

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

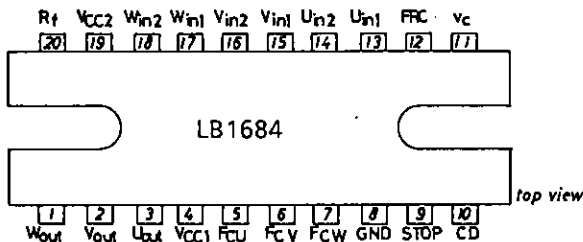
			unit
Supply Voltage	V _{CC1}	7.0 to 20	V
	V _{CC2}	4.3 to 6.3	V

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

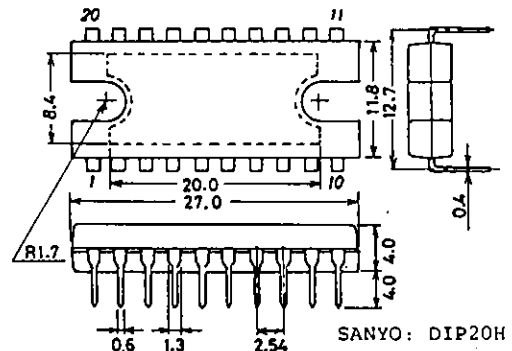
Supply Current	I _{CC(off)} V _C = 0V, I _{CC1} + I _{CC2}	13	18		mA
	I _{CC(dri)} V _C = 4V, I _{CC2}	20	40		mA
Output Saturation Voltage	V _{O(sat)1} I _O = 0.58A sink + source	1.4	2.1		V
	V _{O(sat)2} I _O = 1A sink + source	2.0	3.5		V
Common-Mode Input Voltage Range		1.3	V _{CC2} - 1.3		V

Continued on next page.

Pin Assignment



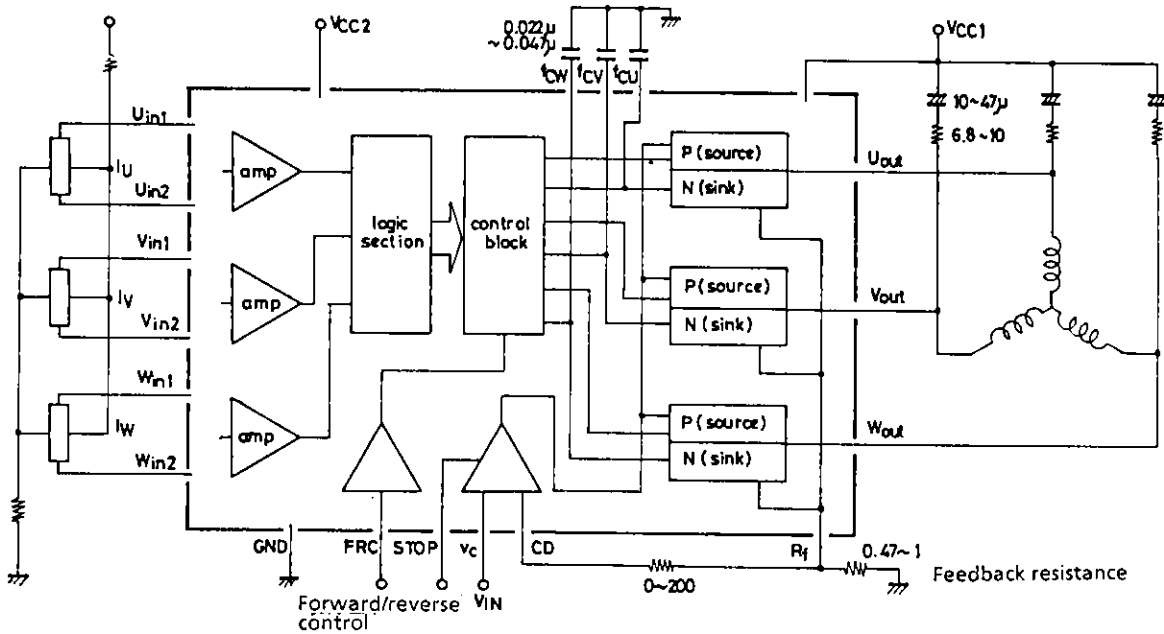
Package Dimensions 3037A-D20HIC (unit: mm)



Continued from preceding page.

		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}			2.38	V
	V _{C3}			2.7	V
Closed-Loop Voltage Gain			0.44		A/V
Input Sensitivity	Hall input		20		mVpeak

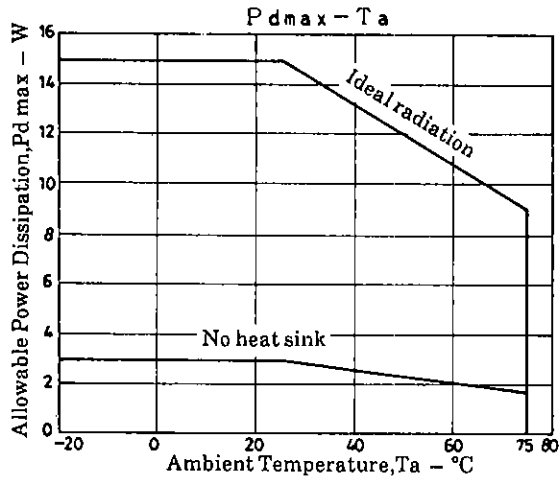
Equivalent Circuit Block Diagram and Peripheral Circuit



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.

- No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.
- Anyone purchasing any products described or contained herein for an above-mentioned use shall:
 - ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use;
 - ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.
- Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.