

DIO1523

0.75Ω, Ultra Low On-Resistance Dual, SPDT Analog Switch

Features

- Switch Type: SPDT(2X)
- Voltage Operation: 1.8V to 4.2V
- Ultra-Low On Resistance: 0.75Ω@+4.2V
- -3dB Bandwidth: 40MHz
- High Off-isolation: -78dB@100kHz
- Low Crosstalk: -103dB@100kHz
- Excellent On Resistance Matching: 0.04Ω
- Low Total Harmonic Distortion (THD)
- Rail-to-Rail Input and Output Operation
- Break-Before-Make Switching
- Green Packaged: DQFN-10
- 8kV HBM ESD

Descriptions

The DIO1523 is a dual Single-Pole, Double-Throw (SPDT) analog switch. DIO1523 operates from a single 1.8V to 4.2V supply and features an ultra-low on resistance of 0.75Ω at a +4.2V supply and $T_A = 25^{\circ}\text{C}$. This device is fabricated with sub-micron CMOS technology to achieve fast switching speeds and is designed for break-before-make operation.

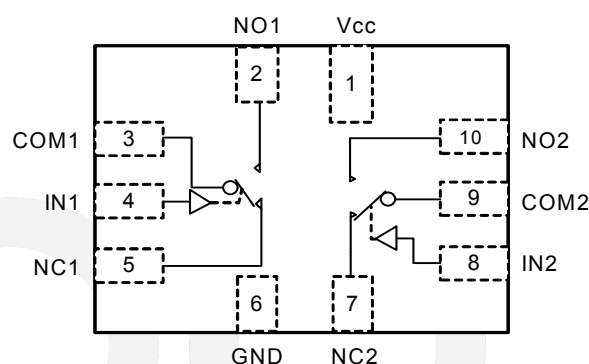
DIO1523 guarantees 0.04Ω on-resistance matching between switches, on-resistance flatness over the signal range, high off-isolation and low crosstalk, which ensures excellent linearity and low distortion when switching audio signals. DIO1523 consists of two normally open and two normally close switches.

DIO1523 provides packages with Green 10-lead DQFN.

Applications

- Cell-Phone/PDA
- MP3/MP4/PMP
- Portable Instrumentation
- Battery Powered Communications
- Computer Peripherals

Block Diagram



Ordering Information

Order Part Number	Top Marking		T_A	Package	
DIO1523LP10	YWGC	Green	-40 to +85°C	DQFN-10	Tape & Reel, 3000



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Pin Assignment

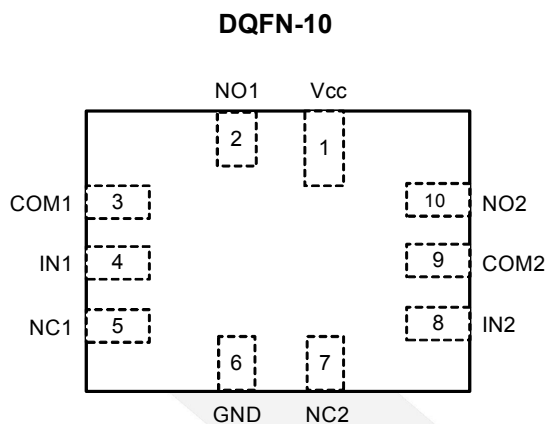


Figure 1 Top View

Pin Descriptions

Pin Name	Description
V _{CC} /GND	Power Supply
IN1, IN2	Digital control pin to connect the COM terminal to the NO or NC terminals
COM1, COM2	Common terminal
NO1, NO2	Normally-open terminal
NC1, NC2	Normally-closed terminal

Truth Table

IN1, IN2	NO	NC
L	OFF	ON
H	ON	OFF



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Absolute Maximum Ratings

Stresses beyond those listed under "Absolute Maximum Rating" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other condition 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.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply Voltage	-0.3	+4.6	V
V_{CNTRL}	DC input Voltage	-0.3	$(V_{CC}) + 0.3$	V
V_{SW}	DC input I/O Voltage	-0.3	$(V_{CC}) + 0.3$	V
I_{IK}	DC input Diode current	-50		mA
I_{OUT}	DC output current		120	mA
T_{STG}	Storage Temperature	-65	+150	$^{\circ}\text{C}$
ESD	HBM, JEDEC: JESD22-A114		8000	V
	CDM, JEDEC : JESD22-C101		2000	

Recommend Operating Conditions

The Recommended Operating Conditions table defines the conditions for actual device operation. Recommended Operating conditions are specified to ensure optimal performance to the datasheet specifications. DIOO does not Recommend exceeding them or designing to Absolute Maximum Ratings.

Symbol	Parameter	Min.	Max.	Unit
V_{CC}	Supply voltage	1.8	4.2	V
V_{CNTRL}	Control input voltage (IN1/IN2)	0	V_{CC}	V
V_{SW}	Switch I/O voltage	0	V_{CC}	V
T_A	Operating Temperature	-40	85	$^{\circ}\text{C}$



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All typical value are at $V_{CC}=+4.2V$, $GND=0V$, $V_{IH}=+1.6V$, $V_{IL}=0.5V$, $T_A=25^{\circ}C$ unless otherwise specified.

Symbol	Parameter	Conditions	V_{CC} /V	Temp	Min	Typ	Max	Unit
Analog Switch Characteristics								
R_{ON}	On-Resistance	V_{NO} , V_{NC} , or $V_{COM}=1V$, $I_{COM} = -100mA$	4.2	$+25^{\circ}C$		0.75	0.85	Ω
				-40 to $85^{\circ}C$			0.95	Ω
ΔR_{ON}	On-Resistance Match Between Channels	V_{NO} , V_{NC} or $V_{COM}=1V$, $I_{COM} = -100mA$	4.2	$+25^{\circ}C$		0.03	0.15	Ω
				-40 to $85^{\circ}C$			0.20	Ω
$R_{FLAT(ON)}$	On-Resistance Flatness	V_{NO} , V_{NC} or $V_{COM}=1V$, 2.5V $I_{COM} = -100mA$	4.2	$+25^{\circ}C$		0.15	0.23	Ω
				-40 to $85^{\circ}C$			0.30	Ω
$I_{NC(OFF)}$, $I_{NO(OFF)}$	Source OFF Leakage Current	V_{NO} , $V_{NC}=3.3V$, 0.3V $V_{COM} = 0.3V/3.3V$	4.2	-40 to $85^{\circ}C$			50	nA
$I_{NC(ON)}$, $I_{NO(ON)}$ $I_{COM(ON)}$	Channel ON Leakage Current	V_{NO} , $V_{NC}=3.3V$, 0.3V or floating $V_{COM} = 0.3V/3.3V$	4.2	-40 to $85^{\circ}C$			50	nA
Digital Inputs								
V_{INH}	Input High Voltage			-40 to $85^{\circ}C$	1.6			V
V_{INL}	Input Low Voltage			-40 to $85^{\circ}C$			0.5	V
I_{IN}	Input Leakage Current	$V_{CC}=4.2V$, $V_{IN}=0V$, or 4.2V		-40 to $85^{\circ}C$			1	μA
Dynamic Characteristics								
t_{ON}	Turn-On Time	$V_{IN}=2.1V$ to 0V, $R_L=50\Omega$, $C_L=35pF$, V_{NO1} or V_{NO2} or $V_{NC2}=2.1V$,		$+25^{\circ}C$		25		ns
t_{OFF}	Turn-Off Time	$V_{IN}=2.1V$ to 0V, $R_L=50\Omega$, $C_L=35pF$, V_{NO1} or V_{NO2} or $V_{NC2}=2.1V$,		$+25^{\circ}C$		35		ns
t_D	Break-Before-Make Time Delay	$V_{IN}=2.1V$ to 0V, $R_L=50\Omega$, $C_L=35pF$, V_{NO1} or V_{NO2} or $V_{NC2}=2.1V$,		$+25^{\circ}C$		45		ns
O_{ISO}	Off Isolation	$V_{BIAS}=2.1V$, Signal=0dBm	100kHz	$+25^{\circ}C$		-78		dB
			1MHz			-58		
X_{TALK}	Channel-to-Channel Crosstalk	$V_{BIAS}=2.1V$, Signal=0dBm	100kHz	$+25^{\circ}C$		-100		dB
			1MHz			-75		
BW	-3dB Bandwidth	$V_{BIAS}=2.1V$, Signal=0dBm		$+25^{\circ}C$		75		MHz
THD	Total Harmonic Distortion	$f=20Hz$ to 20kHz, $R_L=32\Omega$, $V_{SW}=1V_{PP}$		$+25^{\circ}C$		0.02		%
Q	Charge Injection Select Input to Common I/O	$V_G=0V$, $R_S=0\Omega$, $C_L=1.0nF$		$+25^{\circ}C$		4.0		pC
C_{ON}	Channel ON Capacitance			$+25^{\circ}C$		106		pF



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Symbol	Parameter	Conditions	V_{CC}/V	Temp	Min	Typ	Max	Unit
Power Requirements								
V_{CC}	Power Supply Range			-40 to 85°C	1.8		4.2	V
I_{CC}	Quiescent Supply Current	$V_{IN}=0V$ or V_{CC}	4.2	-40 to 85°C			500	nA
I_{CCT}	Increase in I_{CC} per Input	Input at 2.6V	4.2	-40 to 85°C			5	μA
		Input at 1.8V					10	

Test Diagrams

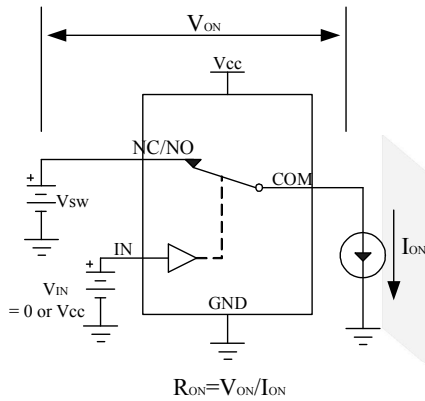


Figure 2 Switch on resistor

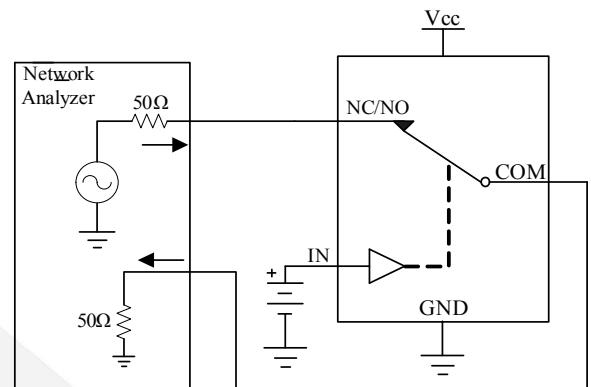


Figure 5 Bandwidth

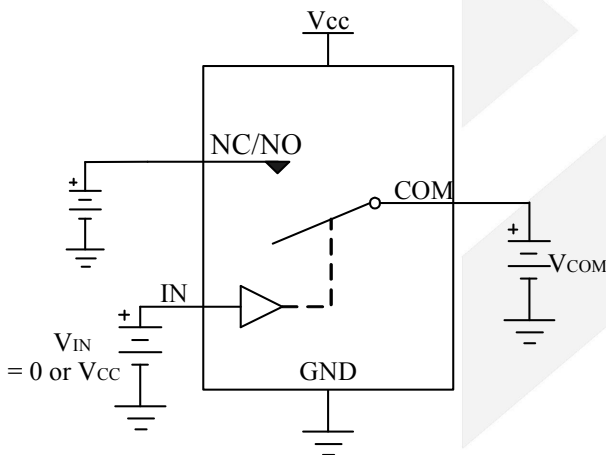


Figure 3 Switch Off Leakage

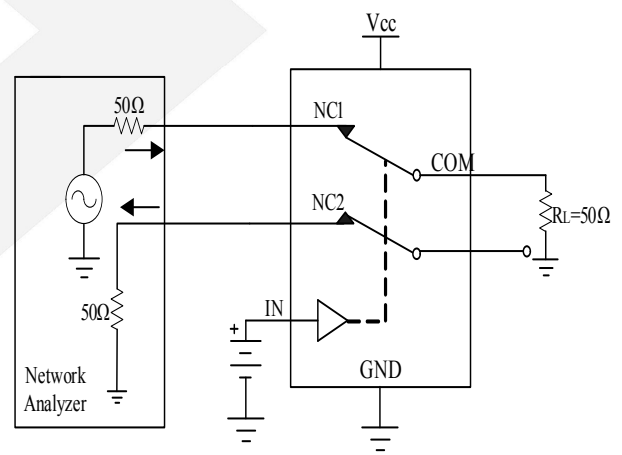


Figure 6 Channel-to-channel crosstalk

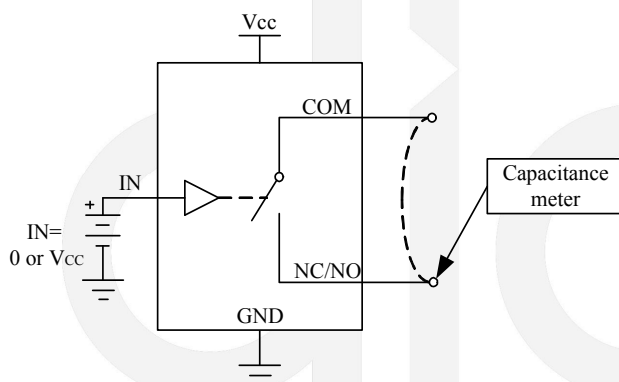


Figure 4 On/off Capacitance test

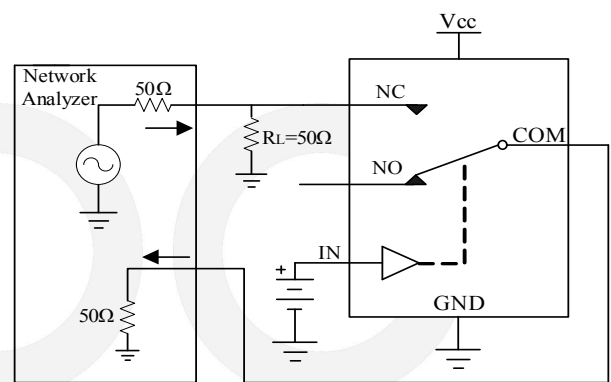


Figure 7 Off-isolation

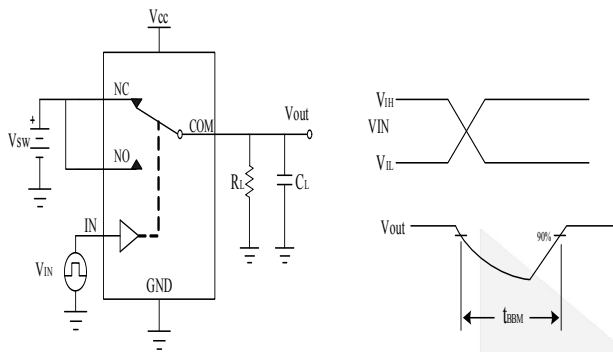


Figure 8 Break-Before-Make

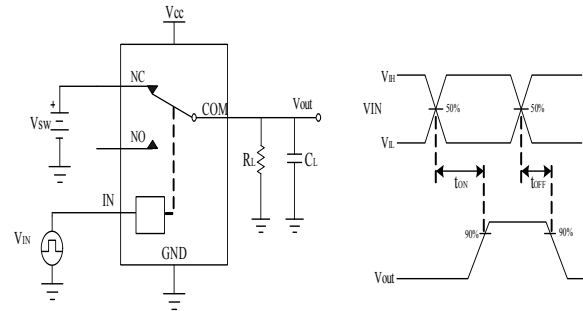


Figure 9 Turn-On/Turn-Off

CONTACT US

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