

SANYO	No.3381	LB1684
	3-Phase DD Motor Driver	

The LB1684 is a 3-phase DD motor driver IC ideally suited for use in low-supply VTR capstan motor drive, drum motor drive, and floppy disk motor drive applications.

Features and Functions

- Designed for 5V-supply control system.
- Voltage-control system/current-control system available
- Speed control available
- Bidirectional control available
- 20V/1.5A rating

Absolute Maximum Ratings at Ta = 25°C

			unit
Maximum Supply Voltage	V _{CC1}	22	V
	V _{CC2}	7	V
Output Current	I _O	1.5	A
Allowable Power Dissipation	P _{d max}	2.2	W
Operating Temperature	T _{opr}	- 20 to +75	°C
Storage Temperature	T _{stg}	- 55 to +125	°C

Allowable Operating Conditions at Ta = 25°C

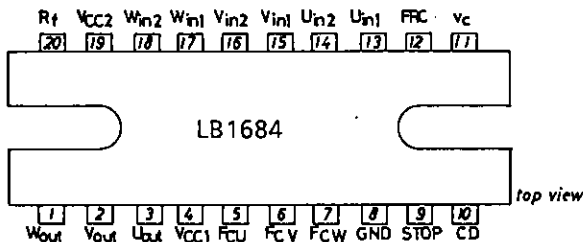
			unit
Supply Voltage	V _{CC1}	7.0 to 20	V
	V _{CC2}	4.3 to 6.3	V

Electrical Characteristics at Ta = 25°C, V_{CC1} = 12V, V_{CC2} = 5.0V

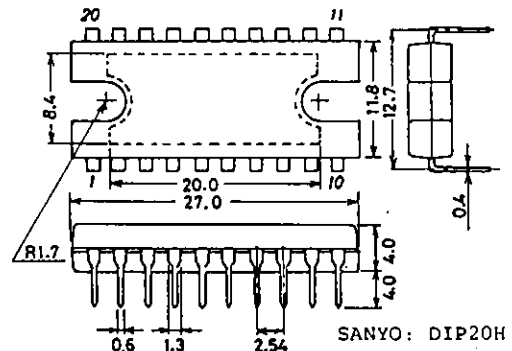
			min	typ	max	unit
Supply Current	I _{CC(off)}	V _C = 0V, I _{CC1} + I _{CC2}		13	18	mA
	I _{CC(dri)}	V _C = 4V, I _{CC2}		20	40	mA
Output Saturation Voltage	V _{O(sat)1}	I _O = 0.58A sink + source	1.4		2.1	V
	V _{O(sat)2}	I _O = 1A sink + source	2.0		3.5	V
Common-Mode Input Voltage Range			1.3	V _{CC2} - 1.3		V

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Pin Assignment



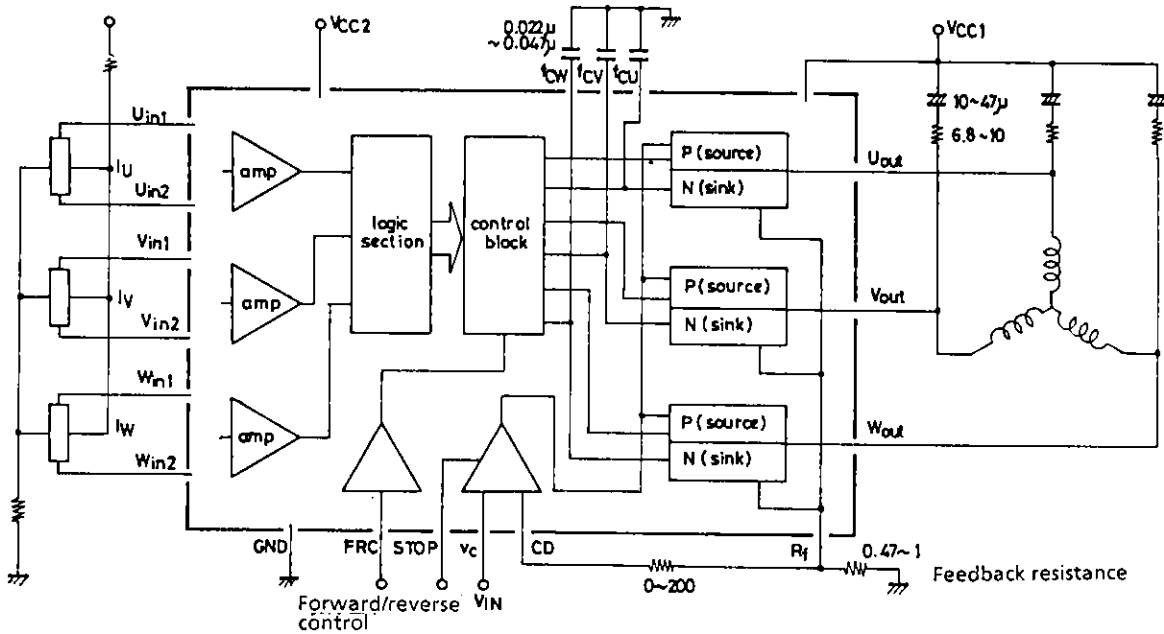
Package Dimensions 3037A-D20HIC (unit: mm)



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		min	typ	max	unit
Motor Forward Rotation		2.0		V _{CC2}	V
Input Voltage Range					
Motor Reverse Rotation		0		0.3	V
Input Voltage Range					
Interphase Current Variation	Driver stage	-25	0	+25	%
	Output stage	-25	0	+25	%
Speed Control Voltage (OFF)	V _{C1}			2.1	V
Speed Control Voltage (ON)	V _{C2}			2.58	V
	V _{C3}			2.7	V
Closed-Loop Voltage Gain			0.44		A/V
Input Sensitivity	Hall input		20		mVpeak

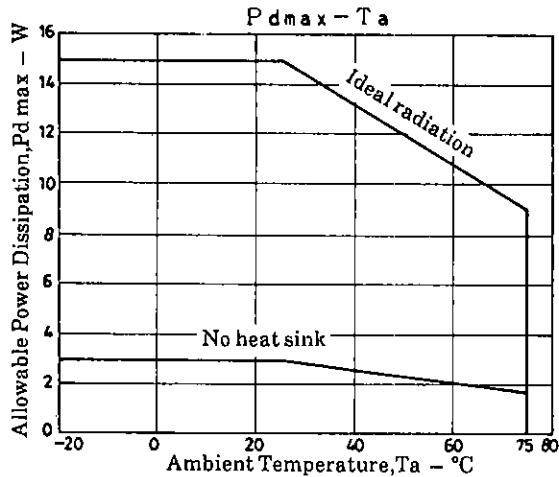
Equivalent Circuit Block Diagram and Peripheral Circuit



Unit (resistance: Ω, capacitance: F)

Truth Table

	Source Sink	Input			Forward/Reverse Control
		U	V	W	F/R/C
1	W phase → V phase	H	H	L	L
	V phase → W phase				H
2	W phase → U phase	H	L	L	L
	U phase → W phase				H
3	V phase → W phase	L	L	H	L
	W phase → V phase				H
4	U phase → V phase	L	H	L	L
	V phase → U phase				H
5	V phase → U phase	H	L	H	L
	U phase → V phase				H
6	U phase → W phase	L	H	H	L
	W phase → U phase				H



Pin Description

Pin Name	Pin No.	Description
U _{IN1} , U _{IN2}	13, 14	U phase hall element input pin. 'H' of logic : $V_{IN1} > V_{IN2}$
V _{IN1} , V _{IN2}	15, 16	V phase hall element input pin. 'H' of logic : $V_{IN1} > V_{IN2}$
W _{IN1} , W _{IN2}	17, 18	W phase hall element input pin. 'H' of logic : $V_{IN1} > V_{IN2}$
U _{OUT}	3	U phase output pin
V _{OUT}	2	V phase output pin
W _{OUT}	1	W phase output pin
V _{CC1}	4	Power supply pin for applying output
V _{CC2}	19	Power supply pin for applying voltage to each section other than output section. The control point of control voltage is at approximately 1/2 of this voltage. This voltage must be stabilized to be free from ripple, noise, etc.
R _f	20	Output current detect pin. By connecting R _f across this pin and GND pin, output current is detected as voltage.
C _D	10	Pin for fetching current (voltage) detected with R _f . By connecting a resistor across C _D pin and R _f pin, speed control start voltage can be fine-adjusted.
STOP	9	Overcurrent protection pin. Voltage being lower than that on C _D pin is taken to be identical to overcurrent flow, causing output to be cut off. For example, if STOP pin is set to 1.5V for R _f =1Ω, approximately 1.5A or more flows at output, causing output to be cut off.
F _{CU}	5	Frequency characteristic compensation pin.
F _{CV}	6	Closed-loop oscillation in current-controlled system (including motor, F-V converter) is stopped.
F _{CW}	7	
V _C	11	Speed/phase control pin. Control starts at approximately 1/2 of V _{CC2} . Control is of current-controlled type that controls output current. For R _f =1Ω, LB1684 closed-loop has gm=0.44A/V typ, which can be adjusted by varying R _f .
GND	8	GND for other than output. Minimum potential of output transistor is at R _f pin.
F/R	12	Forward/reverse control pin. By setting this pin to 'H' (more than 2.0V)/'L' (less than 0.3V), truth value is changed to perform forward/reverse rotation.

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