



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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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

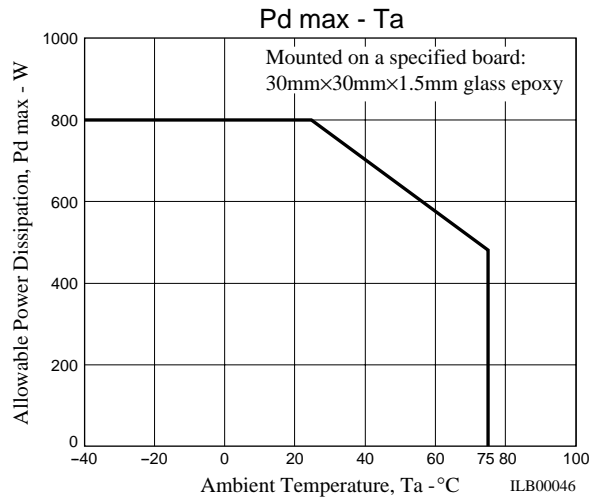
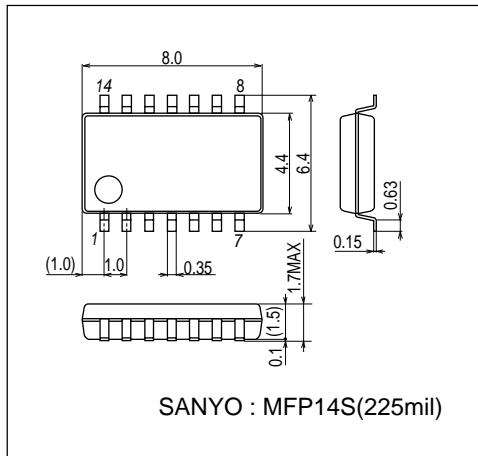
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{S1}=V_{S2}=V_{CC}=3\text{V}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Power current	I_{CCO}	TOTAL, ENA=0V, $V_{IN}=0\text{V}$		0.1	10	μA
	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	μA
	I_{ENA}	$V_{ENA}=3\text{V}$			80	μA
Spark killer diode						
Reverse current	I_S (leak)	$V_{CC}=V_S=7\text{V}$			30	μA
Forward voltage	V_{SF}	$I_{OUT}=400\text{mA}$			1.7	V

Package Dimensions

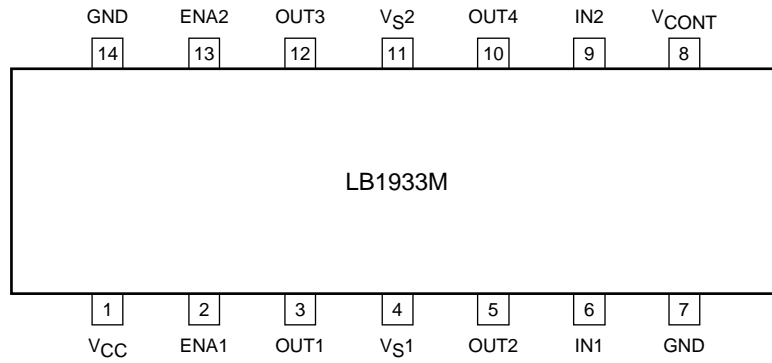
unit : mm (typ)

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LB1933M

Pin Assignment



Top view

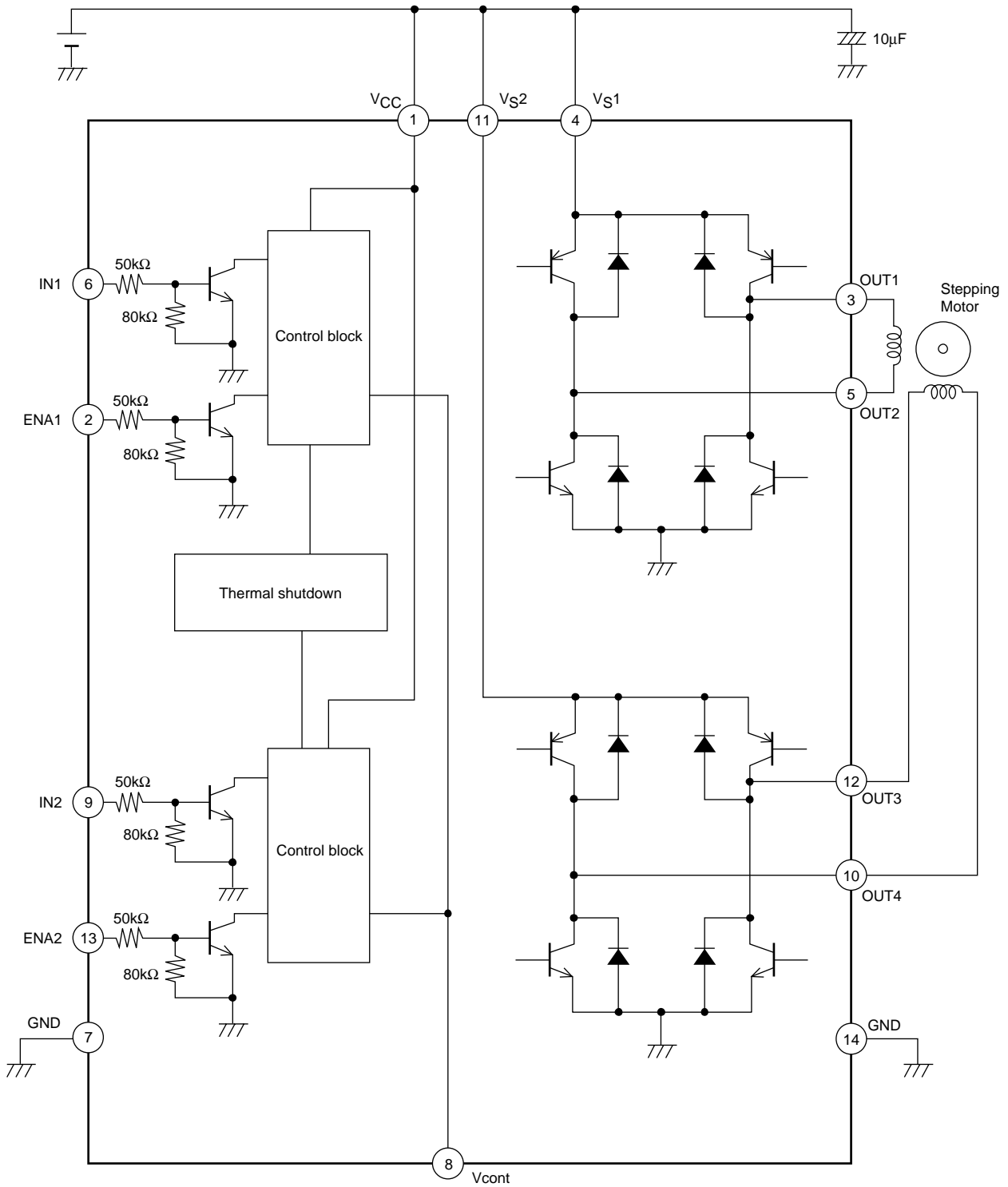
Note: Connect both ground pins.

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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



* 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 $EN_{A1}=EN_{A2}=5V$)

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