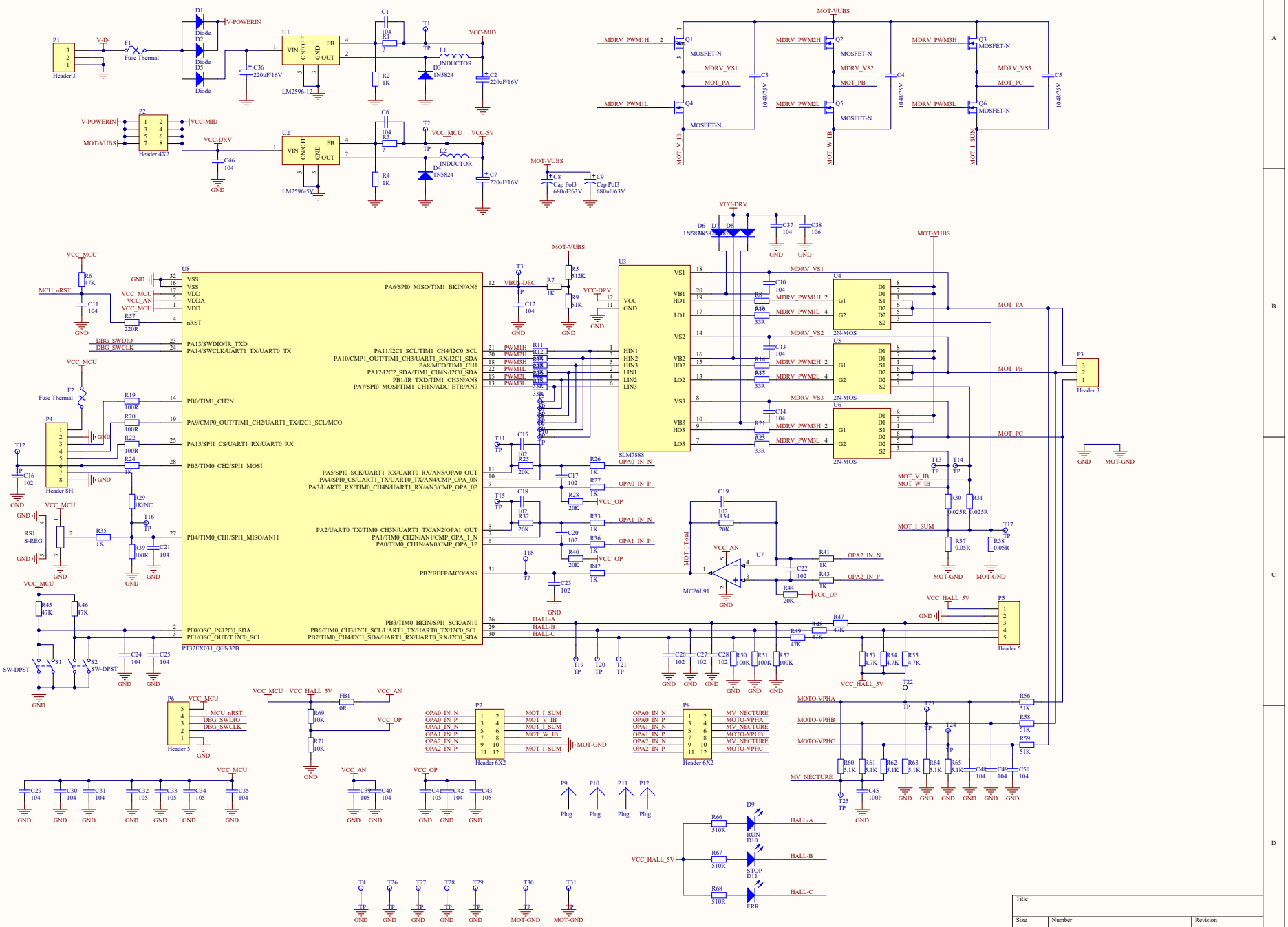
P1
V-IN
Header 3
F1
Fuse Thermal
D1
Diode
D2
Diode
D5
Diode
V-POWERIN
U1
LM2596-12
C1
104
R1
7
T1
TP
VCC-MID
L1
INDUCTOR
D3
1N5824
C2
220uF/16V
C36
220uF/16V
R2
1K
P2
Header 4X2
V-POWERIN
MOT-VUBS
VCC-MID
VCC-DRV
C46
104
GND
U2
LM2596-5V
C6
104
R3
7
T2
VCC_MCU
VCC_5V
L2
INDUCTOR
D4
1N5824
C7
220uF/16V
R4
1K
MOT-VUBS
C8
Cap Pol3
680uF/63V
C9
Cap Pol3
680uF/63V
MOT-VUBS
MDRV_PWM1H
MDRV_PWM1L
Q1
MOSFET-N
Q4
MOSFET-N
MDRV_VS1
MOT_PA
MOT_V_IB
C3
1040/75V
MDRV_PWM2H
MDRV_PWM2L
Q2
MOSFET-N
Q5
MOSFET-N
MDRV_VS2
MOT_PB
MOT_W_IB
C4
1040/75V
MDRV_PWM3H
MDRV_PWM3L
Q3
MOSFET-N
Q6
MOSFET-N
MDRV_VS3
MOT_PC
MOT_I_SUM
C5
1040/75V
VCC_DRV
D6
D7
D8
C37
104
C38
106
GND
MOT-VUBS
U8
PT32FX031_QFN32B
VCC_MCU
MCU_nRST
R6
47K
C11
104
R57
220R
VSS
VDD
VDDA
nRST
DBG_SWDIO
DBG_SWCLK
PA13/SWDIO/IR_TXD
PA14/SWCLK/UART1_TX/UART0_TX
PA6/SPI0_MISO/TIM1_BKIN/AN6
PA11/I2C1_SCL/TIM1_CH4/I2C0_SCL
PA10/CMP1_OUT/TIM1_CH3/UART1_RX/I2C1_SDA
PA8/MCO/TIM1_CH1
PA12/I2C2_SDA/TIM1_CH4N/I2C0_SDA
PB1/IR_TXD/TIM1_CH3N/AN8
PA7/SPI0_MOSI/TIM1_CH1N/ADC_ETR/AN7
PB0/TIM1_CH2N
PA9/CMP0_OUT/TIM1_CH2/UART1_TX/I2C1_SCL/MCO
PA15/SPI1_CS/UART1_RX/UART0_RX
PB5/TIM0_CH2/SPI1_MOSI
PA5/SPI0_SCK/UART1_RX/UART0_RX/AN5/OPA0_OUT
PA4/SPI0_CS/UART1_TX/UART0_TX/AN4/CMP_OPA_0N
PA3/UART0_RX/TIM0_CH4N/UART1_RX/AN3/CMP_OPA_0P
PA2/UART0_TX/TIM0_CH3N/UART1_TX/AN2/OPA1_OUT
PA1/TIM0_CH2N/AN1/CMP_OPA_1_N
PA0/TIM0_CH1N/AN0/CMP_OPA_1P
PB2/BEEP/MCO/AN9
PB3/TIM0_BKIN/SPI1_SCK/AN10
PB6/TIM0_CH3/I2C1_SCL/UART1_TX/UART0_TX/I2C0_SCL
PB7/TIM0_CH4/I2C1_SDA/UART1_RX/UART0_RX/I2C0_SDA
PF0/OSC_IN/I2C0_SDA
PF1/OSC_OUT/T I2C0_SCL
VBUS_DEC
R7
1K
R5
512K
R9
51K
C12
104
VCC_DRV
U3
SLM7888
VCC
GND
VS1
VB1
HO1
LO1
VS2
VB2
HO2
LO2
VS3
VB3
HO3
LO3
HIN1
HIN2
HIN3
LIN1
LIN2
LIN3
PWM1H
PWM2H
PWM3H
PWM1L
PWM2L
PWM3L
R11
R12
R13
R15
R16
R17
R18
33R
C10
104
C13
104
C14
104
R8
R14
R51
MDRV_PWM1H_2
MDRV_PWM1L_4
MDRV_PWM2H_2
MDRV_PWM2L_4
MDRV_PWM3H_2
MDRV_PWM3L_4
U4
U5
U6
2N-MOS
G1
G2
D1
D2
S1
S2
MOT_PA
MOT_PB
MOT_PC
P3
Header 3
GND
MOT-GND
MOT_V_IB
MOT_W_IB
MOT_I_SUM
R30
0.025R
R31
0.025R
R37
0.05R
R38
0.05R
T13
T14
T17
TP
F2
Fuse Thermal
P4
Header 8H
R19
100R
R20
100R
R22
100R
R24
1K
R29
1K/NC
R35
1K
R39
100K
C21
104
T16
RS1
S-REG
C15
102
R25
20K
R26
1K
R27
1K
R28
20K
R32
20K
R33
1K
R36
1K
R40
20K
R42
1K
C17
102
C18
102
C20
102
C23
102
T11
T15
T18
OPA0_IN_N
OPA0_IN_P
OPA1_IN_N
OPA1_IN_P
VCC_OP
C19
102
R34
20K
MOT-I-Total
VCC_AN
U7
MCP6L91
R41
1K
R43
1K
R44
20K
C22
102
OPA2_IN_N
OPA2_IN_P
VCC_HALL_5V
P5
Header 5
R45
47K
R46
47K
R47
47K
R48
47K
R49
47K
SW-DPST
S1
S2
C24
104
C25
104
HALL-A
HALL-B
HALL-C
T19
T20
T21
TP
C26
102
C27
102
C28
102
R50
100K
R51
100K
R52
100K
R53
4.7K
R54
4.7K
R55
4.7K
T22
T23
T24
T25
MOTO-VPHA
MOTO-VPHB
MOTO-VPHC
MV_NECTURE
R56
51K
R58
51K
R59
51K
R60
5.1K
R61
5.1K
R62
5.1K
R63
5.1K
R64
5.1K
R65
5.1K
C48
104
C49
104
C50
104
C45
100P
P6
Header 5
MCU_nRST
DBG_SWDIO
DBG_SWCLK
VCC_HALL_5V
FB1
0R
VCC_AN
R69
10K
R71
10K
VCC_OP
P7
Header 6X2
OPA0_IN_N
OPA0_IN_P
OPA1_IN_N
OPA1_IN_P
OPA2_IN_N
OPA2_IN_P
MOT_I_SUM
MOT_V_IB
MOT_W_IB
MOT-GND
P8
Header 6X2
MV_NECTURE
MOTO-VPHA
MOTO-VPHB
MOTO-VPHC
P9
P10
P11
P12
Plug
C29
104
C30
104
C31
104
C32
105
C33
105
C34
105
C35
104
C39
105
C40
104
C41
105
C42
104
C43
105
D9
RUN
D10
STOP
D11
ERR
R66
510R
R67
510R
R68
510R
T4
T26
T27
T28
T29
T30
T31
MOT-GND
Title
Size
C
Number
Revision
Date:
2021/3/17
Sheet of
File:
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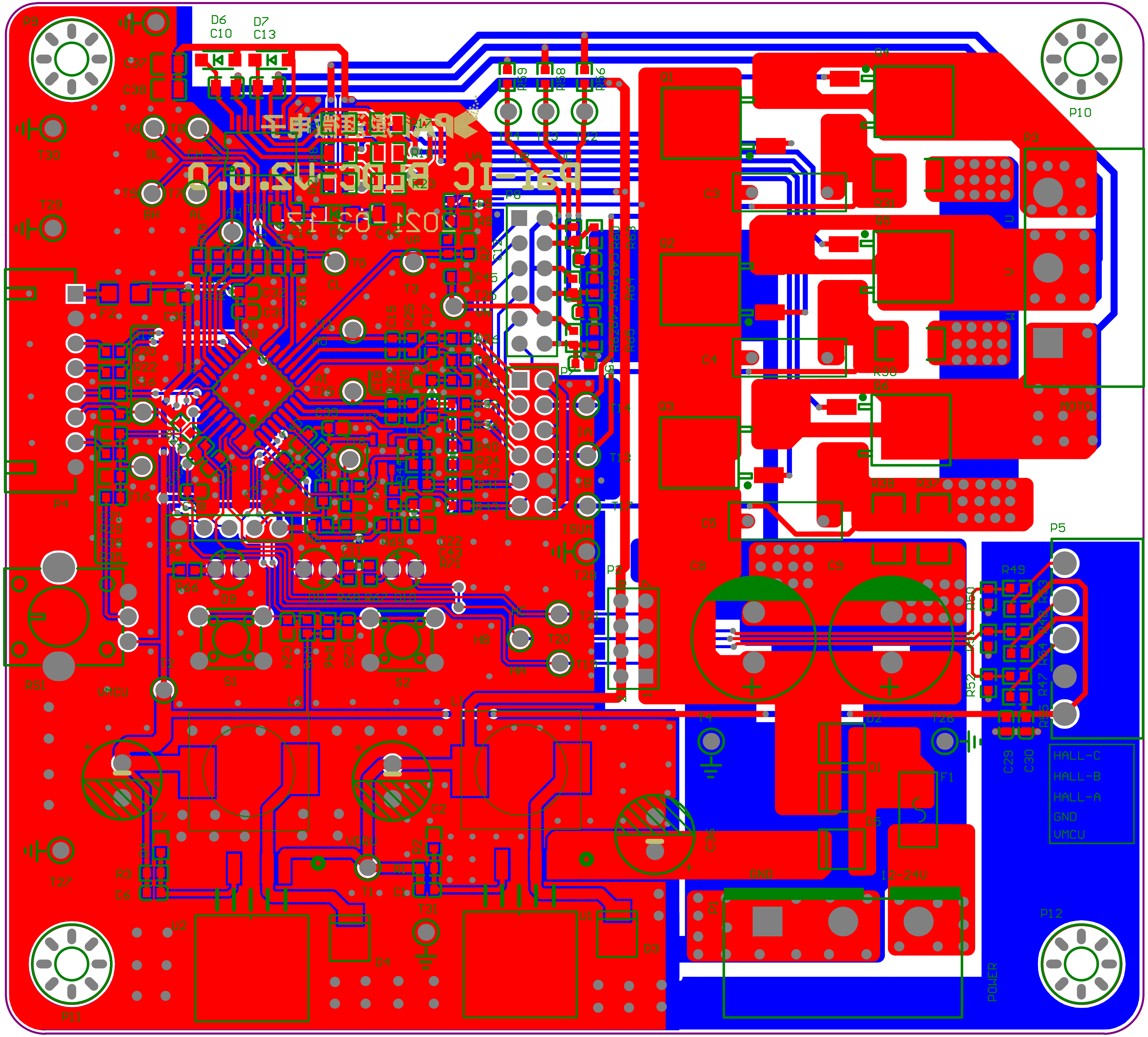
Drawn By:


Pai-IC BLDC-V2.0.0
2021-03-14
MOTO
U
V
W
HALL-C
HALL-B
HALL-A
GND
VMCU
12-24V
GND
POWER
ISUM
VMCU
VDRV
P1
P2
P3
P4
P5
P6
P7
P8
P9
P10
P11
P12
Q1
Q2
Q3
Q4
Q5
Q6
U1
U2
U7
U8
S1
S2
RS1
F1
F2
L1
L2

Comment	Description	Designator	Footprint	LibRef	Quantity
104	Capacitor	C1, C6, C11, C12, C21, C24, C25, C29, C30, C31, C35, C40, C42, C48, C49, C50	C0603	Cap	16
220uF/ 16V	Electrolytic Capacitor	C2, C7, C36	RB-8.0MM	ELECTRO1	3
104J/ 75V	Capacitor	C3, C4, C5	RAD-0.3	Cap	3
Cap Pol3	Polarized Capacitor (Surface Mount)	C8, C9	CBD12P05	Cap Pol3	2
104	Capacitor	C10, C13, C14, C37, C46	C0805	Cap	5
102	Capacitor	C15, C16, C17, C18, C19, C20, C22, C23, C26, C27, C28	C0603	Cap	11
105	Capacitor	C32, C33, C34, C39, C41, C43	C0603	Cap	6
106	Capacitor	C38	C0805	Cap	1
100P	Capacitor	C45	C0603	Cap	1
Diode	Default Diode	D1, D2, D5	DO-214AA	Diode	3
1N5824	Diode	D3, D4	DO-214AA	DIODE	2
1N5824	Diode	D6, D7, D8	SOD-123	DIODE	3
RUN	Typical INFRARED GaAs LED	D9	LED_D3mm	LED0	1
STOP	Typical INFRARED GaAs LED	D10	LED_D3mm	LED0	1
ERR	Typical INFRARED GaAs LED	D11	LED_D3mm	LED0	1
Fuse Thermal	Thermal Fuse	F1	F-6.9X3.2-8A125V	Fuse Thermal	1
Fuse Thermal	Thermal Fuse	F2	R1206	Fuse Thermal	1
0R	Resistor	FB1	R0603	Res2	1
INDUCTOR		L1, L2	L12x12	INDUCTOR	2
Header 3	Header, 3-Pin	P1, P3	KF7.62-3P	Header 3	2
Header 4X2	Header, 4-Pin, Dual row	P2	HDR2X4	Header 4X2	1
Header 8H	Header, 8-Pin, Right Angle	P4	J2.54-8	Header 8H	1
Header 5	Header, 5-Pin	P5	P3.81-5	Header 5	1
Header 5	Header, 5-Pin	P6	J2.54-5B	Header 5	1
Header 6X2	Header, 6-Pin, Dual row	P7, P8	J2.54-2X6	Header 6X2	2
Plug	Plug	P9, P10, P11, P12	VIA_3.5	Plug	4
MOSFET-N	N-Channel MOSFET	Q1, Q2, Q3, Q4, Q5, Q6	TO252-3	MOSFET-N	6
?	Resistor	R1, R3	R0603	Res2	2
1K	Resistor	R2, R4, R7, R24, R26, R27, R33, R35, R36, R41, R42, R43	R0603	Res2	12
512K	Resistor	R5	R0603	Res2	1
47K	Resistor	R6, R45, R46, R47, R48, R49	R0603	Res2	6
33R	Resistor	R8, R10, R14, R17, R21, R23	R0805	Res2	6
51K	Resistor	R9, R56, R58, R59	R0603	Res2	4
33R	Resistor	R11, R12, R13, R15, R16, R18	R0603	Res2	6
100R	Resistor	R19, R20, R22	R0603	Res2	3
20K	Resistor	R25, R28, R32, R34, R40, R44	R0603	Res2	6
1K/ NC	Resistor	R29	R0603	Res2	1
0.025R	Resistor	R30, R31	R2010	Res2	2
0.05R	Resistor	R37, R38	R2010	Res2	2
100K	Resistor	R39, R50, R51, R52	R0603	Res2	4
4.7K	Resistor	R53, R54, R55	R0603	Res2	3
220R	Resistor	R57	R0603	Res2	1
5.1K	Resistor	R60, R61, R62, R63, R64, R65	R0603	Res2	6
510R	Resistor	R66, R67, R68	R0603	Res2	3
10K	Resistor	R69, R71	R0603	Res2	2
S-REG		RS1	TH_RK09K1130A5R	S-REG	1
SW-DPST	Double-Pole, Single-Throw Switch	S1, S2	SW6X6	SW-DPST	2
TP		T1, T2, T3, T4, T5, T6, T7, T8, T9, T10, T11, T12, T13, T14, T15, T16, T17, T18, T19, T20, T21, T22, T23, T24, T25, T26, T27, T28, T29, T30, T31	TP	TP	31
LM2596-12	U?	U1	TO-263-5	LM2596	1
LM2596-5V	U?	U2	TO-263-5	LM2596	1
SLM7888		U3	TSSOP20	SLM7888	1
2N-MOS		U4, U5, U6	SOP-8	2N-MOS	3
MCP6L91		U7		MCP6L91	1
PT32FX031_QFN32		U8		PT32FX031_QFN32	1