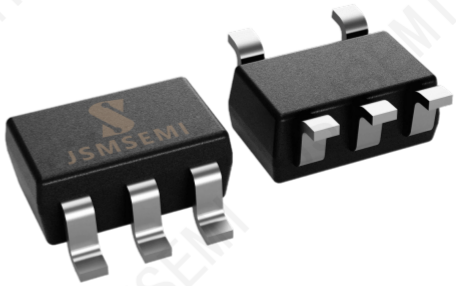
Description

This single buffer gate is designed for 1.65V to 5.5V VCC operation.

The SN74LVC1G34 device performs the Boolean function Y = A in positive logic.

The CMOS device has high output drive while maintaining low static power dissipation over a broad VCC Operating range.

The SN74LVC1G34 is available in Green SOT23-5 and SOT-353 packages. It operates over an ambient temperature range of -40°C to +125°C.



Simplified Schematic

Features

- Packages: SOT23-5, SOT-353(SC70-5)
- Supports 5V V_{CC} operation
- Inputs accept voltages to 5.5V
- Provides down translation to V_{CC}
- Typ t_{pd} of 4.0ns at 3.3V
- Low power consumption, 1μA maximum I_{CC}
- ±24mA output drive at 3V
- I_{off} supports live insertion, partial power down mode, and back drive protection
- ESD protection exceeds JESD 22
  - 2000V human-body model
  - 200V machine model
  - 1000V charged-device model
- Operating Temperature Range: -40°C to +125°C
- RoSH compatible

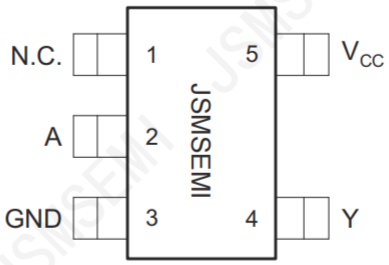
Applications

- AV receiver
- Audio dock: portable
- Blu-ray player and home theater
- DVD recorder and player
- Embedded PC
- MP3 player/recorder (portable audio)
- Personal Digital Assistant (PDA)
- Power: telecom/server AC/DC supply: single controller: analog and digital
- Solid State Drive (SSD): client and enterprise
- TV: LCD/digital and high-definition (HDTV)
- Tablet: enterprise
- Video analytics: server
- Wireless headset, keyboard, and mouse

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship,Quantity	Green
SN74LVC1G34DBVR-JSM	SOT-23-5L	C34J	-40 to 125°C	3	TR&3000	Rohs
SN74LVC1G34DCKR-JSM	SOT-353	C95	-40 to 125°C	3	TR&3000	Rohs

Pin Configuration and Functions



(TOP VIEW)

Pin Functions

PIN		DESCRIPTION
SOT23-5 SOT-353	NAME	
1	NC	Not connected
2	A	Input
3	GND	Ground
4	Y	Output
5	V_{CC}	Power pin

Specifications

Absolute Maximum Ratings

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

			MIN	MAX	UNIT
V_{CC}	Supply voltage range		-0.5	6.5	V
V_I	Input voltage range (2)		-0.5	6.5	V
Vo	Voltage range applied to any output in the high-impedance or power-off state (2)		-0.5	6.5	V
Vo	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
θ_{JA}	Package thermal impedance (4)	SOT23-5		230	°C/W
		SOT353/(SC70-5)		376	
T_J	Junction temperature (5)		-65	150	°C
Tstg	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, 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 and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The value of V_{CC} is provided in the *Recommended Operating Conditions table*.

(4) The package thermal impedance is calculated in accordance with JESD-51.

(5) The maximum power dissipation is a function of $T_{J(MAX)}$, $R_{\theta JA}$, and T_A. The maximum allowable power dissipation at any ambient temperature is $P_D = (T_{J(MAX)} - T_A) / R_{\theta JA}$. All numbers apply for packages soldered directly onto a PCB.

Recommended Operating Conditions

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	MAX	UNIT
Supply voltage	V_{CC}	Operating	1.65	5.5	V
		Data retention only	1.5		
High-level input voltage	V_{IH}	V_{CC}=1.65V to 1.95V	0.65 x V_{CC}		V
		V_{CC}=2.3V to 2.7V	1.7		
		V_{CC}=3V to 3.6V	2		
		V_{CC}=4.5V to 5.5V	0.7 x V_{CC}		
Low-level input voltage	V_{IL}	V_{CC}=1.65V to 1.95V		0.35 x V_{CC}	V
		V_{CC}=2.3V to 2.7V		0.7	
		V_{CC}=3V to 3.6V		0.8	
		V_{CC}=4.5V to 5.5V		0.3 x V_{CC}	
Input voltage	V_I		0	5.5	V
Output voltage	V_O		0	V_{CC}	V
Input transition rise or fall	$\Delta t/\Delta v$	V_{CC}=1.8V± 0.15V,2.5V ± 0.2V		20	ns/V
		V_{CC}=3.3V± 0.3V		10	
		V_{CC}=5V± 0.5V		5	
Operating temperature	T_A		-40	+125	°C

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

Electrical Characteristics

over recommended operating free-air temperature range (TYP values are at T_A = +25°C, Full=-40°C to 125°C, unless otherwise noted.) (1)

PARAMETER		TEST CONDITIONS	V_{CC}	TEMP	MIN(2)	TYP(3)	MAX(2)	UNIT
V_{OH}		I_{OH} = -100μA	1.65V to 5.5V	Full	V_{CC}-0.1			V
		I_{OH} = -4mA	1.65V		1.2			
		I_{OH} = -8mA	2.3V		1.9			
		I_{OH} = -16mA	3V		2.4			
		I_{OH} = -24mA			2.3			
		I_{OH} = -32mA	4.5V		3.8			
V_{OL}		I_{OL} = 100μA	1.65V to 5.5V	Full			0.1	V
		I_{OL} = 4mA	1.65V				0.45	
		I_{OL} = 8mA	2.3V				0.3	
		I_{OL} = 16mA	3V				0.4	
		I_{OL} = 24mA					0.55	
		I_{OL} = 32mA	4.5V				0.55	
I_I	A inputs	V_I=5.5V or GND	0V to 5.5V	+25°C		±0.1	±1	μA
				Full			±5	
I_{off}		V_I or V_O=5.5V	0	+25°C		±0.1	±1	μA
				Full			±10	
I_{CC}		V_I=5.5V or GND, I_O=0	1.65V to 5.5V	+25°C		0.1	1	μA
				Full			10	
ΔI_{CC}		One input at V_{CC}-0.6V, Other inputs at V_{CC} or GND	3V to 5.5V	Full			500	μA
C_i (Input Capacitance)		V_I = V_{CC} or GND	3.3V	+25°C		4		pF

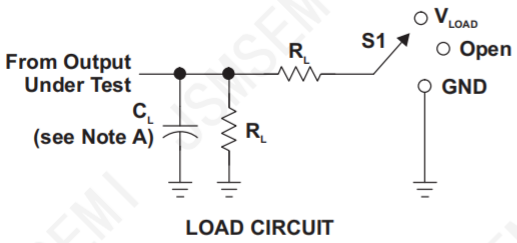
(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.
(2) Limits are 100% production tested at 25°C. Limits over the operating temperature range are ensured through correlations using statistical quality control (SQC) method.
(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

Electrical Characteristics(continued)

PARAMETER	SYMBOL	TEST CONDITIONS		MIN(2)	TYP(3)	MAX(2)	UNIT
Propagation Delay	t_{pd}	V_{CC}=1.8V±0.15V	C_L=30pF, R_L=1kΩ		13.2		ns
		V_{CC}=2.5V±0.2V	C_L=30pF, R_L=500Ω		5.2		
		V_{CC}=3.3V±0.3V	C_L=50pF, R_L=500Ω		4.0		
		V_{CC}=5V±0.5 V	C_L=50pF, R_L=500Ω		3.5		
Power dissipation capacitance	C_{pd}	V_{CC}=1.8V	f=10MHz		16		pF
		V_{CC}=2.5V			18		
		V_{CC}=3.3V			18		
		V_{CC}=5V			20		

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation.
(2) This parameter is ensured by design and/or characterization and is not tested in production.
(3) Typical values represent the most likely parametric norm as determined at the time of characterization. Actual typical values may vary over time and will also depend on the application and configuration.

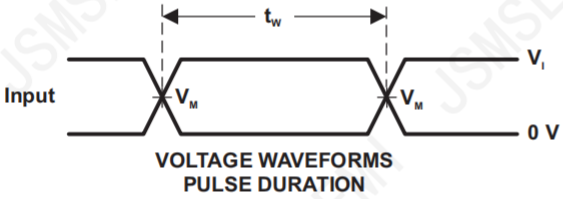
Parameter Measurement Information



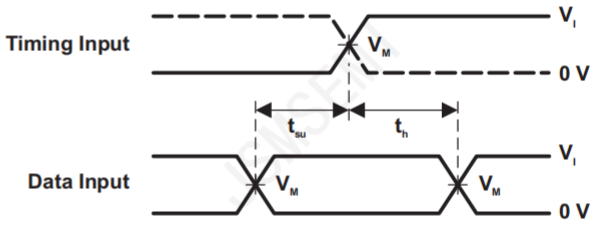
LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

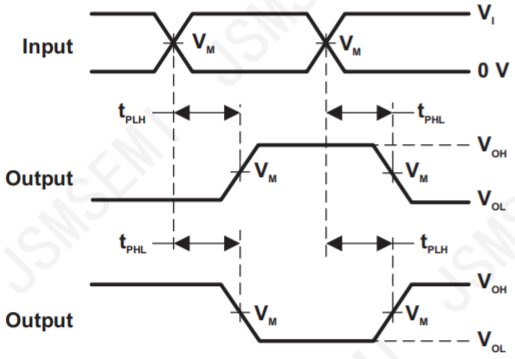
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L		R_L		V_Δ
	V_I	t_r/t_f							
1.8V±0.15V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	30pF	1MΩ	1kΩ	0.15V
2.5V±0.2V	V_{CC}	≤2ns	$V_{CC}/2$	2 x V_{CC}	15pF	30pF	1MΩ	500Ω	0.15V
3.3V±0.3V	3V	≤2.5ns	1.5V	6V	15pF	50pF	1MΩ	500Ω	0.3V
5V±0.5V	V_{CC}	≤2.5ns	$V_{CC}/2$	2 x V_{CC}	15pF	50pF	1MΩ	500Ω	0.3V



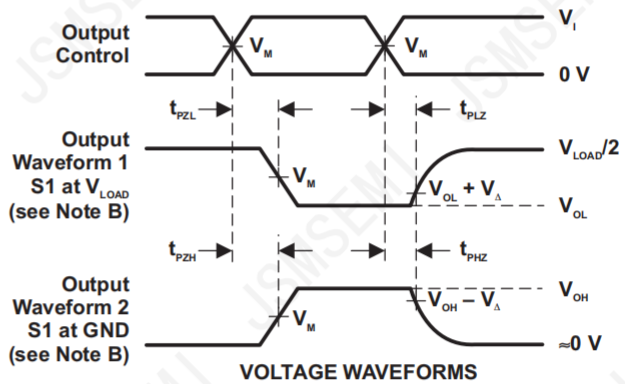
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

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_O = 50 Ω.
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.

Figure 1. Load Circuit and Voltage Waveforms

Detailed Description

Overview

The SN74LVC1G34 device contains one buffer gate device 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.

Functional Block Diagram

Feature Description

Device Functional Modes

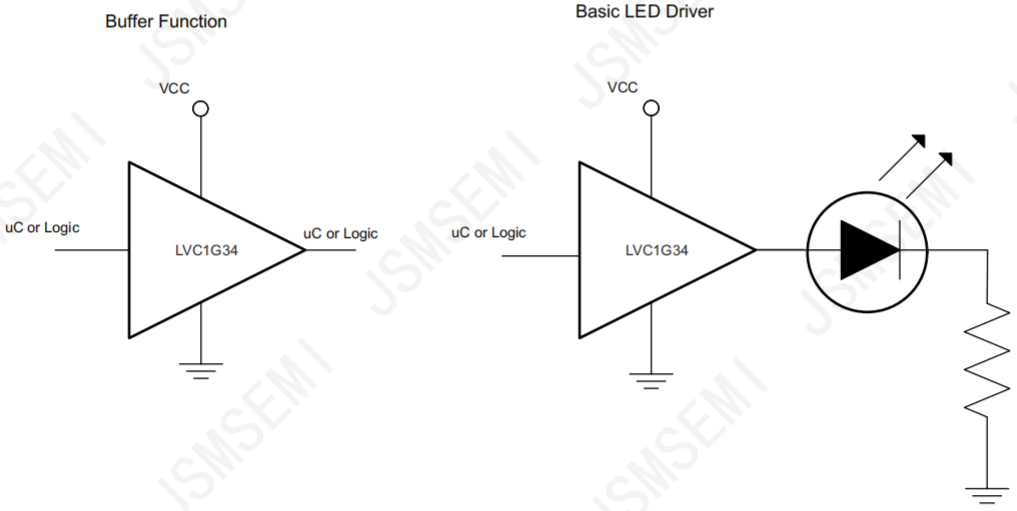
Function Table

INPUT A	OUTPUT Y
H	H
L	L

Application Information

The SN74LVC1G34 is a high drive CMOS device that can be used as a buffer to drive an LED. It can produce 24mA of drive current at 3.3V making it ideal for driving multiple outputs and good for high speed applications up to 100MHz.

Typical Application



Design Requirements

Power Considerations

Ensure that the desired supply voltage is within the range specified in the *Electrical Characteristics*. The supply voltage sets the device electrical characteristics of the device, as described in the *Electrical Characteristics* section.

The positive voltage supply must be capable of sourcing current equal to the maximum static supply current, I_{CC}, listed in the *Electrical Characteristics*, and any transient current required for switching.

The ground must be capable of sinking current equal to the total current to be sunk by all outputs of the SN74LVC1G34 plus the maximum supply current, I_{CC}, listed in the Electrical Characteristics, and any transient current required for switching. The logic device can only sink as much current that can be sunk into its ground connection. Ensure the maximum total current through GND listed in the Absolute Maximum Ratings is not exceeded.

The SN74LVC1G34 can drive a load with a total capacitance less than or equal to 50pF while still meeting all of the data sheet specifications. Larger capacitive loads can be applied; however, it is not recommended to exceed 50pF.

The SN74LVC1G34 can drive a load with total resistance described by $R_L \geq V_O / I_O$, with the output voltage and current defined in the Electrical Characteristics table with V_{OL}. When outputting in the HIGH state, the output voltage in the equation is defined as the difference between the measured output voltage and the supply voltage at the V_{CC} pin.

Input Considerations

Input signals must cross to be considered a logic LOW, and to be considered a logic HIGH. Do not exceed the maximum input voltage range found in the Absolute Maximum Ratings.

Unused inputs must be terminated to either V_{CC} or ground. The unused inputs can be directly terminated if the input is completely unused, or they can be connected with a pull-up or pull-down resistor if the input will be used sometimes, but not always. A pull-up resistor is used for a default state of HIGH, and a pull-down resistor is used for a default state of LOW. The drive current of the controller, leakage current into the SN74LVC1G34 (as specified in the Electrical Characteristics), and the desired input transition rate limits the resistor size. A 10kΩ resistor value is often used due to these factors.

Refer to the Feature Description for additional information regarding the inputs for this device.

Output Considerations

The ground voltage is used to produce the output LOW voltage. Sinking current into the output will increase the output voltage as specified by the V_{OL} specification in the *Electrical Characteristics*.

Unused outputs can be left floating. Do not connect outputs directly to V_{CC} or ground.

Refer to the *Feature Description* section for additional information regarding the outputs for this device.

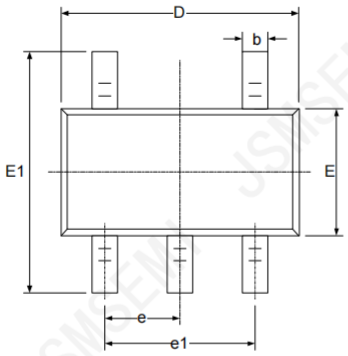
Power Supply Recommendations

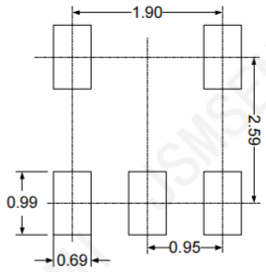
The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each V_{CC} terminal should have a good bypass capacitor to prevent power disturbance.

A 0.1μF capacitor is recommended for this device. It is acceptable to parallel multiple bypass capacitors to reject different frequencies of noise. The 0.1μF and 1μF capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

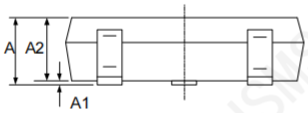
Package Information

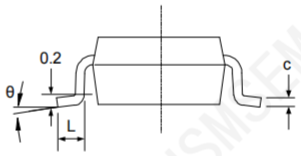
SOT-23-5L





RECOMMENDED LAND PATTERN (Unit: mm)

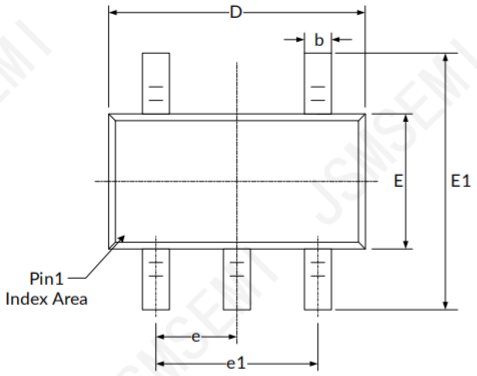


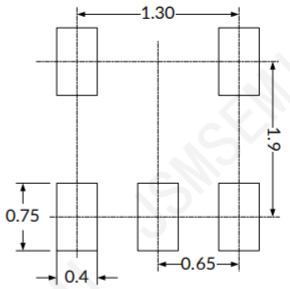


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)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

Package Information

SOT-353(SC70-5)





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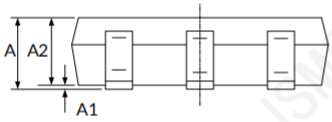

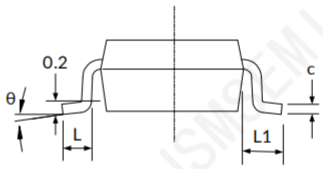

Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.100	0.035	0.043
A1	0.000	0.100	0.000	0.004
A2	0.900	1.000	0.035	0.039
b	0.150	0.350	0.006	0.014
c	0.080	0.150	0.003	0.006
D (1)	2.000	2.200	0.079	0.087
E (1)	1.150	1.350	0.045	0.053
E1	2.150	2.450	0.085	0.096
e	0.650(BSC)		0.026(BSC)	
e1	1.300(BSC)		0.051(BSC)	
L	0.260	0.460	0.010	0.018
L1	0.525		0.021	
θ	0°	8°	0°	8°

Revision History

Rev.	Change	Date
V1.0	Initial version	6/27/2021

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