

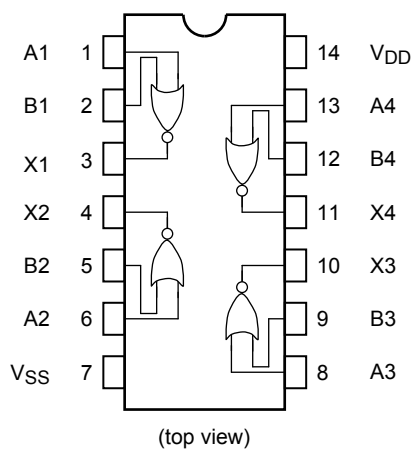
TC4001BP, TC4001BF, TC4001BFN, TC4001BFT

TC4001B Quad 2 Input NOR Gate

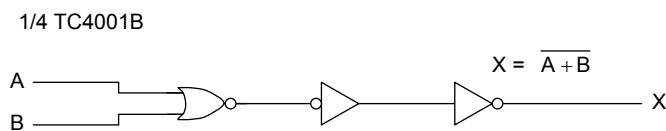
The TC4001B is 2-input positive NOR gate, respectively.

Since the outputs of these gates are equipped with the buffers, the input/output transmission characteristics have been improved and the variation of transmission time due to an increase in the load capacity is kept minimum.

Pin Assignment



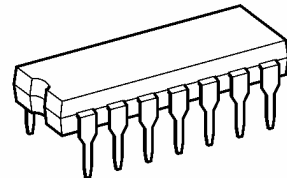
Logic Diagram



Weight	
DIP14-P-300-2.54	: 0.96 g (typ.)
SOP14-P-300-1.27A	: 0.18 g (typ.)
SOP14-P-300-1.27	: 0.18 g (typ.)
SOL14-P-150-1.27	: 0.12 g (typ.)
TSSOP14-P-0044-0.65A	: 0.06 g (typ.)

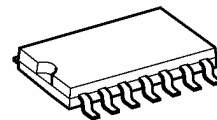
Note: xxxFN (JEDEC SOP) is not available in Japan.

TC4001BP

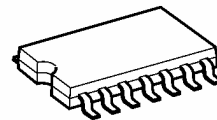


DIP14-P-300-2.54

TC4001BF

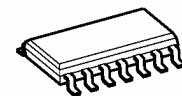


SOP14-P-300-1.27A



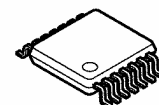
SOP14-P-300-1.27

TC4001BFT



SOL14-P-150-1.27

TC4001BFT



TSSOP14-P-0044-0.65A

Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
DC supply voltage	V_{DD}	$V_{SS} - 0.5$ to $V_{SS} + 20$	V
Input voltage	V_{IN}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
Output voltage	V_{OUT}	$V_{SS} - 0.5$ to $V_{DD} + 0.5$	V
DC input current	I_{IN}	± 10	mA
Power dissipation	P_D	300 (DIP)/180 (SOIC)	mW
Operating temperature range	T_{opr}	-40 to 85	°C
Storage temperature range	T_{stg}	-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Recommended Operating Conditions ($V_{SS} = 0$ V) (Note)

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
DC supply voltage	V_{DD}	—	3	—	18	V
Input voltage	V_{IN}	—	0	—	V_{DD}	V

Note: The recommended operating conditions are required to ensure the normal operation of the device. Unused inputs must be tied to either VCC or GND.

Static Electrical Characteristics (V_{SS} = 0 V)

Characteristics		Symbol	Test Condition	V _{DD} (V)	-40°C		25°C			85°C		Unit
					Min	Max	Min	Typ.	Max	Min	Max	
High-level output voltage		V _{OH}	I _{OUT} < 1 µA V _{IN} = V _{SS} , V _{DD}	5	4.95	—	4.95	5.00	—	4.95	—	V
				10	9.95	—	9.95	10.00	—	9.95	—	
				15	14.95	—	14.95	15.00	—	14.95	—	
Low-level output voltage		V _{OL}	I _{OUT} < 1 µA V _{IN} = V _{SS} , V _{DD}	5	—	0.05	—	0.00	0.05	—	0.05	V
				10	—	0.05	—	0.00	0.05	—	0.05	
				15	—	0.05	—	0.00	0.05	—	0.05	
Output high current		I _{OH}	V _{OH} = 4.6 V	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA
			V _{OH} = 2.5 V	5	-2.50	—	-2.10	-4.0	—	-1.70	—	
			V _{OH} = 9.5 V	10	-1.50	—	-1.30	-2.2	—	-1.10	—	
			V _{OH} = 13.5 V	15	-4.00	—	-3.40	-9.0	—	-2.80	—	
			V _{IN} = V _{SS}									
Output low current		I _{OL}	V _{OL} = 0.4 V	5	0.61	—	0.51	1.2	—	0.42	—	mA
			V _{OL} = 0.5 V	10	1.50	—	1.30	3.2	—	1.10	—	
			V _{OL} = 1.5 V	15	4.00	—	3.40	12.0	—	2.80	—	
			V _{IN} = V _{SS} , V _{DD}									
Input high voltage		V _{IH}	V _{OUT} = 0.5 V	5	3.5	—	3.5	2.75	—	3.5	—	V
			V _{OUT} = 1.0 V	10	7.0	—	7.0	5.50	—	7.0	—	
			V _{OUT} = 1.5 V	15	11.0	—	11.0	8.25	—	11.0	—	
			I _{OUT} < 1 µA									
Input low voltage		V _{IL}	V _{OUT} = 4.5 V	5	—	1.5	—	2.25	1.5	—	1.5	V
			V _{OUT} = 9.0 V	10	—	3.0	—	4.50	3.0	—	3.0	
			V _{OUT} = 13.5 V	15	—	4.0	—	6.75	4.0	—	4.0	
			I _{OUT} < 1 µA									
Input current	"H" level	I _{IH}	V _{IH} = 18 V	18	—	0.1	—	10 ⁻⁵	0.1	—	1.0	µA
	"L" level	I _{IL}	V _{IL} = 0 V	18	—	-0.1	—	-10 ⁻⁵	-0.1	—	-1.0	
Quiescent supply current		I _{DD}	V _{IN} = V _{SS} , V _{DD} (Note)	5	—	0.25	—	0.001	0.25	—	7.5	µA
				10	—	0.50	—	0.001	0.50	—	15.0	
				15	—	1.00	—	0.002	1.00	—	30.0	

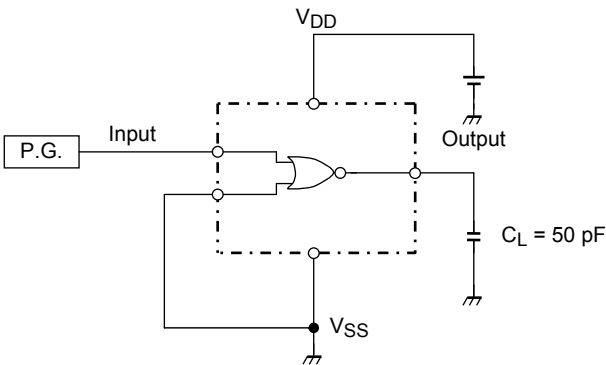
Note: All valid input combinations.

Dynamic Electrical Characteristics (Ta = 25°C, VSS = 0 V, CL = 50 pF)

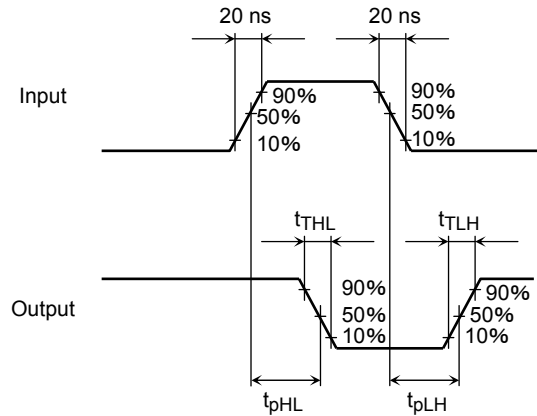
Characteristics	Symbol	Test Condition		Min	Typ.	Max	Unit
			VDD (V)				
Output transition time	t _{TLH}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output transition time	t _{THL}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Propagation delay time	t _{pLH}	—	5	—	65	200	ns
			10	—	30	100	
			15	—	25	80	
Propagation delay time	t _{pHL}	—	5	—	65	200	ns
			10	—	30	100	
			15	—	25	80	
Input capacitance	C _{IN}	—	—	—	5	7.5	pF

Circuit and Waveform for Measurement of Dynamic Characteristics

Circuit



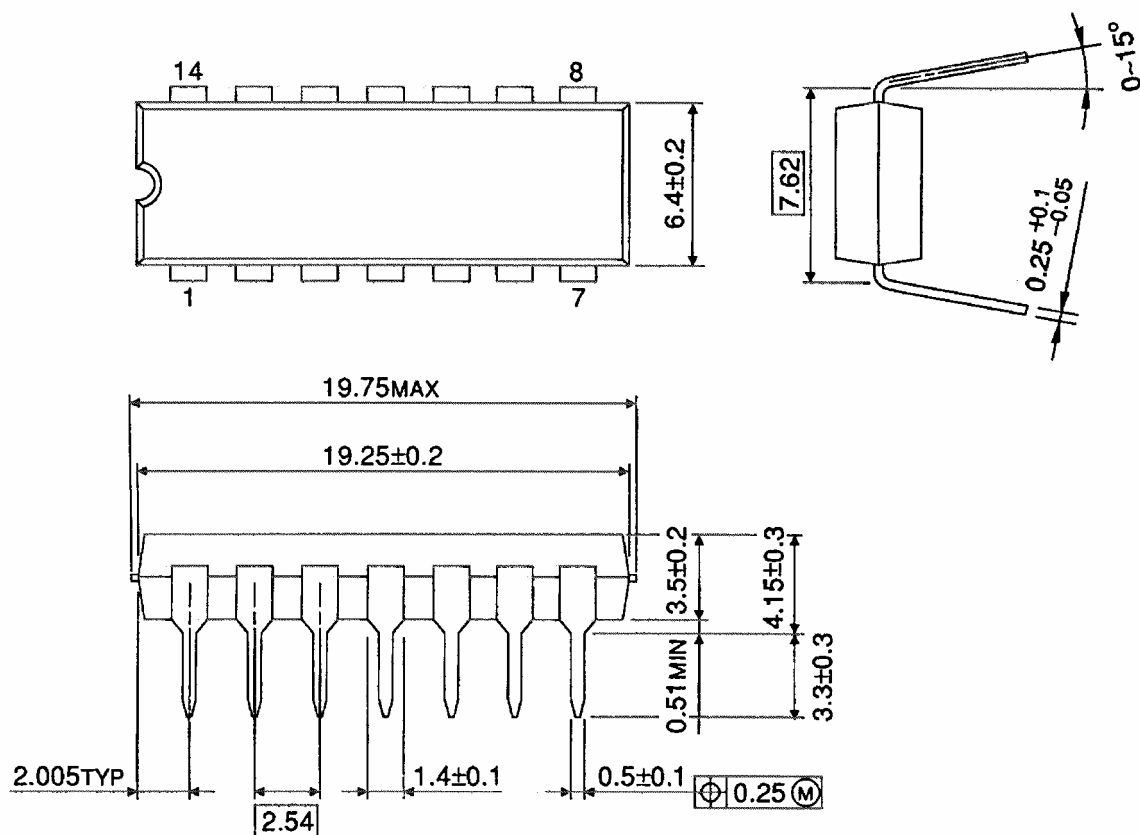
Waveform



Package Dimensions

DIP14-P-300-2.54

Unit : mm

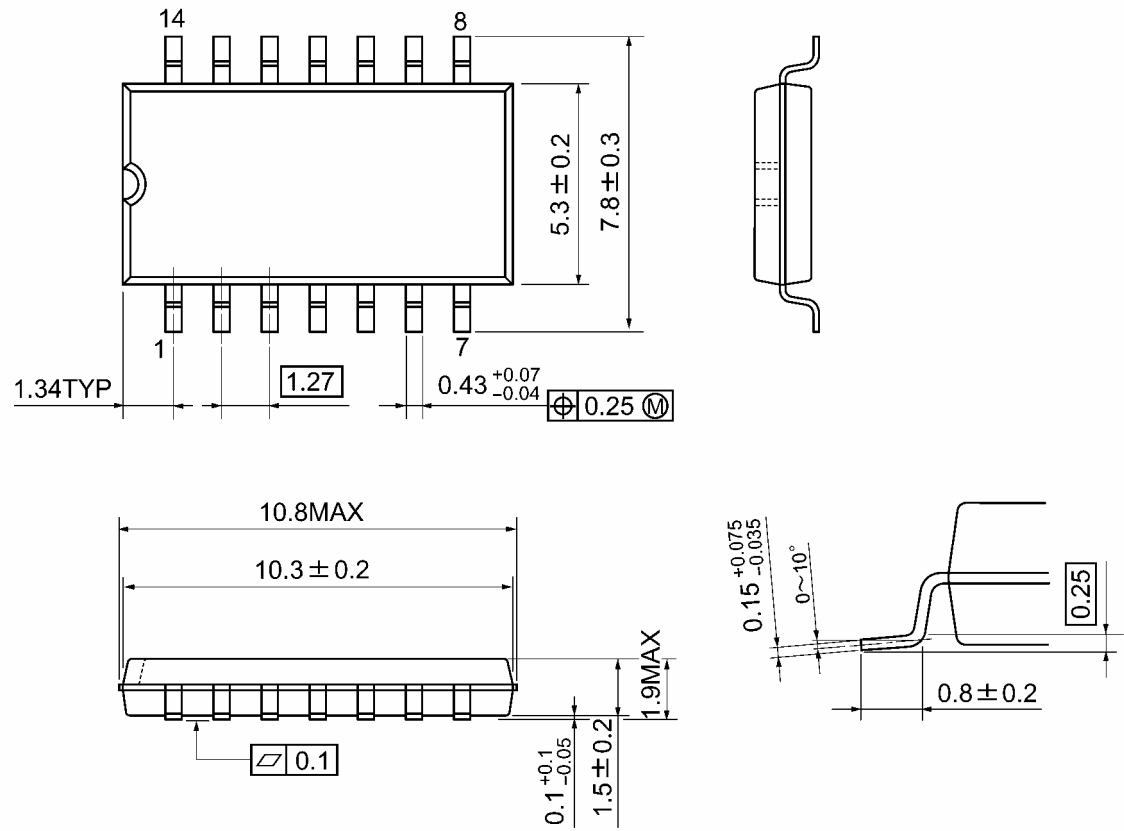


Weight: 0.96 g (typ.)

Package Dimensions

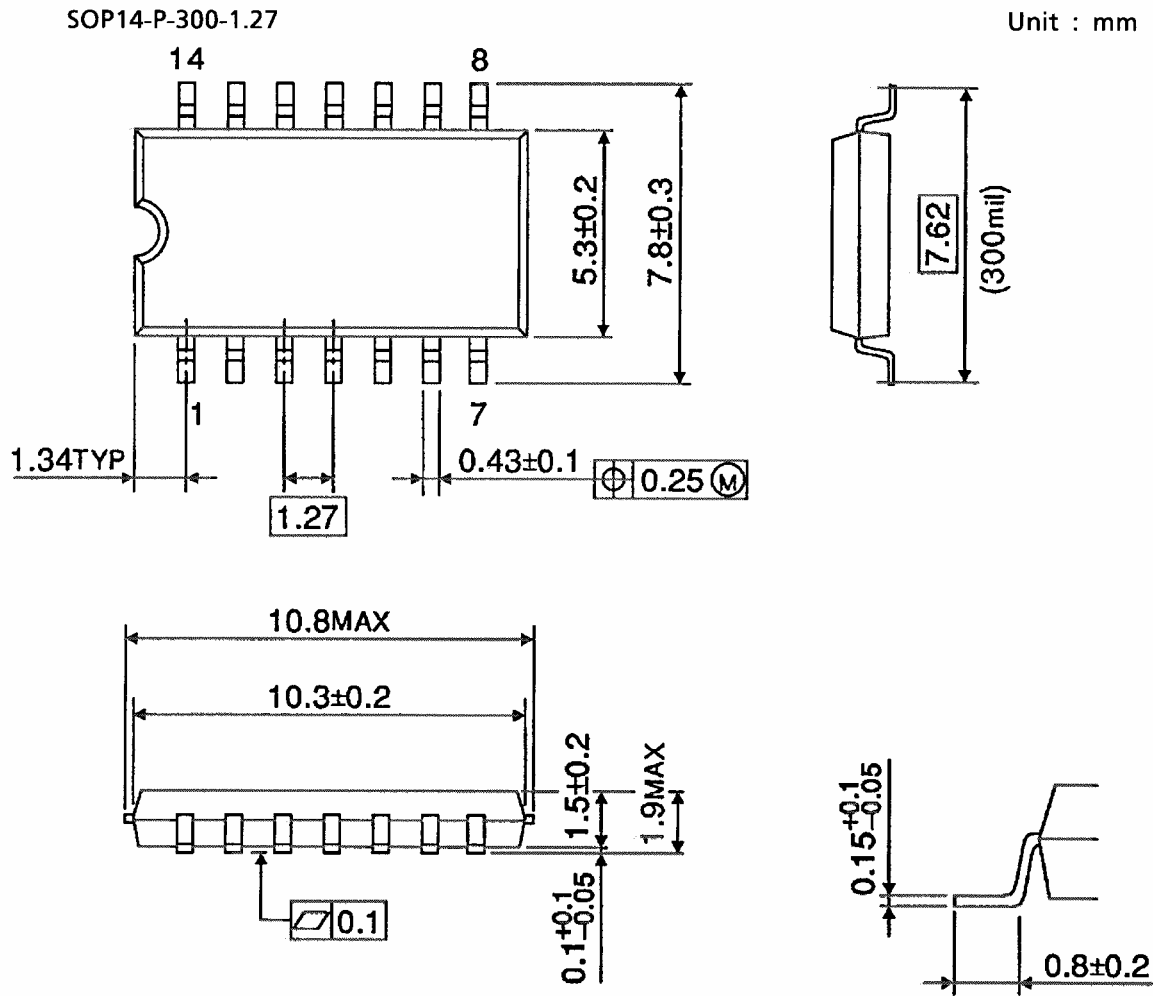
SOP14-P-300-1.27A

Unit: mm



Weight: 0.18 g (typ.)

Package Dimensions

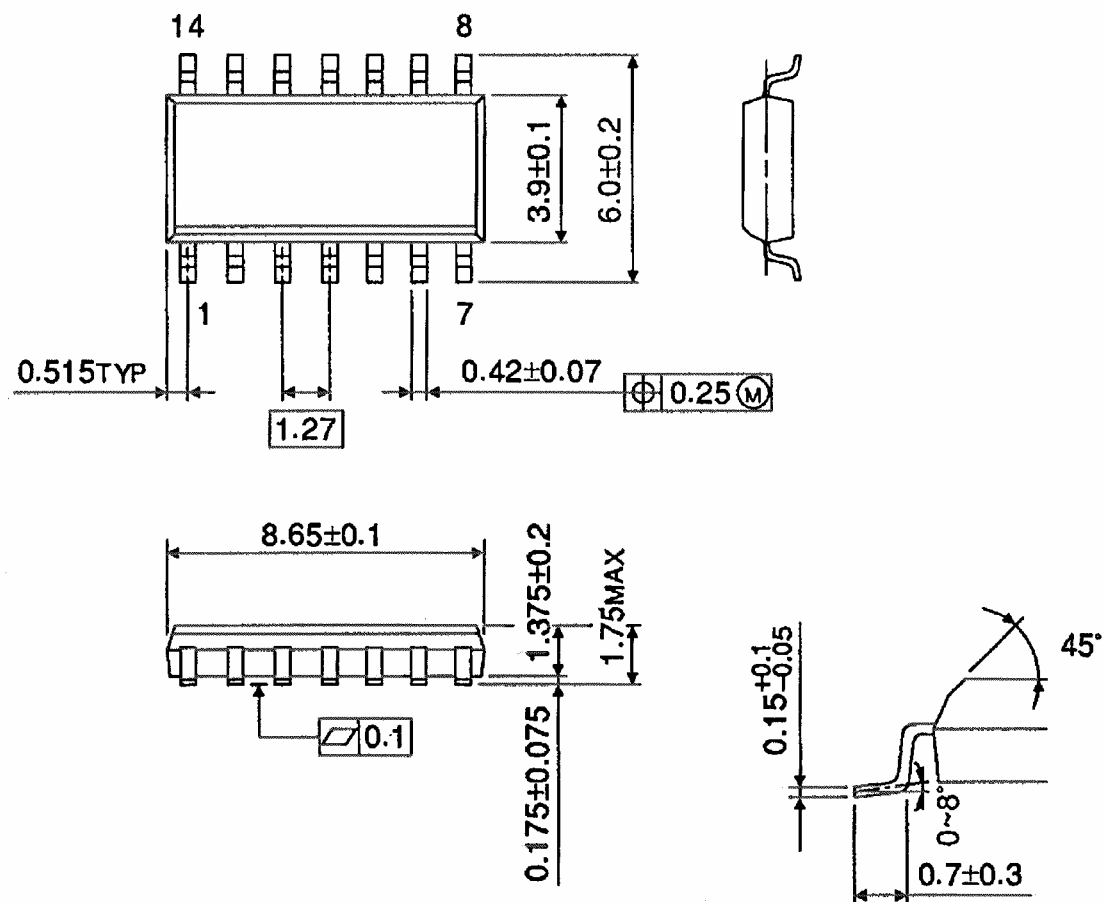


Weight: 0.18 g (typ.)

Package Dimensions (Note)

SOL14-P-150-1.27

Unit : mm



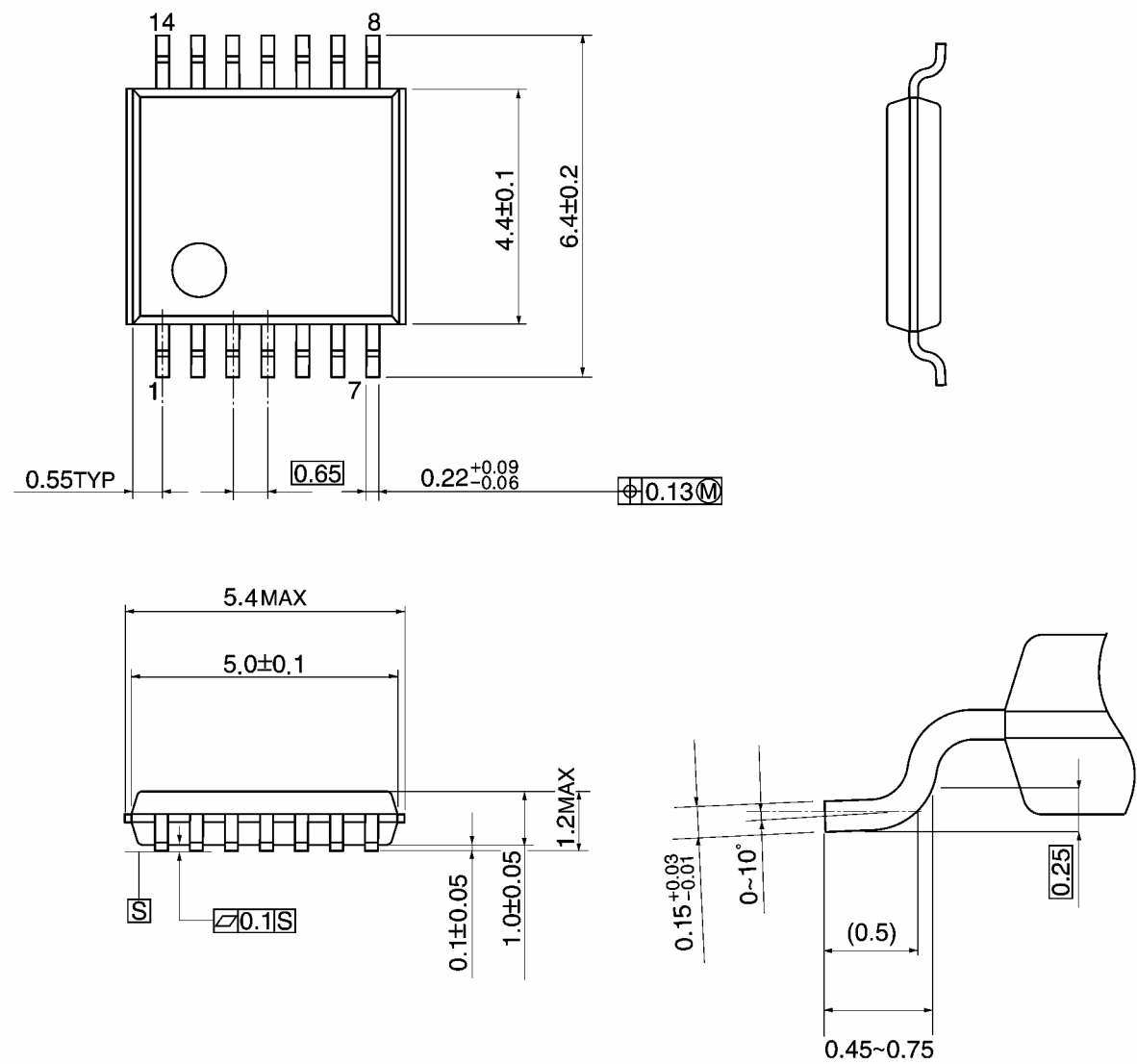
Note: This package is not available in Japan.

Weight: 0.12 g (typ.)

Package Dimensions

TSSOP14-P-0044-0.65A

Unit: mm



Weight: 0.06 g (typ.)

Note: Lead (Pb)-Free Packages**DIP14-P-300-2.54 SOP14-P-300-1.27A SOL14-P-150-1.27 TSSOP14-P-0044-0.65A****RESTRICTIONS ON PRODUCT USE**

20070701-EN

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