

1

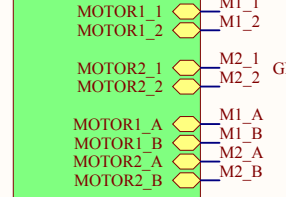
2

3

4

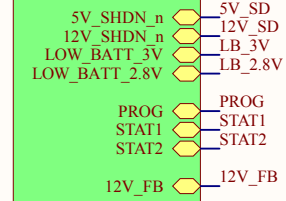
SS7

DC Motors.SchDoc



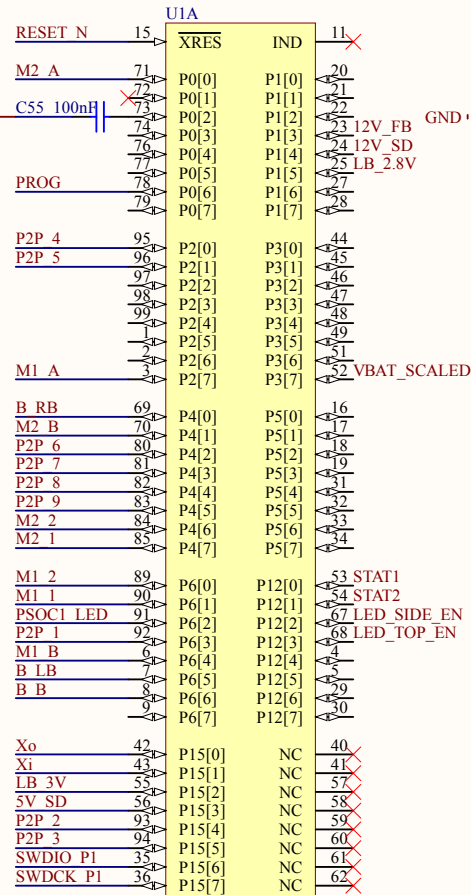
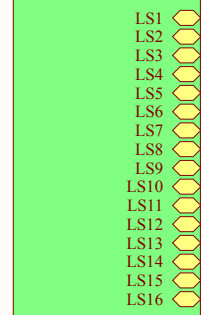
SS6

Power Supply.SchDoc

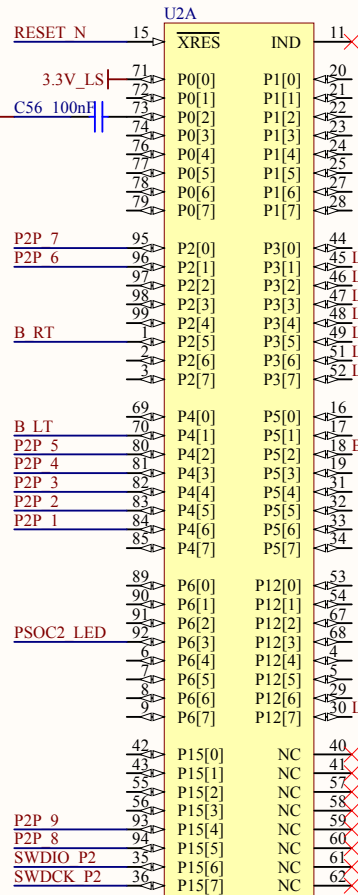


SS8

Light Sensors.SchDoc



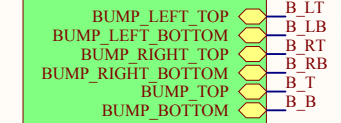
CY8C5888AXI-LP096



CY8C5888AXI-LP096

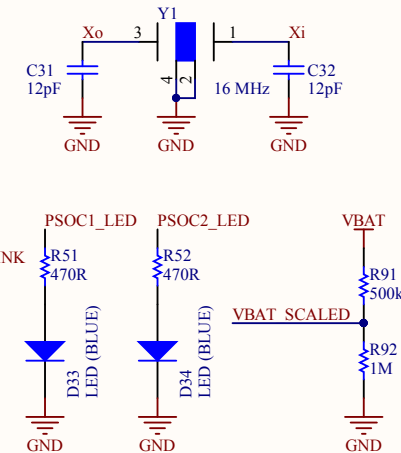
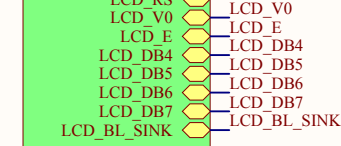
SS10

Bump Sensors.SchDoc



SS9

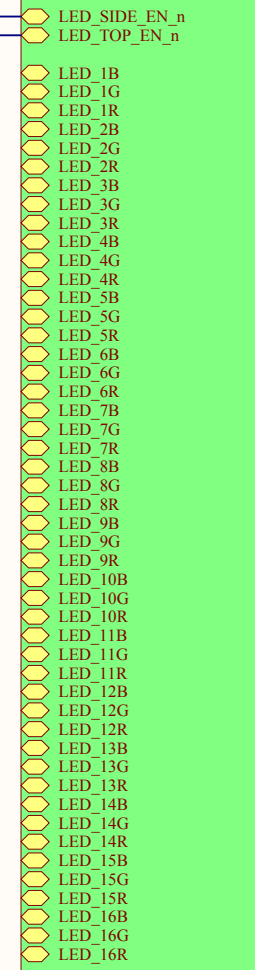
LCD.SchDoc



VBAT_SCALED = (2/3)*VBAT

SS5

LEDs.SchDoc



Title		
PSoC.SchDoc		
Size	Number	Revision
A4	1	A
Date:	29/11/2014	Sheet of 12
File:	C:\Users\...\PSoC.SchDoc	Drawn By: Nick D'Ademo

1

2

3

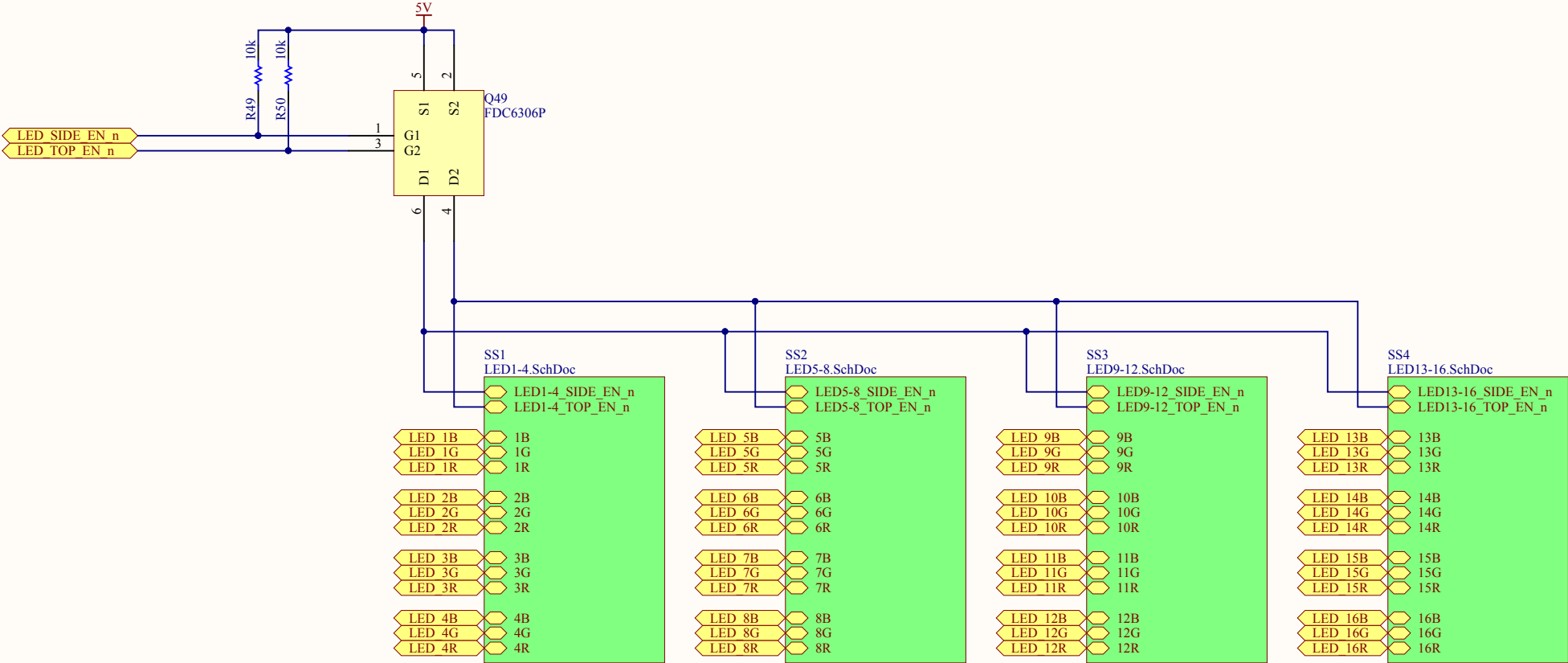
4

▲ All LEDs have been set to 20mA forward current for 5V via:
RED: R=150R
GREEN: R=91R
BLUE: R=91R

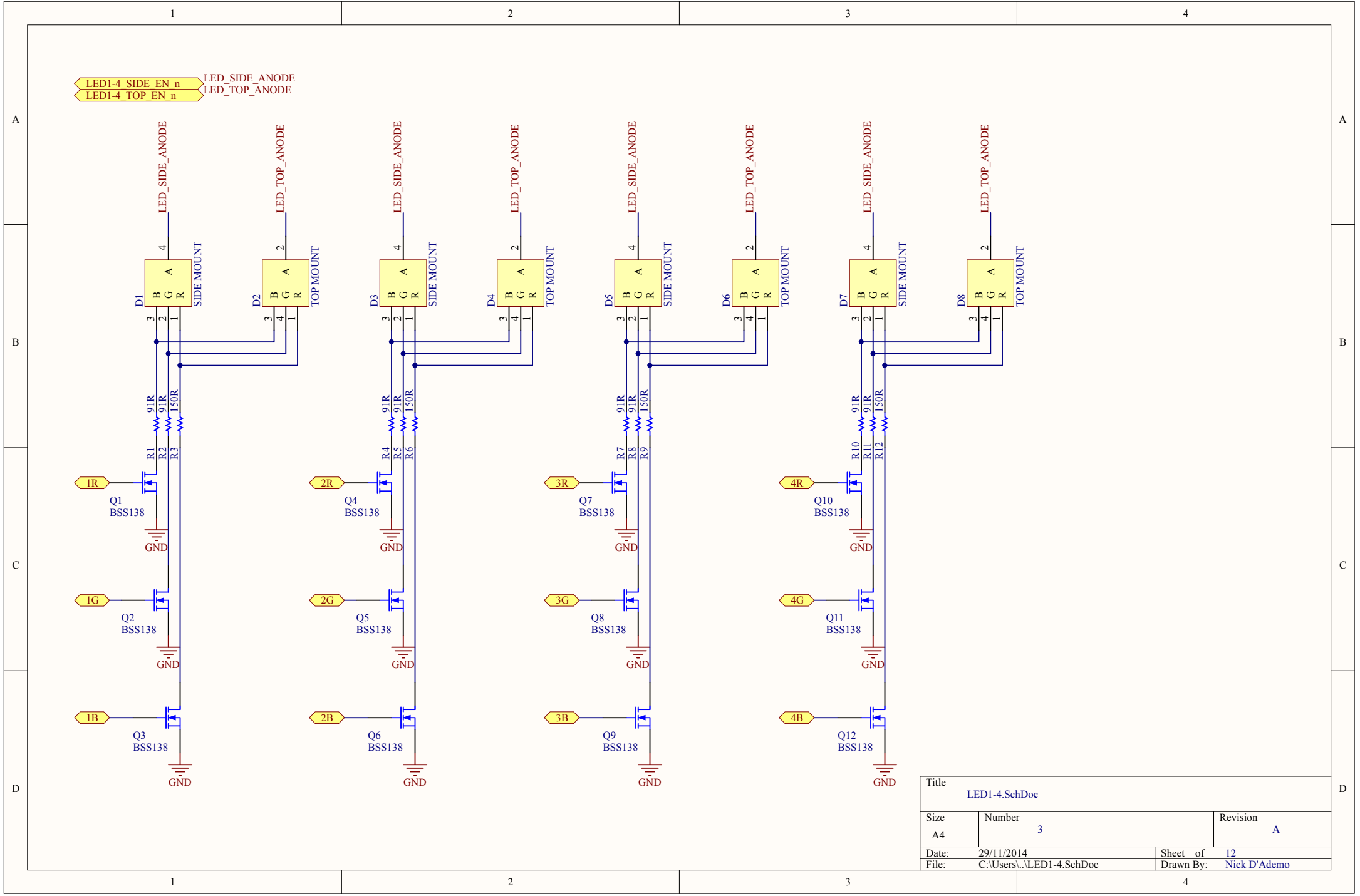
▲ SIDE LED:
Vf @ If=20mA (Min->Typ->Max):
RED: 1.8->2.0->2.4V
GREEN: 3.0->3.3->3.6V
BLUE: 3.0->3.3->3.6V

▲ TOP LED:
Vf @ If=20mA (Avg->Max):
RED: 2.0->2.6V
GREEN: 3.2->4.0V
BLUE: 3.2->4.0V

CLV1A-FKB-CJ1M1F1BB7R4S3: 675med Red, 1055med Green, 337med Blue
CLV1A-FKB-CK1N1G1BB7R4S3: 730med Red, 1150med Green, 365med Blue



Title		
LEDs.SchDoc		
Size	Number	Revision
A4	2	A
Date:	29/11/2014	Sheet of 12
File:	C:\Users\...\LEDs.SchDoc	Drawn By: Nick D'Ademo



Title			LED1-4.SchDoc
Size	Number	Revision	
A4	3	A	
Date:	29/11/2014	Sheet of	12
File:	C:\Users\...\LED1-4.SchDoc	Drawn By:	Nick D'Ademo

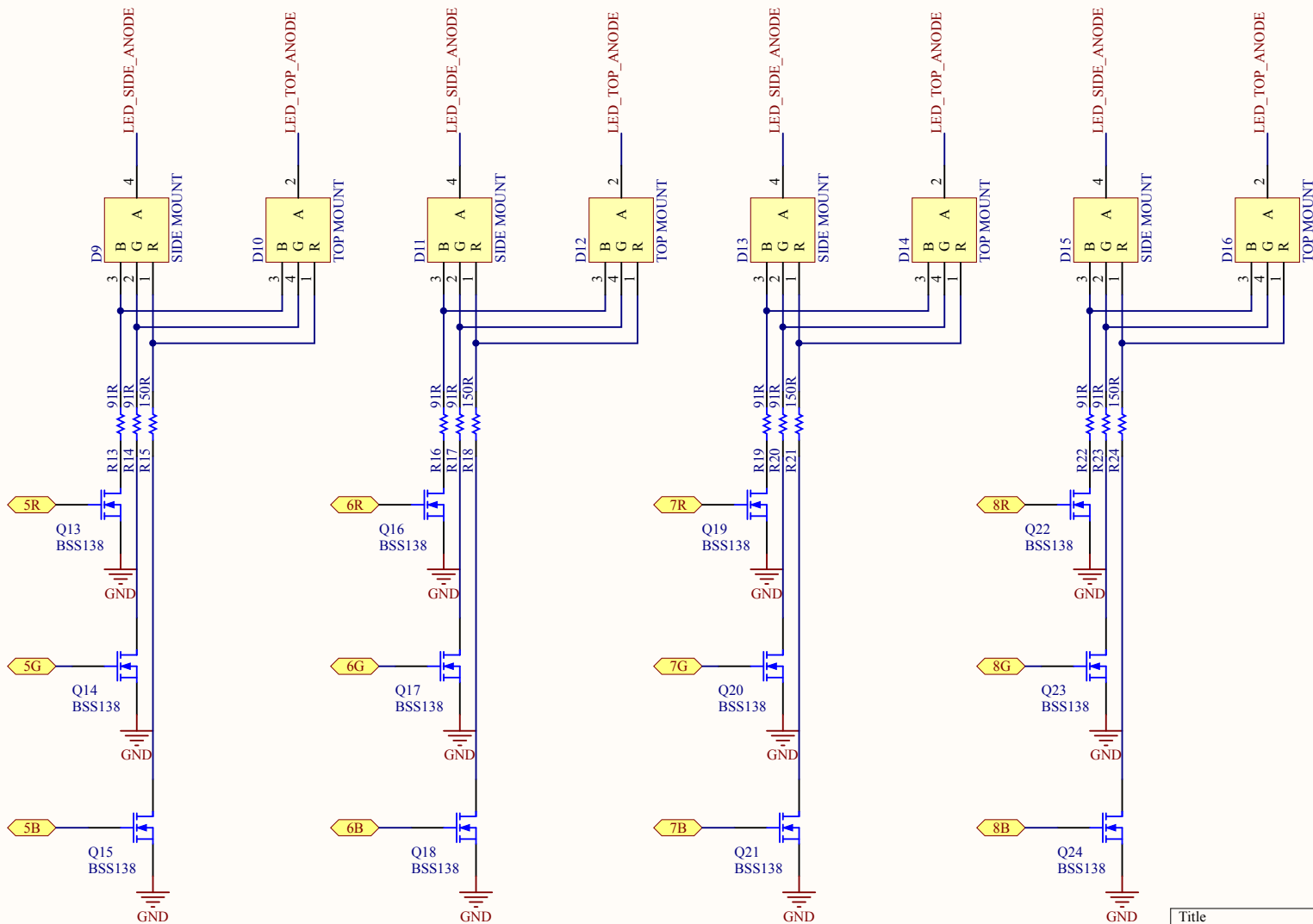
1

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LED5-8 SIDE EN_n LED_SIDE_ANODE
LED5-8 TOP EN_n LED_TOP_ANODE



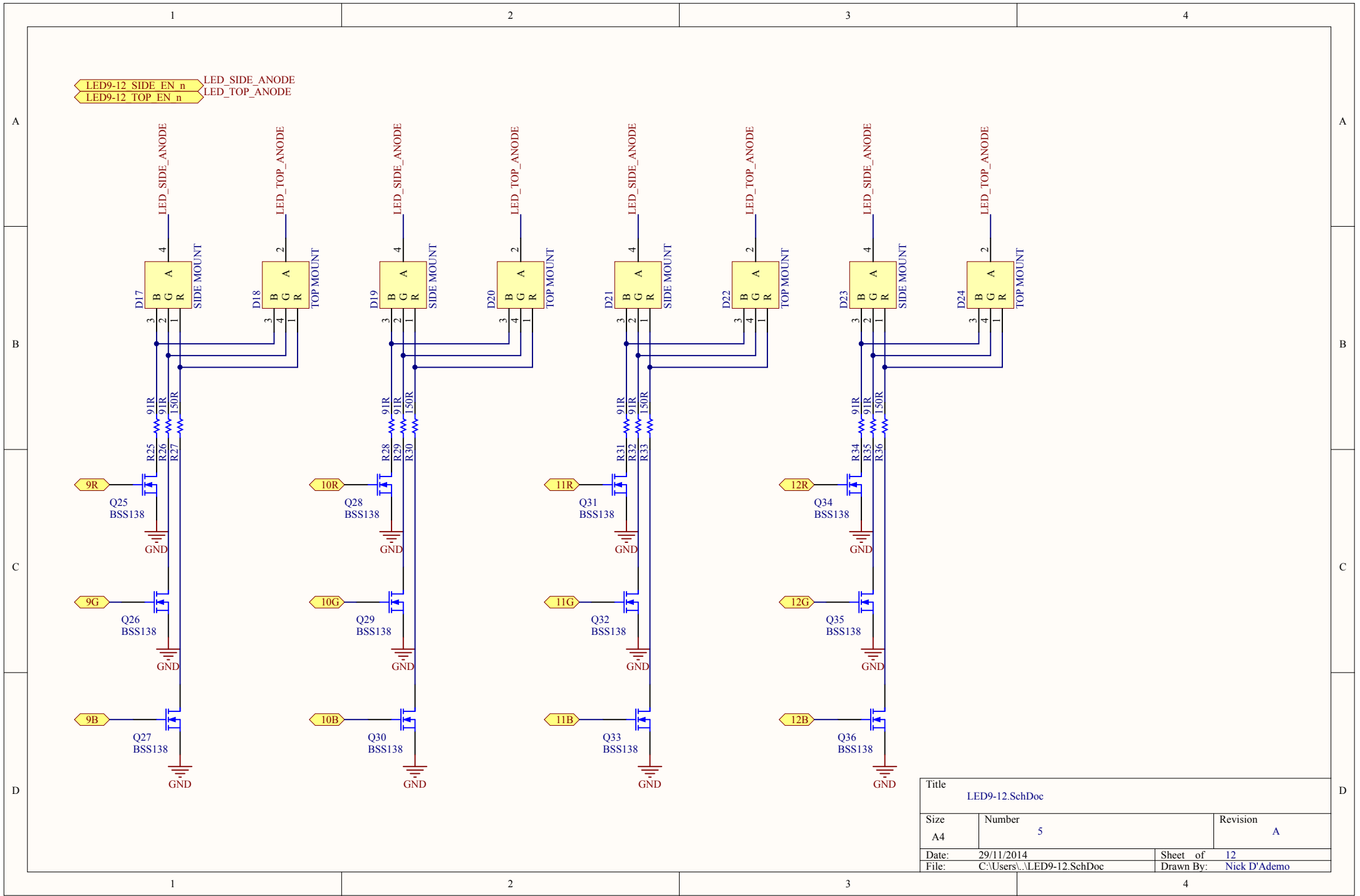
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Size A4	Number 4	Revision A
Date: 29/11/2014	Sheet of 12	
File: C:\Users\...\LED5-8.SchDoc	Drawn By: Nick D'Ademo	

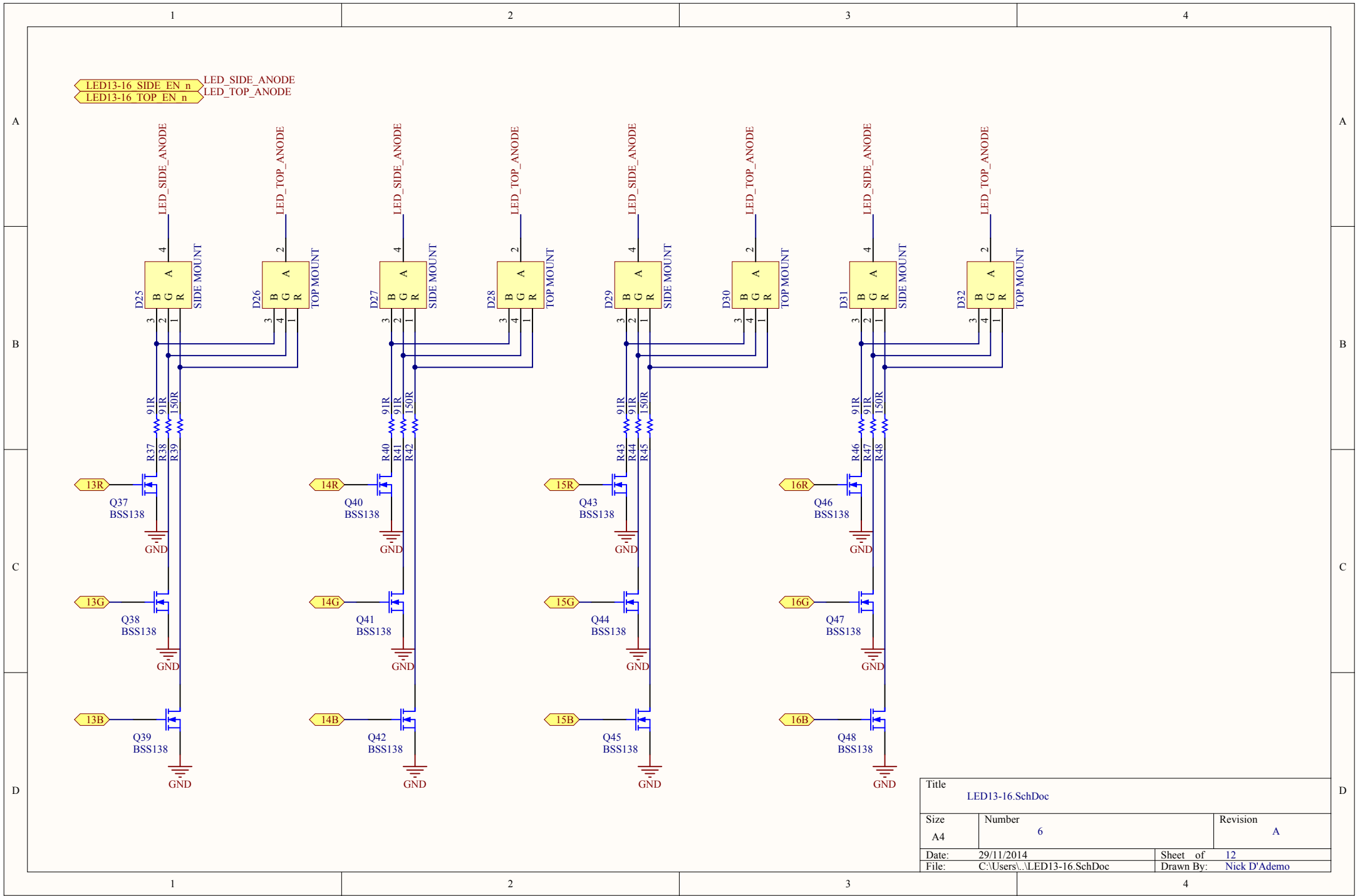
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Title		
LED13-16.SchDoc		
Size	Number	Revision
A4	6	A
Date:	29/11/2014	Sheet of 12
File:	C:\Users\...\LED13-16.SchDoc	Drawn By: Nick D'Ademo

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A

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C

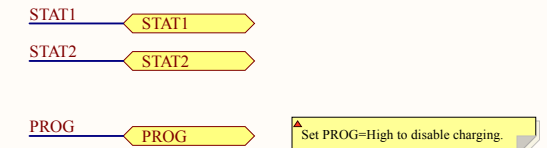
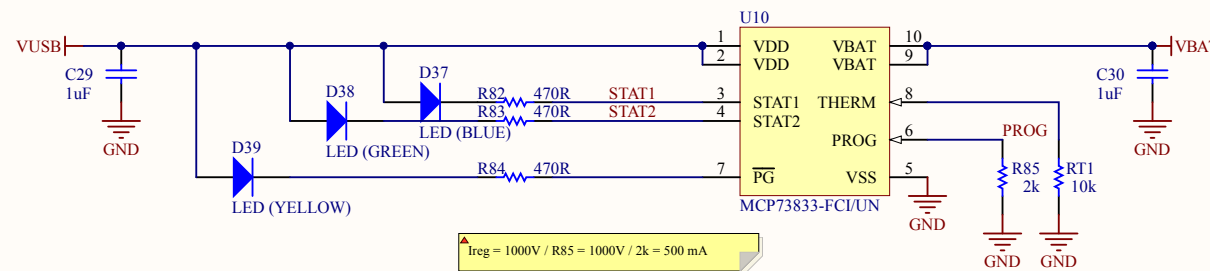
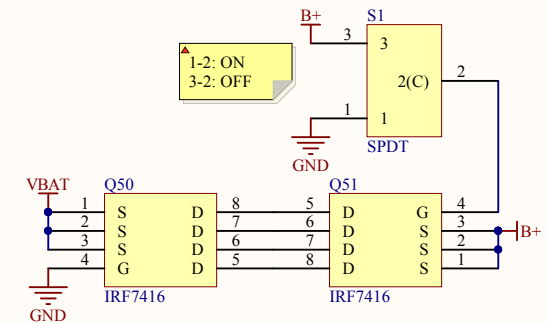
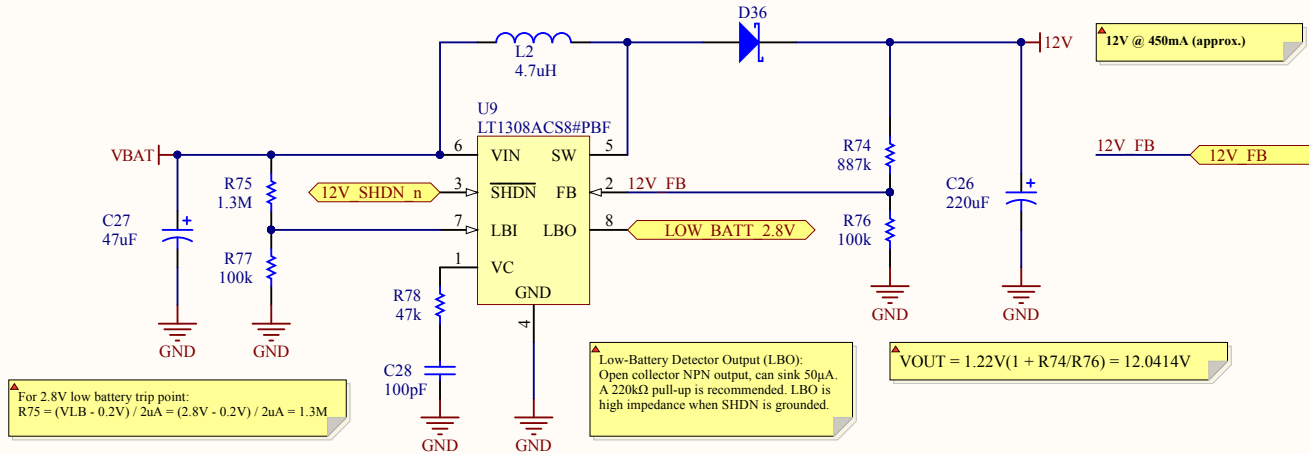
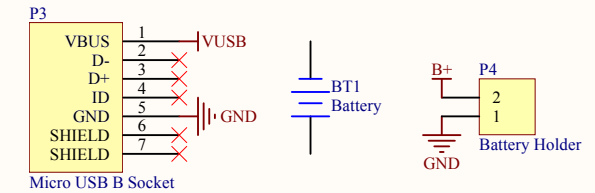
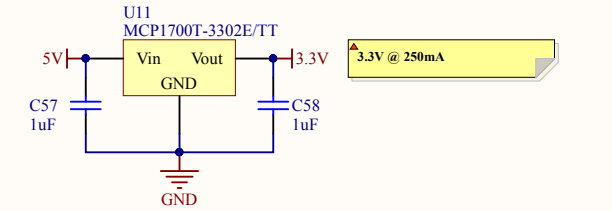
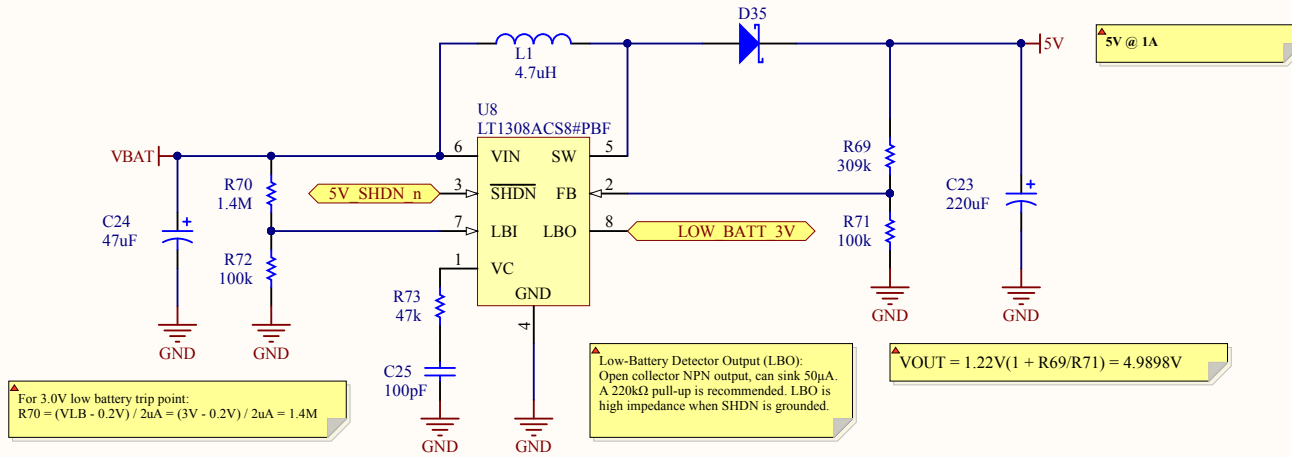
D

A

B

C

D



Title Power Supply.SchDoc		
Size A4	Number 7	Revision A
Date: 29/11/2014	Sheet of 12	Drawn By: Nick D'Ademo
File: C:\Users\...\Power Supply.SchDoc		

1

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▲ AMS light sensors (www.ams.com) have the following pin-outs:
GND - 1
VDD - 2
OUT - 3

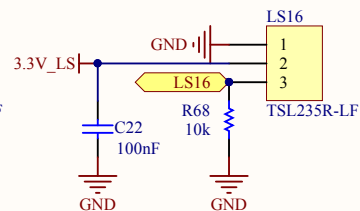
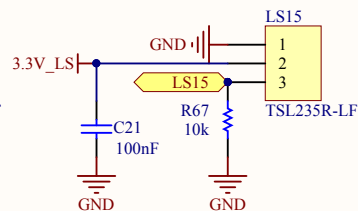
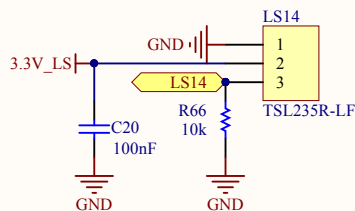
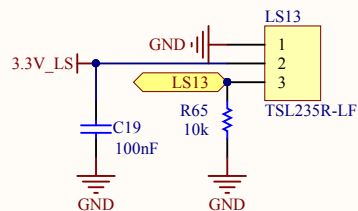
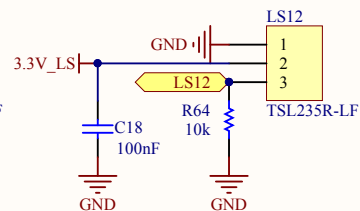
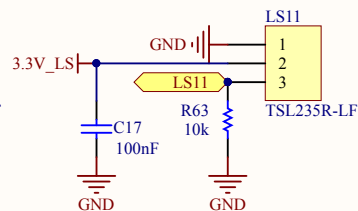
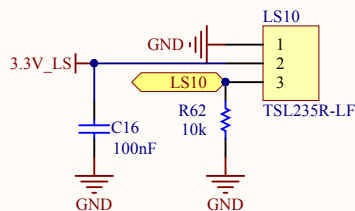
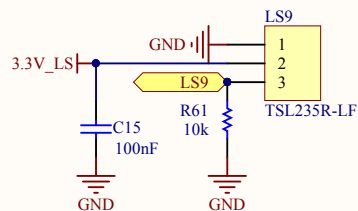
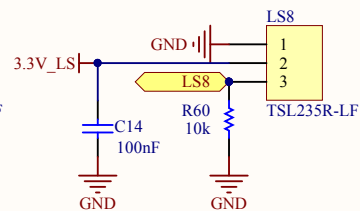
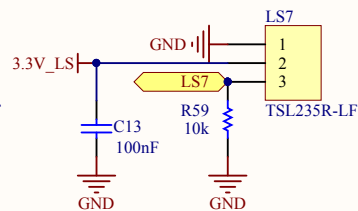
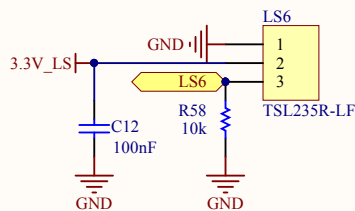
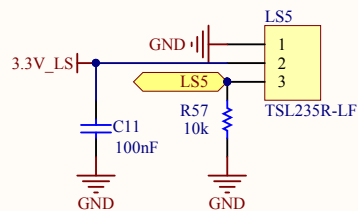
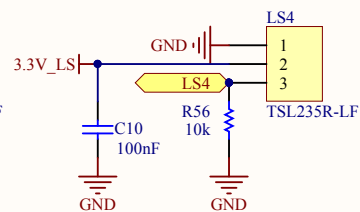
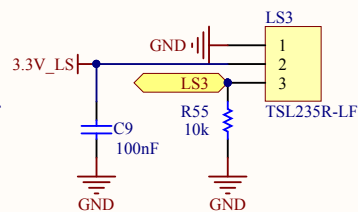
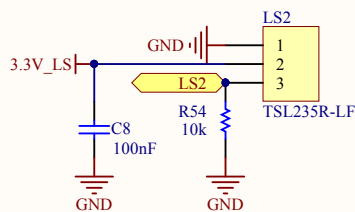
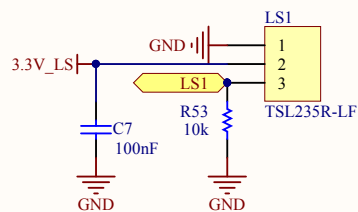
Light-to-Frequency parts:

TSL235
TSL237
TSL245 (IR light)

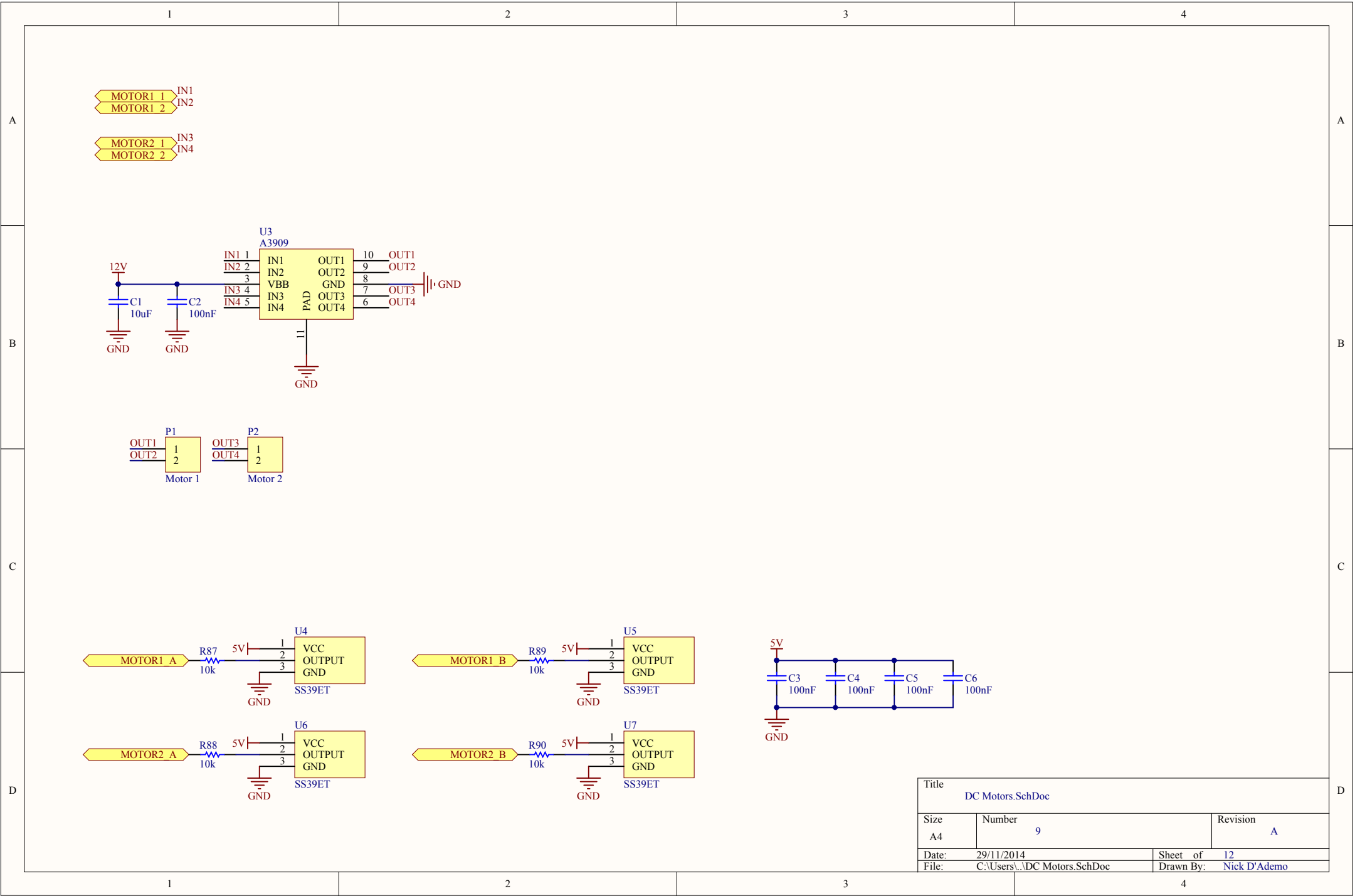
Light-to-Voltage parts:

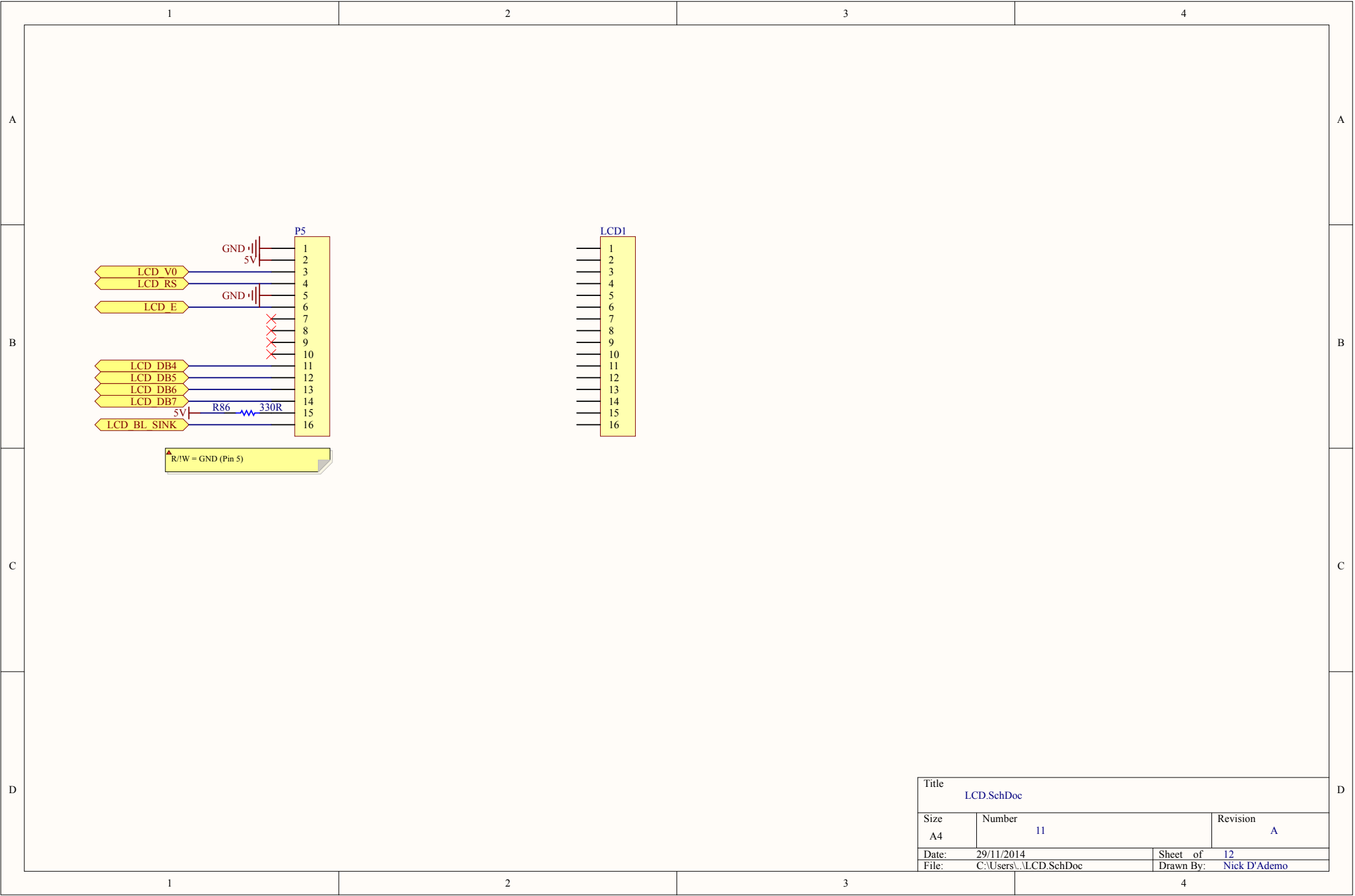
TSL125
TSL135
TSL145
TSL250R
TSL251R
TSL252R
TSL253R
TSL254R
TSL257
TSL260R (IR light)
TSL261R (IR light)
TSL262R (IR light)
TSL267 (IR light)

▲ Only install R53 to R68 if Light-to-Voltage parts are used.

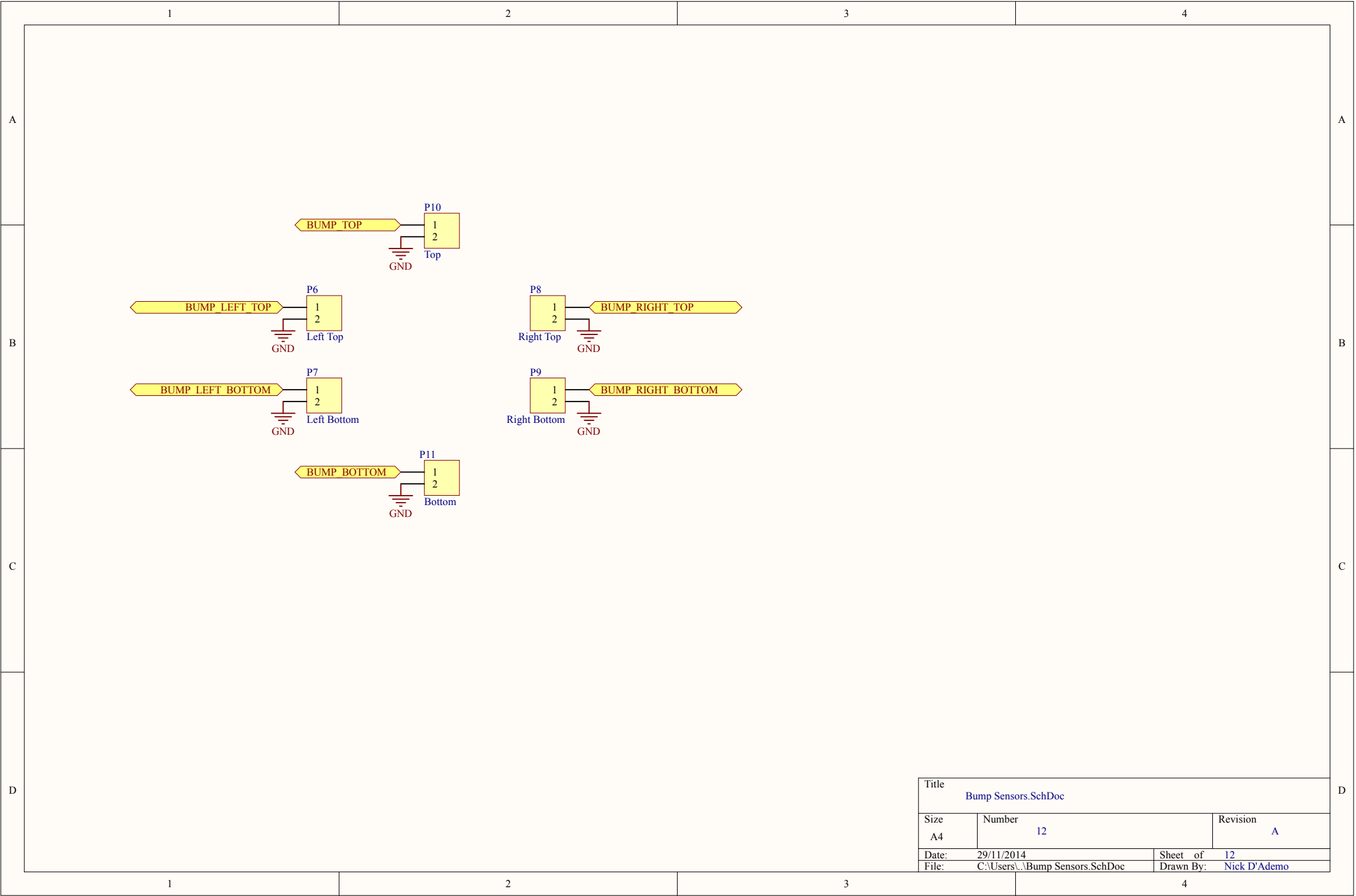


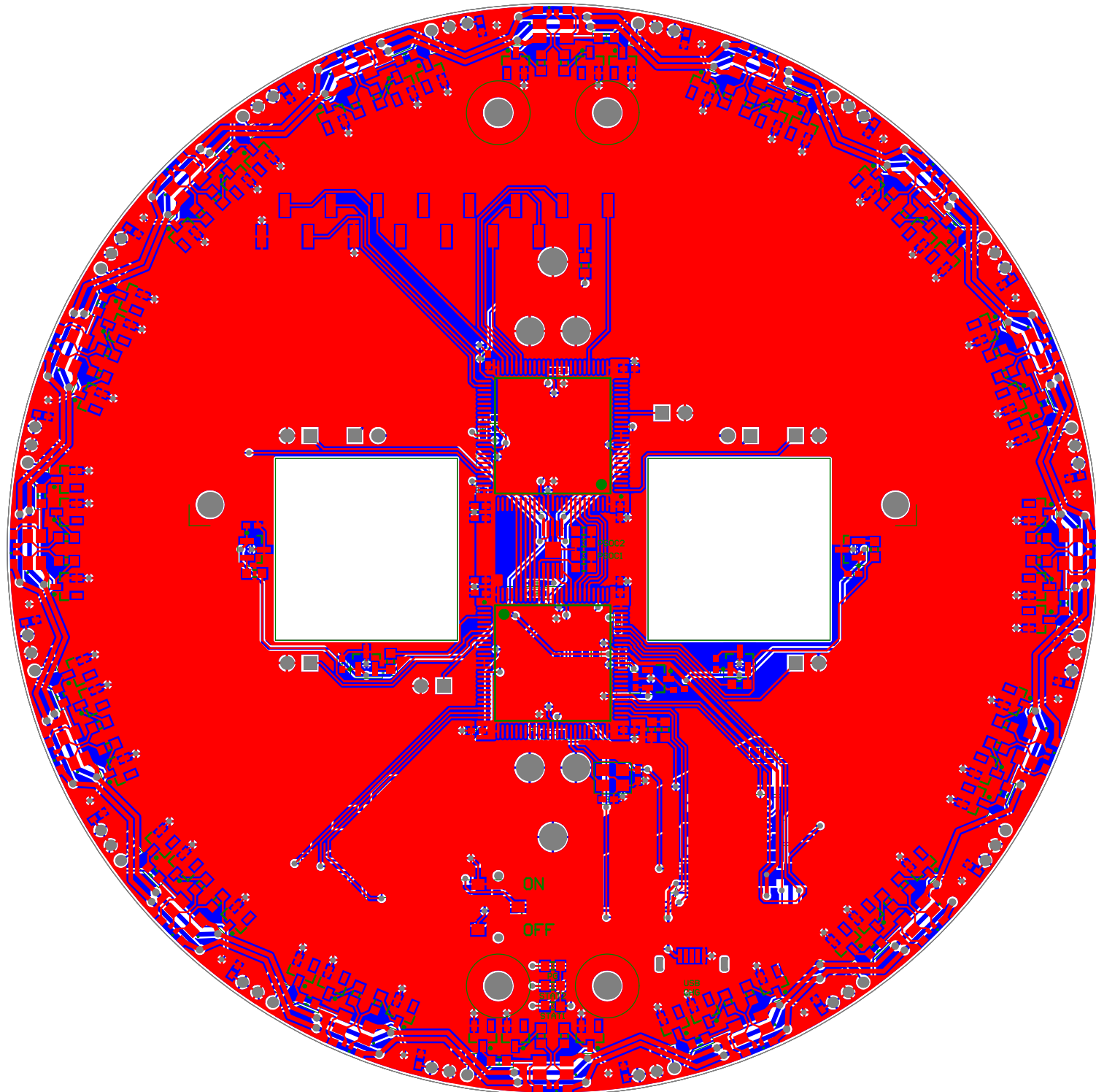
Title Light Sensors.SchDoc		
Size A4	Number 8	Revision A
Date: 29/11/2014	Sheet of 12	
File: C:\Users\...\Light Sensors.SchDoc	Drawn By: Nick D'Ademo	





Title		
LCD.SchDoc		
Size	Number	Revision
A4	11	A
Date:	29/11/2014	Sheet of 12
File:	C:\Users\...\LCD.SchDoc	Drawn By: Nick D'Ademo





Description	Designator	Footprint	Quantity	Value
18650 1-Cell Lithium Ion Battery	BT1		1	
TAIYO YUDEN - EMK1078B106MA-T - CAP CER 10UF 16V 20% XSR 0603	C2, C3, C4, C5, C6	CAPC1005N	1	10uF
Capacitor, XSR, ±10%, 16V, 0402		CAPC1005N	5	100nF
	C7, C8, C9, C10, C11, C12, C13, C14, C15, C16, C17, C18, C19, C20, C21, C22, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48, C49, C50, C55, C56			
Capacitor, X7R, ±10%, 6.3V, 0402		CAPC1005N	32	100nF
KEMET - T491D227K016AT - CAP TANT 220UF 16V 10% 2917	C23, C26	TC7343-2917	2	220uF
KEMET - T491B474K010AT - CAP TANT 47UF 10V 10% 1411	C24, C27	TC3528-1411	2	47uF
Capacitor, NP0, ±10%, 6.3V, 0402	C25, C28	CAPC1005N	2	100pF
Capacitor, XSR, ±10%, 6.3V, 0402	C29, C30	CAPC1005N	2	1uF
Capacitor, NP0, ±2%, 25V, 0402	C31, C32	CAPC1005N	2	12pF
	C33, C34, C35, C36, C51, C52, C53, C54, C57, C58			
Capacitor, XSR, ±10%, 10V, 0402		CAPC1005N	10	1uF
	D1, D3, D5, D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31	OVSRRGBCC3_5I DE	16	
OPTEK - OVSRRGBCC3 - LED RED/GRN/BLUE 1204 SMD				
	D2, D4, D6, D8, D10, D12, D14, D16, D18, D20, D22, D24, D26, D28, D30, D32	PLCC4	16	
CREE - CLV1A-FXB-CK1N1G1887R453 - LED RGB 3-IN-1 3.2X2.8MM 4PLCC	D33, D34, D37	LED_0603	3	
ROHM - SMLE128CTT86Q - LED, 0603, LO-CUR, BLU				
VISHAY SEMICONDUCTOR - VS-M8R51307RP8F - DIODE SCHOTTKY 30V 1A DO214AA	D35, D36	SMB_DIODE	2	
KINGBRIGHT - KP-1608MGC - LED, 0603, GREEN, 70MCD, 568NM	D38	LED_0603	1	
KINGBRIGHT - KP-1608SYC - LED, SMD, 0603, YELLOW	D39	LED_0603	1	
TAIYO YUDEN - NF6028T4R7M - INDUCTOR 4.7UH 2.7A 20% SMD	L1, L2	TY_NR	2	4.7uH
SHENZHEN IOWE ELECTRONICS CO.,LTD - IM120424015 - EONE High 16x2 (1602) Characters LCD	LCD1		1	
	L51, L52, L53, L54, L55, L56, L57, L58, L59, L510, L511, L512, L513, L514, L515, L516			
AMS - TSL235R-4F - IC LIGHT TO FREQUENCY CONV 3PIN		AMS_5_3PIN	16	
	P1, P2, P6, P7, P8, P9, P10, P11	HDR1X2	8	
MOLEX INC - 0022272021 - CONN HEADER 2POS 100 VERT TIN				
GLOBAL CONNECTOR TECHNOLOGY - USB3140-30-0170-1-C - CONNECTOR, USB 2.0 MICRO B, RCPT, SPOS, SMT	P3	USB3140-30-0170-1-C	1	
KEYSTONE ELECTRONICS - 54 - BATTERY CLIP 18MM 18650 CELL	P4	54	1	
SAMTEC - S5W-116-22-F-5-V5 - Conn Socket Strip SKT 16 POS 2.54mm Solder SMD Tube	P5	Samtec-S5W-116-22-F-5-V5	1	
	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17, Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27, Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45, Q46, Q47, Q48			
FAIRCHILD SEMICONDUCTOR - 85S138 - MOSFET N-CH 50V 220MA SOT-23		SOT95P230-3N	48	
FAIRCHILD SEMICONDUCTOR - FDC6308P - MOSFET 2P-CH 20V 1.9A SSO76	Q49	SOT-6	1	
INTERNATIONAL RECTIFIER - IRF7416TRP8F - MOSFET P-CH 30V 10A 8-SOIC	Q50, Q51	SOT-127P600-BAN	2	
	R1, R2, R4, R5, R7, R8, R10, R11, R13, R14, R16, R17, R19, R20, R22, R23, R25, R26, R28, R29, R31, R32, R34, R35, R37, R38, R40, R41, R43, R44, R46, R47			
Resistor, ±1%, 0.1W, 0603		RESC1608N	32	91R
	R3, R6, R9, R12, R15, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48			
Resistor, ±1%, 0.1W, 0603		RESC1608N	16	150R
	R49, R50, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R67, R88, R89, R90			
Resistor, ±1%, 0.1W, 0603		RESC1608N	22	10k
Resistor, ±1%, 0.1W, 0603	R51, R52, R82, R83, R84	RESC1608N	5	470R
Resistor, ±1%, 0.1W, 0603	R69	RESC1608N	1	309k
Resistor, ±1%, 0.1W, 0603	R70	RESC1608N	1	1.4M
Resistor, ±1%, 0.1W, 0603	R71, R72, R76, R77	RESC1608N	4	100k
Resistor, ±1%, 0.1W, 0603	R73, R78	RESC1608N	2	47k
Resistor, ±1%, 0.1W, 0603	R74	RESC1608N	1	987k
Resistor, ±1%, 0.1W, 0603	R75	RESC1608N	1	1.3M
Resistor, ±1%, 0.1W, 0603	R85	RESC1608N	1	2k
Resistor, ±1%, 0.1W, 0603	R86	RESC1608N	1	330R
Resistor, ±1%, 0.1W, 0603	R91	RESC1608N	1	500k
Resistor, ±1%, 0.1W, 0603	R92	RESC1608N	1	1M
MURATA - NCP18XH103J038B - THERMISTOR, NTC, 10K, 5%, SMD	RT1	RESC1608N	1	10k
COPAL ELECTRONICS INC - CL-SB-128-01T - SWITCH SLIDE SPOT 0.2A GULL 12V	S1	CL-SB-128-01T	1	
PSOC Programmable System-on-Chip, 256 KB Flash, 62 GPIOs, 1.71 to 5.5 V, 100 Pin TQFP (AX100), Tray	U1, U2	CYP-AX100_L	2	
ALLEGRO - A3909GLVIR-T - IC MOTOR DRIVER PAR 10MSOP	U3	MSOP-10	1	
HONEYWELL S&C - SS39ET - SENSOR, HALL EFFECT, LINEAR, SOT23-3	U4, U5, U6, U7	SOT23-3N	4	
LINEAR TECHNOLOGY - LT1308AC58P8F - IC REG BOOST 5V 1A 8SOIC	U8, U9	LT-SB-8_N	2	
MICROCHIP - MCP73833-FC/UN - IC U-I/ON(U)-POLY CTRLR 10MSOP	U10	MSOP-UN10_N	1	
MICROCHIP - MCP1700T-3302E/IT - IC REG LDO 3.3V 0.25A SOT23-3	U11	SOT95P230-3N	1	
NDK - NX3225SA-16.000MHZ-STD -CSR-1 - CRYSTAL 16MHZ 8PF SMD	Y1	NX3225SA	1	