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

Pb-free
RoHS COMPLIANT
HALOGEN FREE

APPLICATIONS

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

PACKAGE OUTLINE

SOIC (Top View)

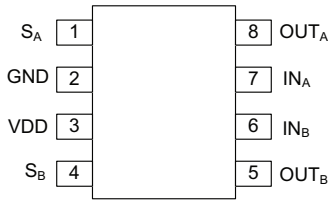

Fig. 1 - Package and Pinout

FUNCTIONAL BLOCK DIAGRAM AND TRUTH TABLE

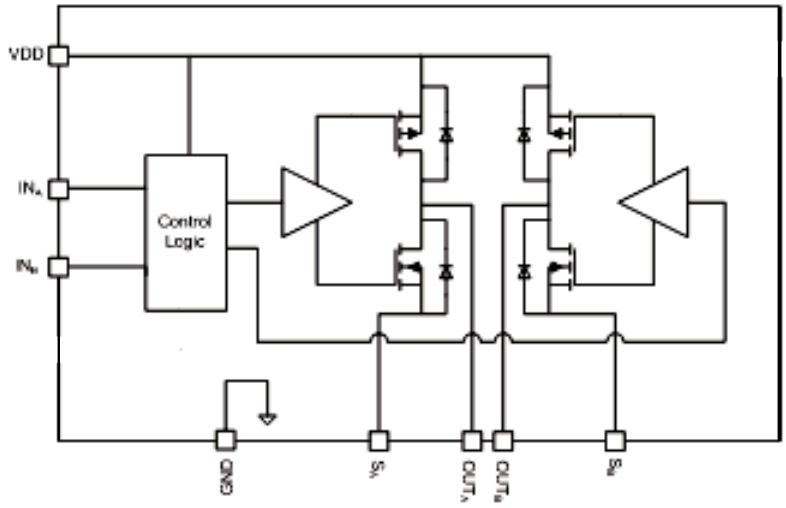

Fig. 2 - Functional Block Diagram

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 °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	°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	°C
Recommended Ambient Temperature	0		70	

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

For technical questions, contact: powerictechsupport@vishay.com
Document Number: 63949
S12-2801-Rev. B, 10-Dec-12

SPECIFICATIONS (T_A = 25 °C, unless otherwise specified)							
Parameter	**Symbol**	**Test Conditions V_{DD} = 5 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	VIN_H			2			V
Input Voltage Low	VIN_L					0.7	
Input Sourcing Current	I_{INH}					1	µA
Input Sinking Current	I_{INL}			- 1			
Output Stage							
Output Voltage High	V_{OUTH}	I_{OUT} = - 500 mA	V_{DD} = 4.75 V	4.4			V
		I_{OUT} = - 1000 mA		4.25			
Output Voltage Low	V_{OUTL}	I_{OUT} = + 500 mA				0.25	
		I_{OUT} = + 1000 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		°C
Thermal Shutdown Hysteresis					20		

Notes:
a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 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)

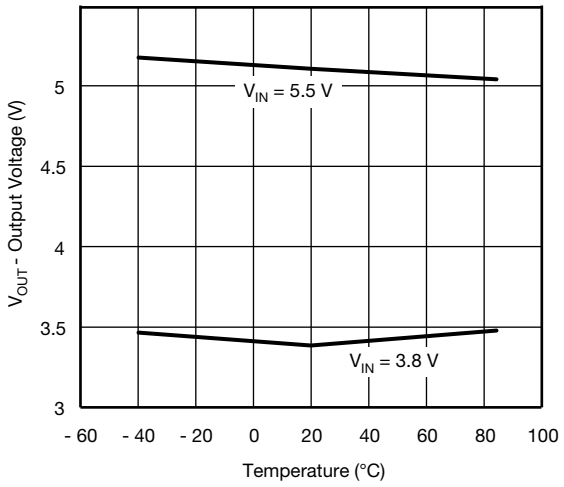

Fig 1. Output Voltage vs. Temperature (at 1.5 A Load)

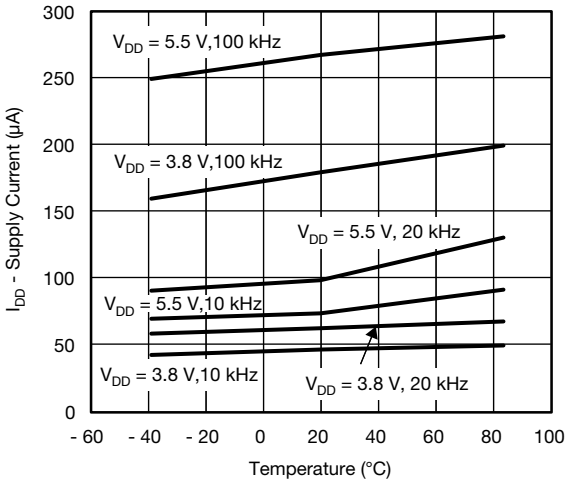

Fig 2. Supply Current I_{DD} vs. Temperature

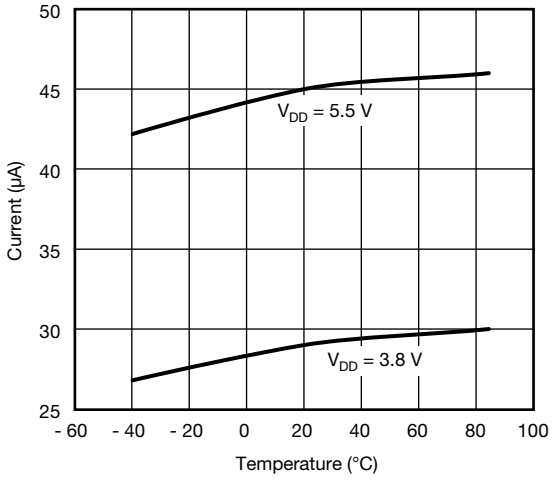

Fig 3. Quiescent Current vs. Temperature

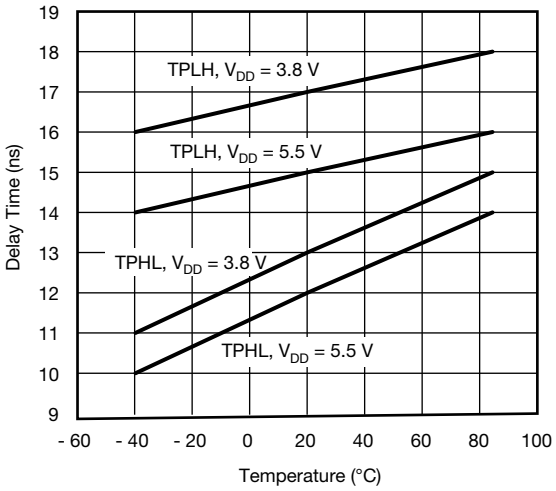

Fig 4. Propagation Delay vs. Temperature

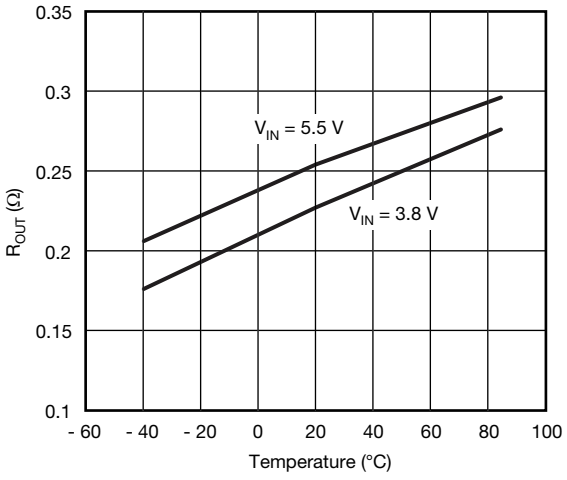

Fig 5. R_{OUT} vs. Temperature

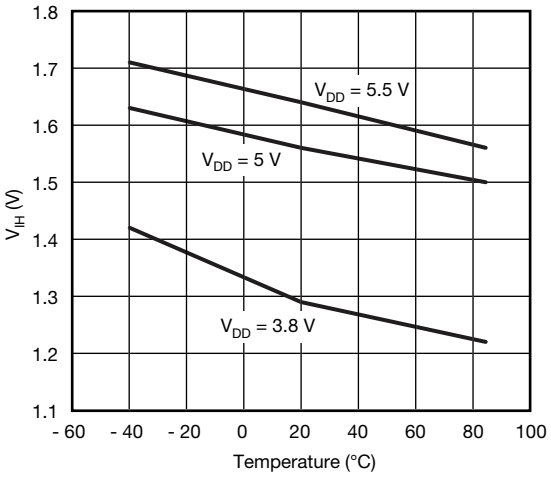

Fig 6. PWM Rising Threshold vs. Temperature

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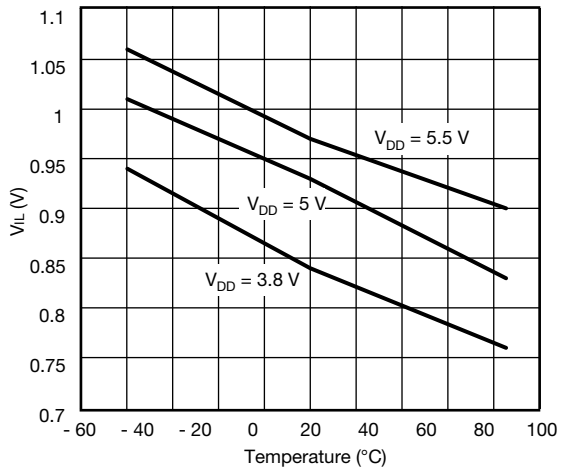

Fig 7. PWM Falling Threshold vs. Temperature

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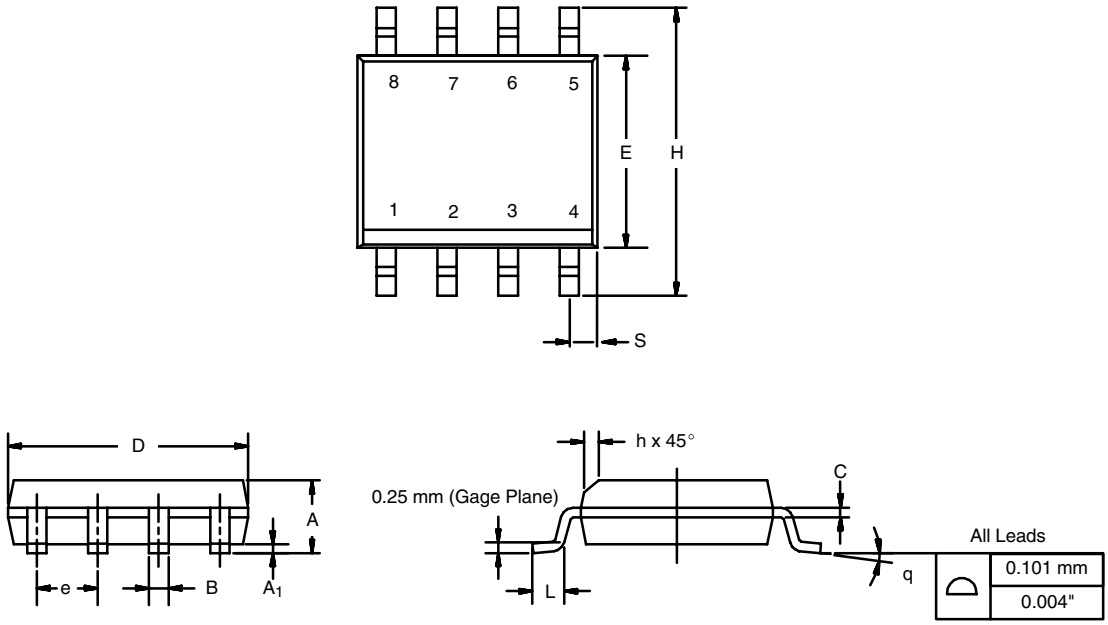
SOIC (NARROW): 8-LEAD
JEDEC Part Number: MS-012



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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