

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

## TD62601P, TD62601F, TD62602P, TD62602F TD62603P, TD62603F, TD62604P, TD62604F

### 6CH THRESHOLD FREE DRIVER

TD62601P, TD62601F INVERTER

TD62602P, TD62602F INVERTER / OPEN COLLECTOR

TD62603P, TD62603F NON-INVERTER

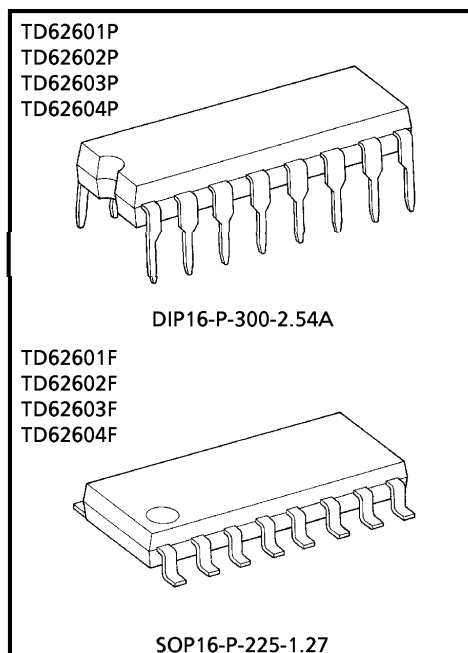
TD62604P, TD62604F NON-INVERTER / OPEN COLLECTOR

The TD62601P, TD62601F series are threshold free drivers which are comprised of six NPN transistor output stages and comparator input stages.

The TD62601P, TD62601F series are pin compatible with CMOS 4049B and 4050B type except  $V_{ref}$  terminal.

$V_{ref}$  is set at  $1/2 V_{CC}$  with internal resistors and it is change able using external resistors.

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



Weight  
DIP16-P-300-2.54A : 1.11g (Typ.)  
SOP16-P-225-1.27 : 0.16g (Typ.)

### FEATURES

- Wide supply voltage range  $V_{CC} = 4 \sim 18V$
- $V_{ref} = 1/2 V_{CC}$  @16 pin is non-connected
- Pin compatible with CMOS logic 4049B, 4050B type

TD62601P, TD62601F (4049B type)

TD62602P, TD62602F (4049B type open-collector)

TD62603P, TD62603F (4050B type)

TD62604P, TD62604F (4050B type open-collector)

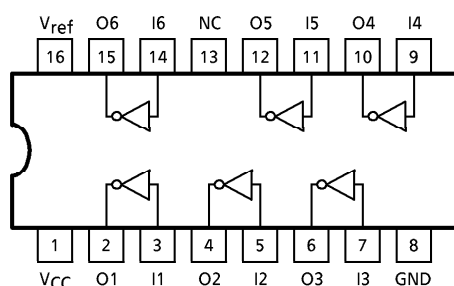
- Package type-P : DIP-16 pin
- Package type-F : SOP-16 pin

961001EBA2

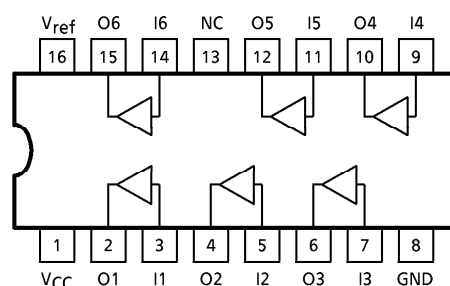
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## PIN CONNECTION (TOP VIEW)

TD62601P, TD62601F, TD62602P, TD62602F

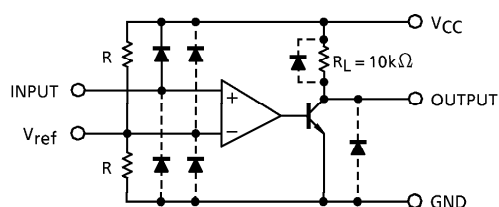


TD62603P, TD62603F, TD62604P, TD62604F



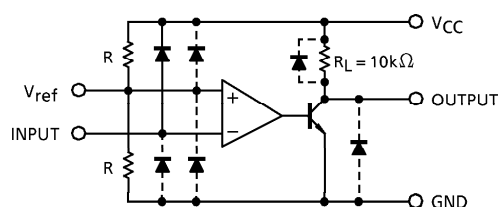
## SCHEMATICS (EACH DRIVER)

TD62601P, TD62601F, TD62602P, TD62602F



TD62601P, TD62601F : With  $R_L$   
TD62602P, TD62602F : Without  $R_L$

TD62603P, TD62603F, TD62604P, TD62604F



TD62603P, TD62603F : With  $R_L$   
TD62604P, TD62604F : Without  $R_L$

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

## MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC            | SYMBOL    | RATING                | UNIT    |
|---------------------------|-----------|-----------------------|---------|
| Supply Voltage            | $V_{CC}$  | 20                    | V       |
| Output Sustaining Voltage | $V_{OUT}$ | - 0.5~20              | V       |
| Output Current            | $I_{OUT}$ | 10                    | mA / ch |
| Input Voltage             | $V_{IN}$  | - 0.5~ $V_{CC} + 0.5$ | V       |
| Power Dissipation         | P         | 1.0                   | W       |
|                           | F         | 0.625 (Note 1)        |         |
| Operating Temperature     | $T_{opr}$ | - 40~85               | °C      |
| Storage Temperature       | $T_{stg}$ | - 55~150              | °C      |

(Note 1) On PCB (30×30×1.6mm Cu 50%)

(Note 2) Delated above 25°C in the proportion of 8.0mW/°C (P Type), 5.0mW/°C (F Type).

RECOMMENDED OPERATING CONDITIONS ( $T_a = -40 \sim 85^\circ\text{C}$ ,  $V_{CC} = 0\text{V}$ )

| CHARACTERISTIC            |                                  | SYMBOL    | CONDITION                | MIN. | TYP. | MAX.           | UNIT    |
|---------------------------|----------------------------------|-----------|--------------------------|------|------|----------------|---------|
| Supply Voltage            |                                  | $V_{CC}$  | —                        | 4.0  | —    | 18             | V       |
| Output Sustaining Voltage | 62602P, 62602F<br>62604P, 62604F | $V_{OUT}$ | —                        | 0    | —    | 18             | V       |
| Output Current            |                                  | $I_{OUT}$ | $V_{CC} = 5\text{V}$     | 0    | —    | 8              | mA / ch |
| Input Voltage             |                                  | $V_{IN}$  | —                        | 0    | —    | $V_{CC}$       | V       |
| REF, Input Voltage        |                                  | $V_{ref}$ | $T_a = 25^\circ\text{C}$ | 0.4  | —    | $V_{CC} - 1.6$ | V       |
| Power Dissipation         | P                                | $P_D$     | —                        | —    | —    | 0.36           | W       |
|                           | F                                |           | On PCB                   | —    | —    | 0.325          |         |

ELECTRICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )

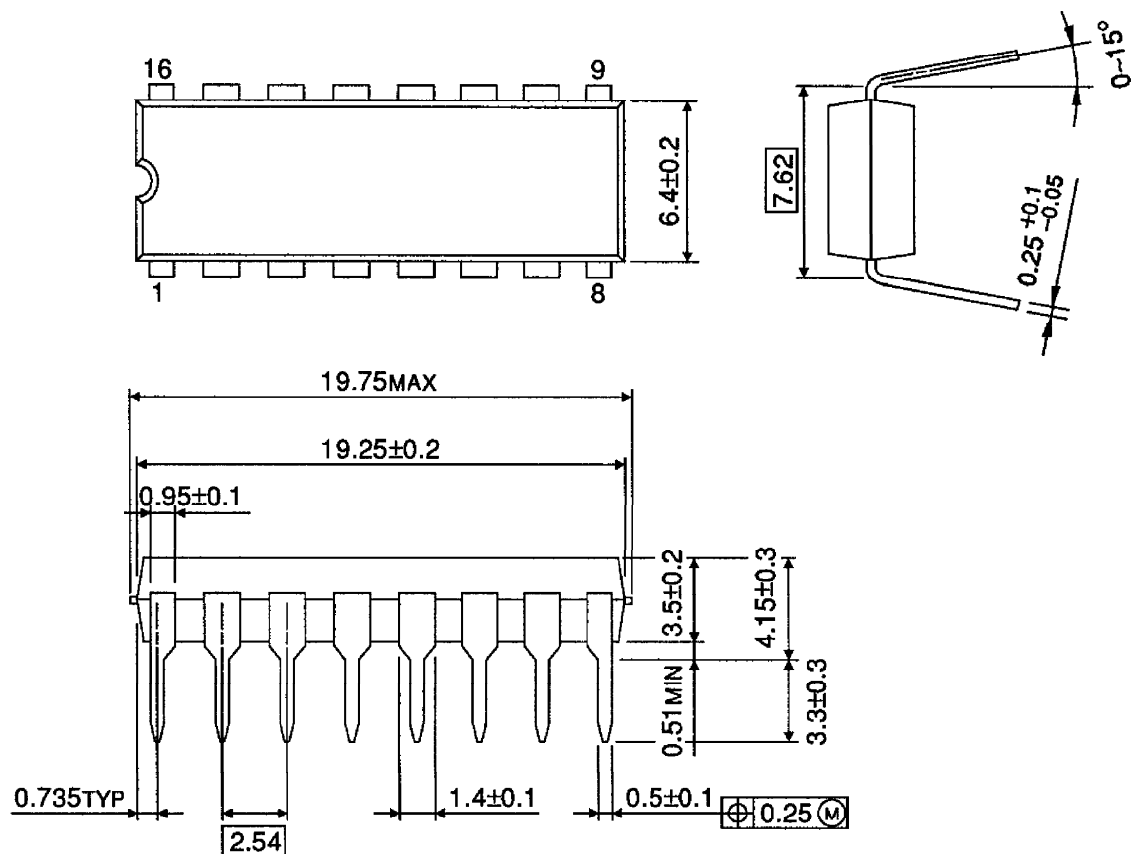
| CHARACTERISTIC             |           | SYMBOL                | TEST CIR-CUIT | TEST CONDITION                                                           | MIN.               | TYP. | MAX.               | UNIT             |
|----------------------------|-----------|-----------------------|---------------|--------------------------------------------------------------------------|--------------------|------|--------------------|------------------|
| Input Voltage              | "H" Level | $V_{IH}$              | —             | —                                                                        | $V_{ref} + 0.1$    | —    | —                  | V                |
|                            | "L" Level | $V_{IL}$              | —             | —                                                                        | —                  | —    | $V_{ref} - 0.1$    |                  |
| Output Current             | "H" Level | $I_{OH}$              | —             | $V_{CC} = 4.5\text{V}$ , $V_O = 18\text{V}$                              | —                  | —    | 10                 | $\mu\text{A}$    |
| Output Voltage             | "H" Level | $V_{OH}$              | —             | $V_{CC} = 4.5\text{V}$ , $I_O = -10\mu\text{A}$                          | 4.0                | —    | —                  | V                |
|                            | "H" Level | $V_{OH}$              | —             | $V_{CC} = 4.5\text{V}$ , $I_O = -10\mu\text{A}$                          | 4.0                | —    | —                  |                  |
|                            | "L" Level | $V_{OL}$              | —             | $V_{CC} = 4.5\text{V}$ , $I_O = 8\text{mA}$                              | —                  | 0.1  | 0.4                |                  |
| Input Current              | "H" Level | $I_{IH}$              | —             | —                                                                        | —                  | —    | 2                  | $\mu\text{A}$    |
|                            | "L" Level | $I_{IL}$              | —             | —                                                                        | —                  | -0.2 | -1.5               |                  |
| $V_{ref}$ Terminal Voltage |           | $V_{ref}(\text{OUT})$ | —             | —                                                                        | $1/2 V_{CC} - 0.1$ | —    | $1/2 V_{CC} + 0.1$ | V                |
| $V_{ref}$ Resistor         |           | $R_{ref}$             | —             | —                                                                        | 3.5                | 5    | 6.5                | $\text{k}\Omega$ |
| Supply Current             |           | $I_{CC}$              | —             | —                                                                        | —                  | —    | 12                 | mA               |
|                            | TD62601P  | $I_{CCL}$             | —             | —                                                                        | —                  | —    | 27                 | mA               |
|                            | TD62601F  |                       |               |                                                                          |                    |      |                    |                  |
|                            | TD62603P  |                       |               |                                                                          |                    |      |                    |                  |
|                            | TD62603F  |                       |               |                                                                          |                    |      |                    |                  |
| Turn-On Delay              |           | $t_{ON}$              | —             | $V_{CC} = 5\text{V}$ , $V_{OUT} = 18\text{V}$<br>$R_L = 2\text{k}\Omega$ | —                  | 0.5  | —                  | $\mu\text{s}$    |
| Turn-Off Delay             |           | $t_{OFF}$             | —             |                                                                          | —                  | 0.2  | —                  |                  |

## 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

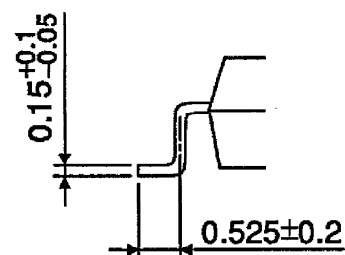
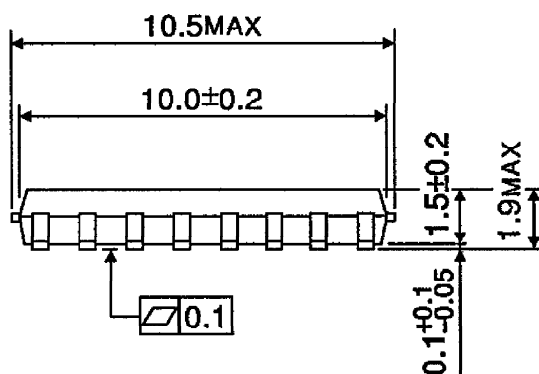
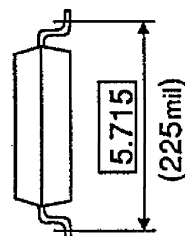
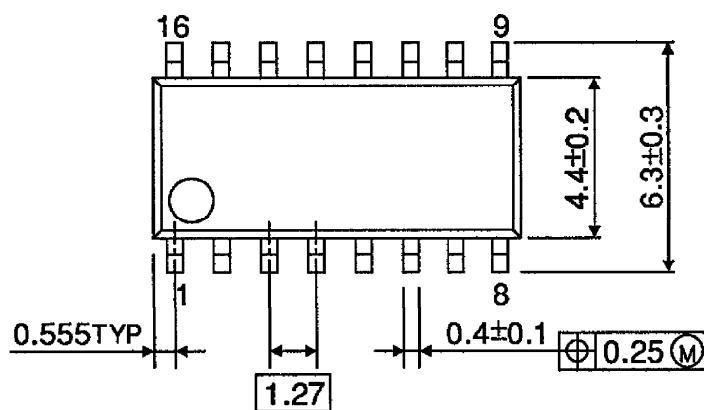
Unit : mm



Weight : 1.11g (Typ.)

**OUTLINE DRAWING**  
SOP16-P-225-1.27

Unit : mm



Weight : 0.16g (Typ.)