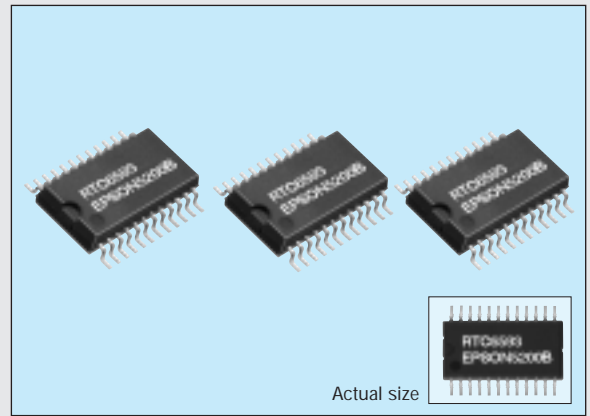


REAL TIME CLOCK MODULE FOR PC/AT \*1

# RTC-6593

- Builtin 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.



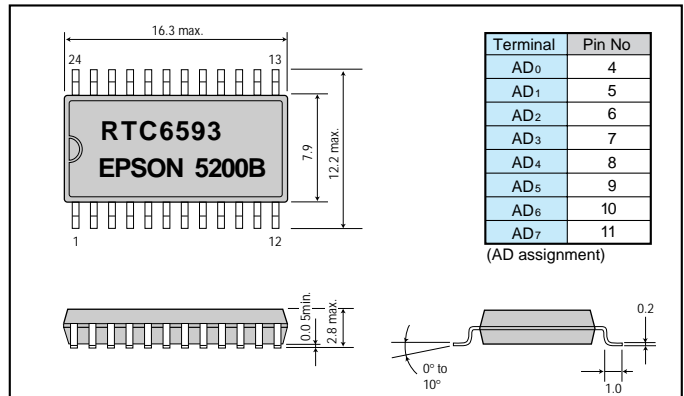
## Specifications (characteristics)

### 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 seconds or under 230°C within 3 minutes		

### External dimensions

(Unit: mm)



### Operating range, frequency and DC characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	$V_{DD}$	$V_{DD} \cdot GND$	4.5	5.0	5.5	V
Operating temperature	$T_{OPR}$	—	-10		+70	°C
Frequency tolerance	$\Delta f/f_0$	$T_a=25^\circ\text{C}, V_{DD}=5\text{V}$			5±20	ppm
Temperature characteristics	$T_{OP}$	$T_a=-10$ to $70^\circ\text{C}$ 25°C standard			+10 -120	
Voltage characteristics	$f_V$	$T_a=\text{stable}$			±6	ppm/V
Aging	$f_a$	$T_a=25^\circ\text{C}, V_{DD}=5\text{V}$ First year			±5	ppm/Y
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			V
	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 <sub>0</sub> to 7	Multiplexed bi-direction address/data buses	4 to 11 (See above table :AD assignment)
GND	Power supply (ground)	12
$\overline{RTC}$	Real time clock select (input)	13
AS	Address strobe (input)	14
$R/\overline{W}$	Read/Write (input)	15
DS	Data strobe (input)	17
$\overline{RESET}$	Reset (input)	18
$\overline{IRQ}$	Interrupt request (output)	19
$V_{BAT}$	Back-up power supply	20
$\overline{XIRQ}$	Extended alarm interrupt request (output)	21
$\overline{XALM}$	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
13		0D h	1	Second Alarm
14	114-bytes	OE h	2	Minutes
			3	Minute Alarm
			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		
127	7F h	14	127	General purpose RAM

● Extended alarm address map

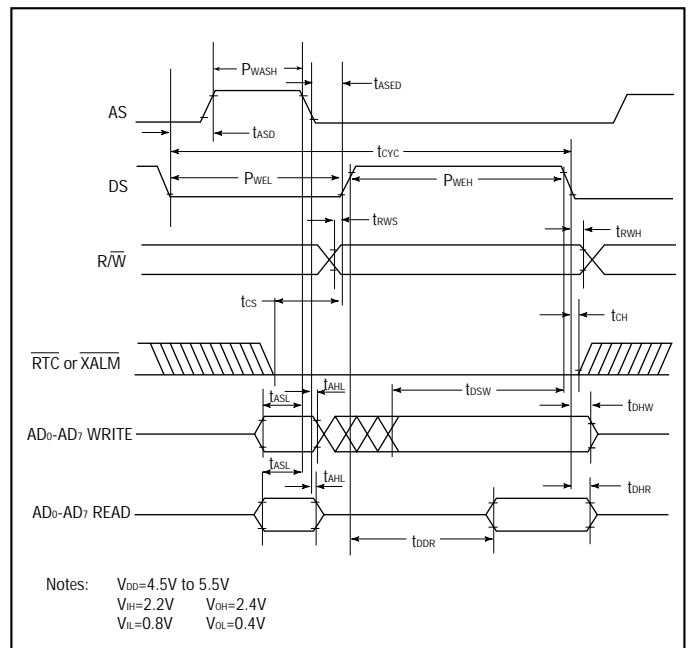
00	8-bytes	00 h	0	Extended Second Alarm
		1	Extended Minute Alarm	
		2	Extended Hour Alarm	
		3	Extended Day of the Week Alarm	
		4	Extended Day of Month Alarm	
		5	Extended Month Alarm	
07	07 h	6	7	Register 6 Register 7

■ Bus timing

(Ta=-10°C to 70°C, VDD=4.5V+5.5V)

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

■ For motorola timing



■ Block diagram

