Ordering number:EN3321

Monolithic Digital IC

LB1656M

2-Phase Stepping Motor Driver

Overview

The LB1656M 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.

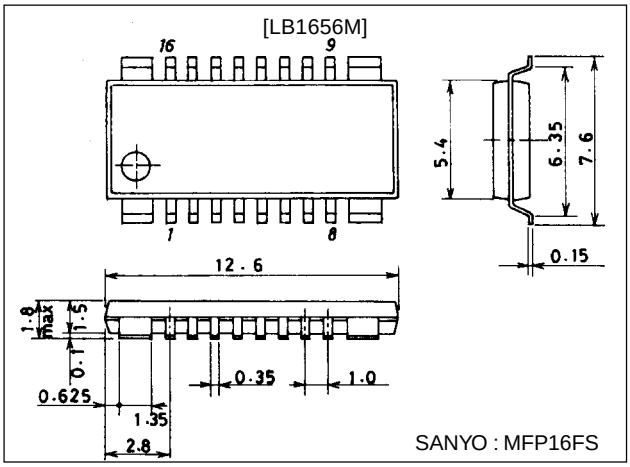
Features

- Power save function.
- ø1, ø2 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

3097-MFP16FS



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≤5ms	500	mA
Continuous seeking current	I_{OS}		330	mA
Holding current	I_{OH}		200	mA
Allowable power dissipation	Pd max		0.9	W
Operating temperature	Topr		–20 to 70	˚C
Storage temperature	Tstg		–55 to +125	˚C

Allowable Operating Conditions 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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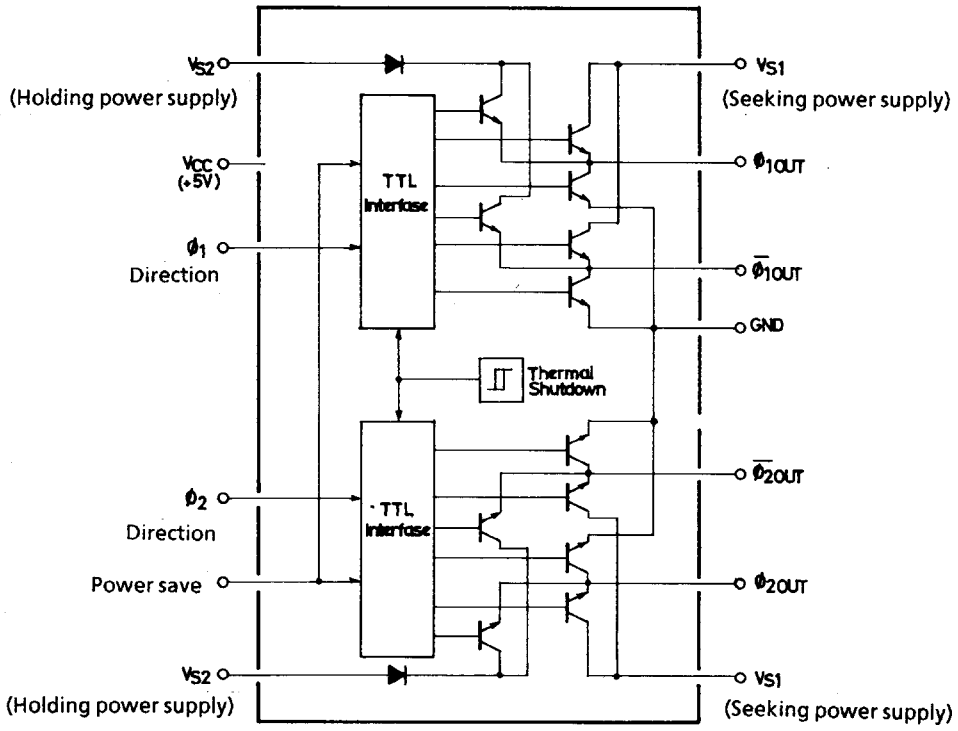
Electrical Characteristics at Ta = 25˚C, V_{CC}=5V, V_{S2}=5V, V_{S1}=12V

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

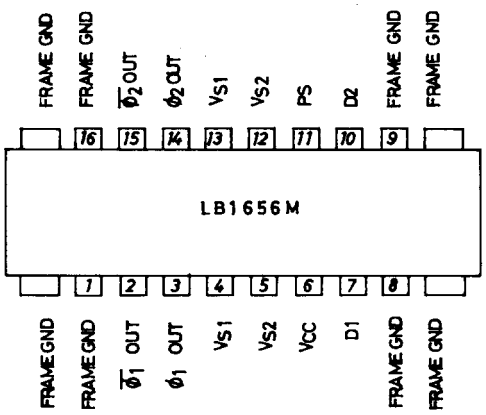
Note : 1. Measure sum of currents at pins 4 and 13.
2. Measure sum of currents at pins 5 and 12.
3. Measure sum of saturation voltages at upper and lower level.

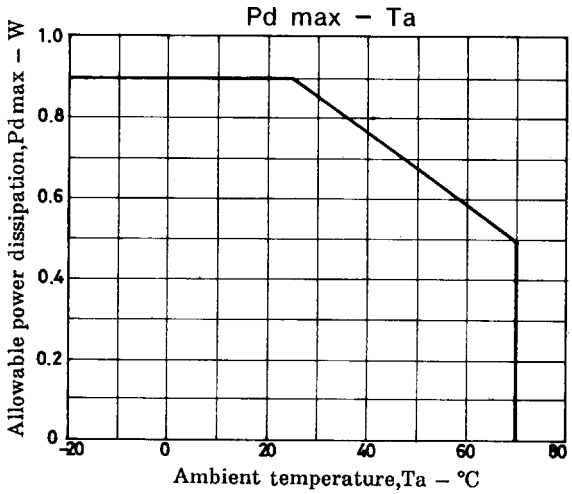
Equivalent Circuit Block Diagram



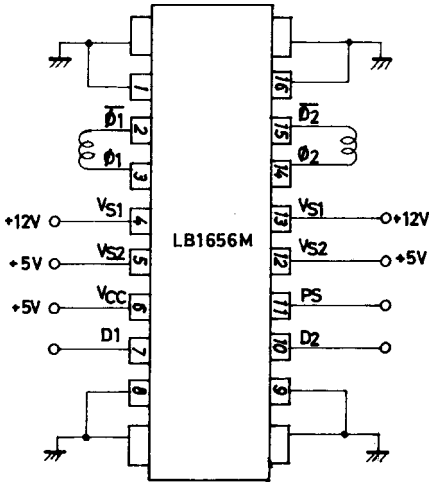
The ø1, ø2 direction inputs are used to make driver output selection and the power save input is used to select the driver source output from between 5V supply and 12V supply.

Pin Assignment





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



Timing Chart