



General Description

The RV-3049-C3 is an ultra-miniature Real-Time-Clock Module with embedded Crystal. This RTC has an SPI Bus (4-wire Serial-Interface) and offers temperature compensated time. The STC-Smart Temperature Compensation is calibrated in the factory and leads to a very high time-accuracy of ± 6 ppm from -40°C to $+85^{\circ}\text{C}$ and ± 8 ppm from -40°C to $+125^{\circ}\text{C}$.

Beside standard RTC functions, it includes a Backup-Battery Input with internal switchover function, a programmable Trickle-charge circuitry, an integrated Temperature Sensor with digital-output and offers 8 Bytes RAM and 2 Bytes EEPROM for customer's application.

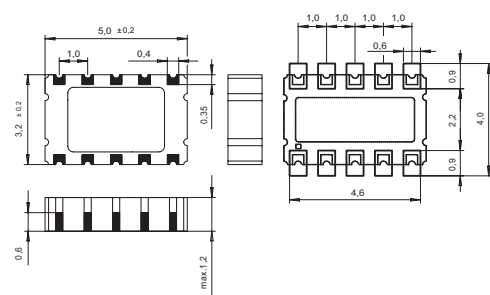
The calendar function tracks year and leap-year flags. The clock tracks second, minute and hour in 24-hour format. Programmable alarm setting and universal timer functions increase flexibility.

For pick-and-place equipment, the parts are available in 12 mm tape: 7" (178 mm) reel with 1'000 parts or reel with 3'000 parts

Applications

- | Reference Clocks and Timers
- | Electricity Meters
- | Gas Meters
- | White Goods
- | Timing Applications
- | Battery Powered Devices
- | POS
- | High Duration Timers

Dimensions



Real Time Clock Module with I²C-Bus

Features

- | Extremely Accurate RTC Module with embedded Xtal.
- | SPI Interface
- | Temperature Compensation
- | Miniature SMD ceramic package, RoHS compliant and 100% leadfree

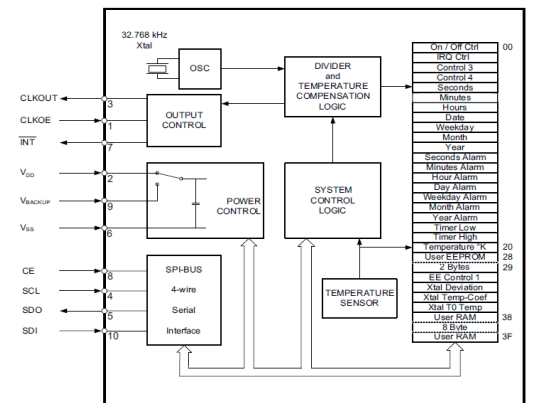
Option A: Calibrated

Temperature	Time Deviation
@ +25 °C	± 0.26 s/day ± 3 ppm
0 °C to +50 °C	± 0.35 s/day ± 4 ppm
-10 °C to +60 °C	± 0.44 s/day ± 5 ppm
-40 °C to +85 °C	± 0.52 s/day ± 6 ppm
-40 °C to +125 °C	± 0.70 s/day ± 8 ppm

Option B: Default

Temperature	Time Deviation
@ +25 °C	± 0.26 s/day ± 3 ppm
0 °C to +50 °C	± 0.44 s/day ± 5 ppm
-10 °C to +60 °C	± 0.87 s/day ± 10 ppm
-40 °C to +85 °C	± 2.17 s/day ± 25 ppm
-40 °C to +125 °C	± 2.60 s/day ± 30 ppm

Block Diagram





Electrical Characteristics at 25 °C

	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage	V_{DD}	Time keeping	1.3		5.5	V
Supply voltage	V_{DD}	Temp. comp.	1.8		5.5	V
Current consumption	I_{DDO}	$V_{DD} = 3V$		800	1000	nA
CLKOUT frequency		Progr.	32.768/1024/32/1			Hz
Frequency Tolerance	$\Delta F/F$	@ 25 °C		±10	±20	ppm
Freq.vs.Temp.	$\Delta F/F_{TOPR}$	$20 \leq T_o \leq 30$	$-0.035 \text{ ppm}/^{\circ}\text{C}_2 (T - T_o)^2 \pm 10\%$			ppm
Aging first year	$\Delta F/F$	@ 25 °C			± 3	ppm
Time accuracy Opt. A	$\Delta t/t$	@ 25 °C			±0.26	s/day
		-40 to +85 °C			±0.52	s/day
Time accuracy Opt. B	$\Delta t/t$	@ 25 °C			±0.26	s/day
		-40 to +85 °C			±2.17	s/day

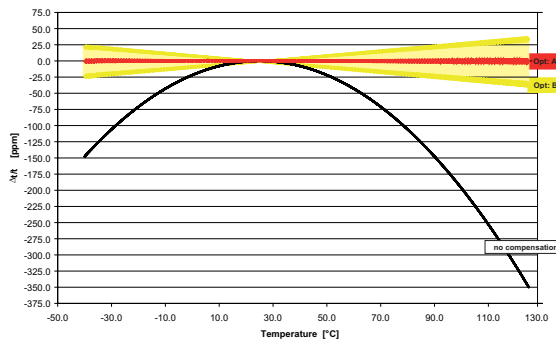
Environmental Characteristics

	Conditions	Max. Dev.
Storage temp. range	-55 to +125 °C	
TA Operating temperature range	-40 to +85 °C	
TB Extended oper. temp. range	-40 to +125 °C	
Shock resistance	$\Delta F/F$ 5000 g, 0.3 ms, 1/2 sine	± 5 ppm
Vibration resistance	$\Delta F/F$ 20 g / 10–2000 Hz	± 5 ppm

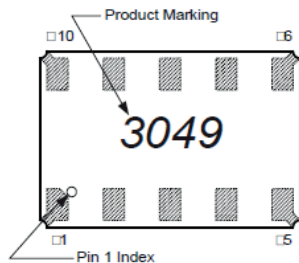
Package, Terminations and Processing

Package-Type	Termination	Processing
SON 10-pin	For SMD mounting Au plated pads	Reflow soldering 260 °C/20 s max.

Frequency Temperature Characteristics



Pin Connections Top View



Pin	Connection
1	CLKOE CLK Output Enable
2	V_{DD} Supply Voltage
3	CLKOUT Clock Output
4	SCL Serial Clock Output
5	SDO Serial Data Output
6	V_{SS} Ground
7	$\overline{\text{INT}}$ Interrupt Output
8	CS Chip Select
9	V_{BACKUP} Backup Supply Voltage
10	SDI Serial Data Input

Ordering Information

The versions below are considered standards and should be readily available. For the other delivery form, please contact EM Microelectronic-Marin S.A. Please make sure to give the complete part number when ordering.

Part Number	Bus	Time Deviation	Temperature	Package	Delivery form
RV-3049-C3-TA-QC-Opt.A	SPI	±6 ppm	-40 °C to +85 °C	SMD C3	12 mm Tape, 7 Inch Reel
RV-3049-C3-TA-QC-Opt.B	SPI	±25 ppm	-40 °C to +85 °C	SMD C3	12 mm Tape, 7 Inch Reel
RV-3049-C3-TB-QA-Opt.A	SPI	±8 ppm	-40 °C to +125 °C	SMD C3	12 mm Tape, 7 Inch Reel
RV-3049-C3-TB-QA-Opt.B	SPI	±30 ppm	-40 °C to +125 °C	SMD C3	12 mm Tape, 7 Inch Reel