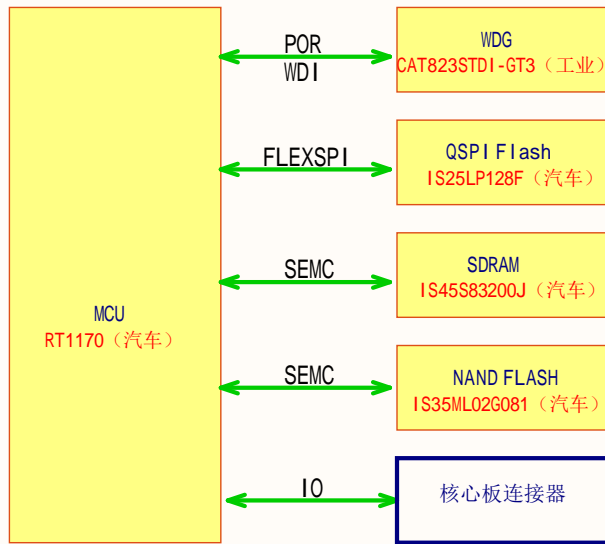


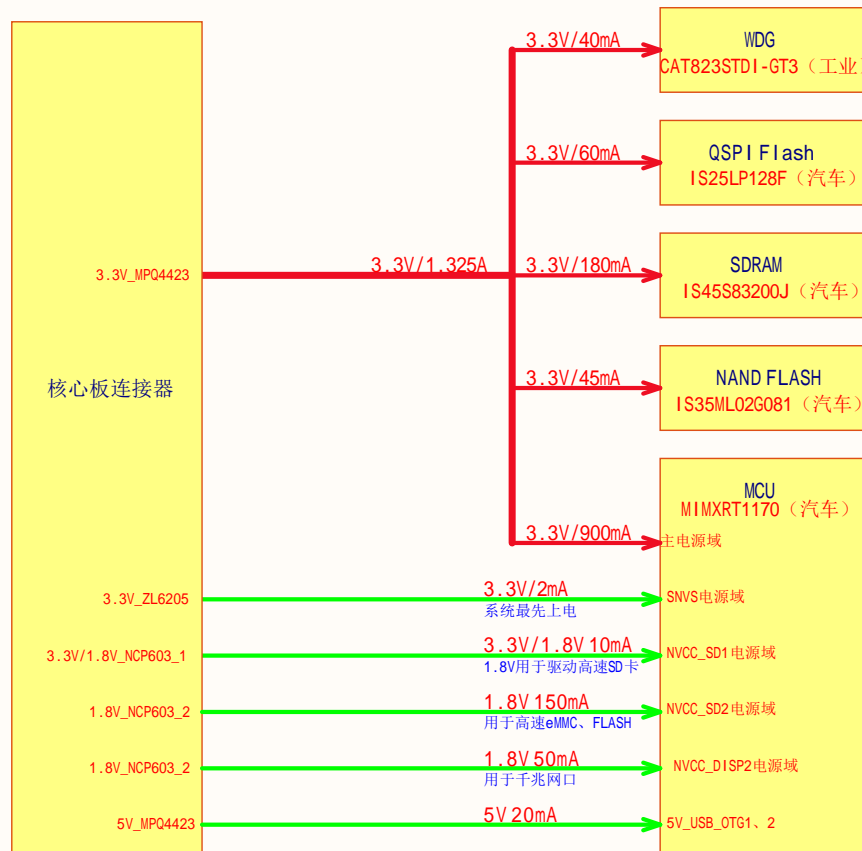
RT1170-Core系统框图



RevisionHistory		
Rev. Code	Date	Description
A	2020-6-10	创建原理图
B		1、 2、 3、 4、
C		
D		

#	修改日期	修改内容
1		
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3		

RT1170-Core 电源框图



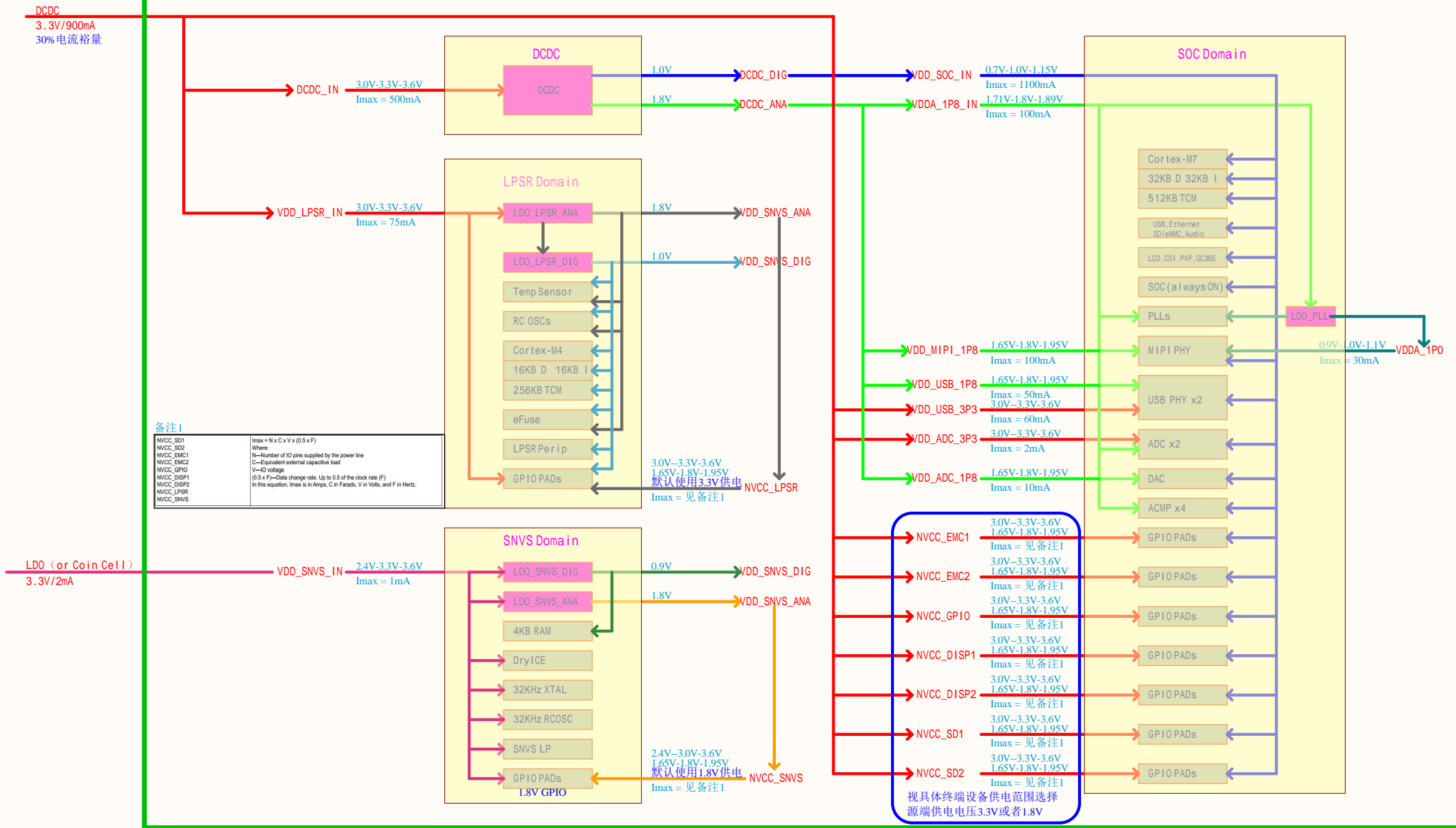
NOTE:

- 设计尽量以汽车级标准设计。
- 本设计电源裕量按照50%设计。
- 系统最先通过ZL6205给MCU的SNVS电源域上电，SNVS电源域上电后，PMIC_ON_REQ输出高电平，该引脚控制DCDC的EN脚，使DCDC开启。
- NCP603_1输出可调的电压给NVCC_SD1供电，用于支持SD卡的高速和低速。依据插入的SD卡类型软件配置SD_VSELECT引脚输出不同电平，控制该LDO输出不同电压，LDO的EN脚加一小段延时，使得LDO在SNVS上电后，POR高电平前上电。
- NCP603_1输出可调的电压给NVCC_DISP1供电，1.8V用于支持千兆网口，此处特别注意该引脚的BOOT电平。

板上设备	电源 电源参数	— 主供电电源	1、每个电源使用的总功率都应标清 2、功能模块的最大功耗标在典型功耗下方 3、整体电源参数应计算清楚 4、每路电源应留有30%以上左右裕量
接口设备	功能模块 型号	— 次供电电源	
		— 其他电源	

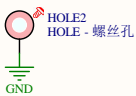
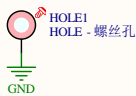
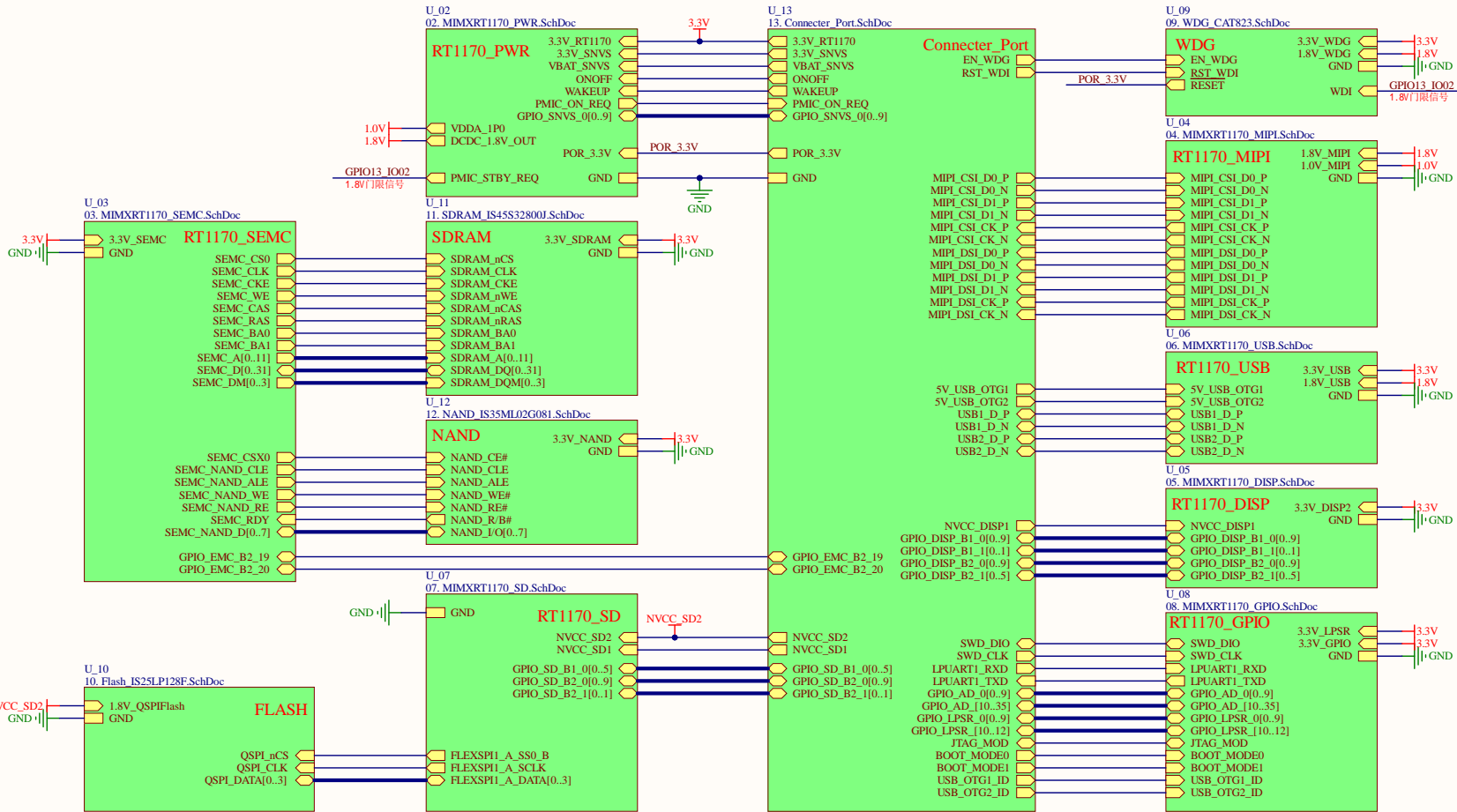
#	修改日期	修改内容
1		
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MIMXRT1170 Series



#	修改日期	修改内容
1		
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4. <图纸名称>



#	修改日期	修改内容
1		
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5. <图纸名称>

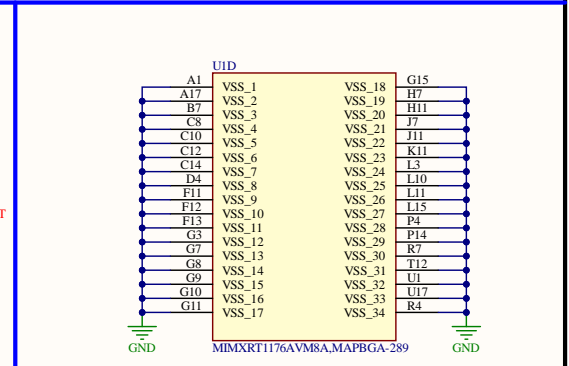
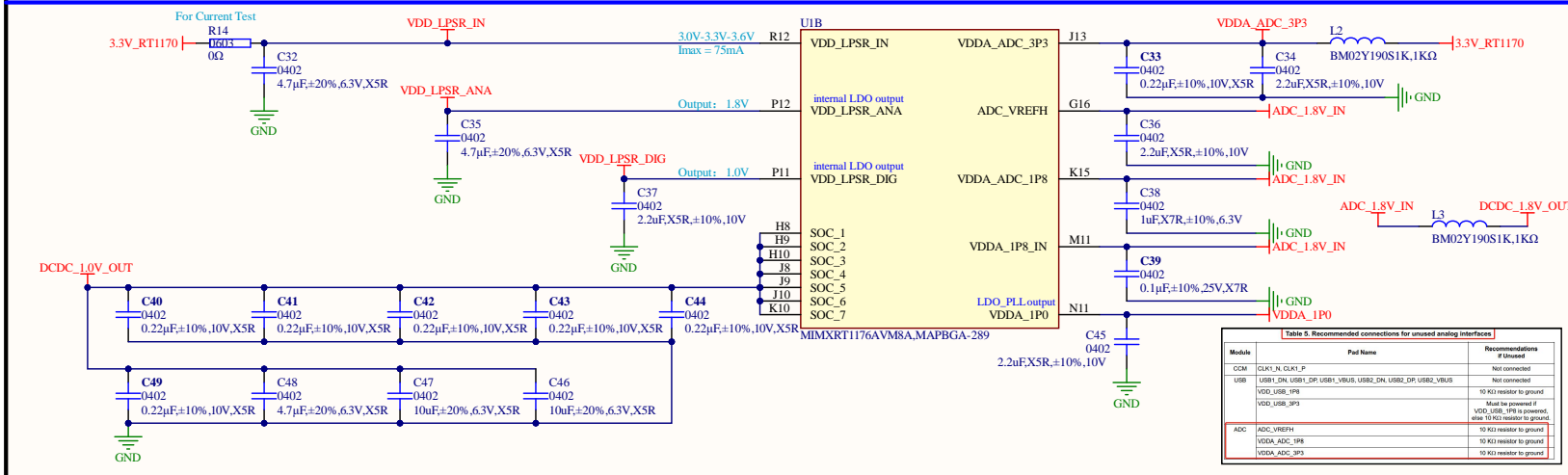
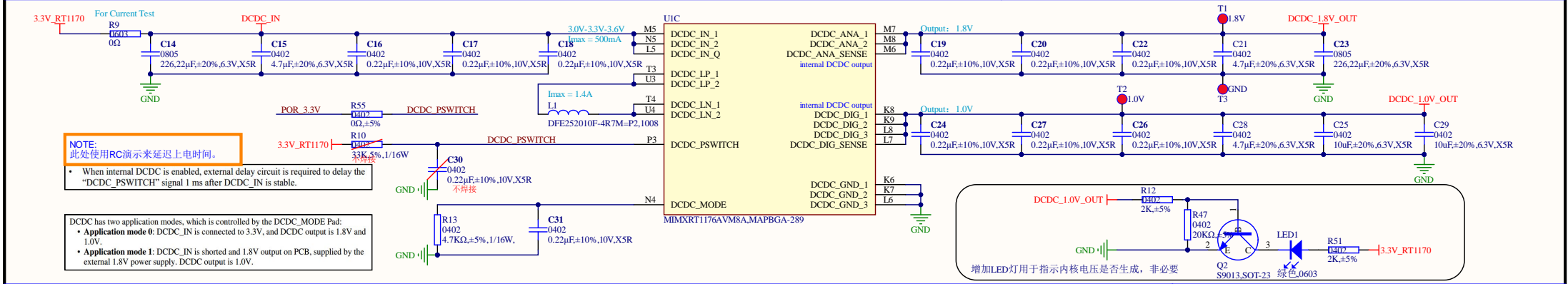
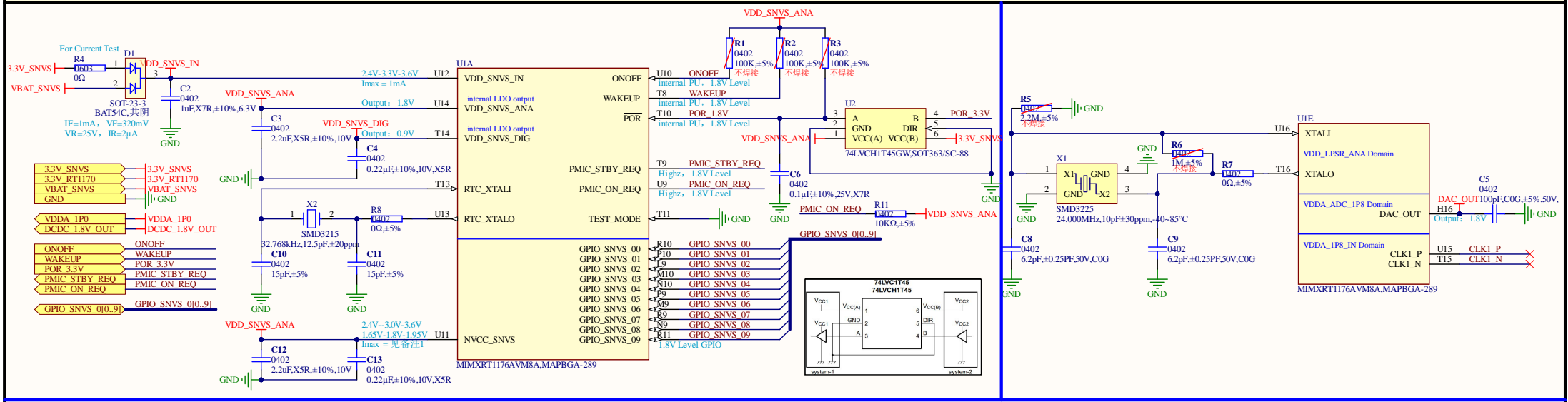
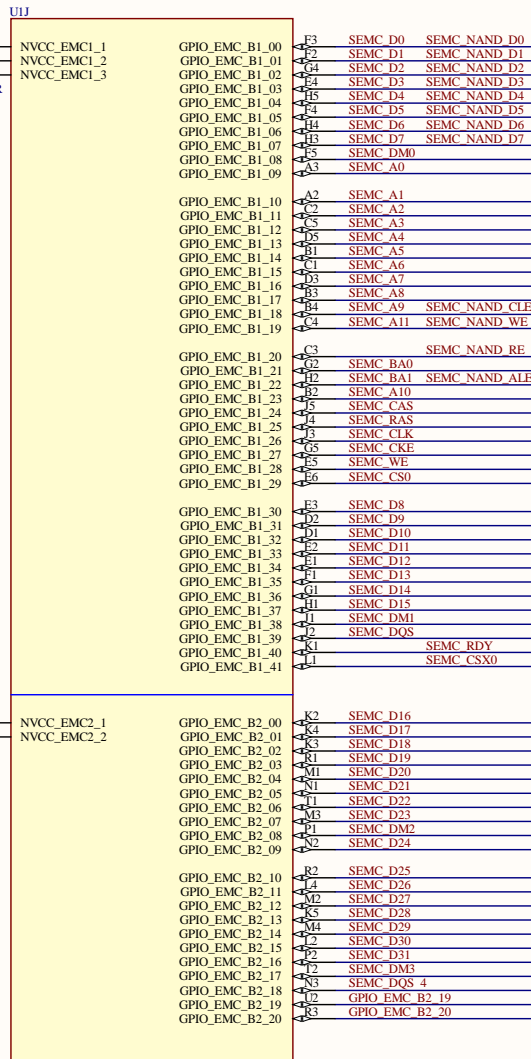
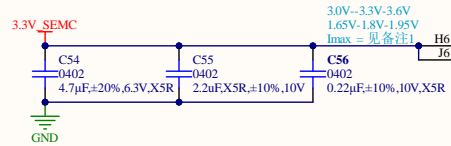
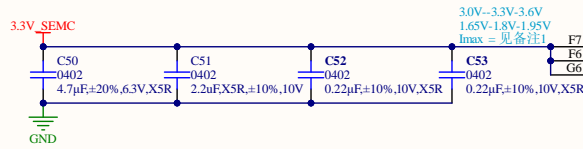
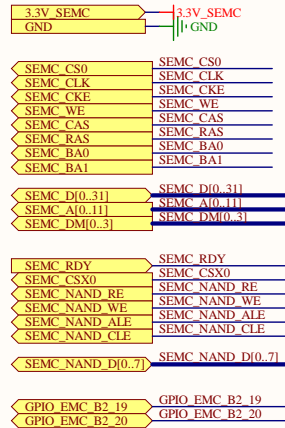


Table 5. Recommended connections for unused analog interfaces

Module	Pad Name	Recommendations if shared
CCM	CLK1_N, CLK1_P	Not connected
USB	USB1_DN, USB1_DP, USB1_VBUS, USB2_DN, USB2_DP, USB2_VBUS	Not connected
	VDD_USB_SIF0	50 K Ω resistor to ground
	VDD_USB_SIF1	Must be powered if VDD_USB_IP8 is powered, else 10 K Ω resistor to ground
ADC	ADC_VREFH	10 K Ω resistor to ground
	VDDA_ADC_IP8	10 K Ω resistor to ground
	VDDA_ADC_3P3	10 K Ω resistor to ground

#	修改日期	修改内容
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6.<图纸名称>



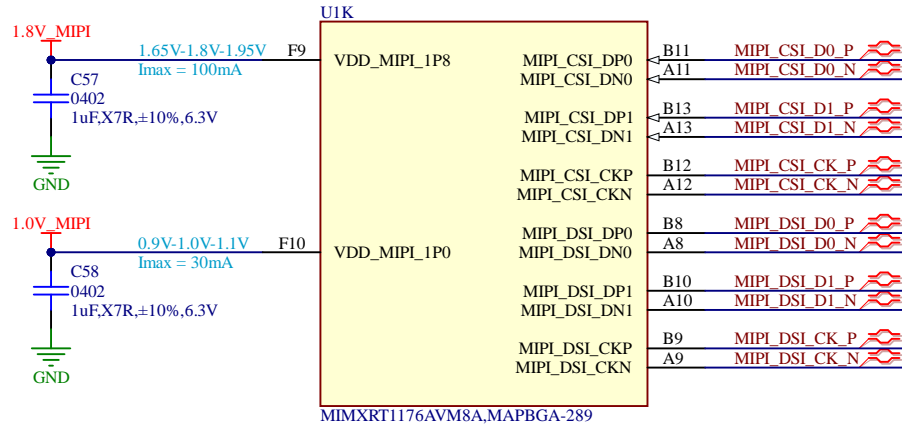
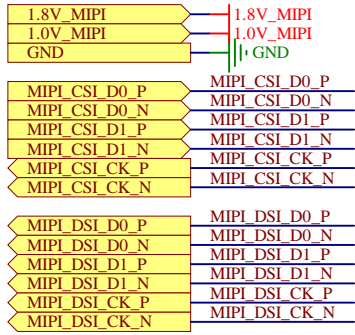
NOTE:
1、SEMC_DQS PIN need floating for SDRAM RW @166MHz

NOTE:
1、SEMC_DQS PIN need floating for NAND.

MIMXRT1176AVM8A_MAPBGA-289

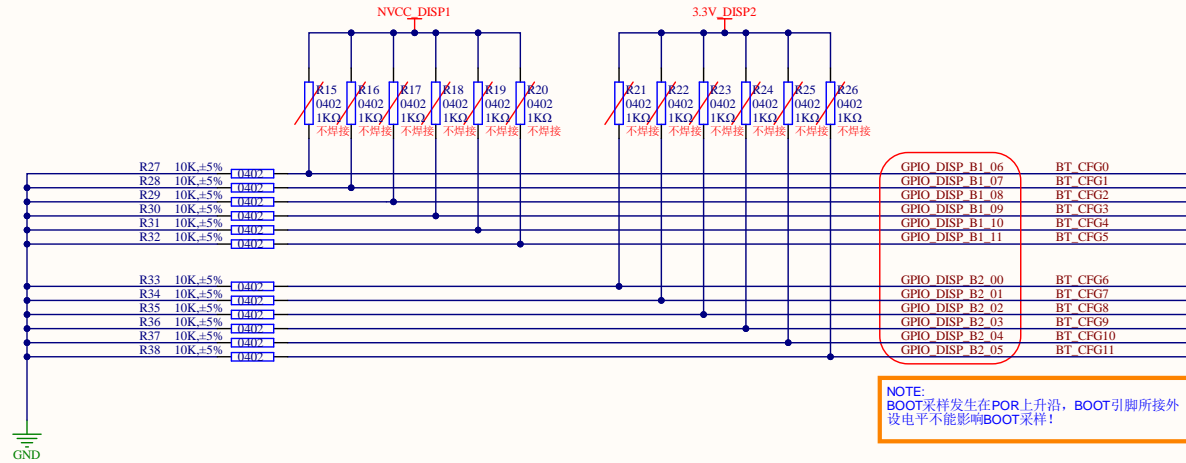
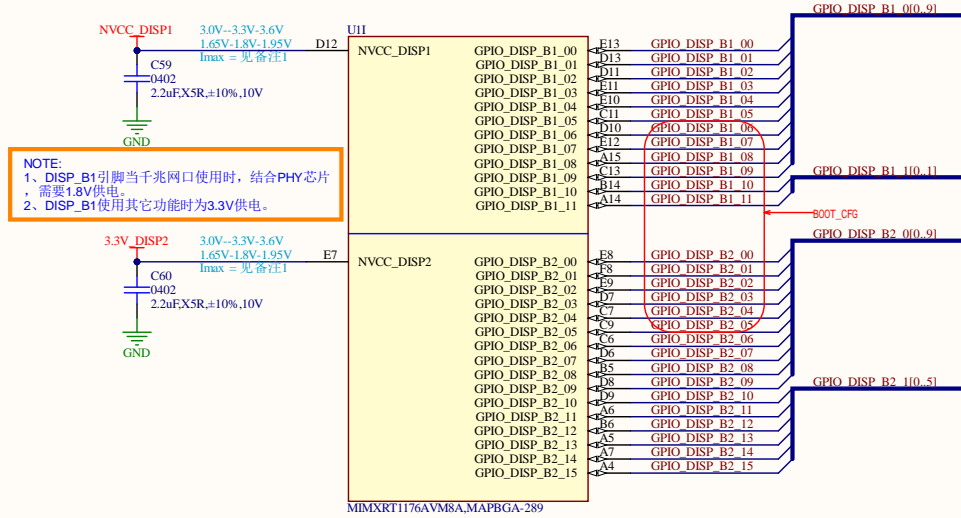
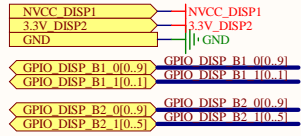
#	修改日期	修改内容
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7.<图纸名称>



#	修改日期	修改内容
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8.<图纸名称>



DEVICE	BT_CFG9 GPIO_DISP_B2_03	BT_CFG6 GPIO_DISP_B2_00	BT_CFG5 GPIO_DISP_B1_11
Flash	0	0	0
SD	1	1	0
NAND	0	0	1

TYPE	Q/1	Q/2	Q/3	Q/4	Q/5	Q/6	Q/7	Q/8	Q/9	Q/10	Q/11	Q/12
FlashSPI - Serial NOR	FlashSPI_INSTANCE 0 - FLASH0 1 - FLASH2	QSPI_FLASH_TYPE 0 - Boot with REDUCED ONFI Read Enable / 1 - Reserved 2 - HyperFLASH J28/J3 / 3 - HyperFLASH J20 4 - MTD Data Read / 5 - Memory Data Read	Reserved	Reserved	0	0	0	0	0	0	0	0
SD Card	Reserved	Reserved	Bit Width 0 - 1-bit 1 - 4-bit	Reserved	0	1	0	0	0	0	0	0
SEMC (NAND)	Reserved	SEMC Access Command 0 - RW 1 - AXI	SEMC ECC Mode 0 - FIRM Mode 1 - HW ECC Mode	DMF compliant 0 - Yes, DMF 1 - No, DMF	0	0	1	0	0	0	0	0

Table 10-9. Boot device selection

BOOT_CFG[9:4]	Boot device
0000b	Serial NOR boot via FlashSPI
0100b	SD Boot via uSDHC
1000b	HM/MC NAND boot via uSDHC
0010b	SILC NAND boot via SEMC
1100b	Serial NAND boot via FlashSPI

#	修改日期	修改内容
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9. <图纸名称>

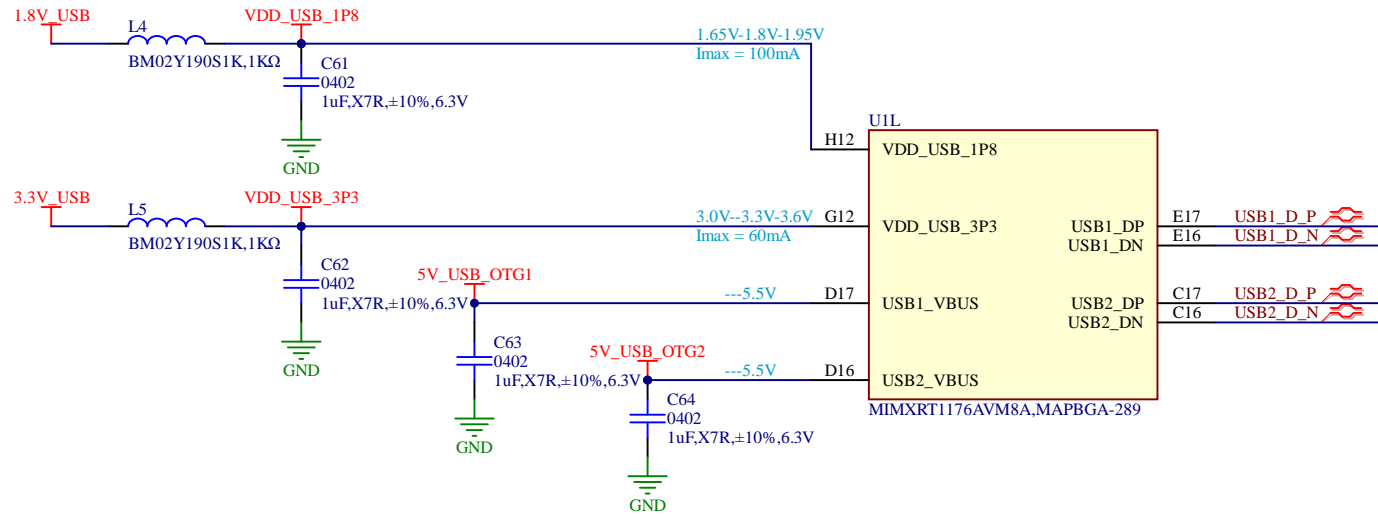
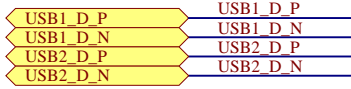
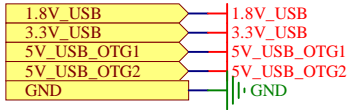
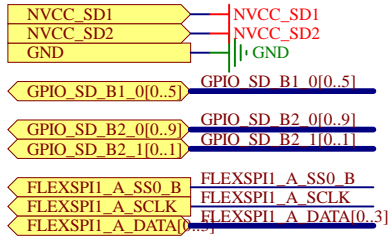


Table 5. Recommended connections for unused analog interfaces

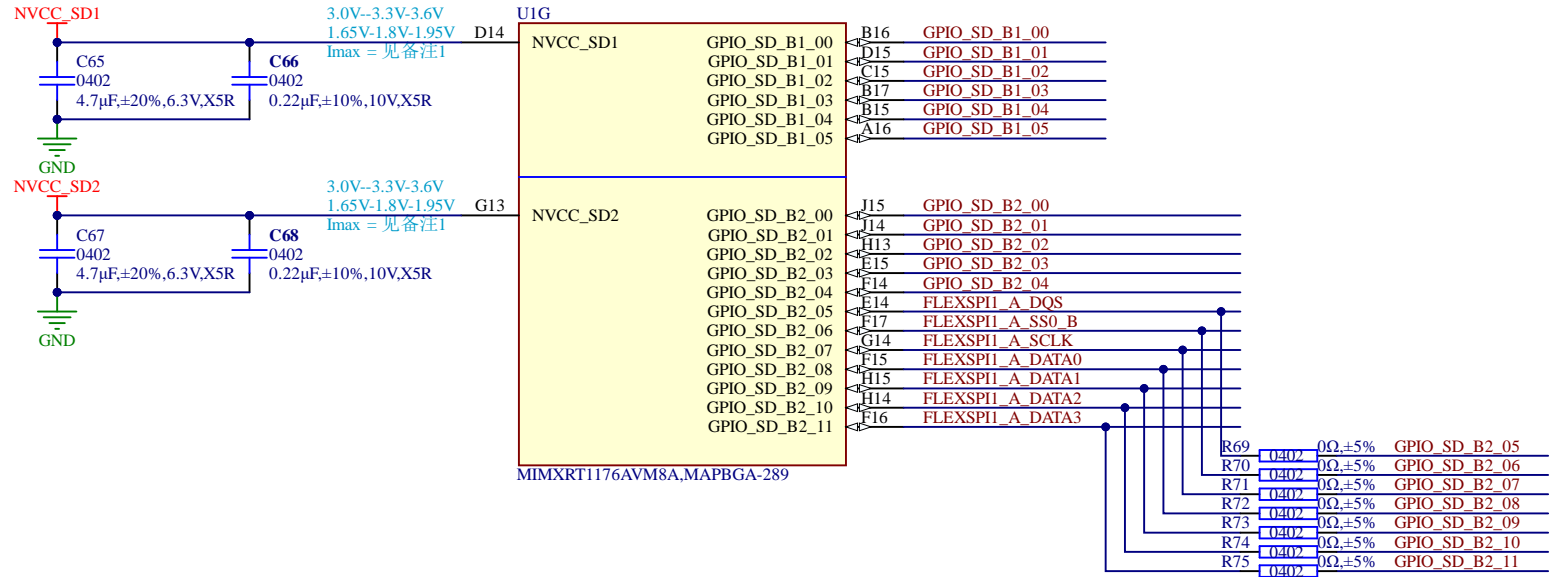
Module	Pad Name	Recommendations if Unused
CCM	CLK1_N, CLK1_P	Not connected
USB	USB1_DN, USB1_DP, USB1_VBUS, USB2_DN, USB2_DP, USB2_VBUS	Not connected
	VDD_USB_1P8	10 K Ω resistor to ground
	VDD_USB_3P3	Must be powered if VDD_USB_1P8 is powered, else 10 K Ω resistor to ground

#	修改日期	修改内容
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10.<图纸名称>

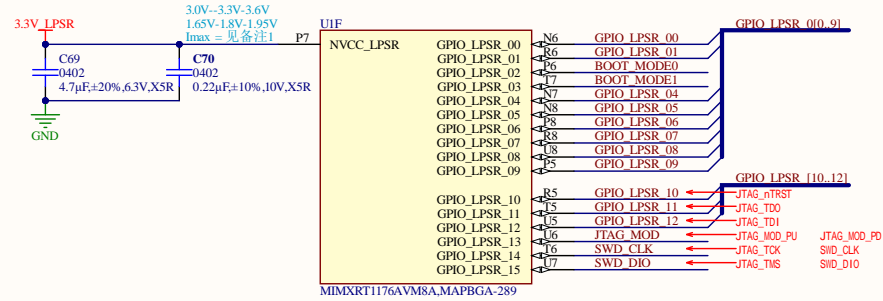
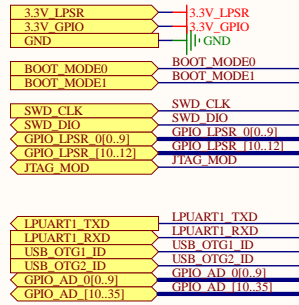


NOTE:
 1、SD1底板外设为SD卡, 当为高速卡, 软件切换供电为1.8V, 默认情况下为3.3V供电。



#	修改日期	修改内容
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11.<图纸名称>



NOTE:
使用JTAG模式下调试时, JTAG_MOD上拉; 使用SWD模式下调试时, JTAG_MOD下拉, 默认使用SWD模式。

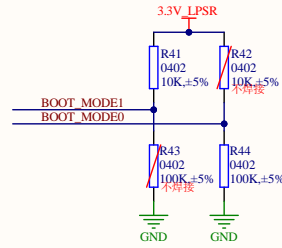
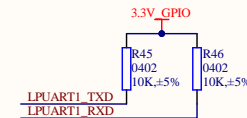
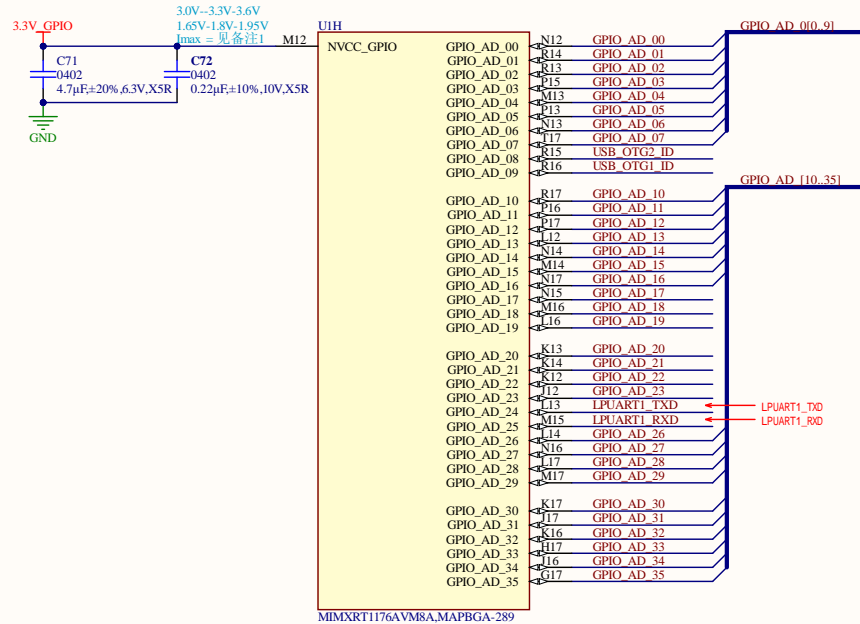


Table 10-3. Boot MODE pin settings

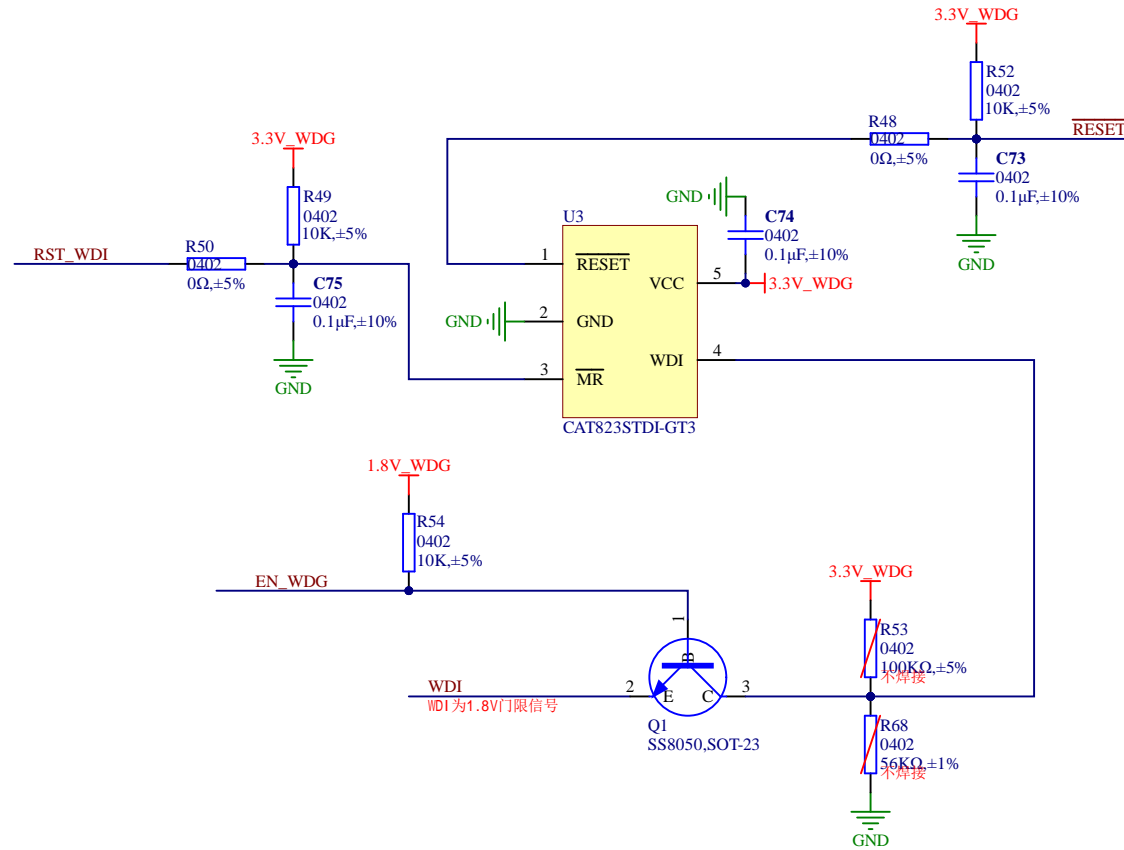
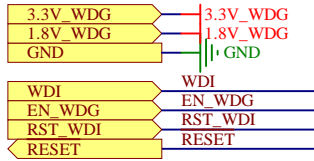
BOOT_MODE[1:0]	Boot Type
00	Boot From Fuses
01	Serial Downloader
10	Internal Boot
11	Reserved



NOTE:
为TXD1/RXD1引脚添加10K上拉, 以避免在串行下载模式时UART端口无效触发。

#	修改日期	修改内容
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12.<图纸名称>

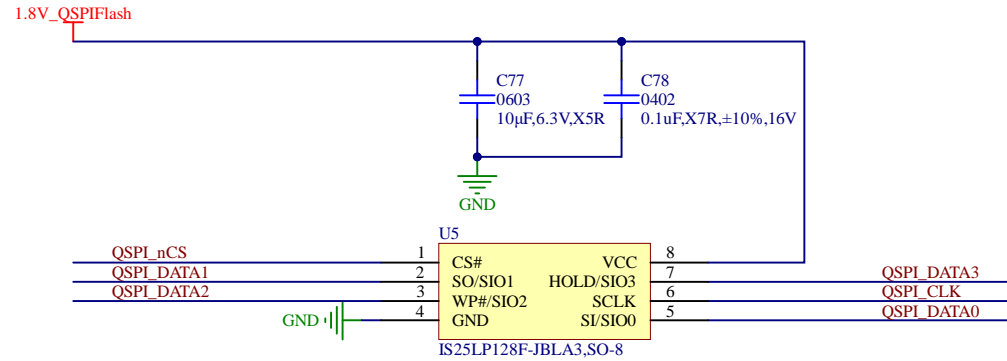
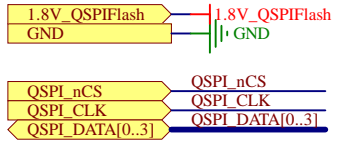


NOTE:
看门狗喂狗信号输入，看门狗定时器溢出周期典型1.6s；喂狗脉冲最小50ns脉宽，低电平最大0.3Vcc，高电平最低0.7Vcc

NOTE:
EN_WDG悬空时使能看门狗，接3.3V时禁能看门狗。

#	修改日期	修改内容
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13.<图纸名称>



ISSI QSPI Flash选型:

<http://www.issi.com/US/product-flash.shtml>

针对不同应用场景选择不同容量、封装、级别的NAND

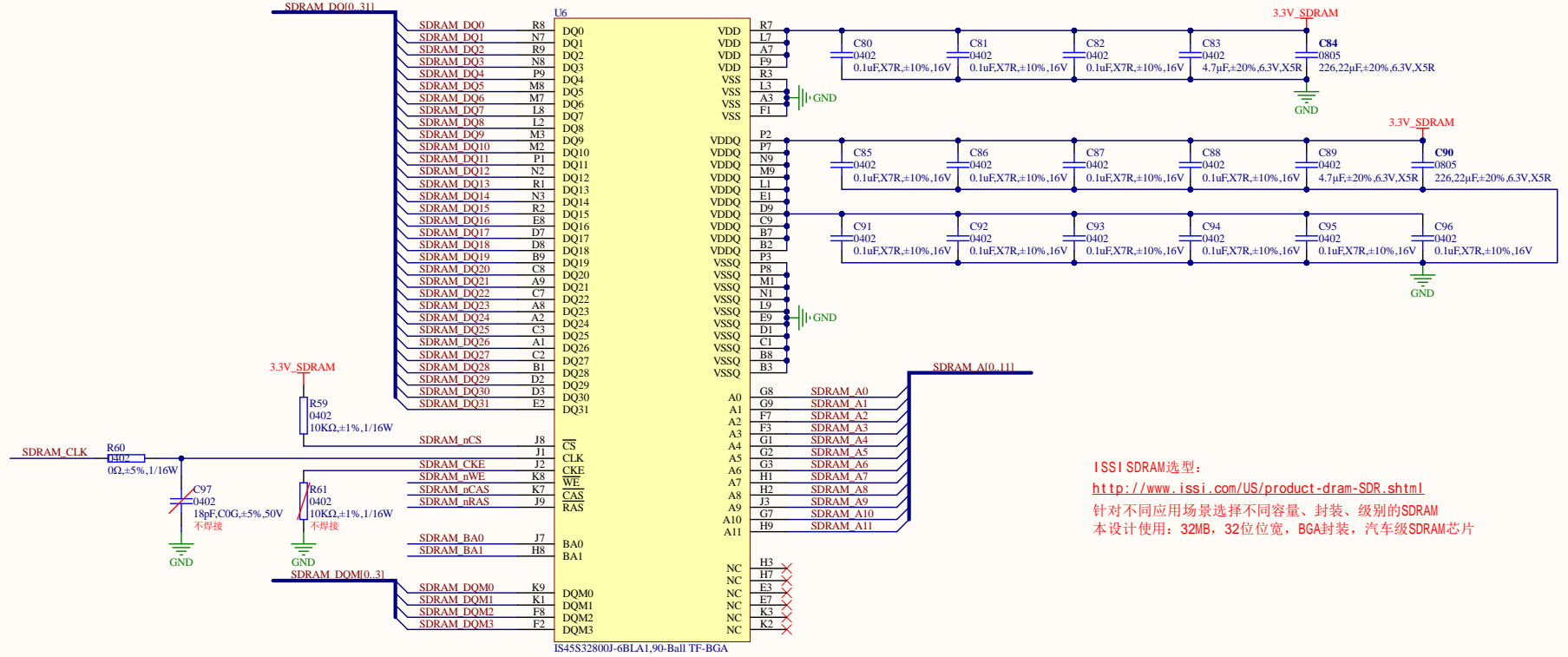
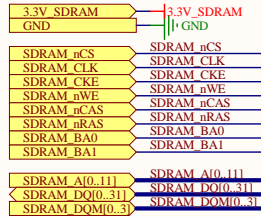
本设计使用: 16MB, SOIC-8封装, 汽车级QSPI FLASH芯片

#	修改日期	修改内容
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立功科技

设计人员	<设计人员>	设计日期	<设计日期>	图纸名称	<图纸名称>	图纸描述	<图纸描述>				
审核人员	<审核日期>	审核日期	<审核人员>	产品名称	评估套件	产品型号	RT1170-Core-A	图纸版本	<图纸版本>	第 13 张 / 共 16 张	A4

14. <图纸名称>



ISSI SDRAM选型:
http://www.issi.com/US/product-dram-SDR_shtml
 针对不同应用场景选择不同容量、封装、级别的SDRAM
 本设计使用: 32MB, 32位位宽, BGA封装, 汽车级SDRAM芯片

SDRAM方案1: 使用一片16位16MB SDRAM

ORDERING INFORMATION - V _{DD} = 3.3V			
Commercial Range: 0°C to +70°C			
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Industrial Range: -40°C to +85°C			
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free

SDRAM方案2: 使用两片16位16MB SDRAM, 共32MB

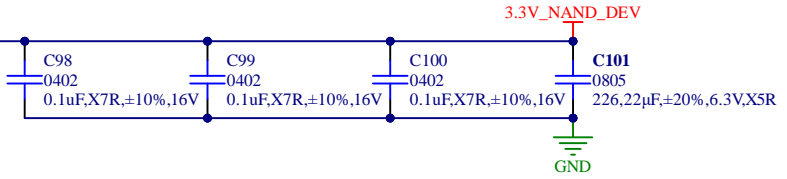
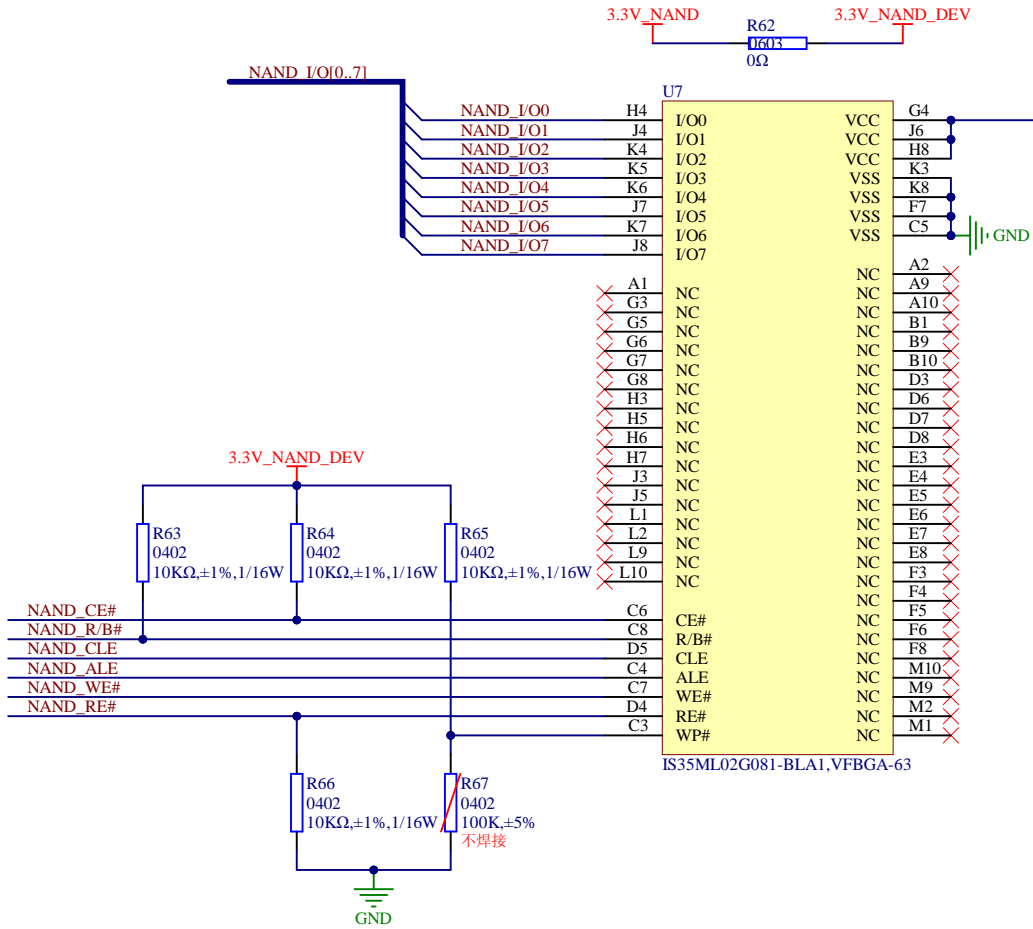
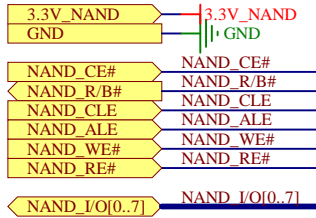
ORDERING INFORMATION - V _{DD} = 3.3V			
Commercial Range: 0°C to +70°C			
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Industrial Range: -40°C to +85°C			
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free
Frequency	Speed (ns)	Order Part No.	Package
200 MHz	5	IS42S1600F-5TL	54-Pin TSOP-II, Lead-free
166 MHz	6	IS42S1600F-6TL	54-Pin TSOP-II, Lead-free
143 MHz	7	IS42S1600F-7TL	54-Pin TSOP-II, Lead-free

SDRAM方案3: 使用1片32位32MB SDRAM

ORDERING INFORMATION - V _{DD} = 3.3V			
Commercial Range: 0°C to +70°C			
Frequency	Speed (ns)	Order Part No.	Package
166 MHz	6	IS42S32800J-6TL	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS42S32800J-7TL	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS42S32800J-7BL	90-Ball TF-BGA, Lead-free
Industrial Range: -40°C to +85°C			
Frequency	Speed (ns)	Order Part No.	Package
166 MHz	6	IS42S32800J-6BL	90-Ball TF-BGA, Lead-free
143 MHz	7	IS42S32800J-7BL	90-Ball TF-BGA, Lead-free
143 MHz	7	IS42S32800J-7TL	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS42S32800J-7BL	90-Ball TF-BGA, Lead-free
133 MHz	7.5	IS42S32800J-75E1	86-Pin, TSOP-II, Lead-free
133 MHz	7.5	IS42S32800J-75E1	90-Ball TF-BGA, Lead-free
Automotive Range: -40°C to +85°C			
Frequency	Speed (ns)	Order Part No.	Package
166 MHz	6	IS45S32800J-6TLA1	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS45S32800J-7TLA1	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS45S32800J-7BLA1	90-Ball TF-BGA, Lead-free
Automotive Range: -40°C to +105°C			
Frequency	Speed (ns)	Order Part No.	Package
143 MHz	7	IS45S32800J-7TLA2	86-Pin, TSOP-II, Lead-free
143 MHz	7	IS45S32800J-7BLA2	90-Ball TF-BGA, Lead-free

#	修改日期	修改内容
1		
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15.<图纸名称>



ISSI NAND选型:
<http://www.issi.com/US/product-flash.shtml#jump8>
 针对不同应用场景选择不同容量、封装、级别的NAND
 本设计使用: 256MB, BGA封装, 汽车级NAND芯片

VDD	Density	Bus	Temp. Grade	Order Part Number	Package	
3.3V	2Gb	X8	Industrial	IS34ML02G081-TL1	48-pin TSOP (Type I)	
				IS34ML02G081-BL1	63-ball VFBGA	
				IS34ML02G081-TL2	48-pin TSOP (Type I)	
				IS34ML02G081-BL2	63-ball VFBGA	
			Automotive (A1) ⁽¹⁾	IS35ML02G081-TLA1	48-pin TSOP (Type I)	
				IS35ML02G081-BLA1	63-ball VFBGA	
				Automotive (A2) ⁽¹⁾	IS35ML02G081-TLA2	48-pin TSOP (Type I)
					IS35ML02G081-BLA2	63-ball VFBGA

#	修改日期	修改内容
1		
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3		



设计人员	<设计人员>	设计日期	<设计日期>	图纸名称	<图纸名称>	图纸描述	<图纸描述>			
审核人员	<审核日期>	审核日期	<审核人员>	产品名称	评估套件	产品型号	RT1170-Core-A	图纸版本	<图纸版本>第 15 张 / 共 16 张	A4

16. <图纸名称>

3.3V_RT1170	3.3V_RT1170
3.3V_SNVS	3.3V_SNVS
VBAT_SNVS	VBAT_SNVS
NVCC_DISP1	NVCC_DISP1
NVCC_DISP1	NVCC_DISP1
NVCC_SD1	NVCC_SD1
NVCC_SD2	NVCC_SD2
GND	GND

POR_3.3V	POR_3.3V
ONOFF	ONOFF
WAKEUP	WAKEUP
PMIC_ON_REQ	PMIC_ON_REQ

GPIO_SNVS_0[0..9]	GPIO_SNVS_0[0..9]
-------------------	-------------------

EN_WDG	EN_WDG
RST_WDI	RST_WDI

BOOT_MODE0	BOOT_MODE0
BOOT_MODE1	BOOT_MODE1

GPIO_EMC_B2_19	GPIO_EMC_B2_19
GPIO_EMC_B2_20	GPIO_EMC_B2_20

MIPI_DSI_CK_P	MIPI_DSI_CK_P
MIPI_DSI_CK_N	MIPI_DSI_CK_N
MIPI_DSI_D0_P	MIPI_DSI_D0_P
MIPI_DSI_D0_N	MIPI_DSI_D0_N
MIPI_DSI_D1_P	MIPI_DSI_D1_P
MIPI_DSI_D1_N	MIPI_DSI_D1_N

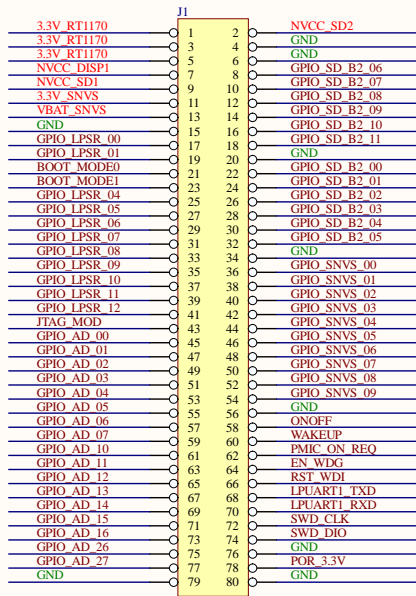
MIPI_CSI_D0_P	MIPI_CSI_D0_P
MIPI_CSI_D0_N	MIPI_CSI_D0_N
MIPI_CSI_D1_P	MIPI_CSI_D1_P
MIPI_CSI_D1_N	MIPI_CSI_D1_N
MIPI_CSI_CK_P	MIPI_CSI_CK_P
MIPI_CSI_CK_N	MIPI_CSI_CK_N

5V_USB_OTG1	5V_USB_OTG1
5V_USB_OTG2	5V_USB_OTG2
USB1_D_P	USB1_D_P
USB1_D_N	USB1_D_N
USB2_D_P	USB2_D_P
USB2_D_N	USB2_D_N
USB_OTG1_ID	USB_OTG1_ID
USB_OTG2_ID	USB_OTG2_ID

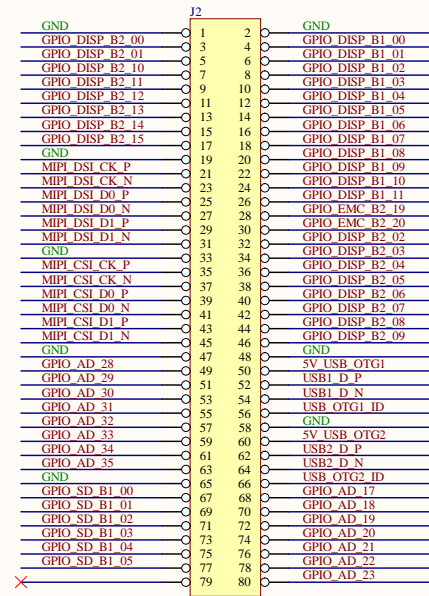
SWD_DIO	SWD_DIO
SWD_CLK	SWD_CLK
LPUART1_TXD	LPUART1_TXD
LPUART1_RXD	LPUART1_RXD
GPIO_AD_0[0..9]	GPIO_AD_0[0..9]
GPIO_AD_1[0..35]	GPIO_AD_1[0..35]
GPIO_LPSR_0[0..9]	GPIO_LPSR_0[0..9]
GPIO_LPSR_1[0..12]	GPIO_LPSR_1[0..12]
JTAG_MOD	JTAG_MOD

GPIO_DISP_B1_0[0..9]	GPIO_DISP_B1_0[0..9]
GPIO_DISP_B1_1[0..1]	GPIO_DISP_B1_1[0..1]
GPIO_DISP_B2_0[0..9]	GPIO_DISP_B2_0[0..9]
GPIO_DISP_B2_1[0..5]	GPIO_DISP_B2_1[0..5]

GPIO_SD_B1_0[0..5]	GPIO_SD_B1_0[0..5]
GPIO_SD_B2_0[0..9]	GPIO_SD_B2_0[0..9]
GPIO_SD_B2_1[0..1]	GPIO_SD_B2_1[0..1]



DF12A(3.0)-80DS-0.5V(81)公座.SMD



DF12A(3.0)-80DS-0.5V(81)公座.SMD

#	修改日期	修改内容
1		
2		
3		