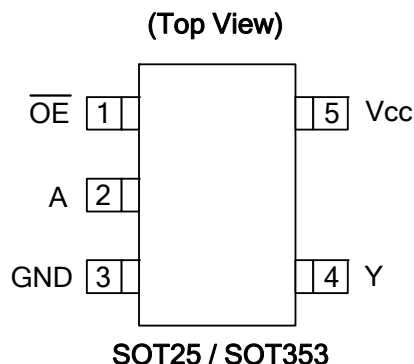


### Description

The 74AHCT1G125 is a single non-inverting buffer/bus driver with a 3-state output. The output enters a high impedance state when a HIGH-level is applied to the output enable ( $\overline{OE}$ ) pin. The device is designed for operation with a power supply range of 4.5V to 5.5V.

### Pin Assignments



### Features

- Supply Voltage Range from 4.5V to 5.5V
- $\pm 8$  mA Output Drive at 5.0V
- CMOS low power consumption
- Schmitt Trigger Action at All Inputs Make the Circuit Tolerant for Slower Input Rise and Fall Time.
- ESD Protection per JESD 22
  - Exceeds 200-V Machine Model (A115-A)
  - Exceeds 2000-V Human Body Model (A114-A)
  - Exceeds 1000-V Charged Device Model (C101C)
- 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

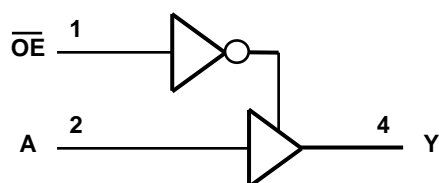
- General Purpose Logic
- Wide array of products such as:
  - PCs, networking, notebooks, netbooks, PDAs
  - Computer peripherals, hard drives, CD/DVD ROM
  - TV, DVD, DVR, set top box
  - Phones, Personal Navigation / GPS
  - MP3 players, Cameras, Video Recorders

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](http://www.diodes.com/products/lead_free.html).

## Pin Descriptions

Pin Name	Pin No.	Description
$\overline{\text{OE}}$	1	Output Enable
A	2	Data Input
GND	3	Ground
Y	4	Data Output
V <sub>CC</sub>	5	Supply Voltage

## Logic Diagram



## Function Table

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

### Absolute Maximum Ratings (Note 2)

Symbol	Description	Rating	Unit
ESD HBM	Human Body Model ESD Protection	2	KV
ESD CDM	Charged Device Model ESD Protection	1	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 $V_O > V_{CC}$ )	$\pm 20$	mA
$I_O$	Continuous output current ( $V_O = 0$ to $V_{CC}$ )	$\pm 25$	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	4.5	5.5	V
$V_{IH}$	High-level Input Voltage	2.0		V
$V_{IL}$	Low-level input voltage		0.8	V
$V_I$	Input Voltage	0	5.5	V
$V_O$	Output Voltage	0	$V_{CC}$	V
$I_{OH}$	High-level output current		-8	mA
$I_{OL}$	Low-level output current		8	mA
$\Delta t/\Delta V$	Input transition rise or fall rate		20	ns/V
$T_A$	Operating free-air temperature	-40	125	°C

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

### Electrical Characteristics

Symbol	Parameter	Test Conditions	V <sub>CC</sub>	25°C			-40°C to 85°C		-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
V <sub>OH</sub>	High Level Output Voltage	I <sub>OH</sub> = -50μA	4.5V	4.4	4.5		4.4		4.4		V
		I <sub>OH</sub> = -8mA	4.5V	3.94			3.8		3.70		
V <sub>OL</sub>	Low Level Output Voltage	I <sub>OL</sub> = 50μA	4.5V		0	0.1		0.1		0.1	V
		I <sub>OL</sub> = 8mA	4.5V			0.36		0.44		0.55	
I <sub>I</sub>	Input Current	V <sub>I</sub> = 5.5V or GND	0 to 5.5V			±0.1		±1		±2	μA
I <sub>OZ</sub>	Z State Leakage Current	V <sub>O</sub> = 0 to 5.5V	5.5V			0.25		2.5		10	μA
I <sub>CC</sub>	Supply Current	V <sub>I</sub> = 5.5V or GND I <sub>O</sub> = 0	5.5V			1		10		40	μA
C <sub>i</sub>	Input Capacitance	V <sub>I</sub> = V <sub>CC</sub> – or GND	5.5V		2.0	10		10		10	pF
ΔI <sub>CC</sub>	Additional Supply Current	One input at 3.4 V Other inputs at V <sub>CC</sub> or GND	5.5V			1.35		1.5			mA
θ <sub>JA</sub>	Thermal Resistance Junction-to-Ambient	SOT25	(Note 4)		204						°C/W
		SOT353			371						
θ <sub>JC</sub>	Thermal Resistance Junction-to-Case	SOT25	(Note 4)		52						°C/W
		SOT353			143						

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

$V_{CC} = 5V \pm 0.5V$  (see Figure 1)

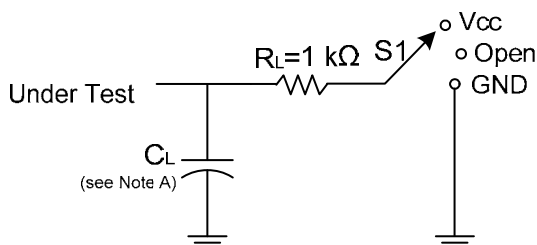
Parameter	From (Input)	TO (OUTPUT)		25°C			-40°C to 85°C		-40°C to 125°C		Unit
				Min	Typ.	Max	Min	Max	Min	Max	
$t_{pd}$	A	Y	$C_L=15pF$	0.6	3.4	5.5	0.6	6.5	0.6	7.0	ns
			$C_L=50pF$	0.6	4.7	7.5	0.6	8.5	0.6	9.5	ns
$t_{en}$	$\overline{OE}$	Y	$C_L=15pF$	0.6	3.6	5.6	0.6	6.3	0.6	7.0	ns
			$C_L=50pF$	0.6	5.4	8.0	0.6	9.0	0.6	9.5	ns
$t_{dis}$	$\overline{OE}$	Y	$C_L=15pF$	0.6	4.3	6.8	0.6	8.0	0.6	8.5	ns
			$C_L=50pF$	0.6	6.1	8.8	0.6	10.0	0.6	11.0	ns

### Operating Characteristics

$T_A = 25^\circ C$

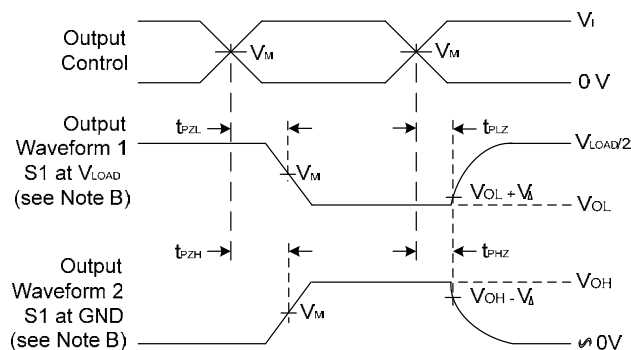
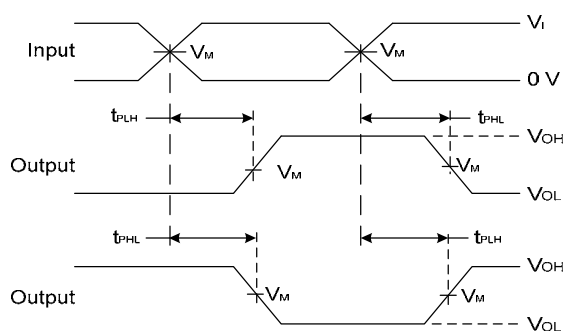
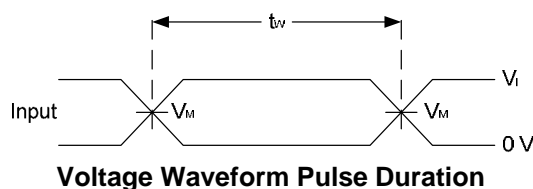
Parameter		Test Conditions	$V_{CC} = 5V$	Unit
			Typ.	
$C_{pd}$	Power dissipation capacitance	$f = 1\text{ MHz}$ No Load	14	pF

**Parameter Measurement Information**



TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	Vload
$t_{PHZ}/t_{PZH}$	GND

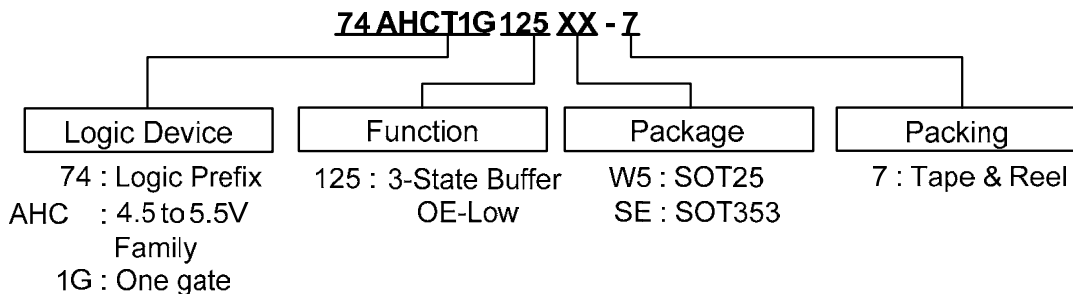
Vcc	Inputs		VM	CL	VΔ
	VI	$t_r/t_f$			
5V±0.5V	VCC	≤3ns	VCC/2	15pF	0.3V
5V±0.5V	VCC	≤3ns	VCC/2	50pF	0.3V



**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.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
  - E.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{EN}$ .
  - F.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{PD}$ .

### Ordering Information

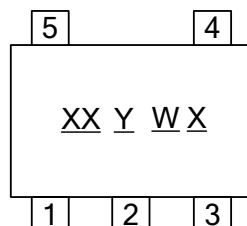


Device	Package Code	Packaging (Note 5)	7" Tape and Reel	
			Quantity	Part Number Suffix
74AHCT1G125W5-7	W5	SOT25	3000/Tape & Reel	-7
74AHCT1G125SE-7	SE	SOT353	3000/Tape & Reel	-7

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)

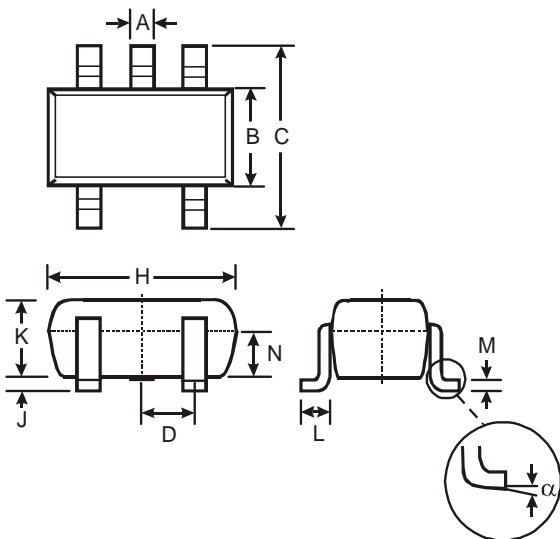


XX : Identification code  
Y : Year 0~9  
W : Week : A~Z : 1~26 week;  
           a~z : 27~52 week; z represents  
           52 and 53 week  
X : A~Z : Internal code

Part Number	Package	Identification Code
74AHCT1G125W5	SOT25	ZY
74AHCT1G125SE	SOT353	ZY

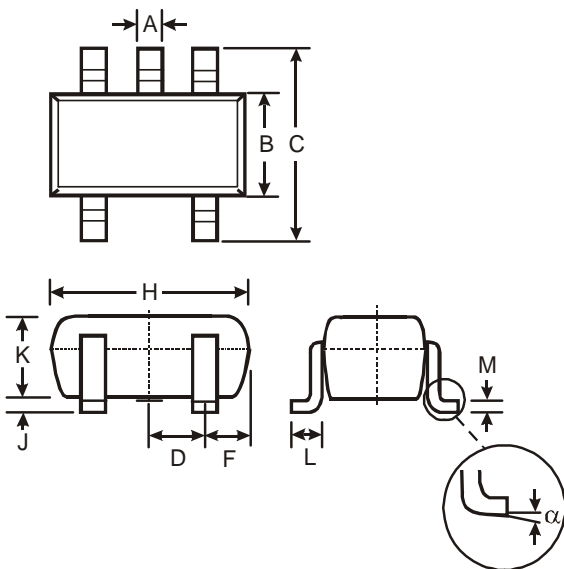
## Package Outline Dimensions (All Dimensions in mm)

### (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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