Ordering number:EN3221A

Monolithic Digital IC

LB1648

Dual Bidirectional Motor Driver

Overview

The LB1648 is a dual bidirectional motor driver. It is especially suited for reel motor in cassette deck.

Features

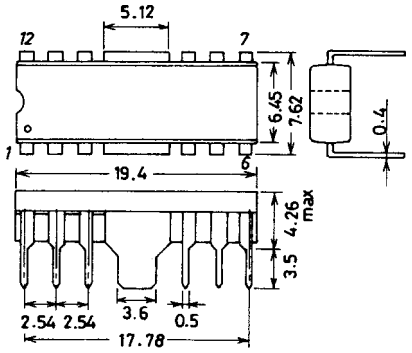
- 2-input logic can be used to exercise control of bidirectional driving, braking and open.
- Output voltage variable by use of external Zener diode.
- On-chip thermal protector.

Package Dimensions

unit:mm

3022A-DIP12F

[LB1648]



SANYO : DIP12F

Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		18	V
Input voltage	V_{IN}		18	V
Output current	I_O		±0.8	A
Allowable power dissipation	Pd max		1.9	W
Operating temperature	Topr		–25 to +75	˚C
Storage temperature	Tstg		–55 to +125	˚C

Allowable Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Supply voltage	V_{CC}		7 to +16	V

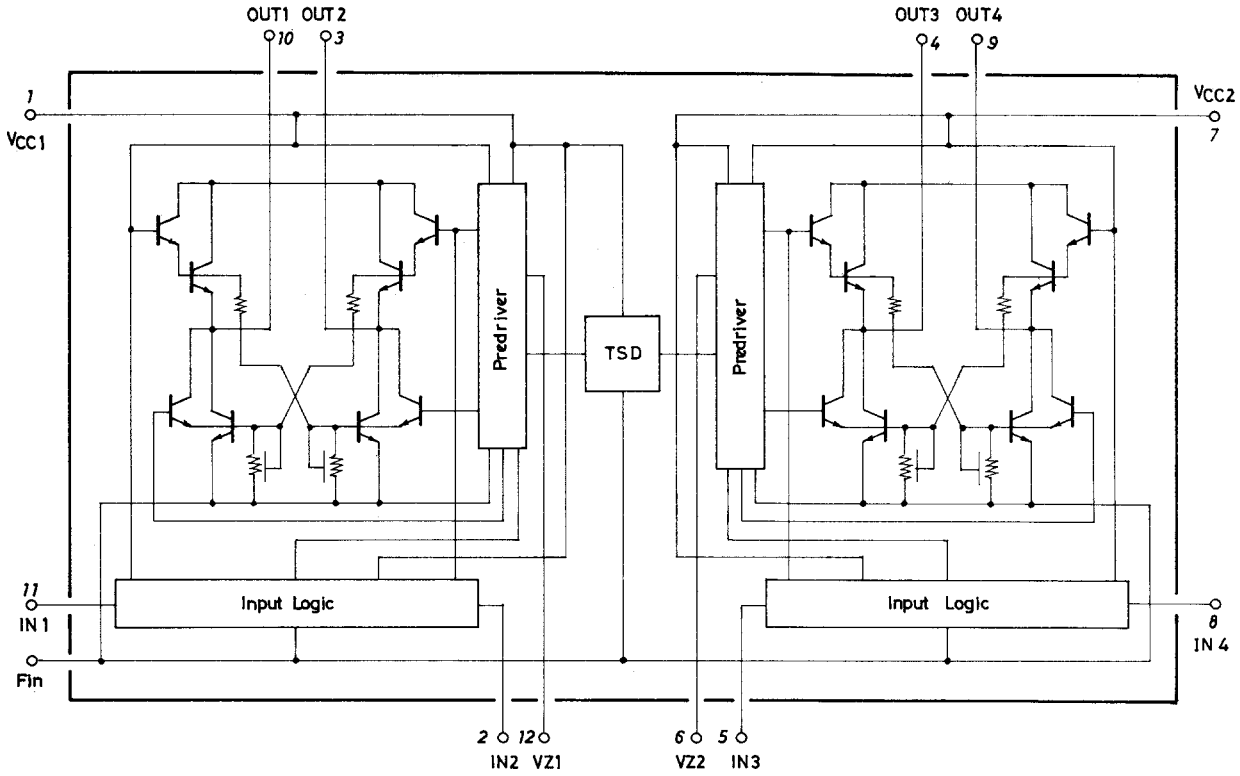
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters

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

Electrical Characteristics at Ta = 25˚C, V_{CC}=12V, per channel

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current drain	I_{CC1}	Pin 1 forward, R_L=∞, V_Z=4V		15	22	mA
	I_{CC2}	Pin 7 forward, R_L=∞, V_Z=4V		14	20	mA
	I_{CC3}	Pin 7 opern, R_L=∞		1.5	3	mA
Output leakage current	I_{OL}	Braking mode, R_L=∞, per output pin		40	120	µA
Input threshold voltage	V_{th}	R_L=∞	0.9	1.05	1.20	V
Output voltage	V_O	V_Z=4V, I_{OUT}=85mA	3.75	4.0	4.25	V
Output transistor saturation voltage (upper)	V_{sat1}	I_{OUT}=200mA		1.9	2.3	V
		I_{OUT}=400mA		2.0	2.4	V
Output transistor saturation voltage (lower)	V_{sat2}	I_{OUT}=200mA		0.3	0.55	V
		I_{OUT}=400mA		0.5	0.7	V
V_Z pin flow-out current	I_Z	V_Z=4V, I_{OUT}=0mA	0.55	0.85	1.15	mA

Equivalent Circuit Block Diagram

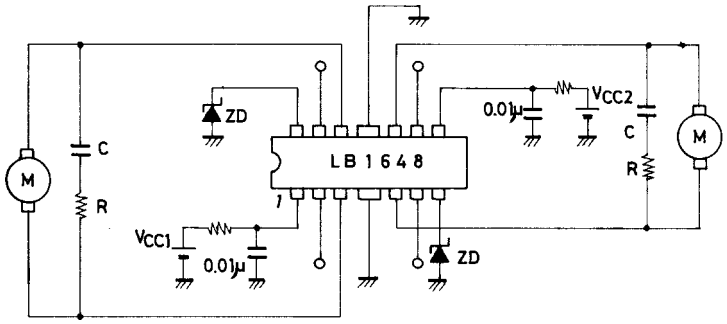


Logic Section Truth Table

Mode	IN1	IN2	OUT1	OUT2	IN3	IN4	OUT3	OUT4
Open	0	0	Open	Open	0	0	Open	Open
Forward	1	0	H	L	1	0	H	L
Reverse	0	1	L	H	0	1	L	H
Brake	1	1	L	L	1	1	L	L

Note : A capacitor of 0.01µF or grater must be connected across $V_{CC1, 2}$ and GND

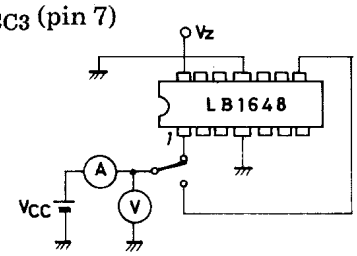
Sample Application Circuit



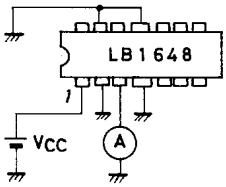
Unit (capacitance: F)

Test Circuit (1channel)

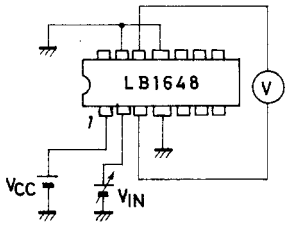
(1) I_{CC1} (pin 1)
I_{CC2} (pin 7)
I_{CC3} (pin 7)



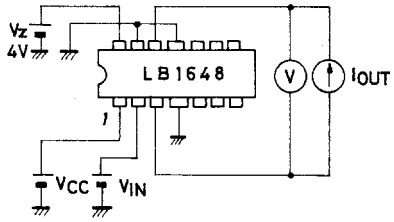
(2) I_{OL}



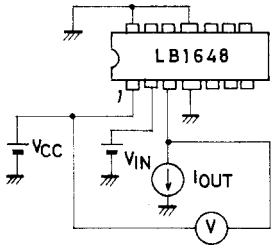
(3) V_{th}



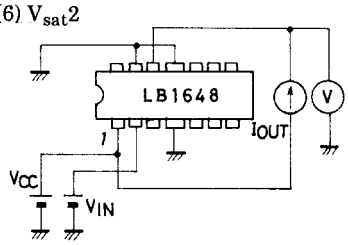
(4) V_o



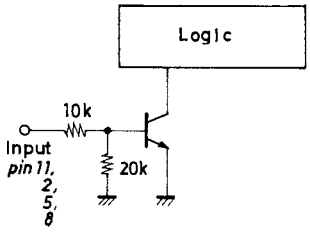
(5) $V_{sat}1$



(6) $V_{sat}2$



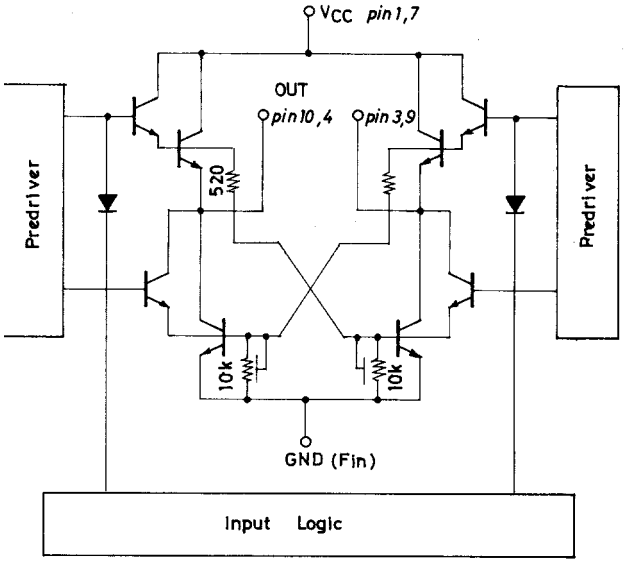
Internal Circuits Input Circuit



Resistance variations (including emperature characteristics)
−35 to +50%

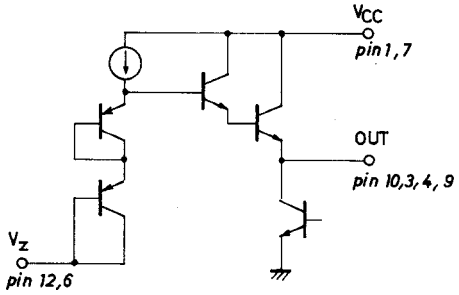
Unit (resistance: Ω)

Output Circuit



Unit (resistance: Ω

Circuit of Pin V_Z

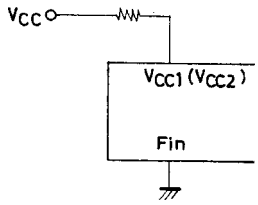


V_{BE} of 2 output NPN transistors
is canceled by V_{BE} of 2 PNP transistors.
$V_o \simeq V_Z$

Design Notes

1 : Maximum voltage, maximum current

A voltage greater than the supply voltage, 7 to 16V, specified in the Allowable Operating Conditions must not be applied to pins 1 and 7. The maximum current is 0.8A (peak). The rush current at the time of start must not exceed the peak current.



2 : Output transistor protection

A resistor (or for fuse resistor) must be connected to the V_{CC} line to provide protection against output short, output pin-to-GND short.

3 : Wiring

The bypass capacitors connected across pins 1, 7 and GND must not have an impedance common to other lines, The GND line must be separated from other circuits.

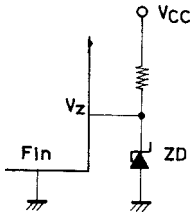
4 : Provision against oscillation

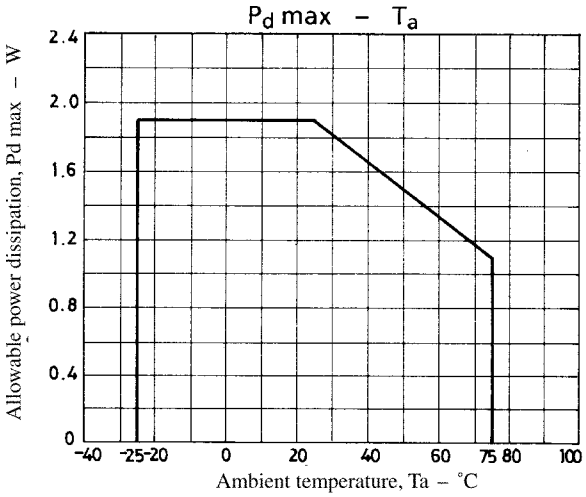
In applications where motors with brush are used, a capacitor may be connectd across both terminals to prevent the spark-caused noise. This capacitor is connected across the output pins of the LB1648, which may cause oscillation to occur. In this case, the capacitor value must be made as small as possible or a resistor must be connected in series.

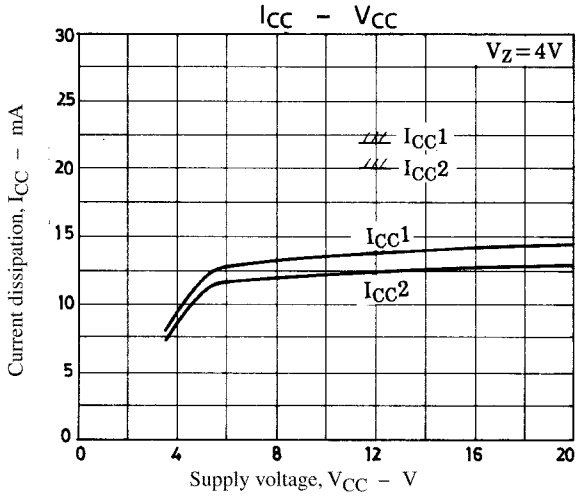
5 : External Zener diode

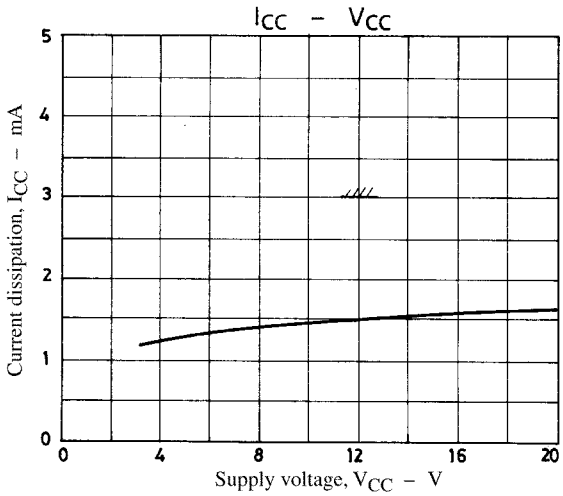
The current flowing out of the V_Z pin varies with the load and its maximum value is approximately 1.2mA.

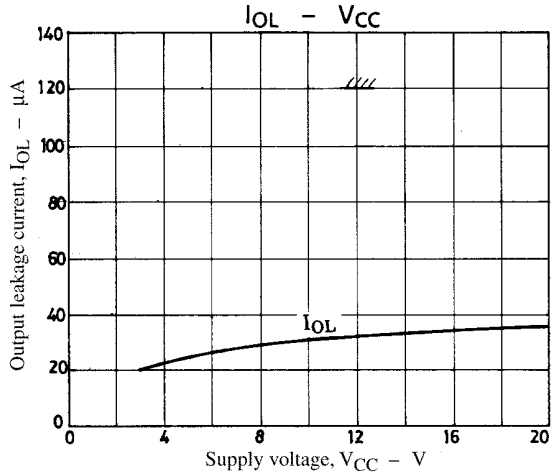
If you use a Zener diode of soft clip type and need an accuracy in voltage, a current required for the Zener diode must be supplied externally.

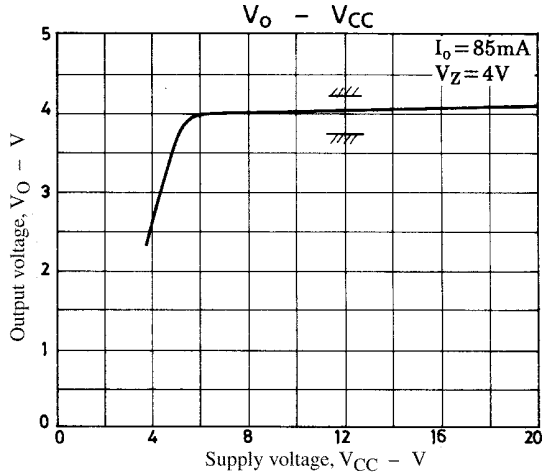


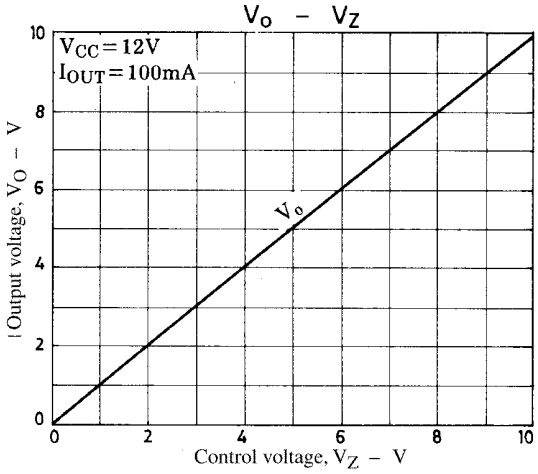


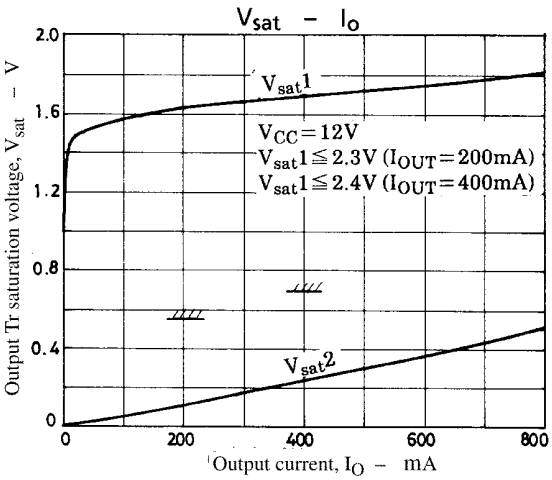


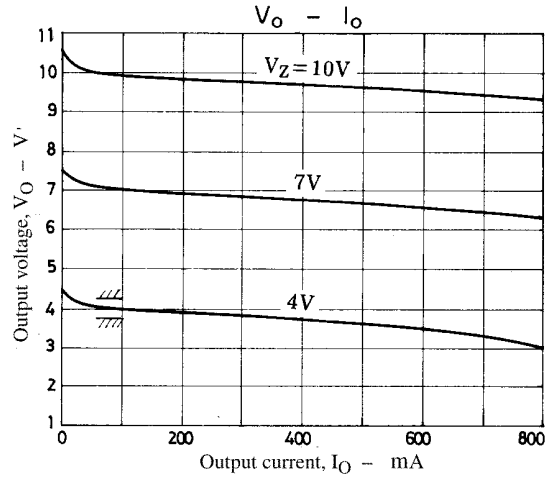


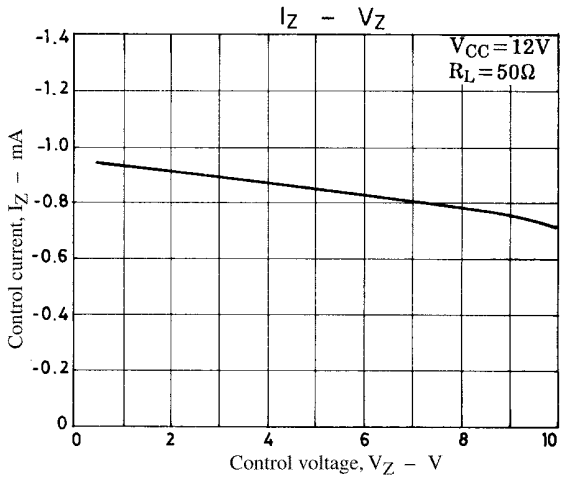

I_{OL} – V_{CC}
Output leakage current, I_{OL} – μA
I_{OL}
Supply voltage, V_{CC} – V

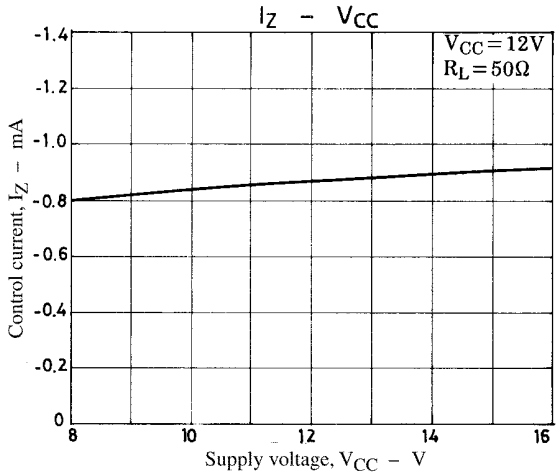

V_O – V_{CC}
I_o=85mA
V_Z=4V
Output voltage, V_O – V
Supply voltage, V_{CC} – V

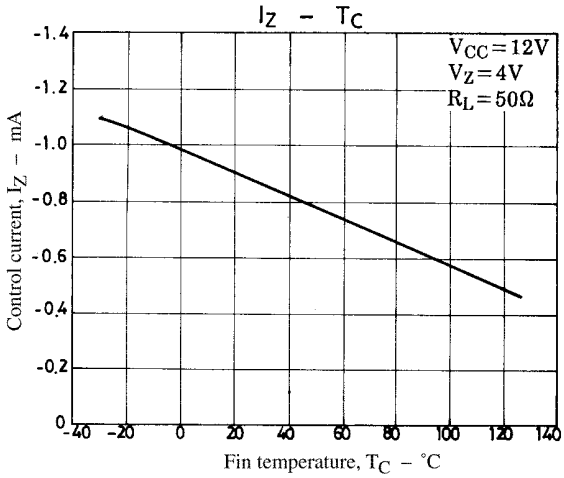

V_O – V_Z
V_{CC}=12V
I_{OUT}=100mA
V_O
Output voltage, V_O – V
Control voltage, V_Z – V


V_{sat} – I_o
$V_{sat}1$
V_{CC}=12V
$V_{sat}1 \leqq 2.3V$ (I_{OUT}=200mA)
$V_{sat}1 \leqq 2.4V$ (I_{OUT}=400mA)
$V_{sat}2$
Output Tr saturation voltage, V_{sat} – V
Output current, I_O – mA


V_O – I_o
V_Z=10V
7V
4V
Output voltage, V_O – V
Output current, I_O – mA


I_Z – V_Z
V_{CC}=12V
R_L=50Ω
Control current, I_Z – mA
Control voltage, V_Z – V


I_Z – V_{CC}
V_{CC}=12V
R_L=50Ω
Control current, I_Z – mA
Supply voltage, V_{CC} – V


I_Z – T_C
V_{CC}=12V
V_Z=4V
R_L=50Ω
Control current, I_Z – mA
Fin temperature, T_C – °C