74HC154; 74HCT154

4-to-16 line decoder/demultiplexer

Rev. 7 — 29 February 2016 Product data sheet

1. General description

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 ($\overline{E0}$ and $\overline{E1}$) 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_{CC}.

2. Features and benefits

- 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

3. Ordering information

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 5.3 mm	SOT340-1
74HCT154DB				
74HC154PW	−40 °C to +125 °C	TSSOP24	plastic thin shrink small outline package; 24 leads; body width 4.4 mm	SOT355-1
74HCT154PW				
74HC154BQ	−40 °C to +125 °C	DHVQFN24	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 24 terminals; body 3.5 × 5.5 × 0.85 mm	SOT815-1
74HCT154BQ				

4. Functional diagram

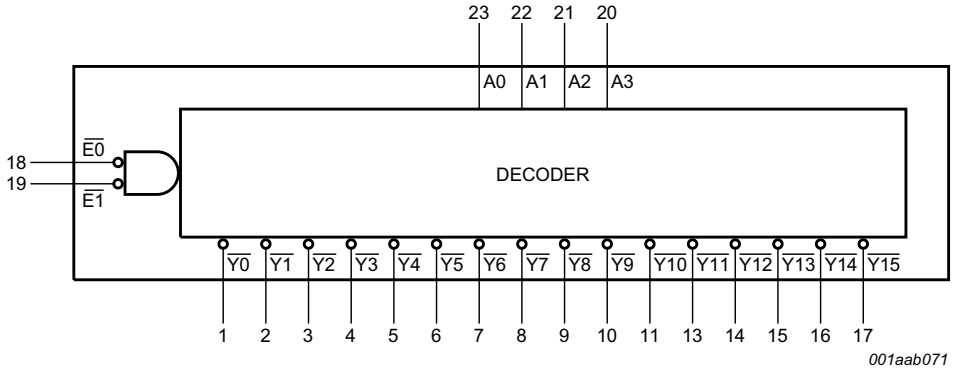


Fig 1. Functional diagram

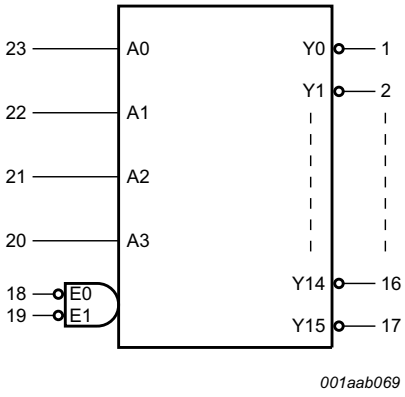


Fig 2. Logic symbol

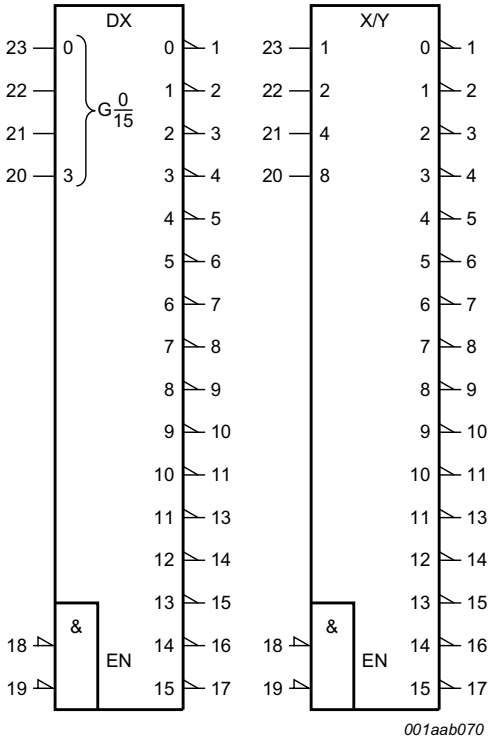


Fig 3. IEC logic symbol

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

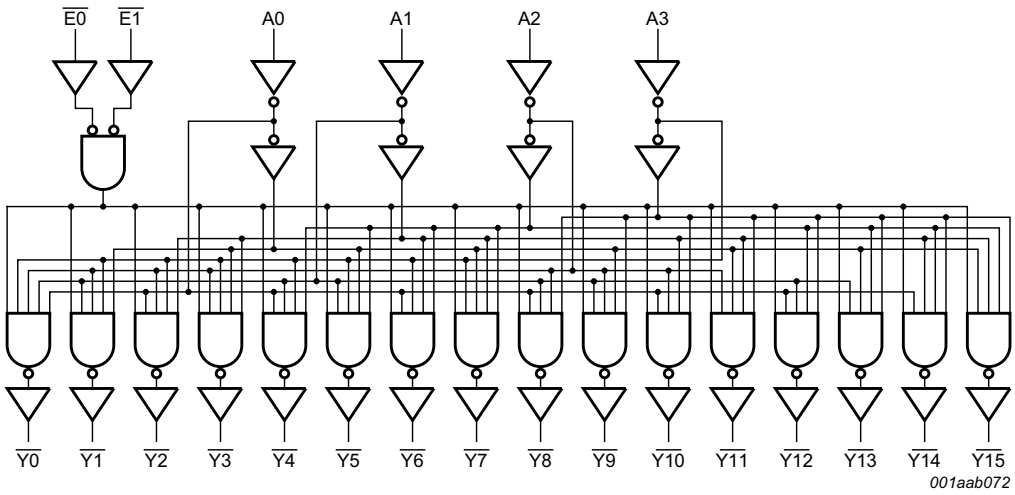


Fig 4. Logic diagram

5. Pinning information

5.1 Pinning

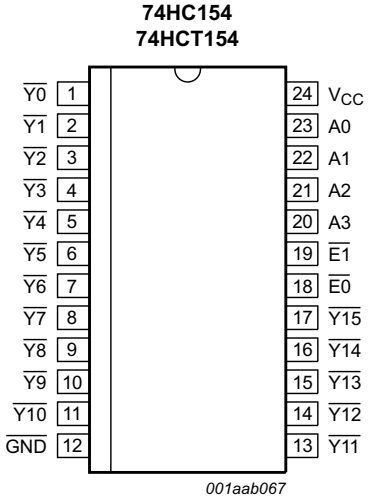
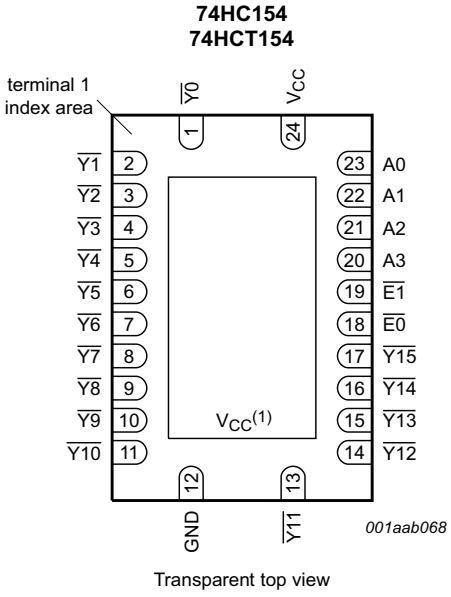


Fig 5. Pin configuration for SO24, SSOP24 and TSSOP24



Transparent top view

(1) This is not a supply pin. The substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad. However, if it is soldered, the solder land should remain floating or be connected to V_{CC}.

Fig 6. Pin configuration for DHVQFN24

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
$\overline{Y0}$, $\overline{Y1}$, $\overline{Y2}$, $\overline{Y3}$, $\overline{Y4}$, $\overline{Y5}$, $\overline{Y6}$, $\overline{Y7}$, $\overline{Y8}$, $\overline{Y9}$, $\overline{Y10}$, $\overline{Y11}$, $\overline{Y12}$, $\overline{Y13}$, $\overline{Y14}$, $\overline{Y15}$	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)
$\overline{E0}$, $\overline{E1}$	18, 19	enable input (active LOW)
A0, A1, A2, A3	23, 22, 21, 20	address input
V_{CC}	24	supply voltage

6. Functional description

Table 3. Function table[1]

Input						Output															
$\overline{E0}$	$\overline{E1}$	A0	A1	A2	A3	$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$	$\overline{Y8}$	$\overline{Y9}$	$\overline{Y10}$	$\overline{Y11}$	$\overline{Y12}$	$\overline{Y13}$	$\overline{Y14}$	$\overline{Y15}$
H	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	L	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	H	X	X	X	X	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
L	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
		H	L	L	L	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H
		L	H	L	L	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	H
		H	H	L	L	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H	H
		L	L	H	L	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H	H
		H	L	H	L	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H	H
		L	H	H	L	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H	H
		H	H	H	L	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H	H
		L	L	L	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H	H
		H	L	L	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H	H
		L	H	L	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H	H
		H	H	L	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H	H
		L	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H	H
		H	L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H	H
		L	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L	H
		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	L

[1] H = HIGH voltage level
L = LOW voltage level
X = don't care.

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

7. 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_{CC}	supply voltage			−0.5	+7.0	V
I_{IK}	input clamping current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	[1]	-	±20	mA
I_{OK}	output clamping current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V	[1]	-	±20	mA
I_O	output current	-0.5 V $< V_O < V_{CC} + 0.5$ V	[1]	-	±25	mA
I_{CC}	supply current		[1]	-	50	mA
I_{GND}	ground current		[1]	-	−50	mA
T_{stg}	storage temperature			−65	+150	°C
P_{tot}	total power dissipation	T_{amb} = −40 °C to +125 °C	[2]	-	300	mW

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

[2] For SO24 packages: P_{tot} derates linearly at 8 mW/K above 70 ×°C.
For SSOP24 and TSSOP24 packages: P_{tot} derates linearly at 5.5 mW/K above 60 ×°C.
For DHVQFN24 packages: P_{tot} derates linearly at 4.5 mW/K above 60 ×°C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

Symbol	Parameter	Conditions	74HC154			74HCT154			Unit
			Min	Typ	Max	Min	Typ	Max	
V_{CC}	supply voltage		2.0	5.0	6.0	4.5	5.0	5.5	V
V_I	input voltage		0	-	V_{CC}	0	-	V_{CC}	V
V_O	output voltage		0	-	V_{CC}	0	-	V_{CC}	V
T_{amb}	ambient temperature		−40	+25	+125	−40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	V_{CC} = 2.0 V	-	-	625	-	-	-	ns/V
		V_{CC} = 4.5 V	-	1.67	139	-	1.67	139	ns/V
		V_{CC} = 6.0 V	-	-	83	-	-	-	ns/V

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

9. Static characteristics

Table 6. Static characteristics 74HC154

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} = 2.0 V	1.5	1.2	-	V
		V_{CC} = 4.5 V	3.15	2.4	-	V
		V_{CC} = 6.0 V	4.2	3.2	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V	-	0.8	0.5	V
		V_{CC} = 4.5 V	-	2.1	1.35	V
		V_{CC} = 6.0 V	-	2.8	1.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = –20 μA	1.9	2.0	-	V
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	4.5	-	V
		V_{CC} = 6.0 V; I_O = –20 μA	5.9	6.0	-	V
		V_{CC} = 4.5 V; I_O = –4.0 mA	3.98	4.32	-	V
		V_{CC} = 6.0 V; I_O = –5.2 mA	5.48	5.81	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = 20 μA	-	0	0.1	V
		V_{CC} = 4.5 V; I_O = 20 μA	-	0	0.1	V
		V_{CC} = 6.0 V; I_O = 20 μA	-	0	0.1	V
		V_{CC} = 4.5 V; I_O = 4.0 mA	-	0.15	0.26	V
		V_{CC} = 6.0 V; I_O = 5.2 mA	-	0.16	0.26	V
I_I	input leakage current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND	-	-	±0.1	μA
I_{CC}	supply current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND; I_O = 0 A	-	-	8.0	μA
C_I	input capacitance		-	3.5	-	pF
T_{amb} = –40 °C to +85 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 2.0 V	1.5	-	-	V
		V_{CC} = 4.5 V	3.15	-	-	V
		V_{CC} = 6.0 V	4.2	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V	-	-	0.5	V
		V_{CC} = 4.5 V	-	-	1.35	V
		V_{CC} = 6.0 V	-	-	1.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = –20 μA	1.9	-	-	V
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	-	-	V
		V_{CC} = 6.0 V; I_O = –20 μA	5.9	-	-	V
		V_{CC} = 4.5 V; I_O = –4.0 mA	3.84	-	-	V
		V_{CC} = 6.0 V; I_O = –5.2 mA	5.34	-	-	V

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

Table 6. Static characteristics 74HC154 *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 6.0 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 4.0 mA	-	-	0.33	V
		V_{CC} = 6.0 V; I_O = 5.2 mA	-	-	0.33	V
I_I	input leakage current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND	-	-	±1.0	μA
I_{CC}	supply current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND; I_O = 0 A	-	-	80	μA
T_{amb} = –40 °C to +125 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 2.0 V	1.5	-	-	V
		V_{CC} = 4.5 V	3.15	-	-	V
		V_{CC} = 6.0 V	4.2	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V	-	-	0.5	V
		V_{CC} = 4.5 V	-	-	1.35	V
		V_{CC} = 6.0 V	-	-	1.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = –20 μA	1.9	-	-	V
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	-	-	V
		V_{CC} = 6.0 V; I_O = –20 μA	5.9	-	-	V
		V_{CC} = 4.5 V; I_O = –4.0 mA	3.7	-	-	V
		V_{CC} = 6.0 V; I_O = –5.2 mA	5.2	-	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 2.0 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 6.0 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 4.0 mA	-	-	0.4	V
		V_{CC} = 6.0 V; I_O = 5.2 mA	-	-	0.4	V
I_I	input leakage current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND	-	-	±0.1	μA
I_{CC}	supply current	V_{CC} = 6.0 V; $V_I = V_{CC}$ or GND; I_O = 0 A	-	-	160	μA

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

Table 7. Static characteristics 74HCT154

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	1.6	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 4.5 V to 5.5 V	-	1.2	0.8	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH} or V_{IL}				
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	4.5	-	V
		V_{CC} = 4.5 V; I_O = –4 mA	3.98	4.32	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}				
		V_{CC} = 4.5 V; I_O = 20 μA	-	0	0.1	V
		V_{CC} = 4.5 V; I_O = 4 mA	-	0.15	0.25	V
I_I	input leakage current	V_{CC} = 5.5 V; V_I = V_{CC} or GND	-	-	±0.1	μA
I_{CC}	supply current	V_{CC} = 5.5 V; V_I = V_{CC} or GND; I_O = 0 A	-	-	8.0	μA
ΔI_{CC}	additional supply current	per input pin; V_{CC} = 4.5 V to 5.5 V; V_I = V_{CC} – 2.1 V; I_O = 0 A	-	-	360	μA
C_I	input capacitance		-	3.5	-	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}				
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	-	-	V
		V_{CC} = 4.5 V; I_O = –4 mA	3.84	-	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}				
		V_{CC} = 4.5 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 4 mA	-	-	0.33	V
I_I	input leakage current	V_{CC} = 5.5 V; V_I = V_{CC} or GND	-	-	±1.0	μA
I_{CC}	supply current	V_{CC} = 5.5 V; V_I = V_{CC} or GND; I_O = 0 A	-	-	80	μA
ΔI_{CC}	additional supply current	per input pin; V_{CC} = 4.5 V to 5.5 V; V_I = V_{CC} – 2.1 V; I_O = 0 A	-	-	450	μA
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}				
		V_{CC} = 4.5 V; I_O = –20 μA	4.4	-	-	V
		V_{CC} = 4.5 V; I_O = –4 mA	3.7	-	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}				
		V_{CC} = 4.5 V; I_O = 20 μA	-	-	0.1	V
		V_{CC} = 4.5 V; I_O = 4 mA	-	-	0.4	V
I_I	input leakage current	V_{CC} = 5.5 V; V_I = V_{CC} or GND	-	-	±1.0	μA
I_{CC}	supply current	V_{CC} = 5.5 V; V_I = V_{CC} or GND; I_O = 0 A	-	-	160	μA
ΔI_{CC}	additional supply current	per input pin; V_{CC} = 4.5 V to 5.5 V; V_I = V_{CC} – 2.1 V; I_O = 0 A	-	-	490	μA

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

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			–40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
74HC154									
t_{pd}	propagation delay	$\overline{An}$ to $\overline{Yn}$; see Figure 7 [1]							
		V_{CC} = 2.0 V	-	36	150	-	190	225	ns
		V_{CC} = 4.5 V	-	13	30	-	38	45	ns
		V_{CC} = 5 V; C_L = 15 pF	-	11	-	-	-	-	ns
		V_{CC} = 6.0 V	-	10	26	-	33	38	ns
		$\overline{En}$ to $\overline{Yn}$; see Figure 8							
		V_{CC} = 2.0 V	-	39	150	-	190	225	ns
		V_{CC} = 4.5 V	-	14	30	-	38	45	ns
		V_{CC} = 5 V; C_L = 15 pF	-	11	-	-	-	-	ns
		V_{CC} = 6.0 V	-	11	26	-	33	38	ns
t_t	transition time	see Figure 7 and 8 [2]							
		V_{CC} = 2.0 V	-	19	75	-	95	110	ns
		V_{CC} = 4.5 V	-	7	15	-	19	22	ns
		V_{CC} = 6.0 V	-	6	13	-	16	19	ns
C_{PD}	power dissipation capacitance	per gate; V_I = GND to V_{CC} [3]	-	60	-	-	-	-	pF
74HCT154									
t_{pd}	propagation delay	$\overline{An}$ to $\overline{Yn}$; see Figure 7 [1]							
		V_{CC} = 4.5 V	-	16	35	-	44	53	ns
		V_{CC} = 5 V; C_L = 15 pF	-	13	-	-	-	-	ns
		$\overline{En}$ to $\overline{Yn}$; see Figure 8							
		V_{CC} = 4.5 V	-	15	32	-	40	48	ns
		V_{CC} = 5 V; C_L = 15 pF	-	13	-	-	-	-	ns
t_t	transition time	see Figure 7 and 8 [2]							
		V_{CC} = 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}

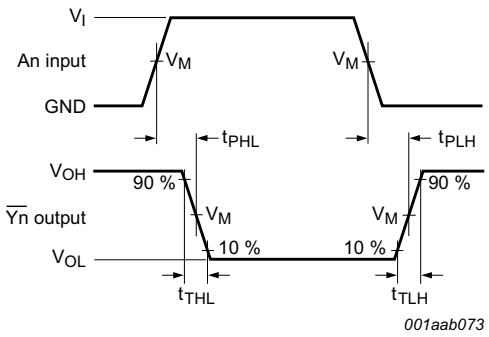
[2] t_t is the same as t_{TLH} and t_{THL}

[3] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ 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 V;
N = number of load switching outputs;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

All information provided in this document is subject to legal disclaimers.

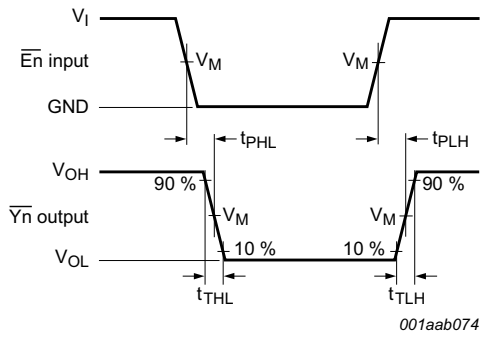
© Nexperia B.V. 2017. All rights reserved

11. Waveforms



Measurement points are given in Table 9.

Fig 7. Propagation delay address input (An) to output (Yn) and transition time output (Yn)



Measurement points are given in Table 9.

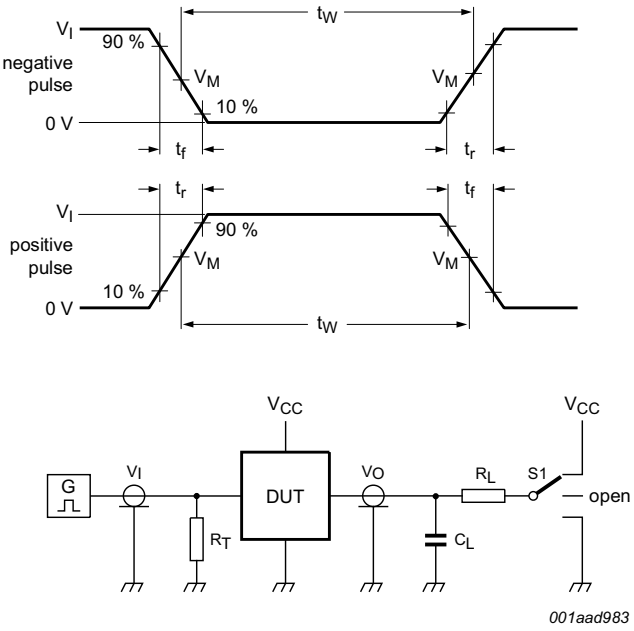
Fig 8. Propagation delay enable input ($\overline{En}$) to output (Yn) and transition time output (Yn)

Table 9. Measurement points

Type	Input	Output
	V_M	V_M
74HC154	$0.5V_{CC}$	$0.5V_{CC}$
74HCT154	1.3 V	1.3 V

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved



Test data is given in Table 10.

Definitions for test circuit:

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

C_L = Load capacitance including jig and probe capacitance.

R_L = Load resistor.

S1 = Test selection switch.

Fig 9. Test circuit for measuring switching times

Table 10. Test data

Type	Input		Load		S1 position
	V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}
74HC154	V_{CC}	6 ns	15 pF, 50 pF	1 kΩ	open
74HCT154	3 V	6 ns	15 pF, 50 pF	1 kΩ	open

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

12. Application information

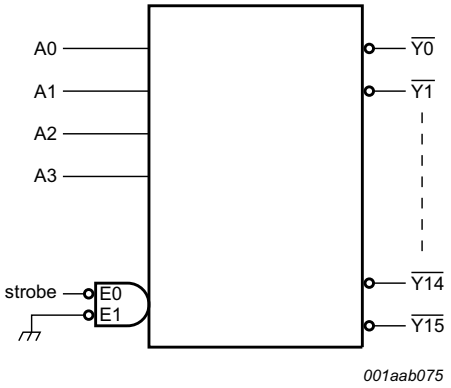


Fig 10. 1-of-16 decoder; LOW level output selected

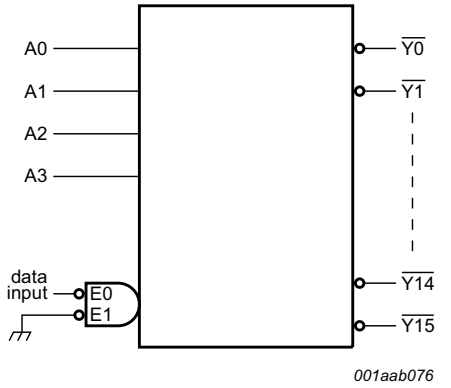


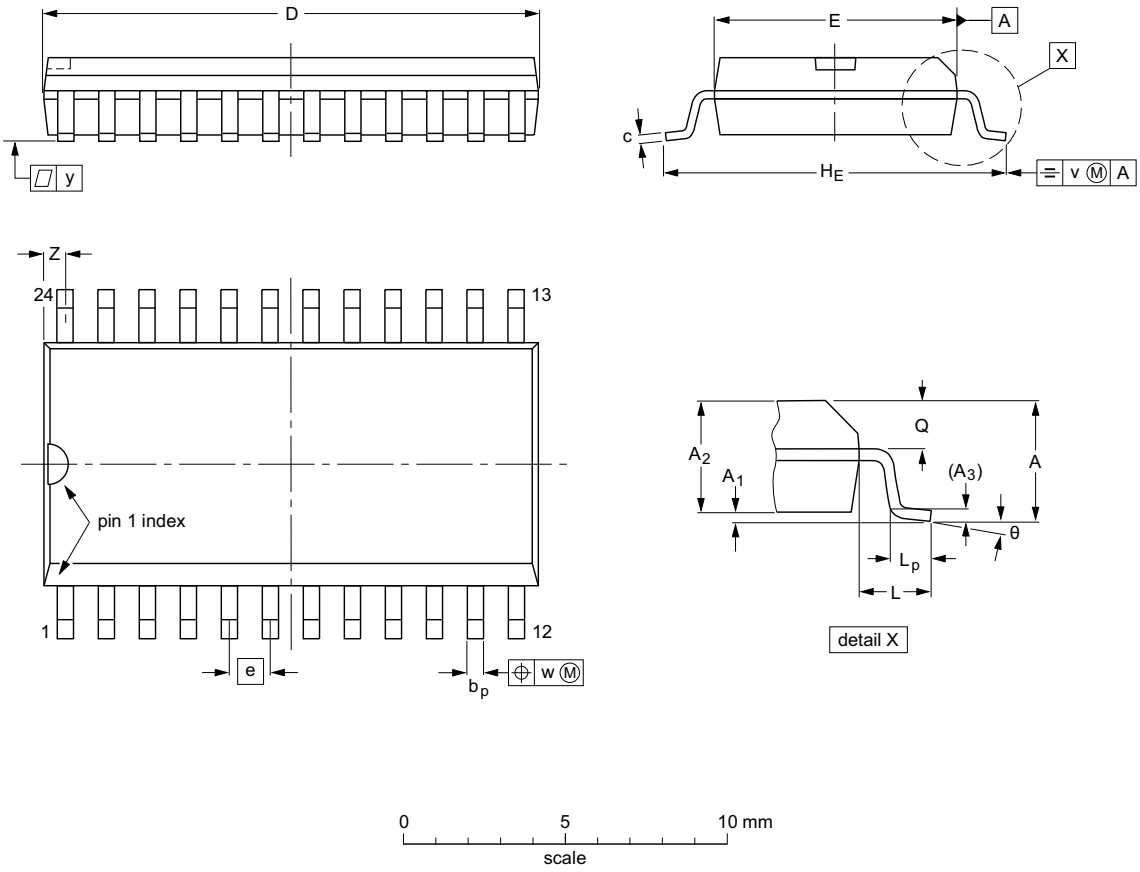
Fig 11. 1-of-16 demultiplexer; logic level on selected outputs follow the logic level on the data input

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

13. Package outline

SO24: plastic small outline package; 24 leads; body width 7.5 mm **SOT137-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	2.65	0.3 0.1	2.45 2.25	0.25	0.49 0.36	0.32 0.23	15.6 15.2	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8^o 0^o
inches	0.1	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.61 0.60	0.30 0.29	0.05	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

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

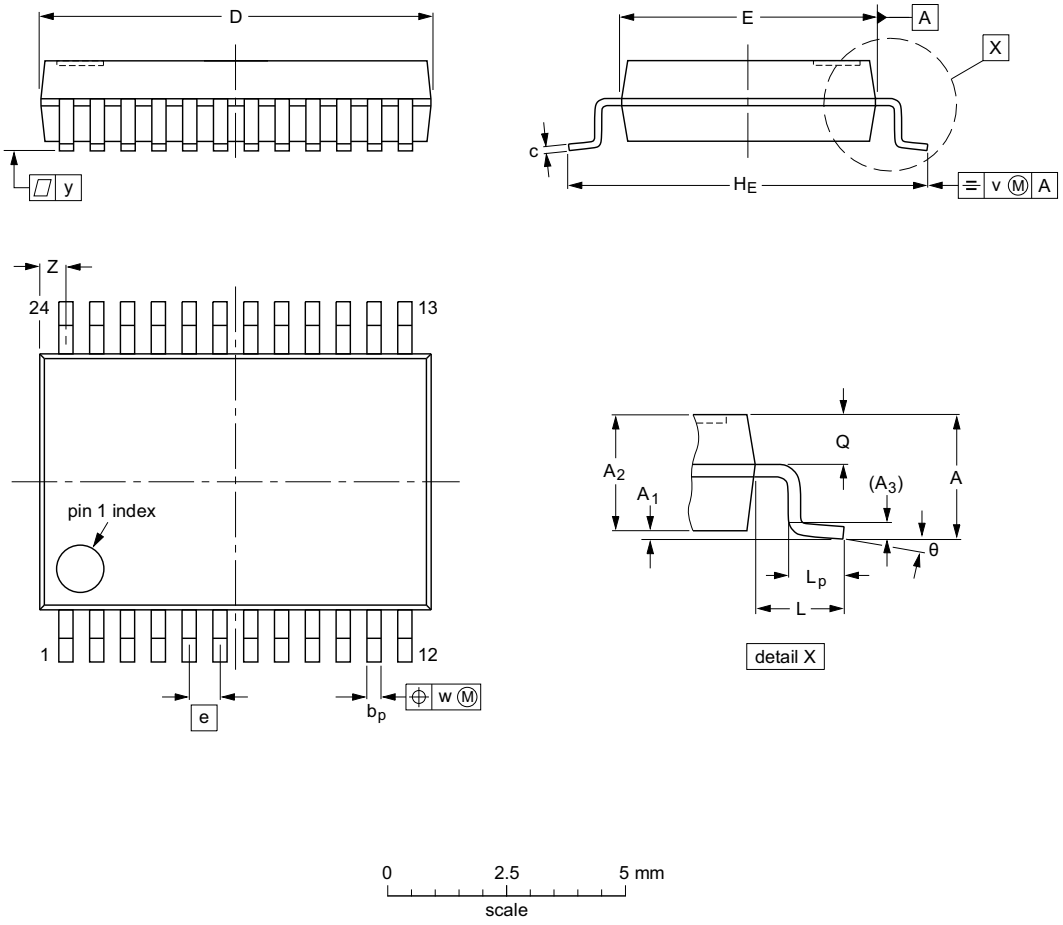
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT137-1	075E05	MS-013				~~99-12-27~~ 03-02-19

Fig 12. Package outline SOT137-1 (SO24)

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

SSOP24: plastic shrink small outline package; 24 leads; body width 5.3 mm **SOT340-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	8.4 8.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.8 0.4	8^o 0^o

Note

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

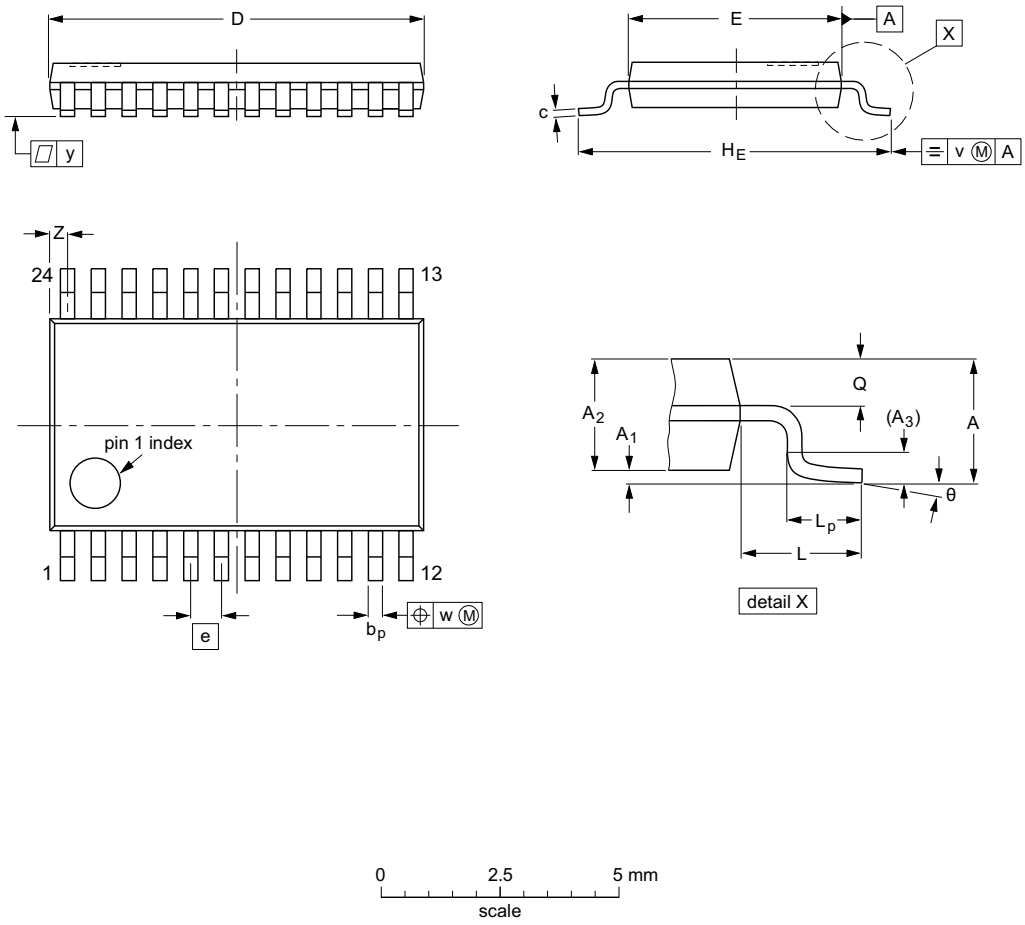
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT340-1		MO-150				~~99-12-27~~ 03-02-19

Fig 13. Package outline SOT340-1 (SSOP24)

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

TSSOP24: plastic thin shrink small outline package; 24 leads; body width 4.4 mm **SOT355-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	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^o 0^o

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.

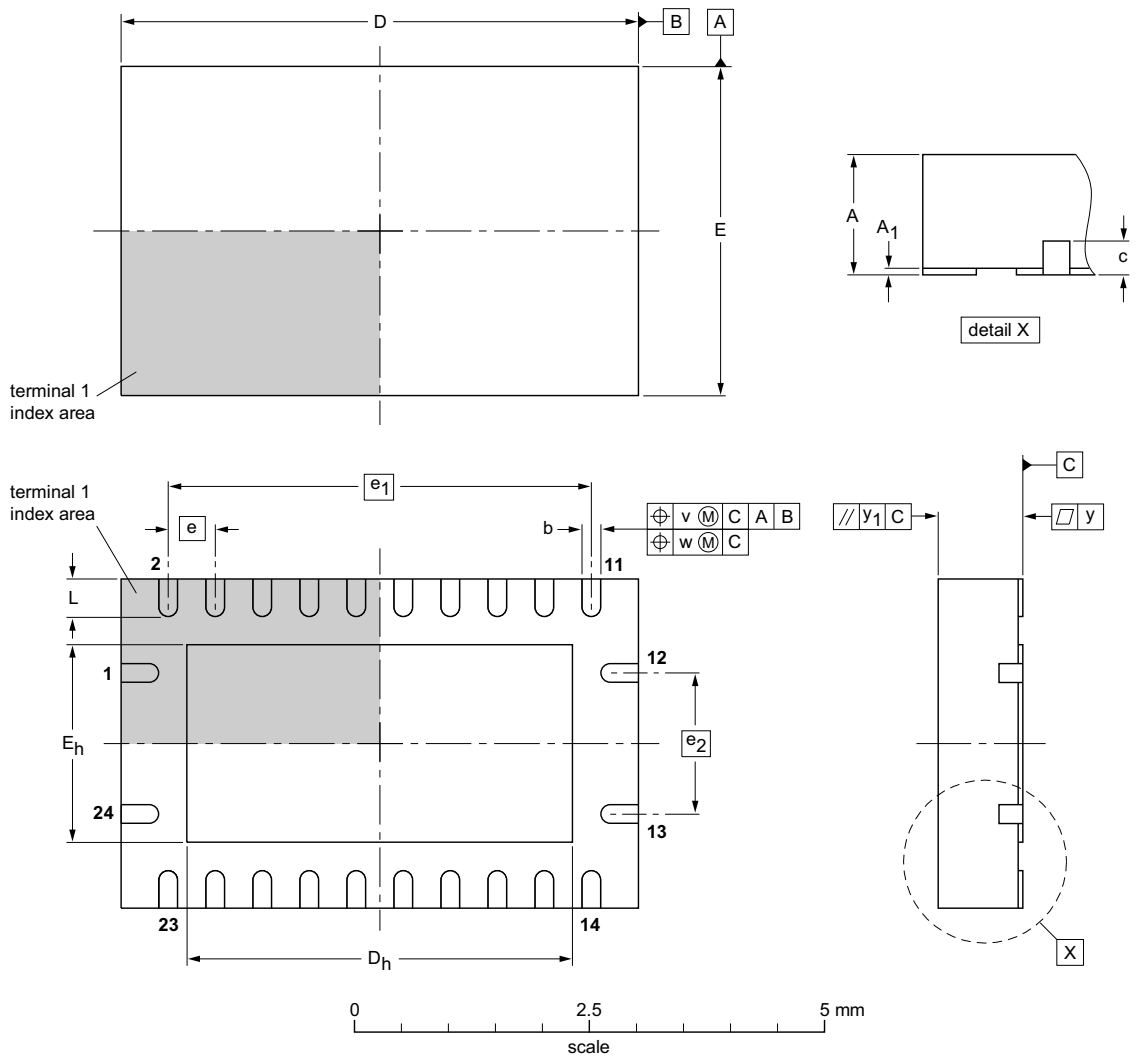
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT355-1		MO-153				~~99-12-27~~ 03-02-19

Fig 14. Package outline SOT355-1 (TSSOP24)

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

DHVQFN24: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 24 terminals; body 3.5 x 5.5 x 0.85 mm **SOT815-1**



DIMENSIONS (mm are the original dimensions)

UNIT	$A^{(1)}$ max.	A_1	b	c	$D^{(1)}$	D_h	$E^{(1)}$	E_h	e	e_1	e_2	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	5.6 5.4	4.25 3.95	3.6 3.4	2.25 1.95	0.5	4.5	1.5	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT815-1	- - -	- - -	- - -			03-04-29

Fig 15. Package outline SOT815-1 (DHVQFN24)

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

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 numbers 74HC154N and 74HCT154N (SOT101-1) removed.			
74HC_HCT154 v.6	20070212	Product data sheet	-	74HC_HCT154 v.5
Modifications:	• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Table 3 on page 4: Corrected errors in 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

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

16. Legal information

16.1 Data sheet status

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.

[1] Please consult the most recently issued document before initiating or completing a design.

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

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL http://www.nexperia.com.

16.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

16.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of a Nexperia product can reasonably be expected to result in personal injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nexperia.com/profile/terms, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by customer.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

Translations — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

16.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

17. Contact information

For more information, please visit: **http://www.nexperia.com**

For sales office addresses, please send an email to: **salesaddresses@nexperia.com**

All information provided in this document is subject to legal disclaimers.

© Nexperia B.V. 2017. All rights reserved

18. Contents

1 General description 1
2 Features and benefits 1
3 Ordering information 1
4 Functional diagram 2
5 Pinning information 3
5.1 Pinning 3
5.2 Pin description 4
6 Functional description 4
7 Limiting values 5
8 Recommended operating conditions 5
9 Static characteristics 6
10 Dynamic characteristics 9
11 Waveforms 10
12 Application information 12
13 Package outline 13
14 Abbreviations 17
15 Revision history 17
16 Legal information 18
16.1 Data sheet status 18
16.2 Definitions 18
16.3 Disclaimers 18
16.4 Trademarks 19
17 Contact information 19
18 Contents 20

© Nexperia B.V. 2017. All rights reserved

For more information, please visit: http://www.nexperia.com
For sales office addresses, please send an email to: salesaddresses@nexperia.com
Date of release: 29 February 2016