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Details

Product Status	Active
Core Processor	ARM® Cortex®-M4
Core Size	32-Bit Single-Core
Speed	72MHz
Connectivity	CANbus, EBI/EMI, Ethernet, I ² C, IrDA, LINbus, MMC/SD/SDIO, QSPI, SmartCard, SPI, UART/USART, USB
Peripherals	Brown-out Detect/Reset, DMA, LCD, POR, PWM, WDT
Number of I/O	80
Program Memory Size	1MB (1M x 8)
Program Memory Type	FLASH
EEPROM Size	-
RAM Size	512K x 8
Voltage - Supply (Vcc/Vdd)	1.8V ~ 3.8V
Data Converters	A/D 16x12b SAR; D/A 2x12b
Oscillator Type	Internal
Operating Temperature	-40°C ~ 85°C (TA)
Mounting Type	Surface Mount
Package / Case	100-TQFP
Supplier Device Package	100-TQFP (14x14)
Purchase URL	https://www.e-xfl.com/product-detail/silicon-labs/efm32gg11b840f1024gq100-br

2. Ordering Information

Table 2.1. Ordering Information

Ordering Code	Flash (kB)	RAM (kB)	DC-DC Converter	USB	Ethernet	QSPI	SDIO	LCD	GPIO	Package	Temp Range
EFM32GG11B820F2048GL192-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	144	BGA192	-40 to +85°C
EFM32GG11B840F1024GL192-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	144	BGA192	-40 to +85°C
EFM32GG11B820F2048GL152-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	121	BGA152	-40 to +85°C
EFM32GG11B820F2048IL152-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	121	BGA152	-40 to +125°C
EFM32GG11B840F1024GL152-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	121	BGA152	-40 to +85°C
EFM32GG11B840F1024IL152-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	121	BGA152	-40 to +125°C
EFM32GG11B820F2048GL120-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	95	BGA120	-40 to +85°C
EFM32GG11B820F2048IL120-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	95	BGA120	-40 to +125°C
EFM32GG11B840F1024GL120-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	95	BGA120	-40 to +85°C
EFM32GG11B840F1024IL120-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	95	BGA120	-40 to +125°C
EFM32GG11B820F2048GQ100-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	80	QFP100	-40 to +85°C
EFM32GG11B820F2048IQ100-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	80	QFP100	-40 to +125°C
EFM32GG11B840F1024GQ100-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	80	QFP100	-40 to +85°C
EFM32GG11B840F1024IQ100-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	80	QFP100	-40 to +125°C
EFM32GG11B820F2048GQ64-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	47	QFP64	-40 to +85°C
EFM32GG11B820F2048GM64-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	50	QFN64	-40 to +85°C
EFM32GG11B820F2048IQ64-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	47	QFP64	-40 to +125°C
EFM32GG11B820F2048IM64-A	2048	512	Yes	Yes	Yes	Yes	Yes	Yes	50	QFN64	-40 to +125°C
EFM32GG11B840F1024GQ64-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	47	QFP64	-40 to +85°C
EFM32GG11B840F1024GM64-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	50	QFN64	-40 to +85°C
EFM32GG11B840F1024IQ64-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	47	QFP64	-40 to +125°C
EFM32GG11B840F1024IM64-A	1024	512	Yes	Yes	Yes	Yes	Yes	Yes	50	QFN64	-40 to +125°C
EFM32GG11B520F2048GL120-A	2048	512	Yes	No	No	No	No	Yes	95	BGA120	-40 to +85°C
EFM32GG11B510F2048GL120-A	2048	384	Yes	No	No	No	No	Yes	95	BGA120	-40 to +85°C
EFM32GG11B520F2048IL120-A	2048	512	Yes	No	No	No	No	Yes	95	BGA120	-40 to +125°C
EFM32GG11B510F2048IL120-A	2048	384	Yes	No	No	No	No	Yes	95	BGA120	-40 to +125°C
EFM32GG11B520F2048GQ100-A	2048	512	Yes	No	No	No	No	Yes	83	QFP100	-40 to +85°C
EFM32GG11B510F2048GQ100-A	2048	384	Yes	No	No	No	No	Yes	83	QFP100	-40 to +85°C
EFM32GG11B520F2048IQ100-A	2048	512	Yes	No	No	No	No	Yes	83	QFP100	-40 to +125°C
EFM32GG11B510F2048IQ100-A	2048	384	Yes	No	No	No	No	Yes	83	QFP100	-40 to +125°C

3.8.4	Capacitive Sense (CSEN)	.18
3.8.5	Digital to Analog Current Converter (IDAC)	.18
3.8.6	Digital to Analog Converter (VDAC)	.18
3.8.7	Operational Amplifiers	.18
3.8.8	Liquid Crystal Display Driver (LCD)	.18
3.9	Reset Management Unit (RMU)	.18
3.10	Core and Memory	.18
3.10.1	Processor Core	.18
3.10.2	Memory System Controller (MSC)	.19
3.10.3	Linked Direct Memory Access Controller (LDMA)	.19
3.10.4	Bootloader	.19
3.11	Memory Map	.20
3.12	Configuration Summary	.22
4.	Electrical Specifications	23
4.1	Electrical Characteristics	.23
4.1.1	Absolute Maximum Ratings	.24
4.1.2	Operating Conditions	.25
4.1.3	Thermal Characteristics	.27
4.1.4	DC-DC Converter	.28
4.1.5	5V Regulator	.30
4.1.6	Backup Supply Domain	.31
4.1.7	Current Consumption	.32
4.1.8	Wake Up Times	.39
4.1.9	Brown Out Detector (BOD)	.40
4.1.10	Oscillators	.41
4.1.11	Flash Memory Characteristics	.48
4.1.12	General-Purpose I/O (GPIO)	.49
4.1.13	Voltage Monitor (VMON)	.51
4.1.14	Analog to Digital Converter (ADC)	.52
4.1.15	Analog Comparator (ACMP)	.54
4.1.16	Digital to Analog Converter (VDAC)	.57
4.1.17	Current Digital to Analog Converter (IDAC)	.60
4.1.18	Capacitive Sense (CSEN)	.62
4.1.19	Operational Amplifier (OPAMP)	.64
4.1.20	LCD Driver	.67
4.1.21	Pulse Counter (PCNT)	.68
4.1.22	Analog Port (APORT)	.68
4.1.23	I2C	.69
4.1.24	USART SPI	.72
4.1.25	External Bus Interface (EBI)	.75
4.1.26	Ethernet (ETH)	.84
4.1.27	Serial Data I/O Host Controller (SDIO)	.87
4.1.28	Quad SPI (QSPI)	.102
4.2	Typical Performance Curves	.106
4.2.1	Supply Current	.107
4.2.2	DC-DC Converter	.113

3.12 Configuration Summary

The features of the EFM32GG11 are a subset of the feature set described in the device reference manual. The table below describes device specific implementation of the features. Remaining modules support full configuration.

Table 3.2. Configuration Summary

Module	Configuration	Pin Connections
USART0	IrDA, SmartCard	US0_TX, US0_RX, US0_CLK, US0_CS
USART1	I ² S, SmartCard	US1_TX, US1_RX, US1_CLK, US1_CS
USART2	IrDA, SmartCard, High-Speed	US2_TX, US2_RX, US2_CLK, US2_CS
USART3	I ² S, SmartCard	US3_TX, US3_RX, US3_CLK, US3_CS
USART4	I ² S, SmartCard	US4_TX, US4_RX, US4_CLK, US4_CS
USART5	SmartCard	US5_TX, US5_RX, US5_CLK, US5_CS
TIMER0	with DTI	TIM0_CC[2:0], TIM0_CDTI[2:0]
TIMER1	-	TIM1_CC[3:0]
TIMER2	with DTI	TIM2_CC[2:0], TIM2_CDTI[2:0]
TIMER3	-	TIM3_CC[2:0]
TIMER4	with DTI	TIM4_CC[2:0], TIM4_CDTI[2:0]
TIMER5	-	TIM5_CC[2:0]
TIMER6	with DTI	TIM6_CC[2:0], TIM6_CDTI[2:0]
WTIMER0	with DTI	WTIM0_CC[2:0], WTIM0_CDTI[2:0]
WTIMER1	-	WTIM1_CC[3:0]
WTIMER2	-	WTIM2_CC[2:0]
WTIMER3	-	WTIM3_CC[2:0]

4.1.10.3 Low-Frequency RC Oscillator (LFRCO)

Table 4.14. Low-Frequency RC Oscillator (LFRCO)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Oscillation frequency	f _{LFRCO}	ENVREF ² = 1	TBD	32.768	TBD	kHz
		ENVREF ² = 1, T > 85 °C	TBD	32.768	TBD	kHz
		ENVREF ² = 0	TBD	32.768	TBD	kHz
Startup time	t _{LFRCO}		—	500	—	μs
Current consumption ¹	I _{LFRCO}	ENVREF = 1 in CMU_LFRCOCTRL	—	370	—	nA
		ENVREF = 0 in CMU_LFRCOCTRL	—	520	—	nA

Note:
1. Block is supplied by AVDD if ANASW = 0, or DVDD if ANASW=1 in EMU_PWRCTRL register.
2. In CMU_LFRCOCTRL register.

4.1.10.4 High-Frequency RC Oscillator (HFRCO)

Table 4.15. High-Frequency RC Oscillator (HFRCO)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Frequency accuracy	$f_{\text{HFRCO_ACC}}$	At production calibrated frequencies, across supply voltage and temperature	TBD	—	TBD	%
Start-up time	t_{HFRCO}	$f_{\text{HFRCO}} \geq 19 \text{ MHz}$	—	300	—	ns
		$4 < f_{\text{HFRCO}} < 19 \text{ MHz}$	—	1	—	μs
		$f_{\text{HFRCO}} \leq 4 \text{ MHz}$	—	2.5	—	μs
Maximum DPLL lock time ¹	$t_{\text{DPLL_LOCK}}$	$f_{\text{REF}} = 32.768 \text{ kHz}$, $f_{\text{HFRCO}} = 39.98 \text{ MHz}$, $N = 1219$, $M = 0$	—	183	—	μs
Current consumption on all supplies	I_{HFRCO}	$f_{\text{HFRCO}} = 72 \text{ MHz}$	—	608	TBD	μA
		$f_{\text{HFRCO}} = 64 \text{ MHz}$	—	545	TBD	μA
		$f_{\text{HFRCO}} = 56 \text{ MHz}$	—	478	TBD	μA
		$f_{\text{HFRCO}} = 48 \text{ MHz}$	—	413	TBD	μA
		$f_{\text{HFRCO}} = 38 \text{ MHz}$	—	341	TBD	μA
		$f_{\text{HFRCO}} = 32 \text{ MHz}$	—	286	TBD	μA
		$f_{\text{HFRCO}} = 26 \text{ MHz}$	—	240	TBD	μA
		$f_{\text{HFRCO}} = 19 \text{ MHz}$	—	191	TBD	μA
		$f_{\text{HFRCO}} = 16 \text{ MHz}$	—	164	TBD	μA
		$f_{\text{HFRCO}} = 13 \text{ MHz}$	—	143	TBD	μA
		$f_{\text{HFRCO}} = 7 \text{ MHz}$	—	103	TBD	μA
		$f_{\text{HFRCO}} = 4 \text{ MHz}$	—	42	TBD	μA
		$f_{\text{HFRCO}} = 2 \text{ MHz}$	—	33	TBD	μA
		$f_{\text{HFRCO}} = 1 \text{ MHz}$	—	28	TBD	μA
		$f_{\text{HFRCO}} = 72 \text{ MHz}$, DPLL enabled	—	927	TBD	μA
		$f_{\text{HFRCO}} = 40 \text{ MHz}$, DPLL enabled	—	526	TBD	μA
		$f_{\text{HFRCO}} = 32 \text{ MHz}$, DPLL enabled	—	419	TBD	μA
		$f_{\text{HFRCO}} = 16 \text{ MHz}$, DPLL enabled	—	233	TBD	μA
		$f_{\text{HFRCO}} = 4 \text{ MHz}$, DPLL enabled	—	59	TBD	μA
		$f_{\text{HFRCO}} = 1 \text{ MHz}$, DPLL enabled	—	36	TBD	μA
Coarse trim step size (% of period)	$SS_{\text{HFRCO_COARSE}}$		—	0.8	—	%
Fine trim step size (% of period)	$SS_{\text{HFRCO_FINE}}$		—	0.1	—	%
Period jitter	PJ_{HFRCO}		—	0.2	—	% RMS

4.1.11 Flash Memory Characteristics⁵

Table 4.19. Flash Memory Characteristics⁵

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Flash erase cycles before failure	EC _{FLASH}		10000	—	—	cycles
Flash data retention	RET _{FLASH}	T ≤ 85 °C	10	—	—	years
		T ≤ 125 °C	10	—	—	years
Word (32-bit) programming time	t _{W_PROG}	Burst write, 128 words, average time per word	20	26.2	32	μs
		Single word	59	68.7	83	μs
Page erase time ⁴	t _{PERASE}		20	26.8	35	ms
Mass erase time ¹	t _{MERASE}		20	26.9	35	ms
Device erase time ^{2 3}	t _{DERASE}	T ≤ 85 °C	—	80.7	95	ms
		T ≤ 125 °C	—	80.7	100	ms
Erase current ⁶	I _{ERASE}	Page Erase	—	—	1.7	mA
		Mass or Device Erase	—	—	2.1	mA
Write current ⁶	I _{WRITE}		—	—	3.9	mA
Supply voltage during flash erase and write	V _{FLASH}		1.62	—	3.6	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. From setting the DEVICEERASE bit in AAP_CMD to 1 until the ERASEBUSY bit in AAP_STATUS is cleared to 0. Internal setup and hold times for flash control signals are included.
4. From setting the ERASEPAGE bit in MSC_WRITECMD to 1 until the BUSY bit in MSC_STATUS is cleared to 0. Internal setup and hold times for flash control signals are included.
5. Flash data retention information is published in the Quarterly Quality and Reliability Report.
6. Measured at 25 °C.

4.1.17 Current Digital to Analog Converter (IDAC)

Table 4.25. Current Digital to Analog Converter (IDAC)

Parameter	Symbol	Test Condition	Min	Typ	Max	Unit
Number of ranges	N _{IDAC_RANGES}		—	4	—	ranges
Output current	I _{IDAC_OUT}	RANGSEL ¹ = RANGE0	0.05	—	1.6	μA
		RANGSEL ¹ = RANGE1	1.6	—	4.7	μA
		RANGSEL ¹ = RANGE2	0.5	—	16	μA
		RANGSEL ¹ = RANGE3	2	—	64	μA
Linear steps within each range	N _{IDAC_STEPS}		—	32	—	steps
Step size	SS _{IDAC}	RANGSEL ¹ = RANGE0	—	50	—	nA
		RANGSEL ¹ = RANGE1	—	100	—	nA
		RANGSEL ¹ = RANGE2	—	500	—	nA
		RANGSEL ¹ = RANGE3	—	2	—	μA
Total accuracy, STEPSEL ¹ = 0x10	ACC _{IDAC}	EM0 or EM1, AVDD=3.3 V, T = 25 °C	TBD	—	TBD	%
		EM0 or EM1, Across operating temperature range	TBD	—	TBD	%
		EM2 or EM3, Source mode, RANGSEL ¹ = RANGE0, AVDD=3.3 V, T = 25 °C	—	-2.7	—	%
		EM2 or EM3, Source mode, RANGSEL ¹ = RANGE1, AVDD=3.3 V, T = 25 °C	—	-2.5	—	%
		EM2 or EM3, Source mode, RANGSEL ¹ = RANGE2, AVDD=3.3 V, T = 25 °C	—	-1.5	—	%
		EM2 or EM3, Source mode, RANGSEL ¹ = RANGE3, AVDD=3.3 V, T = 25 °C	—	-1.0	—	%
		EM2 or EM3, Sink mode, RANGSEL ¹ = RANGE0, AVDD=3.3 V, T = 25 °C	—	-1.1	—	%
		EM2 or EM3, Sink mode, RANGSEL ¹ = RANGE1, AVDD=3.3 V, T = 25 °C	—	-1.1	—	%
		EM2 or EM3, Sink mode, RANGSEL ¹ = RANGE2, AVDD=3.3 V, T = 25 °C	—	-0.9	—	%
		EM2 or EM3, Sink mode, RANGSEL ¹ = RANGE3, AVDD=3.3 V, T = 25 °C	—	-0.9	—	%

4.1.23.3 I2C Fast-mode Plus (Fm+)¹

Table 4.33. I2C Fast-mode Plus (Fm+)¹

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

Note:

1. For CLHR set to 0 or 1 in the I2Cn_CTRL register.
2. For the minimum HPERCLK frequency required in Fast-mode Plus, refer to the I2C chapter in the reference manual.

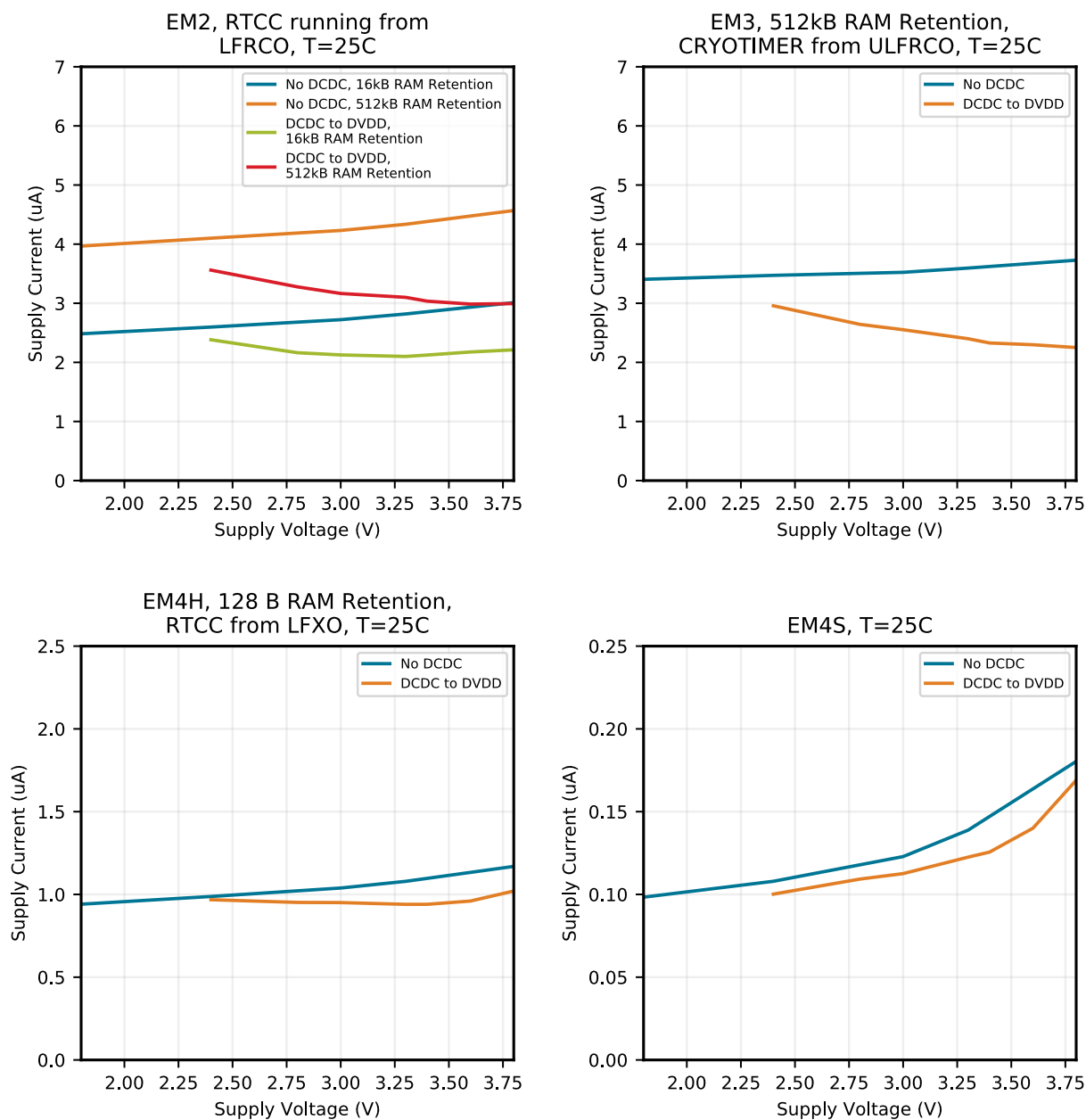


Figure 4.28. EM2, EM3, EM4H and EM4S Typical Supply Current vs. Supply

5.4 EFM32GG11B5xx in BGA120 Device Pinout

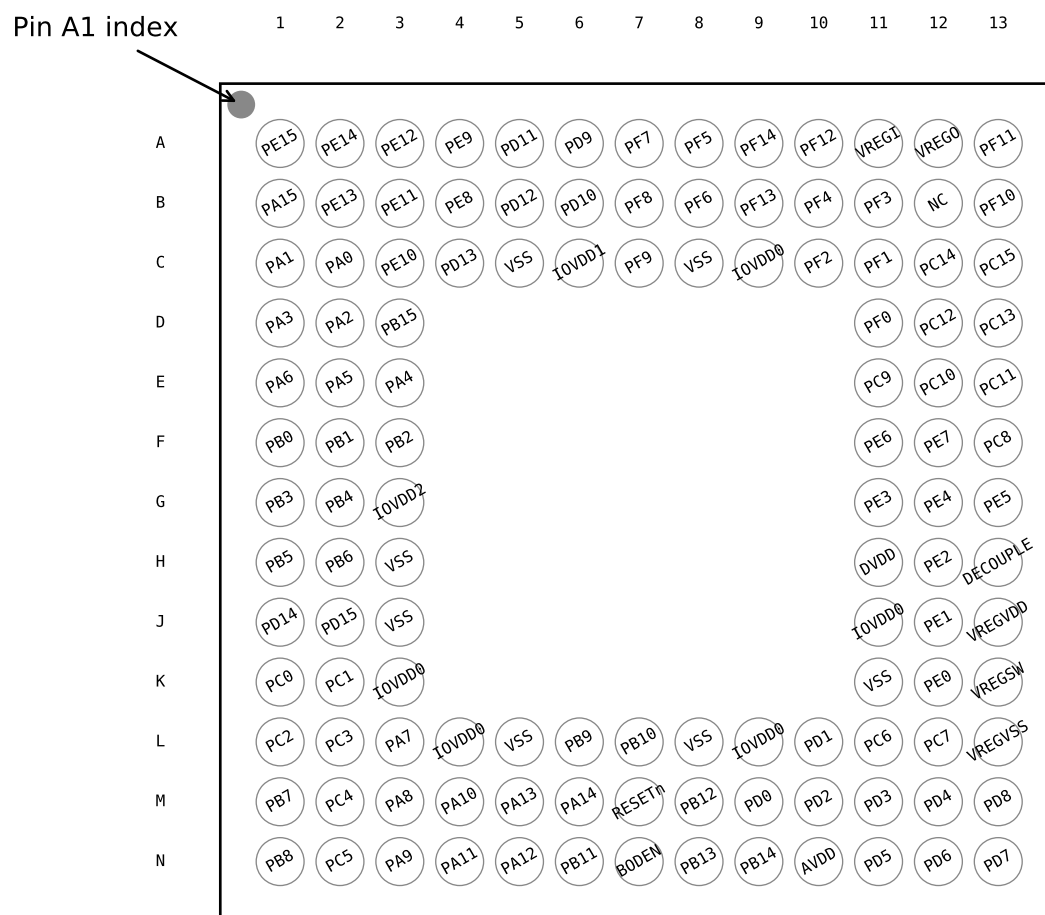


Figure 5.4. EFM32GG11B5xx in BGA120 Device Pinout

The following table provides package pin connections and general descriptions of pin functionality. For detailed information on the supported features for each GPIO pin, see [5.20 GPIO Functionality Table](#) or [5.21 Alternate Functionality Overview](#).

Table 5.4. EFM32GG11B5xx in BGA120 Device Pinout

Pin Name	Pin(s)	Description	Pin Name	Pin(s)	Description
PE15	A1	GPIO	PE14	A2	GPIO
PE12	A3	GPIO	PE9	A4	GPIO
PD11	A5	GPIO	PD9	A6	GPIO
PF7	A7	GPIO	PF5	A8	GPIO
PF14	A9	GPIO (5V)	PF12	A10	GPIO
VREGI	A11	Input to 5 V regulator.	VREGO	A12	Decoupling for 5 V regulator and regulator output. Power for USB PHY in USB-enabled OPNs

5.5 EFM32GG11B4xx in BGA120 Device Pinout

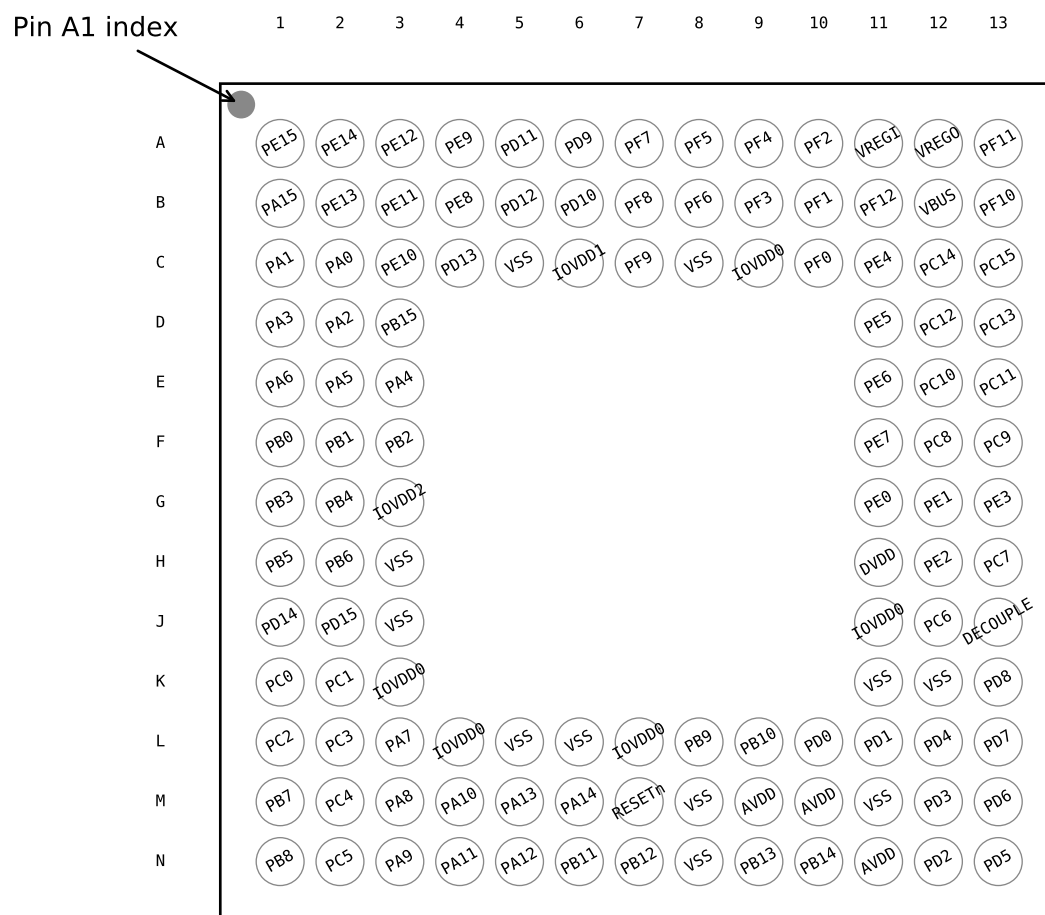


Figure 5.5. EFM32GG11B4xx in BGA120 Device Pinout

The following table provides package pin connections and general descriptions of pin functionality. For detailed information on the supported features for each GPIO pin, see [5.20 GPIO Functionality Table](#) or [5.21 Alternate Functionality Overview](#).

Table 5.5. EFM32GG11B4xx in BGA120 Device Pinout

Pin Name	Pin(s)	Description	Pin Name	Pin(s)	Description
PE15	A1	GPIO	PE14	A2	GPIO
PE12	A3	GPIO	PE9	A4	GPIO
PD11	A5	GPIO	PD9	A6	GPIO
PF7	A7	GPIO	PF5	A8	GPIO
PF4	A9	GPIO	PF2	A10	GPIO
VREGI	A11	Input to 5 V regulator.	VREGO	A12	Decoupling for 5 V regulator and regulator output. Power for USB PHY in USB-enabled OPNs

GPIO Name	Pin Alternate Functionality / Description				
	Analog	EBI	Timers	Communication	Other
PF7	BUSCY BUSDX LCD_SEG25	EBI_BL1 #0 EBI_BL1 #4 EBI_BL1 #5 EBI_DCLK #1	TIM0_CC1 #1 TIM4_CC1 #4	ETH_RMIITXD0 #1 US2_RX #4 QSPI0_CS0 #0 ETH_MIIIRXER #2 US1_RX #3 U0_RX #0	PRS_CH23 #2
PF6	BUSDY BUSCX LCD_SEG24	EBI_BL0 #0 EBI_BL0 #4 EBI_BL0 #5 EBI_CSTFT #1	TIM0_CC0 #1 TIM4_CC0 #4 WTIM3_CC2 #5	ETH_RMIITXD1 #1 US2_TX #4 QSPI0_SCLK #0 US1_TX #3 U0_TX #0	PRS_CH22 #2
PI11				US4_RTS #3	
PI8		EBI_A13 #2	TIM1_CC2 #7 TIM4_CC0 #3	US4_CLK #3	
PF5	BUSCY BUSDX LCD_SEG3	EBI_REn #0 EBI_REn #5 EBI_A27 #1	TIM0_CDTI2 #2 TIM1_CC3 #6 TIM4_CC0 #2	US2_CS #5 I2C2_SCL #0 USB_VBUSEN	PRS_CH2 #1 DBG_TDI
PF13	BUSCY BUSDX		TIM1_CC0 #6 TIM4_CC0 #1 TIM5_CC1 #7 WTIM3_CC0 #7	US5_CLK #2 I2C2_SDA #4	
PF3	BUSCY BUSDX LCD_SEG1	EBI_ALE #0	TIM4_CC0 #0 TIM0_CDTI0 #2 TIM1_CC1 #5	CAN1_TX #1 US1_CTS #2 I2C2_SCL #5	CMU_CLK1 #4 PRS_CH0 #1 ETM_TD3 #1
PF2	BUSDY BUSCX LCD_SEG0	EBI_ARDY #0 EBI_A26 #1	TIM0_CC2 #4 TIM1_CC0 #5 TIM2_CC0 #3	US2_CLK #5 CAN0_TX #1 US1_TX #5 U0_RX #5 LEU0_TX #4 I2C1_SCL #4	CMU_CLK0 #4 PRS_CH0 #3 ACMP1_O #0 DBG_TDO DBG_SWO #0 GPIO_EM4WU4
PF1	BUSCY BUSDX	EBI_A25 #1	TIM0_CC1 #4 WTIM0_CC2 #4 LE- TIM0_OUT1 #2	US2_RX #5 CAN1_RX #1 US1_CS #2 U0_TX #5 LEU0_RX #3 I2C0_SCL #5	PRS_CH4 #2 DBG_SWDIOTMS GPIO_EM4WU3 BOOT_RX
PA1	BUSAY USBX LCD_SEG14	EBI_AD10 #0 EBI_DCLK #3	TIM0_CC0 #7 TIM0_CC1 #0 TIM3_CC1 #4 PCNT0_S1IN #4	ETH_RMIIRXD1 #0 ETH_MIIITXD3 #0 SDIO_DAT1 #1 US3_RX #0 QSPI0_CS1 #1 I2C0_SCL #0	CMU_CLK1 #0 PRS_CH1 #0
PD12	LCD_SEG31	EBI_CS3 #0	TIM4_CC1 #6	ETH_RMIIRXER #1 SDIO_DAT4 #0 QSPI0_DQ3 #0 ETH_MIIIRXCLK #2 US4_CS #1	
PD14		EBI_NANDWEn #1	TIM2_CDTI1 #1 TIM3_CC2 #6 WTIM0_CC2 #1	ETH_MDC #1 CAN0_RX #5 US4_RTS #1 US5_CS #1 I2C0_SDA #3	

Alternate	LOCATION		
Functionality	0 - 3	4 - 7	Description
EBI_A10	0: PE3 1: PD6 2: PC10 3: PB10		External Bus Interface (EBI) address output pin 10.
EBI_A11	0: PE4 1: PD7 2: PI6 3: PB11		External Bus Interface (EBI) address output pin 11.
EBI_A12	0: PE5 1: PD8 2: PI7 3: PB12		External Bus Interface (EBI) address output pin 12.
EBI_A13	0: PE6 1: PC7 2: PI8 3: PD0		External Bus Interface (EBI) address output pin 13.
EBI_A14	0: PE7 1: PE2 2: PI9 3: PD1		External Bus Interface (EBI) address output pin 14.
EBI_A15	0: PC8 1: PE3 2: PI10 3: PD2		External Bus Interface (EBI) address output pin 15.
EBI_A16	0: PB0 1: PE4 2: PH4 3: PD3		External Bus Interface (EBI) address output pin 16.
EBI_A17	0: PB1 1: PE5 2: PH5 3: PD4		External Bus Interface (EBI) address output pin 17.
EBI_A18	0: PB2 1: PE6 2: PH6 3: PD5		External Bus Interface (EBI) address output pin 18.
EBI_A19	0: PB3 1: PE7 2: PH7 3: PD6		External Bus Interface (EBI) address output pin 19.
EBI_A20	0: PB4 1: PC8 2: PH8 3: PD7		External Bus Interface (EBI) address output pin 20.
EBI_A21	0: PB5 1: PC9 2: PH9 3: PC7		External Bus Interface (EBI) address output pin 21.
EBI_A22	0: PB6 1: PC10 2: PH10 3: PE4		External Bus Interface (EBI) address output pin 22.

Alternate	LOCATION		
Functionality	0 - 3	4 - 7	Description
TIM2_CC1	0: PA9 1: PA13 2: PC9 3: PE12	4: PC0 5: PC3 6: PG9 7: PG6	Timer 2 Capture Compare input / output channel 1.
TIM2_CC2	0: PA10 1: PA14 2: PC10 3: PE13	4: PC1 5: PC4 6: PG10 7: PG7	Timer 2 Capture Compare input / output channel 2.
TIM2_CDT10	0: PB0 1: PD13 2: PE8 3: PG0		Timer 2 Complimentary Dead Time Insertion channel 0.
TIM2_CDT11	0: PB1 1: PD14 2: PE14 3: PG1		Timer 2 Complimentary Dead Time Insertion channel 1.
TIM2_CDT12	0: PB2 1: PD15 2: PE15 3: PG2		Timer 2 Complimentary Dead Time Insertion channel 2.
TIM3_CC0	0: PE14 1: PE0 2: PE3 3: PE5	4: PA0 5: PA3 6: PA6 7: PD15	Timer 3 Capture Compare input / output channel 0.
TIM3_CC1	0: PE15 1: PE1 2: PE4 3: PE6	4: PA1 5: PA4 6: PD13 7: PB15	Timer 3 Capture Compare input / output channel 1.
TIM3_CC2	0: PA15 1: PE2 2: PE5 3: PE7	4: PA2 5: PA5 6: PD14 7: PB0	Timer 3 Capture Compare input / output channel 2.
TIM4_CC0	0: PF3 1: PF13 2: PF5 3: PI8	4: PF6 5: PF9 6: PD11 7: PE9	Timer 4 Capture Compare input / output channel 0.
TIM4_CC1	0: PF4 1: PF14 2: PI6 3: PI9	4: PF7 5: PD9 6: PD12 7: PE10	Timer 4 Capture Compare input / output channel 1.
TIM4_CC2	0: PF12 1: PF15 2: PI7 3: PI10	4: PF8 5: PD10 6: PE8 7: PE11	Timer 4 Capture Compare input / output channel 2.
TIM4_CDT10	0: PD0		Timer 4 Complimentary Dead Time Insertion channel 0.
TIM4_CDT11	0: PD1		Timer 4 Complimentary Dead Time Insertion channel 1.

Alternate	LOCATION		
Functionality	0 - 3	4 - 7	Description
US3_RTS	0: PA5 1: PC1 2: PA14 3: PC15	4: PG5 5: PG11	USART3 Request To Send hardware flow control output.
US3_RX	0: PA1 1: PE7 2: PB7 3: PG7	4: PG1 5: PI13	USART3 Asynchronous Receive. USART3 Synchronous mode Master Input / Slave Output (MISO).
US3_TX	0: PA0 1: PE6 2: PB3 3: PG6	4: PG0 5: PI12	USART3 Asynchronous Transmit. Also used as receive input in half duplex communication. USART3 Synchronous mode Master Output / Slave Input (MOSI).
US4_CLK	0: PC4 1: PD11 2: PI2 3: PI8	4: PH6	USART4 clock input / output.
US4_CS	0: PC5 1: PD12 2: PI3 3: PI9	4: PH7	USART4 chip select input / output.
US4_CTS	0: PA7 1: PD13 2: PI4 3: PI10	4: PH8	USART4 Clear To Send hardware flow control input.
US4_RTS	0: PA8 1: PD14 2: PI5 3: PI11	4: PH9	USART4 Request To Send hardware flow control output.
US4_RX	0: PB8 1: PD10 2: PI1 3: PI7	4: PH5	USART4 Asynchronous Receive. USART4 Synchronous mode Master Input / Slave Output (MISO).
US4_TX	0: PB7 1: PD9 2: PI0 3: PI6	4: PH4	USART4 Asynchronous Transmit. Also used as receive input in half duplex communication. USART4 Synchronous mode Master Output / Slave Input (MOSI).
US5_CLK	0: PB11 1: PD13 2: PF13 3: PH12		USART5 clock input / output.
US5_CS	0: PB13 1: PD14 2: PF12 3: PH13		USART5 chip select input / output.
US5_CTS	0: PB14 1: PD15 2: PF11 3: PH14		USART5 Clear To Send hardware flow control input.
US5_RTS	0: PB12 1: PB15 2: PF10 3: PH15		USART5 Request To Send hardware flow control output.

Table 5.23. ACMP0 Bus and Pin Mapping

APORT4Y	APORT4X	APORT3Y	APORT3X	APORT2Y	APORT2X	APORT1Y	APORT1X	APORT0Y	APORT0X	Port
BUSDY	BUSDX	BUSCY	BUSCX	BUSBY	BUSBX	BUSAY	BUSAX	BUSACMP0Y	BUSACMP0X	Bus
PF14	PF15	PF15	PF14	PB14	PB15	PB15	PB14			CH31
	PF13	PF13			PB13	PB13				CH30
PF12			PF12	PB12			PB12			CH29
	PF11	PF11			PB11	PB11				CH28
PF10			PF10	PB10			PB10			CH27
	PF9	PF9			PB9	PB9				CH26
PF8			PF8							CH25
	PF7	PF7								CH24
PF6			PF6	PB6			PB6			CH23
	PF5	PF5			PB5	PB5				CH22
PF4			PF4	PB4			PB4			CH21
	PF3	PF3			PB3	PB3				CH20
PF2			PF2	PB2			PB2			CH19
	PF1	PF1			PB1	PB1				CH18
PF0			PF0	PB0			PB0			CH17
	PE15	PE15			PA15	PA15				CH16
PE14			PE14	PA14			PA14			CH15
	PE13	PE13			PA13	PA13				CH14
PE12			PE12	PA12			PA12			CH13
	PE11	PE11			PA11	PA11				CH12
PE10			PE10	PA10			PA10			CH11
	PE9	PE9			PA9	PA9				CH10
PE8			PE8	PA8			PA8			CH9
	PE7	PE7			PA7	PA7		PC7	PC7	CH8
PE6			PE6	PA6			PA6	PC6	PC6	CH7
	PE5	PE5			PA5	PA5		PC5	PC5	CH6
PE4			PE4	PA4			PA4	PC4	PC4	CH5
					PA3	PA3		PC3	PC3	CH4
				PA2			PA2	PC2	PC2	CH3
	PE1	PE1			PA1	PA1		PC1	PC1	CH2
PE0			PE0	PA0			PA0	PC0	PC0	CH1
										CH0

APORT4Y	APORT3Y	APORT2Y	APORT1Y
BUSDY	BUSCY	BUSBY	BUSAY
	PF15		PB15
PF14		PB14	
	PF13		PB13
PF12		PB12	
	PF11		PB11
PF10		PB10	
	PF9		PB9
PF8			
	PF7		
PF6		PB6	
	PF5		PB5
PF4		PB4	
	PF3		PB3
PF2		PB2	
	PF1		PB1
PF0		PB0	
	PE15		PA15
PE14		PA14	
	PE13		PA13
PE12		PA12	
	PE11		PA11
PE10		PA10	
	PE9		PA9
PE8		PA8	
	PE7		PA7
PE6		PA6	
	PE5		PA5
PE4		PA4	
			PA3
		PA2	
	PE1		PA1
PE0		PA0	

8.3 BGA120 Package Marking



Figure 8.3. BGA120 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.

Table 10.2. TQFP100 PCB Land Pattern Dimensions

Dimension	Min	Nom	Max
C1		15.4	
C2		15.4	
E		0.50 BSC	
X		0.30	
Y		1.50	

- Note:**
- 1. All dimensions shown are in millimeters (mm) unless otherwise noted.
 - 2. This Land Pattern Design is based on the IPC-7351 guidelines.
 - 3. All metal pads are to be non-solder mask defined (NSMD). Clearance between the solder mask and the metal pad is to be 60 µm minimum, all the way around the pad.
 - 4. A stainless steel, laser-cut and electro-polished stencil with trapezoidal walls should be used to assure good solder paste release.
 - 5. The stencil thickness should be 0.125 mm (5 mils).
 - 6. The ratio of stencil aperture to land pad size should be 1:1 for all perimeter pads.
 - 7. A No-Clean, Type-3 solder paste is recommended.
 - 8. The recommended card reflow profile is per the JEDEC/IPC J-STD-020C specification for Small Body Components.

10.3 TQFP100 Package Marking



Figure 10.3. TQFP100 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.

12. QFN64 Package Specifications

12.1 QFN64 Package Dimensions

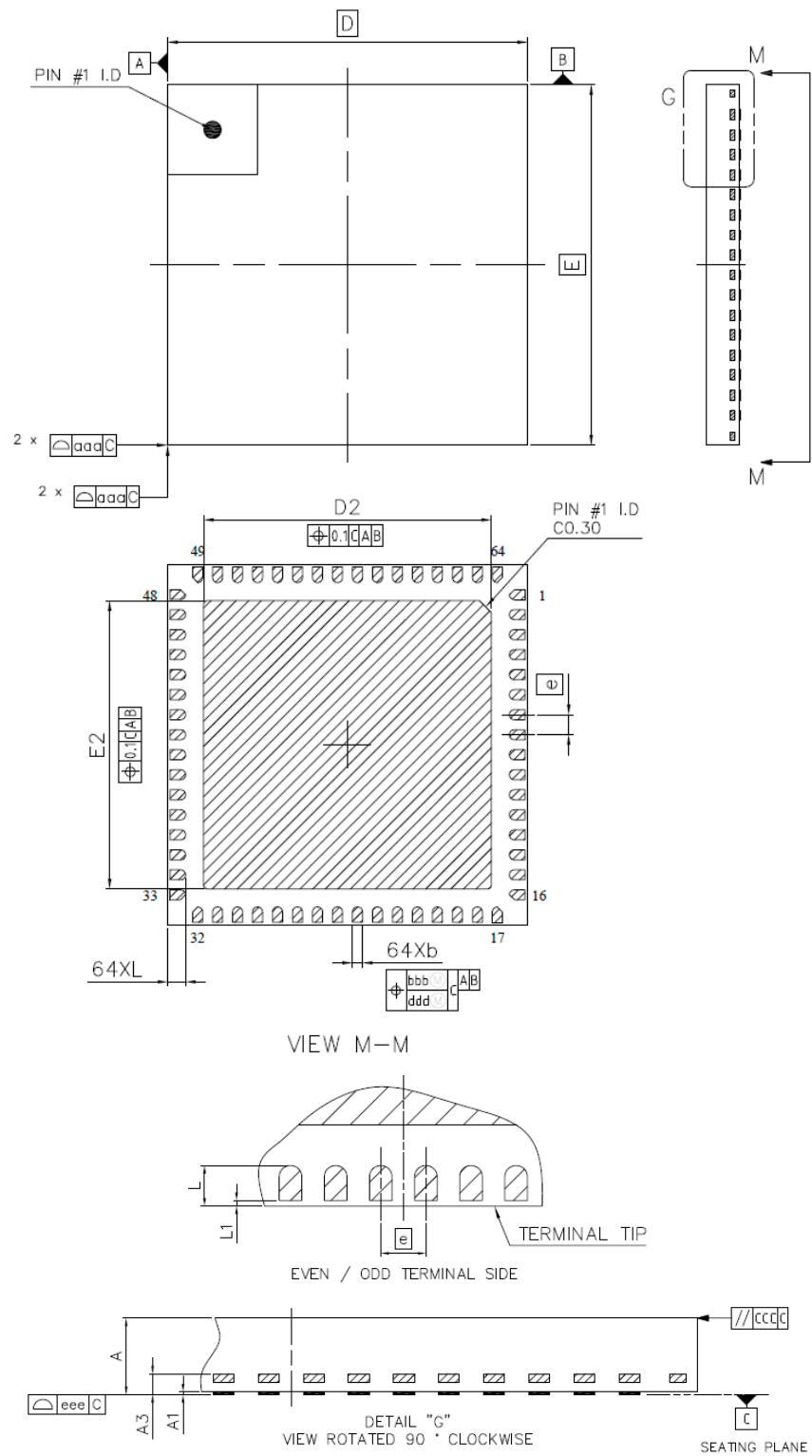


Figure 12.1. QFN64 Package Drawing