Ordering number : EN6215

Monolithic Digital IC

LB1966M

Fan Motor 2-Phase Half-Wave Driver

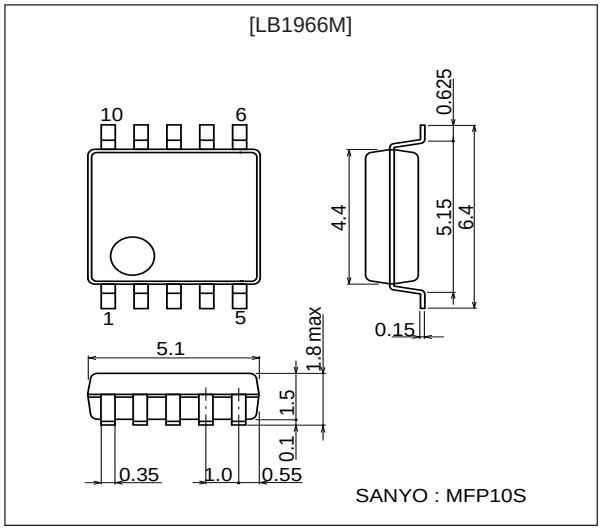
Features

- 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 µF, allowing compact, cost-saving design)
- Built-in latch-type RD (restraint protection) output (Vosat = 0.2Vtyp at Io = 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 Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Allowable power dissipation	Pd max	With specified substrate *	800	mW
Output current	I_{OUT}ave		500	mA
	I_{OUT}peak	t ≤ 1 ms	1200	mA
Output withstand voltage	V_{OUT} max		Internal	V
RD output current	I_{RD} max		10	mA
RD output withstand voltage	V_{RDOUT} max		18	V
Operating temperature	Topr		–30 to +85	°C
Storage temperature	Tstg		–55 to +150	°C

* With 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
Power supply voltage	$V_{CC}1$		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, VCC = 12V

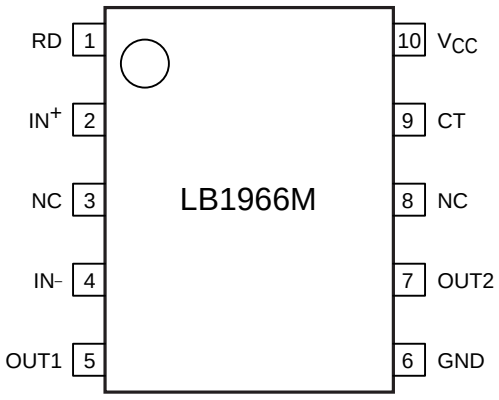
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I_{CC}	In drive mode (CT = L)		4	6	mA
		In lockup protection mode (CT = H)		4	6	mA
CT capacitor charge current	$I_{CT}1$	V_{CT} = 0.2V	0.8	1.2	2.0	µA
Capacitor discharge current	$I_{CT}2$	V_{CT} = 8V	0.16	0.24	0.4	µA
Capacitor discharge current ratio	R_{CT}	$R_{CT} = I_{CT}1/I_{CT}2$	4.0	6.0	8.0	–
CT charge voltage	$V_{CT}1$		6.0	7.0	8.0	V
CT discharge voltage	$V_{CT}2$		1.2	1.6	2.0	V
Output limiter withstand voltage	V_{OLM}	Io = 10 mA	24.0	25.5	27.0	V
Output saturation voltage	$V_O$sat	Io = 500 mA		1.0	1.3	V
Hall input sensitivity	V_{HN}	Including offset and hysteresis		10	18	mV
RD output saturation voltage	V_{RD}sat	I_{RD} = 5 mA		0.2	0.5	V
RD output leak current	I_{RDL}	V_{RD} = 14V		0.1	10	µA
Thermal protection trigger temperature	T_{TSD}	Assured design target *	150	180	200	°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

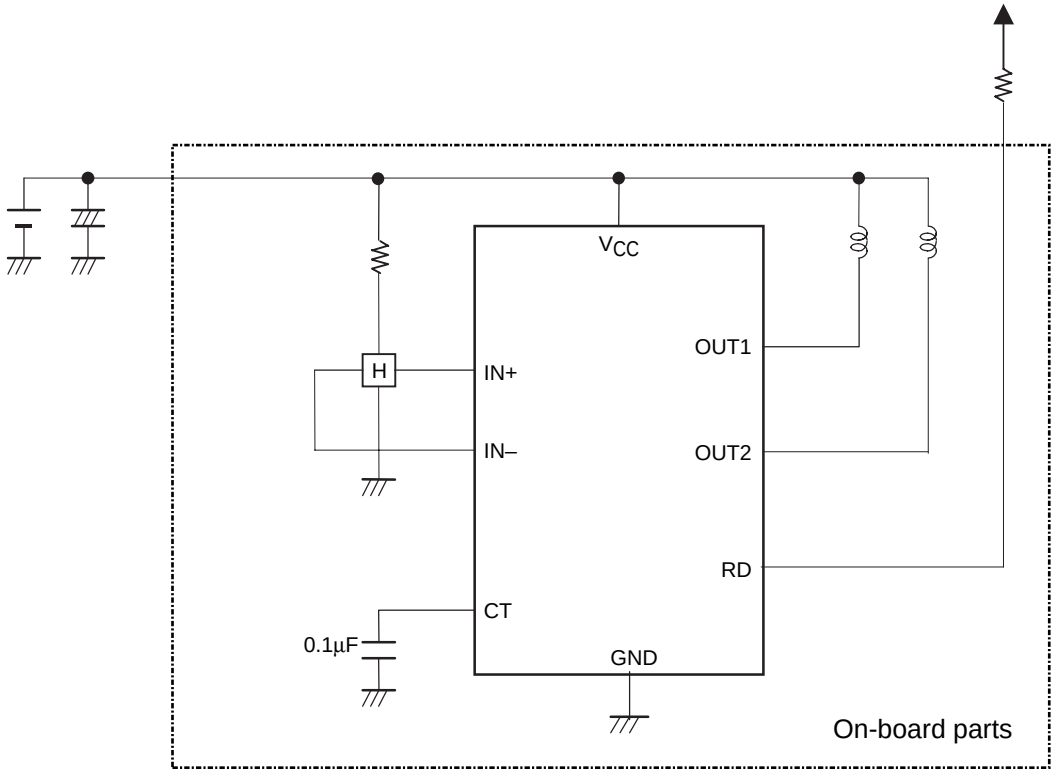
Pin Assignment



Top view

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