SD230

Bipolar Chopper Stepping Motor Driver
(Version 1.0)

Operating Instructions

Key Features

- **High input voltage : 12VDC - 50VDC**
- **High running current : 1.0A - 3.0A / phase**
- **Micro step function : 1/1 (full), 1/2 (half), 1/4 (quarter), 1/8**
- **Automatic current reduction in motor stand by mode**
- **On board potentiometer for running current adjustment**
- **On board switching voltage regulator for 5VDC power supply**
- **On board power LED indicator**
- **Current cut off input**
- **All inputs are optically isolated**
- **Small size : 2.6" x 3.1" x 1"**

MYCOM Inc.
November 15, 1995

Table of Contents

1. Description

SD230 is a bipolar chopper stepping motor driver. The SD230 has a wide input voltage range from 12 to 50 VDC and has an output current up to 3.0 A/phase, which is capable of driving most of the two-phase stepping motors. The SD230 driver is capable of driving Nema size 17 and most size 23 stepping motors.

The SD230 driver includes an on board switching voltage regulator, a 20 kHz chopping rate, optically isolated inputs, an automatic current reduction function, and a power LED power indicator. The on board jumpers select micro step mode. The on board potentiometer provides the running current setting.

2. Specifications

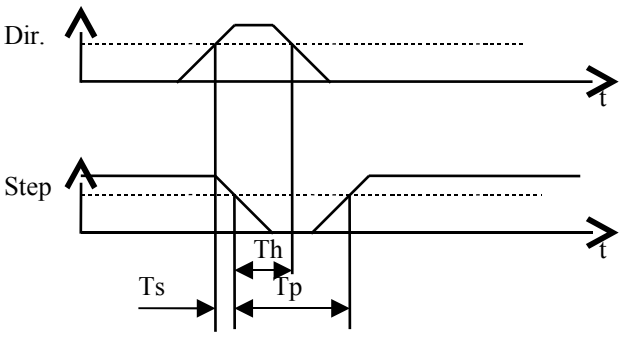
Absolute Maximum Ratings

DC input voltage : 60 VDC
Continuous Phase Current : 3 A
Peak Phase Current : 6 A
Input current (pulse / dir) : 15 mA

Electrical ratings

Symbols	Description	minimum	typical	maximum	units
Vss	input voltage	12		50	V
Iss	input current			3	A
Iout	phase output current	1.0		3.0	A
Iin	Logic input current	5	10	15	mA
Tp	step pulse duration	5			us
Ts	direction set-up time	0			us
Th	direction hold time	10			us
Td	turn on/off time	20			us
Fmax	max. operation frq			50	KHz
Tamb	ambient temperature	0		+50	°C
Tstg	storage temperature	-40		+125	°C

Timing diagram:

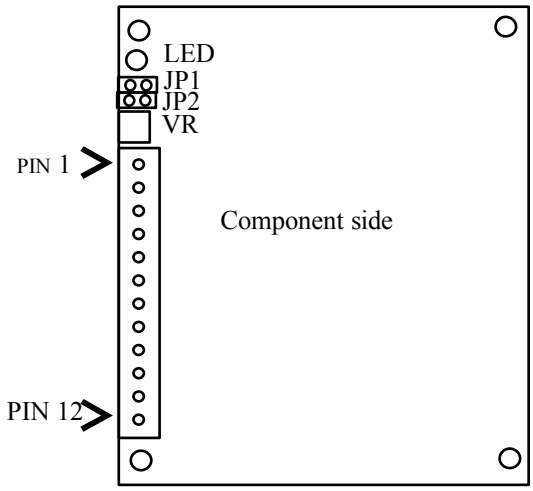


3. Pin Description and Input Circuits

Connector Location and Pin Position

Pin Assignment Table

Pin#	Assignment	Description
1	SIG-source	Signal source input
2	Step-sink	Step sink input
3	Dir-sink	Direction sink input
4	Ctr-source	Control source input
5	Dis-sink	Disable sink input
6	A	ΦA
7	/A	ΦA
8	B	ΦB
9	/B	ΦB
10	Vref	Reference Volt. input
11	GND	Supply power ground
12	+ Vin	Supply power input



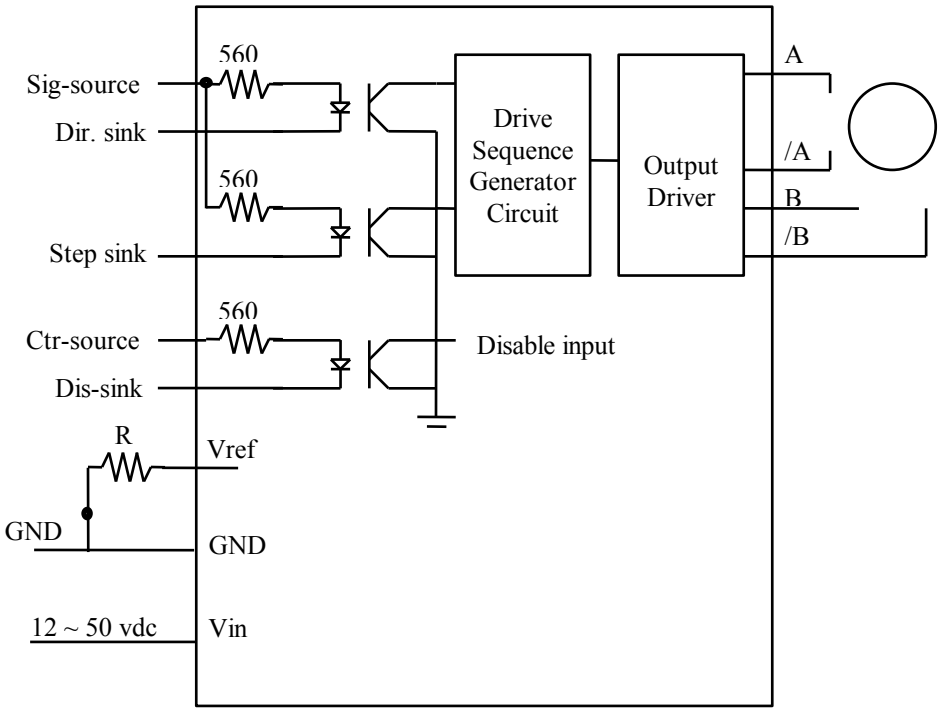
4. Function Description

The SD230, a high performance stepping motor driver, is intended to drive a bipolar constant current through the motor windings. The driver receives step and direction signals from the system controller and generates the phase sequences according to the drive mode setting. The motors running current is adjusted by adjusting the on board potentiometer, VR. Turning the potentiometer VR clockwise will increase the running current up to 3.0 A, and turning VR counter clockwise will decrease the running current down to 1.0 A. The current reduction ratio is fixed at about 50% of the running current. The current reduction will occur after the pulse signal becomes idle for more than 100 ms. the reference voltage input provides a precise way to set the motor winding current. A resistor linked between the Vref and GND terminals will determine the current value of the motor windings. In this case, set VR to the maximum value (turn VR all the way clockwise). The relationship between the motor winding current and resistor value is determined by the following TABLE.

TABLE:

Running current (A)	R (Ω)	Running current (A)	R (Ω)
3.00	no	1.75	350
2.75	2900	1.50	250
2.50	1300	1.25	180
2.25	750	1.00	130
2.00	500		

5. Control block diagram



The micro step mode setting is shown in the bellow table:

Driver mode setting

JP1	JP2	Step Mode
OPEN	OPEN	1/8
OPEN	CLOSED	1/4
CLOSED	OPEN	1/2 (Half)
CLOSED	CLOSED	1/1 (Full)

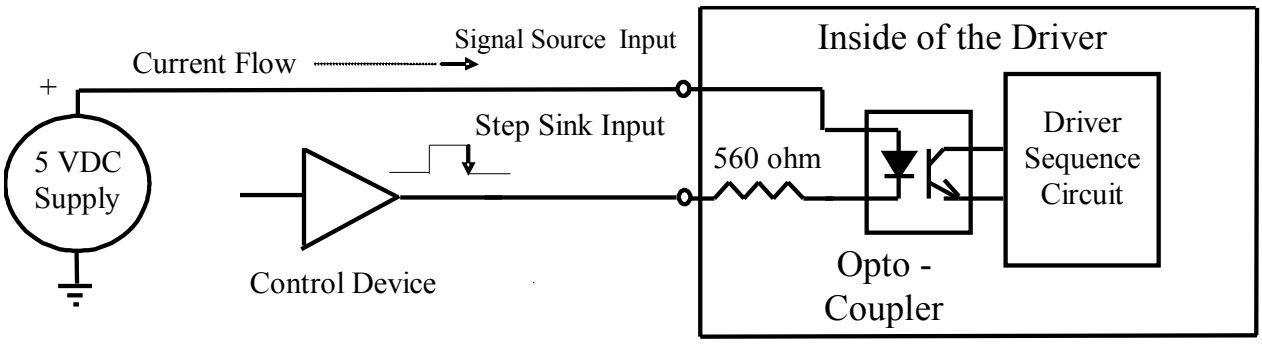
6. Mechanical Specification

3.1" x 2.6" x 1.0"

7. Control Signal Methods

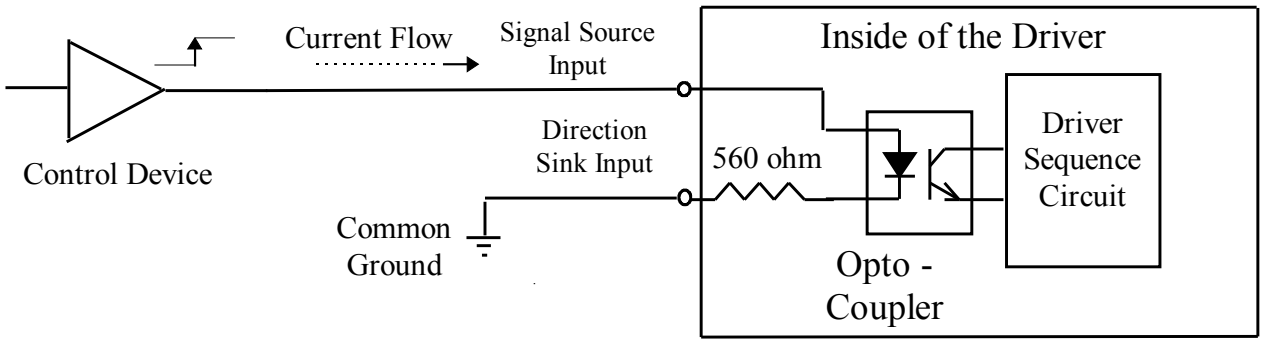
Methods used to Control MYCOM Driver Inputs

There are two methods used to Control the Driver Input stages of MYCOM Drivers. The first is called **Current Sinking** in which the Control Signal is applied to the negative Input of the Opto-Isolated Driver Input stage and a +5 Volt source, typically from a +5 VDC power supply, is connected to the positive Input. Using this first method , as long as the Controlling Device can Sink 10 to 20 mA of Current then the Opto-Isolated Driver Input stage will operate properly at most Clock Rates or Step/Pulse Rates. The figure below shows this configuration.



Current Sinking Method for Controlling Driver Inputs

The second method of controlling the Driver Inputs is called **Current Sourcing** in which the Control Signal is applied to the positive Input of the Opto-Isolated Driver Input stage and the negative Input is grounded. Using this second method , as long as the Controlling Device can Source (provide) 10 to 20 mA of Current then the Opto-Isolated Driver Input stage will operate properly at most Clock Rates or Step/Pulse Rates. The figure below shows this configuration.



Current Sourcing Method for Controlling Driver Inputs

This method is typically called **Pulse & Direction or Step & Direction (1P)** where one Clock signal is used as the Step Input Control Signal and the other signal is the Direction signal which is either On for Counter Clockwise rotations(CCW) or Off for Clockwise rotations(CW). This Control method is typically used in the United States.