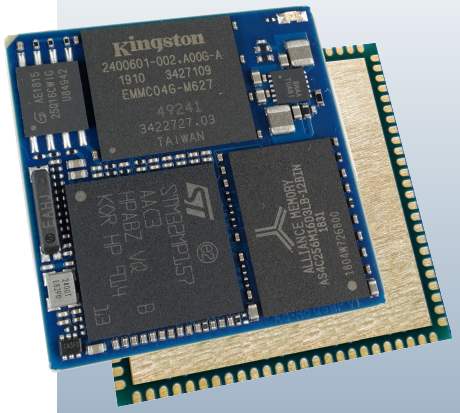
QSMP

QS Family
QFN Style Solder-Down
Computer-on-Modules

- Solder-down version
- 27mm square
- 2.3mm total height
- QFN type lead style
  - 1mm pitch
  - 100 pads
  - Thermal pad
- Visual solder joint inspection possible after soldering
- Single-sided assembly
- High speed design compliant



NEW

Dual Cortex®-A7

Key Features

- Processor — STM32MP1 Series
  Dual-Core Arm® Cortex®-A7 650MHz
  Cortex-M4 209MHz
- RAM — 128MB up to 512MB DDR3L
- ROM — 128MB SLC NAND or
  4GB eMMC
- Grade — Industrial
- Temperature — -25°C to 85°C (eMMC)
  -40°C to 85°C (NAND)
- Display support

  Display Interface — 24-bit RGB
  MIPI® DSI (2-lanes)

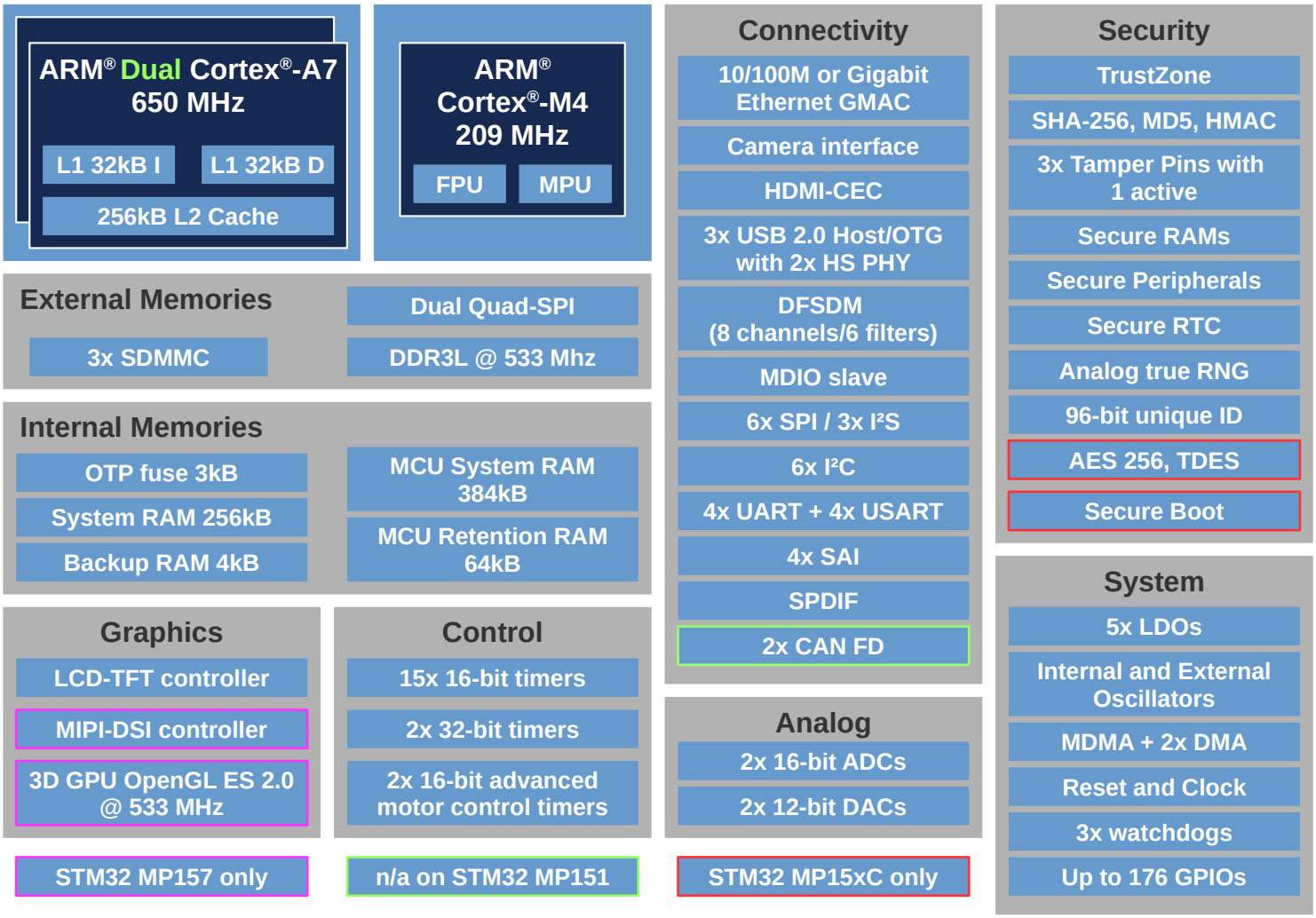
  GPU — 3D GPU: Vivante®,
  OpenGL® ES 2.0
- Connectivity
  - Ethernet, USB2.0, eMMC/SD
  - UART, I²C, SPI, PWM, SAI, CAN

OS Support

- Linux

Contact our Benelux Distributor
for more information about Ka-Ro electronics
Logic Technology B.V. - info@logic.nl - +31 77 307 8438 - www.logicboards.eu

STM32MP1 Block Diagram



Ordering Information

	QSMP-1510 STM32MP151A	QSMP-1530 STM32MP153A	QSMP-1570 STM32MP157C
Primary Arm® Core	1x Cortex®-A7 up to 650 MHz	2x Cortex®-A7 up to 650 MHz	2x Cortex®-A7 up to 650 MHz
Secondary Arm® Core	1x Cortex-M4 up to 200 MHz	1x Cortex-M4 up to 200 MHz	1x Cortex-M4 up to 200 MHz
RAM	128 MB	256 MB	512 MB
ROM	128 MB SLC NAND	128 MB SLC NAND	4GB eMMC
Display Interface	24-bit RGB	24-bit RGB	24-bit RGB + 2-lane MIPI-DSI
3D GPU	-	-	yes
CAN	-	2x FD-CAN	2x FD-CAN
Security	-	-	Secure Boot, Cryptography
Grade / Temp.	Industrial / -40°C to 85°C	Industrial / -40°C to 85°C	Industrial / -25°C to 85°C
Order Code	QSMP/151A/128S/128F/I	QSMP/153A/256S/128F/I	QSMP/157C/512S/4GF/E85

2019-09-27

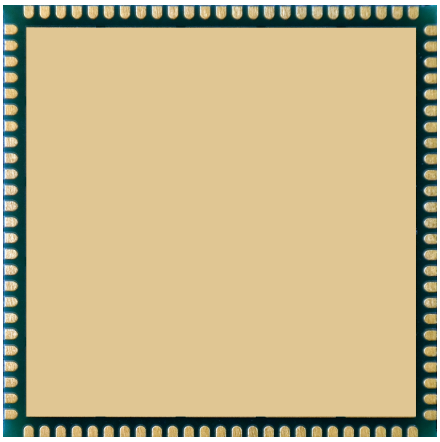
QFN Style Computer On Module Advantages

Defined Return Path

The reason PCB layout becomes more and more important is because of the trend to faster, higher integrated, smaller formfactors, and lower power electronic circuits. The higher the switching frequencies are, the more radiation may occur on a PCB. With good layout, many EMI problems can be minimized to meet the required specifications.

When a module or component is used in a design, the supplier specifies the basis for such a layout. It's not only the pinout which should lead to an easy wiring without the need for crossings. He has also provide a proper solution for the signal path back to the module. If this return path, mostly the ground plane, cannot be connected near the signal pin, the return current has to take another way and this may result in a loop area. The larger the area, the more radiation and EMI problems may occur.

Ka-Ro QSCOM modules uses a large ground pad on the bottom side. With this a defined ground plane connection is available for all signals. In addition to have a good return path for all signals this large ground pad can be used for cooling.



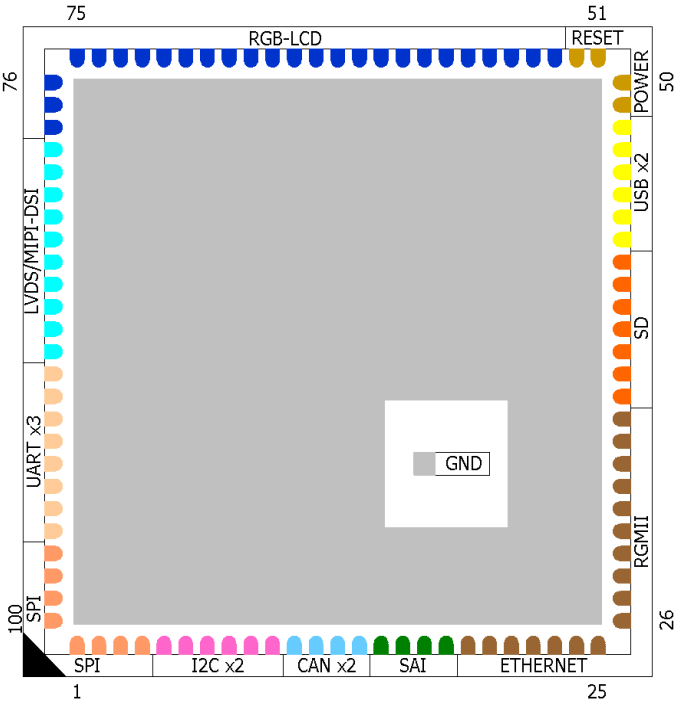
Easy Wiring - Even 2-layer printed circuit boards can be used.

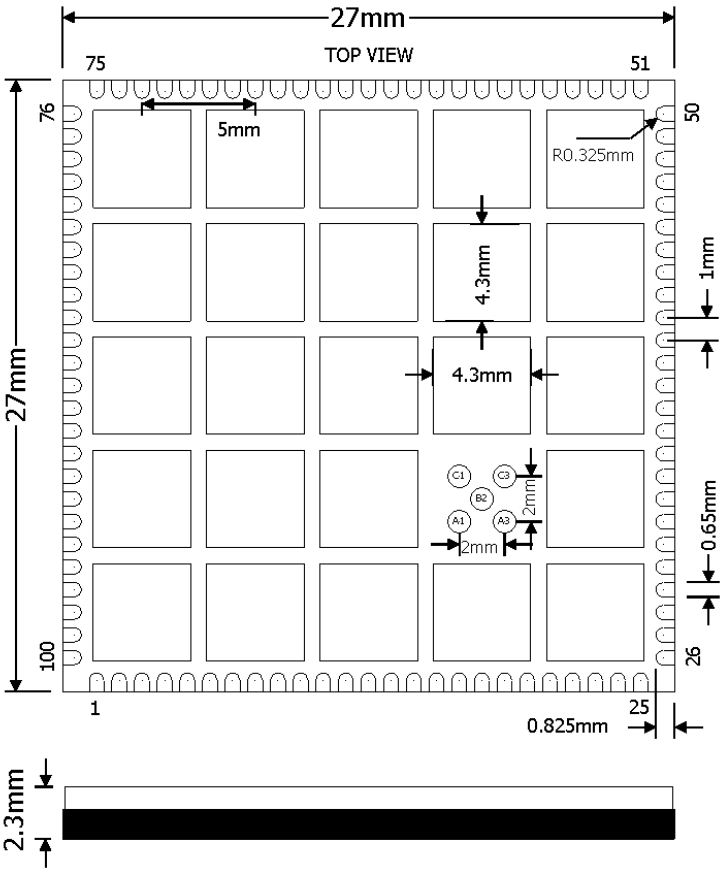
With a solid ground plane on the bottom layer, high speed signals can be routed on the top layer at a defined impedance. However, this is only possible if a peripheral or plug can be connected directly without crossing the routing. Refer to fanout examples at the end of this document.

Advanced Soldering

Using a large solder pad underneath the component has not only electrical and thermal advantages. This is also used to hold the component at a defined height during soldering, without the solder being compressed by the weight, which could result in short circuits.

Standard Contact Assignments





PINOUT

PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
1st SPI							
1	SPIA_NSS	PE11	- TIM1_CH2 - DFSDM1_CKIN4	- **SPI4_NSS** - USART6_CK	- - SAI2_SD_B -	FMC_D8/FMC_DA8 DCMI_D4 LCD_G3 EVENTOUT	
2	SPIA_MISO	PE5	TRACED3 - SAI1_CK2 DFSDM1_CKIN3	TIM15_CH1 **SPI4_MISO** SAI1_SCK_A SDMMC2_D0DIR	SDMMC1_D0DIR SDMMC2_D6 - SDMMC1_D6	FMC_A21 DCMI_D6 LCD_G0 EVENTOUT	
3	SPIA_MOSI	PE14	- TIM1_CH4 - -	- **SPI4_MOSI** - -	UART8_RTS/UART8_DE - SAI2_MCLK_B SDMMC1_D123DIR	FMC_D11/FMC_DA11 LCD_G0 LCD_CLK EVENTOUT	
4	SPIA_SCK	PE2	TRACECLK - SAI1_CK1 -	I2C4_SCL **SPI4_SCK** SAI1_MCLK_A -	- QUADSPI_BK1_IO2 - ETH1_RGMII_TXD3	FMC_A23 - - EVENTOUT	
I2C							
5	I2CA_SCL	PA11	- TIM1_CH4 **I2C6_SCL** -	I2C5_SCL SPI2_NSS/I2S2_WS UART4_RX USART1_CTS/USART1_NSS	- FDCAN1_RX - -	- - LCD_R4 EVENTOUT	
6	I2CA_SDA	PA12	- TIM1_ETR **I2C6_SDA** -	I2C5_SDA - UART4_TX USART1_RTS/USART1_DE	SAI2_FS_B FDCAN1_TX - -	- - LCD_R5 EVENTOUT	
7	INTA	**PD12**	- LPTIM1_IN1 TIM4_CH1 LPTIM2_IN1	I2C4_SCL I2C1_SCL - USART3_RTS/USART3_DE	- QUADSPI_BK1_IO1 SAI2_FS_A -	FMC_ALE/FMC_A17 - - EVENTOUT	
8	I2CA_SCL	PZ0	- - I2C6_SCL **I2C2_SCL**	- SPI1_SCK/I2S1_CK - USART1_CK	SPI6_SCK - - -	- - - EVENTOUT	
9	I2CA_SDA	PZ1	- - I2C6_SDA **I2C2_SDA**	I2C5_SDA SPI1_MISO/I2S1_SDI I2C4_SDA USART1_RX	SPI6_MISO - - -	- - - EVENTOUT	
10	INTA	**PF15**	TRACED7 - - -	I2C4_SDA I2C1_SDA - -	- - - ETH1_GMII_RXD7	FMC_A9 - - EVENTOUT	
CAN							
11	CANA_RX	PD0	- - I2C6_SDA DFSDM1_CKIN6	I2C5_SDA - SAI3_SCK_A -	UART4_RX **FDCAN1_RX** SDMMC3_CMD DFSDM1_DATIN7	FMC_D2/FMC_DA2 - - EVENTOUT	
12	CANA_TX	PD1	- - I2C6_SCL DFSDM1_DATIN6	I2C5_SCL - SAI3_SD_A -	UART4_TX **FDCAN1_TX** SDMMC3_D0 DFSDM1_CKIN7	FMC_D3/FMC_DA3 - - EVENTOUT	
13	CANA_RX	PB5	ETH_CLK TIM17_BKIN TIM3_CH2 SAI4_D1	I2C1_SMBA SPI1_MOSI/I2S1_SDO I2C4_SMBA SPI3_MOSI/I2S3_SDO	SPI6_MOSI **FDCAN2_RX** SAI4_SD_A ETH1_PPS_OUT	UART5_RX DCMI_D10 LCD_G7 EVENTOUT	
14	CANA_TX	PB13	- TIM1_CH1N - DFSDM1_CKOUT	LPTIM2_OUT SPI2_SCK/I2S2_CK DFSDM1_CKIN1 USART3_CTS/USART3_NSS	- **FDCAN2_TX** - ETH1_RGMII_TXD1	- - UART5_TX EVENTOUT	
SAI							
15	SAI_TX	PD11	- - - LPTIM2_IN2	I2C4_SMBA I2C1_SMBA - USART3_CTS/USART3_NSS	- QUADSPI_BK1_IO0 **SAI2_SD_A** -	FMC_CLE/FMC_A16 - - EVENTOUT	
16	SAI_RX	PA0	- TIM2_CH1/TIM2_ETR TIM5_CH1 TIM8_ETR	TIM15_BKIN - - USART2_CTS/USART2_NSS	UART4_TX SDMMC2_CMD **SAI2_SD_B** CRS/ETH1_MII_CRS	- - - EVENTOUT	
17	SAI_SCK	PD13	- LPTIM1_OUT TIM4_CH2 -	I2C4_SDA I2C1_SDA I2S3_MCK -	- QUADSPI_BK1_IO3 **SAI2_SCK_A** -	FMC_A18 DSI_TE - EVENTOUT	

PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
18	SAI_FS	PI7	- - - TIM8_CH3	- - - -	- - **SAI2_FS_A** -	- DCMI_D7 LCD_B7 EVENTOUT	
ETHERNET							
19	ENET_RST	**PA4**	HDP0 - TIM5_ETR -	SAI4_D2 SPI1_NSS/I2S1_WS SPI3_NSS/I2S3_WS USART2_CK	SPI6_NSS - - -	SAI4_FS_A DCMI_HSYNC LCD_VSYNC EVENTOUT	
20	ENET_CK125	PG5	- TIM1_ETR - -	- - - -	- - - **ETH1_RGMII_CLK125**	FMC_A15 - - EVENTOUT	
21	ENET_INT	**PA9**	- TIM1_CH2 - -	I2C3_SMBA SPI2_SCK/I2S2_CK - USART1_TX	SDMMC2_CDIR - SDMMC2_D5 -	- DCMI_D0 LCD_R5 EVENTOUT	
22	ENET_MDIO	PA2	- TIM2_CH3 TIM5_CH3 LPTIM4_OUT	TIM15_CH1 - - USART2_TX	SAI2_SCK_B - SDMMC2_D0DIR **ETH1_MDIO**	MDIOS_MDIO - LCD_R1 EVENTOUT	
23	ENET_MDC	PC1	TRACED0 - SAI1_D1 DFSDM1_DATIN0	DFSDM1_CKIN4 SPI2_MOSI/I2S2_SDO SAI1_SD_A -	- SDMMC2_CK - **ETH1_MDC**	MDIOS_MDC - - EVENTOUT	
24	ENET_RXC	PA1	ETH_CLK TIM2_CH2 TIM5_CH2 LPTIM3_OUT	TIM15_CH1N - - USART2_RTS/USART2_DE	UART4_RX QUADSPI_BK1_IO3 SAI2_MCLK_B **ETH1_RGMII_RX_CLK**/ ETH1_RMII_REF_CLK	- - LCD_R2 EVENTOUT	
25	ENET_RX_CTL	PA7	- TIM1_CH1N TIM3_CH2 TIM8_CH1N	SAI4_D1 SPI1_MOSI/I2S1_SDO - -	SPI6_MOSI TIM14_CH1 QUADSPI_CLK **ETH1_RGMII_RX_CTL**/ ETH1_RMII_CRS_DV	SAI4_SD_A - - EVENTOUT	
26	ENET_RXD0	PC4	- - - DFSDM1_CKIN2	- I2S1_MCK - -	- SPDIFRX_IN2 - **ETH1_RGMII_RXD0**/ ETH1_RMII_RXD0	- - - EVENTOUT	
27	ENET_RXD1	PC5	- - SAI1_D3 DFSDM1_DATIN2	SAI4_D4 - SAI1_D4 -	- SPDIFRX_IN3 - **ETH1_RGMII_RXD1**/ ETH1_RMII_RXD1	SAI4_D3 - - EVENTOUT	
28	ENET_RXD2	PB0	- TIM1_CH2N TIM3_CH3 TIM8_CH2N	- - DFSDM1_CKOUT -	UART4_CTS LCD_R3 - **ETH1_RGMII_RXD2**	MDIOS_MDIO - LCD_G1 EVENTOUT	
29	ENET_RXD3	PH7	- - - -	I2C3_SCL SPI5_MISO - -	- - - **ETH1_RGMII_RXD3**	MDIOS_MDC DCMI_D9 - EVENTOUT	
30	ENET_TX_CTL	PB11	- TIM2_CH4 - LPTIM2_ETR	I2C2_SDA - DFSDM1_CKIN7 USART3_RX	- - - **ETH1_RGMII_TX_CTL**/ ETH1_RMII_TX_EN	- DSI_TE LCD_G5 EVENTOUT	
31	ENET_TXC	PG4	- TIM1_BKIN2 - -	- - - -	- - - **ETH1_RGMII_GTX_CLK**	FMC_A14 - - EVENTOUT	
32	ENET_TXD3	PB8	HDP6 TIM16_CH1 TIM4_CH3 DFSDM1_CKIN7	I2C1_SCL SDMMC1_CKIN I2C4_SCL SDMMC2_CKIN	UART4_RX FDCAN1_RX SDMMC2_D4 **ETH1_RGMII_TXD3**	SDMMC1_D4 DCMI_D6 LCD_B6 EVENTOUT	
33	ENET_TXD2	PC2	- - - DFSDM1_CKIN1	- SPI2_MISO/I2S2_SDI DFSDM1_CKOUT -	- - - **ETH1_RGMII_TXD2**	- DCMI_PIXCLK - EVENTOUT	
34	ENET_TXD1	PG14	TRACED1 LPTIM1_ETR - -	- SPI6_MOSI SAI4_D1 USART6_TX	- QUADSPI_BK2_IO3 SAI4_SD_A **ETH1_RGMII_TXD1**/ ETH1_RMII_TXD1	FMC_A25 - LCD_B0 EVENTOUT	

PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
35	ENET_TXD0	PG13	TRACED0 LPTIM1_OUT SAI1_CK2 -	SAI4_CK1 SPI6_SCK SAI1_SCK_A USART6_CTS/USART6_NSS	- - SAI4_MCLK_A **ETH1_RGMII_TXD0**/ ETH1_RMII_TXD0	FMC_A24 - LCD_R0 EVENTOUT	
SD							
36	SD_CD	**PB7**	- TIM17_CH1N TIM4_CH2 -	I2C1_SDA - I2C4_SDA USART1_RX	- - SDMMC2_D1 DFSDM1_CKIN5	FMC_NL DCMI_VSYNC - EVENTOUT	
37	SD_D1	PC9	TRACED1 - TIM3_CH4 TIM8_CH4	I2C3_SDA I2S_CKIN - -	UART5_CTS QUADSPI_BK1_IO0 - -	**SDMMC1_D1** DCMI_D3 LCD_B2 EVENTOUT	
38	SD_D0	PC8	TRACED0 - TIM3_CH3 TIM8_CH3	- - UART4_TX USART6_CK	UART5_RTS/UART5_DE - - -	**SDMMC1_D0** DCMI_D2 - EVENTOUT	
39	SD_CLK	PC12	TRACECLK MCO2 SAI4_D3 -	- - SPI3_MOSI/I2S3_SDO USART3_CK	UART5_TX - SAI4_SD_B -	**SDMMC1_CK** DCMI_D9 - EVENTOUT	
40	SD_CMD	PD2	- - TIM3_ETR -	I2C5_SMBA - UART4_RX -	UART5_RX - - -	**SDMMC1_CMD** DCMI_D11 - EVENTOUT	
41	SD_D3	PC11	TRACED3 - - DFSDM1_DATIN5	- - SPI3_MISO/I2S3_SDI USART3_RX	UART4_RX QUADSPI_BK2_NCS SAI4_SCK_B -	**SDMMC1_D3** DCMI_D4 - EVENTOUT	
42	SD_D2	PC10	TRACED2 - - DFSDM1_CKIN5	- - SPI3_SCK/I2S3_CK USART3_TX	UART4_TX QUADSPI_BK1_IO1 SAI4_MCLK_B -	**SDMMC1_D2** DCMI_D8 LCD_R2 EVENTOUT	
USB							
43	USBH_VBUS						
44	USBH_DN	USB_ DM1					
45	USBH_DP	USB_ DP1					
46	USBOTG_VBUS	OTG_ VBUS					
47	USBOTG_DN	USB_ DM2					
48	USBOTG_DP	USB_ DP2					
POWER SUPPLY & RESET							
49 50	VIN						3.3V power supply input
51	#POR	NRST					
52	BOOT_MODE						H: Boot from FLASH L: Boot from UART/USB
DISPLAY							
53	**LCD_DE** CSI_DP2 LVDS1_TX2P	PE13	HDP2 TIM1_CH3 - DFSDM1_CKIN5	- SPI4_MISO - -	- - SAI2_FS_B -	FMC_D10/FMC_DA10 DCMI_D6 **LCD_DE** EVENTOUT	
54	**LCD_VSYNC** CSI_DN2 LVDS1_TX2N	PI9	HDP1 - - -	- - - -	UART4_RX FDCAN1_RX - -	- - **LCD_VSYNC** EVENTOUT	
55	**LCD_HSYNC** CSI_DP0 LVDS1_TX0P	PI10	HDP0 - - -	- - - -	USART3_CTS/USART3_NSS - - ETH1_GMII_RX_ER/ ETH1_MII_RX_ER	- - **LCD_HSYNC** EVENTOUT	
56	**LCD_CLK** CSI_DN0 LVDS1_TX0N	PG7	TRACED5 - - -	- - SAI1_MCLK_A USART6_CK	UART8_RTS/UART8_DE QUADSPI_CLK - QUADSPI_BK2_IO3	- DCMI_D13 **LCD_CLK** EVENTOUT	

PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
57	**LCD_R1** CSI_CKN LVDS1_CLKN	PH3	- - - CKIN4	- - - -	- QUADSPI_BK2_IO1 SAI2_MCLK_B ETH1_GMII_COL/ ETH1_MII_COL	- - **LCD_R1** EVENTOUT	
58	**LCD_R2** CSI_DP1 LVDS1_TX1P	PH8	- - TIM5_ETR -	I2C3_SDA - - -	- - - -	- DCMI_HSYNC **LCD_R2** EVENTOUT	
59	**LCD_R3** CSI_DN1 LVDS1_TX1N	PH9	- - TIM12_CH2 -	I2C3_SMBA - - -	- - - -	- DCMI_D0 **LCD_R3** EVENTOUT	
60	**LCD_R4** CSI_DP3 LVDS1_TX3P	PH10	- - TIM5_CH1 -	I2C4_SMBA I2C1_SMBA - -	- - - -	- DCMI_D1 **LCD_R4** EVENTOUT	
61	**LCD_R5** CSI_DN3 LVDS1_TX3N	PH11	- - TIM5_CH2 -	I2C4_SCL I2C1_SCL - -	- - - -	- DCMI_D2 **LCD_R5** EVENTOUT	
62	**LCD_R6** DSI_DP2 LVDS0_TX2P	PH12	HDP2 - TIM5_CH3 -	I2C4_SDA I2C1_SDA - -	- - - -	- DCMI_D3 **LCD_R6** EVENTOUT	
63	**LCD_R7** DSI_DN2 LVDS0_TX2N	PE15	HDP3 TIM1_BKIN - -	TIM15_BKIN - - USART2_CTS/USART2_NSS	UART8_CTS - FMC_NCE2 -	FMC_D12/FMC_DA12 - **LCD_R7** EVENTOUT	
64	**LCD_G2**	PH13	- - - TIM8_CH1N	- - - -	UART4_TX FDCAN1_TX - -	- - **LCD_G2** EVENTOUT	
65	**LCD_G3**	PH14	- - - TIM8_CH2N	- - - -	UART4_RX FDCAN1_RX - -	- DCMI_D4 **LCD_G3** EVENTOUT	
66	**LCD_G4**	PH15	- - - TIM8_CH3N	- - - -	- - - -	- DCMI_D11 **LCD_G4** EVENTOUT	
67	**LCD_G5**	PI0	- - TIM5_CH4 -	- SPI2_NSS/I2S2_WS - -	- - - -	- DCMI_D13 **LCD_G5** EVENTOUT	
68	**LCD_G6**	PI1	- - - TIM8_BKIN2	- SPI2_SCK/I2S2_CK - -	- - - -	- DCMI_D8 **LCD_G6** EVENTOUT	
69	**LCD_G7**	PI2	- - - TIM8_CH4	- SPI2_MISO/I2S2_SDI - -	- - - -	- DCMI_D9 **LCD_G7** EVENTOUT	
70	**LCD_B1**	PG12	- LPTIM1_IN1 - -	- SPI6_MISO SAI4_CK2 USART6_RTS/USART6_DE	SPDIFRX_IN1 LCD_B4 SAI4_SCK_A ETH1_PHY_INTN	FMC_NE4 - **LCD_B1** EVENTOUT	
71	**LCD_B2**	PG10	TRACED10 - - -	- - - -	UART8_CTS LCD_G3 SAI2_SD_B QUADSPI_BK2_IO2	FMC_NE3 DCMI_D2 **LCD_B2** EVENTOUT	
72	**LCD_B3**	PD10	RTC_REFIN TIM16_BKIN - DFSDM1_CKOUT	I2C5_SMBA SPI3_MISO/I2S3_SDI SAI3_FS_B USART3_CK	- - - -	FMC_D15/FMC_DA15 - **LCD_B3** EVENTOUT	
73	**LCD_B4**	PI4	- - - TIM8_BKIN	- - - -	- - SAI2_MCLK_A -	- DCMI_D5 **LCD_B4** EVENTOUT	
74	**LCD_B5**	PI5	- - - TIM8_CH1	- - - -	- - SAI2_SCK_A -	- DCMI_VSYNC **LCD_B5** EVENTOUT	
75	**LCD_B6**	PI6	- - - TIM8_CH2	- - - -	- - SAI2_SD_A -	- DCMI_D6 **LCD_B6** EVENTOUT	
76	**LCD_B7**	PD8	- - - DFSDM1_CKIN3	- - SAI3_SCK_B USART3_TX	- SPDIFRX_IN1 - -	FMC_D13/FMC_DA13 - **LCD_B7** EVENTOUT	

PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
Display Control							
77	**LCD_EN**	**PA10**	- TIM1_CH3 - -	- SPI3_NSS/I2S3_WS - USART1_RX	- - - MDIOS_MDIO	SAI4_FS_B DCMI_D1 LCD_B1 EVENTOUT	
78	**LCD_BL**	PA15	DBTRGI **TIM2_CH1**/TIM2_ETR SAI4_D2 SDMMC1_CDIR	CEC SPI1_NSS/I2S1_WS SPI3_NSS/I2S3_WS SPI6_NSS	UART4_RTS/UART4_DE SDMMC2_D5 SDMMC2_CDIR SDMMC1_D5	SAI4_FS_A UART7_TX LCD_R1 EVENTOUT	
MISC							
79	LCD_R0 CSI_CKP LVDS1_CLKP	PH2	- LPTIM1_IN2 - -	- - - -	- QUADSPI_BK2_IO0 SAI2_SCK_B ETH1_GMII_CRS/ ETH1_MII_CRS	- - **LCD_R0** EVENTOUT	
80	LCD_G0 DSI_DP3 LVDS0_TX3P	PB1	- TIM1_CH3N TIM3_CH4 TIM8_CH3N	- - DFSDM1_DATIN1 -	- LCD_R6 - ETH1_RGMII_RXD3	MDIOS_MDC - **LCD_G0** EVENTOUT	
81	LCD_G1 DSI_DN3 LVDS0_TX3N	PE6	TRACED2 TIM1_BKIN2 SAI1_D1 -	TIM15_CH2 SPI4_MOSI SAI1_SD_A SDMMC2_D0	SDMMC1_D2 - SAI2_MCLK_B -	FMC_A22 DCMI_D7 **LCD_G1** EVENTOUT	
82	LCD_B0	PE4	TRACED1 - SAI1_D2 DFSDM1_DATIN3	TIM15_CH1N SPI4_NSS SAI1_FS_A SDMMC2_CKIN	SDMMC1_CKIN SDMMC2_D4 - SDMMC1_D4	FMC_A20 DCMI_D4 **LCD_B0** EVENTOUT	
MIPI-DSI							
83	**DSI_DP1** LVDS0_TX1P	DSI_ DP1					
84	**DSI_DN1** LVDS0_TX1N	DSI_ DN1					
85	**DSI_DP0** LVDS0_TX0P	DSI_ DP0					
86	**DSI_DN0** LVDS0_TX0N	DSI_ DN0					
87	**DSI_CKP** LVDS0_CLKP	DSI_ CKP					
88	**DSI_CKN** LVDS0_CLKN	DSI_ CKN					
UART							
89	UARTA_RXD	PB2	TRACED4 RTC_OUT2 SAI1_D1 DFSDM1_CKIN1	USART1_RX I2S_CKIN SAI1_SD_A SPI3_MOSI/I2S3_SDO	**UART4_RX** QUADSPI_CLK - -	- - - EVENTOUT	
90	UARTA_TXD	PG11	TRACED11 - - -	USART1_TX - **UART4_TX** -	SPDIFRX_IN0 - - ETH1_RGMII_TX_CTL/ ETH1_RMII_TX_EN	- DCMI_D3 LCD_B3 EVENTOUT	
91	UARTB_RXD	PB12	- TIM1_BKIN I2C6_SMBA -	I2C2_SMBA SPI2_NSS/I2S2_WS DFSDM1_DATIN1 USART3_CK	**USART3_RX** FDCAN2_RX - ETH1_R(G)MII_TXD0	- - UART5_RX EVENTOUT	
92	UARTB_TXD	PB10	- TIM2_CH3 - LPTIM2_IN1	I2C2_SCL SPI2_SCK/I2S2_CK DFSDM1_DATIN7 **USART3_TX**	- QUADSPI_BK1_NCS - ETH1_(G)MII_RX_ER	- - LCD_G4 EVENTOUT	
93	UARTC_RXD	PD6	- TIM16_CH1N SAI1_D1 DFSDM1_CKIN4	DFSDM1_DATIN1 SPI3_MOSI/I2S3_SDO SAI1_SD_A **USART2_RX**	- - - -	FMC_NWAIT DCMI_D10 LCD_B2 EVENTOUT	
94	UARTC_TXD	PD5	- - - -	- - - **USART2_TX**	- - SDMMC3_D2 -	FMC_NWE - - EVENTOUT	
95	UARTC_CTS	PD3	HDP5 - - DFSDM1_CKOUT	- SPI2_SCK/I2S2_CK DFSDM1_DATIN0 **USART2_CTS**/ USART2_NSS	SDMMC1_D123DIR SDMMC2_D7 SDMMC2_D123DIR SDMMC1_D7	FMC_CLK DCMI_D5 LCD_G7 EVENTOUT	**Input** signal
96	UARTC_RTS	PD4	- - - -	- - SAI3_FS_A **USART2_RTS**/ USART2_DE	- - SDMMC3_D1 DFSDM1_CKIN0	FMC_NOE - - EVENTOUT	
2nd SPI							

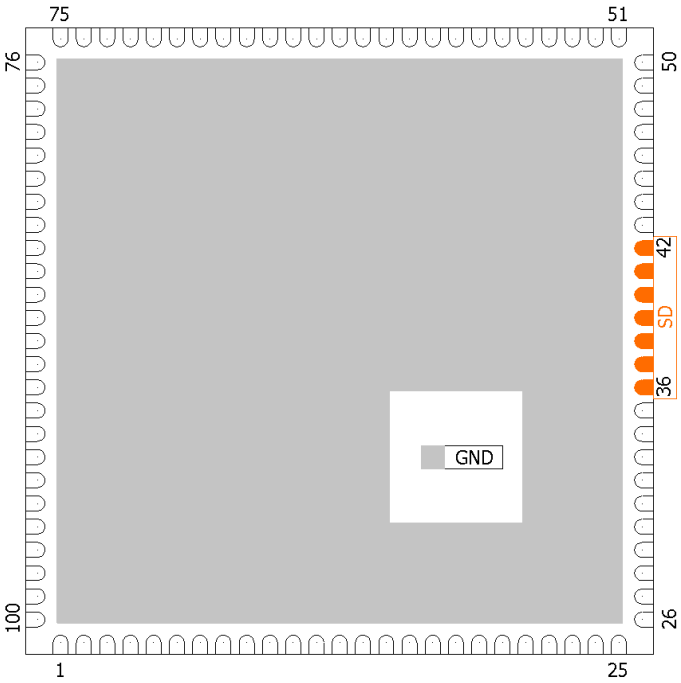
PIN	QSCOM STANDARD	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
97	SPIB_NSS	PZ3	- - I2C6_SDA I2C2_SDA	I2C5_SDA SPI1_NSS/I2S1_WS I2C4_SDA USART1_CTS/USART1_NSS	**SPI6_NSS** - - -	- - - EVENTOUT	
98	SPIB_MISO	PA6	- TIM1_BKIN TIM3_CH1 TIM8_BKIN	SAI4_CK2 SPI1_MISO/I2S1_SDI - -	**SPI6_MISO** TIM13_CH1 - MDIOS_MDC	SAI4_SCK_A DCMI_PIXCLK LCD_G2 EVENTOUT	
99	SPIB_MOSI	PZ2	- - I2C6_SCL I2C2_SCL	I2C5_SMBA SPI1_MOSI/I2S1_SDO I2C4_SMBA USART1_TX	**SPI6_MOSI** - - -	- - - EVENTOUT	
100	SPIB_SCK	PA5	- TIM2_CH1/TIM2_ETR - TIM8_CH1N	SAI4_CK1 SPI1_SCK/I2S1_CK - -	**SPI6_SCK** - - -	SAI4_MCLK_A - LCD_R4 EVENTOUT	

Pins used for manufacturing and debugging – leave unconnected					
PIN		**PIN**		**PIN**	
C1	JTAG_TDI			C3	JTAG_TCK
		B2	JTAG_TDO		
A1	JTAG_TRST_B			A3	JTAG_TMS

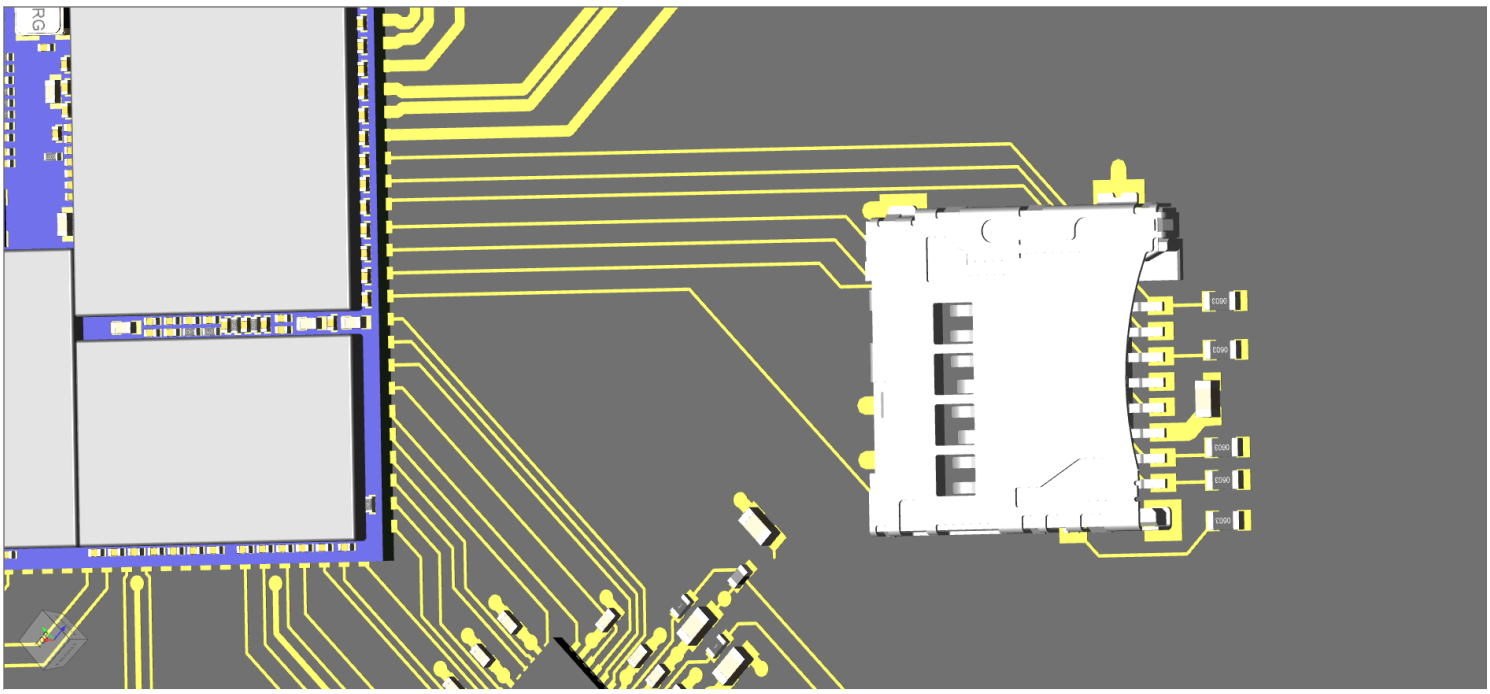
PIN	USED FOR	MP1 PAD	Alternate Function 0-3	Alternate Function 4-7	Alternate Function 8-11	Alternate Function 12-15	Remarks
Onboard wiring							
	SERIAL FLASH	PB6 10K-PU	- TIM16_CH1N TIM4_CH1 -	I2C1_SCL CEC I2C4_SCL USART1_TX	- FDCAN2_TX **QUADSPI_BK1_NCS** DFSDM1_DATIN5	UART5_TX DCMI_D5 - EVENTOUT	
		PF10 10K-PU	- TIM16_BKIN SAI1_D3 SAI4_D4	- - SAI1_D4 -	- **QUADSPI_CLK** - -	SAI4_D3 DCMI_D11 **LCD_DE** EVENTOUT	
		PF8 10K-PU	TRACED12 TIM16_CH1N - -	- SPI5_MISO SAI1_SCK_B UART7_RTS/UART7_DE	- TIM13_CH1 **QUADSPI_BK1_IO0** -	- - - EVENTOUT	
		PF9 10K-PU	TRACED13 TIM17_CH1N - -	- SPI5_MOSI SAI1_FS_B UART7_CTS	- TIM14_CH1 **QUADSPI_BK1_IO1** -	- - - EVENTOUT	
	eMMC	PG6 10K-PU	TRACED14 TIM17_BKIN - -	- - - -	- - **SDMMC2_CMD** -	- DCMI_D12 LCD_R7 EVENTOUT	
		PE3 10K-PU	TRACED0 - - -	TIM15_BKIN - SAI1_SD_B -	- **SDMMC2_CK** - -	FMC_A19 - - EVENTOUT	
		PB14 10K-PU	- TIM1_CH2N TIM12_CH1 TIM8_CH2N	USART1_TX SPI2_MISO/I2S2_SDI DFSDM1_DATIN2 USART3_RTS/USART3_DE	- **SDMMC2_D0** - -	- - - EVENTOUT	
		PB15	RTC_REFIN TIM1_CH3N TIM12_CH2 TIM8_CH3N	USART1_RX SPI2_MOSI/I2S2_SDO DFSDM1_CKIN2 -	- **SDMMC2_D1** - -	- - - EVENTOUT	
		PB3	TRACED9 TIM2_CH2 - -	SAI4_CK1 SPI1_SCK/I2S1_CK SPI3_SCK/I2S3_CK -	SPI6_SCK **SDMMC2_D2** - -	SAI4_MCLK_A UART7_RX - EVENTOUT	
		PB4	TRACED8 TIM16_BKIN TIM3_CH1 -	SAI4_CK2 SPI1_MISO/I2S1_SDI SPI3_MISO/I2S3_SDI SPI2_NSS/I2S2_WS	SPI6_MISO **SDMMC2_D3** - -	SAI4_SCK_A UART7_TX - EVENTOUT	
		PA8	MCO1 TIM1_CH1 - TIM8_BKIN2	I2C3_SCL SPI3_MOSI/I2S3_SDO - USART1_CK	SDMMC2_CKIN **SDMMC2_D4** OTG_FS_SOF/OTG_HS_SOF -	SAI4_SD_B UART7_RX LCD_R6 EVENTOUT	
		PB9	HDP7 TIM17_CH1 TIM4_CH4 DFSDM1_DATIN7	I2C1_SDA SPI2_NSS/I2S2_WS I2C4_SDA SDMMC2_CDIR	UART4_TX FDCAN1_TX **SDMMC2_D5** SDMMC1_CDIR	SDMMC1_D5 DCMI_D7 LCD_B7 EVENTOUT	
		PC6	HDP1 - TIM3_CH1 TIM8_CH1	DFSDM1_CKIN3 I2S2_MCK - USART6_TX	SDMMC1_D0DIR SDMMC2_D0DIR **SDMMC2_D6** DSI_TE	SDMMC1_D6 DCMI_D0 LCD_HSYNC EVENTOUT	
		PC7	HDP4 - TIM3_CH2 TIM8_CH2	DFSDM1_DATIN3 - I2S3_MCK USART6_RX	SDMMC1_D123DIR SDMMC2_D123DIR **SDMMC2_D7** -	SDMMC1_D7 DCMI_D1 LCD_G6 EVENTOUT	

SD/MMC

QSCOM PIN	FUNCTION
36	SD_CD
37	SD_D1
38	SD_D0
39	SD_CLK
40	SD_CMD
41	SD_D3
42	SD_D2

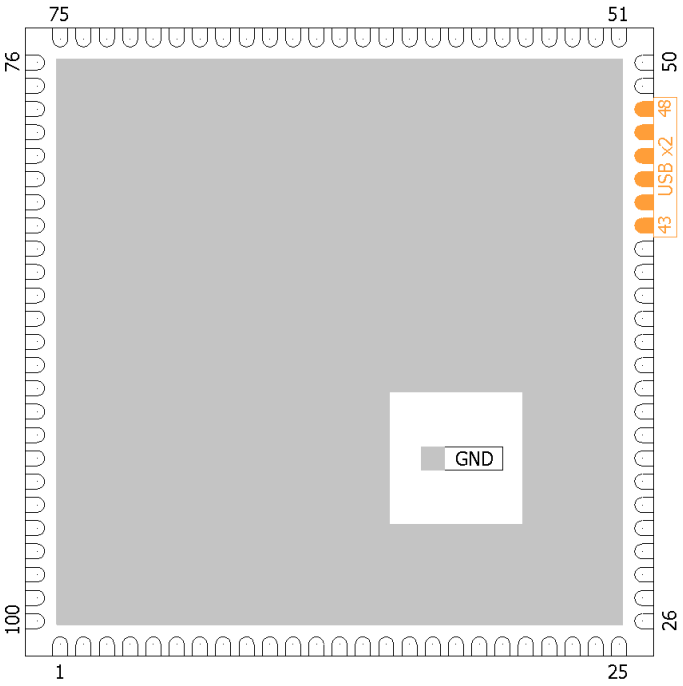


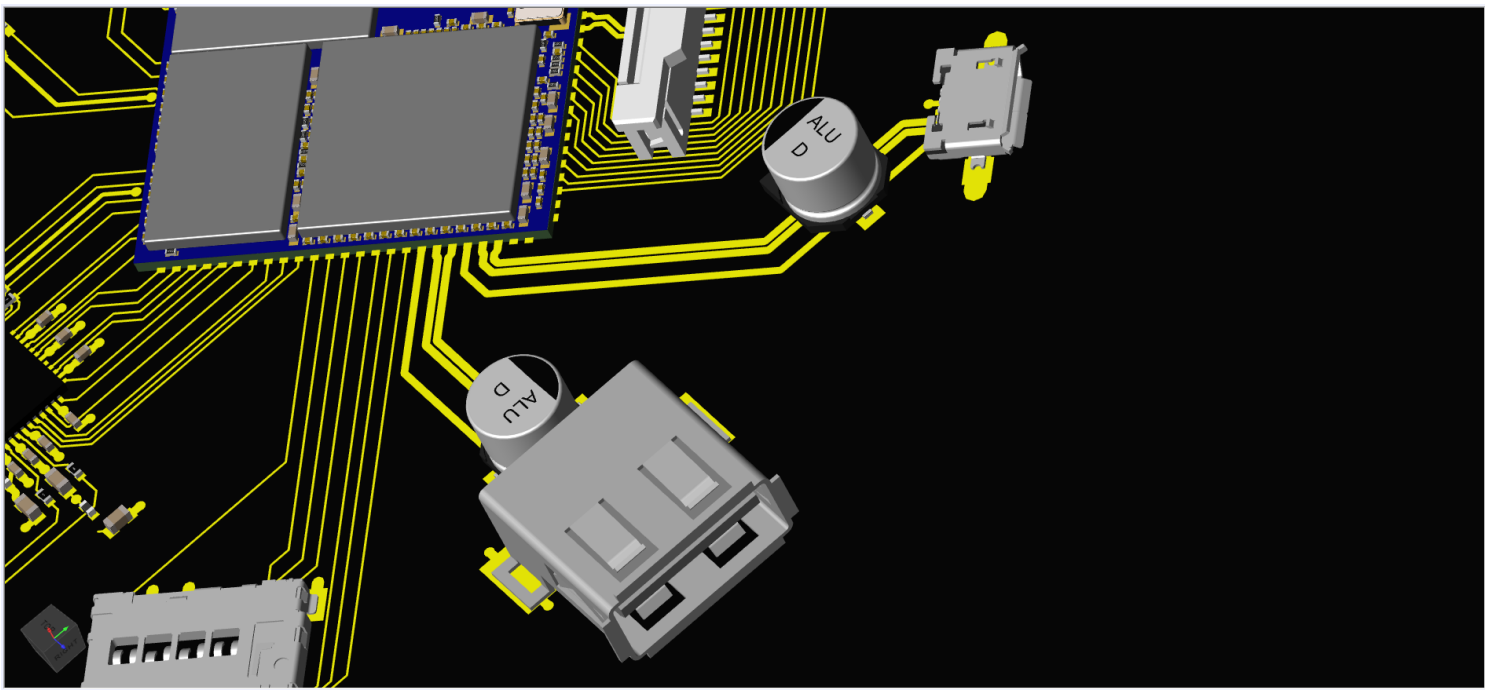
Parameter	Remark
Max. Frequency	208MHz (Ultra-High Speed SD, SDR104) 52MHz (MMCplus, eMMC)
Matched length data and clock up to 52MHz	Group tolerance <100ps ≈15mm
Matched length data and clock up to 208MHz	Group tolerance <20ps ≈3mm
Max. trace length	100mm



USB

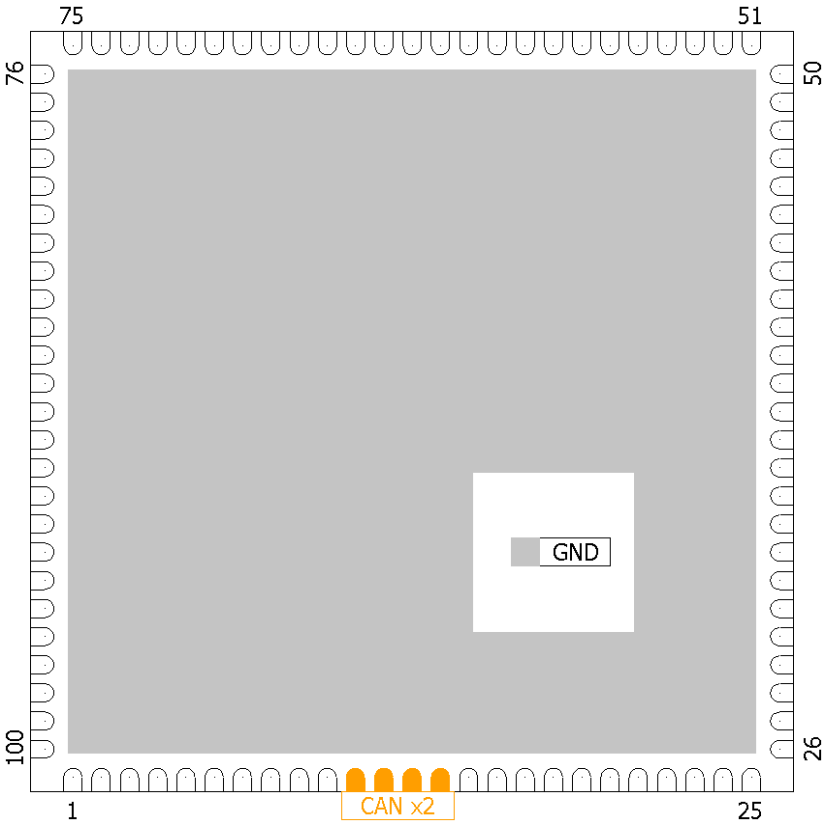
QSCOM PIN	FUNCTION
43	USBH_VBUS
44	USBH_DN
45	USBH_DP
46	USBOTG_VBUS
47	USBOTG_DN
48	USBOTG_DP

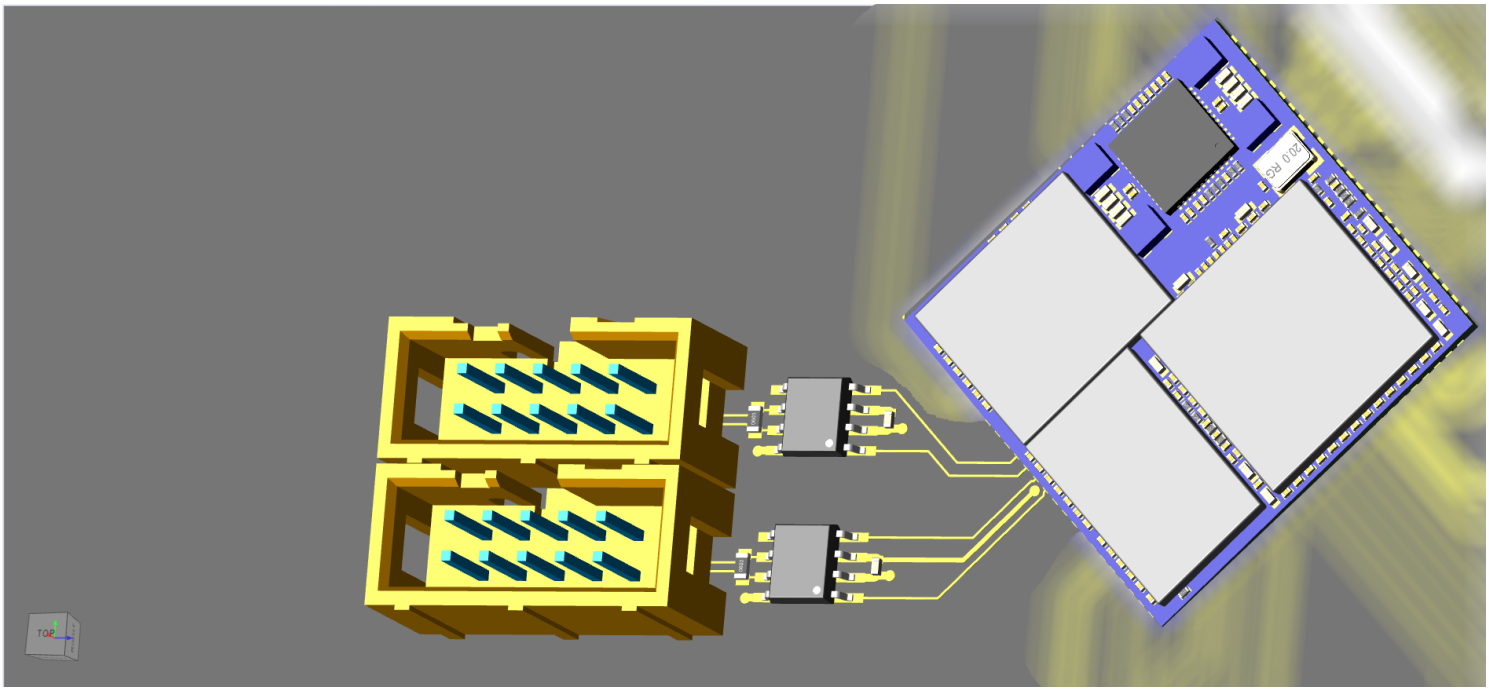




CAN

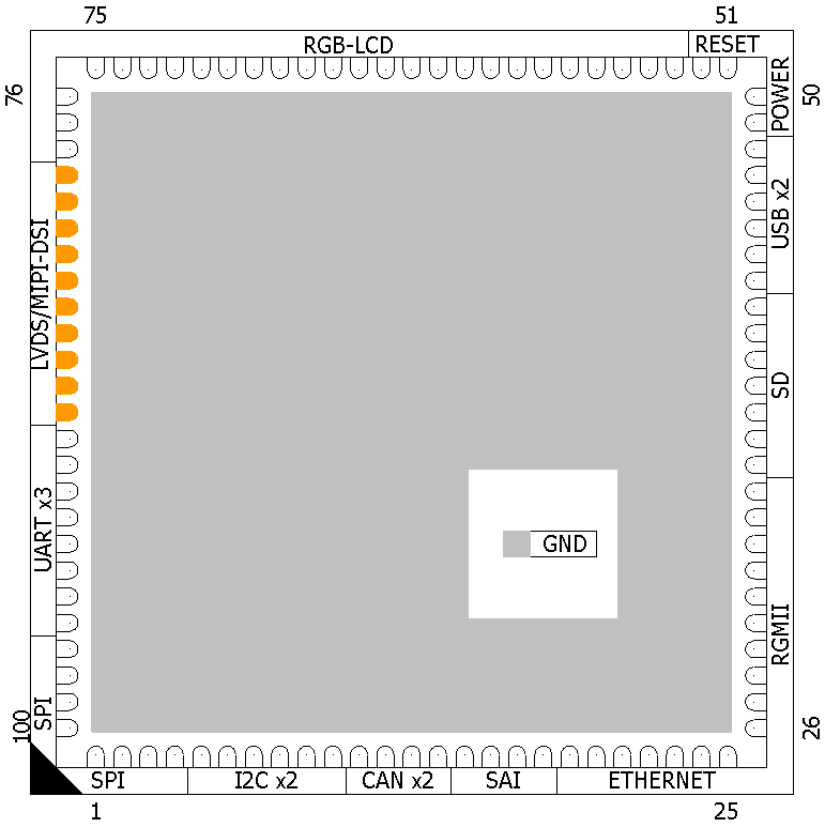
QSCOM PIN	FUNCTION
11	CANA_RX
12	CANA_TX
13	CANA_RX
14	CANA_TX

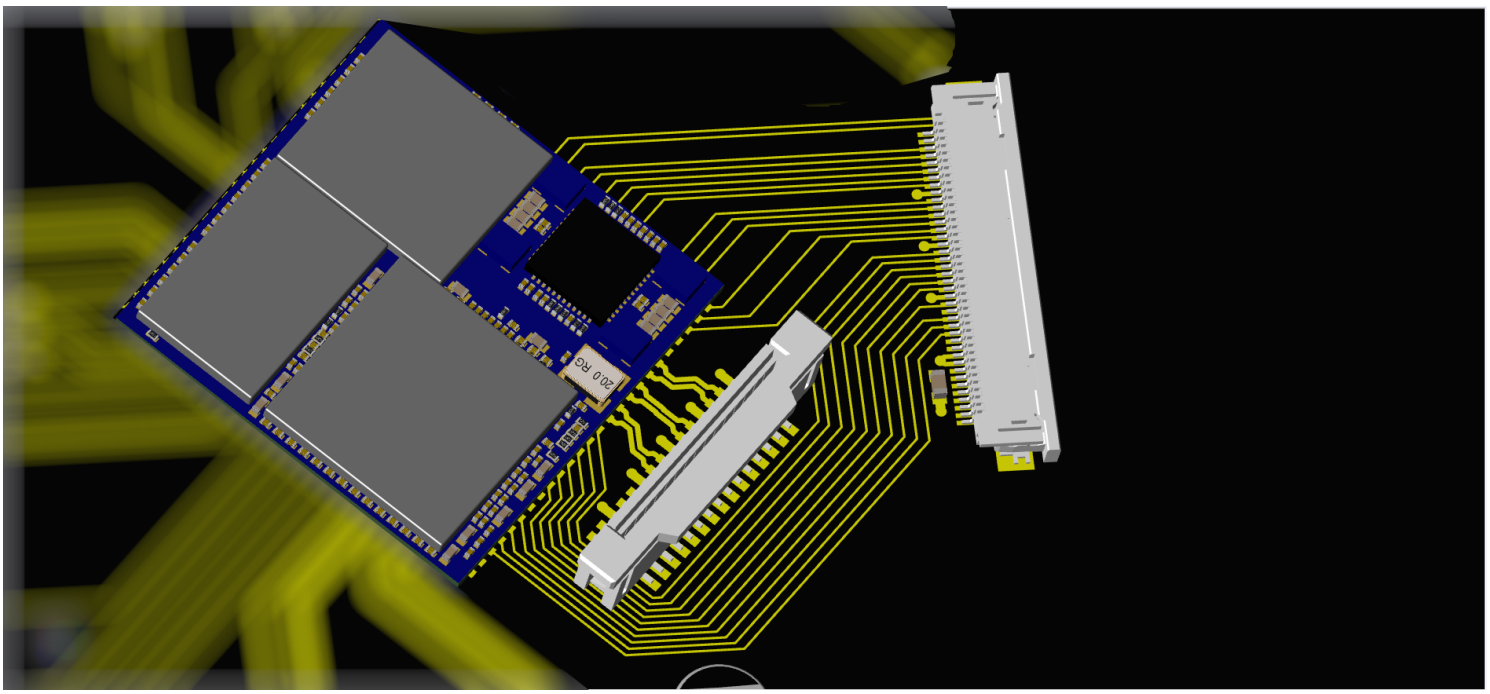




LVDS/MIPI-DSI

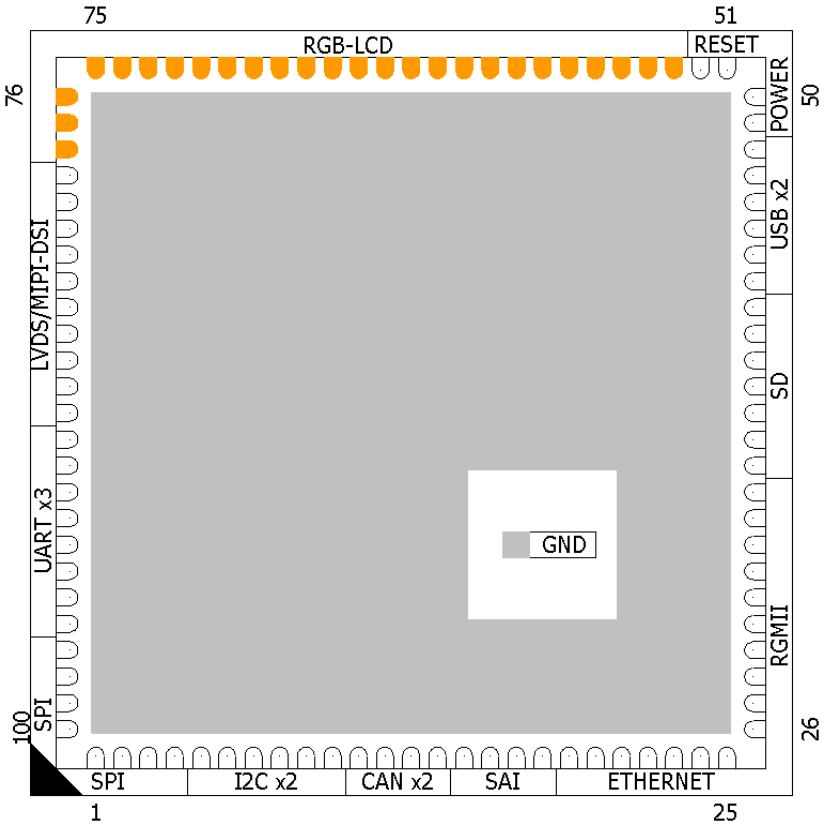
QSCOM PIN	2-lane DSI	4-lane DSI	LVDS
79	(LCD_R0)	DSI_DP3	DSI_DP3
80	(LCD_G0)	DSI_DN3	DSI_DN3
81	(LCD_G1)	DSI_DP2	DSI_DP2
82	(LCD_B0)	DSI_DN2	DSI_DN2
83	DSI_DP1	DSI_DP1	DSI_DP1
84	DSI_DN1	DSI_DN1	DSI_DN1
85	DSI_DP0	DSI_DP0	DSI_DP0
86	DSI_DN0	DSI_DN0	DSI_DN0
87	DSI_CKP	DSI_CKP	DSI_CKP
88	DSI_CKN	DSI_CKN	DSI_CKN

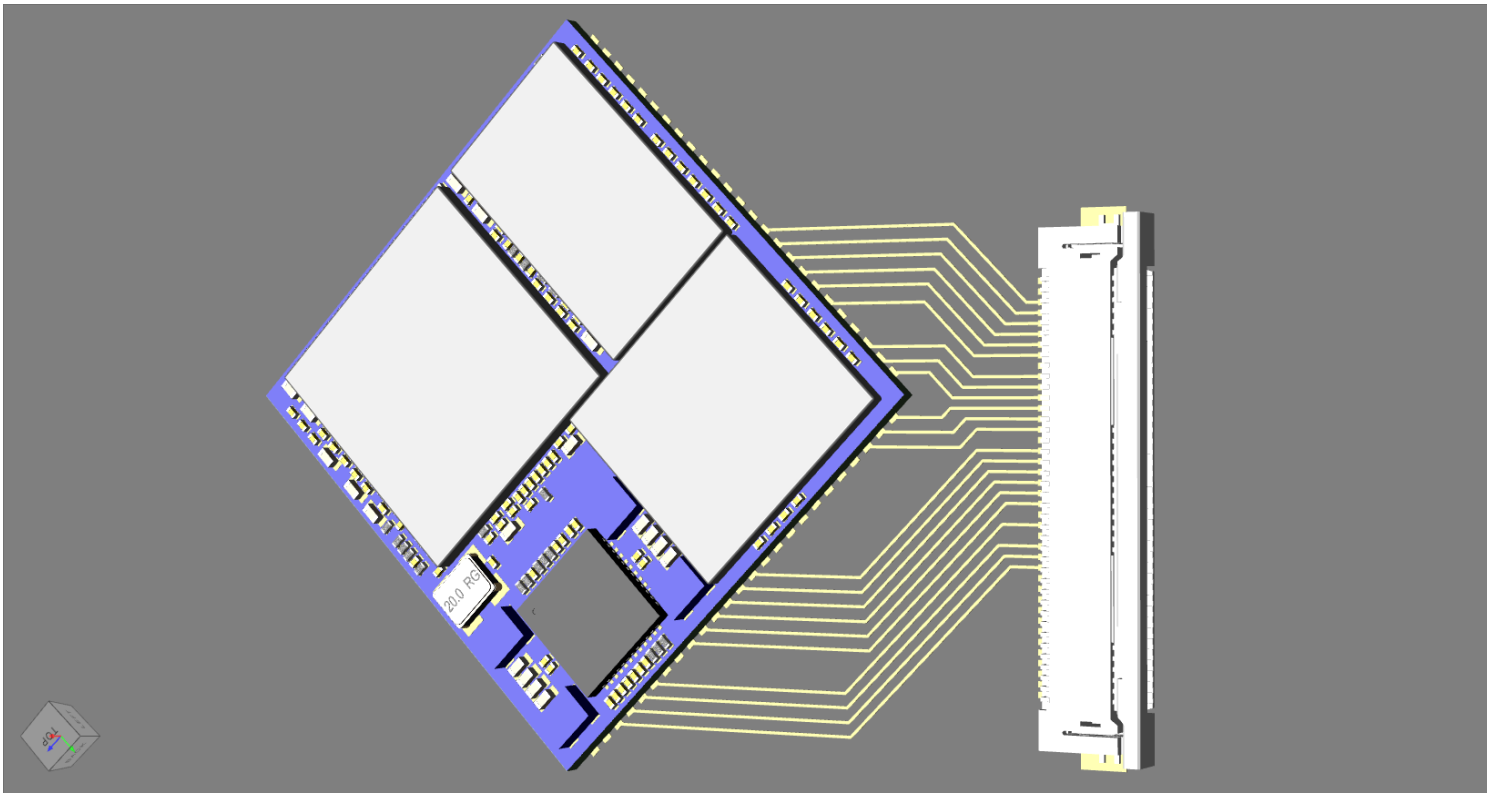




RGB-LCD

QSCOM PIN	FUNCTION	QSCOM PIN	FUNCTION
53	LCD_DE	68	LCD_G6
54	LCD_VSYNC	69	LCD_G7
55	LCD_HSYNC	70	LCD_B1
56	LCD_CLK	71	LCD_B2
57	LCD_R1	72	LCD_B3
58	LCD_R2	73	LCD_B4
59	LCD_R3	74	LCD_B5
60	LCD_R4	75	LCD_B6
61	LCD_R5	76	LCD_B7
62	LCD_R6	77	LCD_EN
63	LCD_R7	78	LCD_BL
64	LCD_G2	79	(LCD_R0)
65	LCD_G3	80	(LCD_G0)
66	LCD_G4	81	(LCD_G1)
67	LCD_G5	82	(LCD_B0)





ETHERNET - RGMII

QSCOM PIN	FUNCTION	QSCOM PIN	FUNCTION
19	ENET_RST	28	ENET_RXD2
20	ENET_CK125	29	ENET_RXD3
21	ENET_INT	30	ENET_TX_CTL
22	ENET_MDIO	31	ENET_TXC
23	ENET_MDC	32	ENET_TXD3
24	ENET_RXC	33	ENET_TXD2
25	ENET_RX_CTL	34	ENET_TXD1
26	ENET_RXD0	35	ENET_TXD0
27	ENET_RXD1