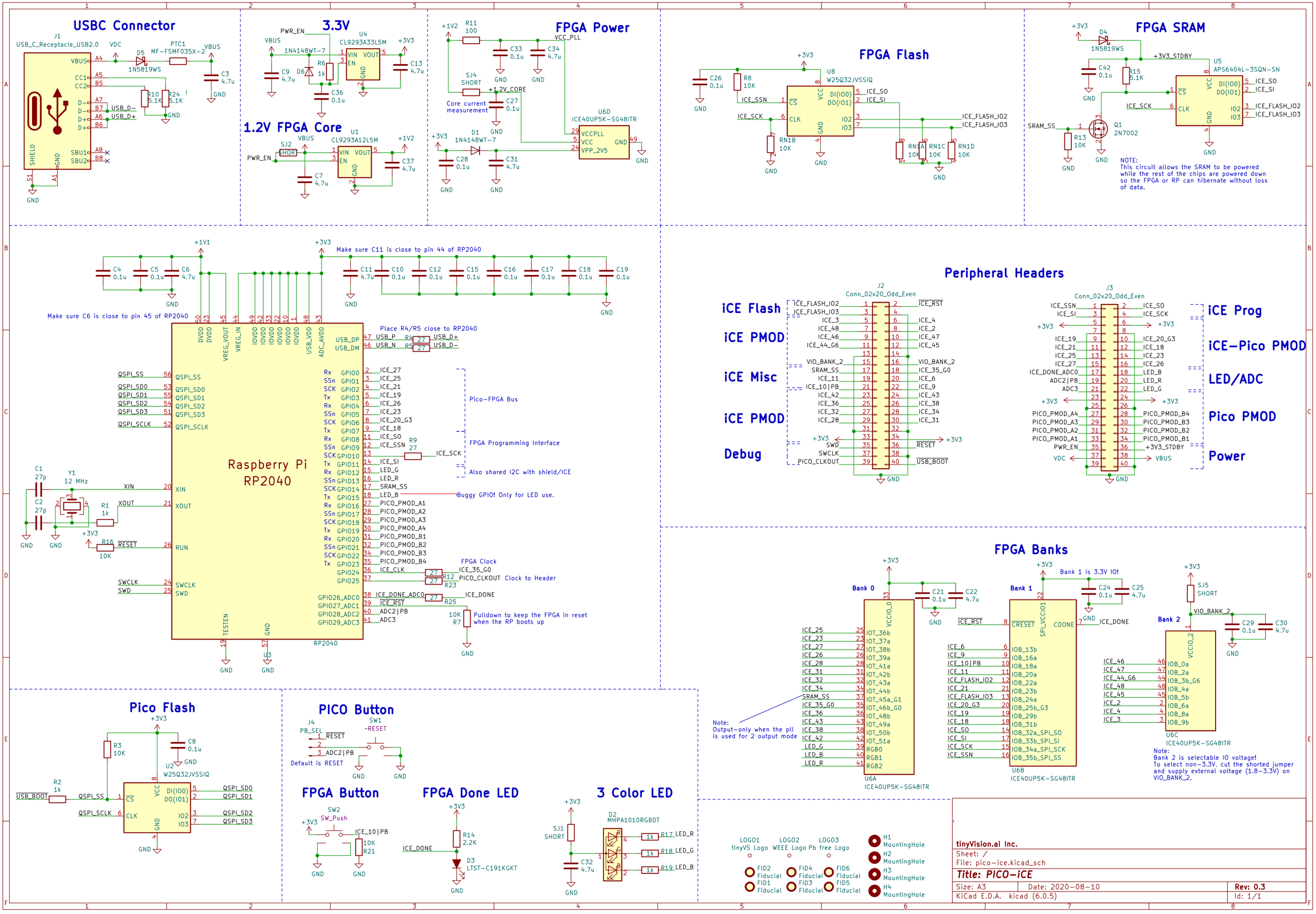
USBC Connector
J1
USB_C_Receptacle_USB2.0
VDC
D5
1N5819WS
PTC1
MF-FSMF035X-2
VBUS
C3
4.7u
GND
R10
5.1K
R24
5.1K
USB_D-
USB_D+
SHIELD
S1
A1
3.3V
PWR_EN
1N4148WT-7
D6
R6
1k
C9
4.7u
C36
0.1u
U4
CL9293A33L5M
VIN
VOUT
EN
+3V3
C13
4.7u
1.2V FPGA Core
U1
CL9293A12L5M
SJ2
SHORT
+1V2
C7
4.7u
C37
4.7u
FPGA Power
R11
100
+1V2
C33
0.1u
C34
4.7u
VCC_PLL
SJ4
SHORT
+1.2V_CORE
Core current measurement
C27
0.1u
D1
1N4148WT-7
C28
0.1u
C31
4.7u
U6D
ICE40UP5K-SG48ITR
VCCPLL
VCC
VPP_2V5
FPGA Flash
U8
W25Q32JVSSIQ
C26
0.1u
R8
10K
ICE_SSN
ICE_SCK
RN1B
10K
DI(IO0)
DO(IO1)
IO2
IO3
ICE_SO
ICE_SI
ICE_FLASH_IO2
ICE_FLASH_IO3
RN1A
10K
RN1C
10K
RN1D
10K
FPGA SRAM
D4
1N5819WS
+3V3_STDBY
C42
0.1u
R15
5.1K
U5
APS6404L-3SQN-SN
SRAM_SS
R13
10K
Q1
2N7002
NOTE:
This circuit allows the SRAM to be powered while the rest of the chips are powered down so the FPGA or RP can hibernate without loss of data.
C4
0.1u
C5
0.1u
C6
4.7u
+1V1
Make sure C6 is close to pin 45 of RP2040
Make sure C11 is close to pin 44 of RP2040
C11
4.7u
C10
0.1u
C12
0.1u
C15
0.1u
C16
0.1u
C17
0.1u
C18
0.1u
C19
0.1u
Place R4/R5 close to RP2040
USB_P
USB_N
USB_DP
USB_DM
R4
27
R5
27
Raspberry Pi
RP2040
QSPI_SS
QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3
QSPI_SCLK
XIN
XOUT
RUN
SWCLK
SWD
TESTEN
ICE_27
ICE_25
ICE_21
ICE_19
ICE_26
ICE_23
ICE_20_G3
ICE_18
ICE_SO
ICE_SSN
ICE_SCK
ICE_SI
LED_G
LED_R
SRAM_SS
LED_B
PICO_PMOD_A1
PICO_PMOD_A2
PICO_PMOD_A3
PICO_PMOD_A4
PICO_PMOD_B1
PICO_PMOD_B2
PICO_PMOD_B3
PICO_PMOD_B4
ICE_CLK
ICE_DONE_ADC0
ICE_RST
ADC2|PB
ADC3
Pico-FPGA Bus
FPGA Programming Interface
Also shared I2C with shield/ICE
Buggy GPIO! Only for LED use.
FPGA Clock
ICE_35_G0
PICO_CLKOUT
Clock to Header
ICE_DONE
Pulldown to keep the FPGA in reset when the RP boots up
R9
27
R12
27
R23
27
R25
27
R7
10K
C1
27p
C2
27p
Y1
12 MHz
R1
1k
R16
10K
RESET
U3
RP2040
Peripheral Headers
J2
Conn_02x20_Odd_Even
ICE Flash
ICE PMOD
ICE Misc
ICE PMOD
Debug
ICE_FLASH_IO2
ICE_FLASH_IO3
ICE_3
ICE_48
ICE_46
ICE_44_G6
VIO_BANK_2
SRAM_SS
ICE_11
ICE_10|PB
ICE_42
ICE_36
ICE_32
ICE_28
SWD
SWCLK
PICO_CLKOUT
ICE_RST
ICE_4
ICE_2
ICE_47
ICE_45
VIO_BANK_2
ICE_35_G0
ICE_6
ICE_9
ICE_43
ICE_38
ICE_34
ICE_31
RESET
USB_BOOT
J3
Conn_02x20_Odd_Even
ICE Prog
iCE-Pico PMOD
LED/ADC
Pico PMOD
Power
ICE_SSN
ICE_SI
ICE_SO
ICE_SCK
ICE_19
ICE_21
ICE_25
ICE_27
ICE_DONE_ADC0
ADC2|PB
ADC3
PICO_PMOD_A4
PICO_PMOD_A3
PICO_PMOD_A2
PICO_PMOD_A1
PWR_EN
VDC
ICE_20_G3
ICE_18
ICE_23
ICE_26
LED_B
LED_R
LED_G
PICO_PMOD_B4
PICO_PMOD_B3
PICO_PMOD_B2
PICO_PMOD_B1
+3V3_STDBY
VBUS
FPGA Banks
Bank 0
U6A
ICE40UP5K-SG48ITR
VCCIO_0
Note:
Output-only when the pll is used for 2 output mode
Bank 1
Bank 1 is 3.3V IO!
C21
0.1u
C22
4.7u
C24
0.1u
C25
4.7u
CRESET
CDONE
SPI_VCCIO1
U6B
ICE40UP5K-SG48ITR
Bank 2
SJ5
SHORT
VIO_BANK_2
C29
0.1u
C30
4.7u
VCCIO_2
U6C
ICE40UP5K-SG48ITR
Note:
Bank 2 is selectable IO voltage!
To select non-3.3V, cut the shorted jumper and supply external voltage (1.8-3.3V) on VIO_BANK_2.
Pico Flash
R3
10K
C8
0.1u
U2
W25Q32JVSSIQ
R2
1k
USB_BOOT
QSPI_SS
QSPI_SCLK
QSPI_SD0
QSPI_SD1
QSPI_SD2
QSPI_SD3
PICO Button
J4
PB_SEL
SW1
~RESET
Default is RESET
FPGA Button
SW2
SW_Push
ICE_10|PB
R21
10K
FPGA Done LED
R14
2.2K
ICE_DONE
D3
LTST-C191KGKT
3 Color LED
SJ1
SHORT
C32
4.7u
D2
MHPA1010RGBDT
R17 LED_R
R18 LED_G
R19 LED_B
LOGO1
tinyVS Logo
LOGO2
WEEE Logo
LOGO3
Pb free Logo
FID1 Fiducial
FID2 Fiducial
FID3 Fiducial
FID4 Fiducial
FID5 Fiducial
FID6 Fiducial
H1 MountingHole
H2 MountingHole
H3 MountingHole
H4 MountingHole
tinyVision.ai Inc.
Sheet: /
File: pico-ice.kicad_sch
Title: PICO-iCE
Size: A3
Date: 2020-08-10
Rev: 0.3
KiCad E.D.A. kicad (6.0.5)
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