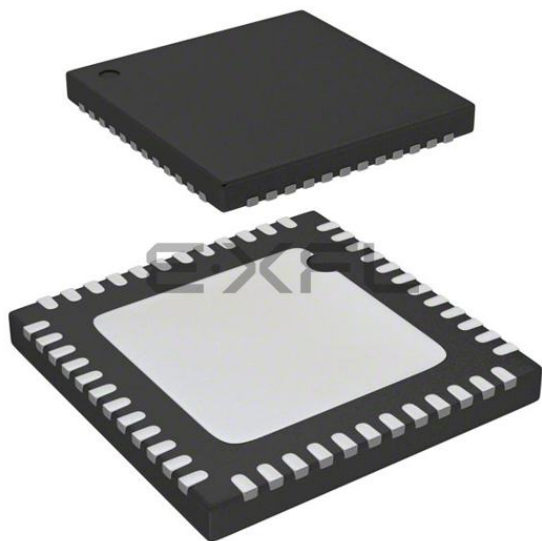




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### What is "[Embedded - Microcontrollers](#)"?

"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

### Applications of "[Embedded - Microcontrollers](#)"

#### Details

|                            |                                                                                                                                                                     |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status             | Discontinued at Digi-Key                                                                                                                                            |
| Core Processor             | ARM® Cortex®-M3                                                                                                                                                     |
| Core Size                  | 32-Bit Single-Core                                                                                                                                                  |
| Speed                      | 40MHz                                                                                                                                                               |
| Connectivity               | I <sup>2</sup> C, IrDA, LINbus, SmartCard, SPI, UART/USART                                                                                                          |
| Peripherals                | Brown-out Detect/Reset, DMA, I <sup>2</sup> S, POR, PWM, WDT                                                                                                        |
| Number of I/O              | 33                                                                                                                                                                  |
| Program Memory Size        | 1MB (1M x 8)                                                                                                                                                        |
| Program Memory Type        | FLASH                                                                                                                                                               |
| EEPROM Size                | -                                                                                                                                                                   |
| RAM Size                   | 256K x 8                                                                                                                                                            |
| Voltage - Supply (Vcc/Vdd) | 1.8V ~ 3.8V                                                                                                                                                         |
| Data Converters            | A/D - 12b SAR                                                                                                                                                       |
| Oscillator Type            | Internal                                                                                                                                                            |
| Operating Temperature      | -40°C ~ 125°C (TJ)                                                                                                                                                  |
| Mounting Type              | Surface Mount                                                                                                                                                       |
| Package / Case             | 48-VFQFN Exposed Pad                                                                                                                                                |
| Supplier Device Package    | 48-QFN (7x7)                                                                                                                                                        |
| Purchase URL               | <a href="https://www.e-xfl.com/product-detail/silicon-labs/efm32jg12b500f1024im48-b">https://www.e-xfl.com/product-detail/silicon-labs/efm32jg12b500f1024im48-b</a> |

| Parameter                                  | Symbol          | Test Condition                                                                            | Min | Typ | Max | Unit          |
|--------------------------------------------|-----------------|-------------------------------------------------------------------------------------------|-----|-----|-----|---------------|
| Max load current                           | $I_{LOAD\_MAX}$ | Low noise (LN) mode, Heavy Drive <sup>2</sup> , $T_{amb} \leq 85\text{ }^{\circ}\text{C}$ | —   | —   | TBD | mA            |
|                                            |                 | Low noise (LN) mode, Heavy Drive <sup>2</sup> , $T_{amb} > 85\text{ }^{\circ}\text{C}$    | —   | —   | TBD | mA            |
|                                            |                 | Low noise (LN) mode, Medium Drive <sup>2</sup>                                            | —   | —   | TBD | mA            |
|                                            |                 | Low noise (LN) mode, Light Drive <sup>2</sup>                                             | —   | —   | TBD | mA            |
|                                            |                 | Low power (LP) mode, $LPCMPBIASEM_{xx}^3 = 0$                                             | —   | —   | TBD | $\mu\text{A}$ |
|                                            |                 | Low power (LP) mode, $LPCMPBIASEM_{xx}^3 = 3$                                             | —   | —   | TBD | mA            |
| DCDC nominal output capacitor <sup>5</sup> | $C_{DCDC}$      | 25% tolerance                                                                             | 1   | 4.7 | 4.7 | $\mu\text{F}$ |
| DCDC nominal output inductor               | $L_{DCDC}$      | 20% tolerance                                                                             | 4.7 | 4.7 | 4.7 | $\mu\text{H}$ |
| Resistance in Bypass mode                  | $R_{BYP}$       |                                                                                           | —   | 1.2 | TBD | $\Omega$      |

**Note:**

1. Due to internal dropout, the DC-DC output will never be able to reach its input voltage,  $V_{VREGVDD}$ .
2. Drive levels are defined by configuration of the PFETCNT and NFETCNT registers. Light Drive: PFETCNT=NFETCNT=3; Medium Drive: PFETCNT=NFETCNT=7; Heavy Drive: PFETCNT=NFETCNT=15.
3. In EMU\_DCDCMISCCTRL register.
4. LP mode controller is a hysteretic controller that maintains the output voltage within the specified limits.
5. Output voltage under/over-shoot and regulation are specified with  $C_{DCDC}$  4.7  $\mu\text{F}$ . Different control loop settings must be used if  $C_{DCDC}$  is lower than 4.7  $\mu\text{F}$ .

| Parameter                                                                                                                            | Symbol                     | Test Condition                                                        | Min | Typ  | Max | Unit   |
|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-----------------------------------------------------------------------|-----|------|-----|--------|
| Current consumption in EM0 mode with all peripherals disabled and voltage scaling enabled, DCDC in LP mode <sup>3</sup> .            | I <sub>ACTIVE_LPM_VS</sub> | 19 MHz HFRCO, CPU running while loop from flash                       | —   | 58   | —   | μA/MHz |
|                                                                                                                                      |                            | 1 MHz HFRCO, CPU running while loop from flash                        | —   | 196  | —   | μA/MHz |
| Current consumption in EM1 mode with all peripherals disabled, DCDC in Low Noise DCM mode <sup>2</sup> .                             | I <sub>EM1_DCM</sub>       | 38.4 MHz crystal <sup>4</sup>                                         | —   | 56   | —   | μA/MHz |
|                                                                                                                                      |                            | 38 MHz HFRCO                                                          | —   | 41   | —   | μA/MHz |
|                                                                                                                                      |                            | 26 MHz HFRCO                                                          | —   | 48   | —   | μA/MHz |
|                                                                                                                                      |                            | 1 MHz HFRCO                                                           | —   | 610  | —   | μA/MHz |
| Current consumption in EM1 mode with all peripherals disabled, DCDC in Low Power mode <sup>3</sup> .                                 | I <sub>EM1_LPM</sub>       | 38.4 MHz crystal <sup>4</sup>                                         | —   | 49   | —   | μA/MHz |
|                                                                                                                                      |                            | 38 MHz HFRCO                                                          | —   | 33   | —   | μA/MHz |
|                                                                                                                                      |                            | 26 MHz HFRCO                                                          | —   | 35   | —   | μA/MHz |
|                                                                                                                                      |                            | 1 MHz HFRCO                                                           | —   | 193  | —   | μA/MHz |
| Current consumption in EM1 mode with all peripherals disabled and voltage scaling enabled, DCDC in Low Noise DCM mode <sup>2</sup> . | I <sub>EM1_DCM_VS</sub>    | 19 MHz HFRCO                                                          | —   | 52   | —   | μA/MHz |
|                                                                                                                                      |                            | 1 MHz HFRCO                                                           | —   | 587  | —   | μA/MHz |
| Current consumption in EM1 mode with all peripherals disabled and voltage scaling enabled. DCDC in LP mode <sup>3</sup> .            | I <sub>EM1_LPM_VS</sub>    | 19 MHz HFRCO                                                          | —   | 32   | —   | μA/MHz |
|                                                                                                                                      |                            | 1 MHz HFRCO                                                           | —   | 170  | —   | μA/MHz |
| Current consumption in EM2 mode, with voltage scaling enabled, DCDC in LP mode. <sup>3</sup>                                         | I <sub>EM2_VS</sub>        | Full 256 kB RAM retention and RTCC running from LFXO                  | —   | 2.1  | —   | μA     |
|                                                                                                                                      |                            | Full 256 kB RAM retention and RTCC running from LFRCO                 | —   | 2.2  | —   | μA     |
|                                                                                                                                      |                            | 16 kB (1 bank) RAM retention and RTCC running from LFRCO <sup>5</sup> | —   | 1.5  | —   | μA     |
| Current consumption in EM3 mode, with voltage scaling enabled.                                                                       | I <sub>EM3_VS</sub>        | Full 256 kB RAM retention and CRYOTIMER running from ULFRCO           | —   | 1.81 | —   | μA     |
| Current consumption in EM4H mode, with voltage scaling enabled.                                                                      | I <sub>EM4H_VS</sub>       | 128 byte RAM retention, RTCC running from LFXO                        | —   | 0.69 | —   | μA     |
|                                                                                                                                      |                            | 128 byte RAM retention, CRYOTIMER running from ULFRCO                 | —   | 0.39 | —   | μA     |
|                                                                                                                                      |                            | 128 byte RAM retention, no RTCC                                       | —   | 0.39 | —   | μA     |
| Current consumption in EM4S mode                                                                                                     | I <sub>EM4S</sub>          | No RAM retention, no RTCC                                             | —   | 0.06 | —   | μA     |

**Note:**

- DCDC Low Noise CCM Mode = Light Drive (PFETCNT=NFETCNT=3), F=6.4 MHz (RCOBAND=4), ANASW=DVDD.
- DCDC Low Noise DCM Mode = Light Drive (PFETCNT=NFETCNT=3), F=3.0 MHz (RCOBAND=0), ANASW=DVDD.
- DCDC Low Power Mode = Medium Drive (PFETCNT=NFETCNT=7), LPOSCDIV=1, LPCMPBIASEM234H=0, LPCLIMILIMSEL=1, ANASW=DVDD.
- CMU\_HFXOCTRL\_LOWPOWER=1.
- CMU\_LFRCOCTRL\_ENVREF = 1, CMU\_LFRCOCTRL\_VREFUPDATE = 1

#### 4.1.7 Brown Out Detector (BOD)

**Table 4.9. Brown Out Detector (BOD)**

| Parameter              | Symbol                     | Test Condition               | Min | Typ | Max | Unit |
|------------------------|----------------------------|------------------------------|-----|-----|-----|------|
| DVDD BOD threshold     | V <sub>DVddbOD</sub>       | DVDD rising                  | —   | —   | TBD | V    |
|                        |                            | DVDD falling (EM0/EM1)       | TBD | —   | —   | V    |
|                        |                            | DVDD falling (EM2/EM3)       | TBD | —   | —   | V    |
| DVDD BOD hysteresis    | V <sub>DVddbOD_HYST</sub>  |                              | —   | 18  | —   | mV   |
| DVDD BOD response time | t <sub>DVddbOD_DELAY</sub> | Supply drops at 0.1V/μs rate | —   | 2.4 | —   | μs   |
| AVDD BOD threshold     | V <sub>AVddbOD</sub>       | AVDD rising                  | —   | —   | TBD | V    |
|                        |                            | AVDD falling (EM0/EM1)       | TBD | —   | —   | V    |
|                        |                            | AVDD falling (EM2/EM3)       | TBD | —   | —   | V    |
| AVDD BOD hysteresis    | V <sub>AVddbOD_HYST</sub>  |                              | —   | 20  | —   | mV   |
| AVDD BOD response time | t <sub>AVddbOD_DELAY</sub> | Supply drops at 0.1V/μs rate | —   | 2.4 | —   | μs   |
| EM4 BOD threshold      | V <sub>EM4dBOD</sub>       | AVDD rising                  | —   | —   | TBD | V    |
|                        |                            | AVDD falling                 | TBD | —   | —   | V    |
| EM4 BOD hysteresis     | V <sub>EM4BOD_HYST</sub>   |                              | —   | 25  | —   | mV   |
| EM4 BOD response time  | t <sub>EM4BOD_DELAY</sub>  | Supply drops at 0.1V/μs rate | —   | 300 | —   | μs   |

### 4.1.9 Flash Memory Characteristics<sup>3</sup>

**Table 4.16. Flash Memory Characteristics<sup>3</sup>**

| Parameter                                   | Symbol               | Test Condition            | Min   | Typ  | Max | Unit   |
|---------------------------------------------|----------------------|---------------------------|-------|------|-----|--------|
| Flash erase cycles before failure           | EC <sub>FLASH</sub>  |                           | 10000 | —    | —   | cycles |
| Flash data retention                        | RET <sub>FLASH</sub> | T <sub>AMB</sub> ≤ 85 °C  | 10    | —    | —   | years  |
|                                             |                      | T <sub>AMB</sub> ≤ 125 °C | 10    | —    | —   | years  |
| Word (32-bit) programming time              | t <sub>W_PROG</sub>  |                           | 20    | 24.4 | 30  | μs     |
| Page erase time                             | t <sub>PERASE</sub>  |                           | 20    | 26.4 | 35  | ms     |
| Mass erase time <sup>1</sup>                | t <sub>MERASE</sub>  |                           | 20    | 26.5 | 35  | ms     |
| Device erase time <sup>2</sup>              | t <sub>DERASE</sub>  | T <sub>AMB</sub> ≤ 85 °C  | —     | 69   | 100 | ms     |
|                                             |                      | T <sub>AMB</sub> ≤ 125 °C | —     | 69   | 110 | ms     |
| Page erase current <sup>4</sup>             | I <sub>ERASE</sub>   |                           | —     | —    | 1.6 | mA     |
| Write current <sup>4</sup>                  | I <sub>WRITE</sub>   |                           | —     | —    | 3.8 | mA     |
| Supply voltage during flash erase and write | V <sub>FLASH</sub>   |                           | 1.62  | —    | TBD | V      |

**Note:**

1. Mass erase is issued by the CPU and erases all flash.
2. Device erase is issued over the AAP interface and erases all flash, SRAM, the Lock Bit (LB) page, and the User data page Lock Word (ULW).
3. Flash data retention information is published in the Quarterly Quality and Reliability Report.
4. Measured at 25 °C.

#### 4.1.17 Operational Amplifier (OPAMP)

Unless otherwise indicated, specified conditions are: Non-inverting input configuration, VDD = 3.3 V, DRIVESTRENGTH = 2, MAIN-OUTEN = 1, C<sub>LOAD</sub> = 75 pF with OUTSCALE = 0, or C<sub>LOAD</sub> = 37.5 pF with OUTSCALE = 1. Unit gain buffer and 3X-gain connection as specified in table footnotes<sup>8 1</sup>.

**Table 4.24. Operational Amplifier (OPAMP)**

| Parameter                     | Symbol            | Test Condition                                                                                                                                         | Min              | Typ  | Max                   | Unit |
|-------------------------------|-------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|------|-----------------------|------|
| Supply voltage                | V <sub>OPA</sub>  | HCMDIS = 0, Rail-to-rail input range                                                                                                                   | 2                | —    | 3.8                   | V    |
|                               |                   | HCMDIS = 1                                                                                                                                             | 1.62             | —    | 3.8                   | V    |
| Input voltage                 | V <sub>IN</sub>   | HCMDIS = 0, Rail-to-rail input range                                                                                                                   | V <sub>VSS</sub> | —    | V <sub>OPA</sub>      | V    |
|                               |                   | HCMDIS = 1                                                                                                                                             | V <sub>VSS</sub> | —    | V <sub>OPA</sub> -1.2 | V    |
| Input impedance               | R <sub>IN</sub>   |                                                                                                                                                        | 100              | —    | —                     | MΩ   |
| Output voltage                | V <sub>OUT</sub>  |                                                                                                                                                        | V <sub>VSS</sub> | —    | V <sub>OPA</sub>      | V    |
| Load capacitance <sup>2</sup> | C <sub>LOAD</sub> | OUTSCALE = 0                                                                                                                                           | —                | —    | 75                    | pF   |
|                               |                   | OUTSCALE = 1                                                                                                                                           | —                | —    | 37.5                  | pF   |
| Output impedance              | R <sub>OUT</sub>  | DRIVESTRENGTH = 2 or 3, 0.4 V ≤ V <sub>OUT</sub> ≤ V <sub>OPA</sub> - 0.4 V, -8 mA < I <sub>OUT</sub> < 8 mA, Buffer connection, Full supply range     | —                | 0.25 | —                     | Ω    |
|                               |                   | DRIVESTRENGTH = 0 or 1, 0.4 V ≤ V <sub>OUT</sub> ≤ V <sub>OPA</sub> - 0.4 V, -400 μA < I <sub>OUT</sub> < 400 μA, Buffer connection, Full supply range | —                | 0.6  | —                     | Ω    |
|                               |                   | DRIVESTRENGTH = 2 or 3, 0.1 V ≤ V <sub>OUT</sub> ≤ V <sub>OPA</sub> - 0.1 V, -2 mA < I <sub>OUT</sub> < 2 mA, Buffer connection, Full supply range     | —                | 0.4  | —                     | Ω    |
|                               |                   | DRIVESTRENGTH = 0 or 1, 0.1 V ≤ V <sub>OUT</sub> ≤ V <sub>OPA</sub> - 0.1 V, -100 μA < I <sub>OUT</sub> < 100 μA, Buffer connection, Full supply range | —                | 1    | —                     | Ω    |
| Internal closed-loop gain     | G <sub>CL</sub>   | Buffer connection                                                                                                                                      | TBD              | 1    | TBD                   | -    |
|                               |                   | 3x Gain connection                                                                                                                                     | TBD              | 2.99 | TBD                   | -    |
|                               |                   | 16x Gain connection                                                                                                                                    | TBD              | 15.7 | TBD                   | -    |
| Active current <sup>4</sup>   | I <sub>OPA</sub>  | DRIVESTRENGTH = 3, OUTSCALE = 0                                                                                                                        | —                | 580  | —                     | μA   |
|                               |                   | DRIVESTRENGTH = 2, OUTSCALE = 0                                                                                                                        | —                | 176  | —                     | μA   |
|                               |                   | DRIVESTRENGTH = 1, OUTSCALE = 0                                                                                                                        | —                | 13   | —                     | μA   |
|                               |                   | DRIVESTRENGTH = 0, OUTSCALE = 0                                                                                                                        | —                | 4.7  | —                     | μA   |

4.1.20.3 I2C Fast-mode Plus (Fm+)<sup>1</sup>Table 4.29. I2C Fast-mode Plus (Fm+)<sup>1</sup>

| Parameter                                        | Symbol              | Test Condition | Min  | Typ | Max  | Unit |
|--------------------------------------------------|---------------------|----------------|------|-----|------|------|
| SCL clock frequency <sup>2</sup>                 | f <sub>SCL</sub>    |                | 0    | —   | 1000 | kHz  |
| SCL clock low time                               | t <sub>LOW</sub>    |                | 0.5  | —   | —    | μs   |
| SCL clock high time                              | t <sub>HIGH</sub>   |                | 0.26 | —   | —    | μs   |
| SDA set-up time                                  | t <sub>SU_DAT</sub> |                | 50   | —   | —    | ns   |
| SDA hold time                                    | t <sub>HD_DAT</sub> |                | 100  | —   | —    | ns   |
| Repeated START condition set-up time             | t <sub>SU_STA</sub> |                | 0.26 | —   | —    | μs   |
| (Repeated) START condition hold time             | t <sub>HD_STA</sub> |                | 0.26 | —   | —    | μs   |
| STOP condition set-up time                       | t <sub>SU_STO</sub> |                | 0.26 | —   | —    | μs   |
| Bus free time between a STOP and START condition | t <sub>BUF</sub>    |                | 0.5  | —   | —    | μs   |

**Note:**

1. For CLHR set to 0 or 1 in the I2Cn\_CTRL register.
2. For the minimum HPPERCLK frequency required in Fast-mode Plus, refer to the I2C chapter in the reference manual.

| Pin   |          | Pin Alternate Functionality / Description |                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                              |                                                                                                                     |
|-------|----------|-------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| Pin # | Pin Name | Analog                                    | Timers                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Communication                                                                                                                                                                                                                                                | Other                                                                                                               |
| A4    | PC3      | BUSAY BUSBX                               | WTIM0_CC0 #23<br>WTIM0_CC1 #21<br>WTIM0_CC2 #19<br>WTIM0_CDTI0 #15<br>WTIM0_CDTI1 #13<br>WTIM0_CDTI2 #11<br>WTIM1_CC0 #7<br>WTIM1_CC1 #5<br>WTIM1_CC2 #3<br>WTIM1_CC3 #1<br>PCNT1_S0IN #16<br>PCNT1_S1IN #15<br>PCNT2_S0IN #16<br>PCNT2_S1IN #15                                                                                                                                                                                                                    | US3_TX #21 US3_RX<br>#20 US3_CLK #19<br>US3_CS #18 US3_CTS<br>#17 US3_RTS #16<br>I2C1_SDA #16<br>I2C1_SCL #15                                                                                                                                                |                                                                                                                     |
| A5    | PC0      | BUSBY BUSAX                               | WTIM0_CC0 #20<br>WTIM0_CC1 #18<br>WTIM0_CC2 #16<br>WTIM0_CDTI0 #12<br>WTIM0_CDTI1 #10<br>WTIM0_CDTI2 #8<br>WTIM1_CC0 #4<br>WTIM1_CC1 #2<br>WTIM1_CC2 #0<br>PCNT1_S0IN #13<br>PCNT1_S1IN #12<br>PCNT2_S0IN #13<br>PCNT2_S1IN #12                                                                                                                                                                                                                                     | US3_TX #18 US3_RX<br>#17 US3_CLK #16<br>US3_CS #15 US3_CTS<br>#14 US3_RTS #13<br>I2C1_SDA #13<br>I2C1_SCL #12                                                                                                                                                |                                                                                                                     |
| A6    | PC11     | BUSAY BUSBX                               | TIM0_CC0 #16<br>TIM0_CC1 #15<br>TIM0_CC2 #14<br>TIM0_CDTI0 #13<br>TIM0_CDTI1 #12<br>TIM0_CDTI2 #11<br>TIM1_CC0 #16<br>TIM1_CC1 #15<br>TIM1_CC2 #14<br>TIM1_CC3 #13<br>WTIM0_CC0 #31<br>WTIM0_CC1 #29<br>WTIM0_CC2 #27<br>WTIM0_CDTI0 #23<br>WTIM0_CDTI1 #21<br>WTIM0_CDTI2 #19<br>WTIM1_CC0 #15<br>WTIM1_CC1 #13<br>WTIM1_CC2 #11<br>WTIM1_CC3 #9 LE-<br>TIM0_OUT0 #16 LE-<br>TIM0_OUT1 #15<br>PCNT0_S0IN #16<br>PCNT0_S1IN #15<br>PCNT2_S0IN #20<br>PCNT2_S1IN #19 | US0_TX #16 US0_RX<br>#15 US0_CLK #14<br>US0_CS #13 US0_CTS<br>#12 US0_RTS #11<br>US1_TX #16 US1_RX<br>#15 US1_CLK #14<br>US1_CS #13 US1_CTS<br>#12 US1_RTS #11<br>LEU0_TX #16<br>LEU0_RX #15<br>I2C0_SDA #16<br>I2C0_SCL #15<br>I2C1_SDA #20<br>I2C1_SCL #19 | CMU_CLK0 #3<br>PRS_CH0 #13<br>PRS_CH9 #16<br>PRS_CH10 #5<br>PRS_CH11 #4<br>ACMP0_O #16<br>ACMP1_O #16<br>DBG_SWO #3 |

| Pin   |          | Pin Alternate Functionality / Description                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |
|-------|----------|----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| Pin # | Pin Name | Analog                                                                                                   | Timers                                                                                                                                                                                                                                                                                                                                                                                                                        | Communication                                                                                                                                                                                                              | Other                                                                                                           |
| A7    | PC9      | BUSAY BUSBX                                                                                              | TIM0_CC0 #14<br>TIM0_CC1 #13<br>TIM0_CC2 #12<br>TIM0_CDTI0 #11<br>TIM0_CDTI1 #10<br>TIM0_CDTI2 #9<br>TIM1_CC0 #14<br>TIM1_CC1 #13<br>TIM1_CC2 #12<br>TIM1_CC3 #11<br>WTIM0_CC0 #29<br>WTIM0_CC1 #27<br>WTIM0_CC2 #25<br>WTIM0_CDTI0 #21<br>WTIM0_CDTI1 #19<br>WTIM0_CDTI2 #17<br>WTIM1_CC0 #13<br>WTIM1_CC1 #11<br>WTIM1_CC2 #9<br>WTIM1_CC3 #7 LE-<br>TIM0_OUT0 #14 LE-<br>TIM0_OUT1 #13<br>PCNT0_S0IN #14<br>PCNT0_S1IN #13 | US0_TX #14 US0_RX<br>#13 US0_CLK #12<br>US0_CS #11 US0_CTS<br>#10 US0_RTS #9<br>US1_TX #14 US1_RX<br>#13 US1_CLK #12<br>US1_CS #11 US1_CTS<br>#10 US1_RTS #9<br>LEU0_TX #14<br>LEU0_RX #13<br>I2C0_SDA #14<br>I2C0_SCL #13 | PRS_CH0 #11<br>PRS_CH9 #14<br>PRS_CH10 #3<br>PRS_CH11 #2<br>ACMP0_O #14<br>ACMP1_O #14<br>ETM_TD2 #3            |
| A8    | PC7      | BUSAY BUSBX                                                                                              | TIM0_CC0 #12<br>TIM0_CC1 #11<br>TIM0_CC2 #10<br>TIM0_CDTI0 #9<br>TIM0_CDTI1 #8<br>TIM0_CDTI2 #7<br>TIM1_CC0 #12<br>TIM1_CC1 #11<br>TIM1_CC2 #10<br>TIM1_CC3 #9<br>WTIM0_CC0 #27<br>WTIM0_CC1 #25<br>WTIM0_CC2 #23<br>WTIM0_CDTI0 #19<br>WTIM0_CDTI1 #17<br>WTIM0_CDTI2 #15<br>WTIM1_CC0 #11<br>WTIM1_CC1 #9<br>WTIM1_CC2 #7<br>WTIM1_CC3 #5 LE-<br>TIM0_OUT0 #12 LE-<br>TIM0_OUT1 #11<br>PCNT0_S0IN #12<br>PCNT0_S1IN #11     | US0_TX #12 US0_RX<br>#11 US0_CLK #10<br>US0_CS #9 US0_CTS<br>#8 US0_RTS #7<br>US1_TX #12 US1_RX<br>#11 US1_CLK #10<br>US1_CS #9 US1_CTS<br>#8 US1_RTS #7<br>LEU0_TX #12<br>LEU0_RX #11<br>I2C0_SDA #12<br>I2C0_SCL #11     | CMU_CLK1 #2<br>PRS_CH0 #9 PRS_CH9<br>#12 PRS_CH10 #1<br>PRS_CH11 #0<br>ACMP0_O #12<br>ACMP1_O #12<br>ETM_TD0 #3 |
| A9    | DECOUPLE | Decouple output for on-chip voltage regulator. An external decoupling capacitor is required at this pin. |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |
| A10   | DVDD     | Digital power supply .                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |
| A11   | VREGVDD  | Voltage regulator VDD input                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |
| A12   | VREGSW   | DCDC regulator switching node                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |
| A13   | VREGVSS  | Voltage regulator VSS                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                            |                                                                                                                 |

| Pin   |          | Pin Alternate Functionality / Description |                                                                                                                                                                                                                                                  |                                                                                                                                                                                                |            |
|-------|----------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Pin # | Pin Name | Analog                                    | Timers                                                                                                                                                                                                                                           | Communication                                                                                                                                                                                  | Other      |
| C1    | PF11     | BUSAY BUSBX                               | WTIM1_CC2 #31<br>WTIM1_CC3 #29<br>PCNT1_S0IN #24<br>PCNT1_S1IN #23<br>PCNT2_S0IN #24<br>PCNT2_S1IN #23                                                                                                                                           | US2_TX #24 US2_RX #23<br>US2_CLK #22<br>US2_CS #21 US2_CTS #20<br>US2_RTS #19<br>US3_TX #24 US3_RX #23<br>US3_CLK #22<br>US3_CS #21 US3_CTS #20<br>US3_RTS #19<br>I2C1_SDA #24<br>I2C1_SCL #23 | ETM_TD2 #0 |
| C2    | PF10     | BUSBY BUSAX                               | WTIM1_CC2 #30<br>WTIM1_CC3 #28<br>PCNT1_S0IN #23<br>PCNT1_S1IN #22<br>PCNT2_S0IN #23<br>PCNT2_S1IN #22                                                                                                                                           | US2_TX #23 US2_RX #22<br>US2_CLK #21<br>US2_CS #20 US2_CTS #19<br>US2_RTS #18<br>I2C1_SDA #23<br>I2C1_SCL #22                                                                                  | ETM_TD1 #0 |
| C3    | PF9      | BUSAY BUSBX                               | WTIM1_CC1 #31<br>WTIM1_CC2 #29<br>WTIM1_CC3 #27<br>PCNT1_S0IN #22<br>PCNT1_S1IN #21<br>PCNT2_S0IN #22<br>PCNT2_S1IN #21                                                                                                                          | US2_TX #22 US2_RX #21<br>US2_CLK #20<br>US2_CS #19 US2_CTS #18<br>US2_RTS #17<br>I2C1_SDA #22<br>I2C1_SCL #21                                                                                  | ETM_TD0 #0 |
| C5    | PC2      | BUSBY BUSAX                               | WTIM0_CC0 #22<br>WTIM0_CC1 #20<br>WTIM0_CC2 #18<br>WTIM0_CDTI0 #14<br>WTIM0_CDTI1 #12<br>WTIM0_CDTI2 #10<br>WTIM1_CC0 #6<br>WTIM1_CC1 #4<br>WTIM1_CC2 #2<br>WTIM1_CC3 #0<br>PCNT1_S0IN #15<br>PCNT1_S1IN #14<br>PCNT2_S0IN #15<br>PCNT2_S1IN #14 | US3_TX #20 US3_RX #19<br>US3_CLK #18<br>US3_CS #17 US3_CTS #16<br>US3_RTS #15<br>I2C1_SDA #15<br>I2C1_SCL #14                                                                                  |            |
| C6    | PJ15     | BUSACMP1Y BUSACMP1X                       | PCNT1_S0IN #12<br>PCNT1_S1IN #11<br>PCNT2_S0IN #12<br>PCNT2_S1IN #11                                                                                                                                                                             | US3_TX #17 US3_RX #16<br>US3_CLK #15<br>US3_CS #14 US3_CTS #13<br>US3_RTS #12<br>I2C1_SDA #12<br>I2C1_SCL #11                                                                                  | LES_ALTEX3 |

| Pin   |          | Pin Alternate Functionality / Description |                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                               |                                                                                                 |
|-------|----------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| Pin # | Pin Name | Analog                                    | Timers                                                                                                                                                                                                                                                                                                                                                                           | Communication                                                                                                                                                                                                 | Other                                                                                           |
| C10   | PB15     | BUSCY BUSDX<br>LFX TAL_P                  | TIM0_CC0 #10<br>TIM0_CC1 #9<br>TIM0_CC2 #8<br>TIM0_CDTI0 #7<br>TIM0_CDTI1 #6<br>TIM0_CDTI2 #5<br>TIM1_CC0 #10<br>TIM1_CC1 #9<br>TIM1_CC2 #8<br>TIM1_CC3 #7<br>WTIM0_CC0 #19<br>WTIM0_CC1 #17<br>WTIM0_CC2 #15<br>WTIM0_CDTI0 #11<br>WTIM0_CDTI1 #9<br>WTIM0_CDTI2 #7<br>WTIM1_CC0 #3<br>WTIM1_CC1 #1 LE-<br>TIM0_OUT0 #10 LE-<br>TIM0_OUT1 #9<br>PCNT0_S0IN #10<br>PCNT0_S1IN #9 | US0_TX #10 US0_RX<br>#9 US0_CLK #8<br>US0_CS #7 US0_CTS<br>#6 US0_RTS #5<br>US1_TX #10 US1_RX<br>#9 US1_CLK #8<br>US1_CS #7 US1_CTS<br>#6 US1_RTS #5<br>LEU0_TX #10<br>LEU0_RX #9 I2C0_SDA<br>#10 I2C0_SCL #9 | CMU_CLK0 #1<br>PRS_CH6 #10<br>PRS_CH7 #9 PRS_CH8<br>#8 PRS_CH9 #7<br>ACMP0_O #10<br>ACMP1_O #10 |
| C11   | PB14     | BUSDY BUSCX<br>LFX TAL_N                  | TIM0_CC0 #9<br>TIM0_CC1 #8<br>TIM0_CC2 #7<br>TIM0_CDTI0 #6<br>TIM0_CDTI1 #5<br>TIM0_CDTI2 #4<br>TIM1_CC0 #9<br>TIM1_CC1 #8<br>TIM1_CC2 #7<br>TIM1_CC3 #6<br>WTIM0_CC0 #18<br>WTIM0_CC1 #16<br>WTIM0_CC2 #14<br>WTIM0_CDTI0 #10<br>WTIM0_CDTI1 #8<br>WTIM0_CDTI2 #6<br>WTIM1_CC0 #2<br>WTIM1_CC1 #0 LE-<br>TIM0_OUT0 #9 LE-<br>TIM0_OUT1 #8<br>PCNT0_S0IN #9<br>PCNT0_S1IN #8     | US0_TX #9 US0_RX #8<br>US0_CLK #7 US0_CS<br>#6 US0_CTS #5<br>US0_RTS #4 US1_TX<br>#9 US1_RX #8<br>US1_CLK #7 US1_CS<br>#6 US1_CTS #5<br>US1_RTS #4 LEU0_TX<br>#9 LEU0_RX #8<br>I2C0_SDA #9<br>I2C0_SCL #8     | CMU_CLK1 #1<br>PRS_CH6 #9 PRS_CH7<br>#8 PRS_CH8 #7<br>PRS_CH9 #6<br>ACMP0_O #9<br>ACMP1_O #9    |

| Pin   |          | Pin Alternate Functionality / Description |                                                                                                                                                       |                                                                                                                                                                                                |                            |
|-------|----------|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|
| Pin # | Pin Name | Analog                                    | Timers                                                                                                                                                | Communication                                                                                                                                                                                  | Other                      |
| E13   | PB7      | BUSCY BUSDX                               | WTIM0_CC0 #11<br>WTIM0_CC1 #9<br>WTIM0_CC2 #7<br>WTIM0_CDTI0 #3<br>WTIM0_CDTI1 #1<br>PCNT1_S0IN #7<br>PCNT1_S1IN #6<br>PCNT2_S0IN #7<br>PCNT2_S1IN #6 | US2_TX #10 US2_RX #9<br>US2_CLK #8<br>US2_CS #7 US2_CTS #6<br>US2_RTS #5<br>US3_TX #11 US3_RX #10<br>US3_CLK #9<br>US3_CS #8 US3_CTS #7<br>US3_RTS #6<br>I2C1_SDA #7<br>I2C1_SCL #6            | ETM_TD2 #2                 |
| F1    | PK2      |                                           | PCNT1_S0IN #31<br>PCNT1_S1IN #30<br>PCNT2_S0IN #31<br>PCNT2_S1IN #30                                                                                  | US2_TX #31 US2_RX #30<br>US2_CLK #29<br>US2_CS #28 US2_CTS #27<br>US2_RTS #26<br>US3_TX #31 US3_RX #30<br>US3_CLK #29<br>US3_CS #28 US3_CTS #27<br>US3_RTS #26<br>I2C1_SDA #31<br>I2C1_SCL #30 |                            |
| F2    | IOVDD    | Digital IO power supply .                 |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F5    | VSS      | Ground                                    |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F6    | VSS      | Ground                                    |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F7    | VSS      | Ground                                    |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F8    | VSS      | Ground                                    |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F9    | VSS      | Ground                                    |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F11   | IOVDD    | Digital IO power supply .                 |                                                                                                                                                       |                                                                                                                                                                                                |                            |
| F12   | PB6      | BUSDY BUSCX                               | WTIM0_CC0 #10<br>WTIM0_CC1 #8<br>WTIM0_CC2 #6<br>WTIM0_CDTI0 #2<br>WTIM0_CDTI1 #0<br>PCNT1_S0IN #6<br>PCNT1_S1IN #5<br>PCNT2_S0IN #6<br>PCNT2_S1IN #5 | US2_TX #9 US2_RX #8<br>US2_CLK #7 US2_CS #6<br>US2_CTS #5<br>US2_RTS #4 US3_TX #10<br>US3_RX #9<br>US3_CLK #8 US3_CS #7<br>US3_CTS #6<br>US3_RTS #5 I2C1_SDA #6<br>I2C1_SCL #5                 | CMU_CLKI0 #3<br>ETM_TD1 #2 |
| F13   | PI3      | BUSADC0Y BU-SADC0X                        | PCNT1_S0IN #5<br>PCNT1_S1IN #4<br>PCNT2_S0IN #5<br>PCNT2_S1IN #4                                                                                      | US2_TX #8 US2_RX #7<br>US2_CLK #6 US2_CS #5<br>US2_CTS #4<br>US2_RTS #3 US3_TX #9<br>US3_RX #8<br>US3_CLK #7 US3_CS #6<br>US3_CTS #5<br>US3_RTS #4 I2C1_SDA #5<br>I2C1_SCL #4                  | LES_ALTEX7<br>ETM_TD0 #2   |

| Pin   |          | Pin Alternate Functionality / Description |                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                               |                                                                                                                                     |
|-------|----------|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Pin # | Pin Name | Analog                                    | Timers                                                                                                                                                                                                                                                                                                                                  | Communication                                                                                                                                                                                                                                                                                                 | Other                                                                                                                               |
| 3     | PF2      | BUSBY BUSAX                               | TIM0_CC0 #26<br>TIM0_CC1 #25<br>TIM0_CC2 #24<br>TIM0_CDTI0 #23<br>TIM0_CDTI1 #22<br>TIM0_CDTI2 #21<br>TIM1_CC0 #26<br>TIM1_CC1 #25<br>TIM1_CC2 #24<br>TIM1_CC3 #23<br>WTIM0_CDTI2 #30<br>WTIM1_CC0 #26<br>WTIM1_CC1 #24<br>WTIM1_CC2 #22<br>WTIM1_CC3 #20 LE-<br>TIM0_OUT0 #26 LE-<br>TIM0_OUT1 #25<br>PCNT0_S0IN #26<br>PCNT0_S1IN #25 | US0_TX #26 US0_RX<br>#25 US0_CLK #24<br>US0_CS #23 US0_CTS<br>#22 US0_RTS #21<br>US1_TX #26 US1_RX<br>#25 US1_CLK #24<br>US1_CS #23 US1_CTS<br>#22 US1_RTS #21<br>LEU0_TX #26<br>LEU0_RX #25<br>I2C0_SDA #26<br>I2C0_SCL #25                                                                                  | CMU_CLK0 #6<br>PRS_CH0 #2 PRS_CH1<br>#1 PRS_CH2 #0<br>PRS_CH3 #7<br>ACMP0_O #26<br>ACMP1_O #26<br>DBG_TDO DBG_SWO<br>#0 GPIO_EM4WU0 |
| 4     | PF3      | BUSAY BUSBX                               | TIM0_CC0 #27<br>TIM0_CC1 #26<br>TIM0_CC2 #25<br>TIM0_CDTI0 #24<br>TIM0_CDTI1 #23<br>TIM0_CDTI2 #22<br>TIM1_CC0 #27<br>TIM1_CC1 #26<br>TIM1_CC2 #25<br>TIM1_CC3 #24<br>WTIM0_CDTI2 #31<br>WTIM1_CC0 #27<br>WTIM1_CC1 #25<br>WTIM1_CC2 #23<br>WTIM1_CC3 #21 LE-<br>TIM0_OUT0 #27 LE-<br>TIM0_OUT1 #26<br>PCNT0_S0IN #27<br>PCNT0_S1IN #26 | US0_TX #27 US0_RX<br>#26 US0_CLK #25<br>US0_CS #24 US0_CTS<br>#23 US0_RTS #22<br>US1_TX #27 US1_RX<br>#26 US1_CLK #25<br>US1_CS #24 US1_CTS<br>#23 US1_RTS #22<br>US2_TX #16 US2_RX<br>#15 US2_CLK #14<br>US2_CS #13 US2_CTS<br>#12 US2_RTS #11<br>LEU0_TX #27<br>LEU0_RX #26<br>I2C0_SDA #27<br>I2C0_SCL #26 | CMU_CLK1 #6<br>PRS_CH0 #3 PRS_CH1<br>#2 PRS_CH2 #1<br>PRS_CH3 #0<br>ACMP0_O #27<br>ACMP1_O #27<br>DBG_TDI                           |
| 5     | PF4      | BUSBY BUSAX                               | TIM0_CC0 #28<br>TIM0_CC1 #27<br>TIM0_CC2 #26<br>TIM0_CDTI0 #25<br>TIM0_CDTI1 #24<br>TIM0_CDTI2 #23<br>TIM1_CC0 #28<br>TIM1_CC1 #27<br>TIM1_CC2 #26<br>TIM1_CC3 #25<br>WTIM1_CC0 #28<br>WTIM1_CC1 #26<br>WTIM1_CC2 #24<br>WTIM1_CC3 #22 LE-<br>TIM0_OUT0 #28 LE-<br>TIM0_OUT1 #27<br>PCNT0_S0IN #28<br>PCNT0_S1IN #27                    | US0_TX #28 US0_RX<br>#27 US0_CLK #26<br>US0_CS #25 US0_CTS<br>#24 US0_RTS #23<br>US1_TX #28 US1_RX<br>#27 US1_CLK #26<br>US1_CS #25 US1_CTS<br>#24 US1_RTS #23<br>US2_TX #17 US2_RX<br>#16 US2_CLK #15<br>US2_CS #14 US2_CTS<br>#13 US2_RTS #12<br>LEU0_TX #28<br>LEU0_RX #27<br>I2C0_SDA #28<br>I2C0_SCL #27 | PRS_CH0 #4 PRS_CH1<br>#3 PRS_CH2 #2<br>PRS_CH3 #1<br>ACMP0_O #28<br>ACMP1_O #28                                                     |

| Alternate     | LOCATION                             |                                         |                                           |                                            |                                             |                                              |                                          |                                          |                                                  |
|---------------|--------------------------------------|-----------------------------------------|-------------------------------------------|--------------------------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------|------------------------------------------|--------------------------------------------------|
| Functionality | 0 - 3                                | 4 - 7                                   | 8 - 11                                    | 12 - 15                                    | 16 - 19                                     | 20 - 23                                      | 24 - 27                                  | 28 - 31                                  | Description                                      |
| LES_CH5       | 0: PD13                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 5.                               |
| LES_CH6       | 0: PD14                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 6.                               |
| LES_CH7       | 0: PD15                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 7.                               |
| LES_CH8       | 0: PA0                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 8.                               |
| LES_CH9       | 0: PA1                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 9.                               |
| LES_CH10      | 0: PA2                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 10.                              |
| LES_CH11      | 0: PA3                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 11.                              |
| LES_CH12      | 0: PA4                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 12.                              |
| LES_CH13      | 0: PA5                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 13.                              |
| LES_CH14      | 0: PA6                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 14.                              |
| LES_CH15      | 0: PA7                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | LESENSE channel 15.                              |
| LETIM0_OUT0   | 0: PA0<br>1: PA1<br>2: PA2<br>3: PA3 | 4: PA4<br>5: PA5<br>6: PB11<br>7: PB12  | 8: PB13<br>9: PB14<br>10: PB15<br>11: PC6 | 12: PC7<br>13: PC8<br>14: PC9<br>15: PC10  | 16: PC11<br>17: PD9<br>18: PD10<br>19: PD11 | 20: PD12<br>21: PD13<br>22: PD14<br>23: PD15 | 24: PF0<br>25: PF1<br>26: PF2<br>27: PF3 | 28: PF4<br>29: PF5<br>30: PF6<br>31: PF7 | Low Energy Timer<br>LETIM0, output<br>channel 0. |
| LETIM0_OUT1   | 0: PA1<br>1: PA2<br>2: PA3<br>3: PA4 | 4: PA5<br>5: PB11<br>6: PB12<br>7: PB13 | 8: PB14<br>9: PB15<br>10: PC6<br>11: PC7  | 12: PC8<br>13: PC9<br>14: PC10<br>15: PC11 | 16: PD9<br>17: PD10<br>18: PD11<br>19: PD12 | 20: PD13<br>21: PD14<br>22: PD15<br>23: PF0  | 24: PF1<br>25: PF2<br>26: PF3<br>27: PF4 | 28: PF5<br>29: PF6<br>30: PF7<br>31: PA0 | Low Energy Timer<br>LETIM0, output<br>channel 1. |

| Alternate     | LOCATION                             |                                         |                                           |                                            |                                             |                                              |                                          |                                          |                                                                                                               |
|---------------|--------------------------------------|-----------------------------------------|-------------------------------------------|--------------------------------------------|---------------------------------------------|----------------------------------------------|------------------------------------------|------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Functionality | 0 - 3                                | 4 - 7                                   | 8 - 11                                    | 12 - 15                                    | 16 - 19                                     | 20 - 23                                      | 24 - 27                                  | 28 - 31                                  | Description                                                                                                   |
| LEU0_RX       | 0: PA1<br>1: PA2<br>2: PA3<br>3: PA4 | 4: PA5<br>5: PB11<br>6: PB12<br>7: PB13 | 8: PB14<br>9: PB15<br>10: PC6<br>11: PC7  | 12: PC8<br>13: PC9<br>14: PC10<br>15: PC11 | 16: PD9<br>17: PD10<br>18: PD11<br>19: PD12 | 20: PD13<br>21: PD14<br>22: PD15<br>23: PF0  | 24: PF1<br>25: PF2<br>26: PF3<br>27: PF4 | 28: PF5<br>29: PF6<br>30: PF7<br>31: PA0 | LEUART0 Receive input.                                                                                        |
| LEU0_TX       | 0: PA0<br>1: PA1<br>2: PA2<br>3: PA3 | 4: PA4<br>5: PA5<br>6: PB11<br>7: PB12  | 8: PB13<br>9: PB14<br>10: PB15<br>11: PC6 | 12: PC7<br>13: PC8<br>14: PC9<br>15: PC10  | 16: PC11<br>17: PD9<br>18: PD10<br>19: PD11 | 20: PD12<br>21: PD13<br>22: PD14<br>23: PD15 | 24: PF0<br>25: PF1<br>26: PF2<br>27: PF3 | 28: PF4<br>29: PF5<br>30: PF6<br>31: PF7 | LEUART0 Transmit output. Also used as receive input in half duplex communication.                             |
| LFXTAL_N      | 0: PB14                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Low Frequency Crystal (typically 32.768 kHz) negative pin. Also used as an optional external clock input pin. |
| LFXTAL_P      | 0: PB15                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Low Frequency Crystal (typically 32.768 kHz) positive pin.                                                    |
| OPA0_N        | 0: PA4                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 0 external negative input.                                                              |
| OPA0_P        | 0: PA2                               |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 0 external positive input.                                                              |
| OPA1_N        | 0: PD15                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 1 external negative input.                                                              |
| OPA1_P        | 0: PD13                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 1 external positive input.                                                              |
| OPA2_N        | 0: PB13                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 2 external negative input.                                                              |
| OPA2_OUT      | 0: PB12                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 2 output.                                                                               |
| OPA2_OUTALT   | 0: PB9<br>1: PB10                    |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 2 alternative output.                                                                   |
| OPA2_P        | 0: PB11                              |                                         |                                           |                                            |                                             |                                              |                                          |                                          | Operational Amplifier 2 external positive input.                                                              |

| Alternate     | LOCATION                                |                                          |                                           |                                             |                                              |                                              |                                          |                                          |                                                      |
|---------------|-----------------------------------------|------------------------------------------|-------------------------------------------|---------------------------------------------|----------------------------------------------|----------------------------------------------|------------------------------------------|------------------------------------------|------------------------------------------------------|
| Functionality | 0 - 3                                   | 4 - 7                                    | 8 - 11                                    | 12 - 15                                     | 16 - 19                                      | 20 - 23                                      | 24 - 27                                  | 28 - 31                                  | Description                                          |
| PRS_CH7       | 0: PA1<br>1: PA2<br>2: PA3<br>3: PA4    | 4: PA5<br>5: PB11<br>6: PB12<br>7: PB13  | 8: PB14<br>9: PB15<br>10: PA0             |                                             |                                              |                                              |                                          |                                          | Peripheral Reflex System PRS, channel 7.             |
| PRS_CH8       | 0: PA2<br>1: PA3<br>2: PA4<br>3: PA5    | 4: PB11<br>5: PB12<br>6: PB13<br>7: PB14 | 8: PB15<br>9: PA0<br>10: PA1              |                                             |                                              |                                              |                                          |                                          | Peripheral Reflex System PRS, channel 8.             |
| PRS_CH9       | 0: PA3<br>1: PA4<br>2: PA5<br>3: PB11   | 4: PB12<br>5: PB13<br>6: PB14<br>7: PB15 | 8: PA0<br>9: PA1<br>10: PA2<br>11: PC6    | 12: PC7<br>13: PC8<br>14: PC9<br>15: PC10   | 16: PC11                                     |                                              |                                          |                                          | Peripheral Reflex System PRS, channel 9.             |
| PRS_CH10      | 0: PC6<br>1: PC7<br>2: PC8<br>3: PC9    | 4: PC10<br>5: PC11                       |                                           |                                             |                                              |                                              |                                          |                                          | Peripheral Reflex System PRS, channel 10.            |
| PRS_CH11      | 0: PC7<br>1: PC8<br>2: PC9<br>3: PC10   | 4: PC11<br>5: PC6                        |                                           |                                             |                                              |                                              |                                          |                                          | Peripheral Reflex System PRS, channel 11.            |
| TIM0_CC0      | 0: PA0<br>1: PA1<br>2: PA2<br>3: PA3    | 4: PA4<br>5: PA5<br>6: PB11<br>7: PB12   | 8: PB13<br>9: PB14<br>10: PB15<br>11: PC6 | 12: PC7<br>13: PC8<br>14: PC9<br>15: PC10   | 16: PC11<br>17: PD9<br>18: PD10<br>19: PD11  | 20: PD12<br>21: PD13<br>22: PD14<br>23: PD15 | 24: PF0<br>25: PF1<br>26: PF2<br>27: PF3 | 28: PF4<br>29: PF5<br>30: PF6<br>31: PF7 | Timer 0 Capture Compare input / output channel 0.    |
| TIM0_CC1      | 0: PA1<br>1: PA2<br>2: PA3<br>3: PA4    | 4: PA5<br>5: PB11<br>6: PB12<br>7: PB13  | 8: PB14<br>9: PB15<br>10: PC6<br>11: PC7  | 12: PC8<br>13: PC9<br>14: PC10<br>15: PC11  | 16: PD9<br>17: PD10<br>18: PD11<br>19: PD12  | 20: PD13<br>21: PD14<br>22: PD15<br>23: PF0  | 24: PF1<br>25: PF2<br>26: PF3<br>27: PF4 | 28: PF5<br>29: PF6<br>30: PF7<br>31: PA0 | Timer 0 Capture Compare input / output channel 1.    |
| TIM0_CC2      | 0: PA2<br>1: PA3<br>2: PA4<br>3: PA5    | 4: PB11<br>5: PB12<br>6: PB13<br>7: PB14 | 8: PB15<br>9: PC6<br>10: PC7<br>11: PC8   | 12: PC9<br>13: PC10<br>14: PC11<br>15: PD9  | 16: PD10<br>17: PD11<br>18: PD12<br>19: PD13 | 20: PD14<br>21: PD15<br>22: PF0<br>23: PF1   | 24: PF2<br>25: PF3<br>26: PF4<br>27: PF5 | 28: PF6<br>29: PF7<br>30: PA0<br>31: PA1 | Timer 0 Capture Compare input / output channel 2.    |
| TIM0_CDT10    | 0: PA3<br>1: PA4<br>2: PA5<br>3: PB11   | 4: PB12<br>5: PB13<br>6: PB14<br>7: PB15 | 8: PC6<br>9: PC7<br>10: PC8<br>11: PC9    | 12: PC10<br>13: PC11<br>14: PD9<br>15: PD10 | 16: PD11<br>17: PD12<br>18: PD13<br>19: PD14 | 20: PD15<br>21: PF0<br>22: PF1<br>23: PF2    | 24: PF3<br>25: PF4<br>26: PF5<br>27: PF6 | 28: PF7<br>29: PA0<br>30: PA1<br>31: PA2 | Timer 0 Complimentary Dead Time Insertion channel 0. |
| TIM0_CDT11    | 0: PA4<br>1: PA5<br>2: PB11<br>3: PB12  | 4: PB13<br>5: PB14<br>6: PB15<br>7: PC6  | 8: PC7<br>9: PC8<br>10: PC9<br>11: PC10   | 12: PC11<br>13: PD9<br>14: PD10<br>15: PD11 | 16: PD12<br>17: PD13<br>18: PD14<br>19: PD15 | 20: PF0<br>21: PF1<br>22: PF2<br>23: PF3     | 24: PF4<br>25: PF5<br>26: PF6<br>27: PF7 | 28: PA0<br>29: PA1<br>30: PA2<br>31: PA3 | Timer 0 Complimentary Dead Time Insertion channel 1. |
| TIM0_CDT12    | 0: PA5<br>1: PB11<br>2: PB12<br>3: PB13 | 4: PB14<br>5: PB15<br>6: PC6<br>7: PC7   | 8: PC8<br>9: PC9<br>10: PC10<br>11: PC11  | 12: PD9<br>13: PD10<br>14: PD11<br>15: PD12 | 16: PD13<br>17: PD14<br>18: PD15<br>19: PF0  | 20: PF1<br>21: PF2<br>22: PF3<br>23: PF4     | 24: PF5<br>25: PF6<br>26: PF7<br>27: PA0 | 28: PA1<br>29: PA2<br>30: PA3<br>31: PA4 | Timer 0 Complimentary Dead Time Insertion channel 2. |
| TIM1_CC0      | 0: PA0<br>1: PA1<br>2: PA2<br>3: PA3    | 4: PA4<br>5: PA5<br>6: PB11<br>7: PB12   | 8: PB13<br>9: PB14<br>10: PB15<br>11: PC6 | 12: PC7<br>13: PC8<br>14: PC9<br>15: PC10   | 16: PC11<br>17: PD9<br>18: PD10<br>19: PD11  | 20: PD12<br>21: PD13<br>22: PD14<br>23: PD15 | 24: PF0<br>25: PF1<br>26: PF2<br>27: PF3 | 28: PF4<br>29: PF5<br>30: PF6<br>31: PF7 | Timer 1 Capture Compare input / output channel 0.    |
| TIM1_CC1      | 0: PA1<br>1: PA2<br>2: PA3<br>3: PA4    | 4: PA5<br>5: PB11<br>6: PB12<br>7: PB13  | 8: PB14<br>9: PB15<br>10: PC6<br>11: PC7  | 12: PC8<br>13: PC9<br>14: PC10<br>15: PC11  | 16: PD9<br>17: PD10<br>18: PD11<br>19: PD12  | 20: PD13<br>21: PD14<br>22: PD15<br>23: PF0  | 24: PF1<br>25: PF2<br>26: PF3<br>27: PF4 | 28: PF5<br>29: PF6<br>30: PF7<br>31: PA0 | Timer 1 Capture Compare input / output channel 1.    |

## 6.4 Analog Port (APORT) Client Maps

The Analog Port (APORT) is an infrastructure used to connect chip pins with on-chip analog clients such as analog comparators, ADCs, DACs, etc. The APORT consists of a set of shared buses, switches, and control logic needed to configurably implement the signal routing. [Figure 6.3 APORT Connection Diagram on page 111](#) Shows the APORT routing for this device family. A complete description of APORT functionality can be found in the Reference Manual.

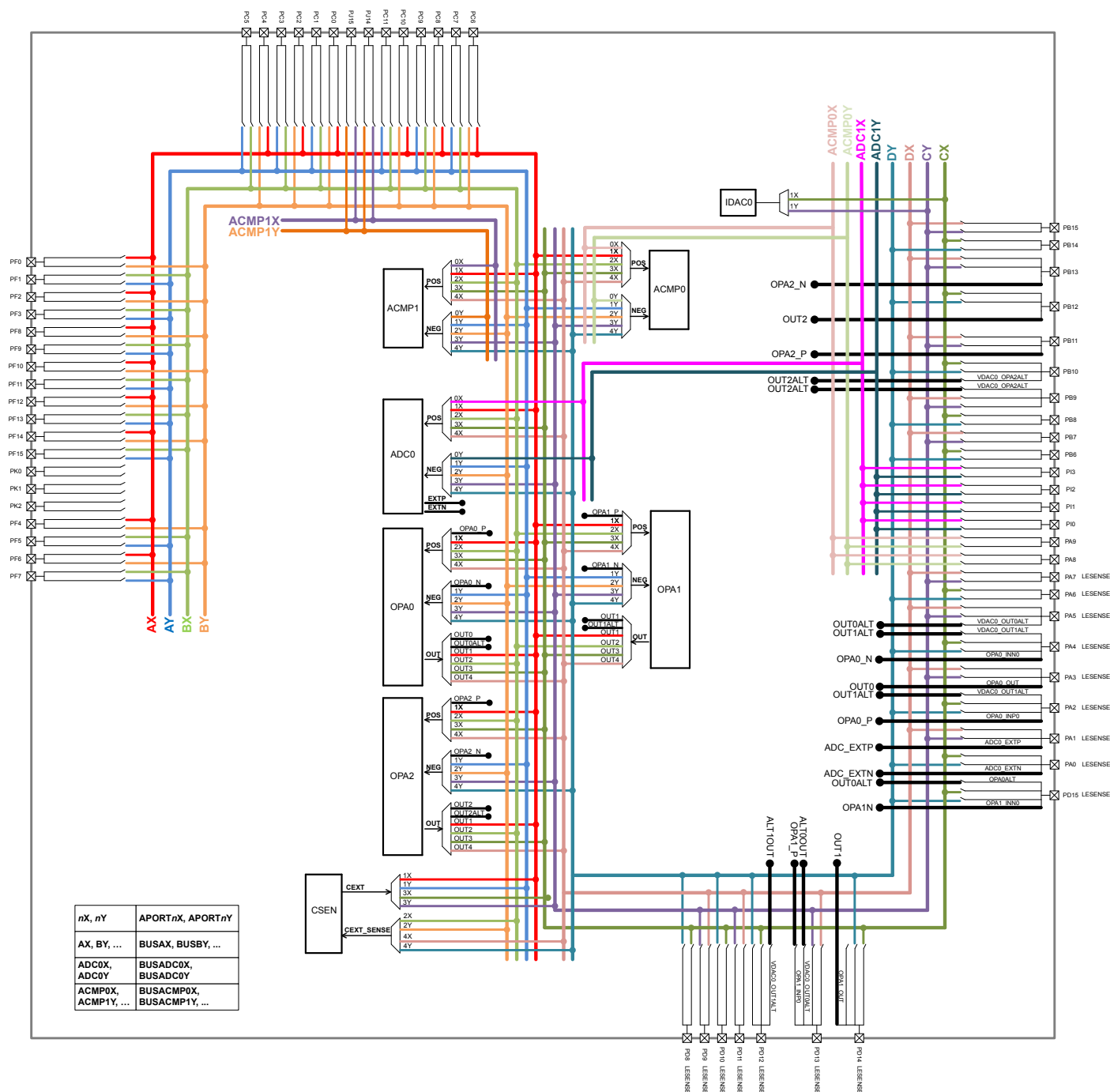


Figure 6.3. APORT Connection Diagram

Client maps for each analog circuit using the APORT are shown in the following tables. The maps are organized by bus, and show the peripheral's port connection, the shared bus, and the connection from specific bus channel numbers to GPIO pins.

In general, enumerations for the pin selection field in an analog peripheral's register can be determined by finding the desired pin connection in the table and then combining the value in the Port column (APORT\_\_), and the channel identifier (CH\_\_). For example, if pin

### 7.3 BGA125 Package Marking



Figure 7.3. BGA125 Package Marking

The package marking consists of:

- P P P P P P P P P P – The part number designation.
- T T T T T T – A trace or manufacturing code. The first letter is the device revision.
- Y Y – The last 2 digits of the assembly year.
- W W – The 2-digit workweek when the device was assembled.

## 8. QFN48 Package Specifications

### 8.1 QFN48 Package Dimensions

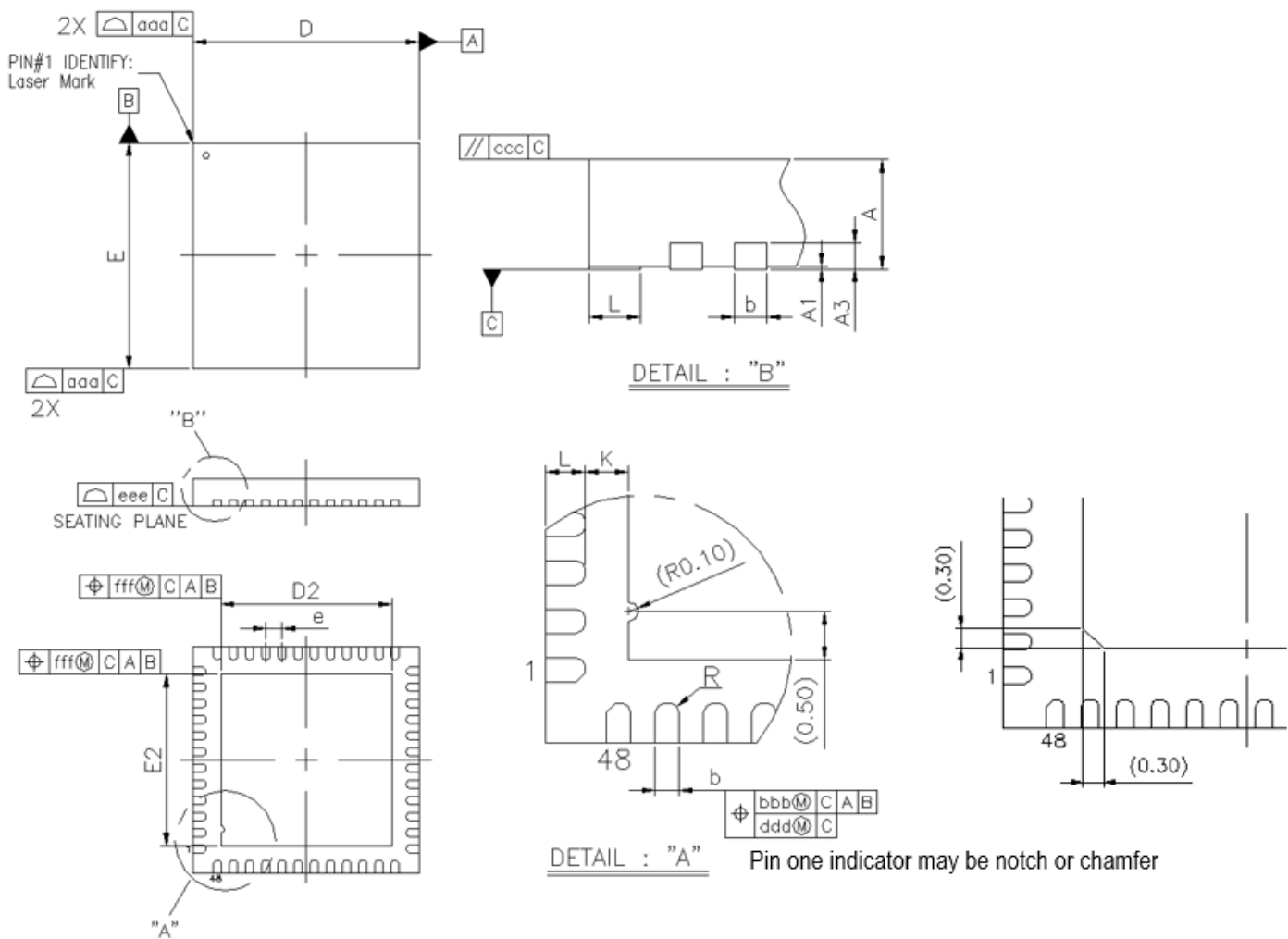


Figure 8.1. QFN48 Package Drawing

## 8.2 QFN48 PCB Land Pattern

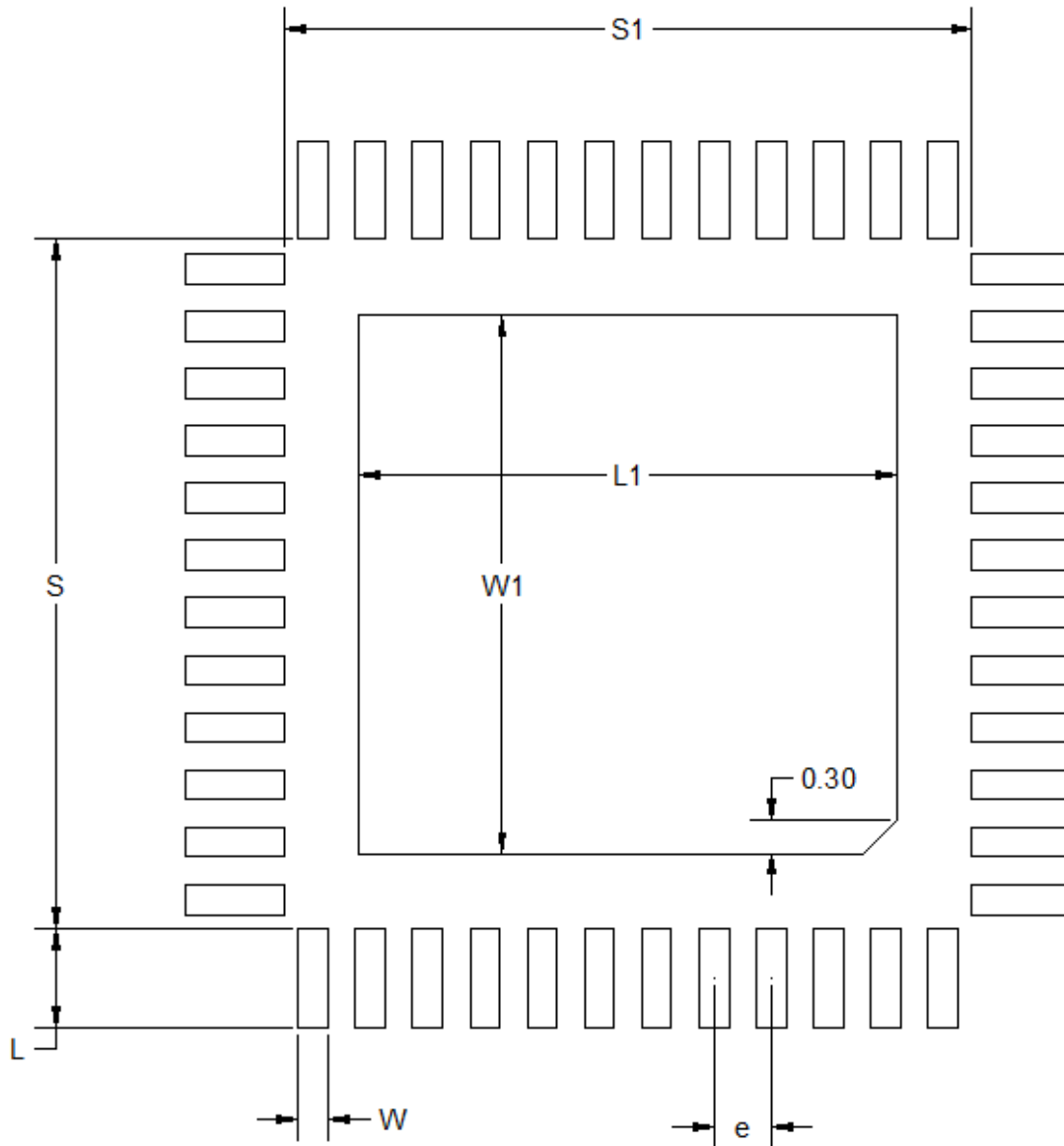


Figure 8.2. QFN48 PCB Land Pattern Drawing

### 8.3 QFN48 Package Marking



Figure 8.3. QFN48 Package Marking

The package marking consists of:

- P P P P P P P P P P – The part number designation.
- T T T T T T – A trace or manufacturing code. The first letter is the device revision.
- Y Y – The last 2 digits of the assembly year.
- W W – The 2-digit workweek when the device was assembled.