# 74HC154; 74HCT154 4-to-16 line decoder/demultiplexer Rev. 7 — 29 February 2016

Product data sheet

#### **General description** 1.

The 74HC154; 74HCT154 is a 4-to-16 line decoder/demultiplexer. It decodes four binary weighted address inputs (A0 to A3) to sixteen mutually exclusive outputs ( $\overline{Y0}$  to  $\overline{Y15}$ ). The device features two input enable (E0 and E1) inputs. A HIGH on either of the input enables forces the outputs HIGH. The device can be used as a 1-to-16 demultiplexer by using one of the enable inputs as the multiplexed data input. When the other enable input is LOW the addressed output will follow the state of the applied data. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V<sub>CC</sub>.

#### Features and benefits 2.

- 16-line demultiplexing capability
- Decodes 4 binary-coded inputs into 16 mutually-exclusive outputs
- Complies with JEDEC standard no. 7A
- Input levels:
  - ◆ For 74HC154: CMOS level
- ◆ For 74HCT154: TTL level ESD protection:
  - ♦ HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

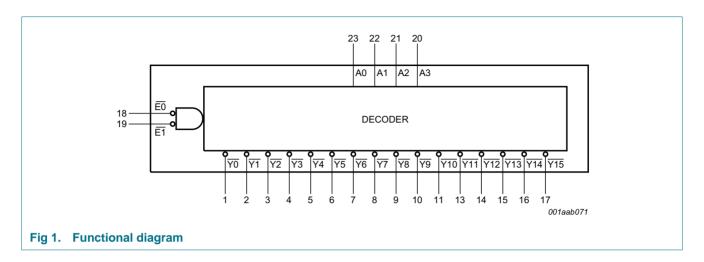
#### **Ordering information** 3.

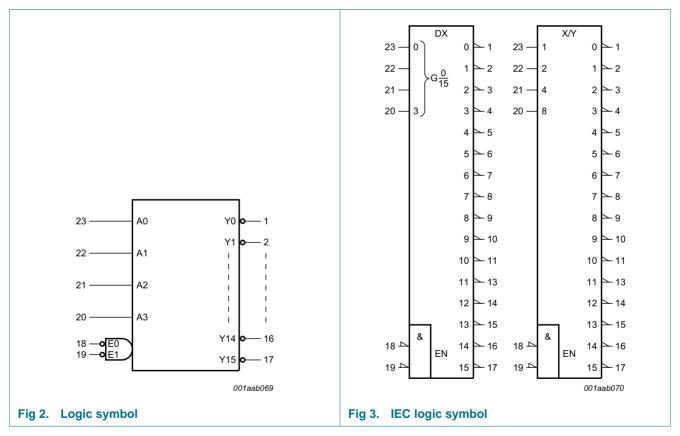
Table 1. **Ordering information** 

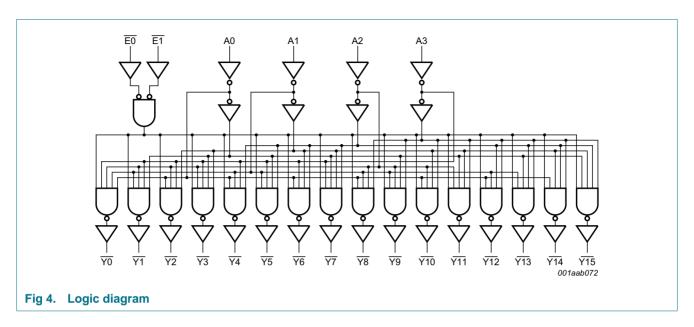
Type number	Package				
	Temperature range	Name	Description	Version	
74HC154D	−40 °C to +125 °C	SO24	plastic small outline package; 24 leads; body width 7.5 mm	SOT137-1	
74HCT154D					
74HC154DB	-40 °C to +125 °C	SSOP24	plastic shrink small outline package; 24 leads; body width	SOT340-1	
74HCT154DB			5.3 mm		
74HC154PW	–40 °C to +125 °C	TSSOP24	plastic thin shrink small outline package; 24 leads; body	SOT355-1	
74HCT154PW			width 4.4 mm		
74HC154BQ	-40 °C to +125 °C DHVQFN24		plastic dual in-line compatible thermal enhanced very thin	SOT815-1	
74HCT154BQ			quad flat package; no leads; 24 terminals; body $3.5 \times 5.5 \times 0.85$ mm		



# 4. Functional diagram

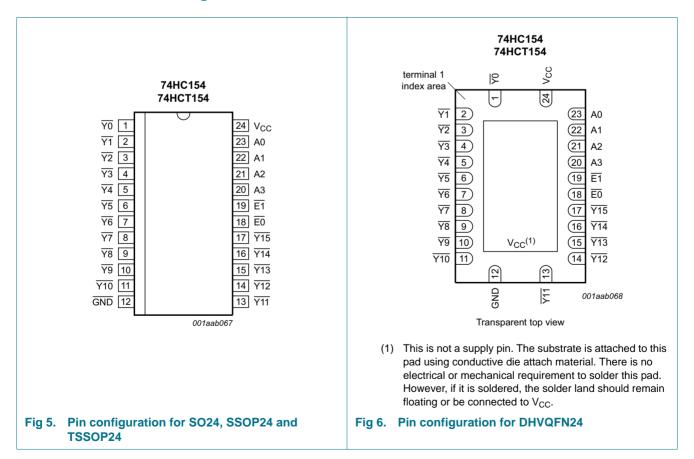






# 5. Pinning information

## 5.1 Pinning



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## 5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
$\frac{\overline{Y0}, \overline{Y1}, \overline{Y2}, \overline{Y3}, \overline{Y4}, \overline{Y5}, \overline{Y6}, \overline{Y7}, \overline{Y8}, \overline{Y9},}{\overline{Y10}, \overline{Y11}, \overline{Y12}, \overline{Y13}, \overline{Y14}, \overline{Y15}}$	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17	data output (active LOW)
GND	12	ground (0 V)
<u>E0</u> , <u>E1</u>	18, 19	enable input (active LOW)
A0, A1, A2, A3	23, 22, 21, 20	address input
V <sub>CC</sub>	24	supply voltage

# 6. Functional description

Table 3. Function table[1]

Input					Out	put															
E0	<u>E1</u>	A0	<b>A</b> 1	A2	А3	Y0	<u>Y1</u>	<u>Y2</u>	<u>Y3</u>	<u>Y4</u>	<u>Y5</u>	<u>Y6</u>	<u>Y7</u>	<u>Y8</u>	<u>Y9</u>	Y10	<u>Y11</u>	<u>Y12</u>	Y13	<u>Y14</u>	Y15
Н	Н	Χ	Χ	Χ	Χ	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
Н	L	Χ	Χ	Χ	Χ	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
L	Н	Χ	Χ	Χ	Χ	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
L	L	L	L	L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		Н	L	L	L	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		L	Н	L	L	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		Н	Н	L	L	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		L	L	Н	L	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		Н	L	Н	L	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н
		L	Н	Н	L	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н
		Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н
		L	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н	Н
		Н	L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н	Н
		L	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н	Н
		Н	Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н	Н
		L	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н	Н
		Н	L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н	Н
		L	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L	Н
		Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	Н	L

<sup>[1]</sup> H = HIGH voltage level

L = LOW voltage level

X = don't care.

## **Limiting values**

Table 4. **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 <sub>CC</sub>	supply voltage			-0.5	+7.0	V
I <sub>IK</sub>	input clamping current	$V_{I} < -0.5 \text{ V or } V_{I} > V_{CC} + 0.5 \text{ V}$	<u>[1]</u>	-	±20	mA
I <sub>OK</sub>	output clamping current	$V_O < -0.5 \text{ V or } V_O > V_{CC} + 0.5 \text{ V}$	<u>[1]</u>	-	±20	mA
Io	output current	$-0.5 \text{ V} < \text{V}_{\text{O}} < \text{V}_{\text{CC}} + 0.5 \text{ V}$	<u>[1]</u>	-	±25	mA
I <sub>CC</sub>	supply current		<u>[1]</u>	-	50	mA
$I_{GND}$	ground current		<u>[1]</u>	-	-50	mA
T <sub>stg</sub>	storage temperature			-65	+150	°C
P <sub>tot</sub>	total power dissipation	$T_{amb} = -40  ^{\circ}\text{C} \text{ to } +125  ^{\circ}\text{C}$	[2]	-	300	mW

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

For SSOP24 and TSSOP24 packages: Ptot derates linearly at 5.5 mW/K above 60 x°C.

For DHVQFN24 packages:  $P_{tot}$  derates linearly at 4.5 mW/K above 60  $\times$  °C.

#### **Recommended operating conditions** 8.

Table 5. **Recommended operating conditions** 

Voltages are referenced to GND (ground = 0 V)

Symbol	Parameter	Conditions	74HC154		7	4HCT15	4	Unit	
			Min	Тур	Max	Min	Тур	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
VI	input voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
Vo	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 2.0 V	-	-	625	-	-	-	ns/V
		V <sub>CC</sub> = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V <sub>CC</sub> = 6.0 V	-	-	83	-	-	-	ns/V

<sup>[2]</sup> For SO24 packages:  $P_{tot}$  derates linearly at 8 mW/K above 70 x°C.

## **Static characteristics**

Static characteristics 74HC154 Table 6.

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> = 25 °	°C					
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	1.2	-	V
		V <sub>CC</sub> = 4.5 V	3.15	2.4	-	V
		V <sub>CC</sub> = 6.0 V	4.2	3.2	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	0.8	0.5	V
		V <sub>CC</sub> = 4.5 V	-	2.1	1.35	V
		V <sub>CC</sub> = 6.0 V	-	2.8	1.8	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V}; I_{O} = -20 \mu\text{A}$	1.9	2.0	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -20 \mu\text{A}$	4.4	4.5	-	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = -20 \mu\text{A}$	5.9	6.0	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -4.0 \text{ mA}$	3.98	4.32	-	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = -5.2 \text{ mA}$	5.48	5.81	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V}; I_{O} = 20 \mu\text{A}$	-	0	0.1	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = 20 \mu\text{A}$	-	0	0.1	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = 20 \mu\text{A}$	-	0	0.1	V
		V <sub>CC</sub> = 4.5 V; I <sub>O</sub> = 4.0 mA	-	0.15	0.26	V
		V <sub>CC</sub> = 6.0 V; I <sub>O</sub> = 5.2 mA	-	0.16	0.26	V
l <sub>l</sub>	input leakage current	$V_{CC} = 6.0 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±0.1	μΑ
I <sub>cc</sub>	supply current	$V_{CC} = 6.0 \text{ V}; V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}$	-	-	8.0	μΑ
Cı	input capacitance		-	3.5	-	рF
T <sub>amb</sub> = -40	°C to +85 °C			II.		
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	1.8	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V}; I_{O} = -20 \mu\text{A}$	1.9	-	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -20 \mu\text{A}$	4.4	-	-	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = -20 \mu\text{A}$	5.9	-	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -4.0 \text{ mA}$	3.84	-	-	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = -5.2 \text{ mA}$	5.34	-	-	V

 Table 6.
 Static characteristics 74HC154 ...continued

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V; } I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		V <sub>CC</sub> = 4.5 V; I <sub>O</sub> = 4.0 mA	-	-	0.33	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = 5.2 \text{ mA}$	-	-	0.33	V
l <sub>l</sub>	input leakage current	$V_{CC} = 6.0 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±1.0	μΑ
I <sub>CC</sub>	supply current	$V_{CC} = 6.0 \text{ V}; V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}$	-	-	80	μΑ
T <sub>amb</sub> = -40	°C to +125 °C					
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	-	-	V
		V <sub>CC</sub> = 4.5 V	3.15	-	-	V
		V <sub>CC</sub> = 6.0 V	4.2	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	-	0.5	V
		V <sub>CC</sub> = 4.5 V	-	-	1.35	V
		V <sub>CC</sub> = 6.0 V	-	-	1.8	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V; } I_{O} = -20 \mu\text{A}$	1.9	-	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -20 \mu\text{A}$	4.4	-	-	V
		$V_{CC} = 6.0 \text{ V; } I_{O} = -20 \mu\text{A}$	5.9	-	-	V
		$V_{CC} = 4.5 \text{ V; } I_{O} = -4.0 \text{ mA}$	3.7	-	-	V
		$V_{CC} = 6.0 \text{ V; } I_{O} = -5.2 \text{ mA}$	5.2	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 2.0 \text{ V}; I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		$V_{CC} = 4.5 \text{ V; } I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		$V_{CC} = 6.0 \text{ V; } I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = 4.0 \text{ mA}$	-	-	0.4	V
		$V_{CC} = 6.0 \text{ V}; I_{O} = 5.2 \text{ mA}$	-	-	0.4	V
I <sub>I</sub>	input leakage current	$V_{CC} = 6.0 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±0.1	μΑ
I <sub>CC</sub>	supply current	$V_{CC} = 6.0 \text{ V}; V_{I} = V_{CC} \text{ or GND}; I_{O} = 0 \text{ A}$	-	-	160	μΑ

Table 7. Static characteristics 74HCT154

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

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
T <sub>amb</sub> = 25	°C					
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	8.0	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 4.5 \text{ V}; I_{O} = -20 \mu\text{A}$	4.4	4.5	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -4 \text{ mA}$	3.98	4.32	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 4.5 \text{ V}; I_{O} = 20 \mu\text{A}$	-	0	0.1	V
		V <sub>CC</sub> = 4.5 V; I <sub>O</sub> = 4 mA	-	0.15	0.25	V
l <sub>l</sub>	input leakage current	$V_{CC} = 5.5 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±0.1	μΑ
I <sub>cc</sub>	supply current	$V_{CC} = 5.5 \text{ V}; V_{I} = V_{CC} \text{ or GND}; I_{O} = 0 \text{ A}$	-	-	8.0	μА
Δl <sub>CC</sub>	additional supply current	per input pin; $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V};$ $V_1 = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A}$	-	-	360	μΑ
Cı	input capacitance		-	3.5	-	pF
T <sub>amb</sub> = -40	°C to +85 °C			1	1	1
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	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 4.5 \text{ V}; I_{O} = -20 \mu\text{A}$	4.4	-	-	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = -4 \text{ mA}$	3.84	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 4.5 \text{ V}; I_{O} = 20 \mu\text{A}$	-	-	0.1	V
		V <sub>CC</sub> = 4.5 V; I <sub>O</sub> = 4 mA	-	-	0.33	V
I <sub>I</sub>	input leakage current	$V_{CC} = 5.5 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±1.0	μА
I <sub>CC</sub>	supply current	$V_{CC} = 5.5 \text{ V}; V_I = V_{CC} \text{ or GND}; I_O = 0 \text{ A}$	-	-	80	μА
Δl <sub>CC</sub>	additional supply current	per input pin; $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V};$ $V_I = V_{CC} - 2.1 \text{ V}; I_O = 0 \text{ A}$	-	-	450	μΑ
T <sub>amb</sub> = -40	°C to +125 °C					
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	$V_I = V_{IH}$ or $V_{IL}$				
		$V_{CC} = 4.5 \text{ V; } I_{O} = -20  \mu\text{A}$	4.4	-	-	V
		$V_{CC} = 4.5 \text{ V; } I_{O} = -4 \text{ mA}$	3.7	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		V <sub>CC</sub> = 4.5 V; I <sub>O</sub> = 20 μA	-	-	0.1	V
		$V_{CC} = 4.5 \text{ V}; I_{O} = 4 \text{ mA}$	-	-	0.4	V
I <sub>I</sub>	input leakage current	$V_{CC} = 5.5 \text{ V}; V_I = V_{CC} \text{ or GND}$	-	-	±1.0	μΑ
I <sub>cc</sub>	supply current	$V_{CC} = 5.5 \text{ V}; V_{I} = V_{CC} \text{ or GND}; I_{O} = 0 \text{ A}$	-	-	160	μΑ
Δl <sub>CC</sub>	additional supply current	per input pin; $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V};$ $V_{I} = V_{CC} - 2.1 \text{ V}; I_{O} = 0 \text{ A}$	-	-	490	μΑ

# 10. Dynamic characteristics

Table 8. Dynamic characteristics

GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; for test circuit, see Figure 9.

Symbol	Parameter	Conditions			25 °C		-4	0 °C to +1	25 °C	Unit
			Mi	n	Тур	Max	Min	Max (85 °C)	Max (125 °C)	
74HC154			'			'				
t <sub>pd</sub>	propagation delay	An to Yn; see Figure 7	<u>1]</u>							
		V <sub>CC</sub> = 2.0 V	-		36	150	-	190	225	ns
		V <sub>CC</sub> = 4.5 V	-		13	30	-	38	45	ns
		$V_{CC} = 5 \text{ V}; C_L = 15 \text{ pF}$	-		11	-	-	-	-	ns
		V <sub>CC</sub> = 6.0 V	-		10	26	-	33	38	ns
		En to Yn; see Figure 8								
		V <sub>CC</sub> = 2.0 V	-		39	150	-	190	225	ns
		V <sub>CC</sub> = 4.5 V	-		14	30	-	38	45	ns
		$V_{CC} = 5 \text{ V}; C_L = 15 \text{ pF}$	-		11	-	-	-	-	ns
		V <sub>CC</sub> = 6.0 V	-		11	26	-	33	38	ns
t <sub>t</sub>	transition time	see Figure 7 and 8	2]							
		V <sub>CC</sub> = 2.0 V	-		19	75	-	95	110	ns
		V <sub>CC</sub> = 4.5 V	-		7	15	-	19	22	ns
		V <sub>CC</sub> = 6.0 V	-		6	13	-	16	19	ns
C <sub>PD</sub>	power dissipation capacitance	per gate; $V_I = GND$ to $V_{CC}$	3] _		60	-	-	-	-	pF
74HCT15	4					1		+	+	4
t <sub>pd</sub>	propagation delay	An to Yn; see Figure 7	1]							
		V <sub>CC</sub> = 4.5 V	-		16	35	-	44	53	ns
		$V_{CC} = 5 \text{ V}; C_L = 15 \text{ pF}$	-		13	-	-	-	-	ns
		En to Yn; see Figure 8								
		V <sub>CC</sub> = 4.5 V	-		15	32	-	40	48	ns
		$V_{CC} = 5 \text{ V}; C_L = 15 \text{ pF}$	-		13	-	-	-	-	ns
t <sub>t</sub>	transition time	see Figure 7 and 8	2]							
		V <sub>CC</sub> = 4.5 V	-		7	15	-	19	22	ns
$C_{PD}$	power dissipation capacitance	per gate; $V_I = GND$ to $(V_{CC} - 1.5 V)$	3] _		60	-	-	-	-	pF

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$
- [2]  $t_t$  is the same as  $t_{TLH}$  and  $t_{THL}$
- [3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu W$ ).

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

 $f_i$  = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

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

N = number of load switching outputs;

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

## 11. Waveforms

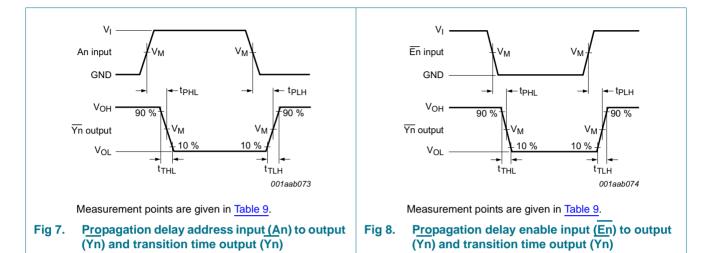
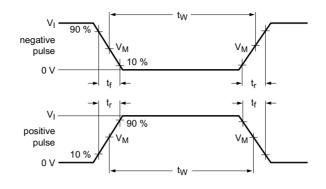
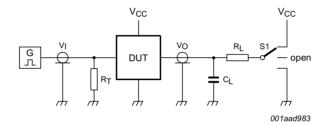


Table 9. **Measurement points** 

Туре	Input	Output
	V <sub>M</sub>	V <sub>M</sub>
74HC154	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>
74HCT154	1.3 V	1.3 V





Test data is given in Table 10.

Definitions for test circuit:

 $R_T$  = Termination resistance; should be equal to output impedance  $Z_0$  of the pulse generator.

 $C_L$  = Load capacitance including jig and probe capacitance.

R<sub>L</sub> = Load resistor.

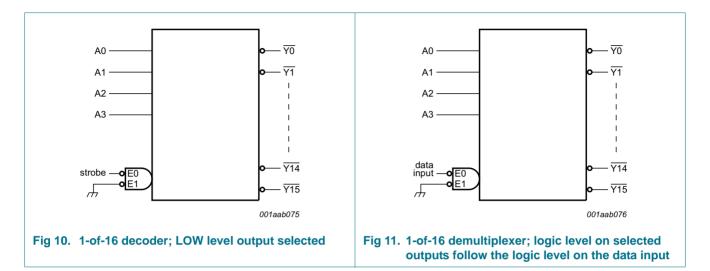
S1 = Test selection switch.

Fig 9. Test circuit for measuring switching times

Table 10. Test data

Туре	Input		Load	Load		
	VI	t <sub>r</sub> , t <sub>f</sub>	CL	R <sub>L</sub>	t <sub>PHL</sub> , t <sub>PLH</sub>	
74HC154	V <sub>CC</sub>	6 ns	15 pF, 50 pF	1 kΩ	open	
74HCT154	3 V	6 ns	15 pF, 50 pF	1 kΩ	open	

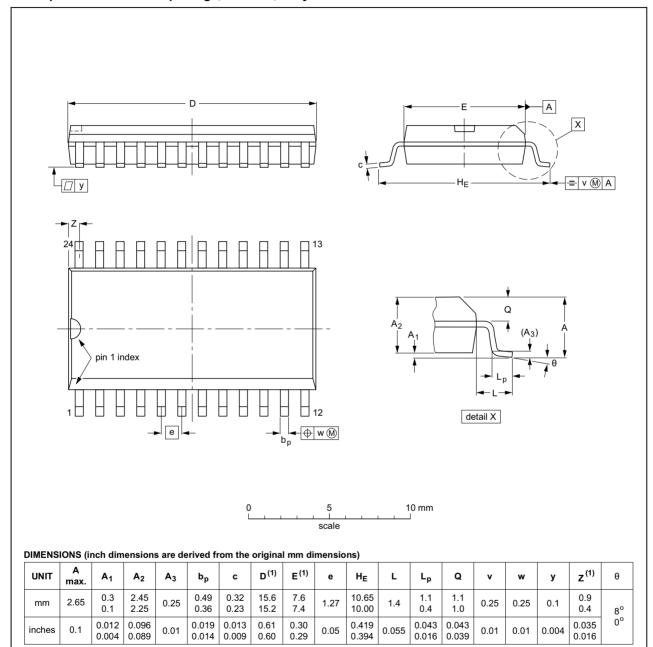
# 12. Application information



# 13. Package outline

#### SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



#### Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

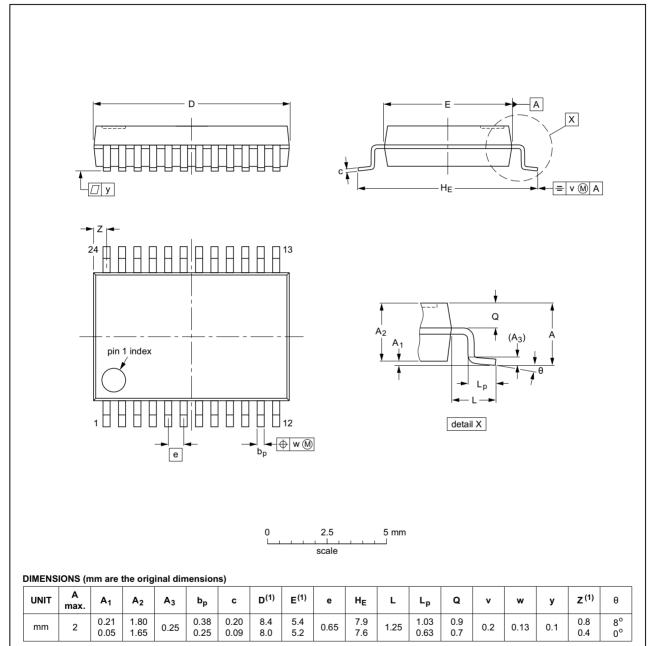
OUTLINE		REFER	RENCES	EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE
SOT137-1	075E05	MS-013			<del>99-12-27</del> 03-02-19

Fig 12. Package outline SOT137-1 (SO24)

74HC\_HCT154

### SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm

SOT340-1



#### NI -4-

1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

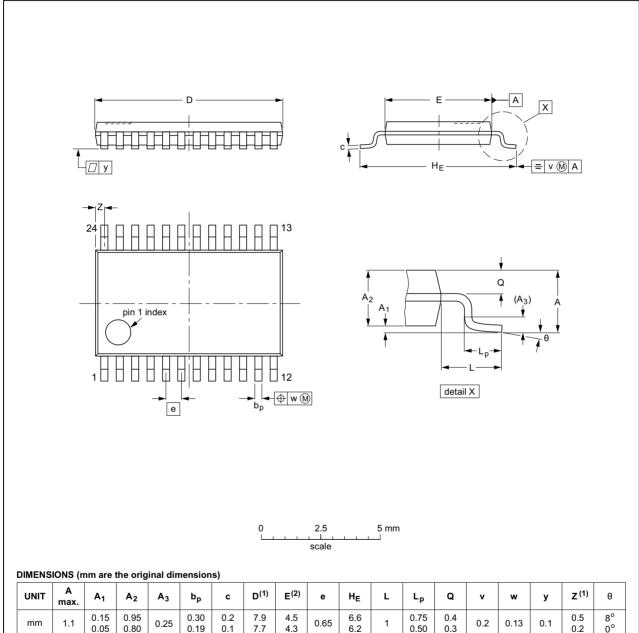
OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT340-1		MO-150				<del>99-12-27</del> 03-02-19	

Fig 13. Package outline SOT340-1 (SSOP24)

74HC\_HCT154

#### TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm

SOT355-1



UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	<b>A</b> <sub>3</sub>	bp	С	D <sup>(1)</sup>	E <sup>(2)</sup>	е	HE	L	Lp	ď	v	w	у	Z <sup>(1)</sup>	θ	
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	7.9 7.7	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°	

#### Notes

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

	OUTLINE		REFER	ENCES	EUROPEAN ISSUE DAT			
	VERSION	IEC	JEDEC	JEITA	PROJECTION	ISSUE DATE		
	SOT355-1		MO-153			<del>-99-12-27</del> 03-02-19		

Fig 14. Package outline SOT355-1 (TSSOP24)

74HC\_HCT154

# DHVQFN24: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 24 terminals; body $3.5 \times 5.5 \times 0.85$ mm

SOT815-1

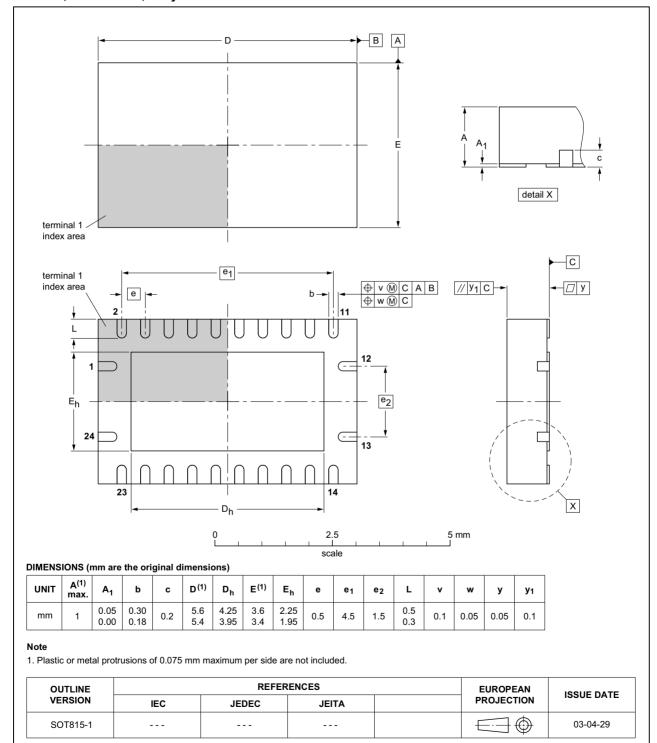


Fig 15. Package outline SOT815-1 (DHVQFN24)

74HC\_HCT154

## 14. Abbreviations

#### Table 11. Abbreviations

Acronym	Description
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
TTL	Transistor-Transistor Logic
MM	Machine Model

# 15. Revision history

#### Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes				
74HC_HCT154 v.7	20160229	Product data sheet	-	74HC_HCT154 v.6				
Modifications:	Type numb	pers 74HC154N and 74HCT1	54N (SOT101-1) remo	oved.				
74HC_HCT154 v.6	20070212	Product data sheet	-	74HC_HCT154 v.5				
Modifications:	guidelines • Legal texts	<ul> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> </ul>						
	• lable 3 on	page 4: Corrected errors in c	output information.					
74HC_HCT154 v.5	20041012	Product specification	-	74HC_HCT154 v.4				
74HC_HCT154 v.4	20041005	Product specification	-	74HC_HCT154 v.3				
74HC_HCT154 v.3	20040601	Product specification	-	74HC_HCT154_CNV v.2				

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Document status[1][2]	Product status[3]	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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- [2] The term 'short data sheet' is explained in section "Definitions"
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