EESAMR34/35J18XX/CT

EESAMR34/R35 Low Power LoRa® Sub-GHz Module Datasheet

Introduction

The EESAMR34/R35 is a family of ultra-low power module designed with a microcontrollers combined with a UHF transceiver communication interface. It uses a 32-bit ARM® Cortex® -M0+ processor and offers up to 256 KB of Flash and 40 KB of SRAM, including an area of battery backed-up SRAM. The UHF transceiver supports LoRa® and FSK modulation. LoRa technology is a spread spectrum protocol optimized for low data-rate, ultra-long range signaling. It is ideal for battery-powered remote sensors and controls. The SAM R34 includes an integrated microcontroller with USB and the UHF transceiver, making it suitable for USB dongle applications or for software updates via USB. The SAM R35 offers the same microcontroller functions along with the UHF transceiver without the USB interface.

Features

Operational Feature

Processor:
– ARM Cortex -M0+ CPU running at up to 48 MHz (2.46CoreMark®/MHz)
– Single-Cycle Hardware Multiplier
– Micro Trace Buffer (MTB)
Memory:
– In-System Self-Programmable Flash Memory, with options for sizes -256 KB, 128 KB or 64 KB
– Static Random Access Memory (SRAM) with options for sizes - 32 KB, 16 KB or 8 KB
– Low power SRAM Memory with option for sizes - 4 KB or 8 KB
System:
– Power-on Reset (POR) and Brown-out Reset
– Internal and External Clock Options with 48 MHz Digital Frequency Locked Loop (DFLL48M) and 48 MHz to 96 MHz Fractional Digital Phase Locked Loop (FDPLL96M)
– External Interrupt Controller (EIC)
– Up to 16 External Interrupts
– One Non-Maskable Interrupt
– Two Pin Serial Wire Debug (SWD) Programming, Test and Debugging Interfaces
Operating Voltage: 1.8V- 3.6V
Low Power Consumption
– Transceiver:
– RX = 16 mA (typical)
– RFO_HF = 33 mA (typical)
– PA_BOOST = 95 mA (typical)
– MCU:
– Idle, Standby, and Backup Sleep Modes
– SleepWalking peripherals
– Temperature Range: -40°C to +85°C (Industrial) RF/Analog Features
Integrated LoRa Technology Transceiver:
• Tri-band Coverage
– 137 MHz to 175 MHz
– 410 MHz to 525 MHz
– 862 MHz to 1020 MHz
– +20 dBm (100 mW) Max Power (VDDANA > 2.4 VDC)
– +17 dBm (50 mW) Max Power (Regulated PA)
– +13 dBm (20 mW) High-efficency PA • High Sensitivity:
– Down to -136 dBm (LoRaWAN™ protocol compliant modes)
– Down to -148 dBm (proprietary narrowband modes)
• Up to 168 dB Maximum Link Budget
• Robust Front-End: IIp3 = -11 dBm
• Excellent Blocking Immunity
• Low RX Current of 17 mA (typical)
• Fully Integrated Synthesizer with a Resolution of 61 Hz
• LoRa Technology, (G)FSK, (G)MSK and OOK Modulation
• Preamble Detection
• 127 dB Dynamic Range RSSI
• Automatic RF Sense and CAD with Ultra-Fast Automatic Frequency Control (AFC) Packet Engine up to 256 bytes with Cyclic Redundancy Check (CRC) Peripheral Information
16-Channel Direct Memory Access Controller (DMAC)
12-Channel Event System
Three 16-bit Timer/Counters (TC), configurable as either of the following:
– One 8-bit TC with compare/capture channels
– One 16-bit TC with compare/capture channels
– One 32-bit TC with compare/capture channels, using two TCs

Features

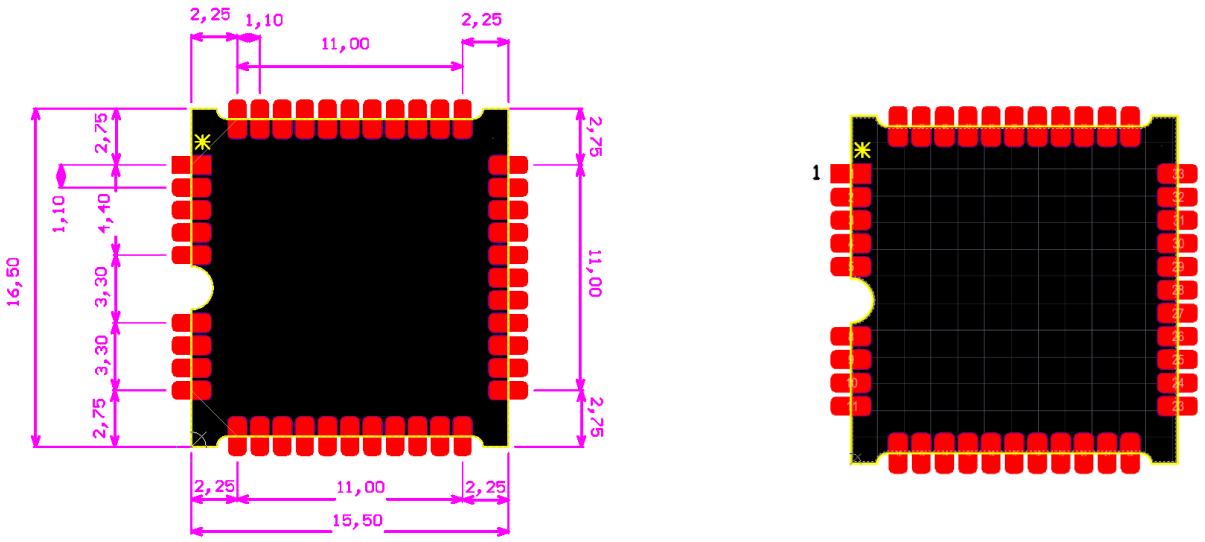
Operational Feature

Two 24-bit and one 16-bit Timer/Counters for Control (TCC), with Extended Functions:
– Up to four compare channels with optional complementary output
– Generation of synchronized Pulse Width Modulation (PWM) pattern across port pins
– Deterministic fault protection, fast decay and configurable dead-time between complementary output
– Dithering that increases resolution with up to five bit and reduces quantization error
32-bit Real Time Counter (RTC) with Clock/Calendar Function
Watchdog Timer (WDT)
CRC-32 Generator
• One Full-Speed (12 Mbps) Universal Serial Bus (USB) 2.0 Interface:
– Only in EESAMR34
– Embedded host and device function
– Eight endpoints
Up to Five Serial Communication Interfaces (SERCOM), each configurable to operate as either of the following:
– USART with full-duplex and single-wire half-duplex configuration
– I2C up to 3.4 MHz
– Serial Peripheral Interface (SPI)
– Local Interconnect Network (LIN) Slave
One 12-bit, 1 Msps Analog-to-Digital Converter (ADC) with up to Eight External Channels:
– Differential and single-ended input
– Automatic offset and gain error compensation
– Oversampling and decimation in hardware to support 13-, 14-, 15-, or 16-bit resolution
Two Analog Comparators (AC) with Window Compare Function
• Peripheral Touch Controller (PTC): – 18-channel capacitive touch and proximity sensing Package Information • 27 Programmable I/O Pins
• 64 Lead Ball Grid Array (BGA)

Pinout Description

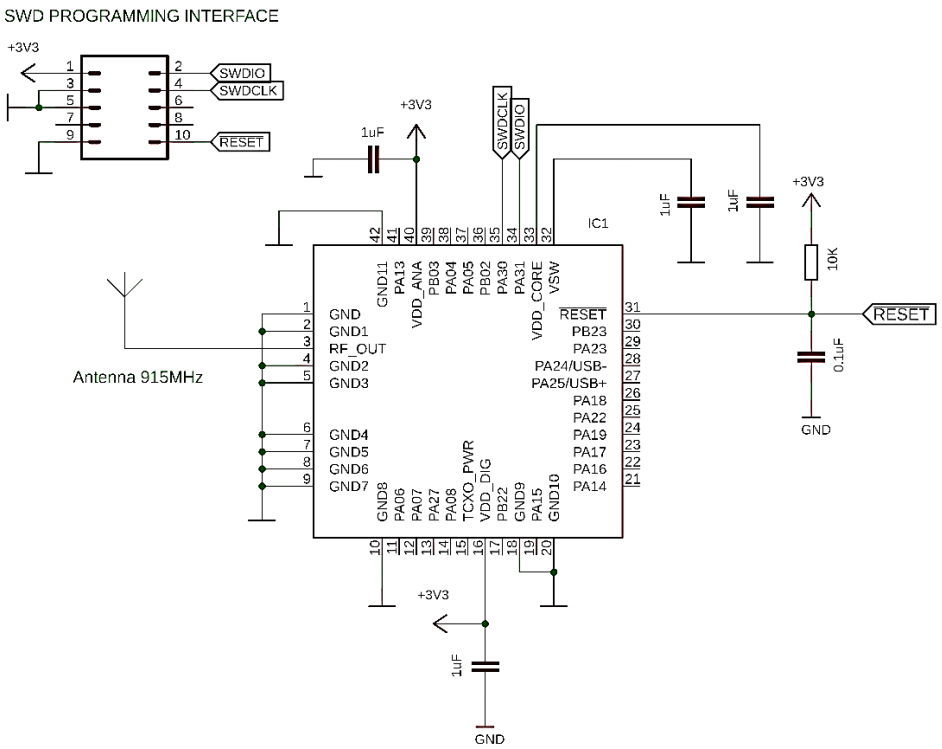
PIN	Principal Function	Other Function
1	GND	
2	GND	
3	RF OUT	
4	GND	
5	GND	
6	GND	
7	GND	
8	GND	
9	GND	
10	GND	
11	PA06	ADC 6
12	PA07	ADC 7
13	PA27	
14	PA08	
15	TCXO	PWR
16	VDD DIG	
17	PB22	SPI MOSI
18	GND	
19	PA15	
20	GND	
21	PA14	
22	PA16	I2C SDA
23	PA17	I2C SCL
24	PA19	PWM/T0/W3
25	PA22	
26	PA18	PWM/T0/W2
27	PA25 USB P *	USB P *
28	PA24 USB N *	USB N *
29	PA23	SPI SS
30	PB23	SPI SCK/EBDG
31	RESET	
32	VSW	
33	VDD CORE	
34	PA31	SWDIO
35	PA30	SWDCLK
36	PB02	SPI MISO
37	PA05	UART RX
38	PA04	UART TX
39	PB03	VBAT
40	VDD ANA	
41	PA13	BAND SEL
42	GND	
*	USB ONLY IN EESAMR34xx/xx	

Pinout & Dimmension



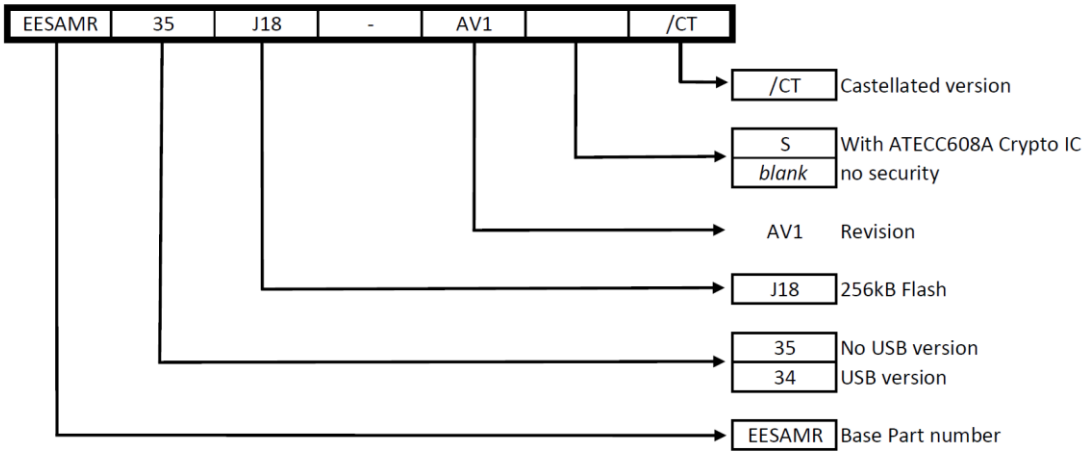
Dimmensiones en mm

Typical Application Circuit



Code Configurations

Available Configurations



Since the module utilizes the SAMR3x chip, we recommend customers to review the IC datasheet which can be found on www.microchip.com

Revision history:

- 09/09/2019: Updated footprint to the current version 16.50 x 15.50 mm.