



ON Semiconductor®

<http://onsemi.com>

# 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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

# 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

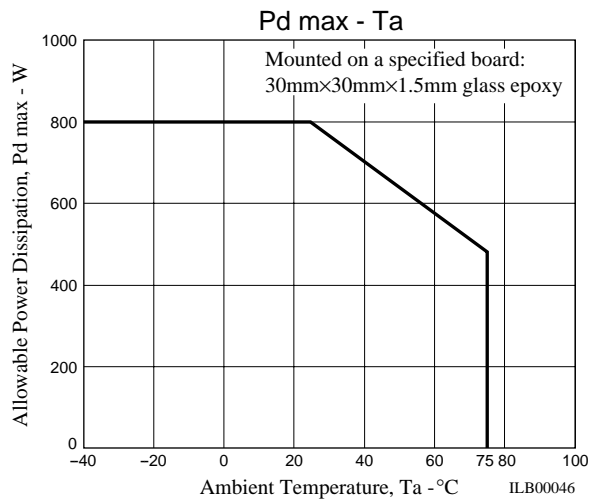
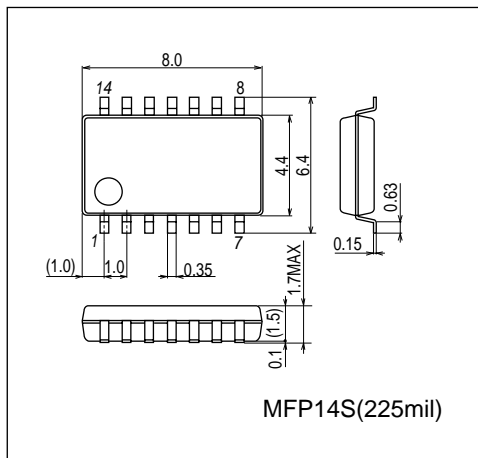
## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{S1}=V_{S2}=V_{CC}=3\text{V}$

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

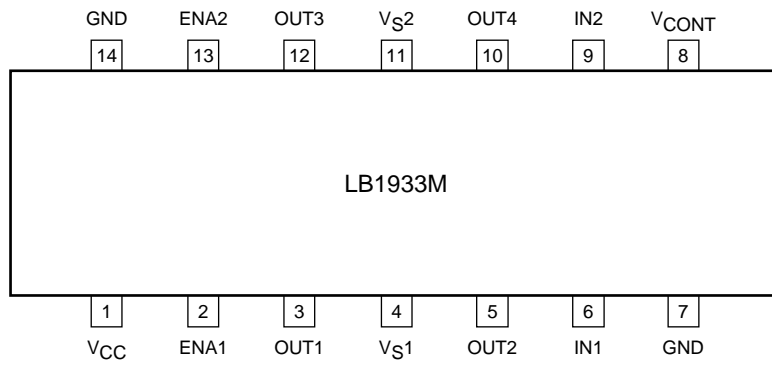
unit : mm (typ)

3111A



# LB1933M

## Pin Assignment



Top view

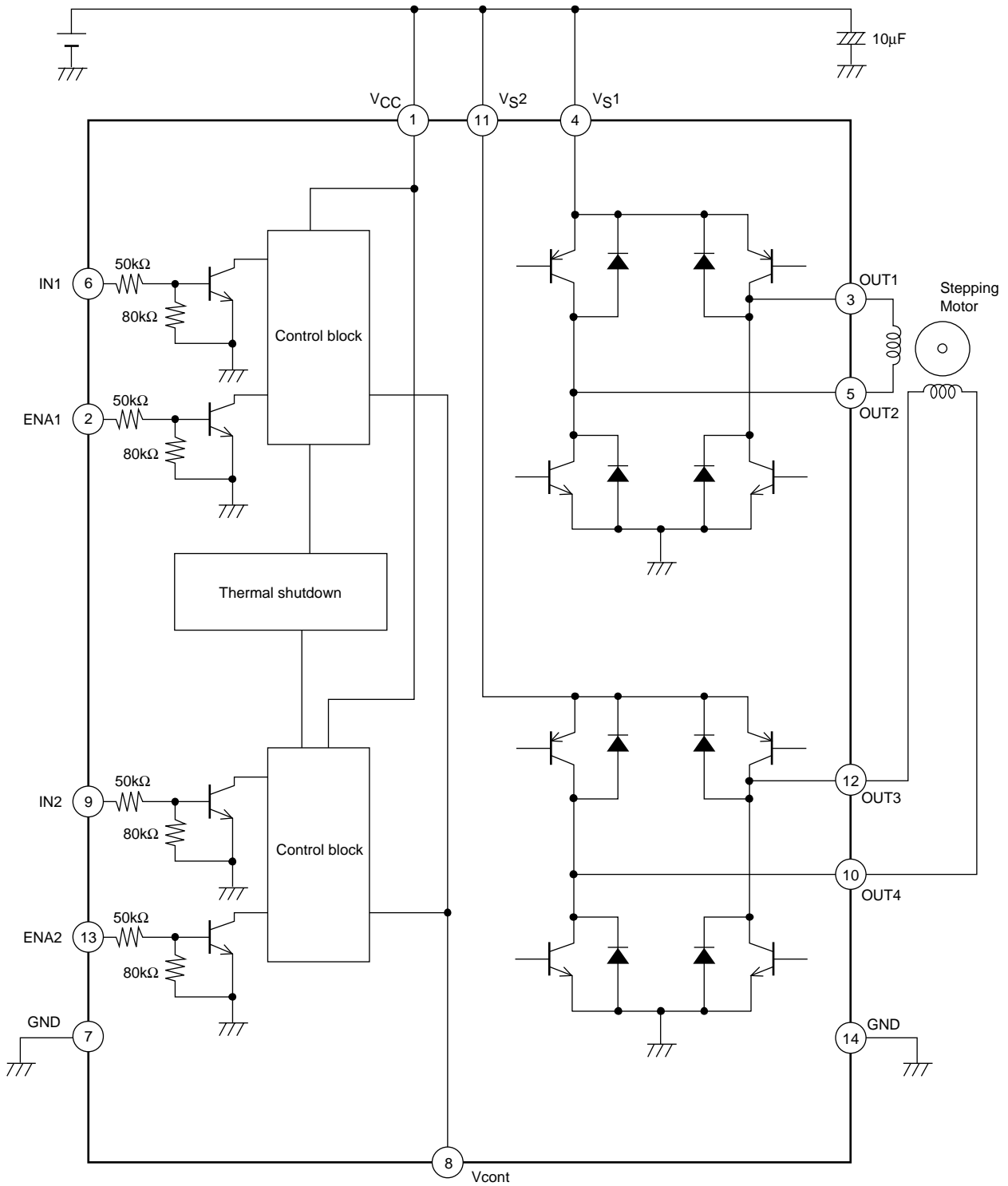
Note: Connect both ground pins.

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





ILB00048

\* 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  $ENA=IN=5V$ )

ON Semiconductor and the ON logo are registered trademarks of Semiconductor Components Industries, LLC (SCILLC). SCILLC owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of SCILLC's product/patent coverage may be accessed at [www.onsemi.com/site/pdf/Patent-Marking.pdf](http://www.onsemi.com/site/pdf/Patent-Marking.pdf). SCILLC reserves the right to make changes without further notice to any products herein. SCILLC makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does SCILLC assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation special, consequential or incidental damages. "Typical" parameters which may be provided in SCILLC data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. SCILLC does not convey any license under its patent rights nor the rights of others. SCILLC products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the SCILLC product could create a situation where personal injury or death may occur. Should Buyer purchase or use SCILLC products for any such unintended or unauthorized application, Buyer shall indemnify and hold SCILLC and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that SCILLC was negligent regarding the design or manufacture of the part. SCILLC is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

-  [View LB1933M-MPB-E on WIN SOURCE](#)
-  [ON Semiconductor](#) Information

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management