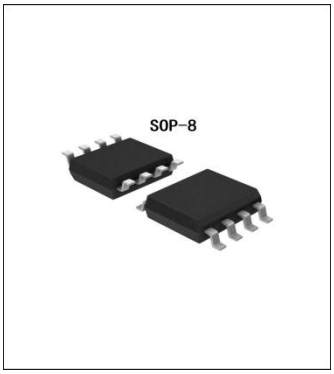
Bi-Direction Relay Driver

SSP8023A

General Description

SSP8023A is a bi-direction relay driver circuit, used to control the DC motor and the magnetic latching relay, with large output capability, ultra-low power consumption. It can be widely used in smart meters and other pulses, level control applications.



Features

- Max input voltage: 40V, recommended safe working voltage: 5~24V
- Pure MOSFET, compared with ordinary BJT triode circuit power consumption is lower. Quiescent current＜10nA
- The input high low conversion level is about 2.6V, which is compatible with various microcontrollers
- The input INA and INB are equipped with pull-down resistors of about 100K
- Integrated high speed continuation diode with built-in reverse voltage function to cancel TVS tubes in general applications
- The typical drive current is 400mA, and according to the different coil internal resistance of the relay itself (drive current is equal to the power supply voltage divided by the chip itself drive internal resistance and the combination of the relay coil internal resistance, the chip itself drive internal resistance; 12Ω when the power supply voltage is 12V, 11Ω when the power supply voltage is 30V)
- Maximum drive current 800mA (refers to the chip can withstand the value of the relay coil inductor recoil current. The value is dependent on the supply voltage. 800mA refers to the general operating voltage of 12V. In the limit operating voltage of 24V, the driving current should be less than 200mA)

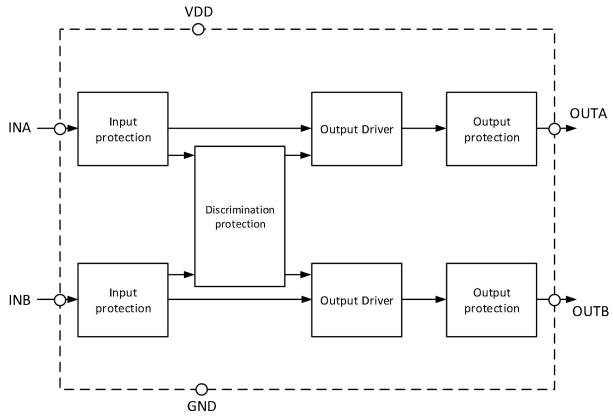
Applications

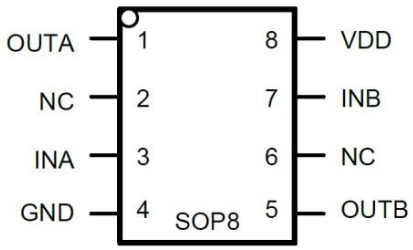
- Smart Meter
- Motor drive
- Magnetic latching relay control

Order specification

Part No	Package	Manner of Packing	Devices per bag/reel
SSP8023A	SOP8	Reel	4000

Block Diagram and Pin Arrangement Diagram





Pin Assignment

Pin No.	Pin Name	Description
1	OUTA	Output A
2	NC	Not connected.
3	INA	Input A
4	GND	Ground.
5	OUTB	Output B
6	NC	Not connected.
7	INB	Input B
8	VDD	Supply input voltage

Functional Description

SSP8023A is a bi-direction relay driver circuit, used to control the DC motor and the magnetic latching relay. INA and INB are triggered by pulse, so long as the input terminal is directly connected with the output terminal of the corresponding device, it can work; The trigger pulse is triggered according to the function list state and the relay acts accordingly.

LOGIC FUNCTION TABLE

Input		Output	
INA	INB	OUTA	OUTB
0	0	High-impedance	High-impedance
0	1	0	1
1	0	1	0
1	1	High-impedance	High-impedance

Absolute Maximum Ratings

T_{amb}=25°C,unless specified otherwise.

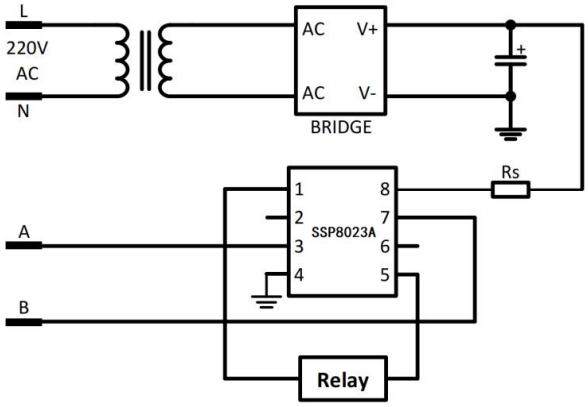
Parameter	Symbol	Value	Unit
Max Input Voltage	V_{DD}-V_{GND}	+40	V
OUTA/OUTB Voltage	V_{OUTA}/V_{OUTB}	+40	V
Other Input / Output Voltage	V_{IN}/V_{OUT}	VGND-0.4~VDD+0.4	V
Max Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	-65~150	℃
Thermal Resistance (Junction to Ambient)	R_{ja}	120	℃/W
ESD (Human-Body Model)	HBM	8000	V
ESD (Machine Model)	MM	200	V

Electrical Characteristics(1) (2)

T_{amb}=25°C,unless specified otherwise.

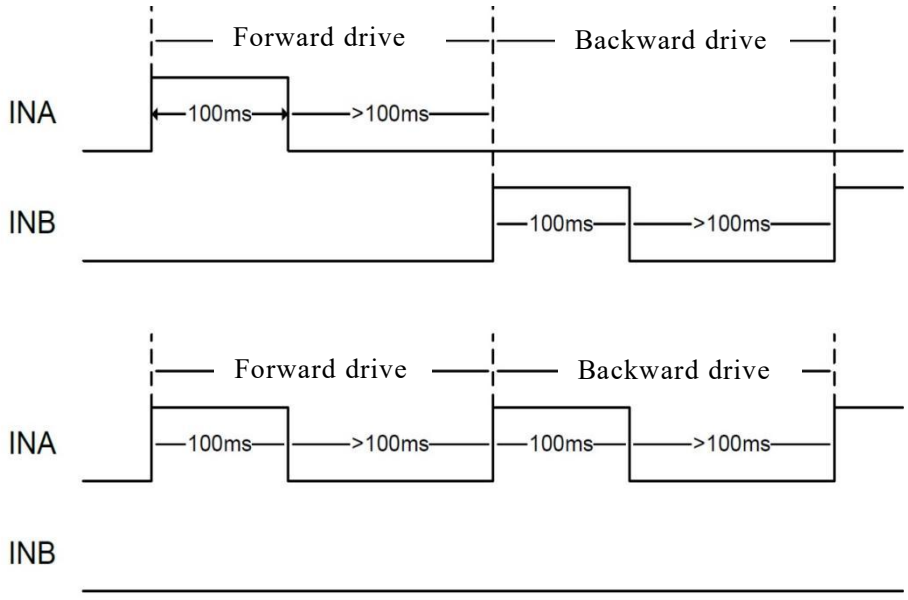
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static Shutdown Characteristics						
Output Breakdown Current	BV_{DSS}	V_{INA}=V_{INB}=0V, I_D=250uA	40			V
Output Leakage Current	I_{DSS}	V_{INA}=V_{INB}=0V, V_D=24V			1	μA
Static Opening Characteristics						
Input Threshold Voltage	VTH			2.6		V
Output On-resistance	$R_{DS(ON)}$	V_{DD}=12V, R_L=80Ω		12	15	Ω
		V_{DD}=30V, R_L=80Ω		11	14	Ω
		V_{DD}=12V, R_L=40Ω		12	15	Ω
		V_{DD}=30V, R_L=40Ω		11	14	Ω
Parasitic Characteristics						
Equivalent Input Resistor	R_{IN}			100		kΩ
Equivalent Input Capacitance	C_{IN}				5	pF
FWD Characteristics						
Long Time Forward Conduction Current	I_S				1	A
Forward Conduction Voltage	V_{SD}	I_S=1A		0.86	1.3	V
Reverse Recovery Time	T_{RR}	V_{DD}=12V, R_L=80Ω		190		ns
Transmission Characteristics						
Rise Time	T_R	V_{DD}=12V, R_L=80Ω		75		ns
Turn ON Delay Time	$T_{D(ON)}$	V_{DD}=12V, R_L=80Ω		210		ns
Fall Time	T_F	V_{DD}=12V, R_L=80Ω		35		ns
Turn OFF Delay Time	$T_{D(OFF)}$	V_{DD}=12V, R_L=80Ω		190		ns

Application Circuits



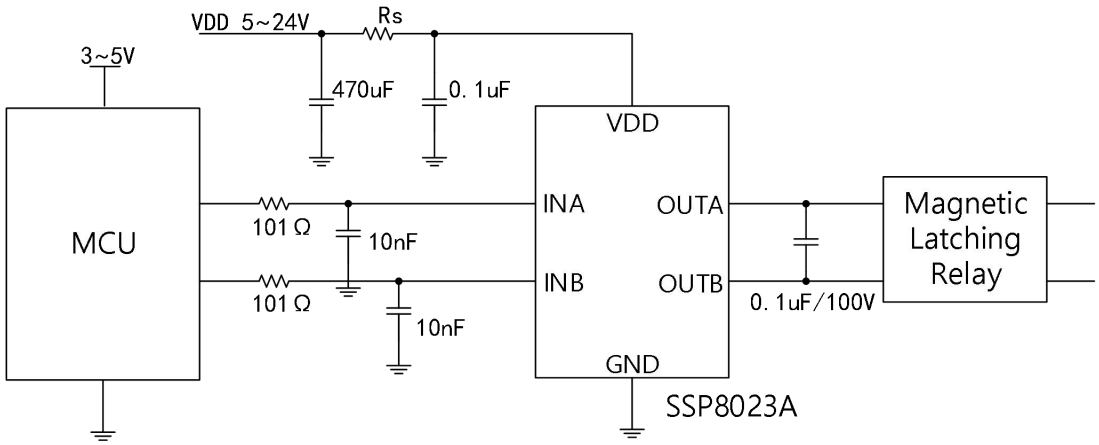
Typical Application Diagram

The input terminals A and B are triggered by pulse. The input terminal of the chip is connected with the output terminal of the corresponding device to work. The trigger pulse is triggered according to the function list state and the relay acts accordingly. In smart meter applications,the recommended pulse width=100ms. The length of the intervals should be longer than 100ms. These intervals include: intervals between forward drive pulse and next backward drive pulse, intervals between forward drive pulse and next forward drive pulse, intervals between backward drive pulse and next forward drive pulse, intervals between backward drive pulse and next backward drive pulse.

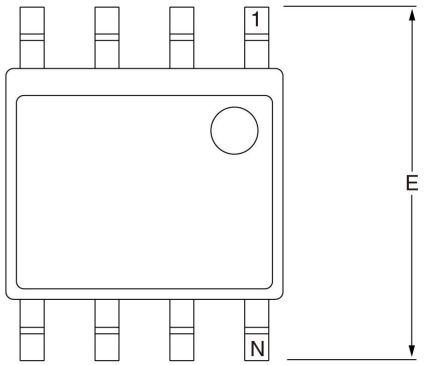


Schematic diagram of pulse excitation

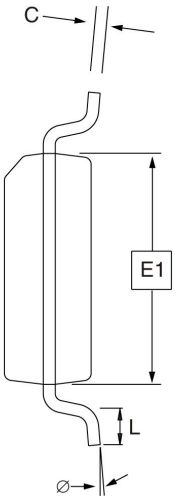
Recommended circuit



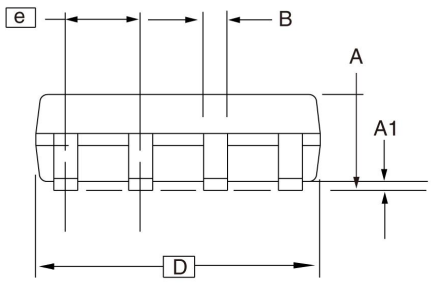
Package Information（SOP8）



Top View



End View



Side View

COMMON DIMENSIONS
(Unit of Measure = mm)

SYMBOL	MIN	NOM	MAX	NOTE
A	1.35	–	1.75	
A1	0.10	–	0.25	
b	0.31	–	0.51	
C	0.17	–	0.25	
D	4.80	–	5.00	
E1	3.81	–	3.99	
E	5.79	–	6.20	
e	1.27 BSC			
L	0.40	–	1.27	
∅	0°	–	8°	

Special Instructions

The company reserves the right of final interpretation of this specification.

Version Change Description

Version：V1.3	Author：Yang	Time：2021.8.19
Modify the record：		
1. Re-typesetting the manual and checking some data		
Version：V1.4	Author：Yang	Time：2021.12.22
Modify the record：		
1. Add the recommended circuit		
Version：V1.5	Author：Yang	Time：2022.5.23
Modify the record：		
1. Update Order specification		

Statement

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