

TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

# TD62107P,TD62107F

## 4ch High-current Darlington Sink Driver

The TD62107P/F are high-voltage, high-current darlington drivers and enable inputs which can gate the outputs. All units feature integral clamp diodes for switching inductive loads.

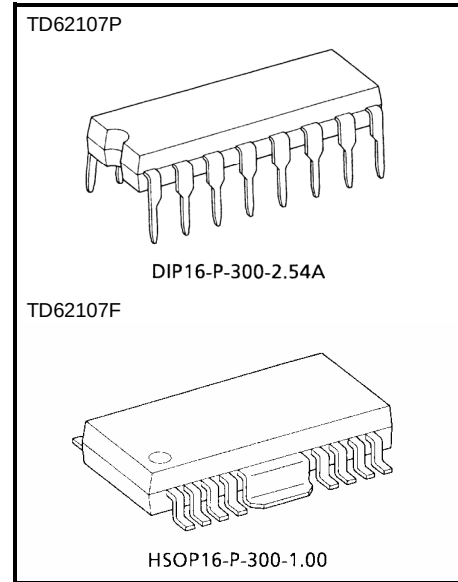
The TD62107P/F have a wide supply voltage range and all input are compatible with TTL and 5-V CMOS.

Application include relay, hammer, lamp and stepping moter drivers.

Please observe the thermal condition for using.

### Features

- Output current (single output) 750 mA (max)
- High sustaining voltage output: 45 V min (TD62107P)  
35 V min (TD62107F)
- Output clamp diodes
- Enable inputs E1, E2
- Wide supply voltage range  $V_{CC} = 4.75$  to 7 V
- Input compatible with TTL and 5-V CMOS
- GND terminal = heat sink
- Package type-P: DIP-16pin
- Package type-F: HSOP-16pin

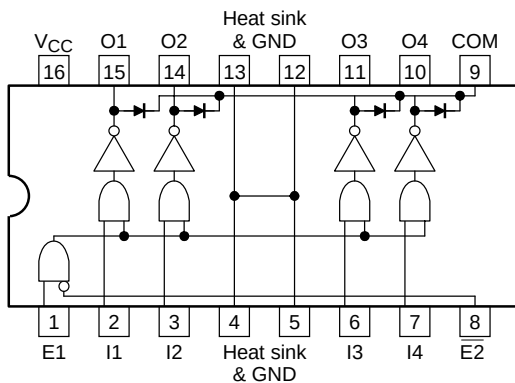


Weight

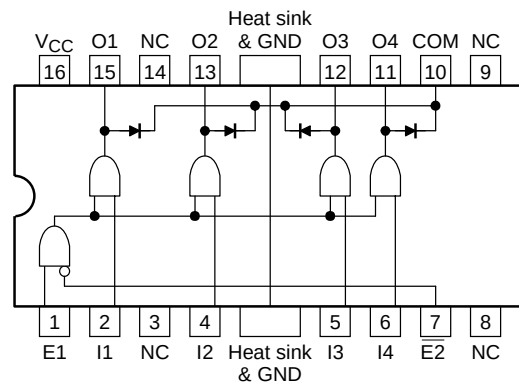
DIP16-P-300-2.54A: 1.11 g (typ.)  
HSOP16-P-300-1.00: 0.50 g (typ.)

### Pin Assignment (top view)

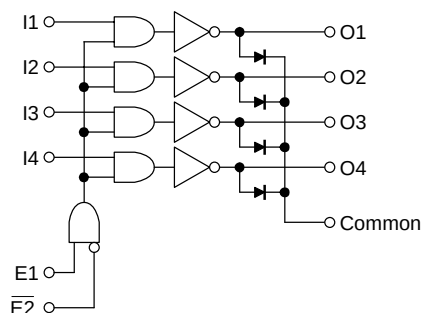
TD62107P



TD62107F



## Schematics (each driver)

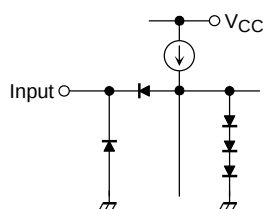


## Truth Table

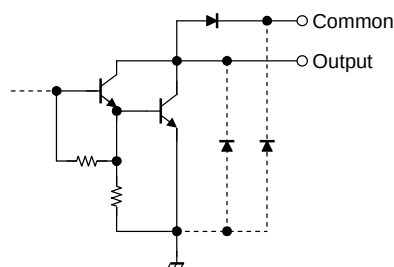
| E1 | $\overline{E2}$ | I1 to I4 | O1 to O4    |
|----|-----------------|----------|-------------|
| L  | L               | L or H   | Disable OFF |
| L  | H               | L or H   | Disable OFF |
| H  | L               | L or H   | Enable In   |
| H  | H               | L or H   | Disable OFF |

In = I1~I4

## Input Equivalent Circuit



## Output Equivalent Circuit



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

## Absolute Maximum Ratings (Ta = 25°C)

| Characteristics             |   | Symbol        | Rating                 | Unit |
|-----------------------------|---|---------------|------------------------|------|
| Supply voltage              |   | $V_{CC}$      | -0.5 to 17             | V    |
| Output sustaining voltage   | P | $V_{CE(SUS)}$ | -0.5 to 45             | V    |
|                             | F |               | -0.5 to 35             |      |
| Output current              |   | $I_{OUT}$     | 750                    | mA   |
| Input voltage               |   | $V_{IN}$      | -0.5 to $V_{CC} + 0.5$ | V    |
| Clamp diode reverse voltage | P | $V_R$         | 45                     | V    |
|                             | F |               | 35                     |      |
| Clamp diode forward current |   | $I_F$         | 500                    | mA   |
| Power dissipation           | P | $P_D$         | 2.7 (Note 1)           | W    |
|                             | F |               | 1.4 (Note 2)           |      |
| Operating temperature       |   | $T_{opr}$     | -40 to 85              | °C   |
| Storage temperature         |   | $T_{stg}$     | -55 to 150             | °C   |

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

## Recommended Operating Conditions (Ta = -40 to 85°C)

| Characteristics             |   | Symbol                | Condition                                      |            | Min  | Typ. | Max             | Unit |
|-----------------------------|---|-----------------------|------------------------------------------------|------------|------|------|-----------------|------|
| Supply voltage              |   | V <sub>CC</sub>       | —                                              |            | 4.75 | —    | 15              | V    |
| Output sustaining voltage   | P | V <sub>CE (SUS)</sub> | —                                              |            | 0    | —    | 45              | V    |
|                             | F |                       |                                                |            | 0    | —    | 35              |      |
| Output current              |   | I <sub>OUT</sub>      | T <sub>pw</sub> = 25 ms, Duty = 75%, 1 Circuit |            | 0    | —    | 500             | mA   |
|                             | P |                       | T <sub>pw</sub> = 25 ms, 4 Circuit             | Duty = 30% | 0    | —    | 400             |      |
|                             | F |                       |                                                | Duty = 40% | —    | —    | 300             |      |
| Input voltage               |   | V <sub>IN</sub>       | —                                              |            | 0    | —    | V <sub>CC</sub> | V    |
| Clamp diode reverse voltage | P | V <sub>R</sub>        | —                                              |            | —    | —    | 45              | V    |
|                             | F |                       |                                                |            | —    | —    | 35              |      |
| Clamp diode forward current |   | I <sub>F</sub>        | —                                              |            | —    | —    | 500             | mA   |
| Power dissipation           | P | P <sub>D</sub>        | —                                              |            | —    | —    | 1.0             | W    |
|                             | F |                       | Ta = 85°C (Note 1)                             |            | —    | —    | 0.7             |      |

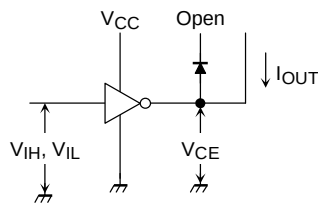
Note1: On Glass Epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

## Electrical Characteristics (Ta = 25°C)

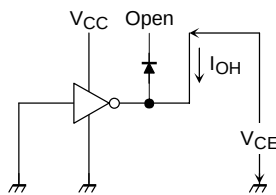
| Characteristics             |             |                 | Symbol           | Test Circuit | Test Condition                                                                                  | Min | Typ. | Max             | Unit |
|-----------------------------|-------------|-----------------|------------------|--------------|-------------------------------------------------------------------------------------------------|-----|------|-----------------|------|
| Input voltage               | High level  |                 | V <sub>IH</sub>  | 1            |                                                                                                 | 2.0 | —    | V <sub>CC</sub> | V    |
|                             | Low level   |                 | V <sub>IL</sub>  |              |                                                                                                 | —   | —    | 0.8             |      |
| Output current              | High level  | P               | I <sub>OH</sub>  | 2            | V <sub>CE</sub> = 45 V, Ta = 75°C                                                               | —   | —    | 100             | μA   |
|                             |             | F               |                  |              | V <sub>CE</sub> = 35 V, Ta = 85°C                                                               | —   | —    | 100             |      |
| Output voltage              | Low level   |                 | V <sub>OL</sub>  | 3            | I <sub>OUT</sub> = 50 mA                                                                        | —   | —    | 1.3             | V    |
| Input current               | High level  |                 | I <sub>IH</sub>  | 4            | V <sub>IN</sub> = 13 V                                                                          | —   | —    | 100             | μA   |
|                             | Low level   |                 | I <sub>IL</sub>  | 5            | V <sub>IN</sub> = 0.4 V                                                                         | —   | —    | −0.3            | mA   |
| Clamp diode reverse current |             | P               | I <sub>R</sub>   | 6            | V <sub>R</sub> = 45 V                                                                           | —   | —    | 100             | μA   |
|                             |             | F               |                  |              | V <sub>R</sub> = 35 V                                                                           | —   | —    | 100             |      |
| Clamp diode forward voltage |             |                 | V <sub>F</sub>   | 7            | I <sub>F</sub> = 500 mA                                                                         | —   | —    | 2.0             | V    |
| Supply current              | Output high | I <sub>CC</sub> | I <sub>CCH</sub> | 4            | V <sub>CC</sub> = 13 V, V <sub>IN</sub> = 0 V<br>Output open                                    | —   | —    | 13              | mA   |
|                             | Output low  |                 | I <sub>CCL</sub> | 5            | V <sub>CC</sub> = 13 V, V <sub>IN</sub> = 5 V<br>Output open                                    | —   | —    | 17              |      |
| Turn-on delay               |             | P               | t <sub>ON</sub>  | 8            | V <sub>CC</sub> = 5 V, R <sub>L</sub> = 90 Ω<br>C <sub>L</sub> = 15 pF, V <sub>OUT</sub> = 45 V | —   | 5    | —               | μs   |
|                             |             | F               |                  |              | V <sub>CC</sub> = 5 V, R <sub>L</sub> = 70 Ω<br>C <sub>L</sub> = 15 pF, V <sub>OUT</sub> = 35 V | —   | 5    | —               |      |
| Turn-off delay              |             | P               | t <sub>OFF</sub> | 8            | V <sub>CC</sub> = 5 V, R <sub>L</sub> = 90 Ω<br>C <sub>L</sub> = 15 pF, V <sub>OUT</sub> = 45 V | —   | 5    | —               | μs   |
|                             |             | F               |                  |              | V <sub>CC</sub> = 5 V, R <sub>L</sub> = 70 Ω<br>C <sub>L</sub> = 15 pF, V <sub>OUT</sub> = 35 V | —   | 5    | —               |      |

## Test Circuit

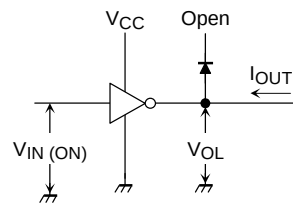
### 1. $V_{IH}$ , $V_{IL}$



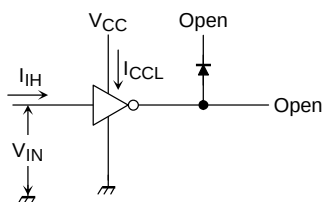
### 2. $I_{OH}$



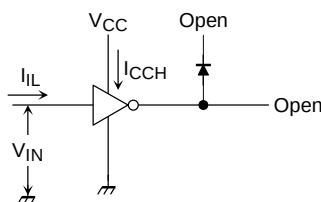
### 3. $V_{OL}$



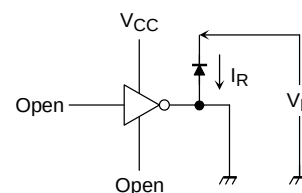
### 4. $I_{IH}$ , $I_{CCL}$



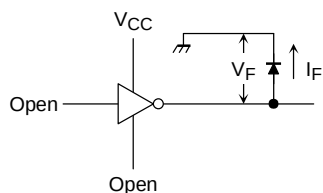
### 5. $I_{IL}$ , $I_{CCH}$



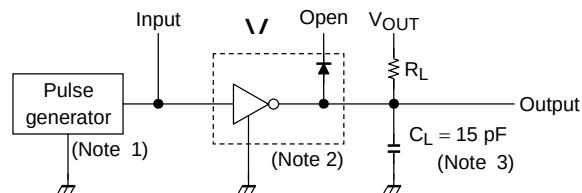
### 6. $I_R$



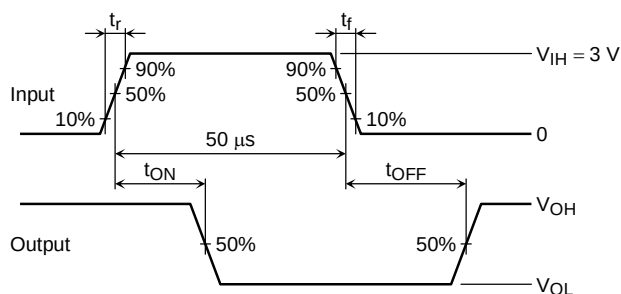
### 7. $V_F$



### 8. $t_{ON}$ , $t_{OFF}$



## Input Condition



Note 1: Pulse width 50  $\mu$ s, duty cycle 10%  
Output Impedance 50  $\Omega$ ,  $t_r \leq 5$  ns,  $t_f \leq 10$  ns

Note 2:  $V_{IH} = 3$  V,  $E1 = V_{IH}$ ,  $E2 = \text{GND}$ ,  $V_{CC} = 5$  V

Note 3:  $C_L$  includes probe and jig capacitance

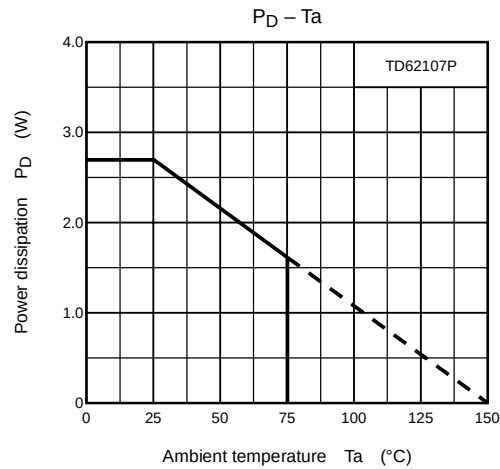
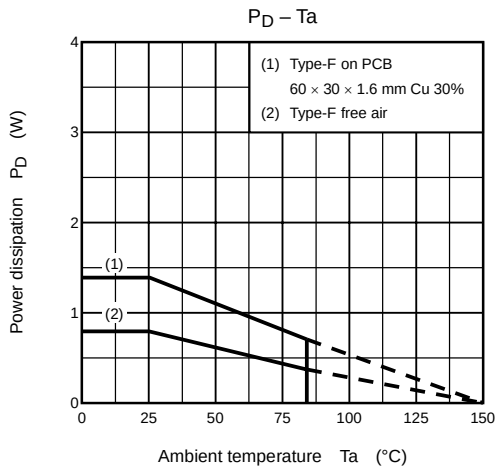
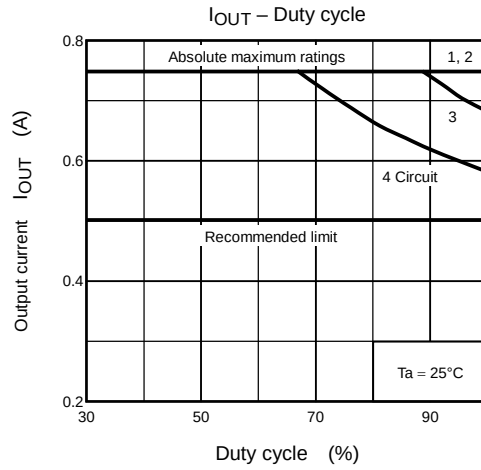
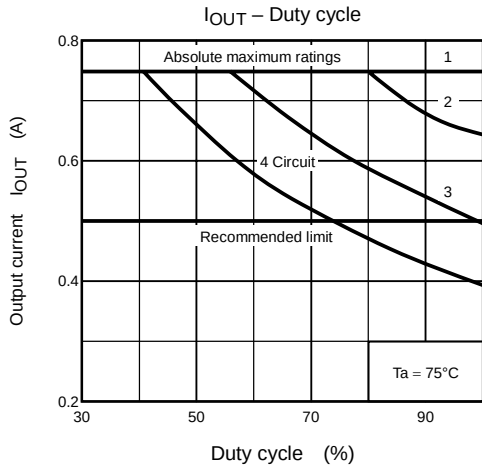
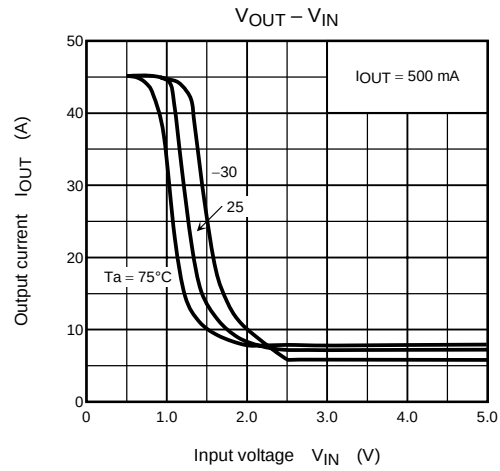
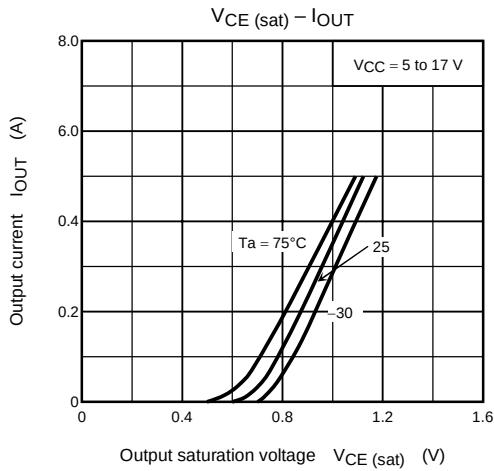
## Precautions for Using

This IC does not include built-in protection circuits for excess current or overvoltage.

If this IC is subjected to excess current or overvoltage, it may be destroyed.

Hence, the utmost care must be taken when systems which incorporate this IC are designed.

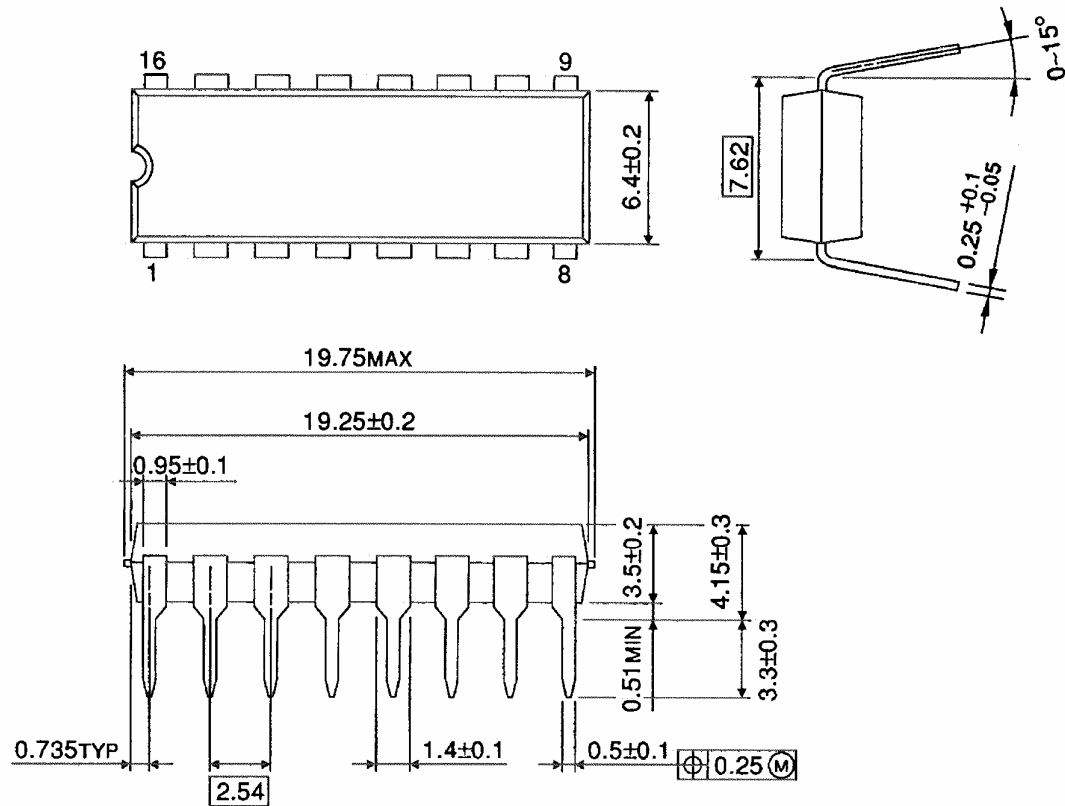
Utmost care is necessary in the design of the output line,  $V_{CC}$ , COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



## Package Dimensions

DIP16-P-300-2.54A

Unit : mm

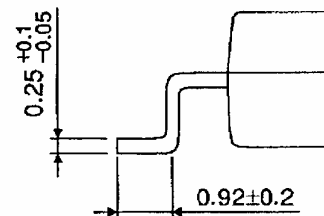
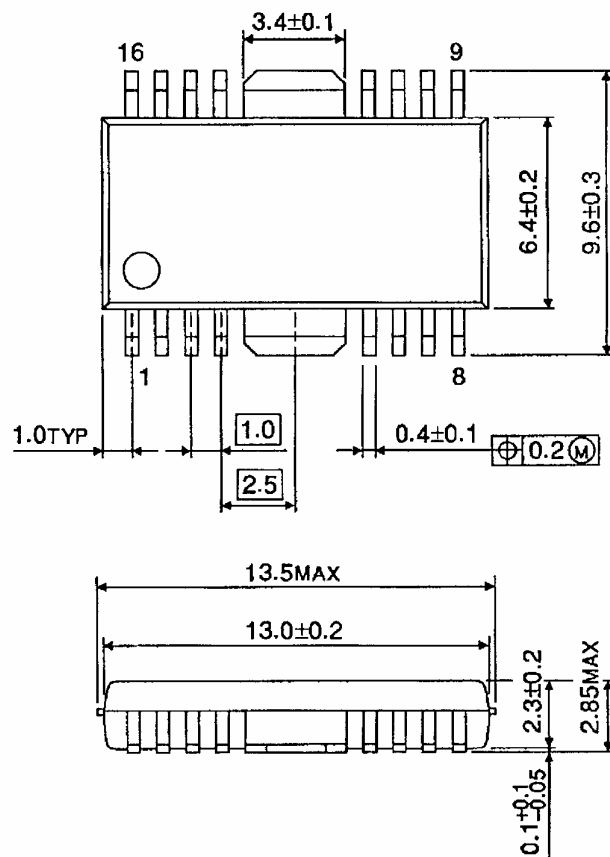


Weight: 1.11 g (typ.)

## Package Dimensions

HSOP16-P-300-1.00

Unit : mm



Weight: 0.50 g (typ.)

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060116EBA

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