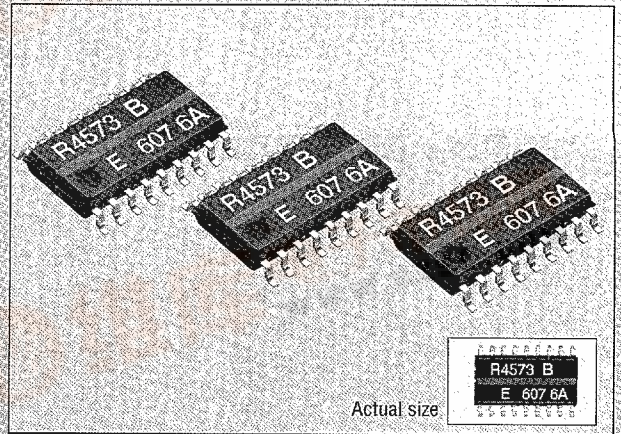


Real time clock module

SERIAL INTERFACE RTC WITH AN ALARM TIMER

# RTC-4573SB

- Built-in crystal unit allows adjustment-free efficient operation.
- 2.0mm thickness featuring high-density mounting.
- Using a serial interface, controllable only three signal lines.
- Alarm interruption of sec. to month and day of week possible.
- Interval timer interrupt function that can be set with an interval ranging from 1/4096 of a second to 255 minutes.
- Automatic leap year correction.
- Similar mounting method to that used for universal type SMD IC.
- Low current consumption. (0.5  $\mu$ A/3V Typ.)



■ Specifications (characteristics)

■ Absolute Max. rating

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	$V_{DD}$	$V_{DD}$ -GND		+7.0	V
Input voltage	$V_{IN}$	Input Pin	-0.3	$V_{DD}+0.3V$	
Output voltage	$V_{OUT1}$	TIRQ,AIRQ		+8.0	
	$V_{OUT2}$	Four,DATA		$V_{DD}+0.3V$	
Storage temperature	$T_{STG}$	Stored without tape & reel	-55	+125	$^{\circ}C$
Soldering conditions	$T_{SOL}$		Twice at under 260 $^{\circ}C$ within 10 sec. or under 230 $^{\circ}C$ within 3 min.		

■ Operating range

Item	Symbol	Condition	Min.	Max.	Unit
Operating voltage	$V_{DD}$		1.6	5.5	V
Operating temperature	$T_{OPR}$		-40	+85	$^{\circ}C$

■ Frequency characteristics

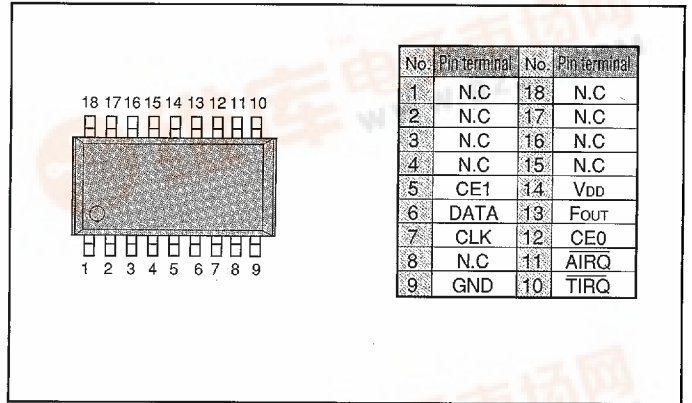
Item	Symbol	Condition	Range	Unit
Frequency tolerance	$\Delta f/f_0$	$T_a=25^{\circ}C, V_{DD}=3V$	$5\pm 23$	ppm
Frequency temperature characteristics	$T_{OP}$	$T_a=-10$ to $70^{\circ}C$ , Reference at $25^{\circ}C$	+10 -120	
Frequency voltage characteristics	$f_v$	$T_a=25^{\circ}C, V_{DD}=1.6$ to $5.5V$	$\pm 2$	ppm/V
Oscillation start up time	$t_{STA}$	$T_a=25^{\circ}C, V_{DD}=1.6V$	3	s
Aging	$f_a$	$T_a=25^{\circ}C, V_{DD}=3V$ , first year	$\pm 5$	ppm/year

■ DC characteristics

( $V_{DD}=1.6$  to  $5.5V, T_a=-40$  to  $+85^{\circ}C$ )

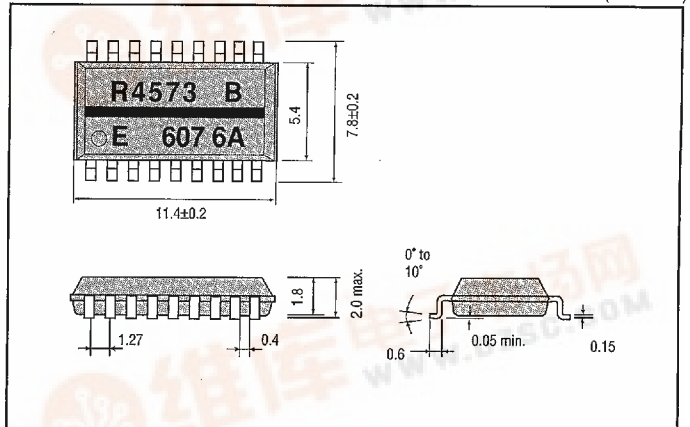
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Input voltage	$V_{IH}$	$CE_0, CE_1$	$0.8V_{DD}$	—	$V_{DD}$	V
	$V_{IL}$	CLK,DATA pins	0	—	$0.2V_{DD}$	
Input leakage current	$I_{LK}$	$V_i=GND$ or $V_{DD}$ $CE_0, CE_1, CLK$ pins	-0.5	—	0.5	$\mu A$
Pulldown R1	$R_{DWN1}$	$V_{DD}=5V$	75	150	300	$k\Omega$
Pulldown R2	$R_{DWN2}$	$V_{DD}=3V$	150	300	600	
Output voltage 1	$V_{OH1}$	$V_{DD}=5V$	4.5	—	5.0	V
	$V_{OH2}$	$V_{DD}=3V$	2.0	—	3.0	
	$V_{OL1}$	$V_{DD}=5V$	—	—	GND+0.5	
	$V_{OL2}$	$V_{DD}=3V$	—	—	GND+0.8	
Output voltage 2	$V_{OL3}$	$V_{DD}=5V$	—	—	GND+0.25	V
	$V_{OL4}$	$V_{DD}=3V$	—	—	GND+0.4	
Leakage current	$I_{OZ}$	$V_o=GND$ or $V_{DD}$ , DATA, AIRQ, TIRQ pins	-0.5	—	0.5	$\mu A$
Standby current 1	$I_{DD1}$	$V_{DD}=5V$	—	1.0	2.0	$\mu A$
Standby current 2	$I_{DD2}$	$V_{DD}=3V$	—	0.5	1.0	

■ Terminal connection



■ External dimensions

(Unit: mm)



Register table

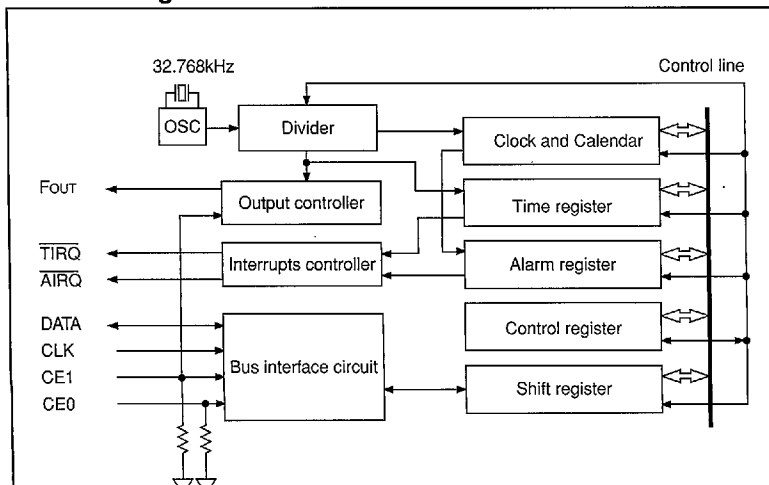
Address	Register symbol	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
0	Sec	fos	S40	S20	S10	S8	S4	S2	S1
1	Min	fr	Min40	Min20	Min10	Min8	Min4	Min2	Min1
2	Hour	fr	*	Hour20	Hour10	Hour8	Hour4	Hour2	Hour1
3	Week	fr	W7	W6	W5	W4	W3	W2	W1
4	Day	fr	*	Day20	Day10	Day8	Day4	Day2	Day1
5	Month	fr	*	*	Month10	Month8	Month4	Month2	Month1
6	Year	Year80	Year40	Year20	Year10	Year8	Year4	Year2	Year1
7	Minutes Alarm	AE	A-Min40	A-Min20	A-Min10	A-Min8	A-Min4	A-Min2	A-Min1
8	Hours Alarm	AE	*	A-Hr20	A-Hr10	A-Hr8	A-Hr4	A-Hr2	A-Hr1
9	Week Alarm	AE	A-W7	A-W6	A-W5	A-W4	A-W3	A-W2	A-W1
A	Day Alarm	AE	*	A-Day20	A-Day10	A-Day8	A-Day4	A-Day2	A-Day1
B	Four control	FE	*	FD4	FD3	*	FD2	FD1	FD0
C	Timer interrupt control	TE	*	TD1	TD0	*	*	*	*
D	Count Down Timer	Timer128	Timer64	Timer32	Timer16	Timer8	Timer4	Timer2	Timer1
E	Control 1	*	*	*	TI/TP	AF	TF	AIE	TIE
F	Control 2	*	TEST	STOP	RESET	HOLD	*	*	*

Switching characteristics

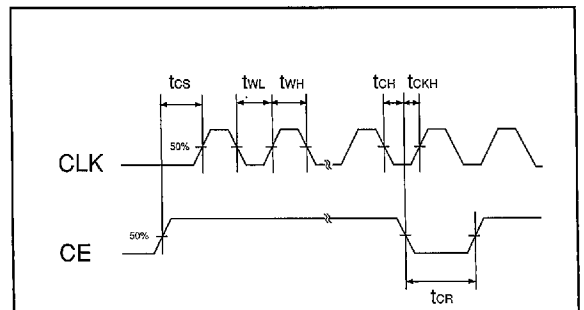
CL=50pF, Ta=-40°C to 85°C

Item	Symbol	VDD=3.0±10%		VDD=5.0±10%		Unit
		Min.	Max.	Min.	Max.	
CLK clock cycle	tCLK	1200		600		ns
CLK H Pulse Width	tWH	600		300		
CLK L Pulse Width	tWL					
CE setup time	tCS	300		150		
CE hold time	tCH	400		200		
CE recovery time	tCR	600		300		
CLK hold time	tCKH	100		50		
Write data setup time	tDS					
Write data hold time	tDH					
Read data delay time	tRD	0	400	0	200	
Read data disable delay time	trZ		200		100	
Rise and fall time	trF		40		20	
FOUT duty ratio (32.768KHz output)	Duty	35	65	40	60	

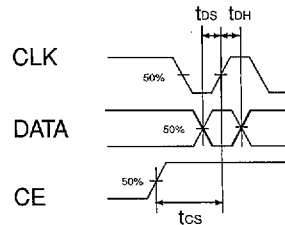
Block diagram



Timing chart



Write mode



Read mode

