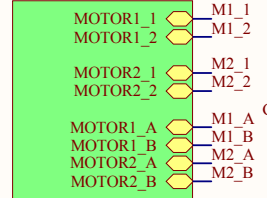
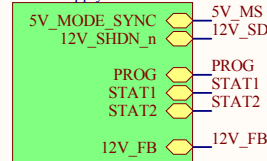
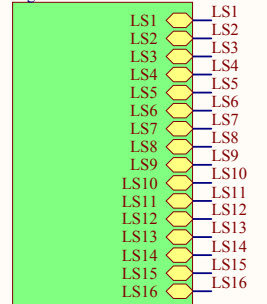
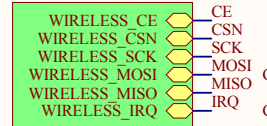
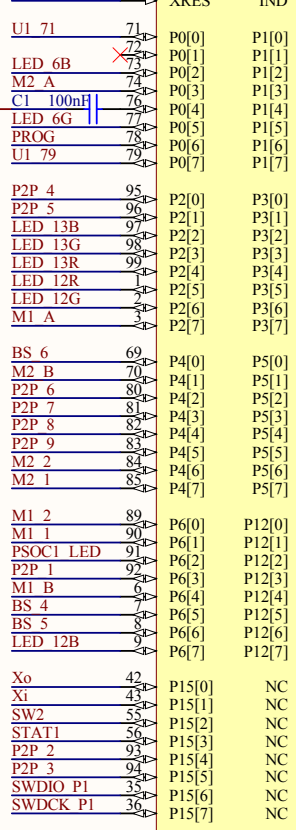


1

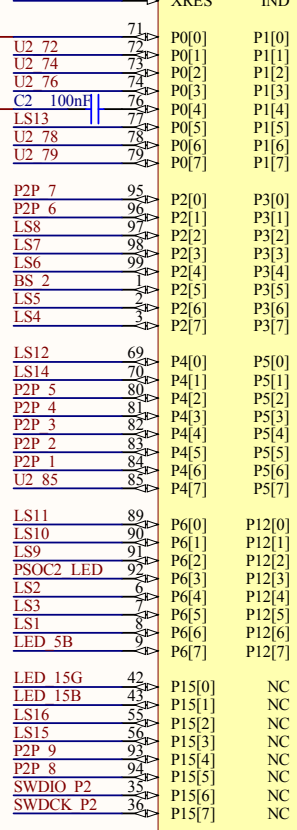
2

3

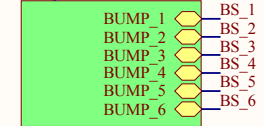
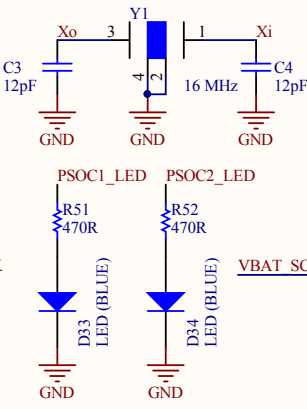
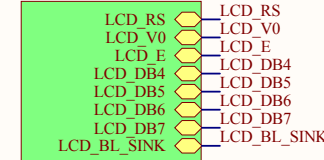
4

SS7  
DC Motors.SchDocSS6  
Power Supply.SchDocSS8  
Light Sensors.SchDocSS11  
Wireless.SchDocU1A  
CY8C5888AXI-LP096

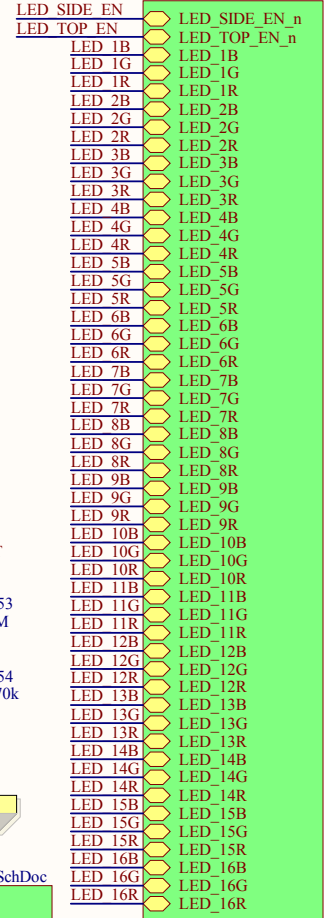
CY8C5888AXI-LP096

U2A  
CY8C5888AXI-LP096

CY8C5888AXI-LP096

SS10  
Bump Sensors.SchDocSS9  
LCD.SchDoc

VBAT\_SCALED = 0.32\*VBAT

SS5  
LEDs.SchDoc

1

2

3

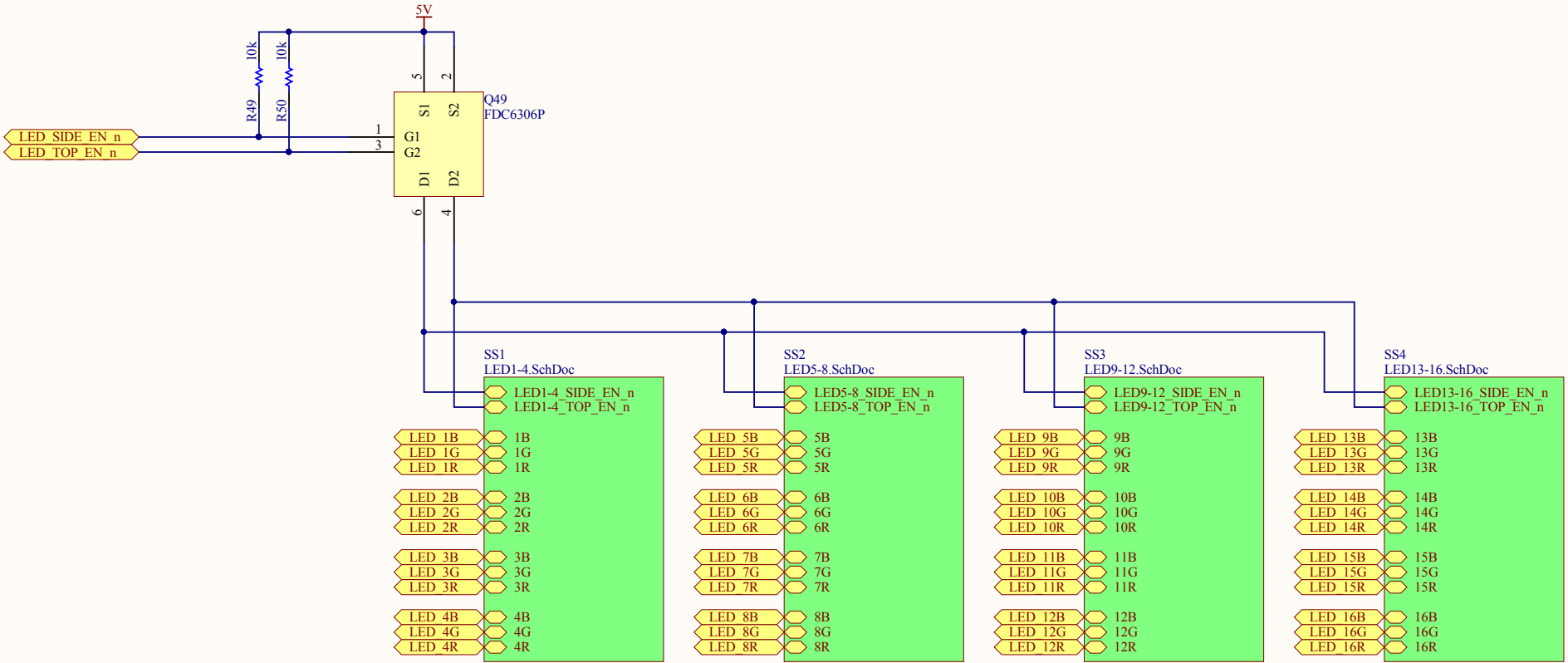
4

| Title       |                          |                        |
|-------------|--------------------------|------------------------|
| PSoC.SchDoc |                          |                        |
| Size        | Number                   | Revision               |
| A4          | 1                        | B                      |
| Date:       | 3/26/2015                | Sheet of 13            |
| File:       | C:\Users\...\PSoC.SchDoc | Drawn By: Nick D'Ademo |

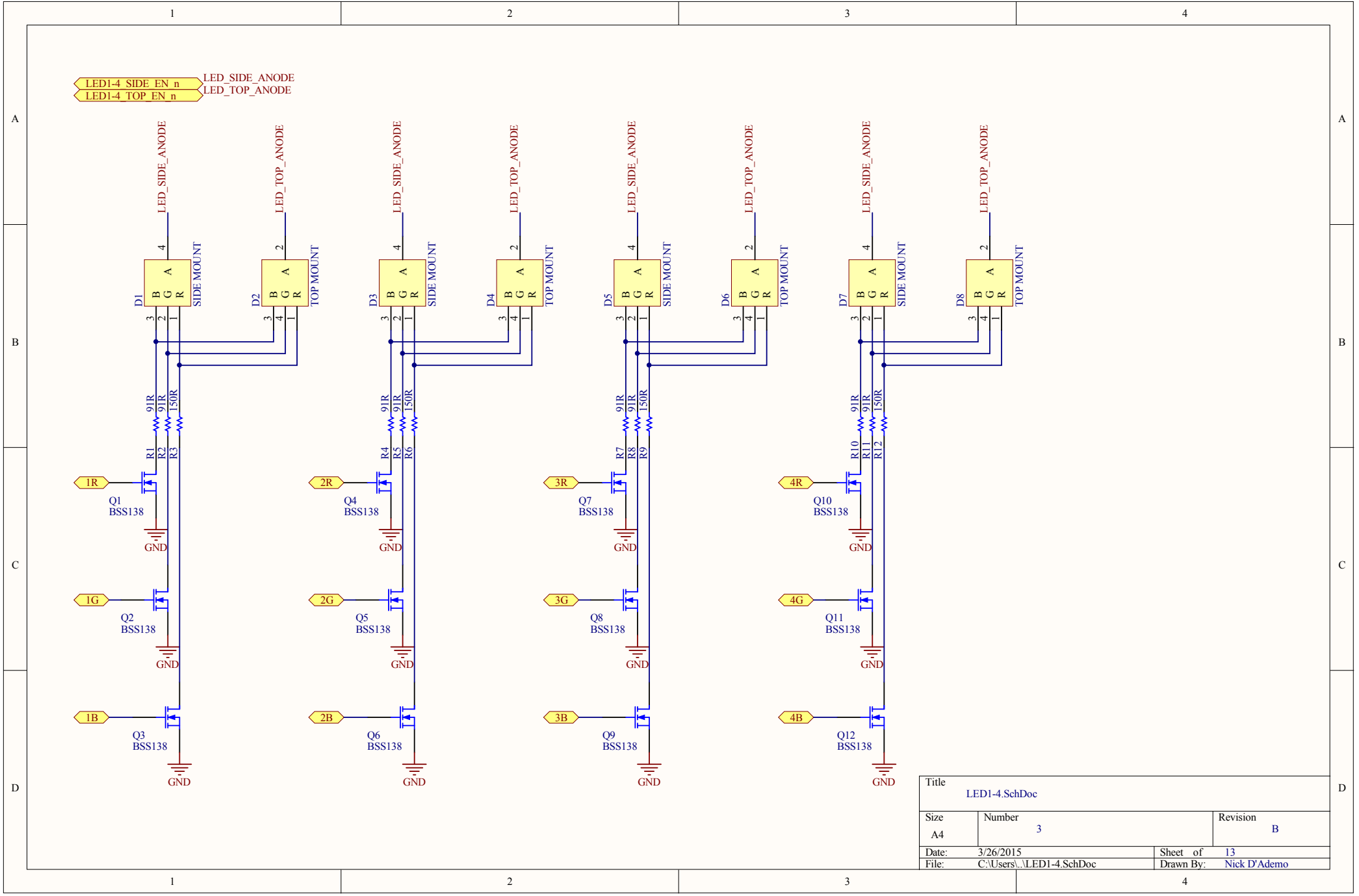
▲ All LEDs have been set to 20mA forward current for 5V via:  
RED: R=150R  
GREEN: R=91R  
BLUE: R=91R

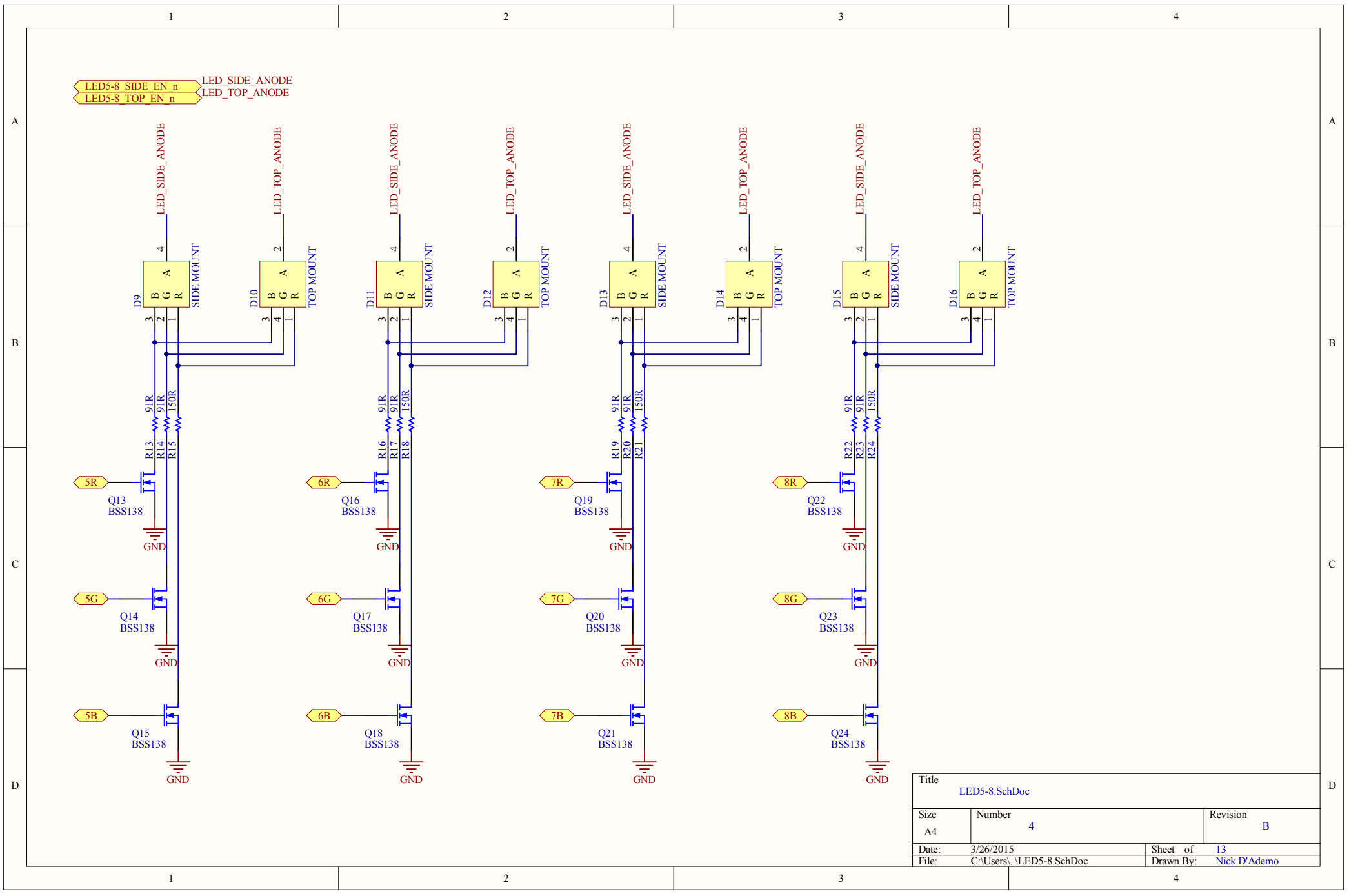
▲ SIDE LED:  
Vf @ If=20mA (Min->Typ->Max):  
RED: 1.8~2.0~2.4V  
GREEN: 3.0~3.3~3.6V  
BLUE: 3.0~3.3~3.6V

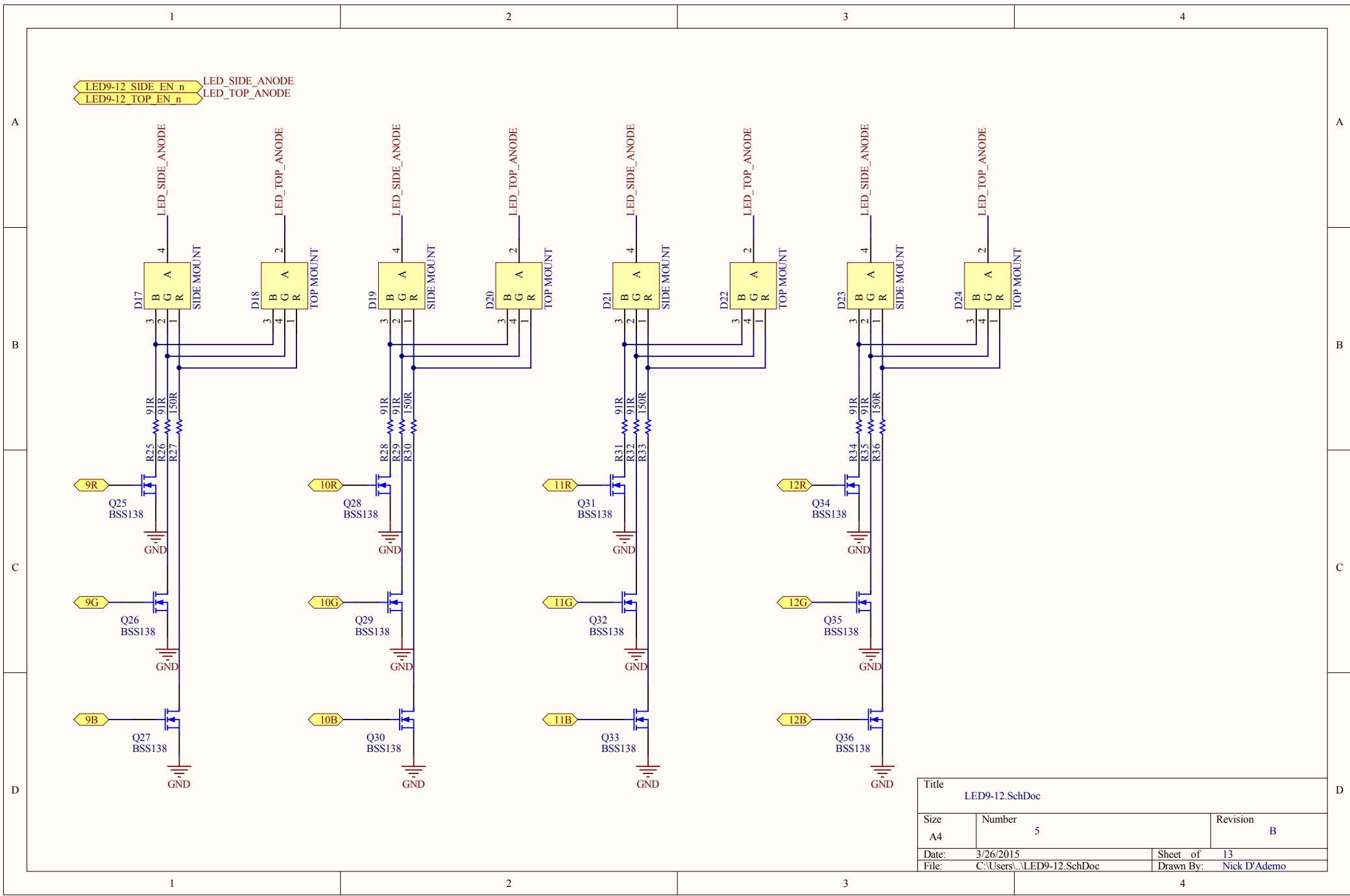
▲ TOP LED:  
Vf @ If=20mA (Avg->Max):  
RED: 2.0~2.6V  
GREEN: 3.2~4.0V  
BLUE: 3.2~4.0V  
CLV1A-FKB-CJ1M1F1BB7R4S3: 675mcd Red, 1055mcd Green, 337mcd Blue  
CLV1A-FKB-CK1N1G1BB7R4S3: 730mcd Red, 1150mcd Green, 365mcd Blue



|                                   |                           |               |
|-----------------------------------|---------------------------|---------------|
| Title<br>LEDs.SchDoc              |                           |               |
| Size<br>A4                        | Number<br>2               | Revision<br>B |
| Date:<br>3/26/2015                | Sheet of<br>13            |               |
| File:<br>C:\Users\...\LEDs.SchDoc | Drawn By:<br>Nick D'Ademo |               |

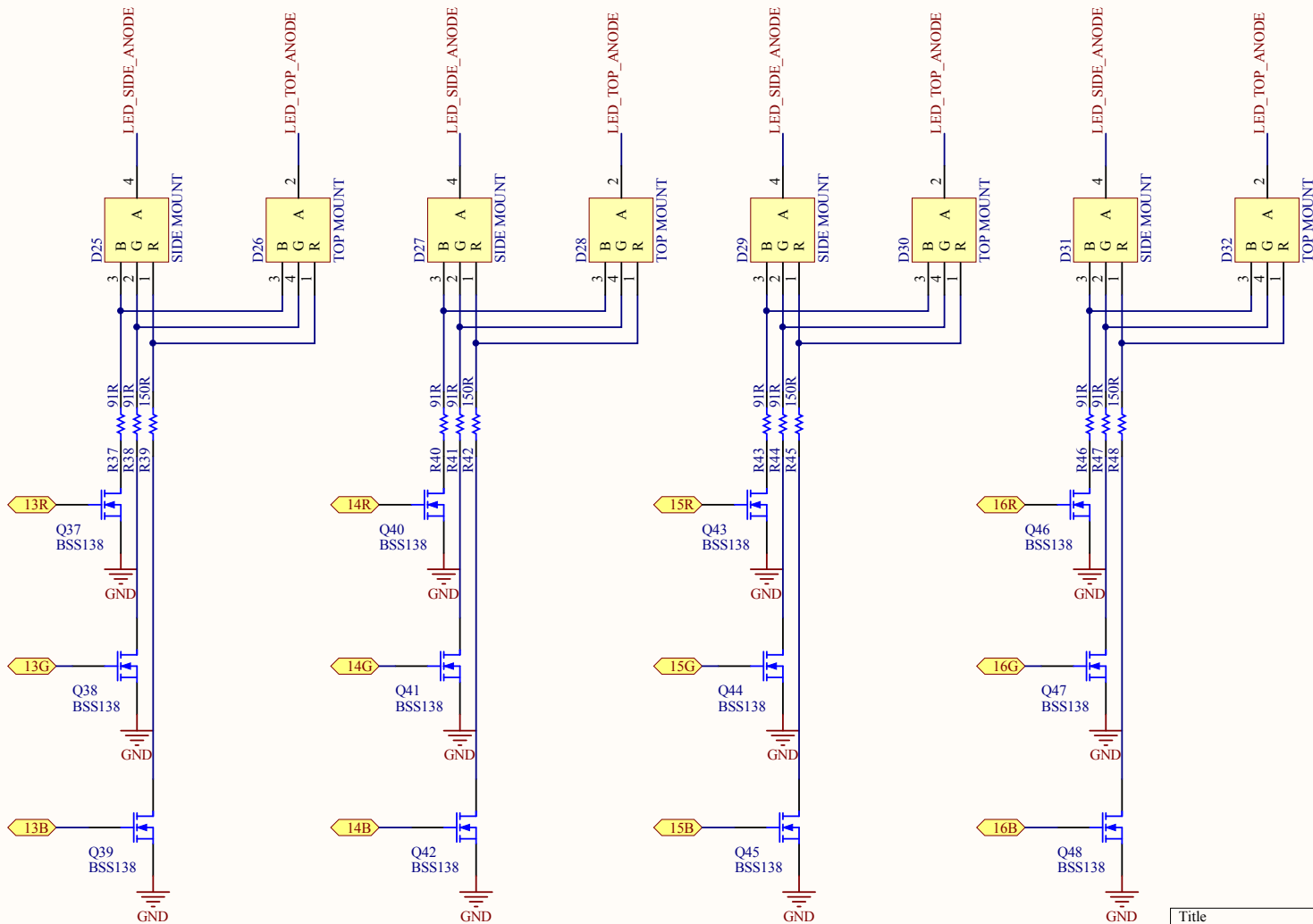




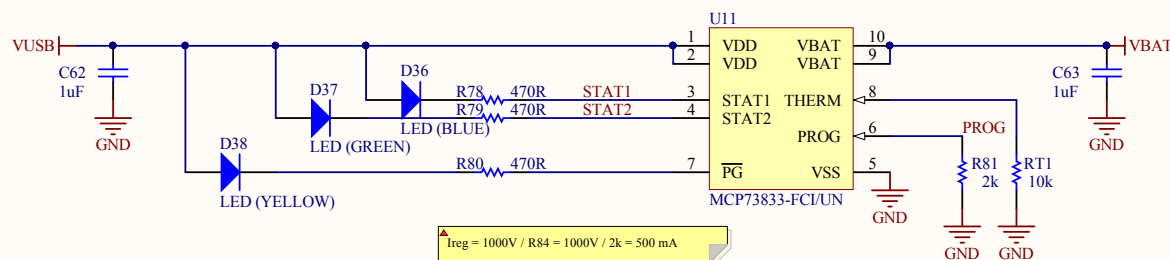
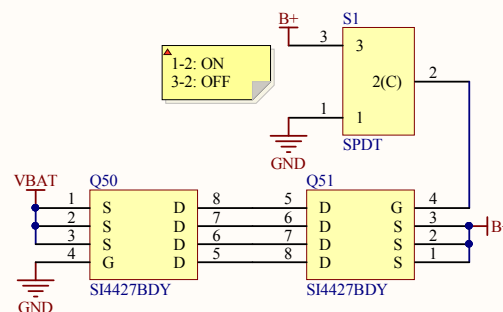
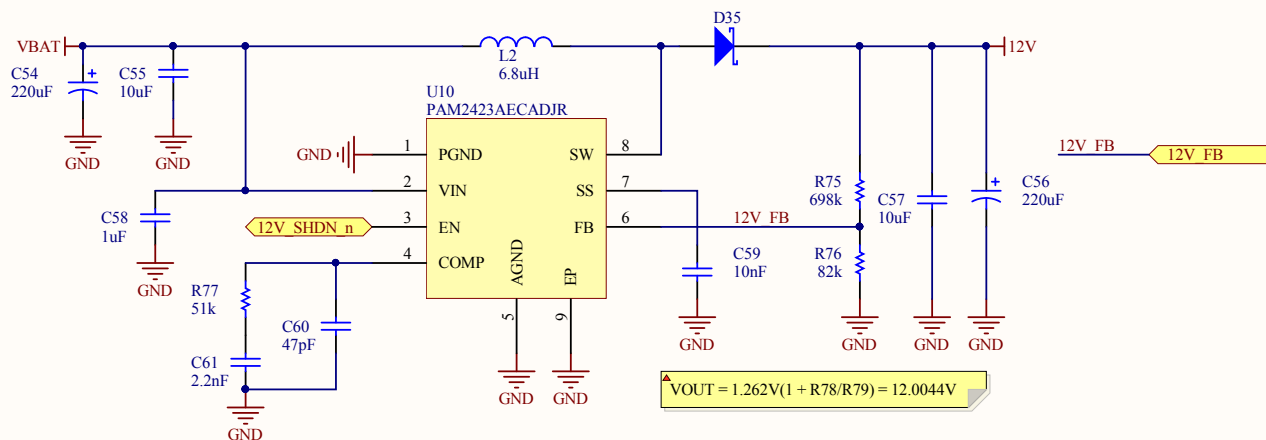
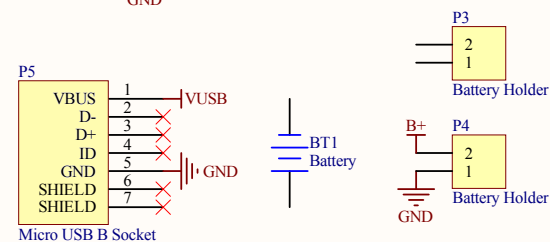
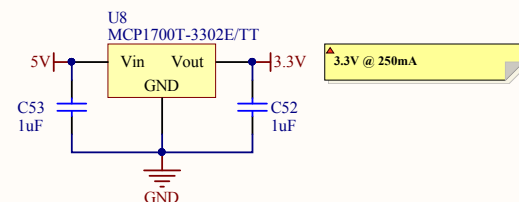
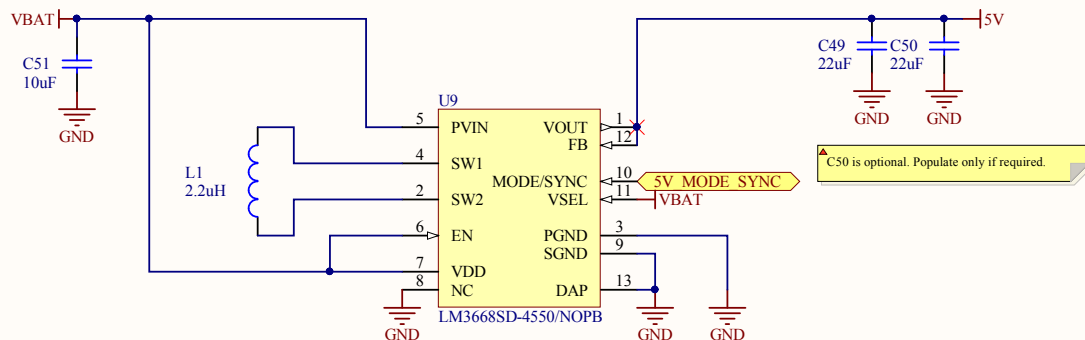


|                |                             |                        |
|----------------|-----------------------------|------------------------|
| Title          |                             |                        |
| LED9-12.SchDoc |                             |                        |
| Size           | Number                      | Revision               |
| A4             | 5                           | B                      |
| Date:          | 3/26/2015                   | Sheet of 13            |
| File:          | C:\Users\...\LED9-12.SchDoc | Drawn By: Nick D'Ademo |

LED13-16 SIDE\_EN n LED\_SIDE\_ANODE  
LED13-16 TOP\_EN n LED\_TOP\_ANODE



|                                       |                           |               |
|---------------------------------------|---------------------------|---------------|
| Title<br>LED13-16.SchDoc              |                           |               |
| Size<br>A4                            | Number<br>6               | Revision<br>B |
| Date:<br>3/26/2015                    | Sheet of<br>13            |               |
| File:<br>C:\Users\...\LED13-16.SchDoc | Drawn By:<br>Nick D'Ademo |               |



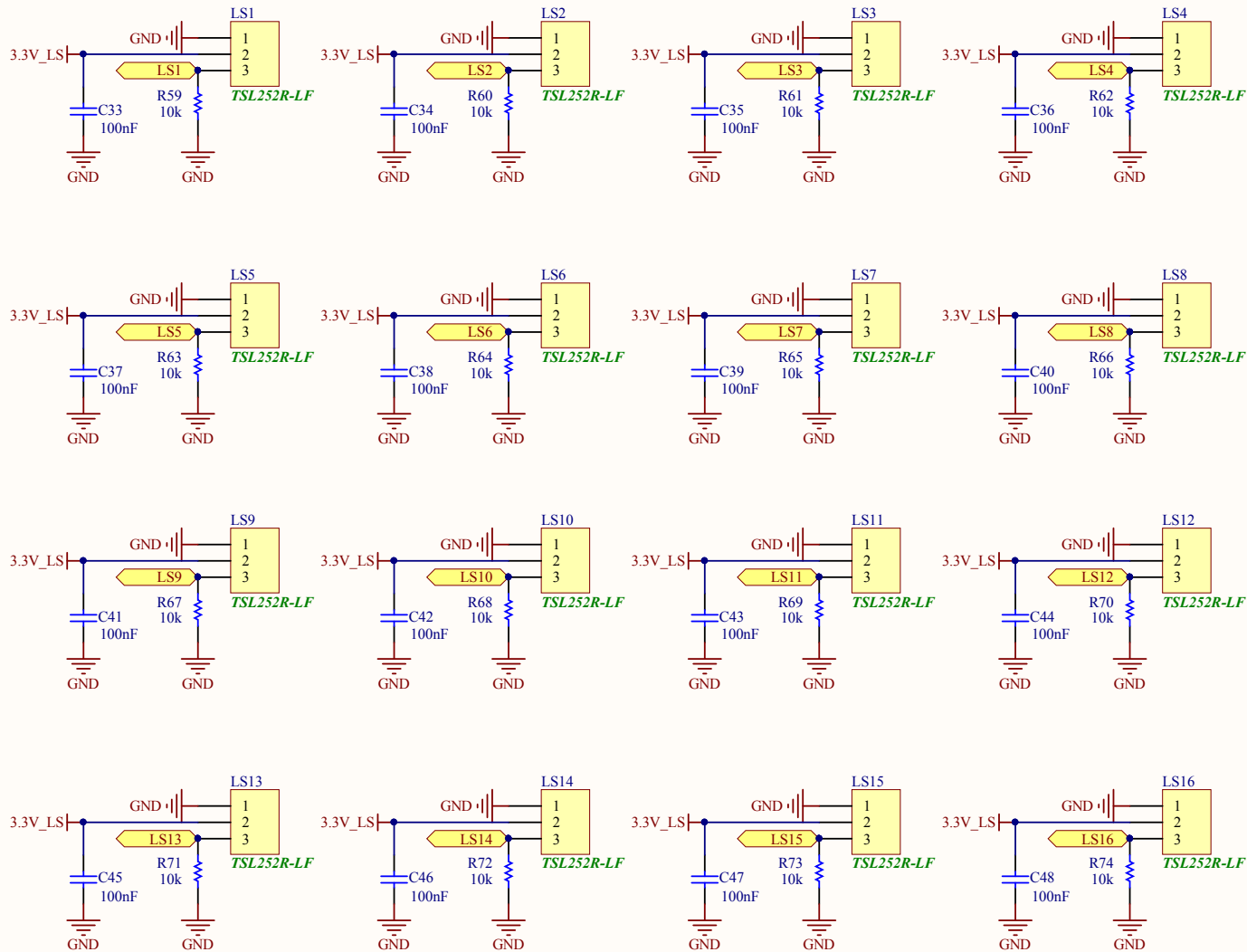
|                     |                                  |                        |
|---------------------|----------------------------------|------------------------|
| Title               |                                  |                        |
| Power Supply.SchDoc |                                  |                        |
| Size                | Number                           | Revision               |
| A4                  | 7                                | B                      |
| Date:               | 3/26/2015                        | Sheet of 13            |
| File:               | C:\Users\...\Power Supply.SchDoc | Drawn By: Nick D'Ademo |

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:  
TSL12S  
TSL13S  
TSL14S  
TSL250R  
TSL251R  
TSL252R  
TSL253R  
TSL254R  
TSL257  
TSL260R (IR light)  
TSL261R (IR light)  
TSL262R (IR light)  
TSL267 (IR light)

Only install R59 to R74 if Light-to-Voltage parts are used.

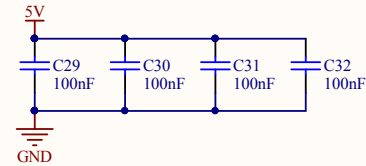
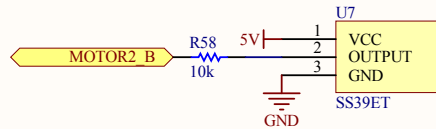
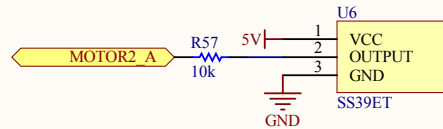
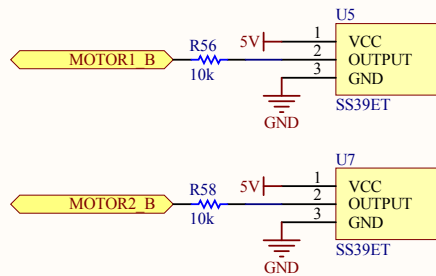
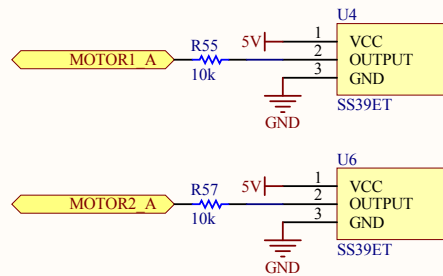
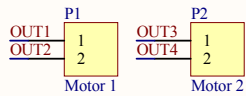
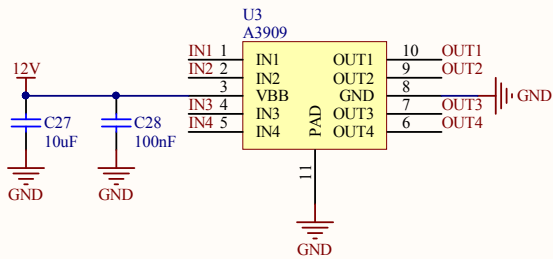


|  |             |                           |
|--|-------------|---------------------------|
| Title<br>Light Sensors.SchDoc              |             |                           |
| Size<br>A4                                 | Number<br>8 | Revision<br>B             |
| Date:<br>3/26/2015                         |             | Sheet of<br>13            |
| File:<br>C:\Users\...\Light Sensors.SchDoc |             | Drawn By:<br>Nick D'Ademo |

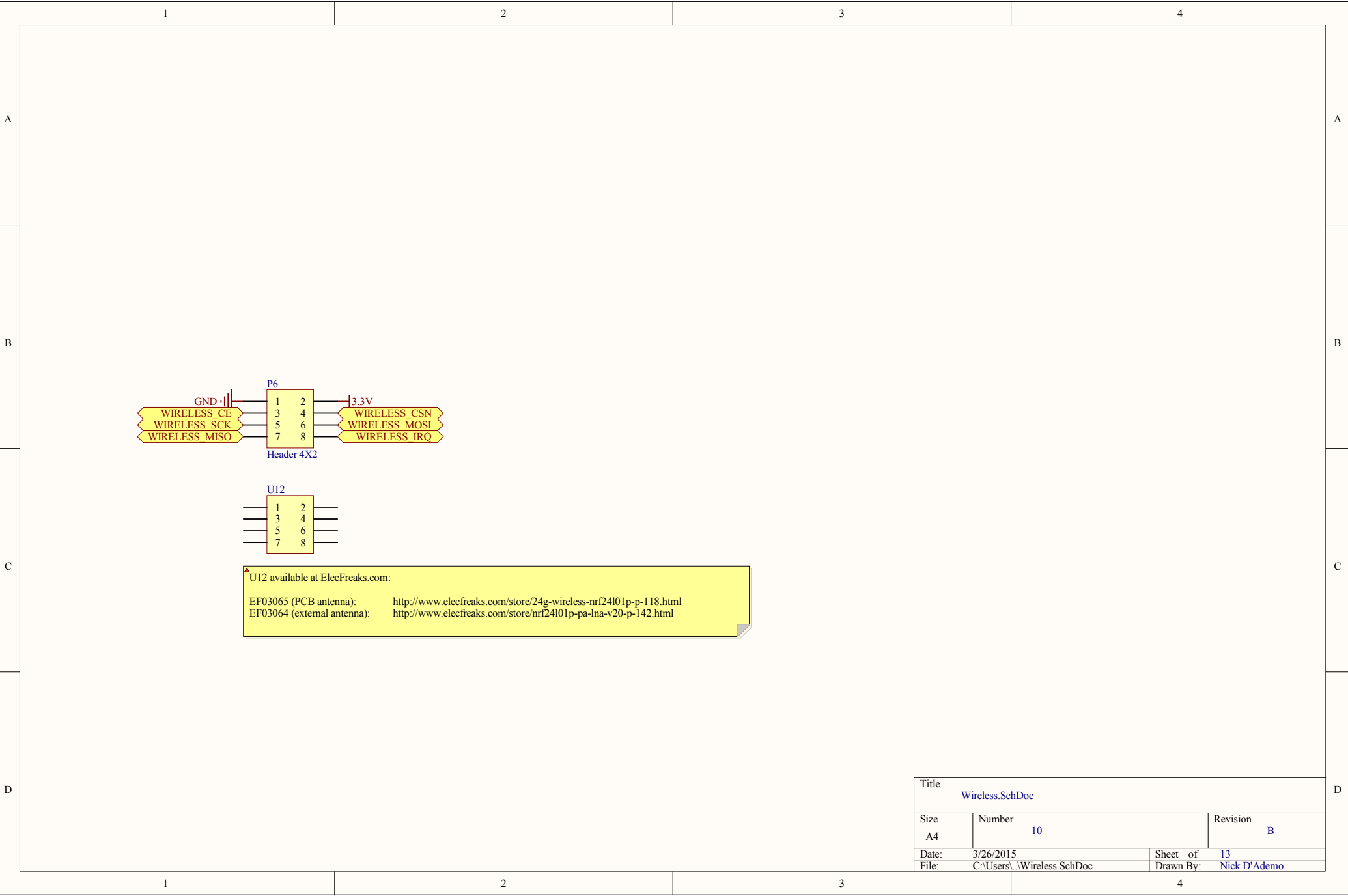


MOTOR1 1 IN1  
MOTOR1 2 IN2

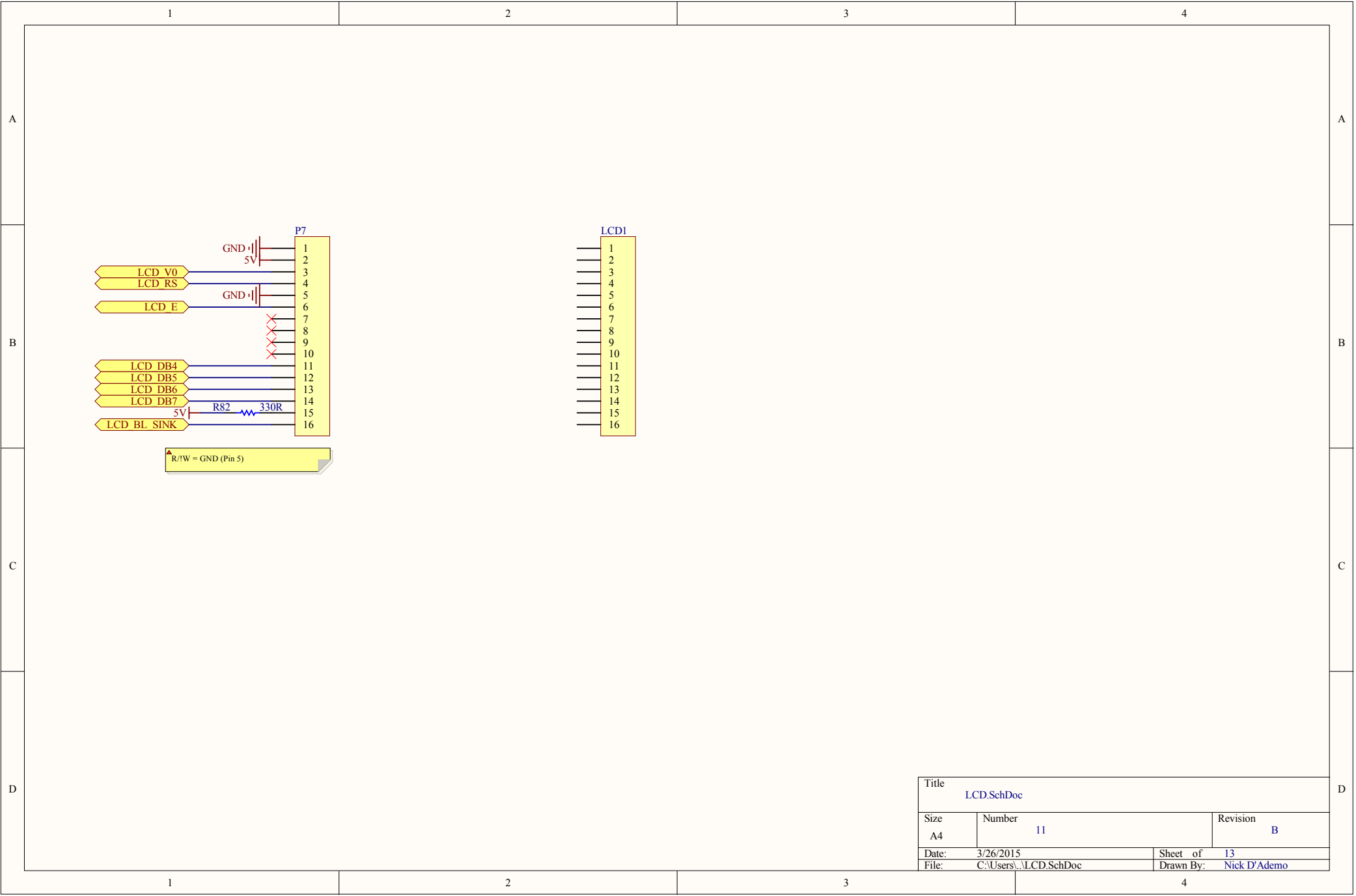
MOTOR2 1 IN3  
MOTOR2 2 IN4



|  |                           |               |
|--|---------------------------|---------------|
| Title<br>DC Motors.SchDoc              |                           |               |
| Size<br>A4                             | Number<br>9               | Revision<br>B |
| Date:<br>3/26/2015                     | Sheet of<br>13            |               |
| File:<br>C:\Users\...\DC Motors.SchDoc | Drawn By:<br>Nick D'Ademo |               |



|       |                              |           |                 |
|-------|------------------------------|-----------|-----------------|
| Title |                              |           | Wireless.SchDoc |
| Size  | Number                       | Revision  |                 |
| A4    | 10                           | B         |                 |
| Date: | 3/26/2015                    | Sheet of  | 13              |
| File: | C:\Users\...\Wireless.SchDoc | Drawn By: | Nick D'Ademo    |



1

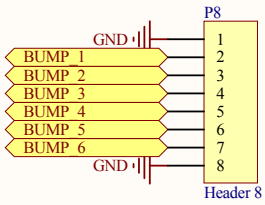
2

3

4

A

A



B

B

C

C

D

D

|                              |                                  |  |                           |
|------------------------------|----------------------------------|--|---------------------------|
| Title<br>Bump Sensors.SchDoc |                                  |  |                           |
| Size<br>A4                   | Number<br>12                     |  | Revision<br>B             |
| Date:                        | 3/26/2015                        |  | Sheet of<br>13            |
| File:                        | C:\Users\...\Bump Sensors.SchDoc |  | Drawn By:<br>Nick D'Ademo |

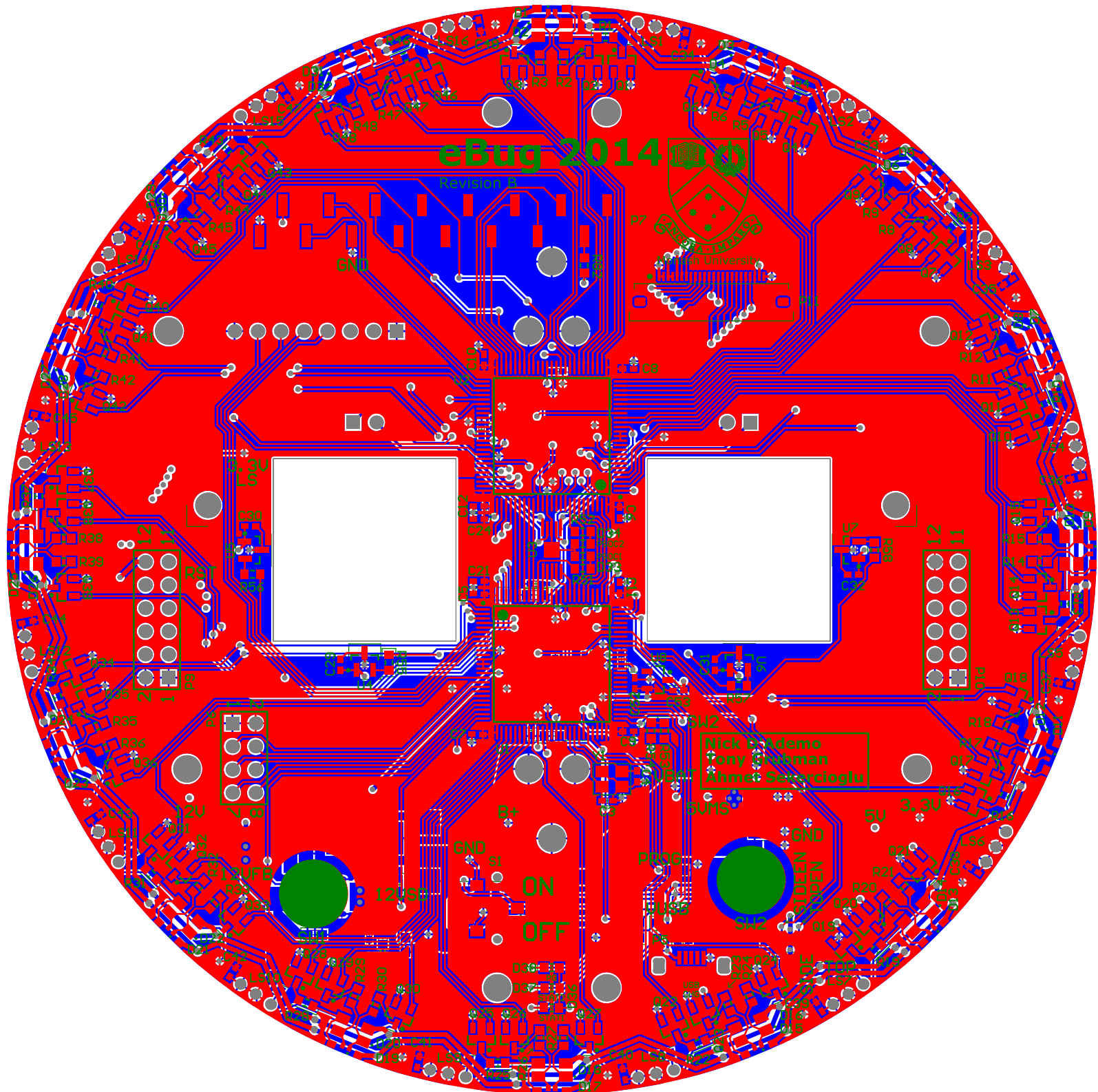
1

2

3

4

|   |                           |               |
|---|---------------------------|---------------|
| Title<br>Expansion Header.SchDoc              |                           |               |
| Size<br>A4                                    | Number<br>13              | Revision<br>B |
| Date:<br>3/26/2015                            | Sheet of<br>13            |               |
| File:<br>C:\Users\...\Expansion Header.SchDoc | Drawn By:<br>Nick D'Ademo |               |



| Description   | Designator  | Footprint   | Quantity | Value    |
|---|---|---|----------|----------|
| 18650 1-Cell Lithium Ion Battery  | B1  |   | 1        |          |
|   | C1, C2, C5, C6, C7, C8, C9, C10, C11, C12, C16, C19, C22, C23, C25, C26, C28, C49, C30, C31, C32, C33, C34, C35, C36, C37, C38, C39, C40, C41, C42, C43, C44, C45, C46, C47, C48  |   |          |          |
| Capacitor, X7R, ±10%, 16V, 0402   | C3, C4  | CAPC1005N   | 37       | 100nF    |
| Capacitor, NP0, ±2%, 25V, 0402  | C13, C14, C15, C17, C18, C20, C41, C24, C52, C53, C58, C62, C63   | CAPC1005N   | 2        | 12pF     |
| Capacitor, X5R, ±10%, 10V, 0402   | C27, C55, C57   | CAPC1005N   | 13       | 1uF      |
| TAIYO YUDEN - EMI0107B81106MA-T - CAP CER 10UF 16V 20% X5R 0603                                     | C49, C50  | CAPC2012N   | 1        | 10uF     |
| TAIYO YUDEN - LM0212B1236MG-T - CAPACITOR CERAMIC 22UF, 10V, X5R, 0805                              | C51   | CAPC2012N   | 2        | 22uF     |
| TAIYO YUDEN - LM0212 B106MG-T - CAP. MLCC, X5R, 10UF, 10V, 0805                                     | C54, C56  | TC7343-2917   | 1        | 10uF     |
| KEMET - T491D227K016AT - CAP TANT 220UF 16V 10% 2917  | C59   | CAPC1005N   | 2        | 220uF    |
| Capacitor, X7R, ±10%, 16V, 0402   | C60   | CAPC1005N   | 1        | 10nF     |
| Capacitor, NP0, ±5%, 25V, 0402  | C61   | CAPC1005N   | 1        | 47pF     |
| Capacitor, X7R, ±10%, 16V, 0402   | D4, D3, D5, D7, D9, D11, D13, D15, D17, D19, D21, D23, D25, D27, D29, D31, D32, D34, D36, D38, D30, D32   | OVSRRGBCC3_SI DE  | 16       | 1.2, 2nF |
| 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-CKX1NLG1887R453 - LED RGB 3-IN-1 3.2X2.8MM 4PLCC                                   | D33, D34, D36   | LED, 0603   | 3        |          |
| ROHM - SMLE128C7786Q - LED, 0603, LO-CUR, BLU   | D35   | DO-214AB  | 1        |          |
| VISHAY - SS34-E3/5T7 - DIODE SCHOTTKY 40V 3A DO214AB  | D37   | LED, 0603   | 1        |          |
| KINGBRIGHT - KP-1608MGC - LED, 0603, GREEN, 70MCD, 568NM  | D38   | LED, 0603   | 1        |          |
| KINGBRIGHT - KP-1608SYC - LED, SMD, 0603, YELLOW  | L1  | COILCRAFT_LPS4 018  | 1        | 1.2, 2uH |
| COILCRAFT - LPS4018-222MRB - INDUCTOR, SHLD, 2.2uH, 20%, 1.5A, SMD                                  | L2  | SRP7028A  | 1        | 6.8uH    |
| BOURNS - SRP7028A-6R8M - FIXED IND 6.8uH 4.5A 60 MOHM SMD   | LC01  |   | 1        |          |
| SHENZHEN EONE ELECTRONICS CO.,LTD - IM120424015 - EONE High 16x2 1602) Characters LCD               | LS1, LS2, LS3, LS4, LS5, LS6, LS7, LS8, LS9, LS10, LS11, LS12, LS13, LS14, LS15, LS16   |   | 16       |          |
| AMS - TL252R-4F - IC LIGHT TO VOLTAGE SENSOR 3PIN   | P1, P2  | HDR1X2  | 2        |          |
| MOLEX INC - 0022272021 - CONN HEADER 2POS, 100 VERT TIN   | P3, P4  | 54  | 2        |          |
| KEYSTONE ELECTRONICS - 54 - BATTERY CLIP 18MM 18650 CELL  |   | USB3140-30-0170-1-C - CONNECTOR, USB 2.0 MICRO B, RCPT, SPOS, SMT | 1        |          |
| GLOBAL CONNECTOR TECHNOLOGY - USB3140-30-0170-1-C - CONNECTOR, USB 2.0 MICRO B, RCPT, SPOS, SMT     | P5  | C-MODIFIED  | 1        |          |
| SAMTEC - SSW-116-22-F-S-V5 - Conn Socket Strip SKT 16 POS 2.54mm Solder ST SMD Tube                 | P7  | 22-F-S-V5   | 1        |          |
| MOLEX INC - 22-27-2081 - HEADER, SQUARE PIN, 0.1", 8WAY   | P8  | HDR1X8  | 1        |          |
| SAMTEC - SSW-106-01-T-D - SOCKET, 2.54MM, 2X6WAY  | P9, P10   | SSW-106-01-X-D  | 2        |          |
| GLOBAL CONNECTOR TECHNOLOGY - FFC2810-24-T - FFC/FPC CONNECTOR, RECEPTACLE, 24POS, 1ROW             | P11   | FFC2810   | 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 - BS5138 - MOSFET N-CH 50V 220MA SOT-23                                     | Q49   | SOT89P230-3N  | 48       |          |
| FAIRCHILD SEMICONDUCTOR - FDC6306P - MOSFET 2P-CH 20V 1.9A S5OT6                                    |   | SOT-6   | 1        |          |
| VISHAY SILICONIX - SI4427BDY-ET-E3 - MOSFET P-CH 30V 9.7A B-SOIC                                    | Q50, Q51  | SOIC127P600-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  | RESC1608N   | 32       | 91R      |
| Resistor, ±1%, 0.1W, 0603   | R3, R6, R9, R12, R15, R18, R21, R24, R27, R30, R33, R36, R39, R42, R45, R48   | RESC1608N   | 16       | 150R     |
| Resistor, ±1%, 0.1W, 0603   | R49, R50, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74  | RESC1608N   | 22       | 10k      |
| Resistor, ±1%, 0.1W, 0603   | R51, R52, R78, R79, R80   | RESC1608N   | 5        | 470R     |
| Resistor, ±1%, 0.1W, 0603   | R53   | RESC1608N   | 1        | 1M       |
| Resistor, ±1%, 0.1W, 0603   | R54   | RESC1608N   | 1        | 470k     |
| Resistor, ±1%, 0.1W, 0603   | R75   | RESC1608N   | 1        | 698k     |
| Resistor, ±1%, 0.1W, 0603   | R76   | RESC1608N   | 1        | 82k      |
| Resistor, ±1%, 0.1W, 0603   | R77   | RESC1608N   | 1        | 51k      |
| Resistor, ±1%, 0.1W, 0603   | R81   | RESC1608N   | 1        | 2k       |
| Resistor, ±1%, 0.1W, 0603   | R82   | RESC1608N   | 1        | 330R     |
| MURATA - NCFP18XH103J03RB - THERMISTOR, NTC, 10K, 5%, SMD   | RT1   | RESC1608N   | 1        | 10k      |
| COPAL ELECTRONICS INC - CL-SB-128-01T - SWITCH SLIDE SPDT 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 - A3999GLVTR-T - IC MOTOR DRIVER PAR 10MSOP   | U3  | MSOP-10   | 1        |          |
| HONEYWELL SAC - SS58T - SENSOR, HALL EFFECT, LINEAR, SOT23-3  | U4, U5, U6, U7  | SOT23-3N  | 4        |          |
| MICROCHIP - MCP1207T-3302E/TT - IC REG LDO 1.3V 0.35A SOT23-3                                       | U8  | SOT89P230-3N  | 1        |          |
| 1A, High Efficiency Dual Mode Single Inductor Buck-Boost DC/DC Converter, 12-pin LLP, Pb-Free       | U9  | SDF12A  | 1        |          |
| DIODES INCORPORATED - PAM2423AECADIR - IC REG BOOST ADJ 5 SA RSOIC                                  | U10   | SOIC127P600-BEN   | 1        |          |
| MICROCHIP - MCP73833-FC4UN - IC U3IONA3-POLY CTRLR 10MSOP   | U11   | MSOP-LIN10_N  | 1        |          |
| NORDIC SEMICONDUCTOR - nRF24L01+  | U12   | HDR2X4  | 1        |          |
| NDK - NX3225SA-16.000MHZ-STD-CSR-1 - CRYSTAL 16MHZ 8PF SMD  | V1  | NX3225SA  | 1        |          |