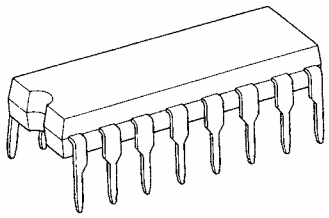
TOSHIBA Bipolar Digital Integrated Circuit Silicon Monolithic

TD62318APG,TD62318AFG

4ch Low Input Active High-Current Darlington Sink Driver

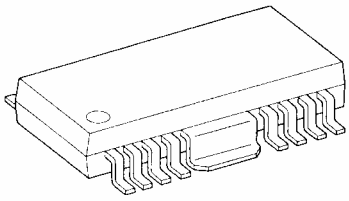
The TD62318APG and TD62318AFG are non-inverting transistor arrays which are comprised of four NPN darlington output stages and PNP input stages.
These devices can be operated by source input voltage and are suitable for operation with a 5-V general pourposed logic IC such as TTL, 5-V CMOS and 5-V Microprocessor which have sink current output drivers.
Applications include relay, hammer, lamp and stepping moter drivers.
Please observe the thermal condition for using.

TD62318APG



DIP16-P-300-2.54A

TD62318AFG



HSOP16-P-300-1.00

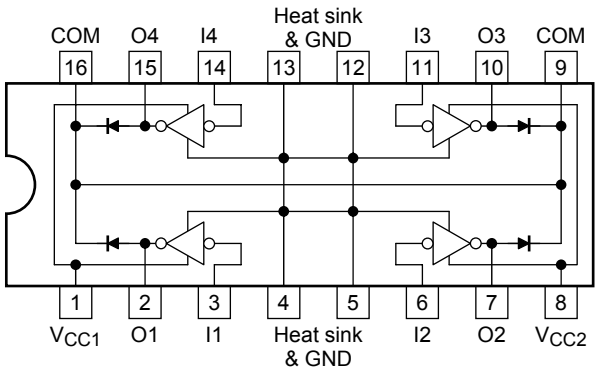
Weight
DIP16-P-300-2.54A : 1.11 g (typ.)
HSOP16-P-300-1.00 : 0.50 g (typ.)

Features

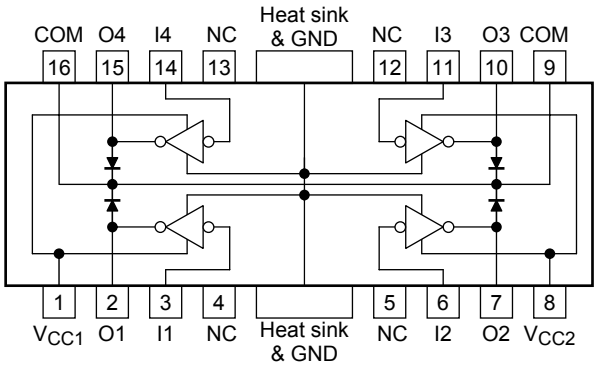
- Output current (single output) 700 mA (max)
- High sustaining voltage output 50 V (min)
- Output clamp diodes
- Input compatible with TTL and 5-V CMOS
- Low level active inputs
- Standard supply voltage
- Two V_{CC} terminals V_{CC1}, V_{CC2} (separated)
- GND and SUB terminal = heat sink
- Package type-APG: DIP-16 pin
- Package type-AFG: HSOP-16 pin

Pin Connection (top view)

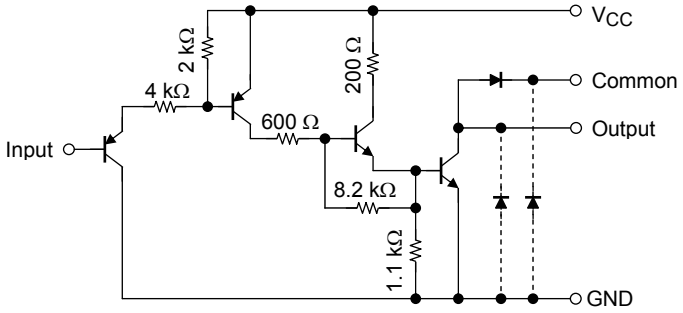
TD62318APG



AD62318AFG



Schematics (each driver)



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

Maximum Ratings (Ta = 25°C)

Characteristics		Symbol	Rating	Unit
Supply voltage		V_{CC}	−0.5 to 17	V
Output sustaining voltage		$V_{CE\ (SUS)}$	−0.5 to 50	V
Output current		I_{OUT}	700	mA/ch
Input current		I_{IN}	−10	mA
Input voltage		V_{IN}	−0.5 to 30	V
Clamp diode reverse voltage		V_R	50	V
Clamp diode forward current		I_F	700	mA
Power dissipation	APG	P_D	1.47/2.7 (Note 1)	W
	AFG		0.9/1.4 (Note 2)	
Operating temperature		T_{opr}	−40 to 85	°C
Storage temperature		T_{stg}	−55 to 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 to 85°C)

Characteristics		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
	APG		T_{pw} = 25 ms, 4 circuits, Ta = 85°C, T_j = 120°C	Duty = 10%	0	—	570	
				Duty = 50%	0	—	570	
	AFG			Duty = 10%	0	—	570	
				Duty = 50%	0	—	480	
Input voltage		V_{IN}			0	—	15	V
	Output on	$V_{IN\ (ON)}$			0	—	V_{CC} − 3.6	V
	Output off	$V_{IN\ (OFF)}$			V_{CC} − 1.6	—	5.5	
Clamp diode reverse voltage		V_R			—	—	50	V
Clamp diode forward current		I_F			—	—	500	mA
Power dissipation	APG	P_D	Ta = 85°C	(Note 1)	—	—	1.4	W
	AFG		Ta = 85°C	(Note 2)	—	—	0.7	

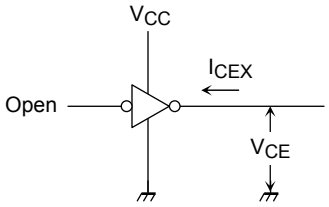
Note 1: On glass epoxy PCB (50 × 50 × 1.6 mm Cu 50%)
Note 2: On glass epoxy PCB (60 × 30 × 1.6 mm Cu 30%)

Electrical Characteristics (Ta = 25°C)

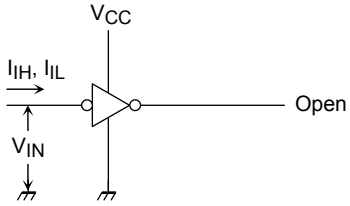
Characteristics		Symbol	Test Circuit	Test Condition	Min	Typ.	Max	Unit
Input voltage	"H" level	V_{IH}	—		V_{CC} – 1.6	—	25	V
	"L" level	V_{IL}			0	—	V_{CC} – 3.6	
Input current	"H" level	I_{IH}	2		—	—	10	μA
	"L" level	I_{IL}			—	–0.05	–0.36	mA
Output leakage current		I_{CEX}	1	V_{CE} = 50 V, Ta = 25°C	—	—	50	μA
				V_{CE} = 50 V, Ta = 85°C	—	—	100	
Output saturation voltage		$V_{CE\ (sat)}$	3	I_{OUT} = 0.5 A, V_{CC} = 4.5 V	—	—	0.8	V
				I_{OUT} = 0.2 A, V_{CC} = 4.5 V	—	—	0.45	
Clamp diode reverse current		I_R	4	V_R = 50 V, Ta = 25°C	—	—	50	μA
				V_R = 50 V, Ta = 85°C	—	—	100	
Clamp diode forward voltage		V_F	5	I_F = 500 mA	—	—	2.0	V
Supply current	Output on	$I_{CC\ (ON)}$	2	V_{CC} = 5.5 V, V_{IN} = 0 V	—	35	40	mA/ch
	Output off	$I_{CC\ (OFF)}$	2	V_{CC} = 5.5 V, V_{IN} = V_{CC}	—	—	10	μA
Turn-on delay		t_{ON}	6	V_{OUT} = 50 V, R_L = 90 Ω V_{CC} = 5.0 V, C_L = 15 pF	—	0.4	0.8	μs
Turn-off delay		t_{OFF}			—	8.0	16.0	

Test Circuit

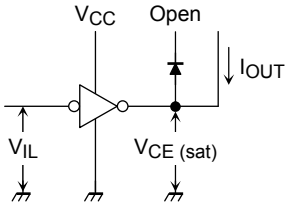
1. I_{CEX}



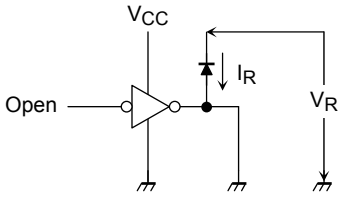
2. I_{IH}, I_{IL}



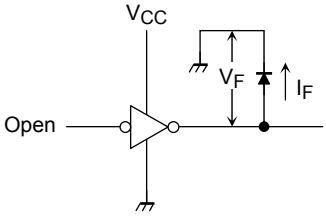
3. $V_{CE\ (sat)}$



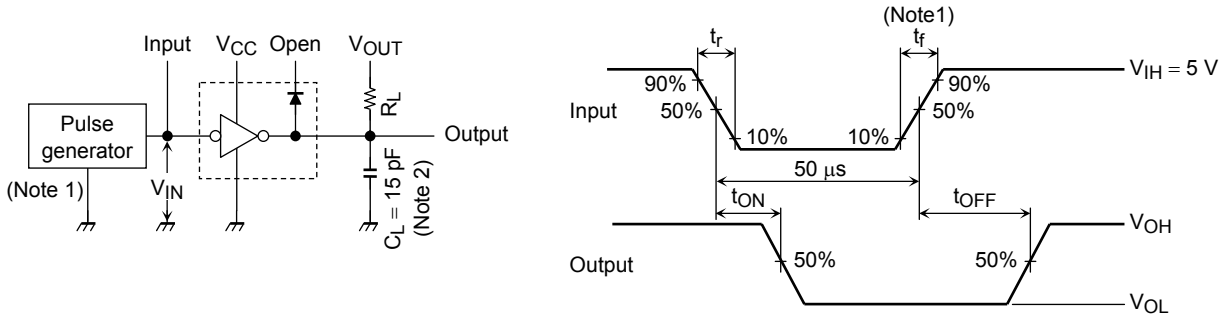
4. I_R



5. V_F



6. t_{ON}, t_{OFF}



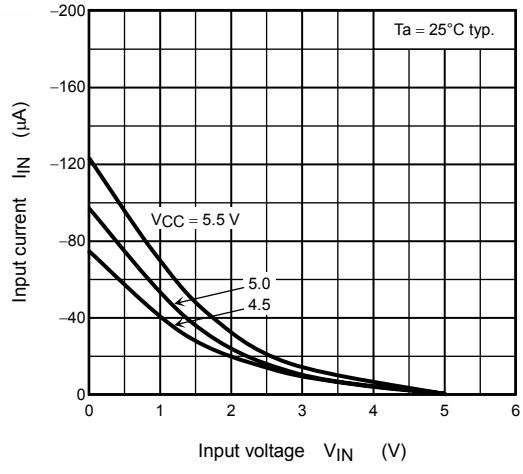
Note 1: Pulse width 50 μs, duty cycle 10%, output impedance 50 Ω, $t_r \leq 5$ ns, $t_f \leq 10$ ns

Note 2: C_L includes probe and jig capacitance.

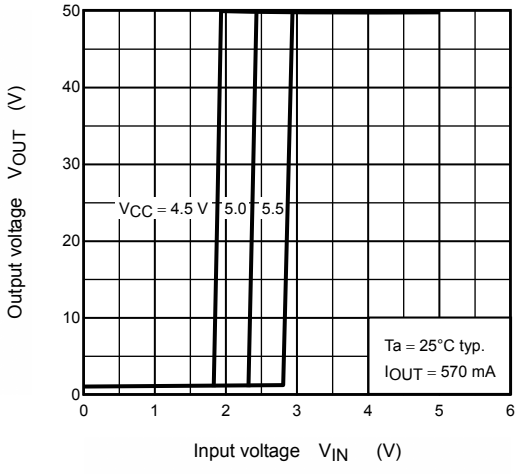
Precautions for Using

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.

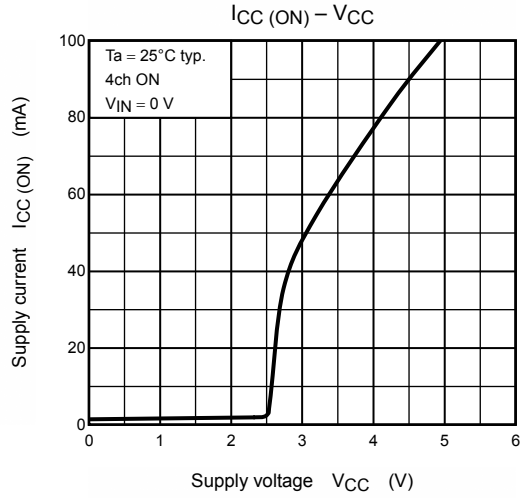
$I_{IN} – V_{IN}$



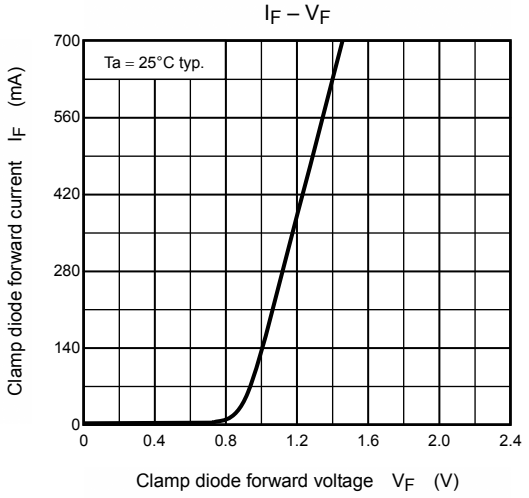
$V_{OUT} – V_{IN}$



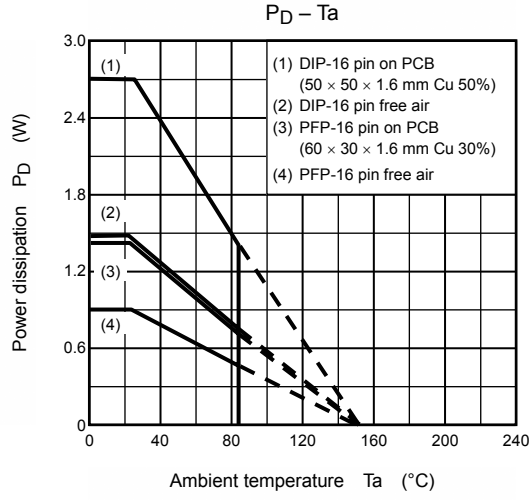
$I_{CC\ (ON)} – V_{CC}$

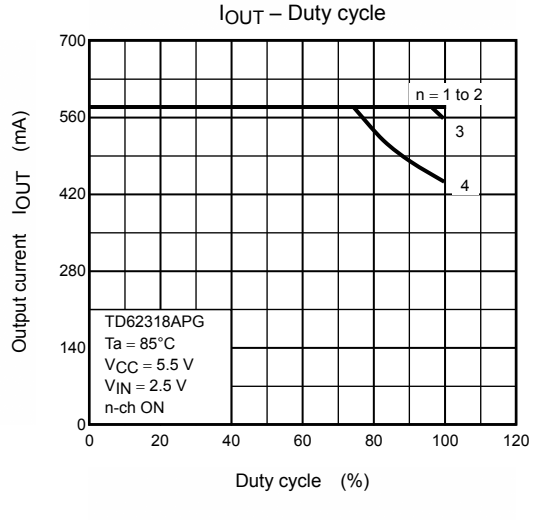


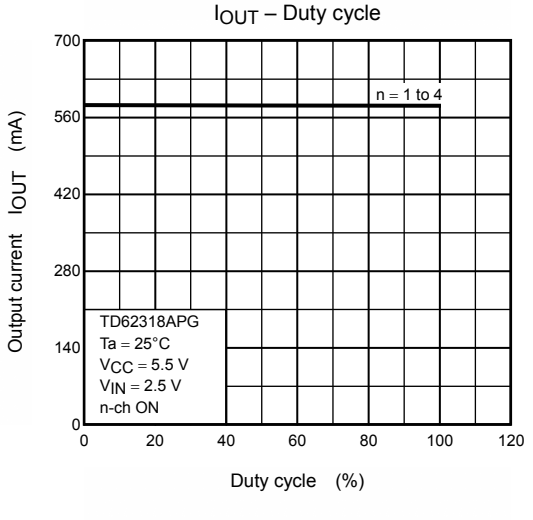
$I_F – V_F$

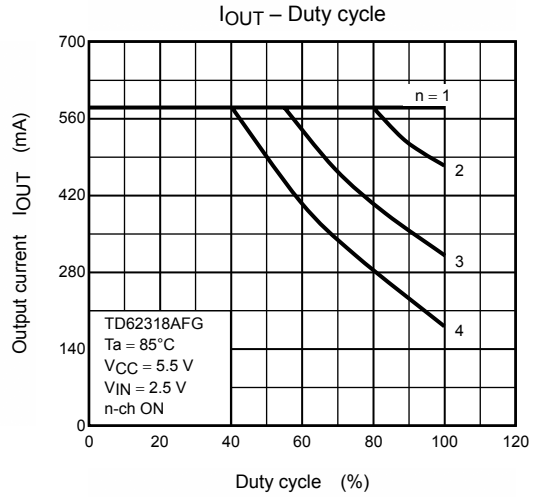


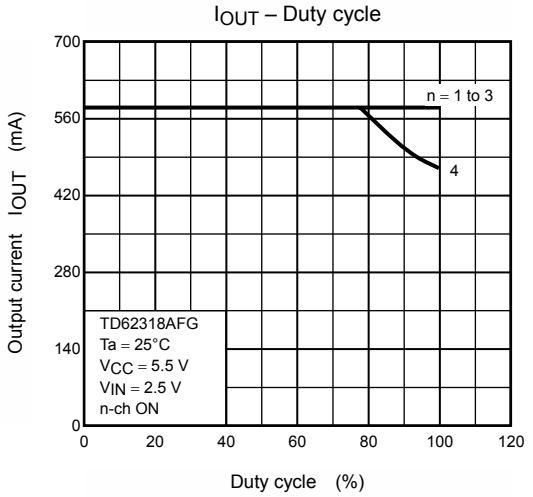
$P_D – Ta$




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 to 2
3
4
TD62318APG
Ta = 85°C
V_{CC} = 5.5 V
V_{IN} = 2.5 V
n-ch ON

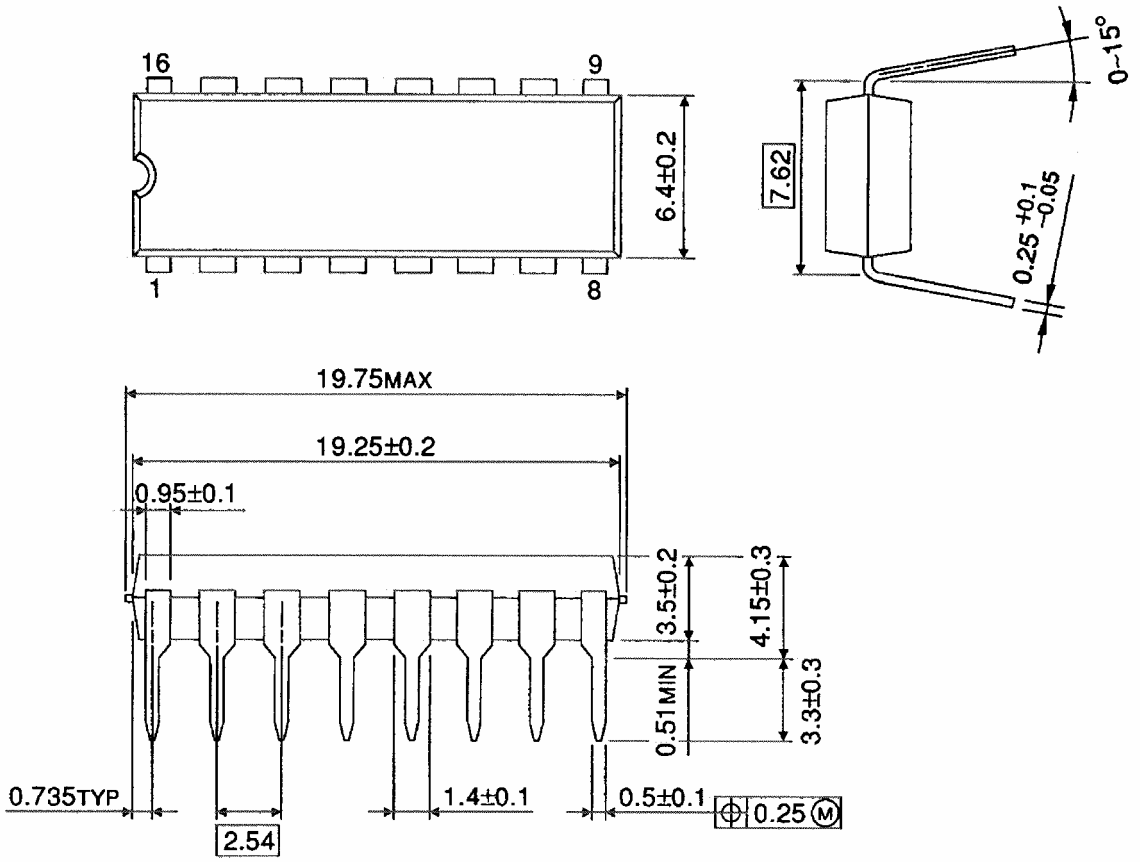

I_{OUT} – Duty cycle
Output current I_{OUT} (mA)
700
560
420
280
140
0
0 20 40 60 80 100 120
Duty cycle (%)
n = 1 to 4
TD62318APG
Ta = 25°C
V_{CC} = 5.5 V
V_{IN} = 2.5 V
n-ch ON


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
TD62318AFG
Ta = 85°C
V_{CC} = 5.5 V
V_{IN} = 2.5 V
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 to 3
4
TD62318AFG
Ta = 25°C
V_{CC} = 5.5 V
V_{IN} = 2.5 V
n-ch ON

Package Dimensions

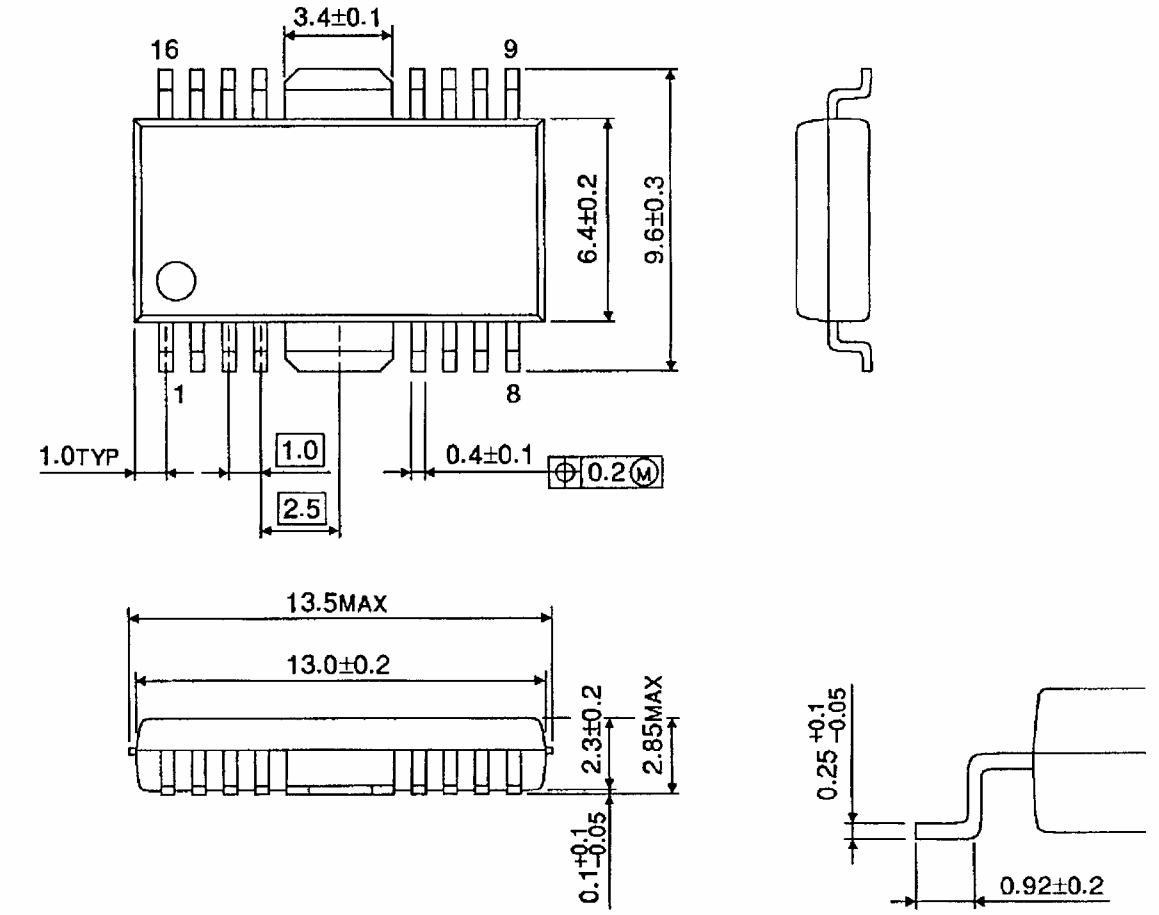
DIP16-P-300-2.54A Unit : mm



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 = 5 seconds
  - 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 = 5 seconds
  - the number of times = once
  - use of R-type flux

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