

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 ($-3dB @ 800MHz$) Suitable For USB2.0 High-Speed Routing
- Low Quiescent Current ($<2\mu A$) With Very Wide Supply Range ($1.5V \sim 5.5V$)

Applications

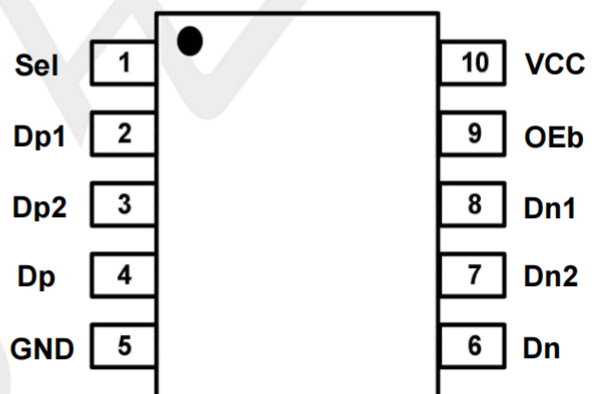
- Mobile Phones, Tablets and Notebooks
- Anywhere a USB Type-C™ or Micro-B Connector is Used

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)

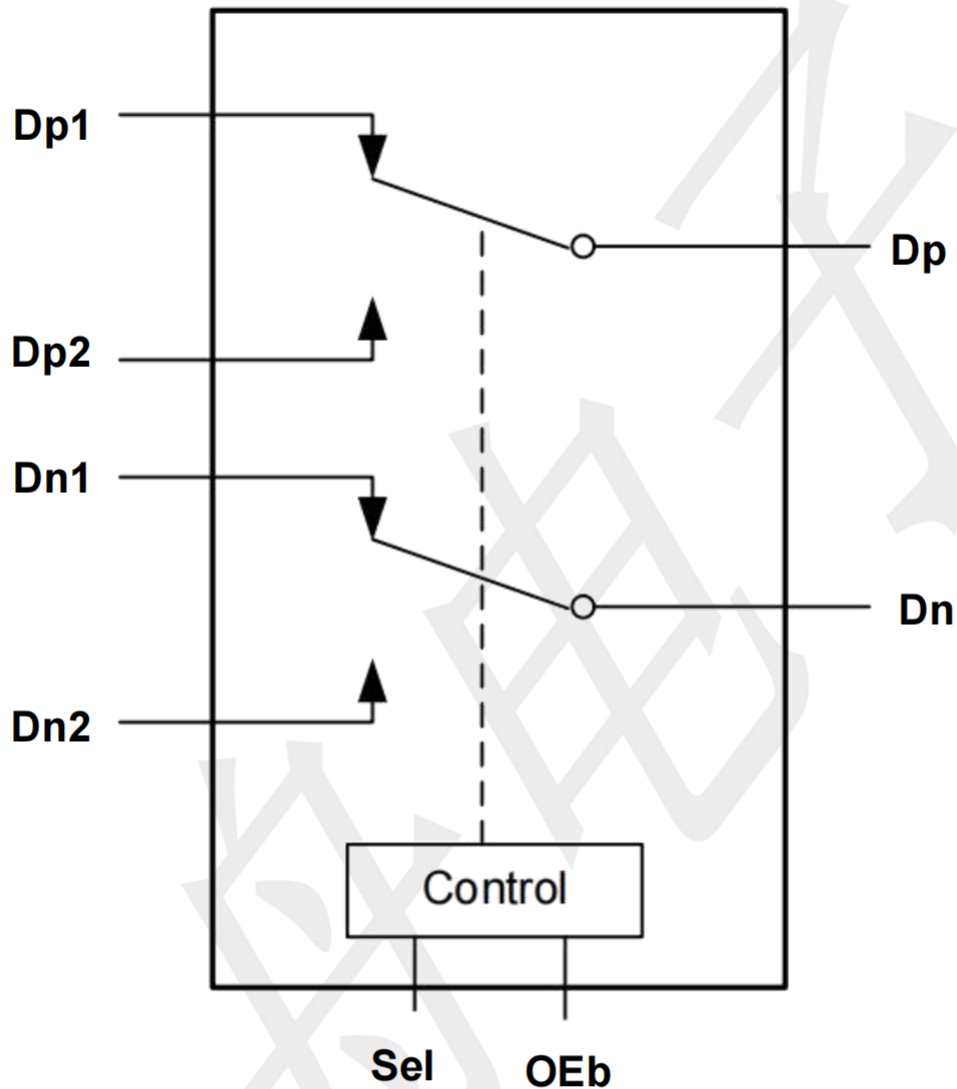
MSOP-10L



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	Sel	Logic Input Selection
2	Dp1	Analog/Digital Signal Ports (Normally closed)
3	Dp2	Analog/Digital Signal Ports (Normally open)
4	Dp	Port A common data terminal, Connect to Dp1 or Dp2 according to Sel logic
5	GND	Ground
6	Dn	Port B common data terminal, Connect to NC2 or NO2 according to SEL logic
7	Dn2	Analog/Digital Signal Ports (Normally open)
8	Dn1	Analog/Digital Signal Ports (Normally closed)
9	OEb	output enable input (active LOW), prohibit high level connection
10	VCC	Supply voltage

BLOCK DIAGRAM



Function Table

OEb	Input Sel	Function
0	0	Dp=Dp1 and Dn=Dn1
0	1	Dp=Dp2 and Dn=Dn2

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	V _{CC}	-0.3 ~ +6.5	V
Input Voltage	V _{IN}	-0.3 ~ +6.5	V
OEB Input Voltage	VOEB	-0.3 ~ +0	V
Continuous Current Through Dp, Dn		±100	mA
Peak Current Through Dp, Dn (pulsed at 1ms 50% duty cycle)		±200	mA
Storage Temperature Range	T _{STG}	-55 ~ +150	°C
Operating Junction Temperature	T _J	150	°C
Lead Temperature (Soldering, 10 seconds)	T _L	260	°C
Power Dissipation	P _D	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	V _{CC}	1.5 ~ 5.5	V
Control Input Voltage	V _{IN}	-0.3 ~ 5.5	V
Input Signal Voltage	V _D	-0.3 ~ 5.5	V
Operating Temperature	T _A	-40 ~ +85	°C
Junction to Ambient	R _{θJA}	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 Dn or Dp to Dnx (or Dpx)	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	Δ RON	VA=0~5.5V, IA=30mA	--	0.1	0.2	Ω

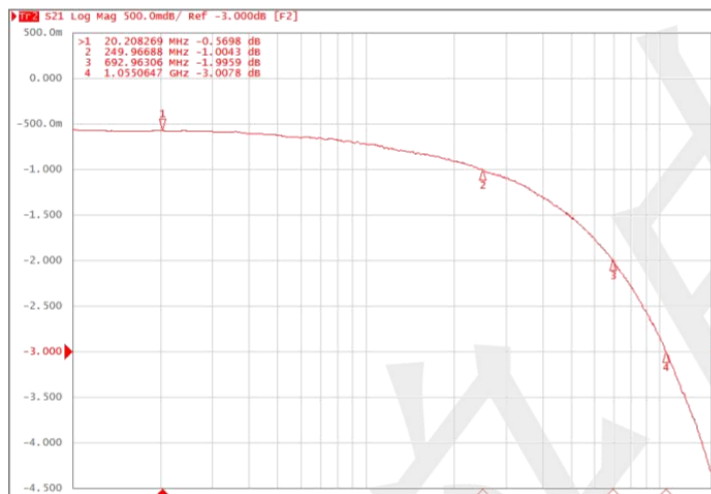
AC Electronics Characteristics (Ta=25°C, VCC=+3.3V, unless otherwise noted)

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

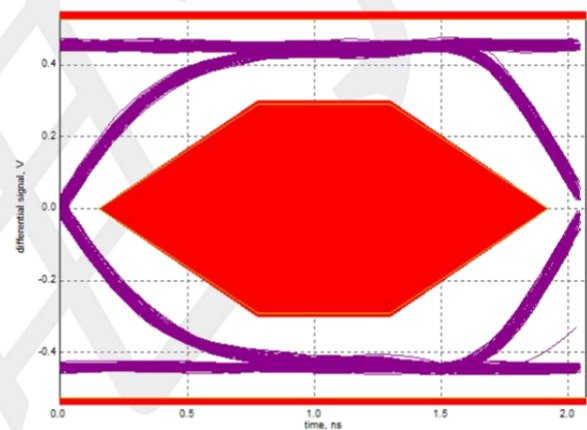
Capacitance ($T_a=25^{\circ}\text{C}$, $V_{CC}=+3.3\text{V}$, unless otherwise noted)

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

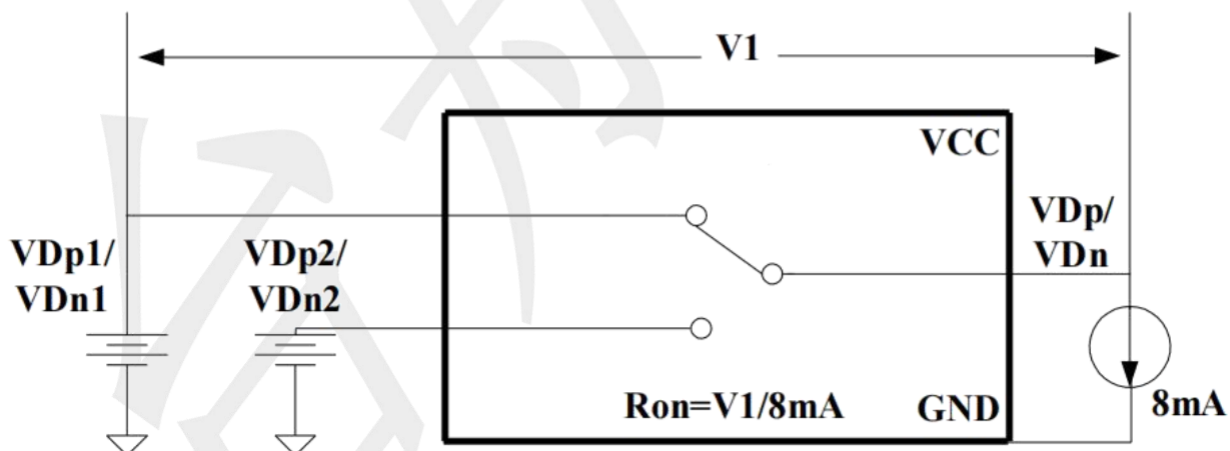
Typical Characteristics ($T_a=25^{\circ}\text{C}$, $V_{CC}=3.3\text{V}$, unless otherwise noted)



Bandwidth

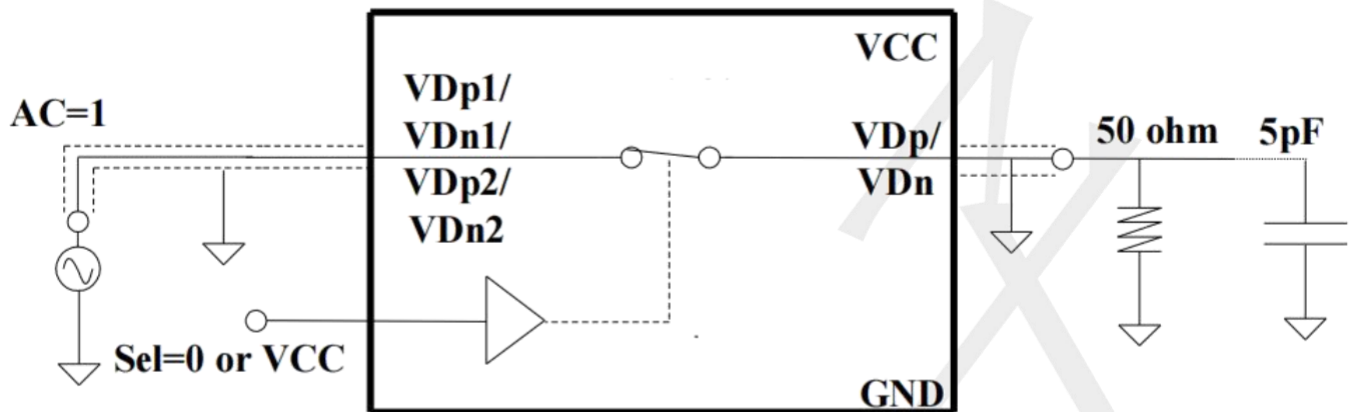


Eye Diagram (480Mbps)

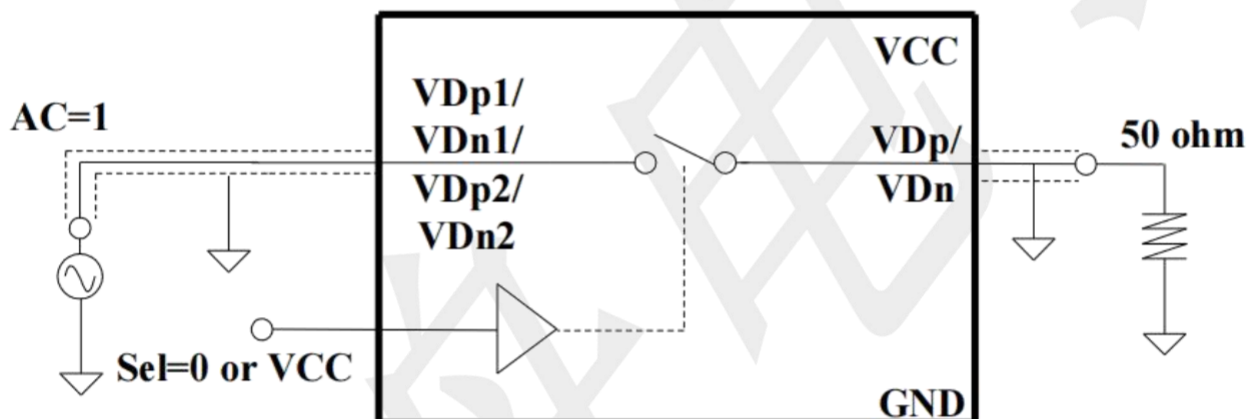


Test Circuit for On Resister

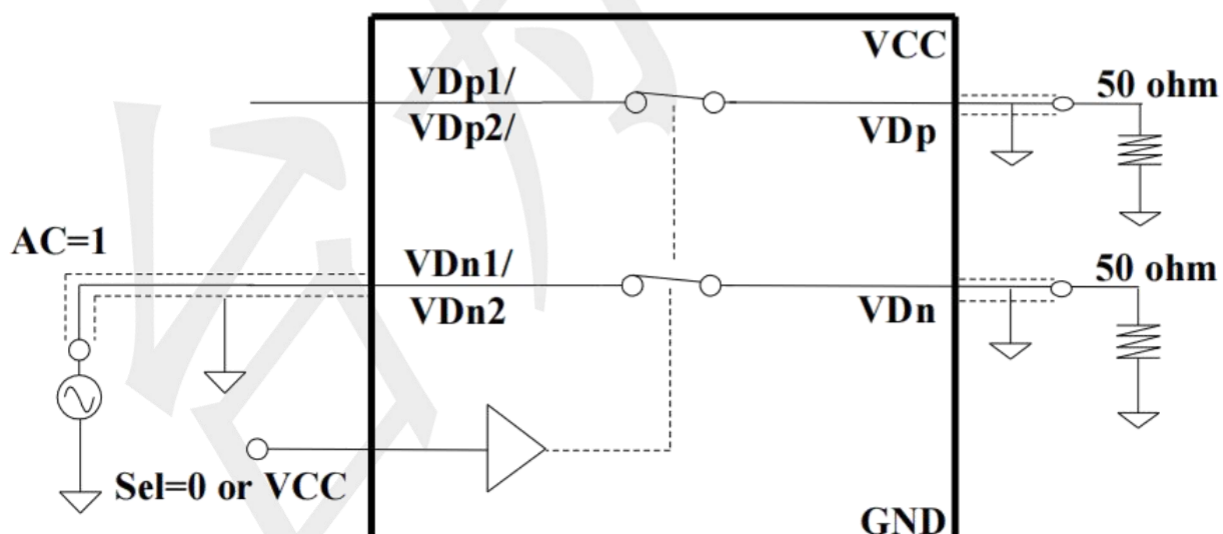
Typical Characteristics ($T_a=25^{\circ}\text{C}$, unless otherwise noted)



Test Circuit for Bandwidth



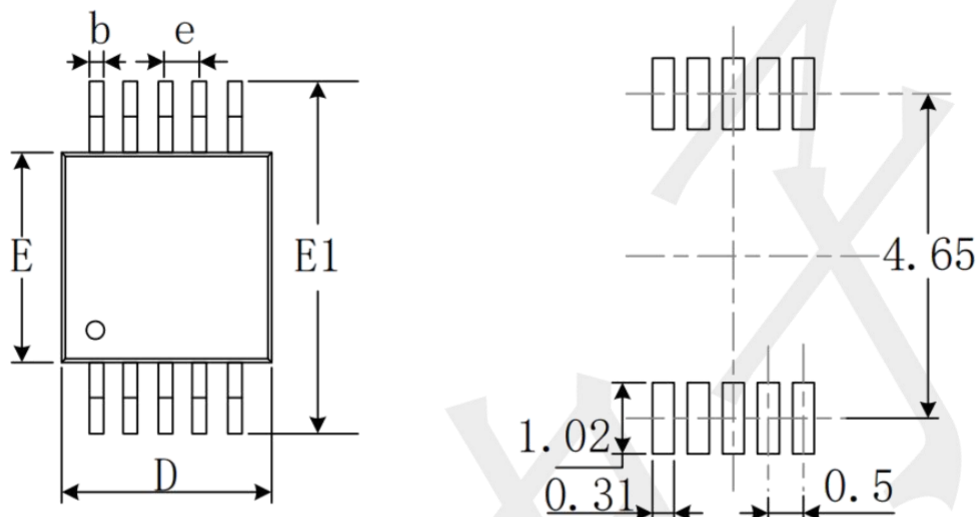
Test Circuit for Off Isolation



Test Circuit for 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°