



## 4-bit REAL TIME CLOCK MODULE

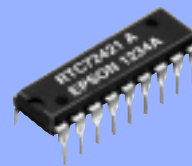
# RTC-72421

# RTC-72423

- Built-in crystal unit allows adjustment-free efficient operation.
- 24 h/12 h changeable and leap year automatically adjustable (Gregorian calendar).



Product Number (Please contact us)  
 RTC-72421 : Q42724211xxxx00  
 RTC-72423 : Q42724231xxxx00



Actual size

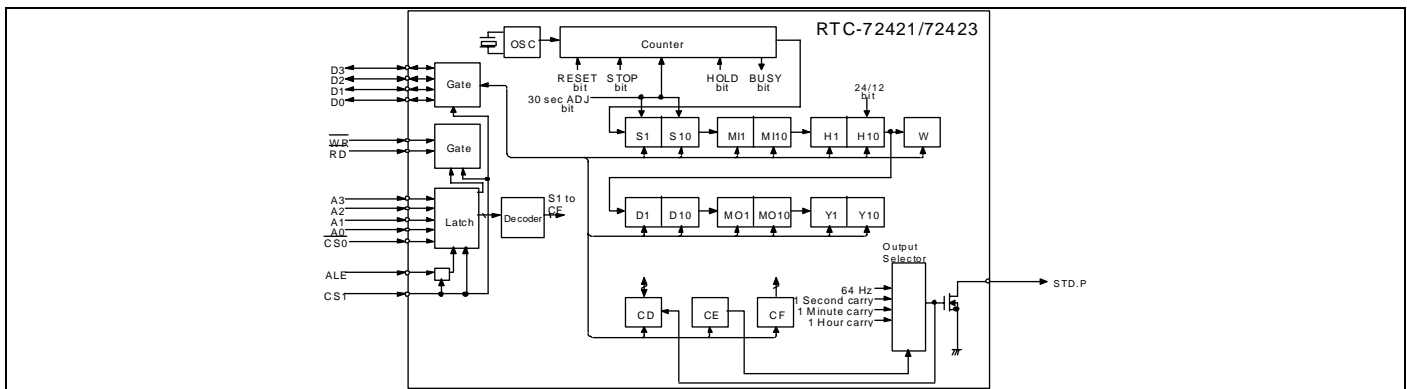
RTC-72421



RTC-72423



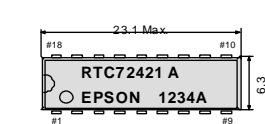
## Block diagram



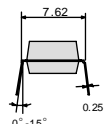
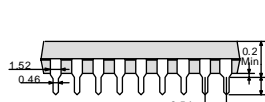
## Terminal connection/External dimensions

(Unit:mm)

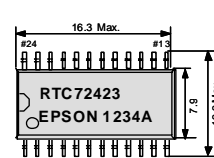
## ● RTC-72421 (DIP 18-pin)



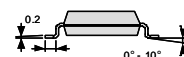
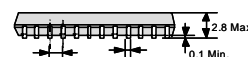
No.	Pin terminal	No.	Pin terminal
1	STD.P	18	VDD
2	/CS0	17	(VDD)
3	ALE	16	(VDD)
4	A0	15	CS1
5	A1	14	C0
6	A2	13	D1
7	A3	12	D2
8	/RD	11	D3
9	GND	10	/WR



## ● RTC-72423 (SOP 24-pin)



No.	Pin terminal	No.	Pin terminal
1	STD.P	24	VDD
2	/CS0	23	(VDD)
3	N.C.	22	(VDD)
4	ALE	21	N.C.
5	A0	20	CS1
6	N.C.	19	D0
7	A1	18	N.C.
8	N.C.	17	N.C.
9	A2	16	D1
10	A3	15	D2
11	/RD	14	D3
12	GND	13	/WR



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.

## Absolute Max. rating

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	VDD	Ta=+25 °C	-0.3	+7.0	V
Input voltage	VIO	Ta=+25 °C	GND-0.3	VDD+0.3	V
Storage temperature *	TSTG		-55	+85	°C
		RTC-72423	-55	+125	°C

\*Stored as bare product after unpacking

## Operating range

Item	Symbol	Condition	Min.	Max.	Unit
Power voltage	VDD	—	4.5	5.5	V
Clock voltage	VCLK	—	2.0	5.5	V
Operating temperature	TOPR	RTC-72421	-10	+70	°C
		RTC-72423	-40	+85	°C

Stored as bare product after unpacking

## Frequency characteristics

Item	Symbol	Condition	Range	Unit
Frequency precision	$\Delta f/f$	Ta=+25 °C VDD=5.0 V	72421A 72421B 72423A 72423	$\pm 10$ $\pm 50$ $\pm 20$ $\pm 50$ $\times 10^{-6}$
Frequency temperature characteristics	TOP	-10 °C to +70 °C (+25 °C) -40 °C to +85 °C (+25 °C)		+10/-120 +10/-220 $\times 10^{-6}/\text{°C}$
Frequency voltage characteristics	t/V	Ta=+25 °C, VDD=2.0 V to 5.5 V		$\pm 5.0$ Max. $\times 10^{-6}/\text{V}$
Aging	fa	Ta=+25 °C, VDD=5.0 V, First year		$\pm 5.0$ Max. $\times 10^{-6}/\text{year}$

## DC characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Applicable terminal
Current consumption	IDD1	CS1=0 V Exclude input/output current	—	1	10	μA	—
	IDD2	VDD=5 V VDD=2 V	—	0.9	5	μA	—
HIGH input voltage (1)	VIH1	—	2.2	—	—	V	All inputs other than CS1
LOW input voltage (1)	UIL1	—	—	—	0.8	V	D0 to D3
LOW output voltage (1)	VOL1	IOL=2.5 mA	—	—	0.4	V	STD.P
HIGH output voltage	VOH	IOL=-400 μA	2.4	—	—	V	—
LOW output voltage (2)	VOL2	IOL=2.5 mA	—	—	0.4	V	—
OFF leak current	IOFLK	V1=VDD/0 V	—	—	10/-10	μA	—
Input capacity	C1	Input frequency 1 MHz	—	10	—	pF	Input other than D0 to D3
HIGH input voltage (2)	VIH2	VDD=2.0 V to 5.5 V	4/5 VDD	—	—	V	D0 to D3, STD.P
LOW input voltage (2)	UIL2	—	—	—	1/5 VDD	V	—
Input leak current (1)	ILK1	V1=VDD/0 V	—	—	1/-1	μA	Input other than D0 to D3
Input leak current (2)	ILK2	—	—	—	10/-10	μA	D0 to D3

# “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.

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.

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.

## WORKING FOR HIGH QUALITY




In order to 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.

### ► Explanation of the mark that are using it for the catalog

	<ul style="list-style-type: none"><li>► Pb free.</li><li>► Complies with EU RoHS directive.</li></ul>
	<ul style="list-style-type: none"><li>► Pb free terminal designed. Contains Pb in products exempted by RoHS directive. (Contains Pb in sealing glass, high melting temperature type solder or other.)</li><li>► Complies with EU RoHS directive.</li></ul>
	<ul style="list-style-type: none"><li>► The products have been designed for high reliability applications such as Automotive.</li></ul>

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- These products are intended for general use in electronic equipment. When using them in specific applications that require extremely high reliability, such as the applications stated below, you must obtain permission from Epson Toyocom in advance.
  - / Space equipment (artificial satellites, rockets, etc.) / Transportation vehicles and related (automobiles, aircraft, trains, vessels, etc.)
  - / Medical instruments to sustain life / Submarine transmitters / Power stations and related / Fire work equipment and security equipment
  - / traffic control equipment / and others requiring equivalent reliability.
- In this new crystal master for Epson Toyocom, product codes and markings will remain as previously identified prior to the merger. Due to the on-going strategy of gradual unification of part numbers, please review product codes and markings, as they will change during the course of the coming months.

We apologize for the inconvenience, but we will eventually have a unified part numbering system for Epson Toyocom that will be user friendly.