2-Phase Stepper Motor Unipolar Driver ICs

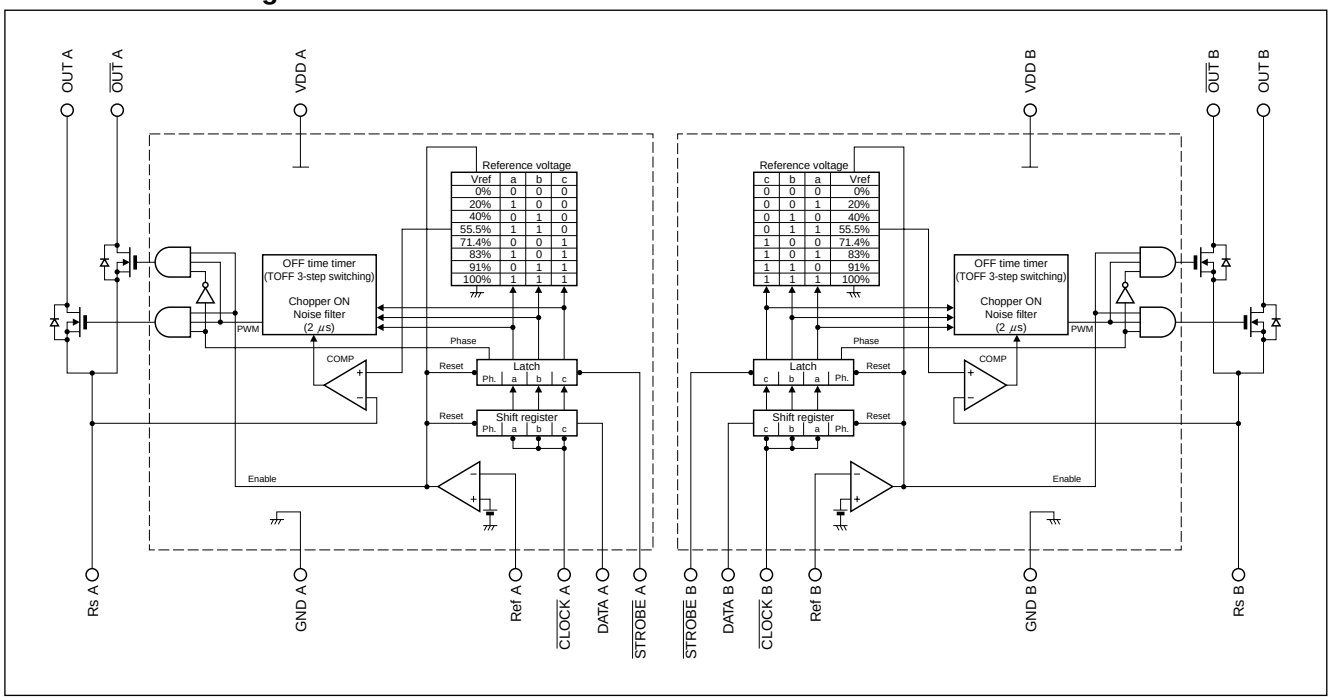
■Absolute Maximum Ratings

Parameter	Symbol	Ratings		Units
		SLA7042M	SLA7044M	
Motor supply voltage	V_{CC}	46		V
FET Drain-Source voltage	V_{DSS}	100		V
Control supply voltage	V_{DD}	7		V
Input voltage	V_{IN}	−0.5 to V_{DD}+0.5		V
Output current	I_O	1.2	3	A
Power dissipation	P_D	4.5 (Without Heatsink)		W
Channel temperature	T_{ch}	+150		°C
Storage temperature	T_{stg}	−40 to +150		°C

■Electrical Characteristics

	Parameter		Symbol	Ratings						Units
				SLA7042M			SLA7044M			
				min	typ	max	min	typ	max	
DC characteristics	Control supply current		I_{DD}			7			7	mA
			Conditions		V_{DD}=5.5V			V_{DD}=5.5V		
	Control supply voltage		V_{DD}	4.5	5	5.5	4.5	5	5.5	V
	Terminals DATA, CLOCK and STROBE	Input voltage	V_{IH}	3.5		5	3.5		5	V
			Conditions		V_{DD}=5V			V_{DD}=5V		
			V_{IL}	0		1.5	0		1.5	
			Conditions		V_{DD}=5V			V_{DD}=5V		
		Input hysteresis voltage	V_H		1			1		V
			Conditions		V_{DD}=5V			V_{DD}=5V		
		Input current	I_I			±1			±1	μA
			Conditions		V_{DD}=5V, V_I=0 or 5V			V_{DD}=5V, V_I=0 or 5V		
	REF terminal	Input voltage	V_{REF}	0.4		2.5	0.4		2.5	V
			Conditions		V_{DD}=5V			V_{DD}=5V		
			$V_{DISABLE}$	V_{DD}−1		V_{DD}	V_{DD}−1		V_{DD}	
			Conditions		V_{DD}=5V			V_{DD}=5V		
		Input current	I_{REF}			±1			±1	μA
			Conditions		V_{DD}=5V, V_I=0 or 5V			V_{DD}=5V, V_I=0 or 5V		
	Reference voltage selection output voltage		V_{ref}		0			0		%
			Conditions		MODE 0			MODE 0		
			V_{ref}		20			20		
			Conditions		MODE 1			MODE 1		
			V_{ref}		40			40		
			Conditions		MODE 2			MODE 2		
			V_{ref}		55.5			55.5		
			Conditions		MODE 3			MODE 3		
			V_{ref}		71.4			71.4		
			Conditions		MODE 4			MODE 4		
			V_{ref}		83			83		
			Conditions		MODE 5			MODE 5		
			V_{ref}		91			91		
			Conditions		MODE 6			MODE 6		
			V_{ref}		100			100		
			Conditions		MODE 7			MODE 7		
	FET ON voltage		V_{DS}			0.8			1.4	V
			Conditions		I_D=1.2A, V_{DD}=4.75V			I_D=3A, V_{DD}=4.75V		
	FET Drain-Source voltage		V_{DSS}	100			100			V
			Conditions		I_{DSS}=4mA, V_{DD}=5V			I_{DSS}=4mA, V_{DD}=5V		
	FET drain leakage current		I_{DSS}			4			4	mA
			Conditions		V_{DSS}=100V, V_{DD}=5V			V_{DSS}=100V, V_{DD}=5V		
	FET diode forward voltage		V_{SD}			1.2			2.3	V
			Conditions		I_D=1.2A			I_D=3A		
AC characteristics	Chopper off time		T_{OFF}		7			7		μs
			Conditions		MODE 1, 2			MODE 1, 2		
			T_{OFF}		9			9		
			Conditions		MODE 3, 4, 5			MODE 3, 4, 5		
			T_{OFF}		11			11		
			Conditions		MODE 6, 7			MODE 6, 7		
	Switching time		T_r		0.5			0.5		μs
			Conditions		V_{DD}=5V, I_D=1A			V_{DD}=5V, I_D=1A		
			T_{stg}		0.7			0.7		
			Conditions		V_{DD}=5V, I_D=1A			V_{DD}=5V, I_D=1A		
			T_f		0.1			0.1		
			Conditions		V_{DD}=5V, I_D=1A			V_{DD}=5V, I_D=1A		
	Data setup time "A"		$_{ts}$DAT	75			75			ns
			Conditions		Inter-clock			Inter-clock		
	Data hold time "B"		$_{th}$DAT	75			75			
			Conditions		Inter-clock			Inter-clock		
	Data pulse time "C"		$_{tw}$DAT	150			150			
			Conditions							
	Clock pulse width "D"		$_{twh}$CLK	100			100			
			Conditions							
	Stabilization time before strobe "E"		$_{tps}$STB	100			100			
			Conditions		Strobe=L from clock			Strobe=L from clock		
	Strobe pulse H width "F"		$_{twh}$STB	100			100			
			Conditions							

■Internal Block Diagram

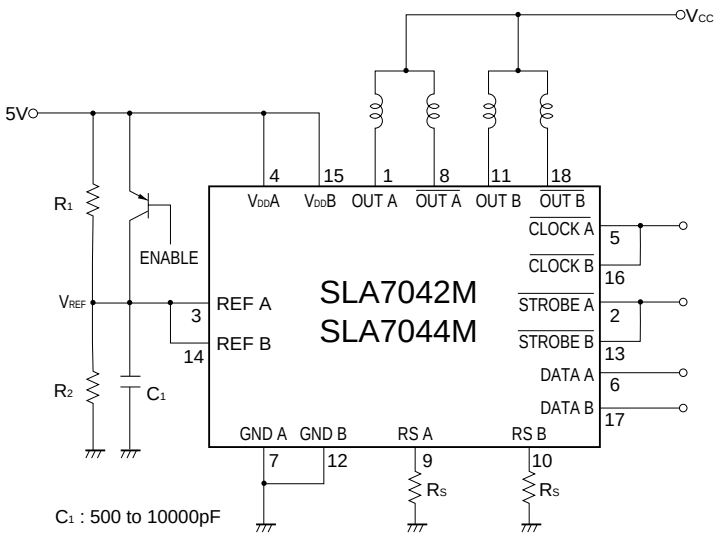


■Output Current Formula

$$I_O = \frac{K}{3} \bullet \frac{V_{REF}}{R_S}$$

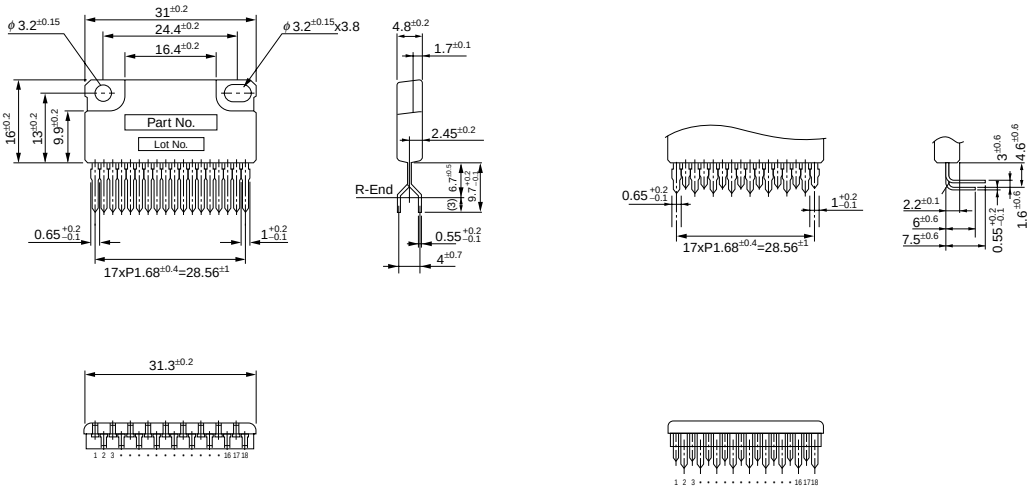
K: Reference voltage setting rate by serial signal
(See the internal block diagram)

■Diagram of Standard External Circuit



■External Dimensions

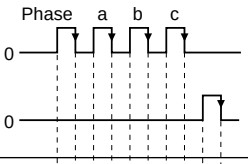
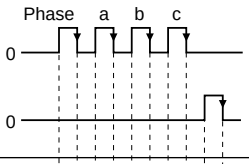
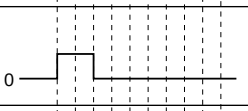
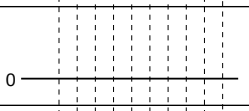
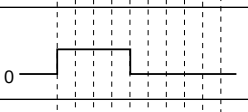
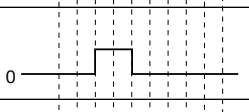
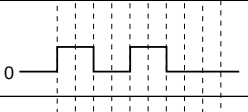
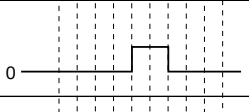
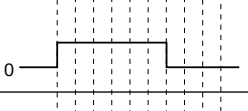
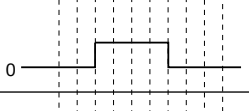
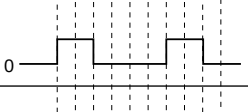
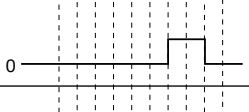
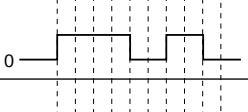
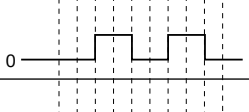
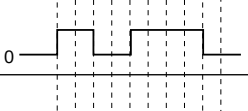
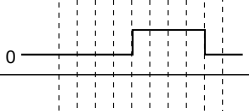
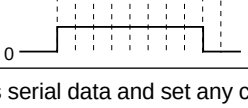
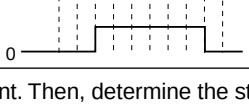
(Unit: mm)



Forming No. No.871

Forming No. No.872

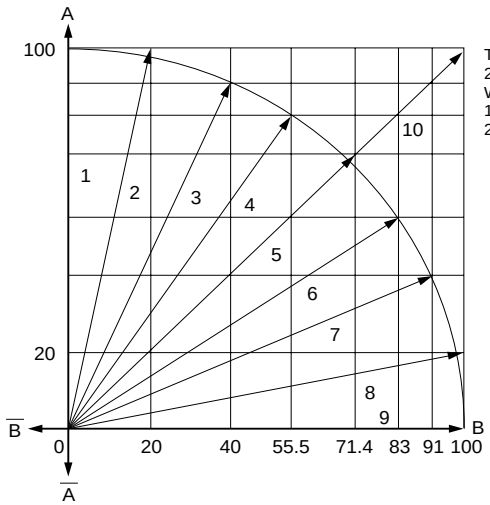
■Serial Data Pattern

		OUT excitation (MODEχ)	$\overline{\text{OUT}}$ excitation (MODEχ)
	$\overline{\text{CLOCK}}$		
	$\overline{\text{STROBE}}$		
DATA	MODE0 (0%)		
	MODE1 (20%)		
	MODE2 (40%)		
	MODE3 (55.5%)		
	MODE4 (71.4%)		
	MODE5 (83%)		
	MODE6 (91%)		
	MODE7 (100%)		

Successively output this serial data and set any current. Then, determine the step time of the reference voltage V_{ref} at $\overline{\text{STROBE}}$ signal intervals.

See page 48 for details of PG001M serial signal generator IC for SLA7042M and SLA7044M.

■Current Vector Locus (One step of stepper motor normalized to 90 degrees)



To rotate the motor, enter serial data as follows:
2W1-2 phase excitation : Vector 1→2→3→4→5→6→7→8→9 ...
W1-2 phase excitation : Vector 1→3→5→7→9→....
1-2 phase excitation : Vector 1→5→9
2-2 phase excitation : Vector 5 or 10

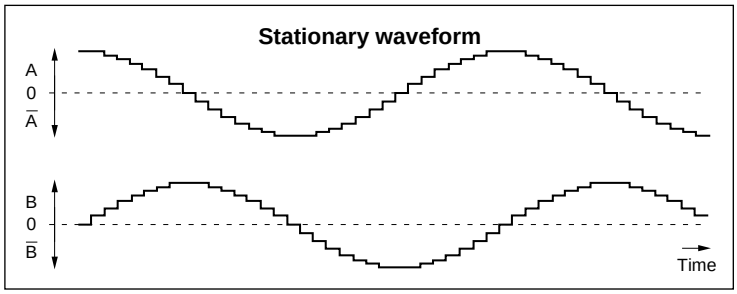
Combined vector	Current A	Current B
1	100%	0%
2	100%	20%
3	91%	40%
4	83%	55.5%
5	71.4%	71.4%
6	55.5%	83%
7	40%	91%
8	20%	100%
9	0%	100%
10	100%	100%

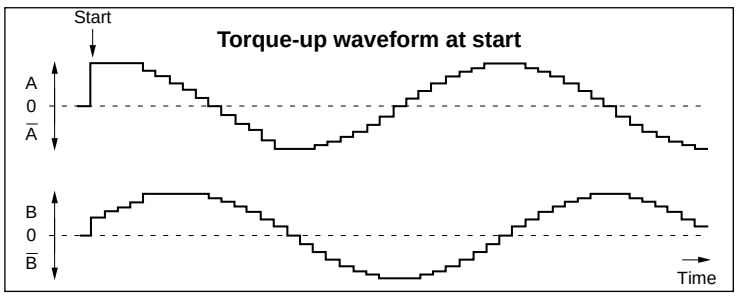
■Serial Data Sequence Example (2W 1-2 Phase Excitation for CW)

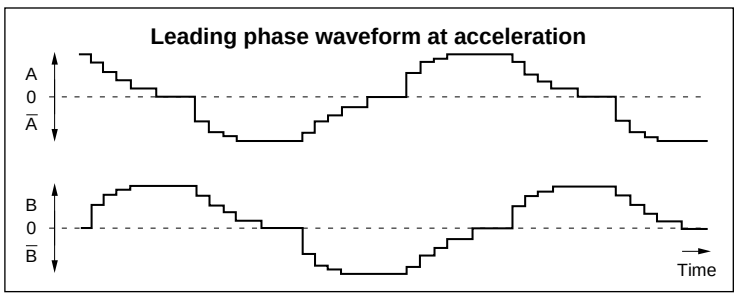
Sequence	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	0
DATA-A MODE	4	3	2	1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	$\overline{0}$	1	2	3	4	5	6	7	7	7	6	5	4
DATA-B MODE	4	5	6	7	7	7	6	5	4	3	2	1	0	$\overline{1}$	$\overline{2}$	$\overline{3}$	$\overline{4}$	$\overline{5}$	$\overline{6}$	$\overline{7}$	$\overline{7}$	$\overline{7}$	$\overline{6}$	$\overline{5}$	$\overline{4}$	$\overline{3}$	$\overline{2}$	$\overline{1}$	0	1	2	3	4

A malfunction may occur just after the power (V_{DD}) is turned on because the internal logic is unstable. Therefore, set the RESET state (REF terminal voltage: V_{DD}–1V to V_{DD}) after the power is turned on.)

■Operation Current Waveform Examples







These three types of waveforms can all be set with a serial signal.

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Parça koduyla arama

Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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