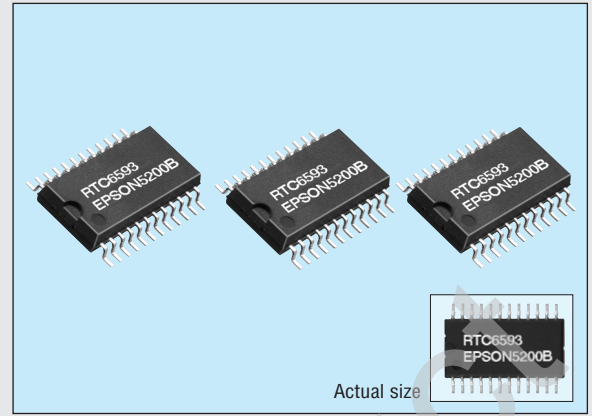


REAL TIME CLOCK MODULE FOR PC/AT *1

RTC-6593

- Built-in crystal unit allows adjustment-free efficient operation.
- Provides 114-bytes of backed-up RAM.
- Extended alarm function.
- Low current consumption.
- A builtin power supply switching circuit makes it possible to provide automatic power supply backup to both the RTC and extended RAM.

*1 PC/AT is a trademark of International Business Machines Corporation.



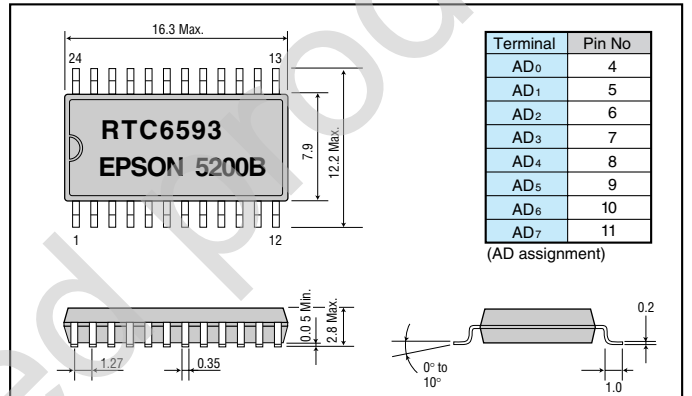
Specifications (characteristics)

Absolute Max. rating

Item	Symbol	Condition	Rating	Unit
Supply voltage	V_{DD}	V_{DD} -GND	- 0.3 to + 7.0	V
Input voltage	V_{IN}	Input pin	- 0.3 to V_{DD} + 0.3	
Storage temperature	T_{STG}	—	- 55 to +125	°C
Soldering conditions	T_{SOL}	Twice under +260 °C within 10 s or under +230 °C within 3 min.		

External dimensions

(Unit: mm)



Operating range, frequency and DC characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	V_{DD}	V_{DD} - GND	4.5	5.0	5.5	V
Operating temperature	T_{OPR}	—	-10		+70	°C
Frequency tolerance	$\Delta f/f_0$	$T_a=+25\text{ }^\circ\text{C}$, $V_{DD}=5\text{ V}$			5±20	$\times 10^{-6}$
Temperature characteristics	T_{OP}	$T_a=-10\text{ to }+70\text{ }^\circ\text{C}$ +25 °C standard			+10 -120	
Voltage characteristics	f_V	$T_a=\text{stable}$			±6	$\times 10^{\pm}V$
Aging	f_a	$T_a=+25\text{ }^\circ\text{C}$, $V_{DD}=5\text{ V}$ First year			±5	$\times 10^{\pm}/\text{year}$
Input voltage	High level	V_{IH}	2.2		$V_{DD}+0.3$	V
	Low level	V_{IL}	-0.3		0.8	
Output voltage	High level	V_{OH}	2.4			
	Low level	V_{OL}			0.4	
Power supply current	I_{DD}	Output unloaded		3	10	mA
Battery supply current	I_{BAT}	$V_{BAT}=3\text{ V}$ $V_{DD}=0\text{ V}$		0.5	1.0	µA

Terminal functions

Terminal	Function	Pin No.
MOT	Model select (input)	1
AD ₀ to 7	Multiplexed bi-direction address/data buses	4 to 11 (See above table :AD assignment)
GND	Power supply (grand)	12
RTC	Real time clock select (input)	13
AS	Address strobe (input)	14
R/W	Read/ Write (input)	15
DS	Data strobe (input)	17
RESET	Reset (input)	18
IRQ	Interrupt request (output)	19
V _{BAT}	Back-up power supply	20
XIRQ	Extended alarm interrupt request (output)	21
XALM	Extended alarm select (input)	22
SQW	Square wave output	23
V _{DD}	Power supply (+5V)	24
NC	Not connected internally	2,3,16

Address map

RTC address map

00	14-bytes	00 h	0	Seconds
1		Second Alarm		
2		Minutes		
3		Minute Alarm		
14	114-bytes	0E h	4	Hours
5		Hour Alarm		
6		Day of the Week		
7		Day of Month		
8		Month		
9		Year		
10		Register A		
11		Register B		
12		Register C		
13		Register D		
14		General purpose RAM		
127	7F h	127		

Extended alarm address map

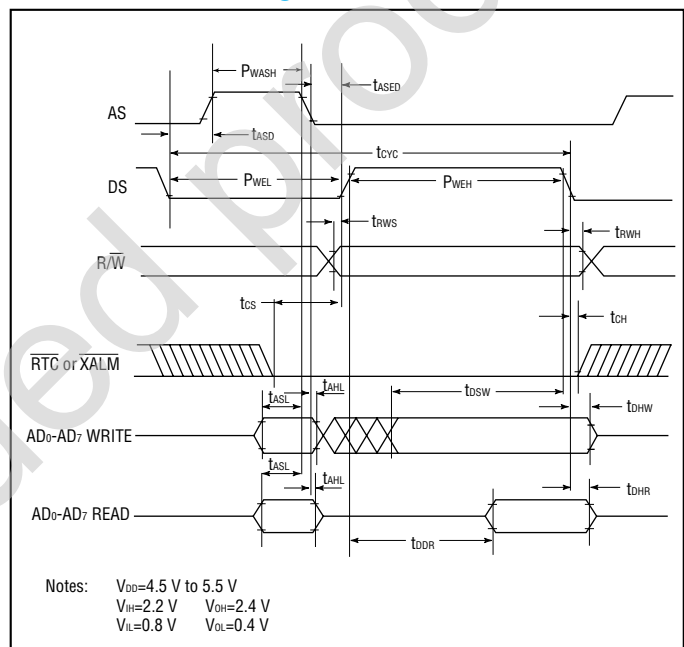
00	8-bytes	00 h	0	Extended Second Alarm
1		Extended Minute Alarm		
2		Extended Hour Alarm		
3		Extended Day of the Week Alarm		
4		Extended Day of Month Alarm		
5		Extended Month Alarm		
07		07 h	6	Register 6
			7	Register 7

Bus timing

(Ta=-10 °C to +70 °C, VDD=4.5 V to 5.5 V)

Parameter	Symbol	Min.	Max.	Unit
Cycle time	t_{CYC}	953	DC	ns
Pulse width DS low or $\overline{RD}/\overline{WR}$ high	P_{WEL}	300	—	
Pulse width DS high or $\overline{RD}/\overline{WR}$ low	P_{WEH}	325	—	
Input rise/fall time	t_{R}, t_{F}	—	30	
R/ \overline{W} hold time	t_{RWH}	10	—	
R/ \overline{W} setup time before DS	t_{RWS}	80	—	
Chip select setup time before DS, \overline{WR} or \overline{RD}	t_{CS}	25	—	
Chip select hold time	t_{CH}	0	—	
Read data hold time	t_{DHR}	10	100	
Write data hold time	t_{DHW}	0	—	
Multiplexed address valid time to AS fall	t_{ASL}	50	—	
Multiplexed address hold time	t_{AHL}	20	—	
Delay time DS to AS rise	t_{ASD}	50	—	
Pulse width AS high	P_{WASH}	135	—	
Delay time AS to DS rise	t_{ASED}	60	—	
Output data delay time from DS or \overline{RD}	t_{DDR}	20	240	
Write data setup time	t_{DSW}	200	—	

For motorola timing



Block diagram

