1 Description

CN8023, as a bi-direction relay driver circuit, is used to control magnetic latching relays. With a large output capability and ultra-low power consumption, it can be widely used in intelligent electro-meter and other related fields. CN8023 is available in SOT23-6 and SOP-8 package.

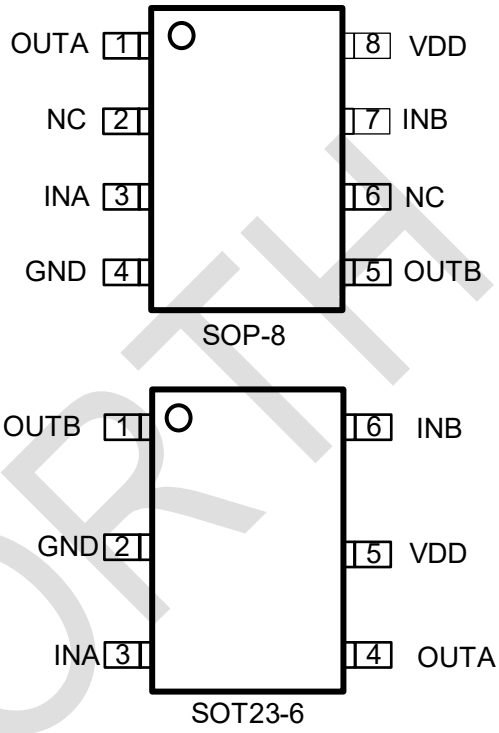
2 Features

- ecommended Supply Voltage Range: 5 ~ 36V
- Up to 450mA current output when adding 1/20 duty cycle input signal.
- Operating Temperature Range: -40 ~ +105°C
- Compatible with 3~5V MCU
- Input Signal Anti-Noise Processing

3 Applications

- Smart Circuit Breaker
- Smart Lock
- Smart water/gas meters
- Toys

4 Pinout



5 Ordering information

Product Number	Package	Quantity/Tape
CN8023A	SOP-8	4000/Reel
CN8023B	SOT23-6	3000/Reel

6 Marking

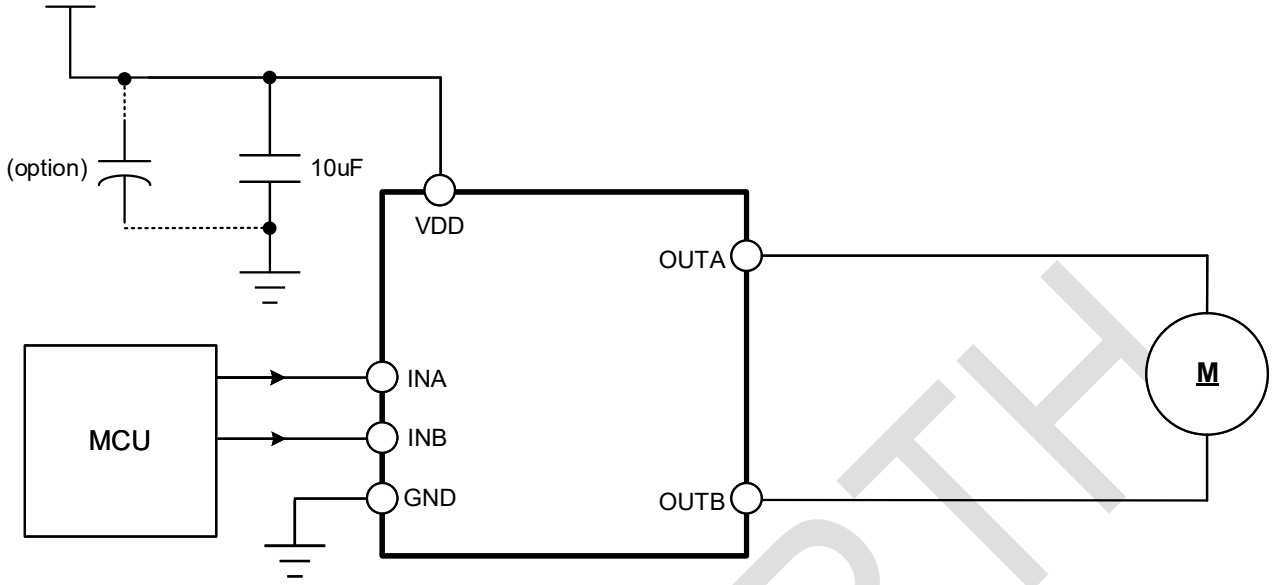
Product Number	Marking
CN8023A	CN8023 YYWW
CN8023B	CNYW

Note: YY/Y=Year;WW/W=Week.

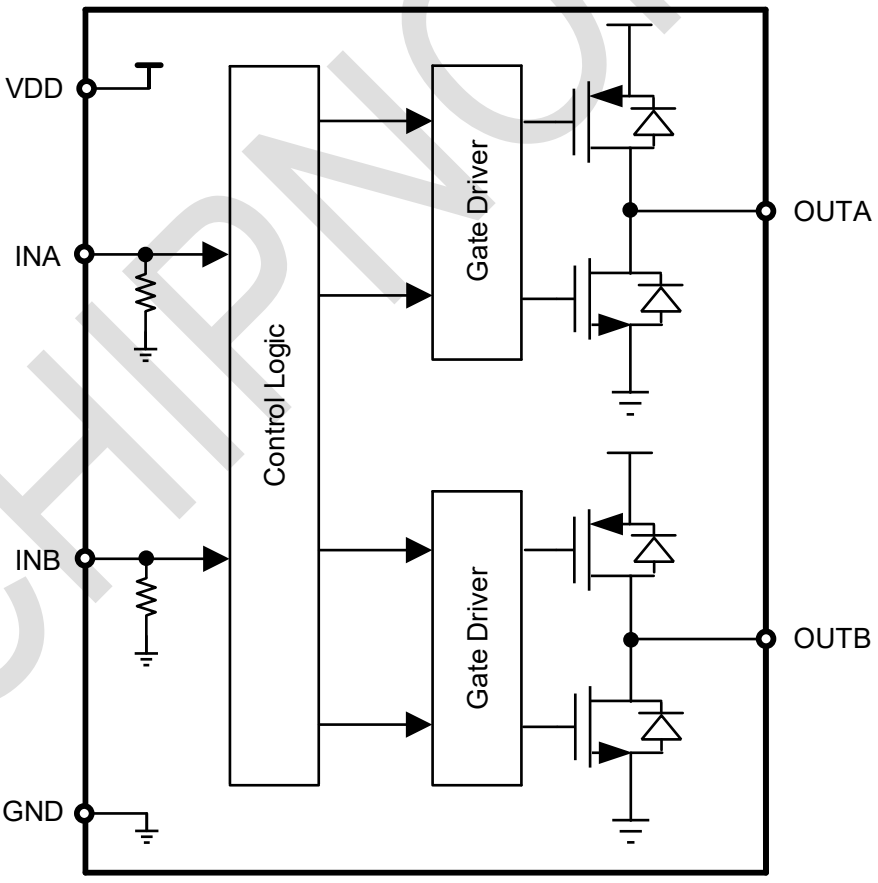
Green (RoHS & HF): CHIPNORTH defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your CHIPNORTH representative directly.

Moisture sensitivity level(MSL):3

7 Typical Application



8 Block Diagram



9 Pin Descriptions

Pin No.			Descriptions
Pin Name	CN8023A	CN8023B	
OUTA	1	4	Output, connect this pin to the motor winding.
VDD	8	5	Supply Voltage. A capacitor is required to prevent large voltage spikes.
OUTB	5	1	Output, connect this pin to the motor winding.
GND	4	2	Hot PAD is also GND.
INA	3	3	Logic input with a large internal pull-down resistor.
INB	6	6	Logic input with a large internal pull-down resistor.
NC	2/6	/	Recommended to be connected to GND.

10 Logic function tables

INA	INB	OUTA	OUTB
0	0	Hi-z	Hi-z
0	1	0	1
1	0	1	0
1	1	0	0

Note:'Hi-z' in the table indicates that the pin has about 42kΩ internal resistance to ground.

11 Specifications

11.1 Absolute Maximum Ratings

Parameter	Value	Units
VDD Supply Voltage Range	-0.3 ~ +40	V
Output Pin Voltage Range	-0.3 ~ +40	V
Input Pin Voltage Range	-0.3 ~ 40	V
Storage Temperature Range	-55~150	°C
Welding Temperature	260（soldering,10s）	°C

Note：

1.Stress exceeds these ratings listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Expose to absolute-maximum-rated conditions for extended periods may affect device reliability.

2.All voltage values are referenced to the ground terminal

11.2 ESD Ratings

Discharge mode	Standardize	Value	Units
HBM	JEDECJS-001-2023	±4000	V
CDM	JEDECJS-002-2022	±2000	V

11.3 Recommended Operating Range

Parameter	Symbol	Min.	Max.	Units
Input Voltage	V_{DD}	5	36	V
Input Logic Level	V_{INx}	2.0	7	V
Operating Temperature	T_A	-40	105	°C

11.4 Thermal Information

Parameter	Package	Value	Unit
θ_{JA}	SOP-8	100	°C/W
	S0T23-6	180	°C/W

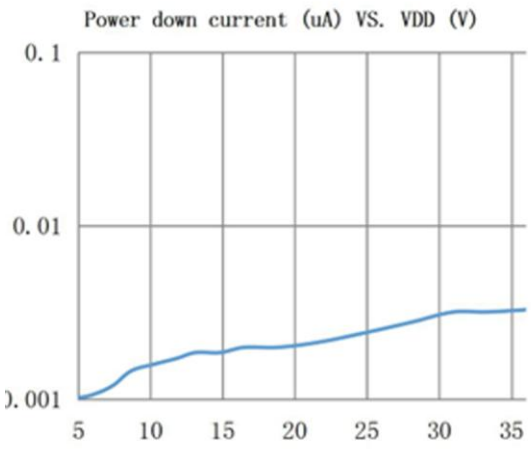
11.5 Electrical Characteristics

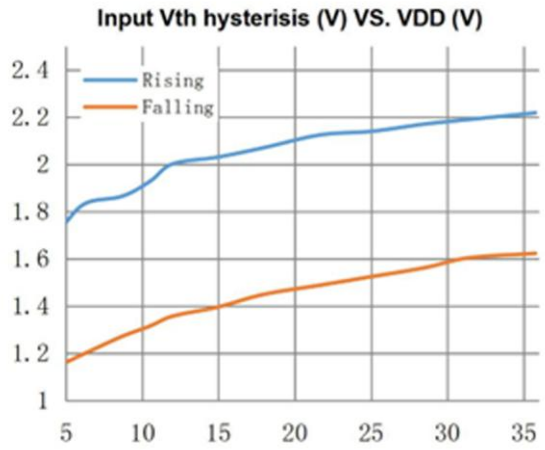
Test conditions: TA = 25 °C unless otherwise noted.

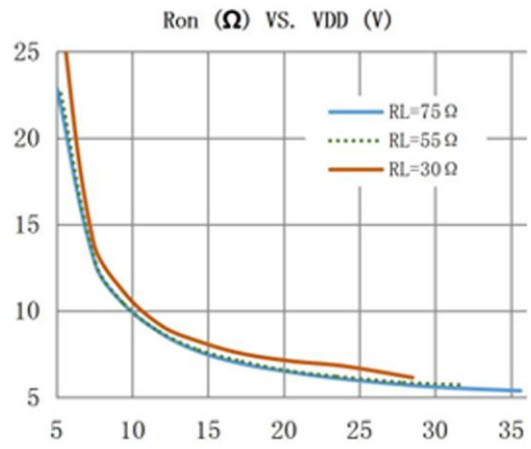
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Recommended Supply Power Voltage	V_{DD}		5	-	36	V
Power Down Current	I_{DD}	INA=INB=0V, VDD=12V	-	10	100	nA
Input Logic Bias Current	I_B	INA=INB=5V	-	50	100	μA
Input Logic High	V_{TH_H}		-	2.0	-	V
Input Logic Low	V_{TH_L}		-	1.4	-	V
Output On-Resistance (R_{HS} + R_{LS})	$R_{DS(ON)}$	VDD=12V, RLOAD=80Ω	-	10	14	Ω
Input Noise Blanking Time	$T_{DEGLITCH}$		0.1	-	1	μs

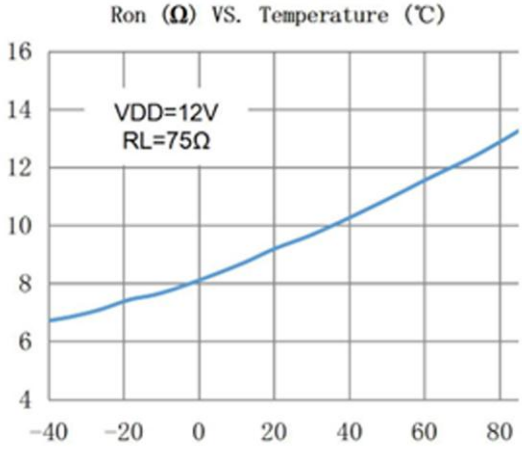
11.6 Characteristics Curve

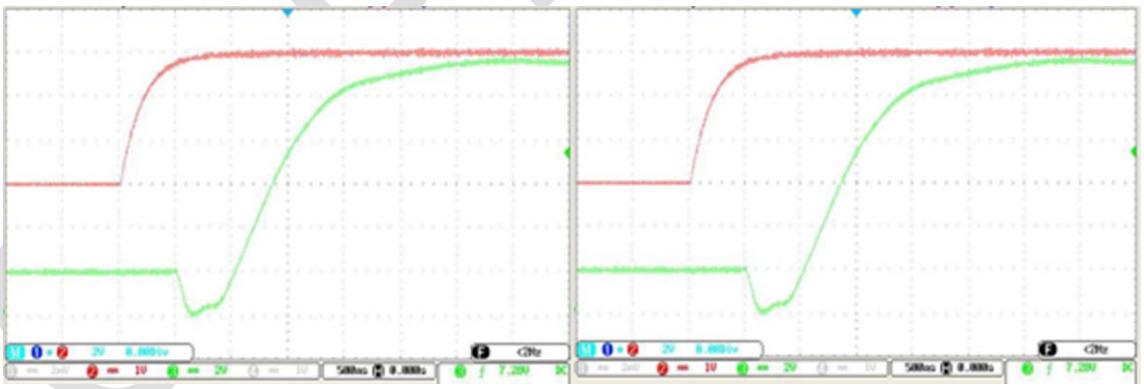
Test conditions: VDD=12V, RL=75Ω, TA=25°C, unless otherwise noted.











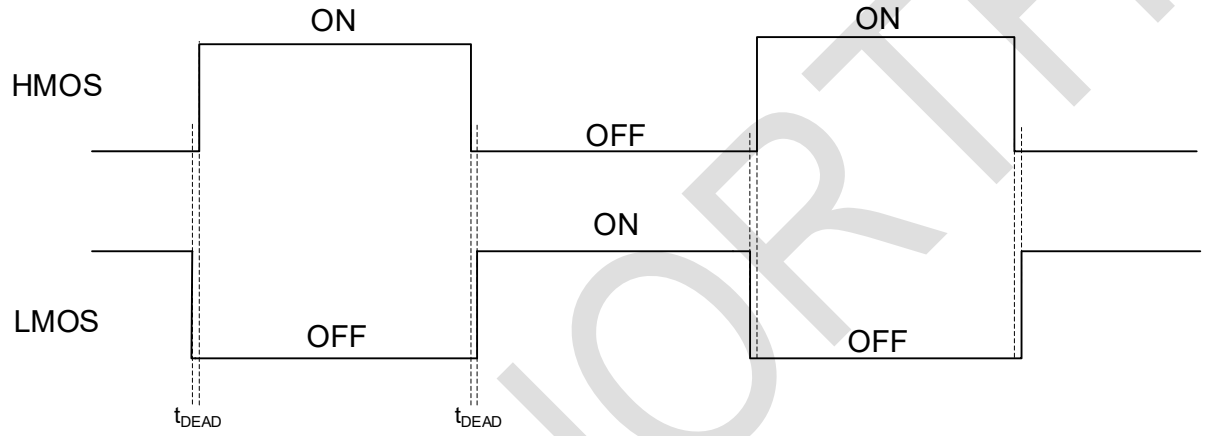
12 Detailed Description

12.1 Overview

CN8023, as a bi-direction relay driver circuit, is used to control magnetic latching relays. With a large output capability and ultra-low power consumption, it can be widely used in intelligent electro-meter and other related fields. CN8023 is available in SOT23-6 and SOP-8 package.

12.2 Internal protection mechanisms

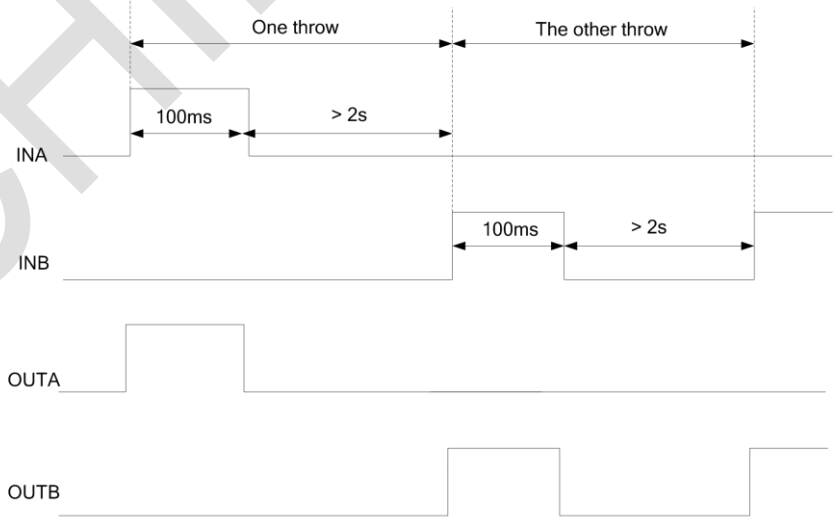
In order to prevent CN8023 high-side MOS and low-side MOS from short-circuiting, there is an internal tDEAD dead time. In the high-side MOS and low-side MOS switching process, the high-side MOS is disconnected, you need to wait for tDEAD before conducting the low-side MOS; the low-side MOS is disconnected, you need to wait for tDEAD before conducting the high-side MOS.



13 Application information

13.1 Typical applications

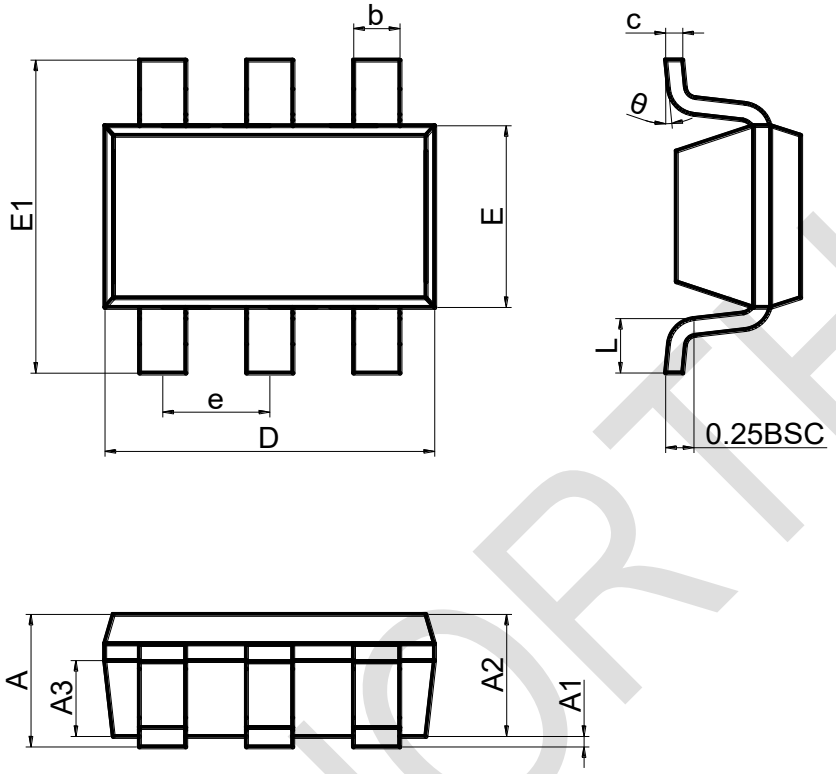
Usually, magnetic latching relay can be driven by a pulse which is about 100ms long, and the interval between the two pulses should be longer than 2s to avoid heat accumulation. Here is a waveform example for the smart meter application.



In the smart meter application, CN8023 can be directly connect with the MCU and the relay

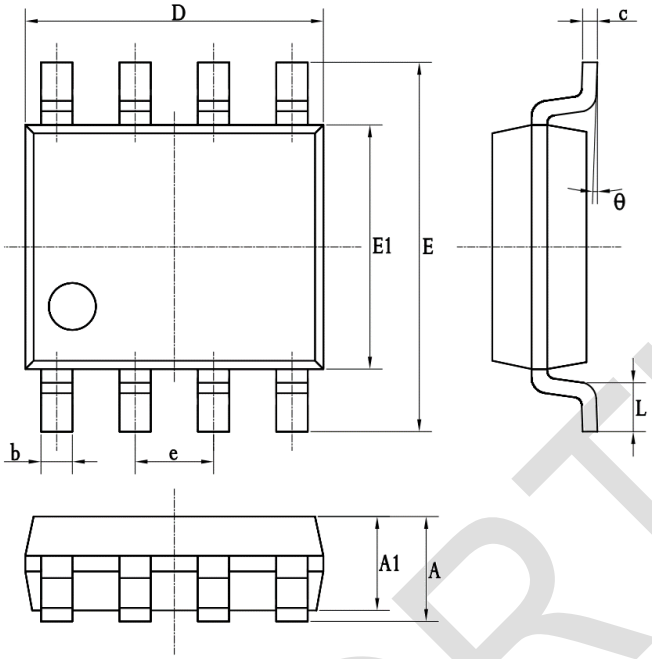
14 Package Information

SOT23-6



Dimension / Symbol	Min (mm)	Nom (mm)	Max (mm)
A	0.90	1.10	1.40
A2	0.90	1.10	1.30
b	0.30	0.40	0.50
c	0.10	0.15	0.25
D	2.70	2.90	3.10
E	1.50	1.60	1.80
E1	2.50	2.80	3.10
e	-	0.95	-
L	0.20	-	-

SOP-8



Dimension / Symbol	Min (mm)	Nom (mm)	Max (mm)
A	-	-	1.75
A1	1.25	-	1.55
b	0.33	-	0.51
c	0.17	-	0.26
D	4.70	-	5.10
E	5.80	-	6.20
E1	3.70	-	4.10
e	-	1.27	-
L	0.50	-	0.80
θ	0	-	8°

15 Important Statement

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