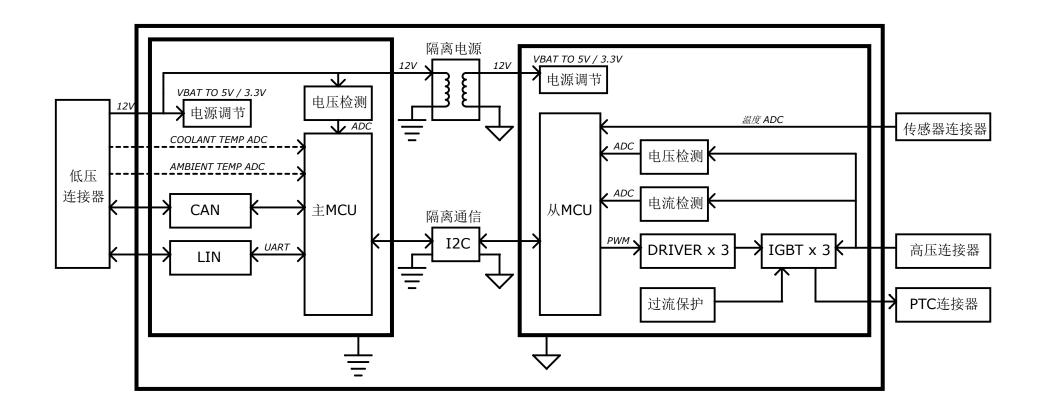
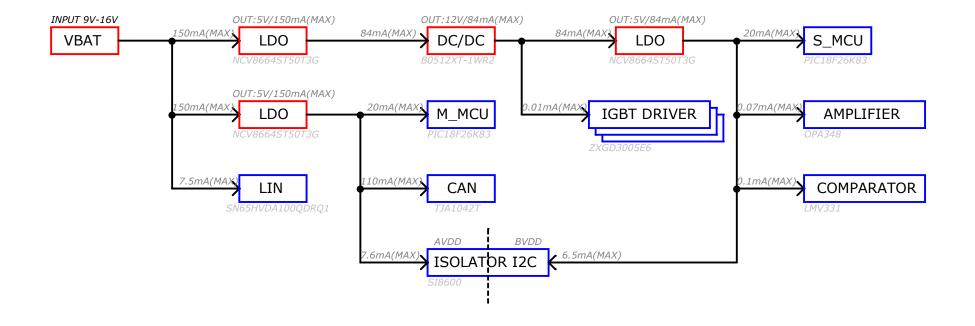
# 1 BLOCK DIAGRAM



## **2 POWER PLANE**



 **3 HISTORY** 

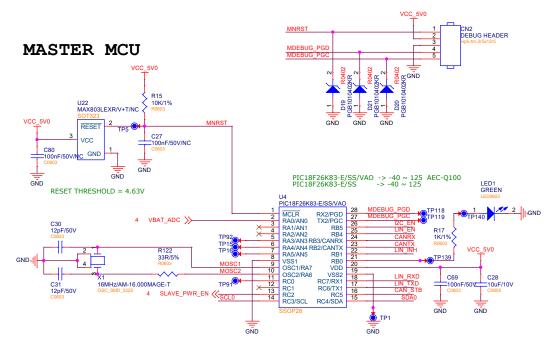
PHU\_MB\_SCH\_V0.1 [yangxutao 2019/09/09]

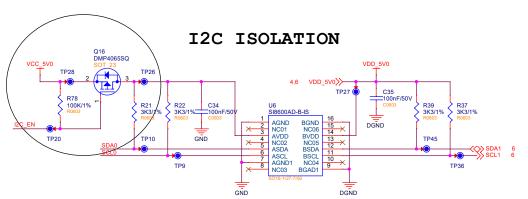
PHU\_MB\_SCH\_V3.0 [yangxutao 2020/06/05]

- 1.Q5、Q7和Q9需要连接至Q11、Q13和Q15的GATE极,以防止产生保护时短路IGBT VCC; [P7]
- 2.信号IGBT PWM0/IGBT PWM1/IGBT PWM2需要增加限流电阻R138、R139、R140 1K/5%,以防止产生保护时短路VDD 5V0; [P7]
- 3.Q10、Q12、Q14、Q16、Q17、Q18物料由BSS84更换为DMP4065SQ, 新物料符合AEC-Q100认证; [P4,P7]
- 4.增加板上NTC温度传感器R143,连接至U7单片机的6脚,以测量IGBT的温度; [P6]
- 5.删除外部温度传感器电路; [P4,P5]
- 6.02型号KST42MTF已经停产,更换物料为SMMBTA42LT1G,封装和参数一致替代料;[P4]
- 7.U21物料由B0512XT-1WR2更换为B0512XT-1WR3, V0.1版本中实际贴片物料型号为B0512XT-1WR3, B0512XT-1WR3为最新版本,旧版本已经采购不到物料; [P4]
- 8.主MCU和从MCU的调试接口信号增加ESD二极管D16、D17、D18、D19、D20和D21,以防止调试时静电损坏MCU; [P5,P6]
- 9. 删除D7和D13二极管,因此二极管与MCU不能实现快速放电,会使MCU无法烧录程序; [P5, P6]
- 10.NC掉MCU的复位电容C27和C40,以防止MCU不能上电复位。Microship规格书要求烧录器调试时使用复位电容,调试完后NC掉; [P5,P6]

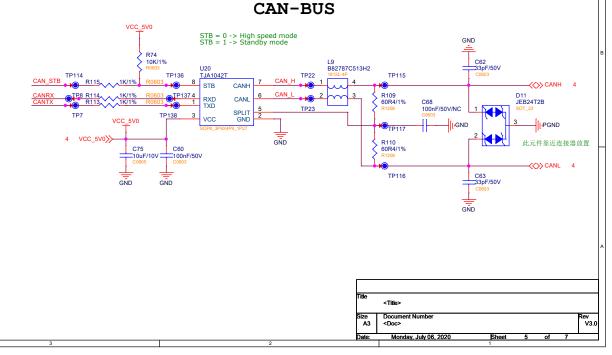
#### **4 POWER** POWER FOR MASTER PARTS POWER INPUT IN 9V-16V CN1 CON10 D1 MSE1PG-M3/89A Q1 PZTA42T1G VBAT\_VCC -⟨⟨⟩⟩ LIN\_BUS 5 300V/500mA ->> VBAT\_VCC 5 TP98 400V/1A VBAT\_VCC FB3 FB0603 NCV8664ST50T3G BLM18AG102SN1D BLM18AG102SN1D VIN ->> VCC\_5V0 SMMBTA42LT1G R10 100K/1% TP111 C6 R131 =100nF/50V 100nF/50V GND4 ADC等效量程 = 0V ~ 38V 2R/5% 330uF/35V/80mR D2 R2 P6SMB200CA 10K/1% \_\_>WBAT\_ADC 5 GND GND GND C5 DLW31SN601SQ2L@6 15K/1% =100pF/50V Rated Current = 260m KL15 C3 100nF/50V MMSZ5248C-E3-08 0R/1% TP99 -18V L→>> PGND 5 PGND GND FOR ISOLATORS POWER 此部分元件靠近MCU放置 DMP4065SQ VBAT\_VCC ISO\_VCC\_5V0 U24 AMBIENT TEMP NCV8664ST50T3G TP95 TP106 TP108 LOCK\_IN+ LOCK\_OUT+ VIN VOUT GND2 R127 R129 GND4 C85 R132 100nF/50V 10K/1% 2R/5% 100nF/50V 100K/1% C84 =100nF/50V GND GND HV LOCK IN MARK1 MARK2 MARK3 MARK4 TP103 C8 =10uF/10V ₹ 2N7002PW-115 C86 TP105 R133 100nF/50V 100K/1% 5 SLAVE\_PWR\_EN>> MARK5 MARK6 MARK7 MARK8 LOCK\_IN-LOCK\_OUT-R73 10K/1% TP107 TP109 COOLANT\_TEMP R137 ISOLATION POWER FOR SLAVE PARTS POWER FOR SLAVE PARTS ISO\_VCC\_5V0 IGBT\_VCC U21 B0512XT-1WR3 FB5 FB0603 BLM18AG102SN1D BLM18AG102SN1D SLAVE\_VCC TP86 BLM18AG102SN1D NCV8664ST50T3G -≫ IGBT\_VCC 7 →>> VDD\_5V0 VIN C66 =4.7uF/35V TP112 C19 C82 C9 C10 GND2 100nF/50V 10uF/10V =100nF/50V 100K/1% 100nF/50V omS delay GND4 2R/5% C13 =10uF/25V C15 R128 C15 10uF/25V GND GND GND GND DGND DGND DGND C18 实际贴4.uF/35V/C080! =10uF/10V C0805 15K/1% 100pF/50V 100K/1% DGND ADC等效量程 = 0V ~ 38V 此部分元件靠近MCU放置 B0512XT-1WR2: Input Voltage:4.5V~5.5V Output Voltage:11.1V(Min) / 13.2V(Max) Output Current:9mA(Min) / 84mA(Max) <Title> Document Number V3.0 A3 <Doc> Wednesday, June 10, 2020

# **5 MASTER MCU & CAN & LIN**

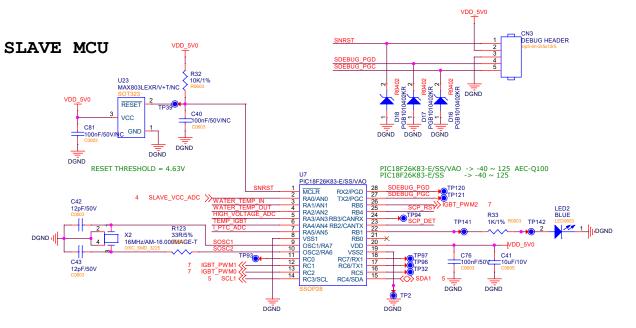




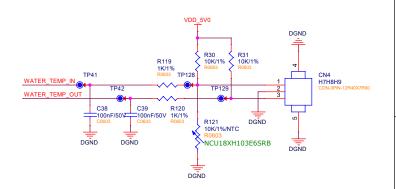
### LIN-BUS VBAT\_VCC D4 MSE1PG-M3/89A MicroSMP TP24 作LIN主节点时使用 R102 C33 100nF/50V VCC\_5V0 MSE1PG-M3/89A/NC R116 R18 1K/1% SN65HVDA100QDRQ1 1K/1%/NC RXD -⟨⟨⟩⟩ LIN\_BUS 4 NWake LIN TXD GND C67 220pF/50V EN = 0 -> Sleep mode EN = 1 -> Normal mode D9 PESD1LIN GND Cathode 1 (15V) Cathode 2 (24V) R117 1K/1% R0603 此元件靠近连接器放置 4 PGND >>



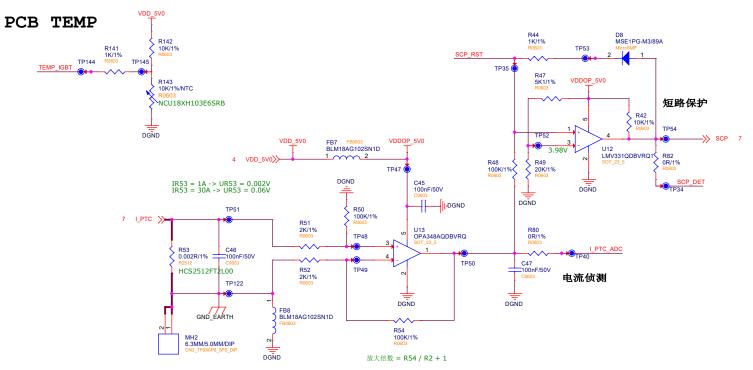
### **6 SLAVE MCU & PROTECT**

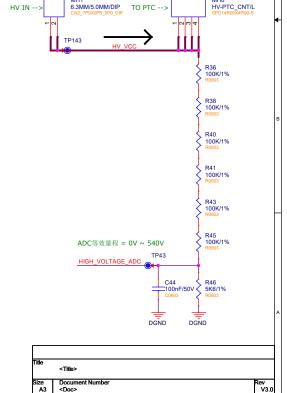


### WATER TEMPERATURE SENSORS



### HIGH VOLTAGE IN & MEASURE





Monday, June 08, 2020

HV-PTC\_CNT/L

#### 7 IGBT & DRIVER 6pcs PTC 500W/pcs -> 6\*500W = 3000W IGBT Driver L HV-PTC CNT/S 33R/5% Q12 DMP4065SQ U10 ZXGD3005E6 IGBT\_VCC VCC SOURCE 5 R62 4 IGBT\_VC 3 IN VEE Q6 AUIRGDC025 =1.5nF/630V R69 10K/1% R76 10K/1% C52 =4.7uF/35V R70 10K/1% R0603 C55 =1.5nF/630V DGND DGND 1K/1% TP30 R0603 DGND DGND 4pcs PTC 500W/pcs -> 4\*500W = 2000W IGBT Driver M HV-PTC\_CNT/S 33R/5% R0603 DMP4065SQ IGBT\_VCC VCC SOURCE 5 X 4 TP62 3 IN VEE C49 =1.5nF/630V 0R/1% Q4 AUIRGDC025 TP66 10K/1% 10K/1% 4.7uF/35\ R68 10K/1% C50 =1.5nF/630V R139 1K/1% TP29 R0603 DGND DGND Q11 2N7002PW-115 6 IGBT\_PWM0>> DGND DGND 2pcs PTC 500W/pcs -> 2\*500W = 1000W IGBT Driver S MH5 HV-PTC CNT/S 33R/5% R63 0R/1% DMP4065SQ TP130 TP67 VCC SOURCE 0R/1% TP72 Q8 AUIRGDC025 ⊒1.5nF/630V 10K/1% 10K/1% = 4.7uF/35V \$ R72 10K/1% R0603 C59 \_\_1.5nF/630V DGND DGND DGND **→**>> I\_PTC 6 TP31 R0603 Q15 2N7002PW-115 6 IGBT\_PWM2>> DGND R126 100K/1% = R0603 DGND DGND <Title> Document Numbe Rev V3.0 Monday, June 08, 202