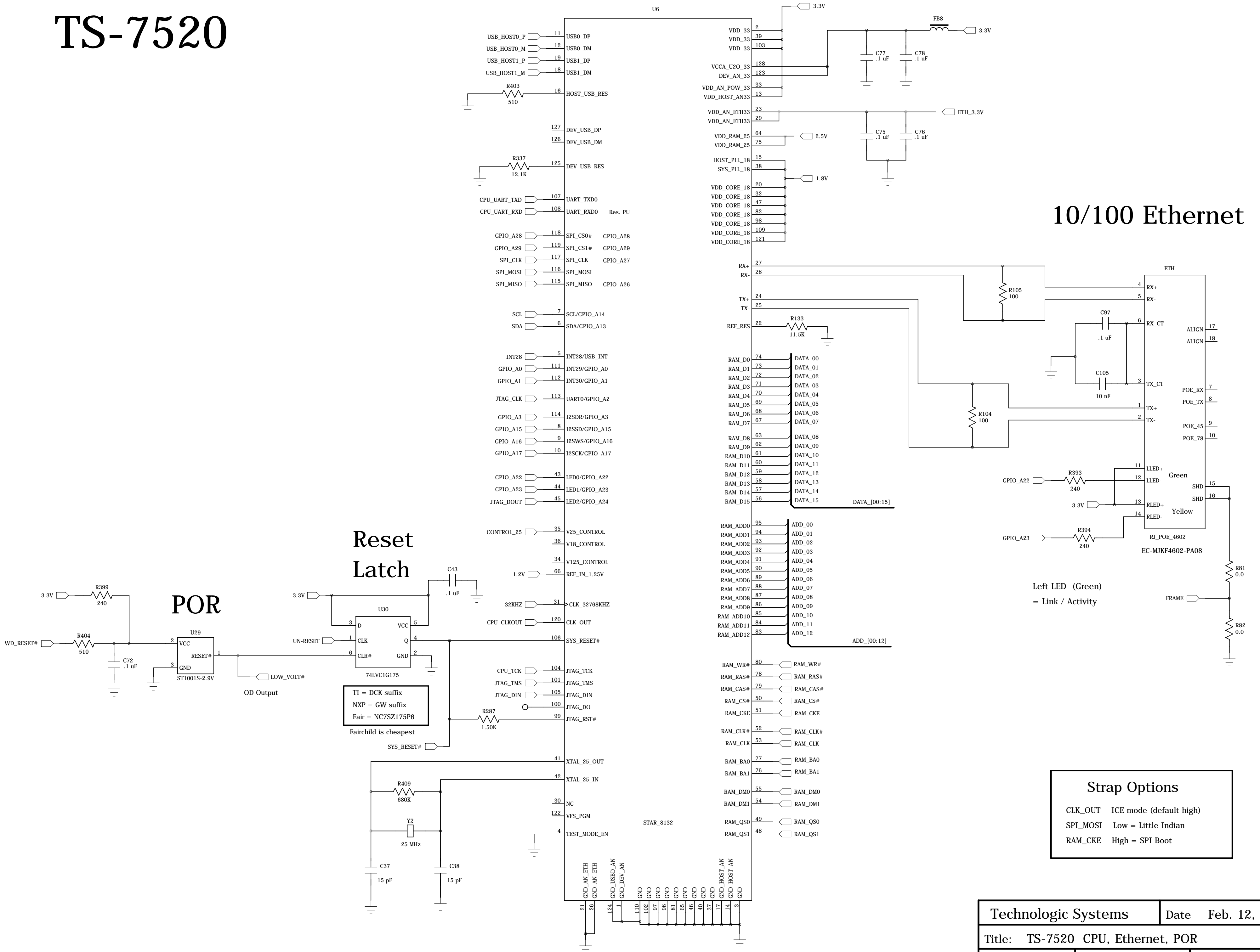


TS-7520

10/100 Ethernet



Reset Latch

TI = DCK suffix
 NXP = GW suffix
 Fair = NC7SZ175P6
 Fairchild is cheapest

POR

OD Output

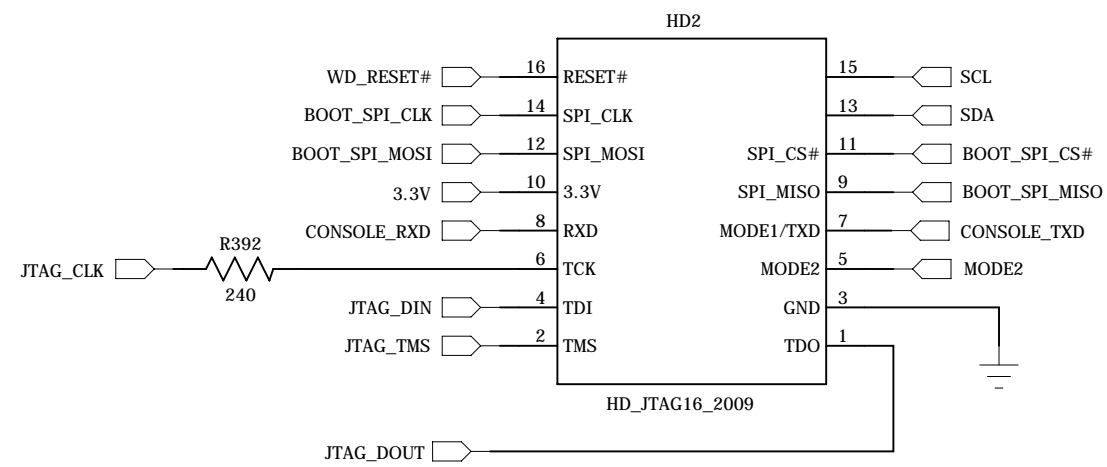
Left LED (Green)
 = Link / Activity

Strap Options

- CLK_OUT ICE mode (default high)
- SPI_MOSI Low = Little Indian
- RAM_CKE High = SPI Boot

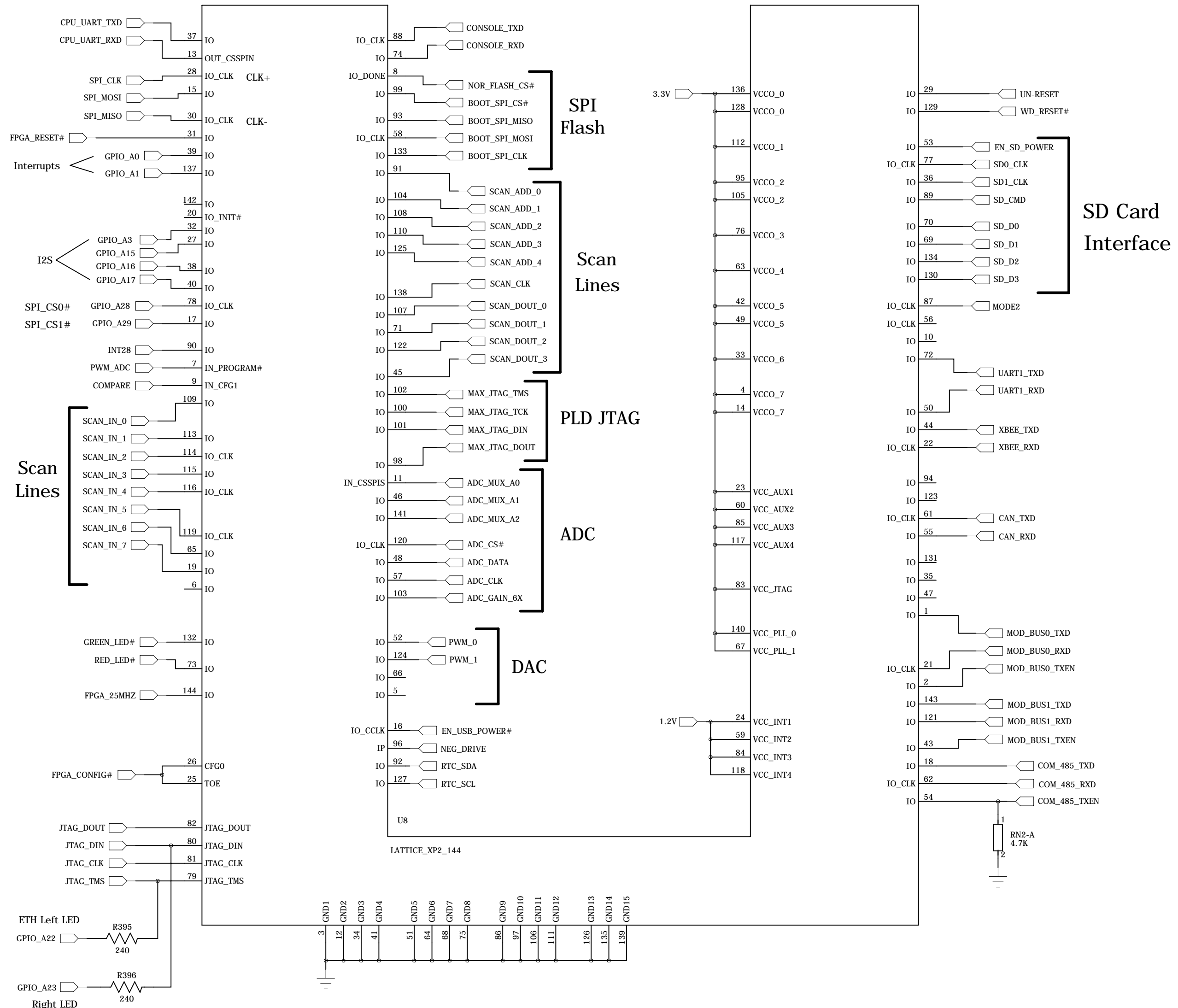
Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 CPU, Ethernet, POR	
Rev: B	Designer
Sheet 1 of 21	

JTAG 16-pin Header



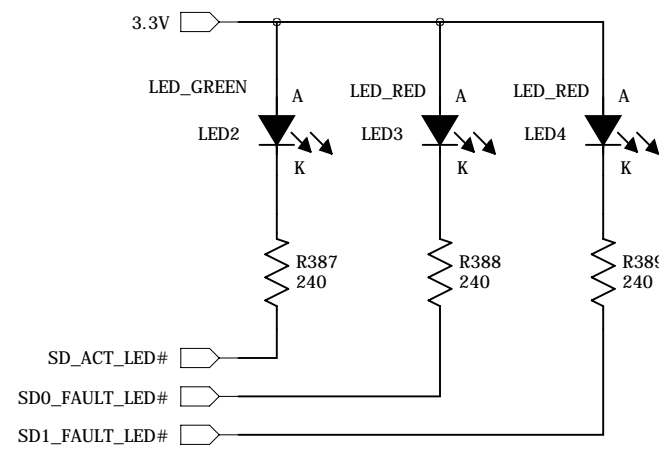
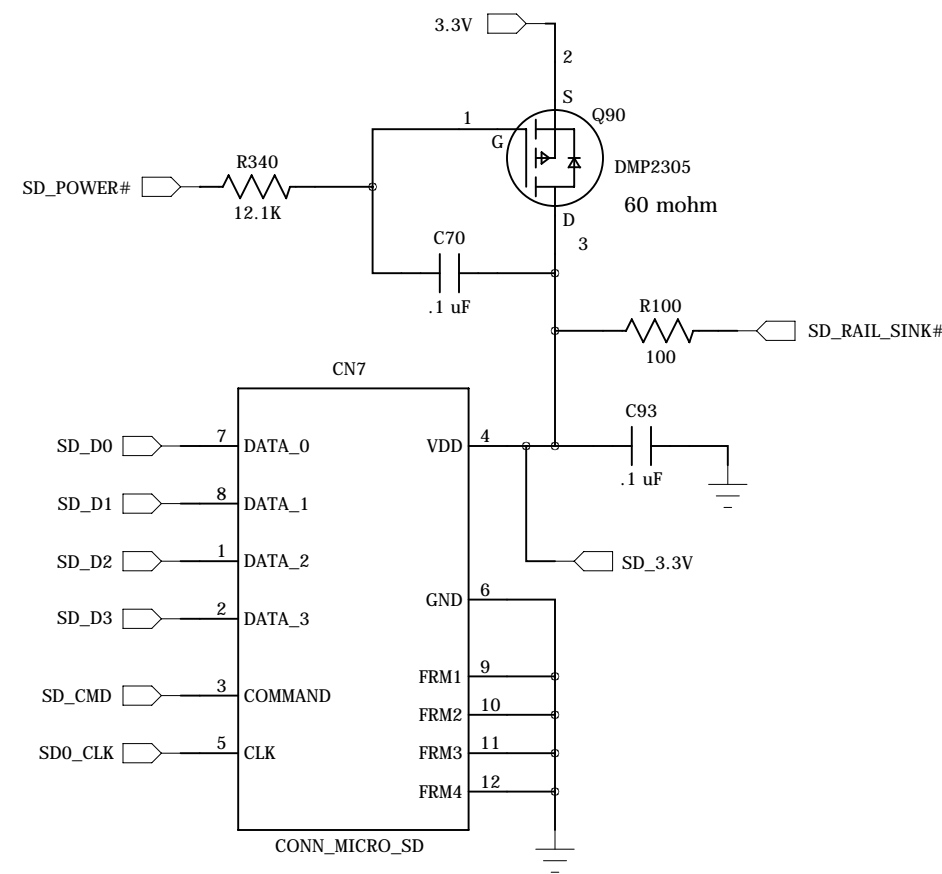
FPGA with 8000 LUTs

XP2-5 has:
 5K LUTs 2 PLLs
 9 blocks of 1Kx18 Block RAM
 12 18x18 Multipliers
 100 I/O with 144 pin package
 "instant ON" = about 1.5 mS
 input PLL clock = 10 MHz min

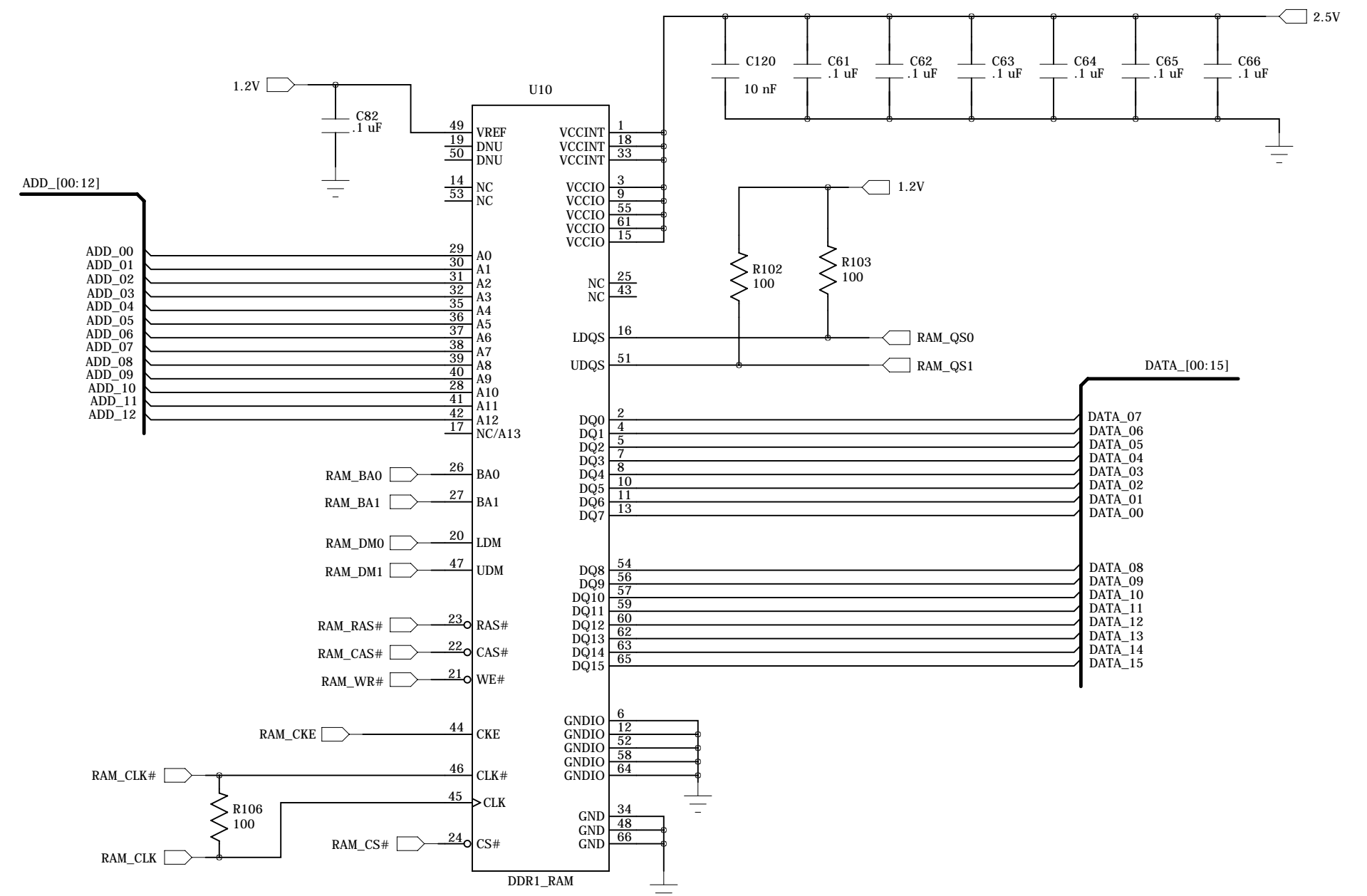


Pull-up and pull-down resistors
are 6 to 30K ohms

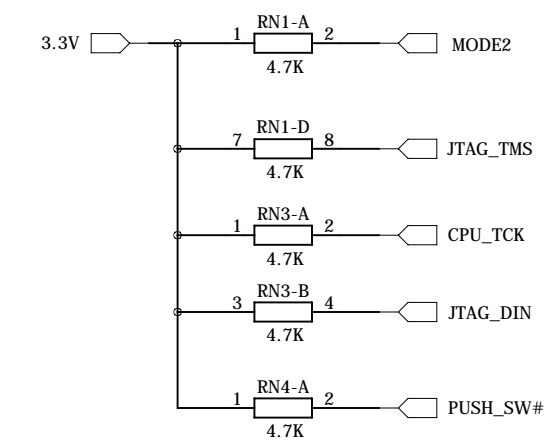
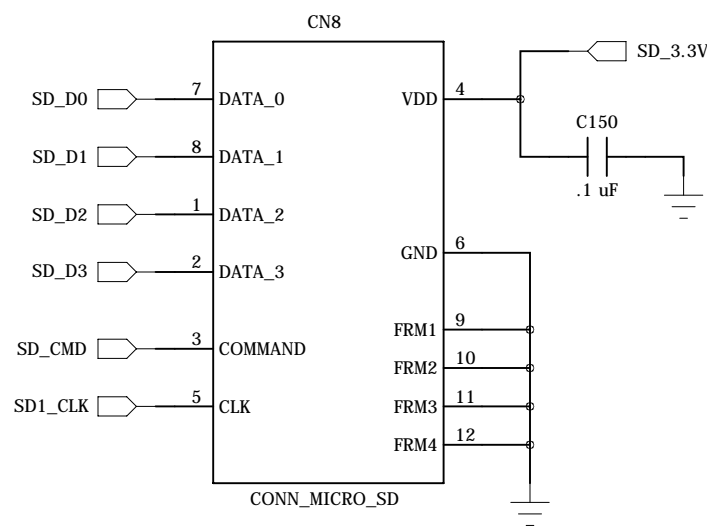
Micro SD Card Socket #0



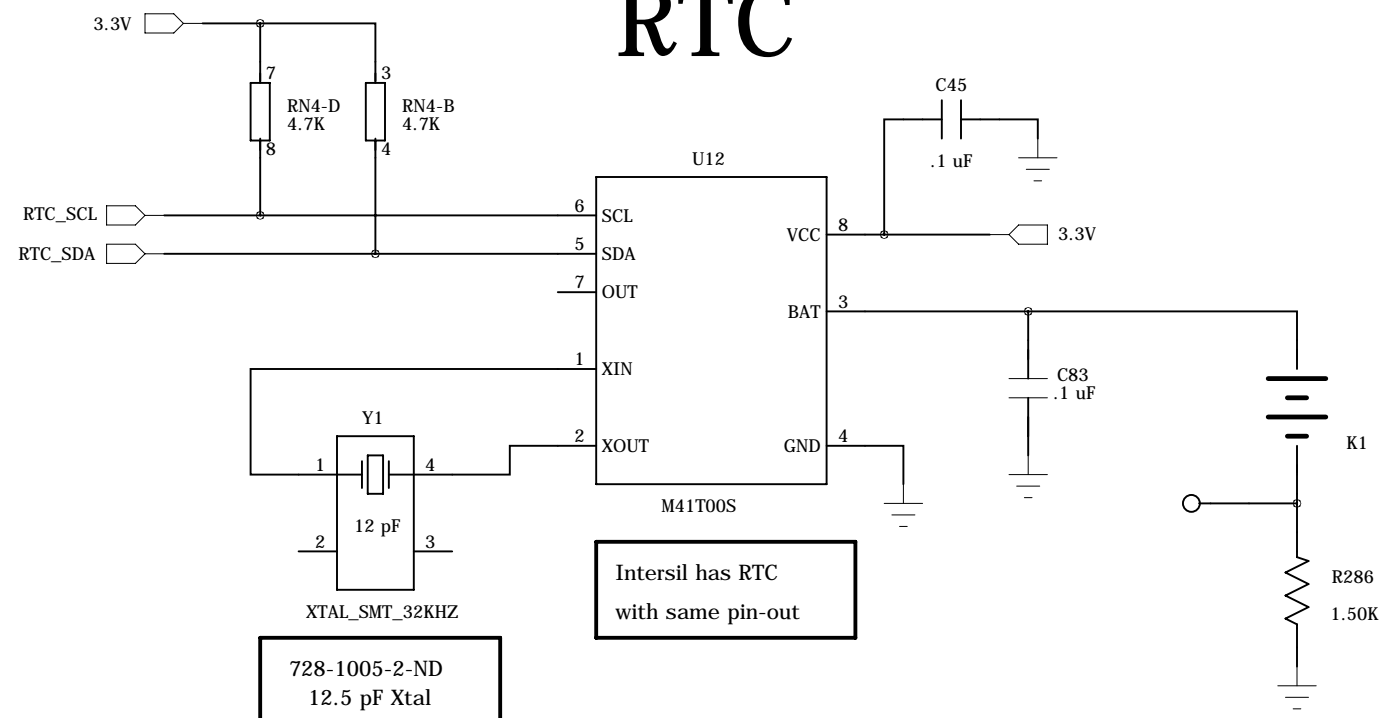
64 Mbyte DDR1 SDRAM



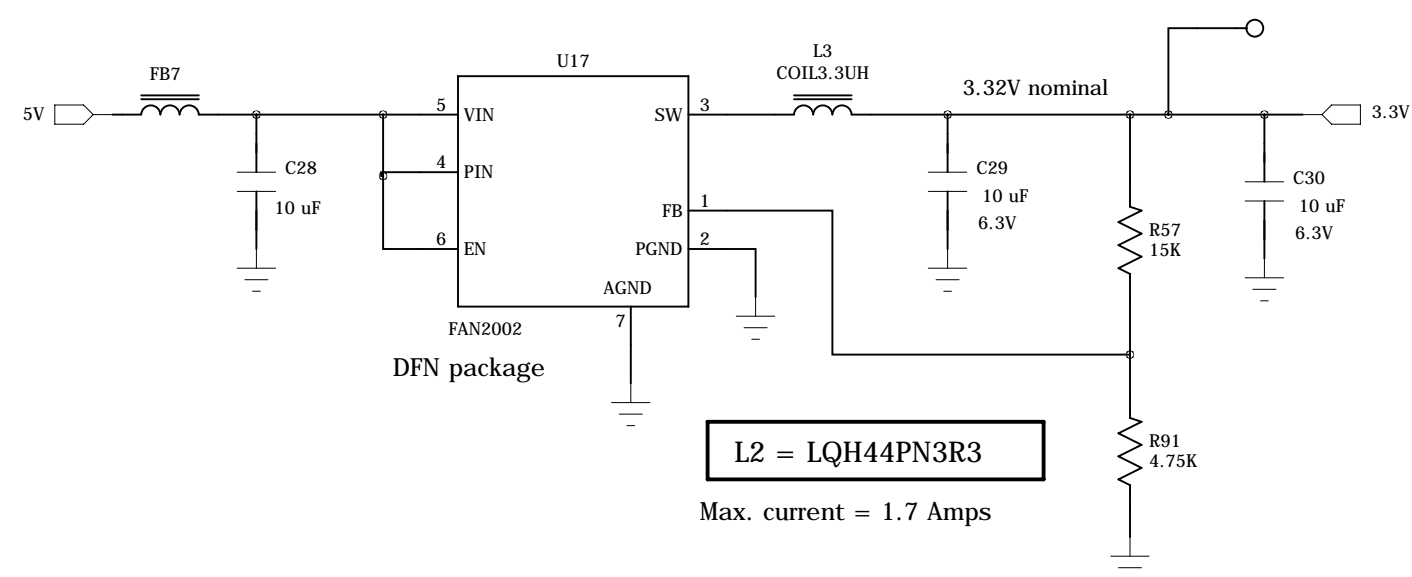
Micro SD Socket #1



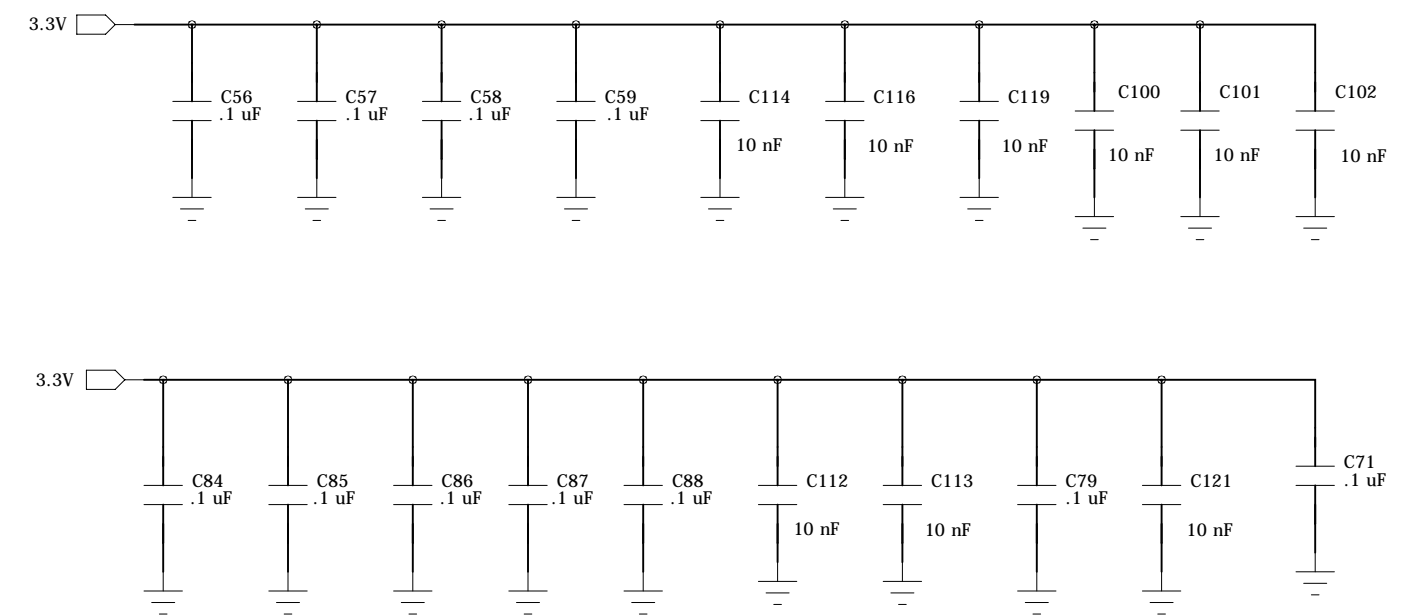
RTC



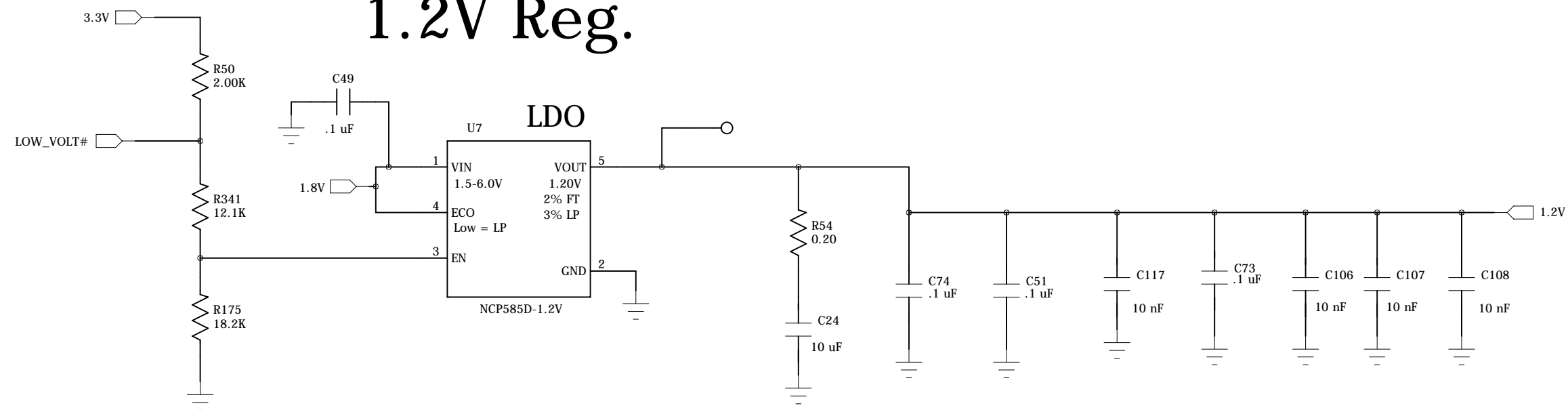
3.3V Regulator



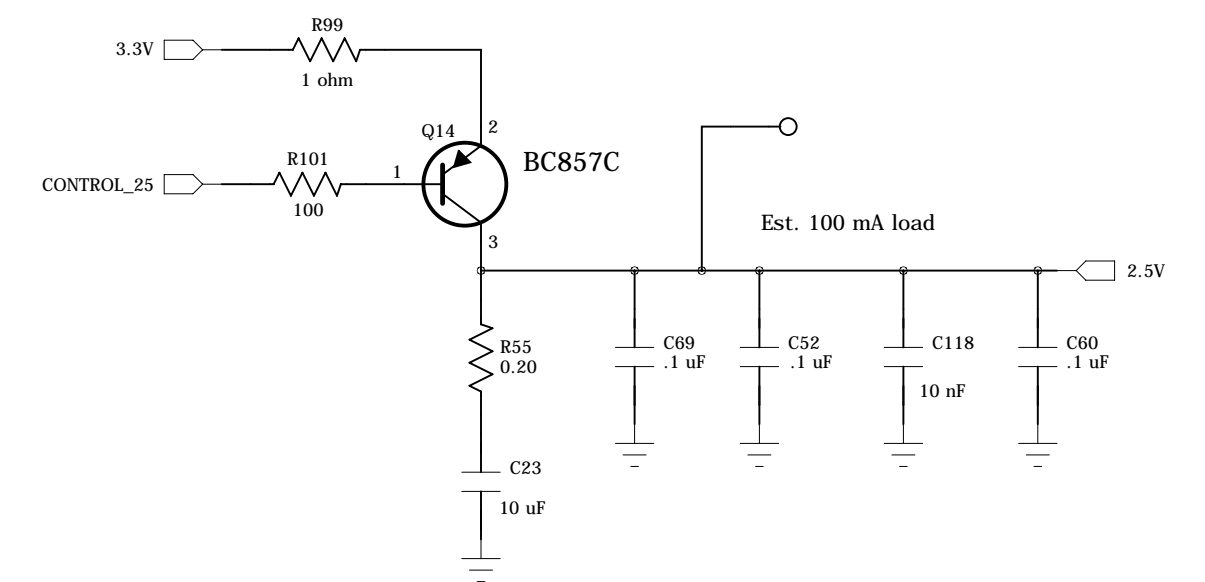
L2 = LQH44PN3R3
Max. current = 1.7 Amps



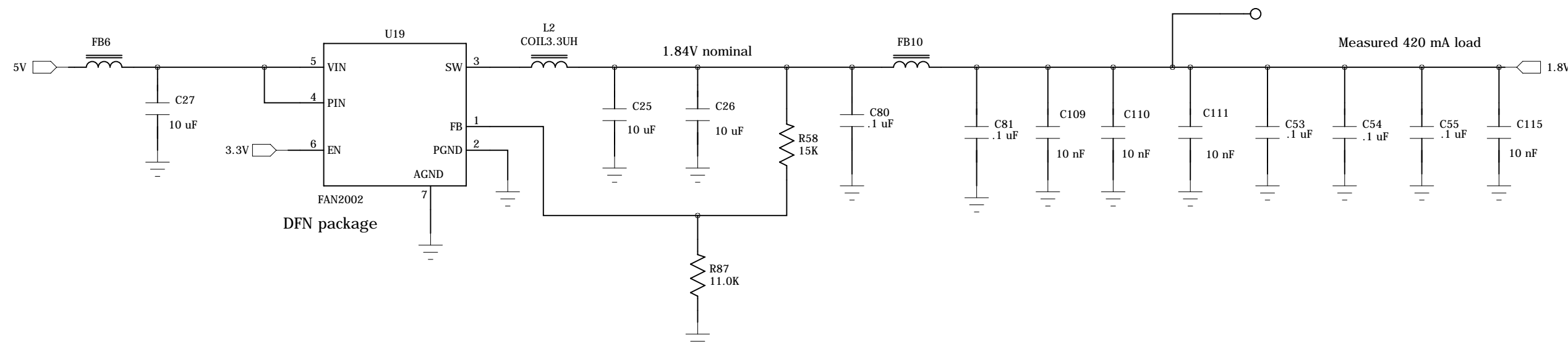
FPGA Core 1.2V Reg.



2.5V Regulator

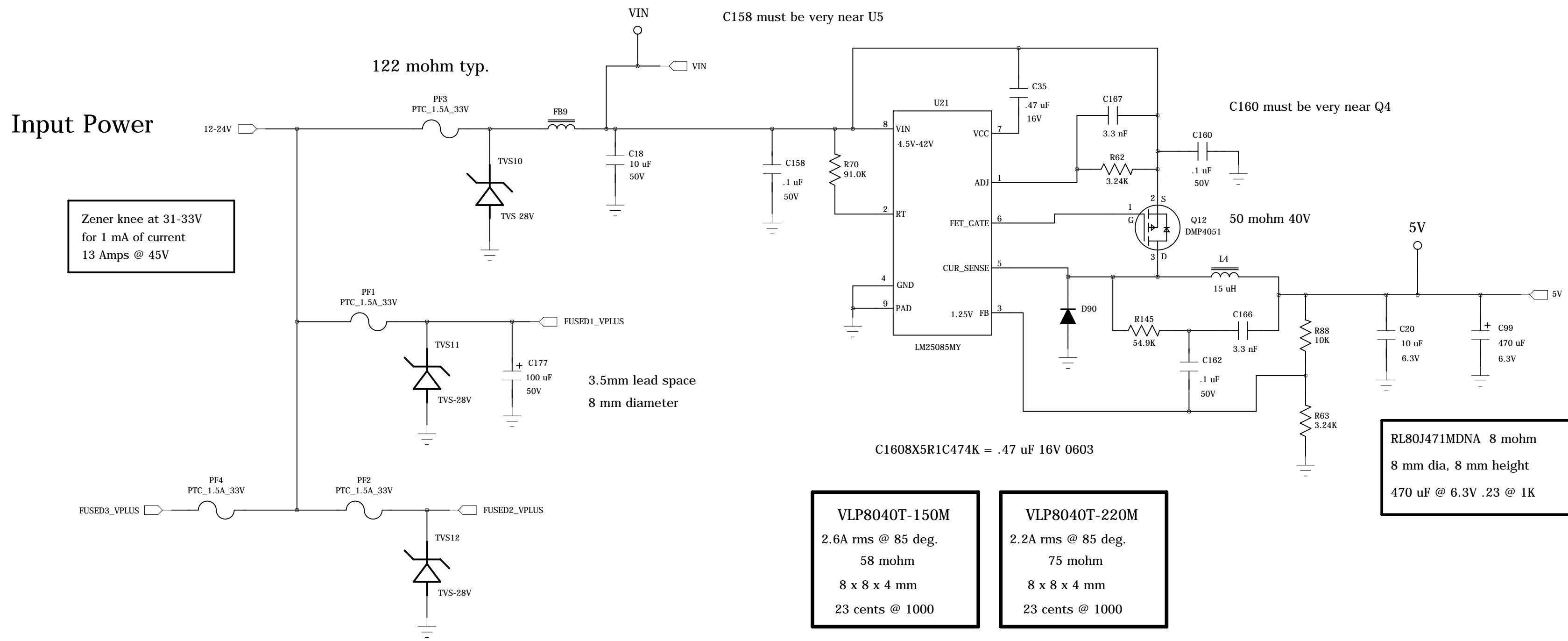


1.8V Regulator

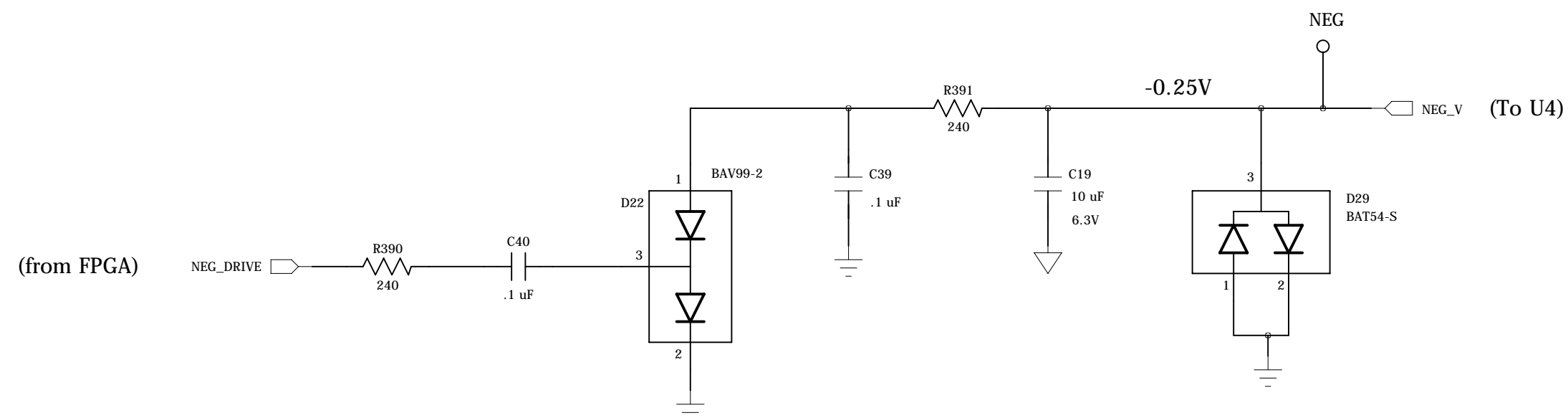


Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 Power Supplies	
Rev: B	Designer RLM Sheet 4 of 21

5V Power Supply (2.0 Amps)

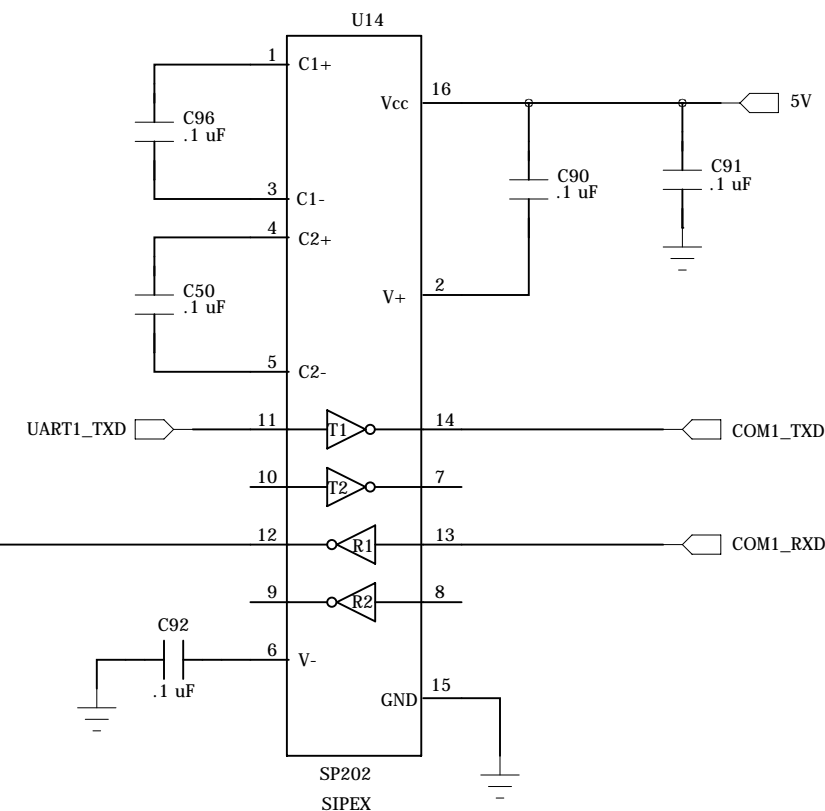
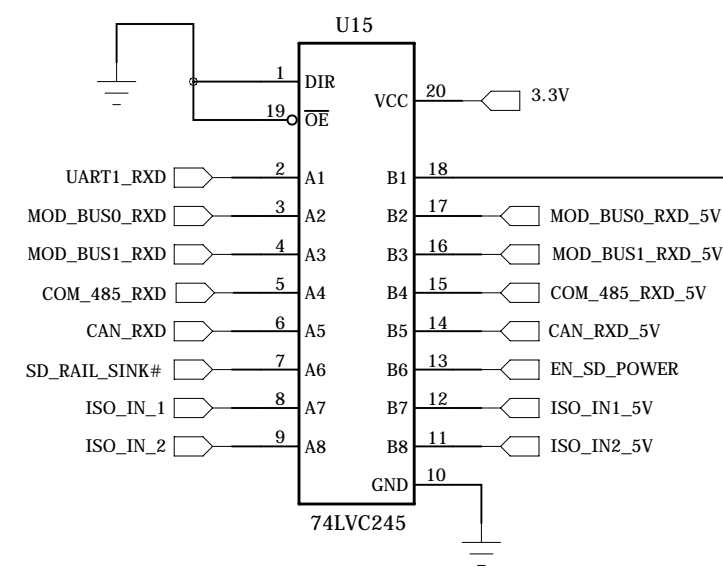


Negative Rail for ADC Op Amp

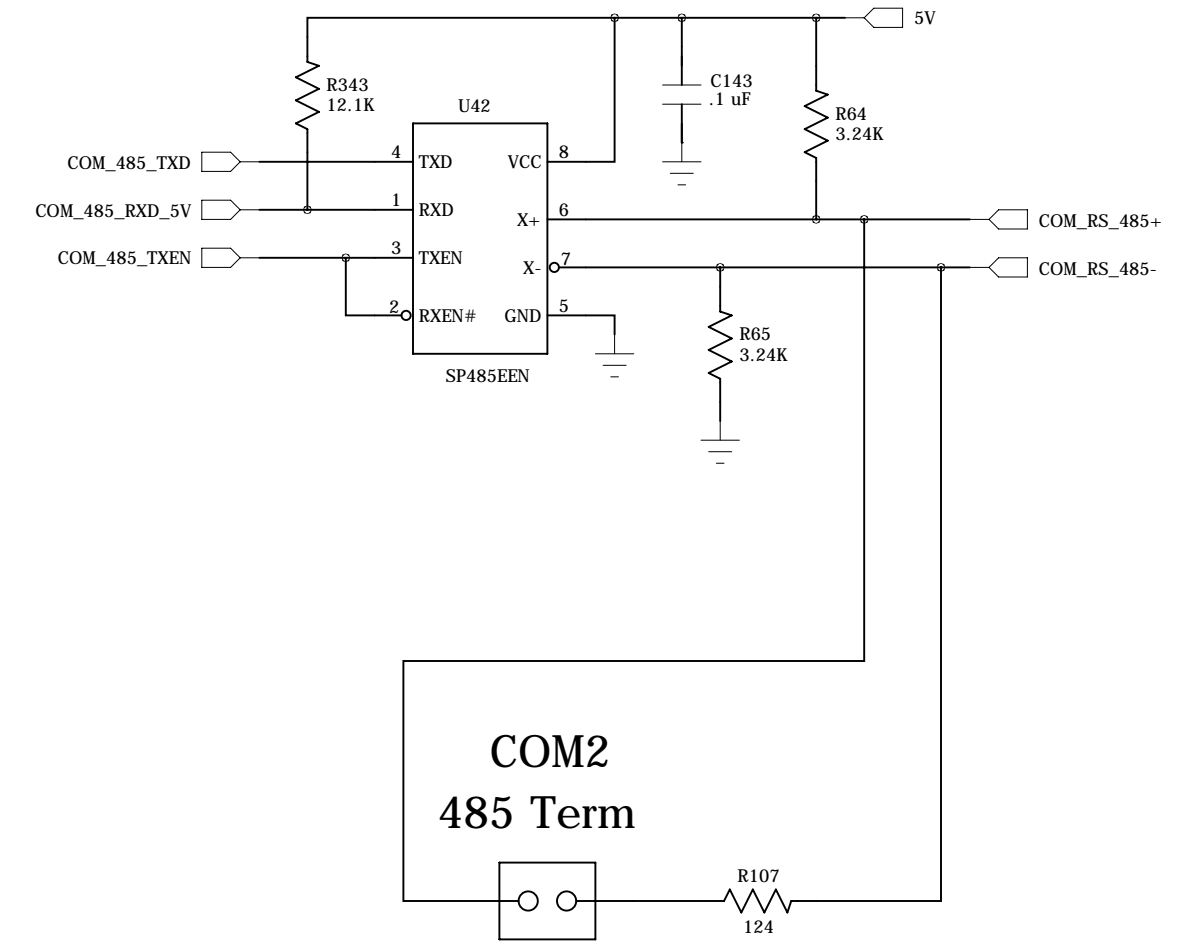


RS-232 Transceiver

3.3V ← 5V
Level shifter

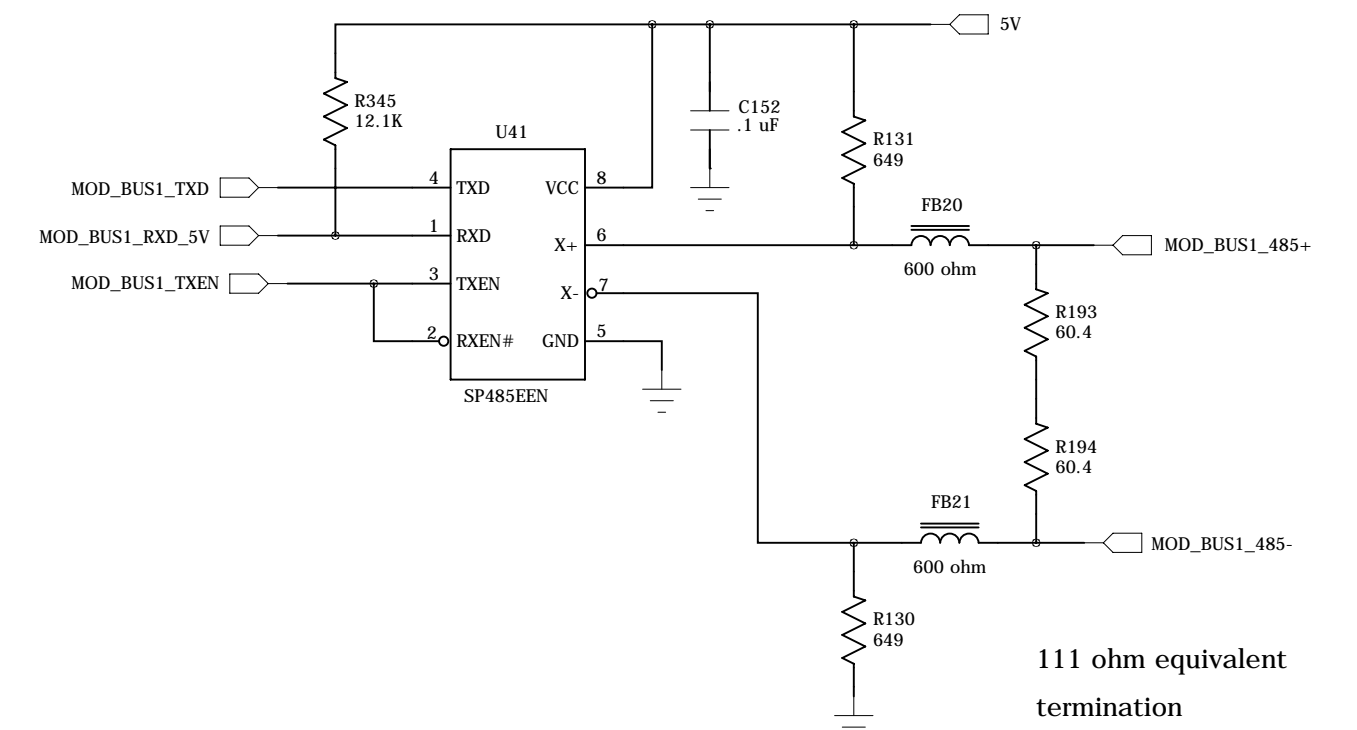


COM Port RS-485 Driver



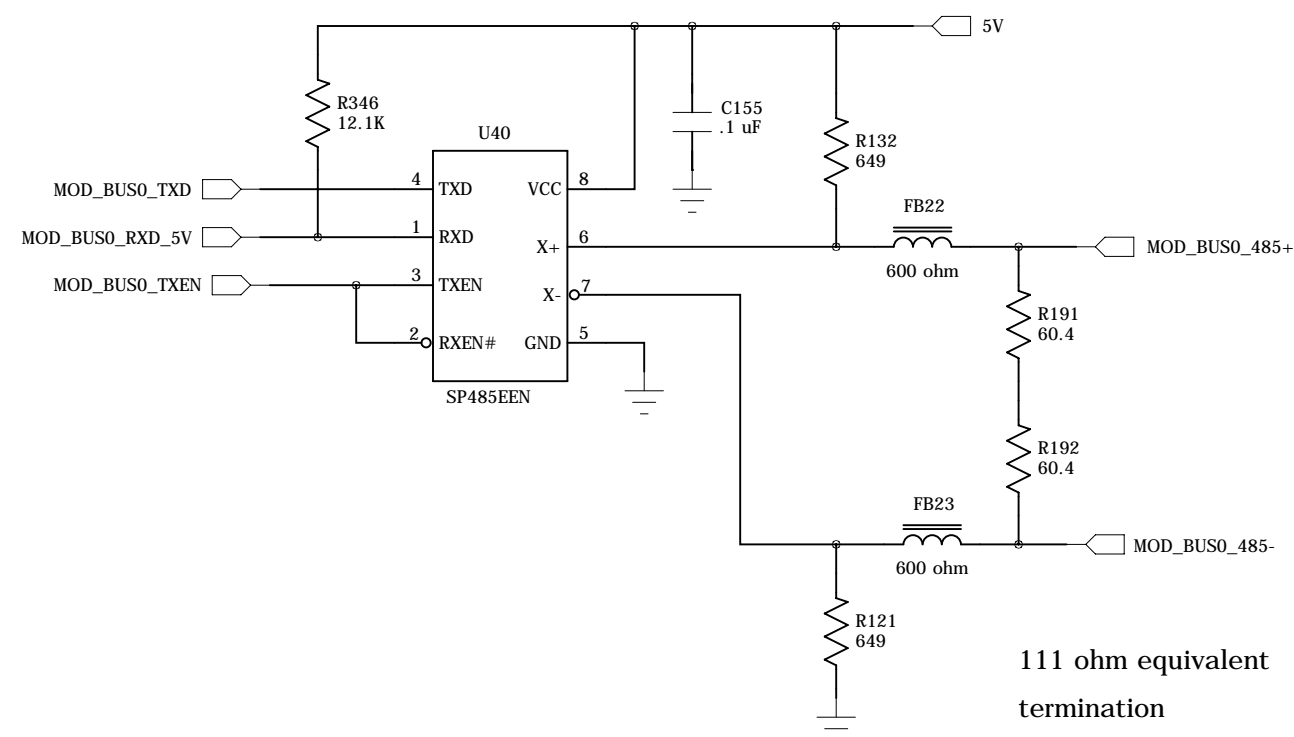
MOD Bus 1

RS-485 Driver



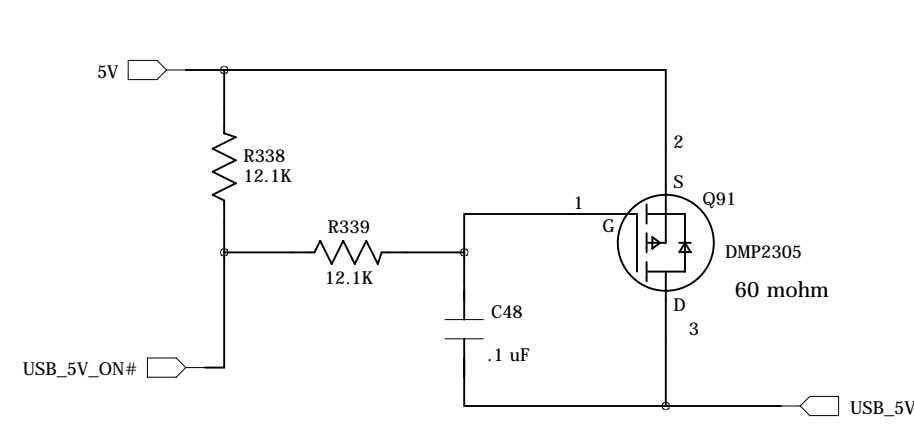
MOD Bus 0

RS-485 Driver

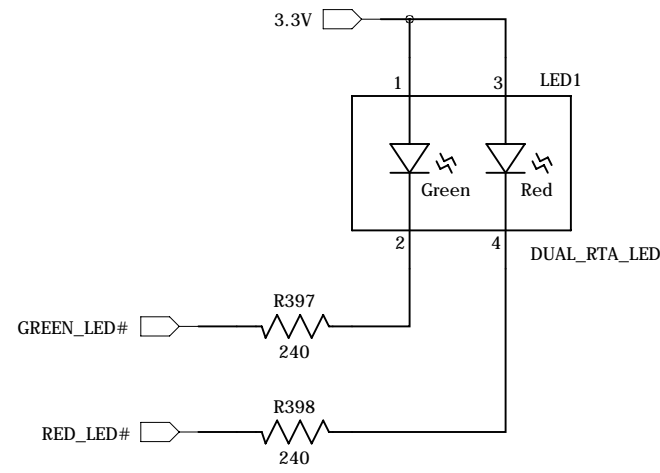


Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 COM port, CAN, RS-485	
Rev: B	Designer RLM
Sheet 6 of 21	

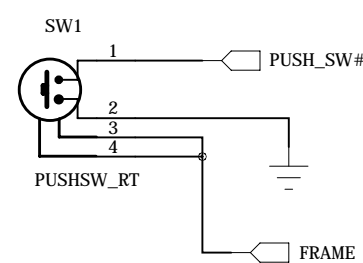
USB Power Switch



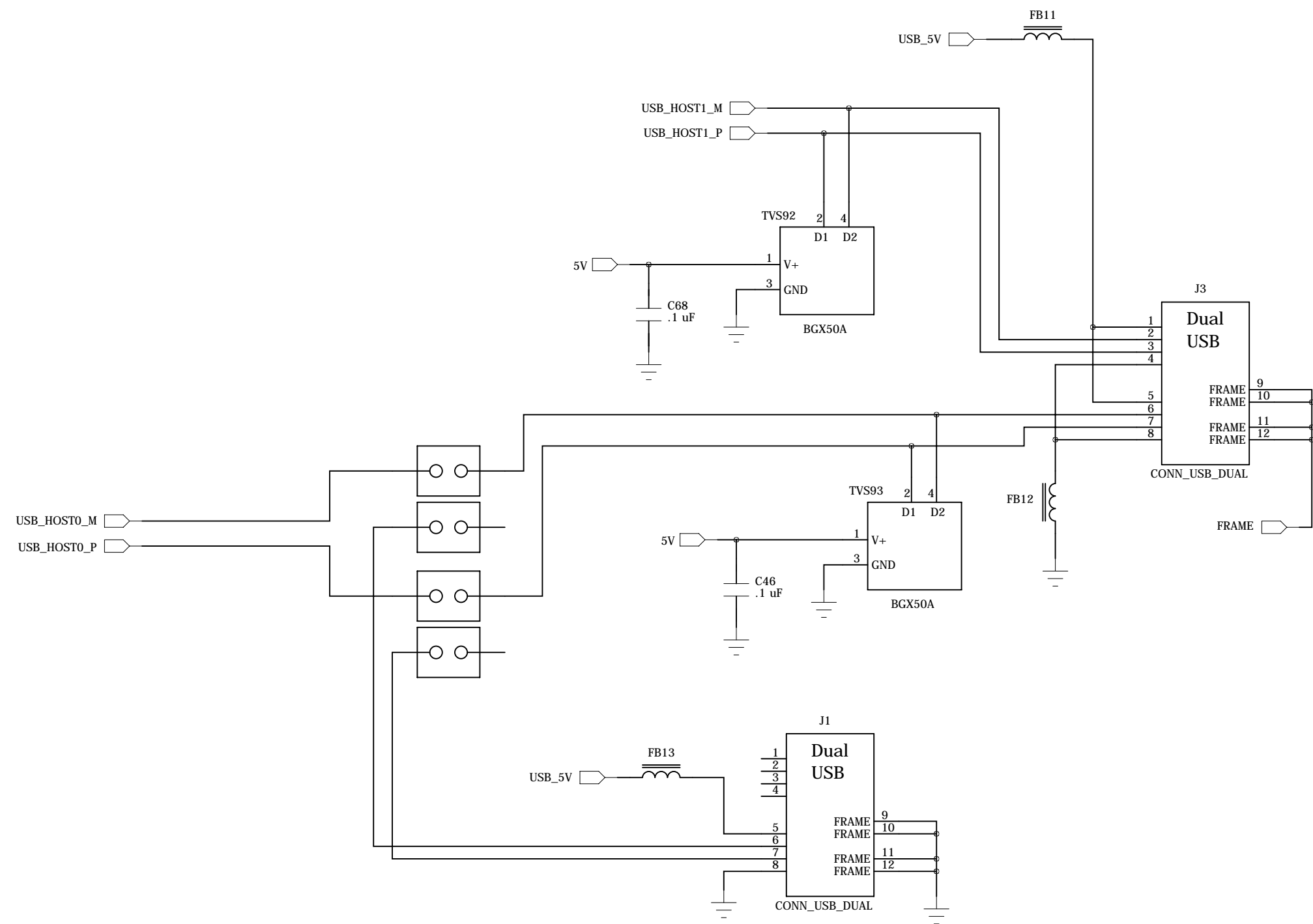
Front Panel LEDs



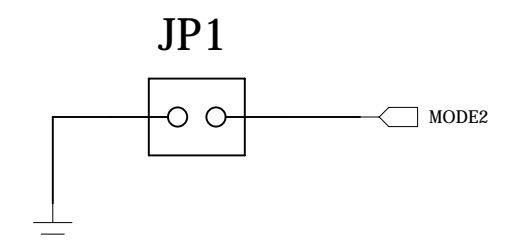
Push Switch



Dual USB Host



Force Boot to SD card



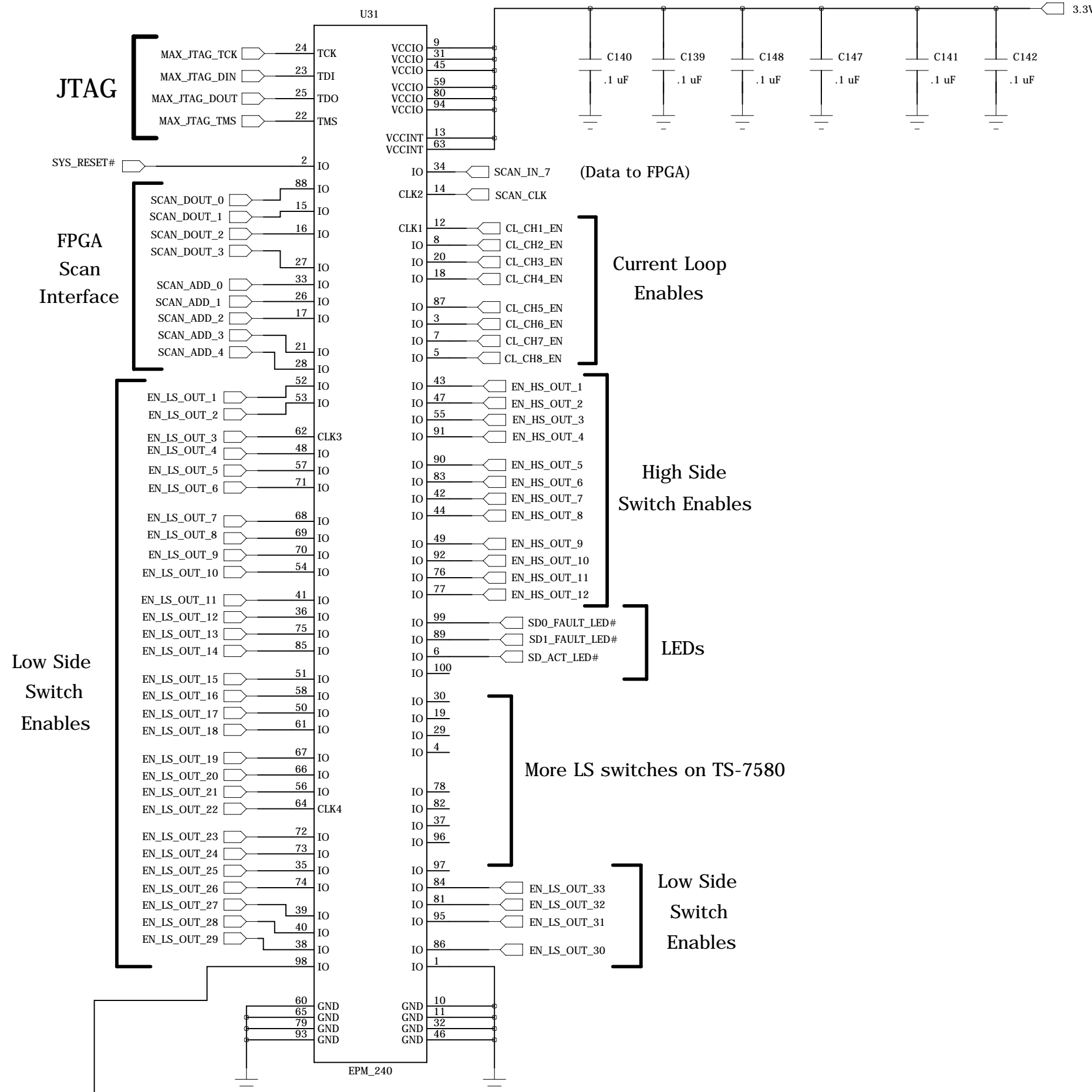
Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 USB, Temp Sensor, Flash	
Rev: B	Designer RLM Sheet 7 of 21

2 Isolated Inputs

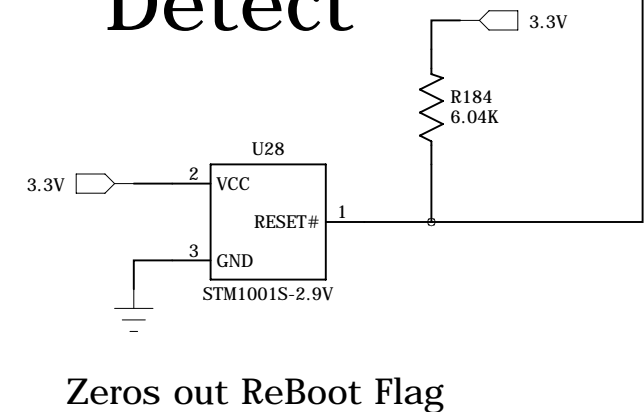
PLD

SYS_RESET# sets all Outputs deasserted except for RED_LED# Does not affect NV Flag

Power Cycle clears NV Flag



Power Cycle Detect



66 Outputs to write
8 Inputs to read

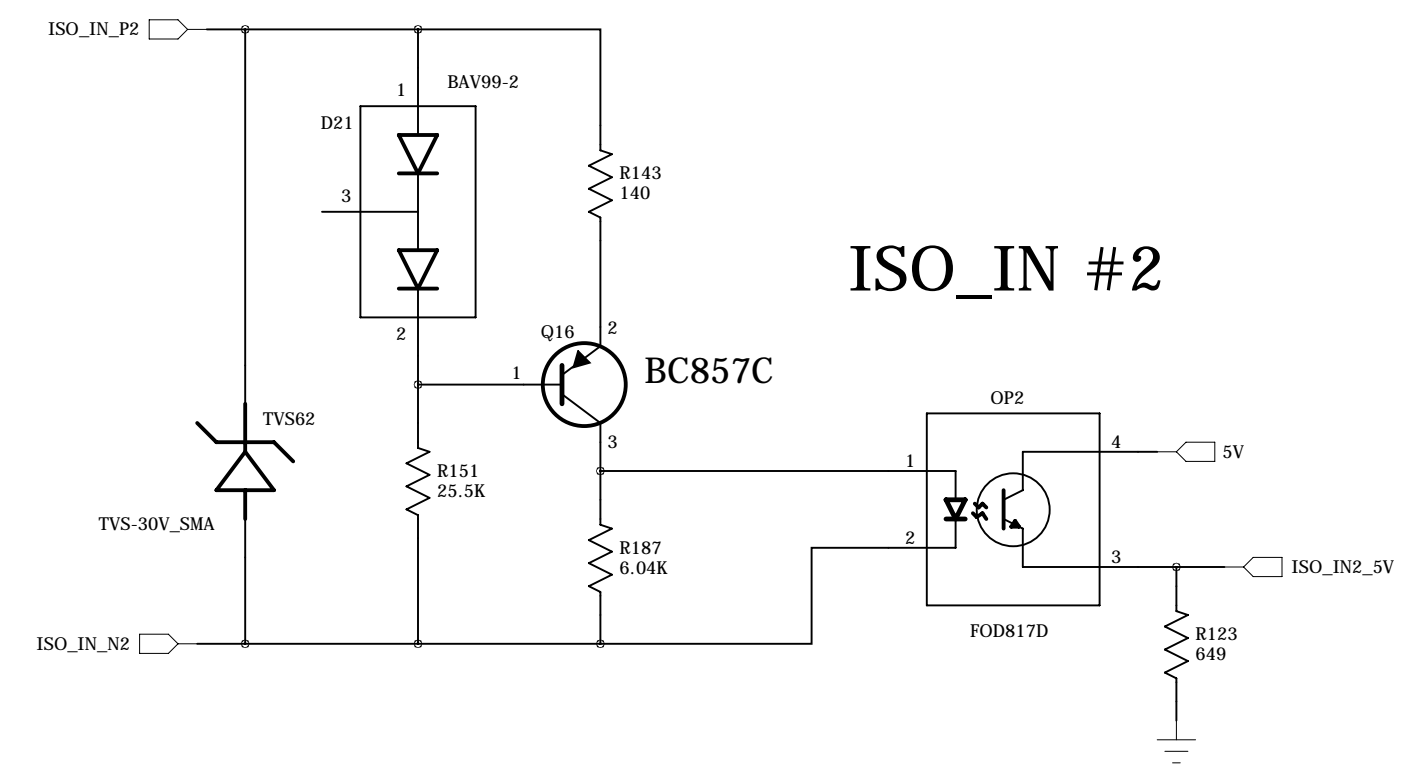
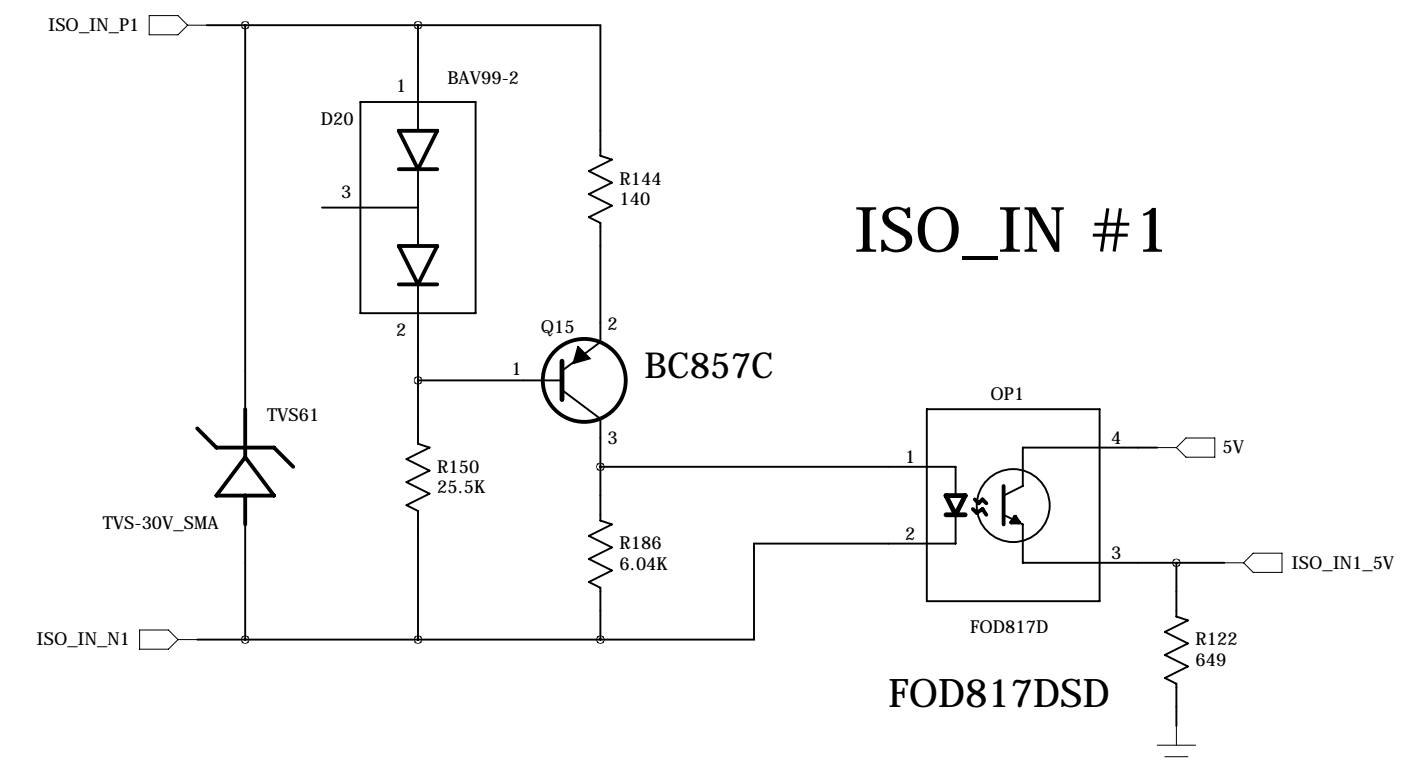
8 bits of Input =
6 PLD Version
2 NV ReBoot Flag

ReBoot Flag

- 0 = Power Cycle
- 1 = Soft Reset
- 2 = WatchDog
- 3 = ?

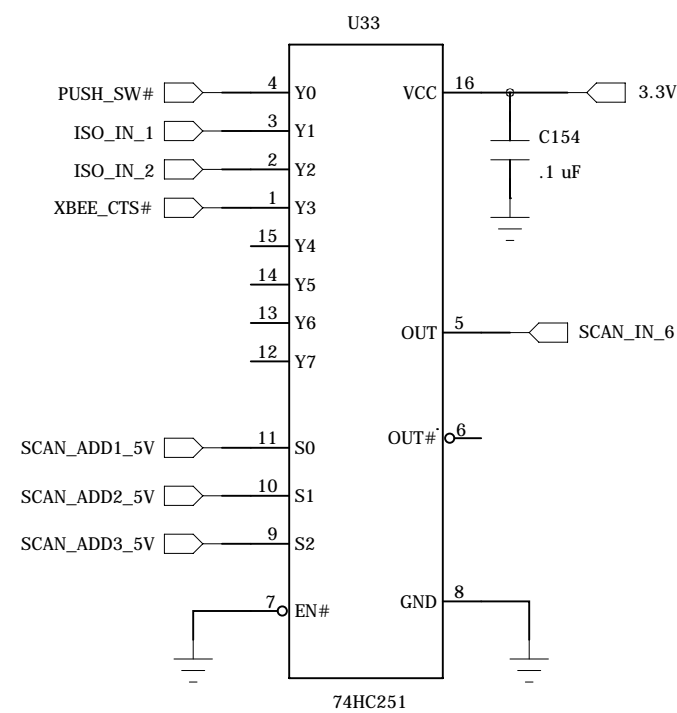
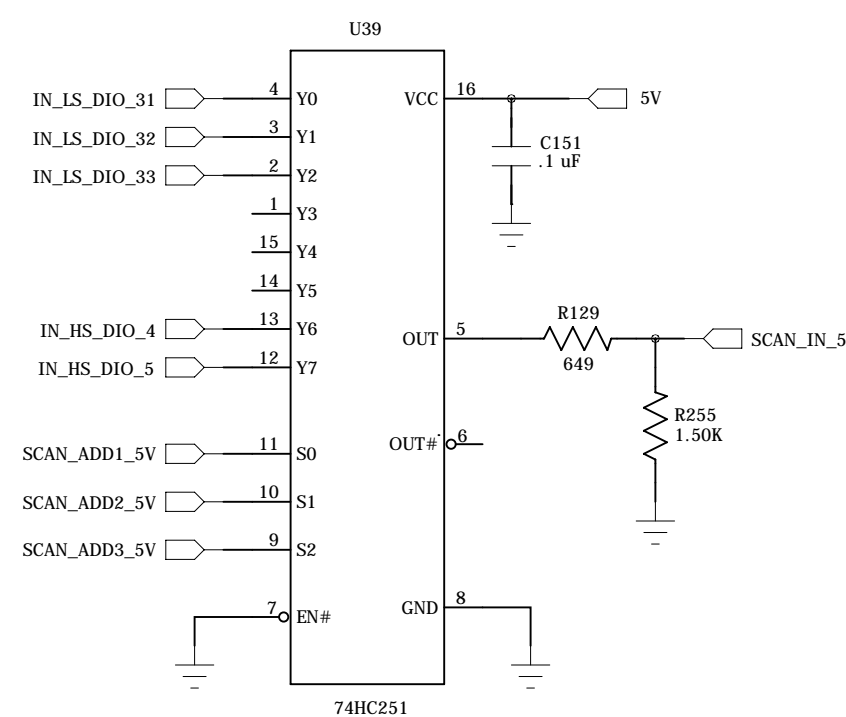
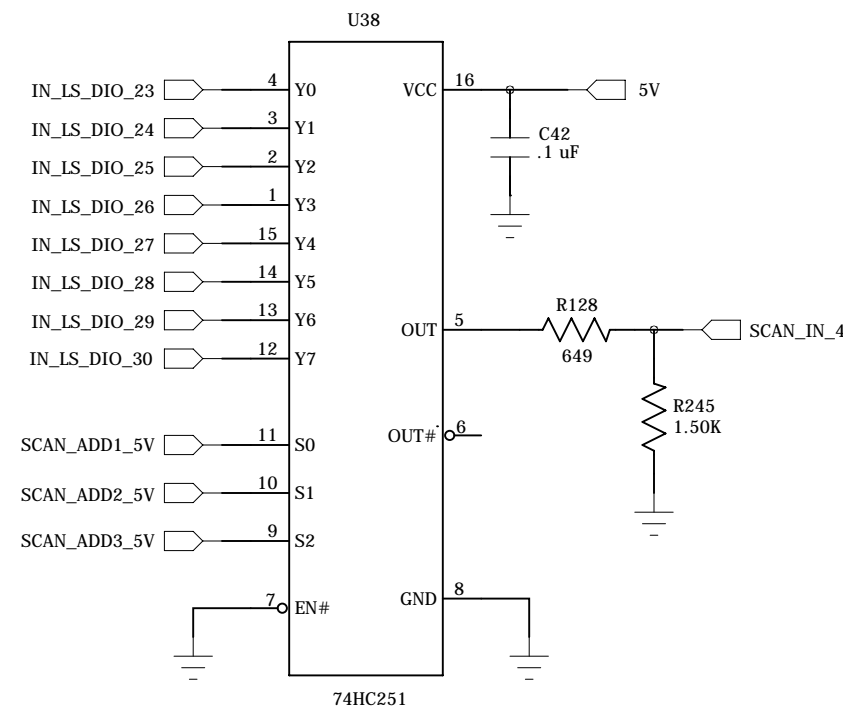
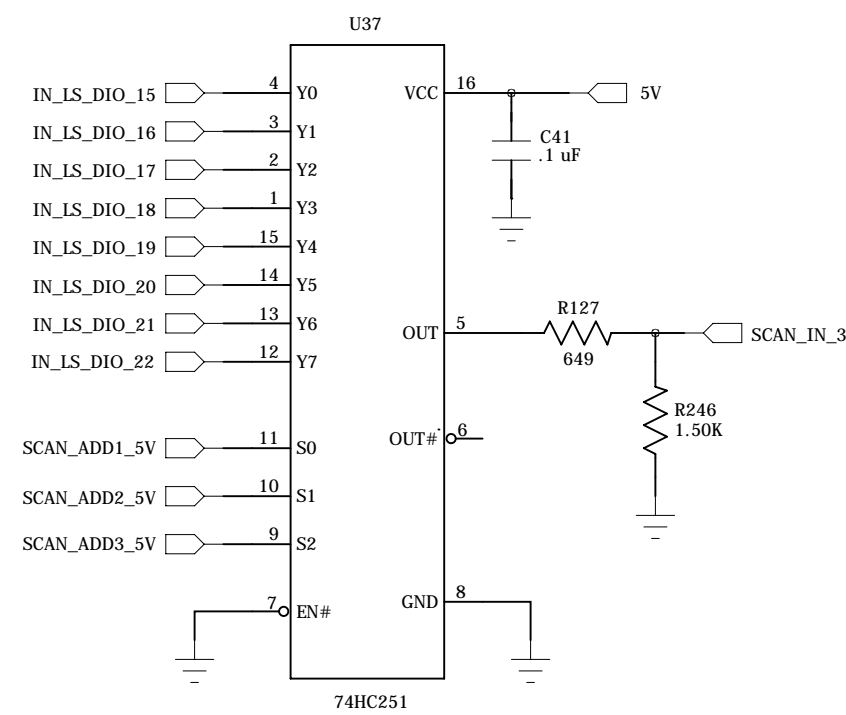
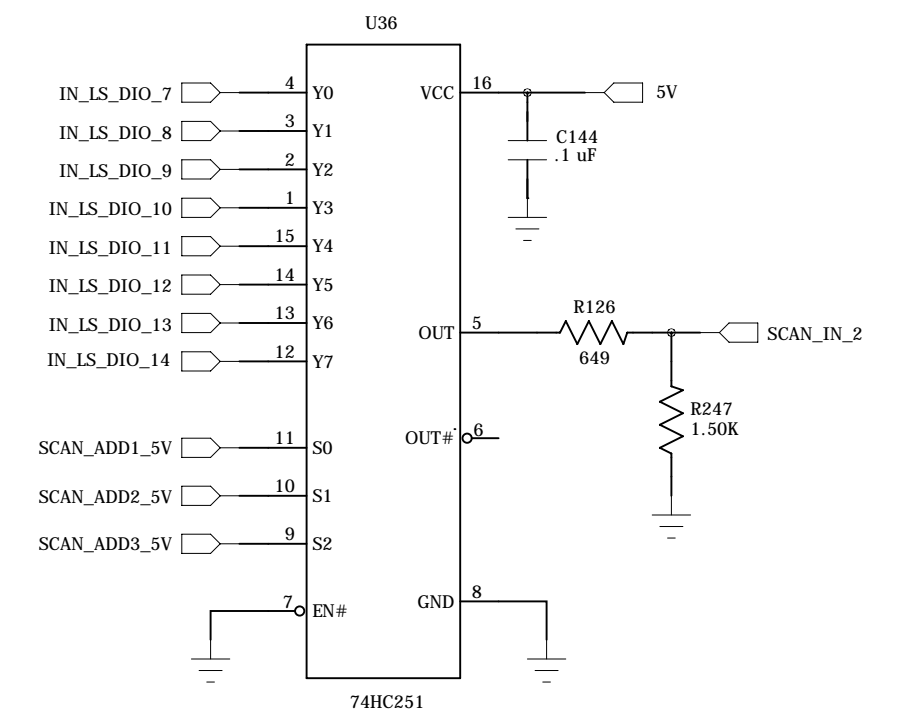
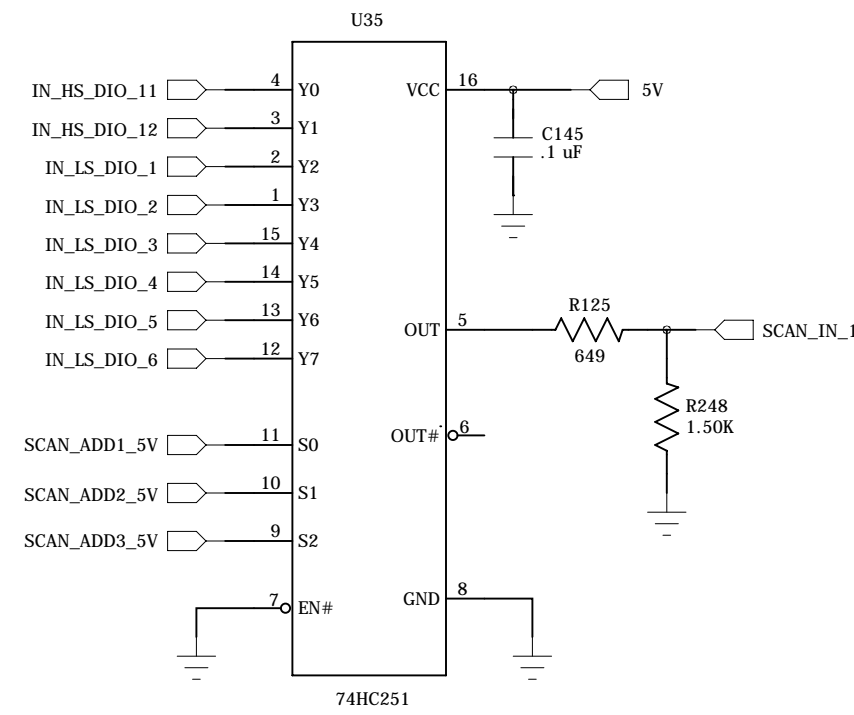
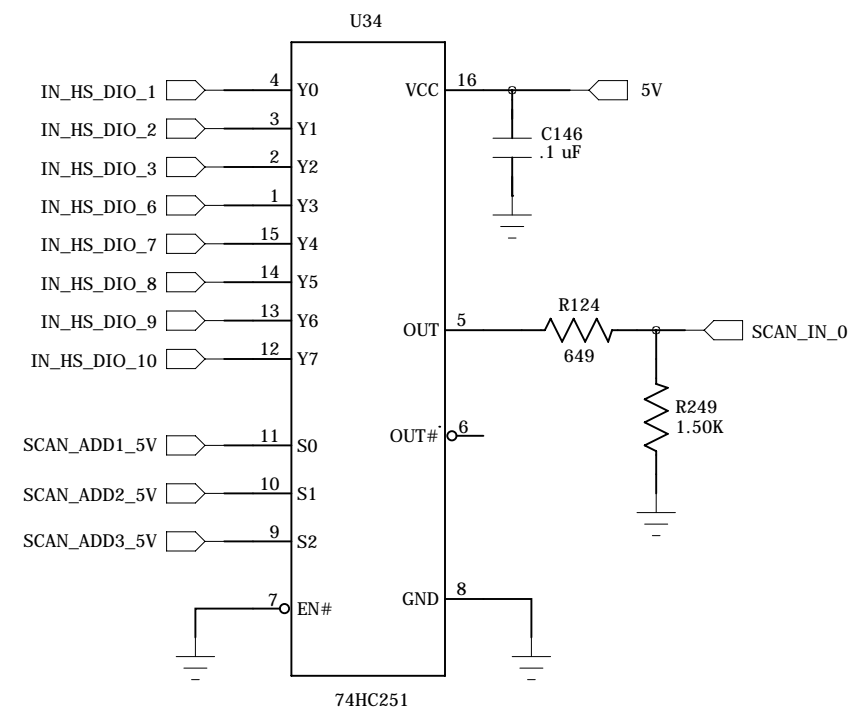
Reg. = 66 + ReBoot Flag = 68 bits total

50 KHz Bandwidth
32V tolerant



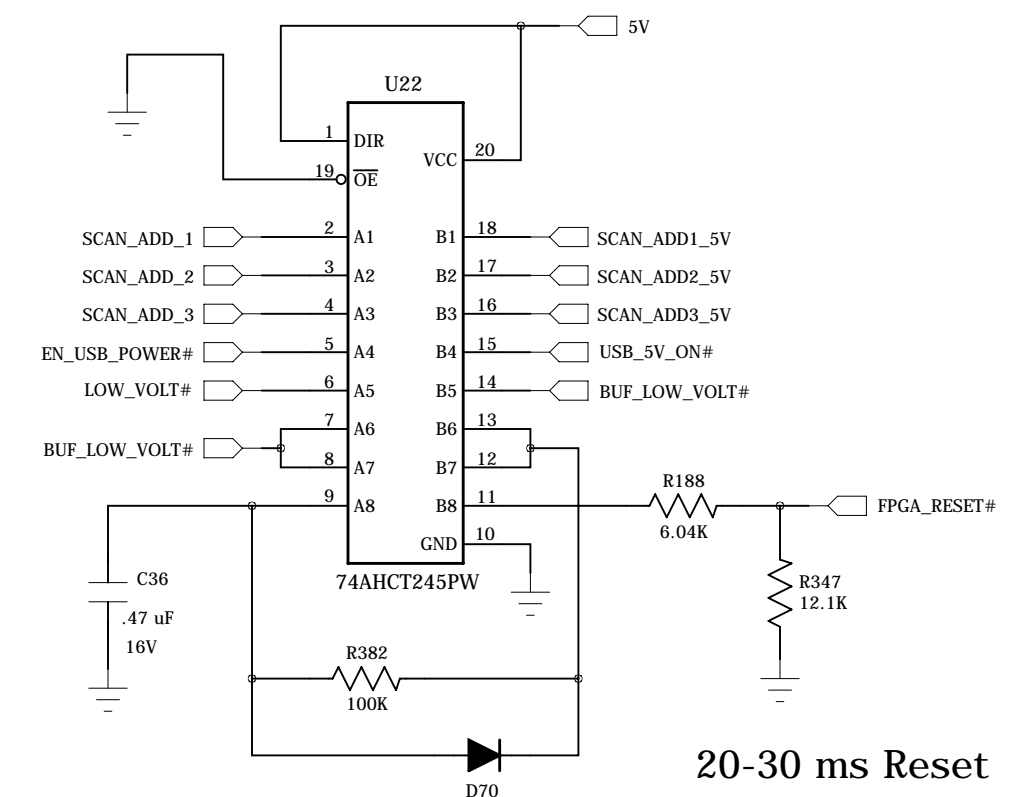
Technologic Systems	Date: Feb. 12, 2012
Title: TS-7520 PLD and Isolated Dig. Inputs	
Rev: B	Designer
Sheet 8 of 21	

MUX Expansion for Inputs



3.3V → 5V

Level shifters



20-30 ms Reset

U22 has Schmitt-trigger Inputs

Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 I/O Expander (Inputs)	
Rev: B	Designer
Sheet 9 of 21	

8 Channels of 12-bit A/D

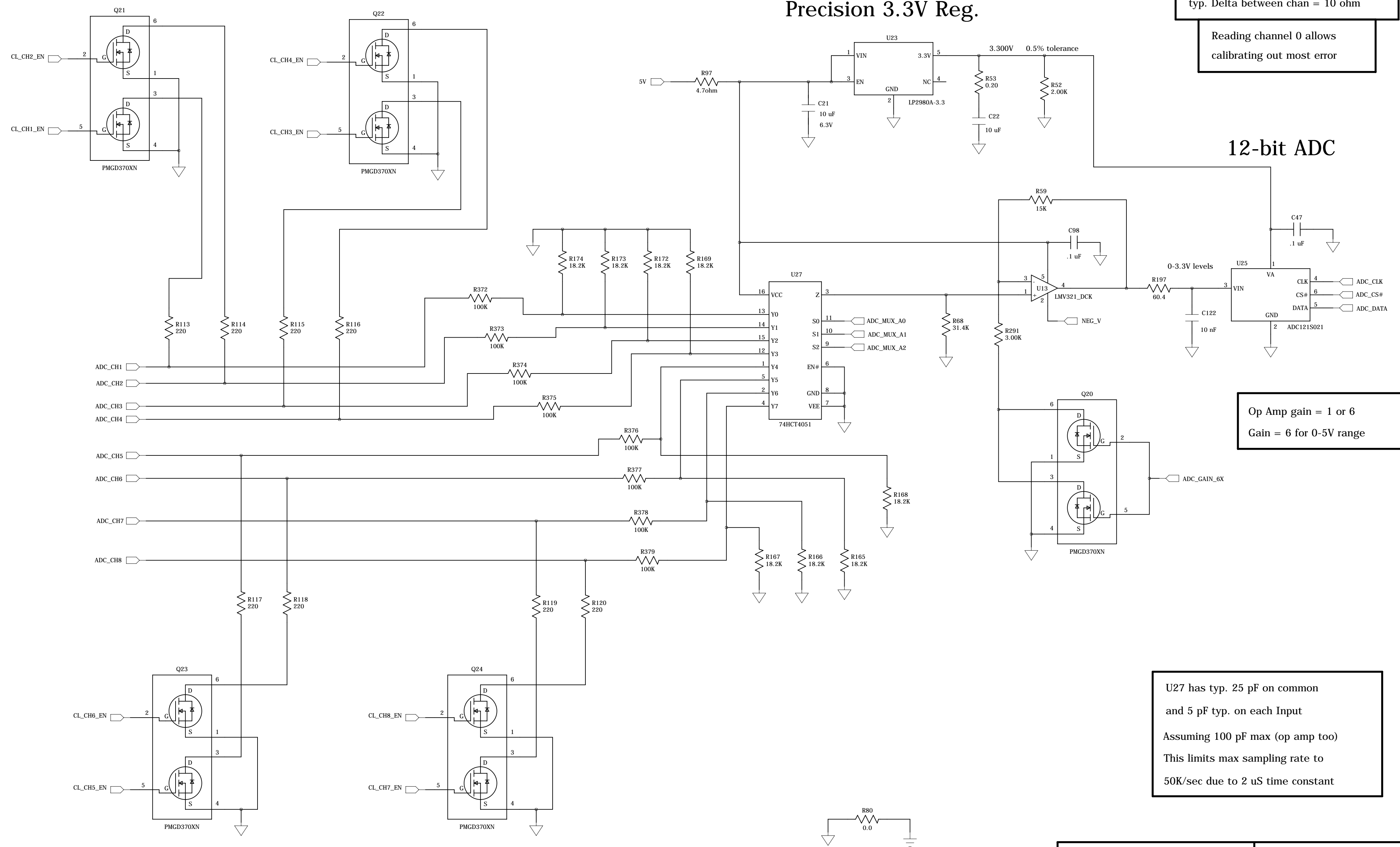
ADC notes
 Input Imedance = 70 Kohm
 TVS adds 1000-3000 pF
 typ. MUX ON resistance = 120 ohm
 typ. Delta between chan = 10 ohm
 Reading channel 0 allows
 calibrating out most error

Precision 3.3V Reg.

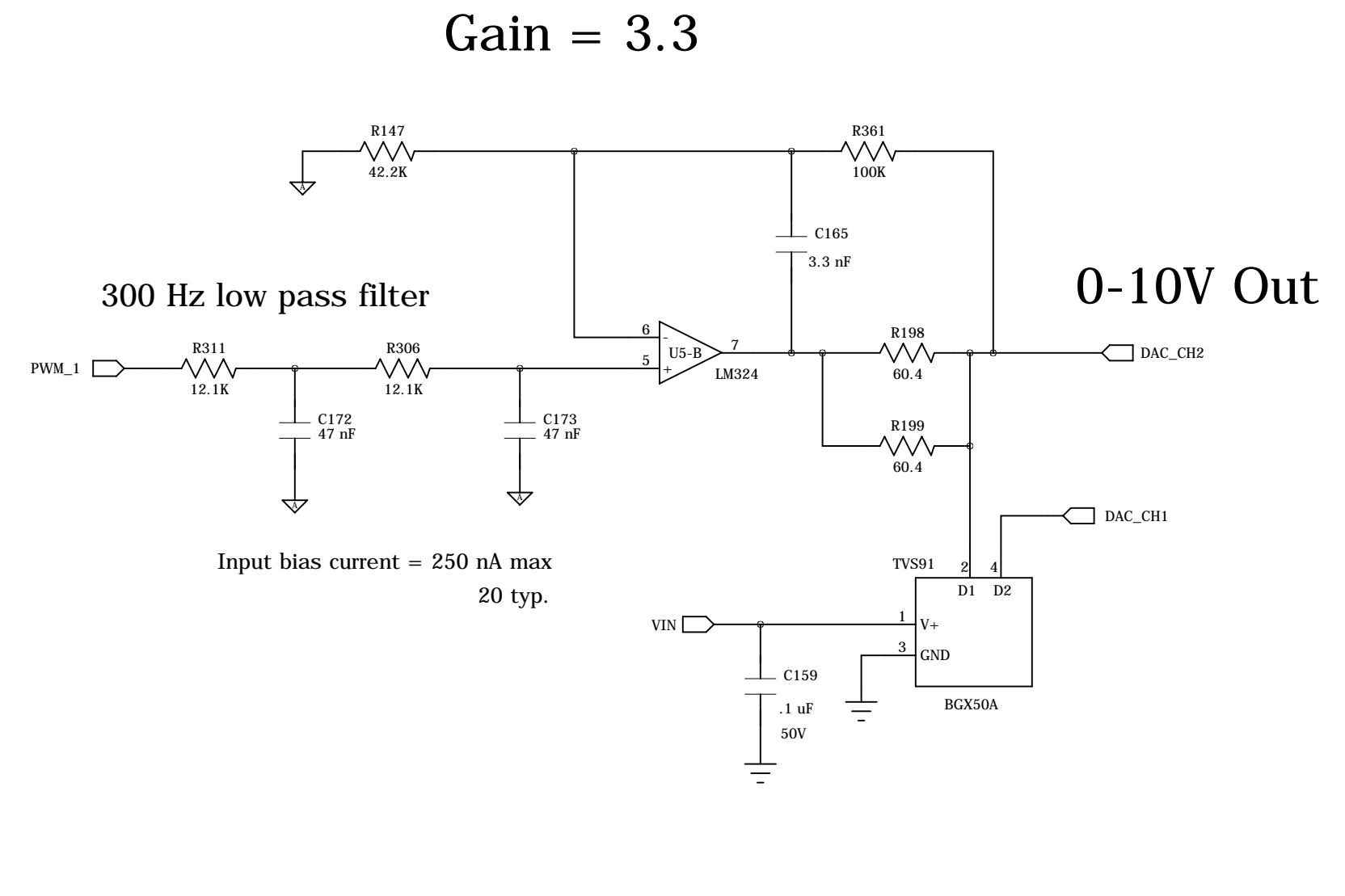
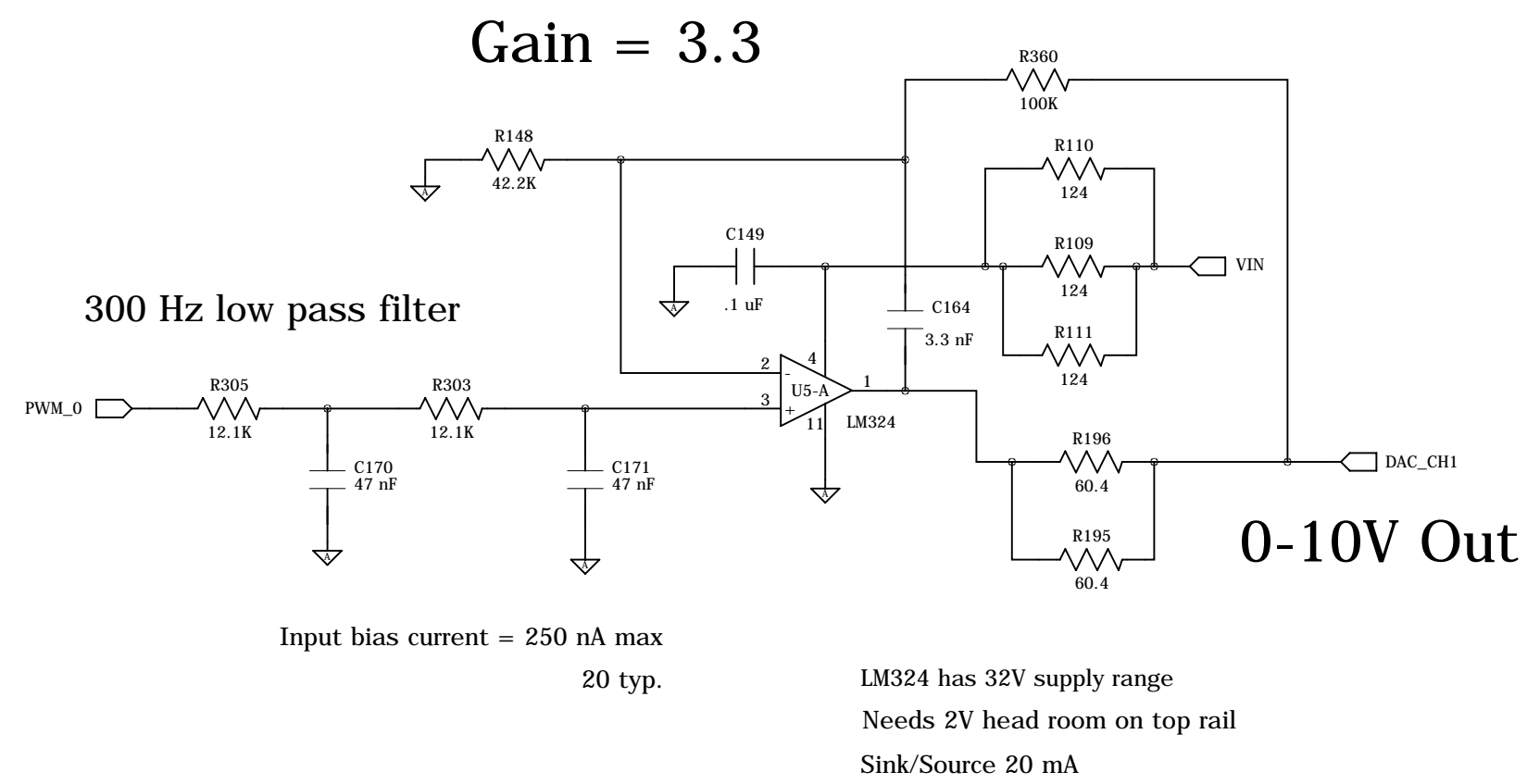
12-bit ADC

Op Amp gain = 1 or 6
 Gain = 6 for 0-5V range

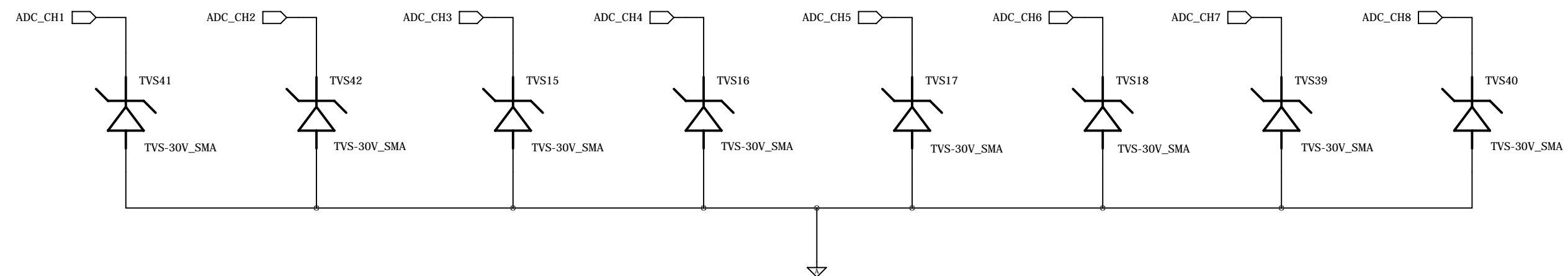
U27 has typ. 25 pF on common
 and 5 pF typ. on each Input
 Assuming 100 pF max (op amp too)
 This limits max sampling rate to
 50K/sec due to 2 uS time constant



10-bit DAC Outputs



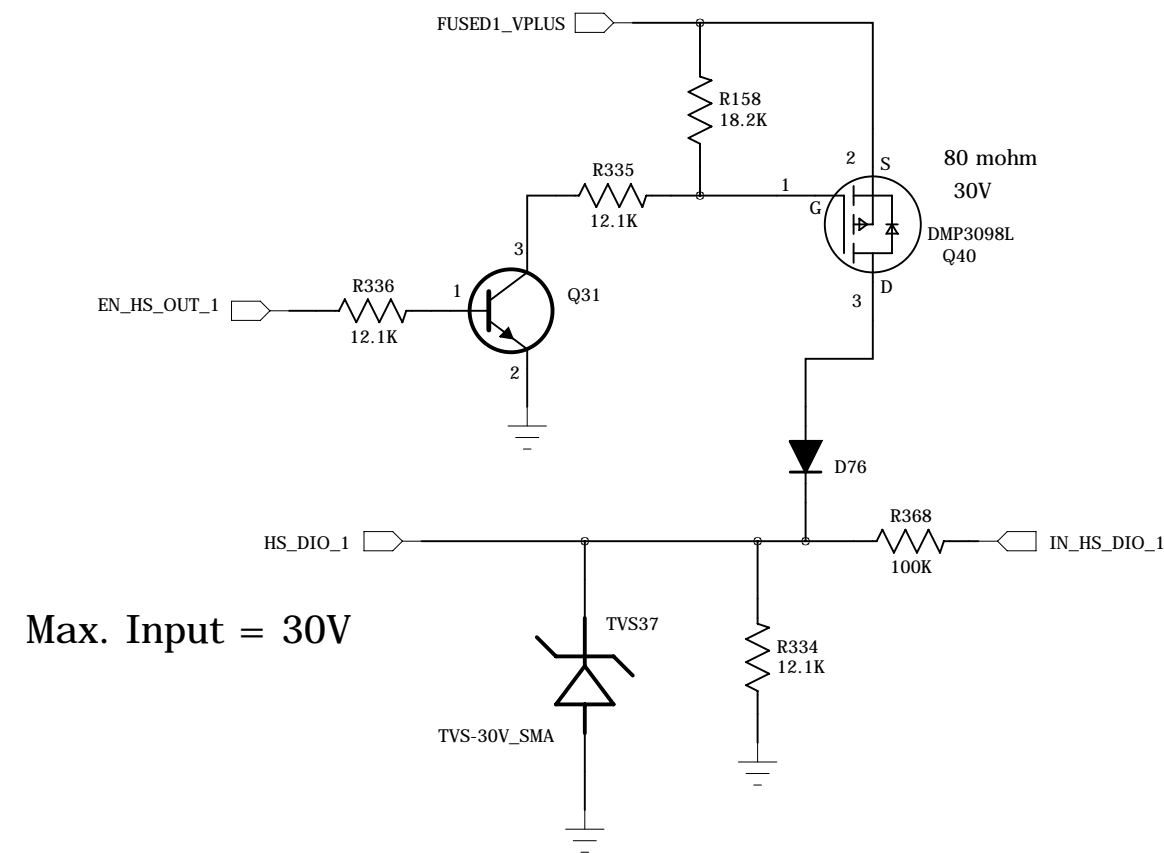
Analog IN TVS Protection



High Side Switches

High-Side Switch

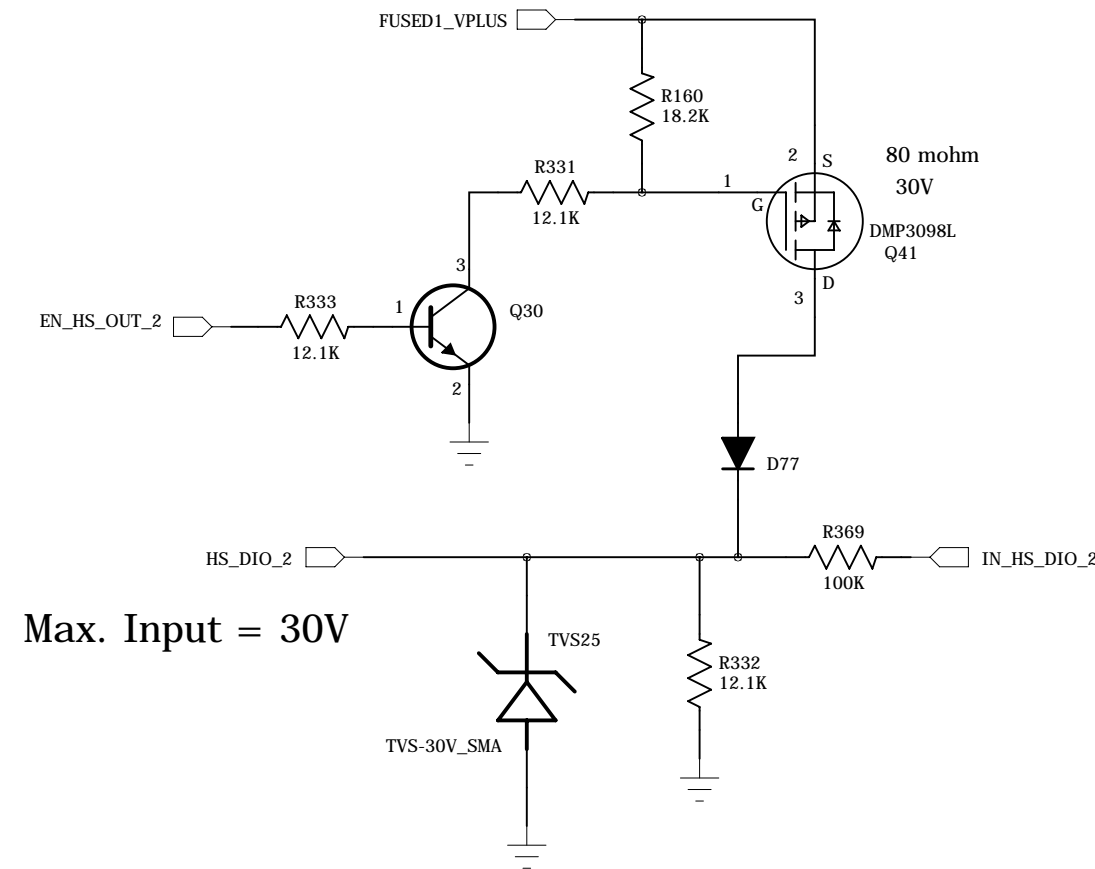
Source 500 mA



Max. Input = 30V

High-Side Switch

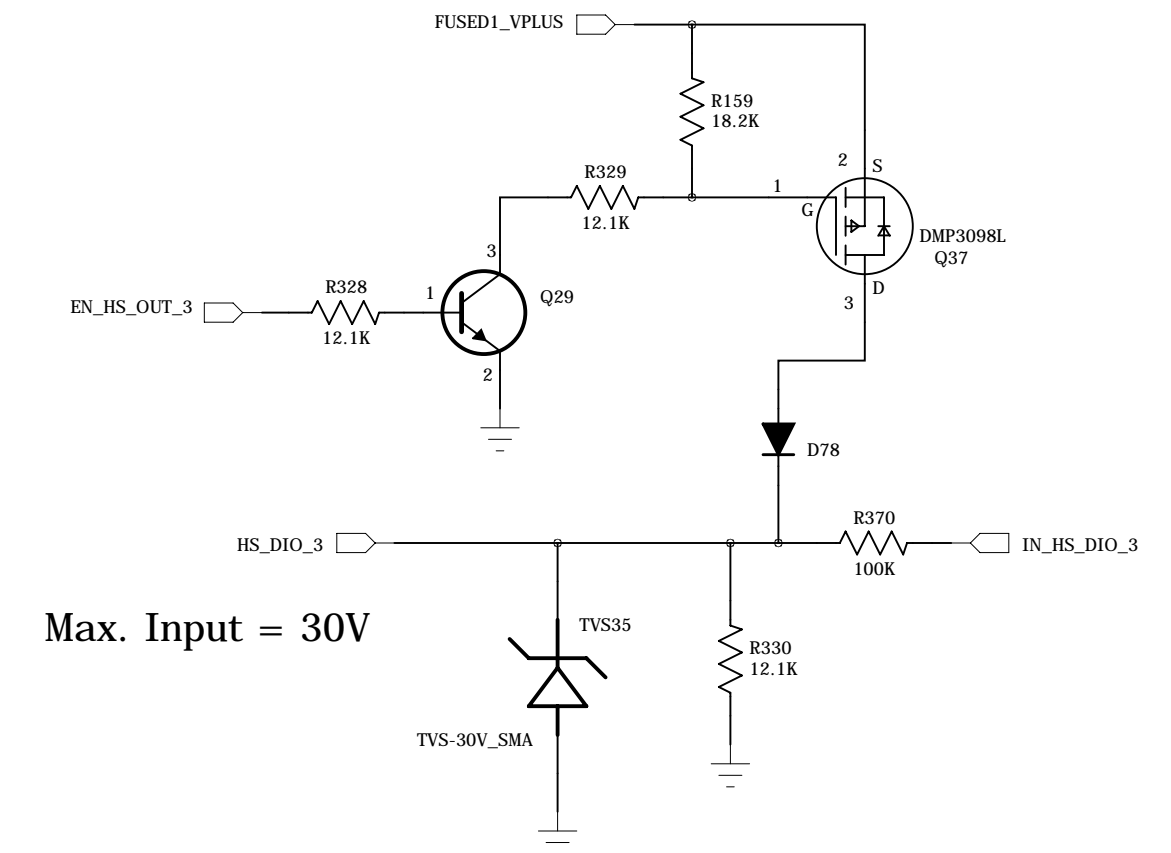
Source 500 mA



Max. Input = 30V

High-Side Switch

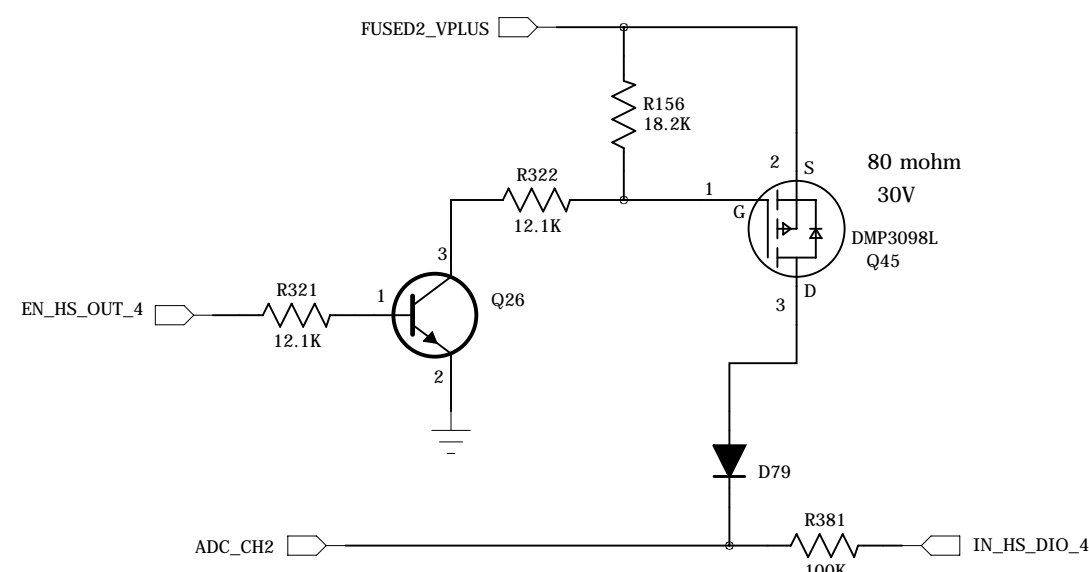
Source 500 mA



Max. Input = 30V

High-Side Switch

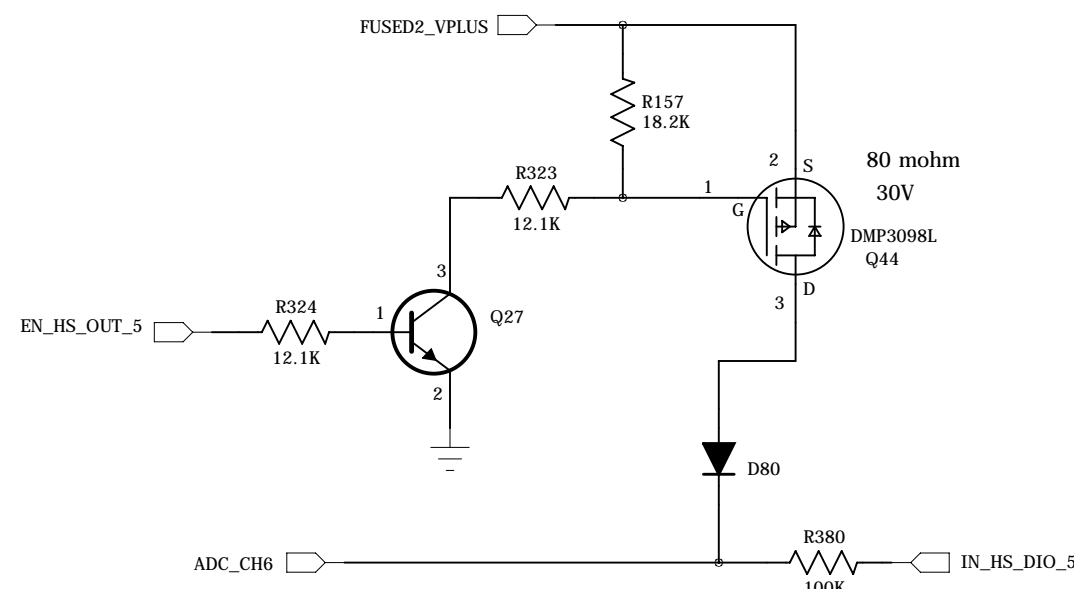
Source 500 mA



Max. Input = 30V

High-Side Switch

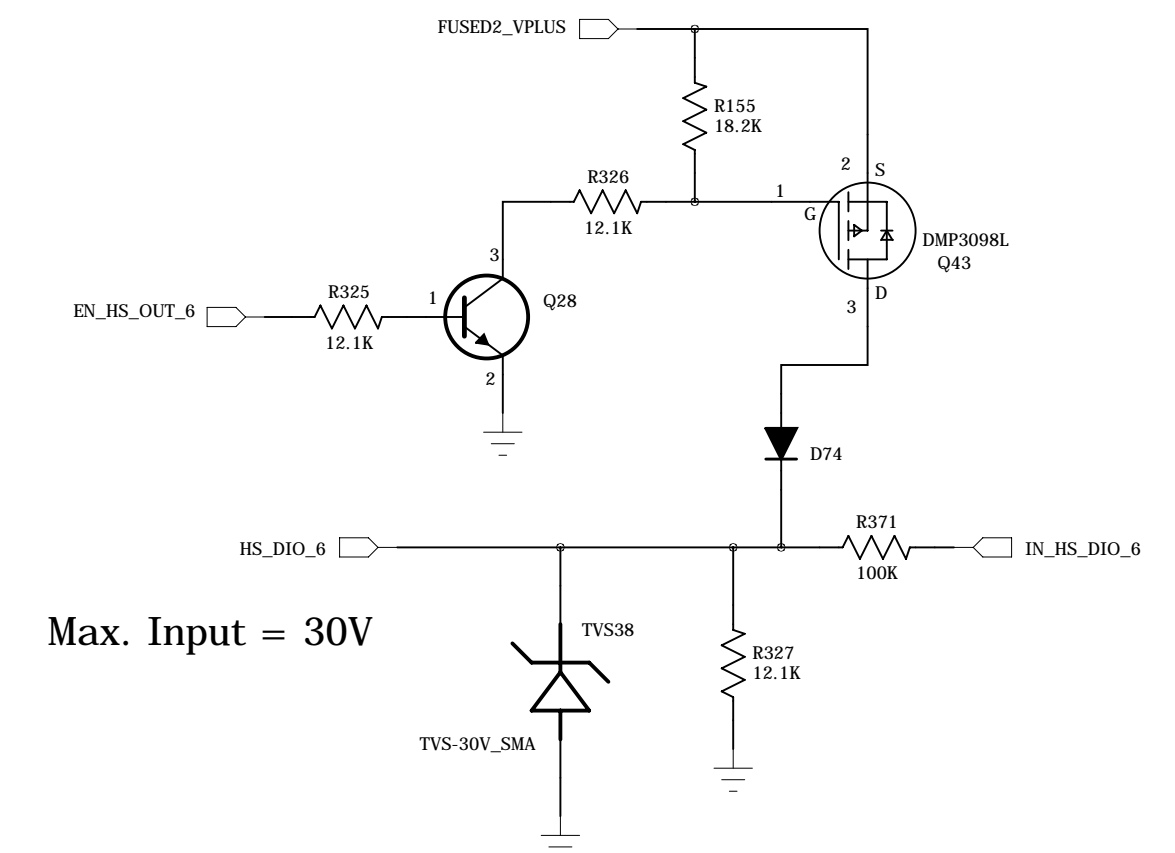
Source 500 mA



Max. Input = 30V

High-Side Switch

Source 500 mA



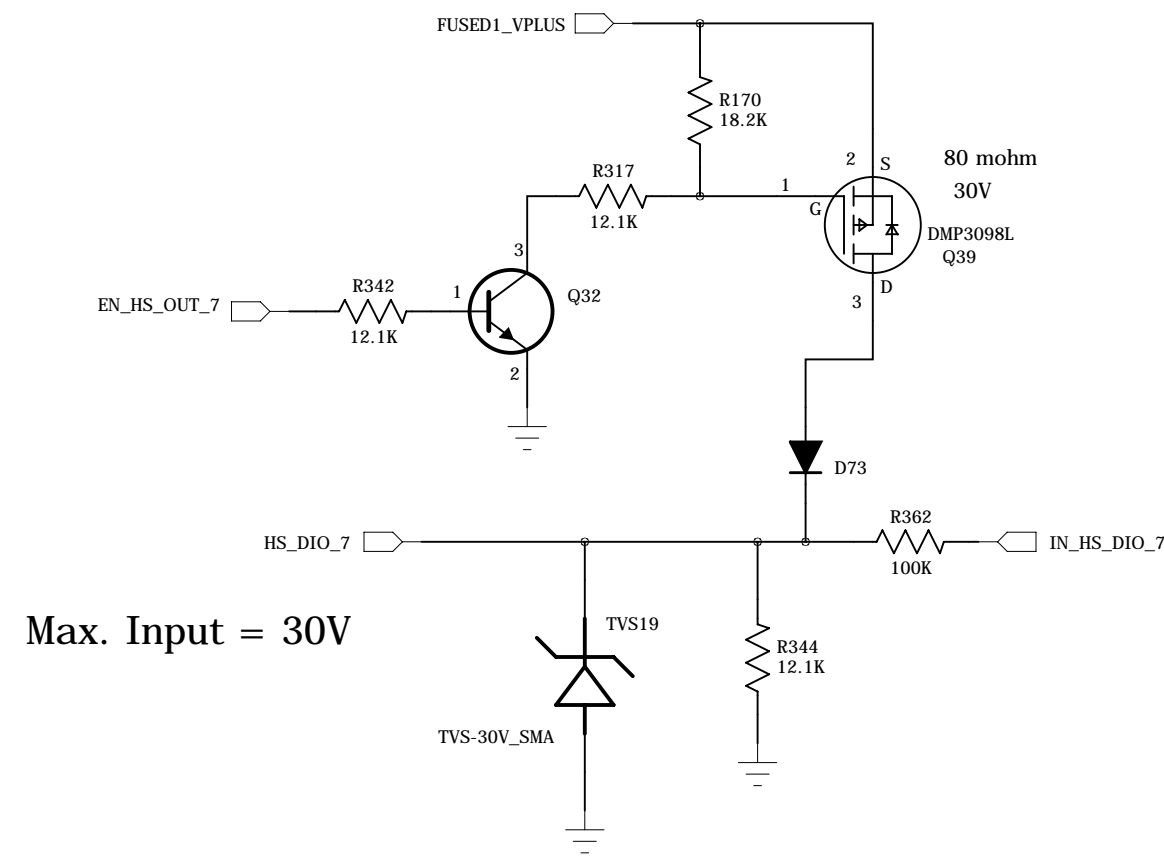
Max. Input = 30V

Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 High Side Switches	
Rev: B	Designer
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High Side Switches

High-Side Switch

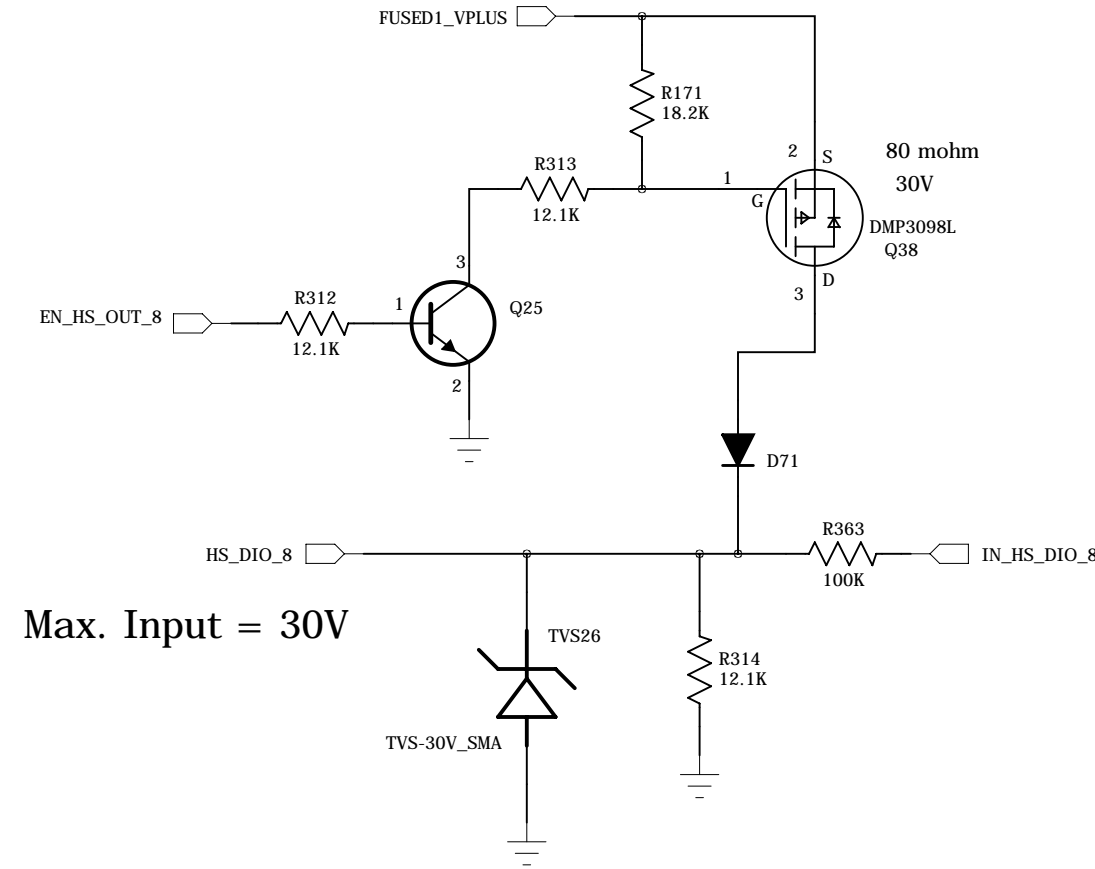
Source 500 mA



Max. Input = 30V

High-Side Switch

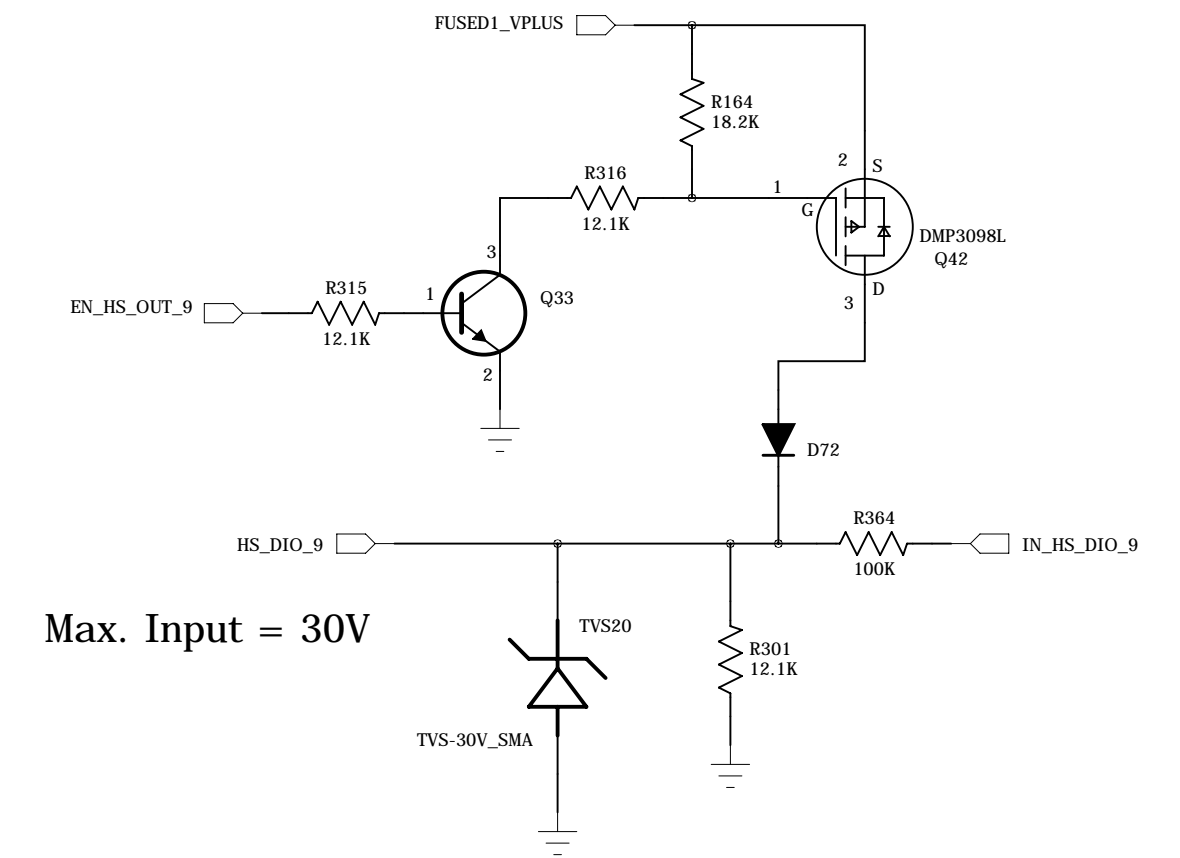
Source 500 mA



Max. Input = 30V

High-Side Switch

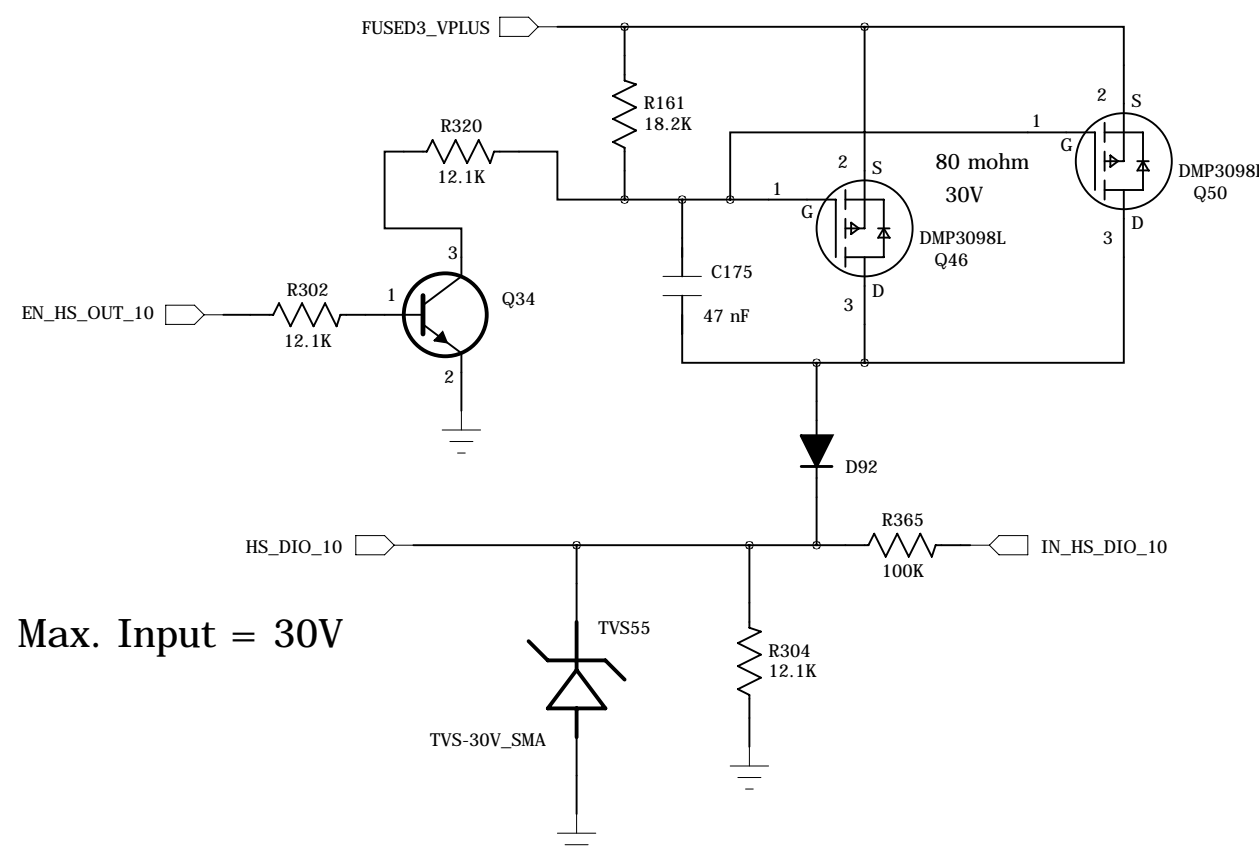
Source 500 mA



Max. Input = 30V

High-Side Switch

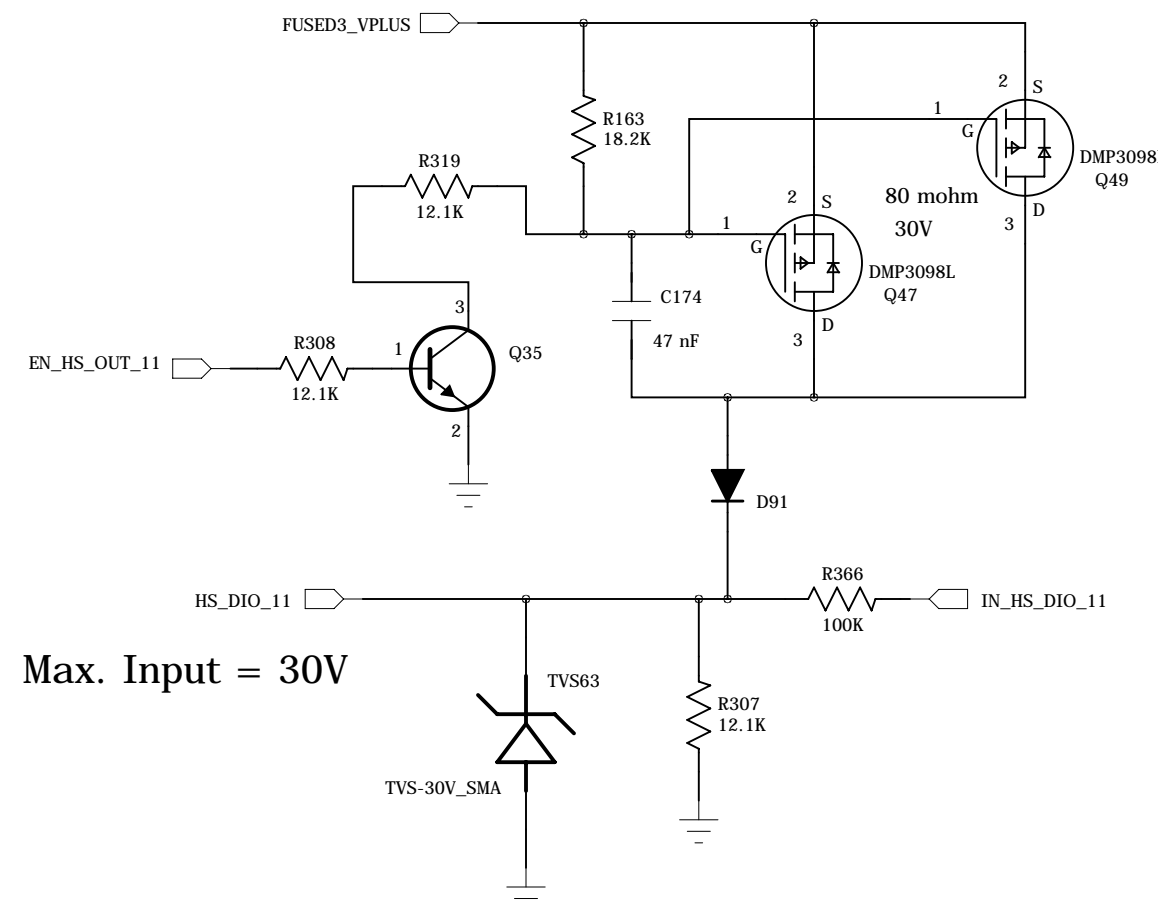
Source 1000 mA



Max. Input = 30V

High-Side Switch

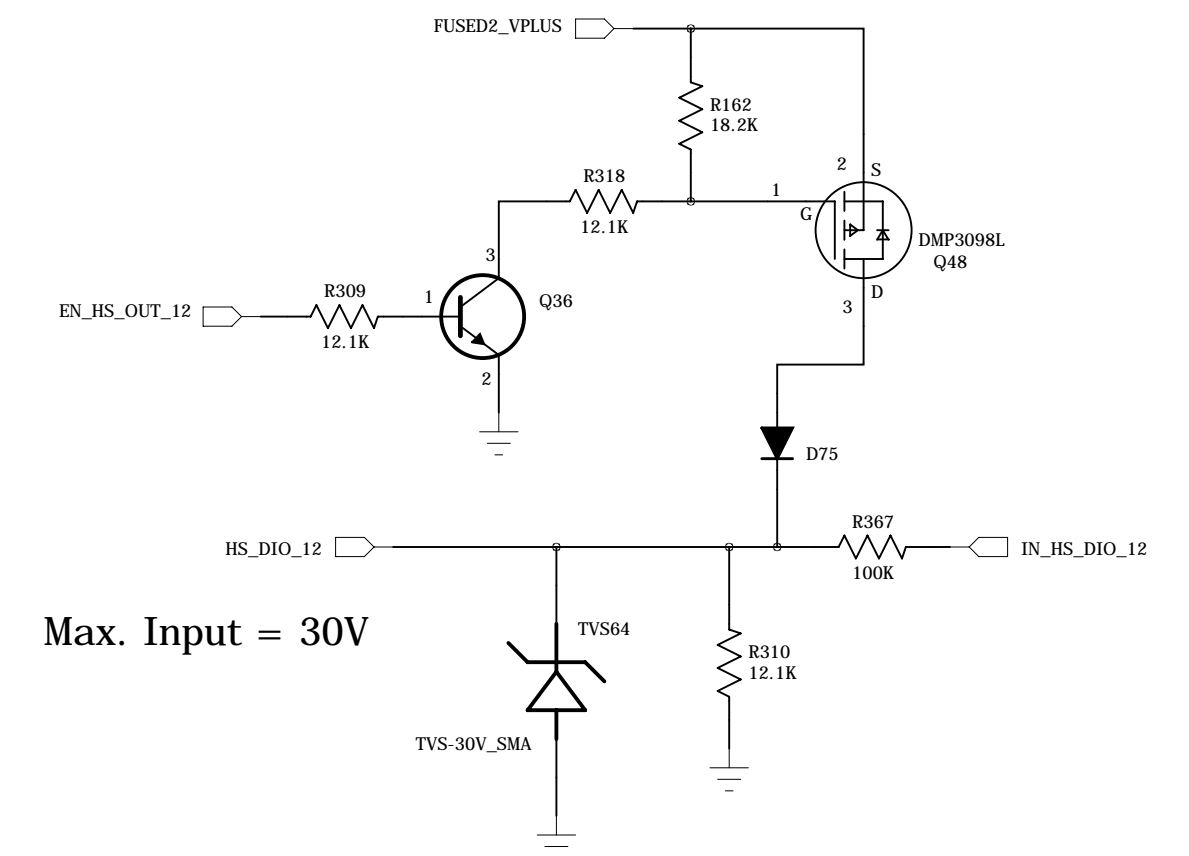
Source 1000 mA



Max. Input = 30V

High-Side Switch

Source 500 mA



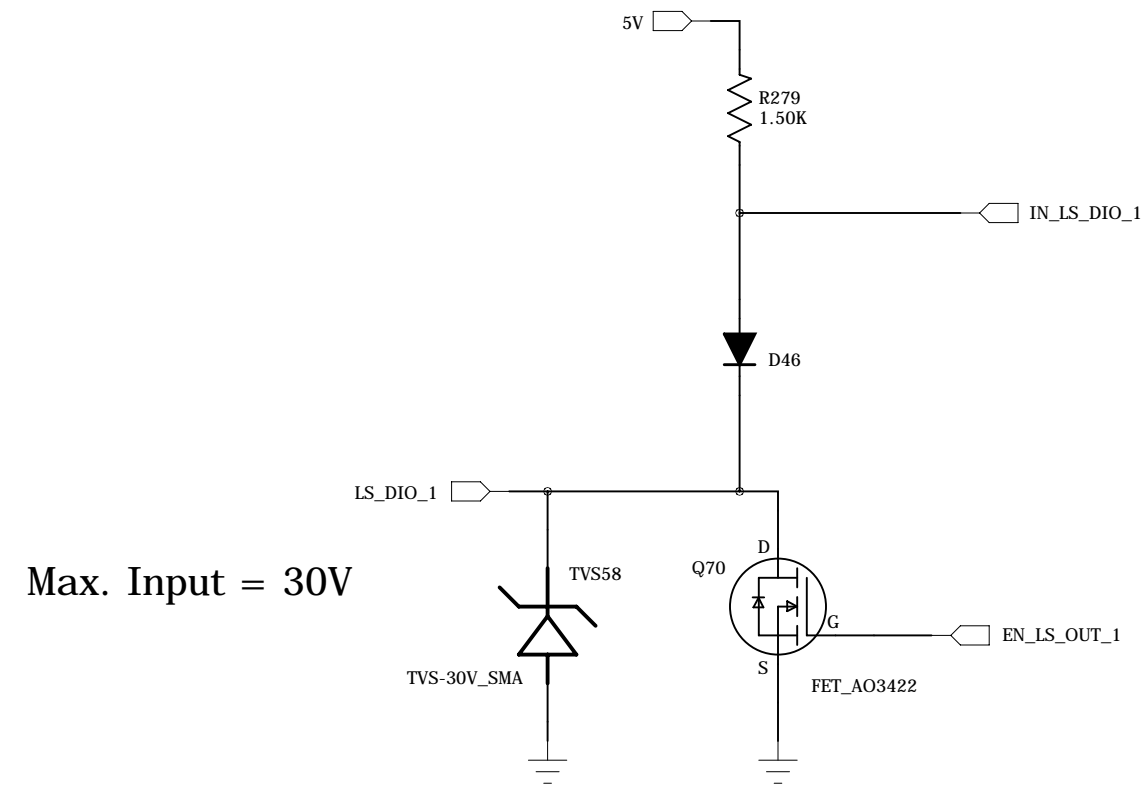
Max. Input = 30V

Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 High Side Switches	
Rev: B	Designer
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Low Side Switches

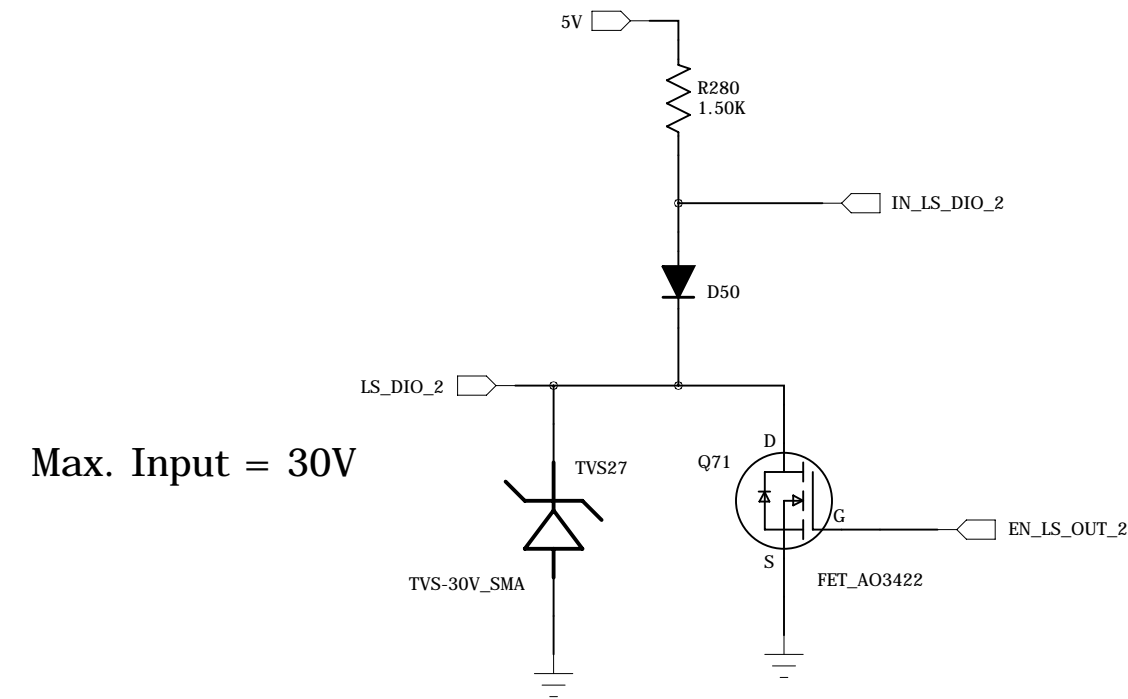
Low-Side Switch

Sinks 500 mA



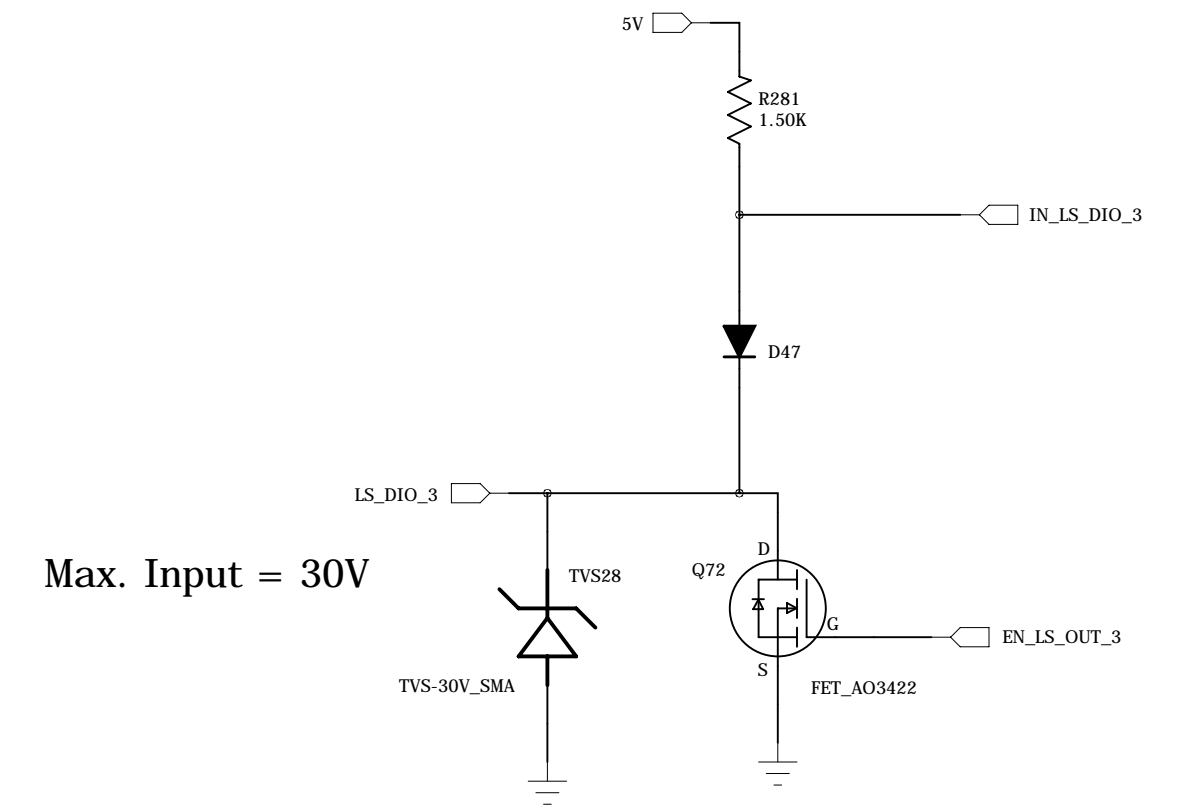
Low-Side Switch

Sinks 500 mA



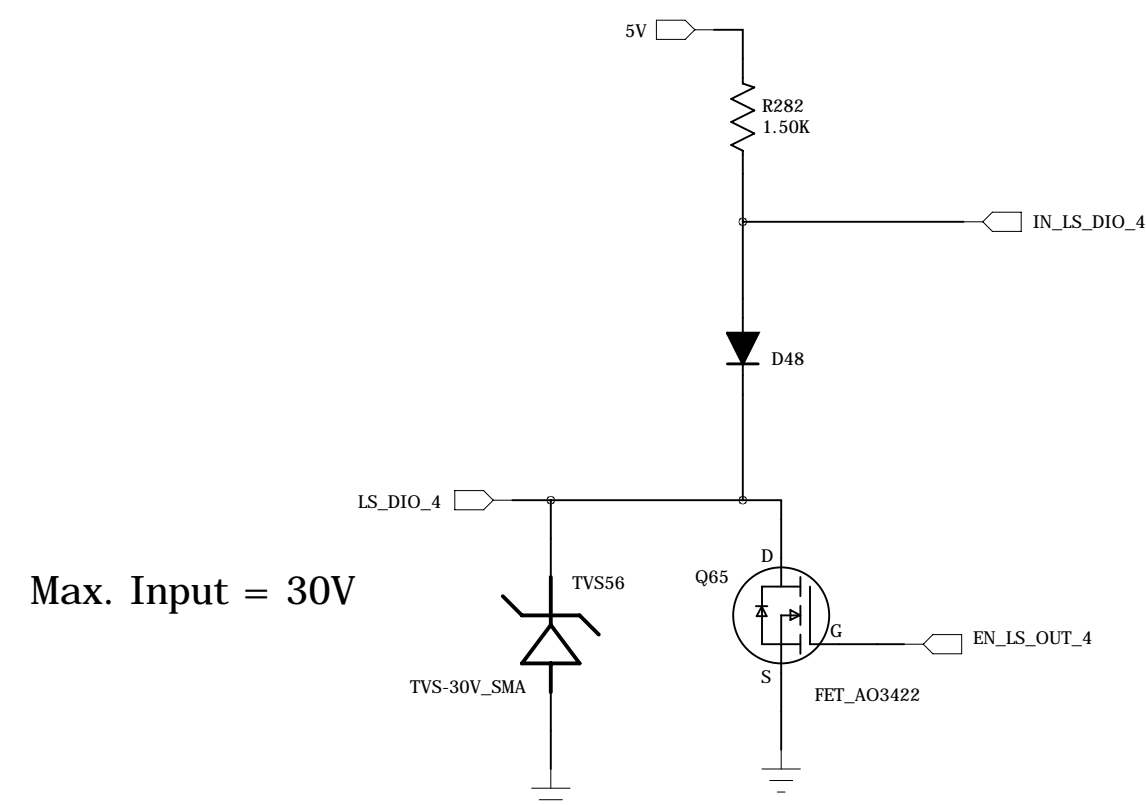
Low-Side Switch

Sinks 500 mA



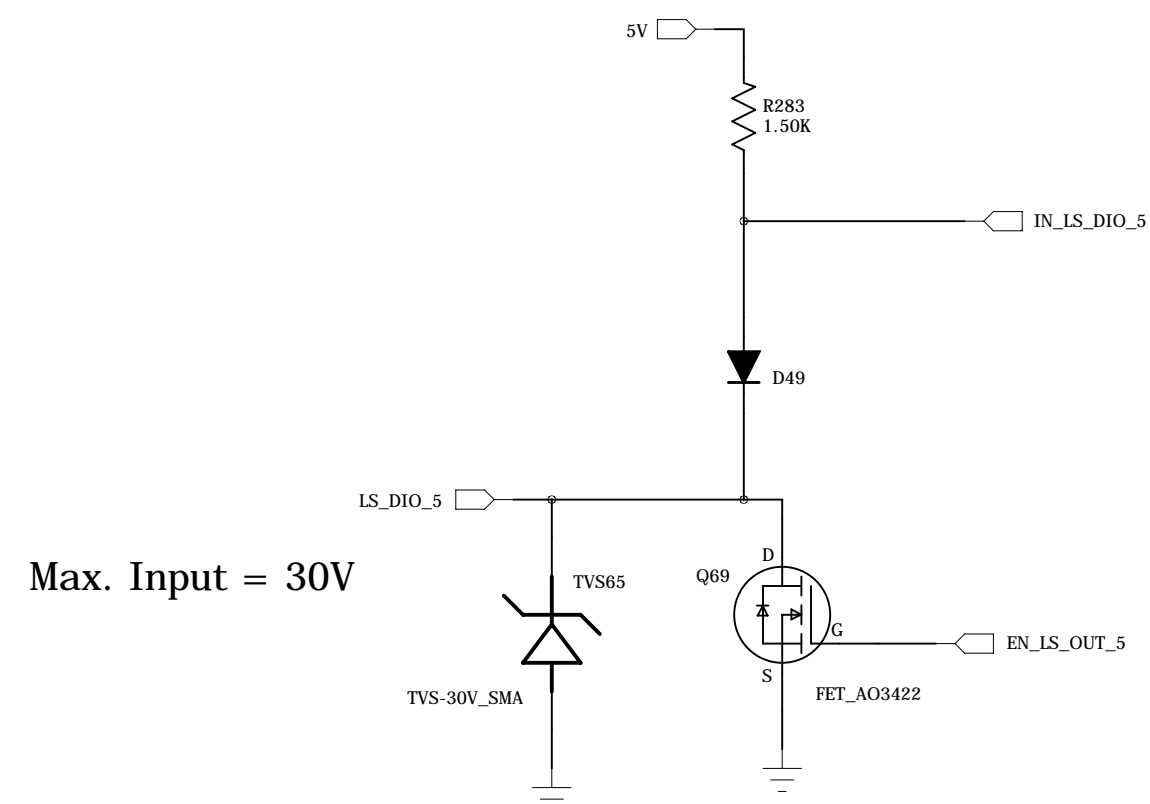
Low-Side Switch

Sinks 500 mA



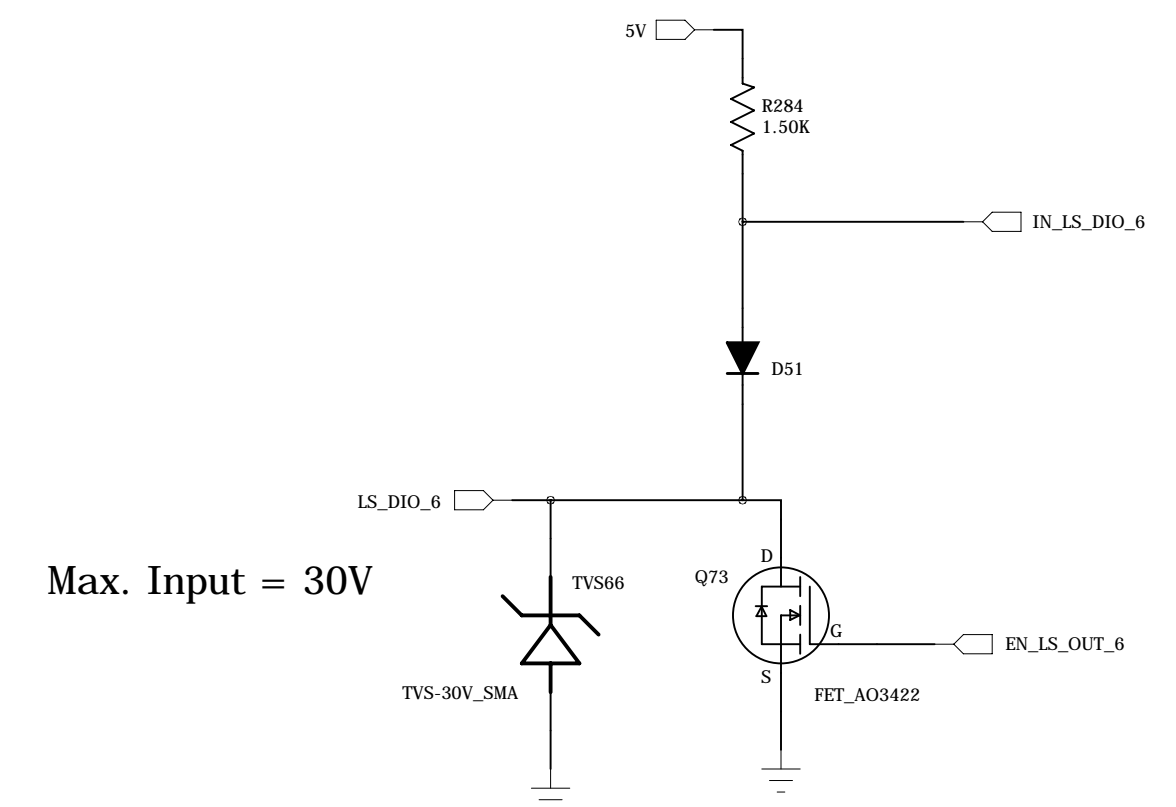
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

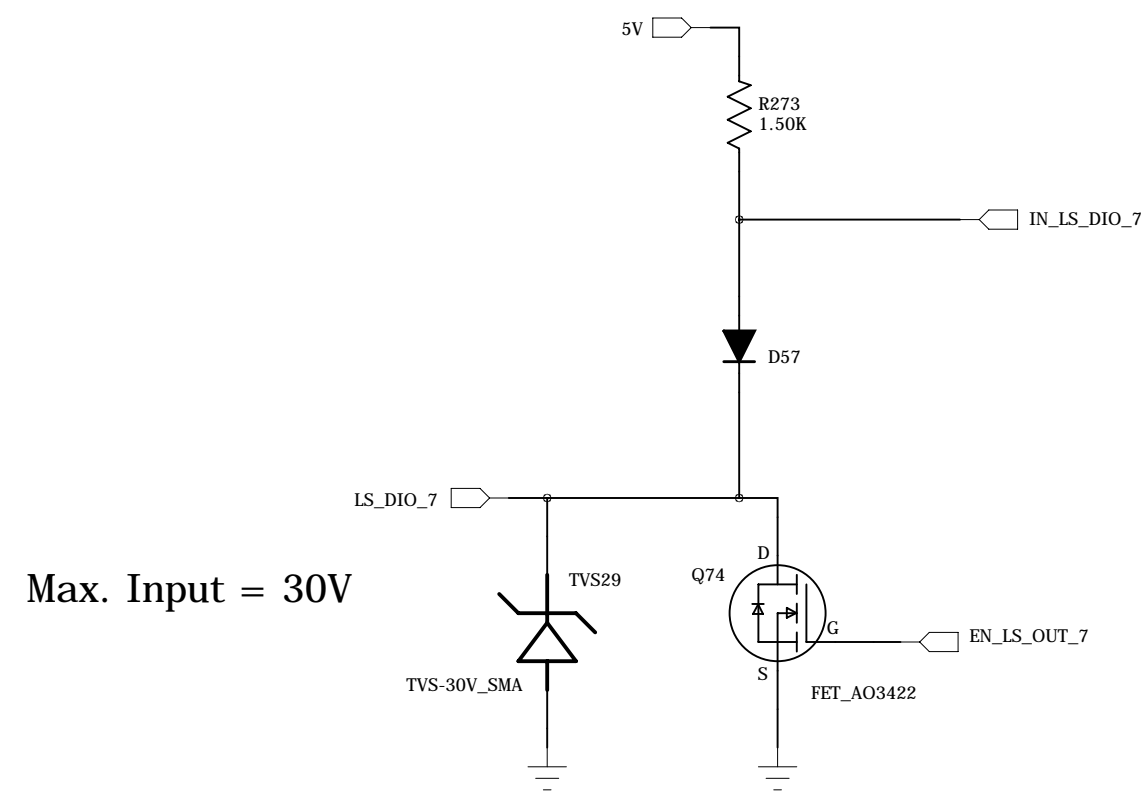


Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 Low Side Switches	
Rev: B	Designer
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Low Side Switches

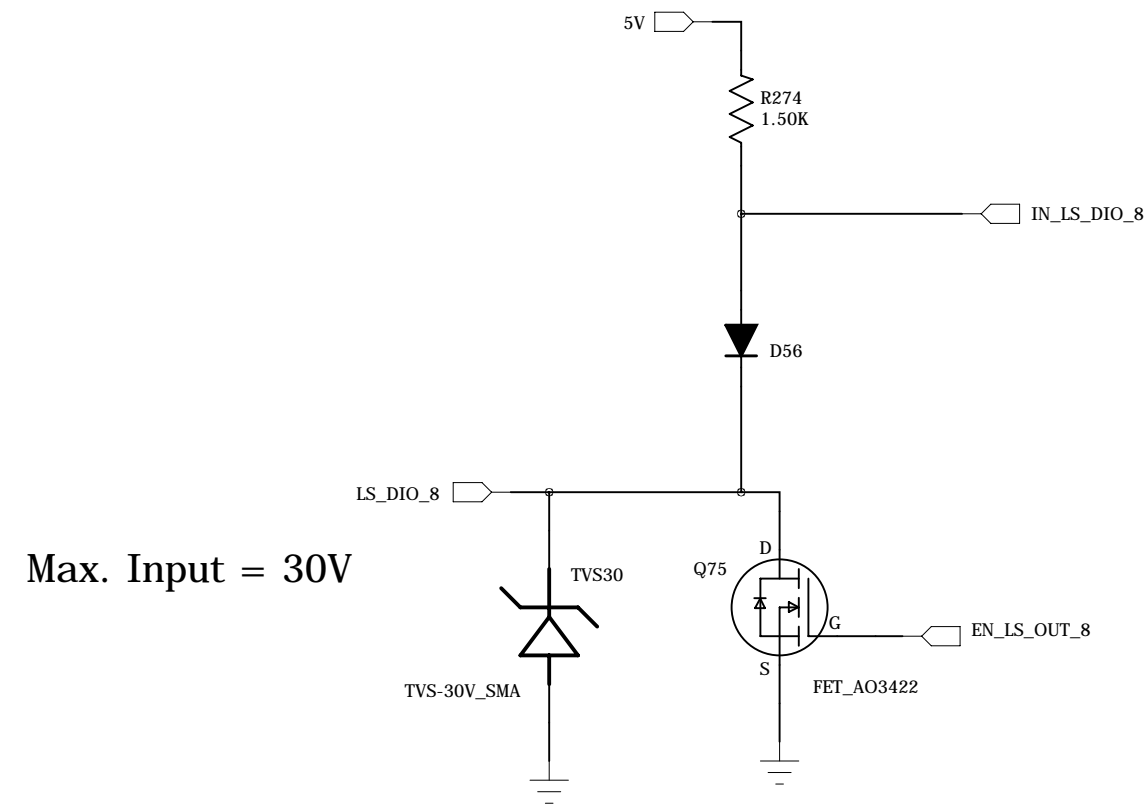
Low-Side Switch

Sinks 500 mA



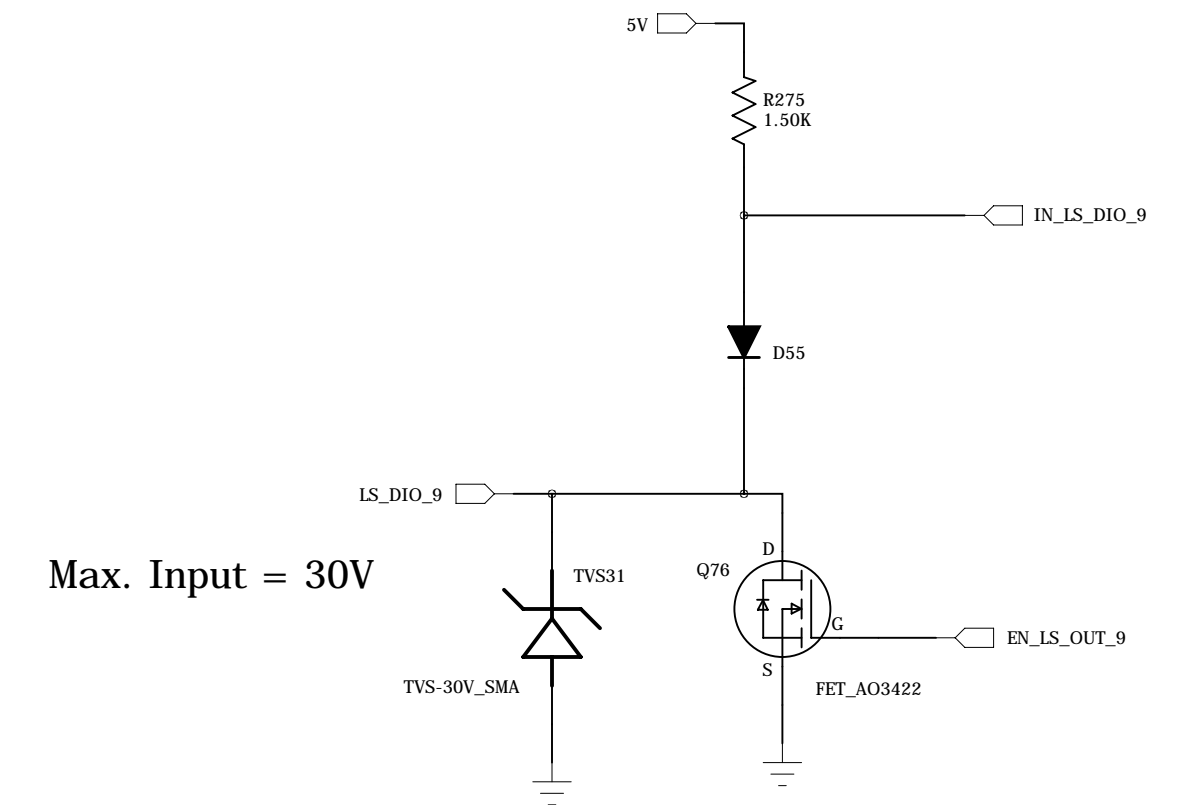
Low-Side Switch

Sinks 500 mA



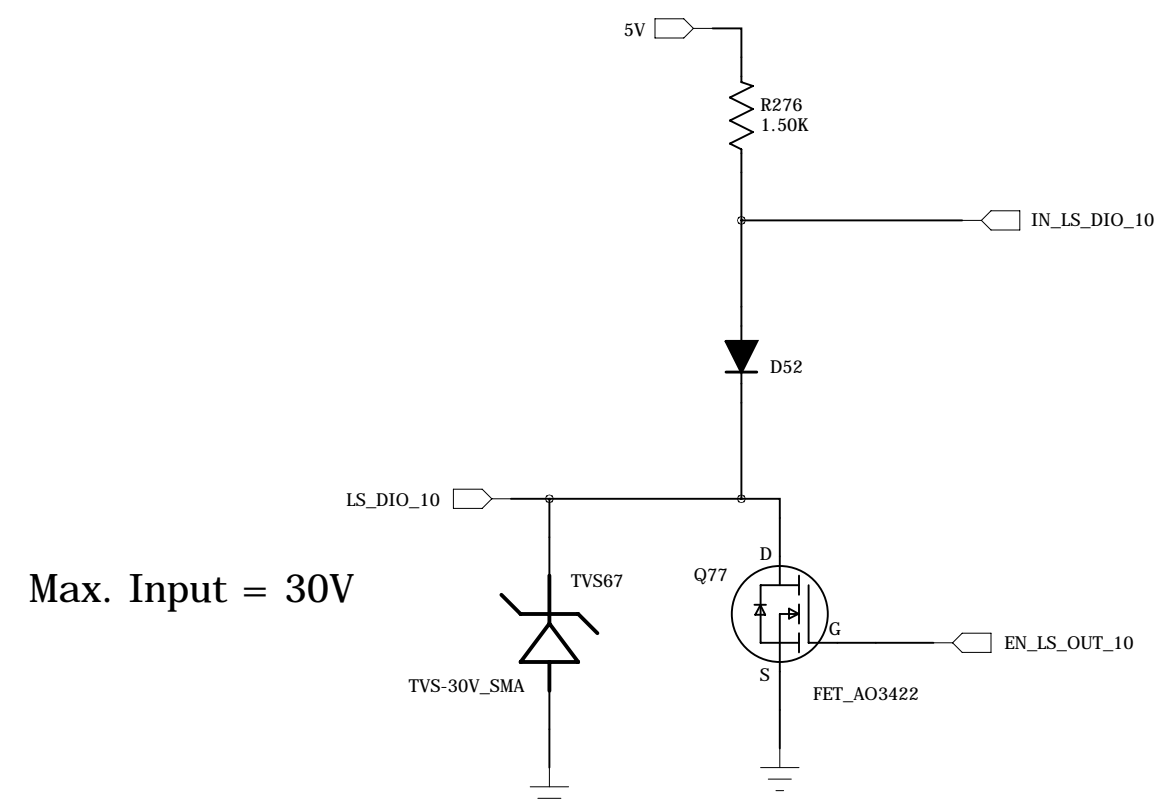
Low-Side Switch

Sinks 500 mA



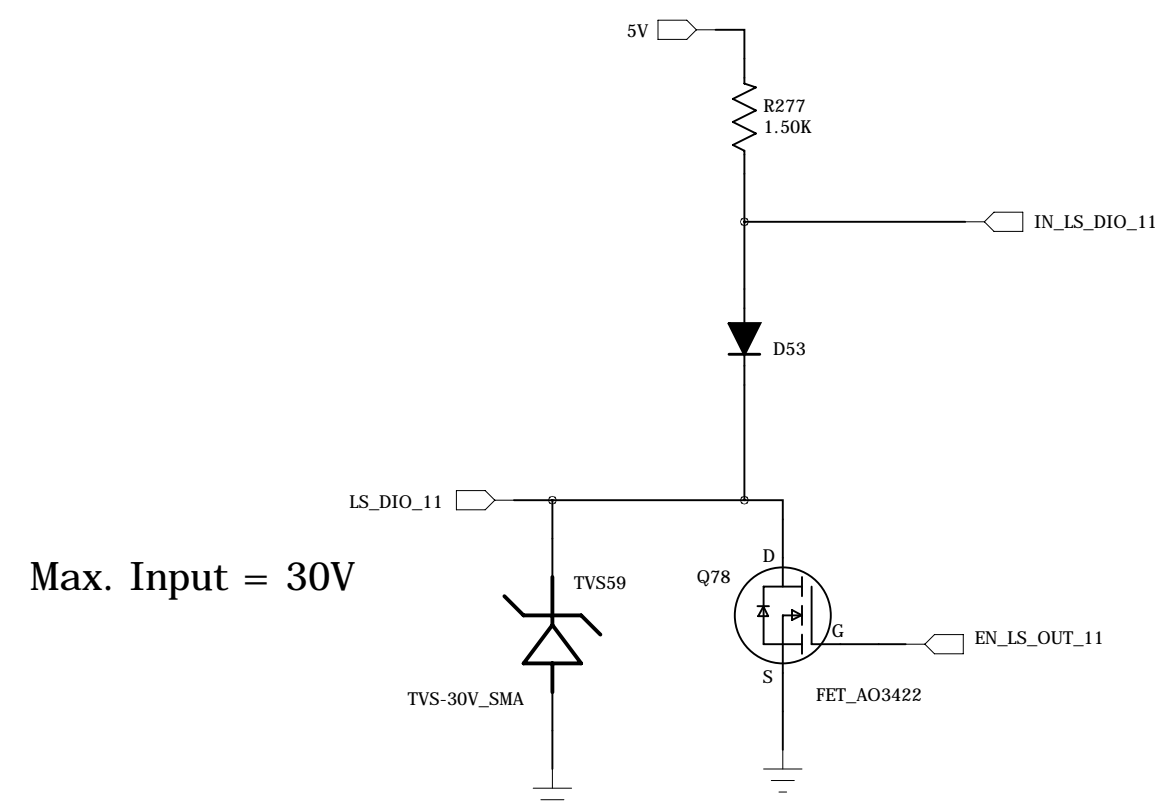
Low-Side Switch

Sinks 500 mA



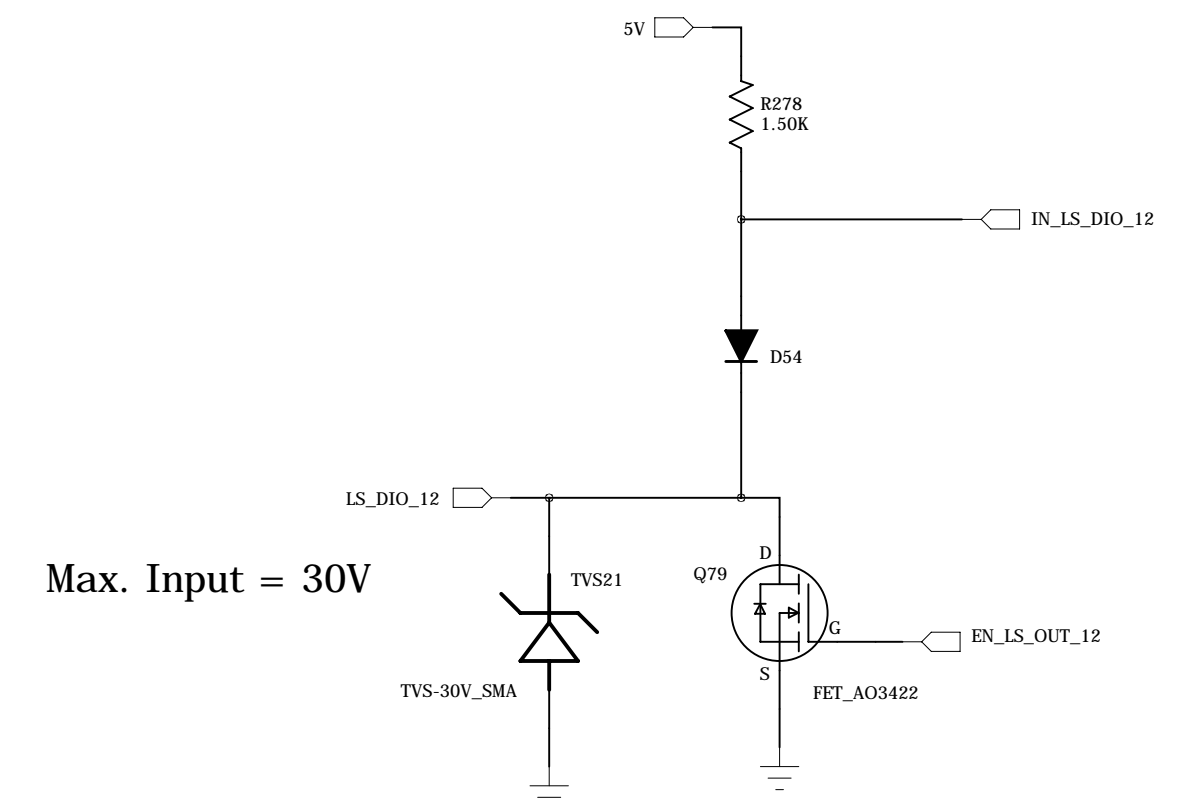
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

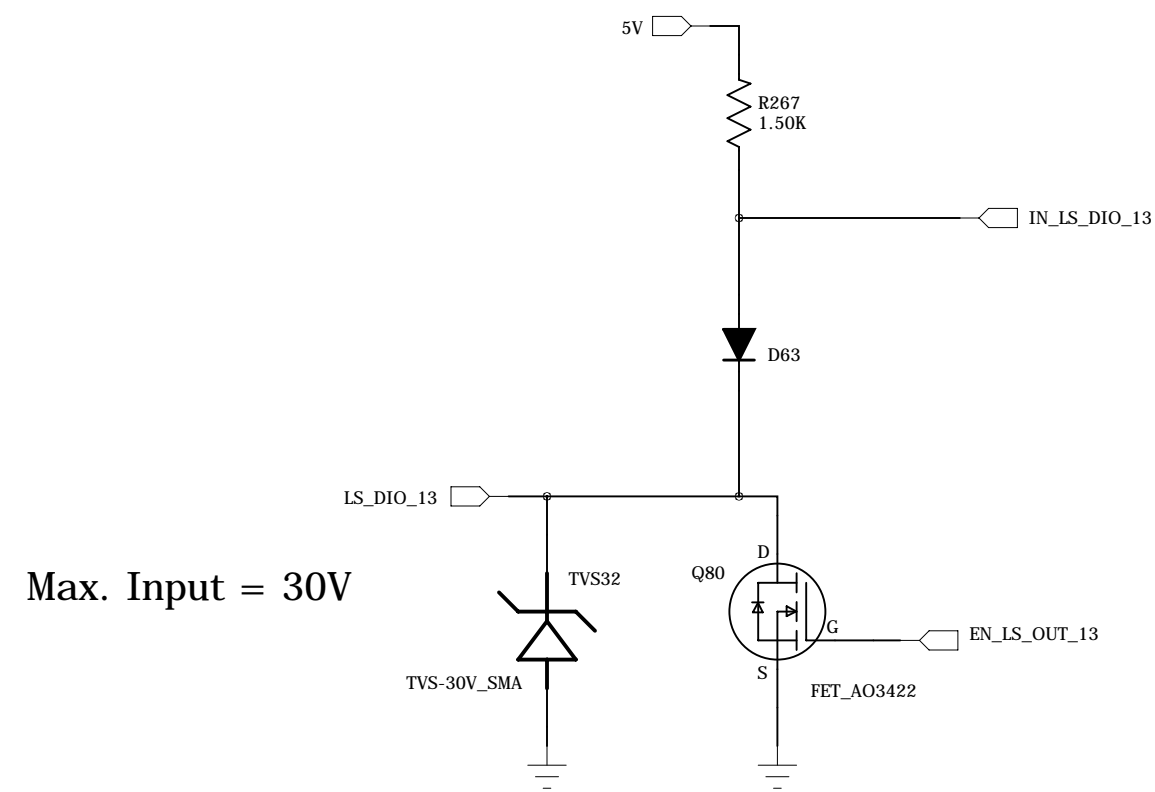


Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 Low Side Switches	
Rev: B	Designer
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Low Side Switches

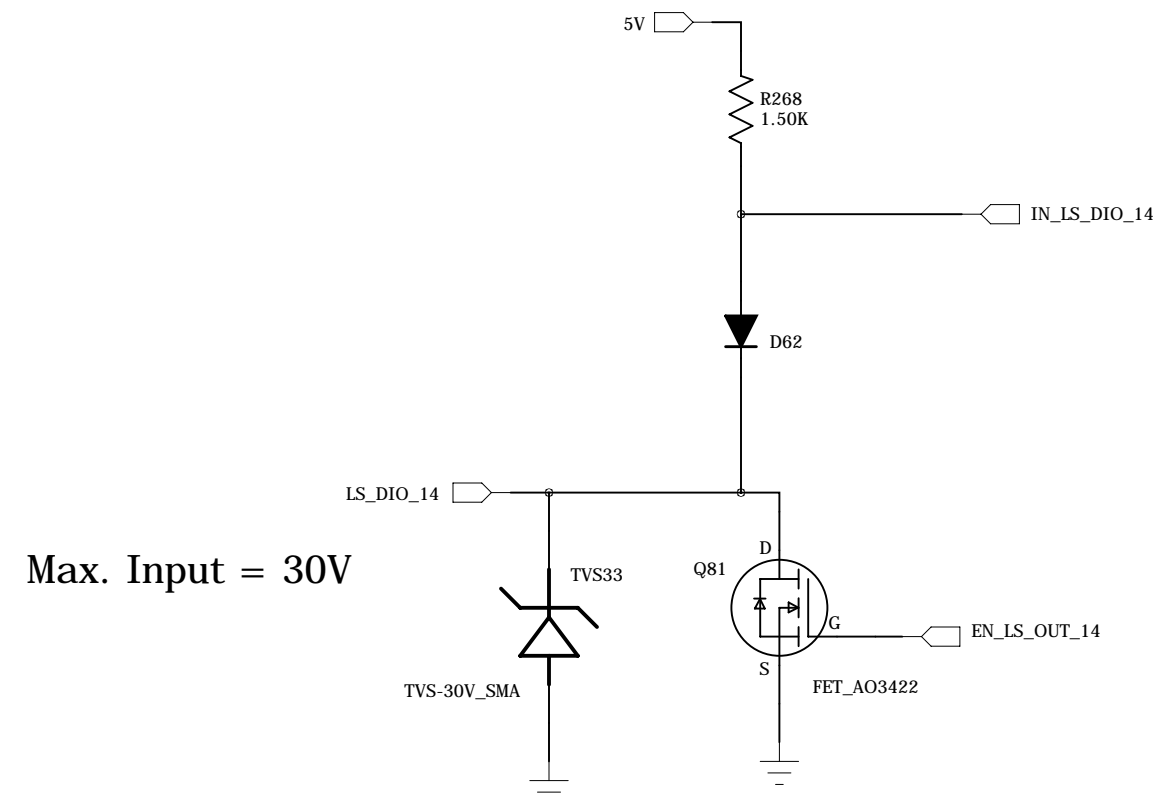
Low-Side Switch

Sinks 500 mA



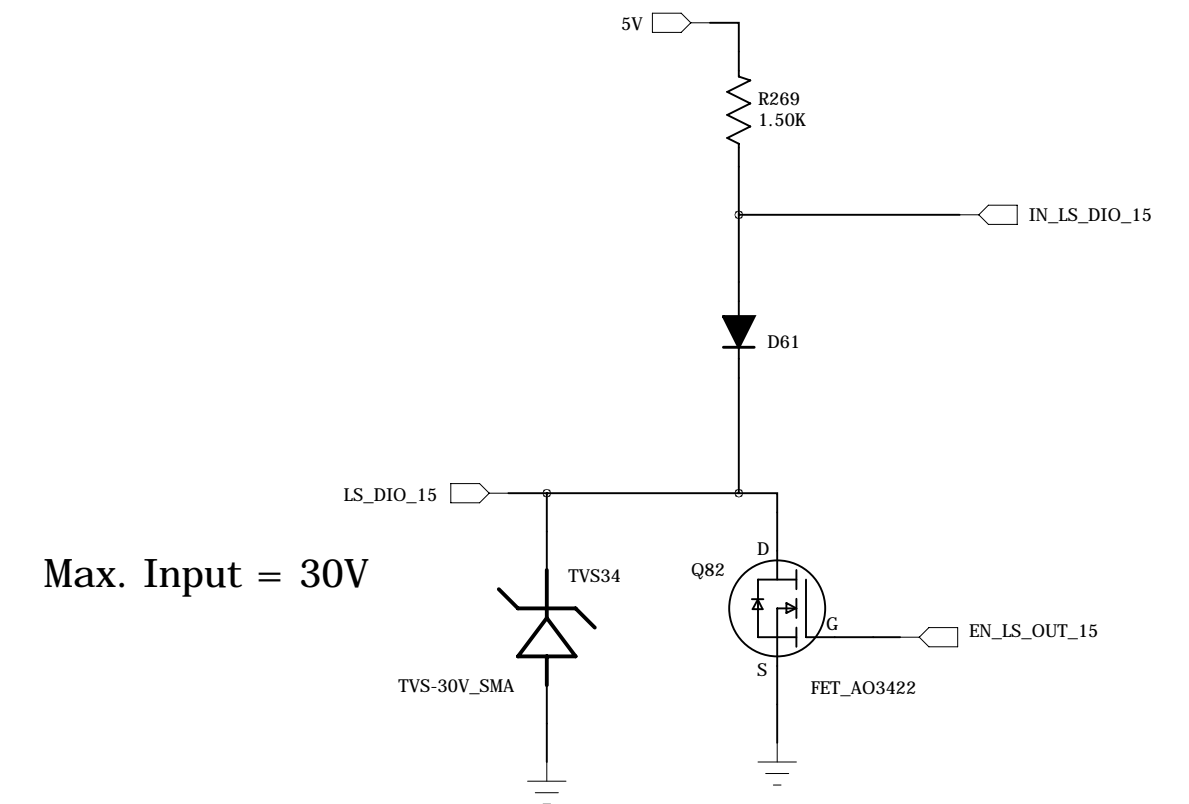
Low-Side Switch

Sinks 500 mA



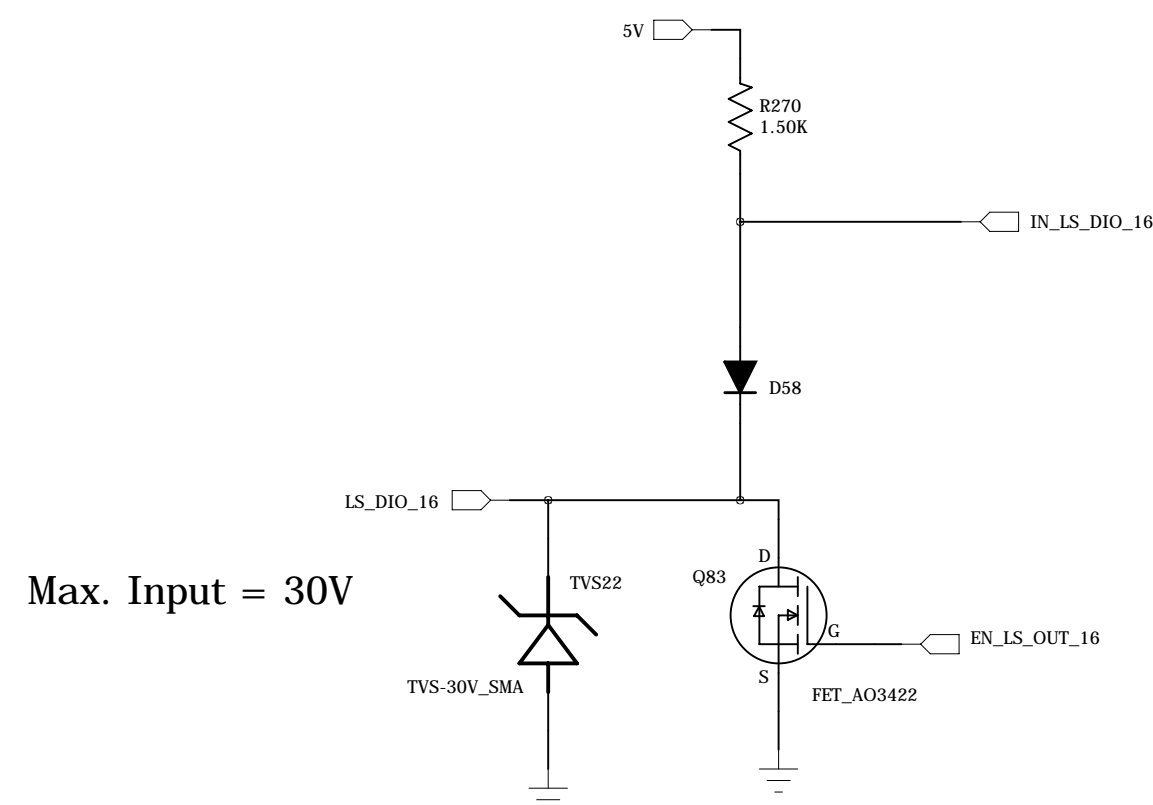
Low-Side Switch

Sinks 500 mA



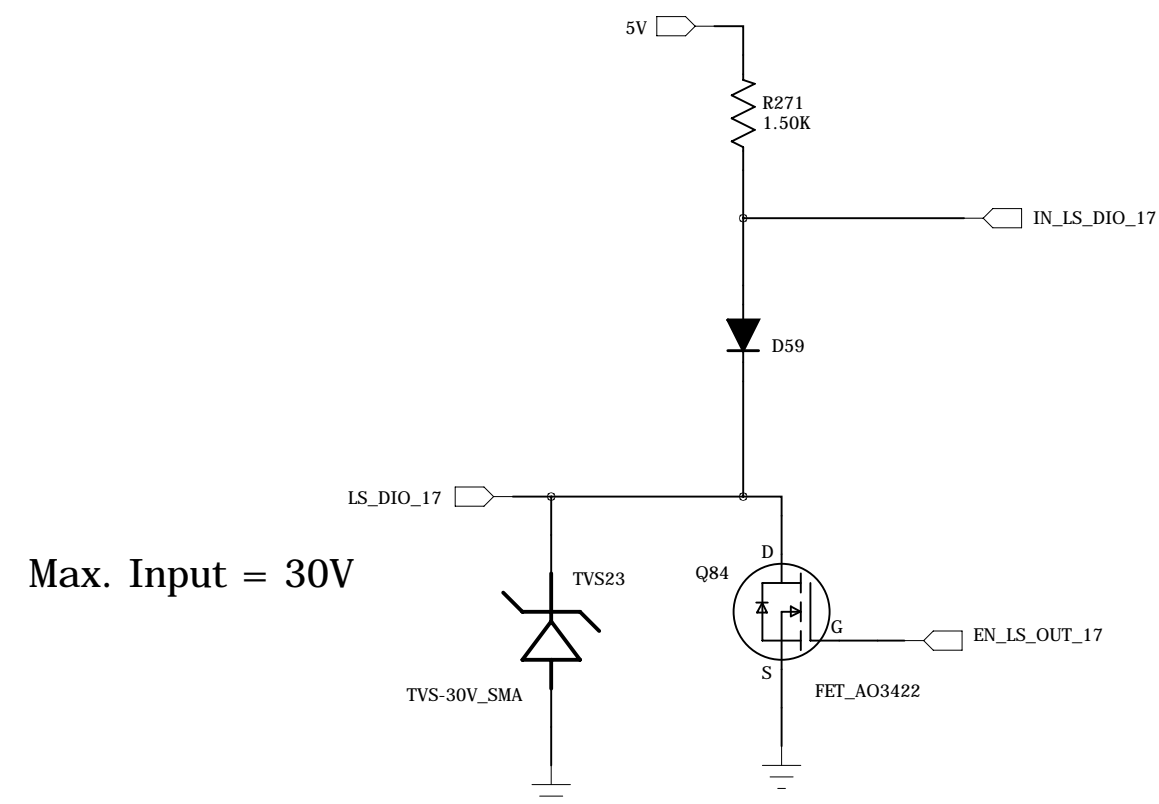
Low-Side Switch

Sinks 500 mA



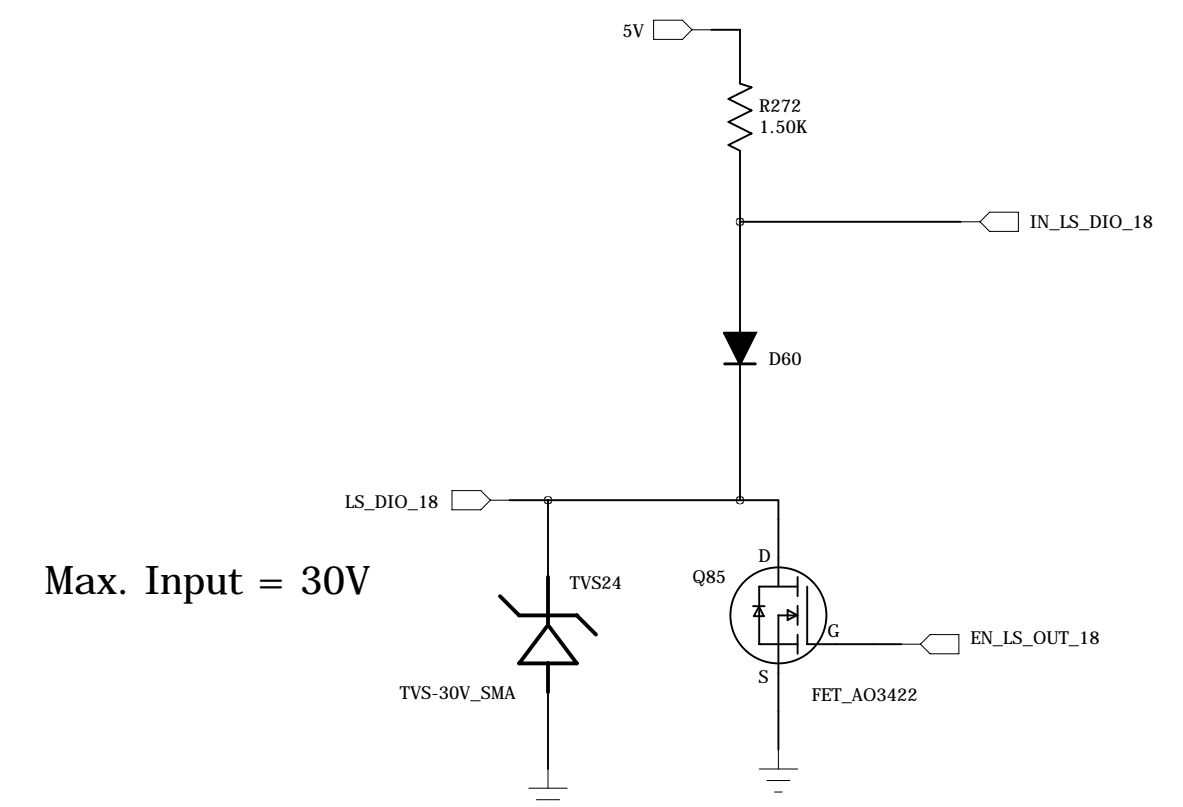
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

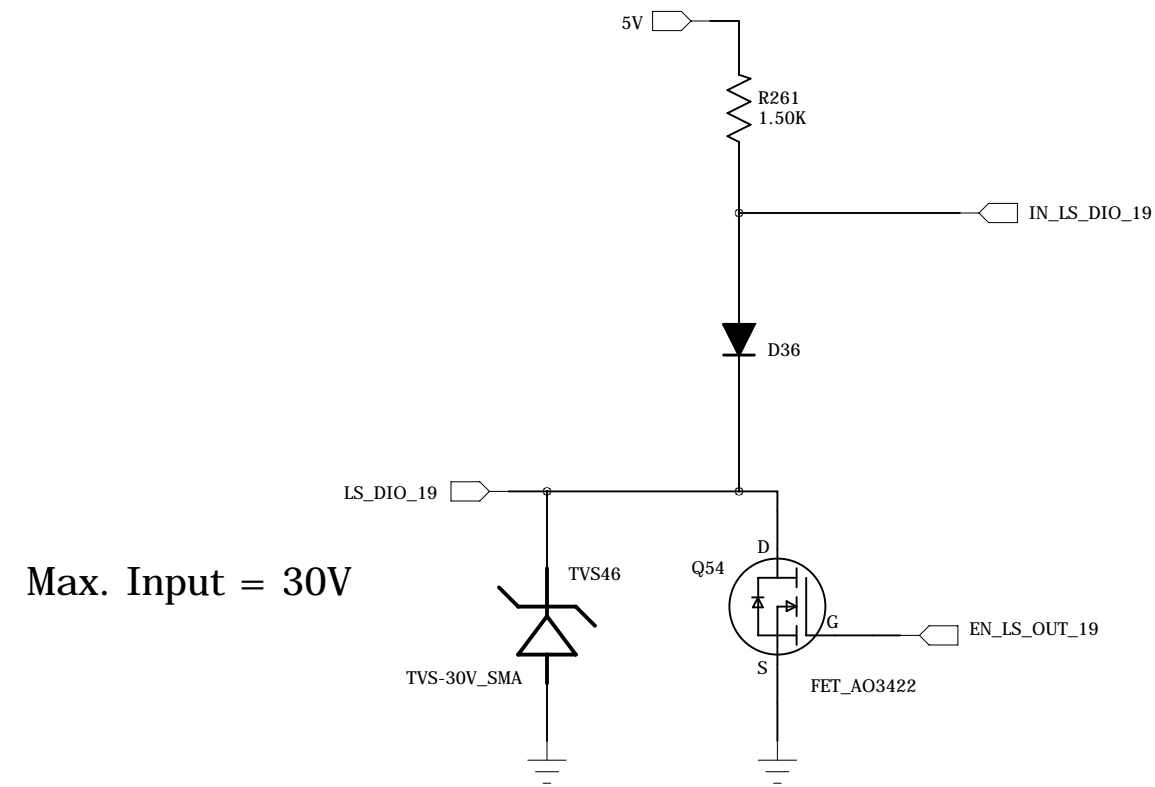


Technologic Systems	Date Feb. 12, 2012
Title: TS-7520 Low Side Switches	
Rev: B	Designer
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Low Side Switches

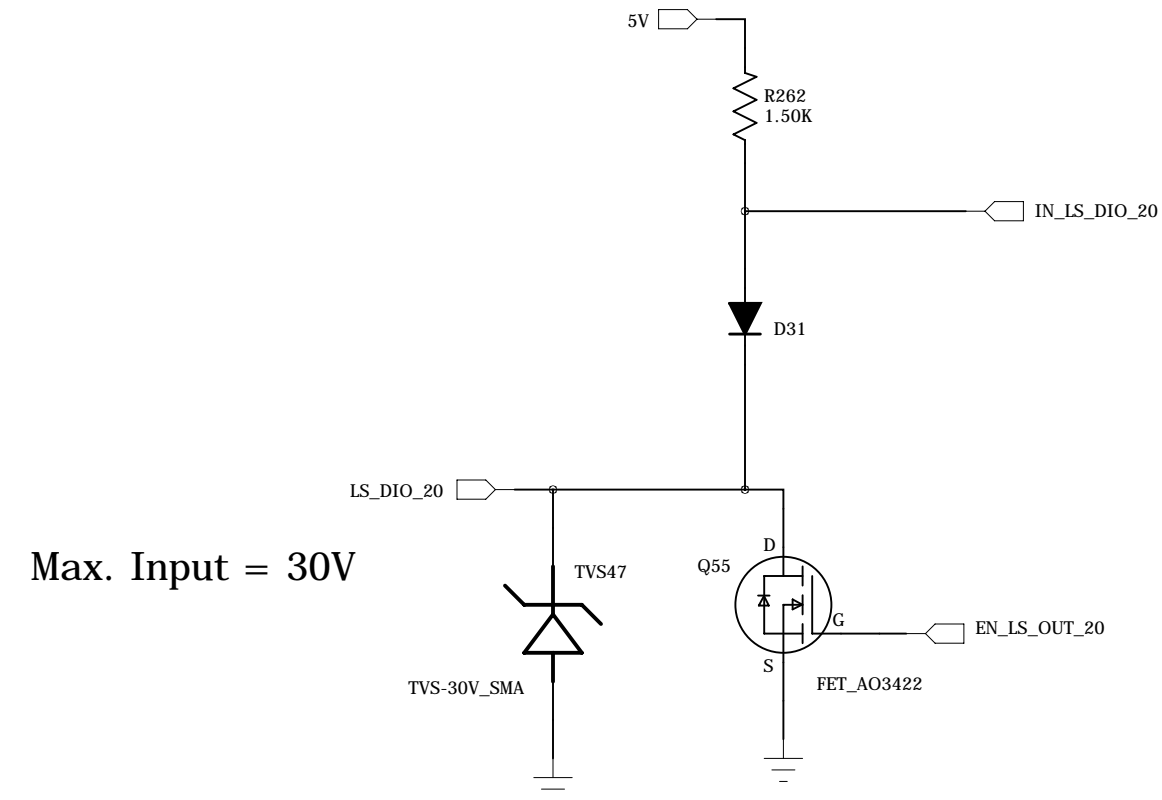
Low-Side Switch

Sinks 500 mA



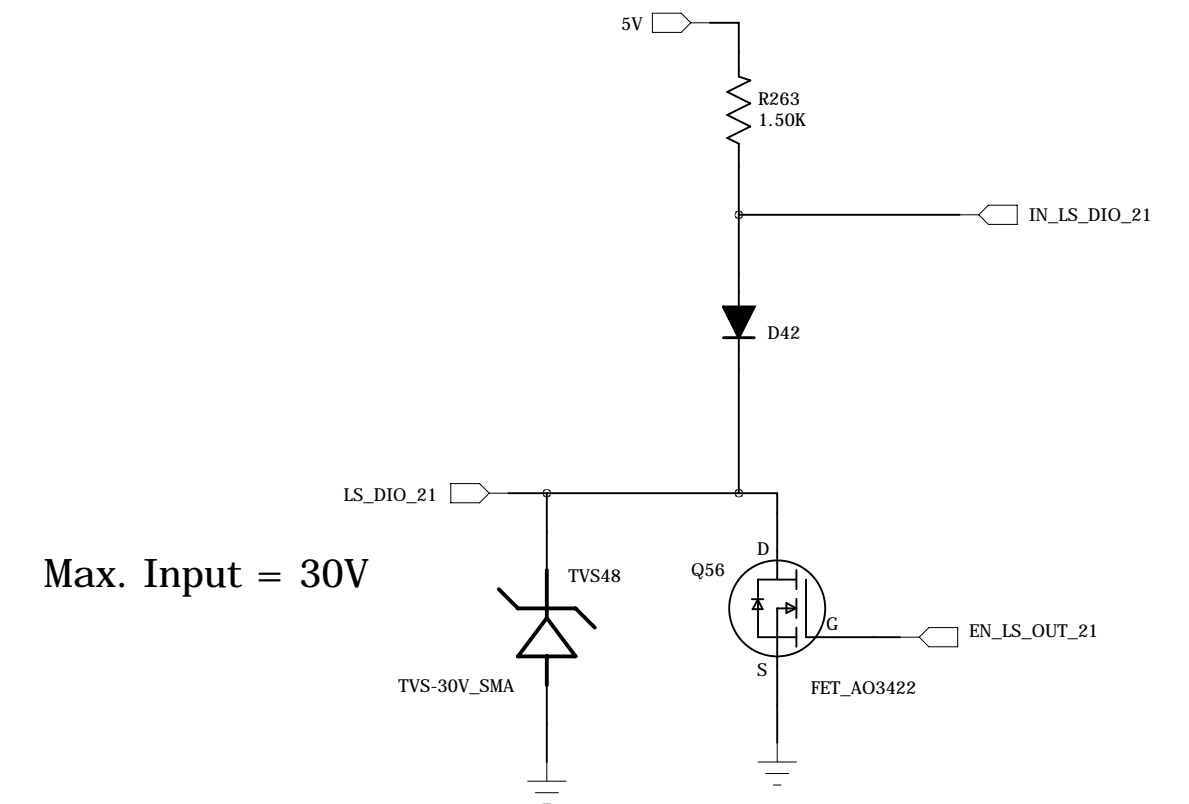
Low-Side Switch

Sinks 500 mA



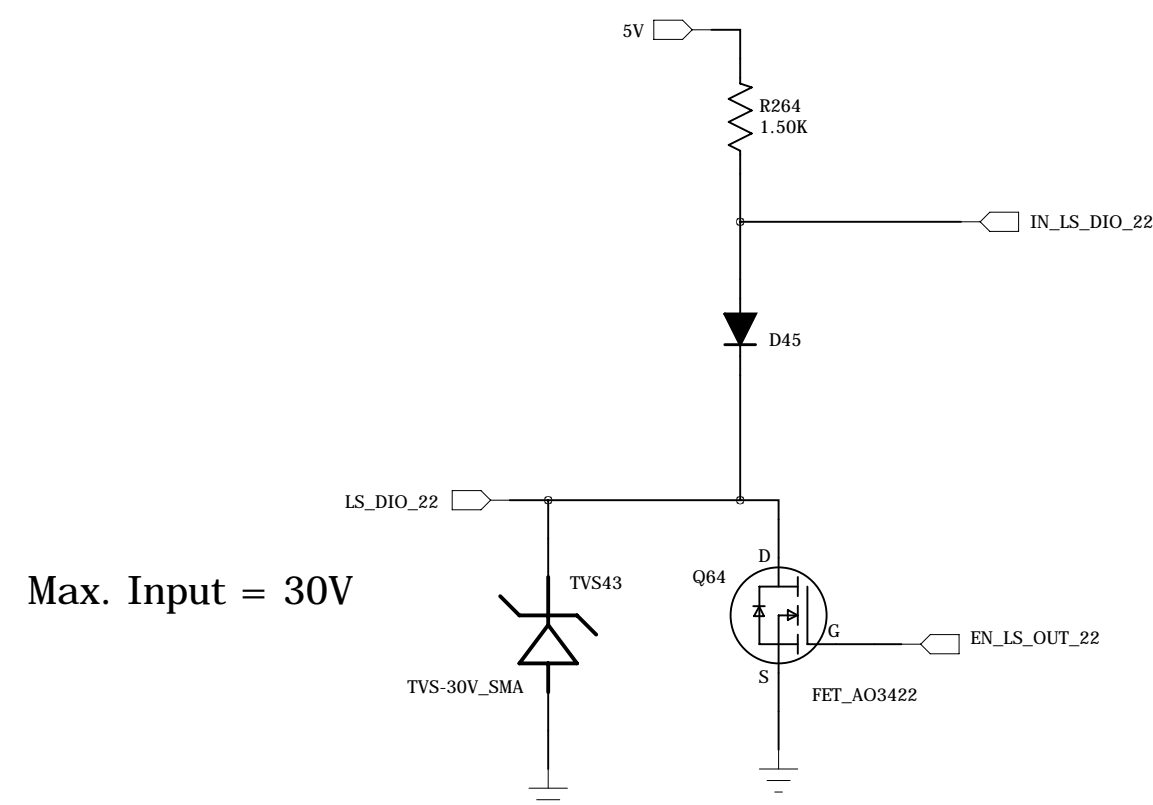
Low-Side Switch

Sinks 500 mA



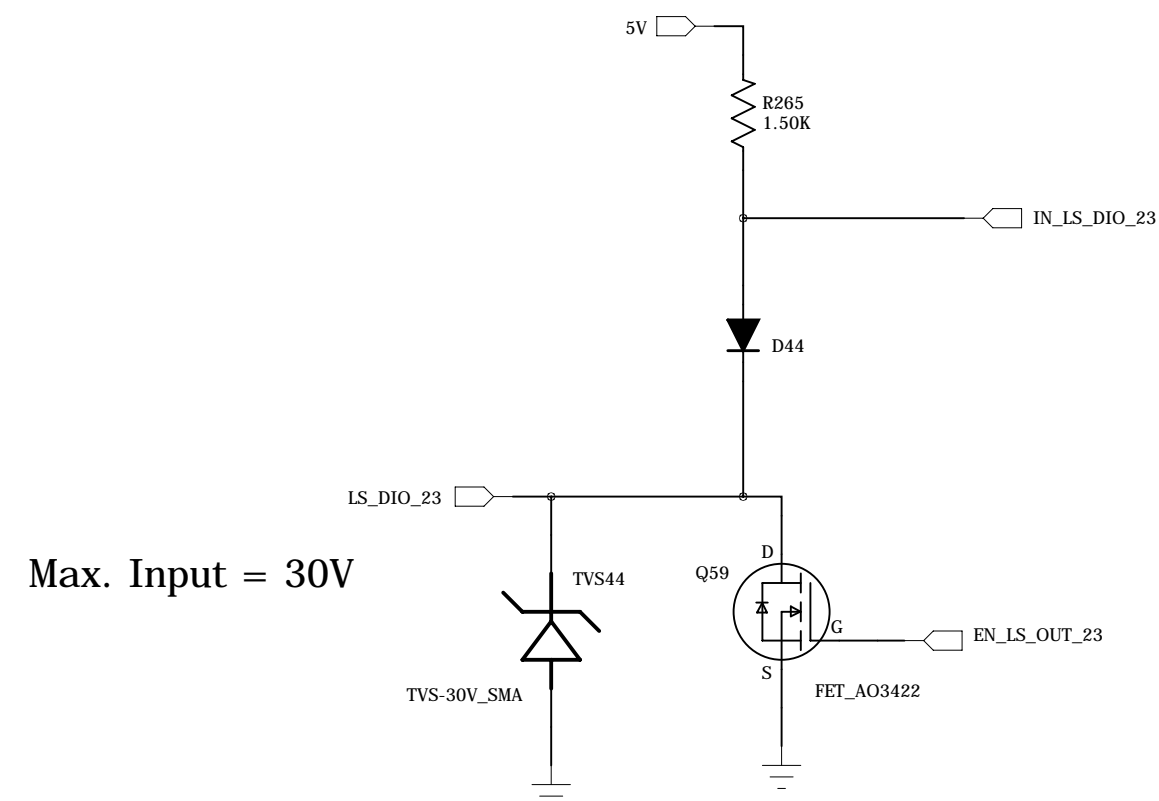
Low-Side Switch

Sinks 500 mA



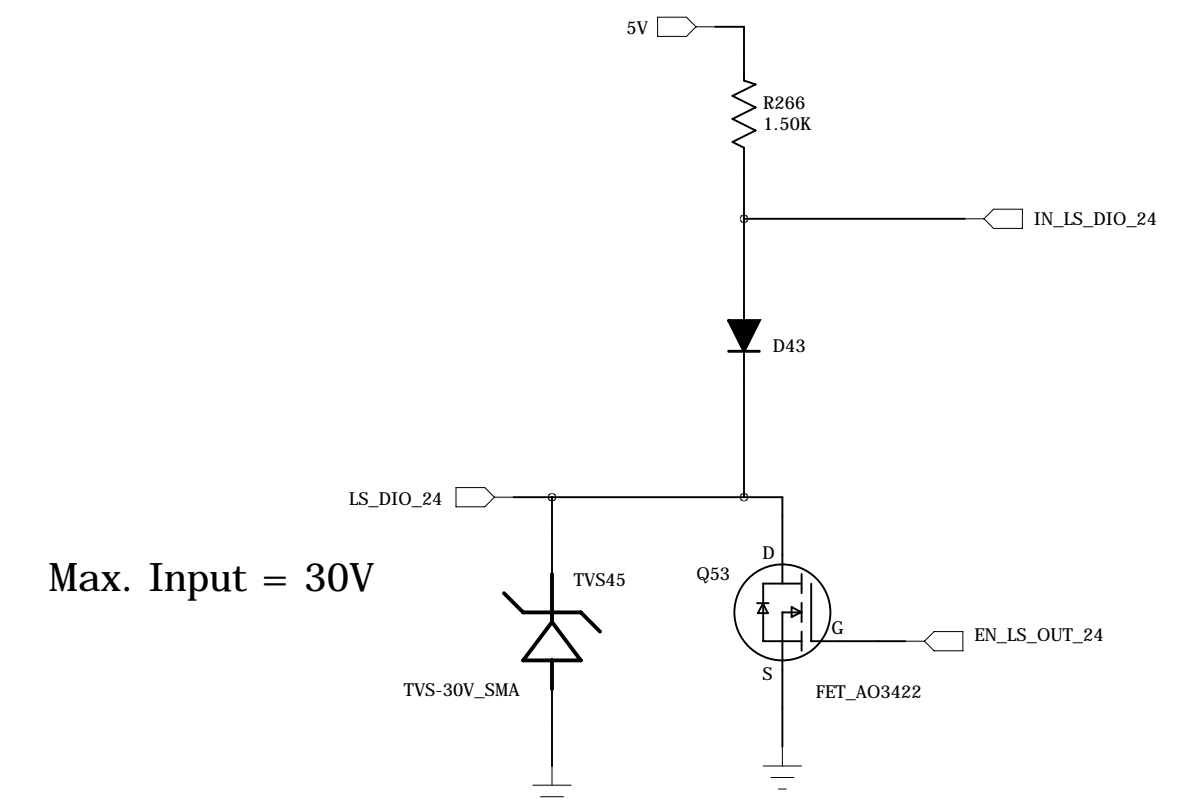
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

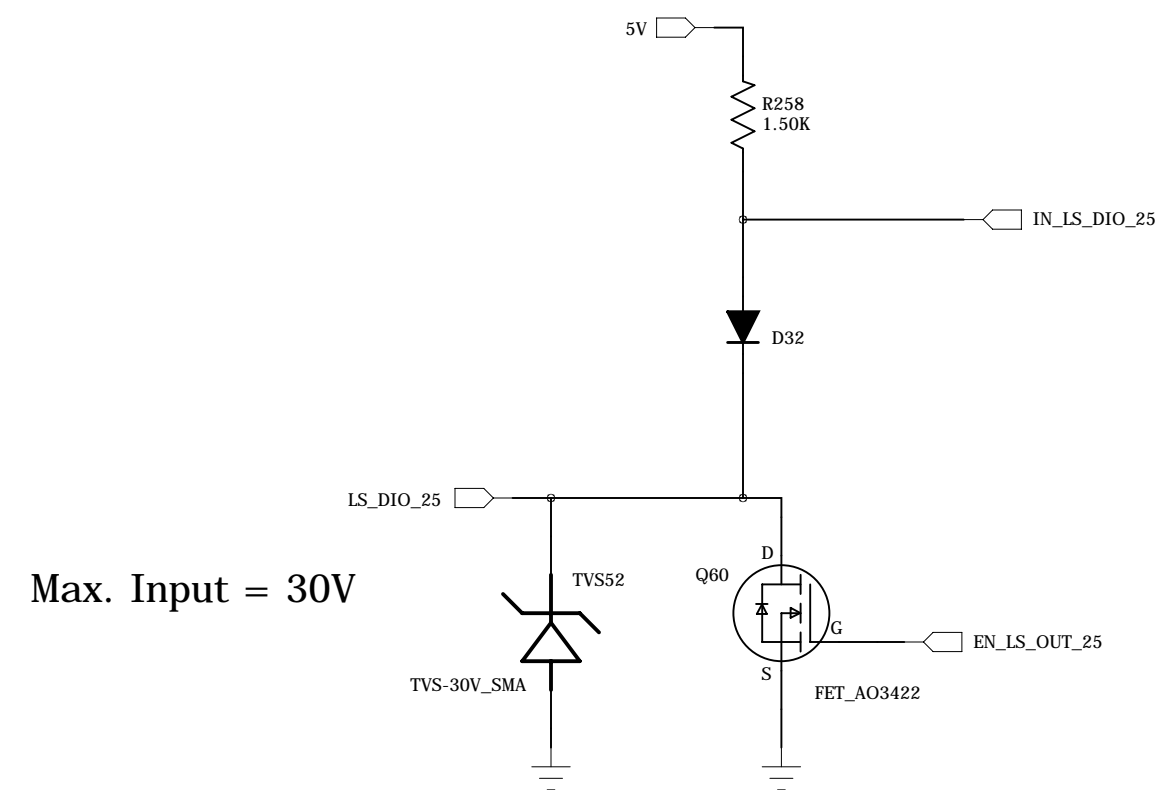


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Low Side Switches

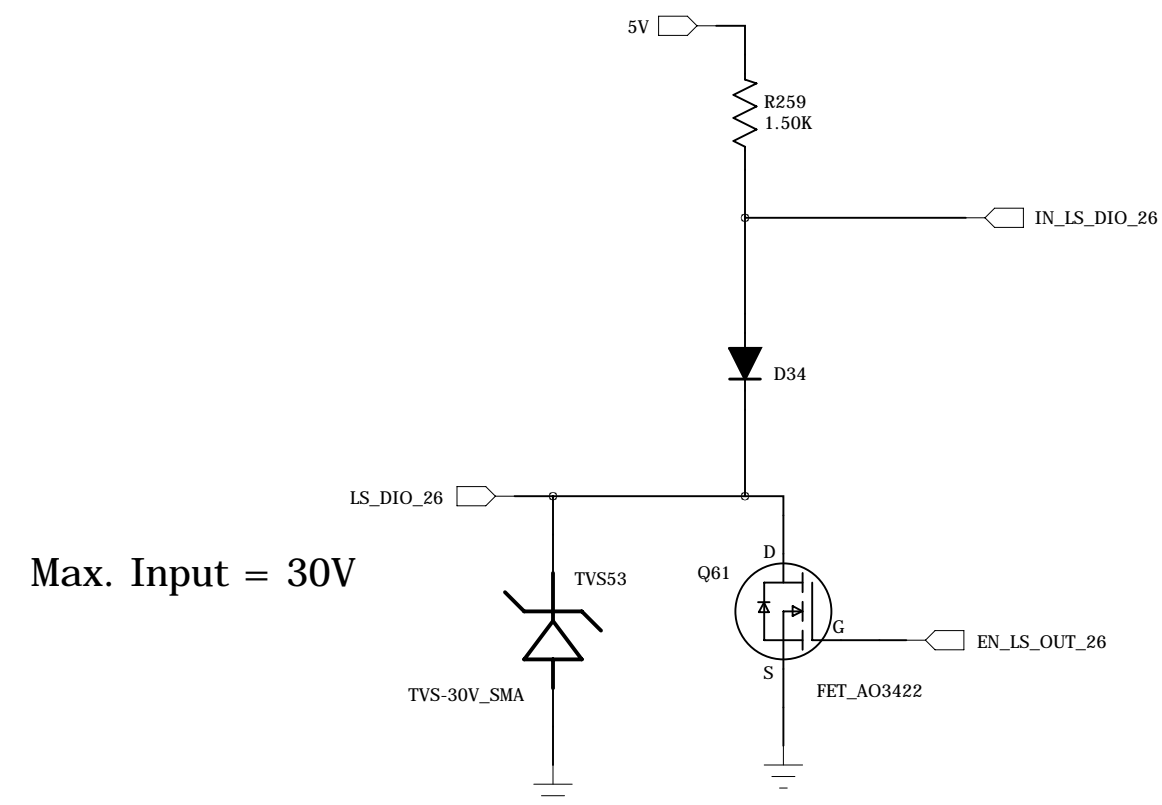
Low-Side Switch

Sinks 500 mA



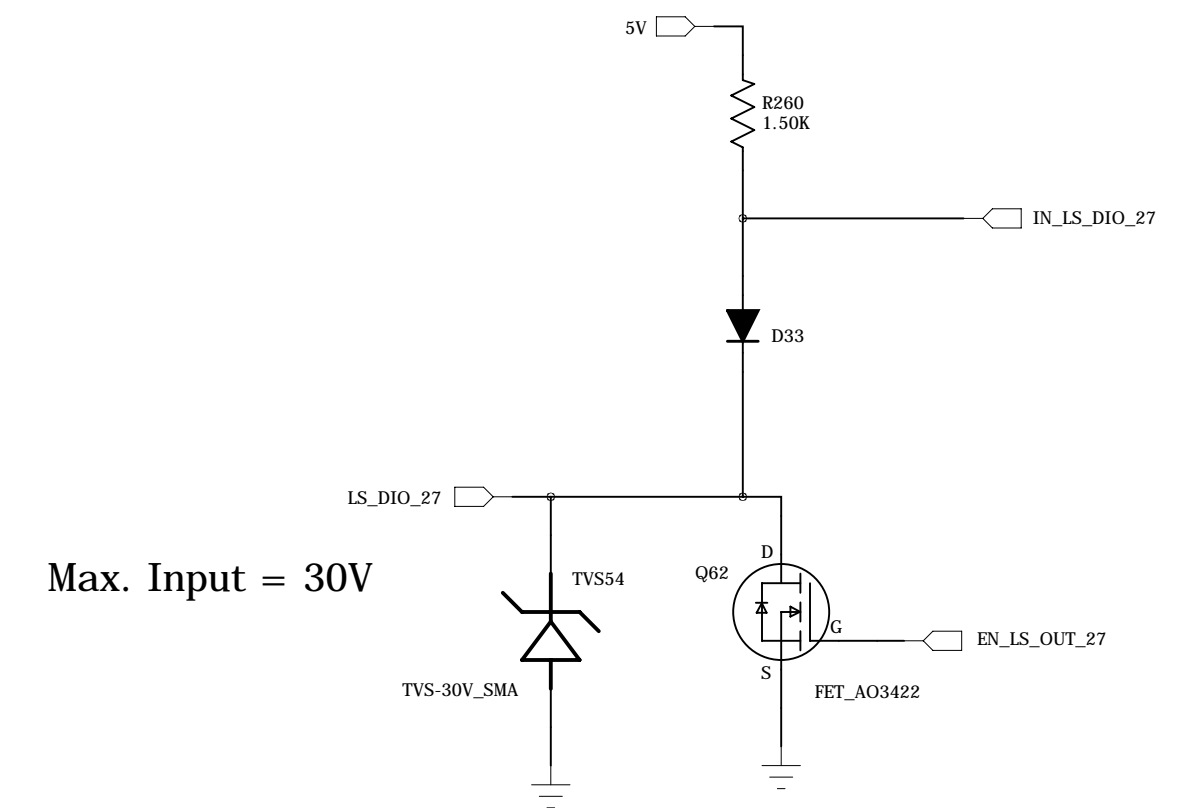
Low-Side Switch

Sinks 500 mA



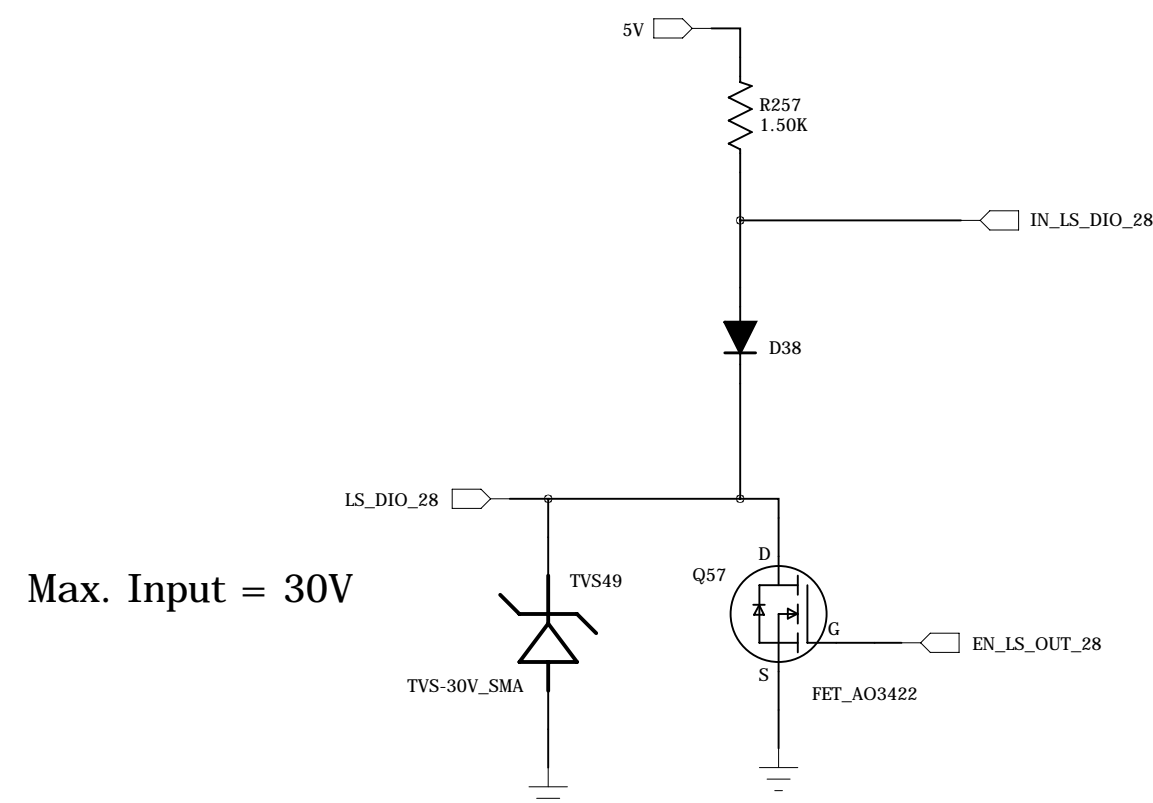
Low-Side Switch

Sinks 500 mA



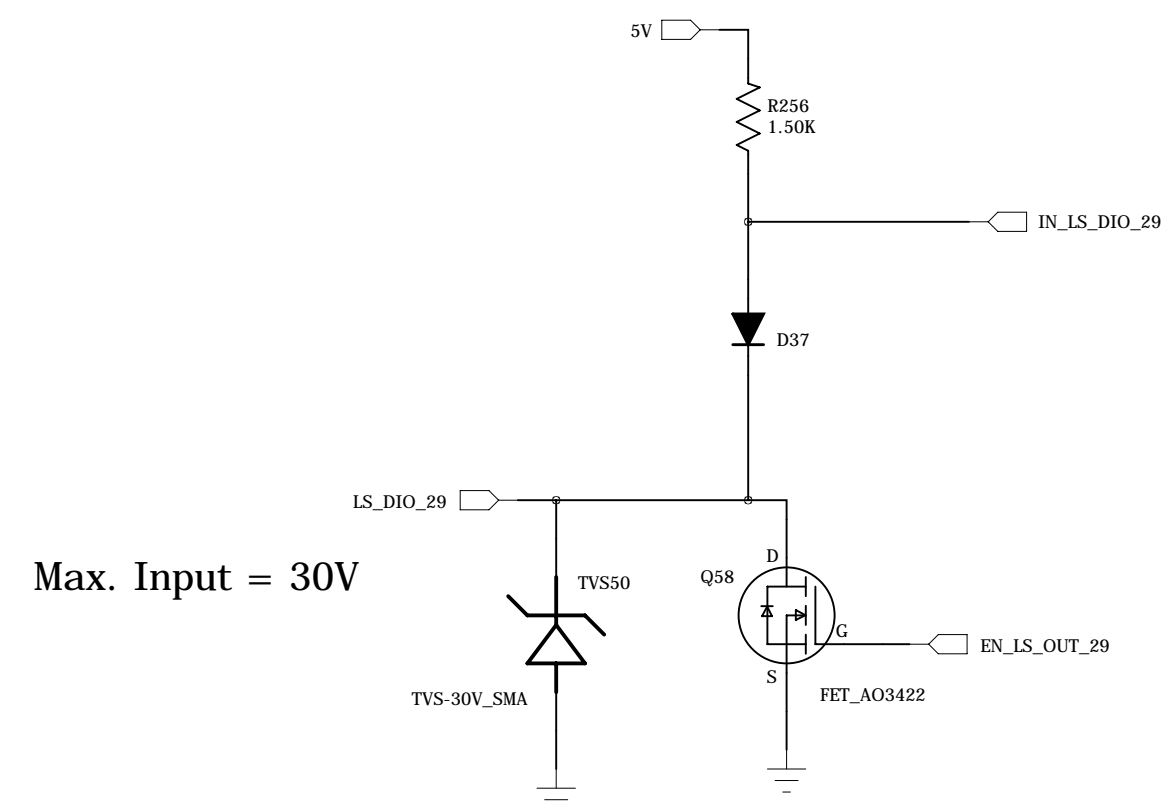
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

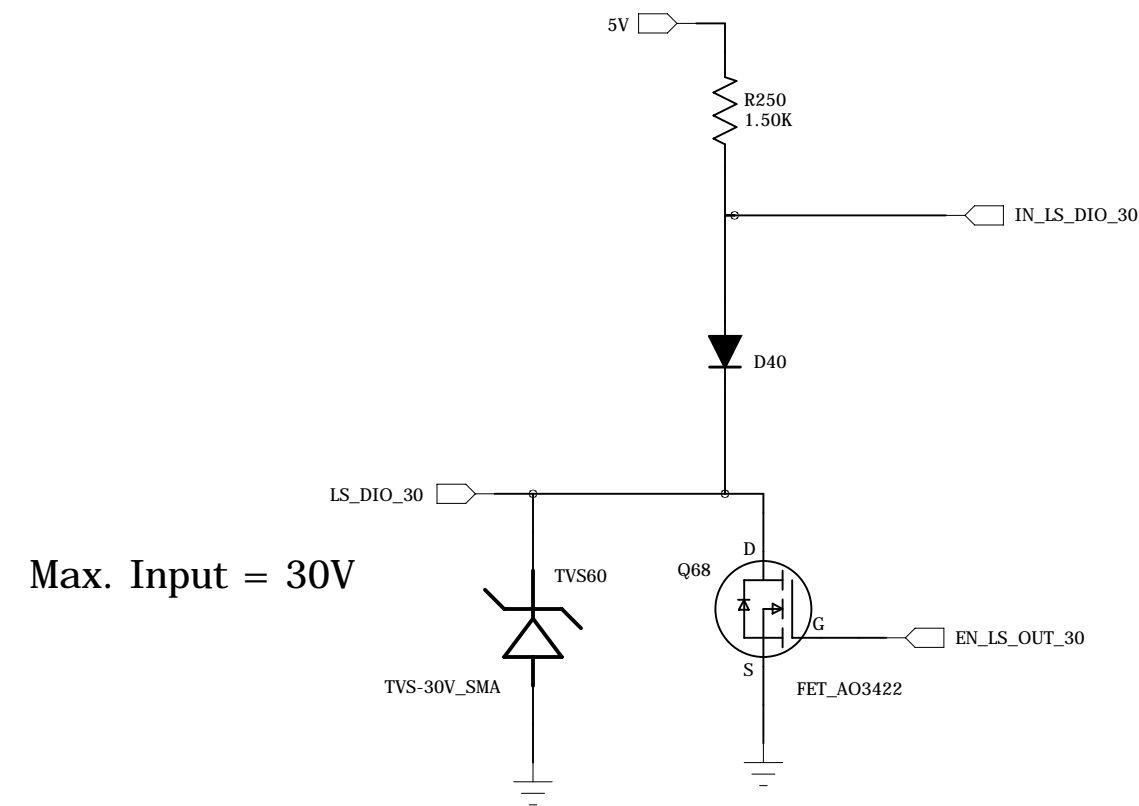


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Title: TS-7520 Low Side Switches	
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Low Side Switches

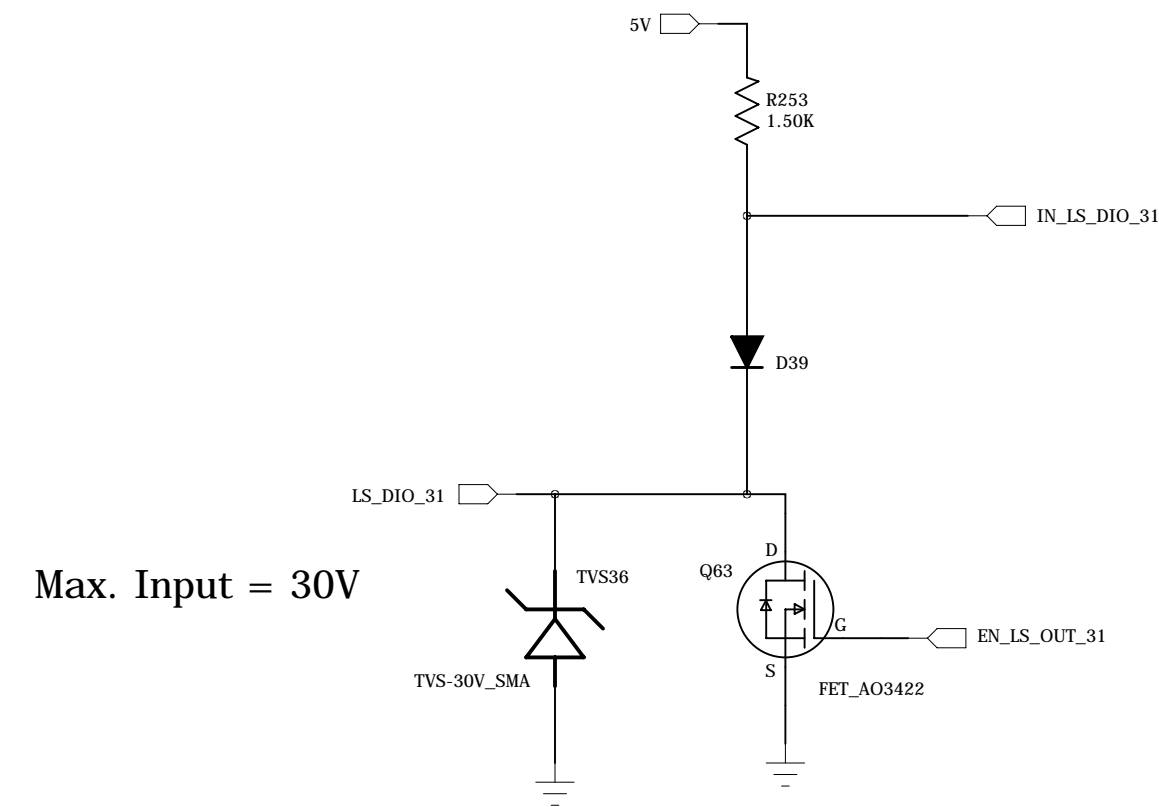
Low-Side Switch

Sinks 500 mA



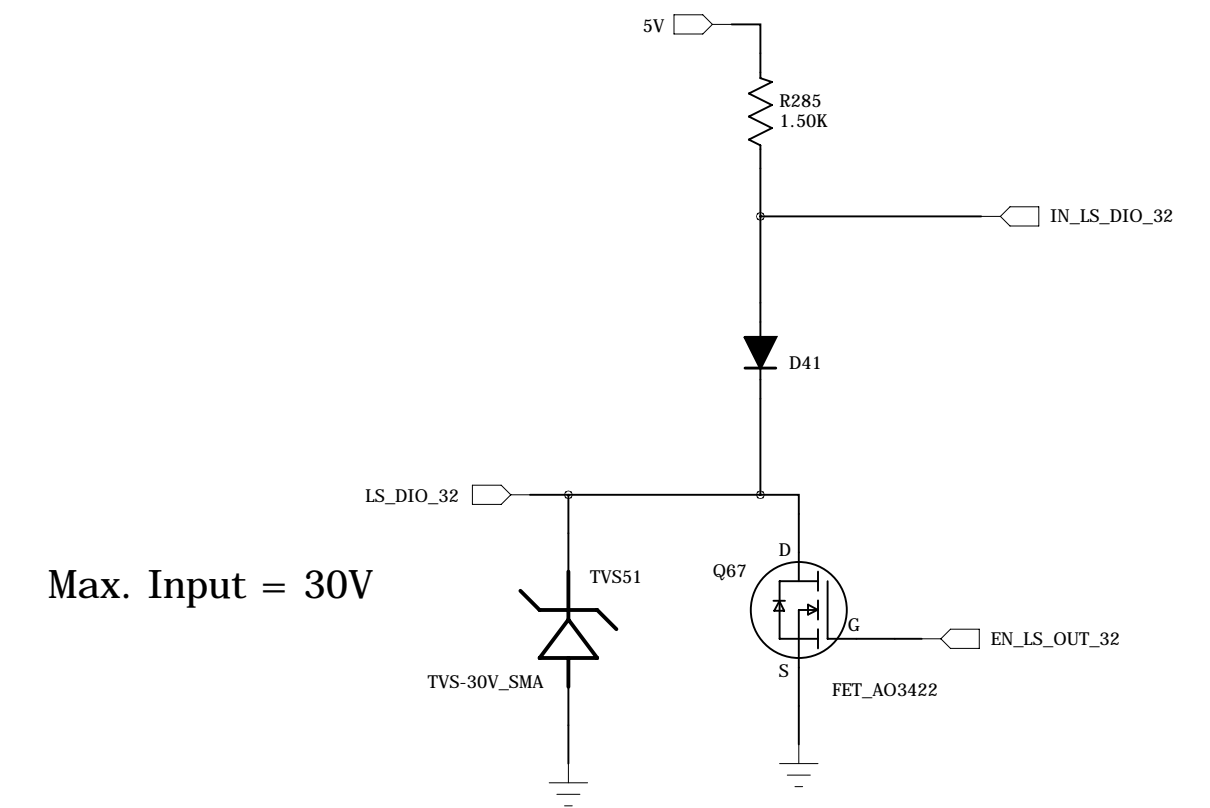
Low-Side Switch

Sinks 500 mA



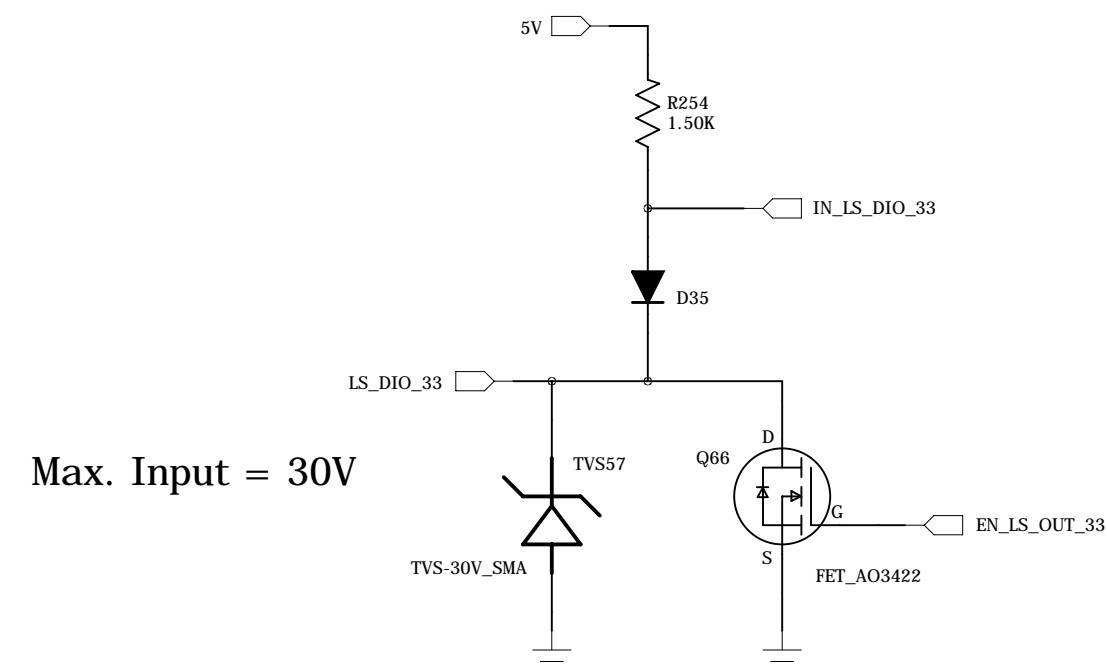
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

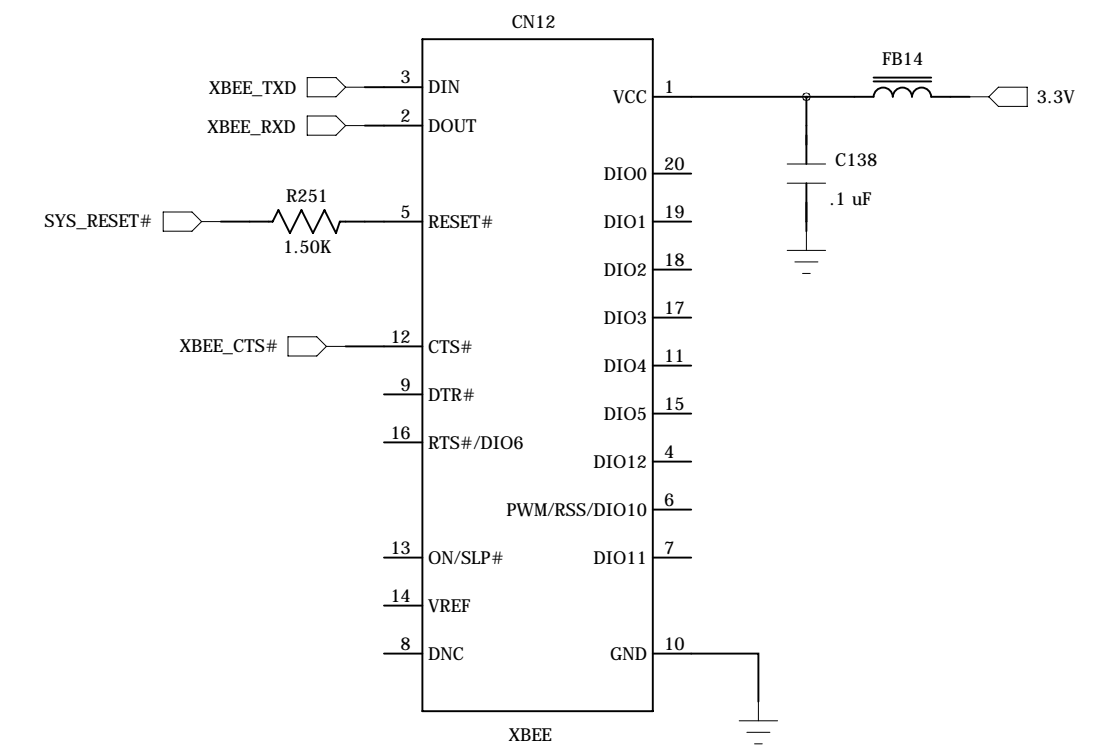


LS and HS
Outputs can be
"short proof"
by FPGA polling
Inputs

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Xbee Radio

Digi/MaxStream
ZigBee Radio



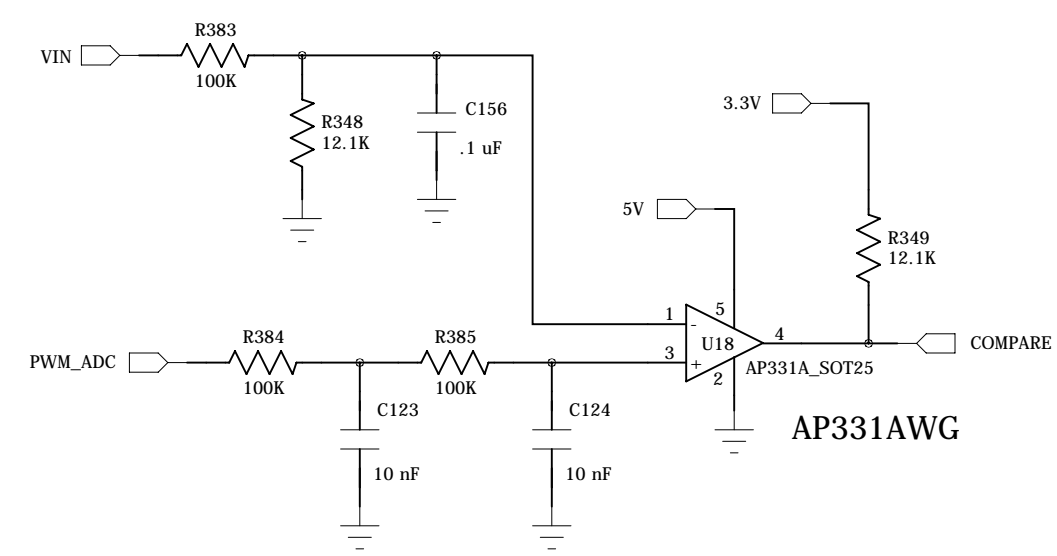
10-pin 2mm socket
S5751-10-ND
56 cents / 100

CTS# is an output
that can be used for
hardware flow control

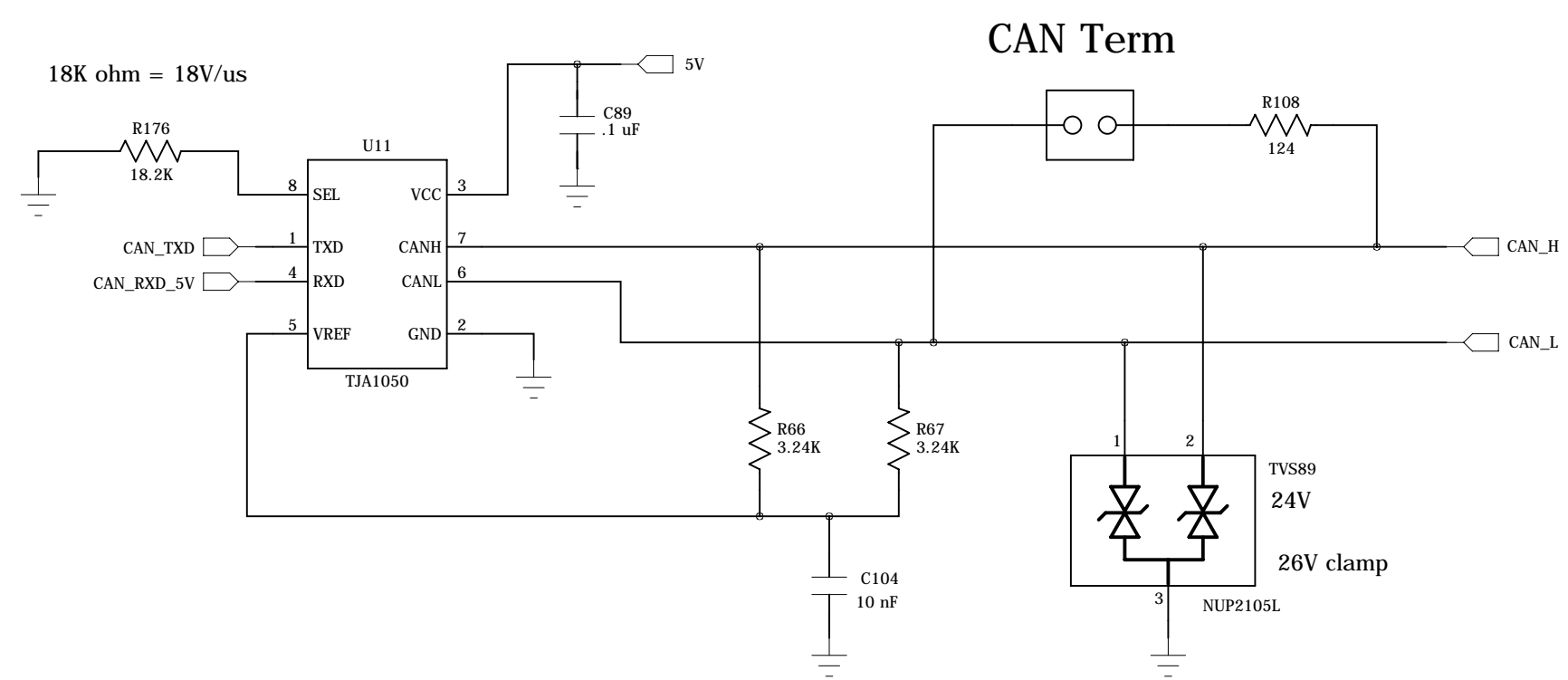
Reset# must be driven
with Open drain

Baud rates up to
230.4K supported

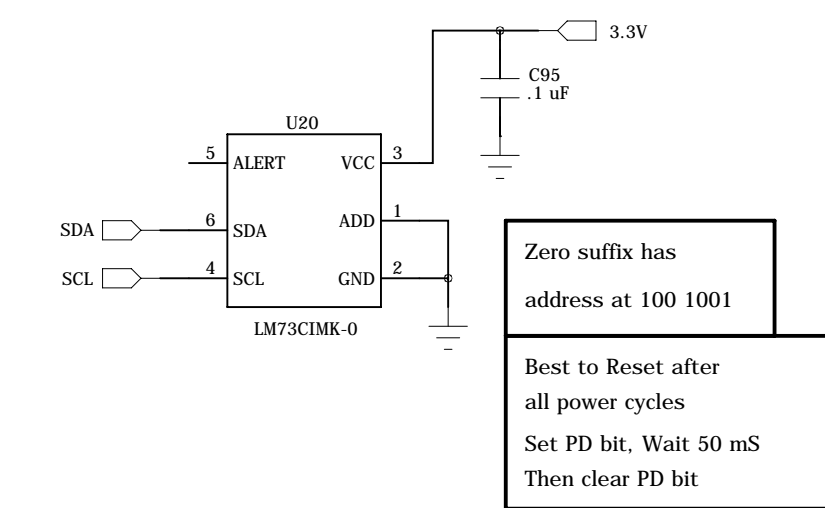
A/D Converter



CAN Transceiver



Temp Sensor



Zero suffix has
address at 100 1001
Best to Reset after
all power cycles
Set PD bit, Wait 50 mS
Then clear PD bit

RJ45 2x6 Array

RJ45 2x6 Array

Tab Up

8	1	A	B	C	D	E	F
1	8	G	H	J	K	L	M

Tab Down

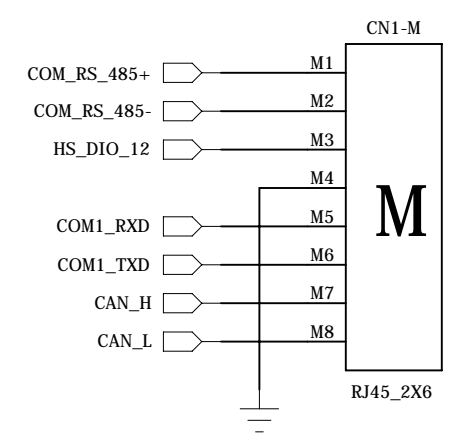
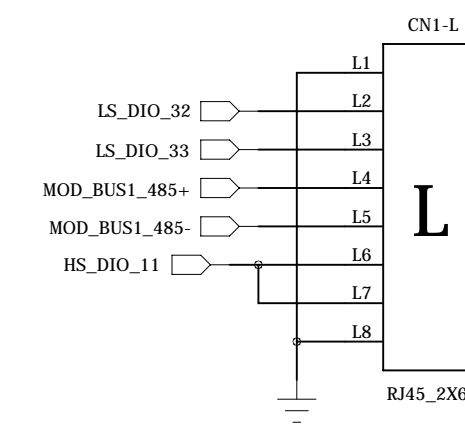
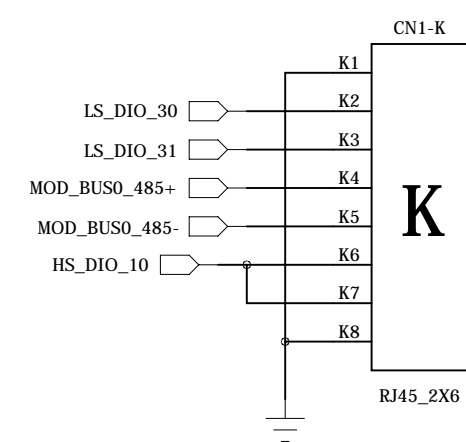
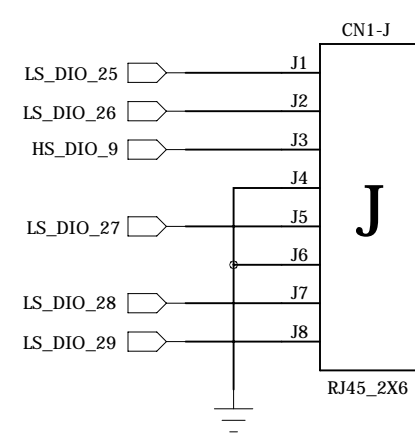
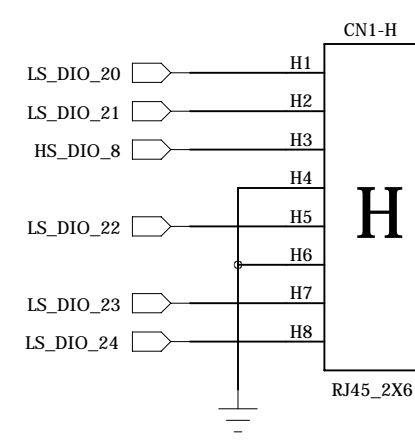
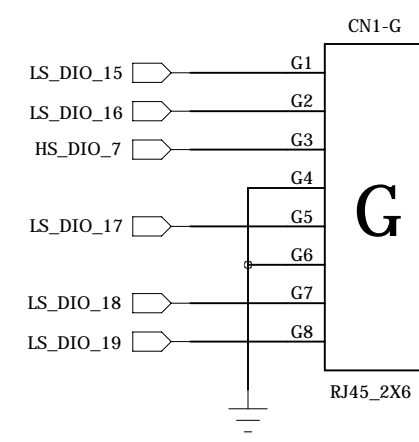
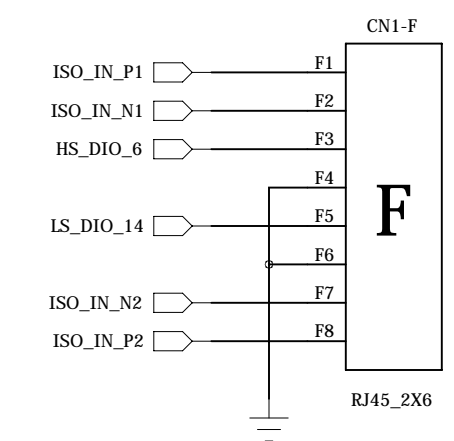
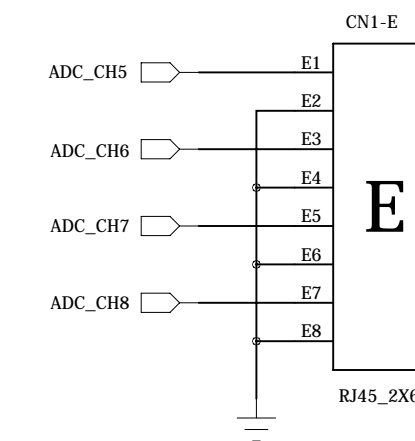
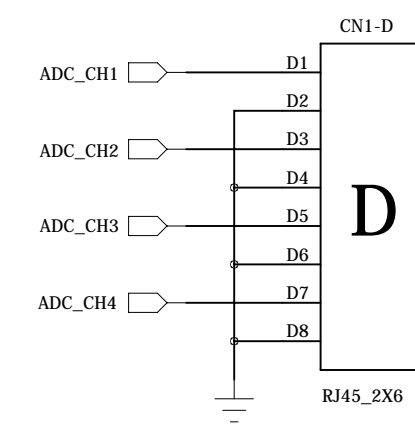
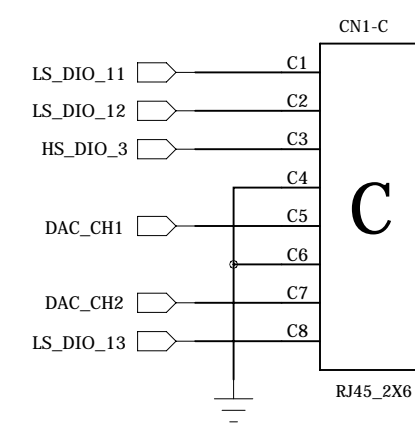
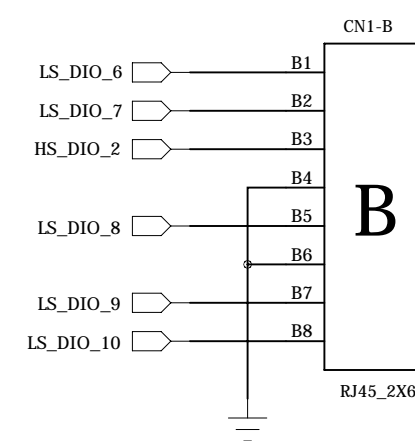
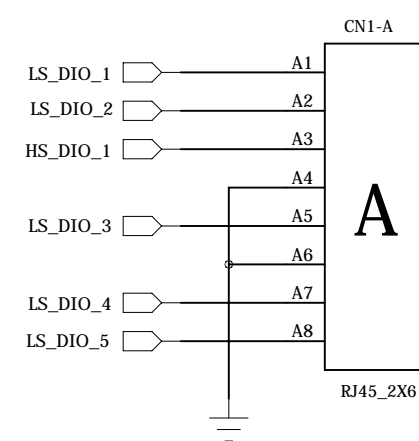
ECE quote Sept. 21 = \$5.19

OST = \$4.47

OST# GJS600-8P8C66-S

Samtec# MODM-B-12-8P8C-U-S4-ND

ECE# EC-MJK731-Pa881GfSb-12S

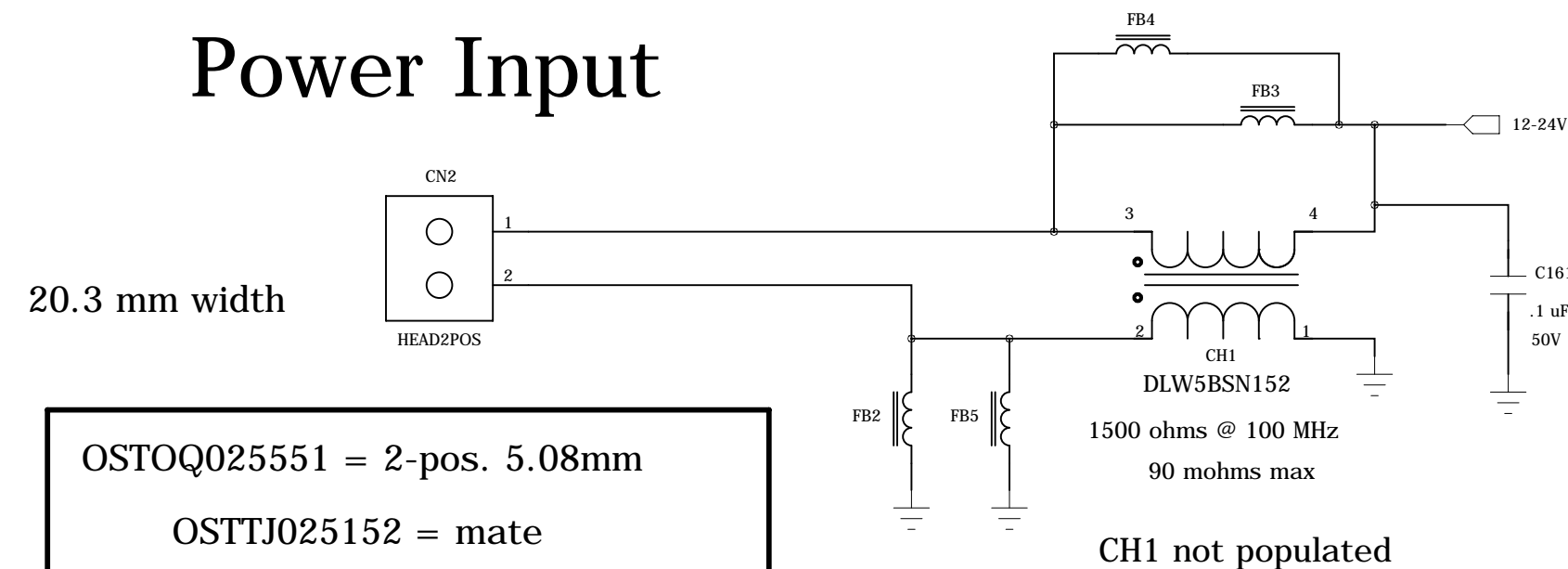


MOD Bus 0

MOD Bus 1

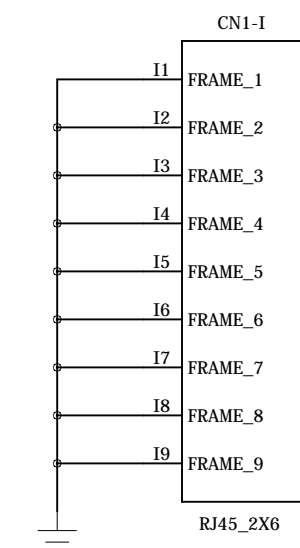
COM Port

10-28 VDC Power Input



OSTOQ025551 = 2-pos. 5.08mm
OSTTJ025152 = mate

CH1 not populated



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