

# 74LVC2G08

## Dual 2-input AND gate

Rev. 16 — 29 July 2019

Product data sheet

## 1. General description

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The 74LVC2G08 provides a 2-input AND gate function.

Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of the 74LVC2G08 as a translator in a mixed 3.3 V and 5 V environment.

This device is fully specified for partial power-down applications using  $I_{OFF}$ . The  $I_{OFF}$  circuitry disables the output, preventing a damaging backflow current through the device when it is powered down.

## 2. Features and benefits

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- Wide supply voltage range from 1.65 V to 5.5 V
- 5 V tolerant outputs for interfacing with 5 V logic
- High noise immunity
- $\pm 24$  mA output drive ( $V_{CC} = 3.0$  V)
- CMOS low power consumption
- Complies with JEDEC standard:
  - JESD8-7 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8-B/JESD36 (2.7 V to 3.6 V)
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5 V
- 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  |
| 74LVC2G08DP | -40 °C to +125 °C | TSSOP8 | plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm                         | SOT505-2 |
| 74LVC2G08DC | -40 °C to +125 °C | VSSOP8 | plastic very thin shrink small outline package; 8 leads; body width 2.3 mm                                      | SOT765-1 |
| 74LVC2G08GT | -40 °C to +125 °C | XSON8  | plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm                     | SOT833-1 |
| 74LVC2G08GF | -40 °C to +125 °C | XSON8  | extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1 x 0.5 mm                             | SOT1089  |
| 74LVC2G08GM | -40 °C to +125 °C | XQFN8  | plastic, extremely thin quad flat package; no leads; 8 terminals; body 1.6 x 1.6 x 0.5 mm                       | SOT902-2 |
| 74LVC2G08GN | -40 °C to +125 °C | XSON8  | extremely thin small outline package; no leads; 8 terminals; body 1.2 x 1.0 x 0.35 mm                           | SOT1116  |
| 74LVC2G08GS | -40 °C to +125 °C | XSON8  | extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1.0 x 0.35 mm                          | SOT1203  |
| 74LVC2G08GX | -40 °C to +125 °C | X2SON8 | plastic thermal enhanced extremely thin small outline package; no leads; 8 terminals; body 1.35 x 0.8 x 0.35 mm | SOT1233  |

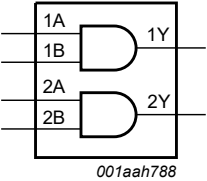
4. Marking

Table 2. Marking codes

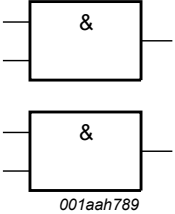
| Type number | Marking code[1] |
|-------------|-----------------|
| 74LVC2G08DP | V08             |
| 74LVC2G08DC | V08             |
| 74LVC2G08GT | V08             |
| 74LVC2G08GF | VE              |
| 74LVC2G08GM | V08             |
| 74LVC2G08GN | VE              |
| 74LVC2G08GS | VE              |
| 74LVC2G08GX | VE              |

[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

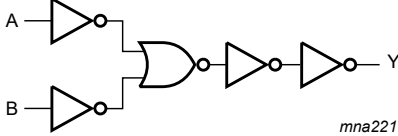
5. Functional diagram



**Fig. 1. Logic symbol**



**Fig. 2. IEC logic symbol**



**Fig. 3. Logic diagram (one gate)**

6. Pinning information

6.1. Pinning

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Diagram showing pin configuration for SOT505-2 and SOT765-1 packages. The package is a square with pins 1 through 8. Pin 1 is at the top left, pin 8 at the top right, pin 7 at the bottom right, pin 6 at the bottom right, pin 5 at the bottom right, pin 4 at the bottom left, pin 3 at the top left, pin 2 at the top left, and pin 1 at the top left. The labels are: 1A (1), 1B (2), 2Y (3), GND (4), 8 (VCC), 7 (1Y), 6 (2B), 5 (2A).

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Transparent top view

Diagram showing pin configuration for SOT833-1, SOT1089, SOT1116 and SOT1203 packages. The package is a square with pins 1 through 8. Pin 1 is at the top left, pin 8 at the top right, pin 7 at the bottom right, pin 6 at the bottom right, pin 5 at the bottom right, pin 4 at the bottom left, pin 3 at the top left, pin 2 at the top left, and pin 1 at the top left. The labels are: 1A (1), 1B (2), 2Y (3), GND (4), 8 (VCC), 7 (1Y), 6 (2B), 5 (2A).

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Transparent top view

Diagram showing pin configuration for SOT902-2 package. The package is a square with pins 1 through 8. Pin 1 is at the top left, pin 8 at the top right, pin 7 at the bottom right, pin 6 at the bottom right, pin 5 at the bottom right, pin 4 at the bottom left, pin 3 at the top left, pin 2 at the top left, and pin 1 at the top left. The labels are: 1A (1), 1B (2), 2Y (3), GND (4), 8 (VCC), 7 (1Y), 6 (2B), 5 (2A).

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Transparent top view

Diagram showing pin configuration for SOT1233 package. The package is a square with pins 1 through 8. Pin 1 is at the top left, pin 8 at the top right, pin 7 at the bottom right, pin 6 at the bottom right, pin 5 at the bottom right, pin 4 at the bottom left, pin 3 at the top left, pin 2 at the top left, and pin 1 at the top left. The labels are: 1A (1), 1B (2), 2Y (3), GND (4), 8 (VCC), 7 (1Y), 6 (2B), 5 (2A).

6.2. Pin description

Table 3. Pin description

| Symbol          | Pin                                                                 |          | Description    |
|-----------------|---------------------------------------------------------------------|----------|----------------|
|                 | SOT505-2, SOT765-1, SOT833-1, SOT1089, SOT1116, SOT1203 and SOT1233 | SOT902-2 |                |
| 1A              | 1                                                                   | 7        | data input     |
| 1B              | 2                                                                   | 6        | data input     |
| 2Y              | 3                                                                   | 5        | data output    |
| GND             | 4                                                                   | 4        | ground (0 V)   |
| 2A              | 5                                                                   | 3        | data input     |
| 2B              | 6                                                                   | 2        | data input     |
| 1Y              | 7                                                                   | 1        | data output    |
| V <sub>CC</sub> | 8                                                                   | 8        | supply voltage |

## 7. Functional description

**Table 4. Function table**

*H = HIGH voltage level; L = LOW voltage level; X = don't care.*

| Input |    | Output |
|-------|----|--------|
| nA    | nB | nY     |
| L     | X  | L      |
| X     | L  | L      |
| H     | H  | H      |

## 8. Limiting values

**Table 5. 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 | +6.5           | V    |
| $V_I$     | input voltage           | [1]                               | -0.5 | +6.5           | V    |
| $V_O$     | output voltage          | Active mode [1]                   | -0.5 | $V_{CC} + 0.5$ | V    |
|           |                         | Power-down mode [1]               | -0.5 | +6.5           | V    |
| $I_{IK}$  | input clamping current  | $V_I < 0$ V                       | -50  | -              | mA   |
| $I_{OK}$  | output clamping current | $V_O < 0$ V or $V_O > V_{CC}$     | -    | $\pm 50$       | mA   |
| $I_O$     | output current          | $V_O = 0$ V to $V_{CC}$           | -    | $\pm 50$       | mA   |
| $I_{CC}$  | supply current          |                                   | -    | 100            | mA   |
| $I_{GND}$ | ground current          |                                   | -100 | -              | mA   |
| $T_{stg}$ | storage temperature     |                                   | -65  | +150           | °C   |
| $P_{tot}$ | total power dissipation | $T_{amb} = -40$ °C to +125 °C [2] | -    | 250            | mW   |
|           |                         | $T_{amb} = -40$ °C to +125 °C [3] | -    | 300            | mW   |

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

[2] For SOT505-2 (TSSOP8) packages:  $P_{tot}$  derates linearly with 4.6 mW/K above 96 °C.

For SOT765-1 (VSSOP8) packages:  $P_{tot}$  derates linearly with 4.9 mW/K above 99 °C.

For SOT833-1 (XSON8) packages:  $P_{tot}$  derates linearly with 3.1 mW/K above 68 °C.

For SOT1089 (XSON8) packages:  $P_{tot}$  derates linearly with 4.0 mW/K above 88 °C.

For SOT902-2 (XQFN8) packages:  $P_{tot}$  derates linearly with 4.1 mW/K above 89 °C.

For SOT1116 (XSON8) packages:  $P_{tot}$  derates linearly with 4.2 mW/K above 90 °C.

For SOT1203 (XSON8) packages:  $P_{tot}$  derates linearly with 3.6 mW/K above 81 °C.

[3] For SOT1233 (X2SON8) packages:  $P_{tot}$  derates linearly with 7.7 mW/K above 118 °C.

## 9. Recommended operating conditions

Table 6. Operating conditions

| Symbol              | Parameter                           | Conditions                               | Min  | Max      | Unit |
|---------------------|-------------------------------------|------------------------------------------|------|----------|------|
| $V_{CC}$            | supply voltage                      |                                          | 1.65 | 5.5      | V    |
| $V_I$               | input voltage                       |                                          | 0    | 5.5      | V    |
| $V_O$               | output voltage                      | Active mode                              | 0    | $V_{CC}$ | V    |
|                     |                                     | Power-down mode                          | 0    | 5.5      | V    |
| $T_{amb}$           | ambient temperature                 |                                          | -40  | +125     | °C   |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.65\text{ V to }2.7\text{ V}$ | -    | 20       | ns/V |
|                     |                                     | $V_{CC} = 2.7\text{ V to }5.5\text{ V}$  | -    | 10       | ns/V |

## 10. Static characteristics

Table 7. Static characteristics

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

| Symbol                                     | Parameter                 | Conditions                                                              | Min                  | Typ[1] | Max                  | Unit |
|--------------------------------------------|---------------------------|-------------------------------------------------------------------------|----------------------|--------|----------------------|------|
| $T_{amb} = -40\text{ °C to }+85\text{ °C}$ |                           |                                                                         |                      |        |                      |      |
| $V_{IH}$                                   | HIGH-level input voltage  | $V_{CC} = 1.65\text{ V to }1.95\text{ V}$                               | $0.65 \times V_{CC}$ | -      | -                    | V    |
|                                            |                           | $V_{CC} = 2.3\text{ V to }2.7\text{ V}$                                 | 1.7                  | -      | -                    | V    |
|                                            |                           | $V_{CC} = 2.7\text{ V to }3.6\text{ V}$                                 | 2.0                  | -      | -                    | V    |
|                                            |                           | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$                                 | $0.7 \times V_{CC}$  | -      | -                    | V    |
| $V_{IL}$                                   | LOW-level input voltage   | $V_{CC} = 1.65\text{ V to }1.95\text{ V}$                               | -                    | -      | $0.35 \times V_{CC}$ | V    |
|                                            |                           | $V_{CC} = 2.3\text{ V to }2.7\text{ V}$                                 | -                    | -      | 0.7                  | V    |
|                                            |                           | $V_{CC} = 2.7\text{ V to }3.6\text{ V}$                                 | -                    | -      | 0.8                  | V    |
|                                            |                           | $V_{CC} = 4.5\text{ V to }5.5\text{ V}$                                 | -                    | -      | $0.3 \times V_{CC}$  | V    |
| $V_{OH}$                                   | HIGH-level output voltage | $V_I = V_{IH}\text{ or }V_{IL}$                                         |                      |        |                      |      |
|                                            |                           | $I_O = -100\text{ }\mu\text{A}; V_{CC} = 1.65\text{ V to }5.5\text{ V}$ | $V_{CC} - 0.1$       | -      | -                    | V    |
|                                            |                           | $I_O = -4\text{ mA}; V_{CC} = 1.65\text{ V}$                            | 1.2                  | 1.53   | -                    | V    |
|                                            |                           | $I_O = -8\text{ mA}; V_{CC} = 2.3\text{ V}$                             | 1.9                  | 2.13   | -                    | V    |
|                                            |                           | $I_O = -12\text{ mA}; V_{CC} = 2.7\text{ V}$                            | 2.2                  | 2.50   | -                    | V    |
|                                            |                           | $I_O = -24\text{ mA}; V_{CC} = 3.0\text{ V}$                            | 2.3                  | 2.60   | -                    | V    |
|                                            |                           | $I_O = -32\text{ mA}; V_{CC} = 4.5\text{ V}$                            | 3.8                  | 4.10   | -                    | V    |
| $V_{OL}$                                   | LOW-level output voltage  | $V_I = V_{IH}\text{ or }V_{IL}$                                         |                      |        |                      |      |
|                                            |                           | $I_O = 100\text{ }\mu\text{A}; V_{CC} = 1.65\text{ V to }5.5\text{ V}$  | -                    | -      | 0.1                  | V    |
|                                            |                           | $I_O = 4\text{ mA}; V_{CC} = 1.65\text{ V}$                             | -                    | 0.08   | 0.45                 | V    |
|                                            |                           | $I_O = 8\text{ mA}; V_{CC} = 2.3\text{ V}$                              | -                    | 0.14   | 0.3                  | V    |
|                                            |                           | $I_O = 12\text{ mA}; V_{CC} = 2.7\text{ V}$                             | -                    | 0.19   | 0.4                  | V    |
|                                            |                           | $I_O = 24\text{ mA}; V_{CC} = 3.0\text{ V}$                             | -                    | 0.37   | 0.55                 | V    |
|                                            |                           | $I_O = 32\text{ mA}; V_{CC} = 4.5\text{ V}$                             | -                    | 0.43   | 0.55                 | V    |

| Symbol                                                                                               | Parameter                 | Conditions                                                                                                     | Min                  | Typ[1]    | Max                  | Unit          |
|------------------------------------------------------------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------|----------------------|-----------|----------------------|---------------|
| $I_I$                                                                                                | input leakage current     | $V_I = 5.5 \text{ V}$ or GND; $V_{CC} = 0 \text{ V}$ to $5.5 \text{ V}$                                        | -                    | $\pm 0.1$ | $\pm 1$              | $\mu\text{A}$ |
| $I_{OFF}$                                                                                            | power-off leakage current | $V_I$ or $V_O = 5.5 \text{ V}$ ; $V_{CC} = 0 \text{ V}$                                                        | -                    | $\pm 0.1$ | $\pm 2$              | $\mu\text{A}$ |
| $I_{CC}$                                                                                             | supply current            | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 1.65 \text{ V}$ to $5.5 \text{ V}$ ; $I_O = 0 \text{ A}$            | -                    | 0.1       | 4                    | $\mu\text{A}$ |
| $\Delta I_{CC}$                                                                                      | additional supply current | per pin; $V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 2.3 \text{ V}$ to $5.5 \text{ V}$ | -                    | 5         | 500                  | $\mu\text{A}$ |
| $C_i$                                                                                                | input capacitance         |                                                                                                                | -                    | 2.5       | -                    | pF            |
| <b><math>T_{amb} = -40 \text{ }^\circ\text{C}</math> to <math>+125 \text{ }^\circ\text{C}</math></b> |                           |                                                                                                                |                      |           |                      |               |
| $V_{IH}$                                                                                             | HIGH-level input voltage  | $V_{CC} = 1.65 \text{ V}$ to $1.95 \text{ V}$                                                                  | $0.65 \times V_{CC}$ | -         | -                    | V             |
|                                                                                                      |                           | $V_{CC} = 2.3 \text{ V}$ to $2.7 \text{ V}$                                                                    | 1.7                  | -         | -                    | V             |
|                                                                                                      |                           | $V_{CC} = 2.7 \text{ V}$ to $3.6 \text{ V}$                                                                    | 2.0                  | -         | -                    | V             |
|                                                                                                      |                           | $V_{CC} = 4.5 \text{ V}$ to $5.5 \text{ V}$                                                                    | $0.7 \times V_{CC}$  | -         | -                    | V             |
| $V_{IL}$                                                                                             | LOW-level input voltage   | $V_{CC} = 1.65 \text{ V}$ to $1.95 \text{ V}$                                                                  | -                    | -         | $0.35 \times V_{CC}$ | V             |
|                                                                                                      |                           | $V_{CC} = 2.3 \text{ V}$ to $2.7 \text{ V}$                                                                    | -                    | -         | 0.7                  | V             |
|                                                                                                      |                           | $V_{CC} = 2.7 \text{ V}$ to $3.6 \text{ V}$                                                                    | -                    | -         | 0.8                  | V             |
|                                                                                                      |                           | $V_{CC} = 4.5 \text{ V}$ to $5.5 \text{ V}$                                                                    | -                    | -         | $0.3 \times V_{CC}$  | V             |
| $V_{OH}$                                                                                             | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$                                                                                     |                      |           |                      |               |
|                                                                                                      |                           | $I_O = -100 \mu\text{A}$ ; $V_{CC} = 1.65 \text{ V}$ to $5.5 \text{ V}$                                        | $V_{CC} - 0.1$       | -         | -                    | V             |
|                                                                                                      |                           | $I_O = -4 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$                                                              | 0.95                 | -         | -                    | V             |
|                                                                                                      |                           | $I_O = -8 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$                                                               | 1.7                  | -         | -                    | V             |
|                                                                                                      |                           | $I_O = -12 \text{ mA}$ ; $V_{CC} = 2.7 \text{ V}$                                                              | 1.9                  | -         | -                    | V             |
|                                                                                                      |                           | $I_O = -24 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$                                                              | 2.0                  | -         | -                    | V             |
|                                                                                                      |                           | $I_O = -32 \text{ mA}$ ; $V_{CC} = 4.5 \text{ V}$                                                              | 3.4                  | -         | -                    | V             |
| $V_{OL}$                                                                                             | LOW-level output voltage  | $V_I = V_{IH}$ or $V_{IL}$                                                                                     |                      |           |                      |               |
|                                                                                                      |                           | $I_O = 100 \mu\text{A}$ ; $V_{CC} = 1.65 \text{ V}$ to $5.5 \text{ V}$                                         | -                    | -         | 0.1                  | V             |
|                                                                                                      |                           | $I_O = 4 \text{ mA}$ ; $V_{CC} = 1.65 \text{ V}$                                                               | -                    | -         | 0.70                 | V             |
|                                                                                                      |                           | $I_O = 8 \text{ mA}$ ; $V_{CC} = 2.3 \text{ V}$                                                                | -                    | -         | 0.45                 | V             |
|                                                                                                      |                           | $I_O = 12 \text{ mA}$ ; $V_{CC} = 2.7 \text{ V}$                                                               | -                    | -         | 0.60                 | V             |
|                                                                                                      |                           | $I_O = 24 \text{ mA}$ ; $V_{CC} = 3.0 \text{ V}$                                                               | -                    | -         | 0.80                 | V             |
|                                                                                                      |                           | $I_O = 32 \text{ mA}$ ; $V_{CC} = 4.5 \text{ V}$                                                               | -                    | -         | 0.80                 | V             |
| $I_I$                                                                                                | input leakage current     | $V_I = 5.5 \text{ V}$ or GND; $V_{CC} = 0 \text{ V}$ to $5.5 \text{ V}$                                        | -                    | -         | $\pm 1$              | $\mu\text{A}$ |
| $I_{OFF}$                                                                                            | power-off leakage current | $V_I$ or $V_O = 5.5 \text{ V}$ ; $V_{CC} = 0 \text{ V}$                                                        | -                    | -         | $\pm 2$              | $\mu\text{A}$ |
| $I_{CC}$                                                                                             | supply current            | $V_I = 5.5 \text{ V}$ or GND;<br>$V_{CC} = 1.65 \text{ V}$ to $5.5 \text{ V}$ ; $I_O = 0 \text{ A}$            | -                    | -         | 4                    | $\mu\text{A}$ |
| $\Delta I_{CC}$                                                                                      | additional supply current | per pin; $V_I = V_{CC} - 0.6 \text{ V}$ ; $I_O = 0 \text{ A}$ ;<br>$V_{CC} = 2.3 \text{ V}$ to $5.5 \text{ V}$ | -                    | -         | 500                  | $\mu\text{A}$ |

[1] All typical values are measured at  $T_{amb} = 25 \text{ }^\circ\text{C}$ .

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

Voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 9.

| Symbol   | Parameter                     | Conditions                                   | -40 °C to +85 °C |        |     | -40 °C to +125 °C |      | Unit |
|----------|-------------------------------|----------------------------------------------|------------------|--------|-----|-------------------|------|------|
|          |                               |                                              | Min              | Typ[1] | Max | Min               | Max  |      |
| $t_{pd}$ | propagation delay             | nA, nB to nY; see Fig. 8 [2]                 |                  |        |     |                   |      |      |
|          |                               | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$ | 1.0              | 3.2    | 9.0 | 1.0               | 11.3 | ns   |
|          |                               | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$   | 0.5              | 2.2    | 5.1 | 0.5               | 6.4  | ns   |
|          |                               | $V_{CC} = 2.7 \text{ V}$                     | 1.0              | 2.5    | 5.3 | 1.0               | 6.7  | ns   |
|          |                               | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$   | 0.5              | 2.1    | 4.7 | 0.5               | 5.9  | ns   |
|          |                               | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$   | 0.5              | 1.7    | 3.8 | 0.5               | 4.8  | ns   |
| $C_{PD}$ | power dissipation capacitance | per gate; $V_I = \text{GND to } V_{CC}$ [3]  | -                | 14.4   | -   | -                 | -    | pF   |

[1] Typical values are measured at nominal  $V_{CC}$  and at  $T_{amb} = 25 \text{ °C}$ .

[2]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .

[3]  $C_{PD}$  is used to determine the dynamic power dissipation ( $P_D$  in  $\mu\text{W}$ ).

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

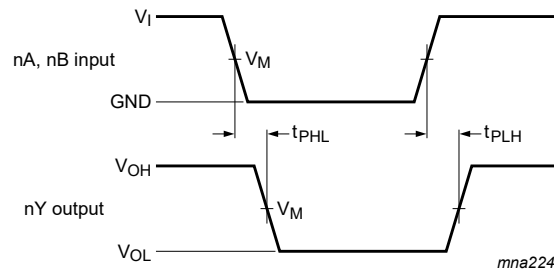
$C_L$  = output load capacitance in pF;

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

$N$  = number of inputs switching;

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

### 11.1. Waveforms and test circuit



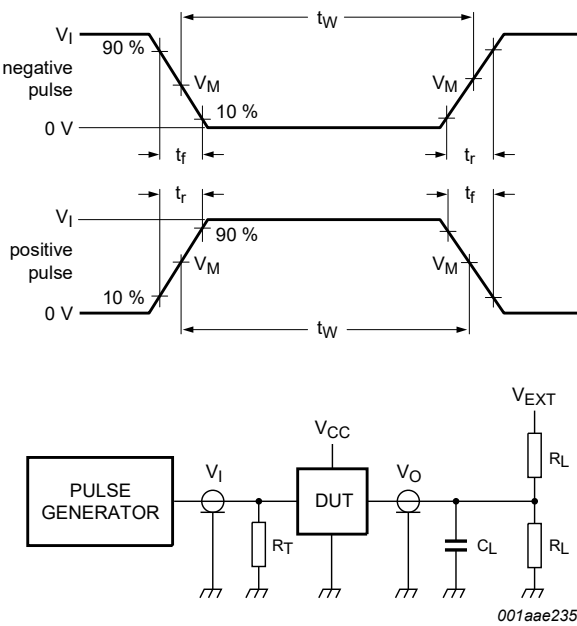
Measurement points are given in Table 9.

$V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

**Fig. 8. Input (nA, nB) to output (nY) propagation delays**

**Table 9. Measurement points**

| Supply voltage   | Input               | Output              |
|------------------|---------------------|---------------------|
| $V_{CC}$         | $V_M$               | $V_M$               |
| 1.65 V to 1.95 V | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| 2.3 V to 2.7 V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |
| 2.7 V            | 1.5 V               | 1.5 V               |
| 3.0 V to 3.6 V   | 1.5 V               | 1.5 V               |
| 4.5 V to 5.5 V   | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ |



Test data is given in [Table 10](#).  
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  
 $V_{EXT}$  = Test voltage for switching times

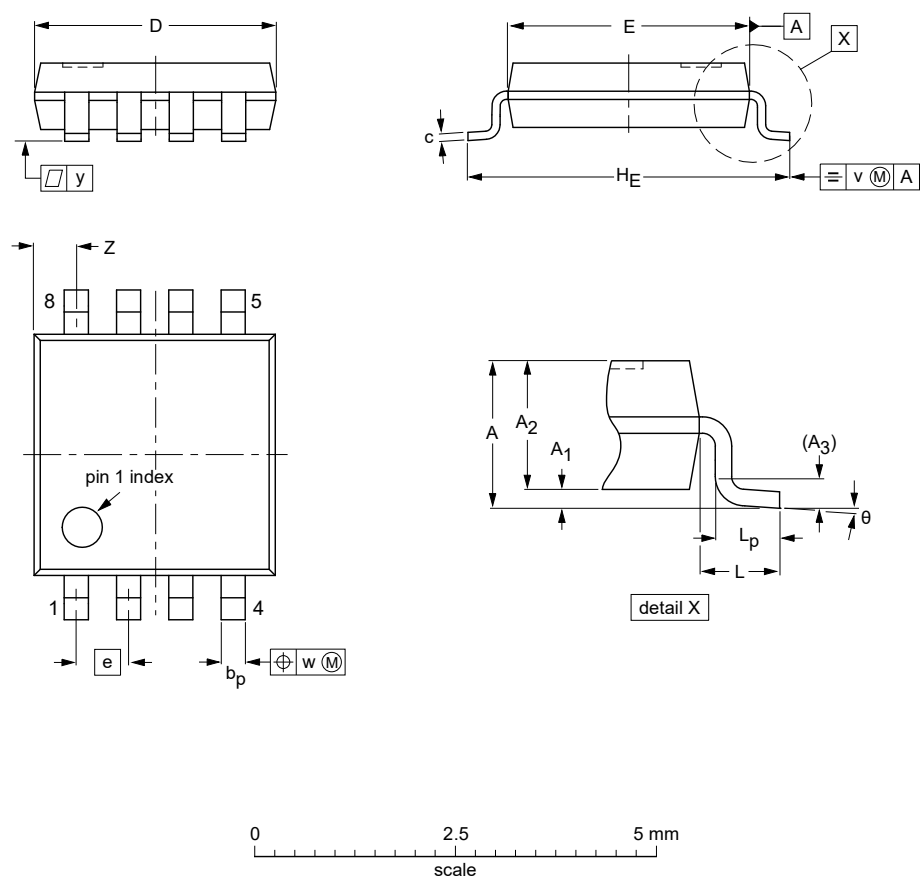
Fig. 9. Test circuit for measuring switching times

Table 10. Test data

| Supply voltage   | Input    |               | Load  |              | $V_{EXT}$          |
|------------------|----------|---------------|-------|--------------|--------------------|
| $V_{CC}$         | $V_I$    | $t_r, t_f$    | $C_L$ | $R_L$        | $t_{PLH}, t_{PHL}$ |
| 1.65 V to 1.95 V | $V_{CC}$ | $\leq 2.0$ ns | 30 pF | 1 k $\Omega$ | open               |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2.0$ ns | 30 pF | 500 $\Omega$ | open               |
| 2.7 V            | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               |
| 3.0 V to 3.6 V   | 2.7 V    | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               |
| 4.5 V to 5.5 V   | $V_{CC}$ | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               |

12. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm    SOT505-2



DIMENSIONS (mm are the original dimensions)

| UNIT | A<br>max. | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c            | D <sup>(1)</sup> | E <sup>(1)</sup> | e    | H <sub>E</sub> | L   | L <sub>p</sub> | v   | w    | y   | Z <sup>(1)</sup> | θ        |
|------|-----------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|------|----------------|-----|----------------|-----|------|-----|------------------|----------|
| mm   | 1.1       | 0.15<br>0.00   | 0.95<br>0.75   | 0.25           | 0.38<br>0.22   | 0.18<br>0.08 | 3.1<br>2.9       | 3.1<br>2.9       | 0.65 | 4.1<br>3.9     | 0.5 | 0.47<br>0.33   | 0.2 | 0.13 | 0.1 | 0.70<br>0.35     | 8°<br>0° |

Note

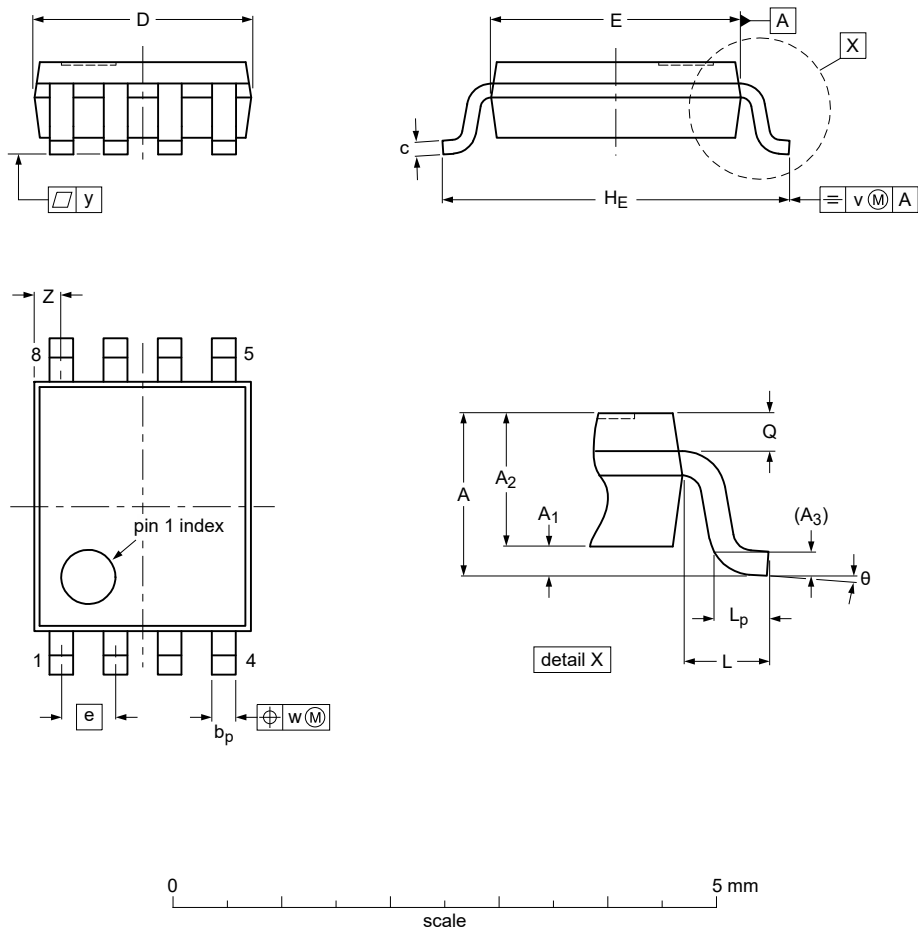
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

| OUTLINE<br>VERSION | REFERENCES |       |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE |
|--------------------|------------|-------|-------|--|------------------------|------------|
|                    | IEC        | JEDEC | JEITA |  |                        |            |
| SOT505-2           |            | ---   |       |  |                        | 02-01-16   |

Fig. 10. Package outline SOT505-2 (TSSOP8)

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1



Dimensions (mm are the original dimensions)

| Unit | A <sub>max.</sub> | A <sub>1</sub> | A <sub>2</sub> | A <sub>3</sub> | b <sub>p</sub> | c    | D <sup>(1)</sup> | E <sup>(2)</sup> | e   | H <sub>E</sub> | L   | L <sub>p</sub> | Q    | v   | w    | y   | Z <sup>(1)</sup> | θ  |
|------|-------------------|----------------|----------------|----------------|----------------|------|------------------|------------------|-----|----------------|-----|----------------|------|-----|------|-----|------------------|----|
| mm   | max               | 0.15           | 0.85           |                | 0.27           | 0.23 | 2.1              | 2.4              |     | 3.2            |     | 0.40           | 0.21 |     |      |     | 0.4              | 8° |
|      | nom               | 1              |                | 0.12           |                |      |                  |                  | 0.5 |                | 0.4 |                |      | 0.2 | 0.08 | 0.1 |                  |    |
|      | min               |                | 0.00           | 0.60           | 0.17           | 0.08 | 1.9              | 2.2              |     | 3.0            |     | 0.15           | 0.19 |     |      |     | 0.1              | 0° |

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

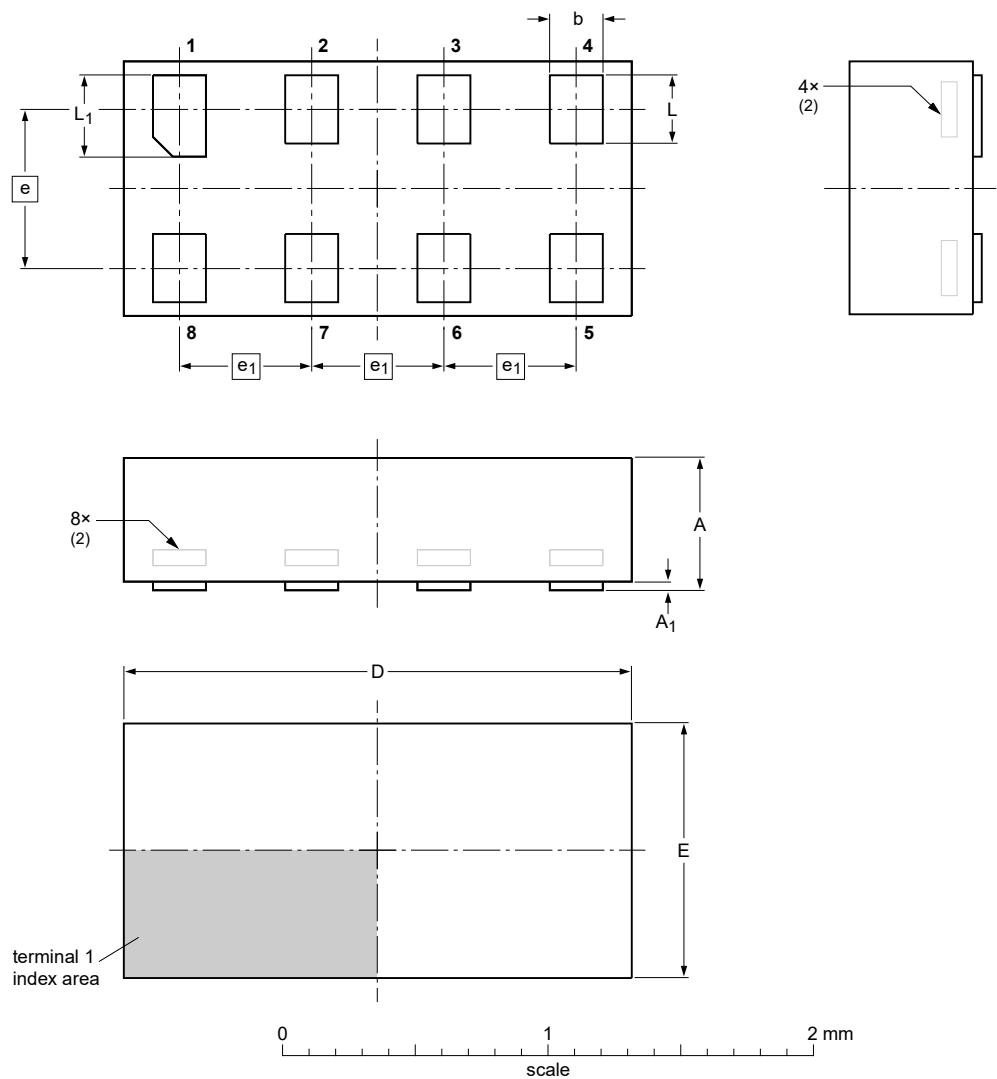
sot765-1\_po

| Outline version | References |        |       |  | European projection | Issue date             |
|-----------------|------------|--------|-------|--|---------------------|------------------------|
|                 | IEC        | JEDEC  | JEITA |  |                     |                        |
| SOT765-1        |            | MO-187 |       |  |                     | -07-06-02-<br>16-05-31 |

Fig. 11. Package outline SOT765-1 (VSSOP8)

XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A <sup>(1)</sup><br>max | A <sub>1</sub><br>max | b            | D          | E            | e   | e <sub>1</sub> | L            | L <sub>1</sub> |
|------|-------------------------|-----------------------|--------------|------------|--------------|-----|----------------|--------------|----------------|
| mm   | 0.5                     | 0.04                  | 0.25<br>0.17 | 2.0<br>1.9 | 1.05<br>0.95 | 0.6 | 0.5            | 0.35<br>0.27 | 0.40<br>0.32   |

- Notes
- 1. Including plating thickness.
  - 2. Can be visible in some manufacturing processes.

| OUTLINE<br>VERSION | REFERENCES |        |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE             |
|--------------------|------------|--------|-------|--|------------------------|------------------------|
|                    | IEC        | JEDEC  | JEITA |  |                        |                        |
| SOT833-1           | ---        | MO-252 | ---   |  |                        | -07-11-14-<br>07-12-07 |

Fig. 12. Package outline SOT833-1 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1 x 0.5 mm

SOT1089

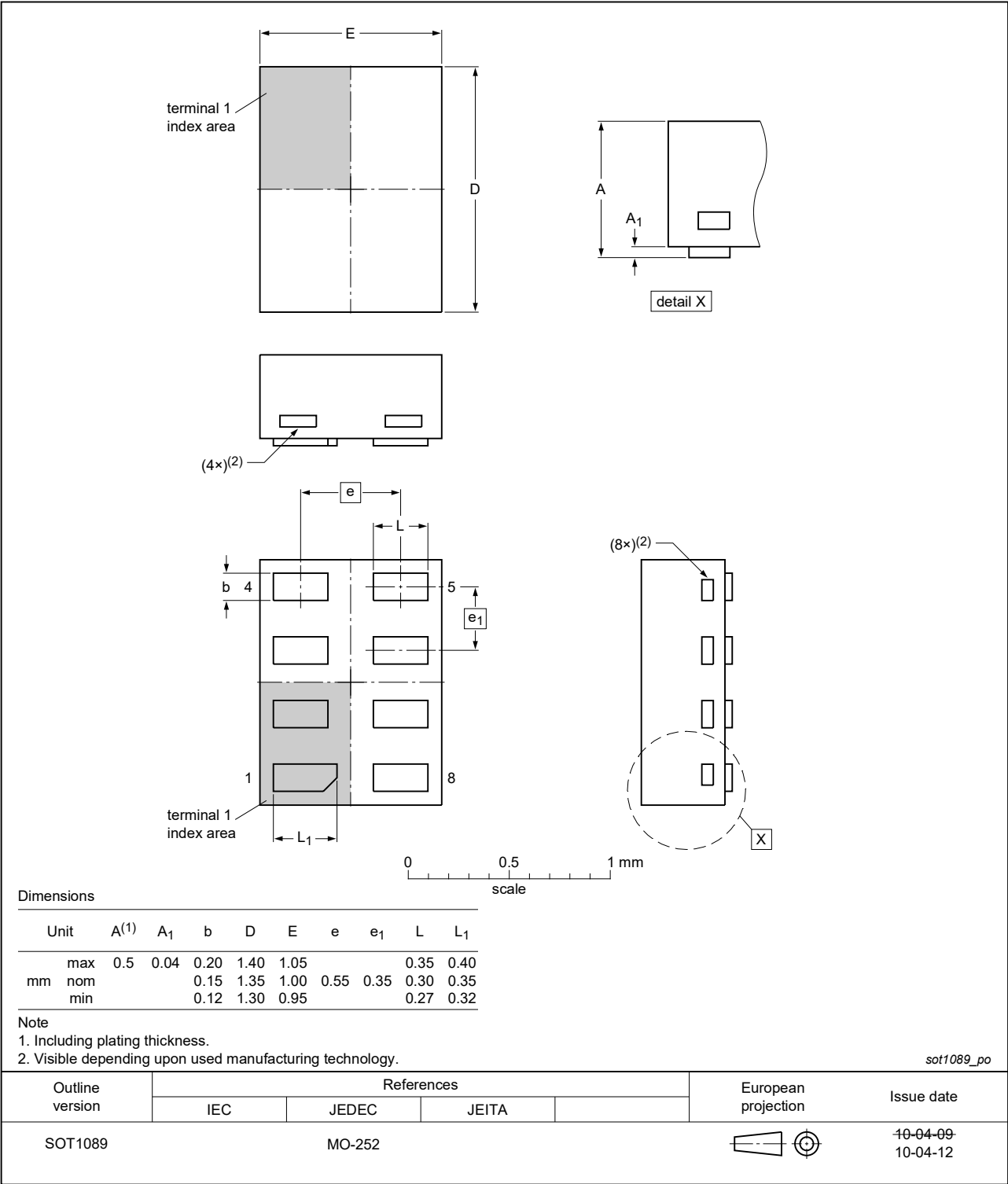


Fig. 13. Package outline SOT1089 (XSON8)

XQFN8: plastic, extremely thin quad flat package; no leads;  
8 terminals; body 1.6 x 1.6 x 0.5 mm

SOT902-2

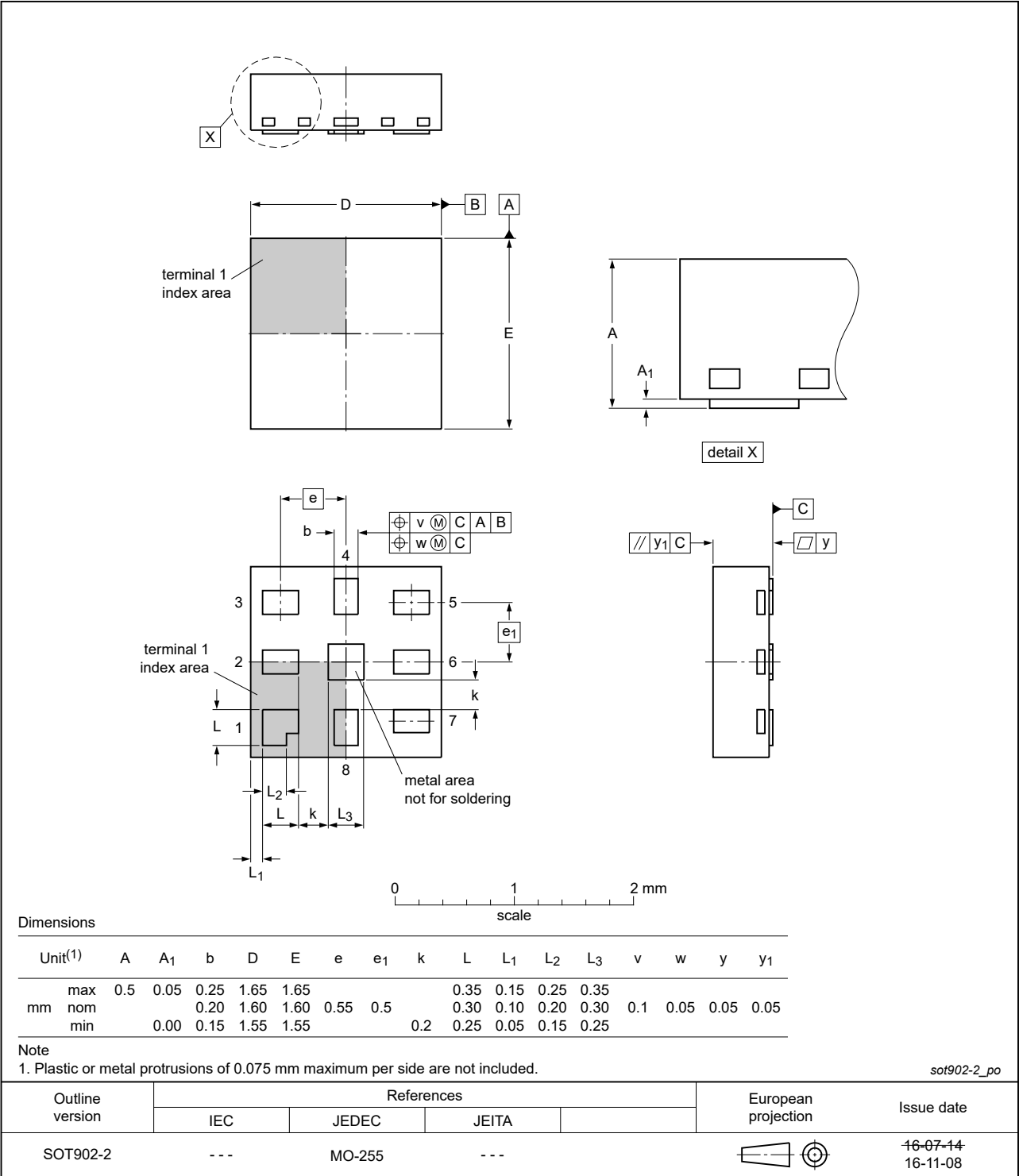
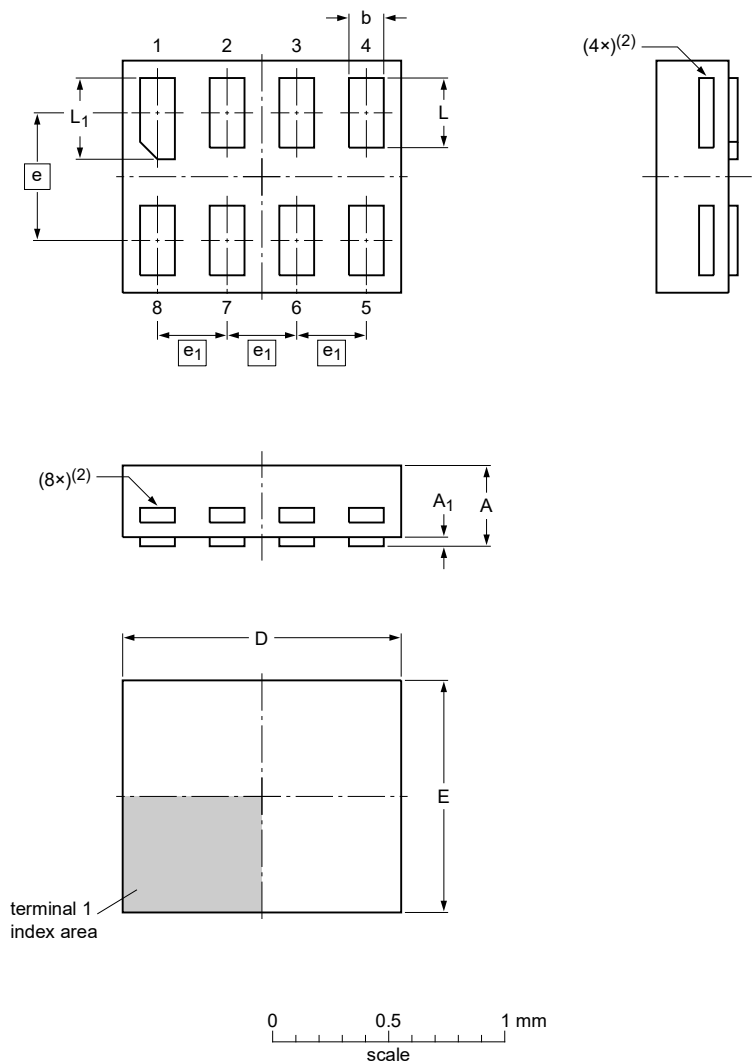


Fig. 14. Package outline SOT902-2 (XQFN8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.2 x 1.0 x 0.35 mm

SOT1116



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| max  | 0.35             | 0.04           | 0.20 | 1.25 | 1.05 |      |                | 0.35 | 0.40           |
| mm   | nom              |                | 0.15 | 1.20 | 1.00 | 0.55 | 0.3            | 0.30 | 0.35           |
|      | min              |                | 0.12 | 1.15 | 0.95 |      |                | 0.27 | 0.32           |

Note

- 1. Including plating thickness.
- 2. Visible depending upon used manufacturing technology.

sot1116\_po

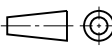
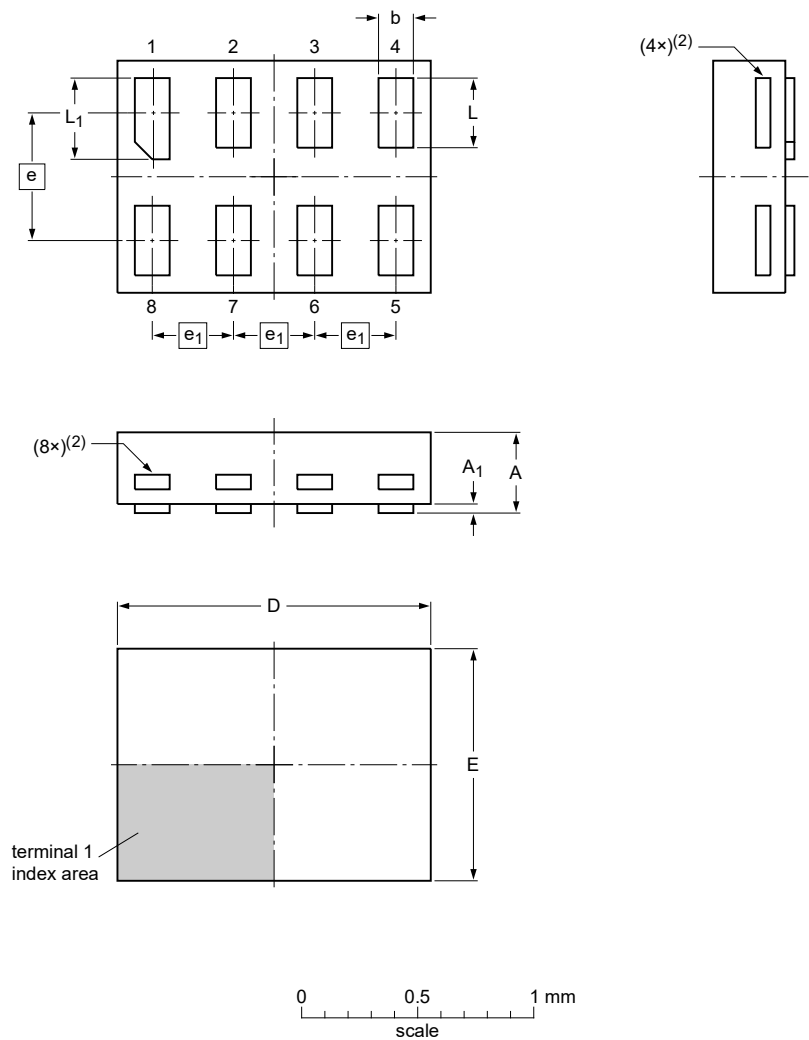
| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT1116         |            |       |       |  |  | 10-04-02<br>10-04-07 |

Fig. 15. Package outline SOT1116 (XSON8)

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1.0 x 0.35 mm

SOT1203



Dimensions

| Unit | A <sup>(1)</sup> | A <sub>1</sub> | b    | D    | E    | e    | e <sub>1</sub> | L    | L <sub>1</sub> |
|------|------------------|----------------|------|------|------|------|----------------|------|----------------|
| mm   | max              | 0.35           | 0.04 | 0.20 | 1.40 | 1.05 |                | 0.35 | 0.40           |
|      | nom              |                |      | 0.15 | 1.35 | 1.00 | 0.55           | 0.30 | 0.35           |
|      | min              |                |      | 0.12 | 1.30 | 0.95 |                | 0.27 | 0.32           |

Note

- 1. Including plating thickness.
- 2. Visible depending upon used manufacturing technology.

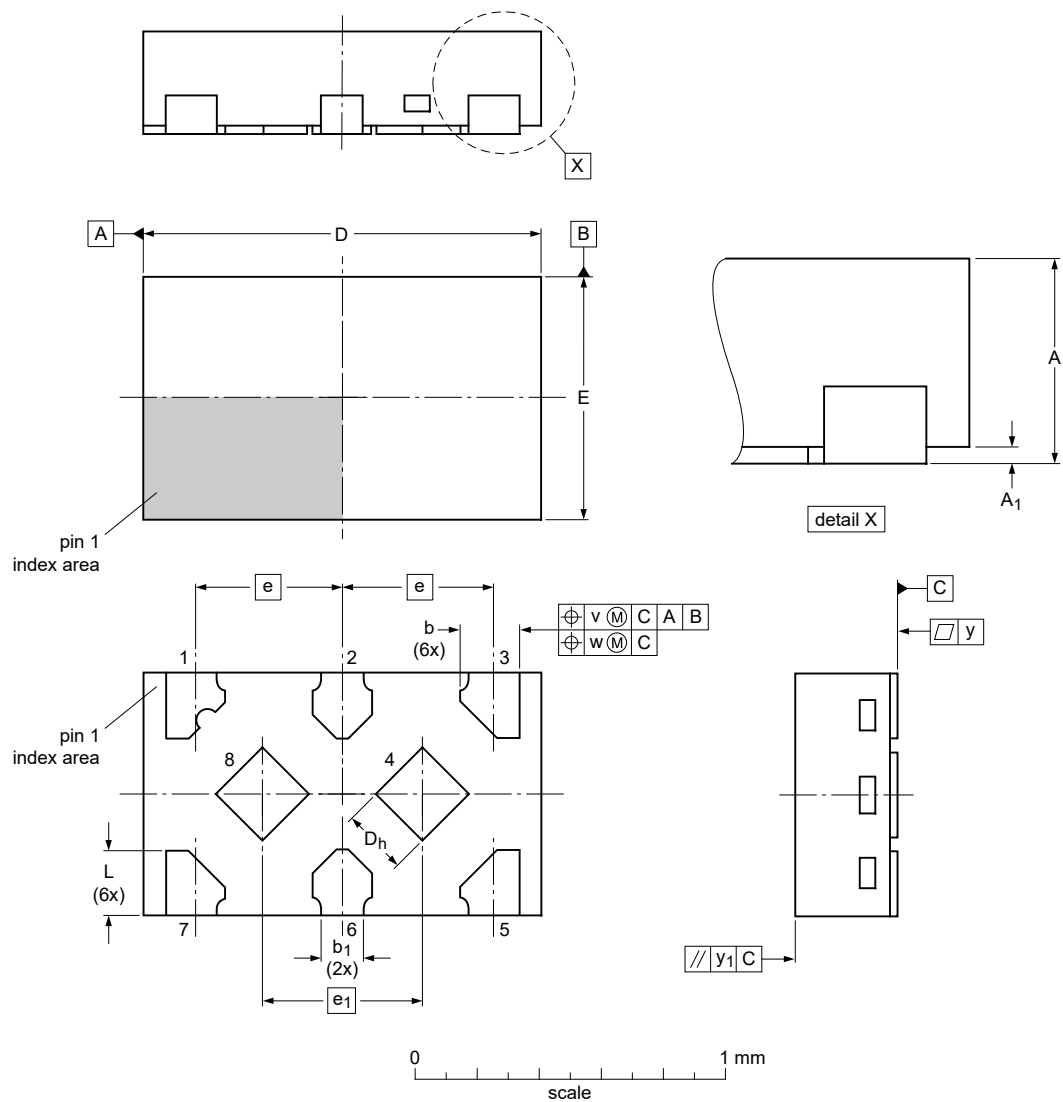
sot1203\_po

| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT1203         |            |       |       |  |  | 10-04-02<br>10-04-06 |

Fig. 16. Package outline SOT1203 (XSON8)

X2SON8: plastic thermal enhanced extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 0.8 x 0.35 mm

SOT1233



Dimensions (mm are the original dimensions)

| Unit | A    | A <sub>1</sub> | b    | b <sub>1</sub> | D    | D <sub>n</sub> | E    | e   | e <sub>1</sub> | L    | v   | w    | y    | y <sub>1</sub> |
|------|------|----------------|------|----------------|------|----------------|------|-----|----------------|------|-----|------|------|----------------|
| max  | 0.35 | 0.04           | 0.25 |                | 1.40 | 0.27           | 0.85 |     |                | 0.27 |     |      |      |                |
| nom  | 0.32 |                | 0.20 | 0.15           | 1.35 | 0.22           | 0.80 | 0.5 | 0.54           | 0.22 | 0.1 | 0.05 | 0.05 | 0.05           |
| min  | 0.30 | 0.00           | 0.15 | (ref)          | 1.30 | 0.17           | 0.75 |     |                | 0.17 |     |      |      |                |

sot1233\_po

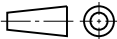
| Outline version | References |       |       |  | European projection                                                                   | Issue date           |
|-----------------|------------|-------|-------|--|---------------------------------------------------------------------------------------|----------------------|
|                 | IEC        | JEDEC | JEITA |  |                                                                                       |                      |
| SOT1233         |            | ---   |       |  |  | 16-04-21<br>17-01-05 |

Fig. 17. Package outline SOT1233 (X2SON8)

## 13. Abbreviations

Table 11. Abbreviations

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

## 14. Revision history

Table 12. Revision history

| Document ID    | Release date                                                                                                                                                                                                                                                                                                                 | Data sheet status     | Change notice | Supersedes     |
|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|---------------|----------------|
| 74LVC2G08 v.16 | 20190729                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.15 |
| Modifications: | <ul style="list-style-type: none"> <li>Type number 74LVC2G08GD (SOT996-2/XSON8) removed.</li> <li><a href="#">Table 5</a>: <math>P_{tot}</math> total power dissipation and derating values updated.</li> </ul>                                                                                                              |                       |               |                |
| 74LVC2G08 v.15 | 20170703                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.14 |
| Modifications: | <ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li><a href="#">Fig. 17</a>: Package outline drawing for SOT1233 has changed.</li> </ul> |                       |               |                |
| 74LVC2G08 v.14 | 20161214                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.13 |
| Modifications: | <ul style="list-style-type: none"> <li><a href="#">Table 7</a>: The maximum limits for leakage current and supply current have changed.</li> </ul>                                                                                                                                                                           |                       |               |                |
| 74LVC2G08 v.13 | 20161028                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.12 |
| Modifications: | <ul style="list-style-type: none"> <li>Added type number 74LVC2G08GX (SOT1233/X2SON8)</li> </ul>                                                                                                                                                                                                                             |                       |               |                |
| 74LVC2G08 v.12 | 20130402                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.11 |
| Modifications: | <ul style="list-style-type: none"> <li>For type number 74LVC2G08GD XSON8U has changed to XSON8.</li> </ul>                                                                                                                                                                                                                   |                       |               |                |
| 74LVC2G08 v.11 | 20120622                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.10 |
| Modifications: | <ul style="list-style-type: none"> <li>For type number 74LVC2G08GM the SOT code has changed to SOT902-2.</li> </ul>                                                                                                                                                                                                          |                       |               |                |
| 74LVC2G08 v.10 | 20111201                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.9  |
| Modifications: | <ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>                                                                                                                                                                                                                                                       |                       |               |                |
| 74LVC2G08 v.9  | 20101020                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.8  |
| 74LVC2G08 v.8  | 20080609                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.7  |
| 74LVC2G08 v.7  | 20080303                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.6  |
| 74LVC2G08 v.6  | 20070904                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.5  |
| 74LVC2G08 v.5  | 20060515                                                                                                                                                                                                                                                                                                                     | Product data sheet    | -             | 74LVC2G08 v.4  |
| 74LVC2G08 v.4  | 20050201                                                                                                                                                                                                                                                                                                                     | Product specification | -             | 74LVC2G08 v.3  |
| 74LVC2G08 v.3  | 20040915                                                                                                                                                                                                                                                                                                                     | Product specification | -             | 74LVC2G08 v.2  |
| 74LVC2G08 v.2  | 20031020                                                                                                                                                                                                                                                                                                                     | Product specification | -             | 74LVC2G08 v.1  |
| 74LVC2G08 v.1  | 20030825                                                                                                                                                                                                                                                                                                                     | Product specification | -             | -              |

## 15. Legal information

### Data sheet status

| Document status<br>[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".
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С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



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