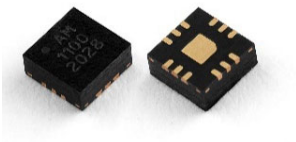
AM6016 – Switch, Reflective

DC to 28 GHz SPDT

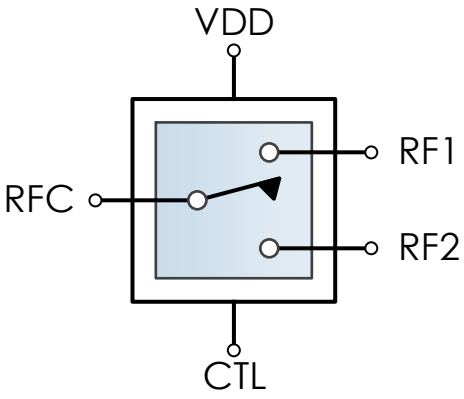


AM6016 is a Single-Pole Six-Throw (SPDT) switch covering the DC to 28 GHz frequency range. The positive control device provides exhibits low insertion loss and a flat frequency response over the operating temperature range of -40C to +85C.

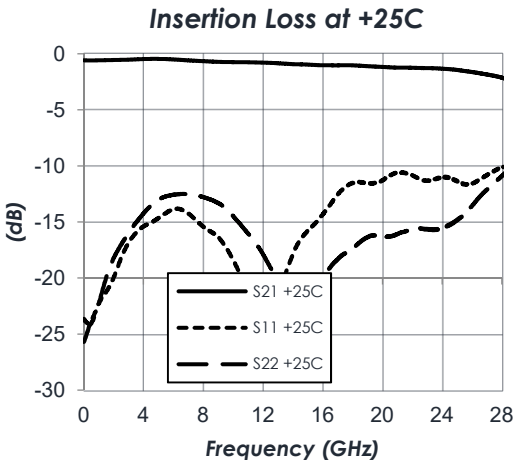
FEATURES

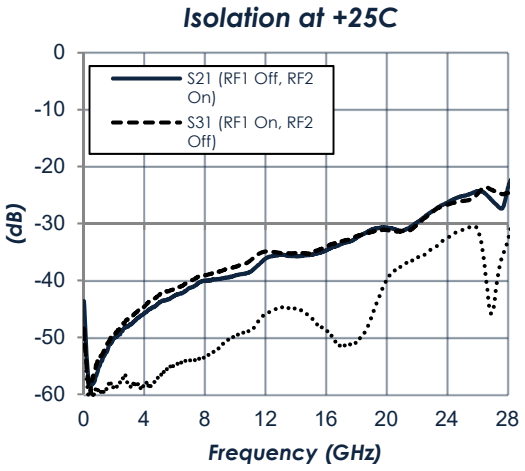
- 1 dB Insertion Loss
- +40 dBm Input IP3
- +3.3V to +5V Supply
- +3.3V to +5V Control
- 20dB Isolation
- 3mm QFN Package
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE



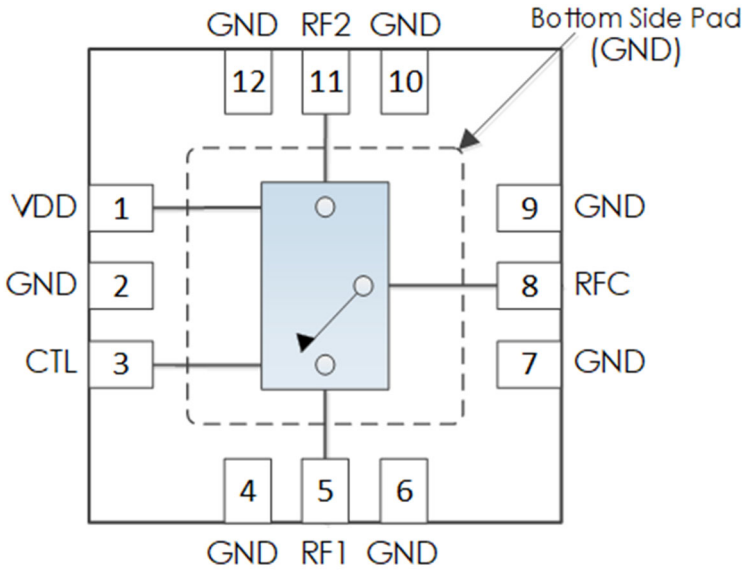


CONTENTS

REVISION HISTORY

Date	Revision	Notes
October 23, 2019	1	Initial Release.
May 13, 2020	2	Updated S-parameter plots. Package information moved to main product page.
August 17, 2020	3	Updated Part Picture.
September 23, 2021	4	Updated S-parameter plots.
July 29, 2024	5	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	VDD	DC Power Input
2	GND	Ground – Common
3	CTL	Switch Control
4	GND	Ground – Common
5	RF1	RF1 Output – 50 Ohms – DC Coupled. External DC blocking capacitor required*
6, 7	GND	Ground – Common
8	RFC	RFC Input – 50 Ohms – DC Coupled. External DC blocking capacitor required*
9, 10	GND	Ground – Common
11	RF2	RF2 Output – 50 Ohms – DC Coupled. External DC blocking capacitor required*
12	GND	Ground – Common
Bottom Side Pad	Case GND	Ground – Common

*__Note:__ DC blocking caps not required if in series with other Mercury parts of the same reference voltage.

SPECIFICATIONS

Absolute Maximum Ratings

	Minimum	Maximum
Supply Input Voltage	-0.3 V	+6.0 V
RF Input Power		+27 dBm
Operating Junction Temperature	-40 C	+150 C
Storage Temperature Range	-50 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
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	+2.5 V	+5.0 V	
Operating Case Temperature	-40 C		+85 C
Operating Junction Temperature	-40 C		+125 C

DC Electrical Characteristics

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
DC Supply Voltage		+2.5V	+5.0 V	
DC Supply Current	VDD = +3.3V		1 mA	
	VDD = +5.0V		1 mA	
Power Dissipated	VDD = +3.3V		3.3 mW	
	VDD = +5.0V		5 mW	
Logic Level Low		0.0V		+0.5V
Logic Level High		+2.0V		+VDD

RF Performance

(T = 25 °C unless otherwise specified)

Param	Testing Conditions	Min	Typical	Max
Frequency Range		DC		28 GHz
Insertion Loss	f = 0.01 GHz		0.6 dB	
	f = 14 GHz		1 dB	
	f = 28 GHz		2 dB	
Return Loss	f = 0.01 GHz		24 dB	
	f = 14 GHz		10 dB	
	f = 28 GHz		10.5 dB	
Input IP3	VDD = +5.0 V		+40 dBm	

Timing Characteristics

Parameter	Minimum	Typical	Maximum
Switching Speed (Path Enabled → Disabled)		7 ns	
Switching Speed (Path Disabled → Enabled)		15 ns	

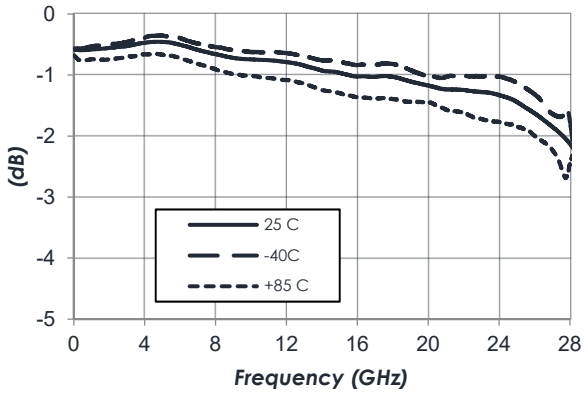
State Table

CTL	State
Low	RFC to RF1
High	RFC to RF2

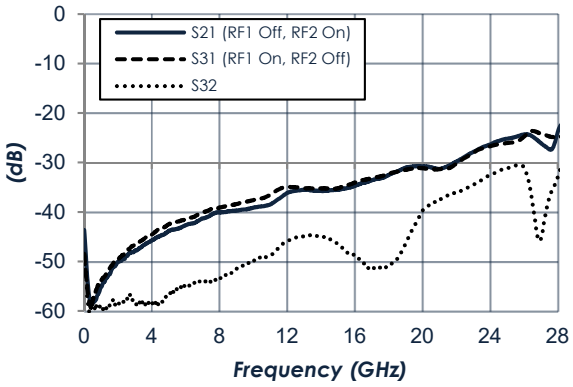
TYPICAL PERFORMANCE

(VDD = +5.0 V. Data measured via probes outside IC package on 10 mil Rogers RO4350B™)

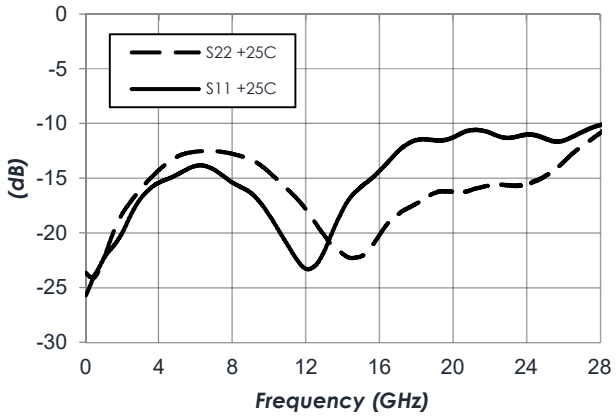
Insertion Loss vs Temperature



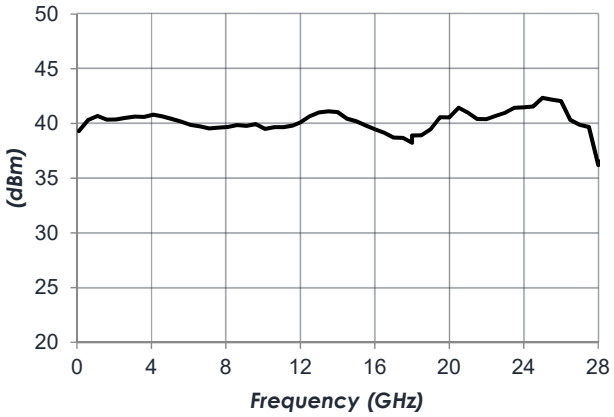
Isolation at +25C



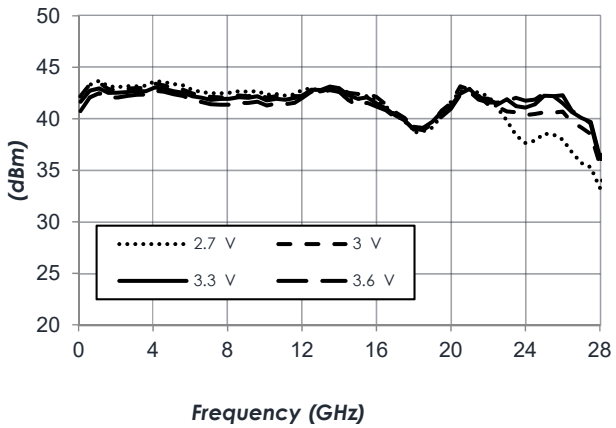
Return Loss at +25C



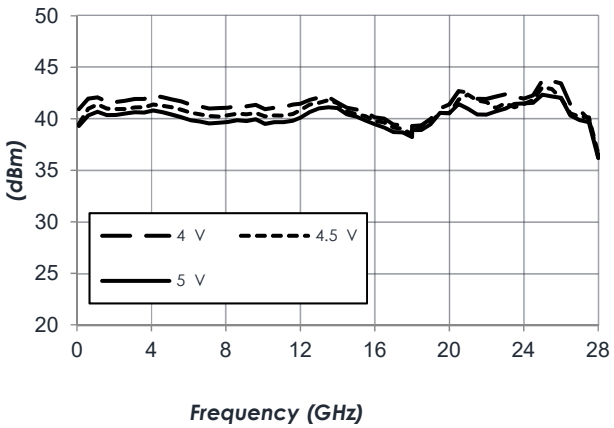
Input IP3 at +25C



Input IP3 at +25 C

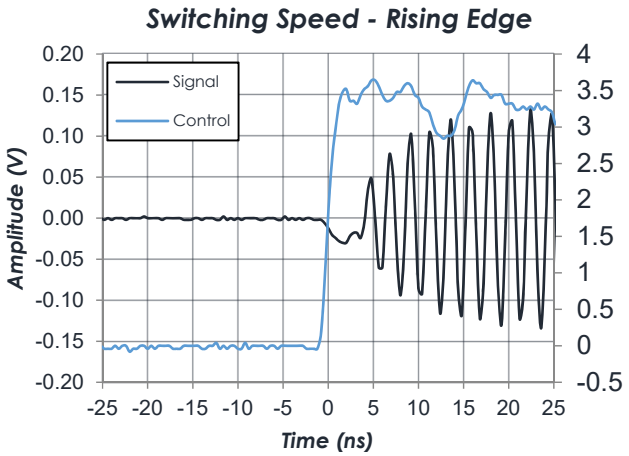


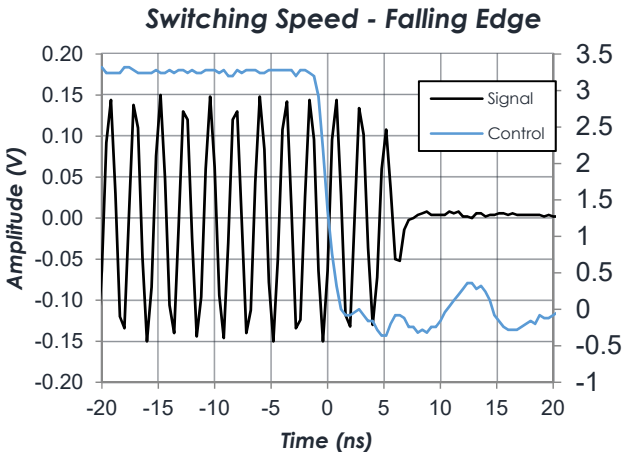
Input IP3 at +25 C



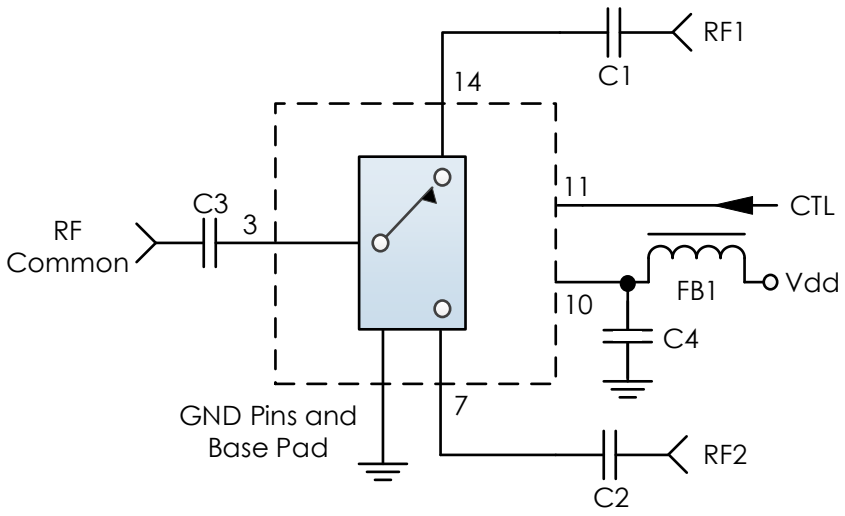
TYPICAL PERFORMANCE (CONTINUED)

(VDD = +5.0 V. Data measured via probes outside IC package on 10 mil Rogers RO4350B™)





TYPICAL APPLICATION

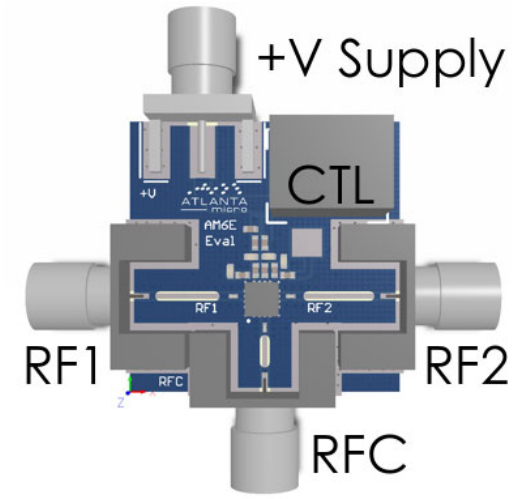


Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C0-C6	0.1µF	0201BB104KW160	Passives Plus
C7	0.1µF	C1005X7R1H104K050BB	TDK
FB1	-	MMZ1005A222E	TDK

Notes:

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



RELATED PARTS

Part Number		Description
AM6012	DC to 18 GHz	SPDT, Reflective
AM6013	DC to 18 GHz	SP4T, Reflective
AM6015	DC to 18 GHz	SP6T, Reflective
AM6029	DC to 18 GHz	SP4T, Reflective
AM6031	DC to 20 GHz	SPDT, Absorptive

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-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)

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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