



# REAL TIME CLOCK IC

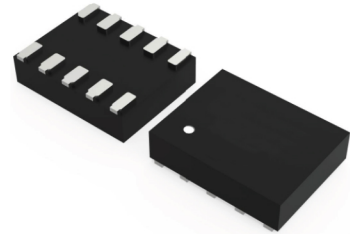
## REAL TIME CLOCK IC (Built-in Crystal Oscillator)

High-precision

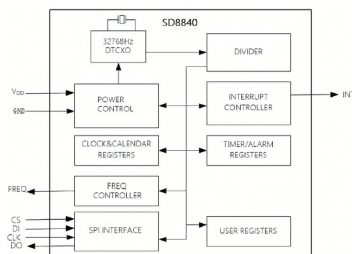


### ST8840

- Low power consumption: 0.6μA typical (VDD =3.0V, Ta=25°C).
- Operating voltage: 1.8V ~ 5.5V; Timekeeping: 1.5V ~ 5.5V.
- Operating temperature: Automotive Grade: -40°C~+125°C; Industrial Grade: -40°C~+85°C
- SPI interface, maximum speed 4Mbit/s.
- Chip pin ESD>4KV
- Passed AEC-Q100 Certification
- CMOS Process
- Package Form:3225 (3.2mmx2.5mmx0.75mm)



#### Block diagram



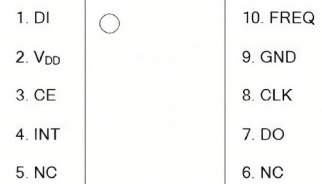
#### Overview

- Built-in 20-byte general-purpose SRAM
- high precision timing function in a wide temperature range: Automotive Grade: -40°C~+85°C<5ppm; +86°C~+105°C<10ppm; +106°C~+125°C<20ppm; Industrial Grade: 25°C<5ppm; -40°C~+85°C<20ppm.
- Built-in 1/1024 second register
- Built-in communication verification function
- Built-in clock data write-protection function

#### Pin Function

Pin	Name	Function	Feature
1	DI	SPI serial data input pin	CMOS input
2	VDD	Positive power supply pin	-
3	CE	SPI slave select input pin (includes a pull-down resistor)	CMOS input
4	INT	Alarm interrupt output pin	N-channel open-drain output
5, 6	NC	No internal connection to the chip	-
7	DO	SPI serial data output pin	CMOS output
8	CLK	Serial clock input pin	CMOS input
9	GND	Ground (GND)	-
10	FREQ	Frequency output terminal	CMOS output

#### Terminal connection



#### Characteristics

##### • DC characteristics

Symbol	Parameter	Condition	Minimum	Typical	Maximum	Unit
V <sub>DD</sub>	Main Supply Voltage		2.5		5.5	V
V <sub>IO</sub>	Interface Voltage		1.8		5.5	V
V <sub>keep</sub>	Keep-Alive Voltage		1.5		5.5	V
I <sub>CC1</sub>	Main Supply Current	f <sub>clk</sub> =0Hz, FREQ has no frequency output, INT is high impedance	V <sub>DD</sub> =5V	0.6	3.0	μA
			V <sub>DD</sub> =3V	0.5	2.0	
I <sub>CC1</sub>	V <sub>DD</sub> Current During Communication	f <sub>clk</sub> =4MHz			120	μA
		f <sub>clk</sub> =2MHz			100	μA
I <sub>IL</sub>	Input Leakage Current of CE/SCLK/DI	PIN connected to VDD or GND	-500		500	nA
I <sub>IO</sub>	Input/Output Leakage Current of INT/DO	PIN connected to VDD or GND	-500		500	nA
V <sub>OL</sub>	Low-Level Output Voltage of INT/DO	V <sub>DD</sub> =5V, I <sub>O2</sub> =1mA	GND		GND+0.3	V
V <sub>OH</sub>	High-Level Output Voltage of FREQ/DO	V <sub>DD</sub> =5V, I <sub>O1</sub> =1mA		4.5	5.0	V
V <sub>IL</sub>	Low-Level Input Voltage of CE/SCLK/DI		GND-0.3V		0.3×V <sub>DD</sub>	V
V <sub>IH</sub>	High-Level Input Voltage of CE/SCLK/DI			0.7×V <sub>DD</sub>	5.5	V
V <sub>D08</sub>	VDD Rise Rate During Power-Up		0.1		1	V/ms
V <sub>temp</sub>	Temperature Compensation Threshold Voltage			2.4		V

##### • Frequency Error & Temperature Relationship Curve

