74LVC1G384

Bilateral switch

Rev. 01 — 26 February 2004 Product data sheet

1. General description

The 74LVC1G384 is a high-speed Si-gate CMOS device.

The 74LVC1G384 provides an analog switch. The switch has input and output terminals (pins Y and Z) and an active LOW enable input (pin $\overline{E}$). When pin $\overline{E}$ is HIGH, the analog switch is turned off.

2. Features

- Very low ON-resistance:
  - 7.5 Ω (typ) at V_{CC} = 2.7 V
  - 6.5 Ω (typ) at V_{CC} = 3.3 V
  - 6.0 Ω (typ) at V_{CC} = 5 V.
- ESD protection:
  - HBM EIA/JESD22-A114-A exceeds 2 000 V
  - MM EIA/JESD22-A115-A exceeds 200 V.
- High noise immunity
- CMOS low power consumption
- Direct interface TTL-levels
- Latch-up performance meets requirements of JESD78 Class I
- Multiple package options
- Specified from –40 °C to +80 °C and –40 °C to +125 °C.

3. Quick reference data

Table 1: Quick reference data

Ground = 0 V; T_{amb} = 25 °C; $t_r = t_f \leq 3.0$ ns.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PZH}, t_{PZL}	turn-on time E to Y or Z	C_L = 50 pF; R_L = 500 Ω				
		V_{CC} = 3.3 V	-	4.8	-	ns
		V_{CC} = 5.0 V	-	3.3	-	ns
t_{PHZ}, t_{PLZ}	turn-off time E to Y or Z	C_L = 50 pF; R_L = 500 Ω				
		V_{CC} = 3.3 V	-	5.4	-	ns
		V_{CC} = 5.0 V	-	3.6	-	ns
C_I	input capacitance		-	2	-	pF

Table 1: Quick reference data *…continued*
Ground = 0 V; T_{amb} = 25 °C; t_r = $t_f \leq$ 3.0 ns.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 10 MHz; V_{CC} = 3.3 V	[1] [2]	-	15.2	-	pF
C_S	switch capacitance	OFF-state		-	5	-	pF
		ON-state		-	9.5	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i + (C_L + C_S) \times V_{CC}^2 \times f_o$ where:
f_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
C_S = maximum switch capacitance in pF;
V_{CC} = supply voltage in V.

[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
74LVC1G384GW	–40 °C to +125 °C	-	plastic surface mounted package; 5 leads	SOT353
74LVC1G384GV	–40 °C to +125 °C	-	plastic surface mounted package; 5 leads	SOT753

5. Marking

Table 3: Marking

Type number	Marking code
74LVC1G384GW	YL
74LVC1G384GV	YL

6. Functional diagram

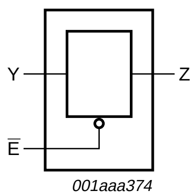


Fig 1. Logic symbol.

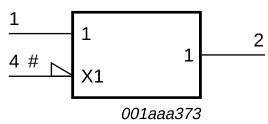


Fig 2. IEC logic symbol.

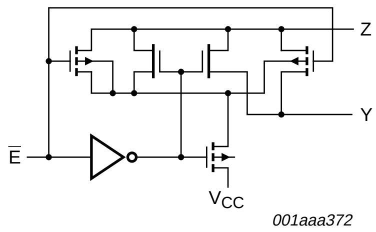


Fig 3. Logic diagram.

7. Pinning information

7.1 Pinning

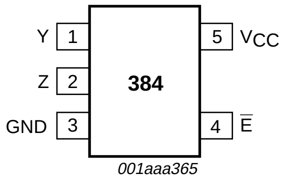


Fig 4. Pin configuration.

7.2 Pin description

Table 4: Pin description

Pin	Symbol	Description
1	Y	independent input or output
2	Z	independent output or input
3	GND	ground (0 V)
4	$\overline{E}$	enable input (active LOW)
5	V_{CC}	supply voltage

8. Functional description

8.1 Function table

Table 5: Function table [1]

Input $\overline{E}$	Switch
L	ON-state
H	OFF-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	DC 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		-	250	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		[1]	0	-	V_{CC}	V
T_{amb}	ambient temperature			–40	-	+125	°C
t_r, t_f	input rise and fall times	V_{CC} = 1.65 V to 2.7 V		0	-	20	ns/V
		V_{CC} = 2.7 V to 5.5 V		0	-	10	ns/V

[1] To avoid drawing V_{CC} current out of terminal Z, when switch current flows in terminal Y, the voltage drop across the bidirectional switch must not exceed 0.4 V. If the switch current flows into terminal Z, no V_{CC} current will flow out of terminal Y. In this case there is no limit for the voltage drop across the switch.

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	[2]	-	±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	[2]	-	±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	[2]	-	±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	[2]	-	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	[2]	-	5	500	μA
C_I	input capacitance			-	2	-	pF
$R_{ON(peak)}$	switch ON-state resistance (peak)	V_I = GND to V_{CC}; see Figure 7 and Figure 8					
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	35	130	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
$R_{ON(rail)}$	switch ON-state resistance rail	V_I = GND					
		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_I = V_{CC}					
		I_S = 4 mA; V_{CC} = 1.65 V 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

Table 8: Static characteristics *...continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{ON(flat)}$	switch ON-state resistance flatness	V_I = GND to V_{CC}; see Figure 9 [3]				
		I_S = 4 mA; V_{CC} = 1.8 V	-	100	-	Ω
		I_S = 8 mA; V_{CC} = 2.5 V	-	17	-	Ω
		I_S = 12 mA; V_{CC} = 2.7 V	-	10	-	Ω
		I_S = 24 mA; V_{CC} = 3.3 V	-	5	-	Ω
		I_S = 32 mA; V_{CC} = 5.0 V	-	3	-	Ω
T_{amb} = −40 °C to +125 °C						
V_{IH}	HIGH-level input voltage	V_{CC} = 1.65 V to 1.95 V	$0.65 \times V_{CC}$	-	-	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	$0.7 \times V_{CC}$	-	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.65 V to 1.95 V	-	-	$0.35 \times V_{CC}$	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	-	-	$0.3 \times V_{CC}$	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
$R_{ON(peak)}$	switch ON-state resistance (peak)	V_I = GND to V_{CC}; see Figure 7				
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V	-	-	180	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

Table 8: Static characteristics *…continued*

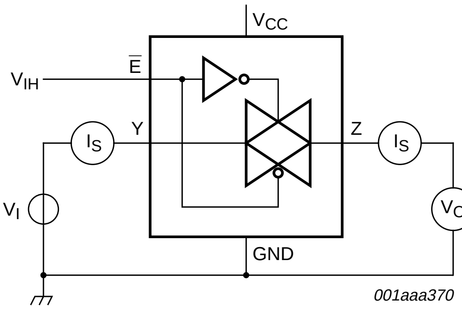
At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$R_{ON(rail)}$	switch ON-state resistance rail	V_I = GND				
		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_I = V_{CC}				
		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] Typical values are measured at T_{amb} = 25 °C.

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

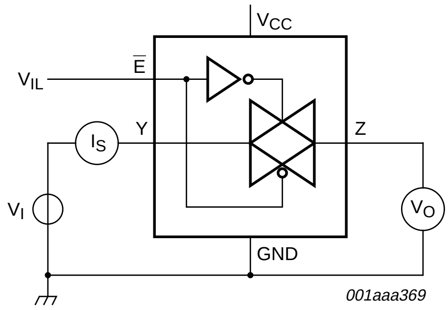
[3] These typical values are measured over the operating temperature range from –40 °C to +125 °C.



$V_I = V_{CC}$ and V_O = GND;

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

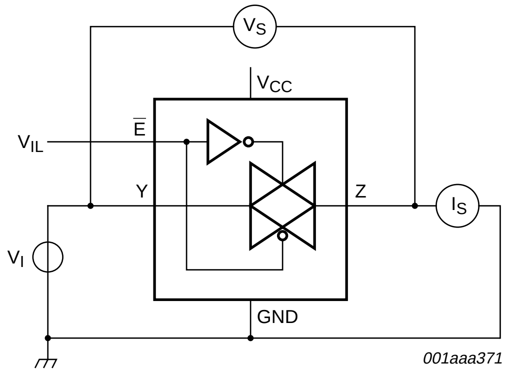
Fig 5. Test circuit for measuring switch OFF-state current.



$V_I = V_{CC}$ and V_O = open circuit;

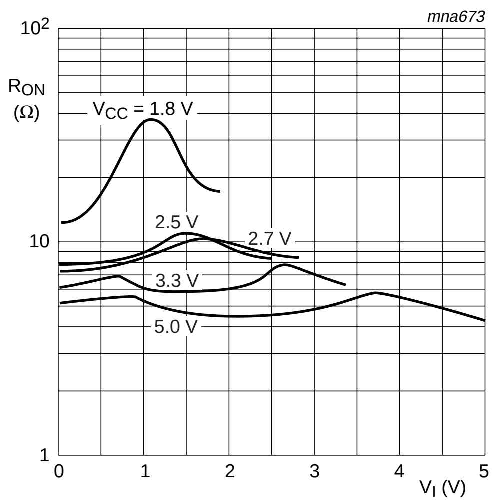
V_I = GND and V_O = open circuit

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



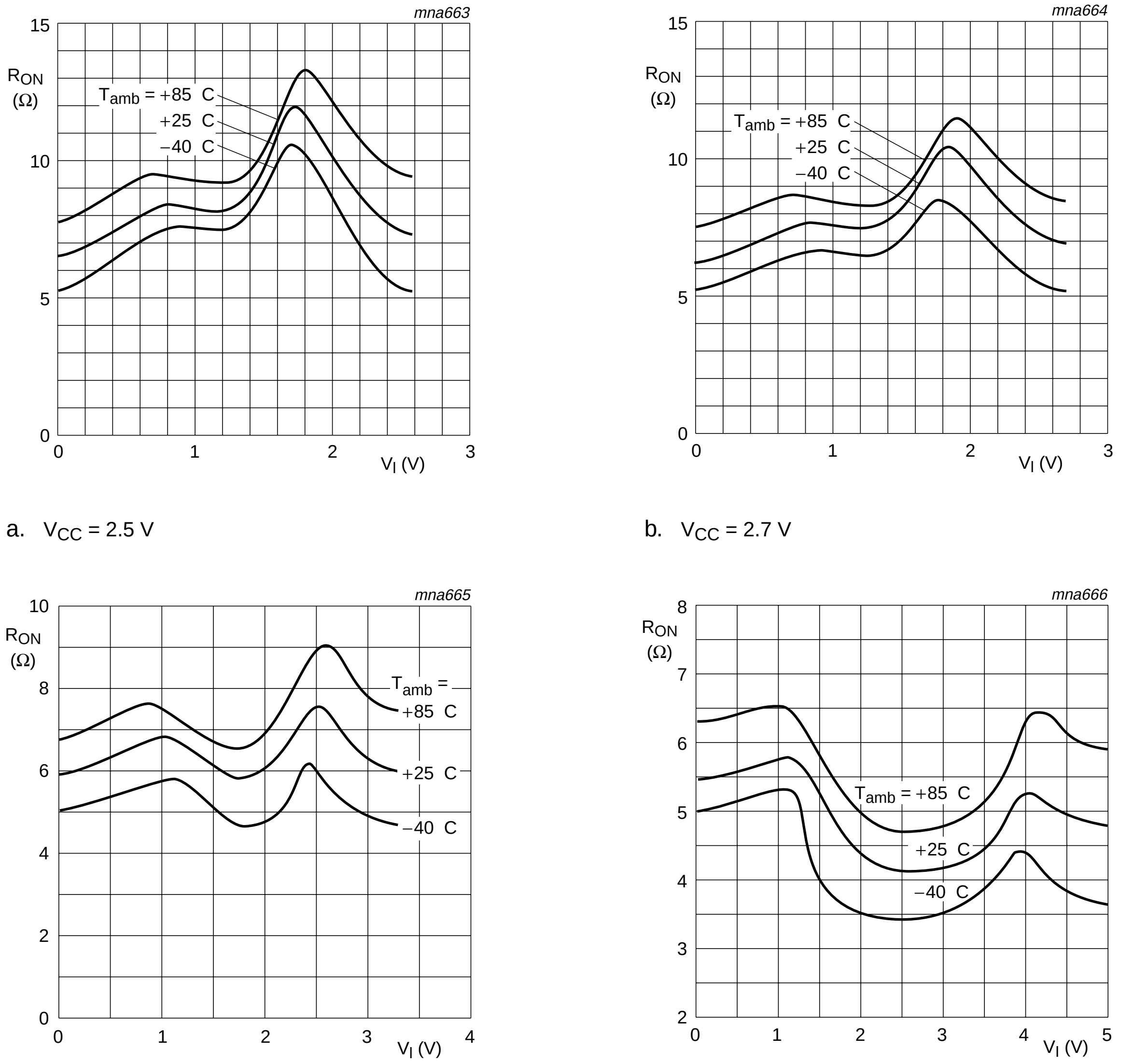
V_I = GND to V_{CC}; $R_{ON} = V_S/I_S$

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



V_S = GND to V_{CC}.

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



a. V_{CC} = 2.5 V

b. V_{CC} = 2.7 V

c. V_{CC} = 3.3 V

d. V_{CC} = 5.0 V

Fig 9. Switch ON-resistance at various supply voltages as a function of input voltage.

12. Dynamic characteristics

Table 9: Dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit Figure 12.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
T_{amb} = −40 °C to +85 °C [1]							
t_{PHL}, t_{PLH}	propagation delay Y to Z or Z to Y	see Figure 10	[2]				
		V_{CC} = 1.65 V to 1.95 V		-	0.8	2.0	ns
		V_{CC} = 2.3 V to 2.7 V		-	0.4	1.2	ns
		V_{CC} = 2.7 V		-	0.4	1.0	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 $\overline{E}$ to Y or Z	see Figure 11					
		V_{CC} = 1.65 V to 1.95 V		1.0	10.0	12.0	ns
		V_{CC} = 2.3 V to 2.7 V		1.0	5.7	6.5	ns
		V_{CC} = 2.7 V		1.0	5.4	6.0	ns
		V_{CC} = 3.0 V to 3.6 V		1.0	4.8	5.0	ns
		V_{CC} = 4.5 V to 5.5 V		1.0	3.3	4.2	ns
t_{PHZ}, t_{PLZ}	turn-off time $\overline{E}$ to Y or Z	see Figure 11					
		V_{CC} = 1.65 V to 1.95 V		1.0	7.4	10.0	ns
		V_{CC} = 2.3 V to 2.7 V		1.0	4.1	6.9	ns
		V_{CC} = 2.7 V		1.0	4.9	7.5	ns
		V_{CC} = 3.0 V to 3.6 V		1.0	5.4	6.5	ns
		V_{CC} = 4.5 V to 5.5 V		1.0	3.6	5.0	ns
C_{PD}	power dissipation capacitance	C_L = 50 pF; f_i = 10 MHz; V_I = GND to V_{CC}	[3] [4]				
		V_{CC} = 2.5 V		-	13.7	-	pF
		V_{CC} = 3.3 V		-	15.2	-	pF
		V_{CC} = 5.0 V		-	18.3	-	pF
T_{amb} = −40 °C to +125 °C							
t_{PHL}, t_{PLH}	propagation delay Y to Z or Z to Y	see Figure 10	[2]				
		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 $\overline{E}$ to Y or Z	see Figure 11					
		V_{CC} = 1.65 V to 1.95 V		1.0	-	15.5	ns
		V_{CC} = 2.3 V to 2.7 V		1.0	-	8.5	ns
		V_{CC} = 2.7 V		1.0	-	8.0	ns
		V_{CC} = 3.0 V to 3.6 V		1.0	-	6.5	ns
		V_{CC} = 4.5 V to 5.5 V		1.0	-	5.5	ns

Table 9: Dynamic characteristics *...continued*

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); test circuit Figure 12.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	turn-off time $\overline{E}$ to Y or Z	see Figure 11				
		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	-	9.0	ns
		V_{CC} = 2.7 V	1.0	-	9.5	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	-	8.5	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.

[2] t_{PHL} and t_{PLH} propagation delay is the calculated RC time constant of the typical switch ON-resistance of the switch and the specified capacitance when driven by an ideal voltage source (zero output impedance).

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

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

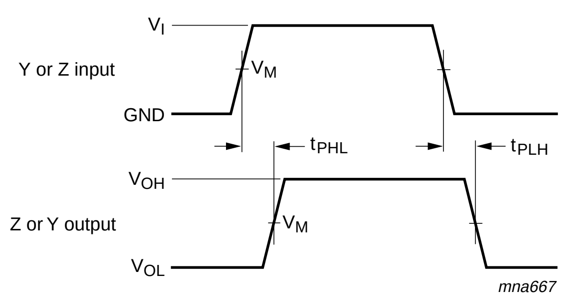
C_L = output load capacitance in pF;

C_S = maximum switch capacitance in pF;

V_{CC} = supply voltage in V.

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

13. Waveforms



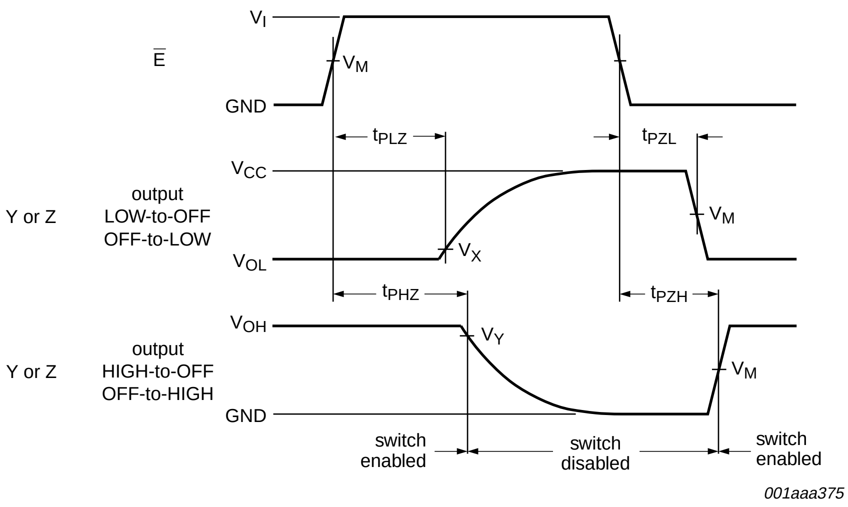
Measurement points are given in Table 10.

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

Fig 10. Input (Y or Z) to output (Z or Y) propagation delays.

Table 10: Measurement points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
1.65 V to 1.95 V	0.5 × V_{CC}	0.5 × V_{CC}
2.3 V to 2.7 V	0.5 × V_{CC}	0.5 × 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 × V_{CC}	0.5 × V_{CC}



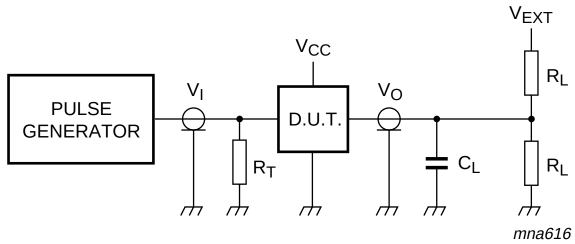
Measurement points are given in Table 11.

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

Fig 11. Turn-on and turn-off times.

Table 11: 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 12.

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} = Test voltage for switching times.

Fig 12. Load circuitry for switching times.

Table 12: 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	6.0 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6.0 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 13: 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	f_i = 1 kHz; R_L = 10 kΩ; C_L = 50 pF; see Figure 13					
		V_{CC} = 1.65 V		-	0.032	-	%
		V_{CC} = 2.3 V		-	0.008	-	%
		V_{CC} = 3.0 V		-	0.006	-	%
		V_{CC} = 4.5 V		-	0.001	-	%
		f_i = 10 kHz; R_L = 10 kΩ; C_L = 50 pF; see Figure 13					
		V_{CC} = 1.65 V		-	0.068	-	%
		V_{CC} = 2.3 V		-	0.009	-	%
		V_{CC} = 3.0 V		-	0.008	-	%
		V_{CC} = 4.5 V		-	0.006	-	%
$f_{ON\text{-}state(res)}$	switch ON-state signal frequency response	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 14	[1]				
		V_{CC} = 1.65 V		-	135	-	MHz
		V_{CC} = 2.3 V		-	145	-	MHz
		V_{CC} = 3.0 V		-	150	-	MHz
		V_{CC} = 4.5 V		-	155	-	MHz
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 14	[1]				
		V_{CC} = 1.65 V		-	>500	-	MHz
		V_{CC} = 2.3 V		-	>500	-	MHz
		V_{CC} = 3.0 V		-	>500	-	MHz
		V_{CC} = 4.5 V		-	>500	-	MHz
$\alpha_{OFF(ft)}$	switch OFF-state signal feed-through attenuation	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 15	[2]				
		V_{CC} = 1.65 V		-	–46	-	dB
		V_{CC} = 2.3 V		-	–46	-	dB
		V_{CC} = 3.0 V		-	–46	-	dB
		V_{CC} = 4.5 V		-	–46	-	dB
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 15	[2]				
		V_{CC} = 1.65 V		-	–37	-	dB
		V_{CC} = 2.3 V		-	–37	-	dB
		V_{CC} = 3.0 V		-	–37	-	dB
		V_{CC} = 4.5 V		-	–37	-	dB

Table 13: Additional dynamic characteristics *...continued*

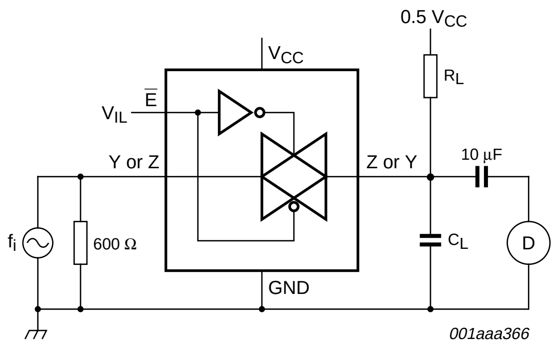
At recommended conditions; typical values measured at T_{amb} = 25 °C.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{ct}	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 16					
		V_{CC} = 1.65 V		-	69	-	mV
		V_{CC} = 2.3 V		-	87	-	mV
		V_{CC} = 3.0 V		-	156	-	mV
		V_{CC} = 4.5 V		-	302	-	mV
f_{max}	frequency response (–3 dB)	R_L = 50 Ω; C_L = 10 pF; see Figure 14	[1]				
		V_{CC} = 1.65 V		-	200	-	MHz
		V_{CC} = 2.3 V		-	350	-	MHz
		V_{CC} = 3.0 V		-	410	-	MHz
		V_{CC} = 4.5 V		-	440	-	MHz
Q	injection charge	C_L = 0.1 nF; V_{gen} = 0 V; R_{gen} = 0 Ω; f = 1 MHz; R_L = 1 MΩ; V_{CC} = 1.65 V to 5.5 V; see Figure 17	[3]	-	0.05	-	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] Definition: Q = $\Delta V_{out} \times C_L$. 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 13. Test circuit for measuring sine-wave distortion.

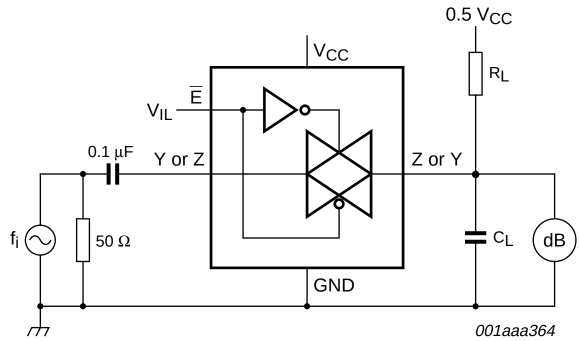


Fig 14. Test circuit for measuring the frequency response when switch is in ON-state.

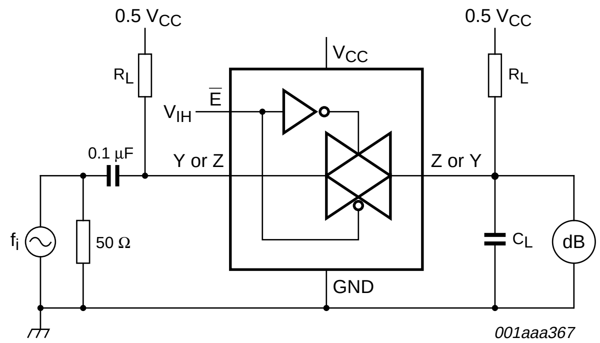


Fig 15. Test circuit for measuring feed-through attenuation when switch is in OFF-state.

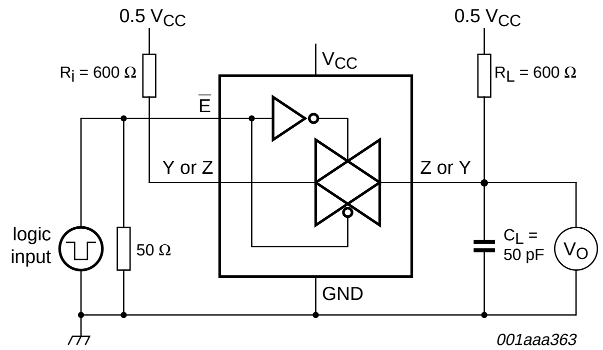


Fig 16. Test circuit for measuring crosstalk between control input and output.

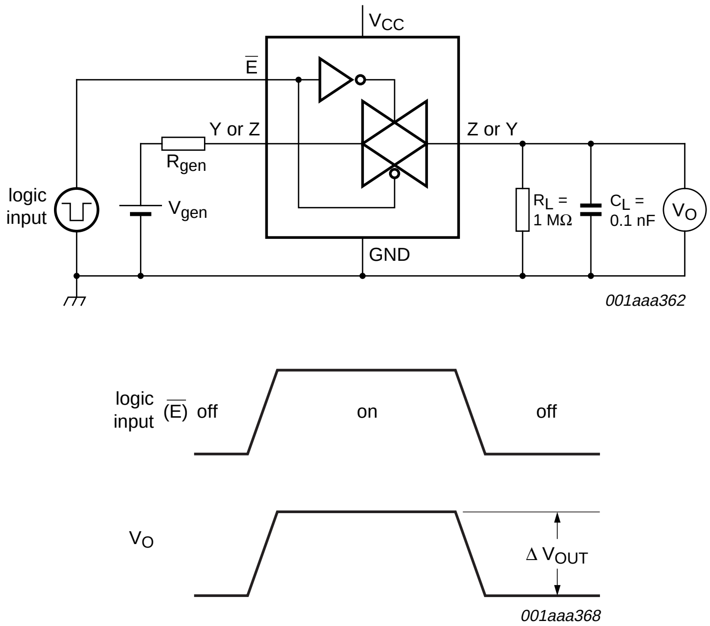
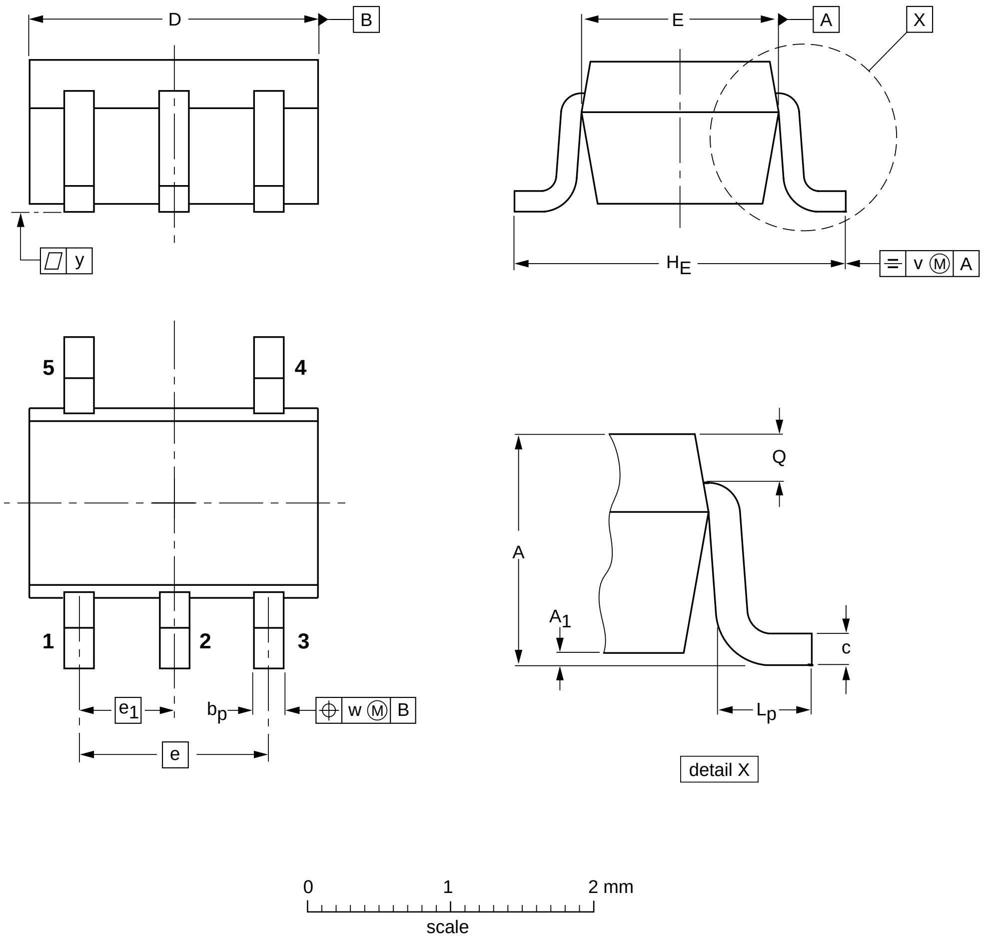


Fig 17. Test circuit for measuring injection charge.

15. Package outline

Plastic surface mounted package; 5 leads **SOT353**



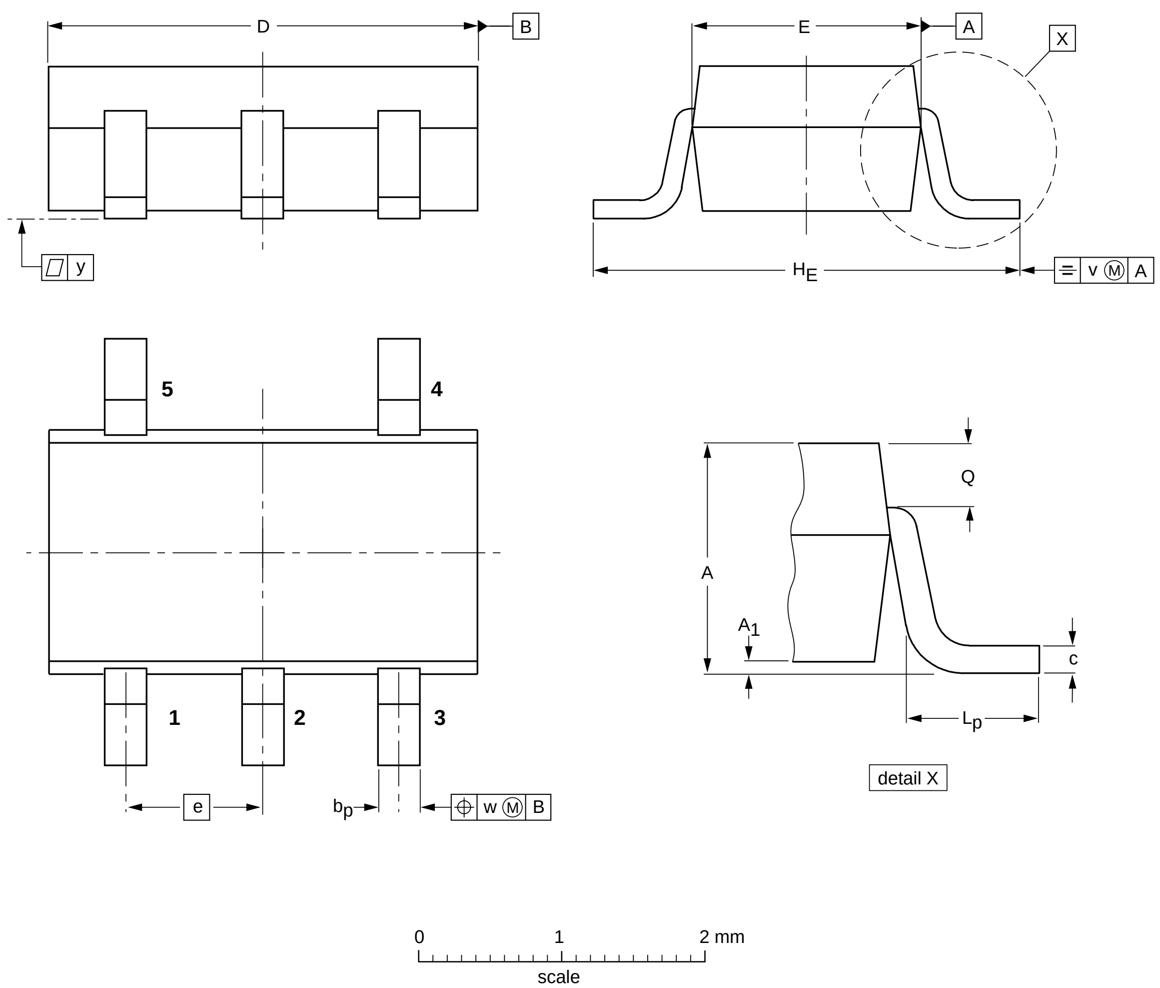
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E [2]	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT353			SC-88A			97-02-28

Fig 18. Package outline SOT353.

Plastic surface mounted package; 5 leads **SOT753**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.100 0.013	0.40 0.25	0.26 0.10	3.1 2.7	1.7 1.3	0.95	3.0 2.5	0.6 0.2	0.33 0.23	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT753			SC-74A			02-04-16

Fig 19. Package outline SOT753.

16. Revision history

Table 14: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVC1G384_1	20040226	Product data	-	9397 750 12675	-

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

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21. Contents

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