Power Supply

MCP1754/3.3V:
Vin: 3.6V to 16.0V
Vout: Fixed 3.3V
Imax: 150mA
Dropout: 300mV @ 150mA

USB BRIDGE 3.3V SUPPLY

"MIC1754"
U505
MCP1754/3.3V
Vin, SHDN, PWRGD, GND, EP, Vout, NC, NC, NC
C510 0603 16V 4.7uF
C504 16V 10402 2.2uF
VCC_BRIDGE_P3V3

SLEW RATE LIMIT:
- With C503 set to 2200pF, the slew rate of VCC_VBUS is limited to 2 V/ms by the power switch MIC2008.

CURRENT LIMIT:
- With R500 set to 120ohm, the current through the power switch MIC2008 is limited to 2A.

VBUS SLEW RATE- & CURRENT-LIMIT

"MIC2008"
U503
MIC2008
VIN, EN, CSLEW, GND, ILIMIT, VOUT, EP
VCC_VBUS
R515 47k
C501 16V 2.2uF
C503 2200pF
R500 1% 120R
C502 0603 16V 4.7uF
"POWER DISABLE"
POWER_DISABLE
N.M
U1900
DMN65D8LFB-7B
Q503
R517 47k

To turn power OFF, drive POWER_DISABLE to 2.0V or higher.

MIC33153/3.3V:
Vin: 2.7V to 5.5V
Vout: Fixed 3.3V
Imax: 1.2A

3.3V BUCK REGULATOR

U500
MIC33153/3.3V
"MIC33153"
VIN, SW, SW, SW, EN, OUT, OUT, OUT, SNS, NC, PG, SS, 13 PGOND, PGND, EP, AGND
P3V3
C511 0603 16V 4.7uF
R524 47k
C512 0603 16V 4.7uF
R535 1k
C513 470pF
D500 GREEN
"3.3V REG"
J505

POWER MONITOR CHANNELS

"PAC1944 POWER MONITOR"

CH3 mA

"CH3 mA"
VCC_VBUS
VCC_P5V0
JP500 JP501 J503 HDR-2.54 Male 2x2
J508 N.M
SENSE3+ SENSE3-
"P5V0"
R514 0.05R 1%
U504D
SENSE3+ SENSE3-
PAC1944

Jumper configurations for CH3 measurements:

VCC_P5V0 measurement (default):
- J503: P1 <-> P2
- J503: P3 <-> P4

Bypass VCC_P5V0 measurement:
- J503: P1 <-> P3
- J503: P2 <-> P4

Using CH3 for general current measurement:
- J503: P2 <-> P4
- J503: P3 current input (+)
- J503: P1 current output (-)

Measure range: ≤ 2.00 A
Resolution: 30.5 µA

CH2 mA

"CH2 mA"
P3V3'
VCC_P3V3
R512 0.075R 1%
J512 N.M
"P3V3"
U504C
SENSE2+ SENSE2-
PAC1944

Measure range: ≤ 1.33 A
Resolution: 20.3 µA

CH4 mA

"CH4 mA"
JP502 J506
"CNANO P3V3"
VCC_CNANO_P3V3
R513 0.22R 1%
JP503 JP504 J504 HDR-2.54 Male 2x2
"CH1 µA"
U504E
SENSE4+ SENSE4-
PAC1944

Measure range: ≤ 455 mA
Resolution: 6.94 µA

CH1 µA

SENSE1+ SENSE1-
R511 51R 1%
U504B
SENSE1+ SENSE1-
PAC1944

Measure range: ≤ 1.96 mA
Resolution: 29.9 nA

Jumper configurations for CH1 and CH4 measurements:

VCC_CNANO_P3V3 measurement with CH4 (mA)(default):
- J504: P1 <-> P2
- J504: P3 <-> P4
- J506: P1 <-> P2

VCC_CNANO_P3V3 measurement with CH1 (uA):
- J504: P1 <-> P2
- J504: P3 <-> P4
- J506: No jumper

Using CH1 for general current measurement:
- J504: P4 current input (+)
- J504: P2 current output (-)
- J506: P1 <-> P2

VBUS MUX SWITCH

VBUS_MUX_OUT
Diode D1900 is added to reduce voltage drop on VBUS_MUX_OUT when the priority supply USB-C is disconnected, switching power-mux to power from VBUS_CNANO.

D1900
PMEG40T20ERX
"R537" R537 N.M 0R
R538 N.M 0R "R538"
U1900 U1901
VIN, VOUT, EN, GND, A1, A2, B1, B2, C1, C2
MIC94163YCS
R1900 8.2k
C1900 4.7uF
R1901 8.2k
D1901
BAT754C
VBUS_CNANO

VBUS START-UP DELAY

VBUS
Q500
CSD25501F3
VBUS_DELAYED
C500 0.1uF
R501 47k
R502 47k

START-UP DELAY: C500 set to 0.1uF and R502 set to 47kohm, Q500 is delaying the turn-on of VBUS_DELAYED by ~1ms.

VBUS MUX CONTROL

VBUS_MUX_VCC
R521 220k
R536 10k
VREF_P0V200
U507A
MCP6062
VDD, OUTA, VSS, -A, +A
R520 47k
"MCP6062"
U507B
MCP6062
-B, +B, OUTB
R522 47k
CC1
CC2
C506 0.1uF
C1901 10nF
VBUS_TARGET_EN
U1902
MIC842NYMT-T5
VDD, OUT, INP, EP, GND
R1902 100R
Q1900
DMN65D8LFB-7B

VBUS_DELAYED has priority over VBUS_CNANO when both are connected.

Design Note1:
When CC1 or CC2 are above VREF_P0V200 (~0.200V), i.e. VBUS connected to USB HUB:
- VBUS_TARGET_EN will be VBUS_MUX_VCC/2
- Comparator U1902 output will be VBUS_MUX_VCC
- MUX switch U1900 will be turned ON, connecting VBUS_DELAYED to VBUS_MUX_OUT
- MUX switch U1901 will be turned OFF through inverter MOSFET Q1900

Design Note 2:
When CC1/CC2 are below VREF_P0V200 (~0.200V), i.e. VBUS not connected to USB HUB:
- VBUS_TARGET_EN will be 0.00V
- Comparator U1902 output will be 0.00V
- MUX switch U1901 will be turend ON, connecting VBUS_CNANO to VBUS_MUX_OUT
- MUX switch U1900 will be turned OFF

CNANO Template Revision: 2.0

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