

## SI-7510 New Pentagon Connection

### Absolute Maximum Ratings

Parameter	Symbol	Ratings	Unit	Remarks
Main Supply Voltage	V <sub>CC1</sub>	44	V	
Logic Supply Voltage	V <sub>CC2</sub>	7	V	
Logic Input Voltage	V <sub>IN</sub>	-0.3 to V <sub>CC2</sub>	V	
REF Input Voltage	V <sub>REF</sub>	-0.3 to V <sub>CC2</sub>	V	
SENCE Input Voltage	V <sub>SENCE</sub>	2	V	Except when $t_w < 1\mu s$
Charge Pump Output Voltage	V <sub>MC3</sub>	48	V	
Power Dissipation	P <sub>D</sub>	1.6	W	
Operating Ambient Temperature	T <sub>a</sub>	-10 to 80	°C	
Storage Temperature	T <sub>stg</sub>	-20 to 150	°C	
Junction Temperature	T <sub>j</sub>	150	°C	

### Recommended Operating Ranges

Parameter	Symbol	Operating Ranges	Unit
Main Supply Voltage	V <sub>CC1</sub>	10 to 42*	V
Logic Supply Voltage	V <sub>CC2</sub>	3 to 5.5	V
REF Input Voltage	V <sub>REF</sub>	0.1 to 1	V

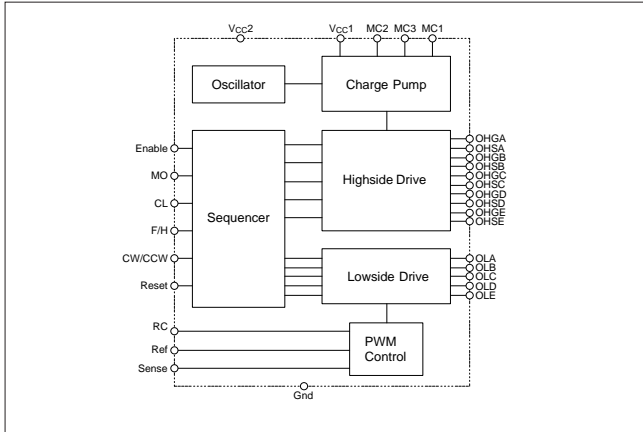
\*: Insert a 5V Zener diode between V<sub>CC1</sub> and V<sub>MC3</sub> when using with V<sub>CC1</sub> of 35 V or more.

### Electrical Characteristics

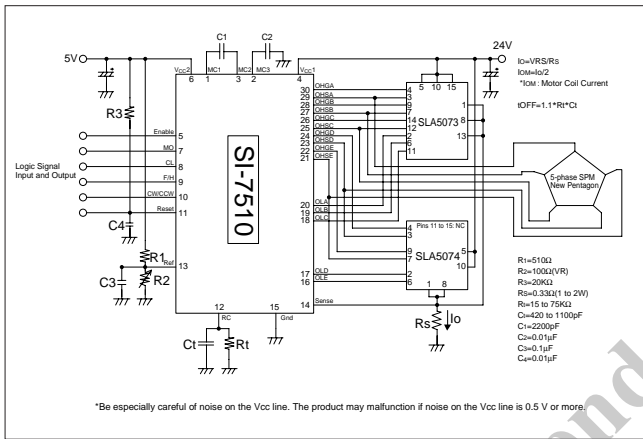
(T<sub>a</sub>=25°C, V<sub>CC1</sub>=24V, V<sub>CC2</sub>=5V, unless otherwise specified)

Parameter	Symbol	Ratings			Unit	Conditions
		min.	typ.	max.		
Main Supply Current	I <sub>CC1</sub>			25	mA	
Logic Supply Current	I <sub>CC2</sub>			10	mA	
Logic Input Voltage	V <sub>IL</sub>			1.25	V	
	V <sub>IH</sub>	3.75			V	
Logic Input Current	I <sub>IL</sub>	-20		20	μA	V <sub>IL</sub> =0V
	I <sub>IH</sub>	-20		20	μA	V <sub>IH</sub> =5.5V
ENA Input Current	I <sub>ENA</sub>	-100		20	μA	V <sub>ENA</sub> =0V
REF Input Current	I <sub>REF</sub>	-20		20	μA	V <sub>REF</sub> =0 to 5.5V
SENCE Voltage	V <sub>SENCE</sub>		1		V	V <sub>REF</sub> =1V
SENCE Current	I <sub>SENCE</sub>	-20		20	μA	V <sub>SENCE</sub> =0V, 2V
					V	I <sub>MOL</sub> =1mA
MO Output Voltage	V <sub>MOL</sub>			1	V	
	V <sub>MOH</sub>	4			V	I <sub>MOH</sub> =-1mA
RC Pin Threshold Voltage	V <sub>RCL</sub>		0.5		V	
	V <sub>RCH</sub>		1.5		V	
RC Pin Outflow Current	I <sub>RC</sub>		300		μA	V <sub>RC</sub> =0V
Charge Pump Output Voltage	V <sub>MC3</sub>		V <sub>CC1</sub> +9		V	
High Side Output Voltage (between gate sources)	V <sub>HGSL</sub>			1	V	Without Zener diode
	V <sub>HGSH</sub>		8.5		V	
Low Side Output Voltage	V <sub>LGL</sub>			1	V	
	V <sub>LGH</sub>		7.5		V	
Maximum CL Frequency	f <sub>CK</sub>	100			KHz	
Maximum Input CL Width (on)	T <sub>CON</sub>	1			μs	
Power-on Reset time	P <sub>TW</sub>		1.5		μs	
Output Delay Time	T <sub>IO</sub>		2		μs	
CW/CCW, F/H						
Input Data Setup Time	T <sub>ICS</sub>	500			μs	Against CL ↑
CW/CCW, F/H						
Input Data Hold Time	T <sub>ICH</sub>	500			μs	

Internal Block Diagram

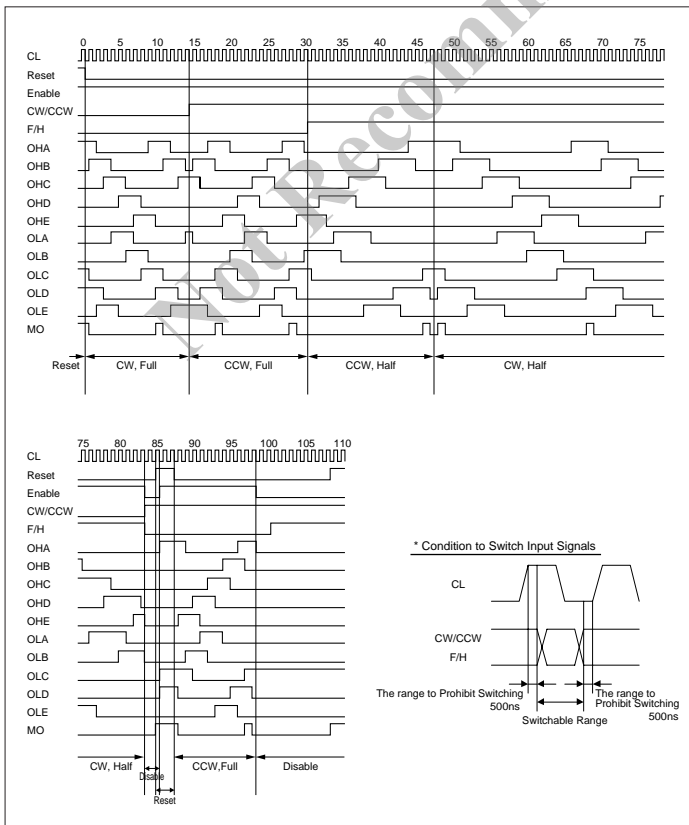


Typical Connection Diagram



\*Be especially careful of noise on the Vcc line. The product may malfunction if noise on the Vcc line is 0.5 V or more.

Input and Output Timing Chart



Pin Assignment and Function Table

Pin No.	Symbol	Function
1	MC1	Capacitor Connection Terminal for Charge Pump (for MC2)
2	MC3	Capacitor Connection Terminal for Charge Pump (for Gnd)
3	MC2	Capacitor Connection Terminal for Charge Pump (for MC1)
4	Vcc1	Main Supply Voltage Input
5	Enable	Output OFF
6	Vcc2	Logic Voltage Input
7	MO	Monitor to Detect Motor Position
8	CL	Clock
9	F/H	4-phase, 4-5 phase switching
10	CW/CCW	Switching Between Forward and Backward Rotation
11	Reset	Reset
12	RC	RC Connection for Chopping Off Time Setting
13	Ref	Reference Voltage Input for Motor Current Setting
14	Sense	For Motor Current Detection
15	Gnd	Gnd
16	VOLE	Low Side MOSFET Gate Connection Pin (E-phase)
17	VOLD	Low Side MOSFET Gate Connection Pin (D-phase)
18	VOLC	Low Side MOSFET Gate Connection Pin (C-phase)
19	VOLB	Low Side MOSFET Gate Connection Pin (B-phase)
20	VOLA	Low Side MOSFET Gate Connection Pin (A-phase)
21	VOHSE	High Side MOSFET Source Connection Pin (E-phase)
22	VOHGE	High Side MOSFET Gate Connection Pin (E-phase)
23	VOHSD	High Side MOSFET Source Connection Pin (D-phase)
24	VOHGD	High Side MOSFET Gate Connection Pin (D-phase)
25	VOHSC	High Side MOSFET Source Connection Pin (C-phase)
26	VOHGC	High Side MOSFET Gate Connection Pin (C-phase)
27	VOHSB	High Side MOSFET Source Connection Pin (B-phase)
28	VOHGB	High Side MOSFET Gate Connection Pin (B-phase)
29	VOHSA	High Side MOSFET Source Connection Pin (A-phase)
30	VOHGA	High Side MOSFET Gate Connection Terminal (A-phase)

Truth Table

Pin Name	Low Level	High Level
Clock		Positive Edge
CW/CCW	Forward Rotation (CW)	Backward Rotation (CCW)
Full/Half	4-phase excitation	4-5 phase excitation
Enable	Disable	Enable
Reset	Enable	Reset

External Dimensions (DIP30)

(Unit : mm)

