

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

TA7774P, TA7774F

STEPPING MOTOR DRIVER IC

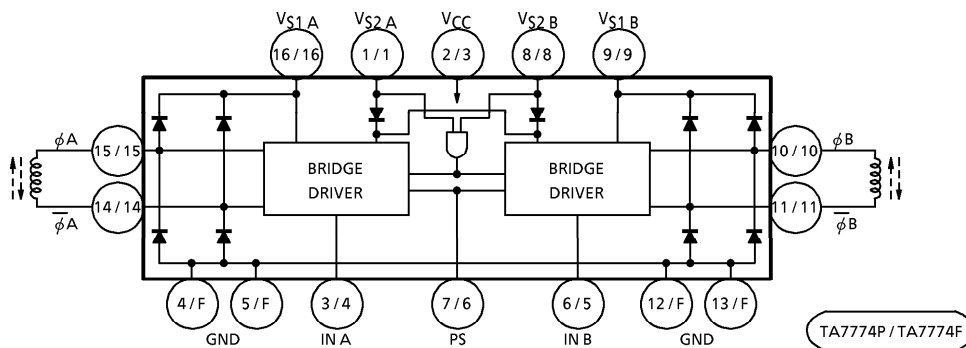
The TA7774P, TA7774F is 2 phase Bipolar stepping motor driver IC designed especially for 3.5 or 5.25 inches FDD head actuator drives.

It consists of TTL compatible input circuit, dual bridge driver outputs with flyback diodes, changing circuit of motor coil drive voltage (Power saving circuit) and stand-by circuit.

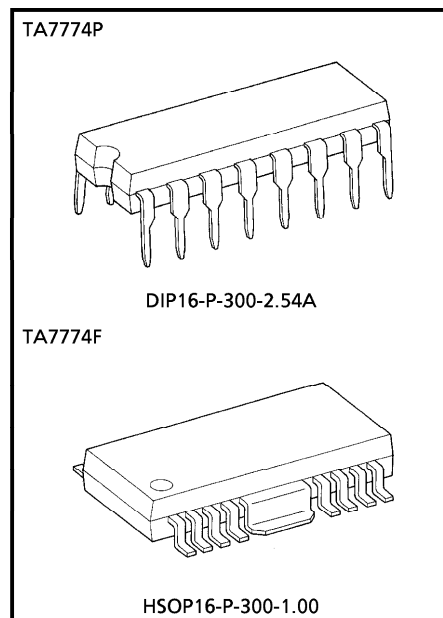
FEATURES

- One Chip 2 Phase Bipolar Stepping Motor Driver.
- Power Saving and Stand-by Operation are available.
I stand-by (I_{CC3}) ≤ 115 μA
- Build-in Punch Through Current Restriction Circuit for System Reliability and Noise Suppression.
- TTL Compatible Inputs
- Surface Mount is available with F Type.
- Output Current up to 0.4 A (peak)

BLOCK DIAGRAM



(Note) Pin ②, ⑦, ⑫, ⑬ of TA7774F are all NC and Heat Fin is connected to GND.



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

980910EBA2

● 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 the foreign exchange and foreign trade 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.

PIN FUNCTION

PIN No.	SYMBOL	FUNCTIONAL DESCRIPTION
1/(1)	V _{S2} A	Low-voltage power supply terminal
2/(3)	V _{CC}	Power voltage supply terminal for control
3/(4)	IN A	A-ch forward rotation /reverse rotation signal input terminal
4/(F)	GND	GND terminal
5/(F)	GND	GND terminal
6/(5)	IN B	B-ch forward rotation /reverse rotation signal input terminal
7/(6)	PS	Powersave signal input terminal
8/(8)	V _{S2} B	Stand-by signal input terminal
9/(9)	V _{S1} B	High-voltage power supply terminal
10/(10)	φ _B	Output B
11/(11)	φ _B [̄]	Output B [̄]
12/(F)	GND	GND terminal
13/(F)	GND	GND terminal
14/(14)	φ _A [̄]	Output A [̄]
15/(15)	φ _A	Output A
16/(16)	V _{S1} A	High-voltage power supply terminal.

() : TA7774F

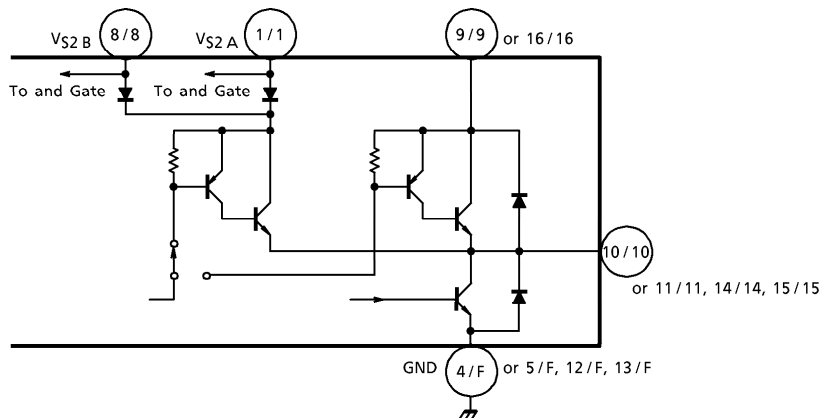
TRUTH TABLE 1

INPUT		OUTPUT		
PS	IN	φ	φ [̄]	
L	L	L	H	Enable V _{S1}
L	H	H	L	Enable V _{S1}
H	L	L	H	Enable V _{S2} (Power save)
H	H	H	L	Enable V _{S2} (Power save)

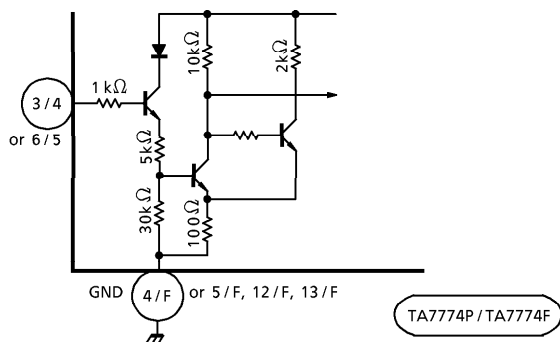
TRUTH TABLE 2

V _{S2} B	
L	Power Off (stand-by)
H	Operation

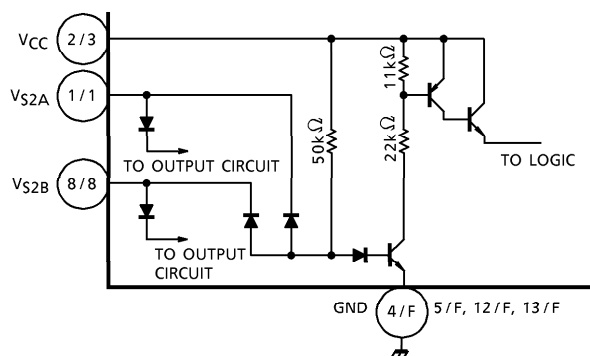
OUTPUT CIRCUIT



INPUT CIRCUIT IN A, IN B



INPUT CIRCUIT V_{S2} A or V_{S2} B

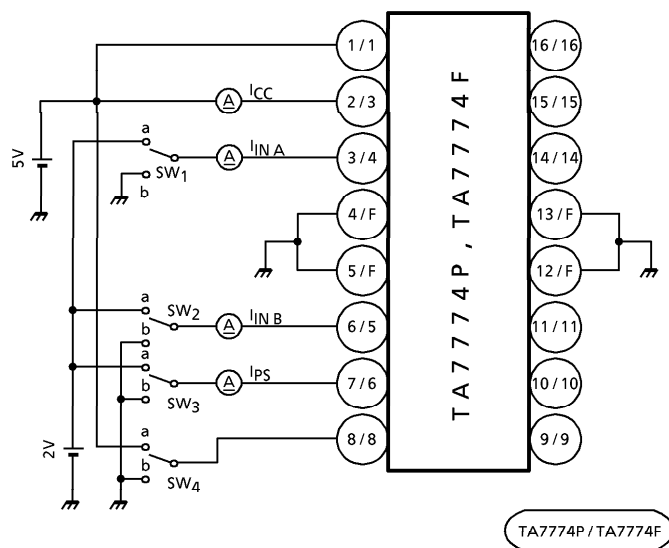


MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Supply Voltage		V _{CC}	7.0	V
		V _{S1}	17.0	
		V _{S2}	~V _{CC}	
Output Current		I _O (PEAK)	± 400	mA
		I _O (START)	± 350	
		I _O (HOLD)	± 100	
Input Voltage		V _{IN}	~V _{CC}	V
Power Dissipation	TA7774P	P _D	(Note 1) 1.4	W
			(Note 2) 2.7	
	TA7774F		(Note 3) 1.4	
Operating Temperature		T _{opr}	- 30~75	°C
Storage Temperature		T _{stg}	- 55~150	°C

- (Note 1) No heat sink
- (Note 2) This value is obtained by 50 × 50 × 0.8 mm PCB mounting occupied copper area in excess of 60%.
- (Note 3) This value is obtained by 60 × 30 × 1.6 mm PCB mounting occupied copper area in excess of 50%.

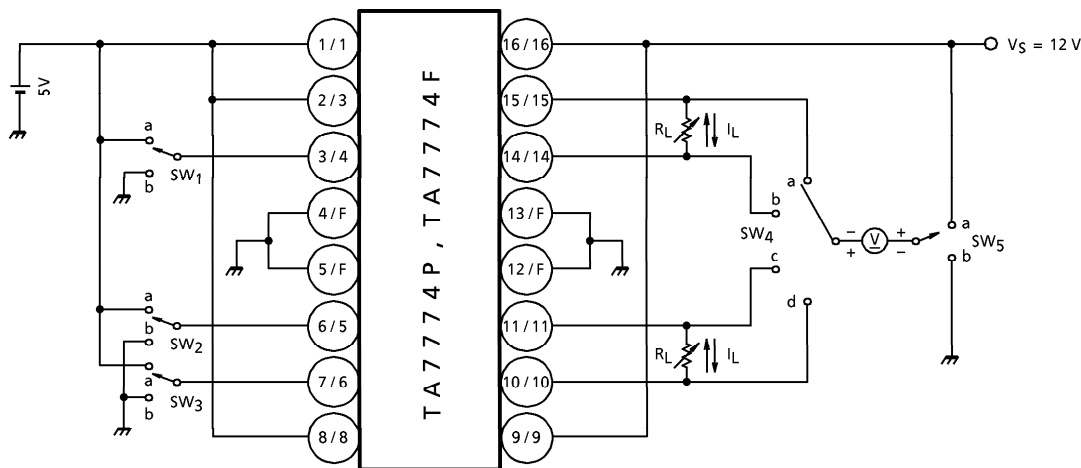
TEST CIRCUIT 1 I_{CC1} , I_{CC2} , I_{CC3} , $I_{IN A}$, $I_{IN B}$, I_{PS}



ITEM	SW ₁	SW ₂	SW ₃	SW ₄
I_{CC1}	b	b	a	a
I_{CC2}	b	b	b	a
I_{CC3}	b	b	—	b
$I_{IN A}$	a	—	—	a
$I_{IN B}$	—	a	—	a
I_{PS}	—	—	a	a

TA7774P/TA7774F

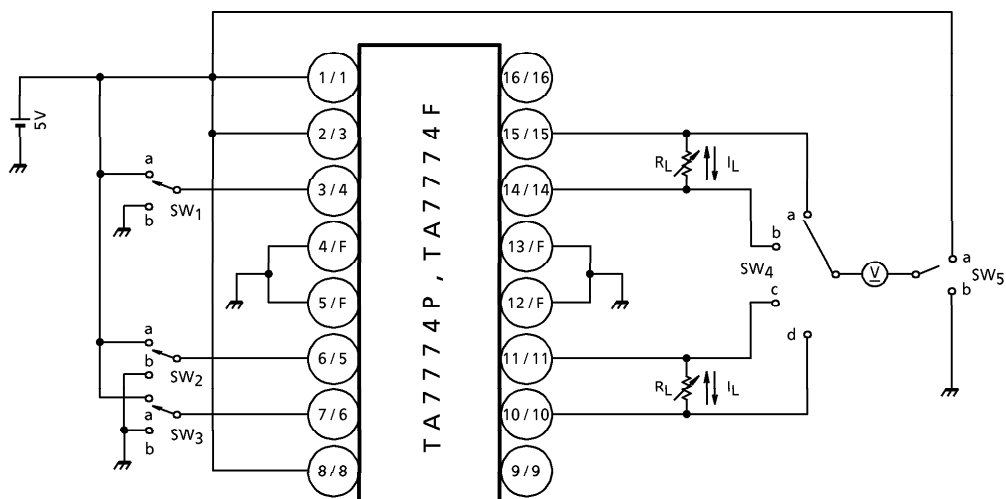
TEST CIRCUIT 2 $V_{SAT\ 1H1}$, $V_{SAT\ 1H2}$, $V_{SAT\ L2}$, $V_{SAT\ L3}$



(*) Calibrate I_L to 0.4/0.1 A by R_L .

ITEM	SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	I_L (mA)
$V_{SAT\ 1H1}$	a	—	b	a	a	100
	b	—		b		
	—	a		d		
	—	b		c		
$V_{SAT\ 1H2}$	a	—	b	a	a	400
	b	—		b		
	—	a		d		
	—	b		c		
$V_{SAT\ L2}$	a	—	—	b	b	100
	b	—		a		
	—	a		c		
	—	b		d		
$V_{SAT\ L3}$	a	—	b	b	b	400
	b	—		a		
	—	a		c		
	—	b		d		

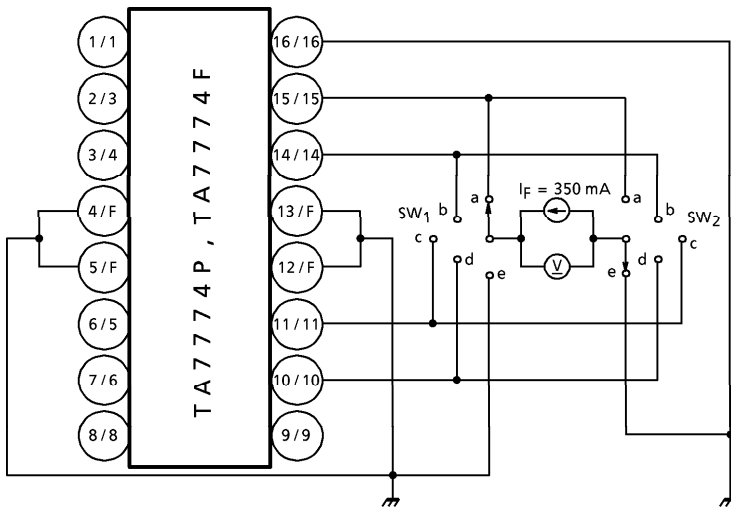
TEST CIRCUIT 3 $V_{SAT\ 2H1}$, $V_{SAT\ 2H2}$, $V_{SAT\ L1}$



(*) Calibrate I_L to 20 / 100 mA by R_L .

ITEM	SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	I_L (mA)
$V_{SAT\ 2H1}$	a	—	a	a	a	20
	b	—		b		
	—	a		c		
	—	b		d		
$V_{SAT\ 2H2}$	a	—	a	a	a	100
	b	—		b		
	—	a		c		
	—	b		d		
$V_{SAT\ L1}$	a	—	a	b	b	20
	b	—		a		
	—	a		c		
	—	b		d		

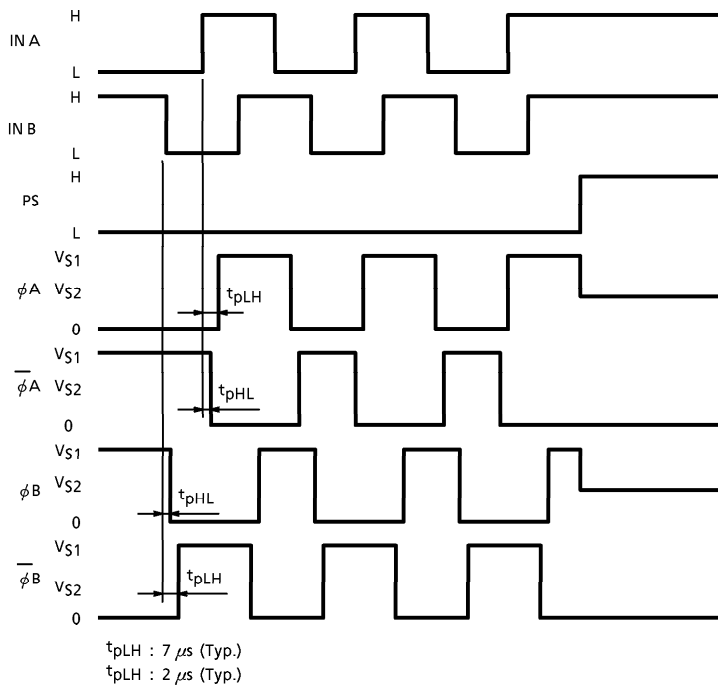
TEST CIRCUIT 4 V_{FU} , V_{FL}

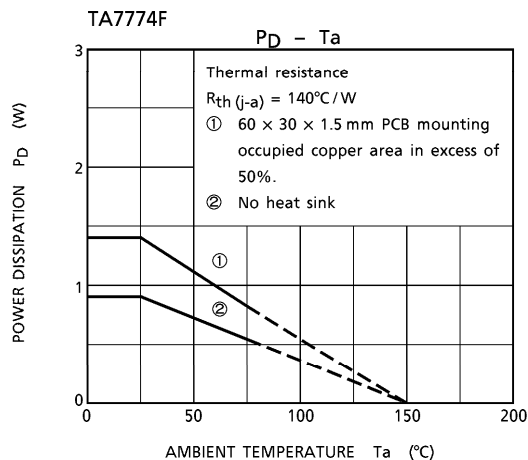
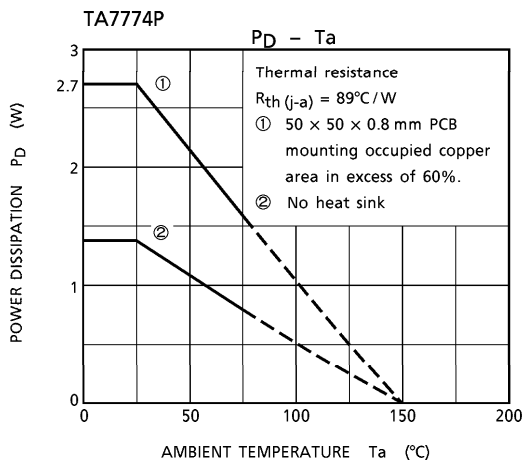


MEASURING METHOD

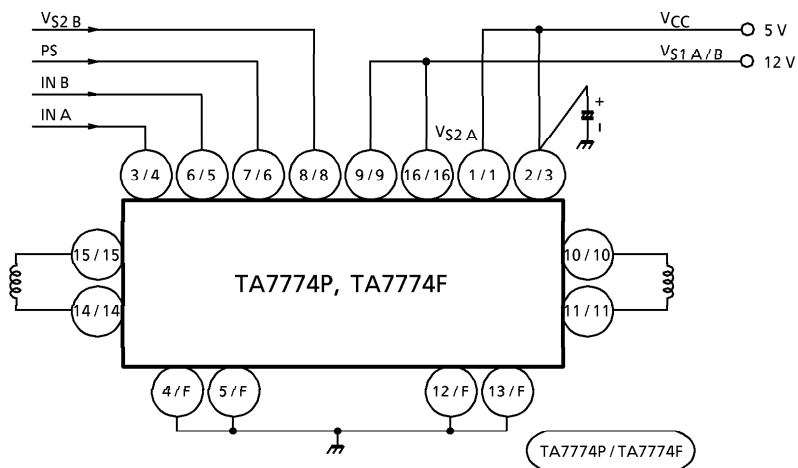
ITEM	SW ₁	SW ₂
V_{FU}	a	e
	b	
	c	
	d	
V_{FL}	e	a
		b
		c
		d

TIMING CHART (2 phase excitation)





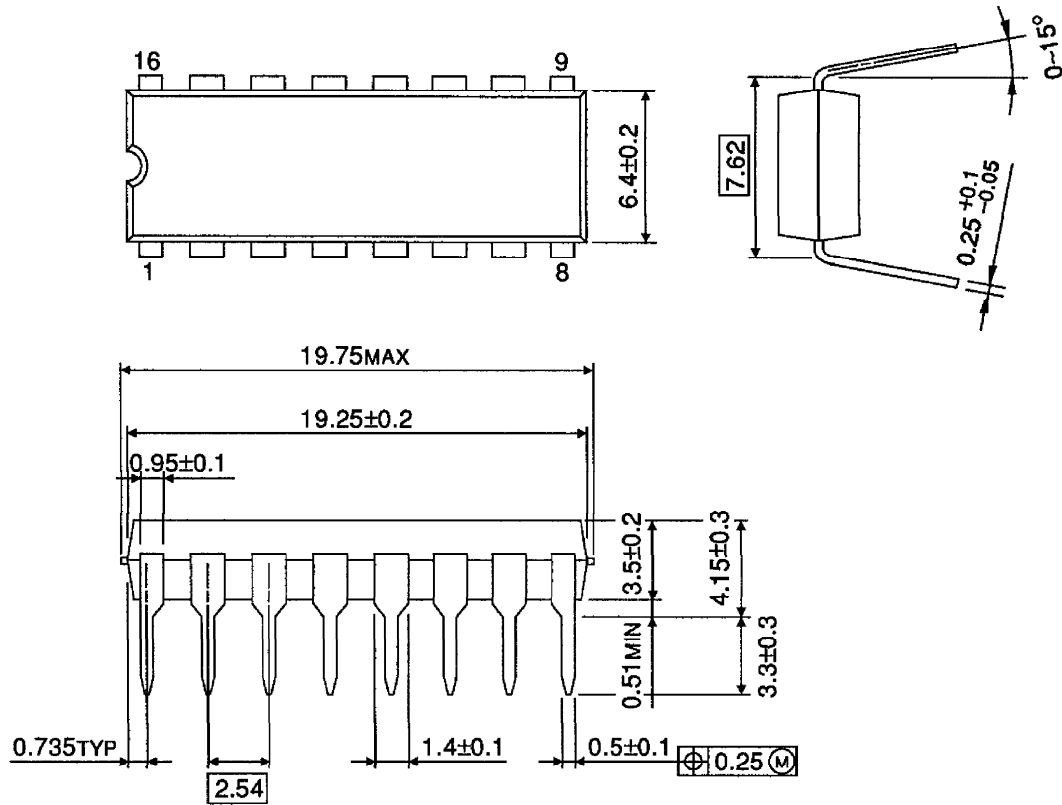
APPLICATION CIRCUIT



(Note) Utmost care is necessary in the design of the output line, V_S 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

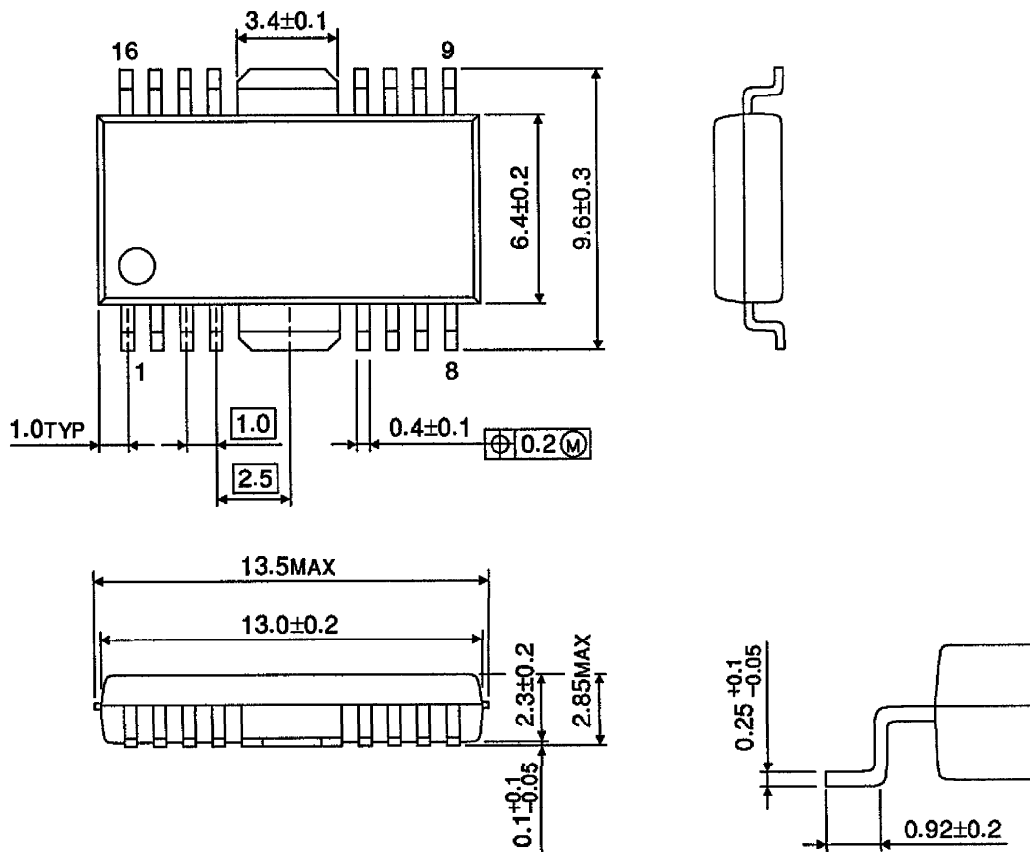
Unit : mm



Weight : 1.11 g (Typ.)

OUTLINE DRAWING
HSOP16-P-300-1.00

Unit : mm



Weight : 0.50 g (Typ.)