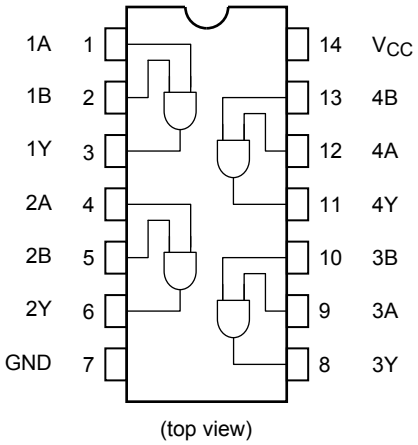
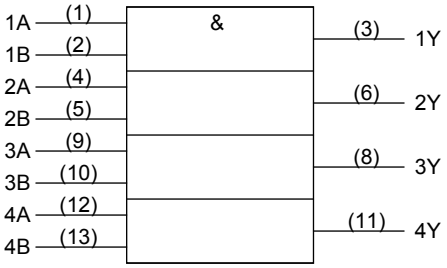
Pin Assignment



(top view)

IEC Logic Symbol



Truth Table

A	B	Y
L	L	L
L	H	L
H	L	L
H	H	H

Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating		Unit
Supply voltage range	V_{CC}	−0.5 to 7.0		V
DC input voltage	V_{IN}	−0.5 to 7.0		V
DC output voltage	V_{OUT}	−0.5 to 7.0	(Note 2)	V
		−0.5 to V_{CC} + 0.5	(Note 3)	
Input diode current	I_{IK}	−20		mA
Output diode current	I_{OK}	±20	(Note 4)	mA
DC output current	I_{OUT}	±25		mA
DC V_{CC}/ground current	I_{CC}	±50		mA
Power dissipation	P_D	180		mW
Storage temperature	T_{stg}	−65 to 150		°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.
Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.
Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook (“Handling Precautions”/“Derating Concept and Methods”) and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 2: V_{CC} = 0 V

Note 3: High or low state. I_{OUT} absolute maximum rating must be observed.

Note 4: $V_{OUT} < GND$, $V_{OUT} > V_{CC}$

Operating Ranges (Note 1)

Characteristics	Symbol	Rating		Unit
Supply voltage	V_{CC}	4.5 to 5.5		V
Input voltage	V_{IN}	0 to 5.5		V
Output voltage	V_{OUT}	0 to 5.5	(Note 2)	V
		0 to V_{CC}	(Note 3)	
Operating temperature	T_{opr}	−40 to 85		°C
Input rise and fall time	dt/dV	0 to 20		ns/V

Note 1: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

Note 2: V_{CC} = 0 V

Note 3: High or low state.

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		V_{CC} (V)	Ta = 25°C			Ta = −40 to 85°C		Unit
					Min	Typ.	Max	Min	Max	
High-level input voltage	V_{IH}	—		4.5 to 5.5	2.0	—	—	2.0	—	V
Low-level input voltage	V_{IL}	—		4.5 to 5.5	—	—	0.8	—	0.8	V
High-level output voltage	V_{OH}	V_{IN} = V_{IH}	I_{OH} = −50 μA	4.5	4.40	4.50	—	4.40	—	V
			I_{OH} = −8 mA	4.5	3.94	—	—	3.80	—	
Low-level output voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50 μA	4.5	—	0.0	0.1	—	0.1	V
			I_{OL} = 8 mA	4.5	—	—	0.36	—	0.44	
Input leakage current	I_{IN}	V_{IN} = 5.5 V or GND		0 to 5.5	—	—	±0.1	—	±1.0	μA
Quiescent supply current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	2.0	—	20.0	μA
	I_{CCT}	Per input: V_{IN} = 3.4 V Other input: V_{CC} or GND		5.5	—	—	1.35	—	1.50	mA
Output leakage current	I_{OPD}	V_{OUT} = 5.5 V		0	—	—	0.5	—	5.0	μA

AC Characteristics (input: $t_r = t_f = 3$ ns)

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = −40 to 85°C		Unit
			V_{CC} (V)	C_L (pF)	Min	Typ.	Max	Min	Max	
Propagation delay time	t_{pLH} t_{pHL}	—	5.0 ± 0.5	15	—	5.0	6.9	1.0	8.0	ns
				50	—	5.5	7.9	1.0	9.0	
Input capacitance	C_{IN}	—			—	4	10	—	10	pF
Power dissipation capacitance	C_{PD}	(Note)			—	18	—	—	—	pF

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation:

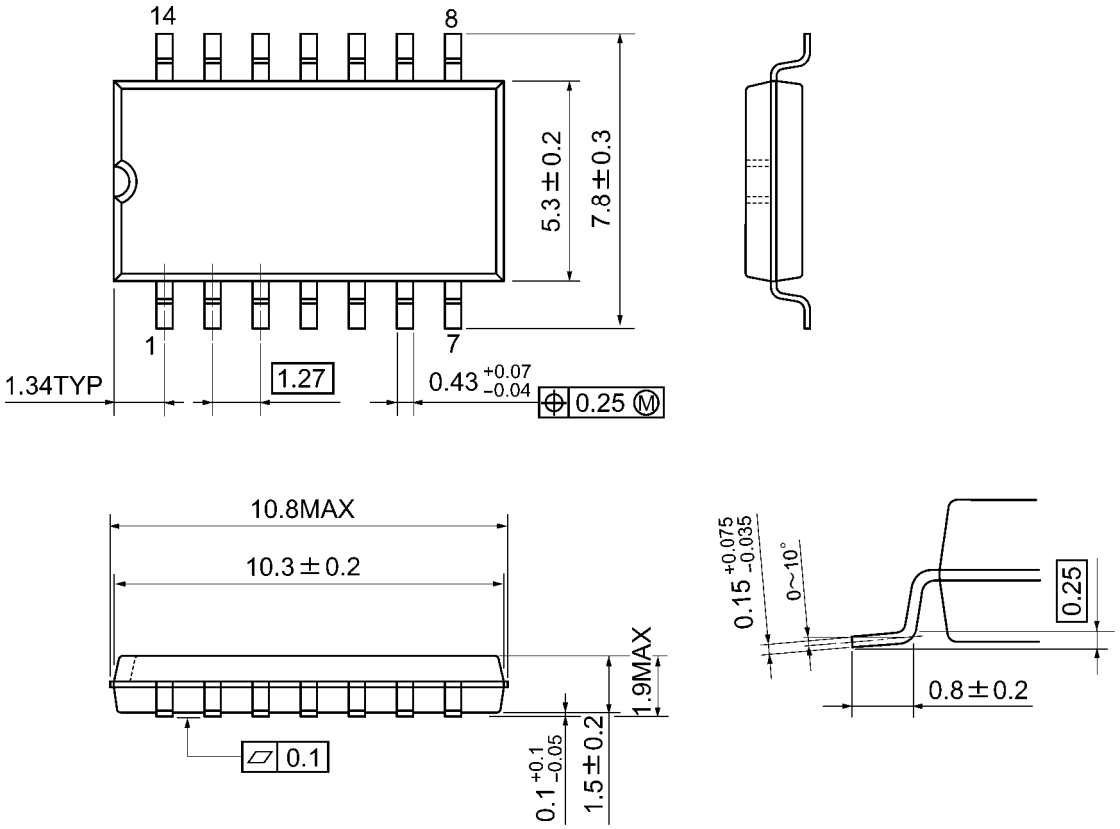
$$I_{CC\ (opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4 \text{ (per gate)}$$

Noise Characteristics (input: $t_r = t_f = 3$ ns)

Characteristics	Symbol	Test Condition	Ta = 25°C			Unit
			V_{CC} (V)	Typ.	Limit	
Quiet output maximum dynamic V_{OL}	V_{OLP}	C_L = 50 pF	5.0	0.4	0.8	V
Quiet output minimum dynamic V_{OL}	V_{OLV}	C_L = 50 pF	5.0	−0.4	−0.8	V
Minimum high level dynamic input voltage	V_{IHD}	C_L = 50 pF	5.0	—	2.0	V
Maximum low level dynamic input voltage	V_{ILD}	C_L = 50 pF	5.0	—	0.8	V

Package Dimensions

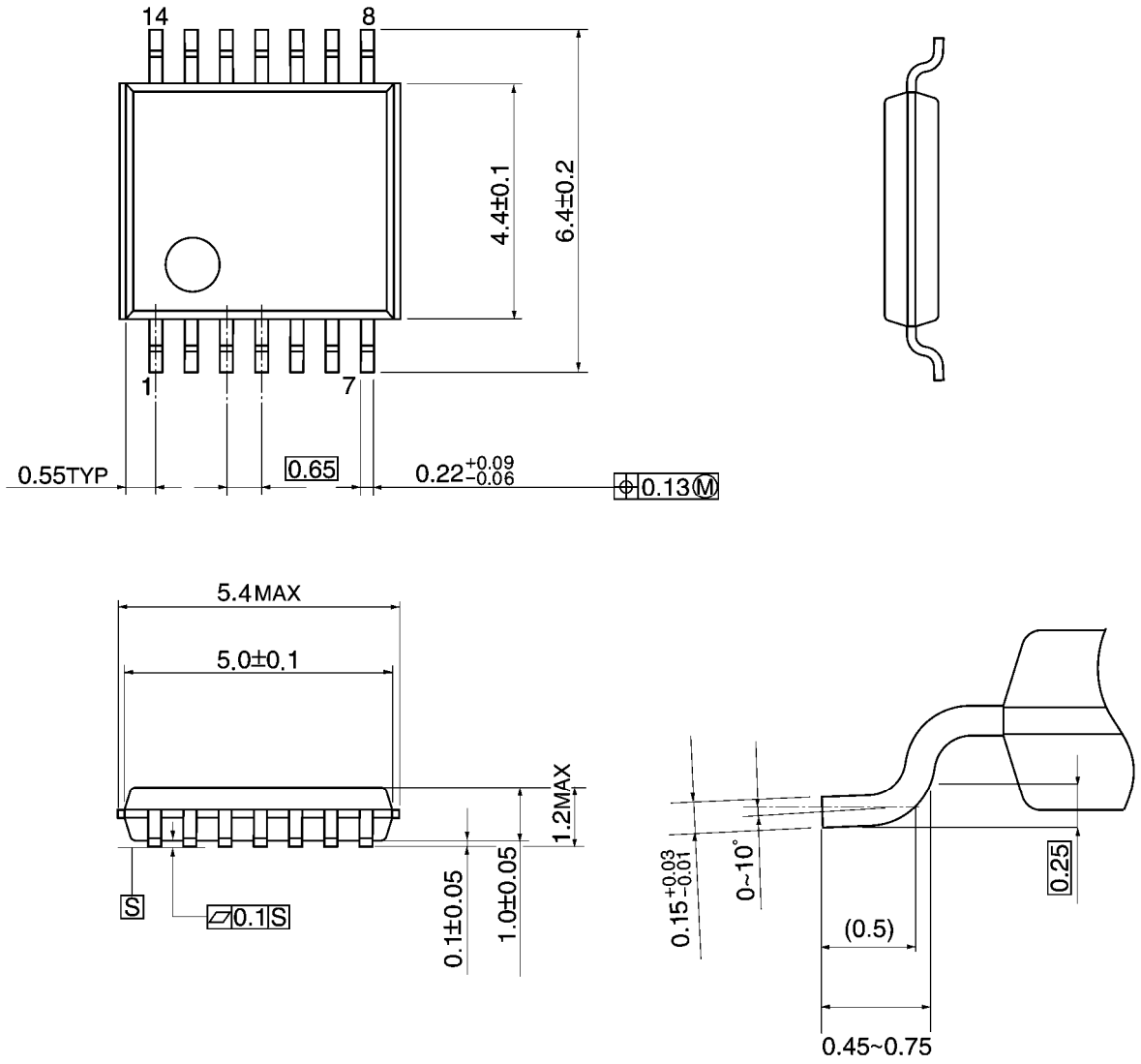
SOP14-P-300-1.27A Unit: mm



Weight: 0.18 g (typ.)

Package Dimensions

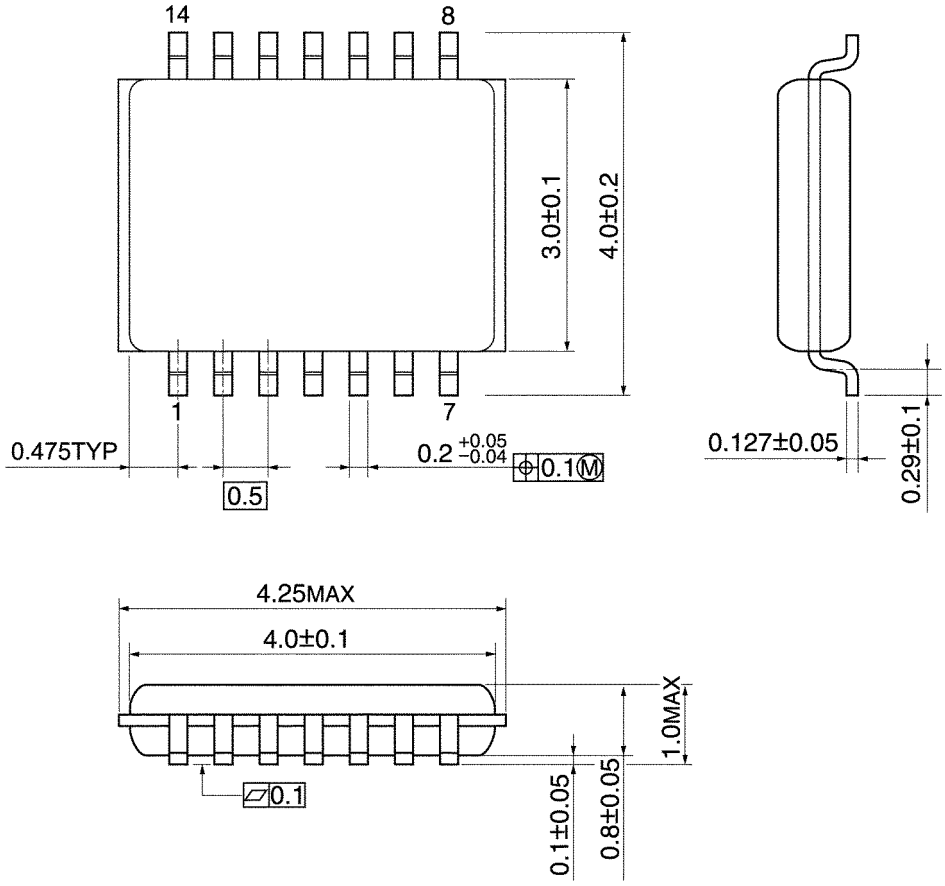
TSSOP14-P-0044-0.65A Unit: mm



Weight: 0.06 g (typ.)

Package Dimensions

VSSOP14-P-0030-0.50 Unit: mm



Weight: 0.02 g (typ.)

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