

74HC137

3-to-8 line decoder, demultiplexer with address latches;
inverting

Rev. 4 — 23 December 2015

Product data sheet

1. General description

The 74HC137 is a high-speed Si-gate CMOS device and is pin compatible with low power Schottky TTL (LSTTL). The 74HC137 is specified in compliance with JEDEC standard no. 7A.

The 74HC137 is a 3-to-8 line decoder, demultiplexer with latches at the three address inputs (A_n). The 74HC137 essentially combines the 3-to-8 decoder function with a 3-bit storage latch. When the latch is enabled ($\overline{LE} = \text{LOW}$), the 74HC137 acts as a 3-to-8 active LOW decoder. When the latch enable (\overline{LE}) goes from LOW-to-HIGH, the last data present at the inputs before this transition, is stored in the latches. Further address changes are ignored as long as \overline{LE} remains HIGH.

The output enable input ($\overline{E1}$ and $E2$) controls the state of the outputs independent of the address inputs or latch operation. All outputs are HIGH unless $\overline{E1}$ is LOW and $E2$ is HIGH.

The 74HC137 is ideally suited for implementing non-overlapping decoders in 3-state systems and strobed (stored address) applications in bus oriented systems.

2. Features and benefits

- Combines 3-to-8 decoder with 3-bit latch
- Multiple input enable for easy expansion or independent controls
- Active LOW mutually exclusive outputs
- Low-power dissipation
- Complies with JEDEC standard no. 7A
- ESD protection:
 - ◆ HBM JESD22-A114F exceeds 2000 V
 - ◆ MM JESD22-A115-A exceeds 200 V
- Specified from $-40\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ and from $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$.

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|-------------|---|--------|--|----------|
| | Temperature range | Name | Description | Version |
| 74HC137D | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |
| 74HC137DB | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | SSOP16 | plastic shrink small outline package; 16 leads; body width 5.3 mm | SOT338-1 |

4. Functional diagram

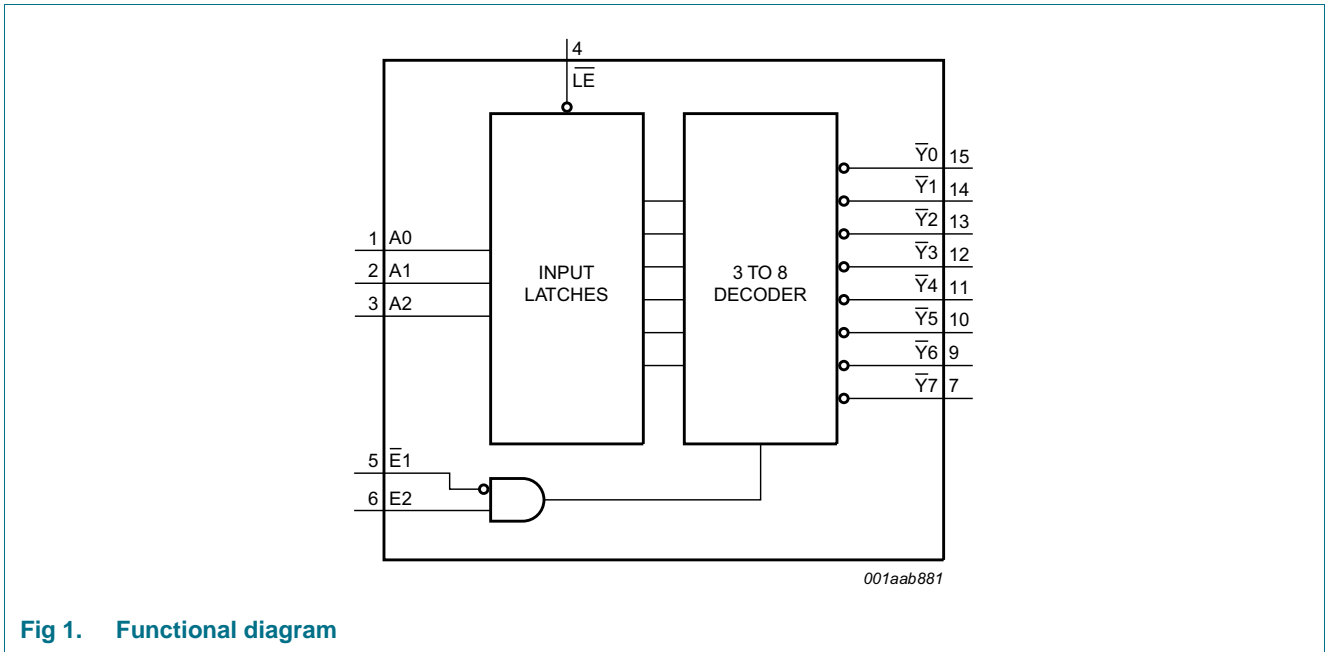


Fig 1. Functional diagram

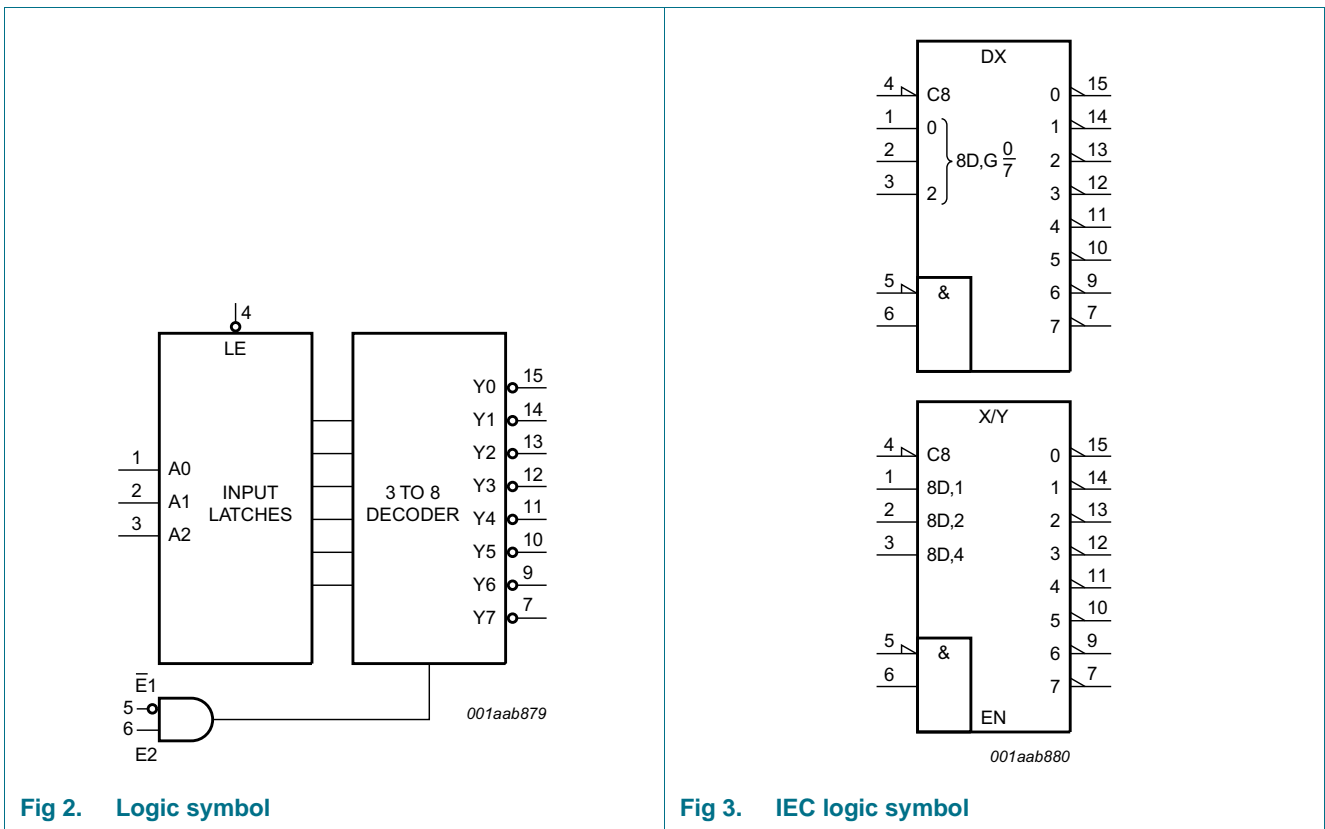


Fig 2. Logic symbol

Fig 3. IEC logic symbol

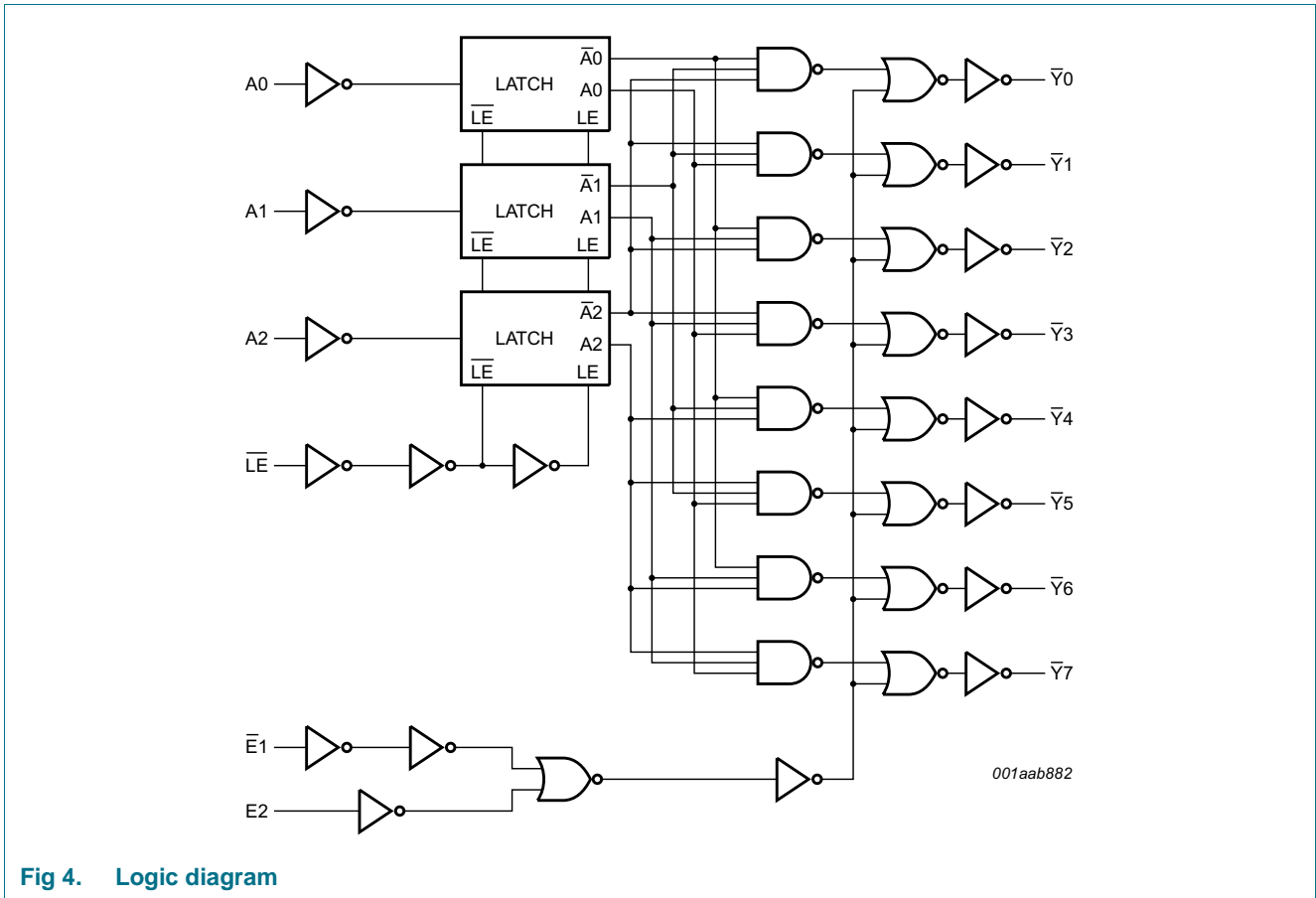


Fig 4. Logic diagram

5. Pinning information

5.1 Pinning

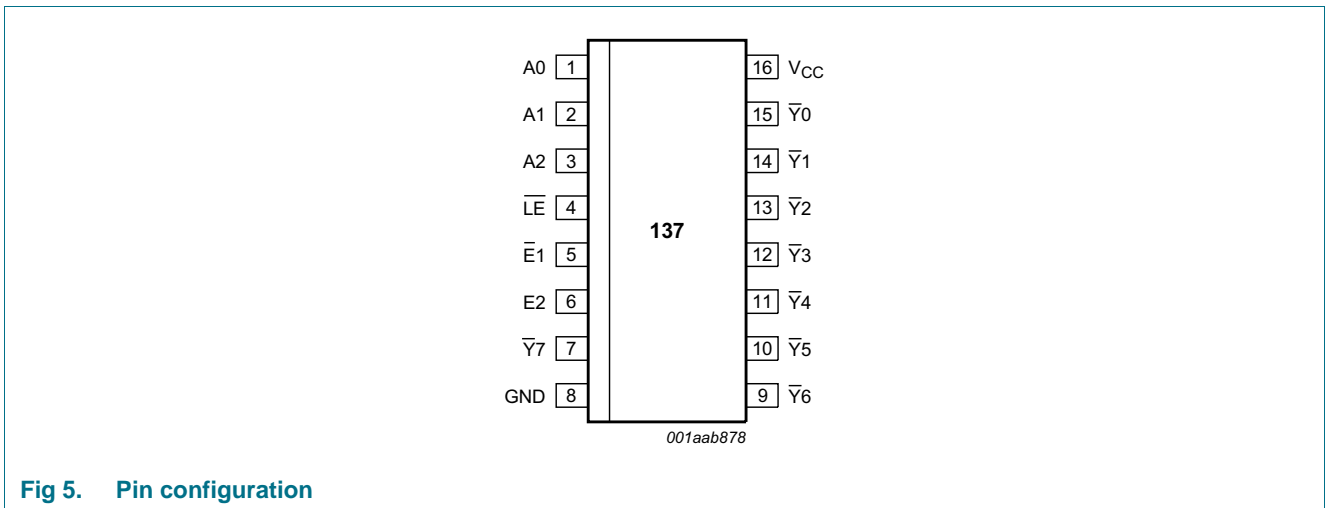


Fig 5. Pin configuration

5.2 Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|------------------------|-----|-----------------------------------|
| A0 | 1 | data input 0 |
| A1 | 2 | data input 1 |
| A2 | 3 | data input 2 |
| $\overline{\text{LE}}$ | 4 | latch enable input (active LOW) |
| $\overline{\text{E1}}$ | 5 | data enable input 1 (active LOW) |
| E2 | 6 | data enable input 2 (active HIGH) |
| $\overline{\text{Y7}}$ | 7 | multiplexer output 7 |
| GND | 8 | ground (0 V) |
| $\overline{\text{Y6}}$ | 9 | multiplexer output 6 |
| $\overline{\text{Y5}}$ | 10 | multiplexer output 5 |
| $\overline{\text{Y4}}$ | 11 | multiplexer output 4 |
| $\overline{\text{Y3}}$ | 12 | multiplexer output 3 |
| $\overline{\text{Y2}}$ | 13 | multiplexer output 2 |
| $\overline{\text{Y1}}$ | 14 | multiplexer output 1 |
| $\overline{\text{Y0}}$ | 15 | multiplexer output 0 |
| V _{CC} | 16 | positive supply voltage |

6. Functional description

6.1 Function table

Table 3. Function table^[1]

| Enable | | | Input | | | Output | | | | | | | |
|------------------------|------------------------|----|-------|----|----|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| $\overline{\text{LE}}$ | $\overline{\text{E1}}$ | E2 | A0 | A1 | A2 | $\overline{\text{Y0}}$ | $\overline{\text{Y1}}$ | $\overline{\text{Y2}}$ | $\overline{\text{Y3}}$ | $\overline{\text{Y4}}$ | $\overline{\text{Y5}}$ | $\overline{\text{Y6}}$ | $\overline{\text{Y7}}$ |
| H | L | H | X | X | X | stable | | | | | | | |
| X | H | X | X | X | X | H | H | H | H | H | H | H | H |
| X | X | L | X | X | X | H | H | H | H | H | H | H | H |
| L | L | H | L | L | L | L | H | H | H | H | H | H | H |
| | | | H | L | L | H | L | H | H | H | H | H | H |
| | | | L | H | L | H | H | L | H | H | H | H | H |
| | | | H | H | L | H | H | H | L | H | H | H | H |
| | | | L | L | H | H | H | H | H | L | H | H | H |
| | | | H | L | H | H | H | H | H | H | L | H | H |
| | | | L | H | H | H | H | H | H | H | H | L | H |
| | | | H | H | H | H | H | H | H | H | H | H | H |

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

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 | V |
| I_{IK} | input diode current | $V_I < -0.5 \text{ V}$ or $V_I > V_{CC} + 0.5 \text{ V}$ | - | ± 20 | mA |
| I_{OK} | output diode current | $V_O < -0.5 \text{ V}$ or $V_O > V_{CC} + 0.5 \text{ V}$ | - | ± 20 | mA |
| I_O | output source or sink current | $V_O = -0.5 \text{ V}$ to $V_{CC} + 0.5 \text{ V}$ | - | ± 25 | mA |
| I_{CC} | supply current | | - | 50 | mA |
| I_{GND} | ground current | | -50 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | power dissipation | SO16 and SSOP16 packages [1] | - | 500 | mW |

- [1] For SO16 package: P_{tot} derates linearly with 8 mW/K above 70 °C.
For SSOP14 packages: P_{tot} derates linearly with 5.5 mW/K above 60 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

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

9. Static characteristics

Table 6. Static characteristics

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} | | | | |
| | | I _O = -20 μA; V _{CC} = 2.0 V | 1.9 | 2.0 | - | V |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | 4.5 | - | V |
| | | I _O = -20 μA; V _{CC} = 6.0 V | 5.9 | 6.0 | - | V |
| | | I _O = -4 mA; V _{CC} = 4.5 V | 3.98 | 4.32 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.0 V | - | 0 | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | 0 | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 6.0 V | - | 0 | 0.1 | V |
| | | I _O = 4 mA; V _{CC} = 4.5 V | - | 0.15 | 0.26 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±0.1 | μA |
| | | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 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} | | | | |
| | | I _O = -20 μA; V _{CC} = 2.0 V | 1.9 | - | - | V |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | - | - | V |
| | | I _O = -20 μA; V _{CC} = 6.0 V | 5.9 | - | - | V |
| | | I _O = -4 mA; V _{CC} = 4.5 V | 3.84 | - | - | V |
| I _O | LOW-level output current | I _O = -5.2 mA; V _{CC} = 6.0 V | 5.34 | - | - | V |

Table 6. Static characteristics ...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} | | | | |
| | | I _O = 20 μA; V _{CC} = 2.0 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 6.0 V | - | - | 0.1 | V |
| | | I _O = 4 mA; V _{CC} = 4.5 V | - | - | 0.33 | V |
| | | I _O = 5.2 mA; V _{CC} = 6.0 V | - | - | 0.33 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±1.0 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 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} | | - | | |
| | | I _O = -20 μA; V _{CC} = 2.0 V | 1.9 | - | - | V |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | - | - | V |
| | | I _O = -20 μA; V _{CC} = 6.0 V | 5.9 | - | - | V |
| | | I _O = -4 mA; V _{CC} = 4.5 V | 3.7 | - | - | V |
| | | I _O = -5.2 mA; V _{CC} = 6.0 V | 5.2 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} | | - | | |
| | | I _O = 20 μA; V _{CC} = 2.0 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 6.0 V | - | - | 0.1 | V |
| | | I _O = 4 mA; V _{CC} = 4.5 V | - | - | 0.4 | V |
| | | I _O = 5.2 mA; V _{CC} = 6.0 V | - | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±1.0 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 160 | μA |

10. Dynamic characteristics

Table 7. Dynamic characteristics

$GND = 0\text{ V}$; $t_r = t_f = 6\text{ ns}$; $C_L = 50\text{ pF}$.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|---|-------------------------------|---|-----------------|---|-----|------|--|
| $T_{\text{amb}} = 25\text{ °C}$ | | | | | | | |
| t_{pd} | propagation delay | An to \overline{Y}_n ; see Figure 6 ^[1] | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | - | 58 | 180 | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | - | 21 | 36 | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | - | 17 | 31 | ns | |
| | | $V_{\text{CC}} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 18 | - | ns | |
| | | $\overline{\text{LE}}$ to \overline{Y}_n ; see Figure 7 | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | - | 55 | 190 | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | - | 20 | 38 | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | - | 16 | 32 | ns | |
| | | $V_{\text{CC}} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 17 | - | ns | |
| | | $\overline{\text{E1}}$ to \overline{Y}_n ; see Figure 7 | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | - | 50 | 145 | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | - | 18 | 29 | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | - | 14 | 25 | ns | |
| | | $V_{\text{CC}} = 5.0\text{ V}$; $C_L = 15\text{ pF}$ | - | 15 | - | ns | |
| | | t_t | transition time | see Figure 6 ^[2] | | | |
| $V_{\text{CC}} = 2.0\text{ V}$ | - | | | 19 | 75 | ns | |
| $V_{\text{CC}} = 4.5\text{ V}$ | - | | | 7 | 15 | ns | |
| $V_{\text{CC}} = 6.0\text{ V}$ | - | | | 6 | 13 | ns | |
| $\overline{\text{E2}}$ to \overline{Y}_n ; see Figure 6 | | | | | | | |
| t_{w} | pulse width | $\overline{\text{LE}}$ HIGH; see Figure 8 | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | 50 | 11 | - | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | 10 | 4 | - | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | 9 | 3 | - | ns | |
| t_{su} | set-up time | An to $\overline{\text{LE}}$; see Figure 8 | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | 50 | 3 | - | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | 10 | 1 | - | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | 9 | 1 | - | ns | |
| t_{h} | hold time | An to $\overline{\text{LE}}$; see Figure 8 | | | | | |
| | | $V_{\text{CC}} = 2.0\text{ V}$ | 30 | 3 | - | ns | |
| | | $V_{\text{CC}} = 4.5\text{ V}$ | 6 | 1 | - | ns | |
| | | $V_{\text{CC}} = 6.0\text{ V}$ | 5 | 1 | - | ns | |
| C_{PD} | power dissipation capacitance | $V_I = GND$ to V_{CC} ^[3] | - | 57 | - | pF | |

Table 7. Dynamic characteristics ...continued

GND = 0 V; $t_r = t_f = 6$ ns; $C_L = 50$ pF.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------|-------------------|---|-----|-----|-----|------|
| $T_{amb} = -40$ °C to $+85$ °C | | | | | | |
| t_{pd} | propagation delay | An to \bar{Y}_n ; see Figure 6 ^[1] | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 225 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 45 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 38 | ns |
| | | \bar{LE} to \bar{Y}_n ; see Figure 7 | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 240 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 48 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 41 | ns |
| | | $\bar{E}1$ to \bar{Y}_n ; see Figure 7 | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 180 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 36 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 31 | ns |
| | | $E2$ to \bar{Y}_n ; see Figure 6 | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 180 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 36 | ns |
| $V_{CC} = 6.0$ V | - | - | 31 | ns | | |
| t_t | transition time | see Figure 6 ^[2] | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 95 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 19 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 16 | ns |
| t_w | pulse width | \bar{LE} HIGH; see Figure 8 | | | | |
| | | $V_{CC} = 2.0$ V | 65 | - | - | ns |
| | | $V_{CC} = 4.5$ V | 13 | - | - | ns |
| | | $V_{CC} = 6.0$ V | 11 | - | - | ns |
| t_{su} | set-up time | An to \bar{LE} ; see Figure 8 | | | | |
| | | $V_{CC} = 2.0$ V | 65 | - | - | ns |
| | | $V_{CC} = 4.5$ V | 13 | - | - | ns |
| | | $V_{CC} = 6.0$ V | 11 | - | - | ns |
| t_h | hold time | An to \bar{LE} ; see Figure 8 | | | | |
| | | $V_{CC} = 2.0$ V | 40 | - | - | ns |
| | | $V_{CC} = 4.5$ V | 8 | - | - | ns |
| | | $V_{CC} = 6.0$ V | 7 | - | - | ns |

Table 7. Dynamic characteristics ...continuedGND = 0 V; $t_r = t_f = 6$ ns; $C_L = 50$ pF.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--|-------------------|---|-----|-----|-----|------|
| T_{amb} = -40 °C to +125 °C | | | | | | |
| t _{pd} | propagation delay | An to \bar{Y}_n ; see Figure 6 ^[1] | | | | |
| | | V _{CC} = 2.0 V | - | - | 270 | ns |
| | | V _{CC} = 4.5 V | - | - | 54 | ns |
| | | V _{CC} = 6.0 V | - | - | 46 | ns |
| | | $\bar{L}\bar{E}$ to \bar{Y}_n ; see Figure 7 | | | | |
| | | V _{CC} = 2.0 V | - | - | 285 | ns |
| | | V _{CC} = 4.5 V | - | - | 57 | ns |
| | | V _{CC} = 6.0 V | - | - | 48 | ns |
| | | $\bar{E}1$ to \bar{Y}_n ; see Figure 7 | | | | |
| | | V _{CC} = 2.0 V | - | - | 220 | ns |
| | | V _{CC} = 4.5 V | - | - | 44 | ns |
| | | V _{CC} = 6.0 V | - | - | 38 | ns |
| | | E2 to \bar{Y}_n ; see Figure 6 | | | | |
| | | V _{CC} = 2.0 V | - | - | 220 | ns |
| | | V _{CC} = 4.5 V | - | - | 44 | ns |
| V _{CC} = 6.0 V | - | - | 38 | ns | | |
| t _t | transition time | see Figure 6 ^[2] | | | | |
| | | V _{CC} = 2.0 V | - | - | 110 | ns |
| | | V _{CC} = 4.5 V | - | - | 22 | ns |
| | | V _{CC} = 6.0 V | - | - | 19 | ns |
| t _w | pulse width | $\bar{L}\bar{E}$ HIGH; see Figure 8 | | | | |
| | | V _{CC} = 2.0 V | - | - | 75 | ns |
| | | V _{CC} = 4.5 V | - | - | 15 | ns |
| | | V _{CC} = 6.0 V | - | - | 13 | ns |
| t _{su} | set-up time | An to $\bar{L}\bar{E}$; see Figure 8 | | | | |
| | | V _{CC} = 2.0 V | - | - | 75 | ns |
| | | V _{CC} = 4.5 V | - | - | 15 | ns |
| | | V _{CC} = 6.0 V | - | - | 13 | ns |

Table 7. Dynamic characteristics ...continuedGND = 0 V; $t_r = t_f = 6$ ns; $C_L = 50$ pF.

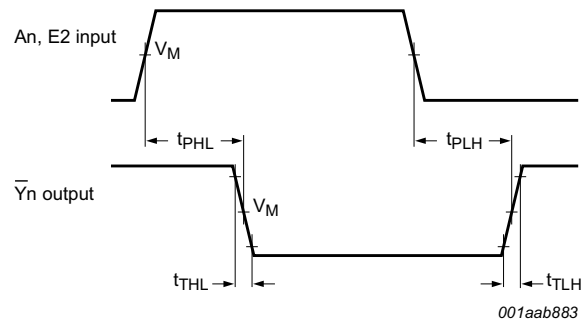
| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------|-----------|--|-----|-----|-----|------|
| t_h | hold time | An to \overline{LE} ; see Figure 8 | | | | |
| | | $V_{CC} = 2.0$ V | - | - | 45 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 9 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 8 | ns |

[1] t_{pd} is the same as t_{PHL} , t_{PLH} .[2] t_t is the same as t_{THL} and t_{TLH} .[3] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W). $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ 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 V;

N = number of inputs switching;

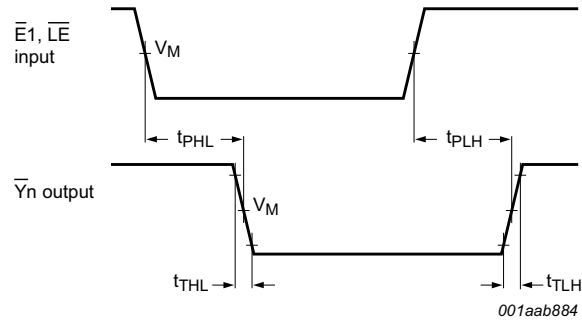
 $\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

11. Waveforms



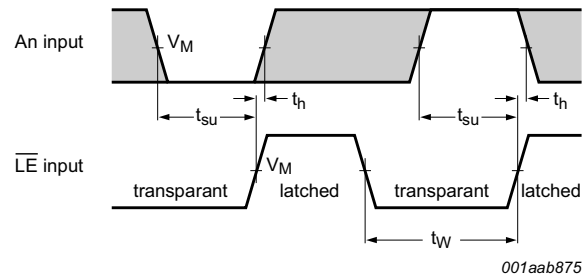
$$V_M = 0.5 \times V_I.$$

Fig 6. Waveforms showing the address input (An) and enable input (E2) to output (\overline{Yn}) propagation delays and the output transition times



$V_M = 0.5 \times V_I$.

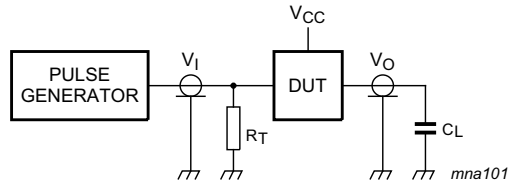
Fig 7. Waveforms showing the enable input ($\bar{E}1, \bar{LE}$) to output (\bar{Y}_n) propagation delays and the output transition times



The shaded areas indicate when the input is permitted to change for predictable output performance.

$V_M = 0.5 \times V_I$.

Fig 8. Waveforms showing the data set-up, hold times for A_n input to \bar{LE} input and the latch enable pulse width



Test data is given in [Table 8](#).

Definitions for test circuit:

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

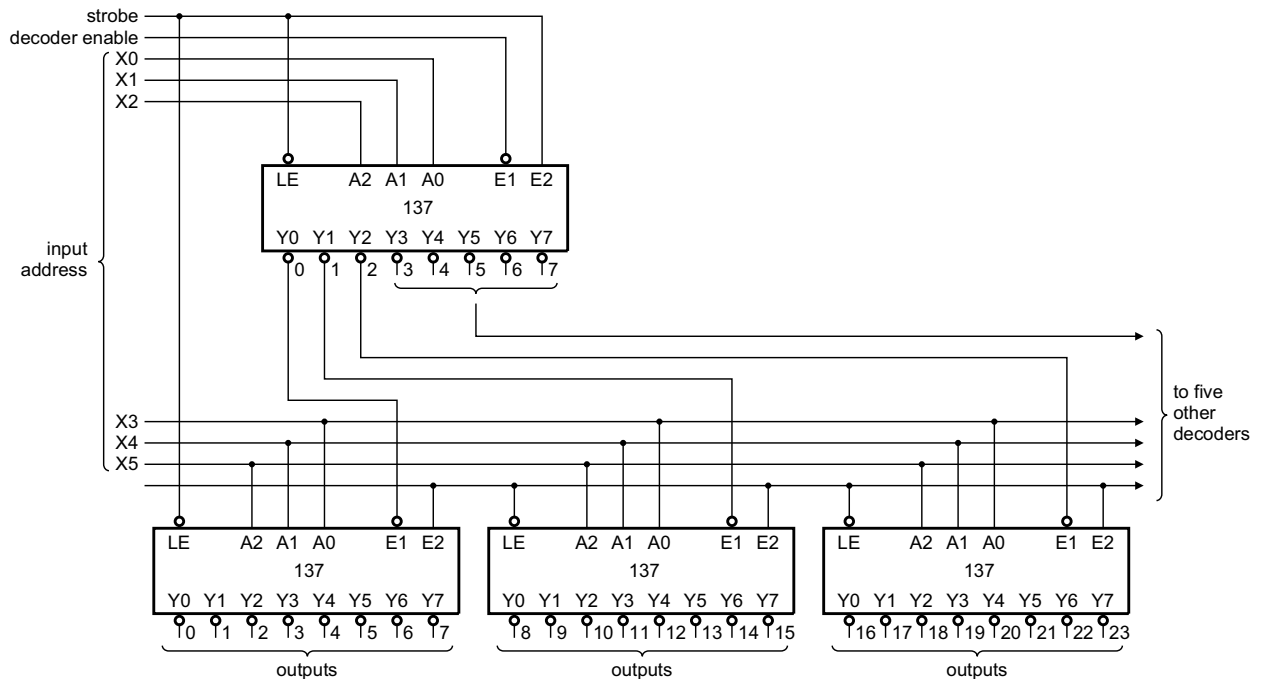
C_L = Load capacitance including jig and probe capacitance.

Fig 9. Test circuit for measuring switching times

Table 8. Test data

| Supply | Input | Load |
|----------|----------|-------|
| V_{CC} | V_I | C_L |
| 2.0 V | V_{CC} | 6 ns |
| 4.5 V | V_{CC} | 6 ns |
| 6.0 V | V_{CC} | 6 ns |
| 5.0 V | V_{CC} | 15 pF |

12. Application information



001aab885

Fig 10. 6-to-64 line decoder with input address storage

13. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1

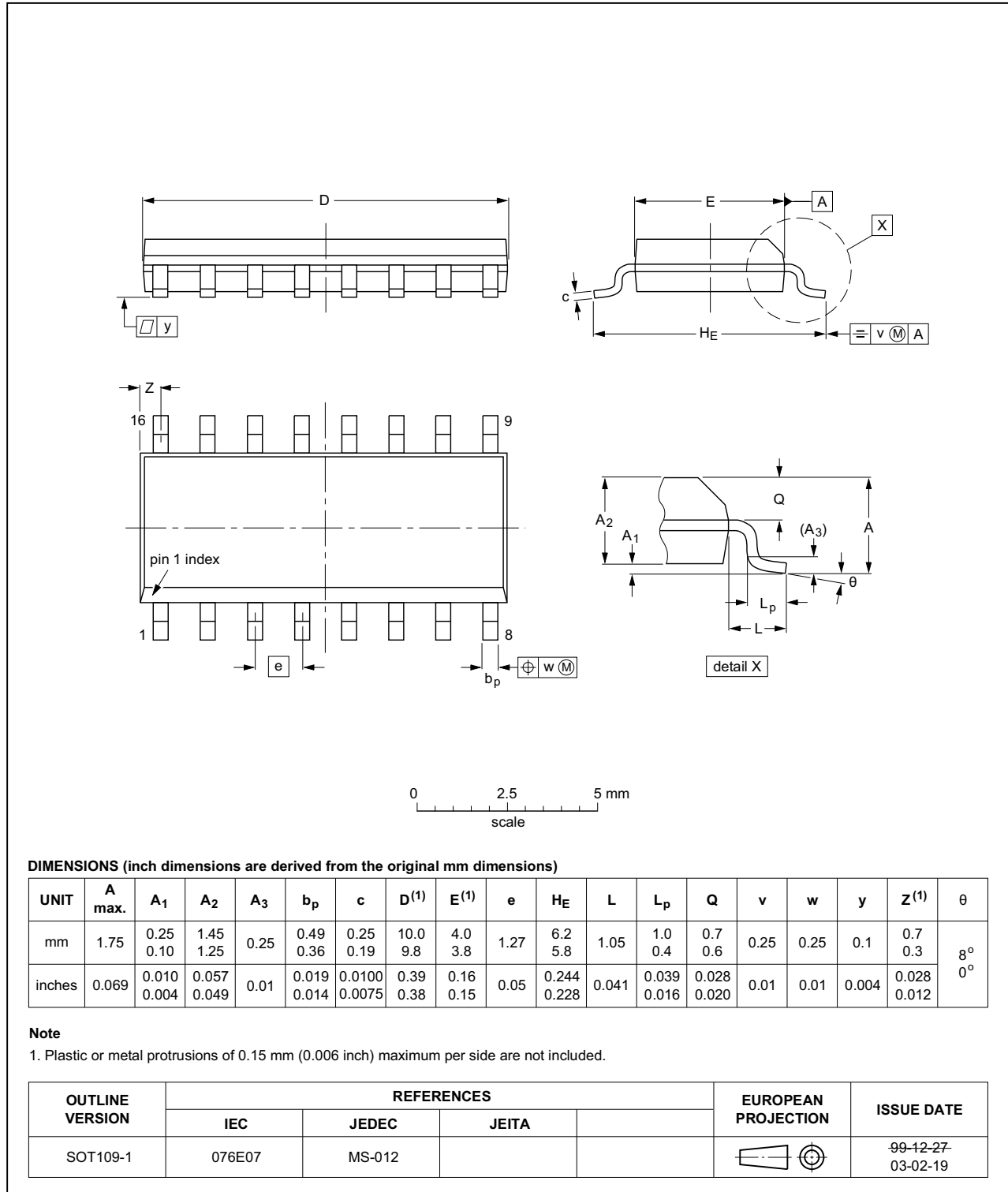


Fig 11. Package outline SOT109-1 (SO16)

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1

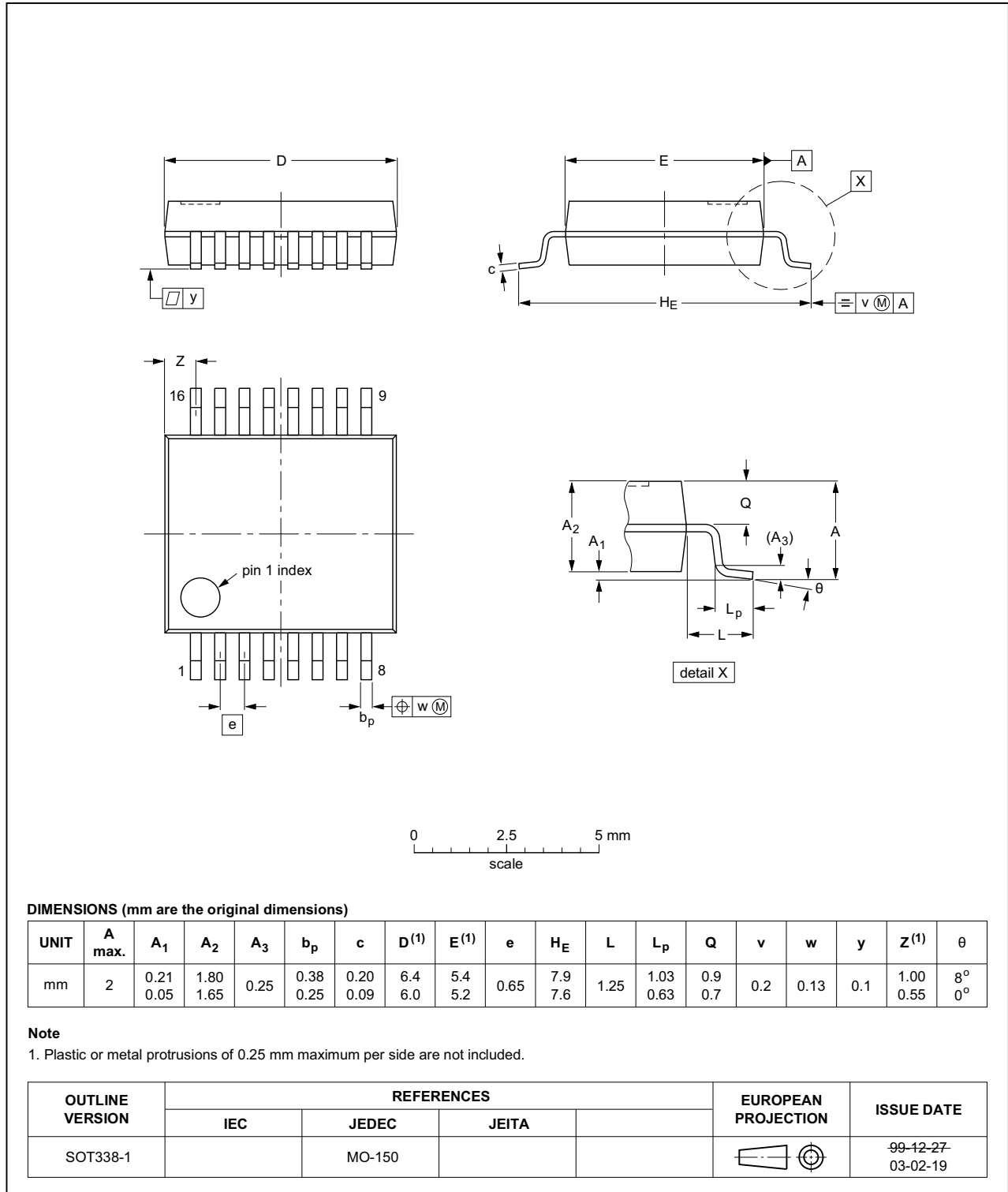


Fig 12. Package outline SOT338-1 (SSOP16)

14. Abbreviations

Table 9. Abbreviations

| Acronym | Abbreviation |
|---------|--|
| CMOS | Complementary Metal Oxide Semiconductor |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| LSTTL | Low-power Schottky Transistor-Transistor Logic |
| MM | Machine Model |

15. Revision history

Table 10. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|--|-----------------------|---------------|---------------------|
| 74HC137 v.4 | 20151223 | Product data sheet | - | 74HC137 v.3 |
| Modifications: | <ul style="list-style-type: none"> Type numbers 74HC137N (SOT38-4) removed. | | | |
| 74HC137 v.3 | 20041111 | Product data sheet | - | 74HC_HCT137_CNV v.2 |
| Modifications: | <ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the current presentation and information standard of Philips Semiconductors. Removed type number 74HCT137. Inserted family specification. | | | |
| 74HC_HCT137_CNV v.2 | 19970827 | Product specification | - | 74HC_HCT137 v.1 |
| 74HC_HCT137 v.1 | 19901201 | Product specification | - | - |

16. Legal information

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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. |

[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>.

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