

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

## TA7262P,TA7262P(LB),TA7262F

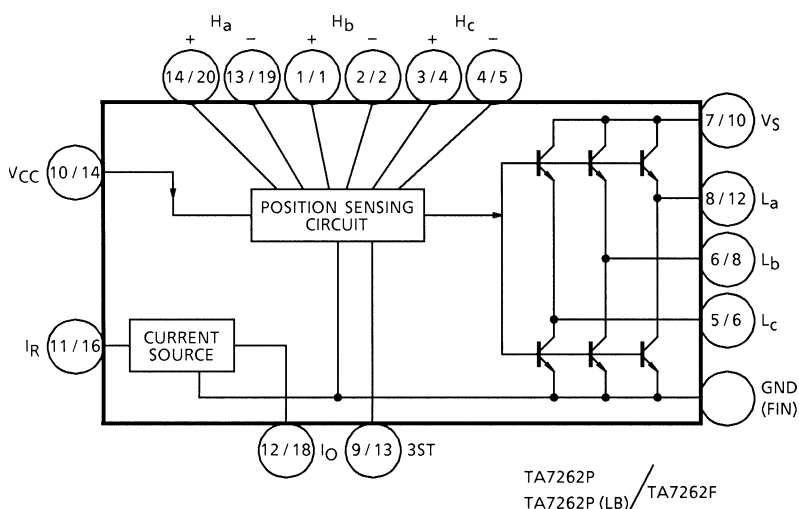
### DC MOTOR DRIVER (3 PHASE Bi-DIRECTIONAL)

The TA7262P / P (LB) / F are 3 Phase Bi-Directional supply-voltage-control Motor Driver IC. It's designed especially for energy saving Motor Control System. It contains Power Drivers, CW / CCW control circuit position sensing amplifiers and current regulator for external connected position sensing elements.

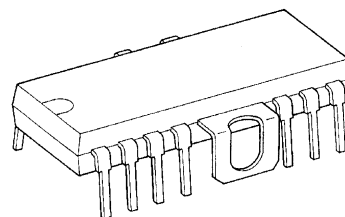
### FEATURES

- Output Current is Up to 1.5 A (AVE).
- Supply Voltage Control Motor Driver.
- Variable Current Source for Hall Sensor Including.
- Few External Parts Required.
- High Sensitivity of Position Sensing Inputs.

### BLOCK DIAGRAM

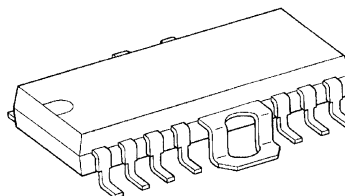


TA7262P



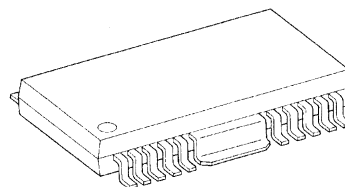
HDIP14-P-500-2.54A

TA7262P (LB)



HSOP14-P-2.54

TA7262F



HSOP20-P-450-1.00

### Weight

HDIP14-P-500-2.54A: 3.00 g (Typ.)  
 HSOP14-P-2.54 : 3.00 g (Typ.)  
 HSOP20-P-450-1.00 : 0.79 g (Typ.)

**PIN FUNCTION**

| PIN No. |        | SYMBOL           | FUNCTION DESCRIPTION                                       |
|---------|--------|------------------|------------------------------------------------------------|
| P TYPE  | F TYPE |                  |                                                            |
| 1       | 1      | H <sub>b</sub> + | b-phase Hall Amp. positive input terminal                  |
| 2       | 2      | H <sub>b</sub> - | b-phase Hall Amp. negative input terminal                  |
| 3       | 4      | H <sub>c</sub> + | c-phase Hall Amp. positive input terminal                  |
| 4       | 5      | H <sub>c</sub> - | c-phase Hall Amp. negative input terminal                  |
| 5       | 6      | L <sub>c</sub>   | c-phase drive output terminal                              |
| 6       | 8      | L <sub>b</sub>   | b-phase drive output terminal                              |
| 7       | 10     | V <sub>S</sub>   | Supply voltage terminal for motor driver                   |
| 8       | 12     | L <sub>a</sub>   | a-phase drive output terminal                              |
| 9       | 13     | 3ST              | Forward rotation / Reverse rotation / Stop switch terminal |
| 10      | 14     | V <sub>CC</sub>  | Power supply input terminal for small signal               |
| 11      | 16     | I <sub>R</sub>   | Hall element bias current control terminal                 |
| 12      | 18     | I <sub>O</sub>   | Hall element bias negative-side connector terminal         |
| 13      | 19     | H <sub>a</sub> - | a-phase Hall Amp. negative input terminal                  |
| 14      | 20     | H <sub>a</sub> + | a-phase Hall Amp. positive input terminal                  |
| Fin     | Fin    | GND              | —                                                          |

F Type: Pin (3), (7), (9), (11), (15), (17) N. C.

**FUNCTION**

| FRS INPUT | POSITION SENSING INPUT |                |                | COIL OUTPUT    |                |                |
|-----------|------------------------|----------------|----------------|----------------|----------------|----------------|
|           | H <sub>a</sub>         | H <sub>b</sub> | H <sub>c</sub> | L <sub>a</sub> | L <sub>b</sub> | L <sub>c</sub> |
| CW        | 1                      | 0              | 1              | H              | L              | M              |
|           | 1                      | 0              | 0              | H              | M              | L              |
|           | 1                      | 1              | 0              | M              | H              | L              |
|           | 0                      | 1              | 0              | L              | H              | M              |
|           | 0                      | 1              | 1              | L              | M              | H              |
|           | 0                      | 0              | 1              | M              | L              | H              |
| CCW       | 1                      | 0              | 1              | L              | H              | M              |
|           | 1                      | 0              | 0              | L              | M              | H              |
|           | 1                      | 1              | 0              | M              | L              | H              |
|           | 0                      | 1              | 0              | H              | L              | M              |
|           | 0                      | 1              | 1              | H              | M              | L              |
|           | 0                      | 0              | 1              | M              | H              | L              |
| STOP      | 1                      | 0              | 1              | High Impedance |                |                |
|           | 1                      | 0              | 0              |                |                |                |
|           | 1                      | 1              | 0              |                |                |                |
|           | 0                      | 1              | 0              |                |                |                |
|           | 0                      | 1              | 1              |                |                |                |
|           | 0                      | 0              | 1              |                |                |                |

**MAXIMUM RATINGS (Ta = 25°C)**

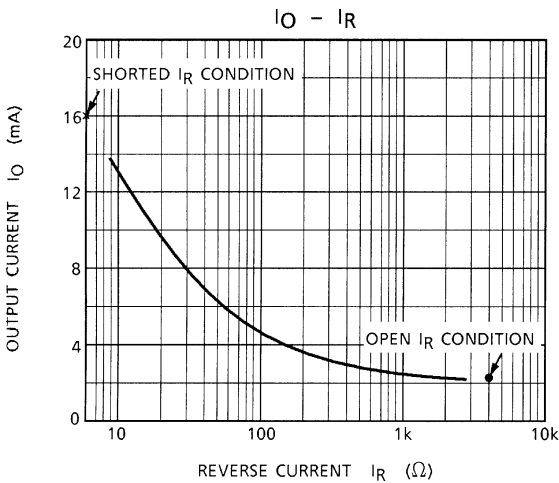
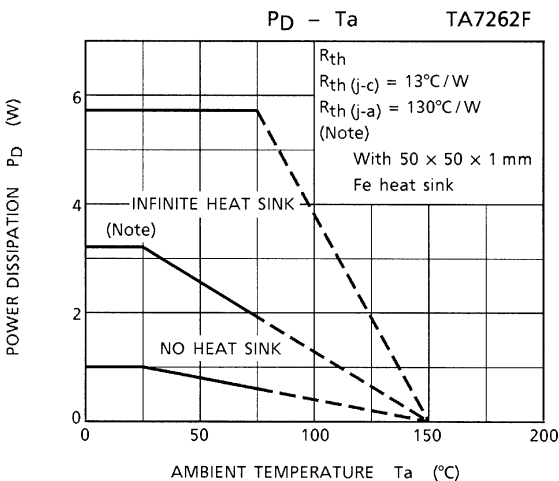
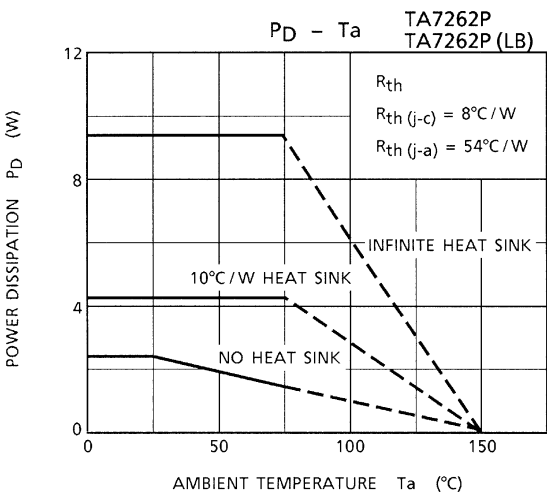
| CHARACTERISTIC                 |              | SYMBOL                | RATING  | UNIT              |
|--------------------------------|--------------|-----------------------|---------|-------------------|
| Supply Voltage (MOTOR)         |              | V <sub>S</sub>        | 25      | V                 |
| Supply Voltage (CONTROL)       |              | V <sub>CC</sub>       | 25      | V                 |
| Output Current (MOTOR)         |              | I <sub>O</sub>        | 1.5     | A                 |
| Output Current                 |              | I <sub>CS</sub>       | 40      | mA                |
| Position Sensing Input Voltage |              | V <sub>H</sub>        | 400     | mV <sub>p-p</sub> |
| Power Dissipation              | TA7262P      | P <sub>D</sub> (Note) | 2.3     | W                 |
|                                | TA7262P (LB) |                       | 2.3     |                   |
|                                | TA7262F      |                       | 1.0     |                   |
| Operating Temperature          |              | T <sub>opr</sub>      | -30~75  | °C                |
| Storage Temperature            |              | T <sub>stg</sub>      | -55~150 | °C                |

Note: No heat sink

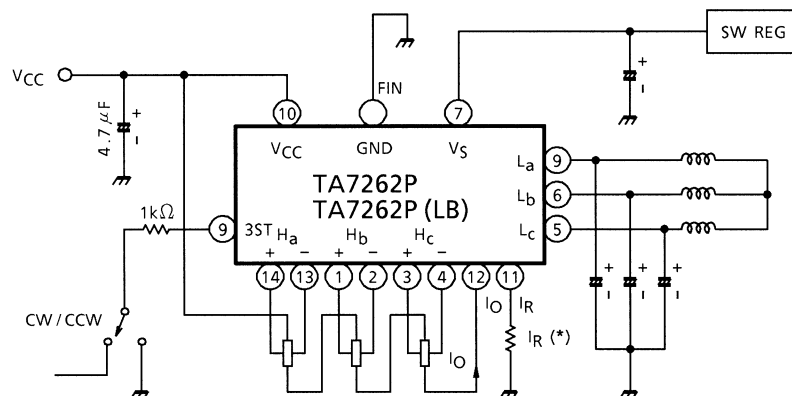
**ELECTRICAL CHARACTERISTICS**

 (Unless otherwise specified, V<sub>CC</sub> = 9 V, V<sub>S</sub> = 12.8 V, 3ST = 5 V, V<sub>H</sub> = ±20 mV, R<sub>L</sub> = 6 Ω, Ta = 25°C)

| CHARACTERISTIC                     |                    | SYMBOL             | TEST CIR-CUIT | TEST CONDITION<br>(TA7262P, TA7262P (LB))             | MIN | TYP.            | MAX                   | UNIT              |
|------------------------------------|--------------------|--------------------|---------------|-------------------------------------------------------|-----|-----------------|-----------------------|-------------------|
| Quiescent Current                  |                    | I <sub>CC-1</sub>  | —             | V <sub>CC</sub> = 9 V, 3 ST GND, V <sub>S</sub> open  | —   | 5.7             | 6.5                   | mA                |
|                                    |                    | I <sub>CC-2</sub>  |               | V <sub>CC</sub> = 25 V, 3 ST GND, V <sub>S</sub> open | —   | 8.0             | 11.0                  |                   |
|                                    |                    | I <sub>CC-3</sub>  |               | Stop (3 ST = V <sub>CC</sub> )                        | —   | —               | 4                     |                   |
| Saturation Voltage                 |                    | V <sub>SAT</sub>   | —             | I <sub>O</sub> = 1 A, (total)                         | —   | —               | 2.0                   | V                 |
| Saturation Voltage Differential    |                    | D-V <sub>SAT</sub> | —             | I <sub>O</sub> = 1 A                                  | —   | 100             | 180                   | mV                |
| Cut-off Current                    | Upper              | I <sub>CC-U</sub>  | —             | V <sub>S</sub> = 22 V                                 | —   | —               | 50                    | μA                |
|                                    | Lower              | I <sub>CC-L</sub>  |               | V <sub>S</sub> = 22 V                                 | —   | —               | 50                    |                   |
| Position Sensing Input Voltage     | Input Sensitivity  | V <sub>H</sub>     | —             | —                                                     | —   | 20              | —                     | mV <sub>p-p</sub> |
|                                    | Input Offset       | V <sub>OFST</sub>  |               | —                                                     | —   | 0               | 5                     | mV                |
|                                    | Operating DC Level | CMR                |               | —                                                     | 2   | —               | V <sub>CC</sub> - 2.5 | V                 |
| CW / CCW Control Operating Voltage | CW                 | V <sub>FW</sub>    | —             | —                                                     | 1.2 | —               | 7.8                   | V                 |
|                                    | Stop               | V <sub>STP</sub>   |               | —                                                     | 8.6 | V <sub>CC</sub> | —                     |                   |
|                                    | CCW                | V <sub>RV</sub>    |               | —                                                     | —   | 0               | 0.4                   |                   |
| Output Current of Current Source   |                    | I <sub>CS-1</sub>  | —             | I <sub>R</sub> open                                   | 1.5 | 2.2             | 3.0                   | mA                |
|                                    |                    | I <sub>CS-2</sub>  |               | I <sub>R</sub> = 100 Ω                                | 3.0 | 4.4             | 5.5                   |                   |

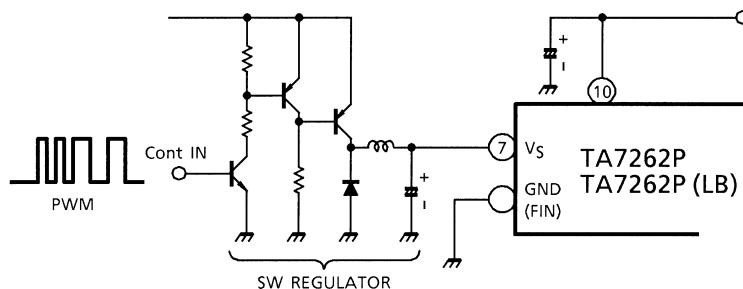


## APPLICATION CIRCUIT 1

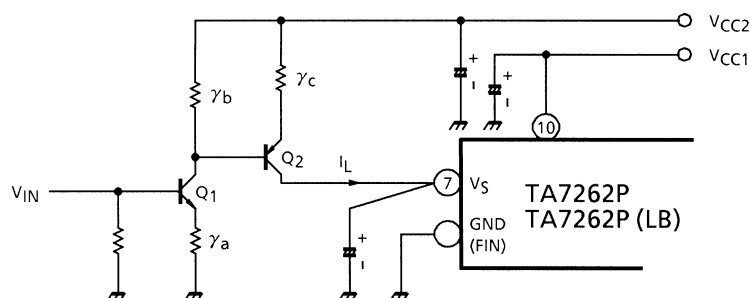


\*: Hall sensor driving current ( $I_O$ ) can be changed by  $I_R$ .  
Refer to  $I_R$  vs  $I_O$  characteristics.

## APPLICATION CIRCUIT 2



## APPLICATION CIRCUIT 3



$$I_L \cong \frac{\gamma_b}{\gamma_a \cdot \gamma_c} \cdot V_{IN} - \frac{1}{\gamma_c} \left( \frac{\gamma_b}{\gamma_c} \cdot V_{BE1} + V_{BE2} \right)$$

$$\cong K_1 \cdot V_{IN} + K_2 \quad (K_1, K_2 = \text{Constant})$$

$Q_2$  works as a Current Regulator for Output Coil. Therefore, Collector to Emitter Voltage of  $Q_2$  is varied in accordance with required coil current.

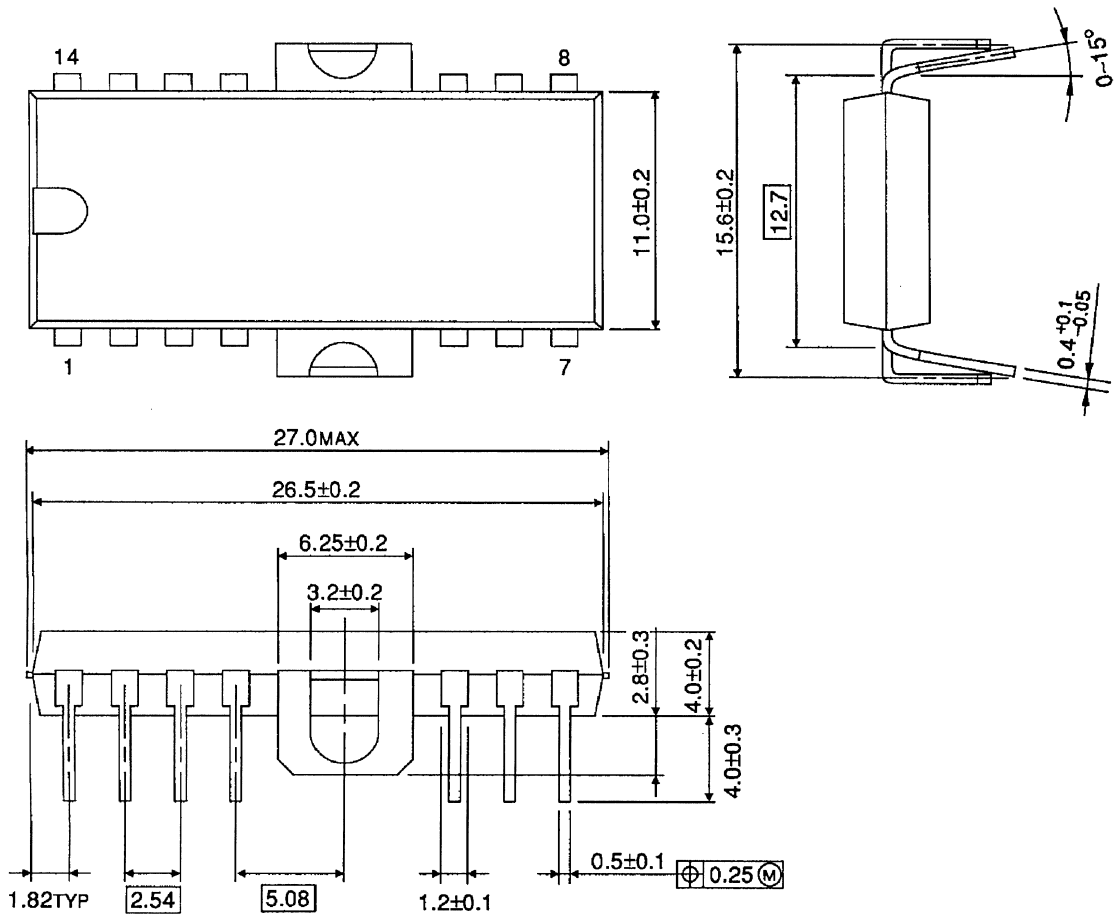
Note 1: Utmost care is necessary in the design of the output line,  $V_S$  and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

Note 2: Don't keep 3 ST terminal open.

PACKAGE DIMENSIONS

HDIP14-P-500-2.54A

Unit: mm

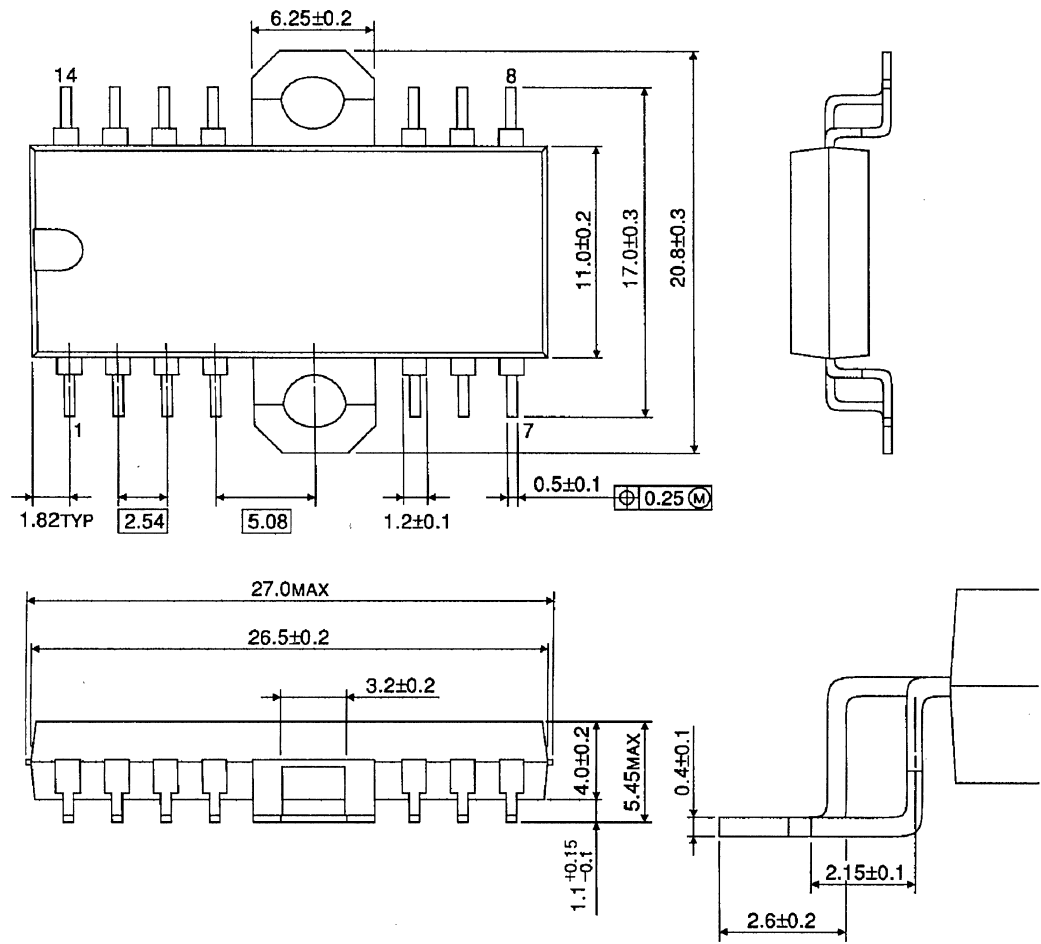


Weight: 3.00 g (Typ.)

PACKAGE DIMENSIONS

HSOP14-P-2.54

Unit: mm

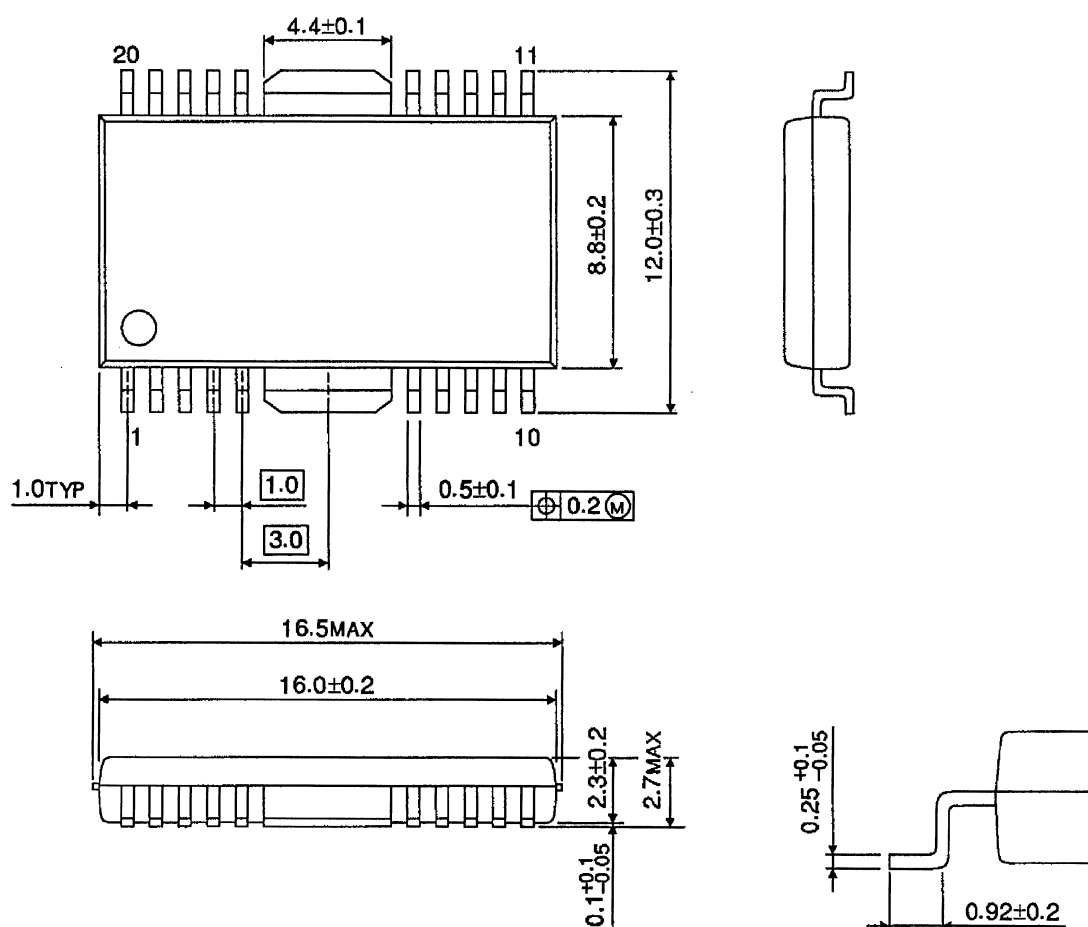


Weight: 3.00 g (Typ.)

## PACKAGE DIMENSIONS

HSOP20-P-450-1.00

Unit: mm



Weight: 0.79 g (Typ.)

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000707EBA

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