



Wideband, 43dB Isolation @ 1GHz, CMOS 1.65 V to 2.75V, Absorptive/Reflective Switches

Preliminary Technical Data

ADG901/ADG902

FEATURES

- Wideband DC to 2GHz
- ADG901/ADG902 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 ADG901/ADG902 are wideband switches using a CMOS process to provide high isolation and low insertion loss to 1GHz. The ADG901 is an absorptive switch having 50 ohm terminated shunt legs, while the ADG902 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

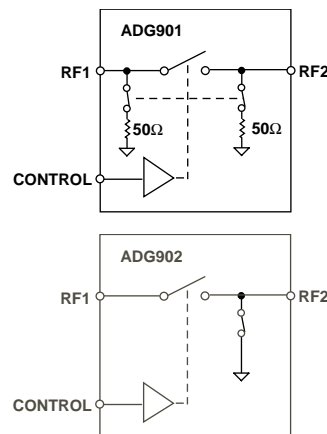


Table 1. Truth Table

CONTROL	Signal Path
0	RF1 isolated from RF2
1	RF1 to RF2

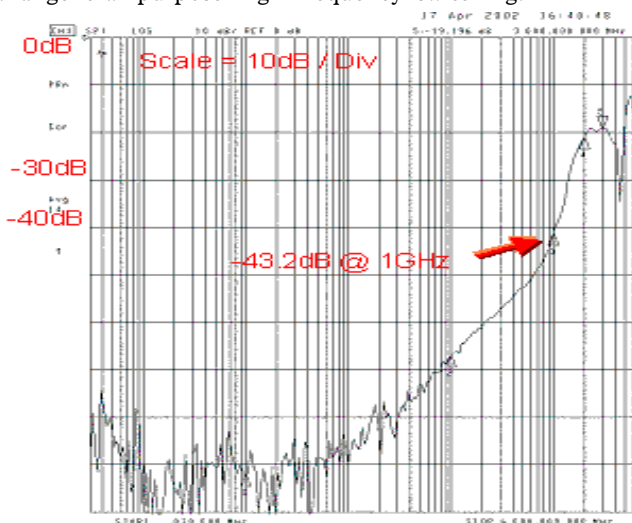


Figure 1. Isolation vs Frequency

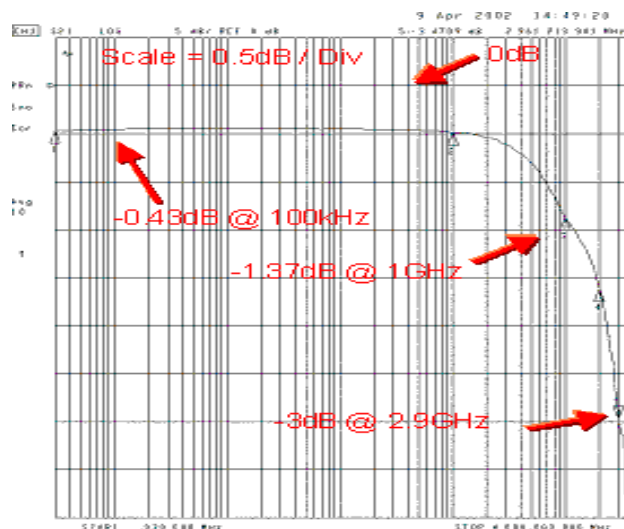


Figure 2. Loss vs Frequency

REV. PrC Sept 2002

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PRELIMINARY TECHNICAL DATA

ADG901/ADG902—SPECIFICATIONS¹

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

Parameter	Symbol	Conditions	B Version			Units
			Min	Typ ²	Max	
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 - RF1 to RF2	S_{21}, S_{12}	1 MHz		100		dB
		100 MHz		55		dB
		500 MHz				dB
Return Loss (On Channel) ADG901	S_{11}, S_{22}	1000 MHz		43		dB
		DC - 100 MHz		tbd		dB
		500 MHz				dB
Return Loss (On Channel) ADG902	S_{11}, S_{22}	1000 MHz		tbd		dB
		DC - 100 MHz		26		dB
		500 MHz				dB
On switching Time	t_{ON}	1000 MHz		23		dB
Off Switching Time	t_{OFF}	50% Control to 90% RF		5		ns
1 dB Compression	P_{-1dB}	50% Control to 10% RF		4		ns
Third Order Intermodulation intercept	IP_3	DC to 1000 MHz		20		dBm
		900MHz, 5dBm		35		dBm
DC ELECTRICAL CHARACTERISTICS						
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	$0 \leq V_{IN} \leq 2.75\text{ V}$			± 1	μA
CAPACITANCE³						
RF1/RF2 Port On Capacitance	$C_{RF\ ON}$	$f = 1\text{ MHz}$		2		pF
Control Input Capacitance	C_{IN}	$f = 1\text{ MHz}$		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

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

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

³ Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

PRELIMINARY TECHNICAL DATA

ADG901/ADG902

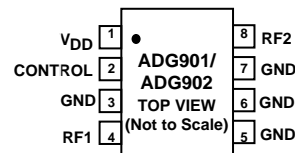
ABSOLUTE MAXIMUM RATINGS¹

(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

PIN CONFIGURATION

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



NOTES

¹Stresses 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
ADG901BRM	-40°C to +85°C	MSOP (Micro Small Outline Package)		RM-8
ADG901BCP	-40°C to +85°C	Chip Scale Package		CP-8
ADG902BRM	-40°C to +85°C	MSOP (Micro Small Outline Package)		RM-8
ADG902BCP	-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 ADG901/ADG902 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.



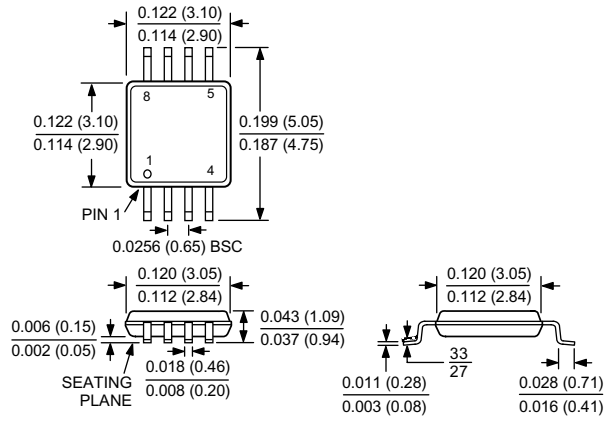
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OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

MSOP (RM-8)



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

TBD