



## Bidirectional Motor Driver

## Overview

The LB1645N is a bidirectional motor driver IC. Since it has a 2-input logic circuit and performs the function of bidirectional driving and braking, it is capable of direct driving 6V, 9V, 12V motors. The output voltage can be varied by using an external Zener diode.

## Features

- 2-input logic can be used to exercise control of bidirectional driving and braking.
- On-chip elements to absorb dash current of motor.
- Input connectable direct to MOS LSI.
- Output voltage variable by use of external Zener diode.

## Specifications

### Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

| Parameter                   | Symbol        | Conditions | Ratings          | Unit |
|-----------------------------|---------------|------------|------------------|------|
| Maximum supply voltage      | $V_{CC\ max}$ |            | 18               | V    |
| Input voltage               | $V_{IN}$      |            | -0.3 to $V_{CC}$ | V    |
| Output current              | $I_{OUT}$     |            | $\pm 1.6$        | A    |
| Allowable power dissipation | $P_{d\ max}$  |            | 2.2              | W    |
| Operating temperature       | $T_{opr}$     |            | -25 to +75       | °C   |
| Storage temperature         | $T_{stg}$     |            | -55 to +125      | °C   |

## Allowable Operating Conditions at $T_a = 25^\circ\text{C}$

| Parameter      | Symbol           | Conditions | Ratings | Unit |
|----------------|------------------|------------|---------|------|
| Supply voltage | V <sub>CC1</sub> |            | 7 to 18 | V    |
|                | V <sub>CC2</sub> |            | 5 to 18 | V    |

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**LB1645N**

### **Electrical Characteristics at $T_a = 25^\circ\text{C}$ , $V_{CC}=12\text{V}$ , See Test Circuit.**

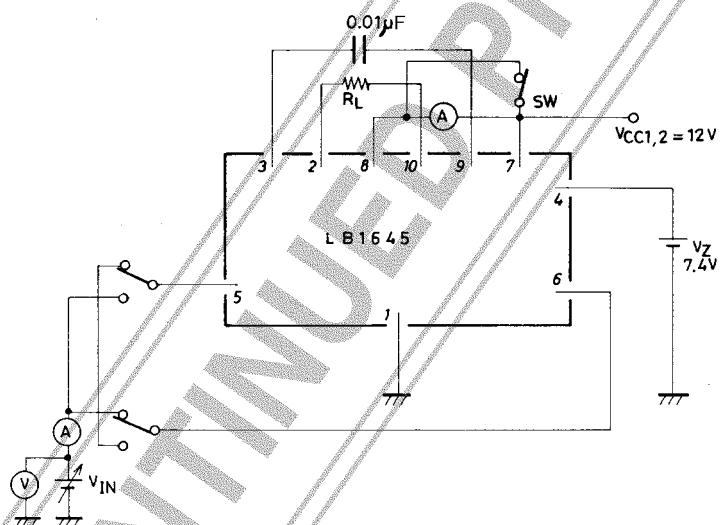
| Parameter                  | Symbol      | Conditions                         | Ratings |      |      | Unit    |
|----------------------------|-------------|------------------------------------|---------|------|------|---------|
|                            |             |                                    | min     | typ  | max  |         |
| Input threshold voltage    | $V_{th}$    | $R_L = \infty$                     | 1.1     | 1.3  | 1.5  | V       |
| Minimum input on current   | $I_{IN}$    | $R_I = \infty$                     |         | 10   | 15   | $\mu A$ |
| Output voltage             | $V_O$       | $R_L = 60\Omega$ , $V_Z = 7.4V$    | 6.6     | 7.2  | 7.4  | V       |
| Output leakage current     | $I_{OL}$    | Pins 5, 6 GND, $R_L = \infty$      |         | 0.01 | 1.0  | mA      |
| Current drain              | $I_{CC}$    | Pins 5, 6 GND, $R_L = \infty$      | 3       | 6    | 10   | mA      |
| Saturation voltage (upper) | $V_{sat1}$  | $V_{CC} = 12V$ , $I_{OUT} = 300mA$ |         | 1.9  | 2.2  | V       |
|                            | $V_{sat1'}$ | $V_{CC} = 12V$ , $I_{OUT} = 500mA$ |         | 1.9  | 2.3  | V       |
| Saturation voltage (lower) | $V_{sat2}$  | $V_{CC} = 12V$ , $I_{OUT} = 300mA$ |         | 0.25 | 0.5  | V       |
|                            | $V_{sat2'}$ | $V_{CC} = 12V$ , $I_{OUT} = 500mA$ |         | 0.4  | 0.65 | V       |

## Truth Table

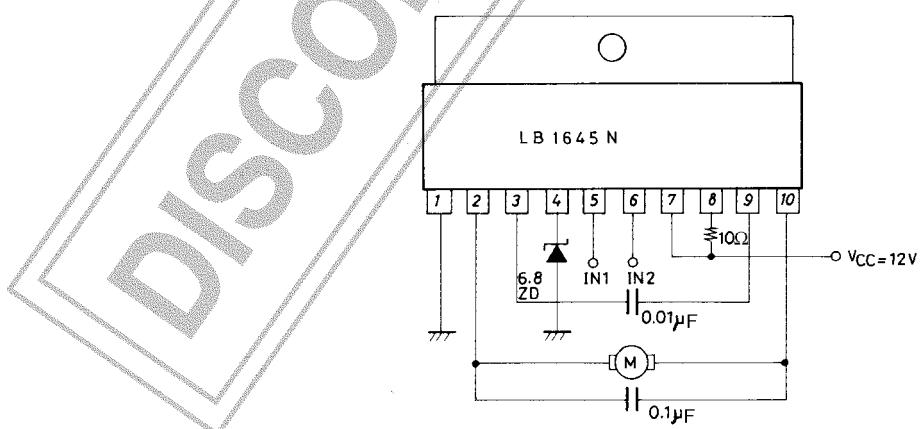
| Input |     | Output |      | Function                |
|-------|-----|--------|------|-------------------------|
| IN1   | IN2 | OUT1   | OUT2 |                         |
| 0     | 0   | 0      | 0    | Braking                 |
| 1     | 0   | 1      | 0    | Forward (reverse) drive |
| 0     | 1   | 0      | 1    | Reverse (forward) drive |
| 1     | 1   | 0      | 0    | Braking                 |

Input level  
1 : 2.0V or more  
0 : 0.7V or less

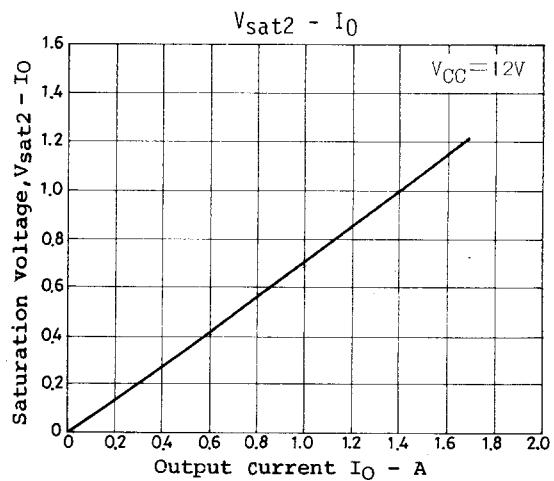
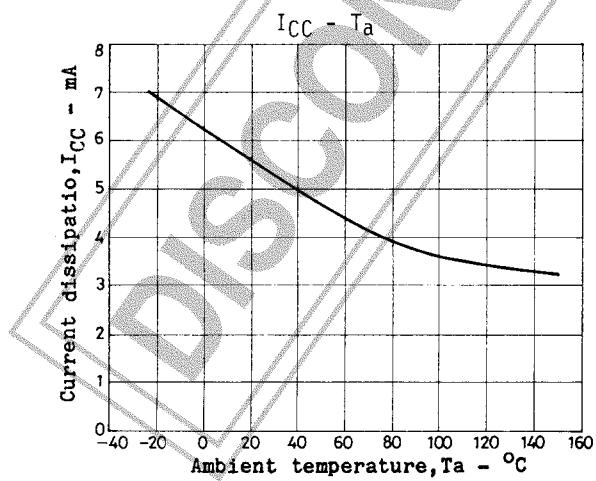
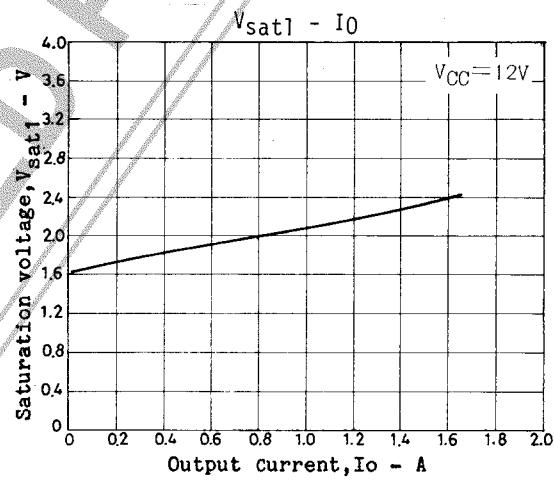
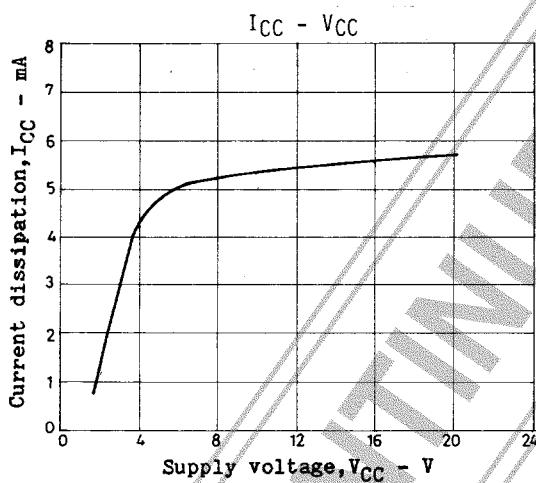
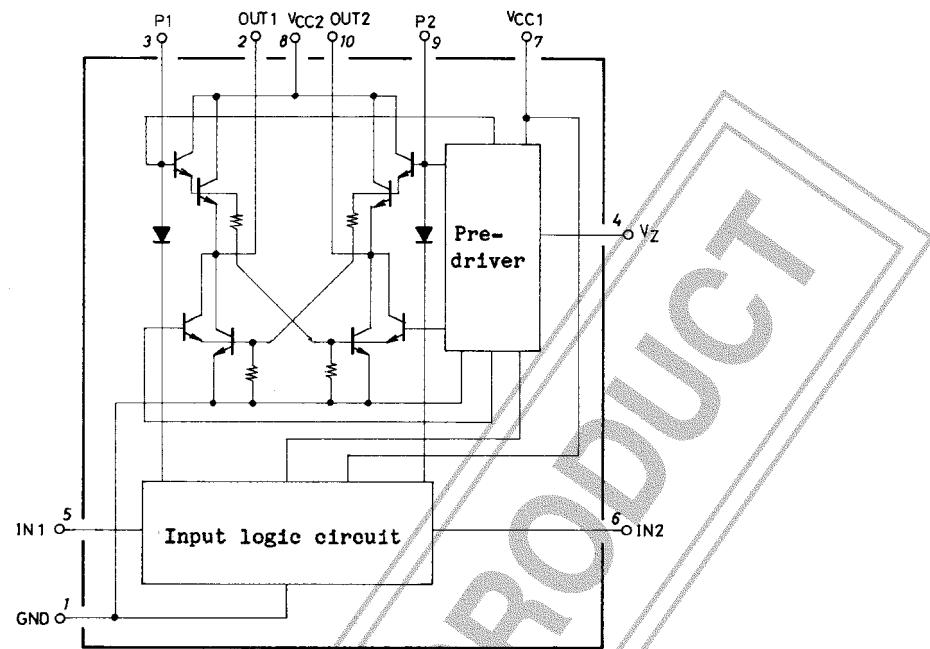
## Test Circuit

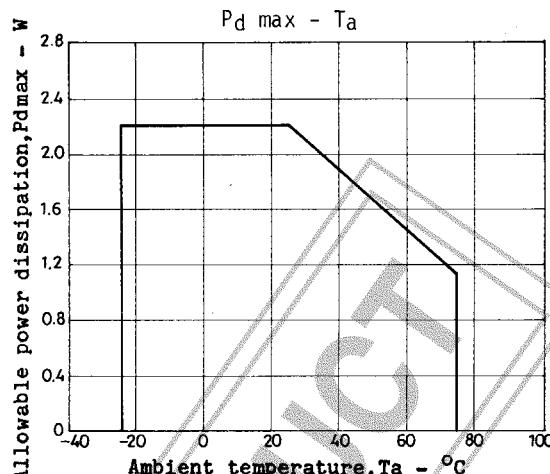
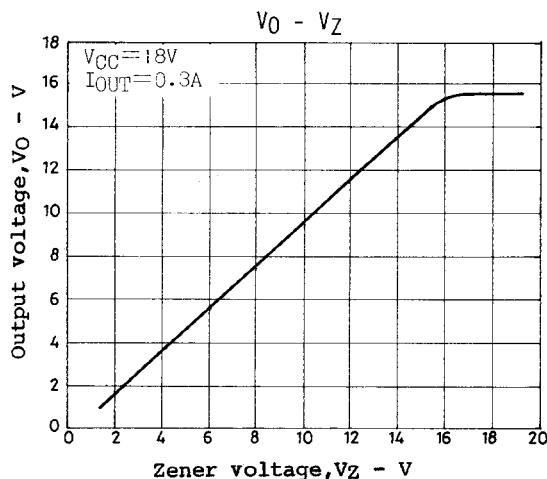


## Sample Application Circuit : 6V motor



## Equivalent Circuit Block Diagram





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