

# 74LVC2G3157-Q100

Dual 10  $\Omega$  single-pole double-throw analog switch

Rev. 1 — 29 April 2019

Product data sheet

## 1. General description

The 74LVC2G3157-Q100 is a dual low-ohmic single-pole double-throw analog switch suitable for use as an analog or digital 2:1 multiplexer/demultiplexer. Each switch has a digital select input (nS), two independent inputs/outputs (nY0 and nY1) and a common input/output (nZ).

Schmitt trigger action at the select inputs makes the circuit tolerant of slower input rise and fall times across the entire  $V_{CC}$  range from 1.65 V to 5.5 V.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

## 2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$
- Wide supply voltage range from 1.65 V to 5.5 V
- Very low ON resistance:
  - 10.4  $\Omega$  (typical) at  $V_{CC} = 2.7\text{ V}$
  - 7.8  $\Omega$  (typical) at  $V_{CC} = 3.3\text{ V}$
  - 6.2  $\Omega$  (typical) at  $V_{CC} = 5\text{ V}$
- Switch current capability of 32 mA
- Break-before-make switching
- High noise immunity
- CMOS low power consumption
- TTL interface compatibility at 3.3 V
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- ESD protection:
  - MIL-STD-883, method 3015 exceeds 2000 V
  - HBM ANSI/ESDA/JEDEC JS-001 Class 2 exceeds 2 kV
  - MM JESD22-A115-C exceeds 200 V (C = 200 pF; R = 0  $\Omega$ )
- Select input accepts voltages up to 5.5 V

## 3. Ordering information

Table 1. Ordering information

| Type number        | Package   |         |  |          |
|--------------------|---|---------|--|----------|
|                    | Temperature range   | Name    | Description  | Version  |
| 74LVC2G3157DP-Q100 | $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$ | TSSOP10 | plastic thin shrink small outline package; 10 leads; body width 3 mm | SOT552-1 |

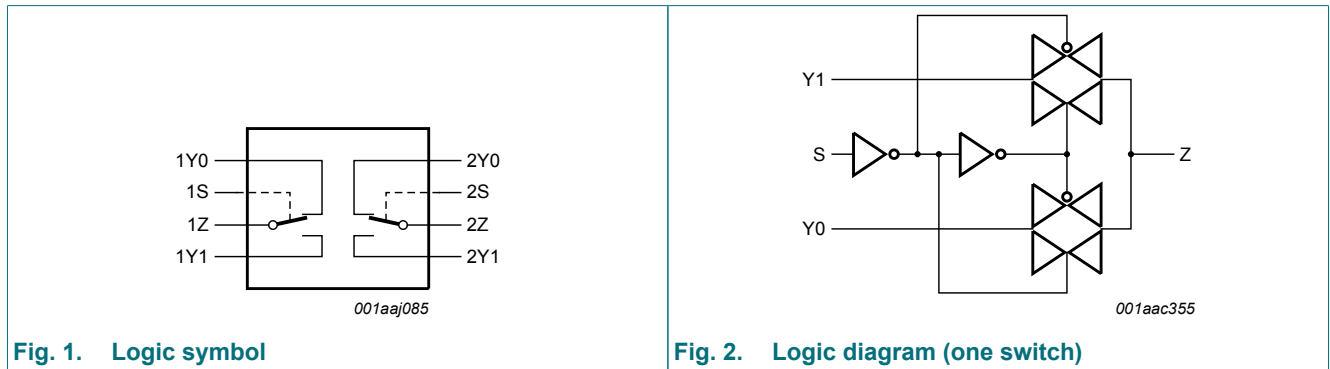
## 4. Marking

Table 2. Marking codes

| Type number        | Marking code[1] |
|--------------------|-----------------|
| 74LVC2G3157DP-Q100 | YJ              |

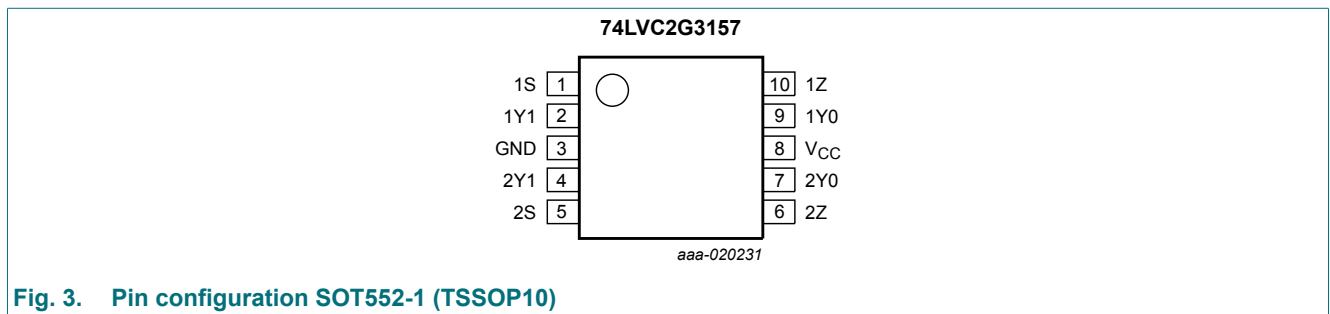
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

## 5. Functional diagram



## 6. Pinning information

### 6.1. Pinning



## 6.2. Pin description

Table 3. Pin description

| Symbol          | Pin | Description                 |
|-----------------|-----|-----------------------------|
| 1S              | 1   | select input                |
| 1Y1             | 2   | independent input or output |
| GND             | 3   | ground (0 V)                |
| 2Y1             | 4   | independent input or output |
| 2S              | 5   | select input                |
| 2Z              | 6   | common output or input      |
| 2Y0             | 7   | independent input or output |
| V <sub>CC</sub> | 8   | supply voltage              |
| 1Y0             | 9   | independent input or output |
| 1Z              | 10  | common output or input      |

## 7. Functional description

Table 4. Function table

H = HIGH voltage level; L = LOW voltage level.

| Input nS | Channel on |
|----------|------------|
| L        | nY0        |
| H        | nY1        |

## 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 <sub>CC</sub>  | supply voltage          |   | -0.5 | +6.5                  | V    |
| V <sub>I</sub>   | input voltage           | [1]   | -0.5 | +6.5                  | V    |
| I <sub>IK</sub>  | input clamping current  | V <sub>I</sub> < -0.5 V   | -50  | -                     | mA   |
| I <sub>SK</sub>  | switch clamping current | V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V   | -    | ±50                   | mA   |
| V <sub>SW</sub>  | switch voltage          | enable and disable mode [2]   | -0.5 | V <sub>CC</sub> + 0.5 | V    |
| I <sub>SW</sub>  | switch current          | V <sub>SW</sub> > -0.5 V or V <sub>SW</sub> < V <sub>CC</sub> + 0.5 V | -    | ±50                   | mA   |
| I <sub>CC</sub>  | supply current          |   | -    | 100                   | mA   |
| I <sub>GND</sub> | ground current          |   | -100 | -                     | mA   |
| T <sub>stg</sub> | storage temperature     |   | -65  | +150                  | °C   |
| P <sub>tot</sub> | total power dissipation | T <sub>amb</sub> = -40 °C to +125 °C [3]                              | -    | 250                   | mW   |

[1] The minimum input voltage rating may be exceeded if the input current rating is observed.

[2] The minimum and maximum switch voltage ratings may be exceeded if the switch clamping current rating is observed.

[3] For TSSOP10 package: above 120°C the value of P<sub>tot</sub> derates linearly with 8.3 mW/K.

## 9. Recommended operating conditions

Table 6. Recommended operating conditions

| Symbol              | Parameter                           | Conditions                                      | Min  | Typ | Max      | Unit               |
|---------------------|-------------------------------------|---|------|-----|----------|--------------------|
| $V_{CC}$            | supply voltage                      |   | 1.65 | -   | 5.5      | V                  |
| $V_I$               | input voltage                       |   | 0    | -   | 5.5      | V                  |
| $V_{SW}$            | switch voltage                      | enable and disable mode [1]                     | 0    | -   | $V_{CC}$ | V                  |
| $T_{amb}$           | ambient temperature                 |   | -40  | -   | +125     | $^{\circ}\text{C}$ |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 1.65 \text{ V to } 2.7 \text{ V}$ [2] | -    | -   | 20       | ns/V               |
|                     |                                     | $V_{CC} = 2.7 \text{ V to } 5.5 \text{ V}$ [2]  | -    | -   | 10       | ns/V               |

- [1] To avoid sinking GND current from terminal Z when switch current flows in terminal Yn, the voltage drop across the bidirectional switch must not exceed 0.4 V. If the switch current flows into terminal Z, no GND current will flow from terminal Yn. In this case, there is no limit for the voltage drop across the switch.
- [2] Applies to control signal levels.

## 10. Static characteristics

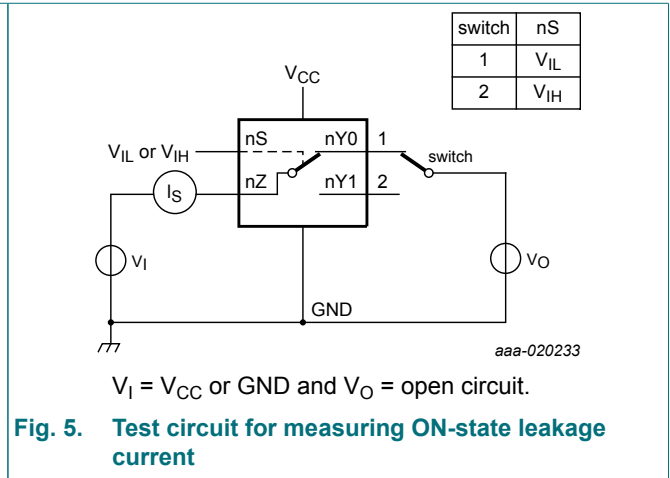
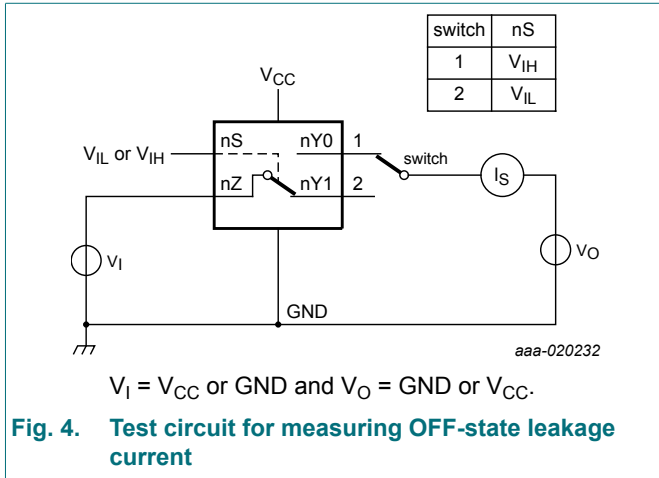
Table 7. Static characteristics

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

| Symbol          | Parameter                 | Conditions  | -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$ |           |              | -40 $^{\circ}\text{C}$ to +125 $^{\circ}\text{C}$ |              | Unit          |
|-----------------|---------------------------|---|--|-----------|--------------|---|--------------|---------------|
|                 |                           |   | Min  | Typ[1]    | Max          | Min   | Max          |               |
| $V_{IH}$        | HIGH-level input voltage  | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$  | $0.65V_{CC}$                                     | -         | -            | $0.65V_{CC}$                                      | -            | V             |
|                 |                           | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$  | 1.7  | -         | -            | 1.7   | -            | V             |
|                 |                           | $V_{CC} = 3 \text{ V to } 3.6 \text{ V}$  | 2.0  | -         | -            | 2.0   | -            | V             |
|                 |                           | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$  | $0.7V_{CC}$                                      | -         | -            | $0.7V_{CC}$                                       | -            | V             |
| $V_{IL}$        | LOW-level input voltage   | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$  | -  | -         | $0.35V_{CC}$ | -   | $0.35V_{CC}$ | V             |
|                 |                           | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$  | -  | -         | 0.7          | -   | 0.7          | V             |
|                 |                           | $V_{CC} = 3 \text{ V to } 3.6 \text{ V}$  | -  | -         | 0.8          | -   | 0.8          | V             |
|                 |                           | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$  | -  | -         | $0.3V_{CC}$  | -   | $0.3V_{CC}$  | V             |
| $I_I$           | input leakage current     | pin nS; $V_I = 5.5 \text{ V or GND}$ ;<br>$V_{CC} = 0 \text{ V to } 5.5 \text{ V}$ [2]                                  | -  | $\pm 0.1$ | $\pm 1$      | -   | $\pm 1$      | $\mu\text{A}$ |
| $I_{S(OFF)}$    | OFF-state leakage current | $V_{CC} = 5.5 \text{ V}$ ; see Fig. 4 [2]   | -  | $\pm 0.1$ | $\pm 0.2$    | -   | $\pm 0.5$    | $\mu\text{A}$ |
| $I_{S(ON)}$     | ON-state leakage current  | $V_{CC} = 5.5 \text{ V}$ ; see Fig. 5 [2]   | -  | $\pm 0.1$ | $\pm 1$      | -   | $\pm 2$      | $\mu\text{A}$ |
| $I_{CC}$        | supply current            | $V_I = 5.5 \text{ V or GND}$ ;<br>$V_{SW} = \text{GND or } V_{CC}$ ;<br>$V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$ [2] | -  | 0.1       | 4            | -   | 4            | $\mu\text{A}$ |
| $\Delta I_{CC}$ | additional supply current | pin nS; $V_I = V_{CC} - 0.6 \text{ V}$ ;<br>$V_{CC} = 5.5 \text{ V}$ ; $V_{SW} = \text{GND or } V_{CC}$ [2]             | -  | 5         | 500          | -   | 500          | $\mu\text{A}$ |
| $C_I$           | input capacitance         |   | -  | 2.5       | -            | -   | -            | pF            |
| $C_{S(OFF)}$    | OFF-state capacitance     |   | -  | 6.0       | -            | -   | -            | pF            |
| $C_{S(ON)}$     | ON-state capacitance      |   | -  | 18        | -            | -   | -            | pF            |

- [1] Typical values are measured at  $T_{amb} = 25 \text{ }^{\circ}\text{C}$ .
- [2] These typical values are measured at  $V_{CC} = 3.3 \text{ V}$

10.1. Test circuits



10.2. ON resistance

Table 8. ON resistance

At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see Fig. 7 to Fig. 12.

| Symbol    | Parameter            | Conditions                                   | -40 °C to +85 °C |        |     | -40 °C to +125 °C |     | Unit |
|-----------|----------------------|--|------------------|--------|-----|-------------------|-----|------|
|           |                      |  | Min              | Typ[1] | Max | Min               | Max |      |
| RON(peak) | ON resistance (peak) | $V_I =$ GND to $V_{CC}$ ; see Fig. 6         |                  |        |     |                   |     |      |
|           |                      | $I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V | -                | 34.0   | 130 | -                 | 195 | Ω    |
|           |                      | $I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V   | -                | 12.0   | 30  | -                 | 45  | Ω    |
|           |                      | $I_{SW} = 12$ mA; $V_{CC} = 2.7$ V           | -                | 10.4   | 25  | -                 | 38  | Ω    |
|           |                      | $I_{SW} = 24$ mA; $V_{CC} = 3.0$ V to 3.6 V  | -                | 7.8    | 20  | -                 | 30  | Ω    |
|           |                      | $I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V  | -                | 6.2    | 15  | -                 | 23  | Ω    |
| RON(rail) | ON resistance (rail) | $V_I =$ GND; see Fig. 6                      |                  |        |     |                   |     |      |
|           |                      | $I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V | -                | 8.2    | 18  | -                 | 27  | Ω    |
|           |                      | $I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V   | -                | 7.1    | 16  | -                 | 24  | Ω    |
|           |                      | $I_{SW} = 12$ mA; $V_{CC} = 2.7$ V           | -                | 6.9    | 14  | -                 | 21  | Ω    |
|           |                      | $I_{SW} = 24$ mA; $V_{CC} = 3.0$ V to 3.6 V  | -                | 6.5    | 12  | -                 | 18  | Ω    |
|           |                      | $I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V  | -                | 5.8    | 10  | -                 | 15  | Ω    |
|           |                      | $V_I = V_{CC}$ ; see Fig. 6                  |                  |        |     |                   |     |      |
|           |                      | $I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V | -                | 10.4   | 30  | -                 | 45  | Ω    |
|           |                      | $I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V   | -                | 7.6    | 20  | -                 | 30  | Ω    |
|           |                      | $I_{SW} = 12$ mA; $V_{CC} = 2.7$ V           | -                | 7.0    | 18  | -                 | 27  | Ω    |
|           |                      | $I_{SW} = 24$ mA; $V_{CC} = 3.0$ V to 3.6 V  | -                | 6.1    | 15  | -                 | 23  | Ω    |
|           |                      | $I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V  | -                | 4.9    | 10  | -                 | 15  | Ω    |

| Symbol                | Parameter                | Conditions   | -40 °C to +85 °C |        | -40 °C to +125 °C |     | Unit |     |
|-----------------------|--------------------------|--|------------------|--------|-------------------|-----|------|-----|
|                       |                          |  | Min              | Typ[1] | Max               | Min |      | Max |
| R <sub>ON(flat)</sub> | ON resistance (flatness) | V <sub>I</sub> = GND to V <sub>CC</sub> [2]                |                  |        |                   |     |      |     |
|                       |                          | I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V | -                | 26.0   | -                 | -   | -    | Ω   |
|                       |                          | I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V   | -                | 5.0    | -                 | -   | -    | Ω   |
|                       |                          | I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V           | -                | 3.5    | -                 | -   | -    | Ω   |
|                       |                          | I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3.0 V to 3.6 V  | -                | 2.0    | -                 | -   | -    | Ω   |
|                       |                          | I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V  | -                | 1.5    | -                 | -   | -    | Ω   |

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and nominal V<sub>CC</sub>.

[2] Flatness is defined as the difference between the maximum and minimum value of ON resistance measured at identical V<sub>CC</sub> and temperature.

### 10.3. ON resistance test circuit and graphs

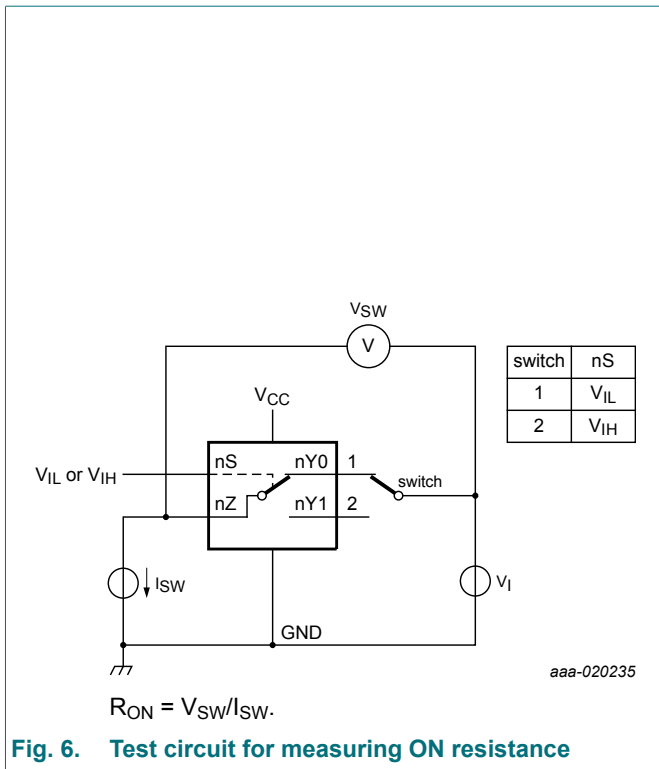
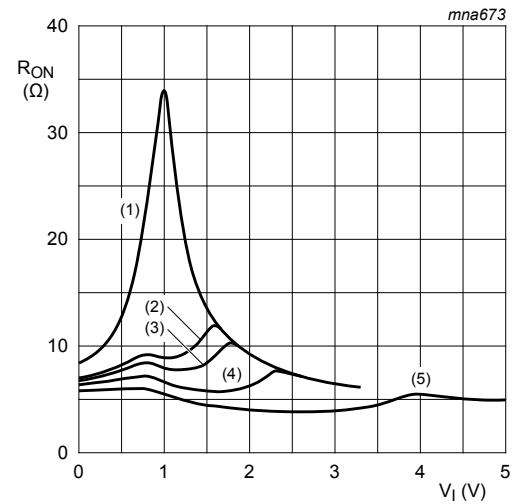
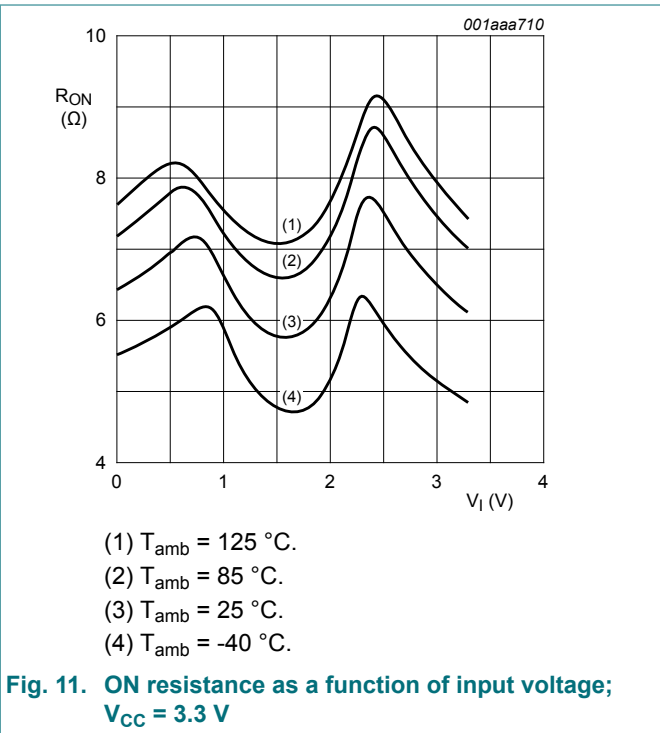
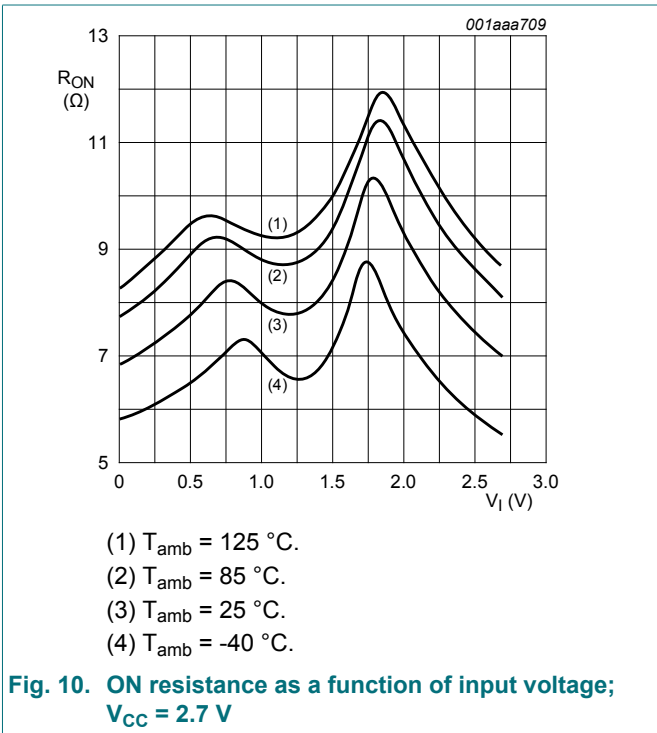
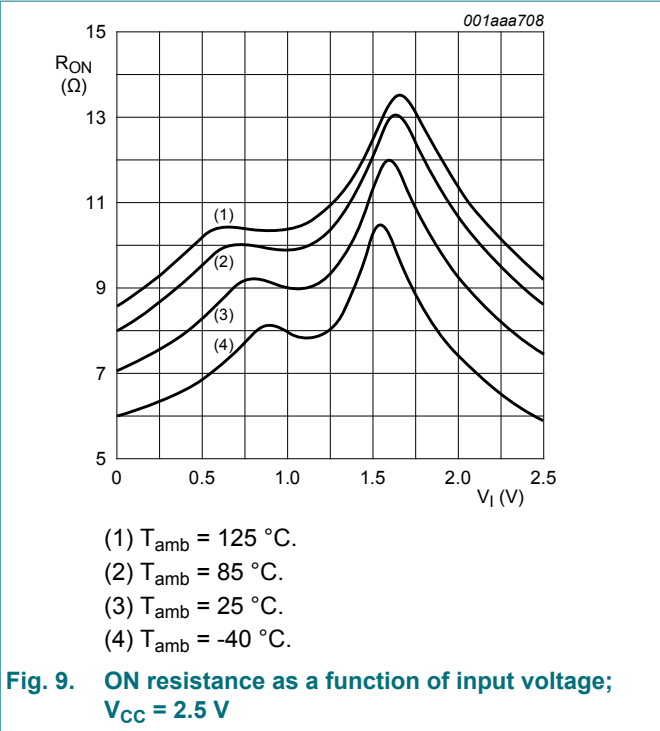
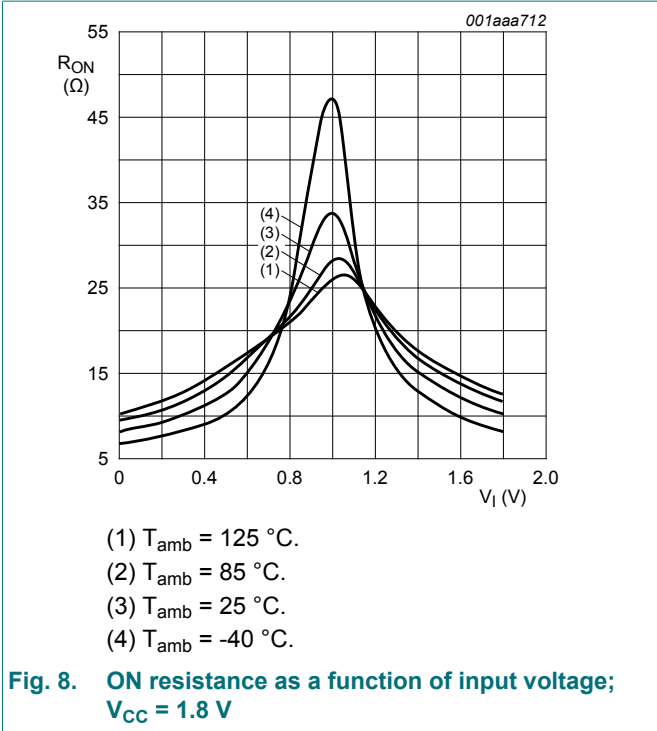


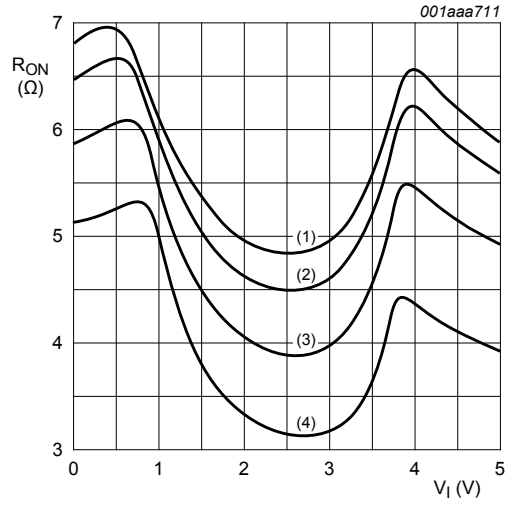
Fig. 6. Test circuit for measuring ON resistance



- (1) V<sub>CC</sub> = 1.8 V.
- (2) V<sub>CC</sub> = 2.5 V.
- (3) V<sub>CC</sub> = 2.7 V.
- (4) V<sub>CC</sub> = 3.3 V.
- (5) V<sub>CC</sub> = 5.0 V.

Fig. 7. Typical ON resistance as a function of input voltage; T<sub>amb</sub> = 25 °C





- (1)  $T_{amb} = 125\text{ °C}$ .
- (2)  $T_{amb} = 85\text{ °C}$ .
- (3)  $T_{amb} = 25\text{ °C}$ .
- (4)  $T_{amb} = -40\text{ °C}$ .

Fig. 12. ON resistance as a function of input voltage;  $V_{CC} = 5.0\text{ V}$



## 11. Dynamic characteristics

**Table 9. Dynamic characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 16.

| Symbol    | Parameter              | Conditions  | -40 °C to +85 °C |        |     | -40 °C to +125 °C |      | Unit |
|-----------|------------------------|---|------------------|--------|-----|-------------------|------|------|
|           |                        |   | Min              | Typ[1] | Max | Min               | Max  |      |
| $t_{pd}$  | propagation delay      | nYn to nZ or nZ to nYn; see Fig. 13 [2][3]                  |                  |        |     |                   |      |      |
|           |                        | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                | -                | -      | 2   | -                 | 3.0  | ns   |
|           |                        | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                  | -                | -      | 1.2 | -                 | 2.0  | ns   |
|           |                        | $V_{CC} = 2.7 \text{ V}$                                    | -                | -      | 1.0 | -                 | 1.5  | ns   |
|           |                        | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$                  | -                | -      | 0.8 | -                 | 1.5  | ns   |
|           |                        | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                  | -                | -      | 0.6 | -                 | 1.0  | ns   |
| $t_{en}$  | enable time            | nS to nYn; see Fig. 14 [4]                                  |                  |        |     |                   |      |      |
|           |                        | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                | 1                | 8.7    | 24  | 1                 | 26.5 | ns   |
|           |                        | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                  | 1                | 5.3    | 14  | 1                 | 15.5 | ns   |
|           |                        | $V_{CC} = 2.7 \text{ V}$                                    | 1                | 4.9    | 14  | 1                 | 15.5 | ns   |
|           |                        | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$                  | 0.5              | 4      | 7.6 | 0.5               | 8.5  | ns   |
|           |                        | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                  | 0.5              | 3      | 5.7 | 0.5               | 6.6  | ns   |
| $t_{dis}$ | disable time           | nS to nYn; see Fig. 14 [5]                                  |                  |        |     |                   |      |      |
|           |                        | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                | 2.5              | 6      | 13  | 2.5               | 14.5 | ns   |
|           |                        | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                  | 2                | 4.4    | 7.5 | 2                 | 8.5  | ns   |
|           |                        | $V_{CC} = 2.7 \text{ V}$                                    | 1.5              | 4.2    | 7.5 | 1.5               | 8.5  | ns   |
|           |                        | $V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$                  | 1.5              | 3.6    | 5.3 | 1.5               | 6    | ns   |
|           |                        | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                  | 0.8              | 2.9    | 3.8 | 0.8               | 4.5  | ns   |
| $t_{b-m}$ | break-before-make time | $C_L = 35 \text{ pF}$ ; $R_L = 50 \Omega$ ; see Fig. 15 [6] |                  |        |     |                   |      |      |
|           |                        | $V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$                | 0.5              | -      | -   | 0.5               | -    | ns   |
|           |                        | $V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$                  | 0.5              | -      | -   | 0.5               | -    | ns   |
|           |                        | $V_{CC} = 2.7 \text{ V}$                                    | 0.5              | -      | -   | 0.5               | -    | ns   |
|           |                        | $V_{CC} = 3 \text{ V to } 3.6 \text{ V}$                    | 0.5              | -      | -   | 0.5               | -    | ns   |
|           |                        | $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$                  | 0.5              | -      | -   | 0.5               | -    | ns   |

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

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

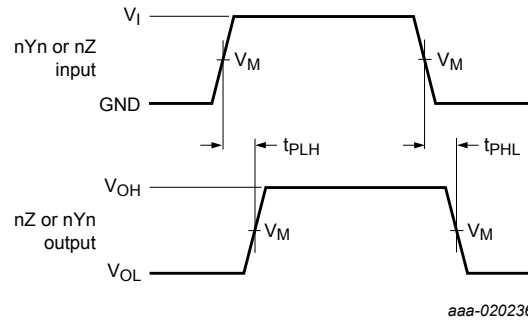
[3] Propagation delay is the calculated RC time constant of the typical ON resistance of the switch and the specified capacitance when driven by an ideal voltage source (zero output impedance).

[4]  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ .

[5]  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .

[6] Break-before-make specified by design.

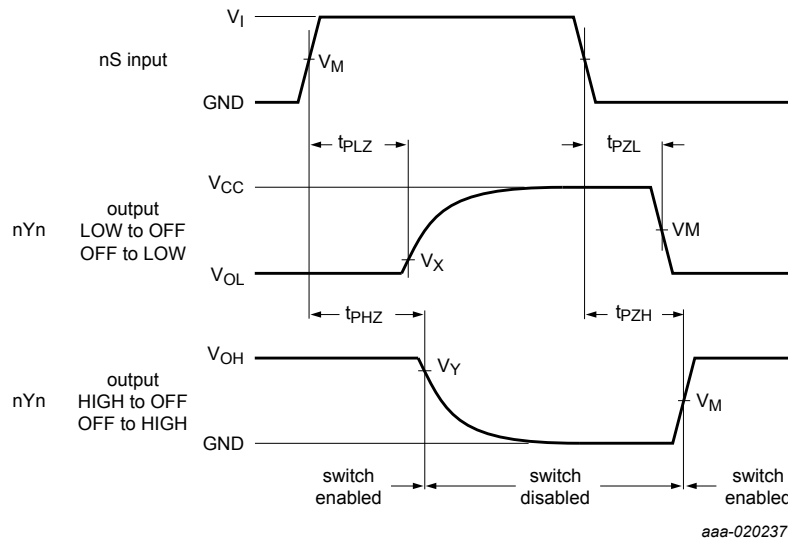
11.1. Waveforms and test circuits



Measurement points are given in [Table 10](#).

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

**Fig. 13. Input (nYn or nZ) to output (nZ or nYn) propagation delays**



Measurement points are given in [Table 10](#).

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

**Fig. 14. Enable and disable times**

**Table 10. Measurement points**

| Supply voltage  | Input       | Output      |                  |                  |
|-----------------|-------------|-------------|------------------|------------------|
| $V_{CC}$        | $V_M$       | $V_M$       | $V_X$            | $V_Y$            |
| 1.65 V to 5.5 V | $0.5V_{CC}$ | $0.5V_{CC}$ | $V_{OL} + 0.3 V$ | $V_{OH} - 0.3 V$ |

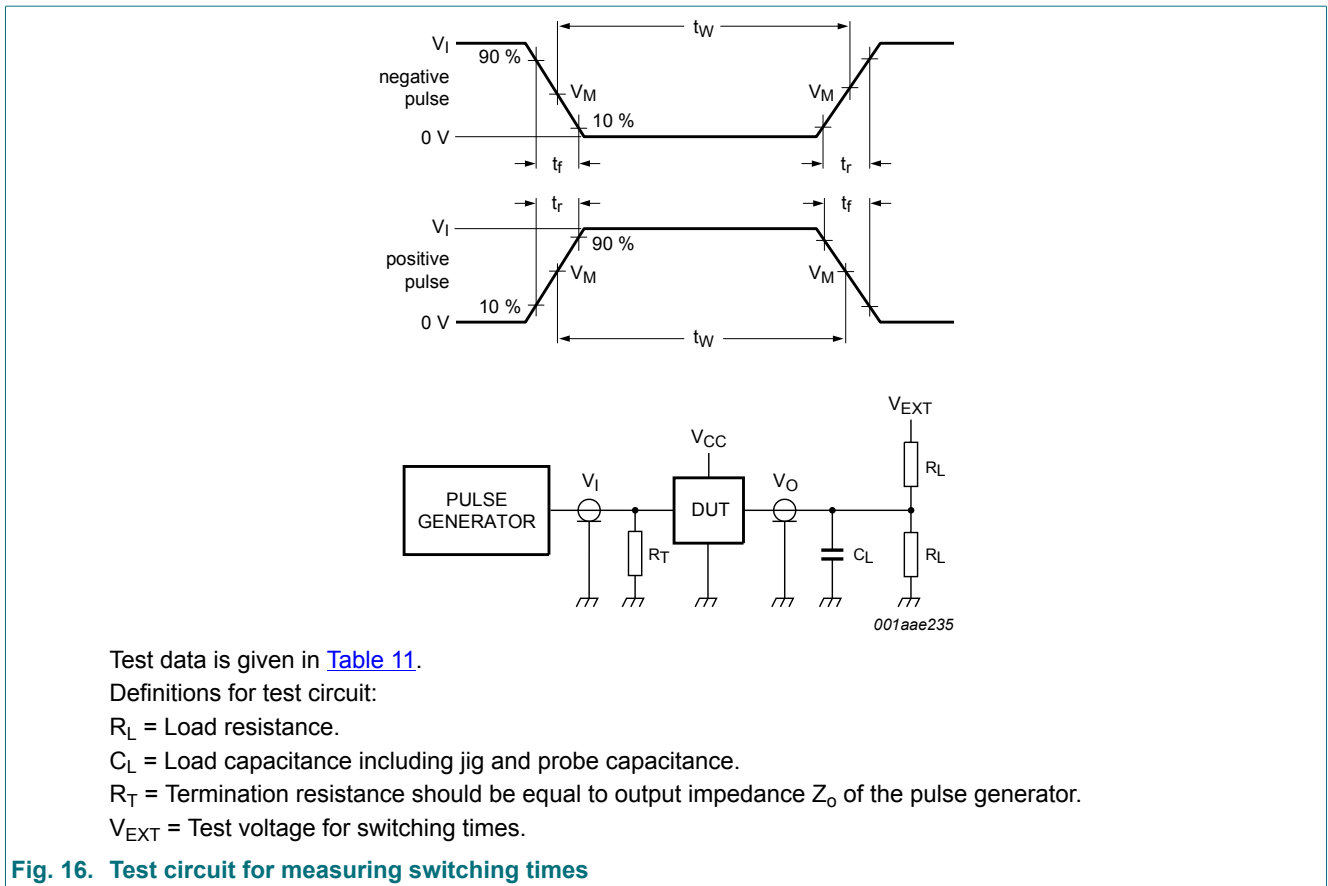
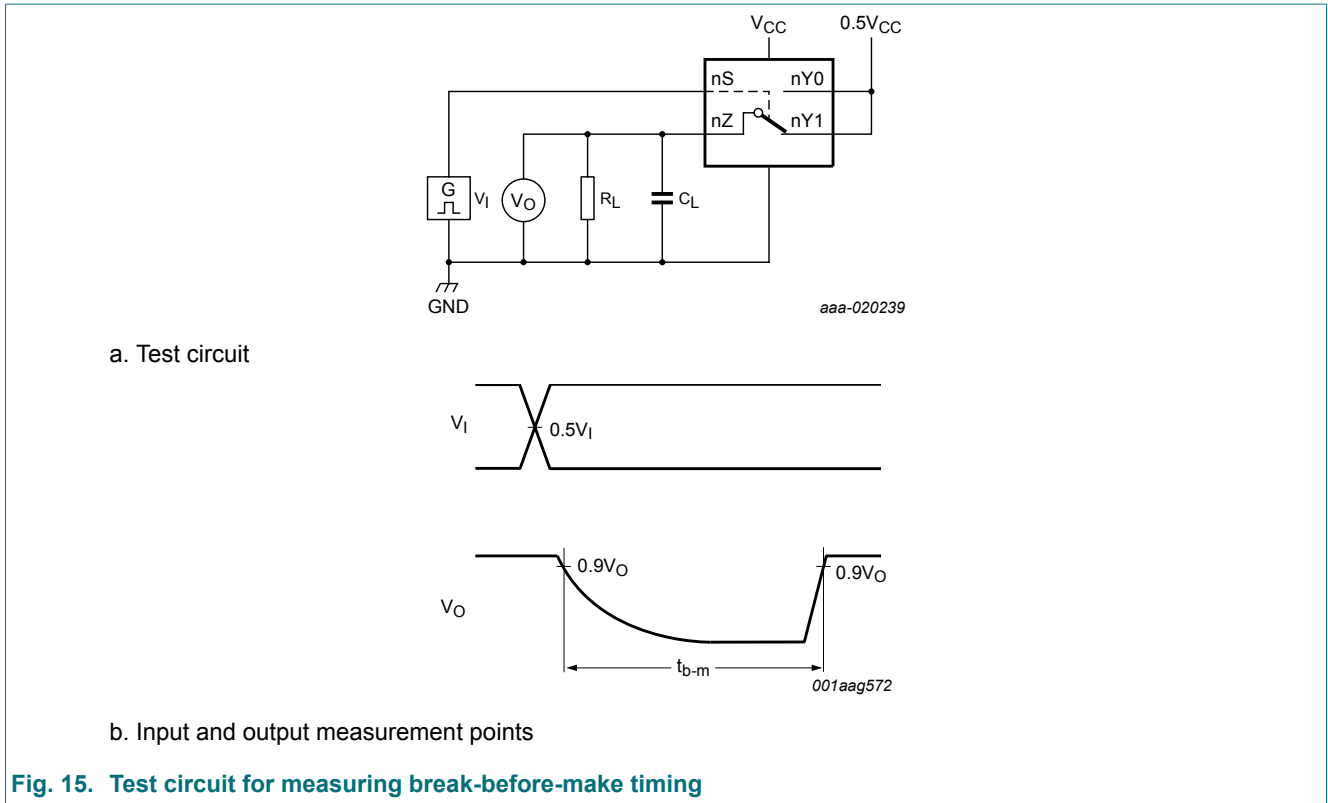


Table 11. Test data

| Supply voltage   | Input    |               | Load  |              | $V_{EXT}$          |                    |                    |
|------------------|----------|---------------|-------|--------------|--------------------|--------------------|--------------------|
| $V_{CC}$         | $V_I$    | $t_r, t_f$    | $C_L$ | $R_L$        | $t_{PLH}, t_{PHL}$ | $t_{PZH}, t_{PHZ}$ | $t_{PZL}, t_{PLZ}$ |
| 1.65 V to 1.95 V | $V_{CC}$ | $\leq 2.0$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |
| 2.3 V to 2.7 V   | $V_{CC}$ | $\leq 2.0$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |
| 2.7 V            | $V_{CC}$ | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |
| 3 V to 3.6 V     | $V_{CC}$ | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |
| 4.5 V to 5.5 V   | $V_{CC}$ | $\leq 2.5$ ns | 50 pF | 500 $\Omega$ | open               | GND                | $2V_{CC}$          |

## 11.2. Additional dynamic characteristics

Table 12. Additional dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V);  $T_{amb} = 25$  °C.

| Symbol         | Parameter                 | Conditions  | Min | Typ   | Max | Unit |
|----------------|---------------------------|---|-----|-------|-----|------|
| THD            | total harmonic distortion | $f_i = 600$ Hz to 20 kHz; $R_L = 600$ $\Omega$ ; $C_L = 50$ pF; $V_I = 0.5$ V (p-p); see Fig. 17            |     |       |     |      |
|                |                           | $V_{CC} = 1.65$ V   | -   | 0.260 | -   | %    |
|                |                           | $V_{CC} = 2.3$ V  | -   | 0.078 | -   | %    |
|                |                           | $V_{CC} = 3.0$ V  | -   | 0.078 | -   | %    |
| $f_{(-3dB)}$   | -3 dB frequency response  | $R_L = 50$ $\Omega$ ; see Fig. 18   |     |       |     |      |
|                |                           | $V_{CC} = 1.65$ V   | -   | 200   | -   | MHz  |
|                |                           | $V_{CC} = 2.3$ V  | -   | 300   | -   | MHz  |
|                |                           | $V_{CC} = 3.0$ V  | -   | 300   | -   | MHz  |
| $\alpha_{iso}$ | isolation (OFF-state)     | $R_L = 50$ $\Omega$ ; $C_L = 5$ pF; $f_i = 10$ MHz; see Fig. 19   |     |       |     |      |
|                |                           | $V_{CC} = 1.65$ V   | -   | -42   | -   | dB   |
|                |                           | $V_{CC} = 2.3$ V  | -   | -42   | -   | dB   |
|                |                           | $V_{CC} = 3.0$ V  | -   | -40   | -   | dB   |
| Xtalk          | crosstalk                 | between switches; $f_i = 10$ MHz; see Fig. 20   |     |       |     |      |
|                |                           | $V_{CC} = 1.65$ V   | -   | -54   | -   | dB   |
|                |                           | $V_{CC} = 2.3$ V  | -   | -54   | -   | dB   |
|                |                           | $V_{CC} = 3.0$ V  | -   | -54   | -   | dB   |
| $Q_{inj}$      | charge injection          | $C_L = 0.1$ nF; $V_{gen} = 0$ V; $R_{gen} = 0$ $\Omega$ ; $f_i = 1$ MHz; $R_L = 1$ M $\Omega$ ; see Fig. 21 |     |       |     |      |
|                |                           | $V_{CC} = 1.8$ V  | -   | 3.3   | -   | pC   |
|                |                           | $V_{CC} = 2.5$ V  | -   | 4.1   | -   | pC   |
|                |                           | $V_{CC} = 3.3$ V  | -   | 5.0   | -   | pC   |
|                |                           | $V_{CC} = 4.5$ V  | -   | 6.4   | -   | pC   |
|                | $V_{CC} = 5.5$ V          | -   | 7.5 | -     | pC  |      |

11.3. Test circuits

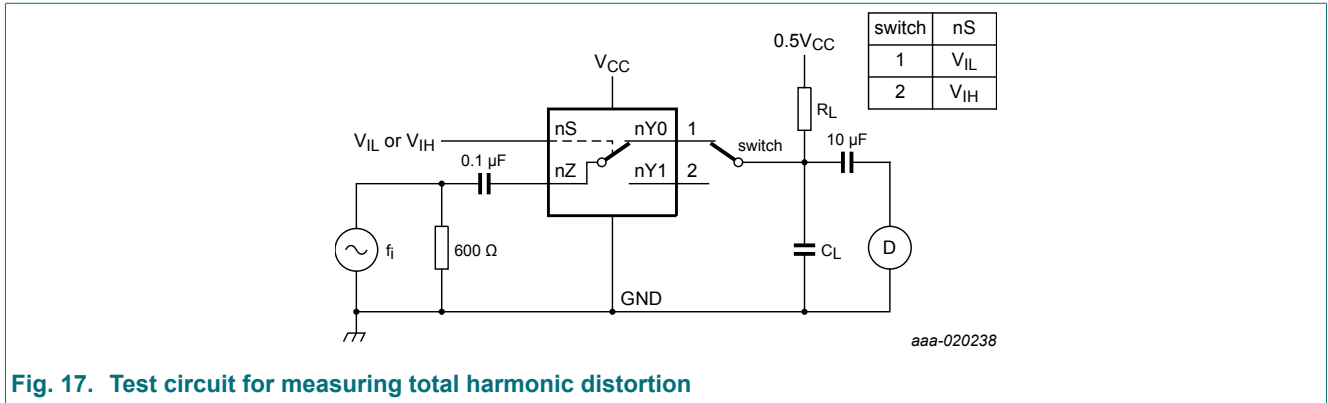


Fig. 17. Test circuit for measuring total harmonic distortion

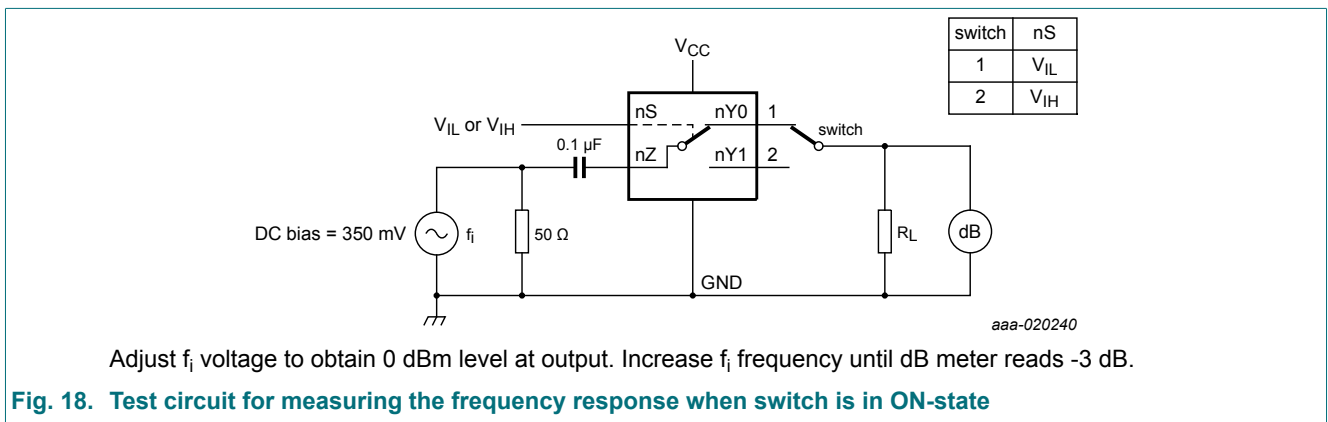


Fig. 18. Test circuit for measuring the frequency response when switch is in ON-state

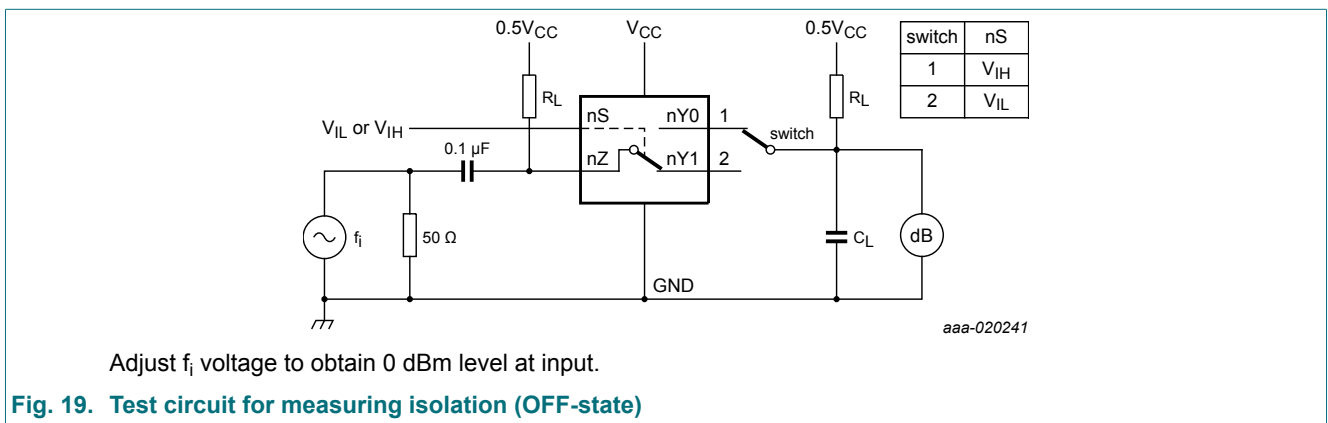


Fig. 19. Test circuit for measuring isolation (OFF-state)

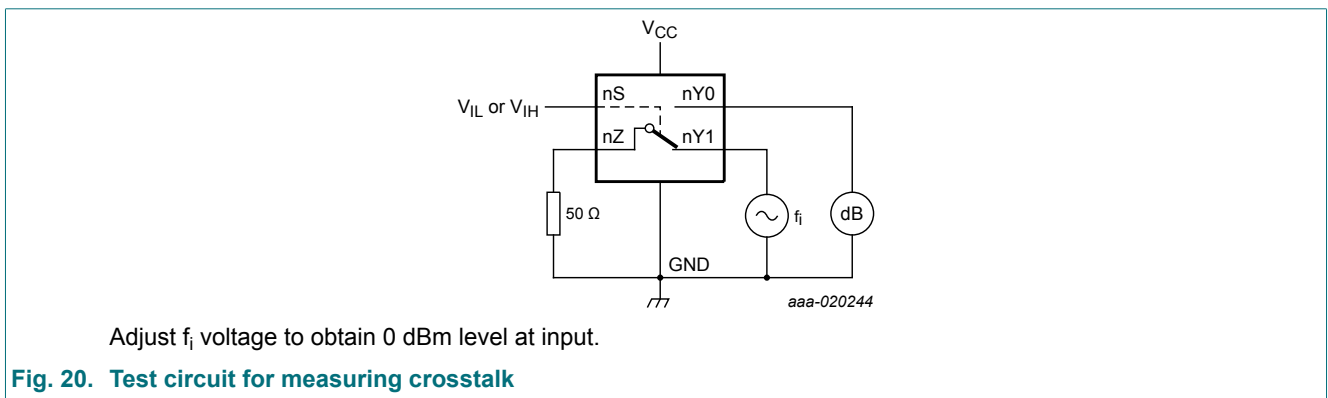
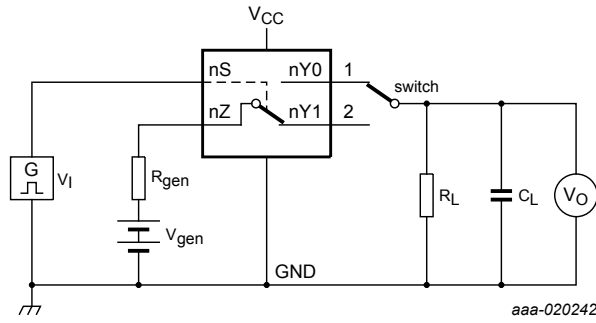
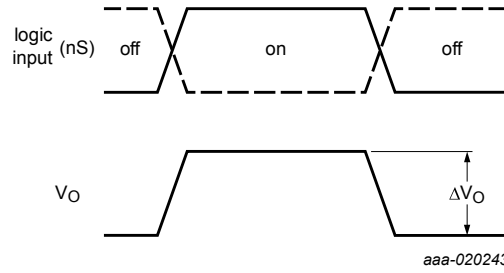


Fig. 20. Test circuit for measuring crosstalk



a. Test circuit



b. Input and output pulse definitions

$$Q_{inj} = \Delta V_O \times C_L$$

$\Delta V_O$  = output voltage variation.

$R_{gen}$  = generator resistance.

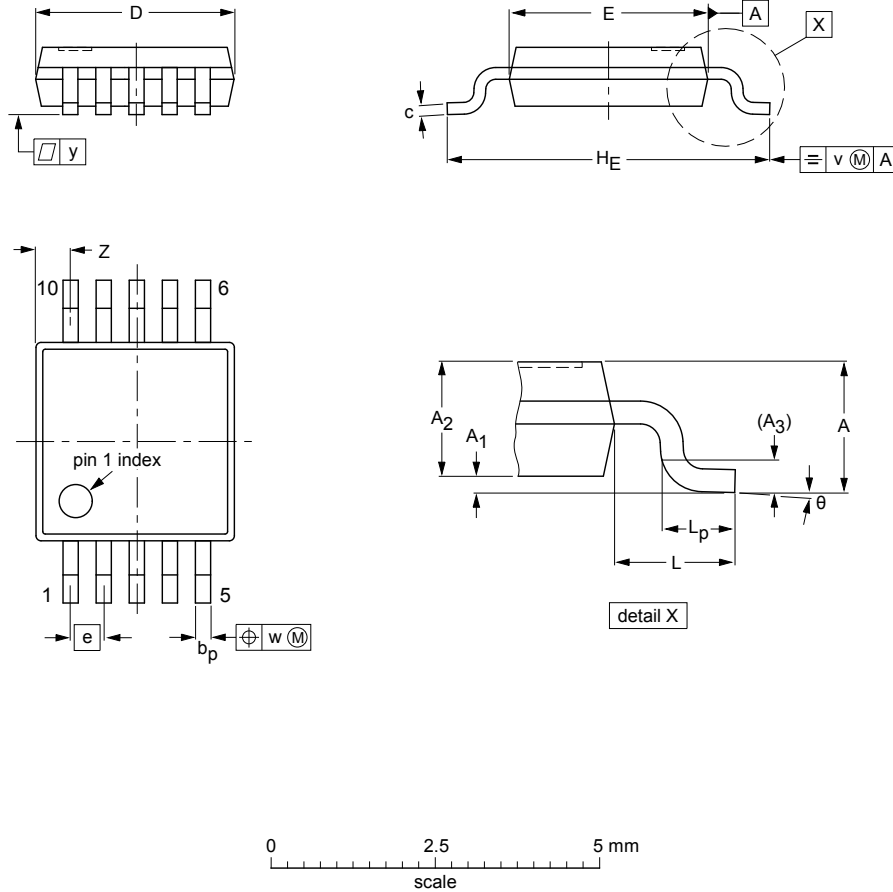
$V_{gen}$  = generator voltage.

**Fig. 21. Test circuit for measuring charge injection**

12. Package outline

TSSOP10: plastic thin shrink small outline package; 10 leads; body width 3 mm

SOT552-1



DIMENSIONS (mm are the original dimensions)

| UNIT | A max. | 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> | v   | w   | y   | Z <sup>(1)</sup> | θ        |
|------|--------|----------------|----------------|----------------|----------------|--------------|------------------|------------------|-----|----------------|------|----------------|-----|-----|-----|------------------|----------|
| mm   | 1.1    | 0.15<br>0.05   | 0.95<br>0.80   | 0.25           | 0.30<br>0.15   | 0.23<br>0.15 | 3.1<br>2.9       | 3.1<br>2.9       | 0.5 | 5.0<br>4.8     | 0.95 | 0.7<br>0.4     | 0.1 | 0.1 | 0.1 | 0.67<br>0.34     | 6°<br>0° |

Notes

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.

| OUTLINE VERSION | REFERENCES |       |       |  | EUROPEAN PROJECTION | ISSUE DATE                      |
|-----------------|------------|-------|-------|--|---------------------|---------------------------------|
|                 | IEC        | JEDEC | JEITA |  |                     |                                 |
| SOT552-1        |            |       |       |  |                     | <del>99-07-29</del><br>03-02-18 |

Fig. 22. Package outline SOT552-1 (TSSOP10)

## 13. Abbreviations

**Table 13. Abbreviations**

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

## 14. Revision history

**Table 14. Revision history**

| Document ID          | Release date | Data sheet status  | Change notice | Supersedes |
|----------------------|--------------|--------------------|---------------|------------|
| 74LVC2G3157_Q100 v.1 | 20190429     | Product data sheet | -             | -          |



## 15. 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. |
| Preliminary [short] data sheet | Qualification      | This document contains data from the preliminary specification.                       |
| Product [short] data sheet     | Production         | This document contains the product specification.                                     |

- [1] Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- [3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the internet at <https://www.nexperia.com>.

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