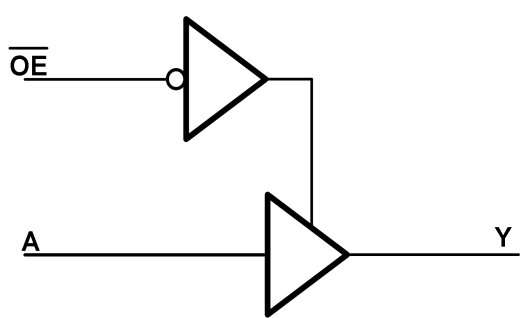


GT74LVC1G125

Single Bus Buffer Gate With 3-State Output

1 Features	2 Application
<ul style="list-style-type: none"> - 3-State output - Wide supply voltage range from 1.65 to 5.5V - Inputs accept voltages to 5.5 V - Max t_{pd} of 4.7 ns at 3.3 V - ± 24-mA output drive at 3.3 V - I_{off} supports partial-power-down mode 	<ul style="list-style-type: none"> - Cable modem termination system - Video communications system - High-speed data acquisition and generation - Military: radar and sonar - Motor control: high-voltage - Power line communication modem - SSD: Internal or external - Video broadcasting and infrastructure - Video broadcasting - WiMAX and wireless infrastructure equipment

3 Description	Circuit Diagram
<p>The operating voltage range of the bus buffer gate is 1.65-V to 5.5-V.</p> <p>The GT74LVC1G125 device is a single line driver with a 3-state output. The output is disabled when the output-enable (\overline{OE}) input is high.</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. 09. 02	Original Version
Rev. A1. 1	2023. 12. 15	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
GT74LVC1G125	GT74LVC1G125S5	SOT23-5	2.90mm×1.60mm×1.10mm	1G125 XXXXX	3	Tape and Reel 3000
	GT74LVC1G125C5	SC70-5	2.10mm×1.25mm×1.00mm	1G125 XXXXX	3	Tape and Reel 3000

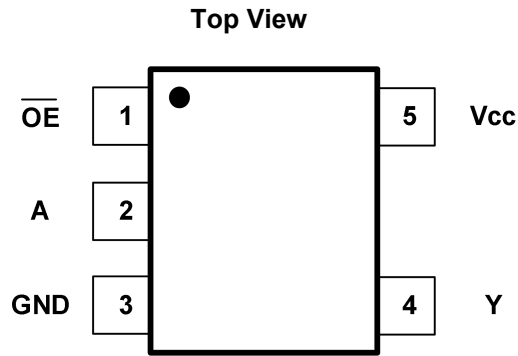
(1) For all available packages, please contact product sales.

(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.

5 Device Summary, Pin and Packages(Continued)



**Fig.5-1.GT74LVC1G125 :S5 (SOT23-5) Package
GT74LVC1G125 C5 (SC70-5) Package**

Table 5-2 S5/C5 Pin definition

Pin		I/O	Description
Name	S5 C5		
\overline{OE}	1	I	Enable Input
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⁽¹⁾

Parameters		Min	Max.	Unit
V _{CC}	Supply voltage range	-0.5	6.5	V
V _I	Input voltage range ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾	-0.5	6.5	V
V _O	Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾	-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) ⁽¹⁾	8 K V
		Charge-Device Model (CDM) ⁽²⁾	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 Voltage, Temperature, ESD and Thermal Ratings (Continued)

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	
		$V_{CC}=4.5V$	-24	
I_{OL}	Low-level output current	$V_{CC}=1.65V$	4	mA
		$V_{CC}=2.3V$	8	
		$V_{CC}=3V$	16	
		$V_{CC}=4.5V$	24	
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

All typical values are at $V_{CC} = 3.3V$, $T_A = +25^\circ C$

Parameter	Test Conditions	Vcc	-40°C to 85°C			-40°C to 125°C			Unit
			Min	Typ	Max	Min	Typ	Max	
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	V _I =5.5 V or GND	V _I =5.5 V or GND	0 to 5.5 V		±5			±5	μA
	Input								
I _{off}	V _I or V _O =5.5 V	0			±10			±10	μA
I _{oz}	V _O =0 to 5.5 V	3.6 V			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)

Typical Values at $T_A=+25^\circ\text{C}$ and nominal voltages 1.8V, 2.5V, 3.3V, and 5.0V.

Parameter	From (Input)	To (Output)	-40°C to 125°C								Unit
			$V_{CC}=1.8\text{ V} \pm 0.15\text{ V}$		$V_{CC}=2.5\text{ V} \pm 0.15\text{ V}$		$V_{CC}=3.3\text{ V} \pm 0.15\text{ V}$		$V_{CC}=5\text{ V} \pm 0.15\text{ V}$		
			Min	Max	Min	Max	Min	Max	Min	Max	
t_{pd}	A	Y	2.8	9.5	1.2	5.8	1	4.7	1	3.2	
t_{en}	$\overline{\text{OE}}$	Y	3.3	10.8	1.5	6.9	1	5.6	1	5.2	ns
t_{dis}	$\overline{\text{OE}}$	Y	1.3	11.8	1	5.2	1	5.2	1	4.4	ns

$T_A=25^\circ\text{C}$

Parameter		Test Conditions	$V_{CC}=1.8\text{ V}$	$V_{CC}=2.5\text{ V}$	$V_{CC}=3.3\text{ V}$	$V_{CC}=5\text{ V}$	Unit
			Typ	Typ	Typ	Typ	
C_{pd}	Power Dissipation Capacitance	f=10 MHz	17	18	25	30	pF

8 Typical Characteristics

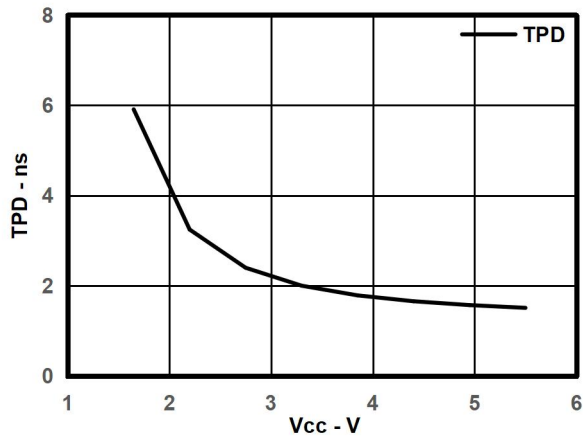


Fig.8-1. Typical Tpd vs Vcc

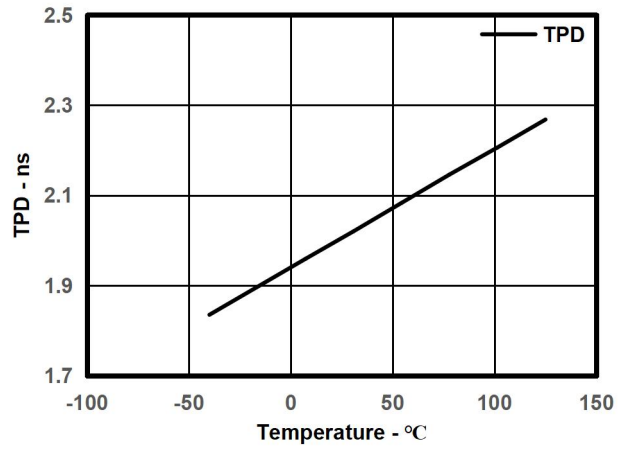
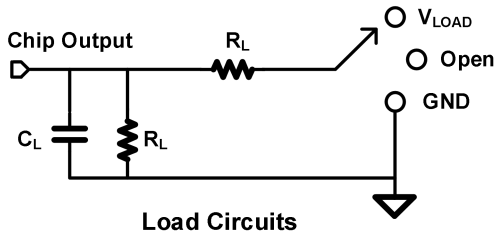


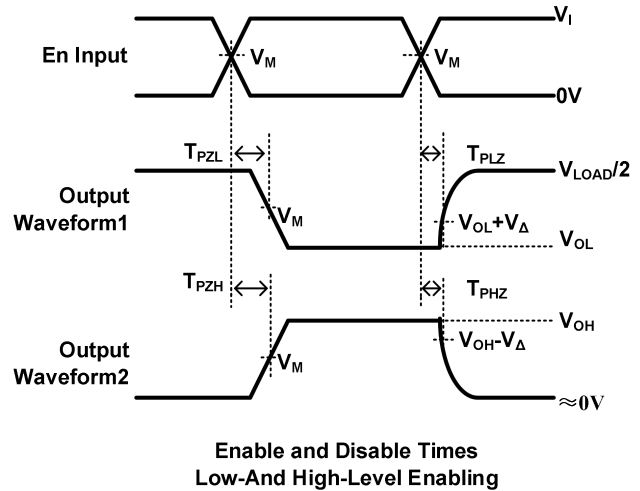
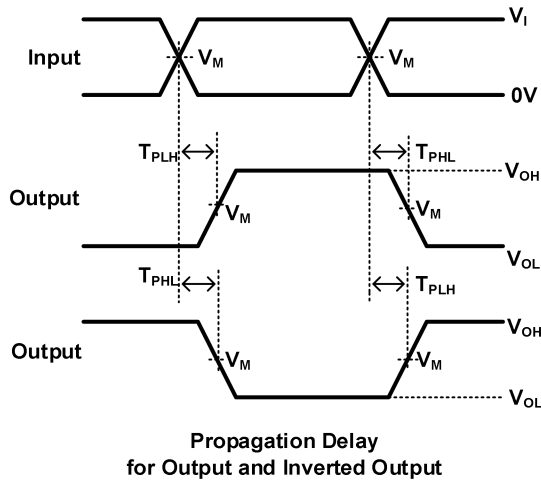
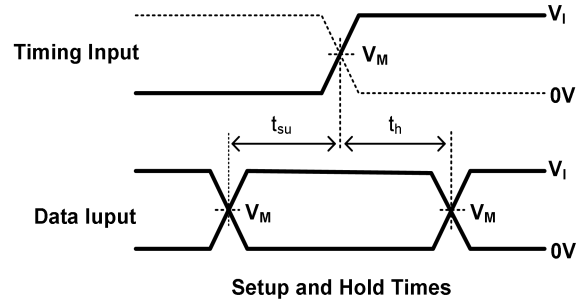
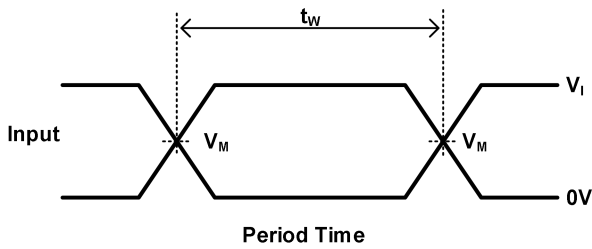
Fig.8-2. Typical Tpd vs Temp

9 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					
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	1k Ω	0.15V
$2.5V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	30pF	500 Ω	0.15V
$3.3V \pm 0.15V$	3V	$\leq 2.5ns$	1.5V	6V	50pF	500 Ω	0.3V
$5V \pm 0.15V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	50pF	500 Ω	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, $Z = 50\Omega$.

- 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 devices.

10 Detailed Description

10.1 Overview

The GT74LVC1G125 device contains one buffer gate device with output enable control and performs the Boolean function $Y = A$. 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. To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

10.2 Functional Block Diagram

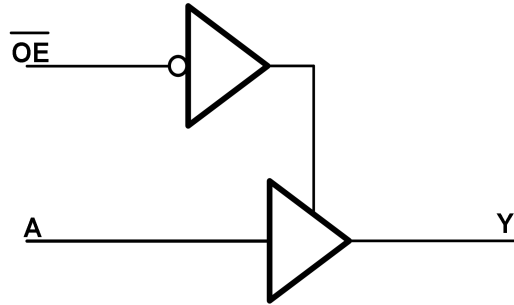


Fig.10-1

10.3 Feature Description

The GT74LVC1G125 have wide operating voltage range from 1.65 V to 5.5 V, It Allows down voltage translation and I_{off} feature allows voltages on the inputs and outputs, when V_{CC} is 0 V.

10.4 Device Functional Modes

Table 10-1 Function Table

Inputs		Output
\overline{OE}	A	Y
L	H	H
L	L	L
H	X	Z

11 Application Note

11.1 Application Information

The GT74LVC1G125 device is a high drive CMOS device that can be used as an output enabled buffer with a high output drive, such as an LED application. It can produce 24 mA of drive current at 3.3 V making it ideal for driving multiple outputs and good for high-speed applications up to 100 MHz. The inputs are 5.5 V tolerant allowing it to translate down to V_{CC} .

11.2 Typical Power Button Circuit

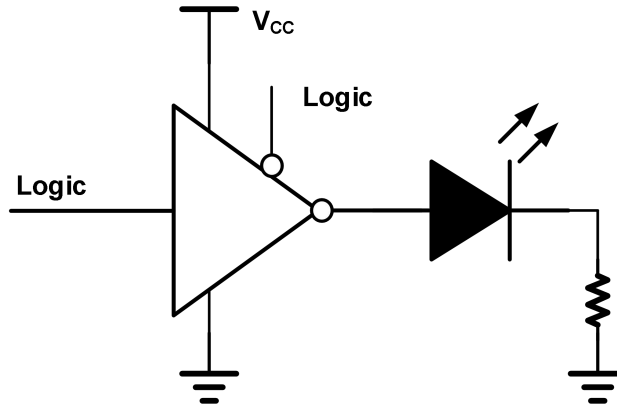
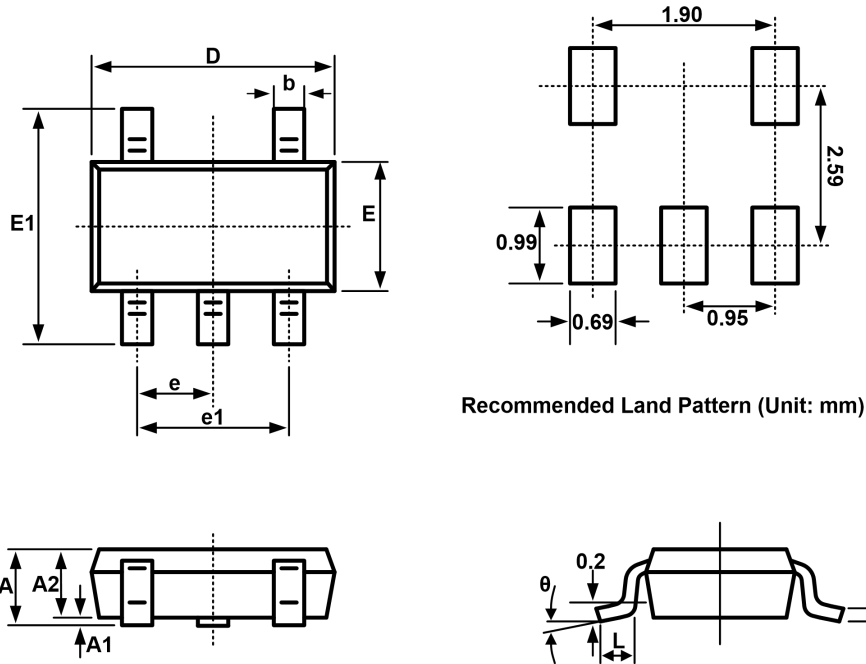


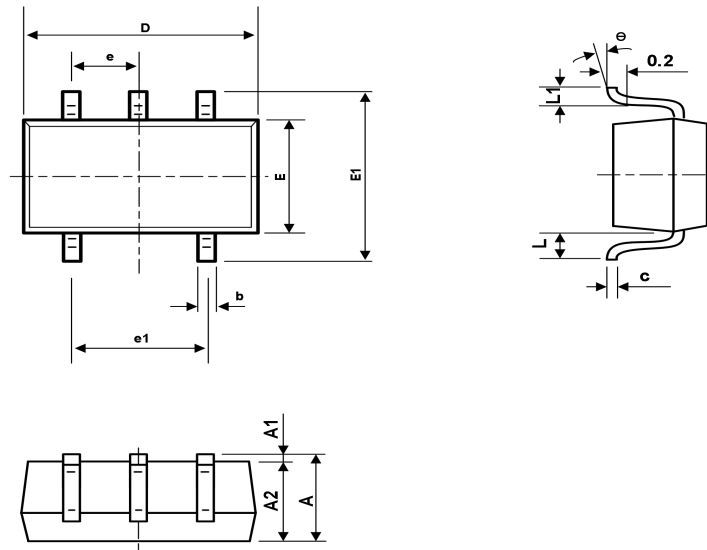
Fig.11-1

12 Package Outline Dimension

SOT23-5

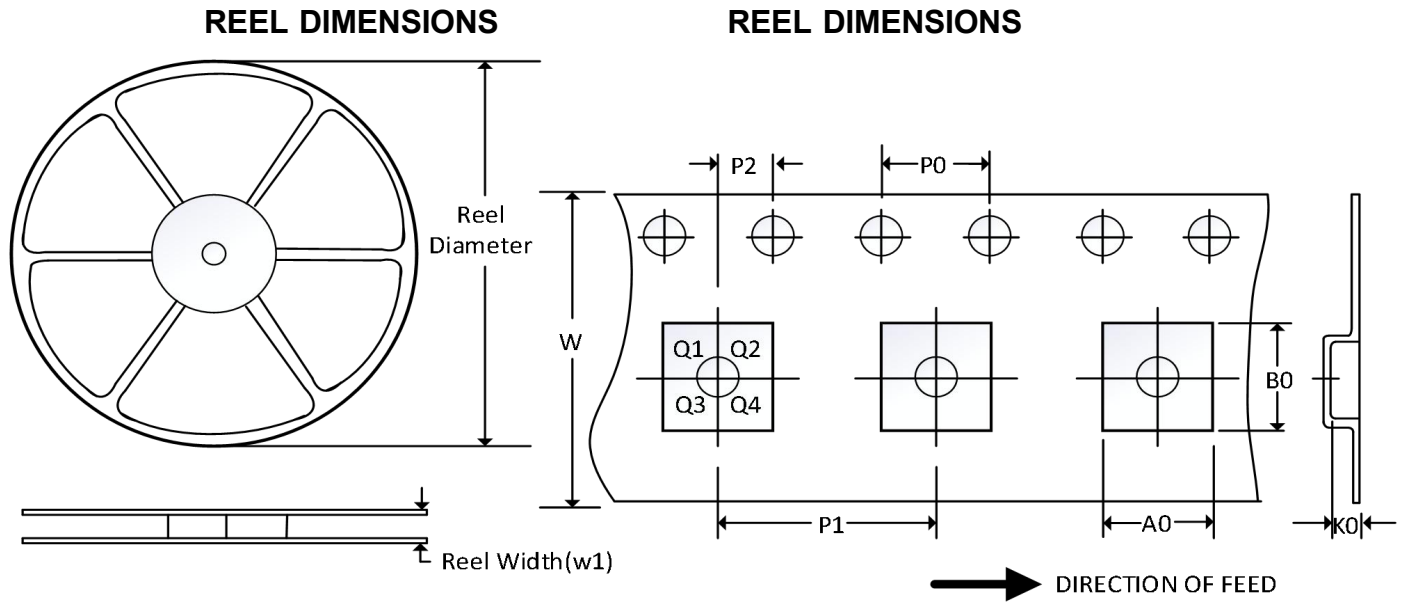


Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)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

12 Package Outline Dimension(Continued)
SC70-5


Symbol	Dimensions 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
θ	0°	8°	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
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.