

**LB1656****2-Phase Stepping Motor Driver****Overview**

The LB1656 is a dual bridge driver IC suited for use in 2-phase bipolar stepping motor driver for FDD (3 to 5.25 inches) head actuator. The maximum driver current×voltage is 0.33A×12V/bridge.

Features

- Power save function.
- $\phi 1$, $\phi 2$ direction inputs are used to make driver output selection.
- Low saturation voltage.
- Low current drain.
- Direct controllable from MPU due to low input current.
- Input level : TTL, LSTTL, 5V CMOS compatible.
- On-chip thermal shutdown (TSD) circuit.

Specifications**Absolute Maximum Ratings at Ta = 25°C**

Parameter	Symbol	Conditions	Ratings	Unit
Logic section supply voltage	V _{CC}		7	V
Seeking supply voltage	V _{S1}		15	V
Holding supply voltage	V _{S2}		7	V
Input voltage	V _{IN}		0 to V _{CC}	V
Peak seeking current	I _{O peak}	t _s ≤5ms	500	mA
Continuous seeking current	I _{OS}		330	mA
Holding current	I _{OH}		200	mA
Allowable power dissipation	P _{d max}		1.9	W
Operating temperature	T _{opr}		-20 to 70	°C
Storage temperature	T _{stg}		-55 to +125	°C

Allowable Operating Characteristics at Ta = 25°C

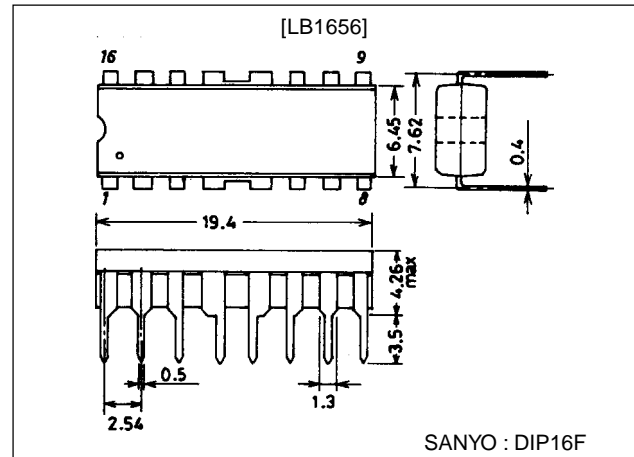
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Logic section supply voltage	V _{CC}		4.5	5.0	5.5	V
Seeking supply voltage	V _{S1}		10.2	12.0	13.8	V
Holding supply voltage	V _{S2}		4.5	5.0	5.5	V

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Package Dimensions

unit:mm

3054A-DIP16F

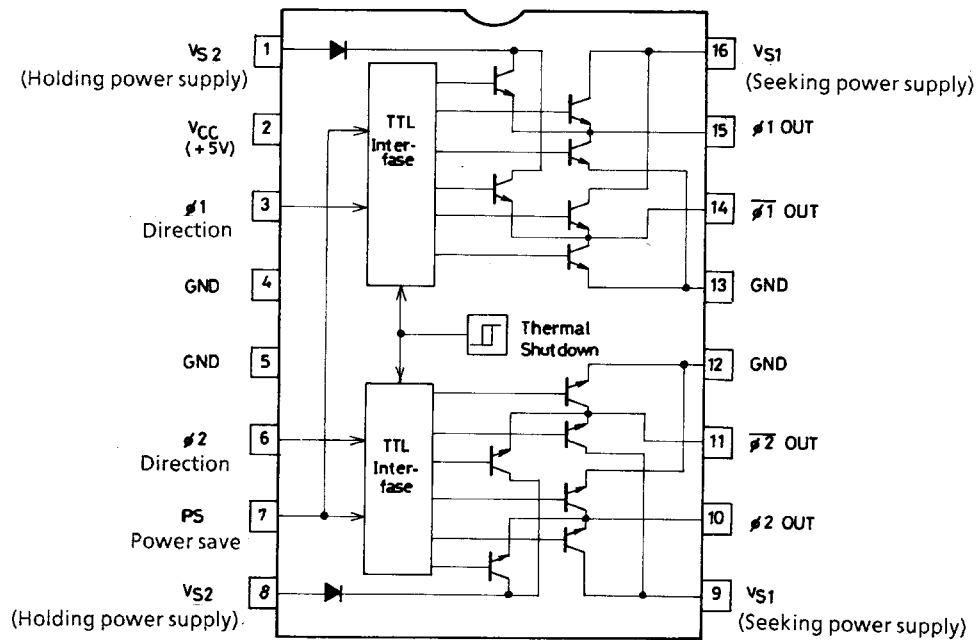
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Electrical Conditions at $T_a = 25^\circ\text{C}$, $V_{CC}=25^\circ\text{C}$, $V_{CC}=5\text{V}$, $V_{CC1}=12\text{V}$, $V_{S2}=5\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit	
			min	typ	max		
Input low-level voltage	V_{IL}				0.8	V	
Input high-level voltage	V_{IH}		2.0			V	
Input low-level current	I_{IL}	$V_I=0.8\text{V}$	-10		+10	μA	
Input high-level current	I_{IH}	$V_I=2\text{V}$		2	10	μA	
		$V_I=5\text{V}$		0.3	1.0	mA	
Current drain	I_{CC}	$ps=0.8\text{V}, V_{CC}$		25	33	mA	
		$ps=0.8\text{V}, V_{S1}$, Note1		6	10	mA	
		$ps=0.8\text{V}, V_{S2}$, Note2			0.1		mA
		$ps=2\text{V}, V_{CC}$		25	33	mA	
		$ps=2\text{V}, V_{S1}$, Note1		1	2	mA	
		$ps=2\text{V}, V_{S2}$, Note2		2.5	4	mA	
Output transistor voltage	$V_{(BR)CER}$	$I_C=10\text{mA}$	18			V	
V_{S1} saturation voltage	$V_{CE(sat)1}$	$ps=0.8\text{V}, I_O=330\text{mA}$, Note3		1.5	2.0	V	
V_{S2} saturation voltage	$V_{CE(sat)2}$	$ps=2.0\text{V}, I_O=130\text{mA}$, Note3		1.5	2.0	V	
Clamp voltage	V_F	$I_F=330\text{mA}$, upper		3		V	
		$I_F=330\text{mA}$, lower		1.5		V	
Delay time	t_{PLH}			4		μs	
	t_{PHL}			2		μs	
TSD operating temperature	TSD			150		$^\circ\text{C}$	
TSD hysteresis	ΔT			25		$^\circ\text{C}$	

- Note :
1. Measure sum of currents at pins 9 and 16.
 2. Measure sum of currents at pins 1 and 8.
 3. Measure sum of saturation voltages at upper and lower level.

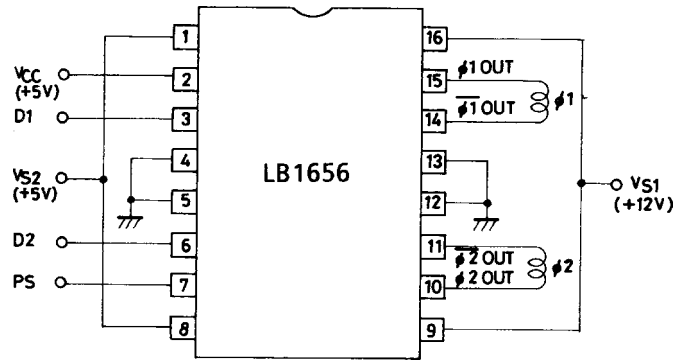
Equivalent Circuit Block Diagram



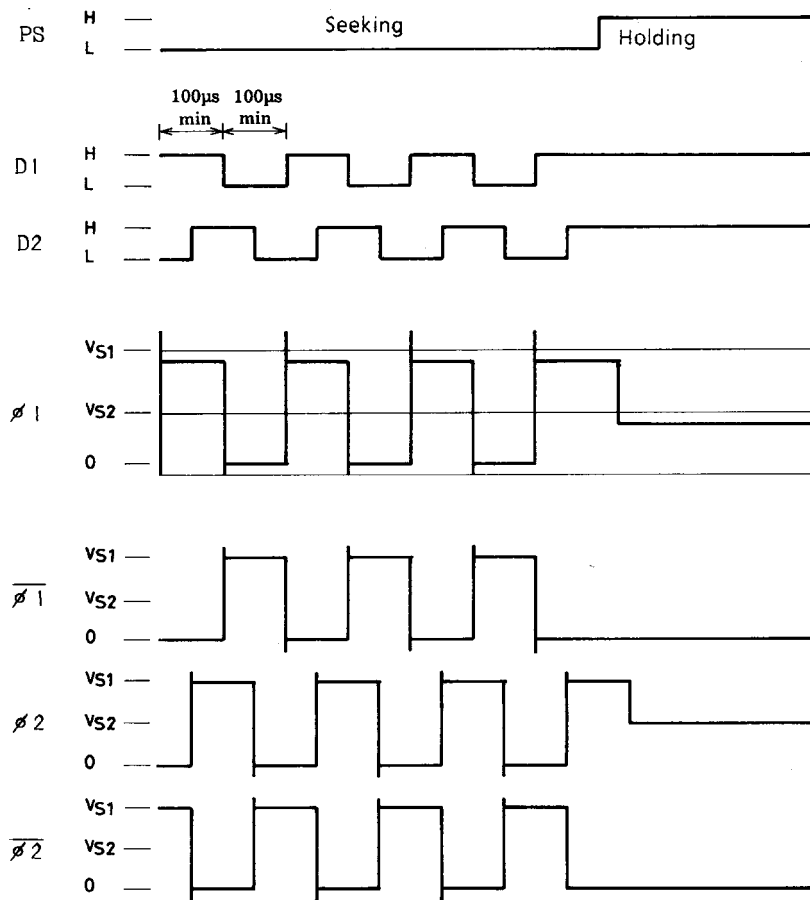
The $\phi 1$, $\phi 2$ direction inputs are used to make driver output selection and the power save input is used to select the driver source output from between 5V supply and 12V supply.

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Sample Application Circuit : 2-phase bipolar stepping motor driver.



Timing Chart



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