



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 _{CC}		3.0 to 15	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

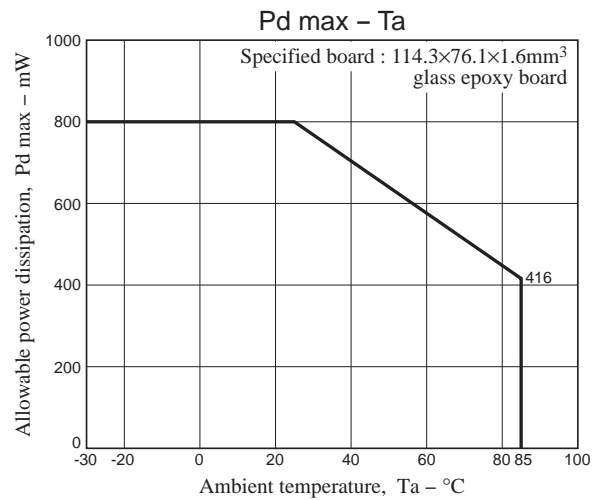
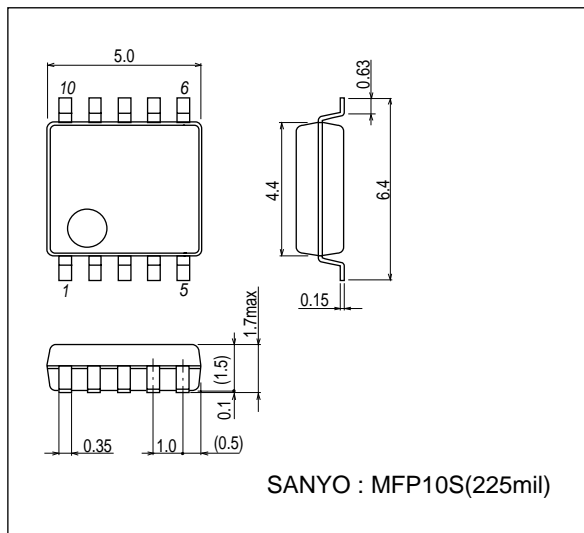
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit current	I _{CC}	During driving (CT = L)		4	6	mA
		During lock protection (CT = H)		3	5	mA
CT capacitor charging current	I _{CT1}	CT = 0.2	2.4	3.0	3.6	μA
CT capacitor dis-charging current	I _{CT2}	CT = 2.0	0.2	0.3	0.4	μA
capacitor charging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

* Design target value and is not measured.

Package Dimensions

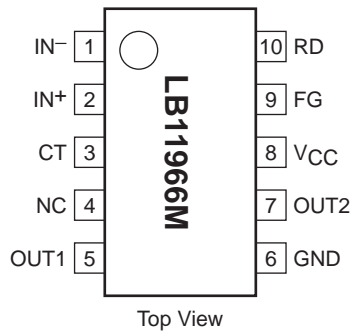
unit : mm (typ)

3086B



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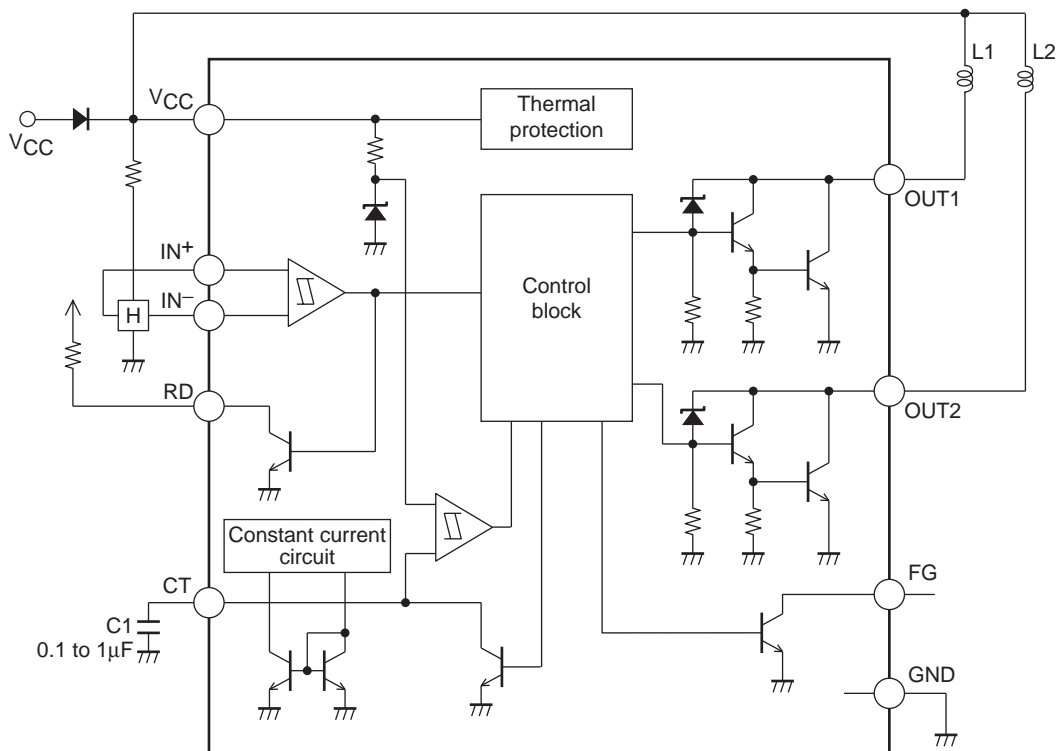
Pin Assignment



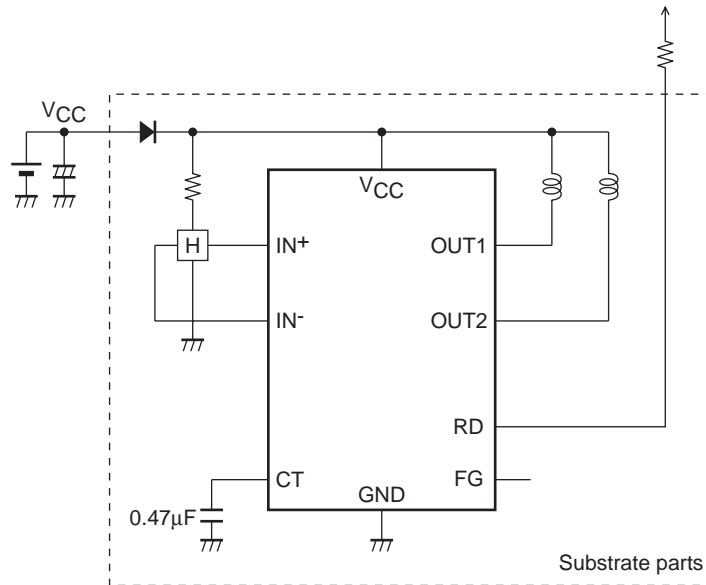
Truth table

IN ⁻	IN ⁺	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⁻ 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_{CC} and the coil.
- The FG pin and RD pin are left open when not used.

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