Preliminary

HD3SS6126EVM Device Reference Design

User's Guide

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This user's guide shows a USB 3.0 KVM switch application example of the HD3SS6126 device and provides recommendations for high-speed digital signal PCB design.

1 HD3SS6126EVM Overview

1.1 Basic Function Introduction of HD3SS6126EVM

Use the HD3SS6126 evaluation module (EVM) board to select between one of two USB host systems for an USB device and to switch between two USB hosts. Figure 1 shows the KVM switch application. The bidirectional capability of the HD3SS6126 also supports applications that allow connections between two target devices and one source device, such as a shared USB 3.0 host between two USB 3.0 devices.

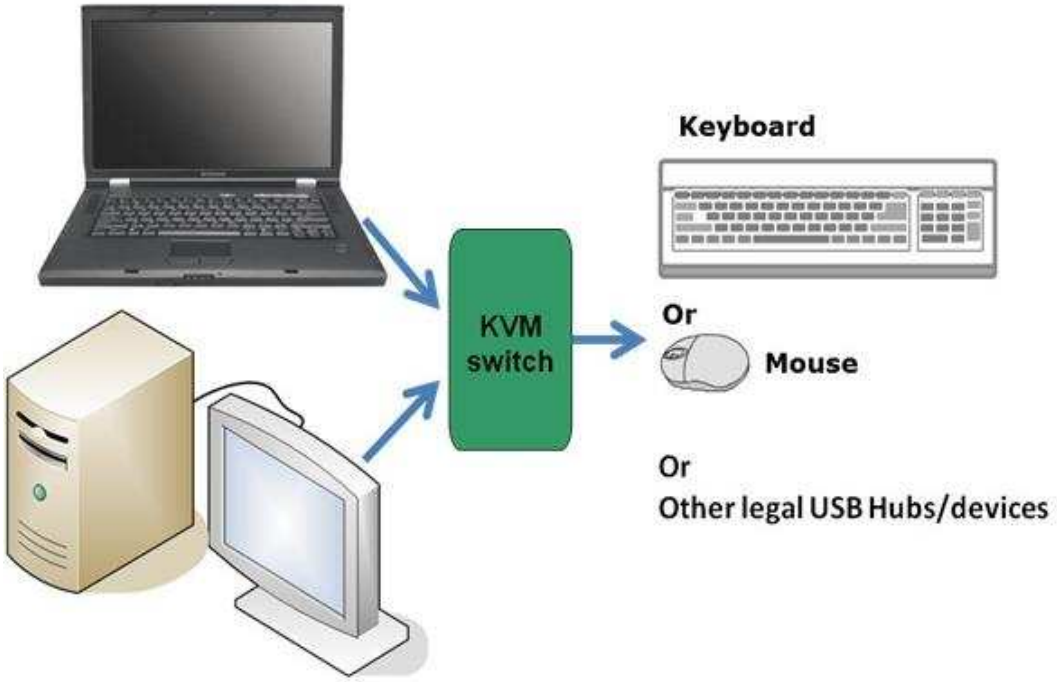


Figure 1. KVM Switch Application of HD3SS6126EVM

USB 3.0 has additional differential TX and RX super-speed signal paths in addition to the USB 2.0 signal path. USB 3.0 always tries to work in super-speed mode first, if the system super-speed path is connected well. Otherwise, it works in USB 2.0 mode. The HD3SS6126EVM manually selects different USB 3.0 paths according to demand. For the HD3SS6126EVM, USB 3.0 micro-B receptacles are employed on the host-side USB port, but a standard type-B receptacle is available, if desired. USB 3.0 standard type-A receptacle is used as the device-side USB port. The USB ports can be attached through a standard USB cable to any USB 3.0, or legacy USB host, hub, or device. However, a legacy USB cable forces the system to use high-speed operation.

1.2 HD3SS6126EVM Operation

Figure 2 shows the HD3SS6126EVM and its default setting. Four LEDs are used to indicate the selected channel and current working mode: super speed (SS) or non-SS. Table 1 lists the working mode with different switch selections. The independent output enable pin of the HD3SS6126 can be used to enable or disable the output to save power in applications where low power is necessary.

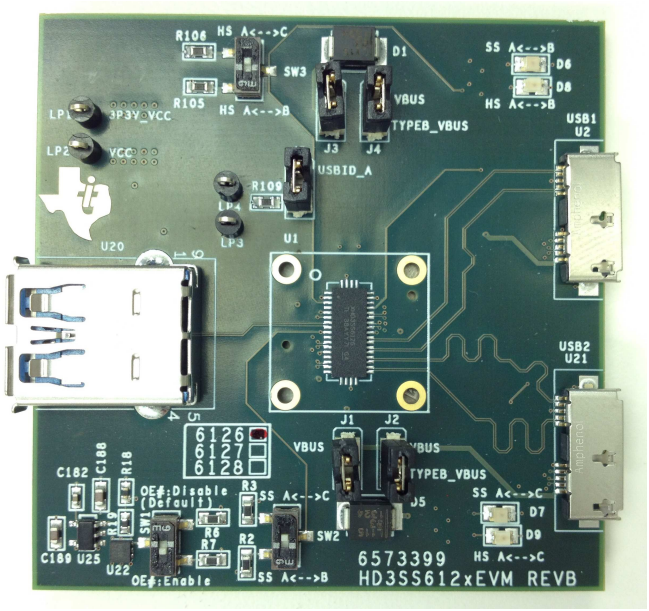


Figure 2. Voice Interface - Example of HD3SS6126 KVM Switch EVM

Table 1. Switches and LED Indicators(1)(2)

Mode	SW1	SW2	SW3	D6	D7	D8	D9	Function
1	2, 3	1, 2	1, 2	Off	Off	Off	Off	KVM HS/ID switch disabled
2	2, 3	1, 2	2, 3	Off	Off	Off	Off	KVM HS/ID switch disabled
3	2, 3	2, 3	1, 2	Off	Off	Off	Off	KVM HS/ID switch disabled
4	2, 3	2, 3	2, 3	Off	Off	Off	Off	KVM HS/ID switch disabled
5	1, 2	1, 2	1, 2	On	Off	On	Off	AC channel USB 3.0 selected
6	1, 2	2, 3	2, 3	Off	On	Off	On	AB channel USB 3.0 selected

(1) SS

(2) Non-SS : High speed, full speed, or low speed

HD3SS6126EVM is powered from the USB hosts, D1 and D5, which are employed to avoid conflict between the two voltage sources from different USB hosts. The smaller the forward voltage drop, the better the system performance. U22 is a low R_{on} PMOS power switch used to enable or disable the EVM and activate the USB device. Note that the HD3SS6126EVM draws some current from the VBUS, so TI recommends low-power-consumption devices.

Per USB 3.0 specification, the 0201, 0.1-µF capacitors are preferred in the transmitter side, but 0402 still works. To be well biased either by source or sink, TI recommends placing capacitors on only one side of the HD3SS6126 device. Capacitors should be placed on either the host or device side, so no AC capacitors are necessary for this EVM.

The HD3SS6126 incorporates internal ESD protection circuitry for all the differential pairs up to HBM 2000 kV and CDM 500 V, so no ESD protection devices populated on this EVM. However, TI recommends the TPD2EUSB30 devices for any system where ESD events are a concern and the application equipment exceeds the device specifications.

2 Reference Schematics

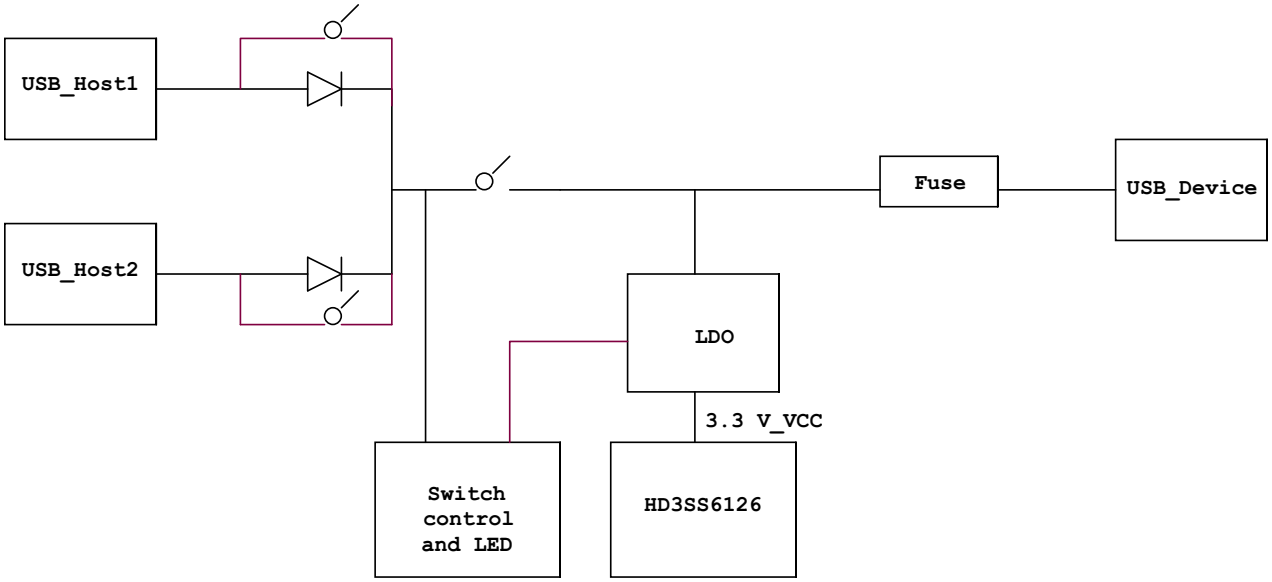
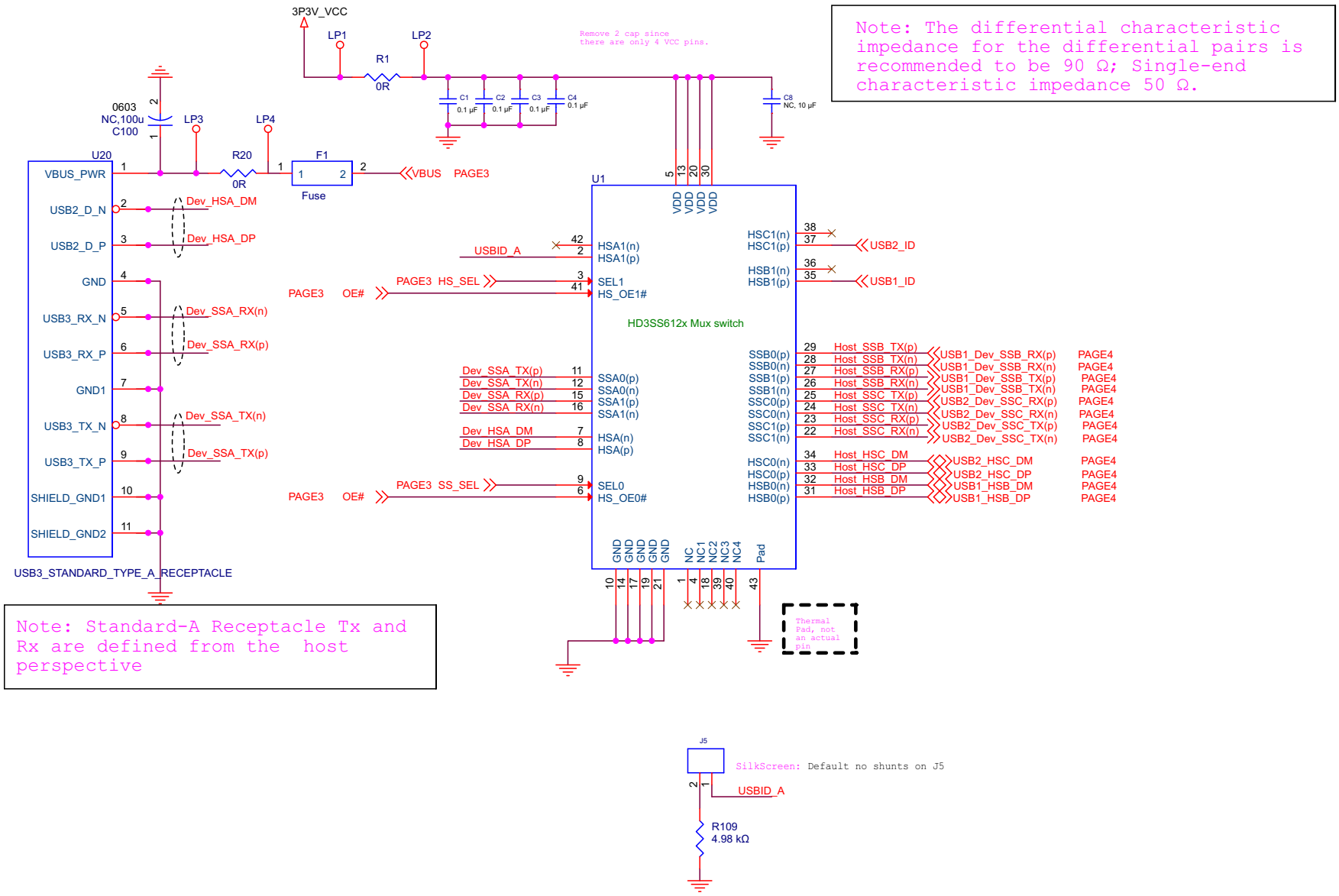
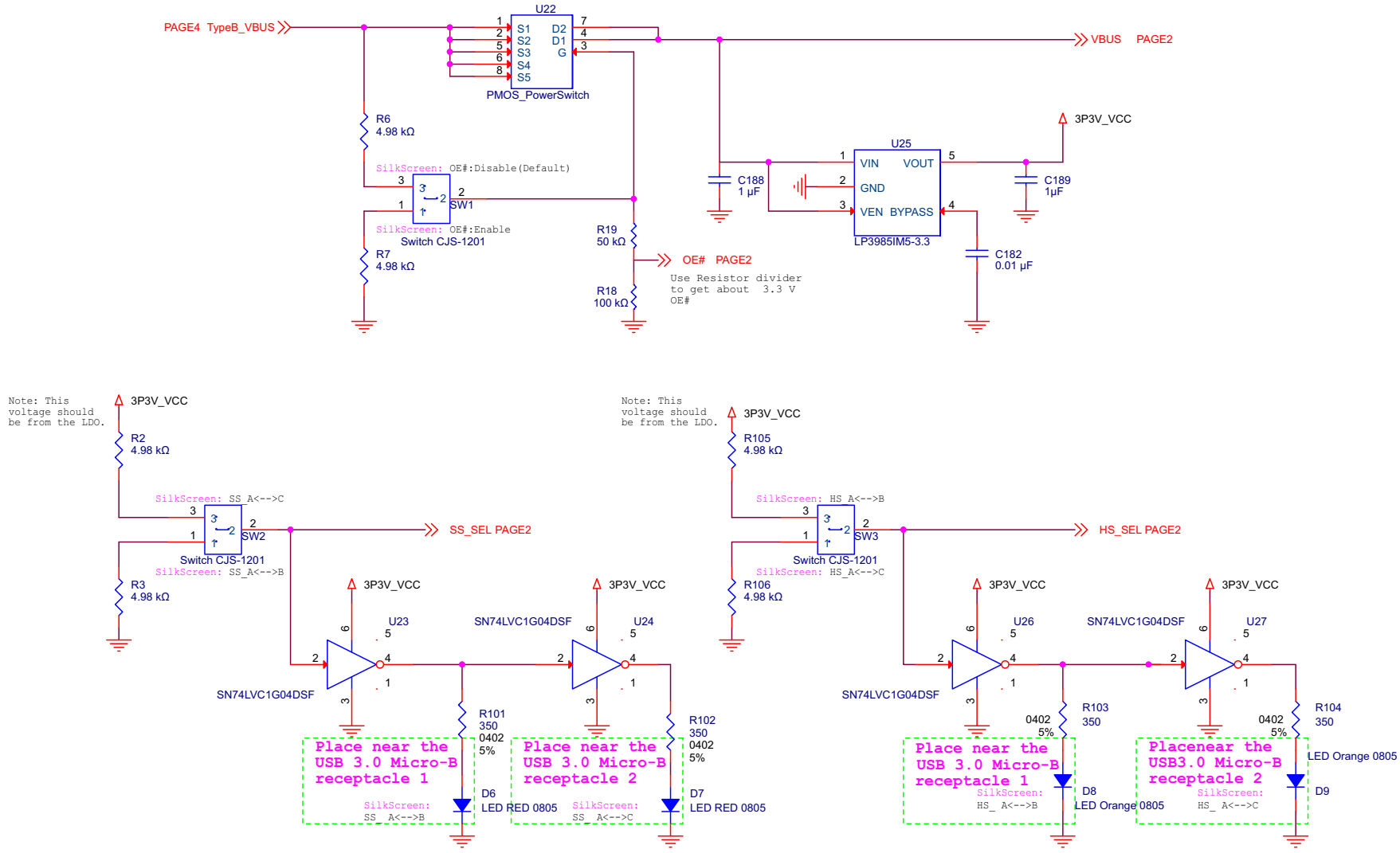
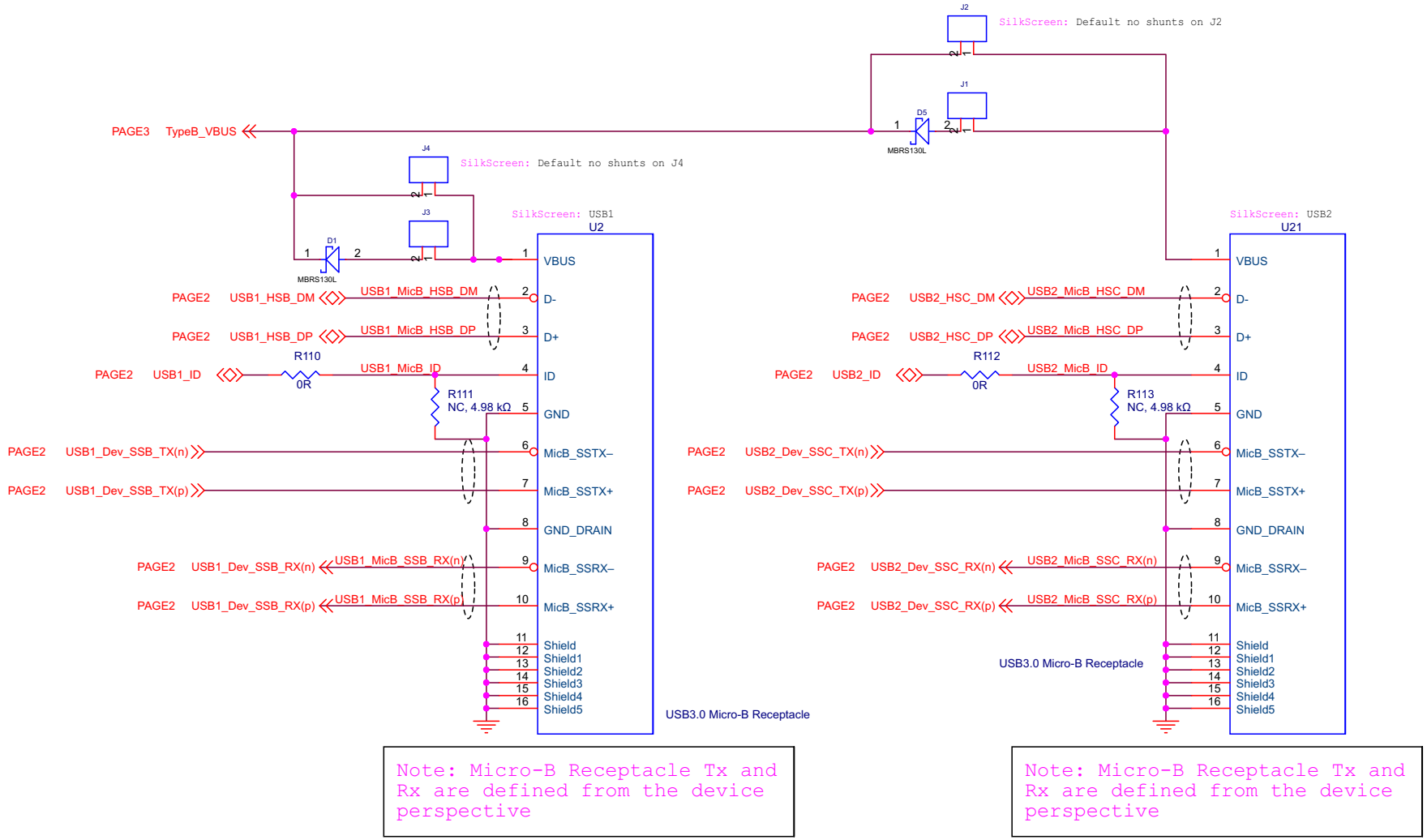


Figure 3. Power Block Diagram







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- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Cet appareil numérique de la classe A ou B est conforme à la norme NMB-003 du Canada.

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Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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