AM1063-1 – Amplifier

DC to 10 GHz Gain Block



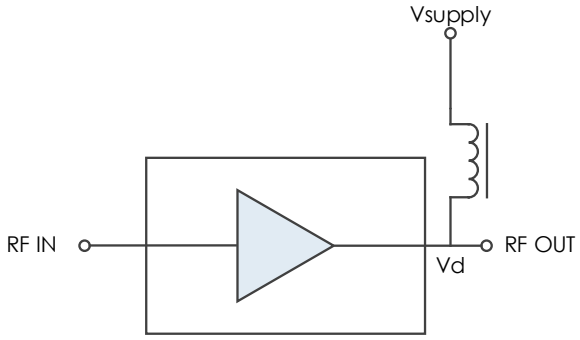


The AM1063-1 is a high dynamic range DC-coupled amplifier covering up to 10 GHz. The device exhibits a moderate positive gain-slope, providing frequency equalization useful in many broadband applications. With internal 50Ω matching and packaged in a 3mm QFN or a shielded module, the AM1063-1 represents a compact total PCB footprint.

FEATURES

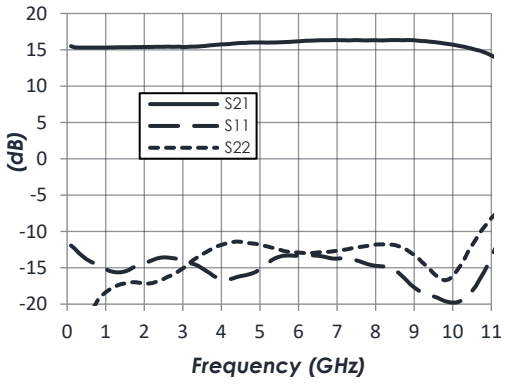
- 15 dB Gain
- 2.5 dB Noise Figure
- +30 dBm OIP3
- +18 dBm P1dB
- +3.3V or +5.0V Operation
- 3mm QFN
- -40C to +85C Operation

FUNCTIONAL DIAGRAM

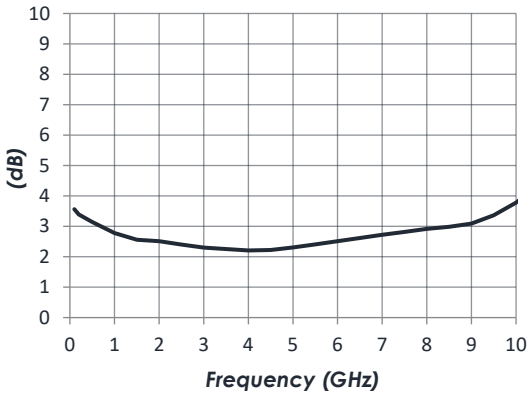


CHARACTERISTIC PERFORMANCE

Gain and Return Loss at +25C



Noise Figure at +25C



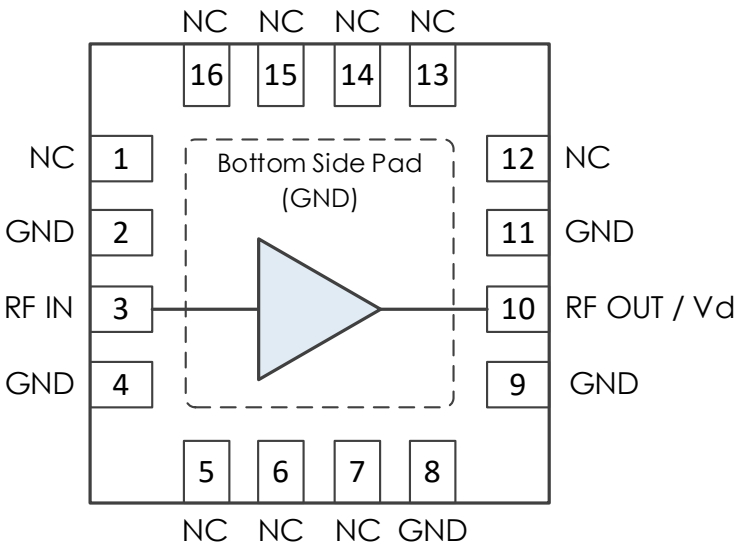
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REVISION HISTORY

Date	Revision	Notes
December 12, 2018	9	Input Power Spec Updated.
March 28, 2019	10	Updated to new datasheet format. More comprehensive part data included.
May 1, 2019	11	AM1063-1 and AM1063-2 Datasheets Split.
June 6, 2019	11A	Component Compliance Information Updated.
July 11, 2019	12	Part Ordering Information Added. New RF Shielded Module Available.
November 26, 2019	12A	Updated Description to include shielded module packaging.
November 11, 2020	13	Package and module information moved to main product page.
November 7, 2024	14	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	NC	Not Connected *
2	GND	Ground – Common
3	RF IN	RF Input – 50 ohms – DC Coupled, External DC Block Required
4	GND	Ground – Common
5-7	NC	Not Connected *
8,9	GND	Ground – Common
10	RF OUT/Vd	RF Output and DC Power Input – 50 Ohms – DC Coupled, External DC Block Required
11	GND	Ground – Common
12-16	NC	Not Connected *
Bottom Pad	GND	Ground – Common

* NC pins may be grounded or left open.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Voltage	-0.3 V	+8.0 V
RF Input Power		+20 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. 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
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.

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+2.7 V		+5.2 V
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

Thermal Information

	Thermal Resistance (°C / W)
Junction to Case Thermal Resistance (θ_{JC})	88

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Device Voltage (Vd)		+3.0 V	+4.7 V	+5.0 V
DC Supply Current	Vd = 4.7 V		74 mA	
	Vd = 3.1 V		37 mA	
Power Dissipated	Vd = 4.7 V		0.35 W	
	Vd = 3.1 V		0.11 W	

RF Performance

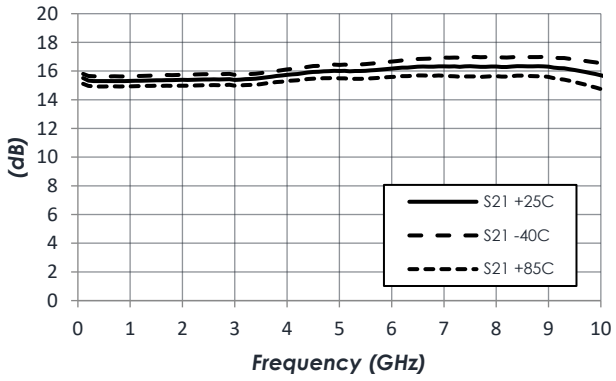
(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		DC		10 GHz
Gain	Vd = 4.7 V		15.0 dB	
Return Loss	Vd = 4.7 V		14 dB	
Output IP3			+30 dBm	
Output P1dB			+18 dBm	
Noise Figure			2.5 dB	

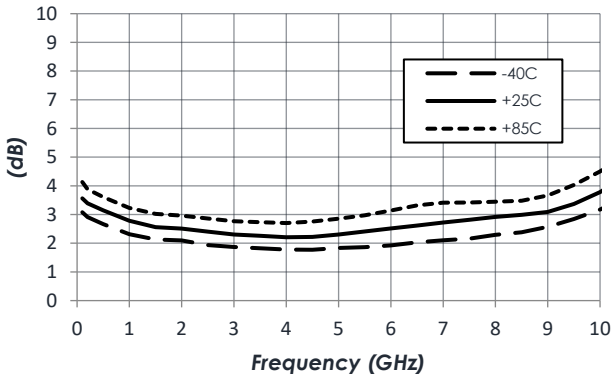
TYPICAL PERFORMANCE

(Vd = +4.7 V, Id = 74 mA)

Gain vs Temperature

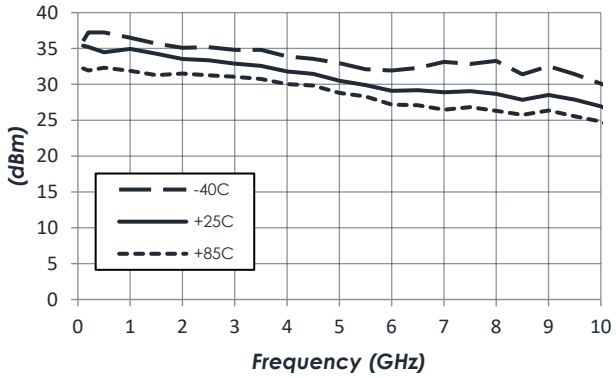


Noise Figure vs Temperature

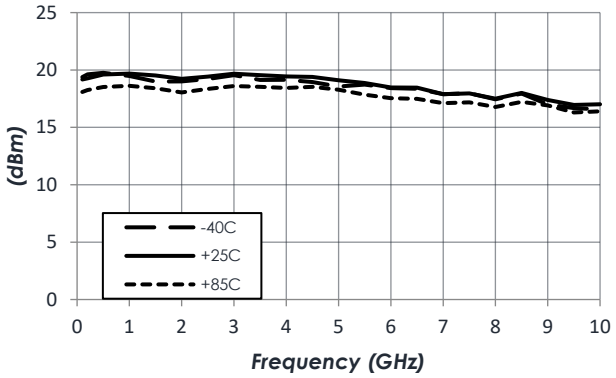


S

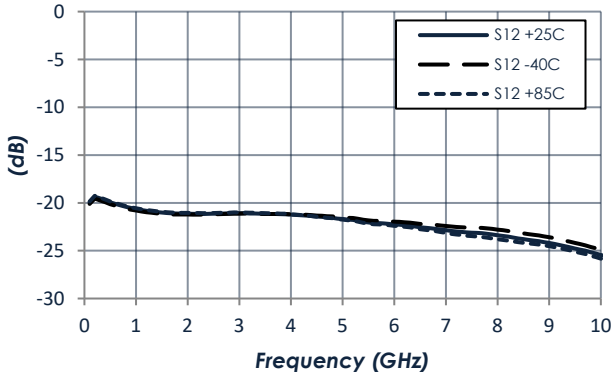
Output IP3 vs Temperature



P1dB vs Temperature



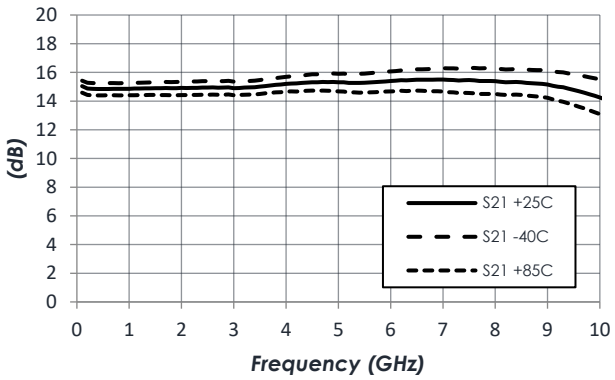
Reverse Isolation vs Temperature



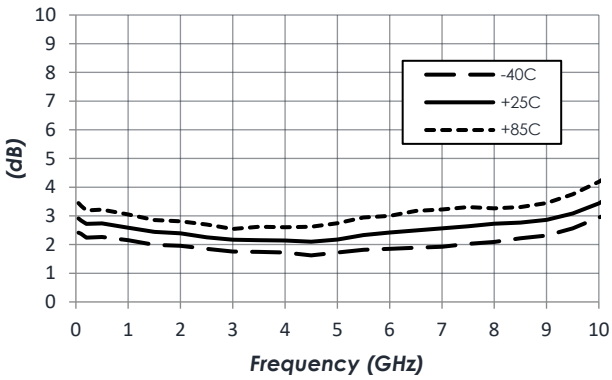
TYPICAL PERFORMANCE (CONTINUED)

(Vd = +3.1 V, Id = 37 mA)

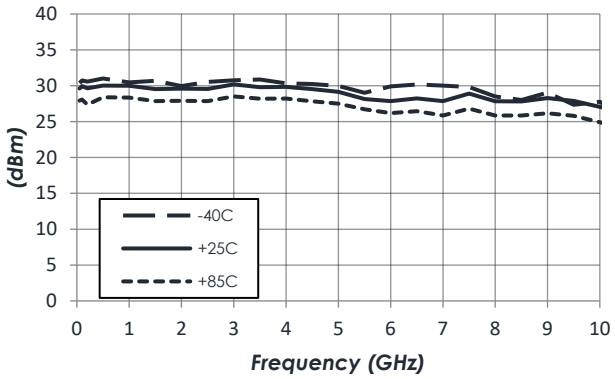
Gain vs Temperature



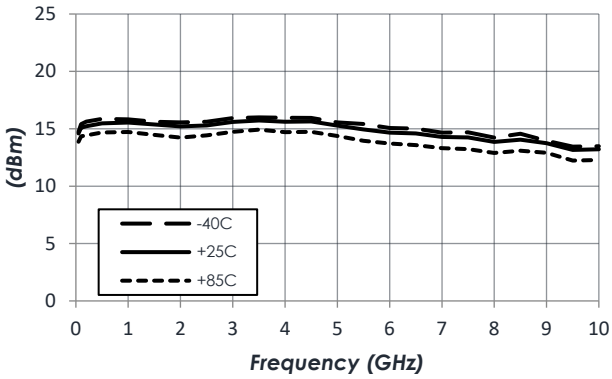
Noise Figure vs Temperature



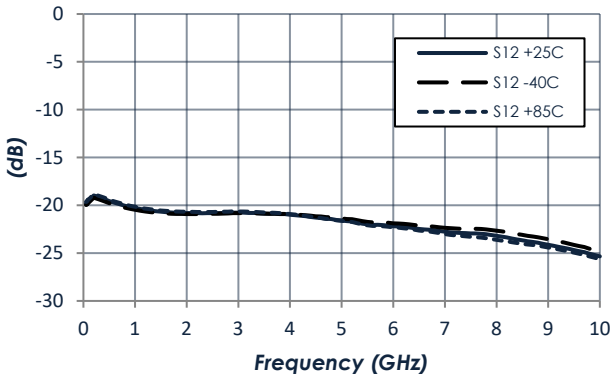
Output IP3 vs Temperature



P1dB vs Temperature



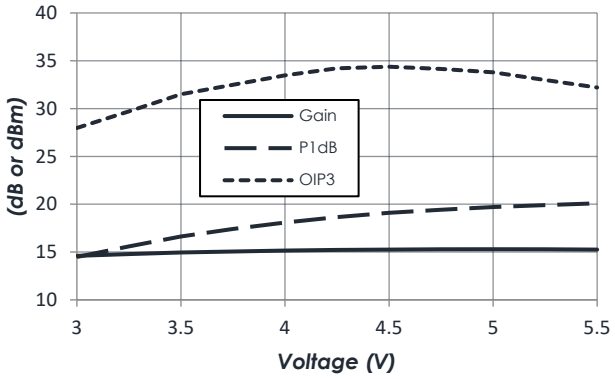
Reverse Isolation vs Temperature



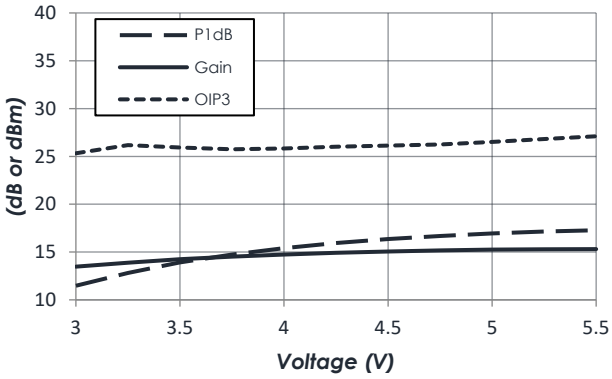
TYPICAL PERFORMANCE (CONTINUED)

(T = 25°C Unless Otherwise Specified)

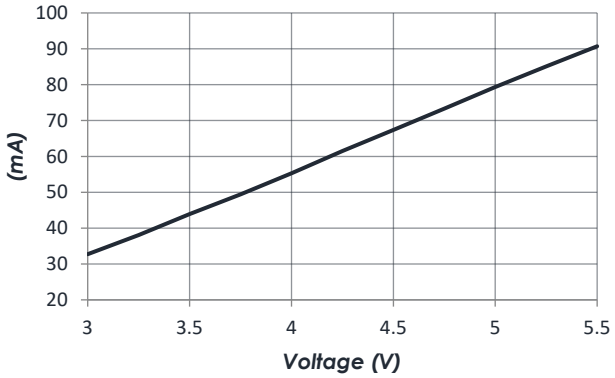
Gain, P1dB, and OIP3 vs Vd @ 1GHz



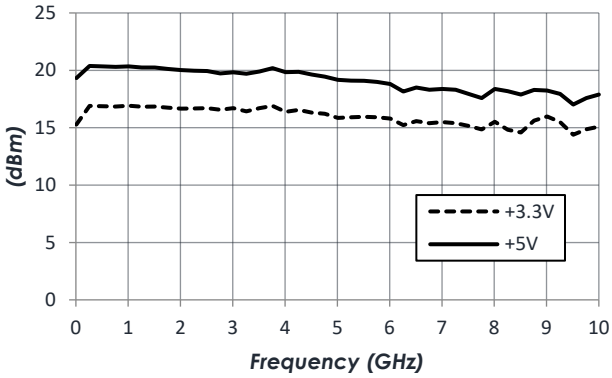
Gain, P1dB, and OIP3 vs Vd @ 10 GHz



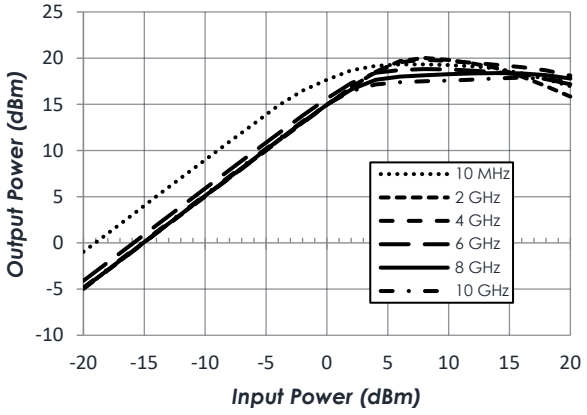
Id vs Vd



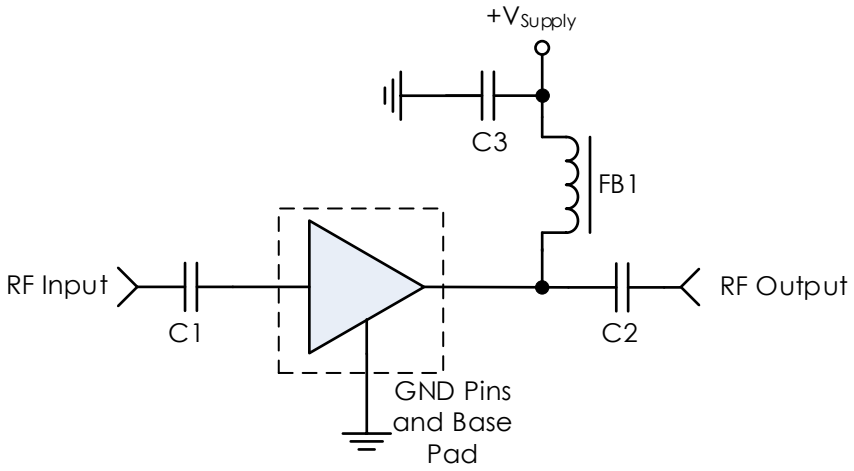
Power Saturation vs. VDD



Pin vs. Pout , VDD = +5V



TYPICAL APPLICATION



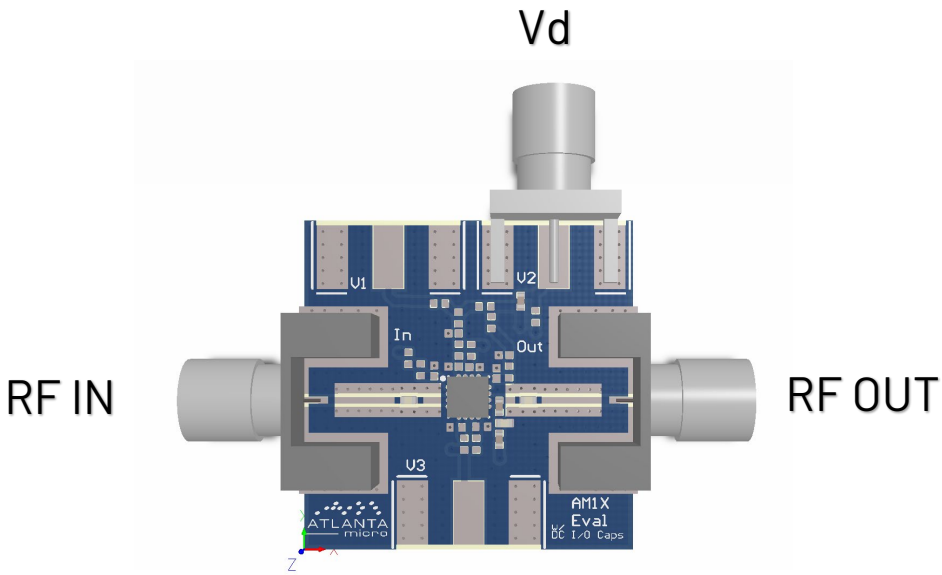
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1, C2	0.1 µF	0402BB104KW160	Passives Plus
C3	0.1 µF	GRM155R71C104KA88	Murata
FB1	-	MMz1005A222E	TDK

Notes:

1. NC pins may be grounded or left open.
2. DC blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.

EVALUATION PC BOARD



PART ORDERING DETAILS

Part Number	Description
AM1063-1	3mm 16 Lead QFN
AM1063-2	1.3mm x 2mm 6 Lead DFN (separate datasheet)
AM1063-1 Eval	AM1063-1 Evaluation Board
AM1063-2 Eval	AM1063-2 Evaluation Board
AM1063-M	AM1063-1 in 0.95" x 1.13" x 0.6" RF-Shielded Module with Integrated Bias Tee and Field Replaceable SMA Connectors

RELATED PARTS

Part Number		Description
AM1063-2	DC to 10 GHz	Miniature Gain Block
AM1016B	20 MHz to 6 GHz	+3.3V Gain Block
AM1018C	20 MHz to 6 GHz	+5.0V Gain Block
AM1025B	20 MHz to 3 GHz	+8.0V Gain Block (High P1dB)
AM1031C	20 MHz to 8 GHz	+3.3V Gain Block
AM1064-1	DC to 8 GHz	Gain Block
AM1064-2	DC to 8 GHz	Miniature Gain Block
AM1065	DC to 8 GHz	Bypassable Gain Block
AM1073	DC to 8 GHz	Bidirectional / Bypassable Gain Block

COMPONENT COMPLIANCE INFORMATION

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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-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)

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