

**SANYO**

No. 1530C

**LB1650****Dual Bidirectional Motor Driver**

The LB1650 is a dual bidirectional motor driver that is designed to accept standard TTL input logic levels and drive motors. It provides the functions of bidirectional motor drive, brake that are determined by two inputs and the inhibit function that brings the output to a high impedance state.

**Applications**

- . Multi DC motor driver
- . Bidirectional motor driver
- . Bipolar stepping motor driver

**Features**

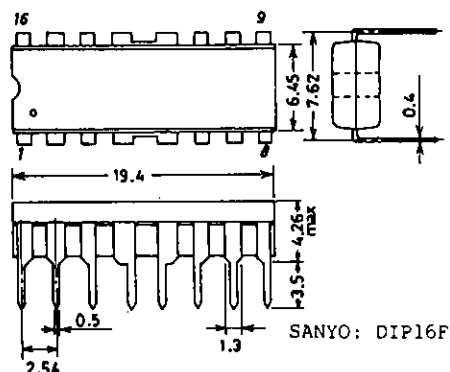
- . High output current (1A/ch)
- . Wide operating voltage range (4.5 to 36V)
- . Inhibit facility
- . Input connectable to TTL, CMOS IC
- . High noise margin

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

|                             |             |                    | unit               |
|-----------------------------|-------------|--------------------|--------------------|
| Maximum Supply Voltage      | $V_{CC1}$   | 36                 | V                  |
| Logic Supply Voltage        | $V_{CC2}$   | 36                 | V                  |
| Input Voltage               | $V_i$       | 7                  | V                  |
| Inhibit Voltage             | $V_{inh}$   | 7                  | V                  |
| Peak Output Current         | $I_{OUT}$   | 1ms non-repetitive | 2 A                |
| Allowable Power Dissipation | $P_{d\max}$ | IC only            | 1.9 W              |
| Operating Temperature       | $T_{opr}$   | -20 to +80         | $^{\circ}\text{C}$ |
| Storage Temperature         | $T_{stg}$   | -40 to +150        | $^{\circ}\text{C}$ |

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

|                      |           |           | unit |
|----------------------|-----------|-----------|------|
| Supply Voltage       | $V_{CC1}$ | 4.5 to 36 | V    |
| Logic Supply Voltage | $V_{CC2}$ | 4.5 to 36 | V    |

**Package Dimensions 3054A**  
(unit: mm)**SANYO Electric Co., Ltd. Semiconductor Business Headquarters**

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# LB1650

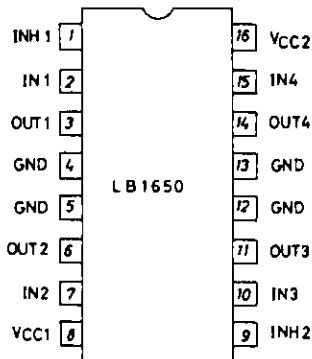
| Electrical Characteristics at $T_a=25^{\circ}\text{C}$ , $V_{CC1}=24\text{V}$ , $V_{CC2}=5\text{V}$ |               |                           |  | min  | typ | max       | unit          |
|-----------------------------------------------------------------------------------------------------|---------------|---------------------------|--|------|-----|-----------|---------------|
| Supply Current<br>(Per CH)                                                                          | $I_{CC1}$     | $V_i=L, I_0=0, V_{inh}=H$ |  |      |     | 1.5       | mA            |
|                                                                                                     |               | $V_i=H, I_0=0, V_{inh}=H$ |  |      |     | 6         | mA            |
|                                                                                                     |               | $V_i=H, I_0=0, V_{inh}=L$ |  |      |     | 1         | mA            |
| Logic Supply Current                                                                                | $I_{CC2}$     | $V_i=L, I_0=0, V_{inh}=H$ |  |      | 44  | 60        | mA            |
|                                                                                                     |               | $V_i=H, I_0=0, V_{inh}=H$ |  |      |     | 22        | mA            |
|                                                                                                     |               | $V_i=H, I_0=0, V_{inh}=L$ |  |      |     | 24        | mA            |
| "L"-Level Input Voltage                                                                             | $V_{IL}$      |                           |  | -0.3 |     | 1.5       | V             |
| "H"-Level Input Voltage                                                                             | $V_{IH}$      | $V_{CC2} \leq 7\text{V}$  |  | 2.3  |     | $V_{CC2}$ | V             |
|                                                                                                     |               | $V_{CC2} > 7\text{V}$     |  | 2.3  |     | 7         | V             |
| "L"-Level Input Current                                                                             | $I_{IL}$      | $V_i=L$                   |  |      |     | $\pm 10$  | $\mu\text{A}$ |
| "H"-Level Input Current                                                                             | $I_{IH}$      | $V_i=H-0.3\text{V}$       |  |      | 30  | 100       | $\mu\text{A}$ |
| "L"-Level Inhibit Voltage                                                                           | $V_{inhL}$    |                           |  | -0.3 |     | 1.5       | V             |
| "H"-Level Inhibit Voltage                                                                           | $V_{inhH}$    | $V_{CC2} \leq 7\text{V}$  |  | 2.3  |     | $V_{CC2}$ | V             |
|                                                                                                     |               | $V_{CC2} > 7\text{V}$     |  | 2.3  |     | 7         | V             |
| "L"-Level Inhibit Current                                                                           | $I_{inhL}$    |                           |  | -100 | -30 |           | $\mu\text{A}$ |
| "H"-Level Inhibit Current                                                                           | $I_{inhH}$    |                           |  |      |     | $\pm 10$  | $\mu\text{A}$ |
| Saturation Voltage                                                                                  | $V_{CE(sat)}$ | $I_0=-1\text{A}$          |  |      | 1.4 | 1.8       | V             |
|                                                                                                     |               | $I_0=1\text{A}$           |  |      | 1.2 | 1.8       | V             |

## Truth Table

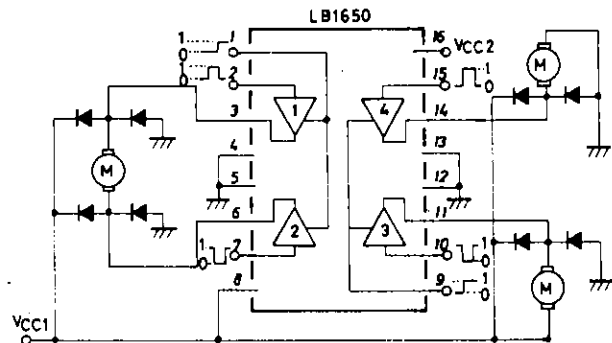
| $V_i$ (per CH) | $V_{inh}$ | $V_O$ |
|----------------|-----------|-------|
| H              | H         | H     |
| L              | H         | L     |
| H              | L         | Open* |
| L              | L         | Open* |

\*: High impedance

## Pin Assignment

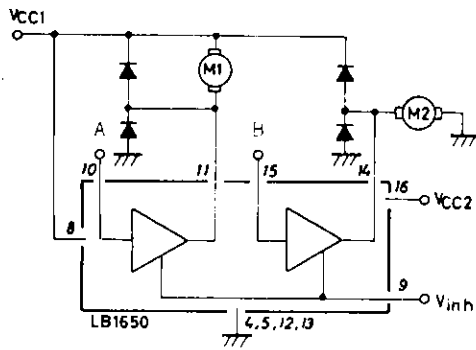


## Equivalent Circuit Block Diagram and Peripheral Circuit



## Sample Application Circuits

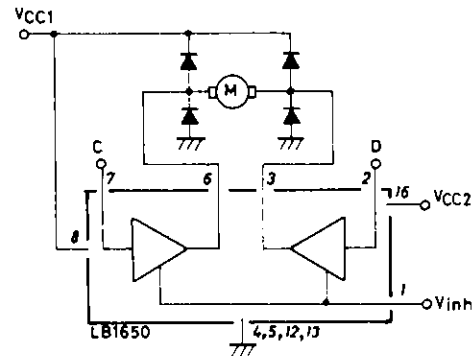
## (1) DC motor control



| $V_{inh}$ | A | M1      | B | M2      |
|-----------|---|---------|---|---------|
| H         | H | Brake   | H | Forward |
| H         | L | Forward | L | Brake   |
| L         | X | Open*   | X | Open*   |

X: don't care

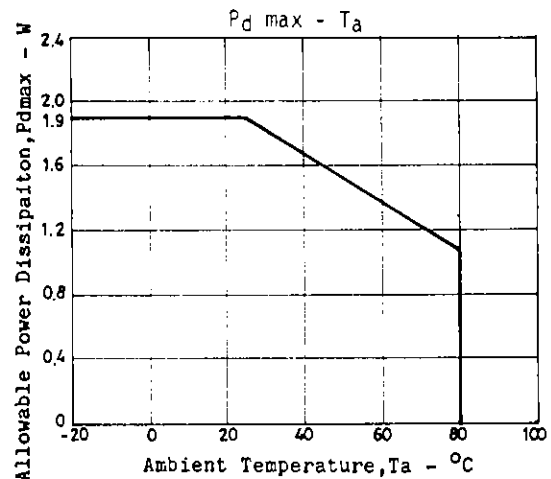
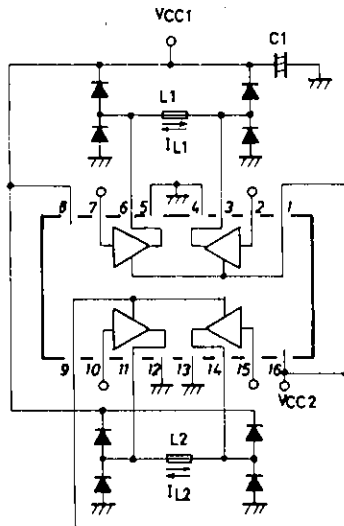
## (2) DC motor control (Forward, reverse)

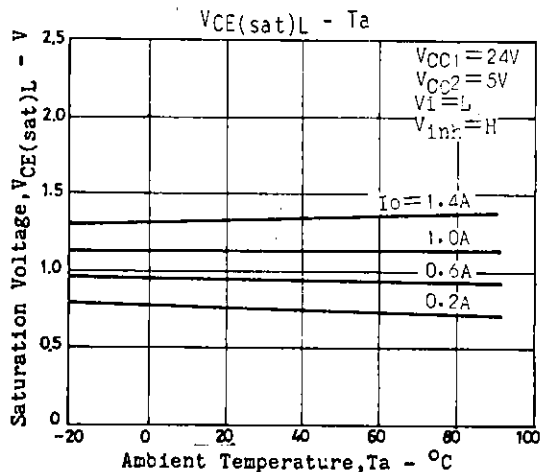
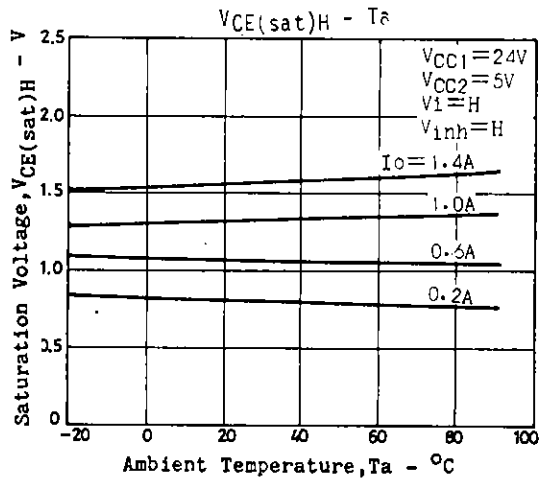
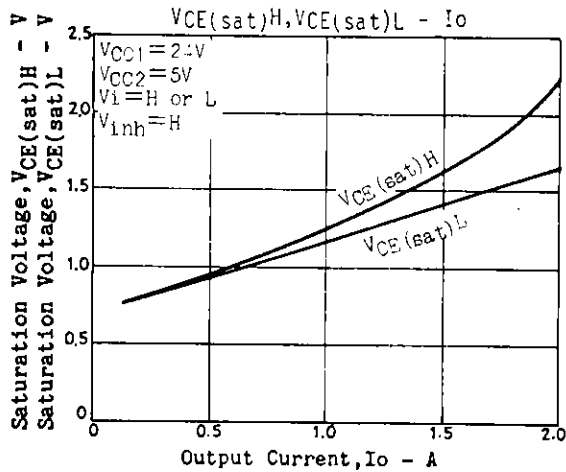
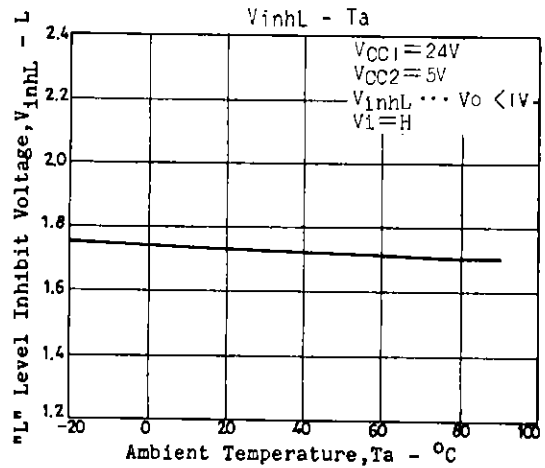
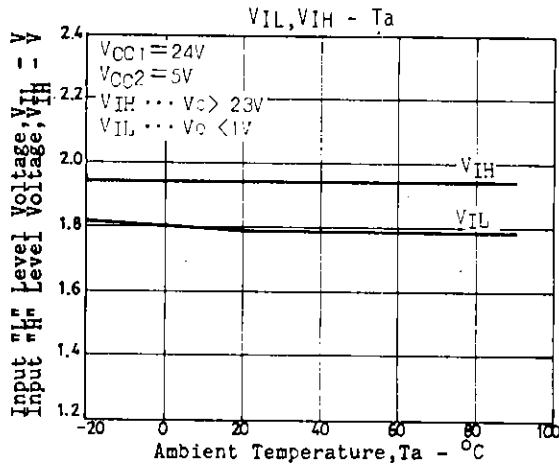
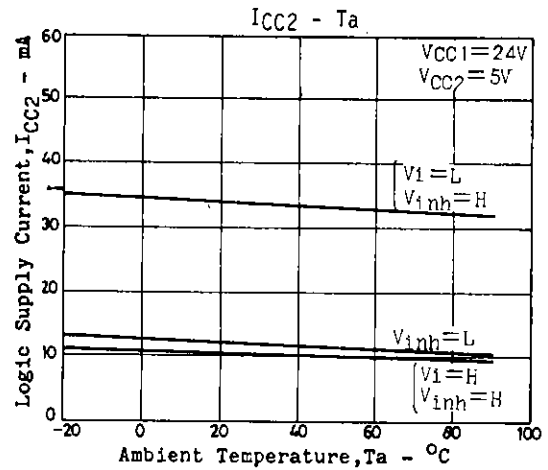
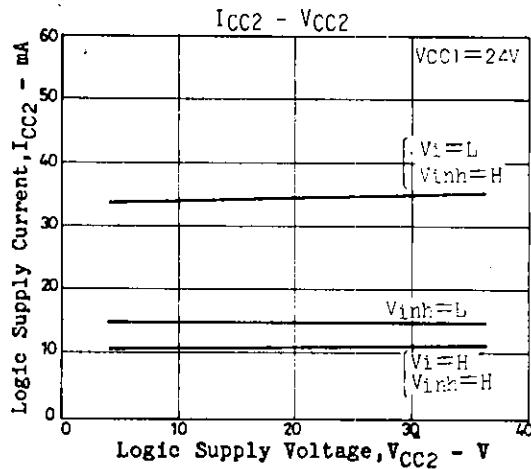


| Input       |     |     | Function       |
|-------------|-----|-----|----------------|
| $V_{inh}=H$ | C=H | D=L | Forward(right) |
|             | C=L | D=H | Reverse(left)  |
|             | C=D |     | Brake          |
| $V_{inh}=L$ | C=X | D=X | Open*          |

\*: High impedance

## (3) Stepping motor control (Bipolar drive)





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