

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TD62504P-H

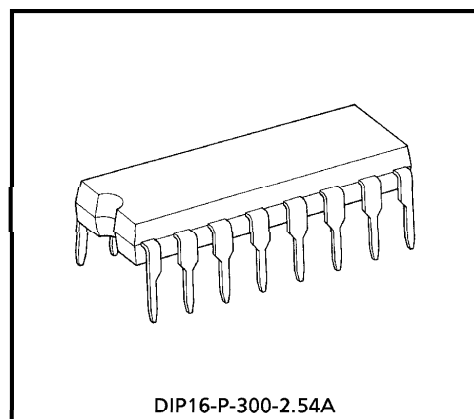
## 7ch SINGLE DRIVER : COMMON EMITTER

The TD62504P-H is comprised of seven or five NPN Transistor Arrays.

Applications include relay, hammer, lamp and display (LED) drivers.

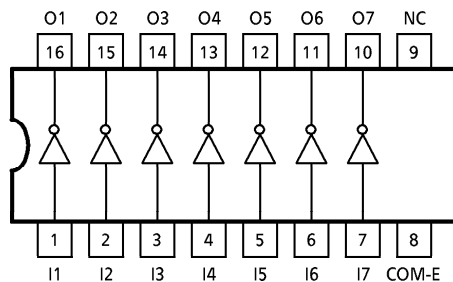
### FEATURES

- Package Type : DIP16 pin
- $R_{IN} = 10.5k\Omega$
- High Sustaining Voltage Output :  $V_{CEO} = 35V$  (Min.)
- Output Current (Single Output) : 200mA (Max.)
- Low Saturation Voltage :  $V_{ce(sat)} = 0.8V @ I_{out} = 150mA$
- Inputs Compatible with Various Types of Logic.
- Wide operating temperature range

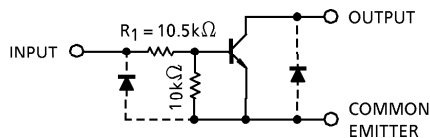


Weight : 1.11g (Typ.)

### PIN CONNECTION (TOP VIEW)



### SCHEMATICS (EACH DRIVER)



(Note) The input and output parasitic diodes cannot be used as clamp diodes.

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**MAXIMUM RATINGS (Ta = 25°C)**

| CHARACTERISTIC            | SYMBOL           | RATING   | UNIT    |
|---------------------------|------------------|----------|---------|
| Collector-Emitter Voltage | V <sub>CEO</sub> | 35       | V       |
| Collector-Base Voltage    | V <sub>CBO</sub> | 50       | V       |
| Collector Current         | I <sub>C</sub>   | 200      | mA / ch |
| Input Voltage             | V <sub>IN</sub>  | - 0.5~30 | V       |
| Power Dissipation         | P <sub>D</sub>   | 1.0      | W       |
| Operating Temperature     | T <sub>opr</sub> | - 40~105 | °C      |
| Storage Temperature       | T <sub>stg</sub> | - 55~150 | °C      |

**RECOMMENDED OPERATING CONDITIONS (Ta = - 40~85°C)**

| CHARACTERISTIC            | SYMBOL               | TEST CONDITION        | MIN. | TYP. | MAX. | UNIT    |
|---------------------------|----------------------|-----------------------|------|------|------|---------|
| Collector-Emitter Voltage | V <sub>CEO</sub>     | —                     | 0    | —    | 35   | V       |
| Collector-Base Voltage    | V <sub>CBO</sub>     | —                     | 0    | —    | 50   | V       |
| Collector Current         | I <sub>C</sub>       | —                     | 0    | —    | 150  | mA / ch |
| Input Voltage             | V <sub>IN</sub>      | —                     | 0    | —    | 25   | V       |
|                           | V <sub>IN (ON)</sub> | I <sub>IN</sub> = 1mA | 15.0 | —    | 25   |         |
| Power Dissipation         | P <sub>D</sub>       | Ta = 85°C             | —    | —    | 0.52 | W       |

**ELECTRICAL CHARACTERISTICS (Ta = 25°C)**

| CHARACTERISTIC                       | SYMBOL                | TEST CIR-CUIT | TEST CONDITION   | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-----------------------|---------------|--|------|------|------|------|
| Output Leakage Current               | I <sub>CEX</sub>      | 1             | V <sub>CE</sub> = 35V, V <sub>IN</sub> = 0V                            | —    | —    | 10   | μA   |
| Collector-Emitter Saturation Voltage | V <sub>CE (sat)</sub> | 2             | I <sub>IN</sub> = 1mA, I <sub>C</sub> = 10mA                           | —    | —    | 0.2  | V    |
|                                      |                       |               | I <sub>IN</sub> = 3mA, I <sub>C</sub> = 150mA                          | —    | —    | 0.8  |      |
| DC Current Transfer Ratio            | h <sub>FE</sub>       | 2             | V <sub>CE</sub> = 10V, I <sub>C</sub> = 10mA                           | 50   | —    | —    | —    |
| Input Voltage                        | V <sub>IN (ON)</sub>  | 3             | I <sub>IN</sub> = 1mA, I <sub>C</sub> = 10mA                           | 7.5  | 11.5 | 15.0 | V    |
| Turn-On Delay                        | t <sub>ON</sub>       | 4             | V <sub>CEO</sub> = 35V, R <sub>L</sub> = 220Ω<br>C <sub>L</sub> = 15pF | —    | 50   | —    | ns   |
| Turn-Off Delay                       | t <sub>OFF</sub>      |               |  | —    | 200  | —    |      |

**RECOMMENDED OPERATING CONDITIONS (Ta = - 40~105°C)**

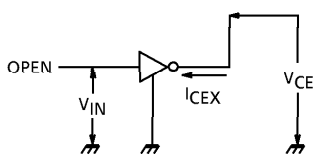
| CHARACTERISTIC            | SYMBOL                | TEST CONDITION        | MIN. | TYP. | MAX. | UNIT    |
|---------------------------|-----------------------|-----------------------|------|------|------|---------|
| Collector-Emitter Voltage | V <sub>CEO</sub>      | —                     | 0    | —    | 35   | V       |
| Collector-Base Voltage    | V <sub>CBO</sub>      | —                     | 0    | —    | 50   | V       |
| Collector Current         | I <sub>C</sub>        | DC 1 circuits         | 0    | —    | 150  | mA / ch |
|                           |                       | 7 circuits            | 0    | —    | 100  |         |
| Input Voltage             | V <sub>IN</sub>       | —                     | 0    | —    | 25   | V       |
|                           | V <sub>IN (ON)</sub>  | I <sub>IN</sub> = 1mA | 15.0 | —    | 25   |         |
|                           | V <sub>IN (OFF)</sub> | —                     | 0    | —    | 0.50 |         |
| Power Dissipation         | P <sub>D</sub>        | Ta = 105°C            | —    | —    | 0.36 | W       |

**ELECTRICAL CHARACTERISTICS (Ta = 105°C)**

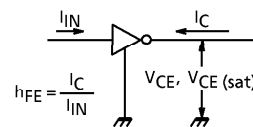
| CHARACTERISTIC                       | SYMBOL        | TEST CIRCUIT | TEST CONDITION                                   | MIN. | TYP. | MAX  | UNIT    |
|--------------------------------------|---------------|--------------|--|------|------|------|---------|
| Output Leakage Current               | $I_{CEX}$     | 1            | $V_{CE} = 35V, V_{IN} = 0V$                      | —    | —    | 300  | $\mu A$ |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | 2            | $I_{IN} = 1mA, I_C = 10mA$                       | —    | —    | 0.3  | V       |
|                                      |               |              | $I_{IN} = 3mA, I_C = 150mA$                      | —    | —    | 0.9  |         |
| DC Current Transfer Ratio            | $h_{FE}$      | 2            | $V_{CE} = 10V, I_C = 10mA$                       | 50   | —    | —    | —       |
| Input Voltage                        | $V_{IN(ON)}$  | 3            | $I_{IN} = 1mA, I_C = 10mA$                       | 6.5  | 11.5 | 16.0 | V       |
| Turn-On Delay                        | $t_{ON}$      | 4            | $V_{CEO} = 35V, R_L = 220\Omega$<br>$C_L = 15pF$ | —    | 100  | —    | ns      |
| Turn-Off Delay                       | $t_{OFF}$     |              |  | —    | 500  | —    |         |

**TEST CIRCUIT**

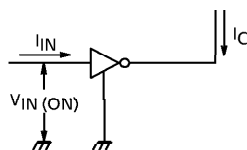
1.  $I_{CEX}$



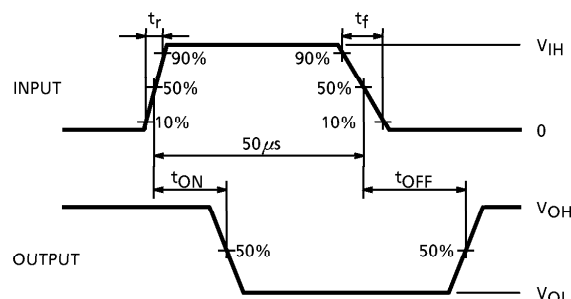
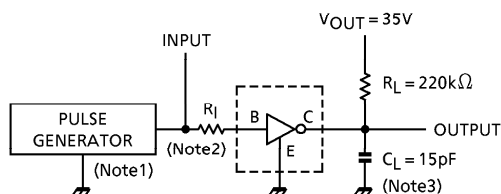
2.  $h_{FE}, V_{CE(sat)}$



3.  $V_{IN(ON)}$



4.  $t_{ON}, t_{OFF}$



(Note1) Pulse Width  $50\mu s$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5ns$ ,  $t_f \leq 10ns$

(Note2)

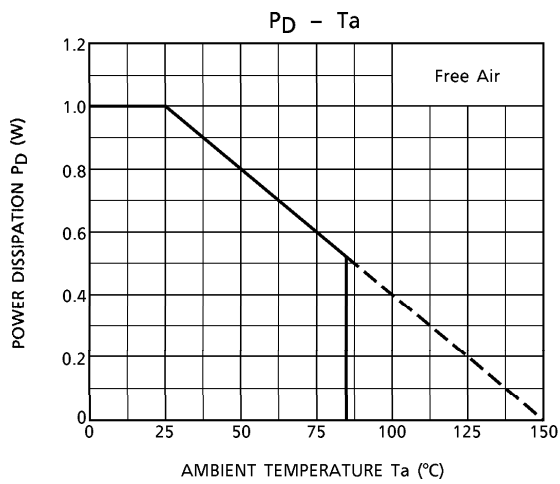
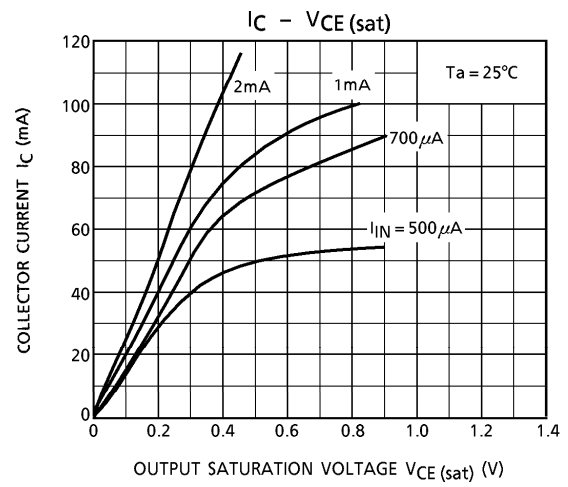
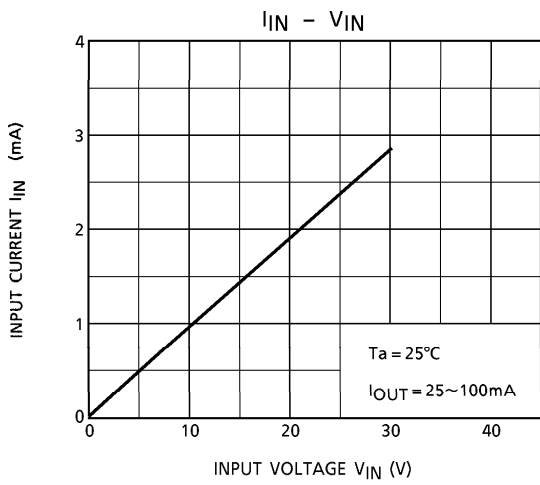
Input Condition

| TYPE NUMBER | $R_I$     | $V_{IH}$ |
|-------------|-----------|----------|
| TD62504P-H  | $0\Omega$ | 10V      |

(Note3)  $C_L$  includes probe and jig capacitance

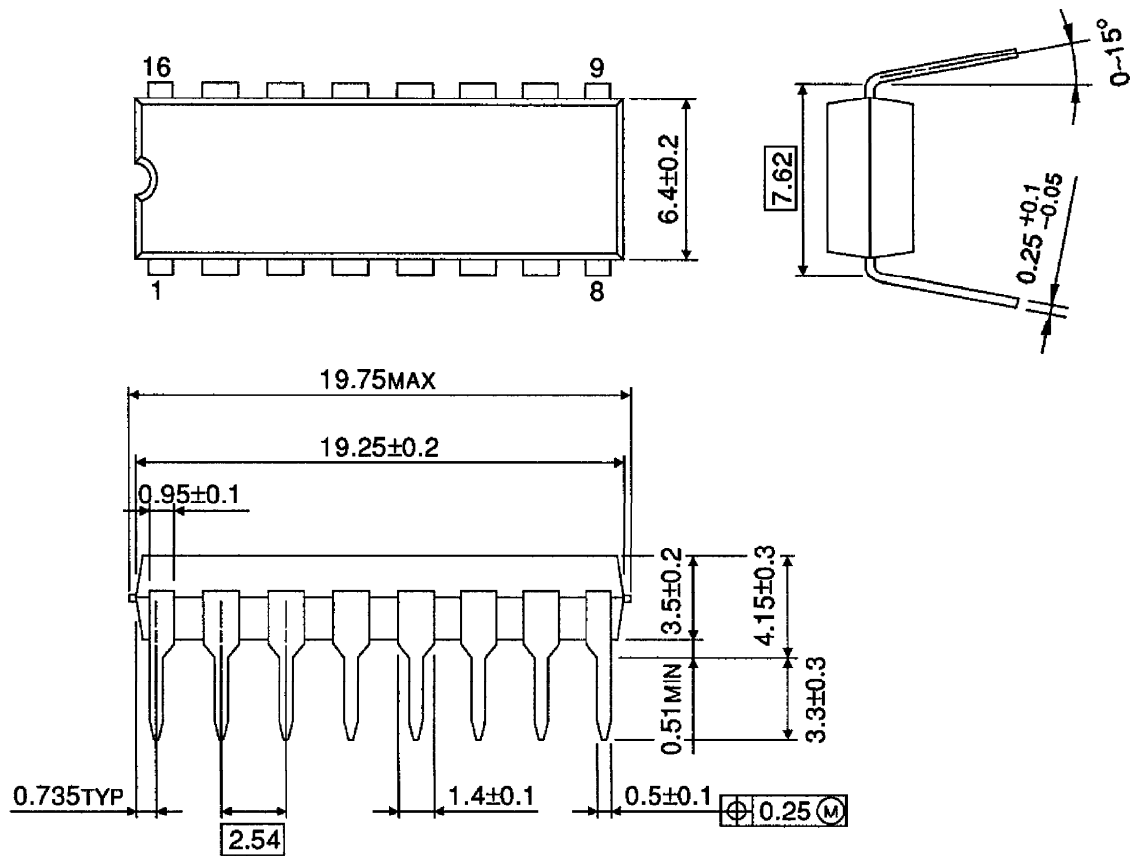
**PRECAUTIONS for USING**

Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



OUTLINE DRAWING  
DIP16-P-300-2.54A

Unit : mm



Weight : 1.11g (Typ.)