

Ordering number : EN5798

Monolithic Digital IC



LB1855NM

3-Phase Brushless Motor Driver

Overview

The LB1855NM is a 3-phase brushless motor driver IC that is optimal for VCR drum motor drive.

Features

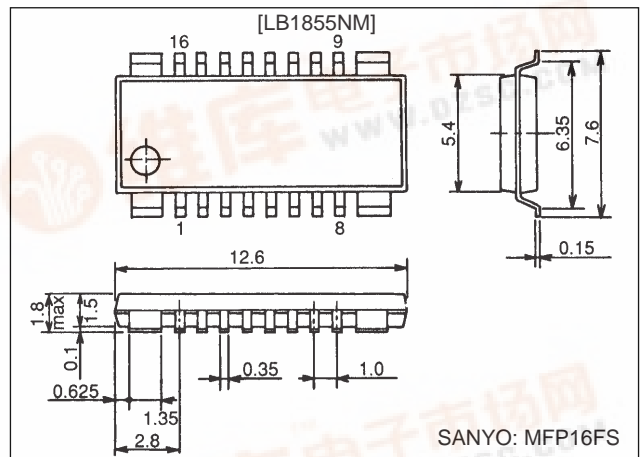
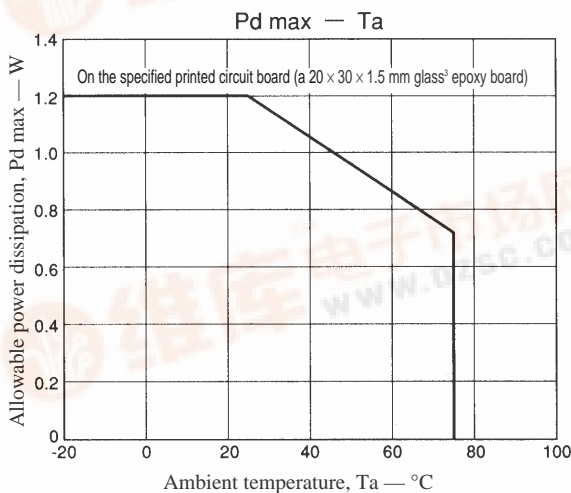
- Current linear drive
- No output electrolytic capacitors required.

- Current limiter circuit built in
- AGC circuit built in
- Thermal shutdown circuit built in

Package Dimensions

unit: mm

3097-MFP16FS



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V _{CC} max		20	V
Maximum output current	I _O max		1.2	A
Allowable power dissipation	Pd max	On the specified printed circuit board (a 20 × 30 × 1.5 mm ³ glass epoxy board)	1.2	W
Operating temperature	T _{opr}		-20 to +75	°C
Storage temperature	T _{stg}		-55 to +150	°C

Allowable Operating Ranges at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Supply current	V _{CC}		7 to 18	V
Hall input amplitude	V _{HALL}	Between the Hall inputs	70 to 300	mVp-p

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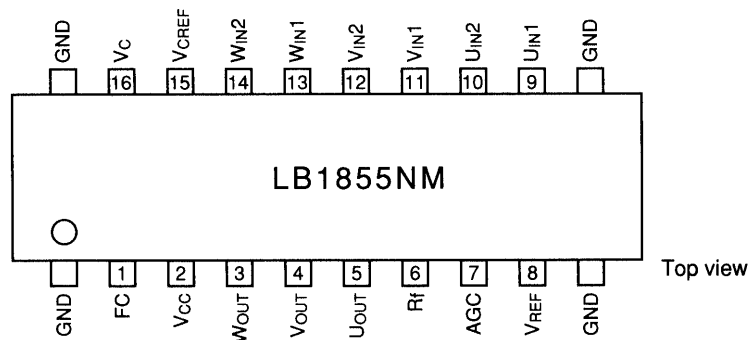
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Electrical Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC} = 12\text{ V}$

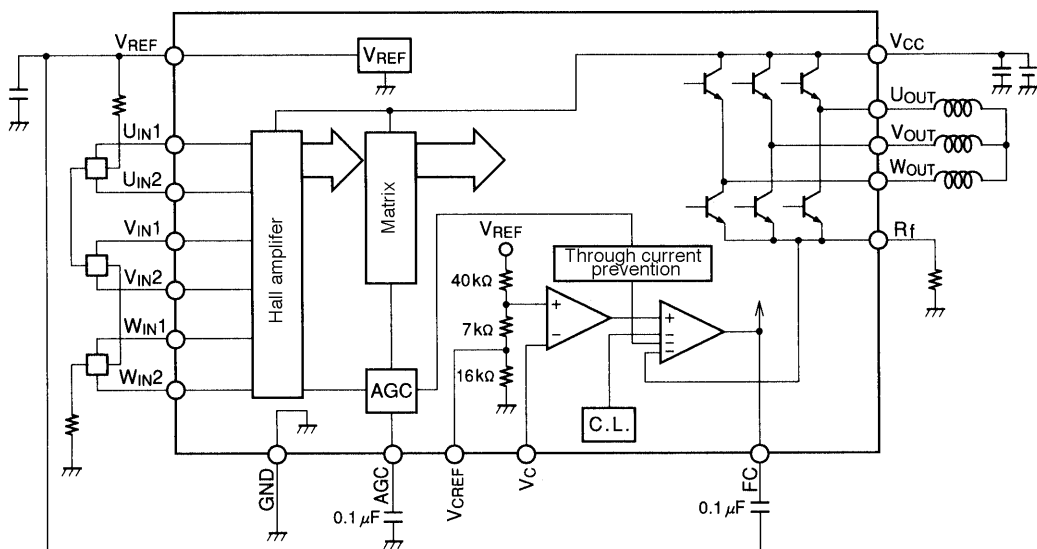
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Supply current	I_{CC}	$V_C = \text{GND}$			8	mA
Reference voltage	V_{REF}	$I_R = 8\text{ mA}$	6.0	6.3	6.6	V
[Saturation voltage]						
Upper side	V_{sat1}	$I_O = 1\text{ A}$		1.5	1.9	V
Lower side	V_{sat2}	$I_O = 1\text{ A}$		0.8	1.2	V
[Leakage current]						
Upper side	I_{OL1}	$V_{CC} = 18\text{ V}$			50	μA
Lower side	I_{OL2}	$V_{CC} = 18\text{ V}$			50	μA
[Hall Amplifier]						
Input offset voltage	V_{HO}	*	-10		+10	mV
Common-mode input voltage range	V_{HCM}		2.2		$V_{CC} - 0.7$	V
[Control Amplifier]						
Control reference voltage	V_{REF1}	(the V_{CREF} pin voltage) $\times 23/16$	2.1	2.3	2.5	V
Control Gm	V_G	$R_f = 1\Omega$		1		A/V
Input current	I_{IN}				10	μA
[Thermal Shutdown Circuit]						
Operating temperature	T_{TSD}	*		180		$^\circ\text{C}$
Hysteresis	ΔT_{TSD}	*		15		$^\circ\text{C}$

Note: Items marked with an asterisk (*) are design target values and are not tested.

Pin Assignment



Block Diagram

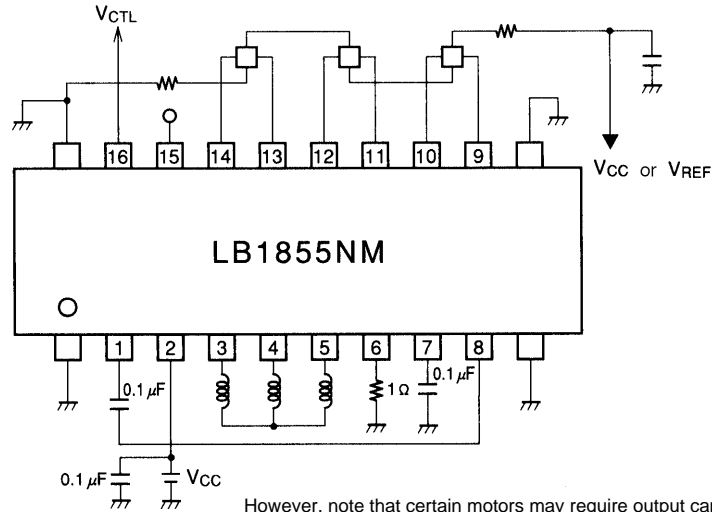


However, note that certain motors may require output capacitors to prevent oscillation.

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Sample Application Circuit

Hall input voltage range: 2.2 to ($V_{CC} - 0.7$) V DC
 70 mV p-p to 300 mV p-p AC



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Truth Table

Item	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" indicates that the input phase 1 is at least 0.2 V higher than phase 2.
 "L" indicates that the input phase 1 is at least 0.2 V lower than phase 2.

Pin Functions

Pin No.	Pin	Pin voltage (V)	Pin description	Equivalent circuit
1	FC		<ul style="list-style-type: none"> Frequency characteristics correction Oscillation in the current control closed loop can be prevented by inserting a capacitor between this pin and VREF. 	
2	V_{CC}	7 to 18	<ul style="list-style-type: none"> Power supply pin 	
3 4 5	W_{OUT} V_{OUT} U_{OUT}		<ul style="list-style-type: none"> Outputs pin 	
6	R_f		<ul style="list-style-type: none"> Ground for the output transistor The output current can be detected as a voltage by inserting the resistor R_f between this pin and ground to provide fixed current drive. The current limiter also operates by detecting this voltage. 	

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Pin No.	Pin	Pin voltage (V)	Pin description	Equivalent circuit
7	AGC		<ul style="list-style-type: none"> AGC pin The Hall amplifier gain can be controlled according to the amplitude of the Hall input by inserting a capacitor between this pin and ground. 	
8	VREF		<ul style="list-style-type: none"> Internal reference voltage. About 6.3 V. 	
9 10 11 12 13 14	U _{IN1} U _{IN2} V _{IN1} V _{IN2} W _{IN1} W _{IN2}	2.2 to V _{CC} - 0.7	<ul style="list-style-type: none"> Hall element inputs pin 	
15 16	V _{CREF} V _C	0 to 5	<ul style="list-style-type: none"> Speed control pin This IC adopts a current control type in which the output current is controlled by the pin 16 voltage. The control start voltage changes about 1.3 to 1.4 V if pin 15 is connected to ground. 	

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