Ordering number : EN8776

SANYO Semiconductors
DATA SHEET

LA6585M — Monolithic Digital IC For Motor Driver BTL Driver Single-Phase Full-Wave

Overview

The LA6585M is single-phase bipolar fan motor is driven, through BTL output linear drive, at high efficiency, low power, and low sound by suppressing the reactive power. Lock protection, rotary signal circuits are incorporated, which is optimum for the notebook PC, consumer equipment power supply, car audio system, CPU cooler, etc. that require high reliability and low noise.

Functions and features

- Pre-driver for single-phase full-wave drive
- Single-phase full-wave linear drive by BTL output (gain resistance 1kΩ-360kΩ, 51dB)
  : No switching noise, which is optimum for equipment requiring silence, such as consumer equipment power supply, car audio system, etc.
- Low-voltage operation possible, with wide operating voltage range (2.2 to 14.0V)
- Low saturation output (Upper + lower saturation voltage : $V_O$sat (total) = 1.2Vtyp, I_O = 250mA)
  : High coil efficiency with low current drain. Additionally, IC itself generates only small heat.
- Built-in lock protection and automatic reset circuits
- Built-in FG & RD outputs
- Built-in Hall bias (V_{HB} = 1.5V)
- Thermal protection circuit
  : When the large current flows due to output short-circuit and the IC chip temperature exceeds 180°C, this protective circuit suppresses the drive current to prevent burn and damage to IC.
- Extra-small & high heat capacity package

SANYO Semiconductor Co., Ltd.
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC} max		15	V
Allowable power dissipation	Pd max	Mounted on a specified board*	800	mW
Output current	I_{OUT} max		0.7	A
Output withstand voltage	V_{OUT} max		15	V
RD/FG output pin output withstand voltage	$V_{RD/FG}$ max		15	V
RD/FG output current	$I_{RD/FG}$ max		10	mA
HB output current	I_B max		10	mA
Operating temperature	Topr		-30 to +90	°C
Storage temperature	Tstg		-55 to +150	°C

*: Mounted on a specified board: 114.3mm×76.1mm×1.6mm glass epoxy

Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		2.2 to 14.0	V
Common-phase input voltage range of Hall input	V_ICM		0 to V_{CC}-1.5	V

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

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Circuit Current	$I_{CC}1$	During drive (CT = L)	3	6	9	mA
	$I_{CC}2$	During lock protection (CT = H)	2.5	5	7.5	mA
Lock detection capacitor charge current	$I_{CT}1$		0.9	1.2	1.5	μA
Capacitor discharge current	$I_{CT}2$		0.10	0.18	0.25	μA
Capacitor charge and discharge current ratio	R_{CT}	RCD = $I_{CT}1/I_{CT}2$	5	6.5	8	-
CT charge voltage	$V_{CT}1$		1.3	1.5	1.7	V
CT discharge voltage	$V_{CT}2$		0.3	0.5	0.7	V
OUT output L saturation voltage	V_{OL}	I_O = 200mA		0.25	0.45	V
OUT output H saturation voltage	V_{OH}	I_O = 200mA		0.95	1.2	V
Hall input sensitivity	V_{HN}	Zero peak value (including offset and hysteresis)		7	15	mV
Hall bias voltage	V_{HB}	I_{HB} = 5mA	1.3	1.5	1.7	V
FG/RD output pin L voltage	$V_{FG/RD}$	$I_{RD/FG}$ = 5mA		0.15	0.3	V
FG/RD output pin leak current	$I_{FG/RDL}$	$V_{RD/FG}$ = 15V		1	30	μA

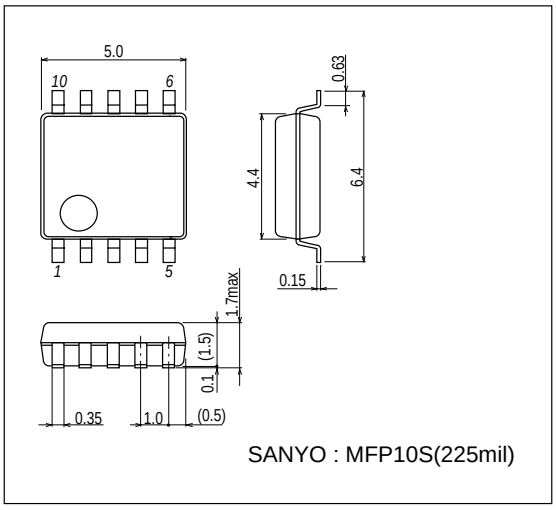
Truth Table

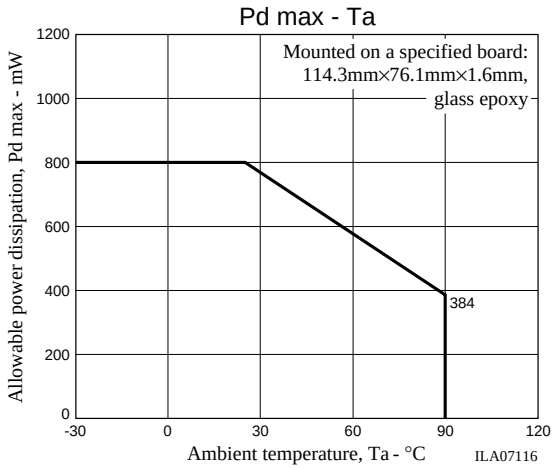
IN-	IN+	CT	OUT1	OUT2	FG	RD	Mode
H	L	L	H	L	L	L	During rotation
L	H		L	H	H		
-	-	H	off	off	-	H	During overheat protection

Package Dimensions

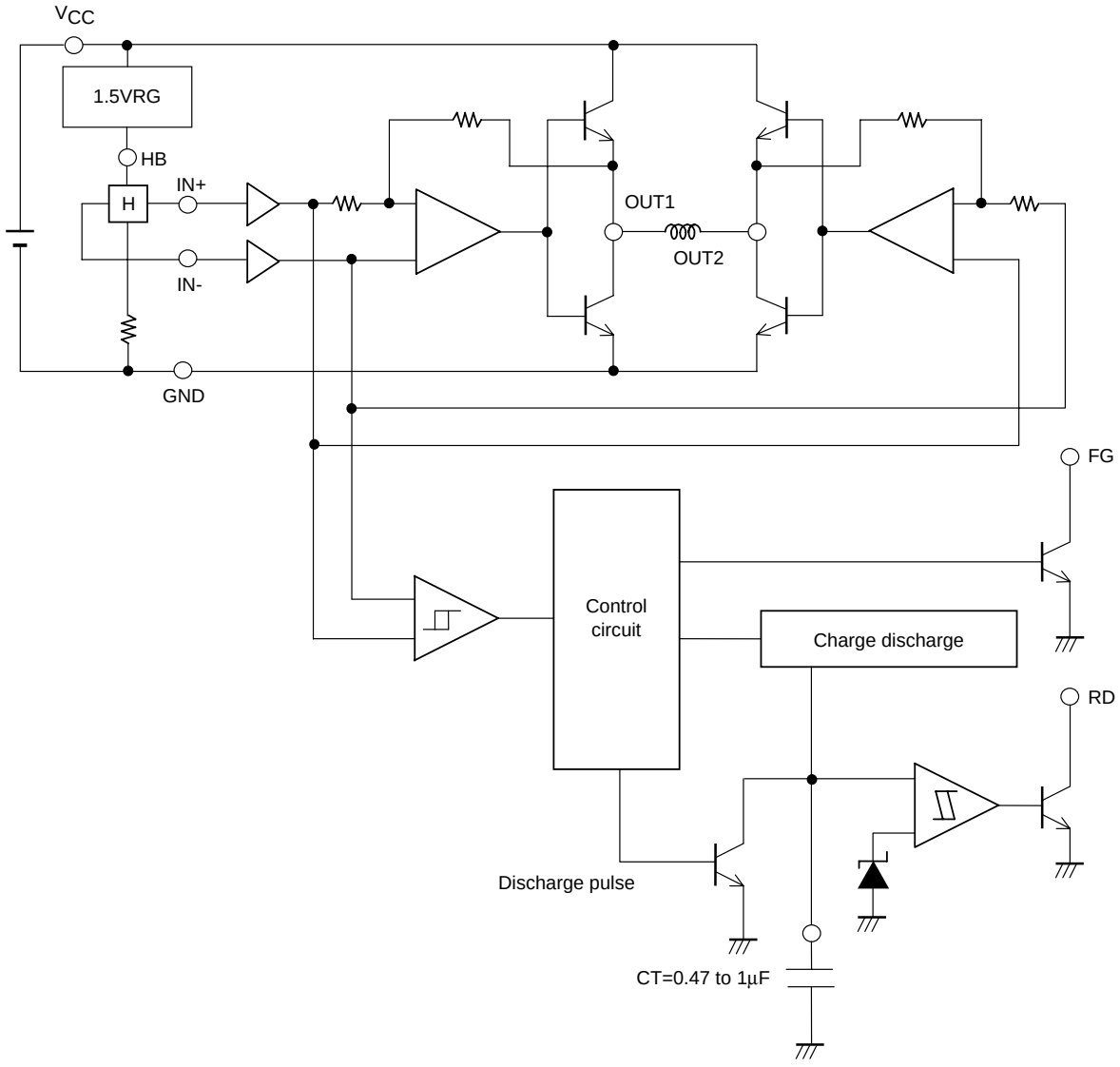
unit : mm (typ)

3086B

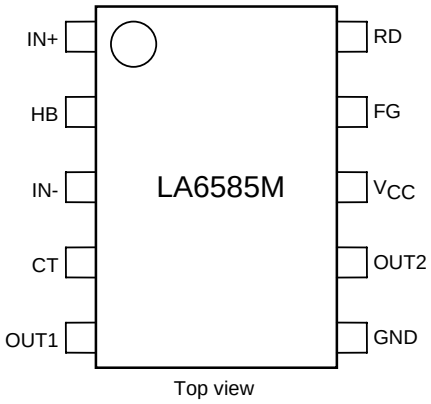




Block Diagram

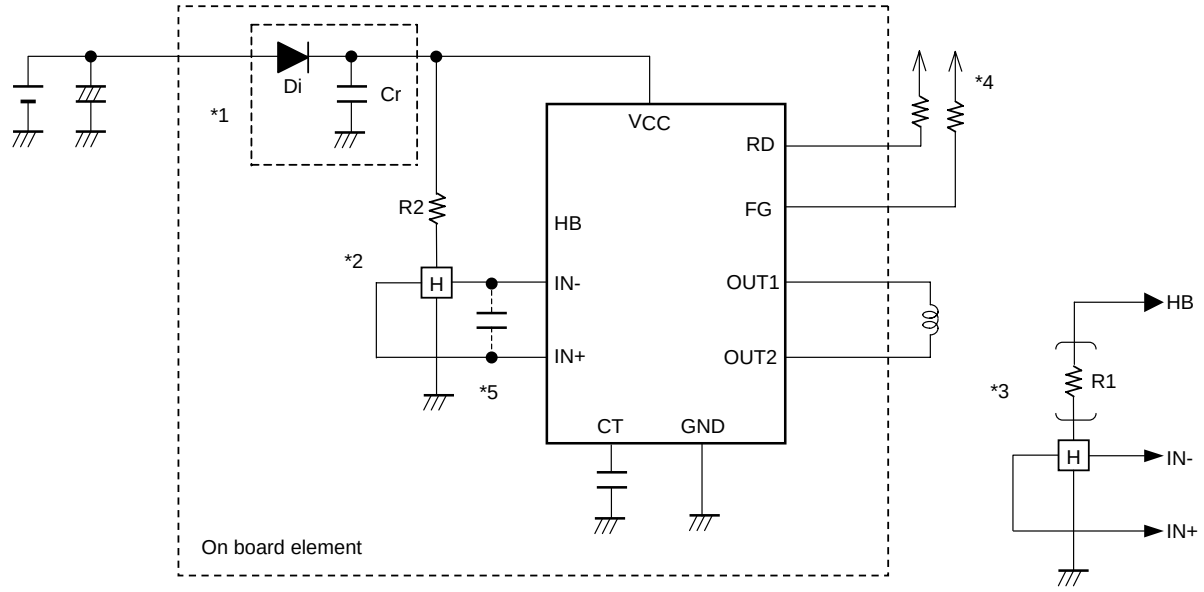


Pin Assignment



Top view

Sample Application Circuit



*1: When the breakdown protective DI at reverse connection is to be used, it is necessary to insert the capacitor Cr to secure the regenerative current route. Similarly, Cr must be provided to enhance the reliability when there is no capacitor near the fan power line.

*2: To obtain Hall bias from V_{CC}, carry out bias to V_{CC} with resister R2 as shown in the figure. Linear driving is made through voltage control of the coil by amplifying the Hall output. When the Hall element output is large, the startup performance and efficiency are improved. Adjustment of the Hall element can reduce the noise further.

*3: To obtain Hall bias from the HB pin, carry out constant-voltage bias at about 1.5V, which enables the Hall element to generate the stable Hall output satisfactory in temperature characteristics. Adjustment of the Hall output amplitude is made with R1. (When V_{CC}=12V, the step *2 above proves advantageous for IC heat generation.)

*4: Keep this open when not using.

*5: When the wiring from the Hall output to IC Hall input is long, noise may be carried through the wiring. In this case, insert the capacitor as shown in the figure.