





0.4- Ω , Low Voltage, Dual SPST Analog Switch

DESCRIPTION

The DG2747, DG2748, and DG2749 are high performance, low on-resistance analog switches of dual SPST configuration.

Built on Vishay Siliconix's sub-micro CMOS technology, the DG2747/2748/2749 achieve switch on-resistance of 0.4 Ω at 2.7 V V+ and 0.3 Ω at 4.3 V V+. It provides 0.1 Ω flatness at 2.7 V V+, and total harmonic distortion to 0.03 % (frequency range 20 Hz to 20 kHz). It achieves - 72 dB off-isolation and - 100 dB crosstalk at 100 kHz. Its - 3 dB bandwidth is up to 78 MHz.

It can switch signals with amplitudes of up to $\rm V_{\rm CC}$ to be transmitted in either direction.

The select pins of the control logic can tolerate voltages above V+. Logic high is 1.4 V to make it compatible with many low voltage digital control circuits.

Combining wide operation voltage, low power, high speed, low on-resistance and small physical size, the DG2747/2748/ 2749 are ideal for portable and battery powered applications requiring high performance and efficient use of board space.

The DG2747/2748/2749 come in a small miniQFN-8lead package ($1.4 \times 1.4 \times 0.55$ mm). As a committed partner to the community and the environment, Vishay Siliconix manufactures this product with the lead (Pb)-free device terminations and is 100 % RoHS compliant.

FEATURES

- Wide operation voltage range: 1.6 V to 4.3 V
- Low on-resistance: 0.4 Ω typ. at 2.7 V
- Low voltage logic threshold:
 V_{th(high)} = 1.4 V at V+ = 3 V
- 100 dB crosstalk
- > 250 mA latch up current per JESD78
 - Switch exceeds 7 kV ESD/HBM

BENEFITS

- Ultra small miniQFN8 package of 1.4 x 1.4 x 0.55 mm
- High fidelity audio switch
- Reed relay replacement
- Low power consumption

APPLICATIONS

- Cellular phones
- Portable media player
- GPS
- PCMCIA cards
- Medical and test equipment

FUNCTIONAL BLOCK DIAGRAM AND PIN CONFIGURATION





ROHS COMPLIANT

DG2747/DG2748/DG2749

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TRUTH TABL	E					
Logio	DG2747		DG2748		DG2749	
Logic	COM_1 and NO_1	COM_2 and NO_2	COM_1 and NC_1	COM_2 and NC_2	COM_1 and NC_1	COM_2 and NO_2
Low	OFF	OFF	ON	ON	ON	OFF
High	ON	ON	OFF	OFF	OFF	ON

ORDERING INFORMATION						
Temp. Range	Package	Part Number				
- 40 °C to 85°C	miniQFN-8L	DG2747DN-T1-E4 DG2748DN-T1-E4 DG2749DN-T1-E4				

ABSOLUTE MAXIMUM RAT	TINGS $T_A = 25 ^{\circ}C$, unless other	erwise noted		
Parameter		Limit	Unit	
Deference to CND	V+	- 0.3 to 5.0		
Reference to GND	IN, COM, NC, NO ^a	- 0.3 to (V+ + 0.3)	v	
Current (Any terminal except NO, NC or	COM)	30		
Continuous Current (NO, NC, or COM)		± 300	mA	
Peak Current (Pulsed at 1 ms, 10 % duty	cycle)	± 500		
Storage Temperature (D Suffix)		- 65 to 150	°C	
Power Dissipation (Packages) ^b	miniQFN-8L ^c	190	mW	
lotes:	· · ·		•	

a. Signals on NC, NO, or COM or IN exceeding V+ will be clamped by internal diodes. Limit forward diode current to maximum current ratings.

b. All leads welded or soldered to PC board.

c. Derate 2.4 mW/°C above 70 °C.



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SPECIFICATIONS $V + = 3 V$								
		Test Conditions Unless Otherwise Specified		Limits - 40 to 85 °C				
Parameter	Symbol	$V + = 3 V, \pm 10 \%, V_{IN} = 0.4 V \text{ or } 1.4 V^{e}$	Temp. ^a	Min. ^b	Typ. ^c	Max. ^b	Unit	
Analog Switch								
Analog Signal Range ^d	V _{analog}	R _{DS(on)}	Full	0		V+	V	
	R _{DS(on)}	$V + = 2.7 \text{ V}, \text{ I}_{\text{NO/NC}} = 100 \text{ mA}, \text{ V}_{\text{COM}} = 0.5 \text{ V}$	Deem		0.4	0.6	Ω	
On Desistance		V+ = 2.7 V, I _{NO/NC} = 100 mA, V _{COM} = 1.5 V	Room		0.4	0.6		
On-Resistance		$V_{+} = 2.7 \text{ V}, \text{ I}_{\text{NO/NC}} = 100 \text{ mA}, \text{ V}_{\text{COM}} = 0.5 \text{ V}$	E.J.II			0.7		
		V + = 2.7 V, $I_{NO/NC}$ = 100 mA, V_{COM} = 1.5 V	Full			0.7		
R _{ON} Match ^d	ΔR_{ON}	V+ = 2.7 V, I _{NO/NC} = 100 mA, V _{COM} = 0.5 V, 1.5 V	Room	Room		0.03		
R Resistance Flatness ^d	R _{ON}	V+ = 2.7 V, I _{NO/NC} = 100 mA,	Boom		0.1	0.2		
NON RESISTANCE Flatness	flatness	V _{COM} = 0.5 V, 1.5 V	noom		0.1	0.2		
	his nise in	V+ = 4.3 V, V _{NO/NC} = 1.0 V/3.3 V,	Room	- 2		2	nA	
Switch Off Leakage	'NO/NC(off)		Full	- 10		10		
Current	I _{COM(off)}	V _{COM} = 3.3 V/1.0 V	Room	- 2		2		
			Full	- 10		10		
Channel-On Leakage	I _{COM(on)}	$V_{+} = 4.3 V, V_{NO/NC} = V_{COM} = 3.3 V/1.0 V$	Room	- 2		2		
Current			Full	- 10		10		
Digital Control								
Input High Voltage	V _{INH}		Full	1.4			V	
Input Low Voltage	V _{INL}		Full			0.4		
Input Current	$I_{\rm INL}$ or $I_{\rm INH}$	V _{IN} = 0 or V+	Full	- 1		1	μΑ	
Dynamic Characteristics								
	t _{ON}		Room		14	25	ns	
		V+ = 2.7 V to 3.6 V, V_{NO} or V_{NC} = 1.5 V,	Full			27		
Turn Off Timo ^e	t _{OFF}	R _L = 50 Ω, C _L = 35 pF	Room		12	25		
			Full			27		
Charge Injection ^d	Q	C_L = 1 nF, R_{GEN} = 0 Ω , V_{GEN} = 0 V	Room		10		рС	
Off-Isolation ^d	O _{IRR}	$R_L = 50 \Omega$, $C_L = 5 pF$, $f = 1 MHz$			- 52		dB	
OITISUIALIUIT		R_L = 50 Ω, C_L = 5 pF, f = 100 kHz	Boom		- 72			
Croostall	X _{TALK}	$R_L = 50 \Omega$, $C_L = 5 pF$, $f = 1 MHz$			- 80		uD	
Olossian		R_L = 50 Ω, C_L = 5 pF, f = 100 kHz			- 100			
3 dB bandwidth ^d		$R_L = 50 $ Ω, $C_L = 5 $ pF	Room		78		MHz	
Source Off Capacitance ^d	C _{NX(off)}	f = 1 MHz, V _{NX} = 0 V	Room		75			
Drain Off Capacitance ^d	C _{COM(off)}	f = 1 MHz, V _{COM} = 0 V	Room		55		pF	
Drain On Capacitance ^d	C _{COM(on)}	$f = 1 MHz, V_{COM} = V_{NX} = 0 V$	Room		100			
Total Harmonic Distortion ^d	THD	V+ = 2.7 V to 3.6 V, V _{IN} = 0.5 Vp-p F = 20 Hz to 20 kHz	Room		0.03		%	
Power Supply								
Power Supply Range	V+			1.6		4.3	V	
Power Supply Current	I+	V _{IN} = 0 or V+	Full			1.0	μΑ	

Notes:

a. Room = 25 $^{\circ}$ C, Full = as determined by the operating suffix.

b. The algebraic convention whereby the most negative value is a minimum and the most positive a maximum, is used in this data sheet.

c. Typical values are for design aid only, not guaranteed nor subject to production testing.

d. Guarantee by design, not subjected to production test.

e. V_{IN} = input voltage to perform proper function.

Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

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V+ = 2.7 V

+ 25 °C

2

I_{COM(off)}

2.5

V+ = 4.3 V Ξ

3

1.5

1

INO(off)

TYPICAL CHARACTERISTICS $T_A = 25$ °C, unless otherwise noted





2 Analog Voltage (V) Charge Injection vs. Analog Voltage

2.5

1.5

3

3.5

4



DG2747/DG2748/DG2749

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DG2747/DG2748/DG2749

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TEST CIRCUITS







Logic "1" = Switch On Logic input waveforms inverted for switches that have the opposite logic sense.





Figure 2. Break-Before-Make (DG2749)

Figure 1. Switching Time











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TEST CIRCUITS



Figure 4. Off-Isolation







Figure 6. Channel Off/On Capacitance

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