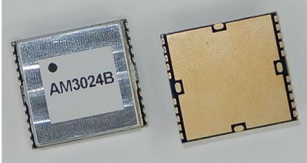


AM3024B – Filter Bank

Miniature Sub-Octave

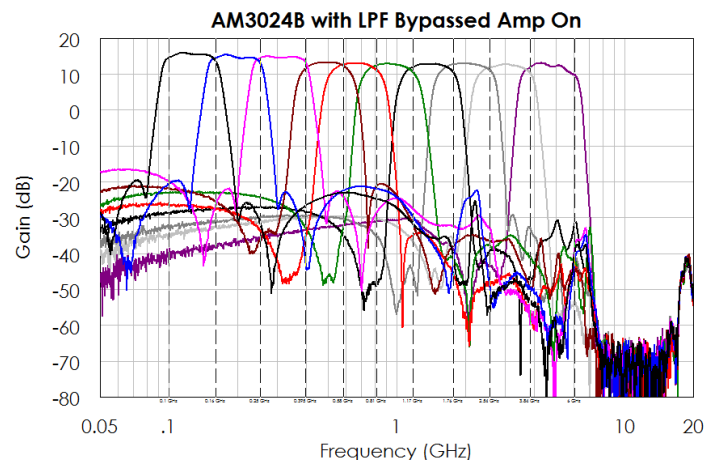


AM3024B is a miniature filter bank module with sub-octave filters covering the 100 MHz to 6000 MHz frequency range. The device contains a bypassable amplifier section, a low pass roofing filter section and can be used for both receive and transmit applications. The module is mounted to a circuit board as a surface mount device and provides an excellent front-end/ back-end for a broadband receiver or transmitter requiring high dynamic range and small size, weight and power consumption.

FEATURES

- Sub-Octave Filter Bank
- Bypassable Amplifier Stage
- Low Pass Roofing Filters
- 12 dB Gain
- +5.0V DC Supply
- 0.50 Watts Power Consumption
- 20.5mm L x 20.5mm W x 3.3mm H
(0.807" L x 0.807" W x 0.13" H)
- 0.5 oz Weight
- +3.3V Logic
- -40C to +85C Operation

TYPICAL PERFORMANCE



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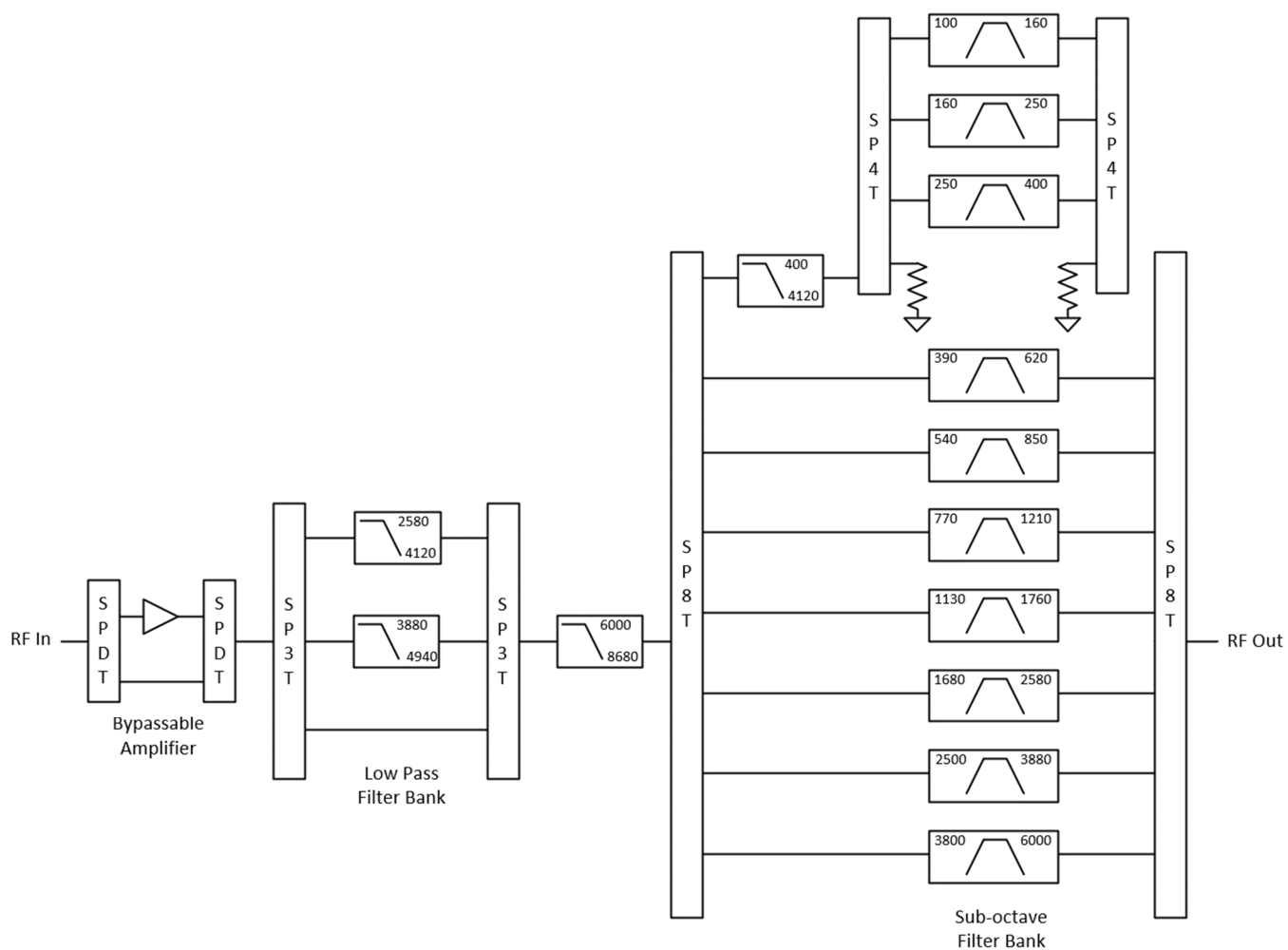
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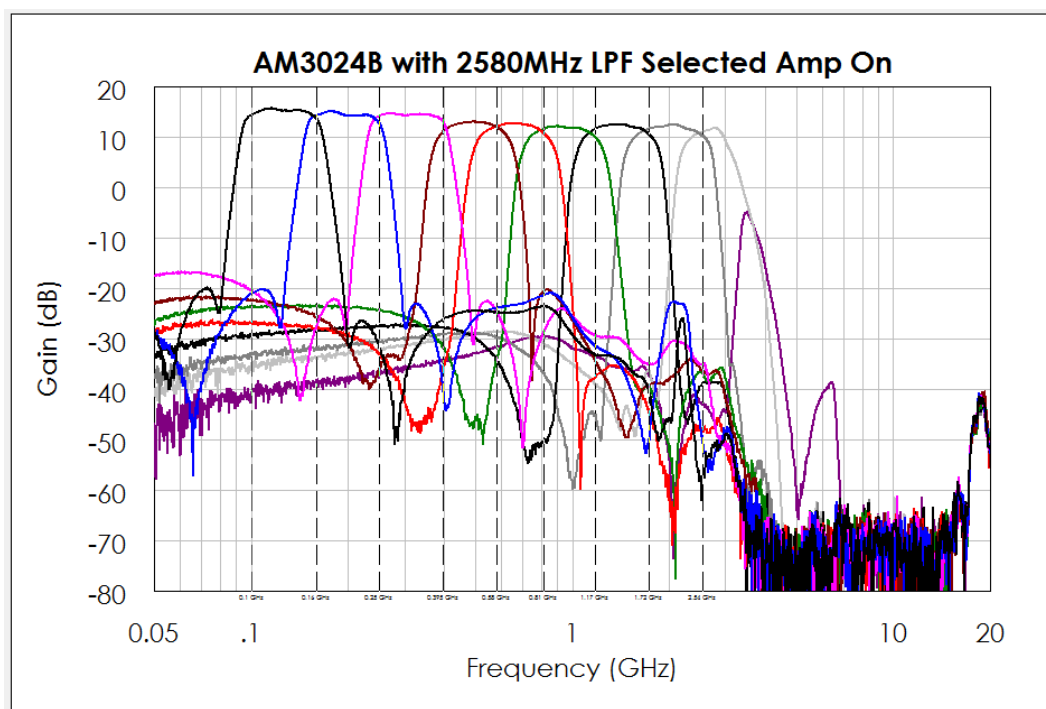
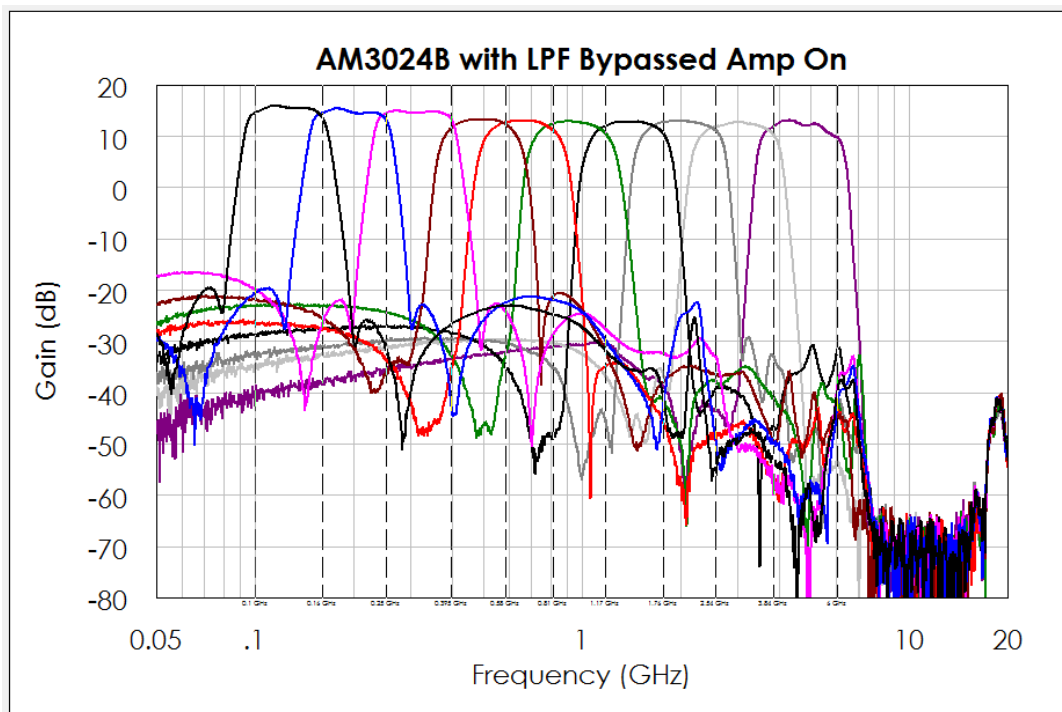
REVISION HISTORY

Date	Revision	Notes
August 2, 2024	A7	Changed to Mercury branding. No content changes.

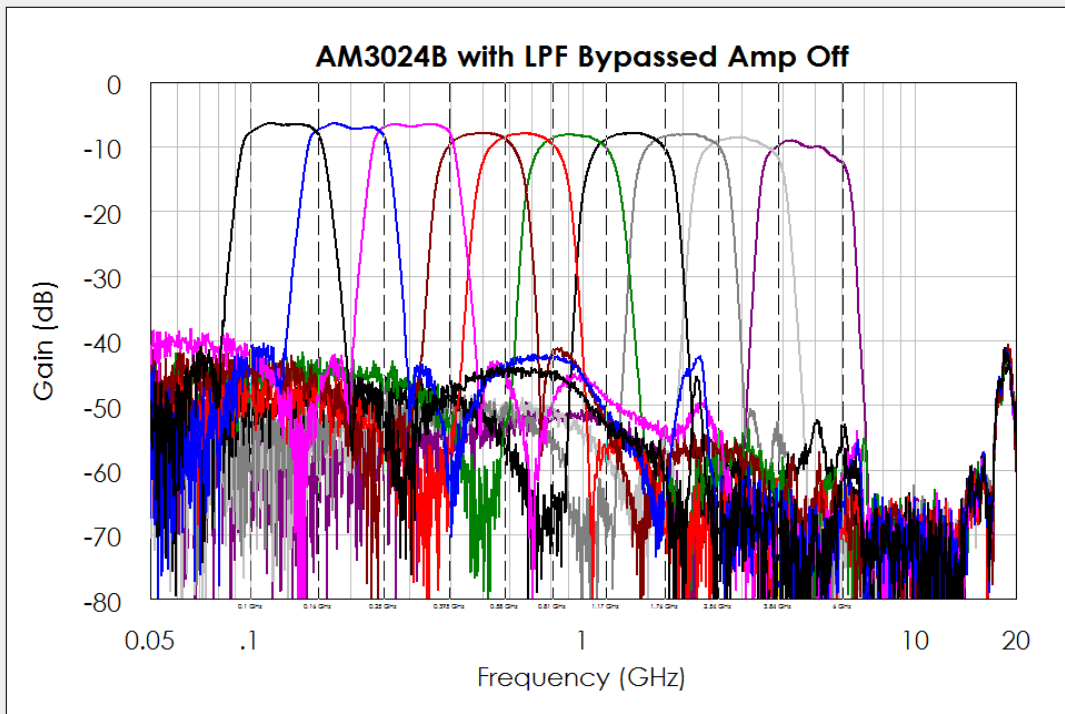
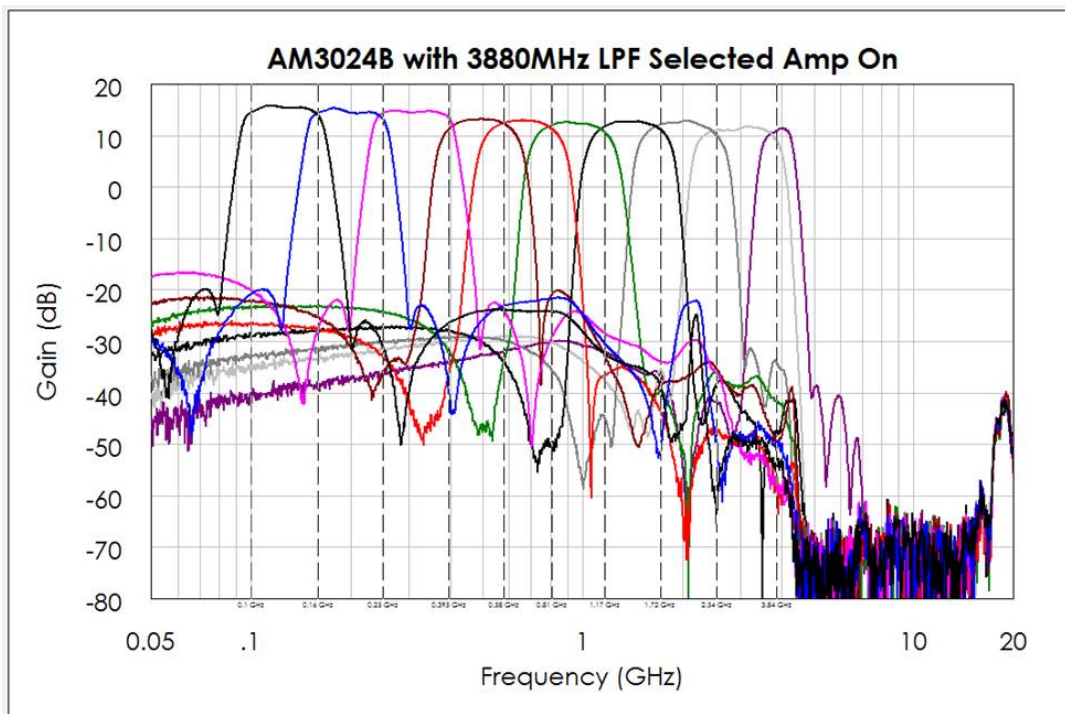
FUNCTIONAL DIAGRAM



TYPICAL PERFORMANCE



TYPICAL PERFORMANCE (CONTINUED)



SPECIFICATIONS

Specifications	Minimum	Typical	Maximum
Frequency Range	100 MHz		6000 MHz
RF In to RF Out, Amplifier Engaged:			
20.5 x 19.0 x 4.5mm		12 dB	
20.5 x 19.0 x 4.5mm		9 dB	
20.5 x 19.0 x 4.5mm		3 dB	
20.5 x 19.0 x 4.5mm		+12 dBm	
RF In to RF Out, Amplifier Bypassed:			
Gain		-10 dB	
Gain (band-edge)		-13 dB	
Noise Figure		10 dB	
Input IP3		+40 dBm	
Rejection		70 dB	
RF Input Level (Amplifier Engaged)			+13 dBm
RF Input Level (Amplifier Bypassed)			+20 dBm
Filter Bank Switching Speed			10 us
Control Logic Level Low	-0.1V		+0.4V
Control Logic Level High	+2.7V		+3.3V
Package Size		20.5 x 19.0 x 4.5mm	
DC Supply Voltage	+4.7V	+5.0 V	+5.2V
DC Supply Current		100 mA	
Power Consumption		0.50 W	
Operating Temperature	-40 C		+85 C
Storage Temperature	-50 C		+125 C

TYPICAL GAIN, NOISE FIGURE, IIP3 PERFORMANCE

Amplifier Engaged:

Frequency (GHz)	Gain (dB)	NF (dB)	IIP3 (dBm)
0.1	14.5	4.0	10.8
0.5	12.9	3.8	12.3
1.0	12.1	3.4	12.1
2.0	12.9	2.5	13.2
3.0	11.3	2.3	12.9
4.0	11.5	2.5	11.2
5.0	12.1	2.6	12.3
6.0	9.1	2.9	11.5

Amplifier Bypassed:

Frequency (GHz)	Gain (dB)	NF (dB)	IIP3 (dBm)
0.1	-7.9	7.9	40.6
0.5	-8.1	8.1	41.0
1.0	-8.8	8.8	40.5
2.0	-8.4	8.4	41.0
3.0	-10.2	10.2	41.0
4.0	-10.2	10.2	40.9
5.0	-10.2	10.2	40.8
6.0	-13.3	13.3	40.3

PIN DEFINITIONS

Pin	Name	Function
1	Band Sel 2#	Sub-Octave Filter Band Select 2#
2	Band Sel 3#	Sub-Octave Filter Band Select 3#
3	Band Sel 4#	Sub-Octave Filter Band Select 4#
4	LPF Sel 0	Low Pass Filter Select 0
5	LPF Sel 1	Low Pass Filter Select 1
6	LPF Sel 2	Low Pass Filter Select 2
7	Amp Sel	Amplifier Path Select. Add a 10K ohm resistor from this pin to ground.
8	Amp Sel#	Legacy Control Bit - Not connected in AM3024B
9	GND	Ground - Common
10	RF In	RF In - 100 MHz to 6 GHz - 50 ohms - AC coupled.
11	Vcc	+5.0V DC Power Input
12	Band Sel 0	Sub-Octave Filter Band Select 0
13	Band Sel 1	Sub-Octave Filter Band Select 1
14	Band Sel 0#	Sub-Octave Filter Band Select 0#
15	Band Sel 1#	Sub-Octave Filter Band Select 1#
16	RF Out	RF Out - 100 MHz to 6 GHz - 50 ohms - AC coupled.
17	GND	Ground - Common
18	Band Sel 2	Sub-Octave Filter Band Select 2
19	Band Sel 3	Sub-Octave Filter Band Select 3
20	Band Sel 4	Sub-Octave Filter Band Select 4

CONTROL TABLES

Filter Bands:

Band Select Control Line										Filter Band
1	0	1	0	0	1	0	1	0	1	100 – 160 MHz
1	0	0	1	0	1	0	1	0	1	160 – 250 MHz
0	1	1	0	0	1	0	1	0	1	250 – 400 MHz
0	1	0	1	0	1	0	1	1	0	390 – 620 MHz
0	1	0	1	1	0	1	0	1	0	540 – 850 MHz
0	1	0	1	1	0	1	0	0	1	770 – 1210 MHz
0	1	0	1	0	1	1	0	0	1	1130 – 1760 MHz
0	1	0	1	1	0	0	1	1	0	1680 – 2580 MHz
0	1	0	1	1	0	0	1	0	1	2500 – 3880 MHz
0	1	0	1	0	1	1	0	1	0	3800 – 6000 MHz

Note: Filter Band control table is not the same as AM3024/ AM3024A.

Lowpass Filter Path Select:

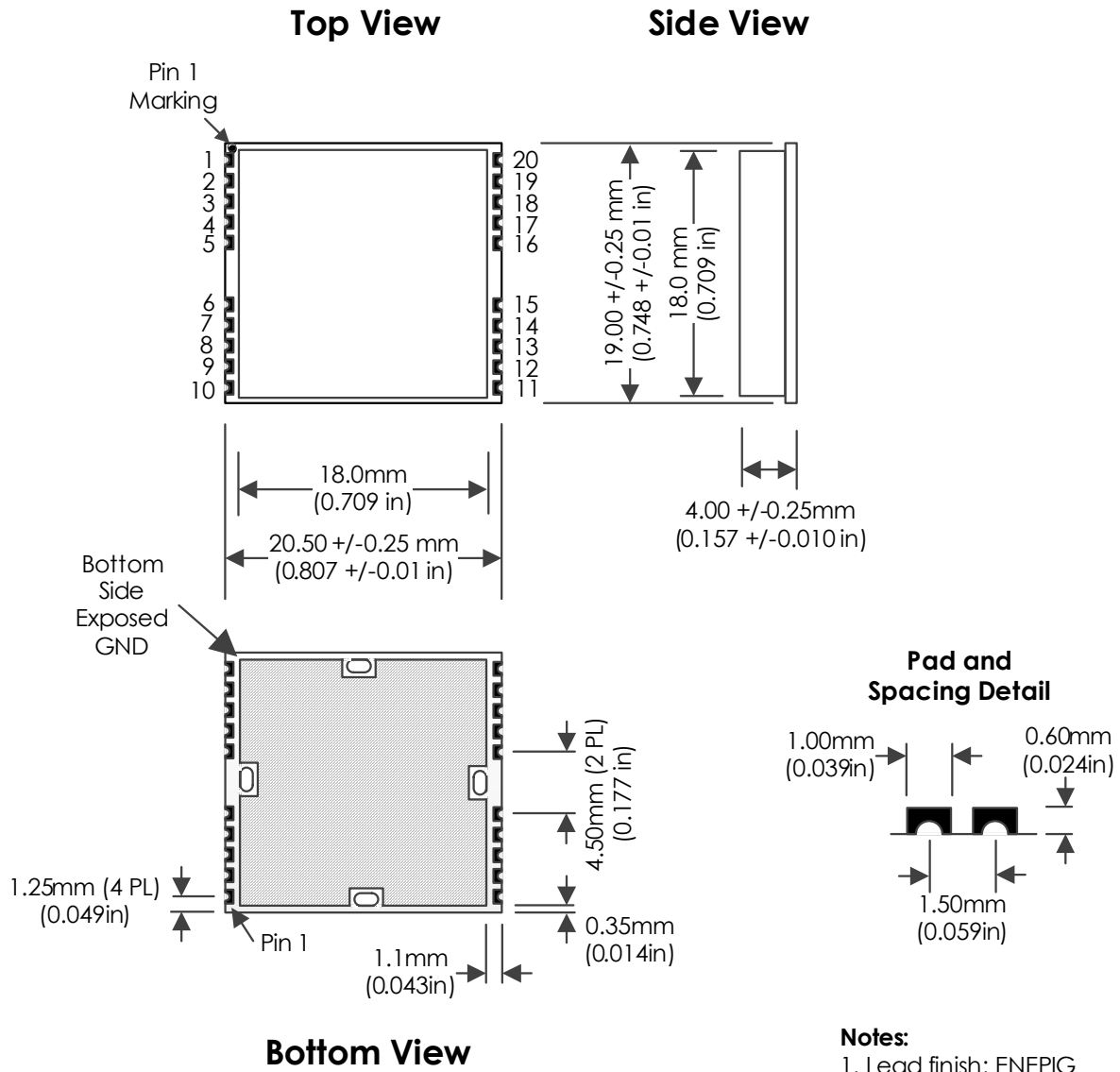
Control Line			Lowpass Filter Path
LPF Sel 0	LPF Sel 1	LPF Sel 1	
1	0	0	2580 MHz
0	1	0	Bypassed
0	0	1	3880 MHz

Amplifier Path:

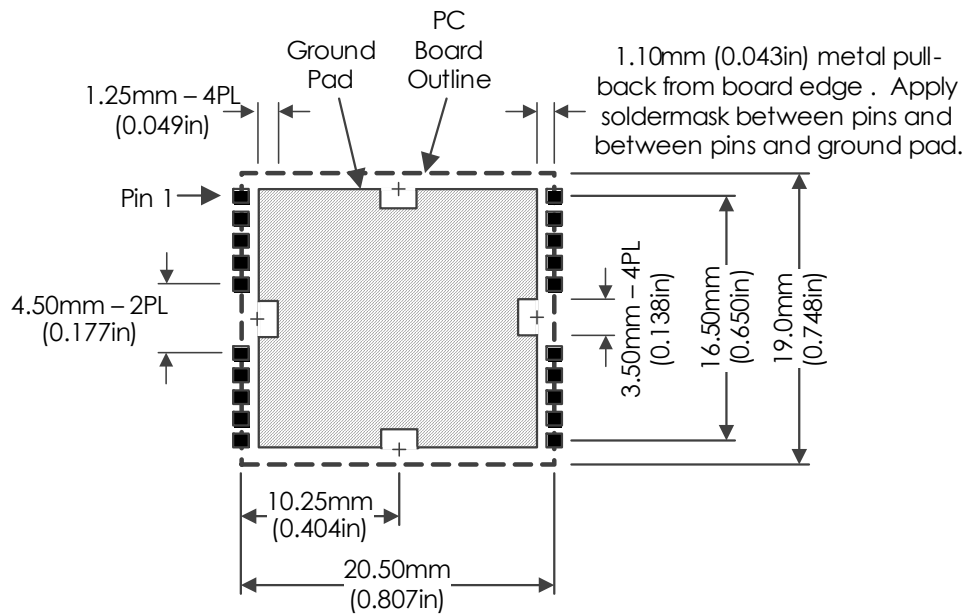
Control Line		Amplifier
Amp Sel	Amp Sel#	
1	X	Enabled
0	X	Bypassed

Note: Amp Sel# is unnecessary in the AM3024B. It is a legacy control bit that was required for AM3024 and AM3024A.

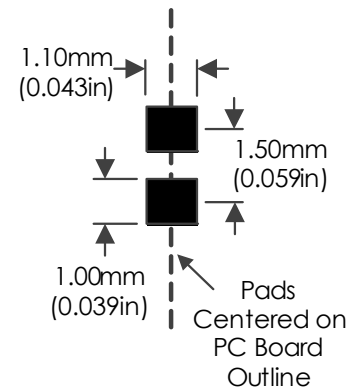
PACKAGE DETAILS



RECOMMENDED PC BOARD FOOTPRINT – TOP VIEW



Pad and Spacing Detail



Notes:

1. The ground pad should be connected to a plane that provides a DC and RF electrical ground for the system as well as a heat dissipation path for thermal management.

RECOMMENDED ASSEMBLY PROCEDURE

It is recommended to attach the bottom side ground pad to the printed circuit board using a highly conductive silver epoxy and then hand solder the 20 pins along the part's perimeter to their intended printed circuit board pads using lead-free solder.

The recommended silver epoxy is MG Chemicals part 8331S and the recommended assembly thickness is 3 to 5 mils.

If the part is attached, both the ground pad and perimeter pins, to the circuit board using a typical lead-free solder reflow process reaching temperatures of 260C, the excessive temperature can cause internal parts to the filter bank to reflow and possibly cause damage to the part. If a solder reflow process must be used, it is recommended to use a lower temperature leaded solder profile, typically 225C maximum.



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