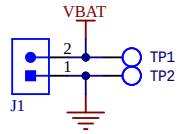
50V-24V Buck Converter @ 10A

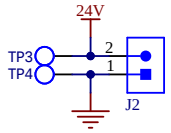
Input Connector



UVLO Calculations
V_MIN = 30
R1 = 49.9kΩ

R2 = 1.2*(49.9/(30+0.005*49.9-1.2))
R2 = 2.06kΩ

Output Connector



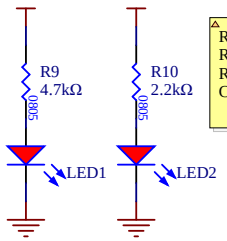
Compensation Network Calculations
R_COMP = R7= (R5*6.28*F_BW*C_OUT)*(10*R4*0.000001)
R7 = 51.626624kΩ (Closest Standard Value: 51kΩ)

C_COMP = C6 = 10*1000000/(6.28*F_BW*R7)
C6 = 1248.907206pF (Closest Standard Value: 1200pF)

C_HF = C7 = 1/(R7*_SW*3.14)
C7 = 24.96pF (Closest Standard Value: 47pF)

Status LEDs

R = V/I
R = (50V)/(10mA)
R = 5kΩ
Closest standard value: 4.7kΩ



R = V/I
R = (24)/(10mA)
R = 2.4kΩ
Closest standard value: 2.2kΩ

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: 2023-08-13
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 C0G/NP0 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	CAP0805	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 C0G/NPO 0805	C7	CAP0805	CAP_47pF_50V_0805	1
CAP_10uF_50V_2220	CAP CER 10UF 100V X7S 2220	C8, C10, C11	CAP2220	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	CAP0805	CAP_0.1uF_50V_0805	1
CAP_1uF_50V_0805	CAP CER 1UF 50V X7R 0805	C15	CAP0805	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	RES0805	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