



**THE DATASHEET OF
CBT3245ADS,112**



CBT3245A

Octal bus switch

Rev. 6 — 21 March 2022

Product data sheet

1. General description

The CBT3245A is an 8-pole, single-throw bus switch. The device features a single output enable input (\overline{OE}) that controls eight switch channels. The switches are disabled when (\overline{OE}) is HIGH. This device is fully specified for partial power down applications using I_{OFF} .

2. Features and benefits

- 5 Ω switch connection between two ports
- Direct interface with TTL levels
- Overvoltage tolerant control inputs to 5.5 V
- I_{OFF} circuitry provides partial Power-down mode operation
- Latch-up performance exceeds 500 mA per JESD 78 Class II Level B
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115B exceeds 150 V
 - CDM JESD22-C101C exceeds 1000 V
- Specified from -40 °C to +85 °C

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|-------------|-------------------|----------|--|----------|
| | Temperature range | Name | Description | Version |
| CBT3245APW | -40 °C to +85 °C | TSSOP20 | plastic thin shrink small outline package; 20 leads; body width 4.4 mm | SOT360-1 |
| CBT3245ABQ | -40 °C to +85 °C | DHVQFN20 | plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 20 terminals; body 2.5 × 4.5 × 0.85 mm | SOT764-1 |

4. Functional diagram

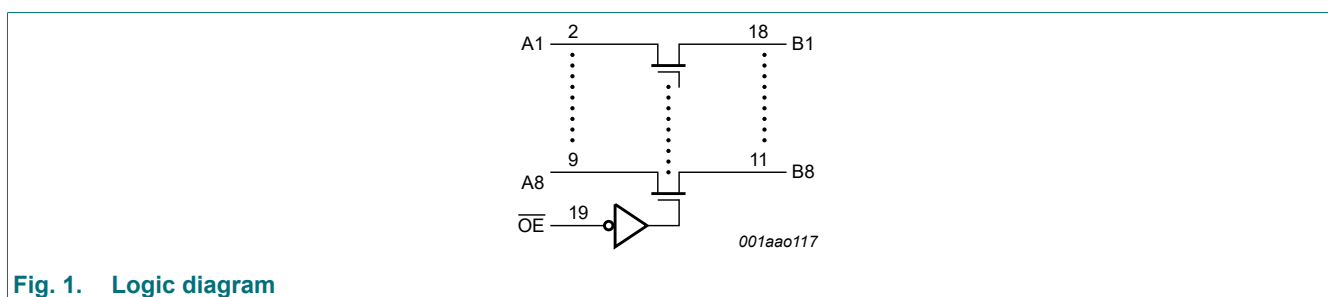
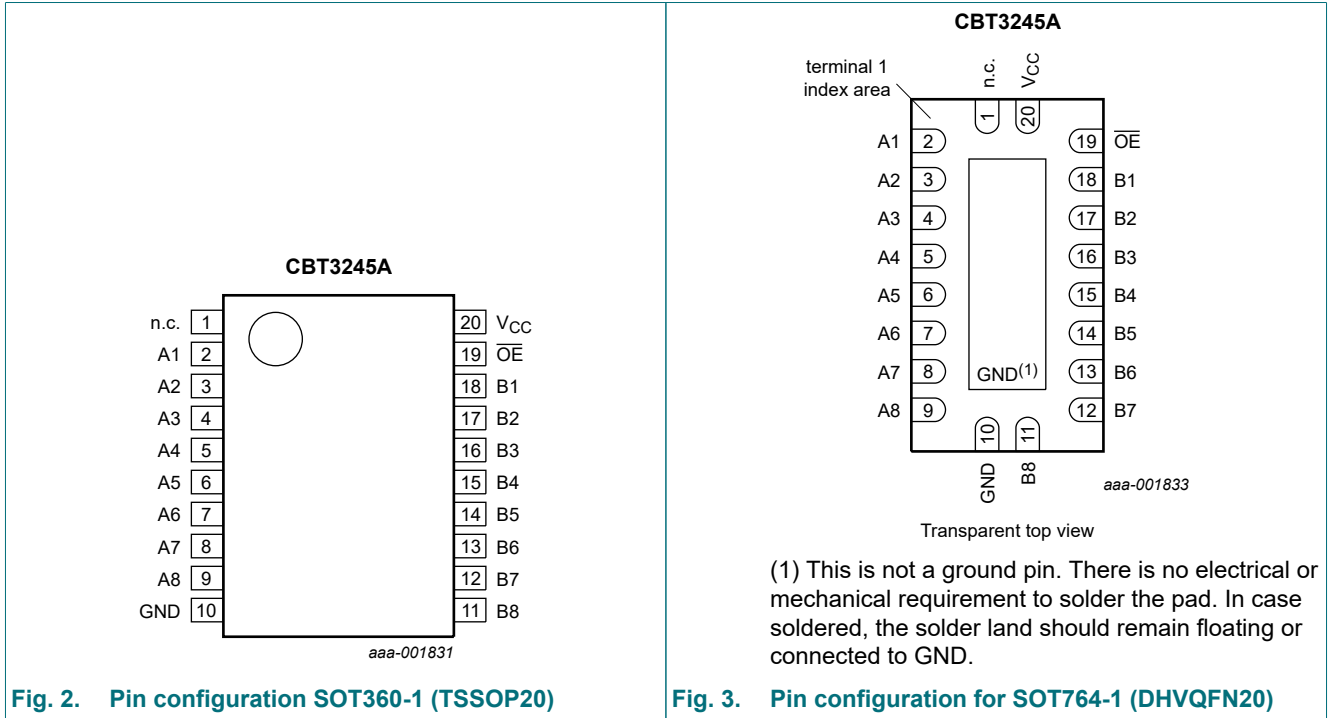


Fig. 1. Logic diagram

5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|--------------------------------|--------------------------------|----------------------------------|
| n.c. | 1 | not connected |
| A1, A2, A3, A4, A5, A6, A7, A8 | 2, 3, 4, 5, 6, 7, 8, 9 | data input/output (A port) |
| GND | 10 | ground (0 V) |
| B1, B2, B3, B4, B5, B6, B7, B8 | 18, 17, 16, 15, 14, 13, 12, 11 | data input/output (B port) |
| OE | 19 | output enable input (active LOW) |
| V _{CC} | 20 | positive supply voltage |

6. Functional description

Table 3. Functional description

H = HIGH voltage level; L = LOW voltage level; Z = high-impedance OFF-state.

| Input | Input/output |
|-------|--------------|
| OE | An, Bn |
| L | An = Bn |
| H | Z |

7. Limiting values

Table 4. Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

$T_{amb} = -40\text{ °C}$ to $+85\text{ °C}$, unless otherwise specified.

| Symbol | Parameter | Conditions | Min | Max | Unit |
|-----------|-------------------------|--------------------|----------|------|------|
| V_{CC} | supply voltage | | -0.5 | +7.0 | V |
| V_I | input voltage | | [1] -0.5 | +7.0 | V |
| I_{OK} | output clamping current | $V_O < 0\text{ V}$ | -50 | - | mA |
| V_O | output voltage | | [1] -0.5 | +7.0 | V |
| I_O | output current | $V_O < 0\text{ V}$ | - | ±128 | mA |
| I_{IK} | input clamping current | $V_I < 0\text{ V}$ | -50 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |

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

8. Recommended operating conditions

Table 5. Recommended operating conditions

All unused control inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------|--------------------------|-----------------------|-----|-----|-----|------|
| V_{CC} | supply voltage | | 4.0 | - | 5.5 | V |
| V_{IH} | HIGH-level input voltage | | 2.0 | - | - | V |
| V_{IL} | LOW-level input voltage | | - | - | 0.8 | V |
| T_{amb} | ambient temperature | operating in free air | -40 | - | +85 | °C |

9. Static characteristics

Table 6. Static characteristics

Voltages are referenced to GND (ground = 0 V).

| Symbol | Parameter | Conditions | $T_{amb} = -40\text{ °C}$ to $+85\text{ °C}$ | | | Unit |
|-----------------|------------------------------------|--|--|---------|------|------|
| | | | Min | Typ [1] | Max | |
| V_{IK} | input clamping voltage | $V_{CC} = 4.5\text{ V}$; $I_I = -18\text{ mA}$ | - | - | -1.2 | V |
| I_I | input leakage current | $V_{CC} = 5.5\text{ V}$; $V_I = \text{GND}$ or 5.5 V | - | - | ±5 | μA |
| I_{CC} | supply current | $V_{CC} = 5.5\text{ V}$; $I_O = 0\text{ mA}$; $V_I = V_{CC}$ or GND | - | 1 | 3 | μA |
| ΔI_{CC} | additional supply current | per input pin; $V_{CC} = 5.5\text{ V}$; one input at 3.4 V , other inputs at V_{CC} or GND | [2] - | - | 3.5 | mA |
| C_I | input capacitance | control pins; $V_I = 3\text{ V}$ or 0 V | - | 3.2 | - | pF |
| $C_{io(off)}$ | off-state input/output capacitance | port off; $V_I = 3\text{ V}$ or 0 V ; $\overline{OE} = V_{CC}$ | - | 6.6 | - | pF |
| R_{ON} | ON resistance | $V_{CC} = 4.5\text{ V}$; $V_I = 0\text{ V}$; $I_I = 64\text{ mA}$ | [3] - | 5 | 7 | Ω |
| | | $V_{CC} = 4.5\text{ V}$; $V_I = 0\text{ V}$; $I_I = 30\text{ mA}$ | [3] - | 5 | 7 | Ω |
| | | $V_{CC} = 4.5\text{ V}$; $V_I = 2.4\text{ V}$; $I_I = -15\text{ mA}$ | [3] - | 10 | 15 | Ω |

[1] All typical values are measured at $V_{CC} = 5\text{ V}$ and $T_{amb} = 25\text{ °C}$.

[2] This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

[3] Measured by the voltage drop between the An and the Bn terminals at the indicated current through the switch. ON resistance is determined by the lowest voltage of the two (An or Bn) terminals.

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 6.

| Symbol | Parameter | Conditions | T _{amb} = -40 °C to +85 °C | | Unit |
|------------------|-------------------|--|-------------------------------------|------|------|
| | | | Min | Max | |
| t _{pd} | propagation delay | An, Bn to Bn, An; V _{CC} = 5.0 V ± 0.5 V; see Fig. 4 [1] [2] | - | 0.25 | ns |
| t _{en} | enable time | \overline{OE} to An or Bn; V _{CC} = 5.0 V ± 0.5 V; see Fig. 5 [3] | 1.0 | 5.9 | ns |
| t _{dis} | disable time | \overline{OE} to An or Bn; V _{CC} = 5.0 V ± 0.5 V; see Fig. 5 [4] | 1.0 | 6.0 | ns |

- [1] The propagation delay is the calculated RC time constant of the typical ON resistance of the switch and the specified load capacitance, when driven by an ideal voltage source (zero output impedance).
- [2] t_{pd} is the same as t_{PLH} and t_{PHL}.
- [3] t_{en} is the same as t_{PZL} and t_{PZH}.
- [4] t_{dis} is the same as t_{PLZ} and t_{PHZ}.

10.1. Waveforms and test circuit

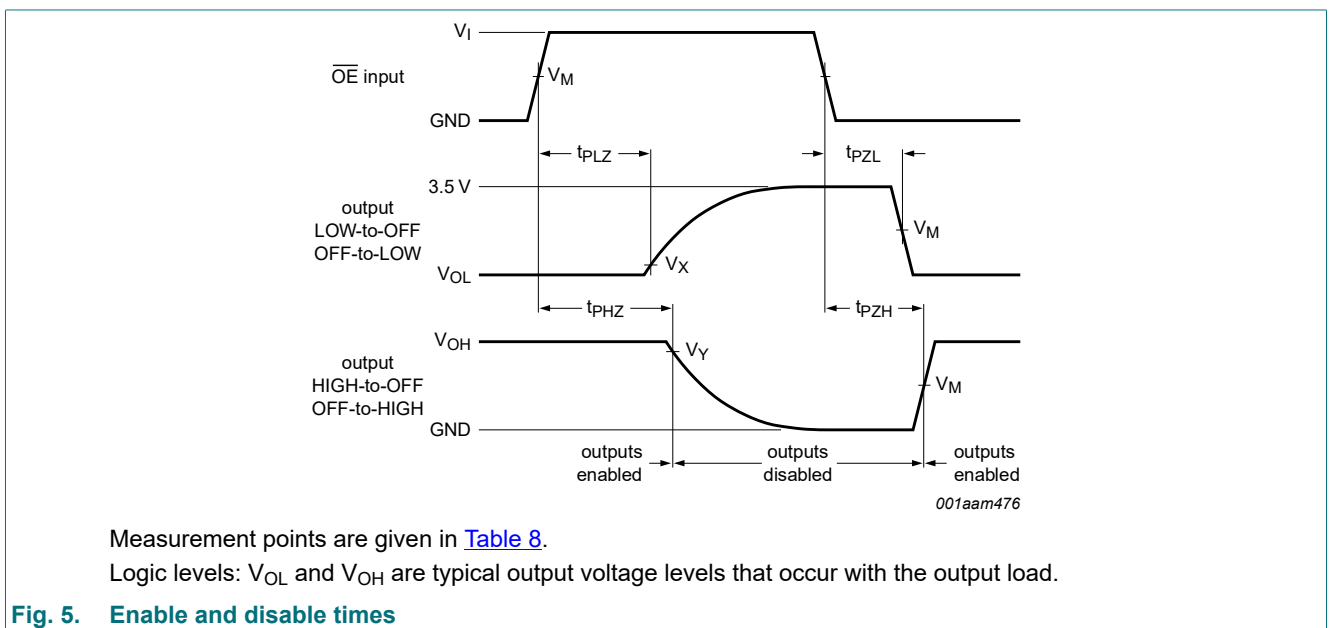
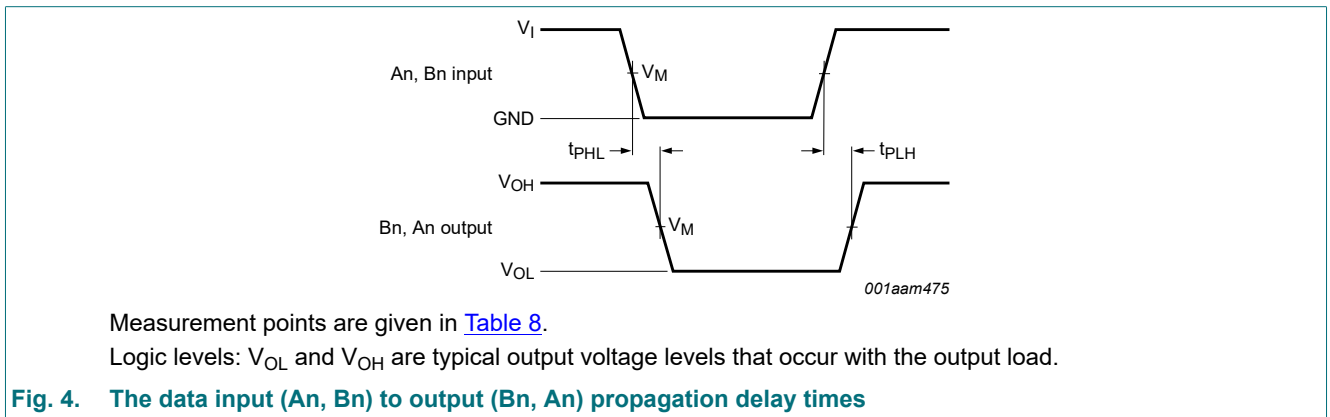
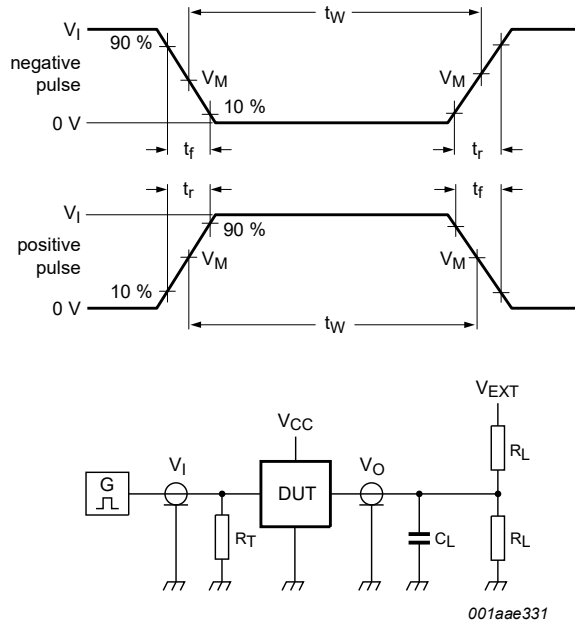


Table 8. Measurement points

| Supply voltage | Input | | Output | | |
|--|--------------|-------|--------|-------------------------|-------------------------|
| V_{CC} | V_I | V_M | V_M | V_X | V_Y |
| $V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}$ | GND to 3.0 V | 1.5 V | 1.5 V | $V_{OL} + 0.3\text{ V}$ | $V_{OH} - 0.3\text{ V}$ |



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

All input pulses are supplied by generators having the following characteristics: PRR \leq 10 MHz; $Z_o = 50\ \Omega$.

The outputs are measured one at a time with one transition per measurement.

Definitions for test circuit:

R_L = Load resistance;

C_L = Load capacitance including jig and probe capacitance;

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

V_{EXT} = External voltage for measuring switching times.

Fig. 6. Test circuit for measuring switching times

Table 9. Test data

| Supply voltage | Input | | Load | | V_{EXT} | | |
|--|--------------|----------------------|-------|--------------|--------------------|--------------------|--------------------|
| | V_I | t_r, t_f | C_L | R_L | t_{PLH}, t_{PHL} | t_{PLZ}, t_{PZL} | t_{PHZ}, t_{PZH} |
| $V_{CC} = 5.0\text{ V} \pm 0.5\text{ V}$ | GND to 3.0 V | $\leq 2.5\text{ ns}$ | 50 pF | 500 Ω | open | 7.0 V | open |

11. Package outline

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

SOT360-1

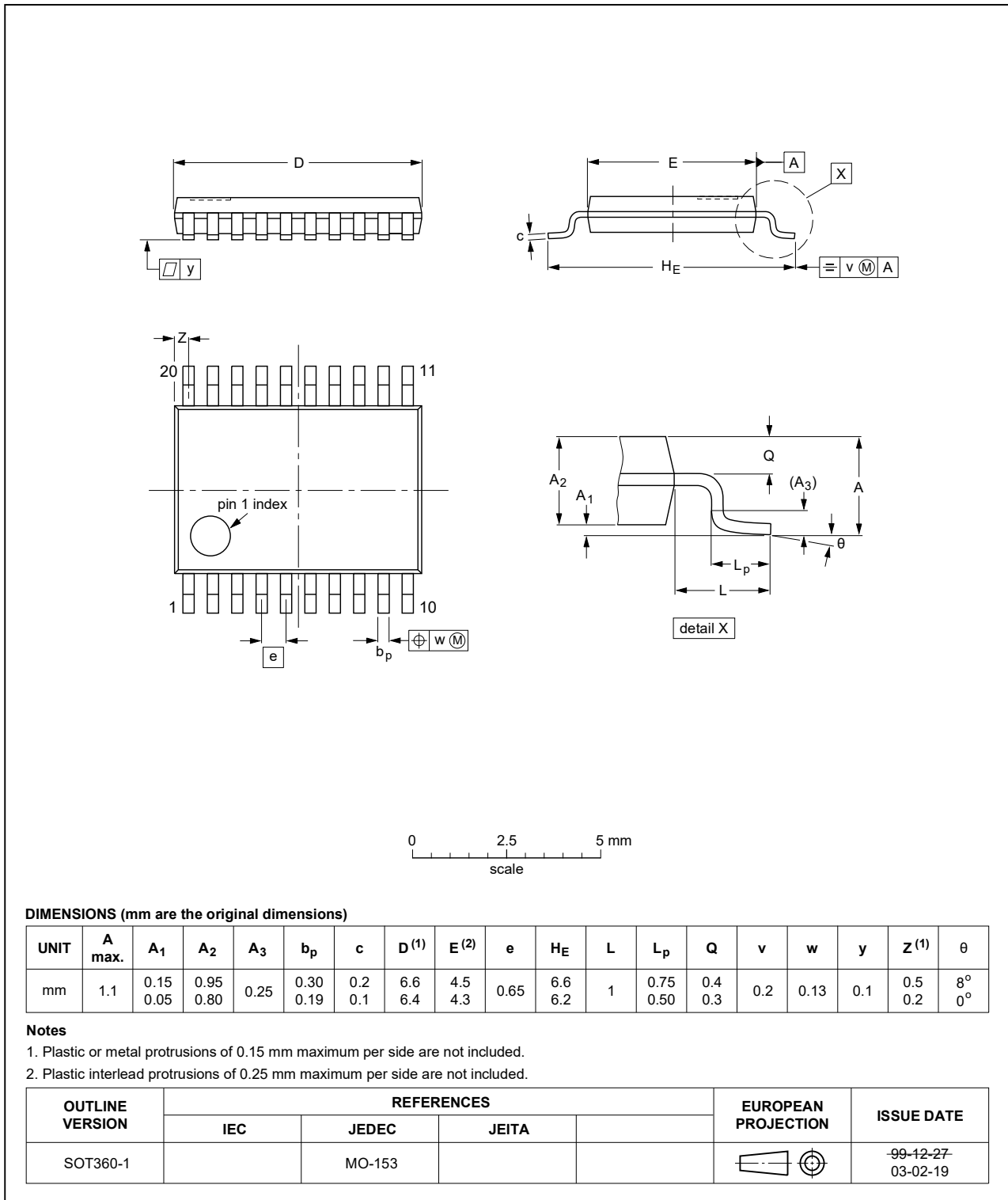


Fig. 7. Package outline SOT360-1 (TSSOP20)

12. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|-----------------------------|
| CDM | Charged Device Model |
| ESD | ElectroStatic Discharge |
| DUT | Device Under Test |
| HBM | Human Body Model |
| MM | Machine Model |
| PRR | Pulse Rate Repetition |
| TTL | Transistor-Transistor Logic |

13. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|----------------|---|--------------------|---------------|--------------|
| CBT3245A v.6 | 20220321 | Product data sheet | - | CBT3245A v.5 |
| Modifications: | <ul style="list-style-type: none"> • Section 1 and Section 2 updated. • Type number CBT3245AD (SOT163-1/SO20) removed. | | | |
| CBT3245A v.5 | 20200409 | Product data sheet | - | CBT3245A v.4 |
| Modifications: | <ul style="list-style-type: none"> • Type number CBT3245ADB (SOT339-1/SSOP20) removed. | | | |
| CBT3245A v.4 | 20190430 | Product data sheet | - | CBT3245A v.3 |
| Modifications: | <ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Type number CBT3245ADS (SOT724-1/SSOP20) removed. • Fig. 8: Package outline drawing SOT764-1 updated. | | | |
| CBT3245A v.3 | 20120105 | Product data sheet | - | CBT3245A v.2 |
| Modifications: | <ul style="list-style-type: none"> • The format of this document 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. • Marking code removed from order information section. • Description of C_I and C_{I/O} corrected (errata). | | | |
| CBT3245A v.2 | 20020627 | Product data sheet | - | CBT3245A v.1 |
| CBT3245A v.1 | 20020218 | Product data sheet | - | - |

14. Legal information

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. |
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| 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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Contents

| | |
|--|----------|
| 1. General description | 1 |
| 2. Features and benefits | 1 |
| 3. Ordering information | 1 |
| 4. Functional diagram | 1 |
| 5. Pinning information | 2 |
| 5.1. Pinning..... | 2 |
| 5.2. Pin description..... | 2 |
| 6. Functional description | 2 |
| 7. Limiting values | 3 |
| 8. Recommended operating conditions | 3 |
| 9. Static characteristics | 3 |
| 10. Dynamic characteristics | 4 |
| 10.1. Waveforms and test circuit..... | 4 |
| 11. Package outline | 6 |
| 12. Abbreviations | 8 |
| 13. Revision history | 8 |
| 14. Legal information | 9 |

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