

Power Bus Switch IC 1 to 1 Bus Switch

■ OVERVIEW

The S1F77310 series is the bus switch suitable for USB applications. The adopted CMOS process technology characterizes the S1F77310 series by low power consumption. The compact PLP-8 adopted for the package enables the S1F77310 series to be mounted on high-density assemblies.

The built-in level shift circuit eliminates the need of external level shift circuitry for the input to this IC.

■ FEATURES

- Input voltage range : 3.0V to 3.6V
- Low-current consumption : 14 μ A (MAX)
- Stand-by current : 1 μ A (MAX)
- Bus switch ON resistance : 5.3 Ω (typ)
- Bus switch OFF capacitance : 1.7pF (typ)

■ APPLICATION

- Mobile communication equipment (mobile phones, cordless phones, and wireless communication devices)
- Mobile AV equipment
- Home appliances
- Cameras, and video equipment
- Portable game devices
- Battery equipment

■ PACKAGE

- PLP-8 (1.60 mm x 1.60 mm)

S1F77310M0A

■ APPLICATION CIRCUIT EXAMPLE

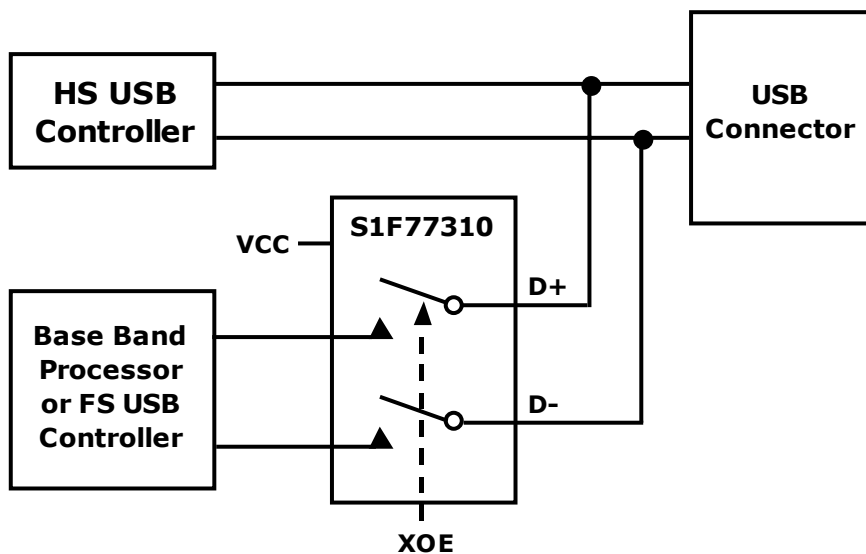
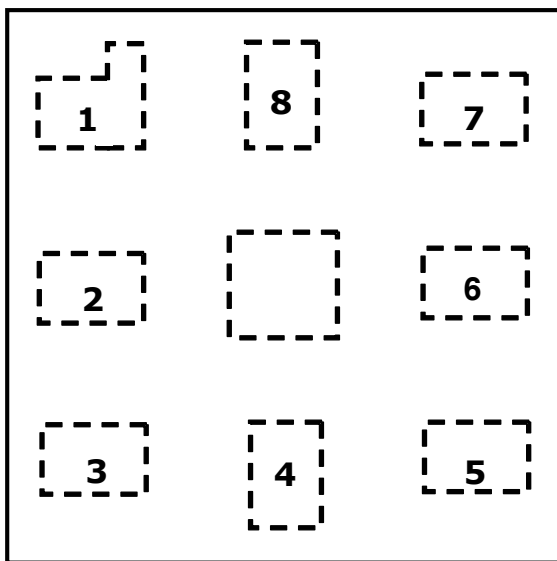


Fig.1 Application Circuit Example

■ PIN ASSIGNMENT



(Top view)

Fig.2 Pin Assignment

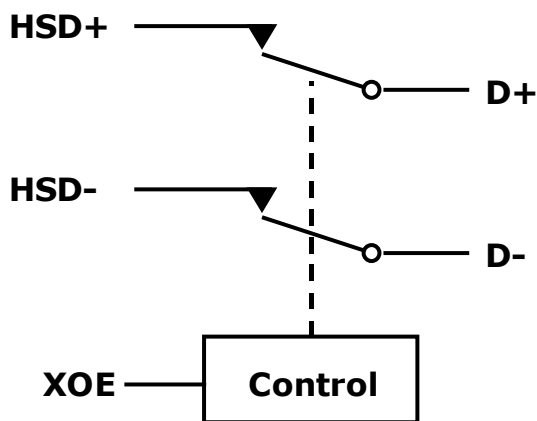


Fig.3 Bus switch symbol

* Central land area in this IC is not used. Do not mount any pin.

■ PIN DESCRIPTION

Pin No.	Pin Name	Pin Description
1	XOE	Bus switch enable input pin
2	HSD+	Data port (+)
3	D+	Data port (+)
4	GND	GND pin
5	D-	Data port (-)
6	HSD-	Data port (-)
7	(NC)	NC pin
8	Vcc	Power supply pin

■ TRUTH TABLE

XOE	Bus Switch status
HIGH	Disconnected
LOW	HSD+ =D+, HSD- =D-

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■ BLOCK DIAGRAM

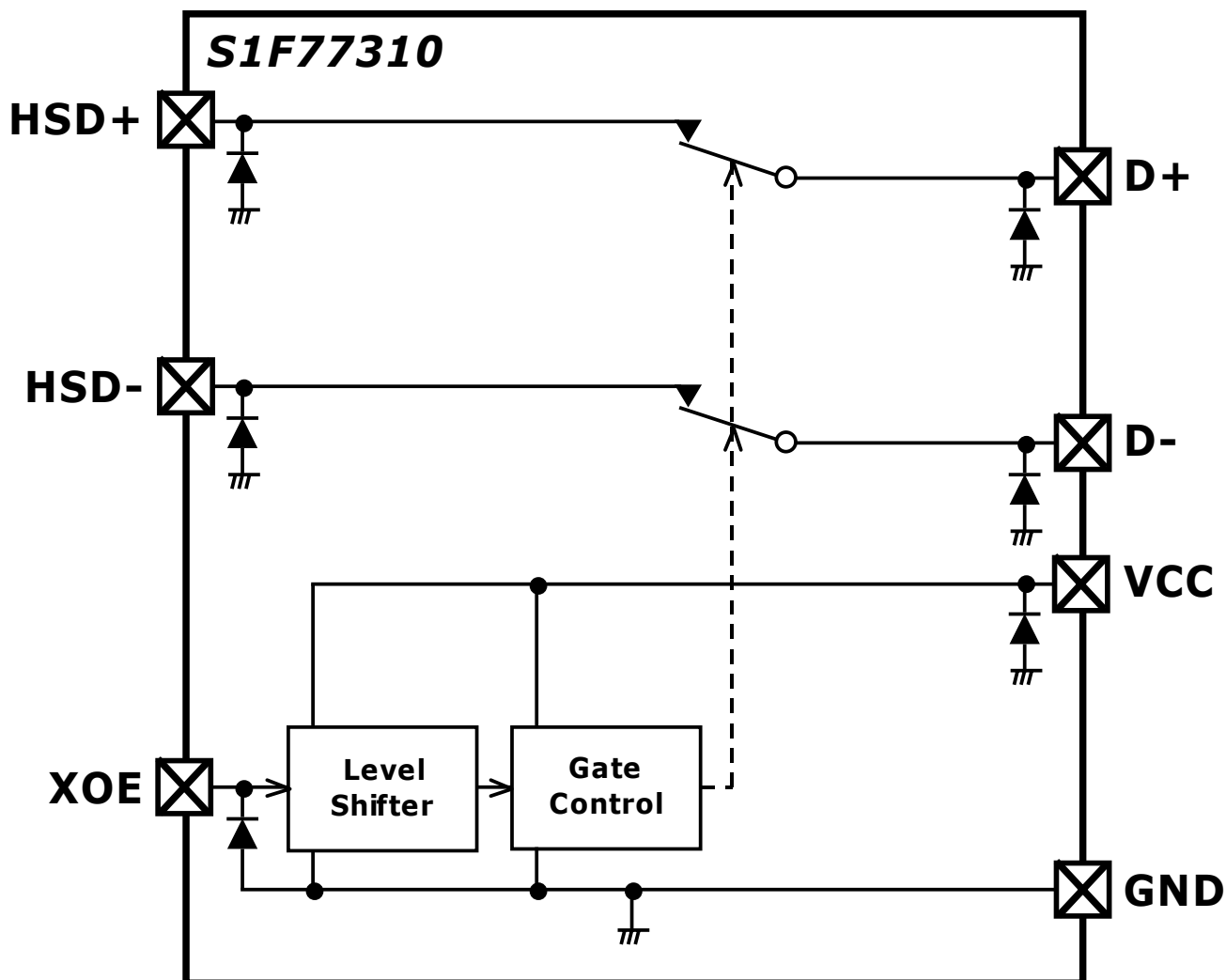


Fig.4 Block diagram

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■ ELECTRICAL CHARACTERISTICS

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Min.	Max.	Unit	
Supply voltage	V _{CC}	-0.3	4.6	V	
Input pin voltage	XOE	V _{IN}	-0.3	7.0	V
Switch input voltage	HSD+,HSD-,D+,D-	V _{SW}	-0.3	7.0	V
Storage temperature	T _{STG}	-65	150	°C	

■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	Min.	Max.	Unit	
Supply voltage	V _{CC}	3.0	3.6	V	
Input pin voltage	XOE	V _{IN}	0.0	5.5	V
Switch input voltage	HSD+,HSD-,D+,D-	V _{SW}	0.0	5.5	V
Operating temperature	T _a	-40	85	°C	

■ DC ELECTRICAL CHARACTERISTICS

(Without protrusion: T_a = -40°C to 85°C)

Item	Symbol	Conditions	V _{CC} [V]	Min.	Typ.	Max.	Unit
Clamp diode voltage	V _{IK}	I _L =18mA	3.0			-1.2	V
High Level Input voltage	V _{IH}		3.0 to 3.6	1.2			V
Low Level Input voltage	V _{IL}		3.0 to 3.6			0.4	V
Input Leakage current	I _{IN}	0V ≤ V _{IN} ≤ V _{CC}	3.6	-1.0		1.0	μA
OFF Stage Leakage current	I _{OZ}	0V ≤ V _{SW} ≤ V _{CC}	3.6	-1.0		1.0	μA
Power off Leakage current (D+, D-)	I _{OFF}	0V ≤ V _{SW} ≤ V _{CC} , V _{CC} =0V	0.0	-2.0		2.0	μA
Switch ON resistance	R _{ON}	V _{SW} =0.4V, I _{ON} = -8mA	3.0		5.3	8.0	Ω
ΔON resistance	ΔR _{ON}	V _{SW} =0.4V, I _{ON} = -8mA	3.0		0.35		Ω
ON resistance flatness	R _{ON(Flat)}	0V ≤ V _{SW} ≤ 1V, I _{ON} = -8mA	3.0		2		Ω
Quiescent current	I _{CC}	V _{IN} =3.6V	3.6			1.0	μA
Current consumption	I _{CC(T)}	V _{IN} =0V, V _{SW} =2.6V	3.6			14.0	μA

* Describe the value based on the USB full speed standard.

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■ AC ELECTRICAL CHARACTERISTICS

(Without protrusion: Ta= -40°C to 85°C)

Item	Symbol	Conditions	Vcc[V]	Min.	Typ.	Max.	Unit
Turn ON Time	t _{ON}	R _L =50Ω, C _L =5pF	3.0 to 3.6		5	20	μs
Turn OFF Time	t _{OFF}	R _L =50Ω, C _L =5pF	3.0 to 3.6		21	40	ns
Propagation Delay	t _{PD}	R _L =50Ω, C _L =5pF	3.3		0.25		ns
OFF Isolation	O _{IRR}	R _L =50Ω, C _L =0pF, f=240MHz	3.0 to 3.6		-35		dB
Crosstalk	X _{talk}	R _L =50Ω, f=240MHz	3.0 to 3.6		-40		dB
-3dB Bandwidth	BW	R _L =50Ω, C _L =0pF, f=240MHz	3.0 to 3.6		1000		MHz
Channel to Channel Skew	t _{SK(O)}	R _L =50Ω, C _L =5pF	3.0 to 3.6		50		ps
Skew of Opposite Transitions of the Same Output	t _{SK(P)}	R _L =50Ω, C _L =5pF	3.0 to 3.6		20		ps
Total Jitter	t _j	R _L =50Ω, C _L =5pF, t _R =t _F =500ps at 480Mbps	3.0 to 3.6		200		ps

■ CAPACITANCE

(Without protrusion: Ta= -40°C to 85°C)

Item	Symbol	Conditions	Vcc[V]	Min.	Typ.	Max.	Unit
Control input pin capacitance	C _{IN}	V _{CC} =0V, f=1MHz	0.0		7.0		pF
Bus switch ON capacitance	C _{ON}	V _{IN} =0V, f=1MHz	3.3		3.7		pF
Bus switch OFF capacitance	C _{OFF}	V _{CC} =0V, f=1MHz	0.0		1.7		pF

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