BL8023K

400mA Bi-Direction Relay Driver

DESCRIPTION

BL8023K 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.

BL8023K can provide 400mA typical driving current, which will different according to the relay coil resistance. The input High Level Threshold of BL8023K is 2V; it can compatible with most single chip microcontroller.
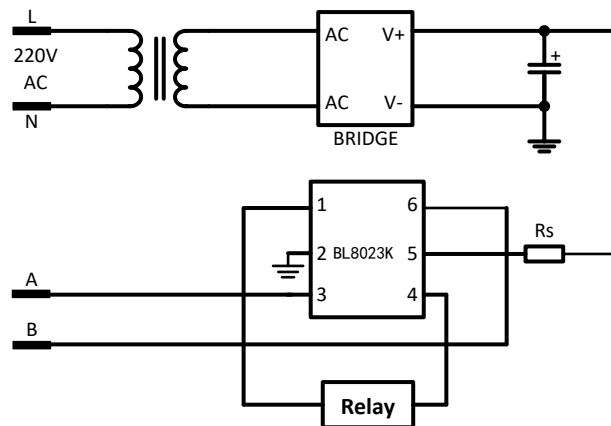
BL8023K is available in SOT-23-6 package.

FEATURES

- 5 to 40V input voltage range
- Low power consumption ($I_Q < 1uA$)
- Input high level threshold: 2V, compatible with most single chip microcontroller
- Typical driving current: 400mA
  $R_{DS(ON)}$=7ohm(VIN=12V, PMOSFET+NMOSFET)
  $R_{DS(ON)}$=7ohm(VIN=30V, PMOSFET+NMOSFET)
- Peak driving current: 500mA@VIN=24V
- Environment temperature: -40°C~85°C
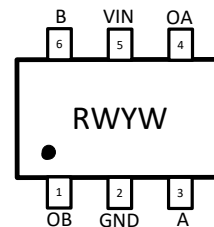- SOT-23-6 package

APPLICATIONS

- Smart Meter

TYPICAL APPLICATION

ORDERING INFORMATION

Part No.	Package	Tape & Reel
BL8023KCB6TR	SOT-23-6	3000/Reel

PIN OUT & MARKING

RW: Product Code
YW: Date code

SOT23-6

ABSOLUTE MAXIMUM RATING

Parameter			Value
Supply voltage VIN			-0.3V - 40V
Input pins			-0.3V - 40V
Output pins			-0.3V - 40V
Max operating junction temperature(T_J)			150°C
Ambient temperature(T_A)			-40°C – 125°C
Package thermal resistance	SOT23-6	Θ_{JA}	190°C / W
		Θ_{JC}	110°C / W
Storage temperature(T_S)			-40°C - 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.40V
Operating junction temperature(T_J)	-40°C –85°C

ELECTRICAL CHARACTERISTICS

(VIN=12V, T_A=25°C)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
VIN	Input voltage range		5		40	V
I_Q	Quiescent current				1	uA
$R_{DS(ON)}$	Switch $R_{DS(ON)}$	Vin=12V, R_L=75ohm		7	10	ohm
		Vin=30V, R_L=75ohm		7	10	ohm
		Vin=12V, R_L=40ohm		7	10	ohm
V_{TH}	ON input high voltage	Vin=12V		2		V
R_{IN}	Equivalent input resistor			20		Kohm
V_{SD}	Fly-wheel diode forward voltage	Is=1A		1.4	1.5	V
T_R	Rise time	VIN=12V, R_L=75ohm		560		ns
$T_{D(ON)}$	Turn on delay time	VIN=12V, R_L=75ohm		1400		ns
T_F	Fall time	VIN=12V, R_L=75ohm		200		ns
$T_{DIOFF)}$	Turn off delay time	VIN=12V, R_L=75ohm		800		ns

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

BL8023K

PIN DESCRIPTION

NAME	PIN #	DESCRIPTION
OB	1	Output B
GND	2	Ground.
A	3	Input A
OA	4	Output A
VIN	5	Supply input voltage
B	6	Input B

ELECTRICAL PERFORMANCE

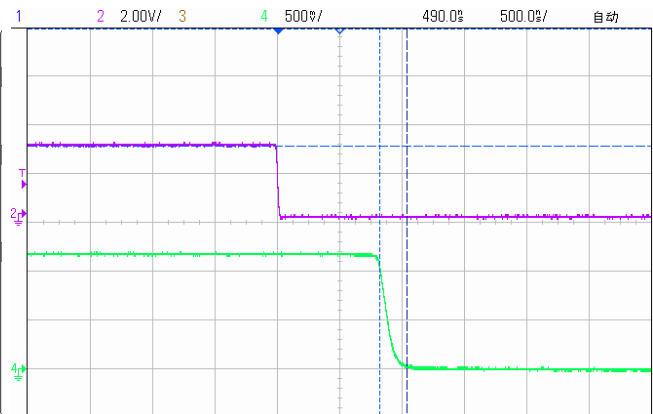*Tested under $T_A=25°$C, unless otherwise specified*

Turn on delay and rise time
Ch1---Input   Ch3---Output

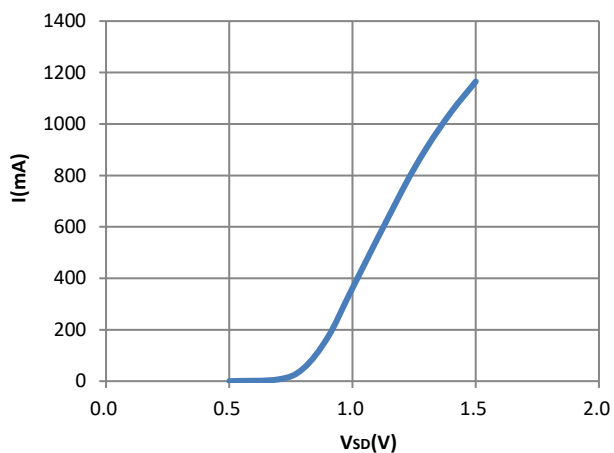### Turn off delay and fall time
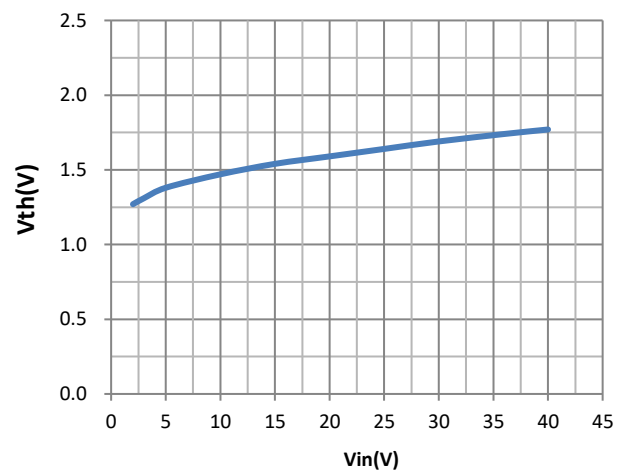Ch2---Input   Ch4---Output

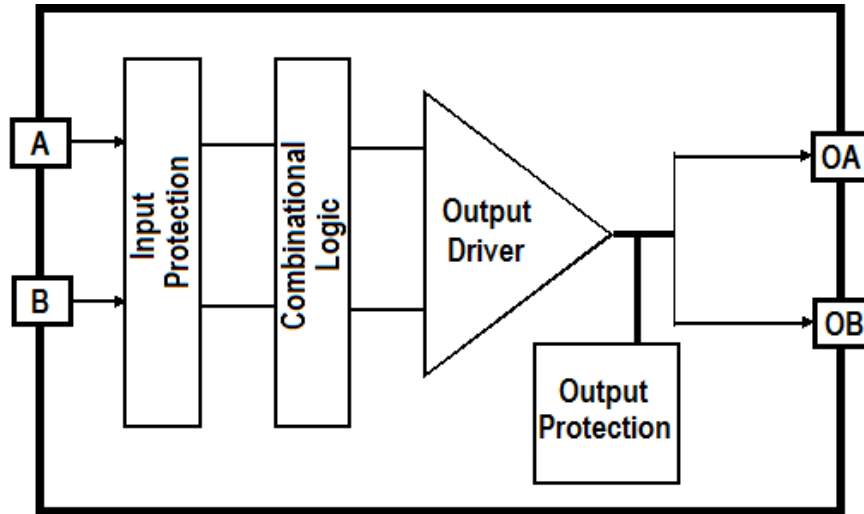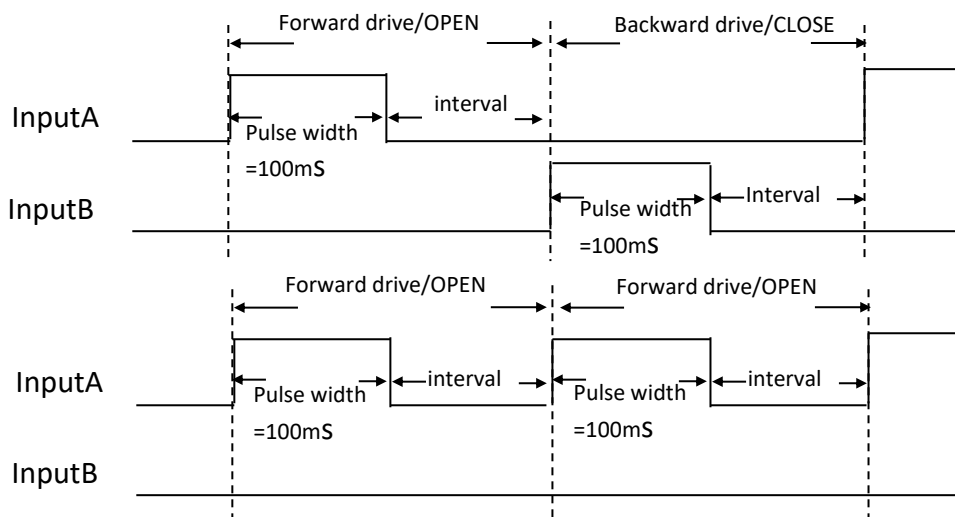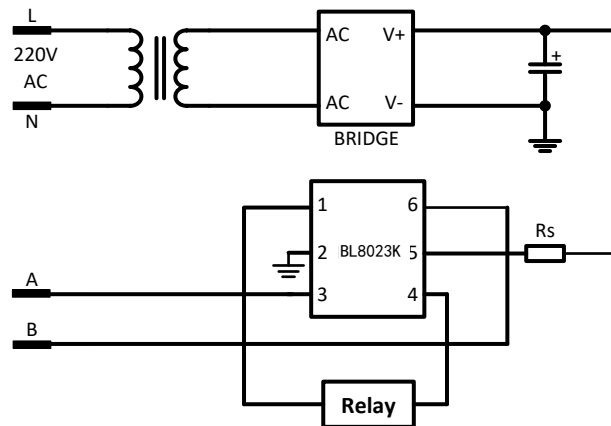### Forward Voltage

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 forward 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	SOT23-6	Devices per reel	3000

Package specification：

Unit: mm