

NX3L4357

Low-ohmic single-pole triple-throw analog switch with enable input

Rev. 01 — 19 October 2009

Product data sheet

1. General description

The NX3L4357 is a low-ohmic single-pole triple-throw analog switch suitable for use as an analog or digital 3:1 multiplexer/demultiplexer. It has two digital select inputs (S0 and S1), one digital enable input (\bar{E}), three independent inputs/outputs (Y0, Y1 and Y2) and a common input/output (Z). The device features a broadcast mode, when S0 and S1 are both high the signal applied to pin Z is passed to Y0, Y1 and Y2.

Schmitt trigger action at the digital inputs makes the circuit tolerant to slower input rise and fall times. Low threshold digital inputs allows this device to be driven by 1.8 V logic levels in 3.3 V applications without significant increase in supply current I_{CC} .

The NX3L4357 allows signals with amplitude up to V_{CC} to be transmitted from Z to Yn or Yn to Z. Its low ON resistance (0.5 Ω) and flatness (0.13 Ω) ensures minimal attenuation and distortion of transmitted signals.

2. Features

- Wide supply voltage range from 1.4 V to 4.3 V
- Very low ON resistance (peak):
 - ◆ 1.65 Ω (typical) at $V_{CC} = 1.4$ V
 - ◆ 0.95 Ω (typical) at $V_{CC} = 1.65$ V
 - ◆ 0.55 Ω (typical) at $V_{CC} = 2.3$ V
 - ◆ 0.50 Ω (typical) at $V_{CC} = 2.7$ V
 - ◆ 0.50 Ω (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

4. Ordering information

Table 1. Ordering information

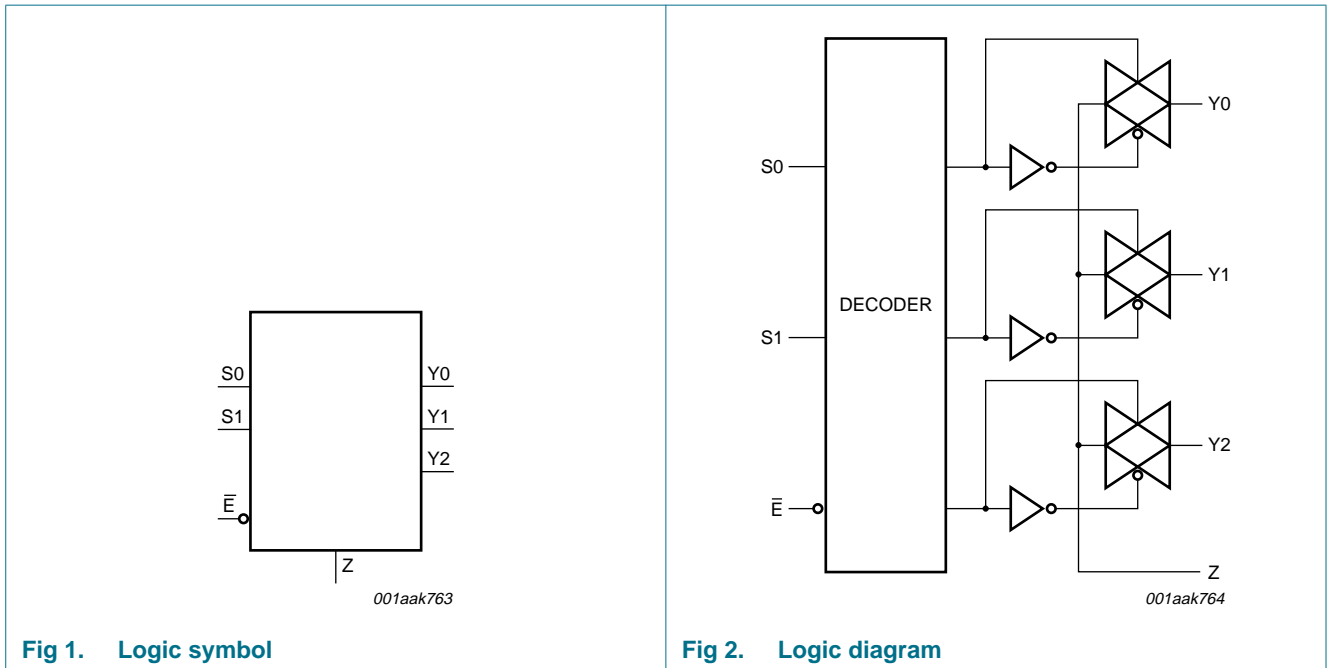
Type number	Package			Version
	Temperature range	Name	Description	
NX3L4357GM	-40 °C to +125 °C	XQFN10U	plastic extremely thin quad flat package; no leads; 10 terminals; UTLP based; body 2 × 1.55 × 0.5 mm	SOT1049-2

5. Marking

Table 2. Marking

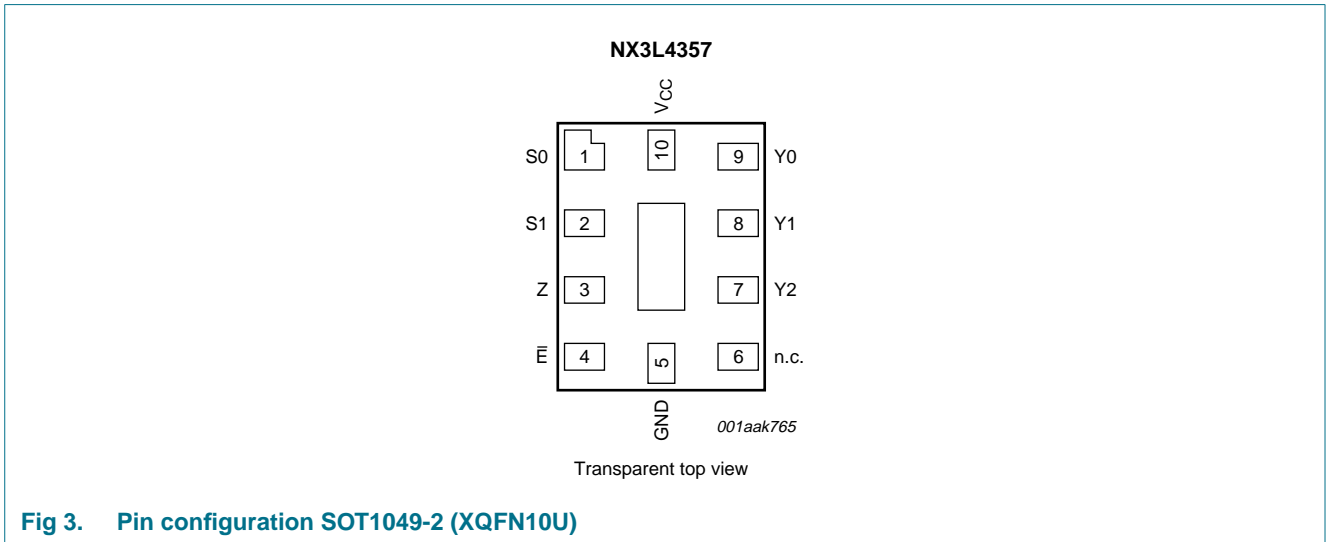
Type number	Marking code
NX3L4357GM	D43

6. Functional diagram



7. Pinning information

7.1 Pinning



7.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
S0	1	select input
S1	2	select input
Z	3	common output or input
E̅	4	enable input (active LOW)
GND	5	ground (0 V)
n.c.	6	not connected
Y2	7	independent input or output
Y1	8	independent input or output
Y0	9	independent input or output
V _{CC}	10	supply voltage

8. Functional description

Table 4. Function table^[1]

\bar{E}	S1	S0	Channel on
L	L	L	Y0 = Z
L	L	H	Y1 = Z
L	H	L	Y2 = Z
L	H	H	Y0, Y1, Y2 = Z (broadcast mode)
H	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	select input S0, S1 and \bar{E}	^[1] -0.5	+4.6	V
V_{SW}	switch voltage		^[2] -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	-	± 50	mA
I_{SW}	switch current	$V_{SW} > -0.5$ V or $V_{SW} < V_{CC} + 0.5$ V; source or sink current	-	± 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	-	± 500	mA
T_{stg}	storage temperature		-65	+150	°C
P_{tot}	total power dissipation	$T_{amb} = -40$ °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 but may not exceed 4.6 V.

[3] For XQFN10U packages: above 132 °C the value of P_{tot} derates linearly with 14.1 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 S0, S1 and \bar{E}	0	4.3	V
V _{SW}	switch voltage	switch input Y0, Y1 and Y2	[1] 0	V _{CC}	V
T _{amb}	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V _{CC} = 1.4 V to 4.3 V	[2] -	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.

[2] Applies to select input Sn signal levels.

11. Static characteristics

Table 7. Static characteristics

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

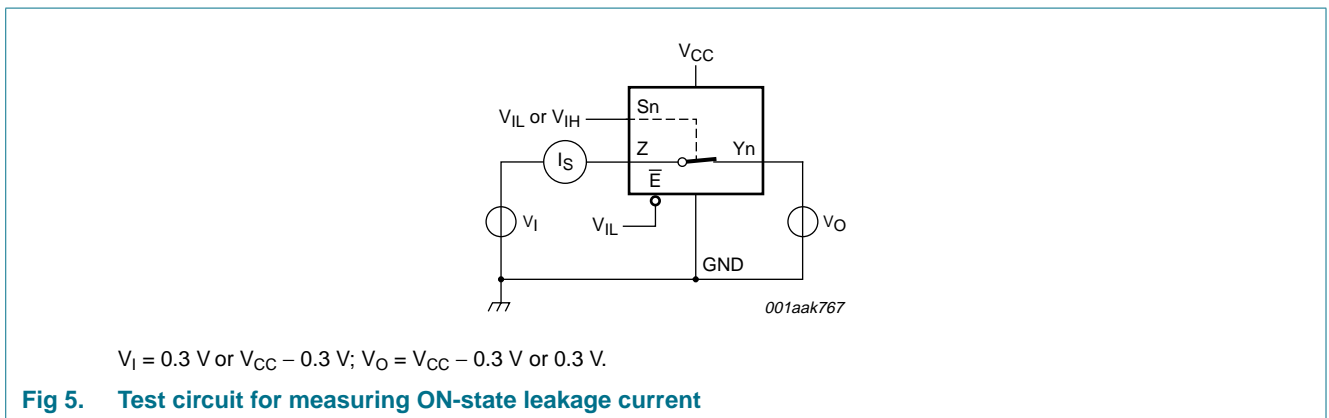
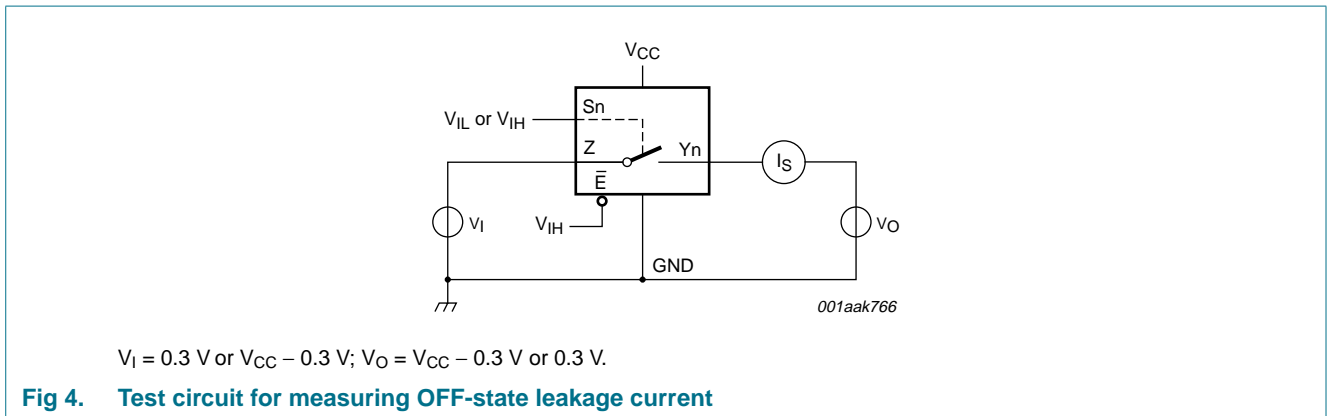
Symbol	Parameter	Conditions	T _{amb} = 25 °C			T _{amb} = -40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
V _{IH}	HIGH-level input voltage	V _{CC} = 1.4 V to 1.6 V	0.9	-	-	0.9	-	-	V
		V _{CC} = 1.65 V to 1.95 V	0.9	-	-	0.9	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.1	-	-	1.1	-	-	V
		V _{CC} = 2.7 V to 3.6 V	1.3	-	-	1.3	-	-	V
		V _{CC} = 3.6 V to 4.3 V	1.4	-	-	1.4	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 1.4 V to 1.6 V	-	-	0.3	-	0.3	0.3	V
		V _{CC} = 1.65 V to 1.95 V	-	-	0.4	-	0.4	0.3	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.5	-	0.5	0.4	V
		V _{CC} = 2.7 V to 3.6 V	-	-	0.5	-	0.5	0.5	V
		V _{CC} = 3.6 V to 4.3 V	-	-	0.6	-	0.6	0.6	V
I _I	input leakage current	select input S0, S1 and \bar{E} ; V _I = GND to 4.3 V; V _{CC} = 1.4 V to 4.3 V	-	-	-	-	±0.5	±1	μA
I _{S(OFF)}	OFF-state leakage current	port Y0, Y1 and Y2; see Figure 4							
		V _{CC} = 1.4 V to 3.6 V	-	-	±5	-	±10	±100	nA
		V _{CC} = 3.6 V to 4.3 V	-	-	±10	-	±50	±200	nA
I _{S(ON)}	ON-state leakage current	Z port; see Figure 5							
		V _{CC} = 1.4 V to 3.6 V	-	-	±5	-	±20	±200	nA
		V _{CC} = 3.6 V to 4.3 V	-	-	±10	-	±50	±400	nA
I _{CC}	supply current	V _I = V _{CC} or GND; V _{SW} = GND or V _{CC}							
		V _{CC} = 3.6 V	-	-	100	-	300	3000	nA
		V _{CC} = 4.3 V	-	-	150	-	500	5000	nA

Table 7. Static characteristics ...continued

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

Symbol	Parameter	Conditions	T _{amb} = 25 °C			T _{amb} = -40 °C to +125 °C			Unit
			Min	Typ	Max	Min	Max (85 °C)	Max (125 °C)	
ΔI _{CC}	additional supply current	V _{SW} = GND or V _{CC}							
		V _I = 2.6 V; V _{CC} = 4.3 V	-	2.0	4.0	-	7	7	μA
		V _I = 2.6 V; V _{CC} = 3.6 V	-	0.35	0.7	-	1	1	μA
		V _I = 1.8 V; V _{CC} = 4.3 V	-	7.0	10.0	-	15	15	μA
		V _I = 1.8 V; V _{CC} = 3.6 V	-	2.5	4.0	-	5	5	μA
		V _I = 1.8 V; V _{CC} = 2.5 V	-	50	200	-	300	500	nA
C _I	input capacitance		-	1.0	-	-	-	-	pF
C _{S(OFF)}	OFF-state capacitance	port Y0, Y1 and Y2	-	35	-	-	-	-	pF
C _{S(ON)}	ON-state capacitance	port Z; broadcast mode	-	330	-	-	-	-	pF
		port Y0, Y1 and Y2	-	170	-	-	-	-	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 7](#) to [Figure 13](#).

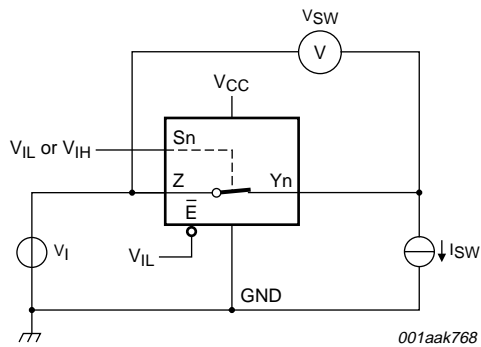
Symbol	Parameter	Conditions	T _{amb} = -40 °C to +85 °C			T _{amb} = -40 °C to +125 °C		Unit	
			Min	Typ ^[1]	Max	Min	Max		
R _{ON(peak)}	ON resistance (peak)	port Y0, Y1 and Y2; V _I = GND to V _{CC} ; I _{SW} = 100 mA; see Figure 6	V _{CC} = 1.4 V	-	1.6	3.7	-	4.1	Ω
			V _{CC} = 1.65 V	-	1.0	1.6	-	1.7	Ω
			V _{CC} = 2.3 V	-	0.55	0.8	-	0.9	Ω
			V _{CC} = 2.7 V	-	0.5	0.75	-	0.9	Ω
			V _{CC} = 4.3 V	-	0.5	0.75	-	0.9	Ω
			ΔR _{ON}	ON resistance mismatch between channels	V _I = GND to V _{CC} ; I _{SW} = 100 mA				
			V _{CC} = 1.4 V	-	0.20	0.35	-	0.35	Ω
			V _{CC} = 1.65 V	-	0.20	0.25	-	0.35	Ω
			V _{CC} = 2.3 V	-	0.09	0.13	-	0.15	Ω
			V _{CC} = 2.7 V	-	0.09	0.13	-	0.15	Ω
			V _{CC} = 4.3 V	-	0.09	0.13	-	0.15	Ω
R _{ON(flat)}	ON resistance (flatness)	port Y0, Y1 and Y2; [3] V _I = GND to V _{CC} ; I _{SW} = 100 mA	V _{CC} = 1.4 V	-	1.05	3.35	-	3.65	Ω
			V _{CC} = 1.65 V	-	0.55	1.25	-	1.35	Ω
			V _{CC} = 2.3 V	-	0.20	0.35	-	0.40	Ω
			V _{CC} = 2.7 V	-	0.18	0.35	-	0.40	Ω
			V _{CC} = 4.3 V	-	0.23	0.40	-	0.45	Ω

[1] Typical values are measured at T_{amb} = 25 °C.

[2] Measured at identical V_{CC}, temperature and input voltage.

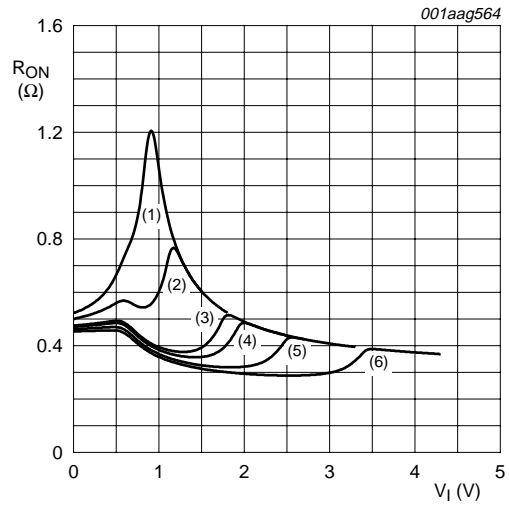
[3] Flatness is defined as the difference between the maximum and minimum value of ON resistance measured at identical V_{CC} and temperature.

11.3 ON resistance test circuit and graphs



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

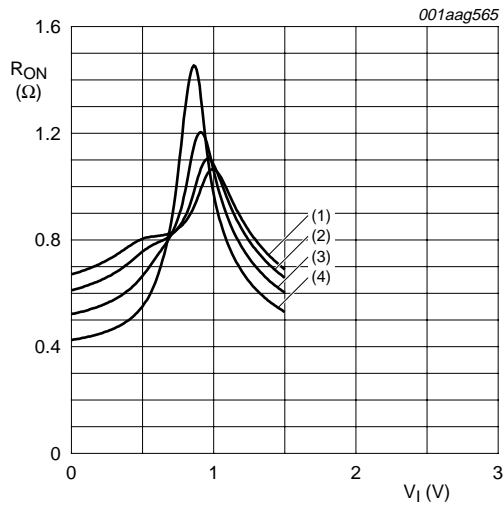
Fig 6. Test circuit for measuring ON resistance



- (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) $V_{CC} = 4.3\text{ V.}$

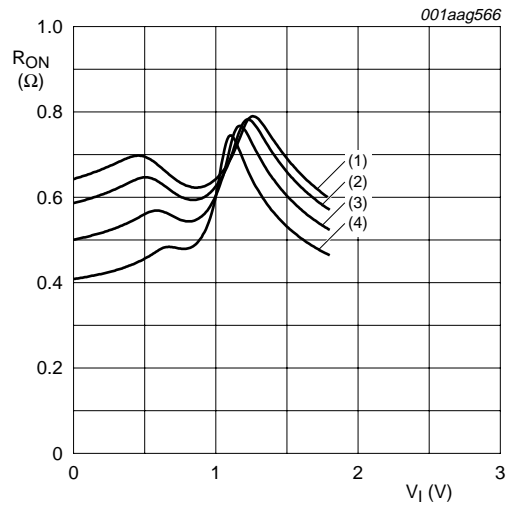
Measured at $T_{amb} = 25\text{ }^{\circ}\text{C.}$

Fig 7. Typical ON resistance as a function of input voltage (Yn port)



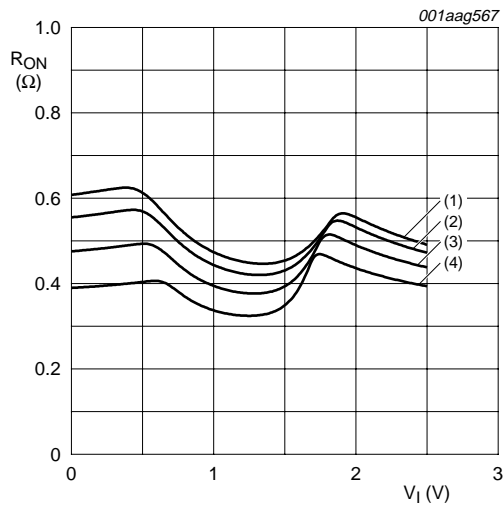
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 8. ON resistance as a function of input voltage; $V_{CC} = 1.5\text{ V}$ (Yn port)



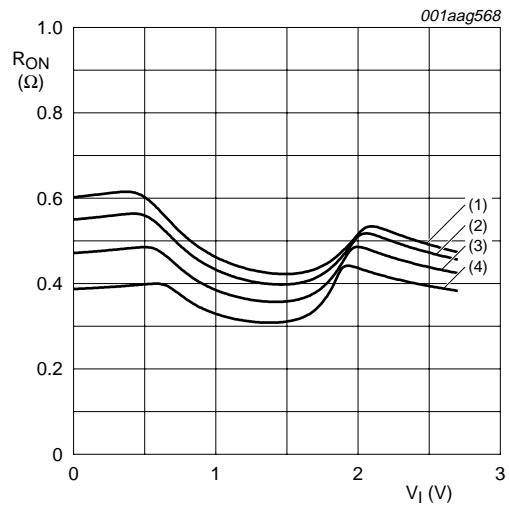
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 9. ON resistance as a function of input voltage; $V_{CC} = 1.8\text{ V}$ (Yn port)



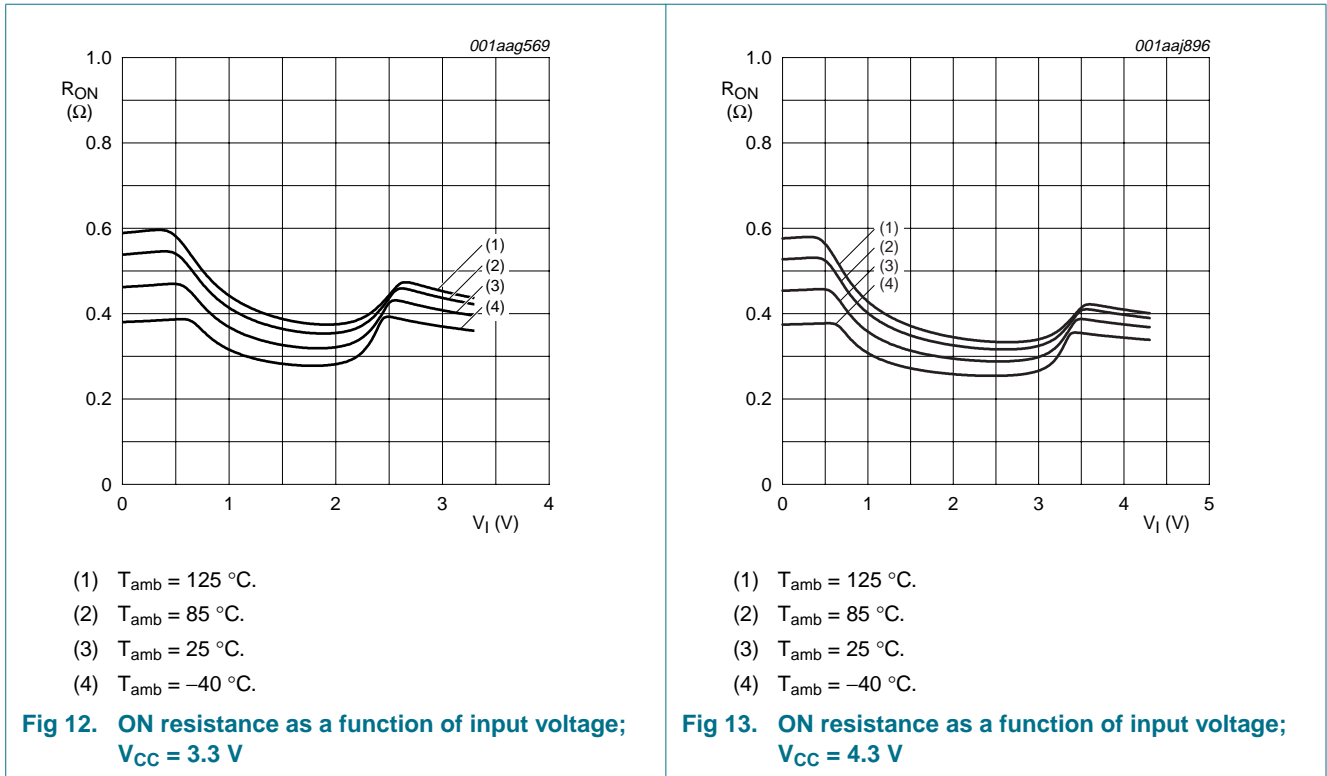
- (1) $T_{amb} = 125\text{ }^{\circ}\text{C}.$
- (2) $T_{amb} = 85\text{ }^{\circ}\text{C}.$
- (3) $T_{amb} = 25\text{ }^{\circ}\text{C}.$
- (4) $T_{amb} = -40\text{ }^{\circ}\text{C}.$

Fig 10. ON resistance as a function of input voltage; $V_{CC} = 2.5\text{ V}$ (Yn port)



- (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; $V_{CC} = 2.7\text{ V}$ (Yn port)



12. Dynamic characteristics

Table 9. Dynamic characteristics

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

Symbol	Parameter	Conditions	T _{amb} = 25 °C			T _{amb} = -40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
t _{en}	enable time	\bar{E} , Sn to Z or Yn; see Figure 14 V _{CC} = 1.4 V to 1.6 V V _{CC} = 1.65 V to 1.95 V V _{CC} = 2.3 V to 2.7 V V _{CC} = 2.7 V to 3.6 V V _{CC} = 3.6 V to 4.3 V	-	50	100	-	120	125	ns
			-	36	75	-	85	95	ns
			-	24	50	-	55	60	ns
			-	22	45	-	45	50	ns
			-	22	45	-	45	50	ns
t _{dis}	disable time	\bar{E} , Sn to Z or Yn; see Figure 14 V _{CC} = 1.4 V to 1.6 V V _{CC} = 1.65 V to 1.95 V V _{CC} = 2.3 V to 2.7 V V _{CC} = 2.7 V to 3.6 V V _{CC} = 3.6 V to 4.3 V	-	32	80	-	90	105	ns
			-	20	65	-	70	75	ns
			-	12	30	-	35	40	ns
			-	10	25	-	30	35	ns
			-	10	25	-	30	35	ns

Table 9. Dynamic characteristics ...continued

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

Symbol	Parameter	Conditions	T _{amb} = 25 °C			T _{amb} = -40 °C to +125 °C			Unit
			Min	Typ ^[1]	Max	Min	Max (85 °C)	Max (125 °C)	
t _{b-m}	break-before-make time	see Figure 15 ^[2]							
		V _{CC} = 1.4 V to 1.6 V	-	19	-	9	-	-	ns
		V _{CC} = 1.65 V to 1.95 V	-	17	-	7	-	-	ns
		V _{CC} = 2.3 V to 2.7 V	-	13	-	4	-	-	ns
		V _{CC} = 2.7 V to 3.6 V	-	10	-	3	-	-	ns
		V _{CC} = 3.6 V to 4.3 V	-	10	-	2	-	-	ns

[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 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

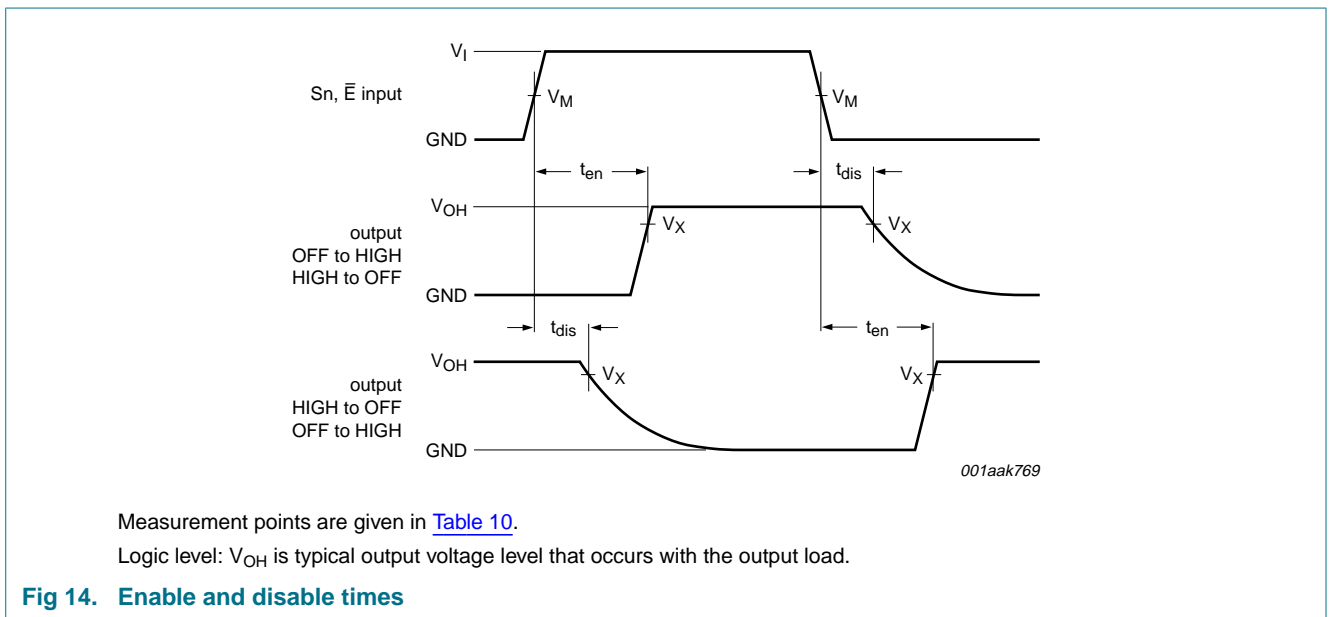
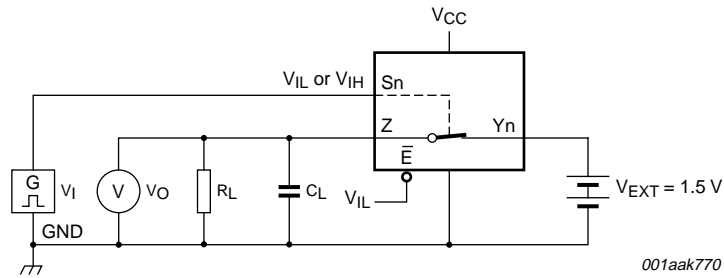
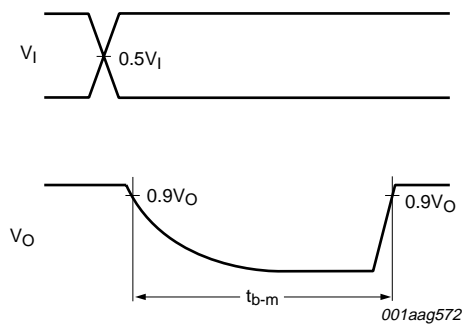


Table 10. Measurement points

Supply voltage	Input	Output
V _{CC}	V _M	V _X
1.4 V to 4.3 V	0.5V _{CC}	0.9V _{OH}



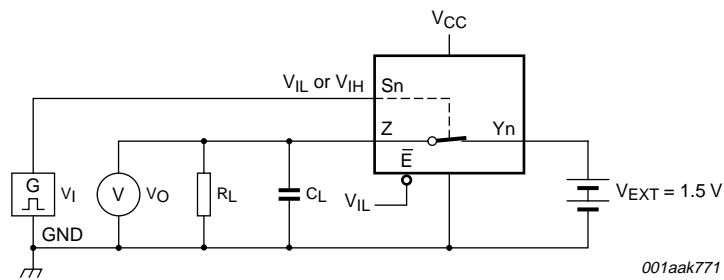
a. Test circuit



b. Input and output measurement points

V_I may be connected to S0 or S1.

Fig 15. Test circuit for measuring break-before-make timing



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

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

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 16. Load circuit for 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}	≤ 2.5 ns	35 pF	50 Ω

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); $t_r = t_f \leq 2.5 \text{ ns}$.

Symbol	Parameter	Conditions	T _{amb} = 25 °C			Unit
			Min	Typ	Max	
THD	total harmonic distortion	$f_i = 20 \text{ Hz to } 20 \text{ kHz}; R_L = 32 \text{ } \Omega$; see Figure 17 [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 Figure 18 [1]				
		port Y0, Y1 or Y2; $V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	30	-	MHz
		port Y0, Y1 and Y2; $V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	20	-	MHz
α_{iso}	isolation (OFF-state)	$f_i = 100 \text{ kHz}; R_L = 50 \text{ } \Omega$; see Figure 19 [1]				
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	-90	-	dB
V_{ct}	crosstalk voltage	between digital inputs and switch; $f_i = 1 \text{ MHz}; C_L = 50 \text{ pF}; R_L = 50 \text{ } \Omega$; see Figure 20				
		$V_{CC} = 1.4 \text{ V to } 3.6 \text{ V}$	-	0.21	-	V
		$V_{CC} = 3.6 \text{ V to } 4.3 \text{ V}$	-	0.30	-	V
Xtalk	crosstalk	between switches; [1] $f_i = 100 \text{ kHz}; R_L = 50 \text{ } \Omega$; see Figure 21				
		$V_{CC} = 1.4 \text{ V to } 4.3 \text{ V}$	-	-90	-	dB
Q_{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 Figure 22				
		$V_{CC} = 1.5 \text{ V}$	-	10	-	pC
		$V_{CC} = 1.8 \text{ V}$	-	15	-	pC
		$V_{CC} = 2.5 \text{ V}$	-	26	-	pC
		$V_{CC} = 3.3 \text{ V}$	-	36	-	pC
		$V_{CC} = 4.3 \text{ V}$	-	50	-	pC

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

12.3 Test circuits

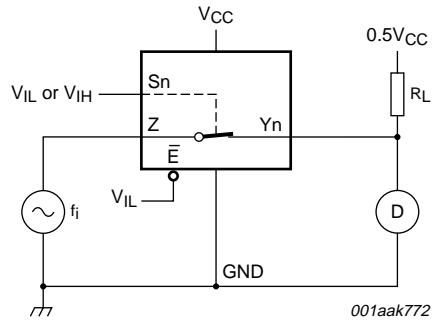
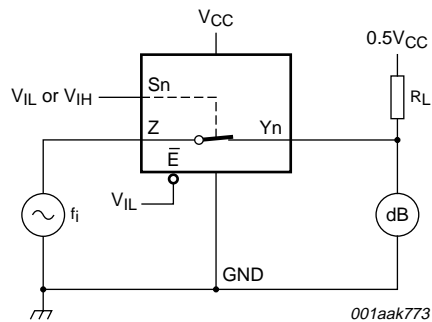
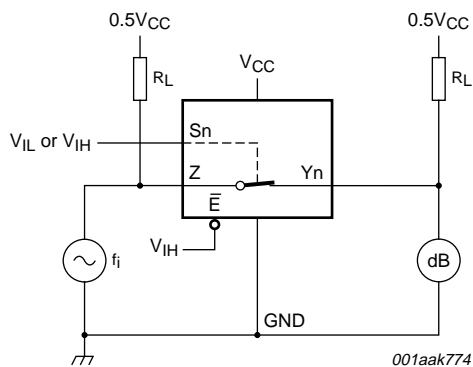


Fig 17. Test circuit for measuring total harmonic distortion



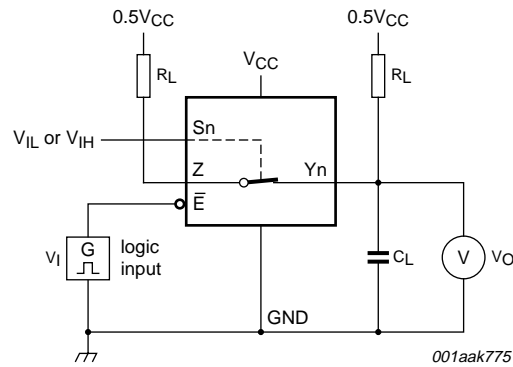
Adjust f_i voltage to obtain 0 dBm level at output. Increase f_i frequency until dB meter reads -3 dB.

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

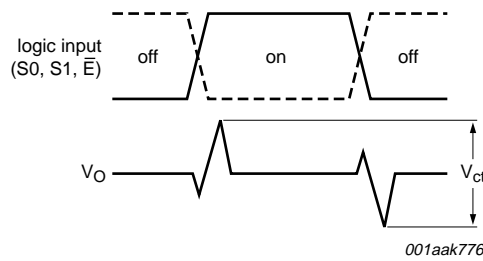


Adjust f_i voltage to obtain 0 dBm level at input.

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

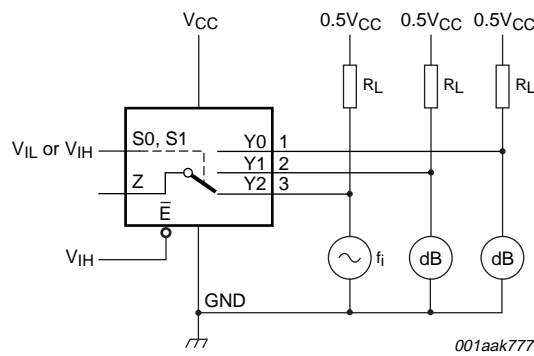


a. Test circuit



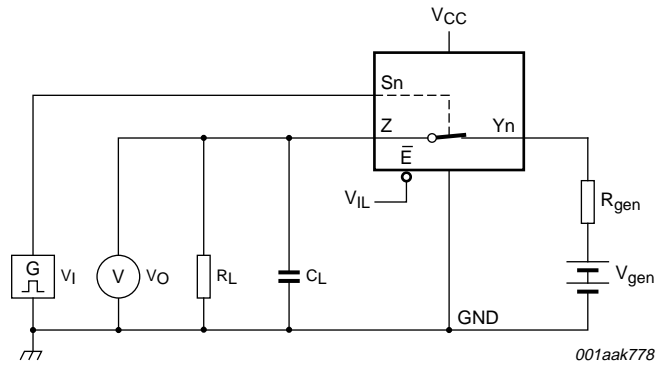
b. Input and output pulse definitions
 V_I may be connected to S_n or \bar{E} .

Fig 20. Test circuit for measuring crosstalk voltage between digital inputs and switch

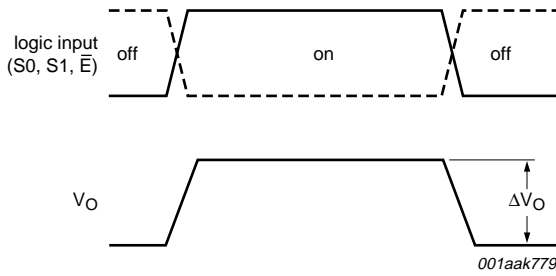


f_i may be connected to Y_0 , Y_1 or Y_2 .

Fig 21. Test circuit for measuring crosstalk between switches



a. Test circuit



b. Input and output pulse definitions

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

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

ΔV_O = output voltage variation.

R_{gen} = generator resistance.

V_{gen} = generator voltage.

Fig 22. Test circuit for measuring charge injection

13. Package outline

XQFN10U: plastic extremely thin quad flat package; no leads; 10 terminals; UTLP based; body 2 x 1.55 x 0.5 mm

SOT1049-2

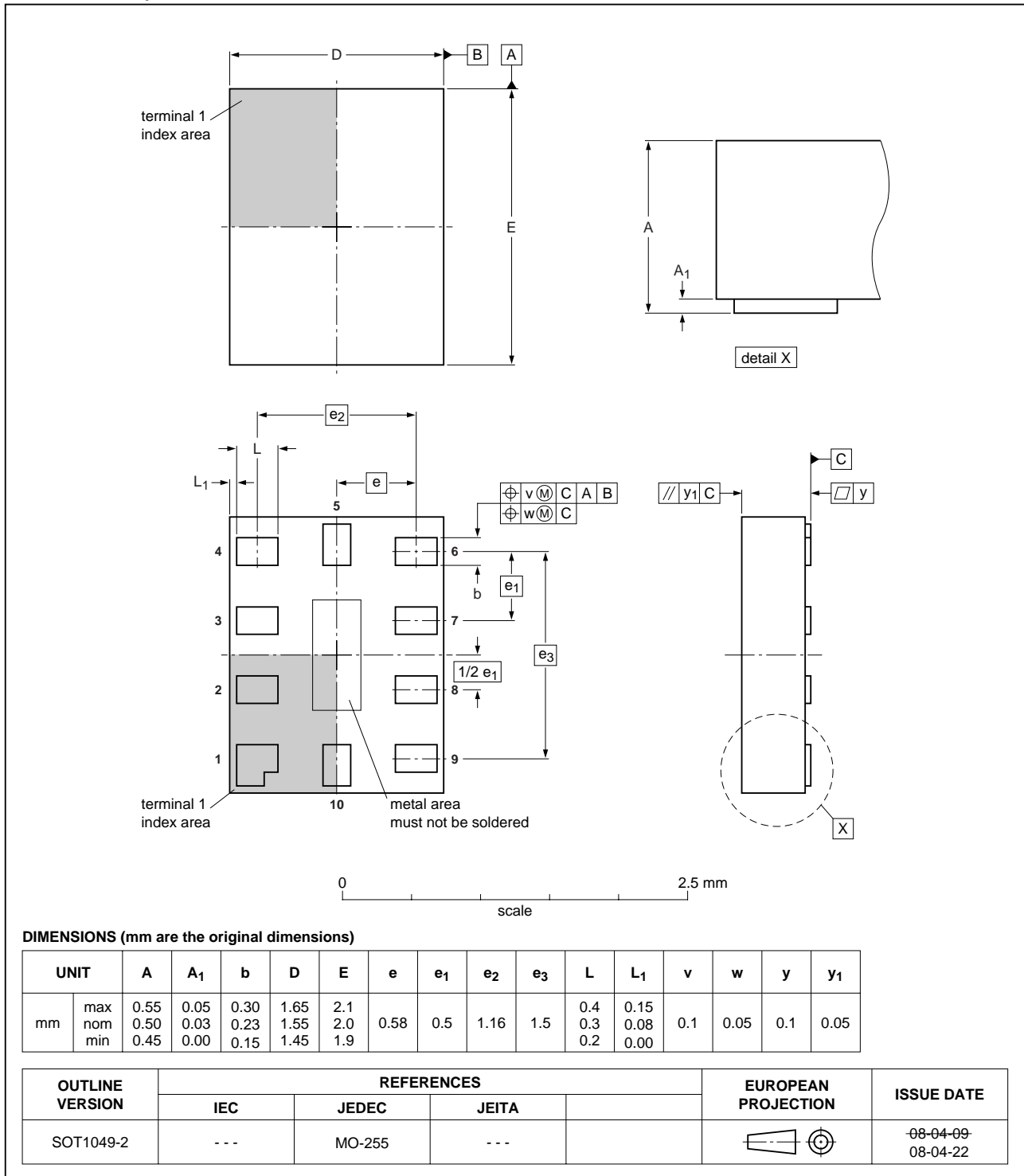


Fig 23. Package outline SOT1049-2 (XQFN10U)

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

15. Revision history

Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
NX3L4357_1	20091019	Product data sheet	-	-

16. Legal information

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

16.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

16.3 Disclaimers

General — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in medical, military, aircraft, space or life support equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental

damage. NXP Semiconductors accepts no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) may cause permanent damage to the device. Limiting values are stress ratings only and operation of the device at these or any other conditions above those given in the Characteristics sections of this document is not implied. Exposure to limiting values for extended periods may affect device reliability.

Terms and conditions of sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <http://www.nxp.com/profile/terms>, including those pertaining to warranty, intellectual property rights infringement and limitation of liability, unless explicitly otherwise agreed to in writing by NXP Semiconductors. In case of any inconsistency or conflict between information in this document and such terms and conditions, the latter will prevail.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

Export control — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from national authorities.

16.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

17. Contact information

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

18. Contents

1 General description 1

2 Features 1

3 Applications 2

4 Ordering information 2

5 Marking 2

6 Functional diagram 2

7 Pinning information 3

7.1 Pinning 3

7.2 Pin description 3

8 Functional description 4

9 Limiting values 4

10 Recommended operating conditions 5

11 Static characteristics 5

11.1 Test circuits 6

11.2 ON resistance 7

11.3 ON resistance test circuit and graphs 8

12 Dynamic characteristics 10

12.1 Waveform and test circuits 11

12.2 Additional dynamic characteristics 13

12.3 Test circuits 14

13 Package outline 17

14 Abbreviations 18

15 Revision history 18

16 Legal information 19

16.1 Data sheet status 19

16.2 Definitions 19

16.3 Disclaimers 19

16.4 Trademarks 19

17 Contact information 19

18 Contents 20

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.



© NXP B.V. 2009.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 19 October 2009

Document identifier: NX3L4357_1