

# 74LVC4066-Q100

## Quad bilateral switch

Rev. 2 — 26 March 2020

Product data sheet

## 1. General description

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The 74LVC4066-Q100 is a high-speed Si-gate CMOS device.

The 74LVC4066-Q100 provides four single pole, single-throw analog switch functions. Each switch has two input/output terminals (nY and nZ) and an active HIGH enable input (nE). When nE is LOW, the analog switch is turned off.

Schmitt-trigger action at the enable 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

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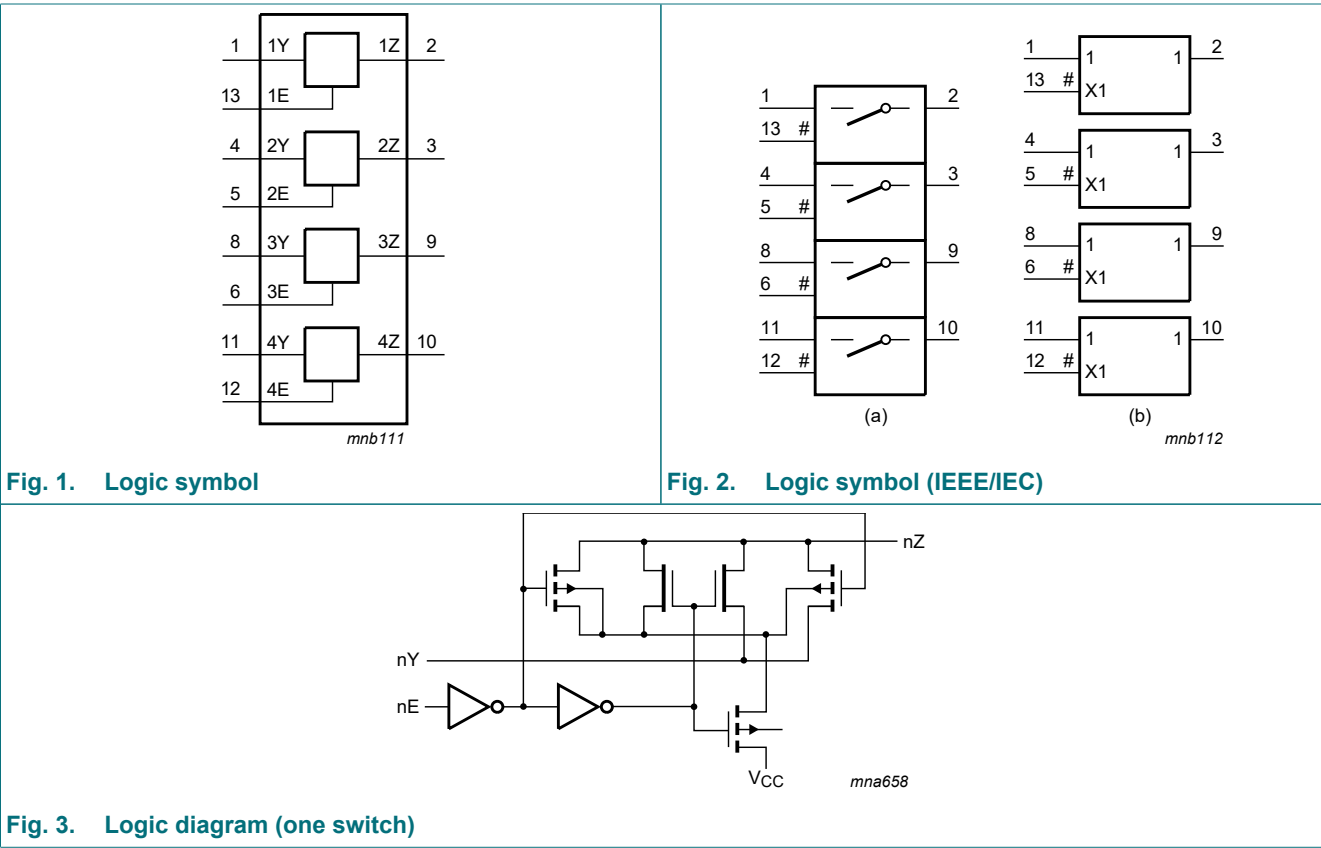
- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- Wide supply voltage range from 1.65 V to 5.5 V
- Very low ON resistance:
  - 7.5  $\Omega$  (typical) at  $V_{CC} = 2.7$  V
  - 6.5  $\Omega$  (typical) at  $V_{CC} = 3.3$  V
  - 6  $\Omega$  (typical) at  $V_{CC} = 5$  V
- Switch current capability of 32 mA
- High noise immunity
- CMOS low-power consumption
- Direct interface TTL-levels
- Latch-up performance exceeds 250 mA
- ESD protection:
  - MIL-STD-883, method 3015 exceeds 2000 V
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V ( $C = 200$  pF,  $R = 0$   $\Omega$ )
- Enable inputs accept voltages up to 5 V
- Multiple package options
- DHVQFN package with Side-Wettable Flanks enabling Automatic Optical Inspection (AOI) of solder joints

3. Ordering information

Table 1. Ordering information

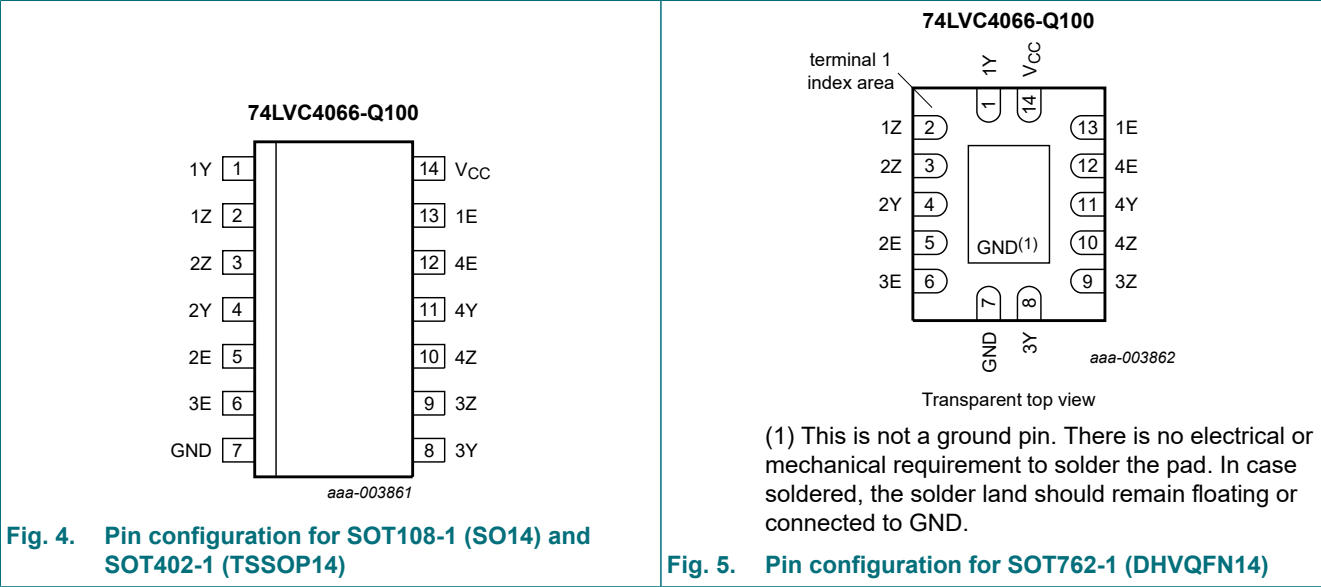
Type number	Package			
	Temperature range	Name	Description	Version
74LVC4066D-Q100	-40 °C to +125 °C	SO14	plastic small outline package; 14 leads; body width 3.9 mm	SOT108-1
74LVC4066PW-Q100	-40 °C to +125 °C	TSSOP14	plastic thin shrink small outline package; 14 leads; body width 4.4 mm	SOT402-1
74LVC4066BQ-Q100	-40 °C to +125 °C	DHVQFN14	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 × 3 × 0.85 mm	SOT762-1

4. Functional diagram



5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
1Y, 2Y, 3Y, 4Y	1, 4, 8, 11	independent input/output
1Z, 2Z, 3Z, 4Z	2, 3, 9, 10	independent output/input
1E, 2E, 3E, 4E	13, 5, 6, 12	enable input (active HIGH)
GND	7	ground (0 V)
V <sub>CC</sub>	14	supply voltage

6. Functional description

Table 3. Function table

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

Input nE	Switch
L	OFF
H	ON

## 7. Limiting values

**Table 4. Limiting values**

In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+6.5	V
$V_I$	input voltage	[1]	-0.5	+6.5	V
$I_{IK}$	input clamping current	$V_I < -0.5 \text{ V}$ or $V_I < V_{CC} + 0.5 \text{ V}$	-50	-	mA
$I_{SK}$	switch clamping current	$V_I < -0.5 \text{ V}$ or $V_I < V_{CC} + 0.5 \text{ V}$	-	$\pm 50$	mA
$V_{SW}$	switch voltage	enable and disable mode [2]	-0.5	+6.5	V
$I_{SW}$	switch current	$-0.5 < V_{SW} < V_{CC} + 0.5 \text{ V}$	-	$\pm 50$	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	$T_{amb} = -40 \text{ °C}$ to $+125 \text{ °C}$ [3]	-	500	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 SOT108-1 (SO14) package:  $P_{tot}$  derates linearly with 10.1 mW/K above 100 °C.

For SOT402-1 (TSSOP14) package:  $P_{tot}$  derates linearly with 7.3 mW/K above 81 °C.

For SOT762-1 (DHVQFN14) package:  $P_{tot}$  derates linearly with 9.6 mW/K above 98 °C.

## 8. Recommended operating conditions

**Table 5. 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	[1]	0	-	$V_{CC}$	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 $2.7 \text{ V}$ [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 nZ when switch current flows in terminal nY, the voltage drop across the bidirectional switch must not exceed 0.4 V. If the switch current flows into terminal nZ, no GND current will flow from terminal nY. In this case, there is no limit for the voltage drop across the switch.

[2] Applies to control signal levels.

## 9. Static characteristics

**Table 6. Static characteristics**

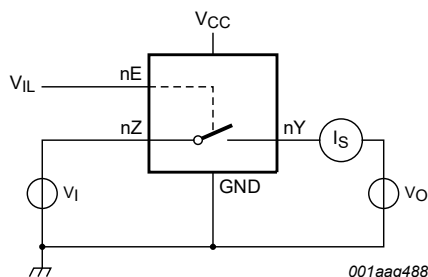
At recommended operating conditions voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °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
		$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	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
		$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	-	-	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 nE; $V_{CC} = 5.5 \text{ V}$ ; $V_I = 5.5 \text{ V or GND}$ [2]	-	$\pm 0.1$	$\pm 5$	-	$\pm 20$	$\mu\text{A}$
$I_{S(OFF)}$	OFF-state leakage current	$ V_{SW}  = V_{CC} - \text{GND}$ ; $V_{CC} = 5.5 \text{ V}$ ; see Fig. 6 [2]	-	$\pm 0.1$	$\pm 5$	-	$\pm 20$	$\mu\text{A}$
$I_{S(ON)}$	ON-state leakage current	$ V_{SW}  = V_{CC} - \text{GND}$ ; $V_{CC} = 5.5 \text{ V}$ ; see Fig. 7 [2]	-	$\pm 0.1$	$\pm 5$	-	$\pm 20$	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = V_{CC} \text{ or GND}$ ; $V_{SW} = \text{GND or } V_{CC}$ ; $V_{CC} = 5.5 \text{ V}$ [2]	-	0.1	10	-	40	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	pin nE; $V_I = V_{CC} - 0.6 \text{ V}$ ; $V_{CC} = 5.5 \text{ V}$ ; $V_{SW} = \text{GND or } V_{CC}$ [2]	-	5	500	-	5000	$\mu\text{A}$
$C_I$	input capacitance		-	12.5	-	-	-	pF
$C_{S(OFF)}$	OFF-state capacitance		-	8.0	-	-	-	pF
$C_{S(ON)}$	ON-state capacitance		-	14.0	-	-	-	pF

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

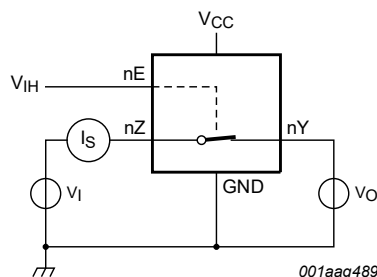
[2] These typical values are measured at  $V_{CC} = 3.3 \text{ V}$ .

### 9.1. Test circuits



$V_I = V_{CC} \text{ or GND}$  and  $V_O = \text{GND or } V_{CC}$ .

**Fig. 6. Test circuit for measuring OFF-state leakage current**



$V_I = V_{CC} \text{ or GND}$  and  $V_O = \text{open circuit}$ .

**Fig. 7. Test circuit for measuring ON-state leakage current**

## 9.2. ON resistance

**Table 7. ON resistance**

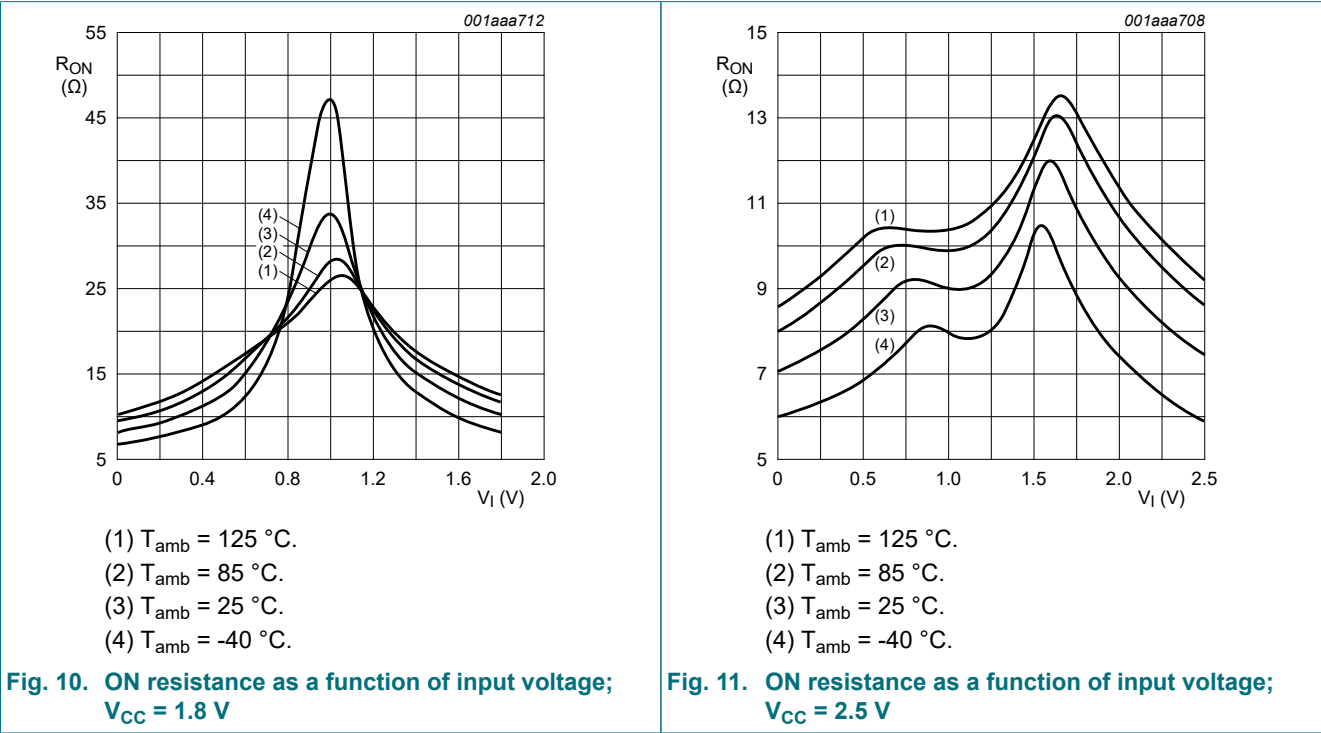
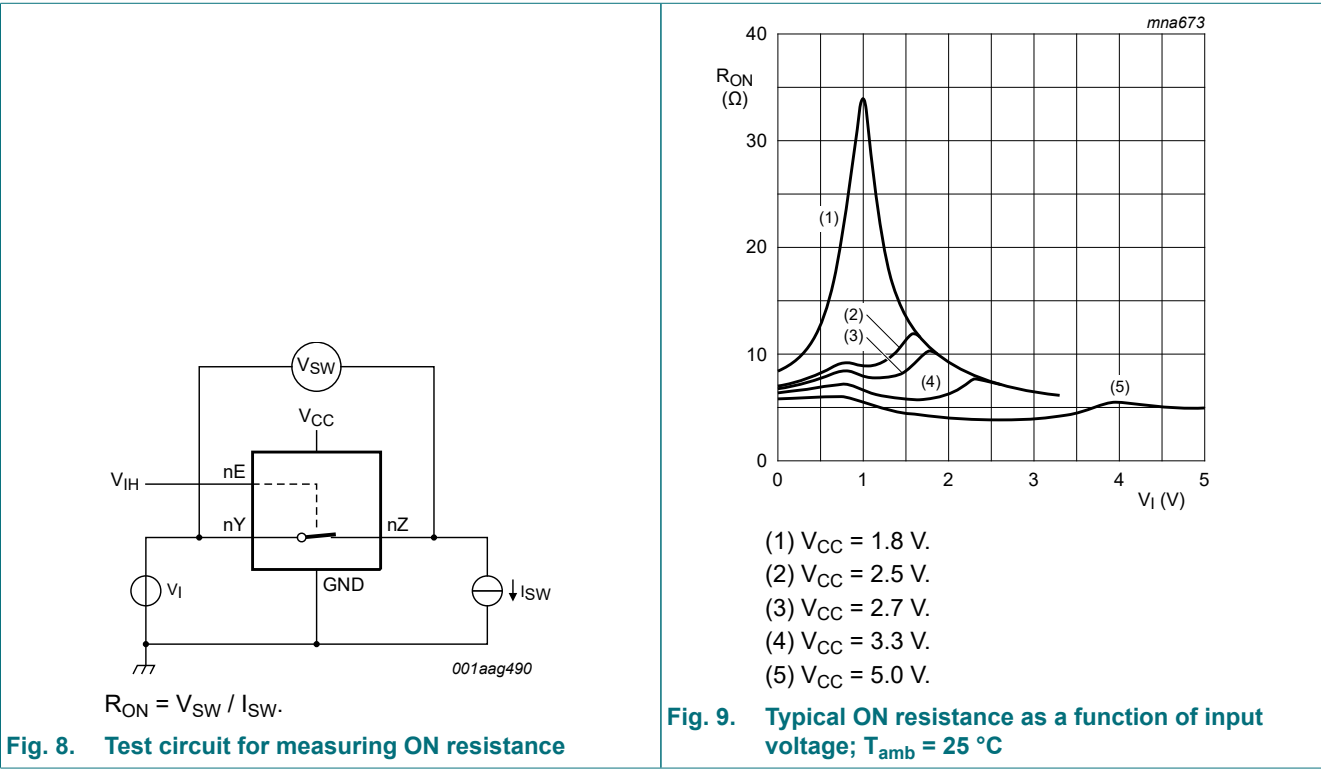
At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see Fig. 9 to Fig. 14.

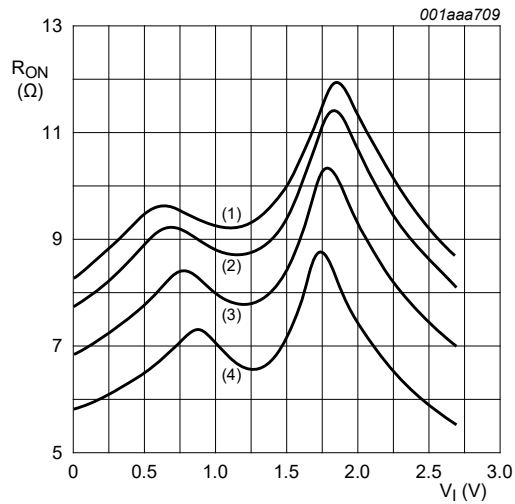
Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	
R <sub>ON(peak)</sub>	ON resistance (peak)	V <sub>I</sub> = GND to V <sub>CC</sub> ; see Fig. 8						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	34.0	130	-	195	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	12.0	30	-	45	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	10.4	25	-	38	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	7.8	20	-	30	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	6.2	15	-	23	Ω
R <sub>ON(rail)</sub>	ON resistance (rail)	V <sub>I</sub> = GND; see Fig. 8						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	8.2	18	-	27	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	7.1	16	-	24	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	6.9	14	-	21	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	6.5	12	-	18	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	5.8	10	-	15	Ω
		V <sub>I</sub> = V <sub>CC</sub> ; see Fig. 8						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	10.4	30	-	45	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	7.6	20	-	30	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	7.0	18	-	27	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	6.1	15	-	23	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	4.9	10	-	15	Ω
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 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.

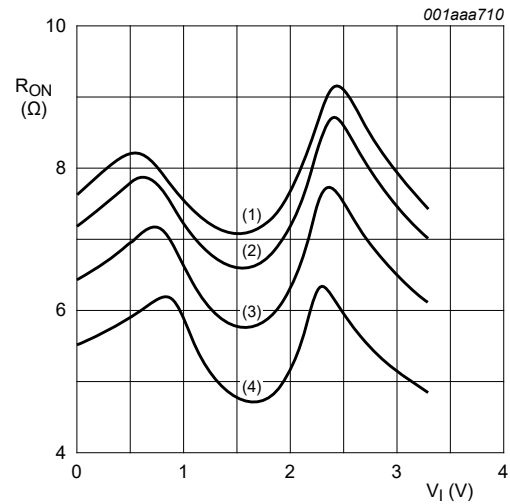
9.3. ON resistance test circuit and graphs





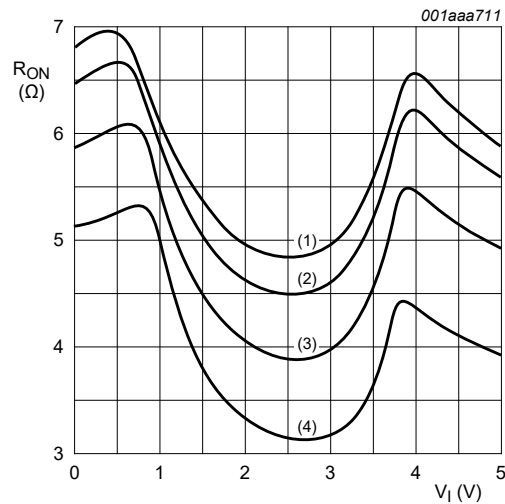
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig. 12. ON resistance as a function of input voltage;**  
 **$V_{CC} = 2.7\text{ V}$**



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

**Fig. 13. ON resistance as a function of input voltage;**  
 **$V_{CC} = 3.3\text{ V}$**



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

**Fig. 14. ON resistance as a function of input voltage;  $V_{CC} = 5.0\text{ V}$**



## 10. Dynamic characteristics

**Table 8. Dynamic characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for test circuit see Fig. 17.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ [1]	Max	Min	Max	
$t_{pd}$	propagation delay	nY to nZ or nZ to nY; see Fig. 15 [2] [3]						
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	0.8	2.0	-	3.0	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	0.4	1.2	-	2.0	ns
		$V_{CC} = 2.7 \text{ V}$	-	0.4	1.0	-	1.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	-	0.3	0.8	-	1.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	0.2	0.6	-	1.0	ns
$t_{en}$	enable time	nE to nY or nZ; see Fig. 16 [4]						
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.0	5.3	10	1.0	12.5	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.0	3.0	5.6	1.0	7.0	ns
		$V_{CC} = 2.7 \text{ V}$	1.0	2.6	5.0	1.0	6.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.0	2.5	4.4	1.0	5.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	1.0	1.9	3.9	1.0	5.0	ns
$t_{dis}$	disable time	nE to nY or nZ; see Fig. 16 [5]						
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	1.0	4.2	9.0	1.0	11.5	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.0	2.4	5.5	1.0	7.0	ns
		$V_{CC} = 2.7 \text{ V}$	1.0	3.6	6.5	1.0	8.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.0	3.4	6.0	1.0	7.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	1.0	2.5	5.0	1.0	6.5	ns
$C_{PD}$	power dissipation capacitance	$C_L = 50 \text{ pF}$ ; $f_i = 10 \text{ MHz}$ ; $V_I = \text{GND to } V_{CC}$ [6]						
		$V_{CC} = 2.5 \text{ V}$	-	11.0	-	-	-	pF
		$V_{CC} = 3.3 \text{ V}$	-	12.5	-	-	-	pF
		$V_{CC} = 5.0 \text{ V}$	-	15.6	-	-	-	pF

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

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

$f_i$  = input frequency in MHz;

$f_o$  = output frequency in MHz;

$C_L$  = output load capacitance in pF;

$C_{S(ON)}$  = maximum ON-state switch capacitance in pF;

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

$N$  = number of inputs switching;

$\Sigma\{(C_L + C_{S(ON)}) \times V_{CC}^2 \times f_o\}$  = sum of the outputs.

10.1. Waveforms and test circuit

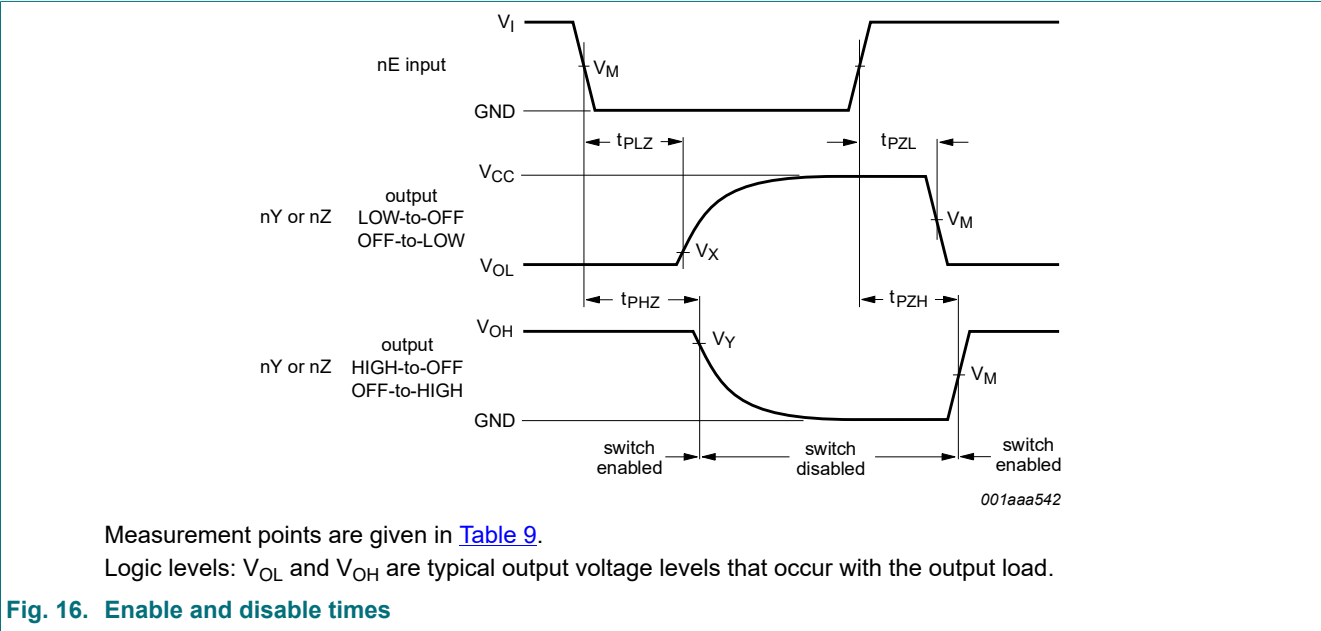
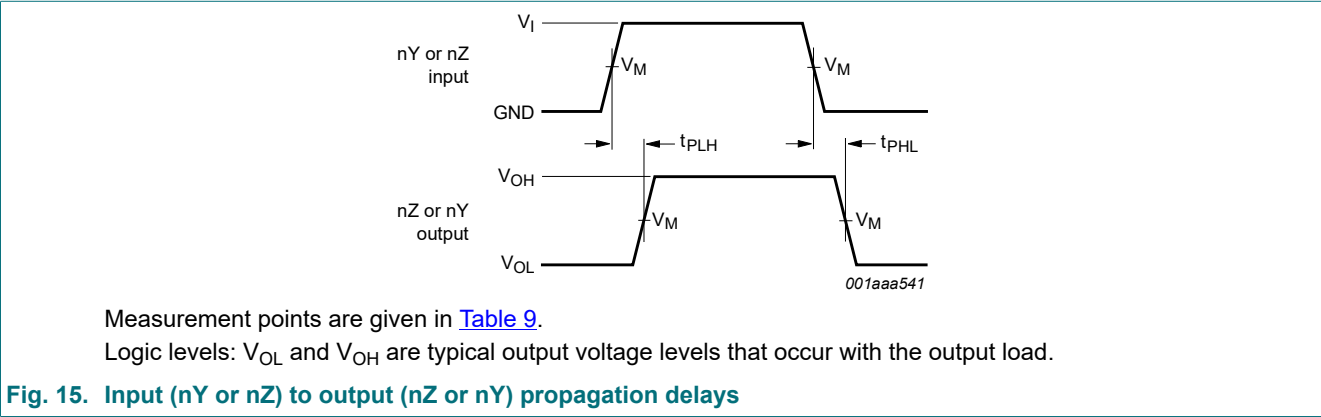
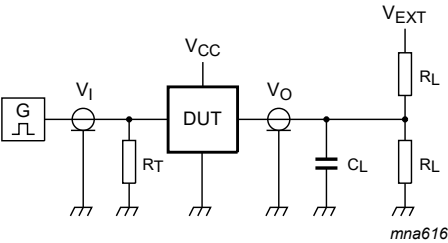


Table 9. Measurement points

Supply voltage	Input	Output		
$V_{CC}$	$V_M$	$V_M$	$V_X$	$V_Y$
1.65 V to 1.95 V	$0.5V_{CC}$	$0.5 V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
2.3 V to 2.7 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
2.7 V	1.5 V	1.5 V	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$
3.0 V to 3.6 V	1.5 V	1.5 V	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$
4.5 V to 5.5 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.3 V$	$V_{OH} - 0.3 V$



Test data is given in [Table 10](#).  
Definitions test circuit:  
 $R_T$  = Termination resistance should be equal to output impedance  $Z_o$  of the pulse generator.  
 $C_L$  = Load capacitance including jig and probe capacitance.  
 $R_L$  = Load resistance.  
 $V_{EXT}$  = External voltage for measuring switching times.

Fig. 17. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Input		Load		$V_{EXT}$		
$V_{CC}$	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PLH}, t_{PHL}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
1.65 V to 1.95 V	$V_{CC}$	$\leq 2.0$ ns	30 pF	1 k $\Omega$	open	GND	$2V_{CC}$
2.3 V to 2.7 V	$V_{CC}$	$\leq 2.0$ ns	30 pF	500 $\Omega$	open	GND	$2V_{CC}$
2.7 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	6 V
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	6 V
4.5 V to 5.5 V	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	$2V_{CC}$

10.2. Additional dynamic characteristics

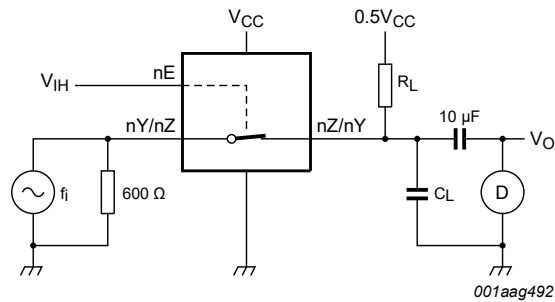
Table 11. Additional dynamic characteristics

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	$R_L = 10$ k $\Omega$ ; $C_L = 50$ pF; $f_i = 1$ kHz; see <a href="#">Fig. 18</a>				
		$V_{CC} = 1.65$ V	-	0.032	-	%
		$V_{CC} = 2.3$ V	-	0.008	-	%
		$V_{CC} = 3$ V	-	0.006	-	%
		$V_{CC} = 4.5$ V	-	0.005	-	%
		$R_L = 10$ k $\Omega$ ; $C_L = 50$ pF; $f_i = 10$ kHz; see <a href="#">Fig. 18</a>				
		$V_{CC} = 1.65$ V	-	0.068	-	%
		$V_{CC} = 2.3$ V	-	0.009	-	%
		$V_{CC} = 3$ V	-	0.008	-	%
		$V_{CC} = 4.5$ V	-	0.006	-	%

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$f_{(-3dB)}$	-3 dB frequency response	$R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; see <a href="#">Fig. 19</a>				
		$V_{CC} = 1.65\ \text{V}$	-	170	-	MHz
		$V_{CC} = 2.3\ \text{V}$	-	210	-	MHz
		$V_{CC} = 3\ \text{V}$	-	212	-	MHz
		$V_{CC} = 4.5\ \text{V}$	-	215	-	MHz
		$R_L = 50\ \Omega$ ; $C_L = 5\ \text{pF}$ ; see <a href="#">Fig. 19</a>				
		$V_{CC} = 1.65\ \text{V}$	-	> 500	-	MHz
		$V_{CC} = 2.3\ \text{V}$	-	> 500	-	MHz
		$V_{CC} = 3\ \text{V}$	-	> 500	-	MHz
		$V_{CC} = 4.5\ \text{V}$	-	> 500	-	MHz
$\alpha_{iso}$	isolation (OFF-state)	$R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Fig. 20</a>				
		$V_{CC} = 1.65\ \text{V}$	-	-46	-	dB
		$V_{CC} = 2.3\ \text{V}$	-	-46	-	dB
		$V_{CC} = 3\ \text{V}$	-	-46	-	dB
		$V_{CC} = 4.5\ \text{V}$	-	-46	-	dB
		$R_L = 50\ \Omega$ ; $C_L = 5\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Fig. 20</a>				
		$V_{CC} = 1.65\ \text{V}$	-	-42	-	dB
		$V_{CC} = 2.3\ \text{V}$	-	-42	-	dB
		$V_{CC} = 3\ \text{V}$	-	-42	-	dB
		$V_{CC} = 4.5\ \text{V}$	-	-42	-	dB
$V_{ct}$	crosstalk voltage	between digital inputs and switch; $R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; $t_r = t_f = 2\ \text{ns}$ ; see <a href="#">Fig. 21</a>				
		$V_{CC} = 1.65\ \text{V}$	-	69	-	mV
		$V_{CC} = 2.3\ \text{V}$	-	87	-	mV
		$V_{CC} = 3\ \text{V}$	-	156	-	mV
		$V_{CC} = 4.5\ \text{V}$	-	302	-	mV
Xtalk	crosstalk	between switches; $R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Fig. 22</a>				
		$V_{CC} = 1.65\ \text{V}$	-	-58	-	dB
		$V_{CC} = 2.3\ \text{V}$	-	-58	-	dB
		$V_{CC} = 3\ \text{V}$	-	-58	-	dB
		$V_{CC} = 4.5\ \text{V}$	-	-58	-	dB
		between switches; $R_L = 50\ \Omega$ ; $C_L = 5\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Fig. 22</a>				
		$V_{CC} = 1.65\ \text{V}$	-	-58	-	dB
		$V_{CC} = 2.3\ \text{V}$	-	-58	-	dB
		$V_{CC} = 3\ \text{V}$	-	-58	-	dB
		$V_{CC} = 4.5\ \text{V}$	-	-58	-	dB
$Q_{inj}$	charge injection	$C_L = 0.1\ \text{nF}$ ; $V_{gen} = 0\ \text{V}$ ; $R_{gen} = 0\ \Omega$ ; $f_i = 1\ \text{MHz}$ ; $R_L = 1\ \text{M}\Omega$ ; see <a href="#">Fig. 23</a>				
		$V_{CC} = 1.8\ \text{V}$	-	3.3	-	pC
		$V_{CC} = 2.5\ \text{V}$	-	4.1	-	pC
		$V_{CC} = 3.3\ \text{V}$	-	5.0	-	pC
		$V_{CC} = 4.5\ \text{V}$	-	6.4	-	pC
		$V_{CC} = 5.5\ \text{V}$	-	7.5	-	pC

## 10.3. Test circuits



Test conditions:

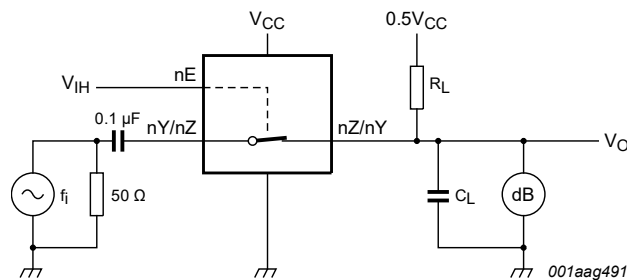
$V_{CC} = 1.65 \text{ V}$ :  $V_i = 1.4 \text{ V (p-p)}$ .

$V_{CC} = 2.3 \text{ V}$ :  $V_i = 2 \text{ V (p-p)}$ .

$V_{CC} = 3 \text{ V}$ :  $V_i = 2.5 \text{ V (p-p)}$ .

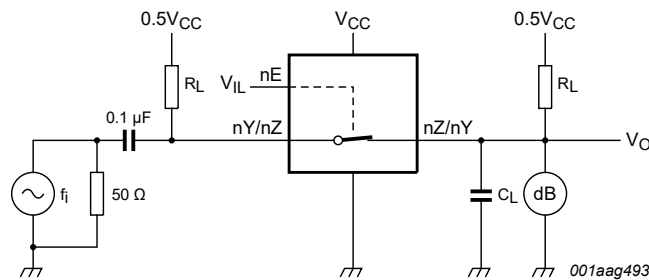
$V_{CC} = 4.5 \text{ V}$ :  $V_i = 4 \text{ V (p-p)}$ .

Fig. 18. Test circuit for measuring total harmonic distortion



Adjust  $f_i$  voltage to obtain 0 dBm level at output. Increase  $f_i$  frequency until dB meter reads -3 dB.

Fig. 19. Test circuit for measuring the frequency response when switch is in ON-state



Adjust  $f_i$  voltage to obtain 0 dBm level at input.

Fig. 20. Test circuit for measuring isolation (OFF-state)

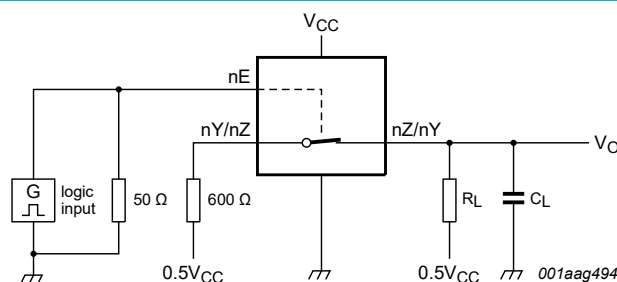
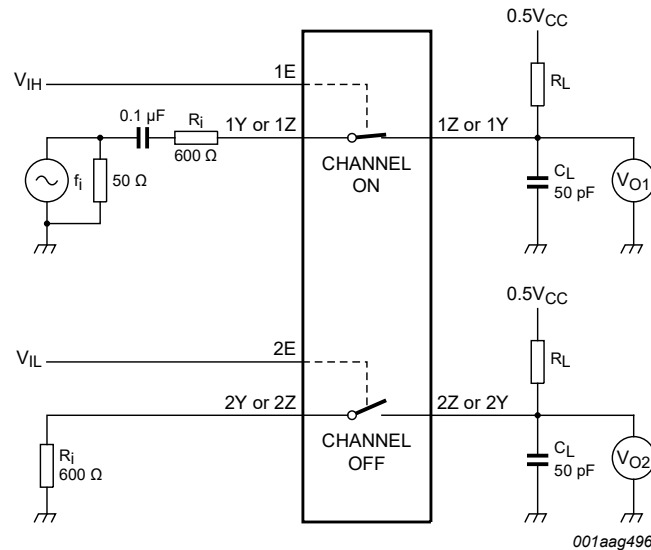
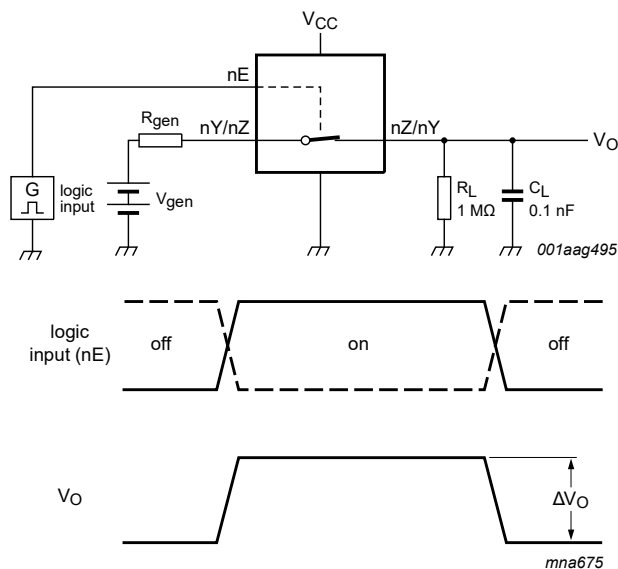


Fig. 21. Test circuit for measuring crosstalk voltage (between digital inputs and switch)



$$20 \log_{10} (V_{O2} / V_{O1}) \text{ or } 20 \log_{10} (V_{O1} / V_{O2}).$$

**Fig. 22. Test circuit for measuring crosstalk between switches**



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

$\Delta V_O$  = output voltage variation.

$R_{gen}$  = generator resistance.

$V_{gen}$  = generator voltage.

**Fig. 23. Test circuit for measuring charge injection**

11. Package outline

SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1

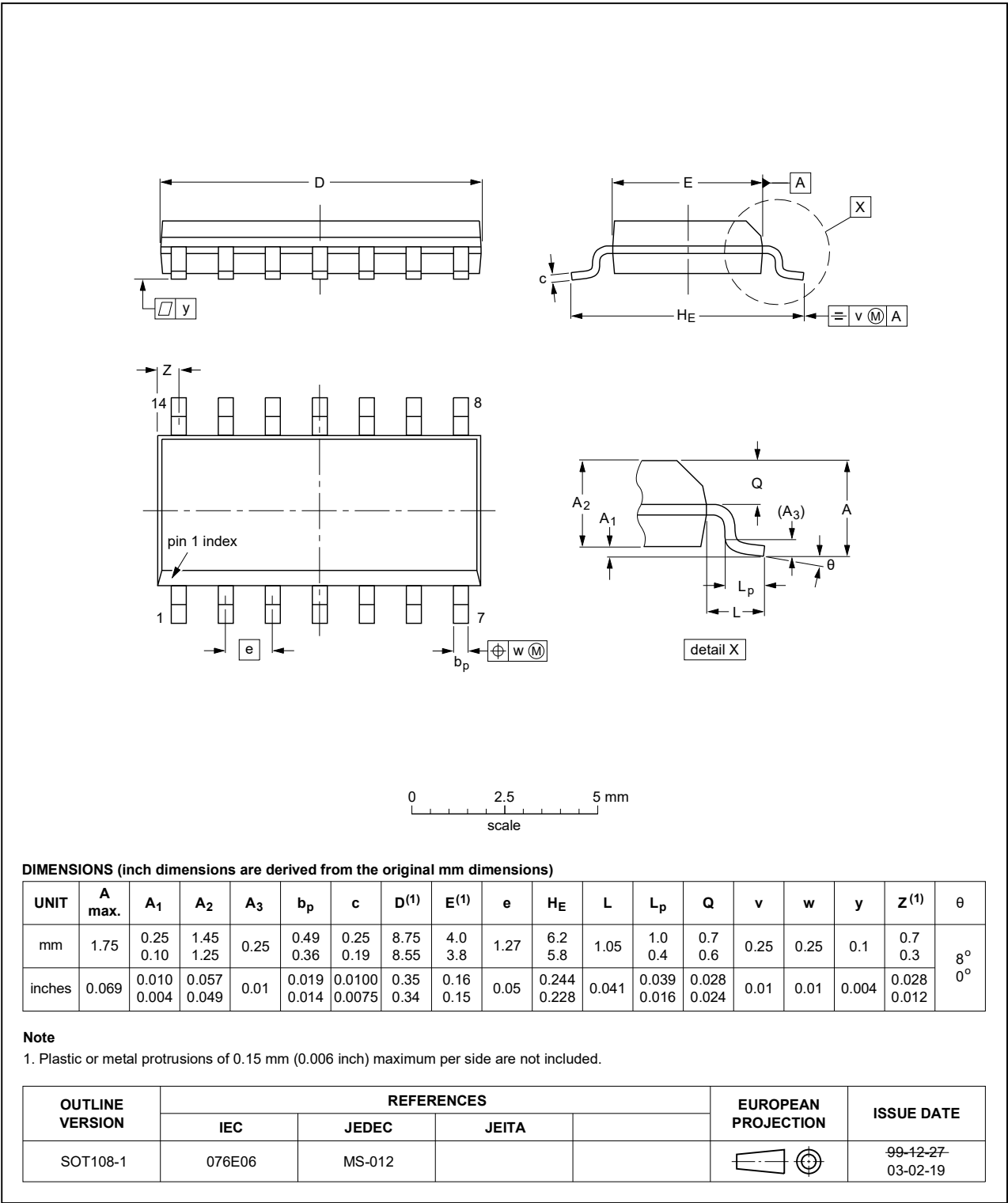


Fig. 24. Package outline SOT108-1 (SO14)

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm

SOT402-1

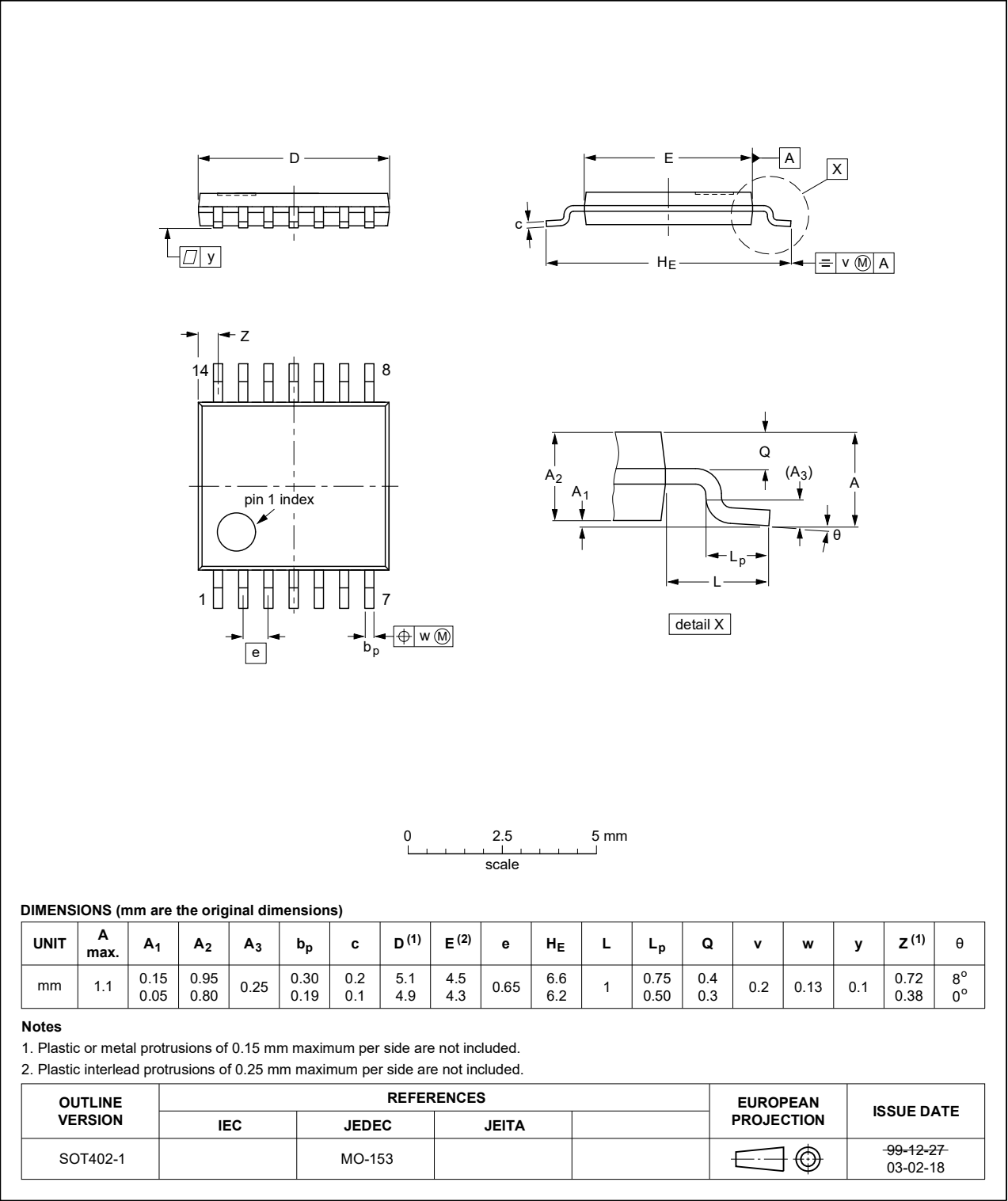
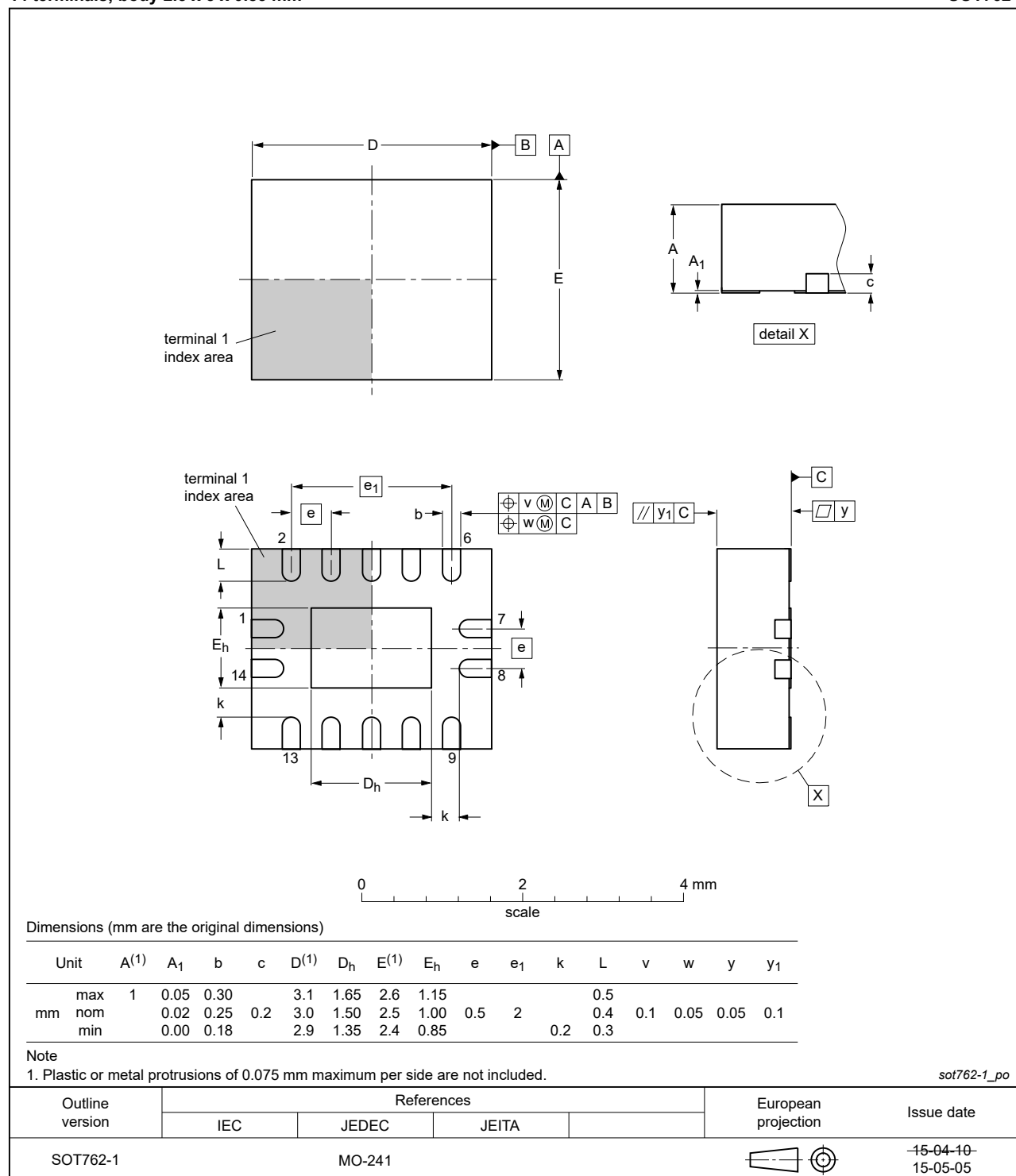


Fig. 25. Package outline SOT402-1 (TSSOP14)



**DHVQFN14:** plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 14 terminals; body 2.5 x 3 x 0.85 mm

SOT762-1



**Fig. 26. Package outline SOT762-1 (DHVQFN14)**

## 12. Abbreviations

Table 12. 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

## 13. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC4066_Q100 v.2	20200326	Product data sheet	-	74LVC4066_Q100 v.1
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="#">Section 2</a> updated.</li><li><a href="#">Table 4</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li><li><a href="#">Fig. 26</a>: Package outline drawing SOT762-1 (DHVQFN14) updated.</li></ul>			
74LVC4066_Q100 v.1	20120807	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.
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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