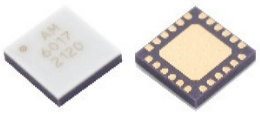
AM6017 – Switch

DC to 26.5 GHz SP4T

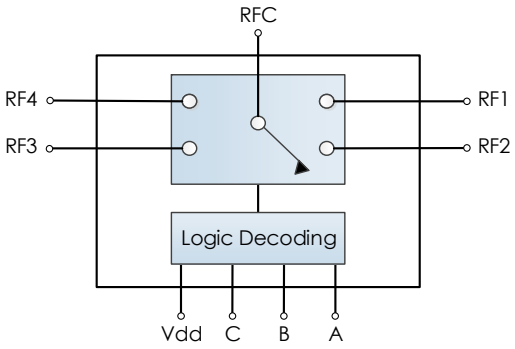


AM6017 is a Single-Pole Four-Throw (SP4T) switch covering the DC to 26.5 GHz frequency range. The positive control device provides low insertion loss, flat frequency response, and high isolation over the operating temperature range of -40C to +85C.

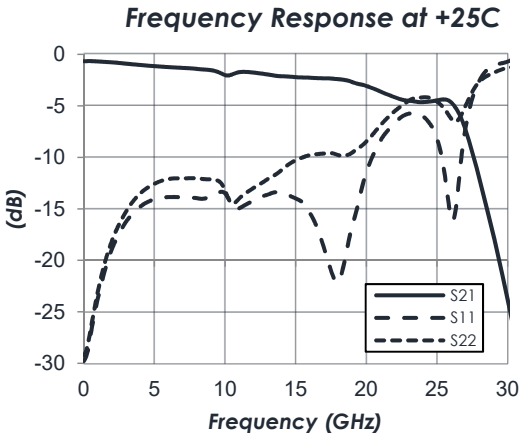
FEATURES

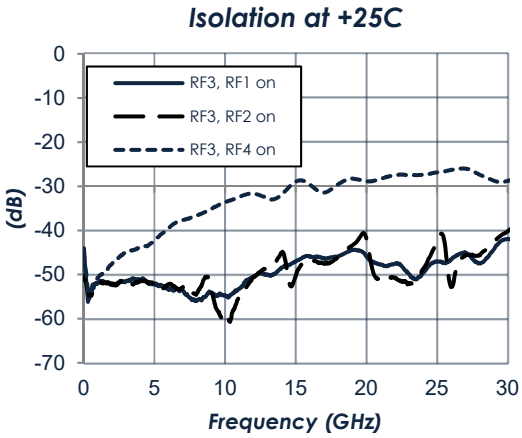
- 2.0 dB Insertion Loss
- +41 dBm Input IP3
- +3.3V to +5V Supply
- +3.3V to +5V Control
- 30dB Isolation
- 4mm QFN Package
- -40C to +85C Operation

FUNCTIONAL DIAGRAM



CHARACTERISTIC PERFORMANCE





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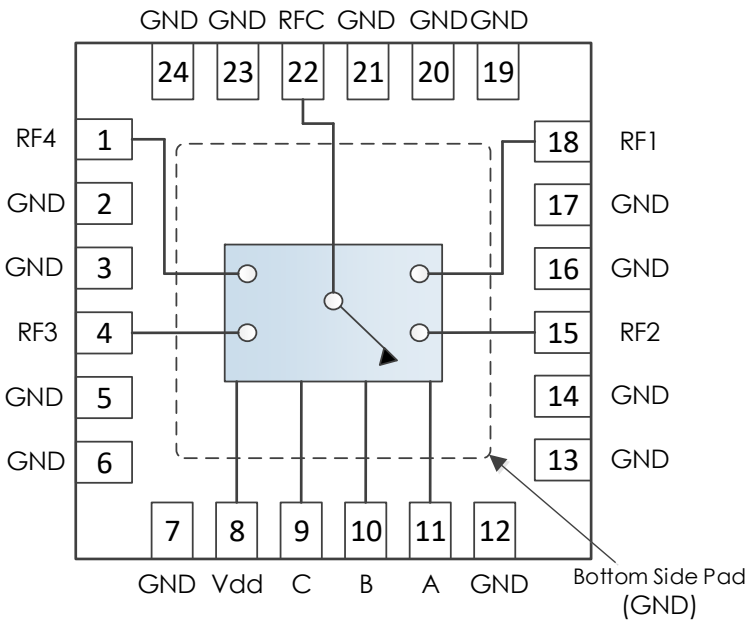
REVISION HISTORY

Date	Revision	Notes
August 21, 2018	1	Initial Release.
July 15, 2019	2	Various Plots Updated. Package Drawing Corrected.
May 18, 2020	3	Package information moved to main product page.
July 30, 2024	4	Changed to Mercury branding. No content changes.

PIN LAYOUT AND DEFINITIONS



Pin	Name	Function
1	RF4	RF4 Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required*
2,3	GND	Ground - Common
4	RF3	RF3 Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required*
5-7	GND	Ground - Common
8	VDD	DC Power Input
9	C	Switch Control C – Can Be Tied to GND
10	B	Switch Control B
11	A	Switch Control A
12-14	GND	Ground - Common
15	RF2	RF2 Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required*
16,17	GND	Ground - Common
18	RF1	RF1 Output – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required*
19-21	GND	Ground - Common
22	RFC	RFC Input – 50 Ohms – DC Coupled. External DC Blocking Capacitor Required*
23,24	GND	Ground - Common
Case GND	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		+2.7 V	+5.0 V	
DC Supply Current	VDD = +3.3V		7 mA	
	VDD = +5.0V		8 mA	
Power Dissipated	VDD = +3.3V		23 mW	
	VDD = +5.0V		40 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		26.5 GHz
Insertion Loss			2.0 dB	
Return Loss			10 dB	
Input IP3	V Supply = +5.0 V		+41 dBm	

Timing Characteristics

Parameter	Minimum	Typical	Maximum
Switching Speed (Path Enabled → Disabled)		820 ns	
Switching Speed (Path Disabled → Enabled)		1.15 µs	

State Table

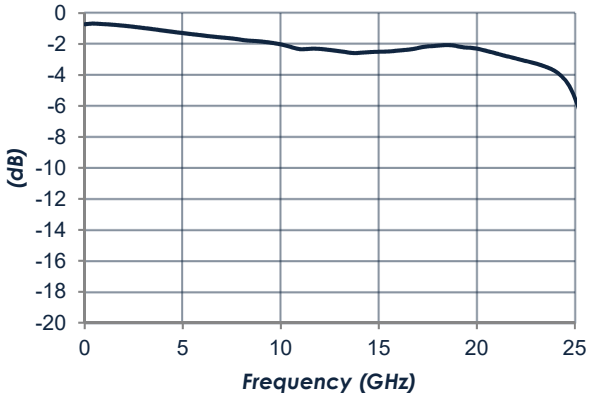
A	B	C*	State
High	High	Low	RF1
High	Low	Low	RF2
Low	High	Low	RF3
Low	Low	Low	RF4
All Other States			Isolation

***Note:** Bit C can be tied to GND.

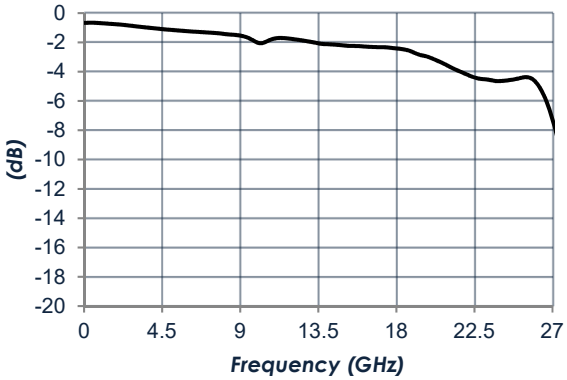
TYPICAL PERFORMANCE

(VDD = +5.0V unless otherwise specified)

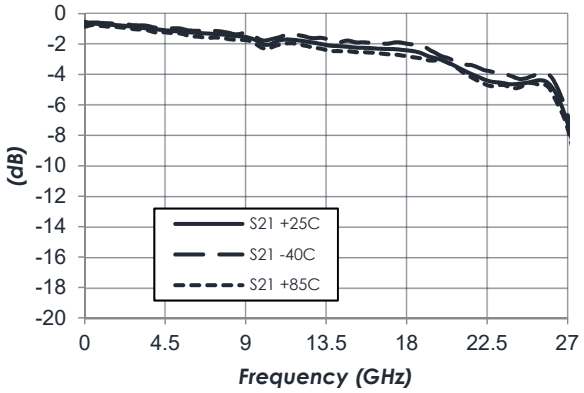
RF1/RF4 Insertion Loss at +25C



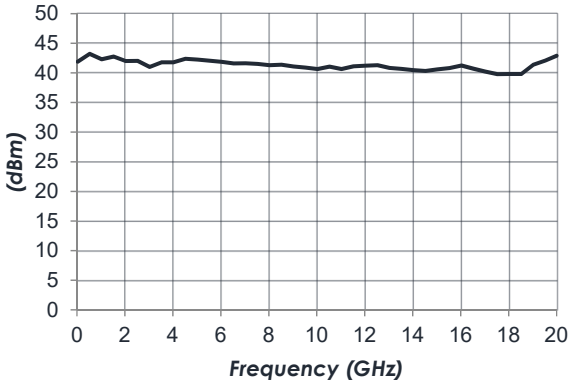
RF2/RF3 Insertion Loss at +25C



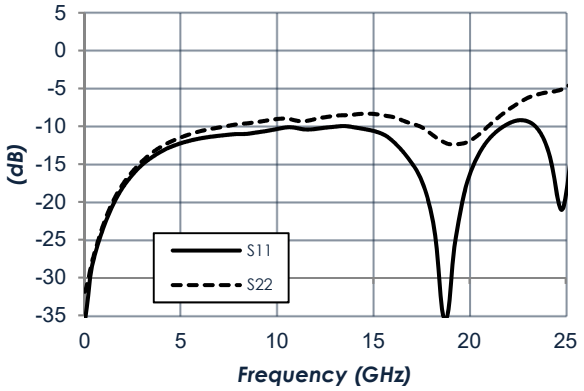
Insertion Loss vs Temperature*



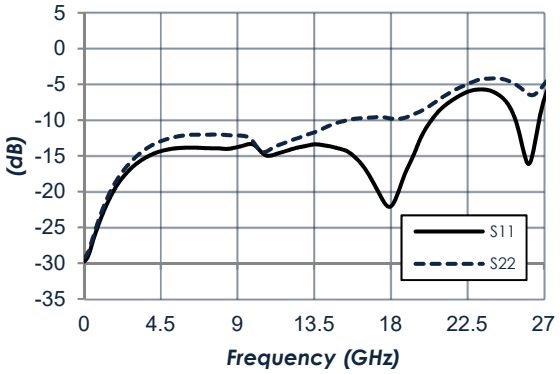
Input IP3 at +25C*



RF1/RF4 Return Loss at +25C

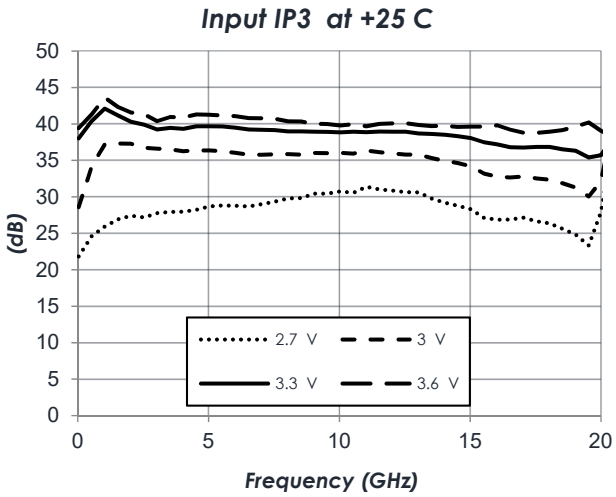


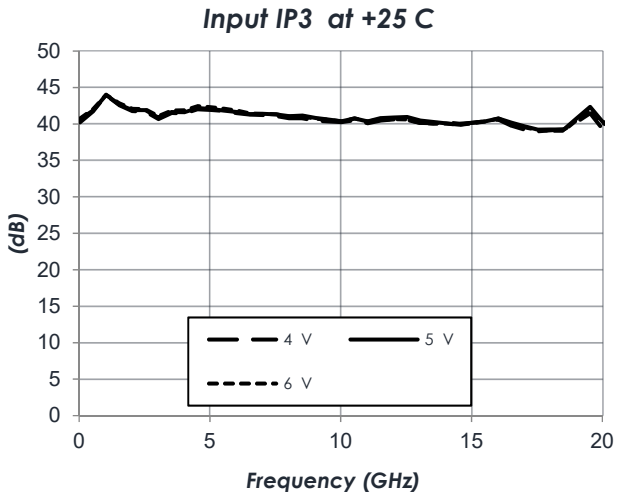
RF2/RF3 Return Loss at +25C



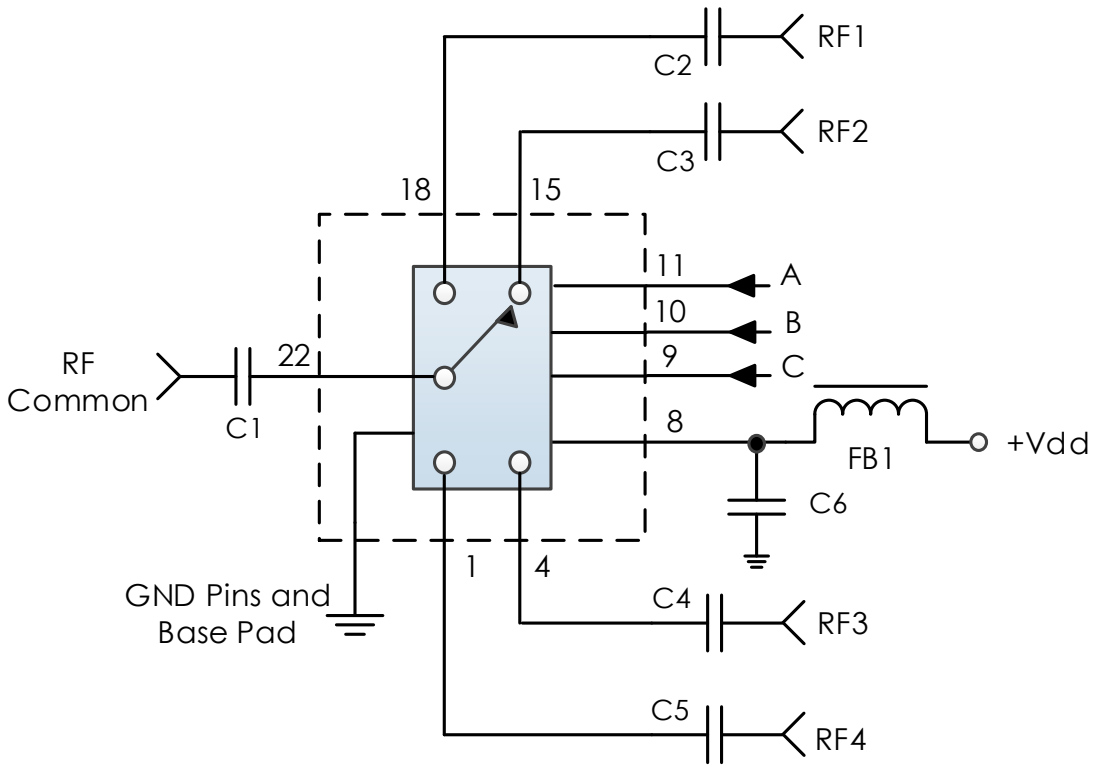
***Note:** RF2/RF3 Path Shown

TYPICAL PERFORMANCE (CONTINUED)





TYPICAL APPLICATION



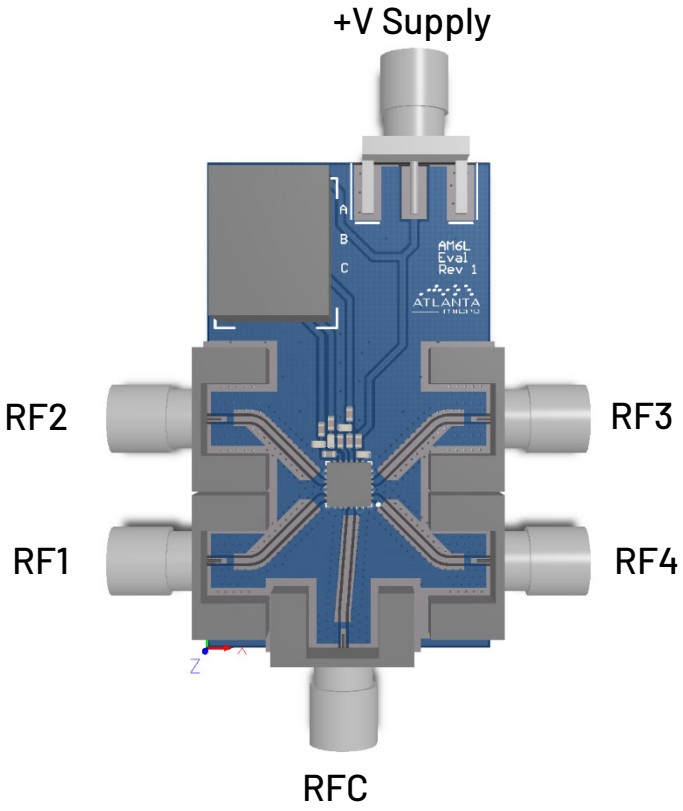
Recommended Component List (or Equivalent)

Part	Value	Part Number	Manufacturer
C0-C5	0.1µF	0402BB104KW160	Passives Plus
C6	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.

EVALUTATION PC BOARD



RELATED PARTS

Part Number		Description
AM6002	DC to 14 GHz	SPDT
AM6011	DC to 10 GHz	SP8T
AM6012	DC to 18 GHz	SPDT
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)
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.

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