



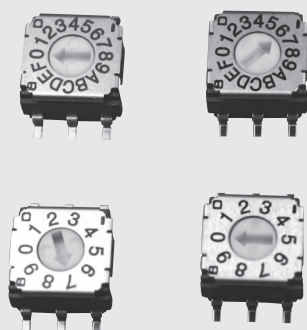
**THE DATASHEET OF  
SH-7070TB**



# ROTARY CODED SWITCHES (SMD)

# SH-7000

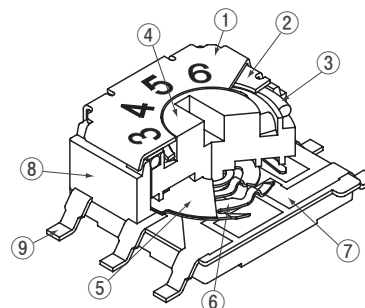
## RoHS compliant



## FEATURES

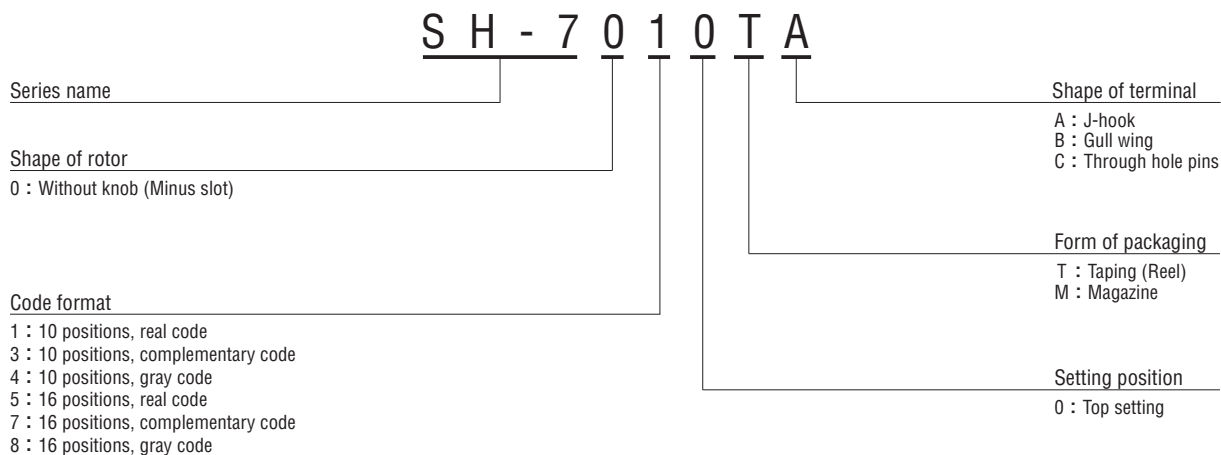
- RoHS compliant
- Center Common terminal pins location
- High digit visibility
- Gray code output available
- Washable

## INTERNAL STRUCTURE



Part name	Material	Flammability
① Marking cover	Stainless steel (SUS 304)	—
② Cover	Stainless steel (SUS 301)	
③ "O" ring	Silicone rubber	UL94HB
④ Rotor	Polyphenylenesulphide	UL94V-0
⑤ Spacer	Stainless steel (SUS 304)	—
⑥ Moving contact	Copper alloy, Gold-plated	
⑦ Fixed contact		
⑧ Housing	Polyphenylenesulphide	UL94V-0
⑨ Terminal pin	Copper alloy, Gold-plated	—

## PART NUMBER DESIGNATION



※ Please refer to the LIST OF PART NUMBERS when placing orders.

# SH-7000

## ROTARY CODED SWITCHES (SMD)

### CODE FORMAT

No. of positions		16 positions																	
		10 positions																	
Position		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F		
Code	Real code	8								●	●	●	●	●	●	●	●		
		4					●	●	●	●					●	●	●	●	
		2			●	●				●	●			●	●			●	●
		1		●		●			●		●		●		●		●		●
	Complementary code	8	●	●	●	●	●	●	●	●									
		4	●	●	●	●					●	●	●	●					
		2	●	●			●	●			●	●			●	●			
		1	●		●		●		●		●		●		●		●		
	Gray code	8									●	●	●	●	●	●	●	●	
		4					●	●	●	●	●	●	●	●					
		2			●	●	●	●					●	●	●	●			
		1		●	●			●	●				●	●			●	●	

● ...Contact closed

### LIST OF PART NUMBERS

Setting position	Shape of rotor	Shape of terminal	Form of packaging	Binary coded decimal			Binary coded hexadecimal			Pieces in package	
				Real code	Complementary code	Gray code	Real code	Complementary code	Gray code		
Top setting	Minus slot	A J-hook	Taping	SH-7010TA	SH-7030TA	<del>SH-7040TB</del>	SH-7050TA	SH-7070TA	<del>SH-7080TB</del>	500 pcs./reel	
			Magazine	SH-7010MA	SH-7030MA	<del>SH-7040MB</del>	SH-7050MA	SH-7070MA	<del>SH-7080MB</del>	50 pcs./stick	
		B Gull wing	Taping	SH-7010TB	SH-7030TB	SH-7040TB	SH-7050TB	SH-7070TB	SH-7080TB	500 pcs./reel	
			Magazine	SH-7010MB	SH-7030MB	SH-7040MB	SH-7050MB	SH-7070MB	SH-7080MB	50 pcs./stick	
		C Through hole pins	Taping	<del>SH-7010TC</del>	<del>SH-7030TC</del>	<del>SH-7040TB</del>	<del>SH-7050TC</del>	<del>SH-7070TC</del>	<del>SH-7080TB</del>	<del>SH-7080TB</del>	<del>500 pcs./reel</del>
			Magazine	SH-7010MC	SH-7030MC	<del>SH-7040MB</del>	SH-7050MC	SH-7070MC	<del>SH-7080MB</del>	50 pcs./stick	

☐ : Not manufactured

※ Verify the above part numbers when placing orders. Taping and magazine version can be supplied only in reel or stick unit.

### STANDARD SPECIFICATIONS

Circuit type	BCD (Real code, Complementary code, Gray code) BCH (Real code, Complementary code, Gray code)
Operating temperature range	— 40 ~ 85 °C
Storage temperature range	— 40 ~ 105 °C (Gray code)
Sealing	Washable by "O" ring ※ Please refer to page 150,151
Net weight	Approx. 0.38 g

### ELECTRICAL CHARACTERISTICS

Contact rating Non-switching Switching Minimum	DC50 V 100 mA DC5 V 100 mA DC20 mV 1 μ A
Contact resistance	100 m Ω maximum
Insulation resistance	1000 M Ω (DC100 V) minimum
Dielectric strength	AC250 V, 60 s

# SH-7000

## ROTARY CODED SWITCHES (SMD)

### MECHANICAL CHARACTERISTICS

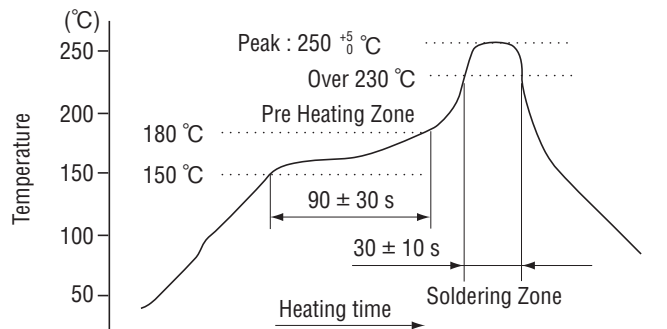
No. of positions	10, 16
Adjustment torque	3 ~ 20 mN·m { 3~ 204 gf·cm}
Stepping angle	36° (10 positions) 22.5° (16 positions)
Solderability	245 ± 3 °C, 2 ~ 3 s
Soldering heat	Reflow : 255 °C (Peak temperature) Reflow : Peak temperature 255 °C (Please refer to the profile below.)
	Flow : 260 ± 3 °C as the temperature in a pot of molten solder, immersion from head of terminal to backside of board, 5 ~ 6 s, two times maximum
	Manual soldering : 350 ± 10 °C, 3 ~ 4 s
Shear (adhesion)	5 N {0.51 kgf} 10 s
Substrate bending	Width 90 mm, bend 3 mm, 5 s, 1 time
Pull-off strength	5 N {0.51 kgf} 10s

{ } : Reference only

### ENVIRONMENTAL CHARACTERISTICS

Vibration	Amplitude 1.5 mmor Acceleration 98 m/s <sup>2</sup> , 10-500-10 Hz, 3 directions for 2 h each
Shock	490 m/s <sup>2</sup> , 11 ms 6 directions for 3 times each
Load life	10000 steps minimum, DC5 V, 100 mA
Humidity	40 °C, Relative humidity 90 ~ 95 %, 240 h
High temperature exposure	85 °C, 96 h 105 °C, 96 h (Gray code)
Low temperature exposure	- 40 °C, 96 h
Thermal shock	- 40 (0.5 h) ~ 85 °C (0.5 h), 5 cycles - 40 (0.5 h) ~ 105 °C (0.5 h), 5 cycles (Gray code)

### <Reflow profile for soldering heat evaluation>

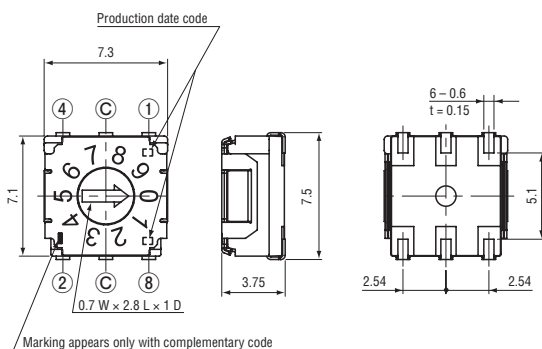


Reflow : two times maximum

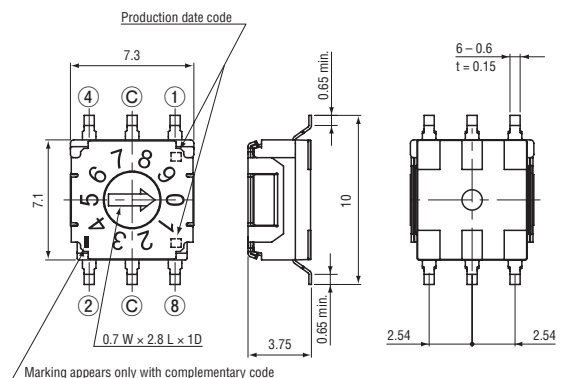
### OUTLINE DIMENSIONS

Unless otherwise specified, tolerance: ± 0.3 (Unit: mm)

- SH-7010A (Real code)
- SH-7030A (Complementary code)



- SH-7010B (Real code)
- SH-7030B (Complementary code)



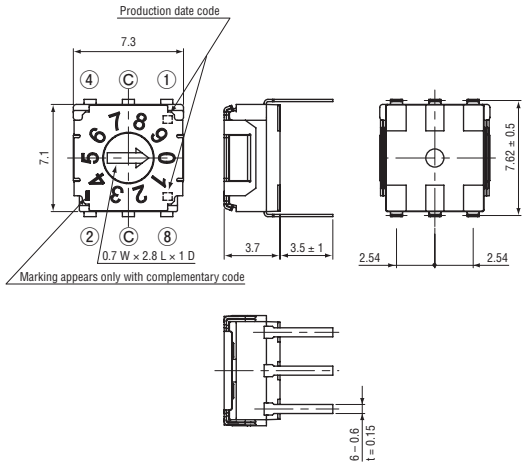
# SH-7000

## ROTARY CODED SWITCHES (SMD)

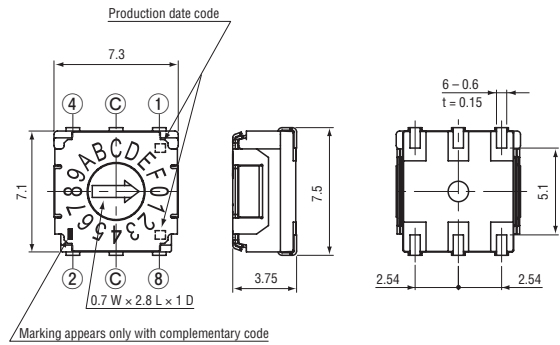
### OUTLINE DIMENSIONS

Unless otherwise specified, tolerance:  $\pm 0.3$  (Unit: mm)

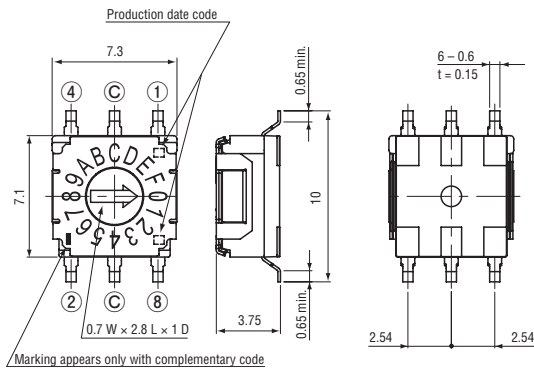
- SH-7010C (Real code)
- SH-7030C (Complementary code)



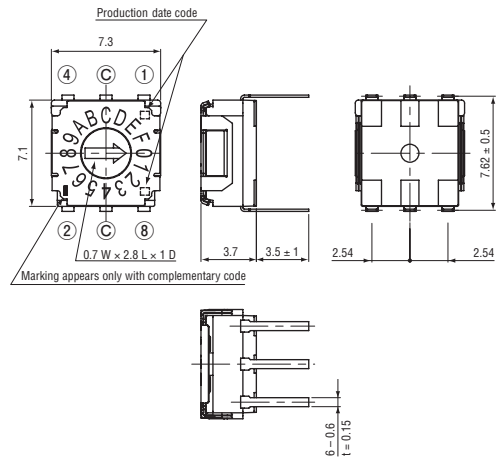
- SH-7050A (Real code)
- SH-7070A (Complementary code)



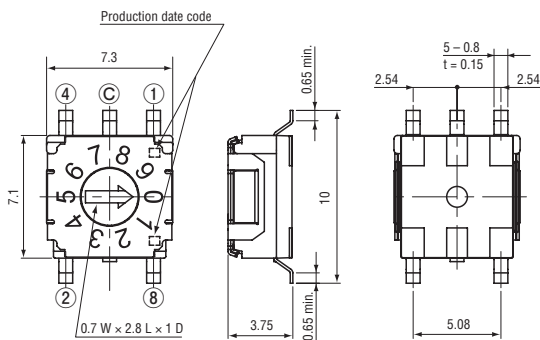
- SH-7050B (Real code)
- SH-7070B (Complementary code)



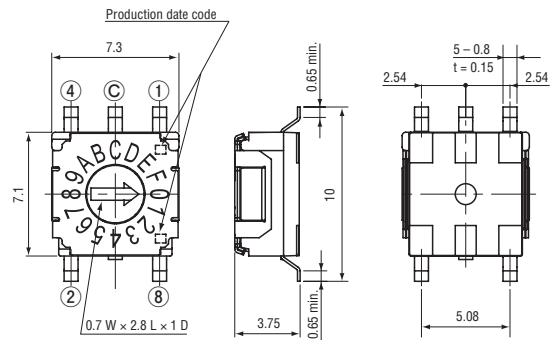
- SH-7050C (Real code)
- SH-7070C (Complementary code)



- SH-7040B (Gray code)



- SH-7080B (Gray code)



# SH-7000

## ROTARY CODED SWITCHES (SMD)

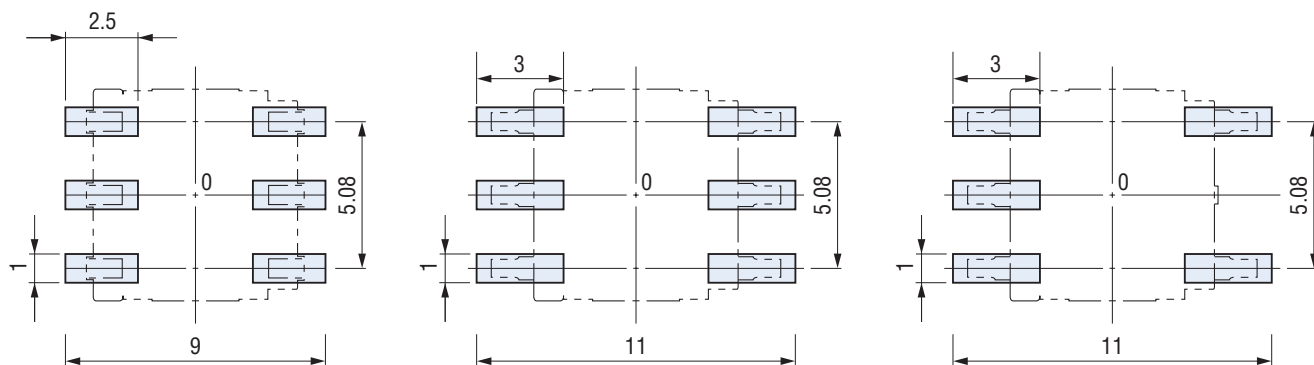
### RECOMMENDED P.C.B. PAD OUTLINE DIMENSIONS

● A type

● B type

● Gray code

(Unit: mm)



注) 0 点は搭載中心とする  
Note) The zero point is the center of mounting.

### TERMINAL CONNECTION / P.C.B. THROUGH HOLE DIMENSIONS

(Unit: mm)

	Through hole																
Terminal pin layout (Bottom view)	<p>Top setting (Through hole)</p> <table border="0"> <tr> <td>Real code</td> <td>Complementary code</td> </tr> <tr> <td> <table border="1"> <tr><td>  8  </td><td>  1  </td></tr> <tr><td>  C  </td><td>  C  </td></tr> <tr><td>  2  </td><td>  4  </td></tr> </table> </td> <td> <table border="1"> <tr><td>  <math>\bar{8}</math>  </td><td>  <math>\bar{1}</math>  </td></tr> <tr><td>  <math>\bar{C}</math>  </td><td>  <math>\bar{C}</math>  </td></tr> <tr><td>  <math>\bar{2}</math>  </td><td>  <math>\bar{4}</math>  </td></tr> </table> </td> </tr> </table>	Real code	Complementary code	<table border="1"> <tr><td>  8  </td><td>  1  </td></tr> <tr><td>  C  </td><td>  C  </td></tr> <tr><td>  2  </td><td>  4  </td></tr> </table>	8	1	C	C	2	4	<table border="1"> <tr><td>  <math>\bar{8}</math>  </td><td>  <math>\bar{1}</math>  </td></tr> <tr><td>  <math>\bar{C}</math>  </td><td>  <math>\bar{C}</math>  </td></tr> <tr><td>  <math>\bar{2}</math>  </td><td>  <math>\bar{4}</math>  </td></tr> </table>	$\bar{8}$	$\bar{1}$	$\bar{C}$	$\bar{C}$	$\bar{2}$	$\bar{4}$
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C	C																
2	4																
$\bar{8}$	$\bar{1}$																
$\bar{C}$	$\bar{C}$																
$\bar{2}$	$\bar{4}$																
P.C.B. dimensions (Bottom view)																	

### PACKAGING SPECIFICATIONS

#### <Taping packaging specifications>

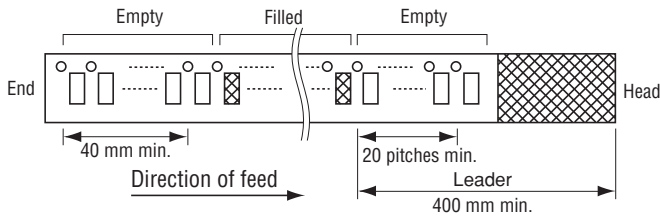
- Taping version is packaged in 500 pcs. per reel.  
Orders will be accepted for units of 500 pcs., i.e., 500, 1000, 1500, pcs., etc.
- Taping version is boxed with one reel (500 pcs.).

Maximum number of consecutive missing pieces = 2  
Leader length and reel dimension are shown in the diagrams below:

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## ROTARY CODED SWITCHES (SMD)

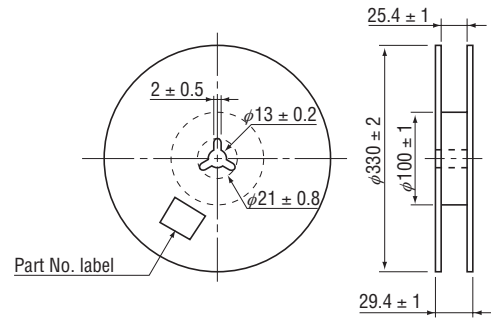
### ● Embossed tape dimensions



### ● Reel dimensions

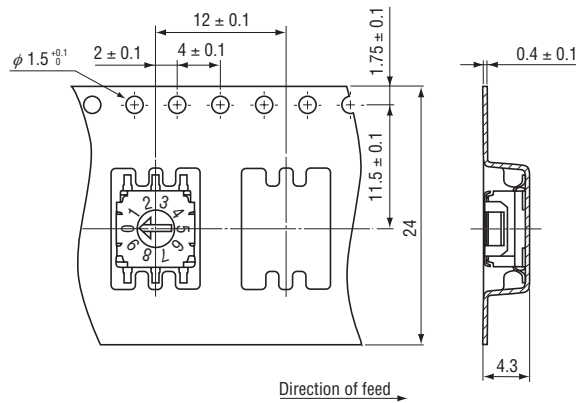
(Conforms to JIS C 0806-3)  
(In accordance with EIAJ ET-7200A)

(Unit: mm)



- SH-70 □ 0TA
- SH-70 □ 0TB

(Unit: mm)



## ■ PACKAGING SPECIFICATIONS

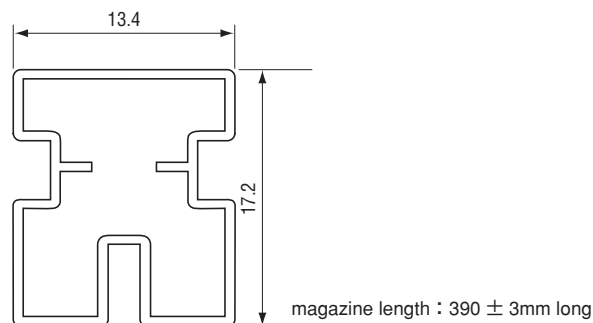
### <Magazine packaging specifications>

- Please order the multiple numbers of the specific packing quantities.

Pieces in package : 50 pcs./stick



### ● Magazine dimensions

(Unit : mm)



## Looking for pricing, stock, or lifecycle information?

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