



LB1966M

Fan Motor 2-Phase Half-Wave Driver

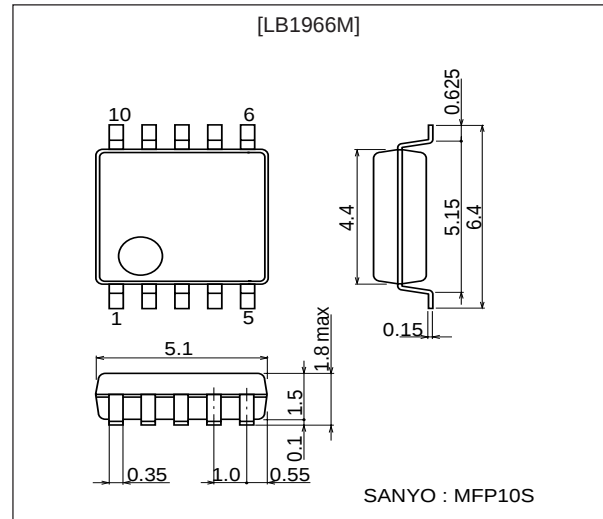
Features

- Dual power supply voltage design (5/12V) and wide voltage handling range
- 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 μ F, allowing compact, cost-saving design)
- Built-in latch-type RD (restraint protection) output ($V_{\text{osat}} = 0.2V_{\text{typ}}$ at $I_o = 5 \text{ mA}$)
- 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	$V_{CC \text{ max}}$		18	V
Allowable power dissipation	$P_d \text{ max}$	With specified substrate *	800	mW
Output current	$I_{OUT \text{ ave}}$		500	mA
	$I_{OUT \text{ peak}}$	$t \leq 1 \text{ ms}$	1200	mA
Output withstand voltage	$V_{OUT \text{ max}}$		Internal	V
RD output current	$I_{RD \text{ max}}$		10	mA
RD output withstand voltage	$V_{RDOUT \text{ max}}$		18	V
Operating temperature	T_{opr}		-30 to $+85$	$^\circ\text{C}$
Storage temperature	T_{stg}		-55 to $+150$	$^\circ\text{C}$

* With substrate ($114.3 \times 76.1 \times 1.5 \text{ mm}^3$, glass epoxy)

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

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 $T_a = 25^\circ\text{C}$, $V_{CC} = 12\text{V}$

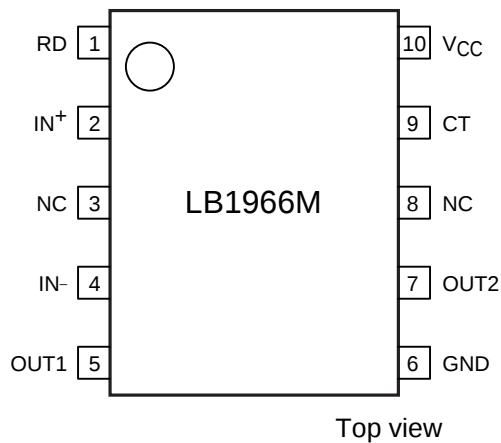
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I_{CC}	In drive mode (CT = L)		4	6	mA
		In lockup protection mode (CT = H)		4	6	mA
CT capacitor charge current	I_{CT1}	$V_{CT} = 0.2\text{V}$	0.8	1.2	2.0	μA
Capacitor discharge current	I_{CT2}	$V_{CT} = 8\text{V}$	0.16	0.24	0.4	μA
Capacitor discharge current ratio	R_{CT}	$R_{CT} = I_{CT1}/I_{CT2}$	4.0	6.0	8.0	—
CT charge voltage	V_{CT1}		6.0	7.0	8.0	V
CT discharge voltage	V_{CT2}		1.2	1.6	2.0	V
Output limiter withstand voltage	V_{OLM}	$I_o = 10\text{ mA}$	24.0	25.5	27.0	V
Output saturation voltage	V_{OSat}	$I_o = 500\text{ mA}$		1.0	1.3	V
Hall input sensitivity	V_{HN}	Including offset and hysteresis		10	18	mV
RD output saturation voltage	V_{RDsat}	$I_{RD} = 5\text{ mA}$		0.2	0.5	V
RD output leak current	I_{RDL}	$V_{RD} = 14\text{V}$		0.1	10	μA
Thermal protection trigger temperature	T_{TSD}	Assured design target *	150	180	200	$^\circ\text{C}$

* Assured design target: Target value, not measured individually

Truth Table

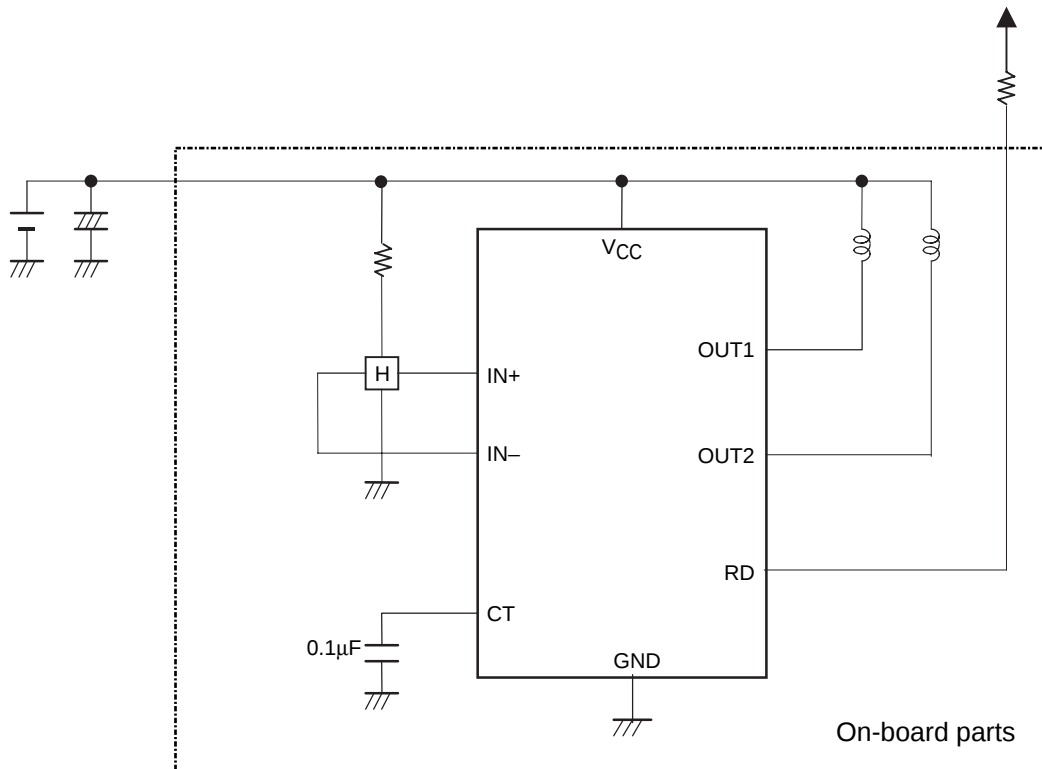
IN-	IN+	CT	OUT1	OUT2	RD	Mode
H	L	L	L	H	L	Rotating
L	H		H	L	L	
—	—	H	off	off	H	Lock-up protection activated

Pin Assignment



Sample Application Circuit

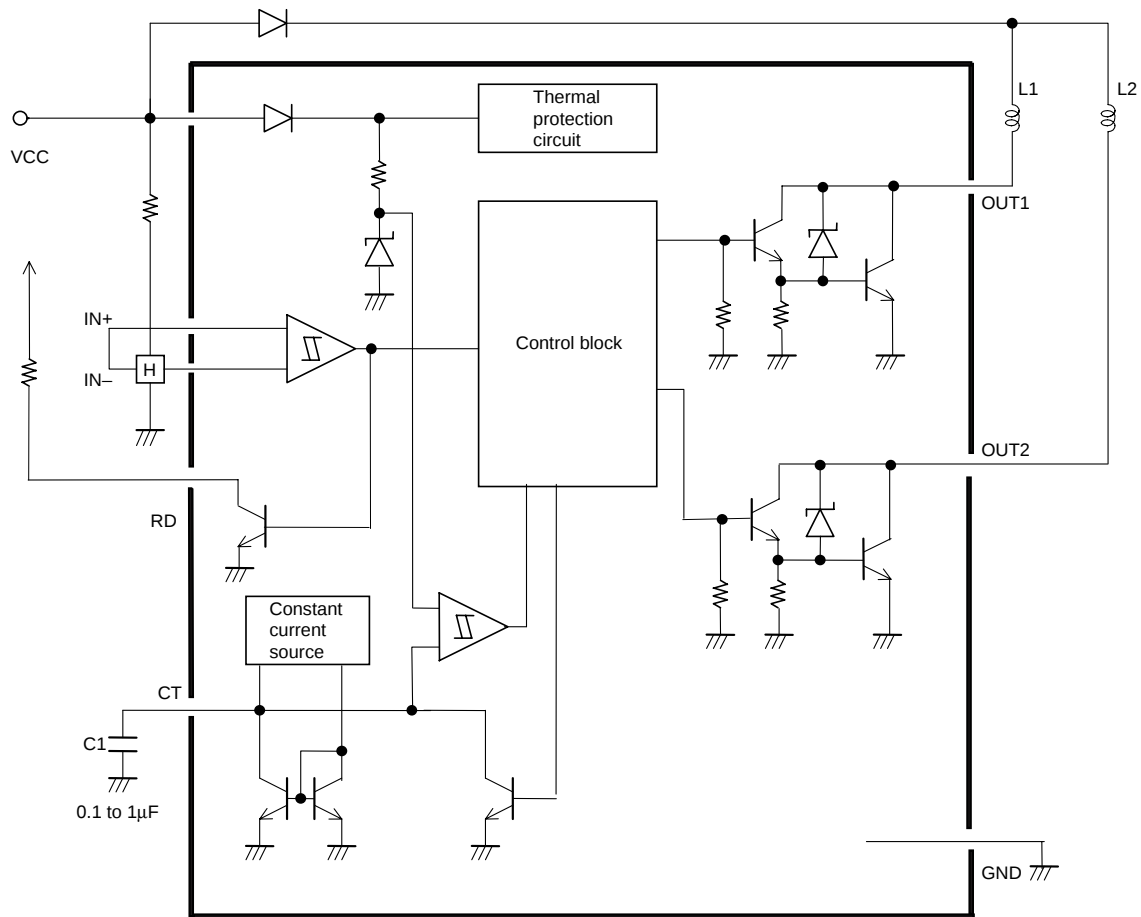
5/12V power supply (3.8 to 17V)



Precautions

- Wiring layout for IN⁻ and OUT1 must be designed to prevent interference. (If oscillation occurs for example when output phase is switched, connect a capacitor with 0.1 µF or less between IN⁻ and IN⁺ pins.)
- 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 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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