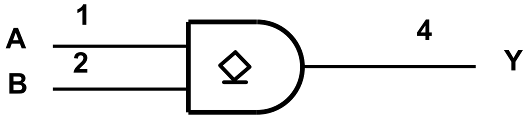
Logic Diagram



Functional Table

Inputs		Output
A	**B**	**Y**
H	H	Z
L	X	L
X	L	L

Absolute Maximum Ratings (Note 4) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter	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 $V_O > V_{CC}$)	±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

Note: 4. 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 5) (@T_A = +25°C, unless otherwise specified.)

Symbol	Parameter		Min	Max	Unit
V_{CC}	Operating Voltage		2.0	5.5	V
V_{IH}	High-Level Input Voltage	V_{CC} = 2V	1.5		V
		V_{CC} = 3V	2.1		
		V_{CC} = 5.5V	3.85		
V_{IL}	Low-Level input Voltage	V_{CC} = 2V		0.5	V
		V_{CC} = 3V		0.9	
		V_{CC} = 5.5V		1.65	
V_I	Input Voltage		0	5.5	V
V_O	Output Voltage		0	5.5	V
I_{OL}	Low-Level Output Current	V_{CC} = 2V		50	uA
		V_{CC} = 5V ± 0.5V		4	mA
		V_{CC} = 3V		8	
Δt/ΔV	Input transition rise or fall rate	V_{CC} = 3.3V ± 0.3V		100	ns/V
		V_{CC} = 5V ± 0.5V		20	
T_A	Operating free-air temperature		-40	+125	°C

Note: 5. Unused inputs should be held at V_{CC} or Ground.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

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_{OL}	High-level Input Voltage	I_{OL} = 50μA	2V			0.1		0.1		0.1	V
			3V			0.1		0.1		0.1	
			4.5V			0.1		0.1		0.1	
		I_{OL} = 4mA	3V			0.36		0.44		0.55	
		I_{OL} = 8mA	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
Ioz	Z-state Output Current	V_I = 5.5V or GND	0 to 5.5V			±0.25		±2.5		±10	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 6)		204						°C/W
		SOT353			371						
θ_{JC}	Thermal Resistance Junction-to-Case	SOT25	(Note 6)		52						°C/W
		SOT353			143						

Note: 6. 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 or B	Y	C_L = 15pF	0.6	4.6	7.5	0.6	8.5	0.6	9.0	ns
			C_L = 50pF	0.6	6.5	11.0	0.6	12.0	0.6	12.5	ns

V_{CC} = 5V ±0.5V (see Figure 1)

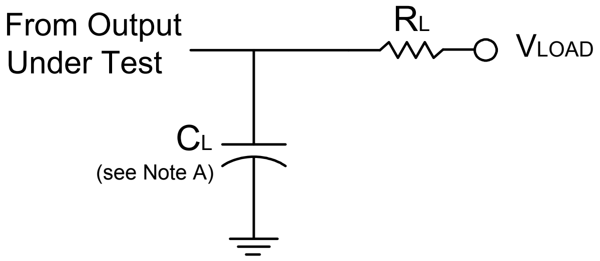
Parameter	From (Input)	TO (OUTPUT)		+25°C			-40°C to +85°C		-40°C to +125°C		Unit
				Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	A or B	Y	C_L = 15pF	0.6	3.2	5.5	0.6	6.5	0.6	7.0	ns
			C_L = 50pF	0.6	4.6	7.5	0.6	8.0	0.6	8.5	ns

Operating Characteristics

T_A = +25°C

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

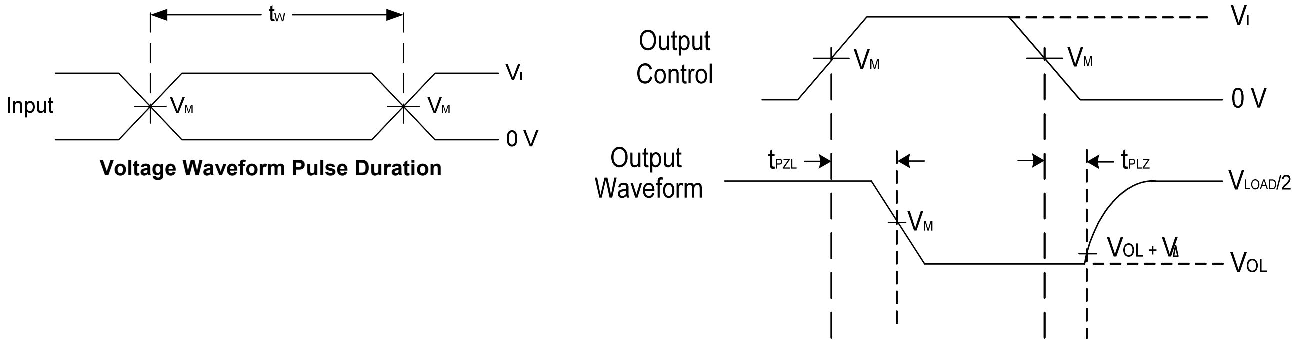
Parameter Measurement Information



TEST	Condition
t_{PLZ} (see Notes D and E) t_{PZL} (see Notes D and F)	V_{LOAD} V_{LOAD}

V_{CC}	Inputs		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
3.3V ±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	V_{CC}	15pF	1KΩ	0.3V
3.3V ±0.3V	V_{CC}	≤3ns	$V_{CC}/2$	V_{CC}	50pF	1KΩ	0.3V
5V ±0.5V	V_{CC}	≤3ns	$V_{CC}/2$	V_{CC}	15pF	1KΩ	0.3V
5V ±0.5V	V_{CC}	≤3ns	$V_{CC}/2$	V_{CC}	50pF	1KΩ	0.3V

Parameter Measurement Information (cont.)



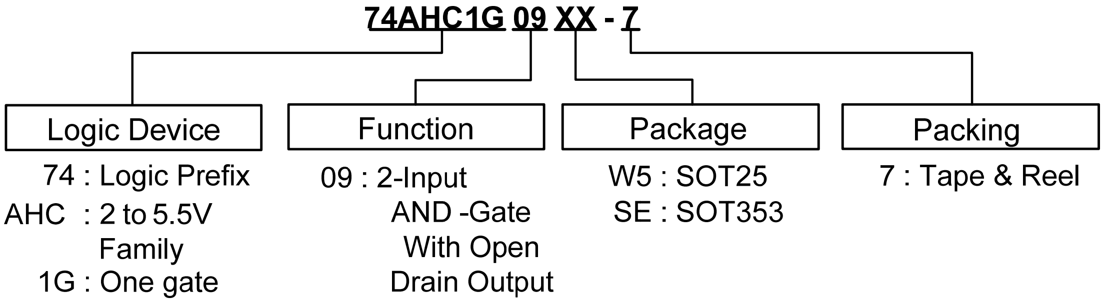
Voltage Waveform Pulse Duration

Voltage Waveform Propagation Delay Times

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. The inputs are measured one at a time with one transition per measurement.
D. For the open drain device t_{PLZ} and t_{PZL} are the same as t_{PD}.
E. t_{PZL} is measured at V_M.
F. t_{PLZ} is measured at $V_{OL} + V_{\Delta}$

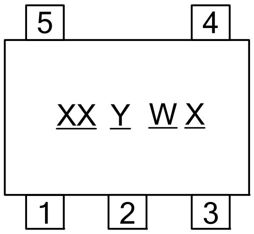
Ordering Information



Part Number	Package Code	Packaging	7" Tape and Reel	
			Quantity	Part Number Suffix
74AHC1G09W5-7	W5	SOT25	3000/Tape & Reel	-7
74AHC1G09SE-7	SE	SOT353	3000/Tape & Reel	-7

Marking Information

(Top View)



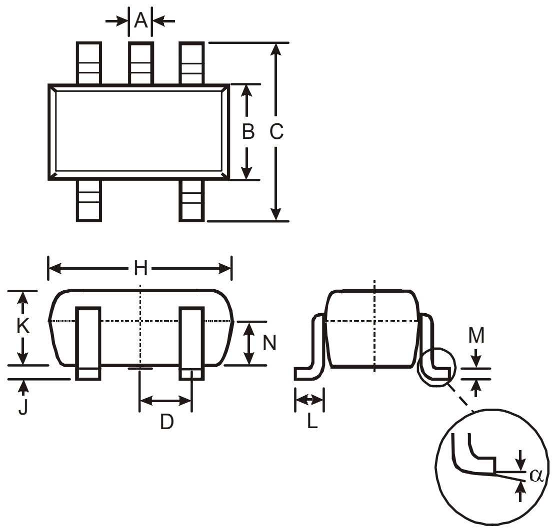
XX : Identification code
Y : Year 0~9
W : Week : A~Z : 1~26 week;
a~z : 27~52 week; z represents 52 and 53 week
X : A~Z : Internal code

Part Number	Package	Identification Code
74AHC1G09W5	SOT25	YN
74AHC1G09SE	SOT353	YN

Package Outline Dimensions (All dimensions in mm.)

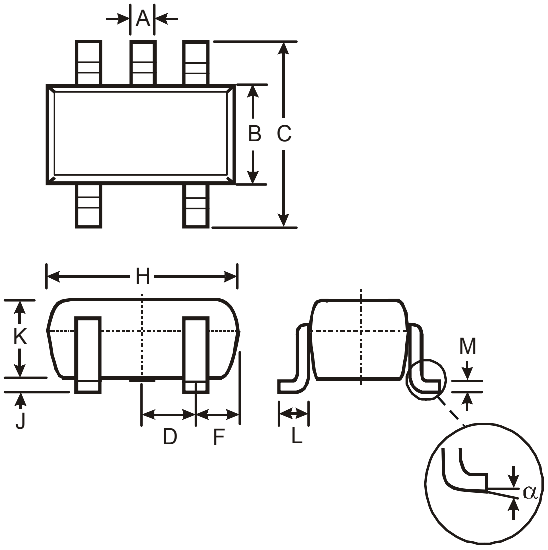
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.

(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

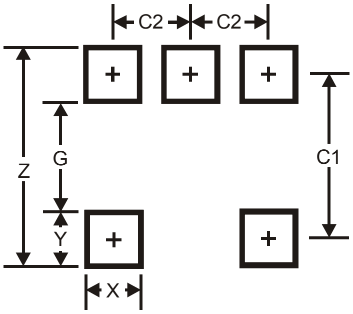


SOT353		
Dim	**Min**	**Max**
A	0.10	0.30
B	1.15	1.35
C	2.00	2.20
D	0.65 Typ	
F	0.40	0.45
H	1.80	2.20
J	0	0.10
K	0.90	1.00
L	0.25	0.40
M	0.10	0.22
α	0°	8°
All Dimensions in mm		

Suggested Pad Layout

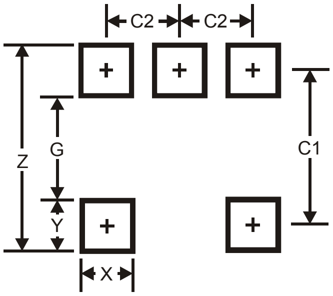
Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

(1) Package Type: SOT25



Dimensions	Value (in mm)
Z	3.20
G	1.60
X	0.55
Y	0.80
C1	2.40
C2	0.95

(2) Package Type: SOT353



Dimensions	Value (in mm)
Z	2.5
G	1.3
X	0.42
Y	0.6
C1	1.9
C2	0.65

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