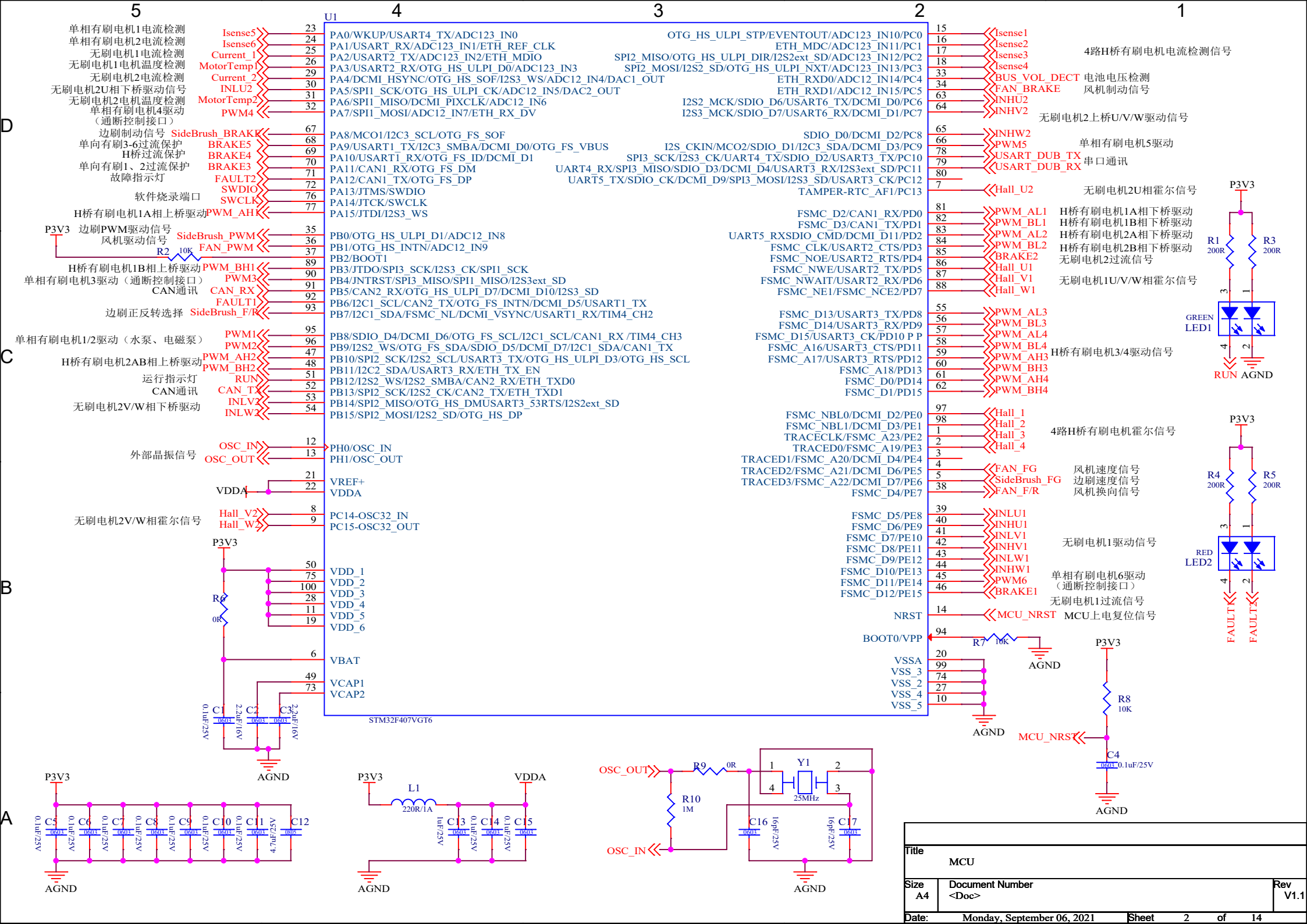
H4AA30-C2

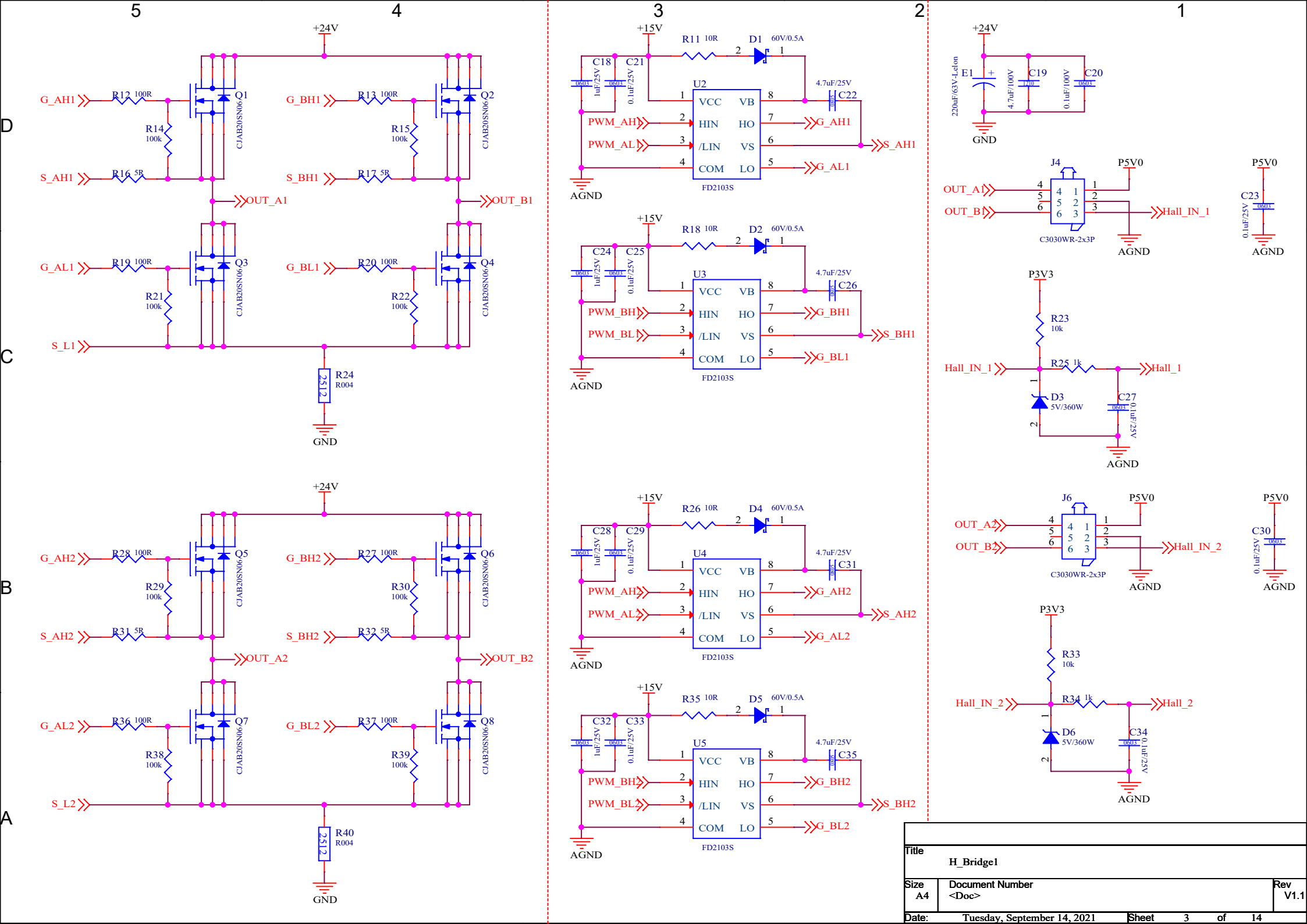
Author: ZhiYong Song

Version: V1.1

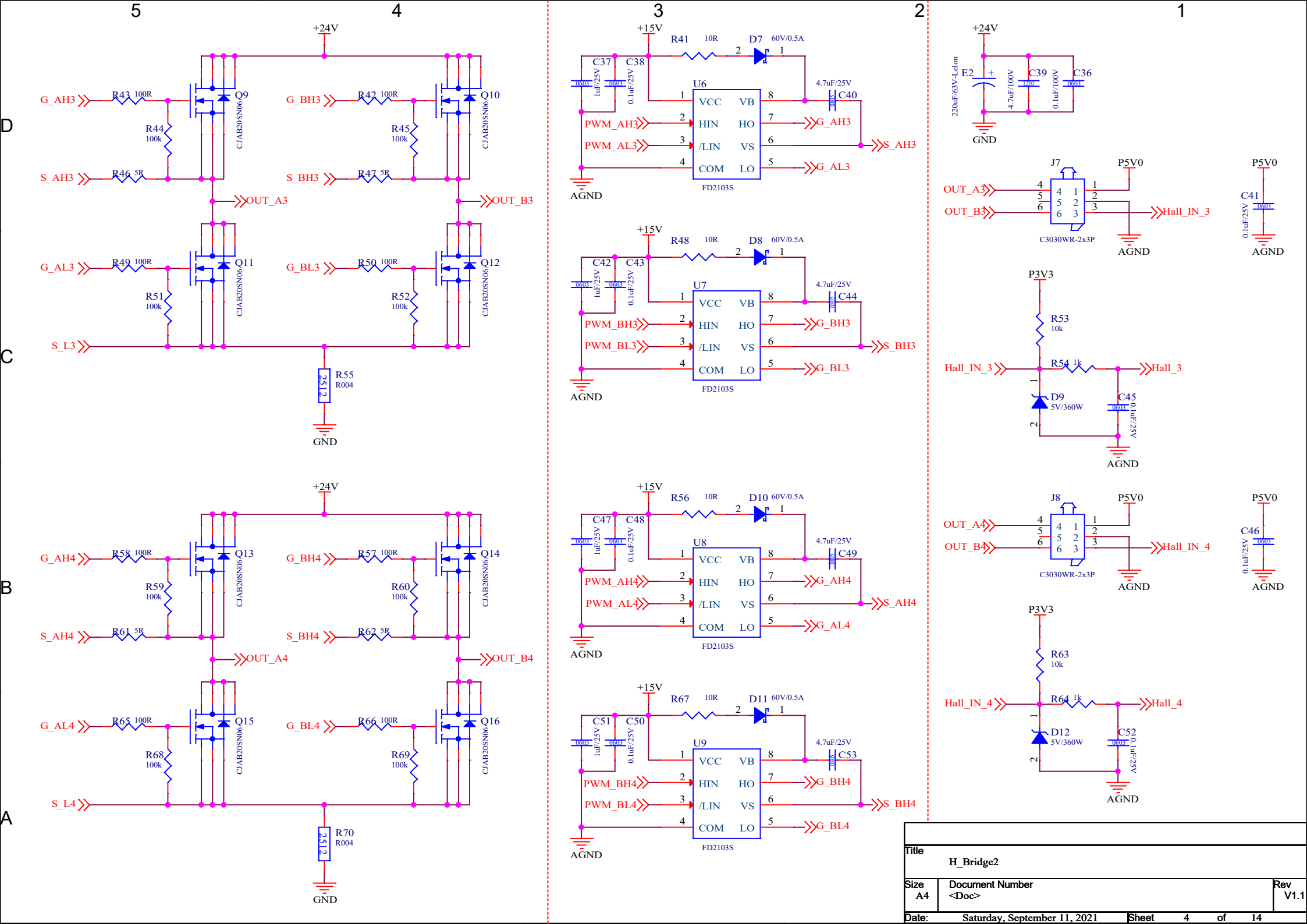
1	为了增加LED亮度，将限流电阻R1、R3、R4、R5由"1k/0603"变更为"200R/0805"
2	门极驱动下拉电阻R14、R15、R21、R22、R29、R30、R38、R39、R44、R45、R51、R52、R59、R60、R68、R69、R75、R76、R77、R85、R86、R87、R102、R103、R104、R112、R113、R114、R131、R132、R145、R146、R149、R150由"10k/0603"变更为"100k/0603"
3	CAN通讯终端电阻R165、R166属性设置为"NO USED"，终端电阻外置
4	15V、5VBUCK电源输出电感L3、L4"22uH/0.52A"(SWPA3015S220MT)变更为"22uH/1.1A"(SWPA5020S220MT)
5	无刷电机霍尔反馈信号滤波电容C67、C68、C69、C83、C84、C85由"10nF/25V/0603"变更为"0.1uF/25V/0603"
6	输入滤波电解电容E1、E2、E3、E4、E5、E6"100uF/63V"，变更为E1、E2、E3、E4、E5"220uF/63V"，删掉E6
7	H桥有刷驱动电流采样电阻R24、R40、R55、R70由"10mΩ/1206/1W/1%"变更为"4mΩ/2512/3W/1%"
8	无刷驱动电流采样电阻R88、R115由"4mΩ/1206/1W/1%"变更为"2mΩ/2512/3W/1%"
9	单向有刷驱动功率端子J9、J10"KF2EDGR-5.08-4P"，J11"KF2EDGR-3.81-4P"变更为J9"KF2EDGRM-3.81-4P"，J10、J11合并为J10"KF2EDGRM-3.81-8P"
10	无刷驱动功率端子J6、J8由"KF2EDGR-3.81-3P"变更为"KF2EDGRM-5.08-3P"
11	24V输入端子J17由"KF2EDGSR-7.62-2P"变更为"XT60PW-F"
12	风机、边刷信号端子J12、J13增加24V/GND
13	单向有刷驱动电流检测电阻R135、R136由"5mΩ/1206/1W/1%"变更为"3mΩ/2512/3W/1%"
14	单向有刷驱动保险FS1、FS2、FS3、FS4由"8A/24V"变更为"4mΩ/2512/3W/1%"
15	单向有刷驱动、H桥有刷驱动增加过流保护电路
16	风机PWM信号FAN_PWM与单向有刷6驱动信号PWM6互换网络；边刷PWM信号SideBrush_PWM与单向有刷5驱动信号PWM5互换网络
17	电源AGND前移至15V BUCK电路输入，删掉15V BUCK电路输入电阻R174"100R/2512"
18	为了与其它单板霍尔信号顺序兼容，变更无刷霍尔信号端子J5、J7信号顺序
19	LDO电源IC由SGM"SGM2013-3.3"改为3PEAK"TPL740F33-89TR"

Title	History	
Size A4	Document Number <Doc>	Rev V1.1
Date: Tuesday, September 07, 2021	Sheet 1 of 14	

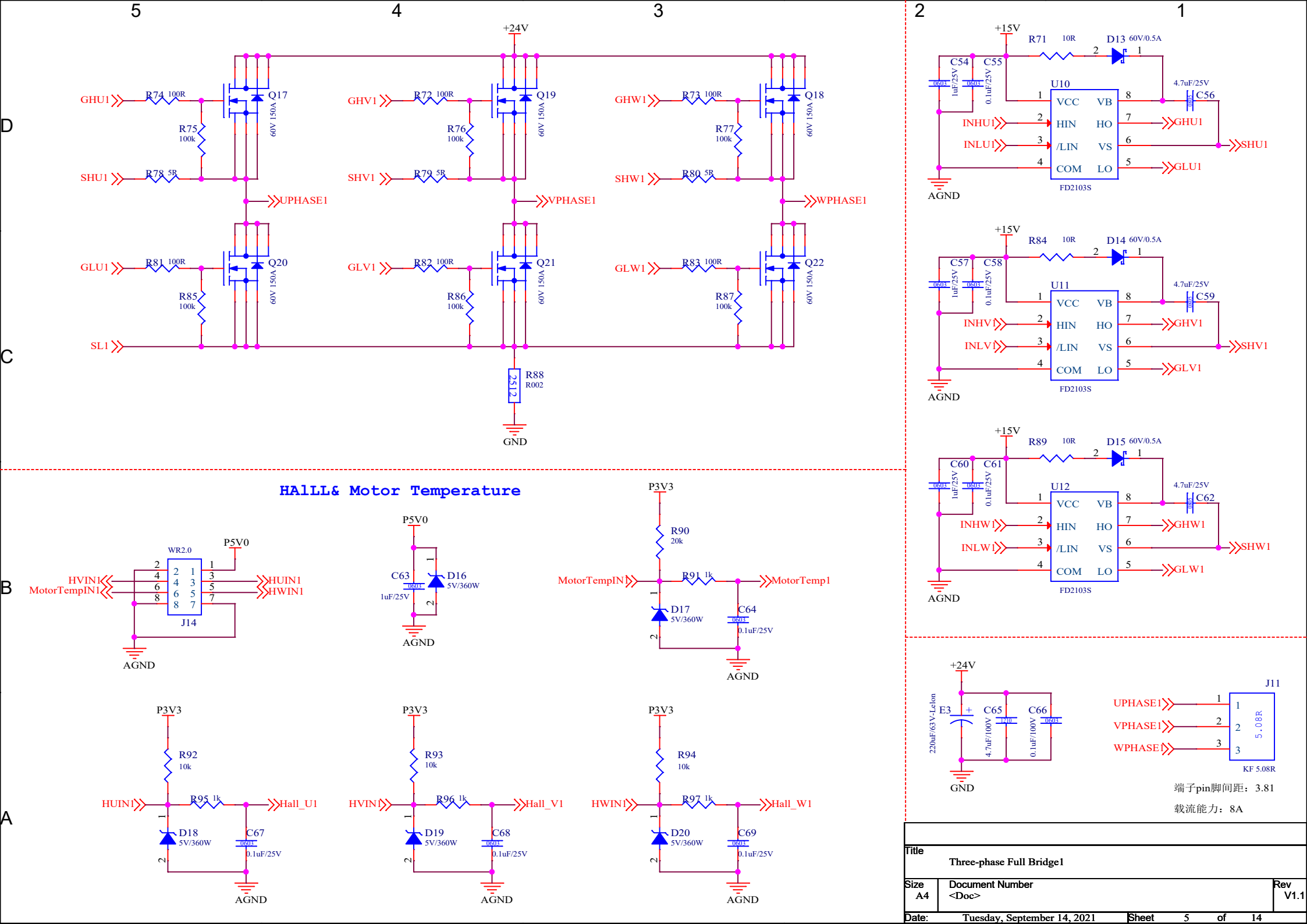

U1
STM32F407VGT6
PA0/WKUP/USART4_TX/ADC123_IN0
PA1/USART_RX/ADC123_IN1/ETH_REF_CLK
PA2/USART2_TX/ADC123_IN2/ETH_MDIO
PA3/USART2_RX/OTG_HS_ULPI_D0/ADC123_IN3
PA4/DCMI_HSYNC/OTG_HS_SOF/I2S3_WS/ADC12_IN4/DAC1_OUT
PA5/SPI1_SCK/OTG_HS_ULPI_CK/ADC12_IN5/DAC2_OUT
PA6/SPI1_MISO/DCMI_PIXCLK/ADC12_IN6
PA7/SPI1_MOSI/ADC12_IN7/ETH_RX_DV
PA8/MCO1/I2C3_SCL/OTG_FS_SOF
PA9/USART1_TX/I2C3_SMBA/DCMI_D0/OTG_FS_VBUS
PA10/USART1_RX/OTG_FS_ID/DCMI_D1
PA11/CAN1_RX/OTG_FS_DM
PA12/CAN1_TX/OTG_FS_DP
PA13/JTMS/SWDIO
PA14/JTCK/SWCLK
PA15/JTDI/I2S3_WS
PB0/OTG_HS_ULPI_D1/ADC12_IN8
PB1/OTG_HS_INTN/ADC12_IN9
PB2/BOOT1
PB3/JTDO/SPI3_SCK/I2S3_CK/SPI1_SCK
PB4/JNTRST/SPI3_MISO/SPI1_MISO/I2S3ext_SD
PB5/CAN2_RX/OTG_HS_ULPI_D7/DCMI_D10/I2S3_SD
PB6/I2C1_SCL/CAN2_TX/OTG_FS_INTN/DCMI_D5/USART1_TX
PB7/I2C1_SDA/FSMC_NL/DCMI_VSYNC/USART1_RX/TIM4_CH2
PB8/SDIO_D4/DCMI_D6/OTG_FS_SCL/I2C1_SCL/CAN1_RX /TIM4_CH3
PB9/I2S2_WS/OTG_FS_SDA/SDIO_D5/DCMI_D7/I2C1_SDA/CAN1_TX
PB10/SPI2_SCK/I2S2_SCL/USART3_TX/OTG_HS_ULPI_D3/OTG_HS_SCL
PB11/I2C2_SDA/USART3_RX/ETH_TX_EN
PB12/I2S2_WS/I2S2_SMBA/CAN2_RX/ETH_TXD0
PB13/SPI2_SCK/I2S2_CK/CAN2_TX/ETH_TXD1
PB14/SPI2_MISO/OTG_HS_DMUSART3_53RTS/I2S2ext_SD
PB15/SPI2_MOSI/I2S2_SD/OTG_HS_DP
PH0/OSC_IN
PH1/OSC_OUT
VREF+
VDDA
PC14-OSC32_IN
PC15-OSC32_OUT
VDD_1
VDD_2
VDD_3
VDD_4
VDD_5
VDD_6
VBAT
VCAP1
VCAP2
OTG_HS_ULPI_STP/EVENTOUT/ADC123_IN10/PC0
ETH_MDC/ADC123_IN11/PC1
SPI2_MISO/OTG_HS_ULPI_DIR/I2S2ext_SD/ADC123_IN12/PC2
SPI2_MOSI/I2S2_SD/OTG_HS_ULPI_NXT/ADC123_IN13/PC3
ETH_RXD0/ADC12_IN14/PC4
ETH_RXD1/ADC12_IN15/PC5
I2S2_MCK/SDIO_D6/USART6_TX/DCMI_D0/PC6
I2S3_MCK/SDIO_D7/USART6_RX/DCMI_D1/PC7
SDIO_D0/DCMI_D2/PC8
I2S_CKIN/MCO2/SDIO_D1/I2C3_SDA/DCMI_D3/PC9
SPI3_SCK/I2S3_CK/UART4_TX/SDIO_D2/USART3_TX/PC10
UART4_RX/SPI3_MISO/SDIO_D3/DCMI_D4/USART3_RX/I2S3ext_SD/PC11
UART5_TX/SDIO_CK/DCMI_D9/SPI3_MOSI/I2S3_SD/USART3_CK/PC12
TAMPER-RTC_AF1/PC13
FSMC_D2/CAN1_RX/PD0
FSMC_D3/CAN1_TX/PD1
UART5_RXSDIO_CMD/DCMI_D11/PD2
FSMC_CLK/USART2_CTS/PD3
FSMC_NOE/USART2_RTS/PD4
FSMC_NWE/USART2_TX/PD5
FSMC_NWAIT/USART2_RX/PD6
FSMC_NE1/FSMC_NCE2/PD7
FSMC_D13/USART3_TX/PD8
FSMC_D14/USART3_RX/PD9
FSMC_D15/USART3_CK/PD10 P P
FSMC_A16/USART3_CTS/PD11
FSMC_A17/USART3_RTS/PD12
FSMC_A18/PD13
FSMC_D0/PD14
FSMC_D1/PD15
FSMC_NBL0/DCMI_D2/PE0
FSMC_NBL1/DCMI_D3/PE1
TRACECLK/FSMC_A23/PE2
TRACED0/FSMC_A19/PE3
TRACED1/FSMC_A20/DCMI_D4/PE4
TRACED2/FSMC_A21/DCMI_D6/PE5
TRACED3/FSMC_A22/DCMI_D7/PE6
FSMC_D4/PE7
FSMC_D5/PE8
FSMC_D6/PE9
FSMC_D7/PE10
FSMC_D8/PE11
FSMC_D9/PE12
FSMC_D10/PE13
FSMC_D11/PE14
FSMC_D12/PE15
NRST
BOOT0/VPP
VSSA
VSS_3
VSS_2
VSS_4
VSS_5
单相有刷电机1电流检测
单相有刷电机2电流检测
无刷电机1电流检测
无刷电机1电机温度检测
无刷电机2电流检测
无刷电机2U相下桥驱动信号
无刷电机2电机温度检测
单相有刷电机4驱动
（通断控制接口）
边刷制动信号
单向有刷3-6过流保护
H桥过流保护
单向有刷1、2过流保护
故障指示灯
软件烧录端口
H桥有刷电机1A相上桥驱动
P3V3
边刷PWM驱动信号
风机驱动信号
R2 10K
H桥有刷电机1B相上桥驱动
单相有刷电机3驱动（通断控制接口）
CAN通讯
边刷正反转选择
单相有刷电机1/2驱动（水泵、电磁泵）
H桥有刷电机2AB相上桥驱动
运行指示灯
CAN通讯
无刷电机2V/W相下桥驱动
外部晶振信号
VDDA
无刷电机2V/W相霍尔信号
R6 0R
C1 0.1uF/25V
C2 2.2uF/16V
C3 2.2uF/16V
AGND
C5 0.1uF/25V
C6 0.1uF/25V
C7 0.1uF/25V
C8 0.1uF/25V
C9 0.1uF/25V
C10 0.1uF/25V
C11 0.1uF/25V
C12 4.7uF/25V
L1 220R/1A
C13 1uF/25V
C14 0.1uF/25V
C15 0.1uF/25V
R9 0R
R10 1M
Y1 25MHz
C16 16pF/25V
C17 16pF/25V
Isense1
Isense2
Isense3
Isense4
4路H桥有刷电机电流检测信号
BUS_VOL_DECT 电池电压检测
FAN_BRAKE 风机制动信号
INHU2
INHV2
无刷电机2上桥U/V/W驱动信号
INHW2
PWM5
USART_DUB_TX
USART_DUB_RX
单相有刷电机5驱动
串口通讯
Hall_U2
无刷电机2U相霍尔信号
PWM_AL1
PWM_BL1
PWM_AL2
PWM_BL2
BRAKE2
Hall_U1
Hall_V1
Hall_W1
H桥有刷电机1A相下桥驱动
H桥有刷电机1B相下桥驱动
H桥有刷电机2A相下桥驱动
H桥有刷电机2B相下桥驱动
无刷电机2过流信号
无刷电机1U/V/W相霍尔信号
PWM_AL3
PWM_BL3
PWM_AL4
PWM_BL4
PWM_AH3
PWM_BH3
PWM_AH4
PWM_BH4
H桥有刷电机3/4驱动信号
Hall_1
Hall_2
Hall_3
Hall_4
4路H桥有刷电机霍尔信号
FAN_FG
SideBrush_FG
FAN_F/R
风机速度信号
边刷速度信号
风机换向信号
INLU1
INHU1
INLV1
INHV1
INLW1
INHW1
PWM6
BRAKE1
无刷电机1驱动信号
单相有刷电机6驱动
（通断控制接口）
无刷电机1过流信号
MCU_NRST
MCU上电复位信号
R7 10K
R8 10K
C4 0.1uF/25V
P3V3
R1 200R
R3 200R
GREEN
LED1
RUN
R4 200R
R5 200R
RED
LED2
FAULT1
FAULT2
Title
MCU
Size
A4
Document Number
<Doc>
Rev
V1.1
Date:
Monday, September 06, 2021
Sheet
2
of
14

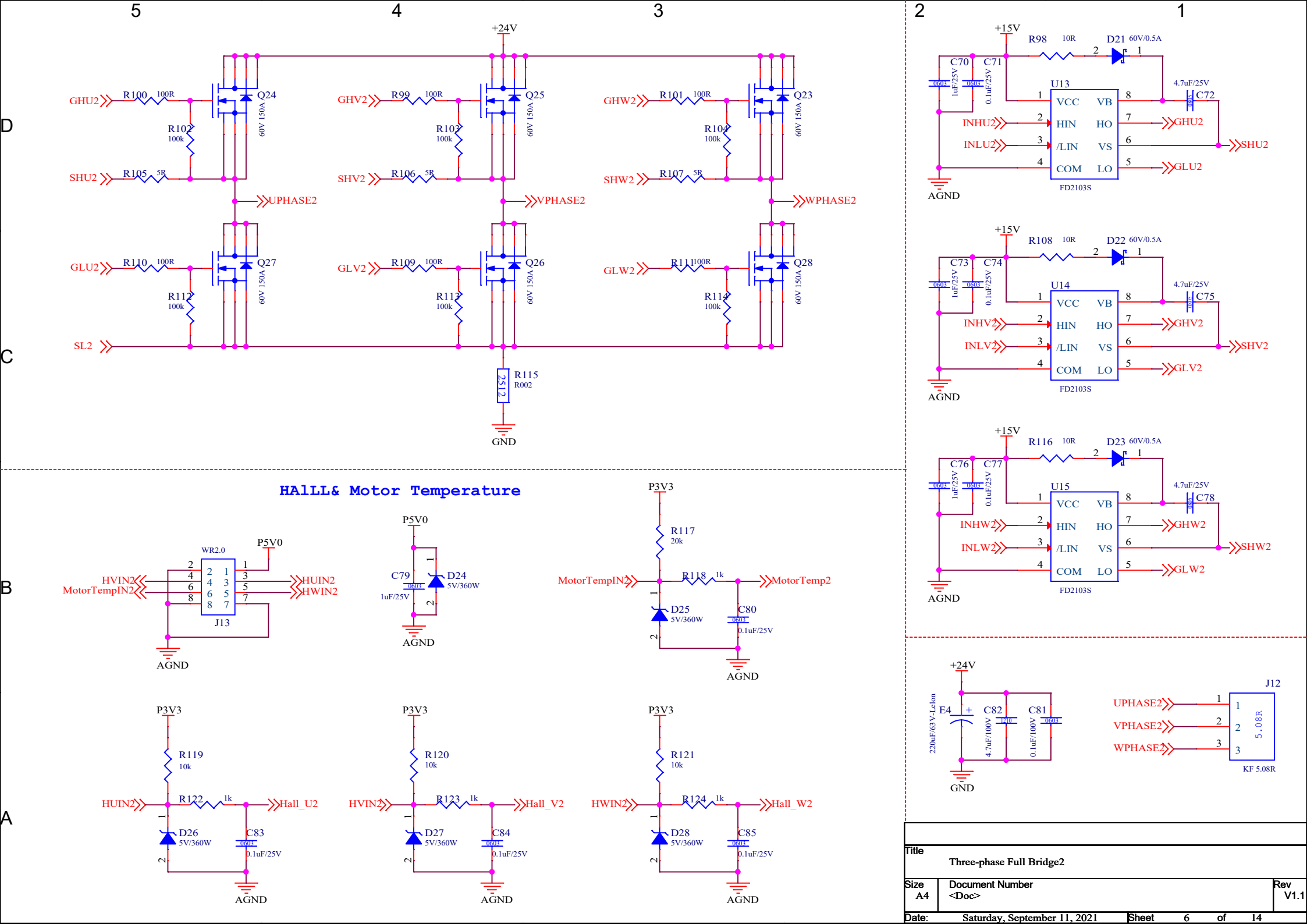


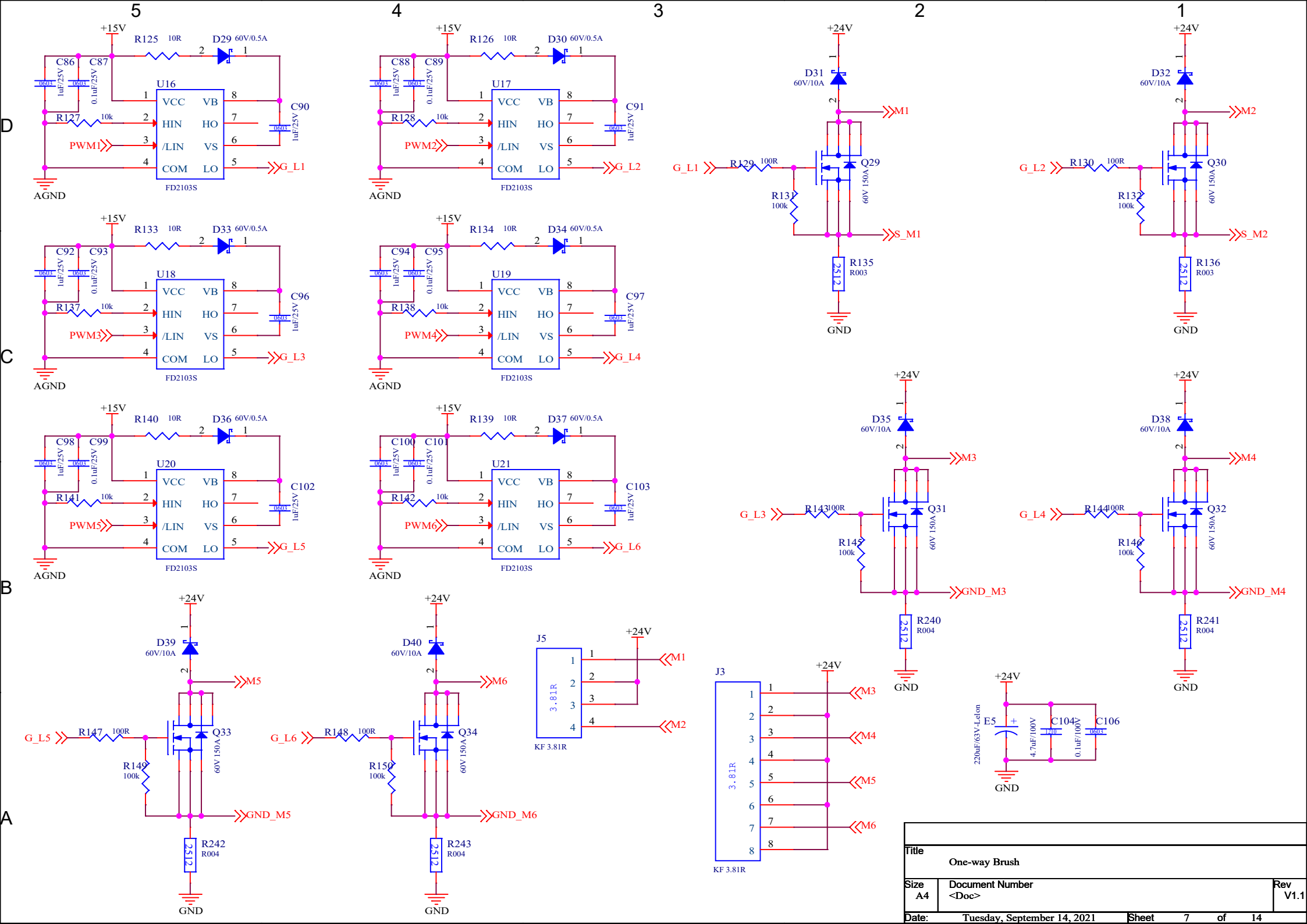
Title	H_Bridge1	
Size A4	Document Number <Doc>	Rev V1.1
Date: Tuesday, September 14, 2021	Sheet 3 of 14	

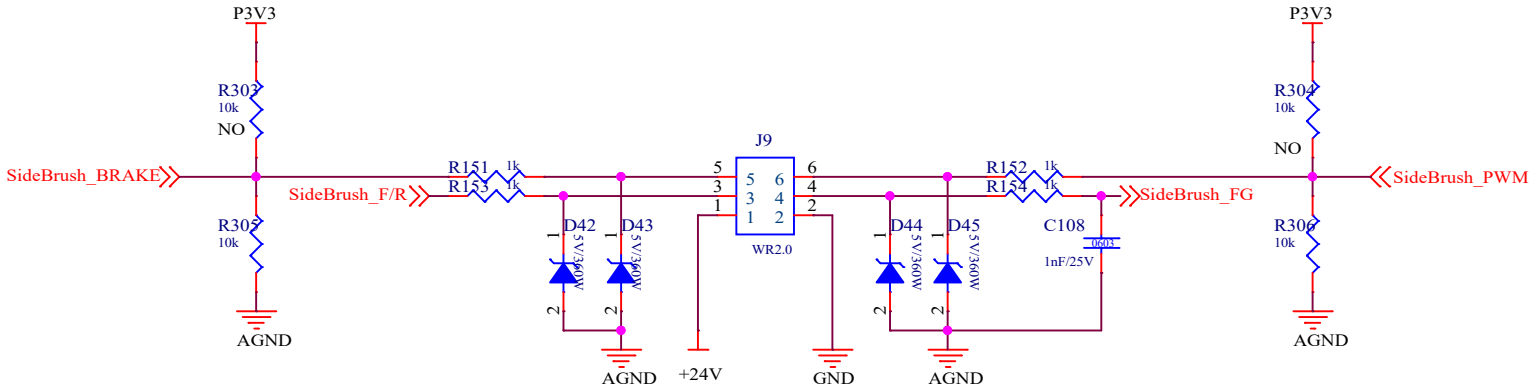


Title	H_Bridge2	
Size A4	Document Number <Doc>	Rev V1.1
Date: Saturday, September 11, 2021	Sheet 4 of 14	

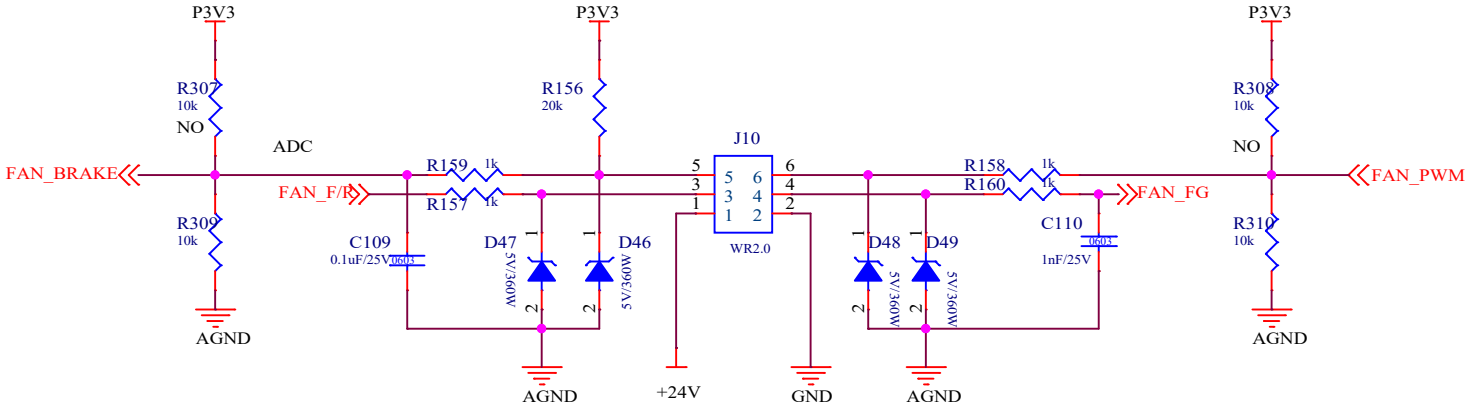

5
4
3
2
1
D
C
B
A
+24V
GHU1
R74 100R
Q17
60V 150A
R75 100k
SHU1
R78 5R
UPHASE1
GHV1
R72 100R
Q19
R76 100k
SHV1
R79 5R
VPHASE1
GHW1
R73 100R
Q18
R77 100k
SHW1
R80 5R
WPHASE1
GLU1
R81 100R
Q20
R85 100k
SL1
GLV1
R82 100R
Q21
R86 100k
GLW1
R83 100R
Q22
R87 100k
R88
R002
2512
GND
HAlLL& Motor Temperature
WR2.0
P5V0
HVIN1
MotorTempIN1
HUIN1
HWIN1
J14
AGND
C63
1uF/25V
D16
5V/360W
P3V3
R90
20k
MotorTempIN
R91 1k
MotorTemp1
D17
5V/360W
C64
0.1uF/25V
R92
10k
R95 1k
Hall_U1
D18
C67
R93
R96 1k
Hall_V1
D19
C68
R94
R97 1k
Hall_W1
D20
C69
+15V
R71 10R
D13 60V/0.5A
C54
C55
U10
VCC
VB
HIN
HO
/LIN
VS
COM
LO
FD2103S
INHU1
INLU1
GHU1
SHU1
GLU1
4.7uF/25V
C56
R84 10R
D14 60V/0.5A
C57
C58
U11
INHV
INLV
GHV1
SHV1
GLV1
C59
R89 10R
D15 60V/0.5A
C60
C61
U12
INHW1
INLW1
GHW1
SHW1
GLW1
C62
E3
220uF/63V-Lelon
C65
4.7uF/100V
C66
0.1uF/100V
J11
UPHASE1
VPHASE1
WPHASE1
5.08R
KF 5.08R
端子pin脚间距：3.81
载流能力：8A
Title
Three-phase Full Bridge1
Size
A4
Document Number
<Doc>
Rev
V1.1
Date:
Tuesday, September 14, 2021
Sheet
5
of
14


5
4
3
2
1
D
C
B
A
+24V
GHU2
R100 100R
Q24
60V 150A
R102 100k
SHU2
R105 5R
UPHASE2
GHV2
R99 100R
Q25
R103 100k
SHV2
R106 5R
VPHASE2
GHW2
R101 100R
Q23
R104 100k
SHW2
R107 5R
WPHASE2
GLU2
R110 100R
Q27
R112 100k
SL2
GLV2
R109 100R
Q26
R113 100k
GLW2
R111 100R
Q28
R114 100k
R115
R002
2512
GND
HAlLL& Motor Temperature
P5V0
WR2.0
HVIN2
MotorTempIN2
HUIN2
HWIN2
J13
AGND
C79
0603
1uF/25V
D24
5V/360W
P3V3
R117
20k
MotorTempIN2
R118 1k
MotorTemp2
D25
5V/360W
C80
0.1uF/25V
R119
10k
HUIN2
R122 1k
Hall_U2
D26
C83
R120
HVIN2
R123 1k
Hall_V2
D27
C84
R121
HWIN2
R124 1k
Hall_W2
D28
C85
+15V
R98 10R
D21 60V/0.5A
C70
C71
1uF/25V
0.1uF/25V
U13
VCC
VB
HIN
HO
/LIN
VS
COM
LO
FD2103S
4.7uF/25V
C72
INHU2
INLU2
GHU2
SHU2
GLU2
AGND
R108 10R
D22 60V/0.5A
C73
C74
U14
C75
INHV2
INLV2
GHV2
SHV2
GLV2
R116 10R
D23 60V/0.5A
C76
C77
U15
C78
INHW2
INLW2
GHW2
SHW2
GLW2
+24V
E4
220uF/63V-Lelon
C82
4.7uF/100V
1210
C81
0.1uF/100V
J12
UPHASE2
VPHASE2
WPHASE2
5.08R
KF 5.08R
Title
Three-phase Full Bridge2
Size
A4
Document Number
<Doc>
Rev
V1.1
Date:
Saturday, September 11, 2021
Sheet
6
of
14


5
4
3
2
1
D
C
B
A
+15V
R125 10R
D29 60V/0.5A
C86 C87
U16
VCC VB
HIN HO
/LIN VS
COM LO
FD2103S
R127 10k
PWM1
C90
G_L1
AGND
R126 10R
D30 60V/0.5A
C88 C89
U17
R128 10k
PWM2
C91
G_L2
R133 10R
D33 60V/0.5A
C92 C93
U18
R137 10k
PWM3
C96
G_L3
R134 10R
D34 60V/0.5A
C94 C95
U19
R138 10k
PWM4
C97
G_L4
R140 10R
D36 60V/0.5A
C98 C99
U20
R141 10k
PWM5
C102
G_L5
R139 10R
D37 60V/0.5A
C100 C101
U21
R142 10k
PWM6
C103
G_L6
+24V
D31 60V/10A
M1
G_L1
R129 100R
Q29
60V 150A
R131 100k
S_M1
R135 R003
2512
GND
D32 60V/10A
M2
G_L2
R130 100R
Q30
R132 100k
S_M2
R136 R003
D35 60V/10A
M3
G_L3
R143 100R
Q31
R145 100k
GND_M3
R240 R004
D38 60V/10A
M4
G_L4
R144 100R
Q32
R146 100k
GND_M4
R241 R004
D39 60V/10A
M5
G_L5
R147 100R
Q33
R149 100k
GND_M5
R242 R004
D40 60V/10A
M6
G_L6
R148 100R
Q34
R150 100k
GND_M6
R243 R004
J5
3.81R
KF 3.81R
M1
M2
J3
M3
M4
M5
M6
E5
220uF/63V-Lelon
C104
4.7uF/100V
C106
0.1uF/100V
Title
One-way Brush
Size
A4
Document Number
<Doc>
Rev
V1.1
Date:
Tuesday, September 14, 2021
Sheet
7
of
14

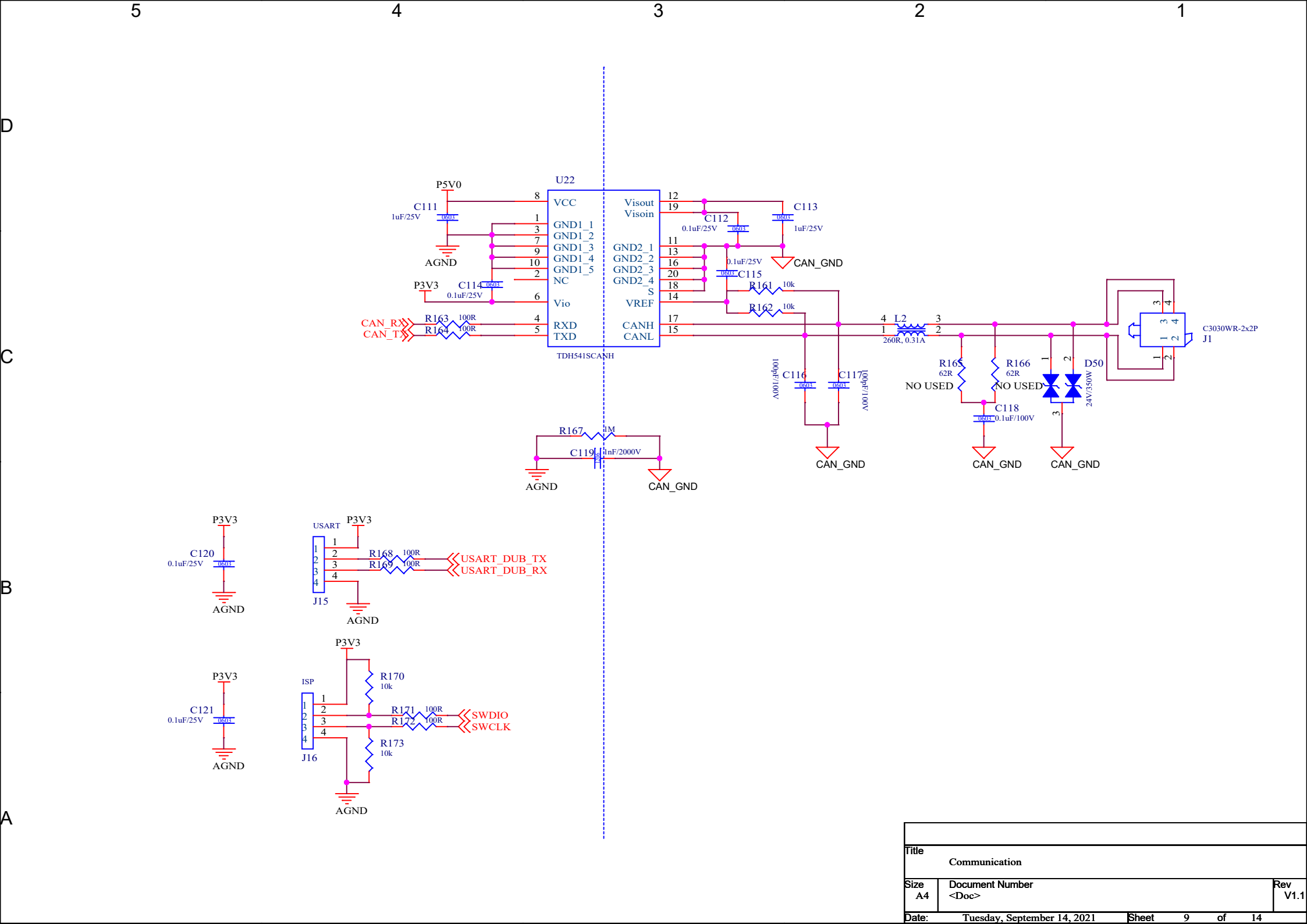


Side Brush

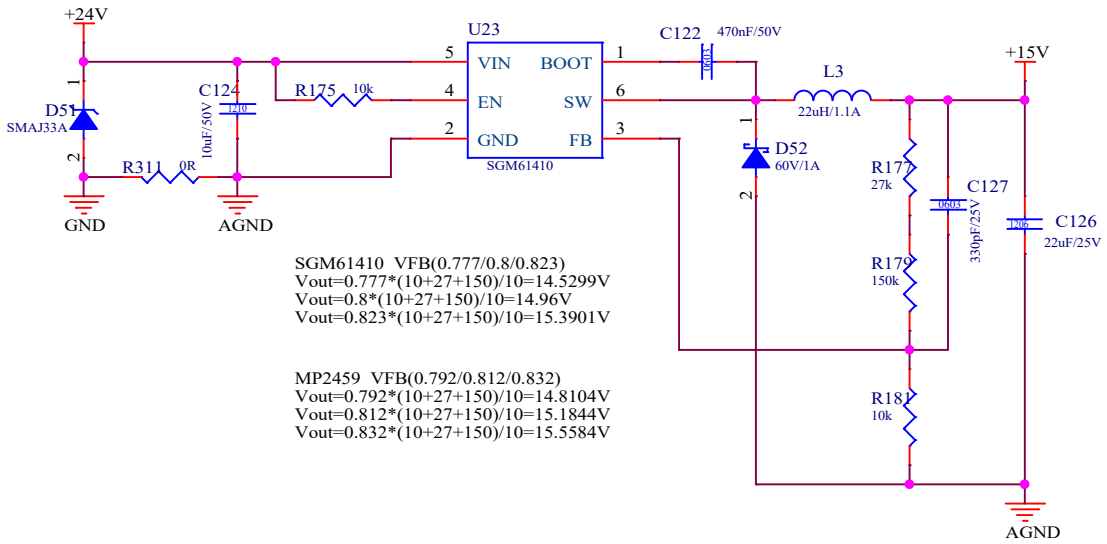


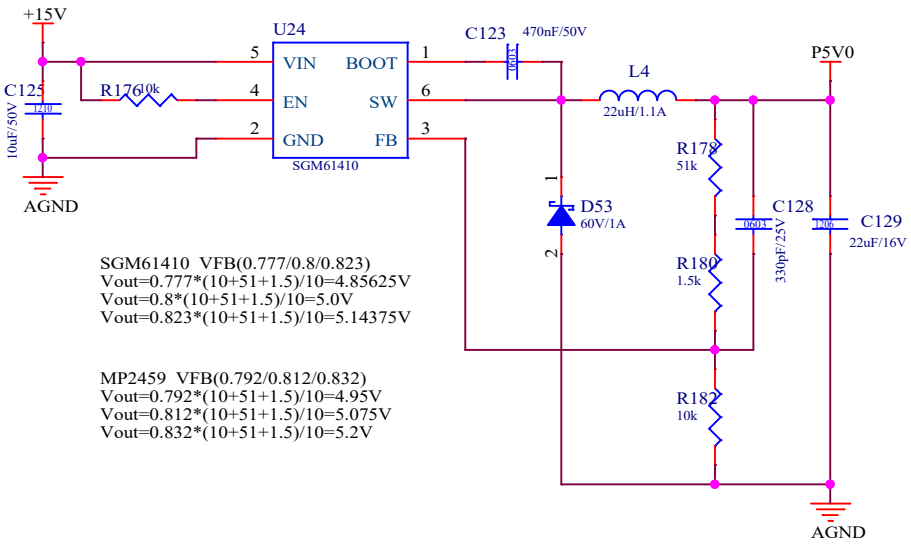
FAN

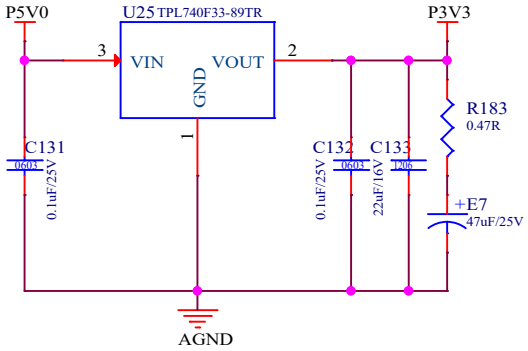
Title	FAN&SideBrush	
Size A4	Document Number <Doc>	Rev V1.1
Date: Monday, September 06, 2021	Sheet 8 of 14	

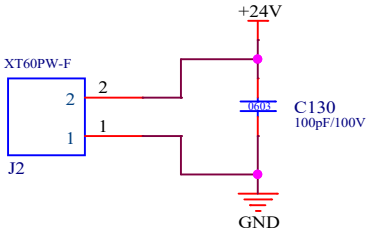


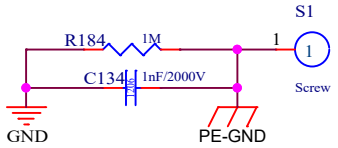
Title	Communication	
Size A4	Document Number <Doc>	Rev V1.1
Date: Tuesday, September 14, 2021	Sheet 9 of 14	

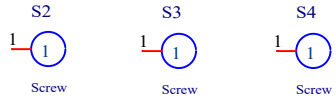






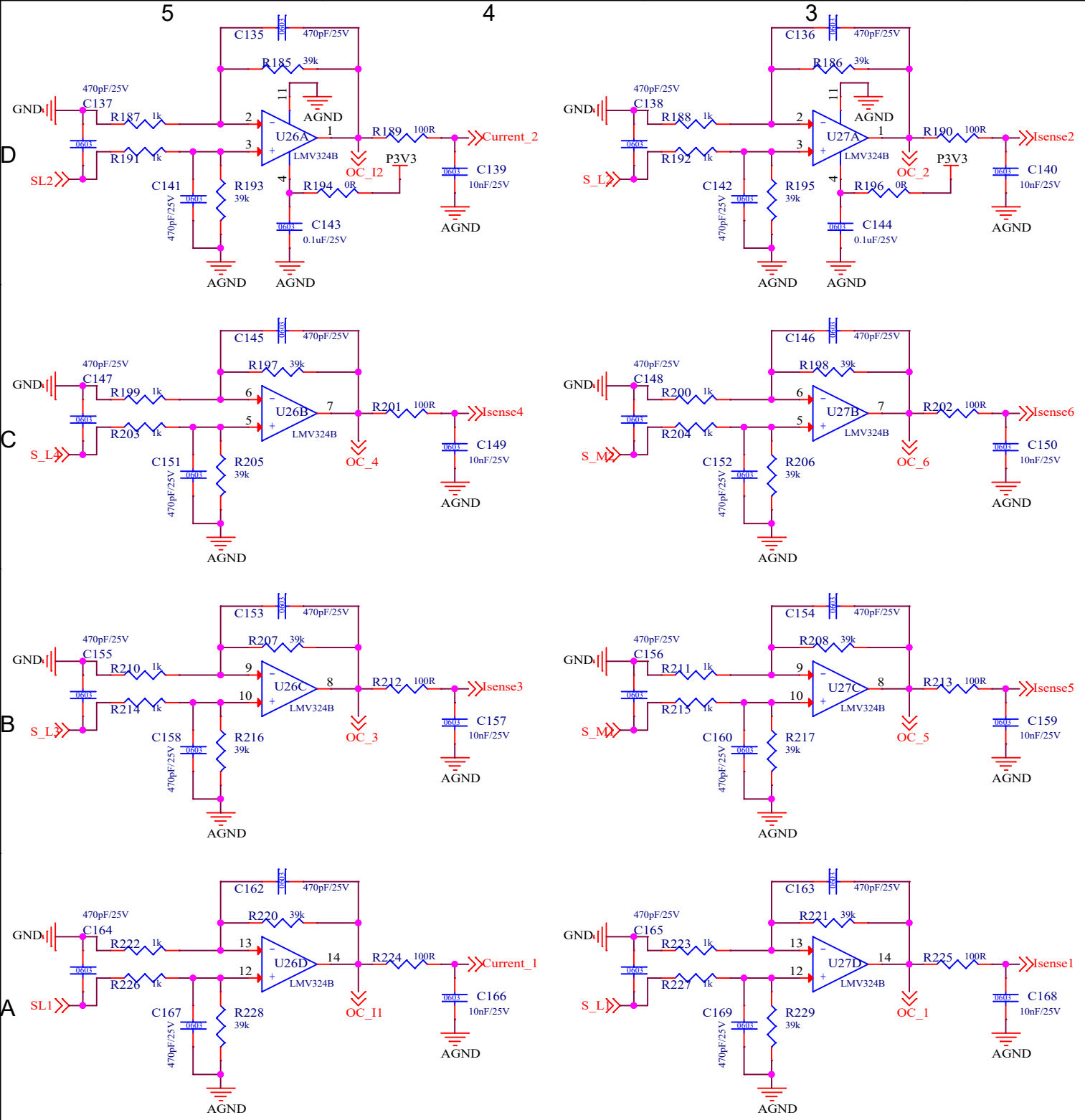






PE-GND为外接地，layout时连接到一个固定螺丝孔

Title: PS		
Size: A4	Document Number: <Doc>	Rev: V1.1
Date: Saturday, September 11, 2021	Sheet 10 of 14	



无刷驱动-2mΩ电阻电流检测范围：
Imax=3.3*1000/(2*39)=42.3A

H桥有刷驱动-4mΩ电阻电流检测范围：
Imax=3.3*1000/(4*39)=21.15A

单向有刷驱动1~2-3mΩ电阻电流检测范围：
Imax=3.3*1000/(3*39)=28.2A

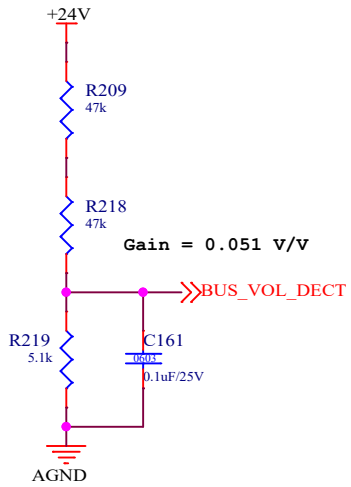
单向有刷驱动3~6-4mΩ电阻电流检测范围：
Imax=3.3*1000/(4*39)=21.15A

无刷驱动-2mΩ电阻过流保护点：
Ioc=2.75*1000/(2*39)=35.25A

H桥有刷驱动-4mΩ电阻过流保护点：
Ioc=2.75*1000/(4*39)=17.63A

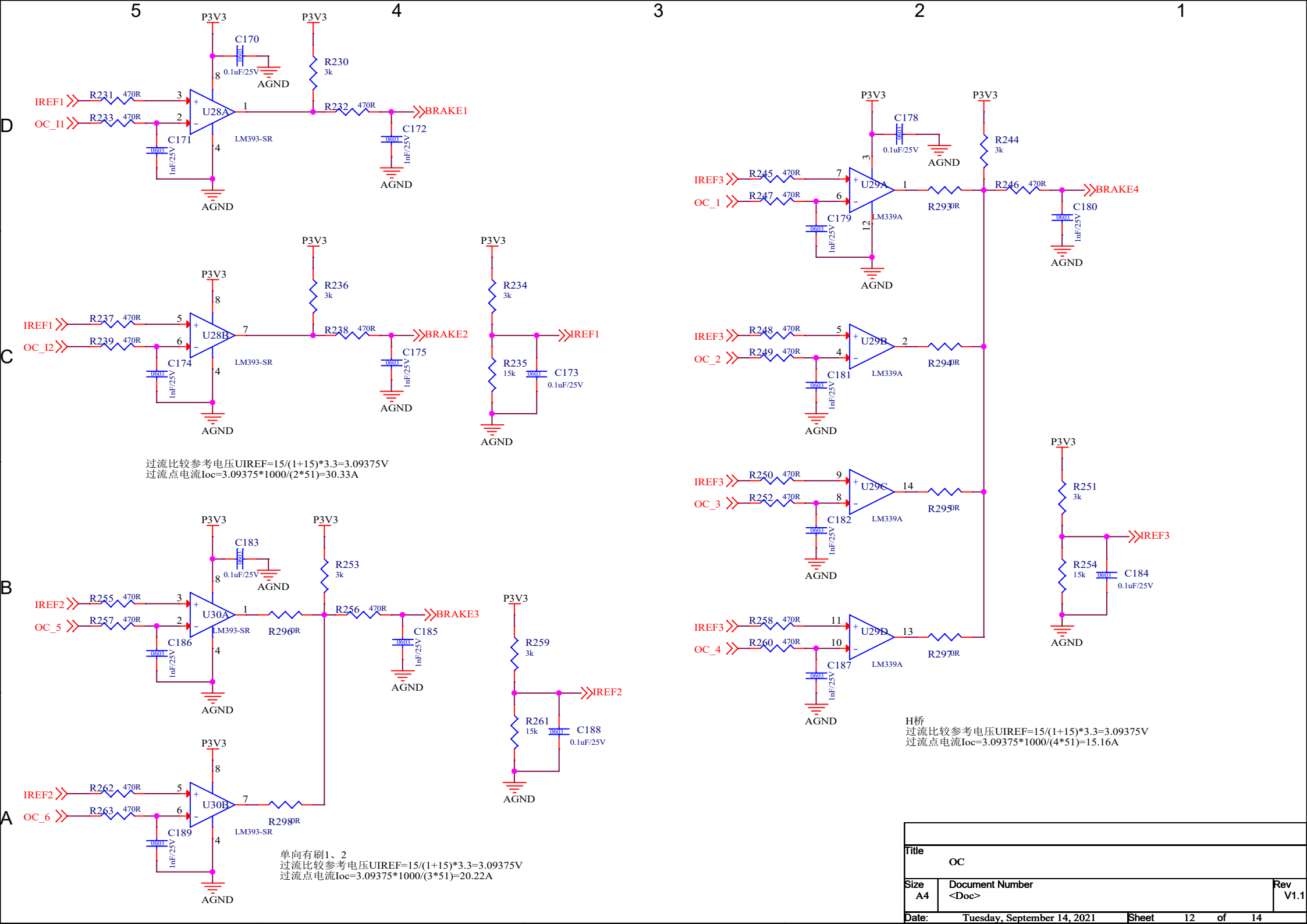
单向有刷驱动1~2-3mΩ电阻过流保护点：
Ioc=2.75*1000/(3*39)=23.5A

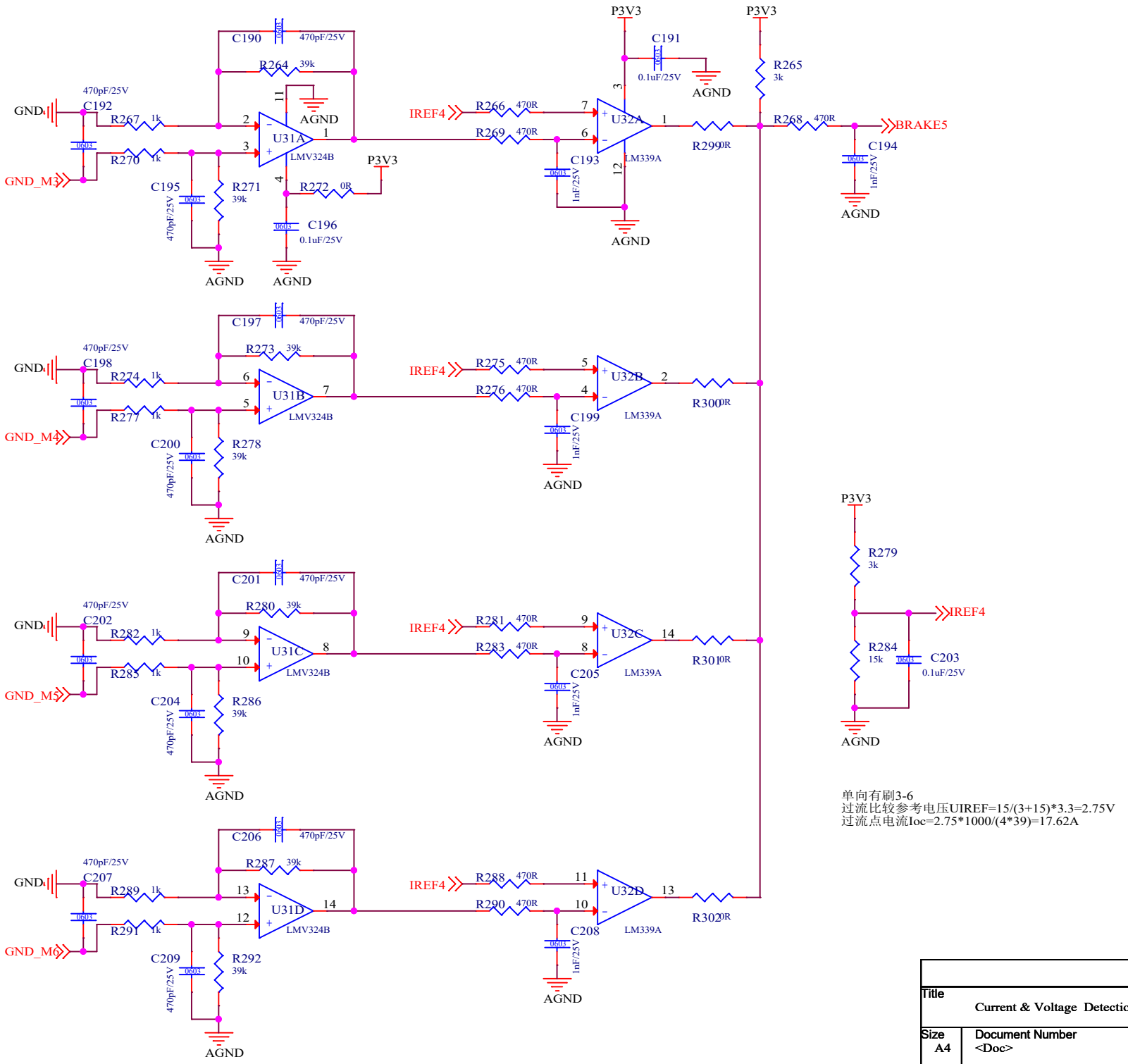
单向有刷驱动3~6-4mΩ电阻过流保护点：
Ioc=2.75*1000/(4*39)=17.63A



BUS_VOL_Dect

Title: Current & Voltage Detection		
Size: A4	Document Number: <Doc>	Rev: V1.1
Date: Tuesday, September 14, 2021	Sheet 11 of 14	


5
4
3
2
1
D
C
B
A
P3V3
C170
0.1uF/25V
AGND
R230
3k
IREF1
R231 470R
OC_I1
R233 470R
U28A
LM393-SR
C171
1nF/25V
R232 470R
BRAKE1
C172
1nF/25V
R236
3k
IREF1
R237 470R
OC_I2
R239 470R
U28B
LM393-SR
C174
1nF/25V
R238 470R
BRAKE2
C175
1nF/25V
R234
3k
R235
15k
C173
0.1uF/25V
过流比较参考电压UIREF=15/(1+15)*3.3=3.09375V
过流点电流Ioc=3.09375*1000/(2*51)=30.33A
C183
0.1uF/25V
R253
3k
IREF2
R255 470R
OC_5
R257 470R
U30A
LM393-SR
R296 0R
C186
1nF/25V
R256 470R
BRAKE3
C185
1nF/25V
R259
3k
R261
15k
C188
0.1uF/25V
IREF2
R262 470R
OC_6
R263 470R
U30B
LM393-SR
R298 0R
C189
1nF/25V
单向有刷1、2
过流比较参考电压UIREF=15/(1+15)*3.3=3.09375V
过流点电流Ioc=3.09375*1000/(3*51)=20.22A
C178
0.1uF/25V
R244
3k
IREF3
R245 470R
OC_1
R247 470R
U29A
LM339A
R293 0R
C179
1nF/25V
R246 470R
BRAKE4
C180
1nF/25V
IREF3
R248 470R
OC_2
R249 470R
U29B
LM339A
R294 0R
C181
1nF/25V
IREF3
R250 470R
OC_3
R252 470R
U29C
LM339A
R295 0R
C182
1nF/25V
R251
3k
R254
15k
C184
0.1uF/25V
IREF3
R258 470R
OC_4
R260 470R
U29D
LM339A
R297 0R
C187
1nF/25V
H桥
过流比较参考电压UIREF=15/(1+15)*3.3=3.09375V
过流点电流Ioc=3.09375*1000/(4*51)=15.16A
Title
OC
Size
A4
Document Number
<Doc>
Rev
V1.1
Date:
Tuesday, September 14, 2021
Sheet
12
of
14


C190 470pF/25V
R264 39k
C192 470pF/25V
R267 1k
R270 1k
GND
GND_M3
C195 470pF/25V
R271 39k
U31A LMV324B
R272 0R
C196 0.1uF/25V
AGND
P3V3
IREF4
R266 470R
R269 470R
C191 0.1uF/25V
U32A LM339A
C193 1nF/25V
R265 3k
R268 470R
R299 0R
BRAKE5
C194 1nF/25V
C197 470pF/25V
R273 39k
C198 470pF/25V
R274 1k
R277 1k
GND_M4
C200 470pF/25V
R278 39k
U31B LMV324B
R275 470R
R276 470R
U32B LM339A
C199 1nF/25V
R300 0R
C201 470pF/25V
R280 39k
C202 470pF/25V
R282 1k
R285 1k
GND_M5
C204 470pF/25V
R286 39k
U31C LMV324B
R281 470R
R283 470R
U32C LM339A
C205 1nF/25V
R301 0R
C206 470pF/25V
R287 39k
C207 470pF/25V
R289 1k
R291 1k
GND_M6
C209 470pF/25V
R292 39k
U31D LMV324B
R288 470R
R290 470R
U32D LM339A
C208 1nF/25V
R302 0R
R279 3k
R284 15k
C203 0.1uF/25V
单向有刷3-6
过流比较参考电压UIREF=15/(3+15)*3.3=2.75V
过流点电流Ioc=2.75*1000/(4*39)=17.62A
Title
Current & Voltage Detection
Size A4
Document Number <Doc>
Rev V1.1
Date: Tuesday, September 14, 2021
Sheet 13 of 14

	G_AH1/S_AH1	PWM_AH1	TIM2_CH1	77	PA15	PE9	40	TIM1_CH1	INHU1	GHU1/SHU1	
H桥有刷1	G_BH1/S_BH1	PWM_BH1	TIM2_CH2	89	PB3	PE8	39	TIM1_CH1N	INLU1	GLU1/GND	
	G_AL1/GND	PWM_AL1	I/O	81	PD0	PE11	42	TIM1_CH2	INHV1	GHV1/SHV1	
	G_BL1/GND	PWM_BL1	I/O	82	PD1	PE10	41	TIM1_CH2N	INLV1	GLV1/GND	
						PE13	44	TIM1_CH3	INHW1	GHW1/SHW1	
	G_AH2/S_AH2	PWM_AH2	TIM2_CH3	47	PB10	PE12	43	TIM1_CH3N	INLW1	GLW1/GND	
H桥有刷2	G_BH2/S_BH2	PWM_BH2	TIM2_CH4	48	PB11						
	G_AL2/GND	PWM_AL2	I/O	83	PD2	PD5	86	EXTI5	Hall_U1	HUIN1	
	G_BL2/GND	PWM_BL2	I/O	84	PD3	PD6	87	EXTI6	Hall_V1	HVIN1	无刷1
						PD7	88	EXTI7	Hall_W1	HWIN1	
	G_AH3/S_AH3	PWM_AH3	TIM4_CH1	59	PD12						
H桥有刷3	G_BH3/S_BH3	PWM_BH3	TIM4_CH2	60	PD13	PA2	25	ADC_IN2	Current_1	SL1/GND	
	G_AL3/GND	PWM_AL3	I/O	55	PD8	PA3	26	ADC_IN3	MotorTemp1	MotorTempIN1	
	G_BL3/GND	PWM_BL3	I/O	56	PD9						
						PE15	46	I/O	BRAKE1	OC_1	
	G_AH4/S_AH4	PWM_AH4	TIM4_CH3	61	PD14						
H桥有刷4	G_BH4/S_BH4	PWM_BH4	TIM4_CH4	62	PD15						
	G_AL4/GND	PWM_AL4	I/O	57	PD10						
	G_BL4/GND	PWM_BL4	I/O	58	PD11	PC6	63	TIM8_CH1	INHU2	GHU2/SHU2	
						PA5	30	TIM8_CH1N	INLU2	GLU2/GND	
	Hall_IN_1	Hall_1	EXTI0	97	PE0	PC7	64	TIM8_CH2	INHV2	GHV2/SHV2	
H桥霍尔信号	Hall_IN_2	Hall_2	EXTI1	98	PE1	PB14	53	TIM8_CH2N	INLV2	GLV2/GND	
	Hall_IN_3	Hall_3	EXTI2	1	PE2	PC8	65	TIM8_CH3	INHW2	GHW2/SHW2	
	Hall_IN_4	Hall_4	EXTI3	2	PE3	PB15	54	TIM8_CH3N	INLW2	GLW2/GND	
	S_L1/GND	Isense1	ADC_IN10	15	PC0	PC13	7	EXTI13	Hall_U2	HUIN2	
H桥电流检测	S_L2/GND	Isense2	ADC_IN11	16	PC1	PC14	8	EXTI14	Hall_V2	HVIN2	无刷2
	S_L3/GND	Isense3	ADC_IN12	17	PC2	PC15	9	EXTI15	Hall_W2	HWIN2	
	S_L4/GND	Isense4	ADC_IN13	18	PC3						
						PA4	29	ADC_IN4	Current_2	SL2/GND	
						PA6	31	ADC_IN6	MotorTemp2	MotorTempIN2	
单向有刷	G_L1/GND	PWM1	TIM10_CH1	95	PB8	PD4	85	EXTI4	BRAKE2	OC_2	
(水泵、电磁泵)	G_L2/GND	PWM2	TIM11_CH1	96	PB9						
	S_M1/GND	Isense5	ADC_IN0	23	PA0						
单向有刷电流检测	S_M2/GND	Isense6	ADC_IN1	24	PA1	PB1	36	TIM3_CH4	FAN_PWM		
						PE5	4	TIM9_CH1	FAN_FG		
						PE7	38	I/O	FAN_EN		外部风机控制信号
						PC5	34	ADC_IN15	FANTemp		
	G_L3/GND	PWM3	TIM3_CH1	90	PB4						
单向有刷开通阀	G_L4/GND	PWM4	TIM3_CH2	32	PA7						
	G_L5/GND	PWM5	TIM8_CH4	66	PC9						
	G_L6/GND	PWM6	TIM1_CH4	45	PE14	PB0	35	TIM3_CH3	SideBrush_PWM		
						PE6	5	TIM9_CH2	SideBrush_FG		
						PA10	69	I/O	SideBrush_EN		外部边刷控制信号
						PA9	68	I/O	SideBrush_F/R		
						PA8	67	I/O	SideBrush_BRAKE		

Title	Singal Map	
Size A4	Document Number <Doc>	Rev V1.1
Date: Monday, September 06, 2021	Sheet 14 of 14	