Ordering number : EN 4188

Monolithic Digital IC

SANYO No.4188

LB1855M

3-Phase Brushless Motor Driver

The LB1855M is a 3-phase brushless motor driver IC ideally suited for use in VCR drum motor driver.

Features

- Linear current drive type
- Output electrolytic capacitor is not required
- Built-in current limiter circuit
- Built-in AGC circuit
- Built-in thermal shutdown circuit

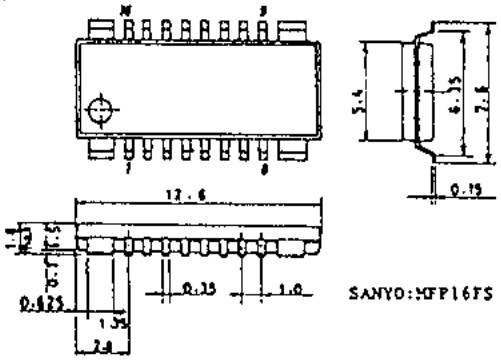
Specifications	Symbol	Test conditions	Limits	Unit
Maximum supply voltage	V CC max		20	V
Maximum output current	I O max		1.2	A
Allowable power dissipation	P d max	w/PCB*	1.2	W
Ambient Temperature	T opg		-20 to + 75	°C
Storage temperature	T stg		-55 to +150	°C

*: Specified PCB (20 x 30 x 1.5 mm^3, glass epoxy resin)

Allowable Operating Conditions at Ta = 25°C

Specifications	Symbol	Test conditions	Limits	Unit
Supply voltage	V CC		7.0 to 18	V
Hall input amplitude between inputs	V HALL	Between inputs	70 to 300	mVp-p

Case Outline 3097
(unit: mm)



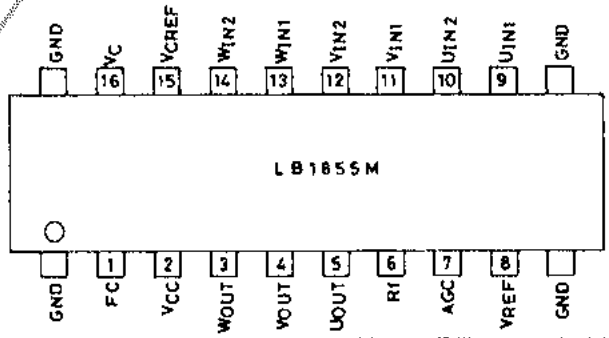
Specifications and information herein are subject to change without notice.

Electrical Characteristics at Ta = 25°C, V CC = 12 V

Specification	Symbol	Test conditions	Min.	Typ.	Max.	Unit	Note 1
Supply current	I CC1	V C = GND			8	mA	
Reference voltage	V REF	I R = 8 mA	6.0	6.3	6.6	V	
[Saturation voltage]							
Upper side	V SAT1	I O = 1 A		1.5	1.9	V	
Lower side	V SAT2	I O = 1 A		0.8	1.2	V	
[Leak current]							
Upper side	I OL1	V CC = 18 V			50	μA	
Lower side	I OL2	V CC = 18 V			50	μA	
[Hall amp]							
Hall amp offset voltage	V HO		-10		+10	mV	※
Common-mode input voltage range	V HCM		2.2		Vref-0.7	V	
[Control amp]							
Control reference voltage	V REF1	(Note 2)	2.1	2.3	2.5	V	
Voltage gain	G V			1.0		A/V	
Input current	I IN				10	μA	
[Thermal shutdown]							
Operating temperature	T TSD			180		°C	※
Hysteresis range	ΔT TSD			15		°C	※

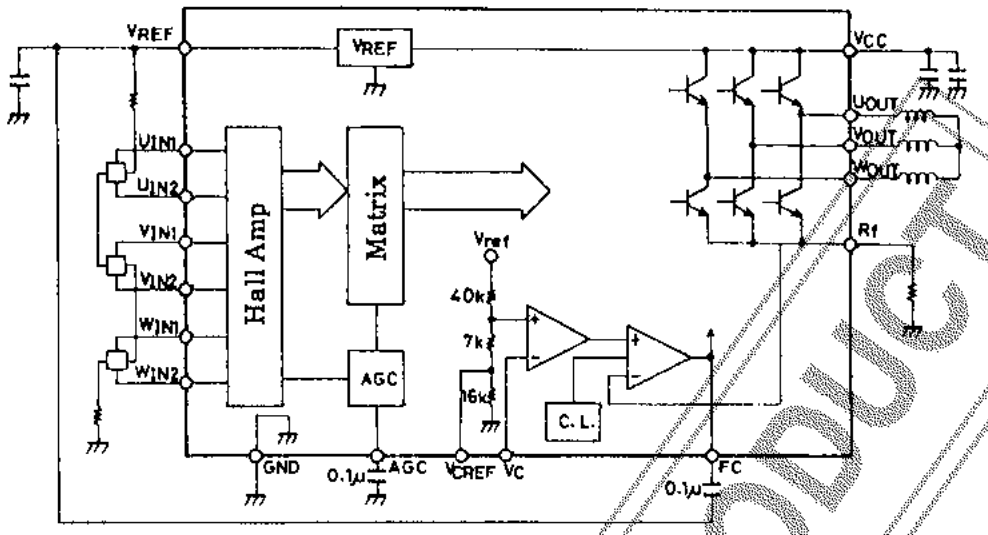
Note 1 ※ : Setting reference only, no measurement taken
Note 2 : (Voltage on V_{CREF} pin)×23/16

Pin Assignment



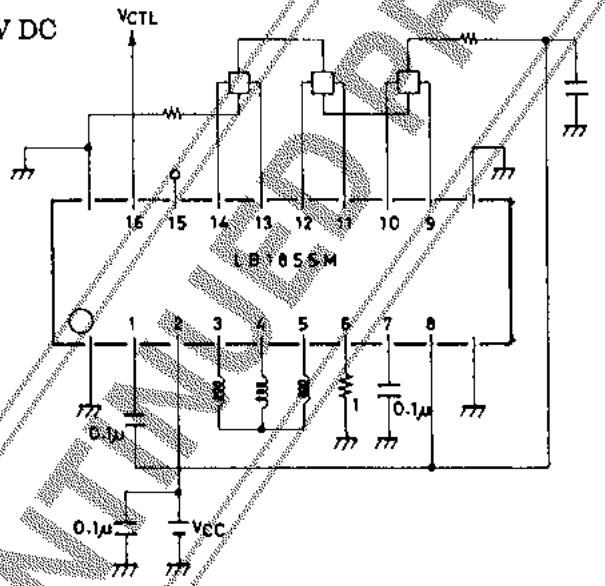
(Top view)

Block Diagram



Typical Application

Hall input range : 2.2 to 5.3V DC
70mVp-p to 300mVp-p AC

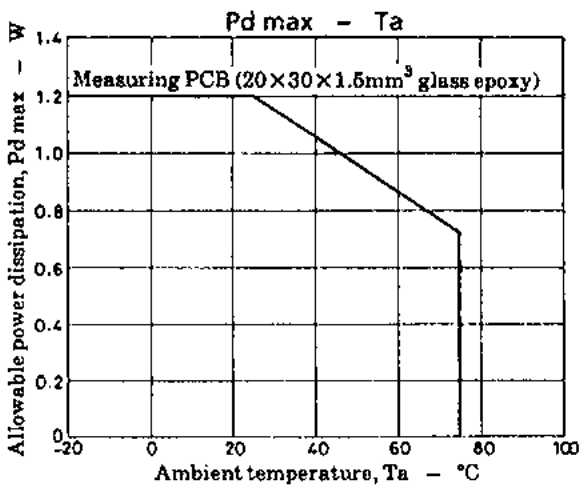


Some motors require output capacitor for oscillation prevention.

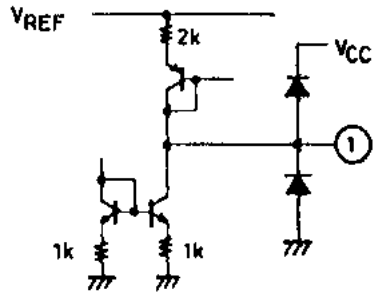
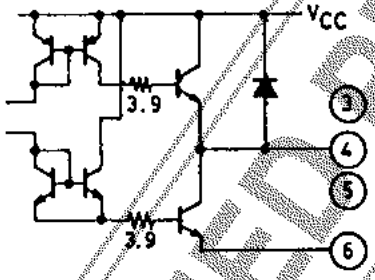
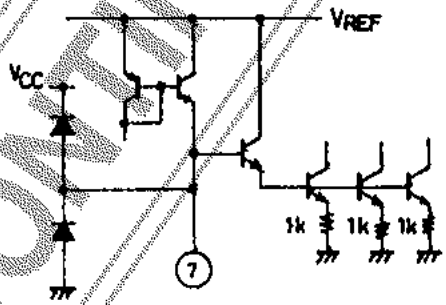
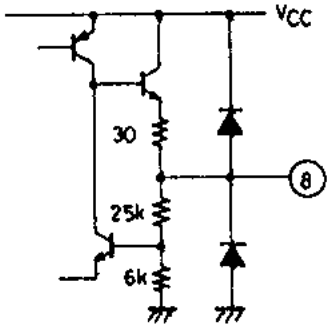
Truth Value Table

	Source → Sink	Input		
		U	V	W
1	V phase → W phase	H	H	L
2	U phase → W phase	H	L	L
3	W phase → V phase	L	L	H
4	V phase → U phase	L	H	L
5	U phase → V phase	H	L	H
6	W phase → U phase	L	H	H

Input: "H" : Input 1 of each phase is higher than input 2 by 0.2 V.
"L" : Input 1 of each phase is lower than input 2 by 0.2 V.



Pin Description

Pin No.	Pin Symbol	Pin Voltage	Equivalent circuit	Description
1	FC			Used to compensate for frequency response. A capacitor placed between this pin and VREF will prevent the current control closed loop from oscillating.
2	V CC	7 to 18 V		Accepts voltage supply
3 4 5	W OUT V OUT V OUT			Output
6	Rf			Return of the output transistor. A resistor Rf placed between this pin and GND senses output current and acts as a constant current drive source. The current limiter monitors the voltage across Rf resistor.
7	AGC			When a capacitor is connected between this pin and GND, the circuit controls the gain of the hall amp in accordance with the level of the hall input.
8	V REF			Reference point of internal voltages. Approx. 6.3 V

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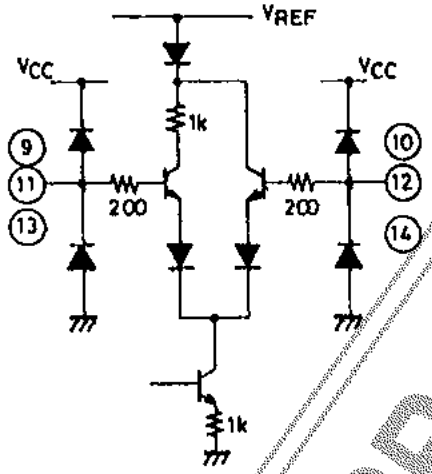
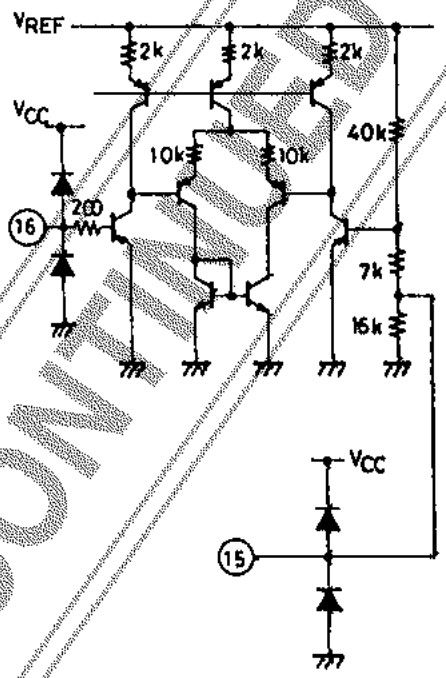
Pin No.	Pin Symbol	Pin Voltage	Equivalent circuit	Description
9 10 11 12 13 14	U IN1 U IN2 V IN1 V IN2 W IN1 W IN2	2.2 V to VREF 0.7 V		Input of hall element
15 16	V CREF VC	0 to 5 V		Used to control the speed. The voltage on pin 16 is used in the current control mode and determines the amount of output current. Connecting the pin 15 to GND decreases the control start voltage by 1.3 - 1.4 volts.