

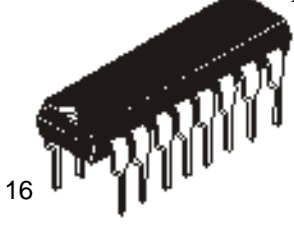
## 7channel sink type DMOS transistor array (compatible to TBD62003A&TBD62004A(TOS))

HT62003A series and HT62004A series are DMOS transistor array with 7 circuits. It has a clamp diode for switching inductive loads built-in in each output. Please be careful about thermal conditions during use.

### Features

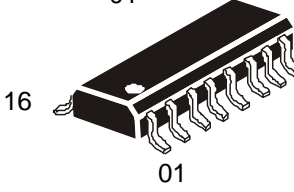
- 7 circuits built-in
- High voltage :  $V_{OUT} = 50\text{ V (MAX)}$
- High current :  $I_{OUT} = 500\text{ mA/ch (MAX)}$ 
  - Input voltage(output on) : HT62003A series 2.5 V (MIN)  
HT62004A series 7.0 V (MIN)
  - Input voltage(output off) : HT62003A series 0.6 V (MAX)  
HT62004A series 1.0 V (MAX)

Index N  
DIP-package



16  
01

Index R  
SOP-package



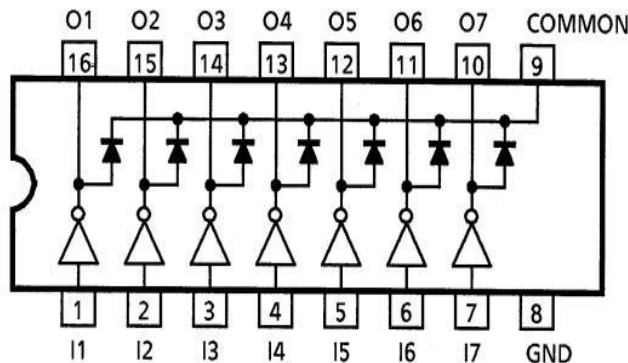
16  
01

**ORDERING INFORMATION**

HT62003ANZ	DIP16
HT62003ARZ	SOP16
HT62003ARSZ	SSOP16
HT62004ANZ	DIP16
HT62004ARZ	SOP16

$T_A = -40\text{ }^\circ\text{C to } 85\text{ }^\circ\text{C}$  for all packages

### Pin connection (top view)

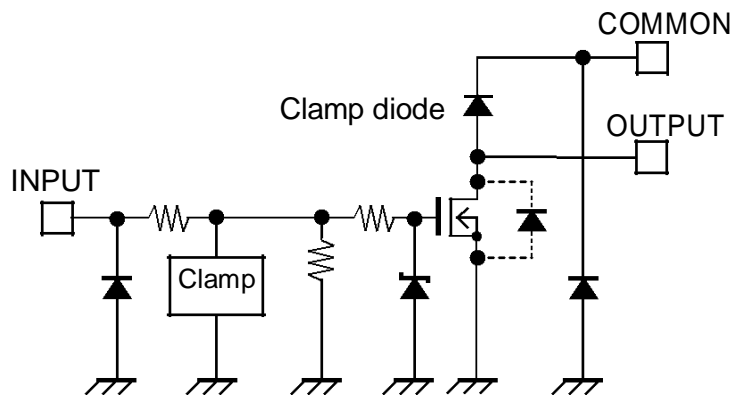


Pin connection may be simplified for explanatory purpose.

**Pin explanations**

Pin No.	Pin name	Function
1	I1	Input pin
2	I2	Input pin
3	I3	Input pin
4	I4	Input pin
5	I5	Input pin
6	I6	Input pin
7	I7	Input pin
8	GND	GND pin
9	COMMON	Common pin
10	O7	Output pin
11	O6	Output pin
12	O5	Output pin
13	O4	Output pin
14	O3	Output pin
15	O2	Output pin
16	O1	Output pin

**Equivalent circuit (each driver)**



Equivalent circuit may be simplified for explanatory purpose.

**Absolute Maximum Ratings (Ta = 25°C)**

Characteristics		Symbol	Rating	Unit
Output voltage		V <sub>OUT</sub>	50	V
COMMON pin voltage		V <sub>COM</sub>	-0.5 to 50	V
Output current		I <sub>OUT</sub>	500	mA/ch
Input voltage		V <sub>IN</sub>	-0.5 to 30	V
Clamp diode reverse voltage		V <sub>R</sub>	50	V
Clamp diode forward current		I <sub>F</sub>	500	mA
Power dissipation	PG (Note 1)	P <sub>D</sub>	1.47	W
	FG (Note 2)		0.625	
	FNG (Note 3)		0.78	
	FWG (Note 4)		1.25	
Operating temperature		T <sub>opr</sub>	-40 to 85	°C
Storage temperature		T <sub>stg</sub>	-55 to 150	°C

Note 1: Device alone. When Ta exceeds 25°C, it is necessary to do the derating with 11.8 mW/°C.

Note 2: On PCB (Size: 30 mm · 30 mm · 1.6 mm, Cu area: 50%, single-side glass epoxy).  
 When Ta exceeds 25°C, it is necessary to do the derating with 5 mW/°C.

Note 3: On PCB (Size: 50 mm · 50 mm · 1.6 mm, Cu area: 40%, single-side glass epoxy).  
 When Ta exceeds 25°C, it is necessary to do the derating with 6.24 mW/°C.

Note 4: On PCB (JEDEC 2s2p).

When Ta exceeds 25°C, it is necessary to do the derating with 10 mW/°C.

**Operating Ranges (Ta = -40 to 85°C)**

Characteristics		Symbol	Condition	Min	Typ.	Max	Unit	
Output voltage		V <sub>OUT</sub>	—	—	—	50	V	
COMMON pin voltage		V <sub>COM</sub>	—	0	—	50	V	
Output current	PG(Note 1)	I <sub>OUT</sub>	1 circuits ON, Ta = 25 °C		0	—	400	mA/ch
			t <sub>pw</sub> = 25 ms 7 circuits ON Ta = 85 °C T <sub>j</sub> = 120 °C	Duty = 10%	0	—	400	
				Duty = 50%	0	—	190	
			FG(Note 2)	1 circuits ON, Ta = 25 °C		0	—	
	t <sub>pw</sub> = 25 ms 7 circuits ON Ta = 85 °C T <sub>j</sub> = 120 °C			Duty = 10%	0	—	270	
				Duty = 50%	0	—	120	
	FNG(Note 3)			1 circuits ON, Ta = 25 °C		0	—	
			t <sub>pw</sub> = 25 ms 7 circuits ON Ta = 85 °C T <sub>j</sub> = 120 °C	Duty = 10%	0	—	300	
		Duty = 50%		0	—	130		
		FWG(Note 4)	1 circuits ON, Ta = 25 °C		0	—	400	
	t <sub>pw</sub> = 25 ms 7 circuits ON Ta = 85 °C T <sub>j</sub> = 120 °C		Duty = 10%	0	—	390		
			Duty = 50%	0	—	170		
Input voltage (Output on)	HT62003A series		V <sub>IN</sub> (ON)	I <sub>OUT</sub> = 100 mA or upper, V <sub>OUT</sub> = 2 V	2.5	—	25	V
	HT62004A series	I <sub>OUT</sub> = 100 mA or upper, V <sub>OUT</sub> = 2 V		7.0	—	25		
Input voltage (Output off)	HT62003A series	V <sub>IN</sub> (OFF)	I <sub>OUT</sub> = 100 μA or less, V <sub>OUT</sub> = 2 V	0	—	0.6	V	
	HT62004A series		I <sub>OUT</sub> = 100 μA or less, V <sub>OUT</sub> = 2 V	0	—	1.0		
Clamp diode forward current		I <sub>F</sub>	—	—	—	400	mA	

Note 1: Device alone.

Note 2: On PCB (Size: 30 mm · 30 mm · 1.6 mm, Cu area: 50%, single-side glass epoxy).

Note 3: On PCB (Size: 50 mm · 50 mm · 1.6 mm, Cu area: 40%, single-side glass epoxy).

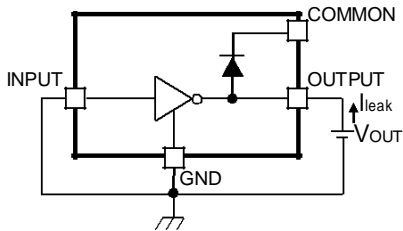
Note 4: On PCB (JEDEC 2s2p).

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

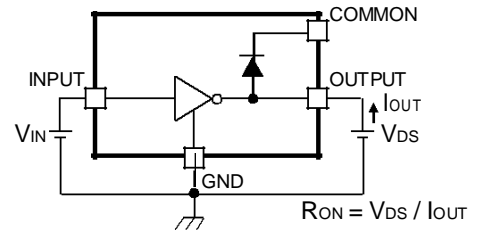
Characteristics	Symbol	Test Circuit	Condition	Min	Typ.	Max	Unit	
Output leakage current	I <sub>leak</sub>	1	V <sub>OUT</sub> = 50V, Ta = 85 °C V <sub>IN</sub> = 0 V	—	—	1.0	μA	
Output voltage (Output <small>ON-resistance</small> )	HT62003A series	V <sub>DS</sub> (R <sub>ON</sub> )	2	I <sub>OUT</sub> = 350 mA, V <sub>IN</sub> = 5.0V	—	0.7 (2.0)	1.14 (3.25)	V (Ω)
				I <sub>OUT</sub> = 200 mA, V <sub>IN</sub> = 5.0V	—	0.4 (2.0)	0.65 (3.25)	
				I <sub>OUT</sub> = 100 mA, V <sub>IN</sub> = 5.0V	—	0.2 (2.0)	0.325 (3.25)	
	HT62004A series			I <sub>OUT</sub> = 350 mA, V <sub>IN</sub> = 7.0V	—	0.7 (2.0)	1.14 (3.25)	
				I <sub>OUT</sub> = 200 mA, V <sub>IN</sub> = 7.0V	—	0.4 (2.0)	0.65 (3.25)	
				I <sub>OUT</sub> = 100 mA, V <sub>IN</sub> = 7.0V	—	0.2 (2.0)	0.325 (3.25)	
Input current (Output on)	HT62003A series	I <sub>IN</sub> (ON)	3	V <sub>IN</sub> = 2.5 V	—	—	0.1	mA
	HT62004A series			V <sub>IN</sub> = 7.0 V	—	—	0.5	
Input current (Output off)	I <sub>IN</sub> (OFF)	4	V <sub>IN</sub> = 0 V, Ta = 85 °C	—	—	1.0	μA	
Input voltage (Output on)	HT62003A series	V <sub>IN</sub> (ON)	5	I <sub>OUT</sub> = 100 mA, V <sub>OUT</sub> = 2 V	—	—	2.5	V
	HT62004A series				—	—	7.0	
Clamp diode reverse current	I <sub>R</sub>	6	V <sub>R</sub> = 50 V, Ta = 85 °C	—	—	1.0	μA	
Clamp diode forward voltage	V <sub>F</sub>	7	I <sub>F</sub> = 350 mA	—	—	2.0	V	
Turn-on delay	t <sub>ON</sub>	8	V <sub>OUT</sub> = 50 V R <sub>L</sub> = 125 Ω C <sub>L</sub> = 15 pF	—	0.4	—	μs	
Turn-off delay	t <sub>OFF</sub>			—	0.8	—		

**Test circuit**

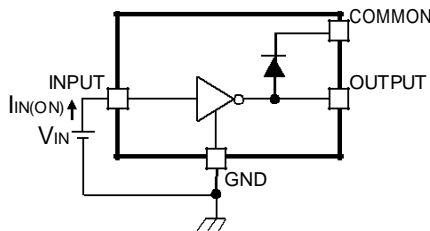
**1. I<sub>leak</sub>**



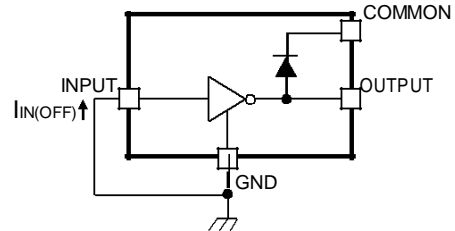
**2. V<sub>DS</sub> (R<sub>ON</sub>)**



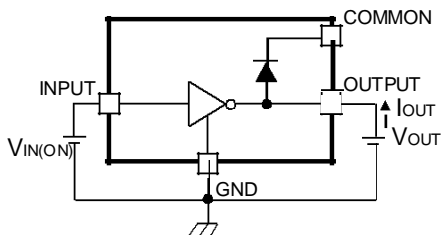
**3. I<sub>IN</sub> (ON)**



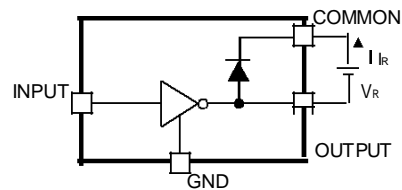
**4. I<sub>IN</sub> (OFF)**



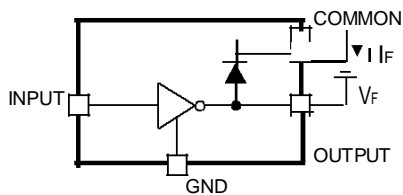
**5. V<sub>IN</sub> (ON)**



**6. I<sub>r</sub>**

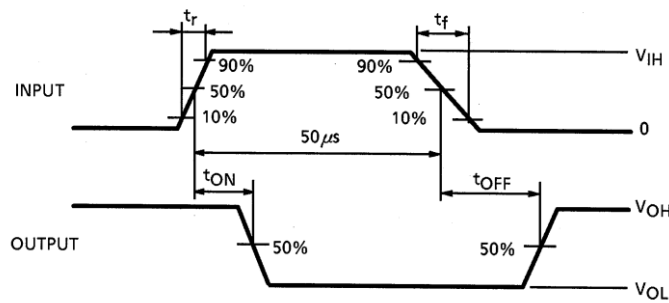
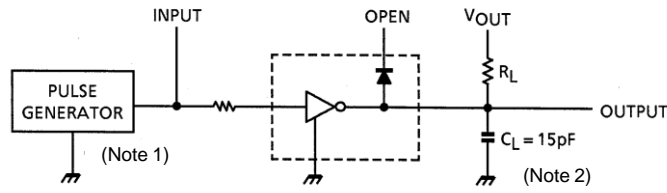


**7. V<sub>F</sub>**



Test circuit may be simplified for explanatory purpose.

**8.  $t_{ON}$ ,  $t_{OFF}$**



Note 1: Pulse width 50  $\mu$ s, Duty cycle 10%

Output impedance 50  $\Omega$ ,  $t_r \leq 5$  ns,  $t_f \leq 10$  ns  
Please refer to the following table for the  $V_{IH}$  condition.

Product	$V_{IH}$
HT62003A series	5.0 V
HT62004A series	7.0 V

Note 2:  $C_L$  includes the probe and the test board capacitance.

Test circuit and timing chart may be simplified for explanatory purpose.

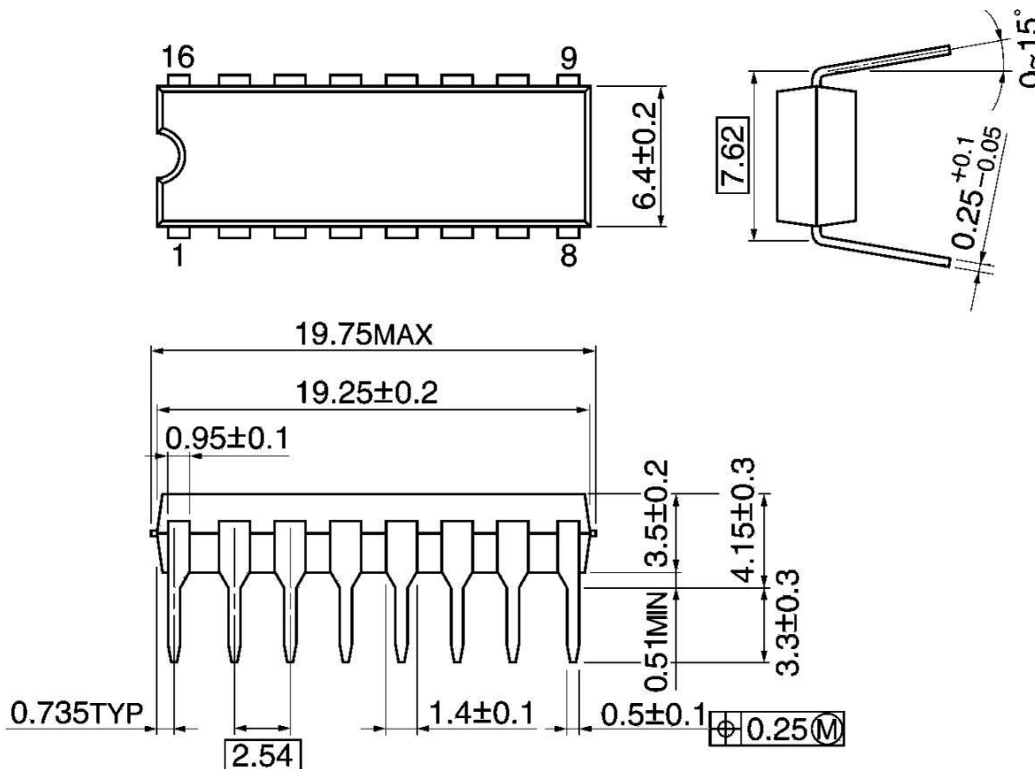
**Precautions for Using**

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

**Package Dimensions**

DIP16-P-300-2.54A

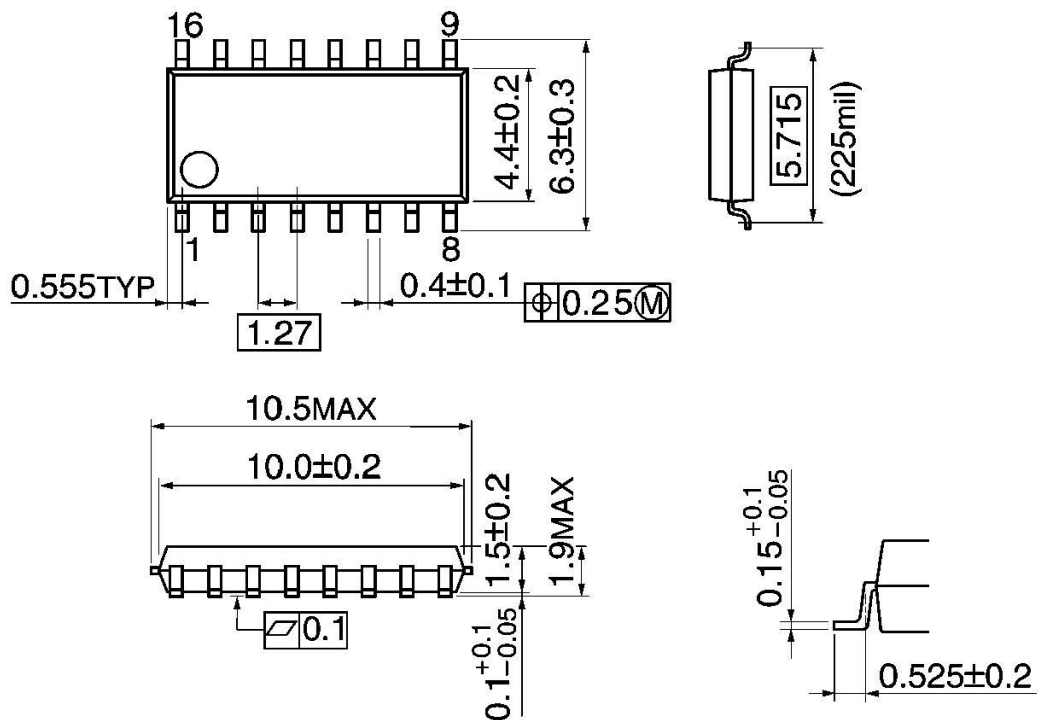
Unit: mm



Weight: 1.11 g (Typ.)

SOP16-P-225-1.27

Unit: mm

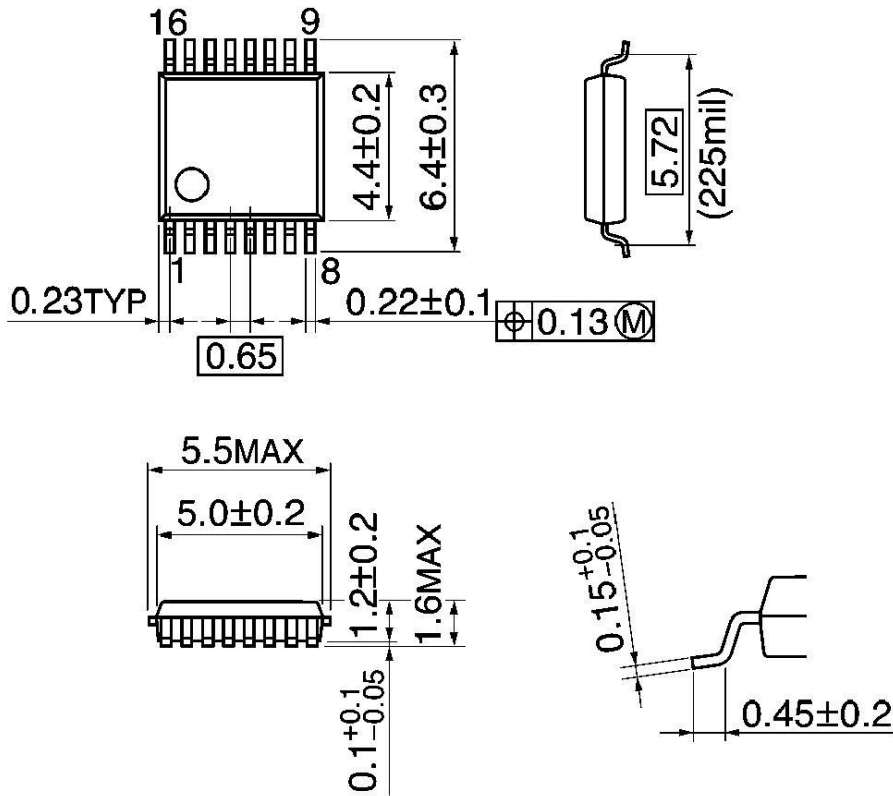


Weight: 0.16 g (Typ.)



SSOP16-P-225-0.65B

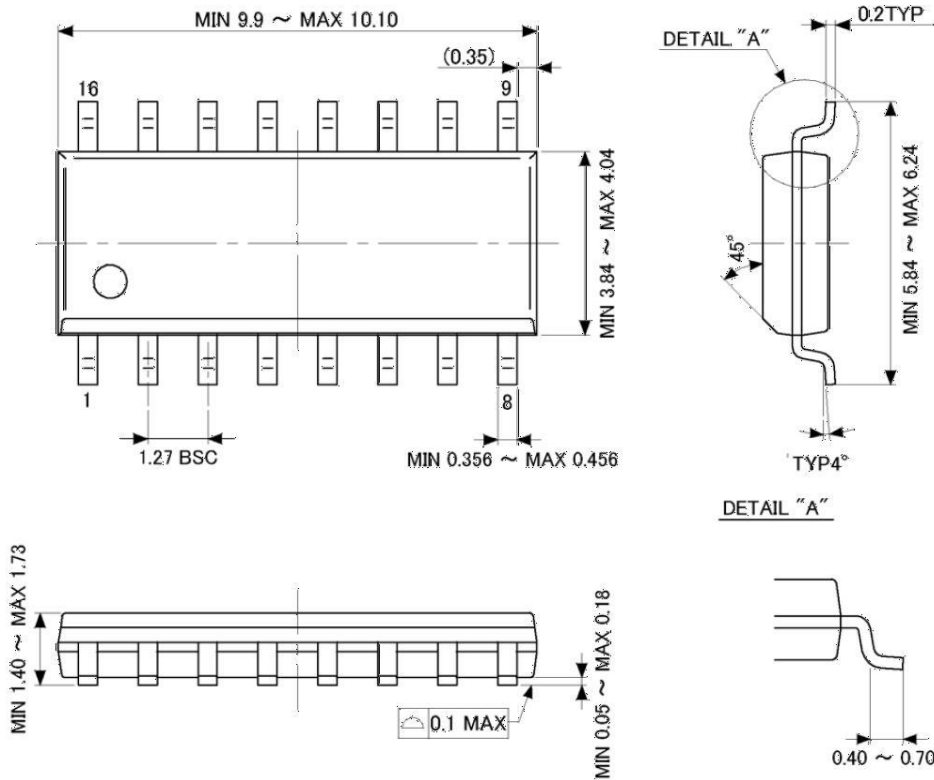
Unit: mm



Weight: 0.07 g (Typ.)

P-SOP16-0410-1.27-002

Unit: mm



Weight: 0.15 g (Typ.)