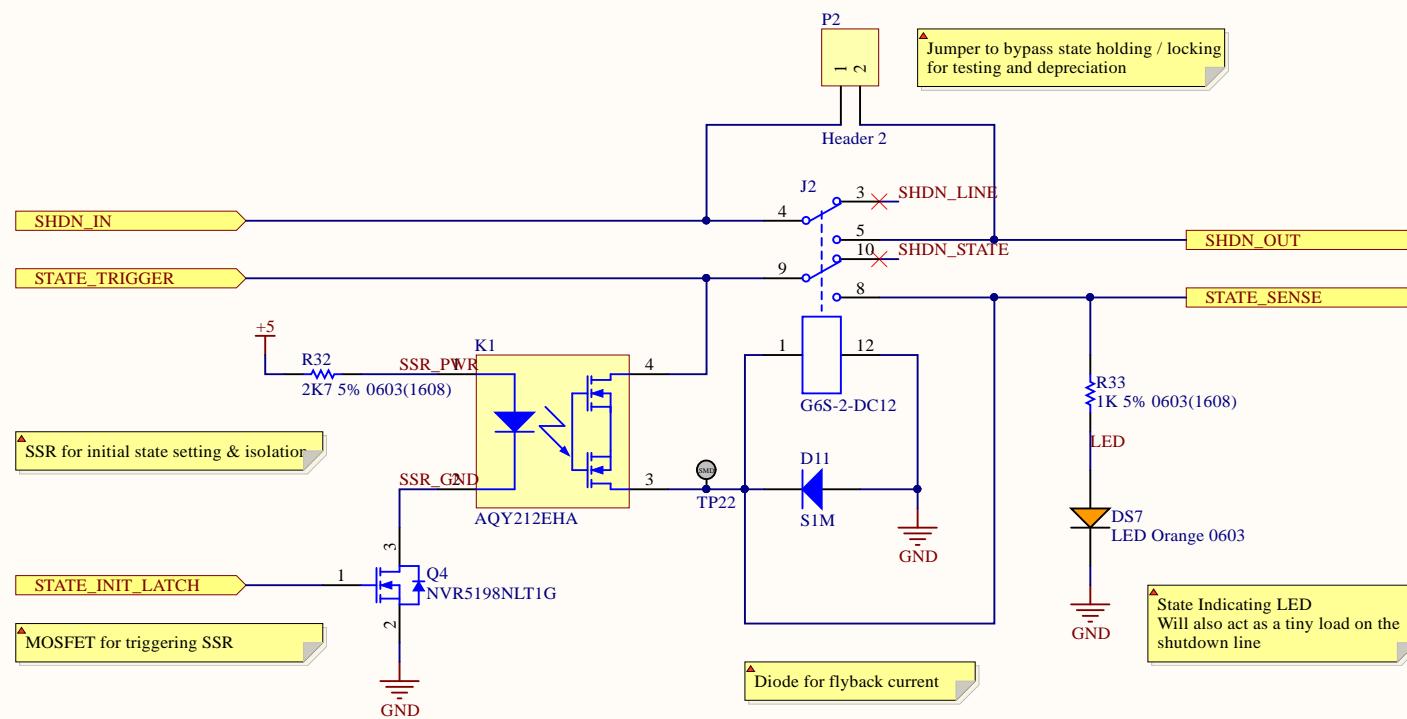


A



D

Relay https://lcsc.com/product-detail/Relays_OMRON_G6S-2-12V_G6S-2-12V_C28410.html

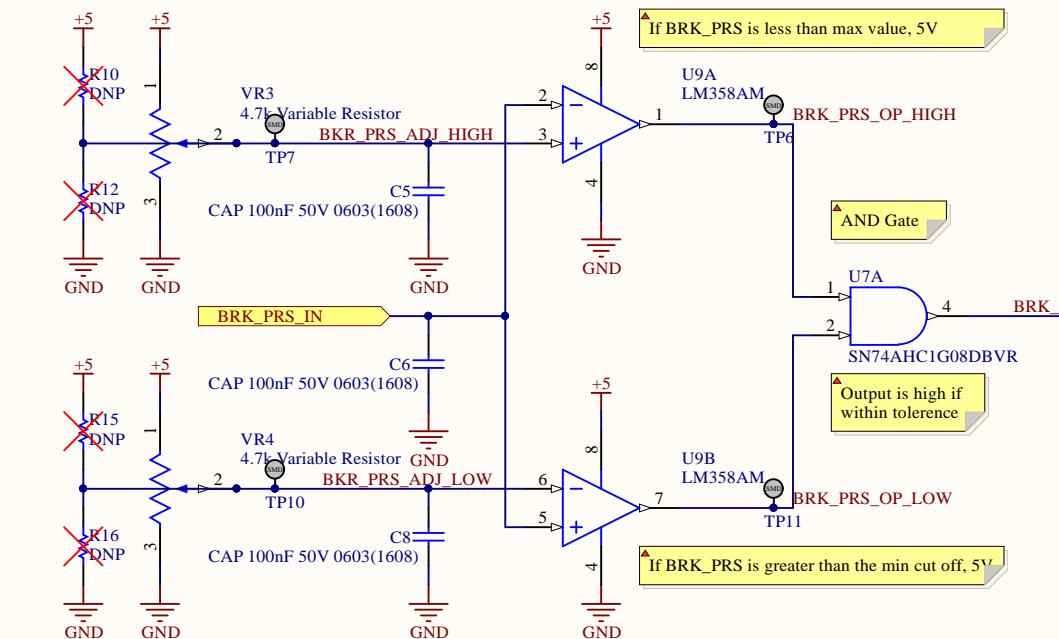
SSR <https://datasheet.octopart.com/AQY212EHA-Panasonic-datasheet-109895.pdf>

Any of these part numbers are suitable replacements to the one listed in the same product family
 - AQY211EH AQY211EHA AQY211EHAX AQY211EHAZ
 - AQY212EH AQY212EHA AQY212EHAX AQY212EHAZ

Relay Diode https://lcsc.com/product-detail/Diodes-General-Purpose_ON-Semicon_MURA120T3G_ON-Semicon-ON-MURA120T3G_C111832.html
 Any diode that has 500mA and greater than 20V resistance will be fine. The package is a common SMA type

Title **QUTMS Shutdown V2.1 - Shutdown Segment**

Size: A4	Number: 3	Revision: 6	QUT Motorsport, O-120 O Block, QUT Gardens Point Brisbane, QLD, Australia
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RC Charging Circuit:
50% Charge Voltage Wise at 500ms (to compare at 2V5)
500ms = $0.7T = 0.7 * R * C$
 $C = 10\mu F = 0.01F$
 $\gg R = 71k5$

AND Gate

SN74AHC1G08DBVR

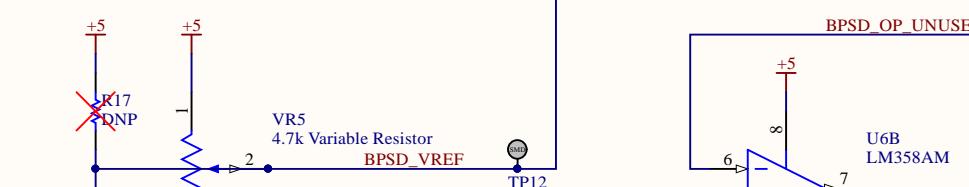
BPSD_DELAY_RESISTOR

SN74AHC1G08DBVR

CAP 10uF 50V 1206(3216)

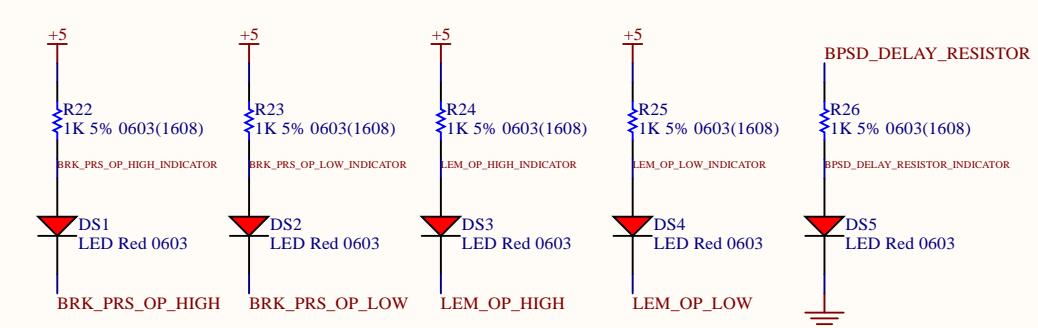
Implausibility exists for more than 500ms
EV 8.6.1.b

If both trigger stages are ON, begin charging the capacitor at current rate set by resistor



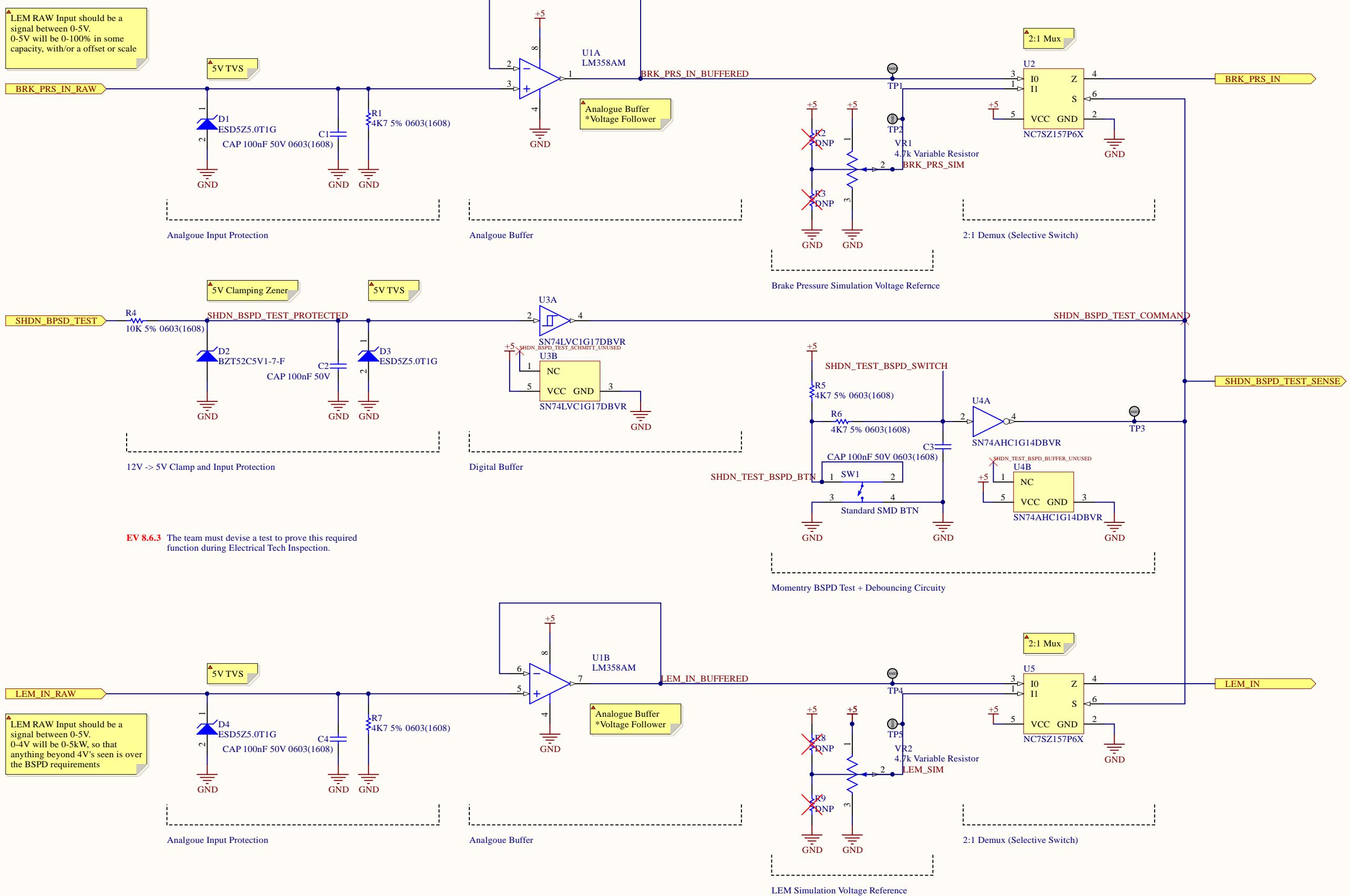
Signal Delay Comparison VREF

Spare Grounded / Disabled OpAmp
* Won't interfere with package's second OpAmp

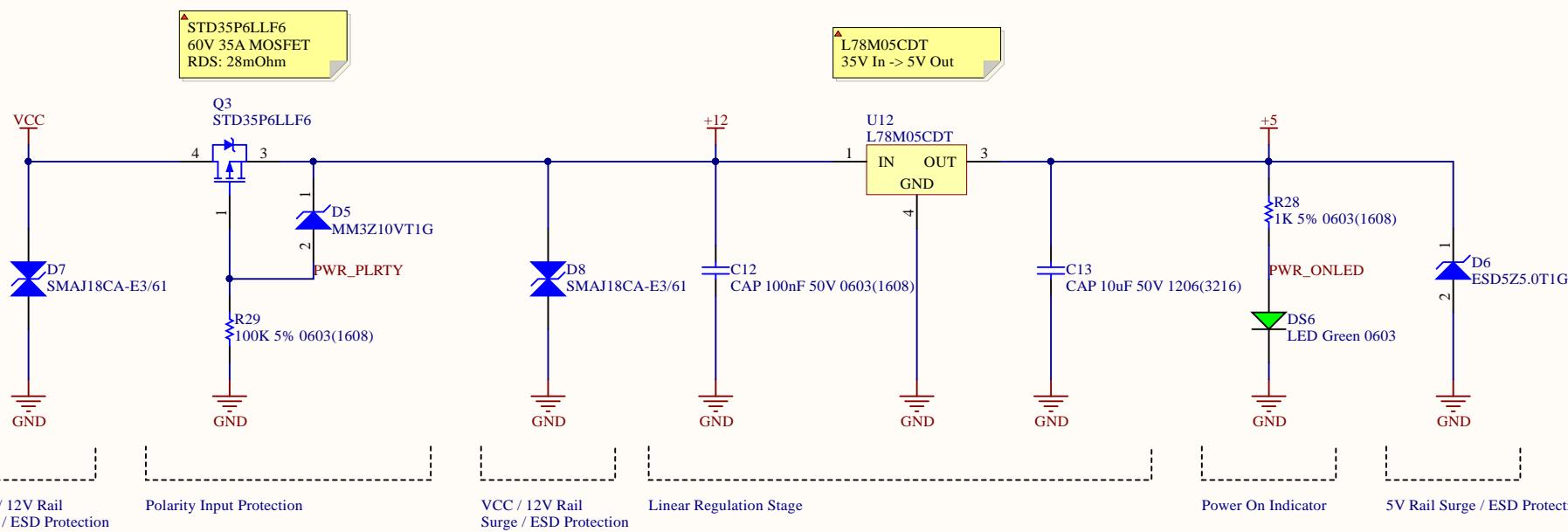


Will only turn on an error state except BPSD_DELAY

Status Indicator LEDs



A



Input power stage needs to be built for:
 - 1 Lead Acid Battery -> 14.4V Max
 - 4s#p Li-ion Battery -> 16.8V Max

Polarity Protection MOSFET https://lcsc.com/product-detail/MOSFET_STMicroelectronics_STD35P6LLF6_STMicroelectronics-STD35P6LLF6_C165929.html 1st Choice

Polarity Protection Zener https://lcsc.com/product-detail/Zener-Diodes_ON-Semicon_MM3Z10VT1G_ON-Semicon-ON-MM3Z10VT1G_C39057.html 2nd Choice

5V Rail TVS https://lcsc.com/product-detail/Diodes-ESD_ON-Semicon_ESD5Z5-0T1G_ON-Semicon-ON-ESD5Z5-0T1G_C82044.html

VCC / 12V Rail TVS https://lcsc.com/product-detail/TVS_Littelfuse_SMAJ18CA_SMAJ18CA_C151240.html

Output Cap https://lcsc.com/product-detail/Multilayer-Ceramic-Capacitors-MLCC-SMD-SMT_SAMSUNG_CL31A106KBHNNNE_10uF-106-10-50V_C13585.html

Linear Reg Actual https://lcsc.com/product-detail/Linear-Voltage-Regulators_ON-Semicon_MC7805BDTRKG_ON-Semicon-ON-MC7805BDTRKG_C110908.html
 Listed https://lcsc.com/product-detail/Others_STMicroelectronics_L78M05CDT-1_STMicroelectronics-L78M05CDT-1_C262914.html
 Any DPak package linear reg (not low dropout!) will be sufficient, Just check the pinout just in case

Title **QUTMS Shutdown V2.1 - Power Stage**

Size: A4	Number: 6	Revision: 2	QUT Motorsport, O-120 O Block, QUT Gardens Point Brisbane, QLD, Australia
Date: 9/03/2020	Time: 11:09:26 AM	Sheet 6 of 7	

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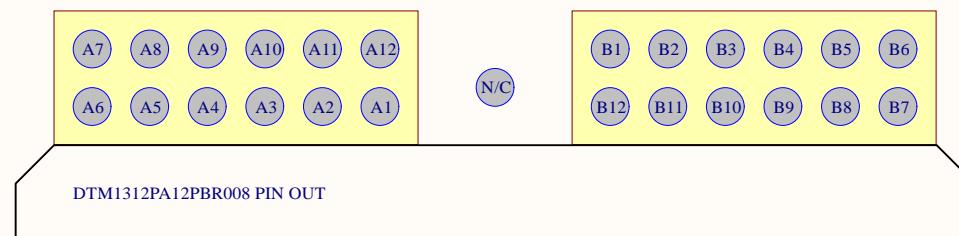
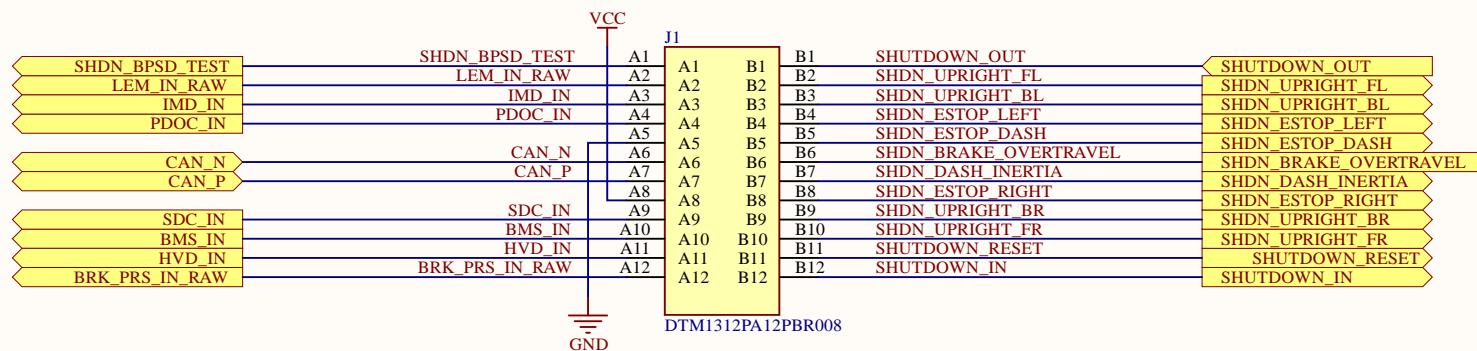
B

C

C

D

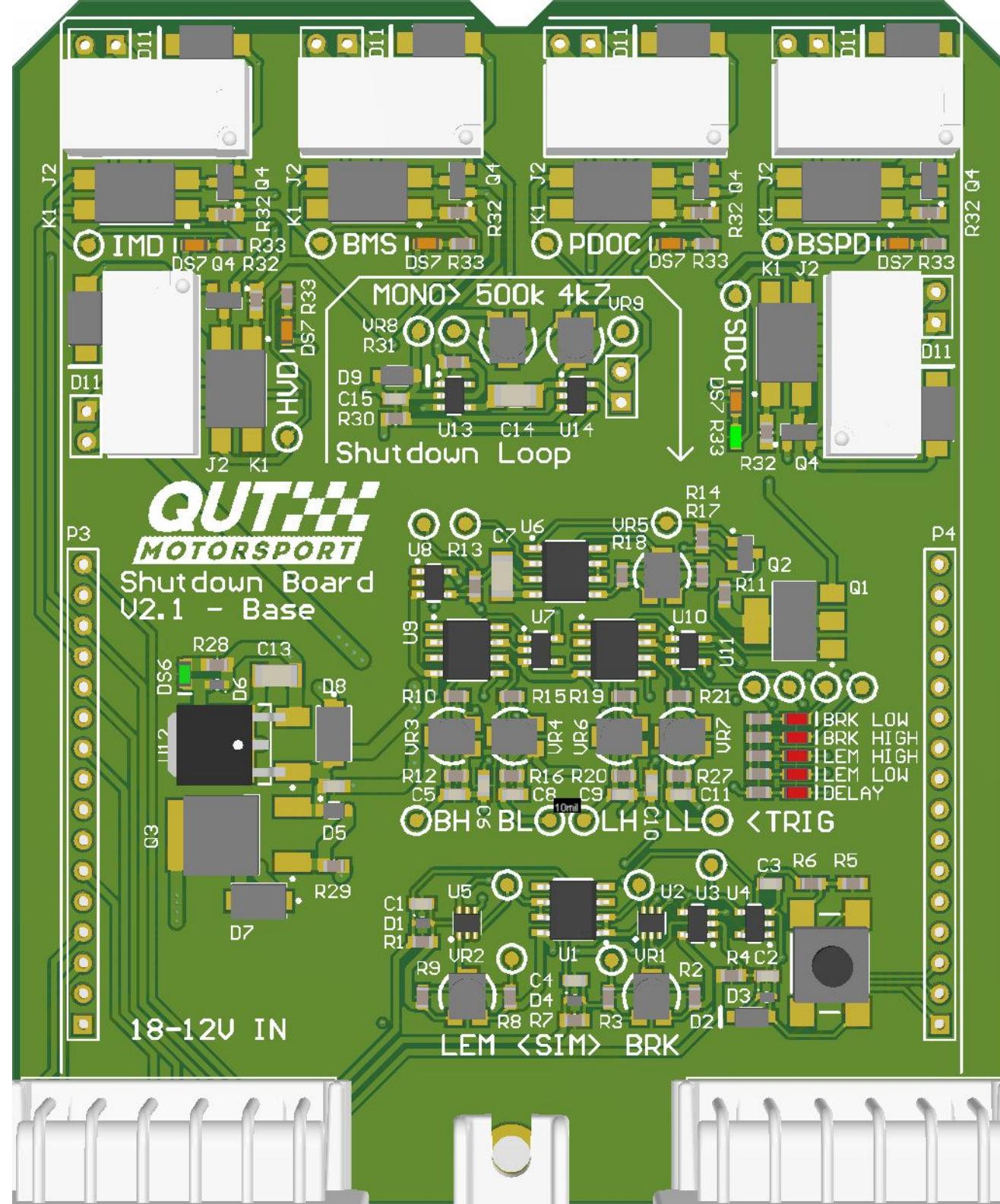
D



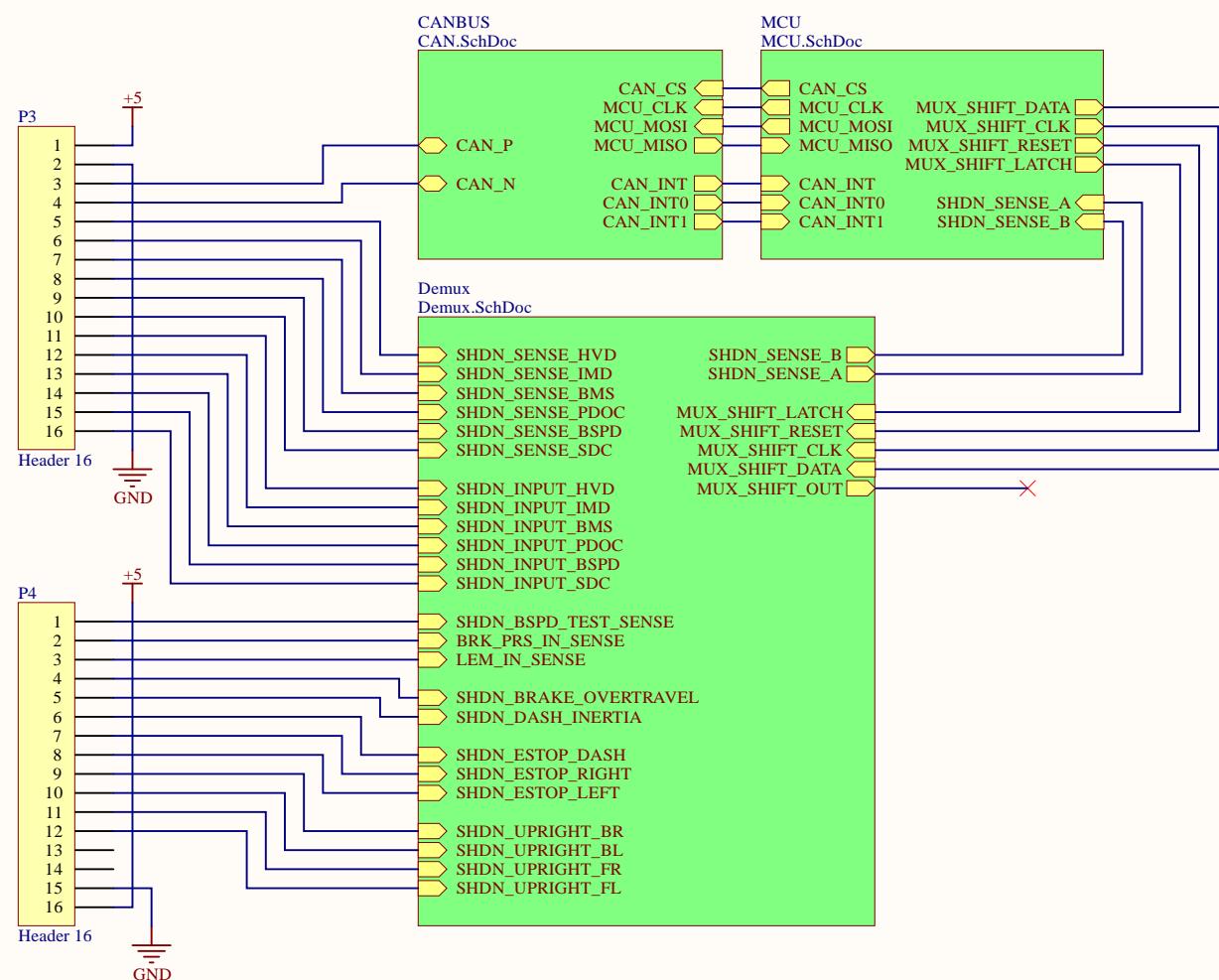
Title **QUTMS Shutdown V2.1 - Connector**

Size: A4	Number: 7	Revision: 3	QUT Motorsport, O-120 O Block, QUT Gardens Point Brisbane, QLD, Australia
Date: 9/03/2020	Time: 11:09:27 AM	Sheet 7 of 7	



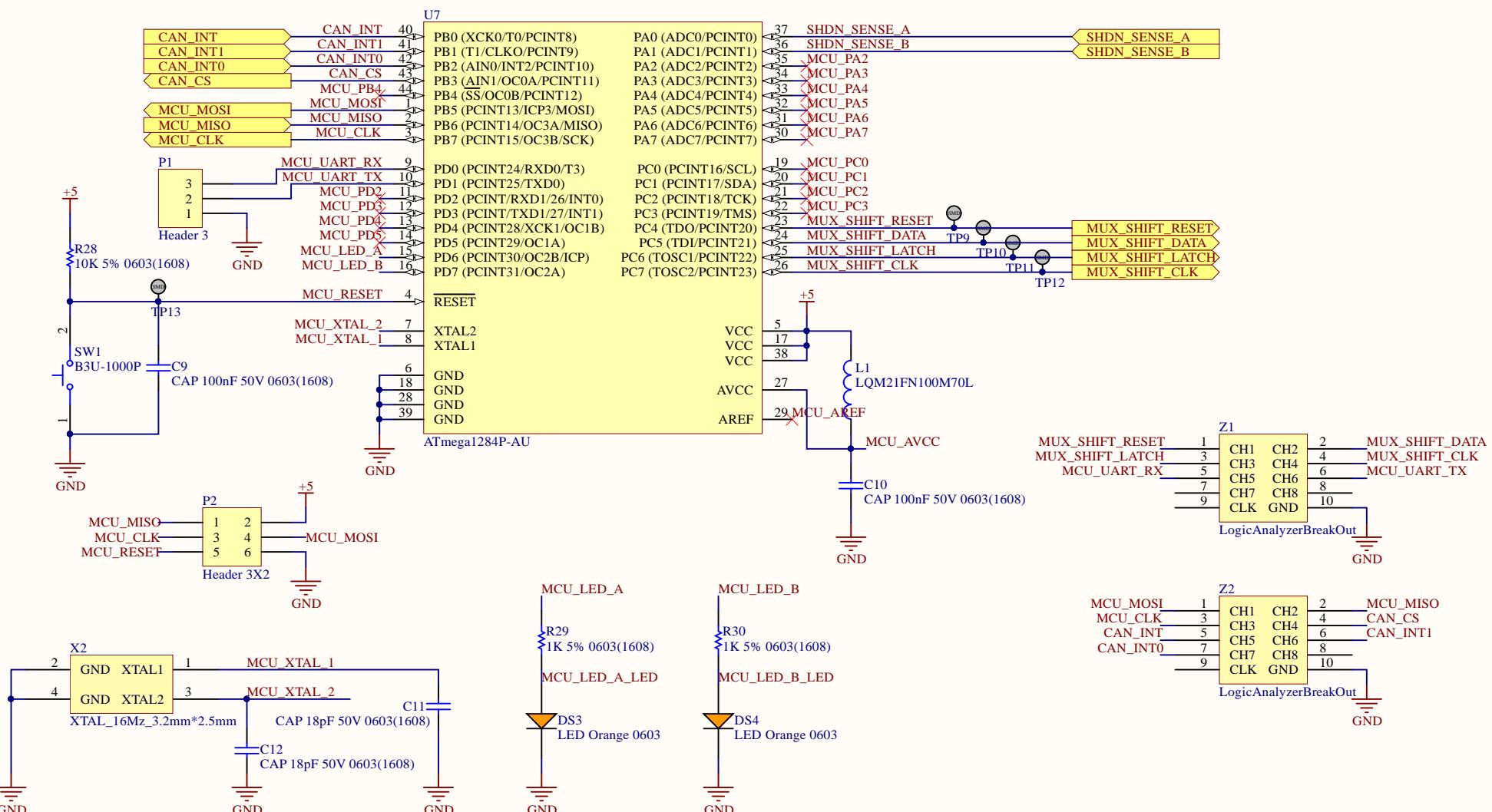


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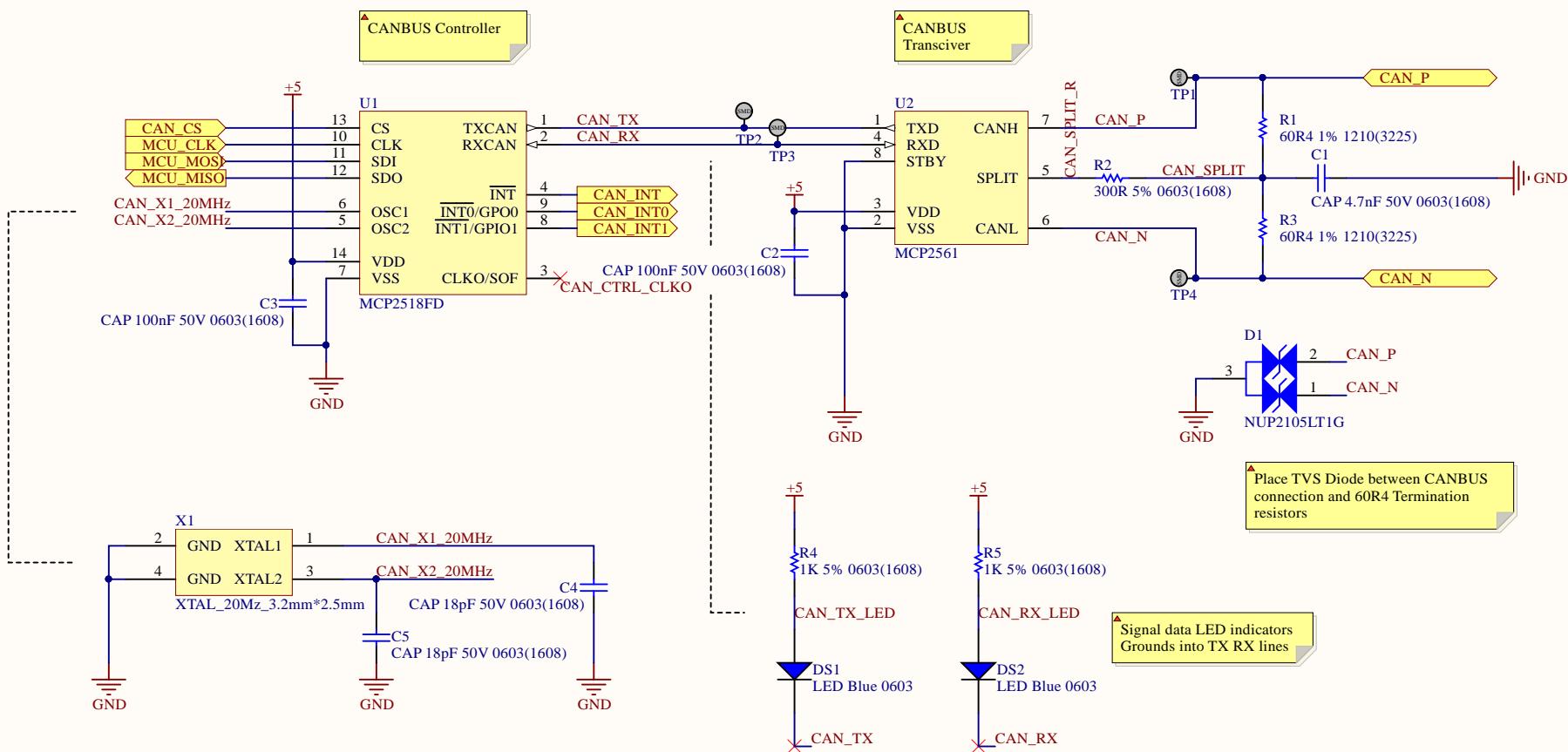
Title **QUTMS Shutdown Board V2.1 - Master Top**

Size: A4	Number: 1	Revision: 4	QUT Motorsport, O-120 O Block, QUT Gardens Point Brisbane, QLD, Australia
Date: 9/03/2020	Time: 11:56:43 AM	Sheet 1 of 4	

A



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20Mhz XTAL

https://lcsc.com/product-detail/SMD-Crystal-Resonators_Yangxing-Tech-X322520MSB4SI_C9004.html

CANBUS Controller: MCP2518FD
MCP2517FD <https://www.digikey.com.au/product-detail/en/microchip-technology/MCP2518FDT-H-SL/MCP2518FDT-H-SLCT-ND/1023140> Check at time of order if these parts exist on LCSC
<https://www.digikey.com.au/product-detail/en/microchip-technology/MCP2517FDT-H-SL/MCP2517FDT-H-SLCT-ND/7801975>

CANBUS Transceiver: MCP2561 https://lcsc.com/product-detail/CAN-ICs_Microchip-Tech_MCP2561T-E-SN_Microchip-Tech-MCP2561T-E-SN_C87081.html

CANBUS TVS Diode: NUP2105L https://lcsc.com/product-detail/TVS_ON-Semicon_NUP2105LT1G_ON-Semicon-ON-NUP2105LT1G_C14486.html
Paper on CANBUS TVS Diode: <https://www.onsemi.com/pub/Collateral/AND8181-D.PDF>
CANBUS Protection: <https://www.onsemi.com/pub/Collateral/AND8169-D.PDF>

Title **QUTMS Shutdown V2.1 - CANBUS**

Size: A4	Number: 3	Revision: 4	QUT Motorsport, O-120 O Block, QUT Gardens Point Brisbane, QLD, Australia
Date: 9/03/2020	Time: 11:56:44 AM	Sheet 3 of 4	

