



Extreme Low Power RTC Module

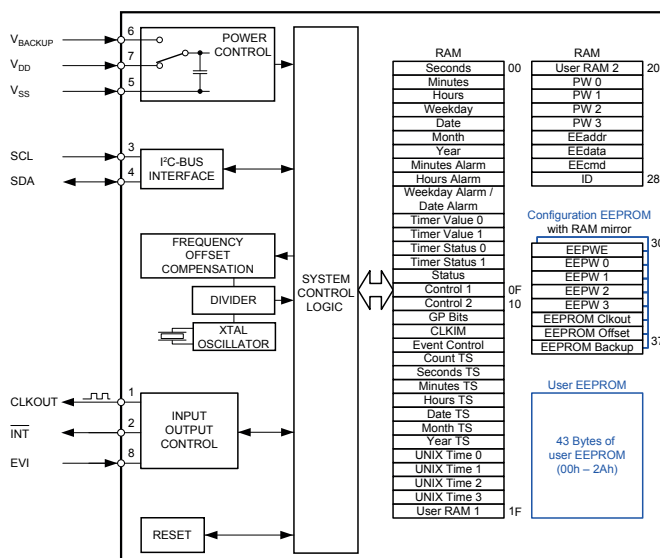
General Description

The EM3028-C7 is a SMT Real-Time Clock Module that incorporates an integrated CMOS circuit together with an XTAL. It operates under vacuum in a hermetically sealed ceramic package with metal lid.

Applications

- | IoT
- | Wearable systems
- | Multi-Solar cell platforms
- | Beacons and wireless sensor networks
- | Industrial and environmental monitoring
- | Battery operated platforms

Block Diagram

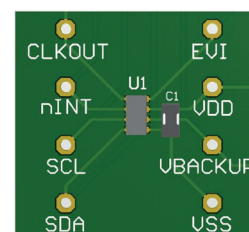


Features

- | Extreme low power consumption: 40 nA @ 3 V.
- | Wide operating voltage range: 1.2 V to 5.5 V.
- | Built-in tuning Fork crystal at 32'768 Hz
- | Time accuracy: Factory calibrated to ±1 ppm @ 25°C
- | Non-volatile configuration settings with user programmable offset value.
- | Configuration stored in EEPROM and mirrored in RAM
- | Backup Switch and Trickle Charger function.
- | Provides year, month, date, weekday, hours, minutes and seconds.
- | Automatic leap year correction; 2000 to 2099.
- | 32 bit UNIX time counter.
- | Timer, alarm and external event functions with time stamp.
- | Clock output: 32.768 kHz, 8192 Hz, 1024 Hz, 64 Hz, 32 Hz, 1 Hz.
- | 43 bytes non-volatile user memory, 2 bytes user RAM.
- | I²C-bus interface: 400 kHz.
- | Packages (RoHS compliant and Lead-free)
 - | Ultra small SMD C7 package, 3.2 x 1.5 x 0.8mm
Part number EM3028C7
 - | TSSOP14 (with external crystal),
Part number EM3028VxTP14 (x = Version nbr)

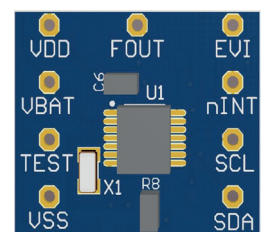
EM3028-C7

Module, integrated crystal



EM3028VxTP14

TSSOP14 with external Crystal





Electrical Characteristics at 25°C

	Symbol	Condition	Min	Typ	Max	Unit
Supply voltage	V_{DD}	I ² C-bus active	1.2		5.5	V
Supply voltage	V_{DD}	Time keeping	1.1		5.5	V
Current consumption Time keeping mode	I_{DDO}	I ² C-bus inactive, $V_{DD} = 3V$		40	60	nA
CLKOUT frequency	F_{CLKOUT}	Programmable	32768...to...1			Hz
Time accuracy	$\Delta t/t$	@ 25°C	± 1			ppm
Aging first year max.	$\Delta F/F$	@ 25°C	± 3			ppm

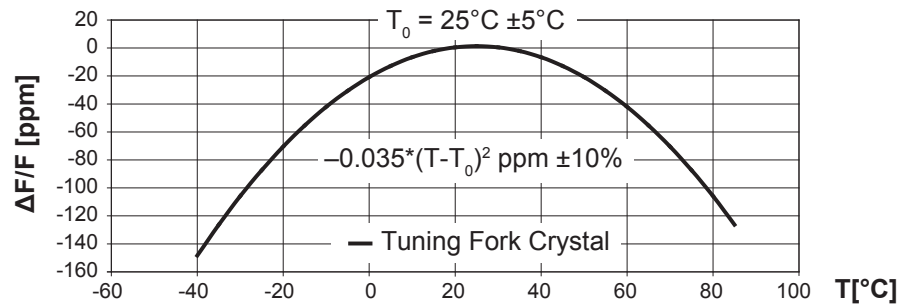
Environmental Characteristics

		Conditions	Max. Dev.
Storage temp. range		-55 to +125°C	
TA Operating temperature range		-40 to +85°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

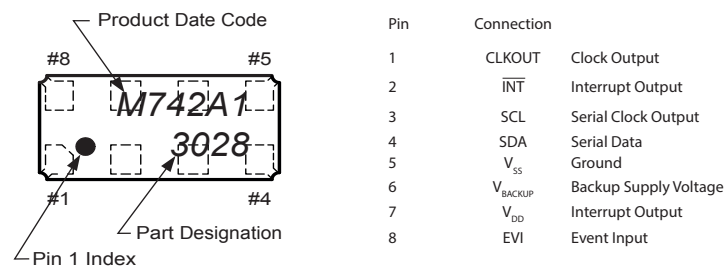
Package, Terminations and Processing

Package-Type	Termination	Processing
SON8	Au flashed pads	IPC/JEDEC J-STD-020C 260°C / 20-40s

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 SA. Please make sure to give the complete part number when ordering.

Part Number		Temperature	Package	Delivery Form
EM3028C7B+	RTC module with integrated 32'768 Hz Crystal Factory calibrated to +/- 1%	-40°C to +85°C	SMD C7 3.2 x 1.5 x 0.8mm	EIA Real, 1000 IC/real
EM3028VxTP14B+	Needs external 32 kHz crystal Please check with EM for available IC versions	-40°C to +85°C	TSSOP14	EIA Real, 2500 IC/real