BL8023C

300mA Bi-Direction Relay Driver

DESCRIPTION

BL8023C is a bi-direction relay driver circuit, used to control 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.

BL8023C can provide 300mA typical driving current, which will different according to the relay coil resistance. The input High Level Threshold of BL8023C is 3V, making it compatible with most single chip microcontroller.

BL8023C is available in SOP-8 and DIP-8 packages.

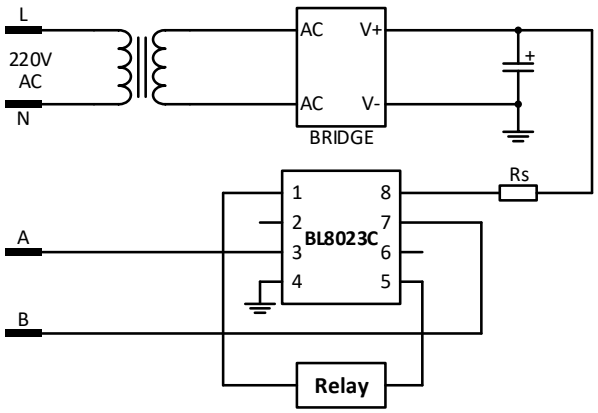
FEATURES

- 5 to 36V input voltage range
- Low Power Consumption (I_Q<1uA)
- Input High Level Threshold: 3V, compatible with most single chip microcontroller
- Typical Driving Current: 300mA
  Rds(on)=12ohm (Vin=12V, PMOSFET+NMOSFET)
  Rds(on)=10ohm (Vin=30V, PMOSFET+NMOSFET)
- Peak Driving Current: 500mA@Vin=24V
- Environment Temperature: -40°C~85°C
- SOP-8 and DIP-8 packages

APPLICATIONS

- Smart Meter

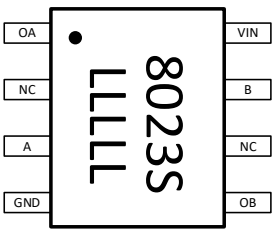
TYPICAL APPLICATION



ORDERING INFORMATION

Part No.	Package	Tape & Reel
BL8023C	SOP-8	2500/Reel

PIN OUT & MARKING



SOP-8/DIP-8

8023S: Product Code
LLLLL: Lot No.

ABSOLUTE MAXIMUM RATING

Parameter			Value
Max Input Voltage			40V
Max Operating Junction Temperature (T_J)			150°C
Ambient Temperature (T_A)			-40°C to 125°C
Package Thermal Resistance	SOP-8	θ_{JA}	128°C/W
		θ_{JC}	45°C/W
Storage Temperature (T_S)			-40°C to 150°C
Lead Temperature & Time			260°C, 10S

***Note**: Exceed these limits to damage to the device.*
Exposure to absolute maximum rating conditions may affect device reliability.

RECOMMENDED WORK CONDITIONS

Parameter	Value
Input Voltage Range	Max. 36V
Operating Junction Temperature (T_J)	-40°C to 85°C

ELECTRICAL CHARACTERISTICS

(V_{IN}=5V, T_A=25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IN}	Input Voltage Range		5		36	V
I_Q	Quiescent Current				1	uA
Rds(on)	Switch Rds(on)	V_{IN}=12V, R_L=75ohm		12	18	ohm
		V_{IN}=30V, R_L=75ohm		10	16	ohm
		V_{IN}=12V, R_L=40ohm		12	20	ohm
		V_{IN}=30V, R_L=40ohm		10	16	ohm
V_{TH}	ON Input High Voltage	V_{IN}=12V		3		V
R_{IN}	Equivalent Input Resistor			500		Kohm
V_{SD}	Fly-Wheel Diode Forward Voltage	Is=1A		1.2	2	V
T_R	Rise Time	V_{IN}=12V, R_L=75ohm		40		ns
$T_{D(ON)}$	Turn ON Delay Time	V_{IN}=12V, R_L=75ohm		60		ns
T_F	Fall Time	V_{IN}=12V, R_L=75ohm		30		ns
$T_{D(OFF)}$	Turn OFF Delay Time	V_{IN}=12V, R_L=75ohm		70		ns

***Note**: 1) Input rise/fall time must less than 1ms, otherwise maybe destroy the chip.*

LOGIC FUNCTION TABLE

Input A	Input B	Output OA	Output OB	RELAY RESPONSE
1	0	1	0	ON
0	1	0	1	OFF
0	0	High-impedance	High-impedance	Hold
1	1	High-impedance	High-impedance	Hold

PIN DESCRIPTION

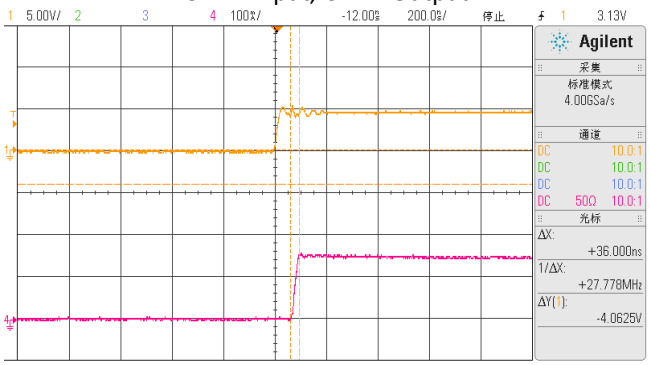
PIN #	NAME	DESCRIPTION
1	OA	Output A.
2, 6	NC	Not connected.
3	A	Input A.
4	GND	Ground.
5	OB	Output B.
7	B	Input B.
8	VIN	Supply input voltage.

ELECTRICAL PERFORMANCE

Tested under T_A=25°C, unless otherwise specified.

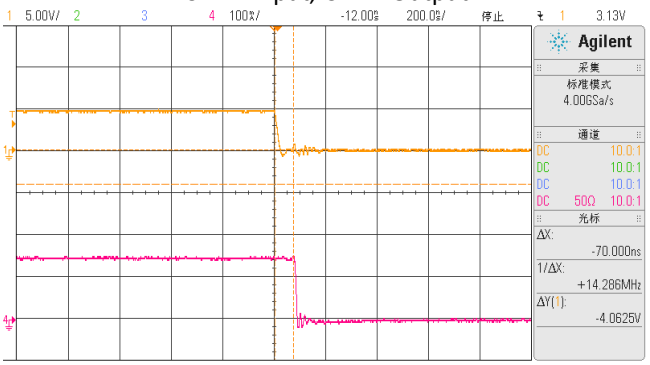
Turn on delay and rise time

Ch1—Input, Ch4—Output

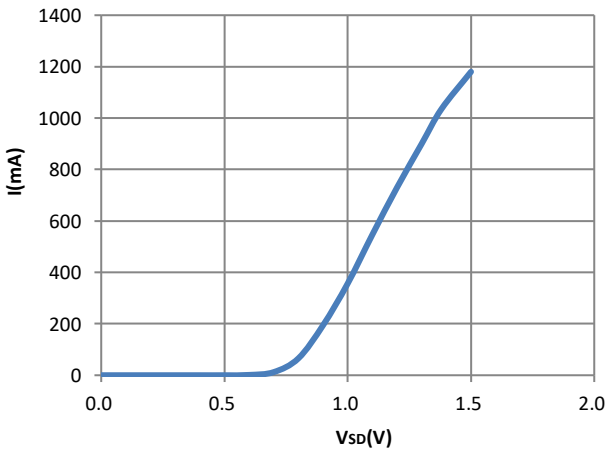


Turn off delay and fall time

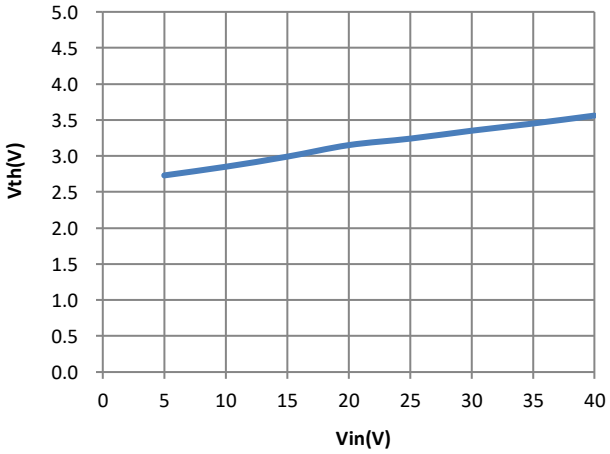
Ch1—Input, Ch4—Output



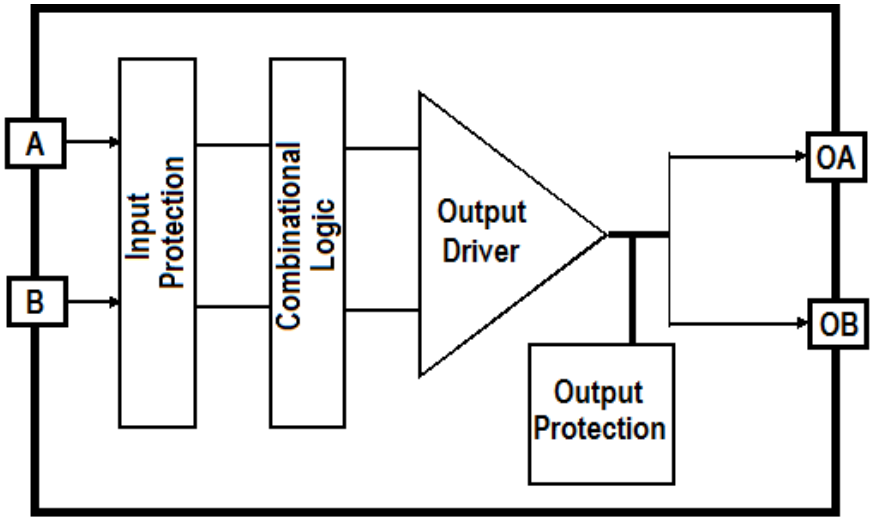
Forward Voltage



Vth vs. Vin



BLOCK DIAGRAM

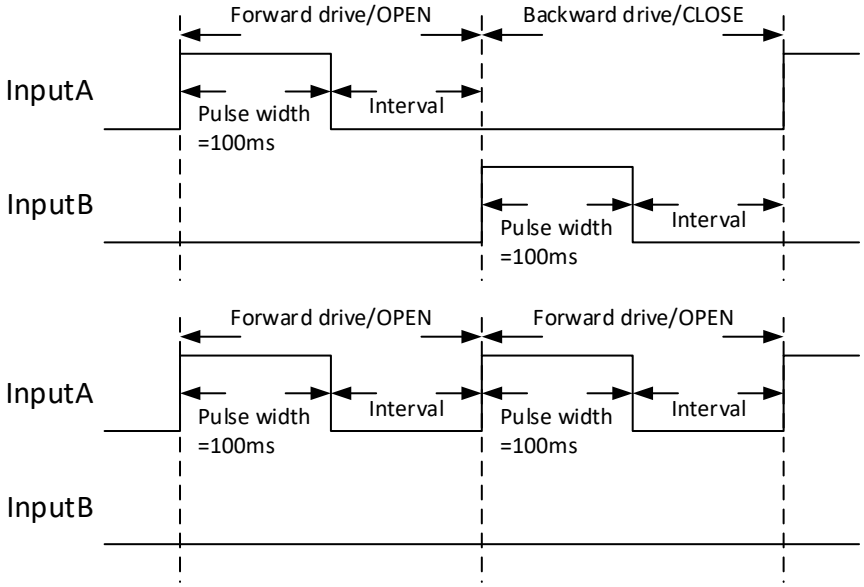


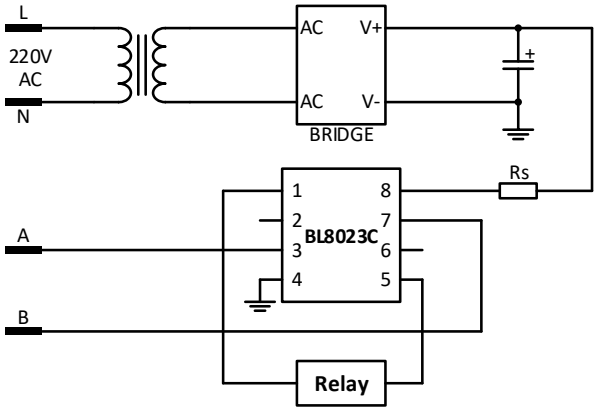
DETAILED DESCRIPTION

Pulse Triggering

If input is driven by square pulse, connect the inputs to the pulse source directly. Relay will operate as logic table stated (Vin should be less than the power supply voltage, Rs is current-limiting resistor, it can be ignored in the voltage is below 20V, i.e., Rs=0).

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 backward drive pulse, intervals between backward drive pulse and next backward drive pulse.





Pulse triggering application diagram

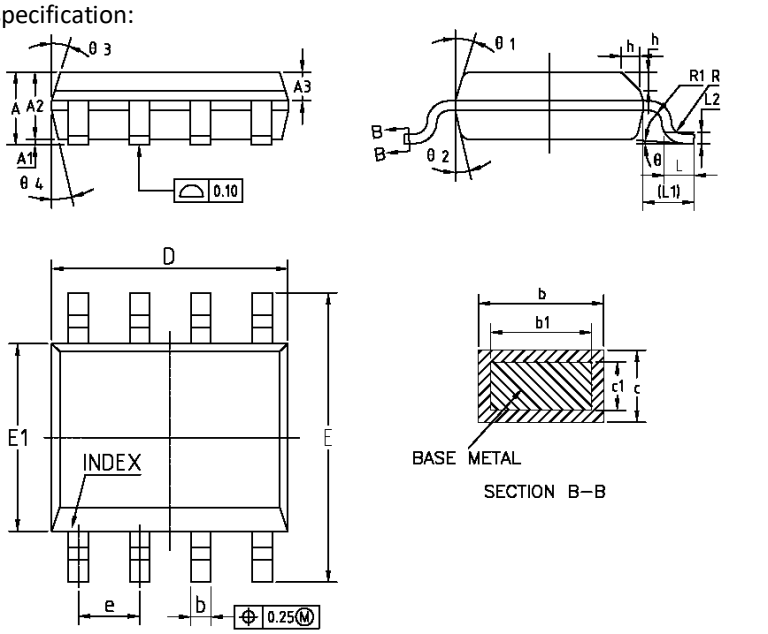
Relay free-wheel

Relay from ON to OFF, the energy stored in the relay inductor released by the chip's internal body diode and the relay inductor. Until the end of the release of this energy, relay proceeding to the next operation.

PACKAGE OUTLINE

Package	SOP-8	Devices per reel	2500	Unit	mm

Package specification:

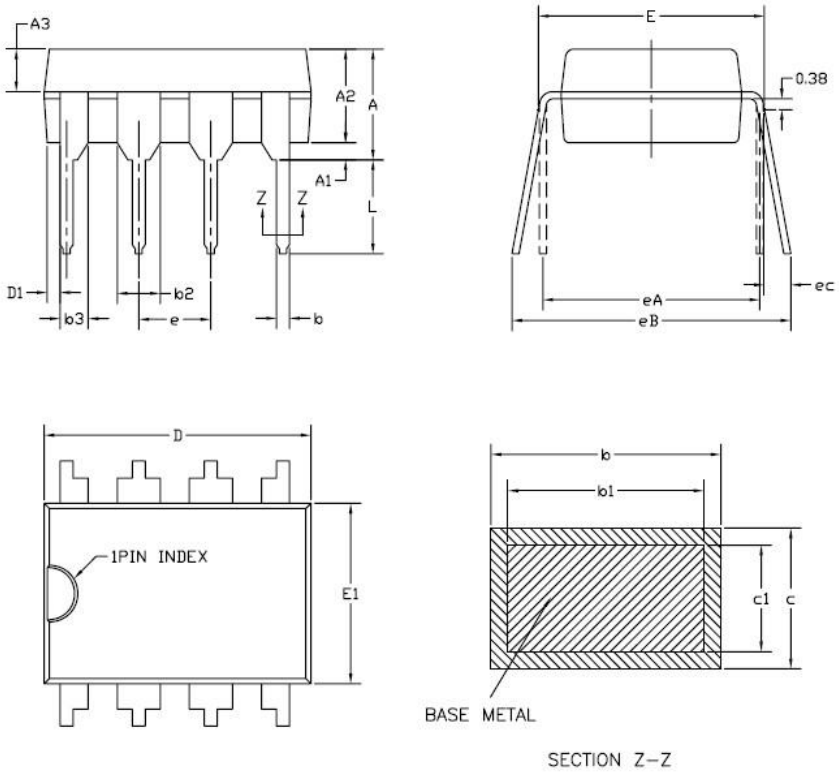


COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	1.35	1.55	1.75
A1	0.10	0.15	0.25
A2	1.25	1.40	1.65
A3	0.50	0.60	0.70
b	0.38	–	0.51
b1	0.37	0.42	0.47
c	0.17	–	0.25
c1	0.17	0.20	0.23
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.27BSC		
L	0.45	0.60	0.80
L1	1.04REF		
L2	0.25BSC		
R	0.07	–	–
R1	0.07	–	–
h	0.30	0.40	0.50
θ	0°	–	8°
θ 1	15°	17°	19°
θ 2	11°	13°	15°
θ 3	15°	17°	19°
θ 4	11°	13°	15°

Package	DIP-8	Devices per reel		Unit	mm

Package specification:



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

SYMBOL	MIN	NOM	MAX
A	–	–	4.80
A1	0.50	–	–
A2	3.10	3.30	3.50
A3	1.40	1.50	1.60
b	0.38	–	0.55
b1	0.38	0.46	0.51
b2	1.47	1.52	1.57
b3	0.89	0.99	1.09
c	0.21	–	0.35
c1	0.20	0.25	0.30
D	9.10	9.20	9.30
D1	0.13	–	–
E	7.62	7.87	8.25
E1	6.25	6.35	6.45
e	2.54BSC		
eA	7.62BSC		
eB	7.62	8.80	10.90
ec	0	–	1.52
L	2.92	3.30	3.81