

Schematics

BOM

Layout

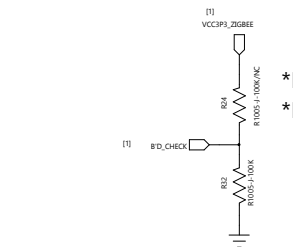
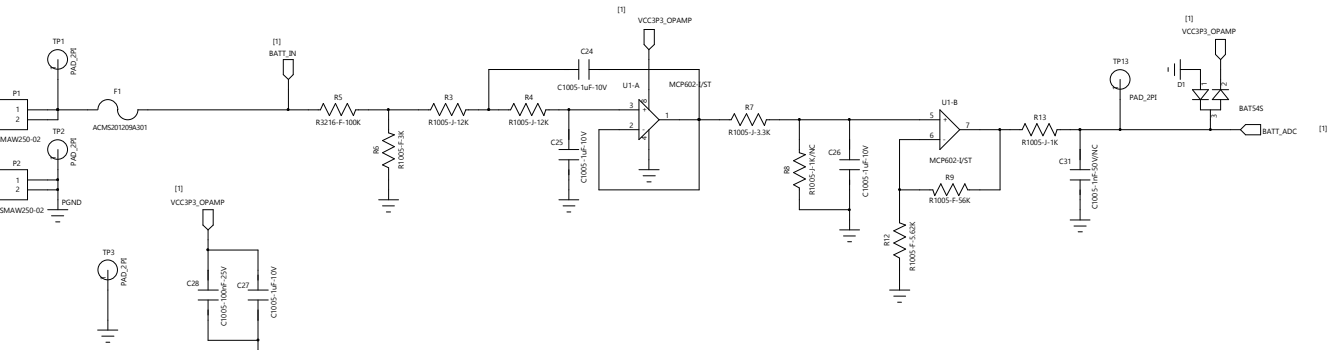
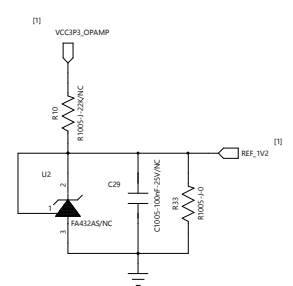
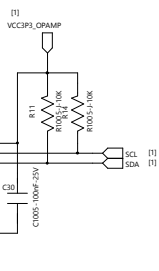
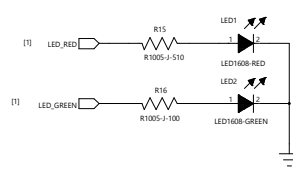
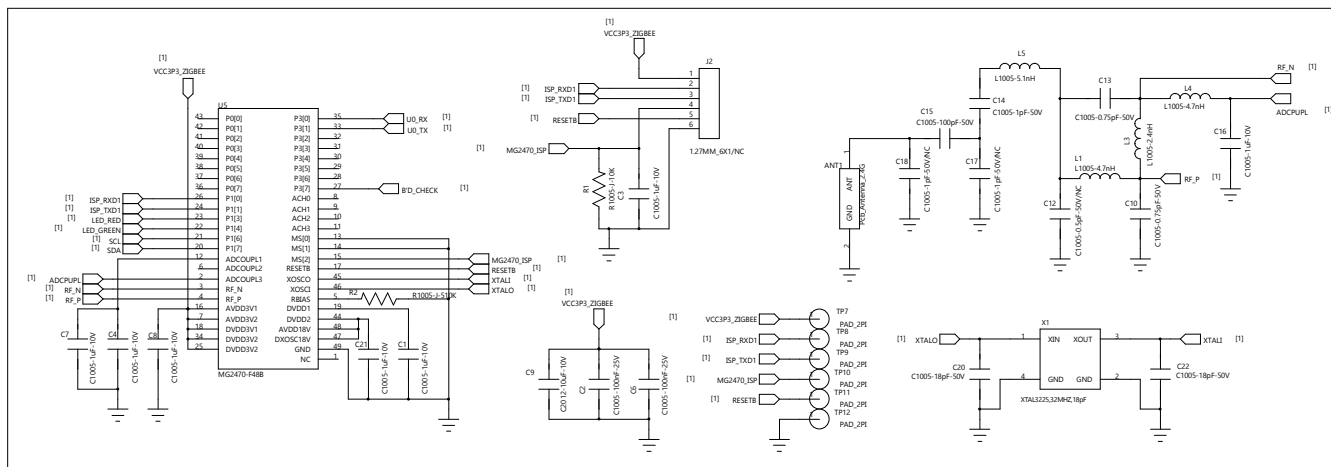
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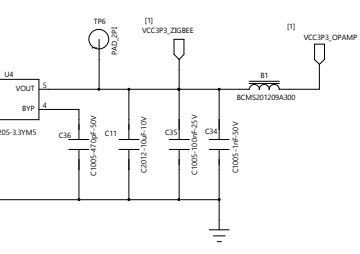
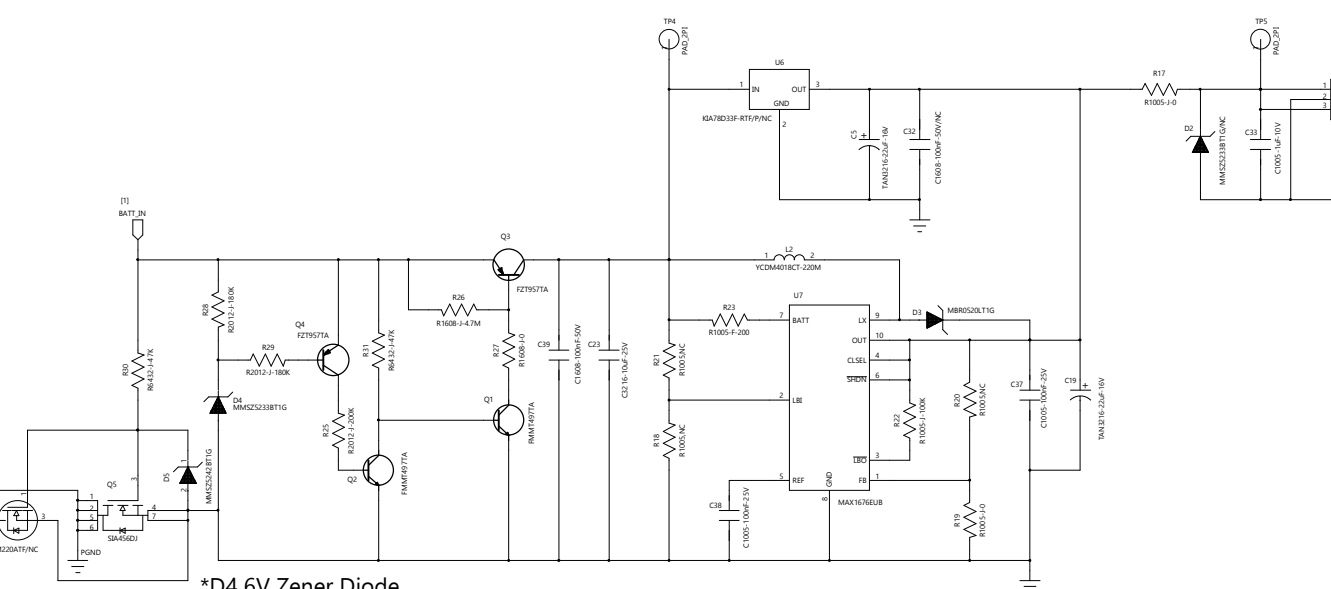
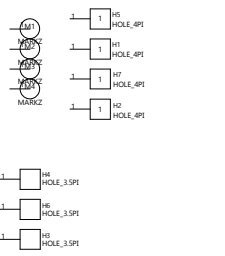
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*Pull-Up : 6V & 12V
*Pull-Down : 2V

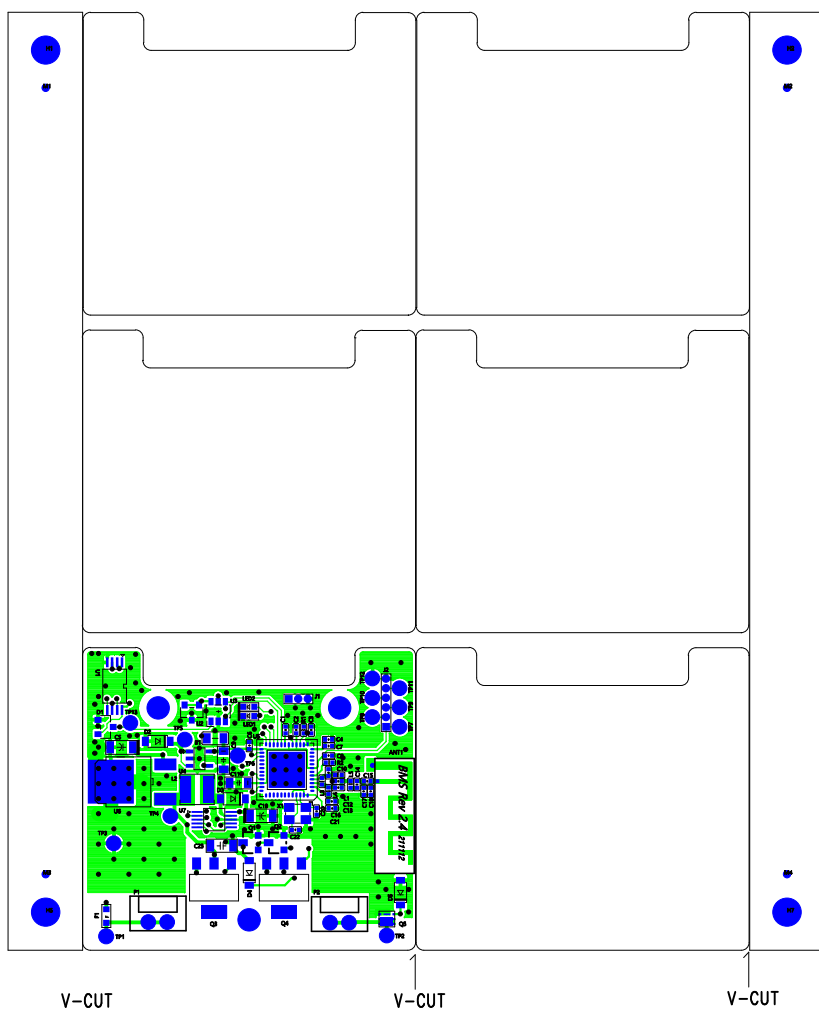


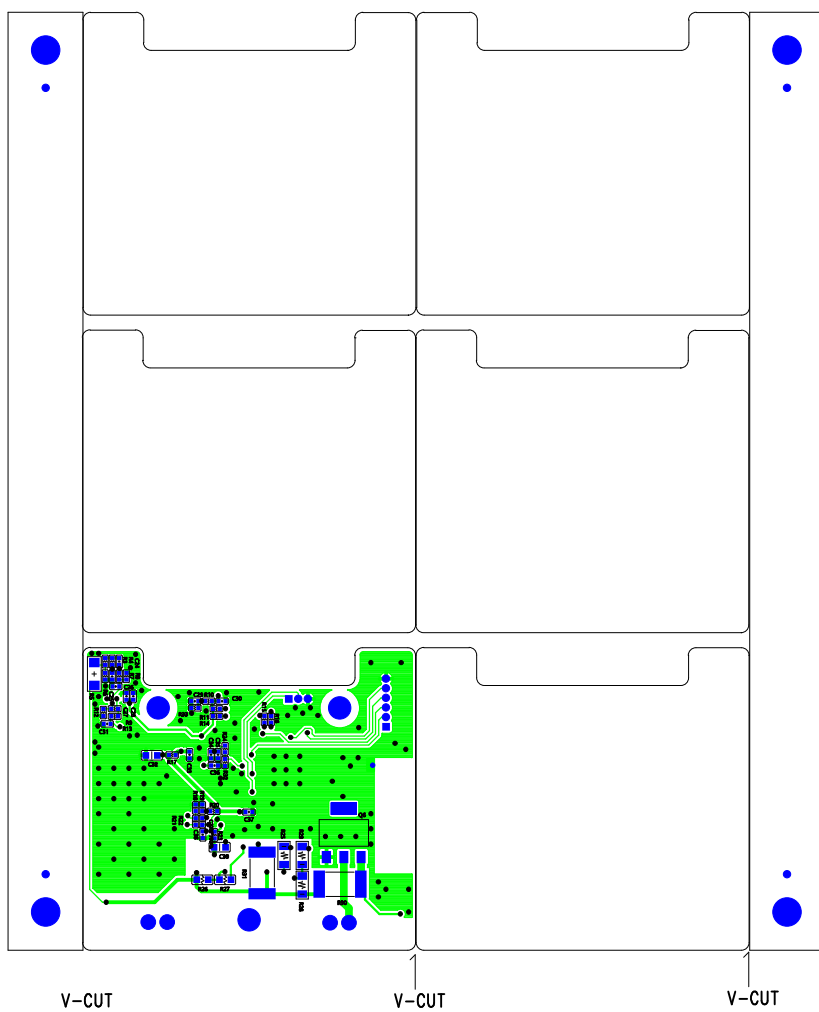
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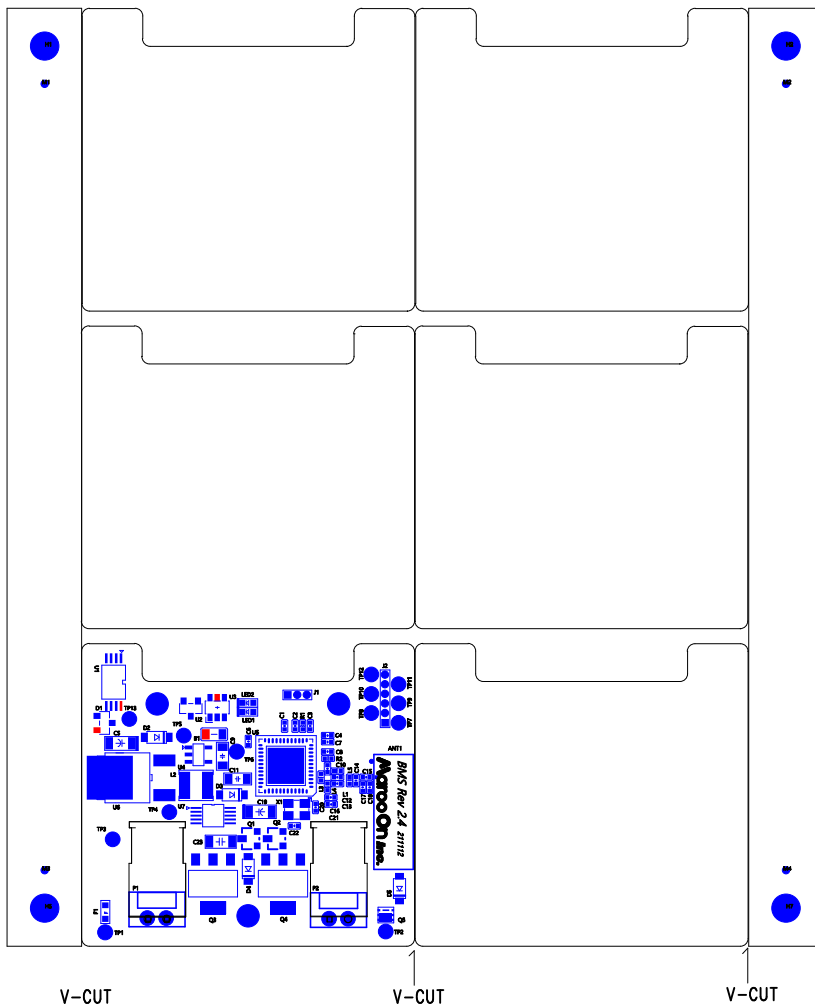
*D4 6V Zener Diode

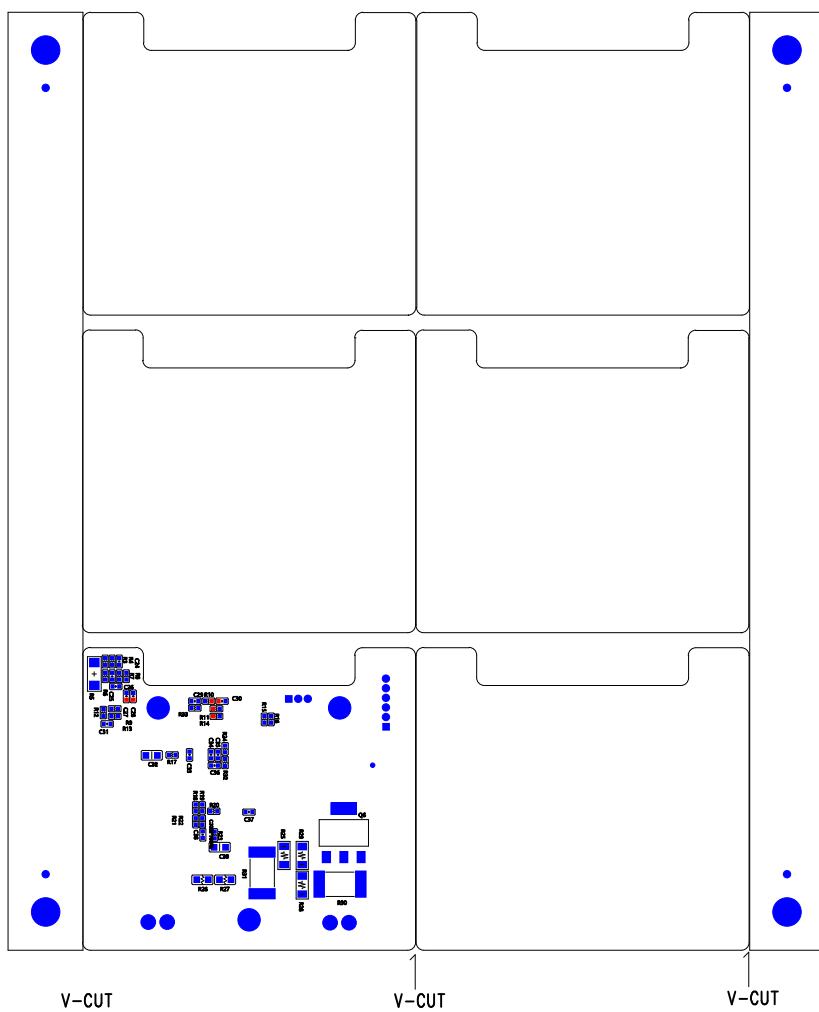
BOM (Bill Of Material)
2V_BMS Rev2.4

No.	Location	Part Number	Specification	Qty	Maker	Package	Remark
1	U1	MCP602-UT	OPAMP, Rail to Rail Output, 2Ch, TSSOP-8	1	MICROCHIP	TSSOP-8	
2	U3	MCP3421A0T-E/CH	ADC, 18Bit, 1Ch, I2C, SOT23-6	1	MICROCHIP	SOT23-6	
3	U4	MAX265-2.3HM5	LDO, 3.3V, 150mA, SOT23-5	1	MICROCHIP	SOT23-5	
4	U5	MG2470-4488	WCL, RS1, 240dB, QFN-48	1		RADIO PULSE	QFN-48
5	U7	MAX1876EUB	DCDC, Step-Up, 200mA, 5.5V, 500KHz, SOT-26	1	MAXIM	µMAX-10	
6	X1	XTAL3225,32MHz,18pf	Crystal, 3225, 32MHz, 18pf, SMD	1	YOKETAN	XTAL3225	
7	D1	BAT54S	Diode, Schottky, 30V, 200mA, SOT23-3	1	ONSEMI	SOT23-3	
8	D3	M8R0520LT1G	Diode, Schottky, 20V, 500mA, SOD-123	1	ONSEMI	SOD-123	
9	D4	MMS25238BT1G	Diode, Zener, 5.1V, 500mW, SOD-123	1	ONSEMI	SOD-123	
10	D5	MMS25242BT1G	Diode, Zener, 12V, 500mW, SOD-123	1	ONSEMI	SOD-123	
11	F1	ACMS201209A301	Bead, 2012, 300 Ohm, 3A, SMD	1	MAX ECHO	B2012	
12	LED1	LED1608-RED	LED, 1608, RED, SMD	1	Any	LED1608	
13	LED2	LED1608-GREEN	LED, 1608, GREEN, SMD	1	Any	LED1608	
14	P1 P2	SMAW250-02	Connector, 2.5mm Pitch, 4 Pin, Right Angle, DIP	2	YCONHO	DIP	
15	Q1 Q2	FMM48771A	Transistor, NPN, 300V, 500mA, SOT23-3	2	DIODES	SOT23-3	
16	Q3 Q4	FZ79571A	Transistor, PNP, 300V, 1A, SOT233	2	DIODES	SOT233	
17	Q6	IRLM220ATF	FET, N-Ch, 200V, 1.13A, SOT223	1	ONSEMI	SOT223	
18	B1	BCMS201209A300	Bead, 2012, 30 Ohm, 6A, SMD	1	MAX ECHO	B2012	
19	R17 R19 R33	R1005-J-0	Resistor, 1005, 0 Ohm, J, SMD	3	Any	R1005	
20	R16	R1005-J-100	Resistor, 1005, 100 Ohm, J, SMD	1	Any	R1005	
21	R15	R1005-J-510	Resistor, 1005, 510 Ohm, J, SMD	1	Any	R1005	
22	R13	R1005-J-1K	Resistor, 1005, 1K Ohm, J, SMD	1	Any	R1005	
23	R7	R1005-J-3.3K	Resistor, 1005, 3.3K Ohm, J, SMD	1	Any	R1005	
24	R1 R11 R14	R1005-J-10K	Resistor, 1005, 10K Ohm, J, SMD	3	Any	R1005	
25	R3 R4	R1005-J-12K	Resistor, 1005, 12K Ohm, J, SMD	2	Any	R1005	
26	R22 R32	R1005-J-100K	Resistor, 1005, 100K Ohm, J, SMD	2	Any	R1005	
27	R2	R1005-J-510K	Resistor, 1005, 510K Ohm, J, SMD	1	Any	R1005	
28	R23	R1005-F-200	Resistor, 1005, 200 Ohm, F, SMD	1	Any	R1005	
29	R6	R1005-F-3K	Resistor, 1005, 3K Ohm, F, SMD	1	Any	R1005	
30	R12	R1005-F-5.62K	Resistor, 1005, 5.62K Ohm, F, SMD	1	Any	R1005	
31	R9	R1005-F-56K	Resistor, 1005, 56K Ohm, F, SMD	1	Any	R1005	
32	R27	R1608-J-0	Resistor, 1608, 0 Ohm, J, SMD	1	Any	R1608	
33	R26	R1608-J-4.7M	Resistor, 1608, 4.7M Ohm, J, SMD	1	Any	R1608	
34	R28 R29	R2012-J-180K	Resistor, 2012, 180K Ohm, J, SMD	2	Any	R2012	
35	R25	R2012-J-200K	Resistor, 2012, 200K Ohm, J, SMD	1	Any	R2012	
36	R5	R3216-F-100K	Resistor, 3216, 100K Ohm, F, SMD	1	Any	R3216	
37	R30 R31	R6432-J-47K	Resistor, 6432, 47K Ohm, J, SMD	2	Any	R6432	
38	L3	L1005-2.4nH	Inductor, 1005, 2.4nH, SMD	1	Any	L1005	
39	L1 L4	L1005-4.7nH	Inductor, 1005, 4.7nH, SMD	2	Any	L1005	
40	L5	L1005-5.1nH	Inductor, 1005, 5.1nH, SMD	1	Any	L1005	
41	L2	YCDM4018CT-220M	Power Inductor, 4018, 22uH, 800mA, SMD	1	Any	YCDM4018	
42	C10 C13	C1005-0.75pf-50V	Ceramic Capacitor, 1005, 0.75pf, 50V, SMD	2	Any	C1005	
43	C14	C1005-1.0pf-50V	Ceramic Capacitor, 1005, 1pf, 50V, SMD	1	Any	C1005	
44	C20 C22	C1005-18pf-50V	Ceramic Capacitor, 1005, 18pf, 50V, SMD	2	Any	C1005	
45	C15	C1005-100pf-50V	Ceramic Capacitor, 1005, 100pf, 50V, SMD	1	Any	C1005	
46	C16	C1005-470pf-50V	Ceramic Capacitor, 1005, 470pf, 50V, SMD	1	Any	C1005	
47	C34	C1005-1nf-50V	Ceramic Capacitor, 1005, 1nf, 50V, SMD	1	Any	C1005	
48	C2 C6 C28 C30 C35 C37 C38	C1005-100nf-25V	Ceramic Capacitor, 1005, 100nf, 50V, SMD	7	Any	C1005	
49	C1 C3 C4 C7 C8 C16 C21 C24 C25 C26 C27 C33	C1005-1uf-10V	Ceramic Capacitor, 1005, 1uf, 10V, SMD	12	Any	C1005	
50	C39	C1608-100nf-50V	Ceramic Capacitor, 1608, 100nf, 50V, SMD	1	Any	C1608	
51	C9 C11	C2012-10uf-10V	Ceramic Capacitor, 2012, 10uf, 10V, SMD	2	Any	C2012	
52	C23	C3216-10uf-25V	Ceramic Capacitor, 3216, 10uf, 25V, SMD	1	Any	C3216	
53	C5 C19	TAN3216-22uf-16V	Tantal Capacitor, 3216, 22uf, 16V, SMD	2	Any	TAN3216	
	U2	FA432AS/NC		1			
	U6	KA78D33F-RTT/P/NC		1			
	Q5	SI4456DI		1			
	D2	MMS25238BT1G/NC		1			
	J1	1.27MM_3X1/NC		1			
	J2	1.27MM_6X1/NC		1			
	R8	R1005-J-1K/NC		1			
	R10	R1005-J-22K/NC		1			
	R18 R20 R21	R1005/NC		3			
	R24	R1005-J-100K/NC		1			
	C12	C1005-0.5pf-50V/NC		1			
	C17 C18	C1005-1pf-50V/NC		2			
	C31	C1005-1nf-50V/NC		1			
	C29	C1005-100nf-25V/NC		1			
	C32	C1608-100nf-50V/NC		1			









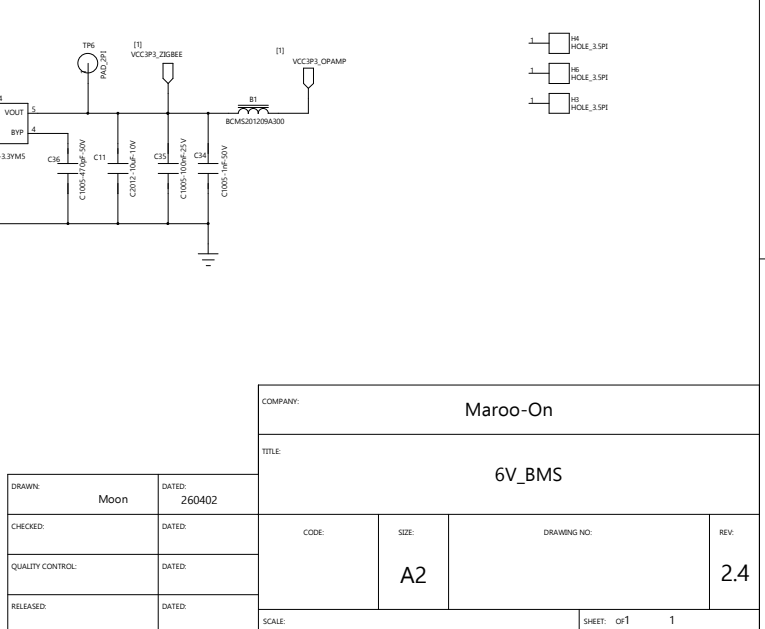
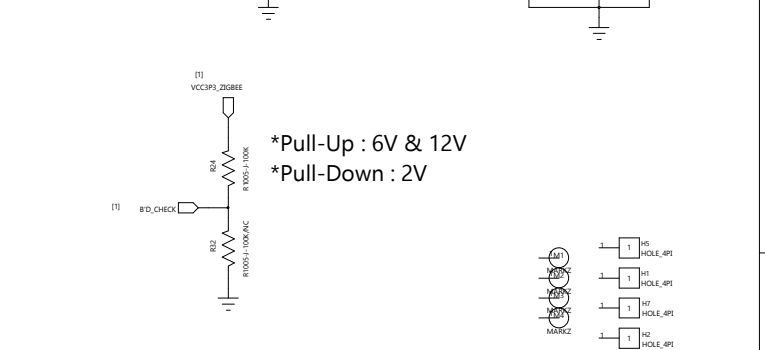
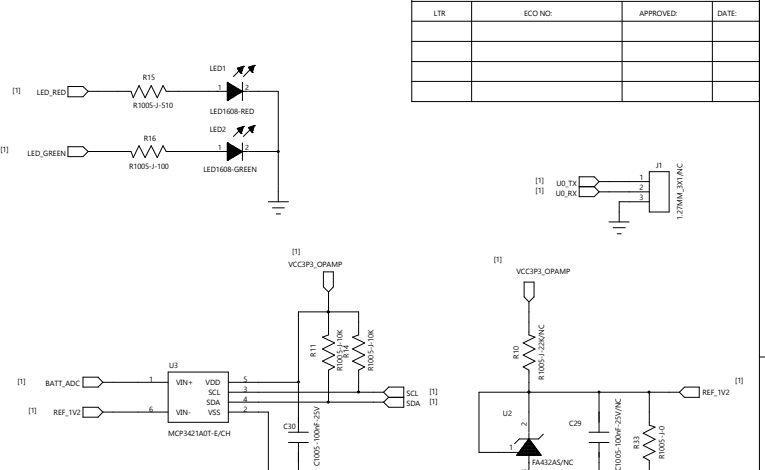
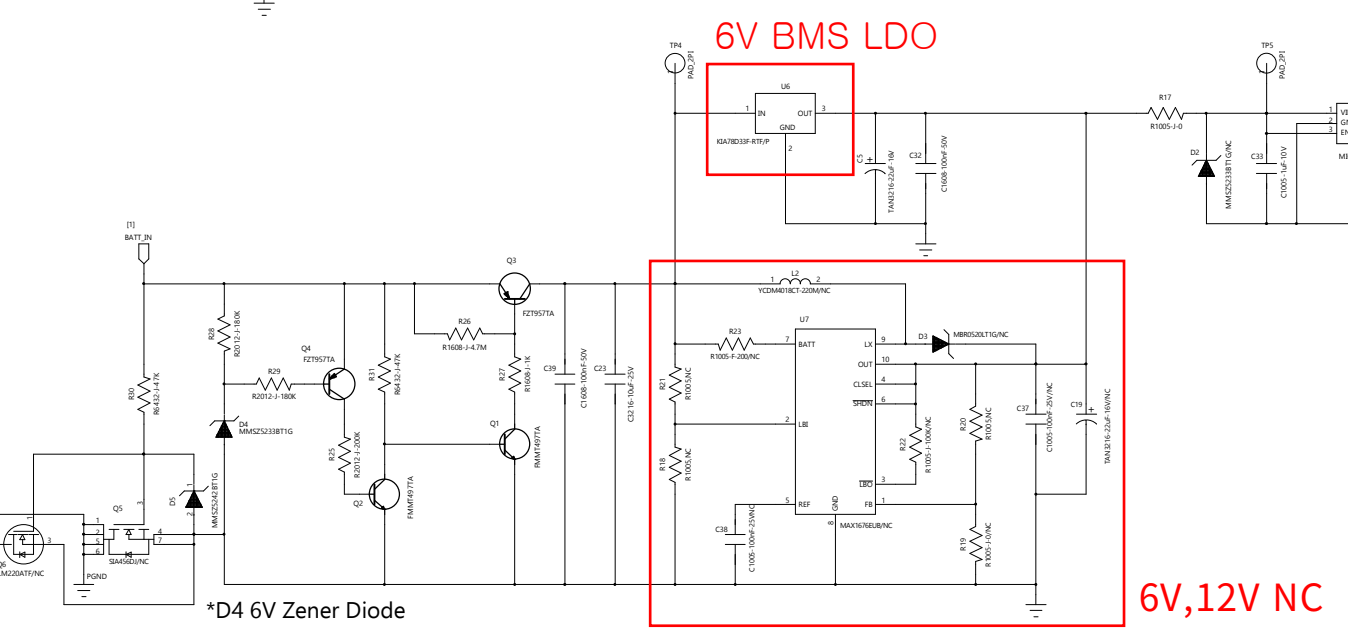
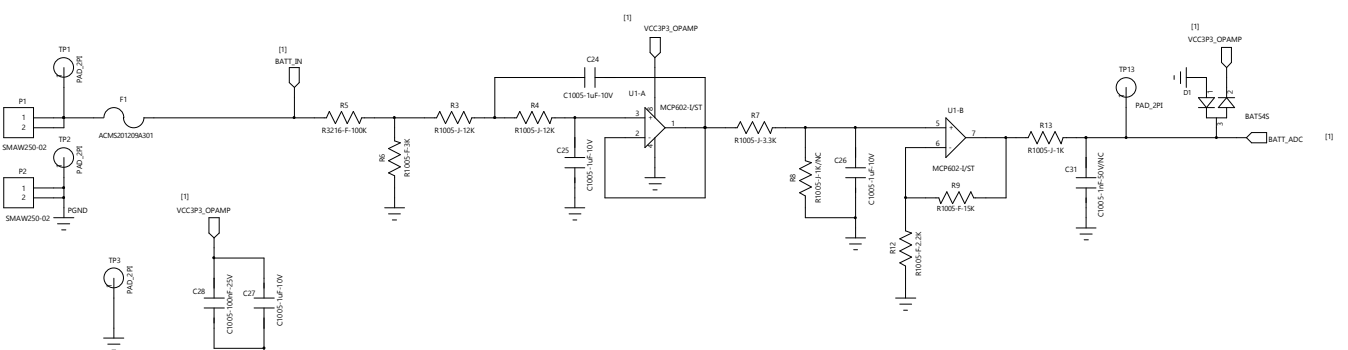
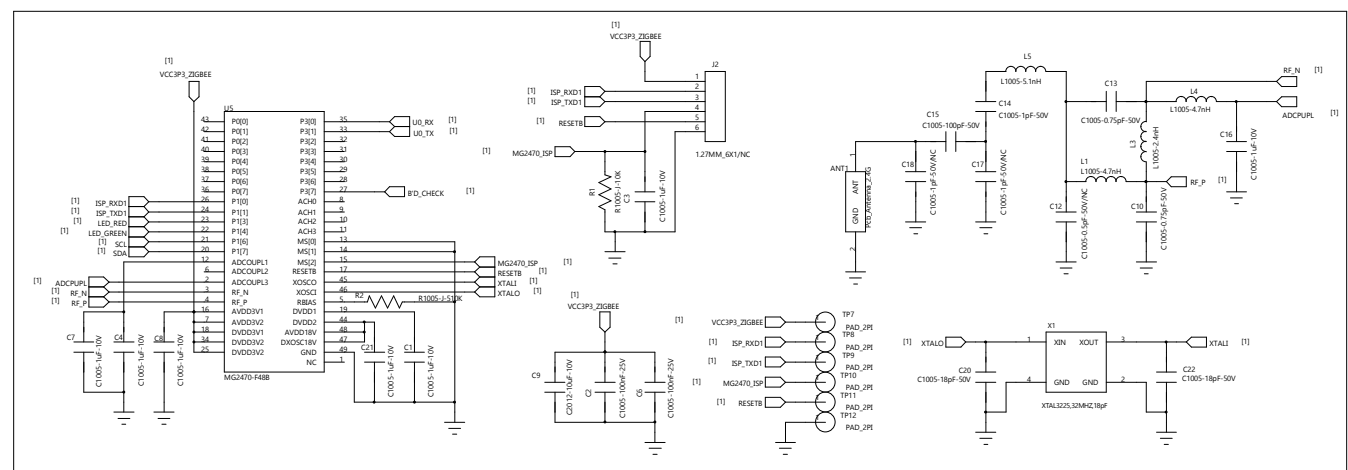
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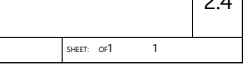
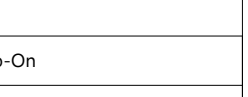
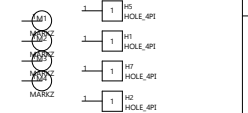
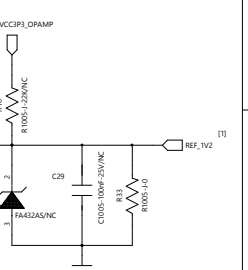
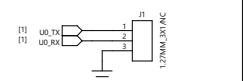
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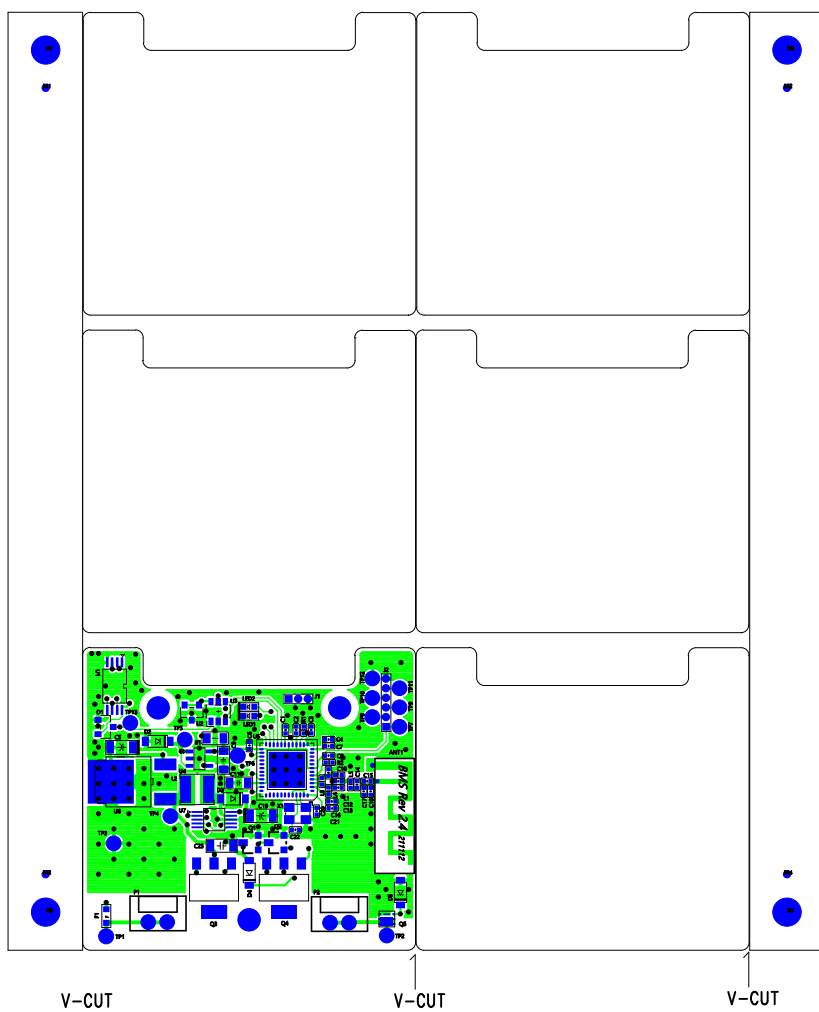
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LTR	ECO NO	APPROVED	DATE

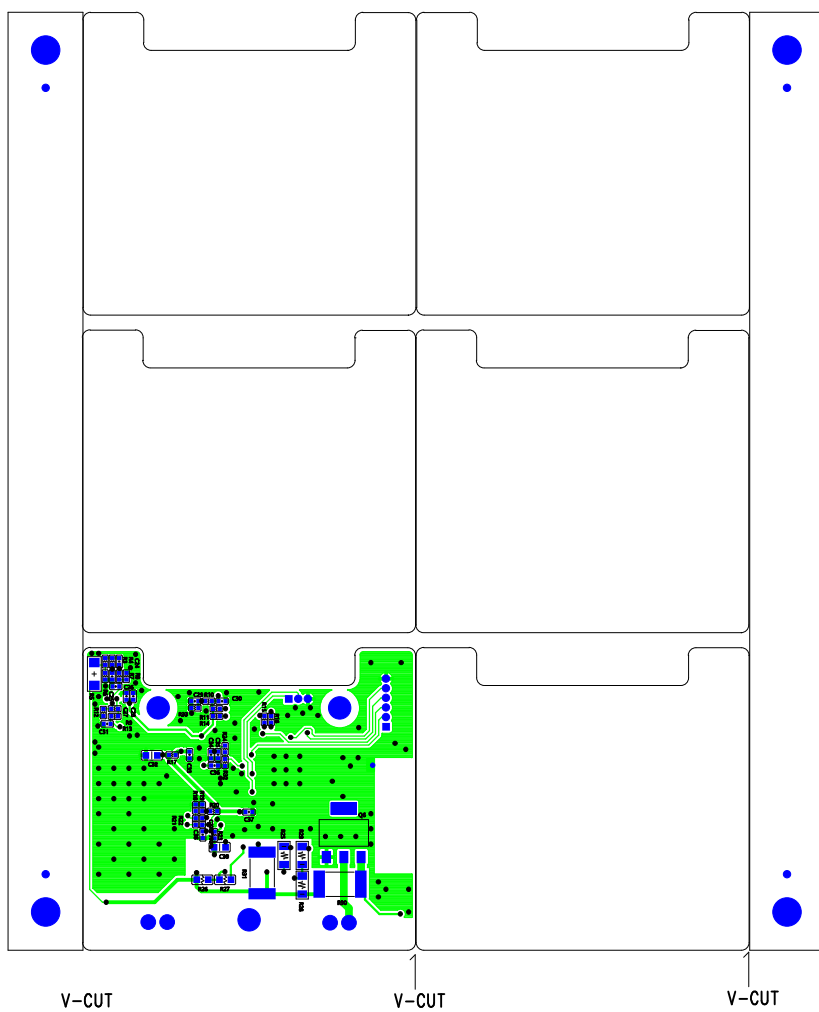


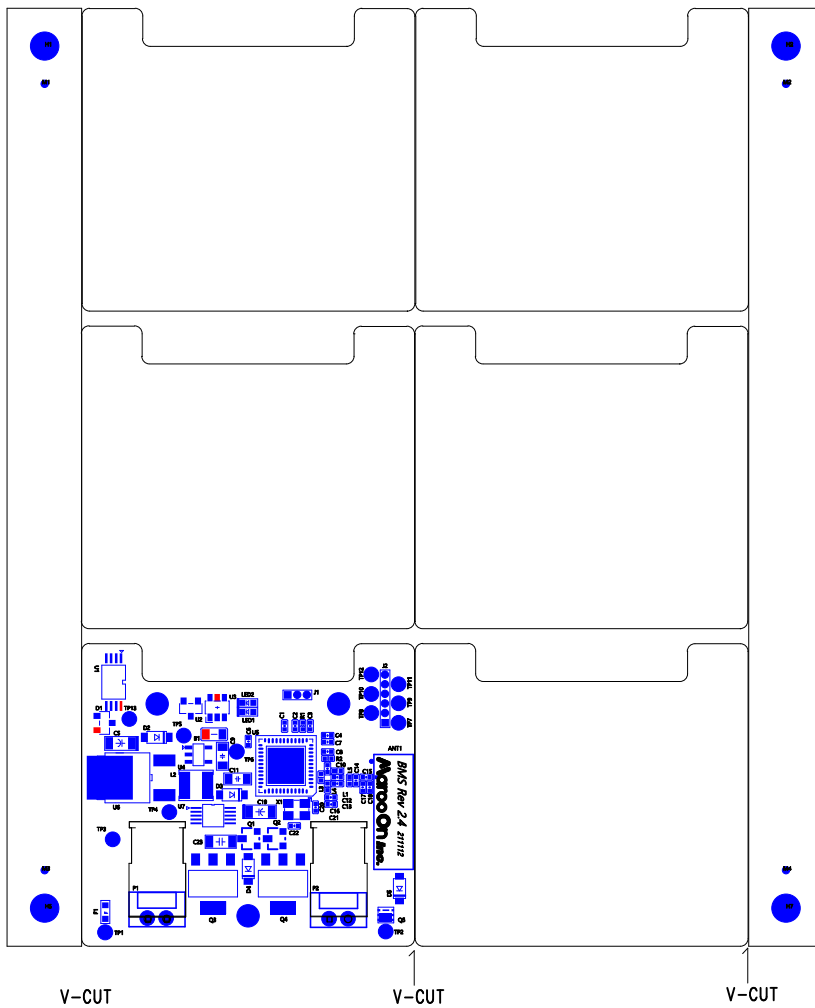
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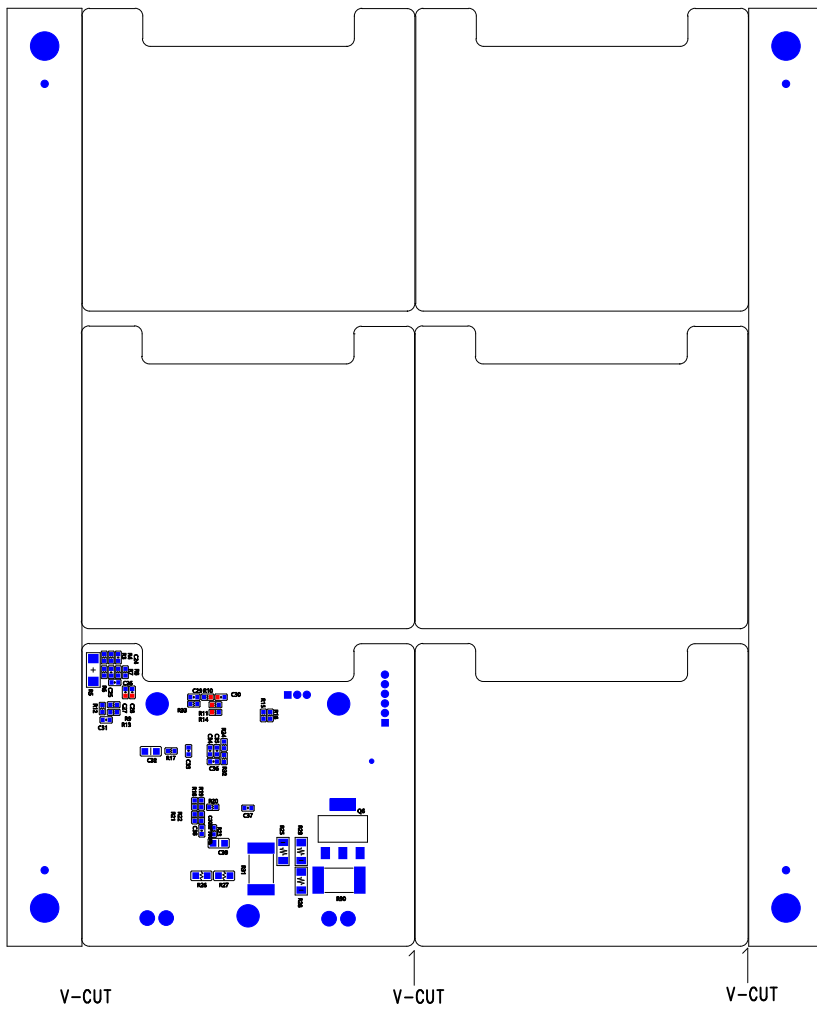
BOM (Bill Of Material)
6V_BMS Rev2.4

No.	Location	Description	Specification	Qty	Maker	Package	Remark
1	U1	MCP602-UT	OPAMP, Rail to Rail Output, 2Ch, TSSOP-8	1	MICROCHIP	TSSOP-8	
2	U3	MCP3421A0T-E/CH	ADC, 18Bit, 1Ch, I2C, SOT23-6	1	MICROCHIP	SOT23-6	
3	U4	MAX232ES-23YM5	LDIO, 3.3V, 150mA, SOT23-5	1	MICROCHIP	SOT23-5	
4	U5	MG2470-4488	MCU, R501, 256KB, QFN-48	1	RADIO PULSE	QFN-48	
5	U6	K8A78D33F-R17/P	LDO, 3.3V, 1A, DPAK	1	KEC	DPAK	
6	X1	XTAL3225,32MHz,18pf	Crystal, 3225, 32MHz, 18pf, SMD	1	YOKETAN	XTAL3225	
7	D1	BAT54S	Diode, Schottky, 30V, 200mA, SOT23-3	1	ONSEMI	SOT23-3	
8	D4	MM5Z5238BT1G	Diode, Zener, 5.1V, 500mW, SOD-123	1	ONSEMI	SOD-123	
9	D5	MM5Z5242BT1G	Diode, Zener, 12V, 500mW, SOD-123	1	ONSEMI	SOD-123	
10	F1	ACM5201209A3001	Resd, 2012, 300 Ohm, 3A, SMD	1	MAX ECHO	R2012	
11	LED1	LED1608-RED	LED, 1608, RED, SMD	1	Any	LED1608	
12	LED2	LED1608-GREEN	LED, 1608, GREEN, SMD	1	Any	LED1608	
13	P1 P2	SMAW250-Q2	Connector, 2.5mm Pitch, 4 Pin, Right Angle, DIP	2	YEONHO	DIP	
14	Q1 Q2	FMMT4971A	Transistor, NPN, 300V, 500mA, SOT23-3	2	DIODES	SOT23-3	
15	Q3 Q4	FZT931TA	Transistor, PNP, 300V, 1A, SOT223	2	DIODES	SOT223	
16	Q6	IRLM220ATF	FET, N-Ch, 200V, 1.13A, SOT223	1	ONSEMI	SOT223	
17	B1	BCMS201209A300	Bead, 2012, 30 Ohm, 6A, SMD	1	MAX ECHO	B2012	
18	R17 R33	R1005-J-0	Resistor, 1005, 0 Ohm, J, SMD	2	Any	R1005	
19	R16	R1005-J-100	Resistor, 1005, 100 Ohm, J, SMD	1	Any	R1005	
20	R15	R1005-J-510	Resistor, 1005, 510 Ohm, J, SMD	1	Any	R1005	
21	R13	R1005-J-1K	Resistor, 1005, 1K Ohm, J, SMD	1	Any	R1005	
22	R7	R1005-J-3.3K	Resistor, 1005, 3.3K Ohm, J, SMD	1	Any	R1005	
23	R1 R11 R14	R1005-J-10K	Resistor, 1005, 10K Ohm, J, SMD	3	Any	R1005	
24	R3 R4	R1005-J-12K	Resistor, 1005, 12K Ohm, J, SMD	2	Any	R1005	
25	R24	R1005-J-100K	Resistor, 1005, 100K Ohm, J, SMD	1	Any	R1005	
26	R2	R1005-J-510K	Resistor, 1005, 510K Ohm, J, SMD	1	Any	R1005	
27	R12	R1005-F-2.2K	Resistor, 1005, 2.2K Ohm, F, SMD	1	Any	R1005	
28	R6	R1005-F-3K	Resistor, 1005, 3K Ohm, F, SMD	1	Any	R1005	
29	R9	R1005-F-15K	Resistor, 1005, 15K Ohm, F, SMD	1	Any	R1005	
30	R27	R1608-J-1K	Resistor, 1608, 1K Ohm, J, SMD	1	Any	R1608	
31	R26	R1608-J-4.7M	Resistor, 1608, 4.7M Ohm, J, SMD	1	Any	R1608	
32	R28 R29	R2012-J-180K	Resistor, 2012, 180K Ohm, J, SMD	2	Any	R2012	
33	R25	R2012-J-200K	Resistor, 2012, 200K Ohm, J, SMD	1	Any	R2012	
34	R5	R3216-F-100K	Resistor, 3216, 100K Ohm, F, SMD	1	Any	R3216	
35	R30 R31	R6432-J-47K	Resistor, 6432, 47K Ohm, J, SMD	2	Any	R6432	
36	L3	L1005-2.4mH	Inductor, 1005, 2.4mH, SMD	1	Any	L1005	
37	L1 L4	L1005-4.7mH	Inductor, 1005, 4.7mH, SMD	2	Any	L1005	
38	L5	L1005-5.1mH	Inductor, 1005, 5.1mH, SMD	1	Any	L1005	
39	C10 C13	C1005-0.75pf-50V	Ceramic Capacitor, 1005, 0.75pf, 50V, SMD	2	Any	C1005	
40	C14	C1005-1pf-50V	Ceramic Capacitor, 1005, 1pf, 50V, SMD	1	Any	C1005	
41	C20 C22	C1005-10pf-50V	Ceramic Capacitor, 1005, 10pf, 50V, SMD	2	Any	C1005	
42	C15	C1005-100pf-50V	Ceramic Capacitor, 1005, 100pf, 50V, SMD	1	Any	C1005	
43	C36	C1005-470pf-50V	Ceramic Capacitor, 1005, 470pf, 50V, SMD	1	Any	C1005	
44	C34	C1005-1nf-50V	Ceramic Capacitor, 1005, 1nf, 50V, SMD	1	Any	C1005	
45	C2 C6 C28 C30 C35	C1005-100nf-25V	Ceramic Capacitor, 1005, 100nf, 50V, SMD	5	Any	C1005	
46	C1 C3 C4 C7 C8 C16 C21 C24 C25 C27 C33	C1005-1uf-10V	Ceramic Capacitor, 1005, 1uf, 10V, SMD	12	Any	C1005	
47	C32 C39	C1608-100nf-50V	Ceramic Capacitor, 1608, 100nf, 50V, SMD	2	Any	C1608	
48	C9 C11	C2012-10uf-10V	Ceramic Capacitor, 2012, 10uf, 10V, SMD	2	Any	C2012	
49	C23	C3216-10uf-25V	Ceramic Capacitor, 3216, 10uf, 25V, SMD	1	Any	C3216	
50	C5	TAN3216-22uf-16V	Tantal Capacitor, 3216, 22uf, 16V, SMD	1	Any	TAN3216	
	U2	FA432AS/NC		1			
	U7	MAX486/NC		1			
	D2	MM5Z5238BT1G/NC		1			
	D3	MBR0520LT1G/NC		1			
	Q5	SI4456DI		1			
	J1	1.27MM_3X1/NC		1			
	J2	1.27MM_6X1/NC		1			
	R19	R1005-J-0/NC		1			
	R8	R1005-J-1K/NC		1			
	R10	R1005-J-22K/NC		1			
	R22 R32	R1005-J-100K/NC		2			
	R23	R1005-F-200/NC		1			
	L2	YCDM4018CT-220M/NC		1			
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	C17 C18	C1005-1pf-50V/NC		2			
	C31	C1005-1nf-50V/NC		1			
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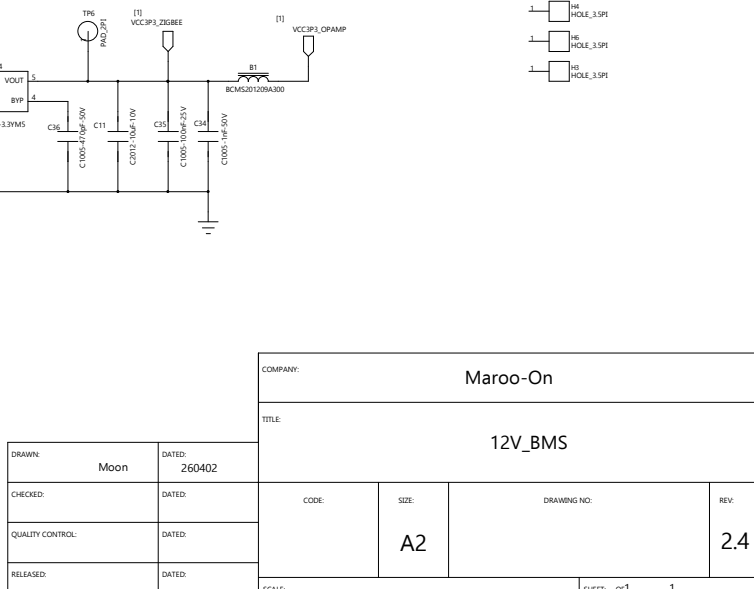
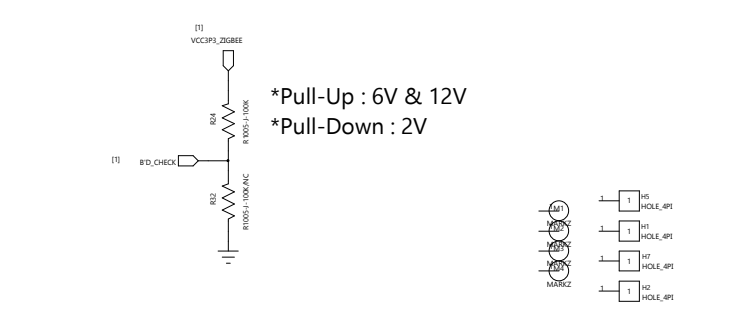
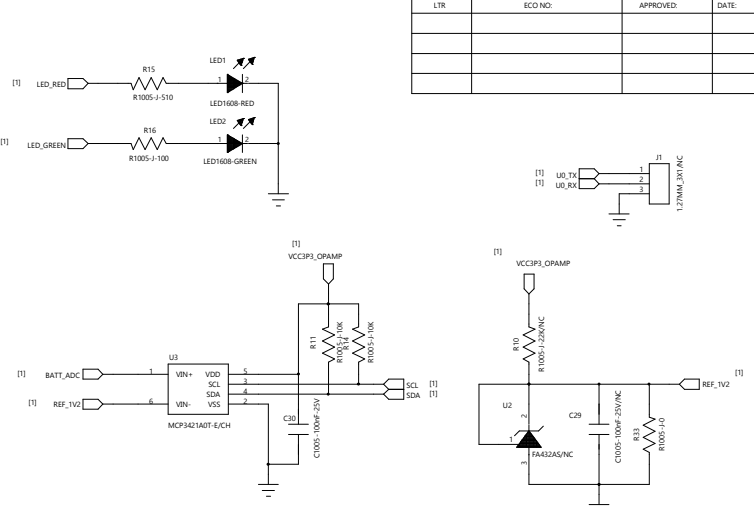
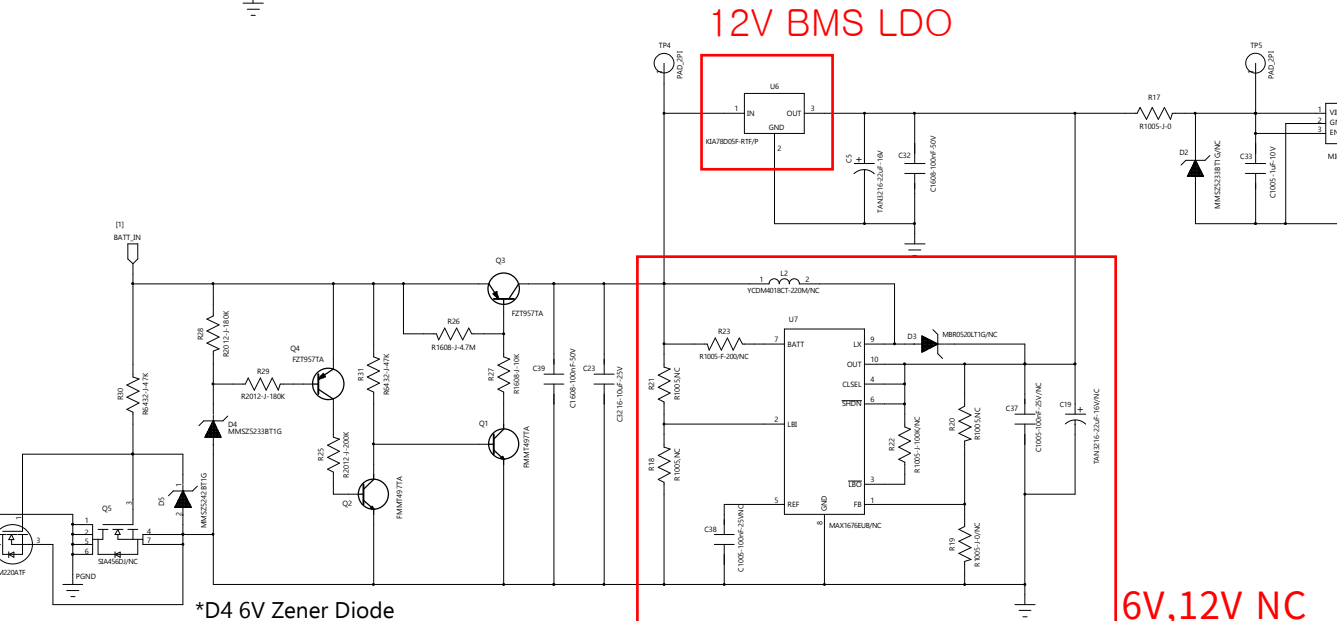
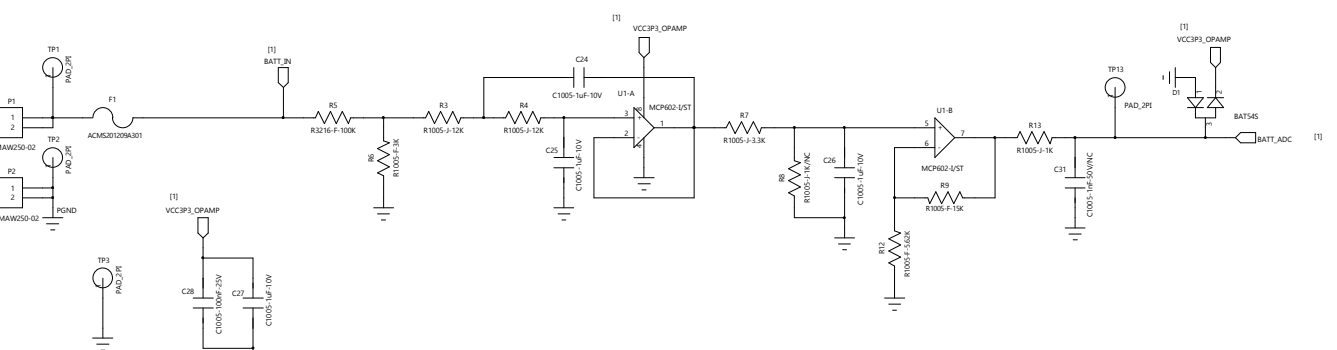
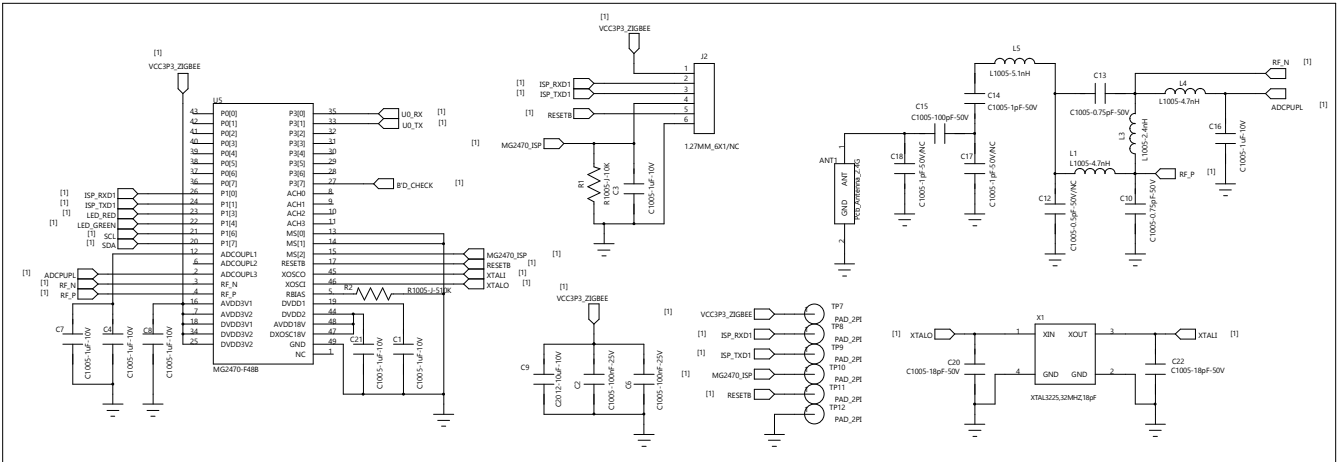
B1-212

D

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B

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REVISION RECORD			
LTR	ECO NO	APPROVED	DATE

*Pull-Up : 6V & 12V
*Pull-Down : 2V

*D4 6V Zener Diode

6V,12V NC

COMPANY:		Maroo-On	
TITLE:		12V_BMS	
CODE:	SIZE:	DRAWING NO:	REV:
	A2		2.4
SCALE:		SHEET: 01	1

BOM (Bill Of Material)
12V_BMS Rev2.4

No.	Location	Part Number	Specification	Qty	Maker	Package	Remark
1	U1	MCP602-UT	OPAMP, Rail to Rail Output, 2Ch, TSSOP-8	1	MICROCHIP	TSSOP-8	
2	U3	MCP3421A0T-E/CH	ADC, 18Bit, 1Ch, I2C, SOT23-6	1	MICROCHIP	SOT23-6	
3	U4	MAX232ES-23YM5	LDO, 3.3V, 150mA, SOT23-5	1	MICROCHIP	SOT23-5	
4	U5	MG2470-4488	MCU, RS51, 256KB, QFN-48	1	RADIO PULSE	QFN-48	
5	U6	K8A78D05F-R17/P	LDO, 5V, 1A, DPAK	1	KEC	DPAK	
6	X1	XTAL3225,32MHz,18pf	Crystal, 3225, 32MHz, 18pf, SMD	1	YOKETAN	XTAL3225	
7	D1	BAT54S	Diode, Schottky, 30V, 200mA, SOT23-3	1	ONSEMI	SOT23-3	
8	D4	MM5Z5208BT1G	Diode, Zener, 20V, 500mW, SOD-123	1	ONSEMI	SOD-123	
9	D5	MM5Z5242BT1G	Diode, Zener, 12V, 500mW, SOD-123	1	ONSEMI	SOD-123	
10	F1	ACM201209A301	Bead, 2012, 300 Ohm, 3A, SMD	1	MAX ECHO	B2012	
11	LED1	LED1608-RED	LED, 1608, RED, SMD	1	Any	LED1608	
12	LED2	LED1608-GREEN	LED, 1608, GREEN, SMD	1	Any	LED1608	
13	P1 P2	SMAW250-Q2	Connector, 2.5mm Pitch, 4 Pin, Right Angle, DIP	2	YEONHO	DIP	
14	Q1 Q2	FMMT4971A	Transistor, NPN, 300V, 500mA, SOT23-3	2	DIODES	SOT23-3	
15	Q3 Q4	T2793TA	Transistor, PNP, 300V, 1A, SOT223	2	DIODES	SOT223	
16	Q6	IRLM220ATF	FET, N-Ch, 200V, 1.13A, SOT223	1	ONSEMI	SOT223	
17	B1	BCMS201209A300	Bead, 2012, 30 Ohm, 6A, SMD	1	MAX ECHO	B2012	
18	R17 R33	R1005-J-0	Resistor, 1005, 0 Ohm, J, SMD	2	Any	R1005	
19	R16	R1005-J-100	Resistor, 1005, 100 Ohm, J, SMD	1	Any	R1005	
20	R15	R1005-J-510	Resistor, 1005, 510 Ohm, J, SMD	1	Any	R1005	
21	R13	R1005-J-1K	Resistor, 1005, 1K Ohm, J, SMD	1	Any	R1005	
22	R7	R1005-J-3.3K	Resistor, 1005, 3.3K Ohm, J, SMD	1	Any	R1005	
23	R1 R11 R14	R1005-J-10K	Resistor, 1005, 10K Ohm, J, SMD	3	Any	R1005	
24	R3 R4	R1005-J-12K	Resistor, 1005, 12K Ohm, J, SMD	2	Any	R1005	
25	R24	R1005-J-100K	Resistor, 1005, 100K Ohm, J, SMD	1	Any	R1005	
26	R2	R1005-J-510K	Resistor, 1005, 510K Ohm, J, SMD	1	Any	R1005	
27	R6	R1005-F-3K	Resistor, 1005, 3K Ohm, F, SMD	1	Any	R1005	
28	R12	R1005-F-5.62K	Resistor, 1005, 5.62K Ohm, F, SMD	1	Any	R1005	
29	R9	R1005-F-15K	Resistor, 1005, 15K Ohm, F, SMD	1	Any	R1005	
30	R27	R1608-J-10K	Resistor, 1608, 10K Ohm, J, SMD	1	Any	R1608	
31	R26	R1608-J-4.7M	Resistor, 1608, 4.7M Ohm, J, SMD	1	Any	R1608	
32	R28 R29	R2012-J-180K	Resistor, 2012, 180K Ohm, J, SMD	2	Any	R2012	
33	R25	R2012-J-200K	Resistor, 2012, 200K Ohm, J, SMD	1	Any	R2012	
34	R5	R3216-F-100K	Resistor, 3216, 100K Ohm, F, SMD	1	Any	R3216	
35	R30 R31	R6432-J-47K	Resistor, 6432, 47K Ohm, J, SMD	2	Any	R6432	
36	L3	L1005-2.4mH	Inductor, 1005, 2.4mH, SMD	1	Any	L1005	
37	L1 L4	L1005-4.7mH	Inductor, 1005, 4.7mH, SMD	2	Any	L1005	
38	L5	L1005-5.1mH	Inductor, 1005, 5.1mH, SMD	1	Any	L1005	
39	C10 C13	C1005-0.75pf-50V	Ceramic Capacitor, 1005, 0.75pf, 50V, SMD	2	Any	C1005	
40	C14	C1005-1pf-50V	Ceramic Capacitor, 1005, 1pf, 50V, SMD	1	Any	C1005	
41	C20 C22	C1005-10pf-50V	Ceramic Capacitor, 1005, 10pf, 50V, SMD	2	Any	C1005	
42	C15	C1005-100pf-50V	Ceramic Capacitor, 1005, 100pf, 50V, SMD	1	Any	C1005	
43	C36	C1005-470pf-50V	Ceramic Capacitor, 1005, 470pf, 50V, SMD	1	Any	C1005	
44	C34	C1005-1nf-50V	Ceramic Capacitor, 1005, 1nf, 50V, SMD	1	Any	C1005	
45	C2 C6 C28 C30 C35	C1005-100nf-25V	Ceramic Capacitor, 1005, 100nf, 50V, SMD	5	Any	C1005	
46	C1 C3 C4 C7 C8 C16 C21 C24 C25 C27 C33	C1005-1uf-10V	Ceramic Capacitor, 1005, 1uf, 10V, SMD	12	Any	C1005	
47	C32 C39	C1608-100nf-50V	Ceramic Capacitor, 1608, 100nf, 50V, SMD	2	Any	C1608	
48	C9 C11	C2012-10uf-10V	Ceramic Capacitor, 2012, 10uf, 10V, SMD	2	Any	C2012	
49	C23	C3216-10uf-25V	Ceramic Capacitor, 3216, 10uf, 25V, SMD	1	Any	C3216	
50	C5	TAN3216-22uf-16V	Tantal Capacitor, 3216, 22uf, 16V, SMD	1	Any	TAN3216	
	U2	FA432AS/NC		1			
	U7	MAX9676/NC		1			
	D2	MM5Z5238BT1G/NC		1			
	D3	MBR0520LT1G/NC		1			
	Q5	SI4456DI		1			
	J1	1.27MM_3X1/NC		1			
	J2	1.27MM_6X1/NC		1			
	R19	R1005-J-0/NC		1			
	R8	R1005-J-1K/NC		1			
	R10	R1005-J-22K/NC		1			
	R22 R32	R1005-J-100K/NC		2			
	R23	R1005-F-200/NC		1			
	L2	YCDM4018CT-220M/NC		1			
	C12	C1005-0.5pf-50V/NC		1			
	C17 C18	C1005-1pf-50V/NC		2			
	C31	C1005-1nf-50V/NC		1			
	C29 C37 C38	C1005-100nf-25V/NC		3			
	C19	TAN3216-22uf-16V/NC		1			

