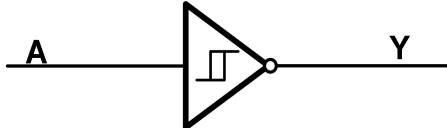


GT74LVC1G14

Single Schmitt-Trigger Inverter

1 Features	2 Application
<ul style="list-style-type: none"> - Schmitt-trigger inputs provide hysteresis - Supports 5 V V_{CC} operation - Inputs accept voltages to 5.5 V - Max t_{pd} of 5.4 ns at 3.3 V - ± 24 mA output drive at 3.3 V - I_{off} supports partial-power-down mode - Typical $V_{OHV} > 2$ V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$ - Typical $V_{OLP} < 0.8$ V at $V_{CC} = 3.3$ V, $T_A = 25^\circ\text{C}$ 	<ul style="list-style-type: none"> - AV receivers - Audio docks: portable - Blu-ray players and home theater - MP3 players/recorders - Personal digital assistants (PDAs) - Power: telecom/server AC/DC supply - Solid state drives (SSDs): client and enterprise - TVs: LCD/digital and high-definition (HDTVs) - Tablets: enterprise - Wireless headsets, keyboards, and mice

3 Description	Circuit Diagram
<p>The operating voltage range of the GT74LVC1G14 single Schmitt-trigger inverter is 1.65V to 5.5V.</p> <p>The GT74LVC1G14 device contains single inverter and performs the Boolean function $Y = \overline{A}$. Because of the Schmitt-Trigger inputs, the device may have different input threshold levels for positive-going (V_{T+}) and negative-going (V_{T-}) signals, to provide hysteresis (ΔV_T) which makes the device tolerant to slow or noisy input signals.</p> <p>This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.</p>	

4 Revision History

Revision	Date	Note
Rev. A1.0	2023. 08. 31	Original Version
Rev. A1.1	2023. 10. 24	1.Updated Package Qty 2.Added Tape and Reel Information 3. Added Application Note
Rev. A1.2	2023. 12. 26	1.Added Marking 2.Added MSL
Rev. A1.3	2024. 01. 26	Updated Part Name

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⁽¹⁾

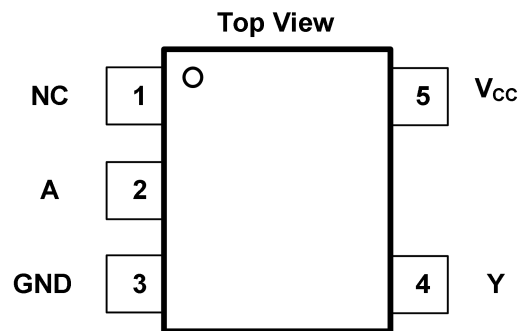
Serial Name	Part Name	Package	Body Size (Nom)	Marking ⁽²⁾	MSL ⁽³⁾	Package Qty
GT74LVC1G14	GT74LVC1G14S5	SOT23-5	2.90mm×1.60mm×1.10mm	1G14 XXXXX	3	Tape and Reel 3000
	GT74LVC1G14C5	SC70-5	2.10mm×1.25mm×1.00mm	1G14 XXXXX	3	Tape and Reel 3000

(1) For all available packages, please contact product sales.

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



**Fig.5-1. GT74LVC1G14: S5 (SOT23-5) Package
GT74LVC1G14: C5 (SC70-5) Package**

Table 5-2 Pin Definition

Pin		Type	Description
Name	S5 C5		
NC	1	—	No internal connection
A	2	I	Input
GND	3	—	Ground
Y	4	O	Output
V _{cc}	5	—	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_J	Junction temperature under bias		150	°C
T_{stg}	Storage temperature range	-65	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)	4 K V
		Charge device model (CDM)	2 K 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.

6.3 Recommended Operating Conditions

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

Symbol	Parameter	Min	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
I_{OH}	High-level output current	$V_{CC}=1.65V$	-4	mA
		$V_{CC}=2.3V$	-8	
		$V_{CC}=3V$	-16	
			-24	
		$V_{CC}=4.5V$	-32	
I_{OL}	Low-level output current	$V_{CC}=1.65V$	4	mA
		$V_{CC}=2.3V$	8	
		$V_{CC}=3V$	16	
			24	
		$V_{CC}=4.5V$	32	
T_A	Operating free-air temperature	-40	125	°C

6.4 Thermal Information

Package Type	θ_{JA}	θ_{JC}	Unit
SOT23-5	250	81	°C/W
SC70-5	400	150	°C/W

7 Electrical Specifications

V_{CC}=5.0V or 3.3V, FULL=-40°C to +125°C, Typical values are at T_A=+25°C. (unless otherwise noted)

Parameter	Test Conditions	V _{CC}	-40°C to 85°C			-40°C to 125°C			Unit
			Min	Typ	Max	Min	Typ	Max	
V _{T+} Positive-going input threshold voltage		1.65 V	0.7		1.4	0.7		1.4	V
		2.3 V	1.0		1.7	1.0		1.7	
		3 V	1.3		2.0	1.3		2.0	
		4.5 V	1.9		3.1	1.9		3.1	
		5.5 V	2.2		3.7	2.2		3.7	
V _{T-} Negative-going input threshold voltage		1.65 V	0.25		0.7	0.25		0.7	V
		2.3 V	0.4		1	0.4		1.0	
		3 V	0.8		1.3	0.8		1.3	
		4.5 V	1.1		2	1.1		2.0	
		5.5 V	1.4		2.5	1.4		2.5	
ΔV _T Hysteresis (V _{T+} - V _{T-})		1.65 V	0.3		1	0.3		1	V
		2.3 V	0.4		1	0.4		1	
		3 V	0.5		1	0.5		1	
		4.5 V	0.6		1	0.6		1	
		5.5 V	0.7		1.1	0.7		1.1	
V _{OH}	I _{OH} =- 100 μA	1.65 V to 5.5 V	V _{CC} -0.1			V _{CC} -0.1			V
	I _{OH} =-4 mA	1.65 V	1.2			1.2			
	I _{OH} =-8 mA	2.3 V	1.9			1.9			
	I _{OH} =- 16 mA	3 V	2.4			2.4			
	I _{OH} =-24 mA		2.3			2.3			
	I _{OH} =-32 mA	4.5 V	3.8			3.8			
V _{OL}	I _{OL} =100 μA	1.65 V to 5.5 V			0.1			0.1	V
	I _{OL} =4 mA	1.65 V			0.45			0.45	
	I _{OL} =8 mA	2.3 V			0.3			0.3	
	I _{OL} =16 mA	3 V			0.4			0.4	
	I _{OL} =24 mA				0.55			0.55	
	I _{OL} =32 mA	4.5 V			0.55			0.55	
I _I	A input	V _I =5.5 V or GND	0 to 5.5 V			±5		±5	μA
I _{off}		V _I or V _O =5.5 V	0			±10		±10	μA
I _{CC}		V _I =5.5 V or GND, I _O =0	1.65 V to 5.5 V			10		10	μA
ΔI _{CC}		One input at V _{CC} - 0.6 V, Other inputs at V _{CC} or GND	3 V to 5.5 V			500		500	μA
C _i		V _I =V _{CC} or GND	3.3 V		5			5	pF

(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)

V_{CC}=5.0V or 3.3V, FULL=-40°C to +125°C, Typical values are at T_A=+25°C. (unless otherwise noted)

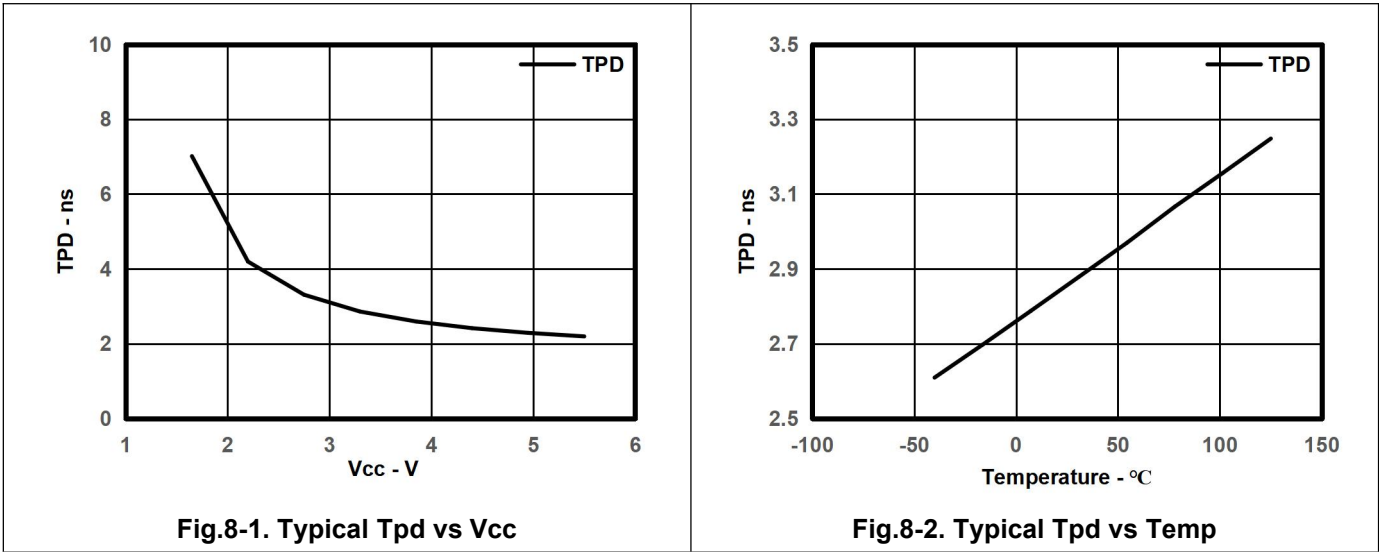
Parameter	From (Input)	To (Output)	-40°C to 125°C								Unit
			V _{CC} =1.8 V ± 0.15 V		V _{CC} =2.5 V ± 0.2 V		V _{CC} =3.3 V ± 0.3 V		V _{CC} =5 V ± 0.5 V		
			Min	Max	Min	Max	Min	Max	Min	Max	
t _{pd}	A	Y	3.9	13.0	1.9	5.0	2.2	4.5	1.5	4.2	ns

T_A=25°C

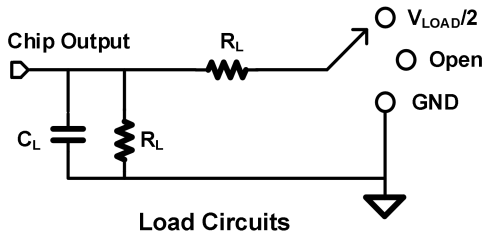
Parameter		Test Conditions	V _{CC} =1.8 V	V _{CC} =2.5 V	V _{CC} =3.3 V	V _{CC} =5 V	Unit
			Typ	Typ	Typ	Typ	
C _{pd}	Power dissipation capacitance	f=10 MHz	17	18	25	30	pF

8 Typical Characteristics

Over recommended operating free-air temperature range, $C_L=30$ pF or 50 pF (unless otherwise noted).

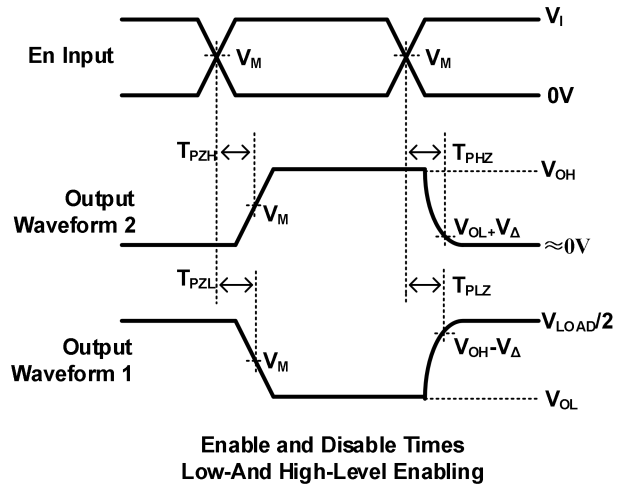
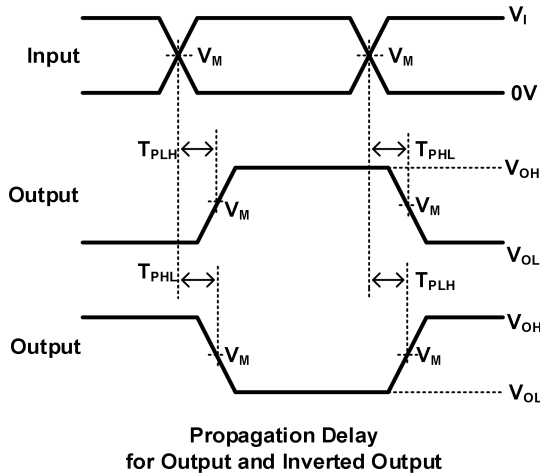
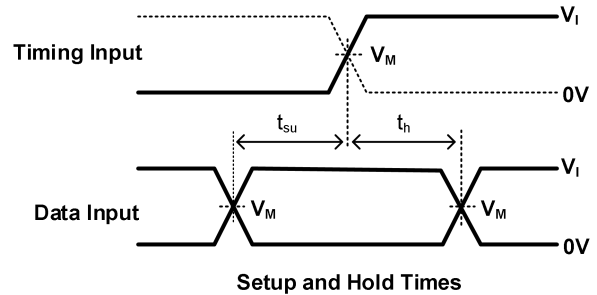
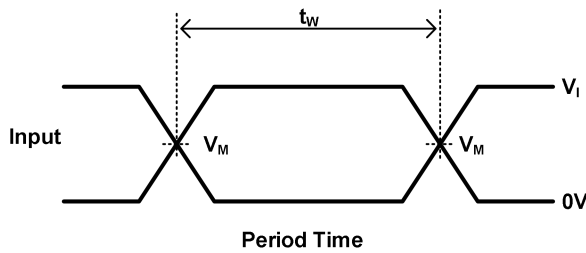


9 Parameter Measurement Information



TEST	S1
T_{PHL}/T_{PLH}	OPEN
T_{PLZ}/T_{PZL}	V_{LOAD}
T_{PHZ}/T_{PZH}	GND

V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_i	T_r/T_f					
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1kΩ	0.15V
2.5V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500Ω	0.15V
3.3V±0.15V	3V	≤2.5ns	1.5V	6V	50pF	500Ω	0.3V
5V±0.15V	V_{CC}	≤2.5ns	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500Ω	0.3V



Notes: A. C_L 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_{PLZ} and t_{PHZ} are the same as t_{dis} .

F. t_{PZL} and t_{PZH} are the same as t_{en} .

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

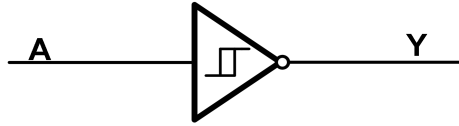
H. All parameters and waveforms are not applicable to all device.

10 Detailed Description

10.1 Overview

This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current back flow through the device when it is powered down.

10.2 Functional Block Diagram



10.3 Feature Description

The device is designed for 1.65 V to 5.5 V V_{CC} operation and it allows down voltage translation from 5 V to 3.3 V, or 3.3 V to 1.8 V. Input signals to this device can be driven above the supply voltage so long as they remain below the maximum input voltage value.

The GT74LVC1G14 has power-down protection (I_{off}) and Schmitt-trigger input.

The inputs and outputs for this device enter a high impedance state when the supply voltage is 0 V. The maximum leakage into or out of any input or output pin on the device is specified by I_{off} in the Electrical Characteristics.

The Schmitt-Trigger input makes this device extremely tolerant to slow or noisy inputs. While the inputs can be driven much slower than standard CMOS inputs, it is still recommended to properly terminate unused inputs. Driving the inputs slowly will also increase dynamic current consumption of the device.

10.4 Device Functional Modes

Table 10-1 Function Table

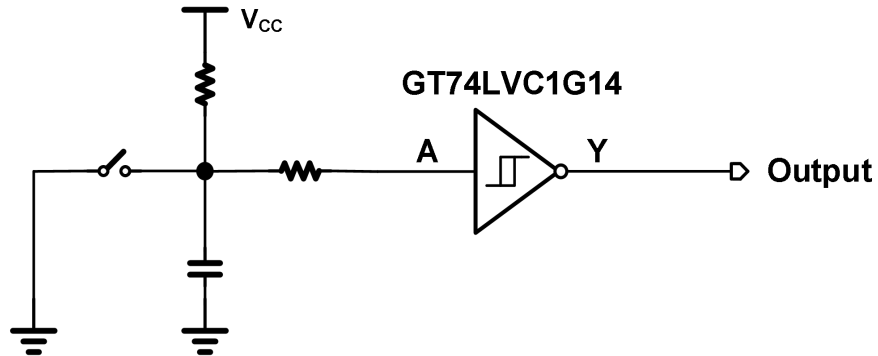
Input A	Output Y
H	L
L	H

11 Application Note

11.1 Application Information

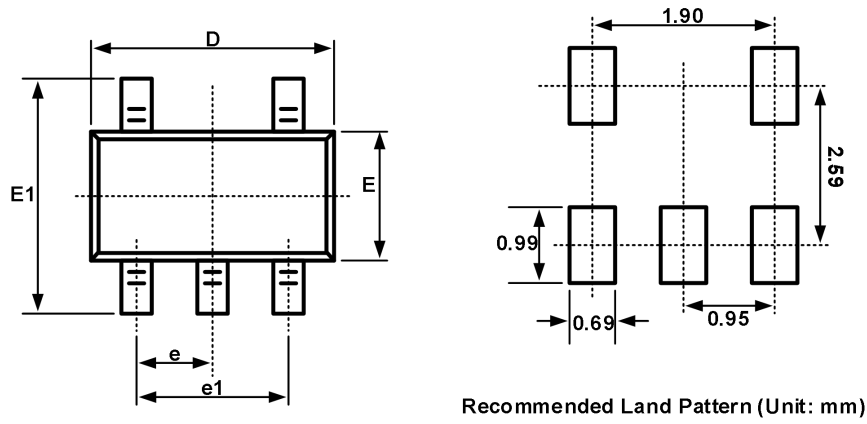
Mechanical input elements, such as push buttons or rotary knobs, offer simple ways to interact with electronic systems. Typically, these elements have recoil or bouncing, where the mechanical element makes and breaks contact multiple times during human interaction. This bouncing can cause one or more repeated signals to be passed, triggering multiple actions when only a single input was intended. One potential solution to mitigating these multiple inputs is by utilizing a Schmitt-trigger to create a debounce circuit.

11.2 Typical Application



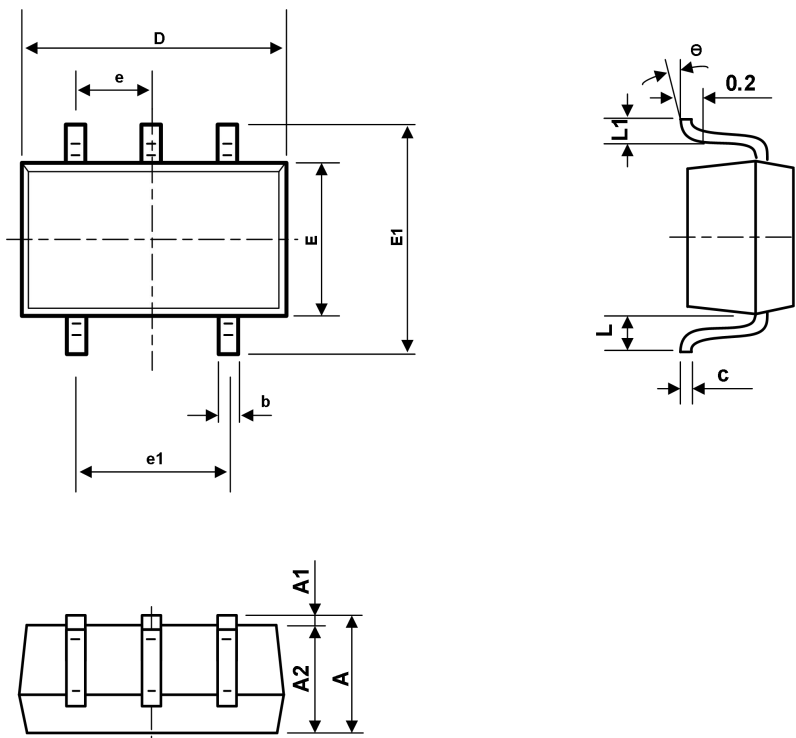
12 Package Outline Dimension

SOT23-5



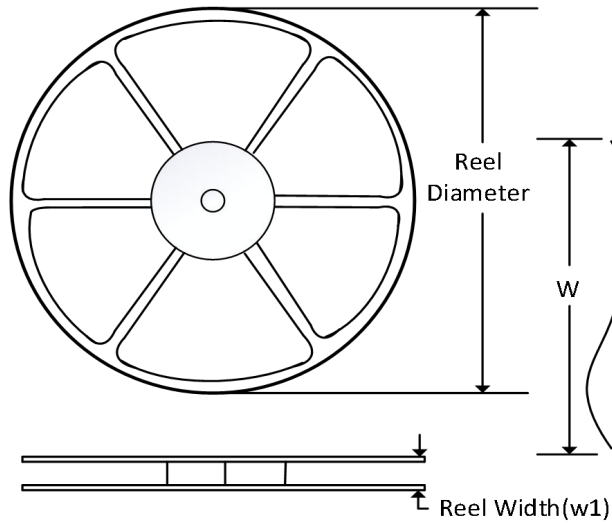
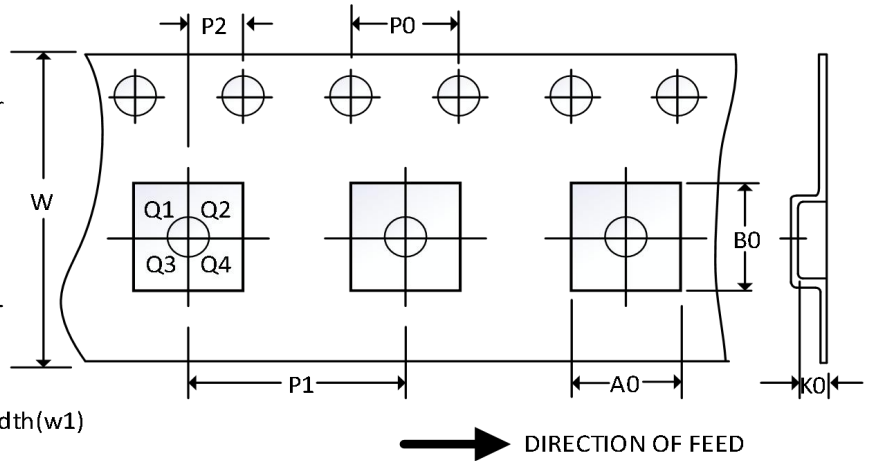
Recommended Land Pattern (Unit: mm)

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950BSC		0.037BSC	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
L1	0.600REF		0.024REF	
θ	0°	8°	0°	8°

12 Package Outline Dimension(Continued)
SC70-5


symbol	Dimension In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.110	0.175	0.004	0.007
D	2.000	2.200	0.079	0.087
E	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650TYP		0.026TYP	
e1	1.200	1.400	0.047	0.055
L	0.525REF		0.021REF	
L1	0.260	0.460	0.010	0.018
e	0°	8°	0°	8°

13 TAPE AND REEL INFORMATION

REEL DIMENSIONS

REEL DIMENSIONS


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
SOT23-5	7"	9.5	3.20	3.20	1.40	4.0	4.0	2.0	8.0	Q3
SC70-5	7"	9.5	2.25	2.55	1.20	4.0	4.0	2.0	8.0	Q3

NOTE:

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