

# 74LVC1G384

## Bilateral switch

Rev. 02 — 29 August 2007

Product data sheet

## 1. General description

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The 74LVC1G384 is a low-power, low-voltage, high-speed Si-gate CMOS device.

The 74LVC1G384 provides one single pole, single throw analog switch function. It has two input/output terminals (Y and Z) and an active LOW enable input pin ( $\bar{E}$ ). When pin  $\bar{E}$  is HIGH, the analog switch is turned off.

Schmitt trigger action at the enable input 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.

## 2. Features

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- Wide supply voltage range from 1.65 V to 5.5 V
- Very low ON resistance:
  - ◆ 7.5  $\Omega$  (typical) at  $V_{CC} = 2.7$  V
  - ◆ 6.5  $\Omega$  (typical) at  $V_{CC} = 3.3$  V
  - ◆ 6  $\Omega$  (typical) at  $V_{CC} = 5$  V
- Switch current capability of 32 mA
- High noise immunity
- CMOS low power consumption
- TTL interface compatibility at 3.3 V
- Latch-up performance meets requirements of JESD 78 Class I
- ESD protection:
  - ◆ HBM JESD22-A114E exceeds 2000 V
  - ◆ MM JESD22-A115-A exceeds 200 V
- Enable input accepts voltages up to 5.5 V
- Multiple package options
- Specified from  $-40$  °C to  $+85$  °C and from  $-40$  °C to  $+125$  °C

### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74LVC1G384GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74LVC1G384GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753
74LVC1G384GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74LVC1G384GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891

### 4. Marking

Table 2. Marking

Type number	Marking code
74LVC1G384GW	YL
74LVC1G384GV	YL
74LVC1G384GM	YL
74LVC1G384GF	YL

### 5. Functional diagram

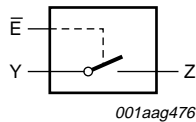


Fig 1. Logic symbol

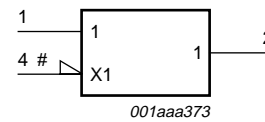


Fig 2. IEC logic symbol

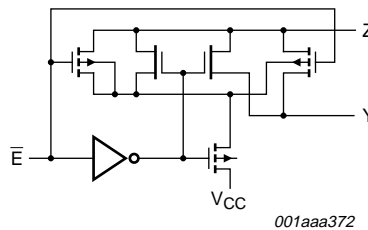
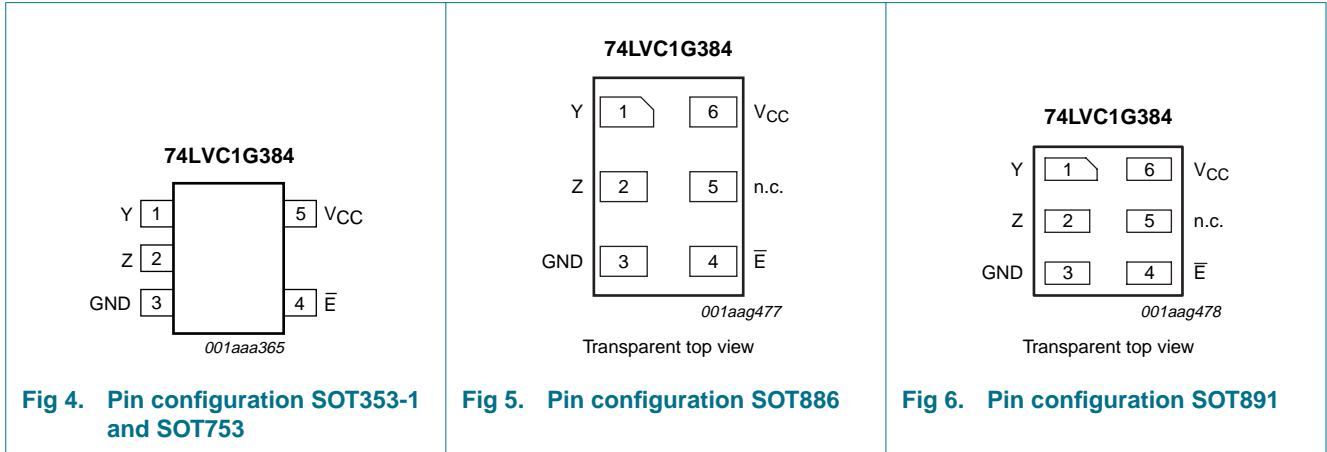


Fig 3. Logic diagram

## 6. Pinning information

### 6.1 Pinning



### 6.2 Pin description

Table 3. Pin description

Symbol	Pin		Description
	SOT353-1/SOT753	SOT886/SOT891	
Y	1	1	independent input or output
Z	2	2	independent output or input
GND	3	3	ground (0 V)
$\bar{E}$	4	4	enable input (active LOW)
n.c.	-	5	not connected
$V_{CC}$	5	6	supply voltage

## 7. Functional description

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

Input $\bar{E}$	Switch
L	ON-state
H	OFF-state

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

## 8. 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	+6.5	V
$V_I$	input voltage		[1] -0.5	+6.5	V
$I_{IK}$	input clamping current	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$	-50	-	mA
$I_{SK}$	switch clamping current	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$	-	$\pm 50$	mA
$V_{SW}$	switch voltage	enable and disable mode	[2] -0.5	$V_{CC} + 0.5$	V
$I_{SW}$	switch current	$V_{SW} > -0.5\text{ V}$ or $V_{SW} < V_{CC} + 0.5\text{ V}$	-	$\pm 50$	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	$T_{amb} = -40\text{ °C}$ to $+125\text{ °C}$	[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.
- [3] For TSSOP5 and SC-74A packages: above 87.5 °C the value of  $P_{tot}$  derates linearly with 4.0 mW/K.  
For XSON6 packages: above 45 °C the value of  $P_{tot}$  derates linearly with 2.4 mW/K.

## 9. Recommended operating conditions

**Table 6. 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	$V_{CC} = 1.65\text{ V}$ to $2.7\text{ V}$	-	-	20	ns/V
		$V_{CC} = 2.7\text{ V}$ to $5.5\text{ V}$	-	-	10	ns/V

- [1] To avoid sinking GND current from 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 GND current will flow from terminal Y. In this case, there is no limit for the voltage drop across the switch.

## 10. Static characteristics

**Table 7. 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 <sup>[1]</sup>	Max	Min	Max		
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65V <sub>CC</sub>	-	-	0.65 V <sub>CC</sub>	-	V	
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V	
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V	
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.7V <sub>CC</sub>	-	-	0.7V <sub>CC</sub>	-	V	
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35V <sub>CC</sub>	-	0.35V <sub>CC</sub>	V	
		V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V	
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V	
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.3V <sub>CC</sub>	-	0.3V <sub>CC</sub>	V	
I <sub>I</sub>	input leakage current	pin $\bar{E}$ ; V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	[2]	-	±0.1	±5	-	100	μA
I <sub>S(OFF)</sub>	OFF-state leakage current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; see <a href="#">Figure 7</a>	[2]	-	±0.1	±5	-	200	μA
I <sub>S(ON)</sub>	ON-state leakage current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 5.5 V; see <a href="#">Figure 8</a>	[2]	-	±0.1	±5	-	200	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = 5.5 V or GND; V <sub>SW</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 1.65 V to 5.5 V	[2]	-	0.1	10	-	200	μA
ΔI <sub>CC</sub>	additional supply current	pin $\bar{E}$ ; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; V <sub>SW</sub> = GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	[2]	-	5	500	-	5000	μA
C <sub>I</sub>	input capacitance		-	2.0	-	-	-	-	pF
C <sub>S(OFF)</sub>	OFF-state capacitance		-	5.0	-	-	-	-	pF
C <sub>S(ON)</sub>	ON-state capacitance		-	9.5	-	-	-	-	pF

[1] All typical values are measured at T<sub>amb</sub> = 25 °C.

[2] These typical values are measured at V<sub>CC</sub> = 3.3 V.

10.1 Test circuits

001aag479

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

**Fig 7. Test circuit for measuring OFF-state leakage current**

001aag480

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

**Fig 8. Test circuit for measuring ON-state leakage current**

10.2 ON resistance

Table 8. ON resistance

At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see [Figure 10](#) to [Figure 15](#).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
$R_{ON(peak)}$	ON resistance (peak)	$V_I =$ GND to $V_{CC}$ ; see <a href="#">Figure 9</a>						
		$I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V	-	34.0	130	-	195	$\Omega$
		$I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V	-	12.0	30	-	45	$\Omega$
		$I_{SW} = 12$ mA; $V_{CC} = 2.7$ V	-	10.4	25	-	38	$\Omega$
		$I_{SW} = 24$ mA; $V_{CC} = 3$ V to 3.6 V	-	7.8	20	-	30	$\Omega$
		$I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V	-	6.2	15	-	23	$\Omega$
$R_{ON(rail)}$	ON resistance (rail)	$V_I =$ GND; see <a href="#">Figure 9</a>						
		$I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V	-	8.2	18	-	27	$\Omega$
		$I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V	-	7.1	16	-	24	$\Omega$
		$I_{SW} = 12$ mA; $V_{CC} = 2.7$ V	-	6.9	14	-	21	$\Omega$
		$I_{SW} = 24$ mA; $V_{CC} = 3$ V to 3.6 V	-	6.5	12	-	18	$\Omega$
		$I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V	-	5.8	10	-	15	$\Omega$
		$V_I = V_{CC}$ ; see <a href="#">Figure 9</a>						
		$I_{SW} = 4$ mA; $V_{CC} = 1.65$ V to 1.95 V	-	10.4	30	-	45	$\Omega$
		$I_{SW} = 8$ mA; $V_{CC} = 2.3$ V to 2.7 V	-	7.6	20	-	30	$\Omega$
		$I_{SW} = 12$ mA; $V_{CC} = 2.7$ V	-	7.0	18	-	27	$\Omega$
$I_{SW} = 24$ mA; $V_{CC} = 3$ V to 3.6 V	-	6.1	15	-	23	$\Omega$		
		$I_{SW} = 32$ mA; $V_{CC} = 4.5$ V to 5.5 V	-	4.9	10	-	15	$\Omega$

**Table 8. ON resistance ...continued**

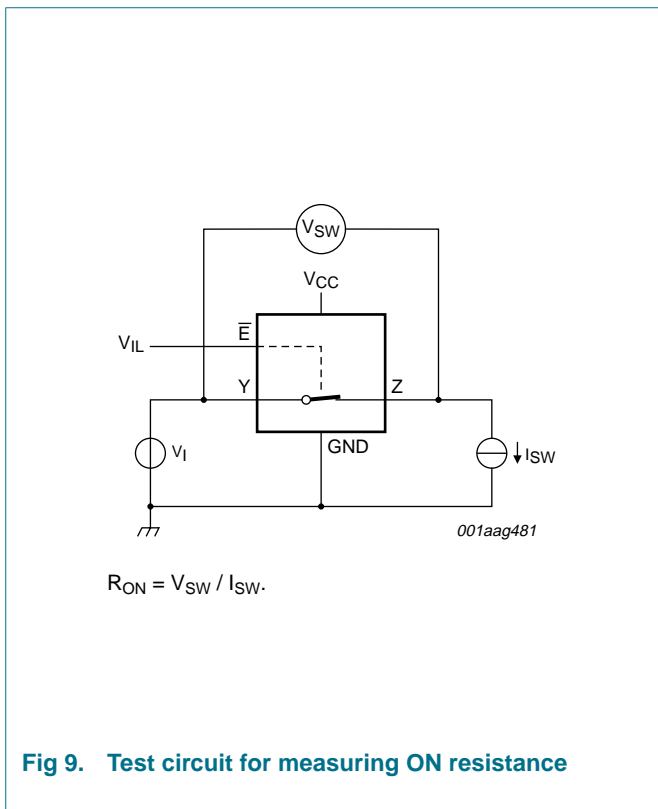
At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see [Figure 10](#) to [Figure 15](#).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
R <sub>ON(flat)</sub>	ON resistance (flatness)	V <sub>I</sub> = GND to V <sub>CC</sub> <sup>[2]</sup>						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	26.0	-	-	-	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	5.0	-	-	-	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	3.5	-	-	-	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	2.0	-	-	-	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.5	-	-	-	Ω

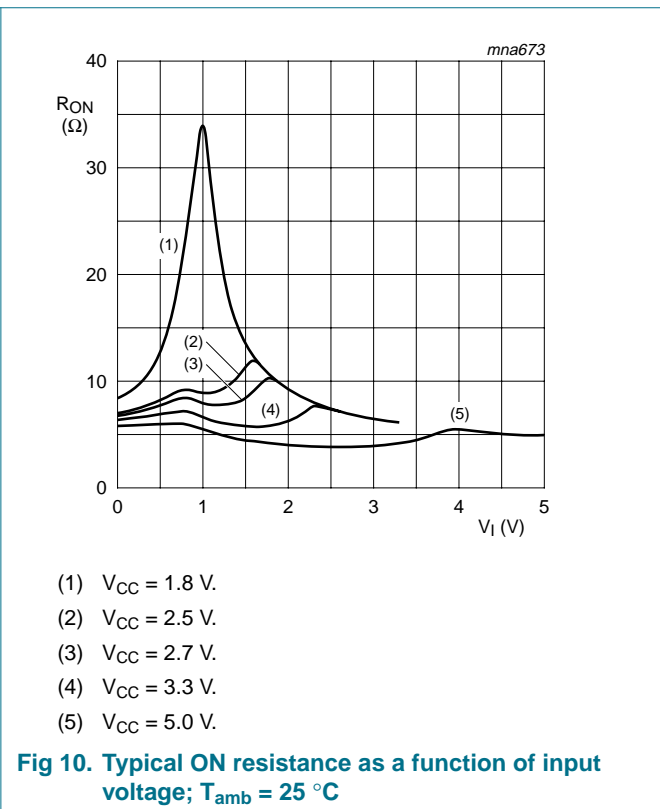
[1] Typical values are measured at T<sub>amb</sub> = 25 °C and nominal V<sub>CC</sub>.

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

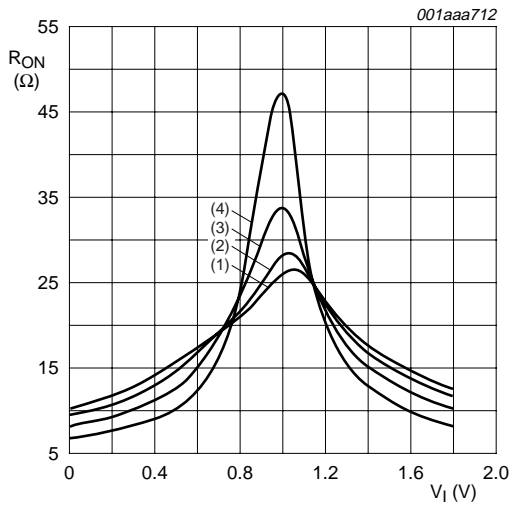
### 10.3 ON resistance test circuit and graphs



**Fig 9. Test circuit for measuring ON resistance**

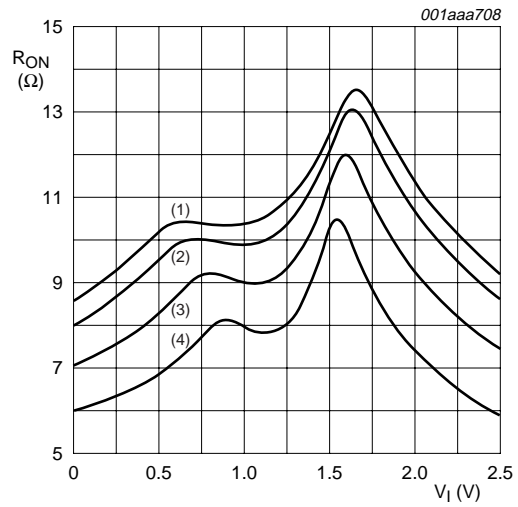


(1) V<sub>CC</sub> = 1.8 V.  
 (2) V<sub>CC</sub> = 2.5 V.  
 (3) V<sub>CC</sub> = 2.7 V.  
 (4) V<sub>CC</sub> = 3.3 V.  
 (5) V<sub>CC</sub> = 5.0 V.  
**Fig 10. Typical ON resistance as a function of input voltage; T<sub>amb</sub> = 25 °C**



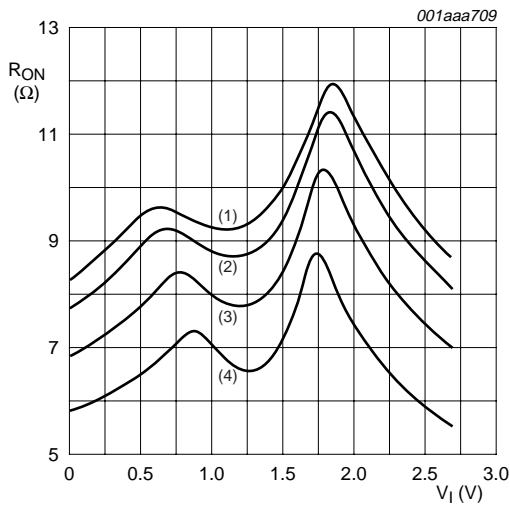
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$ .
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$ .
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$ .

**Fig 11. ON resistance as a function of input voltage;**  
 **$V_{CC} = 1.8\text{ V}$**



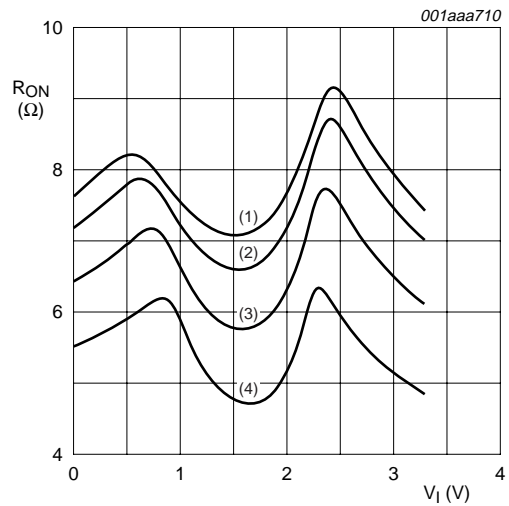
- (1)  $T_{amb} = 125\text{ }^{\circ}\text{C}$ .
- (2)  $T_{amb} = 85\text{ }^{\circ}\text{C}$ .
- (3)  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .
- (4)  $T_{amb} = -40\text{ }^{\circ}\text{C}$ .

**Fig 12. ON resistance as a function of input voltage;**  
 **$V_{CC} = 2.5\text{ V}$**



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

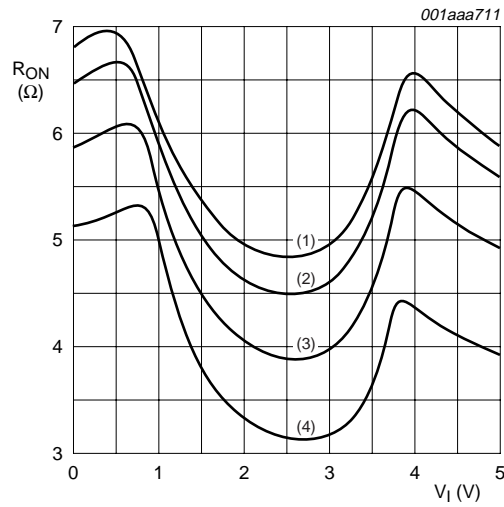
**Fig 13. ON resistance as a function of input voltage;**  
 **$V_{CC} = 2.7\text{ V}$**



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

**Fig 14. ON resistance as a function of input voltage;**  
 **$V_{CC} = 3.3\text{ V}$**





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

Fig 15. ON resistance as a function of input voltage;  $V_{CC} = 5.0\text{ V}$

## 11. Dynamic characteristics

Table 9. Dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for load circuit see Figure 18.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
$t_{pd}$	propagation delay	Y to Z or Z to Y; see Figure 16 <sup>[2][3]</sup>						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	0.8	2.0	-	3.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	0.4	1.2	-	2.0	ns
		$V_{CC} = 2.7\text{ V}$	-	0.4	1.0	-	1.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	0.3	0.8	-	1.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	0.2	0.6	-	1.0	ns
$t_{en}$	enable time	$\bar{E}$ to Y or Z; see Figure 17 <sup>[4]</sup>						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.0	10.0	12.0	1.0	15.5	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.0	5.7	6.5	1.0	8.5	ns
		$V_{CC} = 2.7\text{ V}$	1.0	5.4	6.0	1.0	8.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.0	4.8	5.0	1.0	6.5	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	3.3	4.2	1.0	5.5	ns

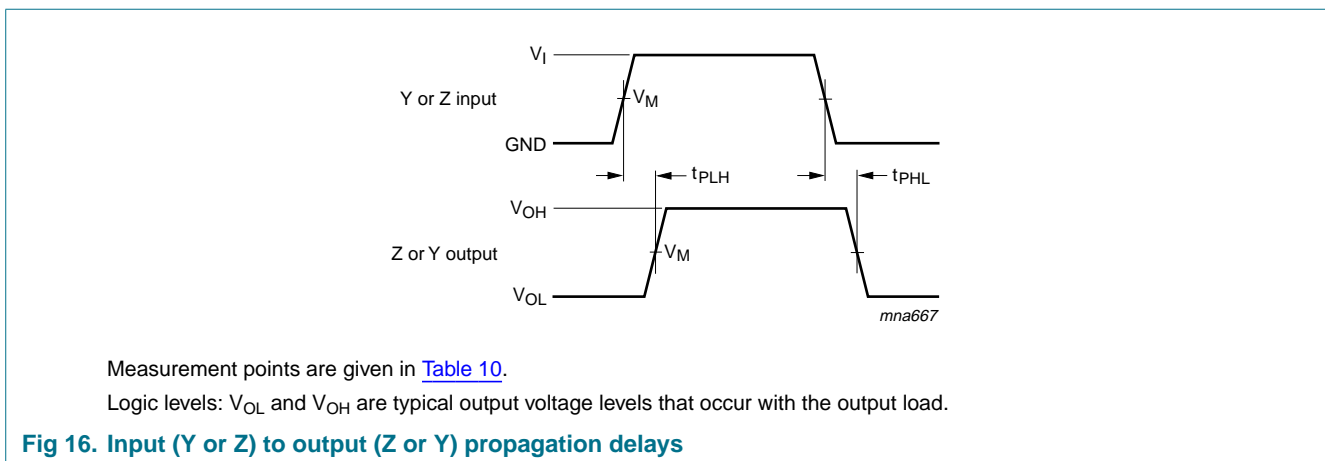
**Table 9. Dynamic characteristics ...continued**

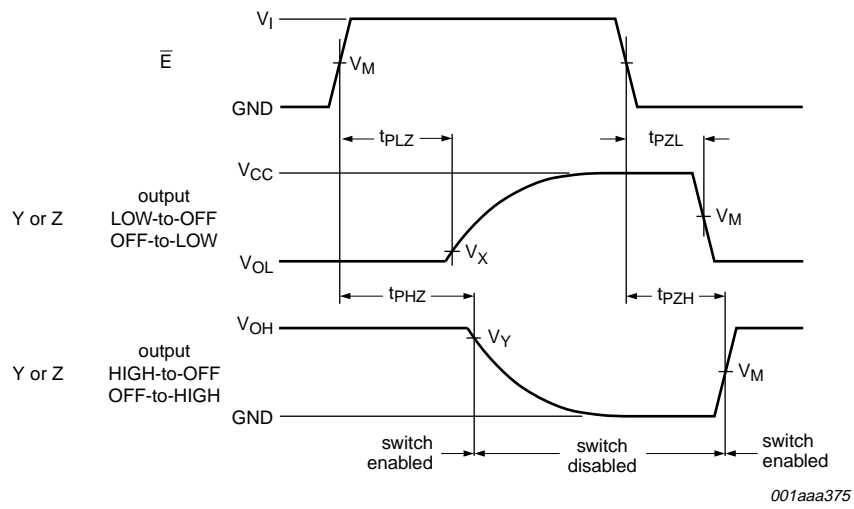
At recommended operating conditions; voltages are referenced to GND (ground = 0 V); for load circuit see [Figure 18](#).

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
t <sub>dis</sub>	disable time	$\bar{E}$ to Y or Z; see <a href="#">Figure 17</a>	<sup>[5]</sup>					
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.0	7.4	10.0	1.0	13.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.0	4.1	6.9	1.0	9.0	ns
		V <sub>CC</sub> = 2.7 V	1.0	4.9	7.5	1.0	9.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.0	5.4	6.5	1.0	8.5	ns
C <sub>PD</sub>	power dissipation capacitance	C <sub>L</sub> = 50 pF; f <sub>i</sub> = 10 MHz; V <sub>I</sub> = GND to V <sub>CC</sub>	<sup>[6]</sup>					
		V <sub>CC</sub> = 2.5 V	-	13.7	-	-	-	pF
		V <sub>CC</sub> = 3.3 V	-	15.2	-	-	-	pF
		V <sub>CC</sub> = 5.0 V	-	18.3	-	-	-	pF

- [1] Typical values are measured at T<sub>amb</sub> = 25 °C and nominal V<sub>CC</sub>.
- [2] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
- [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<sub>en</sub> is the same as t<sub>PZH</sub> and t<sub>PZL</sub>.
- [5] t<sub>dis</sub> is the same as t<sub>PLZ</sub> and t<sub>PHZ</sub>.
- [6] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> 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<sub>i</sub> = input frequency in MHz;  
 f<sub>o</sub> = output frequency in MHz;  
 C<sub>L</sub> = output load capacitance in pF;  
 C<sub>S(ON)</sub> = maximum ON-state switch capacitance in pF;  
 V<sub>CC</sub> = supply voltage in V;  
 N = number of inputs switching;  
 Σ{(C<sub>L</sub> + C<sub>S(ON)</sub>) × V<sub>CC</sub><sup>2</sup> × f<sub>o</sub>} = sum of the outputs.

### 11.1 Waveforms and test circuit





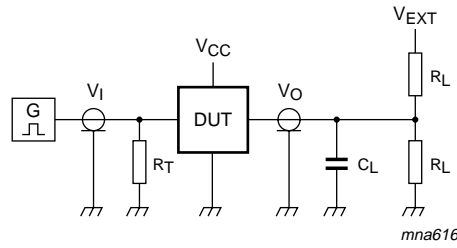
Measurement points are given in [Table 10](#).

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

**Fig 17. Enable and disable times**

**Table 10. Measurement points**

Supply voltage	Input	Output		
$V_{CC}$	$V_M$	$V_M$	$V_X$	$V_Y$
1.65 V to 1.95 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.15 V$	$V_{OH} - 0.15 V$
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 11](#).

Definitions for 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 18. Load circuit for switching times**

**Table 11. 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	$V_{CC}$	$\leq 2.0$ ns	30 pF	1 k $\Omega$	open	GND	$2V_{CC}$
2.3 V to 2.7 V	$V_{CC}$	$\leq 2.0$ ns	30 pF	500 $\Omega$	open	GND	$2V_{CC}$
2.7 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	6 V
3.0 V to 3.6 V	2.7 V	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	6 V
4.5 V to 5.5 V	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	$2V_{CC}$

## 11.2 Additional dynamic characteristics

**Table 12. Additional dynamic characteristics**

At recommended operating conditions; typical values measured at  $T_{amb} = 25^\circ C$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
THD	total harmonic distortion	$R_L = 10$ k $\Omega$ ; $C_L = 50$ pF; $f_i = 1$ kHz; see <a href="#">Figure 19</a>					
		$V_{CC} = 1.65$ V	-	0.032	-	%	
		$V_{CC} = 2.3$ V	-	0.008	-	%	
		$V_{CC} = 3.0$ V	-	0.006	-	%	
		$V_{CC} = 4.5$ V	-	0.001	-	%	
		$R_L = 10$ k $\Omega$ ; $C_L = 50$ pF; $f_i = 10$ kHz; see <a href="#">Figure 19</a>					
		$V_{CC} = 1.65$ V	-	0.068	-	%	
		$V_{CC} = 2.3$ V	-	0.009	-	%	
		$V_{CC} = 3.0$ V	-	0.008	-	%	
		$V_{CC} = 4.5$ V	-	0.006	-	%	

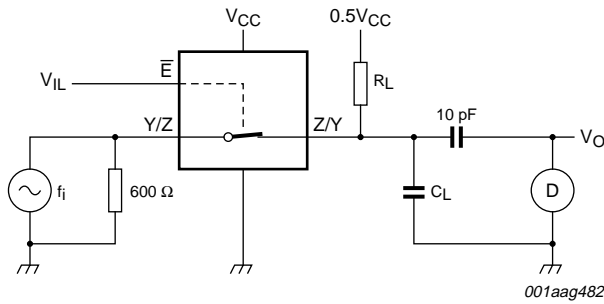
**Table 12. Additional dynamic characteristics ...continued**  
 At recommended operating conditions; typical values measured at  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit		
$f_{(-3\text{dB})}$	-3 dB frequency response	$R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; see <a href="#">Figure 20</a>						
		$V_{CC} = 1.65\ \text{V}$	-	135	-	MHz		
		$V_{CC} = 2.3\ \text{V}$	-	145	-	MHz		
		$V_{CC} = 3.0\ \text{V}$	-	150	-	MHz		
		$V_{CC} = 4.5\ \text{V}$	-	155	-	MHz		
		$R_L = 50\ \Omega$ ; $C_L = 5\ \text{pF}$ ; see <a href="#">Figure 20</a>						
		$V_{CC} = 1.65\ \text{V}$	-	> 500	-	MHz		
		$V_{CC} = 2.3\ \text{V}$	-	> 500	-	MHz		
		$V_{CC} = 3.0\ \text{V}$	-	> 500	-	MHz		
		$V_{CC} = 4.5\ \text{V}$	-	> 500	-	MHz		
		$R_L = 50\ \Omega$ ; $C_L = 10\ \text{pF}$ ; see <a href="#">Figure 20</a>						
		$V_{CC} = 1.65\ \text{V}$	-	200	-	MHz		
		$V_{CC} = 2.3\ \text{V}$	-	350	-	MHz		
		$V_{CC} = 3.0\ \text{V}$	-	410	-	MHz		
		$V_{CC} = 4.5\ \text{V}$	-	440	-	MHz		
		$\alpha_{\text{iso}}$	isolation (OFF-state)	$R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Figure 21</a>				
$V_{CC} = 1.65\ \text{V}$	-			-46	-	dB		
$V_{CC} = 2.3\ \text{V}$	-			-46	-	dB		
$V_{CC} = 3.0\ \text{V}$	-			-46	-	dB		
$V_{CC} = 4.5\ \text{V}$	-			-46	-	dB		
$R_L = 50\ \Omega$ ; $C_L = 5\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; see <a href="#">Figure 21</a>								
$V_{CC} = 1.65\ \text{V}$	-			-37	-	dB		
$V_{CC} = 2.3\ \text{V}$	-			-37	-	dB		
$V_{CC} = 3.0\ \text{V}$	-			-37	-	dB		
$V_{CC} = 4.5\ \text{V}$	-			-37	-	dB		
$V_{\text{ct}}$	crosstalk voltage			between digital input and switch; $R_L = 600\ \Omega$ ; $C_L = 50\ \text{pF}$ ; $f_i = 1\ \text{MHz}$ ; $t_r = t_f = 2\ \text{ns}$ ; see <a href="#">Figure 22</a>				
				$V_{CC} = 1.65\ \text{V}$	-	69	-	mV
		$V_{CC} = 2.3\ \text{V}$	-	87	-	mV		
		$V_{CC} = 3.0\ \text{V}$	-	156	-	mV		
		$V_{CC} = 4.5\ \text{V}$	-	302	-	mV		

**Table 12. Additional dynamic characteristics ...continued**  
 At recommended operating conditions; typical values measured at  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
$Q_{inj}$	charge injection	$C_L = 0.1\text{ nF}$ ; $V_{gen} = 0\text{ V}$ ; $R_{gen} = 0\text{ }\Omega$ ; $f_i = 1\text{ MHz}$ ; $R_L = 1\text{ M}\Omega$ ; see <a href="#">Section 11</a>				
		$V_{CC} = 1.8\text{ V}$	-	3.3	-	pC
		$V_{CC} = 2.5\text{ V}$	-	4.1	-	pC
		$V_{CC} = 3.3\text{ V}$	-	5.0	-	pC
		$V_{CC} = 4.5\text{ V}$	-	6.4	-	pC
		$V_{CC} = 5.5\text{ V}$	-	7.5	-	pC

11.3 Test circuits



**Test conditions:**

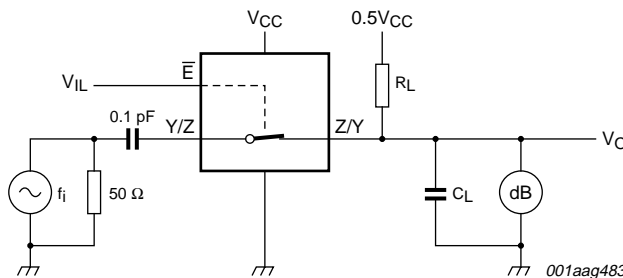
$V_{CC} = 1.65\text{ V}$ :  $V_I = 1.4\text{ V}$  (p-p).

$V_{CC} = 2.3\text{ V}$ :  $V_I = 2\text{ V}$  (p-p).

$V_{CC} = 3\text{ V}$ :  $V_I = 2.5\text{ V}$  (p-p).

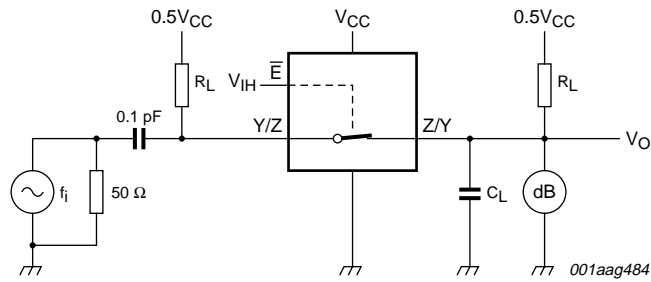
$V_{CC} = 4.5\text{ V}$ :  $V_I = 4\text{ V}$  (p-p).

**Fig 19. 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 20. 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 21. Test circuit for measuring isolation (OFF-state)

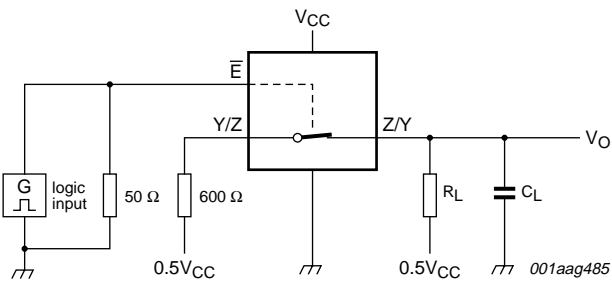
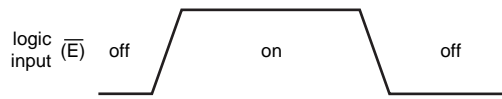
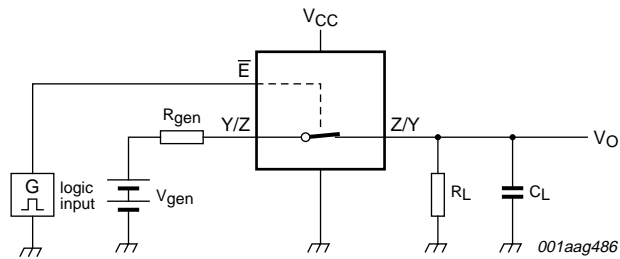


Fig 22. Test circuit for measuring crosstalk between digital inputs and switch



$Q_{inj} = \Delta V_O \times C_L$   
 $\Delta V_O$  = output voltage variation.  
 $R_{gen}$  = generator resistance.  
 $V_{gen}$  = generator voltage.

Fig 23. Test circuit for measuring charge injection

12. Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1



Fig 24. Package outline SOT353-1 (TSSOP5)



Plastic surface-mounted package; 5 leads

SOT753



Fig 25. Package outline SOT753 (SC-74A)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm

SOT886



Fig 26. Package outline SOT886 (XSON6)

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm

SOT891



Fig 27. Package outline SOT891 (XSON6)

## 13. Abbreviations

Table 13. 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

## 14. Revision history

Table 14. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC1G384_2	20070829	Product data sheet	-	74LVC1G384_1
Modifications:	<ul style="list-style-type: none"> <li>The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Added type number 74LVC1G384GM (XSON6/SOT886 package)</li> <li>Added type number 74LVC1G384GF (XSON6/SOT891 package)</li> <li><a href="#">Section 2 “Features”</a>: <ul style="list-style-type: none"> <li>Added: Wide supply voltage range from 1.65 V to 5.5 V.</li> <li>Added: Switch handling capability of 32 mA.</li> <li>Added: Enable input accepts voltages up to 5 V.</li> </ul> </li> <li><a href="#">Section 8 “Limiting values”</a> <ul style="list-style-type: none"> <li>Added: Derating factors of the applicable packages.</li> </ul> </li> <li><a href="#">Section 10 “Static characteristics”</a> <ul style="list-style-type: none"> <li>Changed: Maximum values of ON resistance (peak) parameters and graphics.</li> <li>Changed: Conditions for input leakage and supply current.</li> </ul> </li> <li><a href="#">Section 11 “Dynamic characteristics”</a>: <ul style="list-style-type: none"> <li>Changed: Typical values of the charge injection.</li> </ul> </li> </ul>			
74LVC1G384_1	20040226	Product data	-	-

## 15. Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	Definition
Objective [short] data sheet	Development	This document contains data from the objective specification for product development.
Preliminary [short] data sheet	Qualification	This document contains data from the preliminary specification.
Product [short] data sheet	Production	This document contains the product specification.

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

[2] The term 'short data sheet' is explained in section "Definitions".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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