

AM1168 – Amplifier

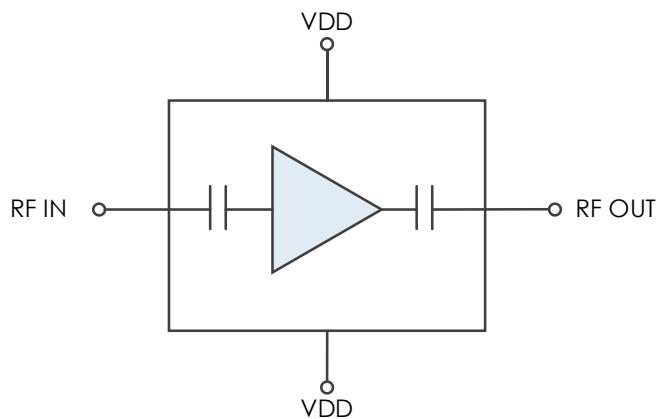
15 to 35 GHz Driver Amplifier

AM1168 is a wideband, cascadable amplifier servicing the 15 to 35 GHz frequency range. The device exhibits 18 dB of gain with high OIP3 and P1dB. The combination of high linearity, output power, and gain makes the AM1168 an ideal choice for high dynamic range Ka Band applications. Packaged in a 4mm QFN with internal 50Ω matching, the AM1168 is a small form-factor solution that can enable low SWaP solutions.

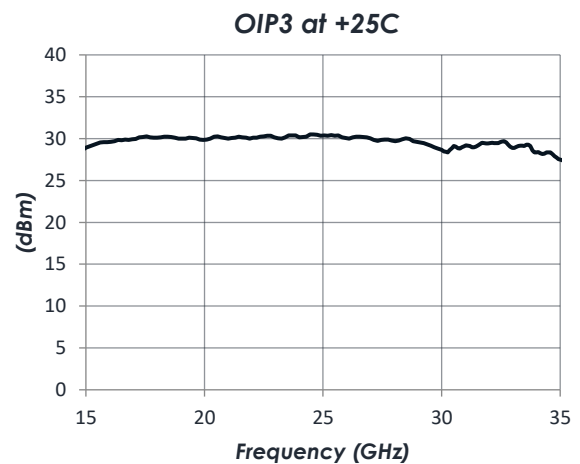
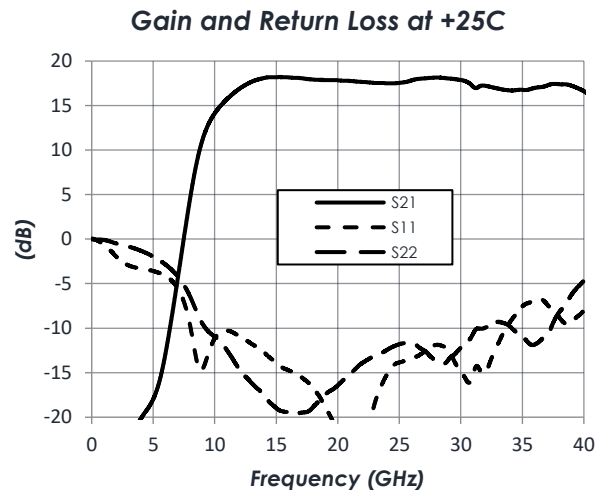
FEATURES

- 18 dB Gain
- +20 dBm P1dB
- +30 dBm OIP3
- 3.2 dB Noise Figure
- +21.5 dBm Psat
- +3.3V / +5.0V Operation
- 114 mA / 208 mA Current
- 4mm QFN
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



CONTENTS

FEATURES 1

FUNCTIONAL DIAGRAM 1

CHARACTERISTIC PERFORMANCE 1

REVISION HISTORY..... 2

PIN LAYOUT AND DEFINITIONS 3

SPECIFICATIONS..... 4

TYPICAL PERFORMANCE 6

TYPICAL APPLICATION..... 8

EVALUATION PC BOARD..... 9

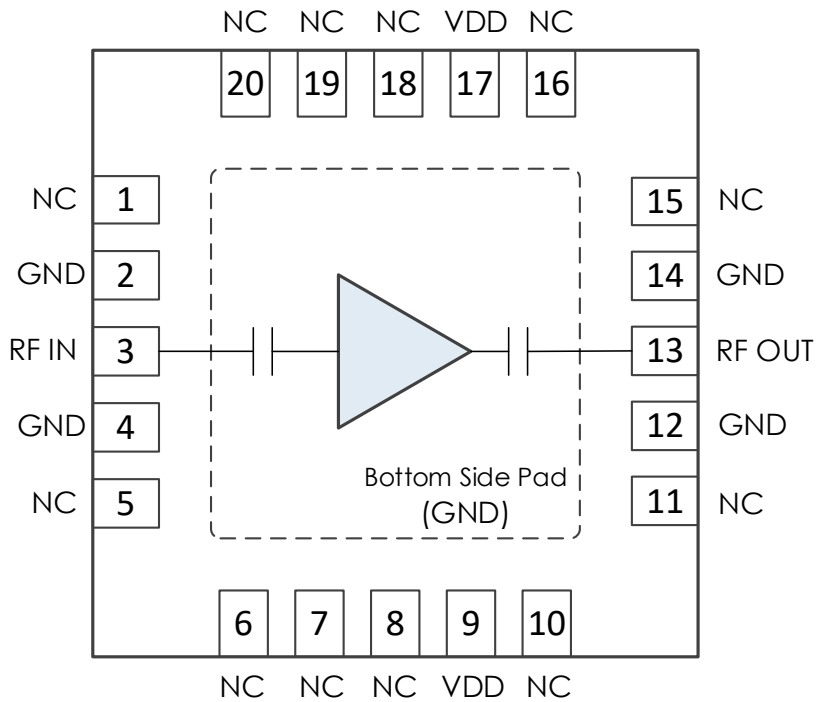
RELATED PARTS 9

COMPONENT COMPLIANCE INFORMATION 10

REVISION HISTORY

Date	Revision	Notes
October 28, 2024	1	Initial Release

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	NC	No Connect
2	GND	Ground - Common
3	RF IN	RF Input - 50 Ohms - AC Coupled
4	GND	Ground - Common
5-8	NC	No Connect
9	VDD	DC Power Input
10-11	NC	No Connect
12	GND	Ground - Common
13	RF OUT	RF Output - 50 Ohms - AC Coupled
14	GND	Ground - Common
15-16	NC	No Connect
17	VDD	DC Power Input
18-20	NC	No Connect

***Note:** NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+6 V
RF Input Power		20 dBm
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	+3.3 V	+5.0 V	
Operating Case Temperature	-40 C		+85 C

Thermal information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	60 C/W
Nominal Junction Temperature at +85C ambient	148 C
Channel Temperature to Maintain 1 Million Hour MTTF	175 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+3.3 V	+5.0 V	
DC Supply Current	VDD = +5.0 V		208 mA	
	VDD = +3.3V		114 mA	
Power Dissipated	VDD = +5.0 V		1.04 W	
	VDD = +3.3V		376 mW	

RF Performance

(T = 25 °C unless otherwise specified)

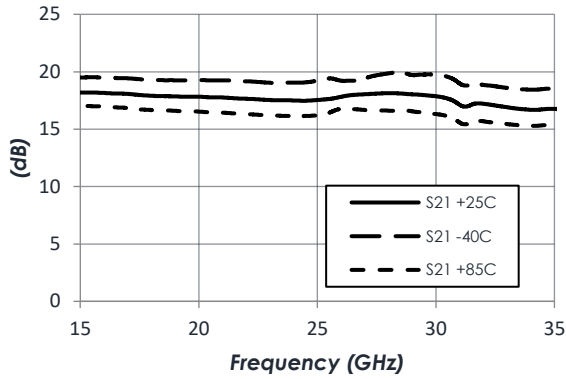
Param	Testing Conditions	Min	Typical	Max
Frequency Range		15 GHz		35 GHz
Insertion Loss	f = 15 GHz		18 dB	
	f = 25 GHz		17.5 dB	
	f = 35 GHz		17 dB	
Return Loss	f = 15 GHz		-14 dB	
	f = 25 GHz		-12 dB	
	f = 35 GHz		-8 dB	
Output IP3	f = 25 GHz		30 dBm	
Output P1dB	f = 25 GHz		19.5 dBm	
Noise Figure	f = 25 GHz		3.2 dB	

Note: IP3 measured with -15dBm input power tones at 10MHz spacing.

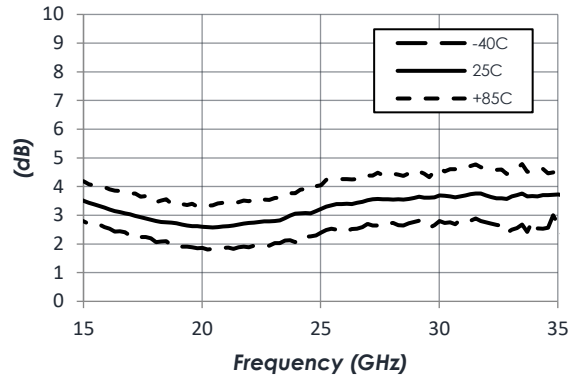
TYPICAL PERFORMANCE

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

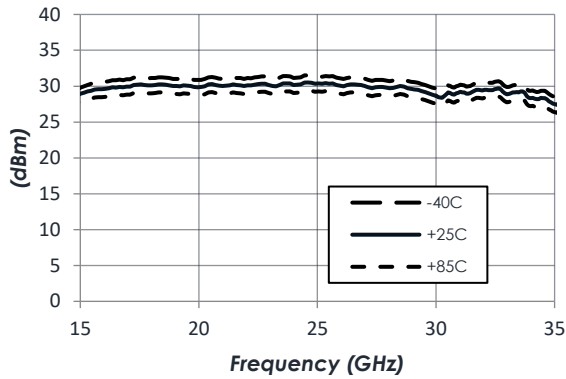
Gain vs Temperature



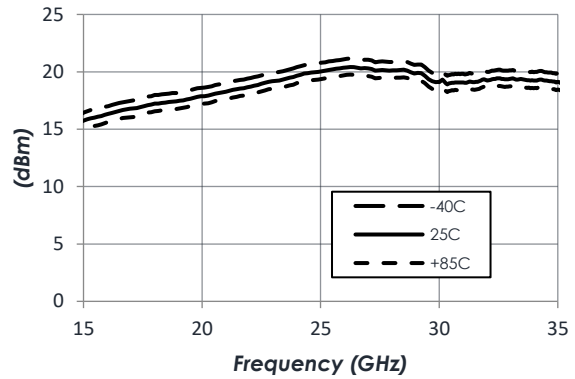
Noise Figure vs Temperature



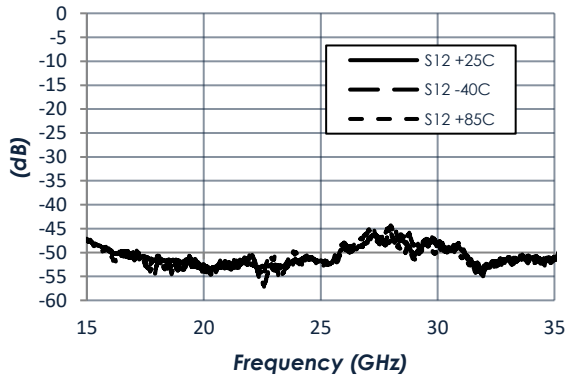
Output IP3 vs Temperature



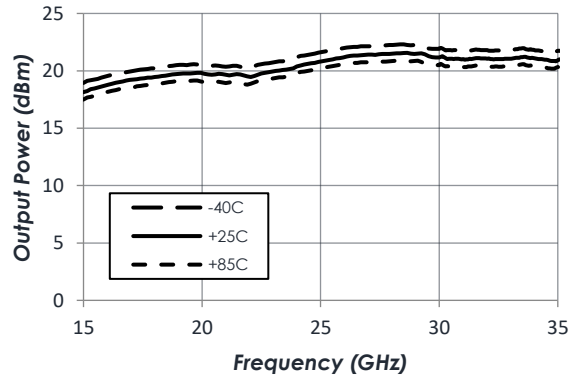
P1dB vs Temperature



Reverse Isolation vs Temperature



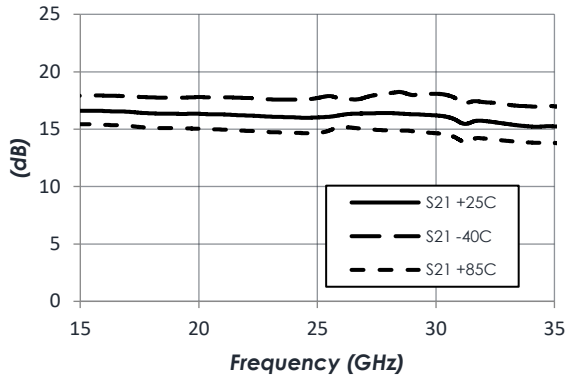
P_Sat vs Temperature



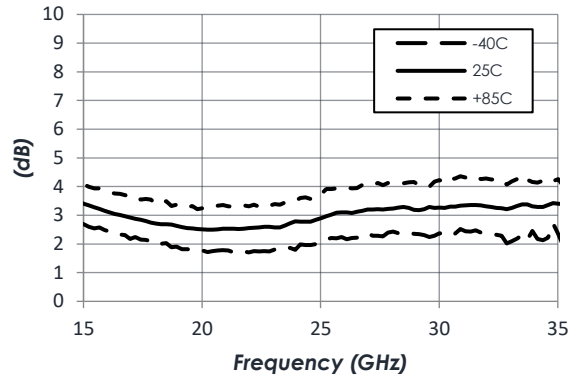
TYPICAL PERFORMANCE (cont.)

(VDD = +3.3V, T = 25 °C unless otherwise specified)

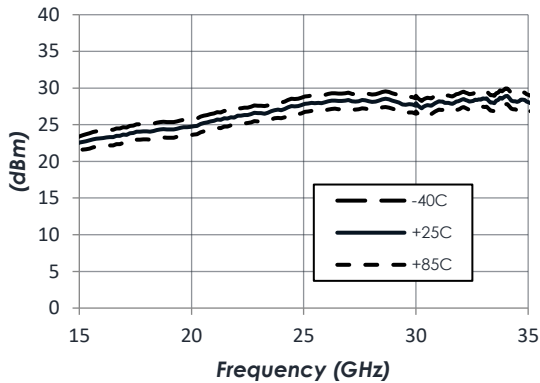
Gain vs Temperature



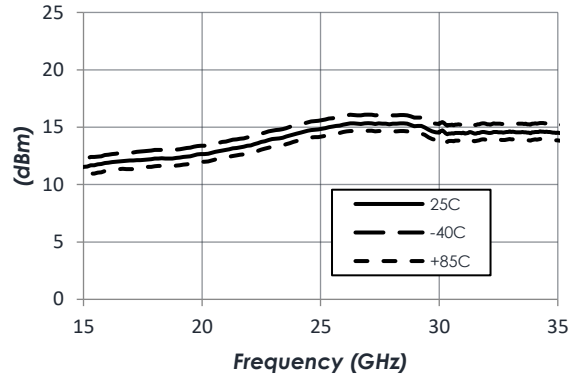
Noise Figure vs Temperature



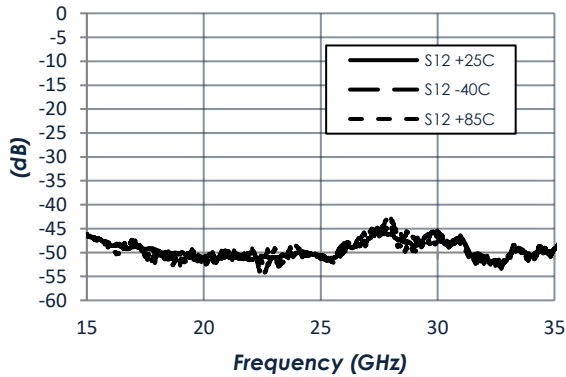
Output IP3 vs Temperature



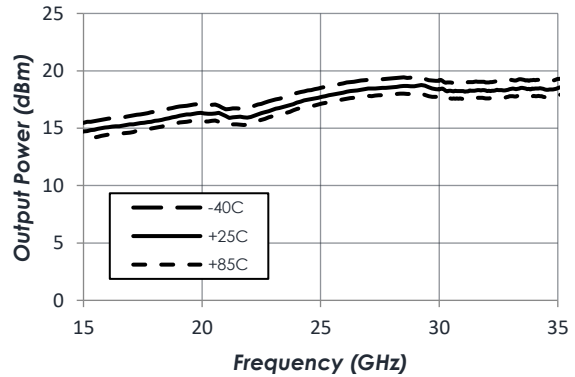
P1dB vs Temperature



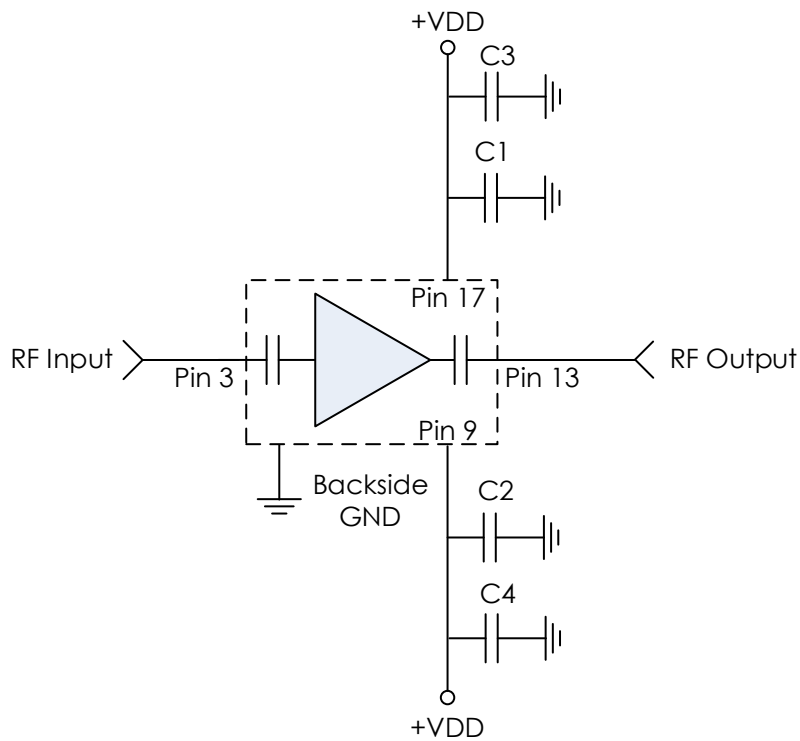
Reverse Isolation vs Temperature



P_Sat vs Temperature



TYPICAL APPLICATION



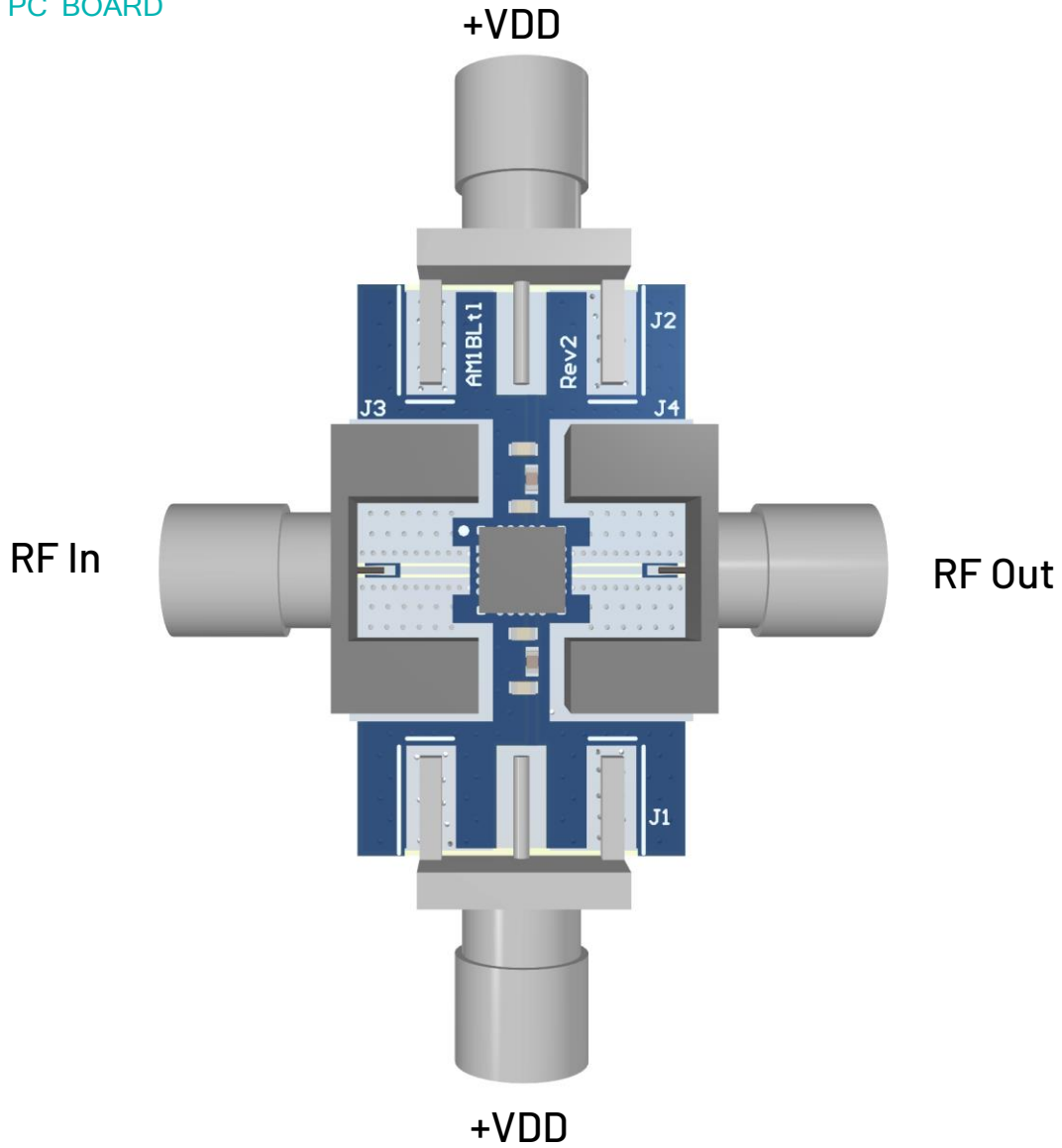
RECOMMENDED COMPONENT LIST (OR EQUIVALENT)

Part	Value	Part Number	Manufacturer
C1, C2	100 pF	GRM1555C1H101GA01D	Murata
C3, C4	0.1 μF	GRM155R71H104KE14D	Murata

Note:

1. AM1168 is AC coupled. No external DC blocking capacitors are required.

EVALUATION PC BOARD



RELATED PARTS

Part Number		Description
AM1144	17 GHz to 40 GHz	Driver Amplifier
AM1162-D	24 GHz to 40 GHz	Low Noise Amplifier
AM1172-D	18 GHz to 50 GHz	Driver Amplifier

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)
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)

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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