

SI-7510 New Pentagon Connection

Absolute Maximum Ratings

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

Recommended Operating Ranges

| Parameter | Symbol | Operating Ranges | Unit |
|----------------------|------------------|------------------|------|
| Main Supply Voltage | V _{CC1} | 10 to 42* | V |
| Logic Supply Voltage | V _{CC2} | 3 to 5.5 | V |
| REF Input Voltage | V _{REF} | 0.1 to 1 | V |

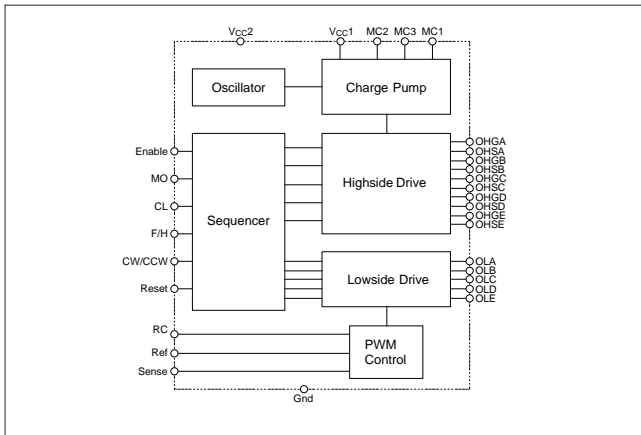
*: Insert a 5V Zener diode between V_{CC1} and V_{MC3} when using with V_{CC1} of 35 V or more.

Electrical Characteristics

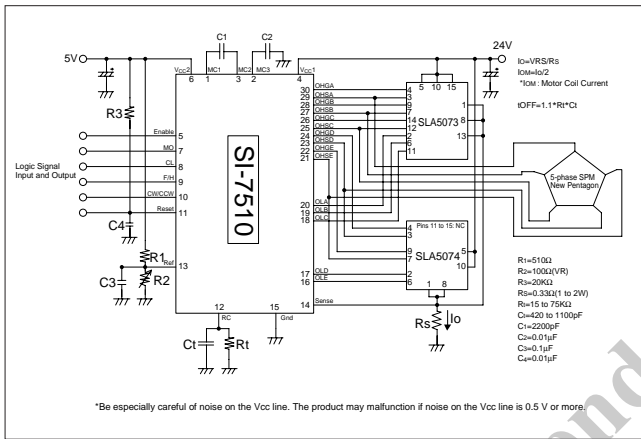
(T_a=25°C, V_{CC1}=24V, V_{CC2}=5V, unless otherwise specified)

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

Internal Block Diagram

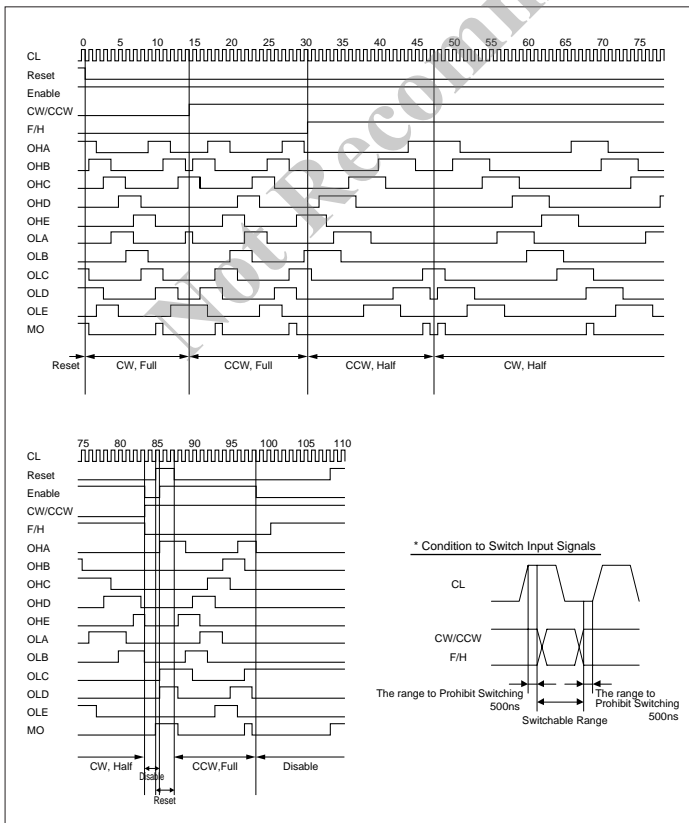


Typical Connection Diagram



*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)

