



LB1967M

Fan Motor 2-Phase Half-Wave Driver

Overview

The LB1967M is a brushless motor driver IC for 2-phase half-wave drive well suited for compact fan motor for communication and office equipment, etc.

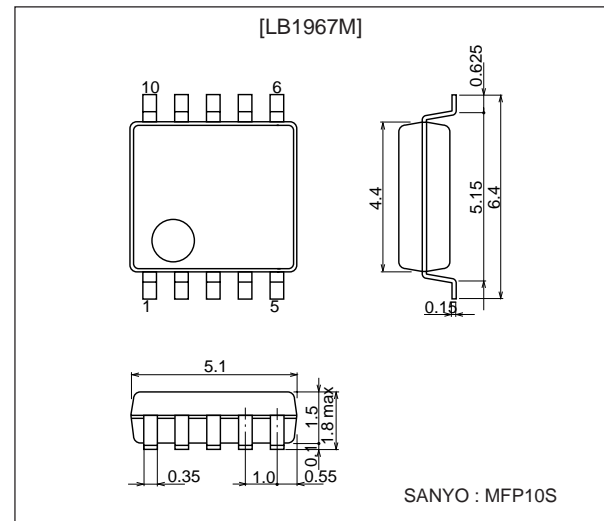
Features

- Dual power supply voltage design (5/12V) and wide voltage handling range
- Built-in Hall amplifier with hysteresis (supports core without auxiliary electrode)
- Built-in lockup protection and automatic recovery circuits (External capacitor for rotation detection need only be 0.1 μ F, allowing compact, cost-saving design)
- Built-in FG output ($V_{osat} = 0.2V_{typ}$ at $I_O = 5$ mA)
- Built-in output transistor with output withstand voltage 24Vmin/output current 500 mA (average), 1.2A (peak)
- Built-in thermal protection circuit
- Compact, high-temperature resistant MFP-10 package reduces external parts count and mounting space, therefore making this IC support the motors with a wide range of sizes and speeds.

Package Dimensions

unit: mm

3086A-MFP10S



Specification

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Output current	I_{OUT} ave		500	mA
	I_{OUT} peak	$t \leq 1$ ms	1200	mA
Output withstand voltage	V_{OUT} max		Internal	V
FG output current	I_{FG} max		10	mA
FG output withstand voltage	V_{FGOUT} max		18	V
Allowable power dissipation	P_d max	With specified substrate *	800	mW
Operating temperature	T_{opr}		-30 to +85	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

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

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Recommended Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Power supply voltage	V _{CC1}		3.6 to 17	V
Common mode input voltage range	V _{COM}		0.2 to V _{CC} -2.3	V

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

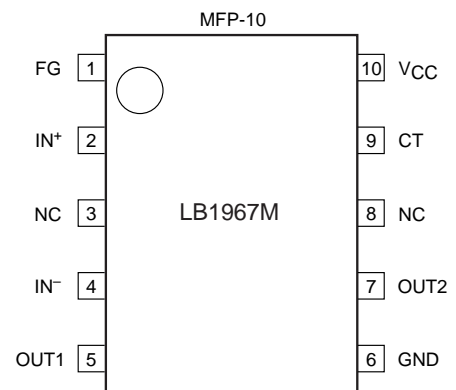
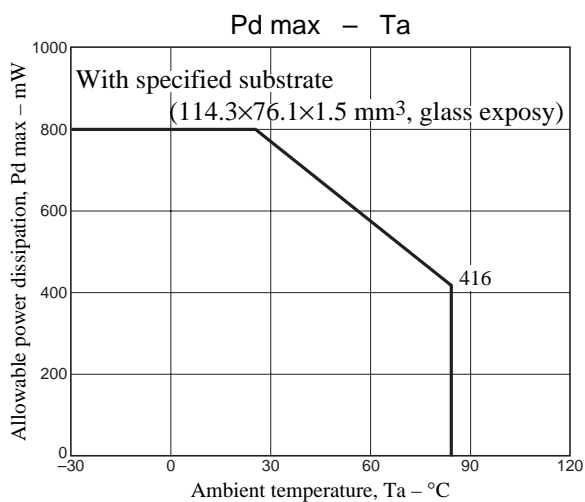
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I _{CC}	In drive mode (CT = L)		3	5	mA
		In lockup protection mode (CT = H)		4	6	mA
CT capacitor charge current	I _{CT1}	V _{CT} = 0.2V	0.8	1.2	2.0	μA
Capacitor discharge current	I _{CT2}	V _{CT} = 8V	0.16	0.24	0.4	μA
Capacitor discharge current ratio	R _{CT}	R _{CT} = I _{CT1} /I _{CT2}	4.0	5.0	7.0	–
CT charge voltage	V _{CT1}		6.8	7.2	7.6	V
	V _{CT2}		1.4	1.6	1.8	V
Output limiter withstand voltage	V _{OLM}	I _O = 10 mA	24.0	25.5	27.0	V
Output saturation voltage	V _{OL}	I _O = 500 mA		1.0	1.3	V
Hall input sensitivity	V _{HN}	Including offset and hysteresis	2	10	18	mV
FG output saturation voltage	V _{FG}	I _O = 5 mA		0.2	0.5	V
FG output leak current	V _{FL}	V _{FG} = 14V		0.1	10	μA
Thermal protection trigger temperature	V _{TH} ⁺	Assured design target *	150	180	210	°C

* Assured design target; Target value, not measured individually

Truth Table

IN ⁻	IN ⁺	CT	OUT1	OUT2	FG	Mode
H	L	L	L	H	L	Rotating
L	H		H	L	H	
–	–	H	off	off	–	Lockup protection activated

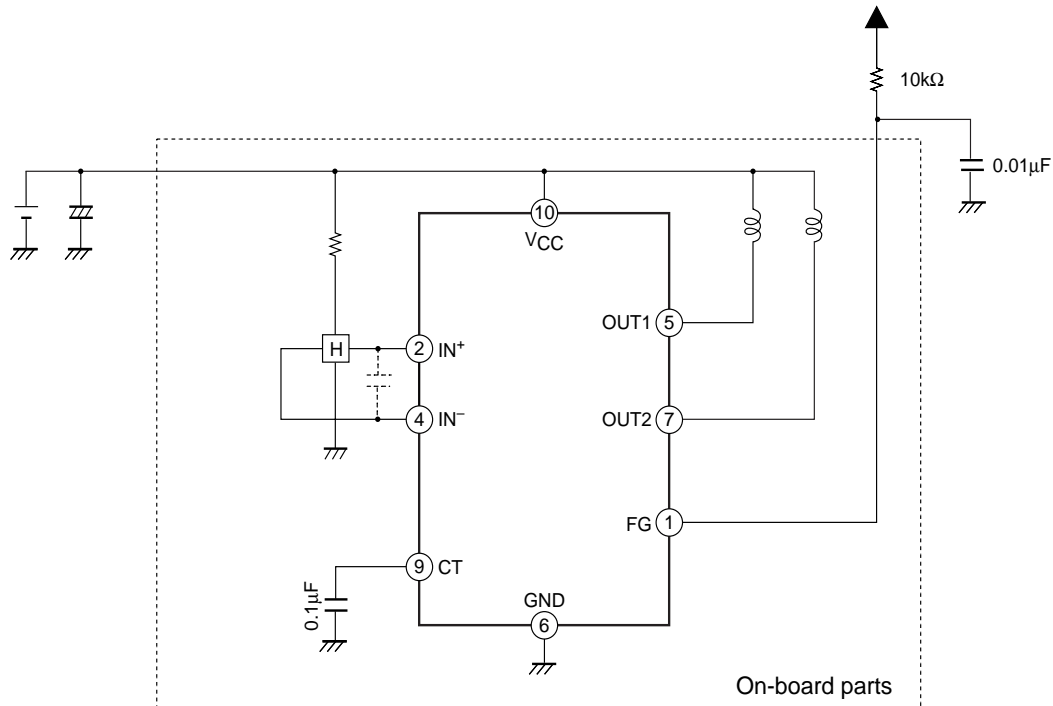
Pin Assignment



Top view
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Sample Application Circuit

5/12V power supply (3.8 to 17V)

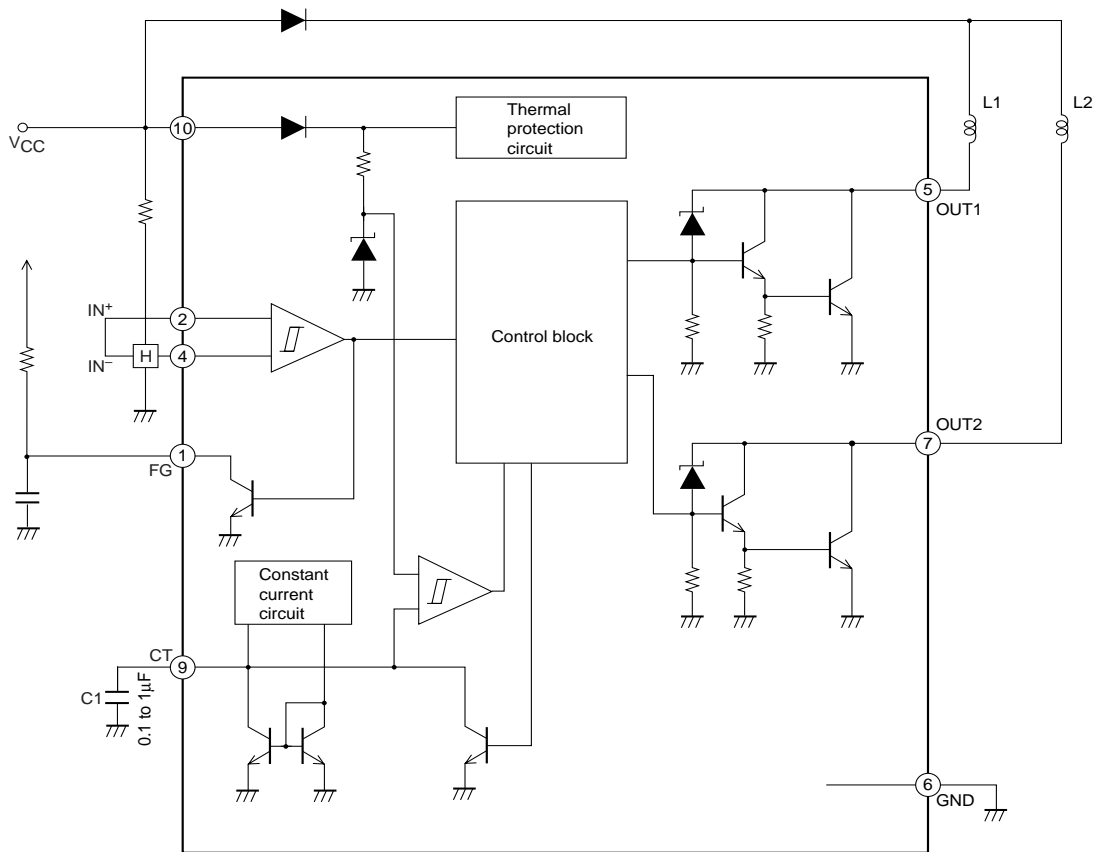


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Precautions

- Wiring layout for IN⁻ and OUT1 must be designed to prevent interference.
- If the wiring between the Hall element and the IC input is long, noise interference may lead to chattering in the FG output waveform. In this case, insert a capacitor with 0.01 to 0.001 µF between IN⁺ and IN⁻.
- If CT pin is connected to GND, the lockup protection and restart functions are disabled.
- In a circuit configuration as shown above, a current-GND reverse connection will cause a current to flow as follows: GND -> OUT -> coil -> power supply. The magnitude 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



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