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# 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:  $V_{Osat}=0.3V$  typ ( $I_O=300mA$ )

### Specifications

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

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	$P_d\ max1$	Independent IC	550	mW
	$P_d\ max2$	* Mounted on a specified board	800	mW
Operating temperature	$T_{opr}$		-30 to +75	°C
Storage temperature	$T_{stg}$		-40 to +150	°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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage range	V <sub>CC</sub>		2.2 to 7.5	V
	V <sub>S</sub>		1.8 to 7.5	V
Input high-level voltage	V <sub>IH</sub>		1.8 to 7.5	V
Input low-level voltage	V <sub>IL</sub>		-0.3 to +0.7	V

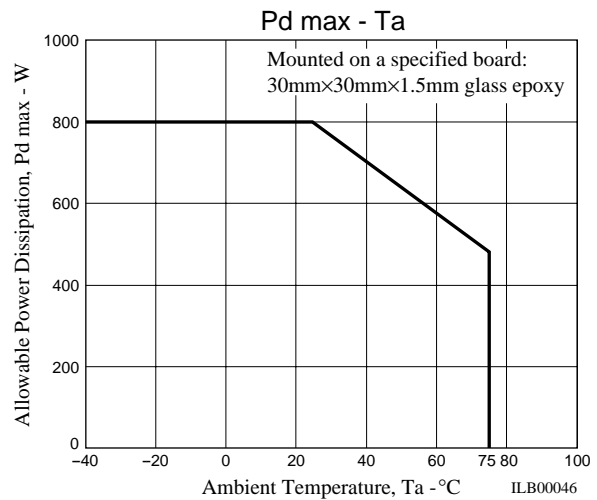
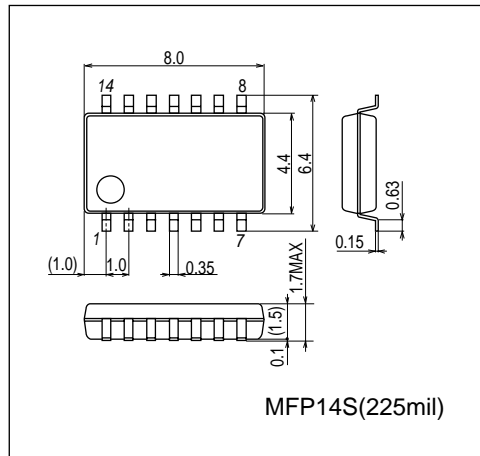
## Electrical Characteristics at Ta = 25°C, V<sub>S1</sub>=V<sub>S2</sub>=V<sub>CC</sub>=3V

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

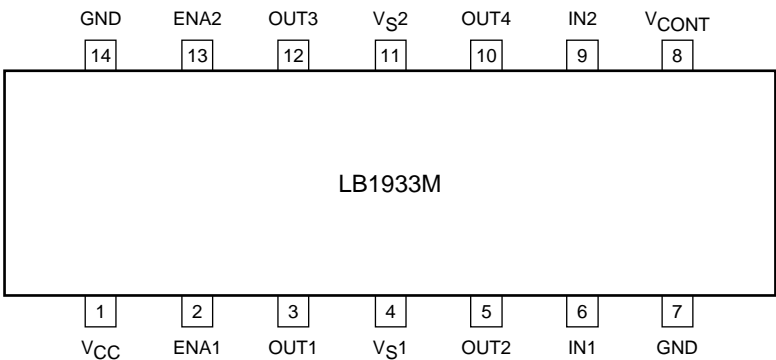
## Package Dimensions

unit : mm (typ)

3111A



Pin Assignment



Note: Connect both ground pins.

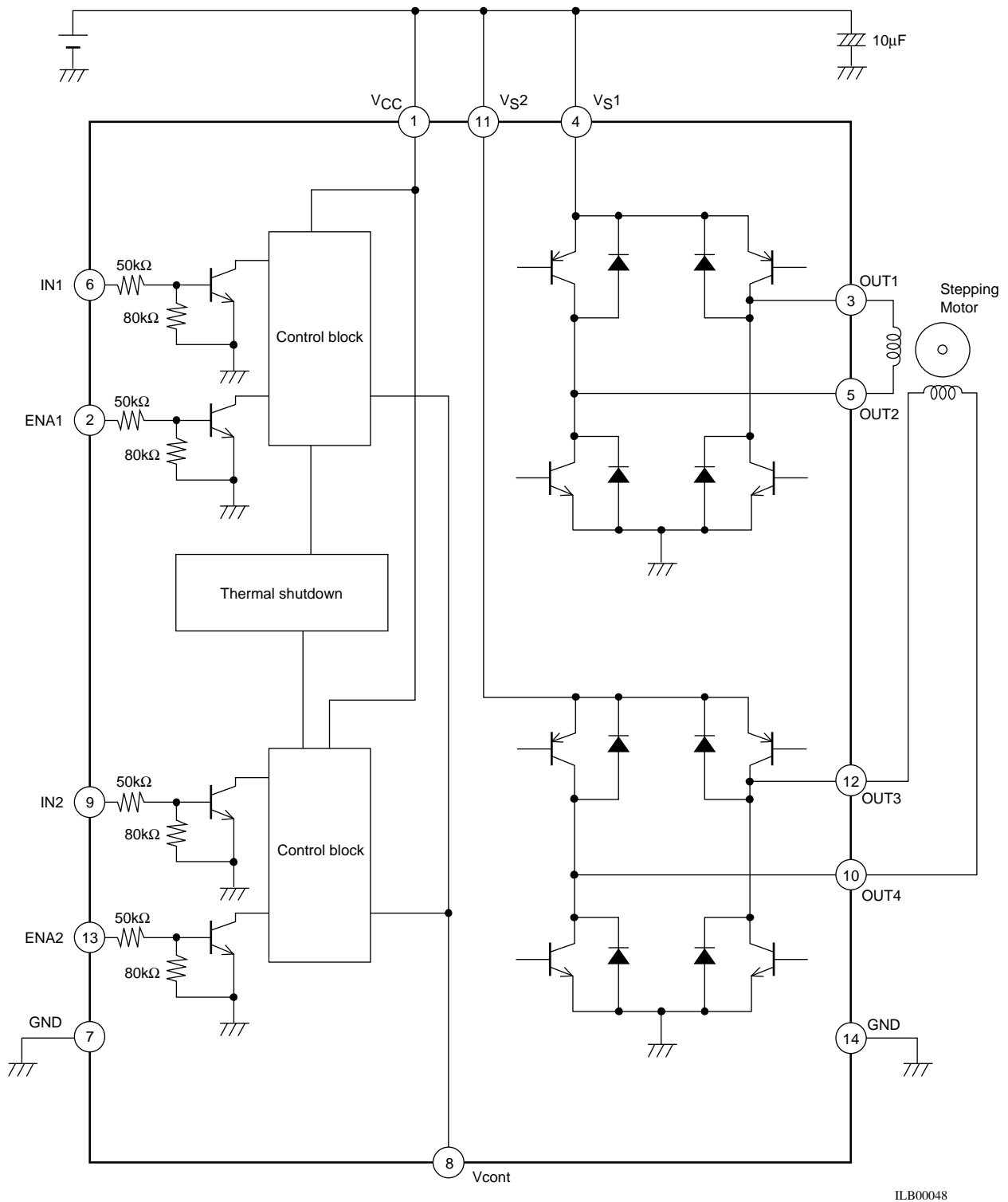
Top view

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  $V_{CC}$ ,  $V_{S1}$ ,  $V_{S2}$ ,  $EN_{A1}$ ,  $EN_{A2}$ ,  $IN_1$ , and  $IN_2$  within the absolute maximum ratings (For example, this IC can be used at  $V_{CC}=3V$ ,  $V_{S1}=V_{S2}=2V$ , and  $EN_{A1}=IN_1=5V$ )

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