



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 $T_a = 25^\circ\text{C}$

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	$^\circ\text{C}$
Storage temperature range	$Tstg$		-55 to +150	$^\circ\text{C}$

* Specified circuit board : $20.0 \times 10.0 \times 0.8\text{mm}^3$, paper phenol, wiring density: 20%.

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LB11964T

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	V _{ICM}		0.2 to V _{CC} - 1.5	V

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

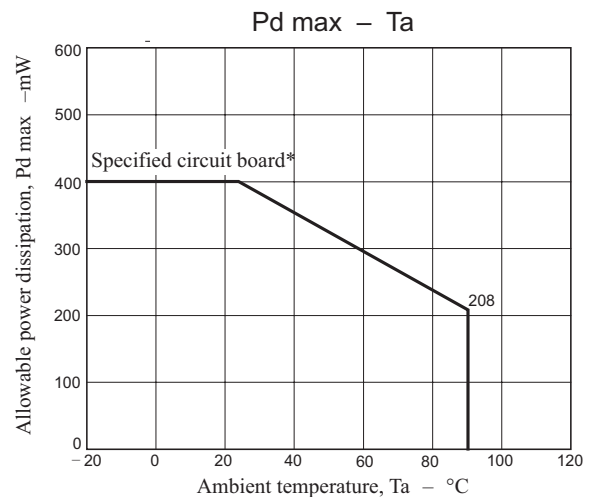
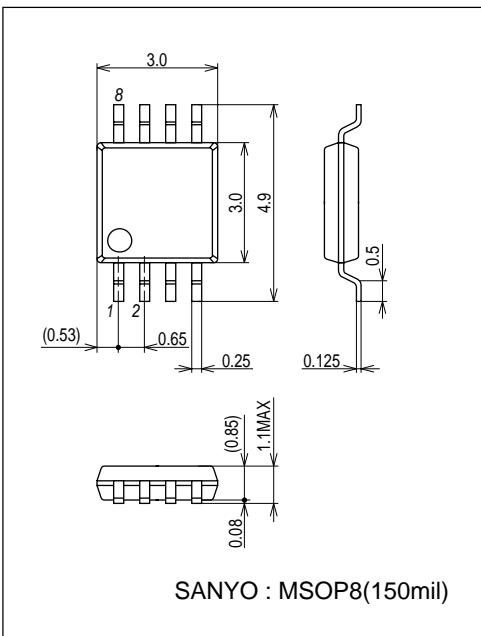
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I _{CC}	Drive mode (CT = L)		9.0	14	mA
		Lock protection mode (CT = H)		3.0	5.0	mA
Lock detection capacitor charge current	I _{CT1}	V _{CT} = 0.2V	1.1	1.8	2.6	μA
Capacitor discharge current	I _{CT2}	V _{CT} = 3.2V	0.15	0.25	0.40	μA
Capacitor charge/discharge current ratio	R _{CT}	R _{CD} = I _{CT1} /I _{CT2}	5.0	7.0	9.0	-
CT charge current	V _{C1}		2.6	2.9	3.2	V
CT discharge current	V _{C2}		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	V _{HN}	Zero peak value (including offset and hysteresis)		7	15	mV
FG output pin low-level voltage	V _{RD}	I _{RD} = 5mA		0.1	0.3	V
FG output pin leakage current	I _{RDL}	V _{RD} = 7V			30	μA
Thermal shutdown operating temperature	T _{SD}	Design target value*	150	180	210	°C

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

Package Dimensions

unit : mm (typ)

3245B



LB11964T

Truth Table

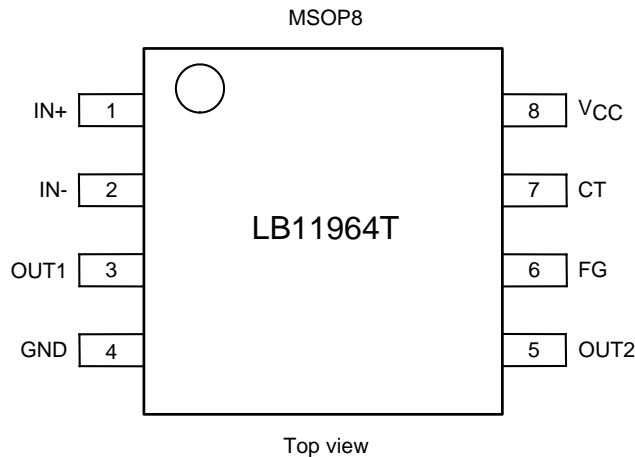
IN+	IN-	CT	OUT1	OUT2	FG	Mode
High	Low	Low	Low	High	Off	When the motor is turning (*1)
Low	High	Low	High	Low	Low	
-	-	High	Off	Off	Off	During lock protection operation (*2)
-	-	-	Off	Off	-	During thermal protection circuit operation

*1: An FG signal at a frequency corresponding to the phase switching operation is output.

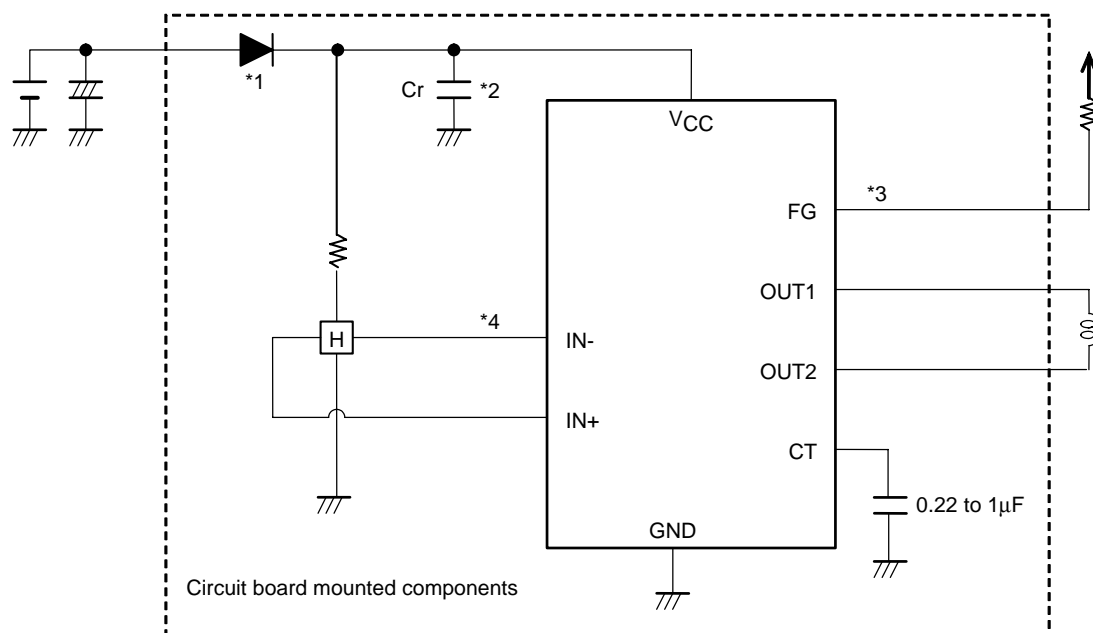
This IC is pin compatible with the LB11963T, which provides a built-in function for dividing the FG output frequency by 2 to handle 8-pole motors.

*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



Application Circuit Example



*1: The diode D_i 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 D_i is used.

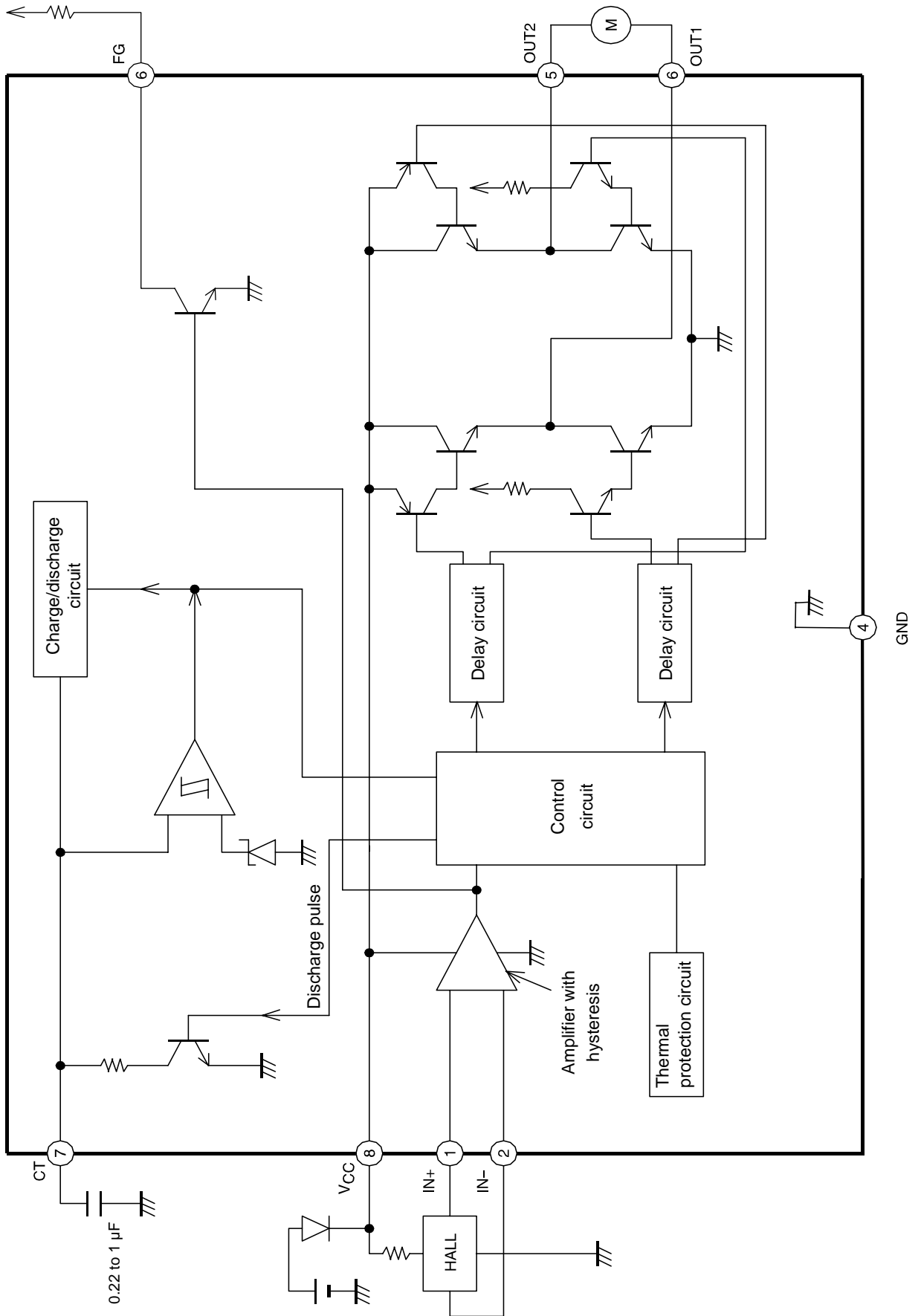
This diode may be omitted if there is no chance of reverse connection problems occurring, for example, if a power supply connector is used.

*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



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