

**100% leadfree, RoHS - compliant**

## General Description

The RV-8803-C7 is a high accuracy, ultra-low power Real-Time-Clock Module with embedded 32.768 kHz Crystal. High accuracy, high stability is achieved by factory calibrated, temperature compensated DTCXO and results to time-accuracy of  $\pm 3.0$  ppm across the temperature range from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

Standard Clock & Calendar function tracks second, minute, hour in 24-hour format, year and leap-year flags. Beside standard RTC function like Timer & Alarm, it includes integrated Temperature Sensor, Time Stamp Event Input and User RAM and offers I2C-bus (2-wire Interface).

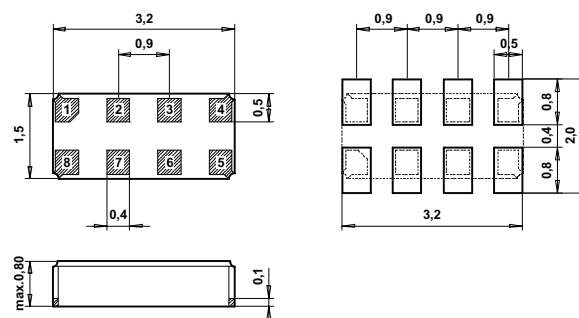
RV-8803-C7 is the smallest and offers the lowest current consumption among all temperature compensated RTC modules.

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

- Communication
  - IOT Wireless Sensors and Tags / Handsets
- Automotive
  - Navigation and Tracking Systems / Dashboard / Tachometers / Engine Control / Car Audio & Entertainment
- Metering
  - E-Meter / Heating Counter / Smart Meters / PV Converter
- Outdoor
  - ATM & POS systems / Surveillance systems / Ticketing
- Medical
  - Glucose Meter / Health Monitoring Systems
- Safety
  - Security & Camera Systems / Door Lock & Access Control
- Consumer
  - Gambling Machines / TV & Set Top Boxes / White Goods
- Automation
  - DSC / Data Logger / Home & Factory Automation

## Dimensions

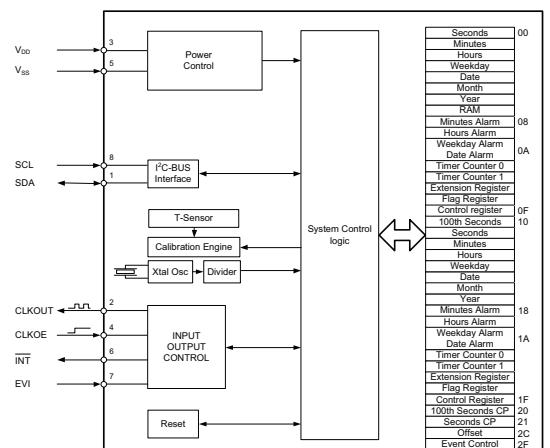


## Real Time Clock Module with I<sup>2</sup>C-Bus

### Features

- 32.768 kHz built-in "Tuning Fork" crystal oscillator
- Counters for hundredths, seconds, minutes, hours, date, month, year, century and weekday
- Factory calibrated temperature compensation
- Very high Time Accuracy
  - $\pm 1.5$  ppm 0 to  $+50^{\circ}\text{C}$
  - $\pm 3.0$  ppm  $-40$  to  $+85^{\circ}\text{C}$
  - Aging compensation with OFFSET value
- I2C (up to 400 kHz) serial interface
- Periodic Countdown Timer Interrupt function
- Periodic Time Update Interrupt function (seconds, minutes)
- Alarm Interrupts for date, weekday, hour and minute settings
- External Event Input
- Programmable Clock Output for peripheral devices (32.768 kHz, 1.024 kHz, 1 Hz) with enable/disable function (CLKOE)
- Automatic leap year calculation (2000 to 2099)
- Wide operating voltage range: 1.5 V to 5.5 V
- Very low current consumption: 240 nA (VDD = 3.0V)
- Operating temperature range:  $-40$  to  $+85^{\circ}\text{C}$
- Ultra-small and compact C7 package size, RoHS-compliant and 100% lead free: 3.2 x 1.5 x 0.8 mm
- Register compatible with Epson RX-8803SA/LC

### Block Diagram





## Electrical Characteristics at 25 °C

	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage	$V_{DD}$	Time keeping	1.5		5.5	V
Supply voltage	$V_{DD}$	Temp. comp.	1.5		5.5	V
Current consumption	$I_{DDO}$	$V_{DD} = 3V$		240	400	nA
CLKOUT frequency	$F_{CLKOUT}$	programmable	32768/1024/1			Hz
Frequency Tol: 1Hz	$\Delta F/F$	-40 to +85 °C		0	±3	ppm
Frequency Tol: 32768Hz	$\Delta F/F$	@25 °C		±10	±20	ppm
Freq.vs.Temp.	$\Delta F/F_{TOPR}$	-40 to +85 °C	$-0.035 \text{ ppm}/^{\circ}\text{C}^2 (T - T_0)^2 \pm 10\%$			ppm
Aging first year	$\Delta F/F$	@ 25 °C			± 3	ppm
Time accuracy Temperature Compensated	$\Delta t/t$	0 to +50 °C			±0.13	s/day
					±0.13	s/day
		-40 to +85 °C			±0.26	s/day
					±3.0	s/day

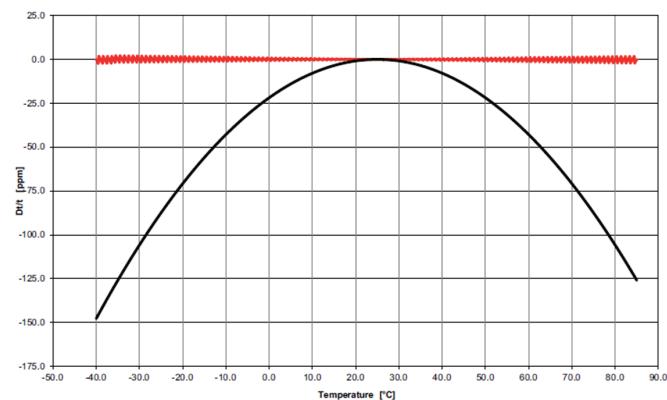
## Environmental Characteristics

		Conditions	Max. Dev.
Storage temp. range		-55 to +125 °C	
Operating temperature range		-40 to +85 °C	
Shock resistance	$\Delta F/F$	5000 g, 0.3 ms, ½ sine	± 5 ppm
Vibration resistance	$\Delta F/F$	20 g / 10-2000 Hz	± 5 ppm

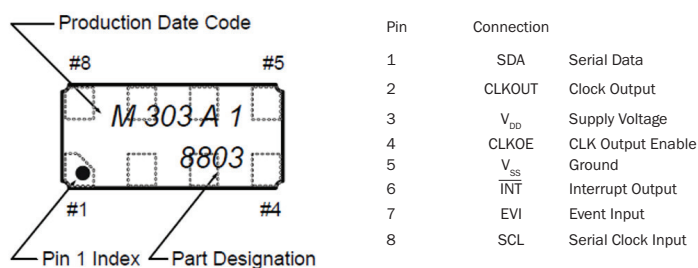
## Package, Terminations and Processing

Package-Type	Termination	Processing
SON 8-pin	For SMD mounting Au plated pads	Reflow soldering 260 °C/20 s max.

## Frequency Temperature Characteristics



## Pin Connections Top View



## Ordering Information

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

Part Number	Bus	Time Deviation	Temperature	Feature	Package	Delivery form
RV-8803-C7-TA-QC	I2C	+/- 3 ppm	-40 °C to +85 °C		SMD C7	12 mm Tape, 7 Inch Reel
RV-8803-C7-TA-QA	I2C	+/- 3 ppm	-40 °C to +85 °C	AEC-Q200	SMD C7	12 mm Tape, 7 Inch Reel