

# 74AHC2G32; 74AHCT2G32

Dual 2-input OR gate

Rev. 01 — 23 February 2004

Product data sheet

## 1. General description

The 74AHC2G/AHCT2G32 is a high-speed Si-gate CMOS device. This device provides two 2-input OR gates.

## 2. Features

- Symmetrical output impedance
- High noise immunity
- ESD protection:
  - ◆ HBM EIA/JESD22-A114-A exceeds 2000 V
  - ◆ MM EIA/JESD22-A115-A exceeds 200 V
  - ◆ CDM EIA/JESD22-C101 exceeds 1000 V.
- Low power dissipation
- Balanced propagation delays
- SOT505-2 and SOT765-1 package
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$ .

## 3. Quick reference data

**Table 1: Quick reference data**

$GND = 0\text{ V}$ ;  $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $t_r = t_f \leq 3.0\text{ ns}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Type 74AHC2G</b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	$C_L = 15\text{ pF}$ ; $V_{CC} = 5\text{ V}$	-	3.2	5.5	ns
$C_I$	input capacitance		-	1.5	10	pF
$C_{PD}$	power dissipation capacitance	$C_L = 50\text{ pF}$ ; $f_i = 1\text{ MHz}$	[1] [2]	16	-	pF
<b>Type 74AHCT2G</b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	$C_L = 15\text{ pF}$ ; $V_{CC} = 5\text{ V}$	-	3.3	6.9	ns
$C_I$	input capacitance		-	1.5	10	pF
$C_{PD}$	power dissipation capacitance	$C_L = 50\text{ pF}$ ; $f_i = 1\text{ MHz}$	[1] [2]	17	-	pF

[1]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

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$C_L$  = output load capacitance in pF;  
 $V_{CC}$  = supply voltage in Volts;  
 $N$  = total load switching outputs;  
 $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

[2] The condition is  $V_I = GND$  to  $V_{CC}$ .

## 4. Ordering information

Table 2: Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74AHC2G32DP	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74AHCT2G32DP	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74AHC2G32DC	-40 °C to +125 °C	VSSOP8	plastic very shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AHCT2G32DC	-40 °C to +125 °C	VSSOP8	plastic very shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

## 5. Marking

Table 3: Marking

Type number	Marking code
74AHC2G32DP	A32
74AHCT2G32DP	C32
74AHC2G32DC	A32
74AHCT2G32DC	C32

## 6. Functional diagram

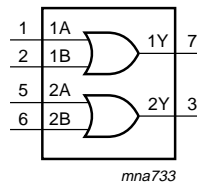


Fig 1. Functional diagram.

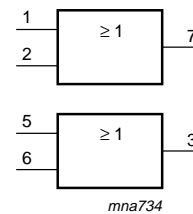


Fig 2. IEC logic symbol.

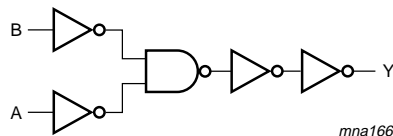


Fig 3. Logic diagram (logic driver).

## 7. Pinning information

### 7.1 Pinning

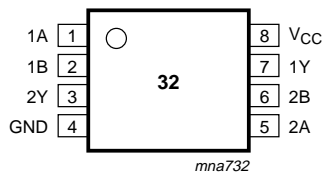


Fig 4. Pin configuration.

### 7.2 Pin description

Table 4: Pin description

Pin	Symbol	Description
1	1A	data input
2	1B	data input
3	2Y	data output
4	GND	ground (0 V)
5	2A	data input
6	2B	data input
7	1Y	data output
8	V <sub>CC</sub>	supply voltage

## 8. Functional description

### 8.1 Function table

Table 5: Function table [1]

Input		Output
nA	nB	nY
L	L	L
L	H	H
H	L	H
H	H	H

[1] H = HIGH voltage level;  
L = LOW voltage level.

## 9. Limiting values

Table 6: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+7.0	V
$V_I$	input voltage		-0.5	+7.0	V
$I_{IK}$	input diode current	$V_I < -0.5$ V	-	-20	mA
$I_{OK}$	output diode current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V	[1] -	±20	mA
$I_O$	output source or sink current	$V_O > -0.5$ V or $V_O < V_{CC} + 0.5$ V	-	±25	mA
$I_{CC}, I_{GND}$	$V_{CC}$ or GND current		-	±75	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	power dissipation	$T_{amb} = -40$ °C to +125 °C	-	250	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

## 10. Recommended operating conditions

Table 7: Recommended operating operations

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>Type 74AHC2G</b>						
$V_{CC}$	supply voltage		2.0	5.0	5.5	V
$V_I$	input voltage		0	-	5.5	V
$V_O$	output voltage		0	-	$V_{CC}$	V
$T_{amb}$	operating ambient temperature	see <a href="#">Section 11</a> and <a href="#">Section 12</a> per device	-40	+25	+125	°C

Table 7: Recommended operating operations ...continued

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$t_r, t_f$	input rise and fall times	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$	-	-	100	ns/V
		$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$	-	-	20	ns/V
<b>Type 74AHCT2G</b>						
$V_{CC}$	supply voltage		4.5	5.0	5.5	V
$V_I$	input voltage		0	-	5.5	V
$V_O$	output voltage		0	-	$V_{CC}$	V
$T_{amb}$	operating ambient temperature	see <a href="#">Section 11</a> and <a href="#">Section 12</a> per device	-40	+25	+125	°C
$t_r, t_f$	input rise and fall times	$V_{CC} = 5 \text{ V} \pm 0.5 \text{ V}$	-	-	20	ns/V

## 11. Static characteristics

Table 8: Static characteristics type 74AHC2G32

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25 \text{ °C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 2.0 \text{ V}$	1.5	-	-	V
		$V_{CC} = 3.0 \text{ V}$	2.1	-	-	V
		$V_{CC} = 5.5 \text{ V}$	3.85	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 2.0 \text{ V}$	-	-	0.5	V
		$V_{CC} = 3.0 \text{ V}$	-	-	0.9	V
		$V_{CC} = 5.5 \text{ V}$	-	-	1.65	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -50 \text{ } \mu\text{A}; V_{CC} = 2.0 \text{ V}$	1.9	2.0	-	V
		$I_O = -50 \text{ } \mu\text{A}; V_{CC} = 3.0 \text{ V}$	2.9	3.0	-	V
		$I_O = -50 \text{ } \mu\text{A}; V_{CC} = 4.5 \text{ V}$	4.4	4.5	-	V
		$I_O = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.58	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 50 \text{ } \mu\text{A}; V_{CC} = 2.0 \text{ V}$	-	0	0.1	V
		$I_O = 50 \text{ } \mu\text{A}; V_{CC} = 3.0 \text{ V}$	-	0	0.1	V
		$I_O = 50 \text{ } \mu\text{A}; V_{CC} = 4.5 \text{ V}$	-	0	0.1	V
		$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.36	V
$I_{LI}$	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	0.1	$\mu\text{A}$
		$V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	-	1.0	$\mu\text{A}$
$C_I$	input capacitance		-	1.5	10	pF

**Table 8: Static characteristics type 74AHC2G32 ...continued**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = -40\text{ °C to }+85\text{ °C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 2.0\text{ V}$	1.5	-	-	V
		$V_{CC} = 3.0\text{ V}$	2.1	-	-	V
		$V_{CC} = 5.5\text{ V}$	3.85	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 2.0\text{ V}$	-	-	0.5	V
		$V_{CC} = 3.0\text{ V}$	-	-	0.9	V
		$V_{CC} = 5.5\text{ V}$	-	-	1.65	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 2.0\text{ V}$	1.9	-	-	V
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 3.0\text{ V}$	2.9	-	-	V
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 4.5\text{ V}$	4.4	-	-	V
		$I_O = -4.0\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.48	-	-	V
		$I_O = -8.0\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	3.8	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 50\text{ }\mu\text{A}$ ; $V_{CC} = 2.0\text{ V}$	-	-	0.1	V
		$I_O = 50\text{ }\mu\text{A}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.1	V
		$I_O = 50\text{ }\mu\text{A}$ ; $V_{CC} = 4.5\text{ V}$	-	-	0.1	V
		$I_O = 4.0\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	-	-	0.44	V
		$I_O = 8.0\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	-	-	0.44	V
$I_{LI}$	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$	-	-	1.0	$\mu\text{A}$
$I_{CC}$	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}$ ; $V_{CC} = 5.5\text{ V}$	-	-	10	$\mu\text{A}$
$C_I$	input capacitance		-	-	10	pF
<b><math>T_{amb} = -40\text{ °C to }+125\text{ °C}</math></b>						
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 2.0\text{ V}$	1.5	-	-	V
		$V_{CC} = 3.0\text{ V}$	2.1	-	-	V
		$V_{CC} = 5.5\text{ V}$	3.85	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 2.0\text{ V}$	-	-	0.5	V
		$V_{CC} = 3.0\text{ V}$	-	-	0.9	V
		$V_{CC} = 5.5\text{ V}$	-	-	1.65	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 2.0\text{ V}$	1.9	-	-	V
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 3.0\text{ V}$	2.9	-	-	V
		$I_O = -50\text{ }\mu\text{A}$ ; $V_{CC} = 4.5\text{ V}$	4.4	-	-	V
		$I_O = -4.0\text{ mA}$ ; $V_{CC} = 3.0\text{ V}$	2.40	-	-	V
		$I_O = -8.0\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	3.70	-	-	V

**Table 8: Static characteristics type 74AHC2G32 ...continued**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 2.0 V	-	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 3.0 V	-	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V	-	-	0.55	V
		I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.55	V
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	2.0	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	40	μA
C <sub>I</sub>	input capacitance		-	-	10	pF

**Table 9: Static characteristics type 74AHCT2G32**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	V
		I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V	3.94	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	V
		I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.36	V
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V	-	-	0.1	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	1.0	μA
ΔI <sub>CC</sub>	additional quiescent supply current per input pin	V <sub>I</sub> = 3.4 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	1.35	mA
C <sub>I</sub>	input capacitance		-	1.5	10	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	4.4	-	-	V
		I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V	3.8	-	-	V

**Table 9: Static characteristics type 74AHCT2G32 ...continued**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	-	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V	-	-	0.44	V
		I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	-	-
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V	-	-	1.0	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	10	μA
ΔI <sub>CC</sub>	additional quiescent supply current per input pin	V <sub>I</sub> = 3.4 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	1.5	mA
C <sub>I</sub>	input capacitance		-	-	10	pF
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	4.4	-	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	3.70	-	-	V
		I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	-	-
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	-	-	0.1	V
		I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V	-	-	0.55	V
		I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V	-	-	-	-
I <sub>LI</sub>	input leakage current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V	-	-	2.0	μA
I <sub>CC</sub>	quiescent supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	40	μA
ΔI <sub>CC</sub>	additional quiescent supply current per input pin	V <sub>I</sub> = 3.4 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	1.5	mA
C <sub>I</sub>	input capacitance		-	-	10	pF



## 12. Dynamic characteristics

**Table 10: Dynamic characteristics type 74AHC2G32**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V);  $t_r = t_f \leq 3.0$  ns; see [Figure 6](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25\text{ }^{\circ}\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a>				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1] -	4.4	7.9	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2] -	3.2	5.5	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	-	6.3	11.4	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	-	4.6	7.5	ns
$C_{PD}$	power dissipation capacitance	$C_L = 50$ pF; $f_i = 1$ MHz	[3] [4] -	16	-	pF
<b><math>T_{amb} = -40\text{ }^{\circ}\text{C}</math> to <math>+85\text{ }^{\circ}\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a>				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	9.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	6.5	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	13.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	1.0	-	8.5	ns
<b><math>T_{amb} = -40\text{ }^{\circ}\text{C}</math> to <math>+125\text{ }^{\circ}\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a>				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	10.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	7.0	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	14.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	1.0	-	9.5	ns

[1] Typical values are measured at  $V_{CC} = 3.3$  V.

[2] Typical values are measured at  $V_{CC} = 5.0$  V.

[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$V_{CC}$  = supply voltage in Volts;

$N$  = total load switching outputs;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.

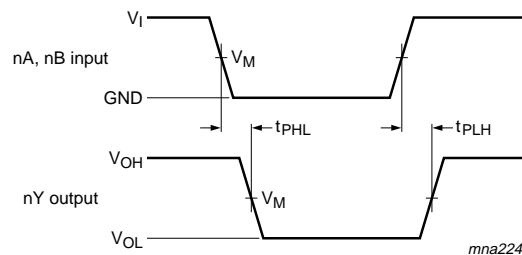
[4] The condition is  $V_i = \text{GND}$  to  $V_{CC}$ .

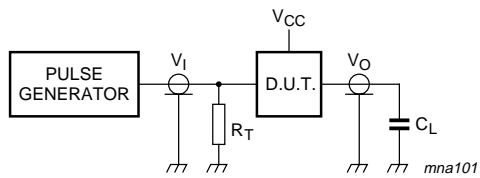
**Table 11: Dynamic characteristics type 74AHCT2G32**At recommended operating conditions; voltages are referenced to GND (ground = 0 V);  $t_r = t_f \leq 3.0$  ns; see [Figure 6](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b><math>T_{amb} = 25\text{ }^\circ\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a> $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 15\text{ pF}$	[1] -	3.3	6.9	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 50\text{ pF}$	[1] -	4.8	7.9	ns
$C_{PD}$	power dissipation capacitance	$C_L = 50\text{ pF}$ ; $f_i = 1\text{ MHz}$	[2] [3] -	17	-	pF
<b><math>T_{amb} = -40\text{ }^\circ\text{C to }+85\text{ }^\circ\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a> $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 15\text{ pF}$	1.0	-	8.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 50\text{ pF}$	1.0	-	9.0	ns
<b><math>T_{amb} = -40\text{ }^\circ\text{C to }+125\text{ }^\circ\text{C}</math></b>						
$t_{PHL}$ , $t_{PLH}$	propagation delay nA and nB to nY	see <a href="#">Figure 5</a> $V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 15\text{ pF}$	1.0	-	9.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ ; $C_L = 50\text{ pF}$	1.0	-	10.0	ns

[1] Typical values are measured at  $V_{CC} = 5.0\text{ V}$ .[2]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ). $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where: $f_i$  = input frequency in MHz; $f_o$  = output frequency in MHz; $C_L$  = output load capacitance in pF; $V_{CC}$  = supply voltage in Volts; $N$  = total load switching outputs; $\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of the outputs.[3] The condition is  $V_i = \text{GND to } V_{CC}$ .

## 13. Waveforms

74AHC2G32:  $V_M = 0.5 \times V_{CC}$ ;  $V_i = \text{GND to } V_{CC}$ .74AHCT2G32: input  $V_M = 1.5\text{ V}$  and output  $V_M = 0.5 \times V_{CC}$ ;  $V_i = \text{GND to } 3.0\text{ V}$ .**Fig 5. The input (nA and nB) to output (nY) propagation delays.**



Definitions for test circuit:

C<sub>L</sub> = Load capacitance including jig and probe capacitance (See [Section 12](#) for the value).

R<sub>T</sub> = Termination resistance should be equal to the output impedance Z<sub>o</sub> of the pulse generator.

**Fig 6. Load circuitry for switching times.**

14. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2

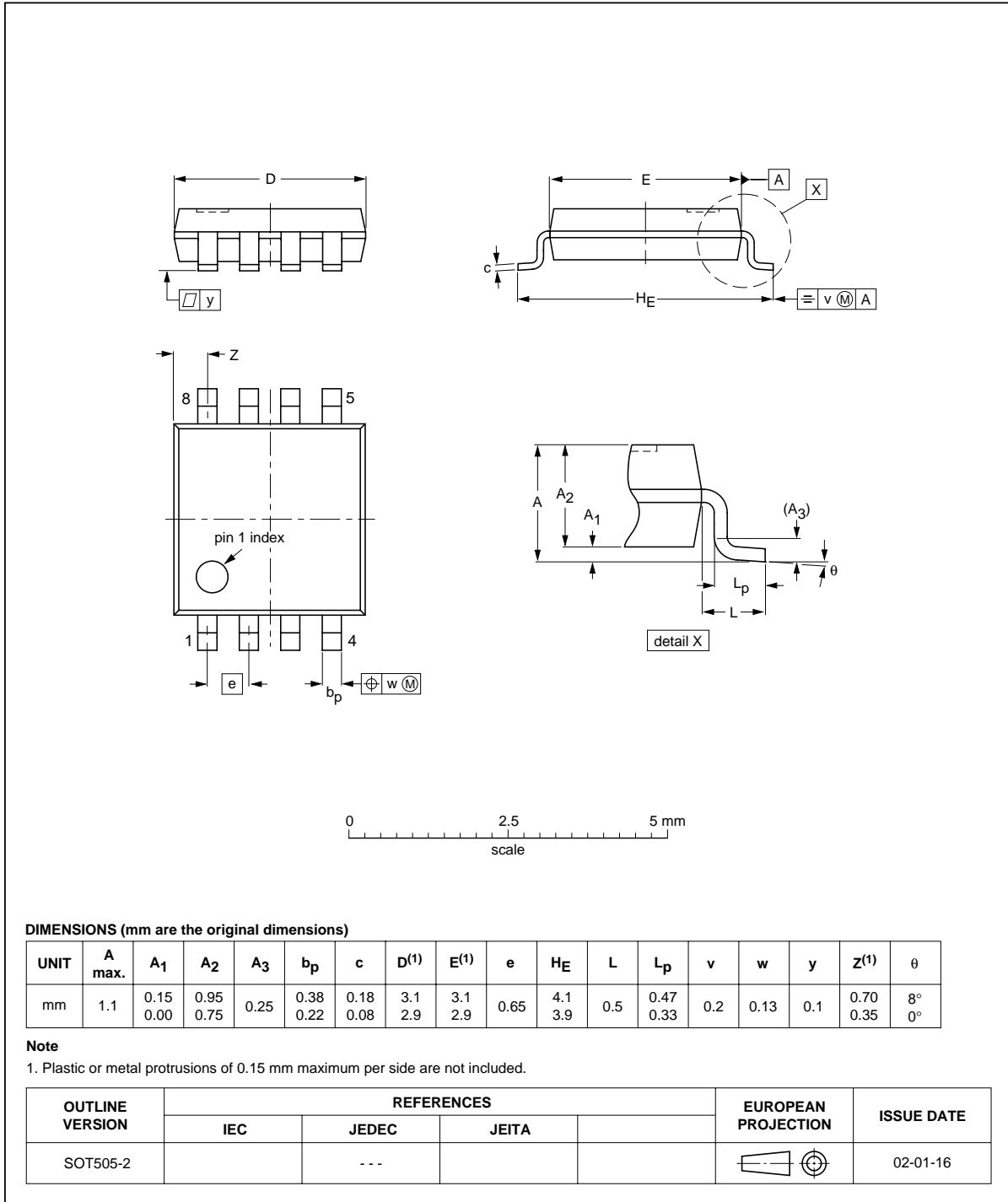


Fig 7. Package outline TSSOP8

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1

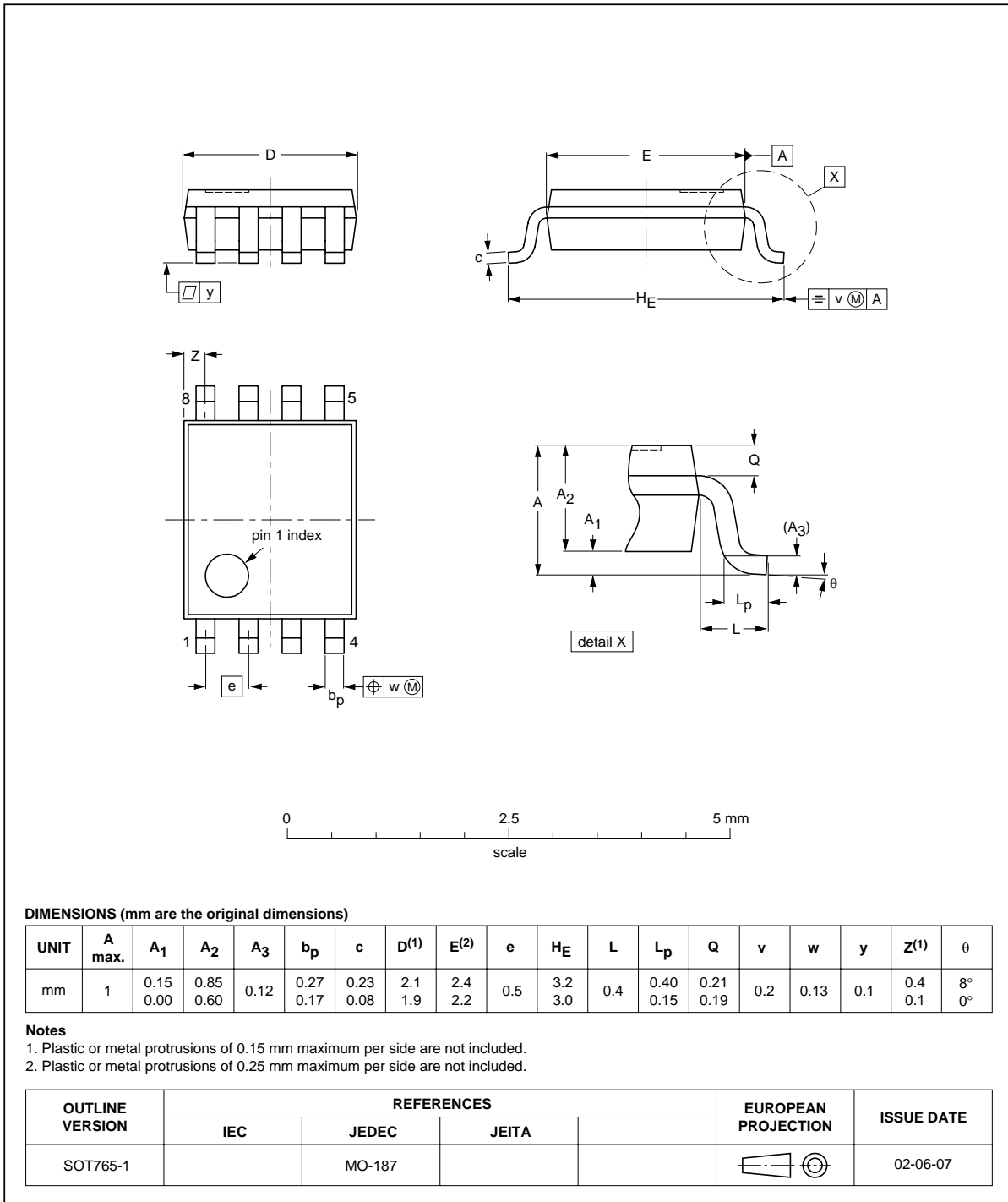


Fig 8. Package outline VSSOP8

## 15. Revision history

Table 12: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74AHC_AHCT2G32_1	20040223	Product data	-	9397 750 12532	-

## 16. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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## 20. Contents

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1	General description . . . . .	1
2	Features . . . . .	1
3	Quick reference data . . . . .	1
4	Ordering information . . . . .	2
5	Marking . . . . .	2
6	Functional diagram . . . . .	2
7	Pinning information . . . . .	3
7.1	Pinning . . . . .	3
7.2	Pin description . . . . .	3
8	Functional description . . . . .	4
8.1	Function table . . . . .	4
9	Limiting values . . . . .	4
10	Recommended operating conditions . . . . .	4
11	Static characteristics . . . . .	5
12	Dynamic characteristics . . . . .	9
13	Waveforms . . . . .	10
14	Package outline . . . . .	12
15	Revision history . . . . .	14
16	Data sheet status . . . . .	15
17	Definitions . . . . .	15
18	Disclaimers . . . . .	15
19	Contact information . . . . .	15



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