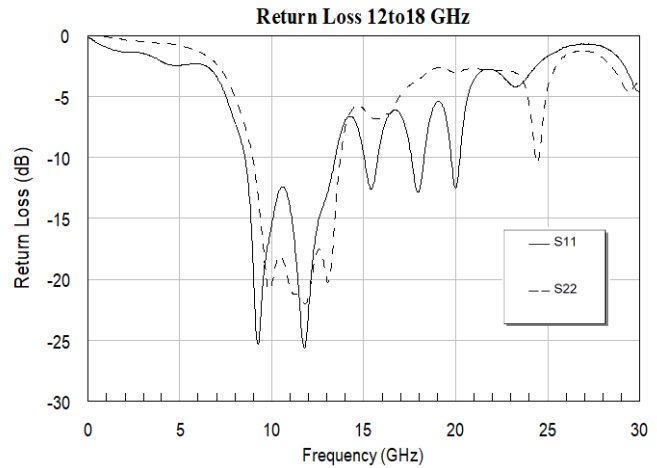
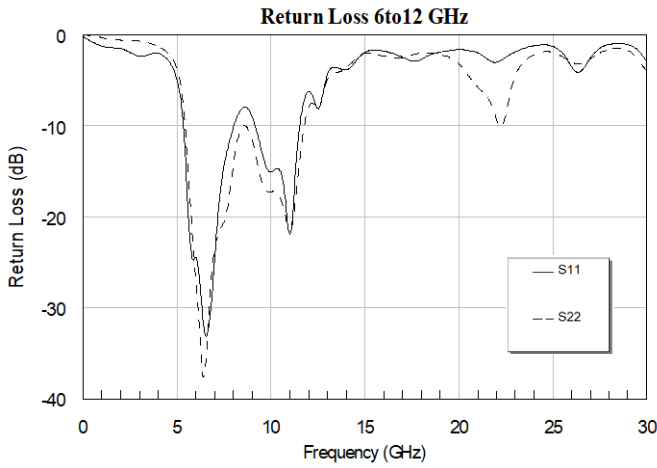
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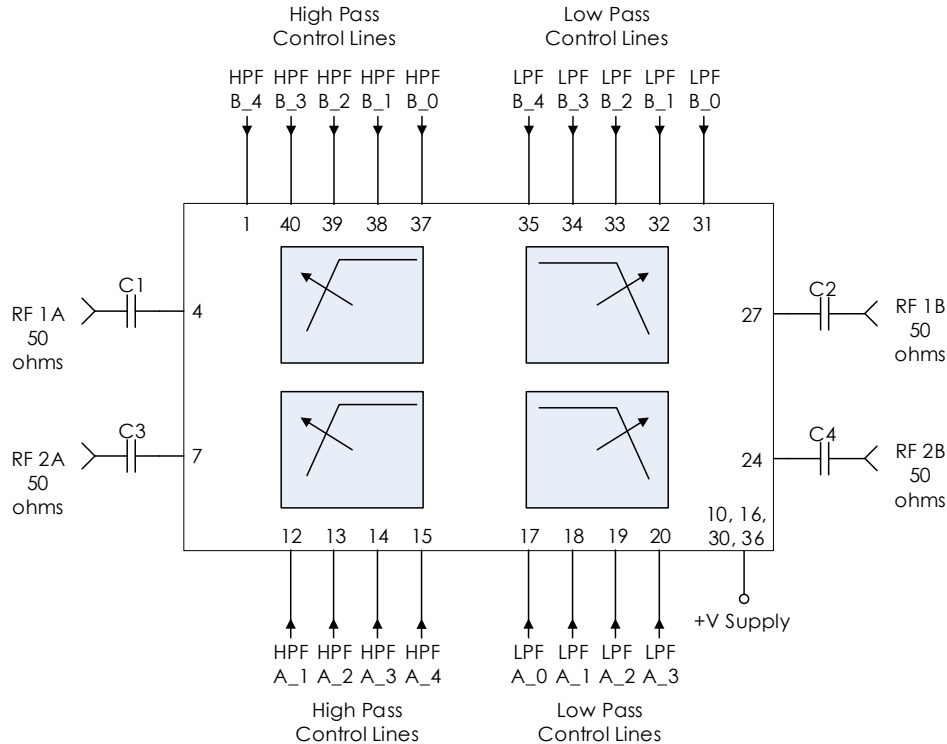
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Typical Performance (continued)

*Note: Only some states shown for simplicity



Typical Application



Recommended Component List (or equivalent):

Part	Value	Part Number	Manufacturer
C1 – C4	0.1 μ F	0201BB104KW160	Passive Plus

Notes:

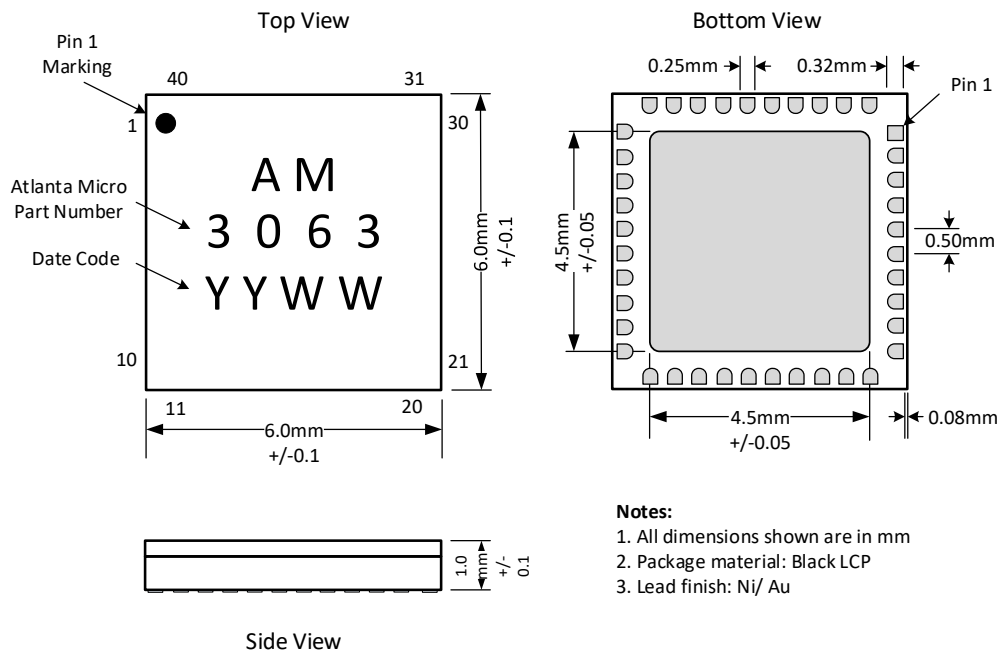
- RF blocking capacitors should be high performance, low loss, broadband capacitors for optimum performance.
- VDD and control lines filtered internally providing high frequency isolation up to 50+ GHz.
 - No additional RC filtering required on control lines.
 - See AM35 datasheet for performance details

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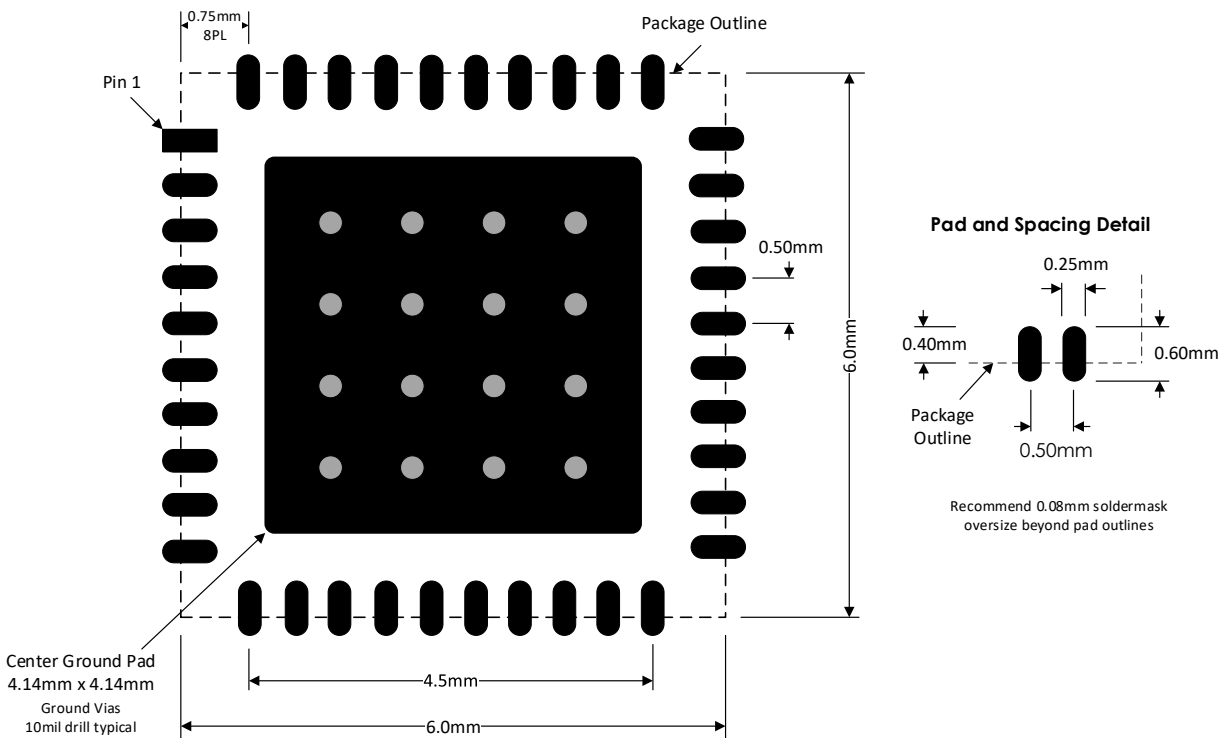
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Package Details

Package Drawing



Recommended Footprint

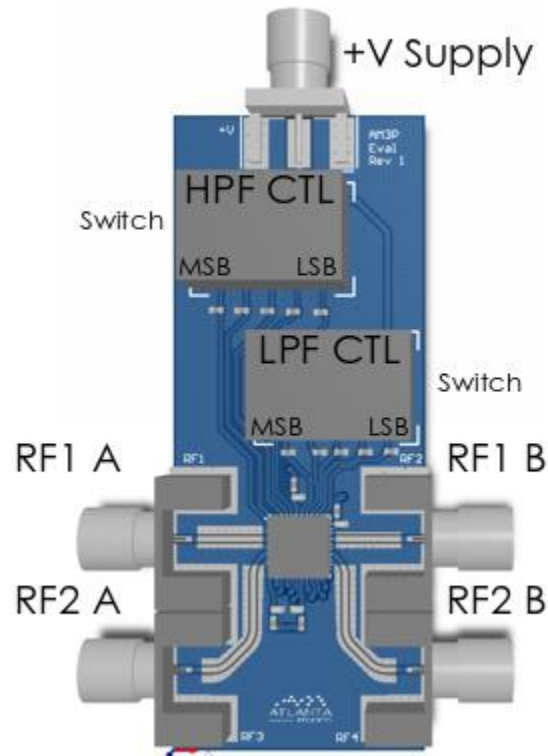


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Evaluation PC Board



Related Parts

Part Number	Description			
AM3060	0.32 GHz	to	6.5 GHz	Switched Digitally Tunable BPF Bank
AM3064	1 GHz	to	6.5 GHz	Digitally Tunable Bandpass Filter Bank
AM3065	6 GHz	to	12 GHz	Digitally Tunable Bandpass Filter
AM3066	12 GHz	to	26.5 GHz	Digitally Tunable Bandpass Filter Bank
AM3089	2 GHz	to	18 GHz	Switched Analog Tunable BPF Bank
AM3134	2 GHz	to	4.5 GHz	Analog Tunable Bandpass Filter Bank
AM3135	3.5 GHz	to	9 GHz	Analog Tunable Bandpass Filter Bank
AM3136	8 GHz	to	19 GHz	Analog Tunable Bandpass Filter Bank
AM35	100 MHz	to	40 GHz	Power and Control EMI Filter Bank

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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-ethylhexyl) 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)

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