Serial Signal Generator IC for SLA7042M and SLA7044M

■Absolute Maximum Ratings

(T_a=25°C)

Parameter	Symbol	Ratings	Units
Supply voltage	V_{DD}	−0.5 to 7	V
Input voltage	V_I	−0.5 to V_{DD}+0.5	V
Input current	I_I	±10	mA
Output voltage	V_O	−0.5 to V_{DD}+0.5	V
Output current	I_O	±15	mA
Power dissipation	P_D	200	mW
Operating temperature	T_{OP}	−20 to +85	°C
Storage temperature	T_{stg}	−40 to +150	°C

■Electrical Characteristics

(T_a=25°C)

	Parameter	Symbol	Conditions	Ratings min	Ratings typ	Ratings max	Units
DC characteristics	Supply voltage	V_{DD}		4.5		5.5	V
	Supply current	I_{DD}	V_{DD}=5.5V		0.35	0.45	mA
	Output voltage	V_{OH}	V_{DD}=5V, I_O=±3mA	4.5			V
		V_{OL}				0.4	
	Input current	I_I	V_{DD}=5V, V_I=0 or 5V			±1	μA
	Input voltage	V_{IH}	V_{DD}=5V	3.5		5	V
		V_{IL}		−0.3		1.5	
	Input hysteresis voltage	V_H	V_{DD}=5V		1		V
	Input capacity	C_I	V_{DD}=5V		5	10	pF
AC characteristics	Internal oscillation frequency	F	V_{DD}=5V See Fig. 1.		1.5		MHz
	Propagation delay time	T_{CS}			50	100	ns
		T_{CC}			430	550	
	Output voltage Rise and fall time	T_r	V_{DD}=5V, C_L=15pF See Fig. 2.		20		ns
		T_f			20		
	CLOCK IN terminal Input clock time	V_{CIH}	H level time, V_{DD}=5V	4.5			μs
		V_{CIL}	L level time, V_{DD}=5V	0.5			
	Reset setting time (A)	$_{ts}R$	Inter-clock See Fig. 3.	100			ns
	Stabilization time after reset (B)	$_{tps}R$					
	Signal setting time (C)	$_{ts}S$	Inter-clock See Fig. 3.	100			ns
	Stabilization time after signal input (D)	$_{tps}S$					

Fig. 1

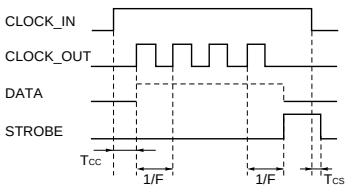


Fig.2

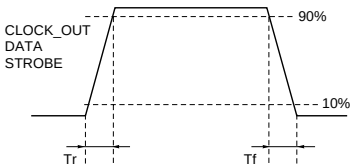
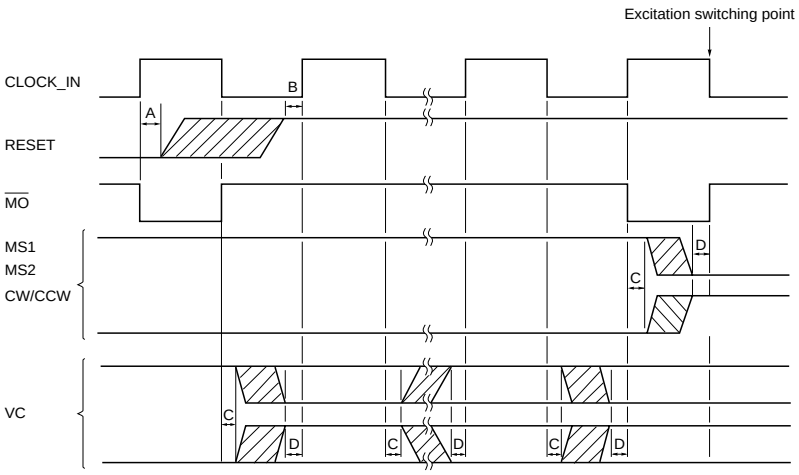
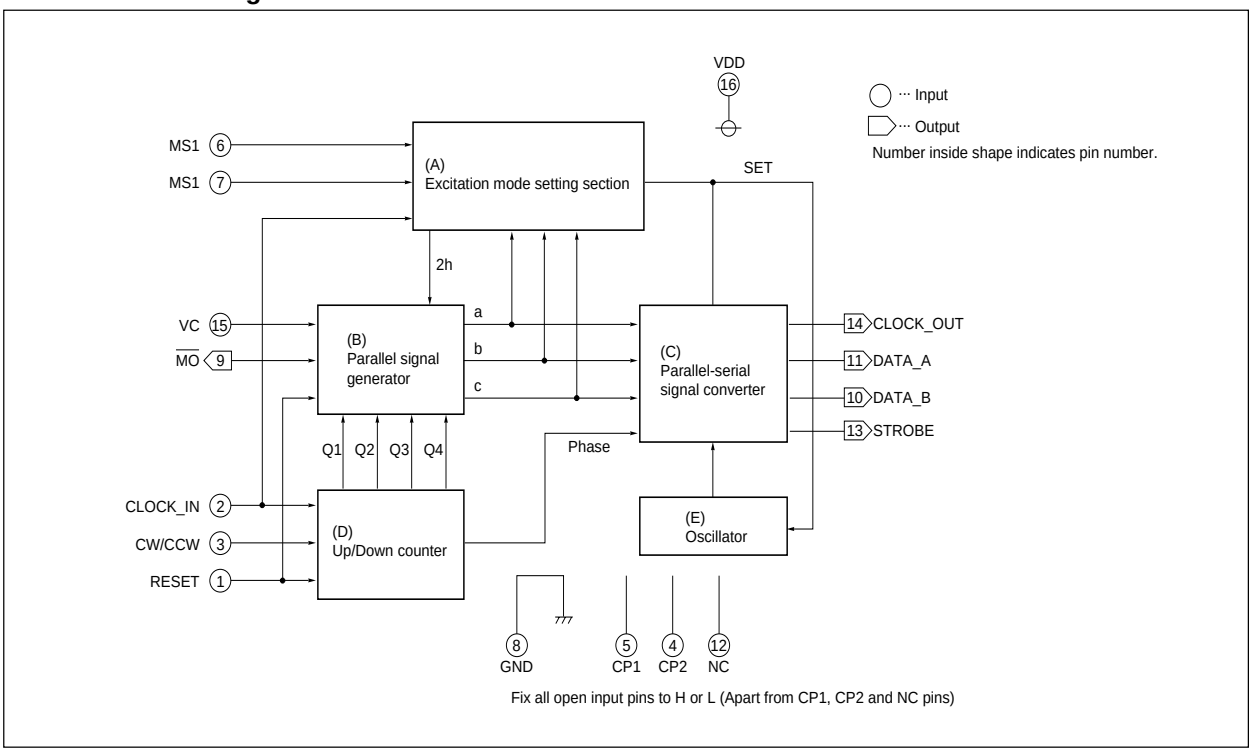


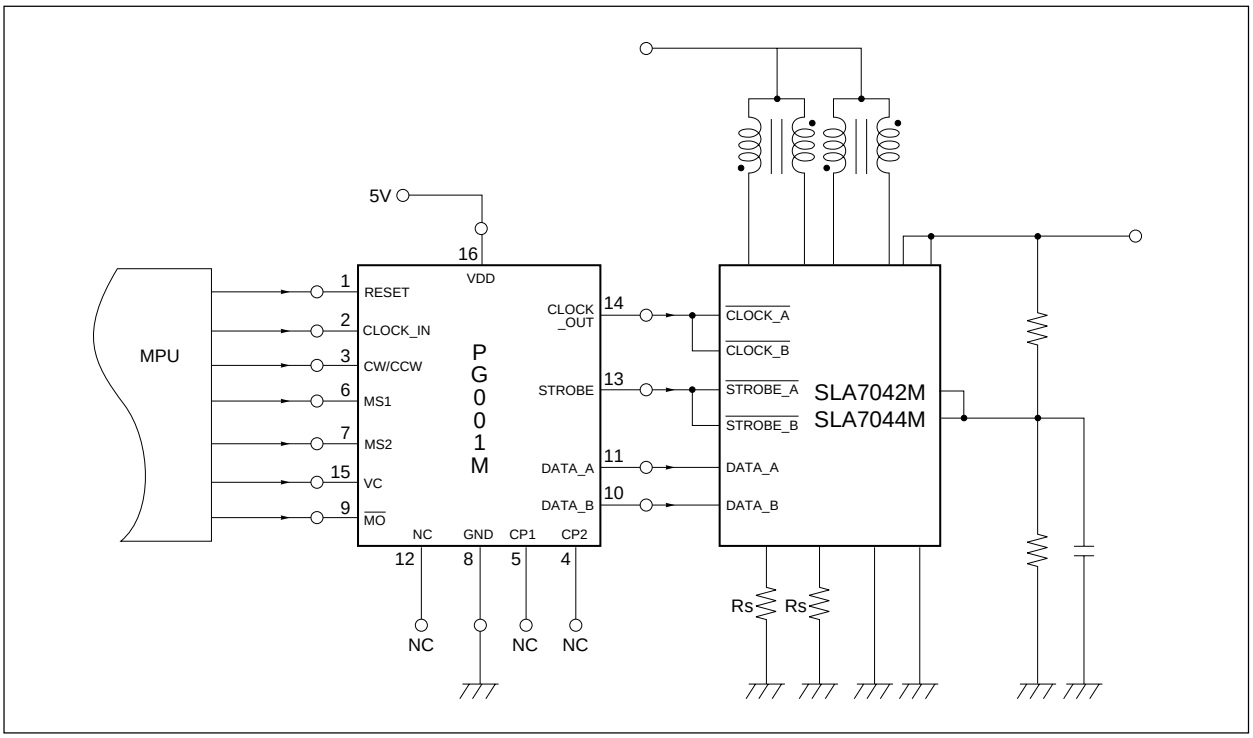
Fig. 3 Timing conditions



■Internal Block Diagram

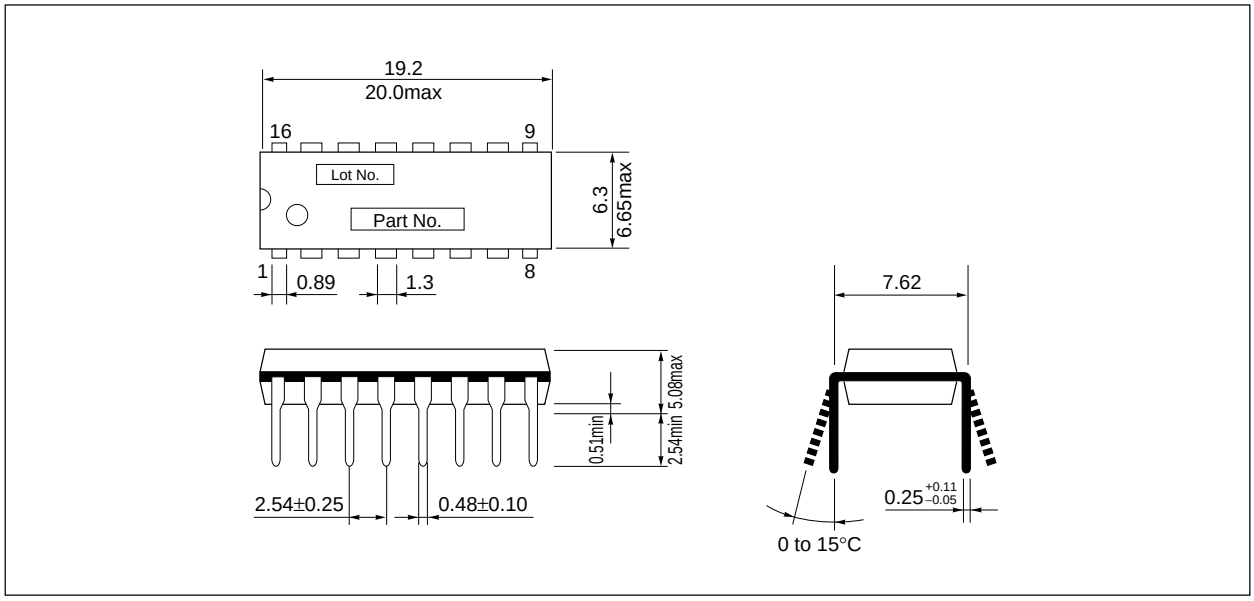


■Diagram of Standard External Circuit

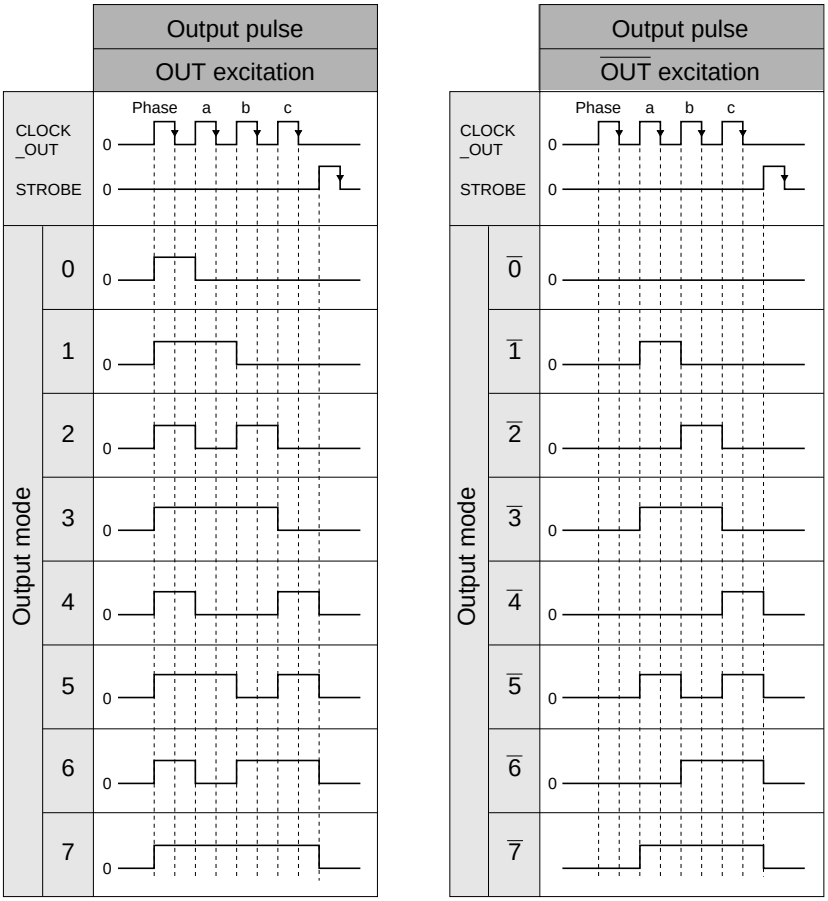


■External Dimensions

(Unit: mm)



■Output Mode Vs Output Pulse



■Input and Output Function Correlation Table

Input				Output				
Mode	CLOCK_IN	CW/CCW	RESET	$\overline{MO}$	CLOCK_OUT	STROBE	DATA-A	DATA-B
CW	↑	L	H	↓	⊓⊓⊓	↑	CW	CW
	↓	L	H	↑	—	↓		
CCW	↑	H	H	↓	⊓⊓⊓	↑	CCW	CCW
	↓	H	H	↑	—	↓		
RESET	↑	×	L	↓	⊓⊓⊓	↑	Output Mode 4 or 7 Output Mode	Input Mode 4 or 7 Output Mode
	↓	×	L	↑	—	↓		

×: Don't care

∗: $\overline{MO}$ outputs L level while CLOCK_IN is H level when output mode is 4:4 (7:7), $\overline{4}$:4 ($\overline{7}$:7), 4:$\overline{4}$ (7:$\overline{7}$),or $\overline{4}$:$\overline{4}$ ($\overline{7}$:$\overline{7}$). Modes in brackets ( ) are for 2-2 phase VC: H.

■Excitation Selection Table

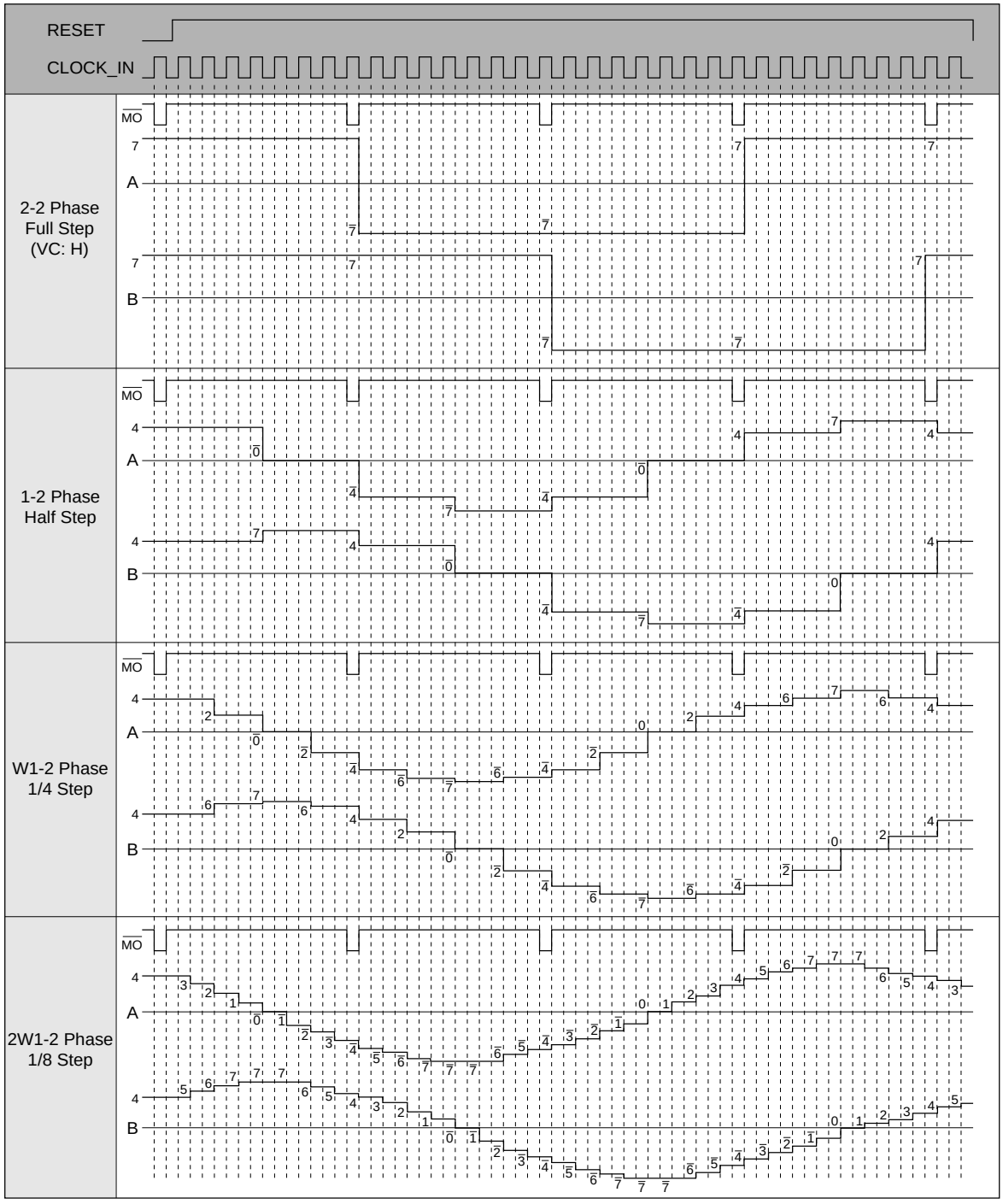
Excitation method	Input			Output current mode of SLA7042M/7044M								Torque vector
	Excitation mode selection			0	1	2	3	4	5	6	7	
	VC	MS1	MS2	0%	20%	40%	55.5%	71.4%	83%	91%	100%	
2-2 Phase Full Step	H	L	L	–	–	–	–	–	–	–	○	141%
	L	L	L	–	–	–	–	○	–	–	–	100%
1-2 Phase Half Step	×	H	L	○	–	–	–	○	–	–	○	100%
W1-2 Phase 1/4 Step	×	L	H	○	–	○	–	○	–	○	○	100%
2W1-2 Phase 1/8 Step	×	H	H	○	○	○	○	○	○	○	○	100%

■Output Mode Sequence

Excitation method	CW/CCW	CLOCK	RESET	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
		$\overline{MO}$	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	L
2-2 Phase Full Step (1) (VC: H)	CW	DATA_A	7	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	7	=	=	=	=	=	=	=	7
		DATA_B	7	=	=	=	=	=	=	=	7	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	7
	CCW	DATA_A	7	=	=	=	=	=	=	=	7	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	7
		DATA_B	7	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	$\overline{7}$	=	=	=	=	=	=	=	7	=	=	=	=	=	=	=	7
2-2 Phase Full Step (2) (VC: L)	CW	DATA_A	4	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	4	=	=	=	=	=	=	=	4
		DATA_B	4	=	=	=	=	=	=	=	4	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	4
	CCW	DATA_A	4	=	=	=	=	=	=	=	4	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	4
		DATA_B	4	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	$\overline{4}$	=	=	=	=	=	=	=	4	=	=	=	=	=	=	=	4
1-2 Phase Half Step	CW	DATA_A	4	=	=	=	$\overline{0}$	=	=	=	$\overline{4}$	=	=	=	$\overline{7}$	=	=	=	$\overline{4}$	=	=	=	0	=	=	=	4	=	=	=	7	=	=	=	4
		DATA_B	4	=	=	=	7	=	=	=	4	=	=	=	$\overline{0}$	=	=	=	$\overline{4}$	=	=	=	$\overline{7}$	=	=	=	$\overline{4}$	=	=	=	0	=	=	=	4
	CCW	DATA_A	4	=	=	=	7	=	=	=	4	=	=	=	0	=	=	=	$\overline{4}$	=	=	=	$\overline{7}$	=	=	=	$\overline{4}$	=	=	=	$\overline{0}$	=	=	=	4
		DATA_B	4	=	=	=	0	=	=	=	$\overline{4}$	=	=	=	$\overline{7}$	=	=	=	$\overline{4}$	=	=	=	$\overline{0}$	=	=	=	4	=	=	=	7	=	=	=	4
W1-2 Phase 1/4 Step	CW	DATA_A	4	=	2	=	$\overline{0}$	=	$\overline{2}$	=	$\overline{4}$	=	$\overline{6}$	=	$\overline{7}$	=	$\overline{6}$	=	$\overline{4}$	=	$\overline{2}$	=	0	=	2	=	4	=	6	=	7	=	6	=	4
		DATA_B	4	=	6	=	7	=	6	=	4	=	2	=	$\overline{0}$	=	$\overline{2}$	=	$\overline{4}$	=	$\overline{6}$	=	$\overline{7}$	=	$\overline{6}$	=	$\overline{4}$	=	$\overline{2}$	=	0	=	2	=	4
	CCW	DATA_A	4	=	6	=	7	=	6	=	4	=	2	=	0	=	$\overline{2}$	=	$\overline{4}$	=	$\overline{6}$	=	$\overline{7}$	=	$\overline{6}$	=	$\overline{4}$	=	$\overline{2}$	=	$\overline{0}$	=	2	=	4
		DATA_B	4	=	2	=	0	=	$\overline{2}$	=	$\overline{4}$	=	$\overline{6}$	=	$\overline{7}$	=	$\overline{6}$	=	$\overline{4}$	=	$\overline{2}$	=	$\overline{0}$	=	2	=	4	=	6	=	7	=	6	=	4
2W1-2 Phase 1/8 Step	CW	DATA_A	4	3	2	1	$\overline{0}$	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	0	1	2	3	4	5	6	7	7	6	5	4
		DATA_B	4	5	6	7	7	7	6	5	4	3	2	1	$\overline{0}$	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	0	1	2	3	4
	CCW	DATA_A	4	5	6	7	7	7	6	5	4	3	2	1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	$\overline{0}$	1	2	3	4
		DATA_B	4	3	2	1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	$\overline{0}$	1	2	3	4	5	6	7	7	7	6	5	4

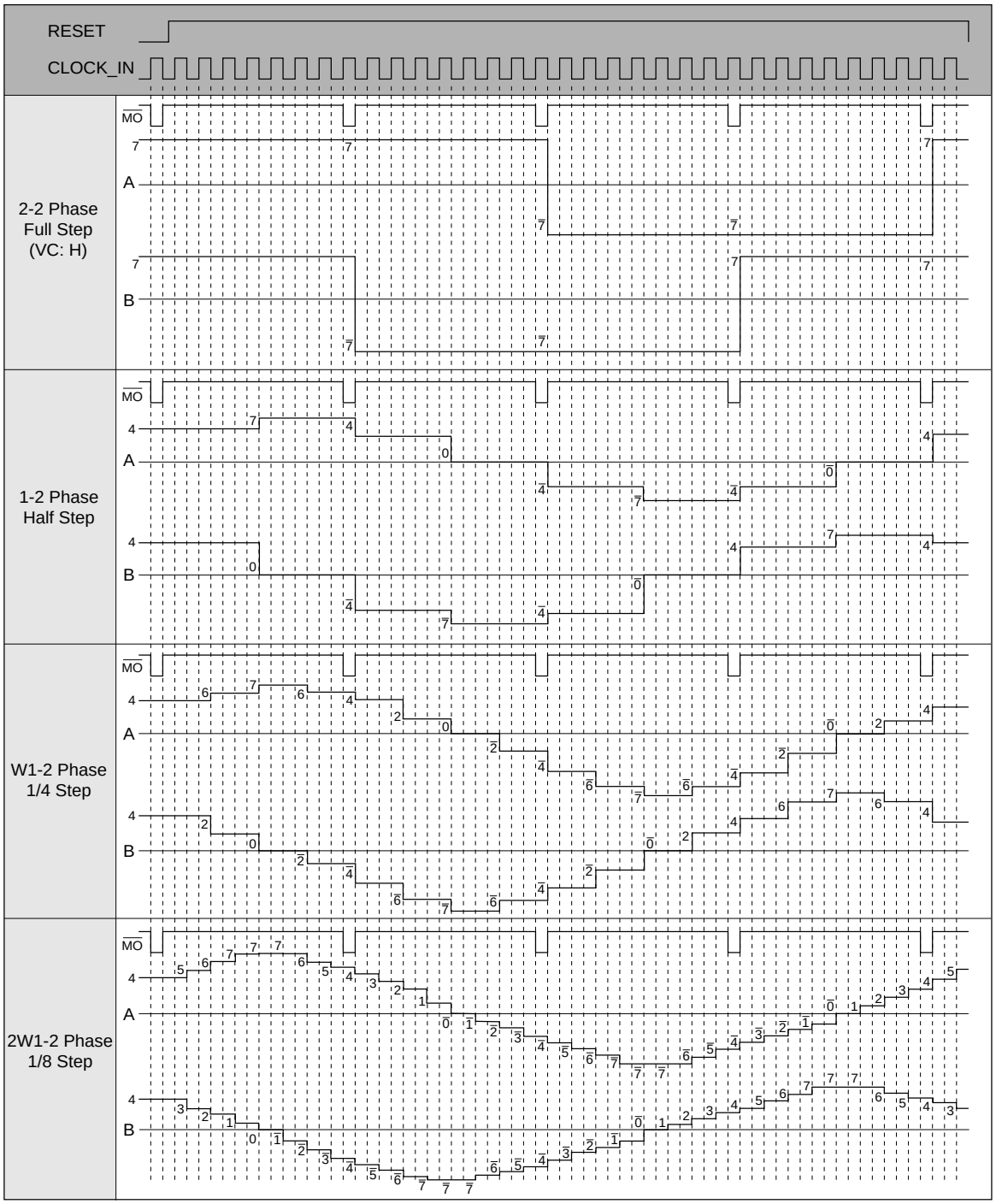
= : No output

■Output Timing Chart (CW) ··· Excitation Current of SLA7042M/7044M



For 2-2 phase VC : L, output mode is 7→4.

■Output Timing Chart (CCW) ··· Excitation Current of SLA7042M/7044M



For 2-2 phase VC:L, output mode is 7→4.