

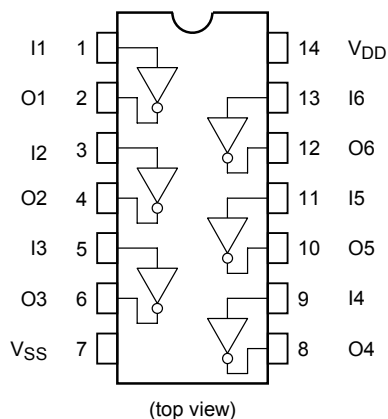
TC4069UBP,TC4069UBF,TC4069UBFN,TC4069UBFT

TC4069UB Hex Inverter

TC4069UB contains six circuits of inverters. Since the internal circuit is composed of a single stage inverter, this is suitable for the applications of CR oscillator circuits, crystal oscillator circuits and linear amplifiers in addition to its application as inverters.

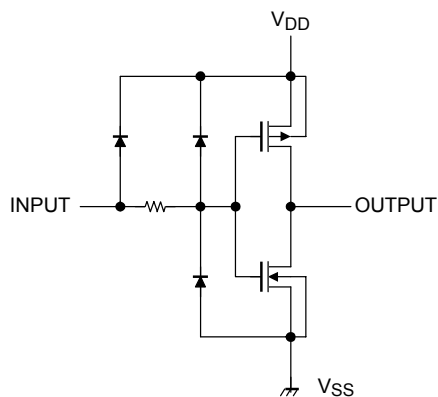
Because of one stage gate configuration, the propagation time has been reduced.

Pin Assignment



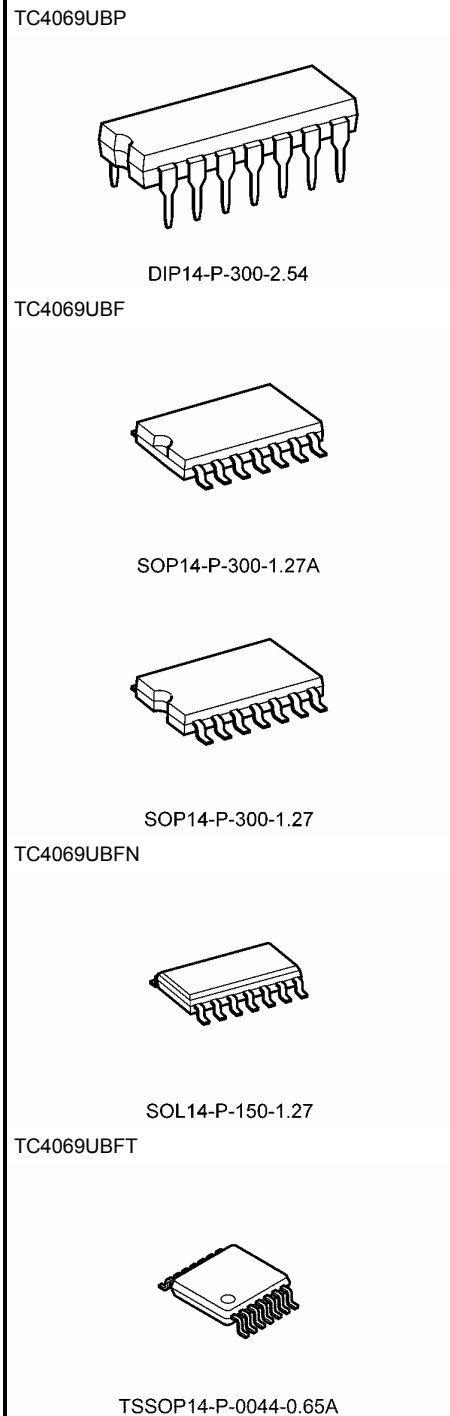
Circuit Diagram

1/6 TC4069UB



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.



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 ($V_{SS} = 0 \text{ V}$)

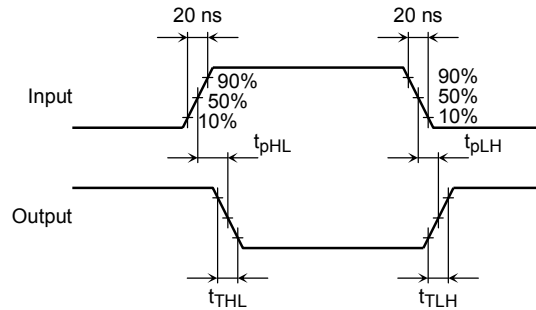
Characteristics		Symbol	Test Condition	V_{DD} (V)	-40°C		25°C			85°C		Unit
					Min	Max	Min	Typ.	Max	Min	Max	
High-level output voltage		V_{OH}	$ I_{OUT} < 1 \mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	5	4.95	—	4.95	5.00	—	4.95	—	V
				10	9.95	—	9.95	10.00	—	9.95	—	
				15	14.95	—	14.95	15.00	—	14.95	—	
Low-level output voltage		V_{OL}	$ I_{OUT} < 1 \mu\text{A}$ $V_{IN} = V_{SS}, V_{DD}$	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}	$V_{OH} = 4.6 \text{ V}$	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA
			$V_{OH} = 2.5 \text{ V}$	5	-2.50	—	-2.10	-4.0	—	-1.70	—	
			$V_{OH} = 9.5 \text{ V}$	10	-1.50	—	-1.30	-2.2	—	-1.10	—	
			$V_{OH} = 13.5 \text{ V}$	15	-4.00	—	-3.40	-9.0	—	-2.80	—	
			$V_{IN} = V_{SS}$									
Output low current		I_{OL}	$V_{OL} = 0.4 \text{ V}$	5	0.61	—	0.51	1.2	—	0.42	—	mA
			$V_{OL} = 0.5 \text{ V}$	10	1.50	—	1.30	3.2	—	1.10	—	
			$V_{OL} = 1.5 \text{ V}$	15	4.00	—	3.40	12.0	—	2.80	—	
			$V_{IN} = V_{DD}$									
Input high voltage		V_{IH}	$V_{OUT} = 0.5 \text{ V}, 4.5 \text{ V}$	5	4.0	—	4.0	—	—	4.0	—	mA
			$V_{OUT} = 1.0 \text{ V}, 9.0 \text{ V}$	10	8.0	—	8.0	—	—	8.0	—	
			$V_{OUT} = 1.5 \text{ V}, 13.5 \text{ V}$	15	12.0	—	12.0	—	—	12.0	—	
			$ I_{OUT} < 1 \mu\text{A}$									
Input low voltage		V_{IL}	$V_{OUT} = 0.5 \text{ V}, 4.5 \text{ V}$	5	—	1.0	—	—	1.0	—	1.0	mA
			$V_{OUT} = 1.0 \text{ V}, 9.0 \text{ V}$	10	—	2.0	—	—	2.0	—	2.0	
			$V_{OUT} = 1.5 \text{ V}, 13.5 \text{ V}$	15	—	3.0	—	—	3.0	—	3.0	
			$ I_{OUT} < 1 \mu\text{A}$									
Input current	"H" level	I_{IH}	$V_{IL} = 18 \text{ V}$	18	—	0.1	—	10^{-5}	0.1	—	1.0	μA
	"L" level	I_{IL}	$V_{IL} = 0 \text{ V}$	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	VDD (V)	Min	Typ.	Max	Unit
Output transition time (low to high)	t_{TLH}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output transition time (high to low)	t_{THL}	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Propagation delay time (low to high)	t_{pLH}	—	5	—	55	110	ns
			10	—	30	60	
			15	—	25	50	
Propagation delay time (high to low)	t_{pHL}	—	5	—	55	110	ns
			10	—	30	60	
			15	—	25	50	
Input capacitance	C_{IN}	—	—	—	7.5	15	pF

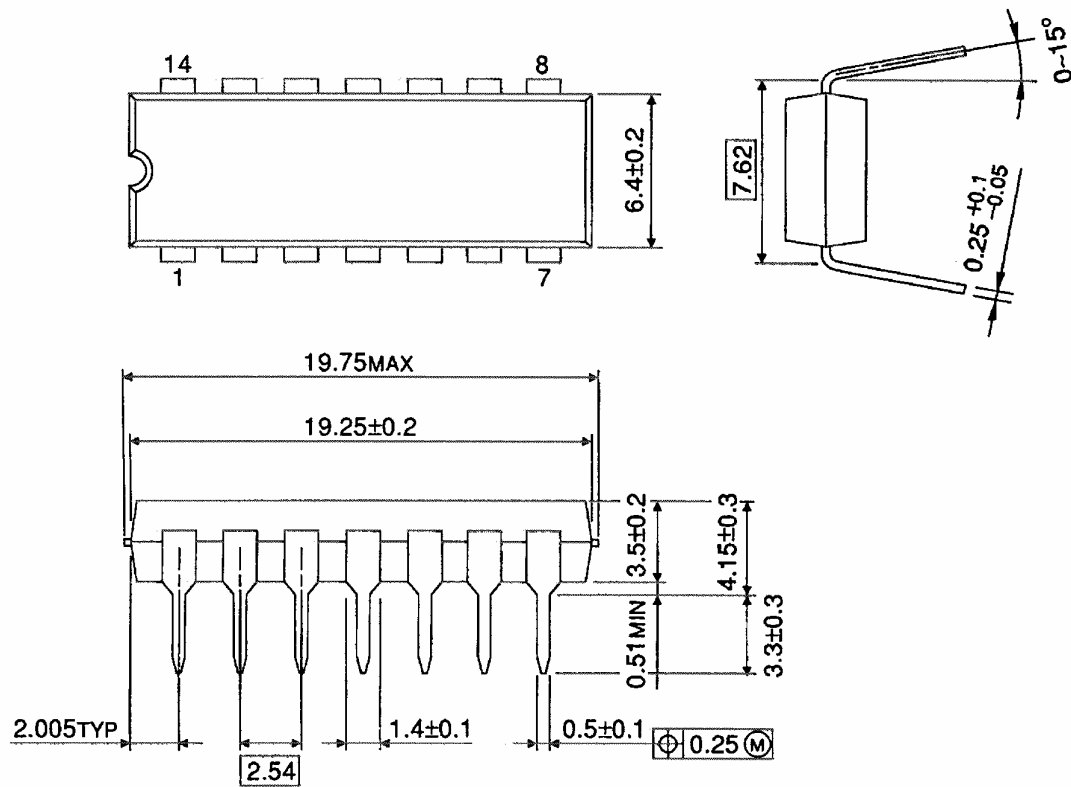
Waveform for Measurement of Dynamic Characteristics



Package Dimensions

DIP14-P-300-2.54

Unit : mm

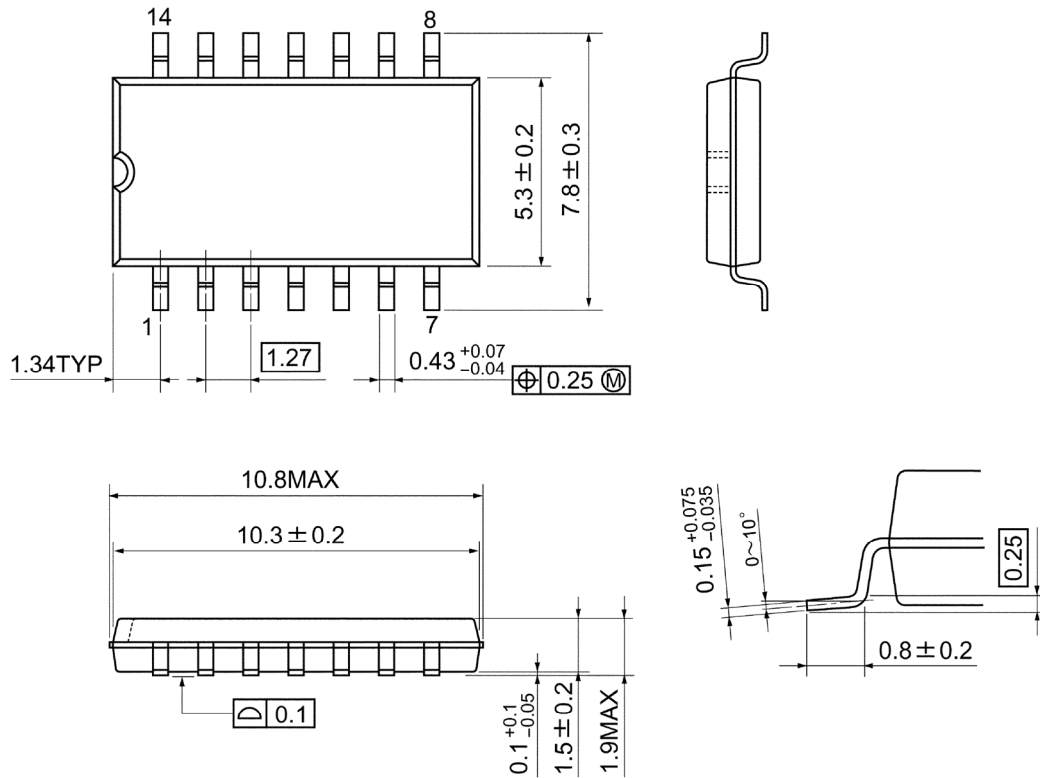


Weight: 0.96 g (typ.)

Package Dimensions

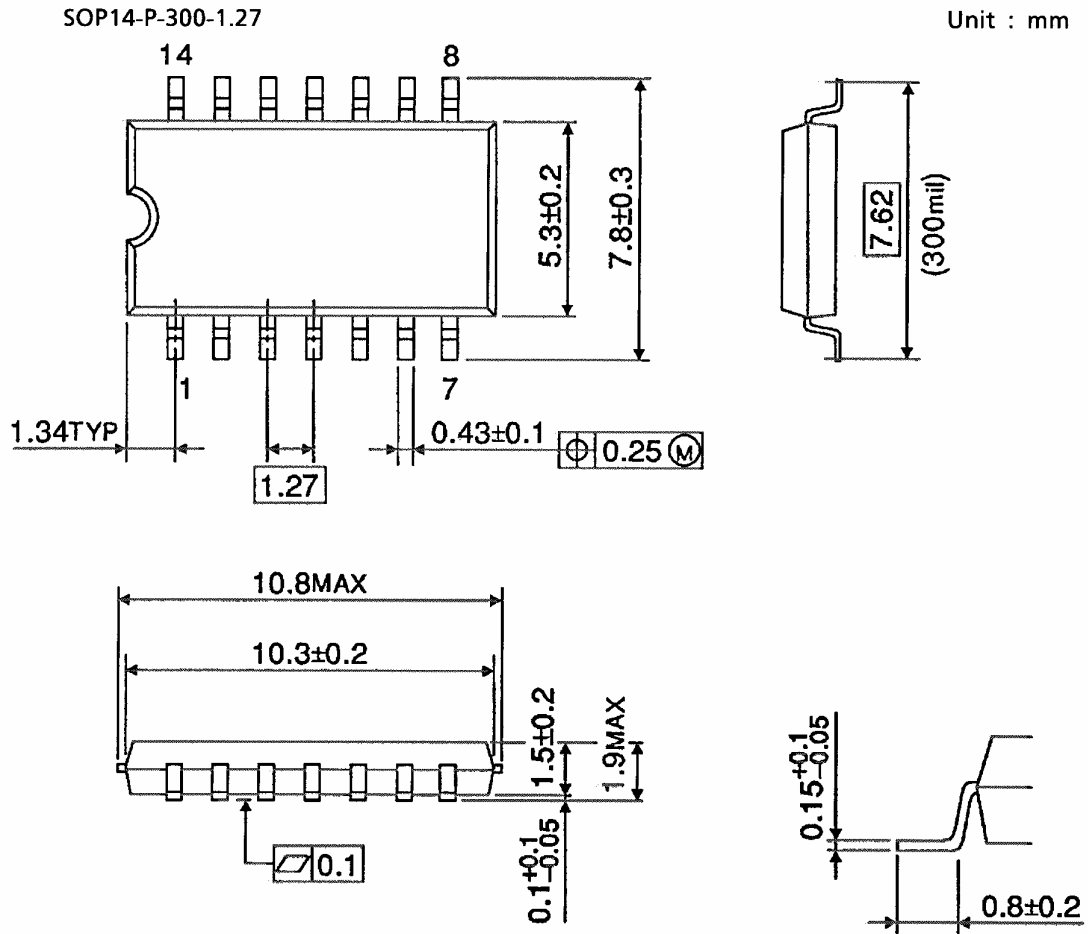
SOP14-P-300-1.27A

Unit: mm



Weight: 0.18 g (typ.)

Package Dimensions

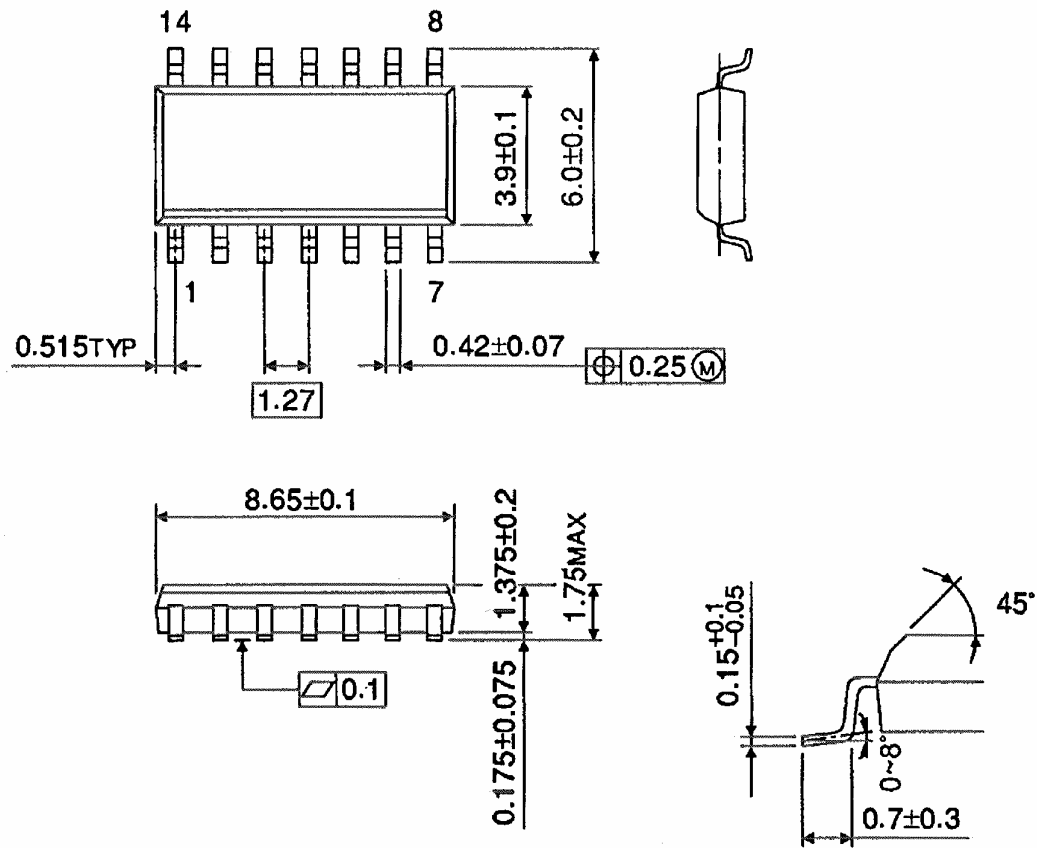


Weight: 0.18 g (typ.)

Package Dimensions (Note)

SOL14-P-150-1.27

Unit : mm



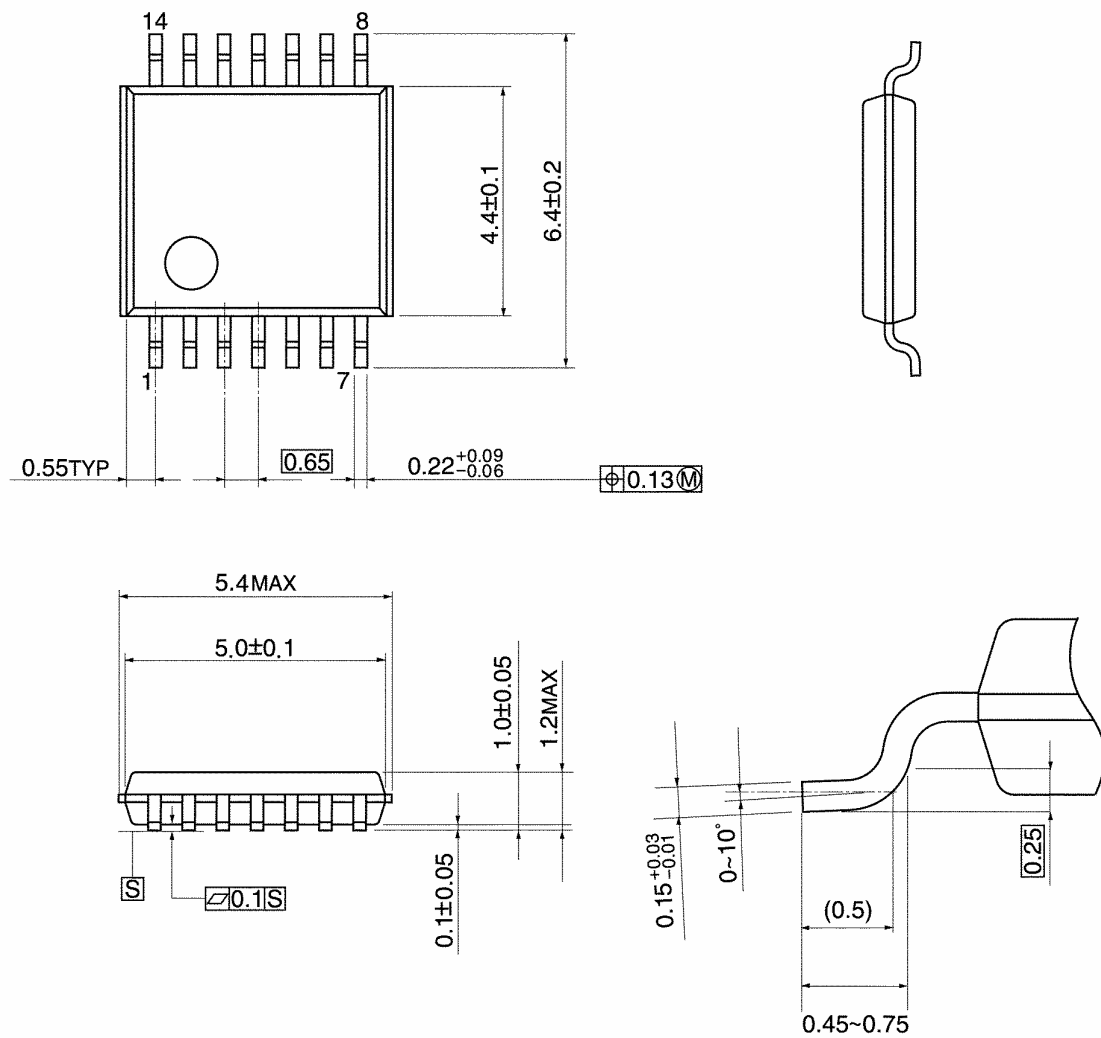
Note: This package is not available in Japan.

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**

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