

Features

- Low On-resistance, $R_{on}=1.5\Omega$ when $V_{CC}=5V$
- 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 ($<2\mu A$) With Very Wide Supply Range ($1.5V \sim 5.5V$)

Applications

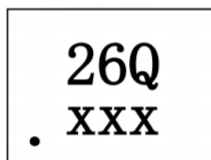
- Mobile Phones, Tablets and Notebooks
- Anywhere a USB Type-C™ or Micro-B Connector is Used

General Description

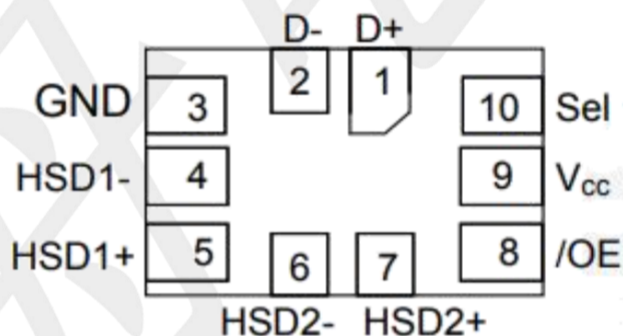
The is a bidirectional low-power dual port, high-speed, USB 2.0 analog switch with integrated protection for USB Type-C™ systems. The device is configured as a dual 2:1 or 1:2 switch. It is optimized for use with the USB 2.0 DP/DM lines in a USB Type-C™ system. The device is capable of true isolation. 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)

Marking:



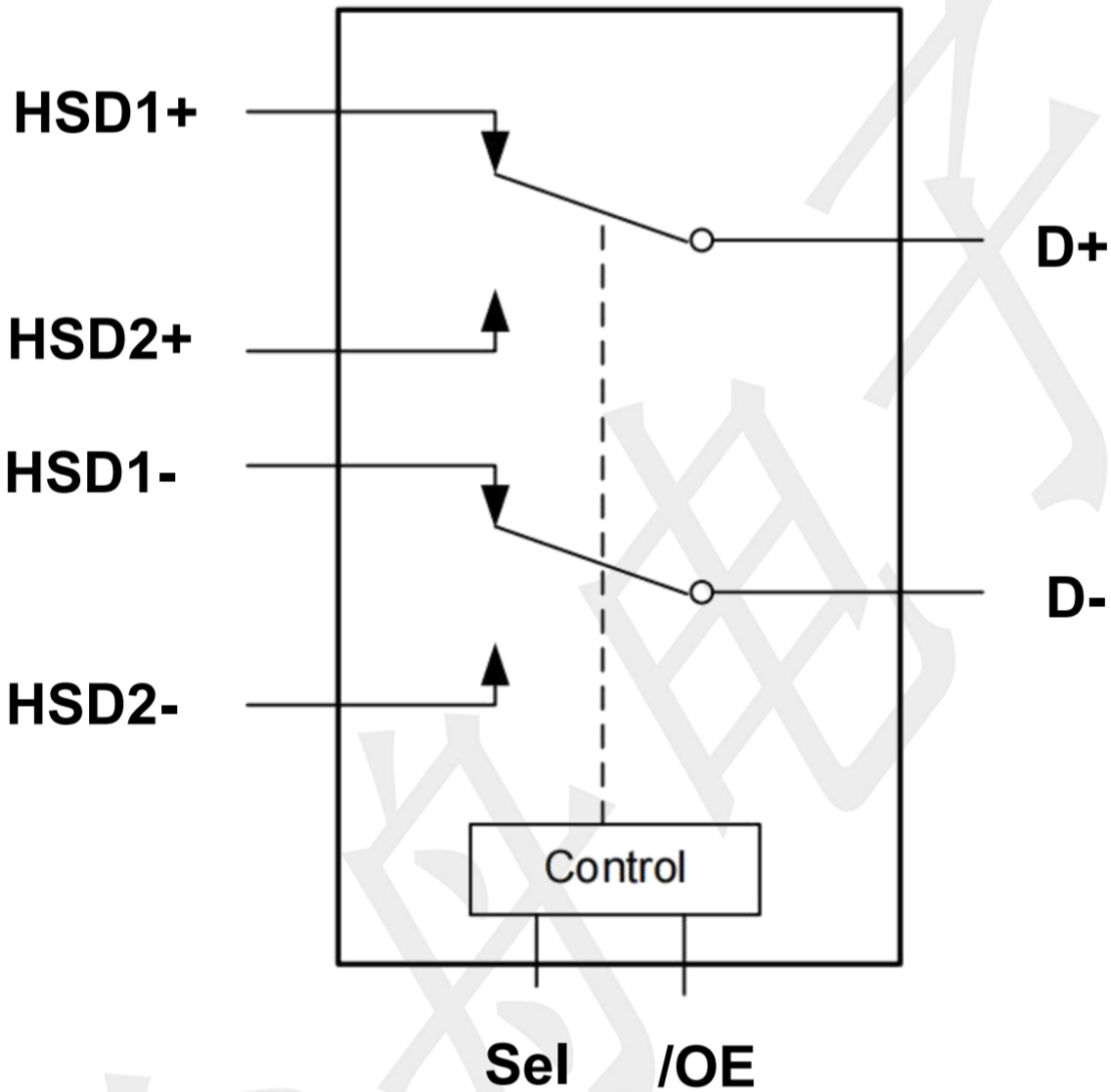
X:IS Production Lot



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	D+	USB Data Bus
2	D-	USB Data Bus
3	GND	Ground
4	HSD1-	Multiplexed Source Inputs
5	HSD1+	Multiplexed Source Inputs
6	HSD2-	Multiplexed Source Inputs
7	HSD2+	Multiplexed Source Inputs
8	/OE	output enable input (active LOW), prohibit high level connection
9	VCC	Supply voltage
10	Sel	Logic Input Selection

BLOCK DIAGRAM



Function Table

/OE	Input Sel	HSD1+ ,HSD1-	HSD2+ ,HSD2-
0	0	ON	OFF
0	1	OFF	ON

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 HSD1,HSD2, D		±100	mA
Peak Current Through HSD1,HSD2, D (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	VD	-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	VIH	VCC=3.3V ~ 5.5V	1.6	--	--	V
		VCC=1.5V ~ 3.3V	1.4	--	--	V
Low-Level Input Voltage	VIL	VCC=3.3V ~ 5.5V	--	--	0.6	V
		VCC=1.5V ~ 3.3V	--	--	0.4	V
Supply quiescent current	ICC	IA=0, VSEL=0 or VSEL=VCC	--	--	1.0	uA
Increase in ICC per input	ICCT	IA=0, VCC=4.5V VSEL>1.8 or VSEL<0.5	--	--	1.0	uA
Off state leakage from COMx to NCx (or NOx)	ICOMx	VCOM = 5.5V, VNC(or NO) = 0V	--	--	±2.0	uA
On-Resistance	RON1	VA=0 ~ 0.5V, IA=30mA	--	3.6	3.9	Ω
	RON2	VA=0.5 ~ 2.0V, IA=30mA	--	3.0	3.5	Ω
	RON3	VA=2.0 ~ 4.0V, IA=30mA	--	2.5	3.5	Ω
	RON4	VA=4.0 ~ 5.5V, IA=30mA	--	1.5	1.8	Ω
On-Resistance Flatness	RFLAT1	VA=0 ~ 0.5V, IA=30mA	--	1.6	--	Ω
	RFLAT2	VA=0.5 ~ 2.0V, IA=30mA	--	0.7	--	Ω
	RFLAT3	VA=2.0 ~ 4.0V, IA=30mA	--	0.5	--	Ω
	RFLAT4	VA=4.0 ~ 5.5V, IA=30mA	--	0.3	--	Ω
On-Resistance Matching Between Channels	ΔRON	VA=0~5.5V, IA=30mA	--	0.1	0.2	Ω

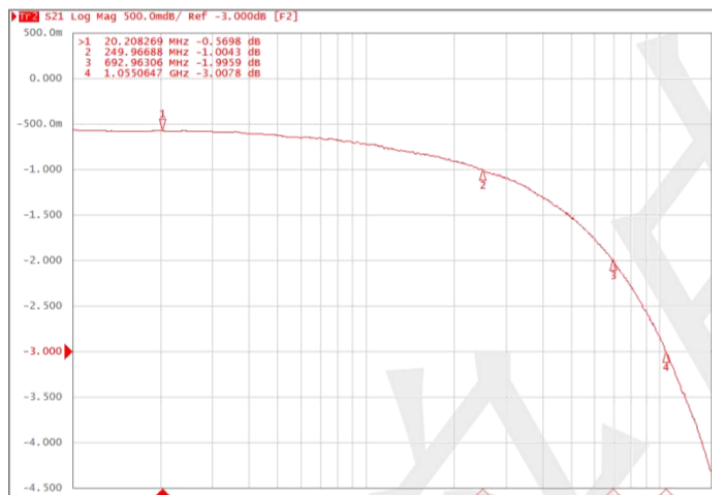
AC Electronics Characteristics (Ta=25°C, VCC=+3.3V, unless otherwise noted)

PARAMETER	SYMBOL	TEST Conditions	MIN	TYP	MAX	UNIT
Turn-On Time	TON	VA=1.5V, CL=35pF, RL=50Ω	--	200	--	ns
Turn-Off Time	TOFF	VA=1.5V, CL=35pF, RL=50Ω	--	200	--	ns
Break-Before-Make time	TBBM	VA=1.5V, CL=35pF, RL=50Ω	--	500	--	ns
-3dB Bandwidth	BW	RL=50Ω, CL=5pF	--	550	--	MHz
		RL=50Ω, CL=0pF	--	800	--	MHz
Off isolation	OIRR	F=1KHz, RL=50Ω	--	-81	--	dB
		F=10KHz, RL=50Ω	--	-80	--	dB
Crosstalk	Xtalk	F=1KHz, RL=50Ω	--	-83	--	dB
		F=10KHz, RL=50Ω	--	-82	--	dB
Total Harmonic Distortion	THD	F=20Hz to 20KHz VA=600mVp-p @RL=32Ω	--	-80	--	dB

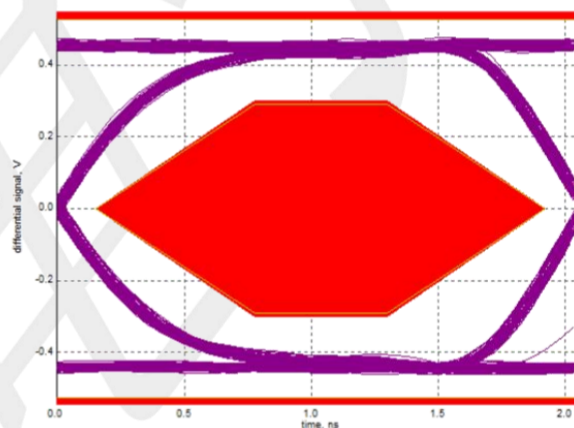
Capacitance ($T_a=25^{\circ}\text{C}$, $V_{CC}=+3.3\text{V}$, unless otherwise noted)

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

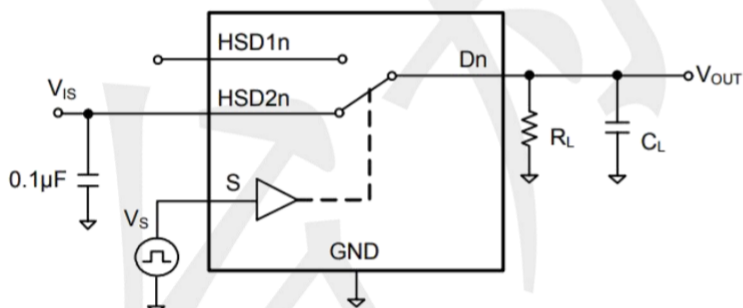
Typical Characteristics ($T_a=25^{\circ}\text{C}$, $V_{CC}=3.3\text{V}$, unless otherwise noted)



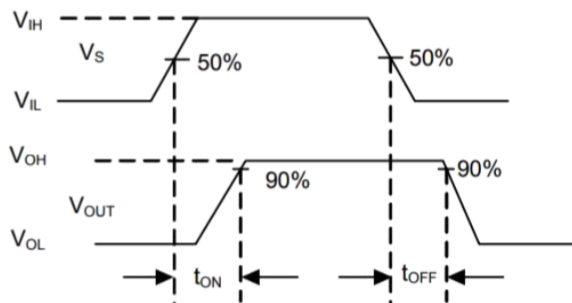
Bandwidth



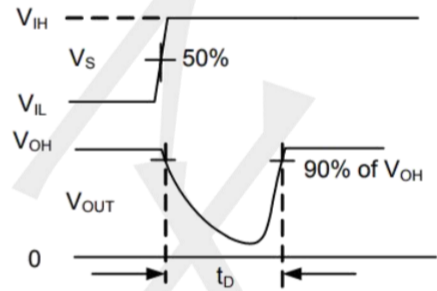
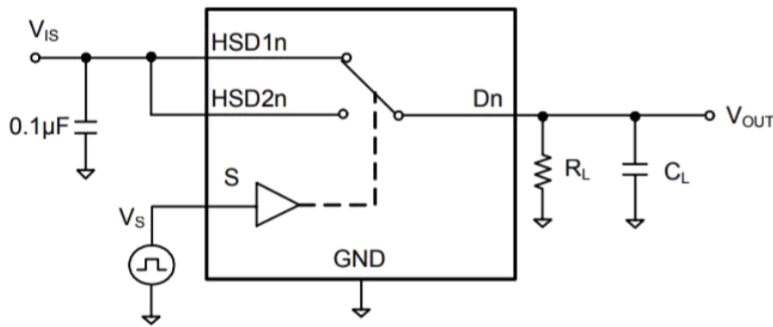
Eye Diagram (480Mbps)



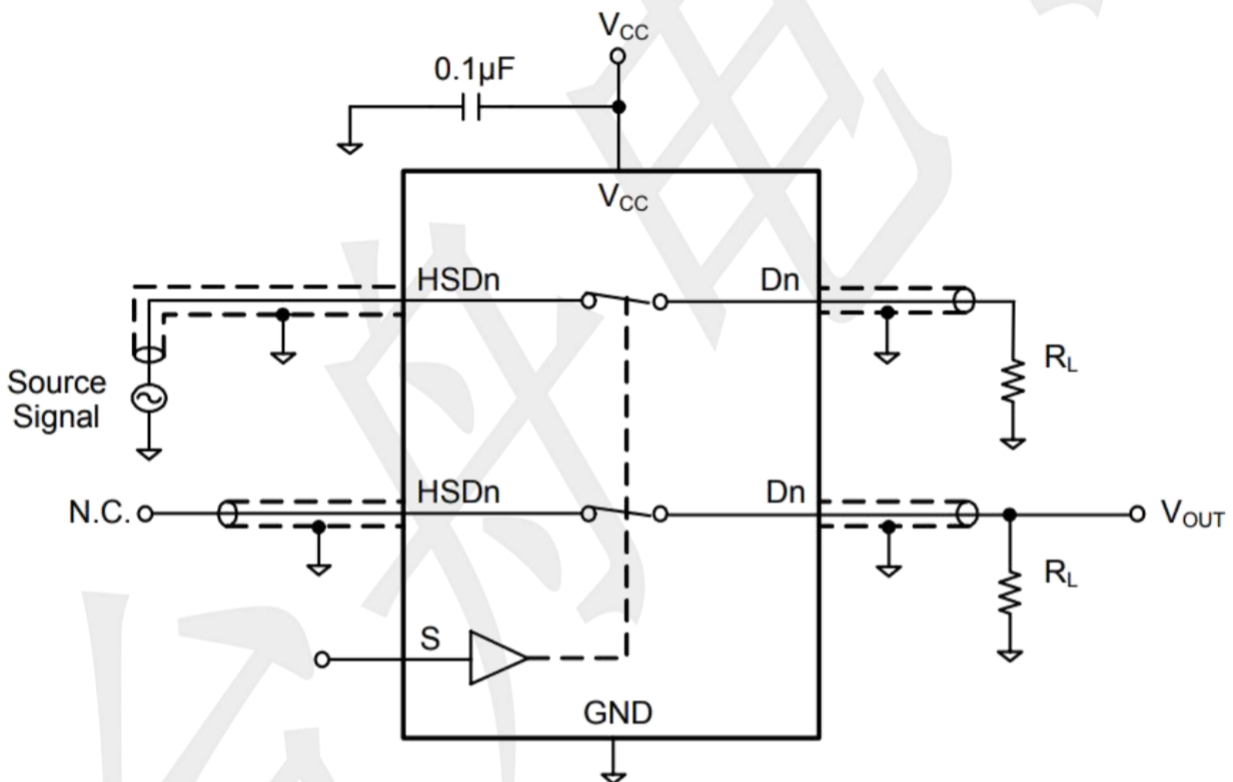
Test Circuit . Switching Times (t_{ON} , t_{OFF})



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



Test Circuit . Break-Before-Make Time (t_D)

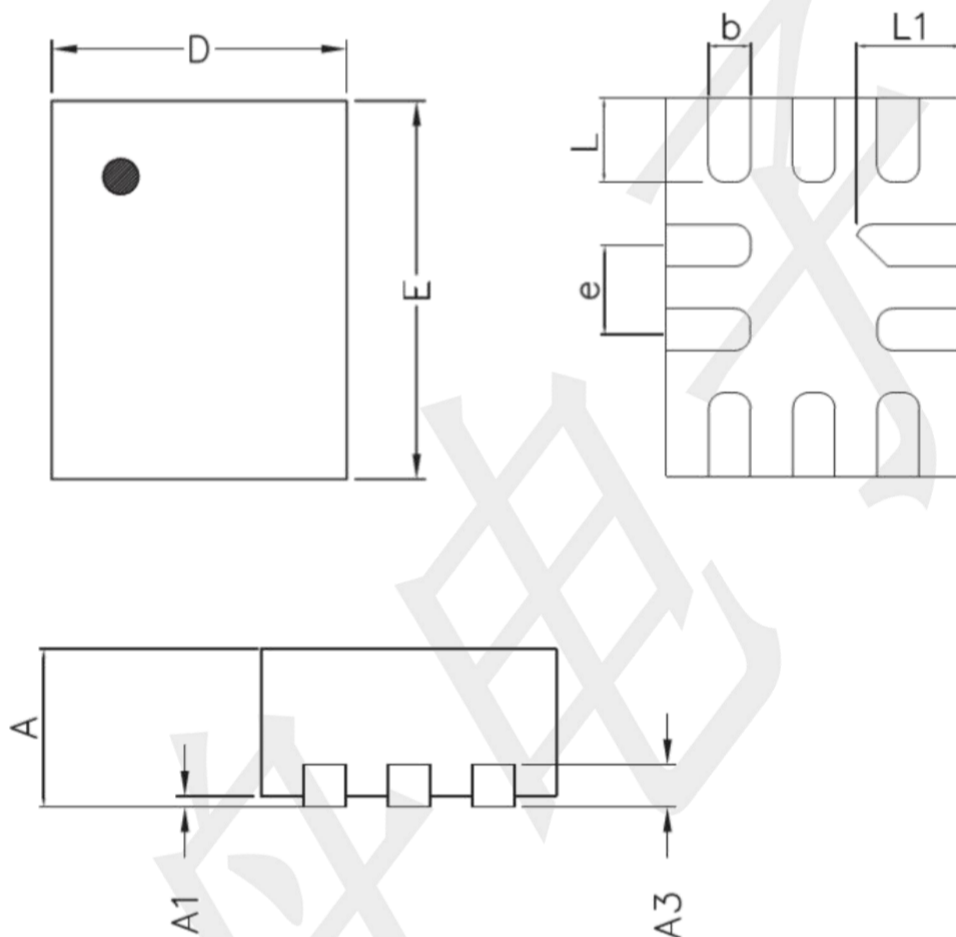


$$\text{Channel To Channel Crosstalk} = -20 \times \log \frac{V_{HSDn}}{V_{OUT}}$$

Test Circuit . Channel-to-Channel Crosstalk

Package information

QFN1418-10L (Unit: mm)



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