

5 V, 1 A H-Bridge Motor Driver

DESCRIPTION

The SiP2100 is an integrated, buffered H-bridge with TTL and CMOS compatible inputs with the capability of delivering up to 1 A continuous current at 5 V V_{DD} supply.

The SiP2100 has two independent logic inputs that can set four different motor operation modes: normal rotation, reverse rotation, stop (idling) and braking. The internal shoot-through protection logic also prevents upper and lower outputs from being turned on simultaneously.

The SiP2100 offers high efficiency with an extremely low operating current. The device also benefits from over temperature protection with a shut down hysteresis of 20 °C.

The SiP2100 is available in SOIC8 package.

FEATURES

- 1 A drive capability
- Optimized for 5 V V_{DD} bias
- Extremely low idle current
- Shoot-through protection scheme
- Thermal shutdown
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- High performance servo
- Optical/tape disk drives
- Brush/stepper motor driver

PACKAGE OUTLINE

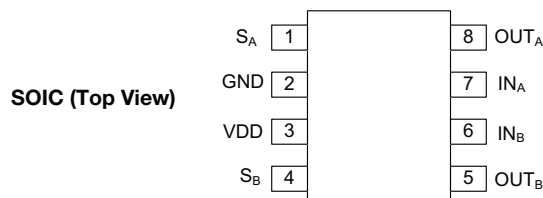


Fig. 1 - Package and Pinout

FUNCTIONAL BLOCK DIAGRAM AND TRUTH TABLE

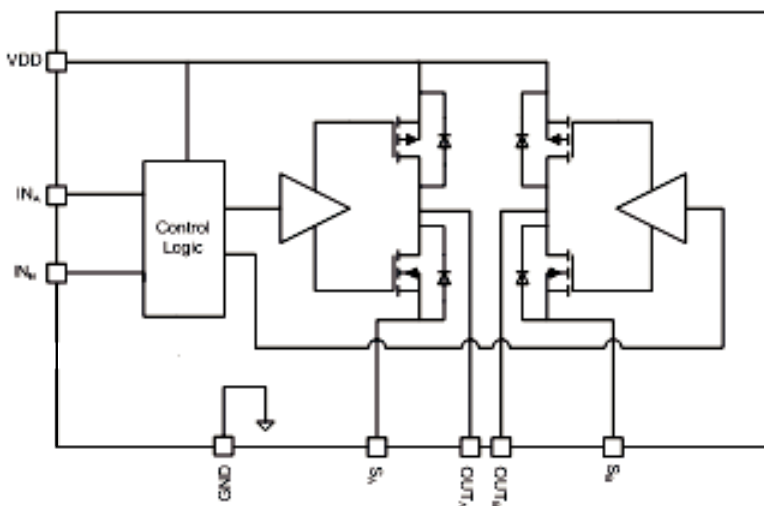


Fig. 2 - Functional Block Diagram

TRUTH TABLE			
IN _A	IN _B	OUT _A	Out _B
1	0	1	0
0	1	0	1
0	0	0	0
1	1	HiZ	HiZ



ABSOLUTE MAXIMUM RATINGS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise noted)			
Electrical Parameter	Conditions	Limits	Unit
V_{DD}	Reference to GND	- 0.3 to 6	V
OUT_A, OUT_B	Reference to GND	- 0.3 to 6	
S_A, S_B	Reference to GND	- 0.3 to 1	
IN_A, IN_B	Reference to GND	- 0.3 to V_{DD}	
Temperature			
Operating Temperature		- 40 to 85	$^\circ\text{C}$
Max. Operating Junction Temperature		150	

Stresses beyond those 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 in the operational sections of the specifications is not implied. Exposure to absolute maximum rating/conditions for extended periods may affect device reliability.

RECOMMENDED OPERATING CONDITIONS				
Parameter	Min.	Typ.	Max.	Unit
V_{DD}	3.8	5	5.5	V
Temperature				
Operating Junction Temperature	0		125	$^\circ\text{C}$
Recommended Ambient Temperature	0		70	

THERMAL RESISTANCE RATINGS			
Parameter		Max.	Unit
Thermal Resistance (Junction to Ambient)	SO-8, R_{thJA}	153	$^\circ\text{C}/\text{W}$
	SO-8 PowerPAD, R_{thJC}	40	
Power Dissipation	SO-8, $T_A = 70\text{ }^\circ\text{C}$	522	mW
	SO-8 PowerPAD, $T_A = 70\text{ }^\circ\text{C}$	2	W
Junction Temperature		- 65 to 150	$^\circ\text{C}$
Storage Temperature		- 55 to 150	



SPECIFICATIONS ($T_A = 25\text{ }^\circ\text{C}$, unless otherwise specified)							
Parameter	Symbol	Test Conditions $V_{DD} = 5\text{ V}$	Limits			Unit	
			Min. ^a	Typ. ^b	Max. ^a		
Driver Power Supply							
V_{DD} Bias Supply Current	I_{DD}	IN = 100 kHz		250	300	μA	
		IN = 20 kHz		150	180		
		Quiescent state		50			
V_{DD} Rising Threshold	$V_{DD\ TH_R}$	V_{DD} rising		2.8	3	V	
V_{DD} Falling Threshold	$V_{DD\ TH_F}$	V_{DD} falling	2	2.5			
V_{DD} UVLO Hysteresis	$V_{DD\ UVLO}$			300		mV	
Input Logic							
Input Voltage High	V_{IN_H}		2			V	
Input Voltage Low	V_{IN_L}				0.7		
Input Sourcing Current	I_{IN_H}				1	μA	
Input Sinking Current	I_{IN_L}		-1				
Output Stage							
Output Voltage High	V_{OUT_H}	$I_{OUT} = -500\text{ mA}$	$V_{DD} = 4.75\text{ V}$	4.4		V	
		$I_{OUT} = -1000\text{ mA}$		4.25			
Output Voltage Low	V_{OUT_L}	$I_{OUT} = +500\text{ mA}$					0.25
		$I_{OUT} = +1000\text{ mA}$					0.5
Output High Propagation Delay	TP_{LH}			20	25	nS	
Output Low Propagation Delay	TP_{HL}			20	25		
Thermal Protection							
Thermal Shutdown Threshold				150		$^\circ\text{C}$	
Thermal Shutdown Hysteresis				20			

Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$.

b. Guaranteed by design, not subject to production testing.

PIN DESCRIPTION (SOIC PACKAGE)		
Pin Number	Name	Function
1	S_A	Driver output return A
2	GND	Analog ground of internal logic
3	V_{DD}	Input of internal logic bias and power stage
4	S_B	Driver output return B
5	OUT_B	Driver output B
6	IN_B	Driver input B
7	IN_A	Driver input A
8	OUT_A	Driver output A

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

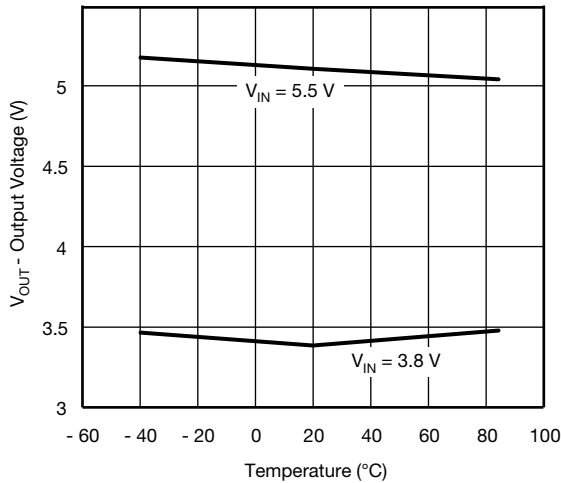


Fig 1. Output Voltage vs. Temperature (at 1.5 A Load)

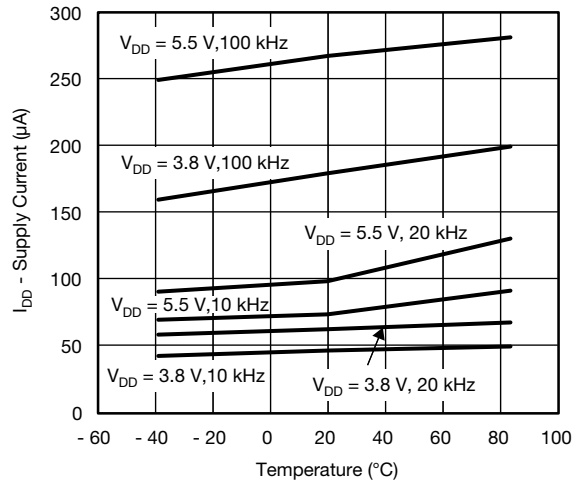


Fig 2. Supply Current I_{DD} vs. Temperature

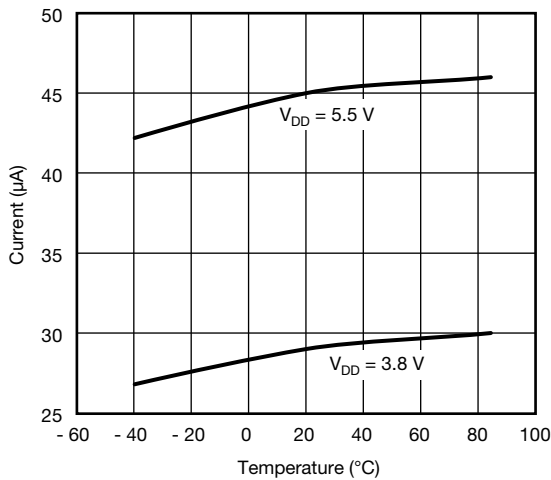


Fig 3. Quiescent Current vs. Temperature

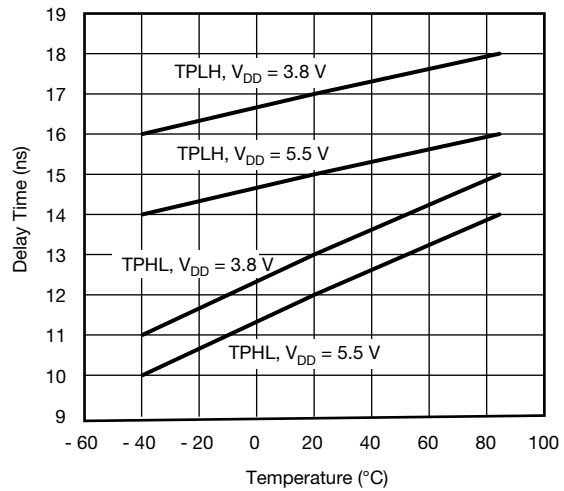


Fig 4. Propagation Delay vs. Temperature

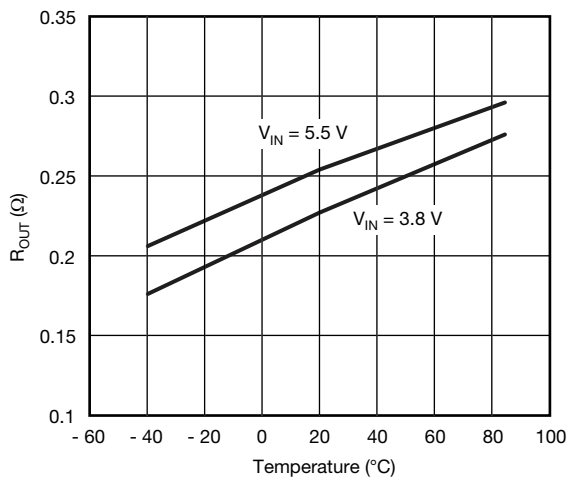


Fig 5. R_{OUT} vs. Temperature

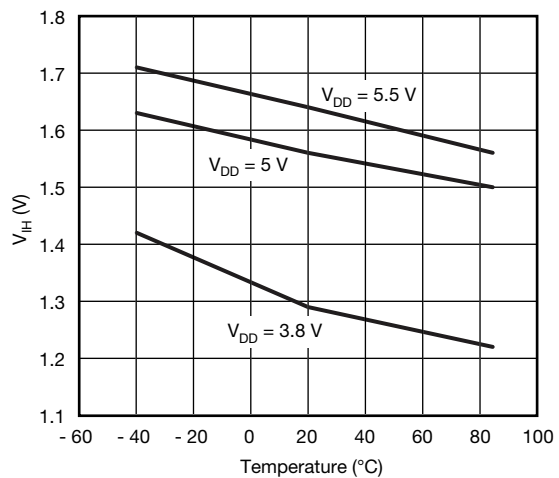


Fig 6. PWM Rising Threshold vs. Temperature



TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

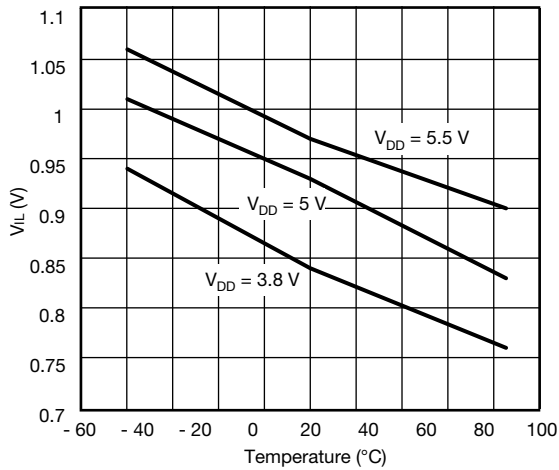


Fig 7. PWM Falling Threshold vs. Temperature

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SOIC (NARROW): 8-LEAD

JEDEC Part Number: MS-012



DIM	MILLIMETERS		INCHES	
	Min	Max	Min	Max
A	1.35	1.75	0.053	0.069
A ₁	0.10	0.20	0.004	0.008
B	0.35	0.51	0.014	0.020
C	0.19	0.25	0.0075	0.010
D	4.80	5.00	0.189	0.196
E	3.80	4.00	0.150	0.157
e	1.27 BSC		0.050 BSC	
H	5.80	6.20	0.228	0.244
h	0.25	0.50	0.010	0.020
L	0.50	0.93	0.020	0.037
q	0°	8°	0°	8°
S	0.44	0.64	0.018	0.026
ECN: C-06527-Rev. I, 11-Sep-06				
DWG: 5498				



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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.