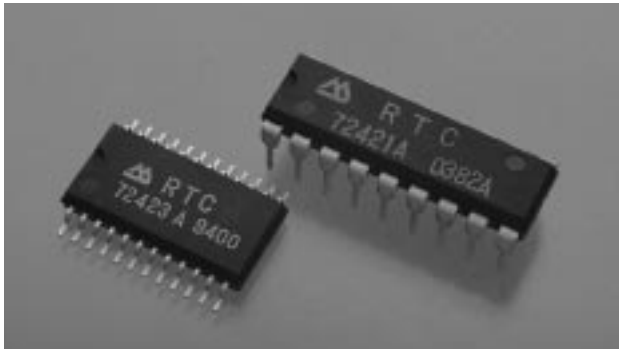


Real Time Clock Modules - Seiko Epson

RTC-72421/72423



Absolute Max. Rating

Item	Symbol	Condition	Specification	Unit
Supply voltage	V_{DD}	$T_a=25^{\circ}\text{C}$	-0.3 ~ +7.0	V
Input and Output voltage	V_{IO}	$T_a=25^{\circ}\text{C}$	GND -0.3 ~ V_{DD} +0.3	V
Storage temp.	T_{STG}	RTC-72421 RTC-72423	-55 ~ +85 -55 ~ +125	$^{\circ}\text{C}$
Soldering condition	T_{SOL}	RTC-72421 RTC-72423	Under 260 $^{\circ}\text{C}$ within 10S (lead part) (package should be less than 150 $^{\circ}\text{C}$) Under 260 $^{\circ}\text{C}$ within 10S x 2 time under 230 $^{\circ}\text{C}$ within 3 min	

Operating Voltage

Item	Symbol	Condition	Specification	Unit
Operating voltage	V_{DD}	-	4.5 ~ 5.5	V
Operating temperature	T_{OPR}	-	-40 ~ +85	$^{\circ}\text{C}$
Data holding voltage	V_{DH}	-	2.0 ~ 5.5	V
CSI data holding time	t_{CDR}	Refer to the data holding timing	2.0 min.	μS
Operating restoring time	t_R			

Frequency and Current Consumption Characteristics

Item	Symbol	Condition	Specification	Unit
Frequency tolerance	$\Delta f/f_0$	$T_a=25^{\circ}\text{C}$ $V_{DD}=5\text{V}$	72421A ± 10 72421B ± 50 72423A ± 20 72423B ± 50	ppm
Frequency temperature characteristics		-10 ~ +70 $^{\circ}\text{C}$, (25 $^{\circ}\text{C}$ reference temperature)	$\pm 10/-120$	ppm
Aging	f_a	$V_{DD}=5\text{V}$, $T_a=25^{\circ}\text{C}$, 1st year	± 5 max.	ppm
Shock resistance	S.R.	Drop test of 3 times on a hard board from 75cm height of 300G x 0.3mS x 1/2 sine wave x 3 directions	± 5 max.	ppm
Current consumption	I_{DD1} I_{DD2}	CSI $\geq 0\text{V}$ $V_{DD}=5\text{V}$ $V_{DD}=2\text{V}$	10 max. 5 Max.	μA

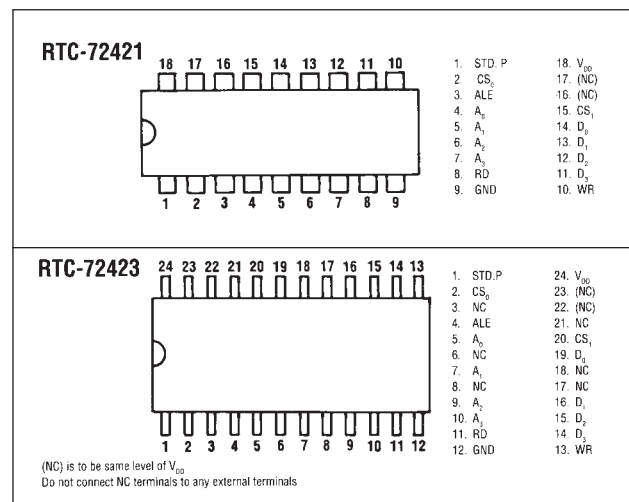
Electrical Characteristics

Item	Symbol	Condition	Min	Typ.	Max.	Unit	Applicable terminal
"H" Input Voltage (1)	V_{IH1}	-	2.2	-	-	V	All inputs
"L" Input Voltage (1)	V_{IL1}	-	-	-	0.8	V	other than CSI
Input leakage current (1)	I_{IK1}	$V_i = V_{DD}/OV$	-	-	1/-1	μA	$D_2 \sim D_3$
Input leakage current (2)	I_{IK2}	-	-	-	10/-10	μA	$D_0 \sim D_3$
"L" output voltage (1)	V_{OL1}	$I_{OL}=2.5\text{mA}$	-	-	0.4	V	$D_0 \sim D_3$
"H" output voltage	V_{OH}	$I_{OH}=-400\mu\text{A}$	2.4	-	-	V	
"L" output voltage (2)	V_{OL2}	$I_{OL}=2.5\text{mA}$	-	-	0.4	V	STD.P
OFF leak current	I_{OFFLK}	$V_i = V_{DD}/OV$	-	-	10	μA	
Input capacity	C_1	Input Frequency 1MHz	-	5	-	pF	
"H" Input Voltage (2)	V_{IH2}	$V_{DD}=2 \sim 5.5\text{V}$	4/5 V_{DD}	-	-	V	CSI ₁
"L" Input Voltage (2)	V_{IL2}	-	-	-	1/5 V_{DD}	V	

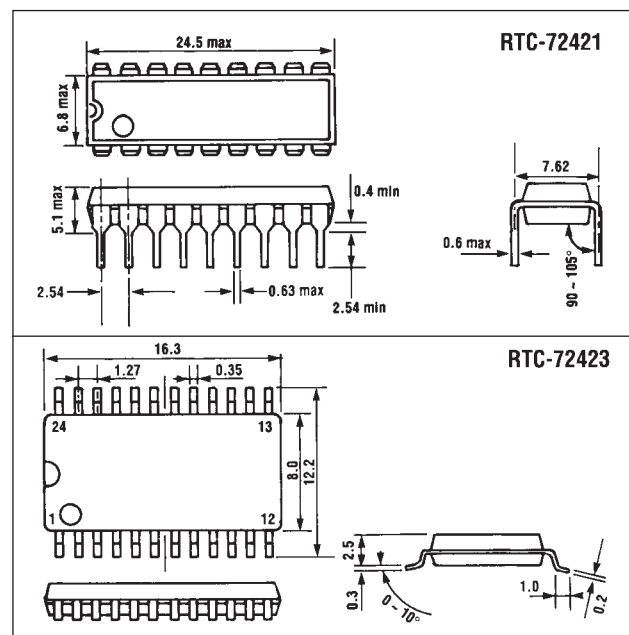
Features

- Built-in quartz crystal makes regulation unnecessary and allows for easy design
- ALE INPUT terminal available for 8048, 8051 and 8085 series
- Incorporates built-in time counters (year, month, week, day)
- 12hr/24hr clock switchcover function and automatic leap year setting
- 30 seconds error adjustment function
- READ, WRITE, HOLD, STOP, RESET and CHIP SELECT inputs
- The CMOS IC boasts low current consumption & features a backup function
- 18 pin dual-in-line package
- Pin and function are compatible with the SMC 5242C

Terminal Connection



Dimensions (mm)



Real Time Clock Modules - Seiko Epson

RTC-72421/72423 Continued

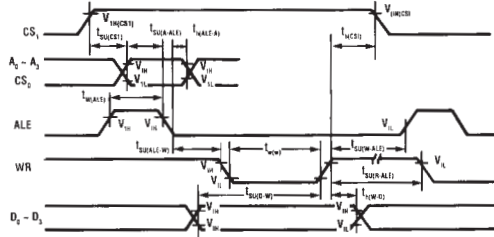
Notes

0="L" level, 1="H" level, REST=RESET ITRPT/STND=INTRUPT/STANDARD

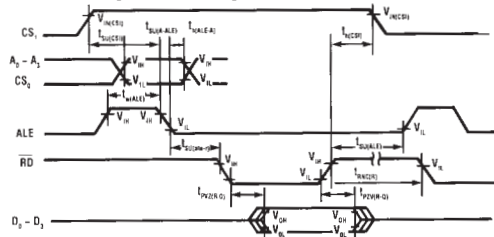
1. Bit * does not exist
2. Please mask AM/PM bit with 10's of hours operation
3. Busy is read only. IRQ can only be set low ("0")

Data Bit	PM/AM	ITRPT/STND	24/12
1	PM	ITRPT	24
0	AM	STND	12

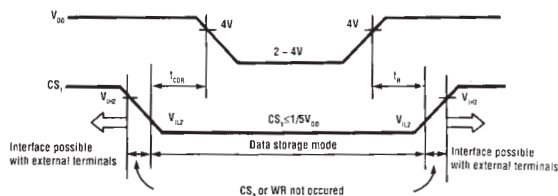
Write Mode (with ALE)



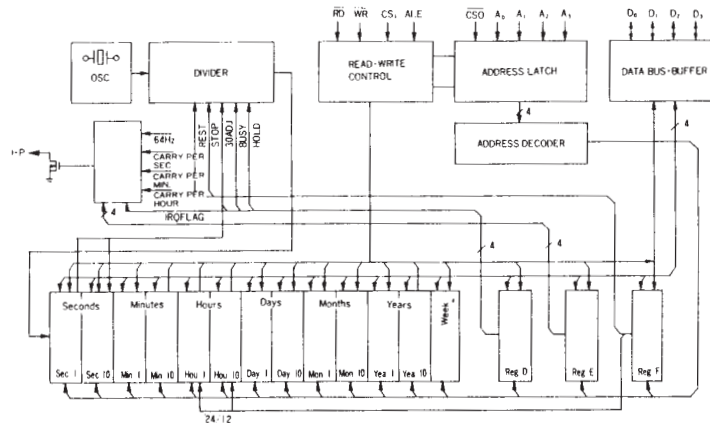
Read Mode (with ALE)



Data Holding Timing



Block Diagram



Function Table

Address	A ₃	A ₂	A ₁	A ₀	Register	D ₃	D ₂	D ₁	D ₀	Count value	Remarks
0	0	0	0	0	S ₁	S ₈	S ₄	S ₂	S ₁	0-9	1 second digit register
1	0	0	0	1	S ₁₀	*	S ₁₀	S ₁₀	S ₁₀	0-5	10 second digit register
2	0	0	1	0	M ₁	m ₁₈	m ₁₄	m ₁₂	m ₁₁	0-9	1 minute digit register
3	0	0	1	1	M ₁₀	*	m ₁₀	m ₁₀	m ₁₀	0-5	10 minute digit register
4	0	1	0	0	H ₁	h ₈	h ₄	h ₂	h ₁	0-9	1 hour digit register
5	0	1	0	1	H ₁	*	PM/AM	h ₁₀	h ₁₀	0-2 or 0-1	PM/AM, 10 hour digit register
6	0	1	1	0	D ₁	d ₈	d ₄	d ₂	d ₁	0-9	1 day digit register
7	0	1	1	1	D ₁₀	*	*	d ₁₀	d ₁₀	0-3	10 day digit register
8	1	0	0	0	M ₀	m ₀	m ₀	m ₀	m ₀	0-9	1 month digit register
9	1	0	0	1	M ₁₀	*	*	*	m ₁₀	0-1	10 month digit register
A	1	0	1	0	Y ₁	y ₈	y ₄	y ₂	y ₁	0-9	1 year digit register
B	1	0	1	1	Y ₁₀	y ₁₀	y ₁₀	y ₁₀	y ₁₀	0-9	10 year digit register
C	1	1	0	0	W	*	w ₄	w ₂	w ₁	0-6	week register
D	1	1	0	1	Reg D	30 sec	IRQ	BUSY	HOLD	-	Control register D
					ADJ	FLAG					
E	1	1	1	0	Reg E	t ₁	t ₁₀	ITRPT	MASK	-	Control register E
								/STND			
F	1	1	1	1	Reg F	TEST	24/12	STOP	REST	-	Control register F

Switching Characteristics (with ALE)

Please connect ALE to VDD (If the microprocessor does not have an ALE OUTPUT)

Item	Symbol	Condition	Min	Max	Unit
CS1 set up time	t _{SU} (CS1)	-	1000	-	nS
Address set up time	t _{SU} (A-ALE)	-	50	-	nS
Address hold time	t _H (ALE-A)	-	50	-	nS
ALE pulse width	t _W (ALE)	-	80	-	nS
ALE before WRITE	t _{SU} (ALE-W)	-	0	-	nS
ALE before READ	t _{SU} (ALE-R)	-	0	-	nS
ALE before WRITE	t _{SU} (W-ALE)	-	50	-	nS
ALE before READ	t _{SU} (R-ALE)	-	50	-	nS
WHITE pulse width	t _W (W)	-	120	-	nS
RD to DATA	t _{PZ} (R-Q)	C _i =150pF	-	120	nS
DATA hold	t _{PV} (R-Q)	-	0	-	nS
DATA setup time	t _{SU} (D-W)	-	80	-	nS
DATA hold time	t _H (W-D)	-	10	-	nS
CS1 hold time	t _H (CS1)	-	1000	-	nS
RD/WR recovery time	t _{REC} (R-W)	-	200	-	nS

(VDD=5V±, Ta=-10μ170°C)