

# NX3L4051

## Single low-ohmic 8-channel analog switch

Rev. 2 — 12 August 2010

Product data sheet

### 1. General description

The NX3L4051 is an 8-channel analog switch, suitable for use as an analog or digital multiplexer/demultiplexer. The NX3L4051 has three digital select inputs (S1 to S3), eight independent inputs/outputs (Y0 to Y7) and a common input/output (Z). All eight switches share an enable input ( $\bar{E}$ ). A HIGH on  $\bar{E}$  causes all switches into the high impedance OFF-state, independent of Sn. Schmitt trigger action at the select input (Sn and  $\bar{E}$ ) 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 Sn and  $\bar{E}$  to be driven by lower level logic signals without a significant increase in supply current  $I_{CC}$ . This makes it possible for the NX3L4051 to switch 4.3 V signals with a 1.8 V digital controller, eliminating the need for logic level translation. The NX3L4051 allows signals with amplitude up to  $V_{CC}$  to be transmitted from Z to Yn or from Yn to Z. Its low ON resistance (0.5  $\Omega$ ) and flatness (0.13  $\Omega$ ) ensures minimal attenuation and distortion of transmitted signals.

### 2. Features and benefits

- Wide supply voltage range from 1.4 V to 4.3 V
- Very low ON resistance (peak):
  - ◆ 1.7  $\Omega$  (typical) at  $V_{CC} = 1.4$  V
  - ◆ 1.0  $\Omega$  (typical) at  $V_{CC} = 1.65$  V
  - ◆ 0.6  $\Omega$  (typical) at  $V_{CC} = 2.3$  V
  - ◆ 0.5  $\Omega$  (typical) at  $V_{CC} = 2.7$  V
  - ◆ 0.5  $\Omega$  (typical) at  $V_{CC} = 4.3$  V
- Break-before-make switching
- High noise immunity
- ESD protection:
  - ◆ HBM JESD22-A114F Class 3A exceeds 7500 V
  - ◆ 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

- Cell phone
- PDA
- Portable media player
- Analog multiplexing and demultiplexing
- Digital multiplexing and demultiplexing
- Signal gating

### 4. Ordering information

Table 1. Ordering information

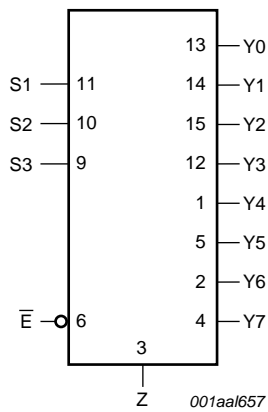
Type number	Package			
	Temperature range	Name	Description	Version
NX3L4051HR	-40 °C to +125 °C	HXQFN16U	plastic thermal enhanced extremely thin quad flat package; no leads; 16 terminals; UTLP based; body 3 × 3 × 0.5 mm	SOT1039-1
NX3L4051PW	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1

### 5. Marking

Table 2. Marking codes

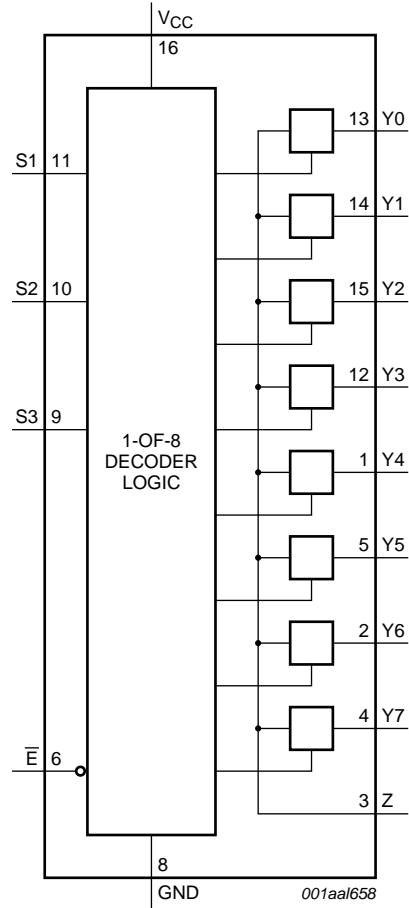
Type number	Marking code
NX3L4051HR	M41
NX3L4051PW	X3L4051

**6. Functional diagram**



Pin numbers are shown for TSSOP16 package only.

**Fig 1. Logic symbol**

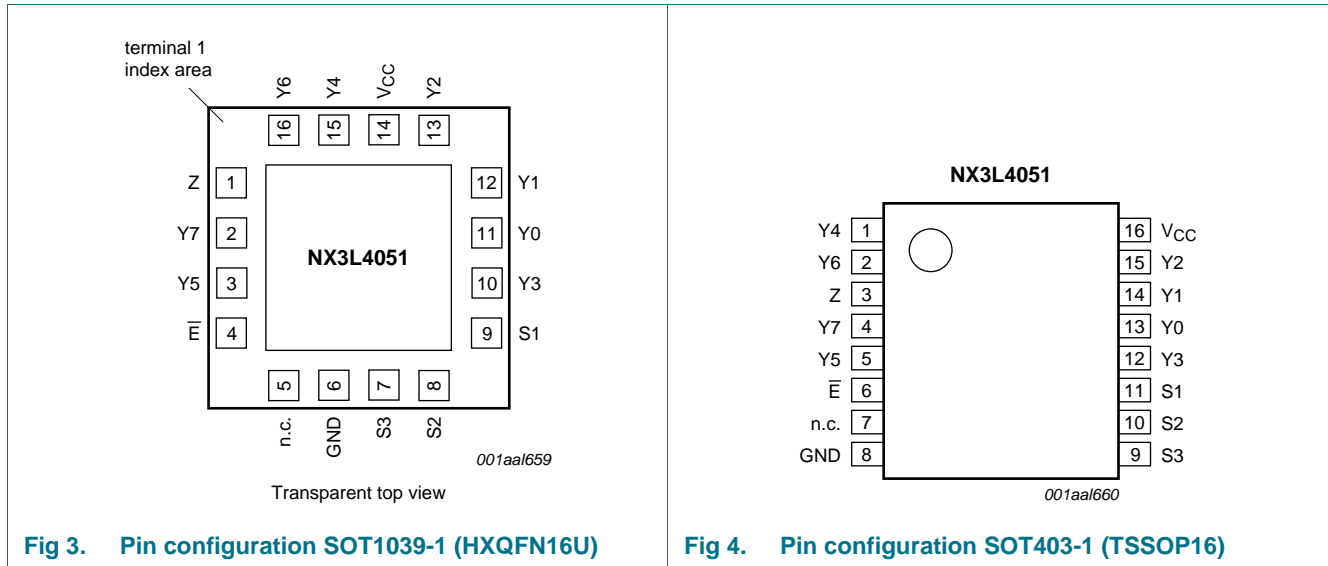


Pin numbers are shown for TSSOP16 package only.

**Fig 2. Functional diagram**

## 7. Pinning information

### 7.1 Pinning



### 7.2 Pin description

**Table 3. Pin description**

Symbol	Pin		Description
	SOT1039-1	SOT403-1	
Y0, Y1, Y2, Y3, Y4, Y5, Y6, Y7	11, 12, 13, 10, 15, 3, 16, 2	13, 14, 15, 12, 1, 5, 2, 4	independent input or output
Z	1	3	independent output or input
$\bar{E}$	4	6	enable input (active LOW)
n.c.	5	7	not connected
GND	6	8	ground (0 V)
S1, S2, S3	9, 8, 7	11, 10, 9	select input
V <sub>CC</sub>	14	16	supply voltage

## 8. Functional description

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

Input				Channel ON
$\bar{E}$	S3	S2	S1	
L	L	L	L	Y0 = Z
L	L	L	H	Y1 = Z
L	L	H	L	Y2 = Z
L	L	H	H	Y3 = Z
L	H	L	L	Y4 = Z
L	H	L	H	Y5 = Z
L	H	H	L	Y6 = Z
L	H	H	H	Y7 = Z
H	X	X	X	switches off

[1] H = HIGH voltage level; L = LOW voltage level; X = don't care.

## 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
$V_{CC}$	supply voltage		-0.5	+4.6	V
$V_I$	input voltage	Sn and $\bar{E}$	<sup>[1]</sup> -0.5	+4.6	V
$V_{SW}$	switch voltage		<sup>[2]</sup> -0.5	$V_{CC} + 0.5$	V
$I_{IK}$	input clamping current	$V_I < -0.5$ V	-50	-	mA
$I_{SK}$	switch clamping current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	-	$\pm 50$	mA
$I_{SW}$	switch current	$V_{SW} > -0.5$ V or $V_{SW} < V_{CC} + 0.5$ V; source or sink current	-	$\pm 350$	mA
		$V_{SW} > -0.5$ V or $V_{SW} < V_{CC} + 0.5$ V; pulsed at 1 ms duration, < 10 % duty cycle; peak current	-	$\pm 500$	mA
$T_{stg}$	storage temperature		-65	+150	°C
$P_{tot}$	total power dissipation	$T_{amb} = -40$ °C to +125 °C			
		HXQFN16U	<sup>[3]</sup> -	250	mW
		TSSOP16	<sup>[4]</sup> -	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 but may not exceed 4.6 V.

[3] For HXQFN16U package: above 135 °C the value of  $P_{tot}$  derates linearly with 16.9 mW/K.

[4] For TSSOP16 package: above 60 °C the value of  $P_{tot}$  derates linearly with 5.5 mW/K above.

## 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	Sn and $\bar{E}$	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	Sn and $\bar{E}$ ; $V_{CC} = 1.4\text{ V to }4.3\text{ V}$	-	200	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.

## 11. Static characteristics

**Table 7. Static characteristics**

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

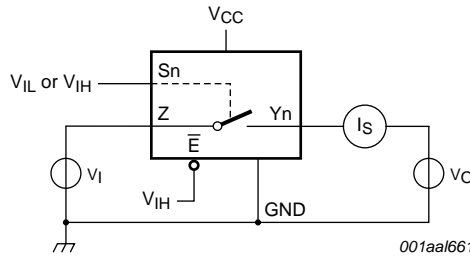
Symbol	Parameter	Conditions	$T_{amb} = 25\text{ °C}$			$T_{amb} = -40\text{ °C to }+125\text{ °C}$			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 1.4\text{ V to }1.6\text{ V}$	0.9	-	-	0.9	-	-	V
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	0.9	-	-	0.9	-	-	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	Sn and $\bar{E}$ ; $V_I = \text{GND to }4.3\text{ V}$ ; $V_{CC} = 1.4\text{ V to }4.3\text{ V}$	-	-	-	-	$\pm 0.5$	$\pm 1$	$\mu\text{A}$
$I_{S(OFF)}$	OFF-state leakage current	Yn ports; see <a href="#">Figure 5</a>							
		$V_{CC} = 1.4\text{ V to }3.6\text{ V}$	-	-	$\pm 5$	-	$\pm 50$	$\pm 500$	nA
		$V_{CC} = 3.6\text{ V to }4.3\text{ V}$	-	-	$\pm 10$	-	$\pm 50$	$\pm 500$	nA
$I_{S(ON)}$	ON-state leakage current	Z port; $V_{CC} = 1.4\text{ V to }3.6\text{ V}$ ; see <a href="#">Figure 6</a>							
		$V_{CC} = 1.4\text{ V to }3.6\text{ V}$	-	-	$\pm 20$	-	$\pm 200$	$\pm 2000$	nA
		$V_{CC} = 3.6\text{ V to }4.3\text{ V}$	-	-	$\pm 40$	-	$\pm 200$	$\pm 2000$	nA
$I_{CC}$	supply current	$V_I = V_{CC}\text{ or GND}$ ; $V_{SW} = \text{GND or }V_{CC}$							
		$V_{CC} = 3.6\text{ V}$	-	-	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).

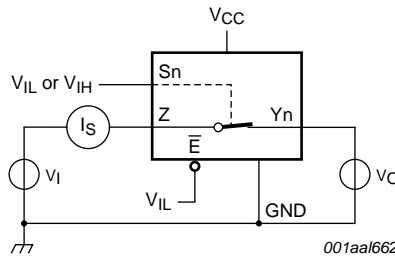
Symbol	Parameter	Conditions	T <sub>amb</sub> = 25 °C			T <sub>amb</sub> = -40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
ΔI <sub>CC</sub>	additional supply current	V <sub>SW</sub> = GND or V <sub>CC</sub>							
		V <sub>I</sub> = 2.6 V; V <sub>CC</sub> = 4.3 V	-	2.0	4.0	-	7	7	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	Sn and $\bar{E}$	-	1.0	-	-	-	-	pF
C <sub>S(OFF)</sub>	OFF-state capacitance		-	35	-	-	-	-	pF
C <sub>S(ON)</sub>	ON-state capacitance		-	350	-	-	-	-	pF

11.1 Test circuits



V<sub>I</sub> = 0.3 V or V<sub>CC</sub> - 0.3 V; V<sub>O</sub> = V<sub>CC</sub> - 0.3 V or 0.3 V.

**Fig 5. Test circuit for measuring OFF-state leakage current**



V<sub>I</sub> = 0.3 V or V<sub>CC</sub> - 0.3 V; V<sub>O</sub> = V<sub>CC</sub> - 0.3 V or 0.3 V.

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

## 11.2 ON resistance

**Table 8. ON resistance<sup>[1]</sup>**

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>[2]</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	-	1.7	3.7	-	4.1	Ω
		V <sub>CC</sub> = 1.65 V	-	1.0	1.6	-	1.7	Ω
		V <sub>CC</sub> = 2.3 V	-	0.6	0.8	-	0.9	Ω
		V <sub>CC</sub> = 2.7 V	-	0.5	0.75	-	0.9	Ω
		V <sub>CC</sub> = 4.3 V	-	0.5	0.75	-	0.9	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="#">[3]</a>						
		V <sub>CC</sub> = 1.4 V; V <sub>SW</sub> = 0.4 V	-	0.18	0.30	-	0.30	Ω
		V <sub>CC</sub> = 1.65 V; V <sub>SW</sub> = 0.5 V	-	0.18	0.20	-	0.30	Ω
		V <sub>CC</sub> = 2.3 V; V <sub>SW</sub> = 0.7 V	-	0.07	0.10	-	0.13	Ω
		V <sub>CC</sub> = 2.7 V; V <sub>SW</sub> = 0.8 V	-	0.07	0.10	-	0.13	Ω
		V <sub>CC</sub> = 4.3 V; V <sub>SW</sub> = 0.8 V	-	0.07	0.10	-	0.13	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="#">[4]</a>						
		V <sub>CC</sub> = 1.4 V	-	1.0	3.3	-	3.6	Ω
		V <sub>CC</sub> = 1.65 V	-	0.5	1.2	-	1.3	Ω
		V <sub>CC</sub> = 2.3 V	-	0.15	0.3	-	0.35	Ω
		V <sub>CC</sub> = 2.7 V	-	0.13	0.3	-	0.35	Ω
		V <sub>CC</sub> = 4.3 V	-	0.2	0.4	-	0.45	Ω

[1] For NX3L4051PW (TSSOP16 package), all ON resistance values are up to 0.05 Ω higher.

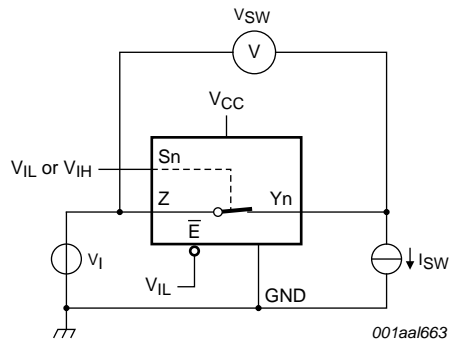
[2] Typical values are measured at T<sub>amb</sub> = 25 °C.

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

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

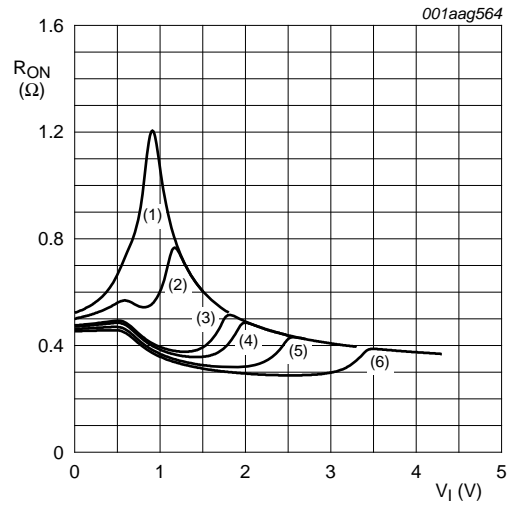


11.3 ON resistance test circuit and graphs



$R_{ON} = V_{SW} / I_{SW}$ .

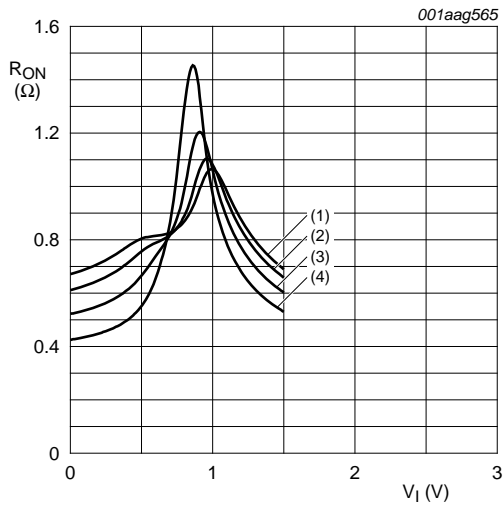
Fig 7. Test circuit for measuring ON resistance



- (1)  $V_{CC} = 1.5\text{ V}$ .
- (2)  $V_{CC} = 1.8\text{ V}$ .
- (3)  $V_{CC} = 2.5\text{ V}$ .
- (4)  $V_{CC} = 2.7\text{ V}$ .
- (5)  $V_{CC} = 3.3\text{ V}$ .
- (6)  $V_{CC} = 4.3\text{ V}$ .

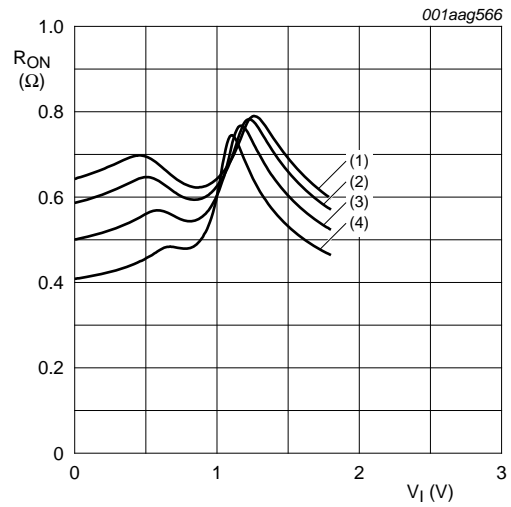
Measured at  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

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



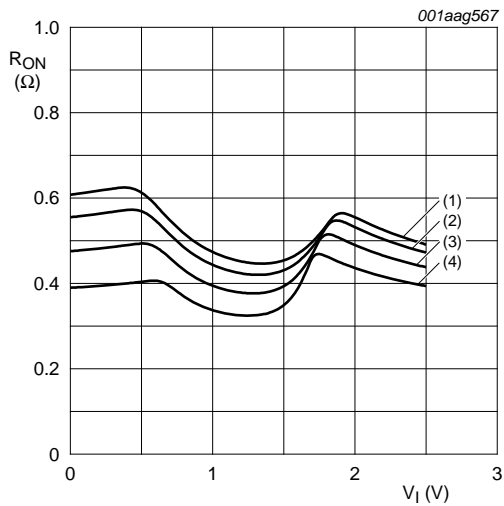
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig 9. ON resistance as a function of input voltage;**  
 $V_{CC} = 1.5\text{ V}$



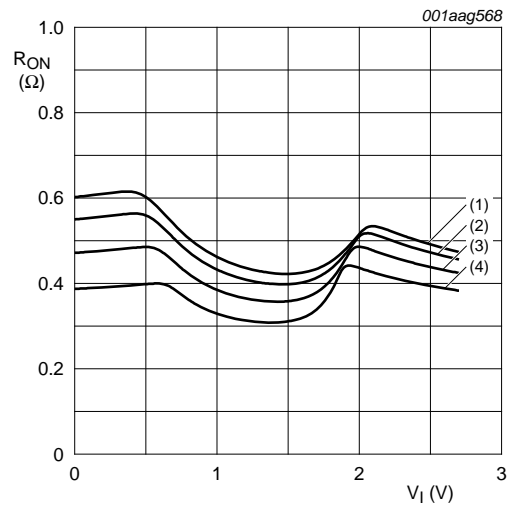
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**Fig 10. ON resistance as a function of input voltage;**  
 $V_{CC} = 1.8\text{ V}$



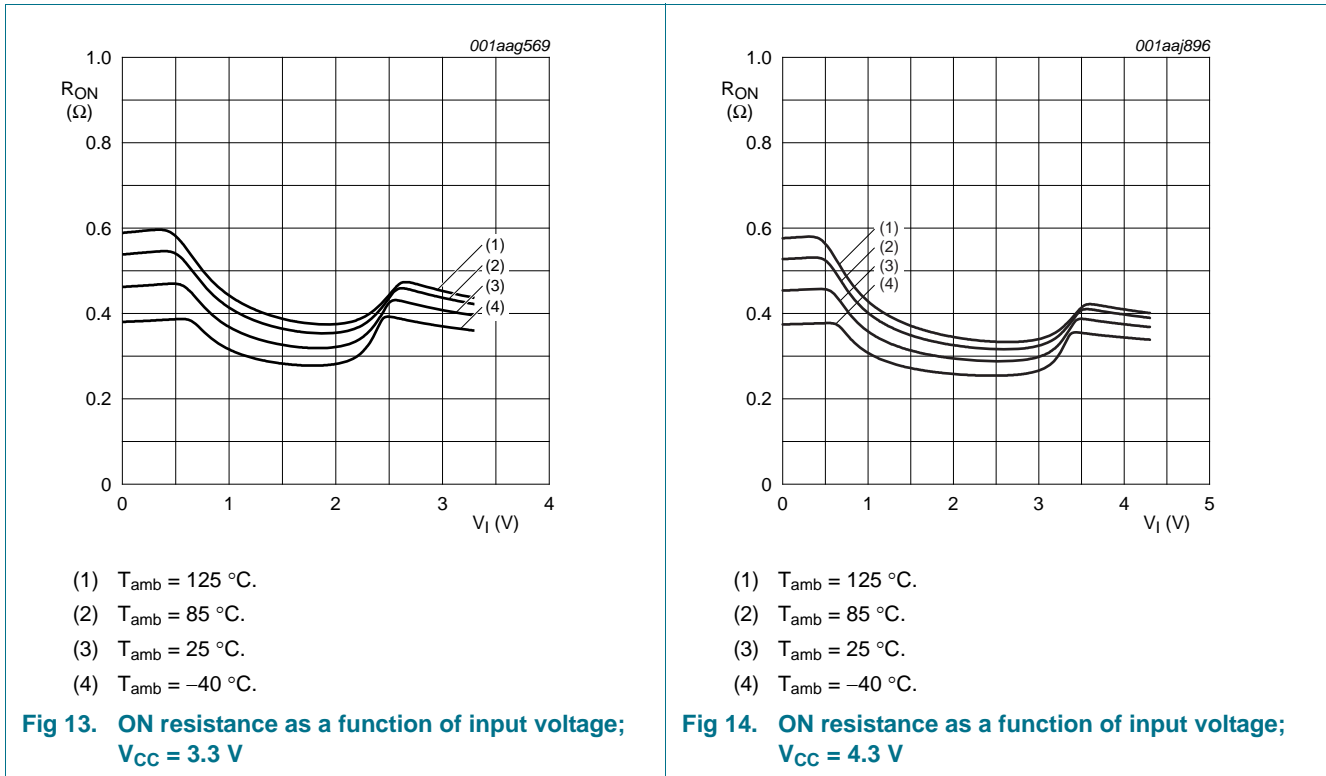
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}.$

**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;**  
 $V_{CC} = 2.7\text{ V}$



## 12. Dynamic characteristics

**Table 9. Dynamic characteristics**

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
t <sub>en</sub>	enable time	$\bar{E}$ , Sn to Z or Yn; see <a href="#">Figure 15</a> V <sub>CC</sub> = 1.4 V to 1.6 V V <sub>CC</sub> = 1.65 V to 1.95 V V <sub>CC</sub> = 2.3 V to 2.7 V V <sub>CC</sub> = 2.7 V to 3.6 V V <sub>CC</sub> = 3.6 V to 4.3 V	-	45	100	-	120	125	ns
			-	32	75	-	85	95	ns
			-	21	50	-	55	60	ns
			-	19	45	-	45	50	ns
			-	19	45	-	45	50	ns
t <sub>dis</sub>	disable time	$\bar{E}$ , Sn to Z or Yn; see <a href="#">Figure 15</a> V <sub>CC</sub> = 1.4 V to 1.6 V V <sub>CC</sub> = 1.65 V to 1.95 V V <sub>CC</sub> = 2.3 V to 2.7 V V <sub>CC</sub> = 2.7 V to 3.6 V V <sub>CC</sub> = 3.6 V to 4.3 V	-	25	80	-	90	105	ns
			-	15	65	-	70	75	ns
			-	9	30	-	35	40	ns
			-	8	25	-	30	35	ns
			-	8	25	-	30	35	ns

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

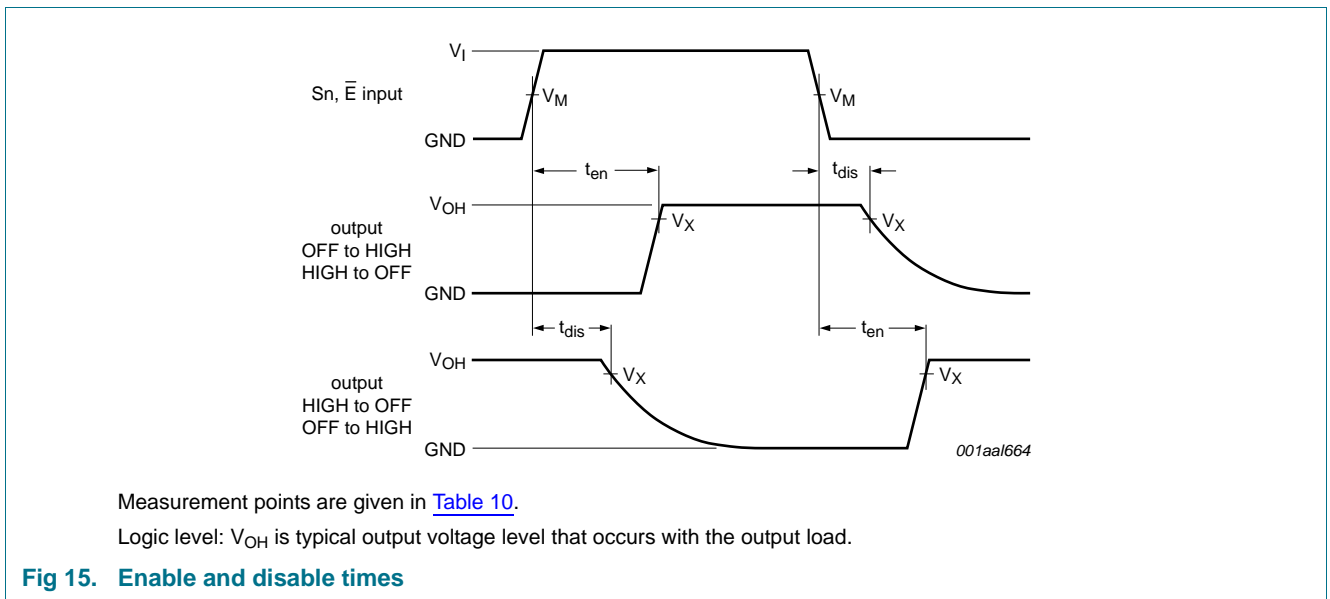
At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for load circuit see [Figure 17](#).

Symbol	Parameter	Conditions	25 °C			-40 °C to +125 °C			Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max (85 °C)	Max (125 °C)	
$t_{b-m}$	break-before-make time	see <a href="#">Figure 16</a> <sup>[2]</sup>							
		$V_{CC} = 1.4 \text{ V to } 1.6 \text{ V}$	-	19	-	9	-	-	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$	-	17	-	7	-	-	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	12	-	4	-	-	ns
		$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	-	10	-	3	-	-	ns
		$V_{CC} = 3.6 \text{ V to } 4.3 \text{ V}$	-	9	-	2	-	-	ns

[1] Typical values are measured at  $T_{amb} = 25 \text{ °C}$  and  $V_{CC} = 1.5 \text{ V}, 1.8 \text{ V}, 2.5 \text{ V}, 3.3 \text{ V}$  and  $4.3 \text{ V}$  respectively.

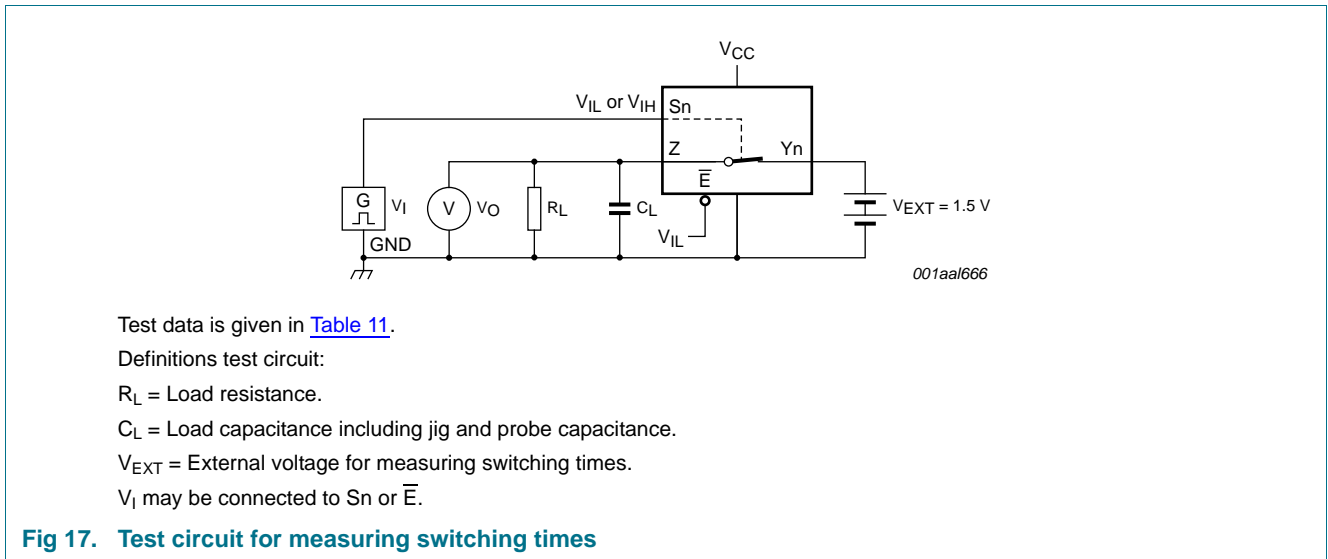
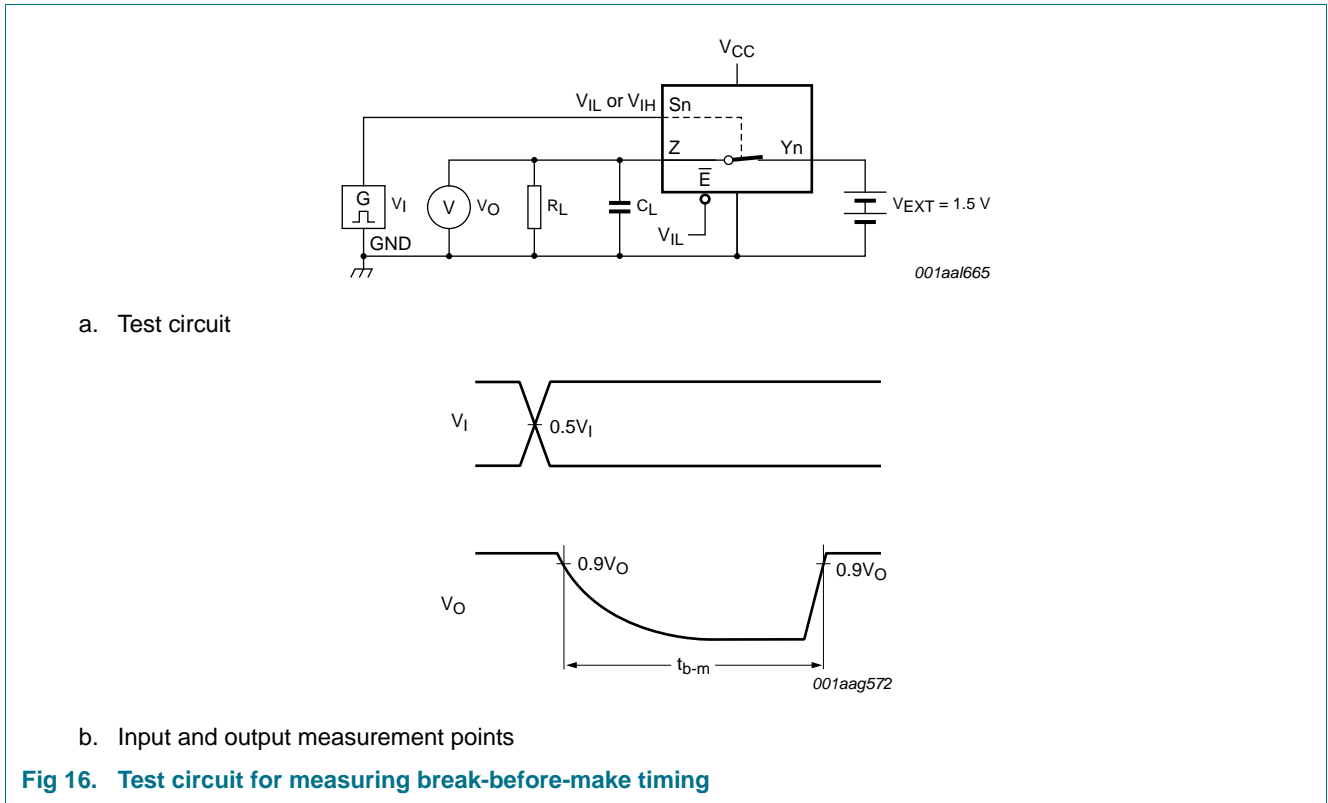
[2] Break-before-make guaranteed by design.

### 12.1 Waveform and test circuits



**Table 10. Measurement points**

Supply voltage	Input	Output
$V_{CC}$	$V_M$	$V_X$
1.4 V to 4.3 V	$0.5V_{CC}$	$0.9V_{OH}$



**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

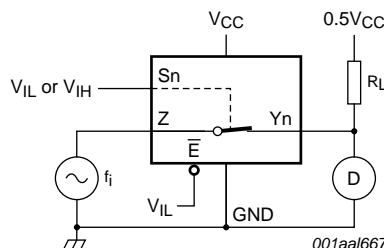
**Table 12. Additional dynamic characteristics**

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

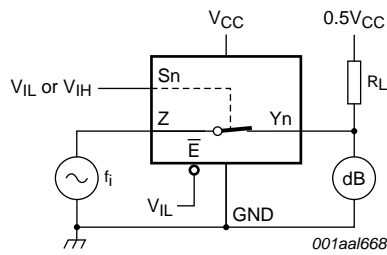
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
THD	total harmonic distortion	$f_i = 20 \text{ Hz to } 20 \text{ kHz}; R_L = 32 \text{ } \Omega$ ; see <a href="#">Figure 18</a>	[1]			
		$V_{CC} = 1.4 \text{ V}; V_I = 1 \text{ V (p-p)}$	-	0.15	-	%
		$V_{CC} = 1.65 \text{ V}; V_I = 1.2 \text{ V (p-p)}$	-	0.10	-	%
		$V_{CC} = 2.3 \text{ V}; V_I = 1.5 \text{ V (p-p)}$	-	0.02	-	%
		$V_{CC} = 2.7 \text{ V}; V_I = 2 \text{ V (p-p)}$	-	0.02	-	%
		$V_{CC} = 4.3 \text{ V}; V_I = 2 \text{ V (p-p)}$	-	0.02	-	%
$f_{(-3\text{dB})}$	-3 dB frequency response	$R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 19</a>	[1]			
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	15	-	MHz
$\alpha_{\text{iso}}$	isolation (OFF-state)	$f_i = 100 \text{ kHz}; R_L = 50 \text{ } \Omega$ ; see <a href="#">Figure 20</a>	[1]			
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	-90	-	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>				
		$V_{CC} = 1.4 \text{ V to } 3.6 \text{ V}$	-	0.2	-	V
		$V_{CC} = 3.6 \text{ V to } 4.3 \text{ V}$	-	0.3	-	V
Xtalk	crosstalk	between switches; $f_i = 100 \text{ kHz}; R_L = 50 \text{ } \Omega$ ; 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>				
		$V_{CC} = 1.5 \text{ V}$	-	3	-	pC
		$V_{CC} = 1.8 \text{ V}$	-	4	-	pC
		$V_{CC} = 2.5 \text{ V}$	-	6	-	pC
		$V_{CC} = 3.3 \text{ V}$	-	9	-	pC
		$V_{CC} = 4.3 \text{ V}$	-	15	-	pC

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

### 12.3 Test circuits

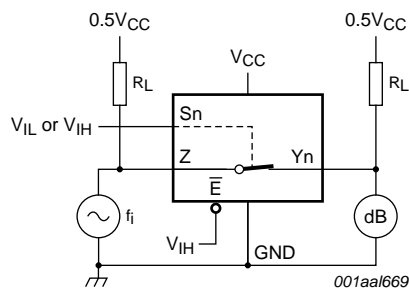


**Fig 18. Test circuit for measuring total harmonic distortion**



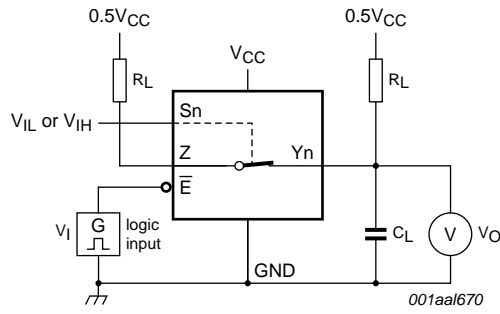
Adjust  $f_i$  voltage to obtain 0 dBm level at output. Increase  $f_i$  frequency until dB meter reads -3 dB.

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

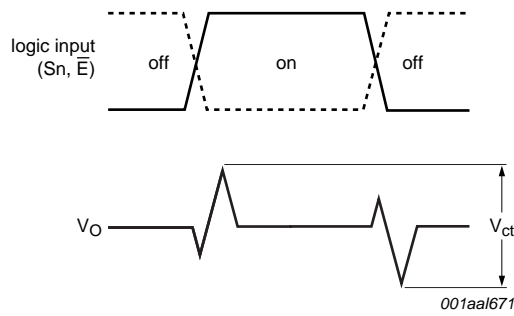


Adjust  $f_i$  voltage to obtain 0 dBm level at input.

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

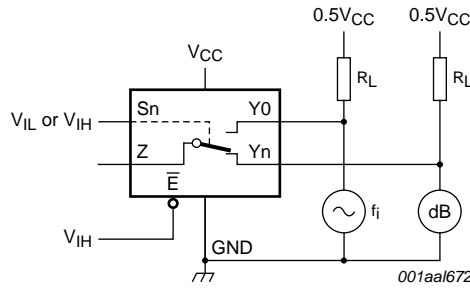


a. Test circuit



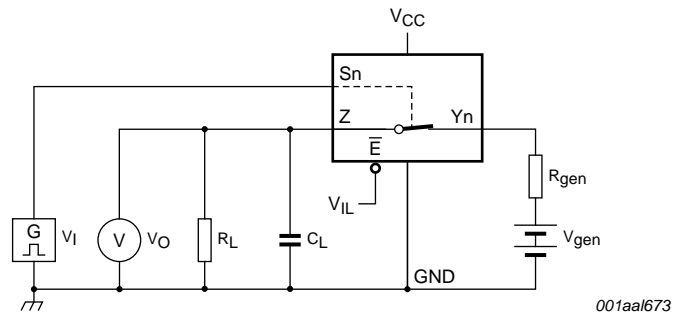
b. Input and output pulse definitions

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

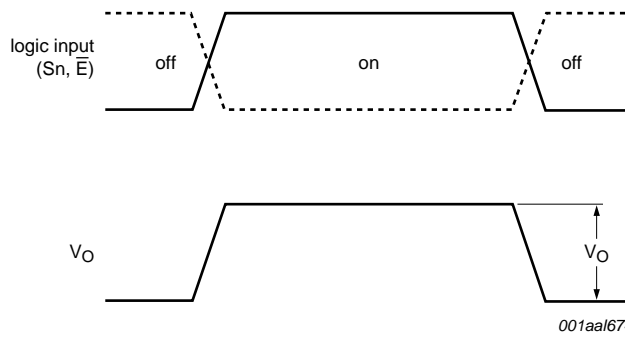


**Fig 22. Test circuit for measuring crosstalk between switches**





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.

$V_I$  may be connected to  $S_n$  or  $\bar{E}$ .

**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

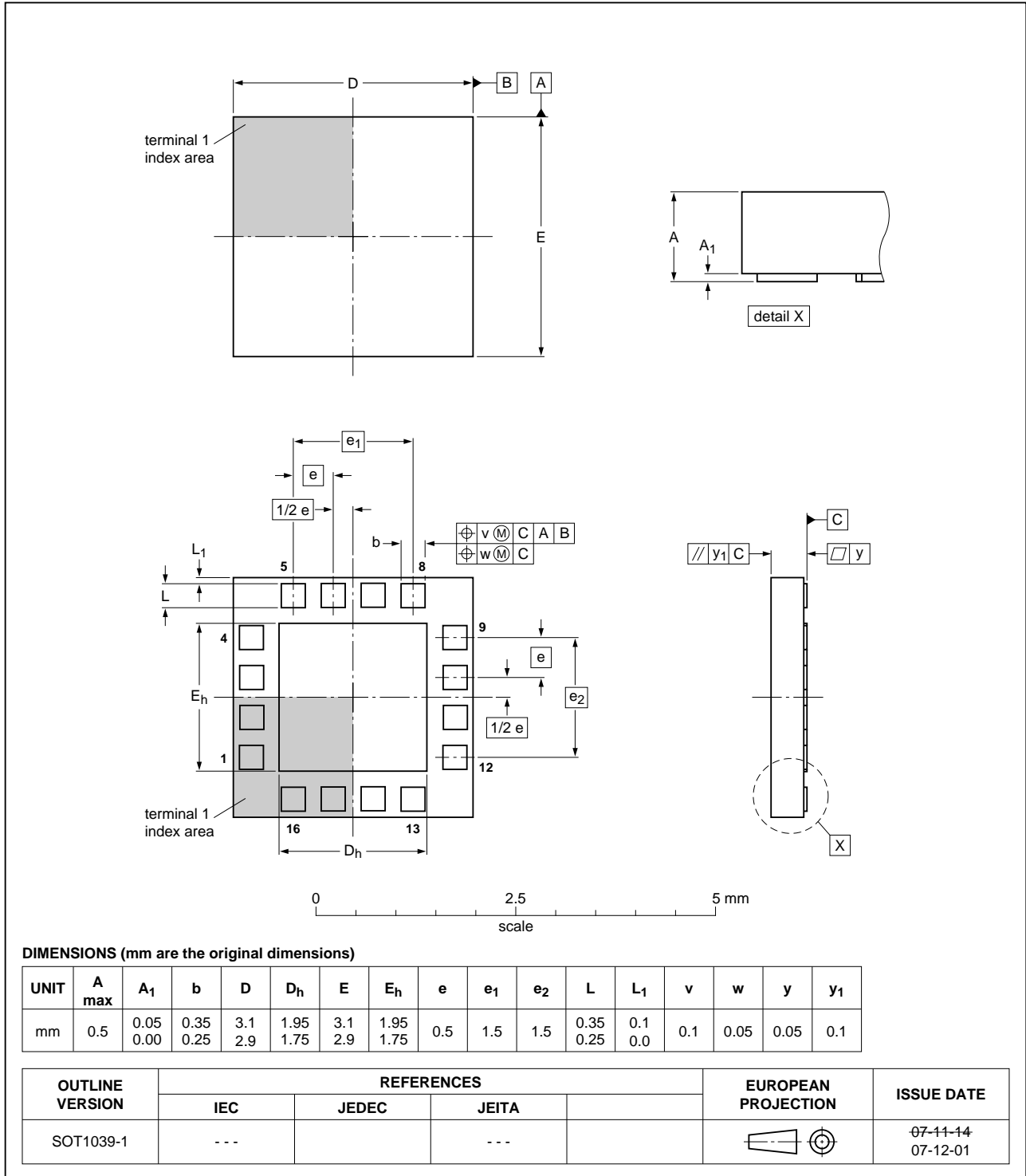


Fig 24. Package outline SOT1039-1 (HXQFN16U)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1

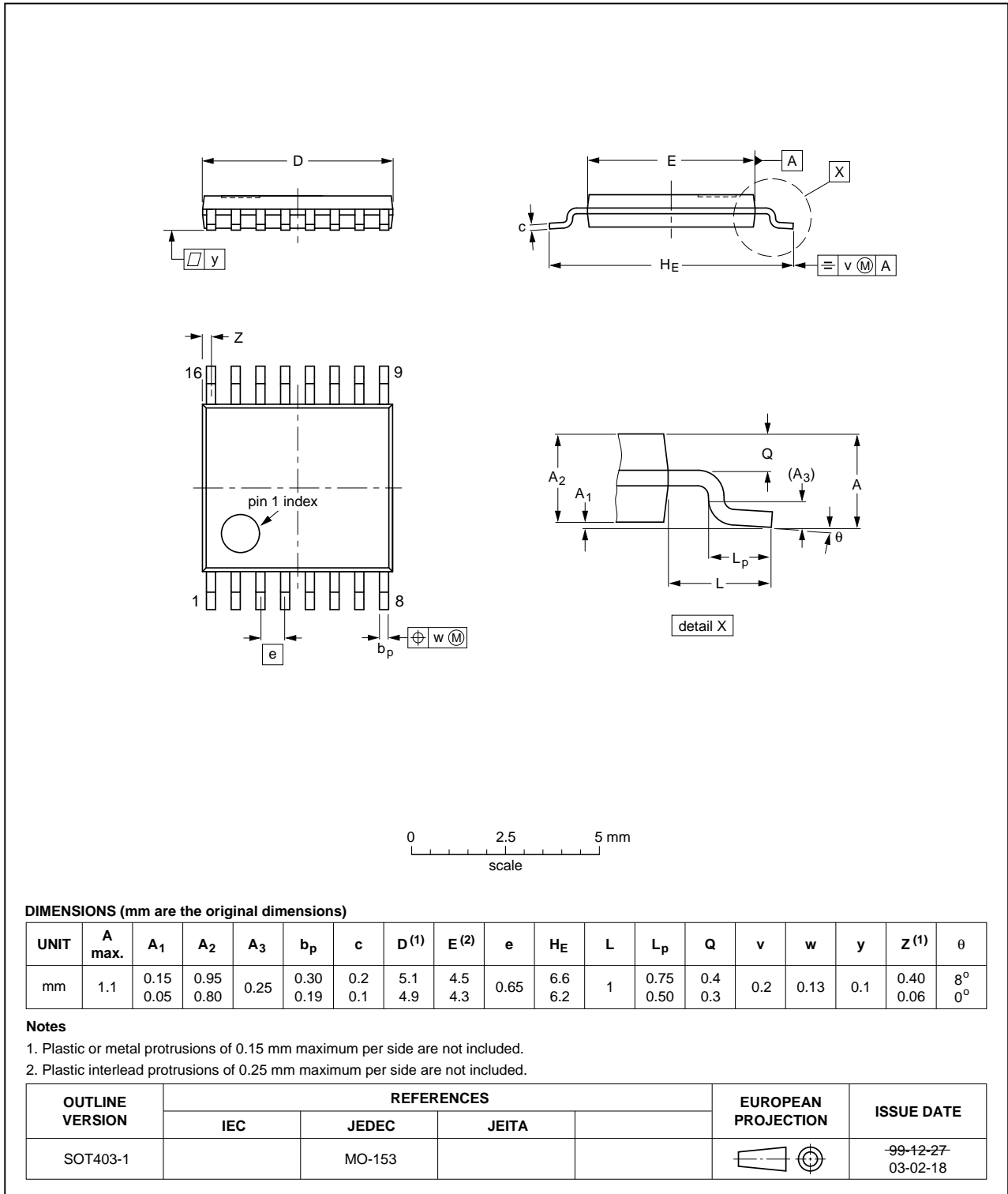


Fig 25. Package outline SOT403-1 (TSSOP16)

## 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
NX3L4051 v.2	20100812	Product data sheet	-	NX3L4051 v.1
Modifications:	• Marking code corrected.			
NX3L4051 v.1	20100415	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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