

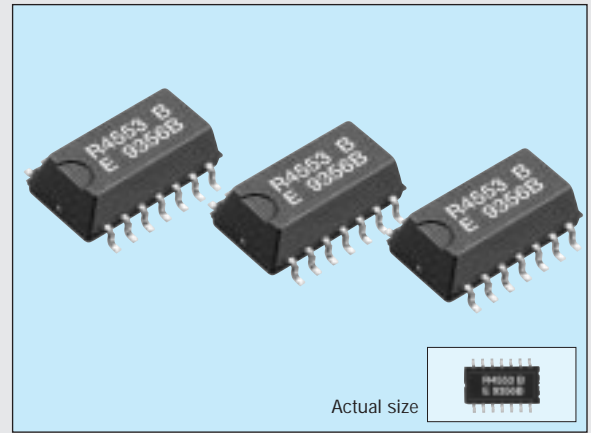
SERIAL-INTERFACE REAL TIME CLOCK MODULE WITH SRAM

RTC-4553

Product number (please refer to page 2)

Q4145535xxxxx00

- Built-in crystal unit allows adjustment-free efficient operation.
- Automatic calendar function (year, month, day, day of the week, hour, minute, second).
- Automatic leap year correction.
- Built-in 30 x 4-bit S-RAM.
- Reference pulse output. (1024 Hz, 1/10 Hz)



The details are mentioned in the application manual.

<http://www.epsondevice.com>

Specifications (characteristics)

Absolute Max. rating

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	V _{DD}	V _{DD} -GND		+6.0	
Input voltage	V _{IN}	S _{IN} , S _{CK} , WR, CS ₀ , CS ₁	-0.3	V _{DD} +0.3	V
Output voltage	V _{OUT}	S _{OUT} , TP _{OUT}			
Storage temperature	T _{STG}	Stored as bare product after unpacking	-55	+125	°C

Operating range

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	V _{DD}	—	2.7	5.0	5.5	V
Clock voltage	V _{CLK}	—	2.0	—	5.5	V
Operating temperature	T _{OPR}	No condensation	-30	—	+70	°C

Frequency characteristics

Item	Symbol	Condition	Range	Unit	
Frequency tolerance	Δf/fo	Ta=+25 °C, V _{DD} =5 V	AA	5±5	x 10 ⁻⁶
			A	5±10	
			B	5±20	
Oscillation start-up time	T _{sta}	Ta=+25 °C	3.0 Max.	s	
Frequency temperature characteristics	T _{op}	Ta=-10 °C to +70 °C, V _{DD} =5 V Reference at +25 °C	+10 -120	x 10 ⁻⁶	
Frequency voltage characteristics	f/v	Ta=Fix, V _{DD} =2 V to 5.5 V Reference at 5 V	±5		
Aging	fa	Ta=+25 °C, V _{DD} =5 V, first year		x 10 ⁻⁴ /year	

DC characteristics (GND=0 V, V_{DD}=5 V ± 10 %, Ta=-30 °C to +70 °C)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Current consumption	I _{DD1}	S _{CK} =500 kHz	—	—	100	μA
	I _{DD2}	S _{CK} =0 Hz	—	1.0	3.0	
Output voltage	V _{OH}	I _{OH} =-400 μA	V _{DD} -0.4	—	—	V
	V _{OL}	I _{OL} =1.6 mA	—	—	0.4	
Off leak current	I _{ozH}	V _{OUT} =5.5 V	-2.0	—	2.0	μA
	I _{ozL}	V _{OUT} =0 V	—	—	—	
Input voltage	V _{IH}	—	4/5 V _{DD}	—	—	V
	V _{IL}	—	—	—	1/5 V _{DD}	
Input current	I _{IH}	V _{IN} =5.5 V	-2.0	—	2.0	μA
	I _{IL}	V _{IN} =0 V	—	—	—	

Terminal connection

No.	Pin terminal	No.	Pin terminal
1	GND	14	TP _{OUT}
2	WR	13	S _{OUT}
3	S _{IN}	12	CS ₁
4	S _{CK}	11	CS ₀
5	L1	10	L5
6	L2	9	L4
7	L3	8	V _{DD}

L1 to L5 are test pin. Do not connect them to any terminals.

External dimensions

(Unit: mm)

● RTC-4553 (SOP 14-pin)

Metal may be exposed on the top or bottom of this product. This won't affect any quality, reliability or electrical spec.

Register table

Address	MODE 0										MODE 1				MODE 2			
	Register symbol				Counter control register						User RAM Domain 1				User RAM Domain 2			
	A ₃	A ₂	A ₁	A ₀	D ₃	D ₂	D ₁	D ₀	Register name	D ₃	D ₂	D ₁	D ₀	D ₃	D ₂	D ₁	D ₀	
0	0	0	0	0	S ₁	S ₈	S ₄	S ₂	S ₁	1-second digit register	RA ₃	RA ₂	RA ₁	RA ₀	RA ₆₃	RA ₆₂	RA ₆₁	RA ₆₀
1	0	0	0	1	S ₁₀	0	S ₄₀	S ₂₀	S ₁₀	10-second digit register	RA ₇	RA ₆	RA ₅	RA ₄	RA ₆₇	RA ₆₆	RA ₆₅	RA ₆₄
2	0	0	1	0	MI ₁	mi ₈	mi ₄	mi ₂	mi ₁	1-minute digit register	RA ₁₁	RA ₁₀	RA ₉	RA ₈	RA ₇₁	RA ₇₀	RA ₆₉	RA ₆₈
3	0	0	1	1	MI ₁₀	0	mi ₄₀	mi ₂₀	mi ₁₀	10-minute digit register	RA ₁₅	RA ₁₄	RA ₁₃	RA ₁₂	RA ₇₅	RA ₇₄	RA ₇₃	RA ₇₂
4	0	1	0	0	H ₁	h ₈	h ₄	h ₂	h ₁	1-hour digit register	RA ₁₉	RA ₁₈	RA ₁₇	RA ₁₆	RA ₇₉	RA ₇₈	RA ₇₇	RA ₇₆
5	0	1	0	1	H ₁₀	PM/AM	0	h ₂₀	h ₁₀	10-hour digit register	RA ₂₃	RA ₂₂	RA ₂₁	RA ₂₀	RA ₈₃	RA ₈₂	RA ₈₁	RA ₈₀
6	0	1	1	0	W	0	w ₄	w ₂	w ₁	Day of the week digit register	RA ₂₇	RA ₂₆	RA ₂₅	RA ₂₄	RA ₈₇	RA ₈₆	RA ₈₅	RA ₈₄
7	0	1	1	1	D ₁	d ₈	d ₄	d ₂	d ₁	1-day digit register	RA ₃₁	RA ₃₀	RA ₂₉	RA ₂₈	RA ₉₁	RA ₉₀	RA ₈₉	RA ₈₈
8	1	0	0	0	D ₁₀	0	0	d ₂₀	d ₁₀	10-day digit register	RA ₃₅	RA ₃₄	RA ₃₃	RA ₃₂	RA ₉₅	RA ₉₄	RA ₉₃	RA ₉₂
9	1	0	0	1	MO ₁	mo ₈	mo ₄	mo ₂	mo ₁	1-month digit register	RA ₃₉	RA ₃₈	RA ₃₇	RA ₃₆	RA ₉₉	RA ₉₈	RA ₉₇	RA ₉₆
A	1	0	1	0	MO ₁₀	0	0	0	mo ₁₀	10-month digit register	RA ₄₃	RA ₄₂	RA ₄₁	RA ₄₀	RA ₁₀₃	RA ₁₀₂	RA ₁₀₁	RA ₁₀₀
B	1	0	1	1	Y ₁	y ₈	y ₄	y ₂	y ₁	1-year digit register	RA ₄₇	RA ₄₆	RA ₄₅	RA ₄₄	RA ₁₀₇	RA ₁₀₆	RA ₁₀₅	RA ₁₀₄
C	1	1	0	0	Y ₁₀	y ₈₀	y ₄₀	y ₂₀	y ₁₀	10-year digit register	RA ₅₁	RA ₅₀	RA ₄₉	RA ₄₈	RA ₁₁₁	RA ₁₁₀	RA ₁₀₉	RA ₁₀₈
D	1	1	0	1	C ₁	TPS	30ADJ	CNTR	24/12	Control register 1	RA ₅₅	RA ₅₄	RA ₅₃	RA ₅₂	RA ₁₁₅	RA ₁₁₄	RA ₁₁₃	RA ₁₁₂
E	1	1	1	0	C ₂	BUSY	PONC	—	*	Control register 2	RA ₅₉	RA ₅₈	RA ₅₇	RA ₅₆	RA ₁₁₉	RA ₁₁₈	RA ₁₁₇	RA ₁₁₆
F	1	1	1	1	C ₃	SYSR	TEST	MS ₁	MS ₀	Control register 3	Same as MODE 0				Same as MODE 0			

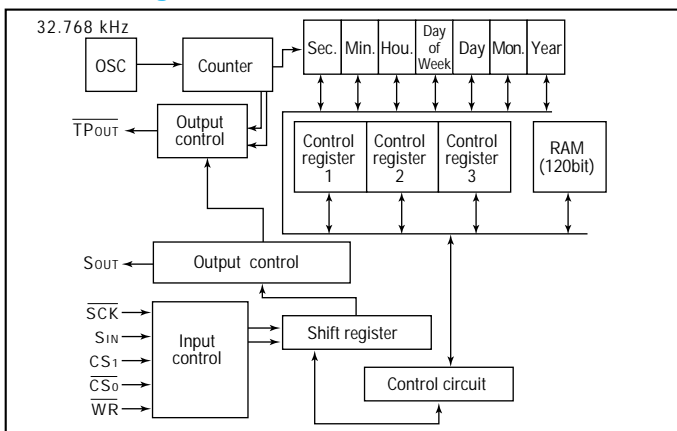
Note: * TEST bit should be "0".

AC characteristics

(Ta=-30 °C to +70 °C, VDD=5 V±10 %, GND=0 V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
SCK input frequency	fCLK	—	—	—	500	kHz
SCK "L" time	twckL	—	—	—	—	μs
SCK "H" time	twckH	—	1.0	—	—	
SCK pause time	tps	—	—	—	—	
CS ₀ setup time	tscs	—	0	—	—	
CS ₀ hold time	thcs	—	0.5	—	—	ns
S _{in} data setup time	tsd	—	0.2	—	—	
S _{in} data Hold time	tHD	—	—	—	—	
WR setup time	tswr	—	1.0	—	—	
WR hold time	thwr	—	0.5	—	—	ns
S _{out} delay time	tdso	—	—	150	500	
CS ₀ and CS ₁ enable to S _{out} output	tdsz1	—	—	—	—	
CS ₀ disable to S _{out} high Z	tdsz2	Cl=100 pF	—	—	100	
CS ₁ enable to S _{out} output	tdp21	—	—	—	—	ns
CS ₁ enable to S _{out} high Z	tdp22	—	—	—	—	

Block diagram



Timing chart

