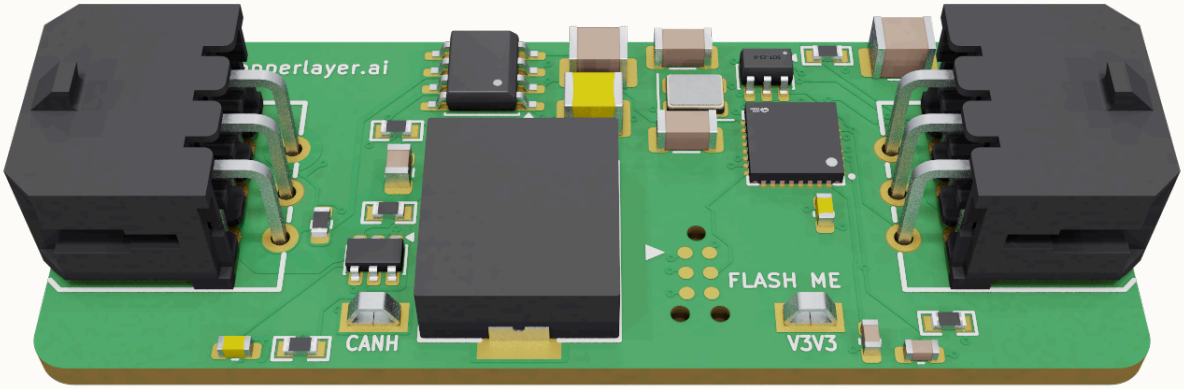
# Molex CAN Node

MOLEX-CAN-NODE - rev A - 2026-10-17 - ENGINEERING RELEASE




Assembly view

## Key specifications

| | |
|---|---|
| **Interfaces** | 12V CAN / I/O / SWD · PCB contacts |
| **Outline** | 56.00 x 22.00 mm |
| **PCB** | 4 copper layers, 1.60 mm finished thickness |
| **Fitted parts** | 27 |

## Operating window

| | |
|---|---|
| V12 supply voltage | `12 V` |
| V3V3 supply voltage | `3.241 to 3.416 V` |
| Ambient operating temperature | `0 to 55 °C` |

See Electrical limits for the conditions behind these values, required external loads and contact limits.

## Connector overview

| CONNECTOR | USE | SIGNALS |
|---|---|---|
| J1 | 12V CAN | V12, GND, CANH, CANL |
| J2 | I/O | V3V3, GND, IO1, IO2, IO3, IO4 |
| J3 | SWD · PCB contacts | V3V3, SWDIO, NRST, SWCLK, GND |

# Electrical limits

Operating conditions and limits for the assembled board

### Recommended operating conditions

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| V12 supply voltage | V12 | Required input supply voltage | 12 | – | 12 | V |
| V3V3 supply voltage | V3V3 | Supply and component tolerances | 3.241 | – | 3.416 | V |
| External load impedance | R(J2.1-J2.2) | Between J2.1 and J2.2 | 6.599 | – | 1001000 | ohm |
| External load impedance | R(J3.1-J3.5) | Between J3.1 and J3.5 | 99900 | – | 10010000 | ohm |
| Ambient operating temperature | TA | Ambient operating range | 0 | – | 55 | °C |

### Electrical characteristics

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| V12 supply current | I12 | RMS, settled operation [1, 2, 3, 4] | – | – | 1.24 | A |
| V3V3 supply current | I3V3 | RMS, settled operation [1, 2, 4] | – | – | 803.7 | mA |
| Power consumption | P | [5, 2, 3] | – | – | 8.445 | W |
| J2.1 to J2.2 mean-square current | I²_J2 | RMS current squared [6] | – | – | 0.2678 | A² |
| J3.1 to J3.5 mean-square current | I²_J3 | RMS current squared [6] | – | – | 0.000000001167 | A² |
| L1.1 to L1.2 mean-square current | I²_L1 | RMS current squared [6, 4] | – | – | 0.64582881976975 | A² |

### Interface constraints

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| J1 current per contact | I(J1) | Pins 1, 6 [7] | – | – | 1 | A |
| J1 current per contact | I(J1) | Pins 2, 5 [7] | – | – | 1.4 | A |
| J1 current per contact | I(J1) | Pins 3, 4 [7] | – | – | 405.092 | mA |
| J2 current per contact | I(J2) | Pin 1 [7] | – | – | 518 | mA |
| J2 current per contact | I(J2) | Pin 2 [7] | – | – | 542 | mA |
| J2 current per contact | I(J2) | Pins 3, 4, 5, 6 [7] | – | – | 6 | mA |

## How to use these limits

[1] **Tolerances:** Calculated across the listed supply ranges and modeled component tolerances.

[2] **External loads:** The current and power limits require J2.1 to J2.2: 6.599 ohm min, 1001000 ohm max and J3.1 to J3.5: 99900 ohm min, 10010000 ohm max.

[3] **U1 efficiency model:** This bound uses an assumed ratio of output power to input power from the component model.

[4] **U1 switching frequency model:** This bound uses an assumed switching frequency, which determines the regulator's current ripple.

[5] Worst-case input power the board itself draws across all supply rails.

[6] **Heating:** Mean-square current is RMS current squared, in A². Use it for cycle-averaged resistive heating under the declared steady-waveform model; startup and fault currents need separate limits.

[7] **Contact current:** Each listed pin must not exceed this current. These are application design limits, not connector ratings or available output current.

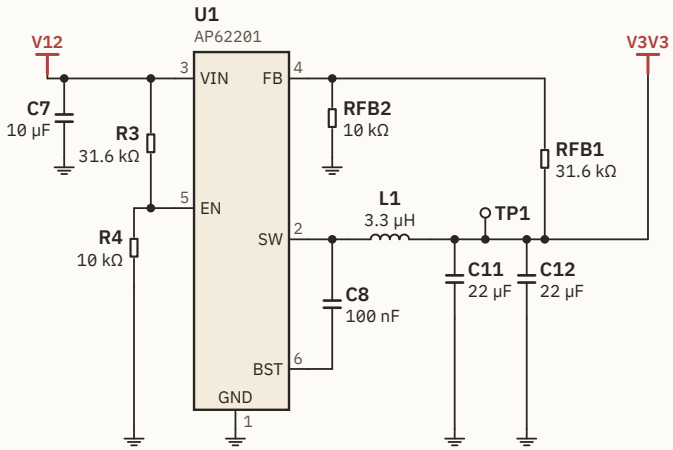
Use only the conditions printed with each value. Component absolute maximum ratings do not automatically apply to the assembled board.

# Schematic

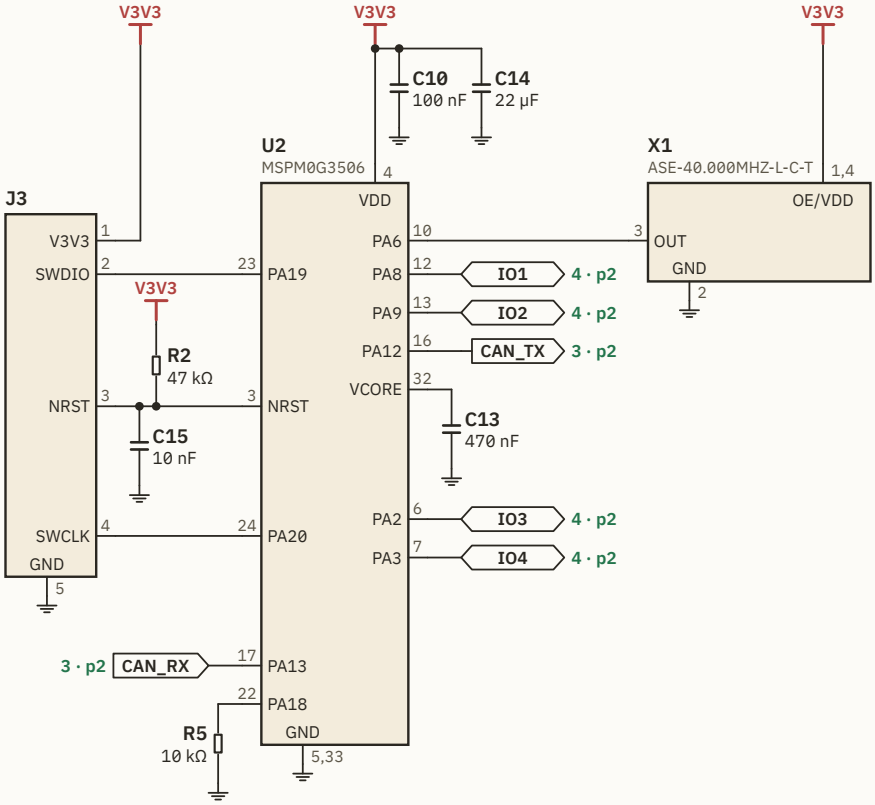
3.3 V buck and controller MOLEX-CAN-NODE

KEY RAIL IN OUT BIDIR PASSIVE 5·p2 BLOCK 5, PAGE 2

## 1 3.3 V buck AP62201

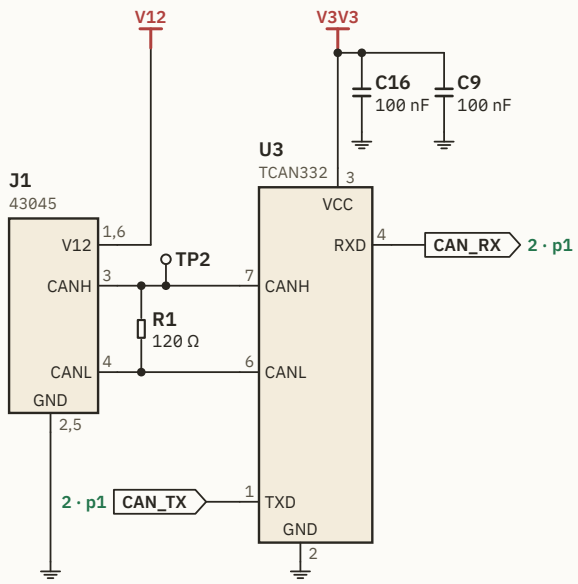



## 2 Controller MSPM0G3506

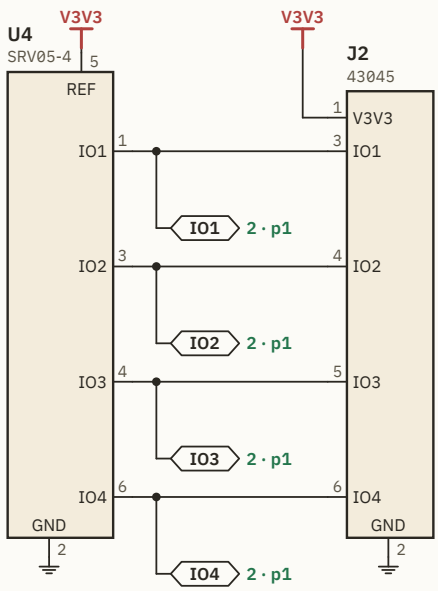



UNUSED PINS NOT SHOWN

## 3 Harness and CAN transceiver TCAN332




## 4 Harness and ESD protection SRV05-4

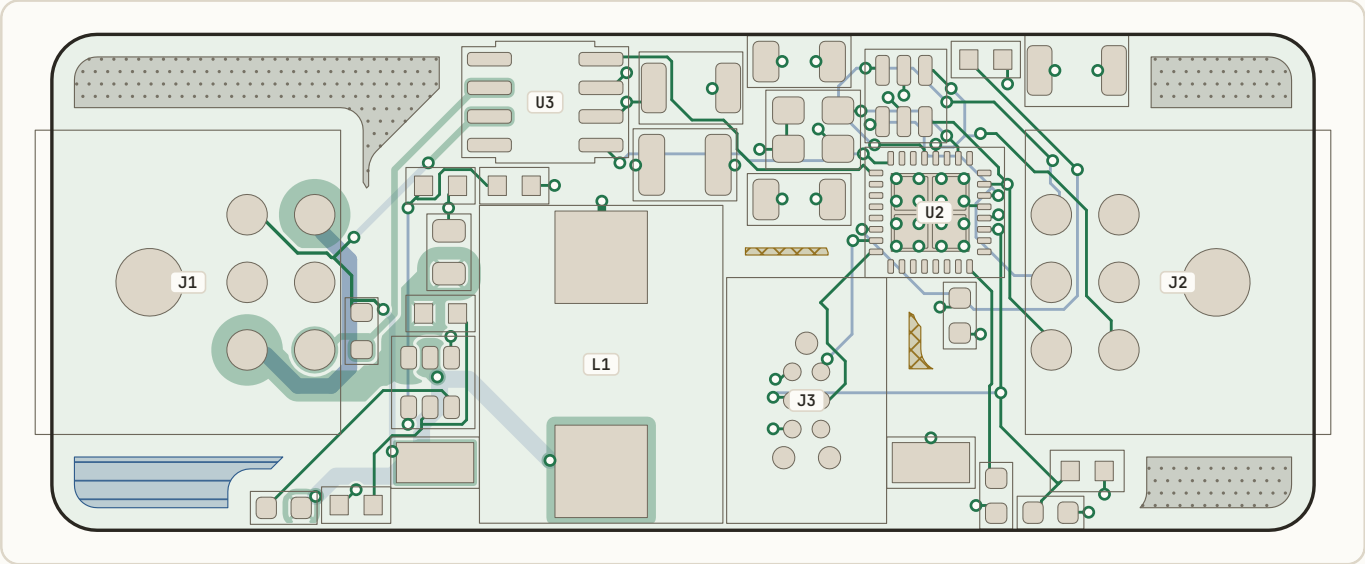



UNUSED PINS NOT SHOWN

# Board layout

Copper on both layers, and the board area that no part or track uses

KEY — TOP COPPER — BOTTOM COPPER — PAD — VIA




TOP VIEW · BOTTOM COPPER SEEN THROUGH · 56 X 22 MM · LARGE PARTS NAMED

## Unused area

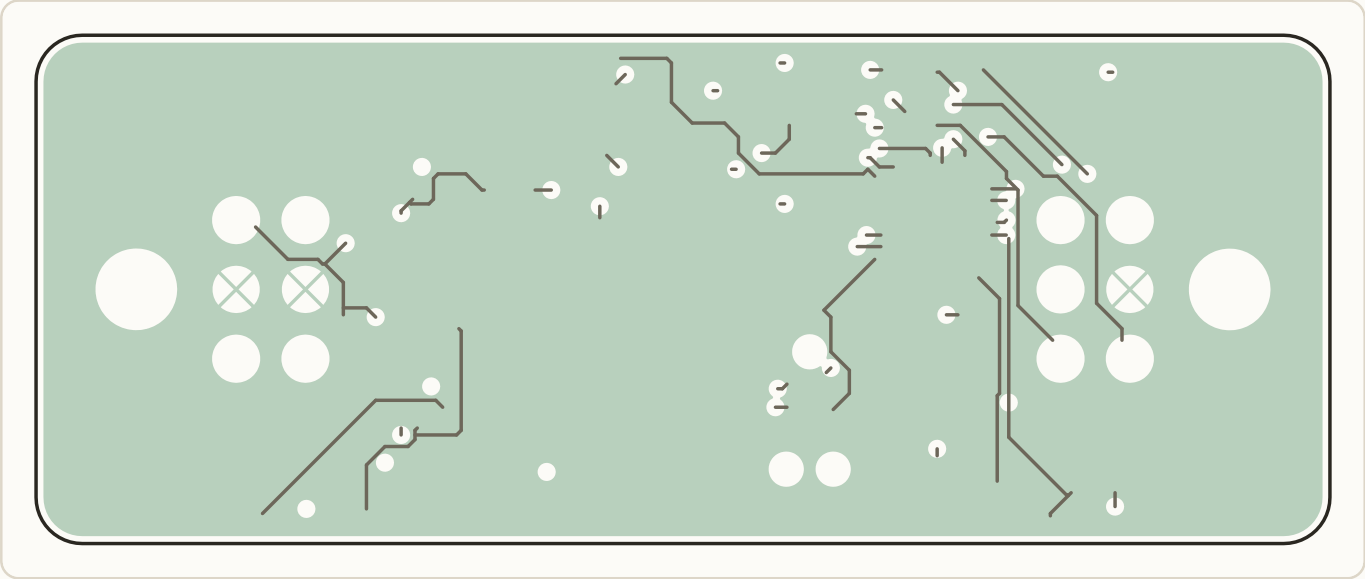
| PATTERN | CAUSE | BOUNDED BY | AREA | OF BOARD |
|---|---|---|---|---|
| | Part gap | between parts | 2.4 mm² | 0.2 % |
| | Connector apron | beside a connector | 16.5 mm² | 1.3 % |
| | Edge margin | between parts and the outline | 67.6 mm² | 5.5 % |
| | Total | at least 1 mm from everything | 86.5 mm² | 7.0 % |

Unused area is board surface at least 1 mm from every part, track and the board edge. A part gap is the only kind a tighter placement can reclaim.

# Ground plane

Ground on In1.Cu under the routes on F.Cu

KEY GROUND PLANE OPENING ROUTE ON F.CU



TOP VIEW · IN1.CU UNDER F.CU

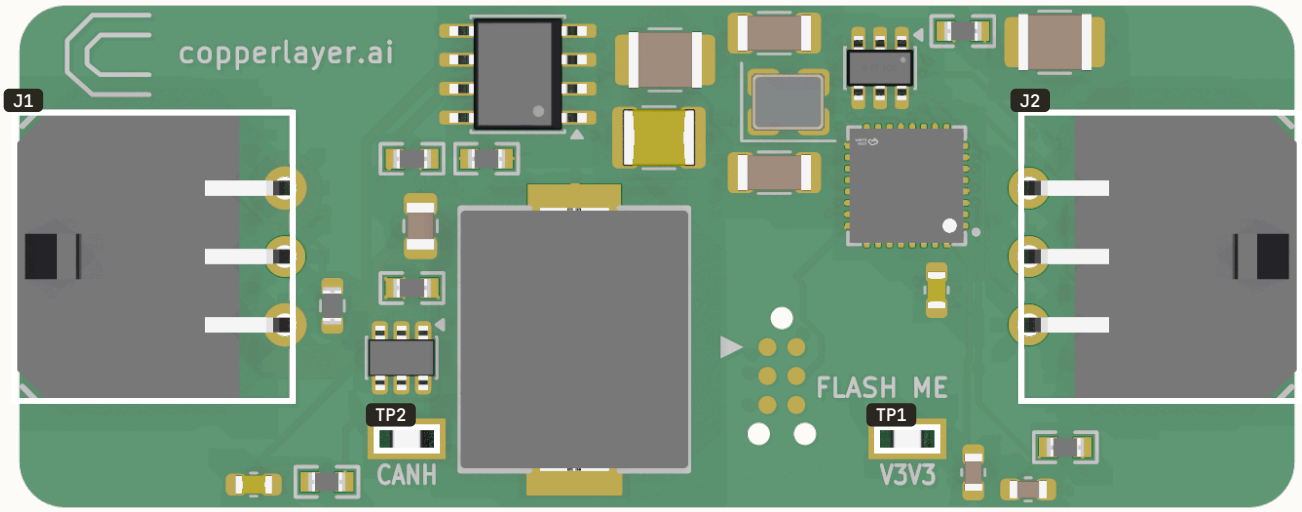
## Return path

| | |
|---|---|
| **Ground plane** | In1.Cu, 89 % of the board |
| **Routes on F.Cu** | 139 mm; no return detour of 1 mm or more |
| **Routes on B.Cu** | 97 mm, next to In2.Cu: V3V3 fill, 88 % of the board |

Openings in the plane add under 1 mm to the return path of a route on F.Cu above them; no route on F.Cu crosses a gap that adds more.

# Board connections

Connector and test point locations viewed from the top of the assembled board




TOP VIEW - CONNECTORS AND TEST POINTS MARKED - NOT TO SCALE

## Test point locations

| STATION | SIGNAL | PINS | CONNECTED TO |
|---|---|---|---|
| TP1 | V3V3 | 1 | to C10, C11, C12, and 12 more |
| TP2 | CANH | 1 | to J1, R1, U3 |

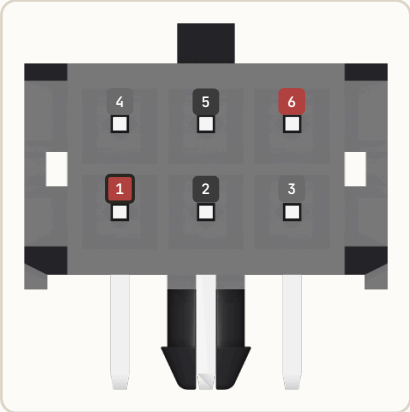
Pin schedules are on the following pages. Mating-face orientation is not published for every connector; confirm it against the connector manufacturer's drawing before wiring.

# Connector pinout

Pin numbers follow the PCB footprint numbering; mating-face orientation is not fully published

SIGNAL CLASS POWER GROUND SIGNAL NO CONNECT

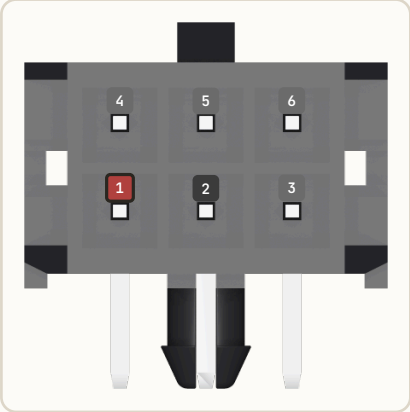
## J1 - 12V CAN




MATING FACE VIEW

| PIN | SIGNAL | DESCRIPTION |
|---|---|---|
| 1 | V12 | 12 V supply rail |
| 2 | GND | Ground reference |
| 3 | CANH | CANH signal |
| 4 | CANL | CANL signal |
| 5 | GND | Ground reference |
| 6 | V12 | 12 V supply rail |

## J2 - I/O




MATING FACE VIEW

| PIN | SIGNAL | DESCRIPTION |
|---|---|---|
| 1 | V3V3 | Supply rail |
| 2 | GND | Ground reference |
| 3 | IO1 | IO1 signal |
| 4 | IO2 | IO2 signal |
| 5 | IO3 | IO3 signal |
| 6 | IO4 | IO4 signal |

## J3 - SWD · PCB contacts

| PIN | SIGNAL | DESCRIPTION |
|---|---|---|
| 1 | V3V3 | Supply rail |
| 2 | SWDIO | SWDIO signal |
| 3 | NRST | NRST signal |
| 4 | SWCLK | SWCLK signal |
| 5 | GND | Ground reference |
| 6 | NC | No connection on the released board |

# Components on this board

Component identities and supplier codes

IDENTIFICATION VIEWS ARE NOT TO SCALE



**C73651**
TCAN332
U3 · QTY 1 · LCSC C73651



**C85364**
SRV05-4 I/O ESD
U4 · QTY 1 · LCSC C85364



**C127367**
12V CAN
J1 · QTY 1 · LCSC C127367



**C127367**
I/O
J2 · QTY 1 · LCSC C127367



**C1670009**
40MHz CAN reference
X1 · QTY 1 · LCSC C1670009



**C2906768**
TP
TP1, TP2 · QTY 2 · LCSC C2906768



**C3194236**
AP62201WU-7
U1 · QTY 1 · LCSC C3194236



**C22427705**
MSPM0G3506
U2 · QTY 1 · LCSC C22427705

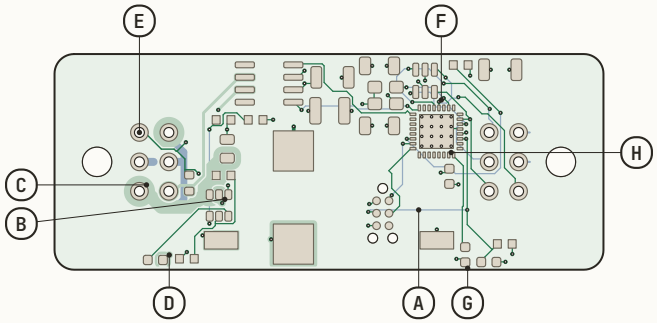
## Passives

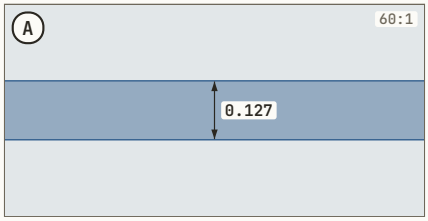
| REFERENCE | VALUE / ROLE | QTY | PART |
|---|---|---|---|
| C8 | 100nF bootstrap | 1 | C14663 |
| C16 | 100nF oscillator bypass | 1 | C14663 |
| C15 | 10nF NRST | 1 | C72452 |
| L1 | FXL1040-3R3-M 3u3 | 1 | C167229 |
| C7 | 10uF low-ESR buck input | 1 | C329933 |
| C13 | 470nF VCORE low-ESR | 1 | C361189 |
| C11 | 22uF buck output A | 1 | C694521 |
| C12 | 22uF buck output B | 1 | C694521 |
| RFB1 | 3V3 feedback upper | 1 | C843870 |
| R3 | EN UVLO top | 1 | C843870 |
| R1 | 120R CAN endpoint | 1 | C844736 |
| RFB2 | 3V3 feedback lower | 1 | C844890 |
| R4 | EN UVLO bottom | 1 | C844890 |
| R5 | PA18 BSL invoke pull-down | 1 | C844890 |
| R2 | 47k NRST pull-up | 1 | C2089026 |
| C10, C9 | 100nF | 2 | C2891592 |
| C14 | 22uF MSP VDD local low-ESR | 1 | C5159399 |

# Manufacturability

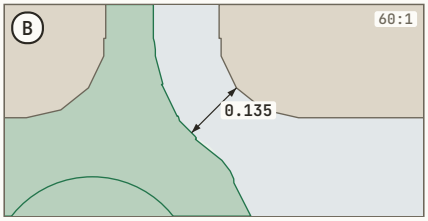
The smallest feature this board asks a fab to make, rule by rule

KEY — TOP COPPER — INNER AND BOTTOM COPPER — PAD — MASK OPENING

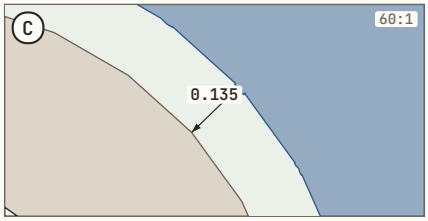


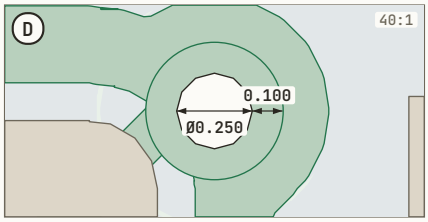

**TRACK WIDTH**
All 198 track segments
Required minimum 0.125; 0.002 above



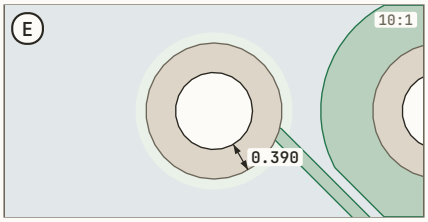

**COPPER TO COPPER, OUTER**
Every outer gap between nets
Required minimum 0.125; 0.010 above



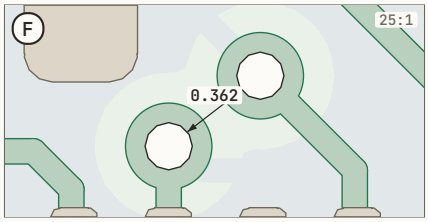

**COPPER TO COPPER, INNER**
Every inner gap between nets
Required minimum 0.125; 0.010 above



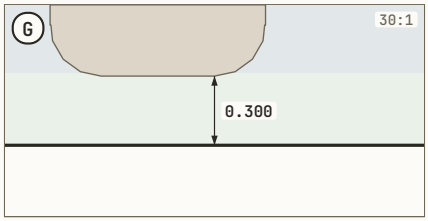

**FINISHED DRILL · VIA RING**
All 93 holes; all 76 vias
Finished drill minimum 0.250; at minimum. Via ring minimum 0.100; at minimum



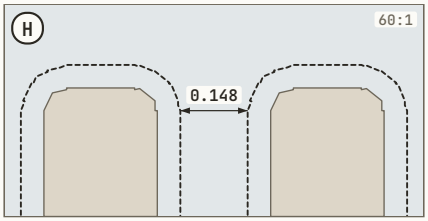

**PTH RING**
All 12 plated leads
Required minimum 0.300; 0.090 above




**HOLE TO HOLE**
All 93 holes, wall to wall
Required minimum 0.300; 0.062 above




**COPPER TO EDGE**
All copper, pours included
Required minimum 0.300; at minimum




**MASK WEB**
All 118 top mask openings
Required minimum 0.100; 0.048 above

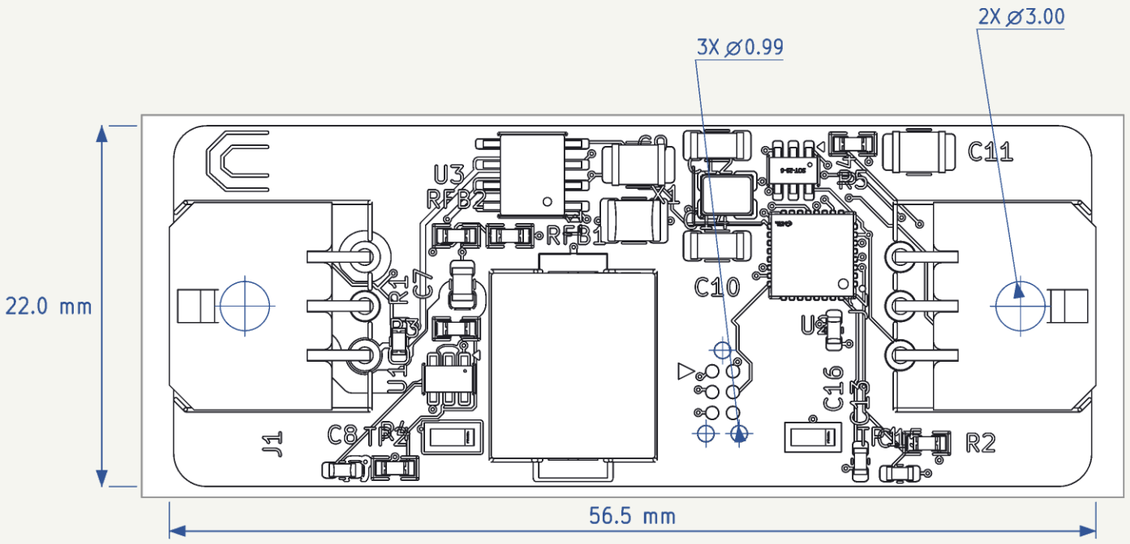
COMPATIBLE FABS AISLER

aisler-4l-1p6mm-35um-enig@2025-07-07+00fe215f [1]

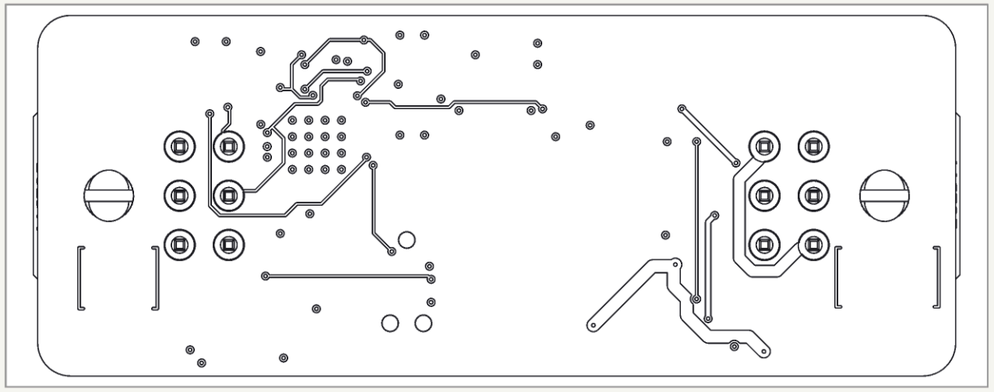
Detail minima use the fab profile this board was built for. Compatibility means the checked dimensional rules pass.

| LAYERS | THICKNESS | ASPECT RATIO | HOLES | DRILL SIZES |
|---|---|---|---|---|
| 4 | 1.6 mm | 6.4 : 1 | 76 via, 12 PTH, 5 NPTH | 4, Ø0.250–3.000 |

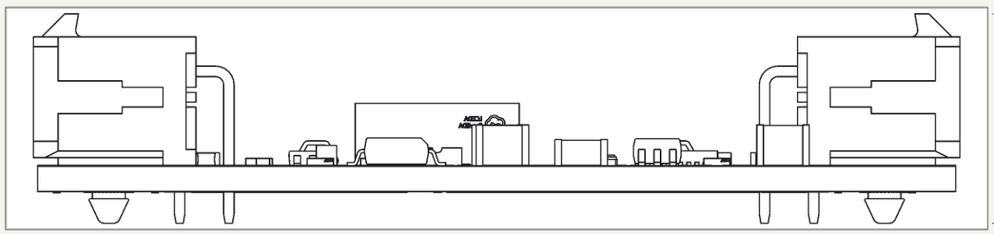
All values in mm. [1] read 2026-08-11



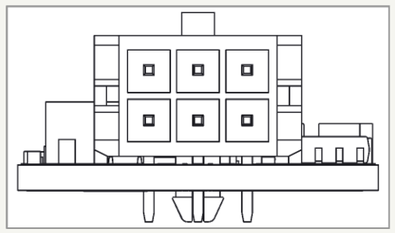

TOP VIEW



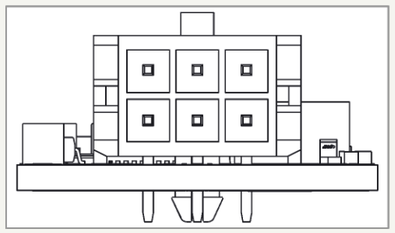
BOTTOM VIEW



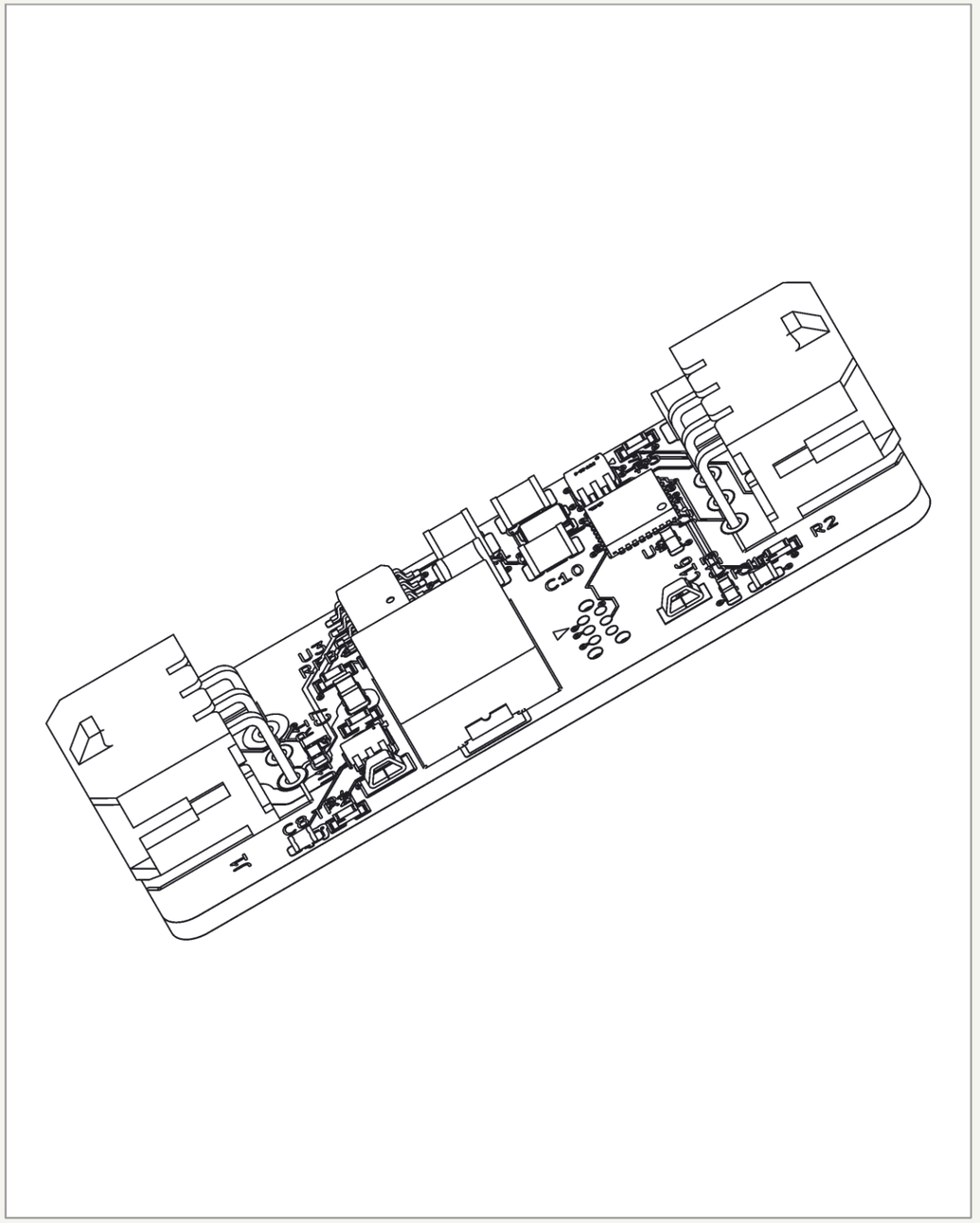

FRONT VIEW (Y)



LEFT VIEW (X)



RIGHT VIEW (X)




ISOMETRIC – NTS

| | |
|---|---|
| TITLE<br>Molex CAN Node assembly | DWG NO.<br>MOLEX-CAN-NODE |
| REV<br>A | DATE<br>2026-10-17 |
| OVERALL<br>56.5 x 22.0 x 12.8 mm | MATERIAL<br>FR-4, 1.60 mm |
| PROJECTION<br>REFERENCE VIEWS | SCALE<br>NTS |
| UNITS<br>mm | SHEET<br>1 OF 1 |