

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

## TD62318AP, TD62318AF

### 4CH LOW INPUT ACTIVE HIGH-CURRENT DARLINGTON SINK DRIVER

The TD62318AP and TD62318AF are non-inverting transistor arrays which are comprised of four NPN darlington output stages and PNP input stages.

These devices can be operated by source input voltage and are suitable for operation with a 5-V general purposed logic IC such as TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers.

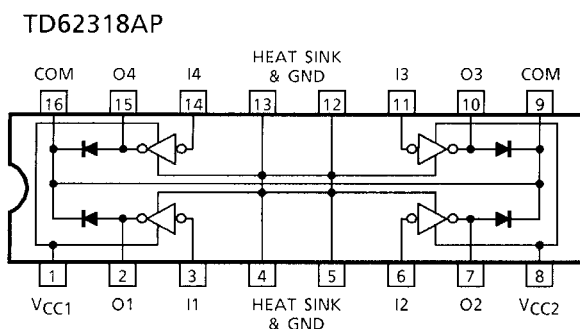
Applications include relay, hammer, lamp and stepping moter drivers.

Please observe the thermal condition for using.

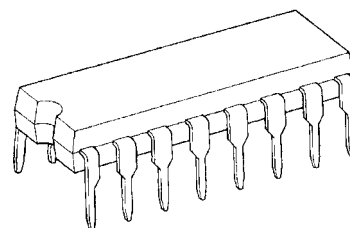
### FEATURES

- Output current (single output) 700 mA (Max)
- High sustaining voltage output 50 V (Min)
- Output clamp diodes
- Input compatible with TTL and 5-V CMOS
- Low level active inputs
- Standard supply voltage
- Two VCC terminals VCC1, VCC2 (separated)
- GND and SUB terminal = heat sink
- Package type-AP: DIP-16 pin
- Package type-AF: HSOP-16 pin

### PIN CONNECTION (TOP VIEW)

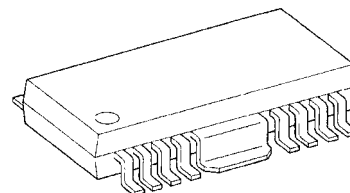


TD62318AP



DIP16-P-300-2.54A

TD62318AF



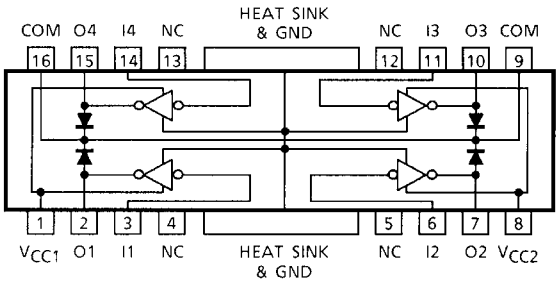
HSOP16-P-300-1.00

Weight

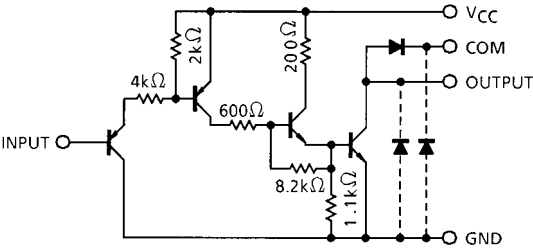
DIP16-P-300-2.54A : 1.11 g (Typ.)

HSOP16-P-300-1.00: 0.50 g (Typ.)

TD62318AF



SCHEMATICS (EACH DRIVER)



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

**MAXIMUM RATINGS (Ta = 25°C)**

| CHARACTERISTICS             |    | SYMBOL                | RATING                 | UNIT    |
|-----------------------------|----|-----------------------|------------------------|---------|
| Supply Voltage              |    | V <sub>CC</sub>       | -0.5~17                | V       |
| Output Sustaining Voltage   |    | V <sub>CE (SUS)</sub> | -0.5~50                | V       |
| Output Current              |    | I <sub>OUT</sub>      | 700                    | mA / ch |
| Input Current               |    | I <sub>IN</sub>       | -10                    | mA      |
| Input Voltage               |    | V <sub>IN</sub>       | -0.5~30                | V       |
| Clamp Diode Reverse Voltage |    | V <sub>R</sub>        | 50                     | V       |
| Clamp Diode Forward Current |    | I <sub>F</sub>        | 700                    | mA      |
| Power Dissipation           | AP | P <sub>D</sub>        | 1.47 /<br>2.7 (Note 1) | W       |
|                             | AF |                       | 0.9 /<br>1.4 (Note 2)  |         |
| Operating Temperature       |    | T <sub>opr</sub>      | -40~85                 | °C      |
| Storage Temperature         |    | T <sub>stg</sub>      | -55~150                | °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 = -40~85°C)**

| CHARACTERISTIC              |            | SYMBOL                | CONDITION                                                                   |            | MIN                  | TYP. | MAX                  | UNIT    |
|-----------------------------|------------|-----------------------|-----------------------------------------------------------------------------|------------|----------------------|------|----------------------|---------|
| Supply Voltage              |            | V <sub>CC</sub>       |                                                                             |            | 4.5                  | —    | 5.5                  | V       |
| Output Sustaining Voltage   |            | V <sub>CE (SUS)</sub> |                                                                             |            | 0                    | —    | 50                   | V       |
| Output Current              | AP         | I <sub>OUT</sub>      | DC 1 circuit, Ta = 25 °C                                                    |            | 0                    | —    | 570                  | mA / ch |
|                             |            |                       | T <sub>pw</sub> = 25ms<br>4 circuits<br>Ta = 85°C<br>T <sub>j</sub> = 120°C | Duty = 10% | 0                    | —    | 570                  |         |
|                             | Duty = 50% |                       |                                                                             | 0          | —                    | 570  |                      |         |
|                             | Duty = 10% |                       |                                                                             | 0          | —                    | 570  |                      |         |
|                             | Duty = 50% |                       |                                                                             | 0          | —                    | 480  |                      |         |
| Input Voltage               |            | V <sub>IN</sub>       |                                                                             |            | 0                    | —    | 15                   | V       |
| Input Voltage               | Output On  | V <sub>IN (ON)</sub>  |                                                                             |            | 0                    | —    | V <sub>CC</sub> -3.6 | V       |
|                             | Output Off | V <sub>IN (OFF)</sub> |                                                                             |            | V <sub>CC</sub> -1.6 | —    | 5.5                  |         |
| Clamp Diode Reverse Voltage |            | V <sub>R</sub>        |                                                                             |            | —                    | —    | 50                   | V       |
| Clamp Diode Forward Current |            | I <sub>F</sub>        |                                                                             |            | —                    | —    | 500                  | mA      |
| Power Dissipation           | AP         | P <sub>D</sub>        | Ta = 85°C (Note 1)                                                          |            | —                    | —    | 1.4                  | W       |
|                             | AF         |                       | Ta = 85°C (Note 2)                                                          |            | —                    | —    | 0.7                  |         |

Note 1: On Glass Epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

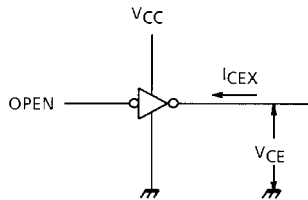
Note 2: On Glass Epoxy PCB 60 × 30 × 1.6 mm Cu 30%)

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

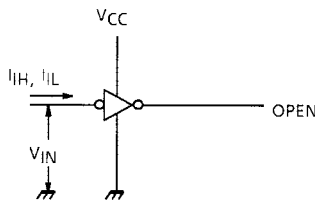
| CHARACTERISTIC              |            | SYMBOL        | TEST CIR-<br>CUIT | TEST CONDITION                                                                           | MIN            | TYP.  | MAX            | UNIT    |
|-----------------------------|------------|---------------|-------------------|------------------------------------------------------------------------------------------|----------------|-------|----------------|---------|
| Input Voltage               | "H" Level  | $V_{IH}$      | —                 |                                                                                          | $V_{CC} - 1.6$ | —     | 25             | V       |
|                             | "L" Level  | $V_{IL}$      |                   |                                                                                          | 0              | —     | $V_{CC} - 3.6$ |         |
| Input Current               | "H" Level  | $I_{IH}$      | 2                 |                                                                                          | —              | —     | 10             | $\mu A$ |
|                             | "L" Level  | $I_{IL}$      |                   |                                                                                          | —              | -0.05 | -0.36          | mA      |
| Output Leakage Current      |            | $I_{CEX}$     | 1                 | $V_{CE} = 50\text{ V}, T_a = 25^\circ C$                                                 | —              | —     | 50             | $\mu A$ |
|                             |            |               |                   | $V_{CE} = 50\text{ V}, T_a = 85^\circ C$                                                 | —              | —     | 100            |         |
| Output Saturation Voltage   |            | $V_{CE(sat)}$ | 3                 | $I_{OUT} = 0.5\text{ A}, V_{CC} = 4.5\text{ V}$                                          | —              | —     | 0.8            | V       |
|                             |            |               |                   | $I_{OUT} = 0.2\text{ A}, V_{CC} = 4.5\text{ V}$                                          | —              | —     | 0.45           |         |
| Clamp Diode Reverse Current |            | $I_R$         | 4                 | $V_R = 50\text{ V}, T_a = 25^\circ C$                                                    | —              | —     | 50             | $\mu A$ |
|                             |            |               |                   | $V_R = 50\text{ V}, T_a = 85^\circ C$                                                    | —              | —     | 100            |         |
| Clamp Diode Forward Voltage |            | $V_F$         | 5                 | $I_F = 500\text{ mA}$                                                                    | —              | —     | 2.0            | V       |
| Supply Current              | Output On  | $I_{CC(ON)}$  | 2                 | $V_{CC} = 5.5\text{ V}, V_{IN} = 0\text{ V}$                                             | —              | 35    | 40             | mA / ch |
|                             | Output Off | $I_{CC(OFF)}$ | 2                 | $V_{CC} = 5.5\text{ V}, V_{IN} = V_{CC}$                                                 | —              | —     | 10             | $\mu A$ |
| Turn-On Delay               |            | $t_{ON}$      | 6                 | $V_{OUT} = 50\text{ V}, R_L = 90\ \Omega$<br>$V_{CC} = 5.0\text{ V}, C_L = 15\text{ pF}$ | —              | 0.4   | 0.8            | $\mu s$ |
| Turn-Off Delay              |            | $t_{OFF}$     |                   |                                                                                          | —              | 8.0   | 16.0           |         |

**TEST CIRCUIT**

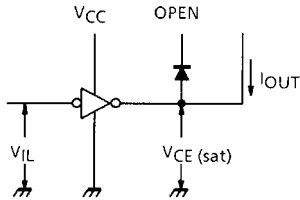
**1.  $I_{CEX}$**



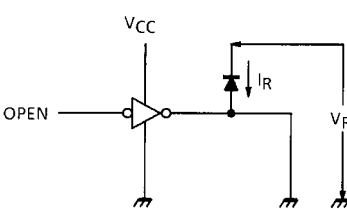
**2.  $I_{IH}, I_{IL}$**



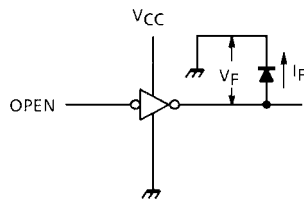
**3.  $V_{CE(sat)}$**



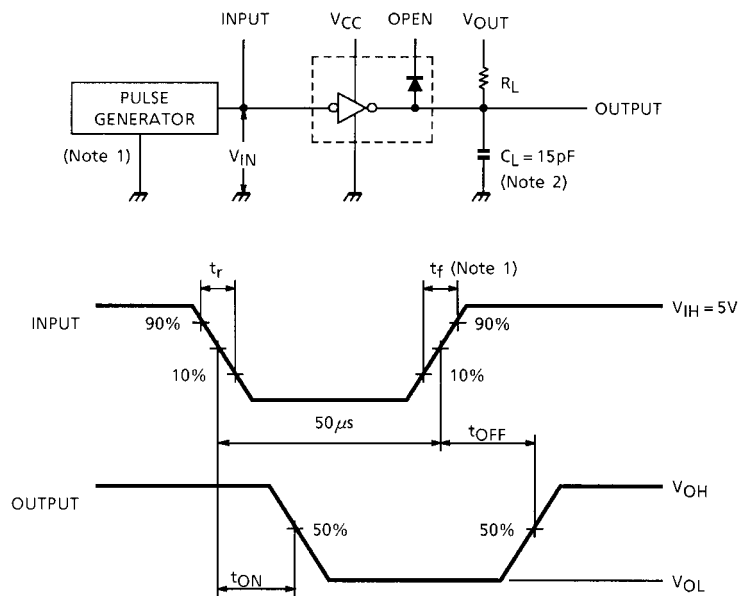
**4.  $I_R$**



## 5. $V_F$



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



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:  $C_L$  includes probe and jig capacitance.

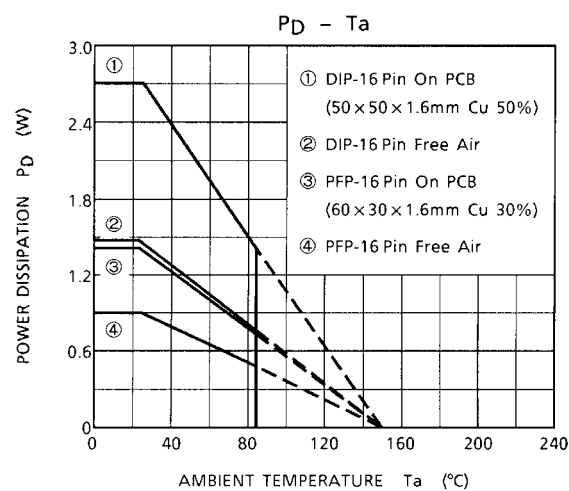
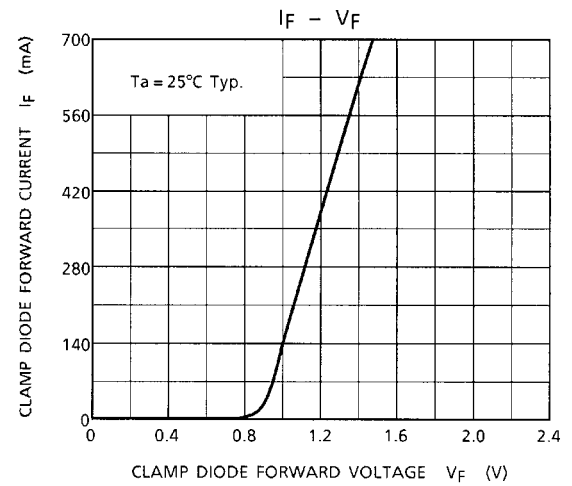
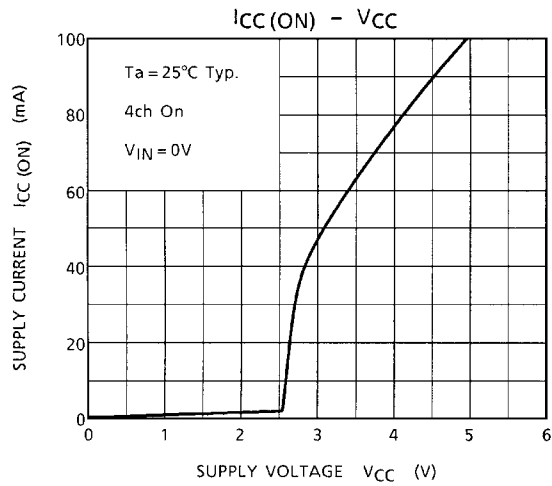
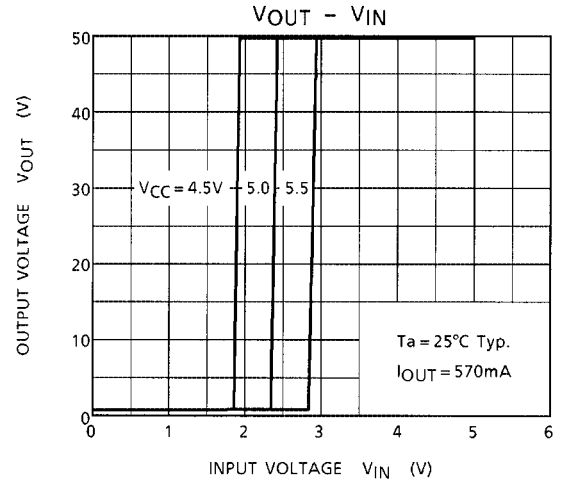
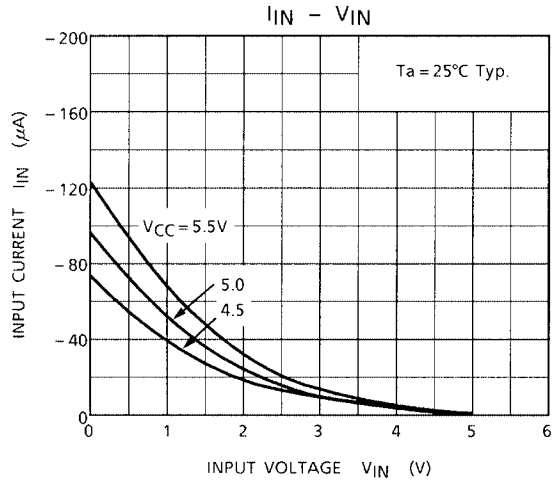
## PRECAUTIONS for USING

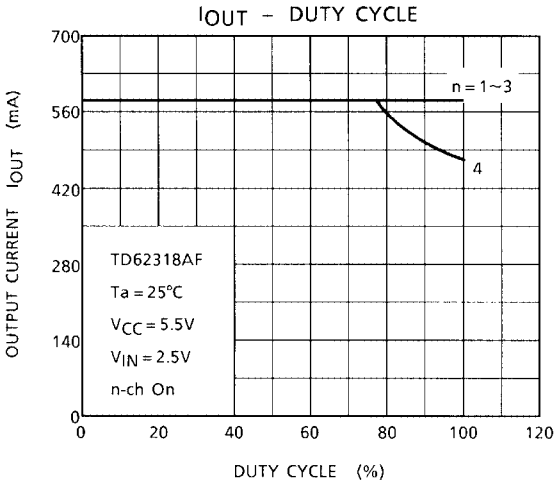
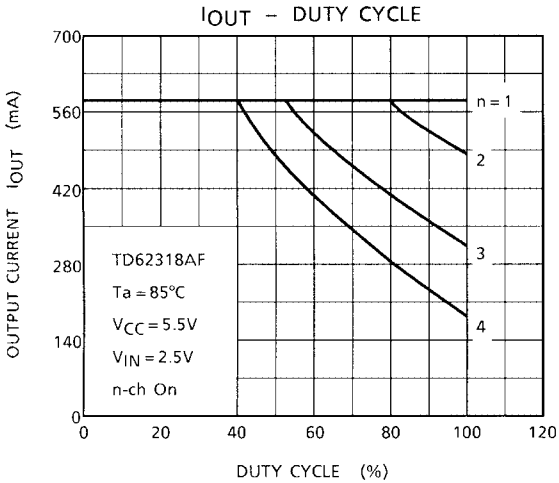
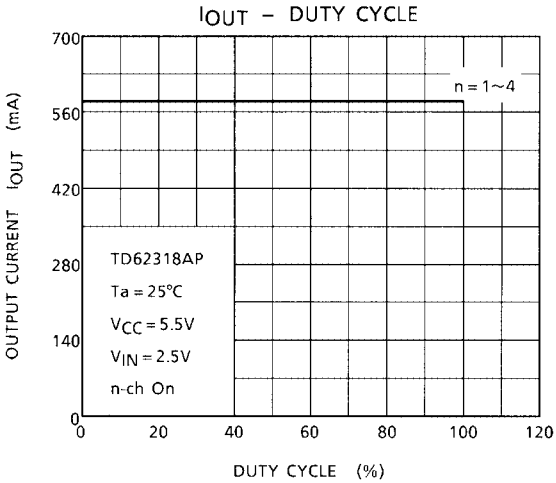
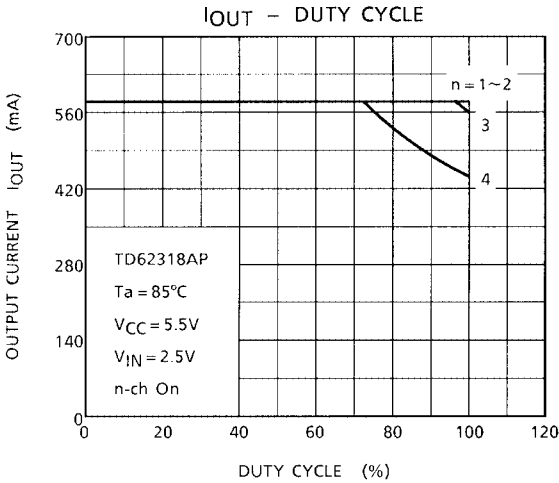
This IC does not include built-in protection circuits for excess current or overvoltage.

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.

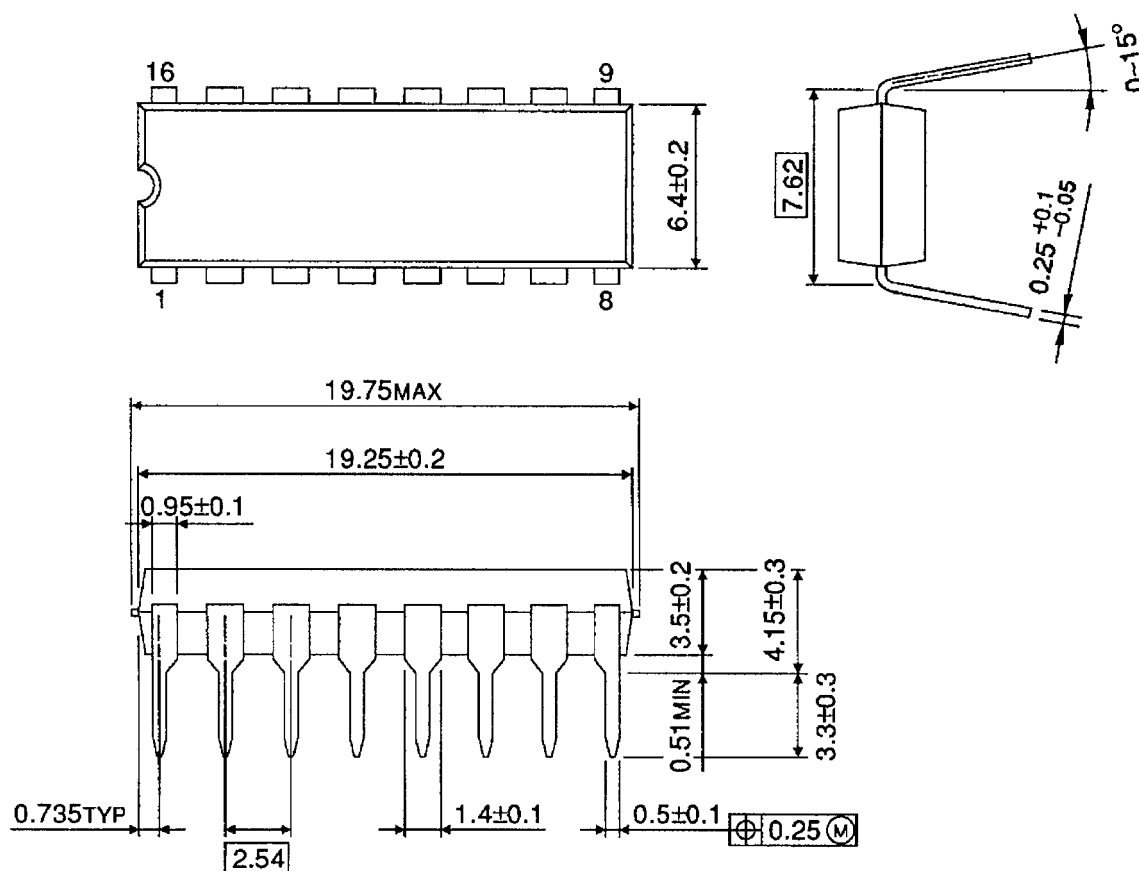




## PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit: mm

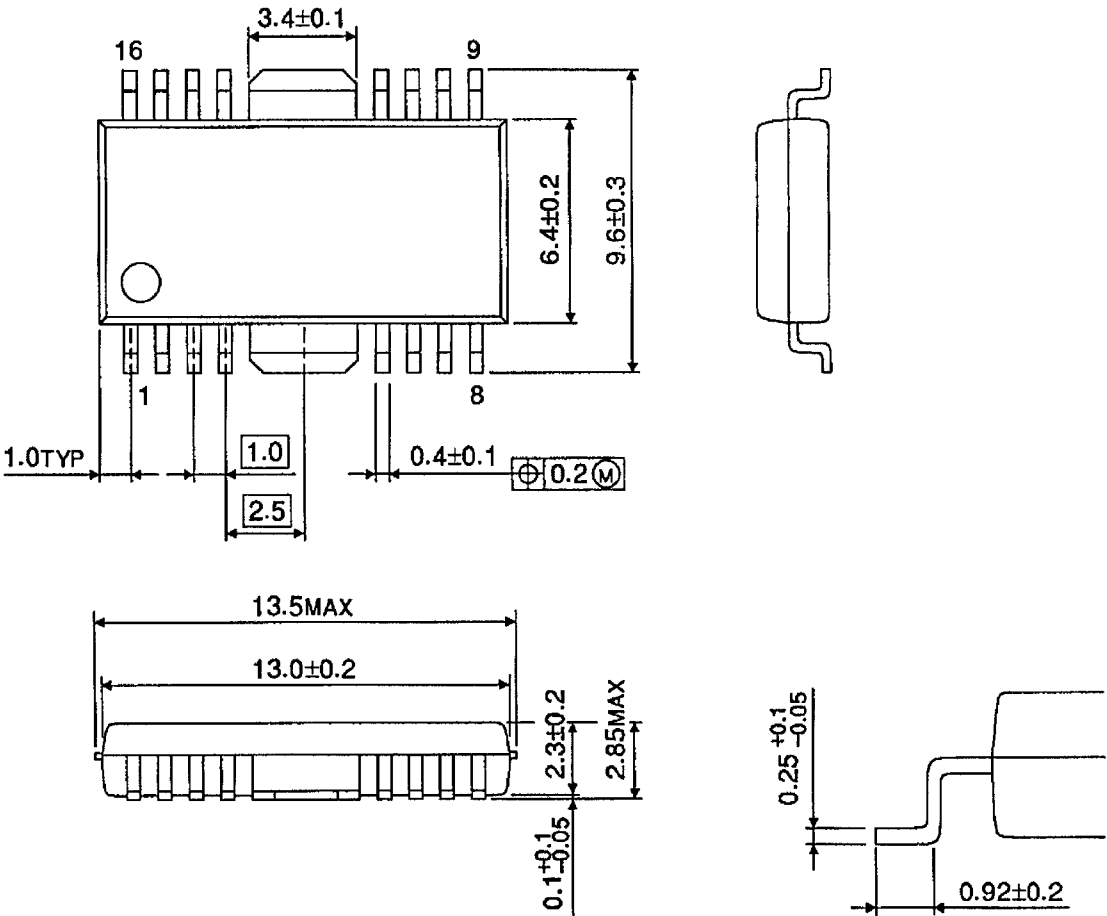


Weight: 1.11 g (Typ.)

PACKAGE DIMENSIONS

HSOP16-P-300-1.00

Unit: mm



Weight: 0.50 g (Typ.)

**RESTRICTIONS ON PRODUCT USE**

000707EBA

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