74LVC2G66

Bilateral switch

Rev. 01 — 29 June 2004 Product data sheet

1. General description

The 74LVC2G66 is a high-performance, low-power, low-voltage, Si-gate CMOS device.

The 74LVC2G66 provides two analog switches. Each switch has a input and output (pins Y and Z) and an active HIGH enable input (pin E). When pin E is LOW, the analog switch is turned off.

2. Features

- 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.
- High noise immunity
- Complies with JEDEC standard:
  - JESD8-7 (1.65 V to 1.95 V)
  - JESD8-5 (2.3 V to 2.7 V)
  - JESD8-B/JESD36 (2.7 V to 3.6 V).
- ESD protection:
  - HBM EIA/JESD22-A114-B exceeds 2000 V
  - MM EIA/JESD22-A115-A exceeds 200 V.
- CMOS low-power consumption
- Latch-up performance meets requirements of JESD78 Class I
- Direct interface with TTL levels
- Enable inputs accept voltages up to 5 V
- SOT505-2 and SOT765-1 package
- Specified from –40 °C to +85 °C and –40 °C to +125 °C.

3. Quick reference data

Table 1: Quick reference data

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f \leq 2.5$ ns.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PZH}, t_{PZL}	turn-on time nE to V_{OS}	C_L = 50 pF; R_L = 500 Ω				
		V_{CC} = 3 V	-	2.4	-	ns
		V_{CC} = 5 V	-	1.8	-	ns

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Table 1: Quick reference data *...continued*

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f \leq 2.5$ ns.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	turn-off time nE to V_{OS}	C_L = 50 pF; R_L = 500 Ω					
		V_{CC} = 3 V		-	3.0	-	ns
		V_{CC} = 5 V		-	2.2	-	ns
C_I	enable input capacitance			-	2.0	-	pF
C_S	switch capacitance	OFF-state		-	5	-	pF
		ON-state		-	9.5	-	pF
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 10 MHz; V_{CC} = 3.3 V	[1] [2]	-	11.0	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

C_S = switch capacitance in pF;

V_{CC} = supply voltage in V;

N = total load switching outputs.

[2] The condition is V_I = GND to V_{CC}.

4. Ordering information

Table 2: Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC2G66DP	–40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2
74LVC2G66DC	–40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1

5. Marking

Table 3: Marking

Type number	Marking code
74LVC2G66DP	V66
74LVC2G66DC	V66

6. Functional diagram

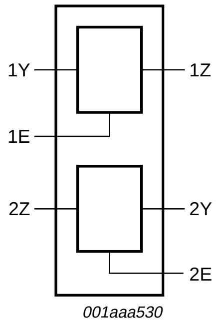


Fig 1. Logic symbol.

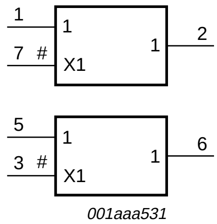


Fig 2. IEC logic symbol.

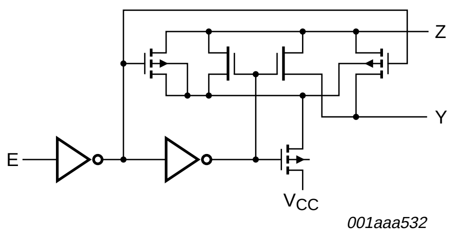


Fig 3. Logic diagram (one switch).

7. Pinning information

7.1 Pinning

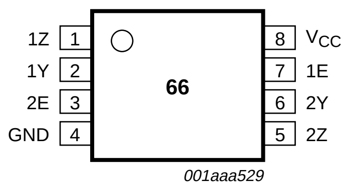


Fig 4. Pin configuration.

7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
1Y	1	independent input or output
1Z	2	independent input or output
2E	3	enable input (active HIGH)
GND	4	ground (0 V)
2Y	5	independent input or output

Table 4: Pin description *...continued*

Symbol	Pin	Description
2Z	6	independent input or output
1E	7	enable input (active HIGH)
V_{CC}	8	supply voltage

8. Functional description

8.1 Function table

Table 5: Function table [1]

Input E	Switch
L	OFF-state
H	ON-state

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

9. Limiting values

Table 6: 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 diode current	V_I < –0.5 V or V_I > V_{CC} + 0.5 V	-	–50	mA
I_{SK}	switch diode current	V_I < –0.5 V or V_I > V_{CC} + 0.5 V	-	±50	mA
V_S	DC switch voltage range	enable and disable mode	–0.5	V_{CC} + 0.5	V
I_S	switch source or sink current	V_S > –0.5 V or V_S < V_{CC} + 0.5 V	-	±50	mA
I_{CC}, I_{GND}	V_{CC} or GND current		-	±100	mA
T_{stg}	storage temperature		–65	+150	°C
P_{tot}	power dissipation	T_{amb} = –40 °C to +125 °C	-	300	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

10. Recommended operating conditions

Table 7: 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_S	DC switch voltage range	enable and disable mode [1] [2]	0	-	V_{CC}	V

Table 7: Recommended operating conditions *...continued*

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
T_{amb}	operating ambient temperature			–40	-	+125	°C
t_r, t_f	input rise and fall times	V_{CC} = 1.65 V to 2.7 V	[3]	0	-	20	ns/V
		V_{CC} = 2.7 V to 5.5 V	[3]	0	-	10	ns/V

[1] To avoid drawing V_{CC} current out of 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 V_{CC} current will flow out of terminal nY. In this case there is no limit for the voltage drop across the switch.

[2] For overvoltage tolerant switch voltage capability, see the 74LVCV2G66.

[3] Applies to control signal levels.

11. Static characteristics

Table 8: Static characteristics

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

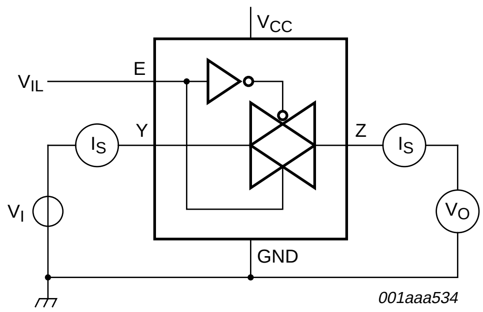
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = –40 °C to +85 °C [1]						
V_{IH}	HIGH-level input voltage	V_{CC} = 1.65 V to 1.95 V	0.65 × V_{CC}	-	-	V
		V_{CC} = 2.3 V to 2.7 V	1.7	-	-	V
		V_{CC} = 2.7 V to 3.6 V	2.0	-	-	V
		V_{CC} = 4.5 V to 5.5 V	0.7 × V_{CC}	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V	-	-	0.35 × V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V_{CC} = 2.7 V to 3.6 V	-	-	0.8	V
		V_{CC} = 4.5 V to 5.5 V	-	-	0.3 × V_{CC}	V
I_{LI}	input leakage current on control pin	V_I = 5.5 V or GND; V_{CC} = 5.5 V	-	±0.1	±5	µA
$I_{S(OFF)}$	analog switch OFF-state current	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} – GND; V_{CC} = 5.5 V; see Figure 5	-	±0.1	±5	µA
$I_{S(ON)}$	analog switch ON-state current	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} – GND; V_{CC} = 5.5 V; see Figure 6	-	±0.1	±5	µA
I_{CC}	quiescent supply current	V_I = V_{CC} or GND; V_S = GND or V_{CC}; I_O = 0 A; V_{CC} = 5.5 V	-	0.1	10	µA
ΔI_{CC}	additional quiescent supply current per control pin	V_I = V_{CC} – 0.6 V; V_S = GND or V_{CC}; I_O = 0 A; V_{CC} = 5.5 V	-	5	500	µA
C_I	input capacitance		-	2.0	-	pF
C_S	switch capacitance	OFF-state	-	5	-	pF
		ON-state	-	9.5	-	pF
T_{amb} = –40 °C to +125 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 1.65 V to 1.95 V	0.65 × V_{CC}	-	-	V
		V_{CC} = 2.3 V to 2.7 V	1.7	-	-	V
		V_{CC} = 2.7 V to 3.6 V	2.0	-	-	V
		V_{CC} = 4.5 V to 5.5 V	0.7 × V_{CC}	-	-	V

Table 8: Static characteristics *…continued*

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

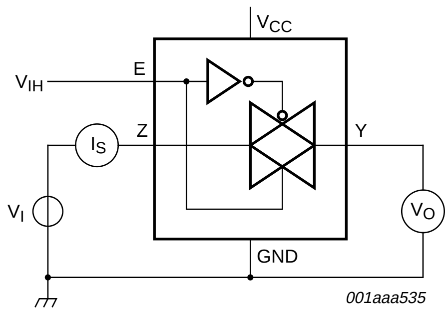
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V	-	-	0.35 × V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V_{CC} = 2.7 V to 3.6 V	-	-	0.8	V
		V_{CC} = 4.5 V to 5.5 V	-	-	0.3 × V_{CC}	V
I_{LI}	input leakage current on control pin	V_I = 5.5 V or GND; V_{CC} = 5.5 V	-	-	±100	μA
$I_{S(OFF)}$	analog switch OFF-state current	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} − GND; V_{CC} = 5.5 V; see Figure 5	-	-	±200	μA
$I_{S(ON)}$	analog switch ON-state current	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} − GND; V_{CC} = 5.5 V; see Figure 6	-	-	±200	μA
I_{CC}	quiescent supply current	V_I = V_{CC} or GND; V_S = GND or V_{CC}; I_O = 0 A; V_{CC} = 5.5 V	-	-	200	μA
ΔI_{CC}	additional quiescent supply current per control pin	V_I = V_{CC} − 0.6 V; V_S = GND or V_{CC}; I_O = 0 A; V_{CC} = 5.5 V	-	-	5000	μA

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



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

Fig 5. Test circuit for measuring switch OFF-state current.



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

Fig 6. Test circuit for measuring switch ON-state current.

Table 9: Resistance R_{ON}

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); see test circuit Figure 7.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = −40 °C to +85 °C						
$R_{ON(peak)}$	switch ON-state resistance (peak)	V_S = GND to V_{CC}; V_I = V_{IH} [1]				
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	35	100	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V	-	14	30	Ω
		I_S = 12 mA; V_{CC} = 2.7 V	-	11.5	25	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V	-	8.5	20	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	6.5	15	Ω

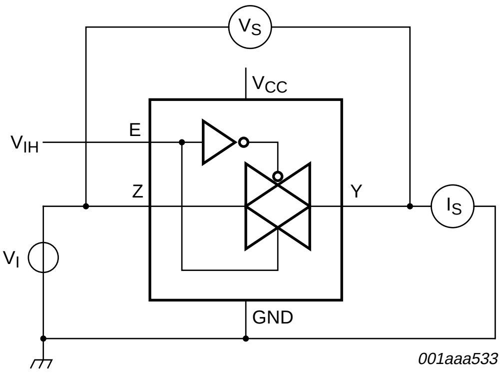
Table 9: Resistance R_{ON} *...continued*

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); see test circuit Figure 7.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$R_{ON(rail)}$	switch ON-state resistance (rail)	V_S = GND; $V_I = V_{IH}$	[1]				
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	10	30	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	8.5	20	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	7.5	18	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	6.5	15	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	6	10	Ω
		$V_S = V_{CC}$; $V_I = V_{IH}$					
		I_S = 4 mA; V_{CC} = 1.65 to 1.95 V		-	12	30	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	8.5	20	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	7.5	18	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	6.5	15	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	6	10	Ω
$R_{ON(flat)}$	switch ON-state resistance (flatness)	V_S = GND to V_{CC}; $V_I = V_{IH}$; see Figure 9 to Figure 13	[2]				
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	100	-	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	17	-	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	10	-	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	5	-	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	3	-	Ω
T_{amb} = −40 °C to +125 °C							
$R_{ON(peak)}$	switch ON-state resistance (peak)	V_S = GND to V_{CC}; $V_I = V_{IH}$					
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	-	150	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	-	45	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	-	38	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	-	30	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	-	23	Ω
$R_{ON(rail)}$	switch ON-state resistance (rail)	V_S = GND; $V_I = V_{IH}$					
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	-	45	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	-	30	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	-	27	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	-	23	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	-	15	Ω
		$V_S = V_{CC}$; $V_I = V_{IH}$					
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	-	45	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	-	30	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	-	27	Ω
		I_S = 24 mA; V_{CC} = 3.0 V to 3.6 V		-	-	23	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	-	15	Ω

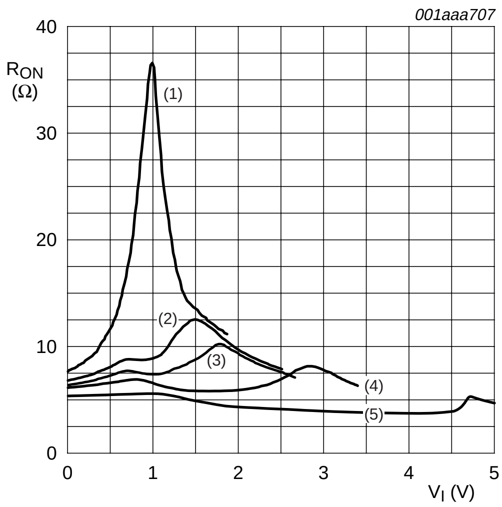
[1] These typical values are measured at T_{amb} = 25 °C and nominal V_{CC}.

[2] These typical values are measured at T_{amb} = −40 °C to +85 °C and nominal V_{CC}.



V_I = GND to V_{CC}.

Fig 7. Test circuit for measuring switch ON-resistance.



(1) V_{CC} = 1.8 V.

(2) V_{CC} = 2.5 V.

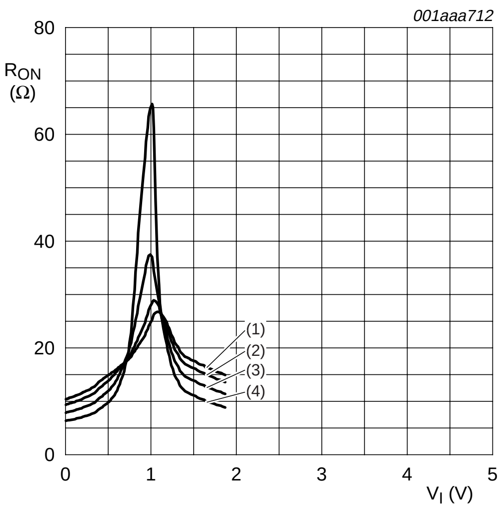
(3) V_{CC} = 2.7 V.

(4) V_{CC} = 3.3 V.

(5) V_{CC} = 5.0 V.

Measured at T_{amb} = 25 °C.

Fig 8. Typical switch ON-resistance as a function of input voltage; V_S = GND to V_{CC}.



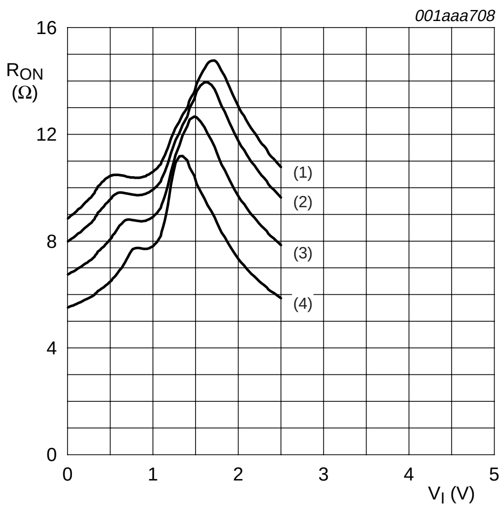
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

(4) T_{amb} = −40 °C.

Fig 9. Switch ON-resistance as a function of input voltage; V_{CC} = 1.8 V.



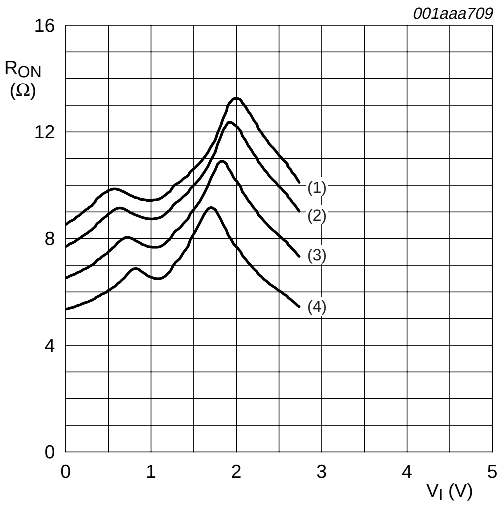
(1) T_{amb} = 125 °C.

(2) T_{amb} = 85 °C.

(3) T_{amb} = 25 °C.

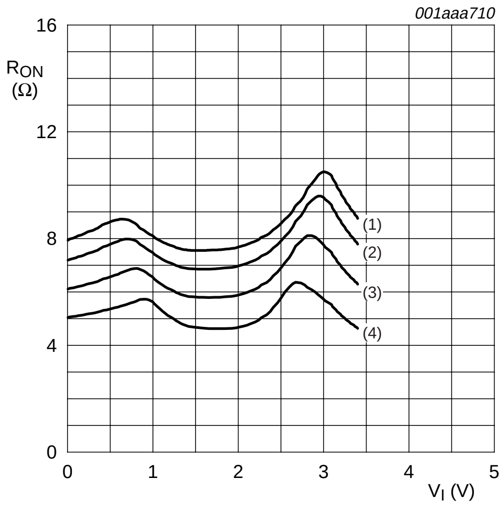
(4) T_{amb} = −40 °C.

Fig 10. Switch ON-resistance as a function of input voltage; V_{CC} = 2.5 V.



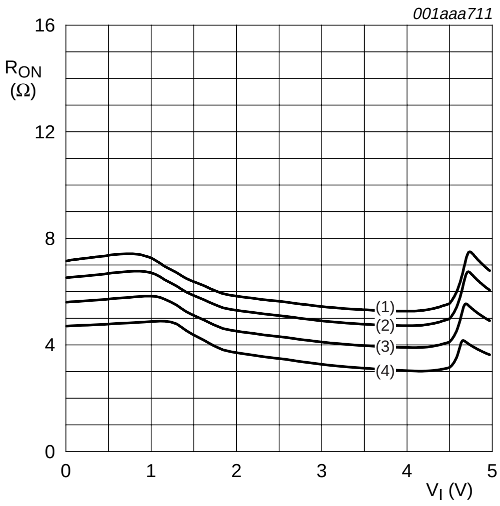
(1) T_{amb} = 125 °C.
(2) T_{amb} = 85 °C.
(3) T_{amb} = 25 °C.
(4) T_{amb} = –40 °C.

Fig 11. Switch 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 12. Switch 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 13. Switch ON-resistance as a function of input voltage; V_{CC} = 5.0 V.

12. Dynamic characteristics

Table 10: Dynamic characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = –40 °C to +85 °C [1]						
t_{PHL}, t_{PLH}	propagation delay nY to nZ or nZ to nY	see Figure 14				
		V_{CC} = 1.65 V to 1.95 V	-	0.8	2	ns
		V_{CC} = 2.3 V to 2.7 V	-	0.4	1.2	ns
		V_{CC} = 2.7 V	-	0.4	1	ns
		V_{CC} = 3.0 V to 3.6 V	-	0.3	0.8	ns
		V_{CC} = 4.5 V to 5.5 V	-	0.2	0.6	ns
t_{PZH}, t_{PZL}	turn-on time nE to V_{OS}	see Figure 15				
		V_{CC} = 1.65 V to 1.95 V	1.0	4.6	10	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	2.7	5.6	ns
		V_{CC} = 2.7 V	1.0	2.7	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	2.4	4.4	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	1.8	3.9	ns
t_{PHZ}, t_{PLZ}	turn-off time nE to V_{OS}	see Figure 15				
		V_{CC} = 1.65 V to 1.95 V	1.0	3.8	9.0	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	2.1	5.5	ns
		V_{CC} = 2.7 V	1.0	3.5	6.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	3.0	6.0	ns
		V_{CC} = 4.5 V to V 5.5 V	1.0	2.2	5.0	ns
C_{PD}	power dissipation capacitance	f_i = 10 MHz [2] [3]				
		V_{CC} = 2.5 V	-	9.0	-	pF
		V_{CC} = 3.3 V	-	11.0	-	pF
		V_{CC} = 5.0 V	-	15.7	-	pF
T_{amb} = –40 °C to +125 °C						
t_{PHL}, t_{PLH}	propagation delay nY to nZ or nZ to nY	see Figure 14				
		V_{CC} = 1.65 V to 1.95 V	-	-	3.0	ns
		V_{CC} = 2.3 V to 2.7 V	-	-	2.0	ns
		V_{CC} = 2.7 V	-	-	1.5	ns
		V_{CC} = 3.0 V to 3.6 V	-	-	1.5	ns
		V_{CC} = 4.5 V to 5.5 V	-	-	1.0	ns
t_{PZH}, t_{PZL}	turn-on time nE to V_{OS}	see Figure 15				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	13.0	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	7.5	ns
		V_{CC} = 2.7 V	1.0	-	6.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	-	6.0	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	-	5.0	ns

Table 10: Dynamic characteristics *...continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	turn-off time nE to V_{OS}	see Figure 15				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	11.5	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	7.0	ns
		V_{CC} = 2.7 V	1.0	-	8.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	-	8.0	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	-	6.5	ns

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

[2] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

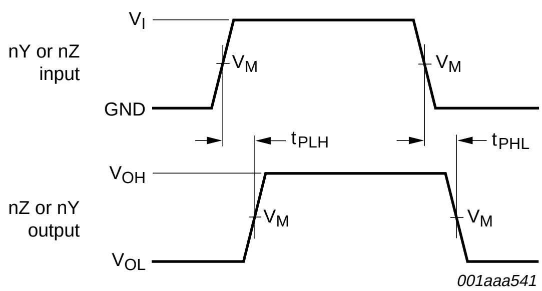
V_{CC} = supply voltage in V;

N = total load switching outputs;

C_S = switch capacitance.

[3] The condition is V_I = GND to V_{CC}.

13. Waveforms



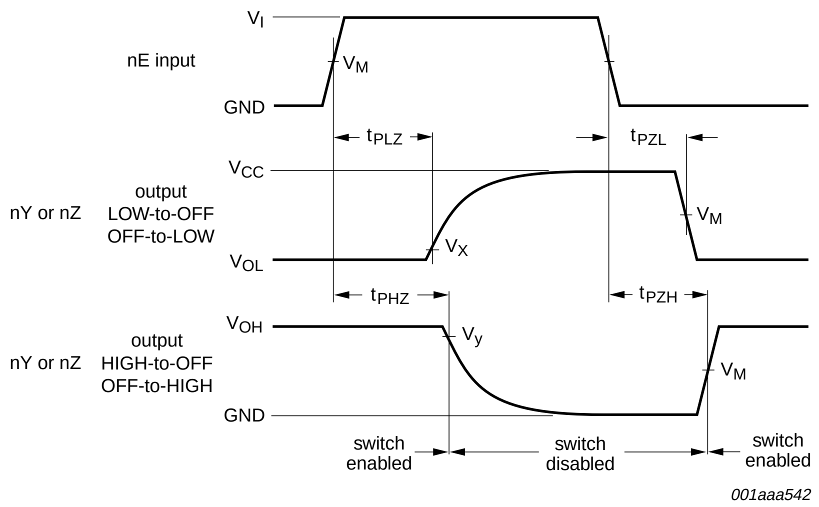
Measurement points are given in Table 11.

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

Fig 14. The input (nY, nZ) to output (nZ, nY) propagation delays and the output transition times.

Table 11: Measurement points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	1.5 V	1.5 V
4.5 V to 5.5 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$



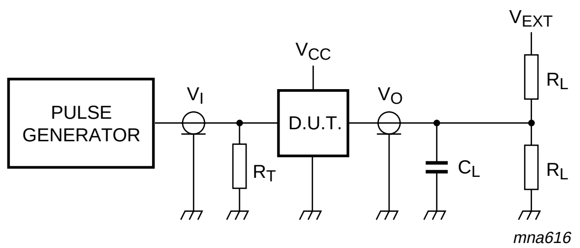
Measurement points are given in Table 12.

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

Fig 15. The turn-on and turn-off times.

Table 12: Measurement points

Supply voltage	Input	Output		
V_{CC}	V_M	V_M	V_X	V_Y
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 \times V_{CC}$	$V_{OH} - 0.1 \times V_{CC}$
2.3 V to 2.7 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$V_{OL} + 0.1 \times V_{CC}$	$V_{OH} - 0.1 \times V_{CC}$
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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V_{OL} + 0.3 V	V_{OH} − 0.3 V



Test data is given in Table 13.

Definitions test circuit:

R_L = Load resistor.

C_L = Load capacitance including jig and probe capacitance.

R_T = Termination resistance should be equal to output impedance Z_o of the pulse generator.

V_{EXT} = Test voltage for switching times.

Fig 16. Load circuitry for switching times.

Table 13: 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	2 × V_{CC}
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	2 × V_{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	2 × V_{CC}

14. Additional dynamic characteristics

Table 14: Additional dynamic characteristics

At recommended conditions; typical values measured at T_{amb} = 25 °C.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
d_{sin}	sine-wave distortion	R_L = 10 kΩ; C_L = 50 pF; f_i = 1 kHz; see Figure 17				
		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 17				
		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	-	%
$f_{ON-state(res)}$	switch ON-state signal frequency response	R_L = 600 Ω; C_L = 50 pF; see Figure 18 [1]				
		V_{CC} = 1.65 V	-	135	-	MHz
		V_{CC} = 2.3 V	-	145	-	MHz
		V_{CC} = 3 V	-	150	-	MHz
		V_{CC} = 4.5 V	-	155	-	MHz
		R_L = 50 Ω; C_L = 5 pF; see Figure 18 [1]				
		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

Table 14: Additional dynamic characteristics *...continued*

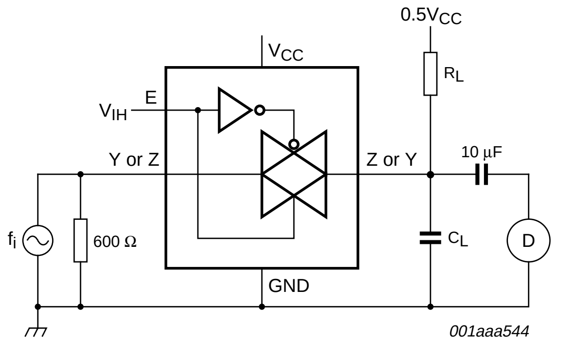
At recommended conditions; typical values measured at T_{amb} = 25 °C.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$\alpha_{OFF(ft)}$	switch OFF-state signal feed-through attenuation	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 19	[2]				
		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 19	[2]				
		V_{CC} = 1.65 V		-	–37	-	dB
		V_{CC} = 2.3 V		-	–37	-	dB
		V_{CC} = 3 V		-	–37	-	dB
		V_{CC} = 4.5 V		-	–37	-	dB
$V_{ct(cti-sw)}$	crosstalk between control input to signal output	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; t_r = t_f = 2 ns; see Figure 20					
		V_{CC} = 1.65 V		-	-	-	mV
		V_{CC} = 2.3 V		-	91	-	mV
		V_{CC} = 3 V		-	119	-	mV
		V_{CC} = 4.5 V		-	205	-	mV
$V_{ct(sw-sw)}$	crosstalk between switches	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 21					
		V_{CC} = 1.65 V		-	-	-	dB
		V_{CC} = 2.3 V		-	–56	-	dB
		V_{CC} = 3 V		-	–56	-	dB
		V_{CC} = 4.5 V		-	–56	-	dB
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 21					
		V_{CC} = 1.65 V		-	-	-	dB
		V_{CC} = 2.3 V		-	–29	-	dB
		V_{CC} = 3 V		-	–28	-	dB
		V_{CC} = 4.5 V		-	–28	-	dB
f_{max}	frequency response (–3 dB)	R_L = 50 Ω; C_L = 10 pF; see Figure 18	[1]				
		V_{CC} = 1.65 V		-	200	-	MHz
		V_{CC} = 2.3 V		-	350	-	MHz
		V_{CC} = 3 V		-	410	-	MHz
		V_{CC} = 4.5 V		-	440	-	MHz
Q	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 22	[3]				
		V_{CC} = 3.5 V		-	0.003	-	pC
		V_{CC} = 5.5 V		-	0.0035	-	pC

[1] Adjust f_i voltage to obtain 0 dBm level at output. Increase f_i frequency until dB meter reads –3 dB.

[2] Adjust f_i voltage to obtain 0 dBm level at input.

[3] Guaranteed by design.



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 V: V_i = 4 V (p-p).

Fig 17. Test circuit for measuring sine-wave distortion.

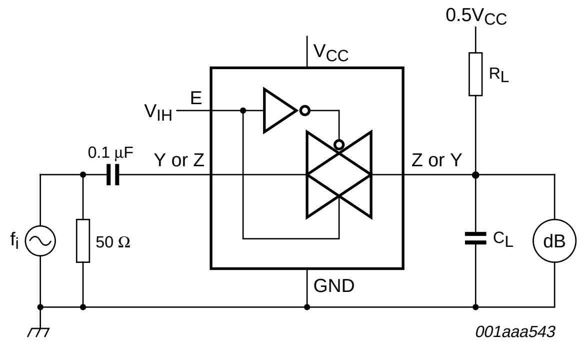


Fig 18. Test circuit for measuring the frequency response when switch is in ON-state.

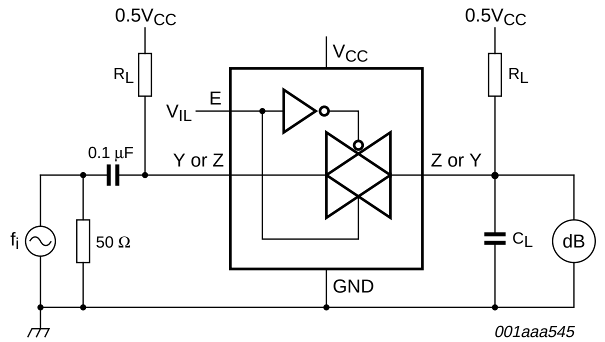


Fig 19. Test circuit for measuring feed-through attenuation when switch is in OFF-state.

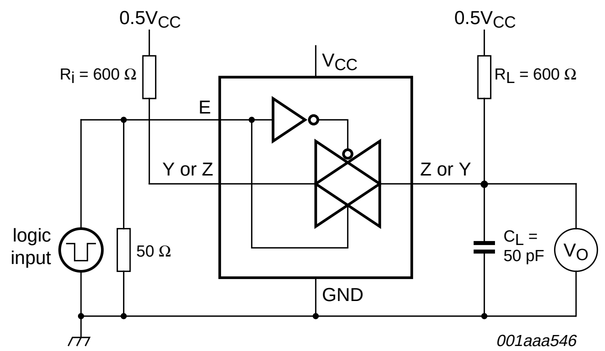
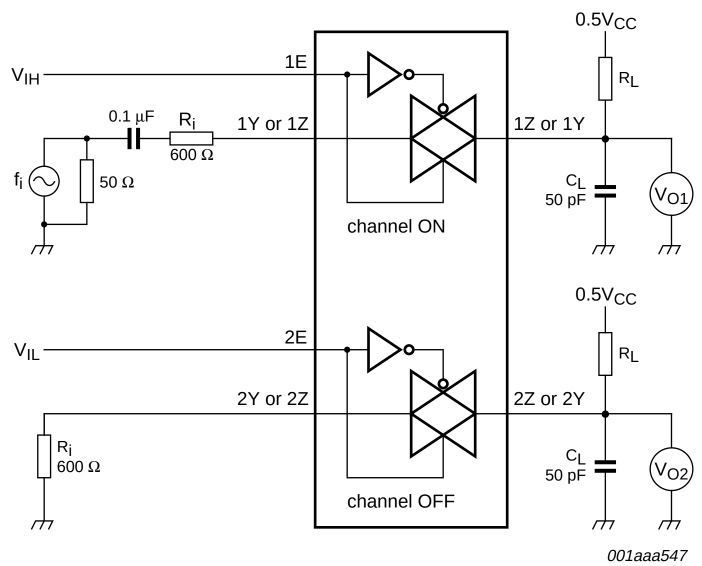
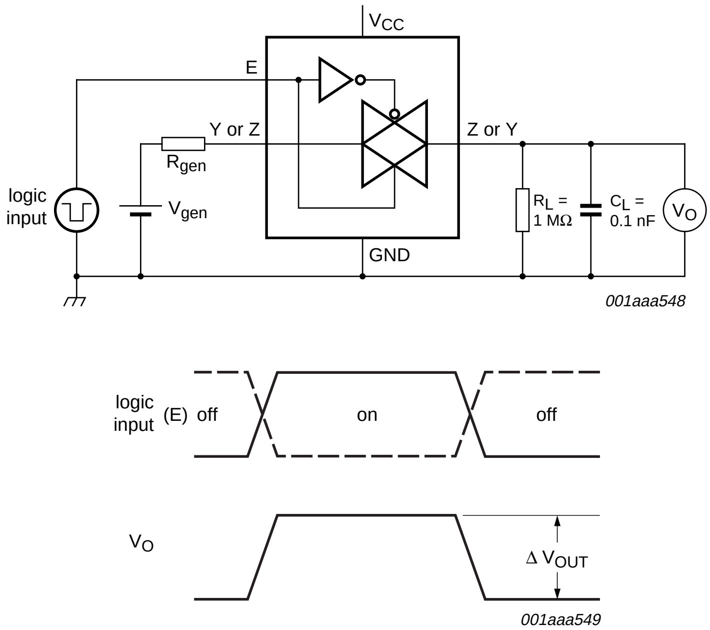


Fig 20. Test circuit for measuring crosstalk between control input and output.



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

Fig 21. Test circuit for measuring crosstalk between switches.

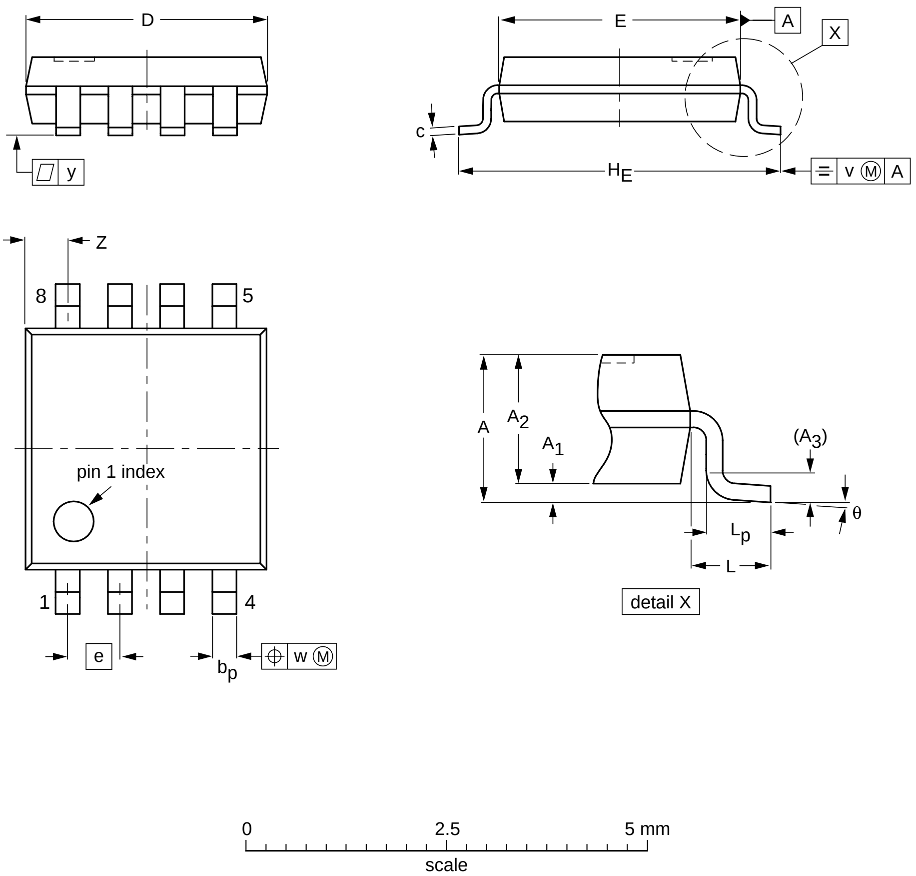


$Q = (\Delta V_{OUT}) \times (C_L)$.

Fig 22. Test circuit for measuring injection charge.

15. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	v	w	y	$Z^{(1)}$	θ
mm	1.1	0.15 0.00	0.95 0.75	0.25	0.38 0.22	0.18 0.08	3.1 2.9	3.1 2.9	0.65	4.1 3.9	0.5	0.47 0.33	0.2	0.13	0.1	0.70 0.35	8° 0°

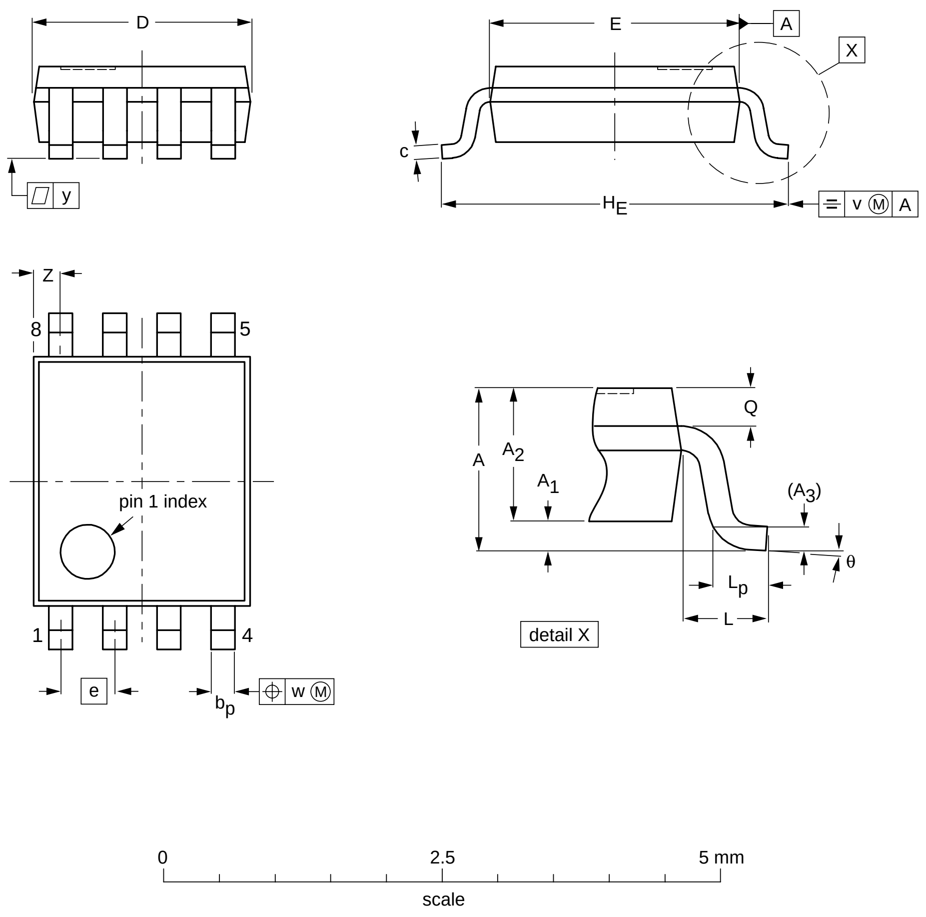
Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT505-2		- - -				02-01-16

Fig 23. Package outline TSSOP8.

VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm **SOT765-1**



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	0.15 0.00	0.85 0.60	0.12	0.27 0.17	0.23 0.08	2.1 1.9	2.4 2.2	0.5	3.2 3.0	0.4	0.40 0.15	0.21 0.19	0.2	0.13	0.1	0.4 0.1	8° 0°

Notes

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT765-1		MO-187				02-06-07

Fig 24. Package outline VSSOP8.

16. Revision history

Table 15: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVC2G66_1	20040629	Product data sheet	-	9397 750 13259	-

17. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

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

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

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21. Contents

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