

**TOSHIBA**

**TA7612AP**

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

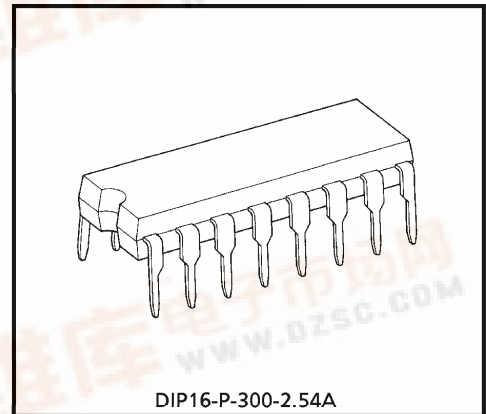
# TA7612AP

## LED DRIVER

The TA7612AP is designed for 10 LED level meter driver.

### FEATURES

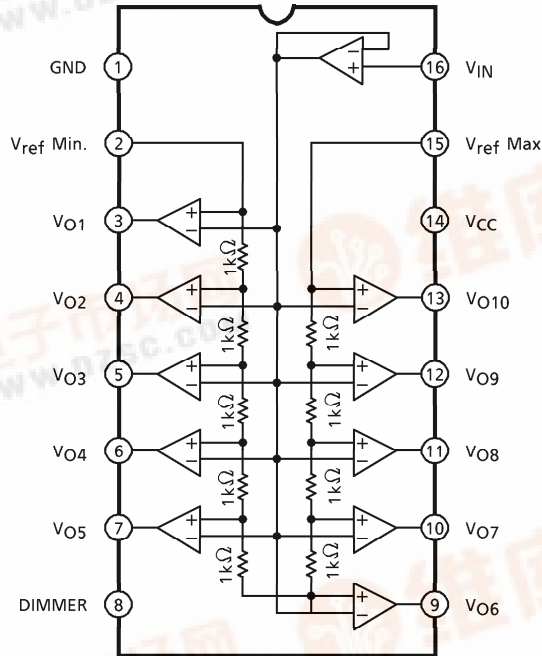
- 10 LED'S Bar Display Driver.
- Linear Scale Display.
- Continuous 10 LED Display.
- By Choosing a Series Connection of IC, Can Display more than 10 LED.



DIP16-P-300-2.54A

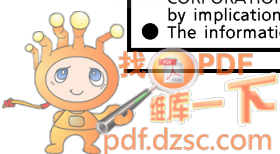
Weight : 1.00g (Typ.)

### BLOCK DIAGRAM



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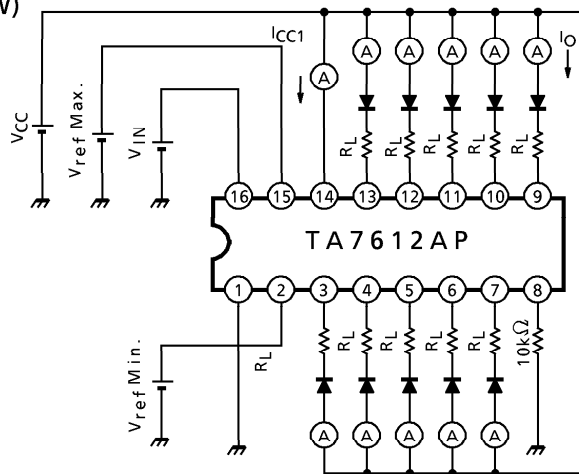


(Note) ( $V_{ref}$  Max. (= ⑮PIN) = 3.6V)

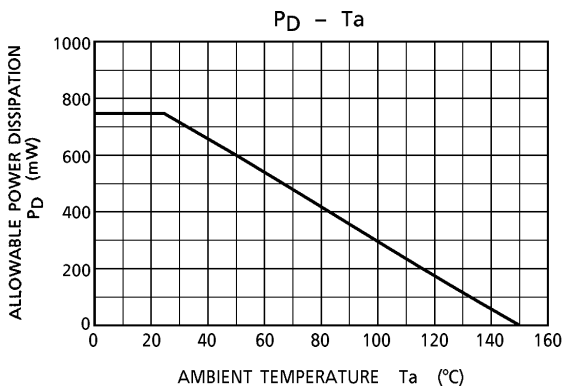
| 2PIN CONNECTION                      | DISPLAY                  | CONDITION                      |
|--------------------------------------|--------------------------|--------------------------------|
| Terminated Ground                    | Light on No.1 LED        | $V_{IN} = 0 \sim 0.4V$ (Typ.)  |
|                                      | Lighted All LED          | $V_{IN} \geq 3.6V$ (Typ.)      |
| Terminated $1k\Omega$ Between Ground | Without Lighted No.1 LED | $V_{IN} = 0 \sim 0.36V$ (Typ.) |
|                                      | Light on No.1 LED        | $V_{IN} \geq 0.36V$ (Typ.)     |

**P<sub>D</sub> CALCULATION AT 10LEDs**

$$P_D = V_{CC} \times I_{CC1} + V_{OL} \times I_O \times 10 \quad (W)$$

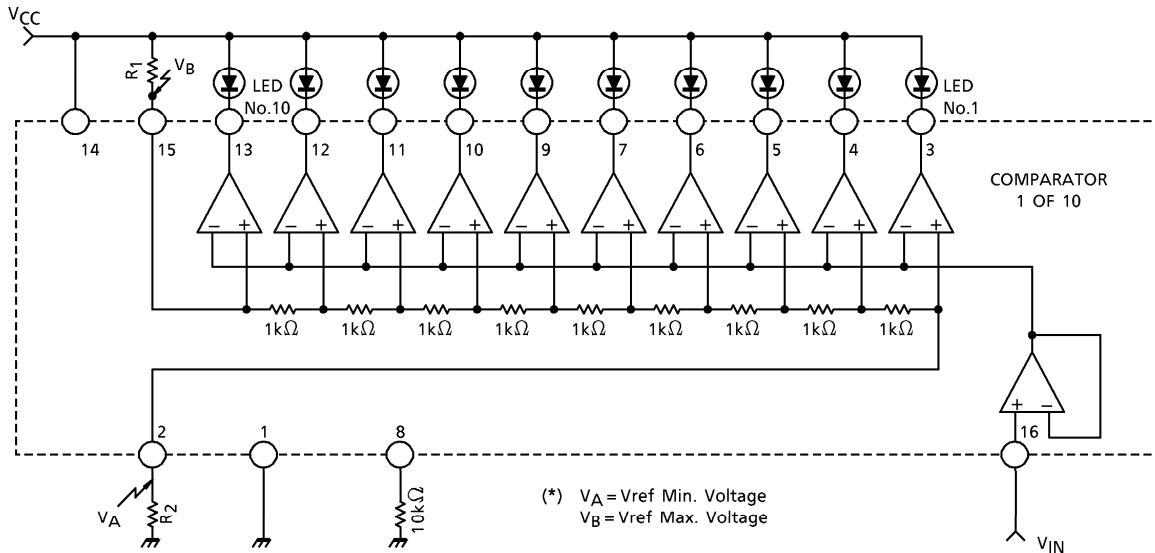


(Note)  $V_{OL}$  is :  $V_{OL} = V_{CC} - V_F(LED) - R_L \times I_O$  (When each output is "ON".)



FUNCTIONAL DESCRIPTION

BLOCK DIAGRAM



The above simplified TA7612AP Block Diagram is to give the general idea of the circuit's operation.

1. General Operation

If  $V_{IN}$  Voltage greater than the first threshold but less than the second threshold is applied "No.1" LED is lighted, if the input voltage is between the second and the third threshold, then 'No.1 and No.2' LED are in operation and so on.

2. Adding  $R_1$  and  $R_2$  Operation

These resistors are to give the reference voltage of 10 comparators. And then above  $V_B - V_A$  is to give the Input Voltage sensitivity of this device.  $R_1$  and  $R_2$  will be calculated as follows.

$$\frac{R_2}{R_1 + R_2 + 9\Omega} \times V_{CC} = V_A \dots \dots \dots (1)$$

$$\frac{R_2 + 9\Omega}{R_1 + R_2 + 9\Omega} \times V_{CC} = V_B \dots \dots \dots (2)$$

From (1) and (2)

$$R_1 = \frac{9(V_{CC} - V_B)}{V_B - V_A} (k\Omega) \dots \dots \dots (3)$$

$$R_2 = \frac{9V_A}{V_B - V_A} (k\Omega) \dots \dots \dots (4)$$

**MAXIMUM RATINGS** (Ta = 25°C)

| CHARACTERISTIC           | SYMBOL           | RATING  | UNIT |
|--------------------------|------------------|---------|------|
| Supply Voltage           | V <sub>CC</sub>  | 20      | V    |
| Power Dissipation (Note) | P <sub>D</sub>   | 750     | mW   |
| Operating Temperature    | T <sub>opr</sub> | -30~75  | °C   |
| Storage Temperature      | T <sub>stg</sub> | -55~125 | °C   |

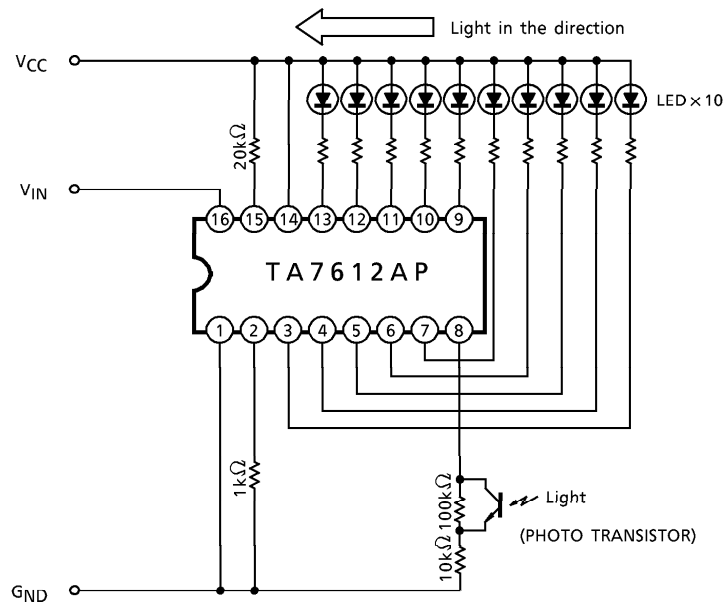
(Note) Derated above Ta = 25°C in the proportion of 6mW/°C.

**ELECTRICAL CHARACTERISTICS** (Ta = 25°C, V<sub>CC</sub> = 12V)

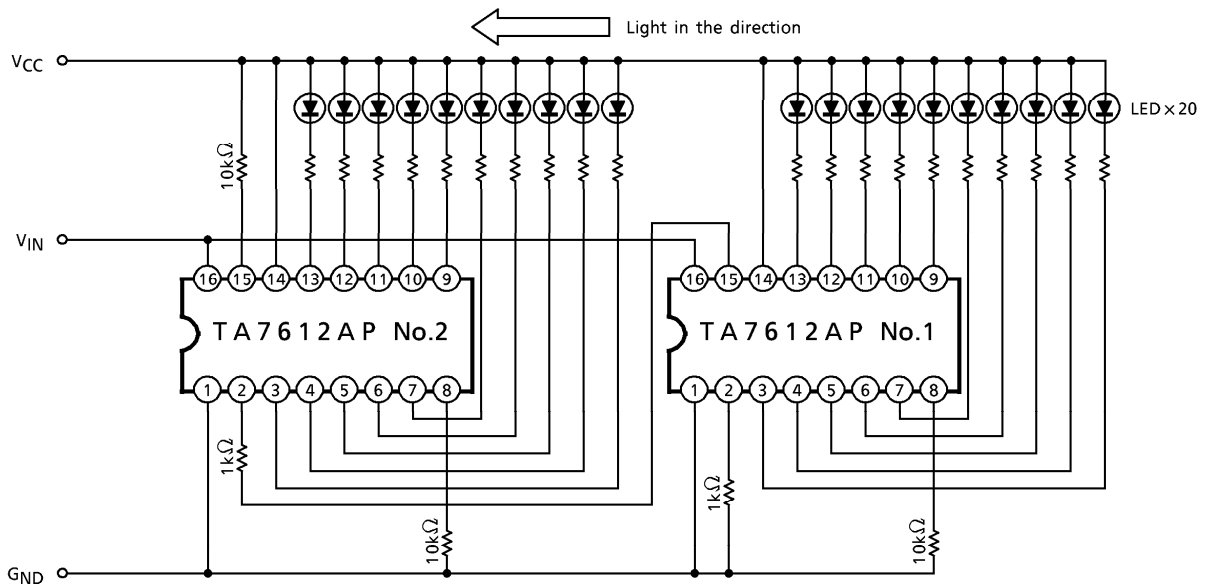
| CHARACTERISTIC              | SYMBOL           | TEST CIR-CUIT | TEST CONDITION   | MIN. | TYP.  | MAX. | UNIT |
|-----------------------------|------------------|---------------|--|------|-------|------|------|
| Supply Voltage              | V <sub>CC</sub>  | —             | —  | 6    | 12    | 15   | V    |
| Supply Current (1)          | I <sub>CC1</sub> | —             | V <sub>ref</sub> = 4V, V <sub>IN</sub> = 0V                                  | —    | 15    | 20   | mA   |
| Supply Current (2)          | I <sub>CC2</sub> | —             | V <sub>ref</sub> = 4V, V <sub>IN</sub> = 4.1V<br>I <sub>O</sub> = 10mA × 10  | —    | 150   | 160  | mA   |
| Input Bias Current          | R <sub>TOT</sub> | —             | —  | 7    | 9     | 11   | kΩ   |
| Internal Resistance         | I <sub>IN</sub>  | —             | V <sub>IN</sub> = GND  | —    | -0.25 | -1   | μA   |
| Input Voltage Range         | V <sub>IN</sub>  | —             | —  | 0    | —     | 8    | V    |
| Output Offset Voltage       | V <sub>OFF</sub> | —             | V <sub>ref</sub> = 4V  | -40  | —     | 40   | mV   |
| Output Voltage (High Level) | V <sub>OH</sub>  | —             | V <sub>ref</sub> = 4V, V <sub>IN</sub> = GND<br>R <sub>L</sub> = 1.5kΩ       | 11.9 | 11.93 | —    | V    |
| Output Voltage (Low Level)  | V <sub>OL</sub>  | —             | V <sub>ref</sub> = 4V, V <sub>IN</sub> = 4.10V<br>R <sub>L</sub> = 1.5kΩ     | —    | 0.6   | 1.0  | V    |
| Output Current              | I <sub>O</sub>   | —             | V <sub>ref</sub> = 4V, V <sub>IN</sub> = 4.10V                               | —    | 7     | 12   | mA   |
| Leak Current                | I <sub>IL</sub>  | —             | V <sub>IN</sub> = 4V<br>V <sub>ref Max</sub> = 0V, V <sub>ref Min</sub> = 0V | —    | —     | 15   | μA   |

**APPLICATION CIRCUIT**

- 10 LEDs Applications

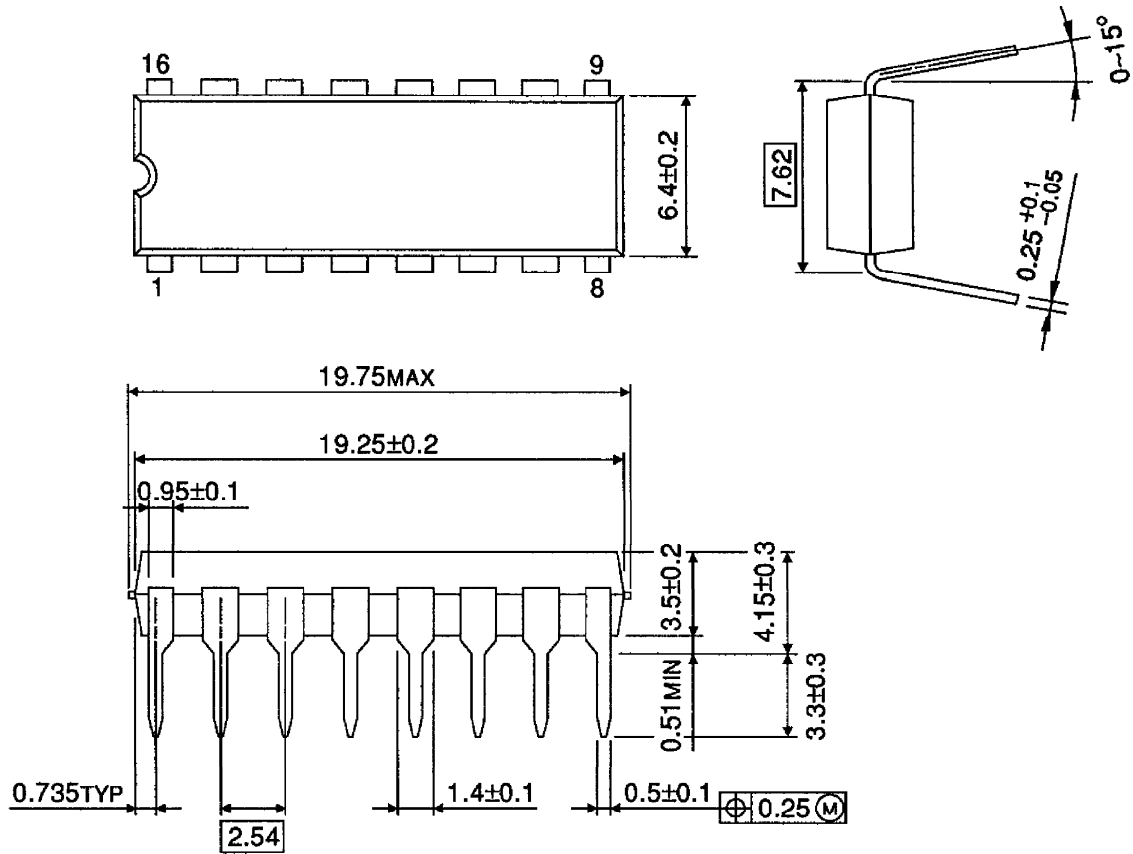


- 20 LEDs Applications



OUTLINE DRAWING  
DIP16-P-300-2.54A

Unit : mm



Weight : 1.00g (Typ.)