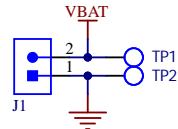


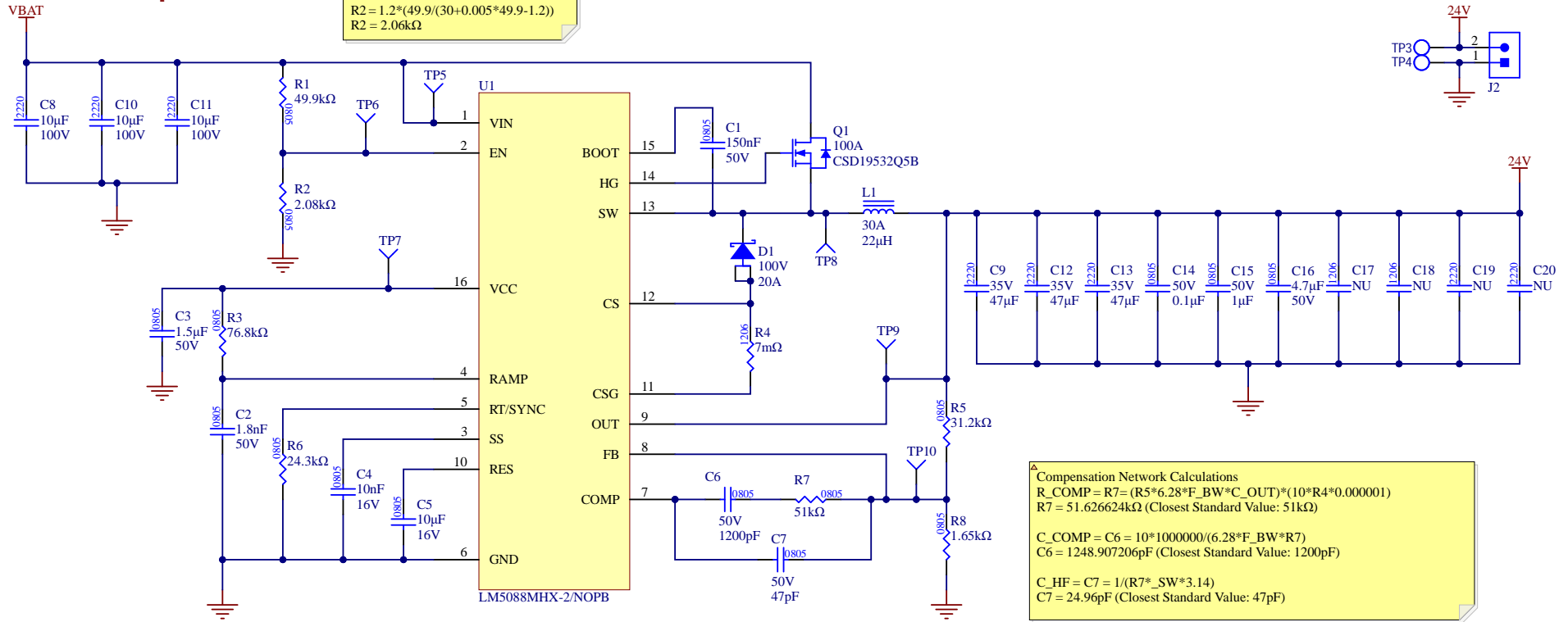
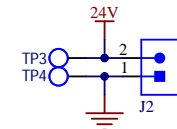
50V-24V Buck Converter @ 10A

Input Connector



UVLO Calculations
 $V_{MIN} = 30$
 $R1 = 49.9k\Omega$
 $R2 = 1.2 * (49.9 / (30 + 0.005 * 49.9 - 1.2))$
 $R2 = 2.06k\Omega$

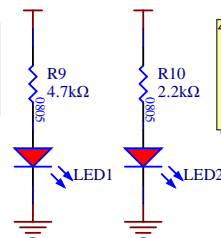
Output Connector



Compensation Network Calculations
 $R_{COMP} = R7 = (R5 * 6.28 * F_{BW} * C_{OUT}) * (10 * R4 * 0.000001)$
 $R7 = 51.626624k\Omega$ (Closest Standard Value: 51k Ω)
 $C_{COMP} = C6 = 10 * 1000000 / (6.28 * F_{BW} * R7)$
 $C6 = 1248.907206pF$ (Closest Standard Value: 1200pF)
 $C_{HF} = C7 = 1 / (R7 * S_{SW} * 3.14)$
 $C7 = 24.96pF$ (Closest Standard Value: 47pF)

Status LEDs

$R = V/I$
 $R = (50V) / (10mA)$
 $R = 5k\Omega$
 Closest standard value: 4.7k Ω



$R = V/I$
 $R = (24V) / (10mA)$
 $R = 2.4k\Omega$
 Closest standard value: 2.2k Ω

Mounting Holes

- MH1 ○ MH2
- MH3 ○ MH4

UW ROBOTICS TEAM University of Waterloo Robotics Team 200 University Ave W Waterloo, Ontario, Canada N2L 3G1		REV 1
PROJECT 30to50V-24V PDB.PrjPcb, [No Variations]		
DOCUMENT 30to50V-24V_10A.SchDoc		MODIFIED 2023-08-12
ENGINEER Muhammad Tanveer	REVIEWER Logan Hartford	SHEET 1 OF 1

Comment	Description	Designator	Footprint	LibRef	Quantity
CAP_150nF_50V_0805	CAP CER 0.15UF 50V X7R 0805	C1	CAP0805	CAP_150nF_50V_0805	1
CAP_1.8nF_50V_0805	CAP CER 1800PF 50V COG/NPO 0805	C2	CAP0805	CAP_1.8nF_50V_0805	1
CAP_1.5uF_50V_0805	CAP CER 1.5UF 50V X7R 0805	C3	CAP0805	CAP_1.5uF_50V_0805	1
CAP_10nF_16V_0805	CAP CER 10000PF 16V X7R 0805	C4	CAP2012	CAP_10nF_16V_0805	1
CAP_10uF_16V_0805	CAP CER 10UF 16V X5R 0805	C5	CAP0805	CAP_10uF_16V_0805	1
CAP_1200pF_50V_0805	CAP CER 1200PF 50V X7R 0805	C6	CAP0805	CAP_1200pF_50V_0805	1
CAP_47pF_50V_0805	CAP CER 47PF 50V COG/NPO 0805	C7	CAP0805	CAP_47pF_50V_0805	1
CAP_10uF_50V_2220	CAP CER 10UF 100V X7S 2220	C8, C10, C11	C5750X7S2A106M230 KB	CAP_10uF_50V_2220	3
CAP_47uF_35V_2220	CAP CER 47UF 35V X7R 2220	C9, C12, C13	CAP2220	CAP_47uF_35V_2220	3
CAP_0.1uF_50V_0805	CAP CER 0.1UF 50V X7R 0805	C14	CAP2012	CAP_0.1uF_50V_0805	1
CAP_1uF_50V_0805	CAP CER 1UF 50V X7R 0805	C15	CAP2012	CAP_1uF_50V_0805	1
CAP_4.7uF_50V_0805	CAP CER 4.7UF 50V X5R 0805	C16	CAP0805	CAP_4.7uF_50V_0805	1
CAP_NU_1206	PLACEHOLDER CAPACITOR	C17, C18	CAP1206	CAP_NU_1206	2
CAP_NU_2220	PLACEHOLDER CAPACITOR	C19, C20	CAP2220	CAP_NU_2220	2
DIO_SCHOTTKY_100V_20A	DIODE SCHOTTKY 100V 20A D2PAK	D1	D2PAK (TO-263AB) - STPS20M100SG-TR	DIO_SCHOTTKY_100V_20A	1
CON_2POS_SCREW_TERM	TERM BLK 2POS SIDE ENTRY 5MM	J1, J2	1935161	CON_2POS_SCREW_TERM	2
IND_22uH_30A	FIXED IND 22UH 30A 2.4 MOHM SMD	L1	7443642200	IND_22uH_30A	1
LED_RED	LED RED DIFFUSED 0805 SMD	LED1, LED2	LED_0805_RED	LED_RED	2
NMOS_100V_100A	MOSFET N-CH 100V 100A 8VSON	Q1	8-VSON	NMOS_100V_100A	1
RES_49.9kΩ_0805_1%	RES 49.9K OHM 1% 1/8W 0805	R1	RES0805	RES_49.9kΩ_0805_1%	1
RES_2.08kΩ_0805_0.05%	RES 2.08K OHM 0.05% 1/8W 0805	R2	RES0805	RES_2.08kΩ_0805_0.05%	1
RES_76.8kΩ_0805_1%	RES 76.8K OHM 1% 1/8W 0805	R3	RES0805	RES_76.8kΩ_0805_1%	1
RES_0.007Ω_1206_1%	RES 0.007 OHM 1% 1W 1206	R4	RES1206	RES_0.007Ω_1206_1%	1
RES_31.2KΩ_0805_0.1%	RES 31.2K OHM 0.1% 1/8W 0805	R5	RES0805	RES_31.2KΩ_0805_0.1%	1
RES_24.3kΩ_0805_1%	RES 24.3K OHM 1% 1/8W 0805	R6	RES0805	RES_24.3kΩ_0805_1%	1
RES_51kΩ_0805_5%	RES 51K OHM 1% 1/8W 0805	R7	RESC2012X60N	RES_51kΩ_0805_5%	1
RES_1.65KΩ_0805_0.1%	RES 1.65K OHM 0.1% 1/4W 0805	R8	RES0805	RES_1.65KΩ_0805_0.1%	1
RES_4.7kΩ_0805_5%	RES 4.7K OHM 5% 1/8W 0805	R9	RES0805	RES_4.7kΩ_0805_5%	1
RES_2.2kΩ_0805_5%	RES 2.2K OHM 5% 1/8W 0805	R10	RES0805	RES_2.2kΩ_0805_5%	1
TESTPOINT_LOOP	TESTPOINT THRUHOLE	TP1, TP2, TP3, TP4	TESTPOINT_LOOP	TESTPOINT_LOOP	4
LM5088	IC REG CTRLR BUCK 16HTSSOP	U1	LM5088	LM5088MHX-2/NOPB	1