



SANYO Semiconductors

# DATA SHEET

## LB11966M

Monolithic Digital IC

For Fan Motor

## 2-phase Half-Wave Driver

### Overview

The LB11966M is a two-phase half-wave brushless motor driver for fan motor.

### Functions

- 2-phase half-wave drive.
- RD (Rotation Detection) outputs incorporated.
- FG (Frequency Generation) outputs incorporated.
- Thermal shutdown circuit incorporated.
- Lock protection and automatic return function incorporated.
- Output protection zener diode incorporated.
- Hall input amplifier incorporated.

### Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	$V_{CC \text{ max}}$		16	V
Output current	$I_{OUT \text{ ave}}$		500	mA
	$I_{OUT \text{ peak}}$	$t \leq 1\text{s}$	1200	mA
Output withstand voltage	$V_{OUT \text{ max}}$		Internal	V
FG/RD output current	$I_{FG/RD \text{ max}}$		10	mA
FG/RD output withstand voltage	$V_{FG/RD \text{ max}}$		16	V
Allowable power dissipation	$P_d \text{ max}$	Mounted on a specified board *	800	mW
Operating temperature	$T_{opr}$		-30 to +85	$^\circ\text{C}$
Storage temperature	$T_{stg}$		-55 to +150	$^\circ\text{C}$

\* Specified board : 114.3mm × 76.1mm × 1.6mm, glass epoxy board.

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## Recommended Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V <sub>CC</sub>		3.0 to 15	V
Common-mode input voltage range	V <sub>COM</sub>		0.2 to V <sub>CC</sub> -2.3	V

## Electrical Characteristics at Ta = 25°C, V<sub>CC</sub>=12V

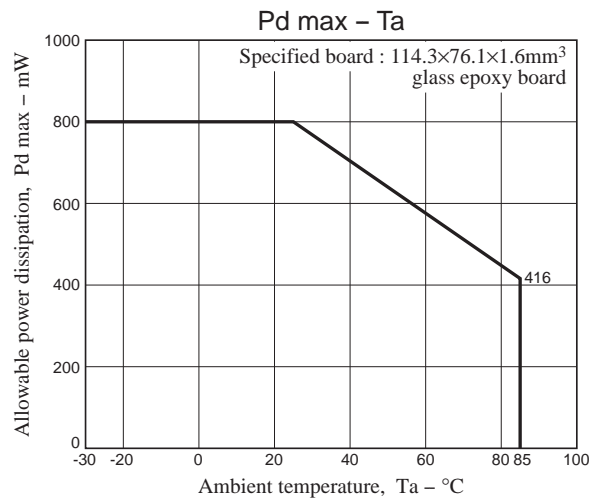
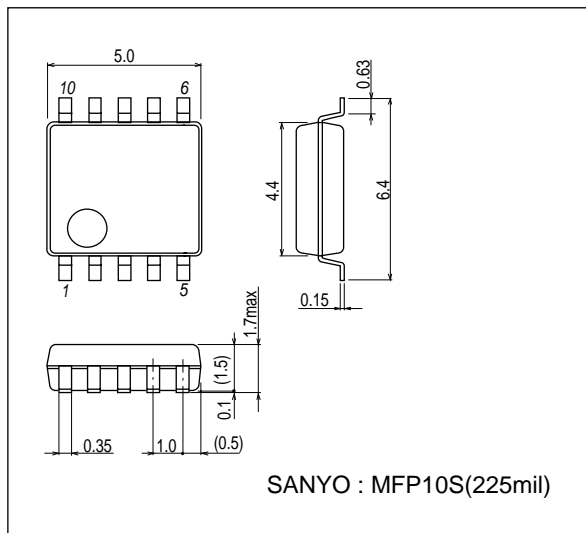
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I <sub>CC</sub>	During driving (CT = L)		4	6	mA
		During lock protection (CT = H)		3	5	mA
CT capacitor charging current	I <sub>CT1</sub>	CT = 0.2	2.4	3.0	3.6	μA
CT capacitor dis-charging current	I <sub>CT2</sub>	CT = 2.0	0.2	0.3	0.4	μA
capacitor charging / dis-charging current ratio	R <sub>CT</sub>	R <sub>CT</sub> = I <sub>CT1</sub> / I <sub>CT2</sub>	8	10	12	
CT charging voltage	V <sub>CT1</sub>		1.4	1.6	1.8	V
CT dis-charging voltage	V <sub>CT2</sub>		0.6	0.8	1.0	V
Output limit withstand voltage	V <sub>OLM</sub>	I <sub>O</sub> = 10mA	23.5	25	26.5	V
Output saturation voltage	V <sub>OL</sub>	I <sub>O</sub> = 500mA		0.95	1.3	V
Hall input sensitivity	V <sub>HN</sub>	Including offset and hysteresis		6	18	mV
RD output saturation voltage	V <sub>RD</sub>	I <sub>RD</sub> = 5mA		0.2	0.5	V
RD output leak current	I <sub>RL</sub>	V <sub>RD</sub> = 14V		0.1	10	μA
RD output saturation voltage	V <sub>FG</sub>	I <sub>FG</sub> = 5mA		0.2	0.5	V
RD output leak current	I <sub>FL</sub>	V <sub>FG</sub> = 14V		0.1	10	μA
Thermal protection function operating temperature	V <sub>TH</sub>	Design target value *	150	180	200	°C

\* Design target value and is not measured.

## Package Dimensions

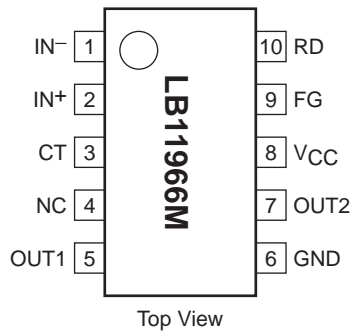
unit : mm (typ)

3086B



# LB11966M

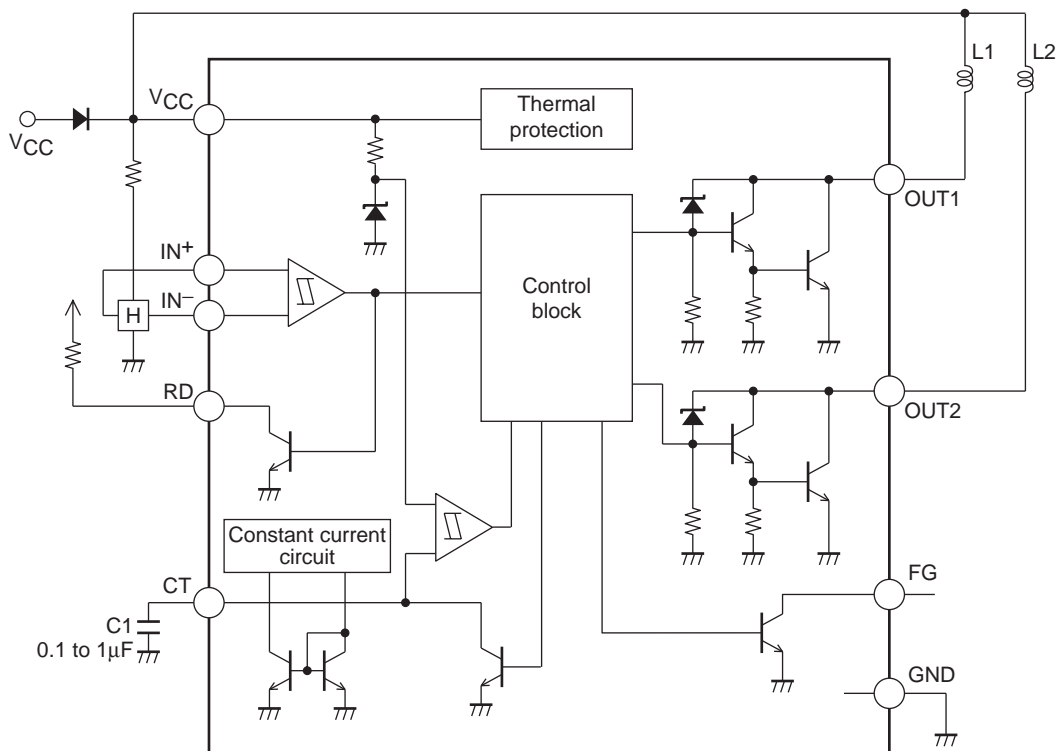
## Pin Assignment



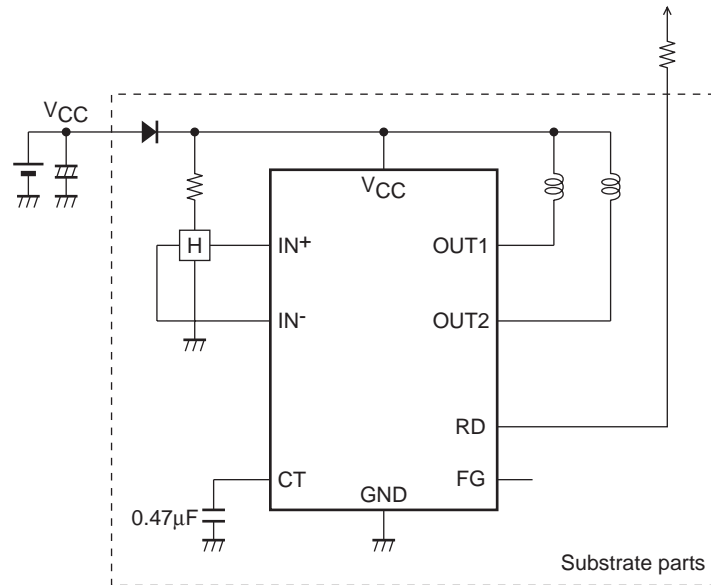
## Truth table

IN <sup>-</sup>	IN <sup>+</sup>	CT	OUT1	OUT2	RD	FG	Mode
H	L	L	L	H	L	L	Rotation
L	H		H	L	L	H	
-	-	H	OFF	OFF	H	-	Lock protection

## Block Diagram



## Application Circuit Example



## Notice

- Take care not to cause interference due to wiring of IN<sup>-</sup> and OUT1.
- In application of connecting the CT pin to GND, lock protection and restart function are not effective.
- 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 500mA, the IC will not be destroyed. If required, insert a diode between V<sub>CC</sub> and the coil.
- The FG pin and RD pin are left open when not used.

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