

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TD62164AP, TD62164AF

## 4CH HIGH-CURRENT DARLINGTON SINK DRIVER

The TD62164AP and TD62164AF are high-voltage, high-current darlington drivers comprised of four NPN darlington pairs. All units feature integral clamp diodes for switching inductive loads.

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

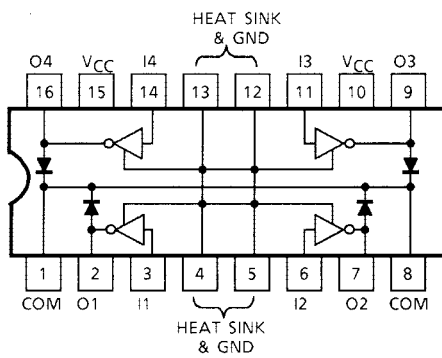
Please observe the thermal condition for using.

### FEATURES

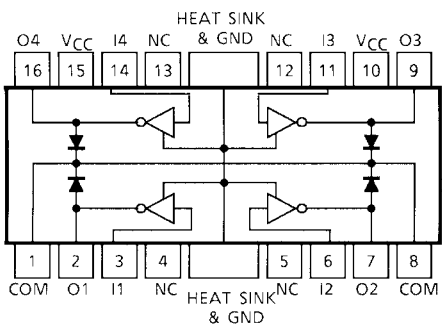
- Output current (single output) 700 mA (Max)
- High sustaining voltage output 50 V (Min)
- Output clamp diodes
- Input compatible with TTL and 5-V CMOS
- GND and SUB terminal heat sink
- Package type-AP : DIP-16 pin
- Package type-AF : HSOP-16 pin

### PIN CONNECTION (TOP VIEW)

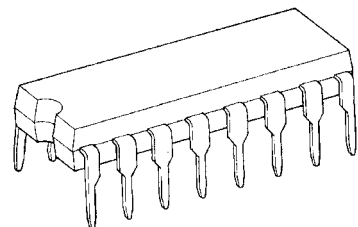
#### TD62164AP



#### TD62164AF

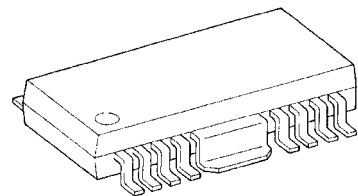


TD62164AP



DIP16-P-300-2.54A

TD62164AF

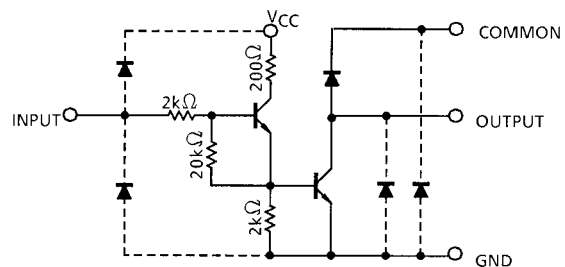


HSOP16-P-300-1.00

### Weight

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

### SCHEMATICS (EACH DRIVER)



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

## MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		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>	50	mA
Input Voltage		V <sub>IN</sub>	17	V
Clamp Diode Reverse Voltage		V <sub>R</sub>	50	V
Clamp Diode Forward Current		I <sub>F</sub>	700	mA
Operating Temperature	AP	P <sub>D</sub>	1.47 / 2.7 (Note 1)	W
	AF		0.9 / 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 × 60 × 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> = 25 ms	Duty = 10%	0	—		570
	4 Circuit		Duty = 50%	0	—	570		
			AF	Ta = 85°C	Duty = 10%	0		—
			T <sub>j</sub> = 120°C	Duty = 50%	0	—	480	
Input Voltage	V <sub>IN</sub>			0	—	15	V	
	Output On	V <sub>IN(ON)</sub>	I <sub>OUT</sub> = 500 mA	h <sub>FE</sub> = 150	10.0	—	15	V
				h <sub>FE</sub> = 2000	2.4	—	15	
	Output Off	V <sub>IN(OFF)</sub>		0	—	0.4		
Input Current		I <sub>IN</sub>		0	—	20	mA	
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%)

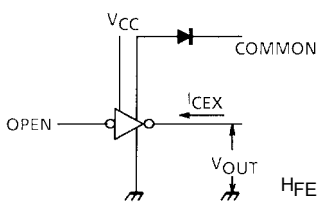
Note 2: On Glass Epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

## ELECTRICAL CHARACTERISTICS (Ta = 25°C)

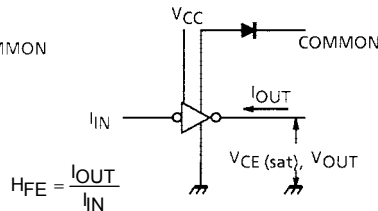
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Output Leakage Current	I <sub>CEX</sub>	1	V <sub>CE</sub> = 50 V, Ta = 25°C	—	—	50	μA
			V <sub>CE</sub> = 50 V, Ta = 85°C	—	—	100	
Collector-Emitter Saturation Voltage	V <sub>CE (sat)</sub>	2	I <sub>OUT</sub> = 500 mA, V <sub>CC</sub> = 5 V	—	—	0.8	V
			I <sub>OUT</sub> = 200 mA, V <sub>CC</sub> = 5 V	—	—	0.45	
DC Current Transfer Ratio	h <sub>FE</sub>	2	V <sub>CE</sub> = 2 V, I <sub>OUT</sub> = 500 mA	2000	—	—	
Input Voltage (Output On)	V <sub>IN (ON)</sub>	3	I <sub>OUT</sub> = 500 mA, h <sub>FE</sub> = 150	7.0	—	10.0	V
			I <sub>OUT</sub> = 500 mA, h <sub>FE</sub> = 2000	1.8	—	2.4	
Clamp Diode Reverse Current	I <sub>R</sub>	4	V <sub>R</sub> = 50 V, Ta = 25°C	—	—	50	μA
			V <sub>R</sub> = 50 V, Ta = 85°C	—	—	100	
Clamp Diode Forward Voltage	V <sub>F</sub>	5	I <sub>F</sub> = 500 mA	—	—	2.0	V
Supply Current	Output On	6	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 2.4 V	—	35	40	mA / ch
	Output Off			I <sub>CC (OFF)</sub>	—	—	10
Input Capacitance	C <sub>IN</sub>	—	V <sub>IN</sub> = 0, f = 1 MHz	—	15	—	pF
Turn-On Delay	t <sub>ON</sub>	7	V <sub>OUT</sub> = 50 V, R <sub>L</sub> = 72 Ω V <sub>CC</sub> = 5.0 V, C <sub>L</sub> = 15 pF	—	0.2	0.4	μs
Turn-Off Delay	t <sub>OFF</sub>			—	4.0	8.0	

## TEST CIRCUIT

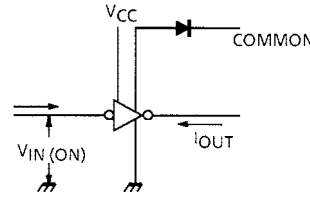
1. I<sub>CEX</sub>



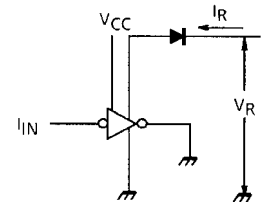
2. h<sub>FE</sub>, V<sub>CE (sat)</sub>



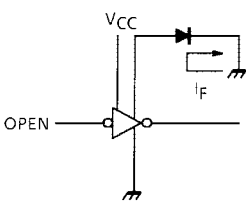
3. V<sub>IN (ON)</sub>



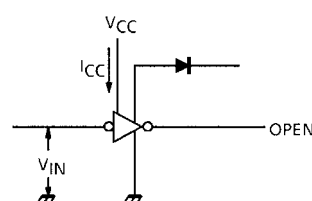
4. I<sub>R</sub>



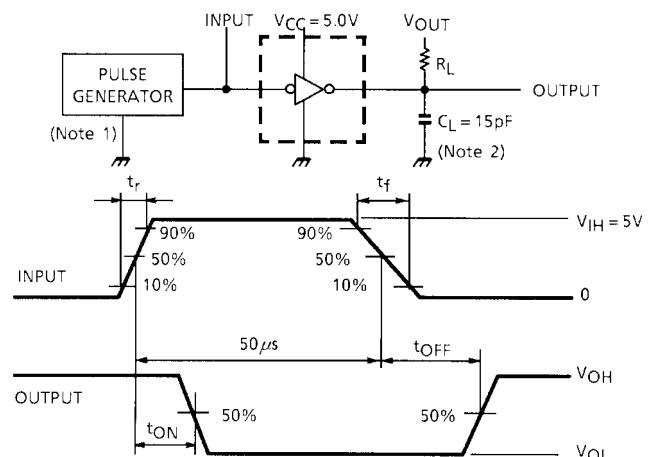
5. V<sub>F</sub>



6. I<sub>CC (ON)</sub>, I<sub>CC (OFF)</sub>



7. t<sub>ON</sub>, t<sub>OFF</sub>



Note 1: Pulse Width 50 μs, Duty Cycle 10%  
Output Impedance 50 Ω, t<sub>r</sub> ≤ 5ns, t<sub>f</sub> ≤ 10 ns

Note 2: C<sub>L</sub> includes probe and jig capacitance.

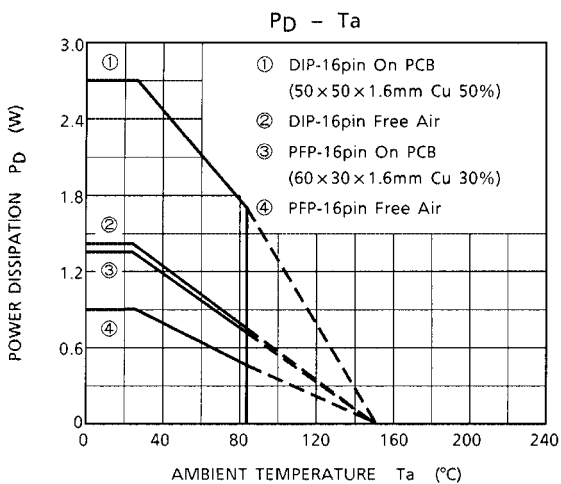
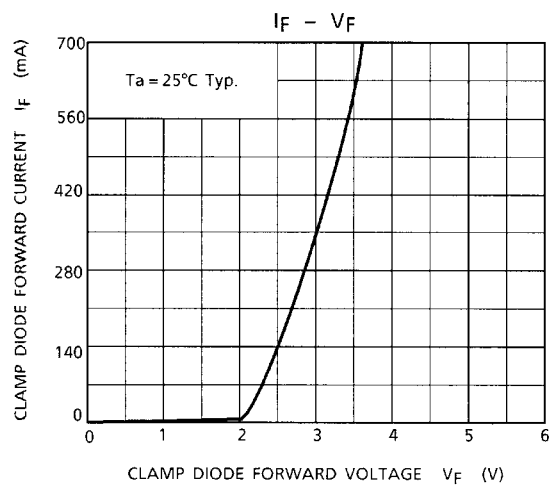
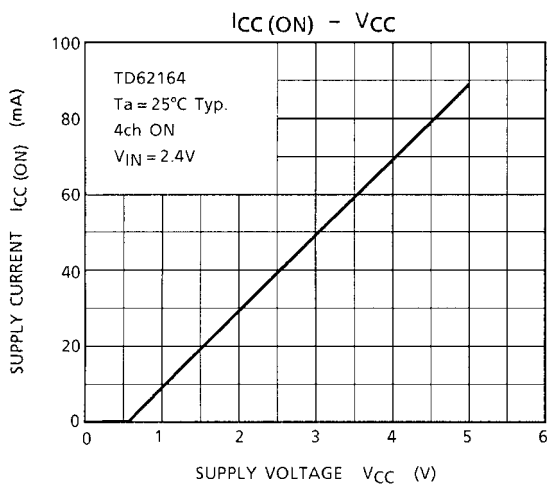
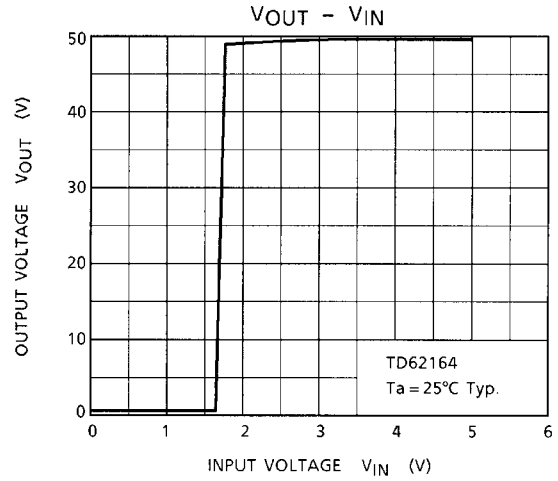
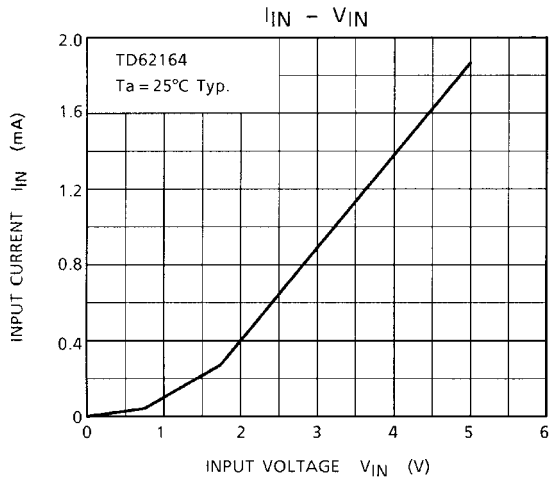
## PRECAUTIONS for USING

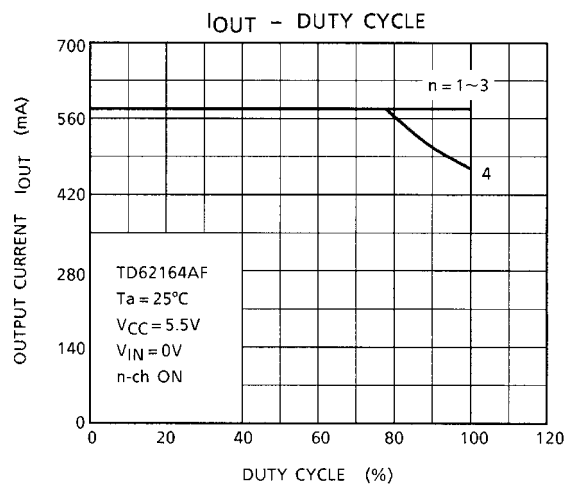
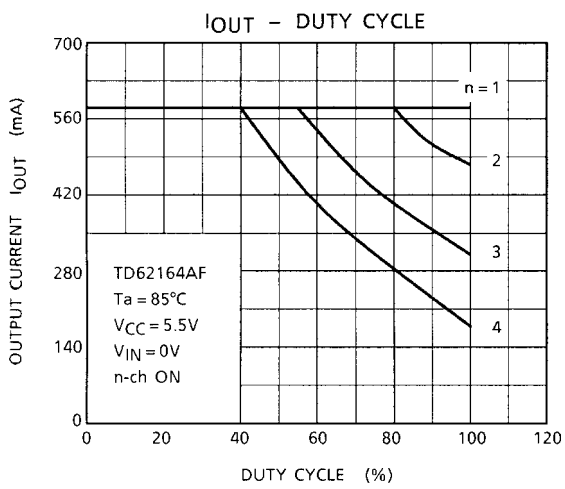
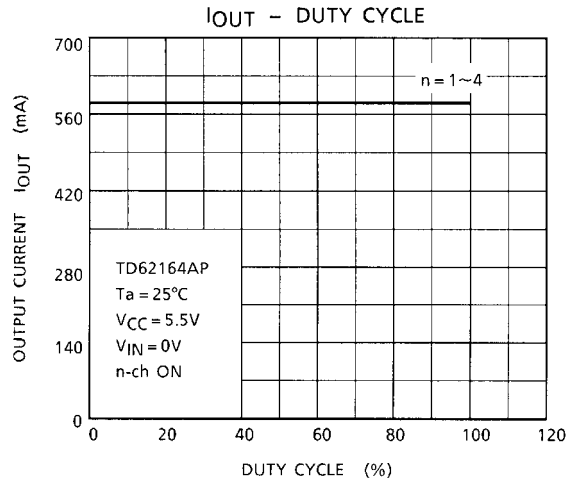
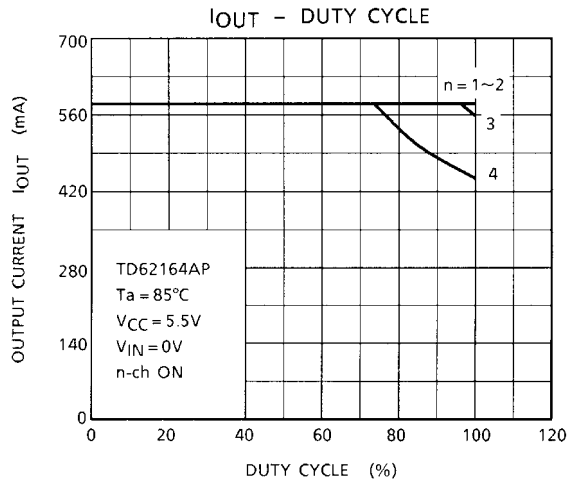
This IC does not include built-in protection circuits for excess current or overvoltage.

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<sub>CC</sub>, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

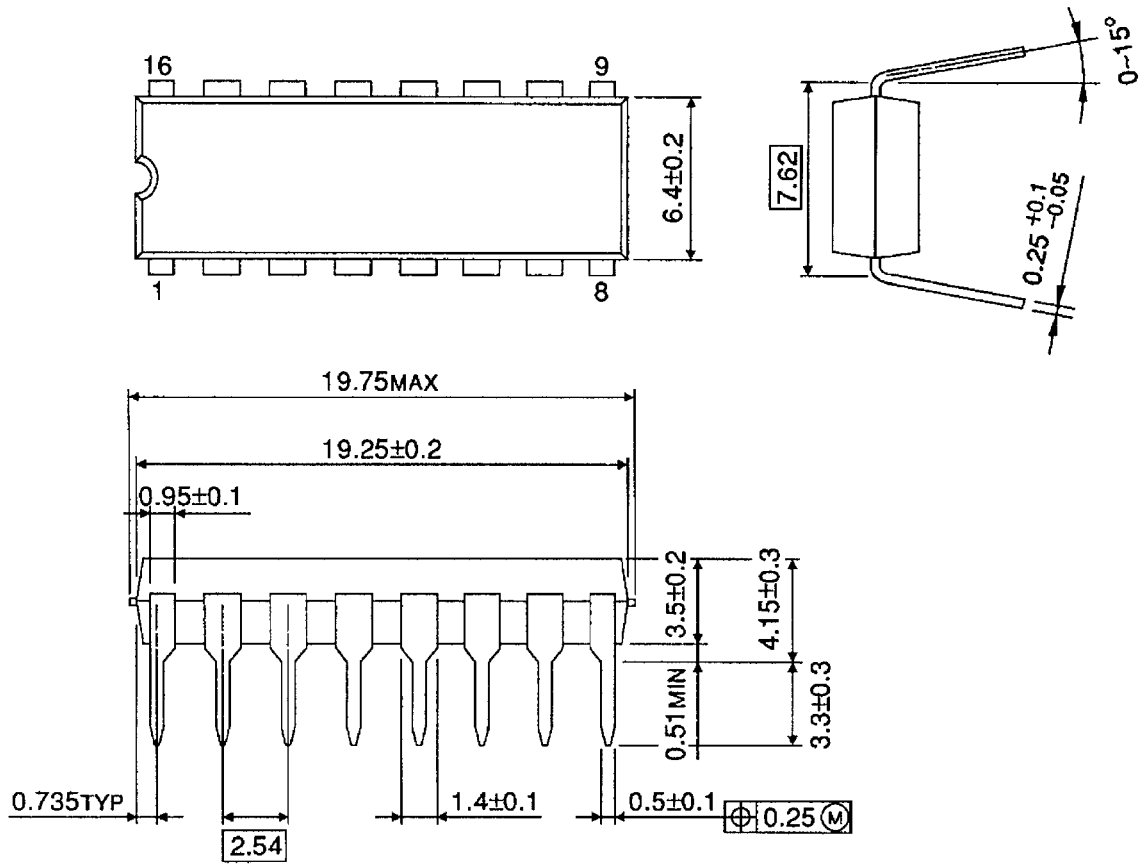




## PACKAGE DIMENSIONS

DIP16-P-300-2.54A

Unit : mm

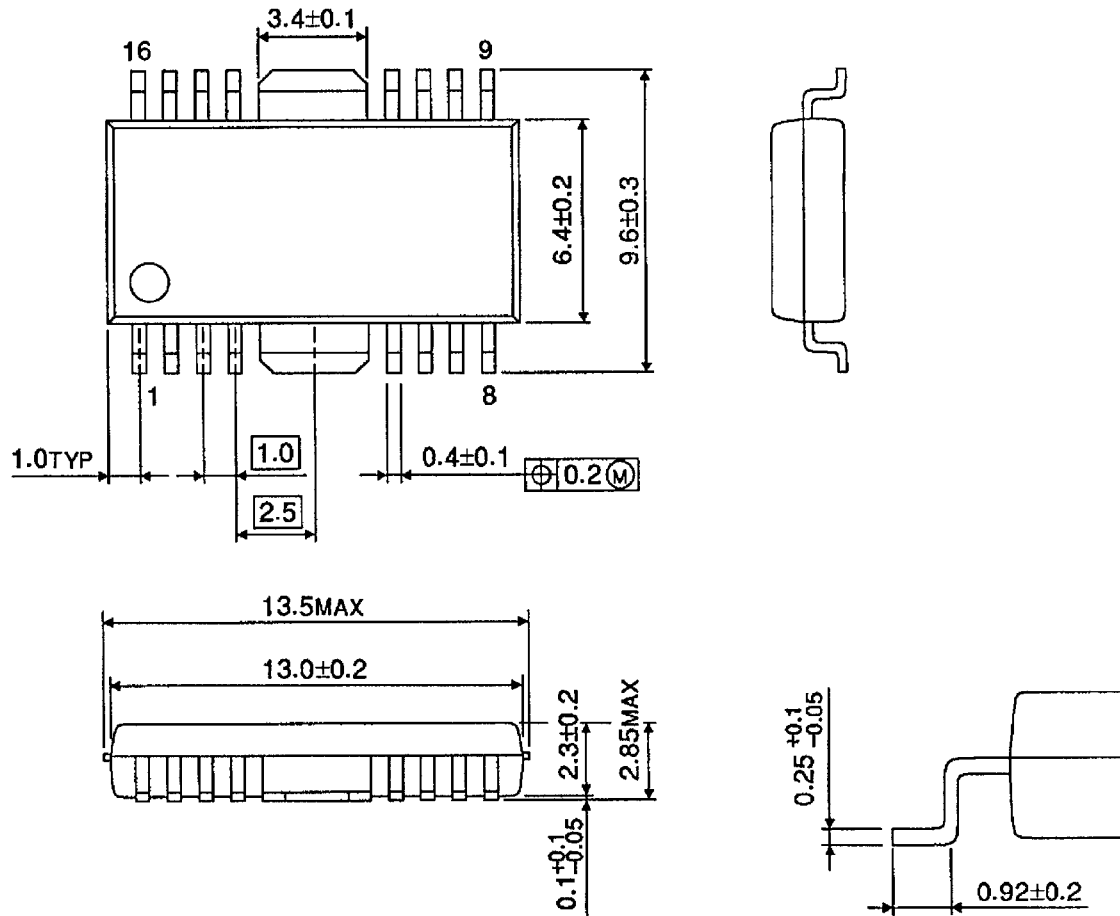


Weight: 1.11 g (Typ.)

**PACKAGE DIMENSIONS**

HSOP16-P-300-1.00

Unit : mm



Weight: 0.50 g (Typ.)

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000707EBA

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