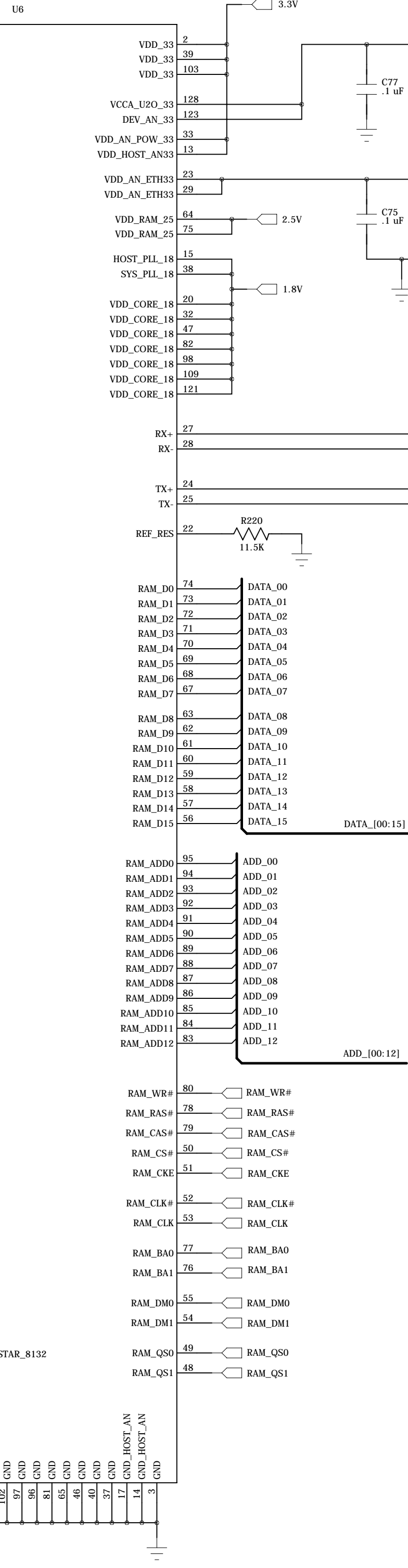
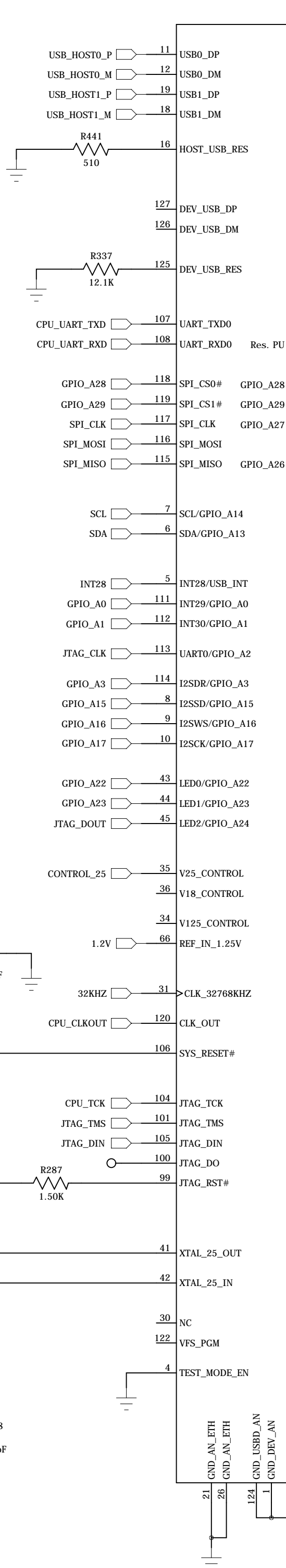
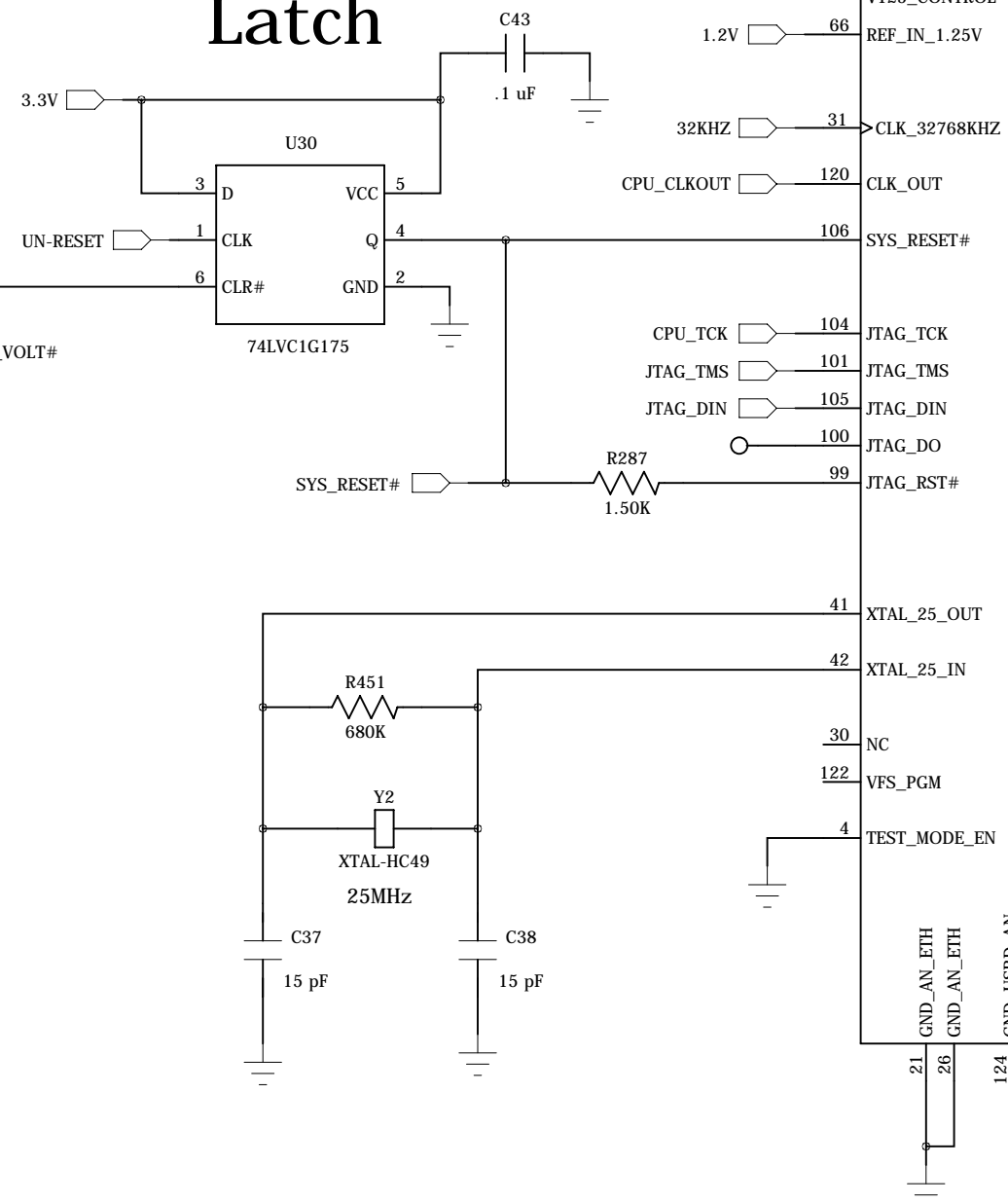


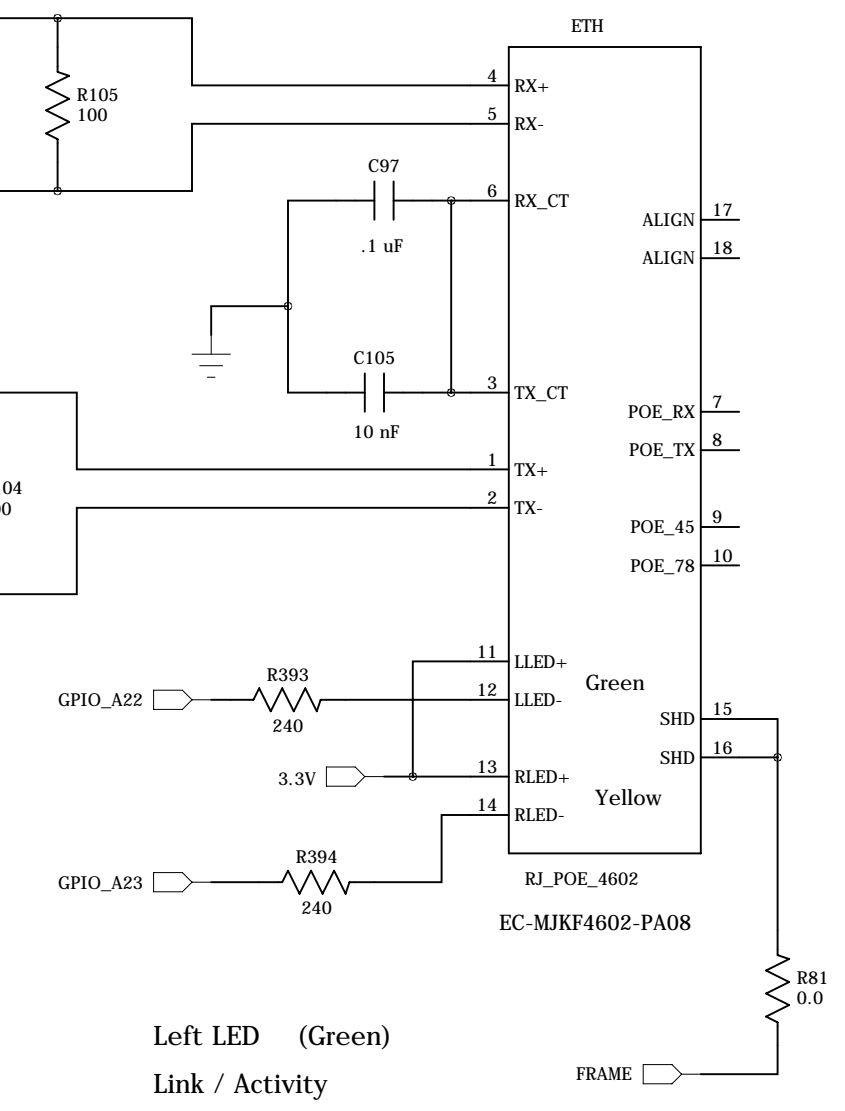
TS-7580



Reset Latch



10/100 Ethernet



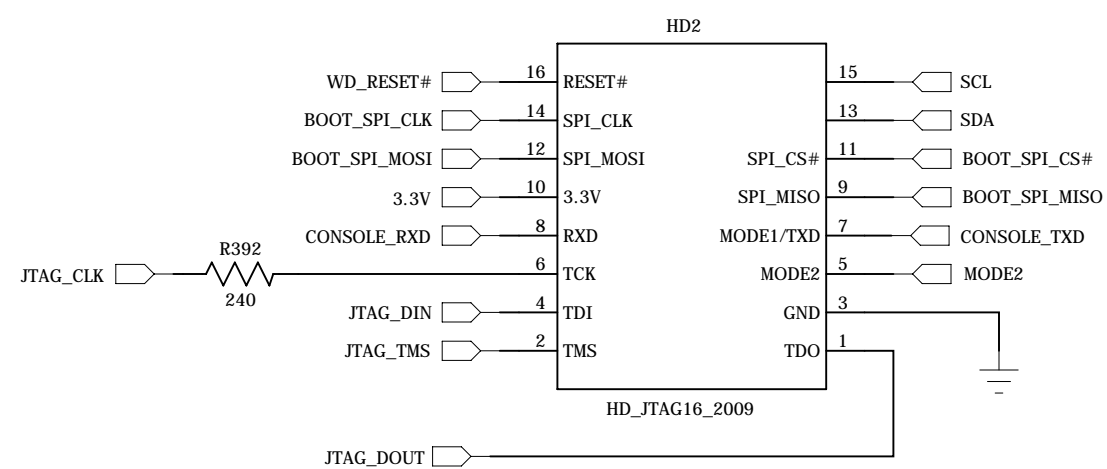
Left LED (Green)
Link / Activity

Technologic Systems	Date May 6, 2012
Title: TS-7580 CPU, Ethernet, POR	
Rev: A	Designer
Sheet 1 of 25	

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



Mode 1	Mode 2	Boots from
1	1	SPI Flash
1	0	SD Card
0	1	Off-board Flash
0	0	Off-board Flash

MODE1 and MODE2 states are latched when CPU_RESET# is deasserted

MODE1 = CONSOLE_TXD

Console always is enabled

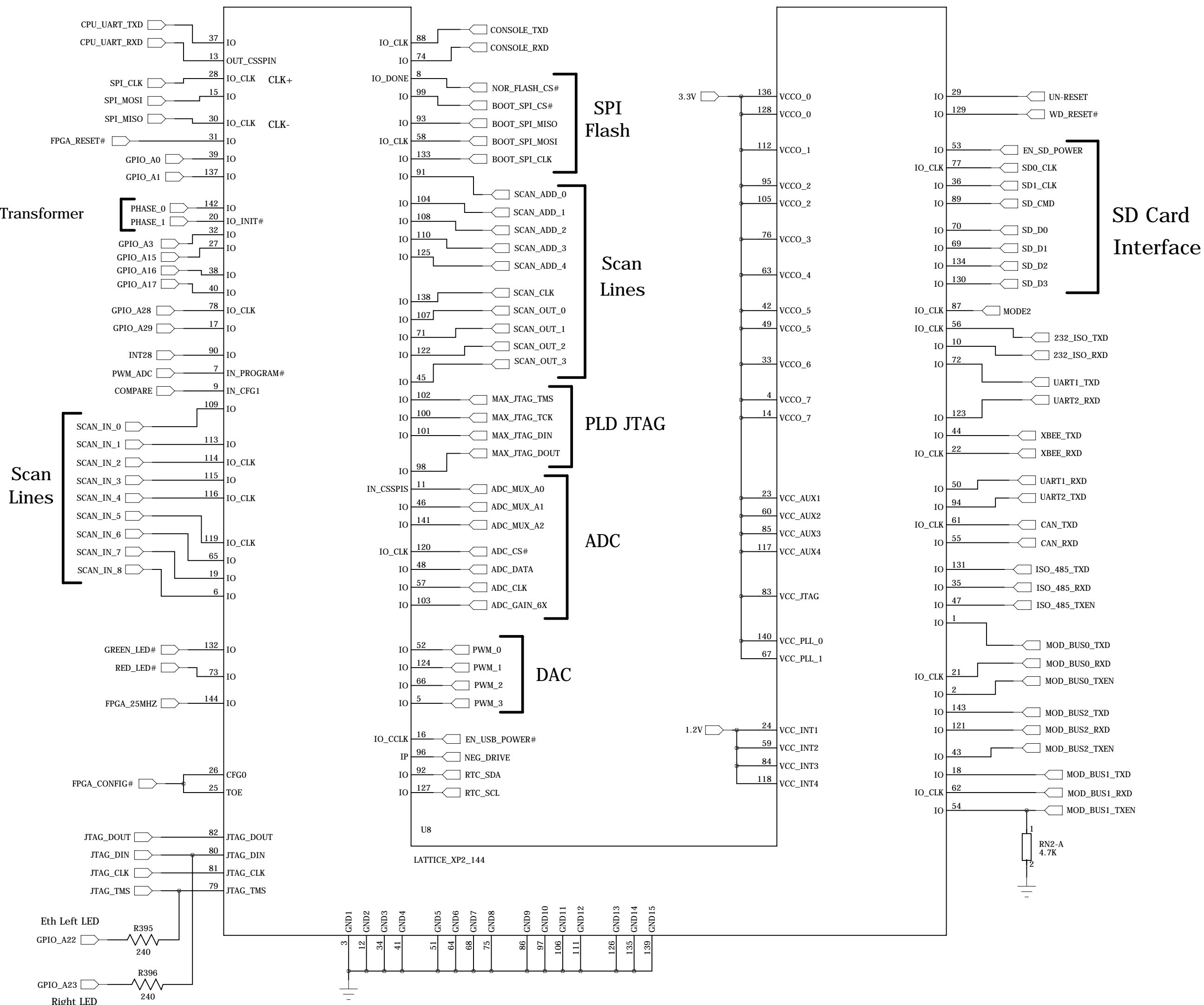
Board ID bits

	Pin 54 (weak PU)	Pin 138 (weak PD)	Pin 71	Pin 37	Hex	Pin 72	Pin 122	Pin 107 (weak PU)
TS-7500	1	1	1	1	F	Float		
TS-7550	1	1	0	1	B	Float		
WM-7551	0	0	1	1	C	Float		
TS-7552	1	0	1	1	D	1		
TS-7553	1	0	0	1	9	1		
TS-7554	0	0	0	1	8	1		
TS-7558	0	1	0	1	A	1		
TS-7520	0	1	1	1	E	1	1	1
TS-4500	0	0	0	0	0	Float		
TS-7580	0	1	1	1	E	1	1	0

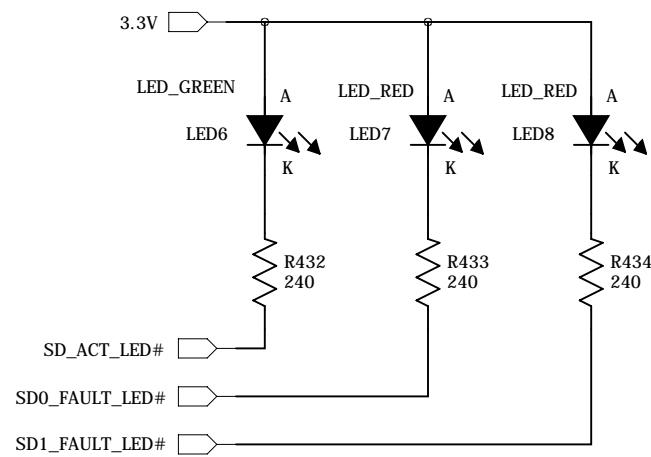
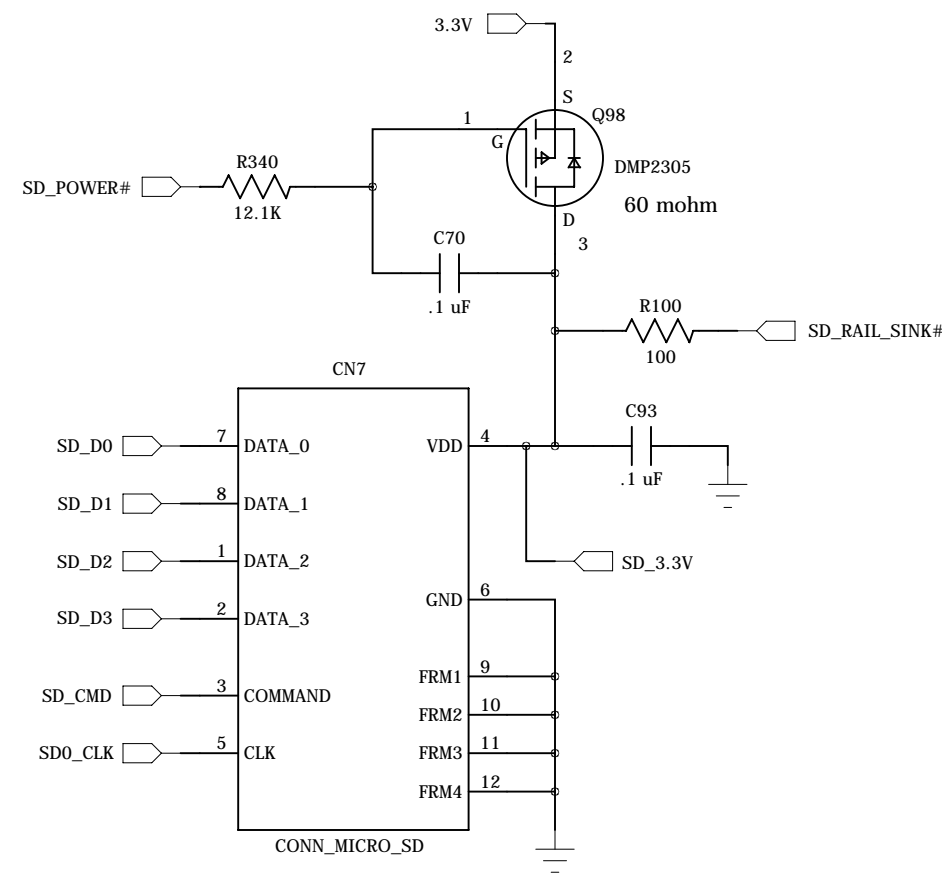
7552 and 7553 FPGA pin 93 = MISO

TS-7554 = Softek TxPort001

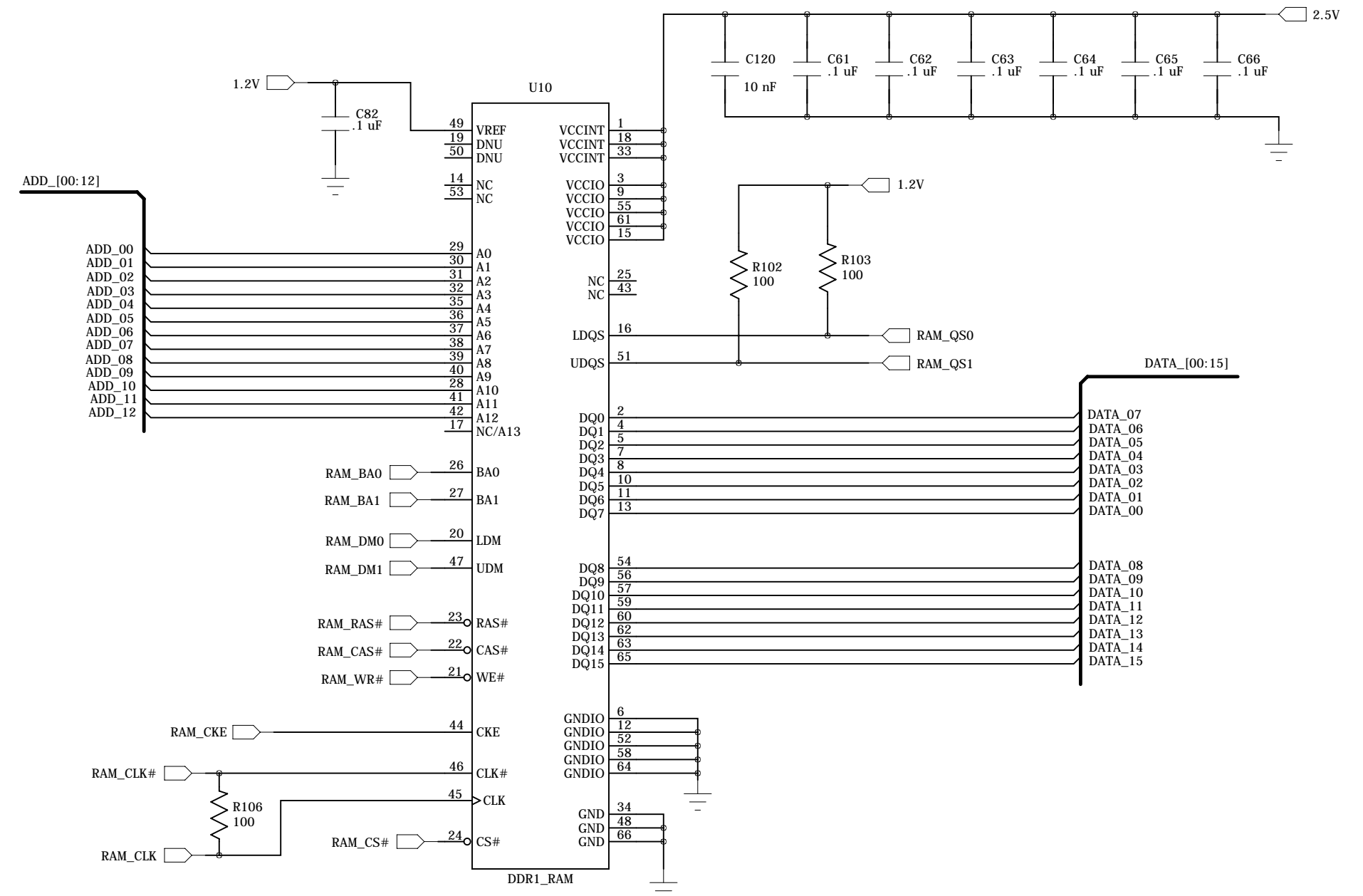
Drives Transformer
Page 7



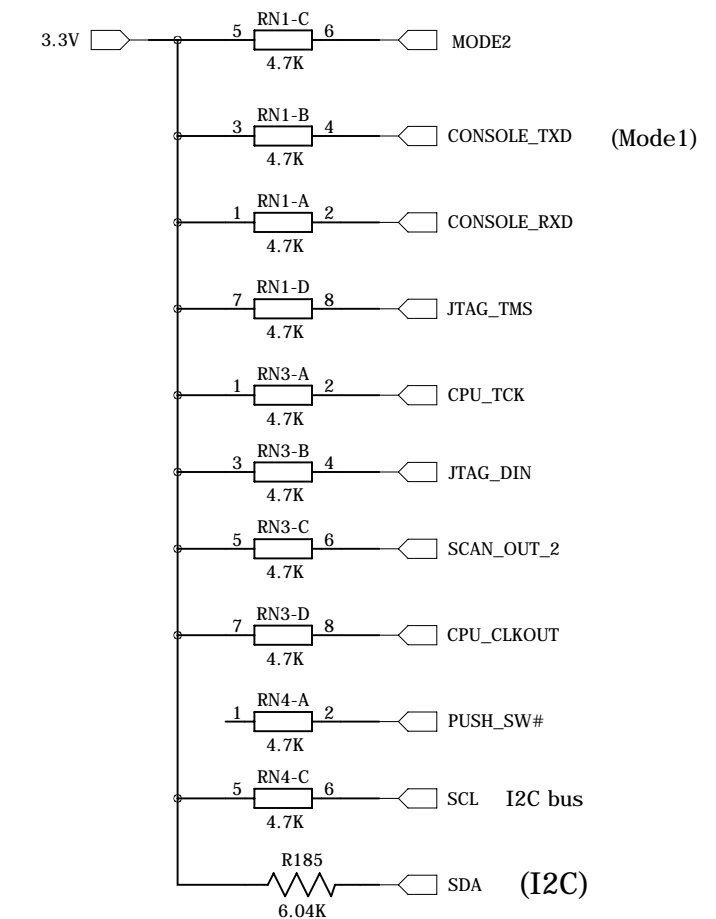
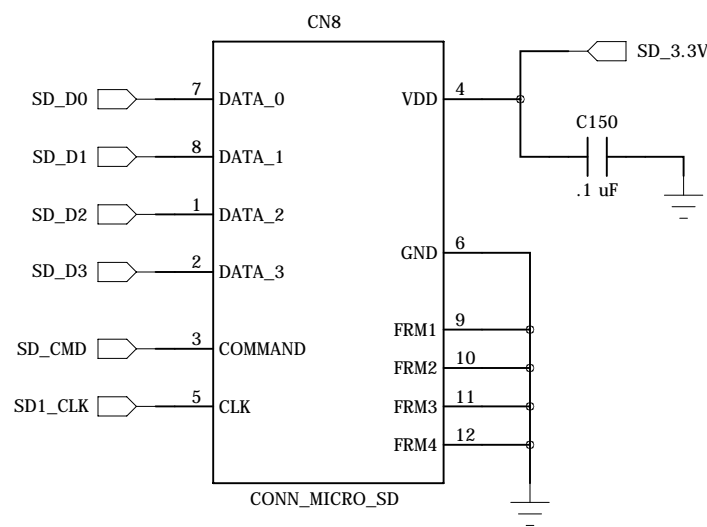
Micro SD Card Socket #0



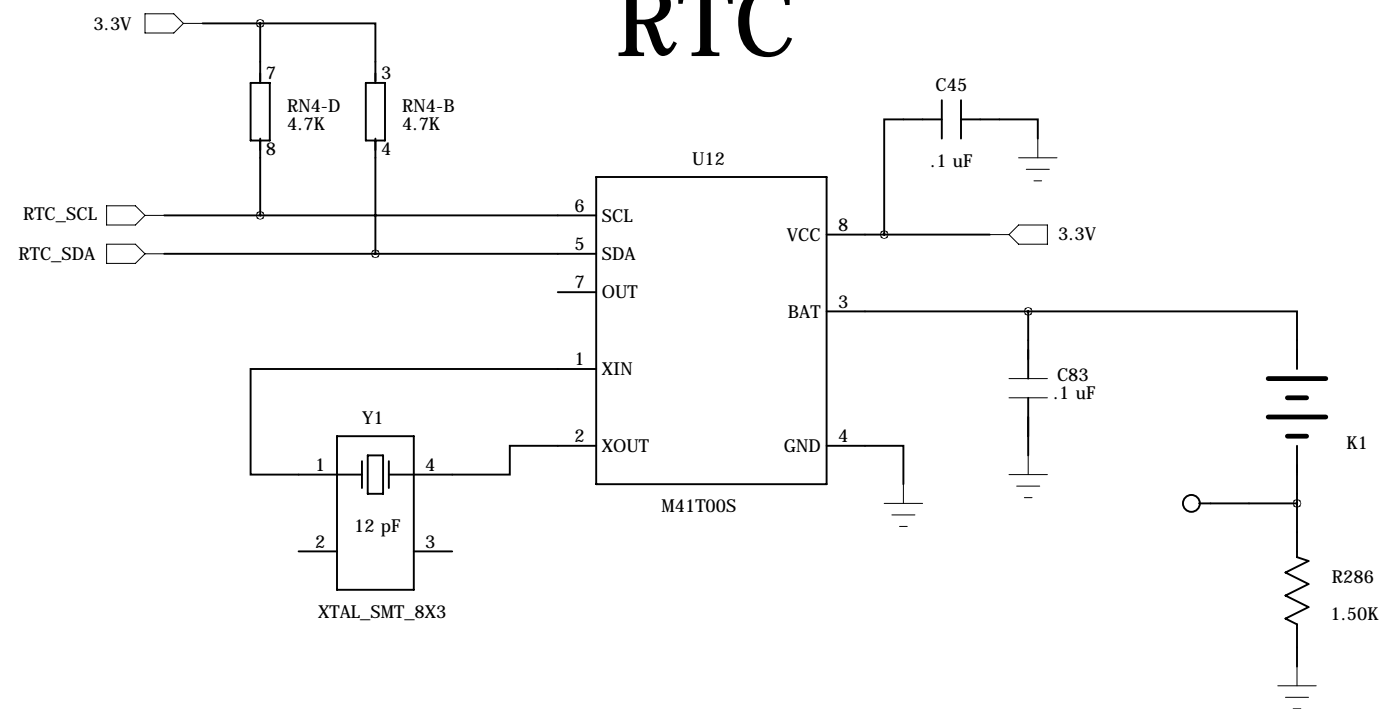
64 Mbyte DDR1 SDRAM



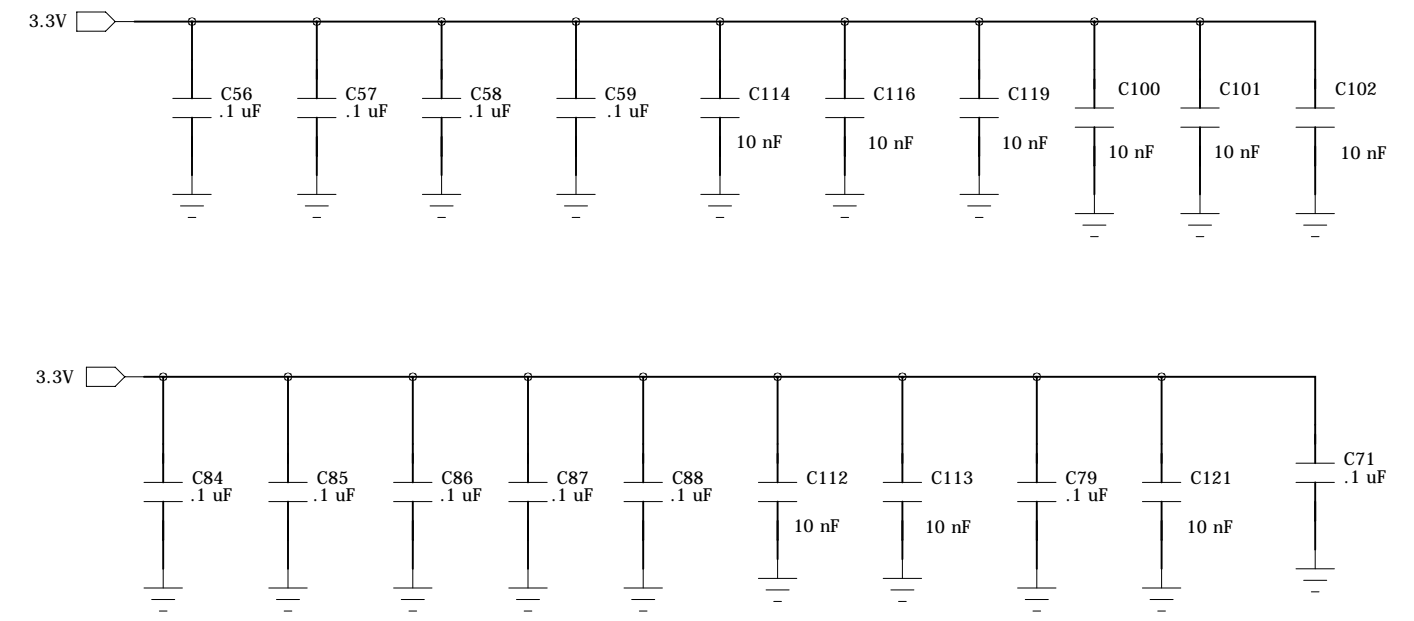
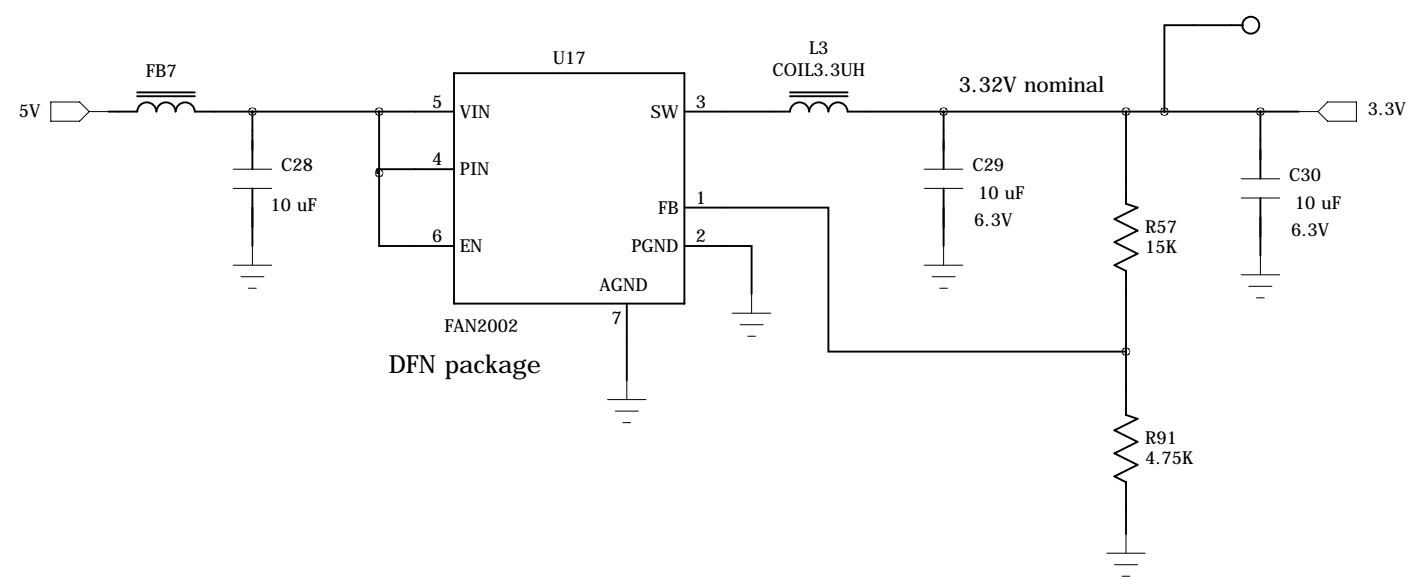
Micro SD Socket #1



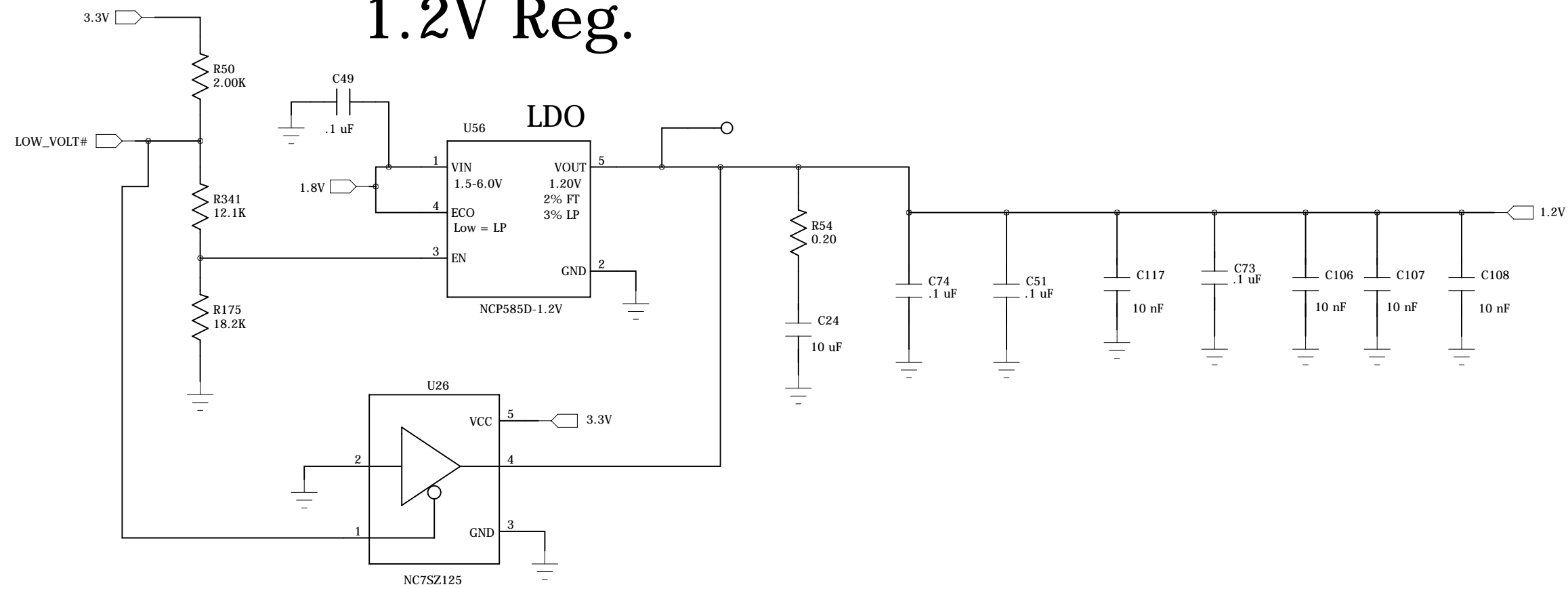
RTC



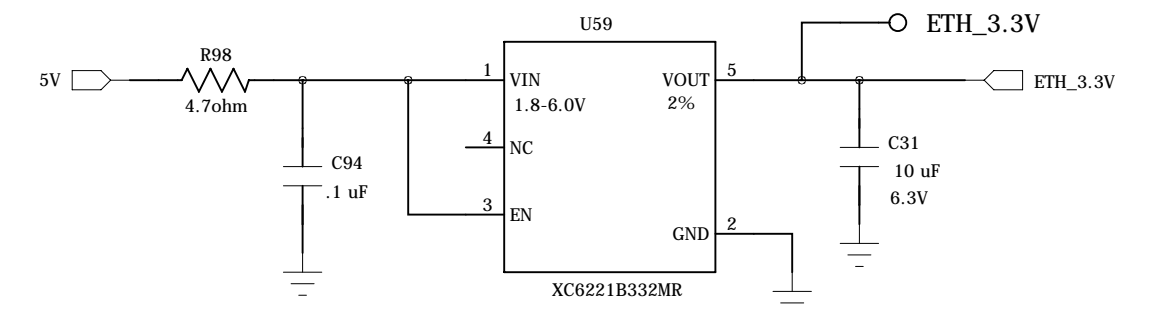
3.3V Regulator



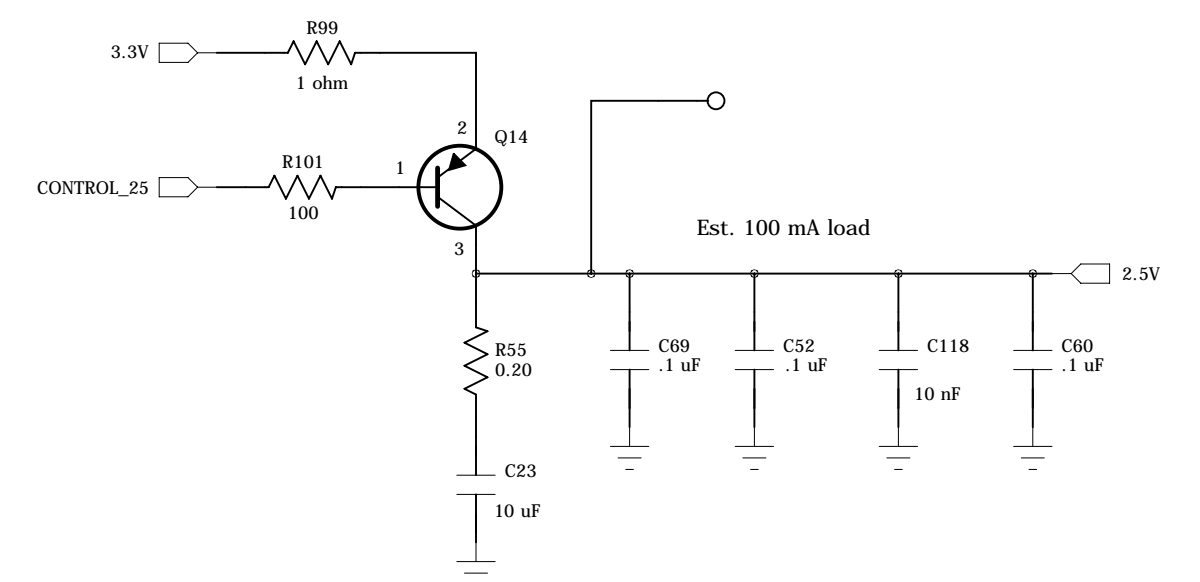
FPGA Core 1.2V Reg.



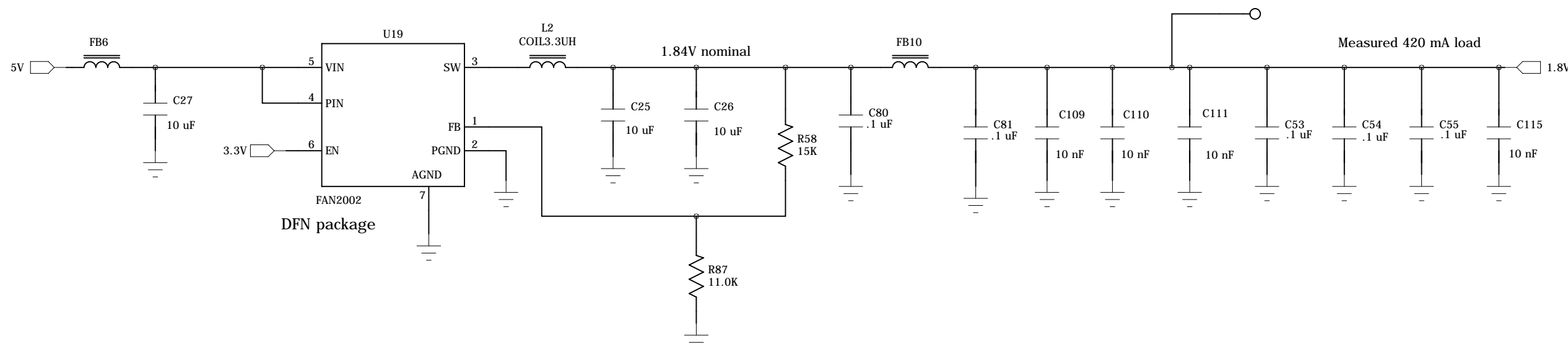
Ethernet Analog 3.3V



2.5V Regulator



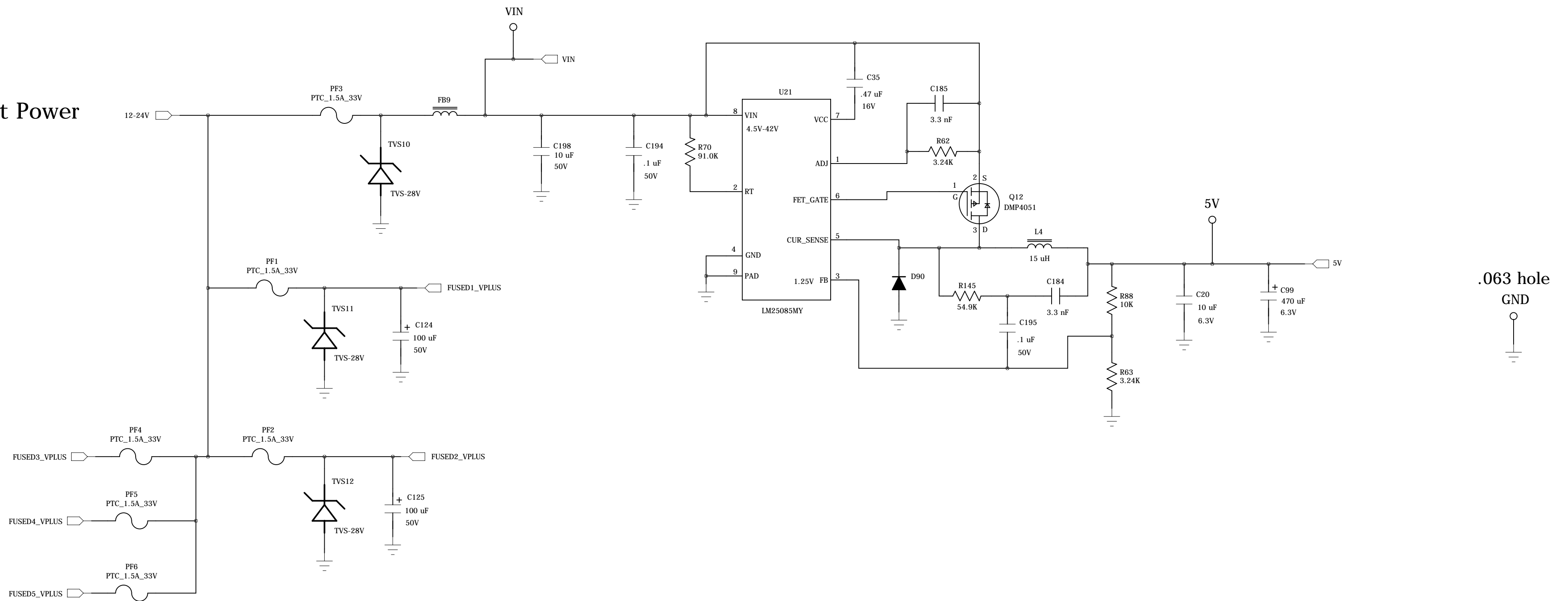
1.8V Regulator



Technologic Systems	Date May 6, 2012
Title: TS-7580 Power Supplies	
Rev: A	Designer RLM Sheet 4 of 25

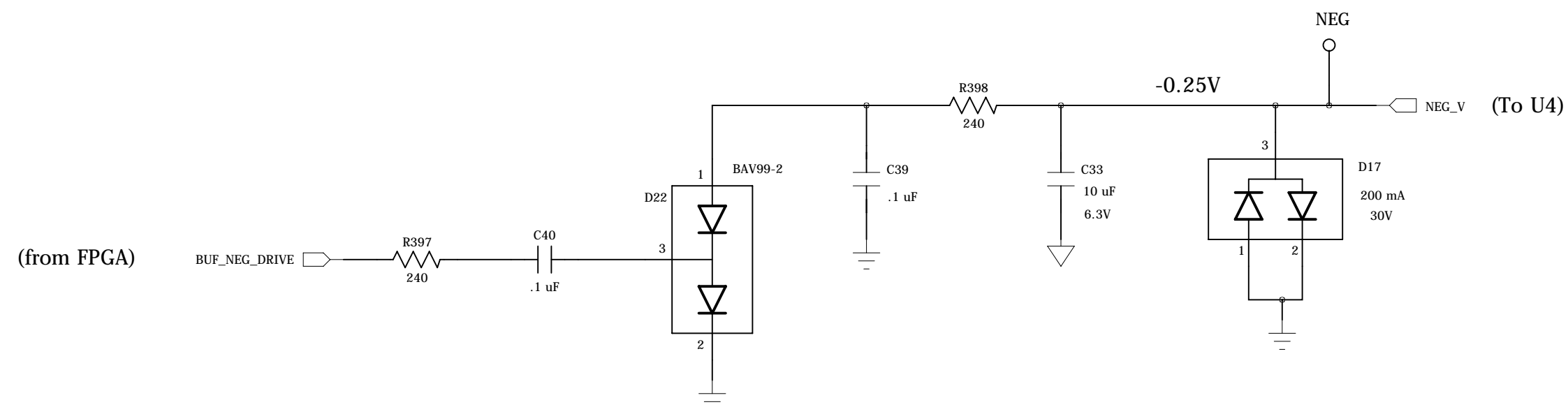
5V Power Supply (2.0 Amps)

Input Power



.063 hole
GND

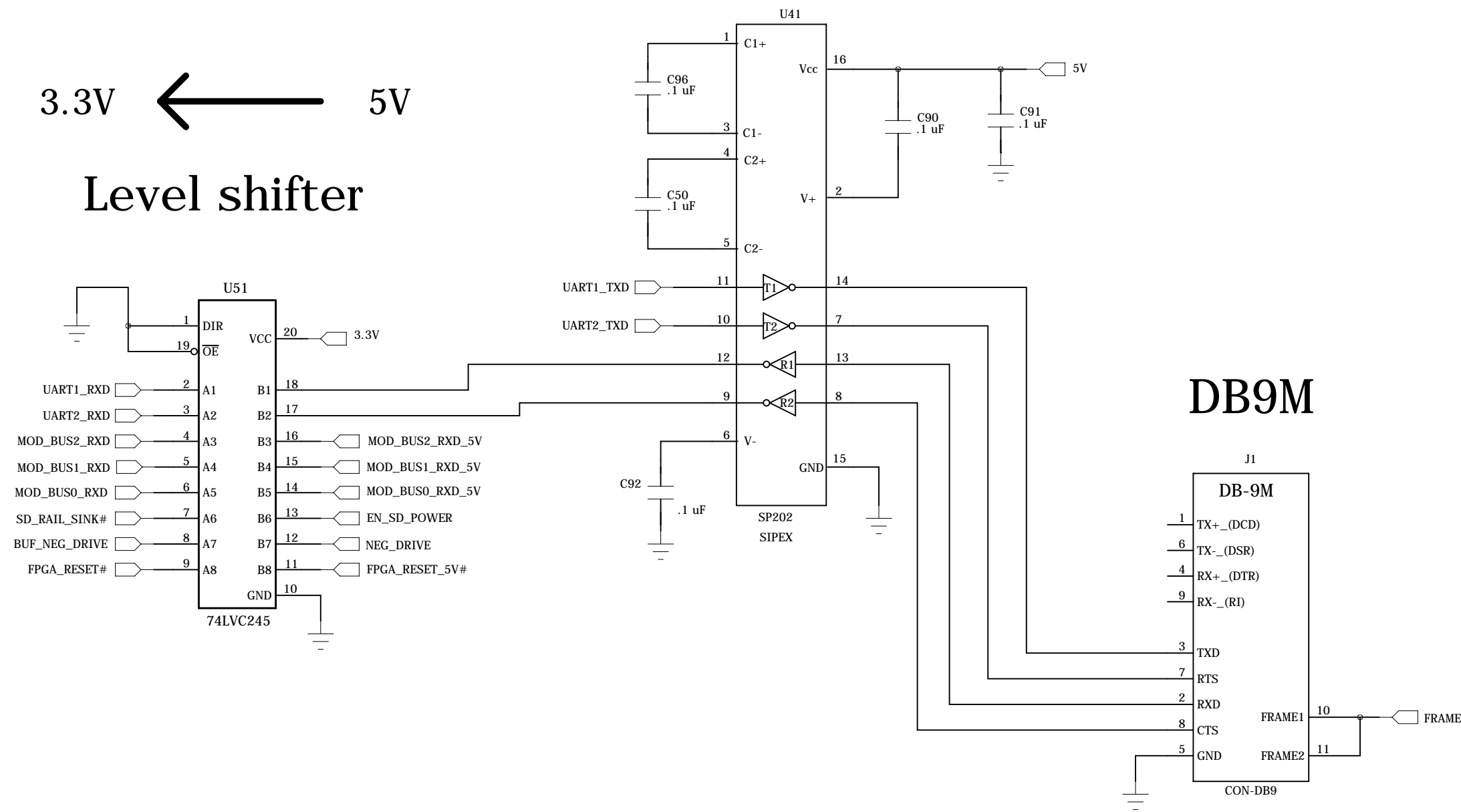
Negative Rail for ADC Op Amp



Technologic Systems	Date: May 6, 2012
Title: TS-7580 5V Power and Neg. Rail	
Rev: A	Designer
Sheet 5 of 25	

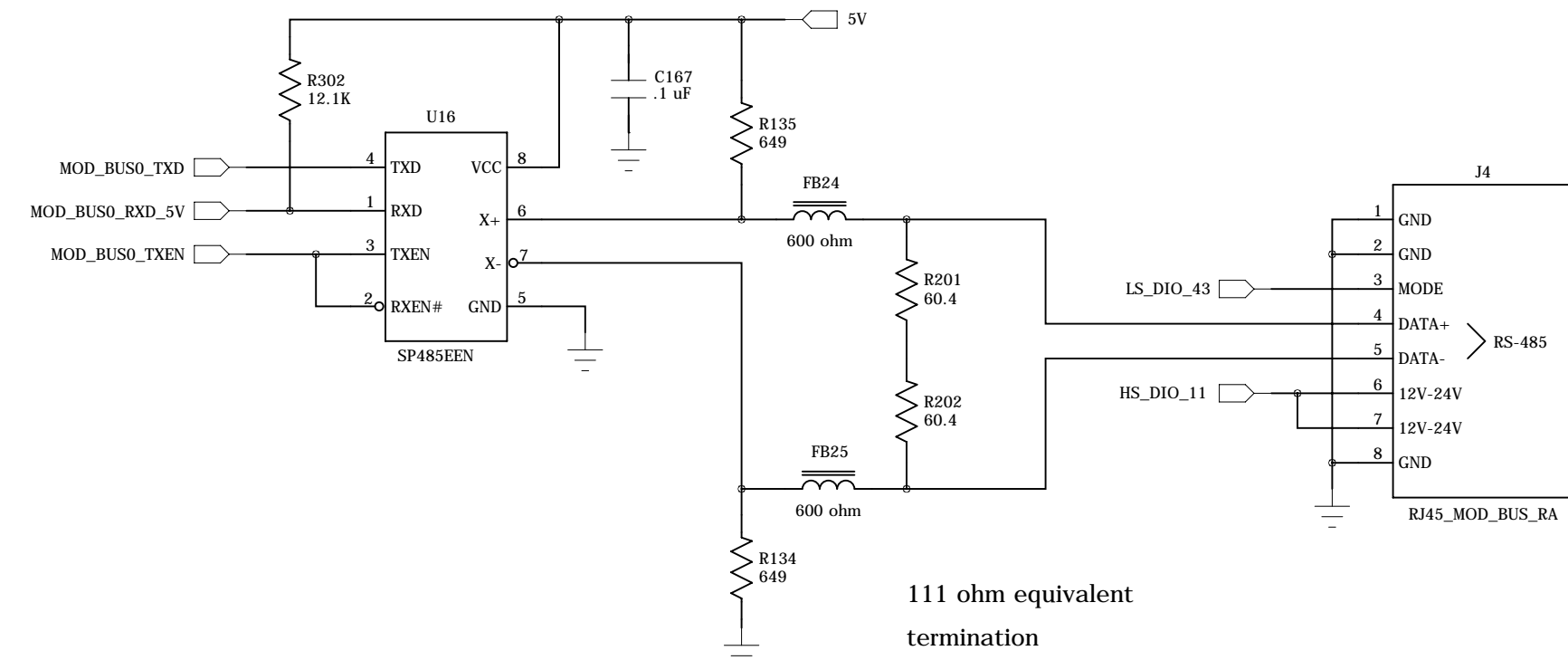
RS-232 Transceiver

3.3V ← 5V
Level shifter



MOD Bus #0

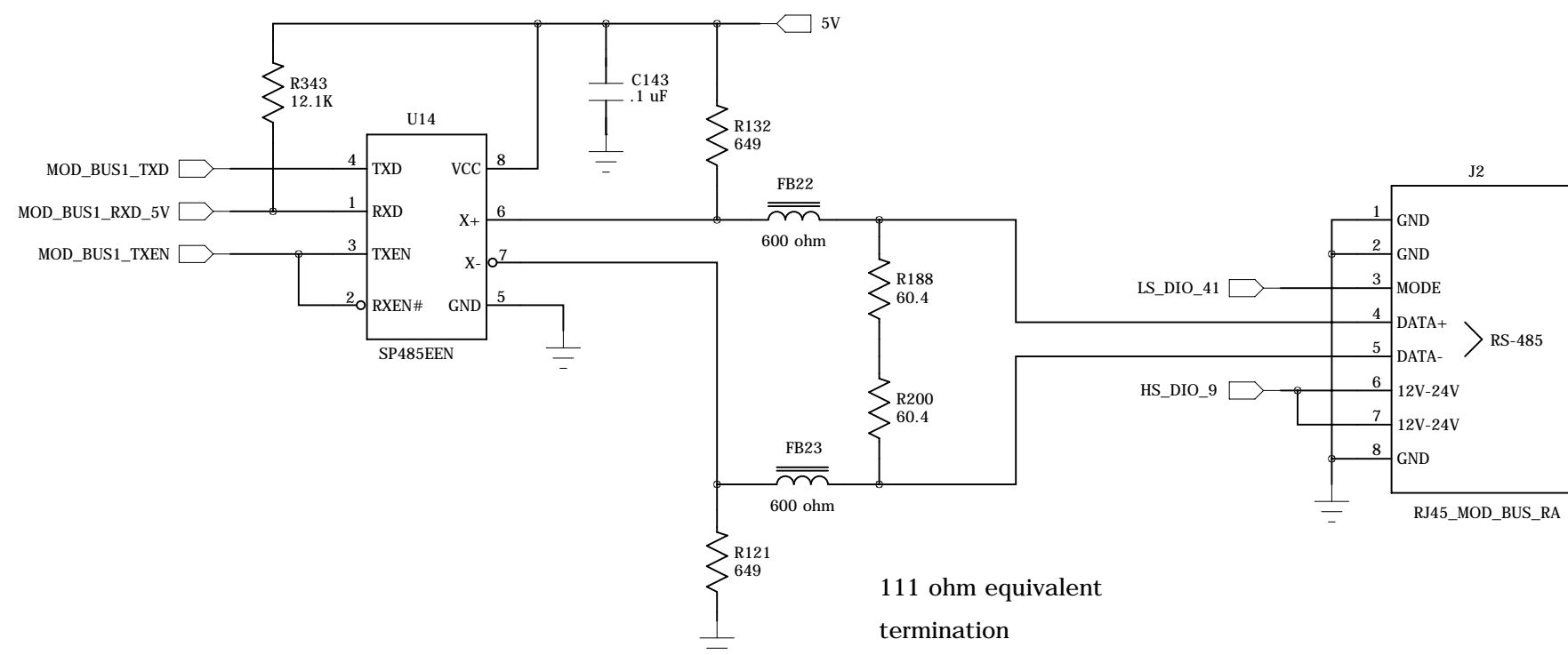
RS-485 Driver



111 ohm equivalent termination

MOD Bus #1

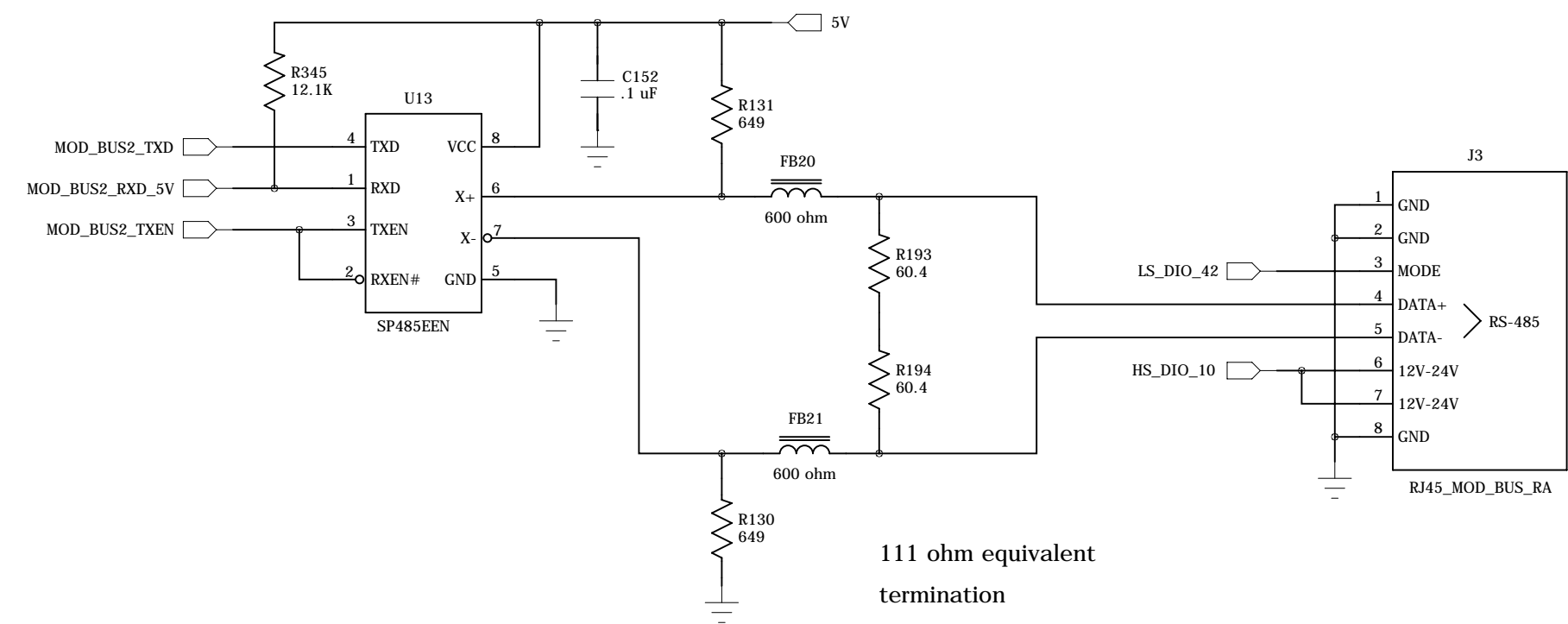
RS-485 Driver



111 ohm equivalent termination

MOD Bus #2

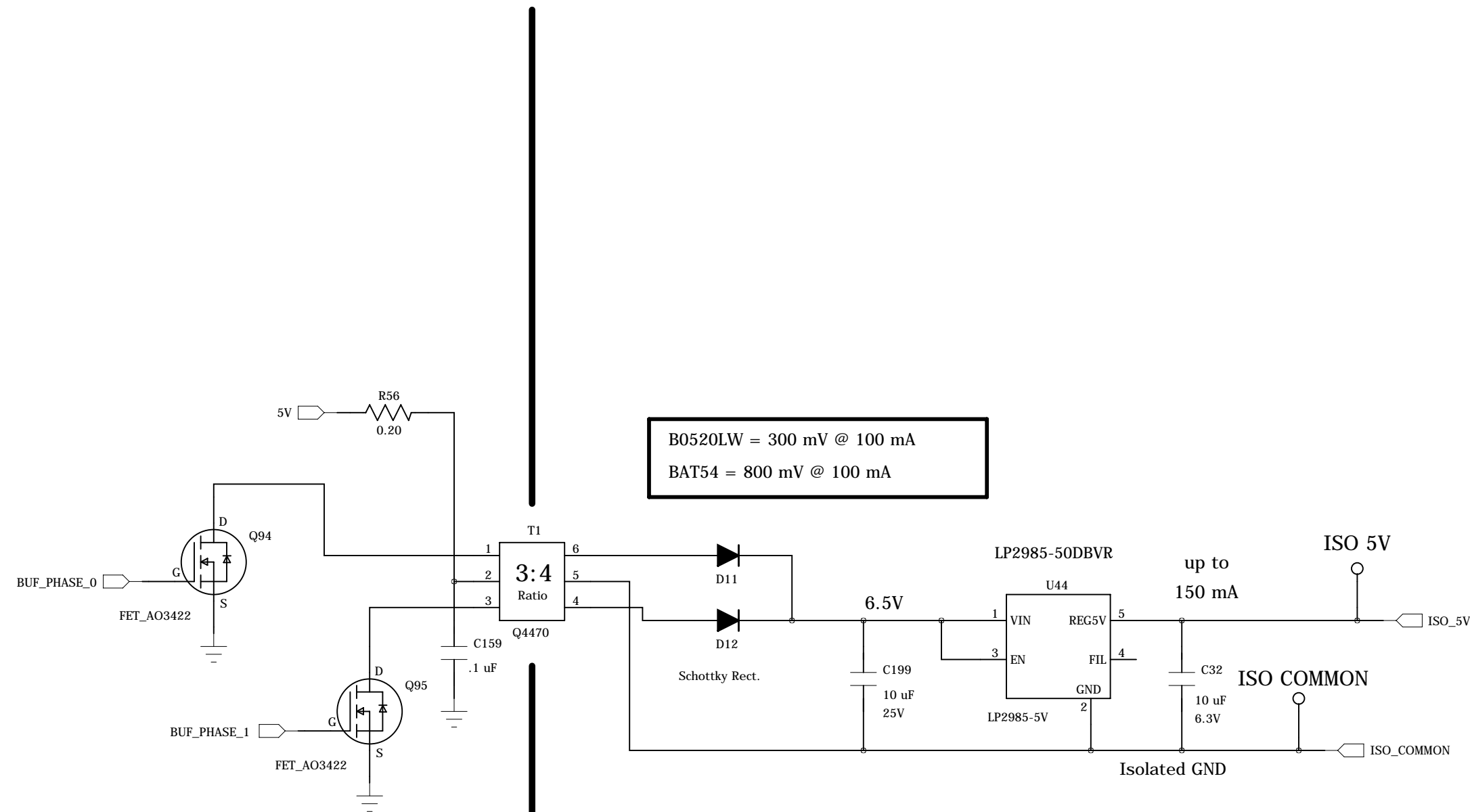
RS-485 Driver



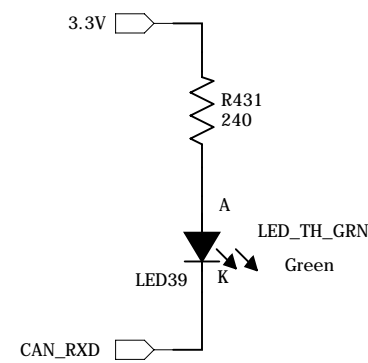
111 ohm equivalent termination

Technologic Systems	Date	May 6, 2012
Title: TS-7580 COM port, CAN, RS-485		
Rev: A	Designer	RLM
		Sheet 6 of 25

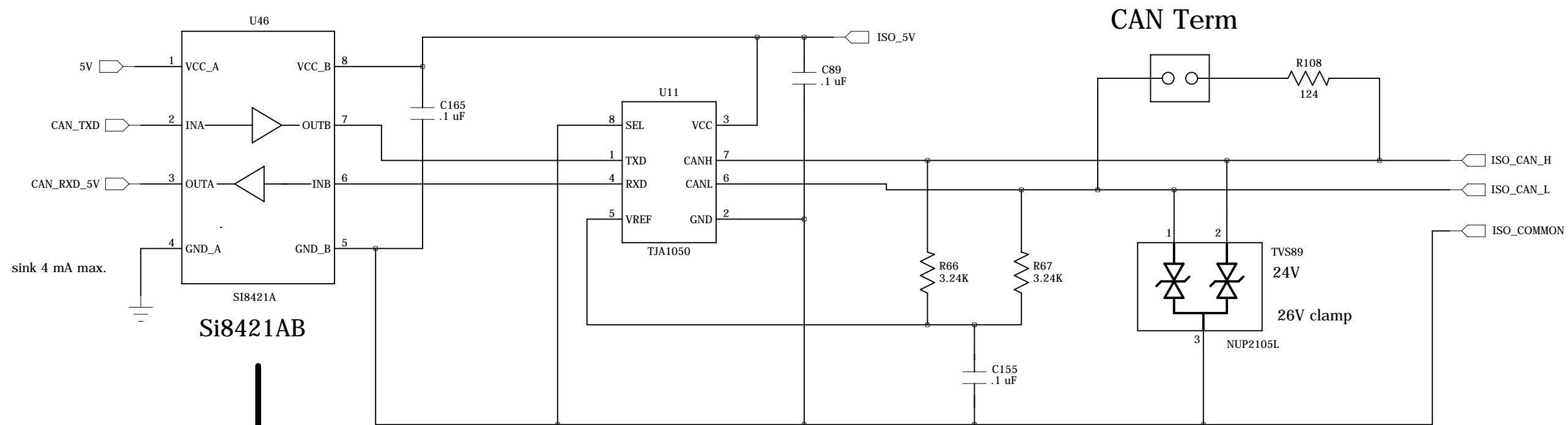
Opto-Isolated Power and Isolated CAN



CAN Activity LED

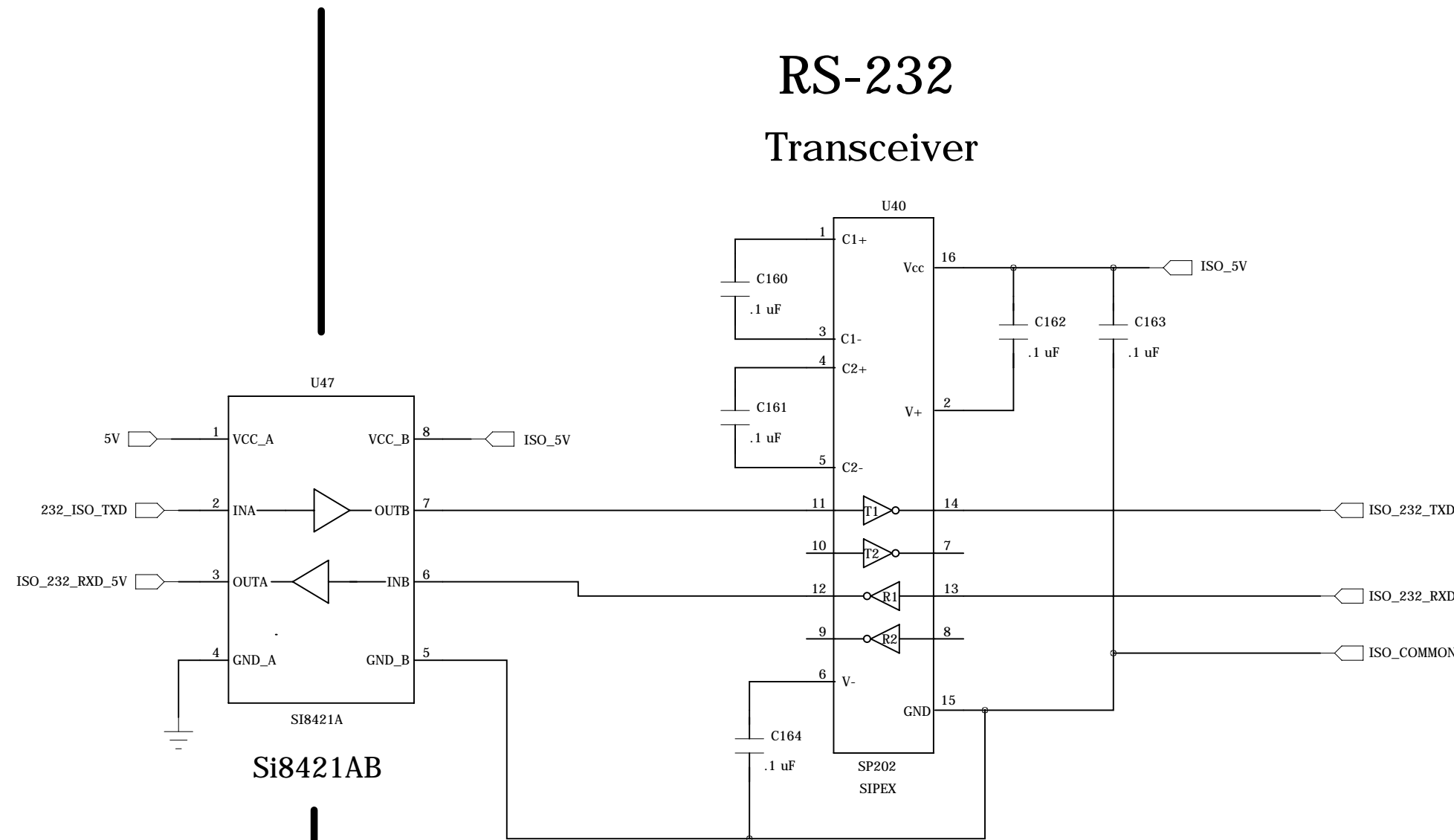


CAN Transceiver

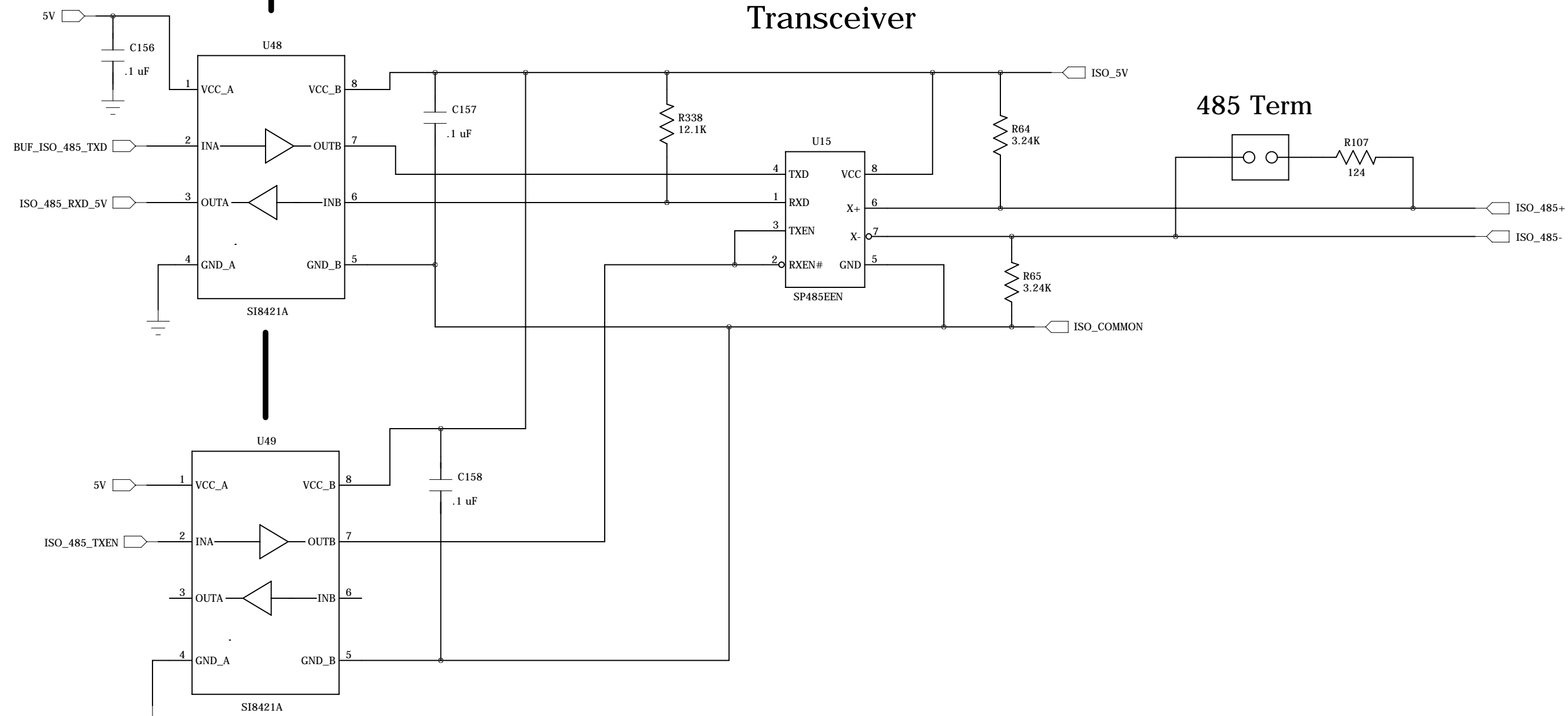


Isolated RS-232 and RS-485

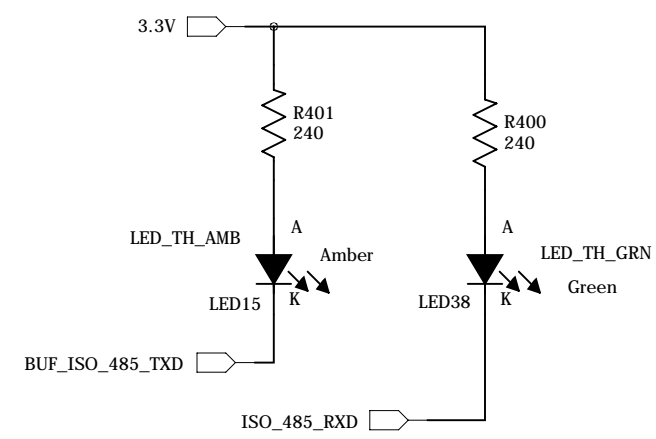
RS-232 Transceiver



RS-485 Transceiver

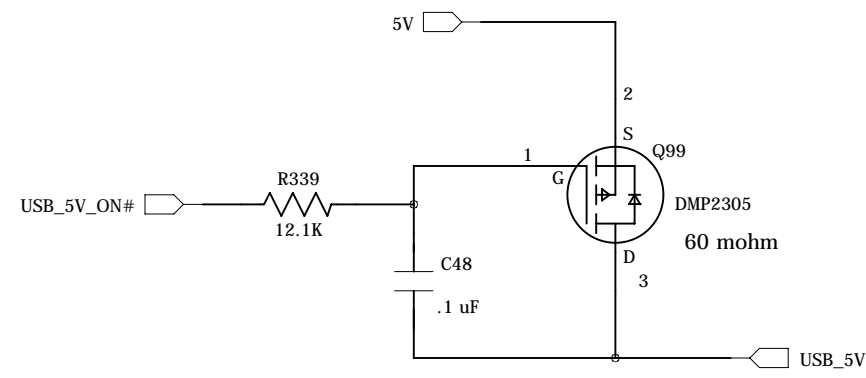


RS-485 LEDs

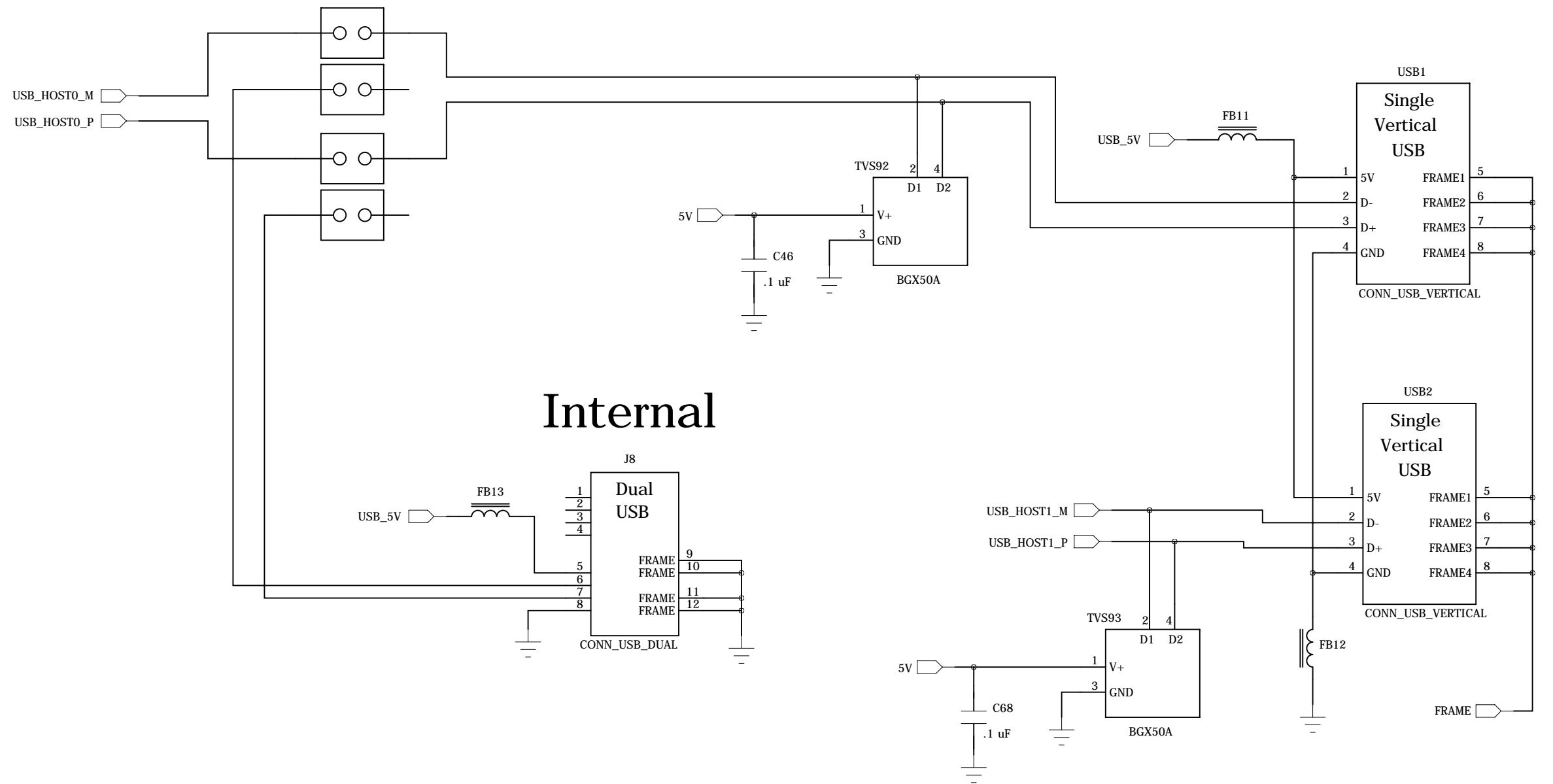


Technologic Systems	Date	May 6, 2012
Title: TS-7580 Isolated RS-232 and RS-485		
Rev: A	Designer	Sheet 8 of 25

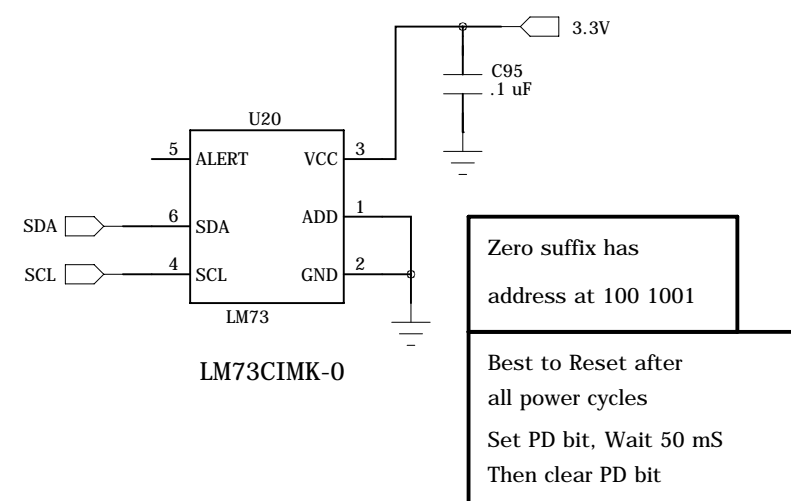
USB Power Switch



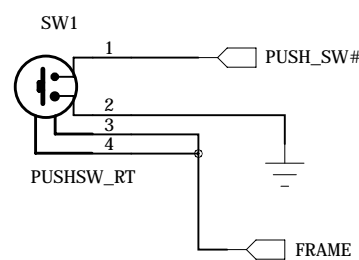
USB ports



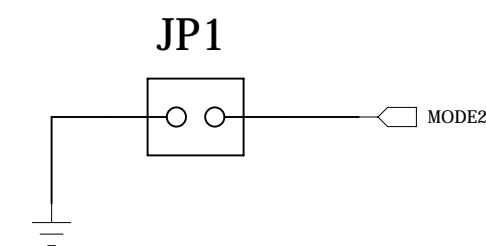
Temp Sensor



Push Switch



Force Boot to SD card



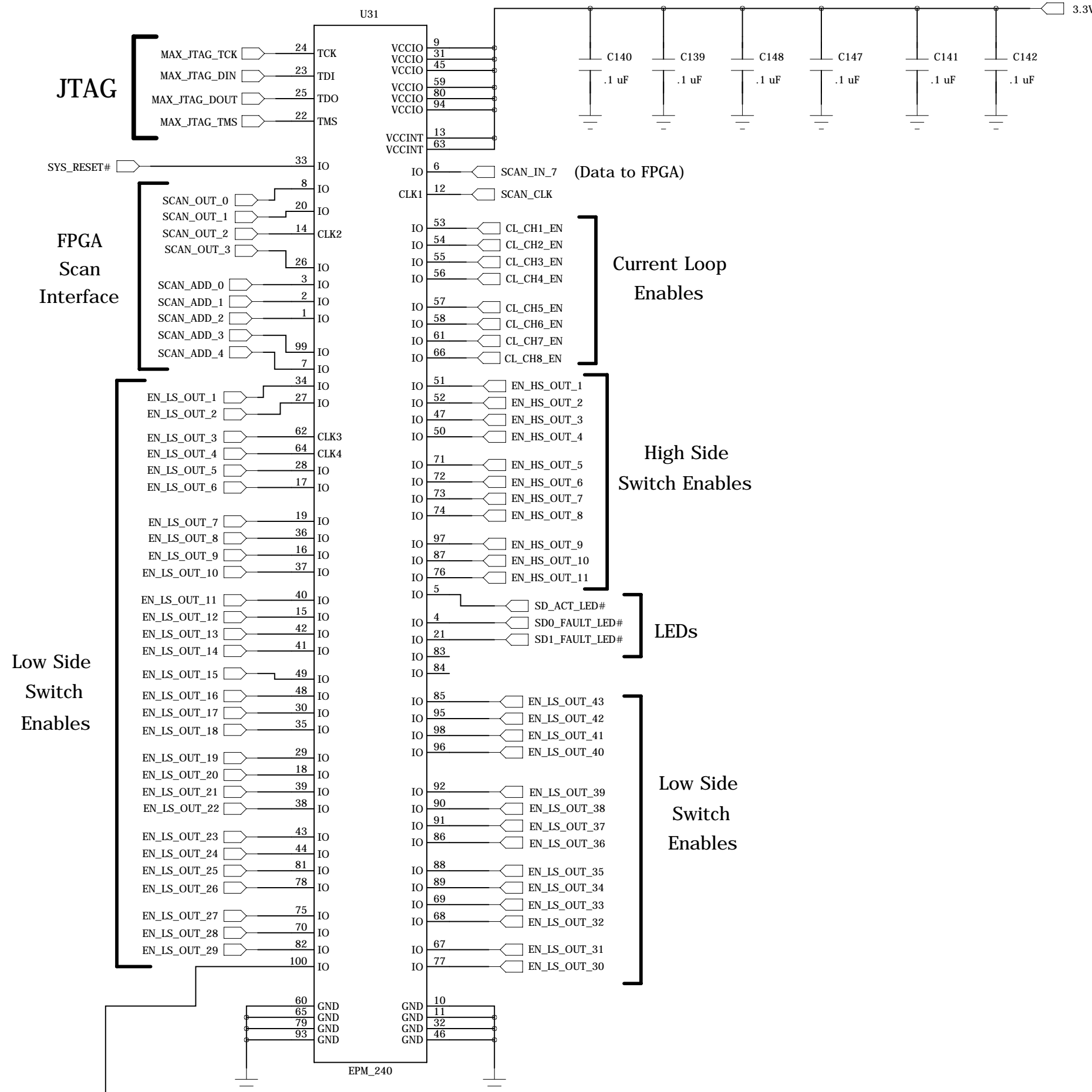
Technologic Systems	Date May 6, 2012
Title: TS-7580 USB, Temp Sensor, Flash	
Rev: A	Designer RLM Sheet 9 of 25

2 Isolated Inputs

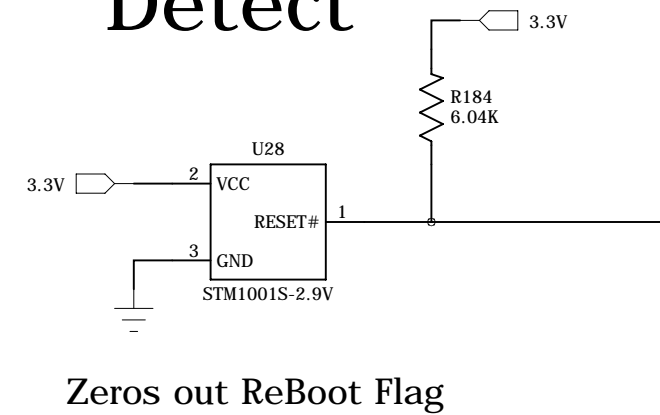
PLD

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

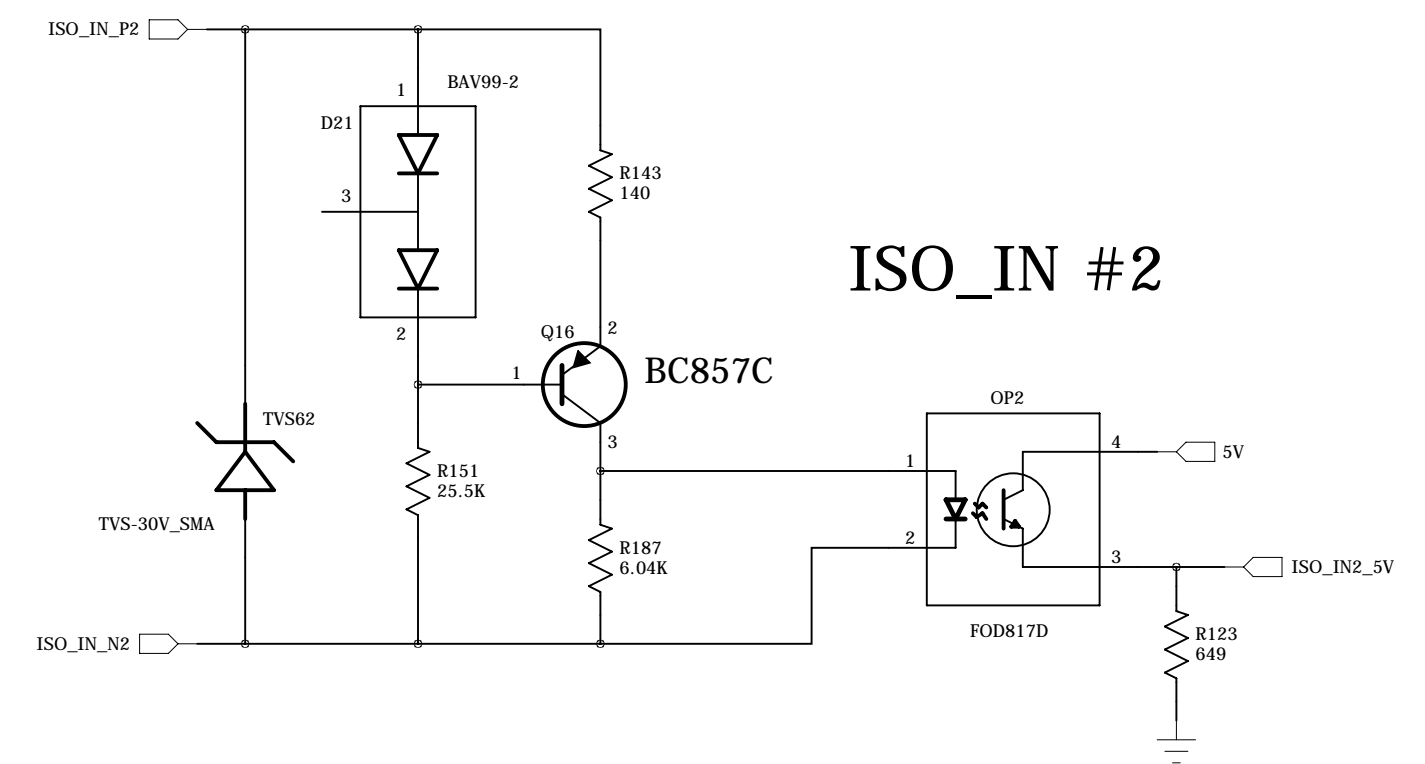
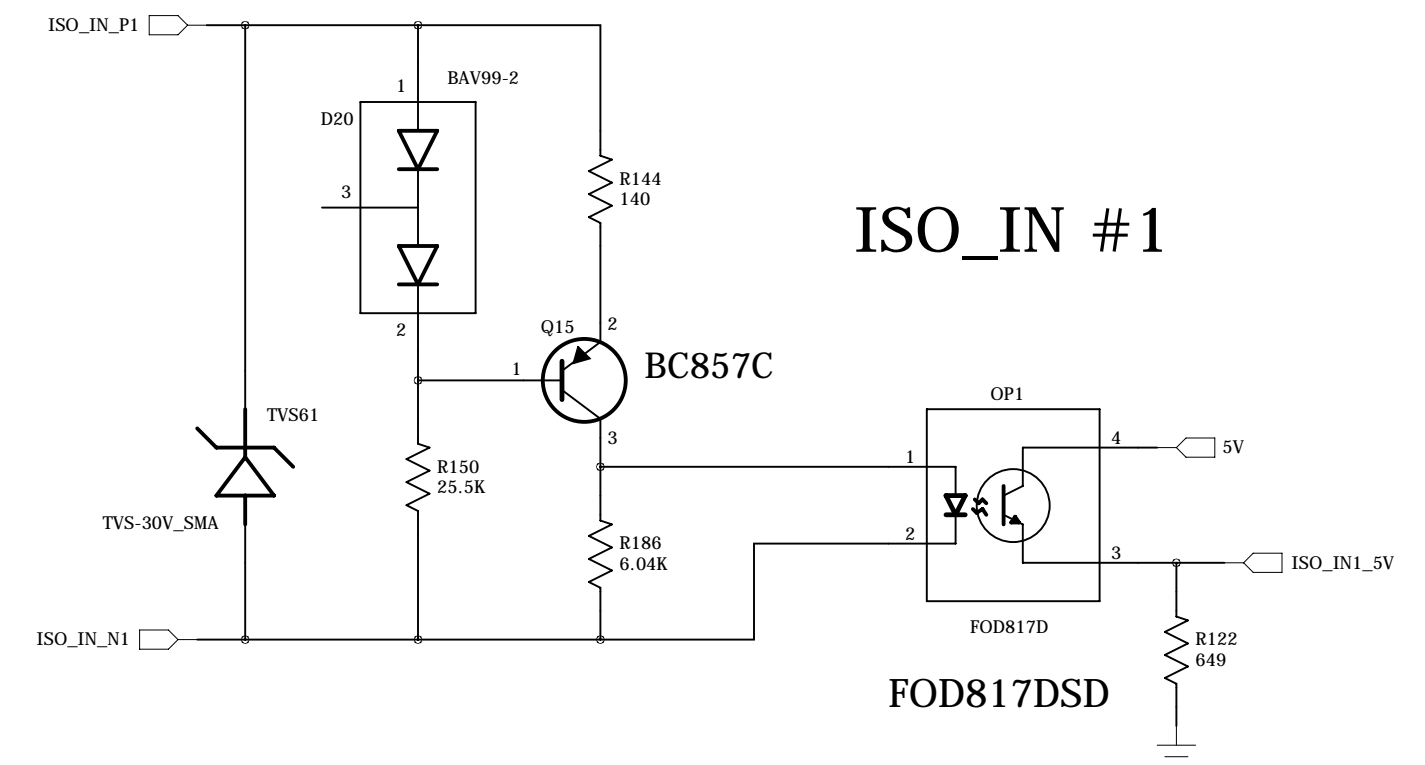
8 bits of Input =
6 PLD Version
2 NV ReBoot Flag

ReBoot Flag

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

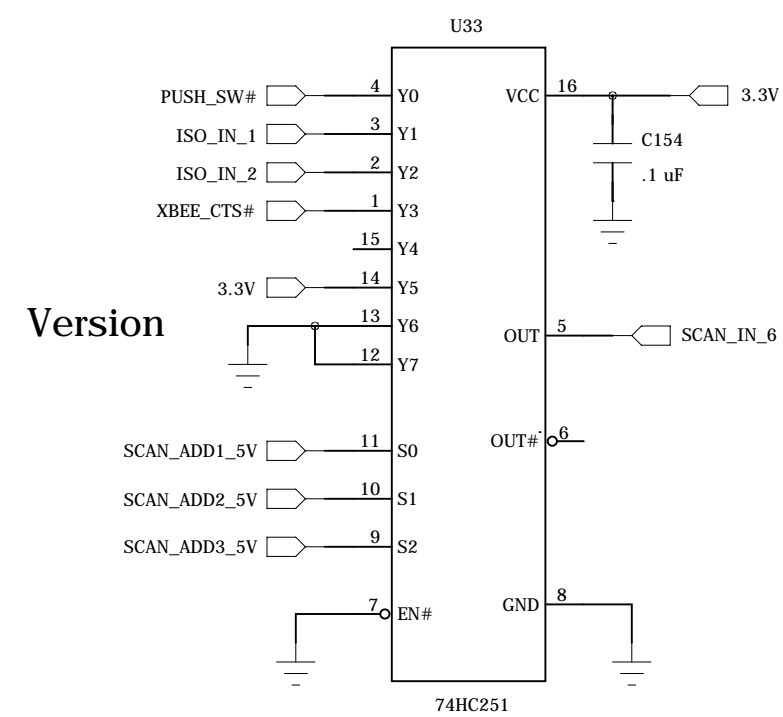
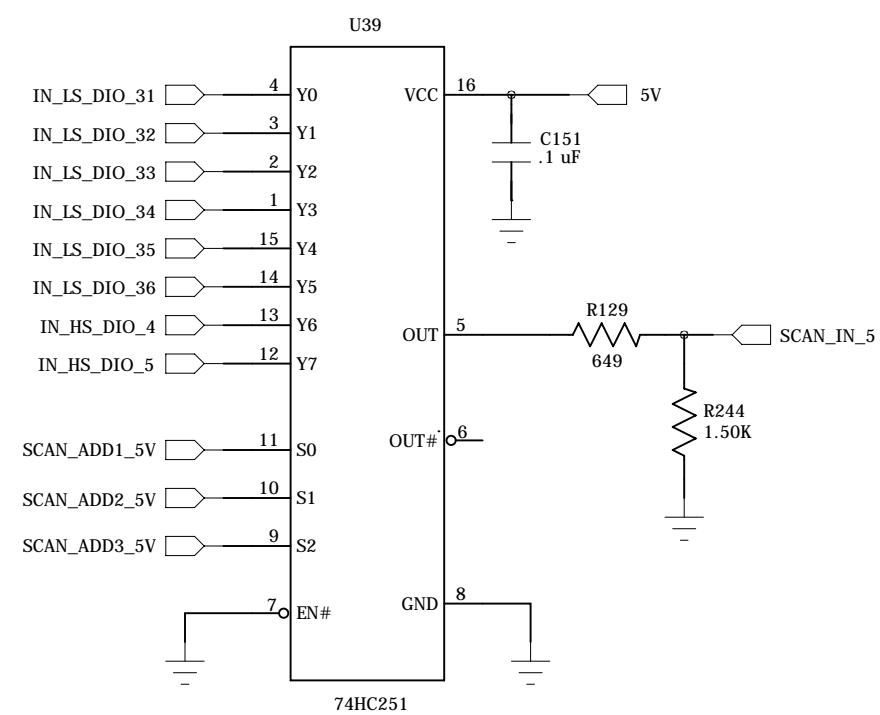
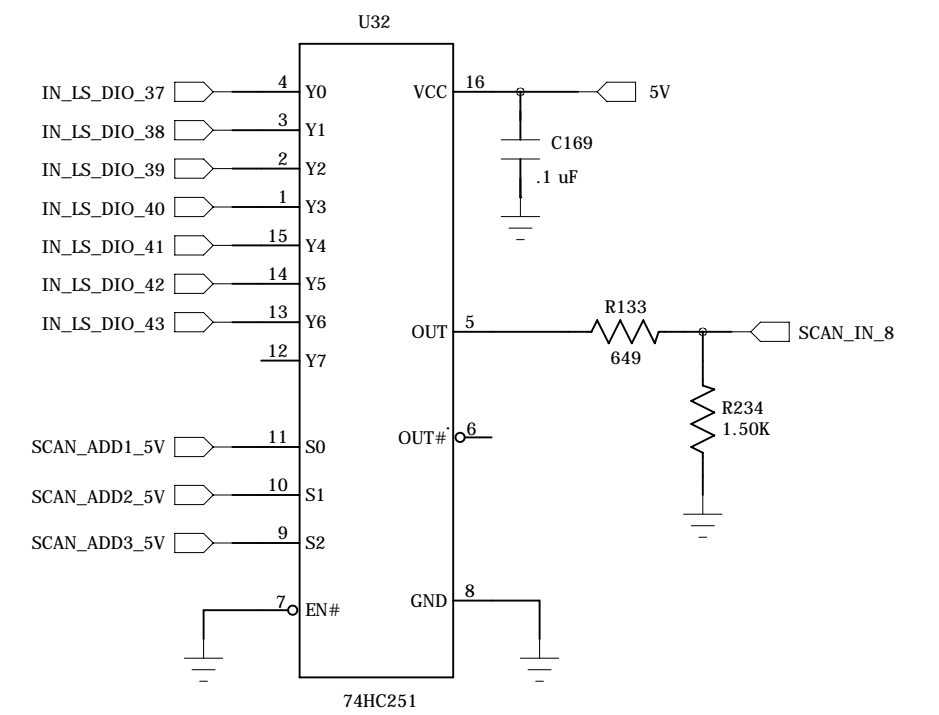
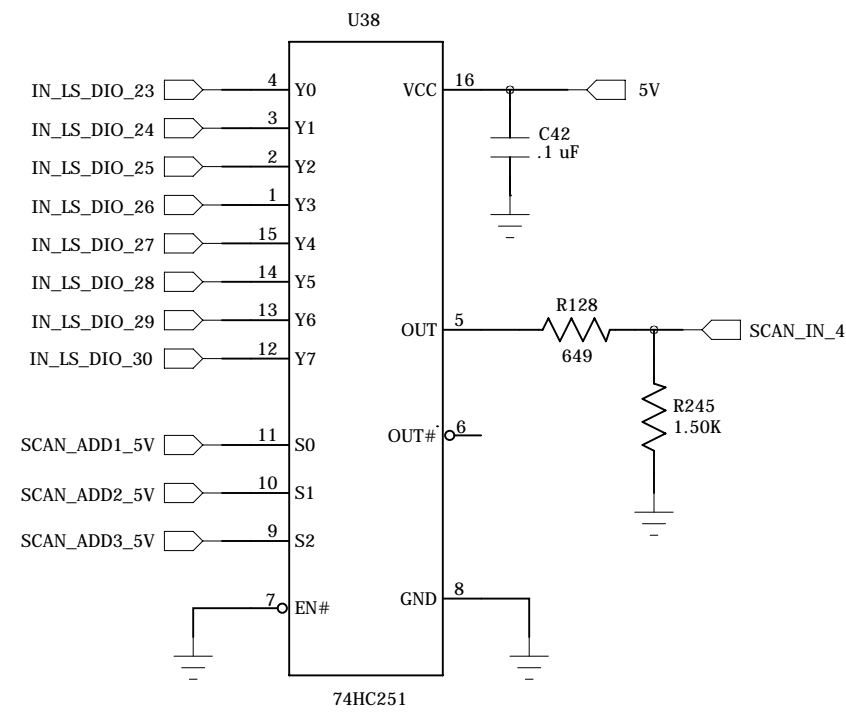
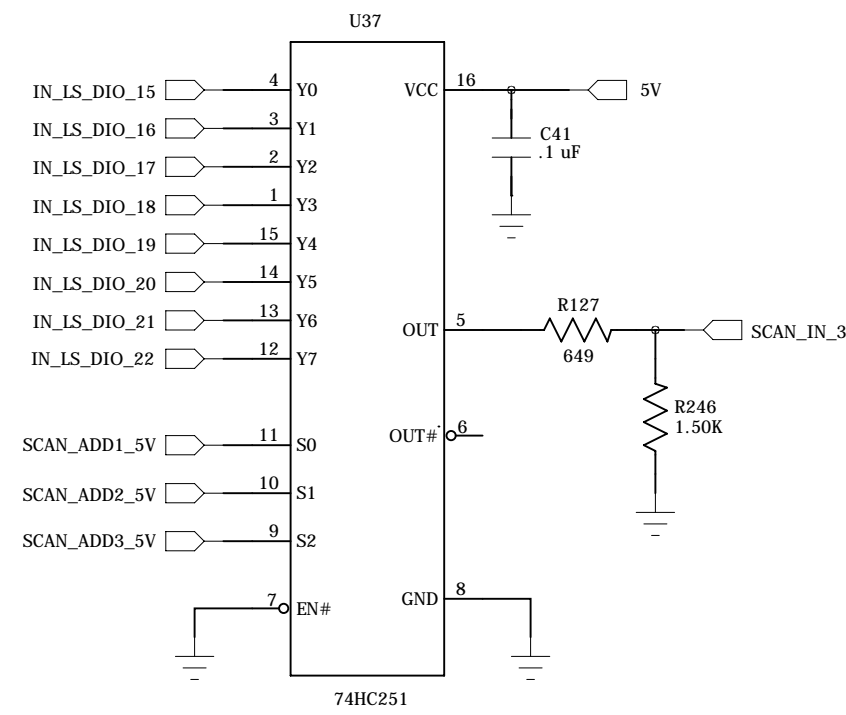
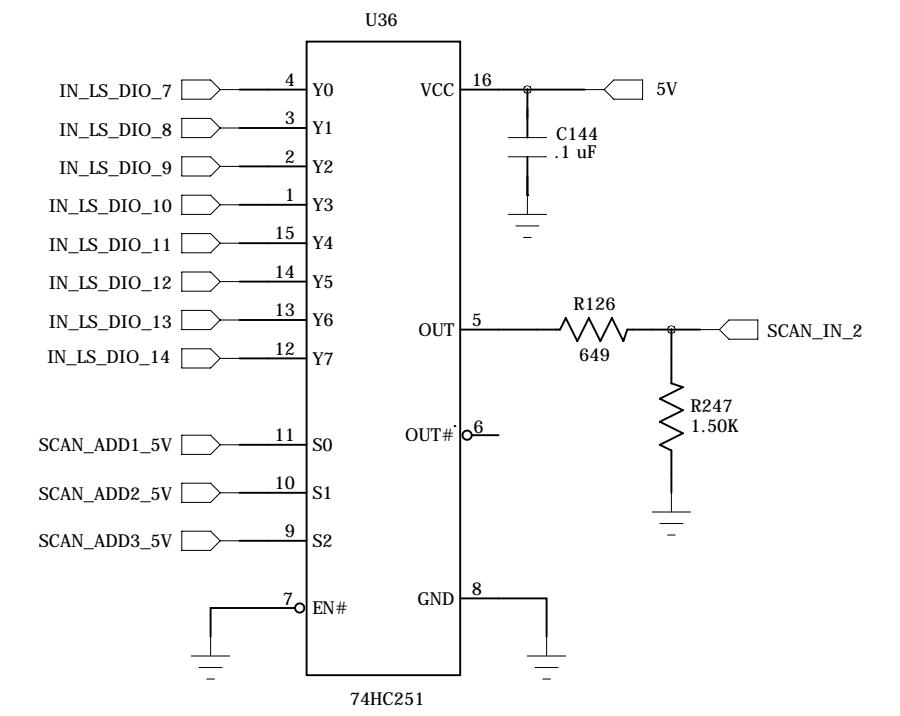
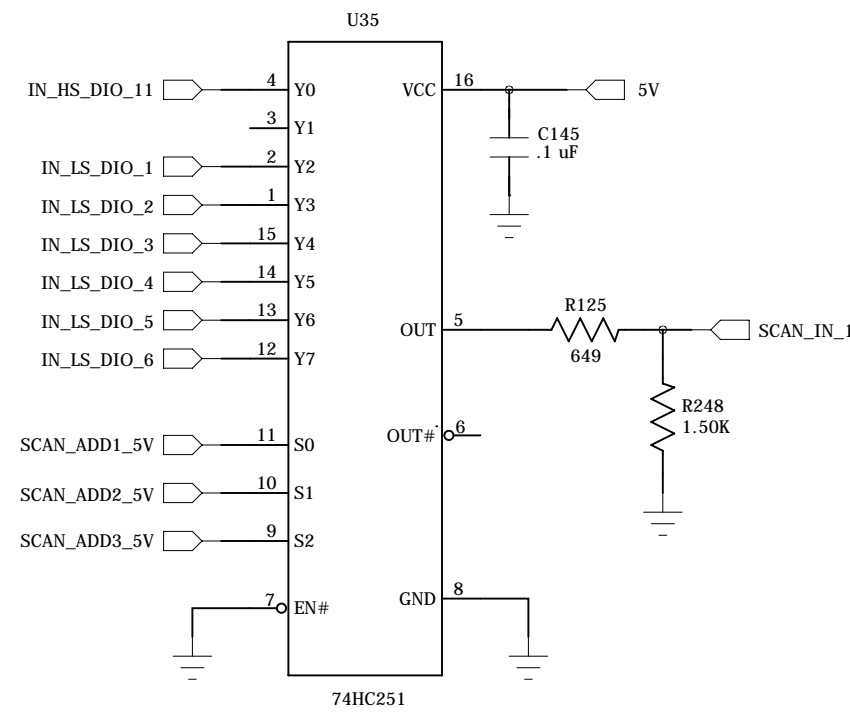
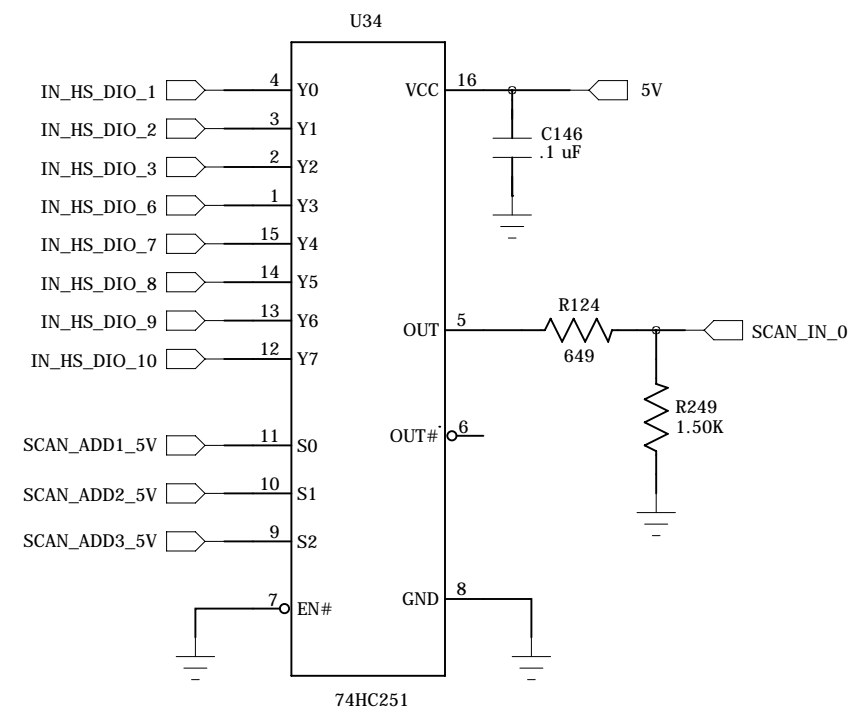
Reg. = 66 + ReBoot Flag = 68 bits total

50 KHz Bandwidth
32V tolerant



Technologic Systems	Date: May 6, 2012
Title: TS-7580 PLD and Isolated Dig. Inputs	
Rev: A	Designer
Sheet 10 of 25	

MUXes for Scanning Inputs



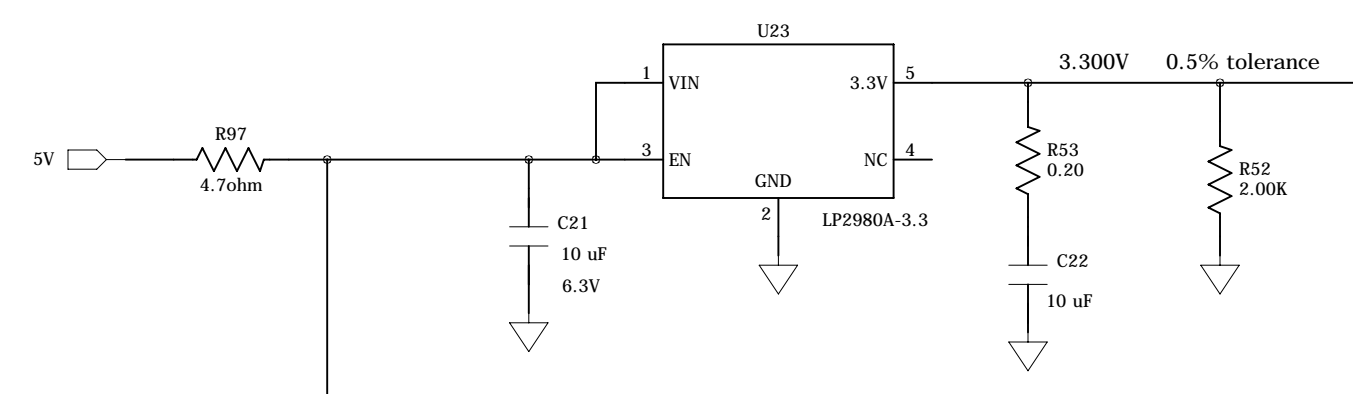
8 Channels of 12-bit A/D

ADC notes

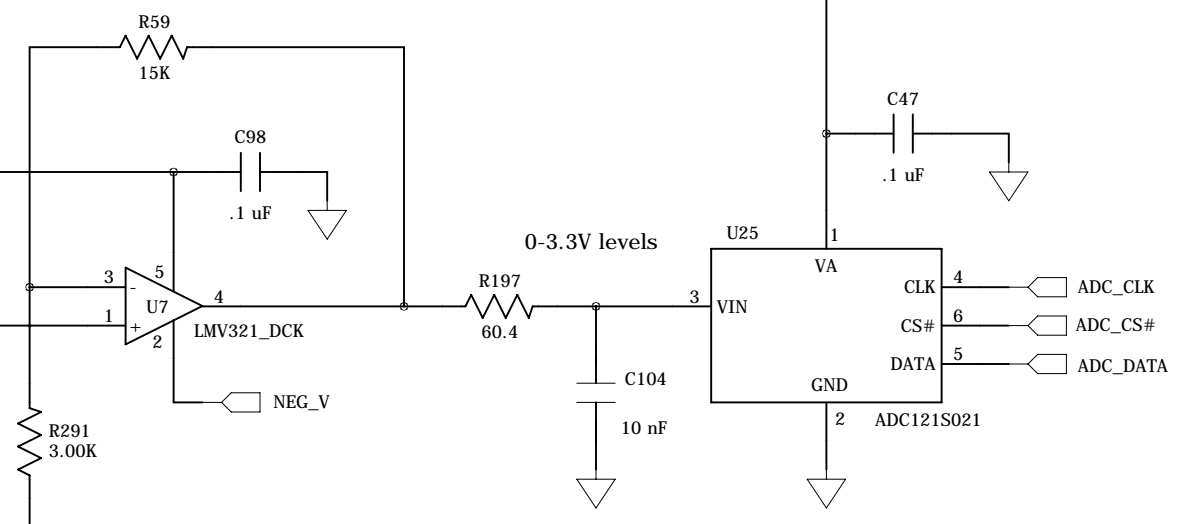
Input Imedance = >110 Kohm
TVS adds 1000-3000 pF

typ. MUX ON resistance = 120 ohm
typ. Delta between chan = 10 ohm

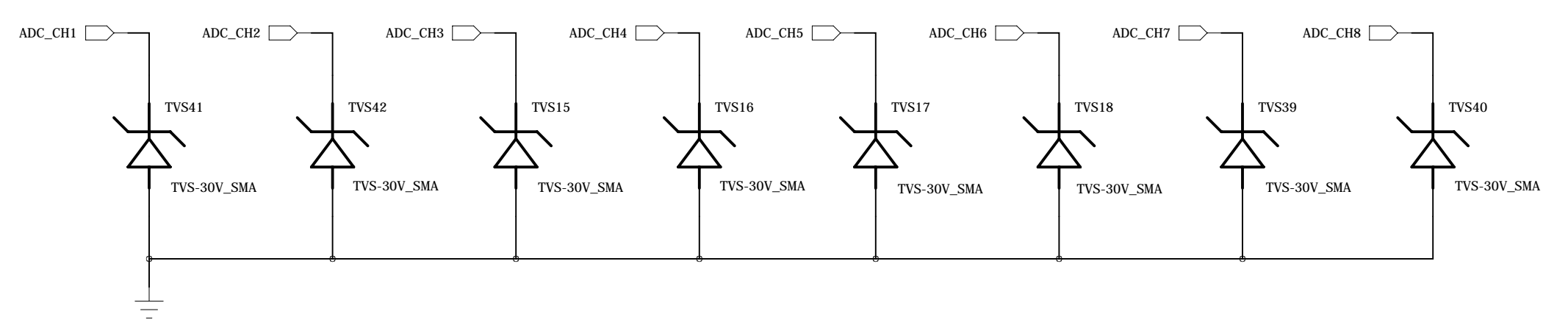
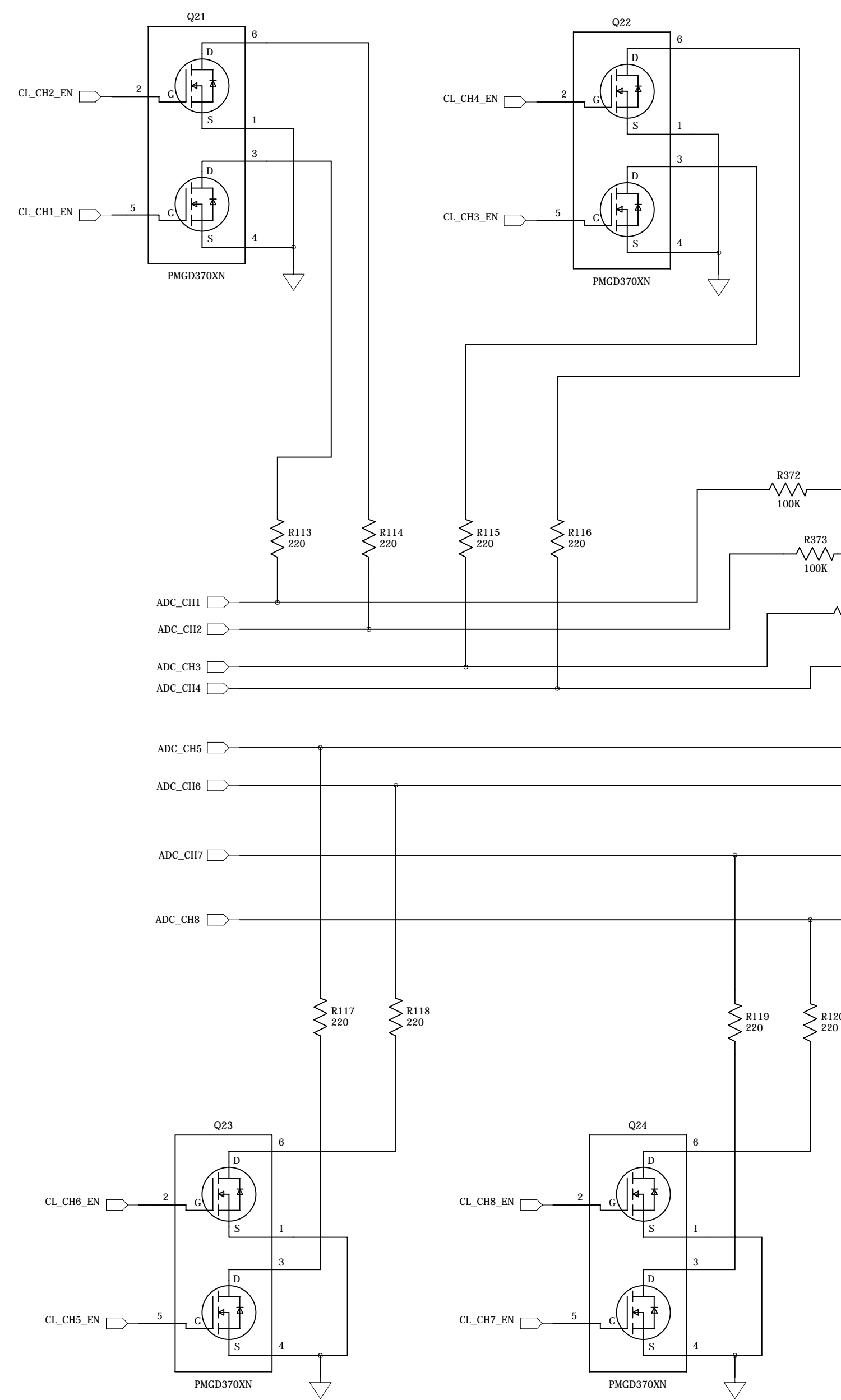
Precision 3.3V Reg.



12-bit ADC

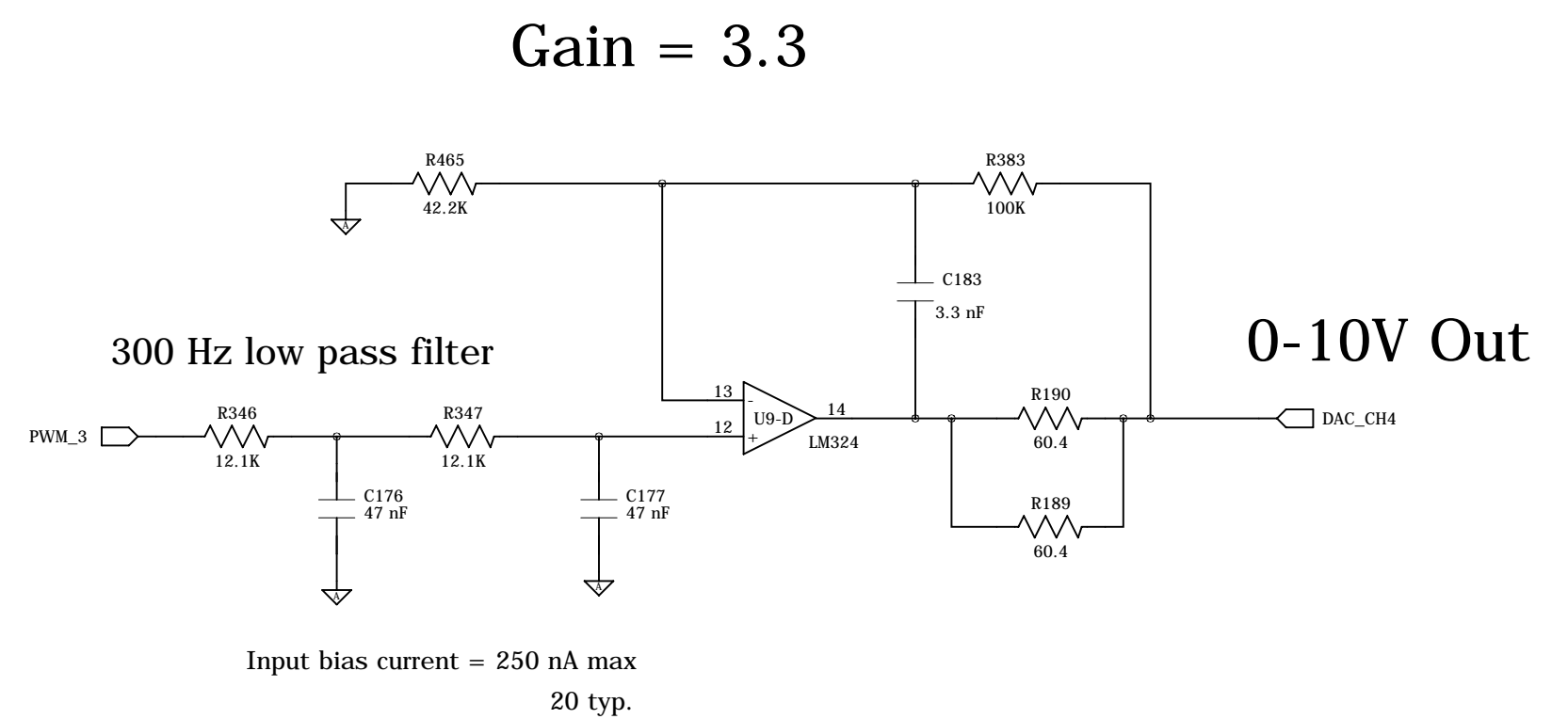
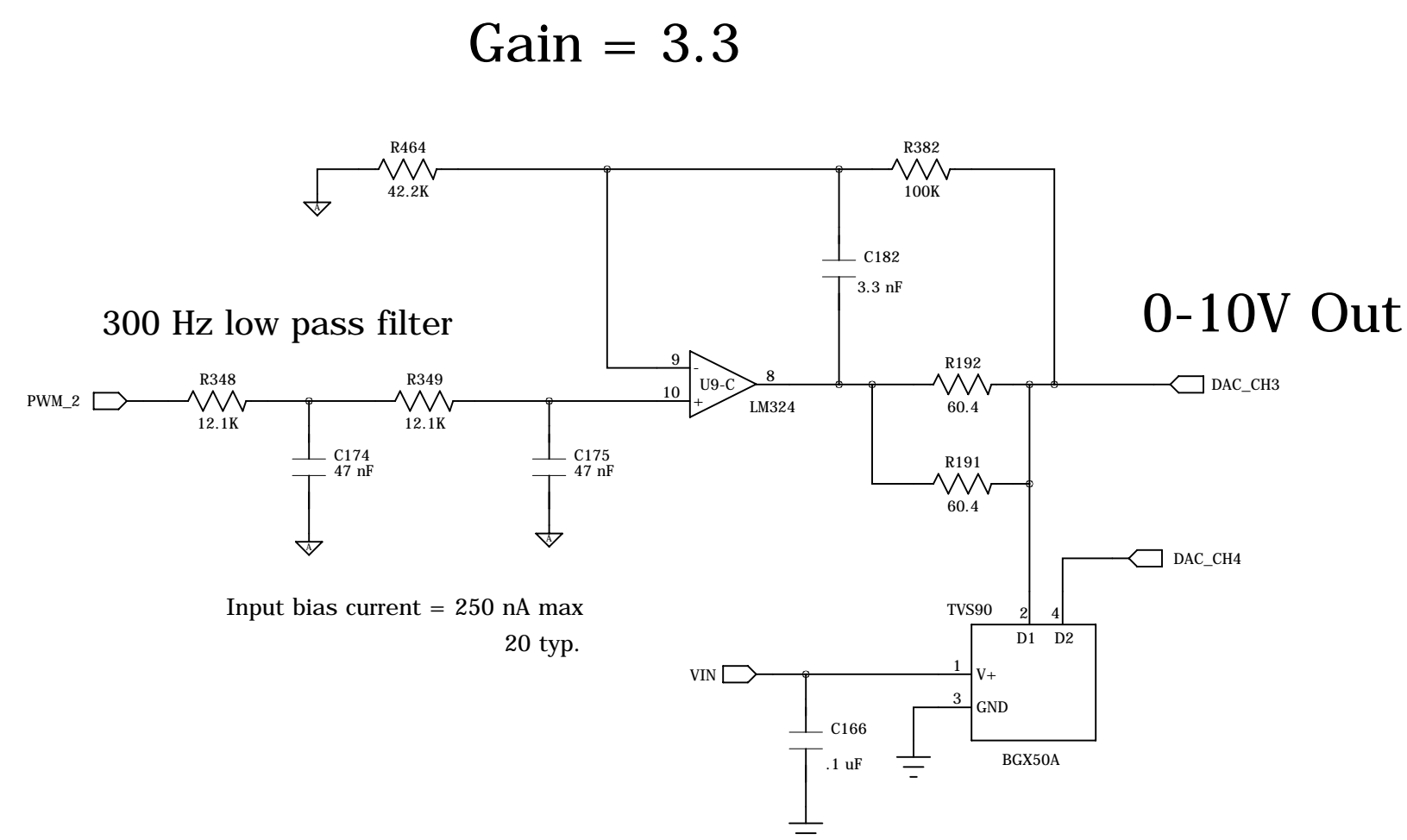
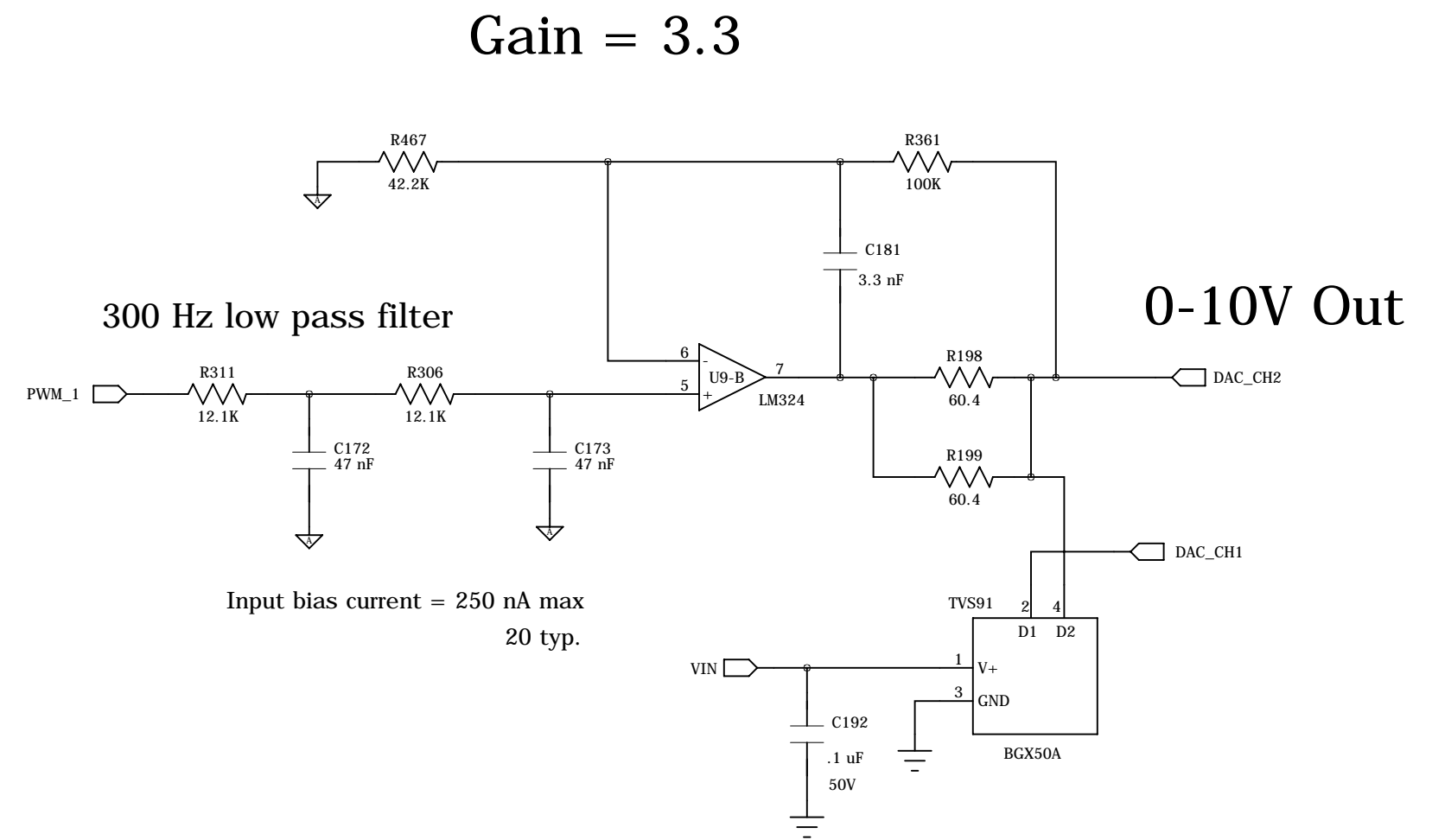
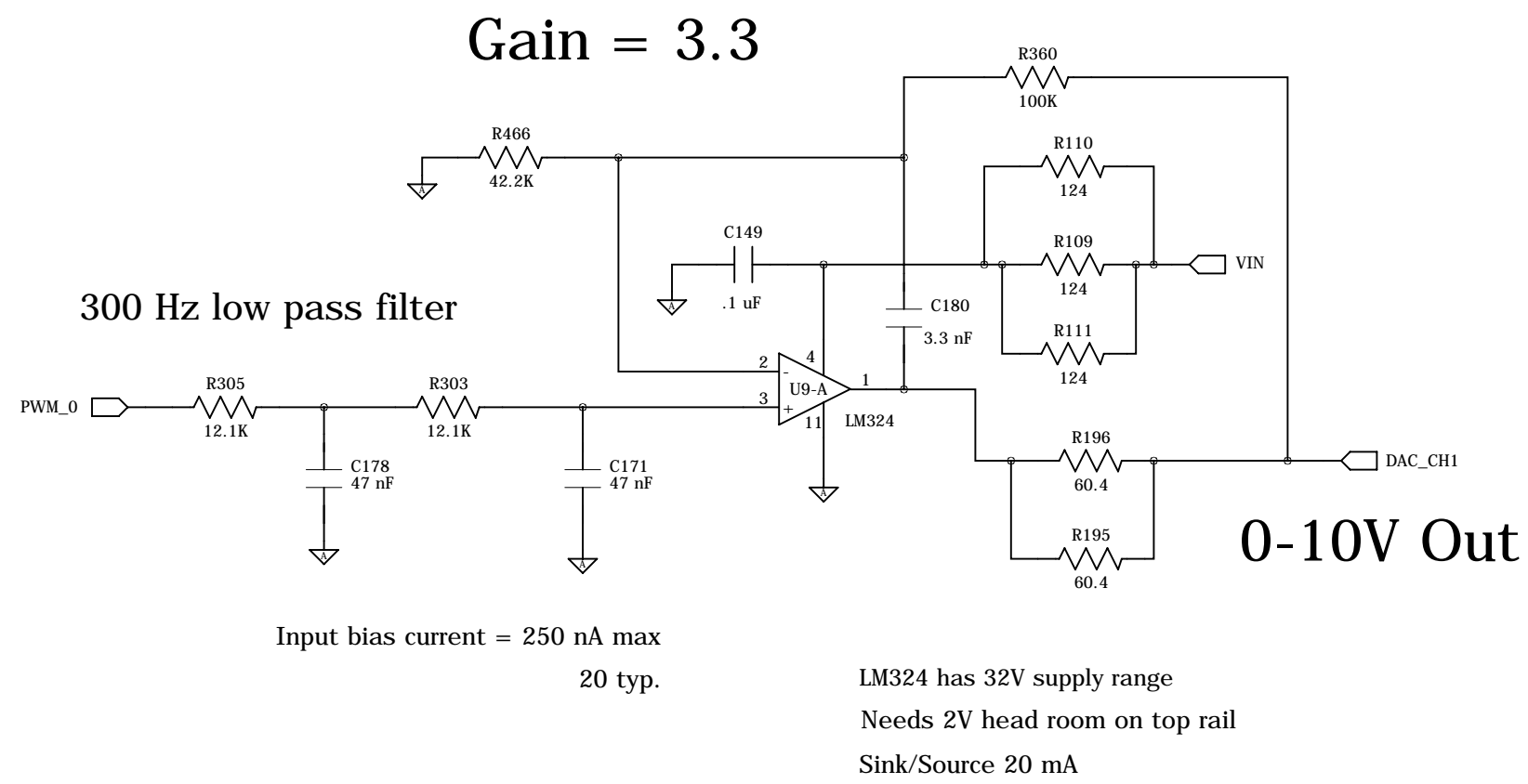


Op Amp gain = 1 or 6
Gain = 6 for 0-5V range



Technologic Systems		Date: May 6, 2012
Title: TS-7580 ADC		
Rev: A	Designer	Sheet 12 of 25

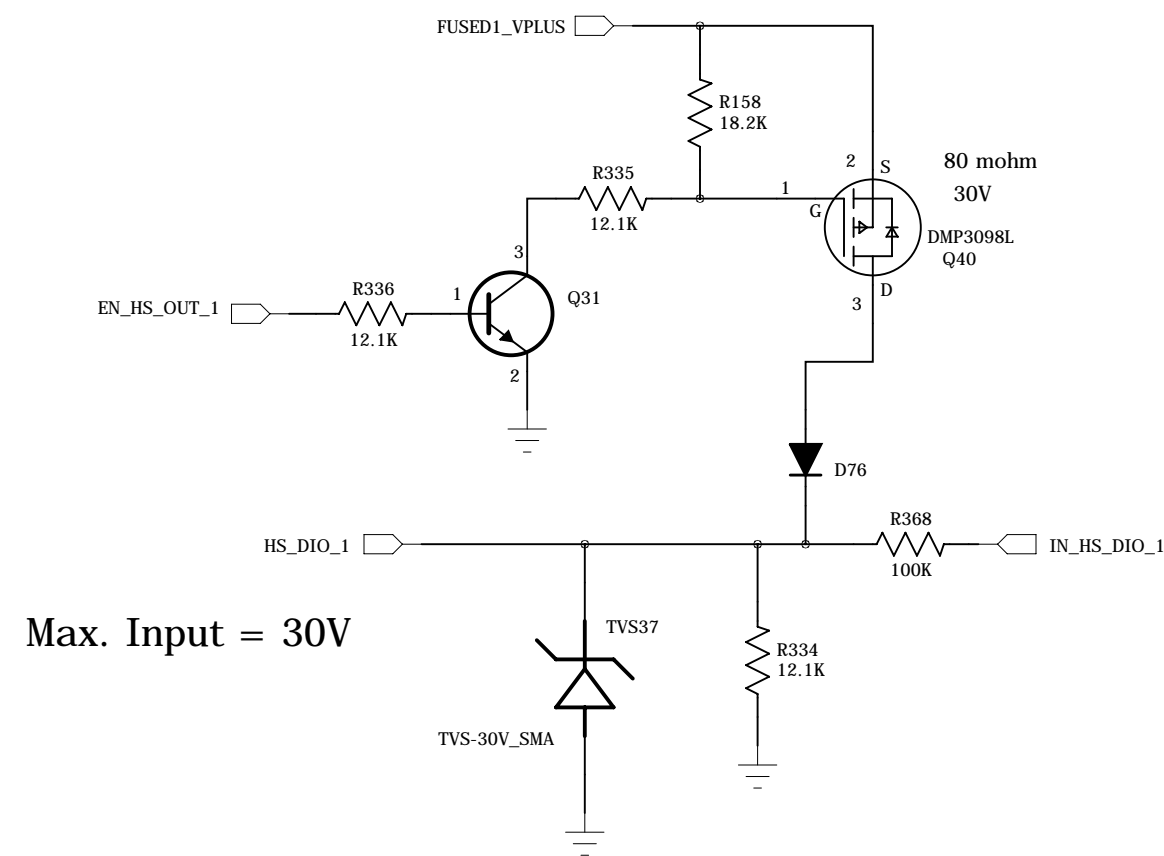
10-bit DAC Outputs



High Side Switches

High-Side Switch

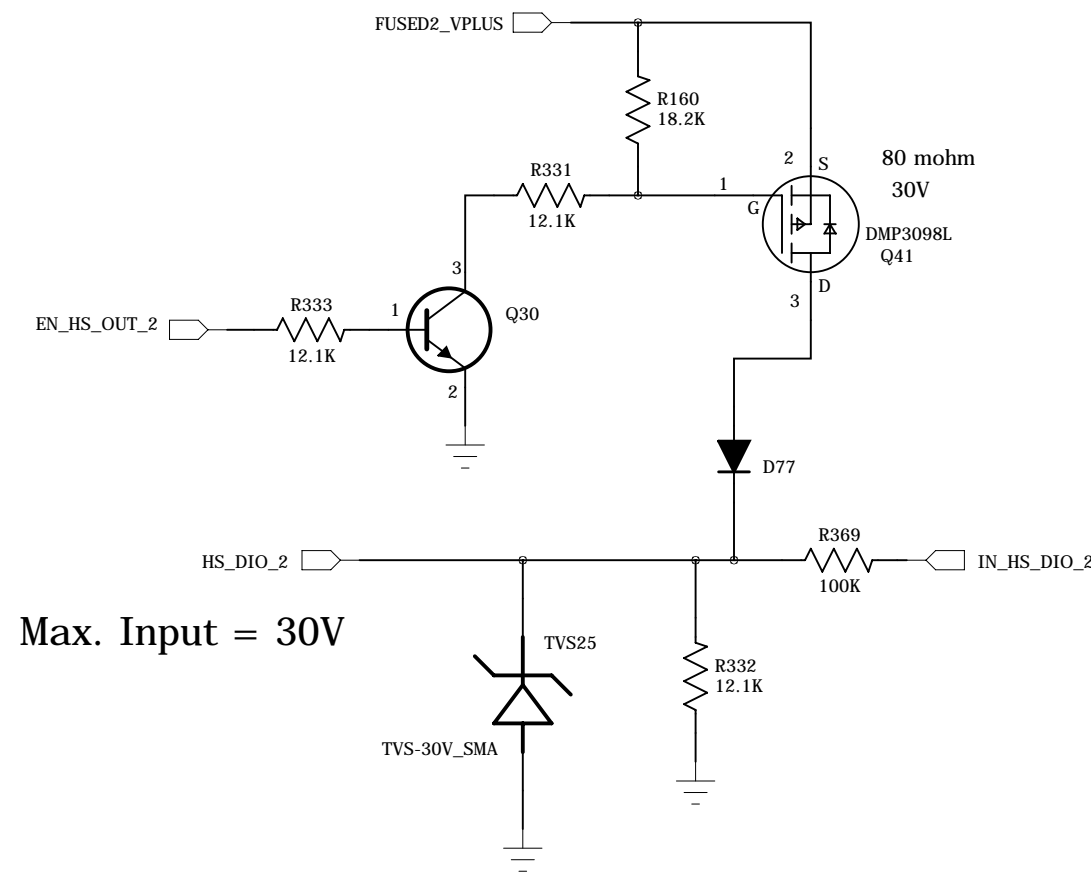
Source 500 mA



Max. Input = 30V

High-Side Switch

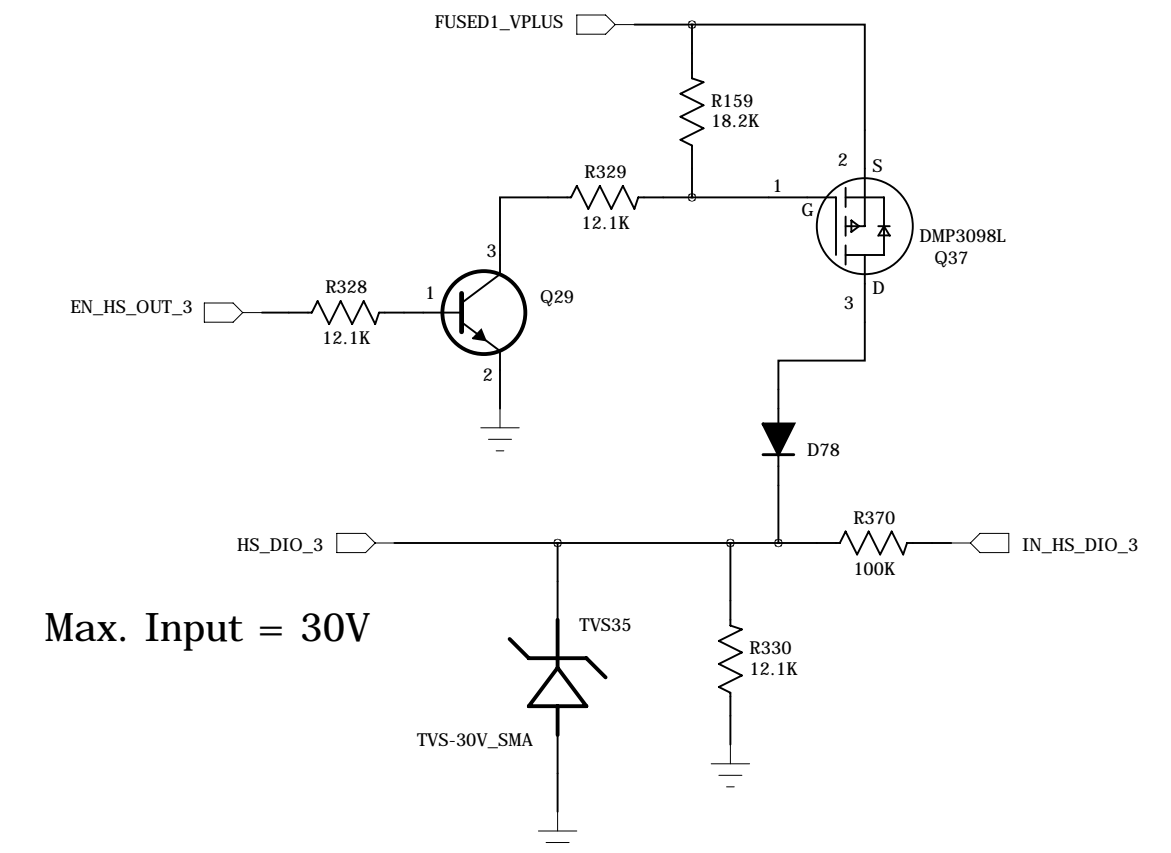
Source 500 mA



Max. Input = 30V

High-Side Switch

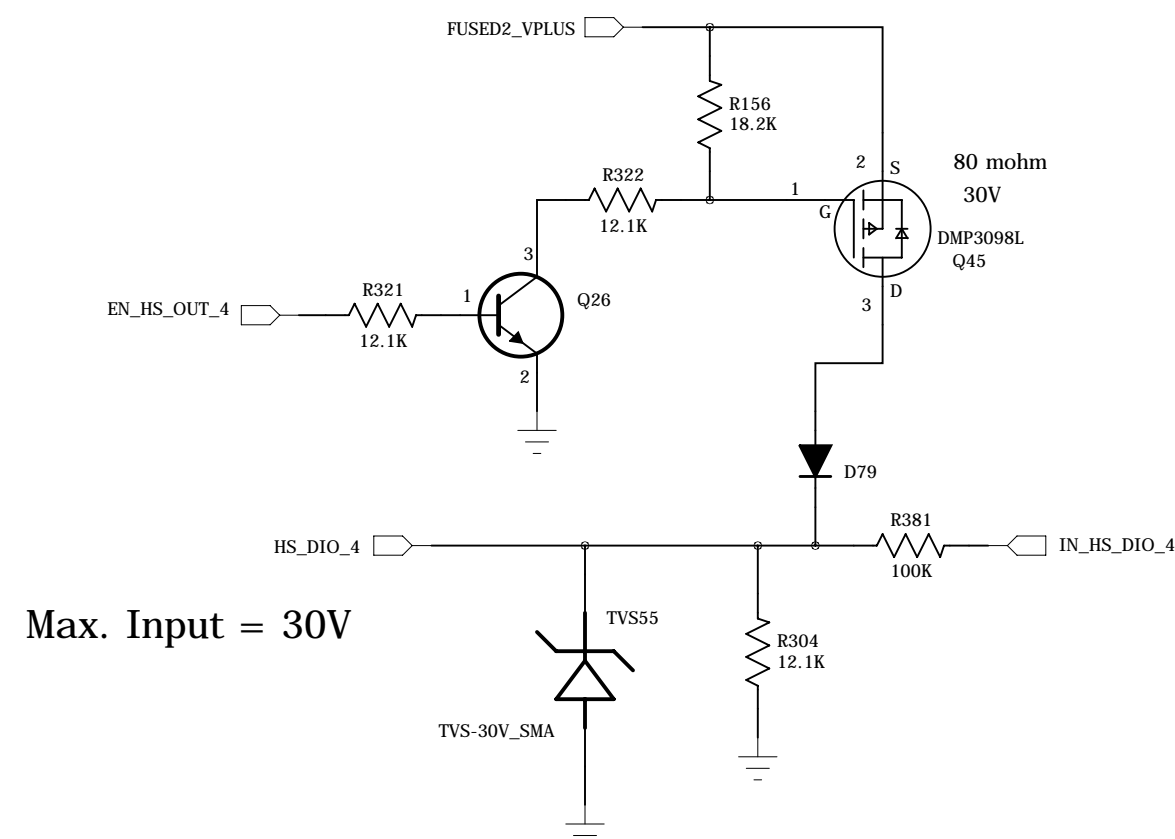
Source 500 mA



Max. Input = 30V

High-Side Switch

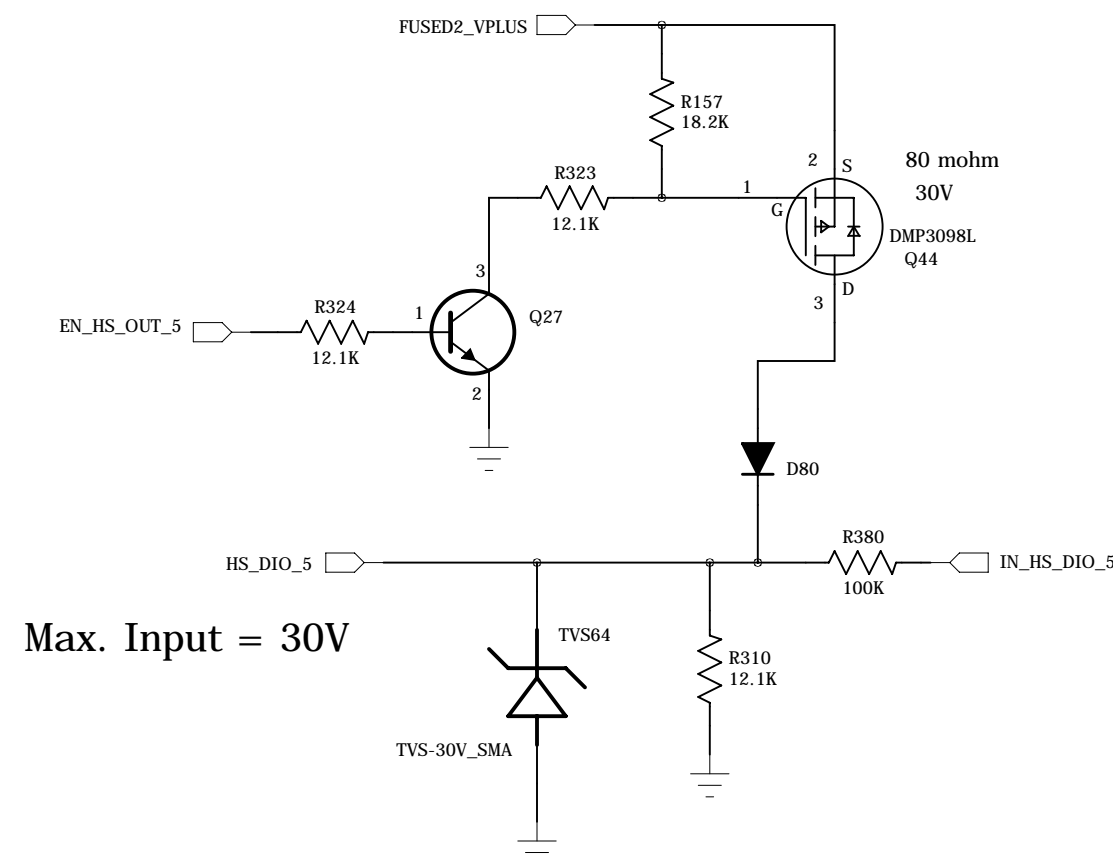
Source 500 mA



Max. Input = 30V

High-Side Switch

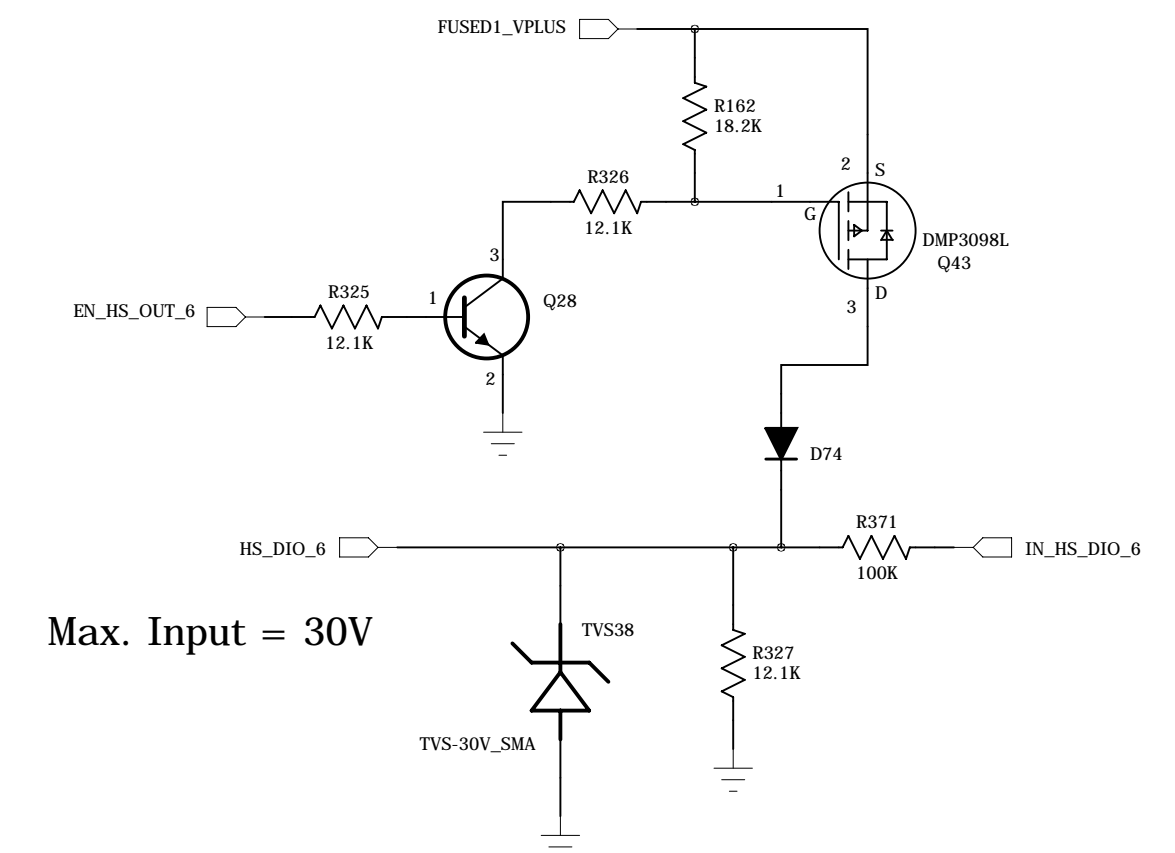
Source 500 mA



Max. Input = 30V

High-Side Switch

Source 500 mA



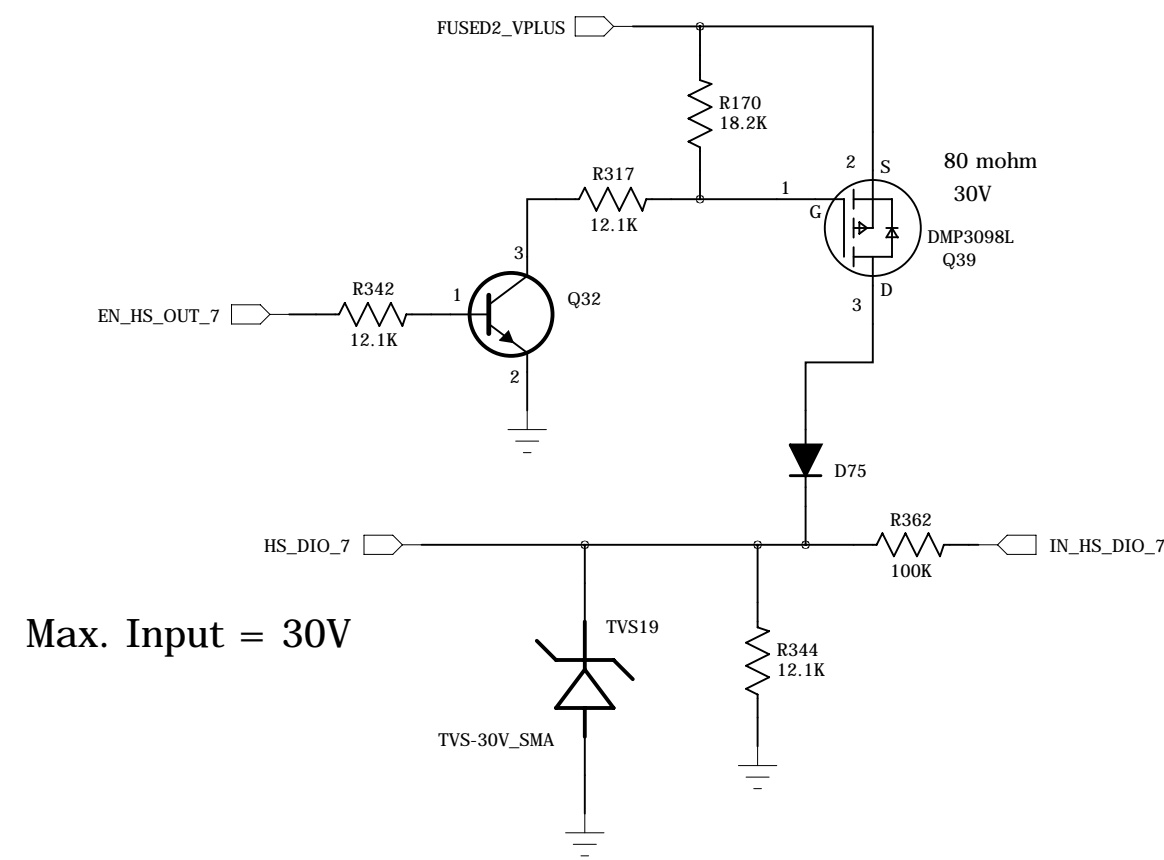
Max. Input = 30V

Technologic Systems		Date	May 6, 2012
Title: TS-7580 High Side Switches			
Rev: A	Designer	Sheet 14 of 25	

High Side Switches

High-Side Switch

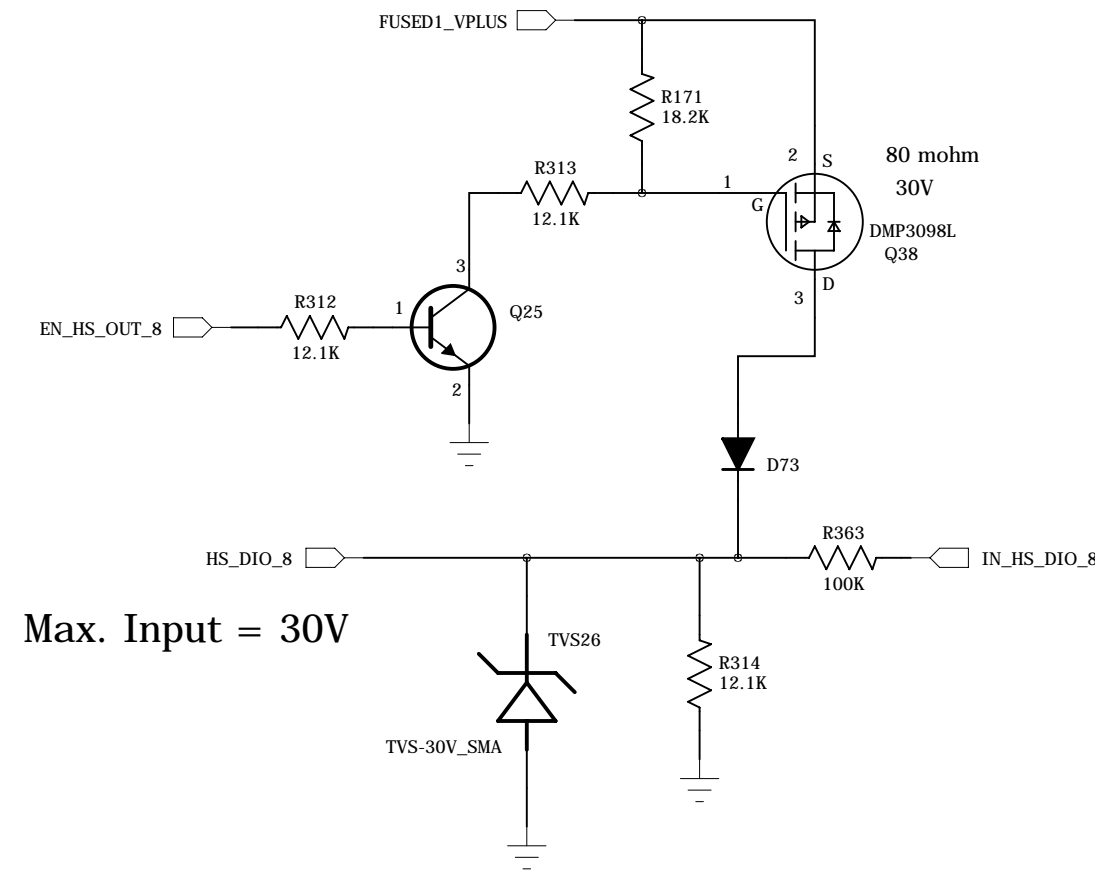
Source 500 mA



Max. Input = 30V

High-Side Switch

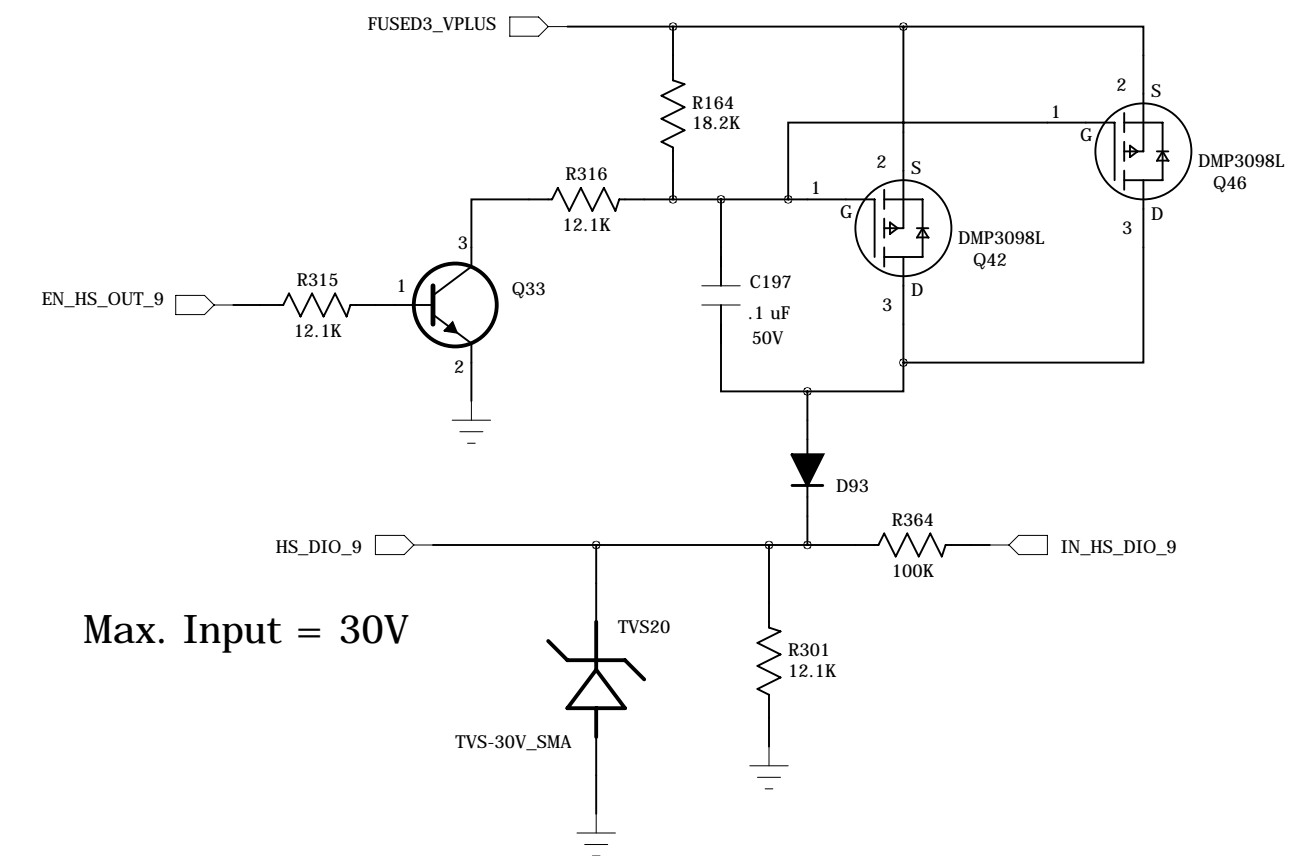
Source 500 mA



Max. Input = 30V

High-Side Switch

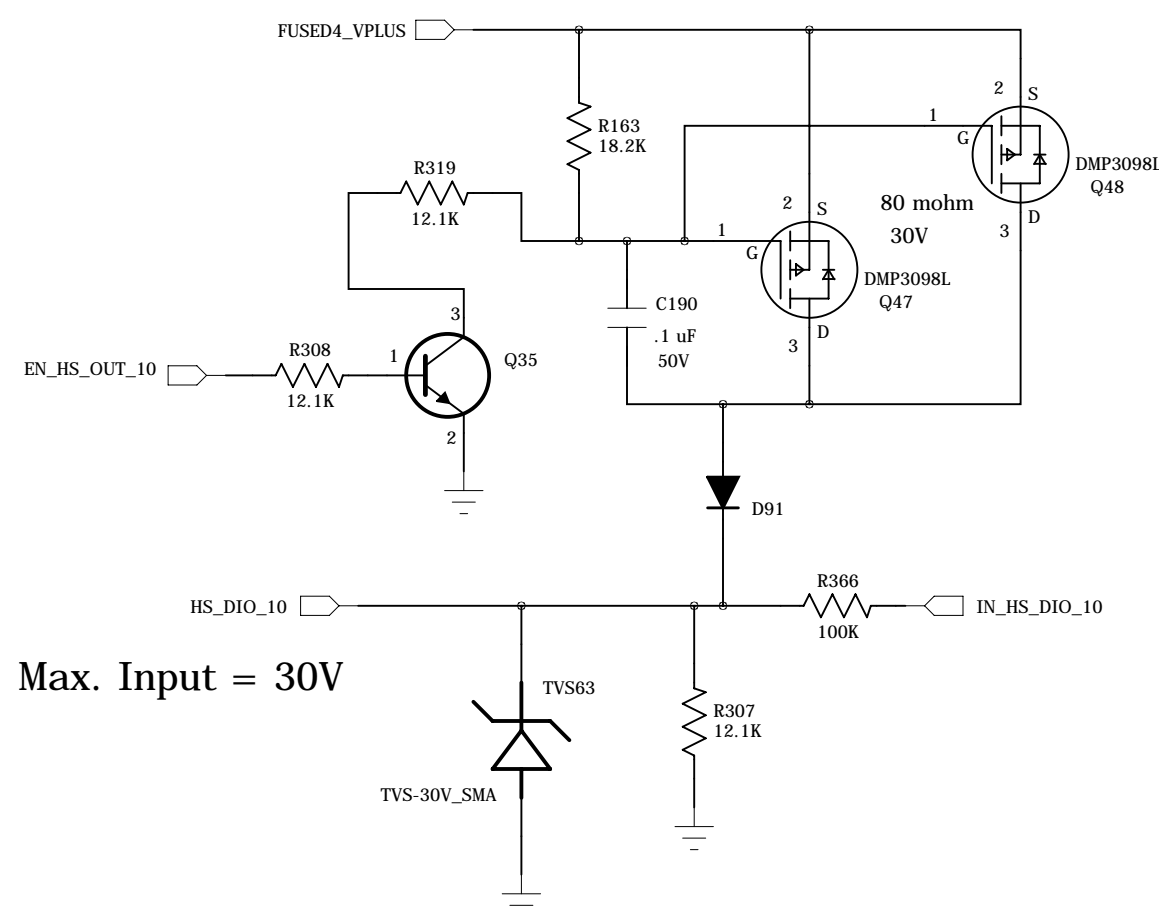
Source 1000 mA



Max. Input = 30V

High-Side Switch

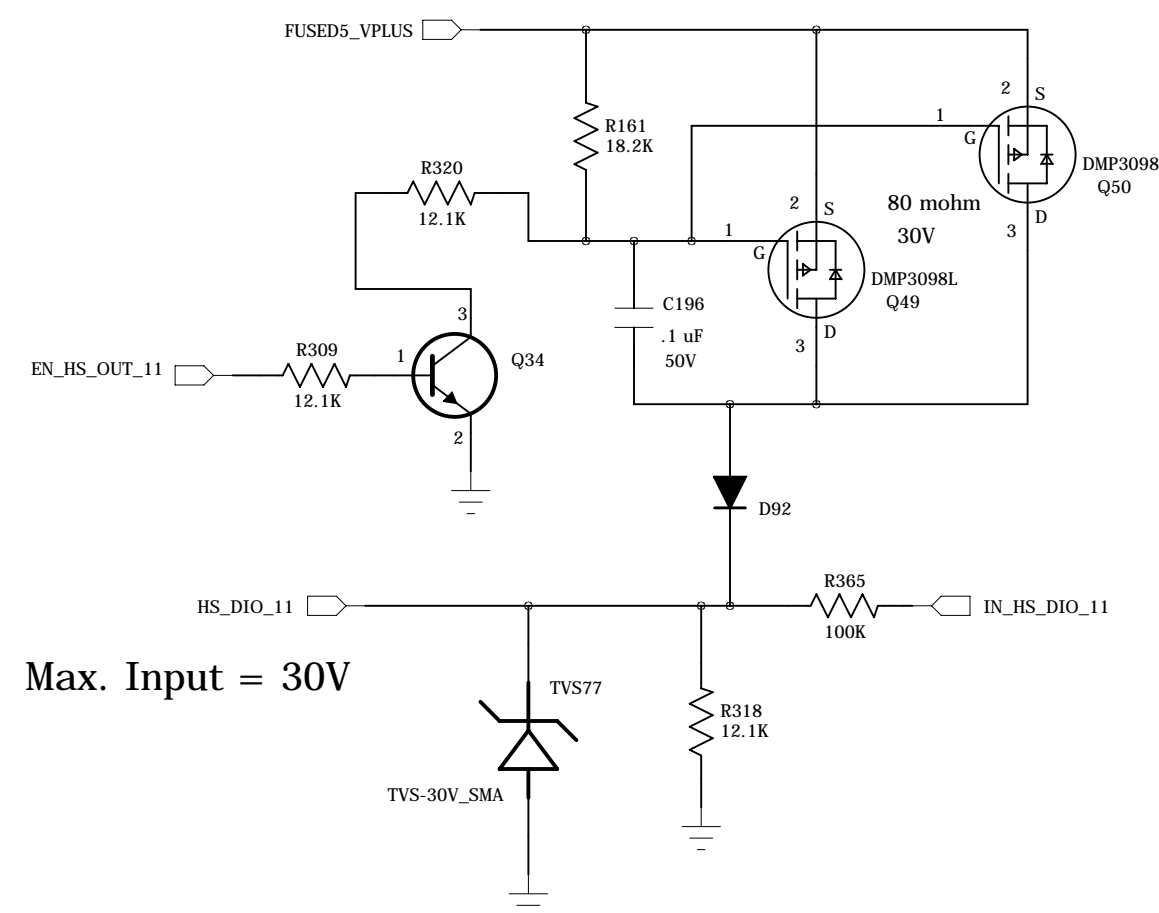
Source 1000 mA



Max. Input = 30V

High-Side Switch

Source 1000 mA



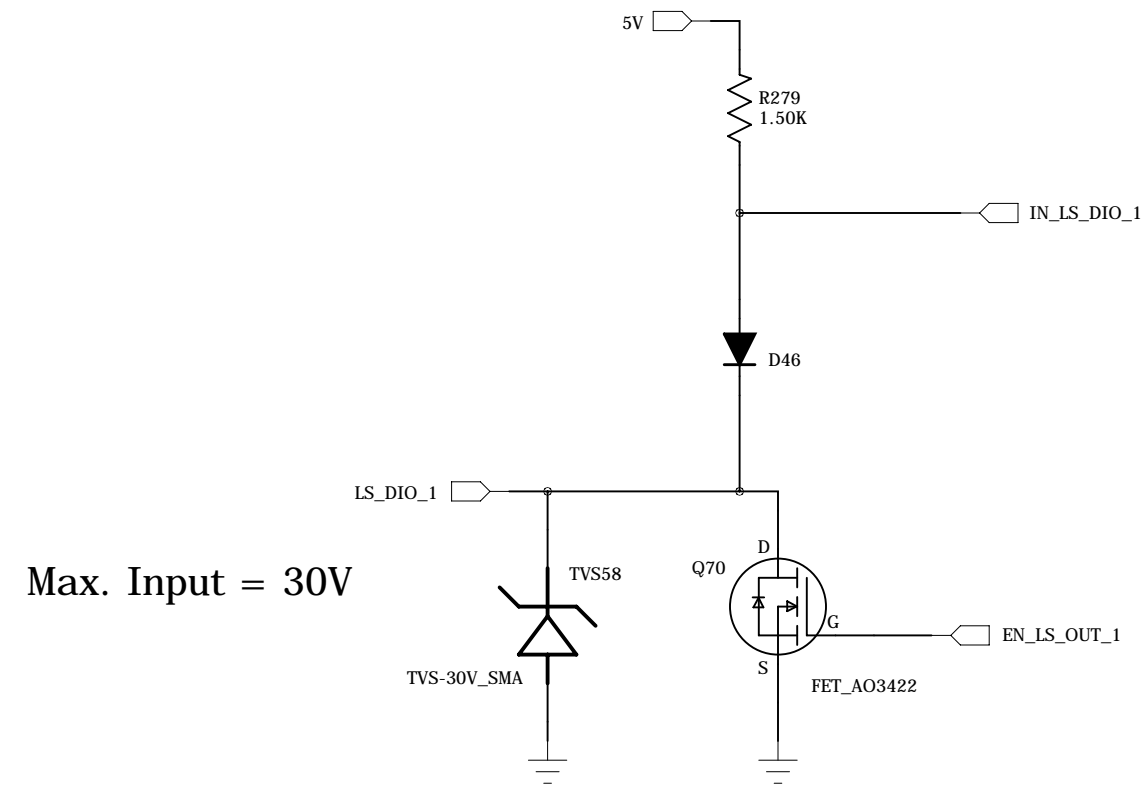
Max. Input = 30V

Technologic Systems	Date	May 6, 2012
Title: TS-7580 High Side Switches		
Rev: A	Designer	Sheet 15 of 25

Low Side Switches

Low-Side Switch

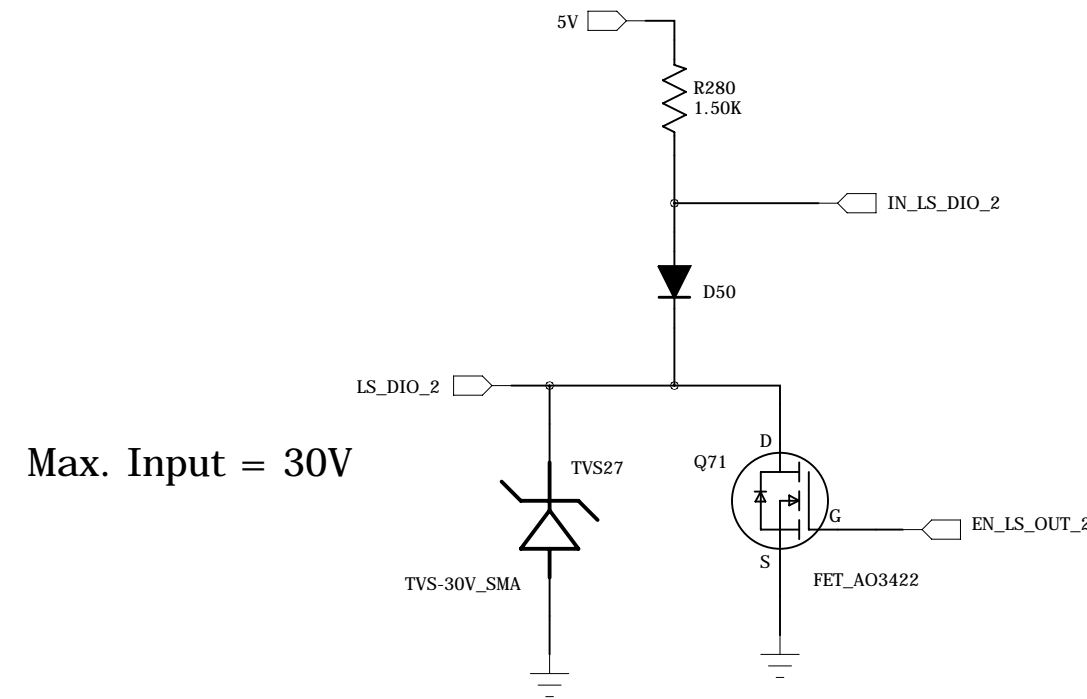
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

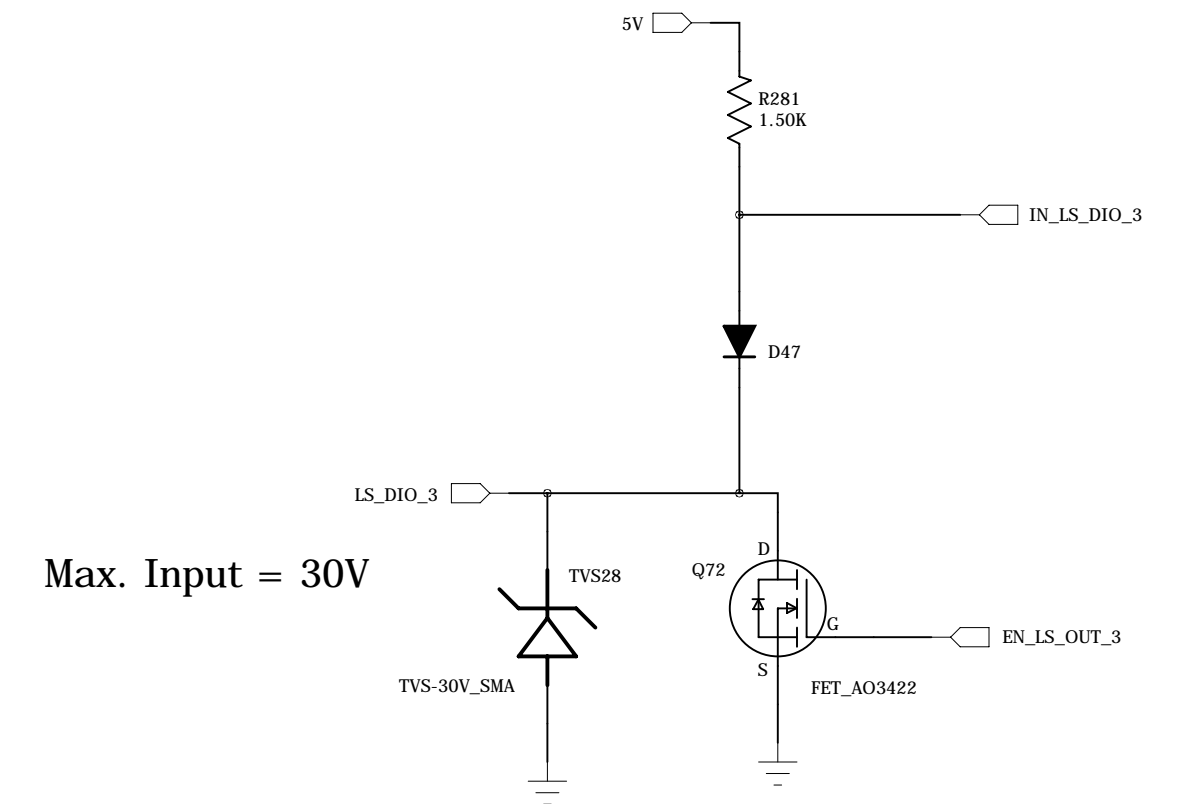
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

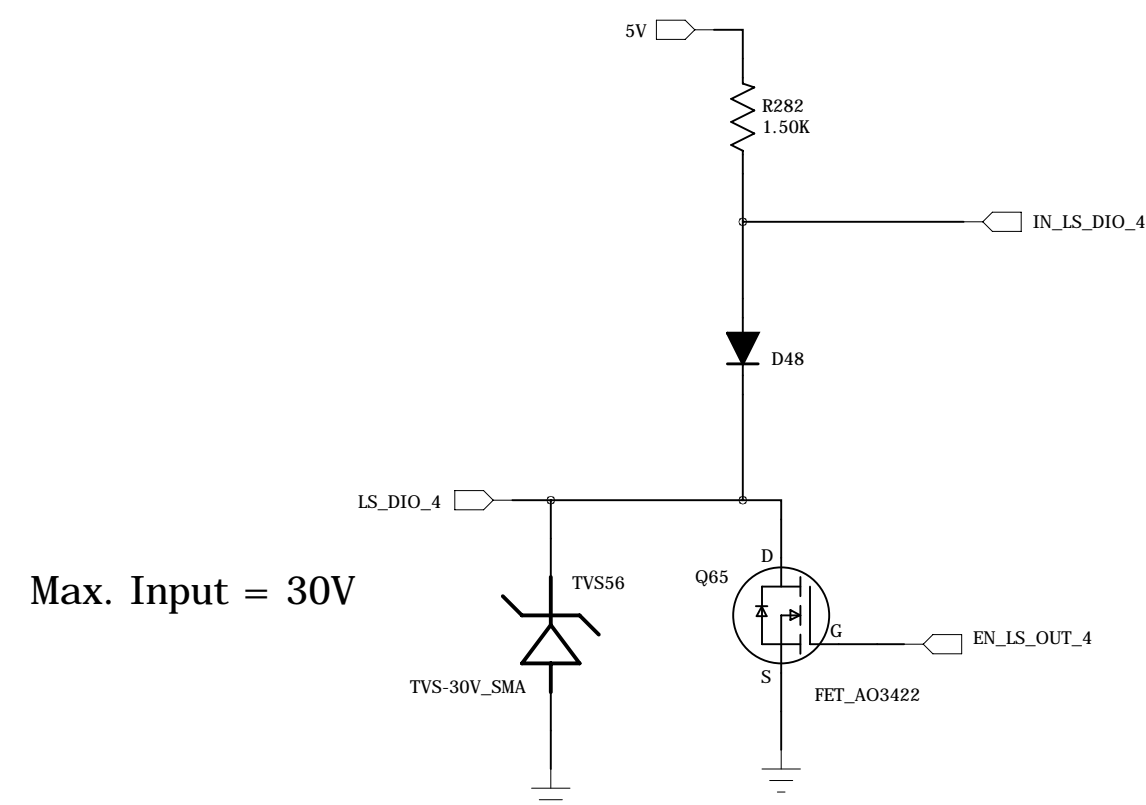
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

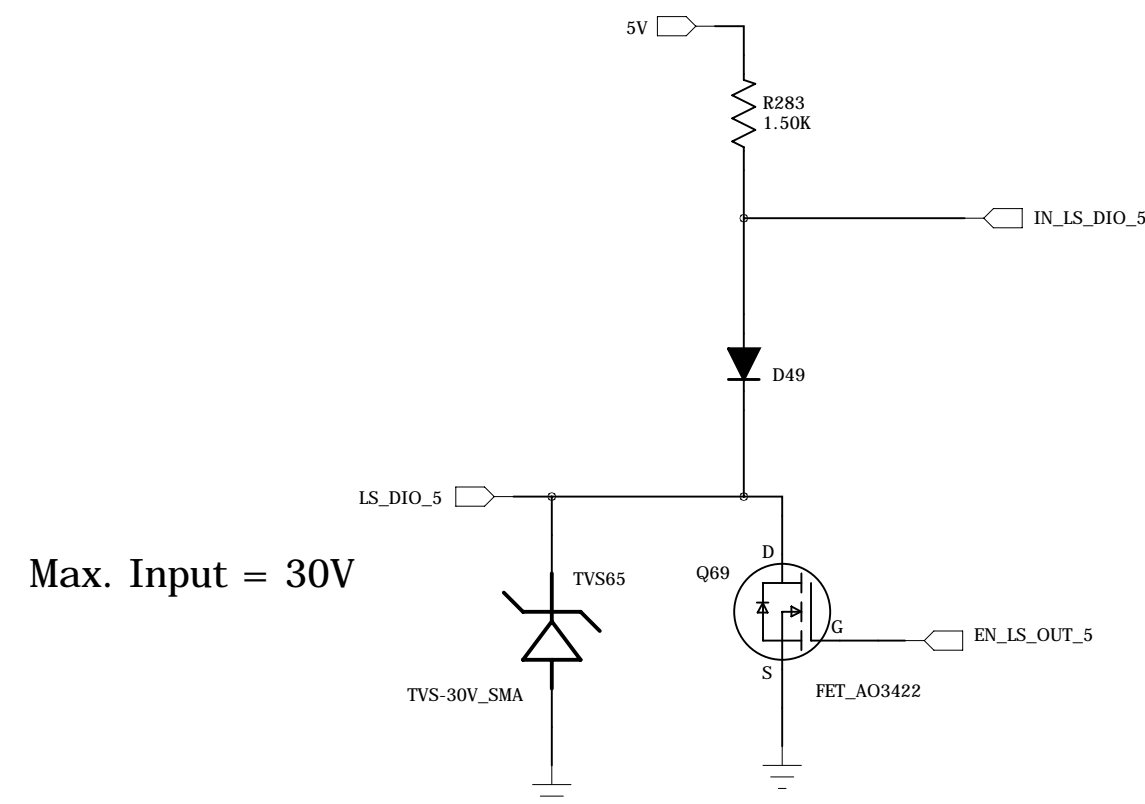
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

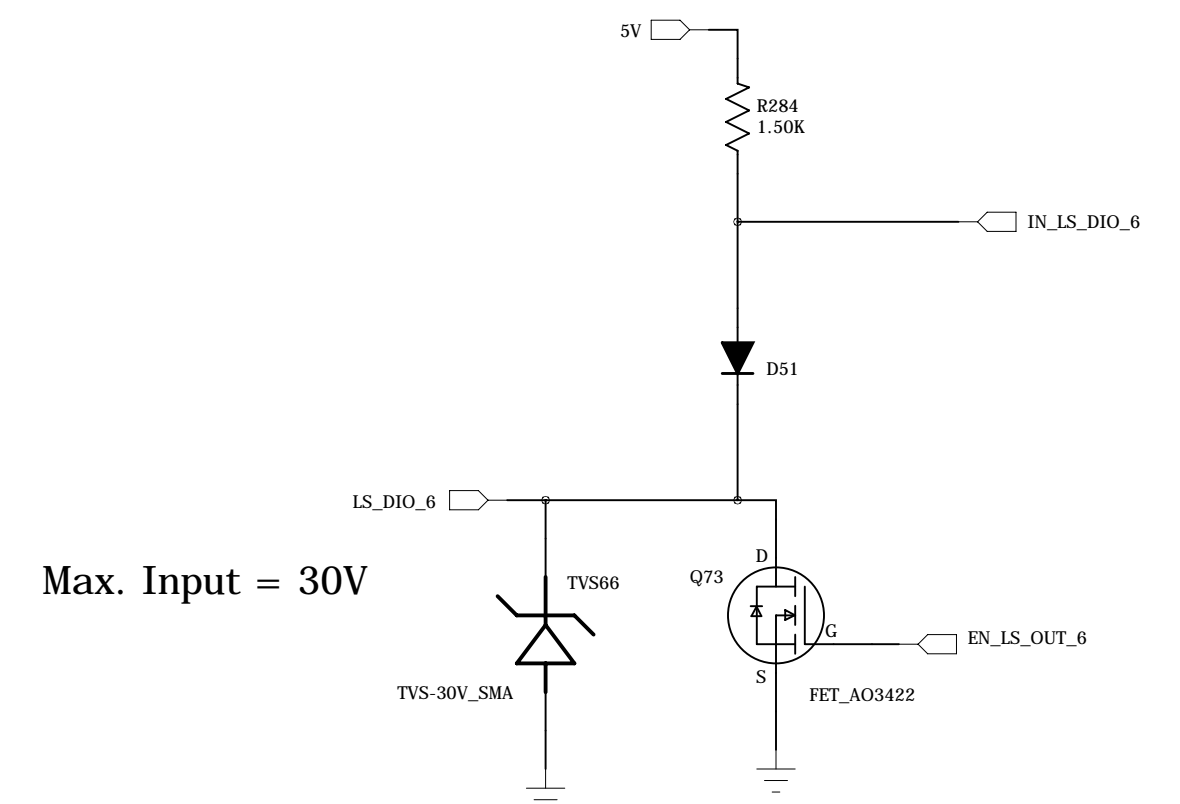
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



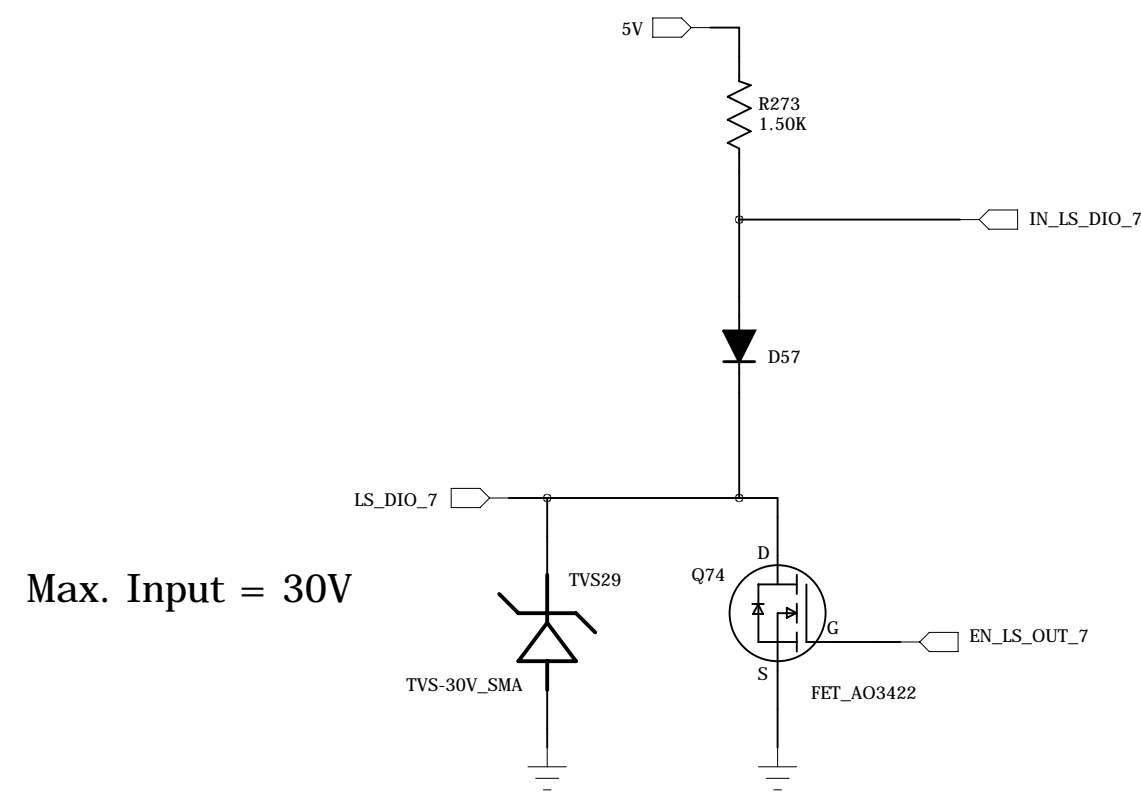
Max. Input = 30V

Technologic Systems	Date	May 6, 2012
Title: TS-7580 Low Side Switches		
Rev: A	Designer	Sheet 16 of 25

Low Side Switches

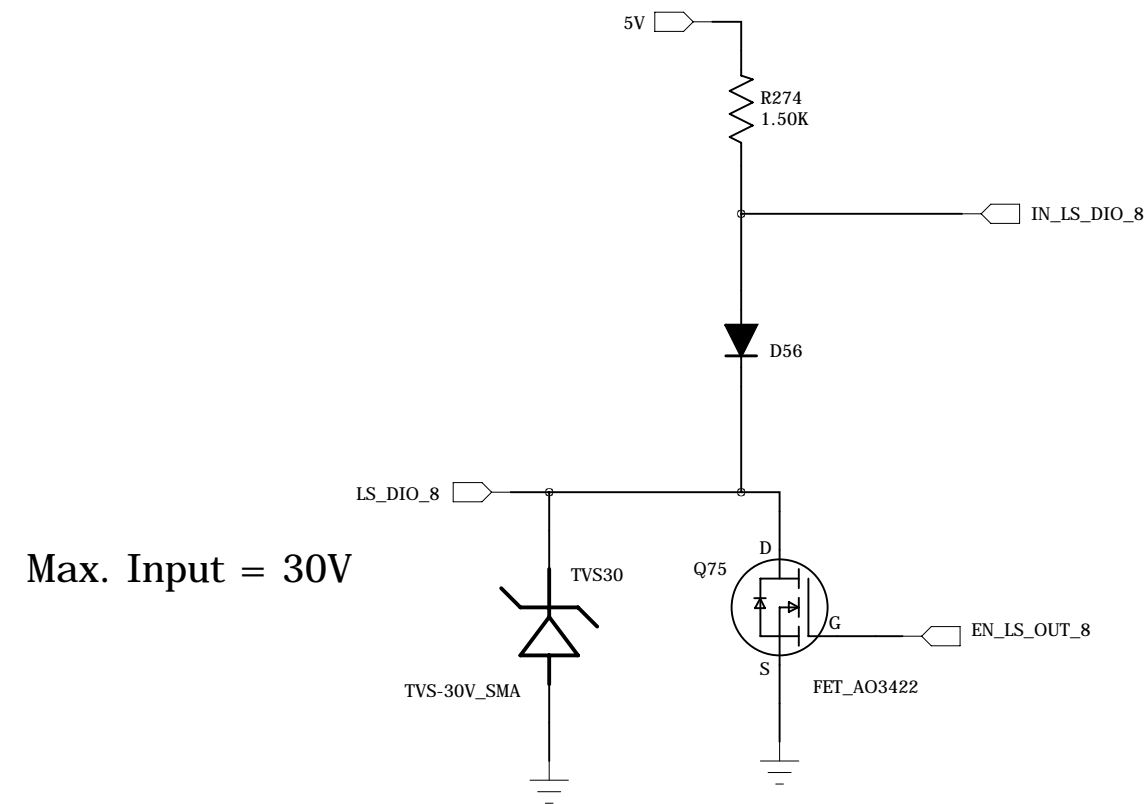
Low-Side Switch

Sinks 500 mA



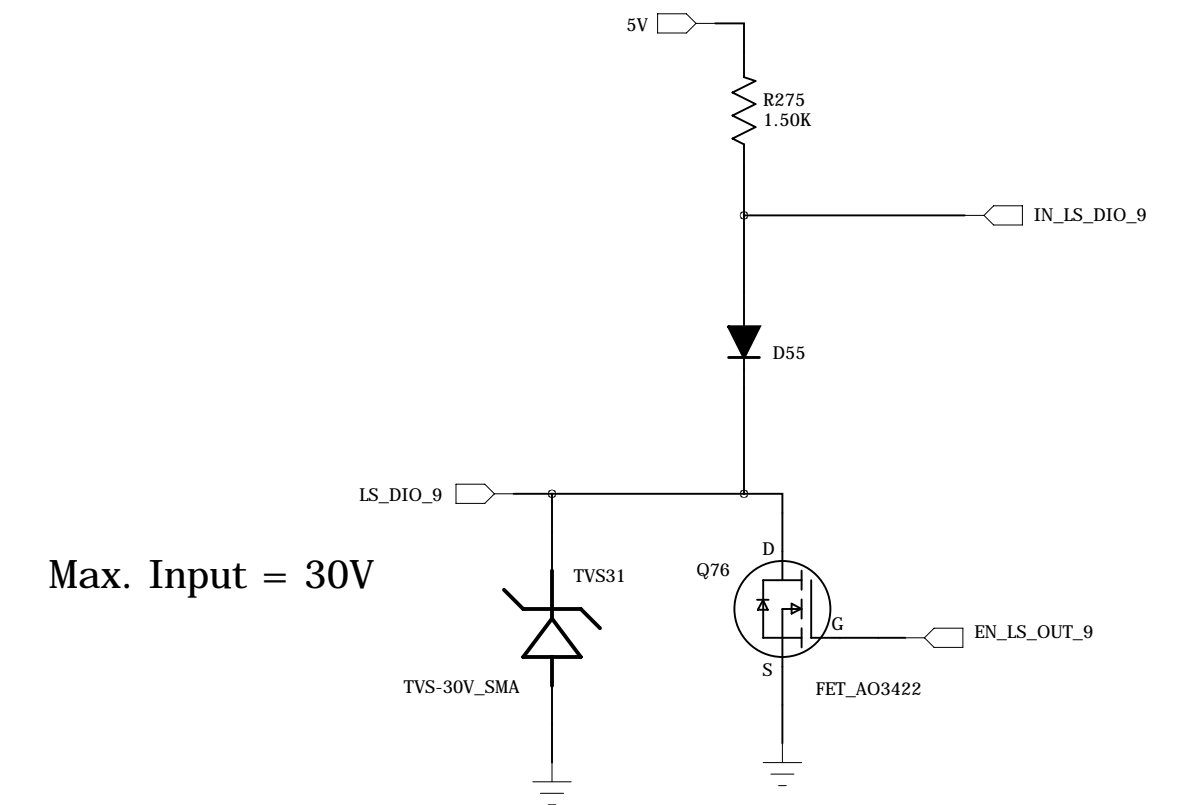
Low-Side Switch

Sinks 500 mA



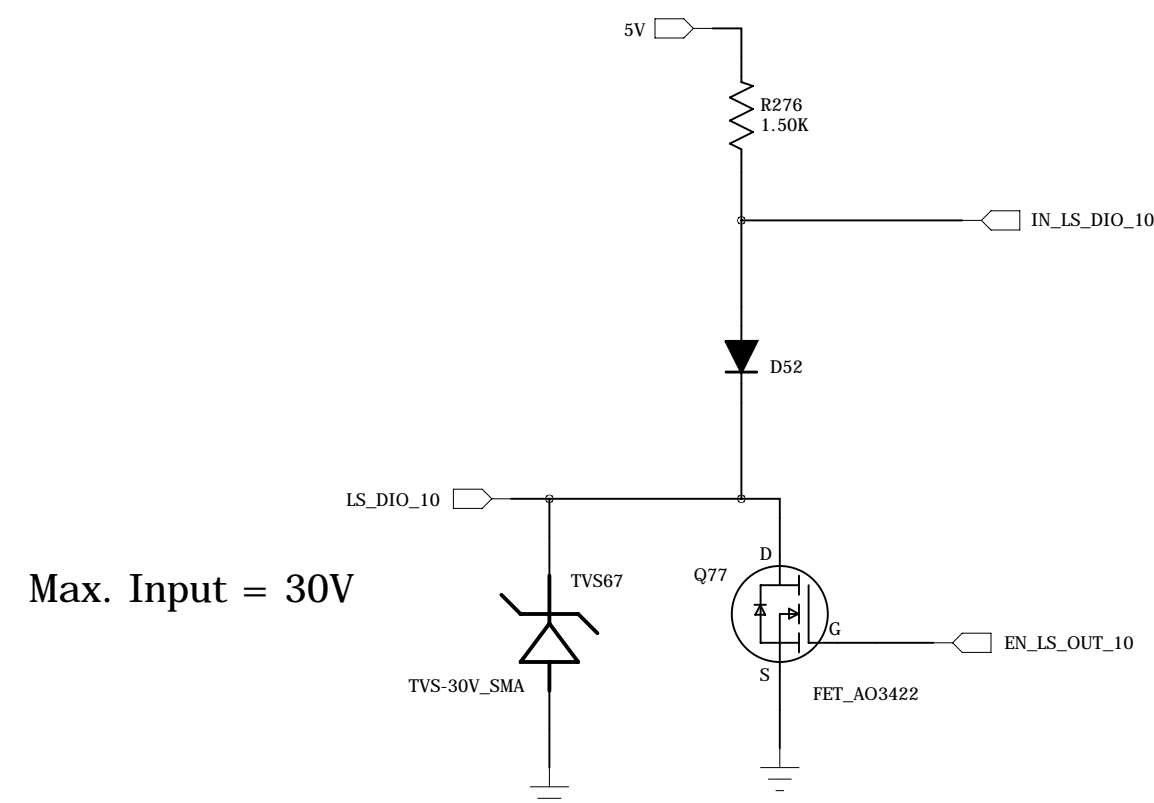
Low-Side Switch

Sinks 500 mA



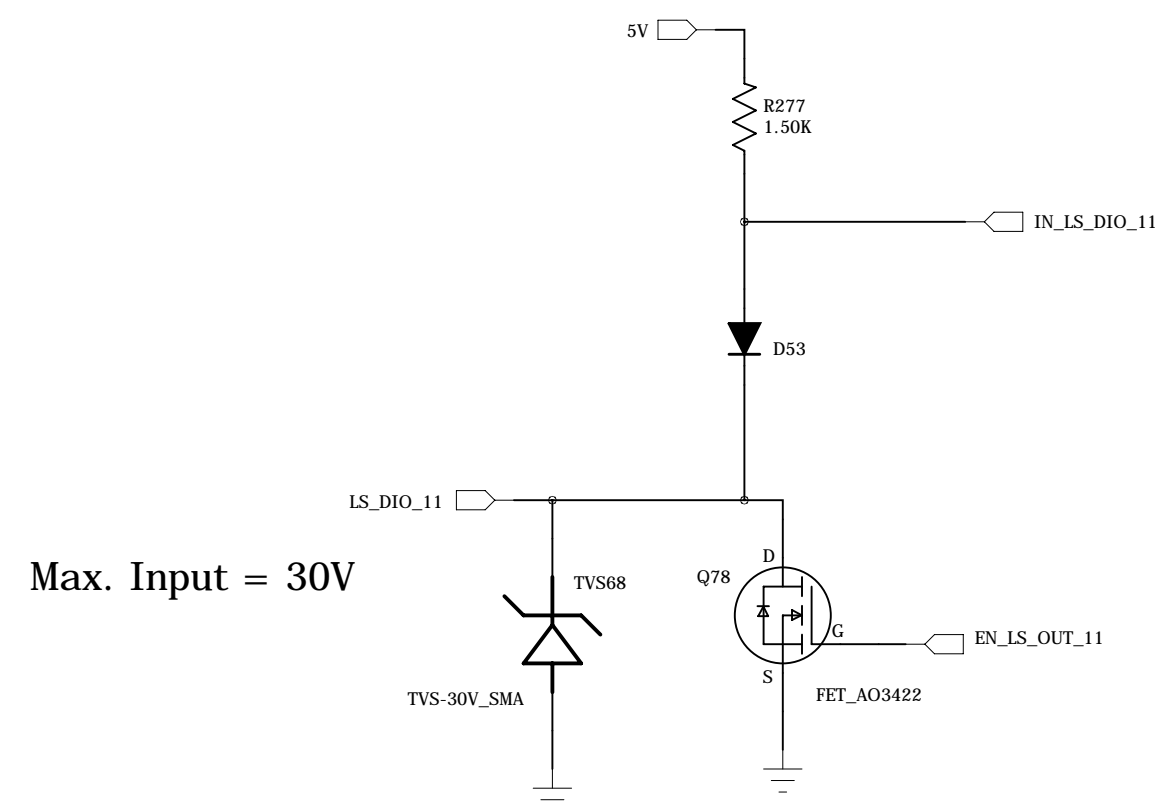
Low-Side Switch

Sinks 500 mA



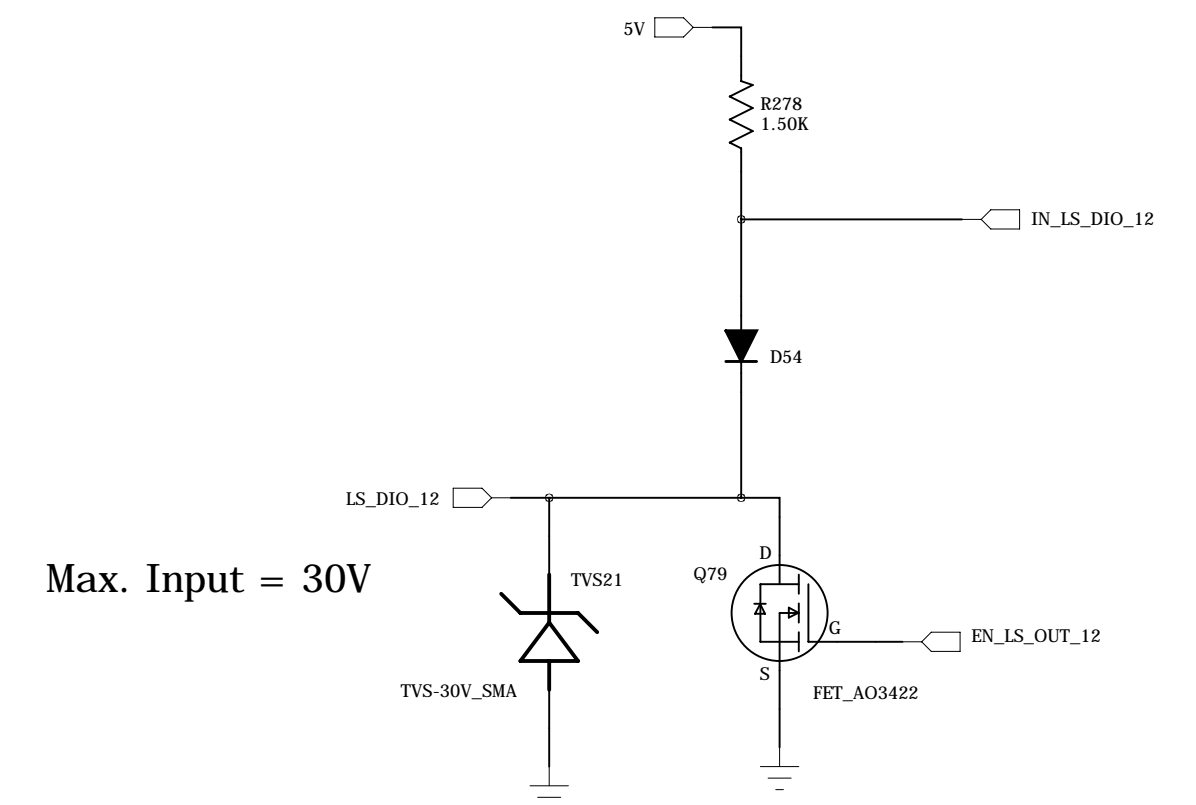
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

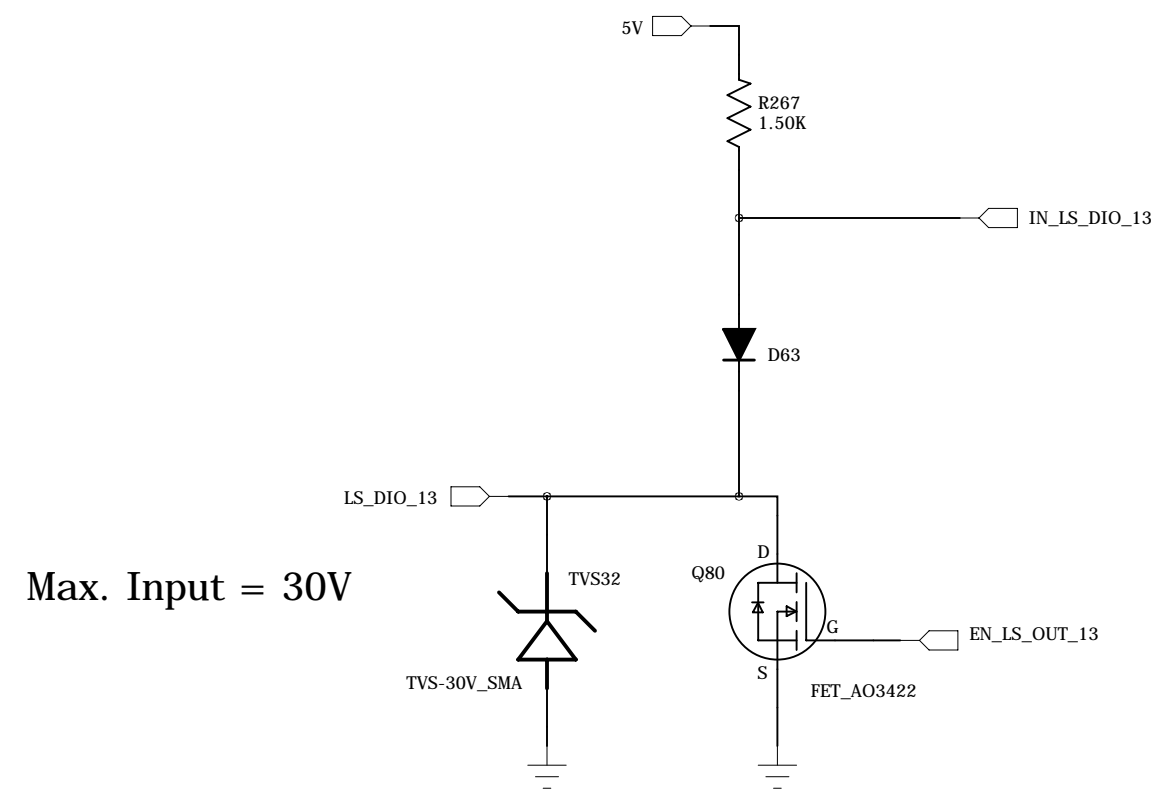


Technologic Systems	Date	May 6, 2012
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Rev: A	Designer	Sheet 17 of 25

Low Side Switches

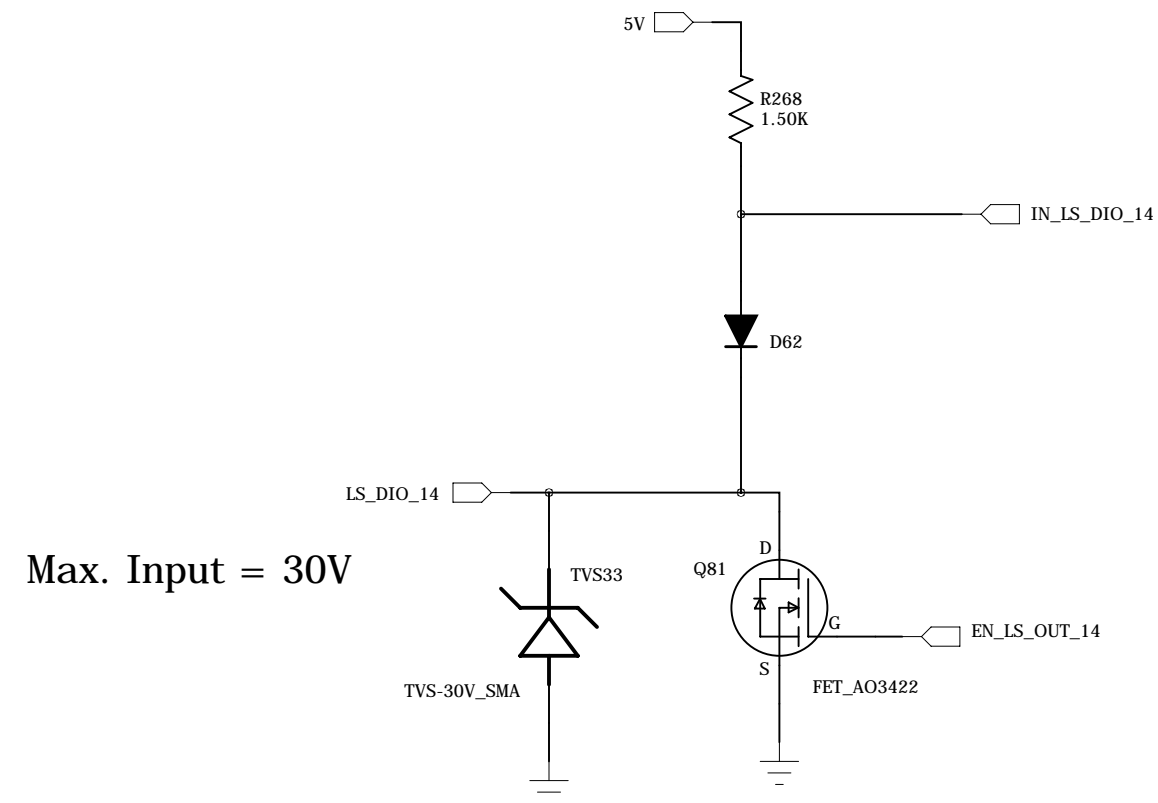
Low-Side Switch

Sinks 500 mA



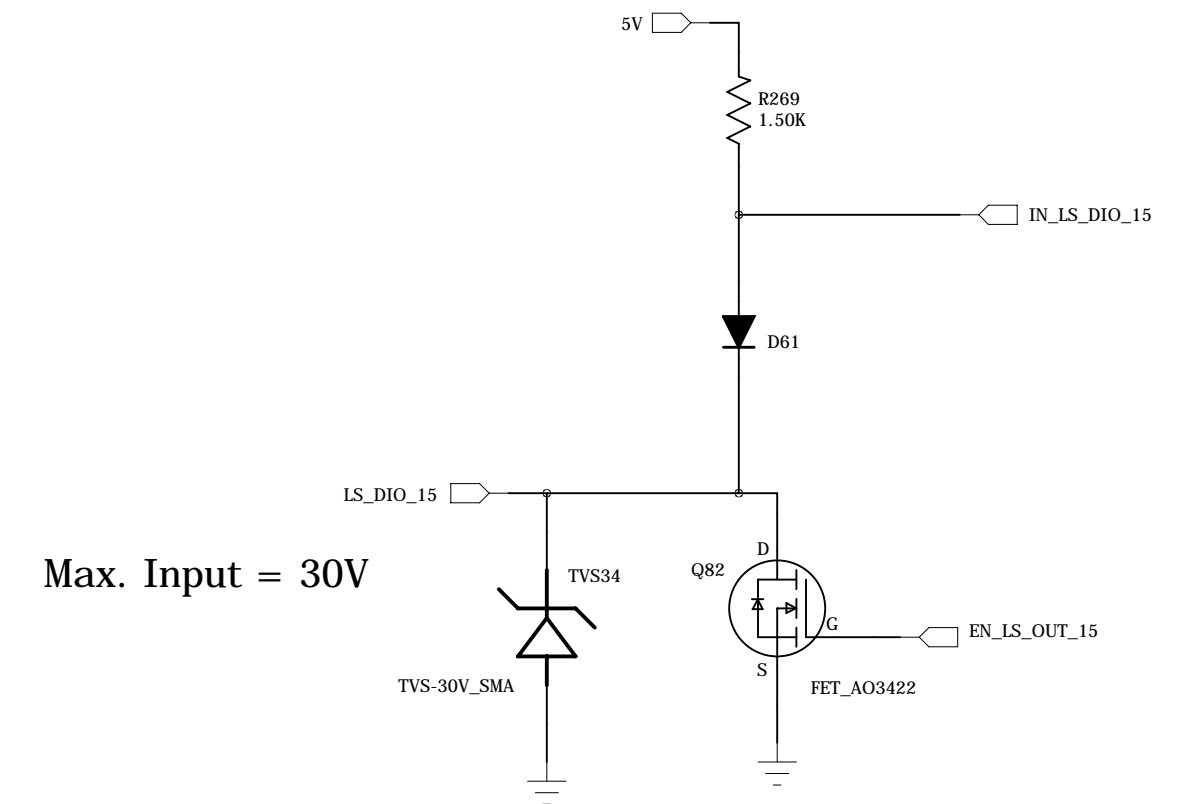
Low-Side Switch

Sinks 500 mA



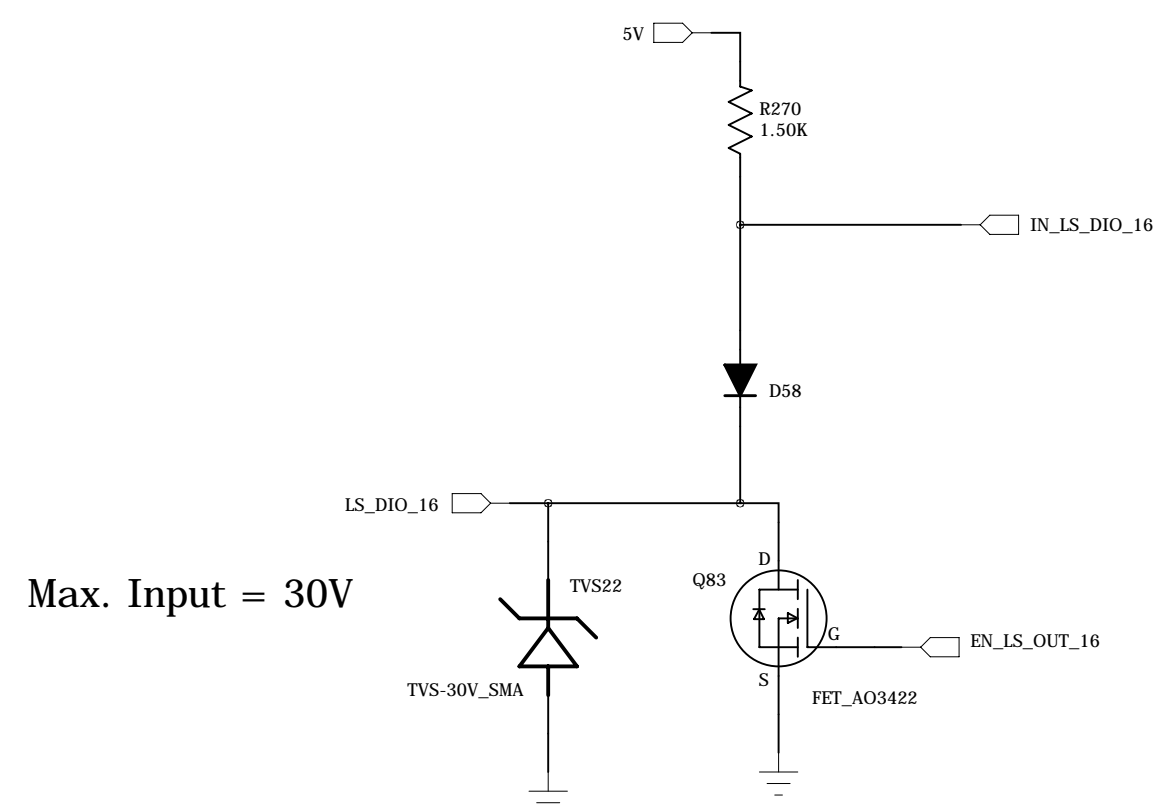
Low-Side Switch

Sinks 500 mA



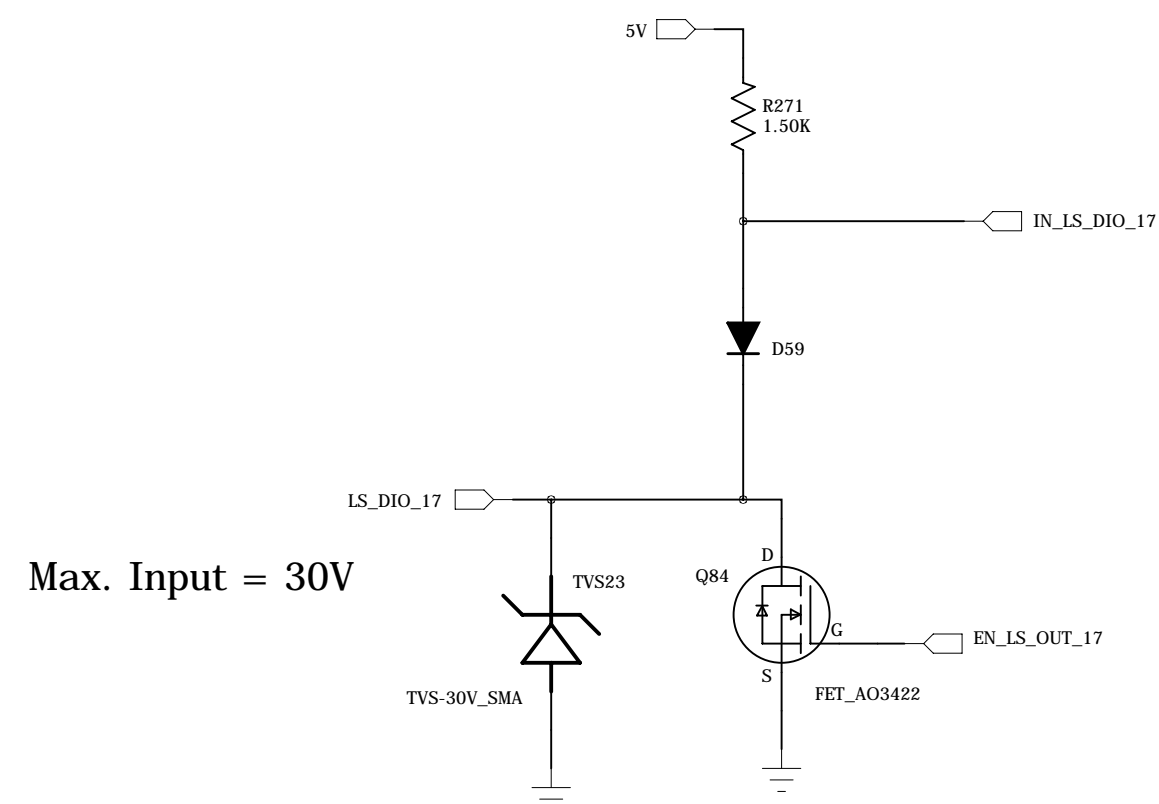
Low-Side Switch

Sinks 500 mA



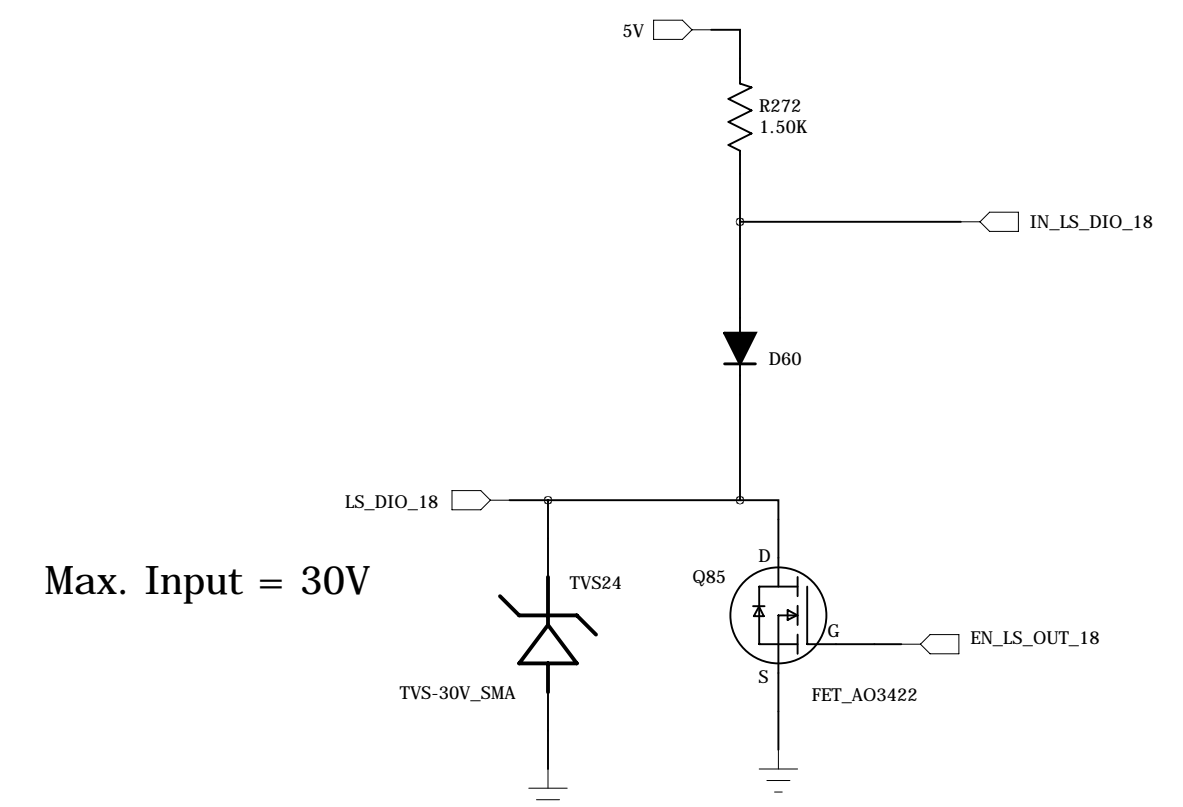
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

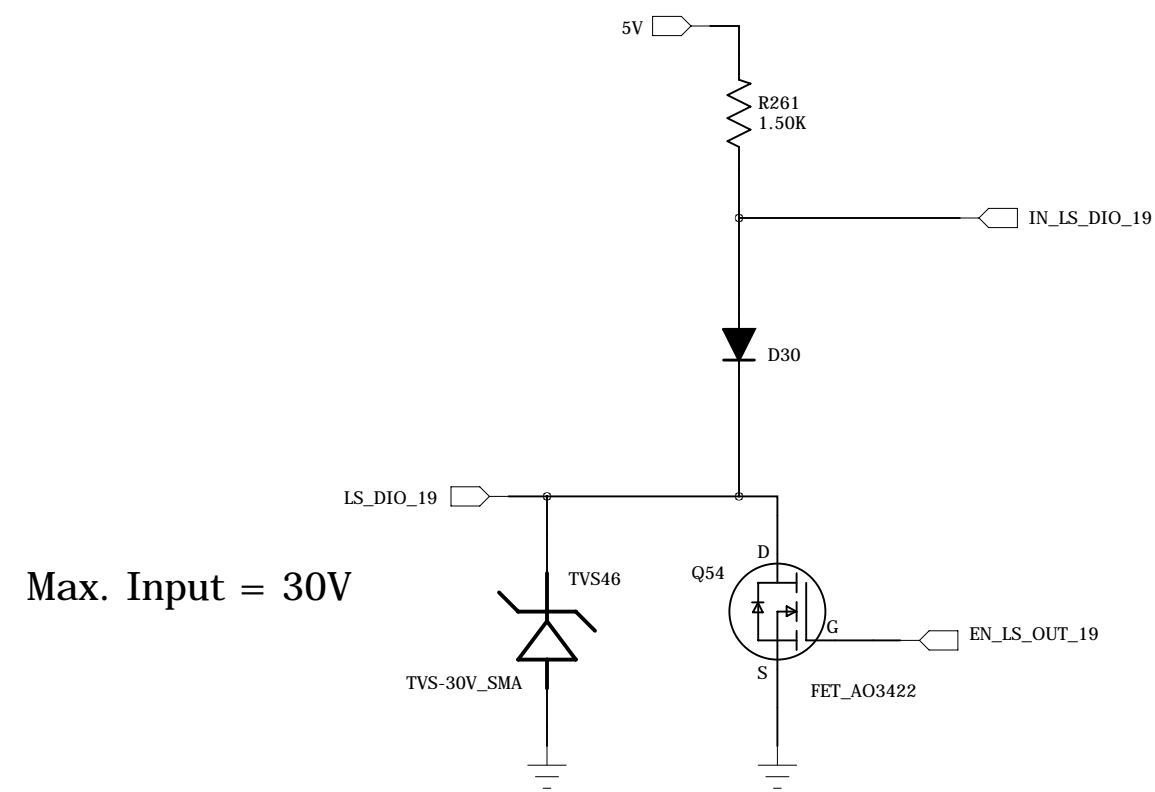


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Low Side Switches

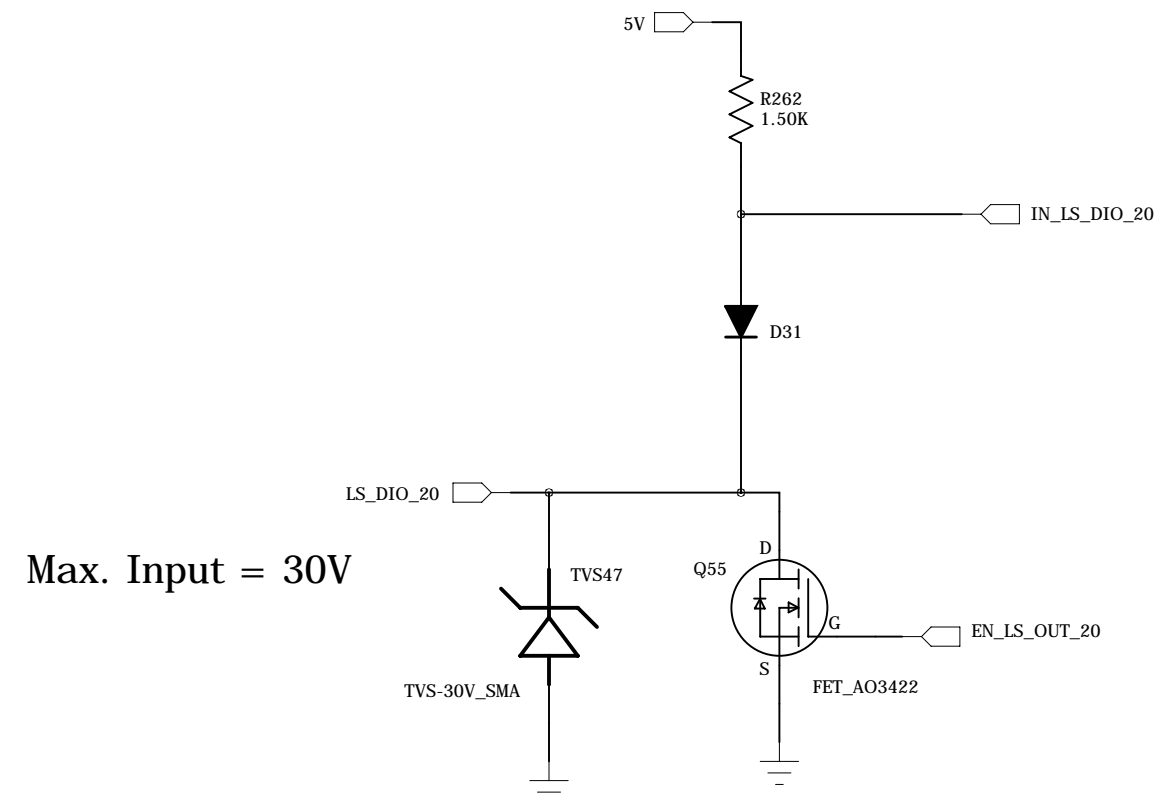
Low-Side Switch

Sinks 500 mA



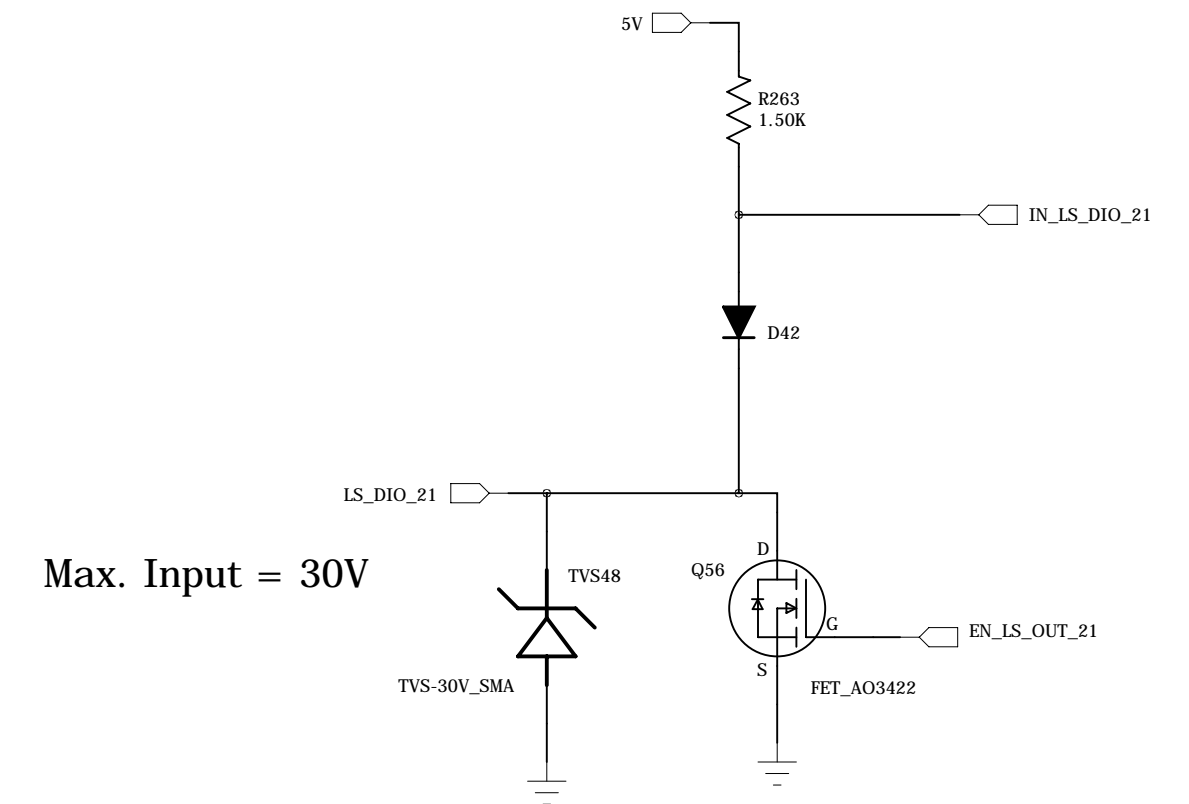
Low-Side Switch

Sinks 500 mA



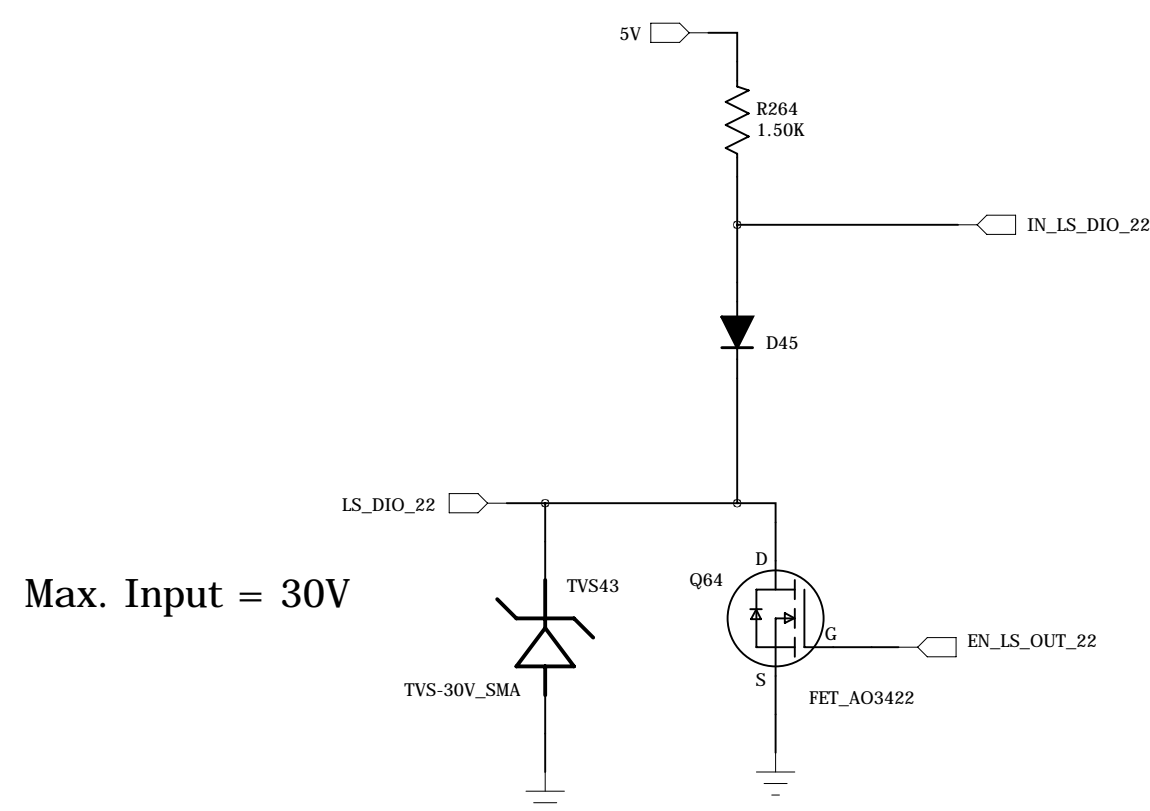
Low-Side Switch

Sinks 500 mA



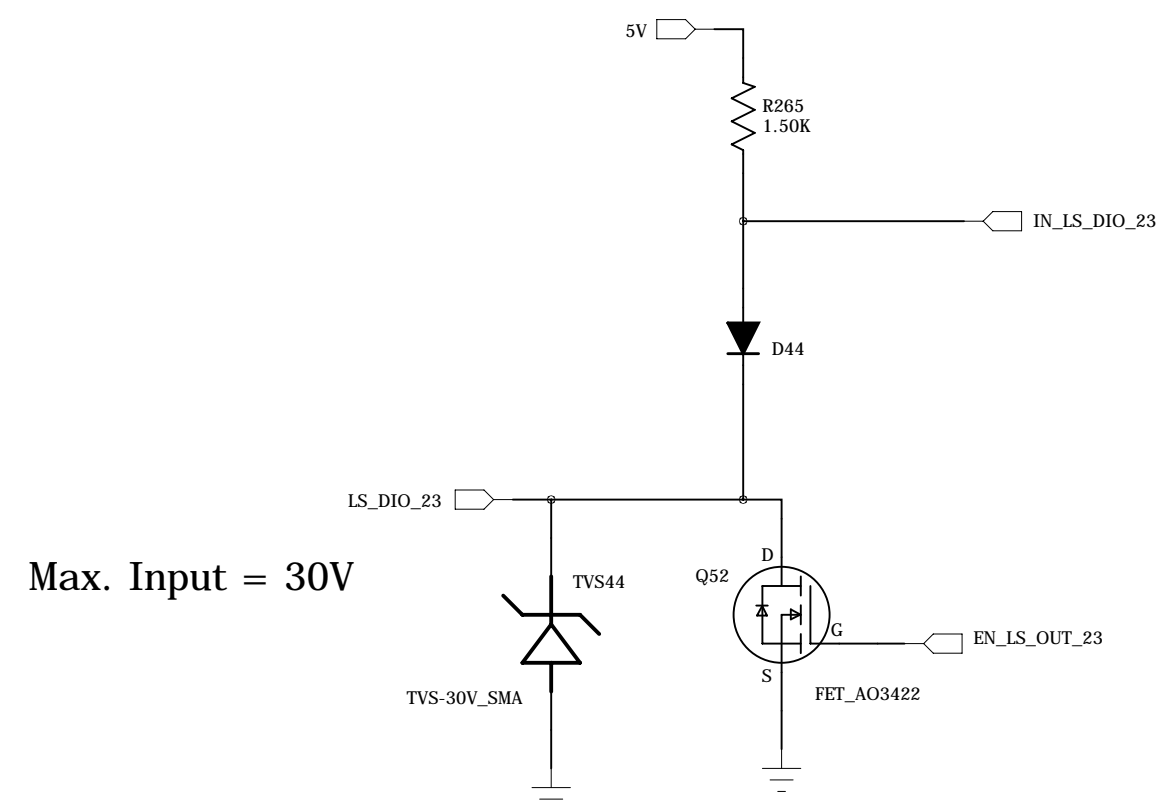
Low-Side Switch

Sinks 500 mA



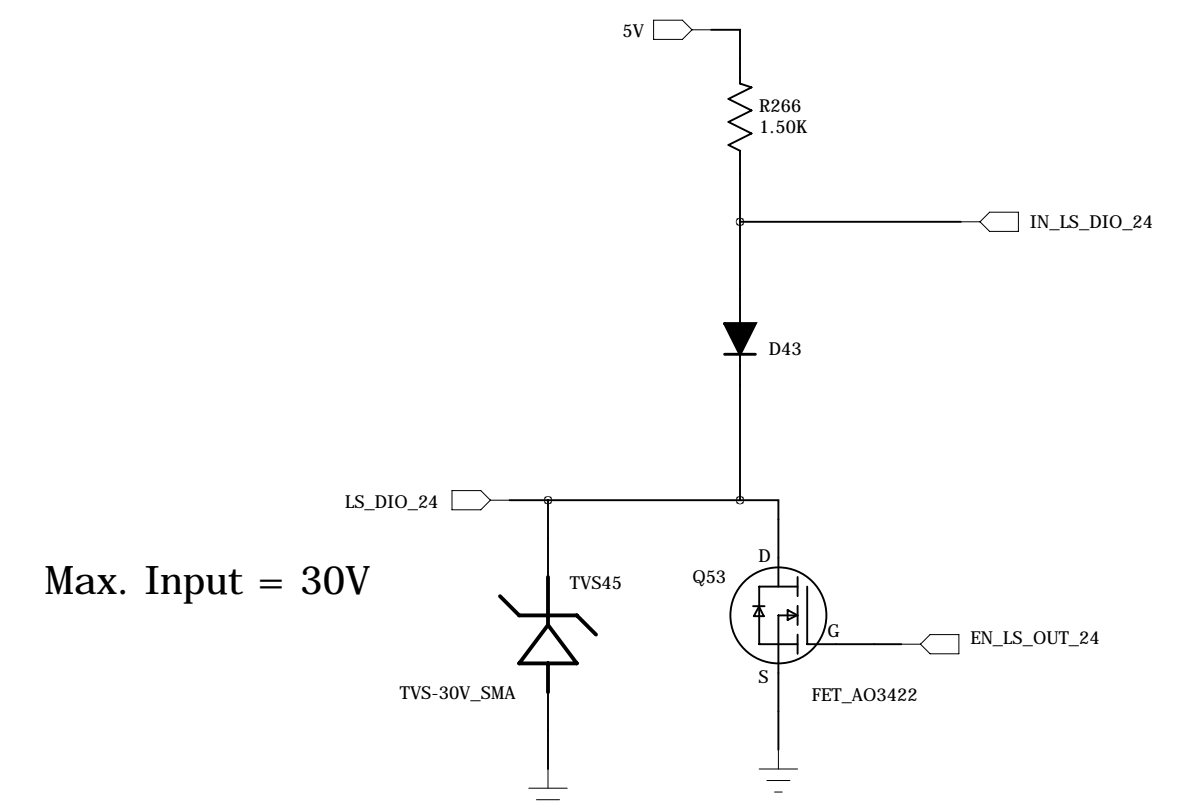
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

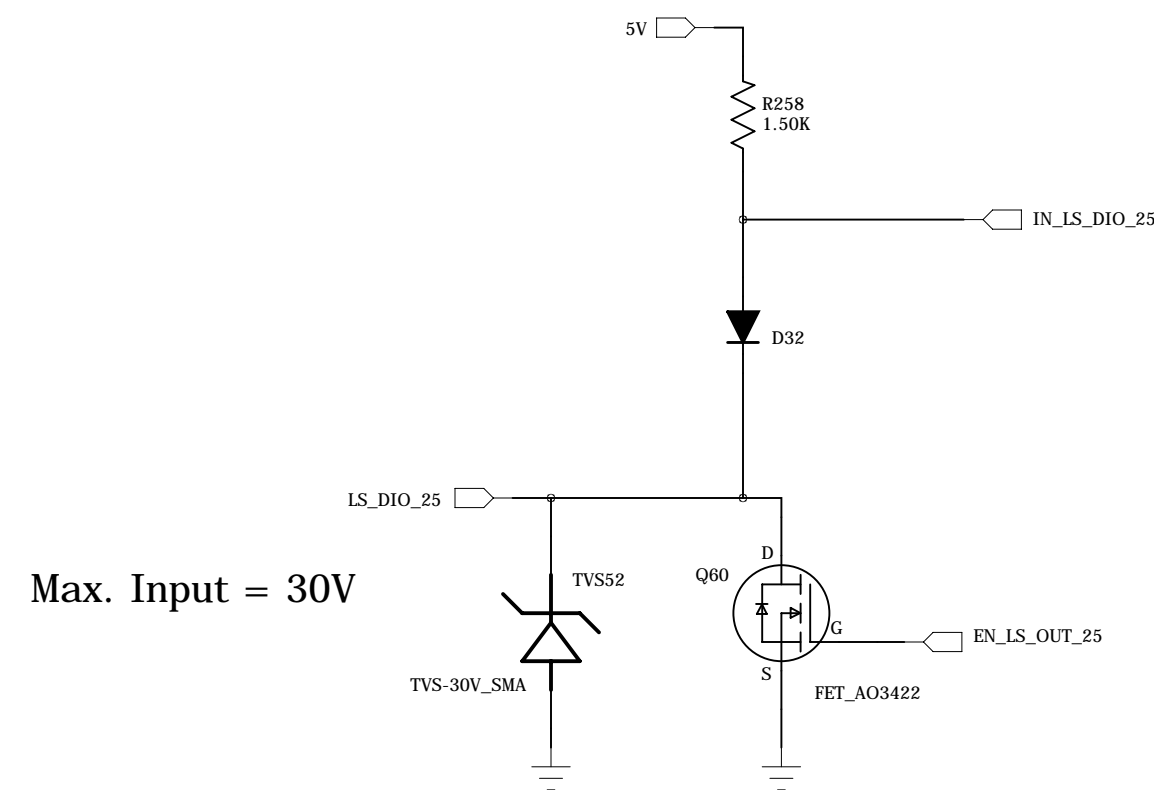


Technologic Systems	Date	May 6, 2012
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Low Side Switches

Low-Side Switch

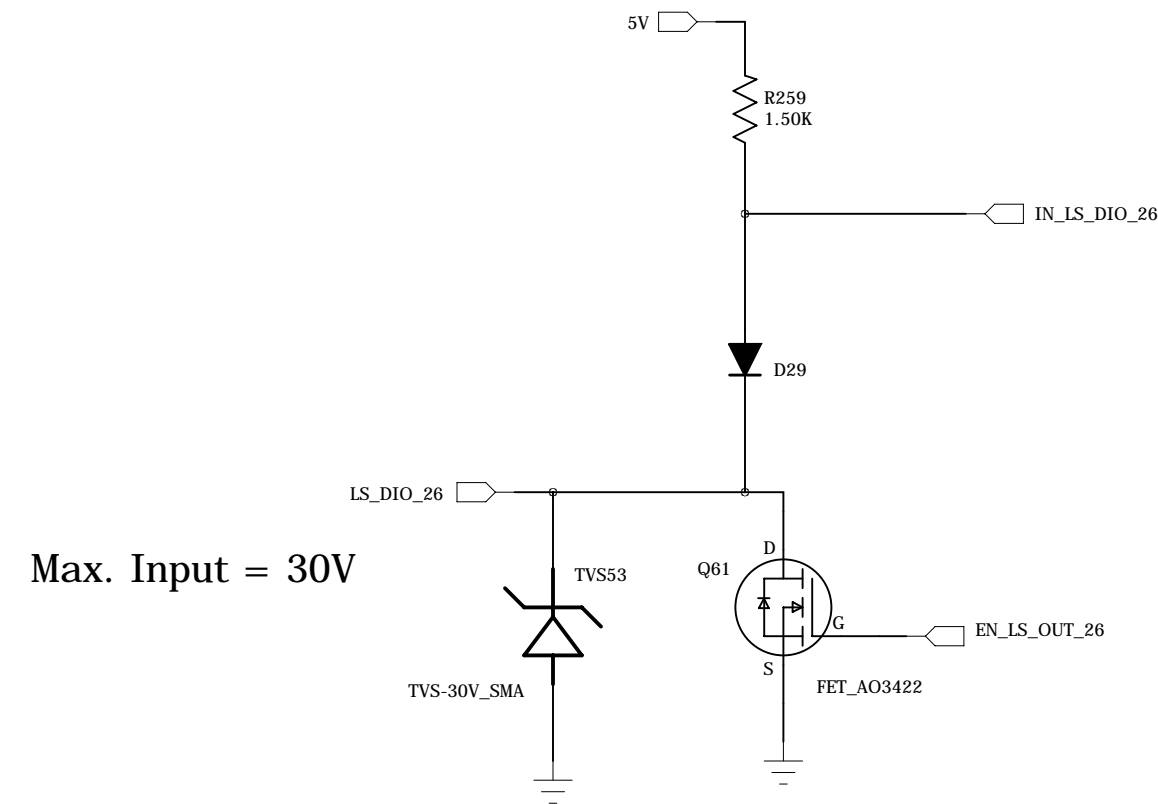
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

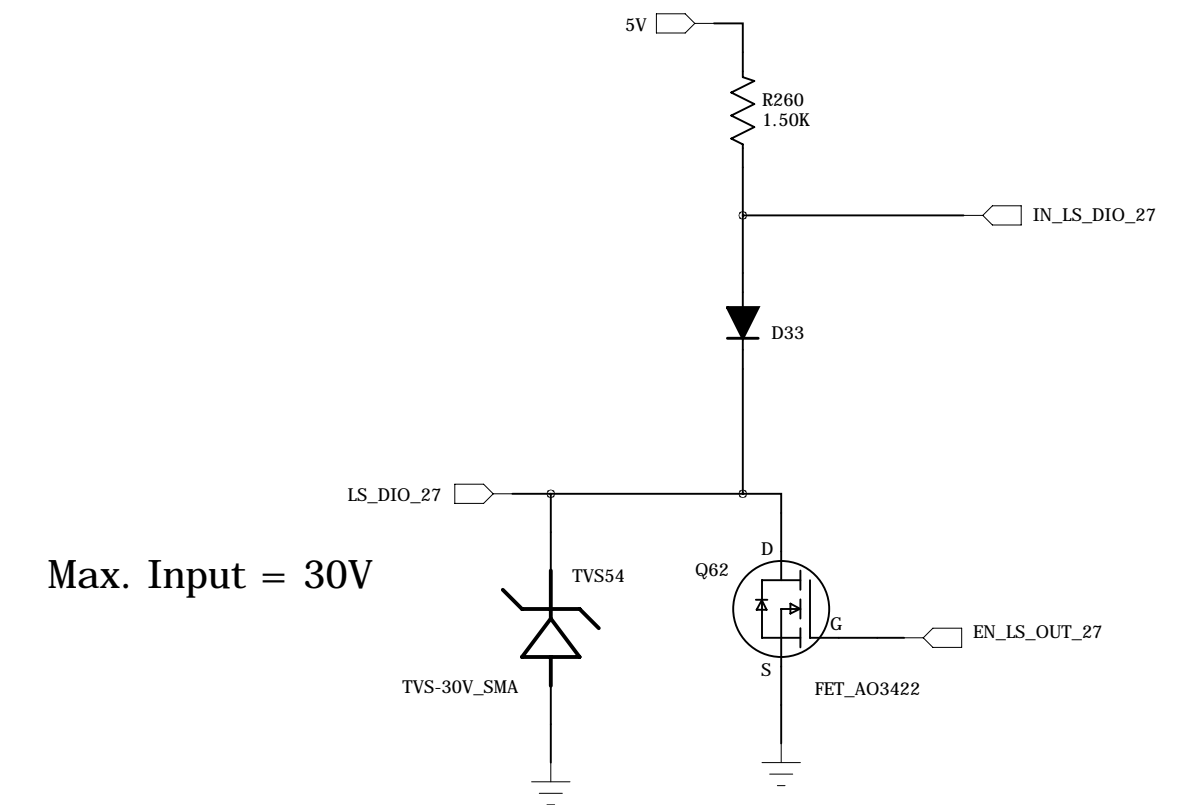
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

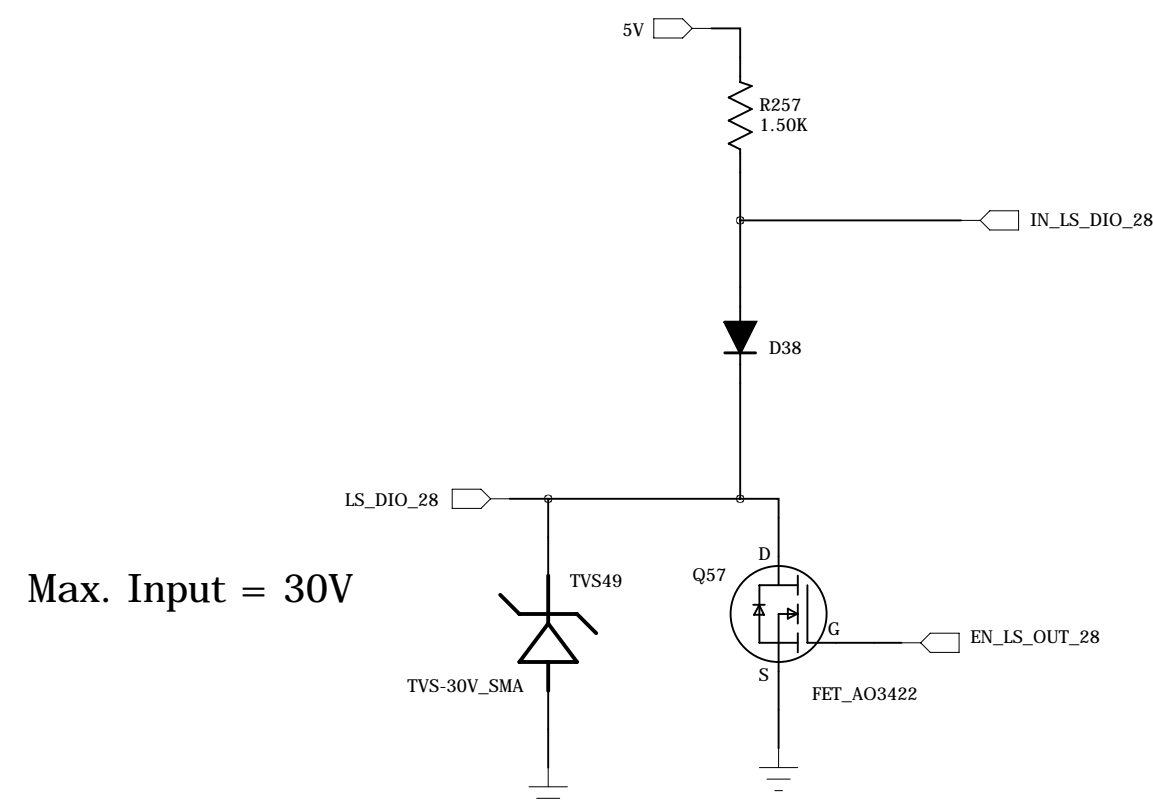
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

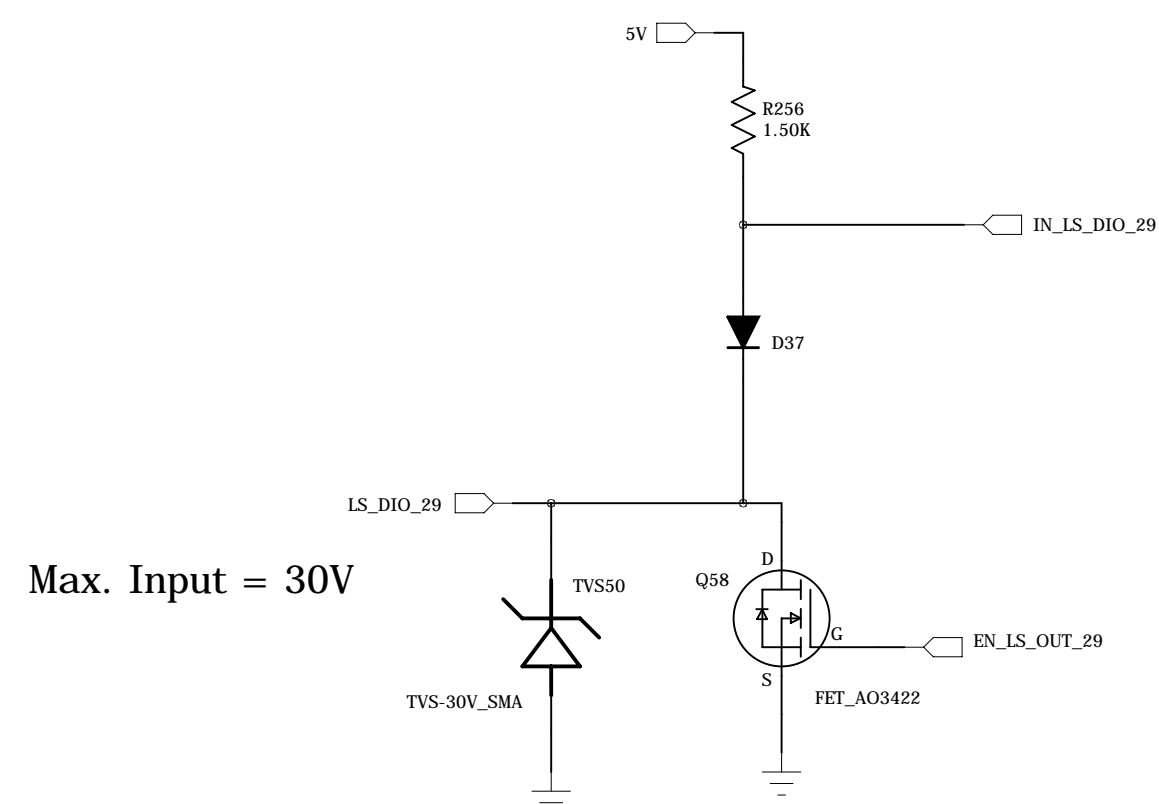
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

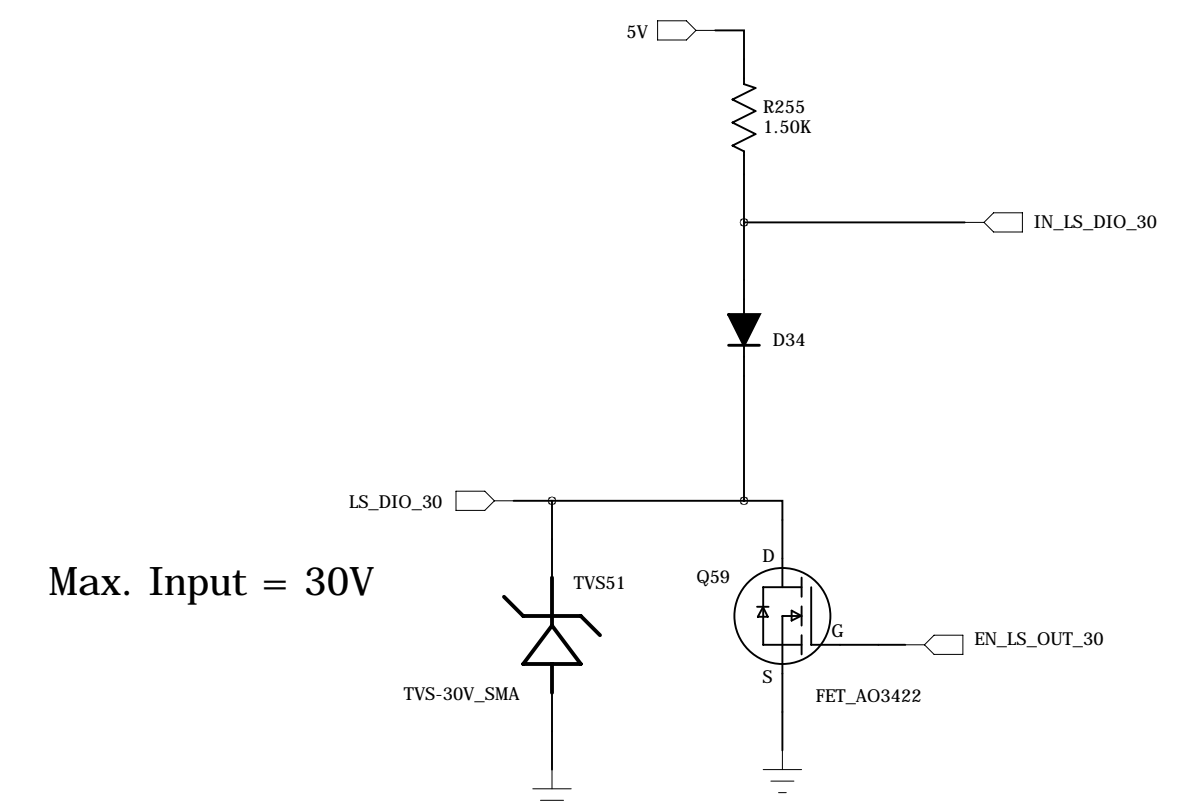
Sinks 500 mA



Max. Input = 30V

Low-Side Switch

Sinks 500 mA



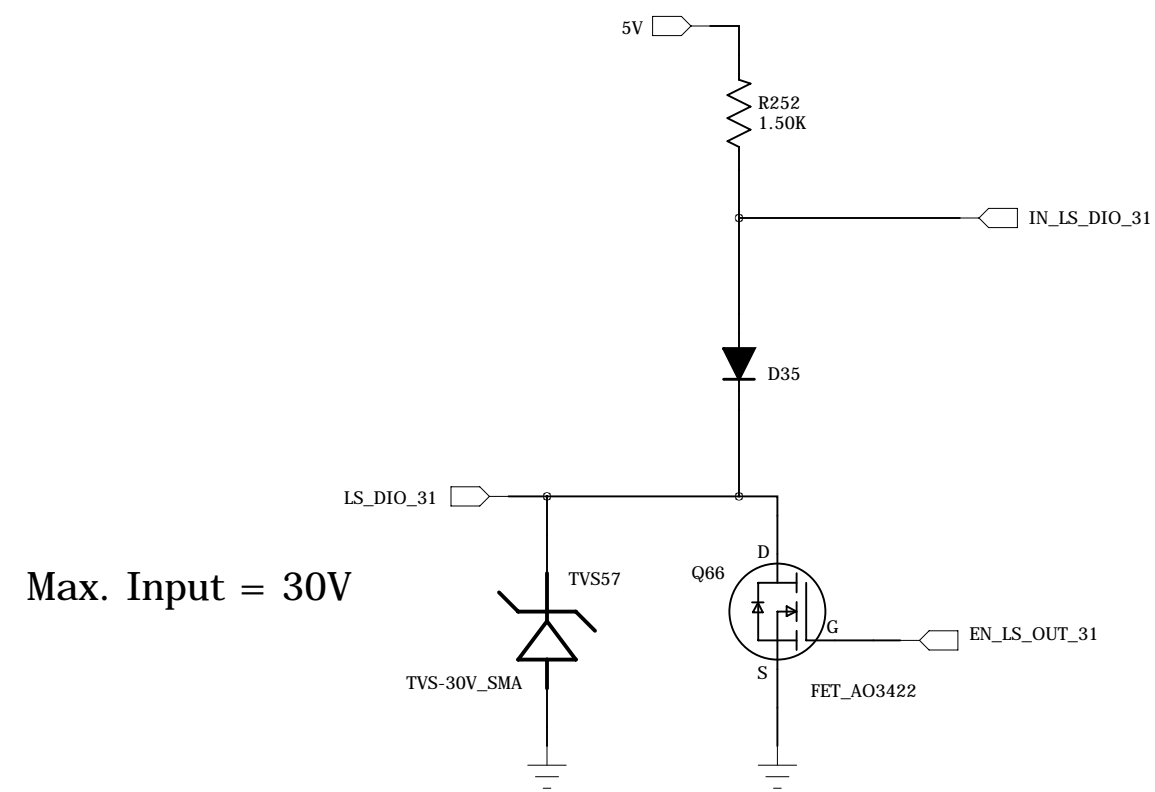
Max. Input = 30V

Technologic Systems	Date	May 6, 2012
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Low Side Switches

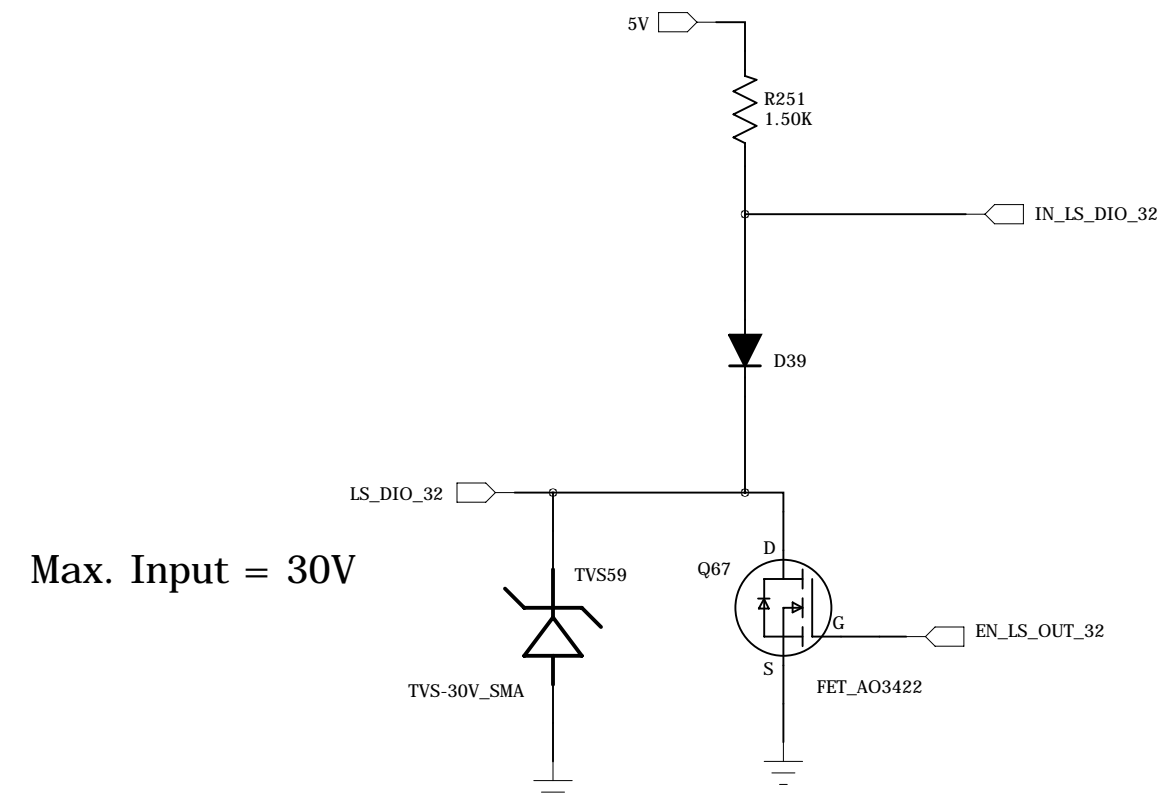
Low-Side Switch

Sinks 500 mA



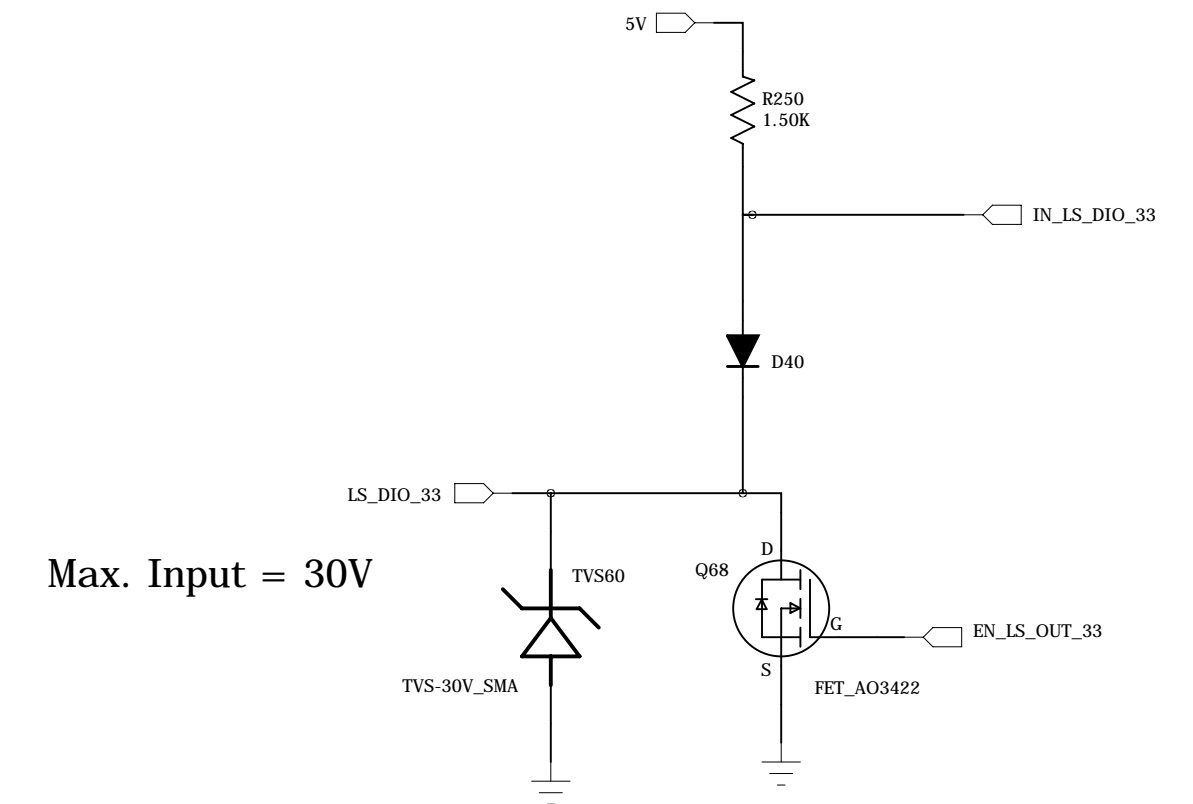
Low-Side Switch

Sinks 500 mA



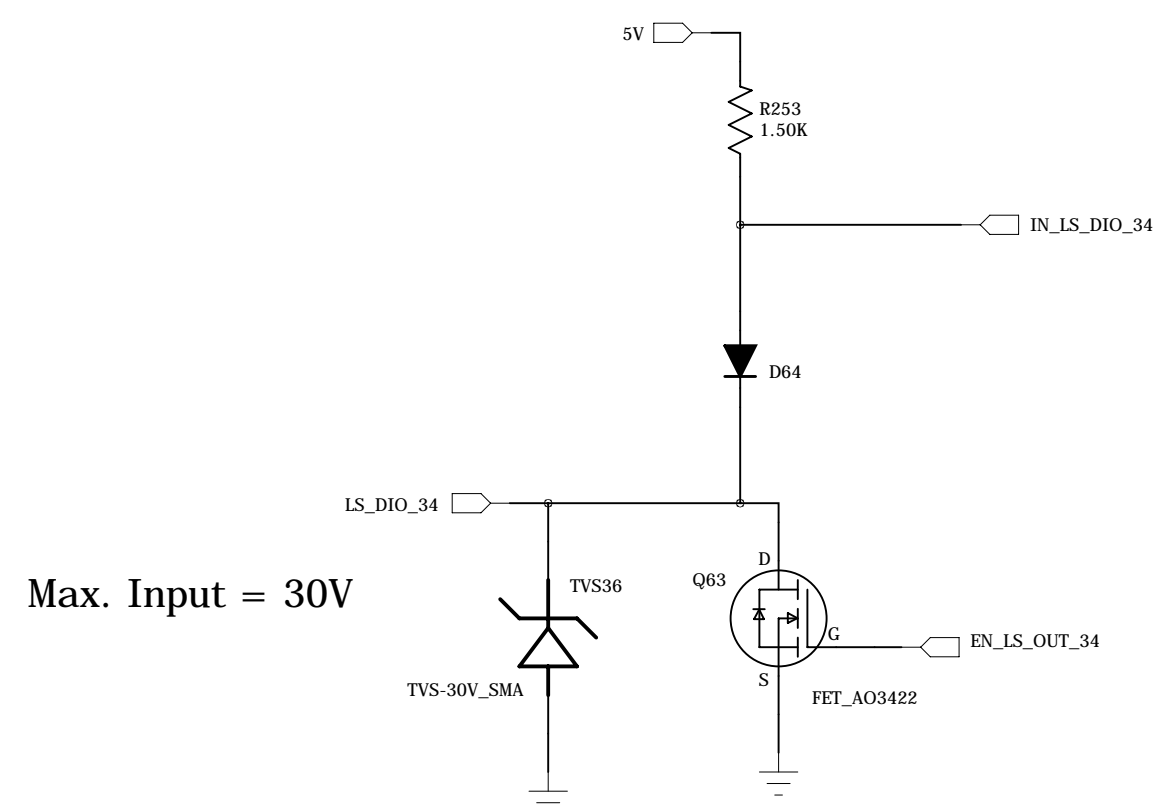
Low-Side Switch

Sinks 500 mA



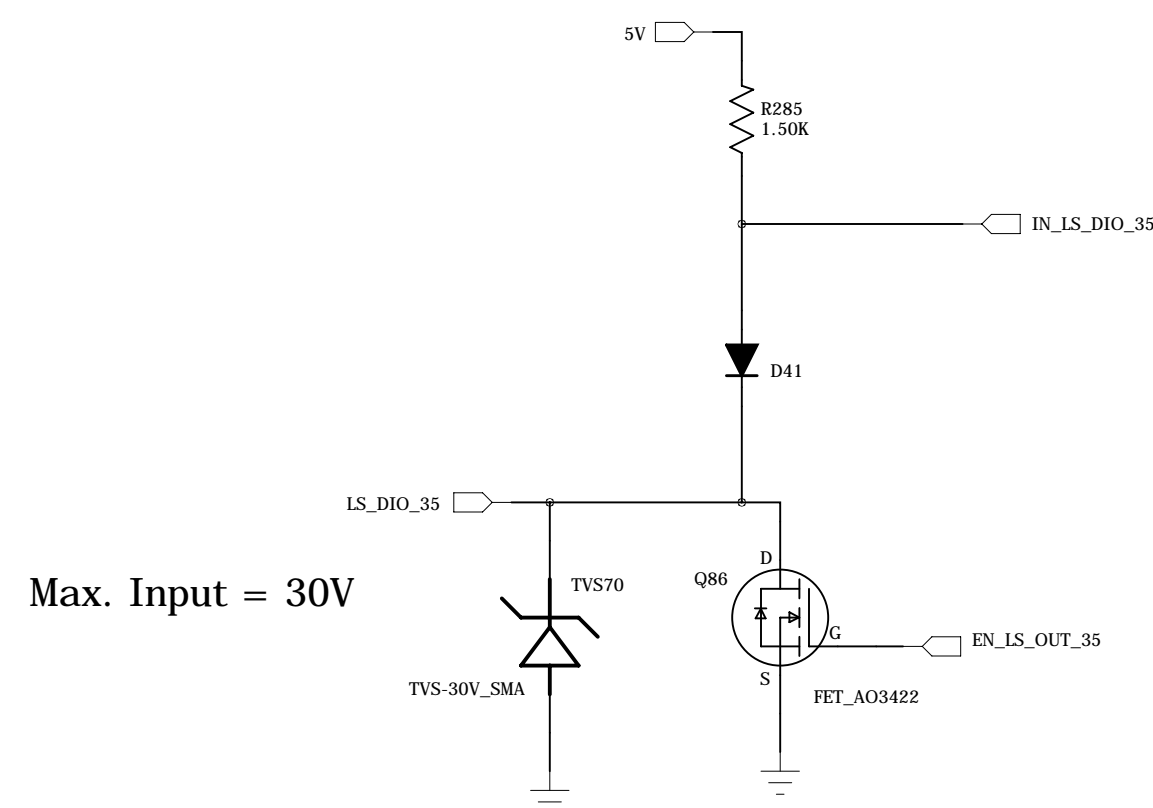
Low-Side Switch

Sinks 500 mA



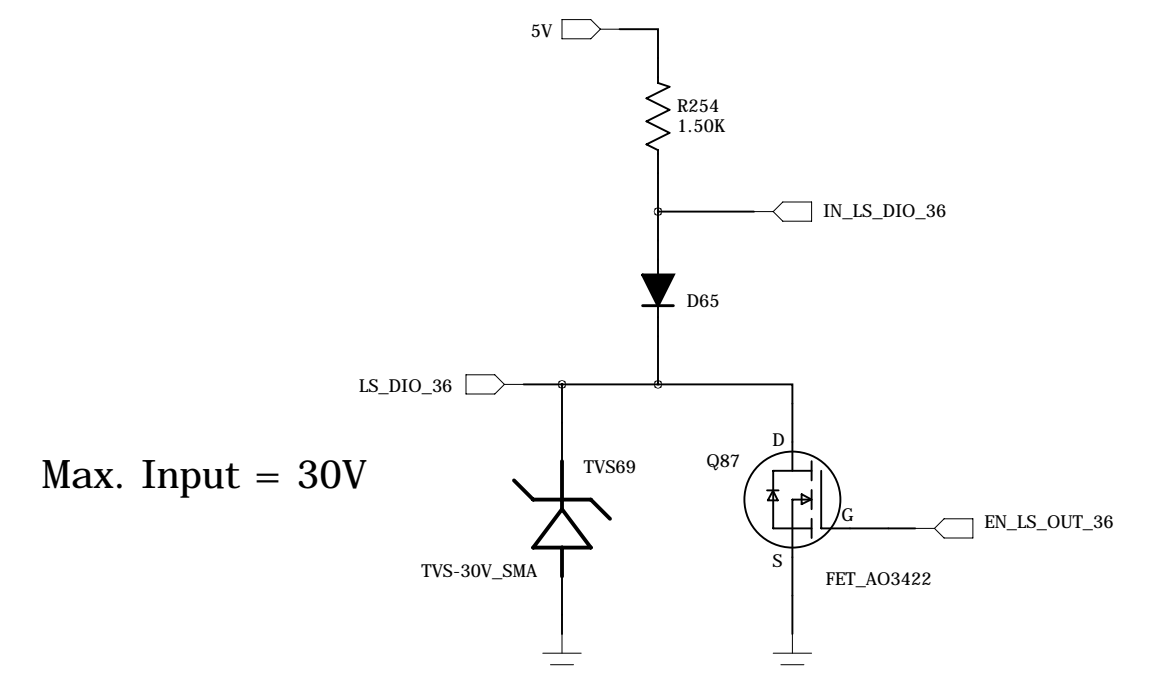
Low-Side Switch

Sinks 500 mA



Low-Side Switch

Sinks 500 mA

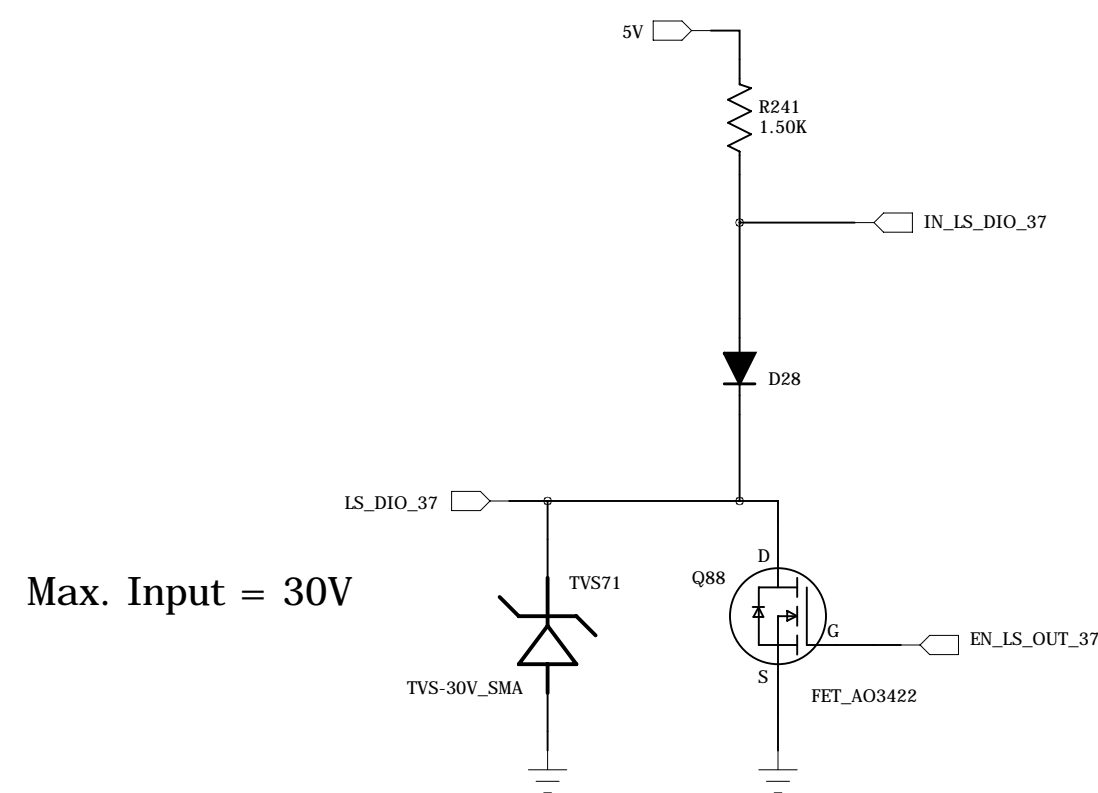


Technologic Systems	Date	May 6, 2012
Title: TS-7580 Low Side Switches		
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Low Side Switches

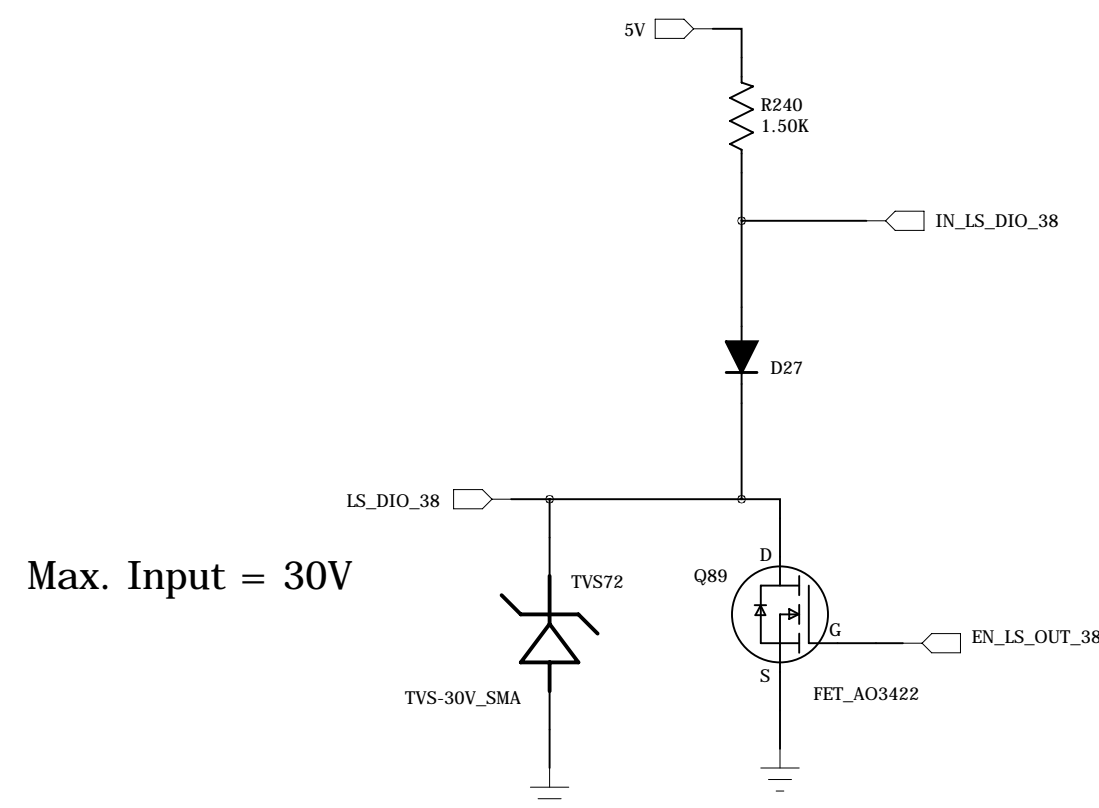
Low-Side Switch

Sinks 500 mA



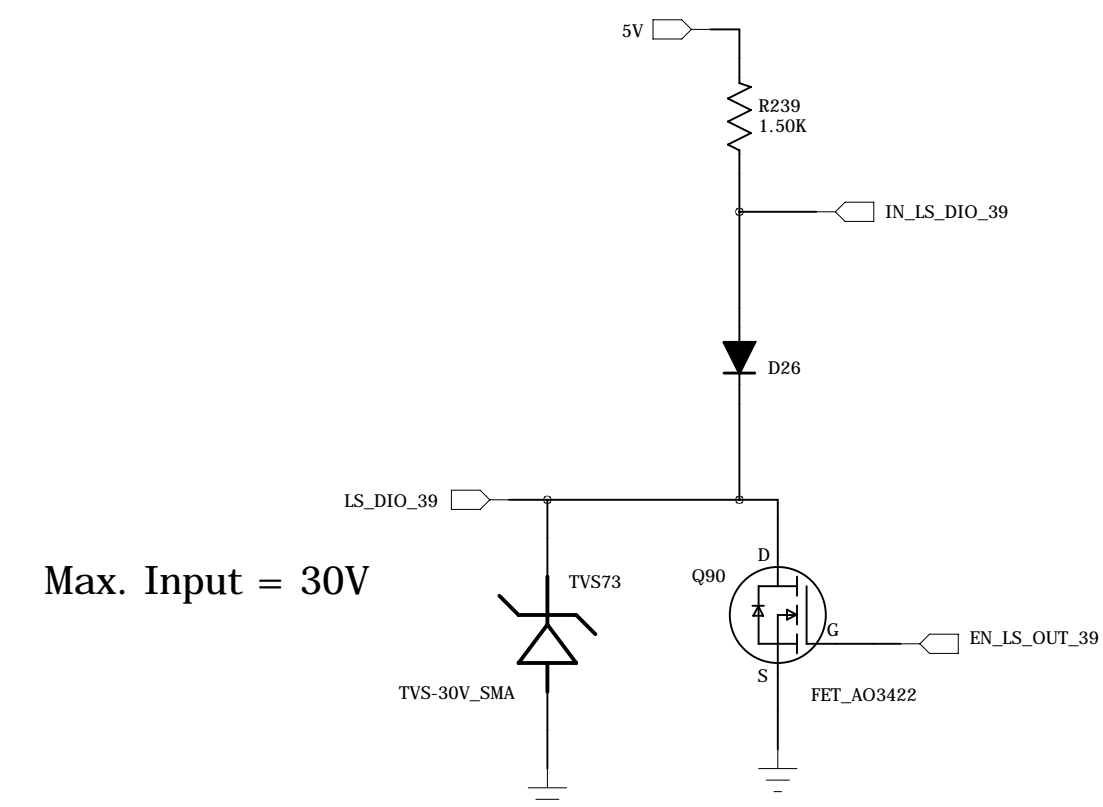
Low-Side Switch

Sinks 500 mA



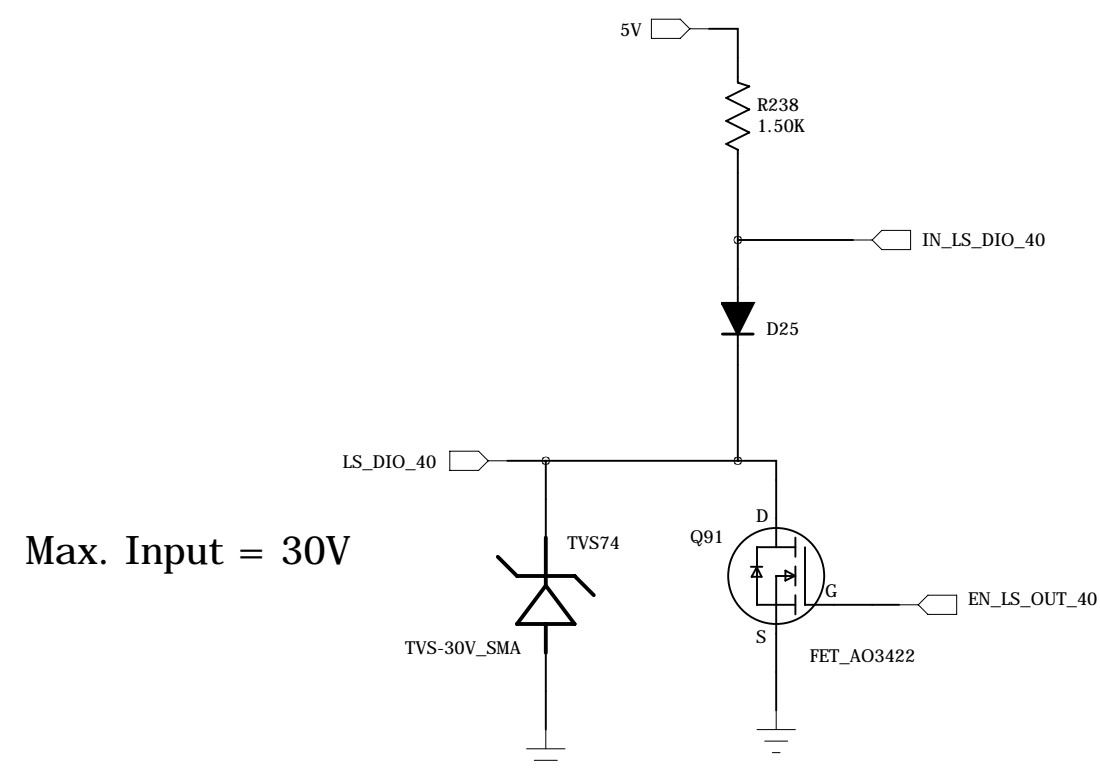
Low-Side Switch

Sinks 500 mA



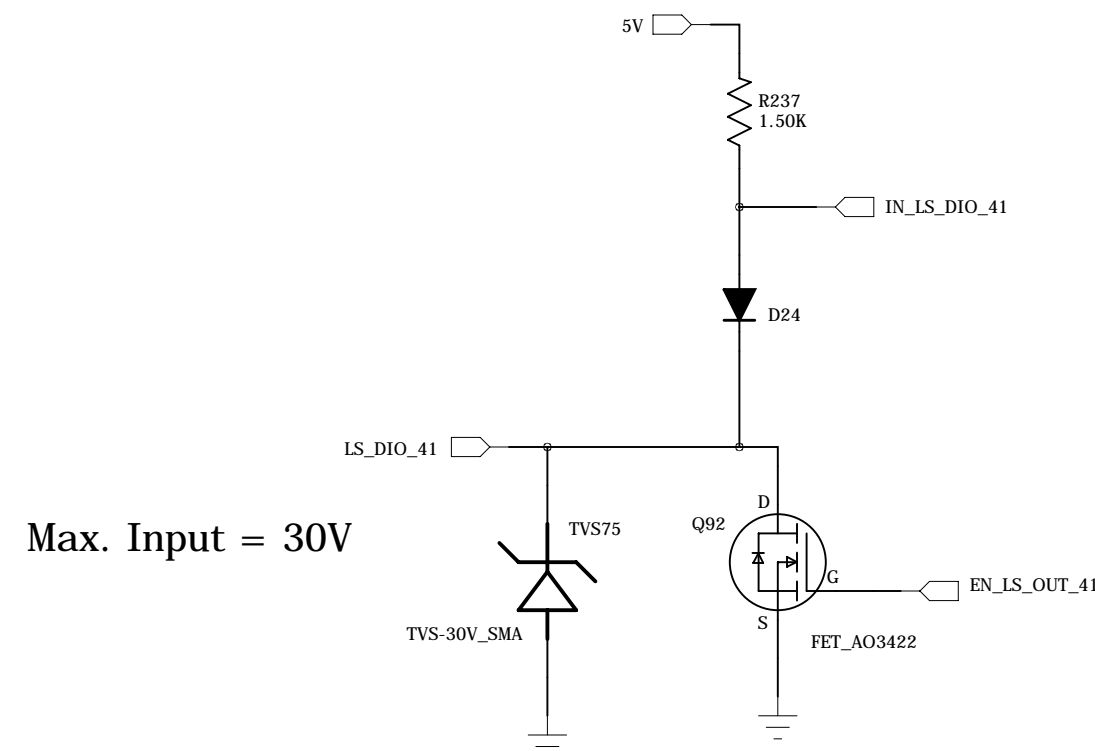
Low-Side Switch

Sinks 500 mA



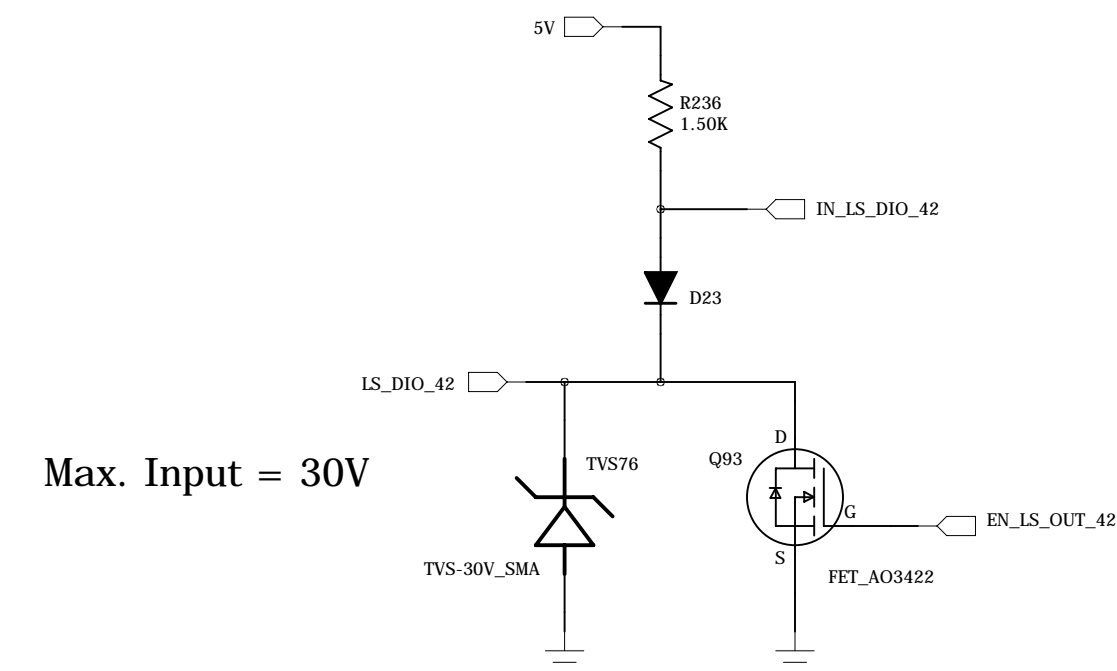
Low-Side Switch

Sinks 500 mA



Low-Side Switch

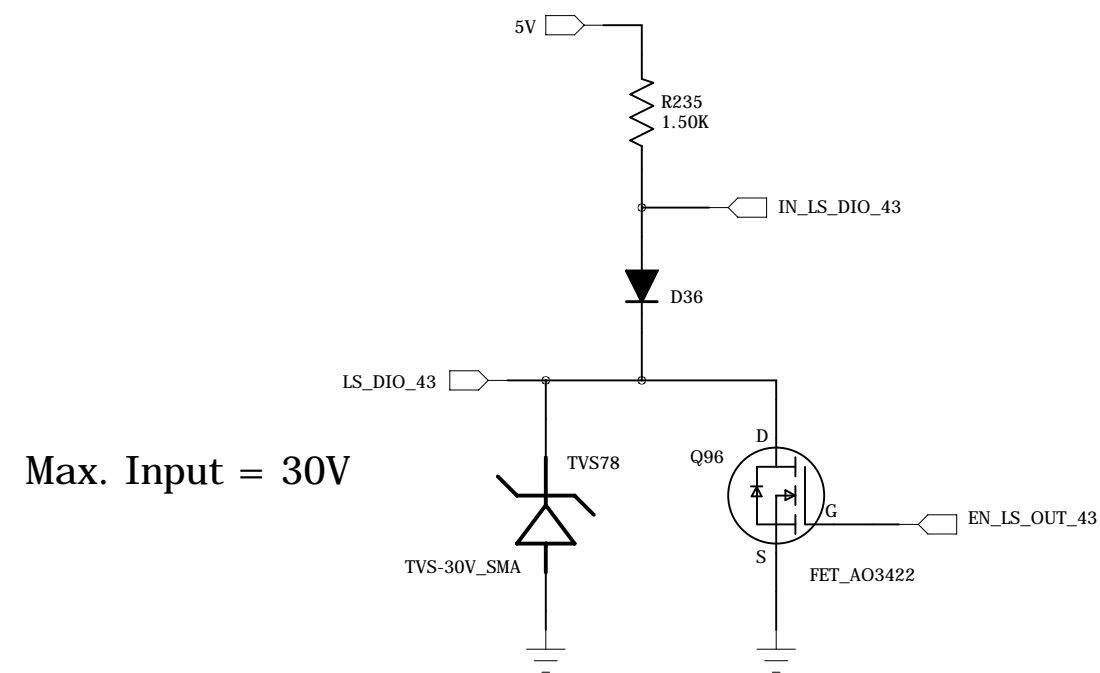
Sinks 500 mA



Technologic Systems	Date	May 6, 2012
Title: TS-7580 Low Side Switches		
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Low-Side Switch

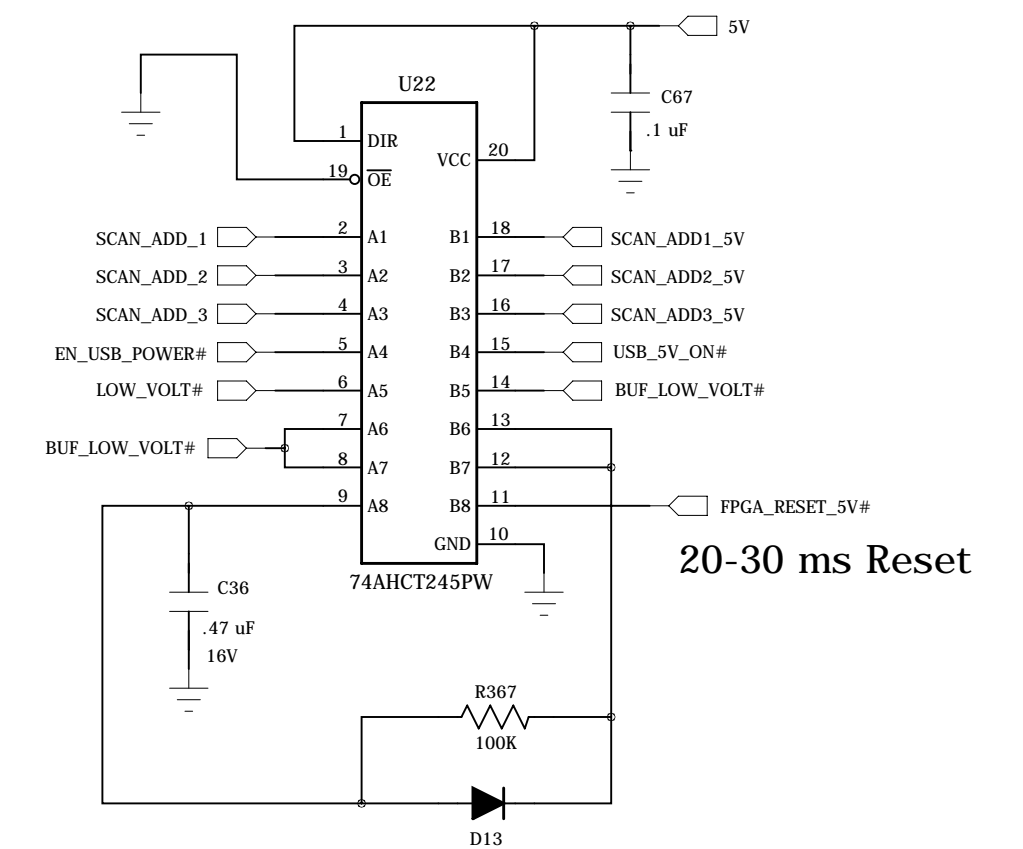
Sinks 500 mA



Max. Input = 30V

3.3V → 5V

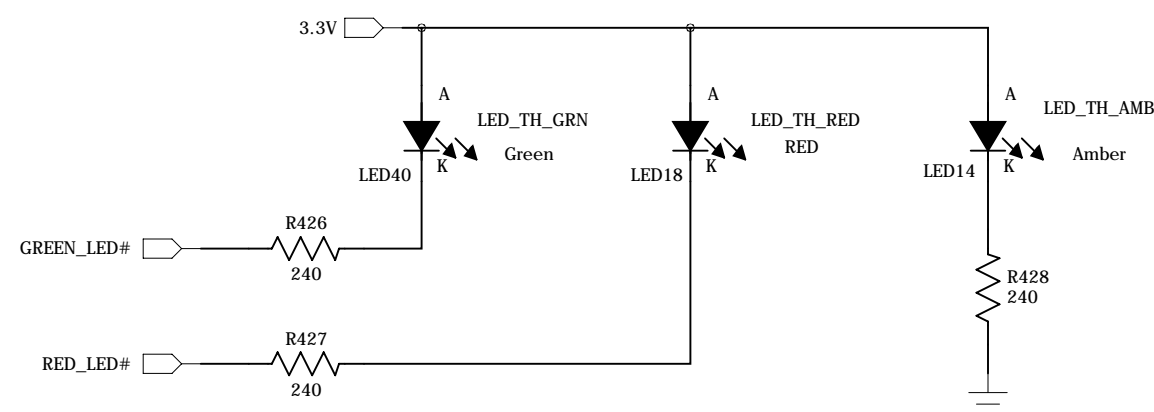
Level shifters



U22 has Schmitt-trigger Inputs

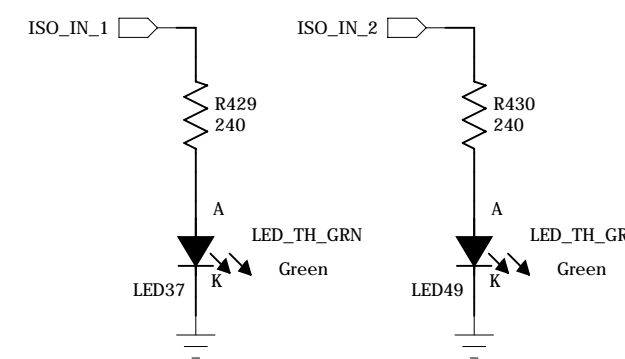
Red Green Amber

LEDs



Isolated Input

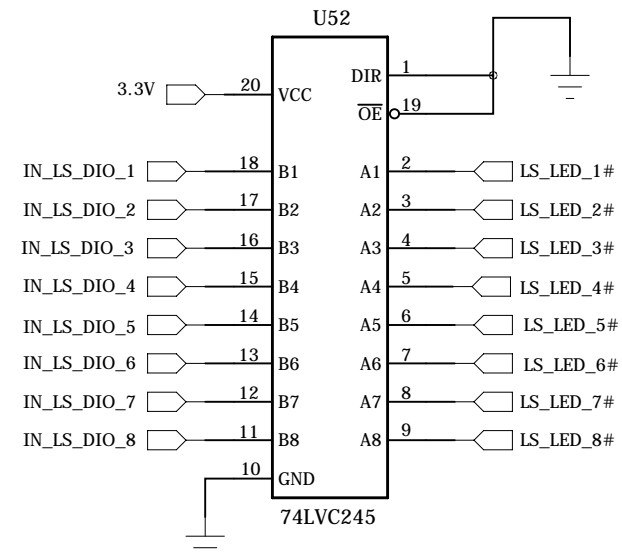
LEDs



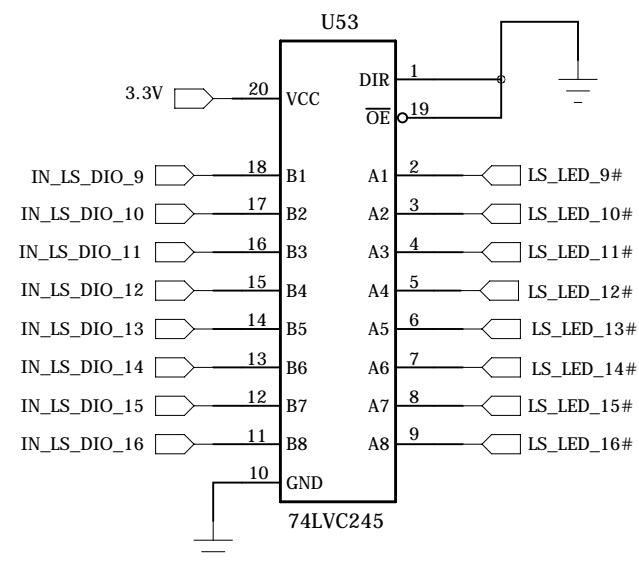
Technologic Systems	Date	May 6, 2012
Title: TS-7580 Low Side Switches		
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LED Buffers

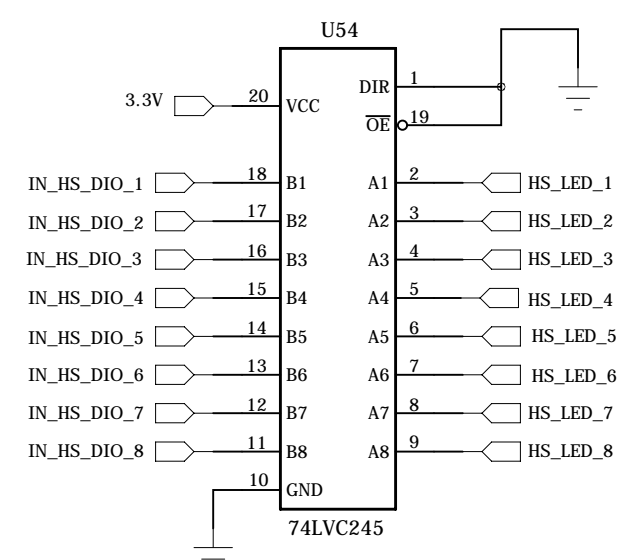
Buffer →



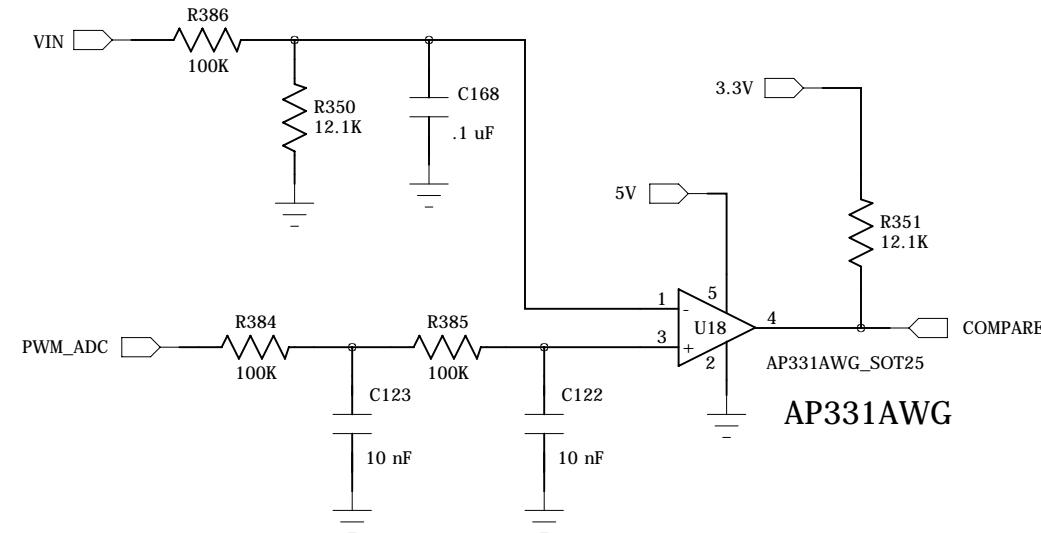
Buffer →



Buffer →

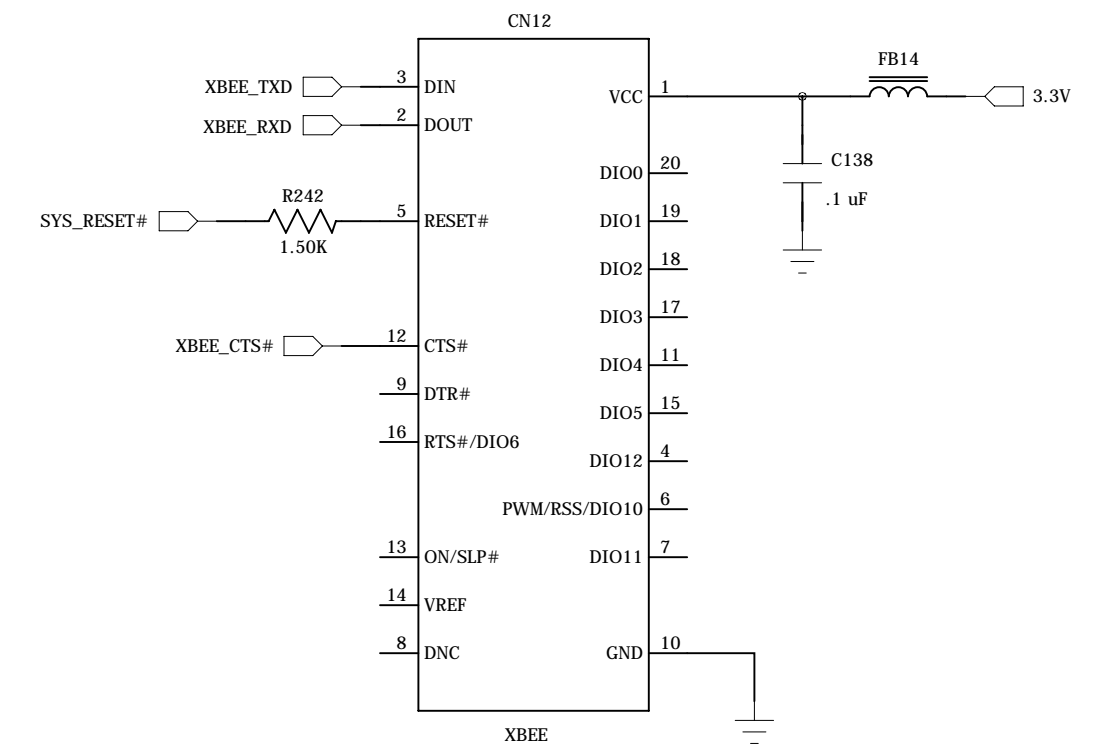


A/D Converter



Not Populated

Digi/MaxStream
XBee Radio Socket



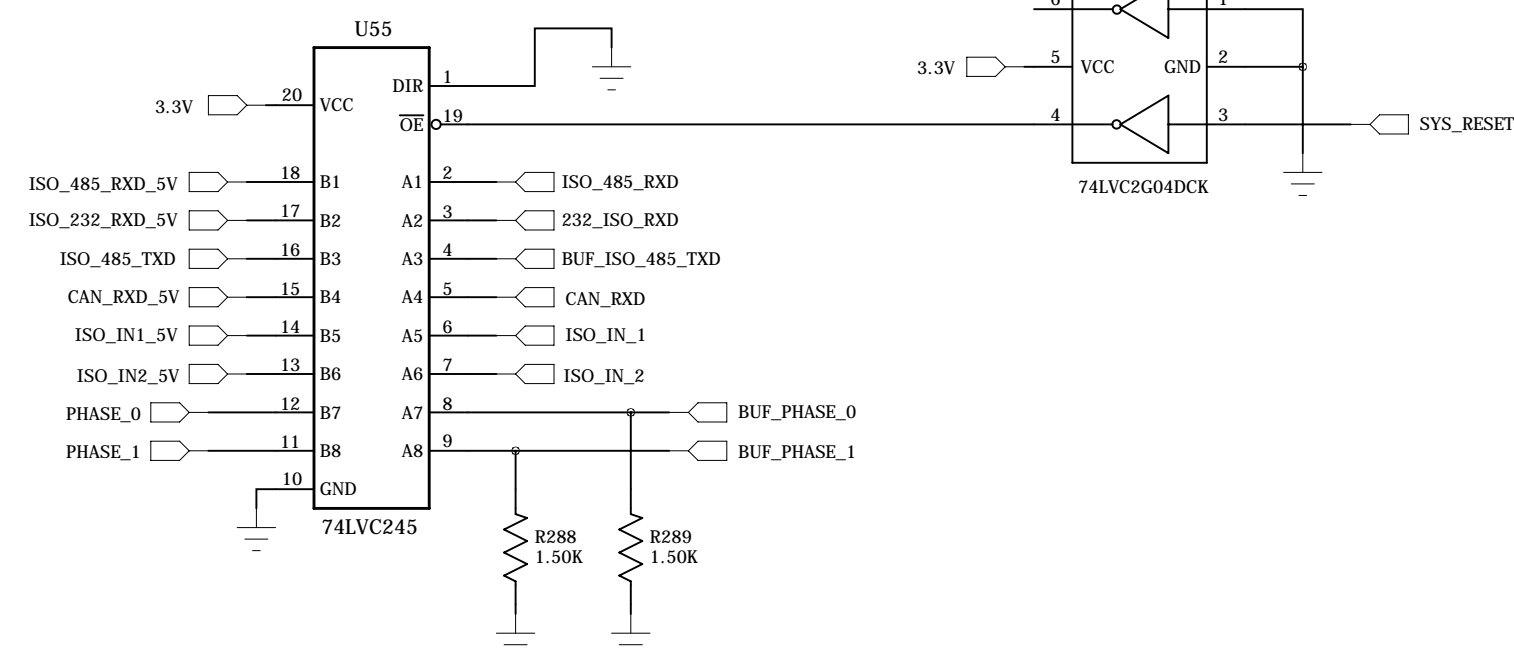
10-pin 2mm socket
S5751-10-ND
56 cents / 100

Reset# must be driven
with Open drain

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

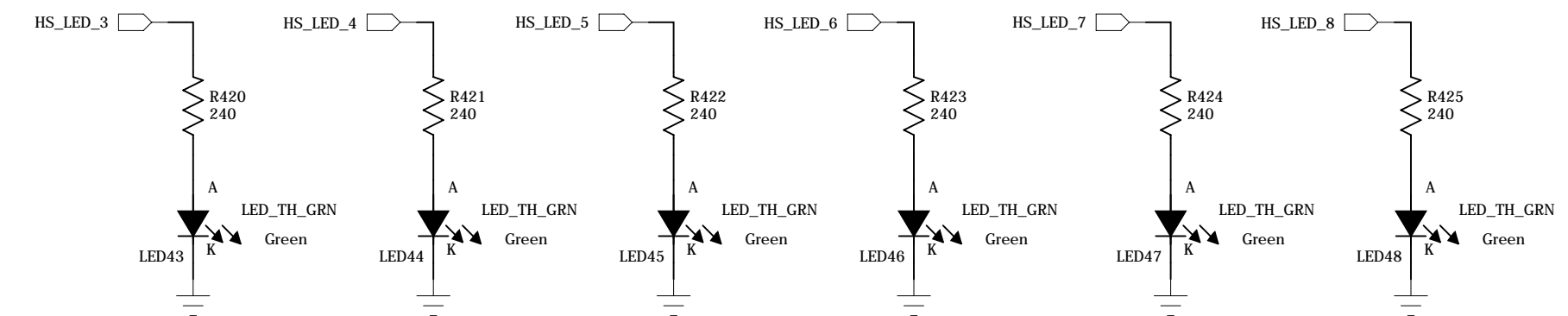
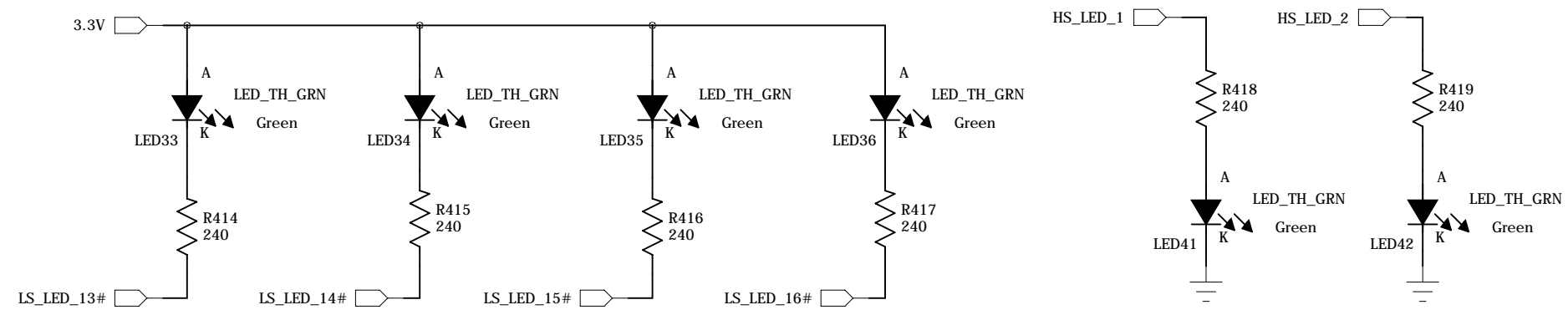
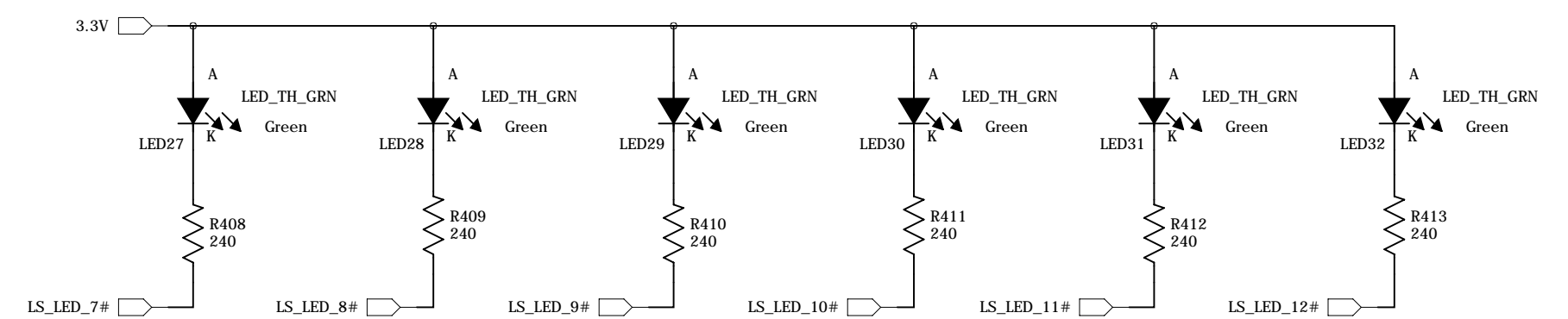
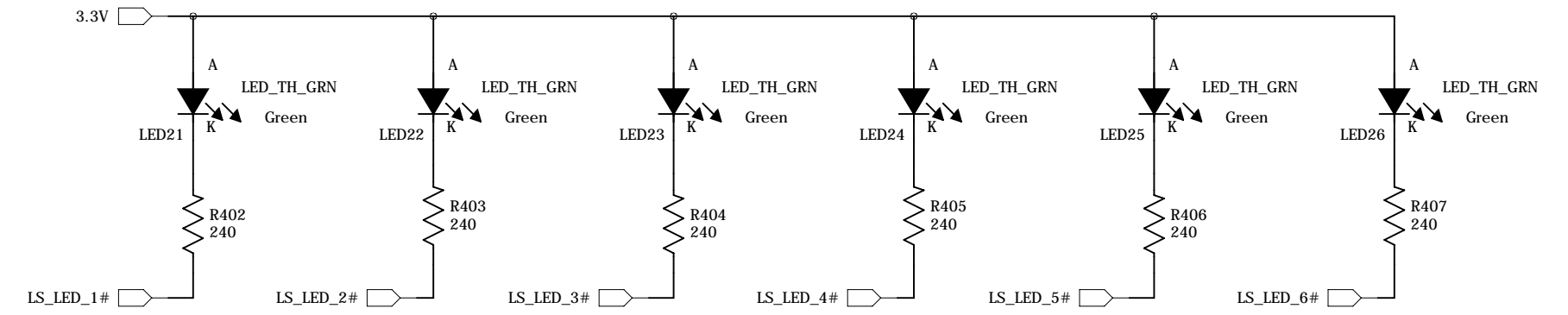
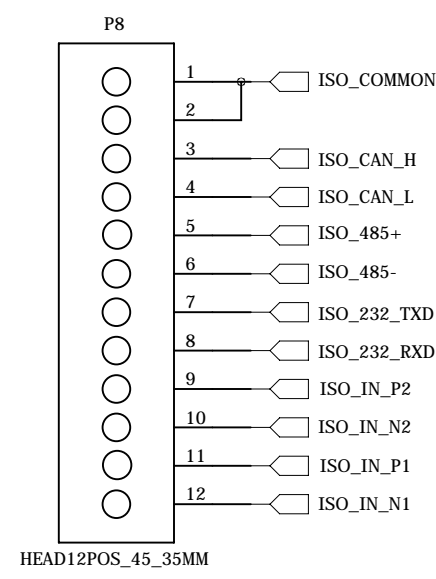
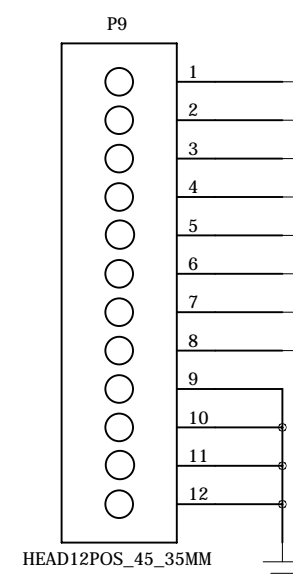
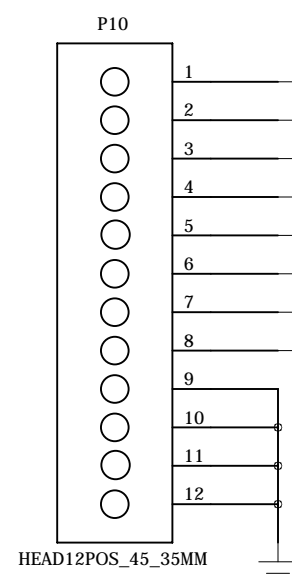
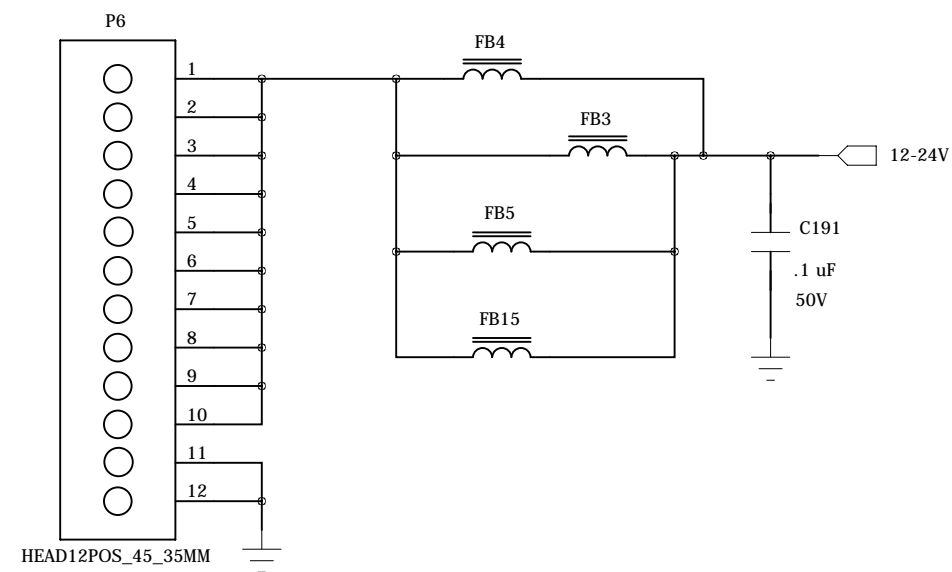
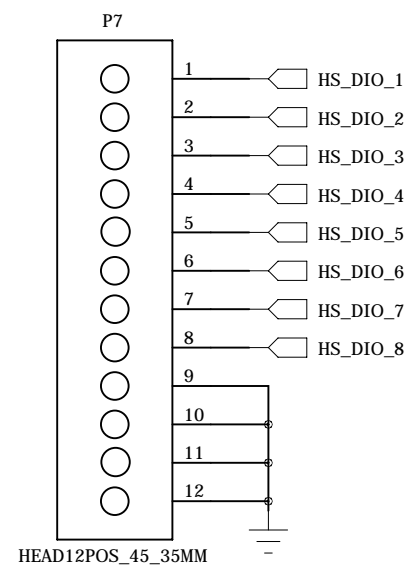
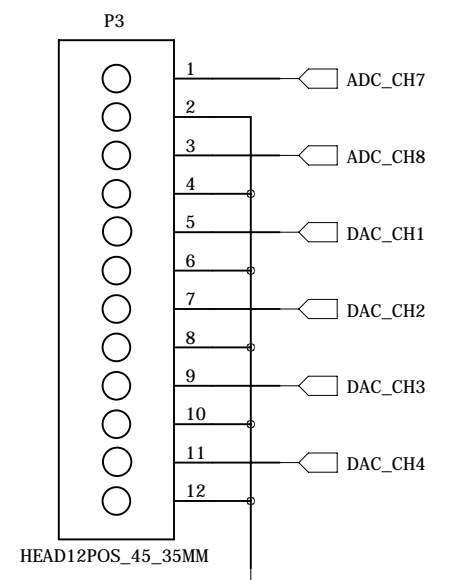
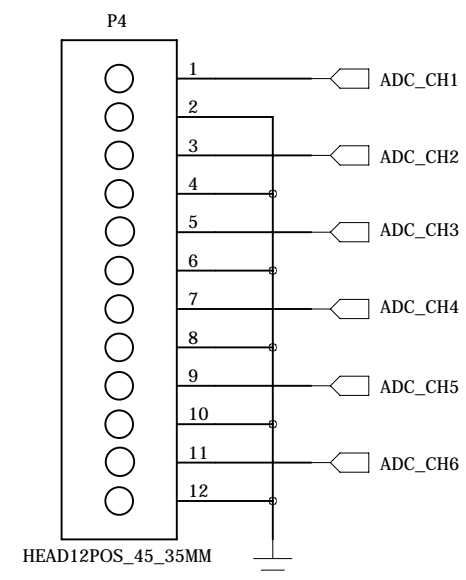
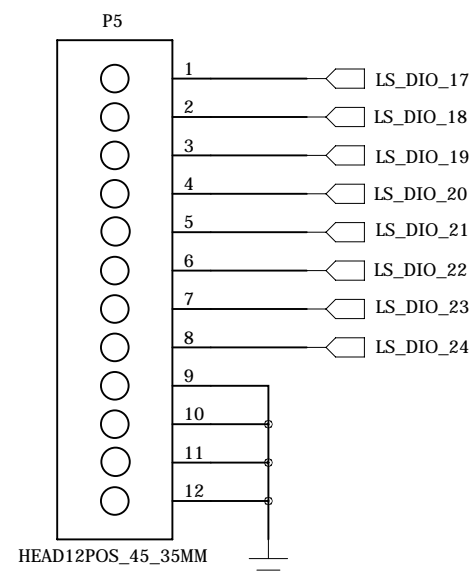
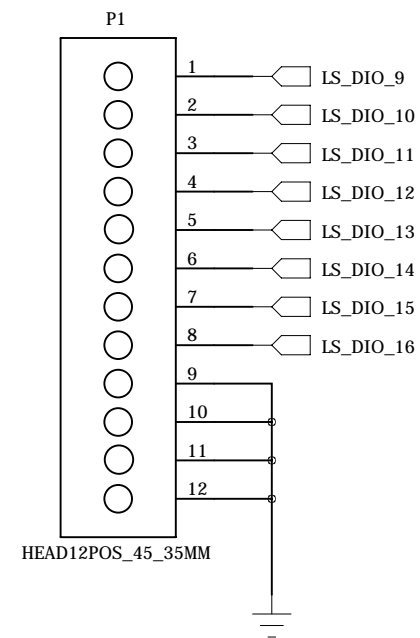
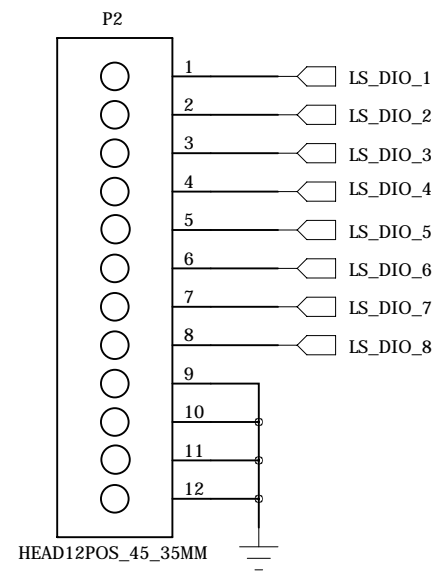
Baud rates up to
230.4K supported

Buffer →



Technologic Systems		Date May 6, 2012	
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Screw Terminal Conn.



Technologic Systems	Date May 6, 2012
Title: TS-7580 Power, Terminals, LEDs	
Rev: A	Designer
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