Ordering number : EN6505

SANYO Semiconductors
DATA SHEET

Monolithic Digital IC

# LB1933M — Low-saturation Forward/Reverse Motor Drive

## Overview

The 1933M is a forward/reverse motor driver that supports low voltage drive and features low-saturation outputs in a miniature package.

## Features

- Low saturation output: $V_O$sat=0.3V typ ($I_O$=300mA)

## Specifications

### Absolute Maximum Ratings at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Maximum supply voltage | $V_{CC}$ max | | -0.3 to +10.5 | V |
| | $V_S$ max | | -0.3 to +10.5 | V |
| Maximum Output applied voltage | $V_{OUT}$ | | $V_S$+$V_{SF}$ | V |
| Maximum input applied voltage | $V_{IN}$ | | -0.3 to +10.0 | V |
| Maximum output current | $I_{GND}$ | Per channel | 1.0 | A |
| Allowable power dissipation | Pd max1 | Independent IC | 550 | mW |
| | Pd max2 | * Mounted on a specified board | 800 | mW |
| Operating temperature | Topr | | -30 to +75 | °C |
| Storage temperature | Tstg | | -40 to +150 | °C |

Note *: Mounted on a specified board: 30mm×30mm×1.5mm, glass epoxy




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## Allowable Operating Ranges at Ta = 25°C

| Parameter | Symbol | Conditions | Ratings | Unit |
|---|---|---|---|---|
| Power supply voltage range | $V_{CC}$ | | 2.2 to 7.5 | V |
| | $V_S$ | | 1.8 to 7.5 | V |
| Input high-level voltage | $V_{IH}$ | | 1.8 to 7.5 | V |
| Input low-level voltage | $V_{IL}$ | | -0.3 to +0.7 | V |

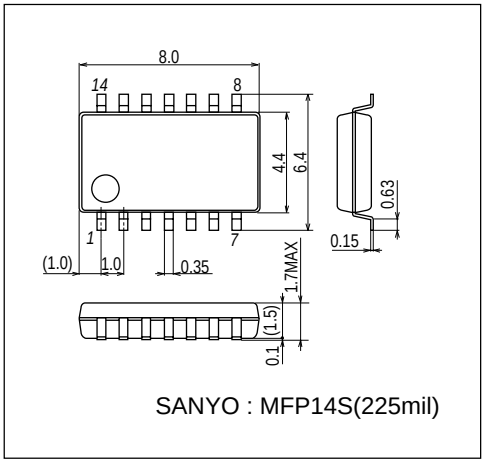
## Electrical Characteristics at Ta = 25°C, $V_S1=V_S2=V_{CC}=3V$

| Parameter | Symbol | Conditions | Ratings | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Power current | $I_{CCO}$ | TOTAL, ENA=0V, $V_{IN}$=0V | | 0.1 | 10 | μA |
| | $I_{CC}$ | $V_{CC}$, ENA=3V, $V_{IN}$=3V | | 5 | 7 | mA |
| | $I_S$ | $V_S1+V_S2$, ENA=3V, $V_{IN}$=3V | | 16 | 25 | mA |
| Output saturation voltage | $V_O$sat1 | ENA=3V, $V_{IN}$=3V or 0V, $I_{OUT}$=300mA | | 0.30 | 0.45 | V |
| | $V_O$sat2 | ENA=2.2V, $V_{IN}$=2.2V or 0V, $V_{CC}$=2.2V, $V_S$=2.0V, $I_{OUT}$=150mA | | | 0.20 | V |
| Input current | $I_{IN}$ | $V_{IN}$=3V | | | 80 | μA |
| | $I_{ENA}$ | $V_{ENA}$=3V | | | 80 | μA |
| **Spark killer diode** | | | | | | |
| Reverse current | $I_S$ (leak) | $V_{CC}=V_S$=7V | | | 30 | μA |
| Forward voltage | $V_{SF}$ | $I_{OUT}$=400mA | | | 1.7 | V |

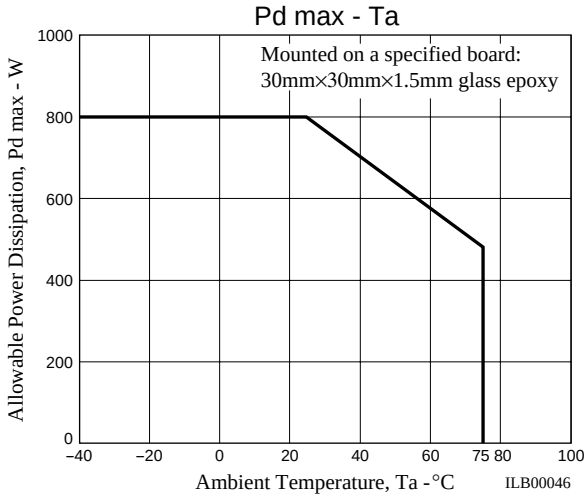
## Package Dimensions

unit : mm (typ)

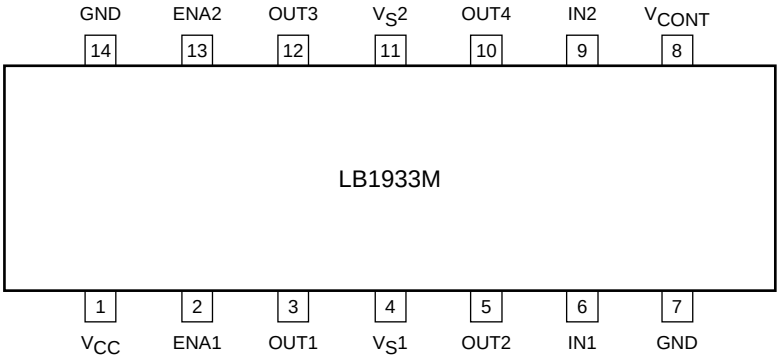
3111A




SANYO : MFP14S(225mil)



## Pin Assignment




Top view

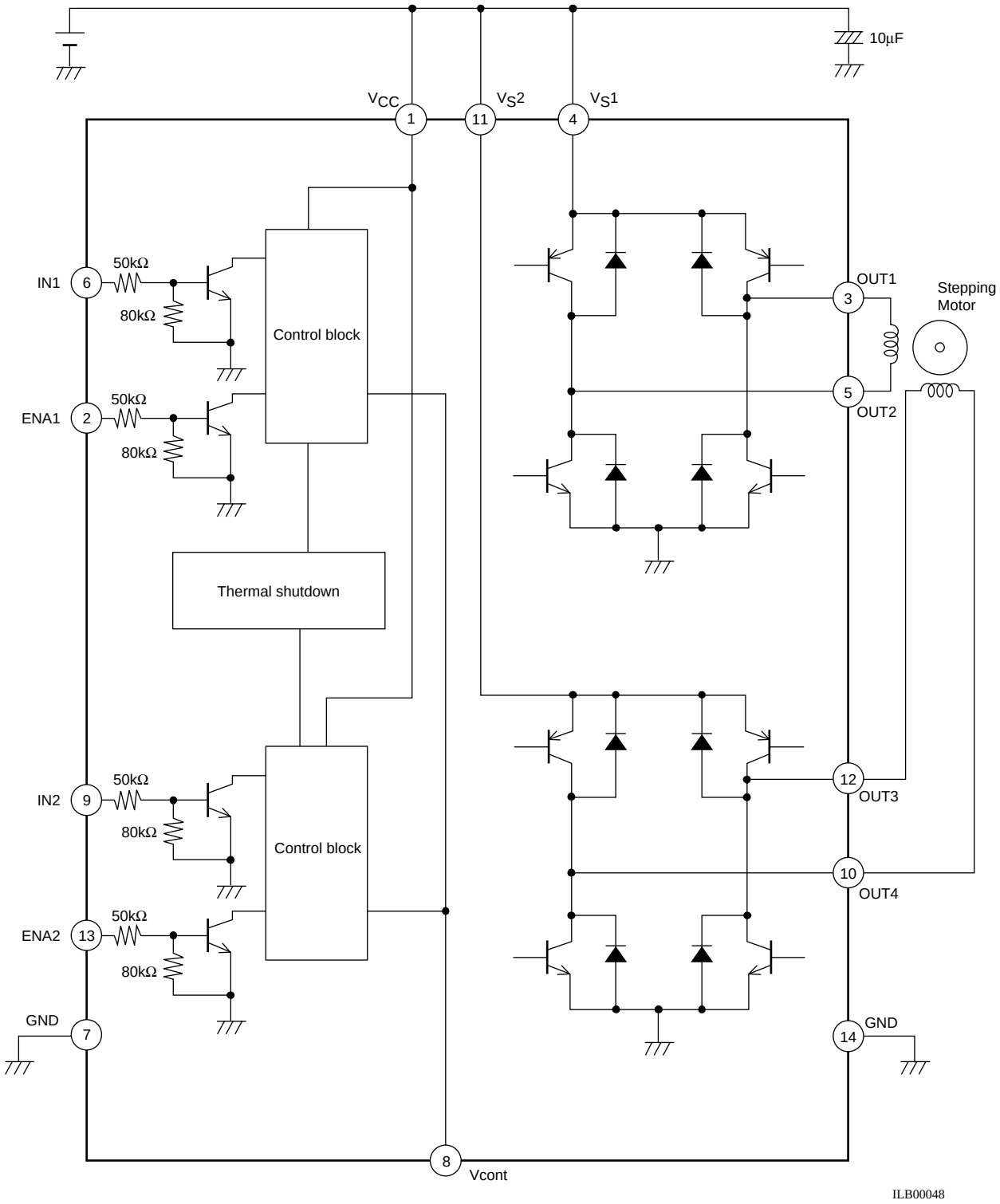
Note: Connect both ground pins.

ILB00047

## Truth Table

| IN 1/2 | ENA 1/2 | OUT 1/3 | OUT 2/4 | Mode |
|---|---|---|---|---|
| L | H | H | L | Forward |
| H | H | L | H | Reverse |
| L | L | OFF | OFF | Standby |
| H | L | OFF | OFF | Standby |

## Equivalent Circuit Block Diagram




* There are no constraints on the relationship between the applied voltage to $V_{CC}$, $V_S1$, $V_S2$, ENA1, ENA2, IN1, and IN2 within the absolute maximum ratings (For example, this IC can be used at $V_{CC}$=3V, $V_S1$=$V_S2$=2V, and ENA=IN=5V)