

74AHC2G241; 74AHCT2G241

Dual buffer/line driver; 3-state

Rev. 01 — 10 March 2004

Product data sheet

1. General description

The 74AHC2G241; 74AHCT2G241 is a high-speed Si-gate CMOS device.

The 74AHC2G241; 74AHCT2G241 is a dual non-inverting buffer/line driver with 3-state outputs. The 3-state outputs are controlled by the output enable inputs $1\overline{OE}$ and 2OE. A HIGH level at pin $1\overline{OE}$ causes output 1Y to assume a high-impedance OFF-state. A LOW level at pin 2OE causes output 2Y to assume a high-impedance OFF-state. Schmitt-trigger action at all inputs makes the circuit highly tolerant for slower input rise and fall times.

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 from $-40\text{ }^{\circ}\text{C}$ 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
Type 74AHC2G241						
t_{PHL} , t_{PLH}	propagation delay nA to nY	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.4	5.5	ns
t_{PZH} , t_{PZL}	enable time $1\overline{OE}$ to 1Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.6	5.1	ns
	enable time 2OE to 2Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.6	5.6	ns
t_{PHZ} , t_{PLZ}	disable time $1\overline{OE}$ to 1Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	4.1	6.8	ns
	disable time 2OE to 2Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	4.3	6.8	ns
C_I	input capacitance		-	1.5	10	pF
C_{PD}	power dissipation capacitance	$C_L = 50\text{ pF}$; $f = 1\text{ MHz}$ [1] [2]	-	10	-	pF

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Table 1: Quick reference data ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Type 74AHCT2G241						
t_{PHL} , t_{PLH}	propagation delay nA to nY	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.4	5.5	ns
t_{PZH} , t_{PZL}	enable time 1OE to 1Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.9	5.1	ns
	enable time 2OE to 2Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	3.4	5.6	ns
t_{PHZ} , t_{PLZ}	disable time 1OE to 1Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	4.5	6.8	ns
	disable time 2OE to 2Y	$C_L = 15\text{ pF}$; $V_{CC} = 5\text{ V}$	-	4.0	6.8	ns
C_I	input capacitance		-	1.5	10	pF
C_{PD}	power dissipation capacitance	$C_L = 50\text{ pF}$; $f = 1\text{ MHz}$	[1][2]	10	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW). $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ 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;

 $\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.[2] The condition is $V_I = \text{GND to } V_{CC}$.

4. Ordering information

Table 2: Ordering information

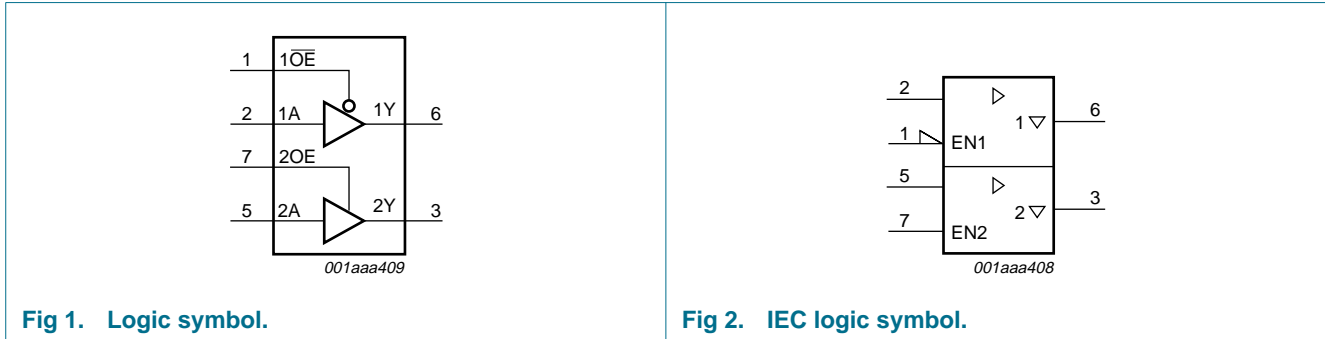
Type number	Package			
	Temperature range	Name	Description	Version
74AHC2G241DP	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74AHCT2G241DP	-40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74AHC2G241DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74AHCT2G241DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

5. Marking

Table 3: Marking

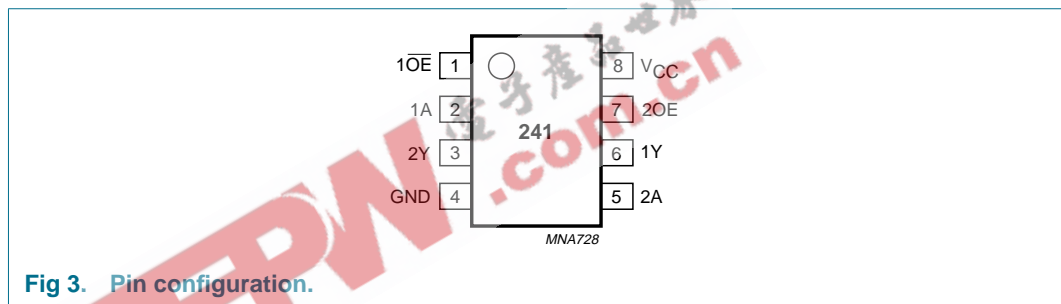
Type number	Marking code
74AHC2G241DP	A241
74AHCT2G241DP	C241
74AHC2G241DC	A41
74AHCT2G241DC	C41

6. Functional diagram



7. Pinning information

7.1 Pinning



7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
1 \overline{OE}	1	output enable input (active LOW)
1A	2	data input
2Y	3	data output
GND	4	ground (0 V)
2A	5	data input
1Y	6	data output
2OE	7	output enable input (active HIGH)
V _{CC}	8	supply voltage

8. Functional description

Table 5: Function table [1]

Input		Output	Input		Output
1OE	1A	1Y	2OE	2A	2Y
L	L	L	H	L	L
L	H	H	H	H	H
H	X	Z	L	X	Z

- [1] H = HIGH voltage level;
 L = LOW voltage level;
 X = don't care;
 Z = high-impedance OFF-state.

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 to $(V_{CC} + 0.5)$ 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 conditions

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Type 74AHC2G241						
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 Section 11 and Section 12	-40	+25	+125	°C
t_r, t_f	input rise and fall times	$V_{CC} = 3.3$ V \pm 0.3 V	-	-	100	ns/V
		$V_{CC} = 5$ V \pm 0.5 V	-	-	20	ns/V
Type 74AHCT2G241						
V_{CC}	supply voltage		4.5	5.0	5.5	V

Table 7: Recommended operating conditions ...continued

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_I	input voltage		0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	operating ambient temperature	see Section 11 and Section 12	-40	+25	+125	°C
t_r, t_f	input rise and fall times	$V_{CC} = 5 V \pm 0.5 V$	-	-	20	ns/V

11. Static characteristics

Table 8: Static characteristics type 74AHC2G241

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = 25\text{ °C}$						
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
	$I_O = -8.0\text{ mA}; V_{CC} = 4.5\text{ V}$	3.94	-	-	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
	$I_O = 8.0\text{ mA}; V_{CC} = 4.5\text{ V}$	-	-	0.36	V	
I_{OZ}	3-state OFF-state current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$	-	-	0.25	μA
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$	-	-	0.1	μA
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}; V_{CC} = 5.5\text{ V}$	-	-	1.0	μA
C_I	input capacitance		-	1.5	10	pF
$T_{amb} = -40\text{ °C to }+85\text{ °C}$						
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

Table 8: Static characteristics type 74AHC2G241 ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V _{IL}	LOW-level input voltage	V _{CC} = 2.0 V	-	-	0.5	V
		V _{CC} = 3.0 V	-	-	0.9	V
		V _{CC} = 5.5 V	-	-	1.65	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -50 μA; V _{CC} = 2.0 V	1.9	-	-	V
		I _O = -50 μA; V _{CC} = 3.0 V	2.9	-	-	V
		I _O = -50 μA; V _{CC} = 4.5 V	4.4	-	-	V
		I _O = -4.0 mA; V _{CC} = 3.0 V	2.48	-	-	V
		I _O = -8.0 mA; V _{CC} = 4.5 V	3.8	-	-	V
V _{OL}	LOW-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = 50 μA; V _{CC} = 2.0 V	-	-	0.1	V
		I _O = 50 μA; V _{CC} = 3.0 V	-	-	0.1	V
		I _O = 50 μA; V _{CC} = 4.5 V	-	-	0.1	V
		I _O = 4.0 mA; V _{CC} = 3.0 V	-	-	0.44	V
		I _O = 8.0 mA; V _{CC} = 4.5 V	-	-	0.44	V
I _{OZ}	3-state OFF-state current	V _I = V _{CC} or GND; V _{CC} = 5.5 V	-	-	2.5	μA
I _{LI}	input leakage current	V _I = V _{CC} or GND; V _{CC} = 5.5 V	-	-	1.0	μA
I _{CC}	quiescent supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V	-	-	10	μA
C _I	input capacitance		-	-	10	pF
T_{amb} = -40 °C to +125 °C						
V _{IH}	HIGH-level input voltage	V _{CC} = 2.0 V	1.5	-	-	V
		V _{CC} = 3.0 V	2.1	-	-	V
		V _{CC} = 5.5 V	3.85	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 2.0 V	-	-	0.5	V
		V _{CC} = 3.0 V	-	-	0.9	V
		V _{CC} = 5.5 V	-	-	1.65	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = -50 μA; V _{CC} = 2.0 V	1.9	-	-	V
		I _O = -50 μA; V _{CC} = 3.0 V	2.9	-	-	V
		I _O = -50 μA; V _{CC} = 4.5 V	4.4	-	-	V
		I _O = -4.0 mA; V _{CC} = 3.0 V	2.40	-	-	V
		I _O = -8.0 mA; V _{CC} = 4.5 V	3.70	-	-	V
V _{OL}	LOW-level output voltage	V _I = V _{IH} or V _{IL}				
		I _O = 50 μA; V _{CC} = 2.0 V	-	-	0.1	V
		I _O = 50 μA; V _{CC} = 3.0 V	-	-	0.1	V
		I _O = 50 μA; V _{CC} = 4.5 V	-	-	0.1	V
		I _O = 4.0 mA; V _{CC} = 3.0 V	-	-	0.55	V
		I _O = 8.0 mA; V _{CC} = 4.5 V	-	-	0.55	V

Table 8: Static characteristics type 74AHC2G241 ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{OZ}	3-state OFF-state current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	10	μ A
I_{LI}	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	2.0	μ A
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	40	μ A
C_I	input capacitance		-	-	10	pF

Table 9: Static characteristics type 74AHCT2G241

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = 25$ °C						
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = -50$ μ A; $V_{CC} = 4.5$ V	4.4	4.5	-	V
		$I_O = -8.0$ mA; $V_{CC} = 4.5$ V	3.94	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = 50$ μ A; $V_{CC} = 4.5$ V	-	0	0.1	V
		$I_O = 8.0$ mA; $V_{CC} = 4.5$ V	-	-	0.36	V
I_{OZ}	3-state OFF-state current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	0.25	μ A
I_{LI}	input leakage current	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 5.5$ V	-	-	0.1	μ A
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	1.0	μ A
ΔI_{CC}	additional quiescent supply current per input pin	$V_I = 3.4$ V; other inputs at V_{CC} or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	1.35	mA
C_I	input capacitance		-	1.5	10	pF
$T_{amb} = -40$ °C to +85 °C						
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = -50$ μ A; $V_{CC} = 4.5$ V	4.4	-	-	V
		$I_O = -8.0$ mA; $V_{CC} = 4.5$ V	3.8	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = 50$ μ A; $V_{CC} = 4.5$ V	-	-	0.1	V
		$I_O = 8.0$ mA; $V_{CC} = 4.5$ V	-	-	0.44	V
I_{OZ}	3-state OFF-state current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	2.5	μ A

Table 9: Static characteristics type 74AHCT2G241 ...continued

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
I_{LI}	input leakage current	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 5.5$ V	-	-	1.0	μ A
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	10	μ A
ΔI_{CC}	additional quiescent supply current per input pin	$V_I = 3.4$ V; other inputs at V_{CC} or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	1.5	mA
C_I	input capacitance		-	-	10	pF
$T_{amb} = -40$ °C to $+125$ °C						
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	2.0	-	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5$ V to 5.5 V	-	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = -50$ μ A; $V_{CC} = 4.5$ V	4.4	-	-	V
		$I_O = -8.0$ mA; $V_{CC} = 4.5$ V	3.70	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		$I_O = 50$ μ A; $V_{CC} = 4.5$ V	-	-	0.1	V
		$I_O = 8.0$ mA; $V_{CC} = 4.5$ V	-	-	0.55	V
I_{OZ}	3-state OFF-state current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5$ V	-	-	10	μ A
I_{LI}	input leakage current	$V_I = V_{IH}$ or V_{IL} ; $V_{CC} = 5.5$ V	-	-	2.0	μ A
I_{CC}	quiescent supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	40	μ A
ΔI_{CC}	additional quiescent supply current per input pin	$V_I = 3.4$ V; other inputs at V_{CC} or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V	-	-	1.5	mA
C_I	input capacitance		-	-	10	pF

12. Dynamic characteristics

Table 10: Dynamic characteristics type 74AHC2G241GND = 0 V; $t_r = t_f \leq 3.0$ ns; see [Figure 7](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
$T_{amb} = 25$ °C							
t_{PHL} , t_{PLH}	propagation delay nA to nY	see Figure 4					
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1]	-	4.7	8.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2]	-	3.4	5.5	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	[1]	-	6.6	11.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	[2]	-	4.7	7.5	ns

Table 10: Dynamic characteristics type 74AHC2G241 ...continued

GND = 0 V; $t_r = t_f \leq 3.0$ ns; see Figure 7.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PZH}, t_{PZL}	enable time $\overline{1OE}$ to 1Y	see Figure 5				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1] -	5.0	8.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2] -	3.6	5.1	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	[1] -	6.9	11.5	ns
	enable time 2OE to 2Y	see Figure 6				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1] -	4.9	8.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2] -	3.6	5.6	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	[1] -	7.0	11.5	ns
t_{PHZ}, t_{PLZ}	disable time $\overline{1OE}$ to 1Y	see Figure 5				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1] -	6.0	9.7	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2] -	4.1	6.8	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	[1] -	8.3	13.2	ns
	disable time 2OE to 2Y	see Figure 6				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	[1] -	6.3	9.7	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	[2] -	4.3	6.8	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	[1] -	9.0	13.2	ns
t_{PHL}, t_{PLH}	propagation delay nA to nY	see Figure 4				
		$V_{CC} = 3.0$ 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
	enable time $\overline{1OE}$ to 1Y	see Figure 5				
		$V_{CC} = 3.0$ 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	-	6.0	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	13.0	ns
enable time 2OE to 2Y	see Figure 6					
	$V_{CC} = 3.0$ 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	-	6.3	ns	
	$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	13.0	ns	
enable time $\overline{1OE}$ to 1Y	see Figure 5					
	$V_{CC} = 3.0$ 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	-	6.0	ns	
	$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	13.0	ns	
enable time 2OE to 2Y	see Figure 6					
	$V_{CC} = 3.0$ 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	-	6.3	ns	
	$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	13.0	ns	

 $T_{amb} = -40$ °C to +85 °C

Table 10: Dynamic characteristics type 74AHC2G241 ...continued

GND = 0 V; $t_r = t_f \leq 3.0$ ns; see Figure 7.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	disable time $\overline{1OE}$ to 1Y	see Figure 5				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	11.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	8.0	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	15.0	ns
	disable time 2OE to 2Y	see Figure 6				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	11.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	8.0	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	15.0	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	1.0	-	10.0	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	11.5	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
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	11.5	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	-	14.5	ns
t_{PHZ}, t_{PLZ}	enable time $\overline{1OE}$ to 1Y	see Figure 5				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	11.5	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	-	14.5	ns
	enable time 2OE to 2Y	see Figure 6				
		$V_{CC} = 3.0$ 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
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	12.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	8.5	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	16.5	ns
	disable time 2OE to 2Y	see Figure 6				
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 15$ pF	1.0	-	12.5	ns
		$V_{CC} = 4.5$ V to 5.5 V; $C_L = 15$ pF	1.0	-	8.5	ns
		$V_{CC} = 3.0$ V to 3.6 V; $C_L = 50$ pF	1.0	-	16.5	ns
	$V_{CC} = 4.5$ V to 5.5 V; $C_L = 50$ pF	1.0	-	11.0	ns	

[1] Typical values are measured at $V_{CC} = 3.3$ V.[2] Typical values are measured at $V_{CC} = 5.0$ V.

Table 11: Dynamic characteristics type 74AHCT2G241

GND = 0 V; $t_r = t_f \leq 3.0$ ns; see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$T_{amb} = 25$ °C [1]						
t_{PHL} , t_{PLH}	propagation delay nA to nY	see Figure 4 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	-	3.4	5.5	ns
		$C_L = 50$ pF	-	4.7	7.5	ns
t_{PZH} , t_{PZL}	enable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	-	3.9	5.1	ns
		$C_L = 50$ pF	-	5.1	7.5	ns
	enable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	-	3.4	5.6	ns
		$C_L = 50$ pF	-	4.8	7.5	ns
t_{PHZ} , t_{PLZ}	disable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	-	4.5	6.8	ns
		$C_L = 50$ pF	-	6.1	8.8	ns
	disable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	-	4.0	6.8	ns
		$C_L = 50$ pF	-	5.7	8.8	ns
$T_{amb} = -40$ °C to +85 °C						
t_{PHL} , t_{PLH}	propagation delay nA to nY	see Figure 4 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	6.5	ns
		$C_L = 50$ pF	1.0	-	8.5	ns
t_{PZH} , t_{PZL}	enable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	6.0	ns
		$C_L = 50$ pF	1.0	-	8.5	ns
	enable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	6.3	ns
		$C_L = 50$ pF	1.0	-	9.0	ns
t_{PHZ} , t_{PLZ}	disable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	8.0	ns
		$C_L = 50$ pF	1.0	-	10.0	ns
	disable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	8.0	ns
		$C_L = 50$ pF	1.0	-	10.0	ns
$T_{amb} = -40$ °C to +125 °C						
t_{PHL} , t_{PLH}	propagation delay nA to nY	see Figure 4 ; $V_{CC} = 4.5$ V to 5.5 V				
		$C_L = 15$ pF	1.0	-	7.0	ns
		$C_L = 50$ pF	1.0	-	9.5	ns

Table 11: Dynamic characteristics type 74AHCT2G241 ...continued

$GND = 0\text{ V}$; $t_r = t_f \leq 3.0\text{ ns}$; see [Figure 7](#)

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PZH} , t_{PZL}	enable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5\text{ V}$ to 5.5 V				
		$C_L = 15\text{ pF}$	1.0	-	6.5	ns
		$C_L = 50\text{ pF}$	1.0	-	9.5	ns
	enable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5\text{ V}$ to 5.5 V				
		$C_L = 15\text{ pF}$	1.0	-	6.5	ns
		$C_L = 50\text{ pF}$	1.0	-	9.5	ns
t_{PHZ} , t_{PLZ}	disable time $\overline{1OE}$ to 1Y	see Figure 5 ; $V_{CC} = 4.5\text{ V}$ to 5.5 V				
		$C_L = 15\text{ pF}$	1.0	-	8.5	ns
		$C_L = 50\text{ pF}$	1.0	-	11.0	ns
	disable time 2OE to 2Y	see Figure 6 ; $V_{CC} = 4.5\text{ V}$ to 5.5 V				
		$C_L = 15\text{ pF}$	1.0	-	8.5	ns
		$C_L = 50\text{ pF}$	1.0	-	11.0	ns

[1] All typical values are measured at $V_{CC} = 5.0\text{ V}$.

13. Waveforms

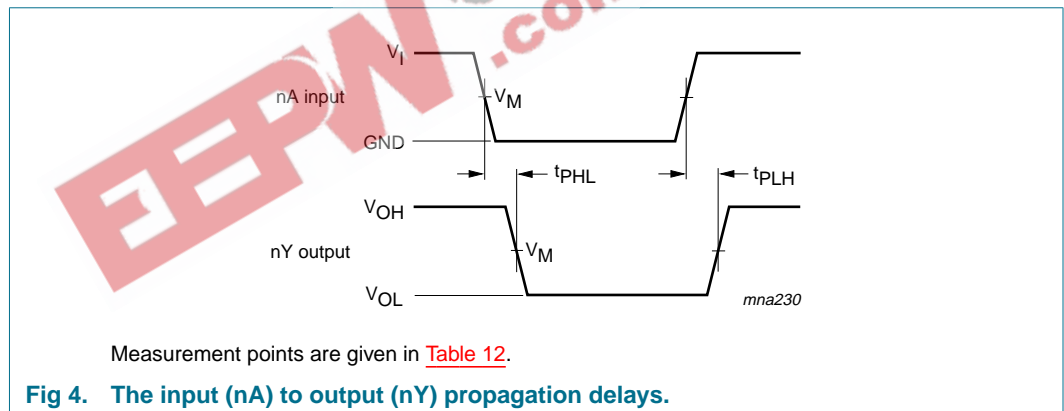
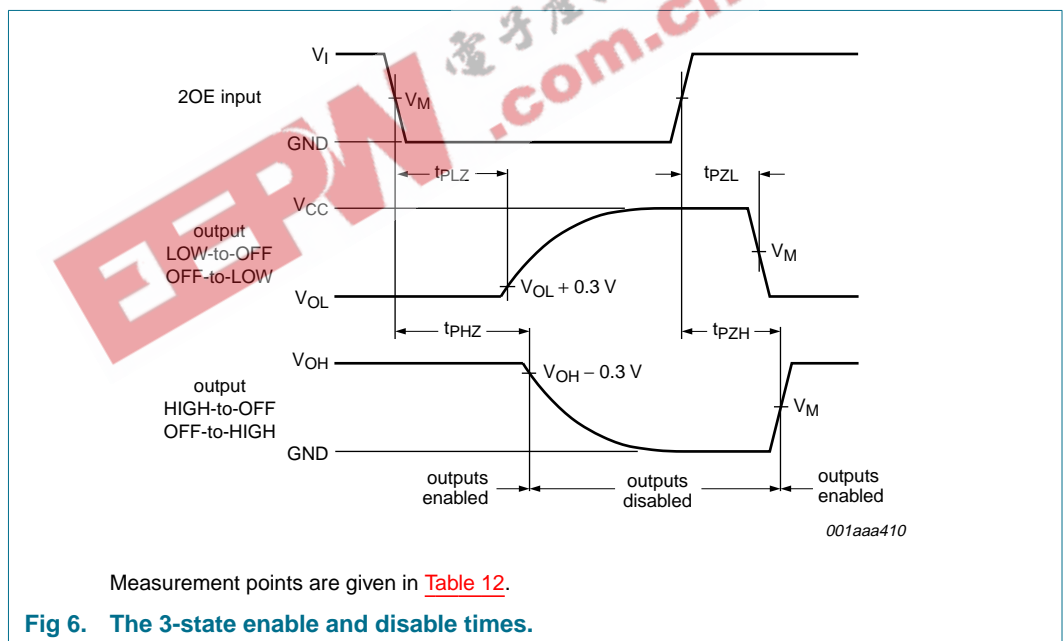
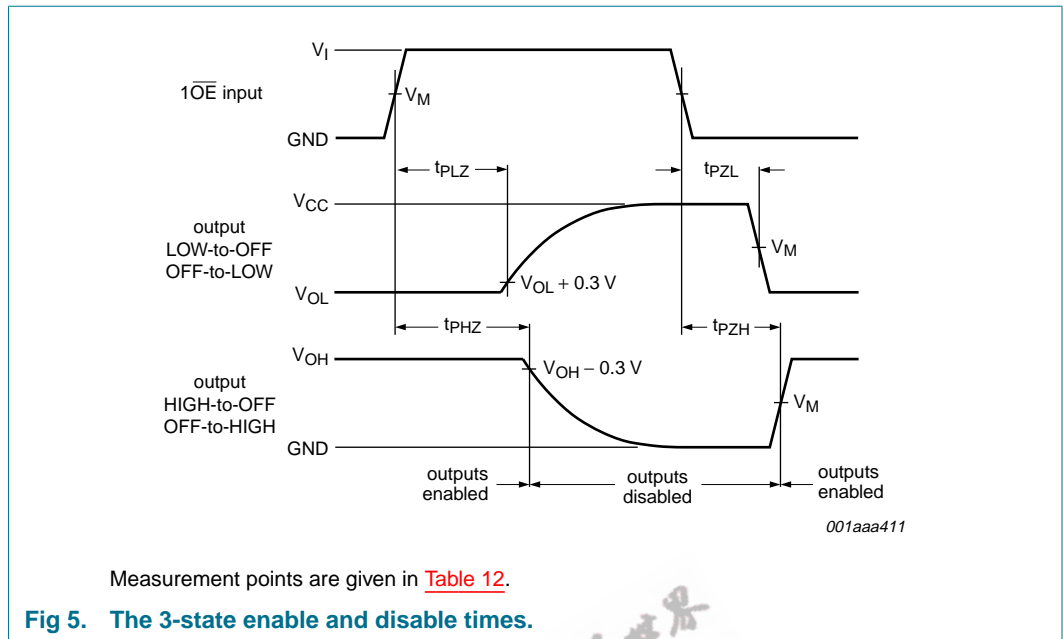


Table 12: Measurement points

Type	V_I input requirements	V_M input	V_M output
74AHC2G241	GND to V_{CC}	$50\% V_{CC}$	$50\% V_{CC}$
74AHCT2G241	GND to 3.0 V	1.5 V	$50\% V_{CC}$



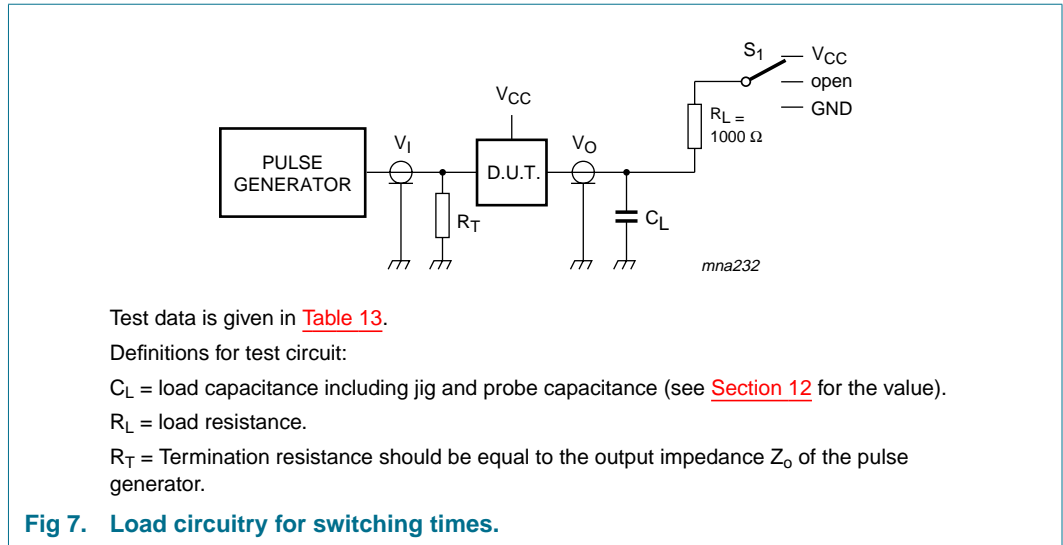


Table 13: Test data

Test	S_1
t_{PLH} , t_{PHL}	open
t_{PLZ} , t_{PZL}	V_{CC}
t_{PHZ} , t_{PZH}	GND

14. Package outline

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

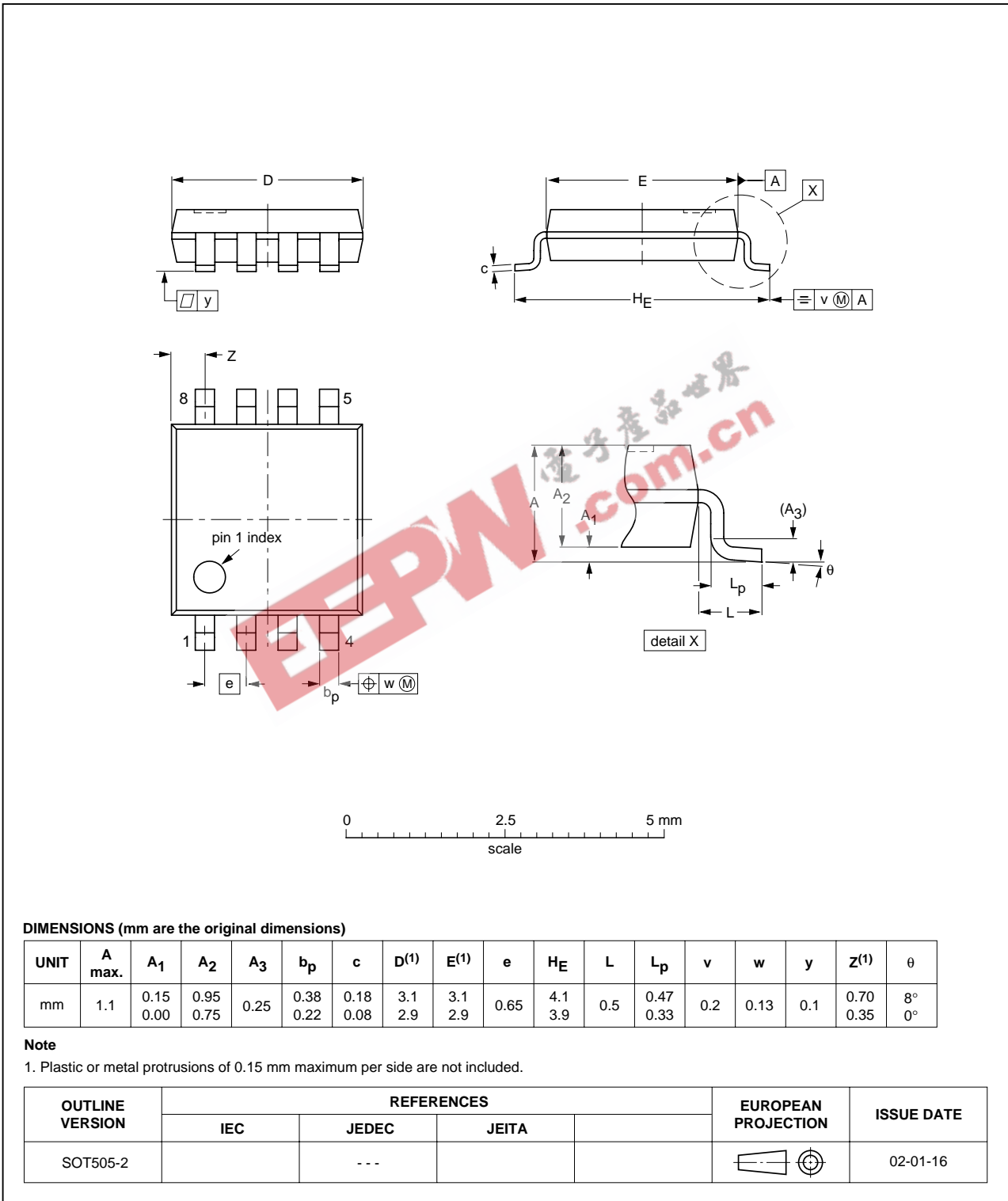


Fig 8. Package outline TSSOP8.

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

SOT765-1

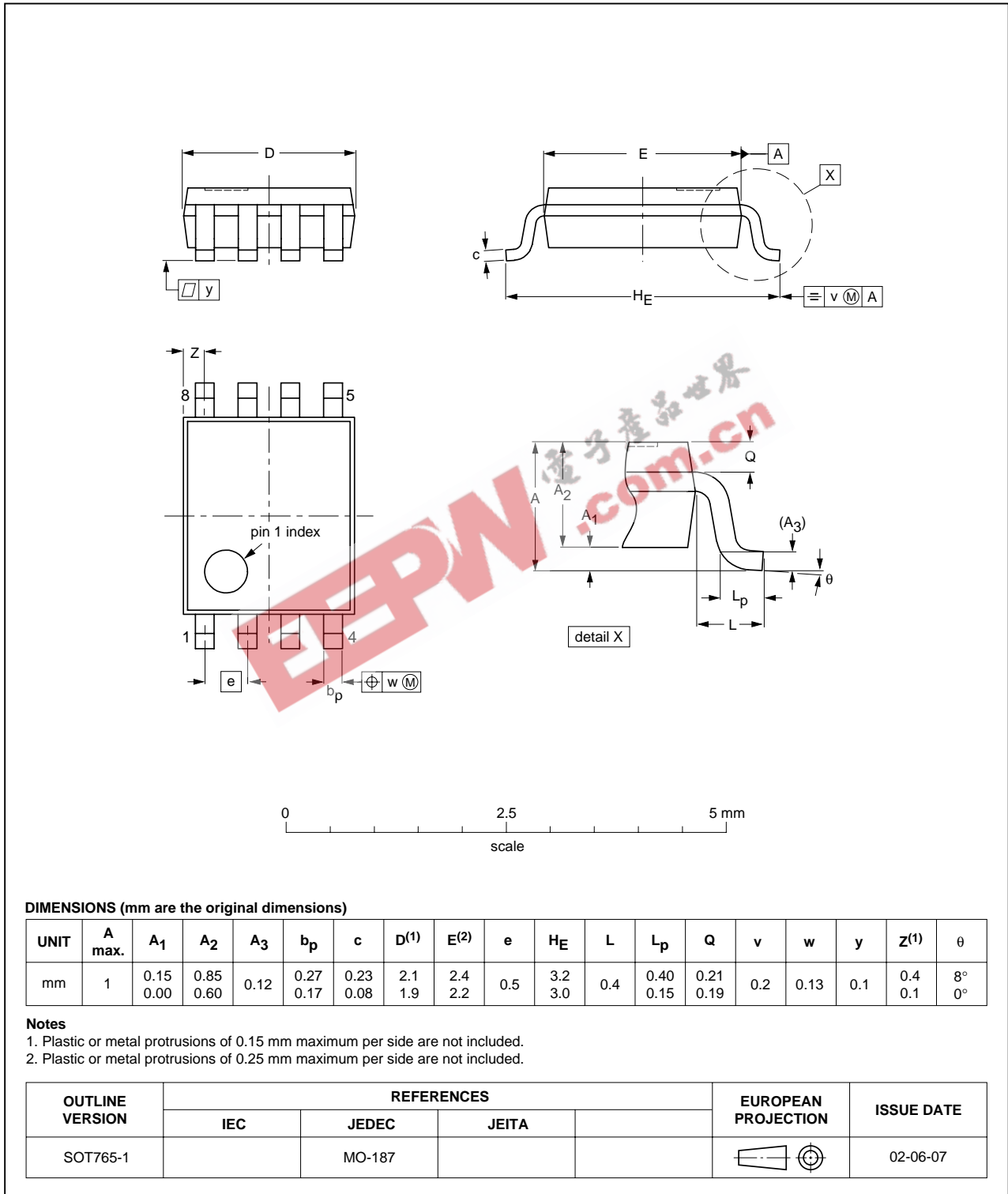


Fig 9. Package outline VSSOP8.

15. Revision history

Table 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74AHC_AHCT2G241_1	20040310	Product data	-	9397 750 12887	-

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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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