

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62591AP, TD62592AP, TD62593AP, TD62594AP  
TD62595AP, TD62595AF, TD62596AP, TD62596AF  
TD62597AP, TD62597AF, TD62598AP, TD62598AF

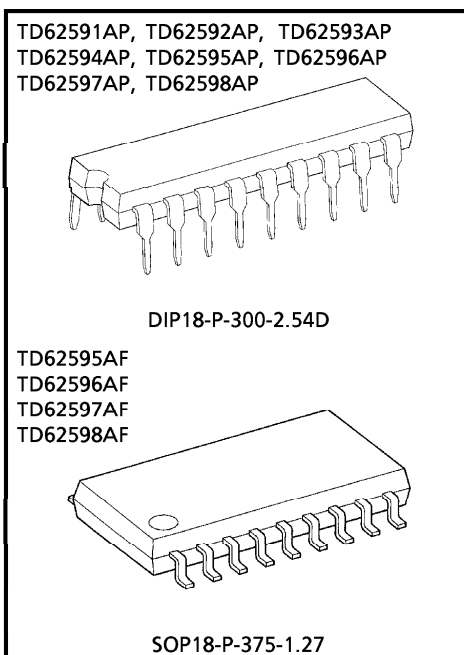
## 8CH SINGLE DRIVER

The TD62591AP, TD62591AF Series are comprised of eight NPN Transistor Arrays.

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

## FEATURES

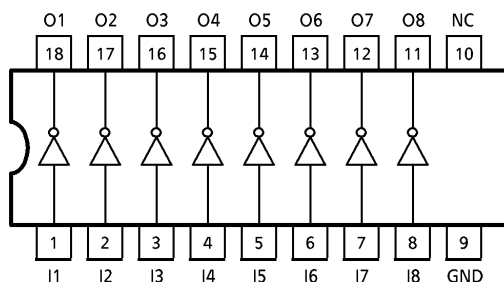
- Output current (single output) 200mA (Max.)
- High sustaining voltage output 50V (Min.)
- Low saturation voltage  $V_{CE(sat)} = 0.8V$
- @Iout = 150mA·inputs compatible with various type logic.  
TD62591, TD62595AP, TD62595AF : external.  
general purpose  
TD62592, TD62596AP, TD62596AF : 10.5k $\Omega$  + 7V  
zener diode 14~25V  
PMOS  
TD62593, TD62597AP, TD62597AF : 2.7k $\Omega$   
TTL, 5V CMOS  
TD62594, TD62598AP, TD62598AF : 10.5k $\Omega$   
6~15V PMOS, CMOS
- Package type-AP : DIP-18pin
- Package type-AF : SOP-18pin



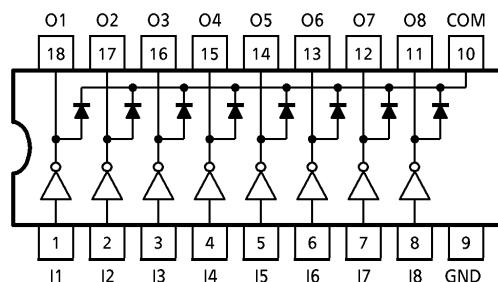
Weight  
DIP18-P-300-2.54D : 1.47g (Typ.)  
SOP18-P-375-1.27 : 0.5g (Typ.)

### PIN CONNECTION (TOP VIEW)

TD62591AP, TD62592AP, TD62593AP, TD62594AP



TD62595AP, TD62595AF, TD62596AP, TD62596AF  
TD62597AP, TD62597AF, TD62598AP, TD62598AF

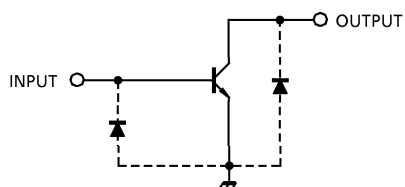


961001EBA2

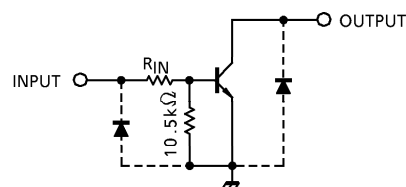
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## SCHEMATICS (EACH DRIVER)

TD62591AP

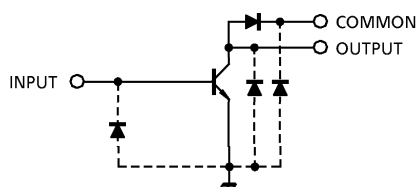


TD62592AP, TD62593AP, TD62594AP

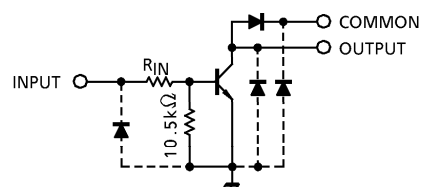


TD62592AP  $R_{IN} = 10.5k\Omega + V_Z = 7V$   
 TD62593AP  $R_{IN} = 2.7k\Omega$   
 TD62594AP  $R_{IN} = 10.5k\Omega$

TD62595AP, TD62595AF



TD62596AP, TD62596AF, TD62597AP,  
 TD62597AF, TD62598AP, TD62598AF



TD62596AP  $R_{IN} = 10.5k\Omega + V_Z = 7V$   
 TD62597AP  $R_{IN} = 2.7k\Omega$   
 TD62598AP  $R_{IN} = 10.5k\Omega$

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

## MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

| CHARACTERISTIC              | SYMBOL            | RATING               | UNIT             |
|-----------------------------|-------------------|----------------------|------------------|
| Collector-Emitter Voltage   | $V_{CEO}$         | 50                   | V                |
| Collector-Base Voltage      | $V_{CBO}$         | 50                   | V                |
| Clamp Diode Reverse Voltage | $V_R$ (Note 1)    | 50                   | V                |
| Collector Current           | $I_C$             | 200                  | mA / ch          |
| Input Voltage               | $V_{IN}$ (Note 2) | - 0.5~30             | V                |
| Input Current               | $I_{IN}$ (Note 3) | 25                   | mA               |
| Power Dissipation           | $P_D$ (Note 4)    | 0.96 (Note 5) / 1.47 | W                |
| Operating Temperature       | $T_{opr}$         | - 40~85              | $^\circ\text{C}$ |
| Storage Temperature         | $T_{stg}$         | - 55~150             | $^\circ\text{C}$ |

(Note 1) Except TD62591~TD62594AP

(Note 2) Except TD62591AP, TD62595AP, TD62595AF

(Note 3) Only TD62591AP, TD62595AP, TD62595AF

(Note 4) Delated above  $25^\circ\text{C}$  in the proportion of  $11.7\text{mW}/^\circ\text{C}$  (AP-Type),  $7.7\text{mW}/^\circ\text{C}$  (F, AF-Type)

(Note 5) SOP-18pin

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

| CHARACTERISTIC              |                    | SYMBOL        | CONDITION | MIN. | TYP. | MAX.  | UNIT    |
|-----------------------------|--------------------|---------------|-----------|------|------|-------|---------|
| Collector-Emitter Voltage   |                    | $V_{CEO}$     | —         | 0    | —    | 50    | V       |
| Collector-Base Voltage      |                    | $V_{CBO}$     | —         | 0    | —    | 50    | V       |
| Collector Current           |                    | $I_C$         | —         | 0    | —    | 150   | mA / ch |
| Clamp Diode Reverse Voltage |                    | $V_R$         | (Note 1)  | 7    | —    | 50    | V       |
| Input Voltage               |                    | $V_{IN}$      | (Note 2)  | 0    | —    | 25    | V       |
| Input Current               |                    | $I_{IN}$      | (Note 3)  | 0    | —    | 10    | mA      |
| Input Voltage (Output On)   | TD62592<br>TD62596 | $V_{IN} (ON)$ | —         | 14.0 | —    | 25    | V       |
|                             | TD62593<br>TD62597 |               |           | 2.4  | —    | 25    |         |
|                             | TD62594<br>TD62598 |               |           | 7.0  | —    | 25    |         |
| Power Dissipation           | AP                 | $P_D$         | —         | —    | —    | 0.52  | W       |
|                             | AF                 |               | —         | —    | —    | 0.355 |         |

## ELECTRICAL CHARACTERISTICS (Ta = 25°C unless otherwise noted)

| CHARACTERISTIC                       |                    | SYMBOL         | TEST CIR-CUIT | TEST CONDITION                   | MIN.           | TYP. | MAX. | UNIT    |
|--------------------------------------|--------------------|----------------|---------------|----------------------------------|----------------|------|------|---------|
| Output Leakage Current               |                    | $I_{CEX}$      | 1             | $V_{CE} = 50V, V_{IN} = 0$       | —              | —    | 10   | $\mu A$ |
| Collector-Emitter Saturation Voltage |                    | $V_{CE} (sat)$ | 2             | $I_C = 10mA, I_{IN} = 0.4mA$     | —              | —    | 0.2  | V       |
|                                      |                    |                |               | $I_C = 150mA, I_{IN} = 3.0mA$    | —              | —    | 0.8  |         |
| DC Current Transfer Ratio            |                    | $h_{FE}$       | 2             | $V_{CE} = 10V$<br>$I_C = 10mA$   | (Note 3)<br>70 | —    | —    | —       |
|                                      |                    |                |               |                                  | (Note 2)<br>50 | —    | —    |         |
| Input Current                        | TD62591<br>TD62595 | $I_{IN} (ON)$  | 3             | $I_C = 50mA$                     | —              | —    | 0.65 | mA      |
|                                      | TD62592<br>TD62596 |                |               | $V_{IN} = 14V, I_C = 50mA$       | —              | —    | 0.9  |         |
|                                      | TD62593<br>TD62597 |                |               | $V_{IN} = 2.4V, I_C = 50mA$      | —              | —    | 0.9  |         |
|                                      | TD62594<br>TD62598 |                |               | $V_{IN} = 7.0V, I_C = 50mA$      | —              | —    | 0.9  |         |
| Turn-On Delay                        |                    | $t_{ON}$       | 4             | $V_{OUT} = 50V, R_L = 330\Omega$ | —              | 0.1  | —    | $\mu s$ |
| Turn-Off Delay                       |                    | $t_{OFF}$      |               |                                  | —              | 0.3  | —    | $\mu s$ |

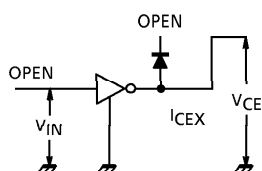
(Note 1) Except TD62591~TD62594AP

(Note 2) Except TD62591AP, TD62595AP, TD62595AF

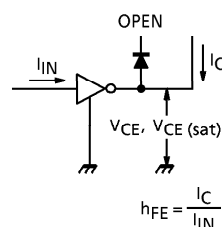
(Note 3) Only TD62591AP, TD62595AP, TD62595AF

# TEST CIRCUIT

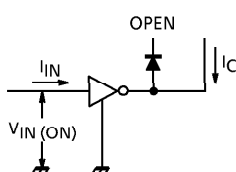
## 1. $I_{CEX}$



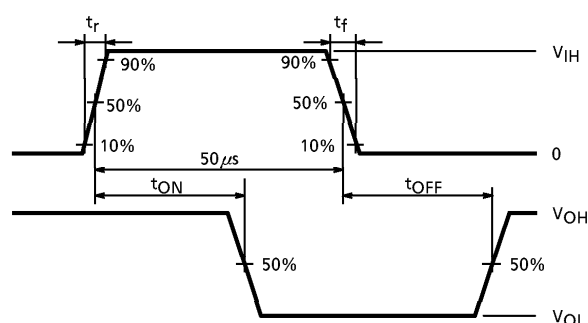
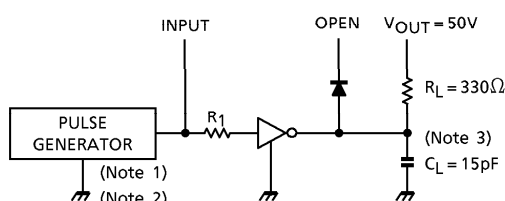
## 2. $h_{FE}$ , $V_{CE(sat)}$



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



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



(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

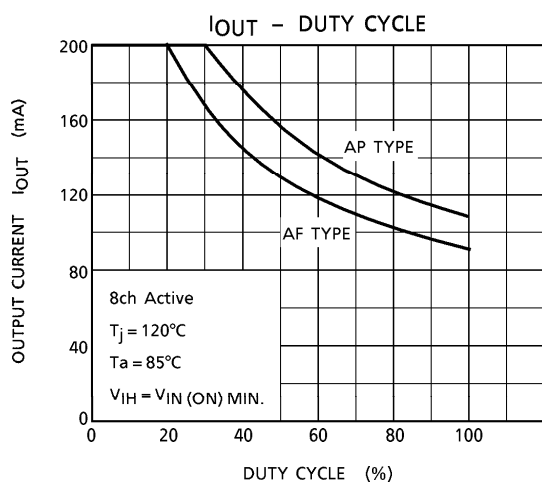
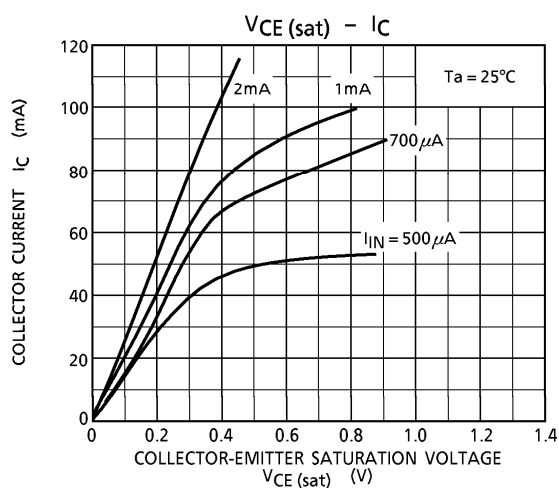
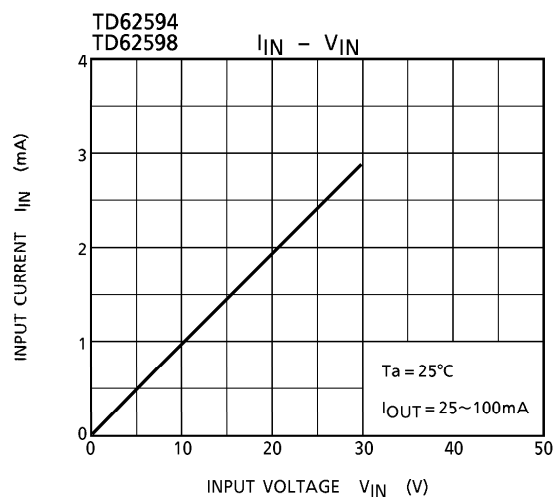
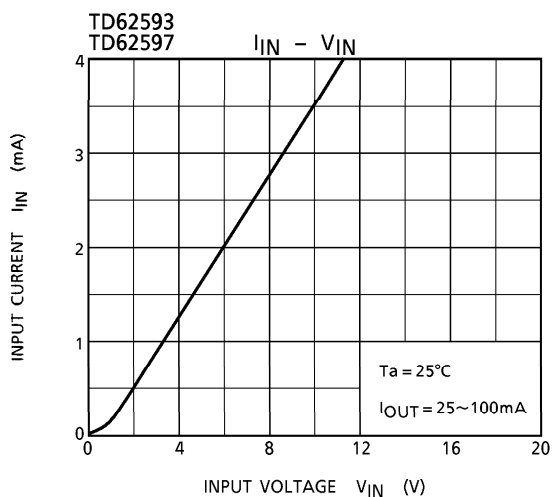
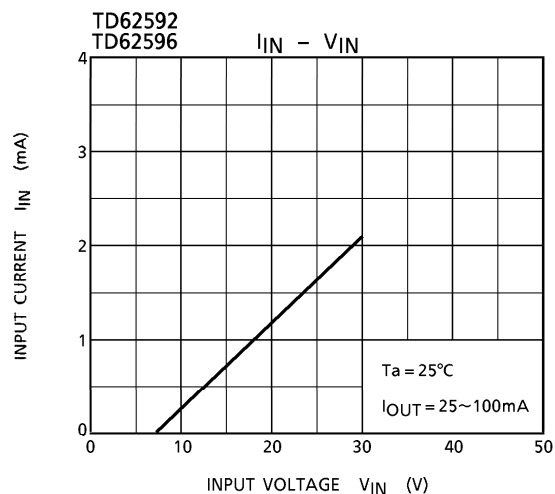
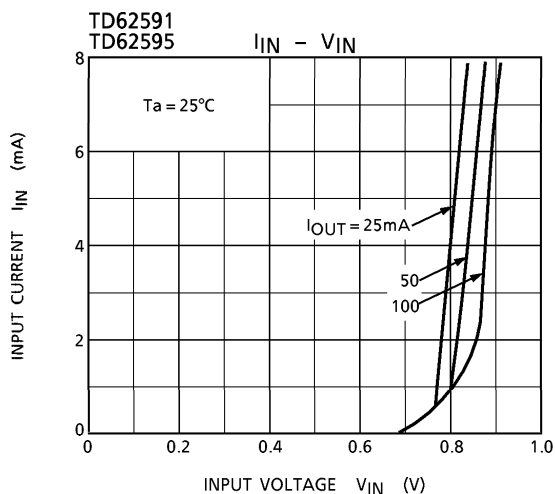
Input Condition

| TYPE NUMBER                     | $R_{IN}$     | $V_{IH}$ |
|---------------------------------|--------------|----------|
| TD62591AP, TD62595AP, TD62595AF | $2.7k\Omega$ | 3V       |
| TD62592AP, TD62596AP, TD62596AF | $0\Omega$    | 15V      |
| TD62593AP, TD62597AP, TD62597AF | $0\Omega$    | 3V       |
| TD62594AP, TD62598AP, TD62598AF | $0\Omega$    | 10V      |

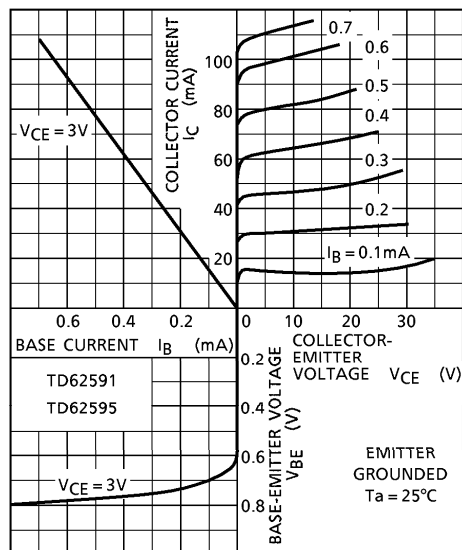
(Note 3)  $C_L$  includes probe and jig capacitance

# PRECAUTIONS for USING

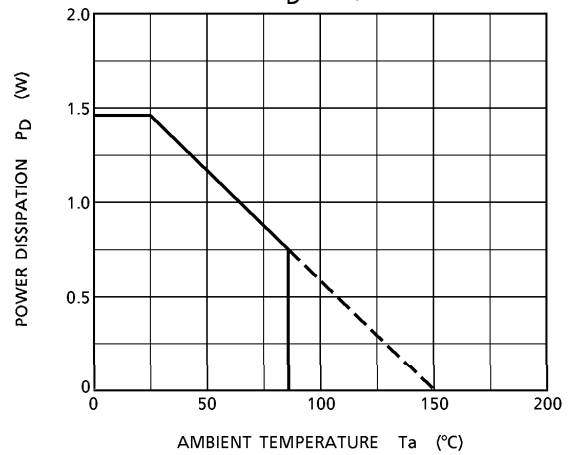
Utmost care is necessary in the design of the output line,  $V_{CC}$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.



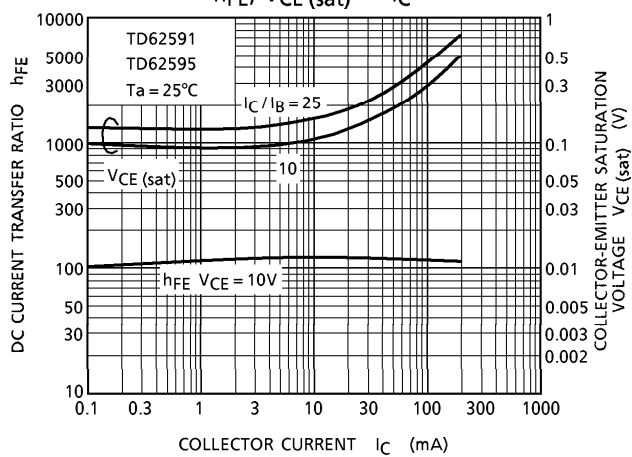
**STATIC CHARACTERISTICS**



**$P_D - T_a$**



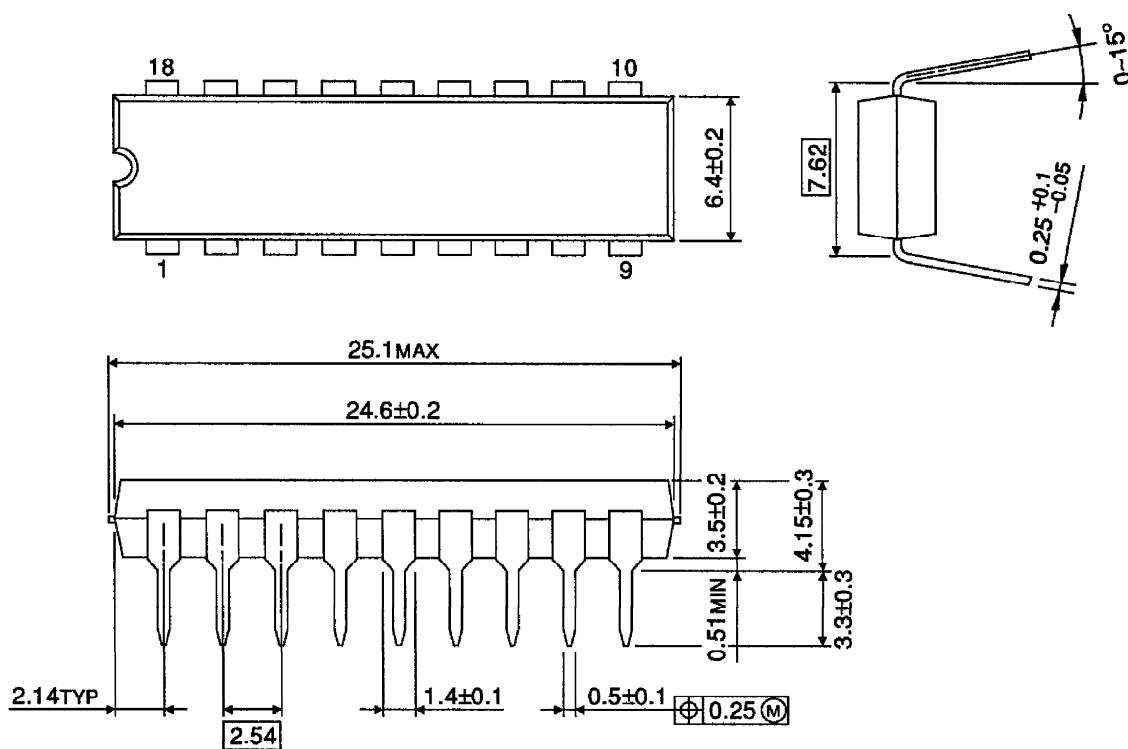
**$h_{FE}, V_{CE(sat)} - I_C$**



**OUTLINE DRAWING**

DIP18-P-300-2.54D

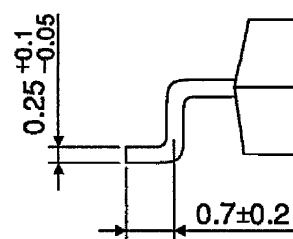
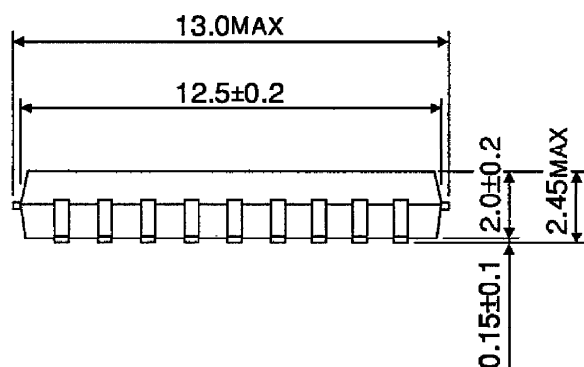
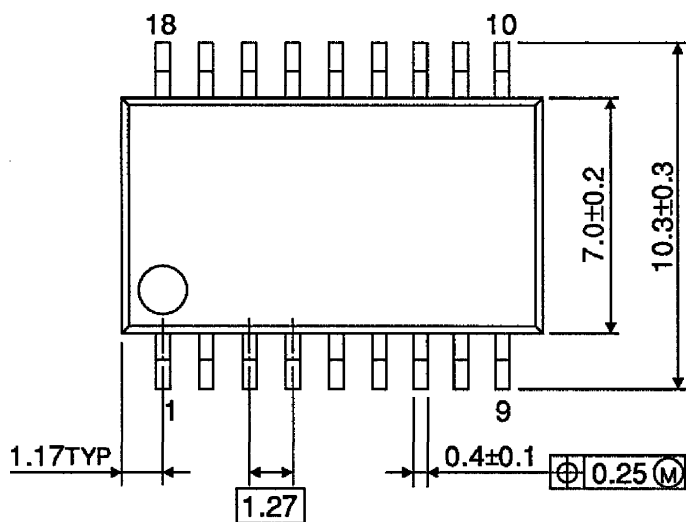
Unit : mm



Weight : 1.47g (Typ.)

**OUTLINE DRAWING**  
SOP18-P-375-1.27

Unit : mm



Weight : 0.50g (Typ.)