



# Wideband, 43dB Isolation @ 1GHz, CMOS 1.65 V to 2.75V, 2:1 Mux/SPDT Switches

## Preliminary Technical Data

## ADG918/ADG919

### FEATURES

- Wideband DC to 2GHz
- ADG918/ADG919 Absorptive/Reflective Switches
- High Off Isolation (43 dB @ 1 GHz)
- Low Insertion Loss (1 dB DC to 900 MHz)
- Single 1.65 to 2.75 V power supply
- CMOS/LVTTL Control Logic
- 8 Lead MSOP & Tiny 3 x 3mm CSP Packages
- Low Power Consumption (5µA)

### APPLICATIONS

- Wireless Communications
- General Purpose RF switching
- Dual Band Applications
- Filter Selection
- Antenna Switch
- Digital Transceiver Front-End Switch
- IF Switching

### GENERAL DESCRIPTION

The ADG918/ADG919 are wideband switches using a CMOS process to provide high isolation and low insertion loss to 1GHz. The ADG918 is an absorptive switch having 50 ohm terminated shunt legs, while the ADG919 is a reflective switch. These devices are designed such that the isolation is high over the DC to 1GHz frequency range. They have on board CMOS control logic, thus eliminating the need for external controlling circuitry. The control inputs are both CMOS and LVTTL compatible. The low power consumption of these CMOS devices makes them ideally suited to wireless applications and general purpose high frequency switching.

### FUNCTIONAL BLOCK DIAGRAM

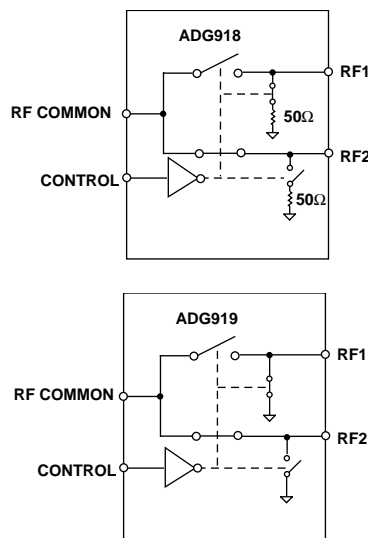


Table 1. Truth Table

Control	Signal Path
0	RF2 to RF Common
1	RF1 to RF Common

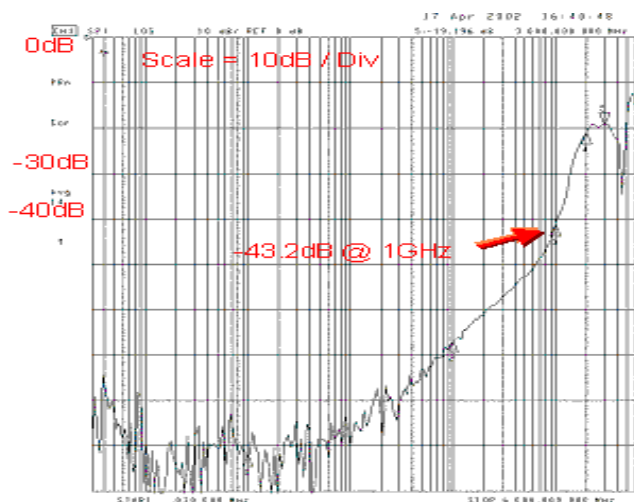


Figure 1. Isolation vs Frequency

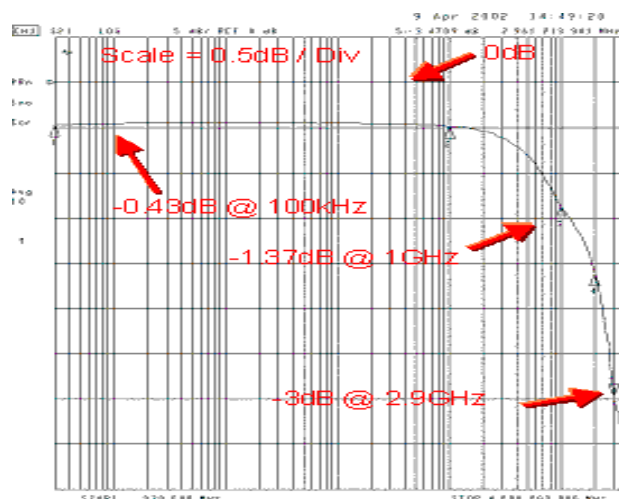


Figure 2. Loss vs Frequency

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# PRELIMINARY TECHNICAL DATA

## ADG918/ADG919—SPECIFICATIONS<sup>1</sup>

( $V_{DD} = +1.65\text{ V to }+2.75\text{ V}$ ,  $GND = 0\text{ V}$ , All specifications  $T_{MIN}$  to  $T_{MAX}$  unless otherwise noted)

Parameter	Symbol	Conditions	B Version			Units
			Min	Typ <sup>2</sup>	Max	
<b>AC ELECTRICAL CHARACTERISTICS</b>						
Operating Frequency			DC		2	GHz
Insertion Loss	$S_{21}, S_{12}$	DC - 100 MHz		0.4		dB
		500 MHz		0.65		dB
		900 MHz		1.0		dB
Isolation- RF to RF1/RF2	$S_{21}, S_{12}$	1 MHz		100		dB
		100 MHz		55		dB
		500 MHz				dB
Isolation - RF1 to RF2	$S_{21}, S_{12}$	1000 MHz		43		dB
		1 MHz		100		dB
		100 MHz		55		dB
Return Loss (On Channel)	$S_{11}, S_{22}$	500 MHz				dB
		1000 MHz		30		dB
		DC - 100 MHz		26		dB
On switching Time	$t_{ON}$	50% Control to 90% RF		5		ns
Off Switching Time	$t_{OFF}$	50% Control to 10% RF		4		ns
1 dB Compression	$P_{-1dB}$	DC to 1000 MHz		20		dBm
Third Order Intermodulation intercept	$IP_3$	900MHz, 5dBm		35		dBm
<b>DC ELECTRICAL CHARACTERISTICS</b>						
Input High Voltage	$V_{INH}$	$V_{DD} = 2.3\text{ V to }2.75\text{ V}$	1.7			V
Input Low Voltage	$V_{INH}$	$V_{DD} = 1.65\text{ V to }1.95\text{ V}$	$0.65V_{CC}$			V
	$V_{INL}$	$V_{DD} = 2.3\text{ V to }2.75\text{ V}$			0.7	V
Input Leakage Current	$V_{INL}$	$V_{DD} = 1.65\text{ V to }1.95\text{ V}$			$0.35V_{CC}$	V
	$I_I$	$0 \leq V_{IN} \leq 2.75\text{ V}$			$\pm 1$	$\mu\text{A}$
<b>CAPACITANCE<sup>3</sup></b>						
RF1/RF2, RF Port On Capacitance	$C_{RF\ ON}$	$f = 1\text{ MHz}$		2		pF
Control Input Capacitance	$C_{IN}$	$f = 1\text{ MHz}$		2		pF
<b>POWER REQUIREMENTS</b>						
$V_{DD}$			1.65		2.75	V
Quiescent Power Supply Current	$I_{DD}$	Digital Inputs = 0 V or $V_{DD}$		1	5	$\mu\text{A}$

### NOTES

<sup>1</sup>Temperature range is as follows: B Version:  $-40^\circ\text{C}$  to  $+85^\circ\text{C}$ .

<sup>2</sup> Typical values are at  $+25^\circ\text{C}$  unless otherwise stated.

<sup>3</sup> Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

# PRELIMINARY TECHNICAL DATA

## ADG918/ADG919

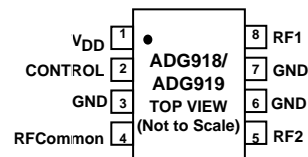
### ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

(T<sub>A</sub> = +25°C unless otherwise noted)

V <sub>DD</sub> to GND	-0.5 V to +4 V
Inputs to GND	-0.5 V to V <sub>DD</sub> + 0.3V
Input Power	TBD dBm
Operating Temperature Range	
Industrial (B Version)	-40°C to +85°C
Storage Temperature Range	-65°C to +150°C
Junction Temperature	+150°C
MSOP Package	
θ <sub>JA</sub> Thermal Impedance	206°C/W
CSP Package	
θ <sub>JA</sub> Thermal Impedance	TBD°C/W
Lead Temperature, Soldering (10seconds)	300°C
IR Reflow, Peak Temperature (<20 seconds)	+235°C

### PIN CONFIGURATION

8-Lead MSOP (RM-8)  
3x3mm CSP (CP-8)



### NOTES

<sup>1</sup>Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Only one absolute maximum rating may be applied at any one time.

### ORDERING GUIDE

Model	Temperature Range	Package Descriptions	Branding	Package Options
ADG918BRM	-40°C to +85°C	MSOP (Micro Small Outline Package)		RM-8
ADG918BCP	-40°C to +85°C	Chip Scale Package		CP-8
ADG919BRM	-40°C to +85°C	MSOP (Micro Small Outline Package)		RM-8
ADG919BCP	-40°C to +85°C	Chip Scale Package		CP-8

### CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the ADG919 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.



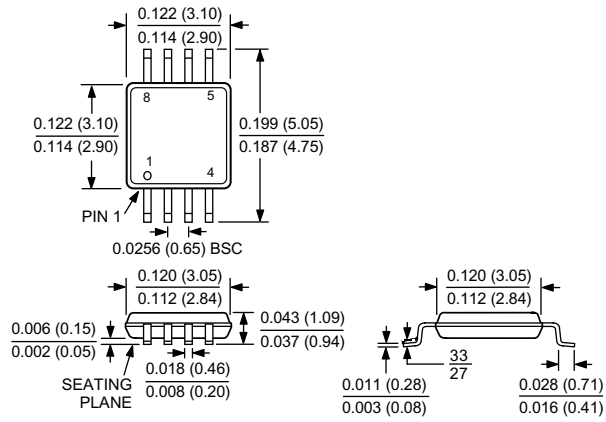
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### OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

#### MSOP (RM-8)



#### Chip Scale Package (CP-8) 3 x 3mm

TBD