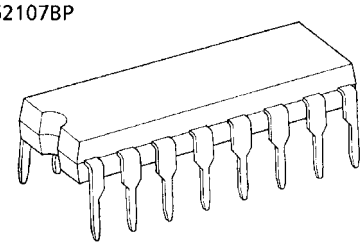
TOSHIBA BIPOLAR DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TD62107P,TD62107BP,TD62107F

4CH HIGH−CURRENT DARLINGTON SINK DRIVER

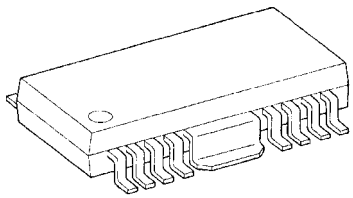
The TD62107P / BP / F are high−voltage, high−current darlington drivers and enable inputs which can gate the outputs. All units feature integral clamp diodes for switching inductive loads.
The TD62107P / BP / F have a wide supply voltage range and all input are compatible with TTL and 5−V CMOS.
Application include relay, hammer, lamp and stepping moter drivers.
Please observe the thermal condition for using.

TD62107P
TD62107BP



DIP16-P-300-2.54A

TD62107F



HSOP16-P-300-1.00

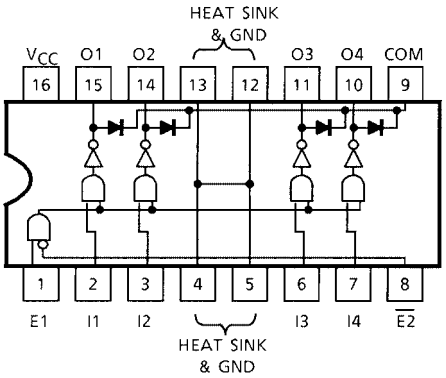
Weight
DIP16−P−300−2.54A : 1.11 g (Typ.)
HSOP16−P−300−1.00 : 0.50 g (Typ.)

FEATURES

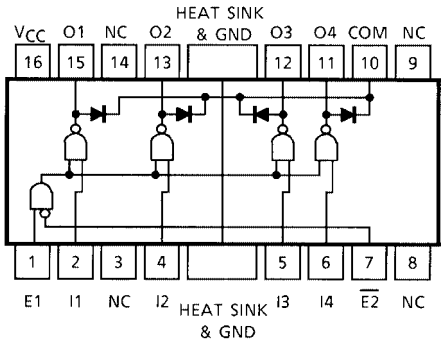
- Output current (single output) 750mA (MAX)
- High sustaining voltage output 80 V MIN. (TD62107BP)
  45 V MIN. (TD62107P)
  35 V MIN. (TD62107F)
- Output clamp diodes
- Enable inputs E1, E2
- Wide supply voltage range V_{CC} = 4.75~17 V
- Input compatible with TTL and 5−V CMOS
- GND terminal = heat sink
- Package type−P, BP : DIP−16pin
- Package type−F : HSOP−16pin

PIN CONNECTION (TOP VIEW)

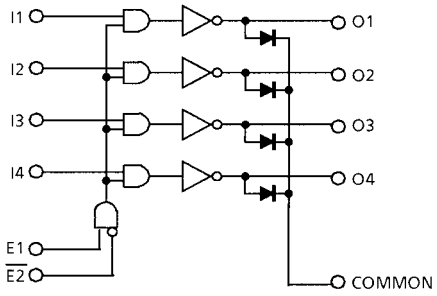
TD62107P / TD62107BP



TD62107F



SCHEMATICS (EACH DRIVER)

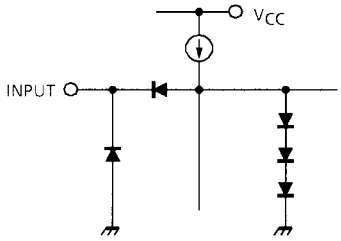


TRUTH TABLE

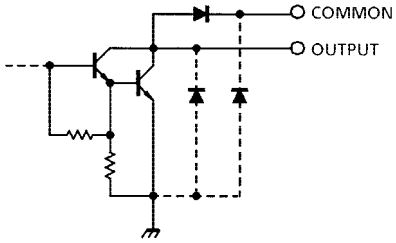
E1	$\overline{E2}$	I1 ~ I4	O1~O4
L	L	L or H	Disable OFF
L	H	L or H	Disable OFF
H	L	L or H	Enable In
H	H	L or H	Disable OFF

In = I1 ~ I4

INPUT EQUIVALENT CIRCUIT



OUTPUT EQUIVALENT CIRCUIT



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_{CC}	−0.5~17	V
Output Sustaining Voltage	P	$V_{CE\ (SUS)}$	−0.5~45	V
	BP		−0.5~80	
	F		−0.5~35	
Output Current		I_{OUT}	750	mA
Input Voltage		V_{IN}	−0.5~V_{CC} + 0.5	V
Clamp Diode Reverse Voltage	P	V_R	45	V
	BP		80	
	F		35	
Clamp Diode Forword Current	P, F	I_F	500	mA
	BP		750	
Power Dissipation	P, BP	P_D	2.7 (Note 1)	W
	F		1.4 (Note 2)	
Operating Temperature		T_{opr}	−40~85	°C
Storage Temperature		T_{stg}	−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_{CC}			4.75	—	15	V
Output Sustaining Voltage	P	$V_{CE\ (SUS)}$			0	—	45	V
	BP				0	—	80	
	F				0	—	35	
Output Current	P, F	I_{OUT}	T_{pw} = 25ms, Duty = 75%, 1 Circuit		0	—	500	mA
	BP		T_{pw} = 25ms, Duty = 10%, 4 Circuits		0	—	750	
	P, BP		T_{pw} = 25ms, 4 Circuits	Duty = 30%	0	—	400	
	F			Duty = 40%	—	—	300	
Input Voltage		V_{IN}			0	—	V_{CC}	V
Clamp Diode ReverseVoltage	P	V_R			—	—	45	V
	BP				—	—	80	
	F				—	—	35	
Clamp Diode Forward Current	P, F	I_F			—	—	500	mA
	BP				—	—	750	
Power Dissipation	B, BP	P_D			—	—	1.0	W
	F		Ta = 85°C	(Note)	—	—	0.7	

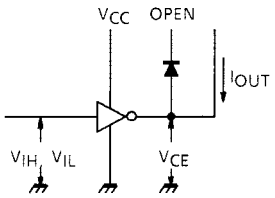
Note: On Glass Epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

ELECTRICAL CHARACTERISTICS (Ta = 25°C)

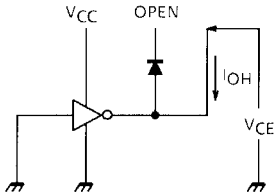
CHARACTERISTIC			SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN	TYP.	MAX	UNIT
Input Voltage	"H" Level		V_{IH}	1		2.0	—	V_{CC}	V
	"L" Level		V_{IL}			—	—	0.8	
Output Current	"H" Level	P	I_{OH}	2	V_{CE} = 45 V, Ta = 75°C	—	—	100	µA
		BP			V_{CE} = 80 V, Ta = 85°C	—	—	100	
		F			V_{CE} = 35 V, Ta = 85°C	—	—	100	
Output Voltage	"L" Level	P, F	V_{OL}	3	I_{OUT} = 50 mA	—	—	1.3	V
		BP			I_{OUT} = 750 mA	—	—	1.6	
Input Current	"H" Level		I_{IH}	4	V_{IN} = 13 V	—	—	100	µA
	"L" Level		I_{IL}	5	V_{IN} = 0.4 V	—	—	−0.3	mA
Clamp Diode Reverse Current		P	I_R	6	V_R = 45 V	—	—	100	µA
		BP			V_R = 80 V	—	—	100	
		F			V_R = 35 V	—	—	100	
Clamp Diode Forward Voltage		P, F	V_F	7	I_F = 500 mA	—	—	2.0	V
		BP			I_F = 750 mA	—	—	2.0	
Supply Current	Output "H"	ICC	I_{CCH}	4	V_{CC} = 13 V, V_{IN} = 0 V, OUTPUT OPEN	—	—	13	mA
	Output "L"		I_{CCL}	5	V_{CC} = 13 V, V_{IN} = 5 V, OUTPUT OPEN	—	—	17	
Turn−On Delay		P	t_{ON}	8	V_{CC} = 5 V, R_L = 90 Ω, C_L = 15 pF, V_{OUT} = 45 V	—	5	—	µs
		BP			V_{CC} = 5 V, V_{OUT} = 80 V, R_L = 160 Ω	—	0.4	—	
		F			V_{CC} = 5 V, R_L = 70 Ω, C_L = 15 pF, V_{OUT} = 35 V	—	5	—	
Turn−Off Delay		P	t_{OFF}	8	V_{CC} = 5 V, R_L = 90 Ω, C_L = 15 pF, V_{OUT} = 45 V	—	5	—	µs
		BP			V_{CC} = 5 V, V_{OUT} = 80 V, R_L = 160 Ω	—	1.7	—	
		F			V_{CC} = 5 V, R_L = 70 Ω, C_L = 15 pF, V_{OUT} = 35 V	—	5	—	

TEST CIRCUIT

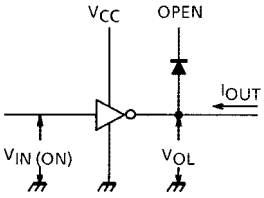
1. V_{IH}, V_{IL}



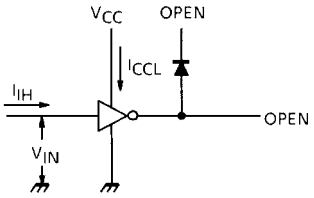
2. I_{OH}



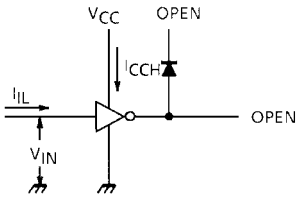
3. V_{OL}



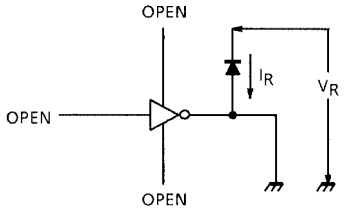
4. I_{IH}, I_{CCL}



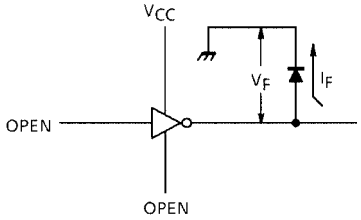
5. I_{IL}, I_{CCH}



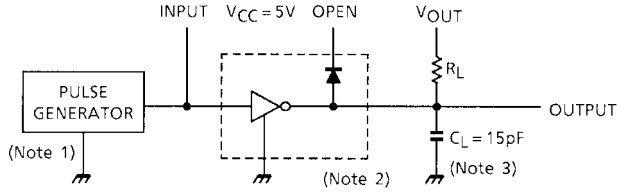
6. I_R



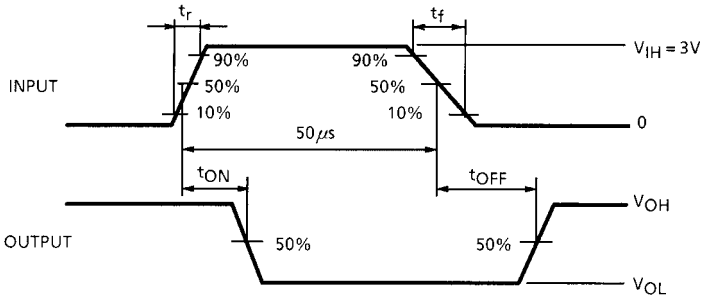
7. V_F



8. t_{ON}, t_{OFF}



Input condition



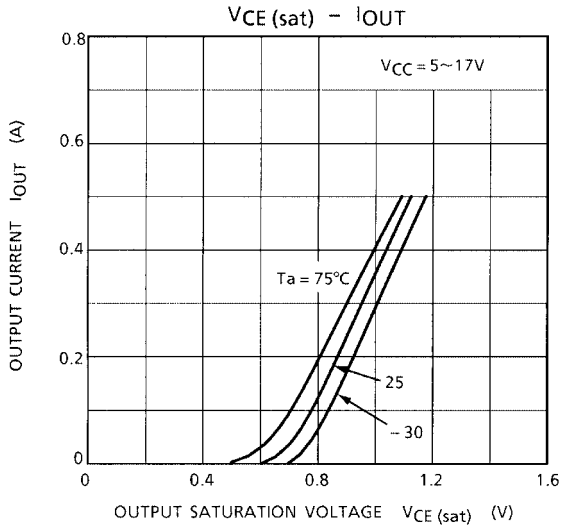
Note 1: Pulse Width 50 μs, Duty Cycle 10%
Output Impedance 50 Ω, $t_r \leq 5$ns, $t_f \leq 10$ ns

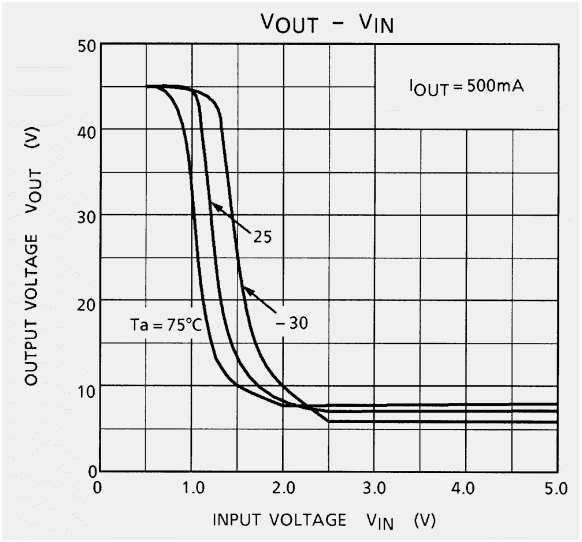
Note 2: V_{IH} = 3 V, E1 = V_{IH}, $\overline{E2}$ = GND,
V_{CC} = 5 V

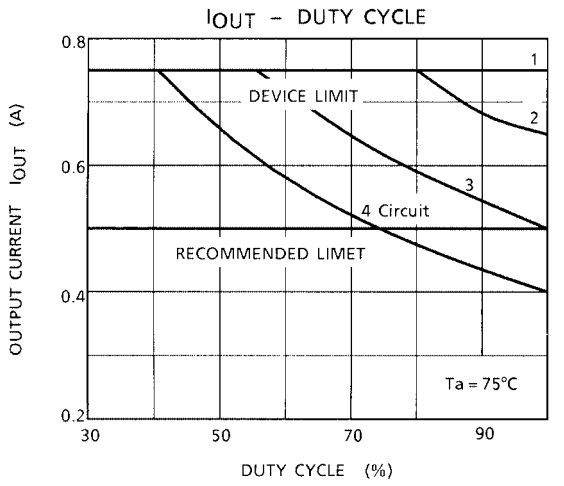
Note 3: C_L includes probe and jig capacitance

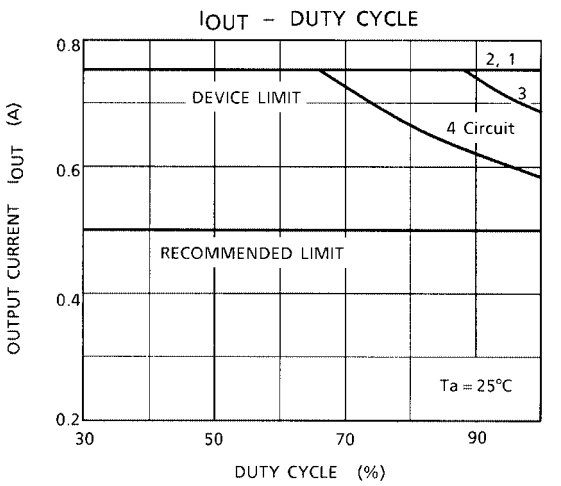
PRECAUTIONS for USING

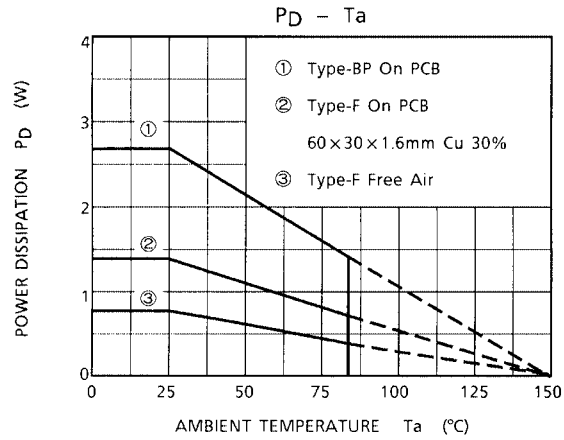
This IC does not include built-in protection circuits for excess current or overvoltage.
If this IC is subjected to excess current or overvoltage, it may be destroyed.
Hence, the utmost care must be taken when systems which incorporate this IC are designed.
Utmost care is necessary in the design of the 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.

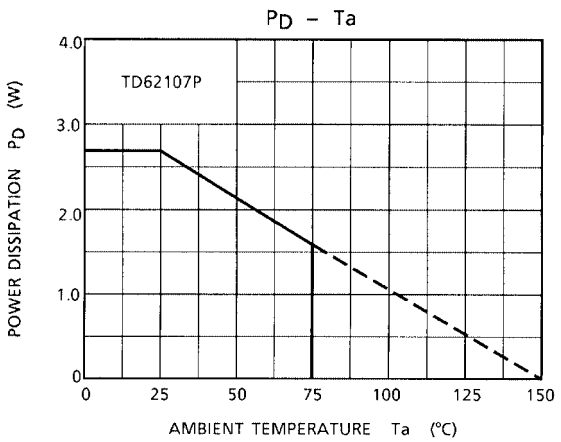

VCE (sat) – IOUT
VCC = 5~17V
Ta = 75°C
25
– 30
OUTPUT CURRENT IOUT (A)
OUTPUT SATURATION VOLTAGE VCE (sat) (V)
0.8
0.6
0.4
0.2
0
0.4
0.8
1.2
1.6


VOUT – VIN
IOUT = 500mA
25
Ta = 75°C
– 30
OUTPUT VOLTAGE VOUT (V)
INPUT VOLTAGE VIN (V)
50
40
30
20
10
0
1.0
2.0
3.0
4.0
5.0


IOUT – DUTY CYCLE
DEVICE LIMIT
1
2
3
4 Circuit
RECOMMENDED LIMET
Ta = 75°C
OUTPUT CURRENT IOUT (A)
DUTY CYCLE (%)
0.8
0.6
0.4
0.2
30
50
70
90

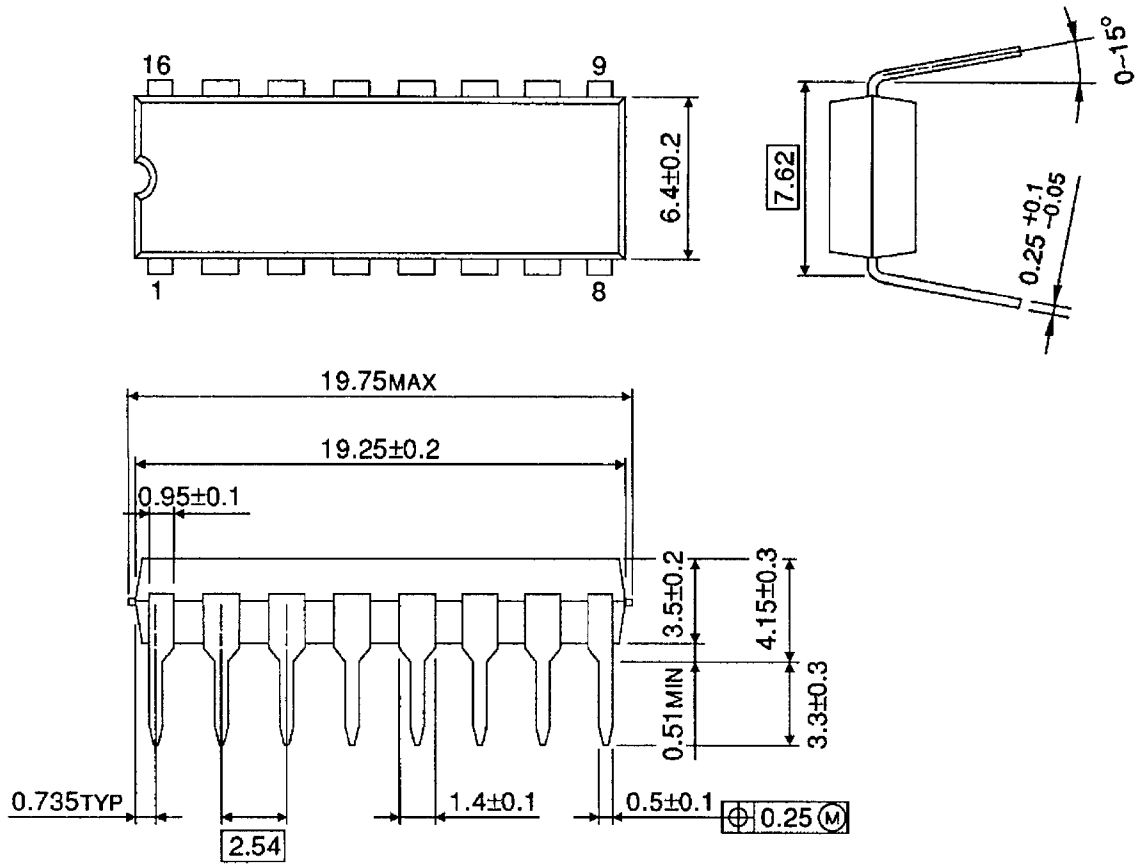

IOUT – DUTY CYCLE
DEVICE LIMIT
2, 1
3
4 Circuit
RECOMMENDED LIMIT
Ta = 25°C
OUTPUT CURRENT IOUT (A)
DUTY CYCLE (%)
0.8
0.6
0.4
0.2
30
50
70
90


PD – Ta
① Type-BP On PCB
② Type-F On PCB
60×30×1.6mm Cu 30%
③ Type-F Free Air
①
②
③
POWER DISSIPATION PD (W)
AMBIENT TEMPERATURE Ta (°C)
4
3
2
1
0
0
25
50
75
100
125
150


PD – Ta
TD62107P
POWER DISSIPATION PD (W)
AMBIENT TEMPERATURE Ta (°C)
4.0
3.0
2.0
1.0
0
0
25
50
75
100
125
150

PACKAGE DIMENSIONS

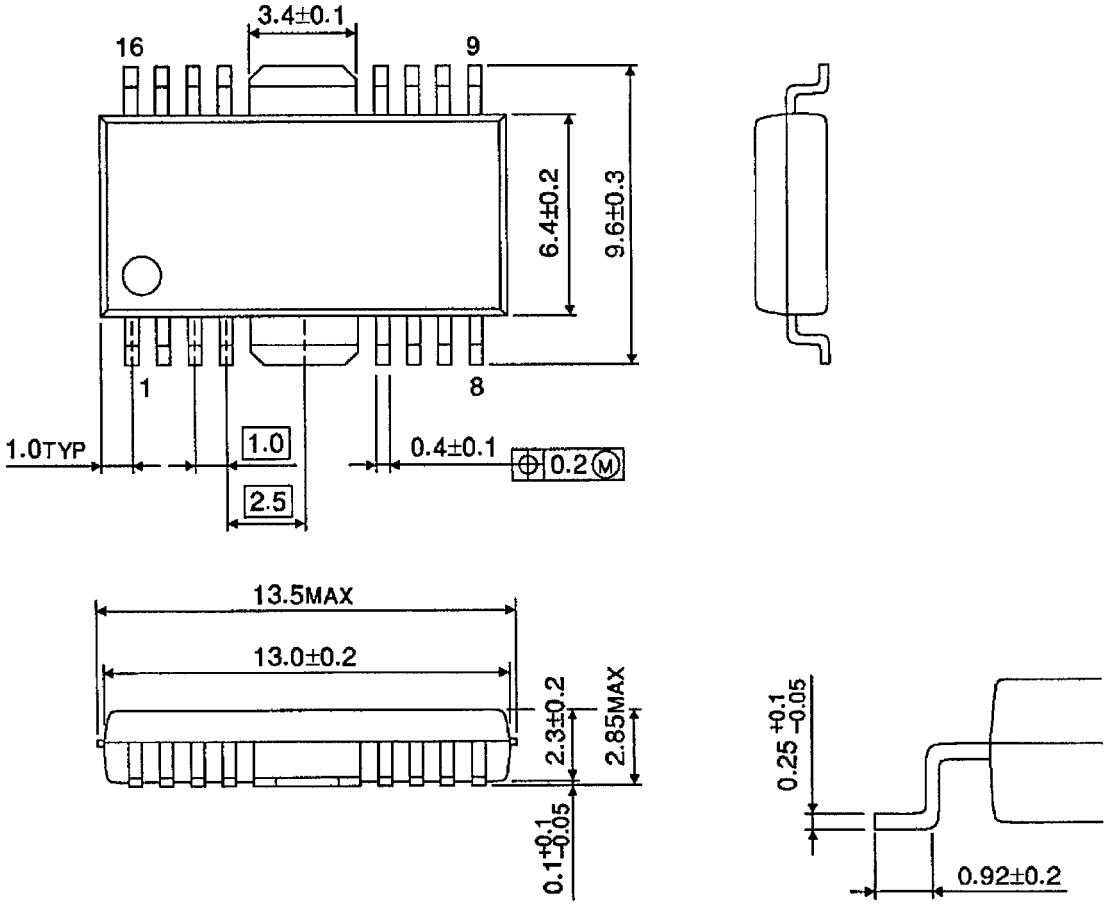
DIP16−P−300−2.54A Unit : mm



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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