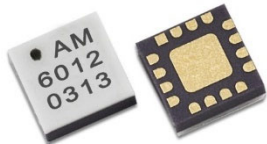


AM6012 – Switch

DC to 18 GHz SPDT

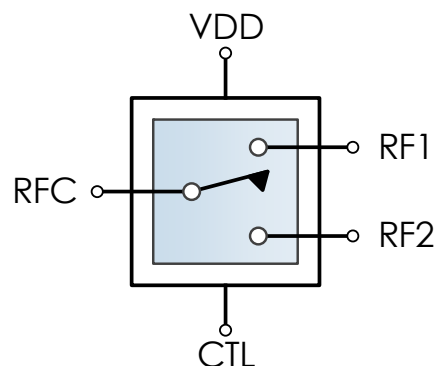


AM6012 is a Single-Pole Double-Throw (SPDT) switch covering the DC to 18 GHz frequency range. The positive control device exhibits low insertion loss, flat frequency response and high isolation over the operating temperature range of -40C to +85C.

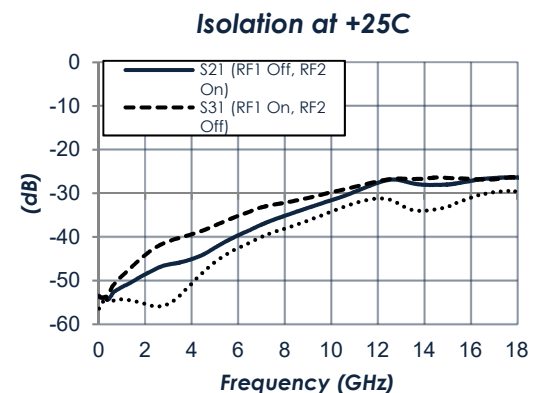
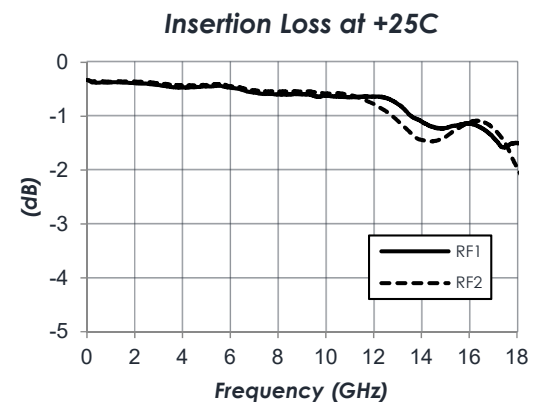
FEATURES

- 1.0 dB Insertion Loss
- +45 dBm Input IP3
- +3.3V to +5V Supply
- +3.3V to +5V Control
- >25 dB Isolation
- 3mm QFN
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE





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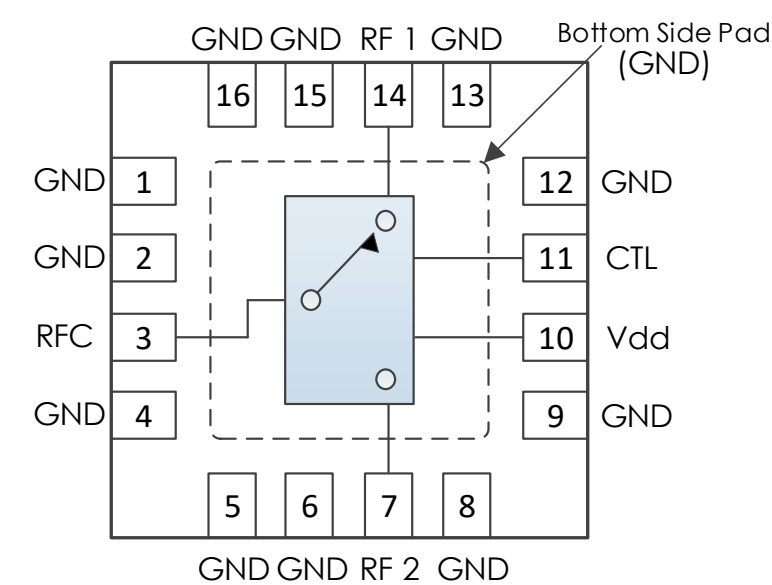
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REVISION HISTORY

Date	Revision	Notes
September 10, 2018	1	Initial Release
July 29, 2024	2	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1, 2	GND	Ground - Common
3	RFC	RFC Input - 50 ohms - DC Coupled. External DC blocking capacitor required*
4-6	GND	Ground - Common
7	RF2	RF2 Output - 50 ohms - DC Coupled. External DC blocking capacitor required*
8,9	GND	Ground - Common
10	VDD	DC Power Input
11	CTL	Switch Control
12, 13	GND	Ground - Common
14	RF1	RF1 Output - 50 ohms - DC Coupled. External DC blocking capacitor required*
15, 16	GND	Ground - Common
Case GND	GND	Ground - Common

* DC blocking capacitors not required if in series with other Mercury parts of the same reference voltage.

SPECIFICATIONS

Absolute Maximum Ratings

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

Recommended Operating Conditions

	Minimum	Typical	Maximum
Supply Voltage	+2.25 V	+5.0 V	
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 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.

Handling Information

	Minimum	Maximum
Storage Temperature Range (Recommended)	-50 C	+125 C
Moisture Sensitivity Level	MSL 1	



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		+2.5 V	+5.0 V	
DC Supply Current	VDD = +3.3 V		<1 mA	
	VDD = +5.0 V		1 mA	
Power Dissipated	VDD = +3.3 V	0.29 W	< 3.3 mW	
	VDD = +5.0 V		5.0 mW	
Logic Level Low		0.0 V		+0.5 V
Logic Level High		+2.0 V		+ VDD

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		DC		18 GHz
Insertion Loss	f = 10 MHz		0.3 dB	
	f = 9 GHz		0.6 dB	
	f = 18 GHz		1.5 dB	
Return Loss	f = 10 MHz		28.5 dB	
	f = 9 GHz		31.5 dB	
	f = 18 GHz		9.3 dB	
Input IP3	VDD = +5.0 V		+45 dBm	

Timing Characteristics

Switching Time	Minimum	Typical	Maximum
Switching Speed (Path Enabled → Disabled)		650 ns	
Switching Speed (Path Disabled → Enabled)		700 ns	

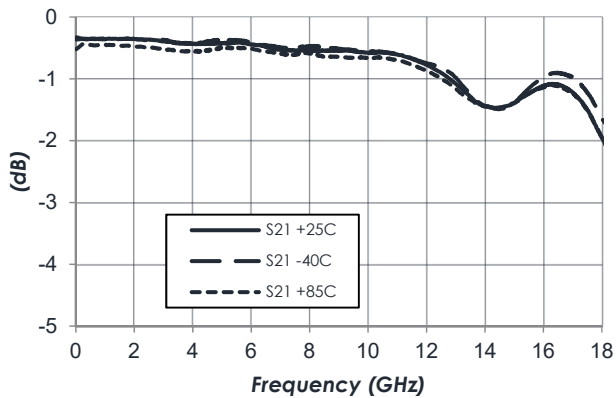
State Table

CTL	Amplifier
Low	RFC to RF1
High	RFC to RF2

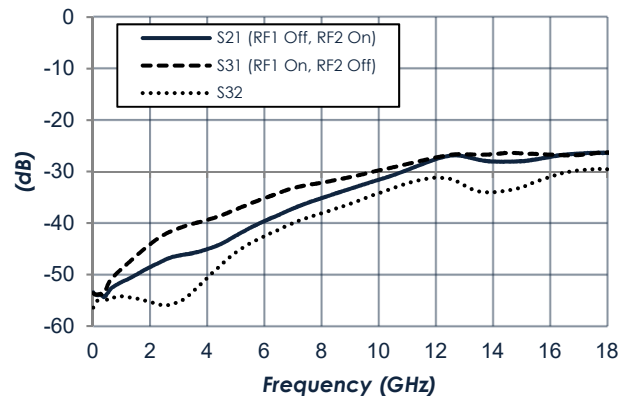
TYPICAL PERFORMANCE

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

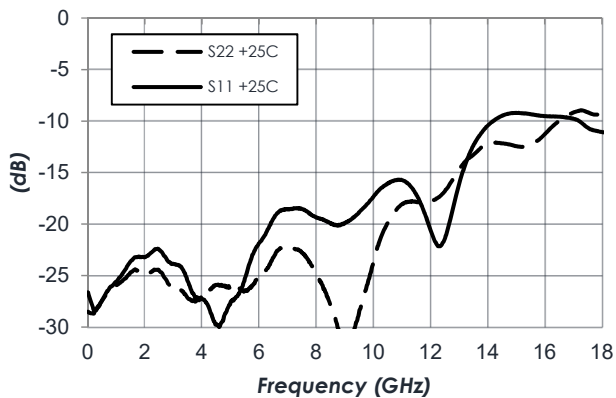
Insertion Loss vs Temperature



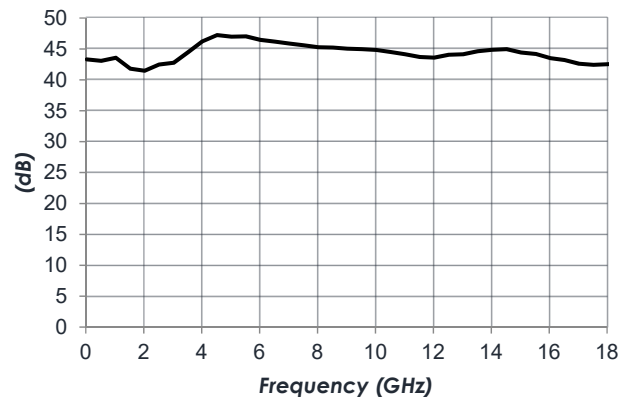
Isolation at +25C



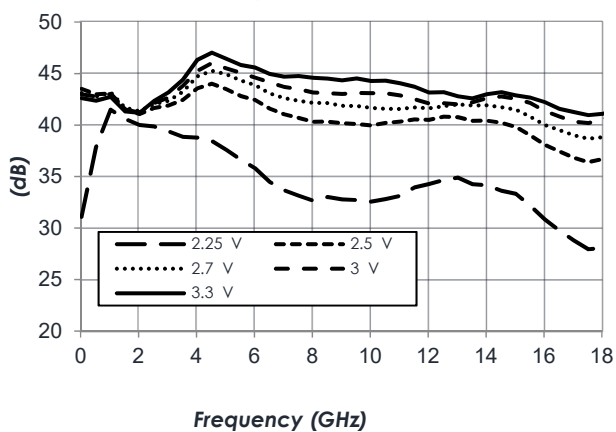
Return Loss at +25C



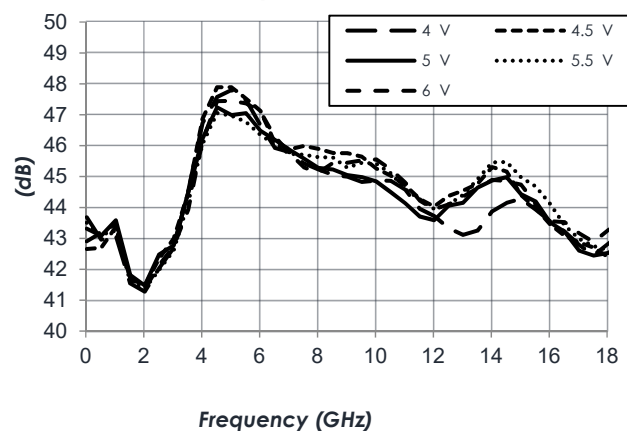
Input IP3 at +25C



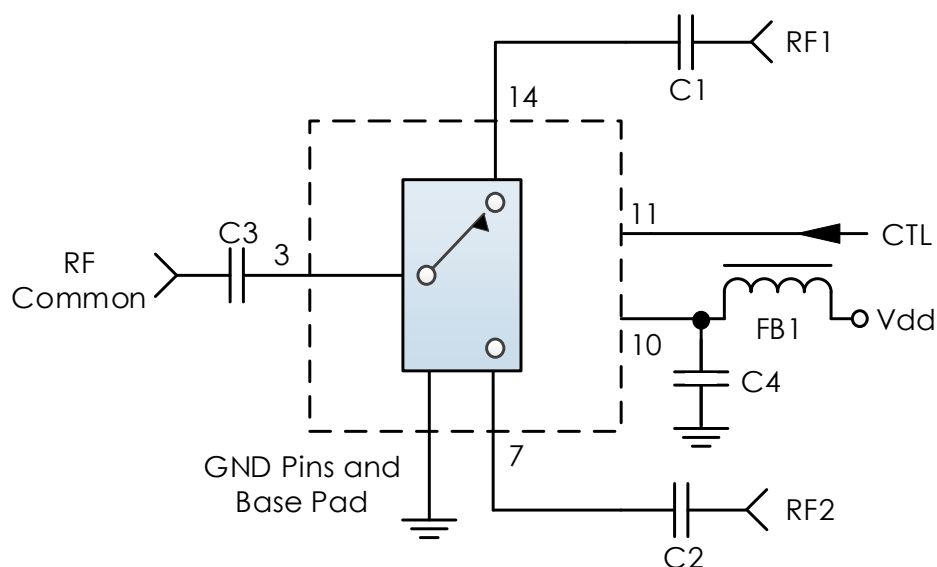
Input IP3 at +25 C



Input IP3 at +25 C



TYPICAL APPLICATION



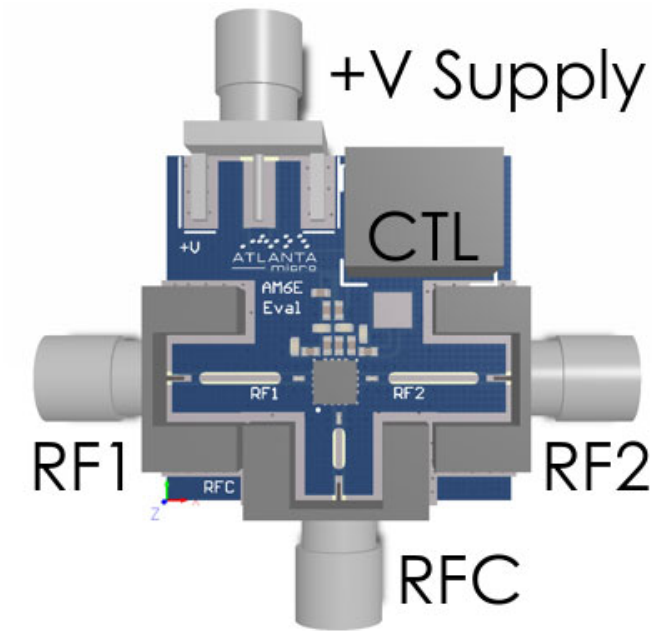
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C1 - C3	0.1 μ F	0402BB104KW160	Passives Plus
C4	0.1 μ F	C1005X7R1H104K050BB	TDK
FB1	-	MMZ1005A222E	TDK

Notes:

- RF blocking capacitors should be high performance, low-loss, broadband capacitors for optimum performance.
- RC filtering on the control line is recommended to prevent digital noise from coupling to the RF path.
 - Select control line RC filter values based on desired logic source decoupling and switching speed.

EVALUATION PC BOARD



RELATED PARTS

Part Number			Description
AM6002A	DC to 14 GHz	SPDT	
AM6011	DC to 10 GHz	SP8T, Reflective	
AM6015	DC to 18 GHz	SP6T	

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.



Corporate Headquarters

50 Minuteman Road
Andover, MA 01810 USA
+1 978.967.1401 tel
+1 866.627.6951 tel
+1 978.256.3599 fax

International Headquarters

Mercury International

Avenue Eugène-Lance, 38
PO Box 584
CH-1212 Grand-Lancy 1
Geneva, Switzerland
+41 22 884 5100 tel

Learn more

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For pricing details, contact: MMICsales@mrcy.com
For technical details, contact: MMICsupport@mrcy.com



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