

SANYO

No.3128A

LB1656**2-Phase Stepping Motor Driver**

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 \times voltage is $0.33\text{A} \times 12\text{V/bridge}$.

Features

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

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

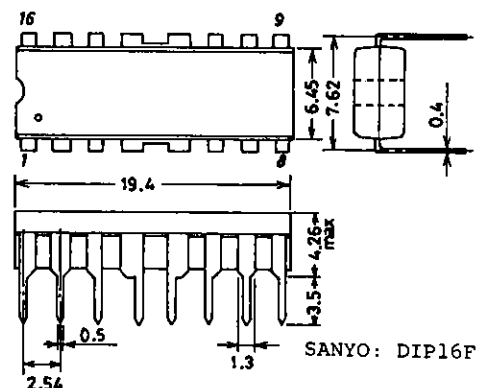
			unit
Logic Section Supply Voltage	V_{CC}	7	V
Seeking Supply Voltage	V_{S1}	15	V
Holding Supply Voltage	V_{S2}	7	V
Input Voltage	V_I	0 to V_{CC}	V
Peak Seeking Current	$I_{O\text{ peak}}$ $t \leq 5\text{ms}$	500	mA
Continuous Seeking Current	I_{OS}	330	mA
Holding Current	I_{OH}	200	mA
Allowable Power Dissipation	$P_{d\text{ max}}$	1.9	W
Operating Temperature	T_{op}	-20 to +70	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +125	$^\circ\text{C}$

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

		min	typ	max	unit
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

Package Dimensions 3054A

(unit: mm)

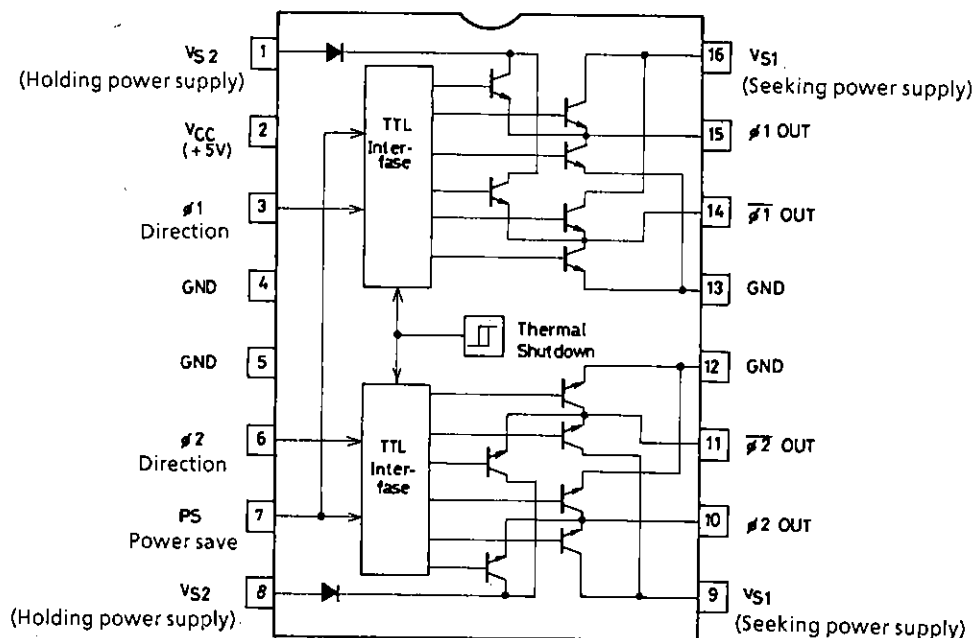


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Electrical Characteristics at $T_a = 25^\circ\text{C}, V_{CC} = 5\text{V}, V_{S1} = 12\text{V}, V_{S2} = 5\text{V}$				min	typ	max	unit	
Input 'L'-Level Voltage	V_{IL}					0.8	V	
Input 'H'-Level Voltage	V_{IH}		2.0				V	
Input 'L'-Level Current	I_{IL}	$V_I = 0.8\text{V}$	-10		+10		μA	
Input 'H'-Level Current	I_{IH}	$V_I = 2\text{V}$		2	10		μA	
Current Dissipation	I_{CC}	$V_I = 5\text{V}$		0.3	1.0		mA	
		$PS = 0.8\text{V}, V_{CC}$		25	33		mA	
		$PS = 0.8\text{V}, V_{S1}, \text{Note 1}$		6	10		mA	
		$PS = 0.8\text{V}, V_{S2}, \text{Note 2}$				0.1		mA
		$PS = 2\text{V}, V_{CC}$		25	33		mA	
		$PS = 2\text{V}, V_{S1}, \text{Note 1}$		1	2		mA	
Output Transistor Voltage	$V_{(BR)CER}$	$PS = 2\text{V}, V_{S2}, \text{Note 2}$	2.5	4			mA	
		$I_C = 10\text{mA}$	18				V	
V_{S1} Saturation Voltage	$V_{CE(sat)1}$	$PS = 0.8\text{V}, I_O = 330\text{mA}, \text{Note 3}$		1.5	2.0		V	
V_{S2} Saturation Voltage	$V_{CE(sat)2}$	$PS = 2.0\text{V}, I_O = 130\text{mA}, \text{Note 3}$		1.5	2.0		V	
Clamp Voltage	V_F	$I_F = 330\text{mA}, \text{upper}$		3			V	
		$I_F = 330\text{mA}, \text{lower}$		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.

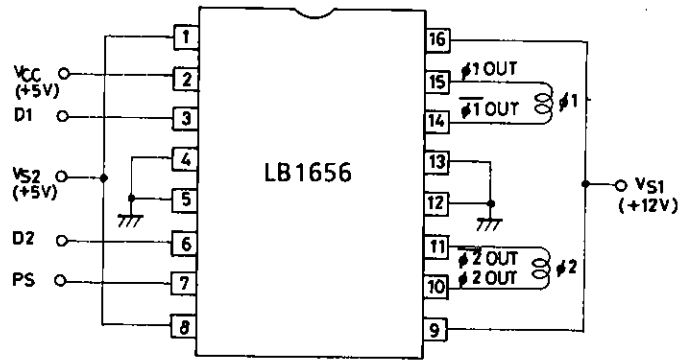
Equivalent Circuit Block Diagram



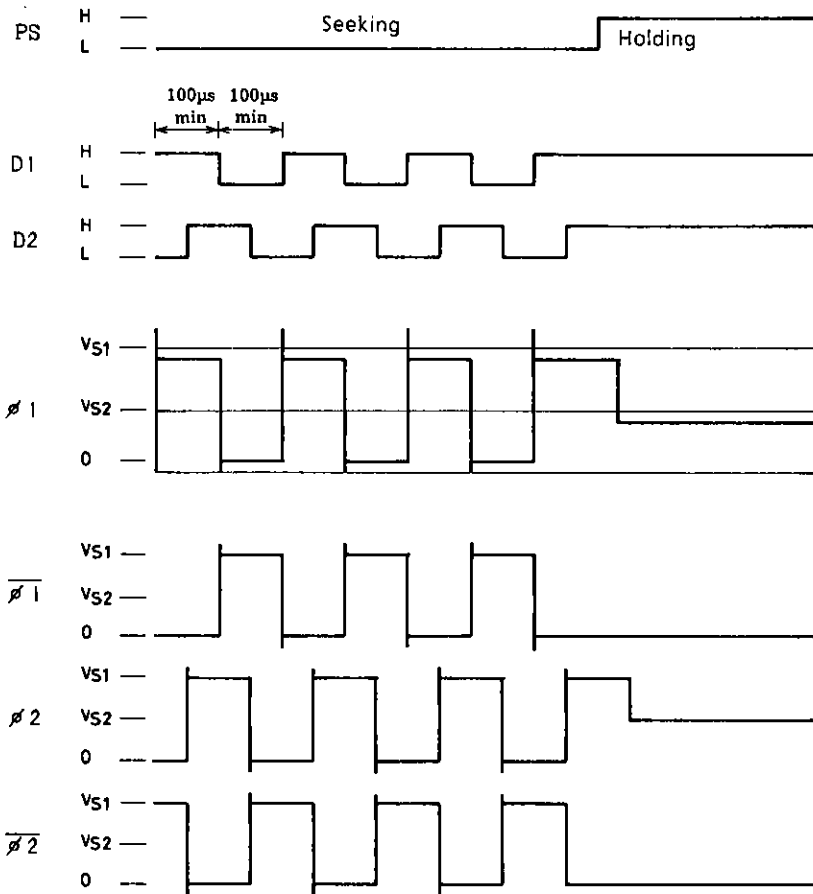
The $\phi 1, \phi 2$ direction inputs are used to make driver output selection and the power save input is used to select the driver source output from between 5V supply and 12V supply.

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Sample Application Circuit : 2-phase bipolar stepping motor driver



Timing Chart



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