Ordering number : EN8795B

SANYO Semiconductors
DATA SHEET

Monolithic Digital IC

LB11964T — Single-Phase Full-Wave Fan Motor Driver

Overview

The LB11964T is a single-phase bipolar drive fan motor driver.

Features

- Single-phase full-wave drive
- Built-in regeneration circuit allows the use of reverse connection prevention diodes
- Built-in thermal shutdown circuit

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum output voltage	V_{CC} max		15	V
Maximum output current	I_{OUT} max		0.5	A
Maximum output voltage	V_{OUT} max		15	V
FG pin maximum output voltage	VR max		15	V
FG maximum output current	IR max		5	mA
Allowable power dissipation	Pd max	When mounted on a circuit board *	400	mW
Operating temperature range	Topr		-30 to +85	°C
Storage temperature range	Tstg		-55 to +150	°C

* Specified circuit board : 20.0 × 10.0 × 0.8mm^3, paper phenol, wiring density: 20%.

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Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		3.5 to 13.8	V
Hall sensor input common-mode input voltage range	VICM		0.2 to V_{CC} – 1.5	V

Electrical Characteristics Unless otherwise specified Ta = 25°C, V_{CC} = 5V

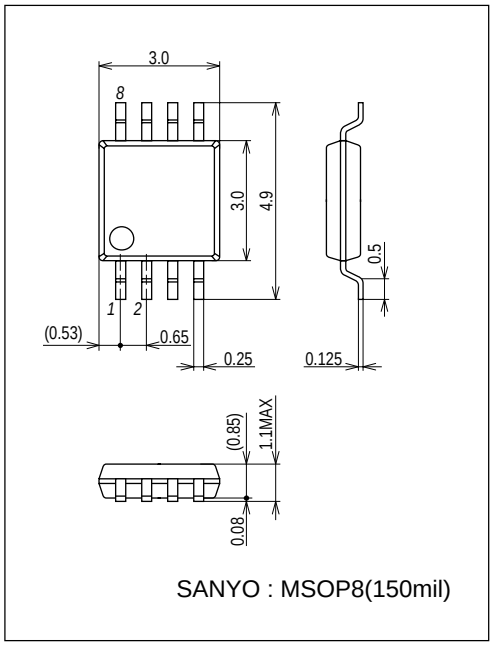
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I_{CC}	Drive mode (CT = L)		9.0	14	mA
		Lock protection mode (CT = H)		3.0	5.0	mA
Lock detection capacitor charge current	ICT1	VCT = 0.2V	1.1	1.8	2.6	μA
Capacitor discharge current	ICT2	VCT = 3.2V	0.15	0.25	0.40	μA
Capacitor charge/discharge current ratio	RCT	RCD = ICT1/ICT2	5.0	7.0	9.0	-
CT charge current	VC1		2.6	2.9	3.2	V
CT discharge current	VC2		1.5	1.8	2.1	V
Output low-level voltage	V_{OL}	I_O = 200mA		0.2	0.3	V
Output high-level voltage	V_{OH}	I_O = 200mA	3.9	4.1		V
Hall sensor input sensitivity	VHN	Zero peak value (including offset and hysteresis)		7	15	mV
FG output pin low-level voltage	VRD	IRD = 5mA		0.1	0.3	V
FG output pin leakage current	IRDL	VRD = 7V			30	μA
Thermal shutdown operating temperature	TSD	Design target value*	150	180	210	°C

* The design specification items are design guarantees and are not measured.

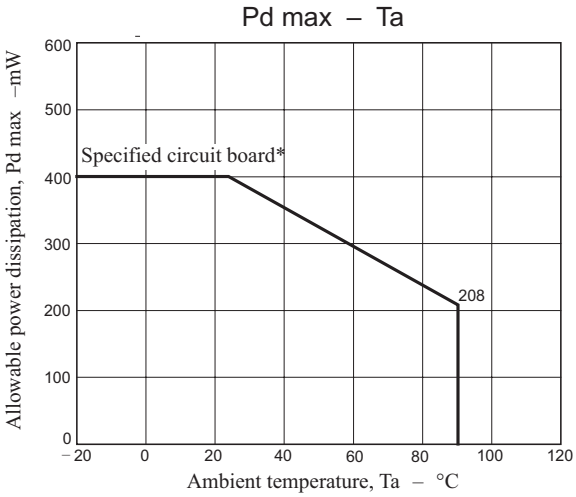
Package Dimensions

unit : mm (typ)

3245B



SANYO : MSOP8(150mil)



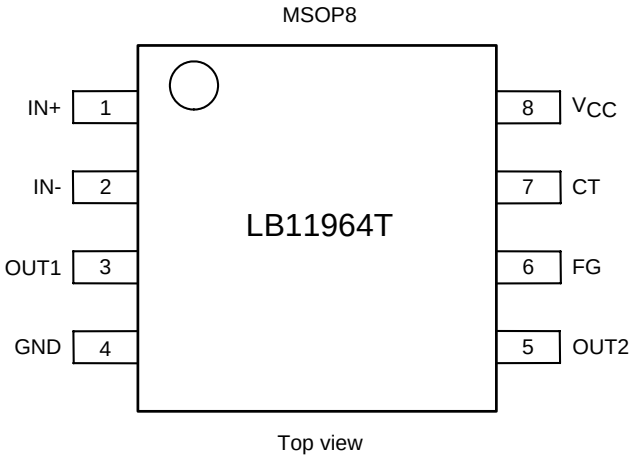
Truth Table

IN+	IN-	CT	OUT1	OUT2	FG	Mode
High	Low	Low	Low	High	Off	When the motor is turning (*1)
Low	High	Low	High	Low	Low	
-	-	High	Off	Off	Off	During lock protection operation (*2)
-	-	-	Off	Off	-	During thermal protection circuit operation

*1: An FG signal at a frequency corresponding to the phase switching operation is output.
This IC is pin compatible with the LB11963T, which provides a built-in function for dividing the FG output frequency by 2 to handle 8-pole motors.

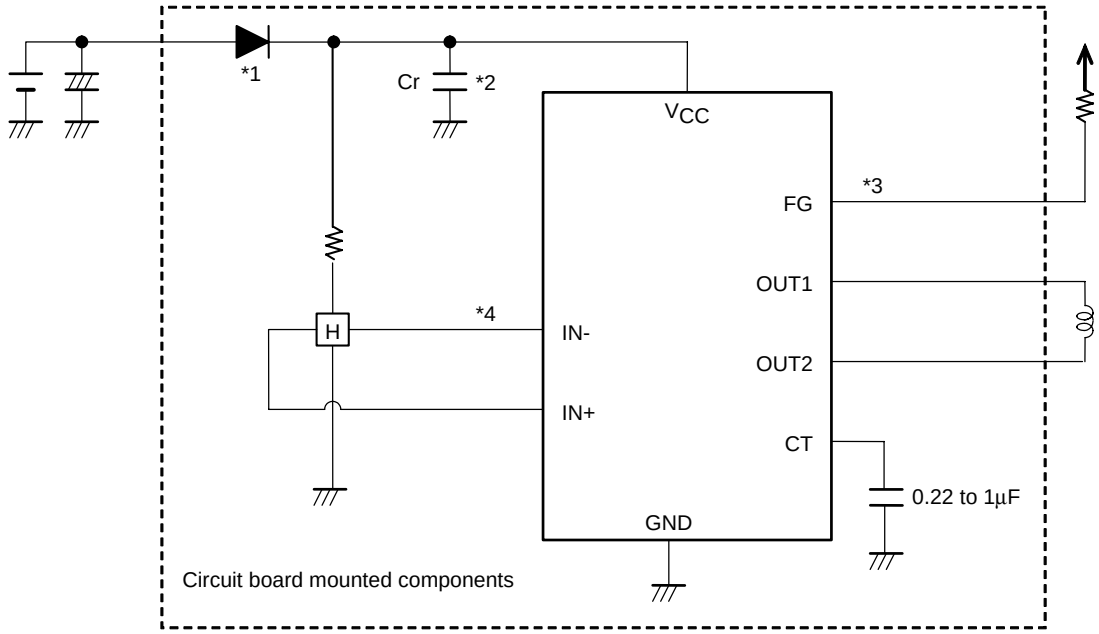
*2: In restart mode (output on) when a rotor constrained state was detected, the FG output operates in the same way as during normal operation, and differs depending on the rotor position.

Pin Assignment



Top view

Application Circuit Example



*1: The diode Di prevents destruction of the IC if the power supply is connected with reverse polarity. Since this IC includes a regeneration circuit, this IC recovers the coil current in the low side pnp output transistors and suppresses kickback, even when the diode Di is used.
This diode may be omitted if there is no chance of reverse connection problems occurring, for example, if a power supply connector is used.

*2: This capacitor is required for rectification if power supply PWM is used for speed control.

*3: This pin must be left open if unused.

*4: Although chattering prevention measures, such as adopting a non-interfering pin assignment and providing hysteresis in the Hall sensor amplifier, these lines must be made as short as possible to make the circuit more resistant to noise.

Block Diagram