



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.

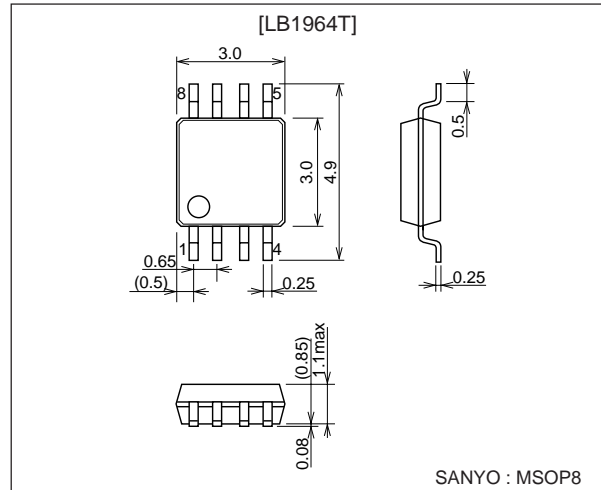
Features

- Single-phase full-wave drive
- Low-voltage operation ($V_{CC} = 2.0V$ min.)
- Low-saturation output (upper side + lower side saturation voltage: V_{osat} (total) = $0.3V$ typ., $I_o = 100$ mA)
- Ultraminiature package ($3.0 \times 4.9 \times 0.93$ mm³)
- FG output
- Built-in thermal protection circuit

Package Dimensions

unit: mm

3245-MSOP8



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		9	V
Allowable power dissipation	P_d 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	T_{opr}		-20 to +85	$^\circ C$
Storage temperature	T_{stg}		-55 to +150	$^\circ C$

* Specified substrate ($20.0 \times 10.0 \times 0.8$ mm³ paper phenol)

Allowable Operating Ranges at $T_a = 25^\circ C$

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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LB1964T

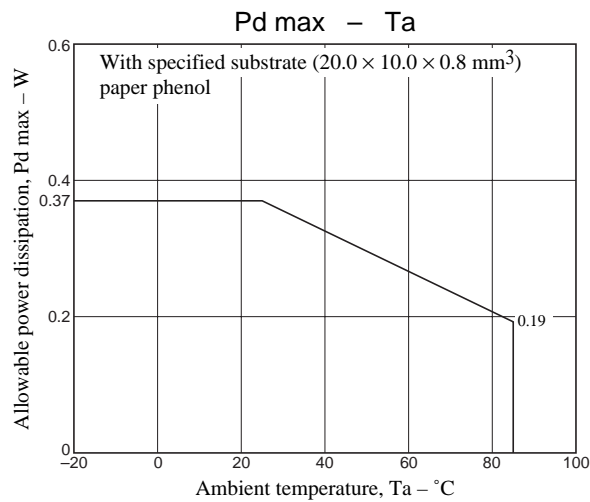
Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 3.3\text{V}$, unless otherwise specified

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

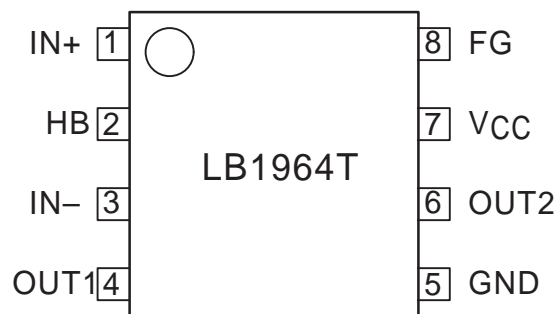
* Assured design target: Target value, not measured individually

Truth Table

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

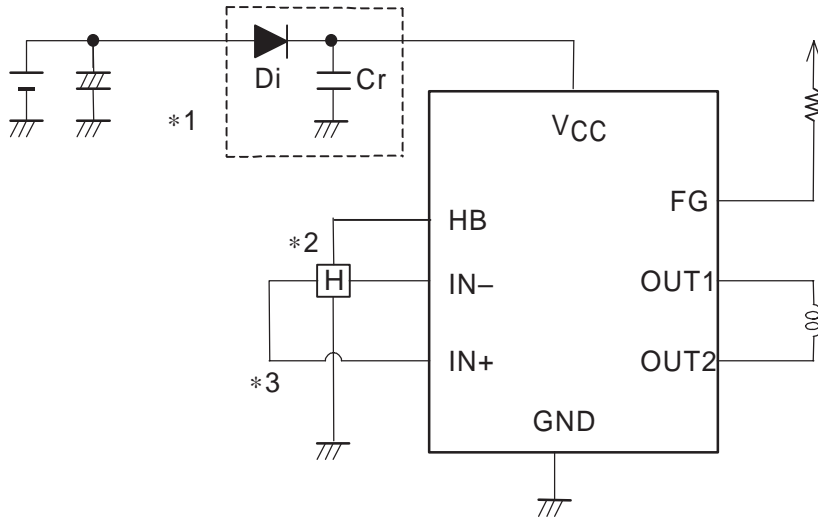


Pin Assignment



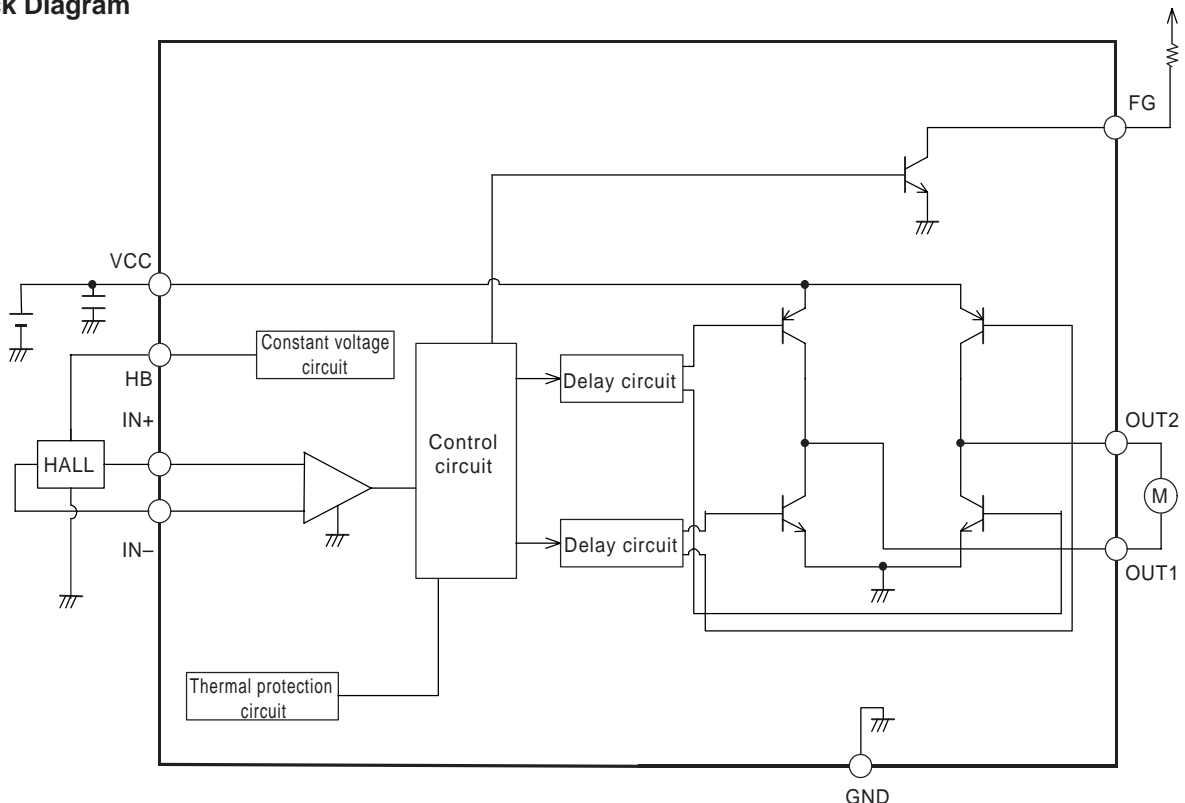
Top view

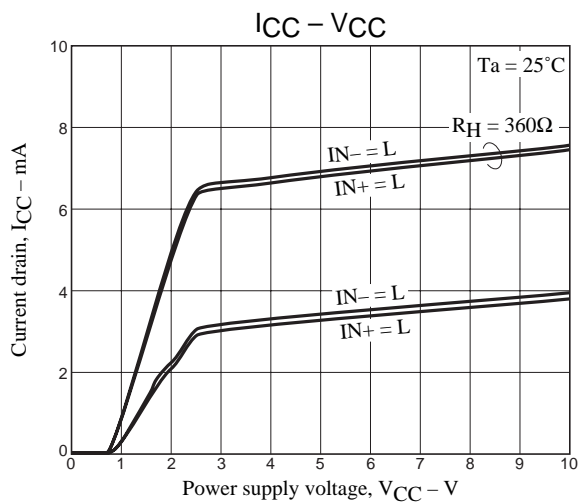
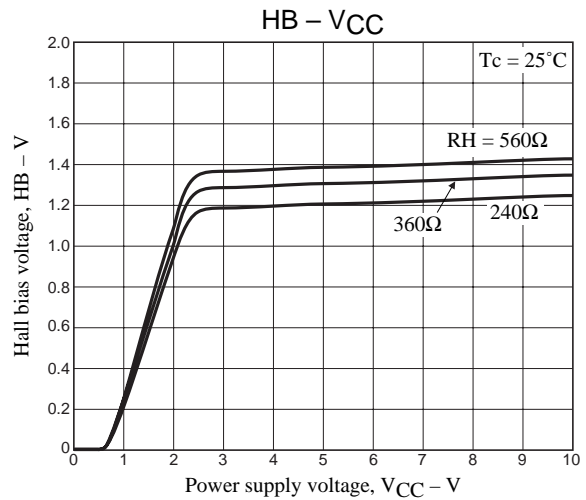
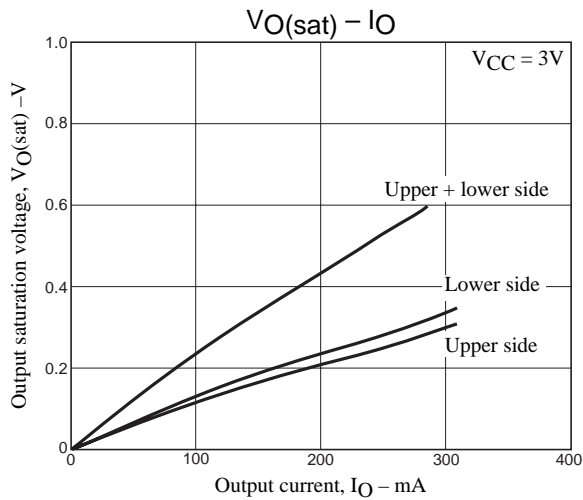
Sample Application Circuit



- *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





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