



SANYO Semiconductors

# DATA SHEET

An ON Semiconductor Company

## LB1933M — Monolithic Digital IC 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:  $V_{O\text{sat}}=0.3\text{V}$  typ ( $I_O=300\text{mA}$ )

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC\text{ max}}$		-0.3 to +10.5	V
	$V_S\text{ max}$		-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	$P_d\text{ max1}$	Independent IC	550	mW
	$P_d\text{ max2}$	* Mounted on a specified board	800	mW
Operating temperature	$T_{opr}$		-30 to +75	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-40 to +150	$^\circ\text{C}$

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

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**SANYO Semiconductor Co., Ltd.**

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# LB1933M

## Allowable Operating Ranges at $T_a = 25^\circ\text{C}$

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

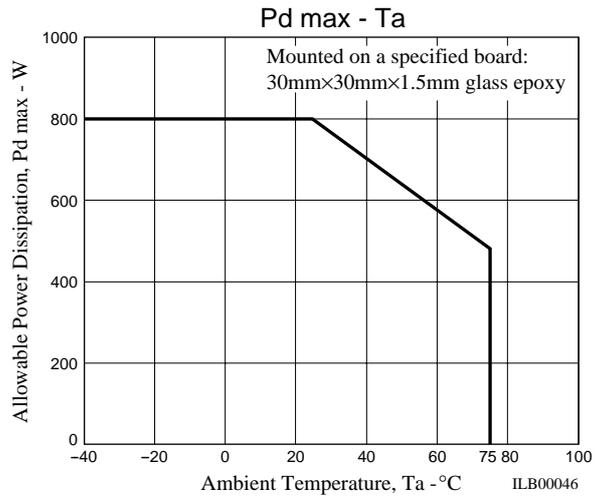
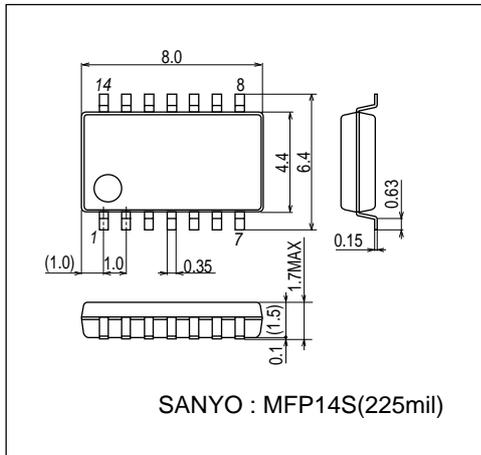
## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{S1}=V_{S2}=V_{CC}=3\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Power current	$I_{CCO}$	TOTAL, ENA=0V, $V_{IN}=0\text{V}$		0.1	10	$\mu\text{A}$
	$I_{CC}$	$V_{CC}$ , ENA=3V, $V_{IN}=3\text{V}$		5	7	mA
	$I_S$	$V_{S1}+V_{S2}$ , ENA=3V, $V_{IN}=3\text{V}$		16	25	mA
Output saturation voltage	$V_{Osat1}$	ENA=3V, $V_{IN}=3\text{V}$ or 0V, $I_{OUT}=300\text{mA}$		0.30	0.45	V
	$V_{Osat2}$	ENA=2.2V, $V_{IN}=2.2\text{V}$ or 0V, $V_{CC}=2.2\text{V}$ , $V_S=2.0\text{V}$ , $I_{OUT}=150\text{mA}$			0.20	V
Input current	$I_{IN}$	$V_{IN}=3\text{V}$			80	$\mu\text{A}$
	$I_{ENA}$	$V_{ENA}=3\text{V}$			80	$\mu\text{A}$
<b>Spark killer diode</b>						
Reverse current	$I_S$ (leak)	$V_{CC}=V_S=7\text{V}$			30	$\mu\text{A}$
Forward voltage	$V_{SF}$	$I_{OUT}=400\text{mA}$			1.7	V

## Package Dimensions

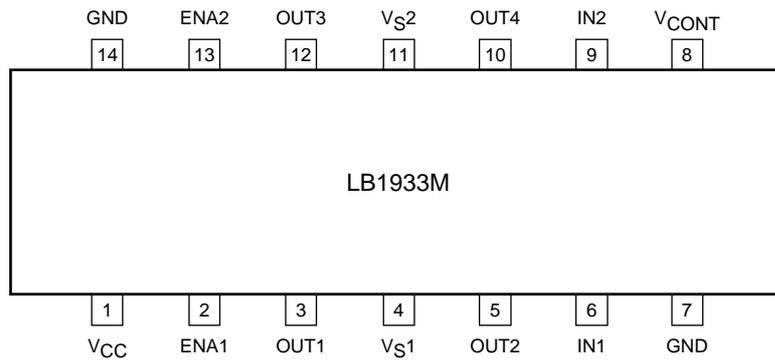
unit : mm (typ)

3111A



# LB1933M

## Pin Assignment



Top view

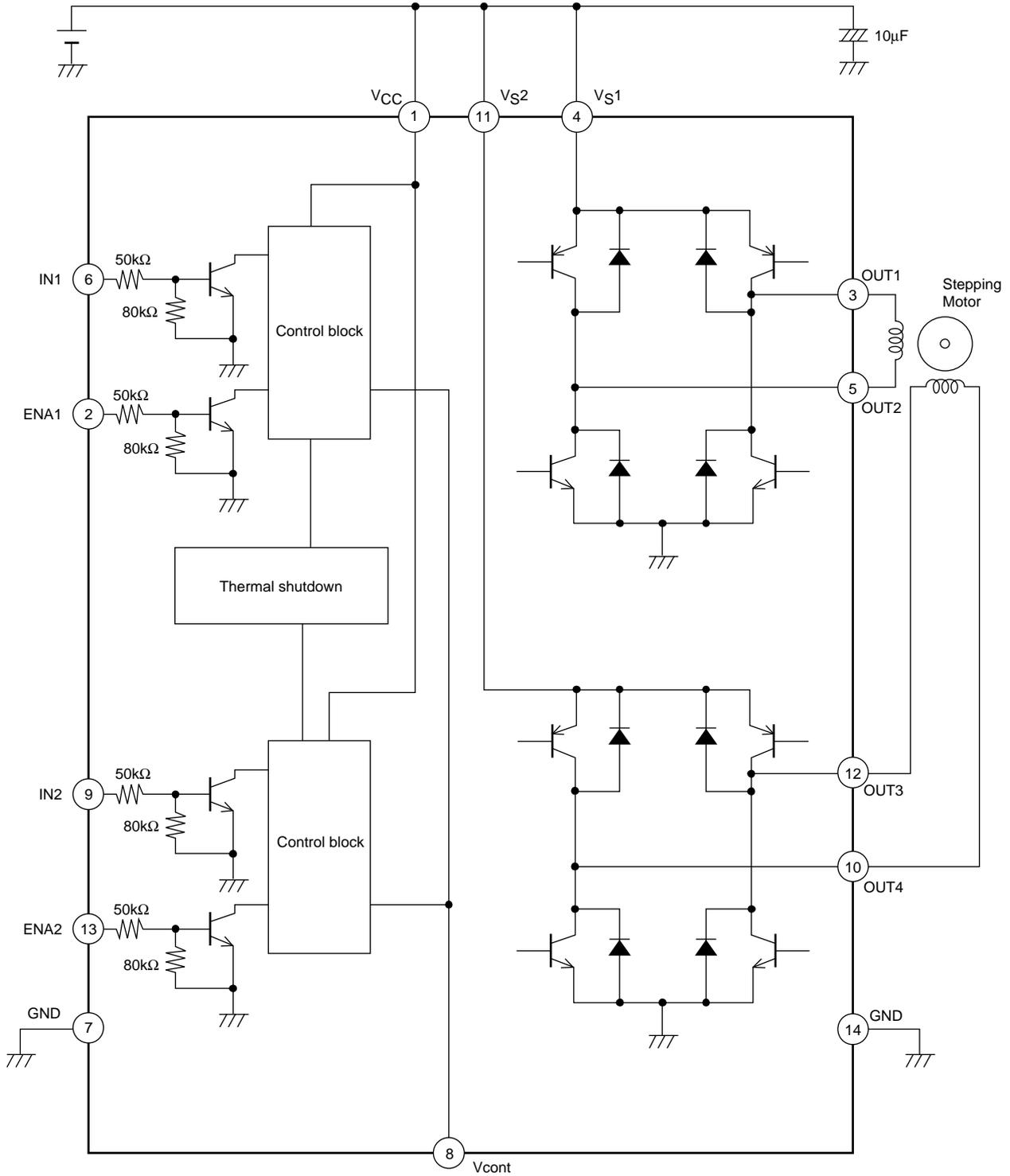
Note: Connect both ground pins.

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## 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



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\* 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  $ENA=IN=5V$ )

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