

Description

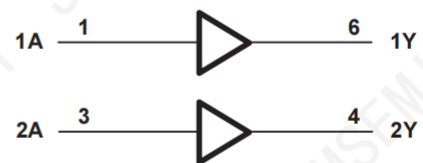
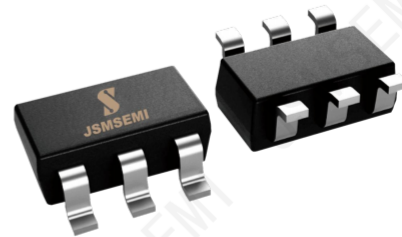
The 74HC2G34 device is a dual buffer gate designed for 1.65V to 5.5V VCC operation. The 74HC2G34 device performs the Boolean function $Y=A$ in positive logic.

This device is fully specified for partial-power-down applications using Ioff. The Ioff circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.

The 74HC2G34 is available in Green SOT23-6 and SOT-363 packages. It operates over an ambient temperature range of -40°C to +125°C.

Features

- Packages: SOT23-6, SOT-363(SC70-6)
- Supports 5.5V VCC Operation
- Inputs Accept Voltages to 5.5 V
- Typ t_{pd} of 4.2ns at 3.3 V
- Low Power Consumption, 1μA Maximum I_{CC}
- ±24mA Output Drive at 3V
- Typical V_{OLP} (Output Ground Bounce)
<0.8 V at V_{CC} = 3.3 V, T_A = 25°C
- Typical V_{OHV} (Output V_{OH} Undershoot)
>2 V at V_{CC} = 3.3 V, T_A = 25°C
- I_{off} Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Can Be Used as a Down Translator to Translate Inputs From a Maximum of 5.5 V Down to the V_{CC} Level
- Latch-Up Performance Exceeds 100 mA
- ESD Protection Exceeds JESD 22
 - 2000V Human Body Model
 - 200V Machine Model
 - 1000V Charged-Device Model



Simplified Schematic

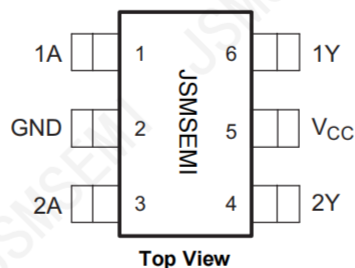
Applications

- AV Receivers
- Audio Docks: Portable
- Blu-ray Player and Home Theaters
- DVD Recorders and Players
- Embedded PCs
- MP3 Players and Recorders (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)
- Tablets: Enterprise
- Video Analytics: Servers
- Wireless Headsets, Keyboards, and Mice

Ordering Information

Order number	Package	Marking	Operation Temperature Range	MSL Grade	Ship,Quantity	Green
74HC2G34GV,125-JSM	SOT-23-6L	C345	-40 to 125°C	3	TR&3000	RoHS
74HC2G34GW,125-JSM	SOT-363	C9F	-40 to 125°C	3	TR&3000	RoHS

Pin Configuration and Functions



Pin Functions

PIN		I/O	DESCRIPTION
NAME	NO.		
1A	1	I	Buffer Input 1
GND	2	—	Ground pin
2A	3	I	Buffer Input 2
2Y	4	O	Buffer Output 2
V _{CC}	5	—	Power pin
1Y	6	O	Buffer Output 1

Specifications

Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

		MIN	MAX	UNIT
V _{CC}	Supply voltage	−0.5	6.5	V
V _I	Input voltage ⁽²⁾	−0.5	6.5	V
V _O	Voltage applied to any output in the high-impedance or power-off state ⁽²⁾	−0.5	6.5	V
V _O	Voltage applied to any output in the high or low state ⁽²⁾⁽³⁾	−0.5	V _{CC} + 0.5	V
I _{IK}	Input clamp current		−50	mA
I _{OK}	Output clamp current		−50	mA
I _O	Continuous output current		±50	mA
	Continuous current through V _{CC} or GND		±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, 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.
- (3) The value of V_{CC} is provided in the Recommended Operating Conditions table.

ESD Ratings

		VALUE	UNIT
V _(ESD)	Electrostatic discharge	Human body model (HBM)	2000
		Charged-device model (CDM)	1000

Recommended Operating Conditions⁽¹⁾

			MIN	MAX	UNIT
V _{CC}	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V _{IH}	High-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}		V
		V _{CC} = 2.3 V to 2.7 V	1.7		
		V _{CC} = 3 V to 3.6 V	2		
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}		
V _{IL}	Low-level input voltage	V _{CC} = 1.65 V to 1.95 V		0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V		0.7	
		V _{CC} = 3 V to 3.6 V		0.8	
		V _{CC} = 4.5 V to 5.5 V		0.3 × V _{CC}	
V _I	Input voltage		0	5.5	V
V _O	Output voltage		0	V _{CC}	V
I _{OH}	High-level output current	V _{CC} = 1.65 V		−4	mA
		V _{CC} = 2.3 V		−8	
		V _{CC} = 3 V		−16	
		V _{CC} = 4.5 V		−24	
I _{OL}	Low-level output current	V _{CC} = 1.65 V		4	mA
		V _{CC} = 2.3 V		8	
		V _{CC} = 3 V		16	
		V _{CC} = 4.5 V		24	
Δt/Δv	Input transition rise or fall rate	V _{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	ns/V
		V _{CC} = 3.3 V ± 0.3 V		10	
		V _{CC} = 5 V ± 0.5 V		5	
T _A	Operating free-air temperature	DBV, DCK, DRL Package	−40	125	°C

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

Thermal Information

THERMAL METRIC		74HC2G34		UNIT
		(SOT-23)	(SC70)	
		6 PINS	6 PINS	
R _{θJA}	Junction-to-ambient thermal resistance	165	259	°C/W

Electrical Characteristics—DC Limit Changes

over recommended operating free-air temperature range (TYP values are at $T_A = +25^{\circ}\text{C}$, 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.

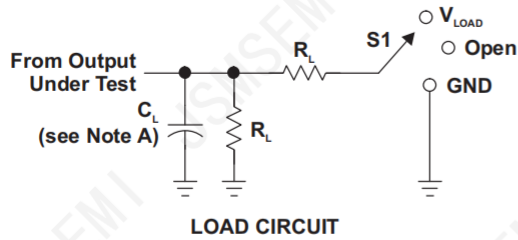
Electrical Characteristics—AC Limit Changes

PARAMETER	SYMBOL	TEST CONDITIONS		MIN ⁽²⁾	TYP ⁽³⁾	MAX ⁽²⁾	UNIT
Propagation Delay	t_{pd}	$V_{CC} = 1.8\text{V} \pm 0.15\text{V}$	$C_L = 30\text{pF}$, $R_L = 1\text{k}\Omega$		13.3		ns
		$V_{CC} = 2.5\text{V} \pm 0.2\text{V}$	$C_L = 30\text{pF}$, $R_L = 500\Omega$		5.3		
		$V_{CC} = 3.3\text{V} \pm 0.3\text{V}$	$C_L = 50\text{pF}$, $R_L = 500\Omega$		4.2		
		$V_{CC} = 5\text{V} \pm 0.5\text{V}$	$C_L = 50\text{pF}$, $R_L = 500\Omega$		3.4		
Power dissipation capacitance	C_{pd}	$V_{CC} = 1.8\text{V}$	$f = 10\text{MHz}$		16		pF
		$V_{CC} = 2.5\text{V}$			18		
		$V_{CC} = 3.3\text{V}$			18		
		$V_{CC} = 5\text{V}$			20		

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

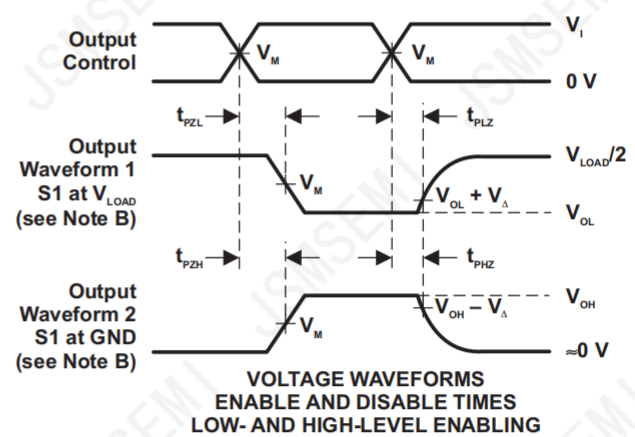
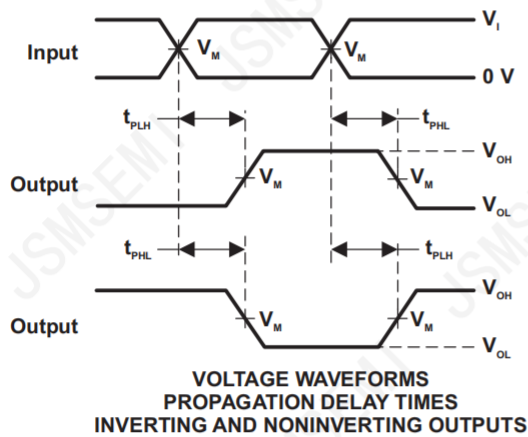
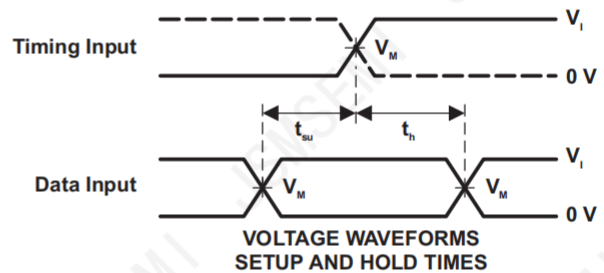
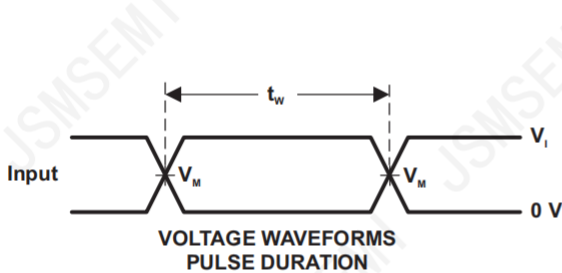
(2) This parameter is ensured by design and/or characterization and is not tested in production.

(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


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							
$1.8V \pm 0.15V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	30pF	1M Ω	1k Ω	0.15V
$2.5V \pm 0.2V$	V_{CC}	$\leq 2ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	30pF	1M Ω	500 Ω	0.15V
$3.3V \pm 0.3V$	3V	$\leq 2.5ns$	1.5V	6V	15pF	50pF	1M Ω	500 Ω	0.3V
$5V \pm 0.5V$	V_{CC}	$\leq 2.5ns$	$V_{CC}/2$	$2 \times V_{CC}$	15pF	50pF	1M Ω	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: $PRR \leq 10 \text{ MHz}$, $Z_o = 50 \Omega$.
 - 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_{PLH} .
 - F. t_{PZL} and t_{PZH} are the same as t_{PHL} .
 - G. t_{PLH} and t_{PHL} are the same as t_{pd} .
 - H. All parameters and waveforms are not applicable to all devices.

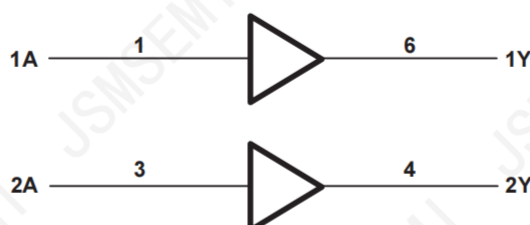
Figure 1. Load Circuit and Voltage Waveforms

Detailed Description

Overview

The 74HC2G34 device contains two buffer gates that each perform 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

The 74HC2G34 device has a wider operating voltage range, operating from 1.65 V to 5.5 V, and allows down voltage translation. The 74HC2G34 I_{off} feature allows voltages on the inputs and outputs when V_{CC} is 0 V.

Device Functional Modes

Table 1 lists the functional modes of the 74HC2G34.

Table 1. Function Table

INPUT A	OUTPUT Y
H	H
L	L

Application Information

The 74HC2G34 is a high-drive CMOS device that can be used as a 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 5.5V tolerant allowing it to translate down to V_{CC} .

Typical Application

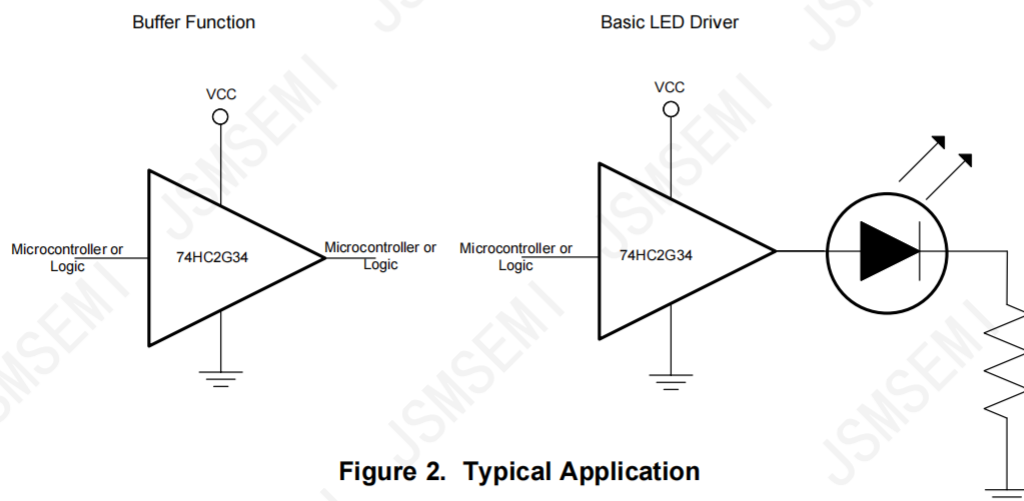


Figure 2. Typical Application

Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the Recommended Operating *Conditions* table.

Each V_{CC} pin must have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a $0.1\mu\text{F}$ capacitor is recommended and if there are multiple V_{CC} pins then a $0.01\mu\text{F}$ or $0.022\mu\text{F}$ capacitor is recommended for each power pin. It is ok to parallel multiple bypass caps to reject different frequencies of noise. $0.1\mu\text{F}$ and $1\mu\text{F}$ capacitors are commonly used in parallel. The bypass capacitor must be installed as close to the power pin as possible for best results.

Layout

Layout Guidelines

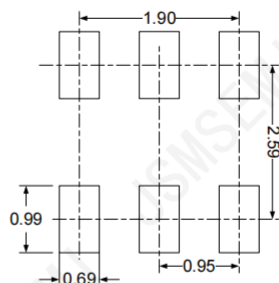
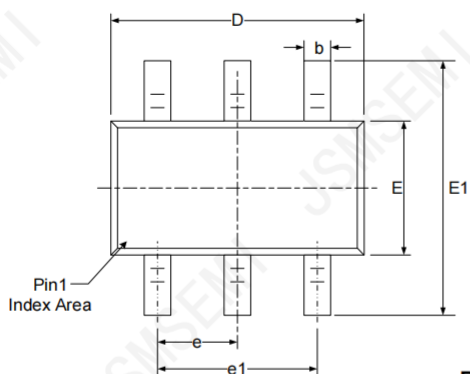
When using multiple bit logic devices inputs must not ever float. In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. Specified below are the rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or V_{CC} whichever make more sense or is more convenient.

Layout Example

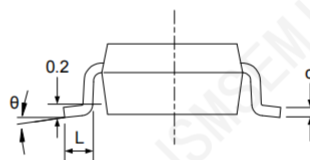
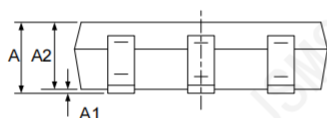


Package Information

SOT-23-6L



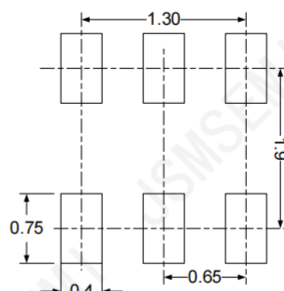
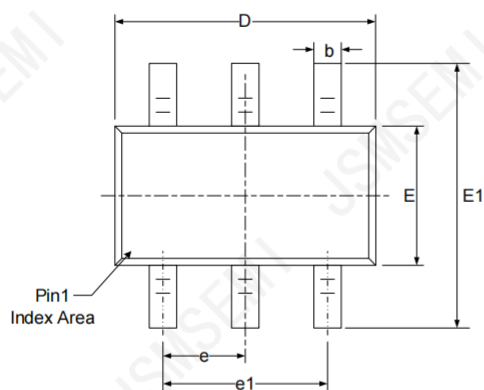
RECOMMENDED LAND PATTERN (Unit: mm)



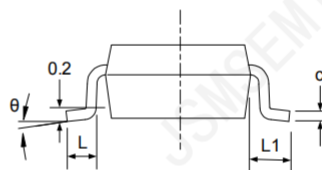
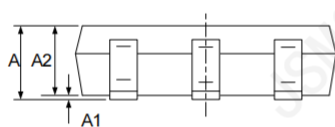
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
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-363(SC70-6)



RECOMMENDED LAND PATTERN (Unit: mm)



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	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	0.650(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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