

## 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
- 3.3V power supply



## Key Features

- Processor RENESAS RZ/G2L  
Dual 1.2GHz Arm® Cortex®-A55  
200-MHz Arm® Cortex®-M33
- RAM 512MB/1GB DDR3L SDRAM
- ROM 4GB eMMC

- Grade Industrial
- Temperature -40°C to 85°C
- Display support

Interfaces 24-bit RGB  
MIPI® DSI (2-lanes)

GPU/VPU 500-MHz Arm® Mali™-G31  
H.264 Video Codec Processor

- Connectivity
  - Gb Ethernet, USB2.0, eMMC/SD
  - UART, I²C, SPI, PWM, SAI, CAN

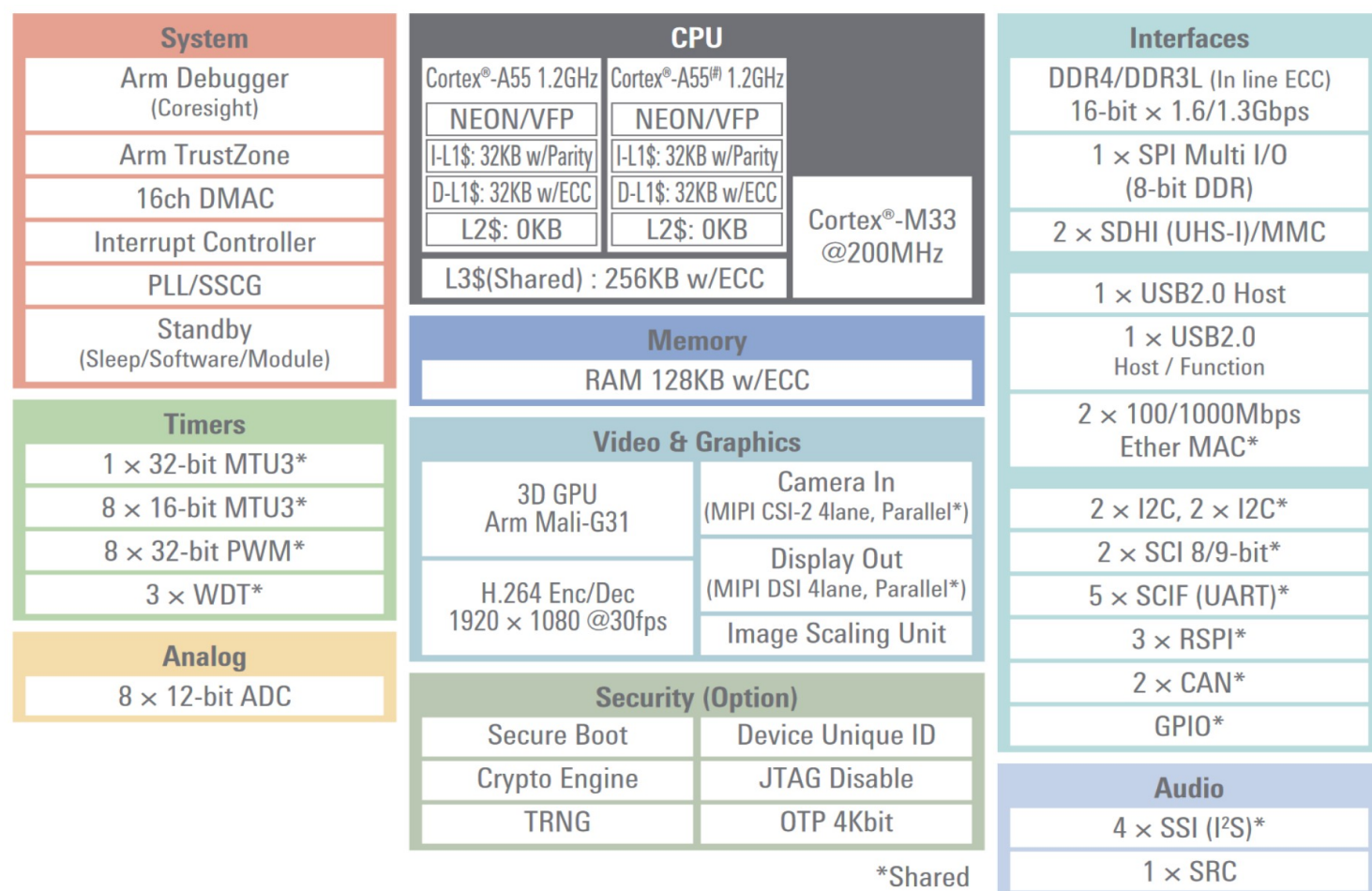
## OS Support

- Linux

**RZ/G2L**  
**Dual**  
**Cortex®-A55**

**RENESAS**

## RZ/G2L Block Diagram



## QSRZ – Main Feature Comparison and Ordering Information

|                     | QSRZ-G2L0                    | QSRZ-G2L1           |
|---------------------|------------------------------|---------------------|
| Primary Arm® Core   | 2x Cortex®-A55 up to 1.2 GHz |                     |
| Secondary Arm® Core | 1x Cortex-M33 up to 500 MHz  |                     |
| RAM                 | 1 GB                         | 512 MB              |
| ROM                 | 4GB eMMC                     |                     |
| Display Interface   | 24-bit RGB + 2-lane MIPI-DSI |                     |
| GPU                 | yes                          |                     |
| CAN                 | 2x                           |                     |
| Security            | Secure Boot, Cryptography    |                     |
| Temperature         | -40°C to 85°C                |                     |
| Order Code          | QSRZ/G2L/1GS/4GF/I           | QSRZ/G2L/512S/4GF/I |

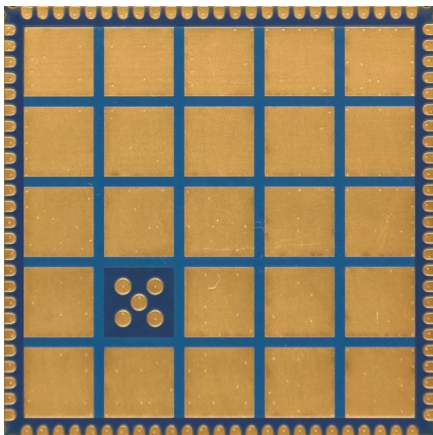
## QFN Style Computer On Module Advantages

### 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.



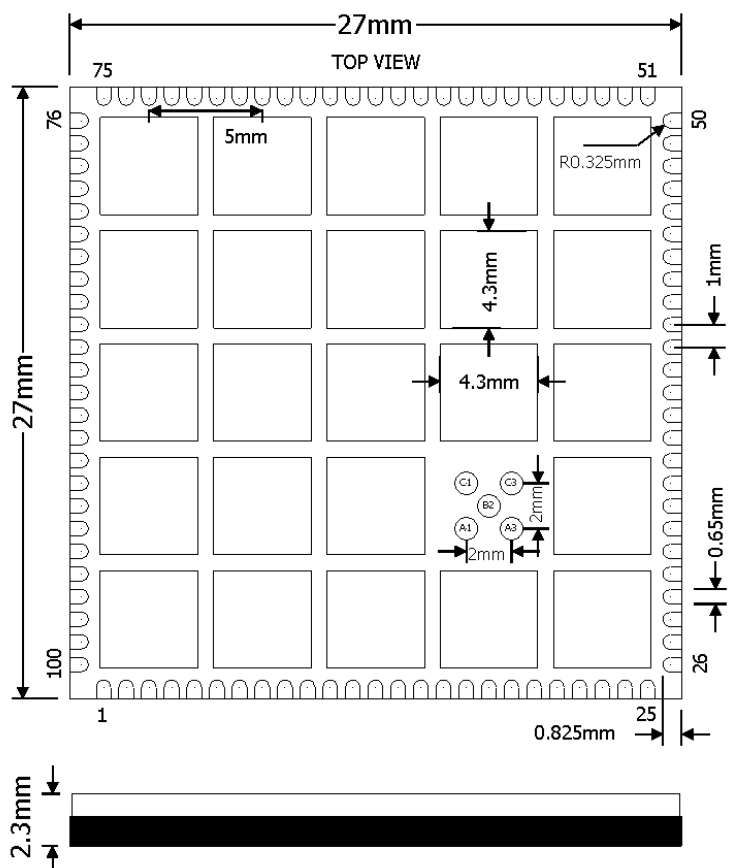
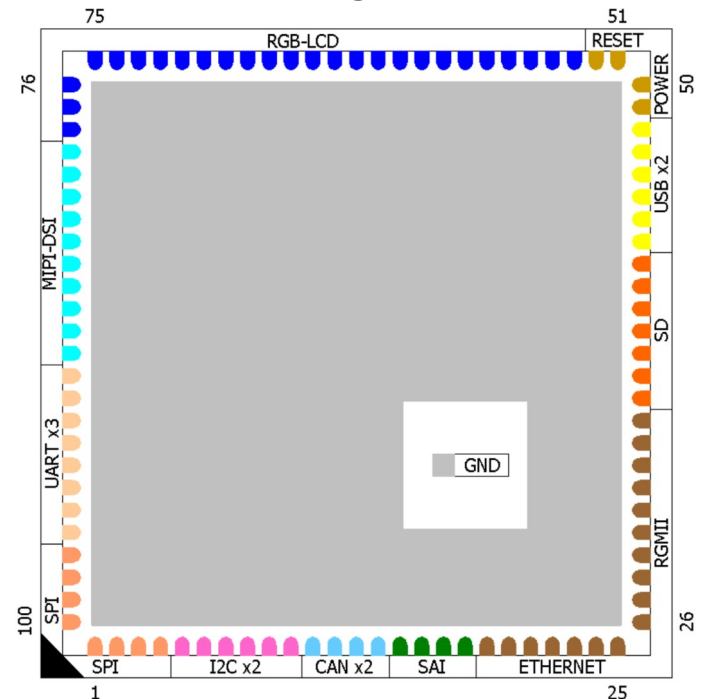
### Easy Wiring - Even 2-layer printed circuit boards can be used.

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.

## 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



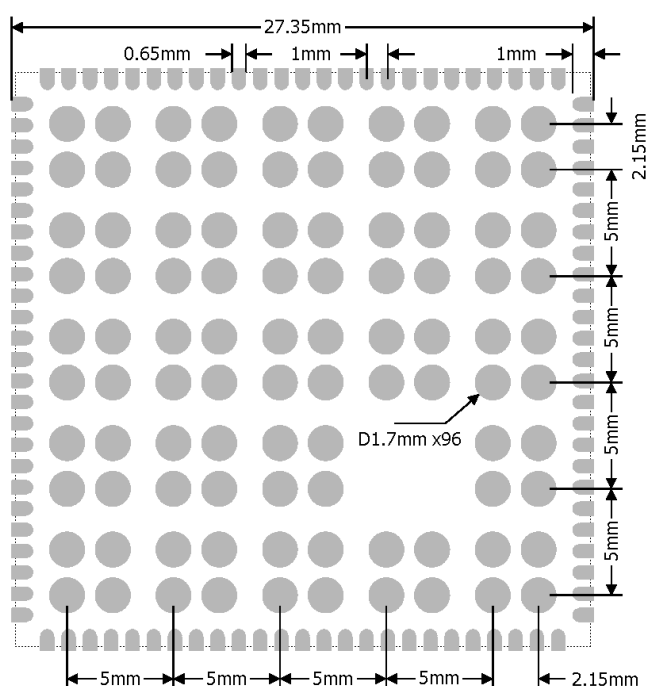


## Soldering Recommendations

Ka-Ro QSCOM modules are compatible with industrial standard reflow profile for Pb-free solders. Ka-Ro will give following recommendations for soldering the module to ensure reliable solder joint and operation of the module after soldering. Since the profile used is process and layout dependent, the optimum profile should be studied case by case. Thus following recommendations should be taken as a starting point guide.

- Refer to technical documentations of particular solder paste for reflow profile configurations
- Avoid using more than one flow.
- A 150µm stencil thickness is recommended.
- Aperture size of the stencil should be 1:1 with the pad size.
- A low residue, “no clean” solder paste should be used due to low mounted height of the component.

## Recommended stencil design

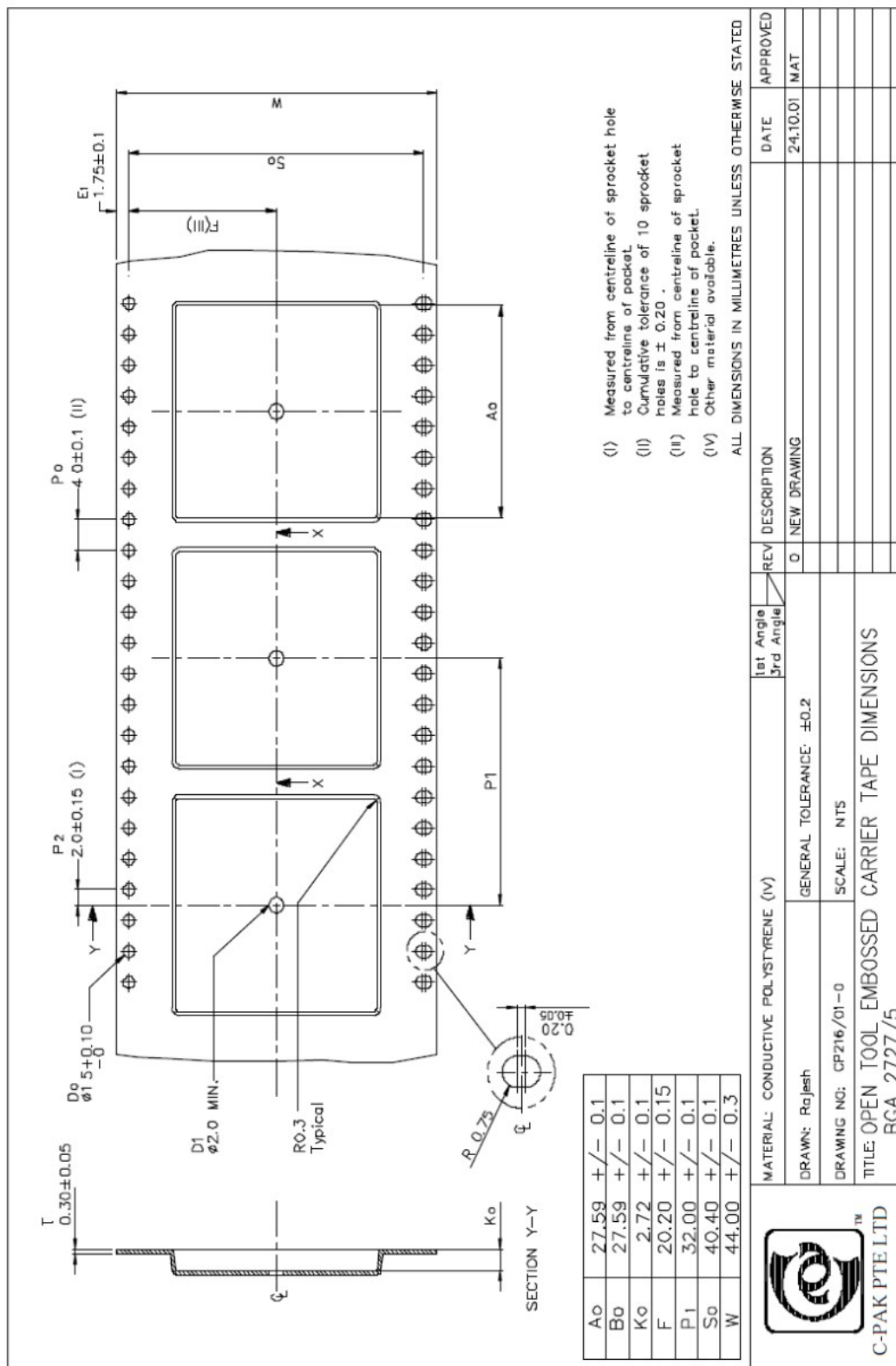


Aperture size of the stencil is 1:1 with the pad size. Four 1.7mm diameter bumps are used for each of the 4.3mm square GND pads sections giving a 50% solder paste padding. The lower component settling with this ensures that the pads at the edge are always soldered even at vertical misalignment by distortion or warping.

## Thermal Considerations

The QSCOM module consume more than 1 W of DC power. In any application where high ambient temperatures for more than a few seconds can occur, it is important that a sufficient cooling surface is provided to dissipate the heat. The thermal pad at the bottom of the module must be connected to the application board ground planes by soldering. The application board should provide a number of vias under and around the pad to conduct the produced heat to the board ground planes, and preferably to a copper surface on the other side of the board in order to conduct and spread the heat. The module internal thermal resistance should in most cases be negligible compared to the thermal resistance from the module into air, and common equations for surface area required for cooling can be used to estimate the temperature rise of the module. Only copper planes on the circuit board surfaces with a solid thermal connection to the module ground pad will dissipate heat. For an application with high load the maximum allowed ambient temperature should be reduced due to inherent heating of the module, especially with small fully plastic enclosed applications where heat transfer to ambient air is low due to low thermal conductivity of plastic. The module measured on the evaluation board exhibits a temperature rise of about 20°C above ambient temperature. An insufficiently cooled module will rapidly heat beyond operating range in ambient room temperature.

# Packaging



## PINOUT

| PIN | Type | QS Standard | RZ/G2L Pad Name | Alternate functions | GPIO | Description<br>(refer to RZ/G2L manuals for details) |
|-----|------|-------------|-----------------|---------------------|------|------------------------------------------------------|
|-----|------|-------------|-----------------|---------------------|------|------------------------------------------------------|

## POWER SUPPLY & RESET

### 1<sup>st</sup> SPI

|   |     |           |       |                                                                     |       |                            |
|---|-----|-----------|-------|---------------------------------------------------------------------|-------|----------------------------|
| 1 | 3V3 | SPIA_NSS  | P43_3 | <b>RSPI0_SSL_B</b><br>GTIOC5B_B<br>IRQ7_D / MTIOC8D_B               | P43_3 | Slave Select signal        |
| 2 | 3V3 | SPIA_MISO | P43_2 | <b>RSPI0_MISO_B</b><br>GTIOC5A_B<br>IRQ6_C / MTIOC8C_B              | P43_2 | Master In/Slave Out signal |
| 3 | 3V3 | SPIA_MOSI | P43_1 | <b>RSPI0_MOSI_B</b><br>GTIOC4B_B<br>GTIOC6B_C<br>IRQ5_C / MTIOC8B_B | P43_1 | Master Out/Slave In signal |
| 4 | 3V3 | SPIA_SCK  | P43_0 | <b>RSPI0_CK_B</b><br>GTIOC4A_B<br>GTIOC6A_C<br>IRQ4_C / MTIOC8A_B   | P43_0 | Serial Clock signal        |

### I2C

|    |     |          |           |                                                                                         |              |           |
|----|-----|----------|-----------|-----------------------------------------------------------------------------------------|--------------|-----------|
| 5  | 3V3 | I2CA_SCL | RIIC1_SDA | <b>RIIC1_SDA</b>                                                                        | N/A          | I2C Data  |
| 6  | 3V3 | I2CA_SDA | RIIC1_SCL | <b>RIIC1_SCL</b>                                                                        | N/A          | I2C Clock |
| 7  | 3V3 | INTA     | P46_3     | SSI1_RXD_D<br>GTETRGD_D<br>CAN1_RX_DATARATE_EN_E<br>RIIC3_SCL_C                         | <b>P46_3</b> |           |
| 8  | 3V3 | I2CB_SCL | P42_4     | <b>RIIC2_SCL_C</b><br>CAM_FIELD_B<br>CAN0_RX_DATARATE_EN_D<br>SCIF2_RTS#_D              | P42_4        |           |
| 9  | 3V3 | I2CB_SDA | P42_3     | <b>RIIC2_SDA_C</b><br>RSPI2_SSL_B<br>CAN0_TX_DATARATE_EN_D<br>SCIF2_CTS#_D<br>MTIOC7D_B | P42_3        |           |
| 10 | 3V3 | INTB     | P46_2     | SSI1_TXD_D<br>GTETRGC_D<br>CAN1_TX_DATARATE_EN_E<br>RIIC3_SDA_C                         | <b>P46_2</b> |           |

### CAN

|    |     |         |       |                                                                               |       |  |
|----|-----|---------|-------|-------------------------------------------------------------------------------|-------|--|
| 11 | 3V3 | CANA_RX | P42_2 | ADC_TRG_D<br>RSPI2_MISO_B<br><b>CAN0_RX_D</b><br>SCIF2_SCK_D<br>MTIOC7C_B     | P42_2 |  |
| 12 | 3V3 | CANA_TX | P42_1 | USB1_OVRCUR_D<br>RSPI2_MOSI_B<br><b>CAN0_TX_D</b><br>SCIF2_RXD_D<br>MTIOC7B_B | P42_1 |  |
| 13 | 3V3 | CANB_RX | P46_1 | SSI1_RCK_D<br>GTETRGB_D<br><b>CAN1_RX_E</b><br>RIIC2_SCL_D                    | P46_1 |  |
| 14 | 3V3 | CANB_TX | P46_0 | SSI1_BCK_D<br>GTETRGA_D<br><b>CAN1_TX_E</b><br>RIIC2_SDA_D                    | P46_0 |  |

### SAI

|    |     |         |       |                                                      |       |                                           |
|----|-----|---------|-------|------------------------------------------------------|-------|-------------------------------------------|
| 15 | 3V3 | SAI_TX  | P45_2 | <b>SSI0_TXD_D</b><br>POE8#_C<br>SCI1_SCK_B           | P45_2 | Serial Audio Interface serial data line 0 |
| 16 | 3V3 | SAI_RX  | P45_3 | <b>SSI0_RXD_D</b><br>POE10#_C<br>SCI1_CTS#<br>RTS#_B | P45_3 | Serial Audio Interface serial data line 1 |
| 17 | 3V3 | SAI_SCK | P45_0 | <b>SSI0_BCK_D</b><br>POE0#_C<br>SCI1_RXD_B           | P45_0 |                                           |
| 18 | 3V3 | SAI_FS  | P45_1 | <b>SSI0_RCK_D</b><br>POE4#_C<br>SCI1_TXD_B           | P45_1 |                                           |

| PIN      | Type   | QS Standard | RZ/G2L Pad Name | Alternate functions                               | GPIO  | Description<br>(refer to RZ/G2L manuals for details)                      |
|----------|--------|-------------|-----------------|---------------------------------------------------|-------|---------------------------------------------------------------------------|
| ETHERNET |        |             |                 |                                                   |       |                                                                           |
| 19       | 3V3    | ENET_RST    | P28_1           | ET0_LINKSTA                                       | P28_1 |                                                                           |
| 20       | 3V3    | ENET_CK125  | AUDIO_CLK1      | AUDIO_CLK1                                        | N/A   |                                                                           |
| 21       | 3V3    | ENET_INT    | P22_1           | ET0_TX_ERR<br>SSI0_RCK_B<br>CAN1_RX_B<br>MTCLKB_B | P22_1 |                                                                           |
| 22       | 3V3    | ENET_MDIO   | P28_0           | ET0_MDIO                                          | P28_0 |                                                                           |
| 23       | 3V3    | ENET_MDC    | P27_1           | ET0_MDC<br>RSPI1_SSL_A<br>MTIOC8D_A               | P27_1 |                                                                           |
| 24       | 3V3    | ENET_RXC    | P24_0           | ET0_RXC<br>RX_CLK<br>SSI1_BCK_B<br>POE0#_B        | P24_0 |                                                                           |
| 25       | 3V3    | ENET_RX_CTL | P24_1           | ET0_RX_CTL<br>RX_DV<br>SSI1_RCK_B<br>POE4#_B      | P24_1 |                                                                           |
| 26       | 3V3    | ENET_RXD0   | P25_0           | ET0_RXD0<br>SSI1_TXD_B<br>POE8#_B                 | P25_0 |                                                                           |
| 27       | 3V3    | ENET_RXD1   | P25_1           | ET0_RXD1<br>SSI1_RXD_B<br>POE10#_B                | P25_1 |                                                                           |
| 28       | 3V3    | ENET_RXD2   | P26_0           | ET0_RXD2<br>RSPI1_CK_A<br>MTIOC8A_A               | P26_0 |                                                                           |
| 29       | 3V3    | ENET_RXD3   | P26_1           | ET0_RXD3<br>RSPI1_MOSI_A<br>MTIOC8B_A             | P26_1 |                                                                           |
| 30       | 3V3    | ENET_TX_CTL | P20_1           | ET0_TX_CTL<br>TX_EN<br>RSPI0_MOSI_A<br>CAN0_TX_B  | P20_1 |                                                                           |
| 31       | 3V3    | ENET_TXC    | P20_0           | ET0_TXC<br>TX_CLK<br>RSPI0_CK_A<br>CAN_CLK_B      | P20_0 |                                                                           |
| 32       | 3V3    | ENET_TXD3   | P22_0           | ET0_TXD3<br>SSI0_BCK_B<br>CAN1_TX_B<br>MTCLKA_B   | P22_0 |                                                                           |
| 33       | 3V3    | ENET_TXD2   | P21_1           | ET0_TXD2<br>CAN0_RX_DATARATE_EN_B                 | P21_1 |                                                                           |
| 34       | 3V3    | ENET_TXD1   | P21_0           | ET0_TXD1<br>RSPI0_SSL_A<br>CAN0_TX_DATARATE_EN_B  | P21_0 |                                                                           |
| 35       | 3V3    | ENET_TXD0   | P20_2           | ET0_TXD0<br>RSPI0_MISO_A<br>CAN0_RX_B             | P20_2 |                                                                           |
| SD       |        |             |                 |                                                   |       |                                                                           |
| 36       | 3V3    | SD_CD       | P19_0           | SD1_CD_B<br>GTIOC3A_B<br>MTIOC1A_C<br>RIIC2_SDA_B | P19_0 | SD Card Detect                                                            |
| 37       | 3V3    | SD_D1       | SD1_DATA1       | SD1_DATA1                                         | N/A   | SD Data bidirectional signals, external pull up resistors must be added.  |
| 38       | 3V3    | SD_D0       | SD1_DATA0       | SD1_DATA0                                         | N/A   |                                                                           |
| 39       | 3V3    | SD_CLK      | SD1_CLK         | SD1_CLK                                           | N/A   | SD Output Clock.                                                          |
| 40       | 3V3    | SD_CMD      | SD1_CMD         | SD1_CMD                                           | N/A   | SD Command bidirectional signal, external pull up resistor must be added. |
| 41       | 3V3    | SD_D3       | SD1_DATA3       | SD1_DATA3                                         | N/A   | SD Data bidirectional signals, external pull up resistors must be added.  |
| 42       | 3V3    | SD_D2       | SD1_DATA2       | SD1_DATA2                                         | N/A   |                                                                           |
| USB      |        |             |                 |                                                   |       |                                                                           |
| 43       | analog | USBA_VBUS   | Not connected   |                                                   |       |                                                                           |
| 44       | analog | USBA_DN     | USB1_DM         |                                                   |       | D- pin of the USB cable                                                   |
| 45       | analog | USBA_DP     | USB1_DP         |                                                   |       | D+ pin of the USB cable                                                   |

| PIN | Type   | QS Standard | RZ/G2L Pad Name | Alternate functions | GPIO   | Description<br>(refer to RZ/G2L manuals for details) |
|-----|--------|-------------|-----------------|---------------------|--------|------------------------------------------------------|
| 46  | analog | USBB_VBUS   | USB0_VBUSIN     |                     | 30K-PD | 10K/20K voltage divider                              |
| 47  | analog | USBB_DN     | USB0_DM         |                     |        | D- pin of the USB cable                              |
| 48  | analog | USBB_DP     | USB0_DP         |                     |        | D+ pin of the USB cable                              |

## POWER SUPPLY & RESET

|    |           |                                                                                                                                                       |  |  |  |                                         |
|----|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|-----------------------------------------|
| 49 | VIN       | 3.3V power supply input                                                                                                                               |  |  |  |                                         |
| 50 |           |                                                                                                                                                       |  |  |  |                                         |
| 51 | POR       | PMIC reset input pin. Pulled to LDO1 (1.8V) power rail by an onboard 10K resistor. Asserted low, PMIC performs reset. Leave unconnected, if not used. |  |  |  |                                         |
| 52 | BOOT_MODE |                                                                                                                                                       |  |  |  | L: Boot from FLASH<br>H: Boot from UART |

## DISPLAY

|    |     |           |       |                                                              |       |  |
|----|-----|-----------|-------|--------------------------------------------------------------|-------|--|
| 53 | 3V3 | LCD_DE    | P7_1  | DISP_DE<br>SSI0_RXD_A<br>USB0_OTG_ID_B<br>MTIC5V_A           | P7_1  |  |
| 54 | 3V3 | LCD_VSYNC | P7_0  | DISP_VSYNC<br>SSI0_TXD_A<br>USB0_OVRCUR_B<br>MTIC5U_A        | P7_0  |  |
| 55 | 3V3 | LCD_HSYNC | P6_1  | DISP_HSYNC<br>SSI0_RCK_A<br>MTIOC1B_B                        | P6_1  |  |
| 56 | 3V3 | LCD_CLK   | P6_0  | DISP_CLK<br>SSI0_BCK_A<br>USB0_VBUSEN_B<br>MTIOC1A_B         | P6_0  |  |
| 57 | 3V3 | LCD_R1    | P8_0  | DISP_DATA1<br>USB1_VBUSEN_A<br>RSPI2_CK_A<br>RIIC3_SCL_A     | P8_0  |  |
| 58 | 3V3 | LCD_R2    | P8_1  | DISP_DATA2<br>USB1_OVRCUR_A<br>RSPI2_MOSI_A<br>RIIC3_SDA_A   | P8_1  |  |
| 59 | 3V3 | LCD_R3    | P8_2  | DISP_DATA3<br>RSPI2_MISO_A                                   | P8_2  |  |
| 60 | 3V3 | LCD_R4    | P9_0  | DISP_DATA4<br>ADC_TRG_C<br>RSPI2_SSL_A<br>MTIOC2A_B          | P9_0  |  |
| 61 | 3V3 | LCD_R5    | P9_1  | DISP_DATA5<br>MTIOC2B_B                                      | P9_1  |  |
| 62 | 3V3 | LCD_R6    | P10_0 | DISP_DATA6<br>CAN_CLK_A<br>MTIOC6A<br>GTETRGA_A              | P10_0 |  |
| 63 | 3V3 | LCD_R7    | P10_1 | DISP_DATA7<br>CAN0_TX_A<br>MTIOC6B<br>GTETRGA_A              | P10_1 |  |
| 64 | 3V3 | LCD_G2    | P12_0 | DISP_DATA10<br>CAN0_RX_DATARATE_EN_A<br>POE0#_A<br>GTIOC7A_A | P12_0 |  |
| 65 | 3V3 | LCD_G3    | P12_1 | DISP_DATA11<br>CAN1_TX_A<br>POE4#_A<br>GTIOC7B_A             | P12_1 |  |
| 66 | 3V3 | LCD_G4    | P13_0 | DISP_DATA12<br>CAN1_RX_A<br>POE8#_A<br>IRQ0_B                | P13_0 |  |
| 67 | 3V3 | LCD_G5    | P13_1 | DISP_DATA13<br>CAN1_TX_DATARATE_EN_A<br>POE10#_A<br>IRQ1_B   | P13_1 |  |
| 68 | 3V3 | LCD_G6    | P13_2 | DISP_DATA14<br>CAN1_RX_DATARATE_EN_A<br>IRQ7_B<br>IRQ2_B     | P13_2 |  |
| 69 | 3V3 | LCD_G7    | P14_0 | DISP_DATA15<br>SSI1_BCK_A<br>SD1_CD_A<br>MTCLKA_A            | P14_0 |  |

| PIN                    | Type | QS Standard | RZ/G2L Pad Name | Alternate functions                                             | GPIO  | Description<br>(refer to RZ/G2L manuals for details)         |
|------------------------|------|-------------|-----------------|-----------------------------------------------------------------|-------|--------------------------------------------------------------|
| 70                     | 3V3  | LCD_B1      | P15_0           | DISP_DATA17<br>SSI1_TXD_A<br>GTIOC4A_A<br>MTCLKC_A              | P15_0 |                                                              |
| 71                     | 3V3  | LCD_B2      | P15_1           | DISP_DATA18<br>SSI1_RXD_A<br>GTIOC4B_A<br>MTCLKD_A              | P15_1 |                                                              |
| 72                     | 3V3  | LCD_B3      | P16_0           | DISP_DATA19<br>SCIF2_TXD_B<br>GTIOC5A_A<br>IRQ3_B               | P16_0 |                                                              |
| 73                     | 3V3  | LCD_B4      | P16_1           | DISP_DATA20<br>SCIF2_RXD_B<br>GTIOC5B_A<br>IRQ4_B               | P16_1 |                                                              |
| 74                     | 3V3  | LCD_B5      | P17_0           | DISP_DATA21<br>SCIF2_SCK_B<br>GTIOC6A_A<br>IRQ5_B               | P17_0 |                                                              |
| 75                     | 3V3  | LCD_B6      | P17_1           | DISP_DATA22<br>SCIF2_CTS#_B<br>GTIOC6B_A<br>IRQ6_B              | P17_1 |                                                              |
| 76                     | 3V3  | LCD_B7      | P17_2           | DISP_DATA23<br>SCIF2_RTS#_B<br>IRQ7_C                           | P17_2 |                                                              |
| <b>Display Control</b> |      |             |                 |                                                                 |       |                                                              |
| 77                     | 3V3  | LCD_EN      |                 |                                                                 |       |                                                              |
| 78                     | 3V3  | LCD_BL      | P19_1           | SD1_WP_B<br>GTIOC3B_B<br>MTIOC1B_C<br>RIIC2_SCL_B               | P19_1 | PWM Output                                                   |
| <b>MISC</b>            |      |             |                 |                                                                 |       |                                                              |
| 79                     | 3V3  | LCD_R0      | P7_2            | DISP_DATA0<br>USB0_OTG_EXICEN_B<br>MTIC5W_A                     | P7_2  |                                                              |
| 80                     | 3V3  | LCD_G0      | P11_0           | DISP_DATA8<br>CAN0_RX_A<br>MTIOC6C<br>GTETRGC_A                 | P11_0 |                                                              |
| 81                     | 3V3  | LCD_G1      | P11_1           | DISP_DATA9<br>CAN0_TX_DATARATE_EN_A<br>MTIOC6D<br>GTETRGD_A     | P11_1 |                                                              |
| 82                     | 3V3  | LCD_B0      | P14_1           | DISP_DATA16<br>SSI1_RCK_A<br>SD1_WP_A<br>MTCLKB_A               | P14_1 |                                                              |
| <b>MIPI-DSI</b>        |      |             |                 |                                                                 |       |                                                              |
| 83                     | MIPI | DSI_DP1     | DSI_DATA1_P     | DSI_DATA1_P                                                     |       |                                                              |
| 84                     | MIPI | DSI_DN1     | DSI_DATA1_N     | DSI_DATA1_N                                                     |       |                                                              |
| 85                     | MIPI | DSI_DP0     | DSI_DATA0_P     | DSI_DATA0_P                                                     |       |                                                              |
| 86                     | MIPI | DSI_DN0     | DSI_DATA0_N     | DSI_DATA0_N                                                     |       |                                                              |
| 87                     | MIPI | DSI_CKP     | DSI_CLKP        | DSI_CLKP                                                        |       |                                                              |
| 88                     | MIPI | DSI_CKN     | DSI_CLKN        | DSI_CLKN                                                        |       |                                                              |
| <b>UART</b>            |      |             |                 |                                                                 |       |                                                              |
| 89                     | 3V3  | UARTA_RXD   | P38_1           | SCIF0_RXD<br>GTETRGB_C<br>CAN0_TX_C<br>MTIOC4B<br>USB1_OVRCUR_C | P38_1 | 1 <sup>st</sup> application UART Receive Data input signal   |
| 90                     | 3V3  | UARTA_TXD   | P38_0           | SCIF0_TXD<br>GTETRGA_C<br>CAN_CLK_C<br>MTIOC4A<br>USB1_VBUSEN_C | P38_0 | 1 <sup>st</sup> application UART Transmit Data output signal |

| PIN                       | Type | QS Standard | RZ/G2L Pad Name | Alternate functions                                                           | GPIO  | Description<br>(refer to RZ/G2L manuals for details)                  |
|---------------------------|------|-------------|-----------------|-------------------------------------------------------------------------------|-------|-----------------------------------------------------------------------|
| 91                        | 3V3  | UARTB_RXD   | P40_1           | SCIF1_RXD<br>GTIOC6B_B<br>CAN1_RX_C<br>MTIC5V_B<br>SCI0_TXD_B                 | P40_1 | 2 <sup>nd</sup> application UART Receive Data input signal            |
| 92                        | 3V3  | UARTB_TXD   | P40_0           | SCIF1_TXD<br>GTIOC6A_B<br>CAN1_TX_C<br>MTIC5U_B<br>SCI0_RXD_B                 | P40_0 | 2 <sup>nd</sup> application UART Transmit Data output signal          |
| 93                        | 3V3  | UARTC_RXD   | P48_1           | SCIF2_RXD_E<br>RSPI1_MOSI_C<br>RIIC2_SCL_E<br>MTCLKB_C                        | P48_1 | 3 <sup>rd</sup> application UART Receive Data input signal            |
| 94                        | 3V3  | UARTC_TXD   | P48_0           | SCIF2_TXD_E<br>RSPI1_CK_C<br>RIIC2_SDA_E<br>MTCLKA_C                          | P48_0 | 3 <sup>rd</sup> application UART Transmit Data output signal          |
| 95                        | 3V3  | UARTC_CTS   | P48_3           | SCIF2_CTS#_E<br>RSPI1_SSL_C<br>RIIC3_SCL_D<br>MTCLKD_C                        | P48_3 | 3 <sup>rd</sup> application UART Clear to Send <b>input</b> signal    |
| 96                        | 3V3  | UARTC_RTS   | P48_4           | SCIF2_RTS#_E<br>ADC_TRG_E                                                     | P48_4 | 3 <sup>rd</sup> application UART Request to Send <b>output</b> signal |
| <b>2<sup>nd</sup> SPI</b> |      |             |                 |                                                                               |       |                                                                       |
| 97                        | 3V3  | SPIB_NSS    | P44_3           | RSPI1_SSL_B<br>SSI1_RXD_C<br>CAN1_RX_DATARATE_EN_D<br>MTIOC3D_B<br>GTIOC7B_C  | P44_3 |                                                                       |
| 98                        | 3V3  | SPIB_MISO   | P44_2           | RSPI1_MISO_B<br>SSI1_TXD_C<br>CAN1_TX_DATARATE_EN_D<br>MTIOC3C_B<br>GTIOC7A_C | P44_2 |                                                                       |
| 99                        | 3V3  | SPIB_MOSI   | P44_1           | RSPI1_MOSI_B<br>SSI1_RCK_C<br>CAN1_RX_D<br>MTIOC3B_B<br>GTIOC6B_D             | P44_1 |                                                                       |
| 100                       | 3V3  | SPIB_SCK    | P44_0           | RSPI1_CK_B<br>SSI1_BCK_C<br>CAN1_TX_D<br>MTIOC3A_B<br>GTIOC6A_D               | P44_0 |                                                                       |

## Onboard wiring

| Pins used for manufacturing – leave unconnected |                     |     |                   |     |                      |
|-------------------------------------------------|---------------------|-----|-------------------|-----|----------------------|
| PIN                                             | (RZ/G2L PAD NAME)   | PIN | (RZ/G2L PAD NAME) | PIN | (RZ/G2L PAD NAME)    |
| C1                                              | JTAG_TDI (TDI)      |     |                   | C3  | JTAG_TCK (TCK/SWCLK) |
|                                                 |                     | B2  | JTAG_TDO (TDO)    |     |                      |
| A1                                              | JTAG_TRST_B (TRST#) |     |                   | A3  | JTAG_TMS (TMS/SWDIO) |

## Onboard peripherals wiring

|      | RZ/G2L Pad Name | Remarks     |
|------|-----------------|-------------|
| eMMC | SD0_CLK         |             |
|      | SD0_CMD         |             |
|      | SD0_DATA0       |             |
|      | SD0_DATA1       |             |
|      | SD0_DATA2       |             |
|      | SD0_DATA3       |             |
|      | SD0_DATA4       |             |
|      | SD0_DATA5       |             |
|      | SD0_DATA6       |             |
|      | SD0_DATA7       |             |
|      | SD0_RST#        |             |
| LED  | P48_2           | Low: LED on |

## Electrical characteristics

### Absolute maximum ratings

| Parameter                       | Symbol                   | Min   | Max   | Remarks |
|---------------------------------|--------------------------|-------|-------|---------|
| Power supply                    | VIN                      | 0V    | 5.5V  |         |
| Input voltage on USB VBUS pins  | USBA_VBUS<br>USBB_VBUS   | 0V    | 6V    |         |
| Input voltage on USB DN/DP pins | USBA_DN/DP<br>USBB_DN/DP | 0V    | 3.6V  |         |
| Input voltage on any other pins |                          | 0V    | 3.6V  |         |
| Storage temperature range       | T <sub>STORAGE</sub>     | -40°C | 150°C |         |

### Operating ranges

| Parameter                      | Symbol                     | Min       | Max       | Remarks           |
|--------------------------------|----------------------------|-----------|-----------|-------------------|
| Power supply                   | VIN                        | 3.1V      | 3.6V      |                   |
| I/O input low level voltage    | V <sub>IL</sub>            | -         | 0.3 x VIN |                   |
| I/O input high level voltage   | V <sub>IH</sub>            | 0.7 x VIN | -         |                   |
| I/O output voltage             | Refer to RZ/G2L datasheet. |           |           | VDD=VIN=3.3V typ. |
| Operating temperature range    | T <sub>AMB</sub>           | -40°C     | 85°C      |                   |
| Processor junction temperature | T <sub>J</sub>             | -40°C     | 125°C     |                   |

### Power supply currents

| Parameter        | Symbol             | VIN  | Current | Remarks                   |
|------------------|--------------------|------|---------|---------------------------|
| At U-Boot prompt | I <sub>UBOOT</sub> | 3.3V | 237mA   | All pins left unconnected |
| At Linux prompt  | I <sub>LINUX</sub> | 3.3V | 199mA   |                           |
| Sleep            | I <sub>SLEEP</sub> | 3.3V | TBD     |                           |