

## 8CH DARLINGTON SINK DRIVER

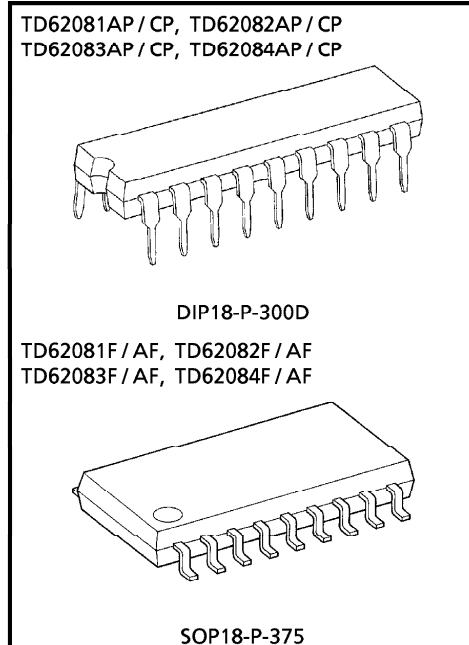
The TD62081AP/CP/F/AF Series are high-voltage, high-current darlington drivers comprised of eight NPN darlington pairs.

All units feature integral clamp diodes for switching inductive loads.

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

### FEATURES

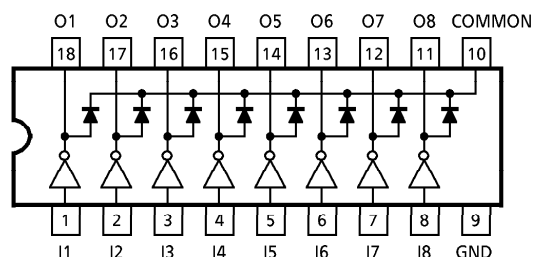
- Output current (single output)  
500mA (Max.) (TD62081AP/F/AF series)  
400mA (Max.) (TD62081CP series)
- High sustaining voltage output  
35V (Min.) (TD62081F series)  
50V (Min.) (TD62081AP/AF series)  
100V (Min.) (TD62081CP series)
- Output clamp diodes
- Inputs compatible with various types of logic.
- Package type-AP, CP : DIP-18pin
- Package type-F, AF : SOP-18pin



Weight DIP18-P-300D : 1.478g (Typ.)  
SOP18-P-375 : 0.41g (Typ.)

| TYPE              | INPUT BASE RESISTOR               | DESIGNATION      |
|-------------------|-----------------------------------|------------------|
| TD62081AP/CP/F/AF | External                          | General Purpose  |
| TD62082AP/CP/F/AF | 10.5-k $\Omega$ + 7V Zenner diode | 14~25V PMOS      |
| TD62083AP/CP/F/AF | 2.7k $\Omega$                     | TTL, 5V CMOS     |
| TD62084AP/CP/F/AF | 10.5k $\Omega$                    | 6~15V PMOS, CMOS |

### PIN CONNECTION (TOP VIEW)

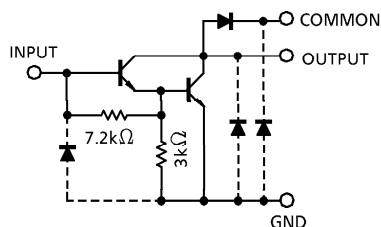


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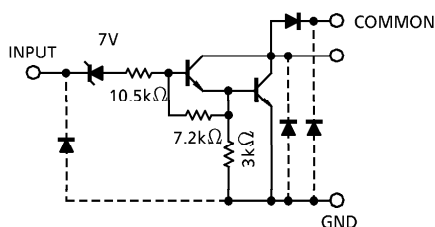
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# SCHEMATICS (EACH DRIVER)

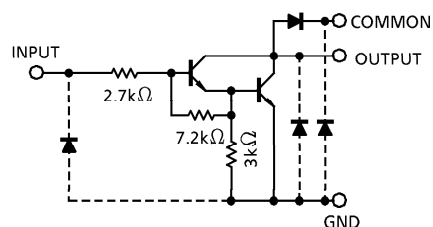
TD62081AP / CP / F / AF



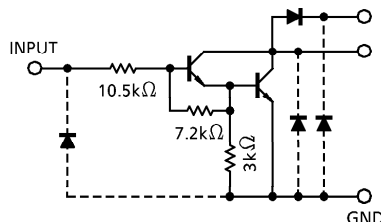
TD62082AP / CP / F / AF



TD62083AP / CP / F / AF



TD62084AP / CP / F / AF



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

## MAXIMUM RATINGS (Ta = 25°C)

| CHARACTERISTIC              |        | SYMBOL                   | RATING    | UNIT    |
|-----------------------------|--------|--------------------------|-----------|---------|
| Output Sustaining Voltage   | AP, AF | V <sub>CE (SUS)</sub>    | − 0.5~50  | V       |
|                             | CP     |                          | − 0.5~100 |         |
|                             | F      |                          | − 0.5~35  |         |
| Output Current              |        | I <sub>OUT</sub>         | 500       | mA / ch |
|                             | CP     |                          | 400       |         |
| Input Voltage               |        | V <sub>IN</sub> (Note 1) | − 0.5~30  | V       |
| Input Current               |        | I <sub>IN</sub> (Note 2) | 25        | mA      |
| Clamp Diode Reverse Voltage | AP, AF | V <sub>R</sub>           | 50        | V       |
|                             | CP     |                          | 100       |         |
|                             | F      |                          | 35        |         |
| Clamp Diode Forward Current |        | I <sub>F</sub>           | 500       | mA      |
|                             | CP     |                          | 400       |         |
| Power Dissipation           | AP, CP | P <sub>D</sub>           | 1.47      | W       |
|                             | F, AF  |                          | 0.96      |         |
| Operating Temperature       |        | T <sub>opr</sub>         | − 40~85   | °C      |
| Storage Temperature         |        | T <sub>stg</sub>         | − 55~150  | °C      |

(Note 1) Except TD62081AP / CP / F / AF

(Note 2) Only TD62081AP / CP / F / AF

**RECOMMENDED OPERATING CONDITIONS** ( $T_a = -40 \sim 85^\circ\text{C}$ )

| CHARACTERISTIC               |                                      | SYMBOL                | TEST CONDITION                                    | MIN. | TYP. | MAX. | UNIT    |
|------------------------------|--------------------------------------|-----------------------|---------------------------------------------------|------|------|------|---------|
| Output Sustaining Voltage    | AP, AF                               | V <sub>CE (SUS)</sub> |                                                   | 0    | —    | 50   | V       |
|                              | CP                                   |                       |                                                   | 0    | —    | 100  |         |
|                              | F                                    |                       |                                                   | 0    | —    | 35   |         |
| Output Current               | AP, CP                               | I <sub>OUT</sub>      | T <sub>pw</sub> = 25ms, Duty = 10%,<br>8 Circuits | 0    | —    | 347  | mA / ch |
|                              |                                      |                       | T <sub>pw</sub> = 25ms, Duty = 50%,<br>8 Circuits | 0    | —    | 123  |         |
|                              | F, AF                                |                       | T <sub>pw</sub> = 25ms, Duty = 10%,<br>8 Circuits | 0    | —    | 268  |         |
|                              |                                      |                       | T <sub>pw</sub> = 25ms, Duty = 50%,<br>8 Circuits | 0    | —    | 90   |         |
| Input Voltage                | Except<br>TD62081AP /<br>CP / F / AF | V <sub>IN</sub>       |                                                   | 0    | —    | 30   | V       |
| Input Voltage<br>(Output On) | TD62082AP /<br>CP / F / AF           | V <sub>IN (ON)</sub>  |                                                   | 14   | —    | 30   | V       |
|                              | TD62083AP /<br>CP / F / AF           |                       |                                                   | 3.5  | —    | 30   |         |
|                              | TD62084AP /<br>CP / F / AF           |                       |                                                   | 8    | —    | 30   |         |
| Input Current                | Only<br>TD62081AP /<br>CP / F / AF   | I <sub>IN</sub>       |                                                   | 0    | —    | 5    | mA      |
| Clamp Diode Reverse Voltage  | AP, AF                               | V <sub>R</sub>        |                                                   | —    | —    | 50   | V       |
|                              | CP                                   |                       |                                                   | —    | —    | 100  |         |
|                              | F                                    |                       |                                                   | —    | —    | 35   |         |
| Clamp Diode Forward Current  |                                      | I <sub>F</sub>        |                                                   | —    | —    | 400  | mA      |
|                              | CP                                   |                       |                                                   | —    | —    | 320  |         |
| Power Dissipation            | AP, CP                               | P <sub>D</sub>        |                                                   | —    | —    | 0.52 | W       |
|                              | F, AF                                |                       |                                                   | —    | —    | 0.4  |         |

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

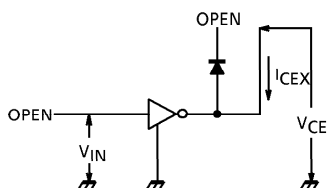
| CHARACTERISTIC                       |                         |                      | SYMBOL                | TEST CIR-<br>CUIT                                 | TEST CONDITION                                    |                      | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-------------------------|----------------------|-----------------------|---------------------------------------------------|---------------------------------------------------|----------------------|------|------|------|------|
| Output Leakage Current               |                         | AP, AF               | I <sub>CEX</sub>      | 1                                                 | V <sub>CE</sub> = 50V                             | Ta = 25°C            | —    | —    | 50   | μA   |
|                                      |                         | CP                   |                       |                                                   | V <sub>CE</sub> = 100V                            |                      |      |      |      |      |
|                                      |                         | F                    |                       |                                                   | V <sub>CE</sub> = 35V                             |                      |      |      |      |      |
|                                      |                         | AP, AF               |                       |                                                   | V <sub>CE</sub> = 50V                             | Ta = 85°C            | —    | —    | 100  |      |
|                                      |                         | CP                   |                       |                                                   | V <sub>CE</sub> = 100V                            |                      |      |      |      |      |
|                                      |                         | F                    |                       |                                                   | V <sub>CE</sub> = 35V                             |                      |      |      |      |      |
|                                      | TD62082                 | AP, AF               |                       |                                                   | V <sub>CE</sub> = 50V                             | V <sub>IN</sub> = 6V | —    | —    | 500  |      |
|                                      |                         | CP                   |                       |                                                   | V <sub>CE</sub> = 100V                            |                      |      |      |      |      |
|                                      |                         | F                    |                       |                                                   | V <sub>CE</sub> = 35V                             |                      |      |      |      |      |
|                                      | TD62084                 | AP, AF               |                       |                                                   | V <sub>CE</sub> = 50V                             | V <sub>IN</sub> = 1V | —    | —    | 500  |      |
|                                      |                         | CP                   |                       |                                                   | V <sub>CE</sub> = 100V                            |                      |      |      |      |      |
|                                      |                         | F                    |                       |                                                   | V <sub>CE</sub> = 35V                             |                      |      |      |      |      |
| Collector-Emitter Saturation Voltage |                         |                      | V <sub>CE</sub> (sat) | 2                                                 | I <sub>OUT</sub> = 350mA, I <sub>IN</sub> = 500μA | —                    | 1.3  | 1.6  | V    |      |
|                                      |                         |                      |                       | I <sub>OUT</sub> = 200mA, I <sub>IN</sub> = 350μA | —                                                 | 1.1                  | 1.3  |      |      |      |
|                                      |                         |                      |                       | I <sub>OUT</sub> = 100mA, I <sub>IN</sub> = 250μA | —                                                 | 0.9                  | 1.1  |      |      |      |
| Input Current                        | TD62082AP / CP / F / AF | I <sub>IN</sub> (ON) | 2                     | V <sub>IN</sub> = 17V                             | —                                                 | 0.82                 | 1.25 | mA   |      |      |
|                                      | TD62083AP / CP / F / AF |                      |                       | V <sub>IN</sub> = 3.85V                           | —                                                 | 0.93                 | 1.35 |      |      |      |
|                                      | TD62084AP / CP / F / AF |                      |                       | V <sub>IN</sub> = 5V                              | —                                                 | 0.35                 | 0.5  |      |      |      |
|                                      |                         |                      |                       | V <sub>IN</sub> = 12V                             | —                                                 | 1.0                  | 1.45 |      |      |      |
|                                      |                         |                      | I <sub>IN</sub> (OFF) | 4                                                 | I <sub>OUT</sub> = 500μA, Ta = 85°C               | 50                   | 65   | —    | μA   |      |
| Input Voltage (Output On)            | TD62082AP / CP / F / AF | V <sub>IN</sub> (ON) | 5                     | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 300mA    | —                                                 | —                    | 13   | V    |      |      |
|                                      | TD62083AP / CP / F / AF |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 200mA    | —                                                 | —                    | 2.4  |      |      |      |
|                                      |                         |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 250mA    | —                                                 | —                    | 2.7  |      |      |      |
|                                      |                         |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 300mA    | —                                                 | —                    | 3.0  |      |      |      |
|                                      |                         |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 125mA    | —                                                 | —                    | 5.0  |      |      |      |
|                                      |                         |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 200mA    | —                                                 | —                    | 6.0  |      |      |      |
|                                      |                         |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 275mA    | —                                                 | —                    | 7.0  |      |      |      |
|                                      | TD62084AP / CP / F / AF |                      |                       | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 350mA    | —                                                 | —                    | 8.0  |      |      |      |
| DC Current Transfer Ratio            |                         |                      | h <sub>FE</sub>       | 2                                                 | V <sub>CE</sub> = 2V, I <sub>OUT</sub> = 350mA    | 1000                 | —    | —    |      |      |
| Clamp Diode Reverse Current          |                         |                      | I <sub>R</sub>        | 6                                                 | Ta = 25°C (Note)                                  | —                    | —    | 50   | μA   |      |
|                                      |                         |                      |                       | Ta = 85°C (Note)                                  | —                                                 | —                    | 100  |      |      |      |
| Clamp Diode Forward Voltage          |                         | V <sub>F</sub>       | 7                     | I <sub>F</sub> = 350mA                            | —                                                 | —                    | 2.0  | V    |      |      |
| CP                                   | I <sub>F</sub> = 280mA  |                      |                       | —                                                 | —                                                 | 1.8                  |      |      |      |      |
| Input Capacitance                    |                         |                      | C <sub>IN</sub>       | —                                                 |                                                   | —                    | 15   | —    | pF   |      |

(Note) V<sub>R</sub> = V<sub>R</sub> MAX.

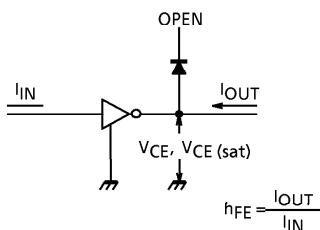
| CHARACTERISTIC |        | SYMBOL           | TEST CIR-<br>CUIT | TEST CONDITION                                 | MIN. | TYP. | MAX. | UNIT |
|----------------|--------|------------------|-------------------|------------------------------------------------|------|------|------|------|
| Turn-On Delay  | AP, AF | t <sub>ON</sub>  | 8                 | R <sub>L</sub> = 125Ω, V <sub>OUT</sub> = 50V  | —    | 0.1  | —    | μs   |
|                | CP     |                  |                   | R <sub>L</sub> = 312Ω, V <sub>OUT</sub> = 100V | —    | 0.1  | —    |      |
|                | F      |                  |                   | R <sub>L</sub> = 87.5Ω, V <sub>OUT</sub> = 35V | —    | 0.1  | —    |      |
| Turn-Off Delay | AP, AF | t <sub>OFF</sub> |                   | R <sub>L</sub> = 125Ω, V <sub>OUT</sub> = 50V  | —    | 0.2  | —    |      |
|                | CP     |                  |                   | R <sub>L</sub> = 312Ω, V <sub>OUT</sub> = 100V | —    | 3.0  | —    |      |
|                | F      |                  |                   | R <sub>L</sub> = 87.5Ω, V <sub>OUT</sub> = 35V | —    | 0.2  | —    |      |

## TEST CIRCUIT

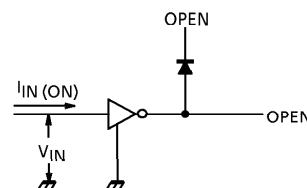
### 1. $I_{CEX}$



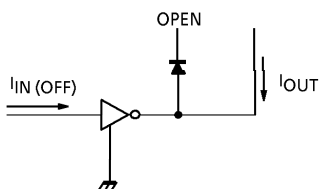
### 2. $V_{CE} (sat)$ , $h_{FE}$



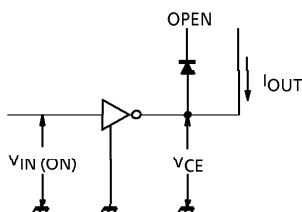
### 3. $I_{IN} (ON)$



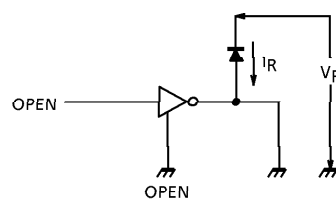
### 4. $I_{IN} (OFF)$



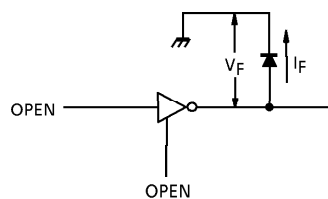
### 5. $V_{IN} (ON)$



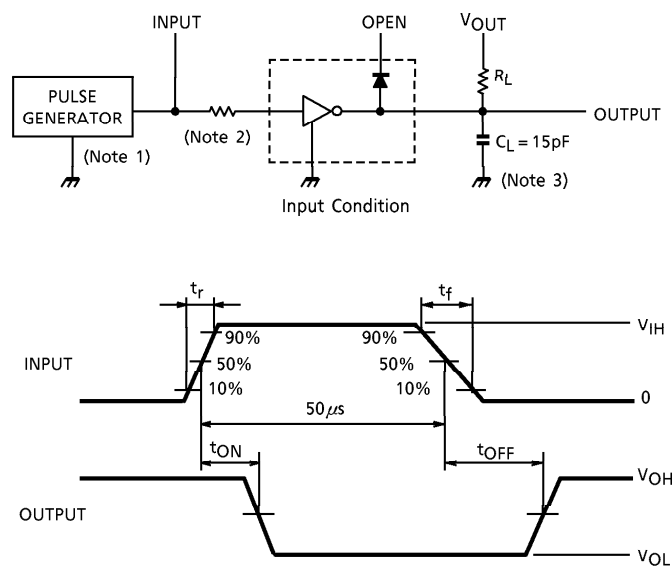
### 6. $I_R$



### 7. $V_F$



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



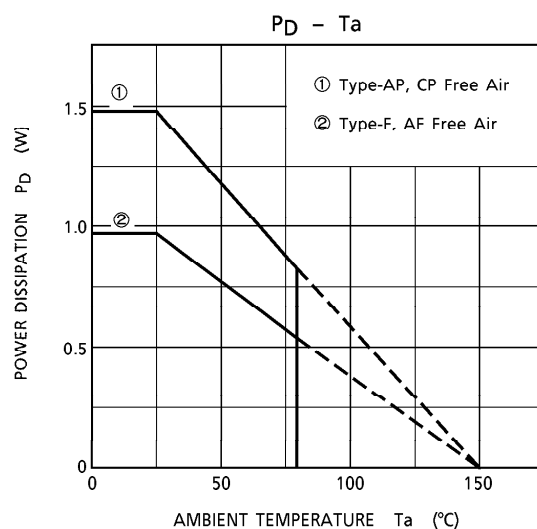
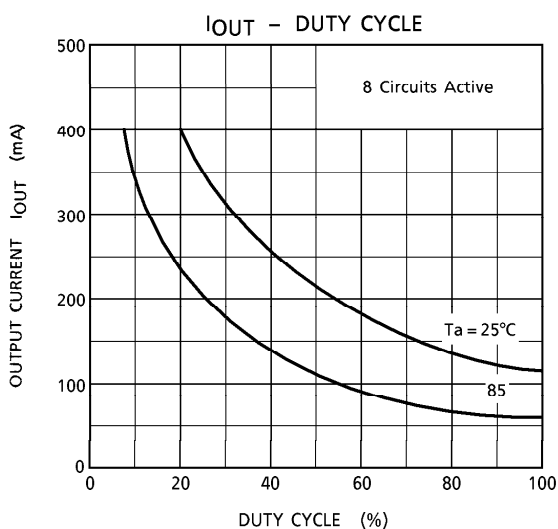
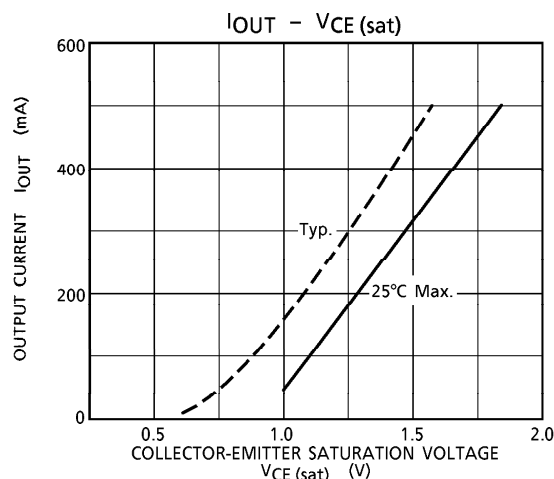
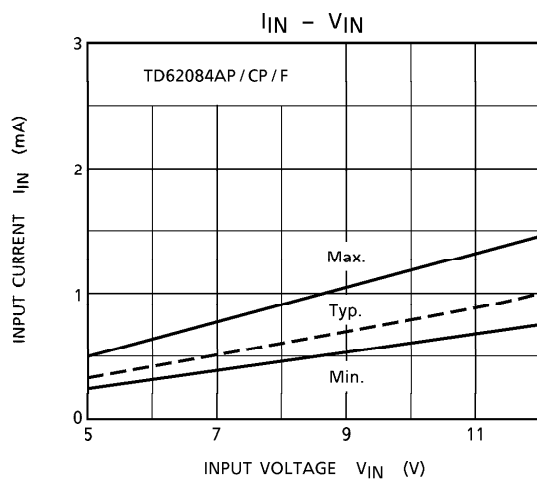
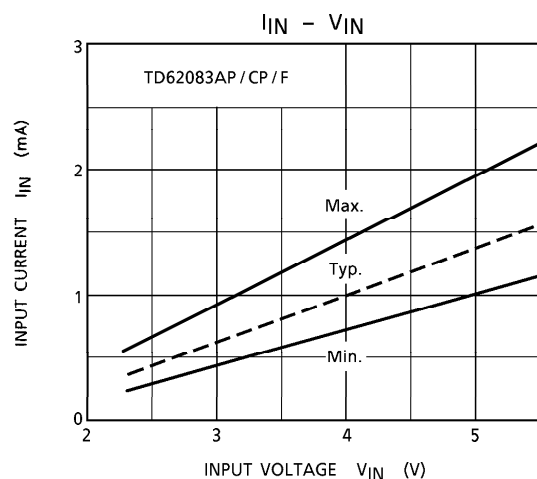
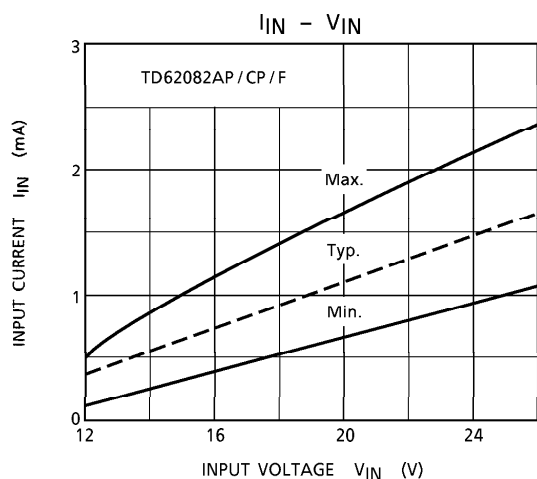
(Note 1) Pulse Width  $50\mu s$ , Duty Cycle 10%  
Output Impedance  $50\Omega$ ,  $t_r \leq 5ns$ ,  $t_f \leq 10ns$

(Note 2) See below.

INPUT CONDITION

| TYPE NUMBER       | R1           | $V_{IH}$ |
|-------------------|--------------|----------|
| TD62081AP/CP/F/AF | $2.7k\Omega$ | 3V       |
| TD62082AP/CP/F/AF | $0\Omega$    | 13V      |
| TD62083AP/CP/F/AF | $0\Omega$    | 3V       |
| TD62084AP/CP/F/AF | $0\Omega$    | 8V       |

(Note 3)  $C_L$  includes probe and jig capacitance

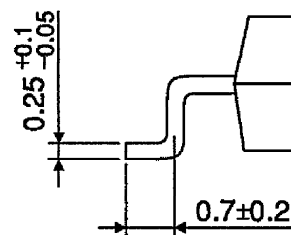
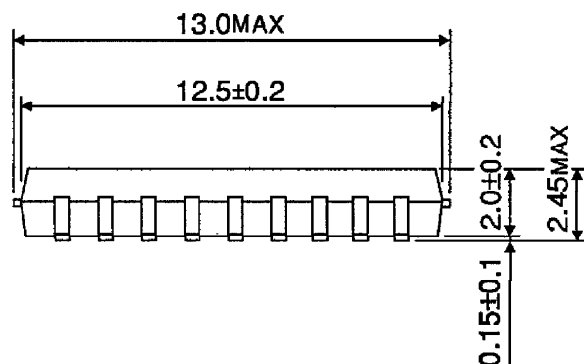
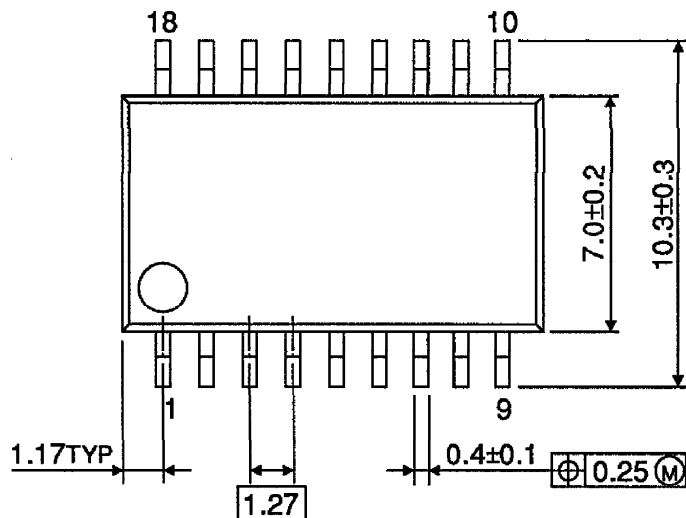




OUTLINE DRAWING

SOP18-P-375

Unit : mm



Weight : 0.41g (Typ.)

TD62081AP - 9\*

1995 - 5 - 29

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