Ordering number: EN 3321

Monolithic Digital IC

No.3321

LB1656M

2-Phase Stepping Motor Driver

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 dissipation
- Direct controllable from MPU due to low input current
- Input level : TTL, LSTTL, 5V CMOS compatible
- On-chip thermal shutdown (TSD) circuit

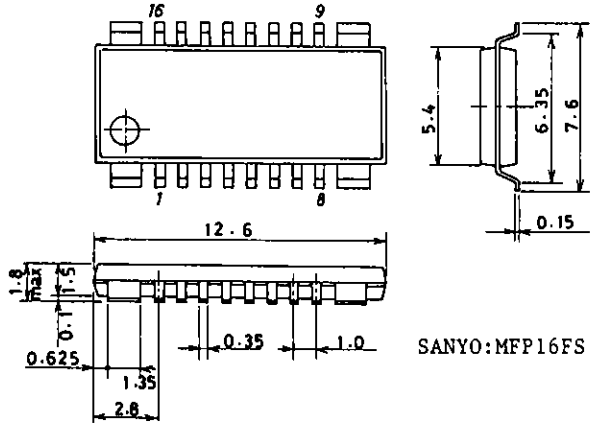
Absolute Maximum Ratings at Ta = 25°C

				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 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

		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

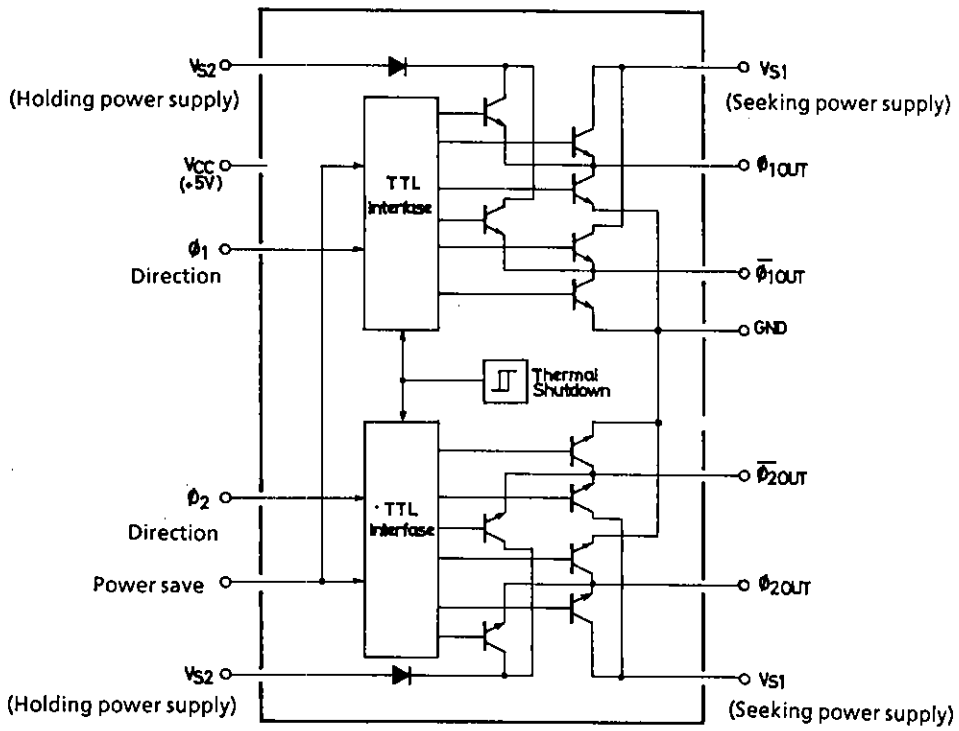
Package Dimensions 3097-M16FSIC
(unit: mm)



Electrical Characteristics at Ta=25°C, V_{CC}=5V, V_{S2}=5V, V_{S1}=12V				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=0.8V		−10		+10	μA
Input 'H'-Level Current	I_{IH}	V_I=2V			2	10	μA
		V_I=5V			0.3	1.0	mA
Current Dissipation	I_{CC}	P_S=0.8V	V_{CC}		25	33	mA
		P_S=0.8V	V_{S1}, Note 1		6	10	mA
		P_S=0.8V	V_{S2}, Note 2			0.1	mA
		P_S=2V	V_{CC}		25	33	mA
		P_S=2V	V_{S1}, Note 1		1	2	mA
		P_S=2V	V_{S2}, Note 2		2.5	4	mA
Output Transistor Voltage	$V_{(BR)CER}$	I_C=10mA		18			V
V_{S1} Saturation Voltage	$V_{CE(sat)1}$	P_S=0.8V, I_O=330mA, Note 3			1.5	2.0	V
V_{S2} Saturation Voltage	$V_{CE(sat)2}$	P_S=2.0V, I_O=130mA, Note 3			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

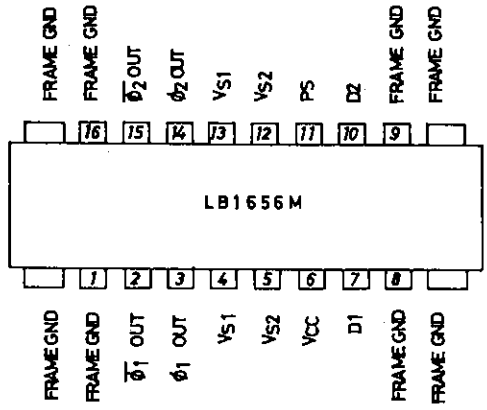
Note) 1. Measure sum of currents at pins 4 and 13.
2. Measure sum of currents at pins 5 and 12.
3. Measure sum of saturation voltages at upper and lower level.

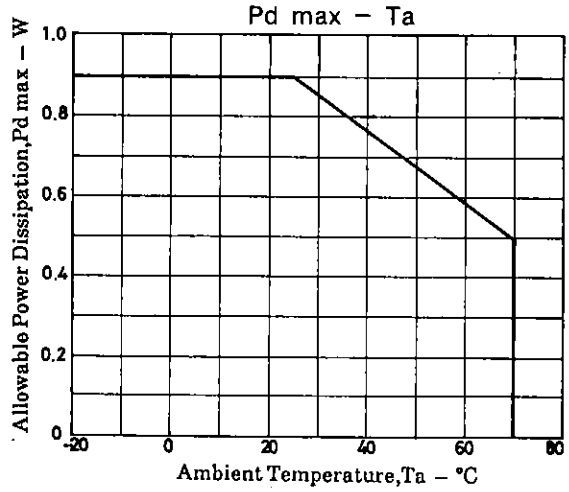
Equivalent Circuit Block Diagram



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.

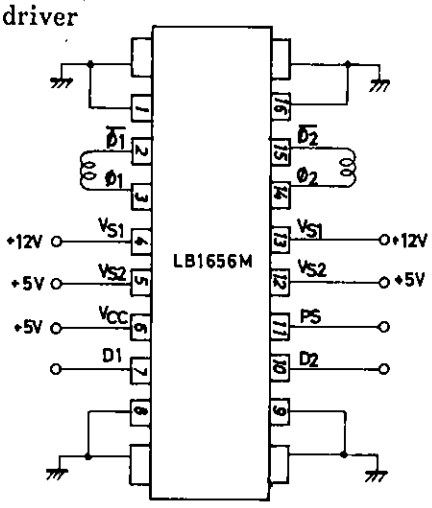
Pin Assignment



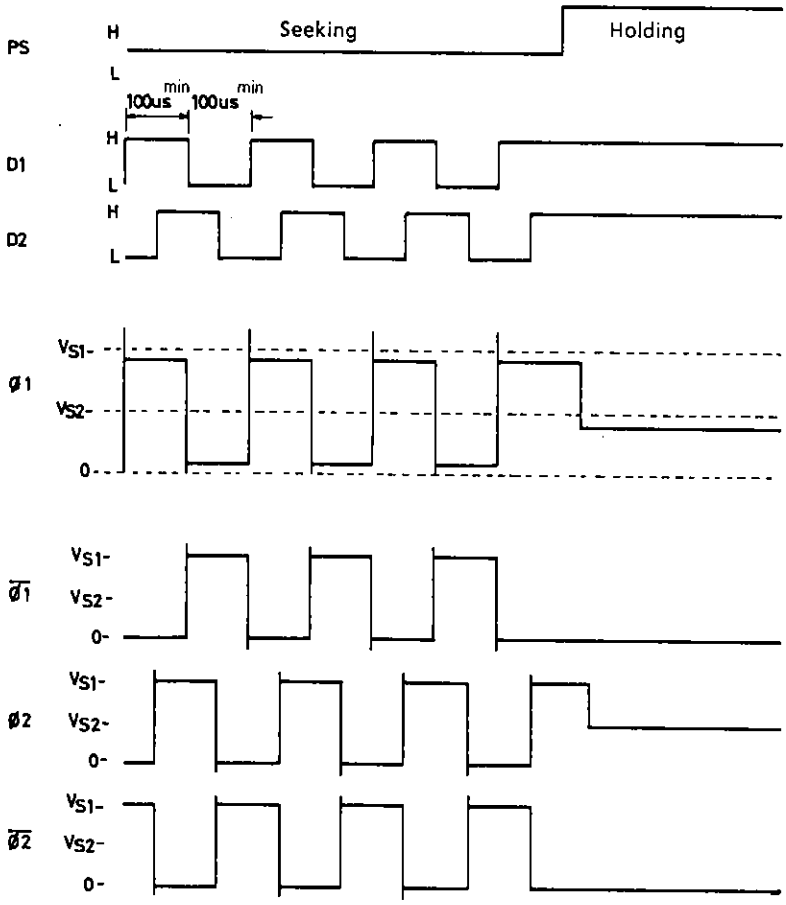


Sample Application Circuit

2-phase bipolar stepping motor driver



Timing Chart



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