

# 74AHC377; 74AHCT377

Octal D-type flip-flop with data enable; positive-edge trigger

Rev. 02 — 12 June 2008

Product data sheet

## 1. General description

The 74AHC377; 74AHCT377 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7-A.

The 74AHC377; 74AHCT377 has eight edge-triggered, D-type flip-flops with individual D inputs and Q outputs. A common clock input (CP) loads all flip-flops simultaneously when the data enable input ( $\bar{E}$ ) is LOW. The state of each D input, one set-up time before the LOW-to-HIGH clock transition, is transferred to the corresponding output (Qn) of the flip-flop. The  $\bar{E}$  input is only required to be stable one set-up time prior to the LOW-to-HIGH transition for predictable operation.

For versions associated with the 74AHC377; 74AHCT377, refer to the following:

- For the master reset version, see 74AHC273; 74AHCT273
- For the transparent latch version, see 74AHC373; 74AHCT373
- For the 3-state version, see 74AHC374; 74AHCT374

## 2. Features

- Balanced propagation delays
- All inputs have Schmitt-trigger actions
- Inputs accept voltages higher than  $V_{CC}$
- Ideal for addressable register applications
- Data enable for address and data synchronization
- Eight positive-edge triggered D-type flip-flops
- Input levels:
  - ◆ For 74AHC377: CMOS level
  - ◆ For 74AHCT377: TTL level
- ESD protection:
  - ◆ HBM EIA/JESD22-A114E exceeds 2000 V
  - ◆ MM EIA/JESD22-A115-A exceeds 200 V
  - ◆ CDM EIA/JESD22-C101C exceeds 1000 V
- Multiple package options
- 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. Ordering information

Table 1. Ordering information

| Type number      | Package           |         |   | Version  |
|------------------|-------------------|---------|---|----------|
|                  | Temperature range | Name    | Description   |          |
| <b>74AHC377</b>  |                   |         |   |          |
| 74AHC377D        | -40 °C to +125 °C | SO20    | plastic small outline package; 20 leads;<br>body width 7.5 mm             | SOT163-1 |
| 74AHC377PW       | -40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm | SOT360-1 |
| <b>74AHCT377</b> |                   |         |   |          |
| 74AHCT377D       | -40 °C to +125 °C | SO20    | plastic small outline package; 20 leads;<br>body width 7.5 mm             | SOT163-1 |
| 74AHCT377PW      | -40 °C to +125 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads;<br>body width 4.4 mm | SOT360-1 |

### 4. Functional diagram

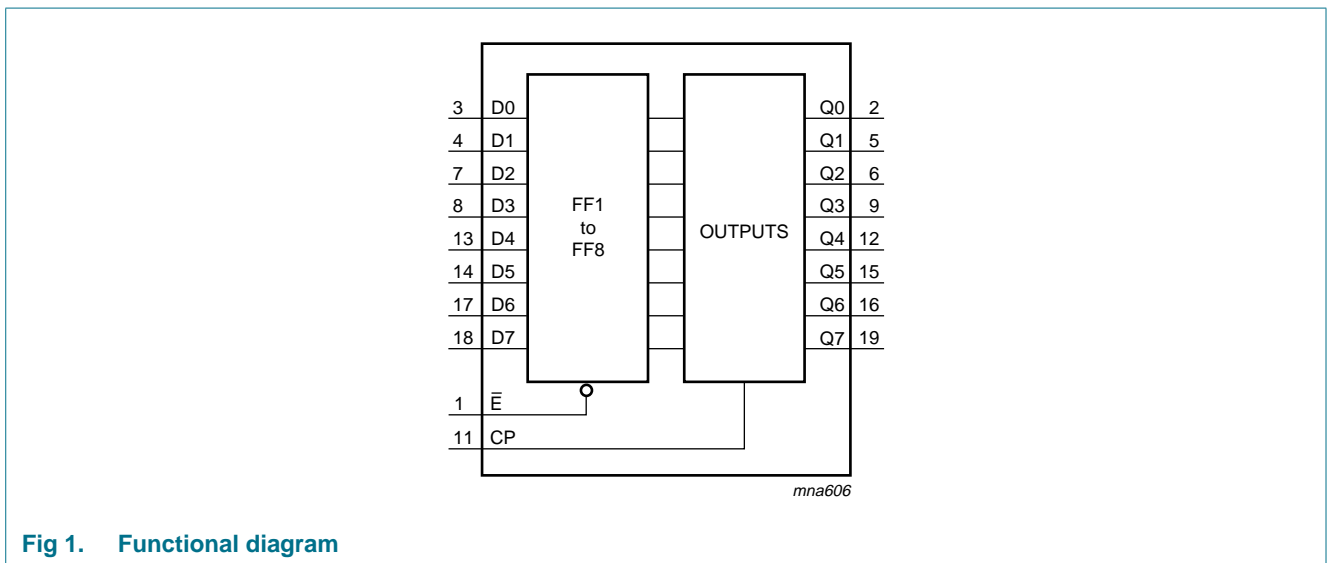


Fig 1. Functional diagram

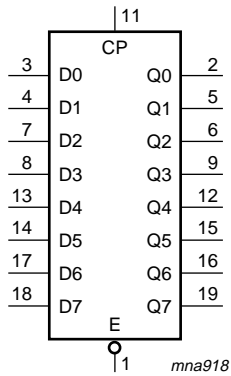


Fig 2. Logic symbol

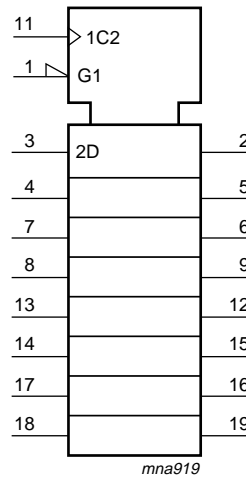


Fig 3. IEC logic symbol

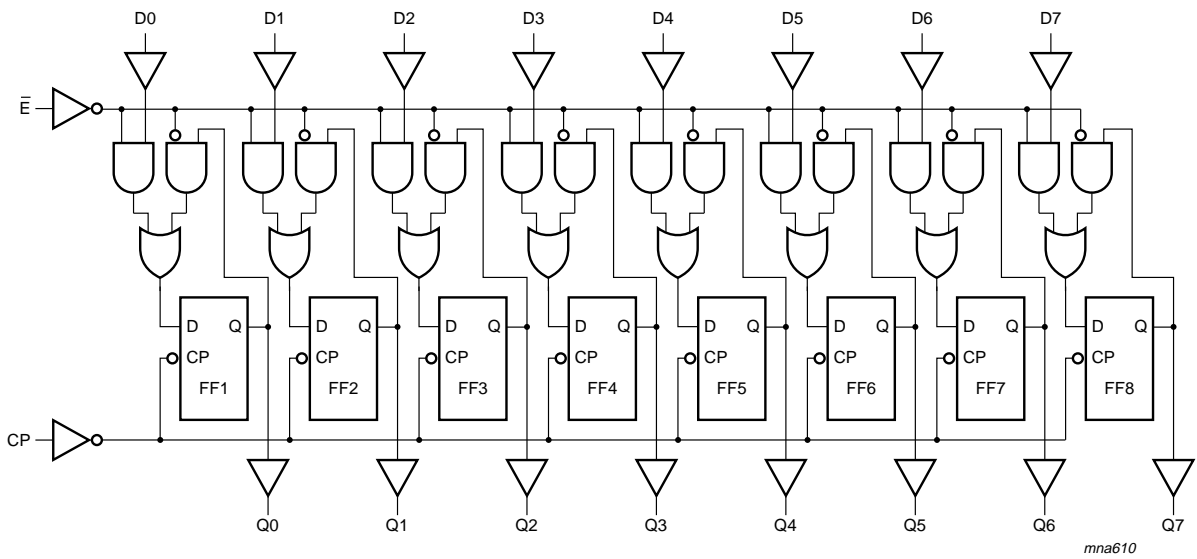


Fig 4. Logic diagram

## 5. Pinning information

### 5.1 Pinning

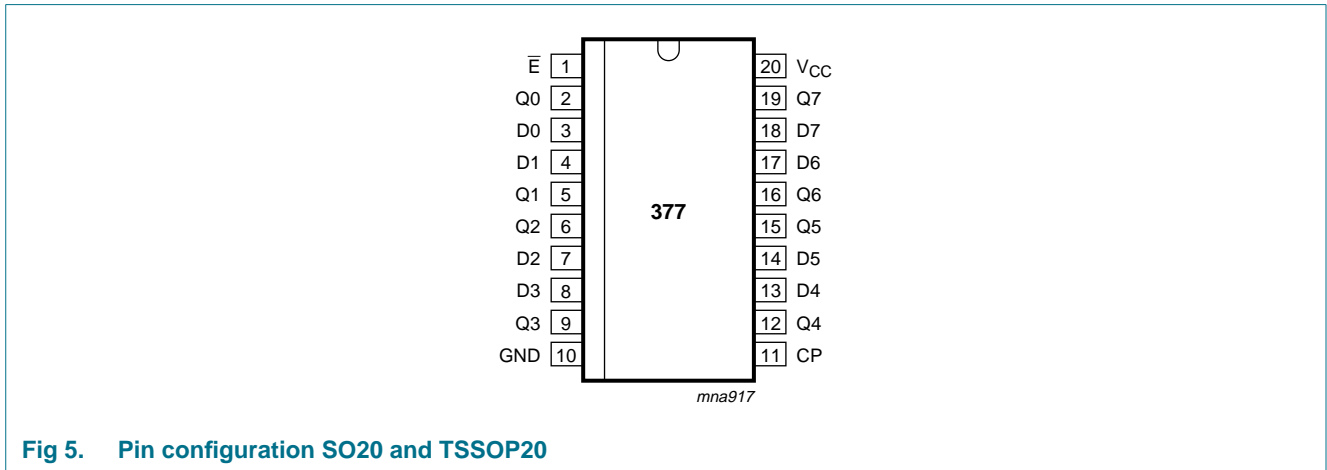


Fig 5. Pin configuration SO20 and TSSOP20

### 5.2 Pin description

Table 2. Pin description

| Symbol          | Pin | Description                               |
|-----------------|-----|---|
| $\bar{E}$       | 1   | data enable input (active LOW)            |
| Q0              | 2   | flip-flop output                          |
| D0              | 3   | data input                                |
| D1              | 4   | data input                                |
| Q1              | 5   | flip-flop output                          |
| Q2              | 6   | flip-flop output                          |
| D2              | 7   | data input                                |
| D3              | 8   | data input                                |
| Q3              | 9   | flip-flop output                          |
| GND             | 10  | ground (0 V)                              |
| CP              | 11  | clock input (LOW-to-HIGH, edge triggered) |
| Q4              | 12  | flip-flop output                          |
| D4              | 13  | data input                                |
| D5              | 14  | data input                                |
| Q5              | 15  | flip-flop output                          |
| Q6              | 16  | flip-flop output                          |
| D6              | 17  | data input                                |
| D7              | 18  | data input                                |
| Q7              | 19  | flip-flop output                          |
| V <sub>CC</sub> | 20  | supply voltage                            |

## 6. Functional description

Table 3. Function table<sup>[1]</sup>

| Operating mode    | Control   |    | Input | Output    |
|-------------------|-----------|----|-------|-----------|
|                   | $\bar{E}$ | CP | Dn    | Qn        |
| Load 1            | l         | ↑  | h     | H         |
| Load 0            | l         | ↑  | l     | L         |
| Hold (do nothing) | h         | ↑  | X     | no change |
|                   | H         | X  | X     | no change |

- [1] H = HIGH voltage level;  
 h = HIGH voltage level one set-up time prior to the LOW-to-HIGH CP transition;  
 L = LOW voltage level;  
 l = LOW voltage level one set-up time prior to the LOW-to-HIGH CP transition;  
 ↑ = LOW-to-HIGH CP transition;  
 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               | +7.0 | V    |
| $V_I$     | input voltage           |  | -0.5               | +7.0 | V    |
| $I_{IK}$  | input clamping current  | $V_I < -0.5$ V                           | <sup>[1]</sup> -20 | -    | mA   |
| $I_{OK}$  | output clamping current | $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V | <sup>[1]</sup> -20 | +20  | mA   |
| $I_O$     | output current          | $V_O = -0.5$ V to $(V_{CC} + 0.5)$ V     | -25                | +25  | mA   |
| $I_{CC}$  | supply current          |  | -                  | +75  | mA   |
| $I_{GND}$ | ground current          |  | -75                | -    | mA   |
| $T_{stg}$ | storage temperature     |  | -65                | +150 | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C            | <sup>[2]</sup> -   | 500  | mW   |

- [1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.  
 [2] For SO20 packages: above 70 °C the value of  $P_{tot}$  derates linearly at 8 mW/K.  
 For TSSOP20 packages: above 60 °C the value of  $P_{tot}$  derates linearly at 5.5 mW/K.

## 8. Recommended operating conditions

**Table 5. Operating conditions**

| Symbol           | Parameter                           | Conditions                       | Min | Typ | Max             | Unit |
|------------------|-------------------------------------|----------------------------------|-----|-----|-----------------|------|
| <b>74AHC377</b>  |                                     |                                  |     |     |                 |      |
| V <sub>CC</sub>  | supply voltage                      |                                  | 2.0 | 5.0 | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                                  | 0   | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      |                                  | 0   | -   | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                                  | -40 | +25 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 3.0 V to 3.6 V | -   | -   | 100             | ns/V |
|                  |                                     | V <sub>CC</sub> = 4.5 V to 5.5 V | -   | -   | 20              | ns/V |
| <b>74AHCT377</b> |                                     |                                  |     |     |                 |      |
| V <sub>CC</sub>  | supply voltage                      |                                  | 4.5 | 5.0 | 5.5             | V    |
| V <sub>I</sub>   | input voltage                       |                                  | 0   | -   | 5.5             | V    |
| V <sub>O</sub>   | output voltage                      |                                  | 0   | -   | V <sub>CC</sub> | V    |
| T <sub>amb</sub> | ambient temperature                 |                                  | -40 | +25 | +125            | °C   |
| Δt/ΔV            | input transition rise and fall rate | V <sub>CC</sub> = 4.5 V to 5.5 V | -   | -   | 20              | ns/V |

## 9. Static characteristics

**Table 6. Static characteristics**

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

| Symbol          | Parameter   | Conditions  | 25 °C |      |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|-----------------|---|---|-------|------|------|------------------|------|-------------------|------|------|
|                 |   |   | Min   | Typ  | Max  | Min              | Max  | Min               | Max  |      |
| <b>74AHC377</b> |   |   |       |      |      |                  |      |                   |      |      |
| V <sub>IH</sub> | HIGH-level input voltage                          | V <sub>CC</sub> = 2.0 V                             | 1.5   | -    | -    | 1.5              | -    | 1.5               | -    | V    |
|                 |   | V <sub>CC</sub> = 3.0 V                             | 2.1   | -    | -    | 2.1              | -    | 2.1               | -    | V    |
|                 |   | V <sub>CC</sub> = 5.5 V                             | 3.85  | -    | -    | 3.85             | -    | 3.85              | -    | V    |
| V <sub>IL</sub> | LOW-level input voltage                           | V <sub>CC</sub> = 2.0 V                             | -     | -    | 0.5  | -                | 0.5  | -                 | 0.5  | V    |
|                 |   | V <sub>CC</sub> = 3.0 V                             | -     | -    | 0.9  | -                | 0.9  | -                 | 0.9  | V    |
|                 |   | V <sub>CC</sub> = 5.5 V                             | -     | -    | 1.65 | -                | 1.65 | -                 | 1.65 | V    |
| V <sub>OH</sub> | HIGH-level output voltage                         | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> |       |      |      |                  |      |                   |      |      |
|                 |   | I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 2.0 V    | 1.9   | 2.0  | -    | 1.9              | -    | 1.9               | -    | V    |
|                 |   | I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 3.0 V    | 2.9   | 3.0  | -    | 2.9              | -    | 2.9               | -    | V    |
|                 |   | I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V    | 4.4   | 4.5  | -    | 4.4              | -    | 4.4               | -    | V    |
|                 |   | I <sub>O</sub> = -4.0 mA; V <sub>CC</sub> = 3.0 V   | 2.58  | -    | -    | 2.48             | -    | 2.40              | -    | V    |
|                 | I <sub>O</sub> = -8.0 mA; V <sub>CC</sub> = 4.5 V | 3.94  | -     | -    | 3.80 | -                | 3.70 | -                 | V    |      |
| V <sub>OL</sub> | LOW-level output voltage                          | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> |       |      |      |                  |      |                   |      |      |
|                 |   | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 2.0 V     | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |   | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 3.0 V     | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |   | I <sub>O</sub> = 50 μA; V <sub>CC</sub> = 4.5 V     | -     | 0    | 0.1  | -                | 0.1  | -                 | 0.1  | V    |
|                 |   | I <sub>O</sub> = 4.0 mA; V <sub>CC</sub> = 3.0 V    | -     | -    | 0.36 | -                | 0.44 | -                 | 0.55 | V    |
|                 | I <sub>O</sub> = 8.0 mA; V <sub>CC</sub> = 4.5 V  | -   | -     | 0.36 | -    | 0.44             | -    | 0.55              | V    |      |

**Table 6. Static characteristics ...continued**

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

| Symbol           | Parameter                 | Conditions  | 25 °C |     |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit          |
|------------------|---------------------------|---|-------|-----|------|------------------|------|-------------------|------|---------------|
|                  |                           |   | Min   | Typ | Max  | Min              | Max  | Min               | Max  |               |
| $I_I$            | input leakage current     | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V  | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | $\mu\text{A}$ |
| $I_{CC}$         | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$  | -     | -   | 4.0  | -                | 40   | -                 | 80   | $\mu\text{A}$ |
| $C_I$            | input capacitance         | $V_I = V_{CC}$ or GND   | -     | 3   | 10   | -                | 10   | -                 | 10   | pF            |
| <b>74AHCT377</b> |                           |   |       |     |      |                  |      |                   |      |               |
| $V_{IH}$         | HIGH-level input voltage  | $V_{CC} = 4.5 \text{ V}$ to 5.5 V   | 2.0   | -   | -    | 2.0              | -    | 2.0               | -    | V             |
| $V_{IL}$         | LOW-level input voltage   | $V_{CC} = 4.5 \text{ V}$ to 5.5 V   | -     | -   | 0.8  | -                | 0.8  | -                 | 0.8  | V             |
| $V_{OH}$         | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$   |       |     |      |                  |      |                   |      |               |
|                  |                           | $I_O = -50 \mu\text{A}$   | 4.4   | 4.5 | -    | 4.4              | -    | 4.4               | -    | V             |
|                  |                           | $I_O = -8.0 \text{ mA}$   | 3.94  | -   | -    | 3.80             | -    | 3.70              | -    | V             |
| $V_{OL}$         | LOW-level output voltage  | $V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$   |       |     |      |                  |      |                   |      |               |
|                  |                           | $I_O = 50 \mu\text{A}$  | -     | 0   | 0.1  | -                | 0.1  | -                 | 0.1  | V             |
|                  |                           | $I_O = 8.0 \text{ mA}$  | -     | -   | 0.36 | -                | 0.44 | -                 | 0.55 | V             |
| $I_I$            | input leakage current     | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 0 \text{ V}$ to 5.5 V  | -     | -   | 0.1  | -                | 1.0  | -                 | 2.0  | $\mu\text{A}$ |
| $I_{CC}$         | supply current            | $V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 5.5 \text{ V}$  | -     | -   | 4.0  | -                | 40   | -                 | 80   | $\mu\text{A}$ |
| $\Delta I_{CC}$  | additional supply current | per input pin;<br>$V_I = V_{CC} - 2.1 \text{ V}$ ; other pins<br>at $V_{CC}$ or GND; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 4.5 \text{ V}$ to 5.5 V | -     | -   | 1.35 | -                | 1.5  | -                 | 1.5  | mA            |
| $C_I$            | input capacitance         | $V_I = V_{CC}$ or GND   | -     | 3   | 10   | -                | 10   | -                 | 10   | pF            |

## 10. Dynamic characteristics

**Table 7. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

| Symbol           | Parameter                     | Conditions   | 25 °C |                    |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|------------------|-------------------------------|--|-------|--------------------|------|------------------|------|-------------------|------|------|
|                  |                               |  | Min   | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| <b>74AHC377</b>  |                               |  |       |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>  | propagation delay             | CP to Qn; see <a href="#">Figure 6</a> <sup>[2]</sup>                          |       |                    |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   |       |                    |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF   | -     | 5.6                | 12.8 | 1.0              | 15.0 | 1.0               | 16.0 | ns   |
|                  |                               | C <sub>L</sub> = 50 pF   | -     | 8.0                | 16.0 | 1.0              | 18.0 | 1.0               | 20.0 | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   |       |                    |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF   | -     | 3.9                | 9.0  | 1.0              | 10.5 | 1.0               | 11.5 | ns   |
| f <sub>max</sub> | maximum frequency             | see <a href="#">Figure 6</a>   |       |                    |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   |       |                    |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF   | 80    | 125                | -    | 70               | -    | 70                | -    | MHz  |
|                  |                               | C <sub>L</sub> = 50 pF   | 50    | 75                 | -    | 45               | -    | 45                | -    | MHz  |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   |       |                    |      |                  |      |                   |      |      |
|                  |                               | C <sub>L</sub> = 15 pF   | 125   | 175                | -    | 110              | -    | 110               | -    | MHz  |
| t <sub>w</sub>   | pulse width                   | CP HIGH or LOW; see <a href="#">Figure 6</a>                                   |       |                    |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
| t <sub>su</sub>  | set-up time                   | Dn, $\bar{E}$ to CP; see <a href="#">Figure 7</a>                              |       |                    |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   | 4.5   | -                  | -    | 4.5              | -    | 4.5               | -    | ns   |
| t <sub>h</sub>   | hold time                     | Dn, $\bar{E}$ to CP; see <a href="#">Figure 7</a>                              |       |                    |      |                  |      |                   |      |      |
|                  |                               | V <sub>CC</sub> = 3.0 V to 3.6 V   | 1.5   | -                  | -    | 1.5              | -    | 1.5               | -    | ns   |
|                  |                               | V <sub>CC</sub> = 4.5 V to 5.5 V   | 2.0   | -                  | -    | 2.0              | -    | 2.0               | -    | ns   |
| C <sub>PD</sub>  | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[3]</sup> | -     | 20                 | -    | -                | -    | -                 | -    | pF   |



**Table 7. Dynamic characteristics ...continued**  
 Voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 8](#).

| Symbol  | Parameter                     | Conditions   | 25 °C |                    |      | -40 °C to +85 °C |      | -40 °C to +125 °C |      | Unit |
|---|-------------------------------|--|-------|--------------------|------|------------------|------|-------------------|------|------|
|   |                               |  | Min   | Typ <sup>[1]</sup> | Max  | Min              | Max  | Min               | Max  |      |
| <b>74AHCT377; V<sub>CC</sub> = 4.5 V to 5.5 V</b> |                               |  |       |                    |      |                  |      |                   |      |      |
| t <sub>pd</sub>                                   | propagation delay             | CP to Qn; see <a href="#">Figure 6</a> <sup>[2]</sup>                          |       |                    |      |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | -     | 4.0                | 9.0  | 1.0              | 10.5 | 1.0               | 11.5 | ns   |
|   |                               | C <sub>L</sub> = 50 pF   | -     | 5.7                | 10.5 | 1.0              | 12.0 | 1.0               | 13.5 | ns   |
| f <sub>max</sub>                                  | maximum frequency             | see <a href="#">Figure 6</a>   |       |                    |      |                  |      |                   |      |      |
|   |                               | C <sub>L</sub> = 15 pF   | 90    | 140                | -    | 80               | -    | 80                | -    | MHz  |
|   |                               | C <sub>L</sub> = 50 pF   | 85    | 130                | -    | 75               | -    | 75                | -    | MHz  |
| t <sub>W</sub>                                    | pulse width                   | CP HIGH or LOW; see <a href="#">Figure 6</a>                                   | 5.0   | -                  | -    | 5.0              | -    | 5.0               | -    | ns   |
| t <sub>su</sub>                                   | set-up time                   | Dn, $\bar{E}$ to CP; see <a href="#">Figure 7</a>                              | 4.5   | -                  | -    | 4.5              | -    | 4.5               | -    | ns   |
| t <sub>h</sub>                                    | hold time                     | Dn, $\bar{E}$ to CP; see <a href="#">Figure 7</a>                              | 2.0   | -                  | -    | 2.0              | -    | 2.0               | -    | ns   |
| C <sub>PD</sub>                                   | power dissipation capacitance | f <sub>i</sub> = 1 MHz; V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[3]</sup> | -     | 23                 | -    | -                | -    | -                 | -    | pF   |

[1] Typical values are measured at nominal supply voltage (V<sub>CC</sub> = 3.3 V and V<sub>CC</sub> = 5.0 V).

[2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[3] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

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

f<sub>i</sub> = input frequency in MHz;

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

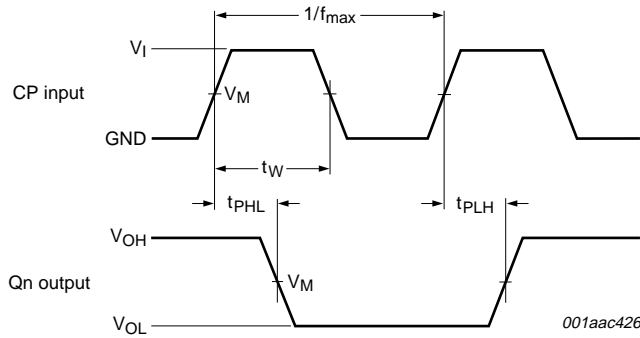
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

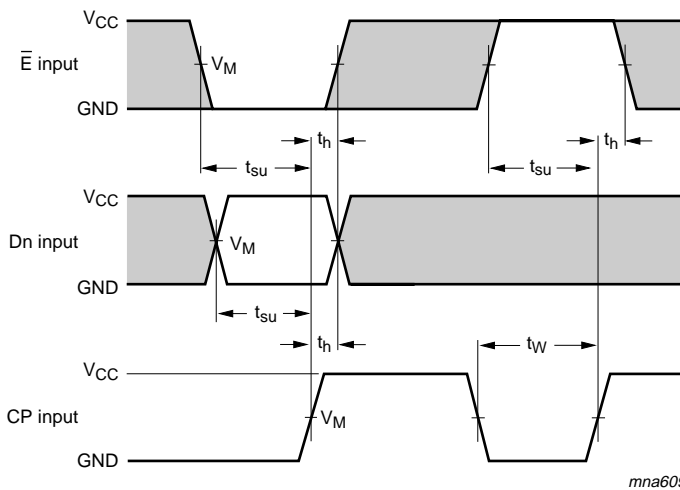
Σ(C<sub>L</sub> × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>) = sum of the outputs.

## 11. Waveforms



Measurement points are given in [Table 8](#).  
 $V_{OL}$  and  $V_{OH}$  are typical voltage output levels that occur with the output load.

**Fig 6. Clock pulse width, maximum frequency and input to output propagation delays**

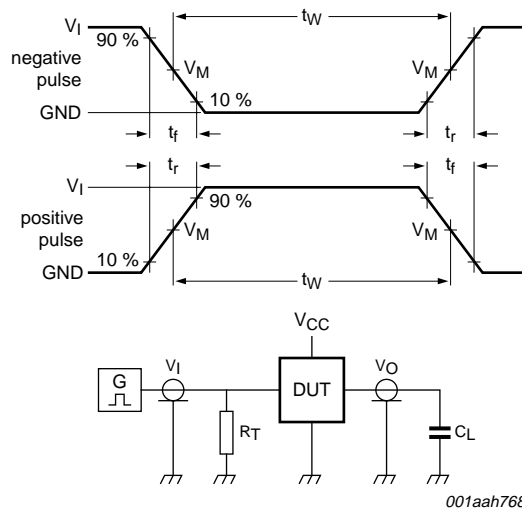


Measurement points are given in [Table 8](#).  
 The shaded areas indicate when the input is permitted to change for predictable output performance.

**Fig 7. Data set-up and hold times**

**Table 8. Measurement points**

| Type      | Input               | Output              |
|-----------|---------------------|---------------------|
|           | $V_M$               | $V_M$               |
| 74AHC377  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| 74AHCT377 | 1.5 V               | $0.5 \times V_{CC}$ |



001aah768

Test data is given in [Table 9](#).

Definitions 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 8. Load circuitry for measuring switching times**

**Table 9. Test data**

| Type      | Input    |               | Load         | Test               |
|-----------|----------|---------------|--------------|--------------------|
|           | $V_I$    | $t_r, t_f$    | $C_L$        |                    |
| 74AHC377  | $V_{CC}$ | $\leq 3.0$ ns | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |
| 74AHCT377 | 3.0 V    | $\leq 3.0$ ns | 15 pF, 50 pF | $t_{PLH}, t_{PHL}$ |

12. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1

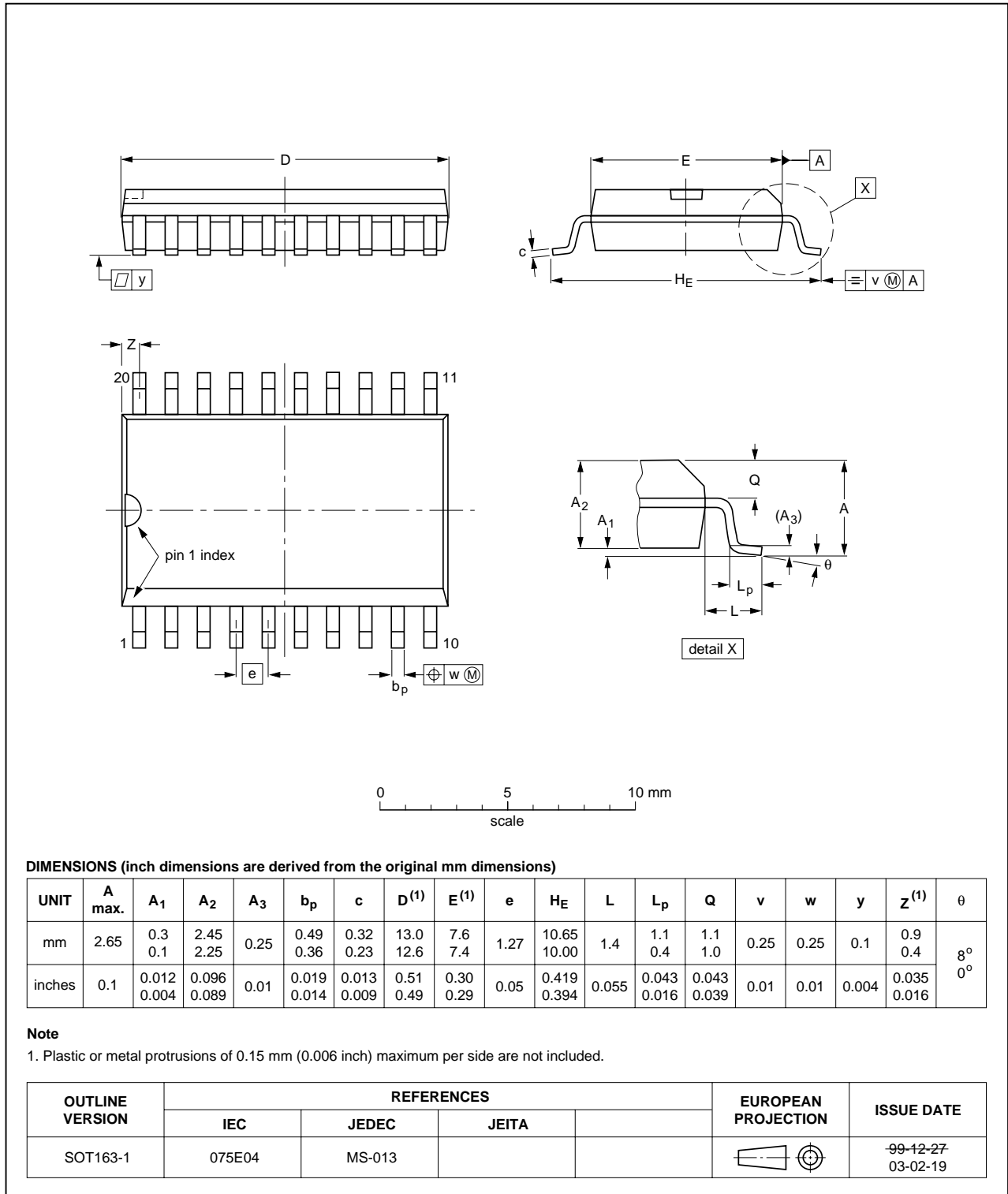


Fig 9. Package outline SOT163-1 (SO20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1

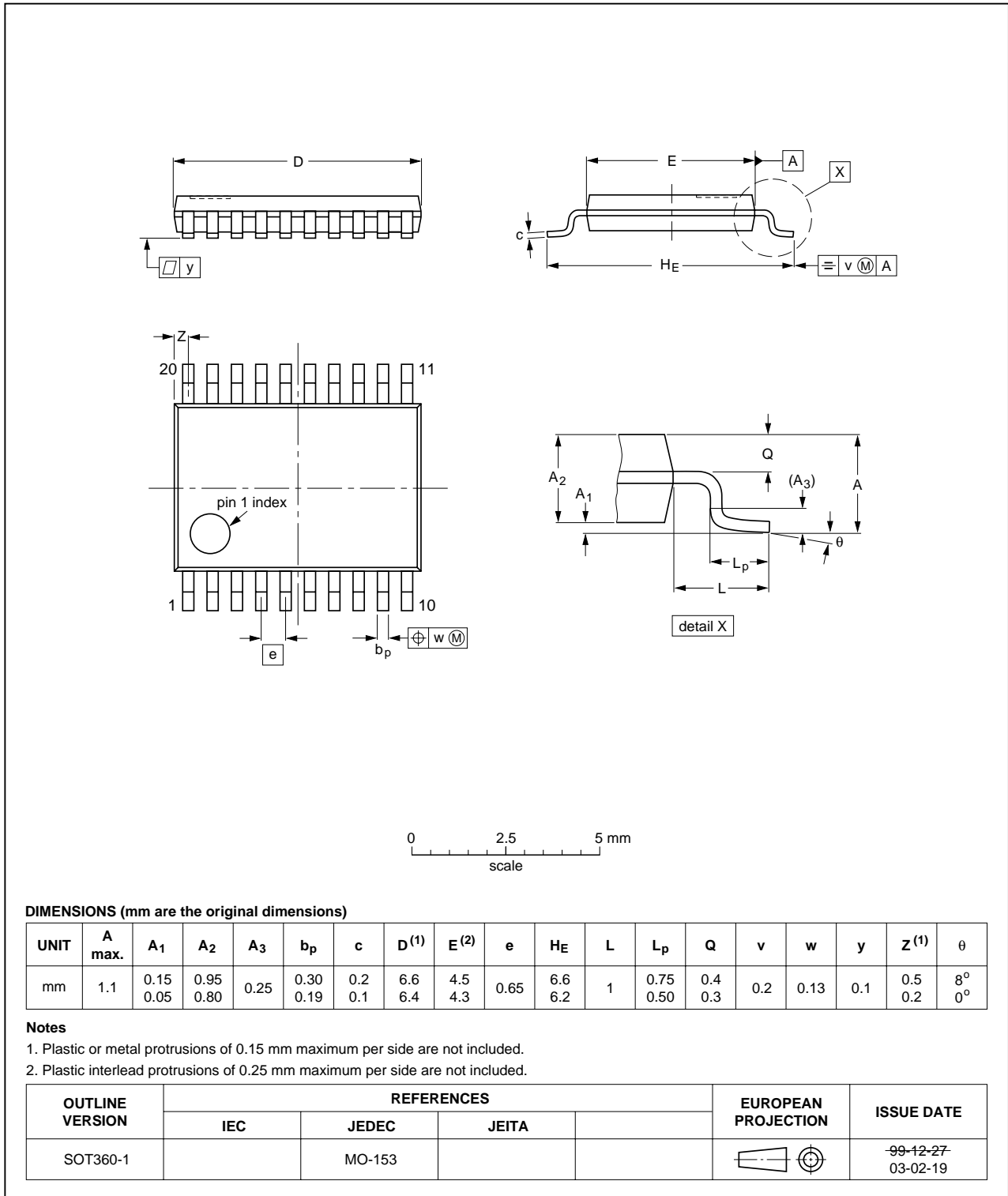


Fig 10. Package outline SOT360-1 (TSSOP20)

## 13. Abbreviations

Table 10. Abbreviations

| Acronym | Description                                    |
|---------|--|
| CDM     | Charged Device Model                           |
| 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                                  |

## 14. Revision history

Table 11. Revision history

| Document ID     | Release date  | Data sheet status     | Change notice | Supersedes      |
|-----------------|---|-----------------------|---------------|-----------------|
| 74AHC_AHCT377_2 | 20080612  | Product data sheet    | -             | 74AHC_AHCT377_1 |
| Modifications:  | <ul style="list-style-type: none"> <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> <li>• <a href="#">Table 6</a>: the conditions for input leakage current have been changed.</li> </ul> |                       |               |                 |
| 74AHC_AHCT377_1 | 20000815  | Product specification | -             | -               |

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### 15.1 Data sheet status

| Document status <sup>[1][2]</sup> | Product status <sup>[3]</sup> | 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".

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