

SANYO Semiconductors DATA SHEET

An ON Semiconductor Company

Monolithic Digital IC

LB1973M

Two-channel H-Bridge Driver

Overview

The LB1973M is a two-channel H-bridge driver that supports for low saturation draive operation. It is optimal for H-bridge drive of stepping motors (AF and zoom) in portable equipment such as camera cell phones.

Features

- Two-channel H-bridge driver
- The range of the operation voltage is wide.(1.8V to 7.5V)
- Small package : MFP10S(225mil)
- Built-in thermal protection

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		-0.3 to +8.0	V
Output voltage	V _{OUT} max		-0.3 to V _{CC} +V _{SF}	V
Input voltage	V _{IN} max	CONT, IN	-0.3 to +8.0	V
Ground pin source current	I _{GND}	Per channel	1000	mA
Allowable power dissipation	Pd max1	For Unit	350	mW
	Pd max2	Mounted on a circuit board.*	870	mW
Operating temperature	Topr		-20 to +85	°C
Storage temperature	Tstg		-40 to +150	°C

^{*} Mounted on a Specified board: 114.3mm×76.1mm×1.6mm, glass epoxy

Allowable Operating Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V _{CC}		1.8 to 7.5	V
High-level input voltage	v_{IH}		1.3 to 7.5	V
Low-level input voltage	V_{IL}		-0.3 to +0.5	V

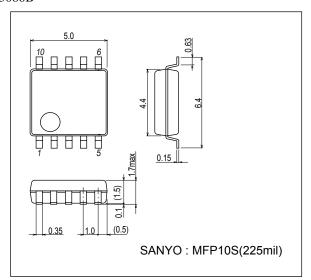
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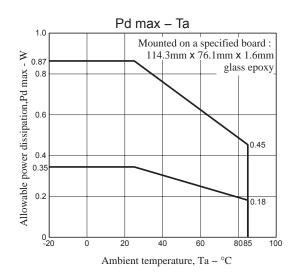
Electrical Characteristics at Ta = 25°C, $V_{CC} = 1.9V$

Parameter	Symbol	Conditions		Unit		
Parameter	Symbol	Conditions	min	typ	max	Offic
Source current	I _{CCO} 1	V _{CC} = 1.9V,IN1 to IN4 = 0V		0.01	1	μΑ
	I _{CCO} 2	V _{CC} = 3V,IN1 to IN4 = 0V		0.01	1	μΑ
	I _{CC} 1	IN1 = 1.9V,IN2 to IN4 = 0V		18	25	mA
	I _{CC} 2	IN1 = 3V,IN2 to IN4 = 0V,V _{CC} = 3V		19	26	mA
Output saturation voltage1 (single connection)	V _{OUT} 11	I _{OUT} = 270mA,V _{CC} = 1.9V to 3.6V,V _{OUT} = Upper Tr and Under Tr IN1 = 1.3V,IN2 to IN4 = 0V Supplementation: Standard similar as for IN2 to IN4 = 1.3V		0.2	0.3	V
	V _{OUT} 12	I _{OUT} = 350mA,V _{CC} = 1.9V to 3.6V,V _{OUT} = Upper Tr and Under Tr IN1 = 1.3V,IN2 to IN4 = 0V Supplementation: Standard similar as for IN2 to IN4 = 1.3V		0.25	0.4	>
Output saturation voltage2 (parallel connection)	V _{OUT} 21	I_{OUT} = 270mA, V_{CC} = 1.9V to 3.6V, V_{OUT} = Upper Tr and Under Tr OUT1-3,OUT2-4 short. IN1 and IN3 = 1.3V,IN2 and IN4 = 0V Supplementation: Standard similar as for IN2 and IN4 = 1.3V		0.12	0.2	V
	V _{OUT} 22	I _{OUT} = 500mA,V _{CC} = 1.9V to 3.6V,V _{OUT} = Upper Tr and Under Tr OUT1-3,OUT2-4 short. IN1 and IN3 = 1.3V,IN2 and IN4 = 0V Supplementation: Standard similar as for IN2 and IN4 = 1.3V		0.2	0.35	V
Input current	I _{IN}	V _{IN} = 1.9V		32	70	μА
Themal shutdown operation temperature	Ttsd			140		°C
Temperature hysteresis width	ΔΤ		20			°C
Spark killer Diode						
Reverse current	I _S (leak)	V _{CC} -OUT = 8V,V _{IN} = 0V			10	μΑ
Forword voltage	V _{SF}	I _{OUT} = 400mA,V _{IN} = 0V			1.7	V

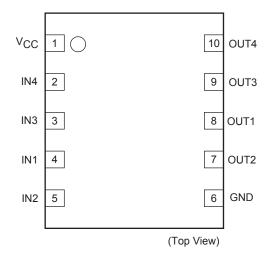
Package Dimensions

unit : mm (typ) 3086B





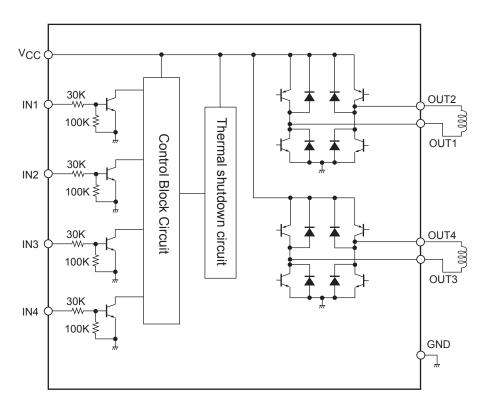
Pin Assignment



Truth Table

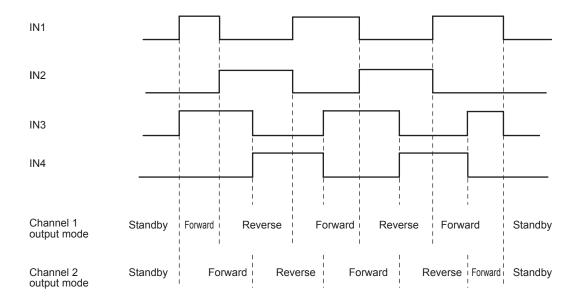
Input			Output			Mada			
IN1	IN2	IN3	IN4	OUT1	OUT2	OUT3	OUT4	Mode	
Low	Low	Low	Low	Off	Off	Off	Off	Standby mode	
High	Low			High	Low			Channel 1, forward	
Low	High	-	-	Low	High	-	-	Channel 1, reverse	
		High	Low				High	Low	Channel 2, forward
- -	Low	High	-	-	Low	High	Channel 2, reverse		
High	High	-	1	The logic output for the first high-level input is produced.					
-	-	High	High						

Block Diagram

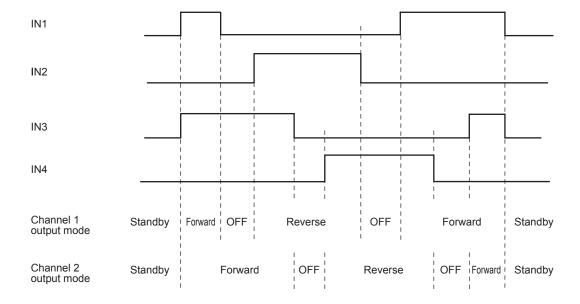


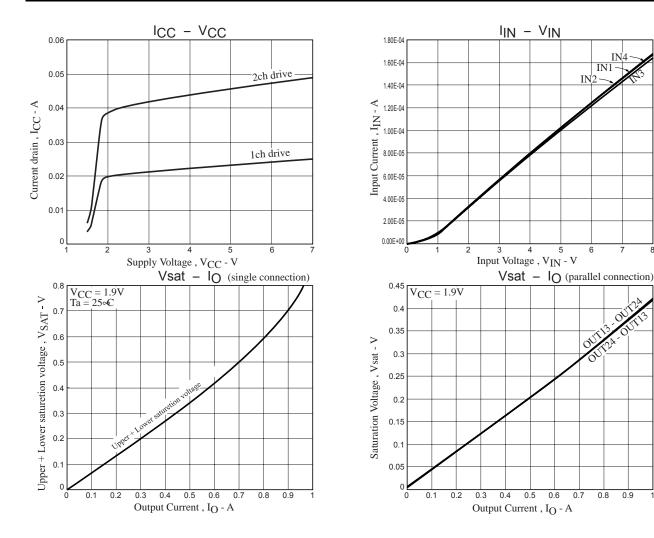
Timing Chart

(1) Stepper motor timing chart Timing chart for 2-phase drive



(2) Timing chart for 1-2 phase drive (Fastdecay mode)





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