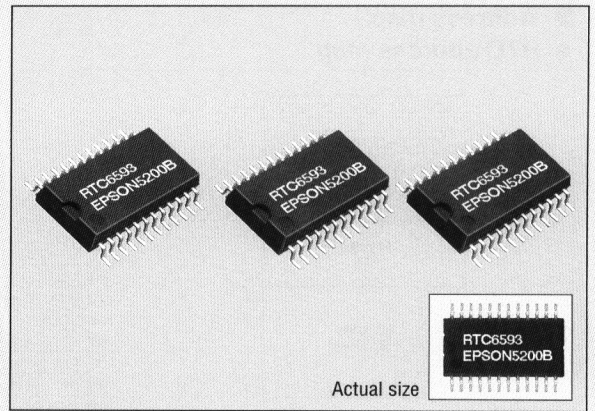


REAL TIME CLOCK MODULE FOR PC/AT *1

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.



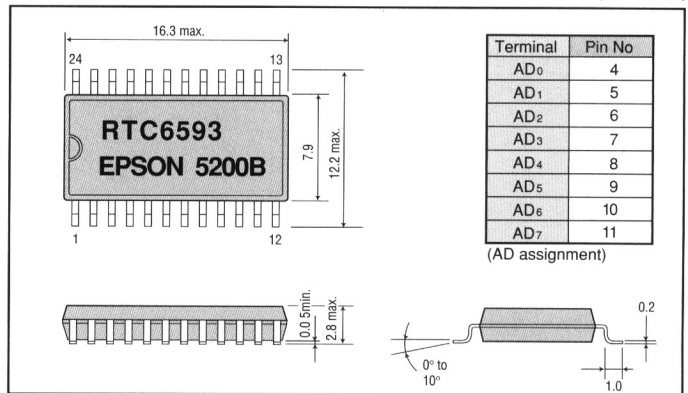
■ Specifications (characteristics)

■ 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 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} -GND	4.5	5.0	5.5	V
Operating temperature	T _{OPR}	—	-10		+70	°C
Frequency tolerance	Δf/fo	T _a =25°C, V _{DD} =5V			5±20	ppm
Temperature characteristics	T _{OP}	T _a =-10 to 70°C 25°C standard			+10 -120	
Voltage characteristics	f _v	T _a =stable			±6	ppm/V
Aging	f _a	T _a =25°C, V _{DD} =5V First year			±5	ppm/y
Input voltage	High level	V _{IH}		2.2	V _{DD} +0.3	V
	Low level	V _{IL}		-0.3		
Output voltage	High level	V _{OH}		2.4	0.4	
	Low level	V _{OL}				
Power supply current	I _{DD}	Output unloaded		3	10	mA
Battery supply current	I _{BAT}	V _{BAT} =3V V _{DD} =0V		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
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
127		7F h	12	Register C
			13	Register D
			14	General purpose RAM
			127	

● Extended alarm address map

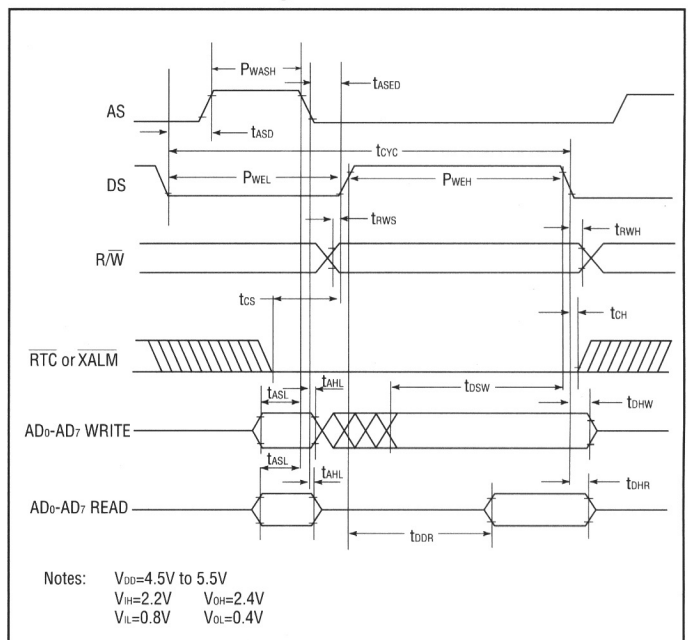
00	8-bytes	00 h	0	Extended Second Alarm
07		07 h	1	Extended Minute Alarm
			2	Extended Hour Alarm
			3	Extended Day of the Week Alarm
			4	Extended Day of Month Alarm
			5	Extended Month Alarm
6	Register 6			
7	Register 7			

■ Bus timing

(Ta=-10°C to +70°C, VDD=4.5V to 5.5V)

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,tF}	—	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

