



LB1657M

2-Phase Stepping Motor Driver

Overview

The LB1657M 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 _S		15	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
Allowable power dissipation	P _{d max}		0.9	W
Operating temperature	T _{opr}		-20 to 70	°C
Storage temperature	T _{stg}		-55 to +125	°C

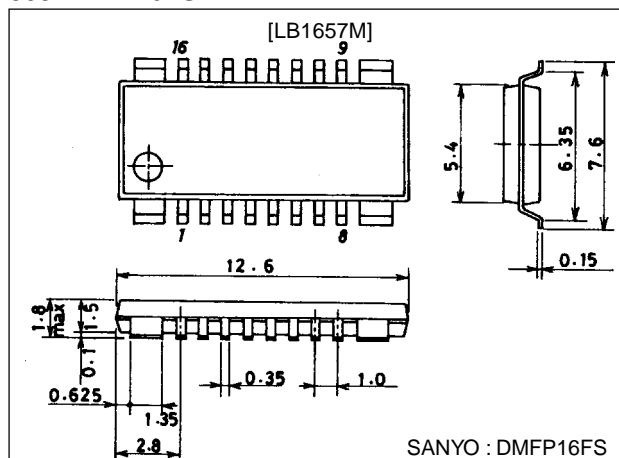
Allowable Operating Conditions at Ta = 25°C

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 _S		10.2	12.0	13.8	V

Package Dimensions

unit:mm

3097-MFP16FS



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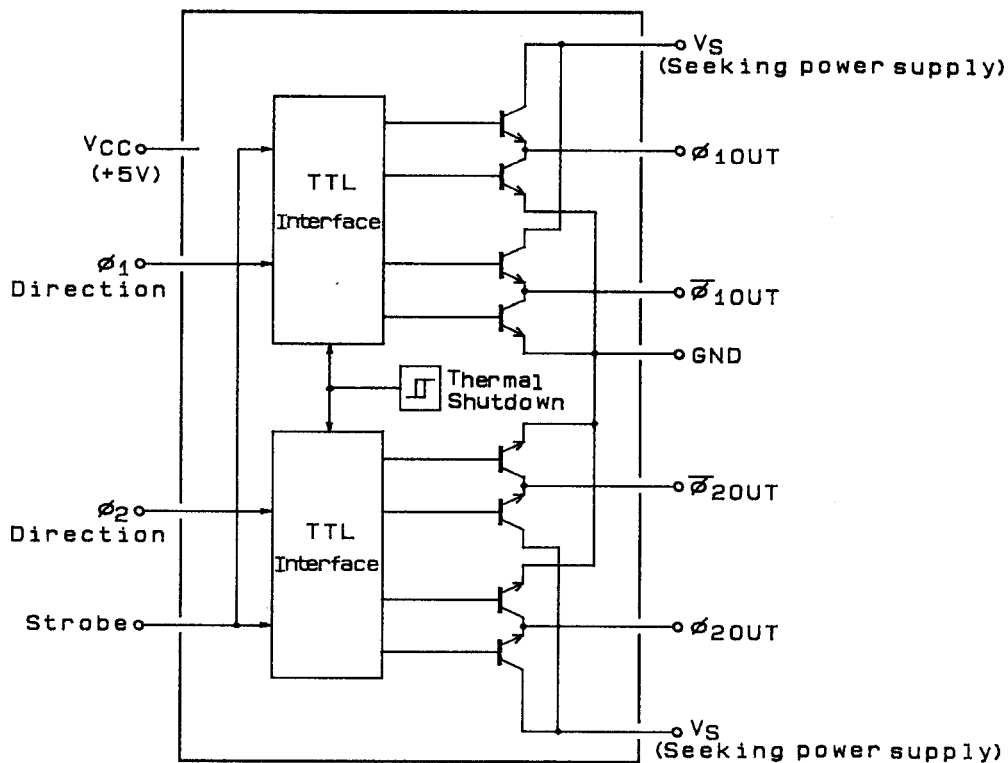
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC}=5\text{V}$, $V_{S2}=5\text{V}$, $V_{S1}=12\text{V}$

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}	$V_I=2\text{V}$		6	10	μA
		$V_I=5\text{V}$		0.55	1.0	mA
Current drain	I_{CL}	$STB=0.8\text{V}, V_{CC}$		25	33	mA
		$STB=0.8\text{V}, V_S$, Note1			1	mA
		$STB=2.0\text{V}, V_{CC}$		25	33	mA
		$STB=2.0\text{V}, V_S$, Note1		5	10	mA
Output transistor voltage	V_{CER}	$I_C=10\text{mA}$	18			V
V_{S1} saturation voltage	V_{sat}	$SB=0.8\text{V}, I_O=330\text{mA}$, Note2		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 4 and 13.

2. Measure sum of saturation voltages at upper and lower level.

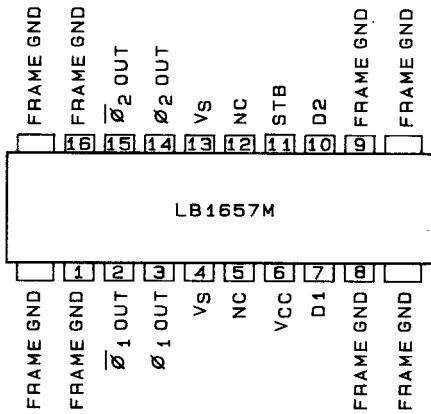
Equivalent Circuit Block Diagram



The ϕ_1, ϕ_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 0V supply and 12V supply.

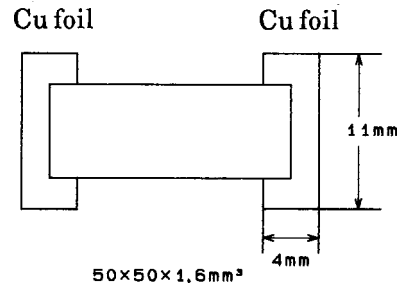
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Pin Assignment

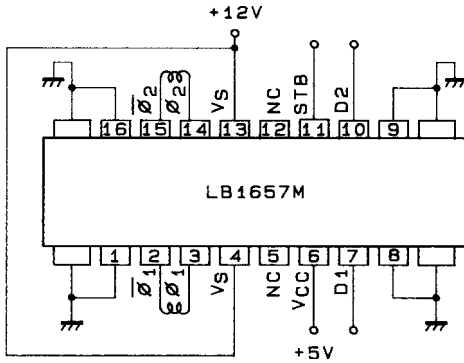


(Top view)

Specified board

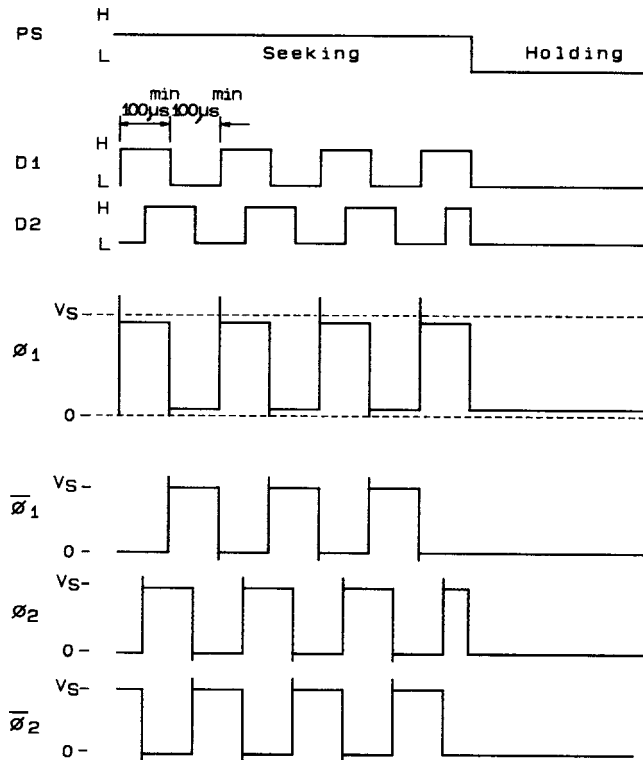


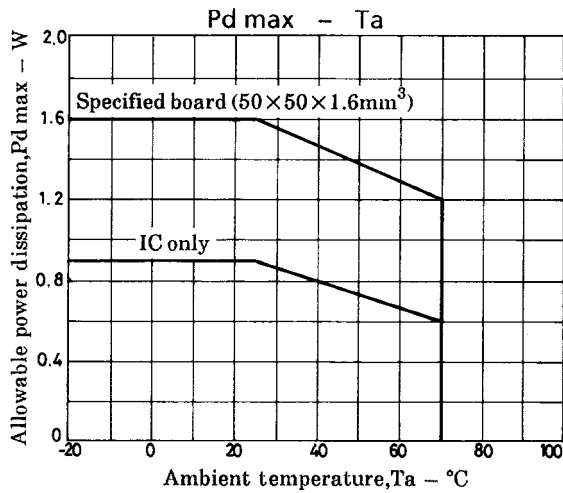
Sample Application Circuit : 2-phase bipolar stepping motor driver.



Note : Keep the terminal to short 4 and 13

Timing Chart





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