# 74LVC1G53

# 2-channel analog multiplexer/demultiplexer

Rev. 12 — 20 July 2021

**Product data sheet** 

# 1. General description

The 74LVC1G53 is a single-pole double-throw analog switch with a digital select input (S), two independent inputs/outputs (Y0 and Y1), a common input/output (Z) and a digital enable input (E). When E is HIGH, the switch is turned off. Control inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments.

Schmitt-trigger action at control inputs makes the circuit tolerant of slower input rise and fall times.

# 2. Features and benefits

- Wide supply voltage range from 1.65 V to 5.5 V
- Very low ON resistance:
  - 7.5 Ω (typical) at V<sub>CC</sub> = 2.7 V
  - 6.5 Ω (typical) at V<sub>CC</sub> = 3.3 V
  - 6 Ω (typical) at V<sub>CC</sub> = 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-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101E exceeds 1000 V
- Control inputs accept voltages up to 5 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C



## 2-channel analog multiplexer/demultiplexer

# 3. Ordering information

**Table 1. Ordering information** 

Type number	Package			
	Temperature range	Name	Description	Version
74LVC1G53DP	-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
74LVC1G53DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74LVC1G53GT	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 × 1.95 × 0.5 mm	SOT833-1
74LVC1G53GF	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1 × 0.5 mm	SOT1089
74LVC1G53GN	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 × 1.0 × 0.35 mm	SOT1116
74LVC1G53GS	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 × 1.0 × 0.35 mm	SOT1203

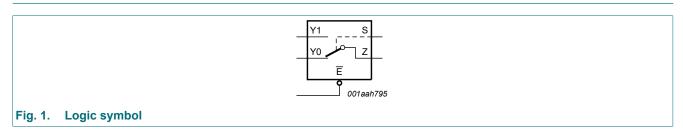
# 4. Marking

Table 2. Marking codes

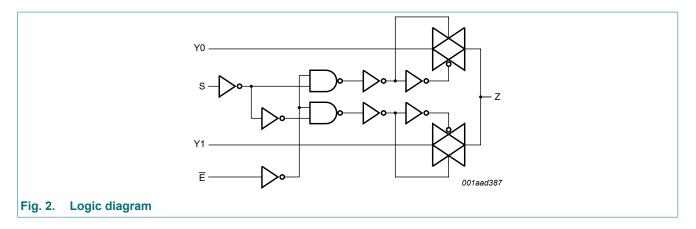
Table 2. Warking codes	
Type number	Marking code[1]
74LVC1G53DC	V53
74LVC1G53DP	V53
74LVC1G53GT	V53
74LVC1G53GF	V3
74LVC1G53GN	V3
74LVC1G53GS	V3

<sup>[1]</sup> The pin 1 indicator is located on the lower left corner of the device, below the marking code.

# 5. Functional diagram

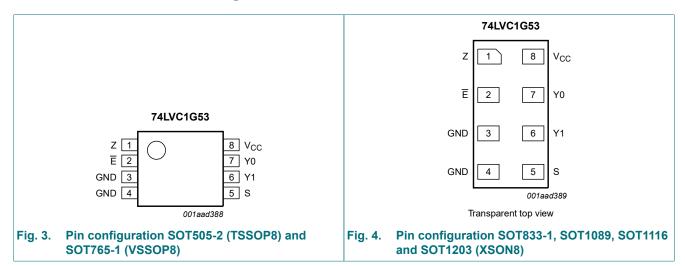


### 2-channel analog multiplexer/demultiplexer



# 6. Pinning information

### 6.1. Pinning



### 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
Z	1	common output or input
Ē	2	enable input (active LOW)
GND	3	ground (0 V)
GND	4	ground (0 V)
S	5	select input
Y1	6	independent input or output
Y0	7	independent input or output
V <sub>CC</sub>	8	supply voltage

#### 2-channel analog multiplexer/demultiplexer

# 7. Functional description

#### **Table 4. Function table**

 $H = HIGH \text{ voltage level}; L = LOW \text{ voltage level}; X = don't care; Z = high-impedance OFF-state.}$ 

Input		Channel on
S	E	
L	L	Y0 to Z or Z to Y0
Н	L	Y1 to Z or Z to Y1
X	Н	Z (switch off)

# 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 <sub>CC</sub>	supply voltage		-0.5	+6.5	V
VI	input voltage	[1]	-0.5	+6.5	V
I <sub>IK</sub>	input clamping current	$V_{I} < -0.5 \text{ V or } V_{I} > V_{CC} + 0.5 \text{ V}$	-50	-	mA
I <sub>SK</sub>	switch clamping current	$V_{I} < -0.5 \text{ V or } V_{I} > V_{CC} + 0.5 \text{ V}$	-	±50	mA
V <sub>SW</sub>	switch voltage	enable and disable mode [2]	-0.5	V <sub>CC</sub> + 0.5	V
I <sub>SW</sub>	switch current	$V_{SW} > -0.5 \text{ V or } V_{SW} < V_{CC} + 0.5 \text{ V}$	-	±50	mA
I <sub>CC</sub>	supply current		-	100	mA
$I_{GND}$	ground current		-100	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	$T_{amb} = -40  ^{\circ}\text{C} \text{ to } +125  ^{\circ}\text{C}$ [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 SOT505-2 (TSSOP8) package: P<sub>tot</sub> derates linearly with 4.6 mW/K above 96 °C.
  - For SOT765-1 (VSSOP8) package: Ptot derates linearly with 4.9 mW/K above 99 °C.
  - For SOT833-1 (XSON8) package:  $P_{tot}$  derates linearly with 3.1 mW/K above 68 °C.
  - For SOT1089 (XSON8) package:  $P_{tot}$  derates linearly with 4.0 mW/K above 88 °C.
  - For SOT1116 (XSON8) package: Ptot derates linearly with 4.2 mW/K above 90 °C.
  - For SOT1203 (XSON8) package: Ptot derates linearly with 3.6 mW/K above 81 °C.

#### 2-channel analog multiplexer/demultiplexer

# 9. Recommended operating conditions

**Table 6. Operating conditions** 

Symbol	Parameter	Conditions	Min	Max	Unit
V <sub>CC</sub>	supply voltage		1.65	5.5	V
VI	input voltage		0	5.5	V
$V_{SW}$	switch voltage	enable and disable mode [1]	0	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
Δt/ΔV	input transition rise and fall rate	V <sub>CC</sub> = 1.65 V to 2.7 V [2]	-	20	ns/V
		V <sub>CC</sub> = 2.7 V to 5.5 V [2]	-	10	ns/V

<sup>[1]</sup> To avoid sinking GND current from terminal Z when switch current flows in terminal Yn, 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 Yn. 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	r Conditions		°C to +8	5 °C	-40 °C to	Unit	
			Min	Typ[1]	Max	Min	Max	
V <sub>IH</sub>	HIGH-level	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65V <sub>CC</sub>	-	-	0.65V <sub>CC</sub>	-	V
	input voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V <sub>CC</sub> = 3 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	V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35V <sub>CC</sub>	-	0.35V <sub>CC</sub>	V
	input voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V <sub>CC</sub> = 3 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 S and pin E; [2 V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	2] -	±0.1	±1	-	±1	μΑ
I <sub>S(OFF)</sub>	OFF-state leakage current	$V_{CC} = 5.5 \text{ V}; \text{ see } \frac{\text{Fig. 5}}{\text{I}}$	2] -	±0.1	±0.2	-	±0.5	μА
I <sub>S(ON)</sub>	ON-state leakage current	$V_{CC} = 5.5 \text{ V}; \text{ see } \frac{\text{Fig. 6}}{\text{C}}$	2] -	±0.1	±1	-	±2	μА
I <sub>CC</sub>	supply current	$V_I$ = 5.5 V or GND; [3 $V_{SW}$ = GND or $V_{CC}$ ; $V_{CC}$ = 1.65 V to 5.5 V	2] -	0.1	4	-	4	μА
ΔI <sub>CC</sub>	additional supply current	pin S and pin $\overline{E}$ ; [3] $V_I = V_{CC} - 0.6 \text{ V}$ ; $V_{SW} = \text{GND or } V_{CC}$ ; $V_{CC} = 5.5 \text{ V}$	2] -	5	500	-	500	μΑ

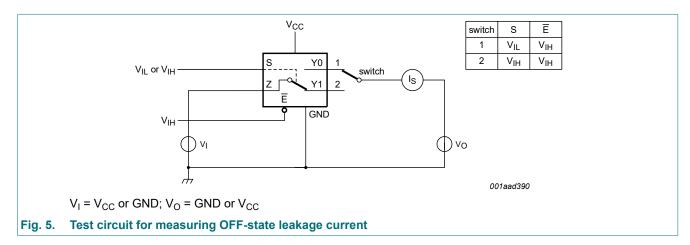
<sup>[2]</sup> Applies to control signal levels.

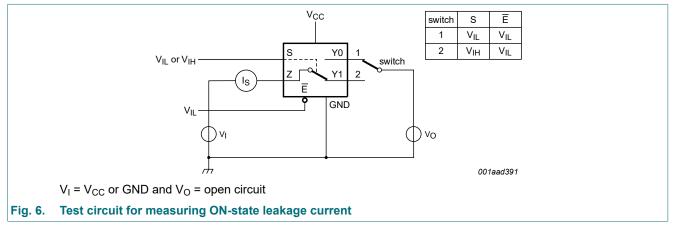
### 2-channel analog multiplexer/demultiplexer

Symbol	Parameter	Conditions	-40	°C to +8	5 °C	-40 °C to	Unit	
			Min	Typ[1]	Max	Min	Max	
Cı	input capacitance		-	2.5	-	-	-	pF
C <sub>S(OFF)</sub>	OFF-state capacitance		-	6.0	-	-	-	pF
C <sub>S(ON)</sub>	ON-state capacitance		-	18	-	-	-	pF

- 1] Typical values are measured at  $T_{amb}$  = 25 °C.
- [2] These typical values are measured at  $V_{CC}$  = 3.3 V.

# 10.1. Test circuits





### 2-channel analog multiplexer/demultiplexer

### 10.2. ON resistance

Table 8. ON resistance

At recommended operating conditions; voltages are referenced to GND (ground 0 V); for graphs see Fig. 8 to Fig. 13.

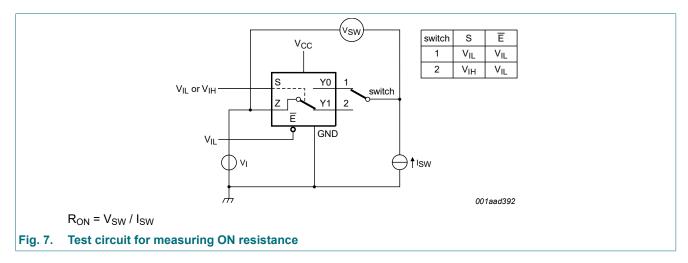
Symbol	Parameter	Conditions	-40 '	°C to +8	5 °C	-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
R <sub>ON(peak)</sub>	ON resistance (peak)	V <sub>I</sub> = GND to V <sub>CC</sub> ; see <u>Fig. 7</u>						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	34.0	130	-	195	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	12.0	30	-	45	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	10.4	25	-	38	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	7.8	20	-	30	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	6.2	15	-	23	Ω
R <sub>ON(rail)</sub>	ON resistance (rail)	V <sub>I</sub> = GND; see <u>Fig. 7</u>						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	8.2	18	-	27	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	7.1	16	-	24	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	6.9	14	-	21	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	6.5	12	-	18	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	5.8	10	-	15	Ω
		V <sub>I</sub> = V <sub>CC</sub> ; see <u>Fig. 7</u>						
		I <sub>SW</sub> = 4 mA; V <sub>CC</sub> = 1.65 V to 1.95 V	-	10.4	30	-	45	Ω
		I <sub>SW</sub> = 8 mA; V <sub>CC</sub> = 2.3 V to 2.7 V	-	7.6	20	-	30	Ω
		I <sub>SW</sub> = 12 mA; V <sub>CC</sub> = 2.7 V	-	7.0	18	-	27	Ω
		I <sub>SW</sub> = 24 mA; V <sub>CC</sub> = 3 V to 3.6 V	-	6.1	15	-	23	Ω
		I <sub>SW</sub> = 32 mA; V <sub>CC</sub> = 4.5 V to 5.5 V	-	4.9	10	-	15	Ω
R <sub>ON(flat)</sub>	ON resistance	$V_I = GND \text{ to } V_{CC}$ [2]						
	(flatness)	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

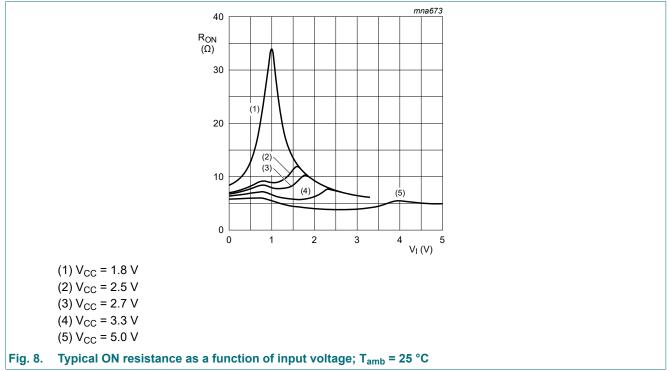
<sup>[1]</sup> Typical values are measured at  $T_{amb}$  = 25 °C and nominal  $V_{CC}$ .

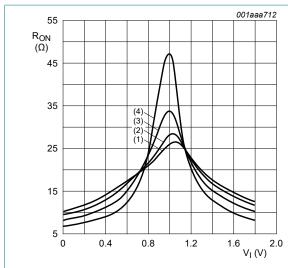
<sup>[2]</sup> Flatness is defined as the difference between the maximum and minimum value of ON resistance measured at identical V<sub>CC</sub> and temperature.

### 2-channel analog multiplexer/demultiplexer

# 10.3. ON resistance test circuit and graphs

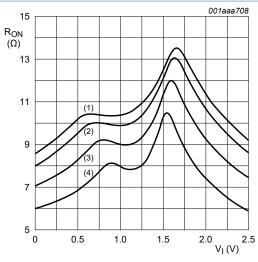






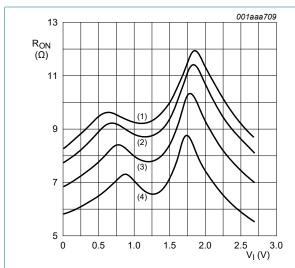
- (1)  $T_{amb} = 125 \, ^{\circ}C$
- (2)  $T_{amb} = 85 \, ^{\circ}C$
- (3) T<sub>amb</sub> = 25 °C
- (4)  $T_{amb} = -40 \, ^{\circ}C$

Fig. 9. ON resistance as a function of input voltage;  $V_{CC} = 1.8 \text{ V}$ 



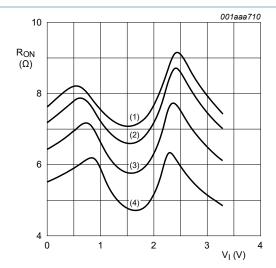
- (1)  $T_{amb} = 125 \, ^{\circ}C$
- (2)  $T_{amb}$  = 85 °C
- $(3) T_{amb} = 25 °C$
- (4)  $T_{amb} = -40 \, ^{\circ}C$

Fig. 10. ON resistance as a function of input voltage;  $V_{CC} = 2.5 \text{ V}$ 



- (1)  $T_{amb} = 125 \, ^{\circ}C$
- (2) T<sub>amb</sub> = 85 °C
- (3)  $T_{amb} = 25 \, ^{\circ}C$
- (4)  $T_{amb}$  = -40 °C

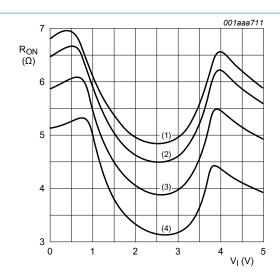
Fig. 11. ON resistance as a function of input voltage;  $V_{CC} = 2.7 \text{ V}$ 



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

Fig. 12. ON resistance as a function of input voltage;  $V_{CC}$  = 3.3 V

### 2-channel analog multiplexer/demultiplexer



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

Fig. 13. ON resistance as a function of input voltage;  $V_{CC} = 5.0 \text{ V}$ 

# 11. Dynamic characteristics

**Table 9. Dynamic characteristics** 

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

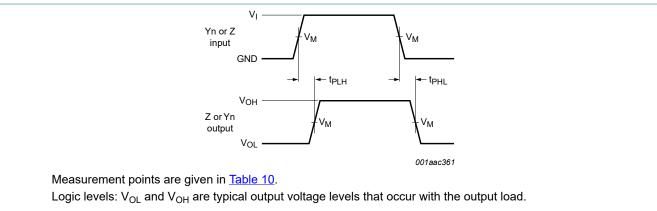
Symbol	Parameter	Conditions		-40 °C to +85 °C			-40 °C to +125 °C		Unit
				Min	Typ[1]	Max	Min	Max	
t <sub>pd</sub>	propagation	Z to Yn or Yn to Z; see Fig. 14	[2] [3]						
	delay	V <sub>CC</sub> = 1.65 V to 1.95 V		-	-	2	-	2.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V		-	-	1.2	-	1.5	ns
		V <sub>CC</sub> = 2.7 V		-	-	1.0	-	1.25	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V		-	-	8.0	-	1.0	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V		-	-	0.6	-	0.8	ns
t <sub>en</sub>	enable time	S to Z or Yn; see Fig. 15	[2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V		2.6	6.7	10.3	2.6	12.9	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V		1.9	4.1	6.4	1.9	8.0	ns
		V <sub>CC</sub> = 2.7 V		1.9	4.0	5.5	1.8	7.0	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V		1.8	3.4	5.0	1.8	6.3	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V		1.3	2.6	3.8	1.3	4.8	ns
		E to Z or Yn; see Fig. 15	[2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V		1.9	4.0	7.3	1.9	9.2	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V		1.4	2.5	4.4	1.4	5.5	ns
		V <sub>CC</sub> = 2.7 V		1.1	2.6	3.9	1.1	4.9	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V		1.2	2.2	3.8	1.2	4.8	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V		1.0	1.7	2.6	1.0	3.3	ns

#### 2-channel analog multiplexer/demultiplexer

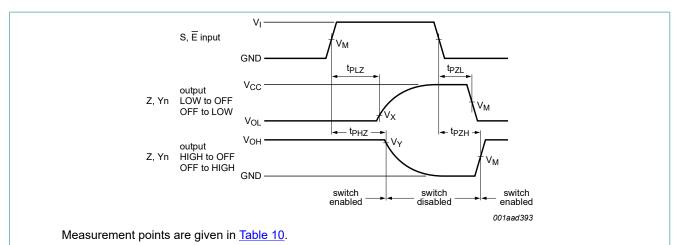
Symbol	Symbol Parameter Conditions		-40	°C to +8	5 °C	-40 °C to	+125 °C	Unit
			Min	Typ[1]	Max	Min	Max	
t <sub>dis</sub>	disable time	S to Z or Yn; see Fig. 15 [2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.1	6.8	10.0	2.1	12.5	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.4	3.7	6.1	1.4	7.7	ns
		V <sub>CC</sub> = 2.7 V	1.4	4.9	6.2	1.4	7.8	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	1.1	4.0	5.4	1.1	6.8	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.0	2.9	3.8	1.0	4.8	ns
		E to Z or Yn; see Fig. 15 [2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	2.3	5.6	8.6	2.3	11.0	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	1.2	3.2	4.8	1.2	6.0	ns
		V <sub>CC</sub> = 2.7 V	1.4	4.0	5.2	1.4	6.5	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	2.0	3.7	5.0	2.0	6.3	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	1.3	2.9	3.8	1.3	4.8	ns

- [2]
- Typical values are measured at  $T_{amb}$  = 25 °C and nominal  $V_{CC}$ .  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ ;  $t_{en}$  is the same as  $t_{PZH}$  and  $t_{PZL}$ ;  $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ . Propagation delay is the calculated RC time constant of the typical ON resistance of the switch and the specified capacitance when [3] driven by an ideal voltage source (zero output impedance).

#### 11.1. Waveforms and test circuits



#### 2-channel analog multiplexer/demultiplexer

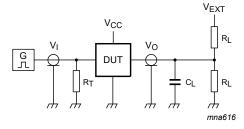


Logic levels:  $V_{OL}$  and  $V_{OH}$  are typical output voltage levels that occur with the output load.

#### **Table 10. Measurement points**

Fig. 15. Enable and disable times

Supply voltage	Input	Output					
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>			
1.65 V to 2.7 V	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>OL</sub> + 0.15 V	V <sub>OH</sub> - 0.15 V			
2.7 V to 5.5 V	0.5 x V <sub>CC</sub>	0.5 x V <sub>CC</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> - 0.3 V			



Test data is given in Table 11.

Definitions test circuit:

 $R_T$  = Termination resistance (should be equal to output impedance  $Z_0$  of the pulse generator).

 $C_L$  = Load capacitance (including jig and probe capacitance).

R<sub>L</sub> = Load resistance.

V<sub>EXT</sub> = External voltage for measuring switching times.

Fig. 16. Test circuit for measuring switching times

Table 11. Test data

Supply voltage	Input		Load		V <sub>EXT</sub>		
V <sub>CC</sub>	VI	t <sub>r</sub> , t <sub>f</sub>	C <sub>L</sub>	R <sub>L</sub>	t <sub>PLH</sub> , t <sub>PHL</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	t <sub>PZL</sub> , t <sub>PLZ</sub>
1.65 V to 1.95 V	V <sub>CC</sub>	≤ 2.0 ns	30 pF	1 kΩ	open	GND	2 × V <sub>CC</sub>
2.3 V to 2.7 V	V <sub>CC</sub>	≤ 2.0 ns	30 pF	500 Ω	open	GND	2 × V <sub>CC</sub>
2.7 V	V <sub>CC</sub>	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V <sub>CC</sub>
3 V to 3.6 V	V <sub>CC</sub>	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V <sub>CC</sub>
4.5 V to 5.5 V	V <sub>CC</sub>	≤ 2.5 ns	50 pF	500 Ω	open	GND	2 × V <sub>CC</sub>

12 / 23

### 2-channel analog multiplexer/demultiplexer

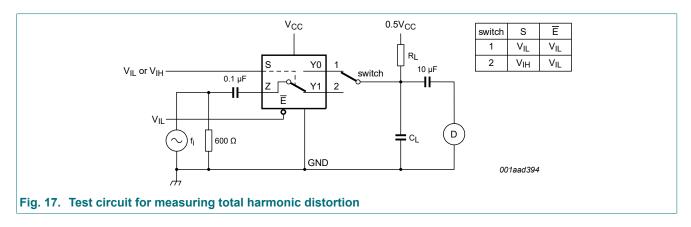
# 11.2. Additional dynamic characteristics

Table 12. Additional dynamic characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V); T<sub>amb</sub> = 25 °C.

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
THD total harmonic distortion	total harmonic distortion	$f_i$ = 600 Hz to 20 kHz; $R_L$ = 600 Ω; $C_L$ = 50 pF; $V_I$ = 0.5 V (p-p); see Fig. 17				
		V <sub>CC</sub> = 1.65 V	-	0.260	-	%
		V <sub>CC</sub> = 2.3 V	-	0.078	-	%
		V <sub>CC</sub> = 3.0 V	-	0.078	-	%
		V <sub>CC</sub> = 4.5 V	-	0.078	-	%
f <sub>(-3dB)</sub> -3 dB fr	-3 dB frequency response	$R_L = 50 \Omega$ ; $C_L = 5 pF$ ; see <u>Fig. 18</u>				
		V <sub>CC</sub> = 1.65 V	-	200	-	MHz
		V <sub>CC</sub> = 2.3 V	-	300	-	MHz
		V <sub>CC</sub> = 3.0 V	-	300	-	MHz
		V <sub>CC</sub> = 4.5 V	-	300	-	MHz
α <sub>iso</sub> isolation (OFI	isolation (OFF-state)	$R_L = 50 \Omega$ ; $C_L = 5 pF$ ; $f_i = 10 MHz$ ; see Fig. 19				
		V <sub>CC</sub> = 1.65 V	-	-42	-	dB
		V <sub>CC</sub> = 2.3 V	-	-42	-	dB
		V <sub>CC</sub> = 3.0 V	-	-40	-	dB
		V <sub>CC</sub> = 4.5 V	-	-40	-	dB
Q <sub>inj</sub> cha	charge injection	$C_L$ = 0.1 nF; $V_{gen}$ = 0 V; $R_{gen}$ = 0 $\Omega$ ; $f_i$ = 1 MHz; $R_L$ = 1 M $\Omega$ ; see Fig. 20				
		V <sub>CC</sub> = 1.8 V	-	3.3	-	рС
		V <sub>CC</sub> = 2.5 V	-	4.1	-	рС
		V <sub>CC</sub> = 3.3 V	-	5.0	-	рС
		V <sub>CC</sub> = 4.5 V	-	6.4	-	рС
		V <sub>CC</sub> = 5.5 V	-	7.5	-	рС

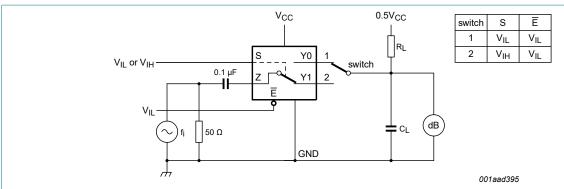
### 11.3. Test circuits



**Product data sheet** 

13 / 23

#### 2-channel analog multiplexer/demultiplexer



Adjust fi voltage to obtain 0 dBm level at output. Increase fi frequency until dB meter reads -3 dB

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

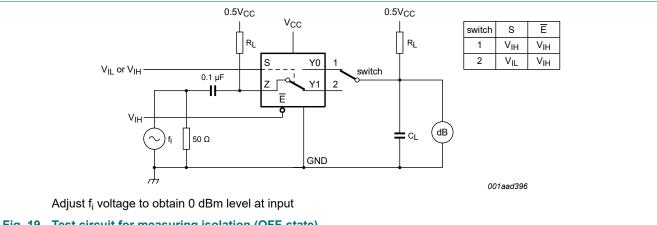
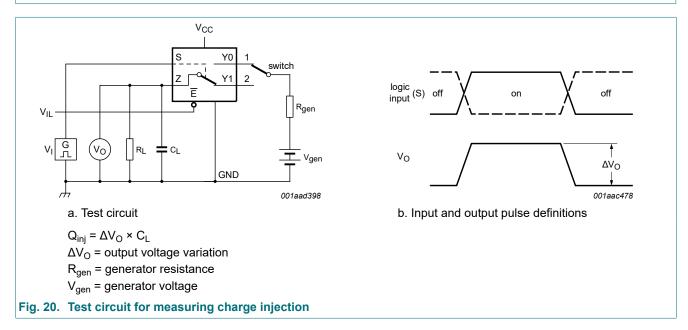


Fig. 19. Test circuit for measuring isolation (OFF-state)



**Product data sheet** 

14 / 23

#### 2-channel analog multiplexer/demultiplexer

# 12. Package outline

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

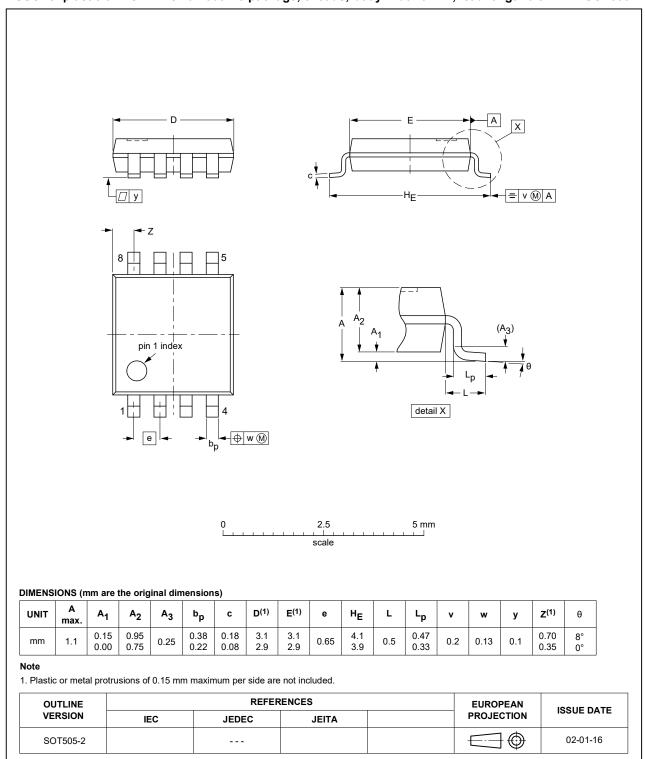


Fig. 21. Package outline SOT505-2 (TSSOP8)

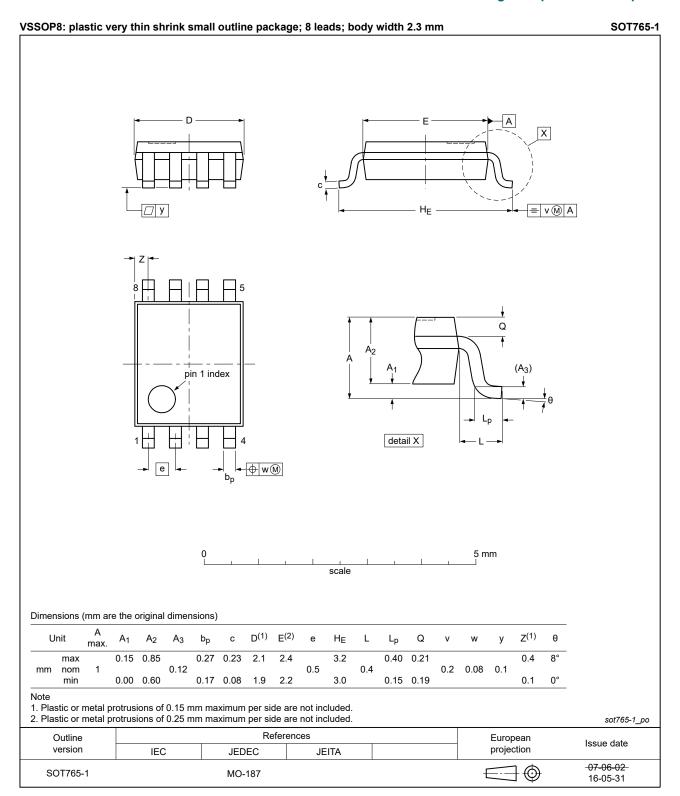


Fig. 22. Package outline SOT765-1 (VSSOP8)

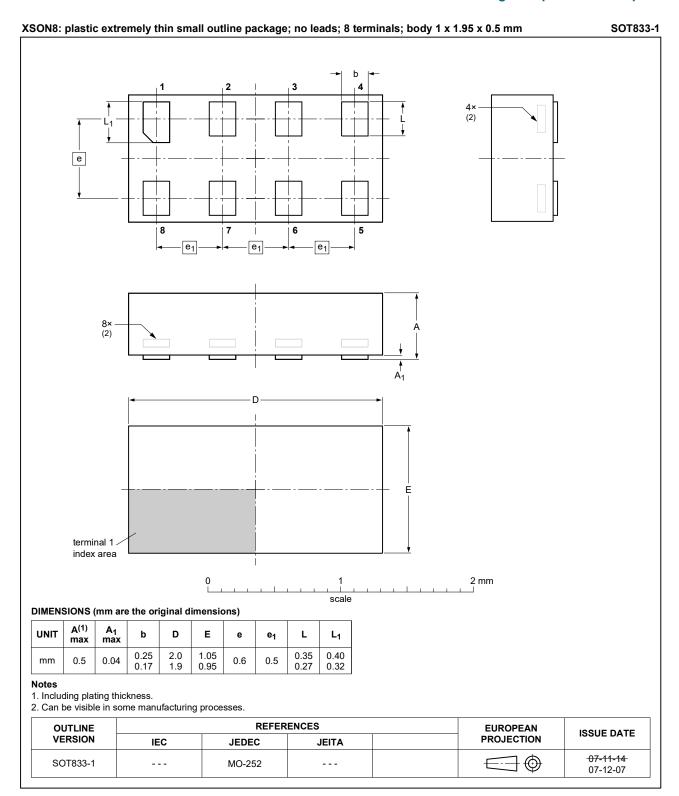


Fig. 23. Package outline SOT833-1 (XSON8)

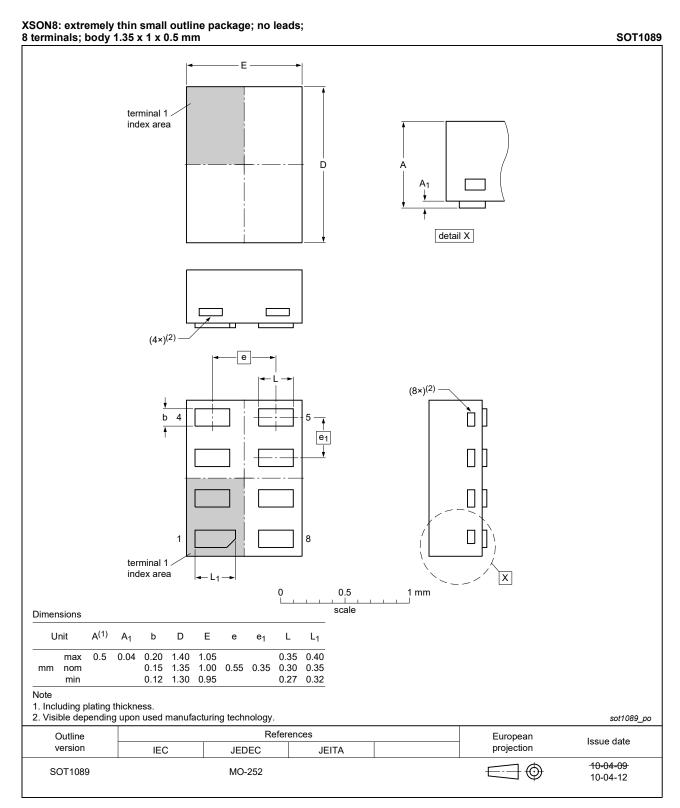


Fig. 24. Package outline SOT1089 (XSON8)

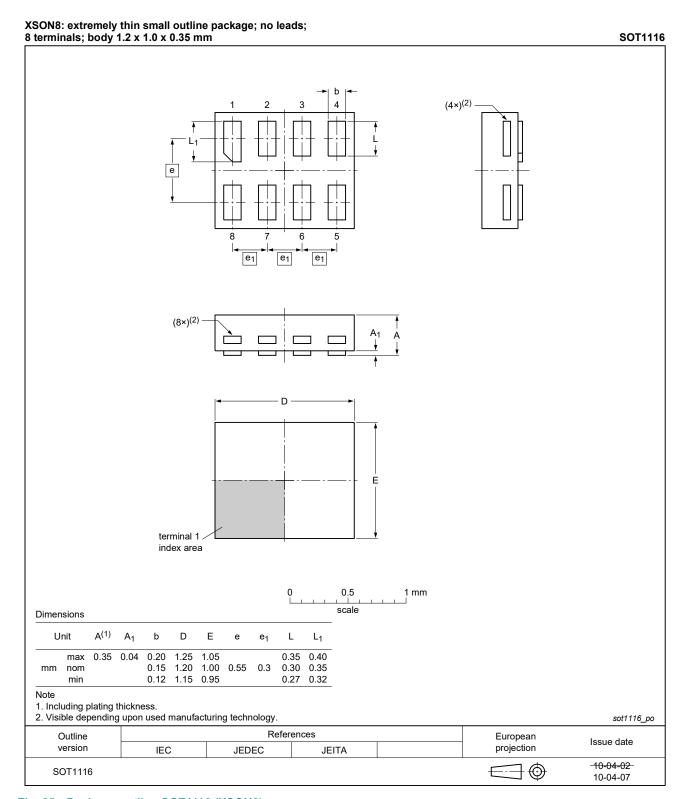


Fig. 25. Package outline SOT1116 (XSON8)

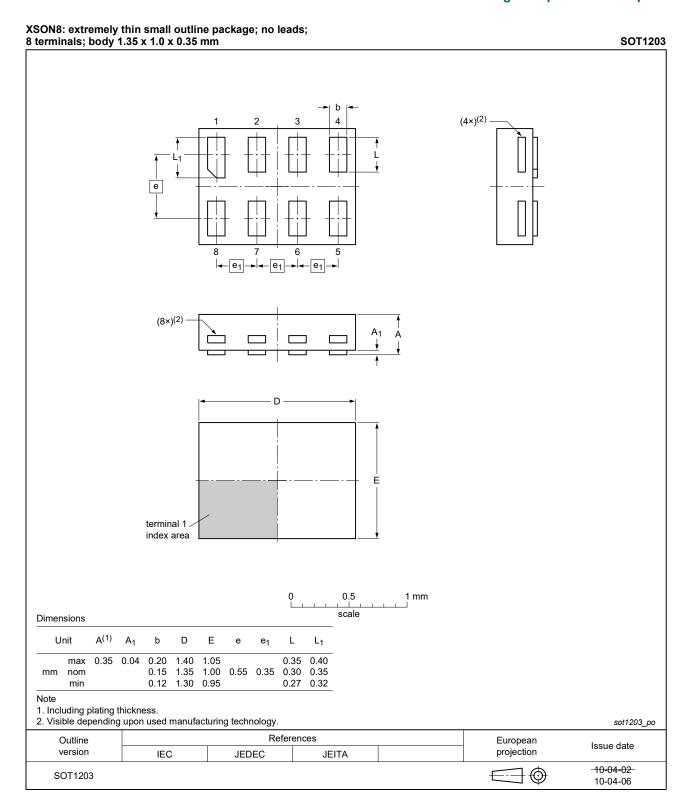


Fig. 26. Package outline SOT1203 (XSON8)

## 2-channel analog multiplexer/demultiplexer

# 13. Abbreviations

#### **Table 13. Abbreviations**

Table 1417 tobile 11410116				
Acronym	Description			
CDM	Charged Device Model			
CMOS	Complementary Metal-Oxide Semiconductor			
DUT	Device Under Test			
ESD	ElectroStatic Discharge			
НВМ	Human Body Model			
MM	Machine Model			
TTL	Transistor-Transistor Logic			

# 14. Revision history

#### **Table 14. Revision history**

Document ID	Release date	Data sheet status	Change notice	Supersedes	
74LVC1G53 v.12	20210720	Product data sheet	-	74LVC1G53 v.11	
Modifications:	Section 1 up	or 74LVC1G53GM (SOT90 odated. Derating values for P <sub>tot</sub> tota	,		
74LVC1G53 v.11	20180116	Product data sheet	-	74LVC1G53 v.10	
Modifications:	<ul> <li>The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia.</li> <li>Legal texts have been adapted to the new company name where appropriate.</li> <li>Type number 74LVC1G53GD (SOT996-2 / XSON8) removed.</li> </ul>				
74LVC1G53 v.10	20161207	Product data sheet	-	74LVC1G53 v.9	
Modifications:	<u>Table 7</u> : The maximum limits for leakage current and supply current have changed.				
74LVC1G53 v.9	20130405	Product data sheet	-	74LVC1G53 v.8	
Modifications:	For type number 74LVC1G53GD XSON8U has changed to XSON8.				
74LVC1G53 v.8	20120622	Product data sheet	-	74LVC1G53 v.7	
Modifications:	For type number 74LVC1G53GM the SOT code has changed to SOT902-2.				
74LVC1G53 v.7	20111206	Product data sheet	-	74LVC1G53 v.6	
Modifications:	Legal pages updated.				
74LVC1G53 v.6	20100621	Product data sheet	-	74LVC1G53 v.5	
74LVC1G53 v.5	20080611	Product data sheet	-	74LVC1G53 v.4	
74LVC1G53 v.4	20080303	Product data sheet	-	74LVC1G53 v.3	
74LVC1G53 v.3	20070829	Product data sheet	-	74LVC1G53 v.2	
74LVC1G53 v.2	20060410	Product data sheet	-	74LVC1G53 v.1	
74LVC1G53 v.1	20060110	Product data sheet	_	-	

# 15. Legal information

#### **Data sheet status**

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

- Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- 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 <a href="https://www.nexperia.com">https://www.nexperia.com</a>.

#### **Definitions**

**Draft** — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. Nexperia does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local Nexperia sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

Product specification — The information and data provided in a Product data sheet shall define the specification of the product as agreed between Nexperia and its customer, unless Nexperia and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the Nexperia product is deemed to offer functions and qualities beyond those described in the Product data sheet.

#### **Disclaimers**

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, Nexperia does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. Nexperia takes no responsibility for the content in this document if provided by an information source outside of Nexperia.

In no event shall Nexperia be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, Nexperia's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms and conditions of commercial sale of Nexperia.

Right to make changes — Nexperia reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — Nexperia products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an Nexperia product can reasonably be expected to result in personal

#### 2-channel analog multiplexer/demultiplexer

injury, death or severe property or environmental damage. Nexperia and its suppliers accept no liability for inclusion and/or use of Nexperia products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

**Quick reference data** — The Quick reference data is an extract of the product data given in the Limiting values and Characteristics sections of this document, and as such is not complete, exhaustive or legally binding.

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. Nexperia makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using Nexperia products, and Nexperia accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the Nexperia product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

Nexperia does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using Nexperia products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). Nexperia does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — Nexperia products are sold subject to the general terms and conditions of commercial sale, as published at <a href="http://www.nexperia.com/profile/terms">http://www.nexperia.com/profile/terms</a>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. Nexperia hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of Nexperia products by sustained.

No offer to sell or license — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific Nexperia product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. Nexperia accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without Nexperia's warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond Nexperia's specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies Nexperia for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond Nexperia's standard warranty and Nexperia's product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

#### **Trademarks**

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

74LVC1G53

All information provided in this document is subject to legal disclaimers

© Nexperia B.V. 2021. All rights reserved

## 2-channel analog multiplexer/demultiplexer

# **Contents**

1. General description	1
2. Features and benefits	1
3. Ordering information	2
4. Marking	2
5. Functional diagram	2
6. Pinning information	3
6.1. Pinning	3
6.2. Pin description	3
7. Functional description	4
8. Limiting values	4
9. Recommended operating conditions	5
10. Static characteristics	5
10.1. Test circuits	6
10.2. ON resistance	7
10.3. ON resistance test circuit and graphs	8
11. Dynamic characteristics	10
11.1. Waveforms and test circuits	11
11.2. Additional dynamic characteristics	13
11.3. Test circuits	13
12. Package outline	15
13. Abbreviations	21
14. Revision history	21
15. Legal information	22

For more information, please visit: http://www.nexperia.com For sales office addresses, please send an email to: salesaddresses@nexperia.com Date of release: 20 July 2021

<sup>©</sup> Nexperia B.V. 2021. All rights reserved

# **X-ON Electronics**

Largest Supplier of Electrical and Electronic Components

Click to view similar products for Multiplexer Switch ICs category:

Click to view products by Nexperia manufacturer:

Other Similar products are found below:

NLV74HC4066ADR2G HEF4051BP MC74HC4067ADTG DG508AAK/883B NLV14051BDG 016400E PI3V512QE 7705201EC
PI2SSD3212NCE NLAS3257CMX2TCG PI3DBS12412AZLEX PI3V512QEX PI3DBS16213ZLEX PI3DBS16415ZHEX
MUX36S16IRSNR TC7W53FK,LF CD4053BM96 MC74HC4053ADWR2G SN74LV4051APWR HEF4053BT.653 PI3L720ZHEX
ADG5408BRUZ-REEL7 ADG1404YRUZ-REEL7 ADG1208YRZ-REEL7 MAX4704EUB+T ADG1406BRUZ-REEL7
LTC4305IDHD#PBF CD4053BPWRG4 74HC4053D.653 74HCT4052PW.118 74LVC2G53DP.125 74HC4052DB.112 74HC4052PW.112
74HC4053DB.112 74HC4067DB.112 74HC4351DB.112 74HCT4052D.112 74HCT4052DB.112 74HCT4053DB.112 74HCT4067D.112
74HCT4351D.112 74LV4051PW.112 FSA1256L8X\_F113 PI5V330QE PI5V331QE 5962-8771601EA 5962-87716022A ADG5249FBRUZ
ADG1438BRUZ AD7506JNZ