TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62064BP1G,TD62064BFG

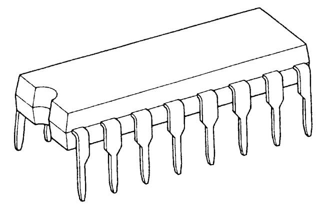
4ch High-Current Darlington Sink Driver

The TD62064BP1G and TD62064BFG 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.

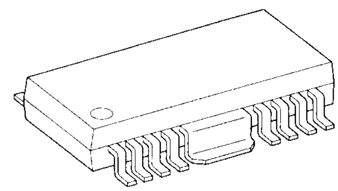
This devices are a product for the Pb free(Sn-Ag).

TD62064BP1G



DIP16-P-300-2.54A

TD62064BFG



HSOP16-P-300-1.00

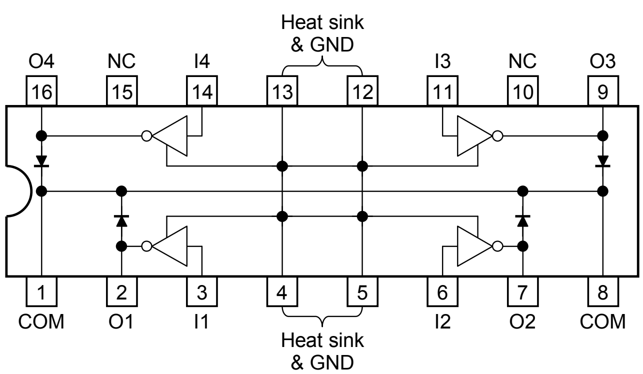
Weight
DIP16-P-300-2.54A: 1.11 g (typ.)
HSOP16-P-300-1.00: 0.50 g (typ.)

Features

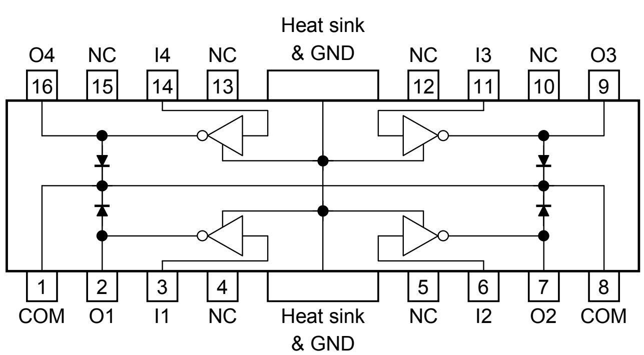
- Package type BP1G: DIP16 pin
  BFG: HSOP16 pin
- High output sustaining voltage: $V_{CE\ (SUS)}$ = 80 V (min)
- Output current (single output): I_{OUT} = 1.5 A/ch (max)
- Output clamp diodes
- Input compatible with TTL and 5 V CMOS
- GND and SUB terminal = Heat sink

Pin Assignment (top view)

TD62064BP1G



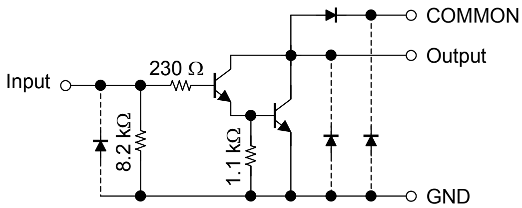
TD62064BFG



Note: The NC pins are not connected to the die. If wiring is required, it is recommended to connect the pins to the Heat sink & GND line(s).

Schematics (each driver)

TD62064BP1G/BFG



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

Precautions for Using

(1) 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, COMMON and GND line since IC may be destroyed due to short-circuit between outputs, air contamination fault, or fault by improper grounding.

(2) If a TD62064BP1G/BFG is being used to drive an inductive load (such as a motor, solenoid or relay), Toshiba recommends that the diodes (pins 1 and 8) be connected to the secondary power supply pin so as to absorb the counter electromotive force generated by the load. Please adhere to the device's maximum ratings.
Toshiba recommends that zener diodes be connected between the diodes (pins 1 and 8) and the secondary power supply pin (as the anode) so as to enable rapid absorption of the counter electromotive force. Again, please adhere to the device's maximum ratings.

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Output sustaining voltage		$V_{CE\ (SUS)}$	−0.5 to 80	V
Parasitic transistor output voltage		V_{CEF} (Note 1)	80	V
Output current		I_{OUT}	1.5	A/ch
Input current		I_{IN}	50	mA
Input voltage		V_{IN}	7	V
Clamp diode reverse voltage		V_R	80	V
Clamp diode forward current		I_F	1.5	A
Power dissipation	BP1G	P_D	1.47/2.7 (Note 2)	W
	BFG		0.9/1.4 (Note 3)	
Operating temperature		T_{opr}	−40 to 85	°C
Storage temperature		T_{stg}	−55 to 150	°C

Note 1: Parasitic transistor (COMMON − GND − OUTPUT) output voltage

Note 2: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

Note 3: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Recommended Operating Conditions (Ta = −40 to 85°C)

Characteristics		Symbol	Test Condition		Min	Typ.	Max	Unit
Output sustaining voltage		$V_{CE\ (SUS)}$	—		0	—	80	V
Output current		I_{OUT}	DC1 circuit, Ta = 25°C		0	—	1250	mA/ch
	BP1G (Note 1)		T_{pw} = 25 ms, 4 circuits, Ta = 85°C, T_j = 120°C	Duty = 10%	0	—	1250	
				Duty = 50%	0	—	380	
	BFG (Note 2)			Duty = 10%	0	—	900	
				Duty = 50%	0	—	170	
Input voltage		V_{IN}	—		0	—	5.5	V
	Output ON	$V_{IN\ (ON)}$	I_{OUT} = 1.25 A		2.5	—	8	
	Output OFF	$V_{IN\ (OFF)}$	—		0	—	0.4	
Input current		I_{IN}	—		0	—	20	mA
Clamp diode reverse voltage		V_R	—		0	—	80	V
Clamp diode forward current		I_F	—		—	—	1.25	A
Power dissipation	BP1G	P_D	Ta = 85°C	(Note 1)	—	—	1.4	W
	BFG		Ta = 85°C	(Note 2)	—	—	0.7	

Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)

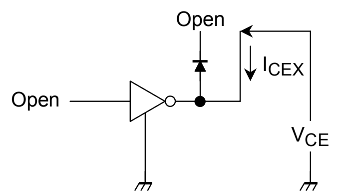
Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C unless otherwise noted)

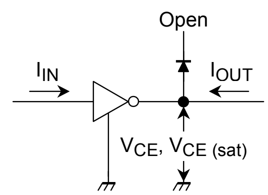
Characteristics	Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Output leakage current	I_{CEX}	1	V_{CE} = 80 V, Ta = 25°C	—	—	50	μA
			V_{CE} = 80 V, Ta = 85°C	—	—	100	
Output saturation voltage	$V_{CE\ (sat)}$	2	I_{OUT} = 1.25 A, V_{IN} = 2.4 V	—	—	1.6	V
			I_{OUT} = 0.75 A, V_{IN} = 2.4 V	—	—	1.25	
DC current transfer ratio	h_{FE}	2	V_{CE} = 2 V, I_{OUT} = 1.25 A	—	1500	—	
Input voltage (output on)	$V_{IN\ (ON)}$	3	I_{OUT} = 1.25 A, I_{IN} = 2 mA	—	—	2.4	V
Clamp diode leakage current	I_R	4	V_R = 80 V, Ta = 25°C	—	—	50	μA
			V_R = 80 V, Ta = 85°C	—	—	100	
Clamp diode forward voltage	V_F	5	I_F = 1.25 A	—	1.5	2.0	V
Input capacitance	C_{IN}	6	V_{IN} = 0, f = 1 MHz	—	15	—	pF
Turn-ON delay	t_{ON}	7	V_{OUT} = 80 V, R_L = 68 Ω	—	0.1	—	μs
Turn-OFF delay	t_{OFF}	7	V_{OUT} = 80 V, R_L = 68 Ω	—	1.0	—	μs
Parasitic transistor output voltage	V_{CEF}	8	I_{CEF} = 150 mA	80	—	—	V

Test Circuit

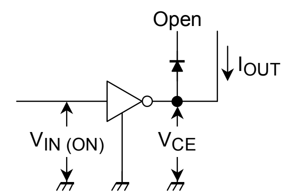
1. I_{CEX}



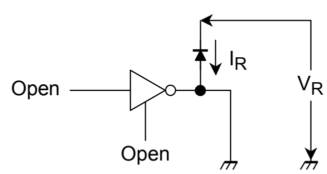
2. $V_{CE\ (sat)}$, h_{FE}



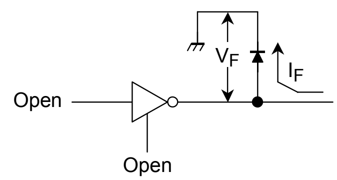
3. $V_{IN\ (ON)}$



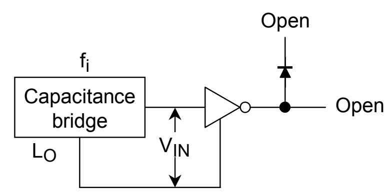
4. I_R



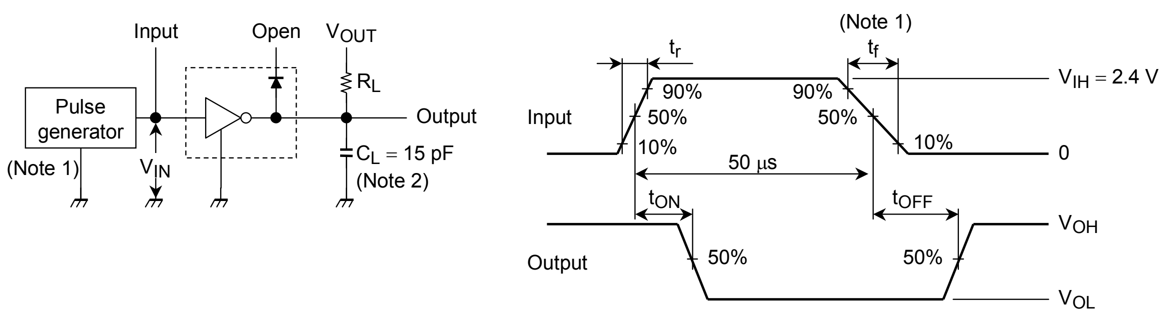
5. V_F



6. C_{IN}



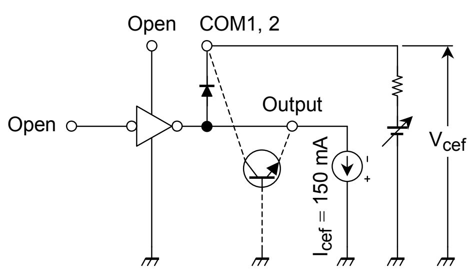
7. t_{ON}, t_{OFF}



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

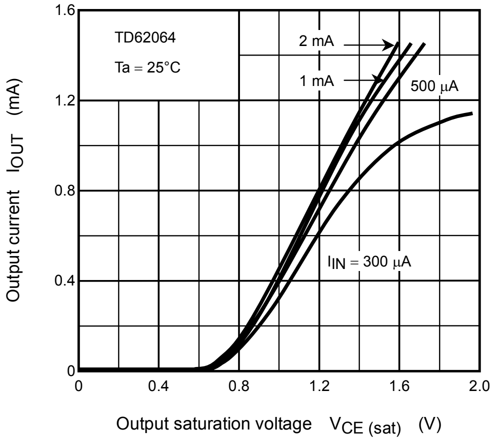
Note 2: C_L includes probe and jig capacitance

8. V_{cef}

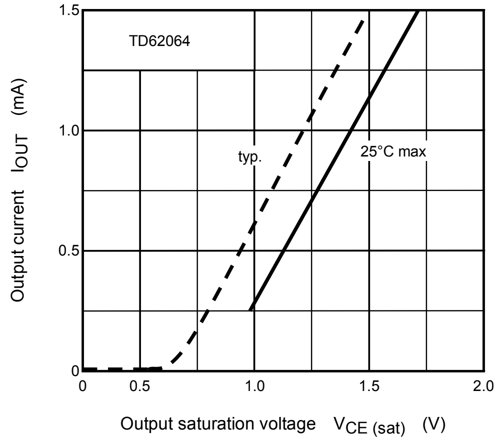


I_{cef} = 150 mA (at. single pulse = 5 ms)

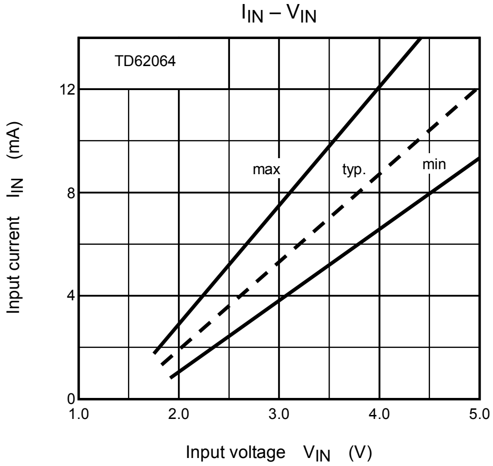
I_{OUT} – V_{CE} (sat)



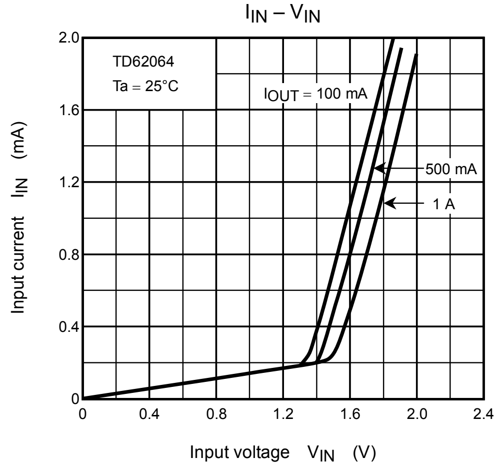
I_{OUT} – V_{CE} (sat)



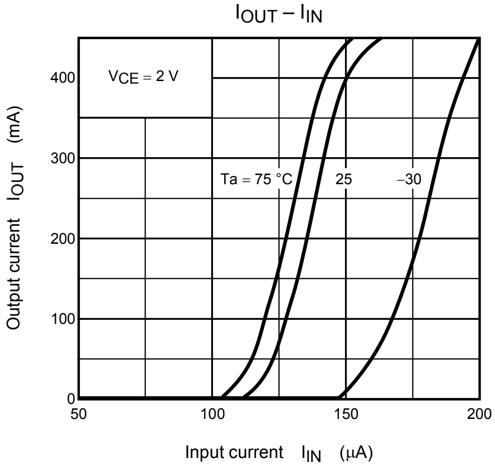
I_{IN} – V_{IN}



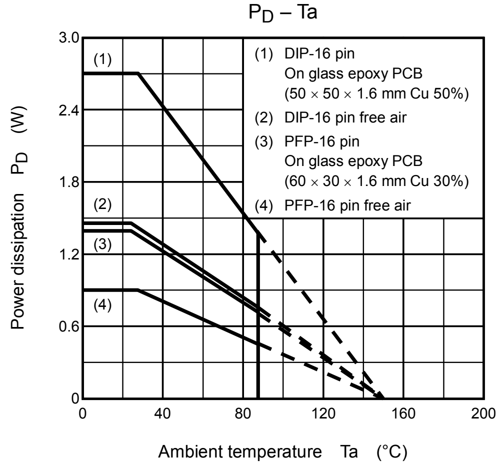
I_{IN} – V_{IN}



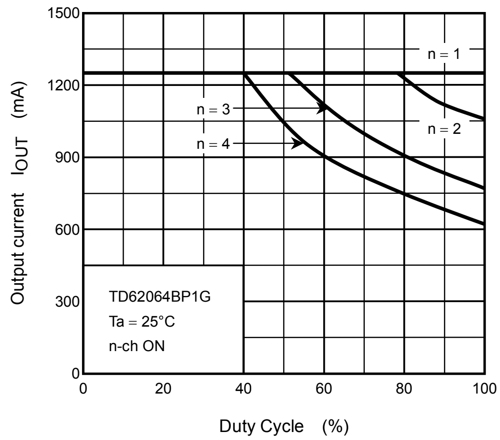
I_{OUT} – I_{IN}



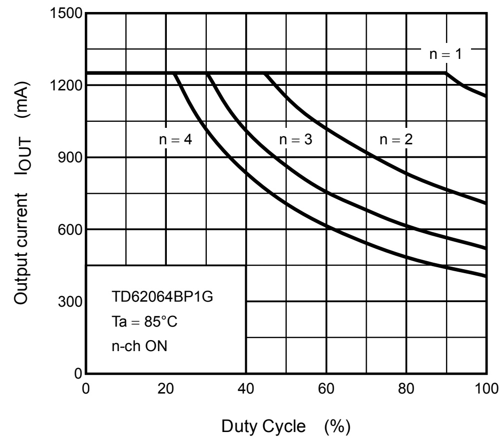
P_D – Ta



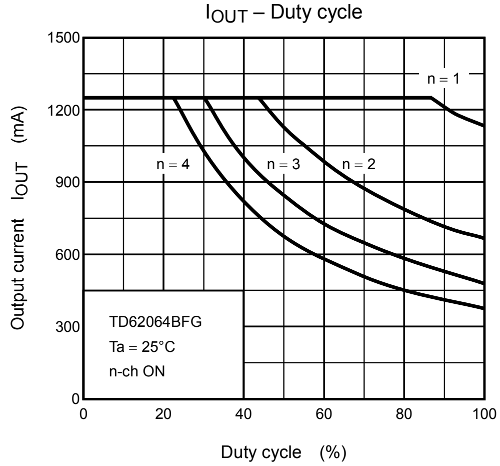
I_{OUT} – Duty cycle



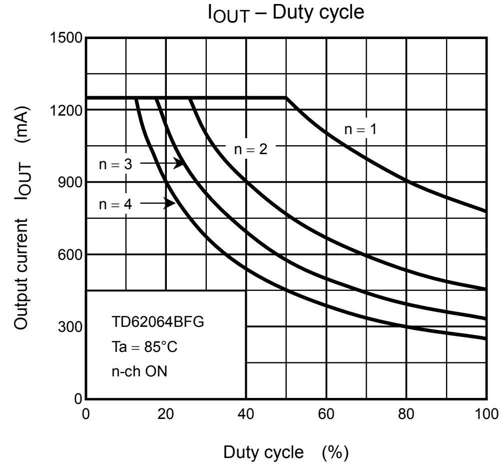
I_{OUT} – Duty cycle



I_{OUT} – Duty cycle

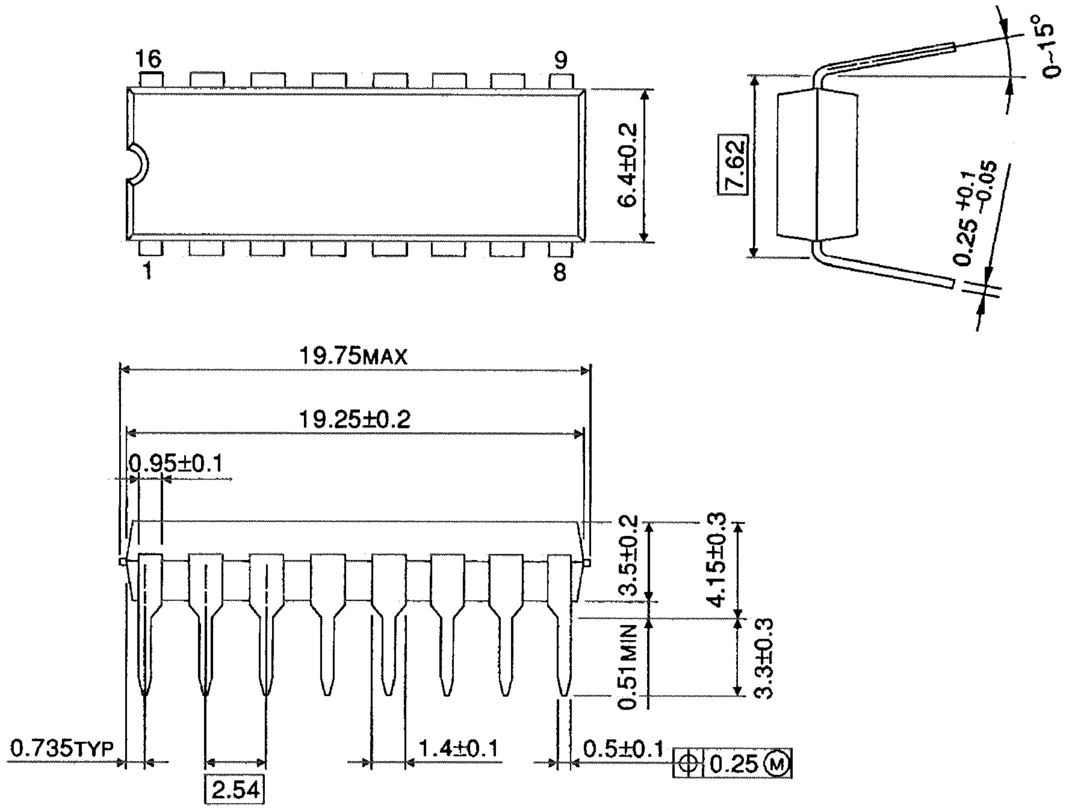


I_{OUT} – Duty cycle



Package Dimensions

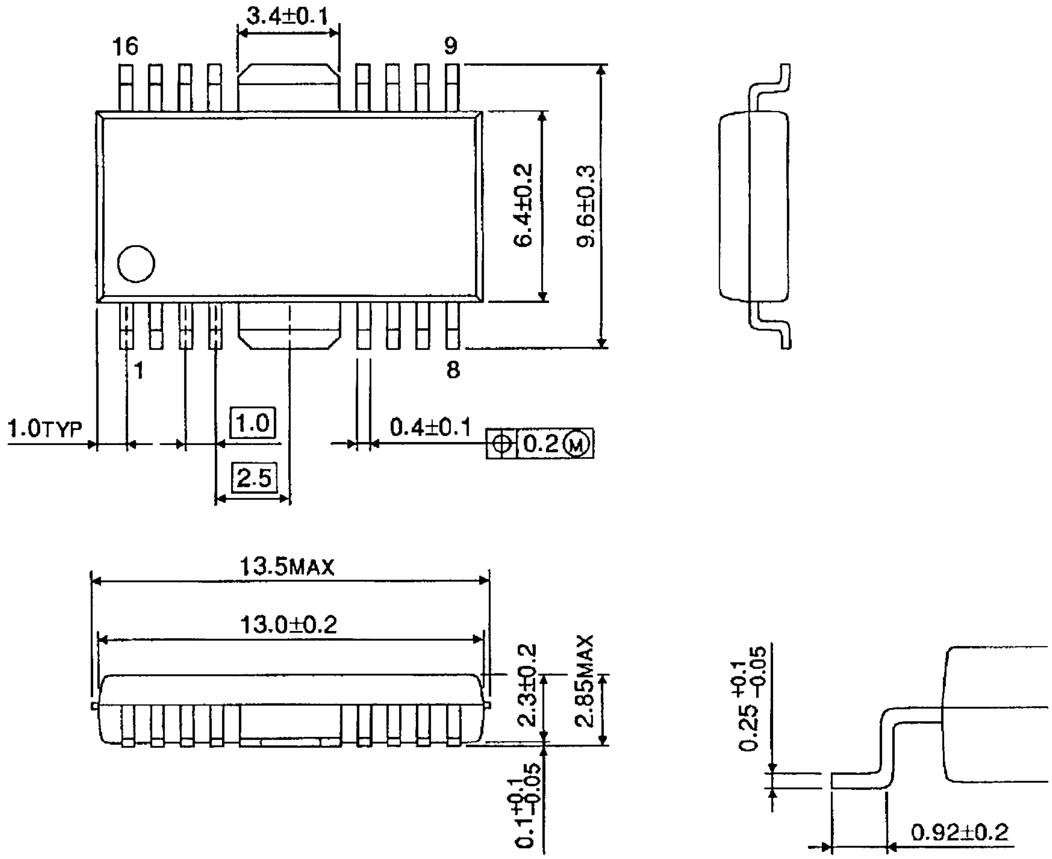
DIP16-P-300-2.54A Unit : mm



Weight: 1.11 g (typ.)

Package Dimensions

HSOP16-P-300-1.00 Unit : mm



Weight: 0.50 g (typ.)

About solderability, following conditions were confirmed

- Solderability

(1) Use of Sn-63Pb solder Bath
- solder bath temperature = 230°C
- dipping time = 5seconds
- the number of times = once
- use of R-type flux

(2) Use of Sn-3.0Ag-0.5Cu solder Bath
- solder bath temperature = 245°C
- dipping time = 5seconds
- the number of times = once
- use of R-type flux