

1 Description

The CN8031 is an H-bridge motor driver used for driving reversible motors, which can drive one DC motor, one winding of a stepper motor, or other loads.

The CN8031 operates on a motor power supply voltage from 4.5V to 24V.

The CN8031 is controlled by two input pins. The two on/off inputs determine the output mode: forward, reverse, coast, or brake. Very low standby circuit current can be achieved when the two inputs are both at a low level.

The CN8031 is available with SOT23-6, SOP-8 or ESOP-8 package.

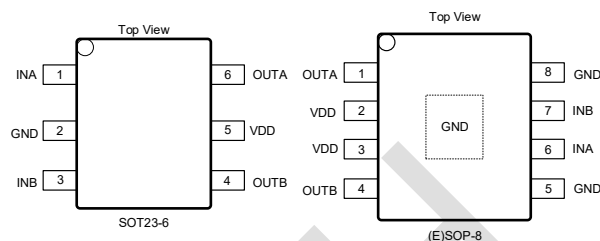
2 Features

- Wide Power Range: 4.5V to 24V
- Low MOSFET On Resistance: $R_{DS(on)}=0.3\Omega$, $R_{IS}=0.3\Omega$
- Forward, Reverse, Coast, or Brake Output Modes
- Suitable for wide range MCU control logic
- Input logic hysteresis
- Thermal Shutdown

3 Applications

- Smart Breaker
- Smart Lock
- Smart Water/Gas Meter
- Toys

4 Pinout



5 Ordering information

Product Number	Package	Quantity/Tape
CN8031TSR	SOT23-6	3000/Tape
CN8031SHR	SOP-8	2500/Tape
CN8031SHR	SOP-8	4000/Tape
CN8031EHR	ESOP-8	2500/Tape
CN8031EHR	ESOP-8	4000/Tape

6 Marking

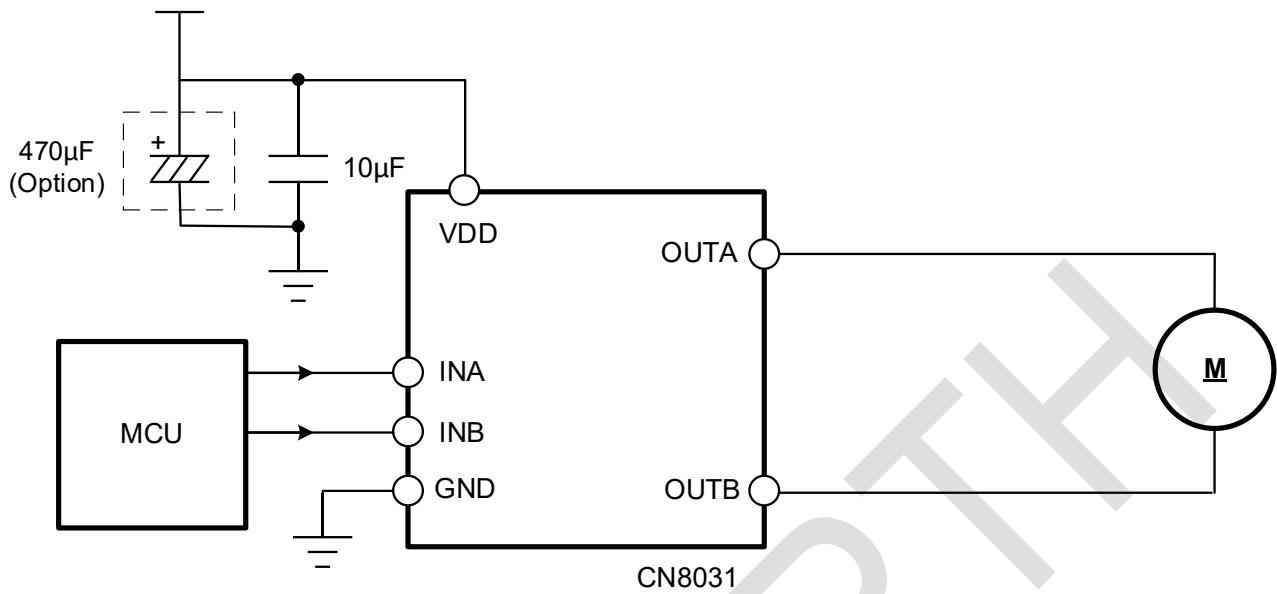
Product Number	Marking
CN8031TSR	31YW
CN8031SHR	CN8031 KYYWW
CN8031EHR	CN8031 KYYWW

Note: YY=Year WW=Week.

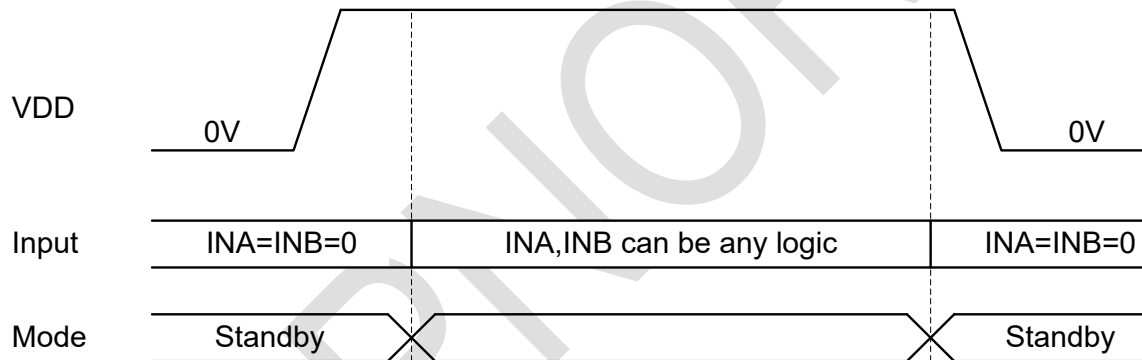
Green (RoHS & HF): CHIPNORTH defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your CHIPNORTH representative directly.

Moisture sensitivity level(MSL):3

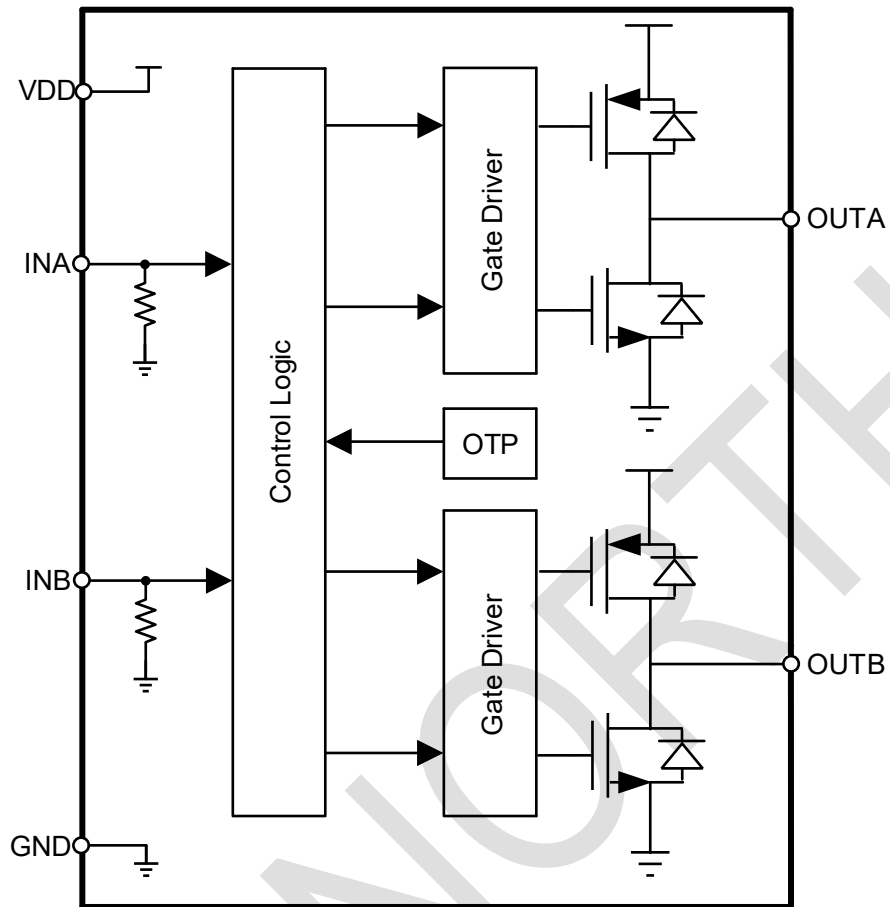
7 Typical Application



Please make sure that the input pins INA and INB remain low during power-up and power-down.



8 Block Diagram



9 Pin Descriptions

Pin No.				Descriptions
Pin Name	CN8031TSR	CN8031SHR	CN8031EHR	
OUTA	6	1	1	Output, Connect this pin to the motor winding.
VDD	5	2,3	2,3	Supply voltage. A decap capacitor is required to prevent large voltage spikes.
OUTB	4	4	4	Output, Connect this pin to the motor winding.
GND	2	5,8,9	5,8,9	Thermal PAD is also GND.
INA	1	6	6	Logic input, with a large internal pull-down resistor.
INB	3	7	7	Logic input, with a large internal pull-down resistor.

10 Specifications

10.1 Absolute Maximum Ratings

Parameter	Symbol	Value	Units
VDD Supply Voltage Range	V _{DD}	-0.4 ~ +25	V
Output Pins Voltage Range	V _{OUTx}	V _{VDD}	V
Input Pins Voltage Range	V _{INx}	GND-0.4 ~ 5.5	V
Storage Temperature Range	T _{STG}	-55~150	°C
Soldering temperature	T _{LEAD}	260 (Soldering 10s)	°C

*Note: There is 8 cm² copper foil on PCB.

10.2 ESD Ratings

Discharge mode	Value	Units
HBM	±4000	V

Note: There is 8 cm² copper foil on the PCB.

10.3 Recommended Operating Range

Parameter	Symbol	Min.	Max.	Units
VDD Supply Voltage Range	V _{DD}	4.5	24	V
Logic Level Input Voltage	V _{INx}	1.3	6	V
Operating ambient temperature	T _A *	-40	105	°C

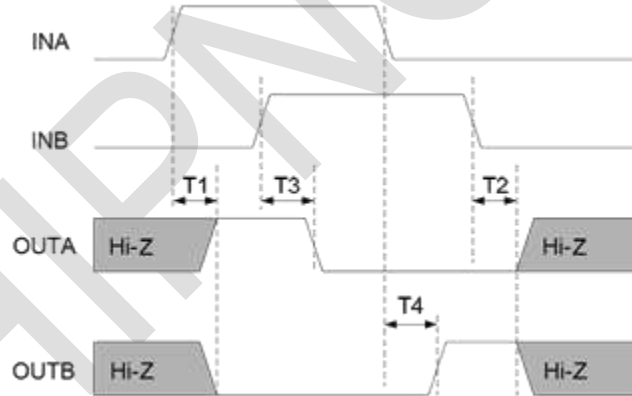
10.4 Thermal Information

Parameter	Package	Value	Unit
θ _{JA}	SOT23-6	180	°C /W
	SOP-8	160	°C /W
	ESOP-8	80	°C /W

10.5 Electrical Characteristics

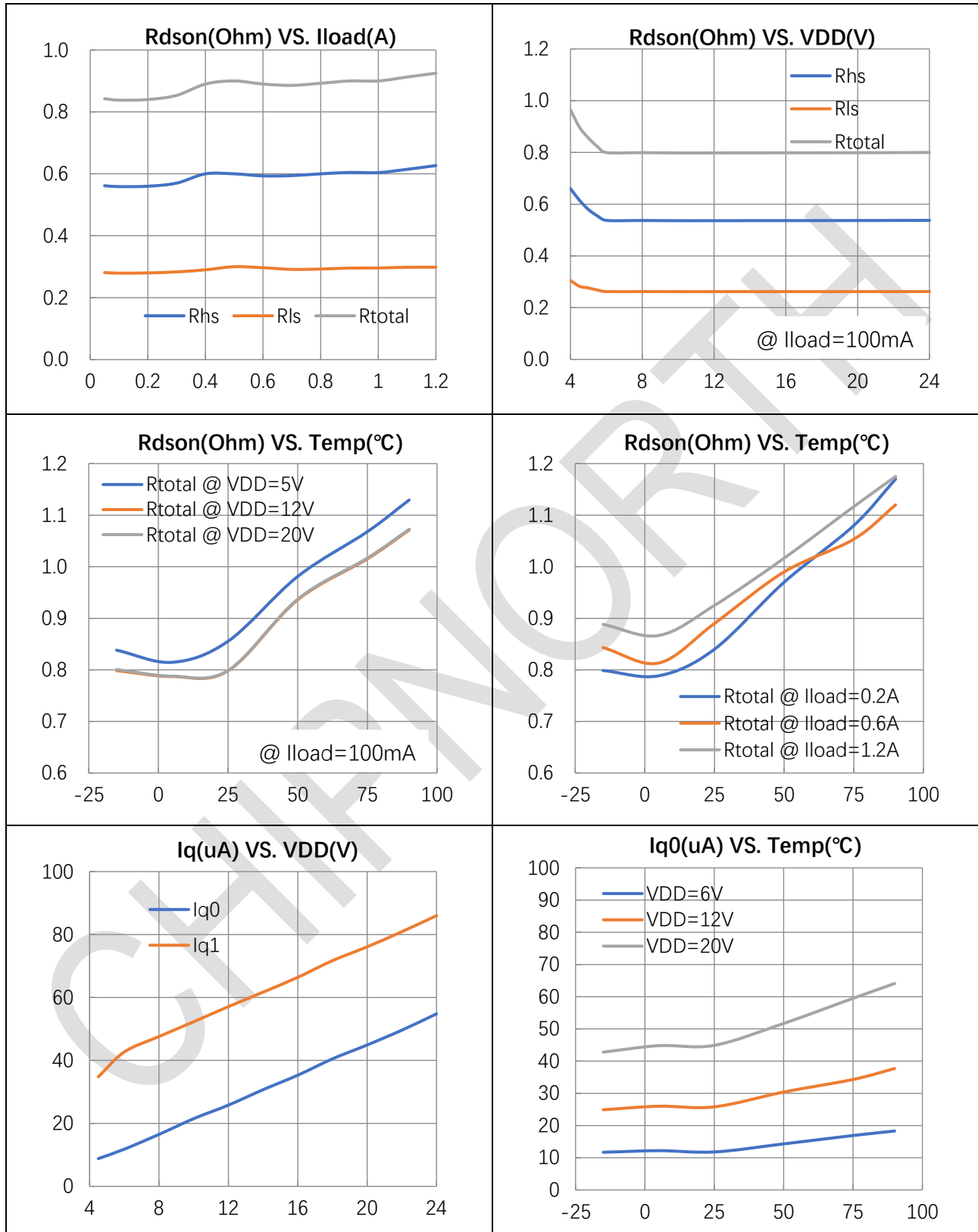
Test conditions: TA = 25°C, VDD=12V, unless otherwise specified.

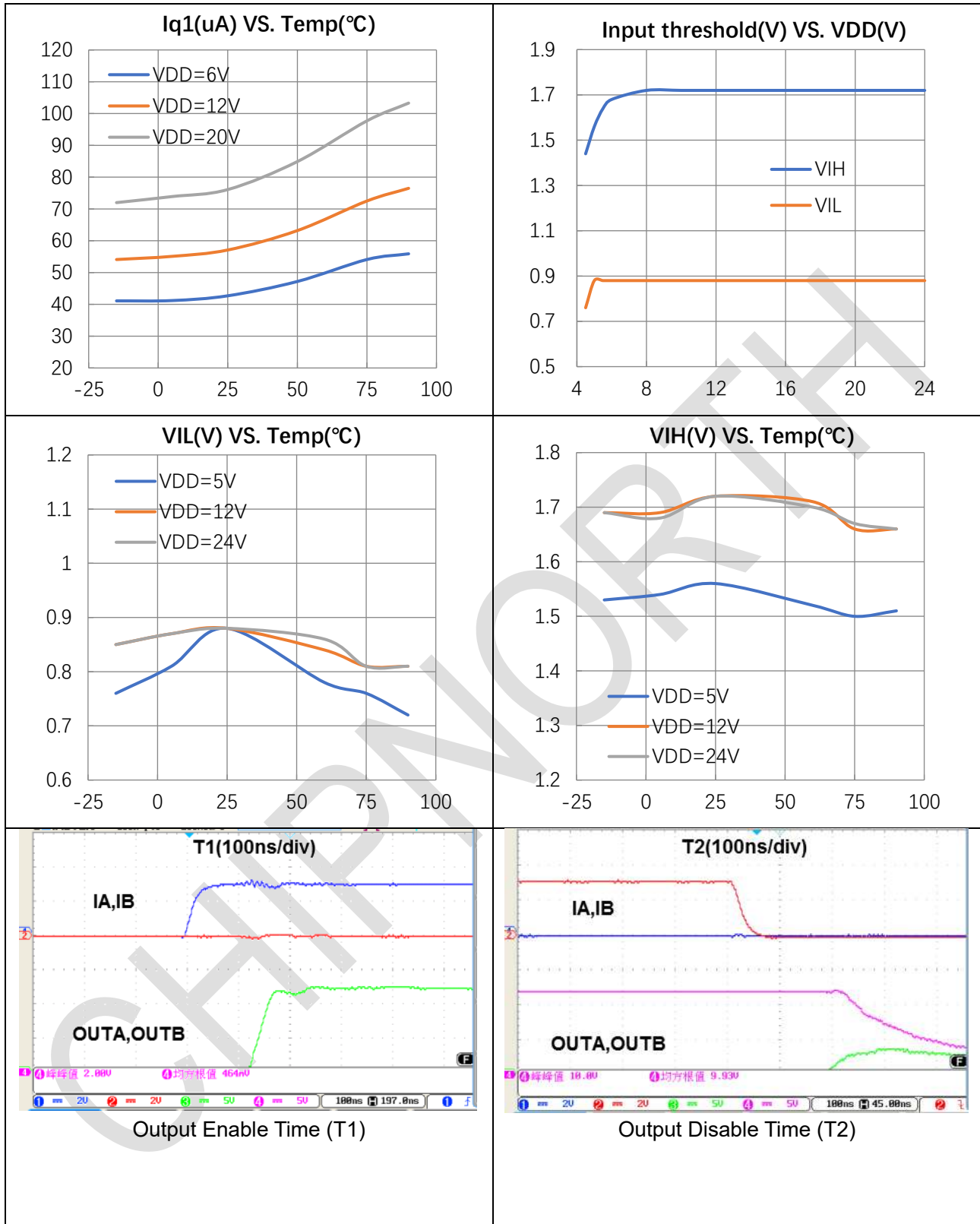
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Operating supply voltage	VDD		4.5		24	V
Standby mode supply current	Iq0	INA=INB=0V		25	36	μA
Operating supply current	Iq1			60	75	μA
UVLO threshold rising				4.05	4.4	V
UVLO hysteresis				0.3		V
Input high voltage	VIH		1.95			V
Input low voltage	VIL				0.45	V
INx Input current	I_INx	V_INx=3.3V		2.5		μA
Input pull-down resistance	RIN			1.275		MΩ
HS switch on resistance	Rhs	ILOAD=300mA		0.6	0.75	Ω
LS switch on resistance	Rls	ILOAD=300mA		0.3	0.4	Ω
Output enable time	T1			150		ns
Output disable time	T2			250		ns
Delay time	T3	INB high to OUTA low		200		ns
	T4	INA low to OUTB high		350		ns
Dead time				200		ns
Thermal shutdown threshold				155		°C
Thermal shutdown hysteresis				25		°C

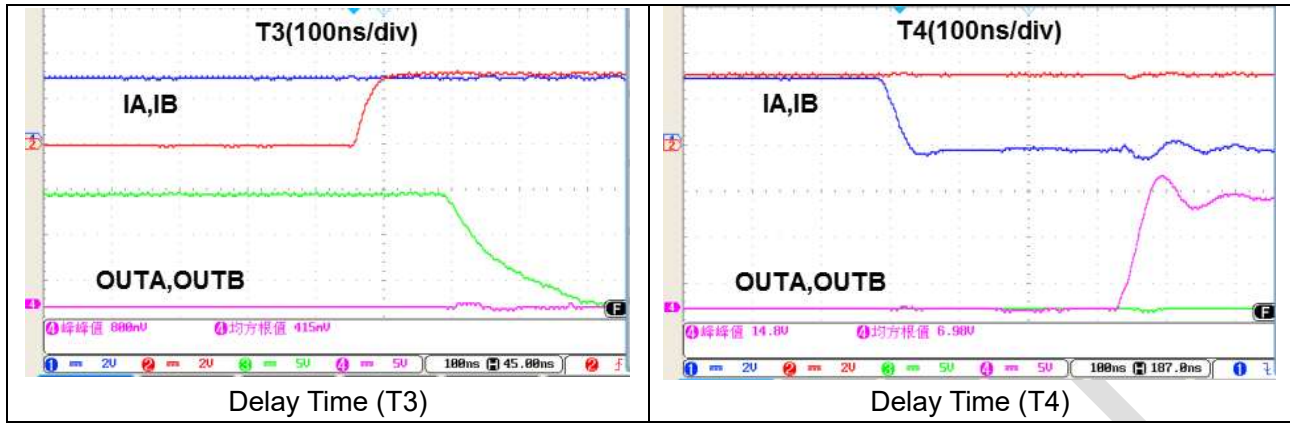


10.6 Characteristics Curve

Test conditions: VDD=6V, TA=25°C, Iload=0mA unless otherwise noted.







11 Detailed Description

11.1 Overview

The CN8031 is an H-bridge driver that can drive a DC motor or other devices such as solenoid valves. Outputs can be controlled via the CN8031's PWM interfaces (INA and INB). These devices integrate the necessary driver FETs and FET control circuits, thereby greatly reducing the number of components in a motor driver system. In addition, the CN8031 adds protection functions that go beyond conventional discrete implementations: thermal shutdown.

11.2 RPM Adjustment

PWM (Pulse Width Modulation) technology achieves precise control of motor speed by adjusting the duty cycle of the pulse signal. This technique regulates the average value of the motor input voltage and thus controls the motor speed by changing the duty cycle of the PWM signal, i.e., the ratio of the pulse width to the pulse period. Specifically, the larger the duty cycle of the PWM signal, the higher the average value of the motor input voltage and the faster the motor speed; on the contrary, the smaller the duty cycle, the slower the motor speed.

11.3 Motor Control

The CN8031 is controlled via PWM input connectors (INA and INB connectors). Each output is controlled by the corresponding input pin.

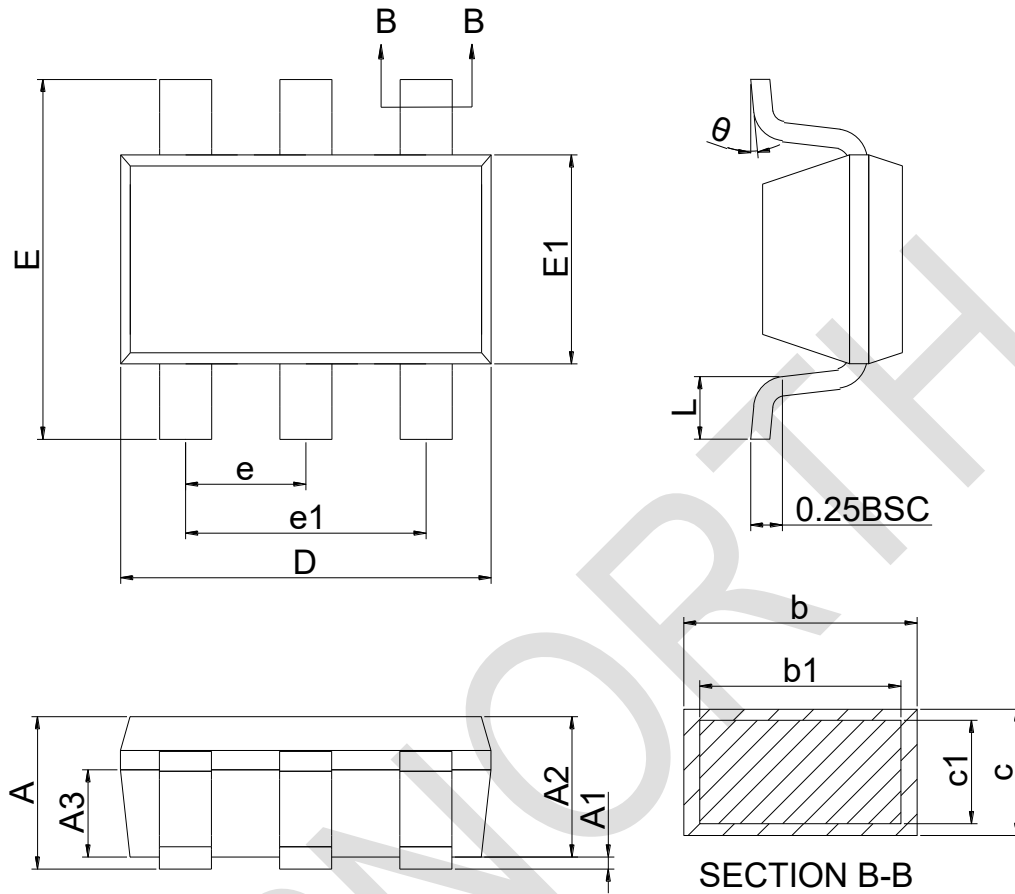
INA	INB	OUTA	OUTB	Functions (DC motors)
L	L	Hi-Z	Hi-Z	Coast
L	H	L	H	Reverse
H	L	H	L	Forward
H	H	L	L	Brake

11.4 OTP

If the chip temperature exceeds 155°C, all field effect tubes in the H-bridge are disabled. Operation is automatically resumed when the chip temperature drops below 130°C.

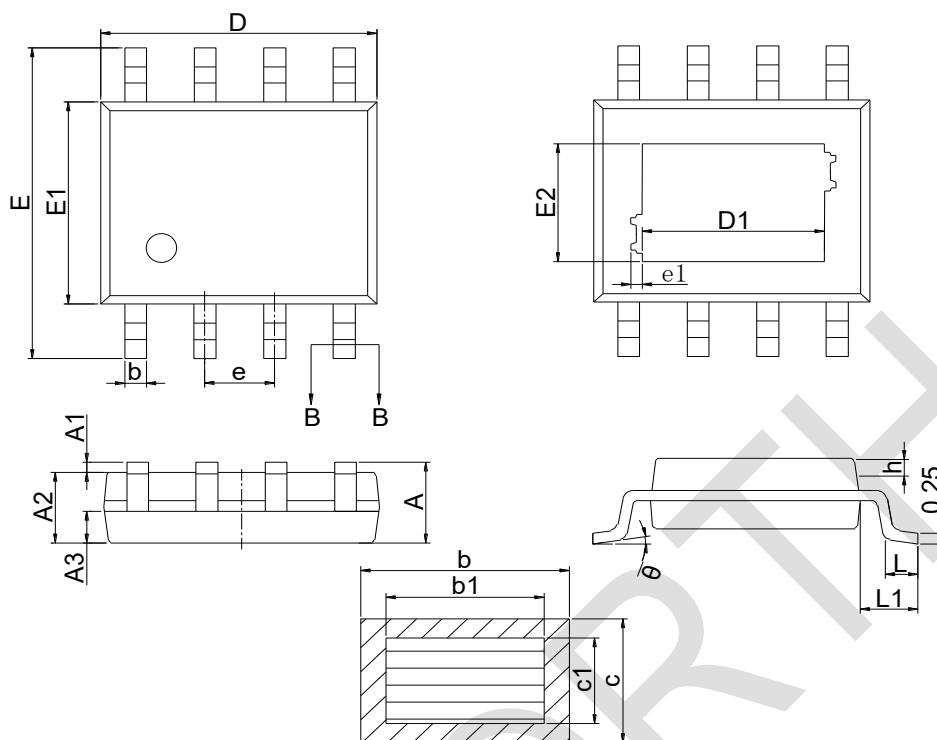
12 Package Information

SOT23-6



Dimension Symbol	Min (mm)	Nom (mm)	Max (mm)
A			1.25
A1	0.04		0.10
A2	1.00	1.10	1.20
A3	0.55	0.65	0.75
b	0.38		0.48
b1	0.37	0.40	0.43
c	0.11		0.21
c1	0.10	0.13	0.16
D	2.72	2.92	3.12
E	2.60	2.80	3.00
E1	1.40	1.60	1.80
e	0.95BSC		
e1	1.90BSC		
L	0.30		0.60
θ	0°		8°

ESOP-8



SECTION B-B

Dimension Symbol	Min (mm)	Nom (mm)	Max (mm)
A			1.65
A1	0.05		0.15
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39		0.47
b1	0.38	0.41	0.44
c	0.20		0.24
c1	0.19	0.20	0.21
D	4.80	4.90	5.00
E	5.80	6.00	6.20
E1	3.80	3.90	4.00
e	1.05REF		
h	0.25		0.50
L	0.50	0.60	0.80
L1	1.05REF		
θ	0°		8°

Size(mm) L/F Size(nil)	D1	E2	e1
95*130	3.10REF	2.21REF	0.10REF

Note: SOP-8 has no heat dissipation pad, other dimensions are the same as ESOP-8

13 Important Statement

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