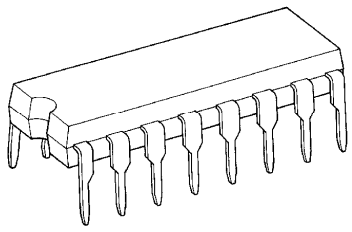
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62164AP, TD62164AF

4CH HIGH-CURRENT DARLINGTON SINK DRIVER

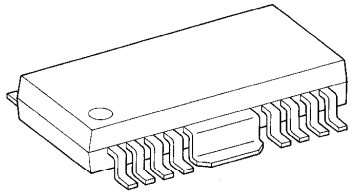
The TD62164AP and TD62164AF are high-voltage, high-current darlington drivers comprised of four NPN darlington pairs.
All units feature integral clamp diodes for switching inductive loads.
Applications include relay, hammer, lamp and stepping moter drivers.

TD62164AP



DIP16-P-300-2.54A

TD62164AF



HSOP16-P-300-1.00

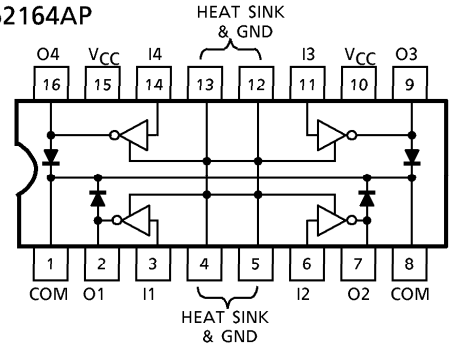
Weight
DIP16-P-300-2.54A : 1.11g (Typ.)
HSOP16-P-300-1.00 : 0.50g (Typ.)

FEATURES

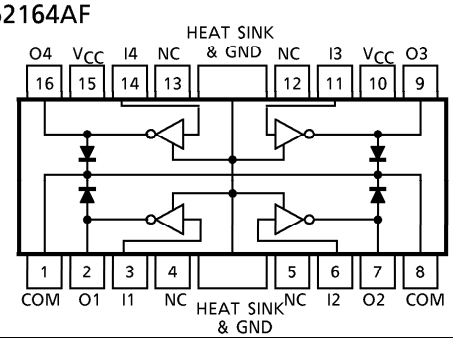
- Output current (single output) 700mA (Max.)
- High sustaining voltage output 50V (Min.)
- Output clamp diodes
- Input compatible with TTL and 5V CMOS
- GND and SUB terminal heat sink
- Package type-AP : DIP-16pin
- Package type-AF : PFP-16pin

PIN CONNECTION (TOP VIEW)

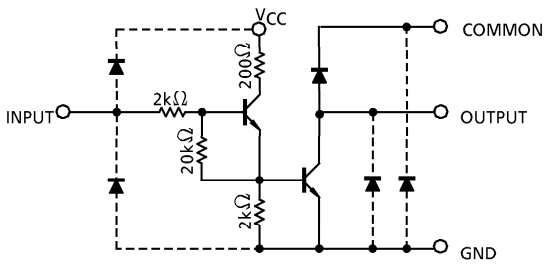
TD62164AP



TD62164AF



SCHEMATICS (EACH DRIVER)



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

961001EBA2

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	P_D	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	AP	I_{OUT}	DC 1 Circuit, Ta = 25°C		0	—	570	mA / ch
			T_{pw} = 25ms, 4 Circuit, Ta = 85°C, T_j = 120°C	Duty = 10%	0	—	570	
				Duty = 50%	0	—	570	
	AF			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	P_D	Ta = 85°C (Note 1)		—	—	1.4	W
	AF		Ta = 85°C (Note 2)		—	—	0.7	

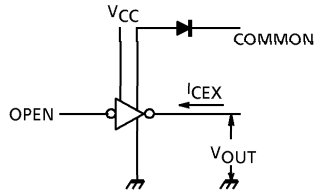
(Note 1) On Glass Epoxy (50 × 50 × 1.6mm Cu 50%)
(Note 2) On Glass Epoxy (60 × 30 × 1.6mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

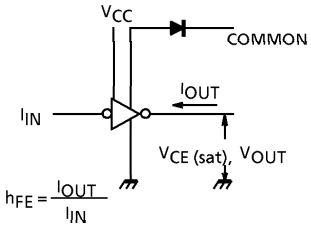
CHARACTERISTIC		SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Leakage Current		I_{CEX}	1	V_{CE} = 50V, Ta = 25°C	—	—	50	μA
				V_{CE} = 50V, Ta = 85°C	—	—	100	
Collector-Emitter Saturation Voltage		$V_{CE\ (sat)}$	2	I_{OUT} = 500mA, V_{CC} = 5V	—	—	0.8	V
				I_{OUT} = 200mA, V_{CC} = 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	$I_{CC\ (ON)}$	6	V_{CC} = 5.5V, V_{IN} = 2.4V	—	35	40	mA / ch
	Output Off	$I_{CC\ (OFF)}$		V_{CC} = 5.5V, V_{IN} = 0.4V	—	—	10	μA
Input Capacitance		C_{IN}	—	V_{IN} = 0, f = 1MHz	—	15	—	pF
Turn-On Delay		t_{ON}	7	V_{OUT} = 50V, R_L = 72Ω	—	0.2	0.4	μs
Turn-Off Delay		t_{OFF}		V_{CC} = 5.0V, C_L = 15pF	—	4.0	8.0	

TEST CIRCUIT

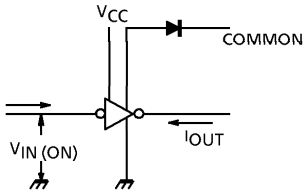
1. I_{CEX}



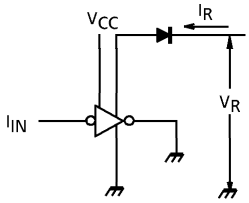
2. h_{FE}, $V_{CE\ (sat)}$



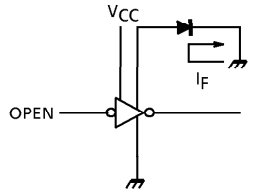
3. $V_{IN\ (ON)}$



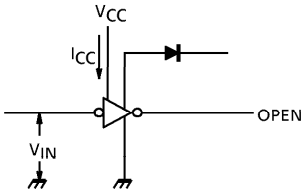
4. I_R



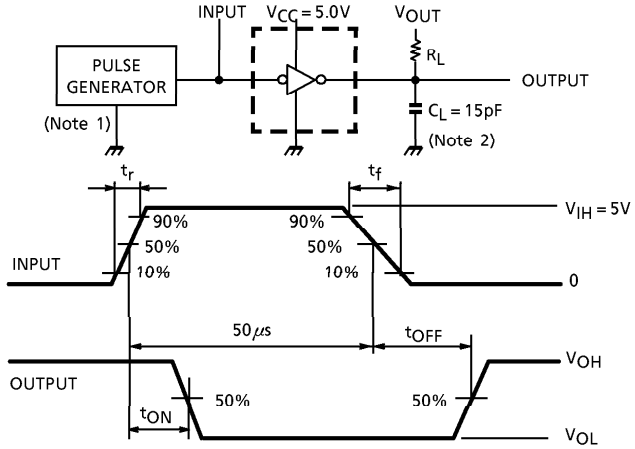
5. V_F



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



7. t_{ON}, t_{OFF}



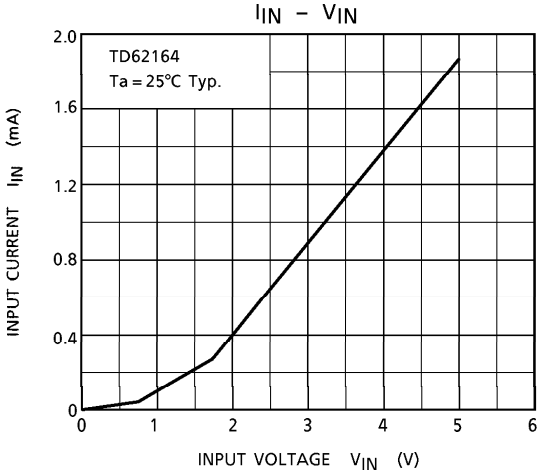
(Note 1) Pulse Width 50μs, Duty Cycle 10%
Output Impedance 50Ω, $t_r \leqq 5$ns, $t_f \leqq 10$ns

(Note 2) C_L includes probe and jig capacitance.

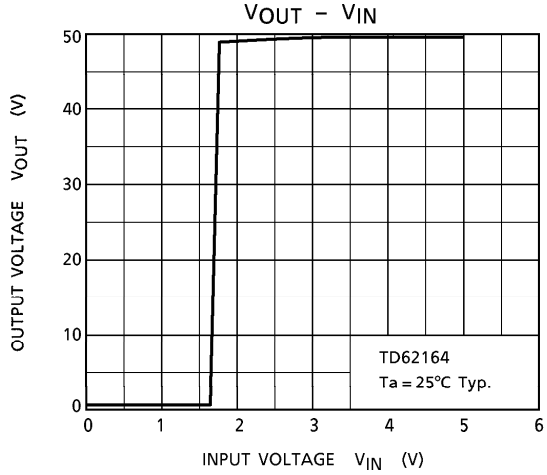
PRECAUTIONS for USING

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.

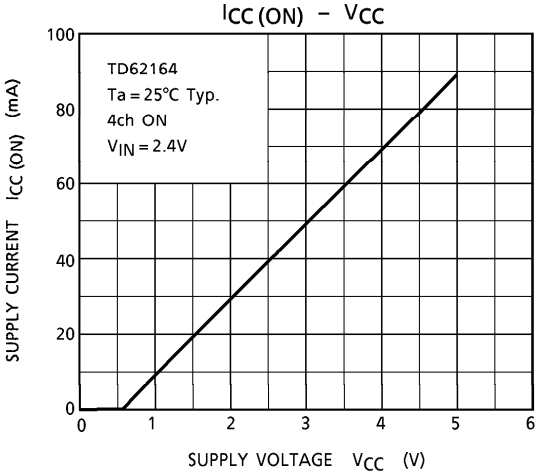
I_{IN} – V_{IN}



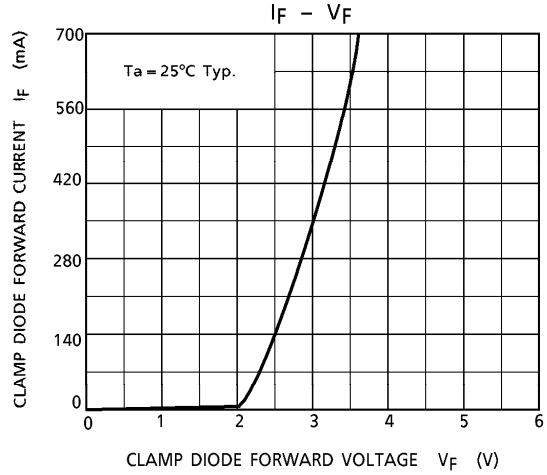
V_{OUT} – V_{IN}



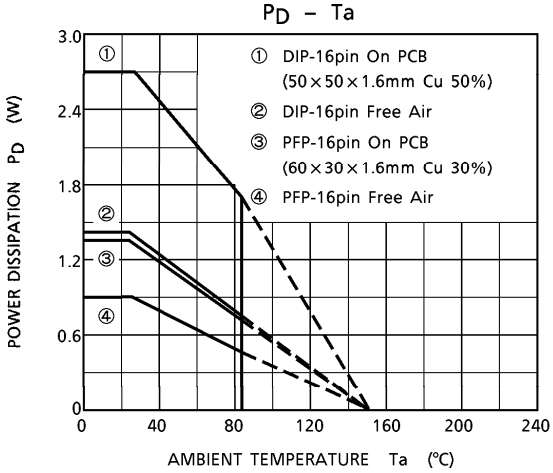
$I_{CC\,(ON)}$ – V_{CC}

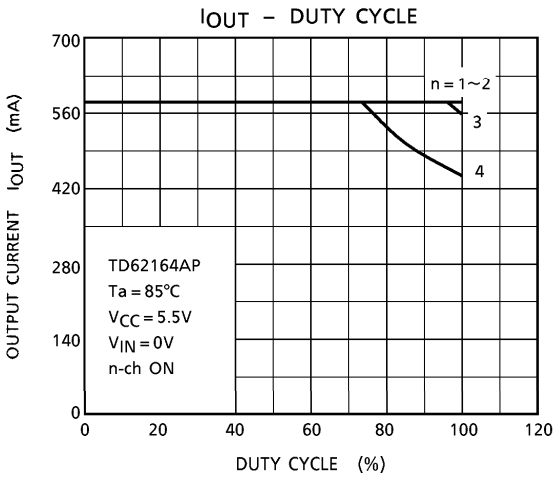


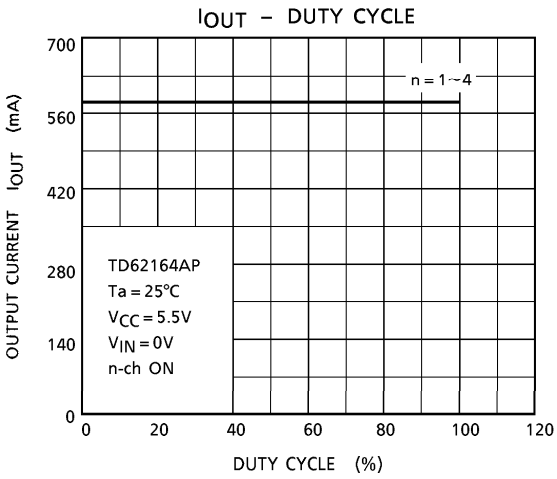
I_F – V_F

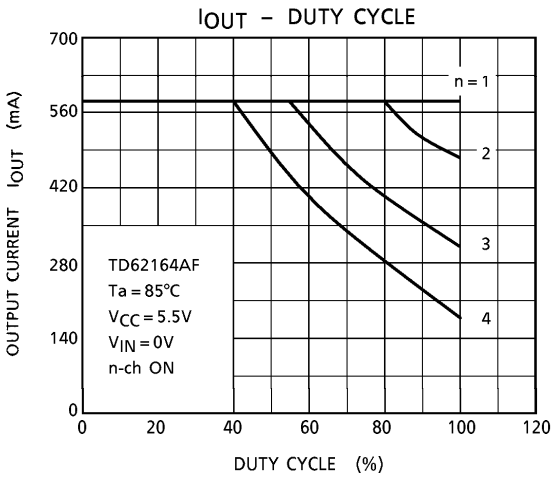


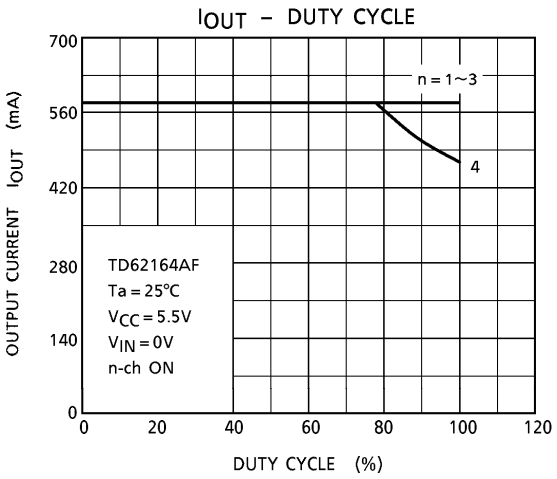
P_D – Ta




I_{OUT} – DUTY CYCLE
OUTPUT CURRENT I_{OUT} (mA)
700
560
420
280
140
0
0 20 40 60 80 100 120
DUTY CYCLE (%)
n = 1~2
3
4
TD62164AP
Ta = 85°C
V_{CC} = 5.5V
V_{IN} = 0V
n-ch ON


I_{OUT} – DUTY CYCLE
OUTPUT CURRENT I_{OUT} (mA)
700
560
420
280
140
0
0 20 40 60 80 100 120
DUTY CYCLE (%)
n = 1~4
TD62164AP
Ta = 25°C
V_{CC} = 5.5V
V_{IN} = 0V
n-ch ON

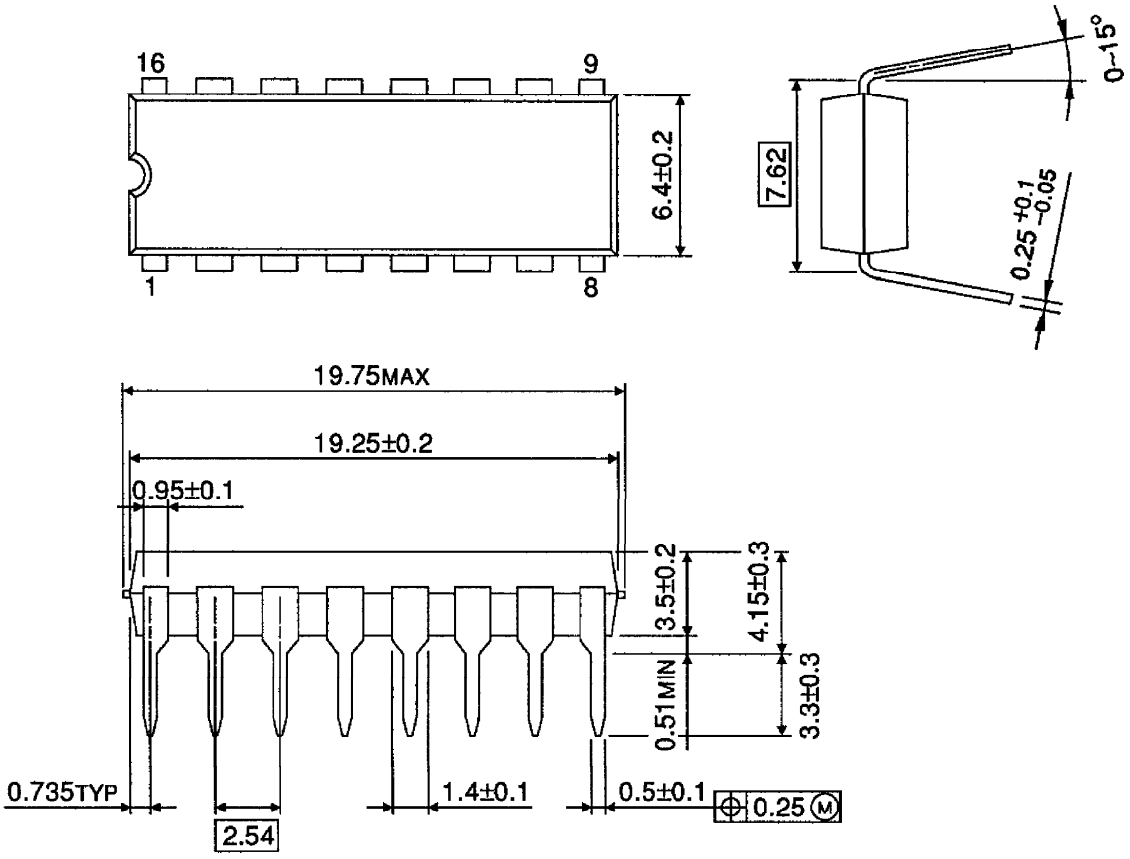

I_{OUT} – DUTY CYCLE
OUTPUT CURRENT I_{OUT} (mA)
700
560
420
280
140
0
0 20 40 60 80 100 120
DUTY CYCLE (%)
n = 1
2
3
4
TD62164AF
Ta = 85°C
V_{CC} = 5.5V
V_{IN} = 0V
n-ch ON


I_{OUT} – DUTY CYCLE
OUTPUT CURRENT I_{OUT} (mA)
700
560
420
280
140
0
0 20 40 60 80 100 120
DUTY CYCLE (%)
n = 1~3
4
TD62164AF
Ta = 25°C
V_{CC} = 5.5V
V_{IN} = 0V
n-ch ON

OUTLINE DRAWING

DIP16-P-300-2.54A

Unit : mm

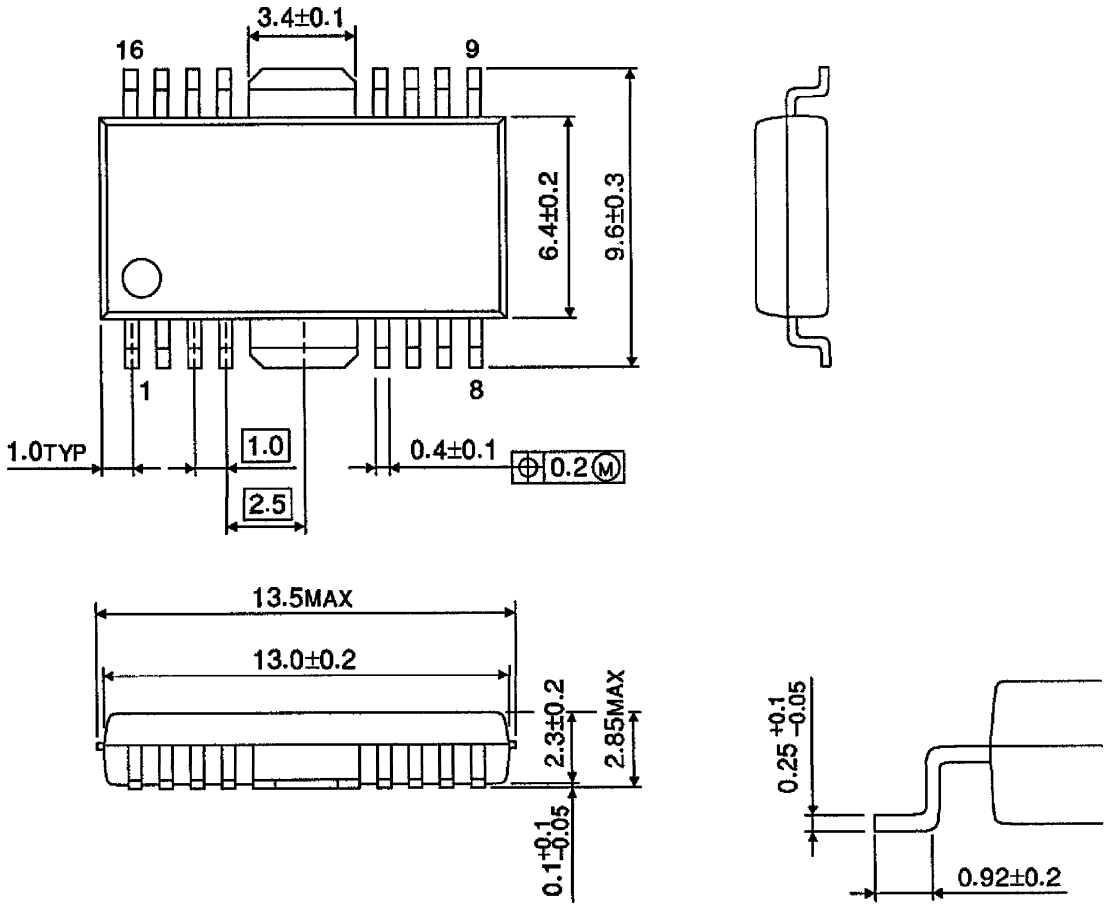


Weight : 1.11g (Typ.)

OUTLINE DRAWING

HSOP16-P-300-1.00

Unit : mm



Weight : 0.50g (Typ.)