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

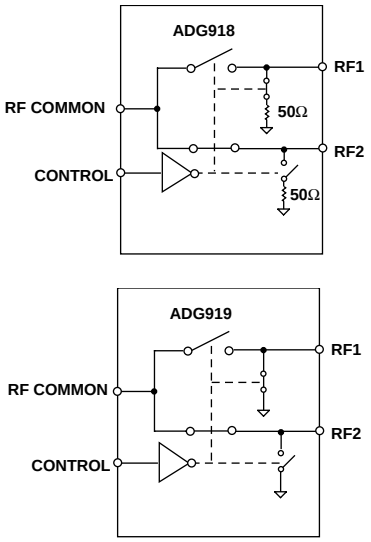


Table 1. Truth Table

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

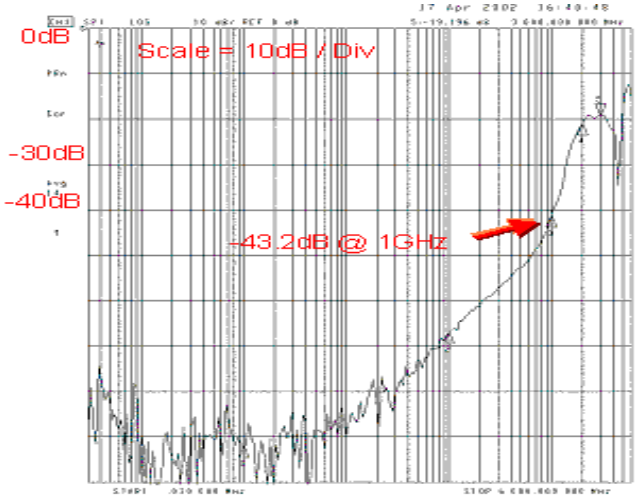


Figure 1. Isolation vs Frequency

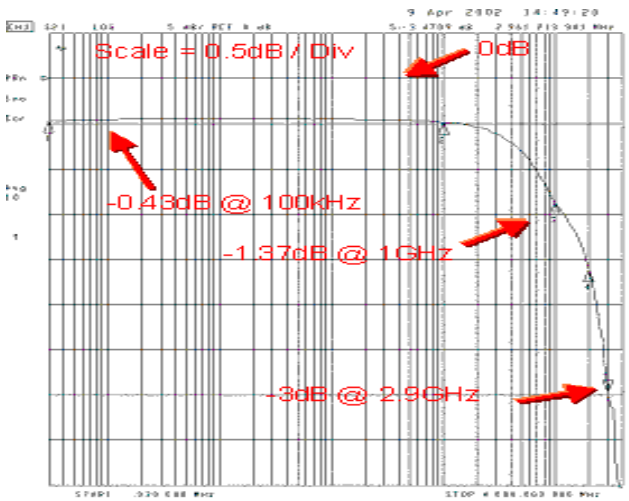


Figure 2. Loss vs Frequency

REV. PrC Sept 2002

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ADG918/ADG919–SPECIFICATIONS[1]

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

Parameter	Symbol	Conditions	B Version Min	Typ[2]	Max	Units
AC ELECTRICAL CHARACTERISTICS						
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
		1000 MHz		43		dB
Isolation - RF1 to RF2	S_{21}, S_{12}	1 MHz		100		dB
		100 MHz		55		dB
		500 MHz				dB
		1000 MHz		30		dB
Return Loss (On Channel)	S_{11}, S_{22}	DC - 100 MHz		26		dB
		500 MHz				dB
		1000 MHz		23		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
DC ELECTRICAL CHARACTERISTICS						
Input High Voltage	V_{INH}	V_{DD} = 2.3 V to 2.75 V	1.7			V
	V_{INH}	V_{DD} = 1.65 V to 1.95 V	$0.65V_{CC}$			V
Input Low Voltage	V_{INL}	V_{DD} = 2.3 V to 2.75 V			0.7	V
	V_{INL}	V_{DD} = 1.65 V to 1.95 V			$0.35V_{CC}$	V
Input Leakage Current	I_I	$0 \le V_{IN} \le 2.75$ V			±1	µA
CAPACITANCE[3]						
RF1/RF2, RF Port On Capacitance	C_{RF} ON	f = 1 MHz		2		pF
Control Input Capacitance	C_{IN}	f = 1 MHz		2		pF
POWER REQUIREMENTS						
V_{DD}			1.65		2.75	V
Quiescent Power Supply Current	I_{DD}	Digital Inputs = 0 V or V_{DD}		1	5	µA

NOTES

[1]Temperature range is as follows: B Version: –40°C to +85°C.

[2] Typical values are at +25°C unless otherwise stated.

[3] Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS[1]

(T_A = +25°C unless otherwise noted)

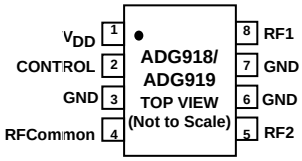
V_{DD} to GND	-0.5 V to +4 V
Inputs to GND	-0.5 V to V_{DD} + 0.3V
Input Power	TBD dBm
Operating Temperature Range	
Industrial (B Version)	–40°C to +85°C
Storage Temperature Range	–65°C to +150°C
Junction Temperature	+150°C
MSOP Package	
θ_{JA} Thermal Impedance	206°C/W
CSP Package	
θ_{JA} Thermal Impedance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

NOTES

[1]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.

PIN CONFIGURATION

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



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

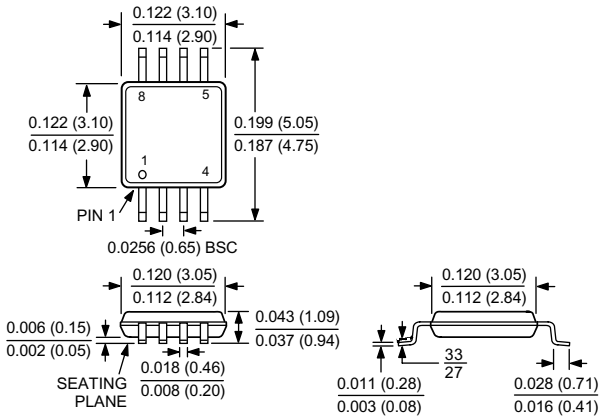
ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the ADG919 features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high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



OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

MSOP
(RM-8)



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

TBD