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Simple Function
SERIAL-INTERFACE REAL TIME CLOCK MODULE

RTC - 4543 SA / SB

RoHS Compliant

Product Number (Please contact us)
RTC-4543SA : Q41454351000200
**RTC-4543SB : Q41454361000200**

- Built in frequency adjusted 32.768 kHz crystal unit.
- Interface type : **3**-wire serial interface
- Operating voltage range : 2.5 V to 5.5 V
- Wide Timekeeper voltage range: 1.4 V to 5.5 V
- 32.768 kHz frequency output function: C-MOS output With Control Pin
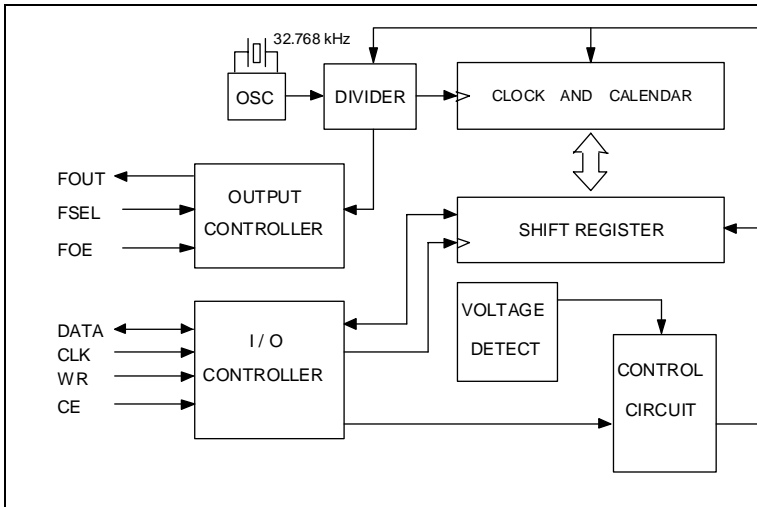- The various functions include full calendar, timer, and low voltage detection.

Actual size

| RTC-4543SA | RTC-4543SB |

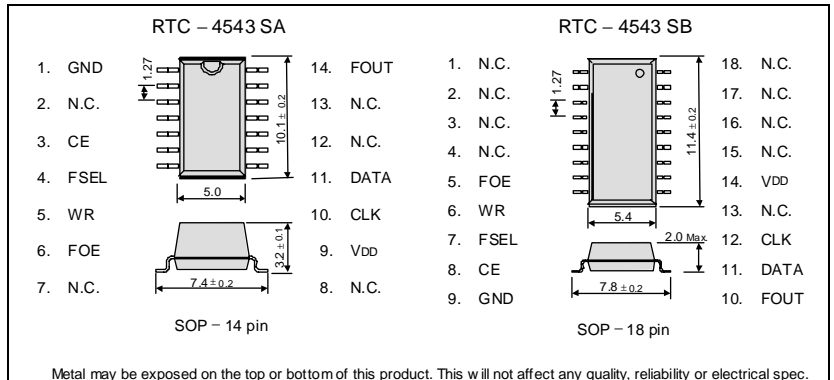---
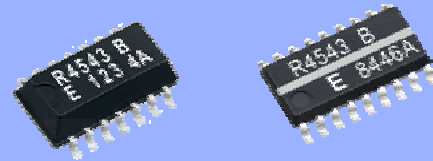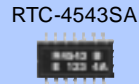
Block diagram

Overview

- **32.768 kHz frequency output function**
  - FOUT pin output (C-MOS output), CL=30 pF
  - FOE pin enables output on/off control.
  - FSEL pin enables output selectable 32.768 kHz or 1 Hz.

- **Power supply voltage monitoring function**
  - Detection that power supply voltage descended to 1.7 V or less.
  - Automatic record to FDT-bit at the time of power supply decline detection.

Pin Function

Signal Name	Input / Output	Function
CE	Input	The chip enabled input pin. At the HIGH level, access becomes possible.
CLK	Input	The shift clock input pin for serial data transfer.
WR	Input	DATA pin input / output switching pin.
DATA	Bi-directional	The data input / output pin for serial data transfer.
FOUT	Output	32.768 kHz or 1Hz clock output pin (C-MOS output). High impedance at output off.
FOE	Input	The input pin for the FOUT output control.
FSEL	Input	Select the frequency that is output from the FOUT pin.
V$_{DD}$	—	Connected to a positive power supply.
GND	—	Connected to a ground.

Terminal connection / External dimensions
(Unit:mm)

RTC – 4543 SA

1. GND	14. FOUT
2. N.C.	13. N.C.
3. CE	12. N.C.
4. FSEL	11. DATA
5. WR	10. CLK
6. FOE	9. V$_{DD}$
7. N.C.	8. N.C.

SOP − 14 pin

RTC – 4543 SB

1. N.C.	18. N.C.
2. N.C.	17. N.C.
3. N.C.	16. N.C.
4. N.C.	15. N.C.
5. FOE	14. V$_{DD}$
6. WR	13. N.C.
7. FSEL	12. CLK
8. CE	11. DATA
9. GND	10. FOUT

SOP − 18 pin

Metal may be exposed on the top or bottom of this product. This will not affect any quality, reliability or electrical spec.

Specifications (characteristics)

* Refer to application Manual for details.

■ Recommended Operating Conditions

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	V$_{DD}$	—	2.5	5.0	5.5	V
Clock voltage	V$_{CLK}$	—	1.4	5.0	5.5	V
Operating temperature	T$_{OPR}$	—	-40	+25	+85	°C

■ Frequency characteristics

Item	Symbol	Condition	Rating	Unit
Frequency tolerance	$\Delta f / f$	Ta = +25 °C V$_{DD}$ = 5.0 V	5 ± 23 *	× 10^{-6}
Oscillation start-up time	t$_{STA}$	Ta = +25 °C V$_{DD}$ = 2.5 V	3 Max.	s

* Please ask for tighter tolerance.(Equivalent to 1 minute of monthly deviation)

■ Current consumption characteristics
Ta = -40 °C to +85 °C

Item	Symbol	Condition		Min.	Typ.	Max.	Unit
Current Consumption	I$_{BK}$	CE = GND FOE = GND FOUT ;output OFF (Hi-z)	V$_{DD}$ = 5 V		1.5	3.0	μA
			V$_{DD}$ = 3 V		1.0	2.0	
			V$_{DD}$ = 2 V		0.5	1.0	

■ Supply Voltage Detection Characteristic
Ta = -40 °C to +85 °C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power supply detection voltage	V$_{DT}$	V$_{DD}$ pin	1.4	1.7	2.0	V

"QMEMS" EPSON TOYOCOM

In order to meet customer needs in a rapidly advancing digital, broadband and ubiquitous society, we are committed to offering products that are one step ahead of the market and a rank above the rest in quality. To achieve our goals, we follow a "3D (three device) strategy" designed to drive both horizontal and vertical growth. We will to grow our three device categories of "Timing Devices", "Sensing Devices" and "Optical Devices", and expand vertical growth through a combination of products from these categories.

A Quartz MEMS is any high added value quartz device that exploits the characteristics of quartz crystal material but that is produced using MEMS (micro-electro-mechanical system) processing technology.

Market needs are advancing faster than previously imagined toward smaller, more stable crystal products, but we will stay ahead of the curve by rolling out products that exceed market speed and quality requirements. We want to further accelerate the 3D strategy by QMEMS.

Quartz devices have become crucial in the network environment where products are increasingly intended for broadband, ubiquitous applications and where various types of terminals can transfer information almost immediately via LAN and WAN on a global scale. Epson Toyocom Corporation addresses every single aspect within a network environment. The new corporation offers "Digital Convergence" solutions to problems arising with products for consumer use, such as, core network systems and automotive systems.

PROMOTION OF ENVIRONMENTAL MANAGEMENT SYSTEM CONFORMING TO INTERNATIONAL STANDARDS

At Epson Toyocom, all environmental initiatives operate under the Plan-Do-Check-Action(PDCA) cycle designed to achieve continuous improvements. The environmental management system (EMS) operates under the ISO 14001 environmental management standard.

> ISO 14000 is an international standard for environmental management that was established by the International Standards Organization in 1996 against the background of growing concern regarding global warming, destruction of the ozone layer, and global deforestation.

All of our major manufacturing and non-manufacturing sites,in Japan and overseas, completed the acquisition of ISO 14001 certification.

In the future, new group companies will be expected to acquire the certification around the third year of operations.

WORKING FOR HIGH QUALITY

In order provide high quality and reliable products and services than meet customer needs,

Epson Toyocom made early efforts towards obtaining ISO9000 series certification and has acquired ISO9001 for all business establishments in Japan and abroad. We have also acquired ISO/TS 16949 certification that is requested strongly by major automotive manufacturers as standard.

> QS-9000 is an enhanced standard for quality assurance systems formulated by leading U.S. automobile manufacturers based on the international ISO 9000 series.

> ISO/TS 16949 is a global standard based on QS-9000, a severe standard corresponding to the requirements from the automobile industry.

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Pb Free	►Pb free. ►Complies with EU RoHS directive.
RoHS Compliant	►Pb free terminal designed. Contains Pb in products exempted by RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.) ►Complies with EU RoHS directive.
For Automotive	►The products have been designed for high reliability applications such as Automotive.

Notice