RECIPIENT

SPECIFICATIONS

PRODUCT No.: **Q41454351000100**

MODEL : **RTC-4543SA**

SPEC. No. : **Q15-085-15A**

DATE: **Jun. 22. 2015**

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SPECIFICATION

1. Application

1)This document is applicable to the real time clock module RTC-4543SA that are delivered to from Seiko Epson Corp. 2)RoHS compliant

RTC-4543SA contains lead in high melting type solder which is exempted in RoHS directive.

3)This Product supplied (and any technical information furnished, if any) by Seiko Epson Corporation shall not be used for the development and manufacture of weapon of mass destruction or for other military purposes. Making available such products and technology to any third party who may use such products or technologies for the said purposes are also prohibited.

4)This product listed here is designed as components or parts for electronics equipment in general consumer use. We do not expect that any of these products would be incorporated or otherwise used as a component or part for the equipment, which requires an systems, and medical equipment, the functional purpose of which is to keep extra high reliability, such as satellite, rocket and other space life.

2. Product No. / Model

The product No. of this crystal clock oscillator's is Q41454351000100.
The model is RTC-4543SA.

3. Packing

It is subject to the packing standard of Seiko Epson Corp.

4. Warranty

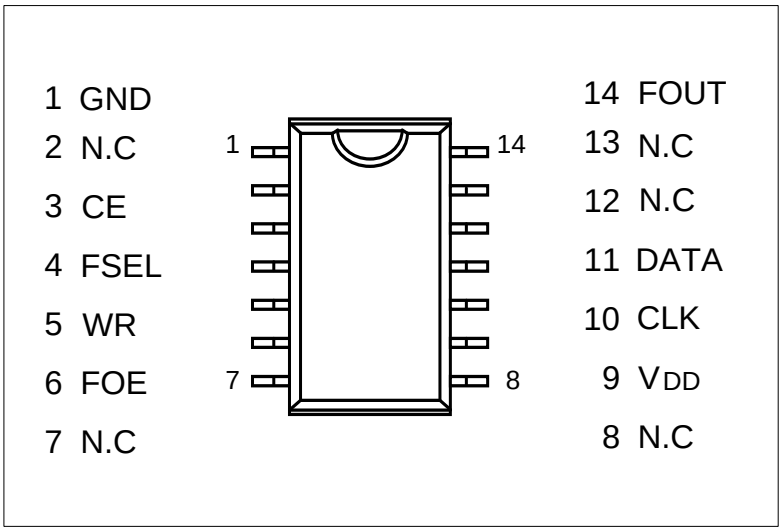
Defective parts which are originated by us are replaced free of charge in case defects are found within 12 months after delivery.

5. Amendment and abolishment

Amendment and/or abolishment of this specification are subject to the agreement of both parties.

6. Contents

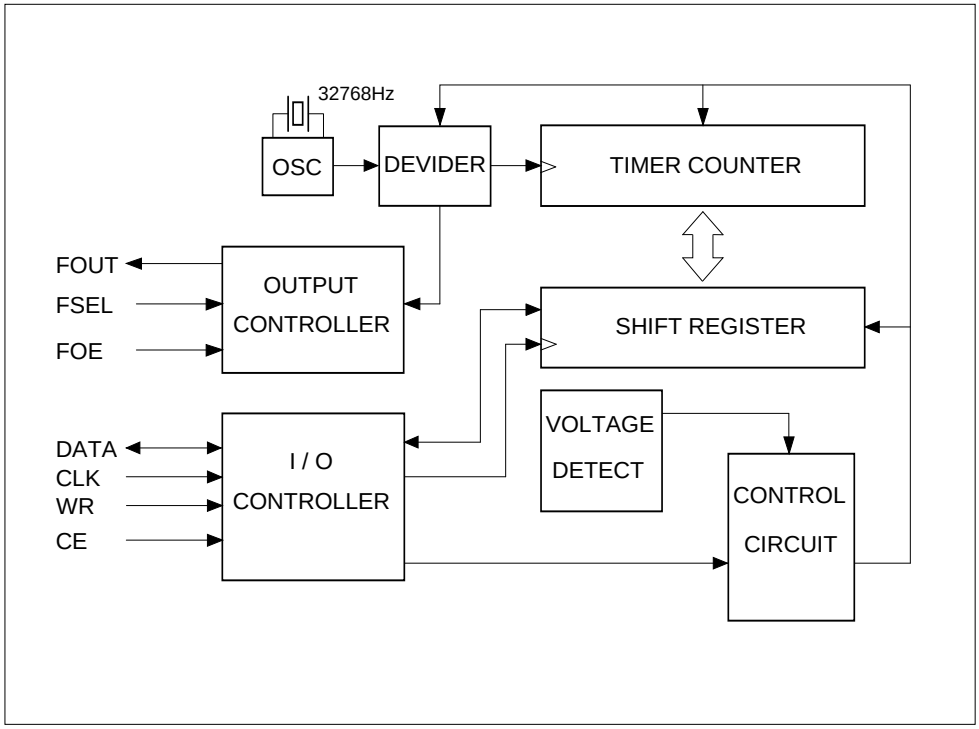
【1】Pin functions



Signal	Pin No.	I/O	Function
GND	1	Input	Connects to negative(-) side (ground) of the power supply.
CE	3	Input	Chip enable input pin. When high, the chip in enabled. When low, the DATA pin goes to high impedance and the CLK, DATA, and WR pins are not able to accept input. In addition, when low, the TM bit is cleared.
FSEL	4	Input	Selects the frequency that is output from the FOUT pin. High : 1Hz Low : 32.768 kHz
WR	5	Input	DATA pin input/output switching pin. High : Data input (when writing the RTC) Low : Data output (when reading the RTC)
FOE	6	Input	When high, the frequency selected by the FSEL pin is output from the FOUT pin. When low, the FOUT pin goes to high impedance.
VDD	9		Connects to the positive (+) side of the power supply.
CLK	10	Input	Serial clock input pin. Data is gotten at the rising edge during a write, and data is output at the rising edge during a read.
DATA	11	Bi-directional	Input/output pin that is used for writing and reading data.
FOUT	14	Output	Outputs the frequency selected by the FSEL pin. 1Hz output is synchronized with the internal one-second signal. This output is not affected by the CE pin.
N.C.	2,7,8, 12,13		Although these pins are not connected internally, they should always be left open in order to obtain the most stable oscillation possible.

※ Always connect a pass through capacitor of at least 0.1 μF as close as possible between VDD and GND.

【2】Block diagram



【3】Absolute maximum ratings GND = 0 V

Item	Symbol	Conditions	Value	Unit
Supply voltage	V_{DD}	Ta=+25 °C	-0.3 to 7.0	V
Input voltage	V_I		GND-0.3 to V_{DD}+0.3	
Output voltage	V_O		GND-0.3 to V_{DD}+0.3	
Storage temperature	TSTG	—	-55 to +125	°C
Soldering conditions	TSOL	+260 °C or less within 10 s , 2 times, or +230 °C or less within 3 m		

【4】Operating condition GND = 0 V

Item	Symbol	Conditions	Rating	Unit
Operating supply voltage	V_{DD}	—	2.5 to 5.5	V
Date holding voltage	V_{CLK}	—	1.4 to 5.5	V
Operating temperature	T_{OPR}	No condensation	-40 to +85	°C

【5】Electrical characteristics

1. Frequency characteristics GND = 0 V

Item	Symbol	Conditions	Value	Unit
Frequency tolerance	△f/fo	Ta=+25 °C, V_{DD}=5.0V	A : 5±12	1×10^{-6}
Frequency temperature characteristics	top	-10 to +70 °C +25 °Cref.	+10 / -120	1×10^{-6}
Frequency voltage characteristics	f/V	Ta=+25 °C, V_{DD}=2.0 to 5.5 V	±2	1×10^{-6}/V
Oscillation start time	t_{STA}	Ta=+25 °C, V_{DD}=2.5 V	3	sec
Aging	fa	Ta=+25 °C, V_{DD}=5V, first year	±5	1×10^{-6}

2. DC characteristics

Unless specified otherwise : V_{DD}=5 V±10%, Ta=-40 to +85° C

Item	Symbol	Conditions		Min.	Typ.	Max.	Unit
Current consumption (1)	I_{DD1}	V_{DD}=5.0V	CE=GND FOE=GND FSEL=V_{DD} No load on the FOUT pin		1.5	3.0	µA
Current consumption (2)	I_{DD2}	V_{DD}=3.0V			1.0	2.0	µA
Current consumption (3)	I_{DD3}	V_{DD}=2.0V			0.5	1.0	µA
Current consumption (4)	I_{DD4}	V_{DD}=5.0V	CE=GND FOE=VDD FSEL=GND No load on the FOUT pin		4.0	10.0	µA
Current consumption (5)	I_{DD5}	V_{DD}=3.0V			2.5	6.5	µA
Current consumption (6)	I_{DD6}	V_{DD}=2.0V			1.5	4.0	µA
Input voltage	V_{IH}	WR, DATA, CE, CLK, FOE, FSEL pins		0.8V_{DD}			V
	V_{IL}					0.2V_{DD}	V
Input off/leak current	I_{OFF}	WR, DATA, CE, CLK, FOE, FSEL pins VIN=V_{DD} or GND				0.5	µA
Output voltage	V_{OH}	V_{DD}=5.0V	I_{OH}=-1.0mA DATA, FOUT	4.5			V
		V_{DD}=3.0V		2.0			V
	V_{OL}	V_{DD}=5.0V	I_{OL}=1.0mA DATA, FOUT			GND+0.5	V
		V_{DD}=3.0V				GND+0.8	V
Output leak current	I_{OZH}	V_{OUT}=5.5V DATA, FOUT		-1.0		1.0	µA
	I_{OZL}	V_{OUT}=0V DATA, FOUT		-1.0		1.0	µA
Supply voltage detection voltage	V_{DT}	—		1.4	1.7	2.0	V

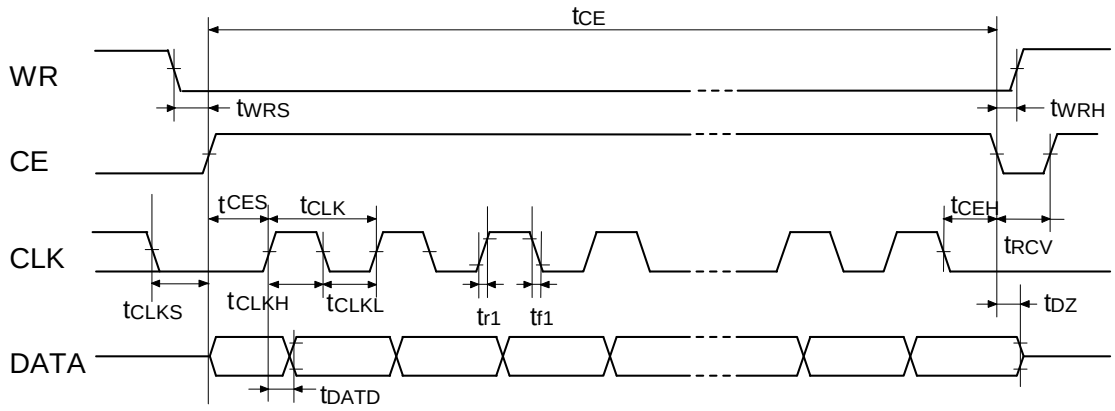
3. AC characteristics

Unless specified otherwise : Ta=-40 to +85 °C, CL=50 pF

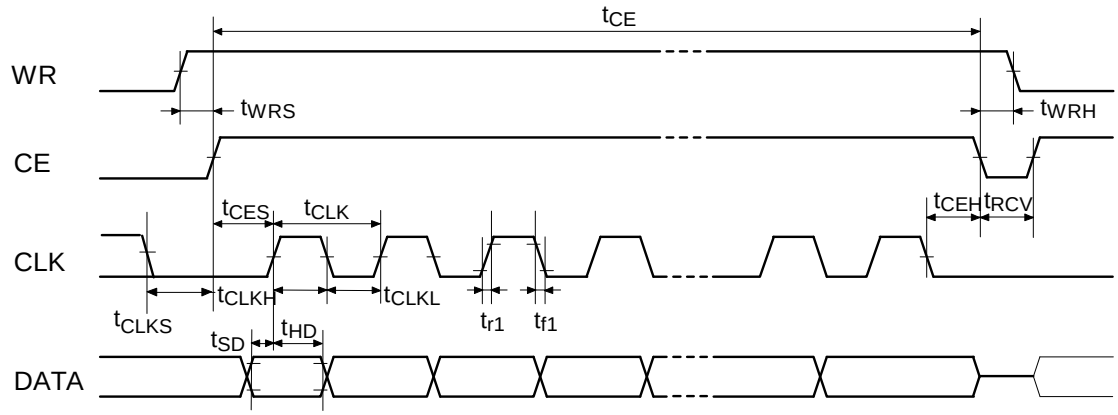
Item	Symbol	V_{DD}=5 V±15%		V_{DD}=3 V±10%		Unit
		Min.	Max.	Min.	Max.	
CLK clock cycle	t_{CLK}	0.75	7800	1.5	7800	µS
CLK low pulse width	t_{CLKL}	0.375	3900	0.75	3900	µS
CLK high pulse width	t_{CLKH}	0.375	3900	0.75	3900	µS
CLK setup time	t_{CLKS}	25		50		µS
CE setup time	t_{CES}	0.375	3900	0.75	3900	µS
CE hold time	t_{CEH}	0.375		0.75		µS
CE enable time	t_{CE}		0.9		0.9	Sec
Write data setup time	t_{SD}	0.1		0.2		µS
Write data hold time	t_{HD}	0.1		0.1		µS
WR setup time	t_{WRS}	100		100		nS
WR hold time	t_{WRH}	100		100		nS
DATA output delay time	t_{DATD}		0.2		0.4	µS
DATA output floating time	t_{DZ}		0.1		0.2	µS
Clock input rise time	t_{r1}		50		100	nS
Clock input fall time	t_{f1}		50		100	nS
FOUT rise time (CL=30pF)	t_{r2}		100		200	nS
FOUT fall time (CL=30pF)	t_{f2}		100		200	nS
FOUT disable time (CL=30pF)	t_{XZ}		100		200	nS
FOUT enable time (CL=30pF)	t_{ZX}		100		200	nS
FOUT(32.768KHz) duty ratio (CL=30pF)	Duty	40	60	40	60	%
Wait time	t_{RCV}	0.95		1.9		µS

■ Timing charts

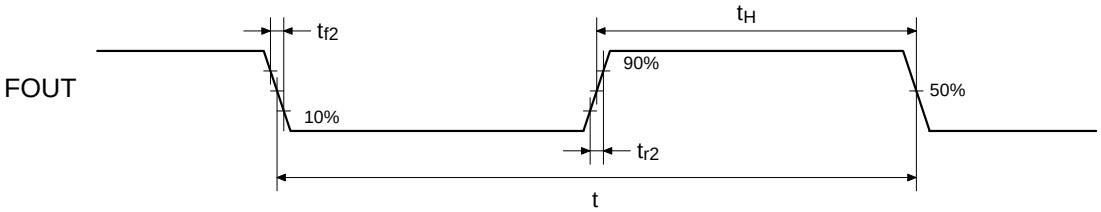
(1) Data read



(2) Data write

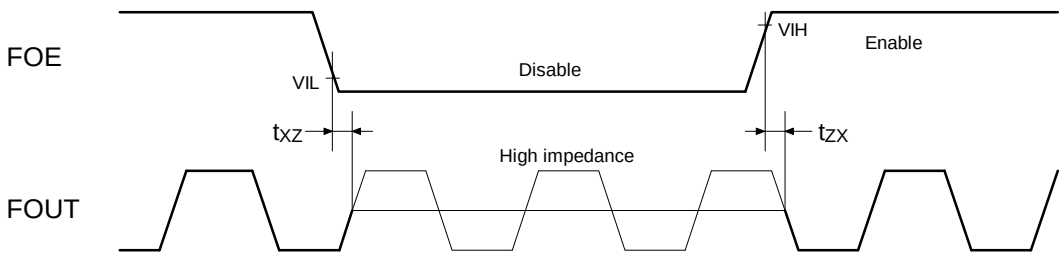


(3) FOUT output



$$\text{Duty} = \frac{t_H}{t} \times 100 \ [\%]$$

(4) Disable/enable



【6】Timer data organization

・The counter data is BCD code.
・The timer automatically adjusts for different month lengths and for leap year.
・Writes and reads are both performed on an LSB-first basis.

	MSB							LSB
Seconds (0 to 59)	FDT	s40	s20	s10	s8	s4	s2	s1
Minutes (0 to 59)	*	mi40	mi20	mi10	mi8	mi4	mi2	mi1
Hour (0 to 23)	*	*	h20	h10	h8	h4	h2	h1
Day of the week (1 to 7)					*	w4	w2	w1
Day (1 to 31)	*	*	d20	d10	d8	d4	d2	d1
Month (1 to 12)	TM	*	*	mo10	mo8	mo4	mo2	mo1
Year (0 to 99)	y80	y40	y20	y10	y8	y4	y2	y1

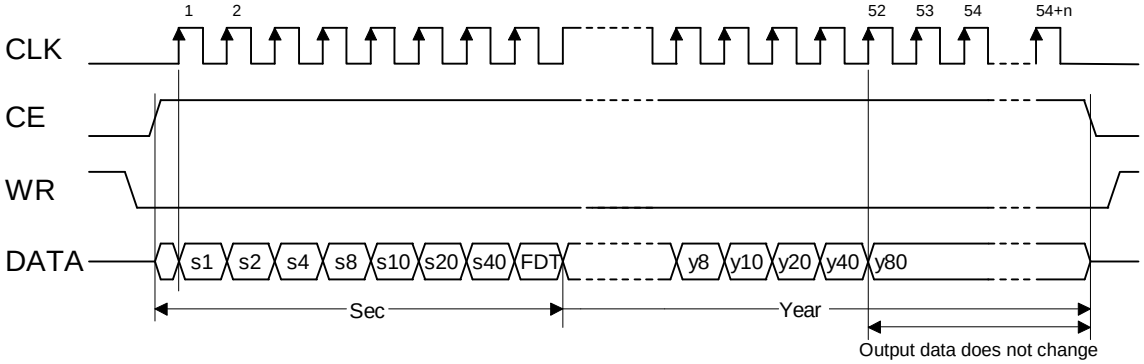
*bits : Any data may be written to these bits.

◆FDT bits : Supply voltage detection bit
・This bit is set to “1” when voltage of 1.7±0.3 V or less is detected between V_{DD} and GND.
・The FDT bit is cleared if all of the digits up to the year digits are read.
・Although this bit can be both read and written, normally set this bit to “0”.

◆TM bit : This is a test bit for SEIKO-EPSON’s use. Always set this bit to “0”.

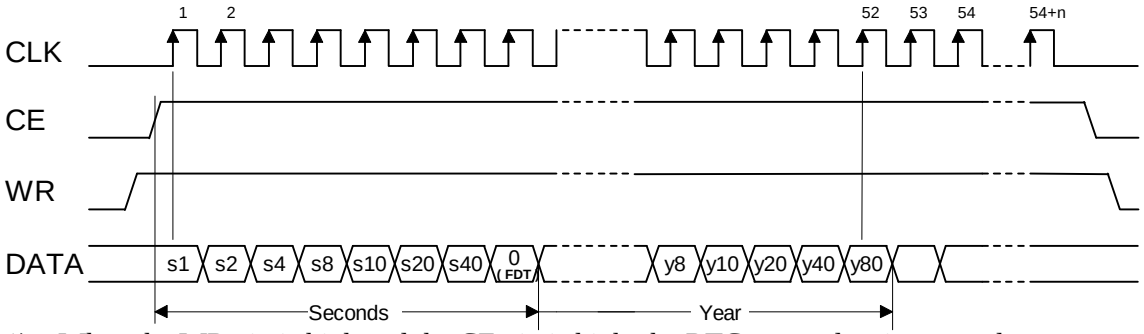
■Description of operation

7-1.Data reads



1) When the WR pin is low and the CE pin is high, the RTC enters data output mode.
2) At the first rising edge of the CLK signal, the clock and calendar data are loaded into the shift register and the LSB of the seconds digits is output from the DATA pin.
3) The remaining seconds, minutes, hour, day of the week, day, month, and year data is shifted out, in sequence and in synchronization with the rising edge of the CLK signal, so that the data is output from the DATA pin.
   The output data is valid until the rising edge of the 52nd clock pulse; even if more than 52 clock pulses are input, the output data does not change.
4) If data is required in less than 52 clock pulses, that part of the data can be gotten by setting the CE pin low after the necessary number of clock pulses have been output.
   Example: If only the data from “seconds” to “day of the week” is needed:
   After 28 clock pulses, set the CE pin low in order to get the data from “seconds” to “day of the week.”
5) When performing successive data read operations, a wait (tRCV) is necessary after the CE pin is set low.
6) Note that if an update operation (a one-second carry) occurs during a data read operation, the data that is read will have an error of -1 second.
7) Complete data read operations within tCE (Max.) = 0.9 seconds, as described earlier.

7-2. Data writes



1) When the WR pin is high and the CE pin is high, the RTC enters data input mode.
2) In this mode, data is input, in succession and in synchronization with the rising edge of the CLK signal, to the shift register from the DATA pin, starting from the LSB of the seconds digits.
3) The sub-seconds counter is reset between the falling edge of the first clock pulse and the rising edge of the second clock pulse. In addition, carries to the seconds counter are prohibited at the falling edge of the first clock pulse.
4) After the last data is input to the shift register at the rising edge of the 52nd clock pulse, the contents of the shift register are transferred to the timer counter.
5) Note that during a data write operation, 52 bits of data must be input.
   - Correct write-access isn't completed when CE terminal turned into low on a state of less than 52 bits.
   - If more than 52 bits of data are input, the 53rd and subsequent bits are ignored. (The first 52 bits of data are valid.)
6) Once the CE pin is set low, the prohibition on carries to the seconds counter is lifted. Complete data write operations within tCE (Max.) = 0.9 seconds, as described earlier.
7) If a data read operation is to be performed immediately after a data write operation, a wait (tRCV) is necessary after the CE pin is set low.

* Malfunction will result if illegal data is written. Therefore, be certain to write legal data.

【7】Environmental and mechanical characteristics

(The company evaluation condition We evaluate it by the following examination item and examination condition.)

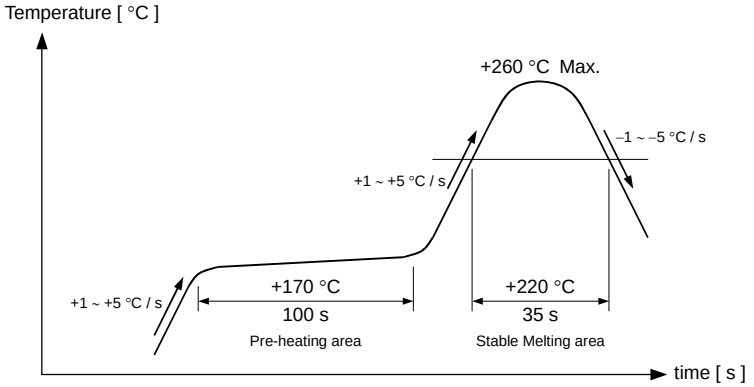
No.	Item	Value *1		Test Conditions
		Δ f / f [1×10^{-6}] *2	Electrical characteristics	
1	High temperature storage	*3 ± 50	Satisfy item 【5】after test (Includes frequency characteristics)	+125 °C × 1 000 h
2	Low temperature storage	*3 ± 10		-55 °C × 1 000 h
3	High temperature bias	*3 ± 20		+85 °C × 5.5 V × 1 000 h
4	Low temperature bias	*3 ± 10		-40 °C × 5.5 V × 1 000 h
5	Temperature humidity bias	*3 ± 20		+85 °C × 85 %RH × 5.5 V × 1 000 h
6	Temperature cycle	*3 ± 10		-55 °C ⇔ +125 °C 30 min at each temp. 100 cycles
7	Resistance to soldering heat	± 5		For convention reflow soldering furnace (2 times)
8	Drop	± 5		Free drop from 750 mm height on a hard wooden board for 3 times (Board is thickness more than 30 mm)
9	Vibration	± 5		10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s^2 10 Hz → 500 Hz → 10 Hz 15min./cycle 6 h (2 hours , 3 directions)
10	Flexibility of termination	No defect for wire termination		Put weight of 2.5 N on top of the termination Bending following angle :+90 ° to -90 ° to 0
11	Solderability	Termination must be 95 % covered with fresh solder		Dip termination into solder bath at +235 °C ± 5 °C for 5 s (Using Rosin Flux)
12	Solvent resistance	The marking shall be legible		Ref. JIS C 0052 or IEC 60068-2-45

< Notes >

1. *1 Each test done independently.
2. *2 Measuring 2 h to 24 h later leaving in room temperature after each test.
3. *3 Pre conditionings
   1. +125 °C × 24 h to +85 °C × 85 % × 48 h → reflow 2 times
   2. Initial value shall be after 24 h at room temperature.

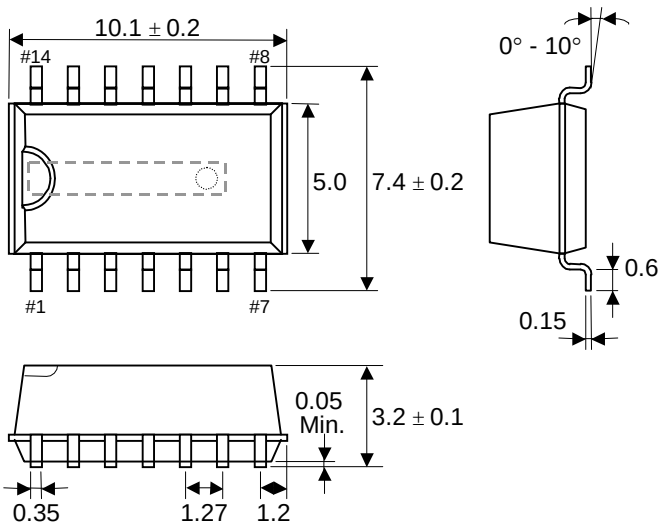
♦ Air-reflow

Pre heating temperature: +170 °C Pre heating time: 100 s
Heating temperature : +220 °C Heating time : 30 s
Peak temperature must not exceed +260 °C

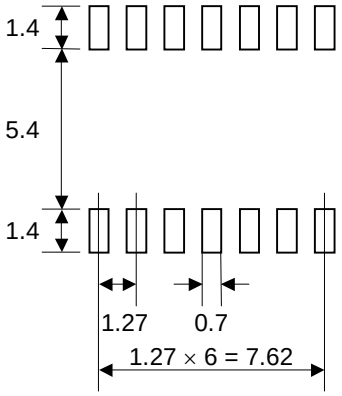


【8】Dimensions

• External dimensions



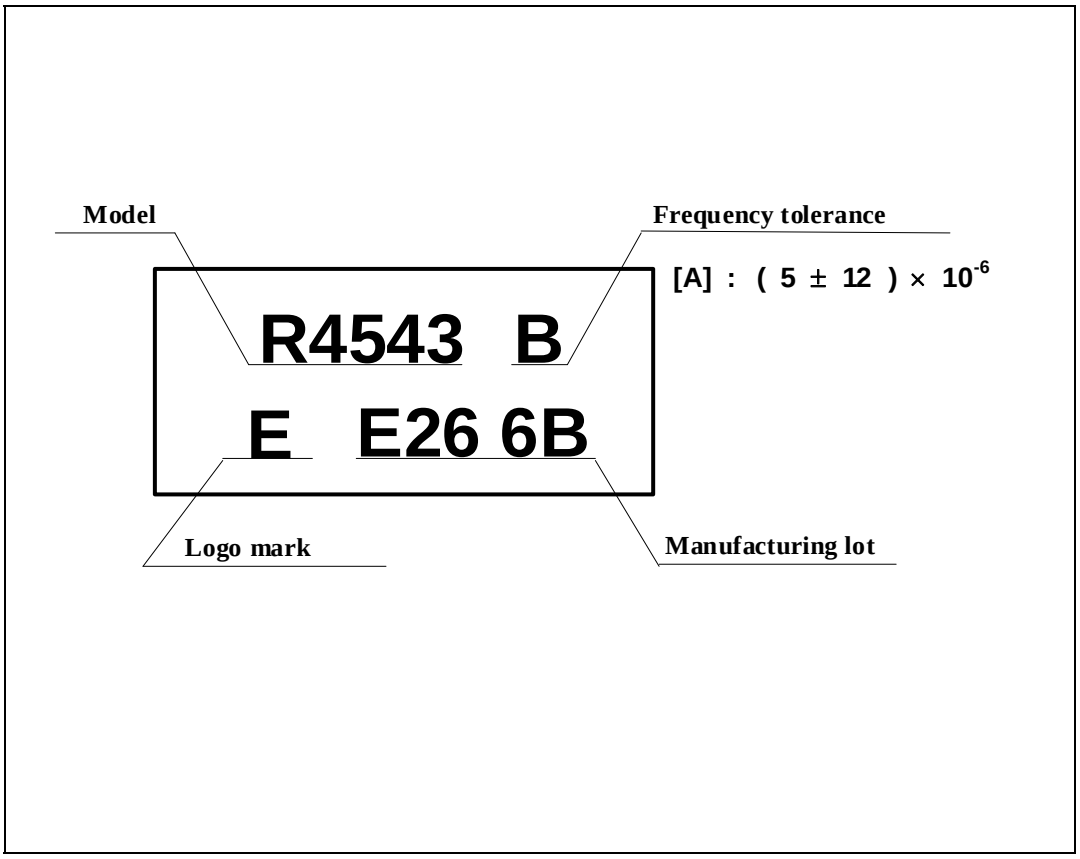
• Recommended soldering pattern



Unit : mm

∗ The cylinder of the crystal unit can be seen in this area (front), but it has no affect on the performance of the device.

【9】Marking layout



∗The above marking layout shows only marking contents and their approximate position and it is not for font, size and exact position.

【10】Note

1) Notes on handling

This module uses a C-MOS IC to realize low power consumption. Carefully note the following cautions when handling.

(1) Static electricity

While this module has built-in circuitry designed to protect it against electrostatic discharge, the chip could still be damaged by a large discharge of static electricity. Containers used for packing and transport should be constructed of conductive materials. In addition, only soldering irons, measurement circuits, and other such devices which do not leak high voltage should be used with this module, which should also be grounded when such devices are being used.

(2) Noise

If a signal with excessive external noise is applied to the power supply or input pins, the device may malfunction or "latch up." In order to ensure stable operation, connect a filter capacitor (preferably ceramic) of greater that 0.1F as close as possible to the power supply pins (between VDD and GNDs). Also, avoid placing any device that generates high level of electronic noise near this module.

* Do not connect signal lines to the shaded area in the figure shown in Fig. 1 and, if possible, embed this area in a GND land.

(3) Voltage levels of input pins

When the input pins are at the mid-level, this will cause increased current consumption and a reduced noise margin, and can impair the functioning of the device. Therefore, try as much as possible to apply the voltage level close to VDD or GND.

(4) Handling of unused pins

Since the input impedance of the input pins is extremely high, operating the device with these pins in the open circuit state can lead to unstable voltage level and malfunctions due to noise. Therefore, pull-up or pull-down resistors should be provided for all unused input pins.

2) Notes on packaging

(1) Soldering heat resistance.

If the temperature within the package exceeds +260 °C, the characteristics of the crystal oscillator will be degraded and it may be damaged. The reflow conditions within our reflow profile is recommended. Therefore, always check the mounting temperature and time before mounting this device. Also, check again if the mounting conditions are later changed.

* See Fig. 2 profile for our evaluation of Soldering heat resistance for reference.

(2) Mounting equipment

While this module can be used with general-purpose mounting equipment, the internal crystal oscillator may be damaged in some circumstances, depending on the equipment and conditions. Therefore, be sure to check this. In addition, if the mounting conditions are later changed, the same check should be performed again.

(3) Ultrasonic cleaning

Depending on the usage conditions, there is a possibility that the crystal oscillator will be damaged by resonance during ultrasonic cleaning. Since the conditions under which ultrasonic cleaning is carried out (the type of cleaner, power level, time, state of the inside of the cleaning vessel, etc.) vary widely, this device is not warranted against damage during ultrasonic cleaning.

(4) Mounting orientation

This device can be damaged if it is mounted in the wrong orientation. Always confirm the orientation of the device before mounting.

(5) Leakage between pins

Leakage between pins may occur if the power is turned on while the device has condensation or dirt on it. Make sure the device is dry and clean before supplying power to it.

Fig. 1 : Example GND Pattern

RTC - 4543 SA (SOP-14pin)

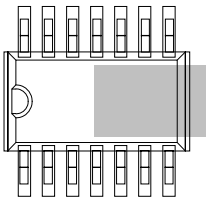
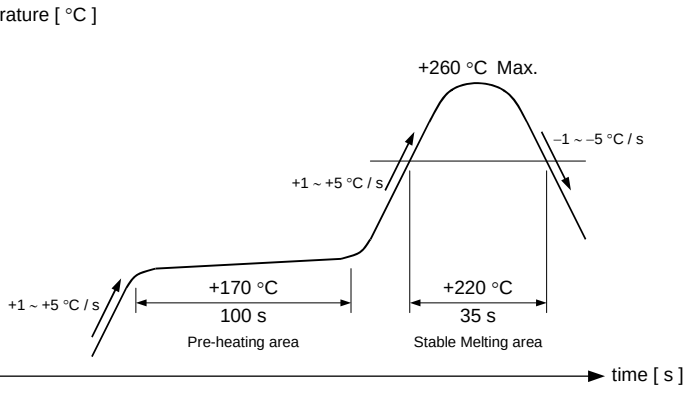


Fig. 2 : Reference profile for our evaluation of Soldering heat resistance.



TAPING SPECIFICATION

Ⅰ. Application

This standard will apply to SOP 14 pin package.

Spec：SA package

Ⅱ. Contents

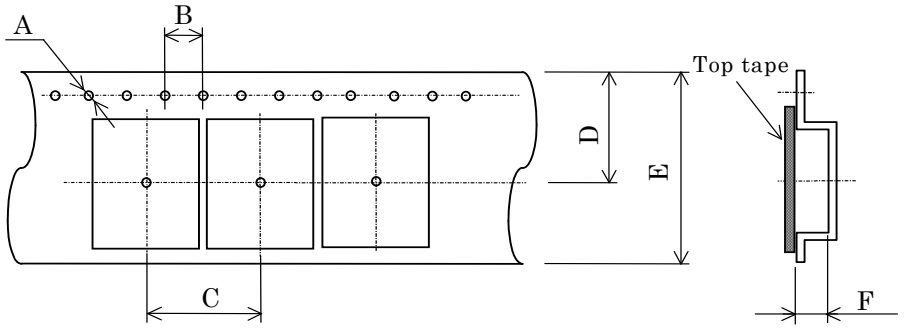
〔1〕 Taping specification

Subject to EIA-481& IEC 60286

(1) Tape dimensions TE-1612L

Material of the carrier tape : PS

Material of the top tape : PET

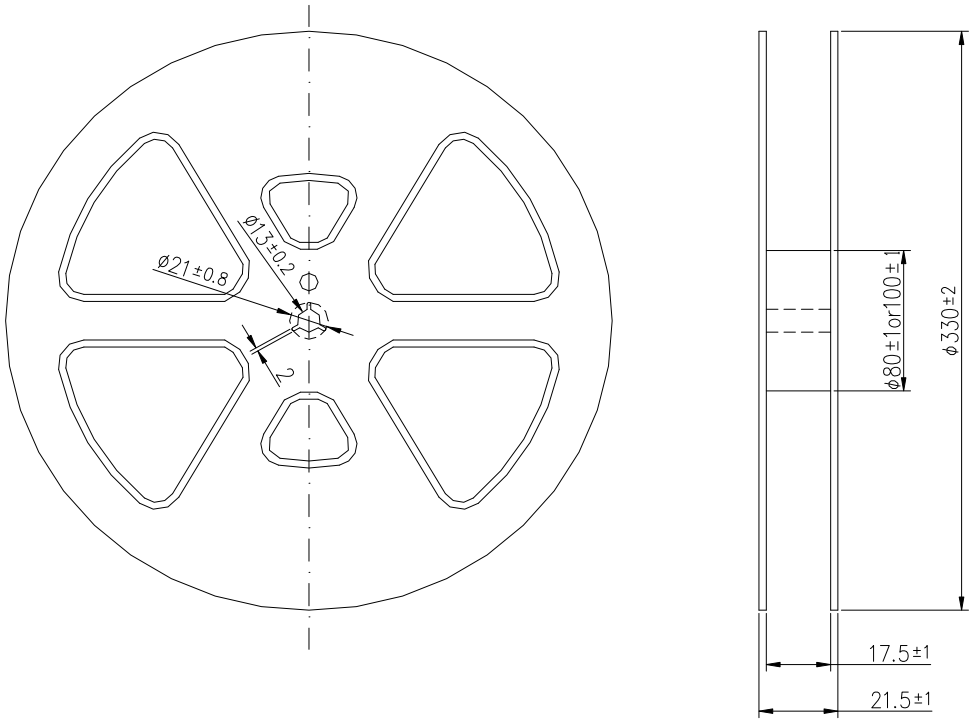


Symbol	A	B	C	D	E	F
Value	ϕ 1.5	4.0	12.0	9.25	16.0	3.65

Unit : mm

(2) Reel dimensions

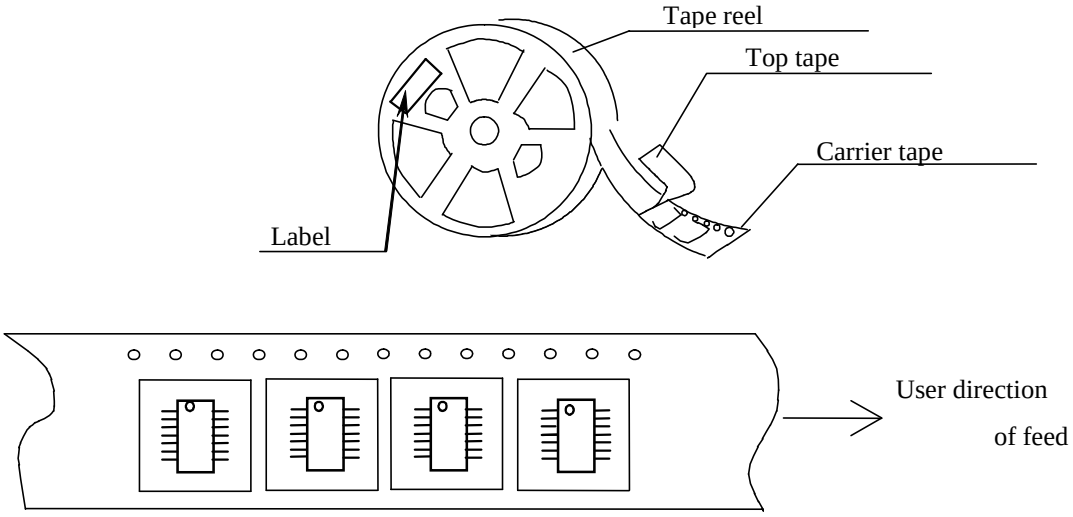
Material of the reel : Conductive polystyrene



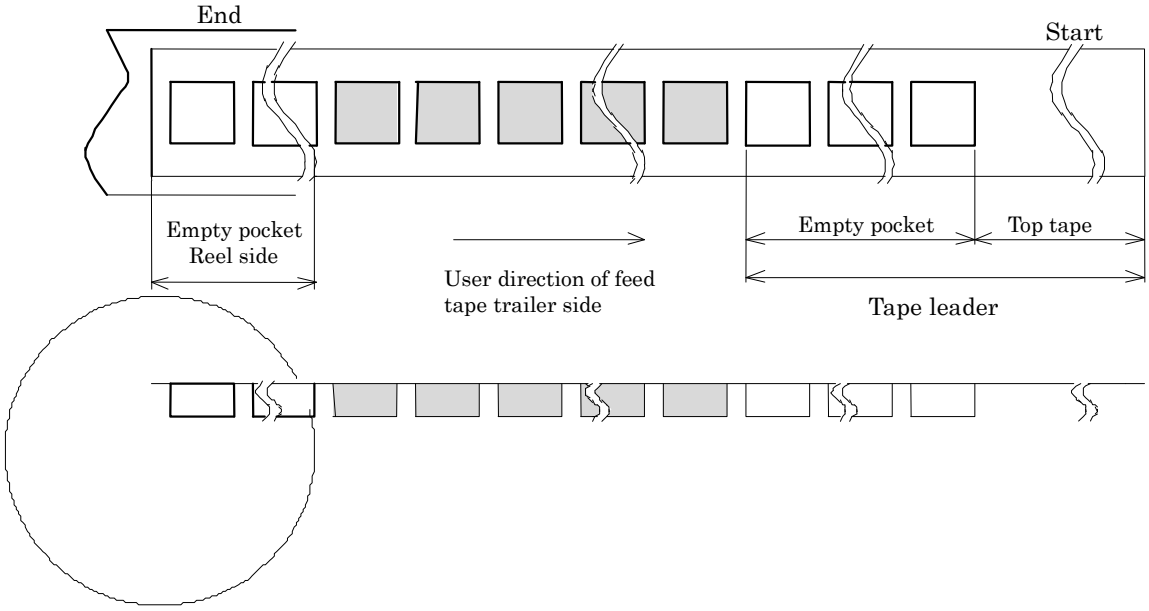
Form and Size of reel window shows are one of the example

(3) Packing

①Tape & reel



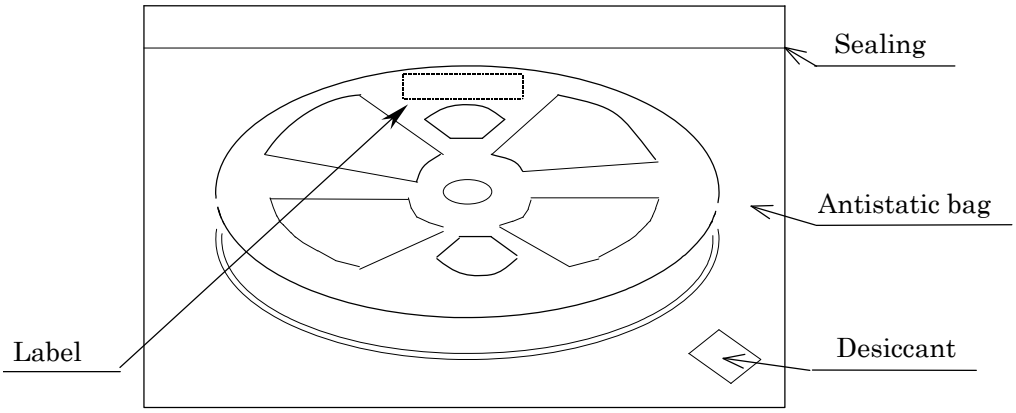
②Start & end point



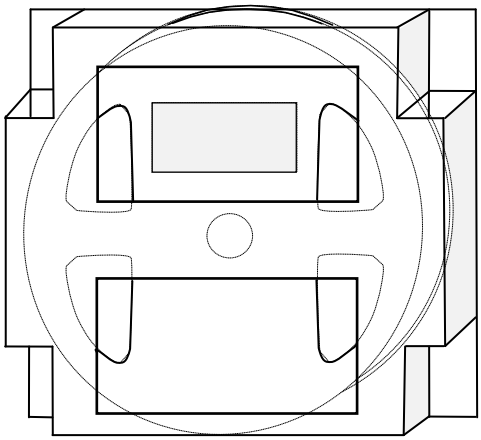
Item		Empty space
Tape leader	Top tape	Min. 1 000 mm
	Carrier tape	Min. 120 mm
Tape trailer	Top tape	Min. 0 mm
	Carrier tape	Min. 120 mm

〔2〕 Inner sleeve

a) Packing to antistatic bag

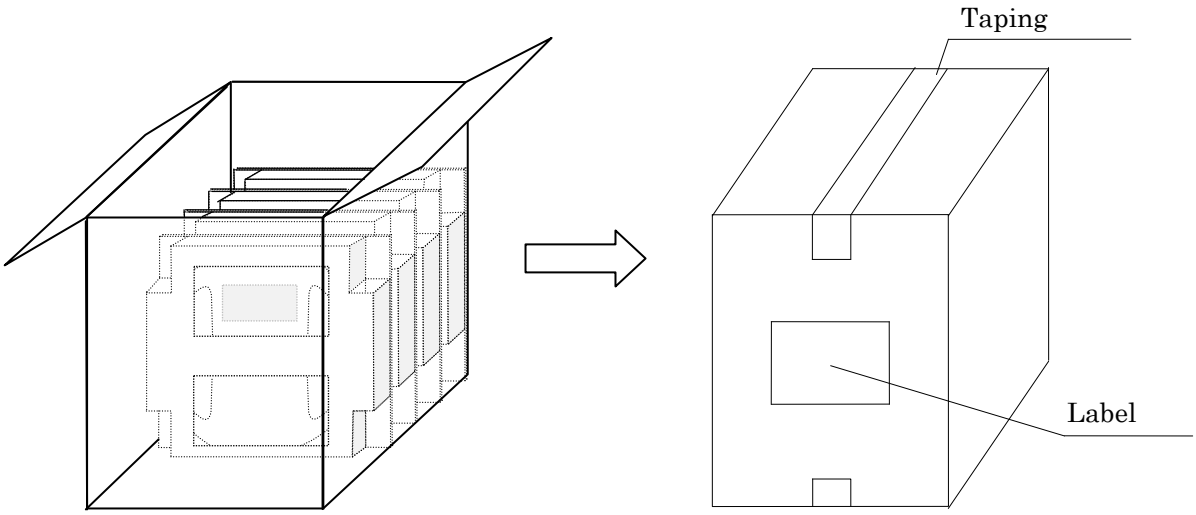


b) Packing to inner Sleeve



* There is also a case to put the two reel.

〔3〕 Shipping carton



〔4〕 Marking

(1) Reel marking

・Reel marking shall consist of :

1) Parts name
2) Quantity
3) Manufacturing date or symbol
4) Manufacturer’s date or symbol
5) Others (if necessary)

(2) Shipping carton marking

・Shipping carton marking shall consist of :

1) Parts name
2) Quantity

〔5〕 Quantity

・1 000 pcs./reel

〔6〕 Storage environment

(1) To storage the reel at 15 °C to 35 °C, 25 %RH to 85 %RH of humidity.
(2) To open the packing just before using.
(3) Not to expose the sun.
(4) Not to storage with some erosive chemicals.
(5) Nothing is allowed to put on the reel or carton to prevent mechanical damage.

〔7〕 Handling

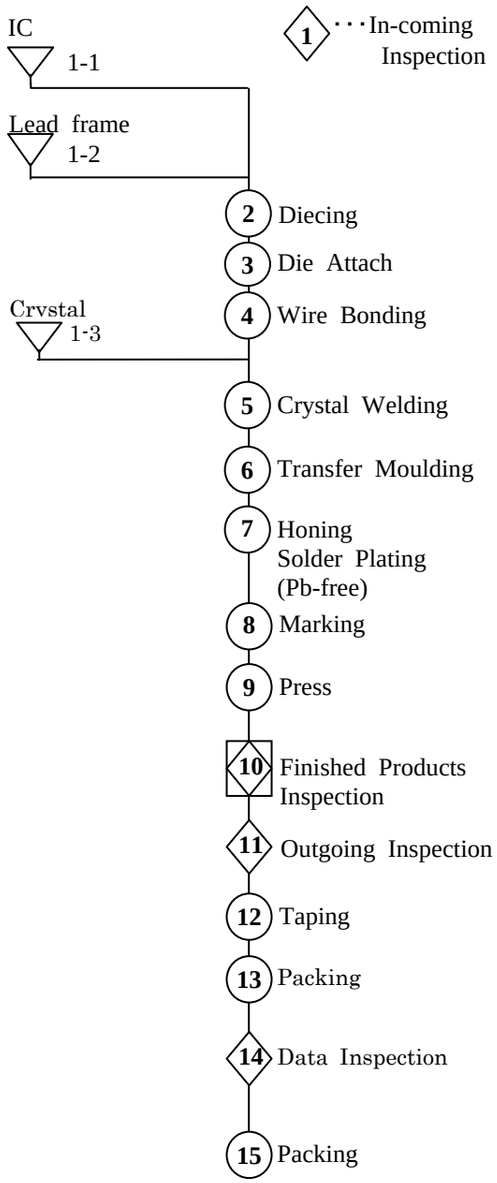
・To handle with care to prevent the damage of tape, reel and products.

- PROCESS QUALITY CONTROL -

2015.03.04

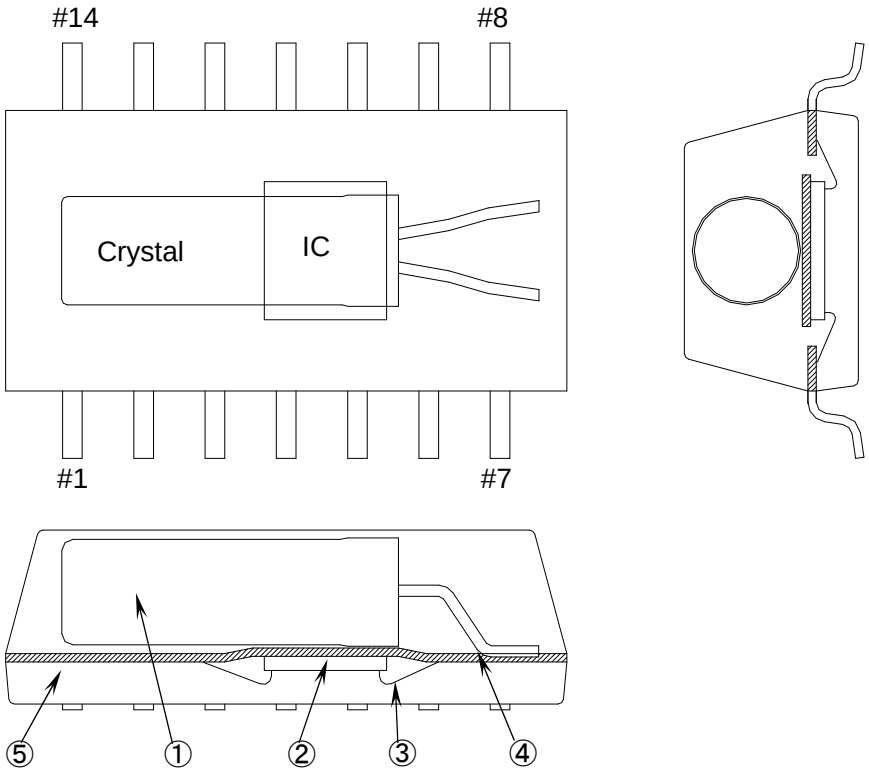
No. SOP14-00-Pb-ATE–1 **SOP 14 pin**

SOP14_Q_0001

Manufacturing process chart	No.	Section In charge	Standards & Specifications	Inspection & Control Item	Inspection Instruments	Inspection methods	Record
	1	Inspection section	Purchasing specification Incoming Inspection standard	Appearance Dimension	Microscope	Sampling	Data Sheet
	1-1	Subcontractor company	Incoming Inspection standard	Model,Quantity	Visual inspection	Sampling	Data sheet
	1-2	Subcontractor company	Incoming Inspection standard	Model,Quantity, Appearance	Visual inspection	Sampling	Data sheet
	2	Subcontractor company	The assembly delivery specification	Deionized water (resistivity) Appearance	Resistivity meter Microscope	Sampling	Data sheet
	3	Subcontractor company	The assembly delivery specification	Appearance Die-share strength Dry-temperature,time	Microscope Thermometer,Timer	Sampling	Data sheet
	4	Subcontractor company	The assembly delivery specification	Wire-pull strength Bonding strength Appearance Temperature,Force U.S.power	Pull-tester Ball-share tester Thermometer,Gauge Dial-gauge Microscope	Sampling	Data sheet
	1-3	Subcontractor company	Incoming inspection standerd	Model,Quantity	Visual inspection	Sampling	Data sheet
	5	Subcontractor company	The assembly delivery specification	Welding-power Pressure,Crystal position Appearance	Power-measure Gauge Microscope	Sampling	Data sheet
	6	Subcontractor company	The assembly delivery specification	Mould Die-temperature Curing-Temperature,Time Appearance	Surface-thermometer Thermometer,Timer X-ray radio graphic equipment Visual Inspection	Sampling 100% Inspection	Data sheet
	7	Subcontractor company	Outer appearance inspection standard	Plating thickness Appearance	Fluorescent X-ray Visual inspection	Sampling	Data sheet
	8	Subcontractor company	Outer appearance inspection standard	Appearance	Image Processor	100% Inspection	Data sheet
	9	Subcontractor company	Outer appearance inspection standard	Appearance Dimension	Image Processor	100% Inspection	Data sheet
	10	Subcontractor company	Manufacturing Instruction sheet	Electrical characteristics Appearance	Measuring equipment	100% Inspection	Data sheet
	11	Subcontractor company	Finished products Inspection standard	Electrical characteristics Outward from dimension Appearance	Measuring equipment Microscope	Sampling	Data sheet
	12	Subcontractor company	The assembly delivery specification	Tape peeling force Appearance	Peeling force test machine Image Processor	Sampling 100% Inspection	Data sheet
	13	Subcontractor company	Packing specification	———	———	———	———
	14	Inspection section	Delivery specification outgoing Inspection standerd	Electrical characteristics Appearance	———	Every Lot	———
	15	Production control section	Manufacturing Instruction sheet Daily shipping list	Customers Type Quantity	———	———	Delivery slip

Structure Diagram 構造図

Model 型式	**SA package**	RTC / RX / RA / SG series
Document No. 管理№	-	SA_D_0001



⑤	Transfer molding compound モールド	
④	Lead Frame リードフレーム	
③	Bonding wire ボンディングワイヤ	
②	IC	
①	Crystal Unit 水晶振動子	
No.	Name of Part 部品名	

RELIABILITY TEST DATA

Product Name : RTC-SAPKG Halide free mold

The Company evaluation condition

We evaluate environmental and mechanical characteristics by the following test condition . **No. F-SAPKG1-001EH**

No.	ITEM	TEST CONDITIONS	VALUE *1		TEST Qty [n]	FAIL Qty [n]
			Δ f / f *2 [1 × 10^{-6}]	Electrical characteristics		
1	High temperature storage	+125 °C × 1 000 h	*3 ± 50	Satisfy specification after test	22	0
2	Low temperature storage	-55 °C × 1 000 h	*3 ± 10		22	0
3	High temperature bias	+85 °C × 5.5 V × 1 000 h	*3 ± 20		22	0
4	Low temperature bias	-40 °C × 5.5 V × 1 000 h	*3 ± 10		22	0
5	Temperature humidity bias	+85 °C × 85 %RH × 5.5 V × 1 000 h	*3 ± 20		22	0
6	Temperature cycle	-55 °C ⇔ +125 °C 30 min at each temp. 100 cycles	*3 ± 10		22	0
7	Resistance to soldering heat	For convention reflow soldering furnace (2 times) The measurement is after 24 h	± 5		22	0
8	Drop	Free drop from 750 mm height on a hard wooden board for 3 times (Board is thickness more than 30 mm)	± 5		22	0
9	Vibration	10 Hz to 55 Hz amplitude 0.75 mm 55 Hz to 500 Hz acceleration 98 m/s^2 10 Hz → 500 Hz → 10 Hz 15 min/cycle 6 h (2 h × 3 directions)	± 5		22	0
10	Flexibility of termination	Put weight of 2.5 N on top of the termination Bending following angle :+90 ° to -90 ° to 0	No defect for wire termination		11	0
11	Solderability	Dip termination into solder bath at +235 °C ± 5 °C for 5 s (Using Rosin Flux)	Termination must be 95 % covered with fresh solder		11	0
12	Solvent resistance	Ref. JIS C 0052 or IEC 60068-2-45	The marking shall be legible		11	0

Notes

*1 Each test done independently.

*2 Measuring 2 h to 24 h later leaving in room temperature after each test.

*3 Pre-conditions (Dry +125°Cx24h→ high temp & humidity +85°Cx85%RHx48h→Reflow 2times) should be performed before each tests. Pre conditionings Initial value shall be after 24 h at room temperature.

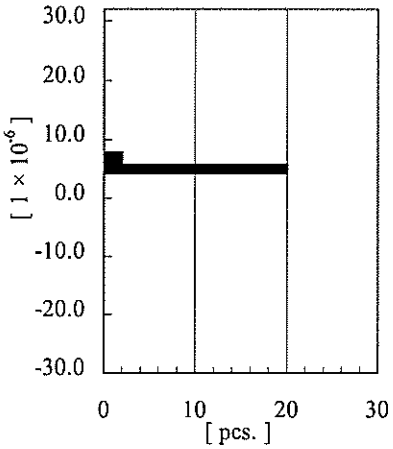
Product Name : RTC-SAPKG Halide free mold

Frequency Shift Rate Δ f / f

No. F-SAPKG1-002EH

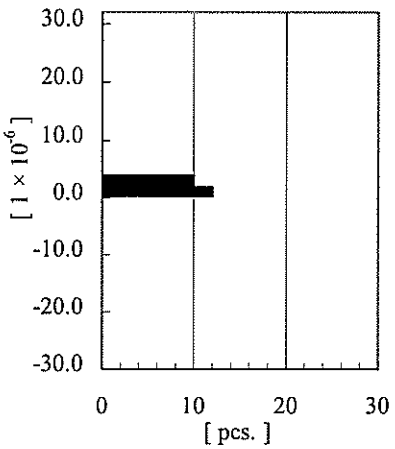
1. High temp. storage

+125 °C 、 1 000 h



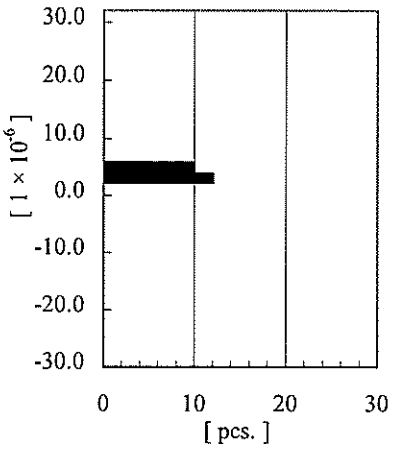
2. Low temp. storage

-55 °C 、 1 000 h



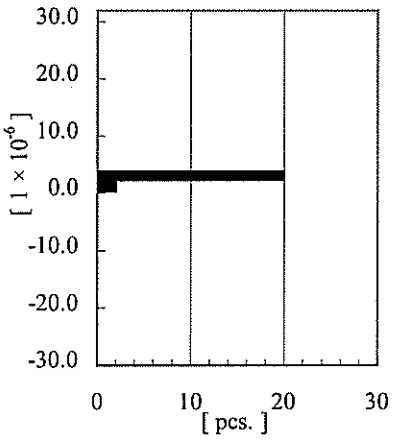
3. High temp. bias

+85 °C 、 5.5 V 、 1 000 h



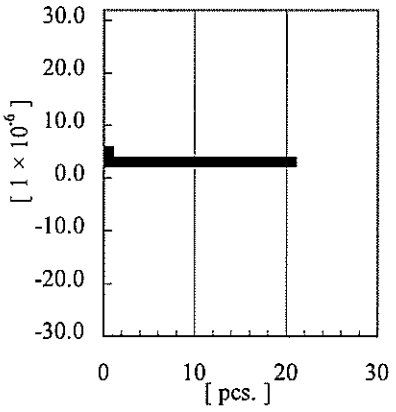
4. Low temp. bias

-40 °C 、 5.5 V 、 1 000 h



5. Temp. humidity bias

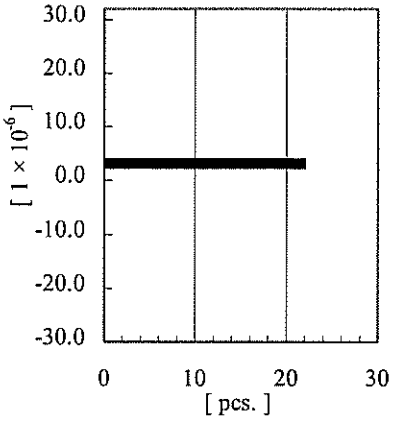
+85 °C 、 85 %RH 、 5.5 V
、 1 000 h



6. Temp. cycle

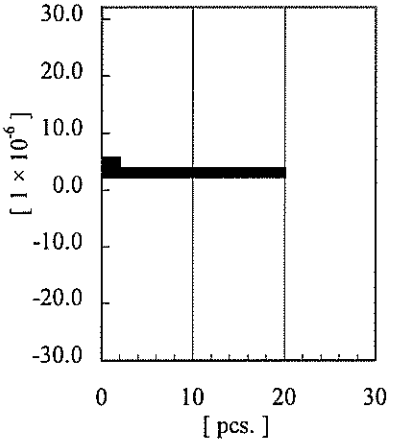
-55 °C ⇔ +125 °C

100 cycles 30 min each step



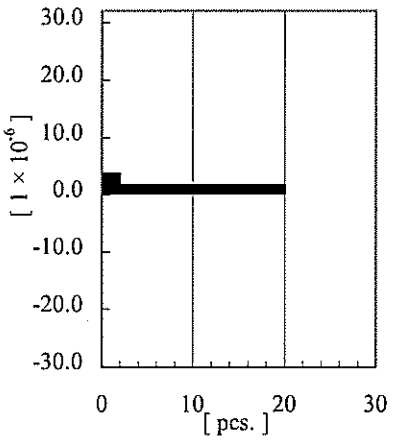
7.Resistance to soldering heat

For convention reflow
soldering furnace (2 times)



8. Drop

750 mm x 3Times

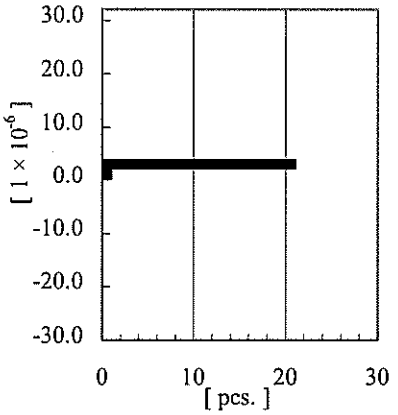


9. Vibration

10 Hz to 55 Hz amplitude 0.75 mm

55 Hz to 500 Hz 98 m/s^2

15 min / cycle 6 h (2 h 、 3 directions)



Qualification Data