Ordering number : EN6191

Monolithic Digital IC

LB1960M

Fan Motor 2-Phase Half-Wave Driver

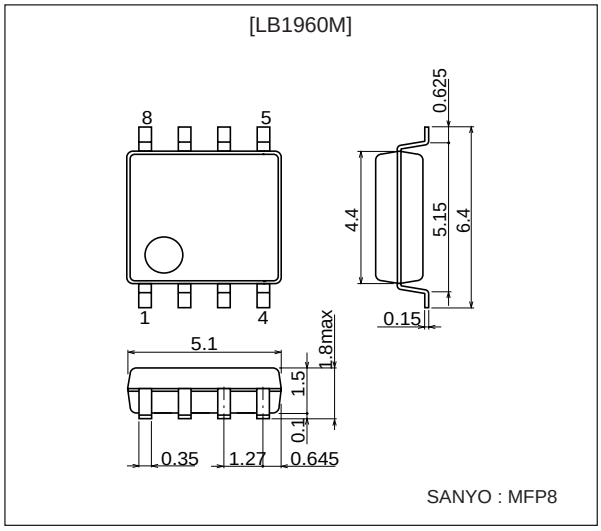
Features

- 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-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 0.1 µF, allowing compact, cost-saving design)
- Built-in output transistor with output withstand voltage 24Vmax/output current 500 mA (average), 1A (peak)
- Built-in thermal protection circuit
- Compact MFP-8 package. Low external parts count, easy wiring, and small PCB area allow use also with miniature fan motors.

Package Dimensions

unit: mm

3032B-MFP8



Specification

Absolute Maximum Ratings at Ta = 25°C

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

* Specified substrate (114.3 × 76.1 × 1.5 mm³, glass epoxy)

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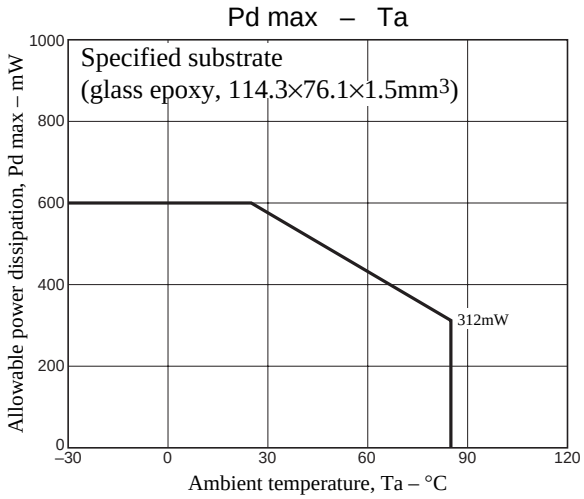
Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC} 1		3.6 to 17	V
Common mode input voltage range	V_{CO}M		0.2 to HB	V

Electrical Characteristics at Ta = 25°C, VCC = 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}	R_{CT} = ICT1/ICT2	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}	Io = 1 mA	22.5	23.5	24.5	V
Output saturation voltage	$V_O$sat	Io = 500 mA		1.0	1.3	V
Hall input sensitivity	V_{HN}	Including offset and hysteresis		6	12	mV
HB output H voltage	V_{HBH}	R_H = 350Ω	1.1	1.3	1.5	V
Thermal protection trigger temperature	T_{TSD}	Assured design target*	150	180	210	°C

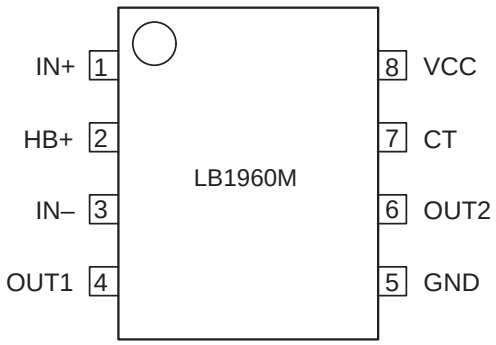
* Assured design target: Target value, not measured individually



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

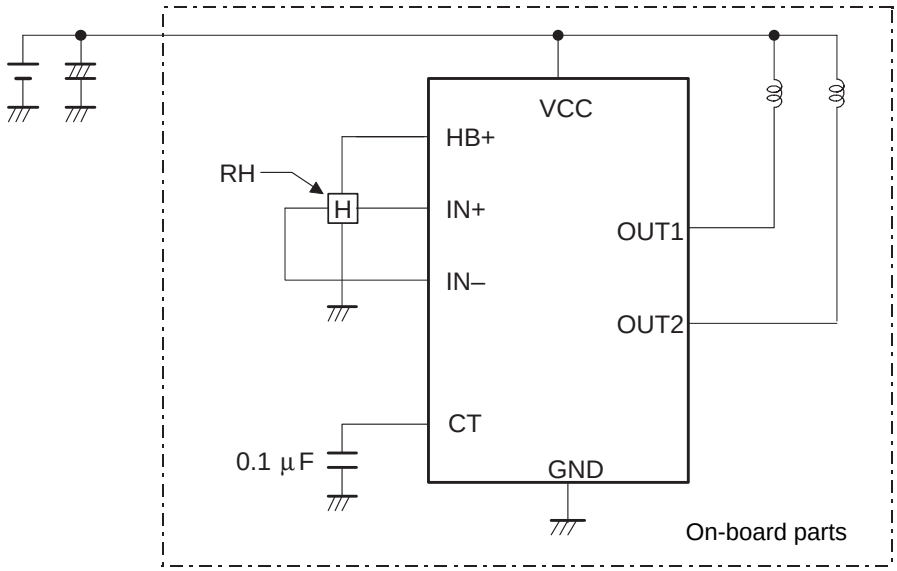
Pin Assignment



Top view

Sample Application Circuit

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 500 mA, the IC will not be destroyed. If required, insert a diode between V_{CC} and the coil.

Block Diagram and Sample Application Circuit