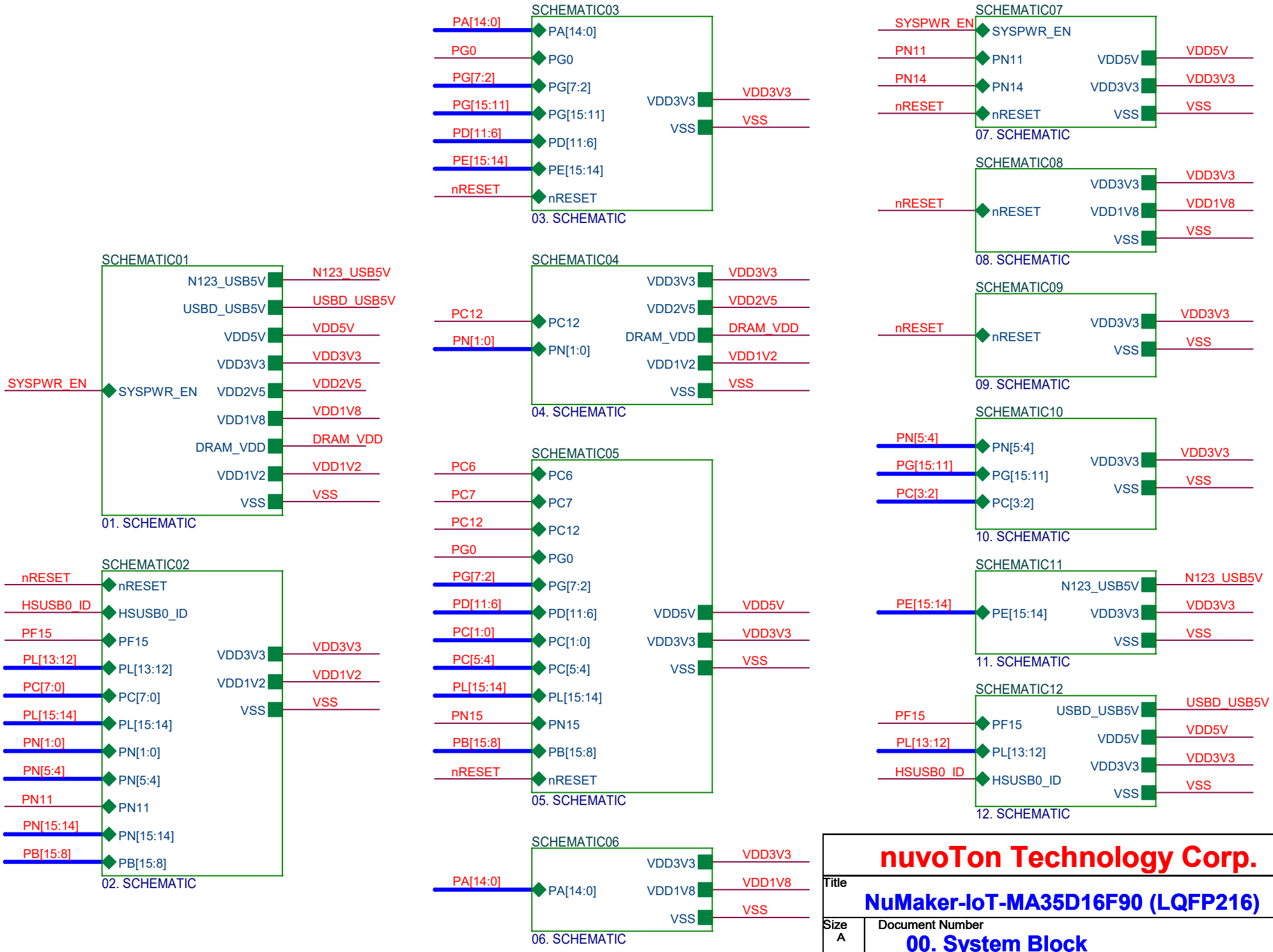
SCHEMATIC01
N123_USB5V
USBD_USB5V
VDD5V
VDD3V3
VDD2V5
VDD1V8
DRAM_VDD
VDD1V2
VSS
SYSPWR_EN
01. SCHEMATIC
SCHEMATIC02
nRESET
HSUSB0_ID
PF15
PL[13:12]
PC[7:0]
PL[15:14]
PN[1:0]
PN[5:4]
PN11
PN[15:14]
PB[15:8]
02. SCHEMATIC
SCHEMATIC03
PA[14:0]
PG0
PG[7:2]
PG[15:11]
PD[11:6]
PE[15:14]
nRESET
03. SCHEMATIC
SCHEMATIC04
PC12
PN[1:0]
04. SCHEMATIC
SCHEMATIC05
PC6
PC7
PC12
PG0
PG[7:2]
PD[11:6]
PC[1:0]
PC[5:4]
PL[15:14]
PN15
PB[15:8]
nRESET
05. SCHEMATIC
SCHEMATIC06
06. SCHEMATIC
SCHEMATIC07
SYSPWR_EN
PN11
PN14
07. SCHEMATIC
SCHEMATIC08
08. SCHEMATIC
SCHEMATIC09
09. SCHEMATIC
SCHEMATIC10
PN[5:4]
PG[15:11]
PC[3:2]
10. SCHEMATIC
SCHEMATIC11
11. SCHEMATIC
SCHEMATIC12
12. SCHEMATIC
nuvoTon Technology Corp.
Title
NuMaker-IoT-MA35D16F90 (LQFP216)
Size
A
Document Number
00. System Block
Rev
V2.4
Date:
Tuesday, August 27, 2024
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1
of
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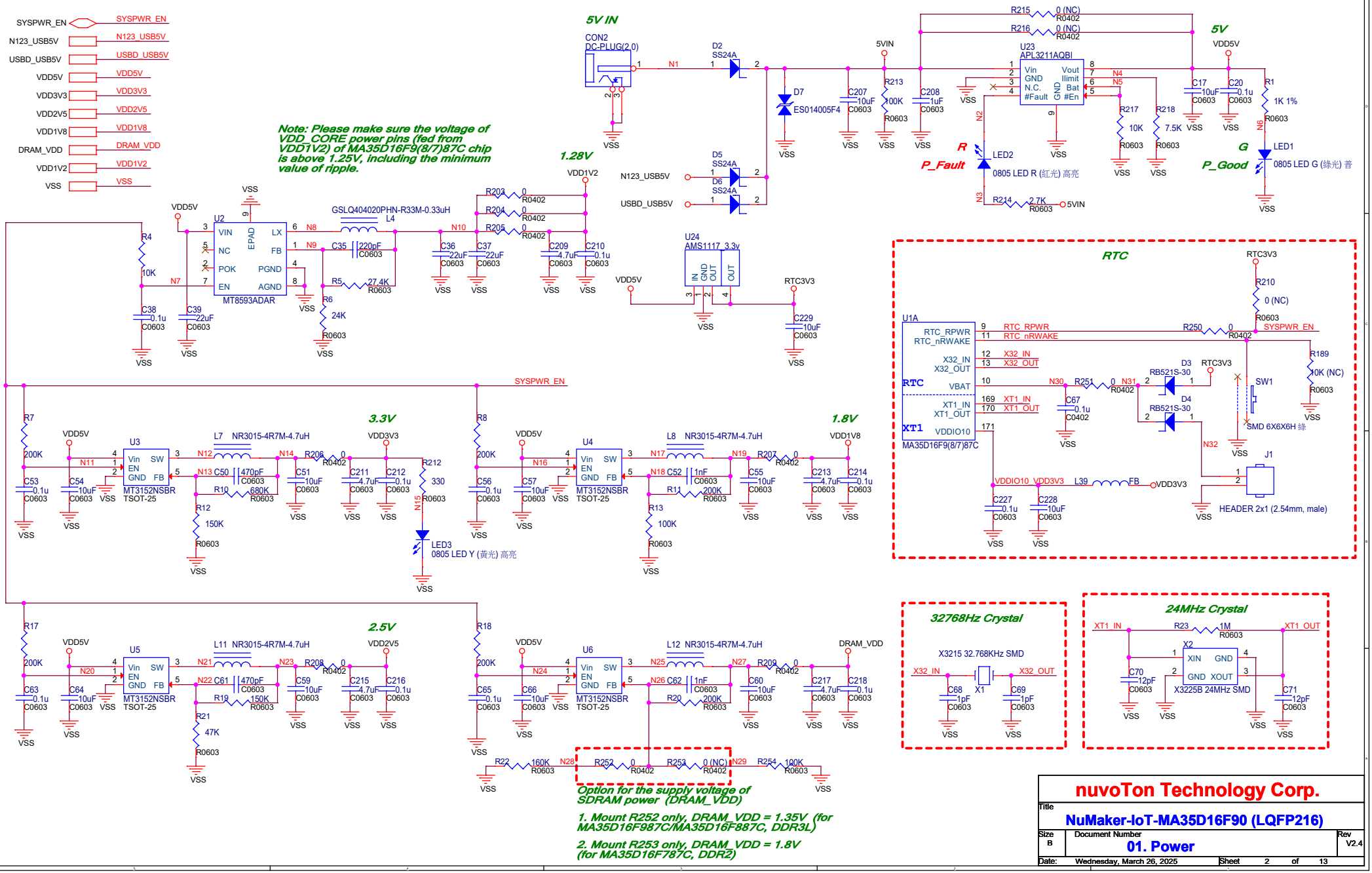

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Title	NuMaker-IoT-MA35D16F90 (LQFP216)	
Size B	Document Number 01. Power	Rev V2.4
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U1C

nRESET/HSUSB0_ID,VBUSVLD/HSUSBH_PWREN,OVC/PWM_0/UART_7,14/CAN_1/SPI_0/SC_1/I2C_2/INT_0,2

MA35D16F9(8/7)87C

nRESET/WDT_nRST — 1 nRESET
HSUSB0_ID — 2 HSUSB0_ID
PF15/HSUSB0_VBUSVLD — 3 PF15 — HSUSB0_VBUSVLD
PL12/EPWM0_SYNC_IN/UART7_nCTS/ECAP1_IC0/UART14_RXD/SPI0_SS0/I2S1_LRCK/SC1_CLK/EBI_AD0/HSUSBH_PWREN/I2C2_SDA/TM0/EPWM0_CH2/EBI_AD11/RGMII0_PPS/RMII0_PPS — 4 PL12 — HSUSBH_PWREN
PL13/EPWM0_SYNC_OUT/UART7_nRTS/ECAP1_IC1/UART14_TXD/SPI0_CLK/I2S1_BCLK/SC1_DAT/EBI_AD1/HSUSBH_OVC/I2C2_SCL/TM0_EXT/EPWM0_CH3/EBI_AD12/RMII1_PPS — 5 PL13 — HSUSBH_OVC
PL14/EPWM0_CH2/UART7_RXD/CAN1_RXD/SPI0_MOSI/I2S1_DI/SC1_RST/EBI_AD2/TM2/INT0/EBI_AD13 — 6 PL14 — SPI0_MOSI — GPIO10
PL15/EPWM0_CH1/UART7_TXD/CAN1_TXD/SPI0_MISO/I2S1_DO/SC1_RWR/EBI_AD3/TM2_EXT/INT2/EBI_AD14 — 7 PL15 — SPI0_MISO — GPIO9
VDDIO0 — 215 VDDIO0_VDD3V3 — L13 FB — VDD3V3
C72 0.1u C0603 — VSS
C73 10uF C0603 — VSS

Note: The VDDIO0 is the input voltage of I/O group 0 and its voltage is 3.3V only.

Reset

VDD3V3 — R24 100K R0603 — nRESET
VDD1V2 — C74 1uF C0603 — VSS
N33 — Q1 2N3904 (NPN) — C75 1uF C0603 — VSS
R29 100K R0603 — VSS
SW2 SMD 6X6X5H 紅 — VSS

U1I

PC0/I2C4_SDA/SD0_CMD/eMMC0_CMD — 142 PC0 — I2C4_SDA — GPIO0
PC1/I2C4_SCL/SD0_CLK/eMMC0_CLK — 143 PC1 — I2C4_SCL — GPIO1
PC2/CAN0_RXD/SD0_DAT0/eMMC0_DAT0 — 144 PC2 — AUDIO_JKEN#
PC3/CAN0_TXD/SD0_DAT1/eMMC0_DAT1 — 145 PC3 — AUDIO_JKDET
PC4/I2C5_SDA/SD0_DAT2/eMMC0_DAT2 — 146 PC4 — I2C5_SDA — GPIO2
PC5/I2C5_SCL/SD0_DAT3/eMMC0_DAT3 — 147 PC5 — I2C5_SCL — GPIO3
PC6/CAN1_RXD/SD0_nCD — 149 PC6 — CAN1_RXD
PC7/CAN1_TXD/SD0_WP — 150 PC7 — CAN1_TXD

eMMC_0

CAN_0,1/I2C_4,5/SD_0

VDDIO6 — 148 VDDIO6_VDD3V3 — L14 FB — VDD3V3
C76 0.1u C0603 — VSS
C77 10uF C0603 — VSS

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Note: The VDDIO6 is the input voltage of I/O group 6 and its voltage is 3.3V only.

Note: If these PC0~PC5 pins (eMMC0_xxx) are used to connect with eMMC device and act as the booting source, please pulls the PC6 pin (SD0_nCD) to low.

PC6
10K

3 Collector
2N3904 (NPN)
1 Base
2 Emitter

U1J

I2C_1,2,4,5/SPI_1/SC_0

PN0/I2C2_SDA/CCAP1_DATA0 — 152 PN0 — CCAP0_I2C2_SDA
PN1/I2C2_SCL/CCAP1_DATA1 — 153 PN1 — CCAP0_I2C2_SCL
PN2/CAN0_RXD/CCAP1_DATA2 — 154 PN2 — KEY0
PN3/CAN0_TXD/CCAP1_DATA3 — 155 PN3 — KEY1
PN4/I2C1_SDA/CCAP1_DATA4 — 156 PN4 — I2C1_SDA
PN5/I2C1_SCL/CCAP1_DATA5 — 157 PN5 — I2C1_SCL
PN6/CAN1_RXD/CCAP1_DATA6 — 159 PN6 — LED0
PN7/CAN1_TXD/CCAP1_DATA7 — 160 PN7 — LED1
PN10/CAN2_RXD/CCAP1_SCLK — 161 PN10 — LED2
PN11/CAN2_TXD/CCAP1_PIXCLK — 162 PN11 — SD_LP
PN12/UART6_nCTS/UART12_RXD/I2C5_SDA/CCAP1_HSYNC — 163 PN12 — KEY2
PN13/UART6_nRTS/UART12_TXD/I2C5_SCL/CCAP1_VSYNC — 164 PN13 — KEY3
PN14/UART6_RXD/CAN3_RXD/SPI1_SS1/CCAP1_SFIELD/SPI1_I2SMCLK — 165 PN14 — SD_nRST
PN15/EPWM2_CH4/UART6_TXD/CAN3_TXD/I2S0_MCLK/SPI1_SS1/SPI1_I2SMCLK/SC0_nCD/CLKO/TM6 — 166 PN15 — GPIO4
PK12/EPWM2_CH0/UART1_nCTS/UART13_RXD/I2C4_SDA/I2S0_LRCK/SPI1_SS0/SC0_CLK/TM10/INT2 — 167

CCAP_1/PWM_2/UART_1,6,12,13/CAN_0,1,2,3/INT_2,3/CLKO

VDDIO7 — 158 VDDIO7_VDD3V3 — L15 FB — VDD3V3
C78 0.1u C0603 — VSS
C79 10uF C0603 — VSS

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Note: The VDDIO7 is the input voltage of I/O group 7 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)

KEY_0 SW3 — R30 10K R0603 — KEY0 — VDD3V3 — VSS — SMD 6X6X5H 黑
KEY_1 SW4 — R31 10K R0603 — KEY1 — VDD3V3 — VSS — SMD 6X6X5H 黑
KEY_2 SW5 — R32 10K R0603 — KEY2 — VDD3V3 — VSS — SMD 6X6X5H 黑
KEY_3 SW6 — R33 10K R0603 — KEY3 — VDD3V3 — VSS — SMD 6X6X5H 黑

U1M

PB8/EPWM2_BRAKE0/UART2_nCTS/UART1_RXD/I2C2_SDA/SPI0_SS1/SPI0_I2SMCLK/ADC0_CH0(A0)/EBI_nCS0/TM4/QEI2_INDEX/KPI_ROW6 — 204 PB8 — SPI0_SS1 — GPIO7
PB9/EPWM2_CH4/UART2_nRTS/UART1_TXD/I2C2_SCL/SPI0_CLK/I2S0_MCLK/CCAP1_HSYNC/ADC0_CH1(A1)/EBI_ALE/EBI_AD13/TM0_EXT/I2S1_MCLK/SC0_nCD/QEI2_A/KPI_ROW7 — 205 PB9 — SPI0_CLK — GPIO11
PB10/EPWM2_CH5/UART2_RXD/CAN0_RXD/SPI0_MOSI/EBI_MCLK/CCAP1_VSYNC/ADC0_CH2(A2)/EBI_ADR15/EBI_AD14/TM5/I2C1_SDA/INT1/QEI2_B — 206 PB10 — ADC0_CH2 — AR_A0
PB11/EPWM2_BRAKE1/UART2_TXD/CAN0_TXD/SPI0_MISO/I2S1_MCLK/CCAP1_SFIELD/ADC0_CH3(VSENSE)/EBI_nCS2/EBI_ALE/TM5_EXT/I2C1_SCL/INT2/QEI2_INDEX — 207 PB11 — ADC0_CH3 — AR_A1
PB12/EPWM2_CH0/UART4_nCTS/UART3_RXD/I2C3_SDA/CAN2_RXD/I2S1_LRCK/ADC0_CH4(YM)/EBI_ADR16/ECAP2_IC0 — 211 PB12 — ADC0_CH4 — AR_A4
PB13/EPWM2_CH1/UART4_nRTS/UART3_TXD/I2C3_SCL/CAN2_TXD/I2S1_BCLK/ADC0_CH5(YP)/EBI_ADR17/ECAP2_IC1 — 212 PB13 — ADC0_CH5 — AR_A5
PB14/EPWM2_CH2/UART4_RXD/CAN1_RXD/I2C4_SDA/I2S1_DI/ADC0_CH6(XM)/EBI_ADR18/ECAP2_IC2 — 213 PB14 — ADC0_CH6 — AR_A2
PB15/EPWM2_CH3/UART4_TXD/CAN1_TXD/I2C4_SCL/I2S1_DO/ADC0_CH7(XP)/EBI_ADR19 — 214 PB15 — ADC0_CH7 — AR_A3

ADC/PWM_2/UART_1,2,3,4/CAN_0,1,2/I2C_2,3,4/SPI_0/I2S_1/INT_1,2

AVDD_EADC0 — 203 AVDD_3V3
AVDD_ADC0 — 208
AVSS — 209
L16 FB — VDD3V3
C80 0.1u C0603 — AVSS
C81 0.1u C0603
C82 10uF C0603
R35 0 R0603 — VSS

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Note: The AVDD_EADC0 and AVDD_ADC0 are the input voltages of EADC0 and ADC0 (includes the I/O votlage of PB8~PB15), their input voltages are 3.3V only.

LED_0 R25 330 R0603 — N34 — LEDR1 R — 0805 LED R (紅光) 高亮 — LED0
LED_1 R26 330 R0603 — N35 — LEDG1 G — 0805 LED G (綠光) 普 — LED1
LED_2 R27 330 R0603 — N36 — LEDY1 Y — 0805 LED Y (黃光) 高亮 — LED2

nRESET — nRESET
HSUSB0_ID — HSUSB0_ID
PF15 — PF15
PL[13:12] — PL[13:12]
PL[15:14] — PL[15:14]
PC[7:0] — PC[7:0]
PN[1:0] — PN[1:0]
PN[5:4] — PN[5:4]
PN11 — PN11
PN[15:14] — PN[15:14]
PB[15:8] — PB[15:8]
VDD3V3 — VDD3V3
VDD1V2 — VDD1V2
VSS — VSS

nuvoTon Technology Corp.

Title: **NuMaker-IoT-MA35D16F90 (LQFP216)**

Size: B | Document Number: **02. VDDIO0/6/7/ADC** | Rev: V2.4

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U1D

NAND/UART_1,2,3,4,5,8,16

PA0/UART1_nCTS/UART16_RXD/NAND_DATA0/EBI_AD0/EBI_ADR0
PA1/UART1_nRTS/UART16_TXD/NAND_DATA1/EBI_AD1/EBI_ADR1
PA2/UART1_RXD/NAND_DATA2/EBI_AD2/EBI_ADR2
PA3/UART1_TXD/NAND_DATA3/EBI_AD3/EBI_ADR3
PA4/UART3_nCTS/UART2_RXD/NAND_DATA4/EBI_AD4/EBI_ADR4
PA5/UART3_nRTS/UART2_TXD/NAND_DATA5/EBI_AD5/EBI_ADR5
PA6/UART3_RXD/NAND_DATA6/EBI_AD6/EBI_ADR6
PA7/UART3_TXD/NAND_DATA7/EBI_AD7/EBI_ADR7
PA8/UART5_nCTS/UART4_RXD/NAND_RDY0/EBI_AD8/EBI_ADR8
PA9/UART5_nRTS/UART4_TXD/NAND_nRE/EBI_AD9/EBI_ADR9
PA10/UART5_RXD/NAND_nWE/EBI_AD10/EBI_ADR10
PA11/UART5_TXD/NAND_CLE/EBI_AD11/EBI_ADR11
PA12/UART7_nCTS/UART8_RXD/NAND_ALE/EBI_AD12/EBI_ADR12
PA13/UART7_nRTS/UART8_TXD/NAND_nCS0/EBI_AD13/EBI_ADR13
PA14/UART7_RXD/CAN3_RXD/NAND_nWP/EBI_AD14/EBI_ADR14

24	PA0	NAND_DATA0
25	PA1	NAND_DATA1
26	PA2	NAND_DATA2
27	PA3	NAND_DATA3
28	PA4	NAND_DATA4
29	PA5	NAND_DATA5
30	PA6	NAND_DATA6
31	PA7	NAND_DATA7
32	PA8	NAND_RDY
33	PA9	NAND_nRE
34	PA10	NAND_nWE
35	PA11	NAND_CLE
36	PA12	NAND_ALE
37	PA13	NAND_nCS
39	PA14	NAND_nWP

PowerOnSetting

INT_0,1,2,3/UART_5,6,9

SC_1/PWM_0,1

SPI_3/I2S_1/CLKO/PWM_0/CAN_0,1,2,3

PG0/EPWM0_CH0/UART7_TXD/CAN3_TXD/SPI0_SS0/EBI_AD15/I2S1_MCLK/QEI0_INDEX/TM1/CLKO/INT0/EBI_ADR15/PowerOnSetting
PA15/EPWM0_CH2/UART9_nCTS/UART6_RXD/I2C4_SDA/CAN2_RXD/EBI_ALE/QEI0_A/TM1/RGMII0_PPS/RMII0_PPS
PG1/EPWM0_CH3/UART9_nRTS/UART6_TXD/I2C4_SCL/CAN2_TXD/EBI_nCS0/QEI0_B/TM1_EXT/RMII1_PPS/PowerOnSetting
PG2/EPWM0_CH4/UART9_RXD/CAN0_RXD/SPI0_SS1/EBI_ADR16/EBI_nCS2/QEI0_A/TM3/INT1/PowerOnSetting
PG3/EPWM0_CH5/UART9_TXD/CAN0_TXD/SPI0_I2SMCLK/EBI_ADR17/EBI_nCS1/EBI_MCLK/QEI0_B/TM3_EXT/I2S1_MCLK/PowerOnSetting
PG4/EPWM1_CH0/UART5_nCTS/UART6_RXD/SPI3_SS0/EBI_ADR18/EBI_nCS0/I2S1_DO/SC1_CLK/TM4/INT2/ECAP1_IC2/PowerOnSetting
PG5/EPWM1_CH1/UART5_nRTS/UART6_TXD/SPI3_CLK/ECAP0_IC0/EBI_ADR19/EBI_ALE/I2S1_DI/SC1_DAT/TM4_EXT/PowerOnSetting
PG6/EPWM1_CH2/UART5_RXD/CAN1_RXD/SPI3_MOSI/ECAP0_IC1/EBI_nRD/I2S1_BCLK/SC1_RST/TM7/INT3/PowerOnSetting
PG7/EPWM1_CH3/UART5_TXD/CAN1_TXD/SPI3_MISO/ECAP0_IC2/EBI_nWR/I2S1_LRCK/SC1_PWR/TM7_EXT/PowerOnSetting

40	PG0	GPIO8
41		
42	PG1	
43	PG2	AR_D2
44	PG3	AR_D3
45	PG4	GPIO21
46	PG5	GPIO20
47	PG6	GPIO18
48	PG7	GPIO19

JTAG/I2S_0

PG11/JTAG_TDO/I2S0_MCLK/NAND_RDY1/EBI_nWRH/EBI_nCS1/EBI_AD0
PG12/JTAG_TCK/SW_CLK/I2S0_LRCK/EBI_nWRL/EBI_AD1
PG13/JTAG_TMS/SW_DIO/I2S0_BCLK/EBI_MCLK/EBI_AD2
PG14/JTAG_TDI/I2S0_DI/NAND_nCS1/EBI_ALE/EBI_AD3
PG15/JTAG_nTRST/I2S0_DO/EBI_nCS0/EBI_AD4

50	PG11	
51	PG12	
52	PG13	
53	PG14	
54	PG15	

QSPI_1/PWM_0/USRT_1,15,16

I2C_0/I2S_1/SC_1

PD6/EPWM0_SYNC_IN/UART1_RXD/QSPI1_MOSI1/I2C0_SDA/I2S0_MCLK/EPWM0_CH0/EBI_AD5/SPI3_SS1
PD7/EPWM0_SYNC_OUT/UART1_TXD/QSPI1_MISO1/I2C0_SCL/I2S1_MCLK/EPWM0_CH1/EBI_AD6/SC1_nCD
PD8/EPWM0_BRAKE0/UART16_nCTS/UART15_RXD/QSPI1_SS0/I2S1_LRCK/EPWM0_CH2/EBI_AD7/SC1_CLK/TM0
PD9/EPWM0_BRAKE1/UART16_nRTS/UART15_TXD/QSPI1_CLK/I2S1_BCLK/EPWM0_CH3/EBI_AD8/SC1_DAT/TM0_EXT
PD10/EPWM1_BRAKE0/UART16_RXD/QSPI1_MOSI0/I2S1_DI/EPWM0_CH4/EBI_AD9/SC1_RST/TM2
PD11/EPWM1_BRAKE1/UART16_TXD/QSPI1_MISO0/I2S1_DO/EPWM0_CH5/EBI_AD10/SC1_PWR/TM2_EXT

58	PD6	AR_D4
59	PD7	AR_D5
60	PD8	AR_D6
61	PD9	AR_D7
62	PD10	AR_D8
63	PD11	AR_D9

UART_0

PE14/UART0_TXD
PE15/UART0_RXD

56	PE14	UART0_TXD
57	PE15	UART0_RXD

VDDIO1
VDDIO1

38	VDDIO1	VDD3V3
64	VDDIO1	

L17 FB VDD3V3

C85 0.1u C0603 — C86 0.1u C0603 — C87 10uF C0603

VSS VSS VSS

MA35D16F9(8/7)87C

Note: The VDDIO1 is the input voltage of I/O group 1 and its voltage is 3.3V only.

Power-on Setting

PG0	
L	Secure Boot
H	Secure Boot Enable

PG1	
L	Secure Boot Disable
H	Boot Source QSPI0, SD/eMMC I/O Voltage

PG3	PG2	
L	L	3.3V
L	H	1.8V
H	L	QSPI0 Flash
H	H	SD/eMMC

PG7	PG6	
L	L	NAND Flash
L	H	USB
H	L	Booting from QSPI0
H	H	Booting from SD/eMMC

PG6	
L	SPI-NAND, 1-bit
H	SPI-NOR, 1-bit

PG7	
L	SD0/eMMC0 booting
H	SD1/eMMC1 booting

PG7	
L	Booting from SD/eMMC
H	eMMC 4-bit booting
	eMMC 8-bit booting

PG5	PG4	
L	L	Booting from NAND
L	H	Ignore
H	L	NAND flash page 2KB
H	H	NAND flash page 4KB
		NAND flash page 8KB

PG7	PG6	
L	L	Booting from NAND
L	H	Ignore
H	L	BCH T12
H	H	BCH T24
		NO ECC

PG4	
L	Booting from USB
H	USBD booting
	USBH booting

PG5	
L	Booting from USBH
H	USBH port 0 booting
	USBH port 1 booting

PG6	
L	Booting from USBH
H	Over-current low-active detect
	Over-current high-active detect

VDD3V3 — R188 0 R0603 — N122

R202 10K R0603 — R40 10K R0603 — R201 10K R0603 — R39 10K R0603 — R233 10K R0603 — R38 10K R0603 — R37 10K R0603 — R36 10K R0603

SW7

PG0 N37
PG1 N38
PG2 N39
PG3 N40
PG4 N41
PG5 N42
PG6 N43
PG7 N44

SW DIP 8 (SMD)

Internal pull-down

Note: When the chip enters debug mode, these GPIO PG11 ~ PG15 pins will be automatically forced to JTAG and SWD functionality by hardware, and other pinout functions of these GPIO pins will be disabled.

J3 HEADER 2x1 (2.54mm, male)

nRESET — SWJ_nRESET

SWJ Connector

VDD3V3 — RP1 10K-8P4R — VSS

CON12

JTAG_nTRST
JTAG_TDI
JTAG_TMS SW_DIO
JTAG_TCK SW_CLK
JTAG_TDO
SWJ_nRESET

N45

C221 10uF C0603

U39 TSOP-6 NSP4201MR6T1G — U40 TSOP-6 NSP4201MR6T1G

SWJ (JTAG/SWD)簡易牛角

L38 FB

VSS VSS VSS VSS

PA[14:0] — PA[14:0]
PG0 — PG0
PG[7:2] — PG[7:2]
PG[15:11] — PG[15:11]
PD[11:6] — PD[11:6]
PE[15:14] — PE[15:14]
nRESET — nRESET
VDD3V3 — VDD3V3
VSS — VSS

Both PD.6 and PD.7 pins are dedicated to I2C0 functions for controlling external PMIC.

Note: The GPIO PE15 (UART0_RXD) pin must be pulled to high level through an external resistor or an internal pull-up resistor in the external device (such as a transceiver or MCU).

VDDIO1 (VDD3V3)

10K

PE15

PG11~15 Connect to SWJ(I2S0)

PG11 R41 0 (NC) R0603 JTAG_TDO
PG12 R42 0 (NC) R0603 JTAG_TCK SW_CLK
PG13 R43 0 (NC) R0603 JTAG_TMS SW_DIO
PG14 R44 0 (NC) R0603 JTAG_TDI
PG15 R45 0 (NC) R0603 JTAG_nTRST

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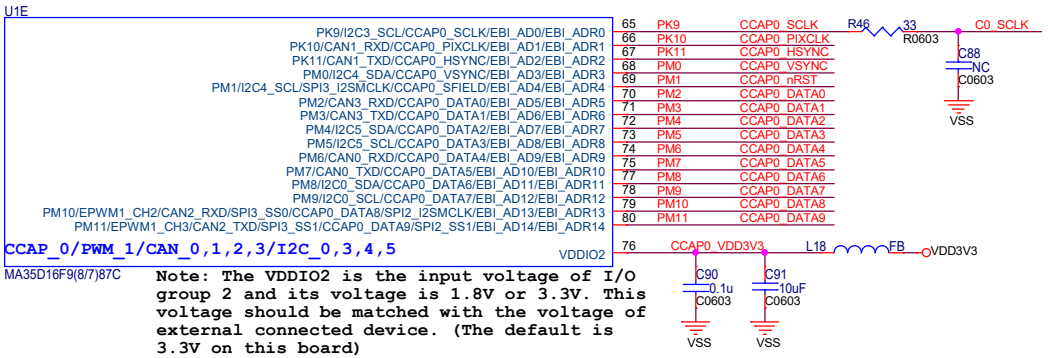
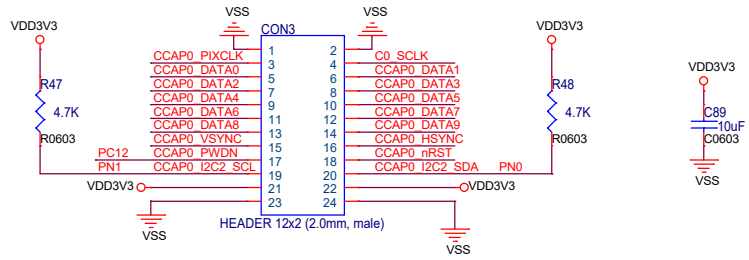
CCAP0 Connector

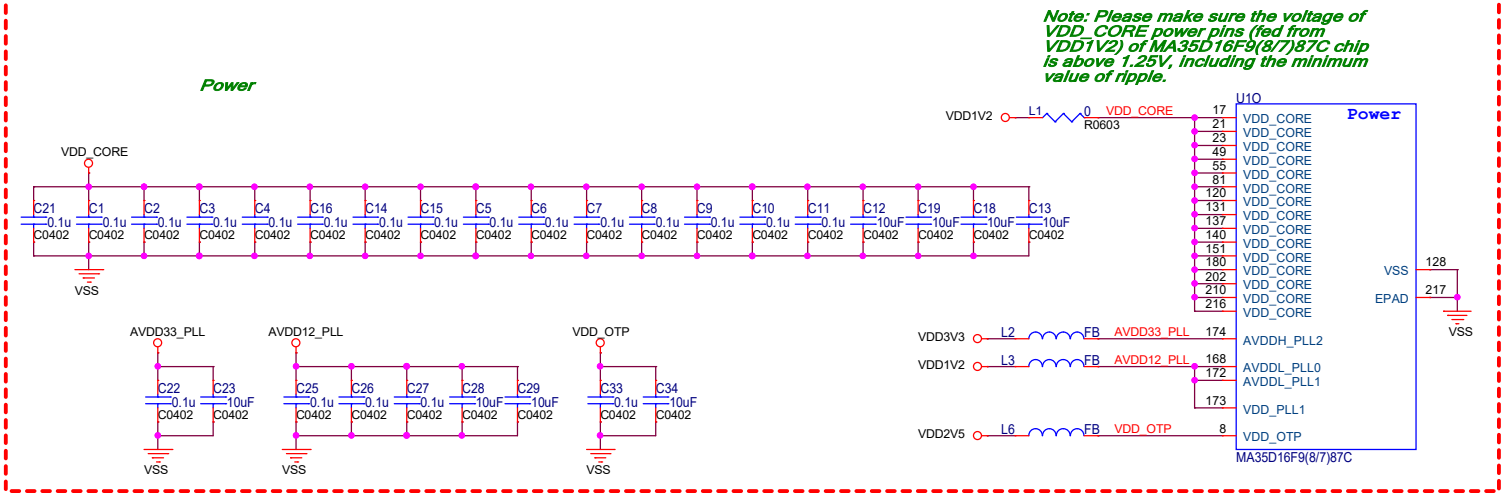


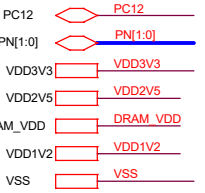
Note: The VDDIO2 is the input voltage of I/O group 2 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)



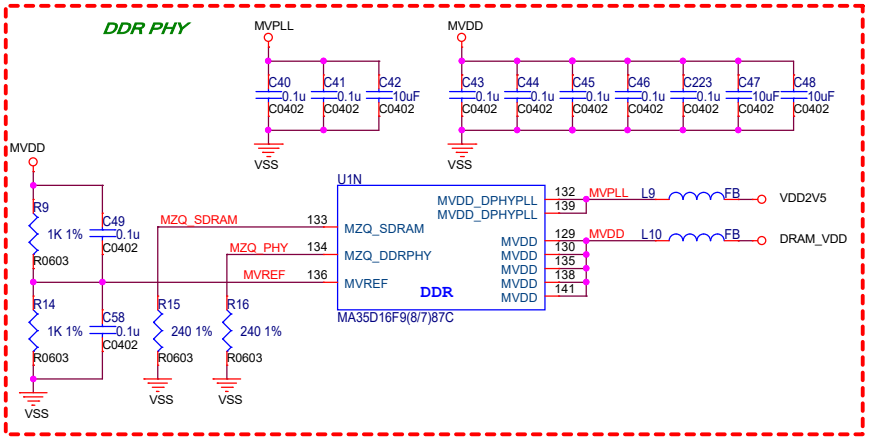
Power

Note: Please make sure the voltage of VDD_CORE power pins (fed from VDD1V2) of MA35D16F9(8/7)87C chip is above 1.25V, including the minimum value of ripple.

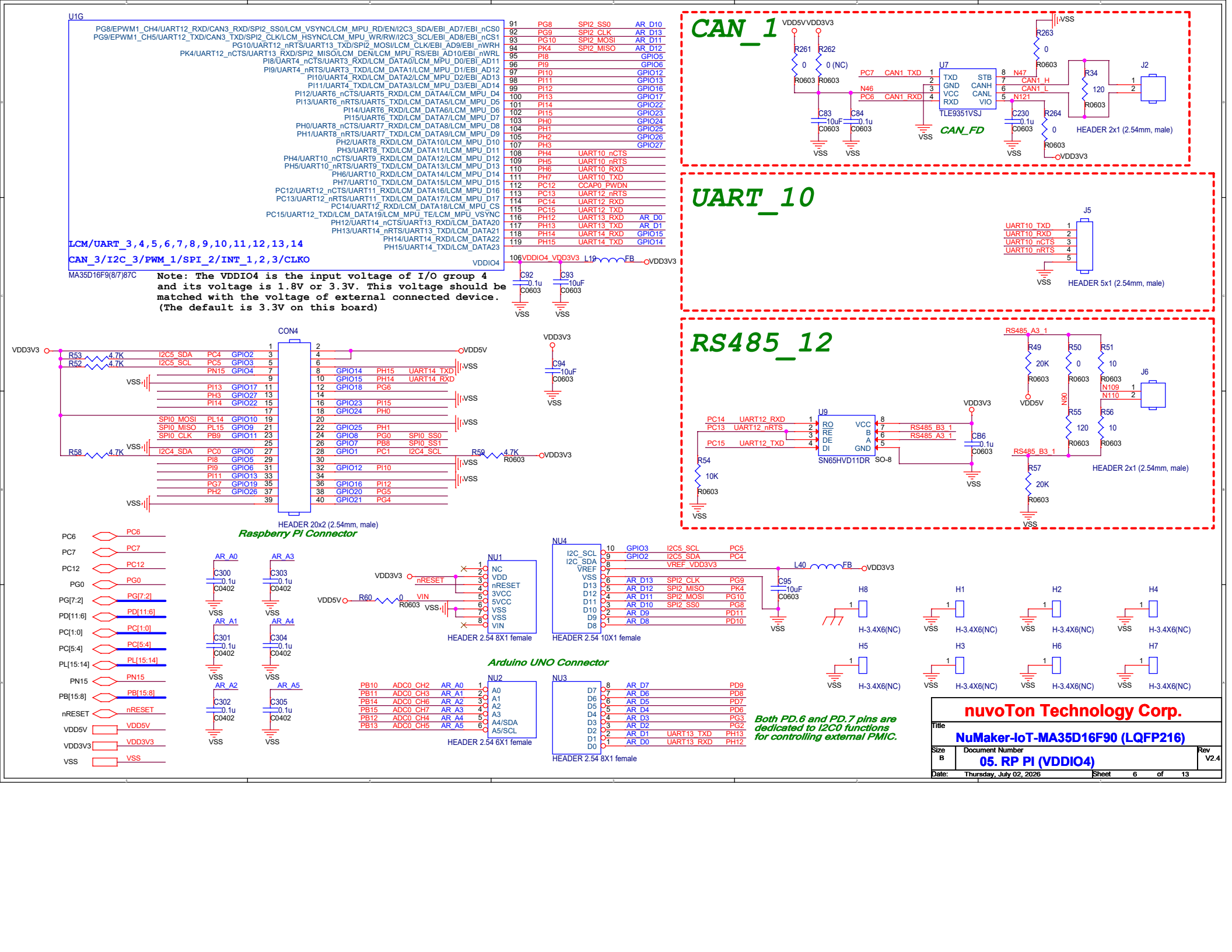




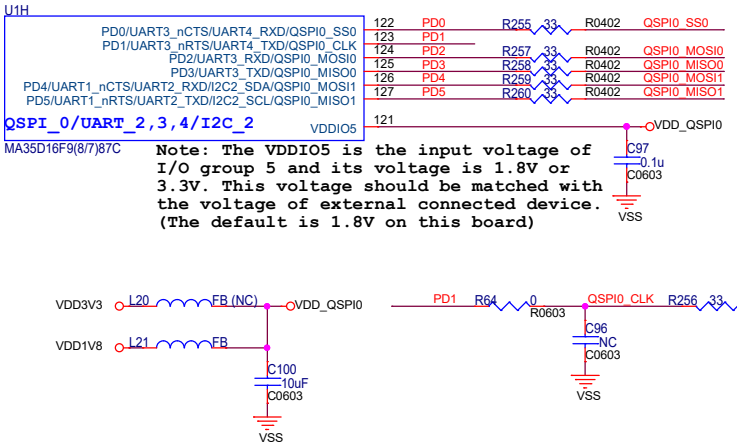
DDR PHY

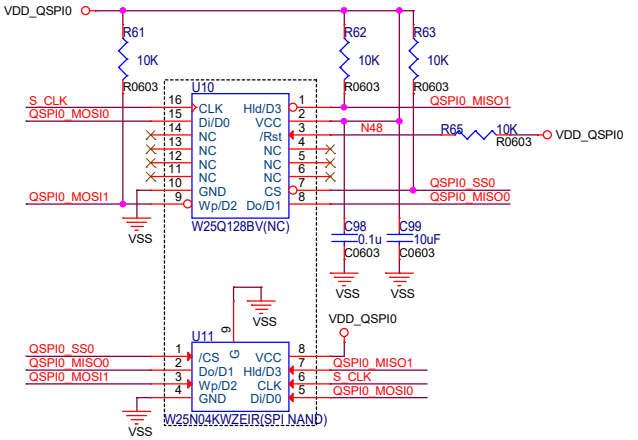


nuvoTon Technology Corp.		
Title: NuMaker-IoT-MA35D16F90 (LQFP216)		
Size: B	Document Number: 04. CCAP0 (VDDIO2)	Rev: V2.4
Date: Tuesday, August 27, 2024	Sheet 5 of 13	

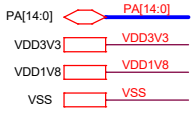

U1G
PG8/EPWM1_CH4/UART12_RXD/CAN3_RXD/SPI2_SS0/LCM_VSYNC/LCM_MPU_RD/EN/I2C3_SDA/EBI_AD7/EBI_nCS0
PG9/EPWM1_CH5/UART12_TXD/CAN3_TXD/SPI2_CLK/LCM_HSYNC/LCM_MPU_WR/RW//I2C3_SCL/EBI_AD8/EBI_nCS1
PG10/UART12_nRTS/UART13_TXD/SPI2_MOSI/LCM_CLK/EBI_AD9/EBI_nWRH
PK4/UART12_nCTS/UART13_RXD/SPI2_MISO/LCM_DEN/LCM_MPU_RS/EBI_AD10/EBI_nWRL
PI8/UART4_nCTS/UART3_RXD/LCM_DATA0/LCM_MPU_D0/EBI_AD11
PI9/UART4_nRTS/UART3_TXD/LCM_DATA1/LCM_MPU_D1/EBI_AD12
PI10/UART4_RXD/LCM_DATA2/LCM_MPU_D2/EBI_AD13
PI11/UART4_TXD/LCM_DATA3/LCM_MPU_D3/EBI_AD14
PI12/UART6_nCTS/UART5_RXD/LCM_DATA4/LCM_MPU_D4
PI13/UART6_nRTS/UART5_TXD/LCM_DATA5/LCM_MPU_D5
PI14/UART6_RXD/LCM_DATA6/LCM_MPU_D6
PI15/UART6_TXD/LCM_DATA7/LCM_MPU_D7
PH0/UART8_nCTS/UART7_RXD/LCM_DATA8/LCM_MPU_D8
PH1/UART8_nRTS/UART7_TXD/LCM_DATA9/LCM_MPU_D9
PH2/UART8_RXD/LCM_DATA10/LCM_MPU_D10
PH3/UART8_TXD/LCM_DATA11/LCM_MPU_D11
PH4/UART10_nCTS/UART9_RXD/LCM_DATA12/LCM_MPU_D12
PH5/UART10_nRTS/UART9_TXD/LCM_DATA13/LCM_MPU_D13
PH6/UART10_RXD/LCM_DATA14/LCM_MPU_D14
PH7/UART10_TXD/LCM_DATA15/LCM_MPU_D15
PC12/UART12_nCTS/UART11_RXD/LCM_DATA16/LCM_MPU_D16
PC13/UART12_nRTS/UART11_TXD/LCM_DATA17/LCM_MPU_D17
PC14/UART12_RXD/LCM_DATA18/LCM_MPU_CS
PC15/UART12_TXD/LCM_DATA19/LCM_MPU_TE/LCM_MPU_VSYNC
PH12/UART14_nCTS/UART13_RXD/LCM_DATA20
PH13/UART14_nRTS/UART13_TXD/LCM_DATA21
PH14/UART14_RXD/LCM_DATA22
PH15/UART14_TXD/LCM_DATA23
LCM/UART_3,4,5,6,7,8,9,10,11,12,13,14
CAN_3/I2C_3/PWM_1/SPI_2/INT_1,2,3/CLKO
VDDIO4
MA35D16F9(8/7)87C
Note: The VDDIO4 is the input voltage of I/O group 4 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)
VDDIO4_VDD3V3
L19
FB
C92 0.1u C0603
C93 10uF C0603
CAN_1
VDD5V VDD3V3
R261 0 R0603
R262 0 (NC) R0603
U7
TLE9351VSJ
CAN_FD
C83 10uF C0603
C84 0.1u C0603
C230 0.1u C0603
R263 0 R0603
R264 0 R0603
R34 120 R0603
J2
HEADER 2x1 (2.54mm, male)
UART_10
J5
HEADER 5x1 (2.54mm, male)
RS485_12
U9
SN65HVD11DR
SO-8
CB6 0.1u C0603
R54 10K R0603
R57 20K R0603
R49 20K R0603
R50 0 R0603
R51 10 R0603
R55 120 R0603
R56 10 R0603
J6
HEADER 2x1 (2.54mm, male)
CON4
HEADER 20x2 (2.54mm, male)
C94 10uF C0603
R53 4.7K
R52 4.7K
R58 4.7K
R59 4.7K R0603
Raspberry PI Connector
Arduino UNO Connector
NU1
HEADER 2.54 8X1 female
NU2
HEADER 2.54 6X1 female
NU3
HEADER 2.54 8X1 female
NU4
HEADER 2.54 10X1 female
C95 10uF C0603
L40 FB
H8
H1
H2
H4
H5
H3
H6
H7
H-3.4X6(NC)
Both PD.6 and PD.7 pins are dedicated to I2C0 functions for controlling external PMIC.
nuvoTon Technology Corp.
Title
NuMaker-IoT-MA35D16F90 (LQFP216)
Size B
Document Number
05. RP PI (VDDIO4)
Rev V2.4
Date: Thursday, July 02, 2026
Sheet 6 of 13

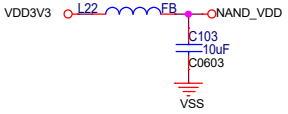
QSPI0_Flash

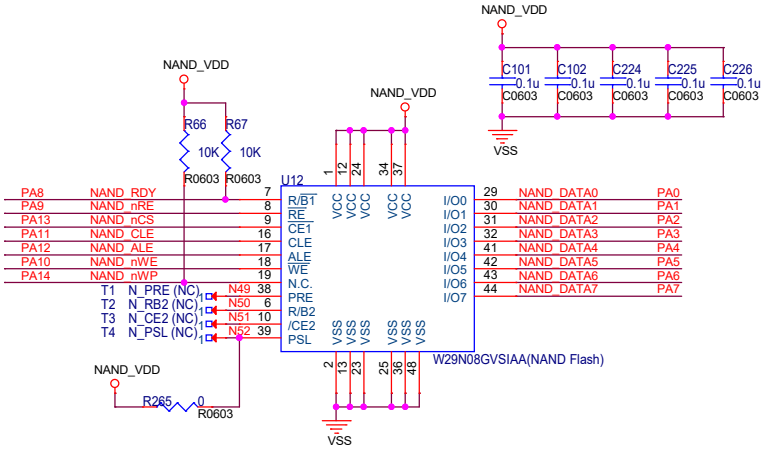




NAND_Flash



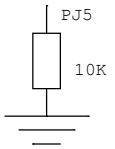


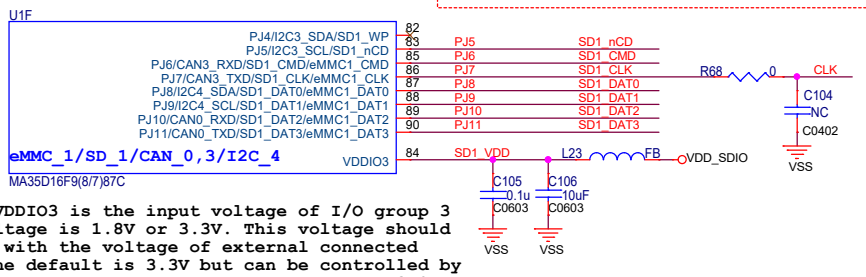


nuvoTon Technology Corp.

Title	NuMaker-IoT-MA35D16F90 (LQFP216)	
Size B	Document Number 06. NAND/QSPI0 (VDDIO5)	Rev V2.4
Date: Tuesday, August 27, 2024	Sheet 7 of 13	

Note: If these PJ6~PJ11 pins (eMMC1_xxx) are used to connect with eMMC device and act as the booting source, please pulls the PJ5 pin (SD1_nCD) to low.



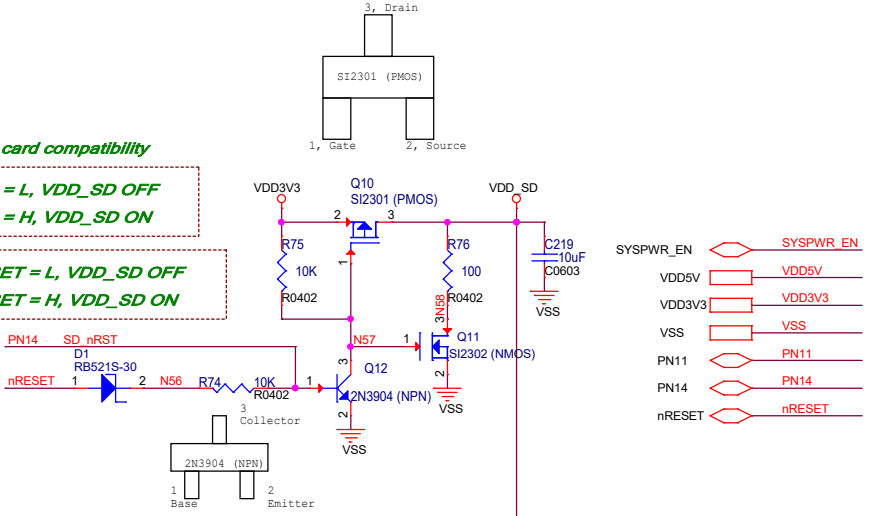


Note: The VDDIO3 is the input voltage of I/O group 3 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V but can be controlled by GPIO PN11 high or low state that follows the SD3.0 timing on this board)

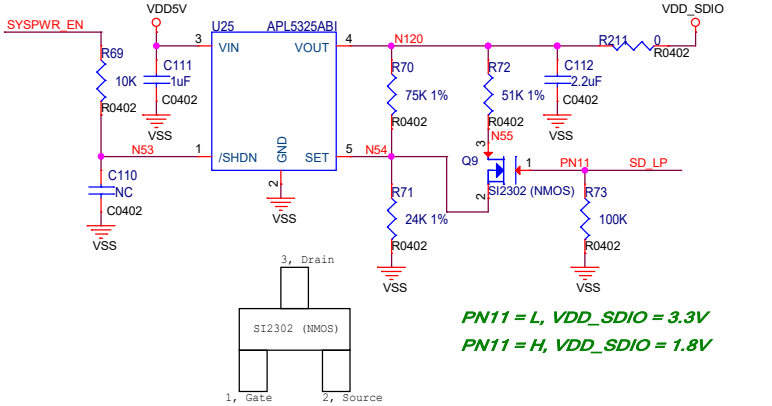
For SD card compatibility

PN14 = L, VDD_SD OFF
PN14 = H, VDD_SD ON

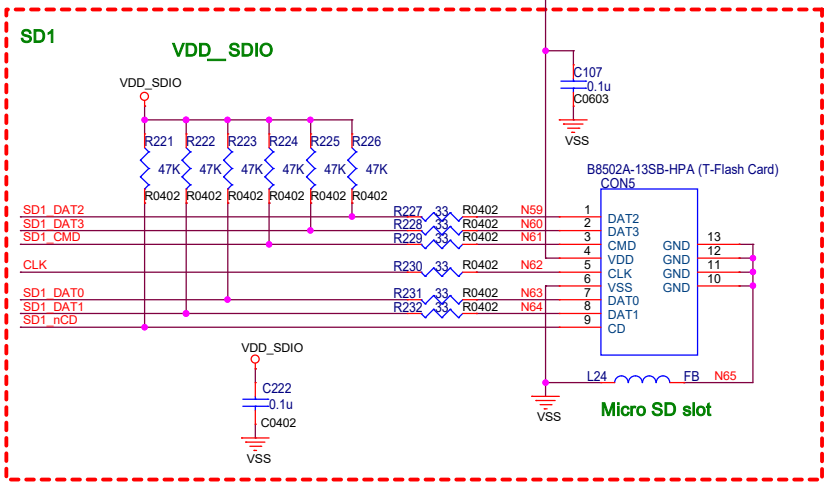
nRESET = L, VDD_SD OFF
nRESET = H, VDD_SD ON



SDIO (3.3V & 1.8V)

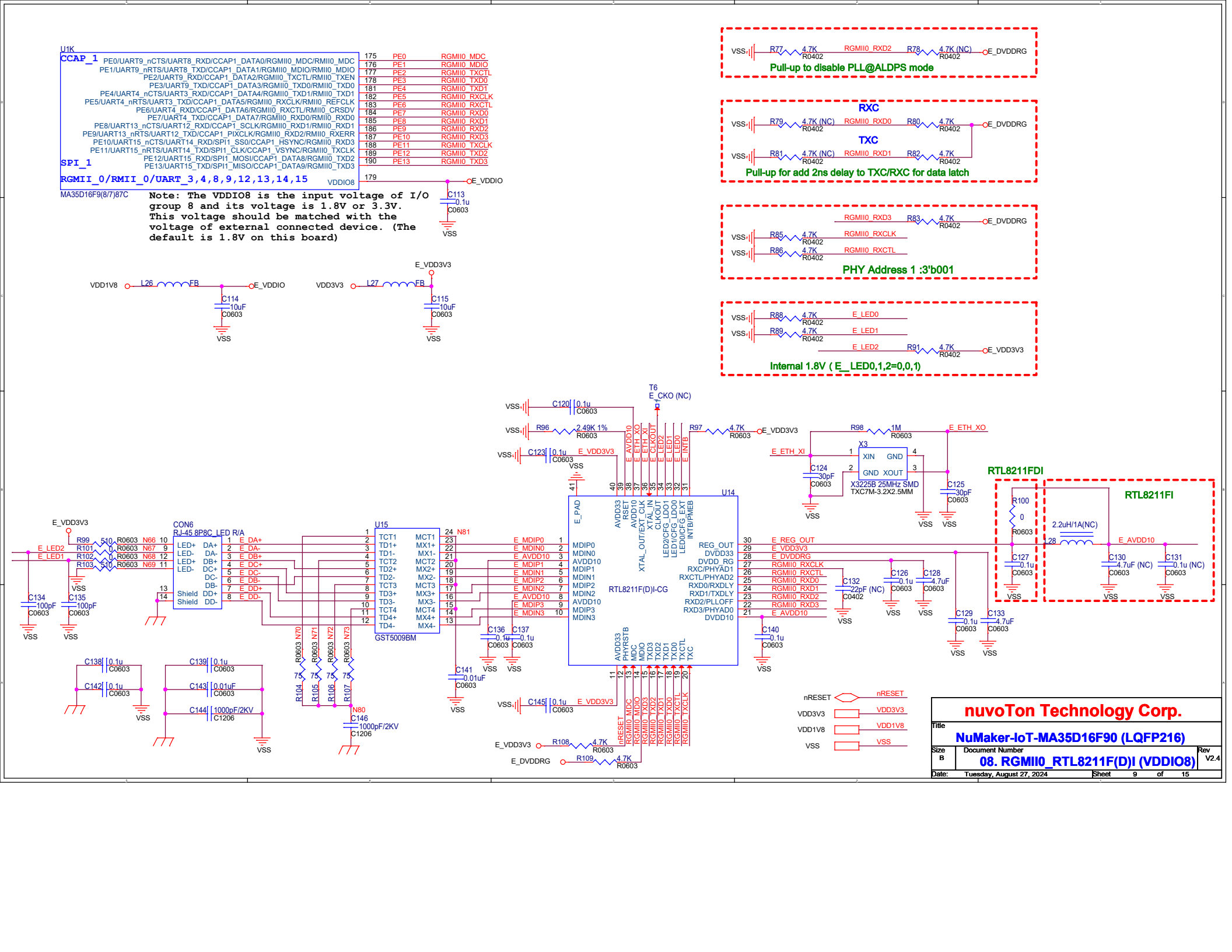


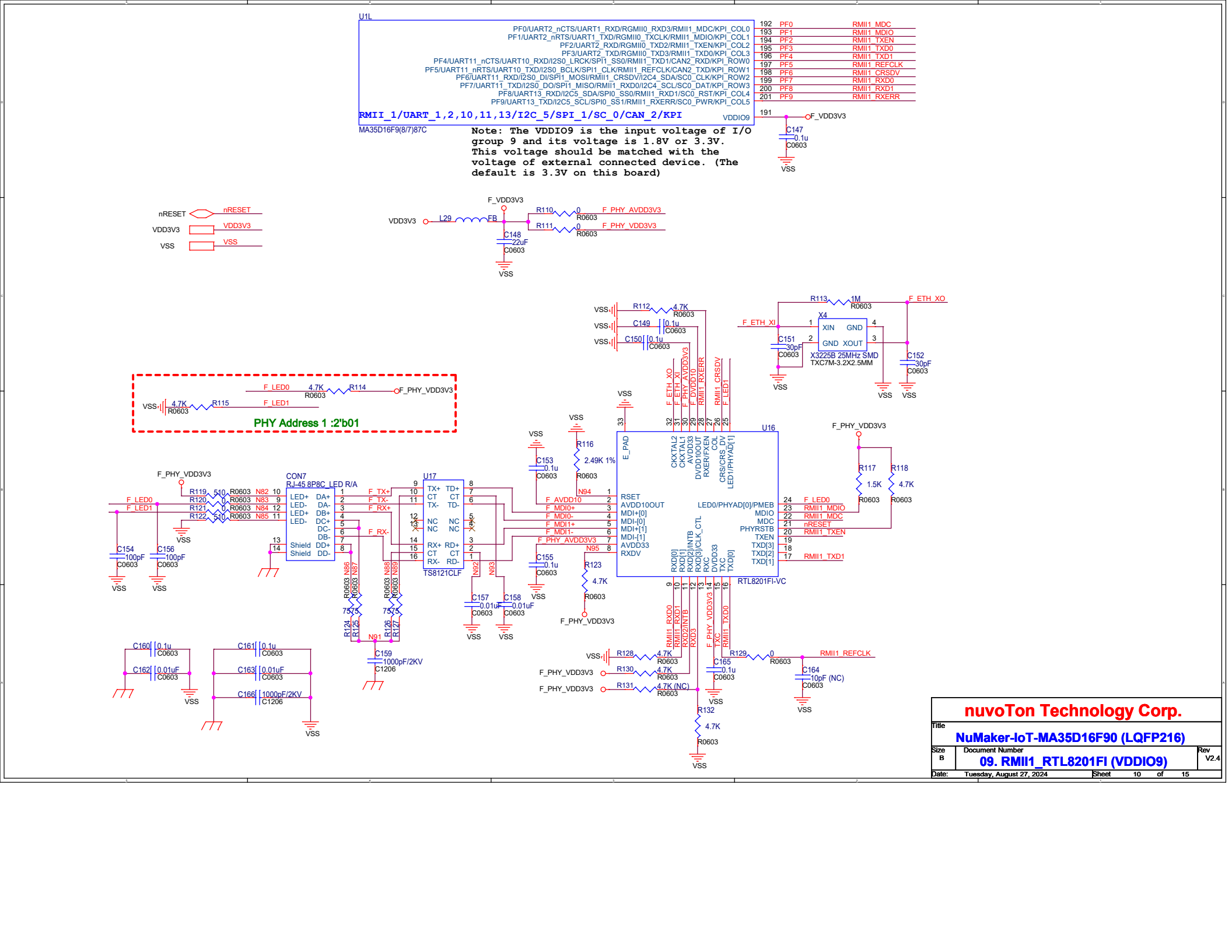
PN11 = L, VDD_SDIO = 3.3V
PN11 = H, VDD_SDIO = 1.8V



nuvoTon Technology Corp.

Title	NuMaker-IoT-MA35D16F90 (LQFP216)	
Size B	Document Number 07. SD1 (VDDIO3)	Rev V2.4
Date: Tuesday, August 27, 2024	Sheet 8 of 13	


U1K
CCAP_1
PE0/UART9_nCTS/UART8_RXD/CCAP1_DATA0/RGMII0_MDC/RMII0_MDC
PE1/UART9_nRTS/UART8_TXD/CCAP1_DATA1/RGMII0_MDIO/RMII0_MDIO
PE2/UART9_RXD/CCAP1_DATA2/RGMII0_TXCTL/RMII0_TXEN
PE3/UART9_TXD/CCAP1_DATA3/RGMII0_TXD0/RMII0_TXD0
PE4/UART4_nCTS/UART3_RXD/CCAP1_DATA4/RGMII0_TXD1/RMII0_TXD1
PE5/UART4_nRTS/UART3_TXD/CCAP1_DATA5/RGMII0_RXCLK/RMII0_REFCLK
PE6/UART4_RXD/CCAP1_DATA6/RGMII0_RXCTL/RMII0_CRSDV
PE7/UART4_TXD/CCAP1_DATA7/RGMII0_RXD0/RMII0_RXD0
PE8/UART13_nCTS/UART12_RXD/CCAP1_SCLK/RGMII0_RXD1/RMII0_RXD1
PE9/UART13_nRTS/UART12_TXD/CCAP1_PIXCLK/RGMII0_RXD2/RMII0_RXERR
PE10/UART15_nCTS/UART14_RXD/SPI1_SS0/CCAP1_HSYNC/RGMII0_RXD3
PE11/UART15_nRTS/UART14_TXD/SPI1_CLK/CCAP1_VSYNC/RGMII0_TXCLK
PE12/UART15_RXD/SPI1_MOSI/CCAP1_DATA8/RGMII0_TXD2
PE13/UART15_TXD/SPI1_MISO/CCAP1_DATA9/RGMII0_TXD3
SPI_1
RGMII_0/RMII_0/UART_3,4,8,9,12,13,14,15
VDDIO8
E_VDDIO
MA35D16F9(8/7)87C
Note: The VDDIO8 is the input voltage of I/O group 8 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 1.8V on this board)
C113 0.1u C0603
VSS
VDD1V8 L26 FB E_VDDIO
C114 10uF C0603
VDD3V3 L27 FB E_VDD3V3
C115 10uF C0603
R77 4.7K R0402 RGMII0_RXD2 R78 4.7K (NC) R0402 E_DVDDRG
Pull-up to disable PLL@ALDPS mode
RXC
R79 4.7K (NC) R0402 RGMII0_RXD0 R80 4.7K R0402 E_DVDDRG
TXC
R81 4.7K (NC) R0402 RGMII0_RXD1 R82 4.7K R0402
Pull-up for add 2ns delay to TXC/RXC for data latch
RGMII0_RXD3 R83 4.7K R0402 E_DVDDRG
R85 4.7K R0402 RGMII0_RXCLK
R86 4.7K R0402 RGMII0_RXCTL
PHY Address 1 :3'b001
R88 4.7K R0402 E_LED0
R89 4.7K R0402 E_LED1
E_LED2 R91 4.7K R0402 E_VDD3V3
Internal 1.8V (E__LED0,1,2=0,0,1)
T6
E_CKO (NC)
C120 0.1u C0603
R96 2.49K 1% R0603
R97 4.7K R0603 E_VDD3V3
C123 0.1u C0603 E_VDD3V3
R98 1M R0603 E_ETH_XO
E_ETH_XI
X3
XIN GND
GND XOUT
X3225B 25MHz SMD
TXC7M-3.2X2.5MM
C124 30pF C0603
C125 30pF C0603
U14
RTL8211F(D)I-CG
E_PAD
AVDD33 RSET AVDD10 XTAL_OUT/EXT_CLK XTAL_IN CLKOUT LED2/CFG_LDO1 LED1/CFG_LDO0 LED0/CFG_EXT INTB/PMEB
MDIP0 MDIN0 AVDD10 MDIP1 MDIN1 MDIP2 MDIN2 AVDD10 MDIP3 MDIN3
REG_OUT DVDD33 DVDD_RG RXC/PHYAD1 RXCTL/PHYAD2 RXD0/RXDLY RXD1/TXDLY RXD2/PLLOFF RXD3/PHYAD0 DVDD10
E_REG_OUT E_VDD3V3 E_DVDDRG RGMII0_RXCLK RGMII0_RXCTL RGMII0_RXD0 RGMII0_RXD1 RGMII0_RXD2 RGMII0_RXD3 E_AVDD10
AVDD33 PHYRSTB MDC MDIO TXD3 TXD2 TXD1 TXD0 TXCTL TXC
nRESET RGMII0_MDC RGMII0_MDIO RGMII0_TXD3 RGMII0_TXD2 RGMII0_TXD1 RGMII0_TXD0 RGMII0_TXCTL RGMII0_TXCLK
C132 22pF (NC) C0402
C126 0.1u C0603
C128 4.7uF C0603
C129 0.1u C0603
C133 4.7uF C0603
C140 0.1u C0603
RTL8211FDI
RTL8211FI
R100 0 R0603
2.2uH/1A(NC)
C127 0.1u C0603
C130 4.7uF (NC) C0603
C131 0.1u (NC) C0603
E_VDD3V3
CON6
RJ-45 8P8C_LED R/A
E_LED2 E_LED1
R99 510 R0603 N66
R101 0 R0603 N67
R102 0 R0603 N68
R103 510 R0603 N69
E_DA+ E_DA- E_DB+ E_DC+ E_DC- E_DB- E_DD+ E_DD-
C134 100pF C0603
C135 100pF C0603
U15
GST5009BM
TCT1 TD1+ TD1- TCT2 TD2+ TD2- TCT3 TD3+ TD3- TCT4 TD4+ TD4-
MCT1 MX1+ MX1- MCT2 MX2+ MX2- MCT3 MX3+ MX3- MCT4 MX4+ MX4-
N81
E_MDIP0 E_MDIN0 E_AVDD10 E_MDIP1 E_MDIN1 E_MDIP2 E_MDIN2 E_AVDD10 E_MDIP3 E_MDIN3
C136 0.1u C0603
C137 0.1u C0603
C141 0.01uF C0603
R0603 N70 R0603 N71 R0603 N72 R0603 N73
R104 75 R105 75 R106 75 R107 75
N80
C146 1000pF/2KV C1206
C138 0.1u C0603
C142 0.1u C0603
C139 0.1u C0603
C143 0.01uF C0603
C144 1000pF/2KV C1206
C145 0.1u C0603 E_VDD3V3
R108 4.7K R0603 E_VDD3V3
R109 4.7K R0603 E_DVDDRG
nRESET
VDD3V3
VDD1V8
VSS
nuvoTon Technology Corp.
Title
NuMaker-IoT-MA35D16F90 (LQFP216)
Size B
Document Number
08. RGMII0_RTL8211F(D)I (VDDIO8)
Rev V2.4
Date: Tuesday, August 27, 2024
Sheet 9 of 15


U1L
PF0/UART2_nCTS/UART1_RXD/RGMII0_RXD3/RMII1_MDC/KPI_COL0
PF1/UART2_nRTS/UART1_TXD/RGMII0_TXCLK/RMII1_MDIO/KPI_COL1
PF2/UART2_RXD/RGMII0_TXD2/RMII1_TXEN/KPI_COL2
PF3/UART2_TXD/RGMII0_TXD3/RMII1_TXD0/KPI_COL3
PF4/UART11_nCTS/UART10_RXD/I2S0_LRCK/SPI1_SS0/RMII1_TXD1/CAN2_RXD/KPI_ROW0
PF5/UART11_nRTS/UART10_TXD/I2S0_BCLK/SPI1_CLK/RMII1_REFCLK/CAN2_TXD/KPI_ROW1
PF6/UART11_RXD/I2S0_DI/SPI1_MOSI/RMII1_CRSDV/I2C4_SDA/SC0_CLK/KPI_ROW2
PF7/UART11_TXD/I2S0_DO/SPI1_MISO/RMII1_RXD0/I2C4_SCL/SC0_DAT/KPI_ROW3
PF8/UART13_RXD/I2C5_SDA/SPI0_SS0/RMII1_RXD1/SC0_RST/KPI_COL4
PF9/UART13_TXD/I2C5_SCL/SPI0_SS1/RMII1_RXERR/SC0_PWR/KPI_COL5
RMII_1/UART_1,2,10,11,13/I2C_5/SPI_1/SC_0/CAN_2/KPI
MA35D16F9(8/7)87C
192 PF0 RMII1_MDC
193 PF1 RMII1_MDIO
194 PF2 RMII1_TXEN
195 PF3 RMII1_TXD0
196 PF4 RMII1_TXD1
197 PF5 RMII1_REFCLK
198 PF6 RMII1_CRSDV
199 PF7 RMII1_RXD0
200 PF8 RMII1_RXD1
201 PF9 RMII1_RXERR
VDDIO9
191
F_VDD3V3
C147 0.1u C0603
VSS
Note: The VDDIO9 is the input voltage of I/O group 9 and its voltage is 1.8V or 3.3V. This voltage should be matched with the voltage of external connected device. (The default is 3.3V on this board)
nRESET
VDD3V3
VSS
L29 FB
R110 0 R0603 F_PHY_AVDD3V3
R111 0 R0603 F_PHY_VDD3V3
C148 22uF C0603
R112 4.7K R0603
C149 0.1u C0603
C150 0.1u C0603
R113 1M R0603
X4
XIN GND XOUT
X3225B 25MHz SMD
TXC7M-3.2X2.5MM
C151 30pF C0603
C152 30pF C0603
F_ETH_XO
F_ETH_XI
F_LED0 4.7K R0603 R114
R115 4.7K R0603 F_LED1
PHY Address 1 :2'b01
U16
E_PAD
RSET
AVDD10OUT
MDI+[0]
MDI-[0]
MDI+[1]
MDI-[1]
AVDD33
RXDV
CKXTAL2
CKXTAL1
AVDD33
DVDD10OUT
RXER/FXEN
COL
CRS/CRS_DV
LED1/PHYAD[1]
LED0/PHYAD[0]/PMEB
MDIO
MDC
PHYRSTB
TXEN
TXD[3]
TXD[2]
TXD[1]
RXD[0]
RXD[1]
RXD2/INTB
RXD3/CLK_CTL
RXC
DVDD33
TXC
TXD[0]
RTL8201FI-VC
R116 2.49K 1%
R117 1.5K R0603
R118 4.7K R0603
F_PHY_VDD3V3
F_AVDD10
F_MDI0+
F_MDI0-
F_MDI1+
F_MDI1-
F_PHY_AVDD3V3
N94
N95
R123 4.7K R0603
C153 0.1u C0603
C155 0.1u C0603
CON7
RJ-45 8P8C_LED R/A
LED+ DA+
LED- DA-
LED+ DB+
LED- DC+
DC-
DB-
Shield DD+
Shield DD-
F_TX+
F_TX-
F_RX+
F_RX-
U17
TX+ TD+
CT CT
TX- TD-
NC NC
NC NC
RX+ RD+
CT CT
RX- RD-
TS8121CLF
R119 510 R0603 N82
R120 0 R0603 N83
R121 0 R0603 N84
R122 510 R0603 N85
C154 100pF C0603
C156 100pF C0603
R124 R125 R126 R127 75/5
N86 N87 N88 N89
N91 N92 N93
C157 0.01uF C0603
C158 0.01uF C0603
C159 1000pF/2KV C1206
C160 0.1u C0603
C161 0.1u C0603
C162 0.01uF C0603
C163 0.01uF C0603
C166 1000pF/2KV C1206
R128 4.7K R0603
R130 4.7K R0603
R131 4.7K (NC) R0603
R129 0 R0603
RMII1_REFCLK
C164 10pF (NC) C0603
C165 0.1u C0603
R132 4.7K R0603
nuvoTon Technology Corp.
Title
NuMaker-IoT-MA35D16F90 (LQFP216)
Size B
Document Number
09. RMII1_RTL8201FI (VDDIO9)
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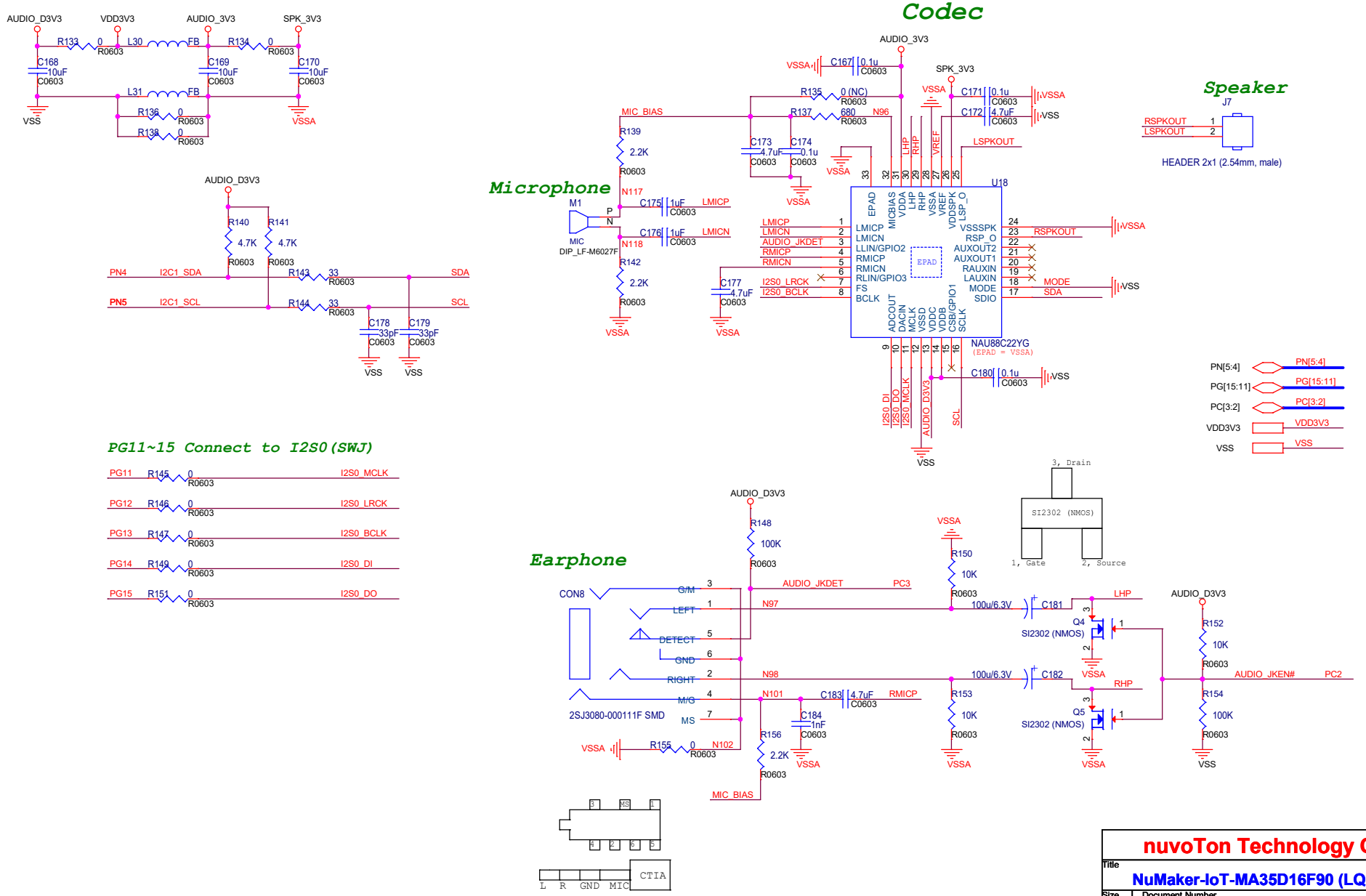
Codec
Speaker
Microphone
Earphone
PG11~15 Connect to I2S0(SWJ)
AUDIO_D3V3
VDD3V3
AUDIO_3V3
SPK_3V3
R133 0 R0603
L30 FB
R134 0 R0603
C168 10uF C0603
C169 10uF C0603
C170 10uF C0603
L31 FB
R136 0 R0603
R138 0 R0603
VSS
VSSA
R140 4.7K R0603
R141 4.7K R0603
PN4 I2C1_SDA
PN5 I2C1_SCL
R143 33 R0603
R144 33 R0603
SDA
SCL
C178 33pF C0603
C179 33pF C0603
C167 0.1u C0603
R135 0 (NC) R0603
R137 680 R0603
N96
MIC_BIAS
R139 2.2K R0603
R142 2.2K R0603
C173 4.7uF C0603
C174 0.1u C0603
C171 0.1u C0603
C172 4.7uF C0603
LSPKOUT
M1
MIC DIP_LF-M6027F
N117
N118
C175 1uF C0603
C176 1uF C0603
LMICP
LMICN
C177 4.7uF C0603
I2S0_LRCK
I2S0_BCLK
U18
NAU88C22YG
(EPAD = VSSA)
EPAD
AUDIO_JKDET
RMICP
RMICN
LLIN/GPIO2
RLIN/GPIO3
FS
BCLK
ADCOUT
DACIN
MCLK
VSSD
VDDC
VDDB
CSB/GPIO1
SCLK
SDIO
MODE
VSSSPK
RSP_O
AUXOUT2
AUXOUT1
RAUXIN
LAUXIN
RSPKOUT
C180 0.1u C0603
I2S0_DI
I2S0_DO
I2S0_MCLK
AUDIO_D3V3
SCL
J7
RSPKOUT 1
LSPKOUT 2
HEADER 2x1 (2.54mm, male)
PN[5:4]
PG[15:11]
PC[3:2]
VDD3V3
VSS
PG11 R145 0 R0603 I2S0_MCLK
PG12 R146 0 R0603 I2S0_LRCK
PG13 R147 0 R0603 I2S0_BCLK
PG14 R149 0 R0603 I2S0_DI
PG15 R151 0 R0603 I2S0_DO
CON8
G/M
LEFT
DETECT
GND
RIGHT
M/G
MS
2SJ3080-000111F SMD
R148 100K R0603
AUDIO_JKDET PC3
N97
N98
N101
N102
R155 0 R0603
R156 2.2K R0603
C183 4.7uF C0603
RMICP
C184 1nF C0603
R150 10K R0603
R153 10K R0603
C181 100u/6.3V
C182 100u/6.3V
SI2302 (NMOS)
Q4
Q5
LHP
RHP
R152 10K R0603
R154 100K R0603
AUDIO_JKEN#
PC2
3, Drain
1, Gate
2, Source
CTIA
L R GND MIC
nuvoTon Technology Corp.
NuMaker-IoT-MA35D16F90 (LQFP216)
10. NAU88C22
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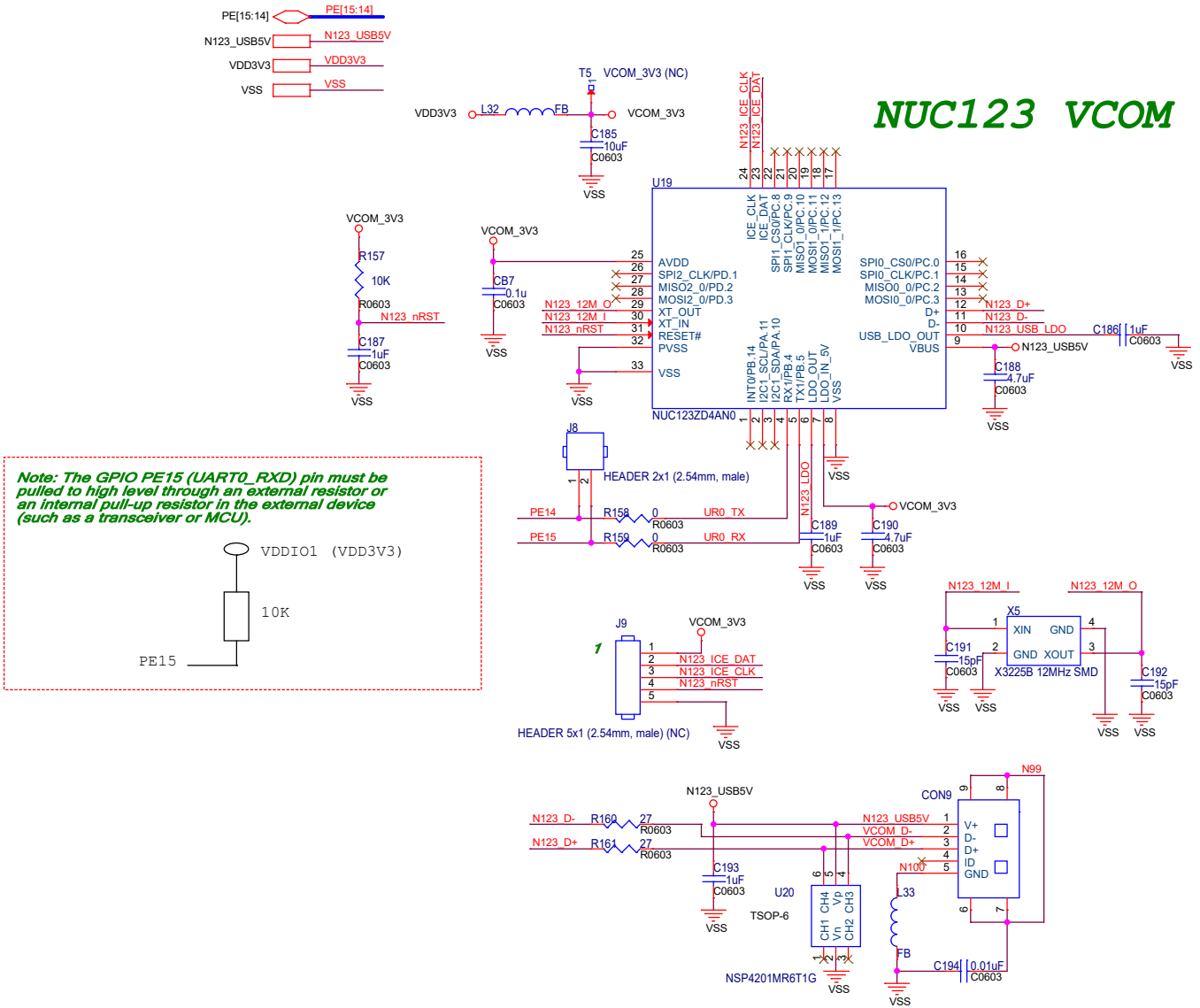

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Size: B	Document Number: 11. NUC123 VCOM	Rev: V2.4
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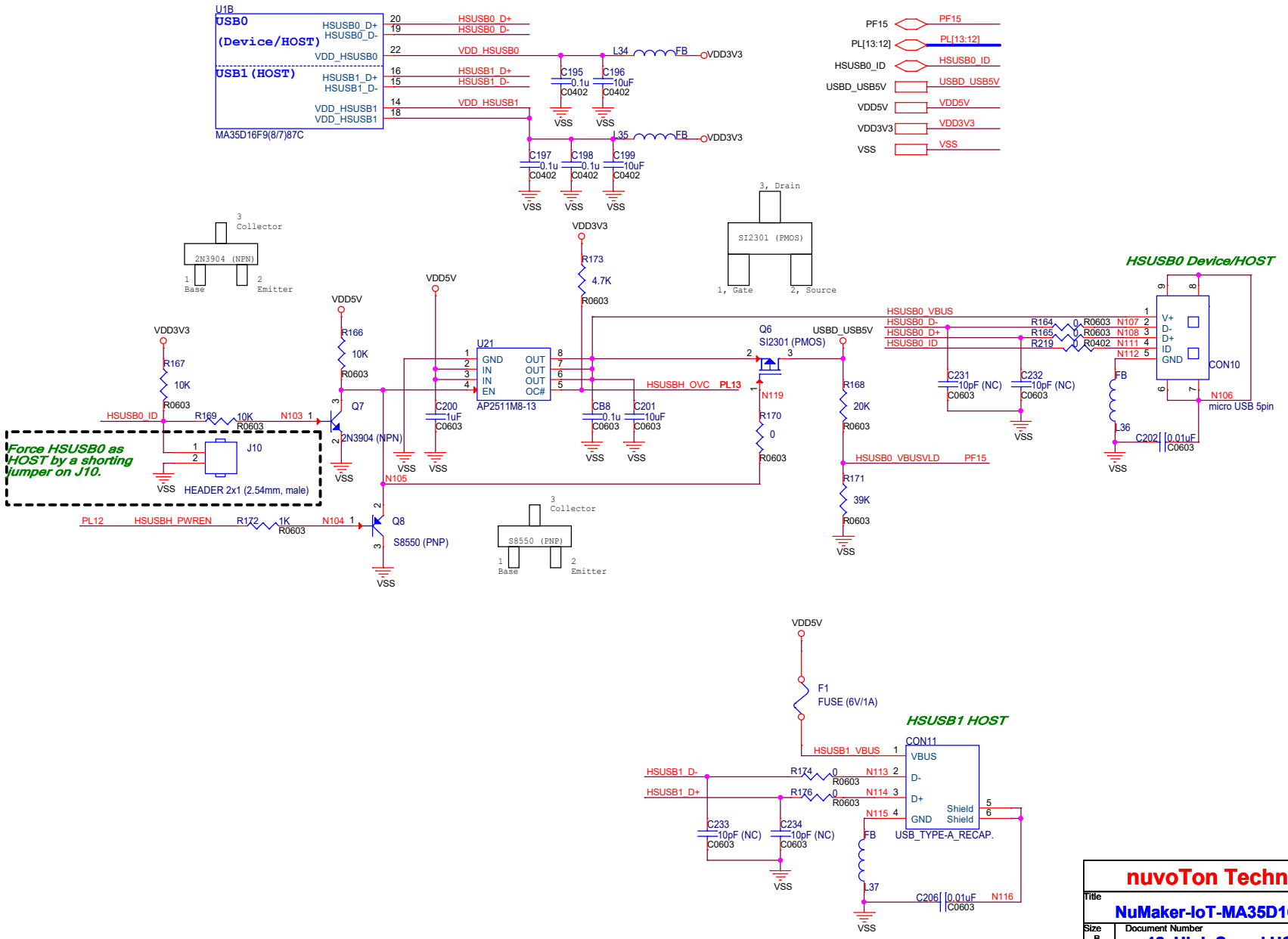

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