

Features

- Low On-resistance, $R_{on}=3.5\Omega$ when
- 1.8V Logic Compatible Control Pin
- High Off-Isolation: -100dB @ 100KHz
- COM+/- Overrides VCC to Achieve True Isolation Even When Supply Is Dead
- Low Channel-to-Channel Crosstalk: -97dB @ 100KHz
- High Bandwidth (-3dB @ 550MHz) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current ($<2\mu\text{A}$) With Very Wide Supply Range ($1.5\text{V} \sim 5.5\text{V}$)

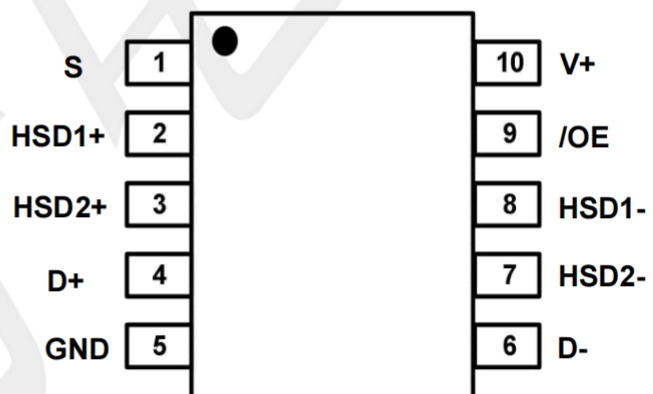
Applications

- Mobile Phones, Tablets and Notebooks
- Anywhere a USB Type-C™ or Micro-B Connector is Used

General Description

The is a bidirectional low-power dual port, high-speed, USB 2.0 analog switch with integrated protection for USB Type-C™ systems. The device is configured as a dual 2:1 or 1:2 switch. It is optimized for use with the USB 2.0 DP/DM lines in a USB Type-C™ system. The device is capable of true isolation. Even when COM+/- overrides VCC, very little current will flow back to the supply. has low bit-to-bit skew and high channel-to-channel noise isolation, and is compatible with various standards, such as high-speed USB 2.0 (480Mbps). Each switch is bidirectional and offers little or no attenuation of the high-speed signals at the outputs. Its bandwidth is wide enough to pass high-speed USB 2.0 differential signals (480 Mb/s) with good signal integrity.

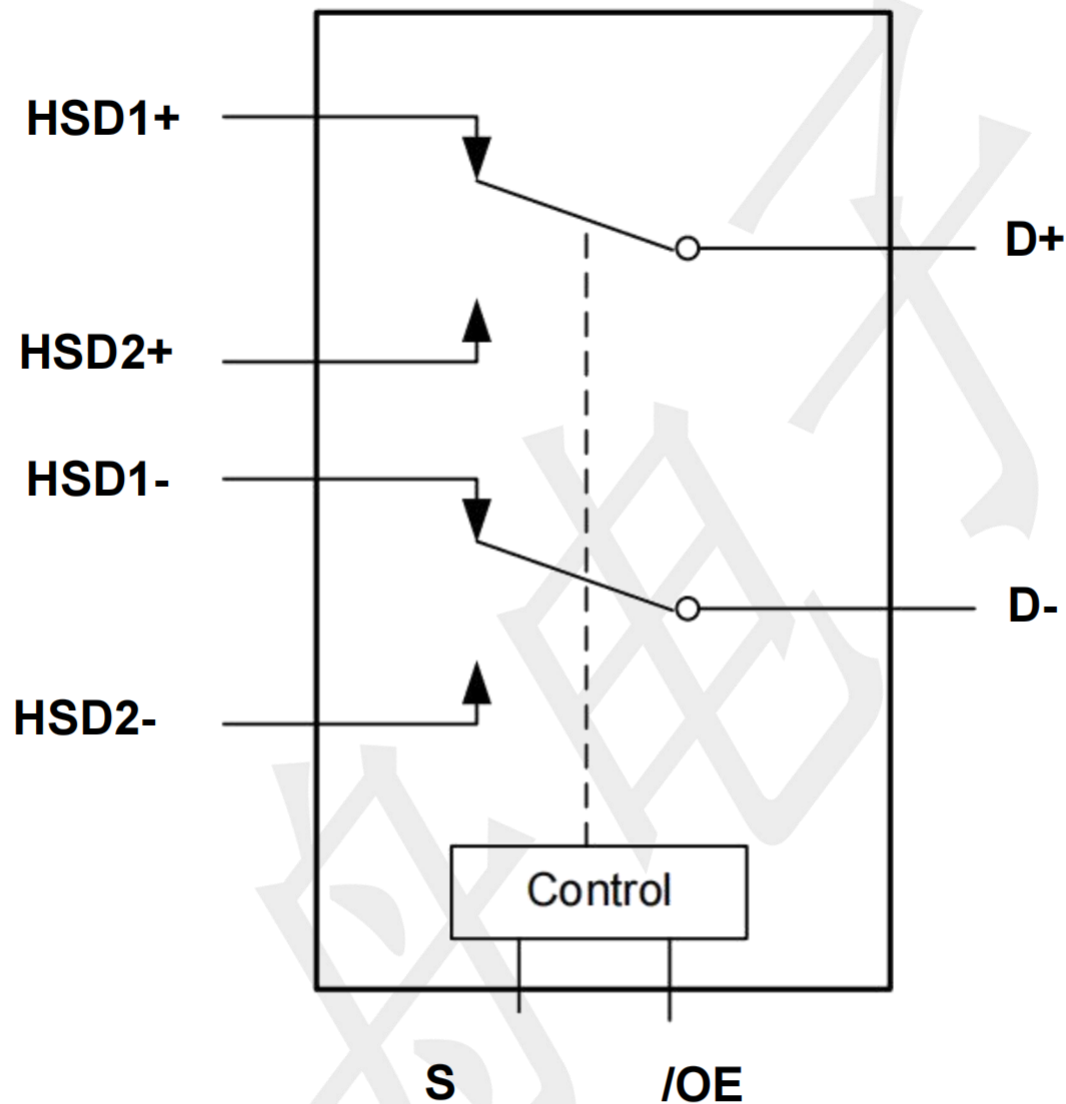
PIN CONFIGURATIONS (TOP VIEW)



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	S	Logic Input Selection
2	HSD1+	Analog/Digital Signal Ports (Normally closed)
3	HSD2+	Analog/Digital Signal Ports (Normally open)
4	D+	Common Data Port
5	GND	Ground
6	D-	Common Data Port
7	HSD2-	Analog/Digital Signal Ports (Normally open)
8	HSD1-	Analog/Digital Signal Ports (Normally closed)
9	/OE	output enable input (active LOW), prohibit high level connection
10	V+	Supply voltage

BLOCK DIAGRAM



Function Table

/OE	S	Function
0	0	HSD1+ =D+ and HSD1- =D-
0	1	HSD2+ =D+ and HSD2- =D-

Switches Shown For Logic "0" Input, /OE is prohibited from connecting to high level 1 in application.

Absolute Maximum Ratings

(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	VCC	-0.3 ~ +6.5	V
Input Voltage	VIN	-0.3 ~ +6.5	V
/OE Input Voltage	VOE	-0.3 ~ +0	V
Continuous Current Through HSD1X, HSD2X, DX		±100	mA
Peak Current Through HSD1X, HSD2X, DX (pulsed at 1ms 50% duty cycle)		±200	mA
Storage Temperature Range	TSTG	-55 ~ +150	°C
Operating Junction Temperature	TJ	150	°C
Lead Temperature (Soldering, 10 seconds)	TL	260	°C
Power Dissipation	PD	250	mW

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

Recommend operating ratings

(Unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage Operating	VCC	1.5 ~ 5.5	V
Control Input Voltage	VIN	-0.3 ~ 5.5	V
Input Signal Voltage	VCOM	-0.3 ~ 5.5	V
Operating Temperature	TA	-40 ~ +85	°C
Junction to Ambient	RθJA	360	°C/W

DC Electrical Characteristics (TA =25°C, VC=+3.3V, unless otherwise specified)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
High-Level Input Voltage	V _{IH}	VCC=3.3V ~ 5.5V	1.6	--	--	V
		VCC=1.5V ~ 3.3V	1.4	--	--	V
Low-Level Input Voltage	V _{IL}	VCC=3.3V ~ 5.5V	--	--	0.6	V
		VCC=1.5V ~ 3.3V	--	--	0.4	V
Supply quiescent current	I _{CC}	I _A =0, V _{SEL} =0 or V _{SEL} =VCC	--	--	1.0	uA
Increase in ICC per input	I _{CC} T	I _A =0, VCC=4.5V V _{SEL} >1.8 or V _{SEL} <0.5	--	--	1.0	uA
Off state leakage from	I _{COMx}	V _{COM} = 5.5V, V _{NC(or NO)} = 0V	--	--	±2.0	uA
On-Resistance	R _{ON1}	V _A =0 ~ 0.5V, I _A =30mA	--	4.6	4.9	Ω
	R _{ON2}	V _A =0.5 ~ 2.0V, I _A =30mA	--	4.0	4.5	Ω
	R _{ON3}	V _A =2.0 ~ 4.0V, I _A =30mA	--	3.5	3.8	Ω
	R _{ON4}	V _A =4.0 ~ 5.5V, I _A =30mA	--	2.5	2.8	Ω
On-Resistance Flatness	R _{FLAT1}	V _A =0 ~ 0.5V, I _A =30mA	--	1.6	--	Ω
	R _{FLAT2}	V _A =0.5 ~ 2.0V, I _A =30mA	--	0.7	--	Ω
	R _{FLAT3}	V _A =2.0 ~ 4.0V, I _A =30mA	--	0.5	--	Ω
	R _{FLAT4}	V _A =4.0 ~ 5.5V, I _A =30mA	--	0.3	--	Ω
On-Resistance Matching Between Channels	Δ R _{ON}	V _A =0~5.5V, I _A =30mA	--	0.1	0.2	Ω

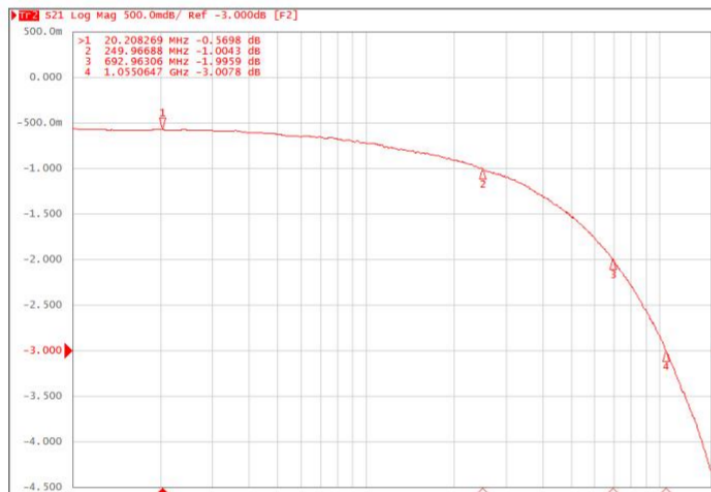
AC Electronics Characteristics (Ta=25°C, VCC=+3.3V, unless otherwise noted)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Turn-On Time	T _{ON}	V _A =1.5V, C _L =35pF, R _L =50Ω	--	200	--	ns
Turn-Off Time	T _{OFF}	V _A =1.5V, C _L =35pF, R _L =50Ω	--	200	--	ns
Break-Before-Make time	T _{BBM}	V _A =1.5V, C _L =35pF, R _L =50Ω	--	500	--	ns
-3dB Bandwidth	BW	R _L =50Ω, C _L =5pF	--	550	--	MHz
		R _L =50Ω, C _L =0pF	--	800	--	MHz
Off isolation	OIRR	F=1KHz, R _L =50Ω	--	-81	--	dB
		F=10KHz, R _L =50Ω	--	-80	--	dB
Crosstalk	Xtalk	F=1KHz, R _L =50Ω	--	-83	--	dB
		F=10KHz, R _L =50Ω	--	-82	--	dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz V _A =600mVp-p @R _L =32Ω	--	-80	--	dB

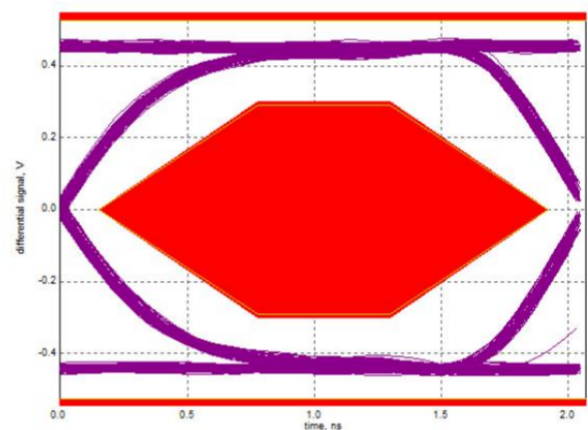
Capacitance ($T_a=25^\circ\text{C}$, $V_{CC}=+3.3\text{V}$, unless otherwise noted)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Off capacitance	C_{OFF}	$F=100\text{KHz}$,	--	5.0	--	pF
On capacitance	C_{ON}	$F=100\text{KHz}$,	--	7.0	--	pF

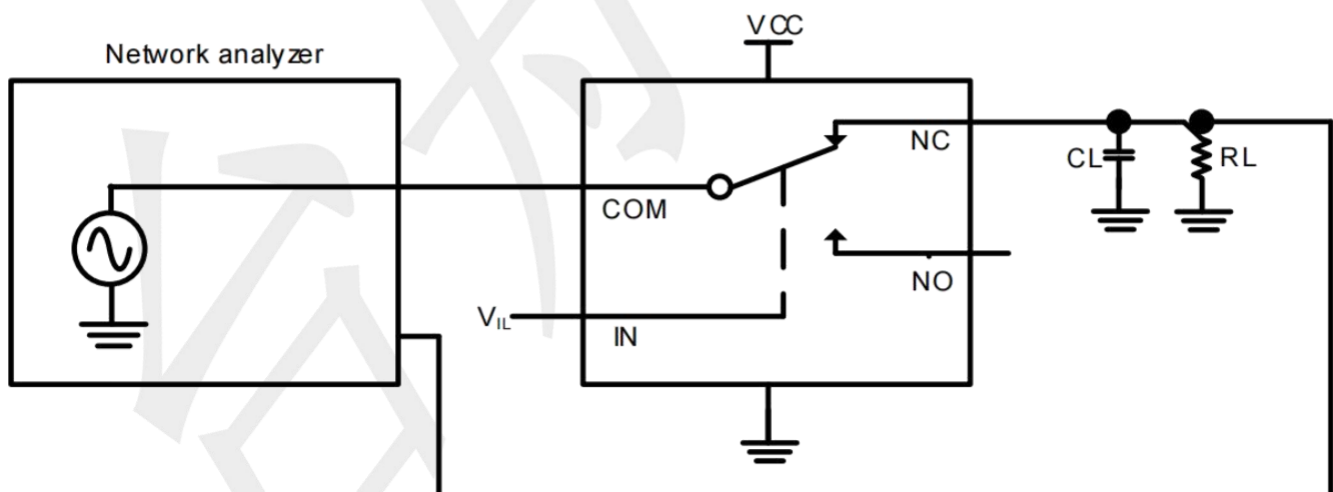
Typical Characteristics ($T_a=25^\circ\text{C}$, $V_{CC}=3.3\text{V}$, unless otherwise noted)



Bandwidth

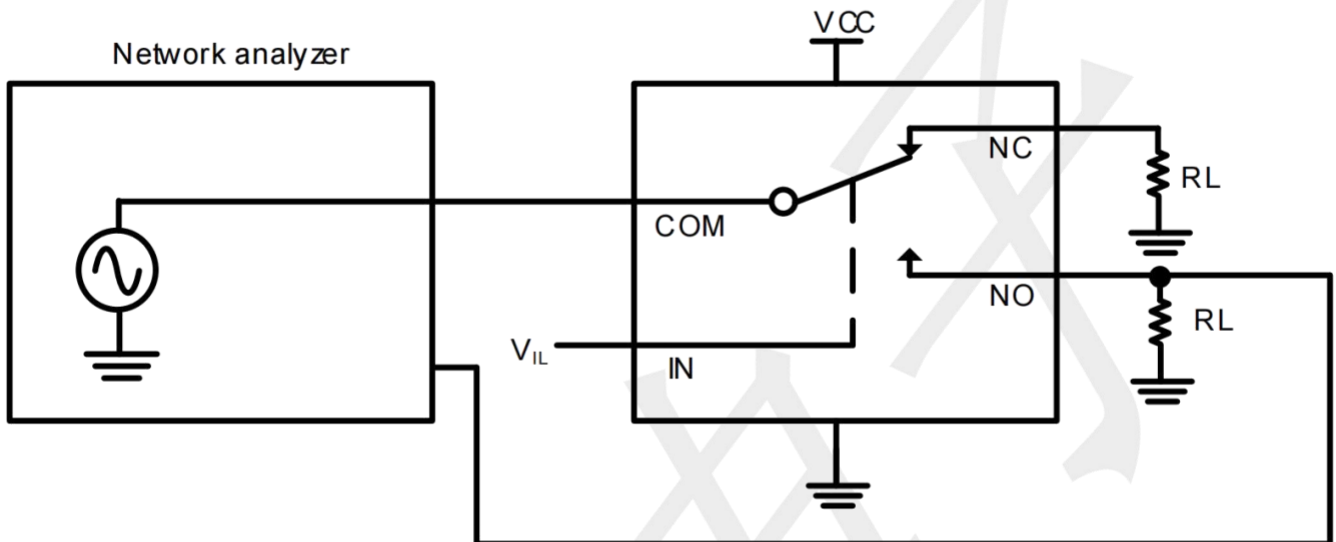


Eye Diagram (480Mbps)

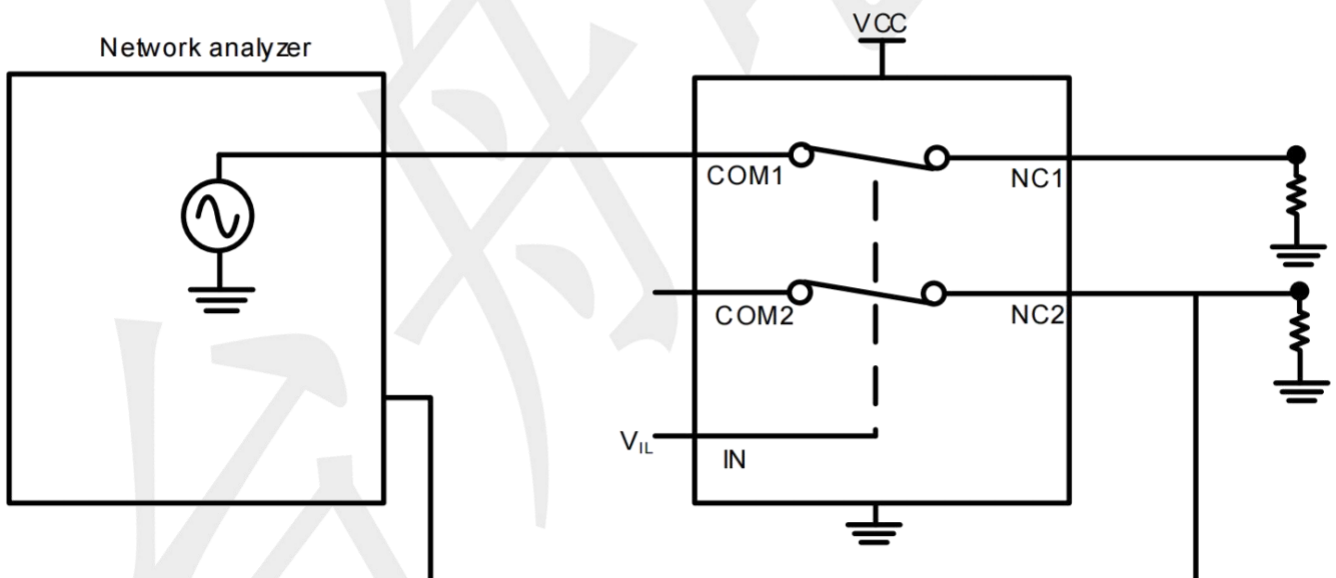


Bandwidth

Typical Characteristics ($T_a=25^{\circ}\text{C}$, $V_{CC}=3.3\text{V}$, unless otherwise noted)



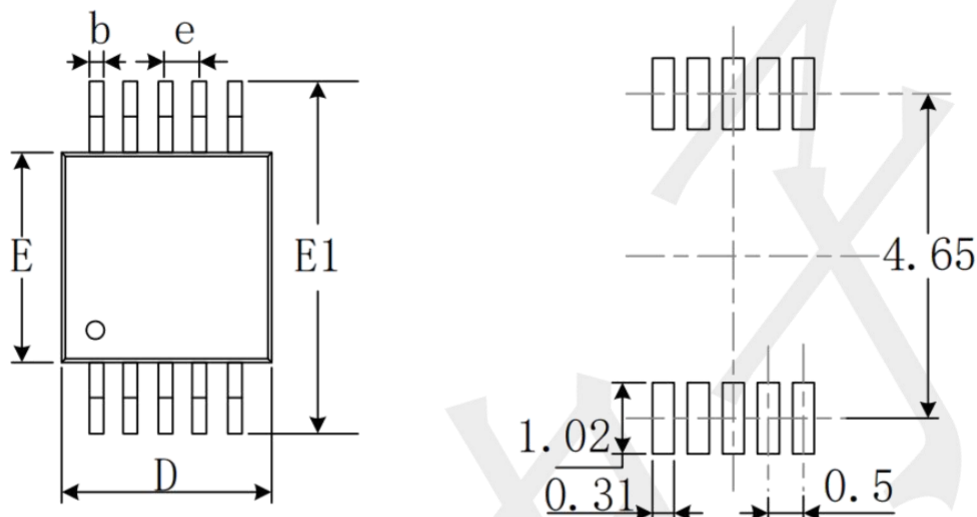
Off isolation



Crosstalk

Package information

MSOP-10L



RECOMMENDED LAND PATTERN (Unit: mm)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.820	1.100	0.032	0.043
A1	0.020	0.150	0.001	0.006
A2	0.750	0.950	0.030	0.037
b	0.180	0.280	0.007	0.011
c	0.090	0.230	0.004	0.009
D	2.900	3.100	0.114	0.122
e	0.50(BSC)		0.020(BSC)	
E	2.900	3.100	0.114	0.122
E1	4.750	5.050	0.187	0.199
L	0.400	0.800	0.016	0.031
θ	0°	6°	0°	6°