

## ADG758/ADG759

### FEATURES

- 1.8 V to 5.5 V Single Supply
- $\pm 2.5$  V Dual Supply
- 3  $\Omega$  On Resistance
- 0.75  $\Omega$  On-Resistance Flatness
- 100 pA Leakage Currents
- 14 ns Switching Times
- Single 8-to-1 Multiplexer ADG758
- Differential 4-to-1 Multiplexer ADG759
- 20-Lead 4 mm  $\times$  4 mm Chip Scale Package
- Low Power Consumption
- TTL/CMOS-Compatible Inputs
- For Functionally Equivalent Devices in 16-Lead TSSOP Package, See ADG708/ADG709

### APPLICATIONS

- Data Acquisition Systems
- Communication Systems
- Relay Replacement
- Audio and Video Switching
- Battery-Powered Systems

### GENERAL DESCRIPTION

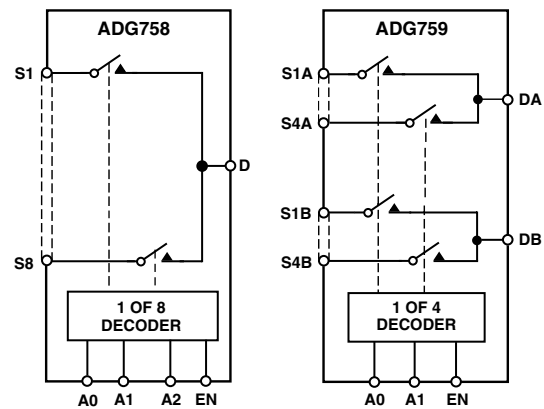
The ADG758 and ADG759 are low voltage, CMOS analog multiplexers comprising eight single channels and four differential channels respectively. The ADG758 switches one of eight inputs (S1–S8) to a common output, D, as determined by the 3-bit binary address lines A0, A1, and A2. The ADG759 switches one of four differential inputs to a common differential output as determined by the 2-bit binary address lines A0 and A1. An EN input on both devices is used to enable or disable the device. When disabled, all channels are switched OFF.

Low power consumption and operating supply range of 1.8 V to 5.5 V make the ADG758 and ADG759 ideal for battery-powered, portable instruments. All channels exhibit break-before-make switching action preventing momentary shorting when switching channels.

These switches are designed on an enhanced submicron process that provides low power dissipation yet gives high switching speed, very low on-resistance and leakage currents. On-resistance is in the region of a few ohms and is closely matched between switches and very flat over the full signal range. These parts can operate equally well as either Multiplexers or Demultiplexers, and have an input signal range that extends to the supplies.

The ADG758 and ADG759 are available in 20-lead chip scale packages.

### FUNCTIONAL BLOCK DIAGRAMS



### PRODUCT HIGHLIGHTS

1. Small 20-Lead 4 mm  $\times$  4 mm Chip Scale Packages (CSP).
2. Single/Dual Supply Operation. The ADG758 and ADG759 are fully specified and guaranteed with 3 V and 5 V single supply and  $\pm 2.5$  V dual supply rails.
3. Low  $R_{ON}$  (3  $\Omega$  Typical).
4. Low Power Consumption ( $< 0.01 \mu\text{W}$ ).
5. Guaranteed Break-Before-Make Switching Action.

### REV. 0

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# ADG758/ADG759—SPECIFICATIONS<sup>1</sup> ( $V_{DD} = 5\text{ V} \pm 10\%$ , $V_{SS} = 0\text{ V}$ , $GND = 0\text{ V}$ , unless otherwise noted.)

Parameter	B Version		Unit	Test Conditions/Comments
	+25°C	-40°C to +85°C		
<b>ANALOG SWITCH</b>				
Analog Signal Range		0 V to $V_{DD}$	V	
On-Resistance ( $R_{ON}$ )	3		$\Omega$ typ	$V_S = 0\text{ V to }V_{DD}$ , $I_{DS} = 10\text{ mA}$ ; Test Circuit 1
	4.5	5	$\Omega$ max	
On-Resistance Match Between Channels ( $\Delta R_{ON}$ )		0.4	$\Omega$ typ	
		0.8	$\Omega$ max	$V_S = 0\text{ V to }V_{DD}$ , $I_{DS} = 10\text{ mA}$
On-Resistance Flatness ( $R_{FLAT(ON)}$ )	0.75		$\Omega$ typ	$V_S = 0\text{ V to }V_{DD}$ , $I_{DS} = 10\text{ mA}$
		1.2	$\Omega$ max	
<b>LEAKAGE CURRENTS</b>				
Source OFF Leakage $I_S$ (OFF)	$\pm 0.01$		nA typ	$V_{DD} = 5.5\text{ V}$ $V_D = 4.5\text{ V}/1\text{ V}$ , $V_S = 1\text{ V}/4.5\text{ V}$ ; Test Circuit 2
	$\pm 0.1$	$\pm 0.3$	nA max	
Drain OFF Leakage $I_D$ (OFF)	$\pm 0.01$		nA typ	$V_D = 4.5\text{ V}/1\text{ V}$ , $V_S = 1\text{ V}/4.5\text{ V}$ ; Test Circuit 3
	$\pm 0.1$	$\pm 0.75$	nA max	
Channel ON Leakage $I_D$ , $I_S$ (ON)	$\pm 0.01$		nA typ	$V_D = V_S = 1\text{ V}$ , or 4.5 V, Test Circuit 4
	$\pm 0.1$	$\pm 0.75$	nA max	
<b>DIGITAL INPUTS</b>				
Input High Voltage, $V_{INH}$		2.4	V min	
Input Low Voltage, $V_{INL}$		0.8	V max	
Input Current $I_{INL}$ or $I_{INH}$	0.005		$\mu\text{A}$ typ	$V_{IN} = V_{INL}$ or $V_{INH}$
		$\pm 0.1$	$\mu\text{A}$ max	
$C_{IN}$ , Digital Input Capacitance	2		pF typ	
<b>DYNAMIC CHARACTERISTICS<sup>2</sup></b>				
$t_{TRANSITION}$	14		ns typ	$R_L = 300\ \Omega$ , $C_L = 35\text{ pF}$ , Test Circuit 5
		25	ns max	$V_{S1} = 3\text{ V}/0\text{ V}$ , $V_{S8} = 0\text{ V}/3\text{ V}$
Break-Before-Make Time Delay, $t_D$	8		ns typ	$R_L = 300\ \Omega$ , $C_L = 35\text{ pF}$
		1	ns min	$V_S = 3\text{ V}$ , Test Circuit 6
$t_{ON(EN)}$	14		ns typ	$R_L = 300\ \Omega$ , $C_L = 35\text{ pF}$
		25	ns max	$V_S = 3\text{ V}$ , Test Circuit 7
$t_{OFF(EN)}$	7		ns typ	$R_L = 300\ \Omega$ , $C_L = 35\text{ pF}$
		12	ns max	$V_S = 3\text{ V}$ , Test Circuit 7
Charge Injection	$\pm 3$		pC typ	$V_S = 2.5\text{ V}$ , $R_S = 0\ \Omega$ , $C_L = 1\text{ nF}$ ; Test Circuit 8
Off Isolation	-60		dB typ	$R_L = 50\ \Omega$ , $C_L = 5\text{ pF}$ , $f = 10\text{ MHz}$
	-80		dB typ	$R_L = 50\ \Omega$ , $C_L = 5\text{ pF}$ , $f = 1\text{ MHz}$ ; Test Circuit 9
Channel-to-Channel Crosstalk	-60		dB typ	$R_L = 50\ \Omega$ , $C_L = 5\text{ pF}$ , $f = 10\text{ MHz}$
	-80		dB typ	$R_L = 50\ \Omega$ , $C_L = 5\text{ pF}$ , $f = 1\text{ MHz}$ ; Test Circuit 10
-3 dB Bandwidth	55		MHz typ	$R_L = 50\ \Omega$ , $C_L = 5\text{ pF}$ , Test Circuit 11
$C_S$ (OFF)	13		pF typ	$f = 1\text{ MHz}$
$C_D$ (OFF)				
ADG758	85		pF typ	$f = 1\text{ MHz}$
ADG759	42		pF typ	$f = 1\text{ MHz}$
$C_D$ , $C_S$ (ON)				
ADG758	96		pF typ	$f = 1\text{ MHz}$
ADG759	48		pF typ	$f = 1\text{ MHz}$
<b>POWER REQUIREMENTS</b>				
$I_{DD}$	0.001		$\mu\text{A}$ typ	$V_{DD} = 5.5\text{ V}$ Digital Inputs = 0 V or 5.5 V
		1.0	$\mu\text{A}$ max	

## NOTES

<sup>1</sup>Temperature range is as follows: B Version: -40°C to +85°C.

<sup>2</sup>Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

SPECIFICATIONS<sup>1</sup>(V<sub>DD</sub> = 3 V ± 10%, V<sub>SS</sub> = 0 V, GND = 0 V, unless otherwise noted.)

Parameter	B Version		Unit	Test Conditions/Comments
	+25°C	-40°C to +85°C		
<b>ANALOG SWITCH</b>				
Analog Signal Range		0 V to V <sub>DD</sub>	V	
On-Resistance (R <sub>ON</sub> )	8		Ω typ	V <sub>S</sub> = 0 V to V <sub>DD</sub> , I <sub>DS</sub> = 10 mA;
	11	12	Ω max	Test Circuit 1
On-Resistance Match Between Channels (ΔR <sub>ON</sub> )		0.4	Ω typ	V <sub>S</sub> = 0 V to V <sub>DD</sub> , I <sub>DS</sub> = 10 mA
		1.2	Ω max	
<b>LEAKAGE CURRENTS</b>				
Source OFF Leakage I <sub>S</sub> (OFF)	±0.01		nA typ	V <sub>DD</sub> = 3.3 V
	±0.1	±0.3	nA max	V <sub>S</sub> = 3 V/1 V, V <sub>D</sub> = 1 V/3 V;
Drain OFF Leakage I <sub>D</sub> (OFF)	±0.01		nA typ	Test Circuit 2
	±0.1	±0.75	nA max	V <sub>S</sub> = 3 V/1 V, V <sub>D</sub> = 1 V/3 V;
Channel ON Leakage I <sub>D</sub> , I <sub>S</sub> (ON)	±0.01		nA typ	Test Circuit 3
	±0.1	±0.75	nA max	V <sub>S</sub> = V <sub>D</sub> = 1 V or 3 V, Test Circuit 4
<b>DIGITAL INPUTS</b>				
Input High Voltage, V <sub>INH</sub>		2.0	V min	
Input Low Voltage, V <sub>INL</sub>		0.8	V max	
Input Current				
I <sub>INL</sub> or I <sub>INH</sub>	0.005		μA typ	V <sub>IN</sub> = V <sub>INL</sub> or V <sub>INH</sub>
		±0.1	μA max	
C <sub>IN</sub> , Digital Input Capacitance	2		pF typ	
<b>DYNAMIC CHARACTERISTICS<sup>2</sup></b>				
t <sub>TRANSITION</sub>	18		ns typ	R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF, Test Circuit 5
		30	ns max	V <sub>S1</sub> = 2 V/0 V, V <sub>S2</sub> = 0 V/2 V
Break-Before-Make Time Delay, t <sub>D</sub>	8		ns typ	R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF
		1	ns min	V <sub>S</sub> = 2 V, Test Circuit 6
t <sub>ON(EN)</sub>	18		ns typ	R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF
		30	ns max	V <sub>S</sub> = 2 V, Test Circuit 7
t <sub>OFF(EN)</sub>	8		ns typ	R <sub>L</sub> = 300 Ω, C <sub>L</sub> = 35 pF
		15	ns max	V <sub>S</sub> = 2 V, Test Circuit 7
Charge Injection	±3		pC typ	V <sub>S</sub> = 1.5 V, R <sub>S</sub> = 0 Ω, C <sub>L</sub> = 1 nF;
				Test Circuit 8
Off Isolation	-60		dB typ	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 10 MHz
	-80		dB typ	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz;
				Test Circuit 9
Channel-to-Channel Crosstalk	-60		dB typ	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 10 MHz
	-80		dB typ	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, f = 1 MHz;
				Test Circuit 10
-3 dB Bandwidth	55		MHz typ	R <sub>L</sub> = 50 Ω, C <sub>L</sub> = 5 pF, Test Circuit 11
C <sub>S</sub> (OFF)	13		pF typ	f = 1 MHz
C <sub>D</sub> (OFF)				
ADG758	85		pF typ	f = 1 MHz
ADG759	42		pF typ	f = 1 MHz
C <sub>D</sub> , C <sub>S</sub> (ON)				
ADG758	96		pF typ	f = 1 MHz
ADG759	48		pF typ	f = 1 MHz
<b>POWER REQUIREMENTS</b>				
I <sub>DD</sub>	0.001		μA typ	V <sub>DD</sub> = 3.3 V
		1.0	μA max	Digital Inputs = 0 V or 3.3 V

## NOTES

<sup>1</sup>Temperature ranges are as follows: B Version: -40°C to +85°C.<sup>2</sup>Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

# ADG758/ADG759—SPECIFICATIONS<sup>1</sup>

**DUAL SUPPLY** ( $V_{DD} = +2.5 \pm 10\%$ ,  $V_{SS} = -2.5 \text{ V} \pm 10\%$ ,  $GND = 0 \text{ V}$  unless otherwise noted.)

Parameter	B Version		Unit	Test Conditions/Comments
	+25°C	-40°C to +85°C		
<b>ANALOG SWITCH</b>				
Analog Signal Range		$V_{SS}$ to $V_{DD}$	V	
On-Resistance ( $R_{ON}$ )	2.5 4.5	$V_{SS}$ to $V_{DD}$ 5	$\Omega$ typ $\Omega$ max	$V_S = V_{SS}$ to $V_{DD}$ , $I_{DS} = 10 \text{ mA}$ ; Test Circuit 1
On-Resistance Match Between Channels ( $\Delta R_{ON}$ )		0.4 0.8	$\Omega$ typ $\Omega$ max	$V_S = V_{SS}$ to $V_{DD}$ , $I_{DS} = 10 \text{ mA}$
On-Resistance Flatness ( $R_{FLAT(ON)}$ )	0.6	1.0	$\Omega$ typ $\Omega$ max	$V_S = V_{SS}$ to $V_{DD}$ , $I_{DS} = 10 \text{ mA}$
<b>LEAKAGE CURRENTS</b>				
Source OFF Leakage $I_S$ (OFF)	$\pm 0.01$ $\pm 0.1$	$\pm 0.3$	nA typ nA max	$V_{DD} = +2.75 \text{ V}$ , $V_{SS} = -2.75 \text{ V}$ $V_S = +2.25 \text{ V}/-1.25 \text{ V}$ , $V_D = -1.25 \text{ V}/+2.25 \text{ V}$ ; Test Circuit 2
Drain OFF Leakage $I_D$ (OFF)	$\pm 0.01$ $\pm 0.1$	$\pm 0.75$	nA typ nA max	$V_S = +2.25 \text{ V}/-1.25 \text{ V}$ , $V_D = -1.25 \text{ V}/+2.25 \text{ V}$ ; Test Circuit 3
Channel ON Leakage $I_D$ , $I_S$ (ON)	$\pm 0.01$ $\pm 0.1$	$\pm 0.75$	nA typ nA max	$V_S = V_D = +2.25 \text{ V}/-1.25 \text{ V}$ , Test Circuit 4
<b>DIGITAL INPUTS</b>				
Input High Voltage, $V_{INH}$		1.7	V min	
Input Low Voltage, $V_{INL}$		0.7	V max	
Input Current $I_{INL}$ or $I_{INH}$	0.005	$\pm 0.1$	$\mu\text{A}$ typ $\mu\text{A}$ max	$V_{IN} = V_{INL}$ or $V_{INH}$
$C_{IN}$ , Digital Input Capacitance	2		pF typ	
<b>DYNAMIC CHARACTERISTICS<sup>2</sup></b>				
$t_{TRANSITION}$	14	25	ns typ ns max	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ , Test Circuit 5 $V_S = 1.5 \text{ V}/0 \text{ V}$ , Test Circuit 5
Break-Before-Make Time Delay, $t_D$	8	1	ns typ ns min	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ $V_S = 1.5 \text{ V}$ , Test Circuit 6
$t_{ON(EN)}$	14	25	ns typ ns max	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ $V_S = 1.5 \text{ V}$ , Test Circuit 7
$t_{OFF(EN)}$	8	15	ns typ ns max	$R_L = 300 \Omega$ , $C_L = 35 \text{ pF}$ $V_S = 1.5 \text{ V}$ , Test Circuit 7
Charge Injection	$\pm 3$		pC typ	$V_S = 0 \text{ V}$ , $R_S = 0 \Omega$ , $C_L = 1 \text{ nF}$ ; Test Circuit 8
Off Isolation	-60 -80		dB typ dB typ	$R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 10 \text{ MHz}$ $R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 1 \text{ MHz}$ ; Test Circuit 9
Channel-to-Channel Crosstalk	-60 -80		dB typ dB typ	$R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 10 \text{ MHz}$ $R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , $f = 1 \text{ MHz}$ ; Test Circuit 10
-3 dB Bandwidth	55		MHz typ	$R_L = 50 \Omega$ , $C_L = 5 \text{ pF}$ , Test Circuit 11
$C_S$ (OFF)	13		pF typ	$f = 1 \text{ MHz}$
$C_D$ (OFF)				
ADG758	85		pF typ	$f = 1 \text{ MHz}$
ADG759	42		pF typ	$f = 1 \text{ MHz}$
$C_D$ , $C_S$ (ON)				
ADG758	96		pF typ	$f = 1 \text{ MHz}$
ADG759	48		pF typ	$f = 1 \text{ MHz}$
<b>POWER REQUIREMENTS</b>				
$I_{DD}$	0.001	1.0	$\mu\text{A}$ typ $\mu\text{A}$ max	$V_{DD} = 2.75 \text{ V}$ Digital Inputs = 0 V or 2.75 V
$I_{SS}$	0.001	1.0	$\mu\text{A}$ typ $\mu\text{A}$ max	$V_{SS} = -2.75 \text{ V}$ Digital Inputs = 0 V or 2.75 V

## NOTES

<sup>1</sup>Temperature range is as follow: B Version: -40°C to +85°C.

<sup>2</sup>Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

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

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

V <sub>DD</sub> to V <sub>SS</sub> .....	7 V
V <sub>DD</sub> to GND .....	-0.3 V to +7 V
V <sub>SS</sub> to GND .....	+0.3 V to -3.5 V
Analog Inputs <sup>2</sup> .....	V <sub>SS</sub> - 0.3 V to V <sub>DD</sub> + 0.3 V or 30 mA, Whichever Occurs First
Digital Inputs <sup>2</sup> .....	-0.3 V to V <sub>DD</sub> + 0.3 V or 30 mA, Whichever Occurs First
Peak Current, S or D .....	100 mA
.....	(Pulsed at 1 ms, 10% Duty Cycle max)
Continuous Current, S or D .....	30 mA
Operating Temperature Range	
Industrial (B Version) .....	-40°C to +85°C
Storage Temperature Range .....	-65°C to +150°C
Junction Temperature .....	150°C

Chip Scale Package,

θ <sub>JA</sub> Thermal Impedance .....	32°C/W
Lead Temperature, Soldering	
Vapor Phase (60 sec) .....	215°C
Infrared (15 sec) .....	220°C

## 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; 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.

<sup>2</sup>Overt voltages at EN, A, S, or D will be clamped by internal diodes. Current should be limited to the maximum ratings given.

## 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 ADG758/ADG759 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.



**Table I. ADG758 Truth Table**

A2	A1	A0	EN	Switch Condition
X	X	X	0	NONE
0	0	0	1	1
0	0	1	1	2
0	1	0	1	3
0	1	1	1	4
1	0	0	1	5
1	0	1	1	6
1	1	0	1	7
1	1	1	1	8

X = Don't Care

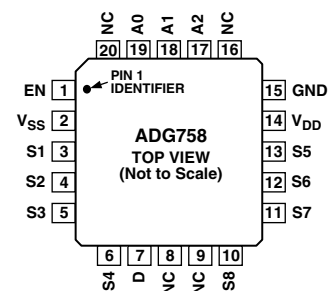
**Table II. ADG759 Truth Table**

A1	A0	EN	ON Switch Pair
X	X	0	NONE
0	0	1	1
0	1	1	2
1	0	1	3
1	1	1	4

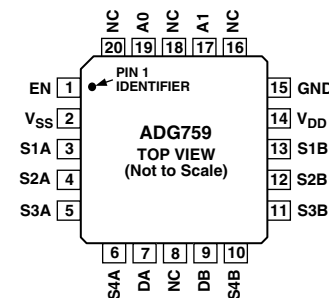
X = Don't Care

## PIN CONFIGURATIONS

### CSP



NC = NO CONNECT  
EXPOSED PAD TIED TO SUBSTRATE, V<sub>SS</sub>



NC = NO CONNECT  
EXPOSED PAD TIED TO SUBSTRATE, V<sub>SS</sub>

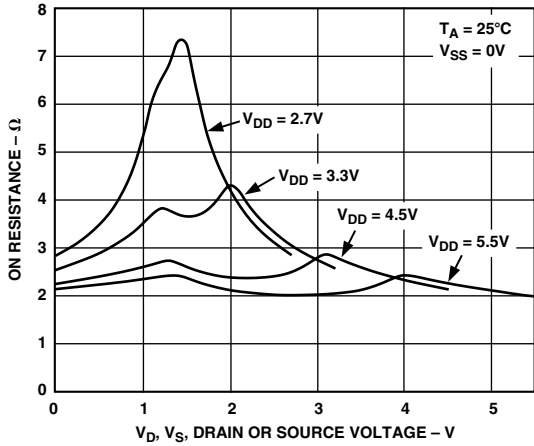
## ORDERING GUIDE

Model	Temperature Range	Package Description	Package Option
ADG758BCP	-40°C to +85°C	20-Lead Chip Scale Package (CSP)	CP-20
ADG759BCP	-40°C to +85°C	20-Lead Chip Scale Package (CSP)	CP-20

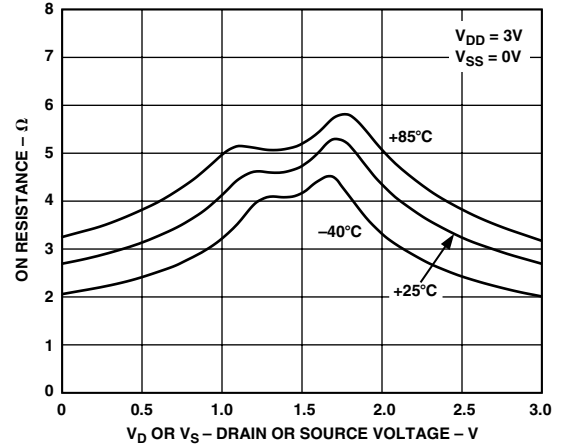
## TERMINOLOGY

$V_{DD}$	Most positive power supply potential.
$V_{SS}$	Most negative power supply in a dual supply application. In single supply applications, this should be tied to ground at the device.
GND	Ground (0 V) Reference.
S	Source Terminal. May be an input or output.
D	Drain Terminal. May be an input or output.
IN	Logic Control Input.
$R_{ON}$	Ohmic resistance between D and S.
$R_{FLAT(ON)}$	Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal range.
$I_S$ (OFF)	Source leakage current with the switch “OFF.”
$I_D$ (OFF)	Drain leakage current with the switch “OFF.”
$I_D, I_S$ (ON)	Channel leakage current with the switch “ON.”
$V_D$ ( $V_S$ )	Analog voltage on terminals D, S.
$C_S$ (OFF)	“OFF” switch source capacitance. Measured with reference to ground.
$C_D$ (OFF)	“OFF” switch drain capacitance. Measured with reference to ground.
$C_D, C_S$ (ON)	“ON” switch capacitance. Measured with reference to ground.
$C_{IN}$	Digital Input Capacitance.
$t_{TRANSITION}$	Delay time measured between the 50% and 90% points of the digital inputs and the switch “ON” condition when switching from one address state to another.
$t_{ON}$ (EN)	Delay time between the 50% and 90% points of the EN digital input and the switch “ON” condition.
$t_{OFF}$ (EN)	Delay time between the 50% and 90% points of the EN digital input and the switch “OFF” condition.
$t_{OPEN}$	“OFF” time measured between the 80% points of both switches when switching from one address state to another.
Off Isolation	A measure of unwanted signal coupling through an “OFF” switch.
Crosstalk	A measure of unwanted signal which is coupled through from one channel to another as a result of parasitic capacitance.
Charge Injection	A measure of the glitch impulse transferred from the digital input to the analog output during switching.
On Response	The frequency response of the “ON” switch.
On Loss	The loss due to the ON resistance of the switch.
$V_{INL}$	Maximum input voltage for Logic “0.”
$V_{INH}$	Minimum input voltage for Logic “1.”
$I_{INL}$ ( $I_{INH}$ )	Input current of the digital input.
$I_{DD}$	Positive Supply Current.
$I_{SS}$	Negative Supply Current.

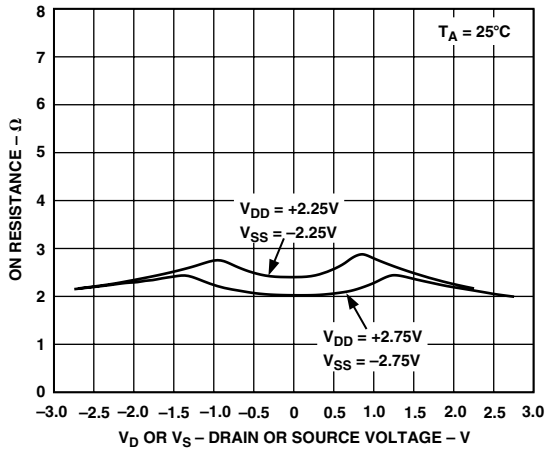
# Typical Performance Characteristics—ADG758/ADG759



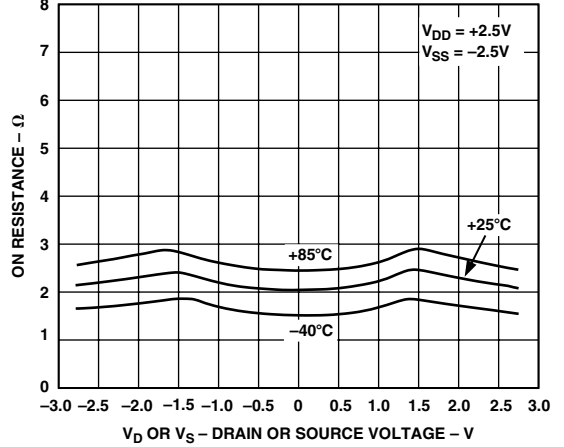
TPC 1. On Resistance as a Function of  $V_D$  ( $V_S$ ) for Single Supply



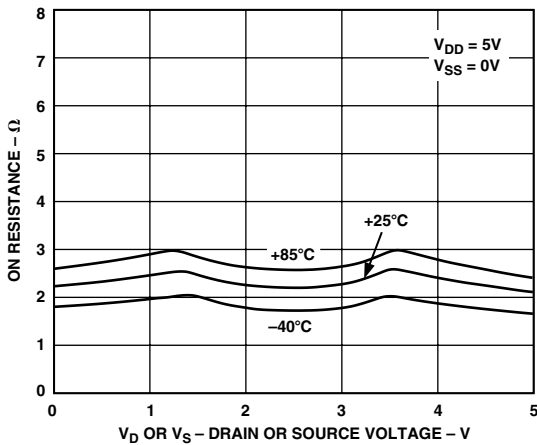
TPC 4. On Resistance as a Function of  $V_D$  ( $V_S$ ) for Different Temperatures, Single Supply



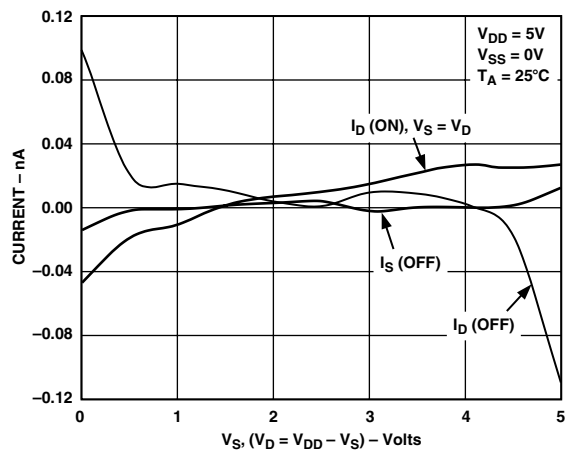
TPC 2. On Resistance as a Function of  $V_D$  ( $V_S$ ) for Dual Supply



TPC 5. On Resistance as a Function of  $V_D$  ( $V_S$ ) for Different Temperatures, Dual Supply

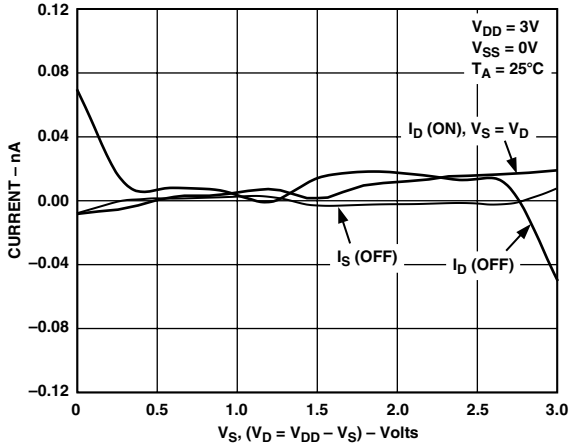


TPC 3. On Resistance as a Function of  $V_D$  ( $V_S$ ) for Different Temperatures, Single Supply

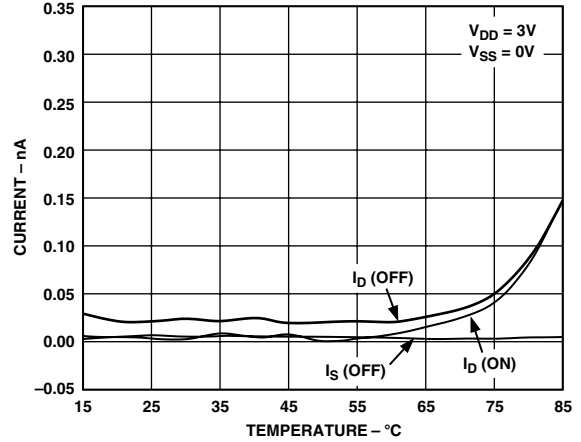


TPC 6. Leakage Currents as a Function of  $V_D$  ( $V_S$ )

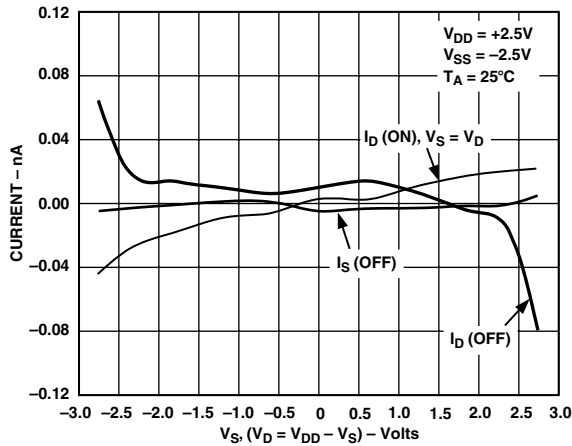
# ADG758/ADG759



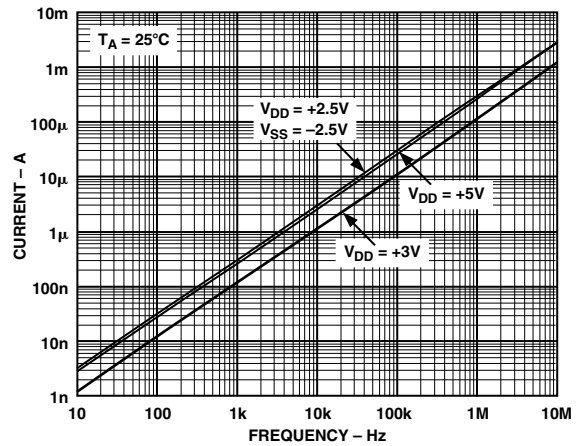
TPC 7. Leakage Currents as a Function of  $V_D$  ( $V_S$ )



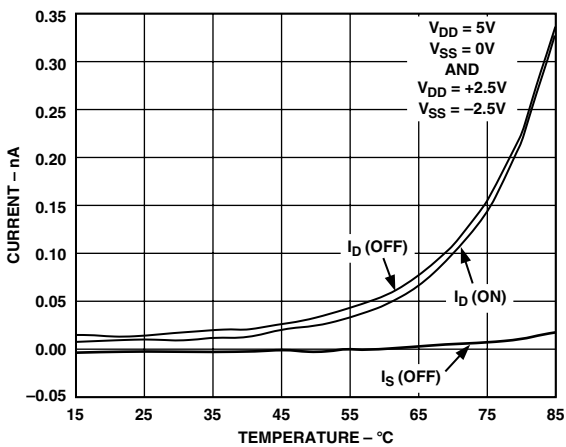
TPC 10. Leakage Currents as a Function of Temperature



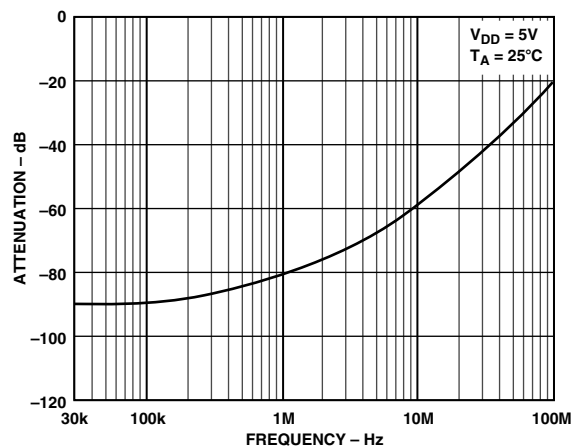
TPC 8. Leakage Currents as a Function of  $V_D$  ( $V_S$ )



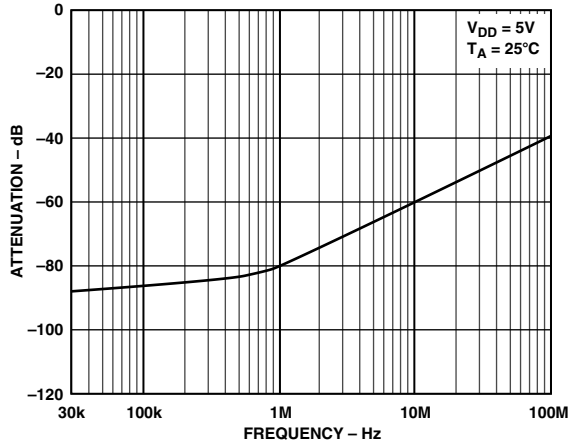
TPC 11. Supply Current vs. Input Switching Frequency



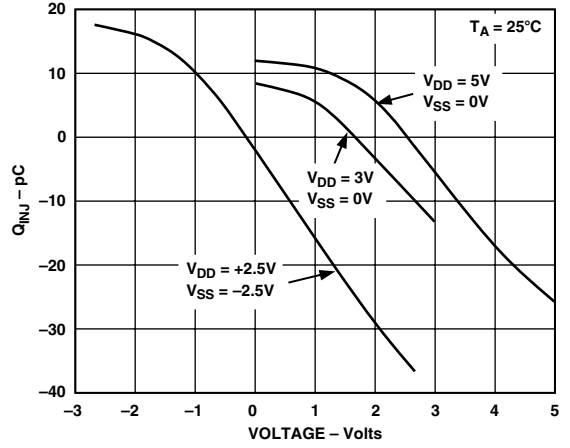
TPC 9. Leakage Currents as a Function of Temperature



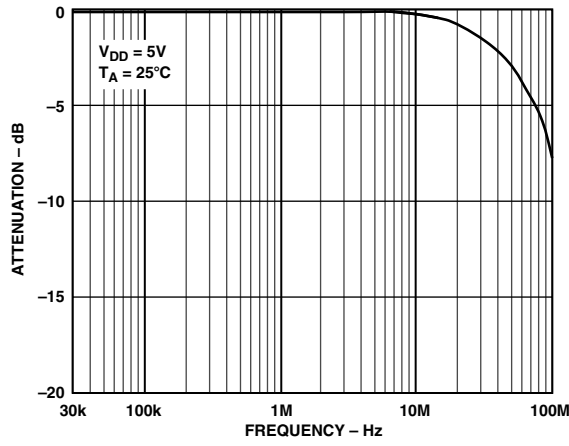
TPC 12. Off Isolation vs. Frequency



TPC 13. Crosstalk vs. Frequency



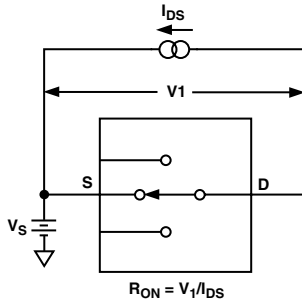
TPC 15. Charge Injection vs. Source Voltage



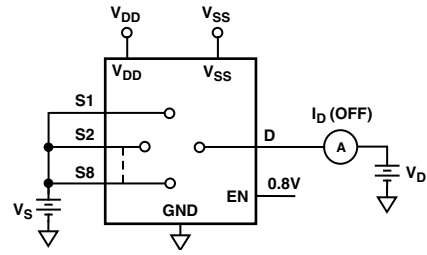
TPC 14. On Response vs. Frequency

# ADG758/ADG759

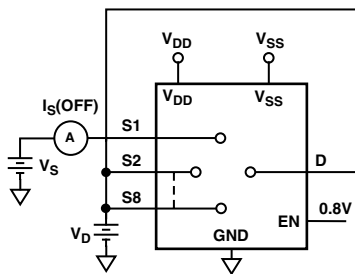
## Test Circuits



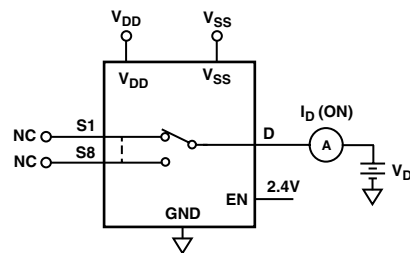
Test Circuit 1. On Resistance



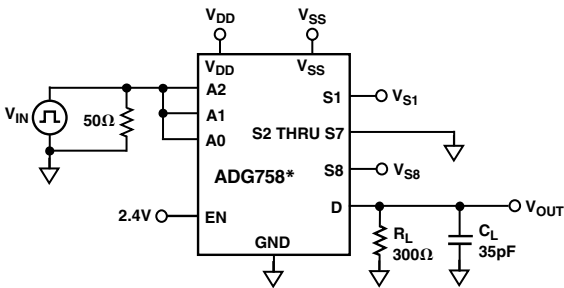
Test Circuit 3.  $I_D$  (OFF)



Test Circuit 2.  $I_S$  (OFF)

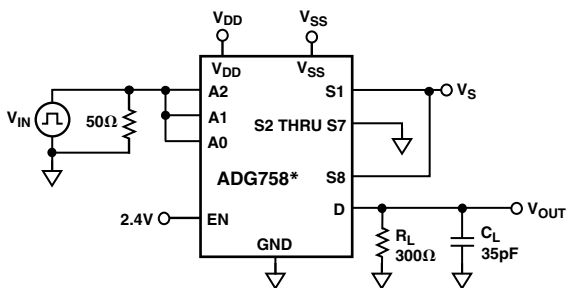
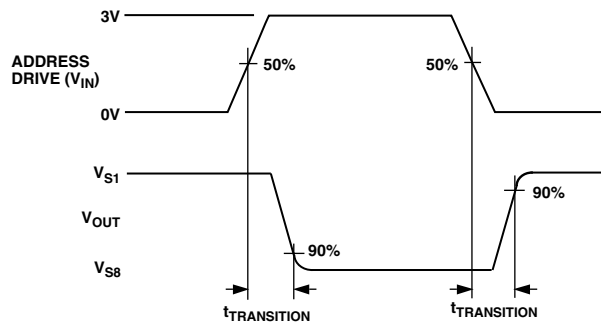


Test Circuit 4.  $I_D$  (ON)



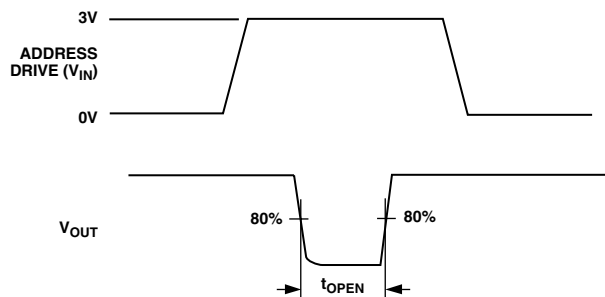
\*SIMILAR CONNECTION FOR ADG759

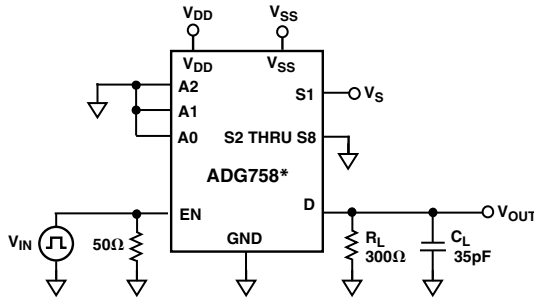
Test Circuit 5. Switching Time of Multiplexer,  $t_{\text{TRANSITION}}$



\*SIMILAR CONNECTION FOR ADG759

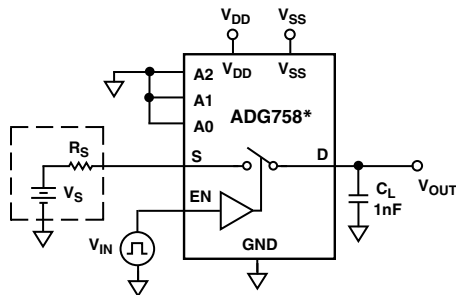
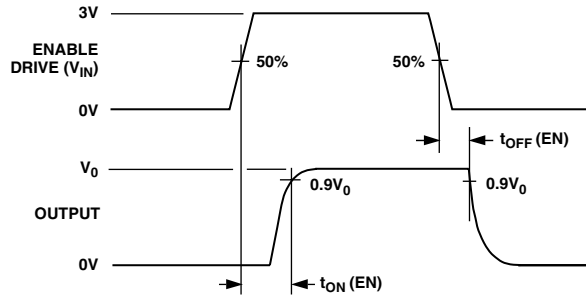
Test Circuit 6. Break-Before-Make Delay,  $t_{\text{OPEN}}$





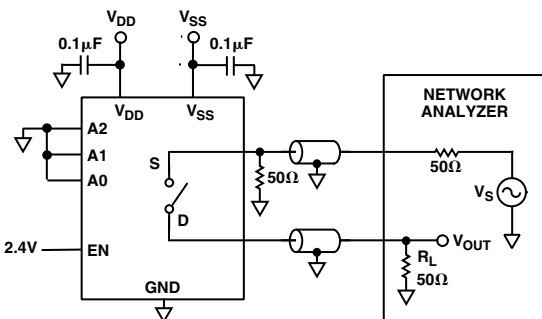
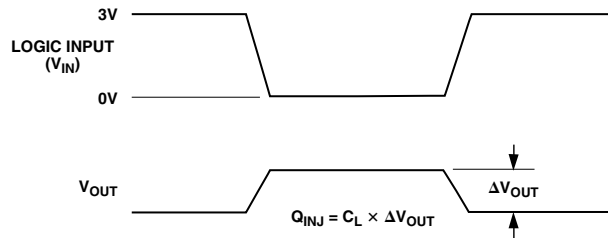
\*SIMILAR CONNECTION FOR ADG759

Test Circuit 7. Enable Delay,  $t_{ON}(EN)$ ,  $t_{OFF}(EN)$



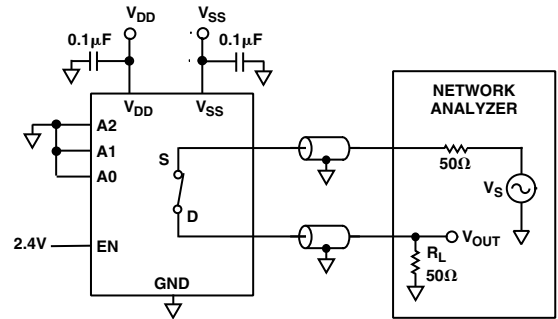
\*SIMILAR CONNECTION FOR ADG759

Test Circuit 8. Charge Injection



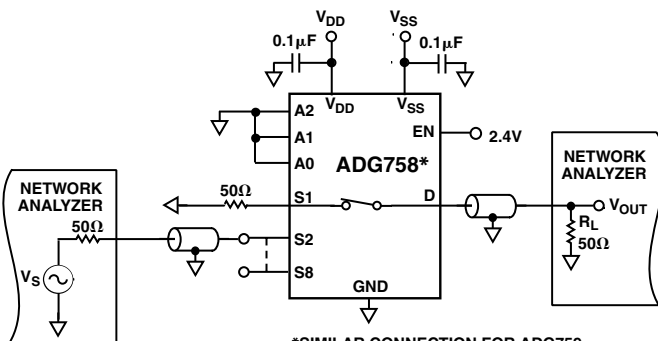
$$\text{OFF ISOLATION} = 20 \text{ LOG } \frac{V_{\text{OUT}}}{V_s}$$

Test Circuit 9. OFF Isolation



$$\text{INSERTION LOSS} = 20 \text{ LOG } \frac{V_{\text{OUT WITH SWITCH}}}{V_{\text{OUT WITHOUT SWITCH}}}$$

Test Circuit 11. Bandwidth



\*SIMILAR CONNECTION FOR ADG759  
CHANNEL-TO-CHANNEL  
CROSSTALK =  $20 \text{ LOG } \frac{V_{\text{OUT}}}{V_s}$

Test Circuit 10. Channel-to-Channel Crosstalk

## Power-Supply Sequencing

When using CMOS devices, care must be taken to ensure correct power-supply sequencing. Incorrect power-supply sequencing can result in the device being subjected to stresses beyond the maximum ratings listed in the data sheet. Digital and analog inputs should always be applied after power supplies and ground. For single supply operation,  $V_{SS}$  should be tied to GND as close to the device as possible.

## OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

### 20-Lead Chip Scale Package (CP-20)

