

SATURN SERIES TBR3206 MACHINE CONTROLLER

Changelog:
1259197 / 1273393:
REV D:
Updated name and title of documents to reflect new component name.
Page 3 -
I2C Bus Pullup Correction: R405 R406 -> 2.74k. Fixed pullup strength for acceptable logic levels.
FPGA Programming Pin Correction: R126 R127 R128 -> 100k. Decreased strength of FPGA programming pins to account for FPGA pull-ups during programming.
HW Revision Bit Resistors updated to 3 // 0x011
Page 9 -
H-Bridge 1 Current Sense Fix: R211 -> 3mOhm. Resolved scenario where overcurrent conditions on H-Bridge 1 could damage uC.
Page 17-
Precharge timing correction: C475 -> 4.7uF, R436 R439 -> 23.7k. Reduced rate of precharge to meet 1.5A requirement.

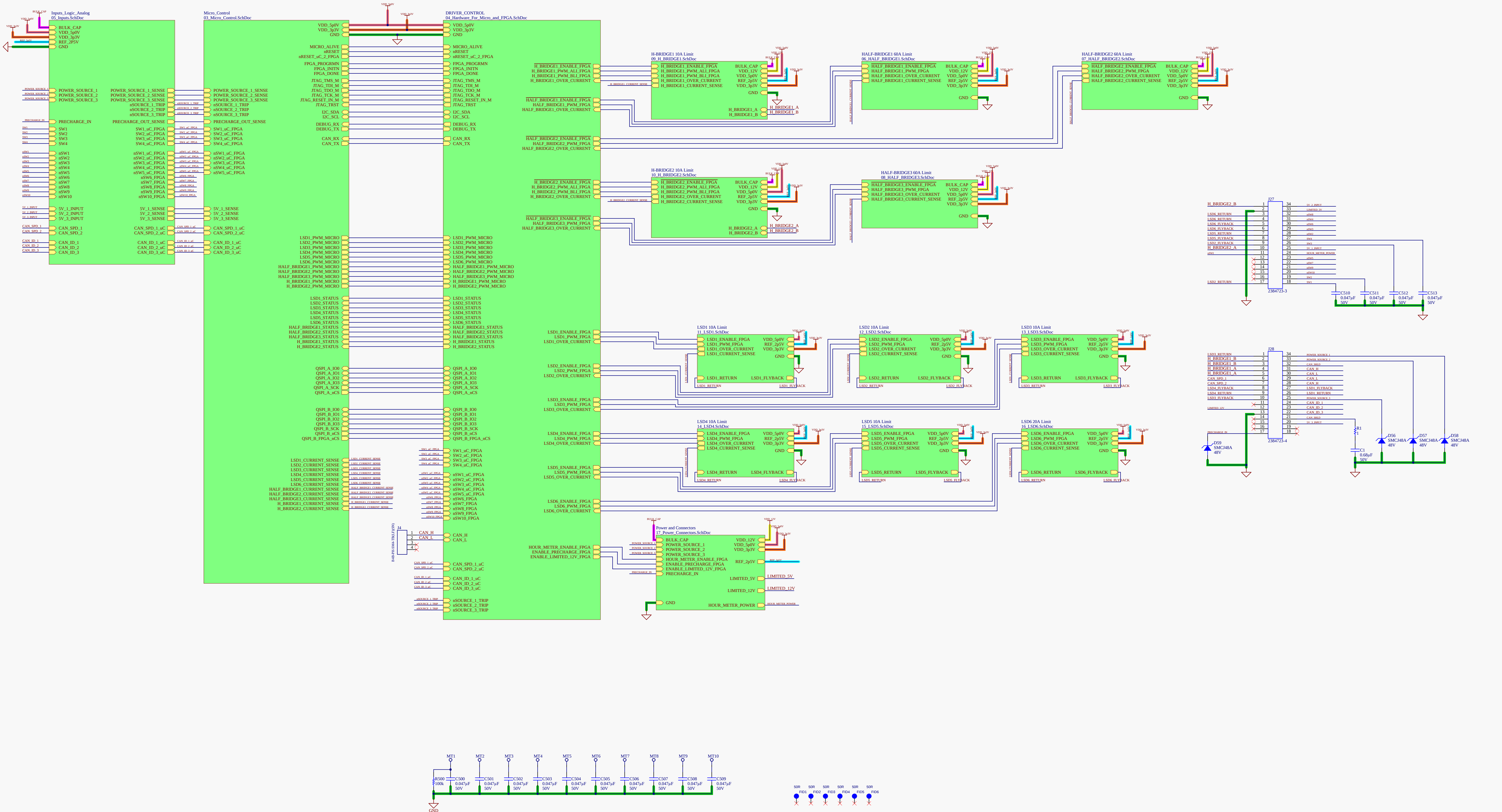
REV E:
Page 4: Updated HW Rev Bits to 4
Pages 9-15: Replaced 0.033uF caps on gates of FETs with 10k resistors to eliminate ringing that was causing component damage.

Continued document version history from 1259197 / 1273393 to X16 redesign 1275623

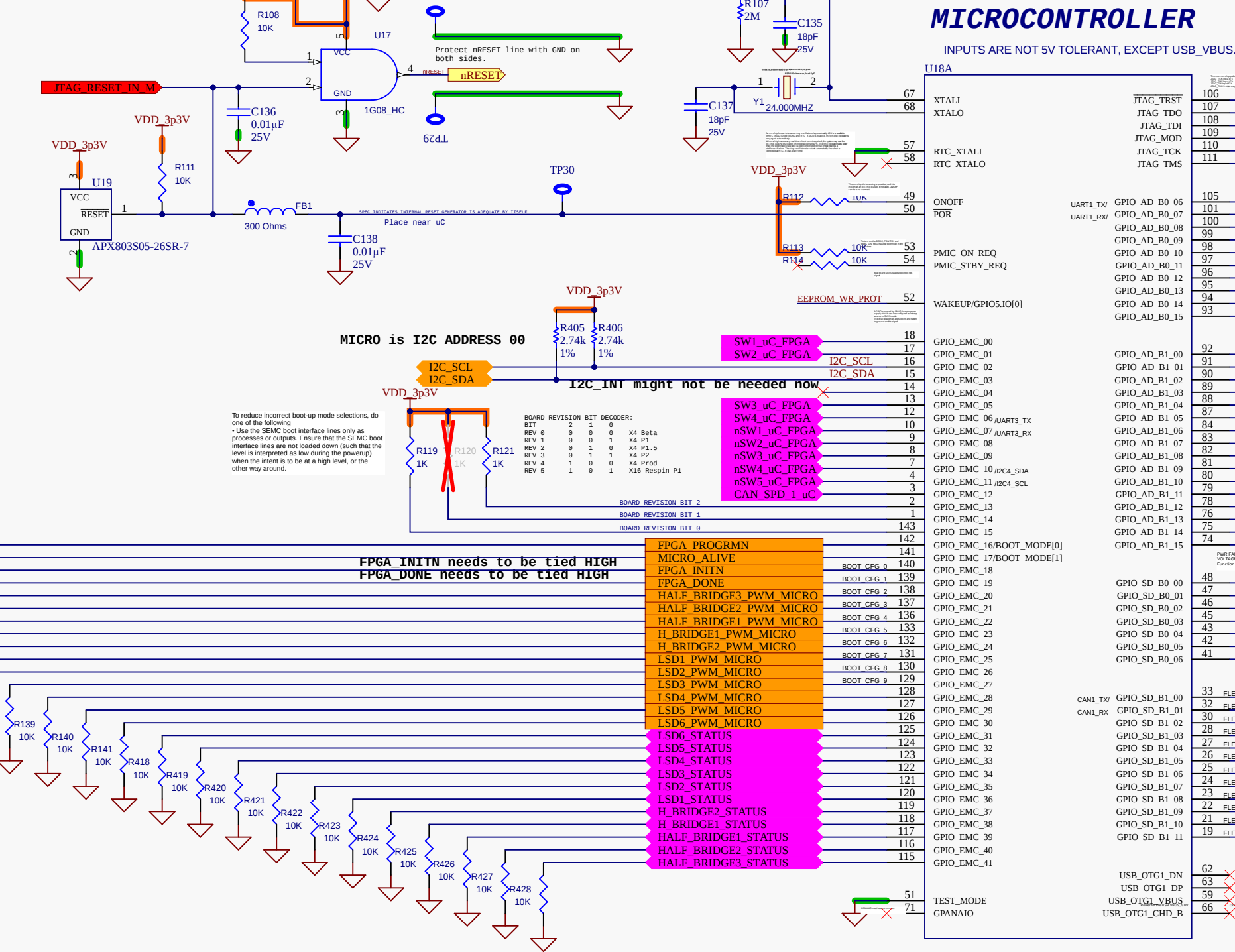
1275623:
REV A:
Removed CAN termination resistors
Added second CANH+CANL+CAN_SHIELD connections to J28
Replaced all OPA2727 Current Sense Feedback Opamps with TLV9152AIDR w/ 3.3V V+
Replaced 12V limited supply with TPS##### 450mA
Replaced 5V limited supply with TPS##### 450mA
Added CAN Node ID and Speed selection pins to J28. These are routed to the micro to the pins that were formally connected to nSW6-10.
nSW6-10 were removed from the micro GPIO pins and are now only connected to the FPGA.
Removed legacy lightning precharge.
Removed TPS16530 eFuse precharge.
Added new TPS2493PWR precharge with current limit high side switching.

PCB Q25101-PCB_revA

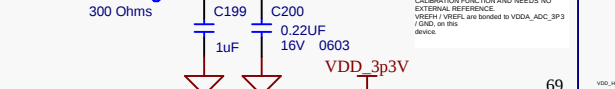
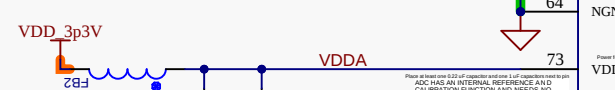
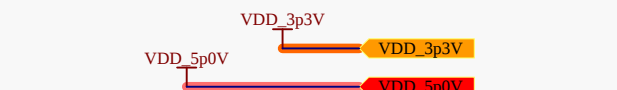
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RESET GENERATION
The RST pin of the microcontroller is connected to the power-up and reset circuit. The reset circuit is designed to ensure that the microcontroller is reset in the event of a power-up or a reset signal. The reset circuit is designed to ensure that the microcontroller is reset in the event of a power-up or a reset signal. The reset circuit is designed to ensure that the microcontroller is reset in the event of a power-up or a reset signal.

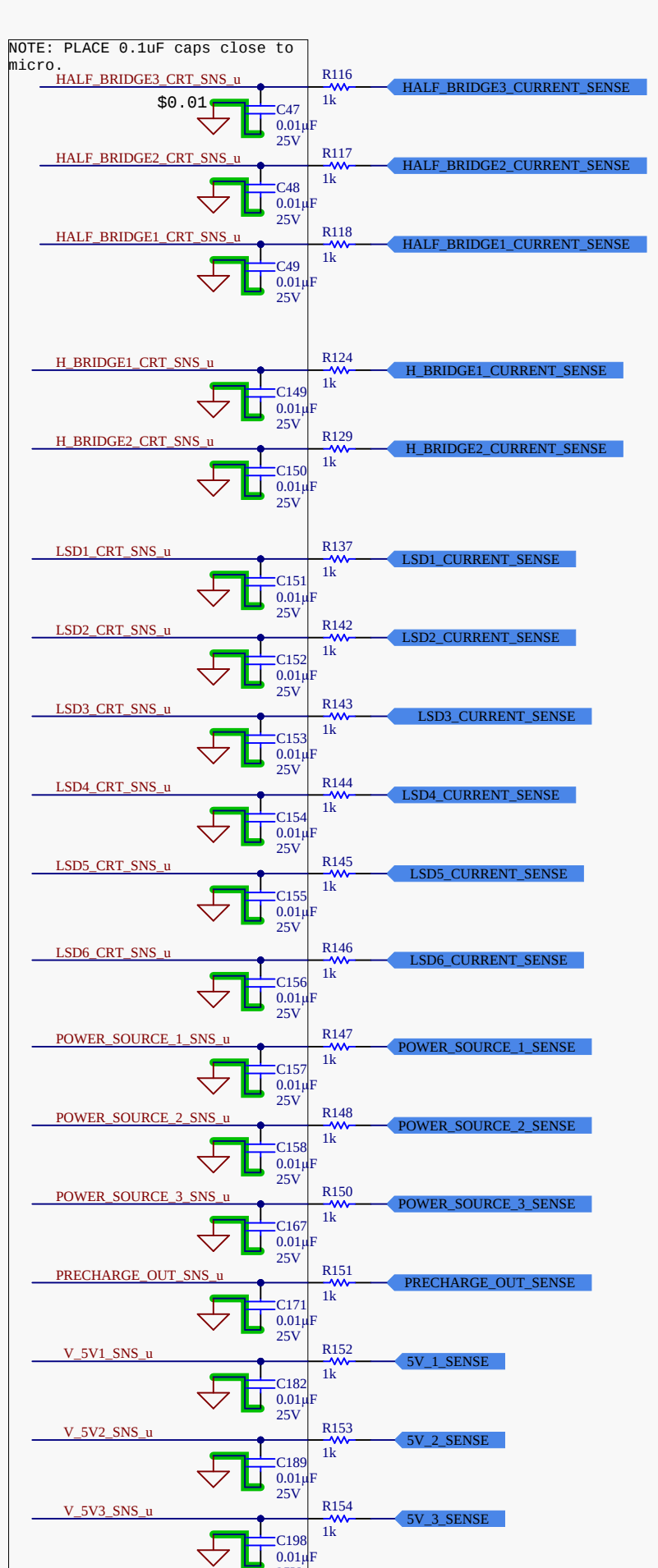


Place these decoupling capacitors near the Micro.

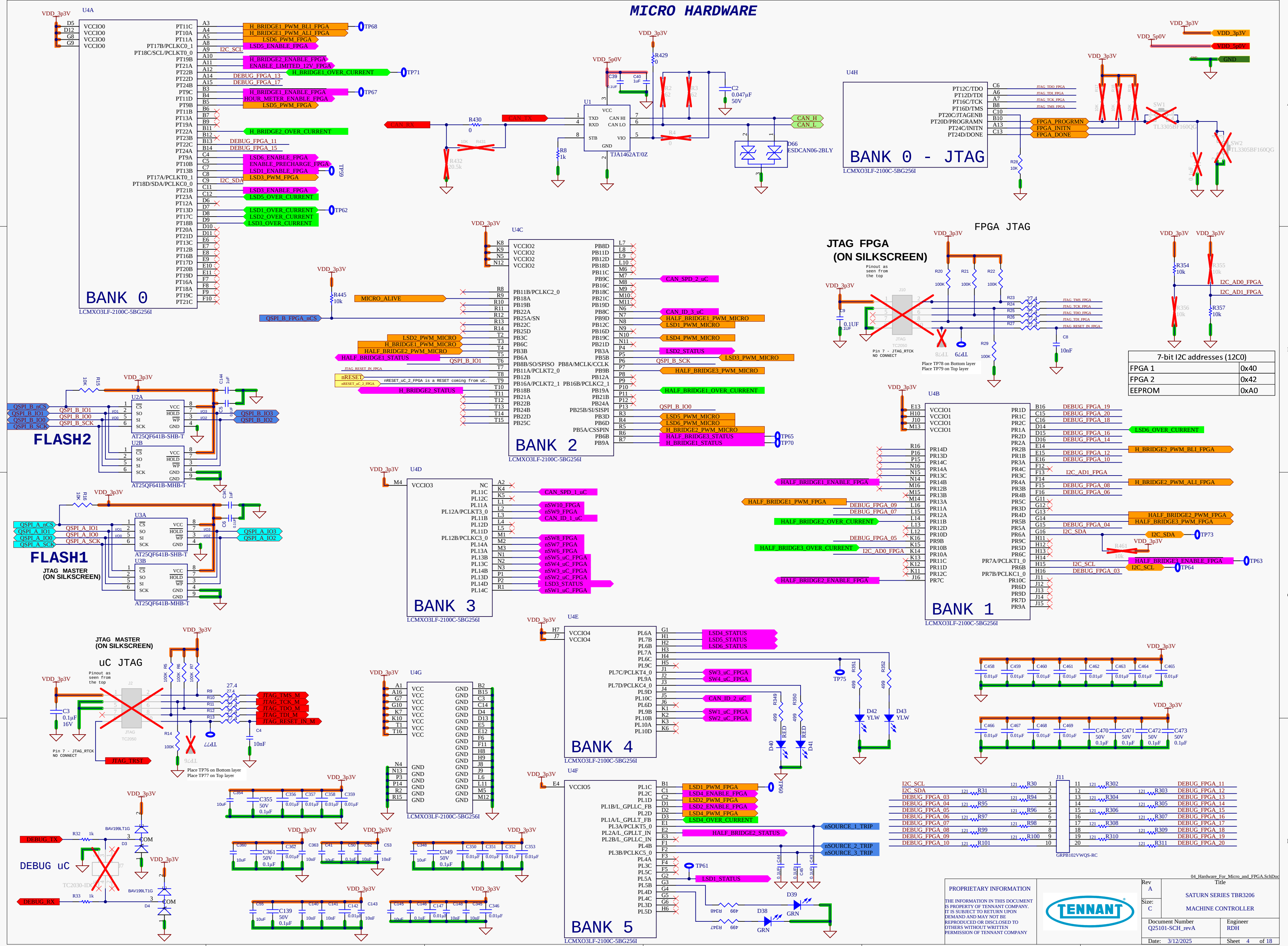


7-bit I2C addresses (12C0)		
FPGA 1	0x40	
FPGA 2	0x42	
EEPROM	0xA0	

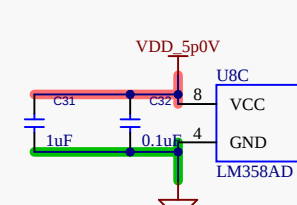
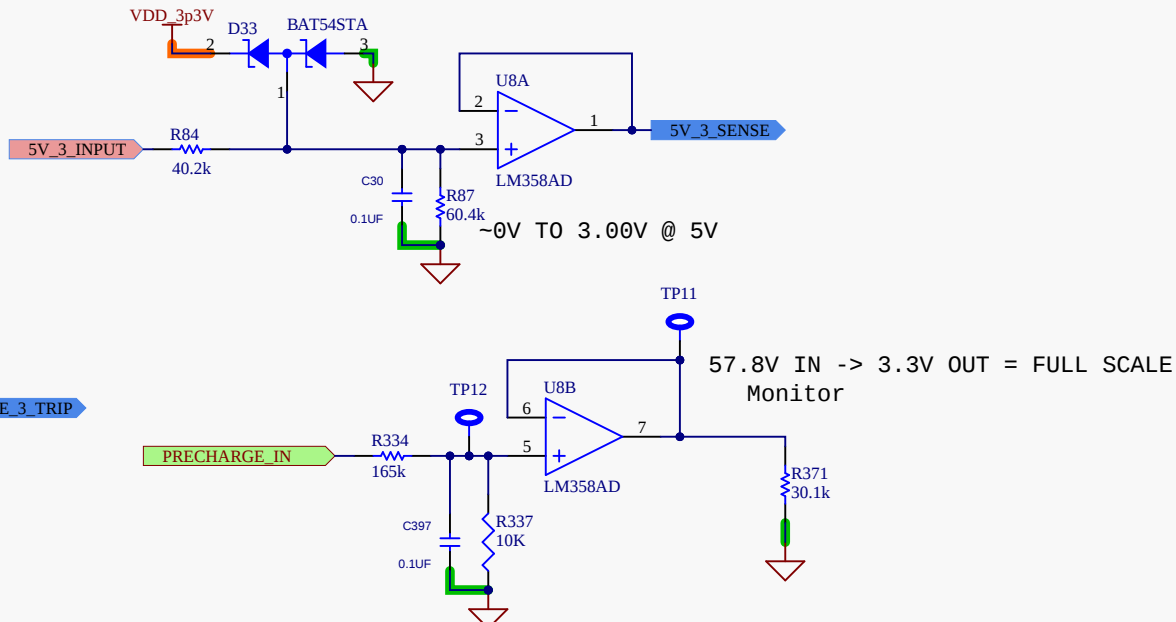
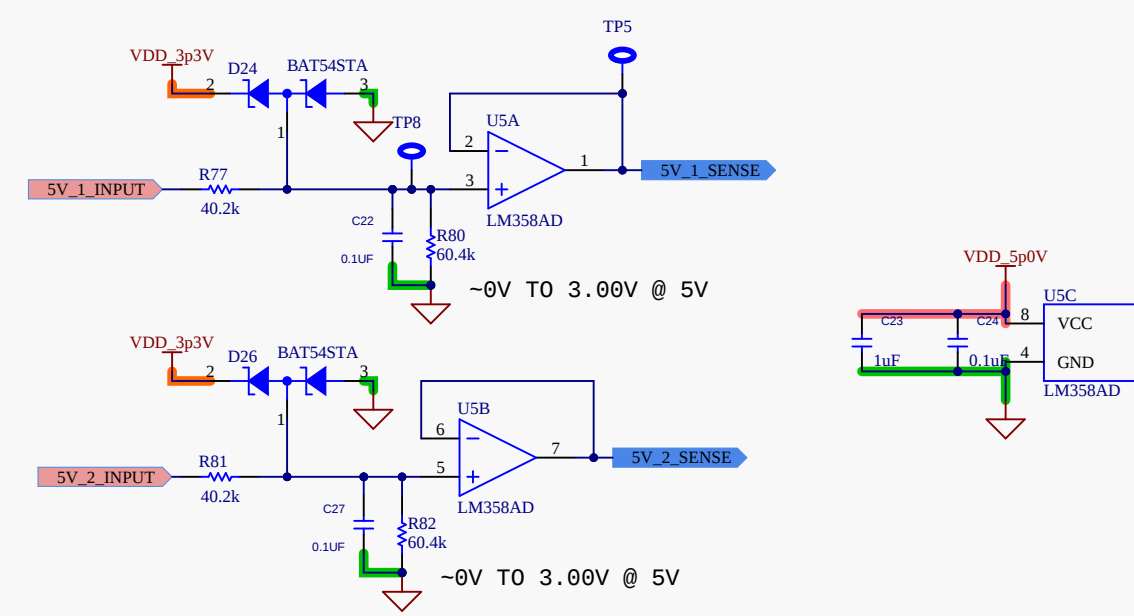
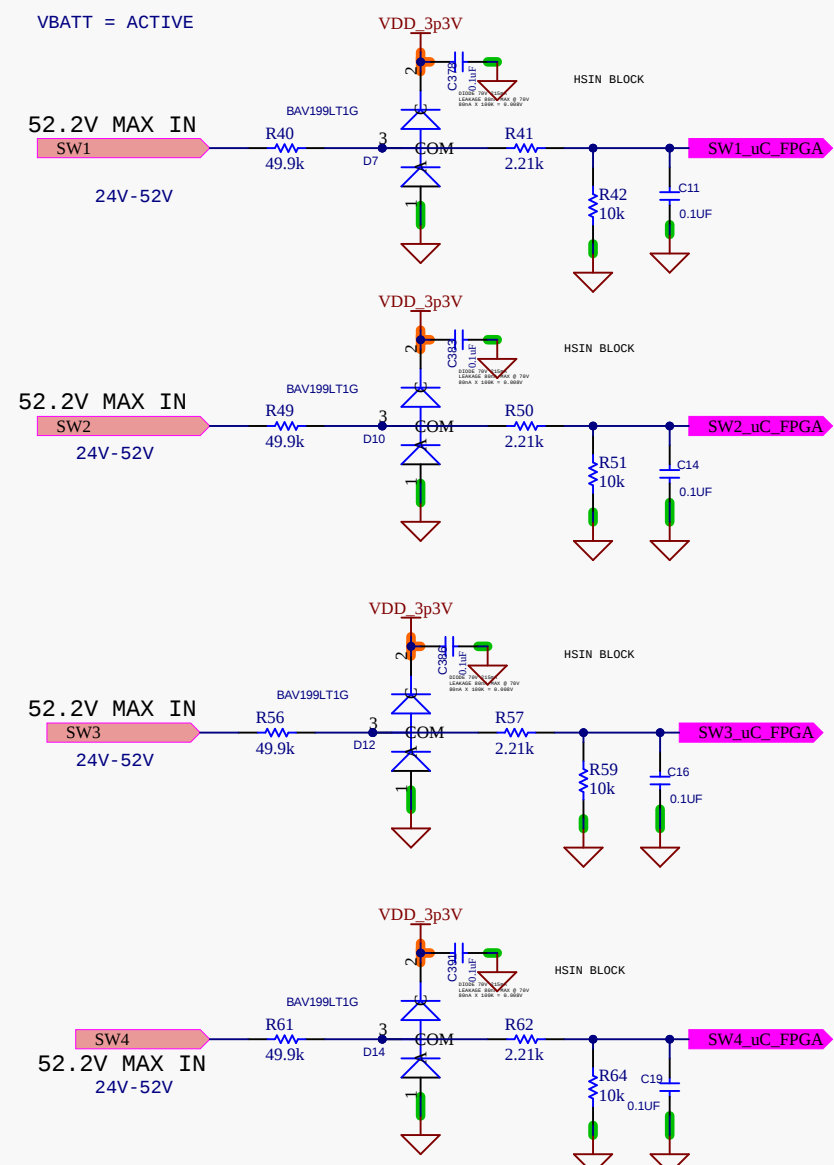
NOTE: PLACE 0.1uF caps close to micro.
\$0.03 per each function for the RC filtering and PWM signal(0.1uF, 1210hms, 100pF)



MICRO HARDWARE



7-bit I2C addresses (12C0)	
FPGA 1	0x40
FPGA 2	0x42
EEPROM	0xA0

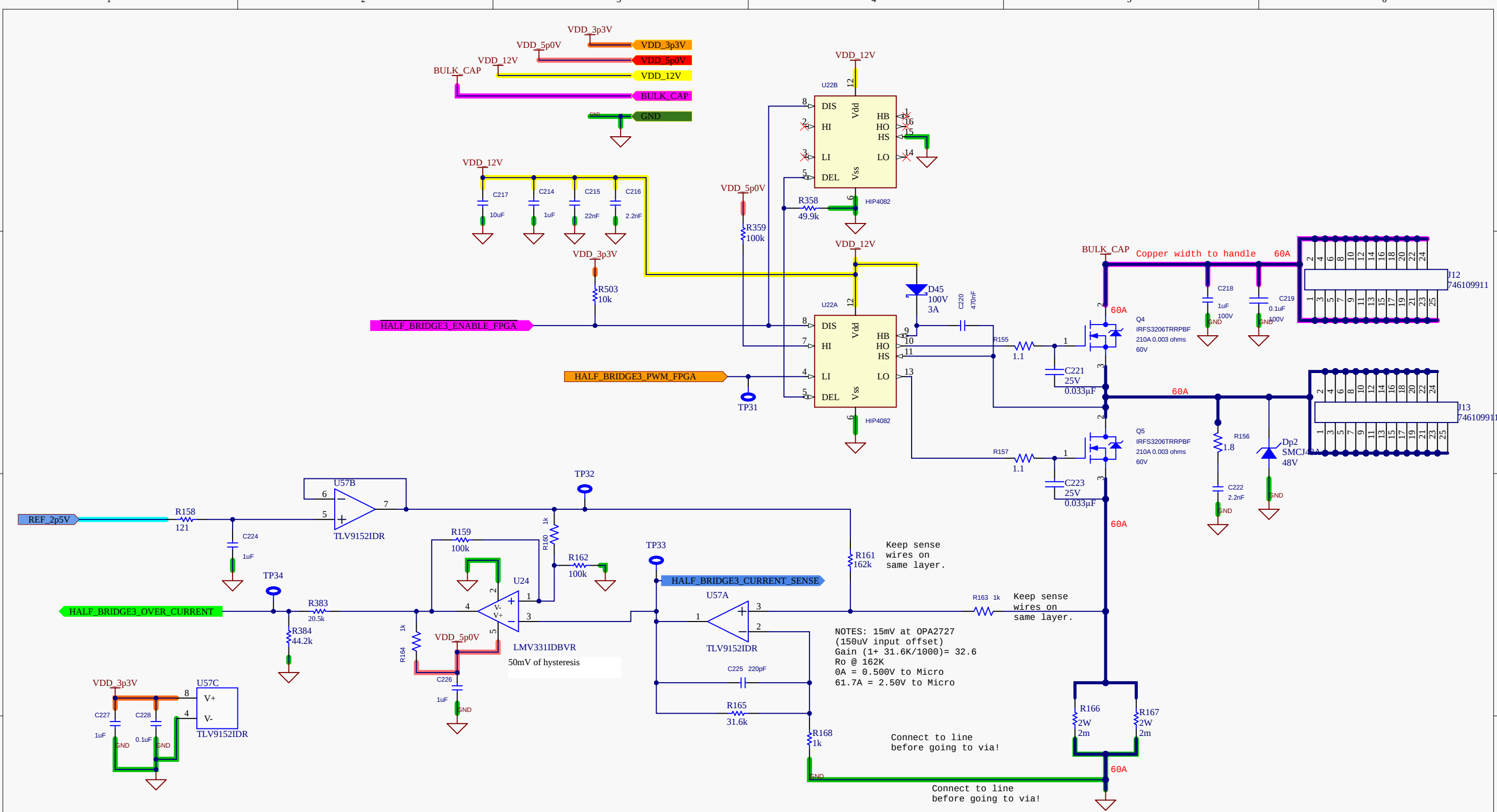


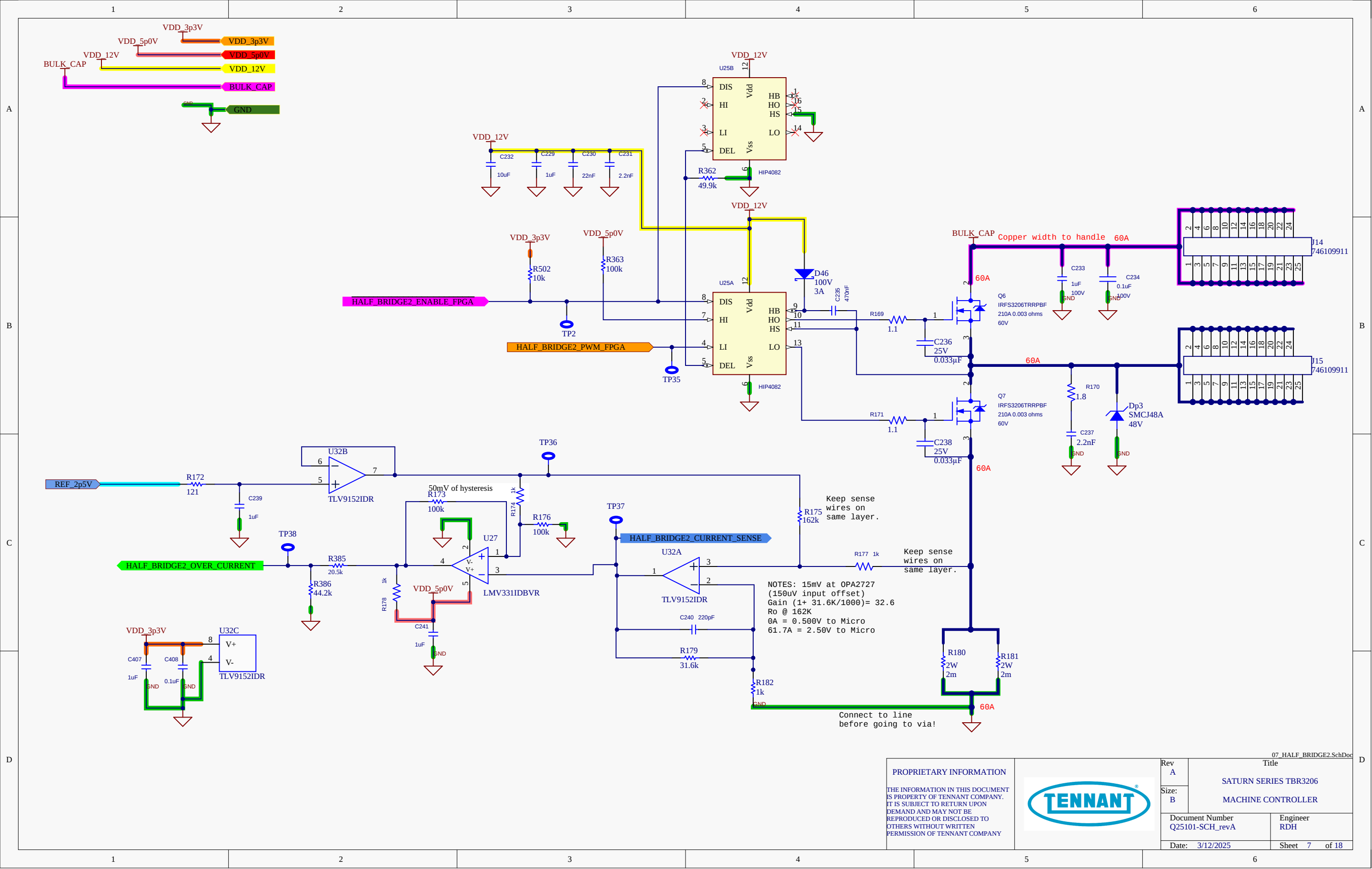
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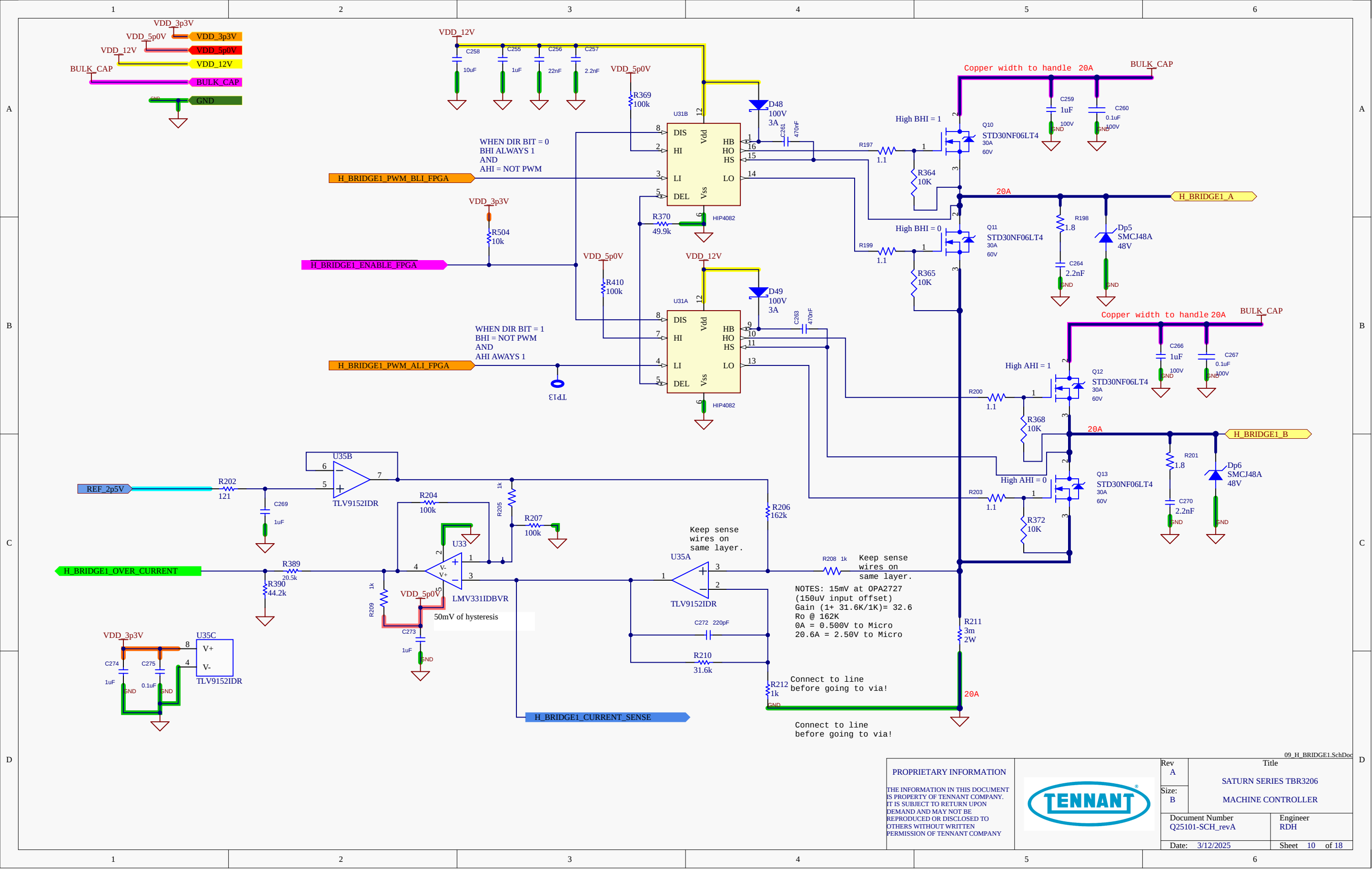
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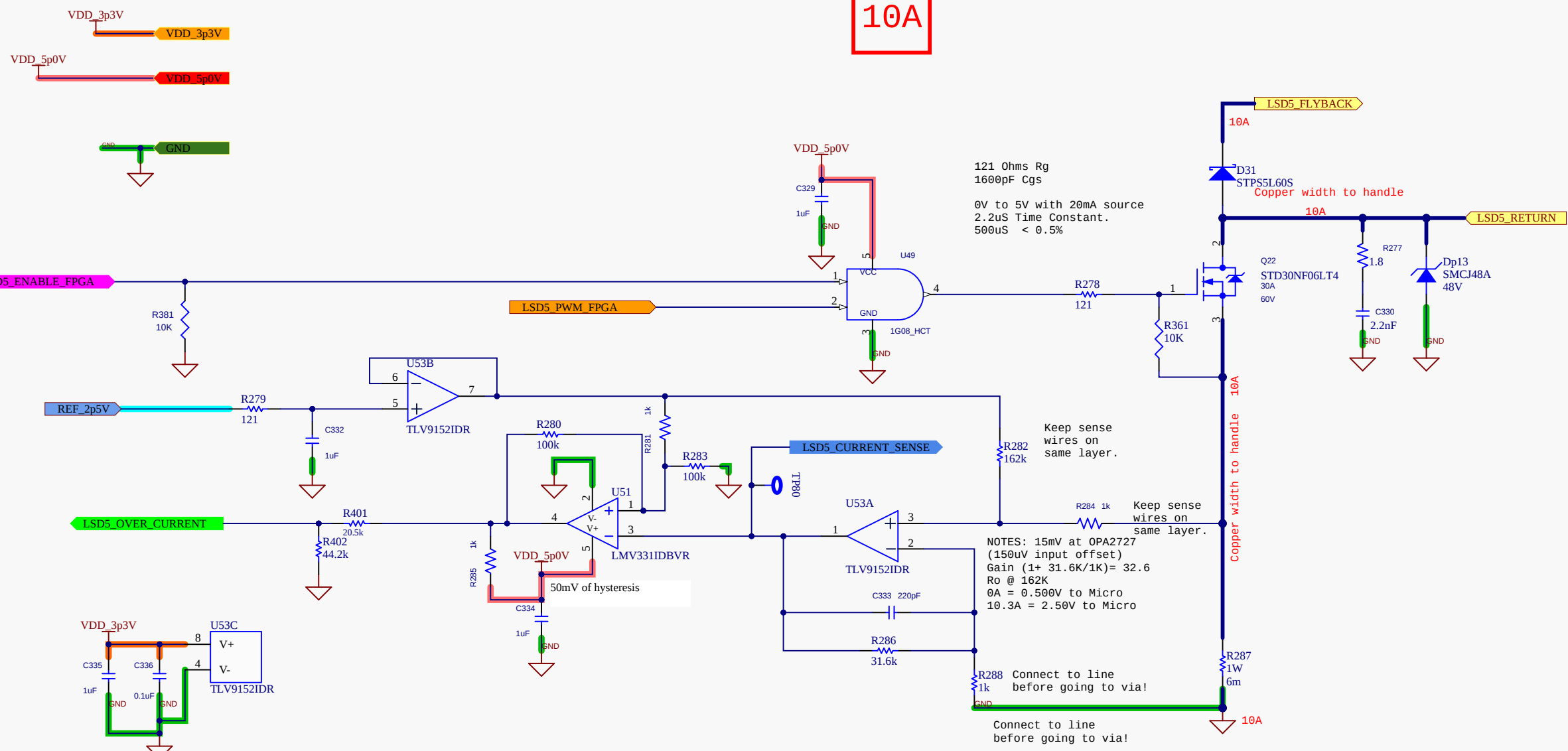
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10A

121 Ohms Rg
1600pF Cgs
0V to 5V with 20mA source
2.2uS Time Constant.
500uS < 0.5%

Keep sense wires on same layer.

Keep sense wires on same layer.

NOTES: 15mV at OPA2727 (150uV input offset)
Gain (1+ 31.6K/1K)= 32.6
Ro @ 162K
0A = 0.500V to Micro
10.3A = 2.50V to Micro

Connect to line before going to via!
Connect to line before going to via!

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