
REAL-TIME CLOCK

S-3513B

S-3513B is a CMOS real-time clock IC, which is designed to transfer or set each data of a clock and calendar as requested by a CPU. This IC is connected to the CPU by three signal buses. It has a 32 kHz output pin and can supply signals to another IC. Because the oscillating circuit of the S-3513B is driven at constant voltage, the IC operates with low power consumption.

■ Features

- Low power consumption: 0.7 μ A typ. ($V_{DD}=3.0$ V)
- Wide area of operating voltage: 1.7 to 5.5 V
- BCD input/output of year, month, day, day of a week, hour, minute and second
- CPU interface via three wires
- Auto calendar till the year of 2,099 (automatic leap year arithmetic feature included)
- Built-in power voltage detecting circuit
- Built-in constant voltage circuit
- Built-in flag generating circuit on power on/off
- Uninterrupted 32 kHz clock signal output
- Built-in 32 kHz crystal oscillating circuit (internal Cd, external Cg)

■ Applications

- Cellular phone
- PHS
- A variety of pagers
- TV set and VCR
- Camera

■ Package

- 8-pin SSOP (pin pitch : 0.65 mm) (Package drawing code : FS008-A)

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■ Block Diagram

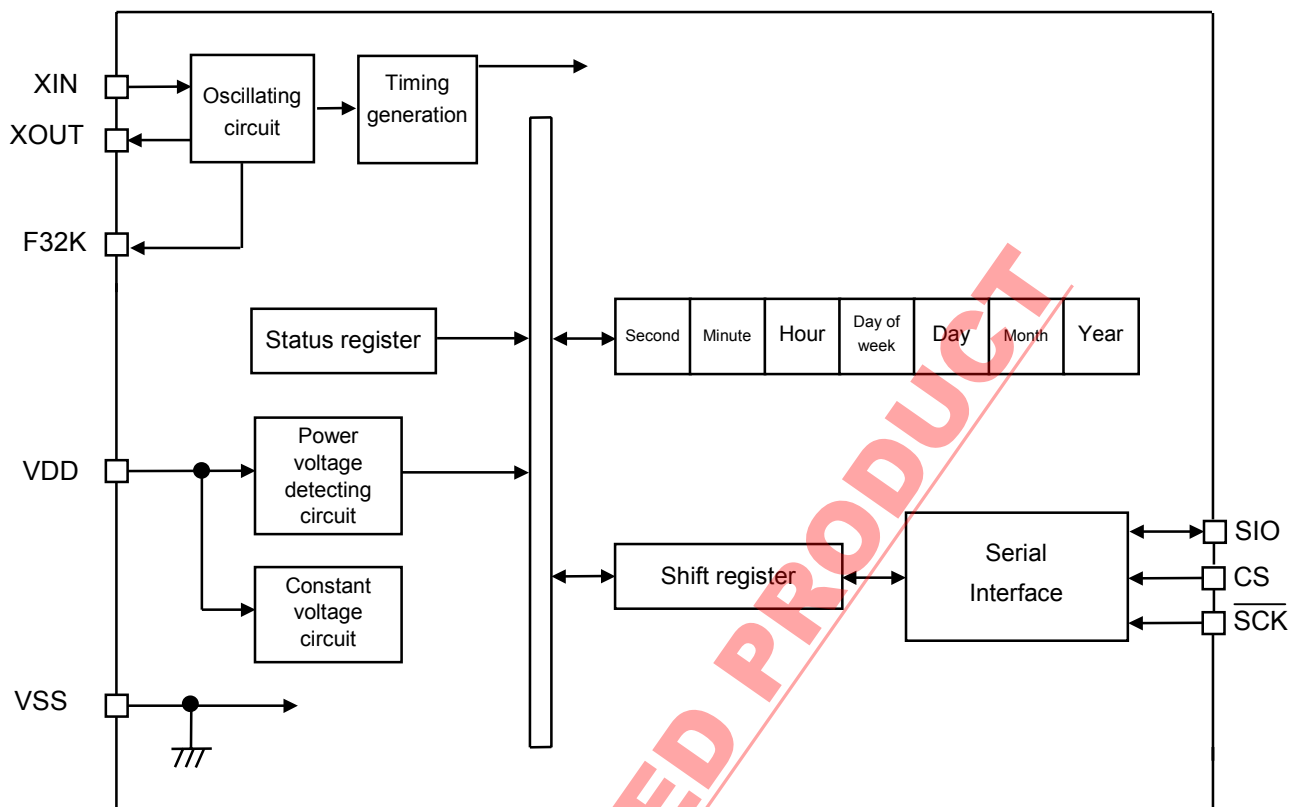
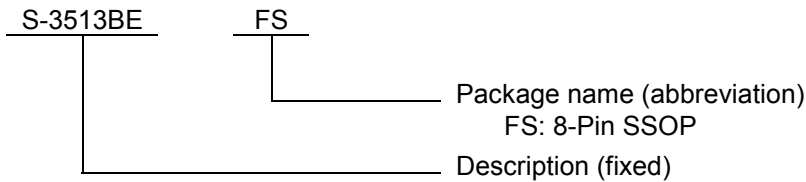


Figure 1

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Product Code Structure



Pin Assignment

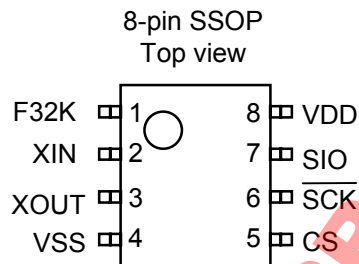


Figure 2

Description of Pins

Table 1

Pin No.	Symbol	Description	Configuration
1	F32K	32,768 kHz clock signal output pin Because these signals are output with no interruption, no command can control these signals.	Nch open drain output (No protective diode on the side of VDD)
2	XIN	Crystal oscillator connect pin (32,768 Hz)	–
3	XOUT	(Internal Cd, External Cg)	–
4	VSS	Negative power supply pin (GND)	–
5	CS	Chip select input pin. During “H” : The SIO pin allows data input/output. The SCK pin allows data input. During “L” : The SIO pin is in the Hi-Z state. The SCK pin is in the input-disabled state.	CMOS input (Included pull-down resistance. No protective diode on the side of VDD)
6	SCK	Serial clock input pin. The input/output of data from the SIO pin is performed in synchronization with this clock. However, the clock is not accepted while the CS pin is “L.”	CMOS input (No protective diode on the side of VDD)
7	SIO	Serial data input/output pin. It is normally in the Hi-Z state while the CS pin is “L”. When the CS pin changes from “L” to “H,” the SIO pin is set to an input pin. It will be set to an input or output pin, depending on an subsequently input command.	Nch open drain output (No protective diode on the side of VDD) CMOS input
8	VDD	Positive power supply pin.	–

■ Absolute Maximum Ratings

Table 2

Item	Symbol	Applicable pin, conditions	Rating	Unit
Power voltage	V_{DD}	–	$V_{SS}-0.3$ to $V_{SS}+6.5$	V
Input voltage	V_{IN}	Applied to SCK, SIO	$V_{SS}-0.3$ to $V_{SS}+6.5$	V
Output voltage	V_{OUT}	Applied to SIO, F32K	$V_{SS}-0.3$ to $V_{SS}+6.5$	V
Operating temperature	T_{opr}	$V_{DD}=3.0$ V	–40 to +85	°C
Storage temperature	T_{stg}	–	–55 to +125	°C

Caution The absolute maximum ratings are rated values exceeding which the product could suffer physical damage. These values must therefore not be exceeded under any conditions.

■ Recommended Operating Conditions

Table 3

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power voltage	V_{DD}	–	1.7	3.0	5.5	V
Operating temperature	T_{opr}	–	–20	+25	+70	°C

■ Oscillation Characteristics

Table 4

(Unless otherwise specified : $T_a=25^\circ\text{C}$, $V_{DD}=3$ V, DS-VT-200 (crystal oscillator, $C_L=6$ pF, 32,768 Hz) manufactured by SII Quartz Techno Ltd.)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Oscillation start voltage	V_{STA}	Within 10 seconds	1.7	–	5.5	V
Oscillation start time	T_{STA}	–	–	–	1	s
IC-to-IC frequency diversity	δIC	–	–10	–	+10	ppm
Frequency voltage diversity	δV	$V_{DD}=1.7$ to 5.5 V	–3	–	+3	ppm/V
Input capacity	C_g	Applied to the XIN pin	3	–	35	pF
Output capacity	C_d	Applied to the XOUT pin	–	12	–	pF

■ DC Electrical Characteristics

Table 5 DC characteristics (3 V)

 (Unless otherwise specified : Ta=25°C, V_{DD}=3 V, DS-VT-200 (crystal oscillator, C_L=6 pF, 32,768 Hz) manufactured by SII Quartz Techno Ltd.)

Item	Symbol	Applicable pin	Condition	Min.	Typ.	Max.	Unit
Operating voltage range	V _{DD}	–	Ta= –20 to +70°C	1.7	3.0	5.5	V
Current consumption 1	I _{DD1}	–	During no communications	–	0.7	1.5	μA
Current consumption 2	I _{DD2}	–	During communications (SCL=100 kHz)	–	5.5	10	μA
Input leak current 1	I _{IZH}	$\overline{\text{SCK}}$, SIO	V _{IN} =V _{DD}	–0.5	–	0.5	μA
Input leak current 2	I _{IZL}	$\overline{\text{SCK}}$, SIO	V _{IN} =V _{SS}	–0.5	–	0.5	μA
Input current 1	I _{IL1}	CS	V _{IN} =5.5 V	2	6	20	μA
Input current 2	I _{IL2}	CS	V _{IN} =0.4 V	40	110	300	μA
Output leak current1	I _{OZH}	F32K, SIO	V _{OUT} =V _{DD}	–0.5	–	0.5	μA
Output leak current2	I _{OZL}	F32K, SIO	V _{OUT} =V _{SS}	–0.5	–	0.5	μA
Input voltage 1	V _{IH}	SIO, $\overline{\text{SCK}}$, CS	–	0.8×V _{DD}	–	–	V
Input voltage 2	V _{IL}	SIO, $\overline{\text{SCK}}$, CS	–	–	–	0.2×V _{DD}	V
Output current 1	I _{OL1}	F32K	V _{OUT} =0.4 V	1.5	2.5	–	mA
Output current 2	I _{OL2}	SIO	V _{OUT} =0.4 V	5	10	–	mA
Power voltage detection voltage 1	V _{DET1}	–	Ta=+25°C	1.8	2.0	2.2	V
Power voltage detection voltage 2	V _{DET2}	–	Ta= –20 to +70°C	1.72	–	2.3	V

Table 6 DC characteristics (5 V)

 (Unless otherwise specified : Ta=25°C, V_{DD}=5 V, DS-VT-200 (crystal oscillator, C_L=6 pF, 32,768 Hz) manufactured by SII Quartz Techno Ltd.)

Item	Symbol	Applicable pin	Condition	Min.	Typ.	Max.	Unit
Operating voltage range	V _{DD}	–	Ta= –20 to +70°C	1.7	3.0	5.5	V
Current consumption 1	I _{DD1}	–	During no communications	–	1.6	3.0	μA
Current consumption 2	I _{DD2}	–	During communications (SCL=100 kHz)	–	12	20	μA
Input leak current 1	I _{IZH}	$\overline{\text{SCK}}$, SIO	V _{IN} =V _{DD}	–0.5	–	0.5	μA
Input leak current 2	I _{IZL}	$\overline{\text{SCK}}$, SIO	V _{IN} =V _{SS}	–0.5	–	0.5	μA
Input current 1	I _{IL1}	CS	V _{IN} =5.5 V	10	25	50	μA
Input current 2	I _{IL2}	CS	V _{IN} =0.4 V	100	175	400	μA
Output leak current1	I _{OZH}	F32K, SIO	V _{OUT} =V _{DD}	–0.5	–	0.5	μA
Output leak current2	I _{OZL}	F32K, SIO	V _{OUT} =V _{SS}	–0.5	–	0.5	μA
Input voltage 1	V _{IH}	SIO, $\overline{\text{SCK}}$, CS	–	0.8×V _{DD}	–	–	V
Input voltage 2	V _{IL}	SIO, $\overline{\text{SCK}}$, CS	–	–	–	0.2×V _{DD}	V
Output current 1	I _{OL1}	F32K	V _{OUT} =0.4 V	2.0	3.5	–	mA
Output current 2	I _{OL2}	SIO	V _{OUT} =0.4 V	6	12	–	mA
Power voltage detection voltage 1	V _{DET1}	–	Ta=+25°C	1.8	2.0	2.2	V
Power voltage detection voltage 2	V _{DET2}	–	Ta= –20 to +70°C	1.72	–	2.3	V

■ AC Electrical Characteristics

(S-3513B, $R_L=10\text{ K}\Omega$, $C_L=80\text{ pF}$)

Table 7 AC characteristics 1

Conditions : $V_{DD}=1.7\text{ V to }5.5\text{ V}$, $T_a=-20\text{ to }70^\circ\text{C}$

Input; $V_{IH}=0.8 \times V_{DD}$, $V_{IL}=0.2 \times V_{DD}$, Output; $V_{OH}=0.8 \times V_{CC}$, $V_{OL}=0.2 \times V_{CC}$ ($V_{CC}=5.0\text{ V}$)

Item	Symbol	Min.	Typ.	Max.	Unit
Clock pulse width	t_{SCK}	5	–	250000	μs
Setup time before CS rising	t_{DS}	1	–	–	μs
Hold time after CS rising	t_{CSH}	1	–	–	μs
Input data setup time	t_{ISU}	1	–	–	μs
Input data hold time	t_{IHO}	1	–	–	μs
Output data definition time	t_{ACC}	–	–	3.5	μs
Setup time before CS falling	t_{CSS}	1	–	–	μs
Hold time after CS falling	t_{DH}	1	–	–	μs
Input rising/falling time	t_R, t_F	–	–	0.1	μs

Caution Since the output form of the SIO pin is Nch open-drain output, the rising time of t_{ACC} is determined by the values of load resistance (R_L) and load capacity (C_L) outside the IC. Use this as a reference value.

Table 8 AC characteristics 2

Conditions : $V_{DD}=3.0 \pm 0.3\text{ V}$, $T_a=-20\text{ to }70^\circ\text{C}$

Input; $V_{IH}=0.8 \times V_{DD}$, $V_{IL}=0.2 \times V_{DD}$, Output; $V_{OH}=0.8 \times V_{CC}$, $V_{OL}=0.2 \times V_{CC}$ ($V_{CC}=5.0\text{ V}$)

Item	Symbol	Min.	Typ.	Max.	Unit
Clock pulse width	t_{SCK}	0.7	–	250000	μs
Setup time before CS rising	t_{DS}	0.2	–	–	μs
Hold time after CS rising	t_{CSH}	0.2	–	–	μs
Input data setup time	t_{ISU}	0.2	–	–	μs
Input data hold time	t_{IHO}	0.2	–	–	μs
Output data definition time	t_{ACC}	–	–	1.0	μs
Setup time before CS falling	t_{CSS}	0.2	–	–	μs
Hold time after CS falling	t_{DH}	0.2	–	–	μs
Input rising/falling time	t_R, t_F	–	–	0.05	μs

Caution Since the output form of the SIO pin is Nch open-drain output, the rising time of t_{ACC} is determined by the values of load resistance (R_L) and load capacity (C_L) outside the IC. Use this as a reference value.

Table 9 AC characteristics 3

Conditions : $V_{DD}=5.0 \pm 0.5\text{ V}$, $T_a=-20\text{ to }70^\circ\text{C}$

Input; $V_{IH}=0.8 \times V_{DD}$, $V_{IL}=0.2 \times V_{DD}$, Output; $V_{OH}=0.8 \times V_{CC}$, $V_{OL}=0.2 \times V_{CC}$ ($V_{CC}=5.0\text{ V}$)

Item	Symbol	Min.	Typ.	Max.	Unit
Clock pulse width	t_{SCK}	0.5	–	250000	μs
Setup time before CS rising	t_{DS}	0.1	–	–	μs
Hold time after CS rising	t_{CSH}	0.1	–	–	μs
Input data setup time	t_{ISU}	0.1	–	–	μs
Input data hold time	t_{IHO}	0.1	–	–	μs
Output data definition time	t_{ACC}	–	–	0.3	μs
Setup time before CS falling	t_{CSS}	0.1	–	–	μs
Hold time after CS falling	t_{DH}	0.1	–	–	μs
Input rising/falling time	t_R, t_F	–	–	0.05	μs

Caution Since the output form of the SIO pin is Nch open-drain output, the rising time of t_{ACC} is determined by the values of load resistance (R_L) and load capacity (C_L) outside the IC. Use this as a reference value.

■ Timing Charts

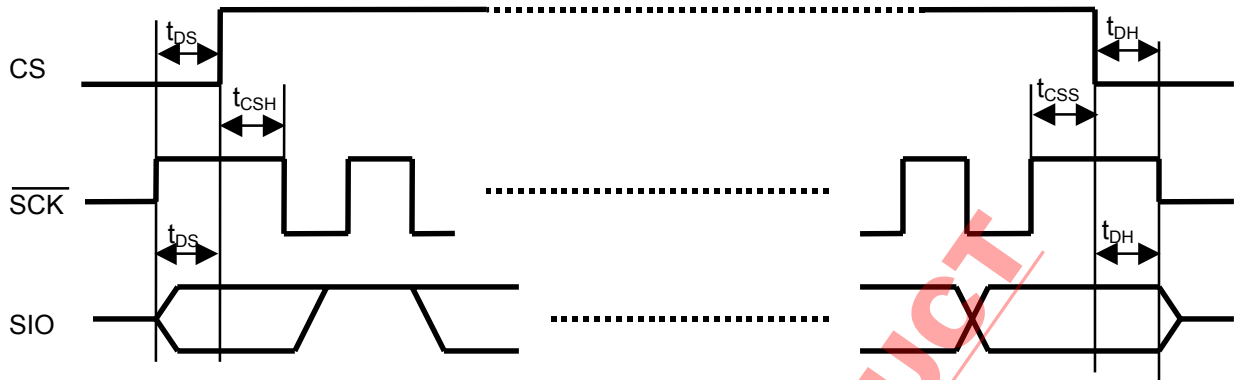


Figure 3

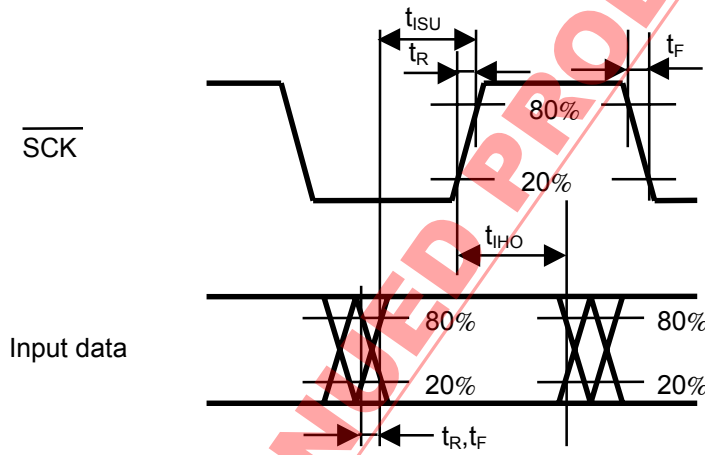


Figure 4

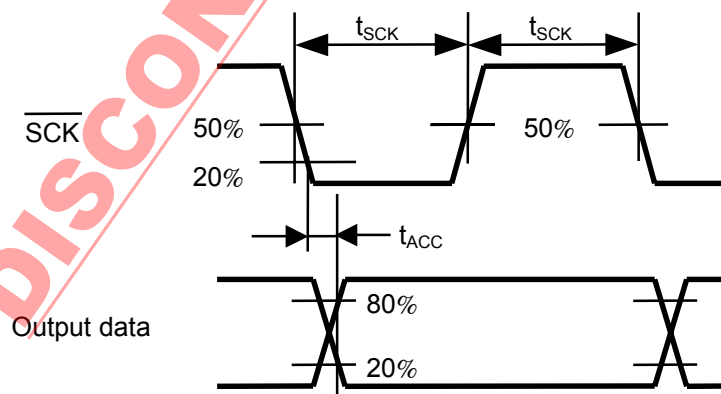


Figure 5

■ Description of Operation

1. Serial interface

S-3513B receives various commands via a 3-wire serial interface to read/write data. This section covers the transfer methods of this product.

1.1 Communication data configuration

After turning the CS pin to "H", send a 4-bit fixed code "0110" and succeedingly transfer the command of a 3-bit length and read/write command of a 1-bit length.

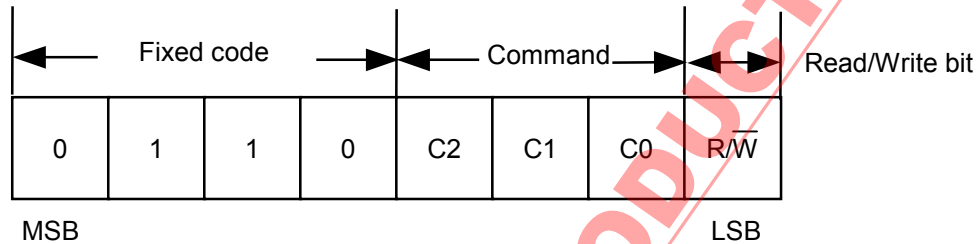


Figure 6 Communication data

1.2 Command configuration

There are six types of commands which read from and write to various registers. The table below lists them. Any command that is not listed in the table provides no operation.

Table 10 Command list

C2	C1	C0	Description
0	0	0	Reset (00 (year), 01 (month), 01 (day), 0 (day of week), 00 (minute), 00 (second)) *1
0	0	1	Status register access
0	1	0	Real-time data access 1 (year data to)
0	1	1	Real-time data access 2 (hour data to)
1	1	0	Test mode start *2
1	1	1	Test mode end *2

*1. Don't care the R/W bit of this command.

*2. This command is access-disabled due to specific use for the IC test.

Caution Do not enter a command not listed in the above table.

1.3 Data reading

When you input data from the SIO pin in synchronization with the falling of the \overline{SCK} pin after turning the CS pin to "H", the data is included into the inside of S-3513B at the eighth rising of the SCK clock and the state of data reading is reached when the R/W bit has "1". The state leads to output of data corresponding each command in synchronization with the falling of subsequent SCK clock input.

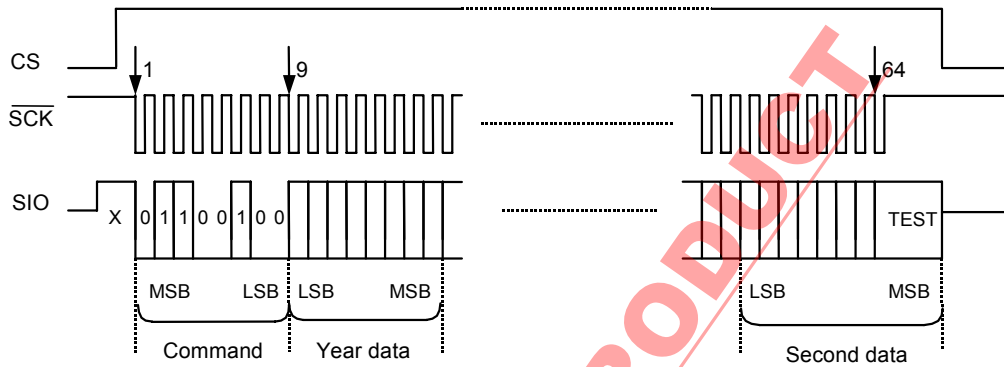
Remark When the number of SCK clocks is less than eight, the state of clock waiting is reached and no processing is done.

When SCK clocks are more than required, they are processed in order from the first and the clocks other than those required are ignored.

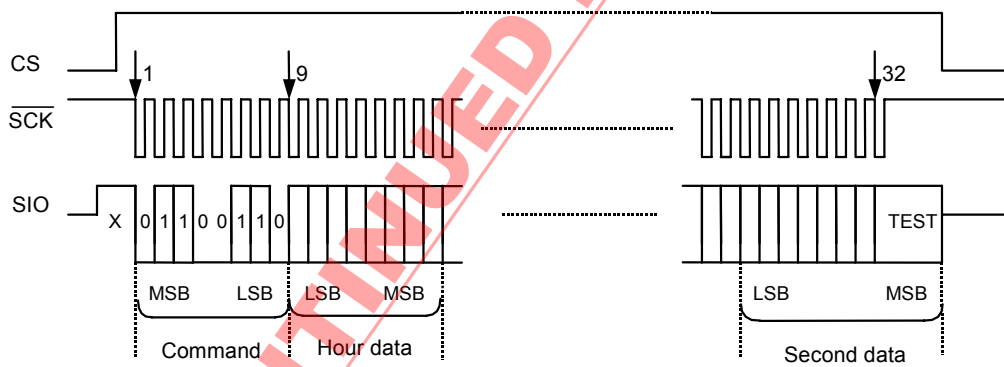
1.2 Data writing

When you input data from the SIO pin in synchronization with the falling of the $\overline{\text{SCK}}$ pin after turning the CS pin to "H", the data is included into the inside of S-3513B at the eighth rising of the SCK clock and the state of data writing is reached when the R/W bit has "0". In the state, the data is written to registers according each command in synchronization with the falling of subsequent SCK clock input.

(1) Real-time data writing 1



(2) Real-time data writing 2



(3) Status register writing

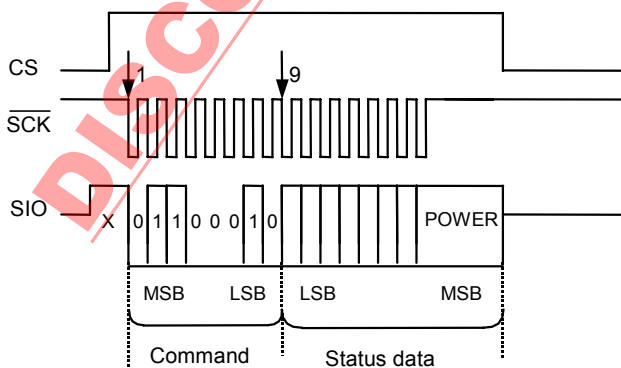


Figure 8 Write communication

2. Register configuration

2.1 Real-time data register

The real-time data register is a 56-bit register which stores the BCD code of the data of year, month, day, day of week, hour, minute and second. Any read/write operation performed by the real-time data access command sends or receives the data from LSB on the first digit of the year data.

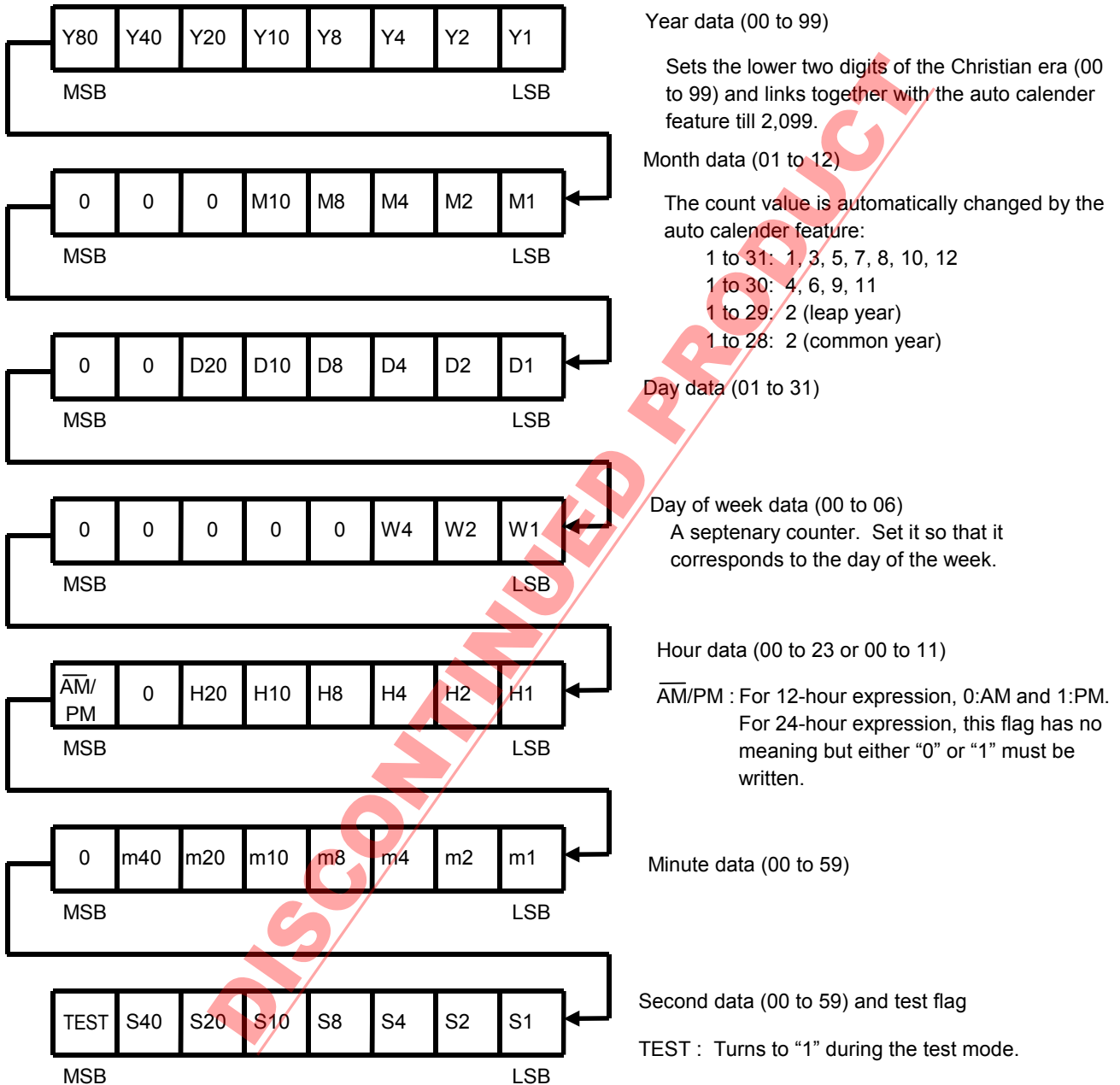


Figure 9

2.2 Status register

The status register, which is an 8-bit register, is used to display and set modes. The POWER flag is dedicated to read operations.

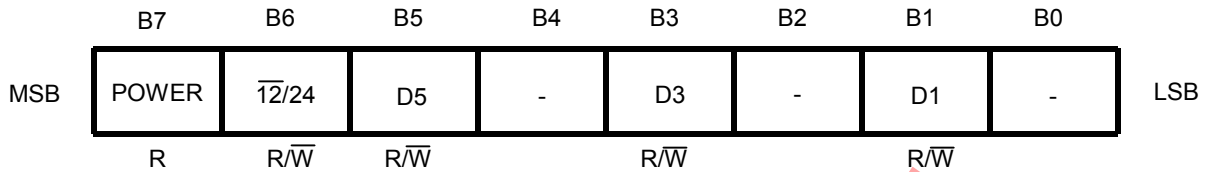


Figure 10

B7:POWER This flag turns to "1" if the power voltage detecting circuit operates during power-on or changes in power voltage (below V_{DET}). Once turning to "1," this flag does not turn back to "0" even when the power voltage reaches or exceeds the detection voltage. When the flag is "1," you must send the reset command (or the status register read command), and turn it to "0." It is a read-only flag.

B6: $\overline{12/24}$ This flag is used to set 12-hour or 24-hour expression.

- 0 : 12-hour expression
- 1 : 24-hour expression

B5, B3, B1: These bits can be used as user memory bits. They have no effect on the timer function.

B4, B2, B0: These bits are ignored when data has been written to them. When data is read from them, it is undetermined.

2.3 Test flag

The test flag is a 1-bit register which is assigned to MSB of the second data of the real-time data register. If transferred data is considered as the test mode starting command due to the receiving of the test mode starting command or noises, "1" is set. When "1" is set, you must send the test mode ending command or reset command.

3. Initialization

Note that S-3513B has different initializing operations, depending on states.

3.1 When power is turned on

When power is turned on, the status register is set to "82h" and the INT register to "8000h." In other words, "1" is set in bit 7 (POWER flag) of the status register. In normal use, make sure to send the reset command when turning on the power.

- Real-time data register : 00 (year), 01 (month), 01 (day), 0 (day of week), 00 (hour), 00 (minute), 00 (second)
- Status register : "82h"

3.2 When the power voltage detecting circuits operates

The power voltage detecting circuit included in S-3513B operates and sets "1" at the bit 7 (POWER flag) of the internal status register when power is turned on or power voltage is reduced. Once "1" is set, it is held even after the power voltage gets equal to or higher than the detection voltage, i.e., power voltage detector threshold. When the flag has "1," you must send the reset command from CPU and initialize the flag. At this point, other registers does not change. However, if the POWER flag has "0" during the power-on reset of CPU (S-3513B does not reach any indefinite area during backup), you do not have to send the reset command.

3.3 When the reset command is received

When the reset command is received, each register turns as follows:

Real-time data register : 00 (year), 01 (month), 01 (day), 0 (day of week), 00 (hour), 00 (minute), 00 (second)
 Status register : "00h"

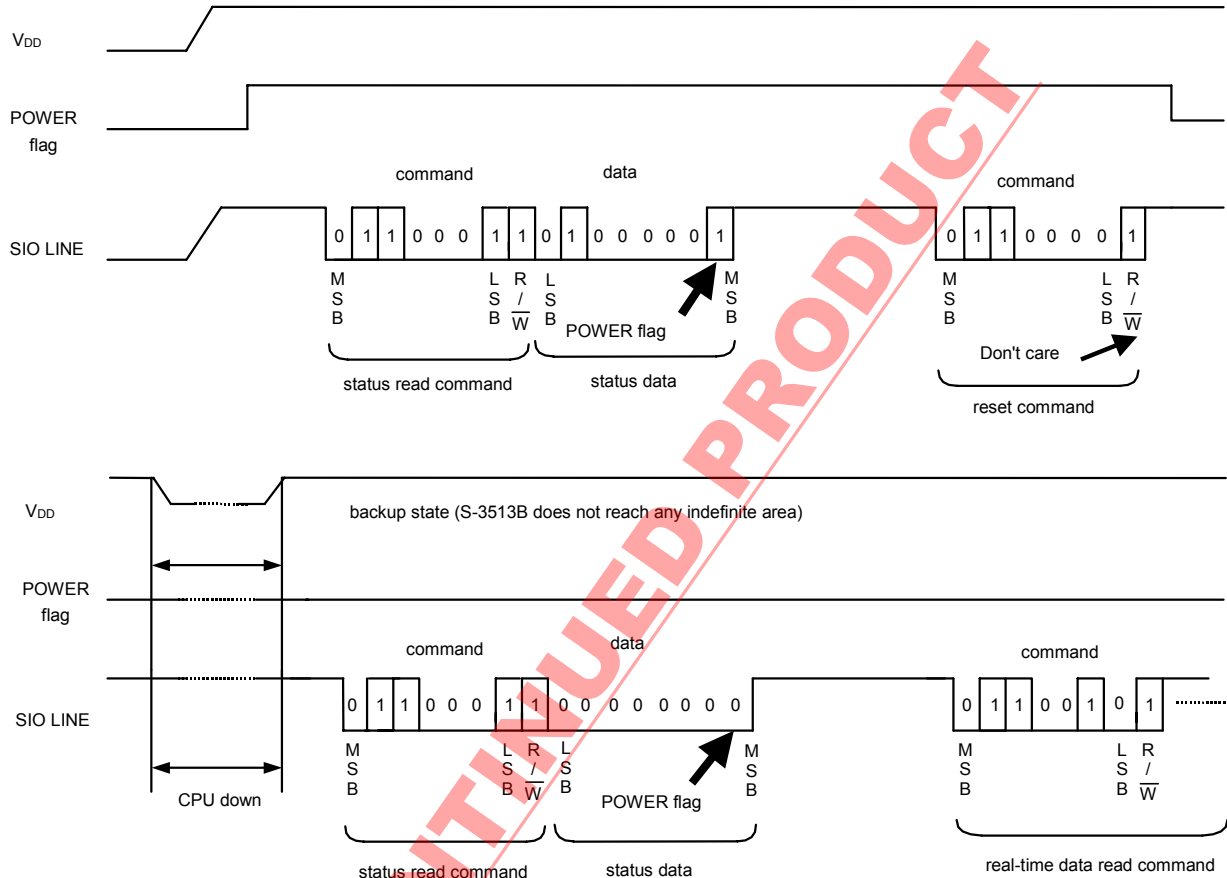


Figure 11 Initializing

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4. Processing of none-existent data and end-of-month

When writing real-time data, validate it and treat any invalid data and end-of-month correction.

[None-existent data processing]

Table 11

Register	Normal data	Error data	Result
Year data	00 to 99	XA to XF, AX to FX	00
Month data	01 to 12	00, 13 to 19, XA to XF	01
Day data	01 to 31	00, 32 to 39, XA to XF	01
Day of week data	0 to 6	7	0
Hour data ^{*1} (24-hour)	0 to 23	24 to 29, 3X, XA to XF	00
(12-hour)	0 to 11	12 to 19, XA to XF	00
Minute data	00 to 59	60 to 79, XA to XF	00
Second data ^{*2}	00 to 59	60 to 79, XA to XF	00

- *1. For 12-hour expression, write the AM/PM flag.
The AM/PM flag is ignored in 24-hour expression, but "0" for 0 to 11 o'clock and "1" for 12 to 23 o'clock are read in a read operation.
- *2. None-existent data processing for second data is performed by a carry pulse one second after the end of writing. At this point, the carry pulse is sent to the minute counter.

[End-of-month correction]

Any none-existent day is corrected to the first day of the next month. For example, February 30 is changed to March 1. Leap-year correction is also performed here.

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5. Power voltage detecting circuit

S-3513B has an internal power voltage detecting circuit. This circuit gives sampling movement for only 15.6 ms. once a second. If the power voltage decreases below the detection voltage (V_{DET}), the BLD latch circuit latches the "H" level, and sampling movement stops. Only when subsequent communication of the status read command, the output of the latch circuit is transferred to the shift register and the sampling movement is resumed. Decrease in power voltage can be monitored by reading the POWER flag. That is to say, once decrease in power voltage is detected, any detecting operation is not performed and "H" is held unless you perform initialization or send the status read command.

Caution When power voltage is increased and the first read operation is performed after decrease in power voltage occurs and the latch circuit latches "H", "1" can be read on the POWER flag, however, if the next read operation is performed after the sampling of the detecting circuit, the POWER flag is reset since sampling is subsequently allowed. See the timing diagram below.

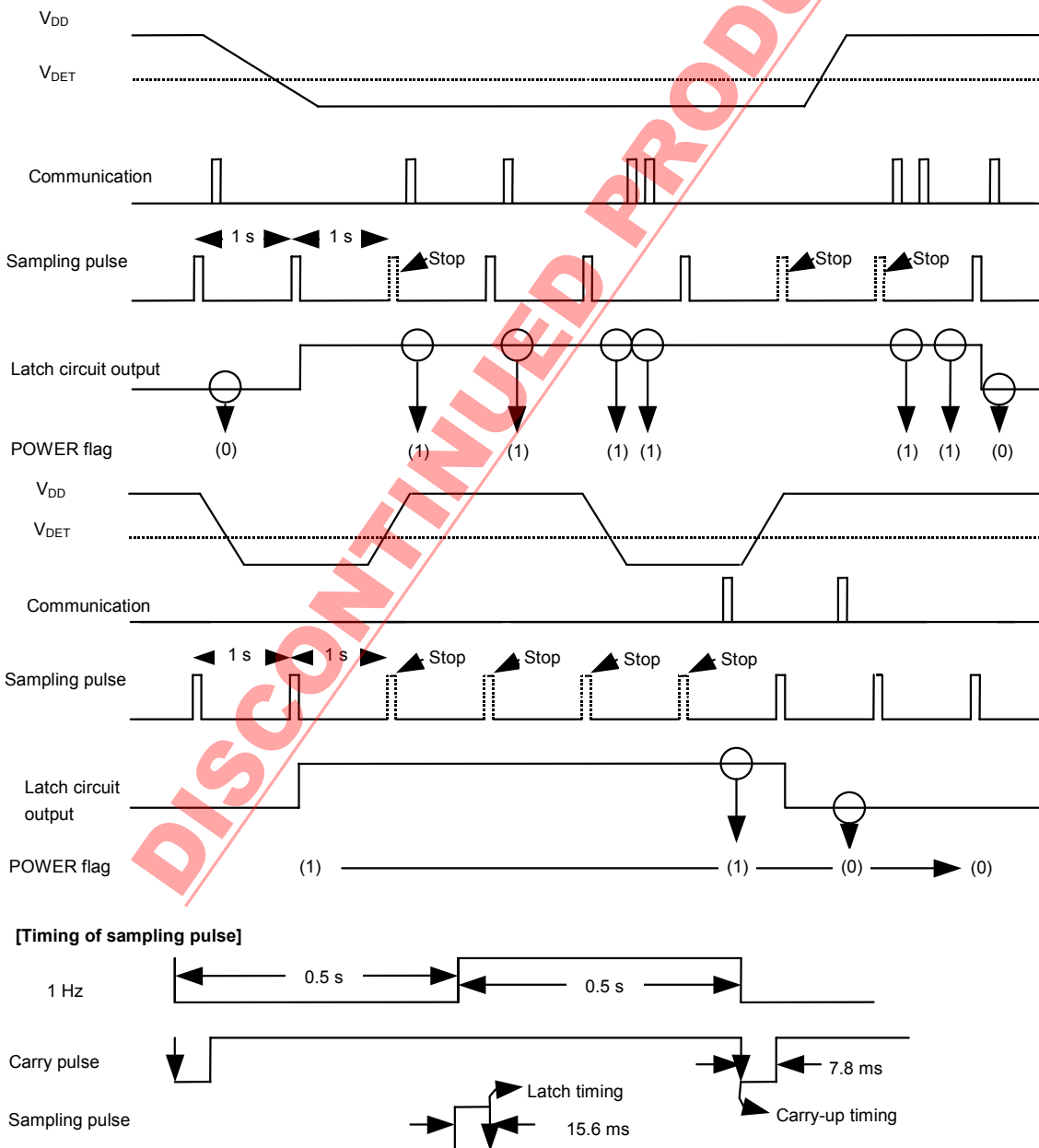
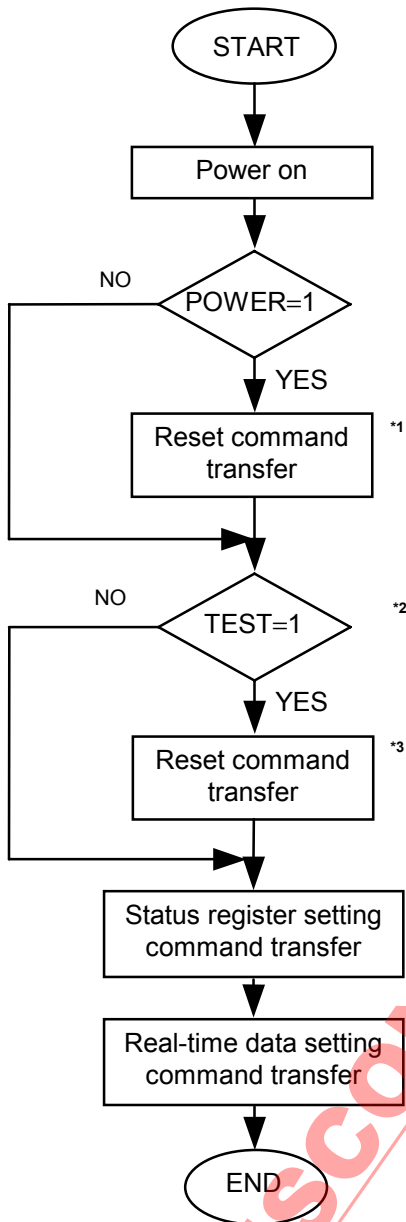


Figure 12 Timing of the power voltage detecting circuit

6. Example of software treatment

(1) Initialization flow at power-on



*1. If S-3513B is back-up and power is turned on only on the CPU side, the reset command does not need transferring.

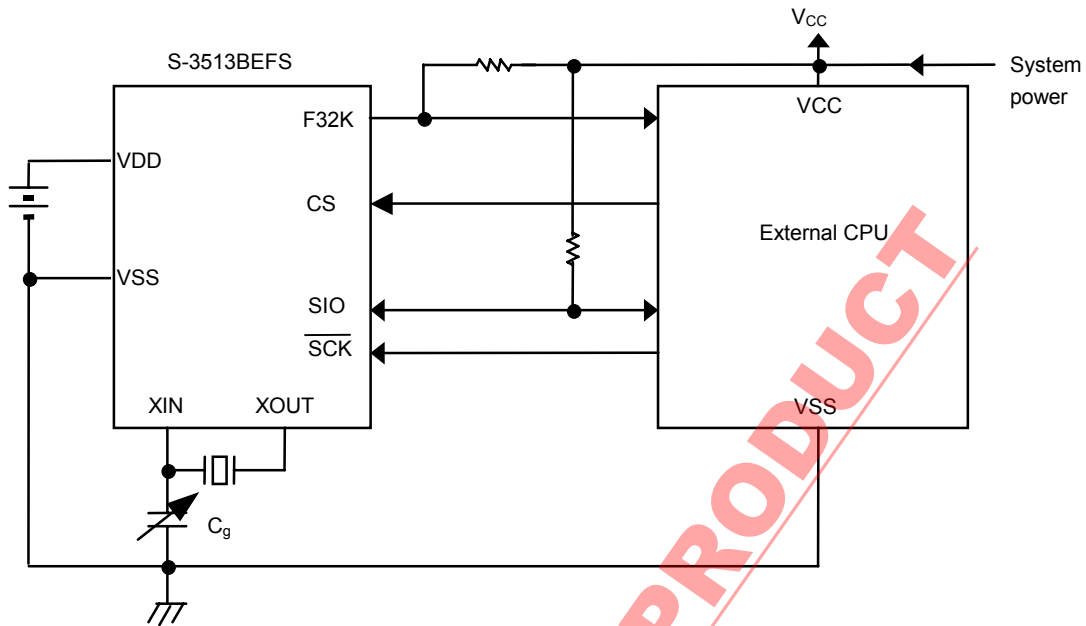
*2. If conditions are no good (e.g., noise) and probable changes in commands occurs via serial communications, it is recommended to make sure the TEST flag.

*3. The test ending command may be used iteratively.

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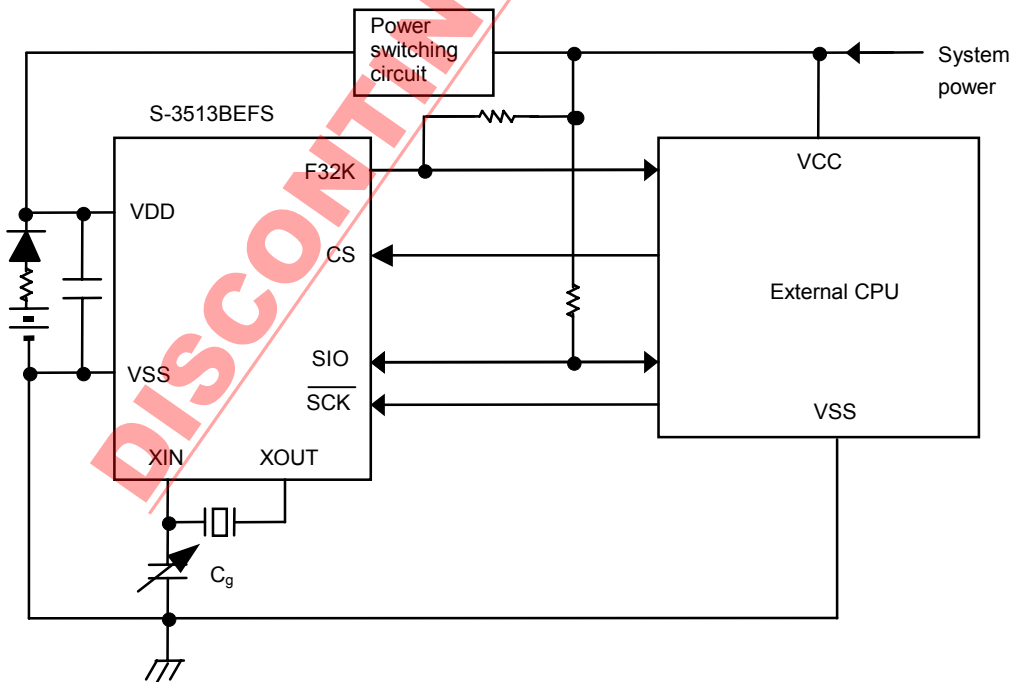
Figure 13 Initialization flow

■ Samples of Application Circuits



Due to the I/O pin with no protective diode on the VDD side, the relation of $VCC \geq VDD$ has no problem but give great care to the standard.
Make communications after the system power is turned on and a stable state is obtained.

Figure 14 Application circuit 1



Make communications after the system power is turned on and a stable state is obtained.

Figure 15 Application circuit 2

Caution The applied circuits above do not guarantee proper operation.
Evaluate in the actual application to determine the correct constants.

■ Adjustment of Oscillating Frequency

1. Configuration of the oscillating circuit

Since crystal oscillation is sensitive to external noises (clock accuracy is affected), the following measures are essential for optimizing your oscillating circuit configuration:

- (1) Place S-3513B, crystal oscillator and external capacitor (C_g) as close to each other as possible.
- (2) Make high the insulation resistance between pins and the substrate wiring patterns of XIN and XOUT.
- (3) Do not place any signal or power lines close to the oscillating circuit.

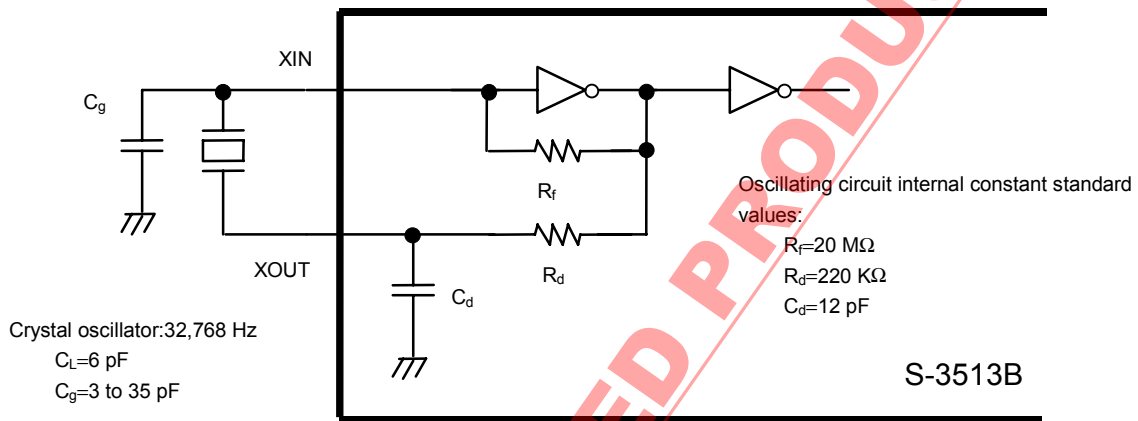


Figure 16 Connection diagram

2. Measurement of oscillating frequencies

Referring to the circuit configuration in Figure 17, turn on the power and measure oscillating frequencies with a frequency counter.

Remark If the error range is ± 5 ppm in relation to 32,768 Hz, time shifts by about ± 13 seconds a month (as calculated using the following expression).

$$5 \times 10^{-6} (1 \text{ ppm}) \times 60 \text{ seconds} \times 60 \text{ minutes} \times 24 \text{ hours} \times 30 \text{ days} = 13 \text{ seconds/month}$$

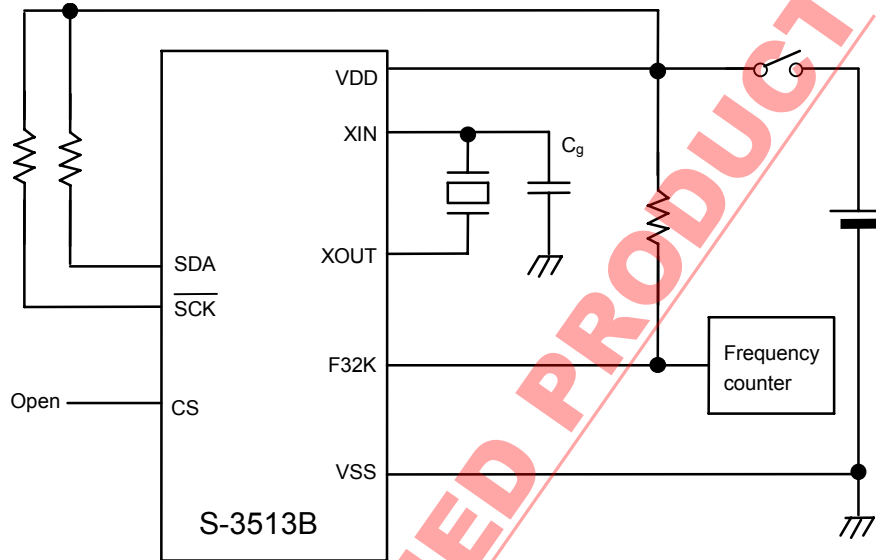


Figure 17 Connection diagram

- Caution 1.** Use a high-accuracy frequency counter (1 ppm order).
2. The 32,768 Hz signal is output uninterruptedly.
3. Determine C_g with its frequency slow/fast range property referred.

3. Adjustment of oscillating frequencies

Matching of a crystal oscillator with the nominal frequency must be performed with parasitic capacitance on the board included. Select a crystal oscillator and optimize the C_g value in accordance with the flow chart below.

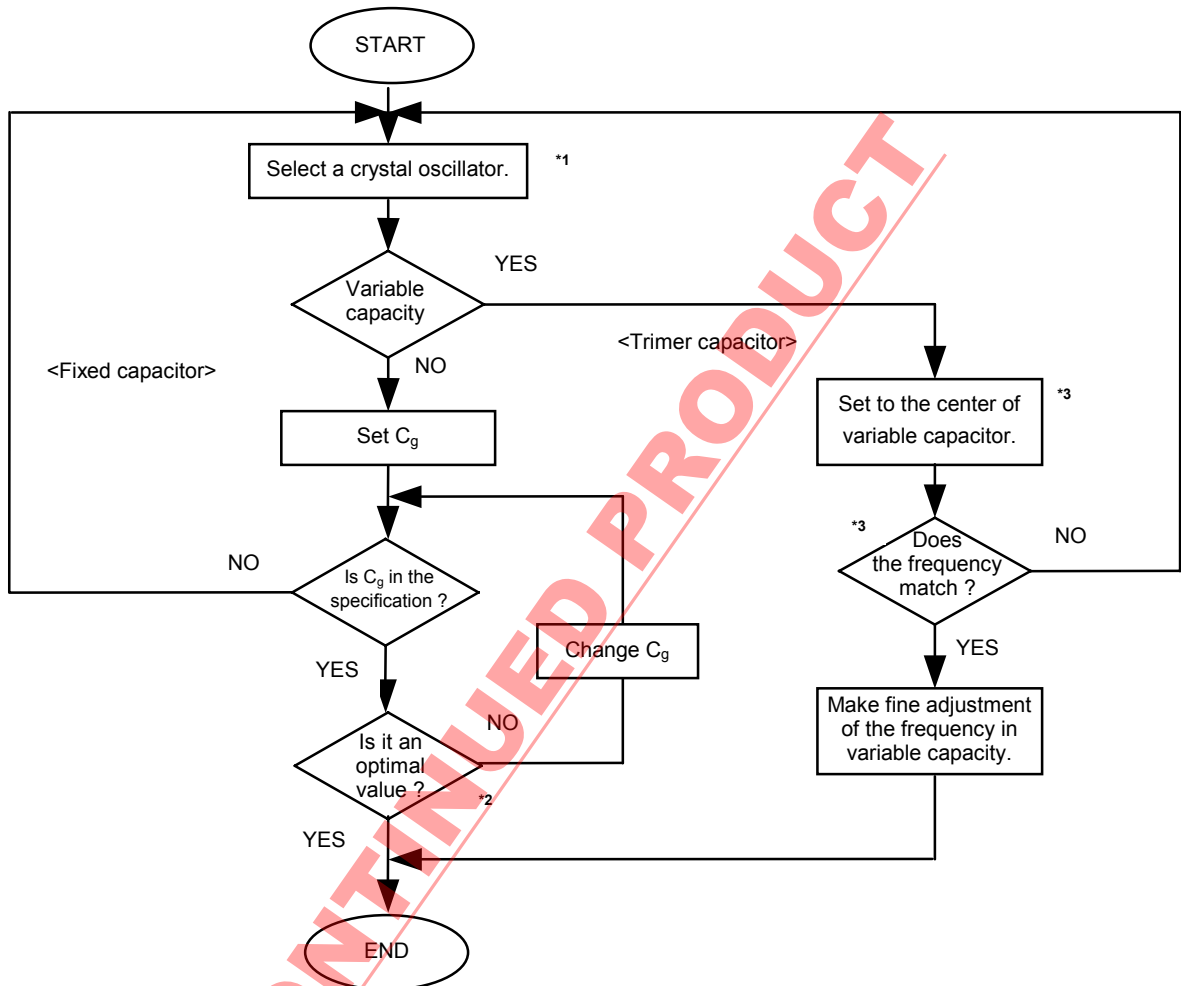


Figure 18 Crystal oscillator setting flow

- *1. For making matching adjustment of the IC with a crystal, contact an appropriate crystal maker to determine the C_L value (load capacity) and R_1 value (equivalent serial resistance). The C_L value = 6 pF and R_1 value = 30 kΩ Typ. are recommended values.
- *2. C_g value selection must be performed on the actual PCB since parasitic capacitance affects it. Select the C_g value in a range from 3 pF to 35 pF. If the frequency does not match, change the C_L value of the crystal.
- *3. Adjust the rotation angle of the variable capacity so that the capacity value is somewhat smaller than the center, and confirm the oscillating frequency and the center value of the variable capacity. This is done in order to make the capacity of the center value smaller than one half of the actual capacity value because a smaller capacity value makes a greater quantity of changes in a frequency. If the frequency does not match, change the C_L value of the crystal.

Caution 1. Oscillating frequencies are changed by ambient temperature and power voltage. Refer to property samples.

2. The 32 kHz crystal oscillator operates slower at higher or lower ambient temperature than 20 to 25°C. Therefore, it is recommended to adjust or set the oscillator to operate somewhat faster at normal temperature.

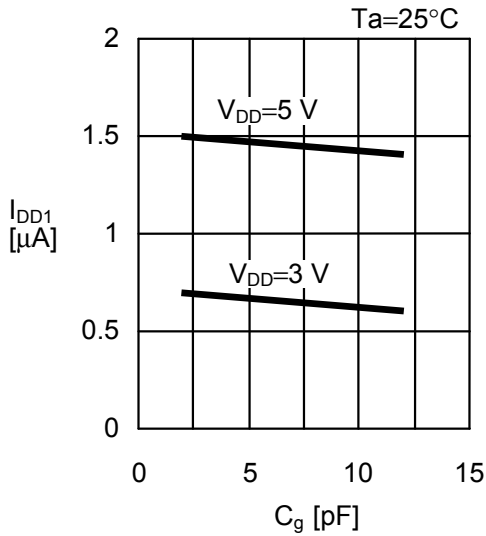
■ Precautions

- Do not apply an electrostatic discharge to this IC that exceeds the performance ratings of the built-in electrostatic protection circuit.
- SII claims no responsibility for any disputes arising out of or in connection with any infringement by products including this IC of patents owned by a third party.

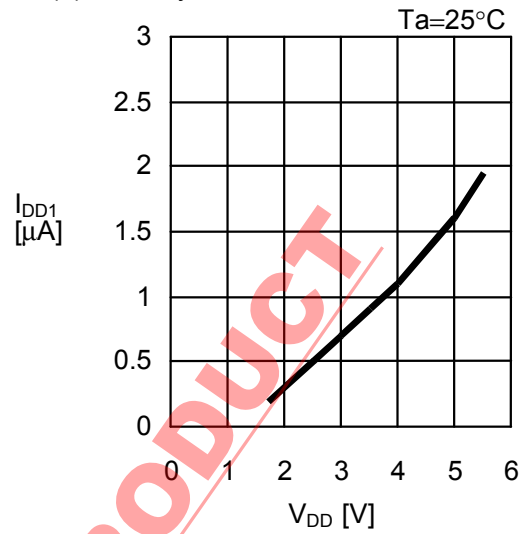
DISCONTINUED PRODUCT

■ **Characteristics (Reference Data)**

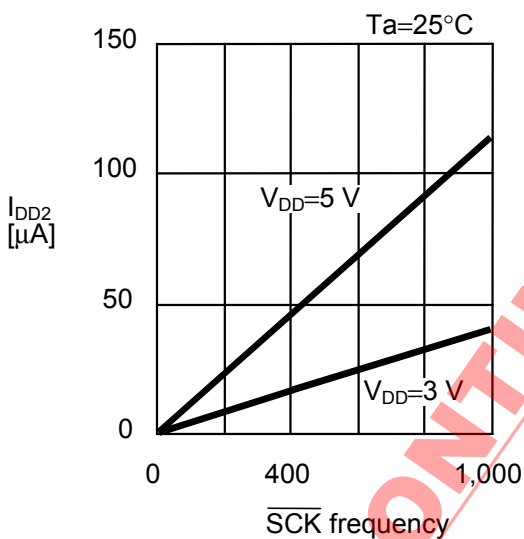
(1) Standby current vs. C_g



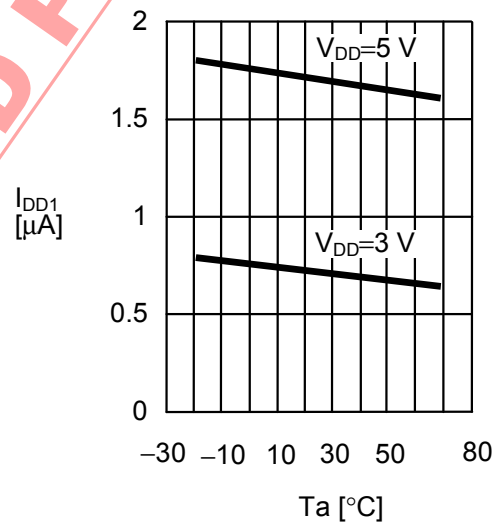
(2) Standby current vs. V_{DD}



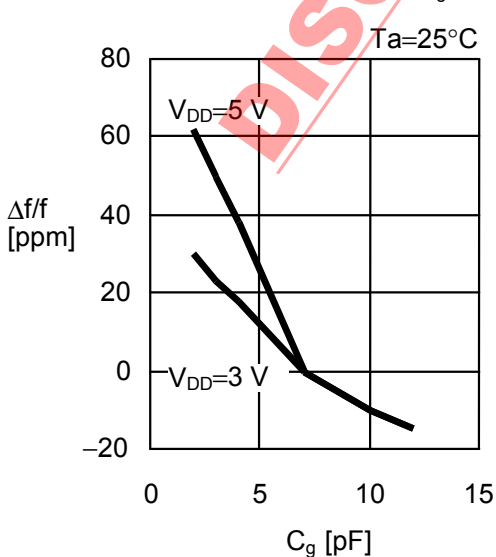
(3) Operating drain current vs. Input clock



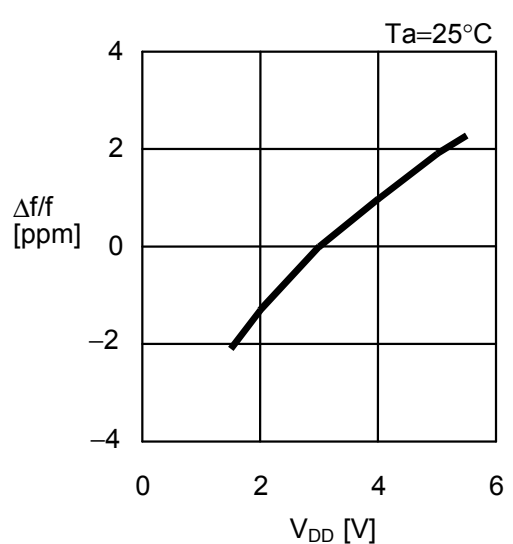
(4) Standby current vs. temperature



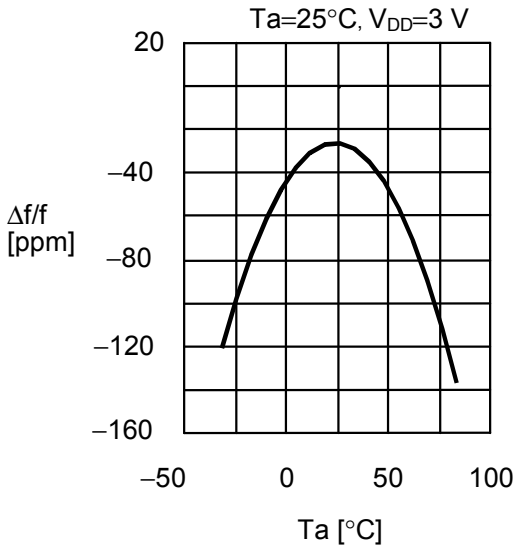
(5) Oscillating frequency vs. C_g



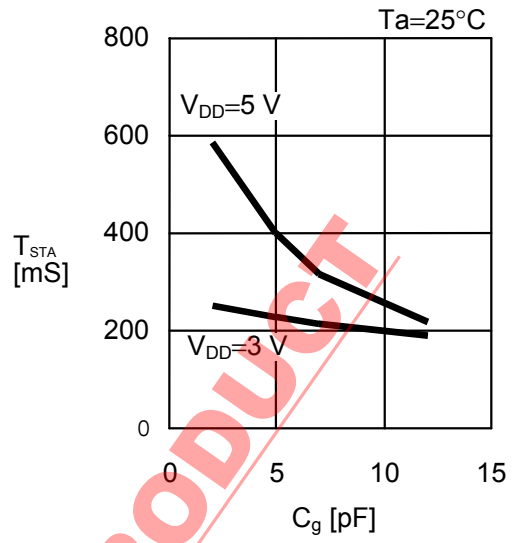
(6) Oscillating frequency vs. V_{DD}



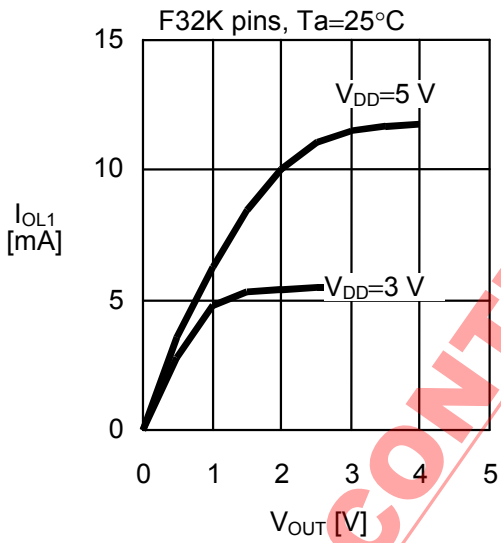
(7) Oscillating frequency vs. temperature



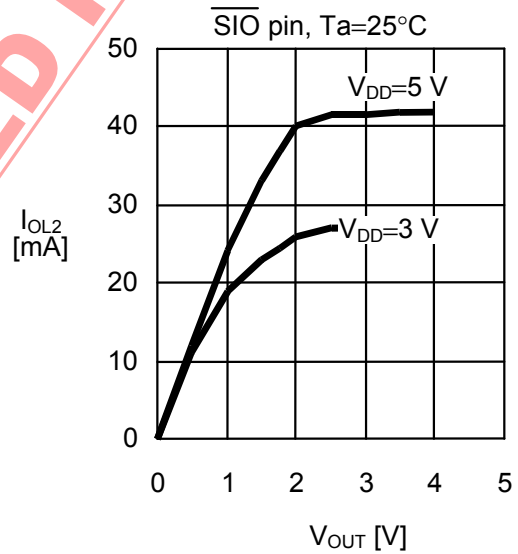
(8) Oscillation start time vs. C_g



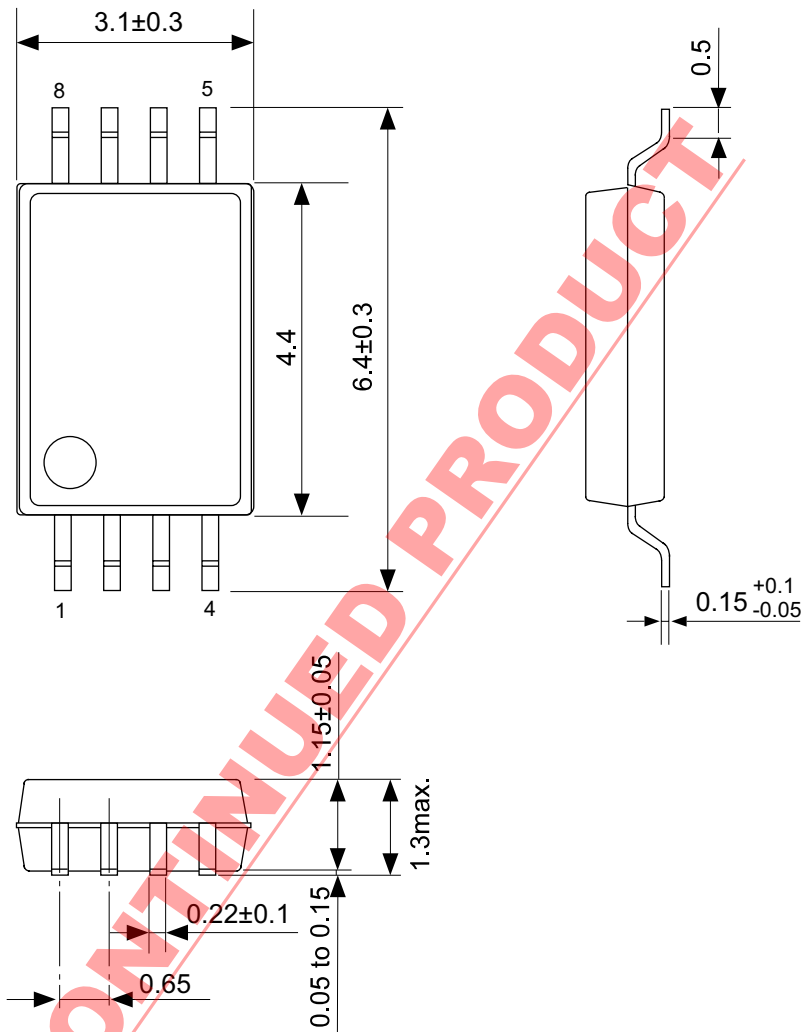
(9) Output current 1 (V_{OUT} vs. I_{OL1})



(10) Output current 2 (V_{OUT} vs. I_{OL2})

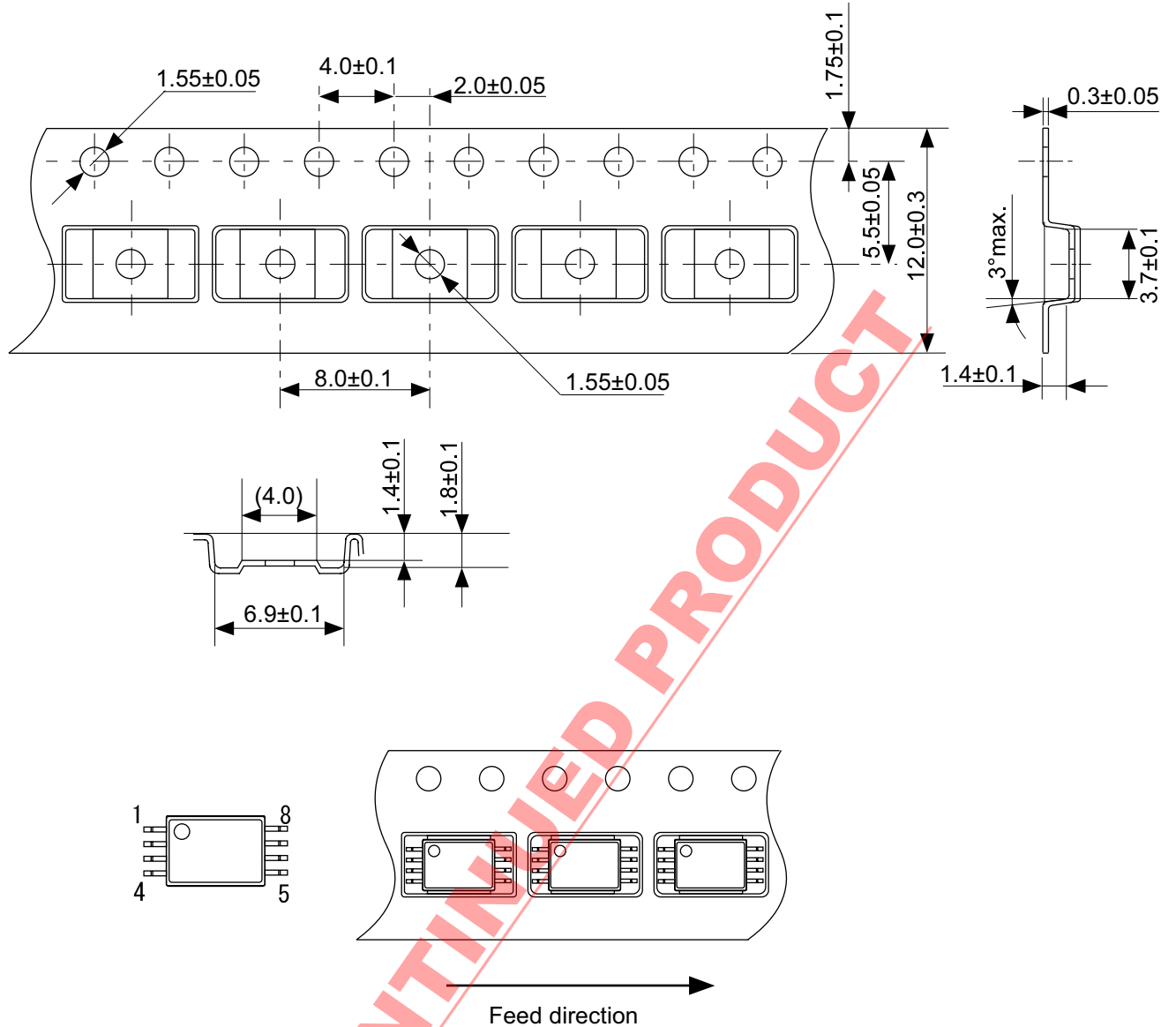


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No. FS008-A-P-SD-1.1

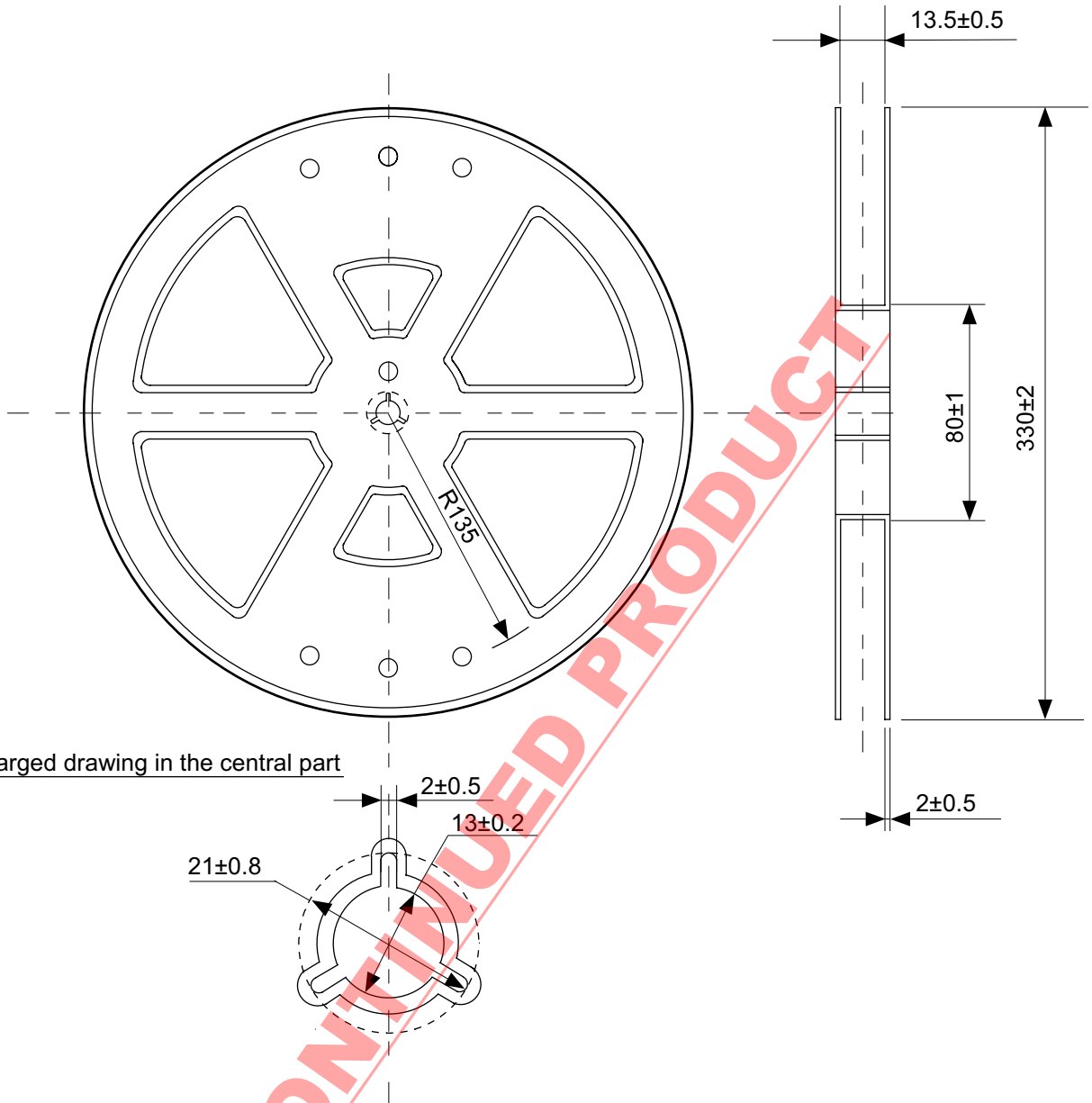
TITLE	SSOP8-A-PKG Dimensions
No.	FS008-A-P-SD-1.1
SCALE	
UNIT	mm
Seiko Instruments Inc.	



DISCONTINUED PRODUCT

No. FS008-A-C-SD-1.1

TITLE	SSOP8-A-Carrier Tape
No.	FS008-A-C-SD-1.1
SCALE	
UNIT	mm
Seiko Instruments Inc.	



Enlarged drawing in the central part

No. FS008-A-R-SD-1.1

TITLE	SSOP8-A-Reel		
No.	FS008-A-R-SD-1.1		
SCALE		QTY.	2,000
UNIT	mm		
Seiko Instruments Inc.			

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