

TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62164AP, TD62164AF

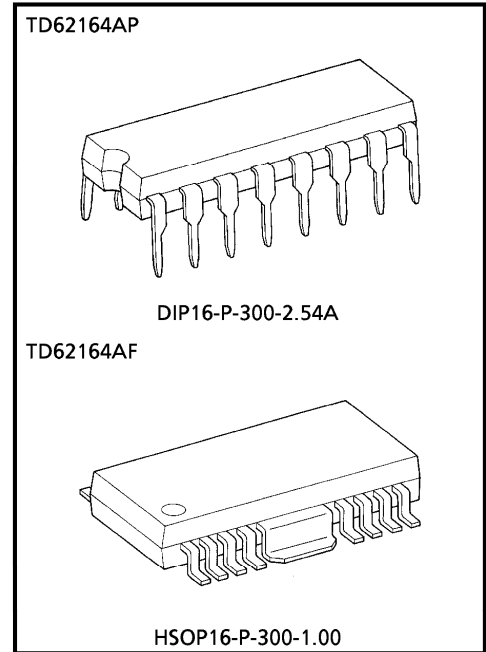
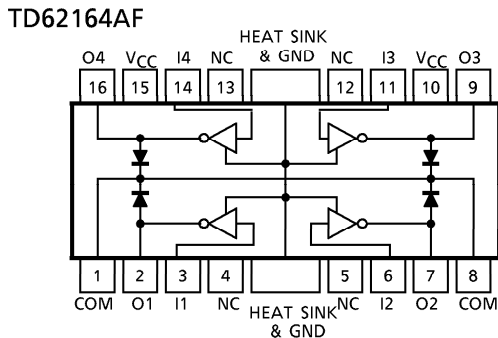
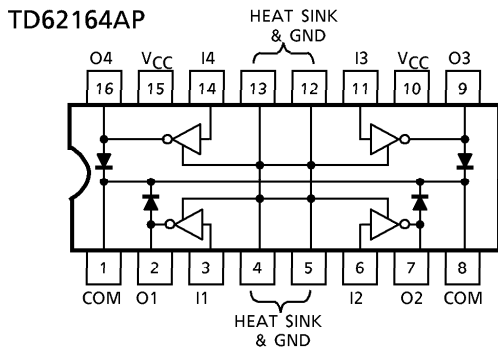
4CH HIGH-CURRENT DARLINGTON SINK DRIVER

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 moter drivers.

FEATURES

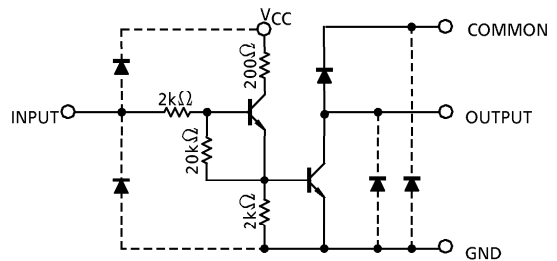
- Output current (single output) 700mA (Max.)
- High sustaining voltage output 50V (Min.)
- Output clamp diodes
- Input compatible with TTL and 5V CMOS
- GND and SUB terminal heat sink
- Package type-AP : DIP-16pin
- Package type-AF : PFP-16pin

PIN CONNECTION (TOP VIEW)



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

SCHEMATICS (EACH DRIVER)



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

961001EBA2

- TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.
- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	- 0.5~17	V
Output Sustaining Voltage	V _{CE (SUS)}	- 0.5~50	V
Output Current	I _{OUT}	700	mA / ch
Input Current	I _{IN}	50	mA
Input Voltage	V _{IN}	17	V
Clamp Diode Reverse Voltage	V _R	50	V
Clamp Diode Forward Current	I _F	700	mA
Power Dissipation	AP	1.47 / 2.7 (Note 1)	W
	AF	0.9 / 1.4 (Note 2)	
Operating Temperature	T _{opr}	- 40~85	°C
Storage Temperature	T _{stg}	- 55~150	°C

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

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

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

CHARACTERISTIC	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT		
Supply Voltage	V _{CC}		4.5	—	5.5	V		
Output Sustaining Voltage	V _{CE (SUS)}		0	—	50	V		
Output Current	I _{OUT}	DC 1 Circuit, Ta = 25°C	0	—	570	mA / ch		
		T _{pw} = 25ms 4 Circuit	Duty = 10%	0	—		570	
			Duty = 50%	0	—		570	
		Ta = 85°C T _j = 120°C	Duty = 10%	0	—		570	
			Duty = 50%	0	—		480	
Input Voltage	V _{IN}		0	—	15	V		
	Output On	V _{IN (ON)}	I _{OUT} = 500mA	h _{FE} = 150	10.0	—	15	V
				h _{FE} = 2000	2.4	—	15	
Output Off	V _{IN (OFF)}		0	—	0.4			
Input Current	I _{IN}		0	—	20	mA		
Clamp Diode Reverse Voltage	V _R		—	—	50	V		
Clamp Diode Forward Current	I _F		—	—	500	mA		
Power Dissipation	AP	Ta = 85°C (Note 1)	—	—	1.4	W		
	AF	Ta = 85°C (Note 2)	—	—	0.7			

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

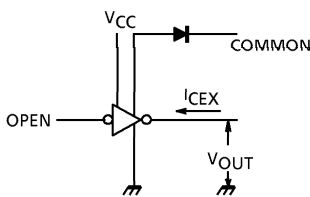
(Note 2) On Glass Epoxy (60×30×1.6mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

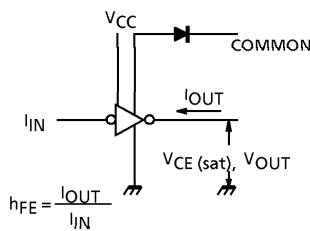
CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current	I _{CEX}	1	V _{CE} = 50V, Ta = 25°C	—	—	50	μA
			V _{CE} = 50V, Ta = 85°C	—	—	100	
Collector-Emitter Saturation Voltage	V _{CE (sat)}	2	I _{OUT} = 500mA, V _{CC} = 5V	—	—	0.8	V
			I _{OUT} = 200mA, V _{CC} =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

TEST CIRCUIT

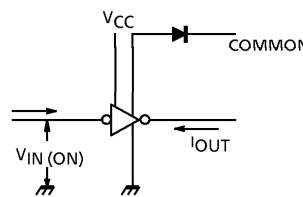
1. I_{CEX}



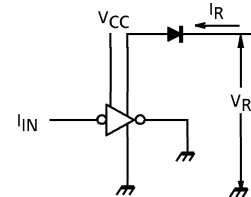
2. h_{FE}, V_{CE (sat)}



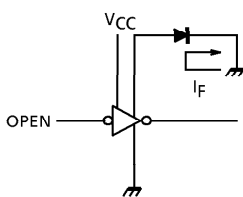
3. V_{IN (ON)}



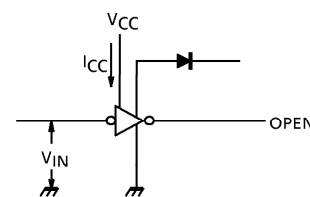
4. I_R



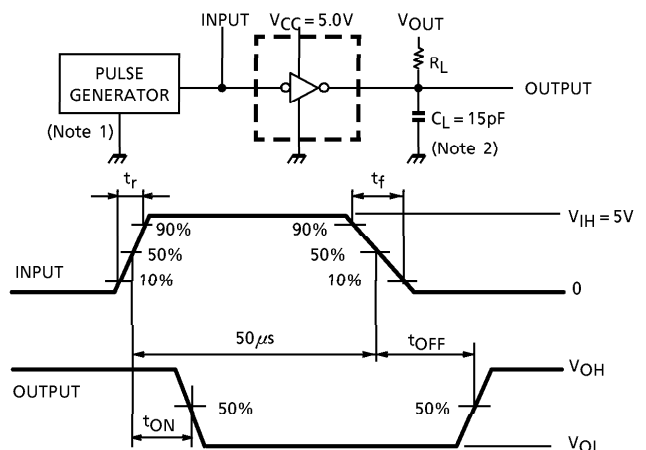
5. V_F



6. I_{CC (ON)}, I_{CC (OFF)}



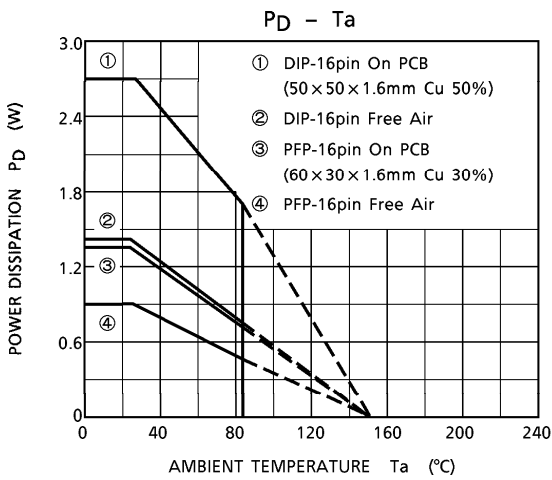
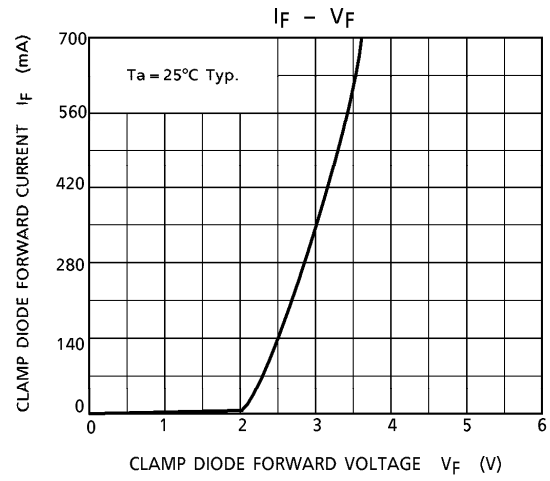
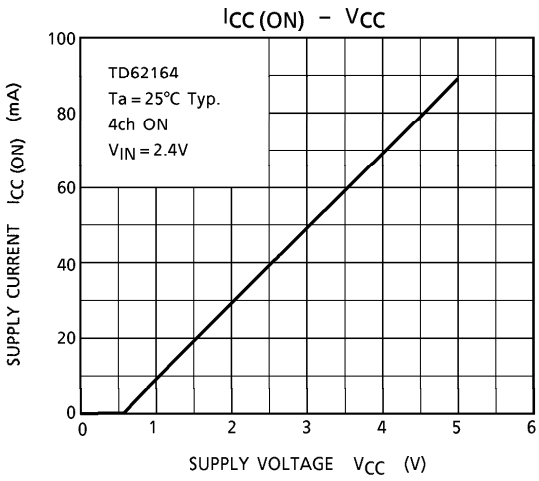
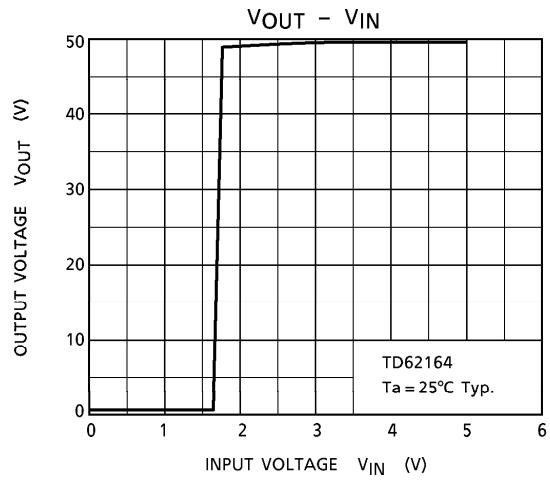
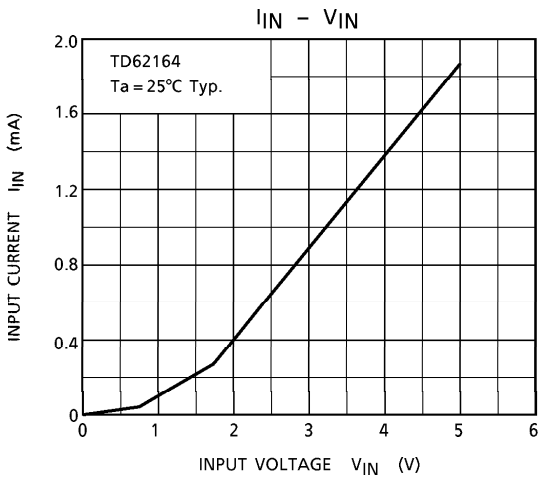
7. t_{ON}, t_{OFF}

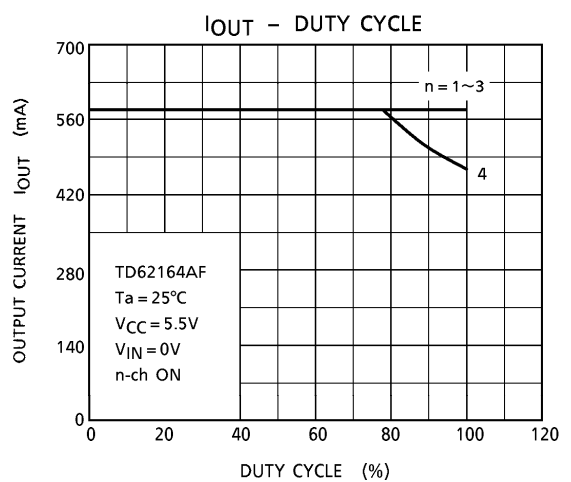
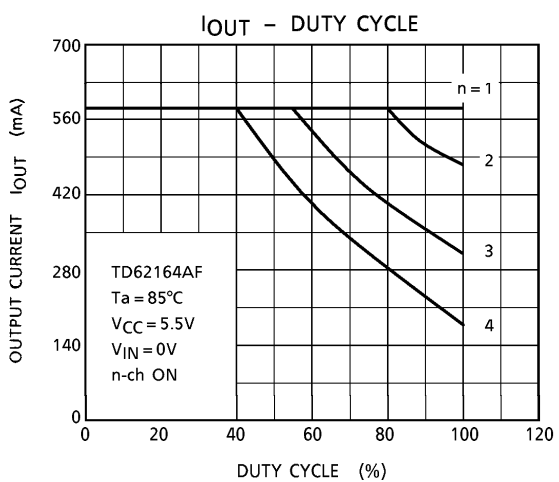
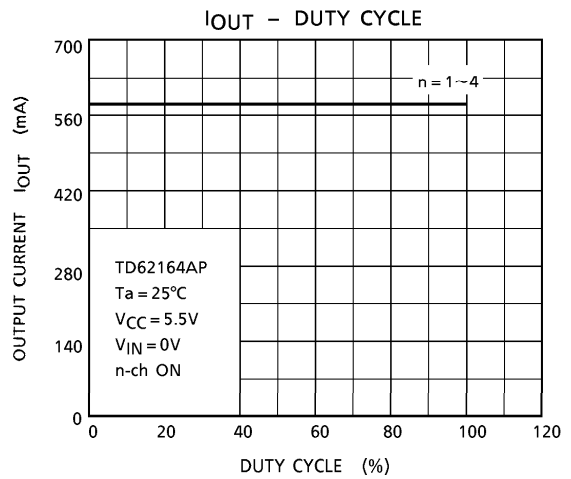
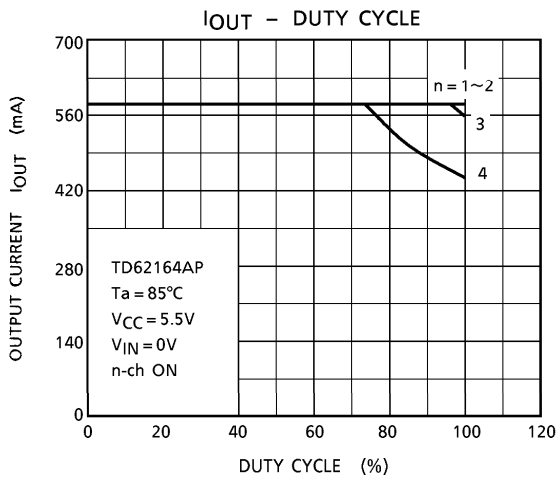


(Note 1) Pulse Width 50μs, Duty Cycle 10%
Output Impedance 50Ω, t_r ≤ 5ns, t_f ≤ 10ns
(Note 2) C_L includes probe and jig capacitance.

PRECAUTIONS for USING

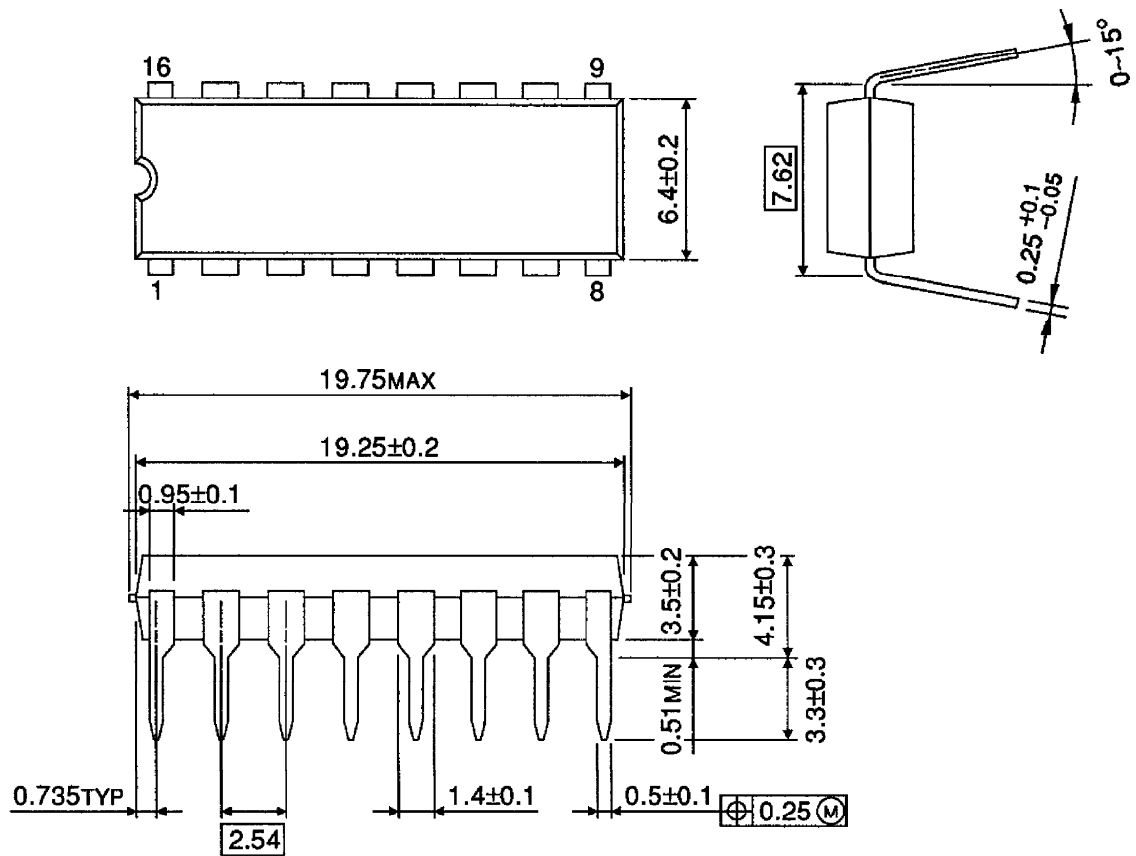
Utmost care is necessary in the design of the output line, V_{CC}, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.





OUTLINE DRAWING
DIP16-P-300-2.54A

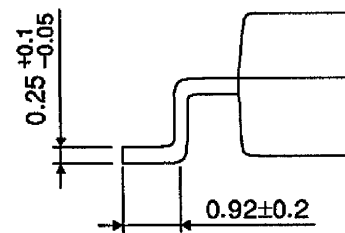
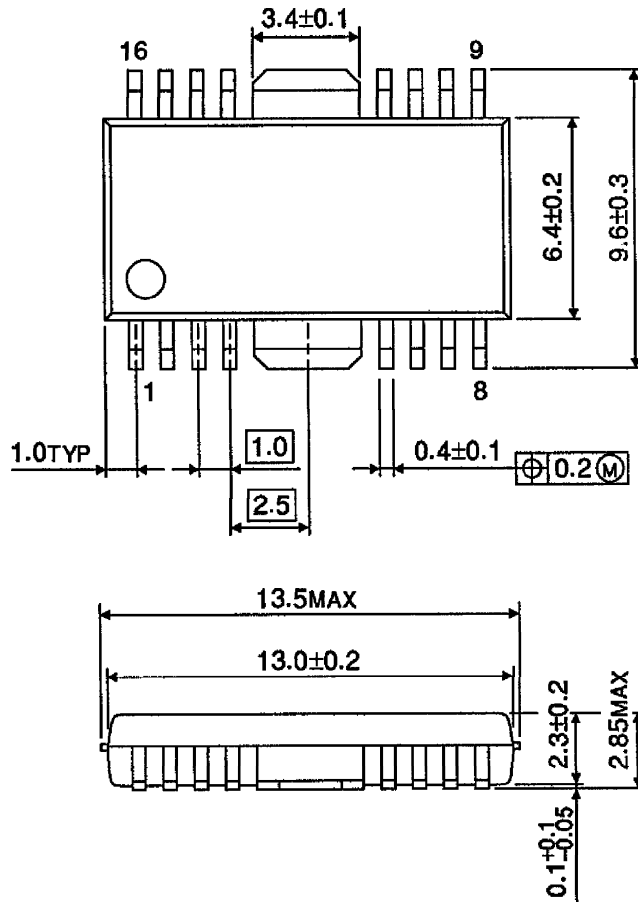
Unit : mm



Weight : 1.11g (Typ.)

OUTLINE DRAWING
HSOP16-P-300-1.00

Unit : mm



Weight : 0.50g (Typ.)