



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

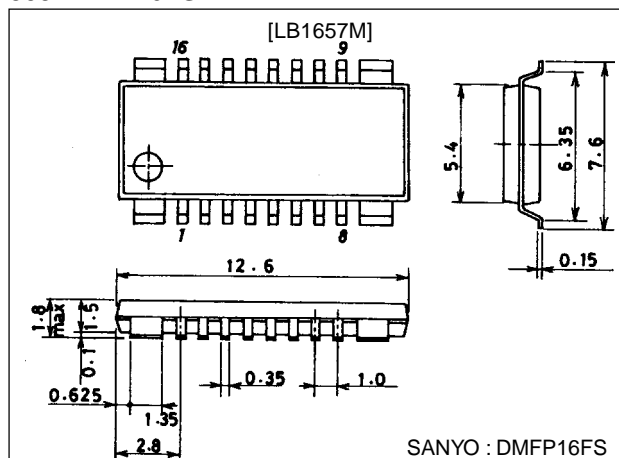
Allowable Operating Conditions at Ta = 25°C

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



■ Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.

■ SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

SANYO Electric Co., Ltd. Semiconductor Business Headquarters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

82098HA (KT)/5231TS (KOTO)/5310TA (KOTO) No.3664-1/4

LB1657M

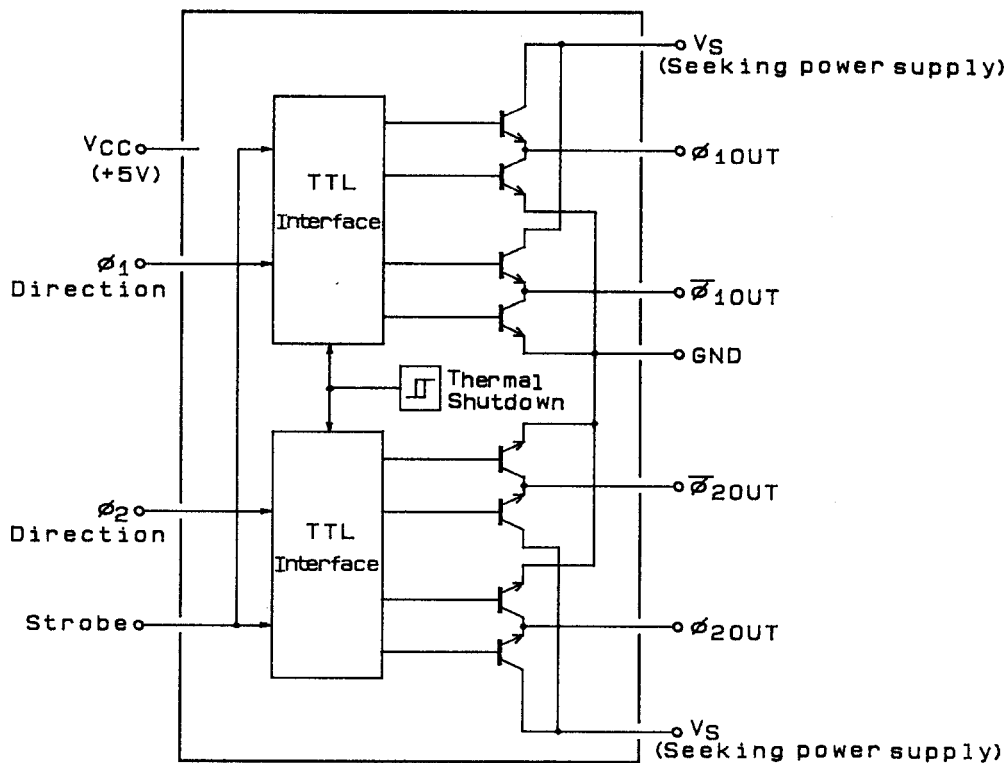
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC}=5\text{V}$, $V_{S2}=5\text{V}$, $V_{S1}=12\text{V}$

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
	I_{SL}	$STB=0.8\text{V}, V_S$, Note1			1	mA
	I_{CH}	$STB=2.0\text{V}, V_{CC}$		25	33	mA
	I_{SH}	$STB=2.0\text{V}, V_S$, 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.

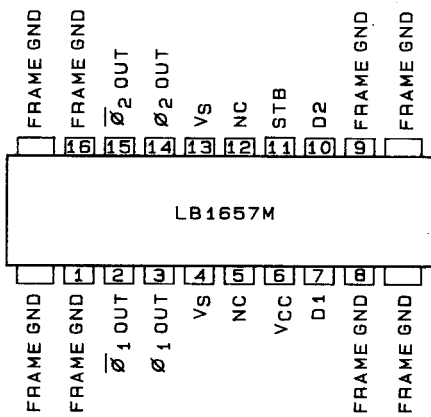
Equivalent Circuit Block Diagram



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.

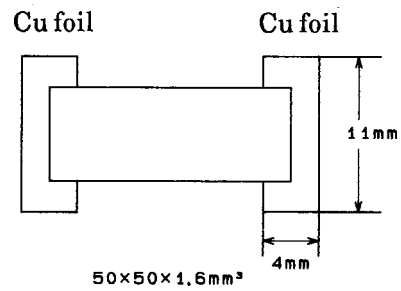
LB1657M

Pin Assignment

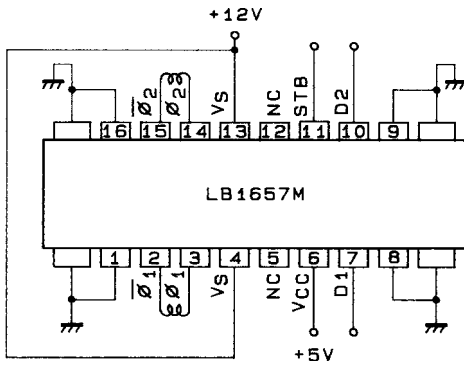


(Top view)

Specified board

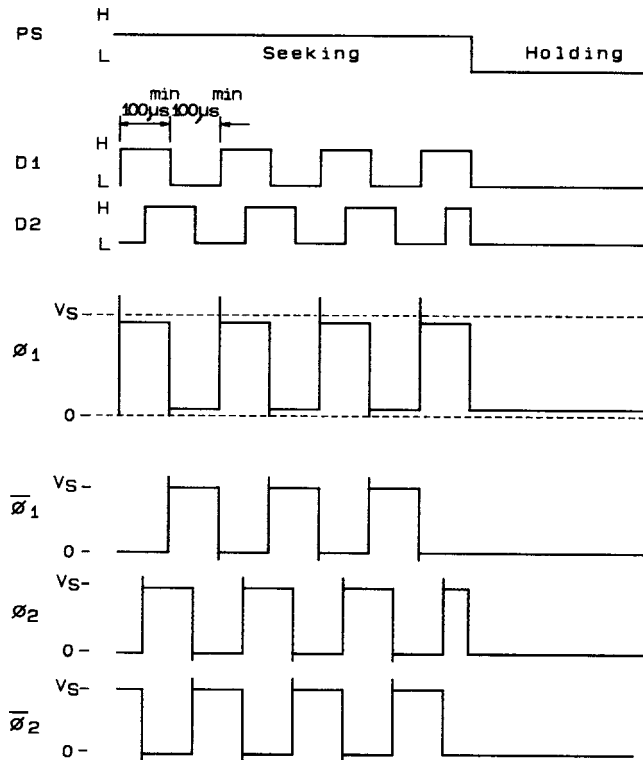


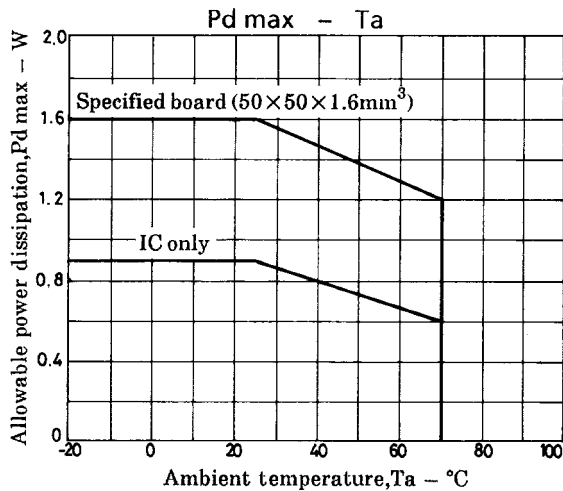
Sample Application Circuit : 2-phase bipolar stepping motor driver.



Note : Keep the terminal to short 4 and 13

Timing Chart





- Specifications of any and all SANYO products described or contained herein stipulate the performance, characteristics, and functions of the described products in the independent state, and are not guarantees of the performance, characteristics, and functions of the described products as mounted in the customer's products or equipment. To verify symptoms and states that cannot be evaluated in an independent device, the customer should always evaluate and test devices mounted in the customer's products or equipment.
- SANYO Electric Co., Ltd. strives to supply high-quality high-reliability products. However, any and all semiconductor products fail with some probability. It is possible that these probabilistic failures could give rise to accidents or events that could endanger human lives, that could give rise to smoke or fire, or that could cause damage to other property. When designing equipment, adopt safety measures so that these kinds of accidents or events cannot occur. Such measures include but are not limited to protective circuits and error prevention circuits for safe design, redundant design, and structural design.
- In the event that any and all SANYO products described or contained herein fall under strategic products (including services) controlled under the Foreign Exchange and Foreign Trade Control Law of Japan, such products must not be exported without obtaining export license from the Ministry of International Trade and Industry in accordance with the above law.
- No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or any information storage or retrieval system, or otherwise, without the prior written permission of SANYO Electric Co., Ltd.
- Any and all information described or contained herein are subject to change without notice due to product/technology improvement, etc. When designing equipment, refer to the "Delivery Specification" for the SANYO product that you intend to use.
- Information (including circuit diagrams and circuit parameters) herein is for example only ; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of August, 1998. Specifications and information herein are subject to change without notice.