74AHC1GU04

UNBUFFERED SINGLE INVERTER GATE

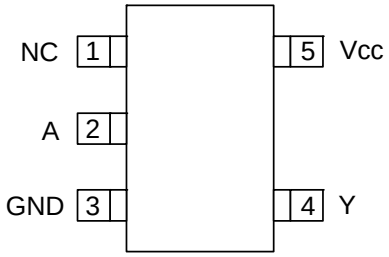
NEW PRODUCT

Description

The 74AHC1GU04 is a single inverter gate with a standard totem pole output. The device is designed for operation with a power supply range of 2.0V to 5.5V. The inverter can be used in analog circuits such as crystal oscillators.

Pin Assignments

(Top View)



SOT25 / SOT353

Features

- Supply Voltage Range from 2.0V to 5.5V
- ± 6 mA Output Drive at 5.0V
- CMOS low power consumption
- Unbuffered Output
- ESD Protection Exceeds JESD 22
- 200-V Machine Model (A115-A)
- 2000-V Human Body Model (A114-A)
- Latch-Up Exceeds 100mA per JESD 78, Class II
- SOT25 and SOT353: Assembled with “Green” Molding Compound (no Br, Sb)
- Lead Free Finish / RoHS Compliant (Note 1)

Applications

- Crystal Oscillators, Analog Inverters
- Wide array of products such as.
  - PCs, networking, notebooks, netbooks, PDAs
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box
  - Personal Navigation / GPS
  - MP3 players ,Cameras, Video Recorders

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.

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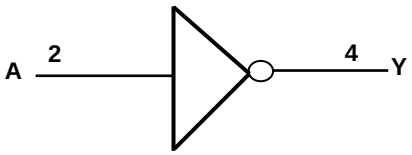
Pin Descriptions

Pin Name	Pin NO.	Description
NC	1	No Connection
A	2	Data Input
GND	3	Ground
Y	4	Data Output
V_{CC}	5	Supply Voltage

Logic Diagram



Function Table

Inputs	Output
A	**Y**
H	L
L	H

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Absolute Maximum Ratings (Note 2)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	KV
ESD MM	Machine Model ESD Protection	200	V
V_{CC}	Supply Voltage Range	-0.5 to 6.5	V
V_I	Input Voltage Range	-0.5 to 6.5	V
V_O	Voltage applied to output in high or low state	-0.5 to V_{CC} +0.5	V
I_{IK}	Input Clamp Current V_I<0	-20	mA
I_{OK}	Output Clamp Current (V_O < 0 or V_O > V_{CC})	±20	mA
I_O	Continuous output current (V_O = 0 to V_{CC})	±25	mA
I_{CC}	Continuous current through V_{CC}	50	mA
I_{GND}	Continuous current through GND	-50	mA
T_J	Operating Junction Temperature	-40 to 150	°C
T_{STG}	Storage Temperature	-65 to 150	°C

Notes: 2. Stresses beyond the absolute maximum may result in immediate failure or reduced reliability. These are stress values and device operation should be within recommend values.

Recommended Operating Conditions (Note 3)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Operating Voltage		2	5.5	V
V_{IH}	High-level Input Voltage	V_{CC} = 2V	1.7		V
		V_{CC} = 3V	2.4		
		V_{CC} = 5.5V	4.4		
V_{IL}	Low-level input voltage	V_{CC} = 2V		0.3	V
		V_{CC} = 3V		0.6	
		V_{CC} = 5.5V		1.1	
V_I	Input Voltage		0	5.5	V
V_O	Output Voltage		0	V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 2V		-50	uA
		V_{CC} = 3.3V ± 0.3V		-3	mA
		V_{CC} = 5V ± 0.5V		-6	
I_{OL}	Low-level output current	V_{CC} = 2V		50	uA
		V_{CC} = 5V ± 0.5V		3	mA
		V_{CC} = 3V		6	
T_A	Operating free-air temperature		-40	85	ºC

Notes: 3. Unused inputs should be held at V_{CC} or Ground.

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Electrical Characteristics

Symbol	Parameter	Test Conditions	V_{CC}	25°C			-40°C to 85°C		-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
V_{OH}	High Level Output Voltage	I_{OH} = -50μA	2V	1.8	2		1.75		1.75		V
			3V	2.7	3		2.65		2.65		
			4.5V	4.0	4.5		3.9		3.9		
		I_{OH} = -3mA	3V	2.58			2.5		2.5		
		I_{OH} = -6mA	4.5V	3.94			3.8		3.8		
V_{OL}	Low Level Output Voltage	I_{OL} = 50μA	2V			0.2		0.2		0.2	V
			3V			0.3		0.3		0.3	
			4.5V			0.5		0.5		0.5	
		I_{OL} = 3mA	3V			0.36		0.44		0.55	
		I_{OL} = 6mA	4.5V			0.36		0.44		0.55	
I_I	Input Current	V_I = 5.5V or GND	0 to 5.5V			± 0.1		± 1		± 2	μA
I_{CC}	Supply Current	V_I = 5.5V or GND I_O=0	5.5V			1		10		40	μA
C_I	Input Capacitance	V_I = V_{CC} – or GND	5.5V		2.0	10		10		10	pF
θ_{JA}	Thermal Resistance Junction-to-Ambient	SOT25	(Note 4)		195						°C/W
		SOT353			430						
θ_{JC}	Thermal Resistance Junction-to-Case	SOT25	(Note 4)		58						°C/W
		SOT353			155						

Note: 4. Test conditions for SOT25, and SOT353: Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout

Switching Characteristics

V_{CC} = 3.3V ± 0.3 (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)		25°C			-40°C to 85°C		-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
t_{pd}	A	Y	C_L=15pF	0.6	3.4	7.1	0.6	8.5	0.6	10.0	ns
			C_L=50pF	0.6	4.9	10.6	0.6	12.0	0.6	13.0	ns

V_{CC} = 5V ± 0.5V (see Figure 1)

Parameter	From (Input)	TO (OUTPUT)		25°C			-40°C to 85°C		-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
t_{pd}	A	Y	C_L=15pF	0.6	2.6	5.5	0.6	6.0	0.6	7.0	ns
			C_L=50pF	0.6	3.6	7.0	0.6	8.0	0.6	9.0	ns

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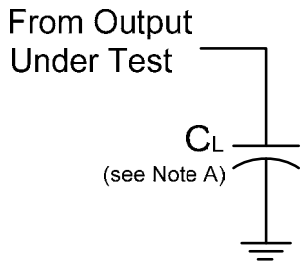
Operating Characteristics

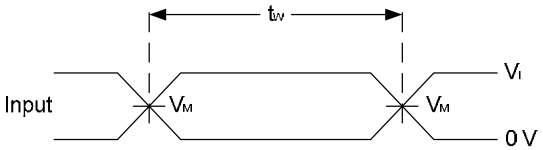
T_A = 25 ºC

Parameter		Test Conditions	V_{CC} = 5V	Unit
			Typ.	
C_{pd}	Power dissipation capacitance	f = 1 MHz No Load	8	pF

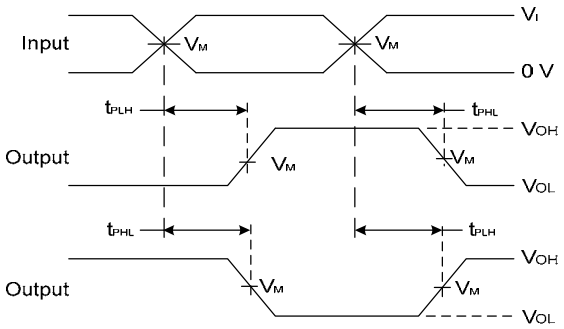
Parameter Measurement Information



V_{CC}	Inputs		V_M	C_L
	V_I	t_r/t_f		
3.3V±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	15pF
5V±0.5V	V_{CC}	≤3ns	$V_{CC}/2$	15pF
3.3V±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	50pF
5V±0.5V	V_{CC}	≤3ns	$V_{CC}/2$	50pF



Voltage Waveform Pulse Duration



Voltage Waveform Propagation Delay Times
Inverting and Non Inverting Outputs

Figure 1. Load Circuit and Voltage Waveforms

Notes: A. Includes test lead and test apparatus capacitance.
B. All pulses are supplied at pulse repetition rate ≤ 1 MHz.
C. Inputs are measured separately one transition per measurement.
D. t_{PLH} and t_{PHL} are the same as t_{PD}.

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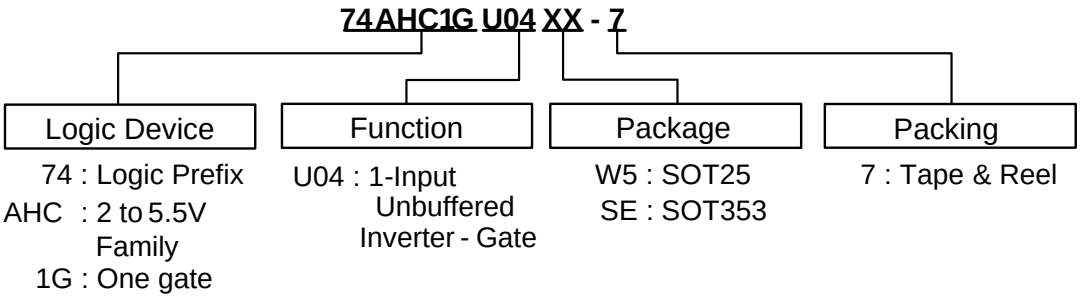
Ordering Information

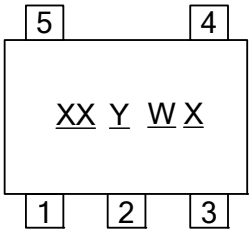


Device	Package Code	Packaging (Note 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
74AHC1GU04W5-7	W5	SOT25	3000/Tape & Reel	-7
74AHC1GU04SE-7	SE	SOT353	3000/Tape & Reel	-7

Notes: 5. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

Marking Information

(Top View)



XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week; a~z : 27~52 week; z represents 52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AHC1GU04W5	SOT25	YP
74AHC1GU04SE	SOT353	YP

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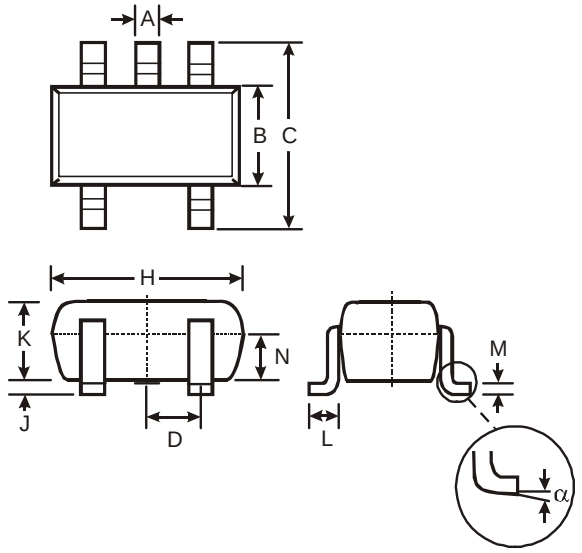
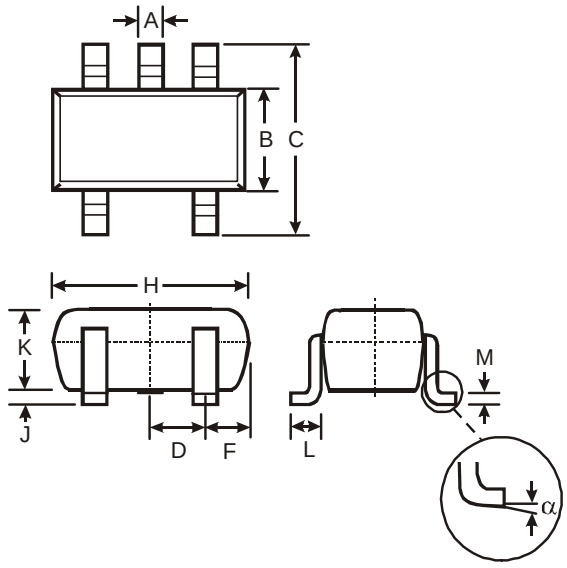
Package Outline Dimensions (All Dimensions in mm)

(1) Package Type: SOT25



SOT25			
Dim	Min	Max	Typ.
A	0.35	0.50	0.38
B	1.50	1.70	1.60
C	2.70	3.00	2.80
D	—	—	0.95
H	2.90	3.10	3.00
J	0.013	0.10	0.05
K	1.00	1.30	1.10
L	0.35	0.55	0.40
M	0.10	0.20	0.15
N	0.70	0.80	0.75
α	0°	8°	—
All Dimensions in mm			

(2) Package Type: SOT353



SOT353		
Dim	Min	Max
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

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