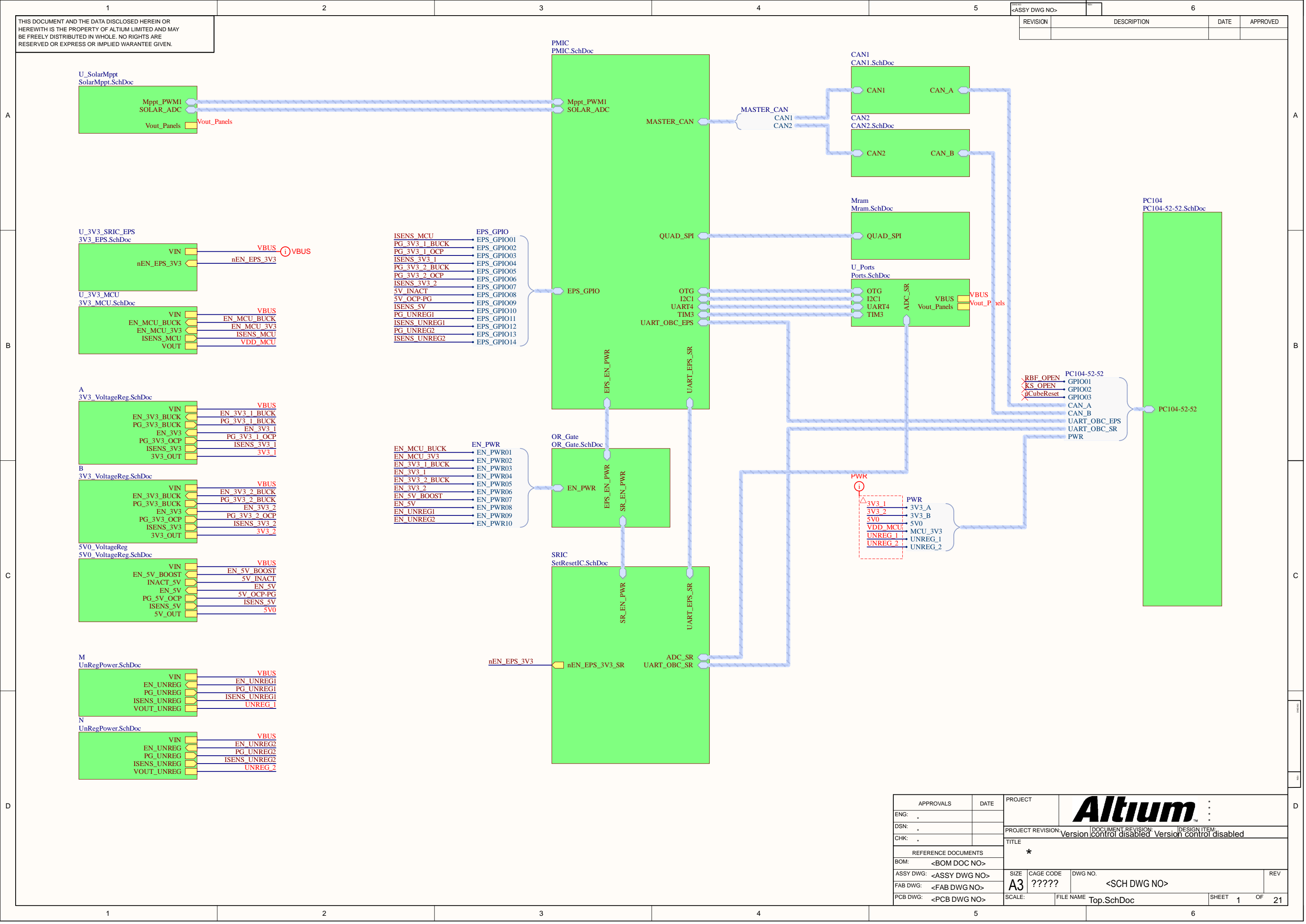


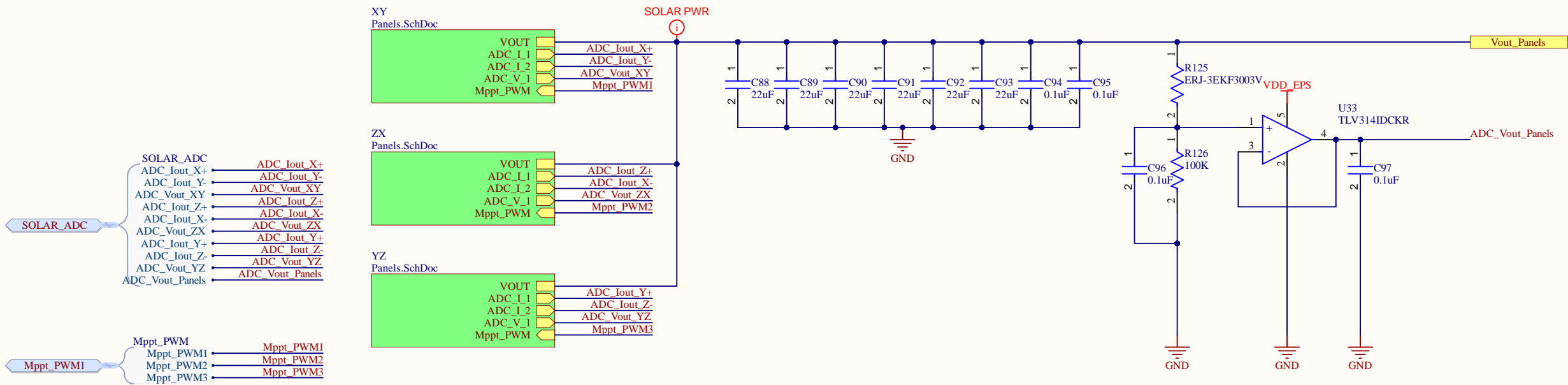
THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium	
ENG: .		PROJECT REVISION: .	DOCUMENT REVISION: .	DESIGN ITEM: .
DSN: .		Version control disabled Version control disabled		
CHK: .		TITLE		
REFERENCE DOCUMENTS		★		
BOM: <BOM DOC NO>		SIZE	CAGE CODE	DWG NO.
ASSY DWG: <ASSY DWG NO>		A3	?????	<SCH DWG NO>
FAB DWG: <FAB DWG NO>		SCALE:	FILE NAME	REV
PCB DWG: <PCB DWG NO>			Top.SchDoc	
		SHEET 1 OF		21

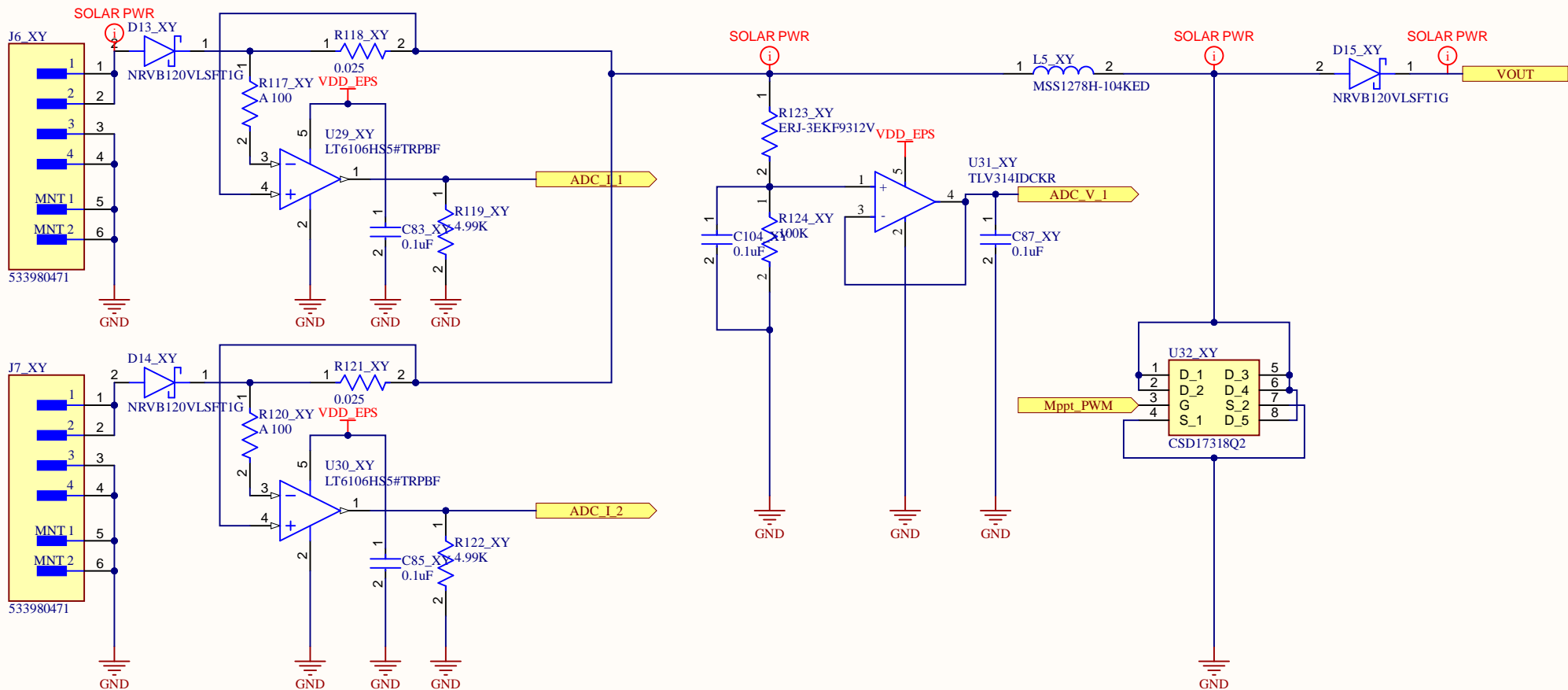
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS		DATE	PROJECT		<div>Altium™</div>		
ENG: *							
DSN: *			PROJECT REVISION: *		DOCUMENT REVISION: *		DESIGN ITEM: *
CHK: *			Version control disabled Version control disabled				
REFERENCE DOCUMENTS			★				
BOM: <BOM DOC NO>							
ASSY DWG: <ASSY DWG NO>							
FAB DWG: <FAB DWG NO>							
PCB DWG: <PCB DWG NO>			SIZE	CAGE CODE	DWG NO.		REV
			A3	?????	<SCH DWG NO>		
			SCALE:	FILE NAME			
			SolarMppt.SchDoc				SHEET 2 OF 21

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

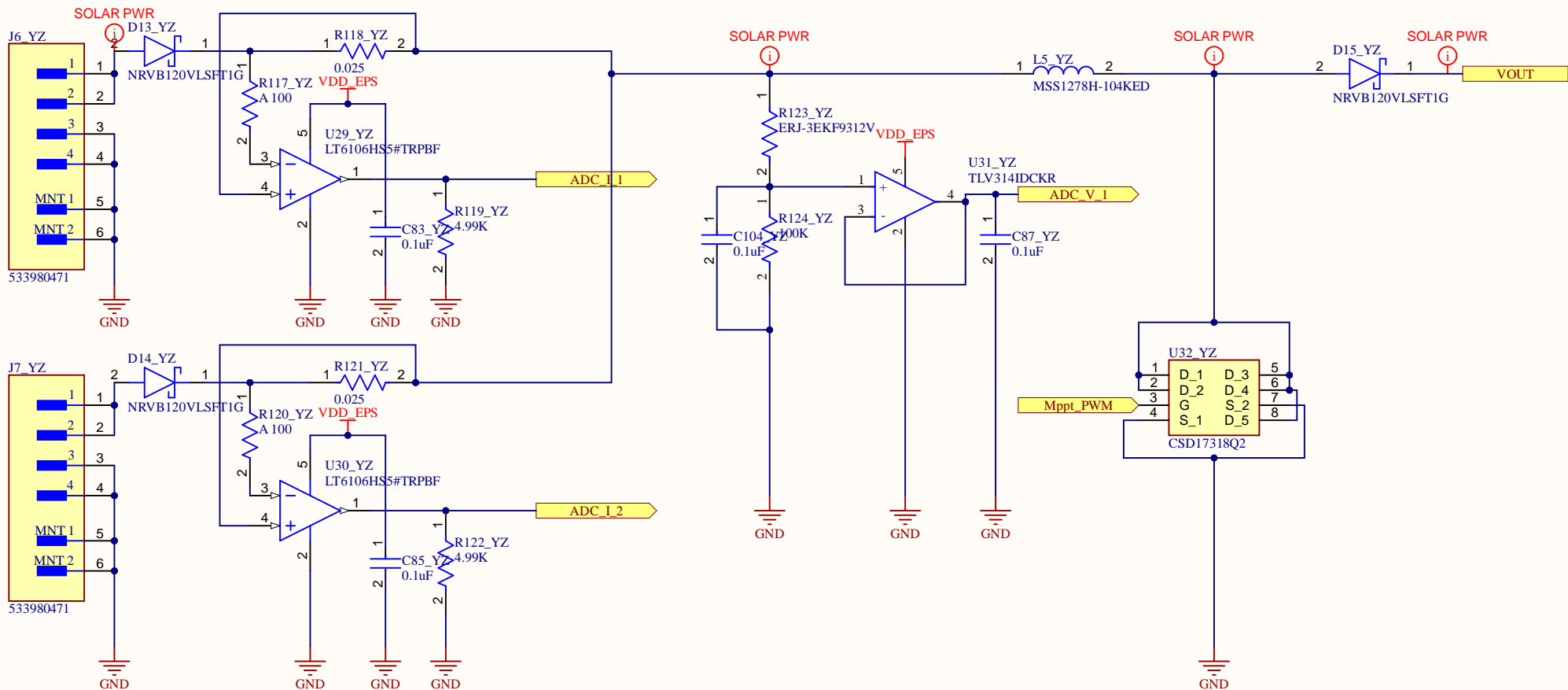
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		Version control disabled Version control disabled			
REFERENCE DOCUMENTS		TITLE			
BOM: <BOM DOC NO>		*			
ASSY DWG: <ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV	
FAB DWG: <FAB DWG NO>	A3	????	<SCH DWG NO>		
PCB DWG: <PCB DWG NO>	SCALE:	FILE NAME	Panels.SchDoc		SHEET 3 OF 21

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HERewith IS THE PROPERTY OF ALTium LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

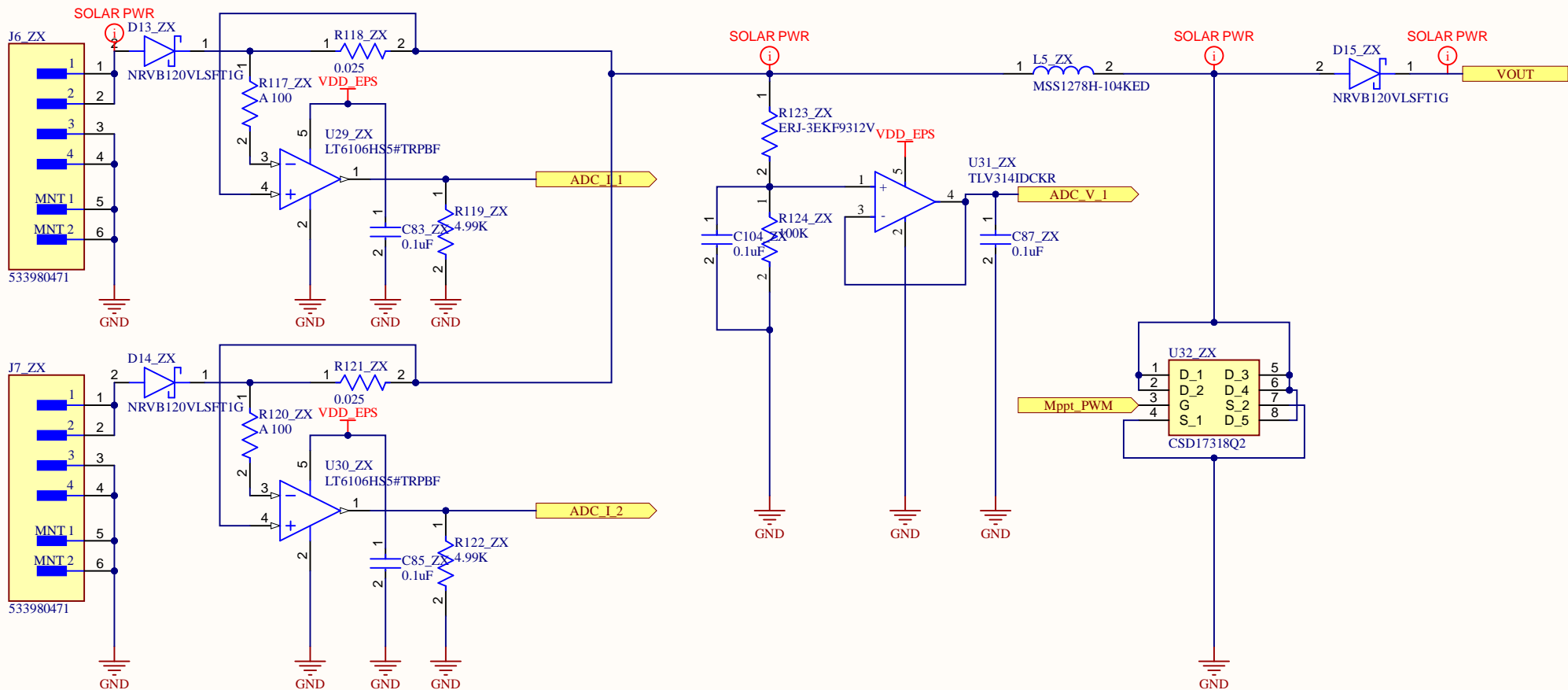
REVISION	DESCRIPTION	DATE	APPROVED



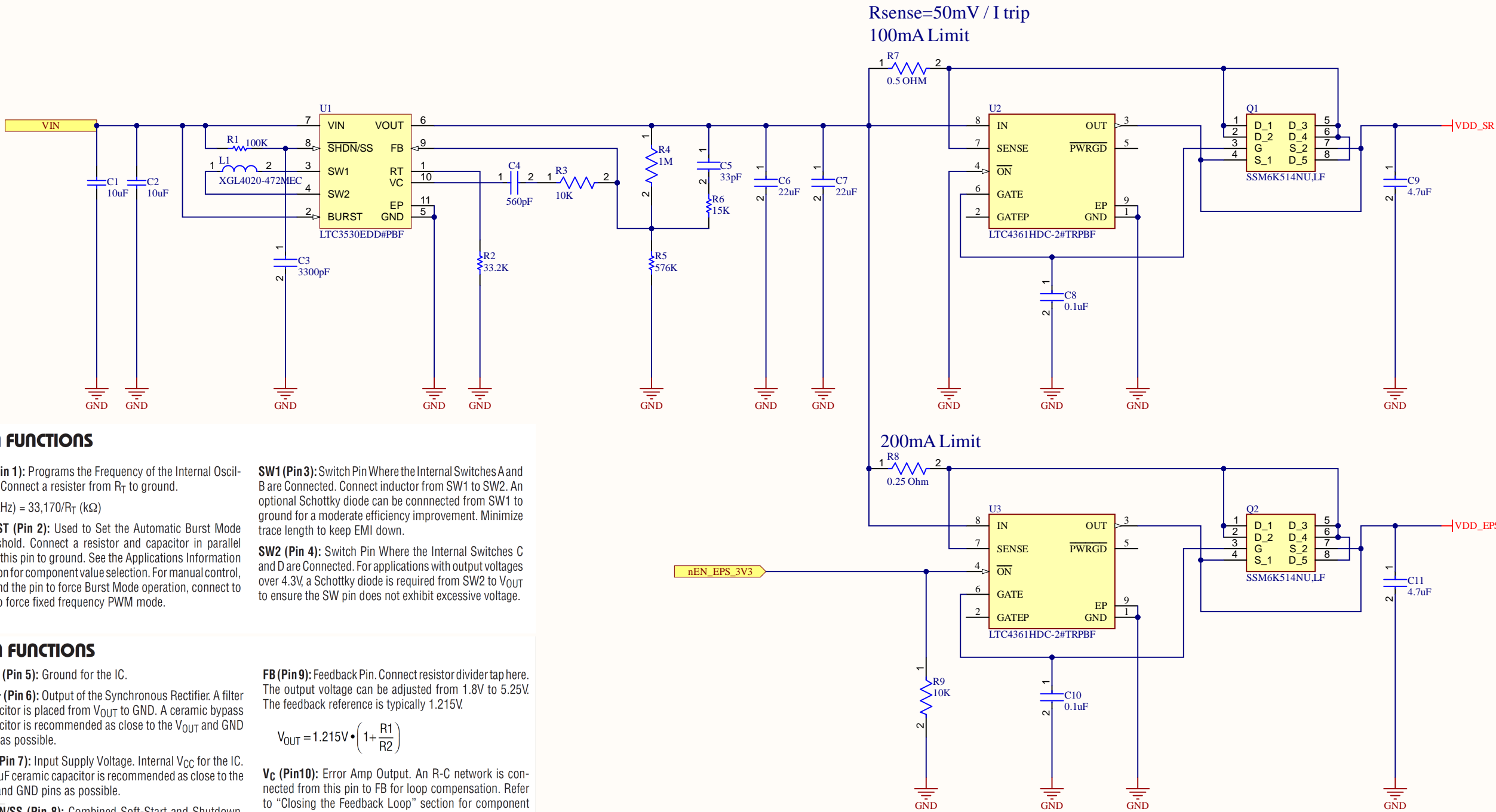
APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		Version control disabled Version control disabled			
REFERENCE DOCUMENTS		TITLE			
BOM: <BOM DOC NO>		★			
ASSY DWG: <ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV	
FAB DWG: <FAB DWG NO>	A3	?????	<SCH DWG NO>		
PCB DWG: <PCB DWG NO>	SCALE:	FILE NAME	Panels.SchDoc		SHEET 3 OF 21

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium	
ENG: .				
DSN: .		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:
CHK: .		Version control disabled Version control disabled		
REFERENCE DOCUMENTS		TITLE		
BOM: <BOM DOC NO>		★		
ASSY DWG: <ASSY DWG NO>	SIZE: A3	CAGE CODE: ?????	DWG NO: <SCH DWG NO>	REV
FAB DWG: <FAB DWG NO>	SCALE:	FILE NAME: Panels.SchDoc	SHEET: 3	OF: 21
PCB DWG: <PCB DWG NO>				



PIN FUNCTIONS

R_T (Pin 1): Programs the Frequency of the Internal Oscillator. Connect a resistor from R_T to ground.

$$f(\text{kHz}) = 33,170/R_T (\text{k}\Omega)$$

BURST (Pin 2): Used to Set the Automatic Burst Mode Threshold. Connect a resistor and capacitor in parallel from this pin to ground. See the Applications Information section for component value selection. For manual control, ground the pin to force Burst Mode operation, connect to V_{IN} to force fixed frequency PWM mode.

SW1 (Pin 3): Switch Pin Where the Internal Switches A and B are Connected. Connect inductor from SW1 to SW2. An optional Schottky diode can be connected from SW1 to ground for a moderate efficiency improvement. Minimize trace length to keep EMI down.

SW2 (Pin 4): Switch Pin Where the Internal Switches C and D are Connected. For applications with output voltages over 4.3V, a Schottky diode is required from SW2 to V_{OUT} to ensure the SW pin does not exhibit excessive voltage.

PIN FUNCTIONS

GND (Pin 5): Ground for the IC.

V_{OUT} (Pin 6): Output of the Synchronous Rectifier. A filter capacitor is placed from V_{OUT} to GND. A ceramic bypass capacitor is recommended as close to the V_{OUT} and GND pins as possible.

V_{IN} (Pin 7): Input Supply Voltage. Internal V_{CC} for the IC. A 10μF ceramic capacitor is recommended as close to the V_{IN} and GND pins as possible.

SHDN/SS (Pin 8): Combined Soft-Start and Shutdown. Applied voltage <0.4V shuts down the IC. Tie to >1.4V to enable the IC and >1.6V to ensure the error amp is not clamped from soft-start. An R-C from the shutdown command signal to this pin will provide a soft-start function by limiting the rise time of V_C.

FB (Pin 9): Feedback Pin. Connect resistor divider tap here. The output voltage can be adjusted from 1.8V to 5.25V. The feedback reference is typically 1.215V.

$$V_{OUT} = 1.215V \cdot \left(1 + \frac{R1}{R2}\right)$$

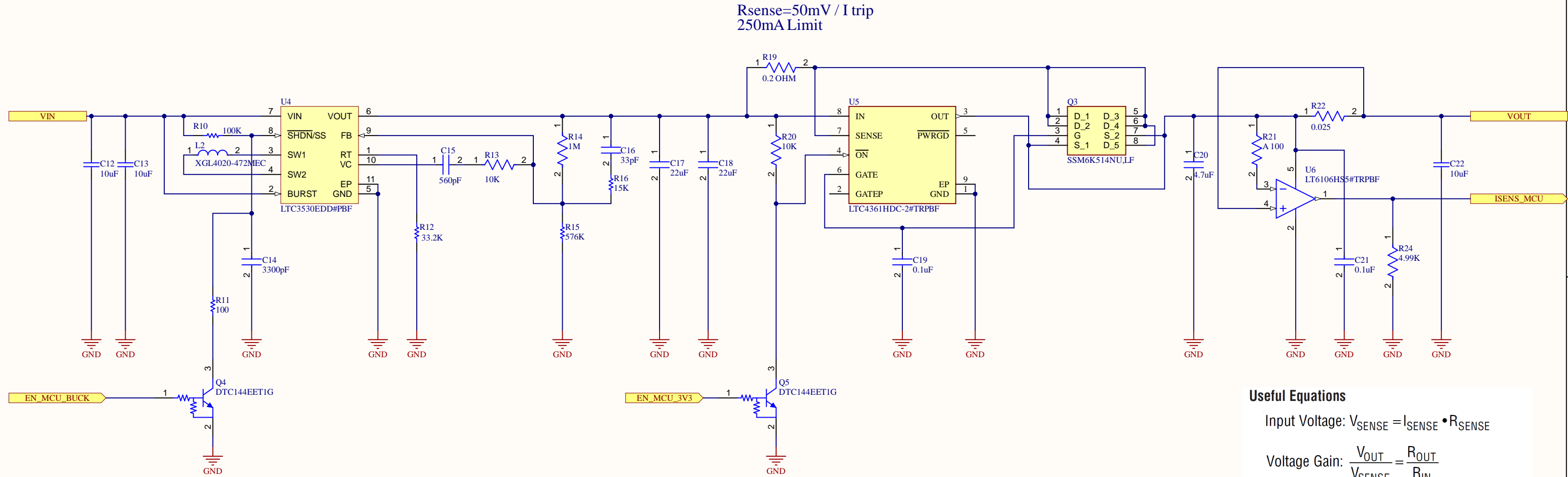
V_C (Pin 10): Error Amp Output. An R-C network is connected from this pin to FB for loop compensation. Refer to "Closing the Feedback Loop" section for component selection guidelines. During Burst Mode operation, V_C is internally clamped.

Exposed Pad (Pin 11, DD Package Only): Ground. This pin must be soldered to the PCB and electrically connected to ground.

APPROVALS		DATE	PROJECT		<div>Altium™</div>			
ENG: *								
DSN: *			PROJECT REVISION:		DOCUMENT REVISION:		DESIGN ITEM:	
CHK: *					Version control disabled		Version control disabled	
REFERENCE DOCUMENTS			★					
BOM: <BOM DOC NO>								
ASSY DWG: <ASSY DWG NO>								
FAB DWG: <FAB DWG NO>								
PCB DWG: <PCB DWG NO>			SIZE	CAGE CODE	DWG NO.			REV
			A3	?????	<SCH DWG NO>			
			SCALE:	FILE NAME			SHEET	
			3v3_EPS.SchDoc			4 OF 21		

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

REVISION	DESCRIPTION	DATE	APPROVED



Useful Equations

Input Voltage: $V_{SENSE} = I_{SENSE} \cdot R_{SENSE}$

Voltage Gain: $\frac{V_{OUT}}{V_{SENSE}} = \frac{R_{OUT}}{R_{IN}}$

Current Gain: $\frac{I_{OUT}}{I_{SENSE}} = \frac{R_{SENSE}}{R_{IN}}$

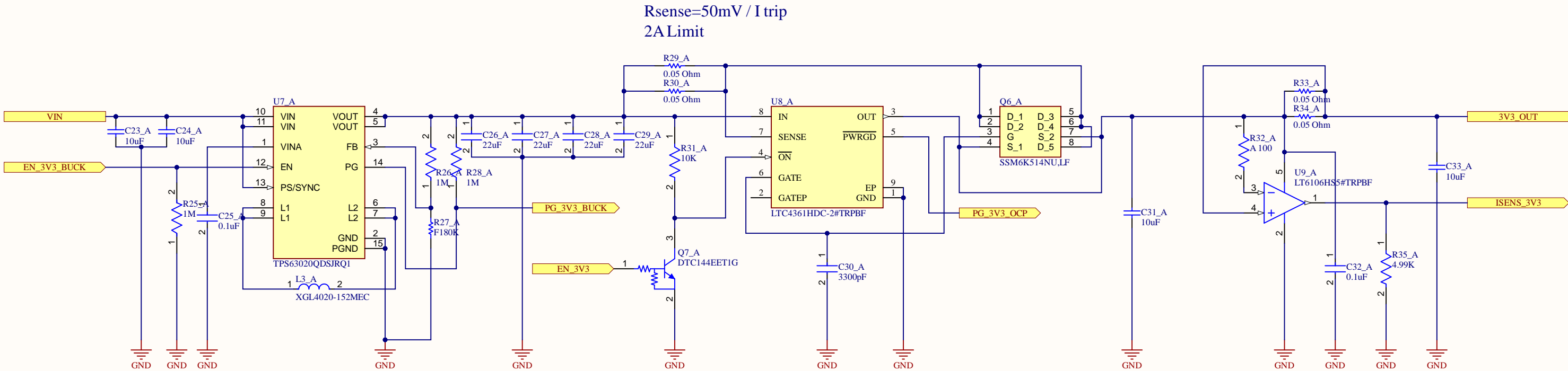
Transconductance: $\frac{I_{OUT}}{V_{SENSE}} = \frac{1}{R_{IN}}$

Transimpedance: $\frac{V_{OUT}}{I_{SENSE}} = R_{SENSE} \cdot \frac{R_{OUT}}{R_{IN}}$

APPROVALS		DATE	PROJECT		<div>Altium™</div>			
ENG: *								
DSN: *			PROJECT REVISION:		DOCUMENT REVISION:	DESIGN ITEM:		
CHK: *					Version control disabled Version control disabled			
REFERENCE DOCUMENTS			★					
BOM: <BOM DOC NO>								
ASSY DWG: <ASSY DWG NO>								
FAB DWG: <FAB DWG NO>								
PCB DWG: <PCB DWG NO>			SIZE	CAGE CODE	DWG NO.			REV
			A3	?????	<SCH DWG NO>			
SCALE:			FILE NAME			SHEET		5 OF 21
			3v3_MCU.SchDoc					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

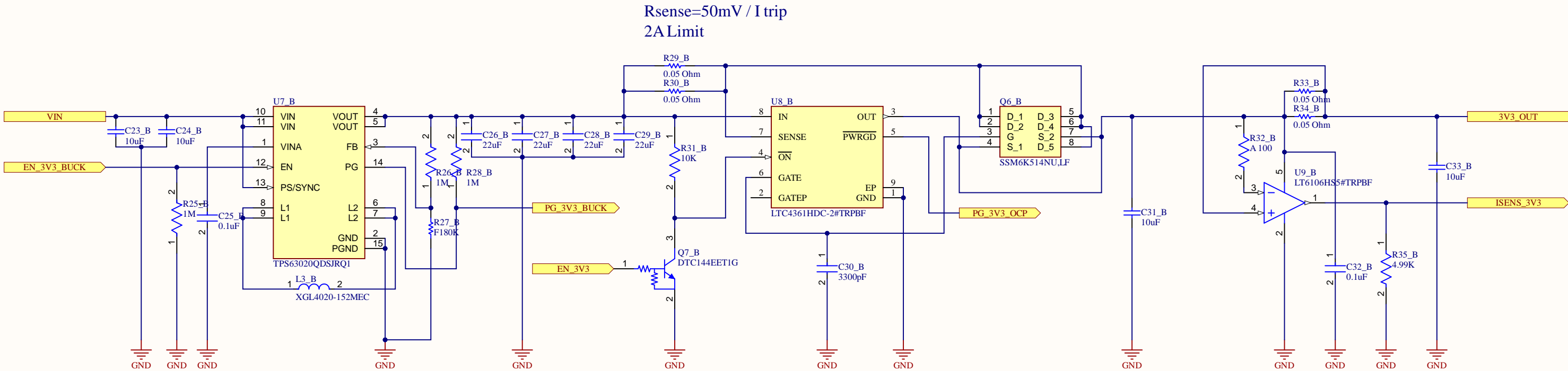
REVISION	DESCRIPTION	DATE	APPROVED



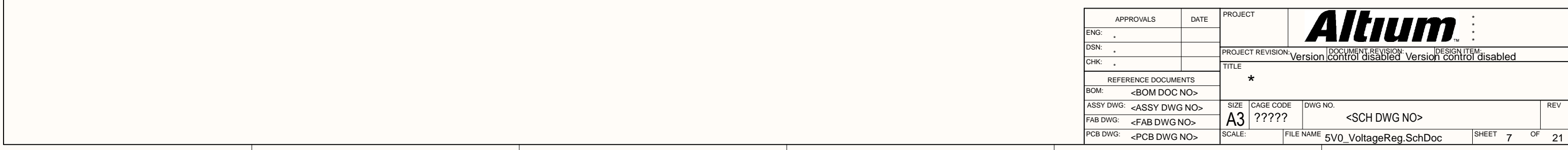
APPROVALS		DATE	PROJECT		<div>Altium™</div>			
ENG: *								
DSN: *			PROJECT REVISION:		DOCUMENT REVISION:	DESIGN ITEM:		
CHK: *					Version control disabled Version control disabled			
REFERENCE DOCUMENTS			★					
BOM: <BOM DOC NO>								
ASSY DWG: <ASSY DWG NO>								
FAB DWG: <FAB DWG NO>								
PCB DWG: <PCB DWG NO>			SIZE	CAGE CODE	DWG NO.			REV
			A3	?????	<SCH DWG NO>			
			SCALE:	FILE NAME			SHEET	OF
			3V3_VoltageReg.SchDoc			6	21	

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

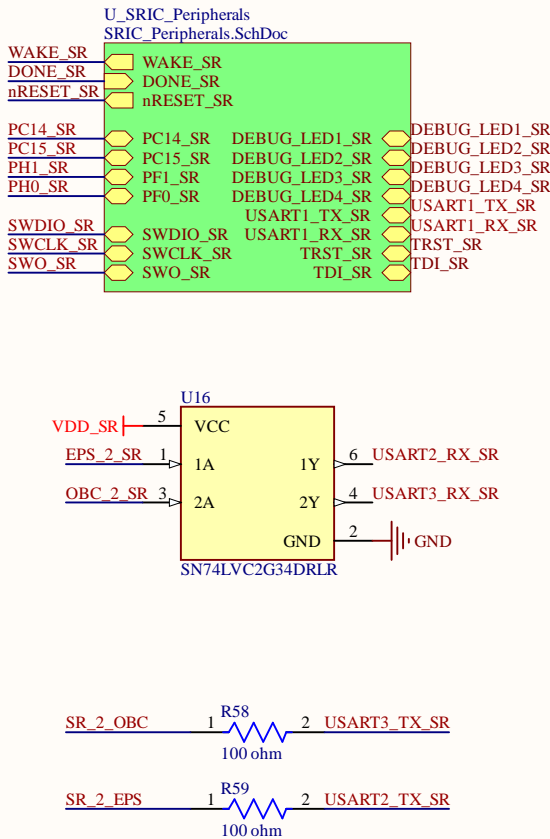
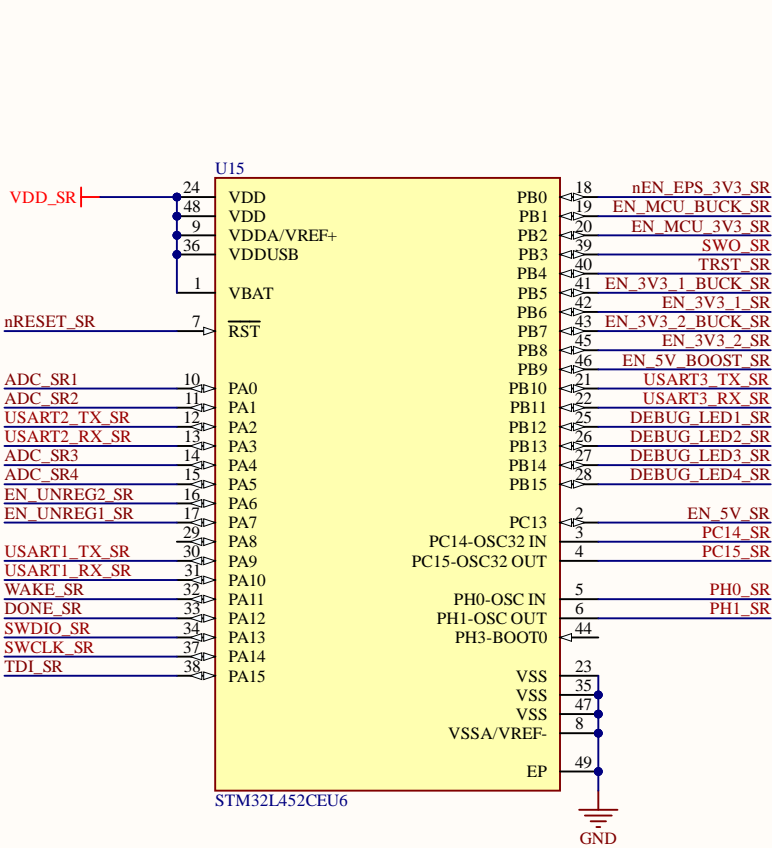
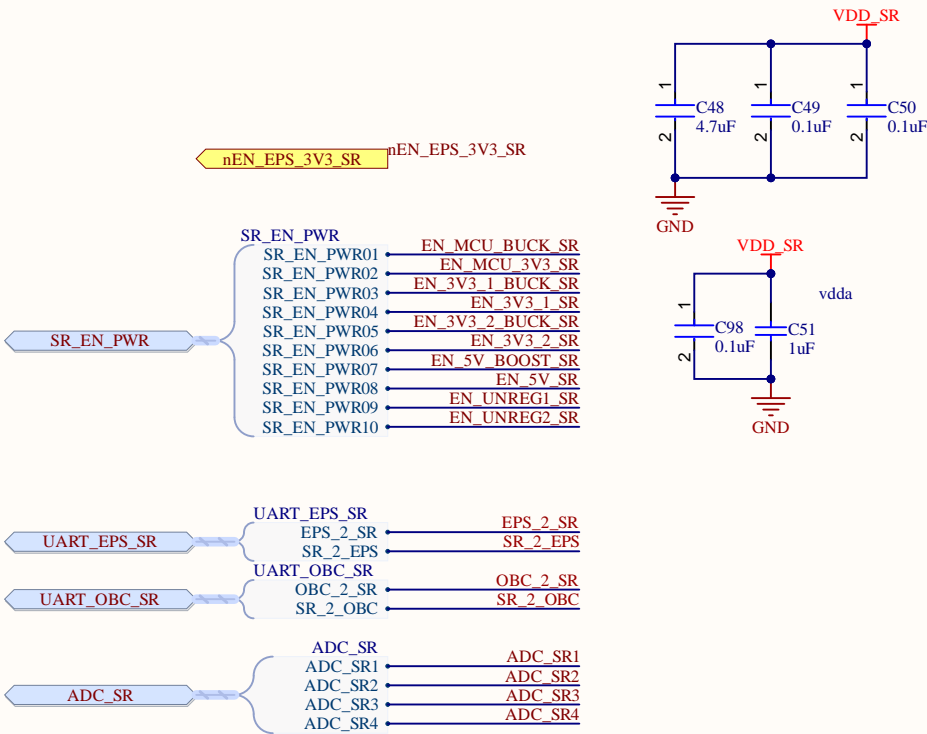
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS		DATE	PROJECT		<div>Altium™</div>		
ENG: *							
DSN: *			PROJECT REVISION:		DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *					Version control disabled Version control disabled		
REFERENCE DOCUMENTS			★				
BOM: <BOM DOC NO>							
ASSY DWG: <ASSY DWG NO>							
FAB DWG: <FAB DWG NO>							
PCB DWG: <PCB DWG NO>			SIZE	CAGE CODE	DWG NO.		REV
			A3	?????	<SCH DWG NO>		
SCALE:			FILE NAME			SHEET 6 OF 21	
			3v3_VoltageReg.SchDoc				

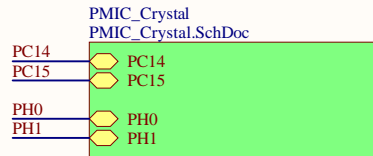
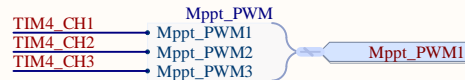
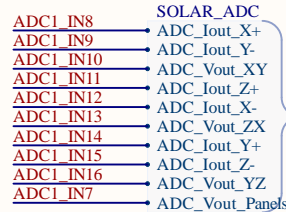
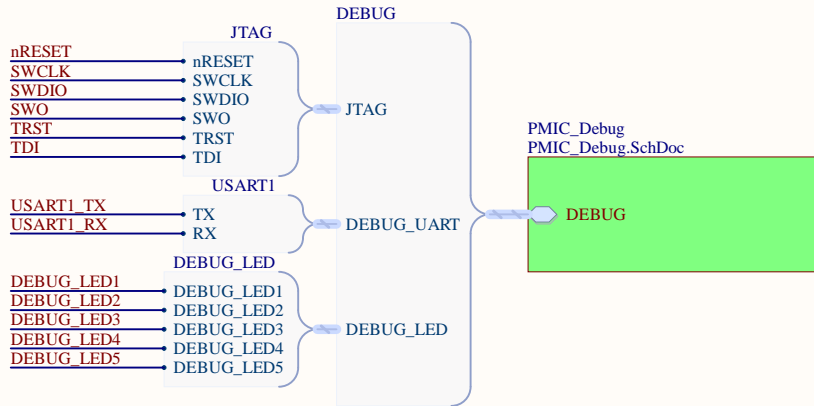
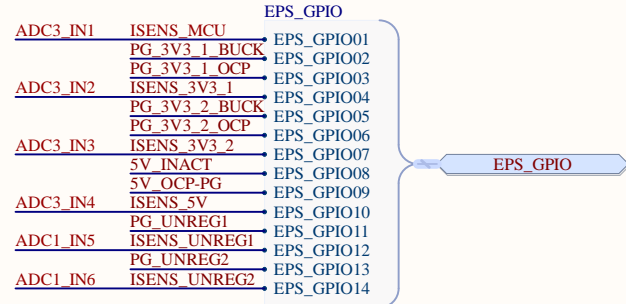
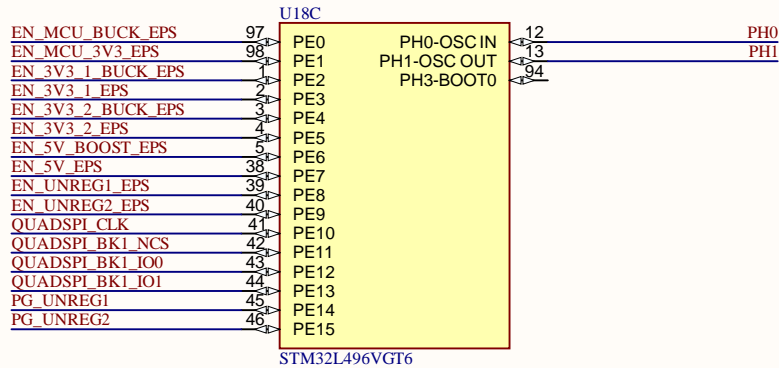
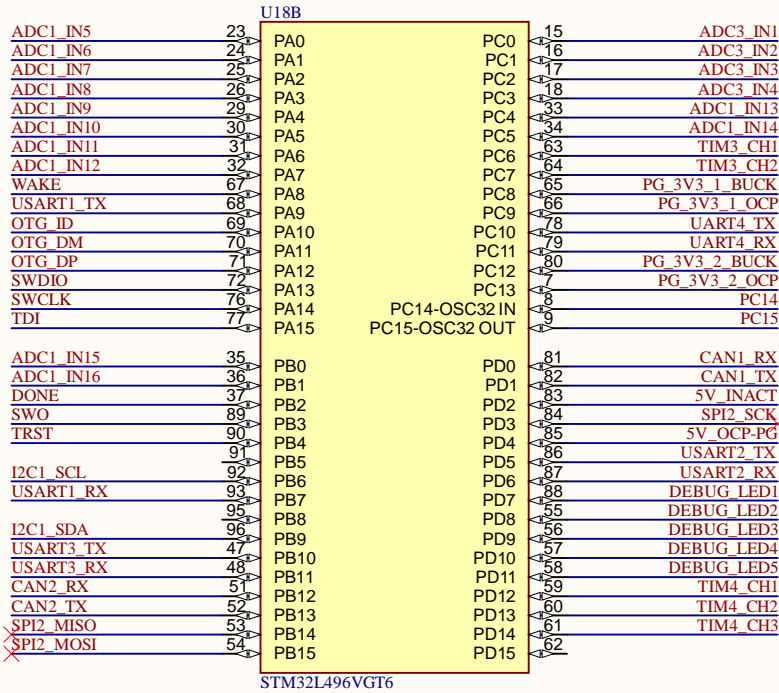
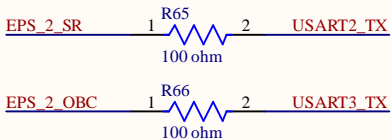
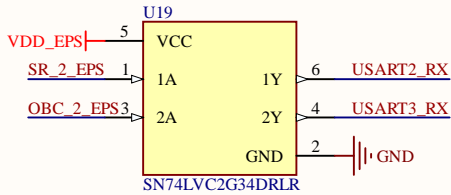
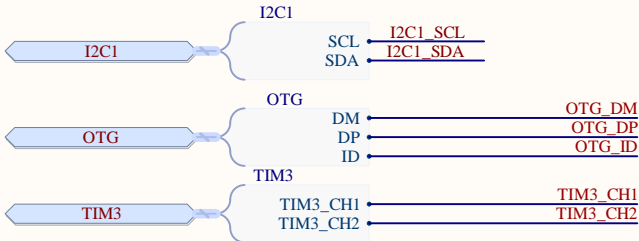
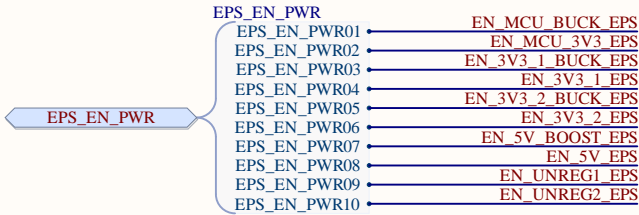
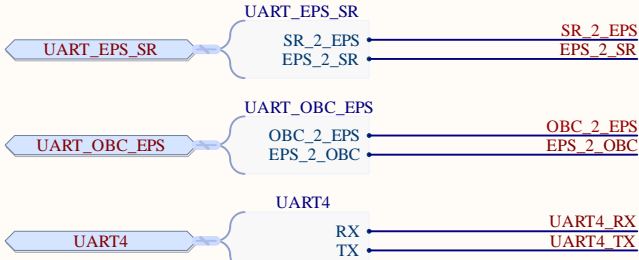
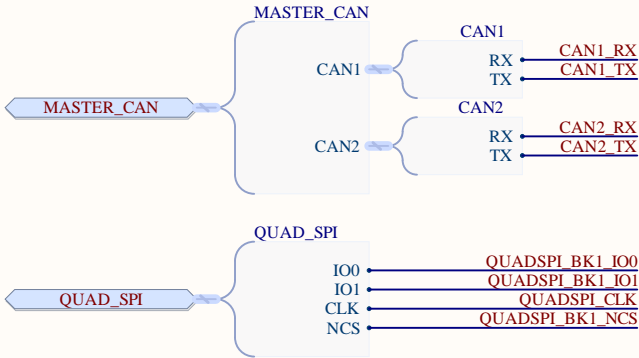
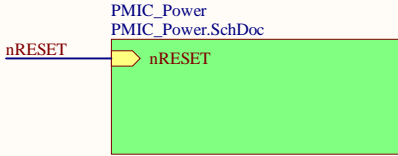
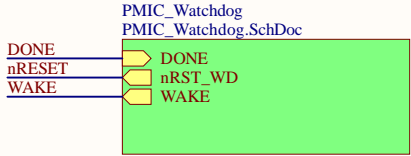


REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION: Version control disabled	DOCUMENT REVISION: Version control disabled	DESIGN ITEM: Version control disabled	
CHK: *		TITLE *			
REFERENCE DOCUMENTS					
BOM: <BOM DOC NO>					
ASSY DWG: <ASSY DWG NO>	SIZE A3	CAGE CODE *****	DWG NO. <SCH DWG NO>	REV	
FAB DWG: <FAB DWG NO>	SCALE:	FILE NAME SetResetIC.SchDoc	SHEET 9	OF 21	
PCB DWG: <PCB DWG NO>					

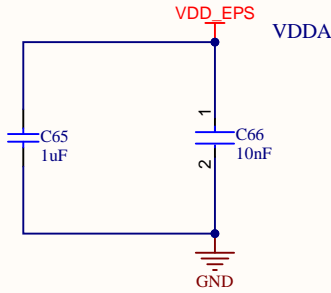
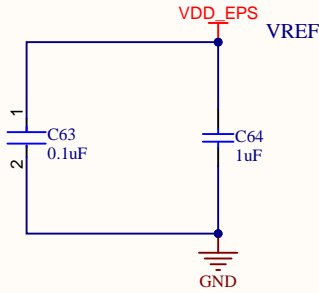
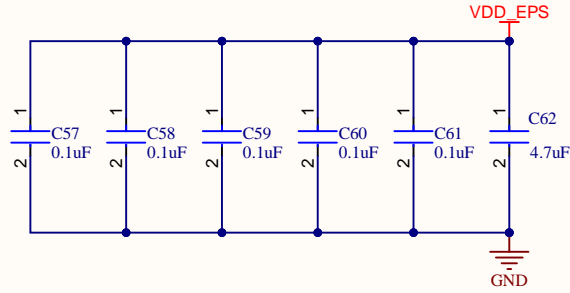
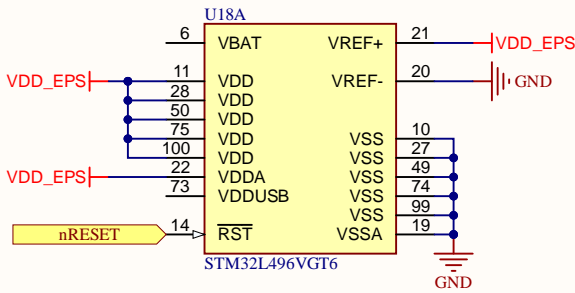
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: .					
DSN: .		PROJECT REVISION: .	DOCUMENT REVISION: .	DESIGN ITEM: .	
CHK: .		TITLE: *			
REFERENCE DOCUMENTS					
BOM: <BOM DOC NO>					
ASSY DWG: <ASSY DWG NO>	SIZE: A3	CAGE CODE: ?????	DWG NO: <SCH DWG NO>	REV	
FAB DWG: <FAB DWG NO>	SCALE: .	FILE NAME: PMIC.SchDoc	SHEET: 11	OF: 21	
PCB DWG: <PCB DWG NO>					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

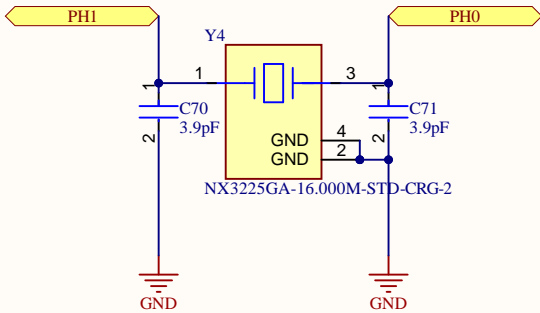
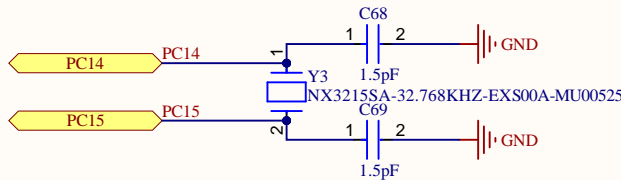
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION: *	DOCUMENT REVISION: *	DESIGN ITEM: *	
CHK: *		TITLE *			
REFERENCE DOCUMENTS					
BOM: <BOM DOC NO>					
ASSY DWG: <ASSY DWG NO>	SIZE A3	CAGE CODE *****	DWG NO. <SCH DWG NO>	REV	
FAB DWG: <FAB DWG NO>	SCALE:	FILE NAME PMIC_Power.SchDoc	SHEET 12 OF 21		
PCB DWG: <PCB DWG NO>					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

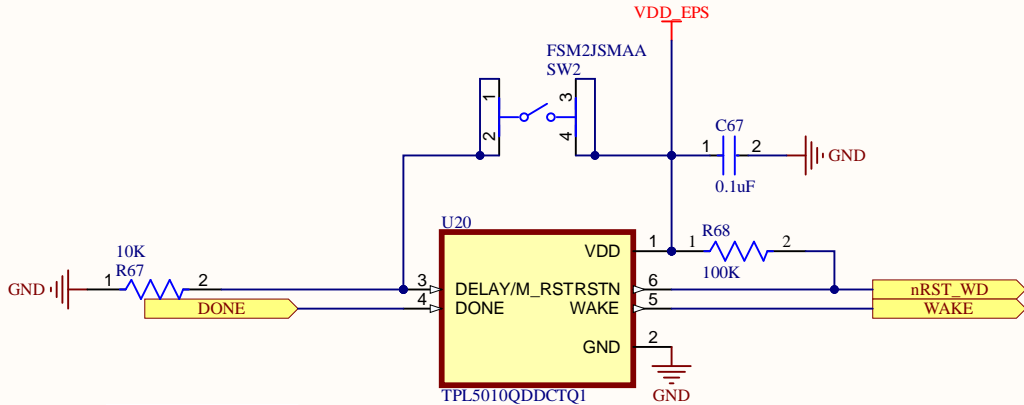
SSY DWG NO>		6		
REVISION	DESCRIPTION		DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		TITLE			
REFERENCE DOCUMENTS		*			
BOM:	<BOM DOC NO>				
ASSY DWG:	<ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV
FAB DWG:	<FAB DWG NO>	A3	?????	<SCH DWG NO>	
PCB DWG:	<PCB DWG NO>	SCALE:	FILE NAME	SHEET	OF
			PMIC_Crystal.SchDoc	14	21

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

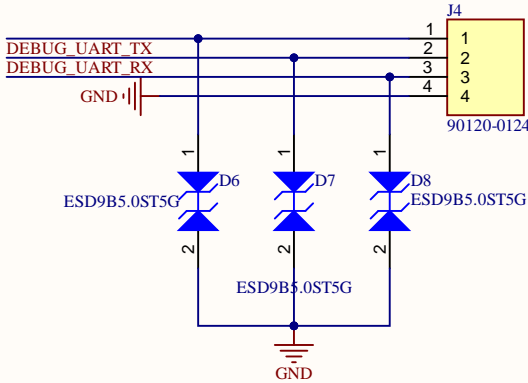
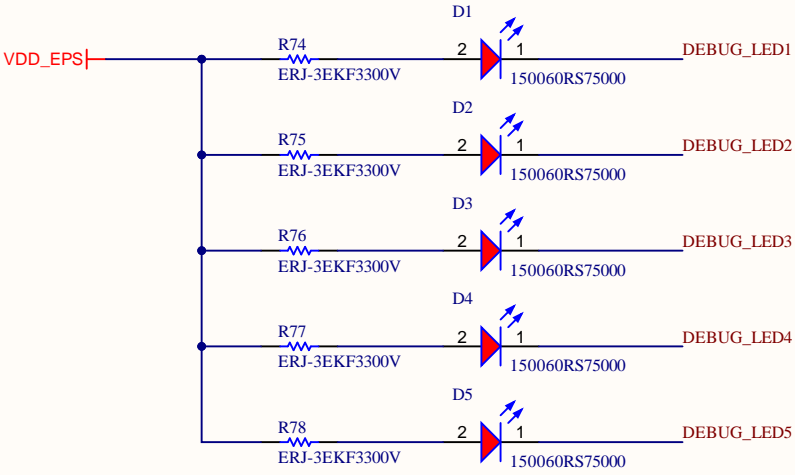
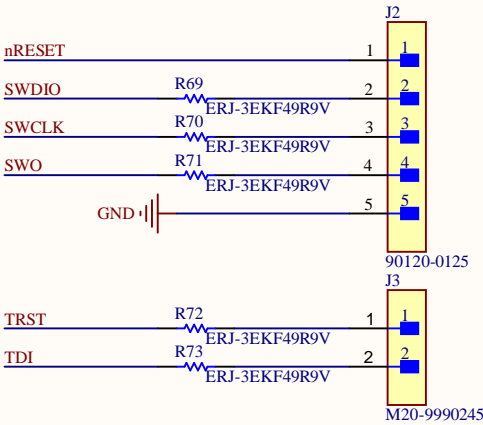
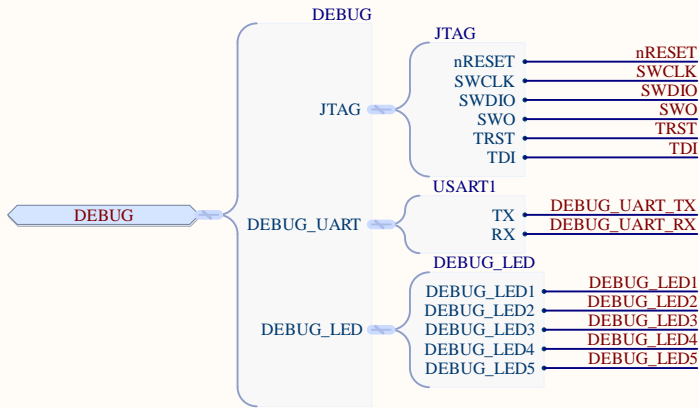
DESIGN NO.	<ASSY DWG NO>	REV.	
REVISION	DESCRIPTION	DATE	APPROVED



Use 1% Resistors
100 ms = 500 ohm
200 ms = 1000 ohm
300 ms = 1500 ohm
400 ms = 2000 ohm
500 ms = 2500 ohm
1 s = 5.2 Kohm
2 s = 6.79 Kohm
5 s = 8.85 Kohm
10 s = 11.20 Kohm

APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		TITLE			
REFERENCE DOCUMENTS		★			
BOM:	<BOM DOC NO>				
ASSY DWG:	<ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV
FAB DWG:	<FAB DWG NO>	A3	?????	<SCH DWG NO>	
PCB DWG:	<PCB DWG NO>	SCALE:	FILE NAME	PMIC_Watchdog.SchDoc	SHEET 15 OF 23

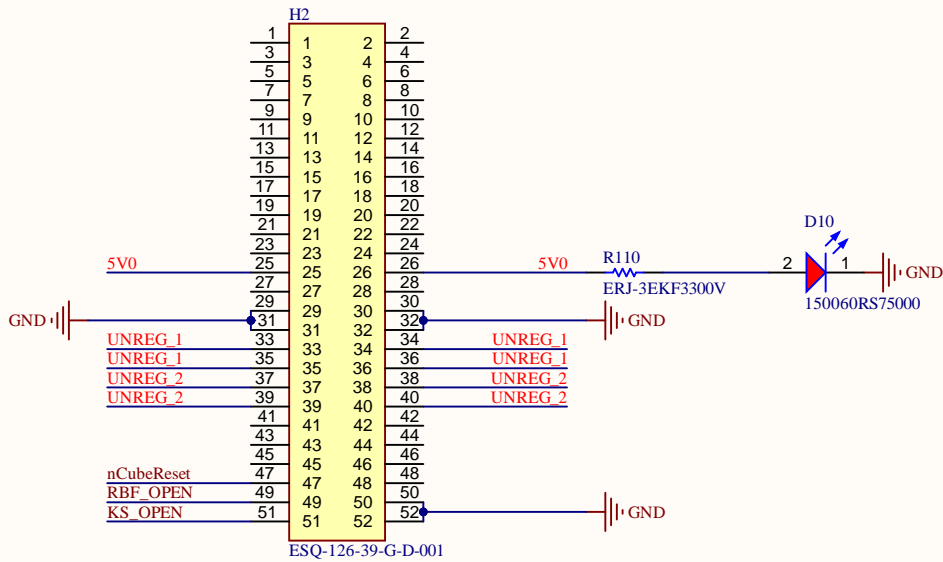
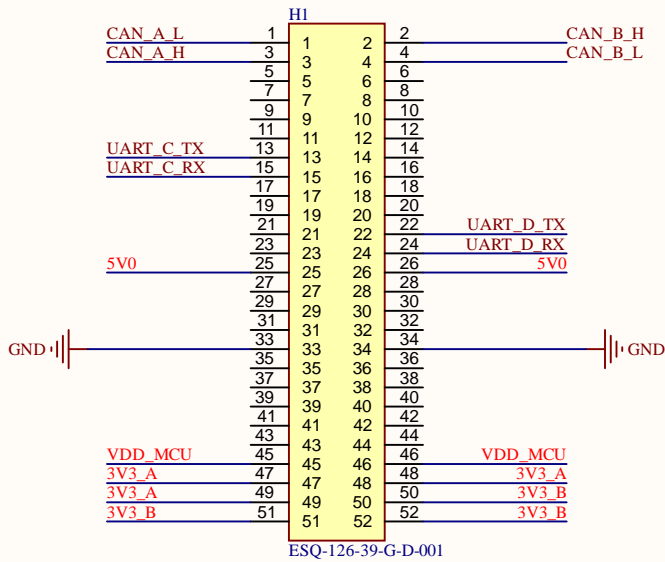
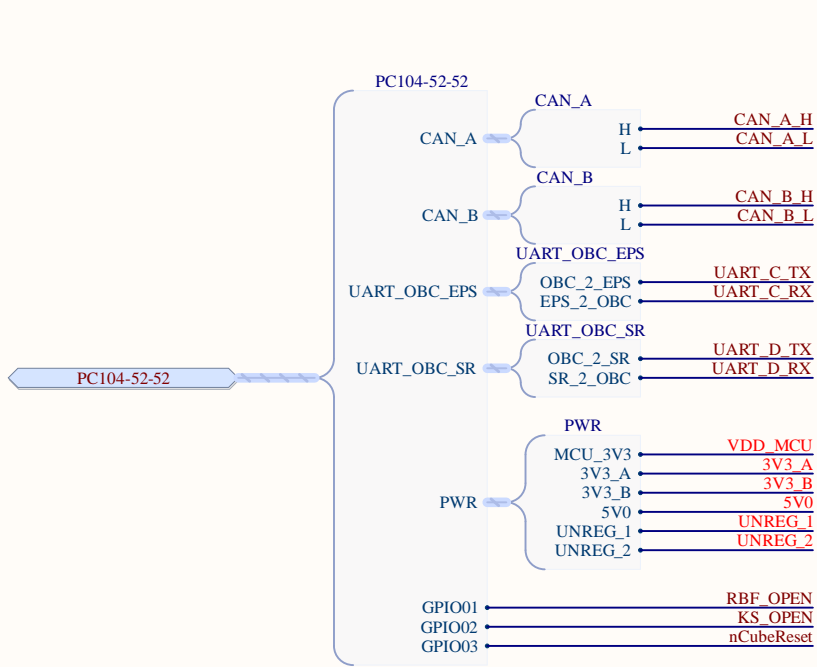
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS		DATE	PROJECT		<div>Altium™</div>		
ENG: *							
DSN: *			PROJECT REVISION:		DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *					Version control disabled Version control disabled		
REFERENCE DOCUMENTS			★				
BOM: <BOM DOC NO>							
ASSY DWG: <ASSY DWG NO>							
FAB DWG: <FAB DWG NO>							
PCB DWG: <PCB DWG NO>							
SIZE	CAGE CODE	DWG NO.			REV		
A3	?????	<SCH DWG NO>					
SCALE:		FILE NAME		SHEET 15 OF 21			
		PMIC_Debug.SchDoc					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

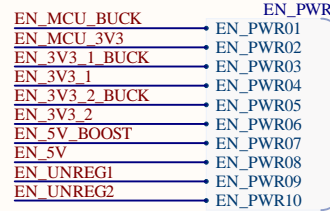
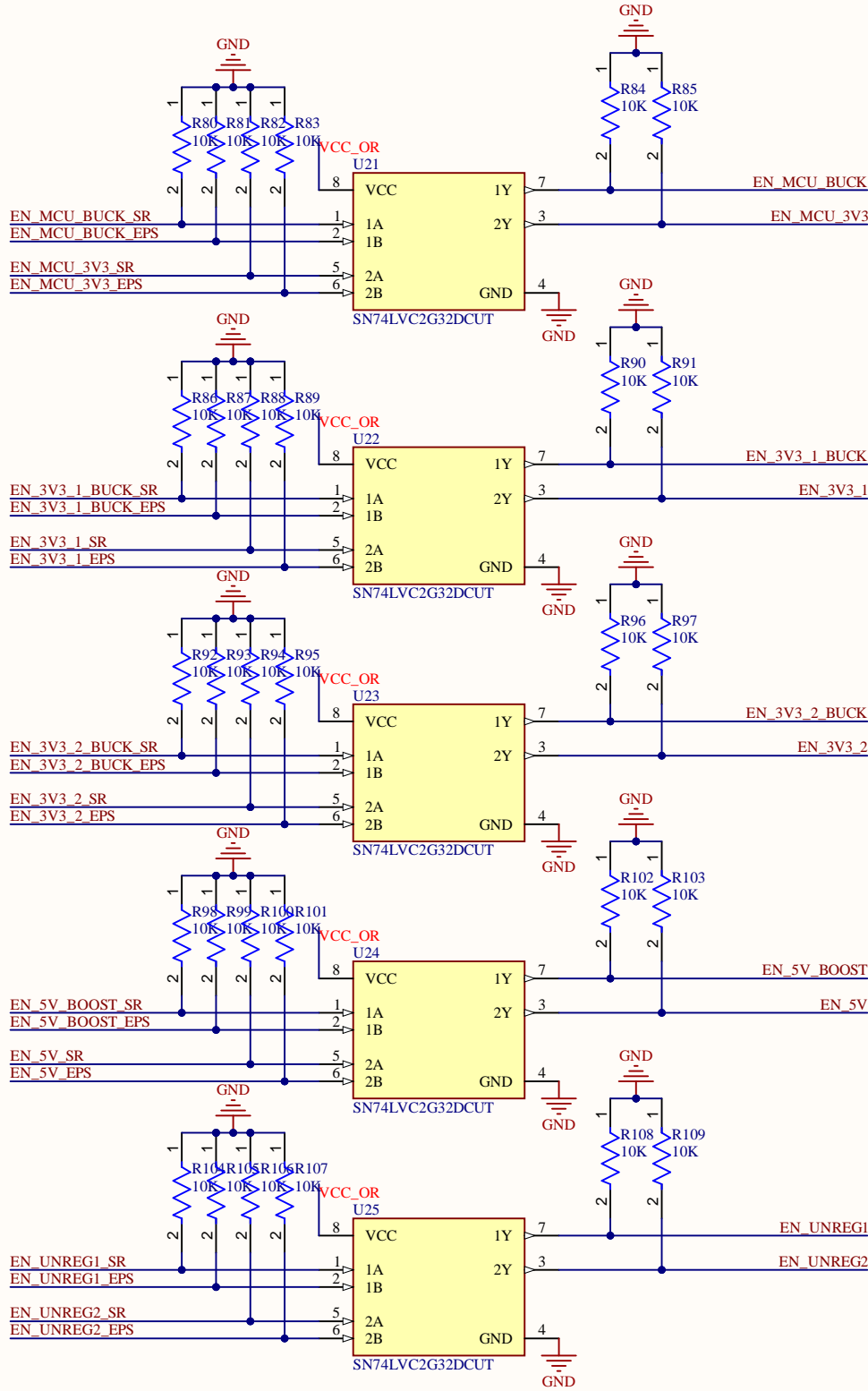
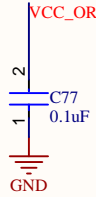
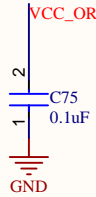
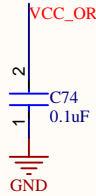
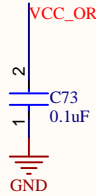
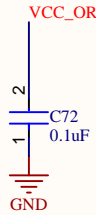
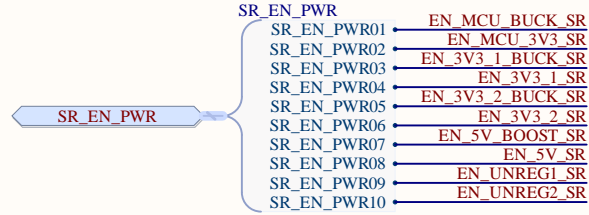
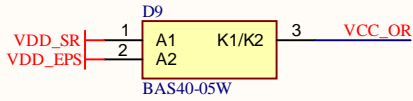
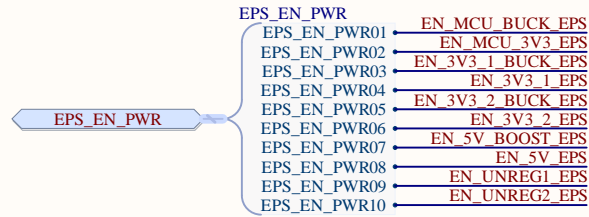
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *	--/--/--	*			
DSN: *	--/--/--	PROJECT REVISION:	Version control disabled		
CHK: *	--/--/--	DOCUMENT REVISION:	Version control disabled		
REFERENCE DOCUMENTS		TITLE	*		
BOM: <BOM DOC NO>					
ASSY DWG: <ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV	
FAB DWG: <FAB DWG NO>	A3	?????	<SCH DWG NO>		
PCB DWG: <PCB DWG NO>	SCALE:	FILE NAME	PC104-52-52.SchDoc		SHEET 17 OF 21

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

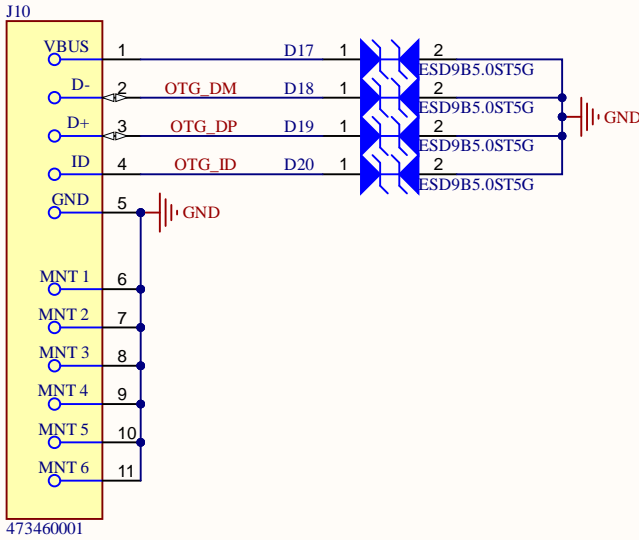
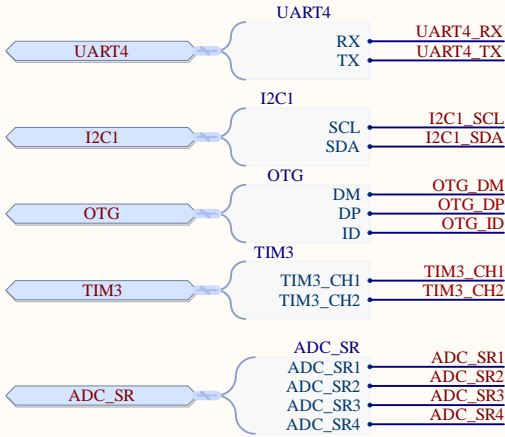
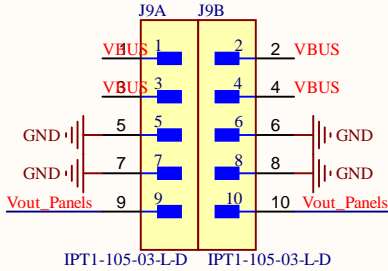
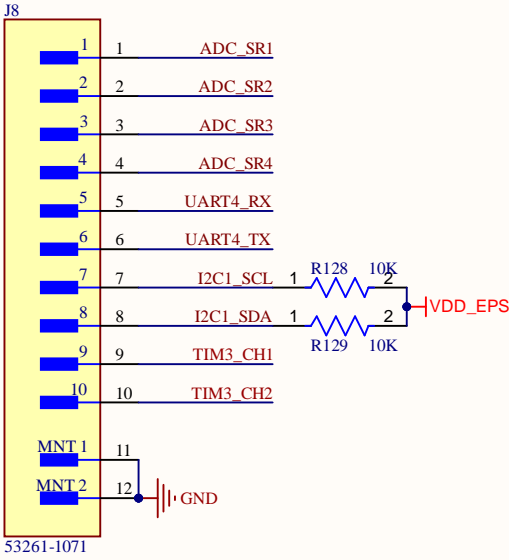
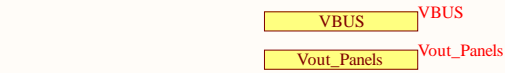
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION: *	DOCUMENT REVISION: Version control disabled	DESIGN ITEM: Version control disabled	
CHK: *		TITLE *			
REFERENCE DOCUMENTS					
BOM: <BOM DOC NO>		SIZE A3	CAGE CODE ?????	DWG NO. <SCH DWG NO>	REV
ASSY DWG: <ASSY DWG NO>		SCALE:	FILE NAME OR_Gate.SchDoc	SHEET 18	OF 23
FAB DWG: <FAB DWG NO>					
PCB DWG: <PCB DWG NO>					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

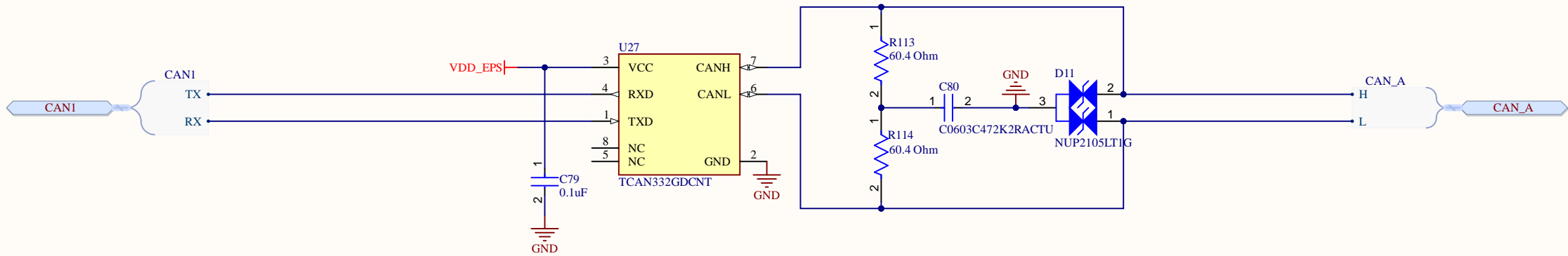
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		Version control disabled Version control disabled			
REFERENCE DOCUMENTS		TITLE			
BOM: <BOM DOC NO>		*			
ASSY DWG: <ASSY DWG NO>	SIZE: A3	CAGE CODE: ?????	DWG NO. <SCH DWG NO>	REV	
FAB DWG: <FAB DWG NO>	SCALE:	FILE NAME: Ports.SchDoc	SHEET 21 OF 21		
PCB DWG: <PCB DWG NO>					

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTium LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

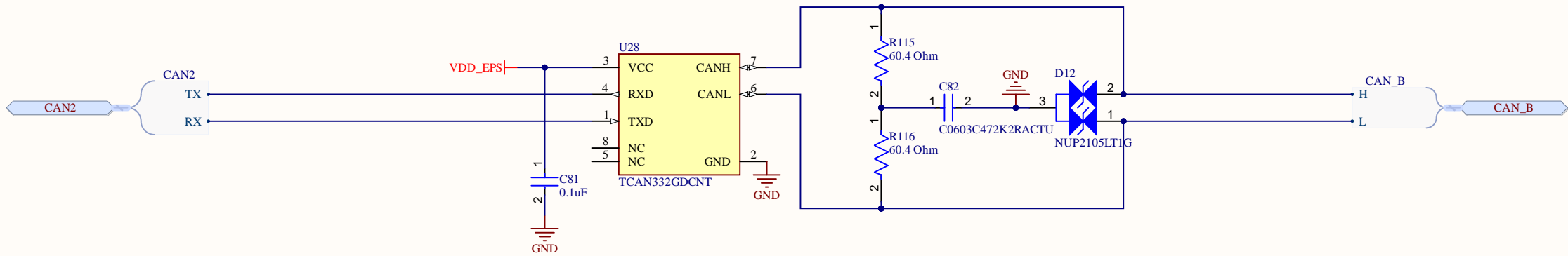
REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		Version control disabled Version control disabled			
REFERENCE DOCUMENTS		TITLE			
BOM: <BOM DOC NO>		*			
ASSY DWG: <ASSY DWG NO>	SIZE	CAGE CODE	DWG NO.	REV	
FAB DWG: <FAB DWG NO>	A3	????	<SCH DWG NO>		
PCB DWG: <PCB DWG NO>	SCALE:	FILE NAME	CAN1.SchDoc	SHEET	21 OF 23

THIS DOCUMENT AND THE DATA DISCLOSED HEREIN OR
HEREWITH IS THE PROPERTY OF ALTUM LIMITED AND MAY
BE FREELY DISTRIBUTED IN WHOLE. NO RIGHTS ARE
RESERVED OR EXPRESS OR IMPLIED WARANTEE GIVEN.

REVISION	DESCRIPTION	DATE	APPROVED



APPROVALS	DATE	PROJECT	Altium		
ENG: *					
DSN: *		PROJECT REVISION:	DOCUMENT REVISION:	DESIGN ITEM:	
CHK: *		TITLE			
REFERENCE DOCUMENTS		★			
BOM: <BOM DOC NO>		SIZE	CAGE CODE	DWG NO.	REV
ASSY DWG: <ASSY DWG NO>		A3	?????	<SCH DWG NO>	
FAB DWG: <FAB DWG NO>		SCALE:	FILE NAME	SHEET	OF
PCB DWG: <PCB DWG NO>			CAN2.SchDoc	22	23