



SANYO Semiconductors

DATA SHEET

LB1964M — Monolithic Digital IC For Fan Motor Single-Phase Full-Wave Driver

Overview

The LB1964M is a driver for single-phase bipolar drive fan motors that features compact and low-profile MFP-8 package. Low-saturation output and low-voltage operation make it ideal for applications that require small size and high efficiency, such as notebook computers and CPU cooling fans.

Functions

- Single-phase full-wave drive
- Low-voltage operation ($V_{CC} = 2.0V$ min.)
- Low-saturation output (upper side + lower side saturation voltage: $V_{Osat}(\text{total}) = 0.3V$ typ., $I_O = 100$ mA)
- Ultraminiature package ($5.0 \times 6.4 \times 1.6\text{mm}^3$)
- FG output
- Built-in thermal protection circuit

Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		9	V
Allowable power dissipation	P_d max	With specified substrate *	800	mW
OUT output current	I_{OUT} max		0.5	A
OUT output withstand voltage	V_{OUT} max		9	V
FG output withstand voltage	V_{FG} max		7	V
FG output current	I_{FG} max		5	mA
Operating temperature	T_{opr}		-20 to +90	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

* Specified substrate: $114.3\text{mm} \times 76.1\text{mm} \times 1.5\text{mm}$, paper phenol board.

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LB1964M

Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V _{CC}		2 to 8	V
Hall input common mode input voltage range	V _{ICM}		0.2 to V _{CC} -1	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 3.3V, unless otherwise specified

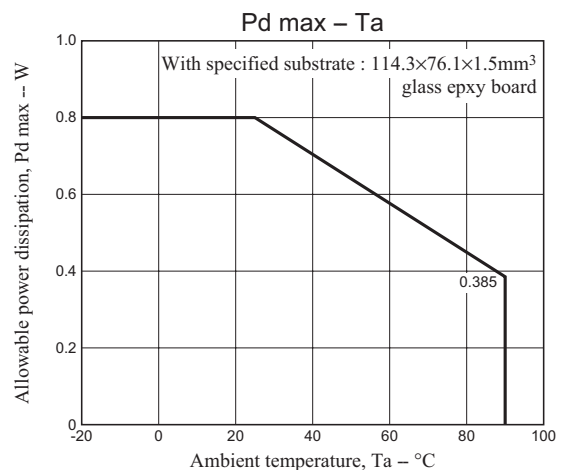
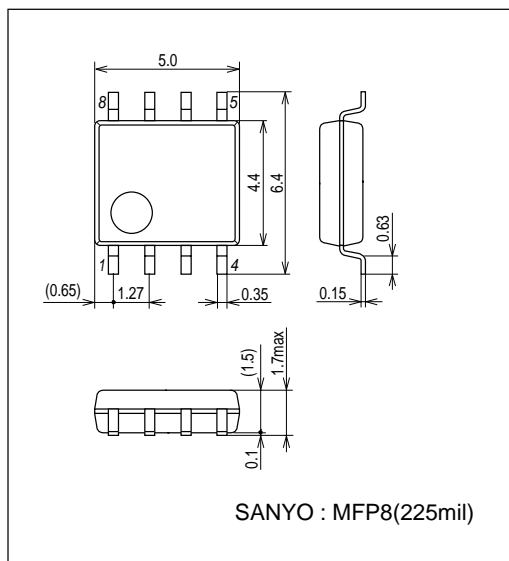
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	ICC			3	4.5	mA
OUT output Low saturation voltage	VOL	I _O = 100mA		0.2	0.3	V
OUT output High saturation voltage	VOH	I _O = 100mA		0.2	0.3	V
Hall bias voltage	VHB	RH = 360Ω	1.17	1.27	1.37	V
Hall input sensitivity	VHN	Zero peak value		1	7	mV
FG output Low voltage	VFG	I _{FG} = 3mA		0.2	0.3	V
FG output leak current	IFGL	V _{FG} = 7V			30	μA
Thermal protection operating temperature	TTSD	Assured design target *	150	180	200	°C

* Assured design target :Target value, not measured individually.

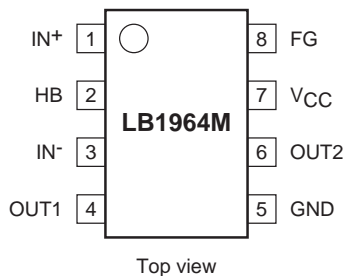
Package Dimensions

unit : mm (typ)

3032D



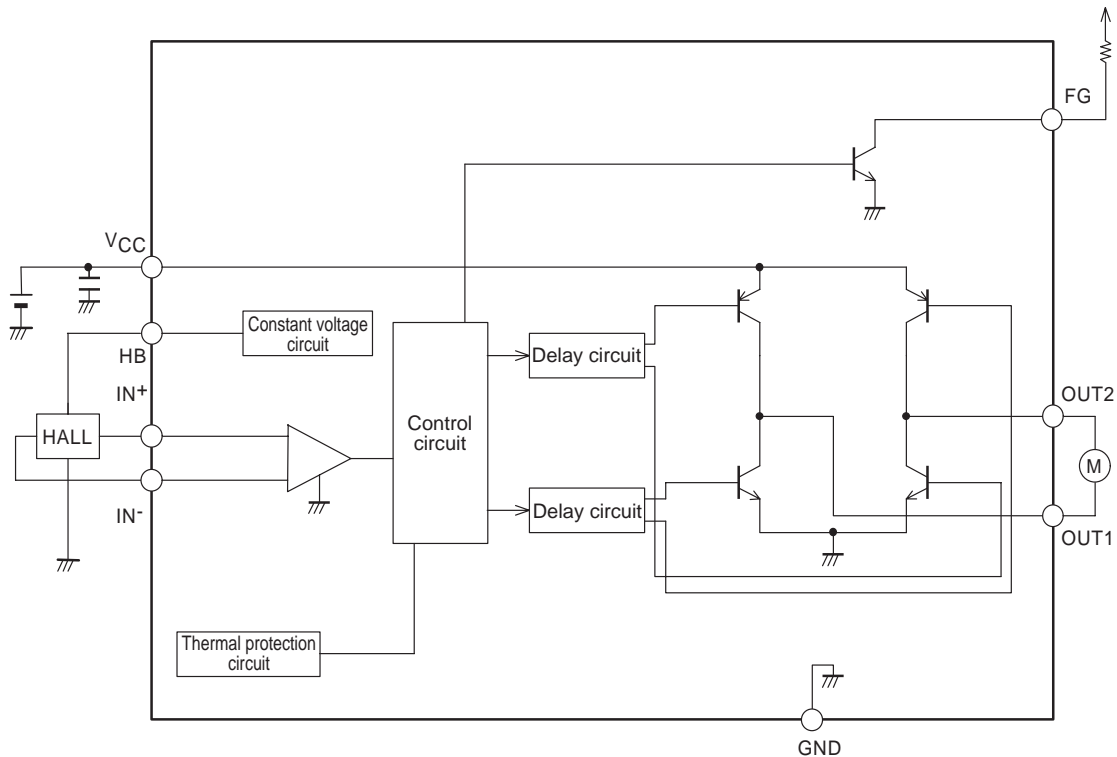
Pin Assignment



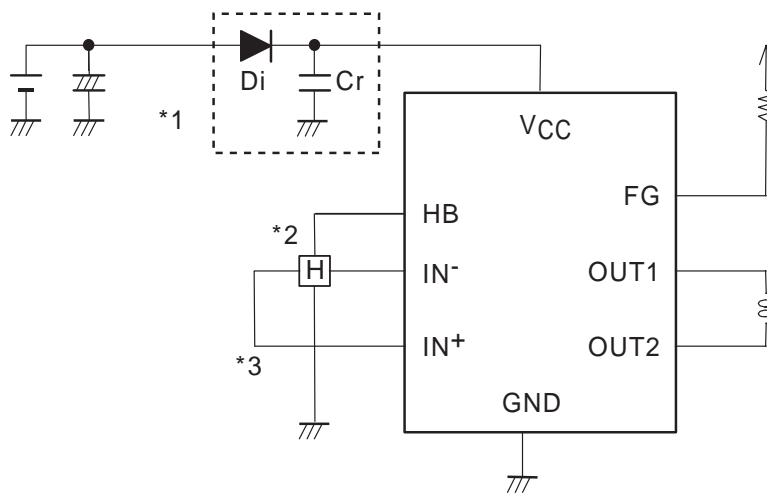
Truth Table

IN ⁻	IN ⁺	OUT1	OUT2	FG	Mode
H	L	H	L	L	Rotating
L	H	L	H	Off	
		Off	Off		In thermal protection

Block Diagram



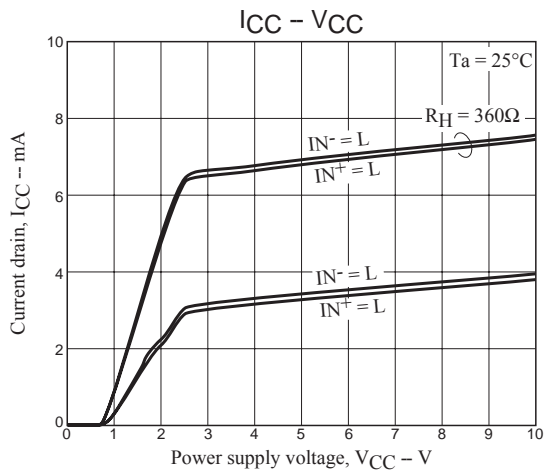
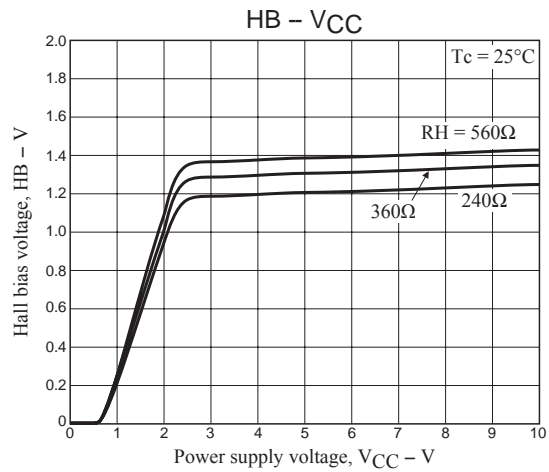
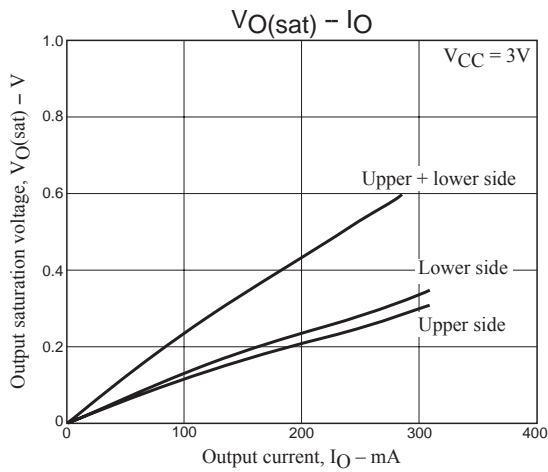
Application Circuit Example



*1 When a diode is used to protect the IC from destruction in case of reverse connection, the capacitor Cr must be inserted to provide a regenerative current route. Similarly, a capacitor is needed in the power supply line, even if no diode is used.

*2 The Hall element is supplied with a constant-voltage bias of approx. 1.27V from the HB pin. This ensures stable output with good temperature characteristics from the Hall element. Because the LB1964M incorporates a Hall amplifier with low offset, it provides coil output with a stable duty.

*3 The Hall amplifier does not have a hysteresis characteristic. The OUT1 and IN⁻ pins are at the same phase, and by arranging the two pins next to each other, chatter during phase switching is prevented. However, if the wiring leading to the IN⁻ pin is long, some noise interference may occur. In such a case, the following steps should be considered:
 (1) Arrange parts layout with priority to proximity of Hall element and IC, to allow short Hall element output wiring.
 (2) Insert a resistor of about 10 to 100 kW between OUT1 and IN⁻ to create a hysteresis characteristic.



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