

Quad 2-Input OR Gate with Schmitt-Trigger Input

Features

- Wide Supply Voltage Range from 2.0 V to 6.0 V
- I/O Tolerance Inputs to 6 V
- All Inputs with Schmitt-Trigger Input
- CMOS Low Power Dissipation
- I_{OFF} Supports Partial Power-down Protection
- ESD Protection: ± 3 -kV HBM Model, ± 1 -kV CDM Model
- Latch-up Performance Exceeds 100 mA per JESD 78, Class II

Applications

- Computing
- Tablet PC
- Television
- Wearable Device
- Server
- Industrial Equipment

Description

The T74H32 is a quad 2-input OR gate with the V_{CC} supply from 2 V to 6 V. Schmitt-Trigger input allows inputs with slower rise-and-fall times and better noise immunity. I_{OFF} circuits can prevent backflow current during power-down, thus supporting partial power-down protection.

The T74H32 is available in the TSSOP14 package and is characterized from -40°C to 125°C .

Device Table

Device	Package	Body Size
T74H32-TS2R	TSSOP14	5 mm x 4.4 mm

Typical Application Circuit

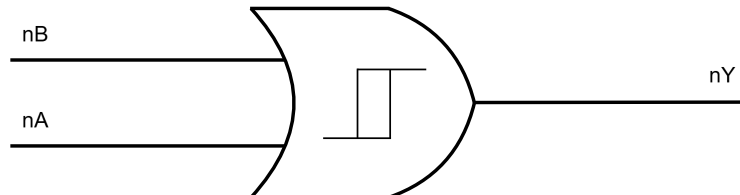


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Quad 2-Input OR Gate with Schmitt-Trigger Input**Revision History**

Date	Revision	Notes
2025-08-01	Rev.Pre.0	Initial version.
2026-06-01	Rev.A.0	Released version.

Pin Configuration and Functions

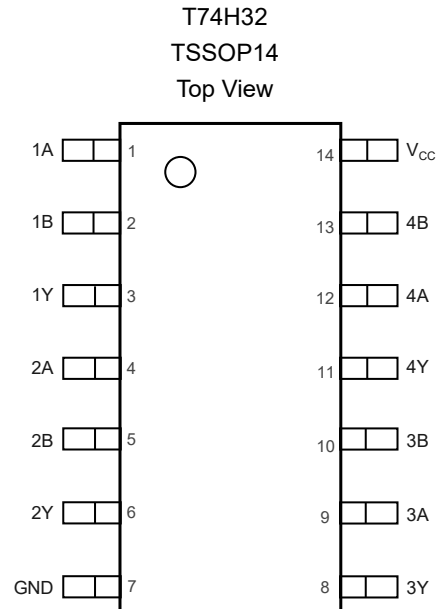


Table 1. Pin Functions

Pin No.	Name	I/O	Description
1, 4, 9, 12	1A, 2A, 3A, 4A	I	Input nA
2, 5, 10, 13	1B, 2B, 3B, 4B	I	Input nB
3, 6, 8, 11	1Y, 2Y, 3Y, 4Y	O	Output nY
7	GND	Power	Ground
14	V _{CC}	Power	Supply pin

Function Table

Table 2. Truth Table

Input		Output
nA	nB	nY
L	L	L
X	H	H
H	X	H

(1) H = High voltage level.

(2) L = Low voltage level.

(3) X = Don't care.

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Specifications

Absolute Maximum Ratings ⁽¹⁾

Parameter		Min	Max	Unit
V _{CC}	Supply Voltage	−0.5	7	V
V _I	Input Voltage ⁽²⁾	−0.5	7	V
I _O	Continuous Output Current	−25	25	mA
I _{IK}	Input Clamp Current, V _I < 0	−20		mA
I _{OK}	Output Clamp Current, V _O < 0	−20		mA
	Continuous Current through V _{CC} or GND	−75	75	mA
T _J	Junction Temperature		150	°C
T _{STG}	Storage Temperature	−65	150	°C

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The minimum input and output voltage ratings may be exceeded if the input and output current ratings are observed.

ESD, Electrostatic Discharge Protection

Symbol	Parameter	Condition	Minimum Level	Unit
HBM	Human Body Model ESD	ANSI/ESDA/JEDEC JS-001, all pins ⁽¹⁾	±3,000	V
CDM	Charged Device Model ESD	ANSI/ESDA/JEDEC JS-002, all pins ⁽²⁾	±1,000	V

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

Recommended Operating Conditions

All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

Parameter		Min	Typ	Max	Unit
V _{CC}	Supply Voltage	2		6	V
V _I	Input Voltage	0		6	V
V _O	Output Voltage	0		V _{CC}	V
T _A	Ambient Temperature	−40		125	°C

Thermal Information

Package Type	θ _{JA}	θ _{Jc}	Unit
TSSOP14	145.8	71.2	°C/W

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Electrical Characteristics – DC Parameter

All test conditions: $T_A = -40^{\circ}\text{C}$ to 125°C , all typical values are measured at $T_A = 25^{\circ}\text{C}$, unless otherwise noted.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{IH}	High-Level Input Voltage	$V_{CC} = 2\text{ V}$	1.5			V
		$V_{CC} = 3\text{ V}$	2.2			V
		$V_{CC} = 4.5\text{ V}$	3.15			V
		$V_{CC} = 5.5\text{ V}$	3.85			V
		$V_{CC} = 6\text{ V}$	4.2			V
V_{IL}	Low-Level Input Voltage	$V_{CC} = 2\text{ V}$			0.3	V
		$V_{CC} = 3\text{ V}$			0.9	V
		$V_{CC} = 4.5\text{ V}$			1.35	V
		$V_{CC} = 5.5\text{ V}$			1.65	V
		$V_{CC} = 6\text{ V}$			1.8	V
$V_H^{(1)}$	Hysteresis Voltage	$V_{CC} = 2\text{ V}$	0.2			V
		$V_{CC} = 3\text{ V}$	0.3			V
		$V_{CC} = 4.5\text{ V}$	0.5			V
		$V_{CC} = 5.5\text{ V}$	0.7			V
		$V_{CC} = 6\text{ V}$	0.8			V
V_{OH}	High-Level Output Voltage	$I_{OH} = -50\text{ }\mu\text{A}; V_{CC} = 2\text{ V}$	1.9			V
		$I_{OH} = -50\text{ }\mu\text{A}; V_{CC} = 3\text{ V}$	2.9			V
		$I_{OH} = -50\text{ }\mu\text{A}; V_{CC} = 4.5\text{ V}$	4.4			V
		$I_{OH} = -4\text{ mA}; V_{CC} = 3\text{ V}$	2.4			V
		$I_{OH} = -8\text{ mA}; V_{CC} = 4.5\text{ V}$	3.7			V
		$I_{OH} = -8\text{ mA}; V_{CC} = 6\text{ V}$	5.2			V
V_{OL}	Low-Level Output Voltage	$I_{OL} = 50\text{ }\mu\text{A}; V_{CC} = 2\text{ V}$			0.1	V
		$I_{OL} = 50\text{ }\mu\text{A}; V_{CC} = 3\text{ V}$			0.1	V
		$I_{OL} = 50\text{ }\mu\text{A}; V_{CC} = 4.5\text{ V}$			0.1	V
		$I_{OL} = 4\text{ mA}; V_{CC} = 3\text{ V}$			0.55	V
		$I_{OL} = 8\text{ mA}; V_{CC} = 4.5\text{ V}$			0.55	V
		$I_{OL} = 8\text{ mA}; V_{CC} = 6\text{ V}$			0.55	V
I_I	Input Leakage Current	$V_I = \text{GND to } 6\text{ V};$ $V_{CC} = 0\text{ V to } 6\text{ V}$	-2	± 0.1	2	μA
I_{OFF}	Power-off Leakage Current	V_I or $V_O = 0\text{ V to } 6\text{ V}; V_{CC} = 0\text{ V}$	-2	± 0.1	2	μA
I_{CC}	Supply Current	$V_I = \text{GND or } V_{CC}; I_O = 0\text{ A};$ $V_{CC} = 6\text{ V}$		0.1	10	μA
$C_I^{(1)}$	Input Capacitance	$V_I = V_{CC}$ or $\text{GND};$		2.1		pF

(1) Spec limit is based on bench characterization and design simulation, not tested in production.

Quad 2-Input OR Gate with Schmitt-Trigger Input

Electrical Characteristics – AC Parameter

All test conditions: $T_A = -40^{\circ}\text{C}$ to 125°C , all typical values are measured at $T_A = 25^{\circ}\text{C}$, unless otherwise noted.

Symbol ⁽¹⁾	Parameter	Conditions	Min	Typ	Max	Unit
$t_{PD}^{(2)}$	Propagation Delay	$C_{LOAD} = 15\text{ pF};$ $V_{CC} = 3\text{ V to }3.6\text{ V}$	1.9	4.6	7.6	ns
		$C_{LOAD} = 50\text{ pF};$ $V_{CC} = 3\text{ V to }3.6\text{ V}$	3.3	5.8	10.8	ns
		$C_{LOAD} = 15\text{ pF};$ $V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.6	3.8	5.9	ns
		$C_{LOAD} = 50\text{ pF};$ $V_{CC} = 4.5\text{ V to }5.5\text{ V}$	2.8	4.8	8.3	ns
$C_{PD}^{(3)}$	Power Dissipation Capacitance	$f = 1\text{ MHz};$ $V_I = \text{GND to }V_{CC}$		7.7		pF

(1) Spec limit is based on bench characterization and design simulation, not tested in production.

(2) t_{PD} is the same as t_{PLH} and t_{PHL} .

(3) C_{PD} is used to determine the dynamic power dissipation (PD in μW).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$$

Where:

f_i = Input frequency in MHz;

f_o = Output frequency in MHz;

C_L = Output load capacitance in pF;

V_{CC} = Supply voltage in Volts;

N = Number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = Sum of the outputs.

Quad 2-Input OR Gate with Schmitt-Trigger Input

Parameter Measurement Waveforms

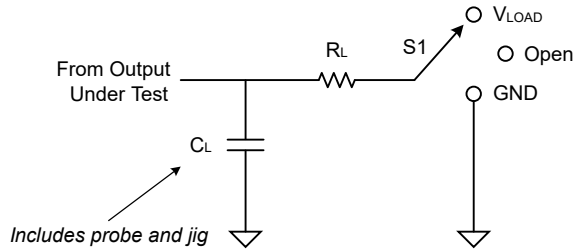


Figure 1. Timing Measurement Load Circuit

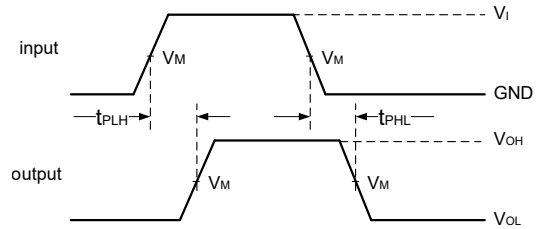


Figure 2. Propagation Delay Times

Table 3. Test Data

V_{CC}	Inputs		C_L	R_L	V_M	S1
	V_I	t_r/t_f				t_{PHL}/t_{PLH}
3 V to 3.6 V	V_{CC}	≤ 3 ns	15 pF, 50 pF	1 k Ω	$0.5V_{CC}$	Open
4.5 V to 5.5 V	V_{CC}	≤ 3 ns	15 pF, 50 pF	1 k Ω	$0.5V_{CC}$	Open

Quad 2-Input OR Gate with Schmitt-Trigger Input**Application and Implementation****Note**

Information in the following application sections is not part of the 3PEAK's component specification and 3PEAK does not warrant its accuracy or completeness. 3PEAK's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

Typical Application

Figure 3 shows the typical application schematic.

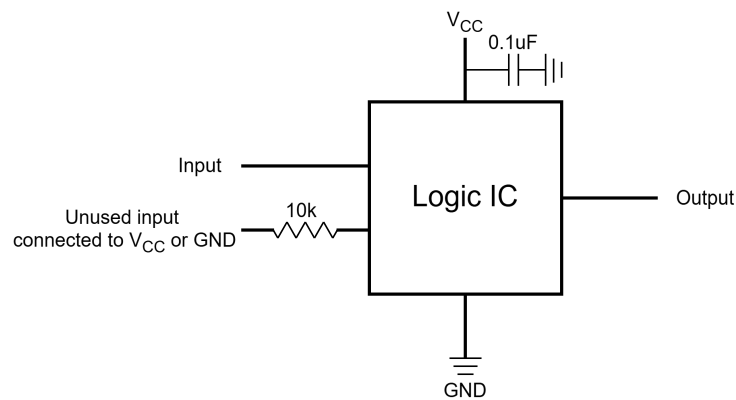
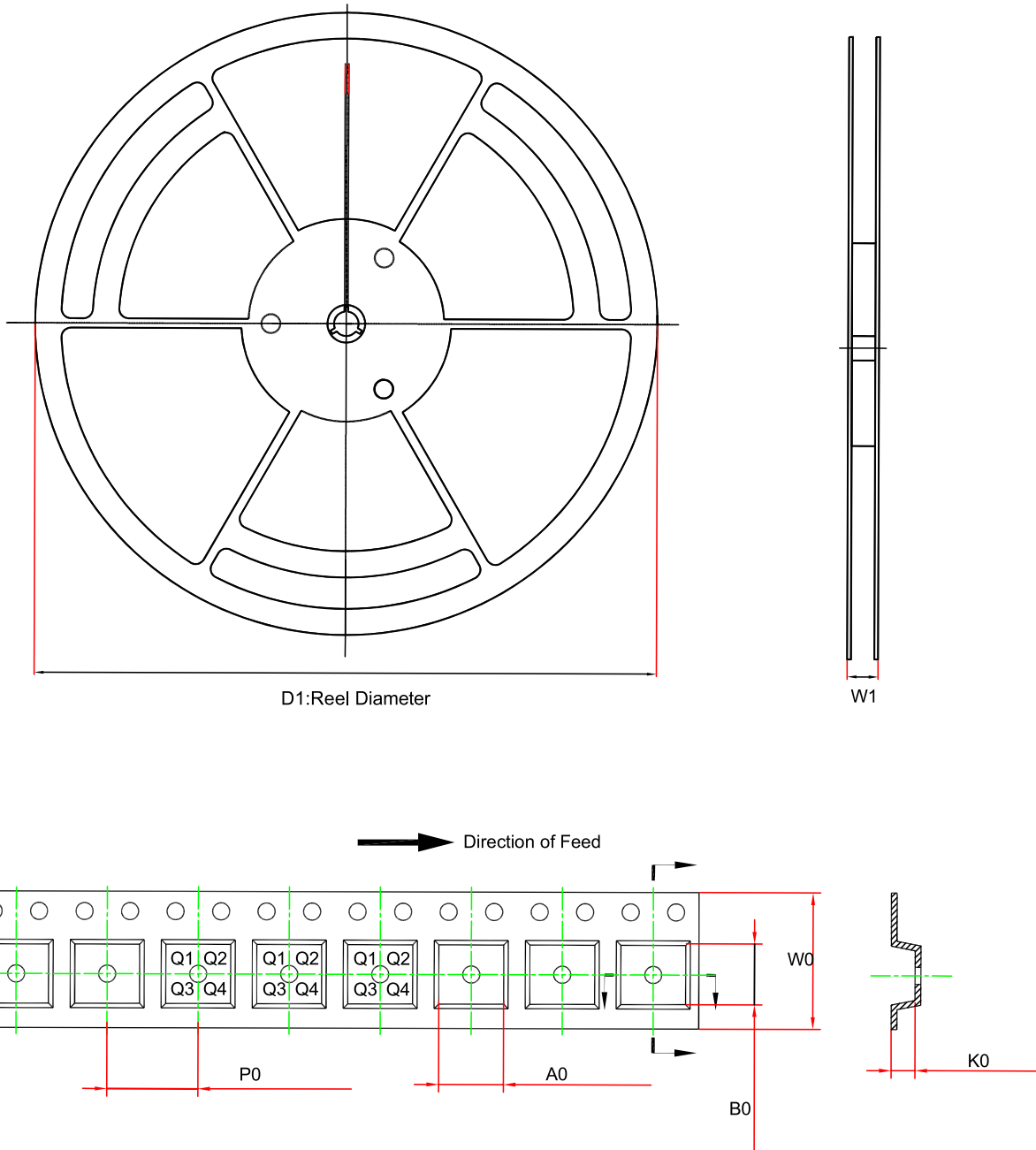


Figure 3. Typical Application Circuit

Tape and Reel Information

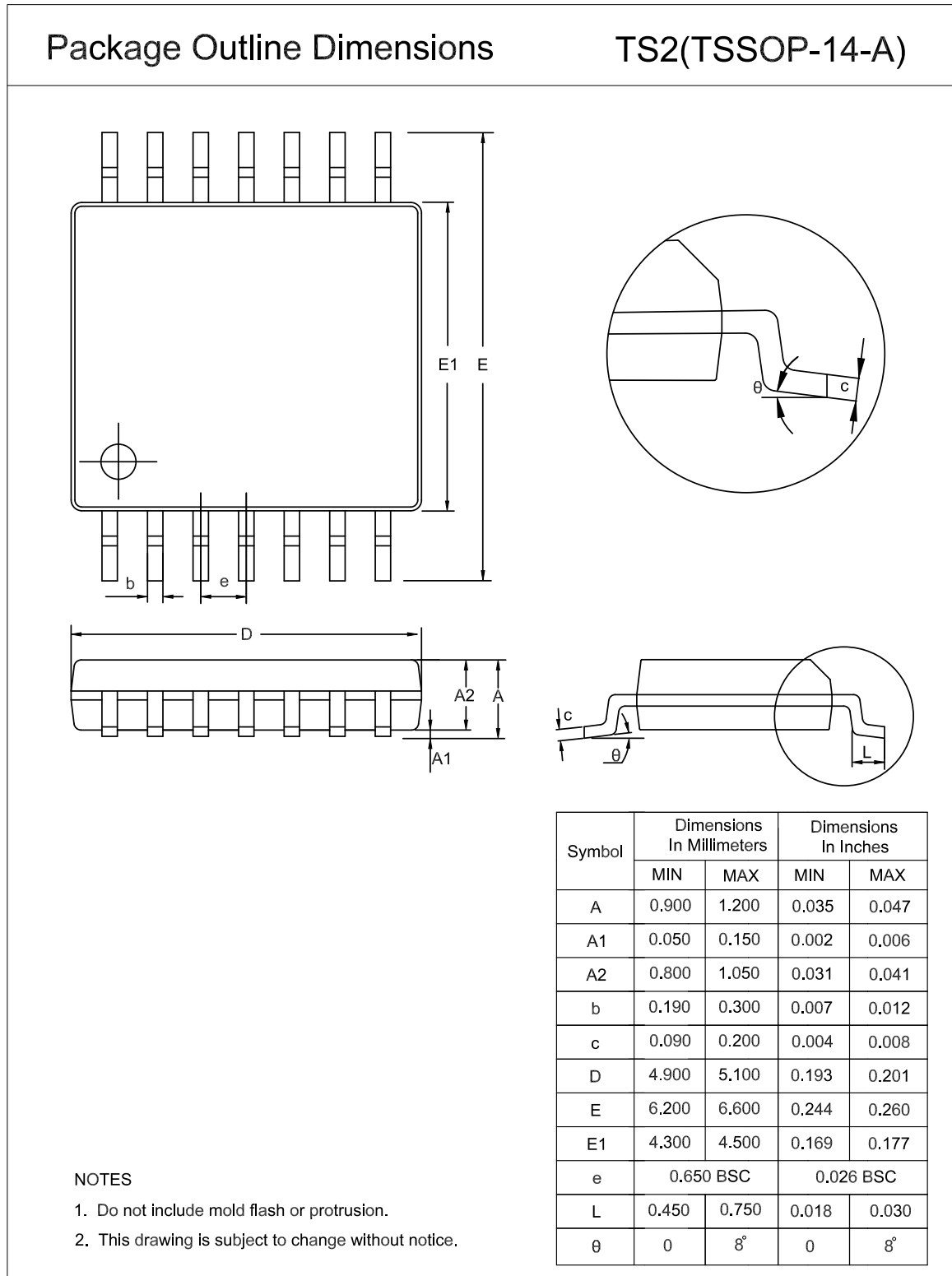


Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
T74H32-TS2R	TSSOP14	330	17.6	6.8	5.5	1.5	8	12	Q1

Quad 2-Input OR Gate with Schmitt-Trigger Input

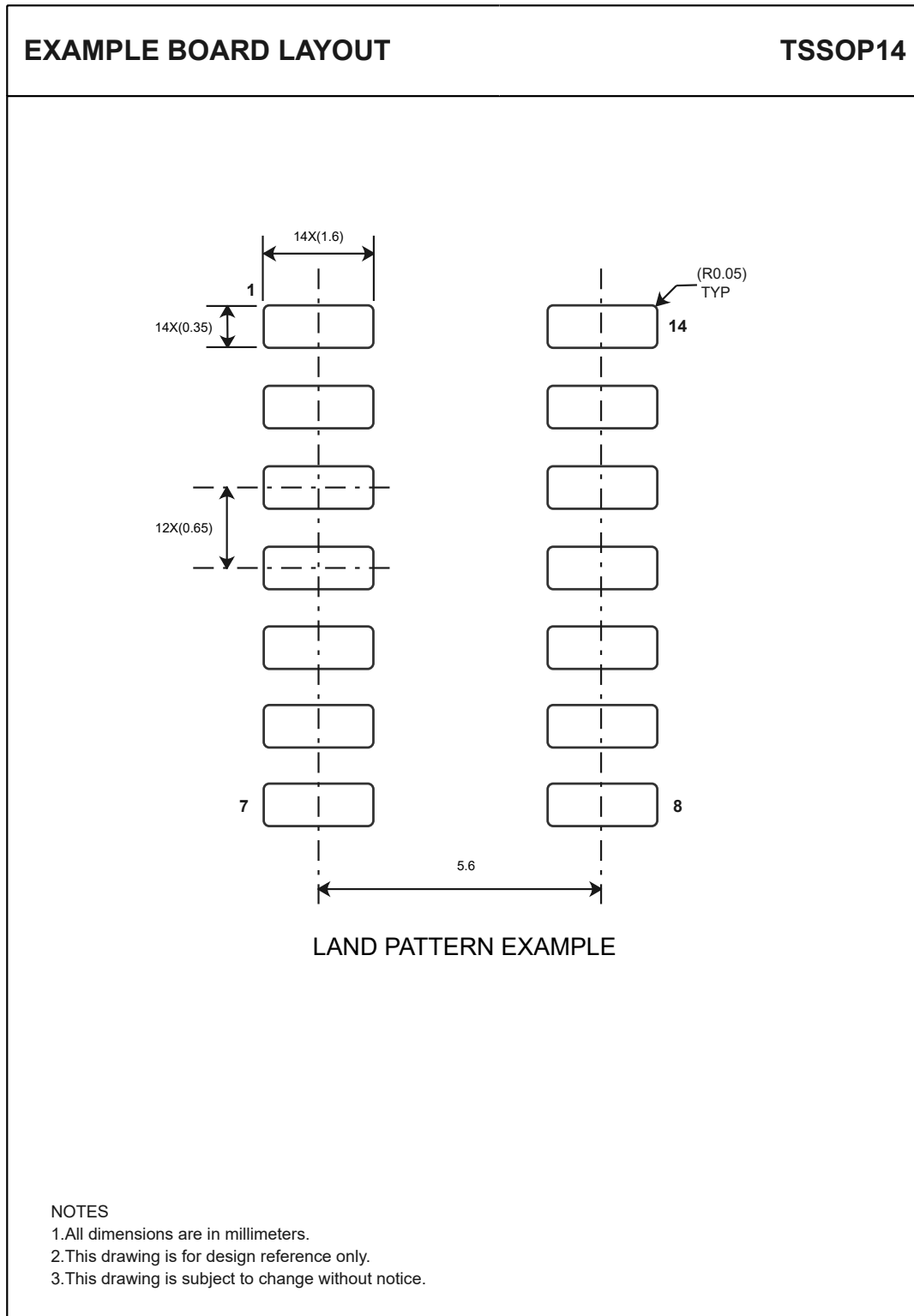
Package Outline Dimensions

TSSOP14



Example Board Layout

TSSOP14



Quad 2-Input OR Gate with Schmitt-Trigger Input**Order Information**

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
T74H32-TS2R	-40 to 125°C	TSSOP14	HCS32	MSL3	Tape and Reel,3000	Green

Green: 3PEAK defines "Green" to mean RoHS compatible and free of halogen substances.

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