Ordering number : EN6506

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: $V_O$sat (total) = 0.3V typ., I_O = 100 mA)
- Ultraminiature package (5.0 × 6.4 × 1.6mm^3)
- FG output
- Built-in thermal protection circuit

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		9	V
Allowable power dissipation	Pd 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	Topr		-20 to +90	°C
Storage temperature	Tstg		-55 to +150	°C

* Specified substrate: 114.3mm × 76.1mm × 1.5mm, paper phenol board.

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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

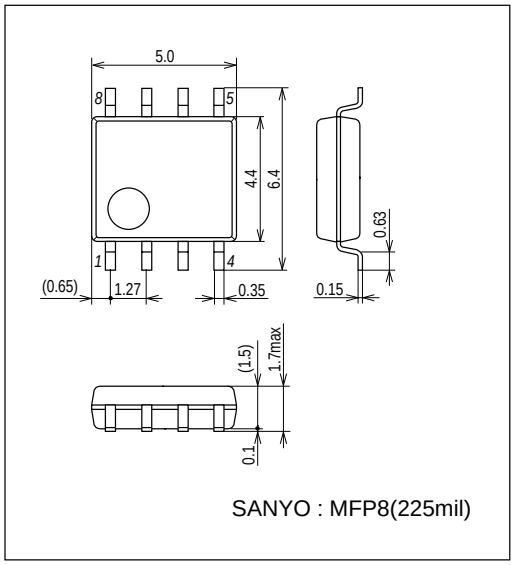
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	ICC			3	4.5	mA
OUT output Low saturation voltage	VOL	I_O = 100mA		0.2	0.3	V
OUT output High saturation voltage	VOH	I_O = 100mA		0.2	0.3	V
Hall bias voltage	VHB	RH = 360Ω	1.17	1.27	1.37	V
Hall input sensitivity	VHN	Zero peak value		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

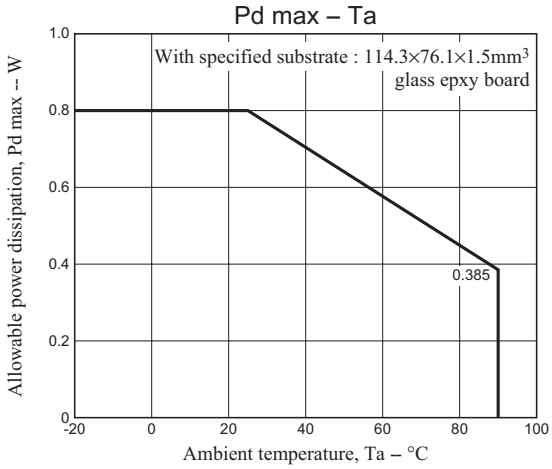
* Assured design target :Target value, not measured individually.

Package Dimensions

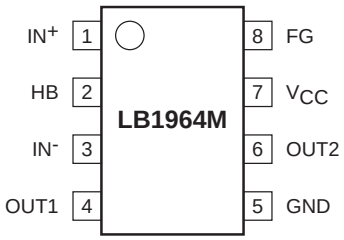
unit : mm (typ)

3032D





Pin Assignment

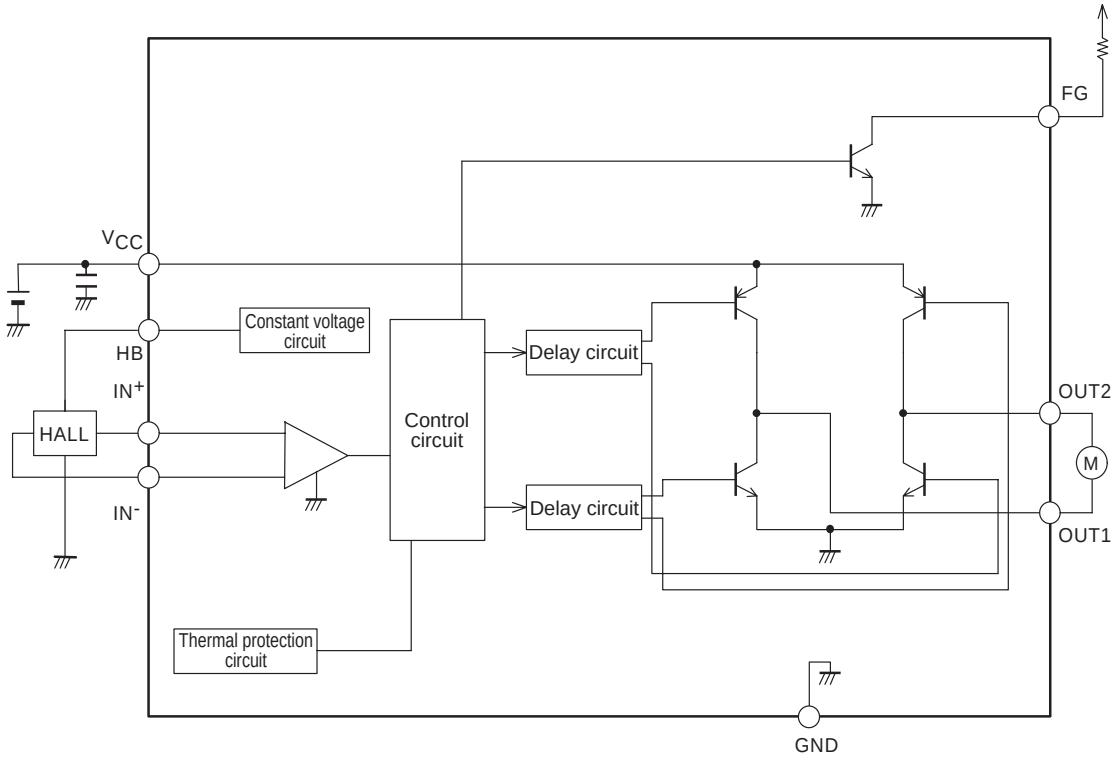


Top view

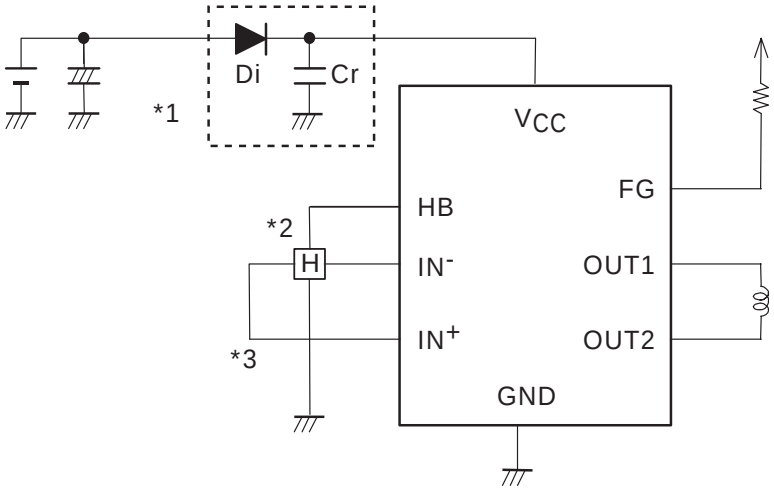
Truth Table

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.