

**SANYO**

NO.1188D

**LB1231 Series****High-Voltage, Large Current  
Darlington Transistor Array**

The circuit configuration of this IC is of 7-channel Darlington transistor array consisting of NPN transistors. It is especially suited for use in hammer drivers and lamp, relay drivers. It contains spark killer diodes against L load.

Features High-voltage ( $V_{CE0} \geq 50V$ ), large-current ( $I_{Cmax} = 500mA$ ) drive

LB1231 . Drivable by TTL, MOS output

LB1232 . Contains base current limiting resistors, Zener diodes for level shift.

. Direct drivable by 24V P MOS.

LB1233 . Contains base current limiting resistors.

. Direct drivable by TTL, C MOS output.

LB1234 . Contains base current limiting resistors.

. Direct drivable by C MOS, P MOS output.

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

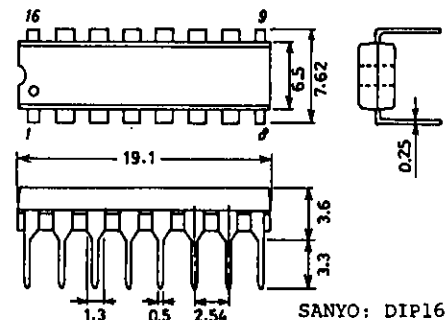
|                             |            |   |             | unit       |
|-----------------------------|------------|---|-------------|------------|
| Output Supply Voltage       | $V_{OUT}$  |   | 50          | V          |
| Output Current              | $I_{OUT}$  | Per unit  | 500         | mA         |
| Input Supply Voltage        | $V_{IN}$   | LB1232/33/34                                    | 30          | V          |
| Input Current               | $I_{IN}$   | LB1231 only                                     | 25          | mA         |
| GND Pin Current             | $I_{GND}$  | 7ch simultaneously on,<br>$f=10Hz, duty, =23\%$ | 2.8         | A          |
| Allowable Power Dissipation | $P_{dmax}$ |   | 1.5         | W          |
| Operating Temperature       | $T_{opr}$  |   | -20 to +75  | $^\circ C$ |
| Storage Temperature         | $T_{stg}$  |   | -40 to +150 | $^\circ C$ |

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

|                         |           |                                   |              | unit |
|-------------------------|-----------|-----------------------------------|--------------|------|
| Output Supply Voltage   | $V_{OUT}$ |                                   | 50           | V    |
| Input "H" Level Voltage | $V_{IH}$  | LB1232 $I_{OUT}=350mA$            | 11 to 30     | V    |
|                         |           | LB1233 $I_{OUT}=350mA$            | 3 to 30      | V    |
|                         |           | LB1234 $I_{OUT}=350mA$            | 5 to 30      | V    |
| Input "L" Level Voltage | $V_{IL}$  | LB1231/33 $I_{OUT} \leq 100\mu A$ | -0.3 to +0.3 | V    |
|                         |           | LB1232 $I_{OUT} \leq 100\mu A$    | -0.3 to +6.0 | V    |
|                         |           | LB1234 $I_{OUT} \leq 100\mu A$    | -0.3 to +0.7 | V    |

**Package Dimensions 3064-D16TR**

(unit : mm)



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O1995YK/7067KI/4055KI/0152KI, TS No.1188-1/4

LB1231,1232,1233,1234

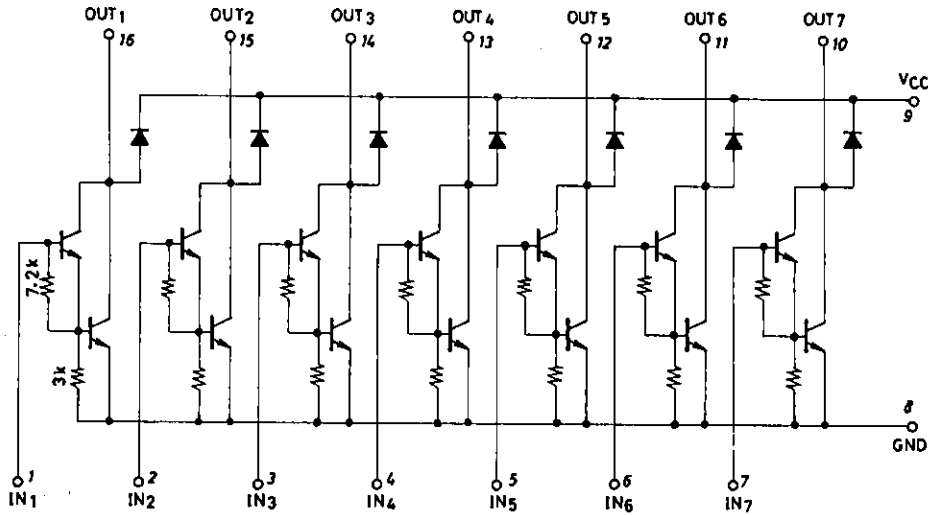
Electrical Characteristics at  $T_a=25^\circ\text{C}$

|                                    |             |  | min  | typ  | max | unit          |
|------------------------------------|-------------|--|------|------|-----|---------------|
| Output Leak Current                | $I_{OFF}$   | $V_{OUT}=50V$                                |      |      | 100 | $\mu\text{A}$ |
| Output Voltage                     | $V_{OH1}$   | $I_{IN}=0.25\text{mA}, I_{OUT}=100\text{mA}$ | 0.9  | 1.1  |     | V             |
|                                    | $V_{OH2}$   | $I_{IN}=0.35\text{mA}, I_{OUT}=200\text{mA}$ | 1.1  | 1.3  |     | V             |
|                                    | $V_{OH3}$   | $I_{IN}=0.5\text{mA}, I_{OUT}=350\text{mA}$  | 1.3  | 1.6  |     | V             |
|                                    | $V_{OH4}$   | $I_{IN}=1\text{mA}, I_{OUT}=400\text{mA}$    |      | 2.4  |     | V             |
| Input Voltage                      | $V_{IN}$    | LB1231 $I_{IN}=1\text{mA}$                   | 1.35 | 1.7  |     | V             |
| Input Current                      | $V_{IN}$    | LB1232 $V_{IN}=17V$                          | 0.82 | 1.25 |     | mA            |
|                                    |             | LB1233 $V_{IN}=3.85V$                        | 0.93 | 1.35 |     | mA            |
|                                    |             | LB1234 $V_{IN}=5V$                           | 0.35 | 0.5  |     | mA            |
|                                    |             | LB1234 $V_{IN}=12V$                          | 1.00 | 1.45 |     | mA            |
| Spark Killer Diode Leak Current    | $I_{R(S)}$  | $V_{R(S)}=50V$                               |      |      | 100 | $\mu\text{A}$ |
| Spark Killer Diode Forward Voltage | $V_{F(S)1}$ | $I_{F(S)}=350\text{mA}$                      |      | 2.0  |     | V             |
| Forward Voltage                    | $V_{F(S)2}$ | $I_{F(S)}=400\text{mA}$                      |      | 2.4  |     | V             |

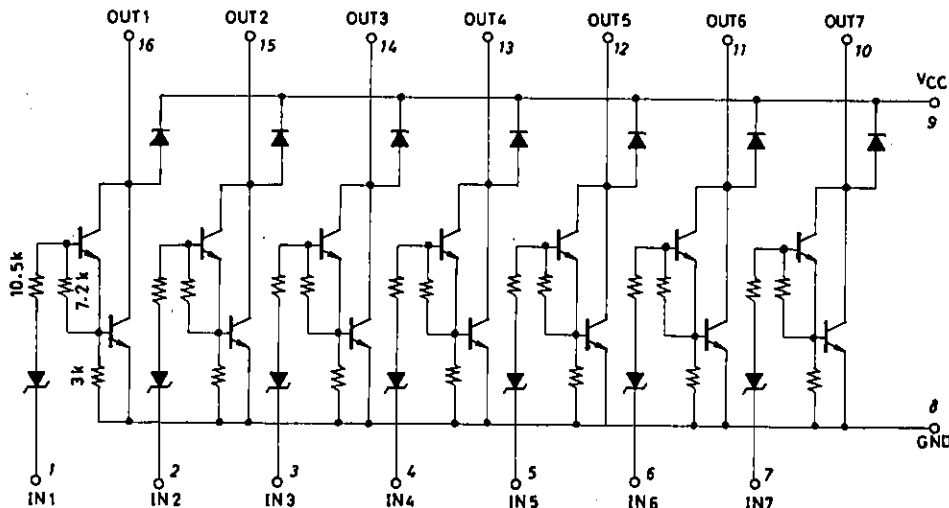
Equivalent Circuits

Unit (resistance:  $\Omega$ )

LB1231



LB1232



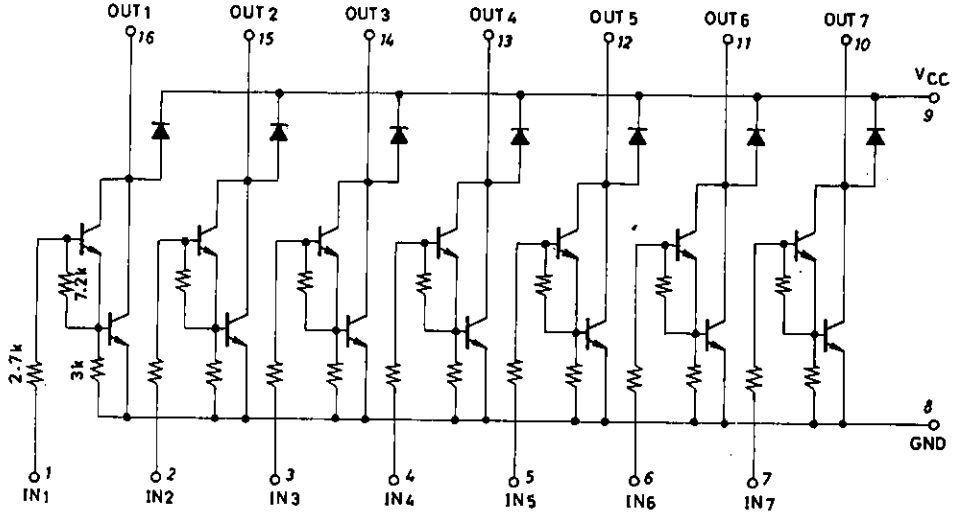
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LB1231, 1232, 1233, 1234

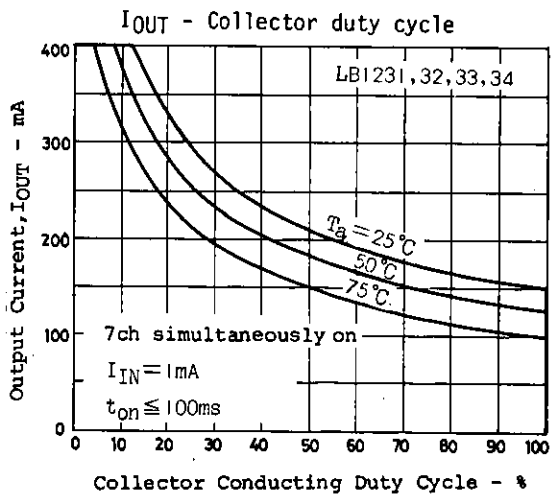
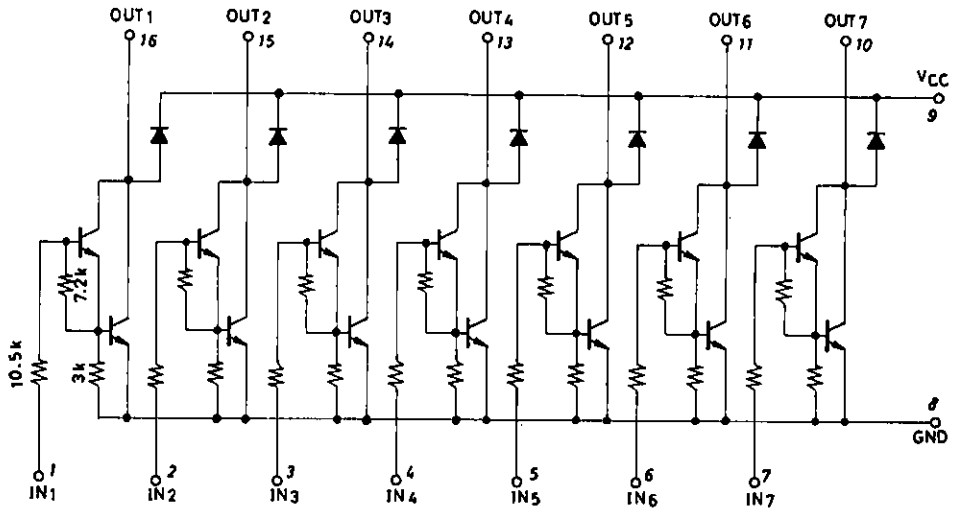
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Unit (resistance:  $\Omega$ )

LB1233



LB1234



**SANYO**

NO.1281D

**LB1268****3-Channel, High-Current,  
Low-Saturation Driver Array****Features and Functions**

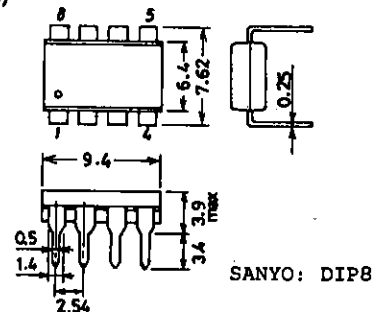
- 3-channel magnet driver
- High current (2.0A max.) and low saturation voltage (1.5V)
- Parallel operation capability (channel 1 + 2)
- On-chip spark killer diodes

**Absolute Maximum Ratings at Ta = 25°C**

|   |                     |   | unit  |
|---|---------------------|---|-------|
| Maximum Supply Voltage                            | V <sub>CC</sub> max | 8.0   | V     |
| Output Supply Voltage                             | V <sub>OUT</sub>    | 10.0  | V     |
| Input Supply Voltage                              | V <sub>IN</sub>     | 12.0  | V     |
| Output Current                                    | I <sub>OUT1</sub>   | ton ≤ 50ms, duty = 20%,<br>solenoid drive stage (ch1,2) | 1.0 A |
|   | I <sub>OUT2</sub>   | ton ≤ 50ms, duty = 5%,<br>motor drive stage (ch3)       | 2.5 A |
| Spark Killer Diode<br>Forward Current             | I <sub>FSM1</sub>   | t ≤ 5ms, duty = 5%,<br>solenoid drive stage (ch1,2)     | 1.0 A |
|   | I <sub>FSM2</sub>   | t ≤ 5ms, duty = 5%,<br>motor drive stage (ch3)          | 2.5 A |
| V <sub>CC</sub> Instantaneous<br>Flow-Out Current | I <sub>CCP</sub>    | t ≤ 5ms, duty = 5%,                                     | 3.0 A |
| GND Pin Flow-Out Current                          | I <sub>GND</sub>    | t ≤ 5ms, duty = 20%,                                    | 3.0 A |
| Allowable Power Dissipation                       | P <sub>d</sub> max  | 785   | mW    |
| Operating Temperature                             | T <sub>opr</sub>    | -20 to +75  | °C    |
| Storage Temperature                               | T <sub>stg</sub>    | -40 to +125   | °C    |

**Allowable Operating Range at Ta = 25°C**

|                         |                 |  | unit |
|-------------------------|-----------------|--|------|
| Supply Voltage          | V <sub>CC</sub> | 3.0 to 7.0                               | V    |
| Input 'H'-Level Voltage | V <sub>IH</sub> | I <sub>OUT</sub> = 300mA<br>3.0 to 11.0  | V    |
| Input 'L'-Level Voltage | V <sub>IL</sub> | I <sub>OUT</sub> ≤ 100μA<br>-0.3 to +0.7 | V    |

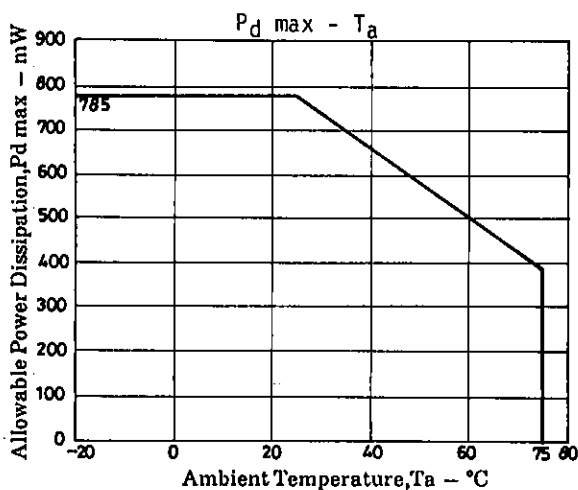
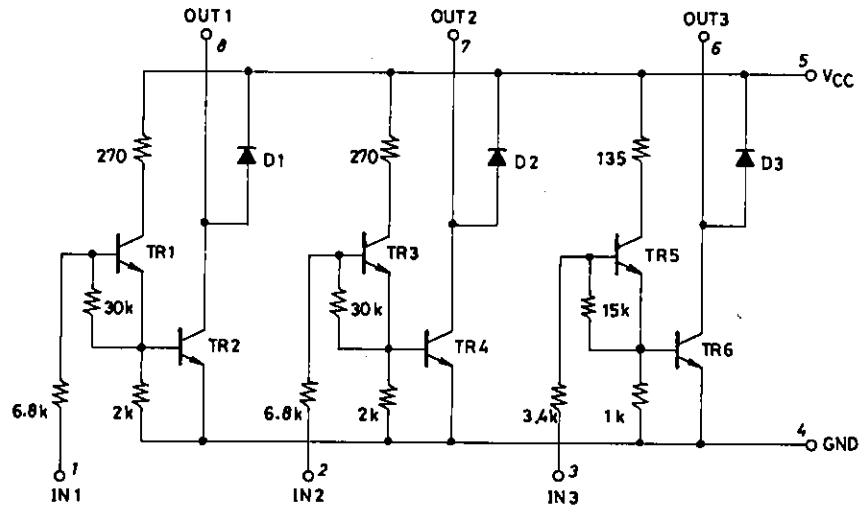
**Package Dimensions 3001B-D81C**  
(unit : mm)

# LB1268

## Electrical Characteristics at $T_a = 25^\circ\text{C}$

|                                       |              |   | min | typ | max  | unit          |
|---------------------------------------|--------------|---|-----|-----|------|---------------|
| Output Voltage                        | $V_{OH1}$    | $V_{IN} = 4.5\text{V}, V_{CC} = 5.0\text{V},$<br>$I_{OUT} = 500\text{mA}$ (ch1,2)           |     |     | 0.65 | V             |
|                                       | $V_{OH2}$    | $V_{IN} = 6.0\text{V}, V_{CC} = 7.0\text{V},$<br>$I_{OUT} = 1000\text{mA}$ (ch1,2)          |     |     | 1.4  | V             |
|                                       | $V_{OH3}$    | $V_{IN} = 6.0\text{V}, V_{CC} = 7.0\text{V},$<br>$I_{OUT} = 1600\text{mA}$ (ch1,2 parallel) |     |     | 1.4  | V             |
|                                       | $V_{OH4}$    | $V_{IN} = 3.0\text{V}, V_{CC} = 3.0\text{V},$<br>$I_{OUT} = 300\text{mA}$ (ch3)             |     |     | 0.25 | V             |
|                                       | $V_{OH5}$    | $V_{IN} = 4.5\text{V}, V_{CC} = 5.0\text{V},$<br>$I_{OUT} = 1000\text{mA}$ (ch3)            |     | 0.5 | 0.7  | V             |
|                                       | $V_{OH6}$    | $V_{IN} = 6.0\text{V}, V_{CC} = 7.0\text{V},$<br>$I_{OUT} = 2000\text{mA}$ (ch3)            |     | 1.0 | 1.5  | V             |
| Input Current                         | $I_{IN1}$    | $V_{IN} = 6.0\text{V}$ (ch1,2)  |     |     | 1.0  | mA            |
|                                       | $I_{IN2}$    | $V_{IN} = 6.0\text{V}$ (ch3)  |     |     | 2.0  | mA            |
| Power Source + Output Leakage Current | $I_{OFF}$    | $V_{IN} = 0.5\text{V}, V_{OUT} = V_{CC} = 6.0\text{V}$                                      |     |     | 30   | $\mu\text{A}$ |
| Spark Killer Diode Forward Voltage    | $V_{F1}$     | $I_F = 1000\text{mA}$ (ch1,2)   |     |     | 3.0  | V             |
|                                       | $V_{F2}$     | $I_F = 2000\text{mA}$ (ch3)   |     |     | 3.0  | V             |
| Output Sustain Voltage                | $V_{O(sus)}$ | $I_{OUT} = 400\text{mA}$  | 10  |     |      | V             |

## Equivalent Circuit



Unit (resistance:  $\Omega$ )

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