



SANYO Semiconductors

# DATA SHEET

## LB11862M — Monolithic Digital IC Single-Phase Full-Wave Fan Motor Driver

### Overview

The LB11862M is optimal for small fan applications, especially CPU cooling fans, due to its single-phase full-wave drive technique and the compact package.

Low switching noise and effective motor drive are further advantages.

### Features

- Support for 5V/12V dual power supply voltage.
- Built-in regenerative circuit allows use of reverse-connection protection diode.
- Built-in Hall amplifier with hysteresis (supports core without commutating pole).
- Built-in lockup protection and automatic recovery circuits.
- Latch-type lockup detection output (RD) is low during rotation and high during stop.
- Hall bias pin and start/stop pin allow reduced current drain in standby mode.
- Built-in thermal protection circuit.

### Specifications

**Absolute Maximum Ratings** at  $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		17	V
Maximum output current	$I_{OUT \text{ max}}$		0.8	A
Maximum output withstand voltage	$V_{OUT \text{ max}}$		17	V
RD maximum output withstand voltage	$V_R \text{ max}$		17	V
RD maximum output current	$I_R \text{ max}$		5	mA
HB maximum output current	$I_B \text{ max}$		10	mA
ST maximum input voltage	$V_{ST \text{ max}}$		15	V
Allowable power dissipation	$P_d \text{ max}$	Mounted on the specified board*	800	mW
Operating temperature	$T_{opr}$		-40 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\*Specified board :  $114.3 \times 76.2 \times 1.5$  mm, glass epoxy.

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# LB11862M

## Allowable Operating Range at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	$V_{CC}$		3.8 to 16.8	V
ST input high-level voltage	STH		3 to 14	V
ST input low-level voltage	STL		-0.3 to 0.4	V
Hall input common-mode input voltage range	VICM		0.2 to $V_{CC}-1.5$	V

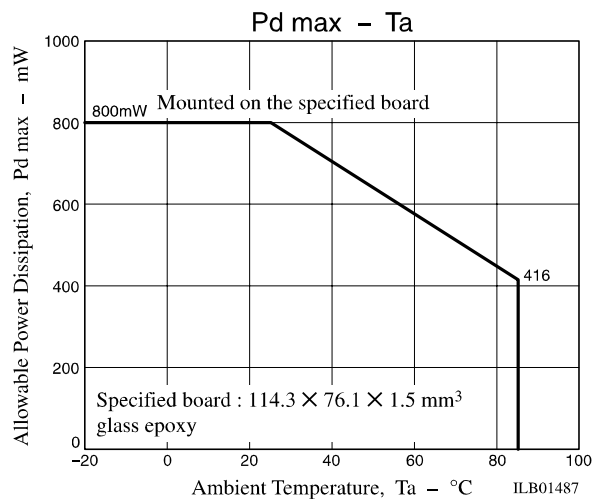
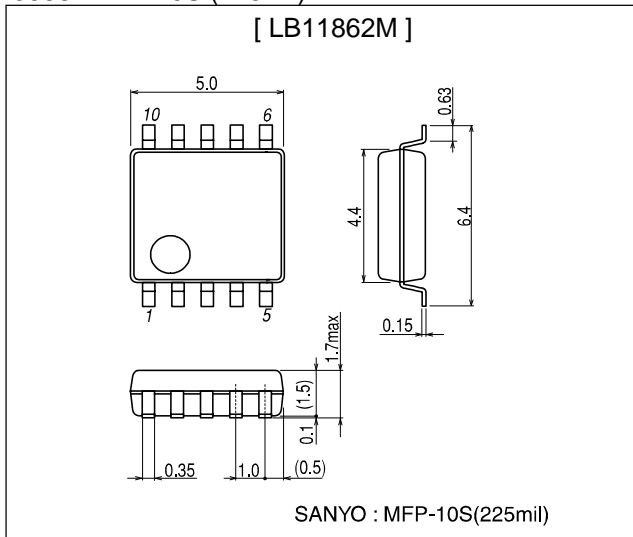
## Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC} = 5\text{V}$ , unless otherwise specified.

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	$I_{CC}$	Operating mode (CT = L, ST = L)		12	17	mA
		Lock protecting mode (CT = H, ST = L)		2.5	4.0	mA
		Standby mode (ST = H)		110	150	$\mu\text{A}$
Lock detection capacitor charging current	ICT1	$V_{CT} = 0.2\text{V}$	1.5	2.1	3.0	$\mu\text{A}$
Capacitor discharging current	ICT2	$V_{CT} = 3.0\text{V}$	0.21	0.35	0.50	$\mu\text{A}$
Capacitor charging/discharging current ratio	RCT	$RCD = ICT1/ICT2$	5.0	6.0	8.0	-
CT charging voltage	VCT1		2.55	2.75	2.95	V
CT discharging voltage	VCT2		1.6	1.8	2.0	V
Output low-level voltage	$V_{OL}$	$I_O = 200\text{mA}$		0.2	0.3	V
Output high-level voltage	$V_{OH}$	$I_O = 200\text{mA}$	3.9	4.1		V
Hall input sensitivity	VHN	Zero peak value. (Including offset, hysteresis)		7	15	mV
RD output pin low-level voltage	VRD	$IR_D = 5\text{mA}$		0.1	0.3	V
RD output pin leakage current	IRDL	$VR_D = 15\text{V}$			30	$\mu\text{A}$
HB output low-level voltage	VHBL	$I_{HB} = 5\text{mA}$		1.0	1.3	V
ST pin input current	IST	$V_{ST} = 5\text{V}$		75	100	$\mu\text{A}$

## Package Dimensions

unit : mm

3086B-MFP10S (225mil)



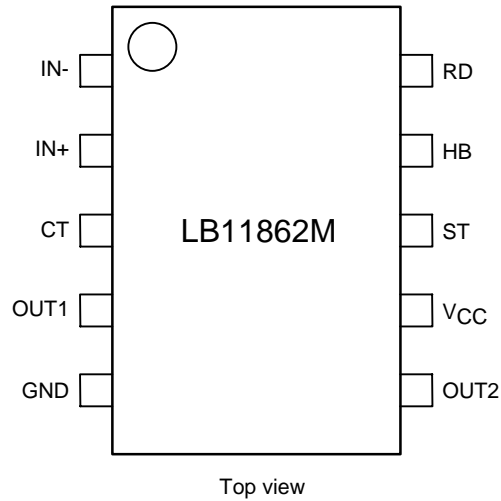
# LB11862M

## Truth Table

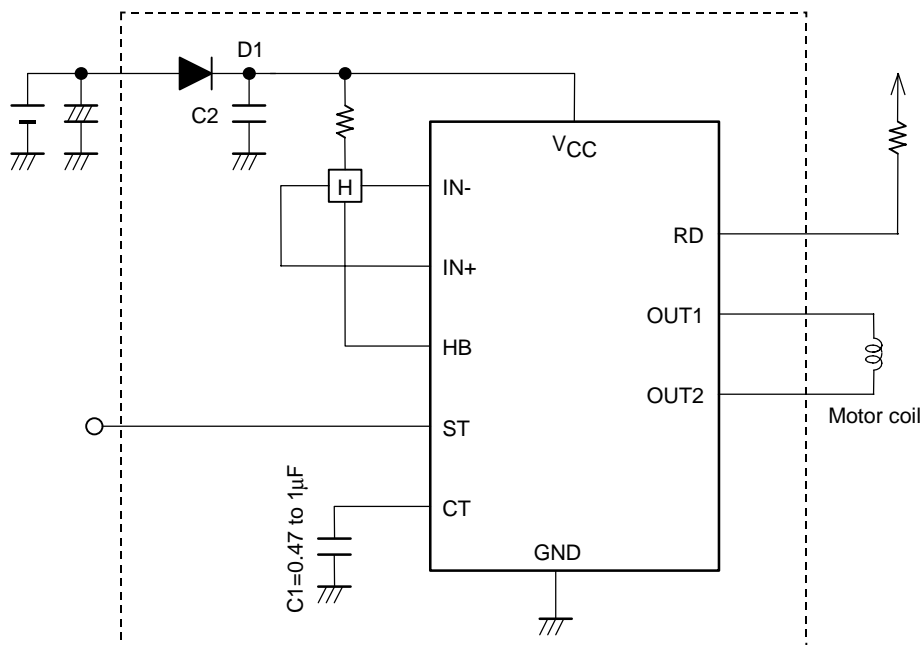
ST	IN-	IN+	CT	OUT1	OUT2	RD	HB	Mode
H	-	-	-	off	off	off	off	Standby
L	H	L	L	H	L	L	L	Operating
	L	H		L	H			
			H	off	off	off	L	Lock protection

(The RD output is latched at "L"-level in operating mode and "H"-level in stop mode.)

## Pin Assignment

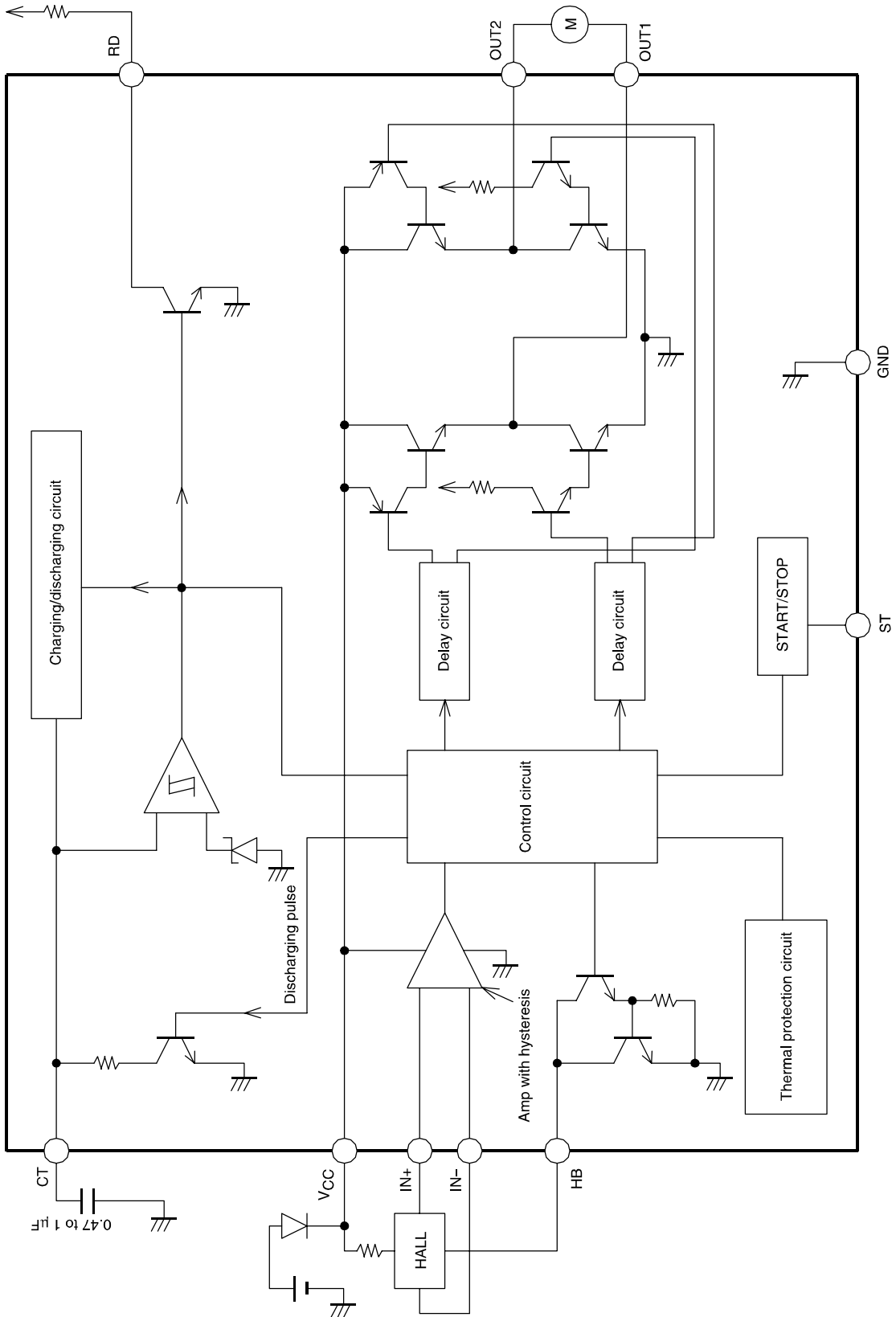


## Sample Application Circuit



- (1) D1 is used to prevent IC destruction caused by reverse-connection. It can be omitted if no problems are expected.
- (2) C2 is used to apply a kickback regenerative current when using the IC with the coil current over 500 mA.
- (3) When CT is not used, it should be connected to ground.
- (4) When RD, ST, and HB are not used, they should be left open.

Block Diagram



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