Ordering number : ENN6188A

Monolithic Digital IC

LB1964T

Fan Motor Single-Phase Full-Wave Driver

Overview

The LB1964T is a driver for single-phase bipolar drive fan motors that features compact and low-profile MSOP–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.

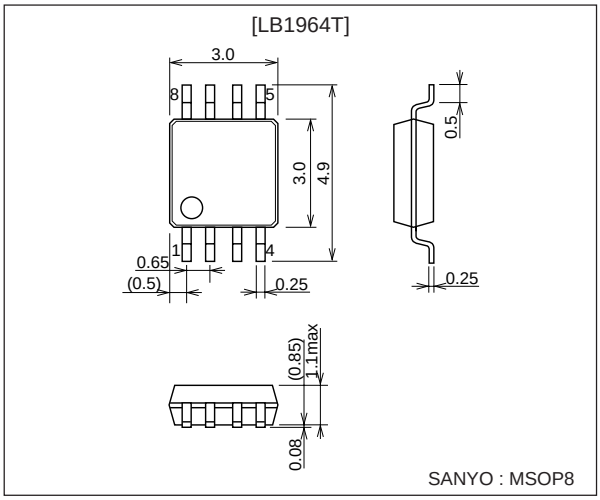
Features

- Single-phase full-wave drive
- Low-voltage operation (V_{CC} = 2.0V min.)
- Low-saturation output (upper side + lower side saturation voltage: Vosat (total) = 0.3V typ., Io = 100 mA)
- Ultraminiature package (3.0 × 4.9 × 0.93 mm^3)
- FG output
- Built-in thermal protection circuit

Package Dimensions

unit: mm

3245-MSOP8



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*	370	mW
OUT output current	I_{OUT} max		0.3	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 +85	˚C
Storage temperature	Tstg		–55 to +150	˚C

* Specified substrate (20.0 × 10.0 × 0.8 mm^3 paper phenol)

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

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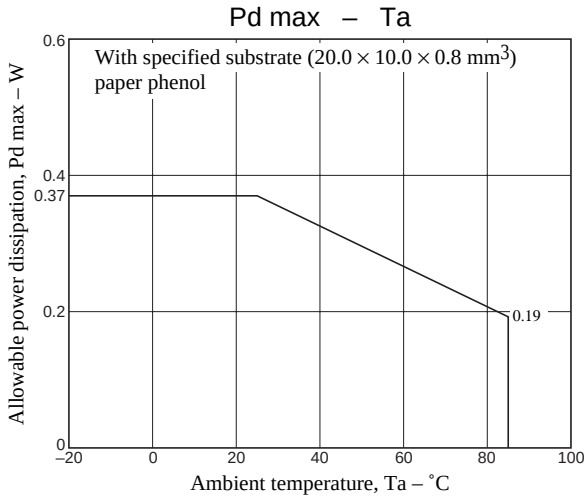
Electrical Characteristics at Ta = 25˚C, V_{CC} = 3.3V, unless otherwise specified

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	Icc			3	4.5	mA
OUT output Low saturation voltage	V_{OL}	IO = 100 mA		0.2	0.3	V
OUT output High saturation voltage	V_{OH}	IO = 100 mA		0.2	0.3	V
Hall bias voltage	V_{HB}	RH = 360Ω	1.17	1.27	1.37	V
Hall input sensitivity	V_{HN}	Zero peak value		1	7	mV
FG output Low voltage	V_{FG}	IFG = 3 mA		0.2	0.3	V
FG output leak current	I_{FGL}	VFG = 7V			30	μA
Thermal protection operating temperature	TTSD	Assured design target*	150	180	200	˚C

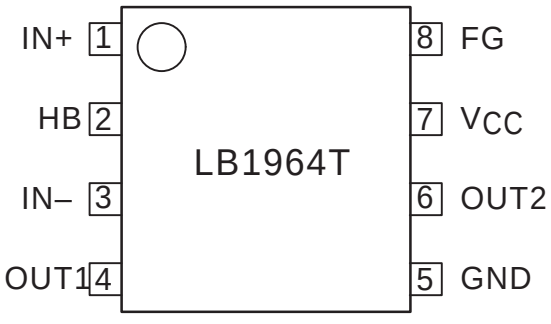
* Assured design target: Target value, not measured individually

Truth Table

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

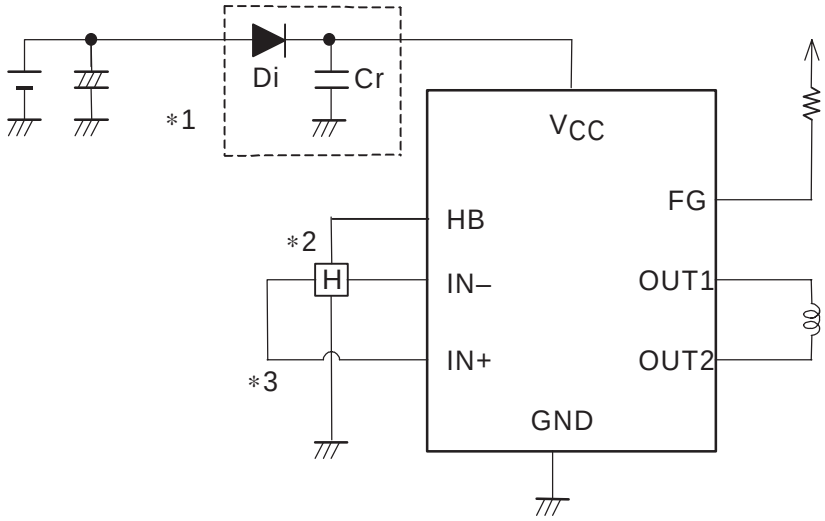


Pin Assignment



Top view

Sample Application Circuit



*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 LB1964T 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 kΩ between OUT1 and IN– to create a hysteresis characteristic.

Block Diagram