Ordering number : EN6191A

SANYO Semiconductors
DATA SHEET

LB1960M — Monolithic Digital IC For Fan Motor 2-phase Half-Wave Driver

Overview

The LB1960M is a 2-phase half-wave driver for fan motor. The LB1960M is a compact package (MFP8). Low external parts count, easy wiring, and small PCB area allow use also with miniature fan motors.

Functions

- Dual power supply voltage design (5/12V) and wide voltage handling range.
  (3V also supported for rotation functions only)
- Constant-voltage Hall bias power supply (1.3V across HB to GND) assures stable Hall output over entire temperature and power supply voltage range. External limiting resistor not required.
- Built-in Hall amplifier with hysteresis (supports core without commutating pole).
- Built-in lockup protection and automatic recovery circuits (External capacitor for rotation detection need only be 0.1μF, allowing compact, cost-saving design).
- Built-in output transistor with output withstand voltage 24V (max)/output current 500mA (average), 1A (peak).
- Built-in thermal protection circuit.

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Maximum output current	I_{OUT} ave		500	mA
	I_{OUT} peak	t ≤ 1ms	1000	mA
Maximum output voltage	V_{OUT} max		Internal	V
Maximum HB output current	IH max		10	mA
Allowable power dissipation	Pd max	Mounted on a specified board *	600	mW
Operating temperature	Topr		-30 to +85	°C
Storage temperature	Tstg		-55 to +150	°C

* Specified board: 114.3mm × 76.1mm × 1.5mm, glass epoxy board.

Allowable Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		3.6 to 17	V
Common mode input voltage range	V_{COM}		0.2 to HB	V

Electrical Characteristics at Ta = 25°C, V_{CC} = 12V

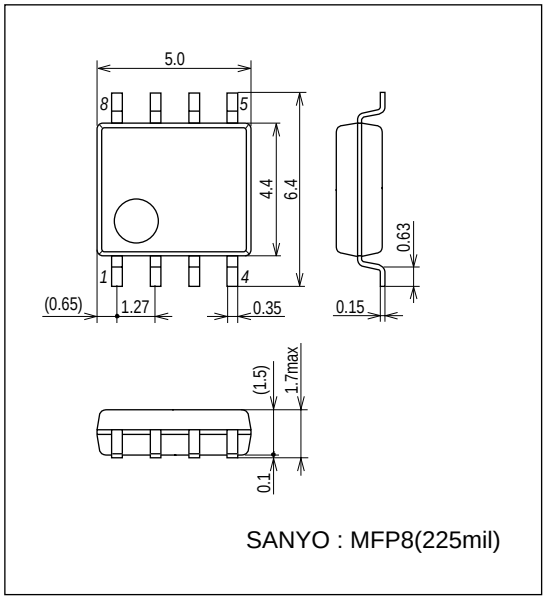
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I_{CC}	In drive mode (CT = L)		2.3	4	mA
		In lockup protection mode (CT = H)		3	5	mA
CT capacitor charge current	$I_{CT}1$	V_{CT} = 0.2V	0.8	1.2	2.0	μA
Capacitor discharge current	$I_{CT}2$	V_{CT} = 8V	0.16	0.24	0.4	μA
Capacitor charge/discharge current ratio	R_{CT}	RCT = $I_{CT}1/I_{CT}2$	4.0	5.0	7.0	
CT charge voltage	$V_{CT}1$		6.8	7.2	7.6	V
CT discharge voltage	$V_{CT}2$		1.4	1.6	1.8	V
Output limiter withstand voltage	V_OLM	I_O = 1mA	22.5	23.5	24.5	V
Output saturation voltage	$V_O$sat	I_O = 500mA		1.0	1.3	V
Hall input sensitivity	V_{HN}	Including offset and hysteresis		6	12	mV
HB output H voltage	V_{HB}H	RH = 350Ω	1.1	1.3	1.5	V
Thermal protection trigger temperature	TSD	Assured design target *	150	180	210	°C

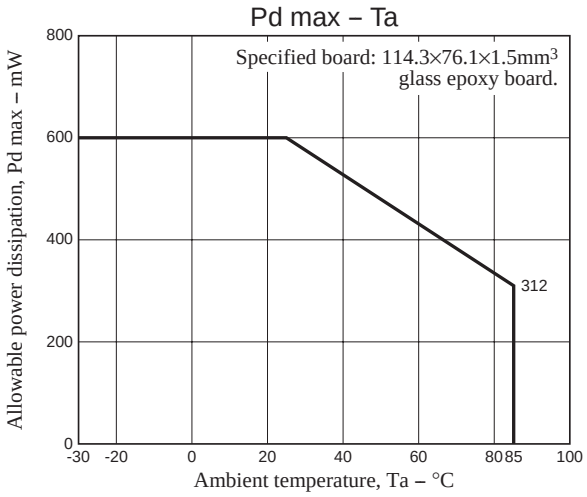
* Assured design target: Target value, not measured individually.

Package Dimensions

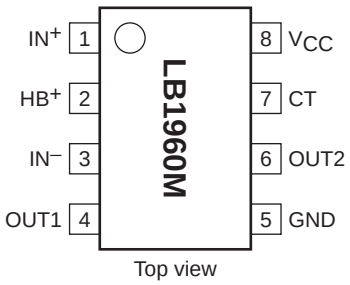
unit : mm (typ)

3032B

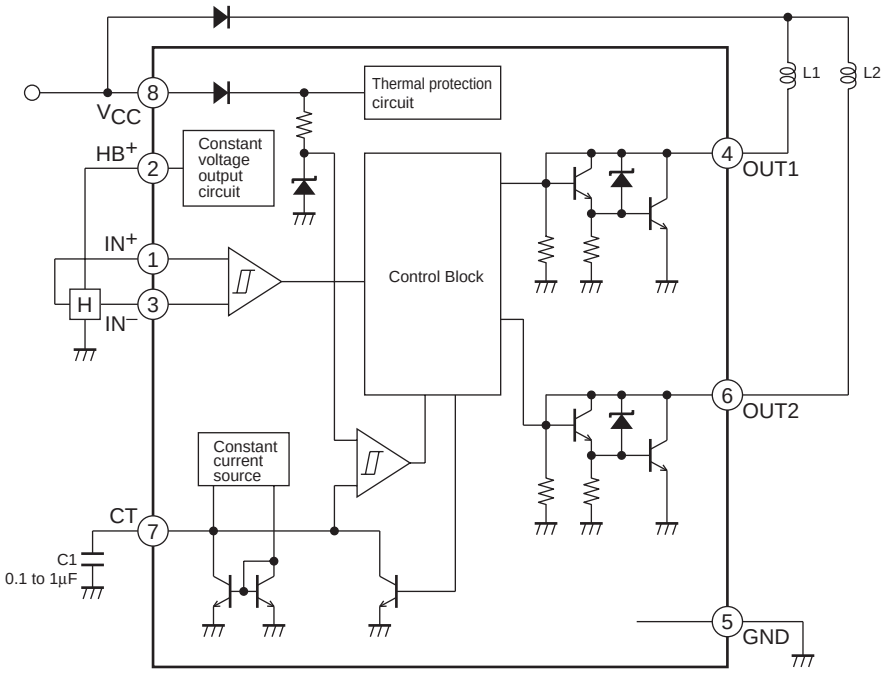




Pin Assignment



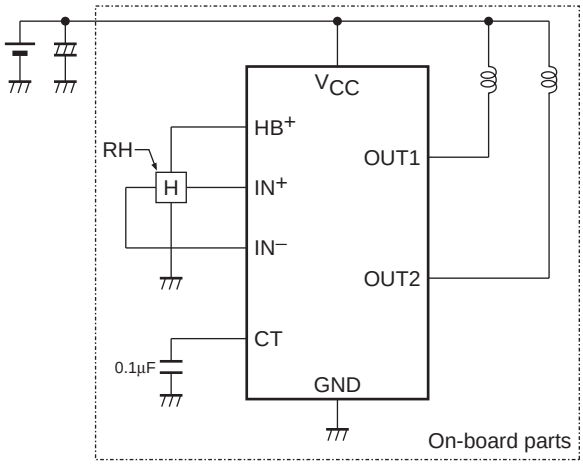
Block Diagram



Truth Table

IN^-	IN^+	CT	OUT1	OUT2	Mode
H	L	L	L	H	Rotating
L	H		H	L	
-	-	H	OFF	OFF	Lock-up protection activated

Application Circuit Example 5/12V power supply (3.8 to 18V)



Precautions

- If CT pin is connected to GND, the lockup protection and restart functions are disabled.
- In a circuit configuration as shown above, a power supply/GND reverse connection will cause a current to flow as follows: GND → OUT → coil → power supply. The value of this current is limited by the coil resistance. If it is less than 500mA, the IC will not be destroyed. If required, insert a diode between V_{CC} and the coil.