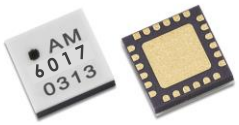
# AM6017 – Switch

**DC – 26.5 GHz SP4T**

## Description

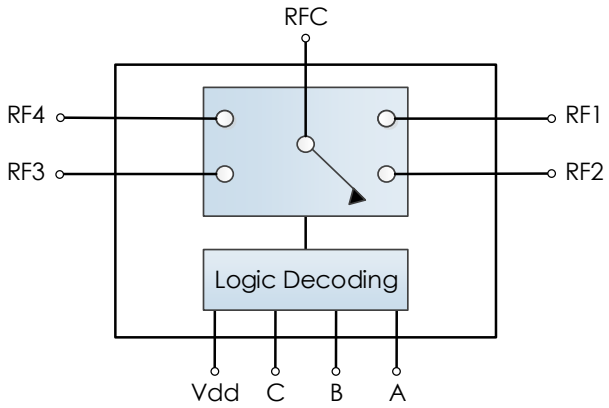
AM6017 is a Single-Pole Four-Throw (SP4T) switch covering the DC to 26.5 GHz frequency range. The positive control device provides low insertion loss, flat frequency response, and high isolation over the operating temperature range of -40C to +85C



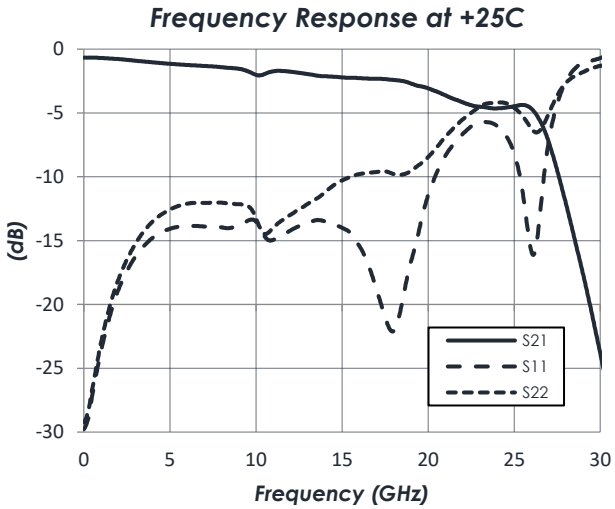

## Features

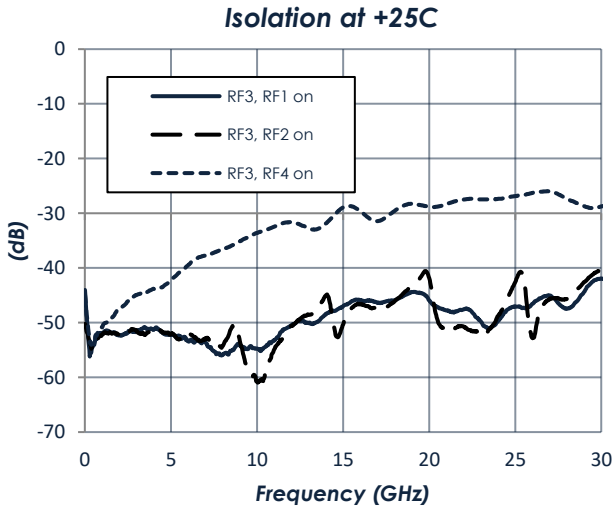
- 2.0 dB Insertion Loss
- +41 dBm Input IP3
- +3.3V to +5V Supply
- +3V to +5V Control
- >30 dB Isolation TYP
- 4mm QFN Package
- -40C to +85C Operation

## Functional Diagram




## Characteristic Performance



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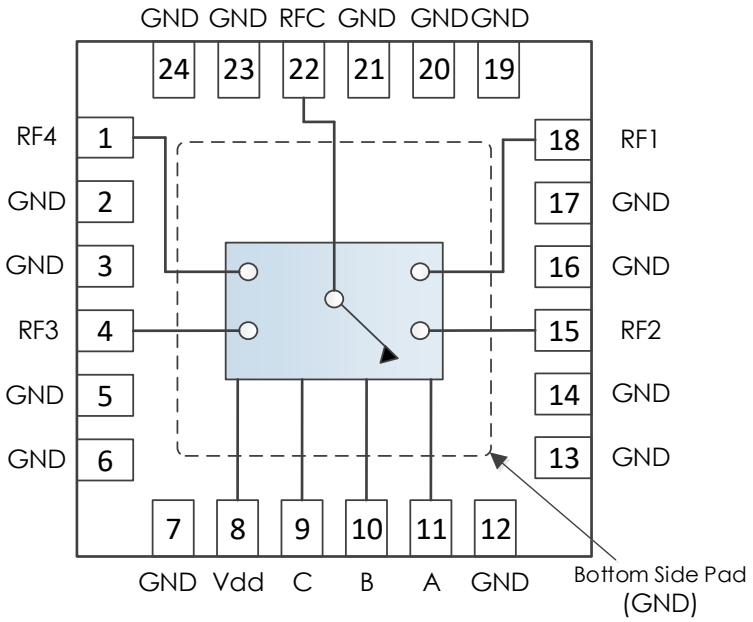
## Revision History

| Date | Revision Number | Notes |
|---|---|---|
| August 21, 2018 | 1 | Initial Release |
| July 15, 2019 | 2 | Various Plots Updated. Package Drawing Corrected. |

## Pin Layout and Definitions




| Pin Number | Pin Name | Pin 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 Atlanta Micro 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 | -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 | |

Atlanta Micro products are electrostatic sensitive.
Follow safe handling practices to avoid damage

## Recommended Operating Conditions

| | Minimum | Typical | Maximum |
|---|---|---|---|
| Supply Voltage | +2.7 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)

| Parameter | Testing Conditions | Minimum | Typical | Maximum |
|---|---|---|---|---|
| DC Supply Voltage | | +2.7 V | +5.0 V | |
| DC Supply Current | V Supply = +3.3 V | | 7 mA | |
| | V Supply = +5.0 V | | 8 mA | |
| Power Dissipated | V Supply = +3.3 V | | 23 mW | |
| | V Supply = +5.0 V | | 40 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)

| Parameter | Testing Conditions | Minimum | Typical | Maximum |
|---|---|---|---|---|
| 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

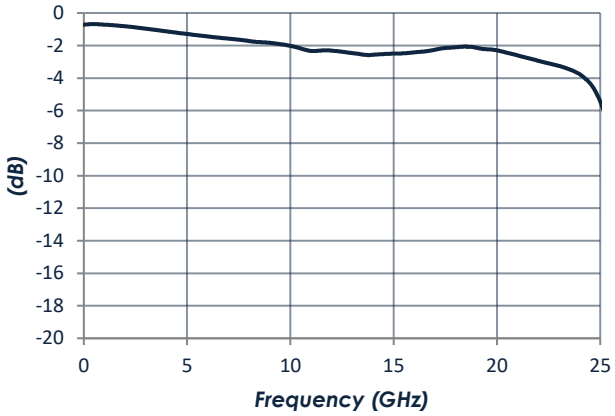
| A | B | C* | State |
|---|---|---|---|
| High | High | Low | RF1 |
| High | Low | Low | RF2 |
| Low | High | Low | RF3 |
| Low | Low | Low | RF4 |
| All Other States | | | Isolation |

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

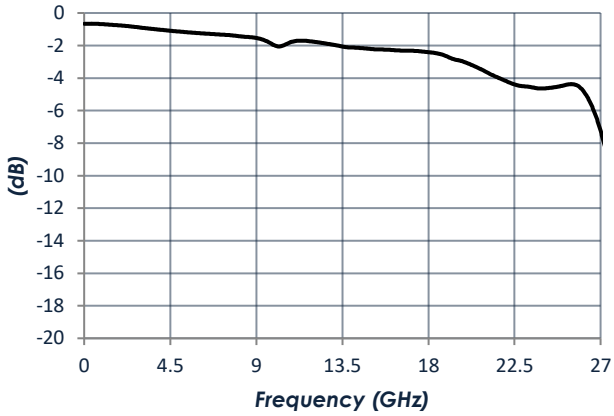
## Typical Performance

(VDD = +5.0V unless otherwise specified)

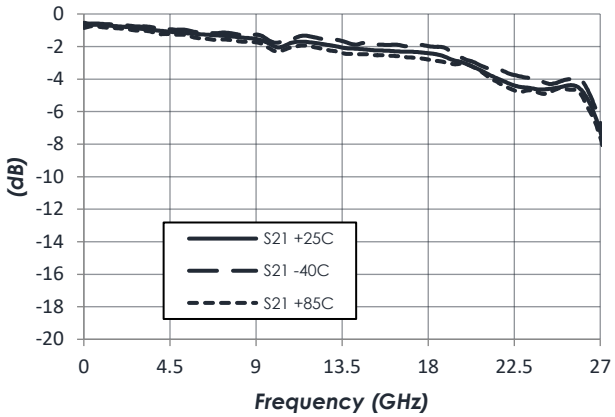
***RF1/RF4 Insertion Loss at +25C***



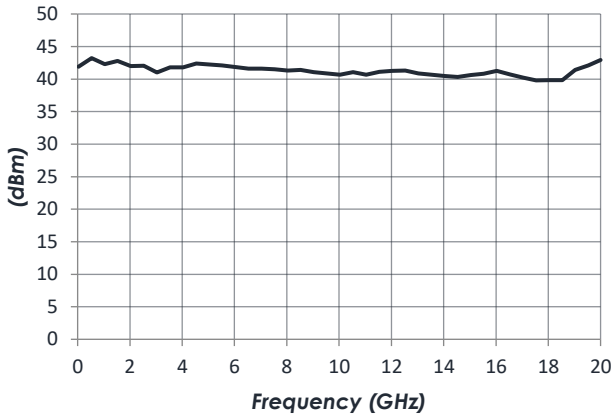

***RF2/RF3 Insertion Loss at +25C***



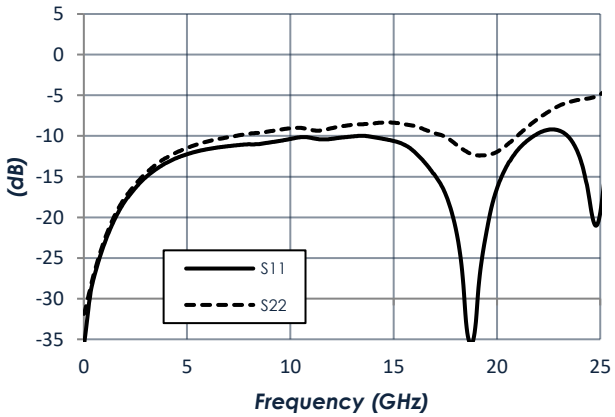

***Insertion Loss vs Temperature****



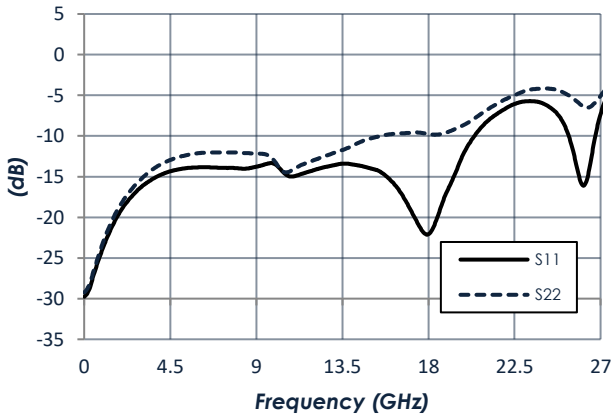

***Input IP3 at +25C****




***RF1/RF4 Return Loss at +25C***

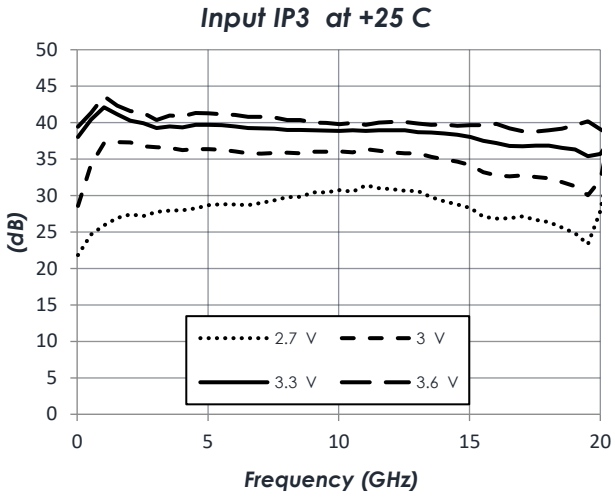


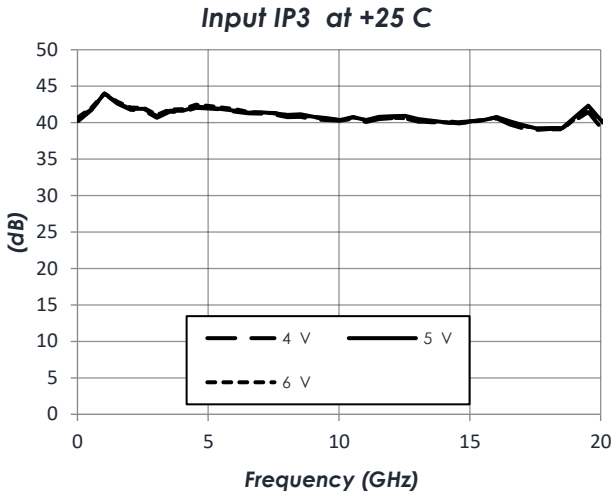

***RF2/RF3 Return Loss at +25C***



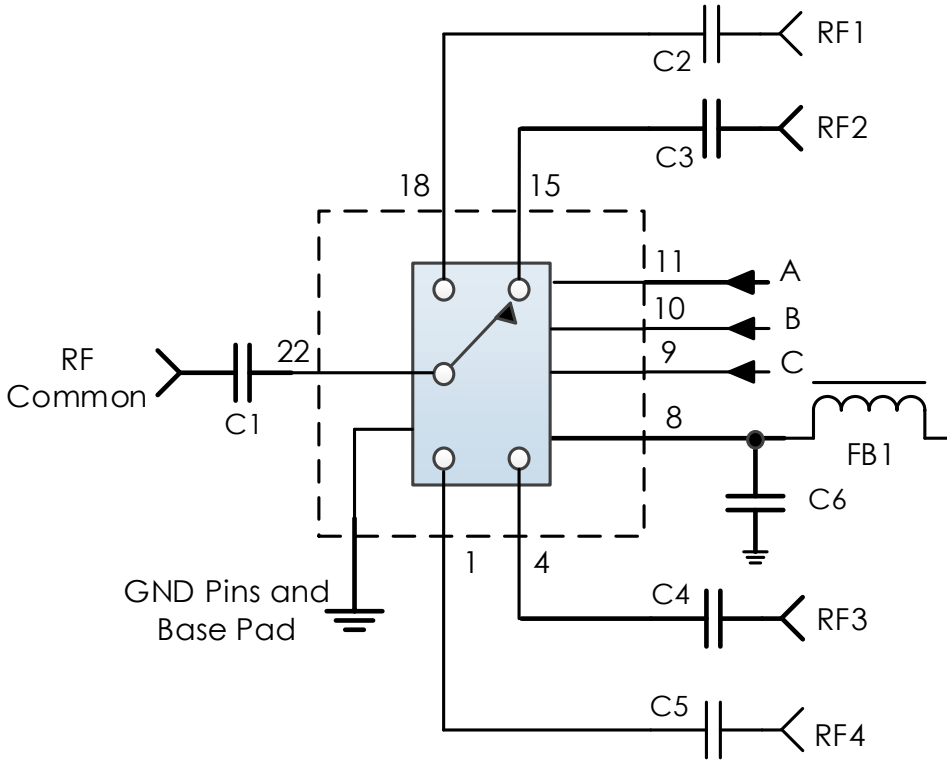

***Note:** RF2/RF3 Path Shown

## Typical Performance (continued)



## Typical Application




### Recommended Component List (or equivalent):

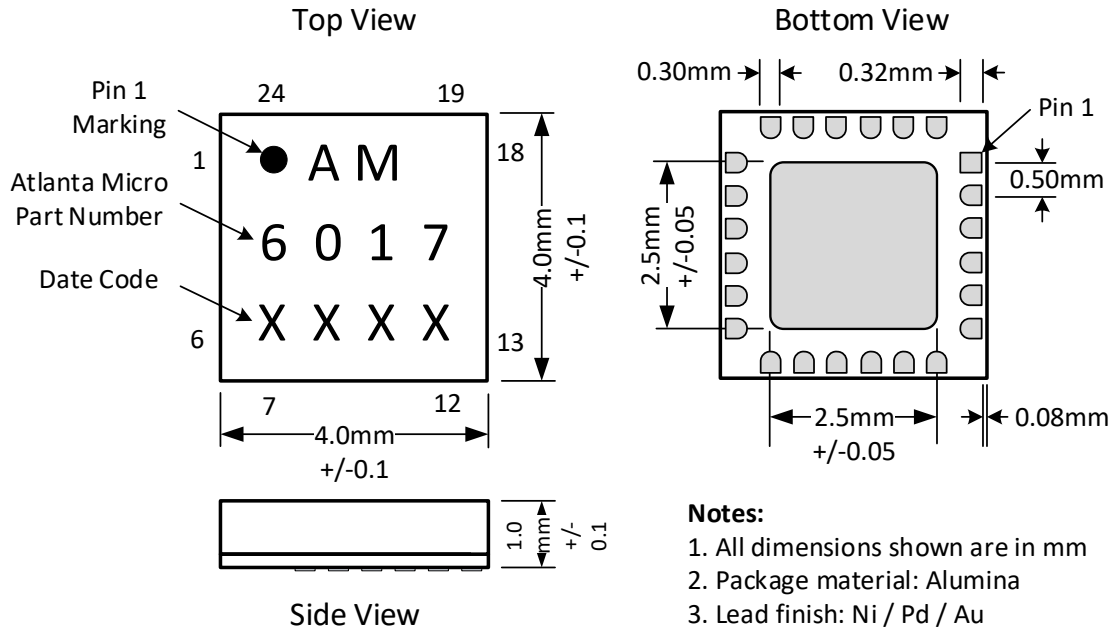
| Part | Value | Part Number | Manufacturer |
|---|---|---|---|
| C1-C5 | 0.1 µF | 0402BB104KW160 | Passives Plus |
| C6 | 0.1 µF | C1005X7R1H104K050BB | TDK |
| FB1 | - | MMZ1005A222E | TDK |

### 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.

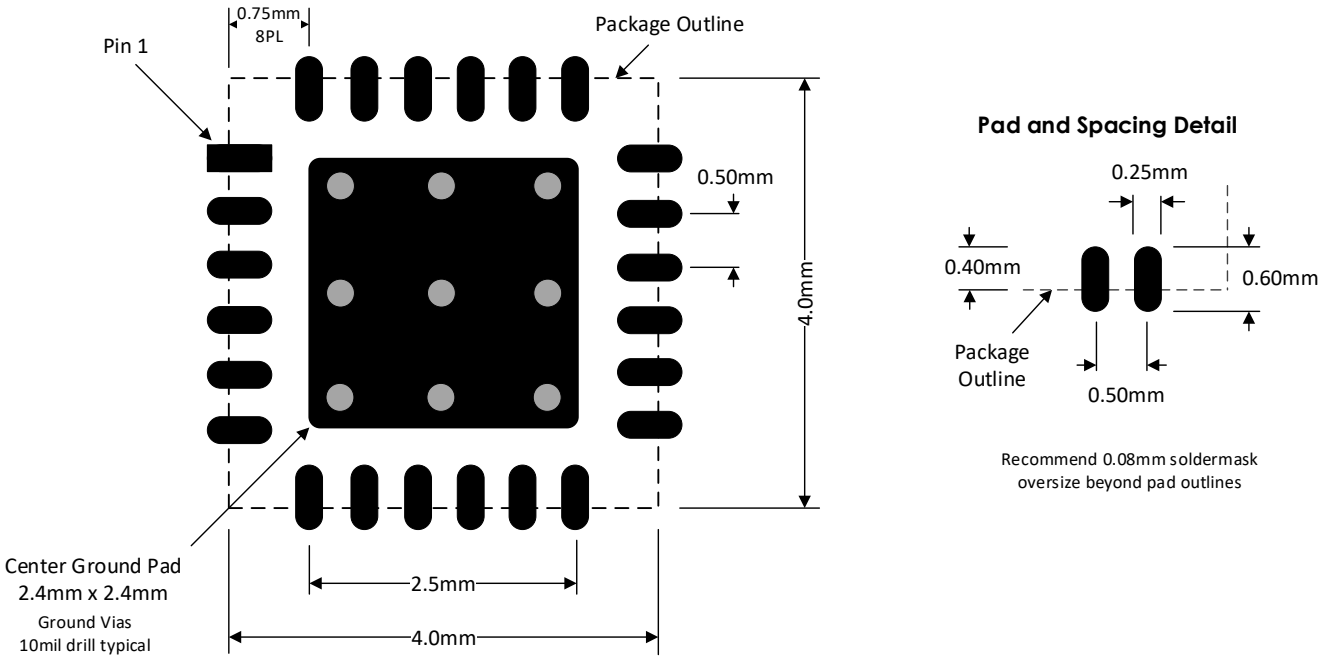
# Package Details

## Package Drawing

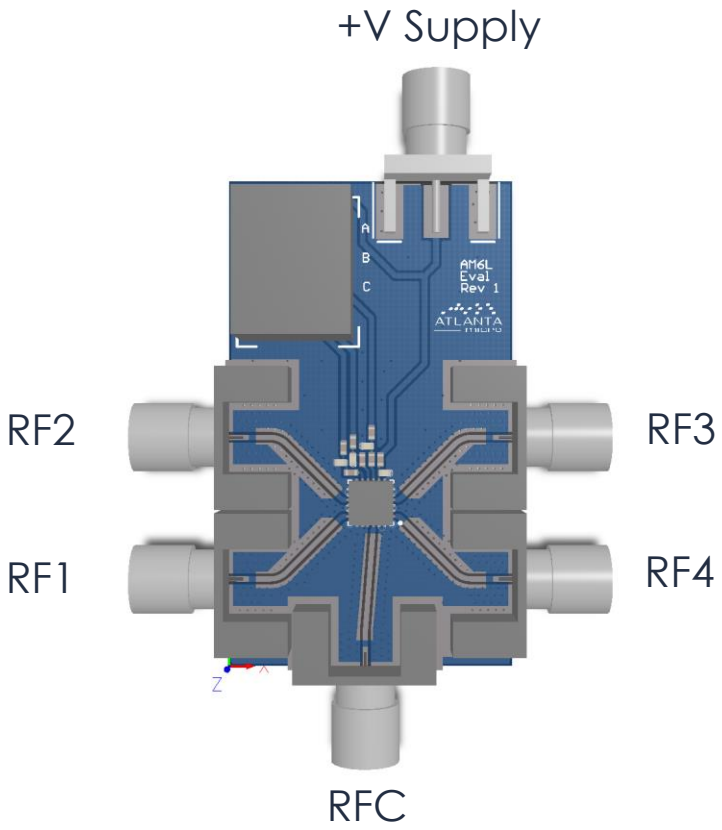



**Notes:**
1. All dimensions shown are in mm
2. Package material: Alumina
3. Lead finish: Ni / Pd / Au

## Recommended Footprint



## Evaluation PC Board




## Related Parts

| Part Number | Description |
|---|---|
| AM6002 | DC – 14 GHz SPDT |
| AM6011 | DC – 10 GHz SP8T |
| AM6012 | DC – 18 GHz SPDT |
| AM6015 | DC – 18 GHz SP6T |

# 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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