

# NX3DV3899

## Dual double-pole double-throw analog switch

Rev. 2 — 23 November 2010

Product data sheet

### 1. General description

The NX3DV3899 is a dual double-pole double-throw analog data-switch suitable for use as an analog or digital multiplexer/demultiplexer. It consists of four switches, each with two independent input/outputs (nY0 and nY1) and a common input/output (nZ). The two digital inputs (1S and 2S) are used to select the switch position. Schmitt trigger action at the select input (nS) makes the circuit tolerant to slower input rise and fall times across the entire  $V_{CC}$  range from 1.4 V to 4.3 V.

A low input voltage threshold allows pin nS to be driven by lower level logic signals without a significant increase in supply current  $I_{CC}$ . This makes it possible for the NX3DV3899 to switch 4.3 V signals with a 1.8 V digital controller, eliminating the need for logic level translation. The NX3DV3899 allows signals with amplitude up to  $V_{CC}$  to be transmitted from nZ to nY0 or nY1; or from nY0 or nY1 to nZ.

### 2. Features and benefits

- Wide supply voltage range from 1.4 V to 4.3 V
- Very low ON resistance (peak):
  - ◆ 7.2  $\Omega$  (typical) at  $V_{CC} = 1.4$  V
  - ◆ 5.4  $\Omega$  (typical) at  $V_{CC} = 1.65$  V
  - ◆ 2.9  $\Omega$  (typical) at  $V_{CC} = 2.5$  V
  - ◆ 2.4  $\Omega$  (typical) at  $V_{CC} = 3.0$  V
  - ◆ 2.3  $\Omega$  (typical) at  $V_{CC} = 3.6$  V
  - ◆ 2.2  $\Omega$  (typical) at  $V_{CC} = 4.3$  V
- Break-before-make switching
- High noise immunity
- ESD protection:
  - ◆ HBM JESD22-A114F Class 2A exceeds 2000 V (all pins)
  - ◆ HBM JESD22-A114F Class 3A exceeds 5000 V (I/O pins to GND)
  - ◆ MM JESD22-A115-A exceeds 200 V
  - ◆ CDM AEC-Q100-011 revision B exceeds 1000 V
- CMOS low-power consumption
- Latch-up performance exceeds 100 mA per JESD 78B Class II Level A
- 1.8 V control logic at  $V_{CC} = 3.6$  V
- Control input accepts voltages above supply voltage
- Very low supply current, even when input is below  $V_{CC}$
- High current handling capability (350 mA continuous current under 3.3 V supply)
- Specified from  $-40$  °C to  $+85$  °C and from  $-40$  °C to  $+125$  °C



### 3. Applications

- Data switch
- Cell phone
- PDA
- Portable media player

### 4. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
NX3DV3899HR	-40 °C to +125 °C	HXQFN16U	plastic thermal enhanced extremely thin quad flat package; no leads; 16 terminals; UTLP based; body 3 × 3 × 0.5 mm	SOT1039-1
NX3DV3899GU	-40 °C to +125 °C	XQFN16	plastic, extremely thin quad flat package; no leads; 16 terminals; body 1.80 × 2.60 × 0.50 mm	SOT1161-1

### 5. Marking

Table 2. Marking codes

Type number	Marking code
NX3DV3899HR	×99
NX3DV3899GU	×9

### 6. Functional diagram

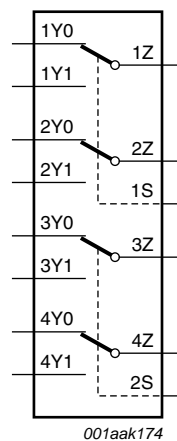
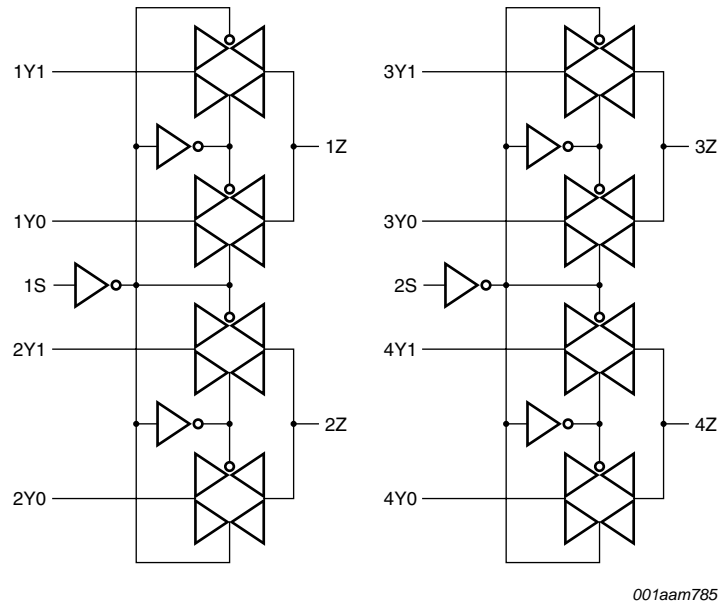


Fig 1. Logic symbol

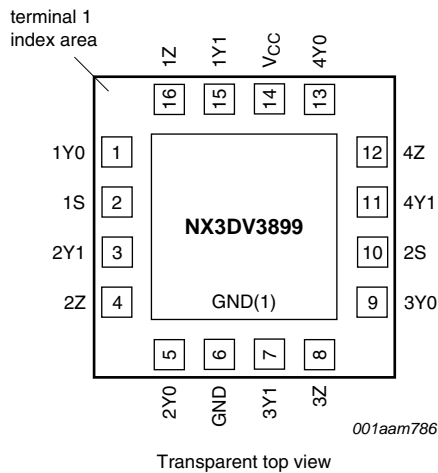


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Fig 2. Logic diagram

## 7. Pinning information

### 7.1 Pinning

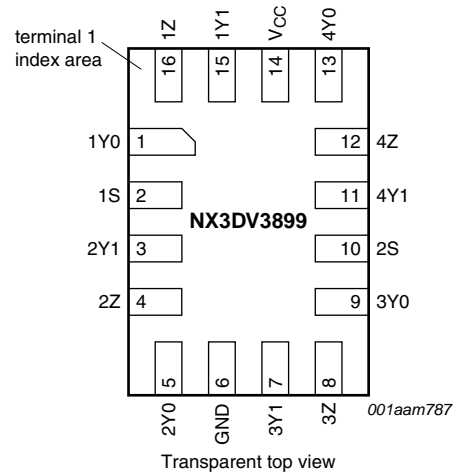


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Transparent top view

- (1) This is not a supply pin, the substrate is attached to this pad using conductive die attach material. There is no electrical or mechanical requirement to solder this pad however if it is soldered the solder land should remain floating or be connected to GND.

Fig 3. Pin configuration SOT1039-1 (HXQFN16U)



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Transparent top view

Fig 4. Pin configuration SOT1161-1 (XQFN16)

## 7.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
1Y0, 2Y0, 3Y0, 4Y0	1, 5, 9, 13	independent input or output
1S, 2S	2, 10	select input
1Y1, 2Y1, 3Y1, 4Y1	15, 3, 7, 11	independent input or output
1Z, 2Z, 3Z, 4Z	16, 4, 8, 12	common output or input
GND	6	ground (0 V)
V <sub>CC</sub>	14	supply voltage

## 8. Functional description

Table 4. Function table<sup>[1]</sup>

Input nS	Channel on
L	nY0
H	nY1

[1] H = HIGH voltage level; L = LOW voltage level.

## 9. 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	+4.6	V
V <sub>I</sub>	input voltage	select input nS	<sup>[1]</sup> -0.5	+4.6	V
V <sub>SW</sub>	switch voltage		<sup>[2]</sup> -0.5	V <sub>CC</sub> + 0.5	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
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; source or sink current	-	±350	mA
		V <sub>SW</sub> > -0.5 V or V <sub>SW</sub> < V <sub>CC</sub> + 0.5 V; pulsed at 1 ms duration, < 10 % duty cycle; peak current	-	±500	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			
		HXQFN16U	<sup>[3]</sup> -	250	mW
		XQFN16	<sup>[4]</sup> -	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 but may not exceed 4.6 V.

[3] For HXQFN16U package: above 135 °C the value of P<sub>tot</sub> derates linearly with 16.9 mW/K.

[4] For XQFN16 package: above 133 °C the value of P<sub>tot</sub> derates linearly with 14.5 mW/K.

## 10. Recommended operating conditions

**Table 6. Recommended operating conditions**

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		1.4	4.3	V
$V_I$	input voltage	select input nS	0	4.3	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	$V_{CC} = 1.4\text{ V to }4.3\text{ V}$	[2] -	200	ns/V

[1] To avoid sinking GND current from terminal nZ when switch current flows in terminal nYn, 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 nYn. In this case, there is no limit for the voltage drop across the switch.

[2] Applies to control signal levels.

## 11. Static characteristics

**Table 7. Static characteristics**

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

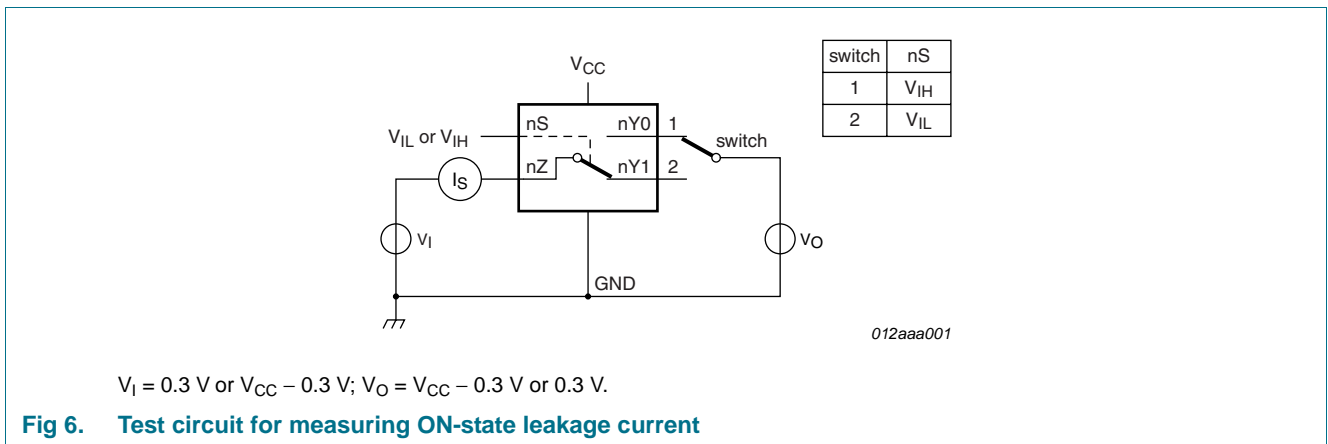
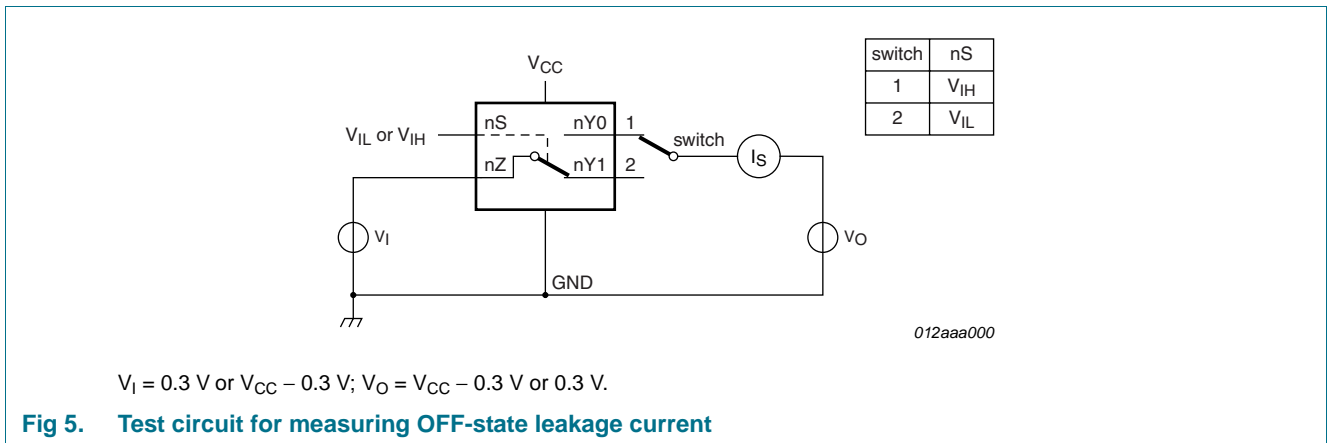
Symbol	Parameter	Conditions	$T_{amb} = 25\text{ °C}$			$T_{amb} = -40\text{ °C to }+125\text{ °C}$			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	0.9	-	-	0.9	-	-	V
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0.9	-	-	0.9	-	-	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.1	-	-	1.1	-	-	V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$	1.3	-	-	1.3	-	-	V
		$V_{CC} = 3.6\text{ V to }4.3\text{ V}$	1.4	-	-	1.4	-	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	-	-	0.3	-	0.3	0.3	V
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	0.4	-	0.4	0.3	V
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	0.4	-	0.4	0.4	V
		$V_{CC} = 2.7\text{ V to }3.6\text{ V}$	-	-	0.5	-	0.5	0.5	V
		$V_{CC} = 3.6\text{ V to }4.3\text{ V}$	-	-	0.6	-	0.6	0.6	V
$I_I$	input leakage current	select input nS; $V_I = \text{GND to }4.3\text{ V};$ $V_{CC} = 1.4\text{ V to }4.3\text{ V}$	-	-	-	-	$\pm 0.5$	$\pm 1$	$\mu\text{A}$
$I_{S(OFF)}$	OFF-state leakage current	nY0 and nY1 port; see <a href="#">Figure 5</a>							
		$V_{CC} = 1.4\text{ V to }4.3\text{ V}$	-	-	$\pm 5$	-	$\pm 50$	$\pm 500$	nA
$I_{S(ON)}$	ON-state leakage current	nZ port; see <a href="#">Figure 6</a>							
		$V_{CC} = 1.4\text{ V to }4.3\text{ V}$	-	-	$\pm 5$	-	$\pm 50$	$\pm 500$	nA
$I_{CC}$	supply current	$V_I = V_{CC}$ or GND; $V_{SW} = \text{GND or }V_{CC}$							
		$V_{CC} = 3.6\text{ V}$	-	-	100	-	500	5000	nA
		$V_{CC} = 4.3\text{ V}$	-	-	150	-	800	6000	nA

**Table 7. Static characteristics ...continued**

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

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
ΔI <sub>CC</sub>	additional supply current	V <sub>SW</sub> = GND or V <sub>CC</sub>							
		V <sub>I</sub> = 2.6 V; V <sub>CC</sub> = 4.3 V	-	2.0	4.0	-	7	7	μA
		V <sub>I</sub> = 2.6 V; V <sub>CC</sub> = 3.6 V	-	0.35	0.7	-	1	1	μA
		V <sub>I</sub> = 1.8 V; V <sub>CC</sub> = 4.3 V	-	7.0	10.0	-	15	15	μA
		V <sub>I</sub> = 1.8 V; V <sub>CC</sub> = 3.6 V	-	2.5	4.0	-	5	5	μA
		V <sub>I</sub> = 1.8 V; V <sub>CC</sub> = 2.5 V	-	50	200	-	300	500	nA
C <sub>I</sub>	input capacitance		-	1.0	-	-	-	-	pF
C <sub>S(OFF)</sub>	OFF-state capacitance		-	8	-	-	-	-	pF
C <sub>S(ON)</sub>	ON-state capacitance		-	30	-	-	-	-	pF

11.1 Test circuits



## 11.2 ON resistance

**Table 8. ON resistance**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for graphs see [Figure 8](#) to [Figure 14](#).

Symbol	Parameter	Conditions	T <sub>amb</sub> = -40 °C to +85 °C			T <sub>amb</sub> = -40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
R <sub>ON(peak)</sub>	ON resistance (peak)	V <sub>I</sub> = GND to V <sub>CC</sub> ; I <sub>SW</sub> = 100 mA; see <a href="#">Figure 7</a>						
		V <sub>CC</sub> = 1.4 V	-	7.2	9.3	-	10	Ω
		V <sub>CC</sub> = 1.65 V	-	5.4	7.3	-	8	Ω
		V <sub>CC</sub> = 2.5 V	-	2.9	3.9	-	4.5	Ω
		V <sub>CC</sub> = 3.0 V	-	2.4	3.4	-	4.5	Ω
		V <sub>CC</sub> = 3.6 V	-	2.3	3.3	-	4.2	Ω
		V <sub>CC</sub> = 4.3 V	-	2.2	3.3	-	4.2	Ω
ΔR <sub>ON</sub>	ON resistance mismatch between channels	V <sub>I</sub> = GND to V <sub>CC</sub> ; I <sub>SW</sub> = 100 mA		<a href="#">[2]</a>				
		V <sub>CC</sub> = 3.0 V	-	0.8	-	-	-	Ω
		V <sub>CC</sub> = 4.3 V	-	0.7	-	-	-	Ω
R <sub>ON(flat)</sub>	ON resistance (flatness)	V <sub>I</sub> = GND to V <sub>CC</sub> ; I <sub>SW</sub> = 100 mA		<a href="#">[3]</a>				
		V <sub>CC</sub> = 1.4 V	-	4.4	-	-	-	Ω
		V <sub>CC</sub> = 1.65 V	-	2.8	-	-	-	Ω
		V <sub>CC</sub> = 2.5 V	-	1.0	-	-	-	Ω
		V <sub>CC</sub> = 3.0 V	-	0.8	-	-	-	Ω
		V <sub>CC</sub> = 3.6 V	-	0.9	-	-	-	Ω
		V <sub>CC</sub> = 4.3 V	-	1.0	-	-	-	Ω

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

[2] Measured at identical V<sub>CC</sub>, temperature and input voltage.

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

11.3 ON resistance test circuit and graphs

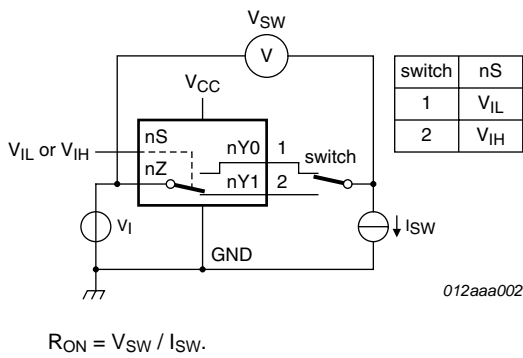
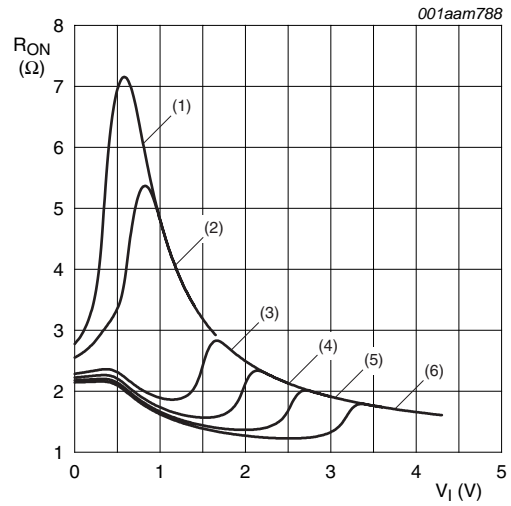


Fig 7. Test circuit for measuring ON resistance

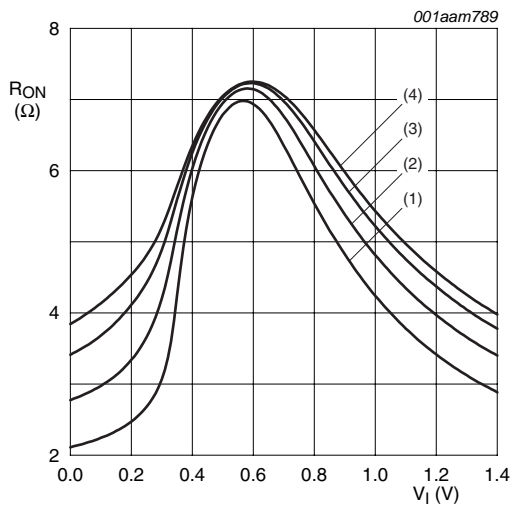


- (1) V<sub>CC</sub> = 1.4 V.
- (2) V<sub>CC</sub> = 1.65 V.
- (3) V<sub>CC</sub> = 2.5 V.
- (4) V<sub>CC</sub> = 3.0 V.
- (5) V<sub>CC</sub> = 3.6 V.
- (6) V<sub>CC</sub> = 4.3 V.

Measured at T<sub>amb</sub> = 25 °C.

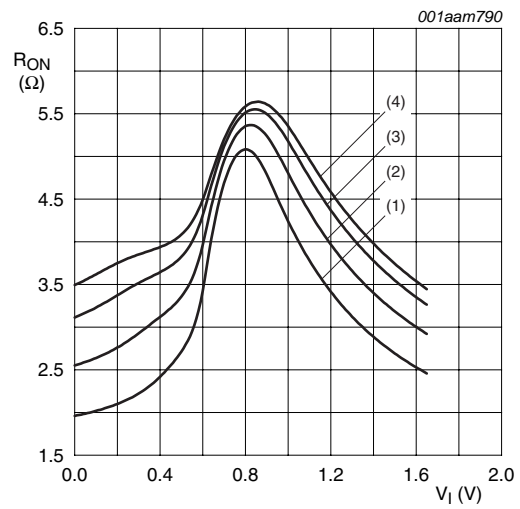
Fig 8. Typical ON resistance as a function of input voltage





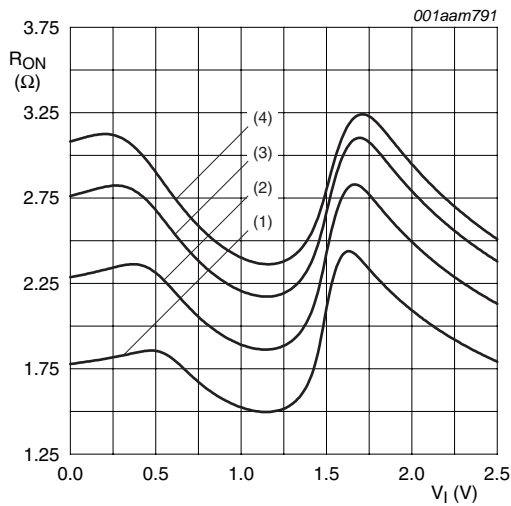
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig 9. ON resistance as a function of input voltage;**  
 $V_{CC} = 1.4\text{ V}$



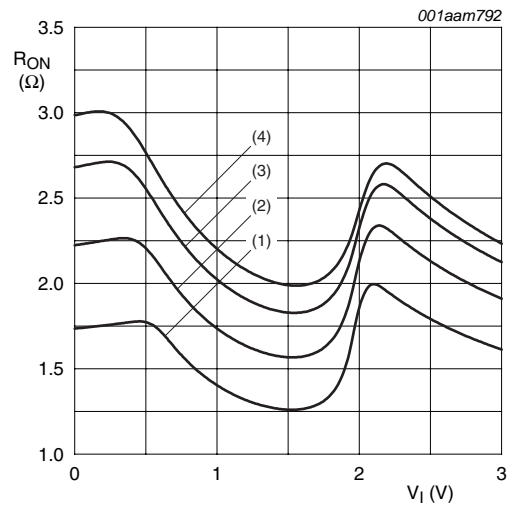
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig 10. ON resistance as a function of input voltage;**  
 $V_{CC} = 1.65\text{ V}$



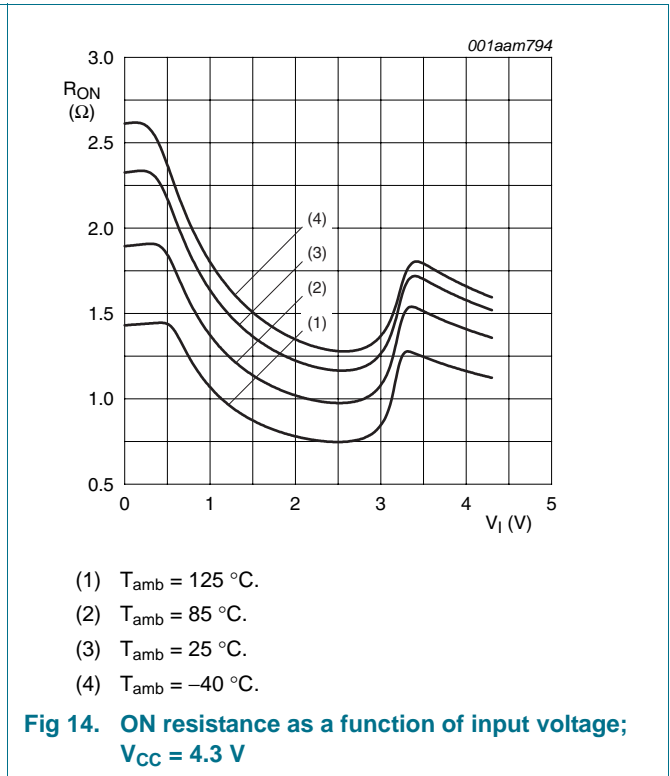
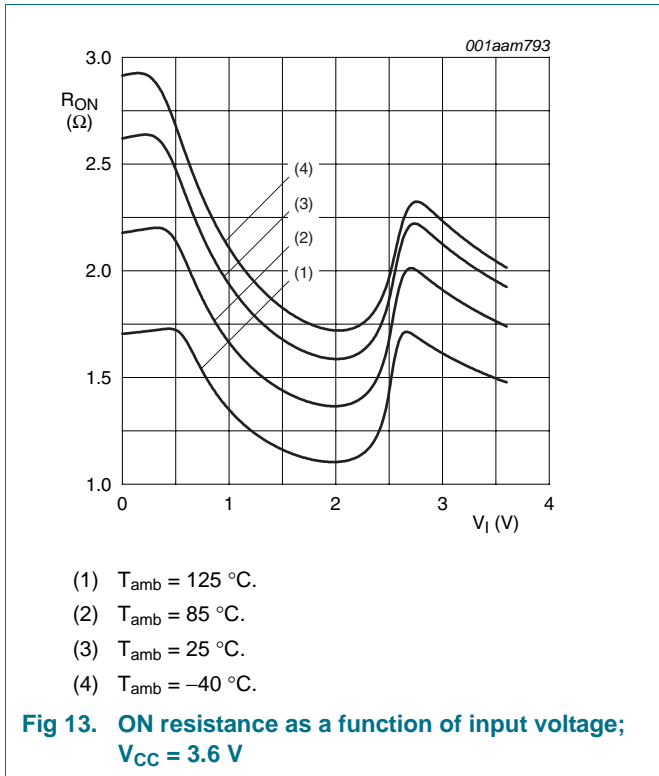
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig 11. ON resistance as a function of input voltage;**  
 $V_{CC} = 2.5\text{ V}$



- (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 12. ON resistance as a function of input voltage;**  
 $V_{CC} = 3.0\text{ V}$



## 12. Dynamic characteristics

**Table 9. Dynamic characteristics**

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

Symbol	Parameter	Conditions	$T_{amb} = 25\text{ }^{\circ}\text{C}$			$T_{amb} = -40\text{ }^{\circ}\text{C to } +125\text{ }^{\circ}\text{C}$			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
$t_{en}$	enable time	nS to nZ or nYn; see <a href="#">Figure 15</a>							
		$V_{CC} = 1.4\text{ V to } 1.6\text{ V}$	-	41	90	-	120	120	ns
		$V_{CC} = 1.65\text{ V to } 1.95\text{ V}$	-	30	70	-	80	90	ns
		$V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	20	45	-	50	55	ns
		$V_{CC} = 2.7\text{ V to } 3.6\text{ V}$	-	19	40	-	45	50	ns
		$V_{CC} = 3.6\text{ V to } 4.3\text{ V}$	-	19	40	-	45	50	ns
$t_{dis}$	disable time	nS to nZ or nYn; see <a href="#">Figure 15</a>							
		$V_{CC} = 1.4\text{ V to } 1.6\text{ V}$	-	24	70	-	80	90	ns
		$V_{CC} = 1.65\text{ V to } 1.95\text{ V}$	-	15	55	-	60	65	ns
		$V_{CC} = 2.3\text{ V to } 2.7\text{ V}$	-	9	25	-	30	35	ns
		$V_{CC} = 2.7\text{ V to } 3.6\text{ V}$	-	8	20	-	25	30	ns
		$V_{CC} = 3.6\text{ V to } 4.3\text{ V}$	-	8	20	-	25	30	ns

**Table 9. Dynamic characteristics ...continued**

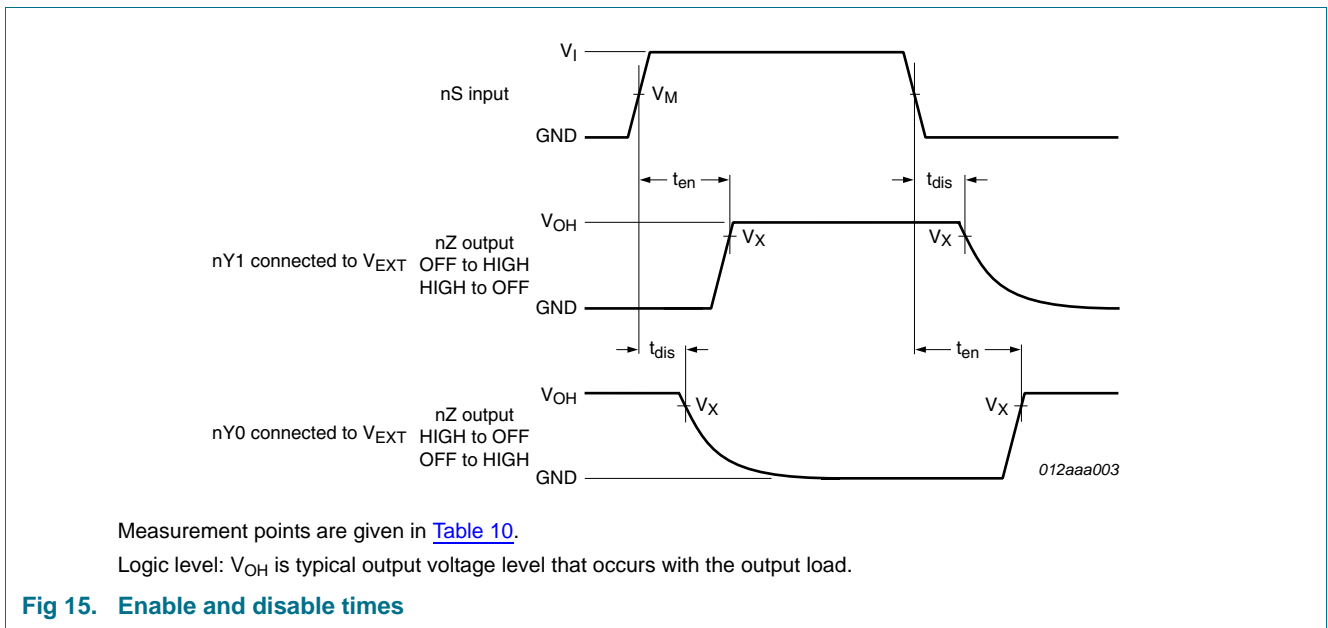
At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for test circuit see [Figure 17](#).

Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
t <sub>b-m</sub>	break-before-make time	see <a href="#">Figure 16</a> <sup>[2]</sup>							
		V <sub>CC</sub> = 1.4 V to 1.6 V	-	20	-	9	-	-	ns
		V <sub>CC</sub> = 1.65 V to 1.95 V	-	17	-	7	-	-	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	13	-	4	-	-	ns
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	11	-	3	-	-	ns
		V <sub>CC</sub> = 3.6 V to 4.3 V	-	11	-	2	-	-	ns

[1] Typical values are measured at T<sub>amb</sub> = 25 °C and V<sub>CC</sub> = 1.5 V, 1.8 V, 2.5 V, 3.3 V and 4.3 V respectively.

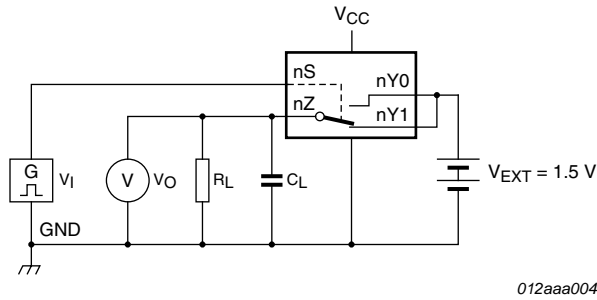
[2] Break-before-make guaranteed by design.

### 12.1 Waveform and test circuits

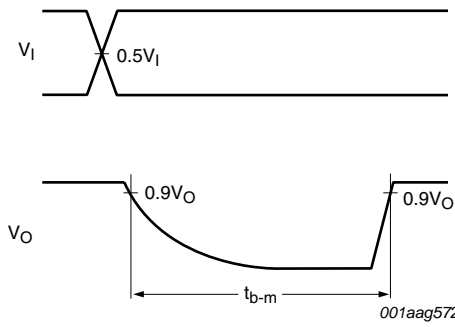


**Table 10. Measurement points**

Supply voltage	Input	Output
V <sub>CC</sub>	V <sub>M</sub>	V <sub>X</sub>
1.4 V to 4.3 V	0.5V <sub>CC</sub>	0.9V <sub>OH</sub>

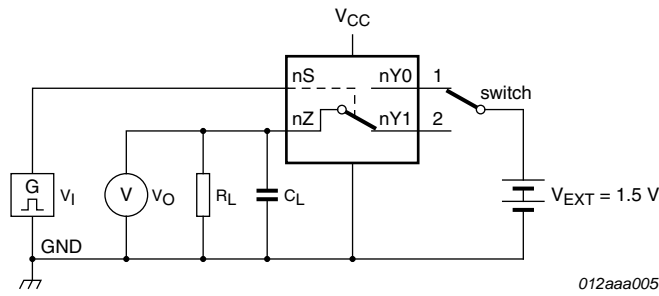


a. Test circuit



b. Input and output measurement points

**Fig 16. Test circuit for measuring break-before-make timing**



Test data is given in [Table 11](#).

Definitions test circuit:

$R_L$  = Load resistance.

$C_L$  = Load capacitance including jig and probe capacitance.

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

**Fig 17. Test circuit for measuring switching times**

**Table 11. Test data**

Supply voltage	Input		Load	
$V_{CC}$	$V_I$	$t_r, t_f$	$C_L$	$R_L$
1.4 V to 4.3 V	$V_{CC}$	$\leq 2.5$ ns	35 pF	50 $\Omega$

## 12.2 Additional dynamic characteristics

**Table 12. Additional dynamic characteristics**

At recommended operating conditions; voltages are referenced to GND (ground = 0 V);  $V_I = \text{GND}$  or  $V_{CC}$  (unless otherwise specified);  $t_r = t_f \leq 2.5 \text{ ns}$ ;  $T_{amb} = 25 \text{ }^\circ\text{C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
THD	total harmonic distortion	$f_i = 20 \text{ Hz to } 20 \text{ kHz}$ ; $R_L = 600 \text{ } \Omega$ ; see <a href="#">Figure 18</a>	[1]			
		$V_{CC} = 1.4 \text{ V}$ ; $V_I = 1 \text{ V (p-p)}$	-	0.05	-	%
		$V_{CC} = 1.65 \text{ V}$ ; $V_I = 1.2 \text{ V (p-p)}$	-	0.02	-	%
		$V_{CC} = 2.3 \text{ V}$ ; $V_I = 1.5 \text{ V (p-p)}$	-	0.01	-	%
		$V_{CC} = 2.7 \text{ V}$ ; $V_I = 2 \text{ V (p-p)}$	-	0.01	-	%
		$V_{CC} = 3.6 \text{ V}$ ; $V_I = 2 \text{ V (p-p)}$	-	0.01	-	%
$f_{(-3\text{dB})}$	-3 dB frequency response	$R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 19</a>	[1]			
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	200	-	MHz
$\alpha_{\text{iso}}$	isolation (OFF-state)	$f_i = 1 \text{ MHz}$ ; $R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 20</a>	[1]			
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	-70	-	dB
$V_{\text{ct}}$	crosstalk voltage	between digital inputs and switch; $f_i = 1 \text{ MHz}$ ; $C_L = 50 \text{ pF}$ ; $R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 21</a>				
		$V_{CC} = 1.4 \text{ V to } 3.6 \text{ V}$	-	210	-	V
		$V_{CC} = 3.6 \text{ V to } 4.3 \text{ V}$	-	300	-	V
Xtalk	crosstalk	between switches; $f_i = 1 \text{ MHz}$ ; $R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 22</a>	[1]			
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	-90	-	dB
$Q_{\text{inj}}$	charge injection	$f_i = 1 \text{ MHz}$ ; $C_L = 0.1 \text{ nF}$ ; $R_L = 1 \text{ M}\Omega$ ; $V_{\text{gen}} = 0 \text{ V}$ ; $R_{\text{gen}} = 0 \text{ } \Omega$ ; see <a href="#">Figure 23</a>				
		$V_{CC} = 1.4 \text{ V}$	-	0.5	-	pC
		$V_{CC} = 1.65 \text{ V}$	-	0.7	-	pC
		$V_{CC} = 2.5 \text{ V}$	-	1.6	-	pC
		$V_{CC} = 3.0 \text{ V}$	-	2.1	-	pC
		$V_{CC} = 3.6 \text{ V}$	-	2.9	-	pC
		$V_{CC} = 4.3 \text{ V}$	-	4.0	-	pC

[1]  $f_i$  is biased at  $0.5V_{CC}$ .

12.3 Test circuits

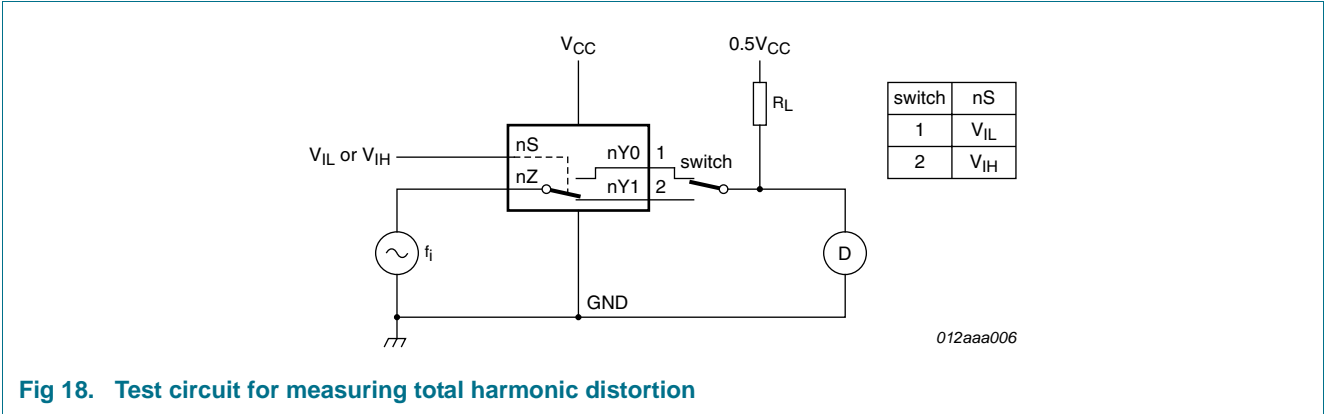


Fig 18. Test circuit for measuring total harmonic distortion

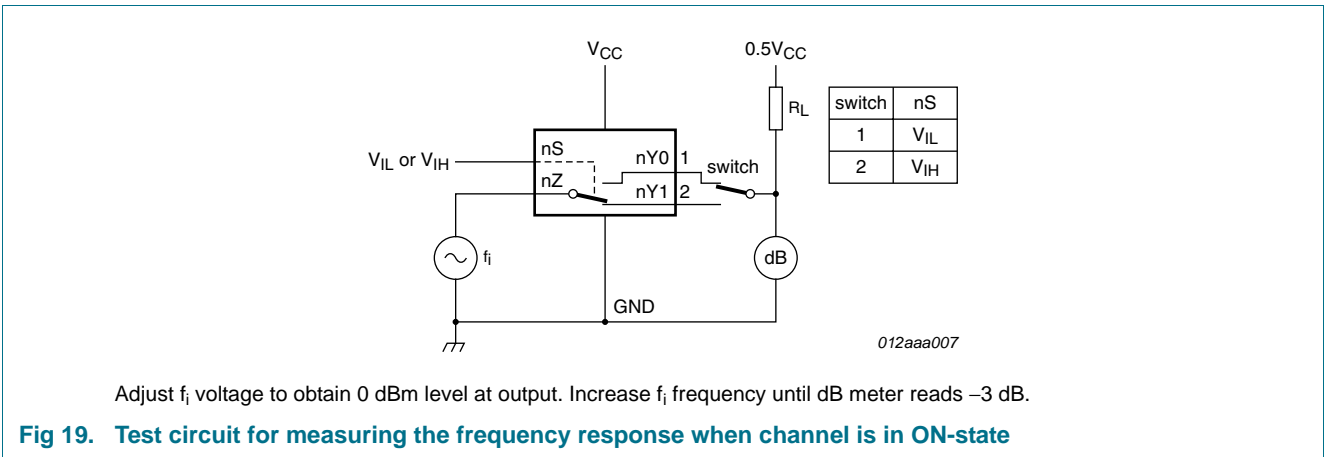


Fig 19. Test circuit for measuring the frequency response when channel is in ON-state

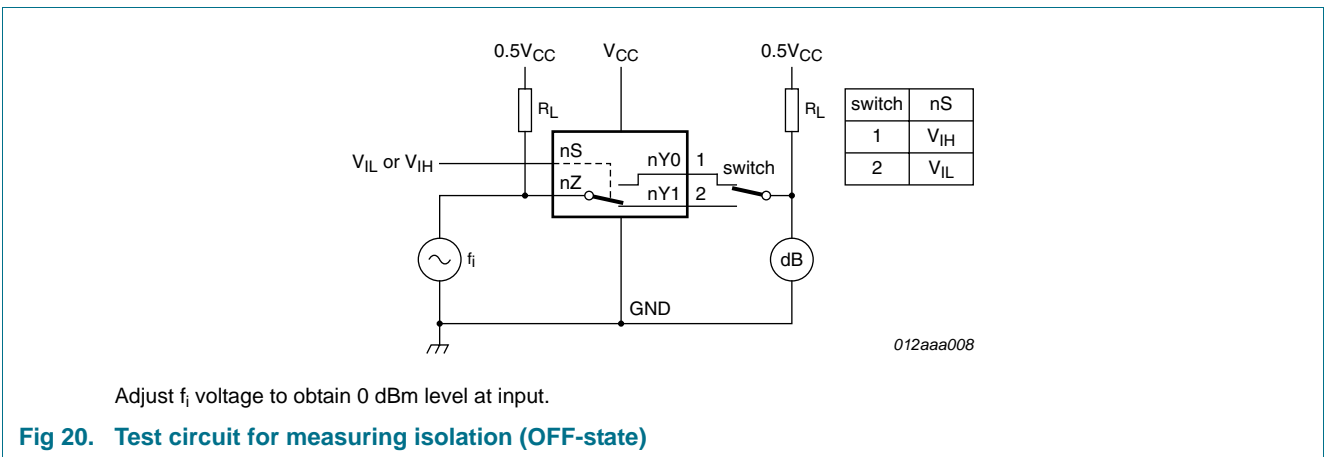
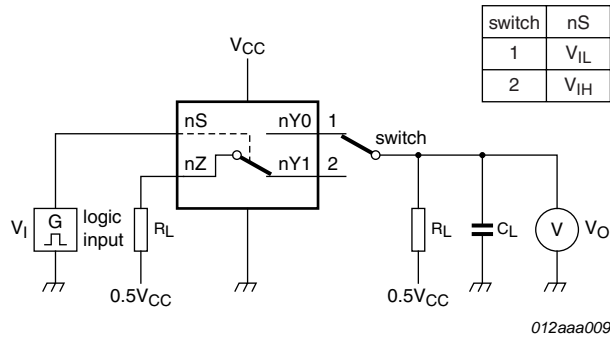
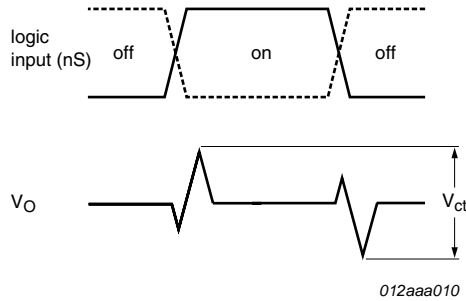


Fig 20. Test circuit for measuring isolation (OFF-state)

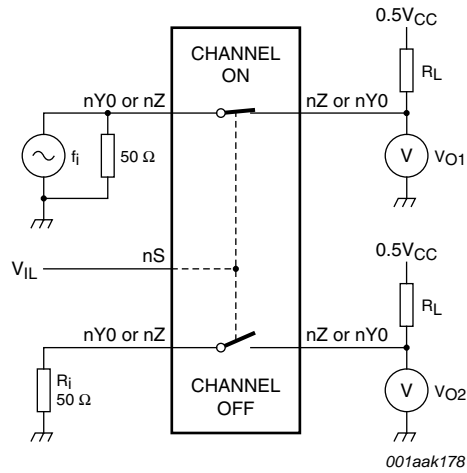


a. Test circuit



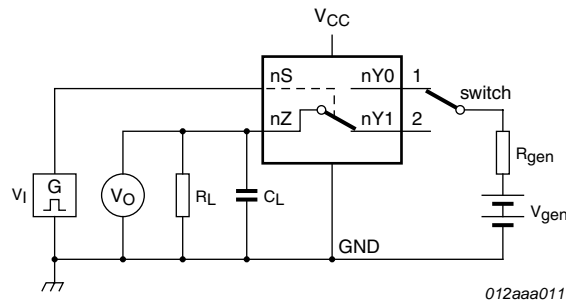
b. Input and output pulse definitions

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

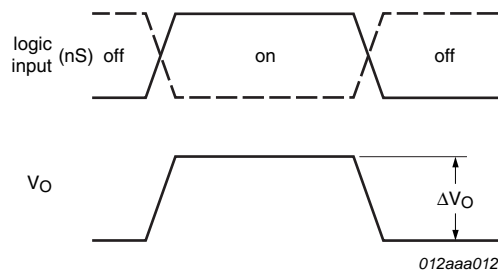


$$20 \log_{10} (V_{O2} / V_{O1}) \text{ or } 20 \log_{10} (V_{O1} / V_{O2}).$$

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



a. Test circuit



b. Input and output pulse definitions

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

$\Delta V_O$  = output voltage variation.

$R_{gen}$  = generator resistance.

$V_{gen}$  = generator voltage.

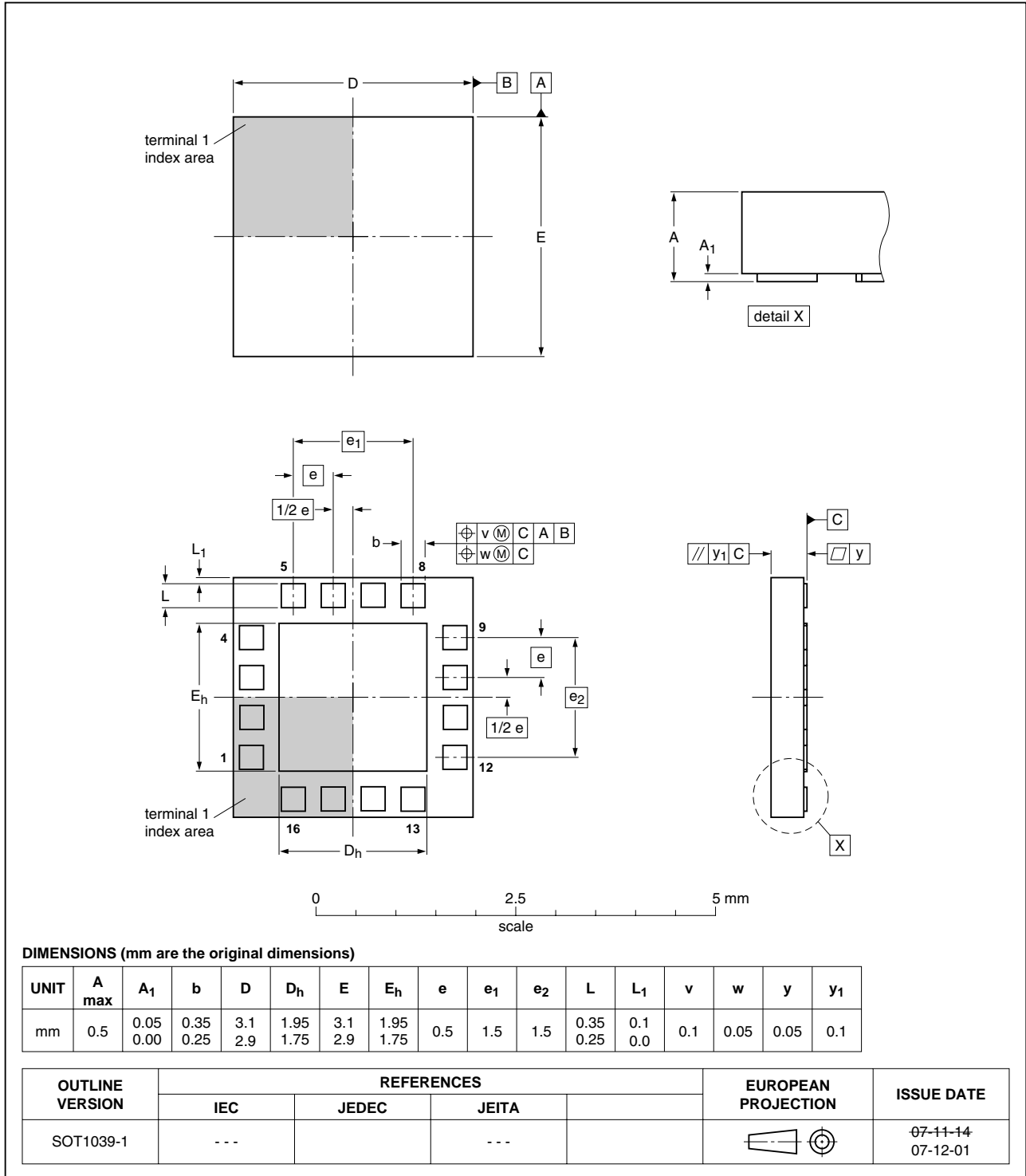
**Fig 23. Test circuit for measuring charge injection**



**13. Package outline**

**HXQFN16U: plastic thermal enhanced extremely thin quad flat package; no leads; 16 terminals; UTLP based; body 3 x 3 x 0.5 mm**

**SOT1039-1**



**Fig 24. Package outline SOT1039-1 (HXQFN16U)**

XQFN16: plastic, extremely thin quad flat package; no leads; 16 terminals; body 1.80 x 2.60 x 0.50 mm

SOT1161-1

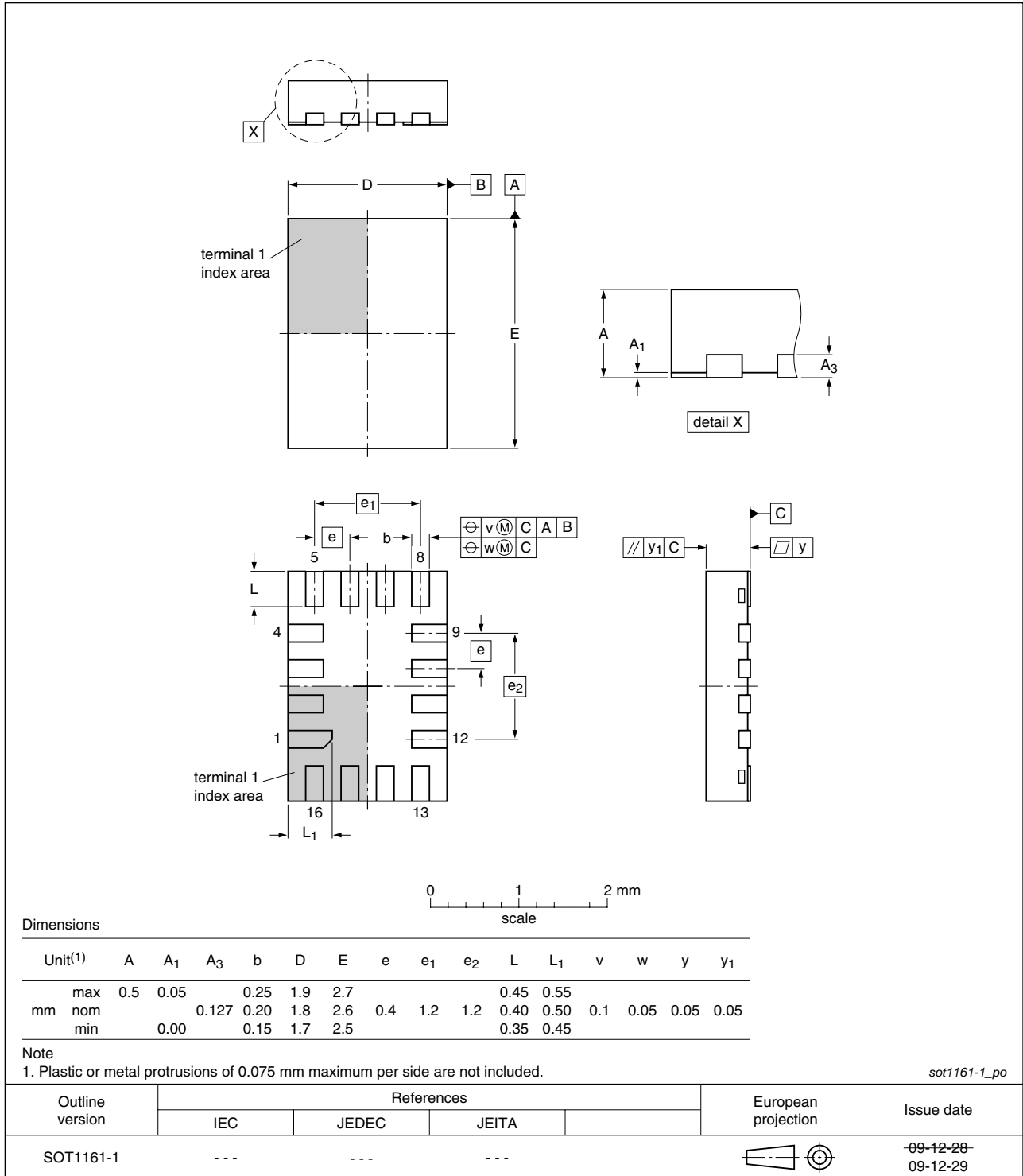


Fig 25. Package outline SOT1161-1 (XQFN16)

## 14. Abbreviations

Table 13. Abbreviations

Acronym	Description
CDM	Charged Device Model
CMOS	Complementary Metal-Oxide Semiconductor
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model
PDA	Personal Digital Assistant

## 15. Revision history

Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NX3DV3899 v.2	20101123	Product data sheet	-	NX3DV3899 v.1
Modifications:	<ul style="list-style-type: none"> <li>• <a href="#">Table 7</a>: conditions for ON-state leakage current (<math>I_{S(ON)}</math>) and supply current (<math>I_{CC}</math>) have changed.</li> </ul>			
NX3DV3899 v.1	20101021	Product data sheet	-	-

## 16. Legal information

### 16.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

[1] Please consult the most recently issued document before initiating or completing a design.

[2] The term 'short data sheet' is explained in section "Definitions".

[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 URL <http://www.nxp.com>.

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