

# 74LVC2G53

## 2-channel analog multiplexer/demultiplexer

Rev. 13 — 31 July 2019

Product data sheet

## 1. General description

---

The 74LVC2G53 is a low-power, low-voltage, high-speed, Si-gate CMOS device.

The 74LVC2G53 provides one analog multiplexer/demultiplexer with a digital select input (S), two independent inputs/outputs (Y0 and Y1), a common input/output (Z) and an active LOW enable input ( $\bar{E}$ ). When pin  $\bar{E}$  is HIGH, the switch is turned off.

Schmitt trigger action at the select and enable inputs 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 and benefits

---

- 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-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

### 3. Ordering information

Table 1. Ordering information

Type number	Package			Version
	Temperature range	Name	Description	
74LVC2G53DP	-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
74LVC2G53DC	-40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1
74LVC2G53GT	-40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm	SOT833-1
74LVC2G53GF	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1 x 0.5 mm	SOT1089
74LVC2G53GN	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 x 1.0 x 0.35 mm	SOT1116
74LVC2G53GS	-40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 x 1.0 x 0.35 mm	SOT1203

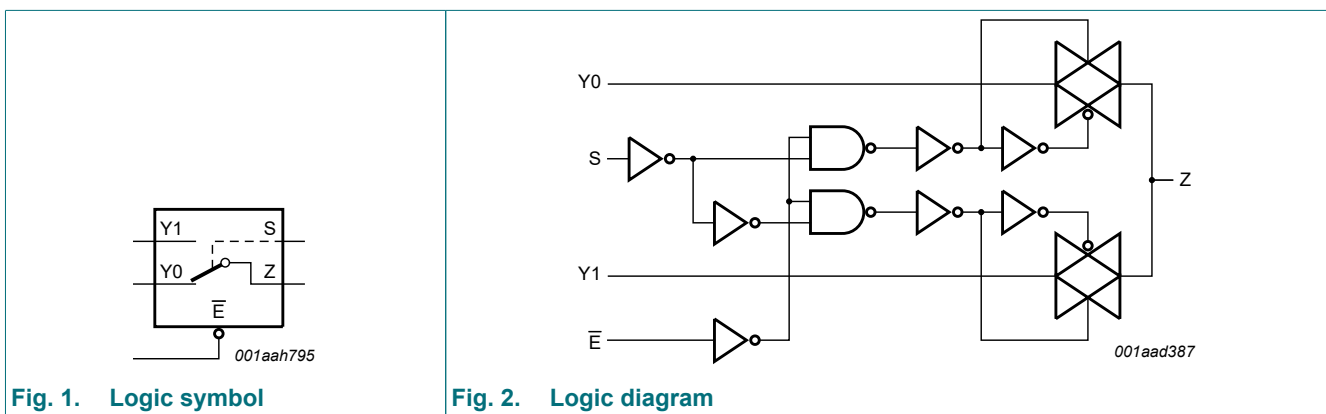
### 4. Marking

Table 2. Marking codes

Type number	Marking code <sup>[1]</sup>
74LVC2G53DP	V53
74LVC2G53DC	V53
74LVC2G53GT	V53
74LVC2G53GF	V3
74LVC2G53GN	V3
74LVC2G53GS	V3

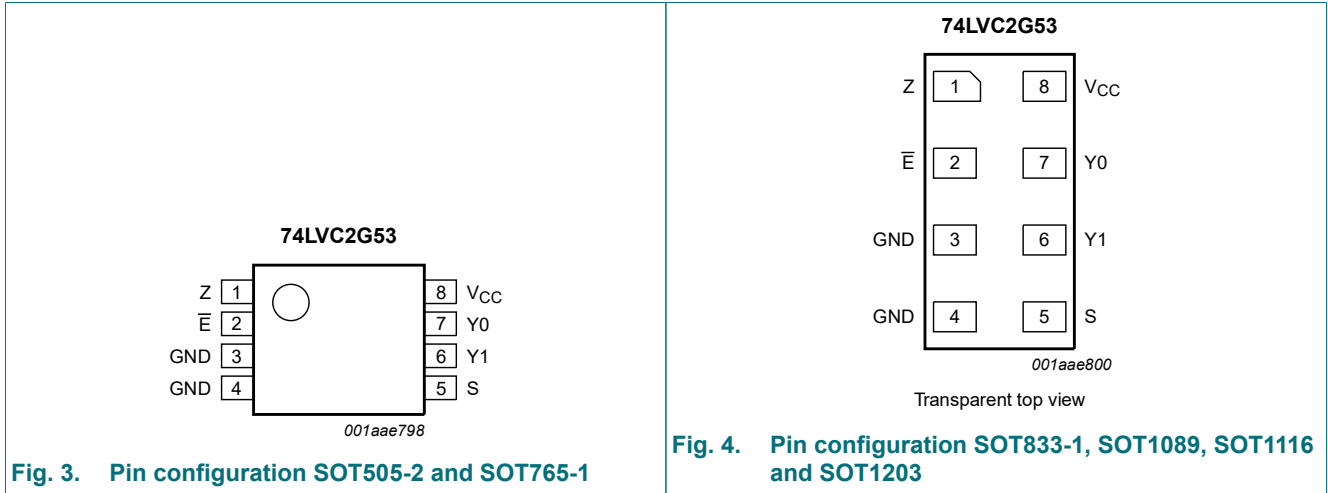
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

### 5. Functional diagram



## 6. Pinning information

### 6.1. Pinning



### 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Description
Z	1	common output or input
$\bar{E}$	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

## 7. Functional description

Table 4. Function table

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

Input		Channel on
S	$\bar{E}$	
L	L	Y0 to Z or Z to Y0
H	L	Y1 to Z or Z to Y1
X	H	Z

## 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 SOT505-2 (TSSOP8) packages:  $P_{tot}$  derates linearly with 4.6 mW/K above 96 °C.

For SOT765-1 (VSSOP8) packages:  $P_{tot}$  derates linearly with 4.9 mW/K above 99 °C.

For SOT833-1 (XSON8) packages:  $P_{tot}$  derates linearly with 3.1 mW/K above 68 °C.

For SOT1089 (XSON8) packages:  $P_{tot}$  derates linearly with 4.0 mW/K above 88 °C.

For SOT1116 (XSON8) packages:  $P_{tot}$  derates linearly with 4.2 mW/K above 90 °C.

For SOT1203 (XSON8) packages:  $P_{tot}$  derates linearly with 3.6 mW/K above 81 °C.

## 9. Recommended operating conditions

**Table 6. Operating conditions**

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		1.65	5.5	V
$V_I$	input voltage		0	5.5	V
$V_{SW}$	switch voltage	enable and disable mode [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 $2.7\text{ V}$ [2]	-	20	ns/V
		$V_{CC} = 2.7\text{ V}$ to $5.5\text{ V}$ [2]	-	10	ns/V

[1] 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.

[2] Applies to control signal levels.

## 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 [1]	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>	-	-	0.65V <sub>CC</sub>	-	V
		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 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> = 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 $\bar{E}$ ; V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	±0.1	±1	-	±1	µA
I <sub>S(OFF)</sub>	OFF-state leakage current	V <sub>CC</sub> = 5.5 V; see Fig. 5	-	±0.1	±0.2	-	±0.5	µA
I <sub>S(ON)</sub>	ON-state leakage current	V <sub>CC</sub> = 5.5 V; see Fig. 6	-	±0.1	±1	-	±2	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> ; V <sub>CC</sub> = 1.65 V to 5.5 V	-	0.1	4	-	4	µA
ΔI <sub>CC</sub>	additional supply current	pin S and pin $\bar{E}$ ; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; V <sub>SW</sub> = GND or V <sub>CC</sub> ; V <sub>CC</sub> = 5.5 V	-	5	500	-	500	µA
C <sub>I</sub>	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<sub>amb</sub> = 25 °C.

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

10.1. Test circuits

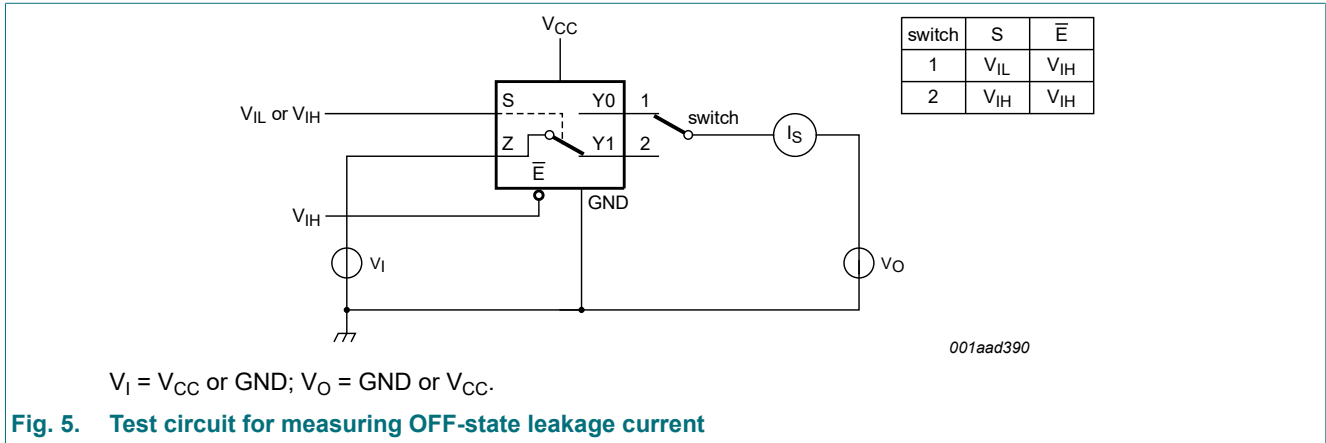


Fig. 5. Test circuit for measuring OFF-state leakage current

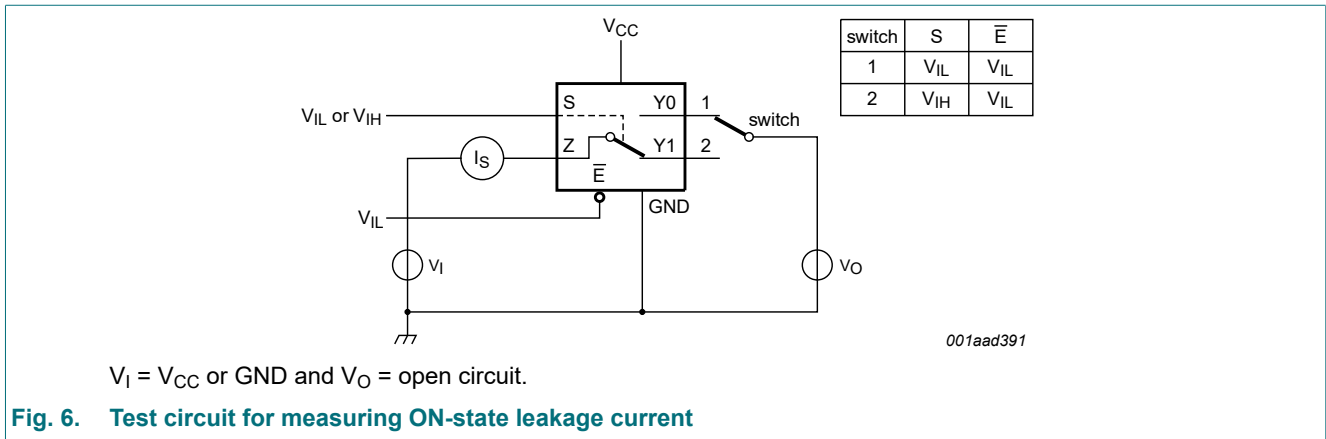


Fig. 6. Test circuit for measuring ON-state leakage current

10.2. ON resistance

Table 8. ON resistance

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

Symbol	Parameter	Conditions	-40 °C to +85 °C		-40 °C to +125 °C		Unit	
			Min	Typ[1]	Max	Min		Max
$R_{ON(peak)}$	ON resistance (peak)	$V_I =$ GND to $V_{CC}$ ; see Fig. 7						
		$I_{SW} = 4$ 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	$\Omega$

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
R <sub>ON(rail)</sub>	ON resistance (rail)	V <sub>I</sub> = GND; see Fig. 7						
		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 Fig. 7						
		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 (flatness)	V <sub>I</sub> = GND to V <sub>CC</sub> [2]						
		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

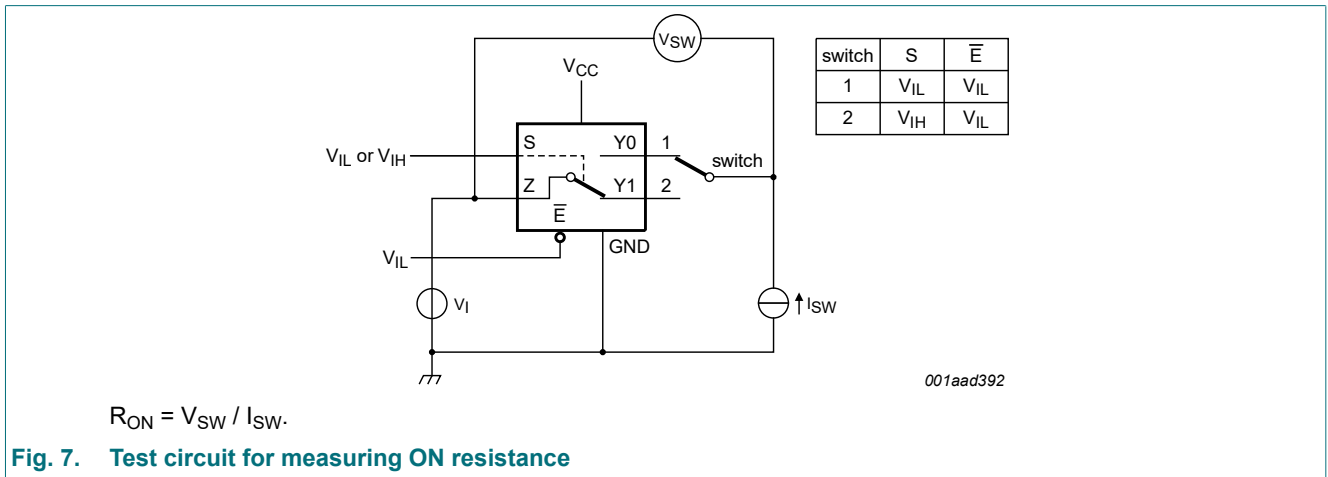
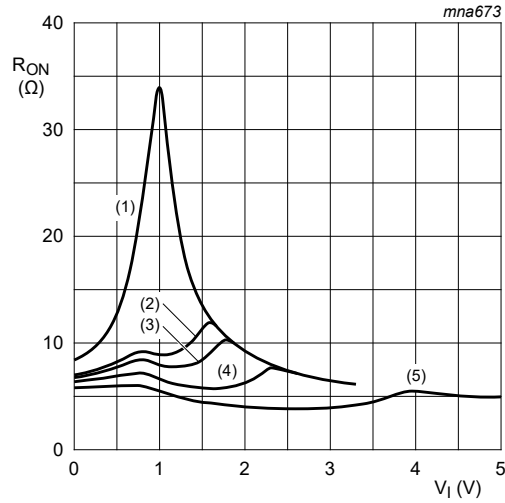
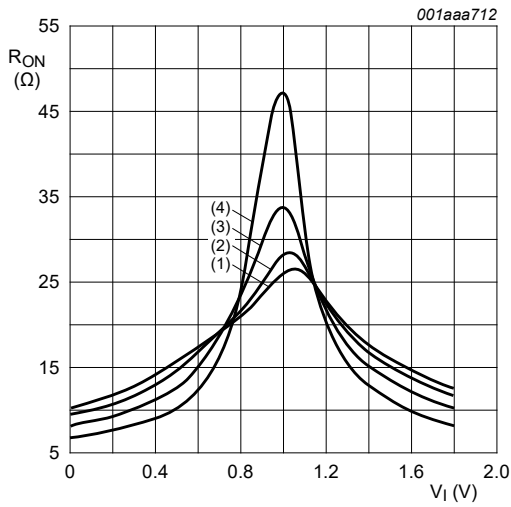


Fig. 7. Test circuit for measuring ON resistance



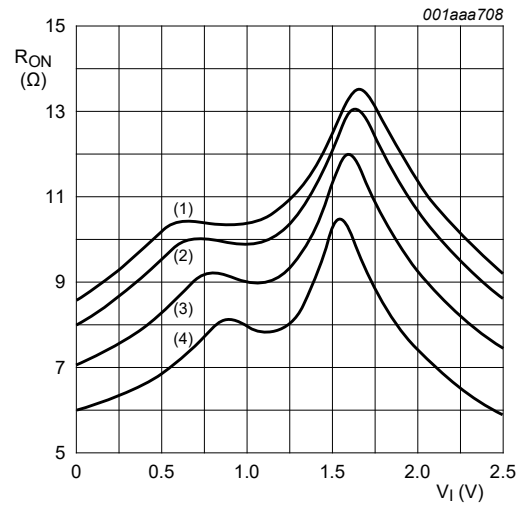
- $T_{amb} = 25\text{ }^{\circ}\text{C}$
1.  $V_{CC} = 1.8\text{ V}$
  2.  $V_{CC} = 2.5\text{ V}$
  3.  $V_{CC} = 2.7\text{ V}$
  4.  $V_{CC} = 3.3\text{ V}$
  5.  $V_{CC} = 5.0\text{ V}$

Fig. 8. Typical 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. 9. 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. 10. ON resistance as a function of input voltage





Fig. 11. ON resistance as a function of input voltage



Fig. 12. ON resistance as a function of input voltage

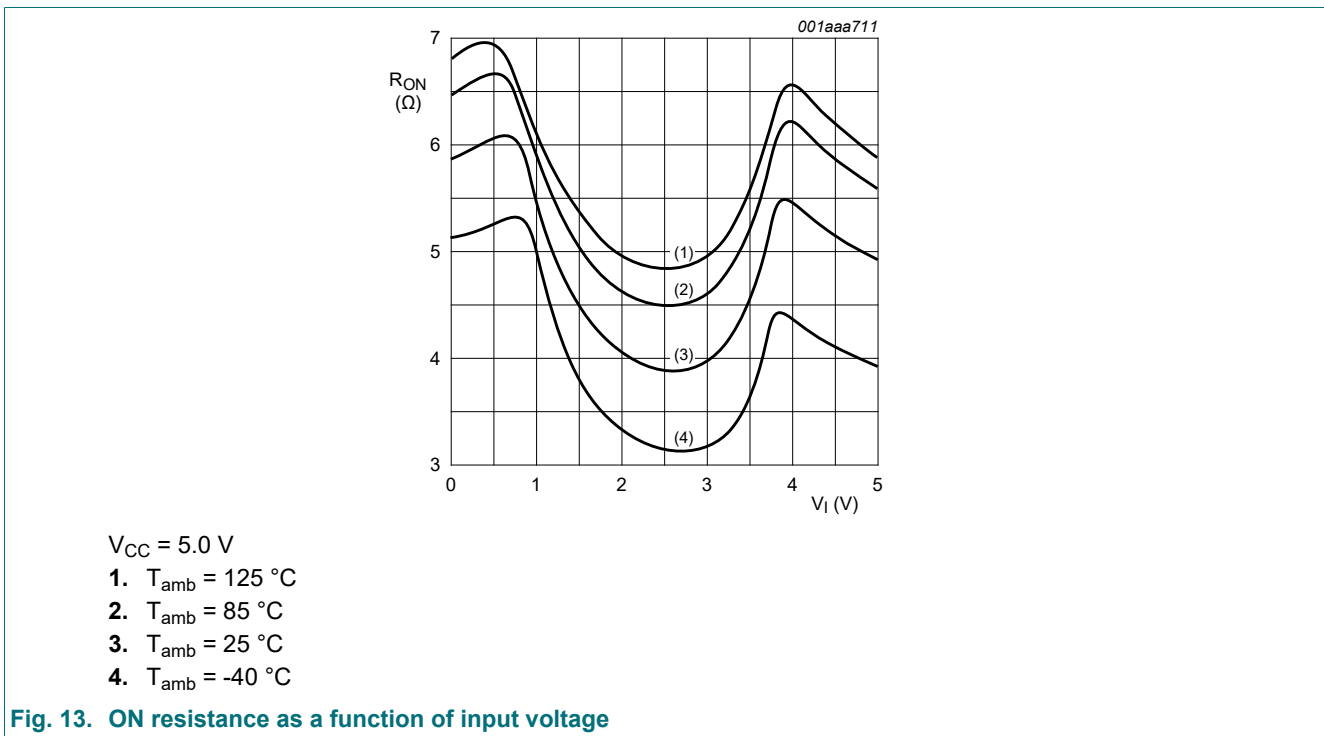


Fig. 13. ON resistance as a function of input voltage

## 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.

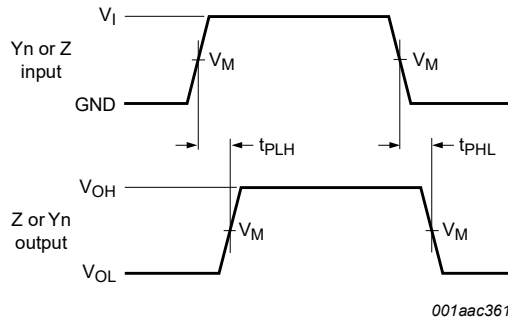
Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$t_{pd}$	propagation delay	Z to Yn or Yn to Z; see Fig. 14 [2][3]						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	-	-	2	-	2.5	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	-	-	1.2	-	1.5	ns
		$V_{CC} = 2.7\text{ V}$	-	-	1.0	-	1.25	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	-	-	0.8	-	1.0	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	-	-	0.6	-	0.8	ns
$t_{en}$	enable time	S to Z or Yn; see Fig. 15 [2]						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.6	6.7	10.3	2.6	12.9	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.9	4.1	6.4	1.9	8.0	ns
		$V_{CC} = 2.7\text{ V}$	1.9	4.0	5.5	1.8	7.0	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.8	3.4	5.0	1.8	6.3	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.3	2.6	3.8	1.3	4.8	ns
		$\bar{E}$ to Z or Yn; see Fig. 15 [2]						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	1.9	4.0	7.3	1.9	9.2	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	2.5	4.4	1.4	5.5	ns
		$V_{CC} = 2.7\text{ V}$	1.1	2.6	3.9	1.1	4.9	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.2	2.2	3.8	1.2	4.8	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	1.7	2.6	1.0	3.3	ns
$t_{dis}$	disable time	S to Z or Yn; see Fig. 15 [2]						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.1	6.8	10.0	2.1	12.5	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.4	3.7	6.1	1.4	7.7	ns
		$V_{CC} = 2.7\text{ V}$	1.4	4.9	6.2	1.4	7.8	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	1.1	4.0	5.4	1.1	6.8	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.0	2.9	3.8	1.0	4.8	ns
		$\bar{E}$ to Z or Yn; see Fig. 15 [2]						
		$V_{CC} = 1.65\text{ V to }1.95\text{ V}$	2.3	5.6	8.6	2.3	11.0	ns
		$V_{CC} = 2.3\text{ V to }2.7\text{ V}$	1.2	3.2	4.8	1.2	6.0	ns
		$V_{CC} = 2.7\text{ V}$	1.4	4.0	5.2	1.4	6.5	ns
		$V_{CC} = 3.0\text{ V to }3.6\text{ V}$	2.0	3.7	5.0	2.0	6.3	ns
		$V_{CC} = 4.5\text{ V to }5.5\text{ V}$	1.3	2.9	3.8	1.3	4.8	ns

[1] Typical values are measured at  $T_{amb} = 25\text{ °C}$  and nominal  $V_{CC}$ .

[2]  $t_{pd}$  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  $t_{PHZ}$ .

[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).

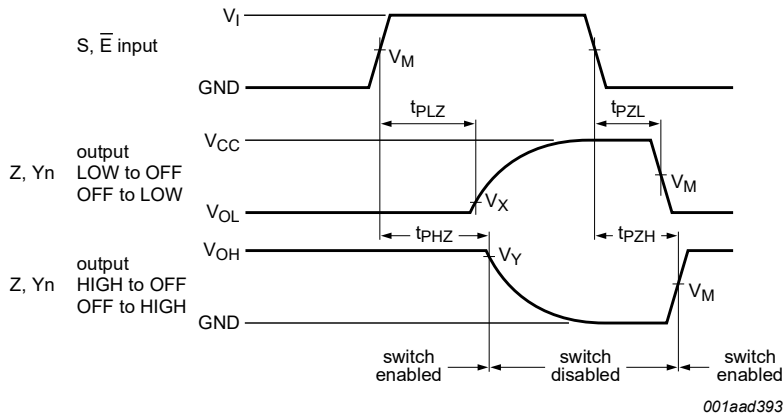
11.1. Waveforms and test circuits



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. 14. Input (Yn or Z) to output (Z or Yn) propagation delays**



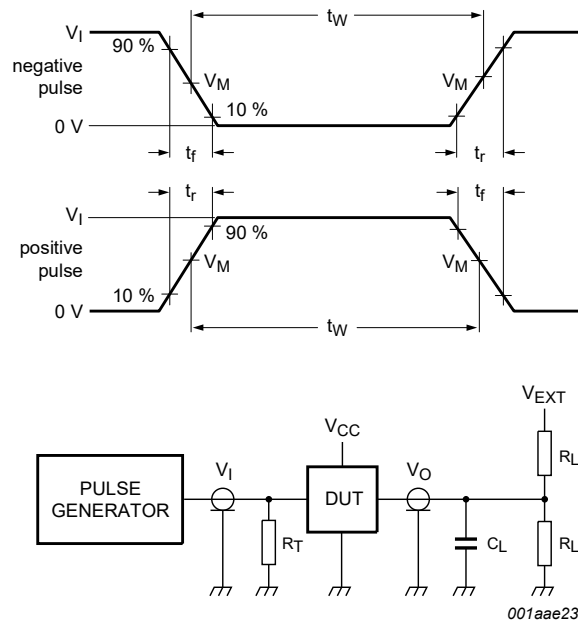
Measurement points are given in [Table 10](#).

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

**Fig. 15. 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 2.7 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.15\text{ V}$	$V_{OH} - 0.15\text{ V}$
2.7 V to 5.5 V	$0.5V_{CC}$	$0.5V_{CC}$	$V_{OL} + 0.3\text{ V}$	$V_{OH} - 0.3\text{ V}$



Test data is given in [Table 11](#).

Definitions for test circuit:

$R_L$  = Load resistance.

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

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

$V_{EXT}$  = Test voltage for switching times.

**Fig. 16. Test circuit for measuring 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	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	$2V_{CC}$
3 V to 3.6 V	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	$2V_{CC}$
4.5 V to 5.5 V	$V_{CC}$	$\leq 2.5$ ns	50 pF	500 $\Omega$	open	GND	$2V_{CC}$

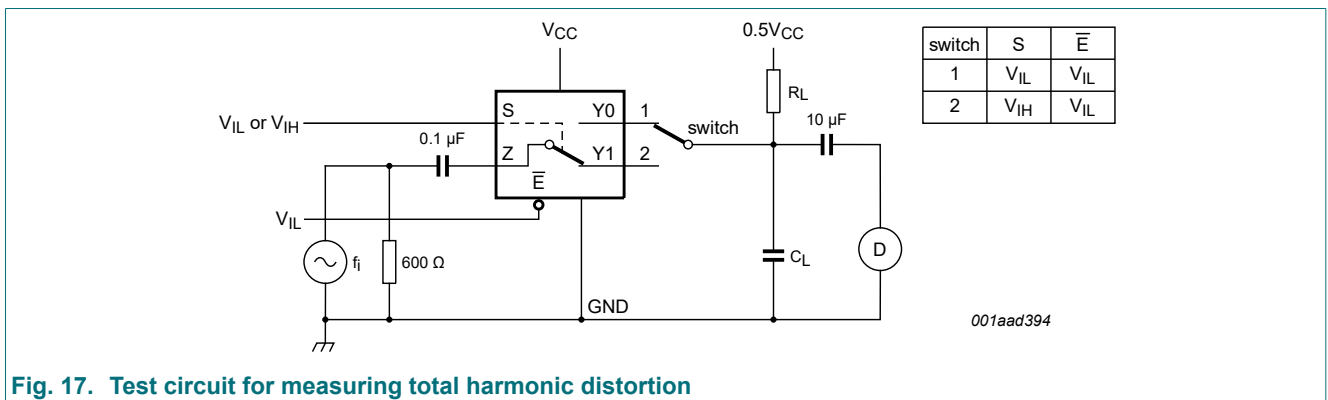
### 11.2. Additional dynamic characteristics

**Table 12. Additional dynamic characteristics**

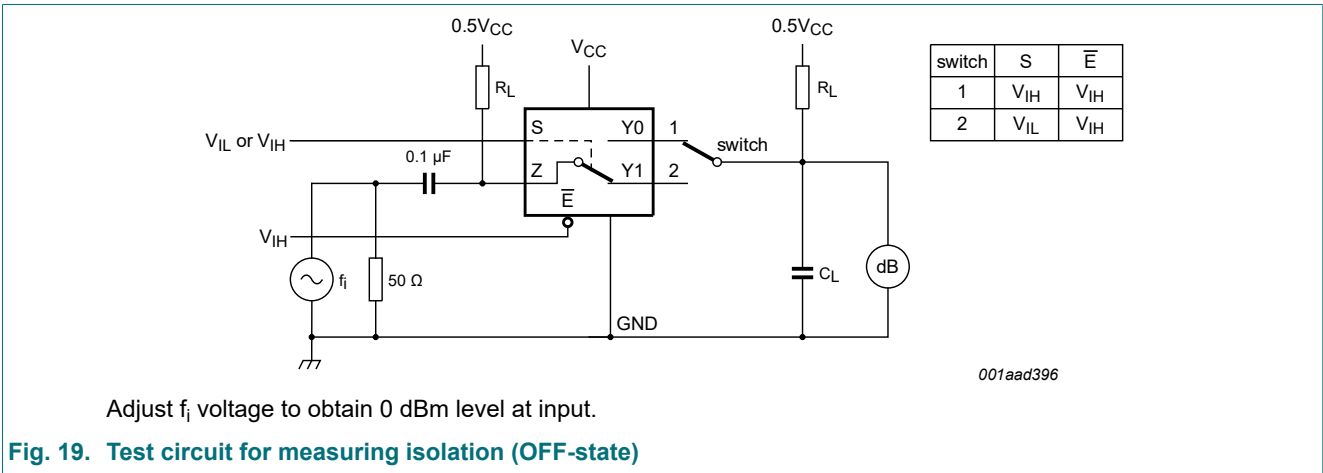
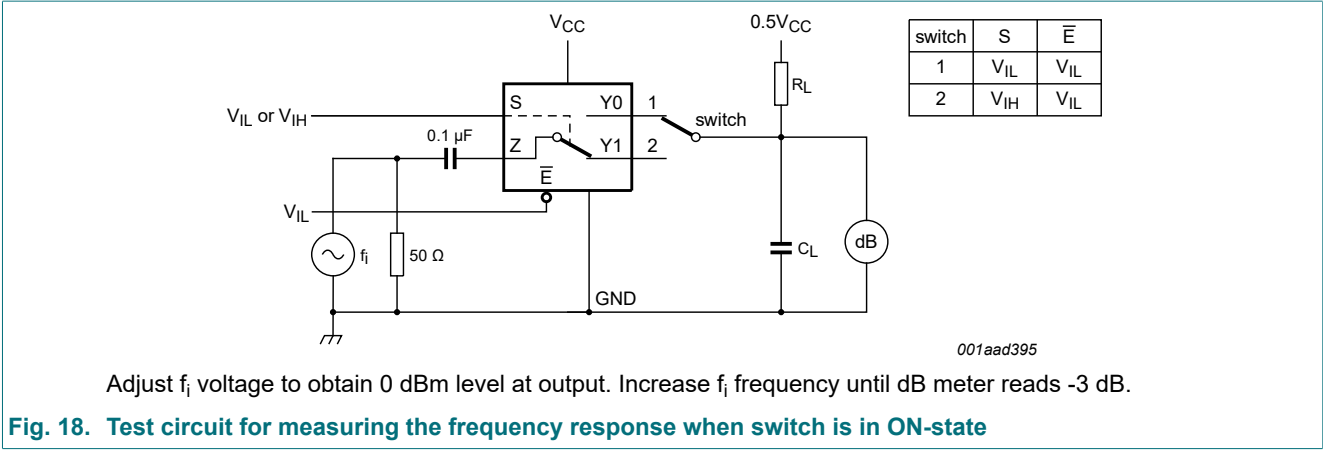
At recommended operating conditions; voltages are referenced to GND (ground = 0 V);  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

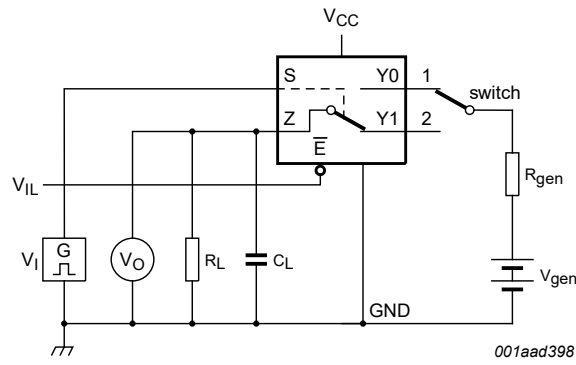
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
THD	total harmonic distortion	$f_i = 600\text{ Hz to }20\text{ kHz}; R_L = 600\text{ }\Omega;$ $C_L = 50\text{ pF}; V_I = 0.5\text{ V (p-p)};$ see Fig. 17				
		$V_{CC} = 1.65\text{ V}$	-	0.260	-	%
		$V_{CC} = 2.3\text{ V}$	-	0.078	-	%
		$V_{CC} = 3.0\text{ V}$	-	0.078	-	%
$f_{(-3\text{dB})}$	-3 dB frequency response	$R_L = 50\text{ }\Omega; C_L = 5\text{ pF};$ see Fig. 18				
		$V_{CC} = 1.65\text{ V}$	-	200	-	MHz
		$V_{CC} = 2.3\text{ V}$	-	300	-	MHz
		$V_{CC} = 3.0\text{ V}$	-	300	-	MHz
$\alpha_{\text{iso}}$	isolation (OFF-state)	$R_L = 50\text{ }\Omega; C_L = 5\text{ pF}; f_i = 10\text{ MHz};$ see Fig. 19				
		$V_{CC} = 1.65\text{ V}$	-	-42	-	dB
		$V_{CC} = 2.3\text{ V}$	-	-42	-	dB
		$V_{CC} = 3.0\text{ V}$	-	-40	-	dB
$Q_{\text{inj}}$	charge injection	$C_L = 0.1\text{ nF}; V_{\text{gen}} = 0\text{ V}; R_{\text{gen}} = 0\text{ }\Omega;$ $f_i = 1\text{ MHz}; R_L = 1\text{ M}\Omega;$ see Fig. 20				
		$V_{CC} = 1.8\text{ V}$	-	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

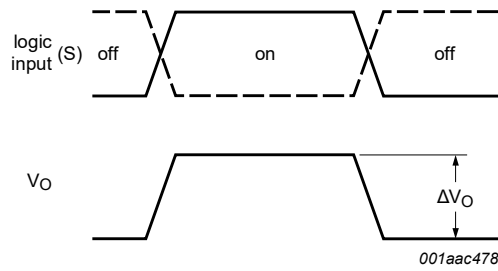


**Fig. 17. Test circuit for measuring total harmonic distortion**





a. Test circuit



b. Input and output pulse definitions

$$Q_{inj} = \Delta V_O \times C_L.$$

$\Delta V_O$  = output voltage variation.

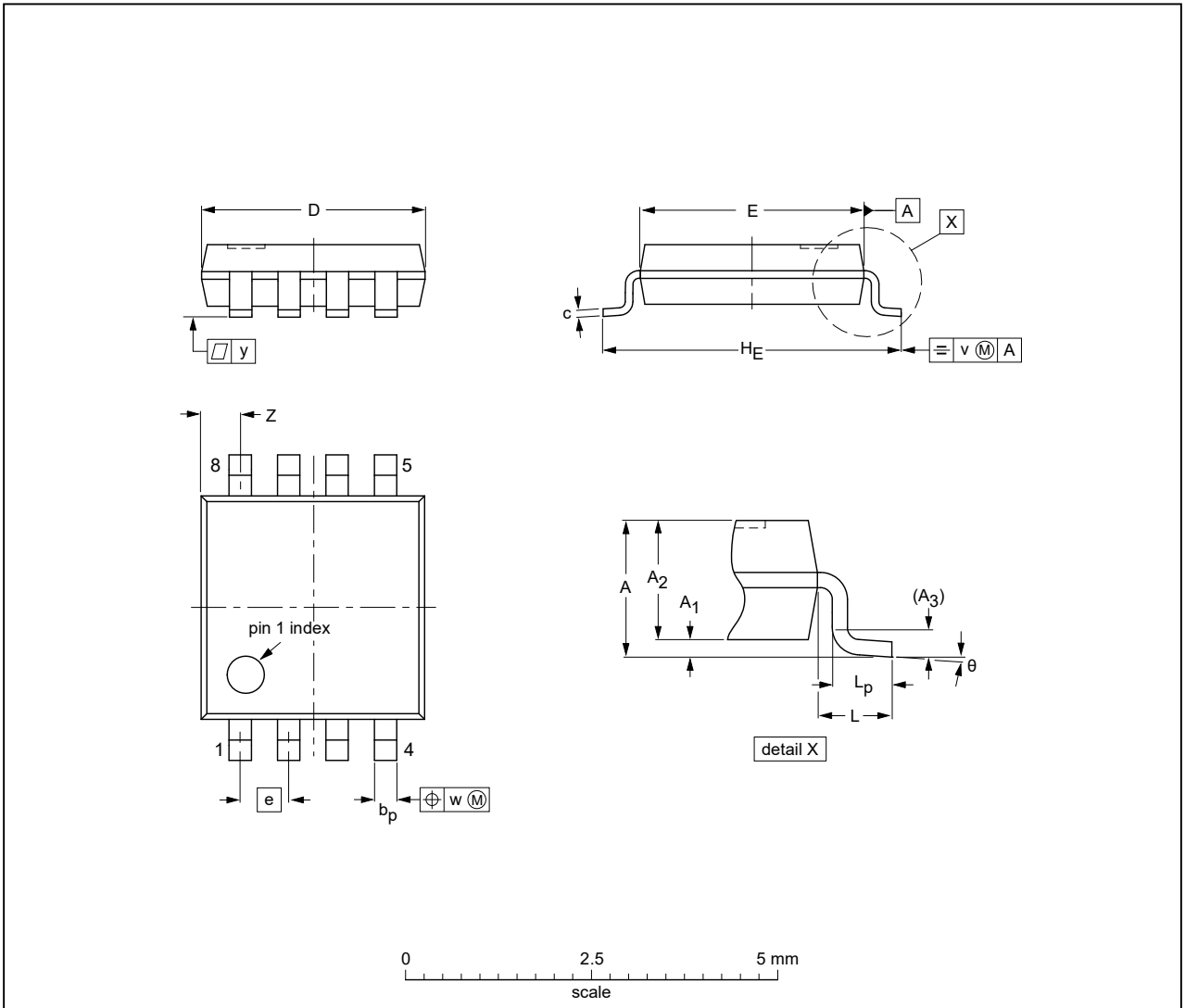
$R_{gen}$  = generator resistance.

$V_{gen}$  = generator voltage.

**Fig. 20. Test circuit for measuring charge injection**

## 12. Package outline

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



**DIMENSIONS** (mm are the original dimensions)

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	v	w	y	Z <sup>(1)</sup>	θ
mm	1.1	0.15 0.00	0.95 0.75	0.25	0.38 0.22	0.18 0.08	3.1 2.9	3.1 2.9	0.65	4.1 3.9	0.5	0.47 0.33	0.2	0.13	0.1	0.70 0.35	8° 0°

**Note**

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

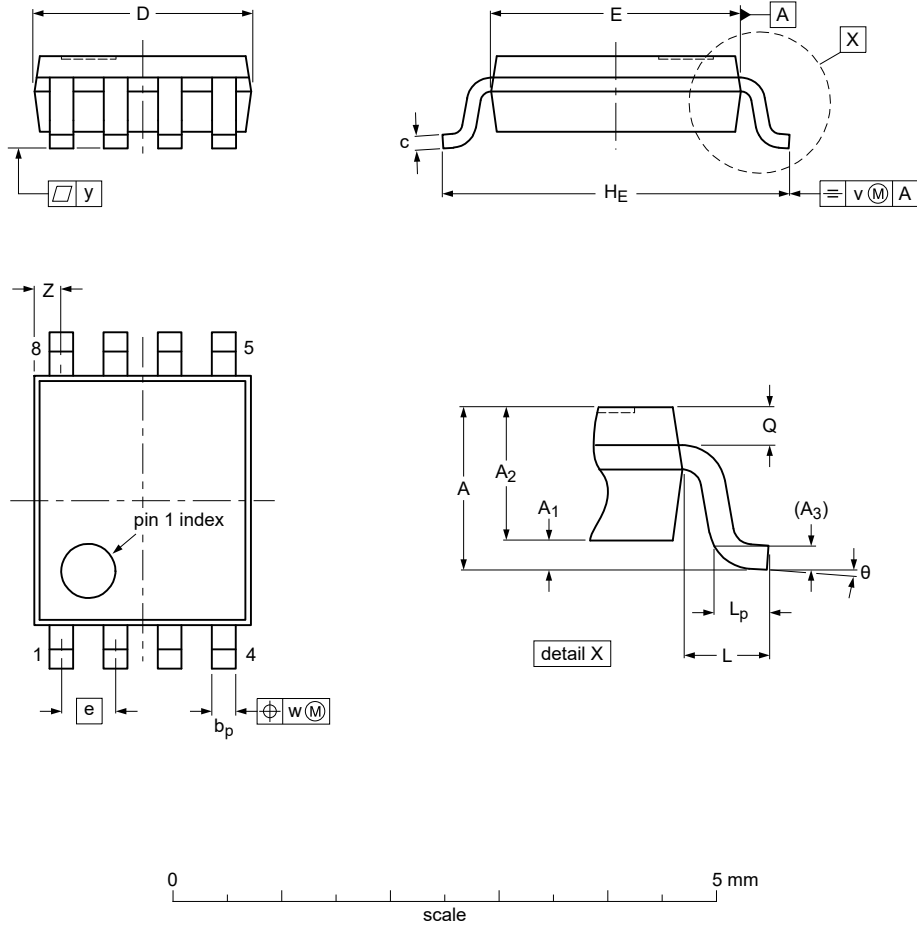
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT505-2		---				02-01-16

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



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

SOT765-1



Dimensions (mm are the original dimensions)

Unit	A <sup>A</sup> max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(2)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
max		0.15	0.85		0.27	0.23	2.1	2.4		3.2		0.40	0.21				0.4	8°
mm	nom	1		0.12					0.5		0.4			0.2	0.08	0.1		
	min		0.00	0.60	0.17	0.08	1.9	2.2		3.0		0.15	0.19				0.1	0°

Note

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

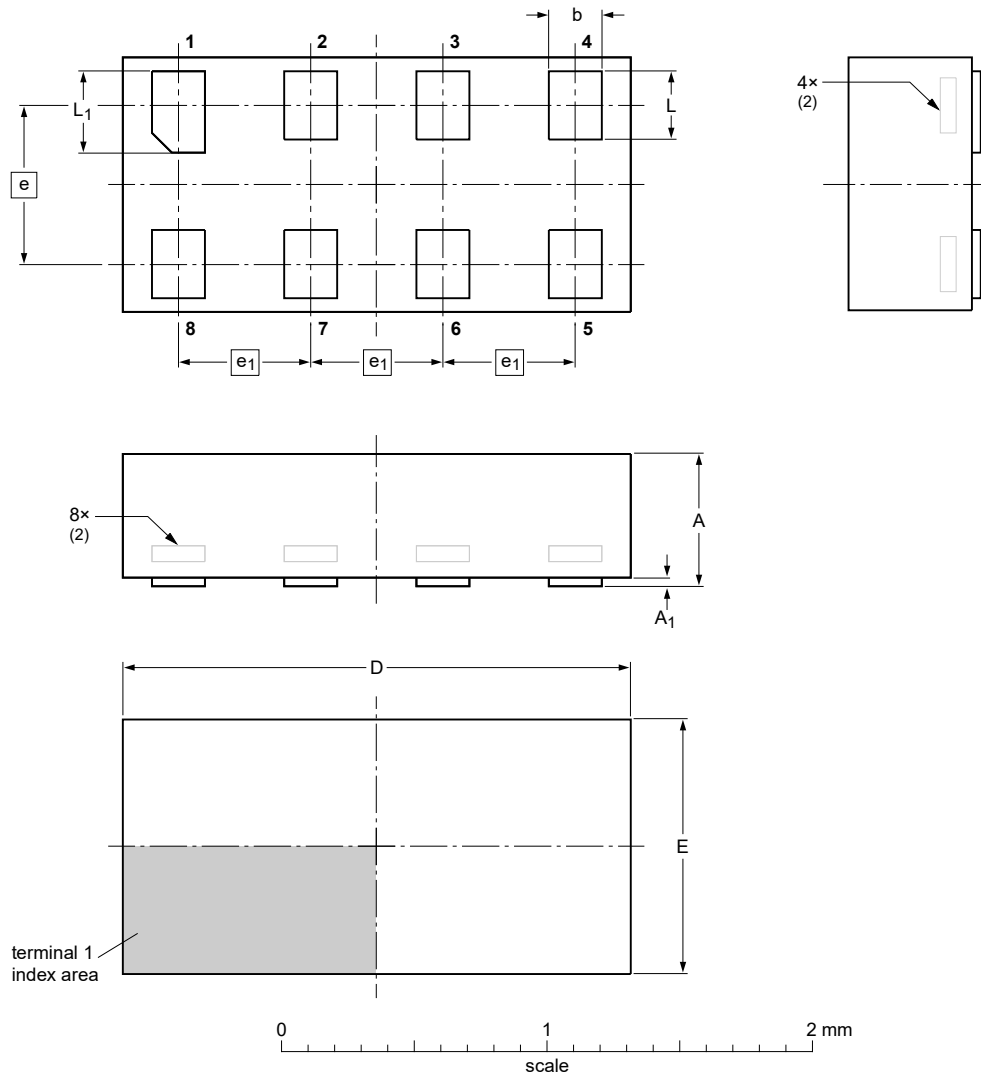
sot765-1\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT765-1		MO-187			-07-06-02-16-05-31

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

XSON8: plastic extremely thin small outline package; no leads; 8 terminals; body 1 x 1.95 x 0.5 mm

SOT833-1



**DIMENSIONS (mm are the original dimensions)**

UNIT	A <sup>(1)</sup> max	A <sub>1</sub> max	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	0.5	0.04	0.25 0.17	2.0 1.9	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

**Notes**

- Including plating thickness.
- Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT833-1	---	MO-252	---			07-11-14 07-12-07

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

XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1 x 0.5 mm

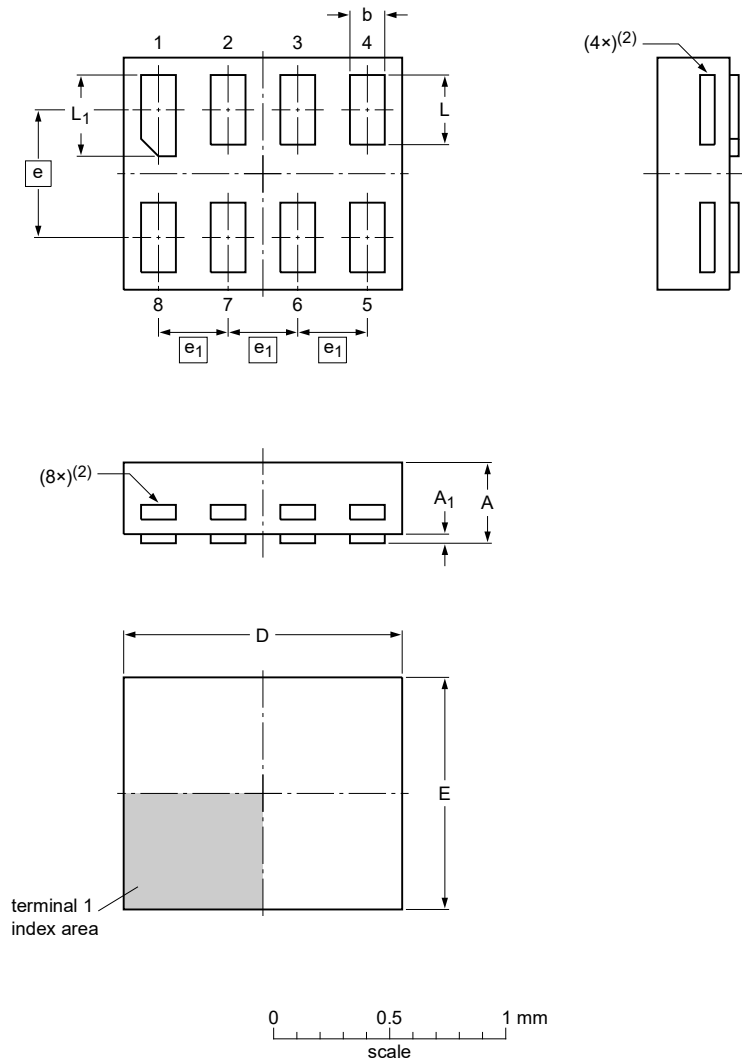
SOT1089



Fig. 24. Package outline SOT1089 (XSON8)

**XSON8: extremely thin small outline package; no leads;**  
**8 terminals; body 1.2 x 1.0 x 0.35 mm**

SOT1116



Dimensions

Unit	A <sup>(1)</sup>	A <sub>1</sub>	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	max	0.35	0.04	0.20	1.25	1.05		0.35	0.40
	nom			0.15	1.20	1.00	0.55	0.30	0.35
	min			0.12	1.15	0.95		0.27	0.32

Note

1. Including plating thickness.
2. Visible depending upon used manufacturing technology.

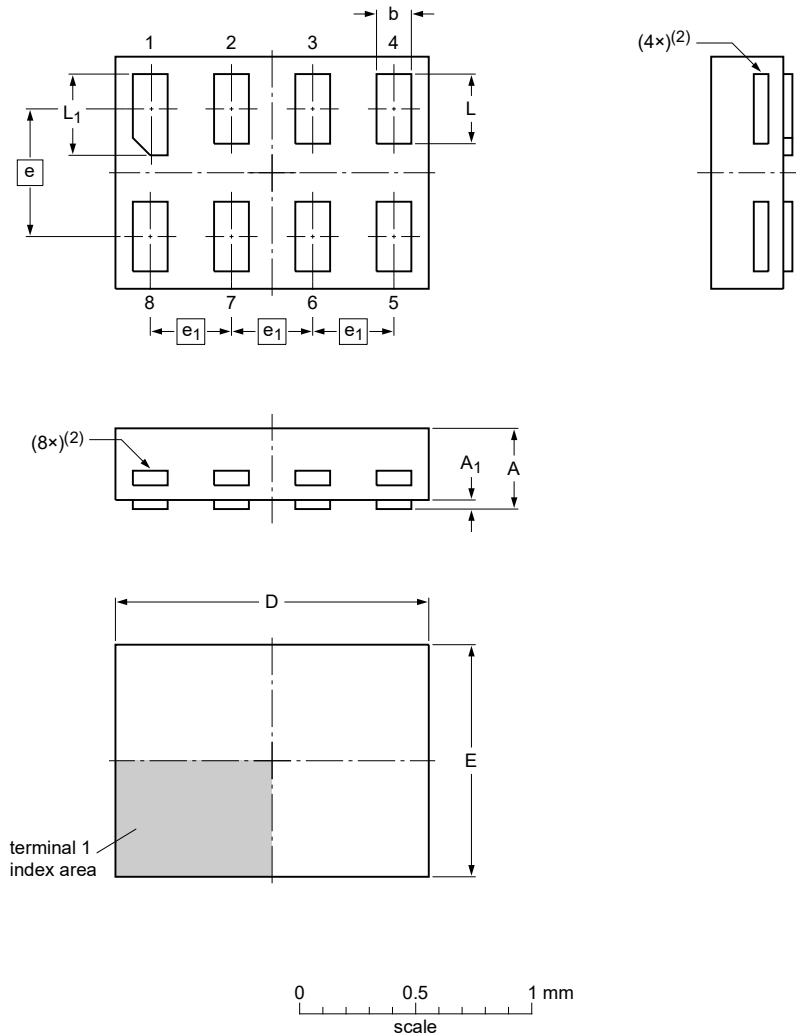
sot1116\_po

Outline version	References			European projection	Issue date
	IEC	JEDEC	JEITA		
SOT1116					-10-04-02- 10-04-07

**Fig. 25. Package outline SOT1116 (XSON8)**

**XSON8: extremely thin small outline package; no leads;  
8 terminals; body 1.35 x 1.0 x 0.35 mm**

SOT1203



Dimensions

Unit	A <sup>(1)</sup>	A <sub>1</sub>	b	D	E	e	e <sub>1</sub>	L	L <sub>1</sub>
mm	max 0.35	0.04	0.20	1.40	1.05			0.35	0.40
	nom		0.15	1.35	1.00	0.55	0.35	0.30	0.35
	min		0.12	1.30	0.95			0.27	0.32

Note

- Including plating thickness.
- Visible depending upon used manufacturing technology.

sot1203\_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT1203						-10-04-02- 10-04-06

Fig. 26. Package outline SOT1203 (XSON8)

## 13. Abbreviations

Table 13. Abbreviations

Acronym	Description
CMOS	Complementary Metal-Oxide Semiconductor
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	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
74LVC2G53 v.13	20190731	Product data sheet	-	74LVC2G53 v.12
Modifications:	<ul style="list-style-type: none"> <li>Type number 74LVC2G53GM (SOT902-2/XQFN8) removed.</li> <li><a href="#">Table 5</a>: Derating values for <math>P_{tot}</math> total power dissipation updated.</li> </ul>			
74LVC2G53 v.12	20181116	Product data sheet	-	74LVC2G53 v.11
Modifications:	<ul style="list-style-type: none"> <li>Type number 74LVC2G53GD (SOT996-2/XSON8) removed.</li> </ul>			
74LVC2G53 v.11	20170821	Product data sheet	-	74LVC2G53 v.10
Modifications:	<ul style="list-style-type: none"> <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> </ul>			
74LVC2G53 v.10	20161215	Product data sheet	-	74LVC2G53 v.9
Modifications:	<ul style="list-style-type: none"> <li><a href="#">Table 7</a>: The maximum limits for leakage current and supply current have changed.</li> </ul>			
74LVC2G53 v.9	20130405	Product data sheet	-	74LVC2G53 v.8
Modifications:	<ul style="list-style-type: none"> <li>For type number 74LVC2G53GD XSON8U has changed to XSON8.</li> </ul>			
74LVC2G53 v.8	20120622	Product data sheet	-	74LVC2G53 v.7
Modifications:	<ul style="list-style-type: none"> <li>For type number 74LVC2G53GM the SOT code has changed to SOT902-2.</li> </ul>			
74LVC2G53 v.7	20111125	Product data sheet	-	74LVC2G53 v.6
Modifications:	<ul style="list-style-type: none"> <li>Legal pages updated.</li> </ul>			
74LVC2G53 v.6	20100927	Product data sheet	-	74LVC2G53 v.5
74LVC2G53 v.5	20080618	Product data sheet	-	74LVC2G53 v.4
74LVC2G53 v.4	20080228	Product data sheet	-	74LVC2G53 v.3
74LVC2G53 v.3	20070828	Product data sheet	-	74LVC2G53 v.2
74LVC2G53 v.2	20060331	Product data sheet	-	74LVC2G53 v.1
74LVC2G53 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.

- [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 <https://www.nexperia.com>.

### 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

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 <http://www.nexperia.com/profile/terms>, 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 customer.

**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.

## Contents

---

<b>1. General description</b> .....	<b>1</b>
<b>2. Features and benefits</b> .....	<b>1</b>
<b>3. Ordering information</b> .....	<b>2</b>
<b>4. Marking</b> .....	<b>2</b>
<b>5. Functional diagram</b> .....	<b>2</b>
<b>6. Pinning information</b> .....	<b>3</b>
6.1. Pinning.....	3
6.2. Pin description.....	3
<b>7. Functional description</b> .....	<b>3</b>
<b>8. Limiting values</b> .....	<b>4</b>
<b>9. Recommended operating conditions</b> .....	<b>4</b>
<b>10. Static characteristics</b> .....	<b>5</b>
10.1. Test circuits.....	6
10.2. ON resistance.....	6
10.3. ON resistance test circuit and graphs.....	7
<b>11. Dynamic characteristics</b> .....	<b>10</b>
11.1. Waveforms and test circuits.....	11
11.2. Additional dynamic characteristics.....	13
11.3. Test circuits.....	13
<b>12. Package outline</b> .....	<b>16</b>
<b>13. Abbreviations</b> .....	<b>22</b>
<b>14. Revision history</b> .....	<b>22</b>
<b>15. Legal information</b> .....	<b>23</b>

---

© Nexperia B.V. 2019. All rights reserved

For more information, please visit: <http://www.nexperia.com>

For sales office addresses, please send an email to: [salesaddresses@nexperia.com](mailto:salesaddresses@nexperia.com)

Date of release: 31 July 2019

---





## Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331