



## Descriptions

The DIO3712LP10 is a dual SPDT low on-resistance analog switch. It can operate from a single 1.5V to 5.5V power supply. The device offers low ON-state resistance and excellent ON-state resistance matching with break-before-make feature, to prevent signal distortion during the transferring of a signal from one channel to another. The device is capable of true isolation. Even when COMx overrides VCC, very little current will flow back to the supply.

## Order Information

Package		Part Number	Top-Side Marking
QFN1418(QFN-10(1.8x1.4))	Tape and Reel	DIO3712LP10	A50 TYW

## Features

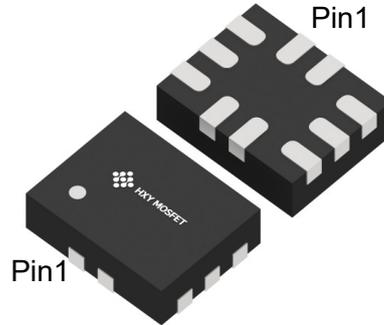
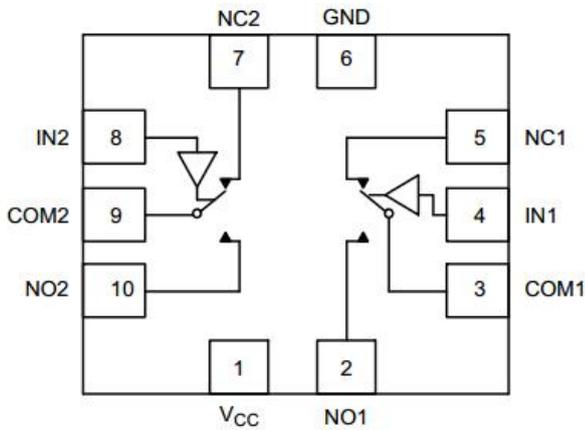
- Pin-to-Pin NLA2750 and NX5L2750, QFN1418(QFN-10(1.8x1.4)) Package
- Low On-resistance,  $R_{on}=1.5\Omega$  when  $COMx=5V$
- 1.8V Logic Compatible Control Pin
- COMx Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- High Off-Isolation: -100dB @ 100KHz
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth ( -3dB @700MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current (<2uA) With Very Wide Supply Range (1.5V ~ 5.5V)

## Applications

- Audio, Video, UART, USB2.0 Signal and Supply Routing
- Cell phones and TWS headset
- USB Type-C Mic/Gnd Switch
- DC Motor Drive



### Pin Configuration



QFN1418(QFN-10(1.8x1.4))

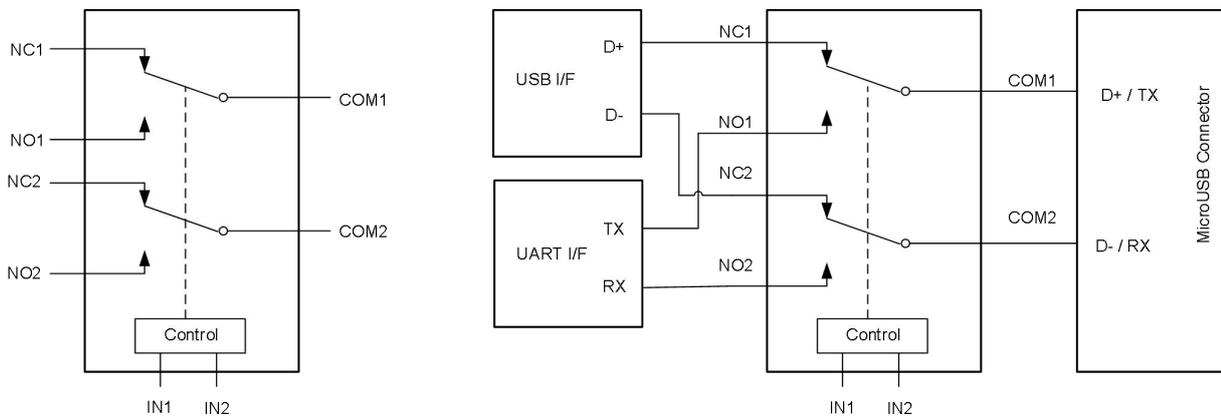
### Functions and Pin Configuration

Pin Number	Symbol	Descriptions
1	VCC	Single Power Supply
2,10	NO <sub>x</sub>	Analog/Digital Signal Ports (Normally open)
3,9	COM <sub>x</sub>	Common Signal Ports
5,7	NC <sub>x</sub>	Analog/Digital Signal Ports (Normally closed)
6	GND	Ground
4,8	IN <sub>x</sub>	Logic Input Control

### Function Descriptions

Logic Input(IN <sub>x</sub> )	Function
0	NC1=COM1 and NC2=COM2
1	NO1=COM1 and NO2=COM2

Note: X= 1 or 2



Typical Application: Configured as USB2.0 Mux

### Absolute Maximum Ratings <sup>(1)</sup>

Parameter	Symbol	Value	Unit
Supply Voltage	$V_{CC}$	-0.3 ~ 6.5	V
Control Input Voltage	$V_{IN}$	-0.3 ~ 6.5	V
Continuous Current Through NO, NC, COM		±100	mA
Peak Current Through NO, NC, COM (pulsed at 1ms 50% duty cycle)		±200	mA
Storage Temperature Range	$T_{STG}$	-55 ~ 150	°C
Junction Temperature under Bias	$T_J$	150	°C
Lead Temperature (Soldering, 10 seconds)	$T_L$	260	°C
Power Dissipation	$P_D$	250	mW

### Recommend operating ratings <sup>(2)</sup>

Parameter	Symbol	Value	Unit
Supply Voltage Operating	$V_{CC}$	1.5 ~ 5.5	V
Control Input Voltage	$V_{IN}$	-0.3 ~ 5.5	V
Input Signal Voltage	$V_{COM}$	-0.3 ~ 5.5	V
Operating Temperature	$T_A$	-40 ~ 85	°C
Thermal Resistance	$R_{\theta JA}$	360	°C/W

**Note:**

1. "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied.



**DC Electronics Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input logic high level	V <sub>IH</sub>	VCC: 3.3 ~ 5.5V	1.6			V
		VCC: 1.5 ~ 3.3V	1.4			V
Input logic low level	V <sub>IL</sub>	VCC: 3.3 ~ 5.5V			0.6	V
		VCC: 1.5 ~ 3.3V			0.4	V
Supply quiescent current	I <sub>CC</sub>	I <sub>COM</sub> =0, V <sub>IN</sub> =0 or V <sub>IN</sub> =VCC			1.0	uA
Increase in I <sub>CC</sub> per input	I <sub>CC</sub> T	I <sub>COM</sub> =0, VCC=4.5V V <sub>IN</sub> >1.8 or V <sub>IN</sub> <0.5			1.0	uA
Off state leakage from COM <sub>x</sub> to NC <sub>x</sub> (or NO <sub>x</sub> )	I <sub>COMx</sub>	V <sub>COM</sub> = 5.5V , V <sub>NC(or NO)</sub> = 0V			±2.0	uA
On-Resistance	R <sub>ON1</sub>	V <sub>COM</sub> =0 ~ 0.5V, I <sub>COM</sub> =30mA		3.0	3.5	Ω
	R <sub>ON2</sub>	V <sub>COM</sub> =0.5 ~ 2.0V, I <sub>COM</sub> =30mA		3.6	3.9	Ω
	R <sub>ON3</sub>	V <sub>COM</sub> =2.0 ~ 4.0V, I <sub>COM</sub> =30mA		2.5	3.5	Ω
	R <sub>ON4</sub>	V <sub>COM</sub> =4.0 ~ 5.5V, I <sub>COM</sub> =30mA		1.5	1.8	Ω
On-Resistance Flatness	R <sub>FLAT1</sub>	V <sub>COM</sub> =0 ~ 0.5V, I <sub>COM</sub> =30mA		0.7		Ω
	R <sub>FLAT2</sub>	V <sub>COM</sub> =0.5 ~ 2.0V, I <sub>COM</sub> =30mA		0.5		Ω
	R <sub>FLAT3</sub>	V <sub>COM</sub> =2.0 ~ 4.0V, I <sub>COM</sub> =30mA		1.6		Ω
	R <sub>FLAT4</sub>	V <sub>COM</sub> =4.0 ~ 5.5V, I <sub>COM</sub> =30mA		0.3		Ω
On-Resistance Matching Between Channels	Δ R <sub>ON</sub>	V <sub>COM</sub> =0~5.5V, I <sub>COM</sub> =30mA,		0.1	0.2	Ω



**AC Electronics Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)**

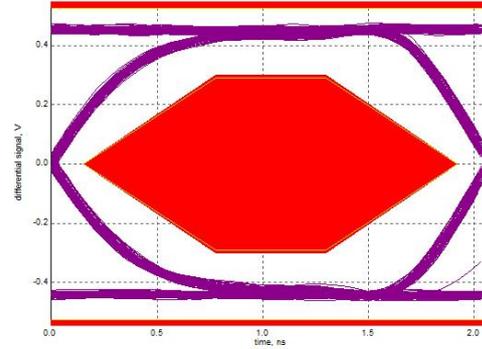
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Turn-On Time	T <sub>ON</sub>	V <sub>COM</sub> =1.5V, C <sub>L</sub> =35pF, R <sub>L</sub> =50Ω		200		ns
Turn-Off Time	T <sub>OFF</sub>	V <sub>COM</sub> =1.5V, C <sub>L</sub> =35pF, R <sub>L</sub> =50Ω		200		ns
Break-Before-Make time	T <sub>BBM</sub>	V <sub>COM</sub> =1.5V, C <sub>L</sub> =35pF, R <sub>L</sub> =50Ω		500		ns
-3dB Bandwidth	BW	R <sub>L</sub> =50Ω, C <sub>L</sub> =0pF		850		MHz
Off isolation	OIRR	F=1KHz, R <sub>L</sub> =50Ω		-81		dB
		F=10KHz, R <sub>L</sub> =50Ω		-80		dB
Crosstalk	Xtalk	F=1KHz, R <sub>L</sub> =50Ω		-83		dB
		F=10KHz, R <sub>L</sub> =50Ω		-82		dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz V <sub>COM</sub> =600mVp-p @R <sub>L</sub> =32Ω,		-80		dB

**Capacitance (Ta=25°C, VCC=3.3V, unless otherwise noted)**

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Off capacitance	C <sub>OFF</sub>	F=100KHz		5		pF
On capacitance	C <sub>ON</sub>	F=100KHz		7		pF

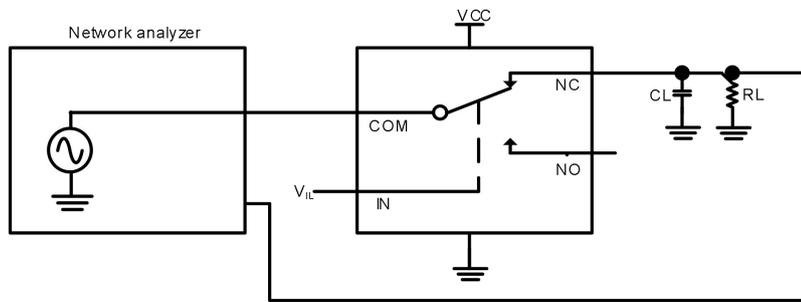


Typical Characteristics (Ta=25°C, VCC=3.3V, unless otherwise noted)

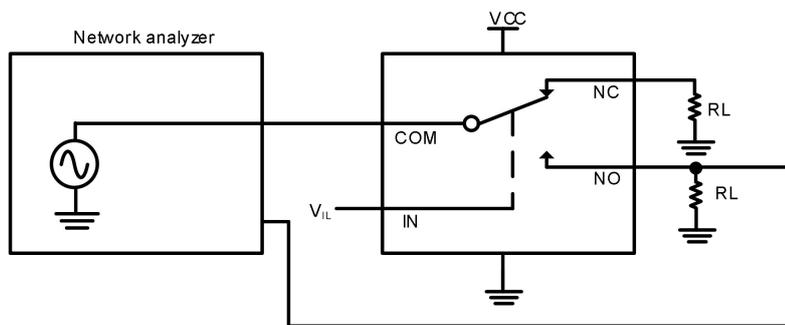


Bandwidth

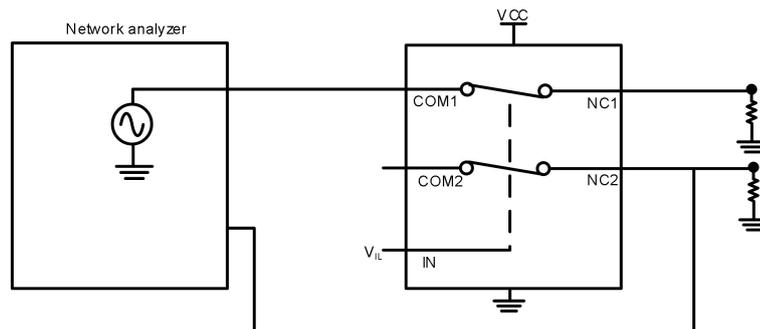
Eye Diagram (480Mbps)



Bandwidth



Off isolation

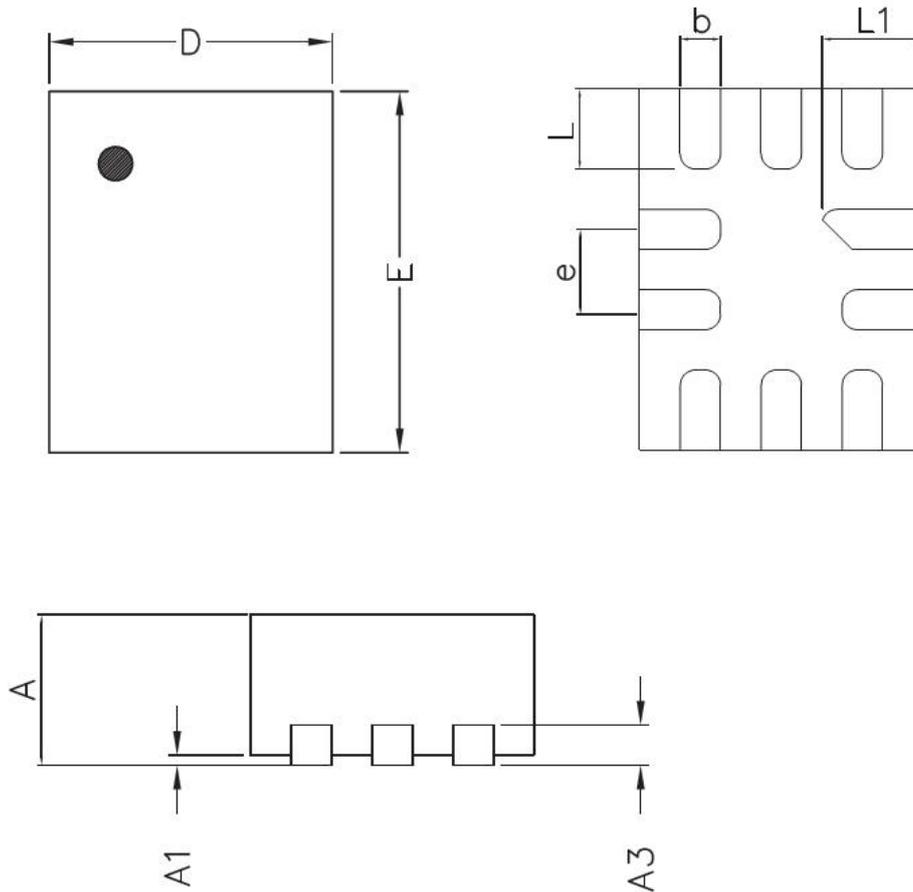


Crosstalk



### Package Outline Dimensions

#### QFN1418(QFN-10(1.8x1.4))



Symbol	Dimension in Millimeters	
	Min.	Max.
A	0.450	0.550
A1	0.000	0.050
A3	0.152 Ref.	
D	1.350	1.450
E	1.750	1.850
b	0.150	0.250
e	0.400 Typ.	
L	0.350	0.450
L1	0.450	0.550



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