

Features

- Wide Supply Voltage Range from 1.65 V to 5.5 V
- I/O Tolerance Inputs to 5.5 V
- All Inputs with Schmitt-Trigger Action
- CMOS Low Power Dissipation
- I_{OFF} Supports Partial Power-down Protection
- ESD Protection: ±4-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 T74L2G08 is a dual 2-input AND gate with the V_{CC} supply from 1.65 V to 5.5 V. Schmitt-Trigger action 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 T74L2G08 is available in VSSOP8 and DFN1.4X1-8 packages and is characterized from -40°C to 125°C.

Device Table

Device	Package	Body Size
T74L2G08-VS3R	VSSOP8	2 mm x 2.3 mm
T74L2G08-DFSRR	DFN1.4X1-8	1.4 mm x 1 mm

Typical Application Circuit



Table of Contents

Features	1
Applications	1
Description	1
Device Table	1
Typical Application Circuit	1
Revision History	3
Pin Configuration and Functions	4
Specifications	5
Absolute Maximum Ratings ⁽¹⁾	5
ESD, Electrostatic Discharge Protection.....	5
Recommended Operating Conditions.....	5
Thermal Information.....	6
Electrical Characteristics – DC Parameter.....	7
Electrical Characteristics – AC Parameter.....	8
Parameter Measurement Waveforms.....	9
Application and Implementation	10
Typical Application.....	10
Tape and Reel Information	11
Package Outline Dimensions	12
VSSOP8.....	12
DFN1.4X1-8.....	13
Land Pattern	14
VSSOP8.....	14
DFN1.4X1-8.....	15
Order Information	16
IMPORTANT NOTICE AND DISCLAIMER	17

Revision History

Date	Revision	Notes
2025-08-01	Rev.Pre.0	Initial version.
2026-04-01	Rev.A.0	Released version.

Pin Configuration and Functions

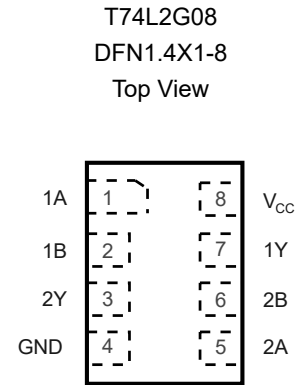
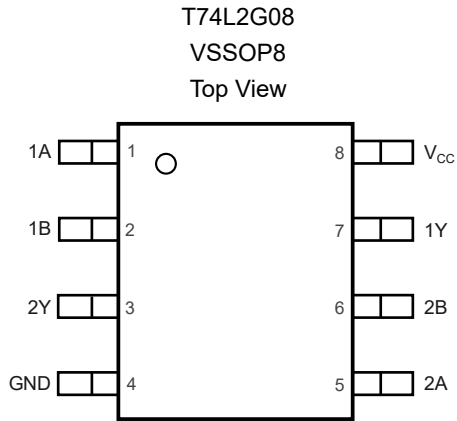


Table 1. Pin Functions

Pin No.	Name	I/O	Description
1	1A	I	Input 1A
2	1B	I	Input 1B
3	2Y	O	Output 2Y
4	GND	Power	Ground
5	2A	I	Input 2A
6	2B	I	Input 2B
7	1Y	O	Output 1Y
8	V _{CC}	Power	Supply pin

Function Table

Table 2. Truth Table

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

(1) H = High voltage level.

(2) L = Low voltage level.

(3) X = Don't care.

Specifications

Absolute Maximum Ratings ⁽¹⁾

Parameter		Min	Max	Unit
V _{CC}	Supply Voltage	-0.5	6.5	V
V _I	Input Voltage ⁽²⁾	-0.5	6.5	V
V _O	Output Voltage, in Power-off Mode ⁽²⁾	-0.5	6.5	V
V _O	Output Voltage, in Active Mode ⁽²⁾	-0.5	V _{CC} + 0.5	V
I _O	Continuous Output Current	-50	50	mA
I _{IK}	Input Clamp Current, V _I < 0	-50		mA
I _{OK}	Output Clamp Current, V _O < 0	-50		mA
	Continuous Current through V _{CC} or GND	-100	100	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⁾	±4,000	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	1.65		5.5	V
V _I	Input Voltage	0		5.5	V
V _O	Output Voltage	0		V _{CC}	V
T _A	Ambient Temperature	-40		125	°C
Δt/ΔV	Input Transition Rise-and-Fall Rate, V _{CC} = 1.65 V to 2.7 V			20	ns/V
	Input Transition Rise-and-Fall Rate, V _{CC} = 2.7 V to 5.5 V			10	ns/V

Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
VSSOP8	265.6	110.3	°C/W
DFN1.4X1-8	330.2	213.3	°C/W

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	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	$0.7V_{CC}$			V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.7			V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$	2			V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	$0.7V_{CC}$			V
V_{IL}	Low-Level Input Voltage	$V_{CC} = 1.65\text{ V to }1.95\text{ V}$			$0.3V_{CC}$	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$			0.7	V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$			0.8	V
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$			$0.3V_{CC}$	V
V_{OH}	High-Level Output Voltage	$I_{OH} = -100\ \mu\text{A};$ $V_{CC} = 1.65\text{ V to }5.5\text{ V}$	$V_{CC} - 0.1$			V
		$I_{OH} = -4\text{ mA}; V_{CC} = 1.65\text{ V}$	0.95			V
		$I_{OH} = -8\text{ mA}; V_{CC} = 2.3\text{ V}$	1.7			V
		$I_{OH} = -12\text{ mA}; V_{CC} = 2.7\text{ V}$	1.9			V
		$I_{OH} = -24\text{ mA}; V_{CC} = 3\text{ V}$	2			V
		$I_{OH} = -32\text{ mA}; V_{CC} = 4.5\text{ V}$	3.4			V
V_{OL}	Low-Level Output Voltage	$I_{OL} = 100\ \mu\text{A};$ $V_{CC} = 1.65\text{ V to }5.5\text{ V}$			0.1	V
		$I_{OL} = 4\text{ mA}; V_{CC} = 1.65\text{ V}$			0.7	V
		$I_{OL} = 8\text{ mA}; V_{CC} = 2.3\text{ V}$			0.45	V
		$I_{OL} = 12\text{ mA}; V_{CC} = 2.7\text{ V}$			0.6	V
		$I_{OL} = 24\text{ mA}; V_{CC} = 3\text{ V}$			0.8	V
		$I_{OL} = 32\text{ mA}; V_{CC} = 4.5\text{ V}$			0.8	V
I_I	Input Leakage Current	$V_I = \text{GND or }5.5\text{ V};$ $V_{CC} = 0\text{ V to }5.5\text{ V}$	-1	± 0.1	1	μA
I_{OFF}	Power-off Leakage Current	$V_I \text{ or } V_O = 5.5\text{ V};$ $V_{CC} = 0\text{ V}$	-1	± 0.1	1	μA
I_{CC}	Supply Current	$V_I = \text{GND or }V_{CC}; I_O = 0\text{ A};$ $V_{CC} = 1.65\text{ V to }5.5\text{ V}$		0.1	2	μA
ΔI_{CC}	Additional Supply Current	$V_I = V_{CC} - 0.6\text{ V}; I_O = 0\text{ A};$ $V_{CC} = 2.3\text{ V to }5.5\text{ V}$		0.1	10	μA
$C_I^{(1)}$	Input Capacitance			2.1		pF

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

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 at 30-pF C_{LOAD}	$C_{LOAD} = 30\text{ pF};$ $V_{CC} = 1.65\text{ V to }1.95\text{ V}$	3.7	8.5	14.9	ns
		$C_{LOAD} = 30\text{ pF};$ $V_{CC} = 2.3\text{ V to }2.7\text{ V}$	2.5	5.7	9.5	ns
	Propagation Delay at 50-pF C_{LOAD}	$C_{LOAD} = 50\text{ pF};$ $V_{CC} = 2.7\text{ V}$	2.9	5.6	8.9	ns
		$C_{LOAD} = 50\text{ pF};$ $V_{CC} = 3\text{ V to }3.6\text{ V}$	2.3	4.9	8.2	ns
		$C_{LOAD} = 50\text{ pF};$ $V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.9	4.1	6.5	ns
	C_{PD} ⁽³⁾	Power Dissipation Capacitance	$f = 10\text{ MHz};$ $V_{CC} = 3.3\text{ V}$		13	

(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;

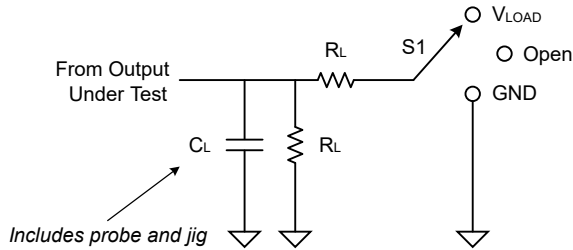
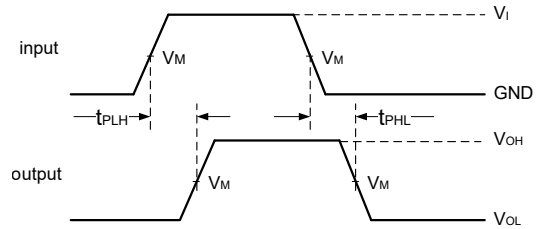
f_o = Output frequency in MHz;

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.

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}
1.65 V to 1.95 V	V_{CC}	≤ 2 ns	30 pF	1 k Ω	$0.5V_{CC}$	Open
2.3 V to 2.7 V	V_{CC}	≤ 2 ns	30 pF	500 Ω	$0.5V_{CC}$	Open
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	1.5 V	Open
3 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	1.5 V	Open
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	$0.5V_{CC}$	Open

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.

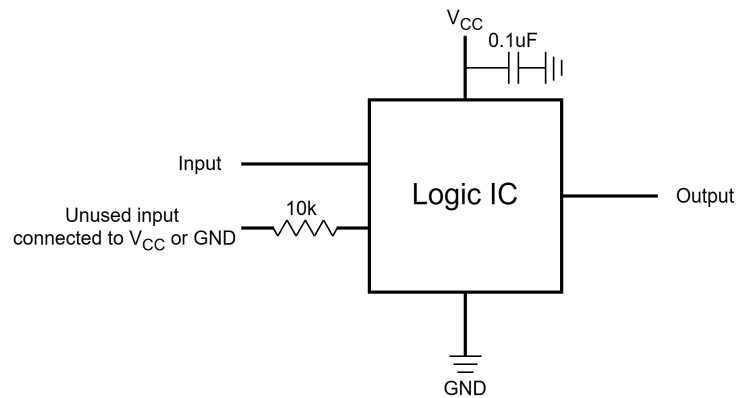
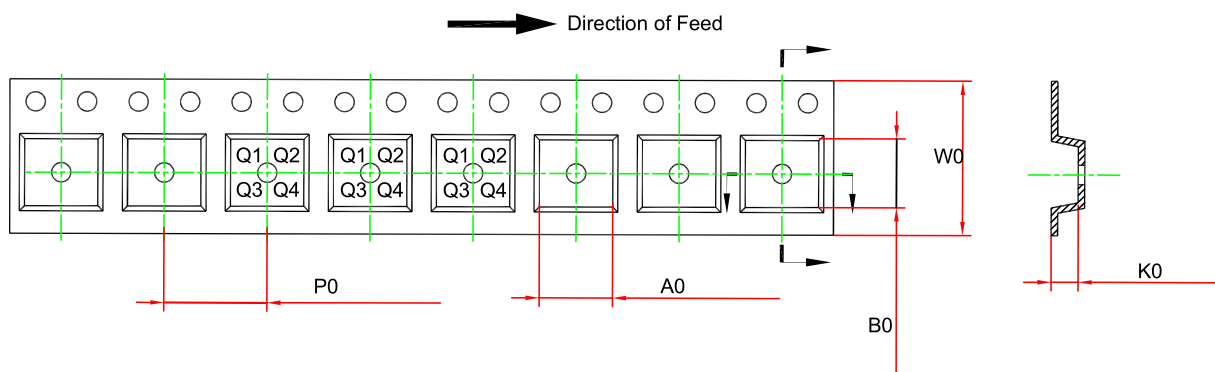
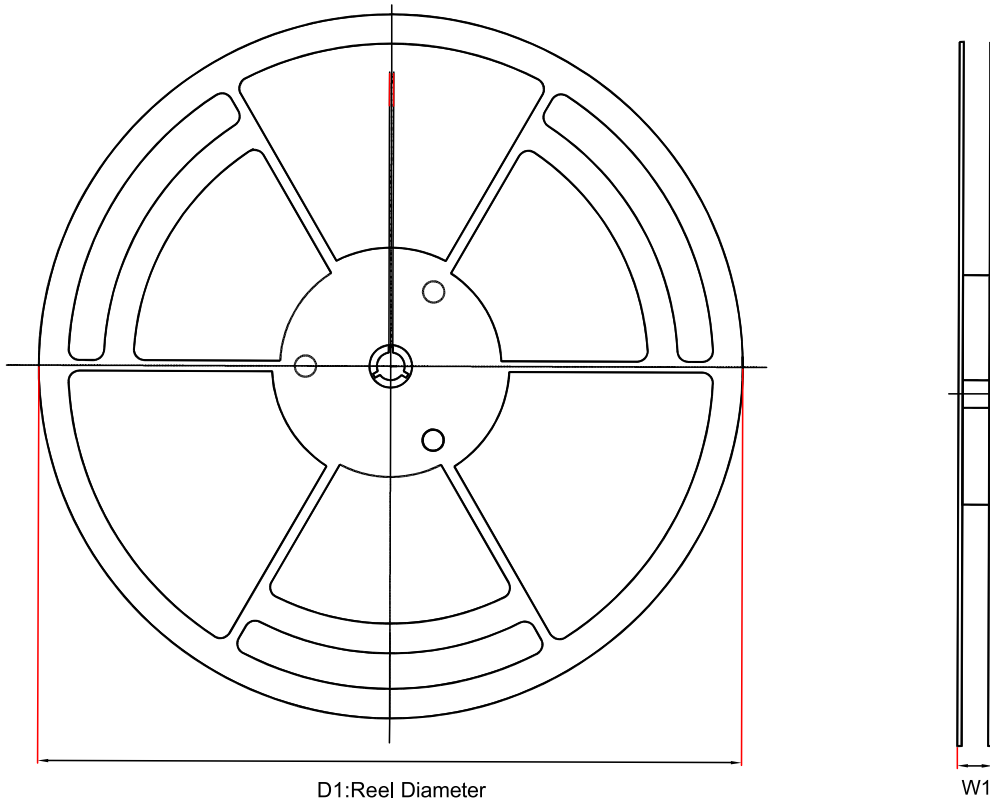


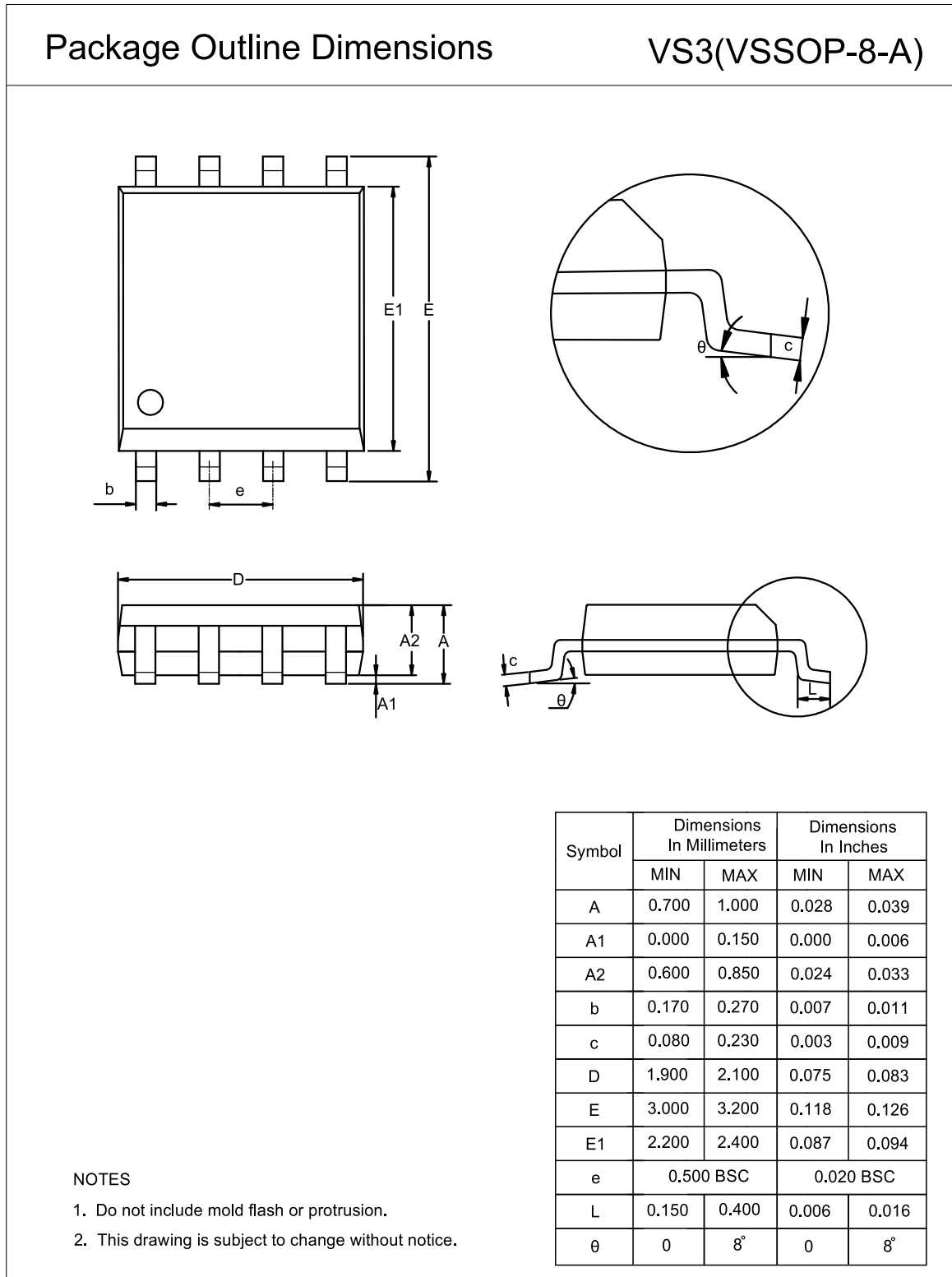
Figure 3. Typical Application Circuit

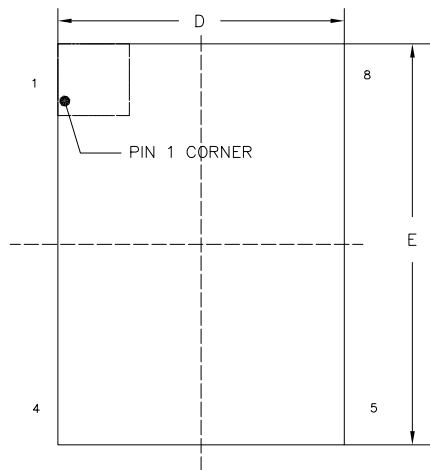
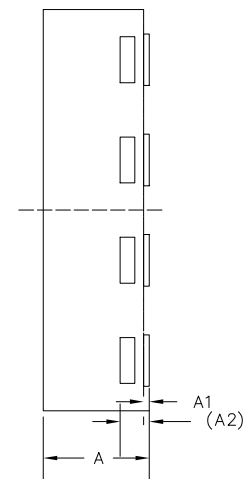
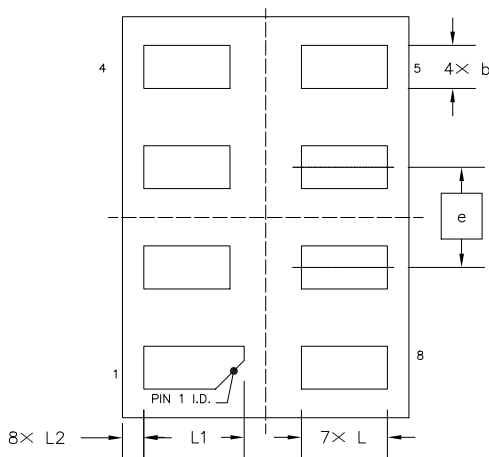
Tape and Reel Information


Order Number	Package	D1 (mm)	W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	W0 (mm)	Pin1 Quadrant
T74L2G08-VS3R	VSSOP8	178	11.4	2.25	3.35	1.05	4	8	Q3
T74L2G08-DFSRR	DFN1.4X1-8	180	13.1	1.15	1.6	0.5	4	8	Q1

Package Outline Dimensions

VSSOP8



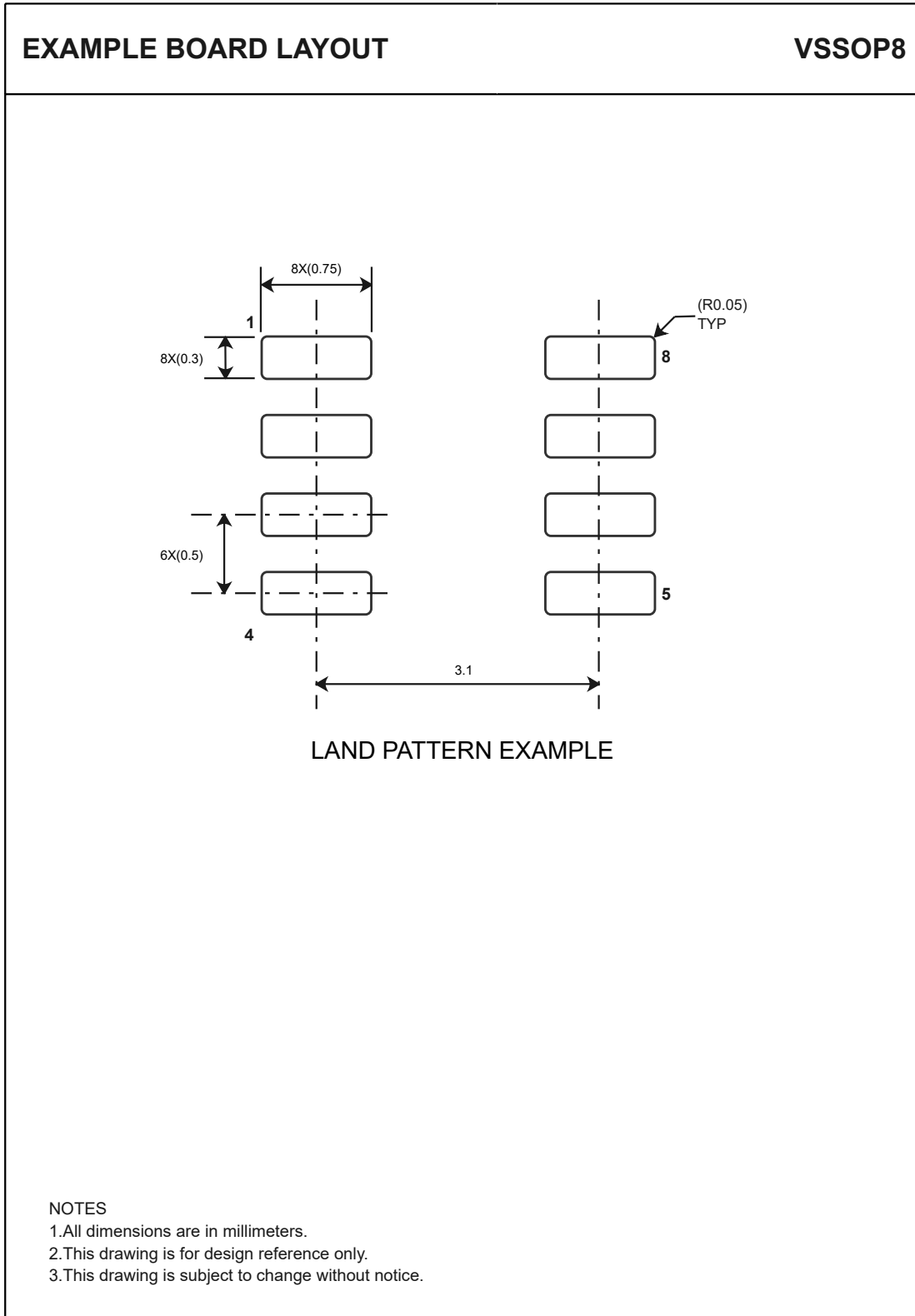
DFN1.4X1-8
Package Outline Dimensions
DFSR(DFN1.4X1-8-B)

TOP VIEW

SIDE VIEW

BOTTOM VIEW
NOTES

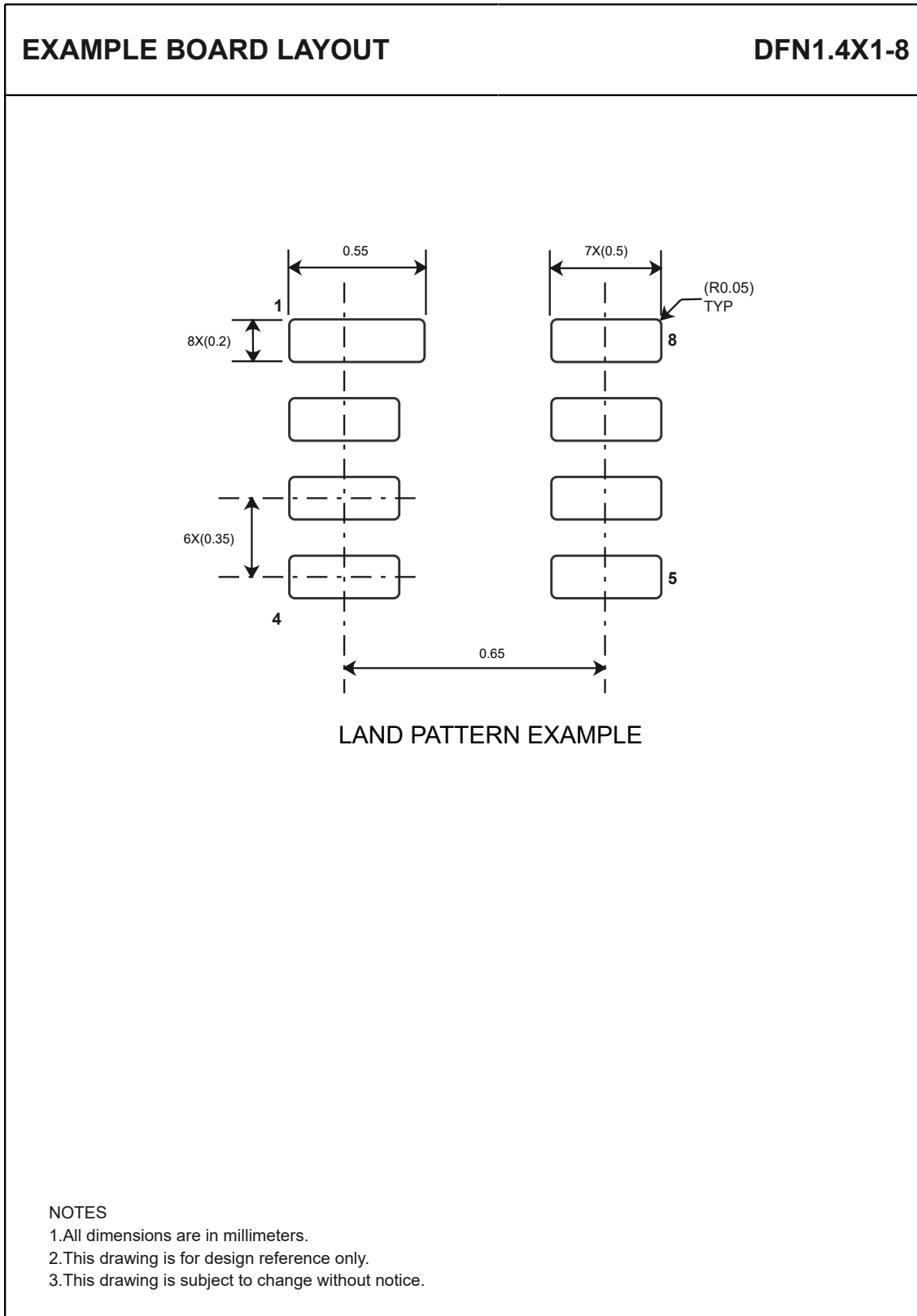
1. Do not include mold flash or protrusion.
2. This drawing is subject to change without notice.

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.320	0.400	0.013	0.016
A1	0.000	0.050	0.000	0.002
A2	0.102 REF		0.004 REF	
b	0.100	0.200	0.004	0.008
D	1.000 BSC		0.039 BSC	
E	1.400 BSC		0.055 BSC	
e	0.350 BSC		0.014 BSC	
L	0.250	0.350	0.010	0.014
L1	0.300	0.400	0.011	0.016
L2	0.075 REF		0.003 REF	

Land Pattern

VSSOP8



DFN1.4X1-8


Order Information

Order Number	Operating Temperature Range	Package	Marking Information	MSL	Transport Media, Quantity	Eco Plan
T74L2G08-VS3R	-40 to 125°C	VSSOP8	V08	MSL3	Tape and Reel,3000	Green
T74L2G08-DFSRR	-40 to 125°C	DFN1.4X1-8	VE	MSL3	Tape and Reel,4000	Green

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

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