

Features

- Audio Path On-Resistance 0.9Ω
- VBUS Pin Voltage 18V
- D+/R & D-/L Pin OVP Threshold 5V
- USB Path On-Resistance 3.8Ω
- THD+N@ 32Ω load & 0.7Vrms -105dB
- Signal-to-Noise (SNR) Ratio 115dBA
- USB Path -3dB Bandwidth 1000MHz
- Audio Swing Range ($R_L = 1K\Omega$) 2.5Vrms
- Wide Supply Range (2.5V ~ 4.5V)
- Packaging: QFN 1418-10L

Applications

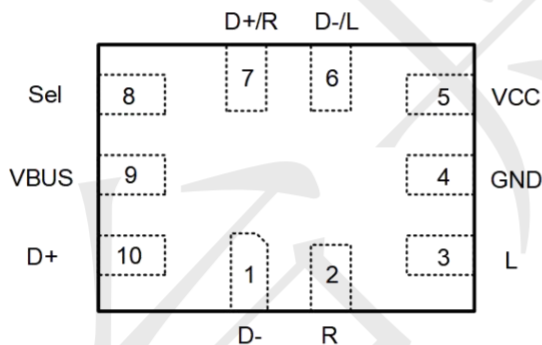
- Mobile Phones, Tablets and Notebooks
- USB Type-C Audio

General Description

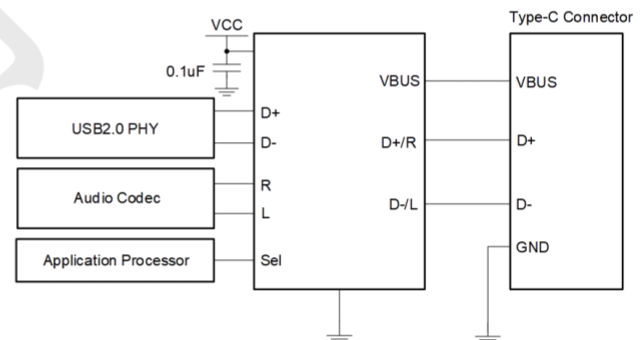
The is a high performance, Double-Pole, Double Throw (DPDT) multiplexer that combines a low-distortion audio and a USB2.0 High-Speed (HS) switch path. This configuration enables audio and USB data to share a common connector port. The architecture is designed to allow audio signals to swing below ground. This means analog audio over USB-C connector can be used for personal media players and portable peripheral devices.

With Max. 18V high voltage range of VBUS pin, can be configured for automatic USB communication with VBUS tie to VBUS directly. The includes an over voltage protection of D+/R & D-/L pin to protect internal port. Typical applications involve switching in portables and consumer applications such as mobile phone, tablet, laptop, portable media players.

PIN CONFIGURATIONS (TOP VIEW)



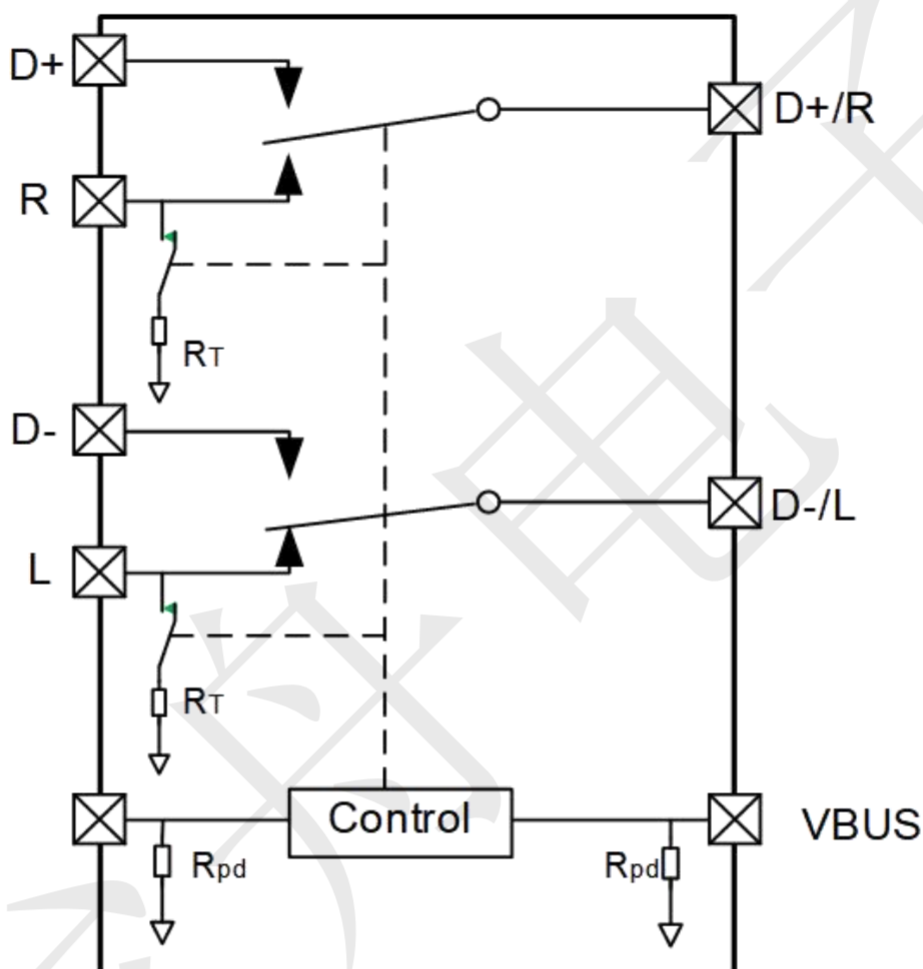
Typical Application



PIN DESCRIPTION

PIN NO.	PIN NAME	DESCRIPTION
1	D-	USB data (Negative) input sources
2	R	Audio Right input sources
3	L	Audio Left input sources
4	GND	Ground
5	VCC	Power supply
6	D-/L	USB data (Negative) and audio Left common connector ports
7	D+/R	USB data (Positive) and audio Right common connector ports
8	Sel	Audio Selection and Low-Power Mode Control
9	VBUS	USB Switch Selection
10	D+	USB data (Positive) input sources

BLOCK DIAGRAM



Function Table

VBUS	Sel	USB Mode	Audio Mode
1	0	ON	OFF
0	0	OFF	ON
1	1	OFF	ON
0	1	OFF	ON

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Supply voltage range	V_{CC}	-0.3 ~ 6.5	V
USB signal voltage range	V_{USB}	-0.3 ~ 4.0	V
Audio signal voltage range	V_{AUDIO}	-2.5 ~ V_{CC}	V
VBUS pin voltage range	V_{VBUS}	-0.3 ~ 18	V
Sel pin voltage range	V_{SEL}	-0.3 ~ 6.5	V
Continues output current (USB)	I_{OUT}	±100	mA
Continues output current (Audio)	I_{OUT}	±200	mA
Junction temperature range	T_J	150	°C
Lead temperature range	T_L	260	°C
Storage temperature range	T_{STG}	-65 ~ +150	°C
Thermal resistance	$R_{\theta JA}$	250	°C/W
ESD protection (HBM)	Sel, VBUS to GND	±4000	V
	V_{CC} to GND	±5000	V
	D+, D- to GND	±4000	V
	D+/R, D-/L to GND	±4000	V
	L, R to GND	±4000	V

Note: “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.

Recommend operating ratings

Parameter	Symbol	Value	Unit
Supply voltage range	V_{CC}	2.5 ~ 4.5	V
USB signal voltage range	V_{USB}	0.0 ~ 3.3	V
Audio signal voltage range	V_{AUDIO}	-2.5 ~ +2.5	V
VBUS pin voltage range	V_{VBUS}	-0 ~ 18	V
Sel pin voltage range	V_{SEL}	-0 ~ 5.5	V
Operating temperature range	T_{OPR}	-40 ~ 85	°C

Note: The input and output negative voltage ratings may be exceeded if the input and output diode current ratings are observed.

Electrical Characteristics (Ta=25°C, VDD=3.3V, unless otherwise specified)

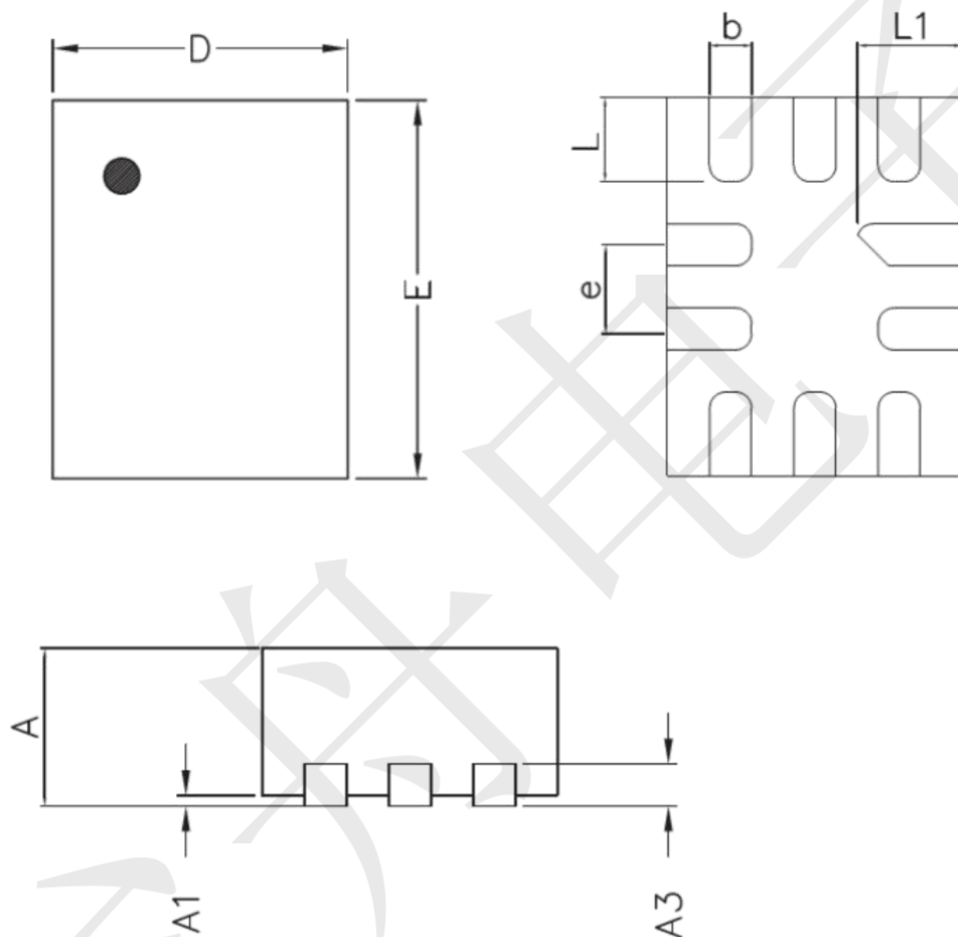
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Control Input Voltage High	V _{IH}		1.5	--	--	V
Control Input Voltage Low	V _{IL}		--	--	0.4	V
Quiescent Supply Current	I _{CC-A}	Audio Mode	--	66	--	uA
	I _{CC-U}	USB Mode	--	35	--	uA
Sel Input Leakage Current	I _{IN}	0 < V _{IS} < V _{CC}	--	--	2	uA
VBUS Input Leakage Current	I _{IN}	0 < V _{IS} < 20V	--	--	2	uA
Off state leakage current	I _{OFF}		--	--	1	uA
Sel and VBUS Internal Pull-Down Resistors	R _{PD}		--	4	--	MΩ
Audio Path Termination Resistors	R _T		--	33	--	Ω
USB Switch On Resistance	R _{ONUSB}	V _{D+/D-} = 0V~0.4V, I _{ON} = 10mA	--	3.8	4.5	Ω
USB Switch Delta R _{ON}	ΔR _{ONUSB}	V _{D+/D-} = 0V~0.4V, I _{ON} = 10mA	--	0.5	--	Ω
Audio Switch On Resistance	R _{ONAudio}	V _{L/R} = -2V~+2V, I _{ON} = 60mA	--	0.9	1.2	Ω
Audio Switch Delta R _{ON}	ΔR _{ONAudio}	V _{L/R} = -2V~+2V, I _{ON} = 60mA	--	0.02	--	Ω
Audio Switch R _{ON} Flatness	R _{FLATAudio}	V _{L/R} = -2V~+2V, I _{ON} = 60mA	--	0.02	--	Ω
Non-Adjacent Channel Crosstalk	Xtalk	Audio Mode f=1KHz R _T =32Ω	--	-80	--	dB
		USB Mode f=240MHz R _T =50Ω	--	-35	--	
Off Isolation	O _{IRR}	Audio Mode f=1KHz R _T =32Ω	--	-100	--	dB
		USB Mode f=240MHz R _T =50Ω	--	-40	--	
-3dB Bandwidth (USB Mode)	BW	R _T =50Ω, C _L =0pF Signal 0dBm	--	1000	--	MHz
Total Harmonic Distortion (Audio Mode)	THD	f = 20Hz to 20KHz, R _L = 32Ω, V _{IN} = 0.7V _{rms}	--	-105	--	dB
		f = 20Hz to 20KHz, R _L = 1KΩ, V _{IN} = 1.5V _{rms}	--	-110	--	dB
Signal-to-Noise Ratio (Audio Mode)	SNR	f = 20Hz to 20kHz, R _L = 32Ω, V _{IN} = 2V _{rms}	--	-115	--	dB
D+/R, D-/L On Capacitance	C _{ON}	V _{Bias} = 0.2V, f = 1MHz	--	5	--	pF
USB Path Off Capacitance	C _{OFF1}	V _{Bias} = 0.2V, f = 1MHz	--	3	--	pF
Audio Path Off Capacitance	C _{OFF2}	V _{Bias} = 0.2V, f = 1MHz	--	4	--	pF

Note:(1) Flatness is defined as the difference between maximum and minimum value of ON-resistance at the specified analog signal voltage points.

(2) R_{ON} matching between channels is calculated by subtracting the channel with the lowest max Ron value from the channel with the highest max Ron value.

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