74LVC1G3157

Analog multiplexer/demultiplexer

Rev. xx — 02 November 2004 Preliminary data sheet

1. General description

The 74LVC1G3157 is a high-performance, low-power, low-voltage, Si-gate CMOS device that provides superior performance to most advanced CMOS compatible TTL families.

The 74LVC1G3157 provides one analog multiplexer/demultiplexer with one digital select input (S), two independent inputs/outputs (B1 and B2) and a common input/output (A). One of the two switches is selected by S.

2. Features

- Wide supply voltage range from 1.65 V to 5.5 V
- 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 Ω (typ) at V_{CC} = 5 V.
- High noise immunity
- 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
- Control input accepts voltages up to 5 V
- Multiple package options
- 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; $t_r = t_f \leq 2.5$ ns; min and max at $T_{amb} = -40$ °C to +85 °C; typical at $T_{amb} = 25$ °C.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t_{PHL}, t_{PLH}	propagation delay A to Bn or Bn to A	C_L = 50 pF; R_L = 500 Ω				
		V_{CC} = 3.3 V	-	-	0.8	ns
		V_{CC} = 5.0 V	-	-	0.3	ns
t_{PZH}, t_{PZL}	turn-on time S to Vos	C_L = 50 pF; R_L = 500 Ω				
		V_{CC} = 3.3 V	1.0	-	7.6	ns
		V_{CC} = 5.0 V	1.0	-	5.7	ns

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

GND = 0 V; $t_r = t_f \leq 2.5$ ns; min and max at $T_{amb} = -40$ °C to +85 °C; typical at $T_{amb} = 25$ °C.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
t_{PHZ}, t_{PLZ}	turn-off time S to Vos	C_L = 50 pF; R_L = 500 Ω					
		V_{CC} = 3.3 V		1.0	-	5.3	ns
		V_{CC} = 5.0 V		1.0	-	3.8	ns
C_I	select input capacitance			-	2.9	-	pF
C_S	switch capacitance	OFF-state		-	6.7	-	pF
		ON-state		-	21.7	-	pF
C_{PD}	power dissipation capacitance per switch	C_L = 50 pF; f_i = 10 MHz; V_{CC} = 3.3 V	[1] [2]	-	19.3	-	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 = number of inputs switching.

[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
74LVC1G3157GW	–40 °C to +125 °C	TSSOP6	plastic surface mounted package; 6 leads	SOT363
74LVC1G3175GV	–40 °C to +125 °C	VSSOP6	plastic surface mounted package; 6 leads	SOT457
74LVC1G3175GM	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886

5. Marking

Table 3: Marking

Type number	Marking code
74LVC1G3175GW	YJ
74LVC1G3175GV	YJ
74LVC1G3175GM	YJ

6. Functional diagram

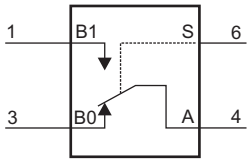


Fig 1. Logic symbol.

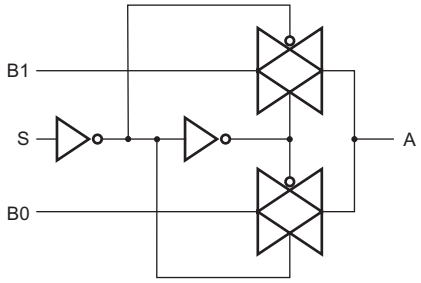


Fig 2. Logic diagram.

7. Pinning information

7.1 Pinning

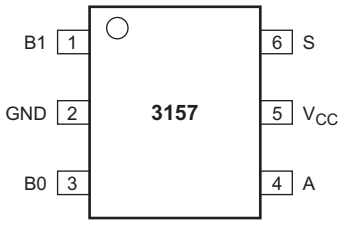
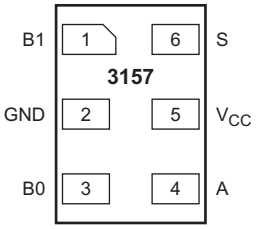


Fig 3. Pin configuration SOT363 and SOT457.



Transparent top view

Fig 4. Pin configuration SOT886.

7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
B1	1	independent input/output
GND	2	ground (0 V)
B0	3	independent input/output
A	4	independent input/output
V_{CC}	5	supply voltage
S	6	control input

8. Functional description

8.1 Function table

Table 5: Function table [1]

Input S	channel ON
L	B0
H	B1

[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 $V_I > V_{CC} + 0.5$		-	–50	mA
I_{SK}	switch diode current	$V_I < –0.5$ V or $V_I > V_{CC} + 0.5$		-	±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 $V_S < V_{CC} + 0.5$		-	±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]	0	-	V_{CC}	V
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	[2]	0	-	20	ns/V
		V_{CC} = 2.7 V to 5.5 V	[2]	0	-	10	ns/V

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

[2] 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} = 3 V to 3.6 V	[2]	2.0	1.65	-	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} = 3 V to 3.6 V	[2]	-	1.62	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 per channel	VI = VIH or VIL; |VS| = VCC – GND; VCC = 5.5V; see Figure 5		-	±0.1	±5	µA
$I_{S(ON)}$	analog switch ON-state current per channel	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			-	2.88	-	pF

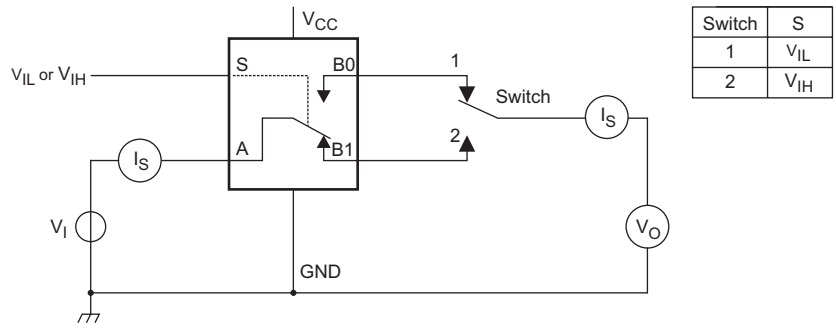
Table 8: Static characteristics *…continued*

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
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} = 3 V to 3.6 V	2.0	-	-	V
		V_{CC} = 4.5 V to 5.5 V	0.7 × V_{CC}	-	-	
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} = 3 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 per channel	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} − GND; V_{CC} = 5.5 V; see Figure 5	-	-	±20	µA
$I_{S(ON)}$	analog switch ON-state current per channel	V_I = V_{IH} or V_{IL}; $\|V_S\|$ = V_{CC} − GND; V_{CC} = 5.5V; see Figure 6	-	-	±20	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	-	-	40	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.

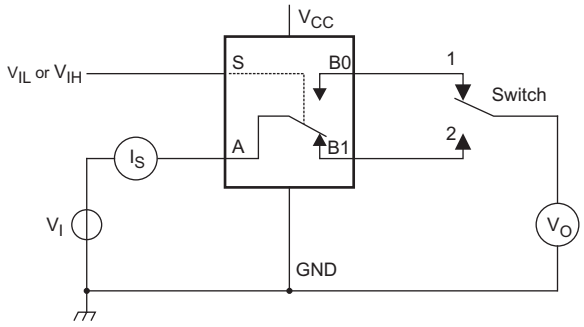
[2] All typical values are measured at V_{CC} = 3.3 V.



Switch	S
1	V_{IL}
2	V_{IH}

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

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



Switch	S
1	V_{IL}
2	V_{IH}

$V_I = V_{CC}$ 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.

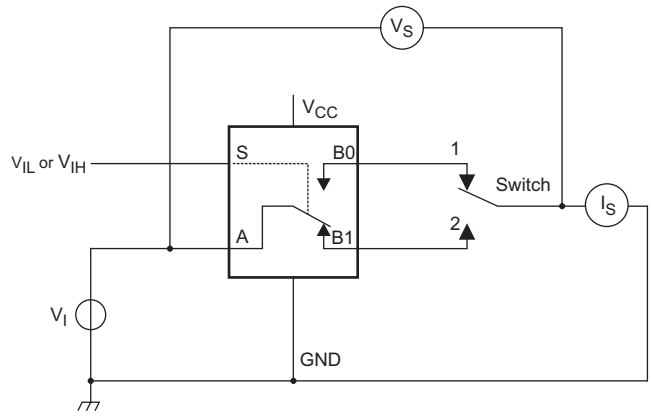
Symbol	Parameter	Conditions		Min	Typ	Max	Unit
T_{amb} = −40 °C to +85 °C							
$R_{ON(peak)}$	switch ON-state resistance (peak)	V_S = GND to V_{CC}; $V_I = V_{IH}$	[1]				
		I_S = 4 mA; V_{CC} = 1.65 V to 1.95 V		-	90	140	Ω
		I_S = 8 mA; V_{CC} = 2.3 V to 2.7 V		-	20	40	Ω
		I_S = 12 mA; V_{CC} = 2.7 V		-	13	25	Ω
		I_S = 24 mA; V_{CC} = 3 V to 3.6 V		-	11	20	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	7.8	15	Ω
$R_{ON(rail)}$	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		-	8.0	18	Ω
		I_S = 24 mA; V_{CC} = 3 V to 3.6 V		-	7.8	15	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	7.0	10	Ω
		$V_S = V_{CC}$; $V_I = V_{IH}$					
		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		-	7.8	18	Ω
		I_S = 24 mA; V_{CC} = 3 V to 3.6 V		-	7.5	15	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	7	10	Ω
$R_{ON(flatness)}$	switch ON-resistance (flatness)	V_S = GND to V_{CC}; $V_I = V_{IH}$; see Figure 9					
		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 V to 3.6 V		-	5	-	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V		-	3	-	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
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 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 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 V to 3.6 V	-	-	23	Ω
		I_S = 32 mA; V_{CC} = 4.5 V to 5.5 V	-	-	15	Ω

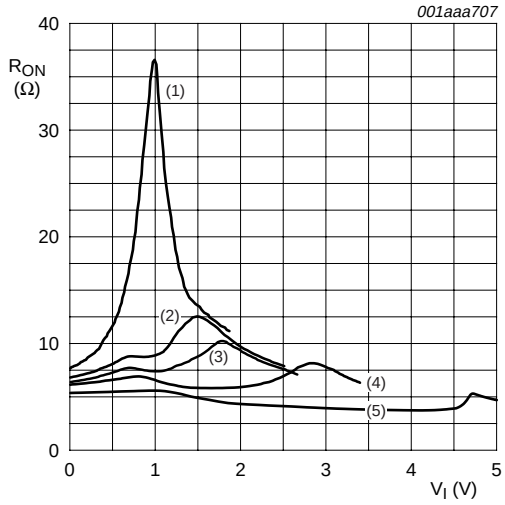
[1] These typical typical values are measured at T_{amb} = 25 °C.



Switch	S
1	V_{IL}
2	V_{IH}

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

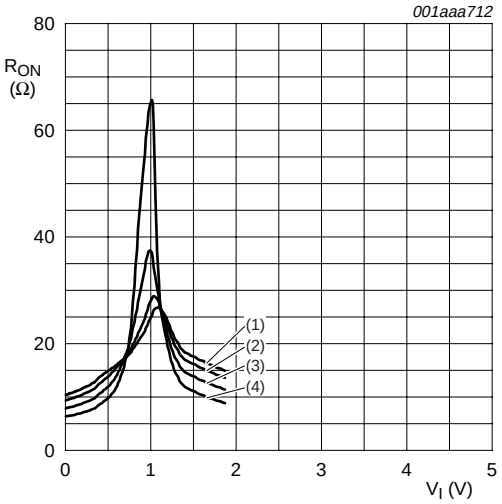
Fig 7. Test circuit for measuring switch ON-resistance.



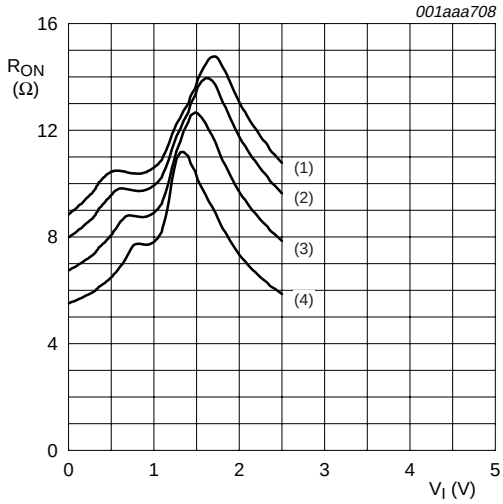
(1) V_{CC} = 1.8V
(2) V_{CC} = 2.5V
(3) V_{CC} = 2.7V
(4) V_{CC} = 3.3V
(5) V_{CC} = 5.0V

V_S = GND to V_{CC}; T_{amb} = 25 °C.

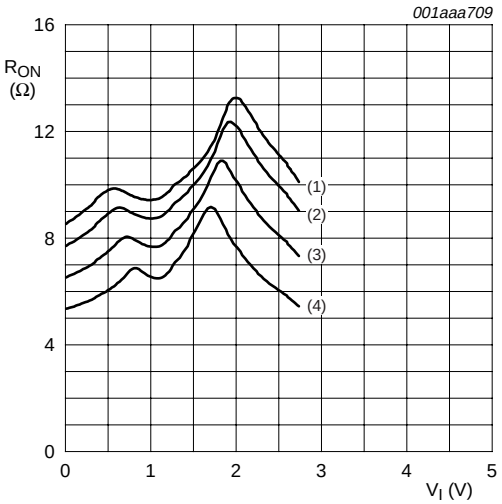
Fig 8. Typical switch ON-resistance as a function of input voltage.



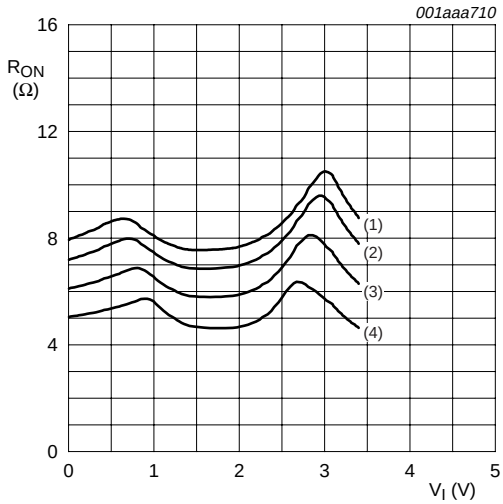
a. V_{CC} = 1.8 V ((1) T_{amb} = 125 °C (2) T_{amb} = 85 °C (3) T_{amb} = 25 °C (4) T_{amb} = -40 °C)



b. 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)



c. 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)



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

12. Dynamic characteristics

Table 10: 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 A to Bn or Bn to A	see Figure 10				
		V_{CC} = 1.65 V to 1.95 V	-	-	2	ns
		V_{CC} = 2.3 V to 2.7 V	-	-	1.2	ns
		V_{CC} = 3 V to 3.6 V	-	-	0.8	ns
		V_{CC} = 4.5 V to 5.5 V	-	-	0.3	ns
t_{PZH}, t_{PZL}	turn-on time S to Vos	see Figure 11				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	24	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	14	ns
		V_{CC} = 3 V to 3.6 V	1.0	-	7.6	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	-	5.7	ns
t_{PHZ}, t_{PLZ}	turn-off time S to Vos	see Figure 11				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	13	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	7.5	ns
		V_{CC} = 3 V to 3.6 V	1.0	-	5.3	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	-	3.8	ns
C_{PD}	power dissipation capacitance per switch	C_L = 50 pF; f_i = 10 MHz	[2] [3]			
		V_{CC} = 2.5 V	-	-	-	pF
		V_{CC} = 3.3 V	-	19.3	-	pF
		V_{CC} = 5 V	-		-	pF

Table 10: Dynamic characteristics *…continued*

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

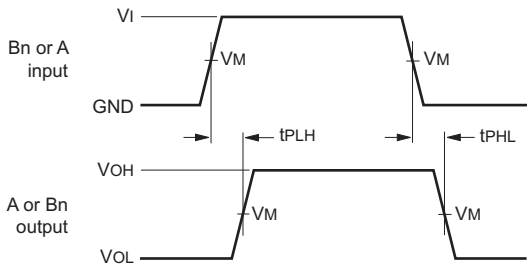
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = −40 °C to +125 °C						
t_{PHL}, t_{PLH}	propagation delay A to Bn or Bn to A	see Figure 10				
		V_{CC} = 1.65 V to 1.95 V	-	-	?	ns
		V_{CC} = 2.3 V to 2.7 V	-	-	?	ns
		V_{CC} = 3 V to 3.6 V	-	-	?	ns
		V_{CC} = 4.5 V to 5.5 V	-	-	?	ns
t_{PZH}, t_{PZL}	turn-on time S to Vos	see Figure 11				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	26.5	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	15.5	ns
		V_{CC} = 3 V to 3.6 V	1.0	-	8.5	ns
		V_{CC} = 4.5 V to 5.5 V	1.0		6.5	ns
t_{PHZ}, t_{PLZ}	turn-off time S to Vos	see Figure 11				
		V_{CC} = 1.65 V to 1.95 V	1.0	-	14.5	ns
		V_{CC} = 2.3 V to 2.7 V	1.0	-	8.5	ns
		V_{CC} = 3 V to 3.6 V	1.0	-	6.0	ns
		V_{CC} = 4.5 V to 5.5 V	1.0	-	4.5	ns

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

[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;
C_S = switch capacitance in pF;
V_{CC} = supply voltage in V;
N = number of inputs.

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

13. Waveforms



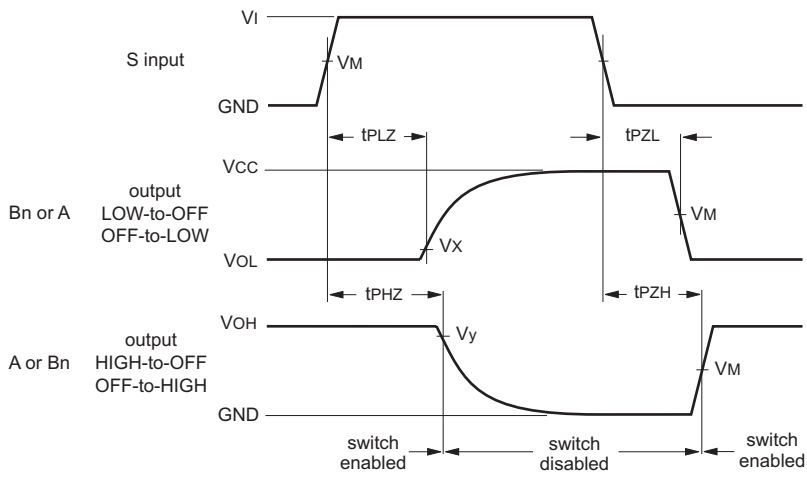
Measurement points are given in Table 11.

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

Fig 10. Input (Bn or A) to output (A or Bn) propagation delays.

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	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
3 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
4.5 V to 5.5 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$



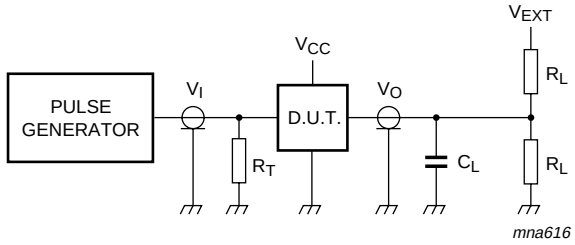
Measurement points are given in Table 12.

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

Fig 11. 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 × V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OH} − 0.3 V
2.3 V to 2.7 V	0.5 × V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OH} − 0.3 V
2.7 V	0.5 × V_{CC}	0.5 × V_{CC}	0.5 × V_{CC}	V_{OH} − 0.3 V
3 V to 3.6 V	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.3 V	V_{OH} − 0.3 V
4.5 V to 5.5 V	0.5 × V_{CC}	0.5 × V_{CC}	V_{OL} + 0.3 V	V_{OH} − 0.3 V



Test data is given in Table 13.

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 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	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
2.3 V to 2.7 V	V_{CC}	≤ 2.0 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
2.7 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
3 V to 3.6 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$
4.5 V to 5.5 V	V_{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	$2 \times V_{CC}$

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	f_i = 1 kHz; R_L = 10 kΩ; C_L = 50 pF; see Figure 13				
		V_{CC} = 1.65 V	-		-	%
		V_{CC} = 2.3 V	-		-	%
		V_{CC} = 3.0 V	-		-	%
		V_{CC} = 4.5 V	-		-	%
		f_i = 10 kHz; R_L = 10 kΩ; C_L = 50 pF; see Figure 13				
		V_{CC} = 1.65 V	-		-	%
		V_{CC} = 2.3 V	-		-	%
		V_{CC} = 3.0 V	-		-	%
		V_{CC} = 4.5 V	-		-	%

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

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
$f_{ON\text{-}state(res)}$	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		-		-	%
		V_{CC} = 2.3 V		-		-	%
		V_{CC} = 3.0 V		-		-	%
		V_{CC} = 4.5 V		-		-	%
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 14	[1]				
		V_{CC} = 1.65 V		-		-	%
		V_{CC} = 2.3 V		-		-	%
		V_{CC} = 3.0 V		-		-	%
		V_{CC} = 4.5 V		-		-	%
$\alpha_{OFF(ft)}$	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		-		-	dB
		V_{CC} = 2.3 V		-			dB
		V_{CC} = 3.0 V		-		-	dB
		V_{CC} = 4.5 V		-		-	dB
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 15	[2]				
		V_{CC} = 1.65 V		-		-	dB
		V_{CC} = 2.3 V		-			dB
		V_{CC} = 3.0 V		-		-	dB
		V_{CC} = 4.5 V		-		-	dB
$V_{ct(ctl\text{-}sw)}$	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 16					
		V_{CC} = 1.65 V		-		-	mV
		V_{CC} = 2.3 V		-		-	mV
		V_{CC} = 3.0 V		-		-	mV
		V_{CC} = 4.5 V		-		-	mV
$V_{ct(sw\text{-}sw)}$	crosstalk between switches	R_L = 600 Ω; C_L = 50 pF; f_i = 1 MHz; see Figure 17					
		V_{CC} = 1.65 V		-		-	dB
		V_{CC} = 2.3 V		-		-	dB
		V_{CC} = 3.0 V		-		-	dB
		V_{CC} = 4.5 V		-		-	dB
		R_L = 50 Ω; C_L = 5 pF; f_i = 1 MHz; see Figure 17					
		V_{CC} = 1.65 V		-		-	dB
		V_{CC} = 2.3 V		-		-	dB
		V_{CC} = 3.0 V		-		-	dB
		V_{CC} = 4.5 V		-		-	dB

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

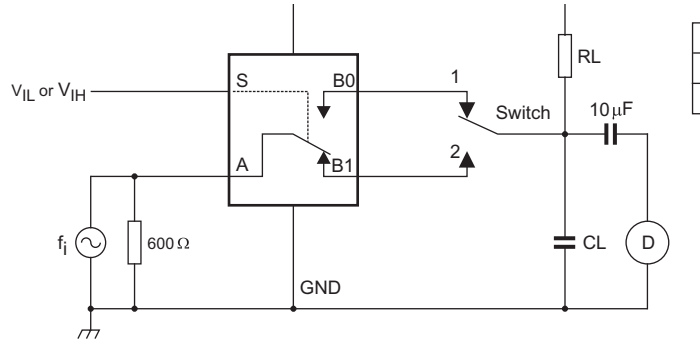
At recommended conditions; typical values measured at T_{amb} = 25 °C.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
f_{max}	frequency response (– 3dB)	R_L = 50 Ω; C_L = 10 pF; see Figure 14				
		V_{CC} = 1.65 V				
		V_{CC} = 2.3 V				
		V_{CC} = 3.0 V				
		V_{CC} = 4.5 V				
Q	injection charge	C_L = 0.1 nF; V_{gen} = 0 V; R_{gen} = 0 Ω; f = 1 MHz; R_L = 1 MΩ; see Figure 18 [3]				
		V_{CC} = 1.8 V	-		-	pC
		V_{CC} = 2.5 V	-		-	pC
		V_{CC} = 3.3 V	-		-	pC
		V_{CC} = 4.5 V	-		-	pC
		V_{CC} = 5.5 V	-		-	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:

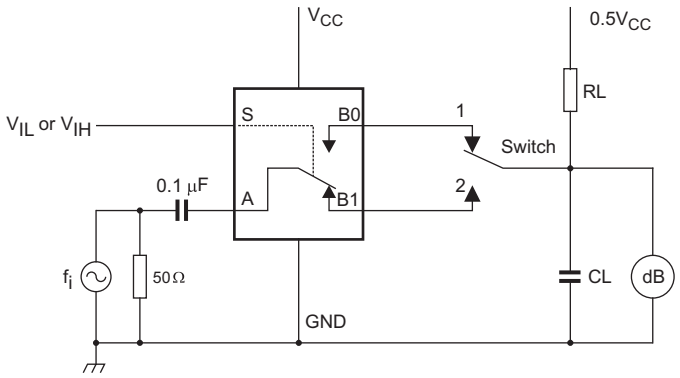
V_{CC} = 1.65 V: V_i = 1.4 V (p-p).

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

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

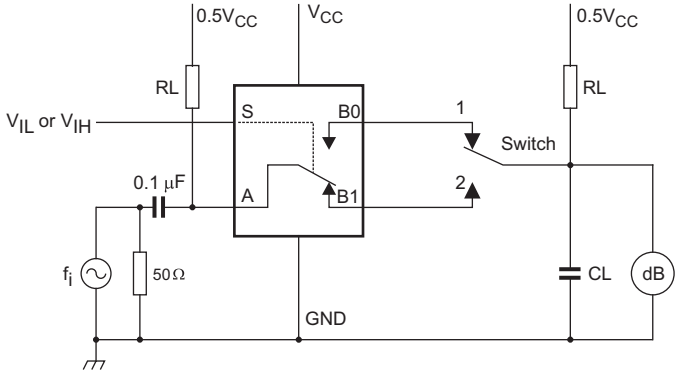
V_{CC} = 4.5 V: V_i = 4 V (p-p).

Fig 13. Test circuit for measuring sine-wave distortion.



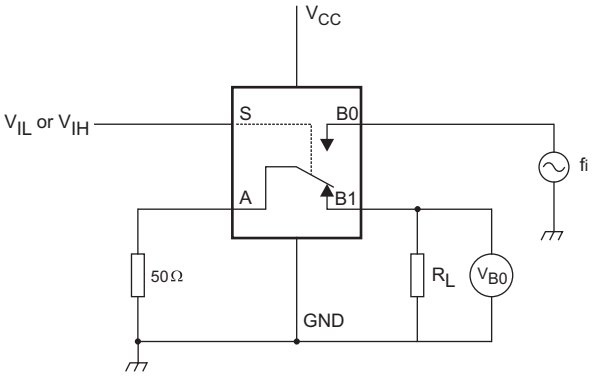
Switch	S
1	V_{IL}
2	V_{IH}

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



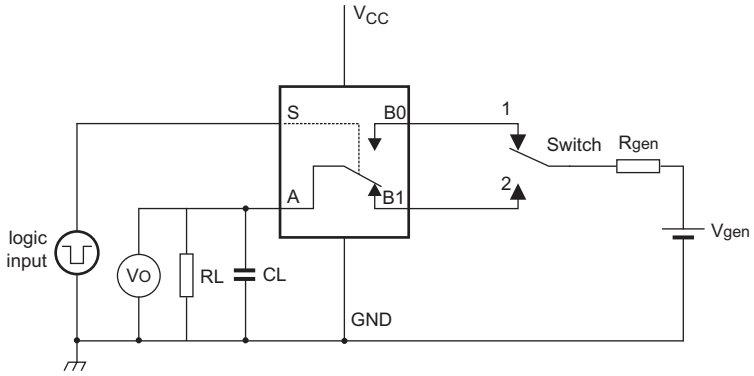
Switch	S
1	V_{IL}
2	V_{IH}

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



S	Test condition
V_{IL}	$20\log_{10}(V_{B0}/V_I)$
V_{IH}	$20\log_{10}(V_{B1}/V_I)$

Fig 16. 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 17. Test circuit for measuring crosstalk between switches.

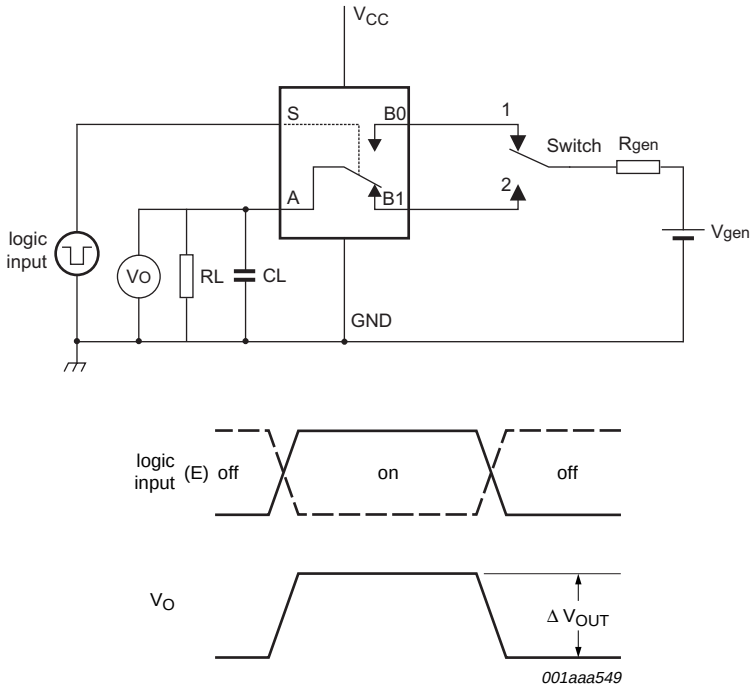
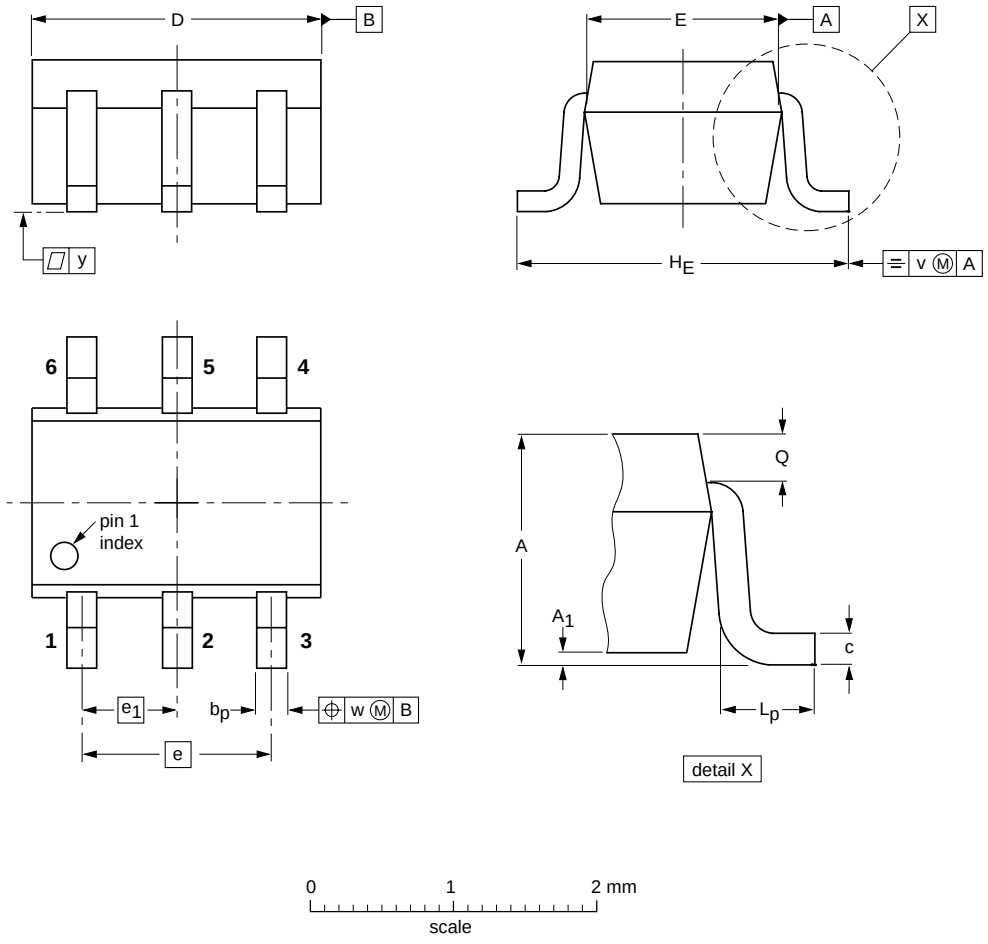


Fig 18. Test circuit for measuring injection charge.

15. Package outline

Plastic surface mounted package; 6 leads **SOT363**



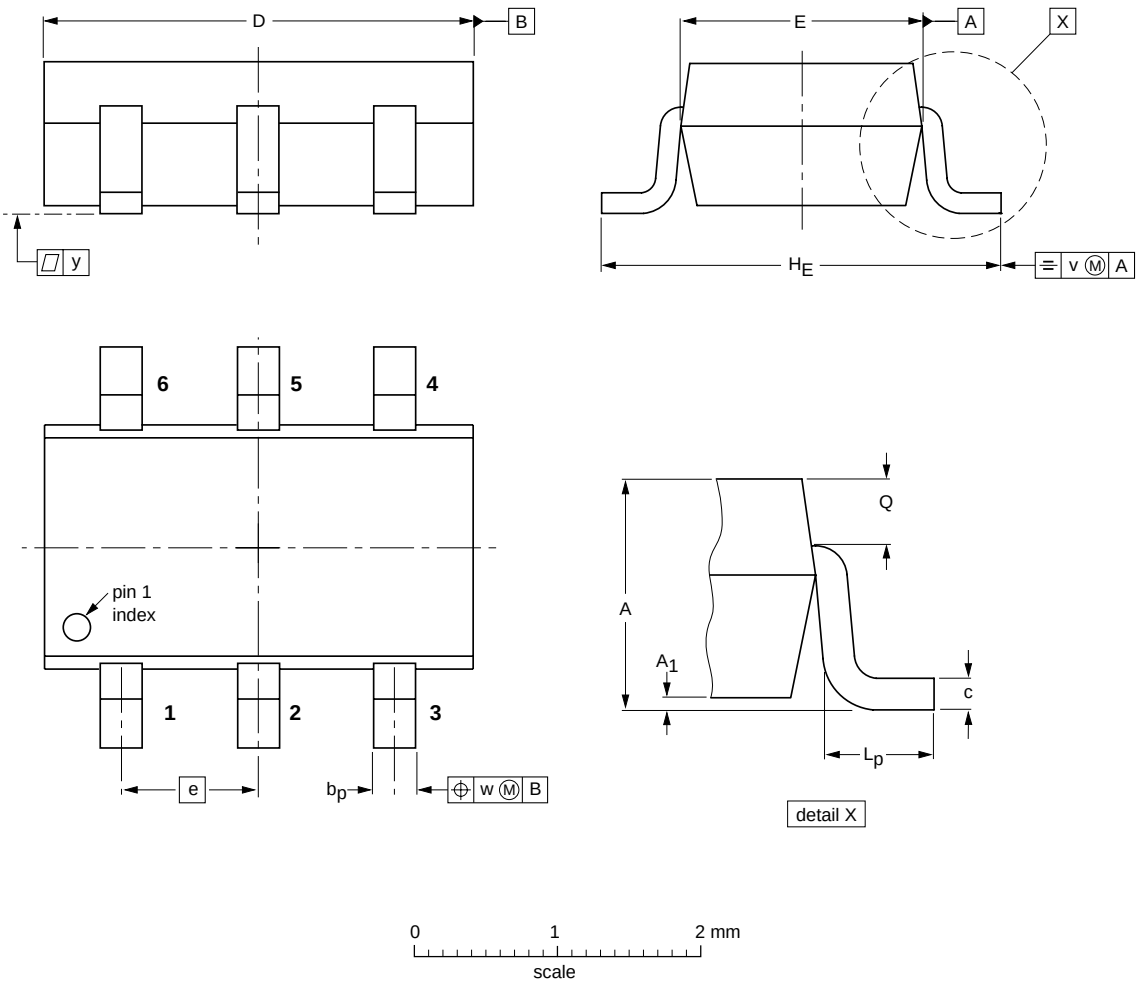
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	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			
SOT363			SC-88			97-02-28

Fig 19. Package outline SOT363.

Plastic surface mounted package; 6 leads **SOT457**



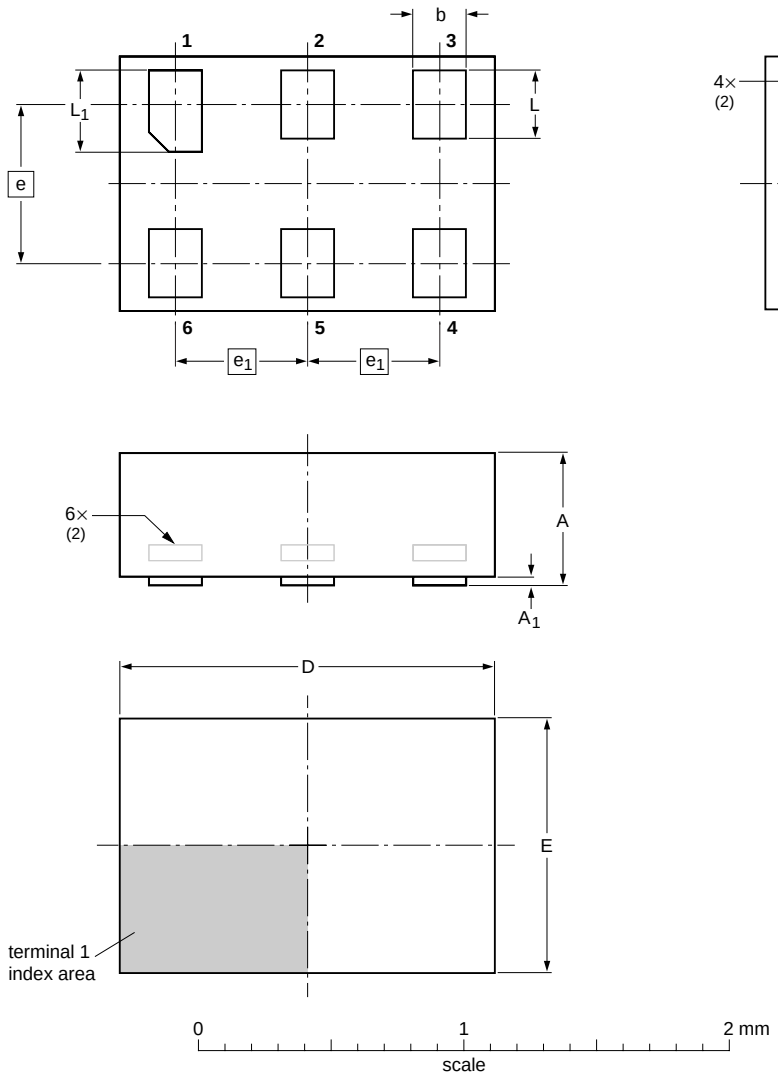
DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1	b_p	c	D	E	e	H_E	L_p	Q	v	w	y
mm	1.1 0.9	0.1 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	EIAJ			
SOT457			SC-74			~~97-02-28~~ 01-05-04

Fig 20. Package outline SOT457.

XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm **SOT886**



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max	A1 max	b	D	E	e	e1	L	L1
mm	0.5	0.04	0.25 0.17	1.5 1.4	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

Notes

1. Including plating thickness.
2. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT886		MO-252				~~04-07-15~~ 04-07-22

Fig 21. Package outline SOT886 (XSON6).

16. Revision history

Table 15: Revision history

Document ID	Release date	Data sheet status	Change notice	Order number	Supersedes
74LVC1G3157		Preliminary data sheet	-		-

Date of release: 02 November 2004

Document order number: 9397 750 xxxxx

Published in The Netherlands

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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