74LVC4066-Q100

Quad bilateral switch

Rev. 1 — 7 August 2012 | Product data sheet

1. General description

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

- 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 Ω (typical) at V_{CC} = 2.7 V
  - 6.5 Ω (typical) at V_{CC} = 3.3 V
  - 6 Ω (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 Ω)
- Enable inputs accept voltages up to 5 V
- Multiple package options

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 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

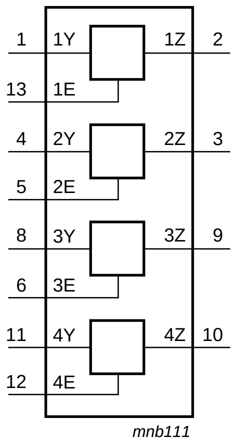


Fig 1. Logic symbol

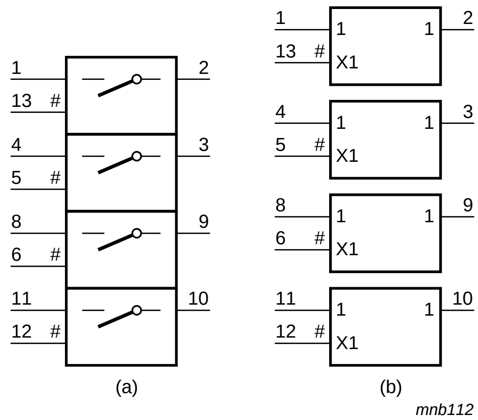


Fig 2. Logic symbol (IEEE/IEC)

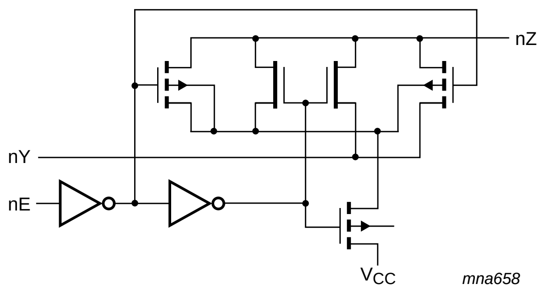


Fig 3. Logic diagram (one switch)

5. Pinning information

5.1 Pinning

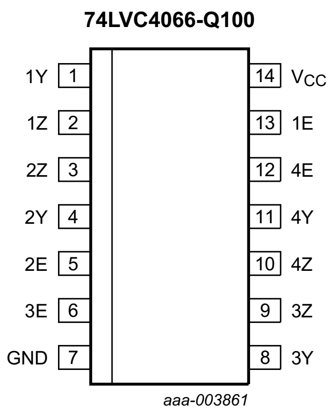
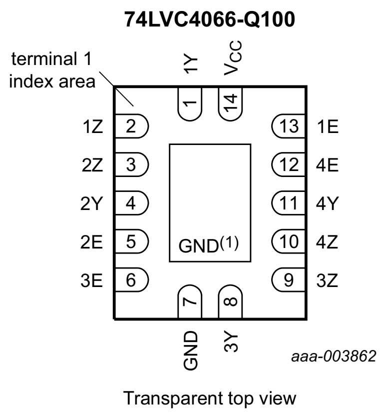


Fig 4. Pin configuration for SO14 and TSSOP14



(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 5. Pin configuration for DHVQFN14

5.2 Pin description

Table 2. Pin description

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

6. Functional description

Table 3. Function table[1]

Input nE	Switch
L	OFF
H	ON

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

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	$V_I < -0.5$ V or $V_I < V_{CC} + 0.5$ V		–50	-	mA
I_{SK}	switch clamping current	$V_I < -0.5$ V or $V_I < V_{CC} + 0.5$ V		-	±50	mA
V_{SW}	switch voltage	enable and disable mode	[2]	–0.5	+6.5	V
I_{SW}	switch current	$-0.5 < V_{SW} < V_{CC} + 0.5$ V		-	±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	$T_{amb} = -40$ °C to +125 °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 SO14 packages: above 70 °C derate linearly with 8 mW/K.
For TSSOP14 packages: above 60 °C derate linearly with 5.5 mW/K.
For DHVQFN14 packages: above 60 °C derate linearly with 4.5 mW/K.

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 V to 2.7 V	[2]	-	-	20	ns/V
		V_{CC} = 2.7 V to 5.5 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 flows 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 V to 1.95 V		$0.65V_{CC}$	-	-	$0.65V_{CC}$	-	V
		V_{CC} = 2.3 V to 2.7 V		1.7	-	-	1.7	-	V
		V_{CC} = 2.7 V to 3.6 V		2.0	-	-	2.0	-	V
		V_{CC} = 4.5 V to 5.5 V		$0.7V_{CC}$	-	-	$0.7V_{CC}$	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V		-	-	$0.35V_{CC}$	-	$0.35V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V		-	-	0.7	-	0.7	V
		V_{CC} = 2.7 V to 3.6 V		-	-	0.8	-	0.8	V
		V_{CC} = 4.5 V to 5.5 V		-	-	$0.3V_{CC}$	-	$0.3V_{CC}$	V
I_I	input leakage current	pin nE; V_{CC} = 5.5 V; V_I = 5.5 V or GND	[2]	-	±0.1	±5	-	±20	μA
$I_{S(OFF)}$	OFF-state leakage current	$\|V_{SW}\| = V_{CC} - GND$; V_{CC} = 5.5 V; see Figure 6	[2]	-	±0.1	±5	-	±20	μA
$I_{S(ON)}$	ON-state leakage current	$\|V_{SW}\| = V_{CC} - GND$; V_{CC} = 5.5 V; see Figure 7	[2]	-	±0.1	±5	-	±20	μA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; V_{SW} = GND or V_{CC}; V_{CC} = 5.5 V	[2]	-	0.1	10	-	40	μA
ΔI_{CC}	additional supply current	pin nE; $V_I = V_{CC} - 0.6$ V; V_{CC} = 5.5 V; V_{SW} = GND or V_{CC}	[2]	-	5	500	-	5000	μA

Table 6. Static characteristics *...continued*

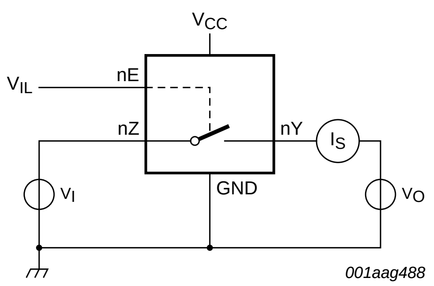
At recommended operating conditions voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	–40 °C to +85 °C			–40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
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 °C.

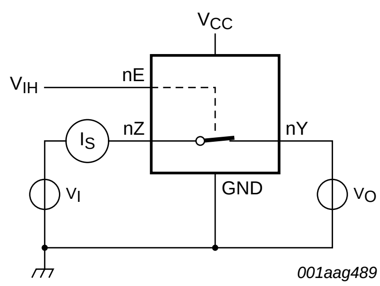
[2] These typical values are measured at V_{CC} = 3.3 V.

9.1 Test circuits



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

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



$V_I = V_{CC}$ or GND and V_O = 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 Figure 9 to Figure 14.

Symbol	Parameter	Conditions	–40 °C to +85 °C			–40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$R_{ON(peak)}$	ON resistance (peak)	V_I = GND to V_{CC}; see Figure 8						
		I_{SW} = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	34.0	130	-	195	Ω
		I_{SW} = 8 mA; V_{CC} = 2.3 V to 2.7 V	-	12.0	30	-	45	Ω
		I_{SW} = 12 mA; V_{CC} = 2.7 V	-	10.4	25	-	38	Ω
		I_{SW} = 24 mA; V_{CC} = 3 V to 3.6 V	-	7.8	20	-	30	Ω
		I_{SW} = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	6.2	15	-	23	Ω

Table 7. ON resistance *...continued*

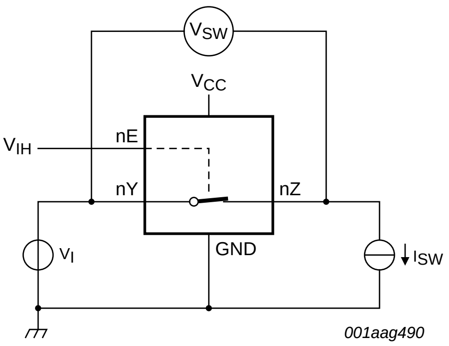
At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see Figure 9 to Figure 14.

Symbol	Parameter	Conditions	–40 °C to +85 °C			–40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$R_{ON(rail)}$	ON resistance (rail)	V_I = GND; see Figure 8						
		I_{SW} = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	8.2	18	-	27	Ω
		I_{SW} = 8 mA; V_{CC} = 2.3 V to 2.7 V	-	7.1	16	-	24	Ω
		I_{SW} = 12 mA; V_{CC} = 2.7 V	-	6.9	14	-	21	Ω
		I_{SW} = 24 mA; V_{CC} = 3 V to 3.6 V	-	6.5	12	-	18	Ω
		I_{SW} = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	5.8	10	-	15	Ω
		V_I = V_{CC}; see Figure 8						
		I_{SW} = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	10.4	30	-	45	Ω
		I_{SW} = 8 mA; V_{CC} = 2.3 V to 2.7 V	-	7.6	20	-	30	Ω
		I_{SW} = 12 mA; V_{CC} = 2.7 V	-	7.0	18	-	27	Ω
		I_{SW} = 24 mA; V_{CC} = 3 V to 3.6 V	-	6.1	15	-	23	Ω
		I_{SW} = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	4.9	10	-	15	Ω
$R_{ON(flat)}$	ON resistance (flatness)	V_I = GND to V_{CC} [2]						
		I_{SW} = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	26.0	-	-	-	Ω
		I_{SW} = 8 mA; V_{CC} = 2.3 V to 2.7 V	-	5.0	-	-	-	Ω
		I_{SW} = 12 mA; V_{CC} = 2.7 V	-	3.5	-	-	-	Ω
		I_{SW} = 24 mA; V_{CC} = 3 V to 3.6 V	-	2.0	-	-	-	Ω
		I_{SW} = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	1.5	-	-	-	Ω

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

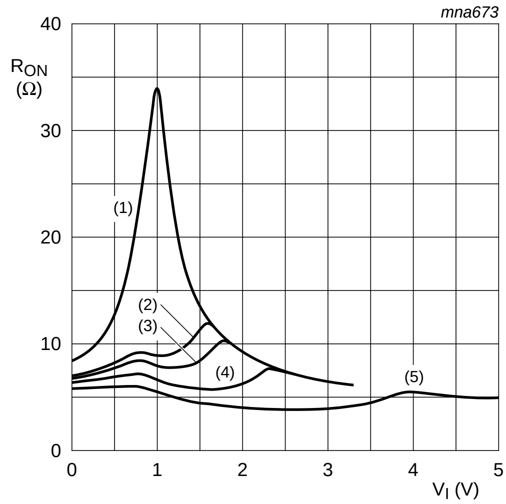
[2] Flatness is defined as the difference between the maximum and minimum value of ON resistance measured at identical V_{CC} and temperature.

9.3 ON resistance test circuit and graphs



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

Fig 8. Test circuit for measuring ON resistance



(1) V_{CC} = 1.8 V.

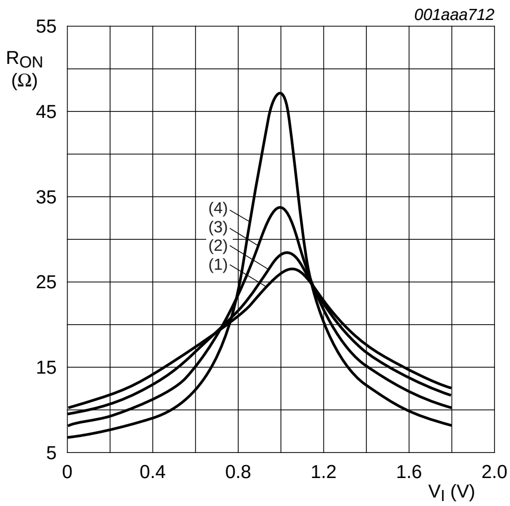
(2) V_{CC} = 2.5 V.

(3) V_{CC} = 2.7 V.

(4) V_{CC} = 3.3 V.

(5) V_{CC} = 5.0 V.

Fig 9. Typical ON resistance as a function of input voltage; T_{amb} = 25 °C



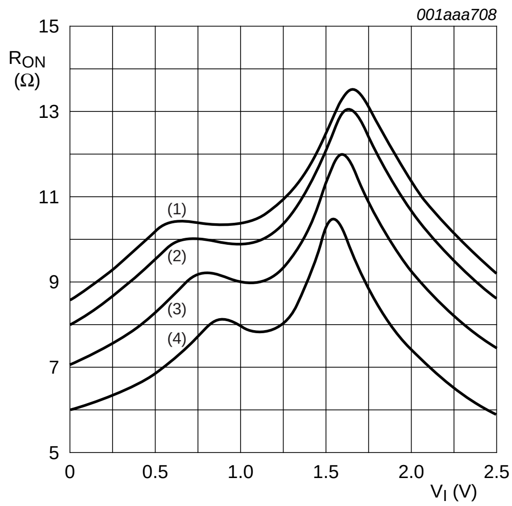
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

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



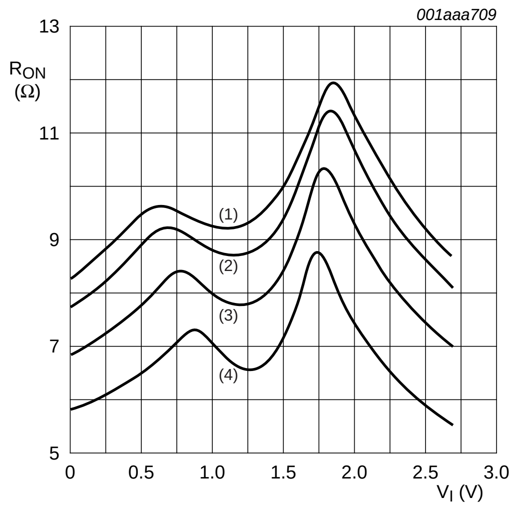
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

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



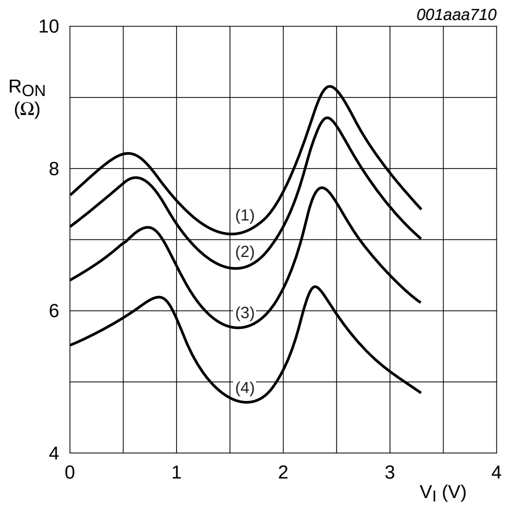
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

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



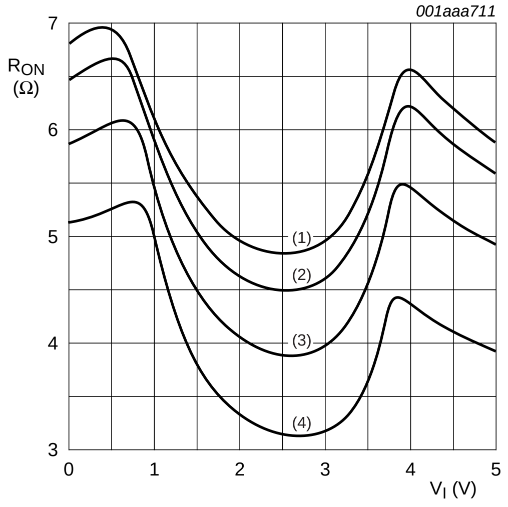
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

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



(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

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

10. Dynamic characteristics

Table 8. Dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for load circuit Figure 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 Figure 15	[2][3]						
		V_{CC} = 1.65 V to 1.95 V		-	0.8	2.0	-	3.0	ns
		V_{CC} = 2.3 V to 2.7 V		-	0.4	1.2	-	2.0	ns
		V_{CC} = 2.7 V		-	0.4	1.0	-	1.5	ns
		V_{CC} = 3.0 V to 3.6 V		-	0.3	0.8	-	1.5	ns
		V_{CC} = 4.5 V to 5.5 V		-	0.2	0.6	-	1.0	ns
t_{en}	enable time	nE to nY or nZ; see Figure 16	[4]						
		V_{CC} = 1.65 V to 1.95 V		1.0	5.3	10	1.0	12.5	ns
		V_{CC} = 2.3 V to 2.7 V		1.0	3.0	5.6	1.0	7.0	ns
		V_{CC} = 2.7 V		1.0	2.6	5.0	1.0	6.5	ns
		V_{CC} = 3.0 V to 3.6 V		1.0	2.5	4.4	1.0	5.5	ns
		V_{CC} = 4.5 V to 5.5 V		1.0	1.9	3.9	1.0	5.0	ns
t_{dis}	disable time	nE to nY or nZ; see Figure 16	[5]						
		V_{CC} = 1.65 V to 1.95 V		1.0	4.2	9.0	1.0	11.5	ns
		V_{CC} = 2.3 V to 2.7 V		1.0	2.4	5.5	1.0	7.0	ns
		V_{CC} = 2.7 V		1.0	3.6	6.5	1.0	8.5	ns
		V_{CC} = 3.0 V to 3.6 V		1.0	3.4	6.0	1.0	7.5	ns
		V_{CC} = 4.5 V to 5.5 V		1.0	2.5	5.0	1.0	6.5	ns
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 10 MHz; V_I = GND to V_{CC}	[6]						
		V_{CC} = 2.5 V		-	11.0	-	-	-	pF
		V_{CC} = 3.3 V		-	12.5	-	-	-	pF
		V_{CC} = 5.0 V		-	15.6	-	-	-	pF

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

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

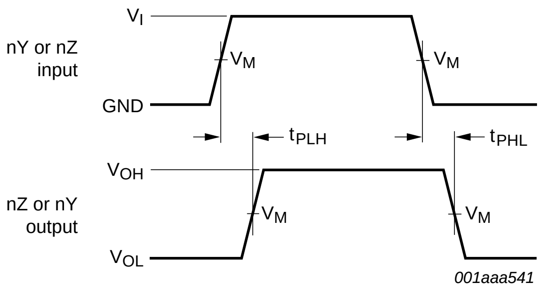
$C_{S(ON)}$ = maximum ON-state switch capacitance in pF;

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.

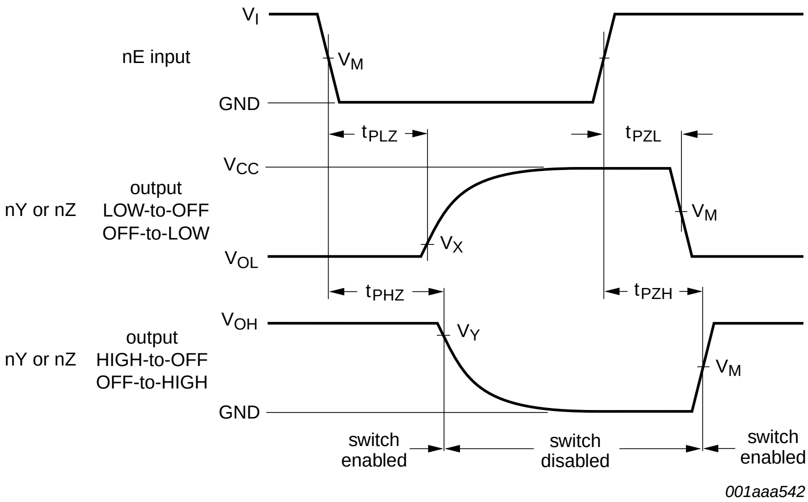
10.1 Waveforms and test circuit



Measurement points are given in Table 9.

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

Fig 15. Input (nY or nZ) to output (nZ or nY) propagation delays



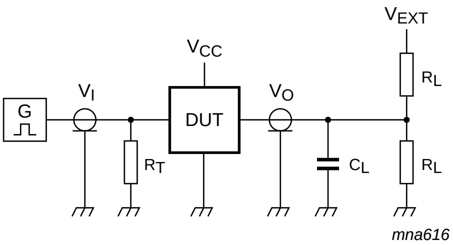
Measurement points are given in Table 9.

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

Fig 16. Enable and disable times

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. Load circuit for 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}	≤ 2.0 ns	30 pF	1 kΩ	open	GND	$2V_{CC}$
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	$2V_{CC}$
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	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 kΩ; C_L = 50 pF; f_i = 1 kHz; see Figure 18				
		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 kΩ; C_L = 50 pF; f_i = 10 kHz; see Figure 18				
		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	-	%

Table 11. Additional dynamic characteristics *...continued*

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

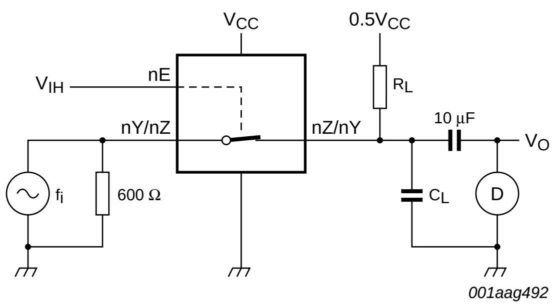
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$f_{(\|-3dB)}$	|-3 dB frequency response	R_L = 600 Ω; C_L = 50 pF; see Figure 19				
		V_{CC} = 1.65 V	-	170	-	MHz
		V_{CC} = 2.3 V	-	210	-	MHz
		V_{CC} = 3 V	-	212	-	MHz
		V_{CC} = 4.5 V	-	215	-	MHz
		R_L = 50 Ω; C_L = 5 pF; see Figure 19				
		V_{CC} = 1.65 V	-	> 500	-	MHz
		V_{CC} = 2.3 V	-	> 500	-	MHz
		V_{CC} = 3 V	-	> 500	-	MHz
		V_{CC} = 4.5 V	-	> 500	-	MHz
α_{iso}	isolation (OFF-state)	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 20				
		V_{CC} = 1.65 V	-	–46	-	dB
		V_{CC} = 2.3 V	-	–46	-	dB
		V_{CC} = 3 V	-	–46	-	dB
		V_{CC} = 4.5 V	-	–46	-	dB
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 20				
		V_{CC} = 1.65 V	-	–42	-	dB
		V_{CC} = 2.3 V	-	–42	-	dB
		V_{CC} = 3 V	-	–42	-	dB
		V_{CC} = 4.5 V	-	–42	-	dB
V_{ct}	crosstalk voltage	between digital inputs and switch; R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; t_r = t_f = 2 ns; see Figure 21				
		V_{CC} = 1.65 V	-	69	-	mV
		V_{CC} = 2.3 V	-	87	-	mV
		V_{CC} = 3 V	-	156	-	mV
		V_{CC} = 4.5 V	-	302	-	mV
Xtalk	crosstalk	between switches; R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 22				
		V_{CC} = 1.65 V	-	–58	-	dB
		V_{CC} = 2.3 V	-	–58	-	dB
		V_{CC} = 3 V	-	–58	-	dB
		V_{CC} = 4.5 V	-	–58	-	dB
		between switches; R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 22				
		V_{CC} = 1.65 V	-	–58	-	dB
		V_{CC} = 2.3 V	-	–58	-	dB
		V_{CC} = 3 V	-	–58	-	dB
		V_{CC} = 4.5 V	-	–58	-	dB

Table 11. Additional dynamic characteristics *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
Q_{inj}	charge injection	C_L = 0.1 nF; V_{gen} = 0 V; R_{gen} = 0 Ω; f_i = 1 MHz; R_L = 1 MΩ; see Figure 23				
		V_{CC} = 1.8 V	-	3.3	-	pC
		V_{CC} = 2.5 V	-	4.1	-	pC
		V_{CC} = 3.3 V	-	5.0	-	pC
		V_{CC} = 4.5 V	-	6.4	-	pC
		V_{CC} = 5.5 V	-	7.5	-	pC

10.2.1 Test circuits



Test conditions:

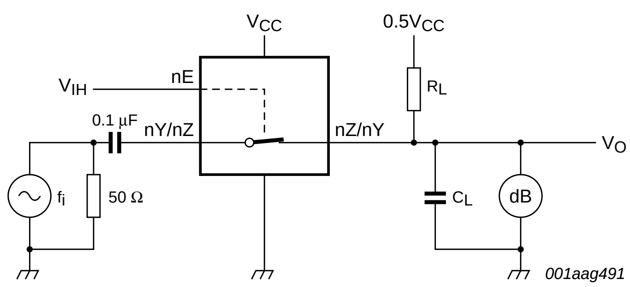
V_{CC} = 1.65 V: V_i = 1.4 V (p-p).

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

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

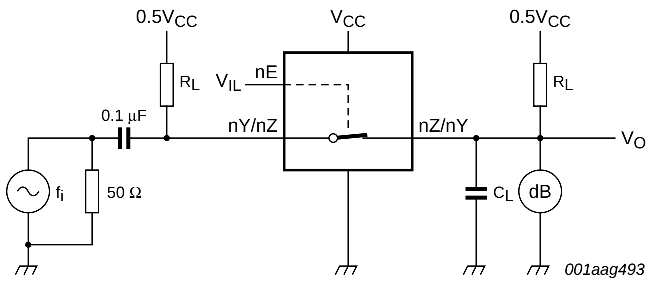
V_{CC} = 4.5 V: V_i = 4 V (p-p).

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)

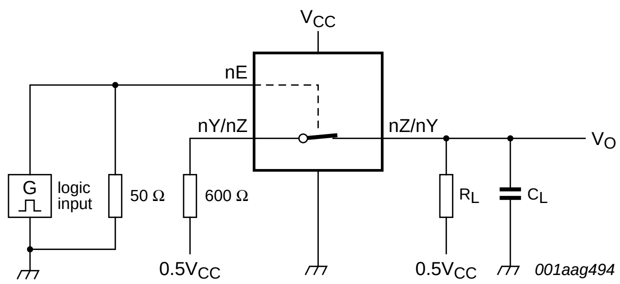
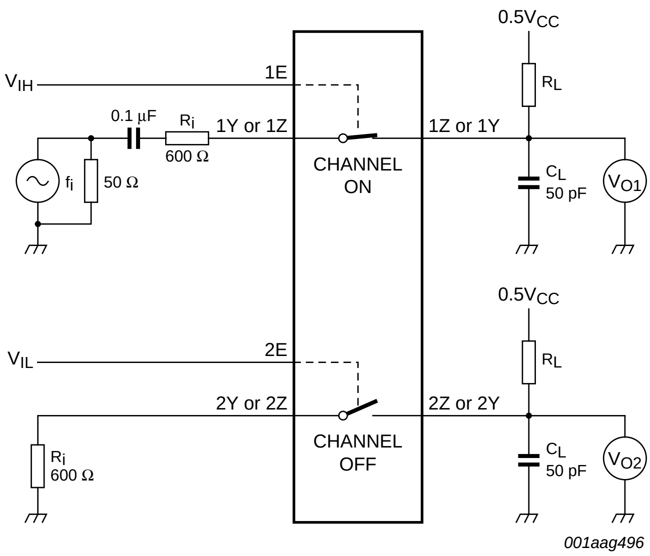
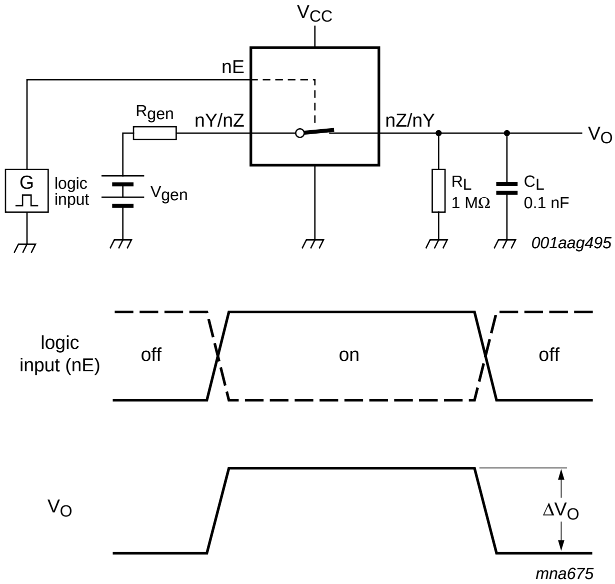


Fig 21. Test circuit for measuring crosstalk voltage (between digital inputs and switch)



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

Fig 22. Test circuit for measuring crosstalk between switches



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

ΔV_O = output voltage variation.

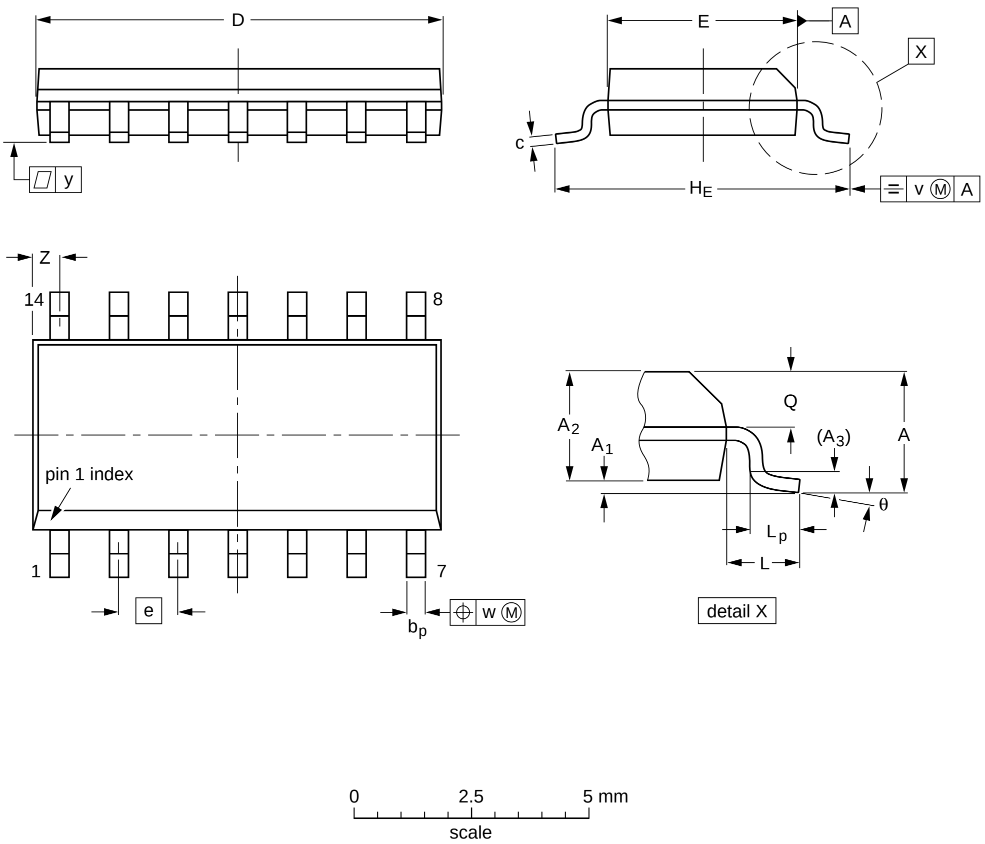
R_{gen} = generator resistance.

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**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D(1)	E(1)	e	H_E	L	L_p	Q	v	w	y	Z(1)	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

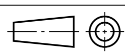
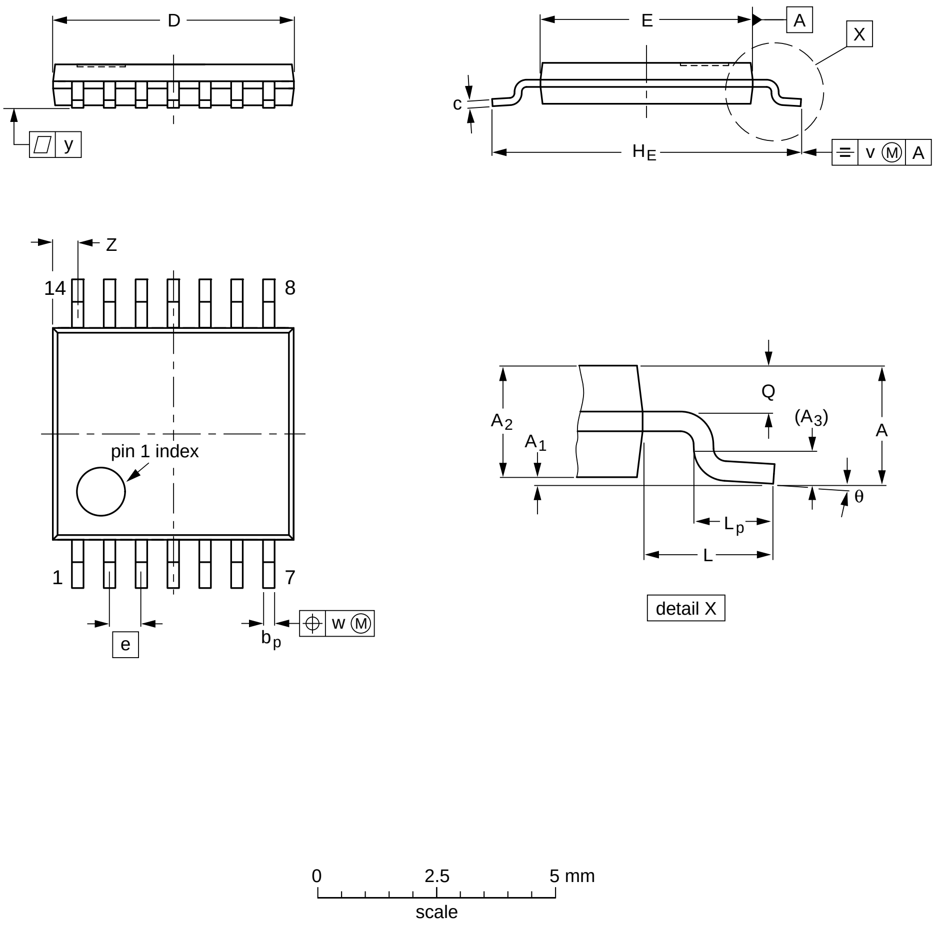
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT108-1	076E06	MS-012				~~99-12-27~~ 03-02-19

Fig 24. Package outline SOT108-1 (SO14)

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm **SOT402-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (2)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.72 0.38	8^o 0^o

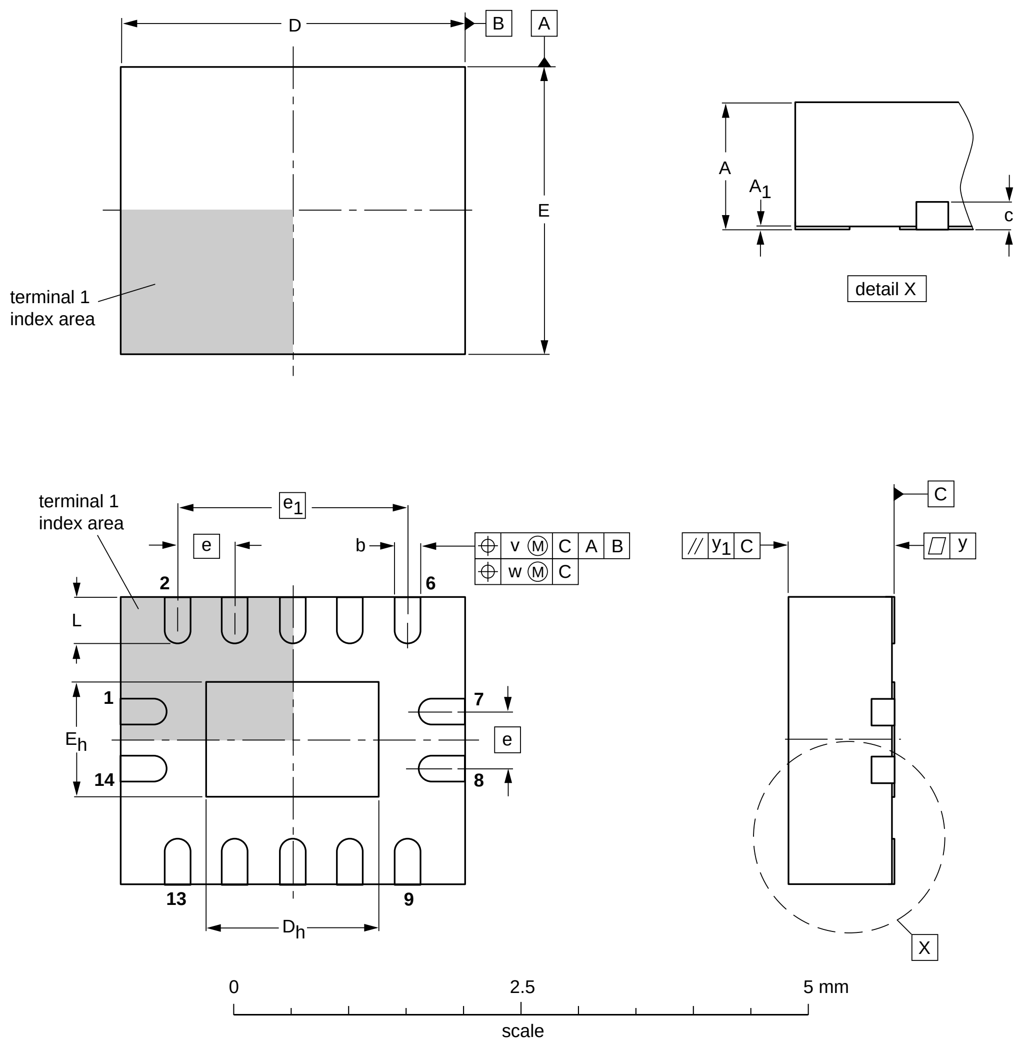
Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT402-1		MO-153				~~99-12-27~~ 03-02-18

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**



DIMENSIONS (mm are the original dimensions)

UNIT	$A^{(1)}$ max.	A_1	b	c	$D^{(1)}$	D_h	$E^{(1)}$	E_h	e	e_1	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	3.1 2.9	1.65 1.35	2.6 2.4	1.15 0.85	0.5	2	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT762-1	- - -	MO-241	- - -			~~02-10-17~~ 03-01-27

Fig 26. Package outline SOT762-1 (DHVQFN14)

12. Abbreviations

Table 12. Abbreviations

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

13. Revision history

Table 13. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC4066_Q100 v.1	20120807	Product data sheet	-	-

14. Legal information

14.1 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.

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