

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

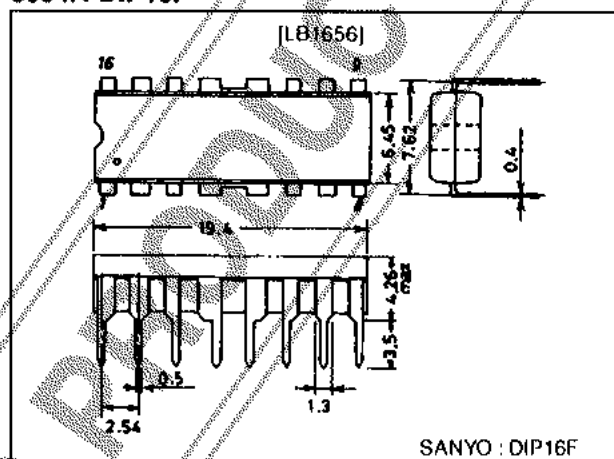
The LB1656 is a dual bridge driver IC suited for use in 2-phase bipolar stepping motor driver for FDD (3 to 5.25 inches) head actuator. The maximum driver current×voltage is 0.33A×12V/bridge.

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.

Package Dimensions

unit:mm

3054A-DIP16F**Specifications****Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$**

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	$I_{O\ peak}$	$t \leq 5\text{ms}$	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	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +125	$^\circ\text{C}$

Allowable Operating Characteristics at $T_a = 25^\circ\text{C}$

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

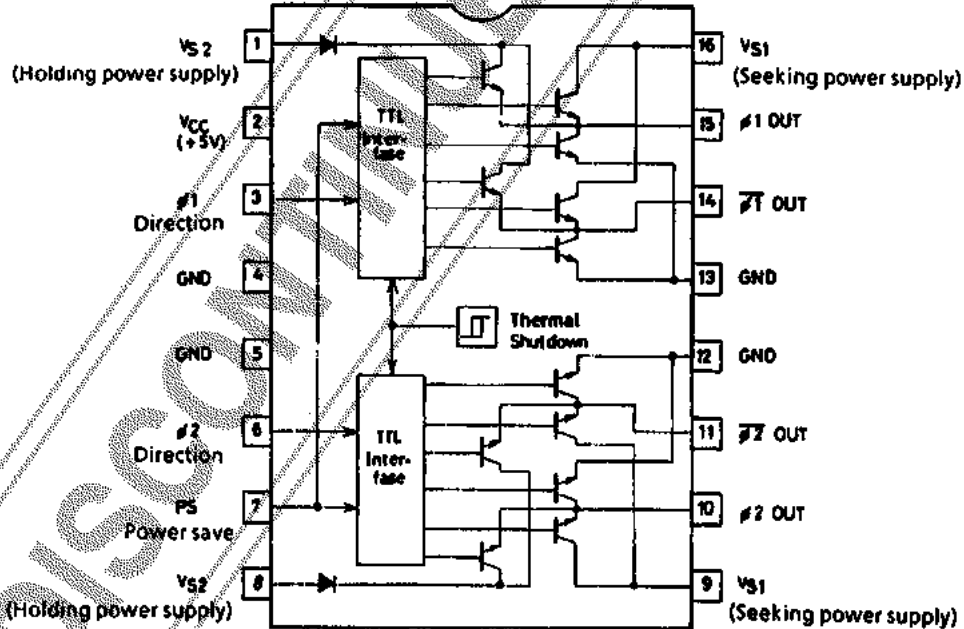
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Electrical Conditions at $T_a = 25^\circ\text{C}$, $V_{CC}=25^\circ\text{C}$, $V_{CC}=5\text{V}$, $V_{CC1}=12\text{V}$, $V_{S2}=5\text{V}$

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
		$p_s=0.8\text{V}$, V_{CC}		25	33	mA
		$p_s=0.8\text{V}$, V_{S1} , Note1		6	10	mA
		$p_s=0.8\text{V}$, V_{S2} , Note2			0.1	mA
		$p_s=2\text{V}$, V_{CC}		25	33	mA
Current drain	I_{CC}	$p_s=2\text{V}$, V_{S1} , Note1		1	2	mA
		$p_s=2\text{V}$, V_{S2} , Note2		2.5	4	mA
		$I_C=10\text{mA}$	18			V
Output transistor voltage	$V_{(BR)CER}$	$I_C=10\text{mA}$	18			V
V_{S1} saturation voltage	$V_{CE(sat)1}$	$p_s=0.8\text{V}$, $I_O=330\text{mA}$, Note3		1.5	2.0	V
V_{S2} saturation voltage	$V_{CE(sat)2}$	$p_s=2.0\text{V}$, $I_O=130\text{mA}$, 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	I_{PLH}			4		μs
	I_{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.

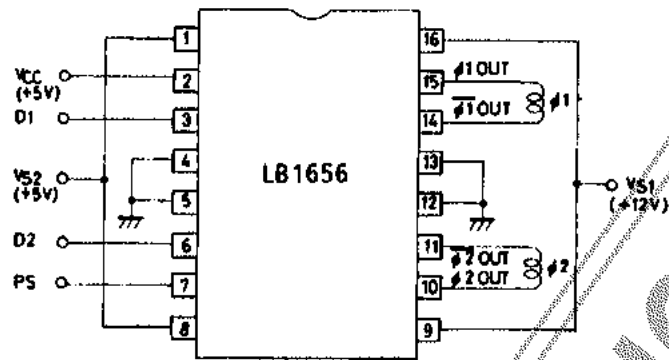
Equivalent Circuit Block Diagram



The #1, #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

