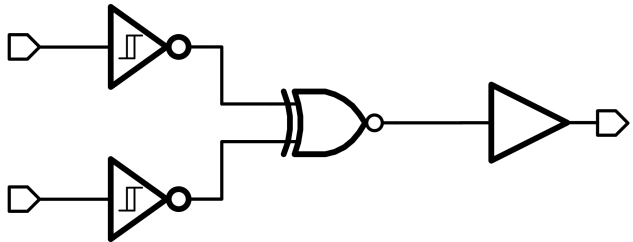


GT74LVC7266

Quadruple 2-Input XNOR Gates with Schmitt-Trigger Inputs

1 Features	2 Application
<ul style="list-style-type: none"> - Wide operating voltage range: 1.65V to 5.5V - Specified from -40°C to 125°C - Schmitt-trigger inputs - Low power consumption - Typical I_{CC} of 0.1 μA - Typical input leakage current of ± 100 nA - ± 7.8mA output drive at 5.5V 	<ul style="list-style-type: none"> - Detect phase differences in input signals - Create a selectable inverter / buffer

3 Description	Logic Diagram (Positive Logic)
<p>This device contains four independent 2-input XNOR Gates with Schmitt-trigger inputs. Each gate performs the Boolean function $Y = \overline{A \oplus B}$ in positive logic.</p>	

4 Revision History

Revision	Date	Note
Rev. A0. 1	2023. 09. 02	Original Version
Rev. A1. 0	2024. 04. 12	1.Updated Electrical Specifications 2.Added Typical Characteristics

The latest datasheet version should be checked on the GTIC official website, as the company does not actively inform customers about updates to the datasheet..

5 Device Summary, Pin and Packages

Table.5-1. Device Summary*

Serial Name	Part Name	Package	Body Size (Nom)	Marking ⁽²⁾	MSL ⁽³⁾	Package Qty
GT74LVC7266	GT74LVC7266PD	SOP14	8.65mm×3.90mm×1.75mm	GT74LVC7266 XXXXXXX	3	Tape and Reel,4000
	GT74LVC7266TD	TSSOP14	5.00mm×4.40mm×1.20mm	GT74LVC7266 XXXXXXX	3	Tape and Reel,4000

(1) For all available package, please contact product sale.

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

(4) "XXXXXX" in Marking will be appeared as the batch code.

5 Device Summary, Pin and Packages(Continued)

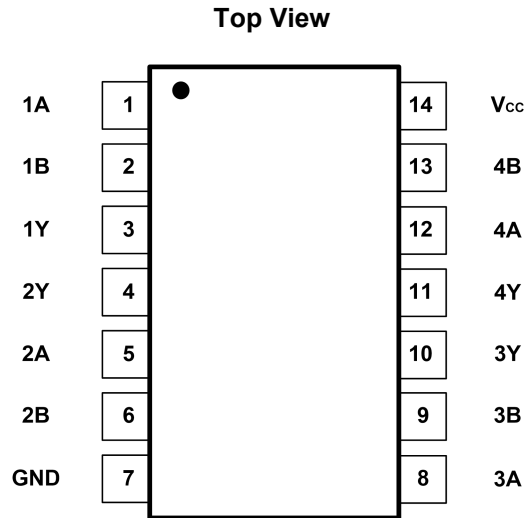


Fig.5-1. GT74LVC7266: PD (SOP14) Package
GT74LVC7266: TD (TSSOP14) Package

Table.5-2. Pin Definition

Pin		I/O	Description
Name	PD TD		
1A	1	I	Channel 1, Input A
1B	2	I	Channel 1, Input B
1Y	3	O	Channel 1, Output Y
2Y	4	O	Channel 2, Output Y
2A	5	I	Channel 2, Input A
2B	6	I	Channel 2, Input B
GND	7	-	Ground
3A	8	I	Channel 3, Input A
3B	9	I	Channel 3, Input B
3Y	10	O	Channel 3, Output Y
4Y	11	O	Channel 4, Output Y
4A	12	I	Channel 4, Input A
4B	13	I	Channel 4, Input B
V _{CC}	14	-	Positive Supply

6 Voltage, Temperature, ESD and Thermal Ratings

6.1 Absolute Maximum Ratings

Parameters		Min.	Max.	Unit
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state	-0.5	V _{CC} +0.5	V
I _{IK}	Input clamp current	V _I <0	-50	mA
I _{OK}	Output clamp current	V _O <0	-50	mA
I _O	Continuous output current		±50	mA
	Continuous current through V _{CC} or GND		±100	mA
T _{stg}	Storage temperature range	-55	150	°C
T _{stg}	Storage temperature	-55	150	°C

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

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

6.2 ESD Ratings

ESD		Value	Unit
V(ESD)	Electrostatic discharge	Human-Body Model (HBM)	8 K
		Charged-Device Model (CDM)	1.5 K

(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.

6 Voltage, Temperature, ESD and Thermal Ratings(Continued)

6.3 Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

Symbol	Parameters		Min.	Max.	Unit
V_{CC}	Supply Voltage		1.65	5.5	V
V_I	Input Voltage		0	V_{CC}	V
V_O	Output Voltage		0	V_{CC}	V
I_{OH}	High-Level Output Current	$V_{CC}=4.5V$		6	mA
		$V_{CC}=6V$		7.8	
I_{OL}	Low-Level output Current	$V_{CC}=4.5V$		6	mA
		$V_{CC}=6V$		7.8	
T_A	Operating Free-air Temperature		-40	125	°C

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

6.4 Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
TSSOP14	180	35	°C/W
SOP14	120	36	°C/W

7 Electrical Specifications

7.1 Electrical Characteristics

FULL=−40°C to +125°C, typical values are at TA=+25°C. (unless otherwise noted)

Parameters	Symbol	Conditions	V _{CC}	T _A	Min.	Typ.	Max.	Unit
Input								
Positive-going Input Threshold Voltage	V _{T+}		1.65V	FULL	0.7		1.5	V
			4.5V		1.7		3.15	
			5.5V		2.1		4.2	
Negative-going Input Threshold Voltage	V _{T-}		1.65V	FULL	0.3		1.0	V
			4.5V		0.9		2.2	
			5.5V		1.2		3.0	
Hysteresis (V _{T+} – V _{T-})	ΔV _T		1.65V	FULL	0.2		1.0	V
			4.5V		0.4		1.4	
			5.5V		0.6		1.6	
Input Leakage Current	I _I	V _I =V _{CC} or 0	5.5V	FULL		±100	±1000	nA
Input Capacitance	C _i	V _I =V _{CC} or GND	1.65V to 5.5V	FULL			5.5	pF
Output								
High-level Output Voltage	V _{OH}	I _{OH} =−20μA	1.65V to 5.5V	FULL	V _{CC} – 0.1	V _{CC} – 0.002		V
		I _{OH} =−6mA	4.5V		4.0	4.34		
		I _{OH} =−7.8mA	5.5V		5.4	5.75		
Low-level Output Voltage	V _{OL}	I _{OL} =20μA	1.65V to 5.5V	FULL		0.002	0.1	V
		I _{OL} =6mA	4.5V			0.1	0.30	
		I _{OL} =7.8mA	5.5V			0.12	0.33	
Power Supply								
Power Supply Range	V _{CC}		1.65V to 5.5V	FULL	1.65		5.5	V
Supply Current	I _{CC}	V _I =V _{CC} or 0, I _O =0	5.5V	FULL		0.1	10	μA

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

7 Electrical Specifications(Continued)

7.2 Switching Characteristics

Over recommended operating free-air temperature range, $C_L=50$ pF (unless otherwise noted)

Parameter	From(Input)	To(Output)	-40°C to +125°C						Units
			V _{CC} =1.65V		V _{CC} =4.5V		V _{CC} =5.5V		
			Min	Max	Min	Max	Min	Max	
t _{pd}	A or B	Y	8	11.9	3.1	4.5	2.7	3.9	ns

7.3 Operating Characteristics

TA=-40°C to +125°C

Parameter		Test Conditions	V _{CC} =1.65V to 5.5V	Units
			Typ	
C _{pd}	Power Dissipation Capacitance	f=10MHz	20	pF

8 Typical Characteristics

Typical values are at TA=+25°C (unless otherwise noted)

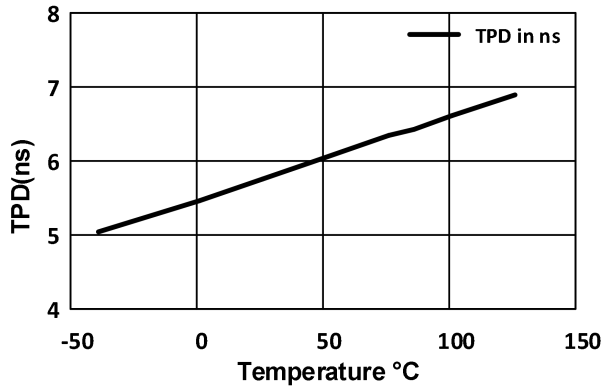


Fig.8-1. TPD Across Temperature at 3.6V V_{cc}

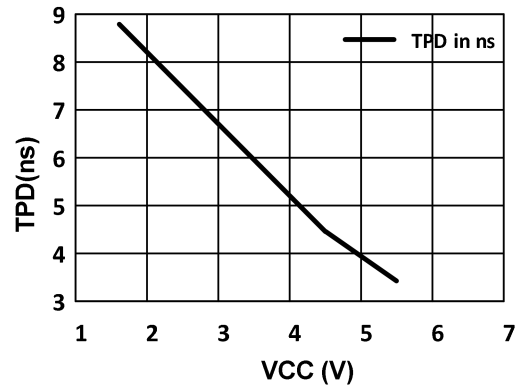
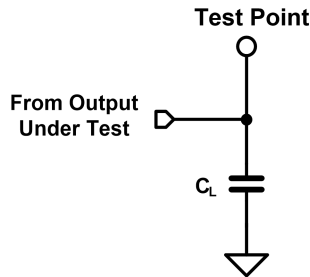


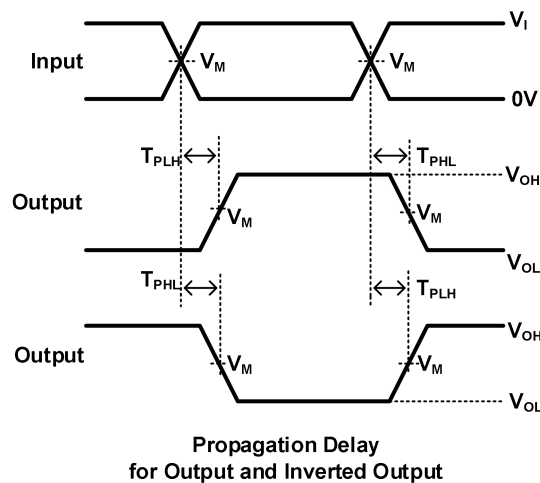
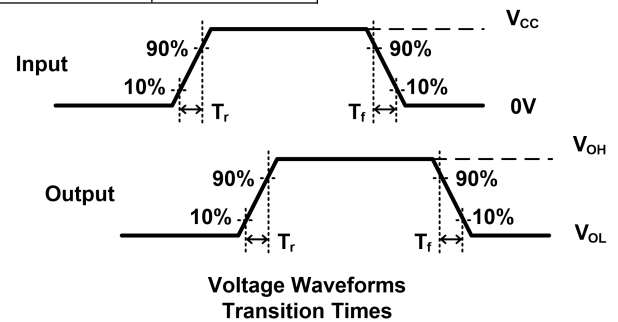
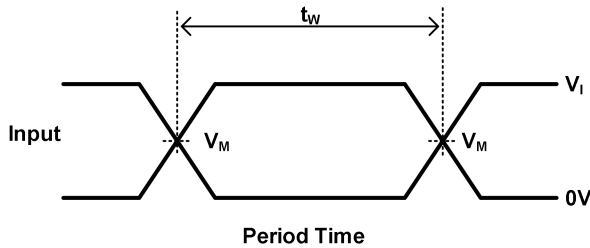
Fig.8-2. TPD Across V_{cc} at 25°C

9 Parameter Measurement Information



$C_L=50\text{pF}$ and includes probe and jig capacitance

V_{CC}		INPUTS T_r/T_f	V_M	C_L
V_I	V_I			
1.65V	V_{CC}	$\leq 2.5\text{ns}$	$V_{CC}/2$	50pF
4.5V	V_{CC}	$\leq 2.5\text{ns}$	$V_{CC}/2$	50pF
5.5V	V_{CC}	$\leq 2.5\text{ns}$	$V_{CC}/2$	50pF



Notes:A. C includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: PRR 10 MHz, $Z=50$.

D. The outputs are measured one at a time, with one transition per measurement.

E. t_{PLH} and t_{PHL} are the same as t_{pd} .

F. All parameters and waveforms are not applicable to all device.

10 Detailed Description

10.1 Overview

This device contains four independent 2-input XNOR Gates with Schmitt-trigger inputs. Each gate performs the Boolean function $Y = \overline{A \oplus B}$ in positive logic.

10.2 Device Functional Modes

Table.10-1. Function Table

Inputs		Output
A	B	Y
L	L	H
L	H	L
H	L	L
H	H	H

11 Application Note

In this application, a 2-input XNOR gate is used as a phase difference detector as shown in Fig. 10-1. The remaining three gates can be used for other applications in the system, or the inputs can be grounded and the channels left unused.

The GT74LVC7266 is used to identify phase difference between a reference clock and another input clock. Whenever the clock states are different, the XNOR output will pulse LOW until the clocks return to the same state. The output is fed into a low-pass filter to obtain a DC representation of the phase difference.

Typically, clock signals have fast transition rates, but additional filtering can be added to the clock signals which can lead to slower transitions rates. This makes the GT74LVC7266 ideal for the application because it has Schmitt-trigger inputs that do not have input transition rate requirements.

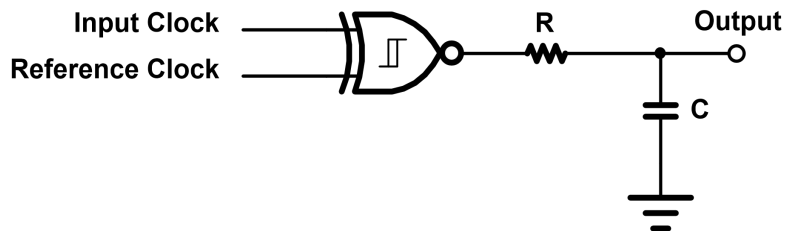


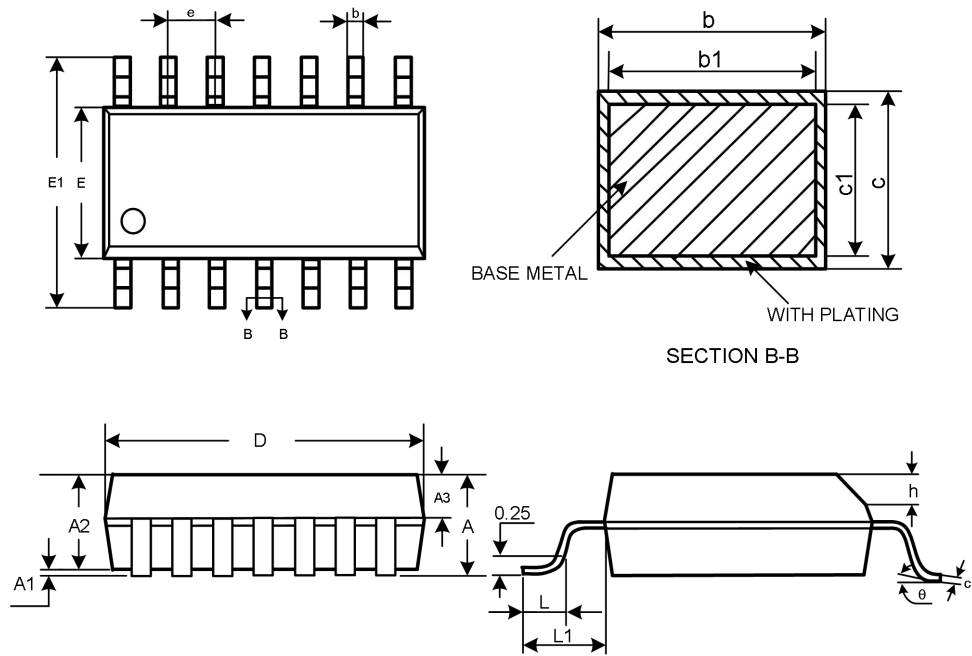
Fig.11-1. Typical application block diagram

Design Requirements:

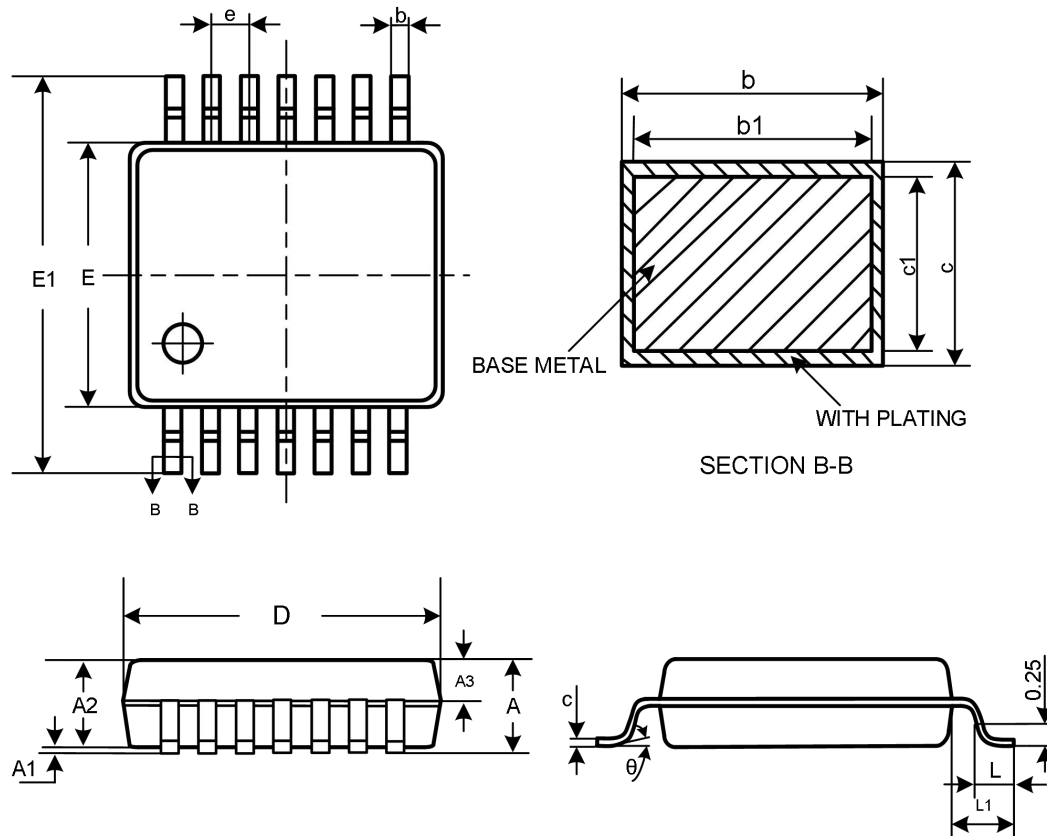
- All signals in the system operate at 5 V
- The XNOR outputs LOW if any of these conditions apply: Input clock is in a HIGH state while the reference clock is in a LOW state; Input clock is in a LOW state while the reference clock is in a HIGH state.

12 Package Outline Dimension

SOP14

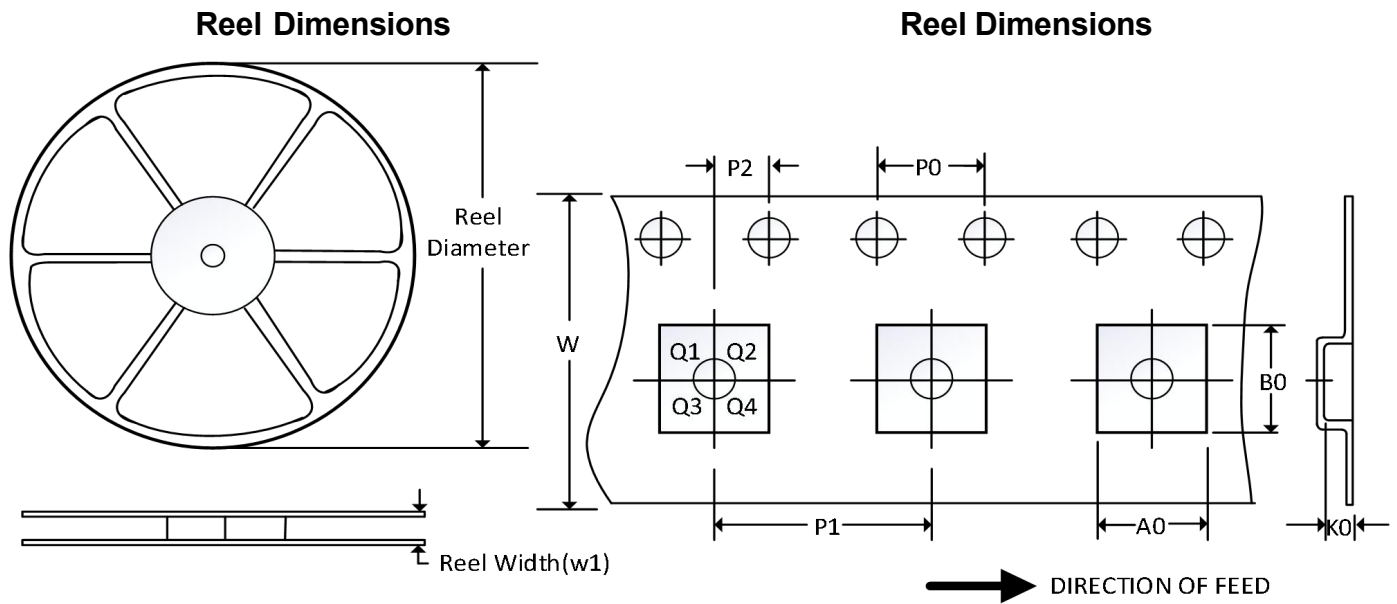


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.75
A1	0.10	—	0.225
A2	1.30	1.40	1.50
A3	0.60	0.65	0.70
b	0.39	—	0.47
b1	0.38	0.41	0.44
c	0.20	—	0.24
c1	0.19	0.20	0.21
D	8.55	8.65	8.75
E1	5.80	6.00	6.20
E	3.80	3.90	4.00
e	1.27BSC		
h	0.25	—	0.50
L	0.50	—	0.80
L1	1.05REF		
θ	0°	—	8°

12 Package Outline Dimension(Continued)
TSSOP14


SYMBOL	MILLMETER		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.39	0.44	0.49
b	0.20	—	0.28
b1	0.19	0.22	0.25
c	0.13	—	0.17
c1	0.12	0.13	0.14
D	4.90	5.00	5.10
E	4.30	4.40	4.50
E1	6.20	6.40	6.60
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00BCS		
θ	0°	—	8°

13 Tape and Reel Information



NOTE: The picture is only for reference. Please make the object as the standard.

Key Parameter List of Tape and Reel

Package Type	Reel Diameter	Reel Width(mm)	A0 (mm)	B0 (mm)	K0 (mm)	P0 (mm)	P1 (mm)	P2 (mm)	W (mm)	Pin1 Quadrant
TSSOP14	13"	12.4	6.95	5.60	1.20	4.0	8.0	2.0	12.0	Q1
SOP14	13"	16.4	6.60	9.30	2.10	4.0	8.0	2.0	16.0	Q1

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.