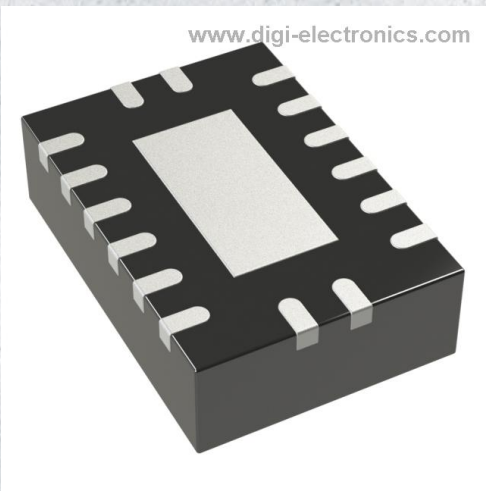
74LVC594ABQ-Q100X Datasheet



https://www.DiGi-Electronics.com

DiGi Electronics Part Number	74LVC594ABQ-Q100X-DG
Manufacturer	Nexperia USA Inc.
Manufacturer Product Number	74LVC594ABQ-Q100X
Description	IC SHIFT REGISTER 8BIT 16DHVQFN
Detailed Description	Shift Shift Register 1 Element 8 Bit 16-DHVQFN (2.5 x3.5)

Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

Purchase and inquiry

Manufacturer Product Number:	Manufacturer:
74LVC594ABQ-Q100X	Nexperia USA Inc.
Series:	Product Status:
74LVC	Active
Logic Type:	Output Type:
Shift Register	Push-Pull
Number of Elements:	Number of Bits per Element:
1	8
Function:	Voltage - Supply:
Serial to Parallel, Serial	1.65V ~ 3.6V
Operating Temperature:	Grade:
-40°C ~ 125°C	Automotive
Qualification:	Mounting Type:
AEC-Q100	Surface Mount
Package / Case:	Supplier Device Package:
16-VFQFN Exposed Pad	16-DHVQFN (2.5x3.5)
Base Product Number:	
74LVC594	

Environmental & Export classification

RoHS Status:	Moisture Sensitivity Level (MSL):
ROHS3 Compliant	1 (Unlimited)
REACH Status:	ECCN:
REACH Unaffected	EAR99
HTSUS:	
8542.39.0001	

74LVC594A-Q100

8-bit shift register with output register

Rev. 5 — 22 February 2024 Product data sheet

1. General description

The 74LVC594A-Q100 is an 8-bit serial-in/serial or parallel-out shift register with a storage register. Separate clock and reset inputs are provided on both shift and storage registers. The device features a serial input (DS) and a serial output (Q7S) to enable cascading. Data is shifted on the LOW-to-HIGH transitions of the SHCP input, and the data in the shift register is transferred to the storage register on a LOW-to-HIGH transition of the STCP input. If both clocks are connected together, the shift register will always be one clock pulse ahead of the storage register. A LOW level on one of the two register reset pins ($\overline{SHR}$ and $\overline{STR}$) will clear the corresponding register. 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 all inputs makes the circuit tolerant of slower input rise and fall times.

This device is fully specified for partial power down applications using I_{OFF}. The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

This product has been qualified to the Automotive Electronics Council (AEC) standard Q100 (Grade 1) and is suitable for use in automotive applications.

2. Features and benefits

- Automotive product qualification in accordance with AEC-Q100 (Grade 1)
  - Specified from -40 °C to +85 °C and from -40 °C to +125 °C
- Overvoltage tolerant inputs to 5.5 V
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power dissipation
- Direct interface with TTL levels
- I_{OFF} circuitry provides partial Power-down mode operation
- Balanced propagation delays
- All inputs have Schmitt-trigger action
- Complies with JEDEC standard:
  - JESD8-7A (1.65 V to 1.95 V)
  - JESD8-5A (2.3 V to 2.7 V)
  - JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
  - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
  - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- DHVQFN package with Side-Wettable Flanks enabling Automatic Optical Inspection (AOI) of solder joints

3. Applications

- Serial-to-parallel data conversion
- Remote control holding register

nexperia

4. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC594AD-Q100	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74LVC594APW-Q100	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74LVC594ABQ-Q100	-40 °C to +125 °C	DHVQFN16	plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 × 3.5 × 0.85 mm	SOT763-1

5. Functional diagram

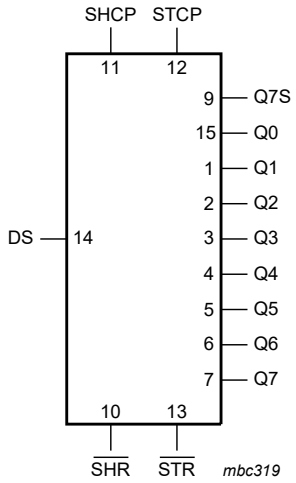


Fig. 1. Logic symbol

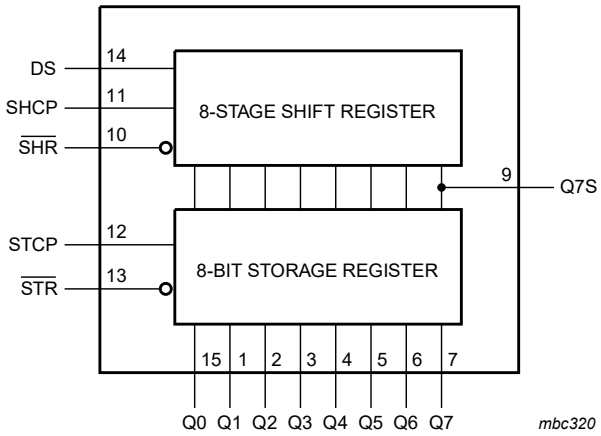


Fig. 2. Functional diagram

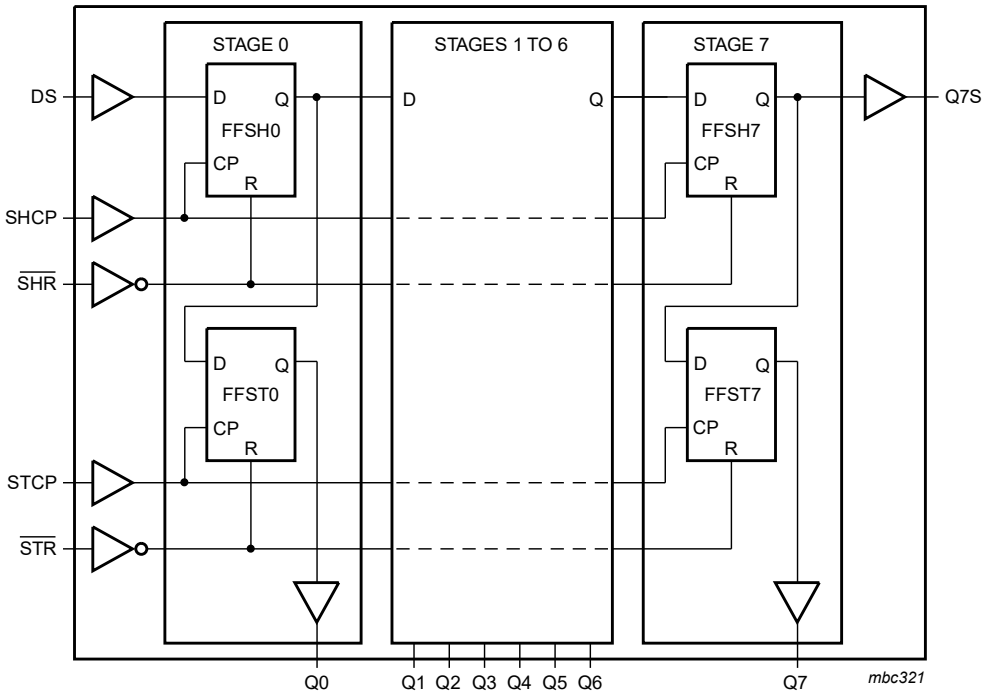


Fig. 3. Logic diagram

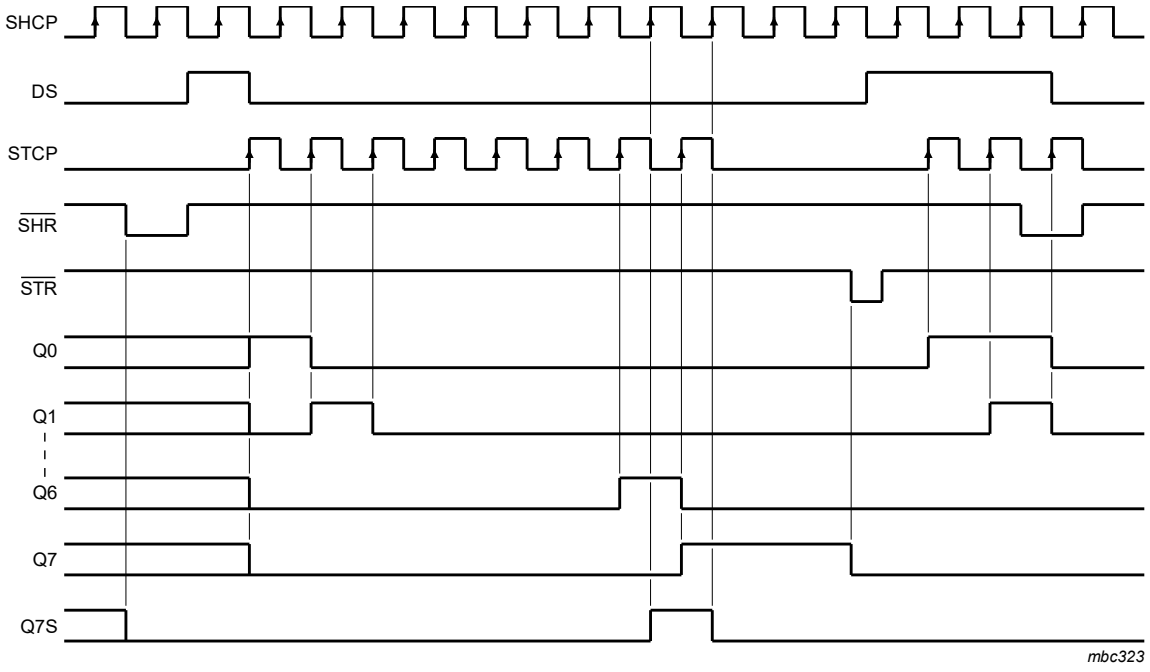


Fig. 4. Timing diagram

6. Pinning information

6.1. Pinning

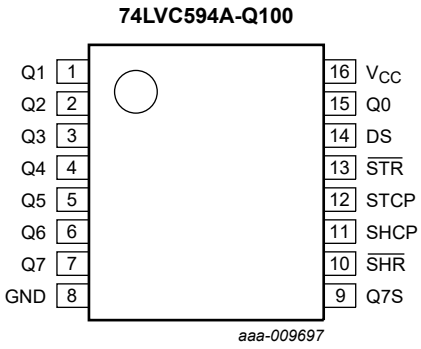
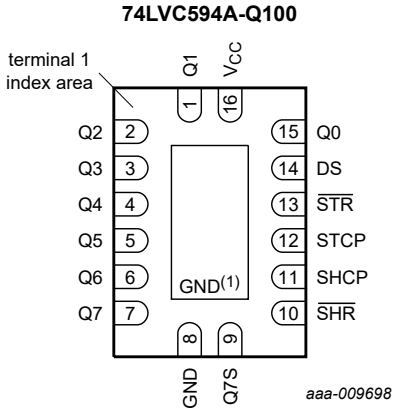


Fig. 5. Pin configuration SOT109-1 (SO16) and SOT403-1 (TSSOP16)



Transparent top view

(1) This is not a ground pin. There is no electrical or mechanical requirement to solder the pad. In case soldered, the solder land should remain floating or connected to GND.

Fig. 6. Pin configuration SOT763-1 (DHVQFN16)

6.2. Pin description

Table 2. Pin description

Symbol	Pin	Description
Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7	15, 1, 2, 3, 4, 5, 6, 7	parallel data output
GND	8	ground (0 V)
Q7S	9	serial data output
$\overline{SHR}$	10	shift register reset (active LOW)
SHCP	11	shift register clock input
STCP	12	storage register clock input
$\overline{STR}$	13	storage register reset (active LOW)
DS	14	serial data input
V_{CC}	16	supply voltage

7. Functional description

Table 3. Function table

H = HIGH voltage state; L = LOW voltage state; ↑ = LOW-to-HIGH transition; X = don't care; NC = no change

Input					Output		Function
SHCP	STCP	$\overline{SHR}$	$\overline{STR}$	DS	Q7S	Qn	
X	X	L	X	X	L	NC	a LOW-state on $\overline{SHR}$ only affects the shift register
X	X	X	L	X	NC	L	a LOW-state on $\overline{STR}$ only affects the storage register
X	↑	L	H	X	L	L	empty shift register loaded into storage register
↑	X	H	X	H	Q6S	NC	logic HIGH level shifted into shift register stage 0. Contents of all shift register stages shifted through, e.g. previous state of stage 6 (internal Q6S) appears on the serial output (Q7S)
X	↑	H	H	X	NC	QnS	contents of shift register stages (internal QnS) are transferred to the storage register and parallel output stages
↑	↑	H	H	X	Q6S	QnS	contents of shift register shifted through; previous contents of the shift register is transferred to the storage register and the parallel output stages

8. Limiting values

Table 4. 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
I_{IK}	input clamping current	$V_I < 0$ V		-50	-	mA
V_I	input voltage		[1]	-0.5	+6.5	V
I_{OK}	output clamping current	$V_O > V_{CC}$ or $V_O < 0$ V		-	±50	mA
V_O	output voltage	3-state	[1]	-0.5	6.5	V
		output HIGH or LOW state	[1]	-0.5	V_{CC} + 0.5	V
I_O	output current	V_O = 0 V to V_{CC}		-	±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 °C to +125 °C	[2]	-	500	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
[2] For SOT109-1 (SO16) package: P_{tot} derates linearly with 12.4 mW/K above 110 °C.
For SOT403-1 (TSSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.
For SOT763-1 (DHVQFN16) package: P_{tot} derates linearly with 11.2 mW/K above 106 °C.

9. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		1.65	-	3.6	V
		functional	1.2	-	-	V
V_I	input voltage		0	-	5.5	V
V_O	output voltage	3-state	0	-	5.5	V
		output HIGH or LOW state	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 V to 2.7 V	-	-	20	ns/V
		V_{CC} = 2.7 V to 3.6 V	-	-	10	ns/V

10. Static characteristics

Table 6. 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_{IH}	HIGH-level input voltage	V_{CC} = 1.2 V	1.08	-	-	1.08	-	V
		V_{CC} = 1.65 V to 1.95 V	$0.65V_{CC}$	-	-	$0.65V_{CC}$	-	V
		V_{CC} = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V_{CC} = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 1.2 V	-	-	0.12	-	0.12	V
		V_{CC} = 1.65 V to 1.95 V	-	-	$0.35V_{CC}$	-	$0.35V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V
		V_{CC} = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH} or V_{IL}						
		I_O = -100 µA; V_{CC} = 1.65 V to 3.6 V	V_{CC}-0.2	-	-	V_{CC}-0.3	-	V
		I_O = -4 mA; V_{CC} = 1.65 V	1.2	-	-	1.05	-	V
		I_O = -8 mA; V_{CC} = 2.3 V	1.8	-	-	1.65	-	V
		I_O = -12 mA; V_{CC} = 2.7 V	2.2	-	-	2.05	-	V
		I_O = -18 mA; V_{CC} = 3.0 V	2.4	-	-	2.25	-	V
		I_O = -24 mA; V_{CC} = 3.0 V	2.2	-	-	2.0	-	V
V_{OL}	LOW-level output voltage	V_I = V_{IH} or V_{IL}						
		I_O = 100 µA; V_{CC} = 1.65 V to 3.6 V	-	-	0.2	-	0.3	V
		I_O = 4 mA; V_{CC} = 1.65 V	-	-	0.45	-	0.65	V
		I_O = 8 mA; V_{CC} = 2.3 V	-	-	0.6	-	0.8	V
		I_O = 12 mA; V_{CC} = 2.7 V	-	-	0.4	-	0.6	V
		I_O = 24 mA; V_{CC} = 3.0 V	-	-	0.55	-	0.8	V

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
I_I	input leakage current	V_{CC} = 3.6 V; V_I = 5.5 V or GND	-	±0.1	±5	-	±20	µA
I_{OFF}	power-off leakage current	V_{CC} = 0 V; V_I or V_O = 5.5 V	-	0.1	10	-	20	µA
I_{CC}	supply current	V_{CC} = 3.6 V; V_I = V_{CC} or GND; I_O = 0 A	-	0.1	10	-	40	µA
ΔI_{CC}	additional supply current	per input pin; V_{CC} = 1.65 V to 3.6 V; V_I = V_{CC} - 0.6 V; I_O = 0 A	-	5	500	-	5000	µA
C_I	input capacitance	V_{CC} = 0 V to 3.6 V; V_I = GND to V_{CC}	-	5.0	-	-	-	pF

[1] All typical values are measured at V_{CC} = 3.3 V (unless stated otherwise) and T_{amb} = 25 °C.

11. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 13.

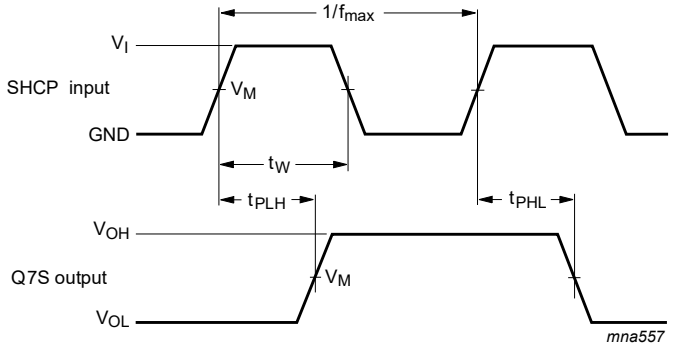
Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_{pd}	propagation delay	SHCP to Q7S; see Fig. 7 [2] [3]						
		V_{CC} = 1.2 V	-	17.5	-	-	-	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	5.2	15.8	2.0	18.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	3.2	8.1	1.5	9.3	ns
		V_{CC} = 2.7 V	1.5	3.5	7.6	1.5	8.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.5	3.1	6.7	1.5	7.7	ns
		STCP to Qn; see Fig. 8 [2]						
		V_{CC} = 1.2 V	-	19.3	-	-	-	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	7.6	15.8	2.0	18.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	4.8	8.1	1.5	9.3	ns
		V_{CC} = 2.7 V	1.5	5.2	7.6	1.5	8.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.2	4.5	6.7	1.2	7.7	ns
t_{PHL}	HIGH to LOW propagation delay	$\overline{SHR}$ to Q7S; see Fig. 11						
		V_{CC} = 1.2 V	-	12.0	-	-	-	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	5.0	15.8	2.0	18.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	3.8	8.1	1.5	9.3	ns
		V_{CC} = 2.7 V	1.2	3.9	7.6	1.2	8.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.2	3.3	6.7	1.2	7.7	ns
		$\overline{STR}$ to Qn; see Fig. 12						
		V_{CC} = 1.2 V	-	20.0	-	-	-	ns
		V_{CC} = 1.65 V to 1.95 V	2.0	7.7	15.8	2.0	18.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	5.0	8.1	1.5	9.3	ns
		V_{CC} = 2.7 V	1.2	5.3	7.6	1.2	8.7	ns
		V_{CC} = 3.0 V to 3.6 V	1.2	4.4	6.7	1.2	7.7	ns

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
t_W	pulse width	SHCP, STCP HIGH or LOW; see Fig. 7 and Fig. 8						
		V_{CC} = 1.65 V to 1.95 V	6.0	2.5	-	7.0	-	ns
		V_{CC} = 2.3 V to 2.7 V	5.0	2.0	-	5.5	-	ns
		V_{CC} = 2.7 V	4.5	1.5	-	5.0	-	ns
		V_{CC} = 3.0 V to 3.6 V	4.0	1.5	-	4.5	-	ns
		$\overline{SHR}$, $\overline{STR}$ LOW; see Fig. 11 and Fig. 12						
		V_{CC} = 1.65 V to 1.95 V	6.0	2.5	-	5.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	4.0	2.0	-	4.5	-	ns
		V_{CC} = 2.7 V	2.5	1.5	-	3.0	-	ns
		V_{CC} = 3.0 V to 3.6 V	2.5	1.5	-	3.0	-	ns
t_{su}	set-up time	DS to SHCP; see Fig. 9						
		V_{CC} = 1.65 V to 1.95 V	5.0	1.0	-	5.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	4.0	0.8	-	4.5	-	ns
		V_{CC} = 2.7 V	2.0	0.6	-	2.5	-	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	0.6	-	2.5	-	ns
		$\overline{SHR}$ to STCP; see Fig. 10						
		V_{CC} = 1.65 V to 1.95 V	8.0	3.5	-	8.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	5.0	2.1	-	5.5	-	ns
		V_{CC} = 2.7 V	4.0	1.8	-	4.5	-	ns
		V_{CC} = 3.0 V to 3.6 V	4.0	1.7	-	4.5	-	ns
		SHCP to STCP; see Fig. 8						
		V_{CC} = 1.65 V to 1.95 V	8.0	3.5	-	8.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	5.0	2.1	-	5.5	-	ns
		V_{CC} = 2.7 V	4.0	1.8	-	4.5	-	ns
		V_{CC} = 3.0 V to 3.6 V	4.0	1.7	-	4.5	-	ns
t_h	hold time	DS to SHCP; see Fig. 9 [3]						
		V_{CC} = 1.65 V to 1.95 V	1.5	0.2	-	2.0	-	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	0.1	-	2.0	-	ns
		V_{CC} = 2.7 V	1.5	-0.1	-	2.0	-	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	-0.2	-	1.5	-	ns
t_{rec}	recovery time	$\overline{SHR}$ to SHCP, $\overline{STR}$ to STCP; see Fig. 11 and Fig. 12						
		V_{CC} = 1.65 V to 1.95 V	5.0	-2.7	-	5.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	4.0	-1.5	-	4.5	-	ns
		V_{CC} = 2.7 V	2.0	-1.0	-	2.5	-	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	-1.0	-	2.5	-	ns
f_{max}	maximum frequency	SHCP or STCP; see Fig. 7 and Fig. 8						
		V_{CC} = 1.65 V to 1.95 V	80	130	-	70	-	MHz
		V_{CC} = 2.3 V to 2.7 V	100	140	-	90	-	MHz
		V_{CC} = 2.7 V	110	150	-	100	-	MHz
		V_{CC} = 3.0 V to 3.6 V	130	180	-	115	-	MHz

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	
$t_{sk(o)}$	output skew time	V_{CC} = 3.0 V to 3.6 V [4]	-	-	1.0	-	1.5	ns
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC} [5]						
		V_{CC} = 1.65 V to 1.95 V	-	50	-	-	-	pF
		V_{CC} = 2.3 V to 2.7 V	-	45	-	-	-	pF
		V_{CC} = 3.0 V to 3.6 V	-	44	-	-	-	pF

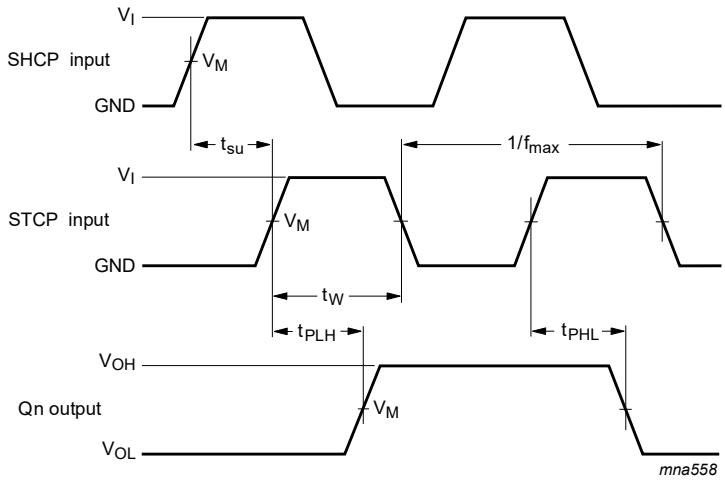
[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.8 V, 2.5 V, 2.7 V, and 3.3 V respectively.
[2] t_{pd} is the same as t_{PLH} and t_{PHL}.
[3] Cascadability is guaranteed under identical V_{CC} and temperature conditions.
[4] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.
[5] C_{PD} is used to determine the dynamic power dissipation (P_D in µW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$ where:
f_i = input frequency in MHz;
f_o = output frequency in MHz;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V;
N = number of inputs switching;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

11.1. Waveforms and test circuit



Measurement points are given in Table 8.
V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

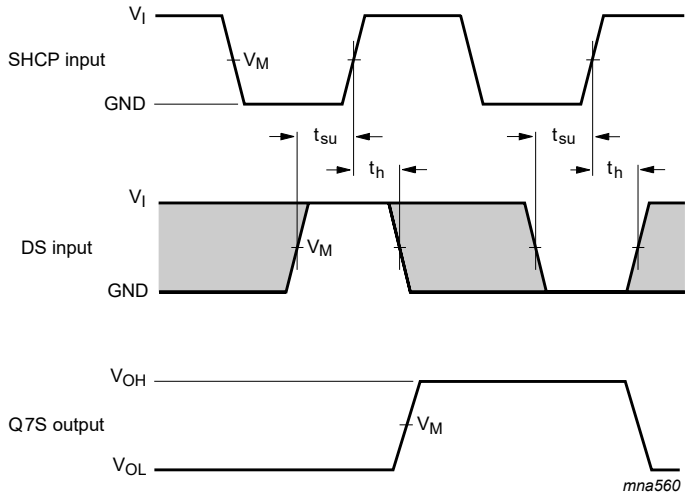
Fig. 7. The shift clock (SHCP) to serial data output (Q7S) propagation delays, the shift clock pulse width and maximum shift clock frequency



Measurement points are given in Table 8.

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

Fig. 8. The storage clock (STCP) to parallel data output (Qn) propagation delays, the storage clock pulse width and the shift clock to storage clock set-up time

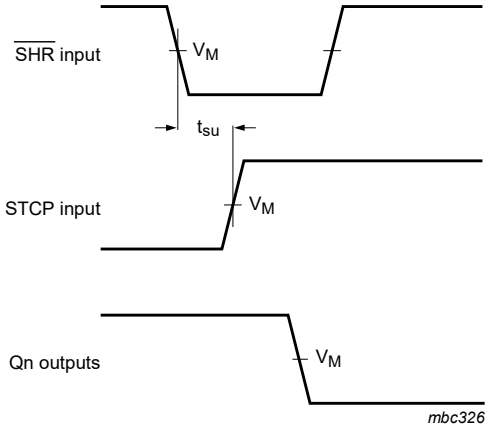


Measurement points are given in Table 8.

The shaded areas indicate when the input is permitted to change for predictable output performance.

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

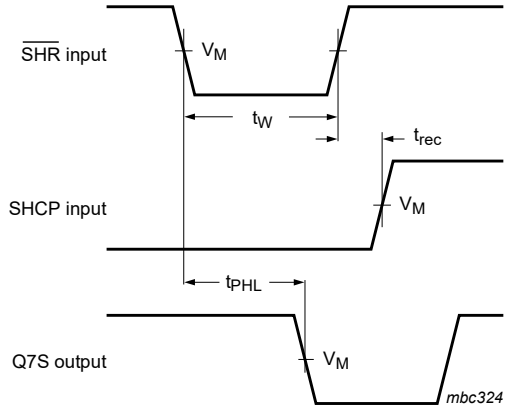
Fig. 9. The data set-up and hold times for the serial data input (DS)



Measurement points are given in Table 8.

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

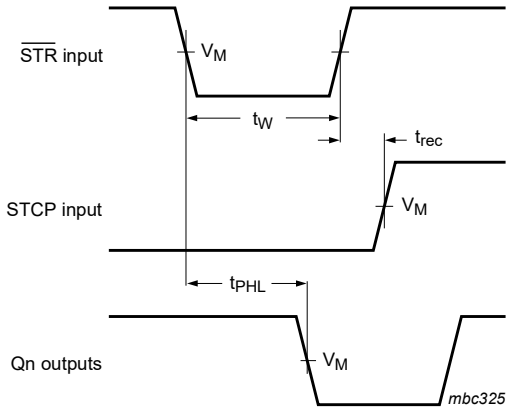
Fig. 10. The shift reset ($\overline{SHR}$) to storage clock (STCP) set-up times



Measurement points are given in Table 8.

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

Fig. 11. The shift reset ($\overline{SHR}$) pulse width, the shift reset to serial data output (Q7S) propagation delays and the shift reset to shift clock (SHCP) recovery time



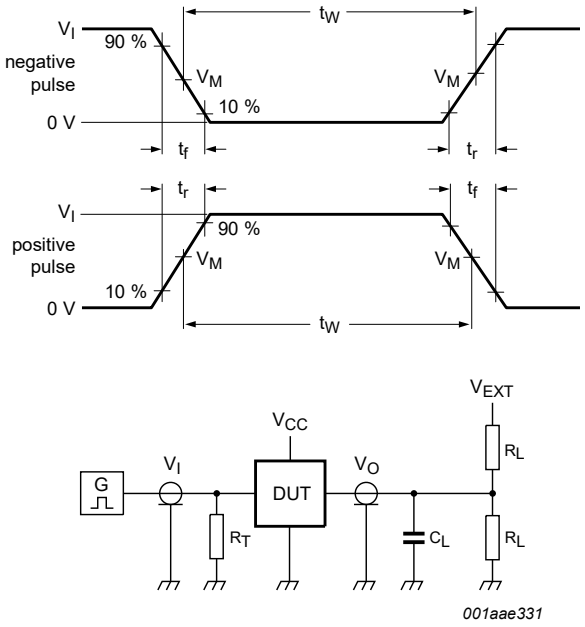
Measurement points are given in Table 8.

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

Fig. 12. The storage reset ($\overline{STR}$) pulse width, the storage reset to parallel data output (Qn) propagation delays and the storage reset to storage clock (STCP) recovery time

Table 8. Measurement points

Supply voltage	Input	Output
V_{CC}	V_M	V_M
V_{CC} < 2.7 V	0.5 x V_{CC}	0.5 x V_{CC}
V_{CC} ≥ 2.7 V	1.5 V	1.5 V



Test data is given in Table 9. 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} = External voltage for measuring switching times.

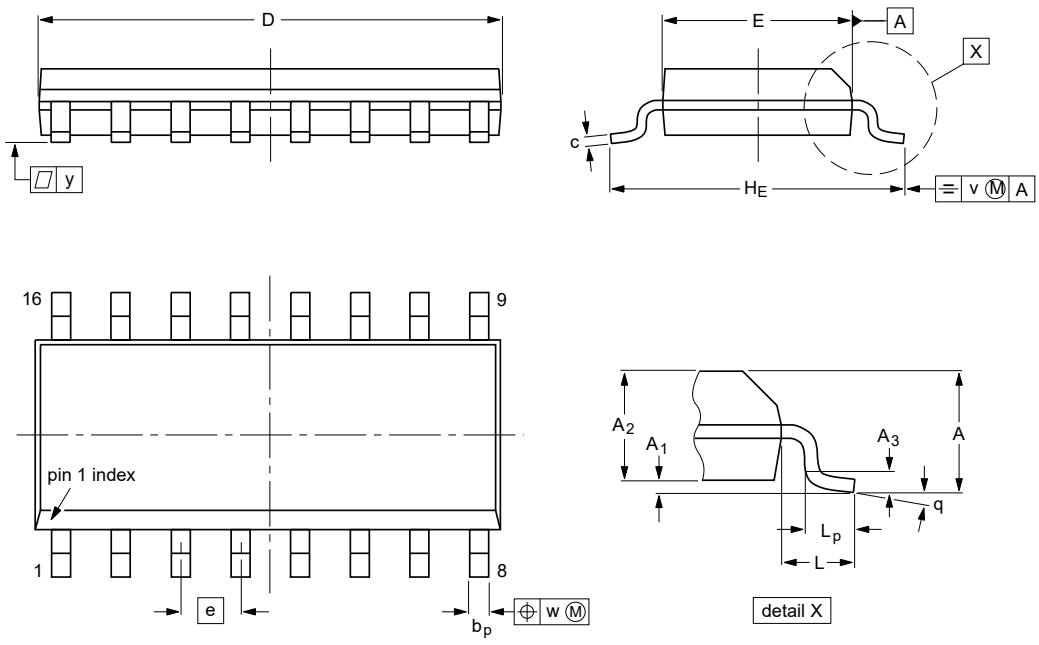
Fig. 13. Test circuit for measuring switching times

Table 9. Test data

Supply voltage	Input		Load		V_{EXT}		
	V_I	t_r, t_f	C_L	R_L	t_{PLH}, t_{PHL}	t_{PLZ}, t_{PZL}	t_{PHZ}, t_{PZH}
1.2 V	V_{CC}	≤ 2 ns	30 pF	1 kΩ	open	2 x V_{CC}	GND
1.65 V to 1.95 V	V_{CC}	≤ 2 ns	30 pF	1 kΩ	open	2 x V_{CC}	GND
2.3 V to 2.7 V	V_{CC}	≤ 2 ns	30 pF	500 Ω	open	2 x V_{CC}	GND
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	2 x V_{CC}	GND
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	2 x V_{CC}	GND

12. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm **SOT109-1**



Dimensions (inch dimensions are derived from the original mm dimensions)

Unit		A	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	v	w	y	θ
mm	max	1.75	0.25			0.51	0.25	10.0	4.0		6.2		1.27				8°
	nom				0.25					1.27		1.05		0.2	0.25	0.1	
	min		0.10	1.25		0.31	0.10	9.8	3.8		5.8		0.4				0°
inches	max	0.069	0.010			0.020	0.010	0.394	0.16		0.244		0.05				8°
	nom				0.01					0.05		0.041		0.008	0.01	0.004	
	min		0.004	0.049		0.012	0.004	0.386	0.15		0.228		0.016				0°

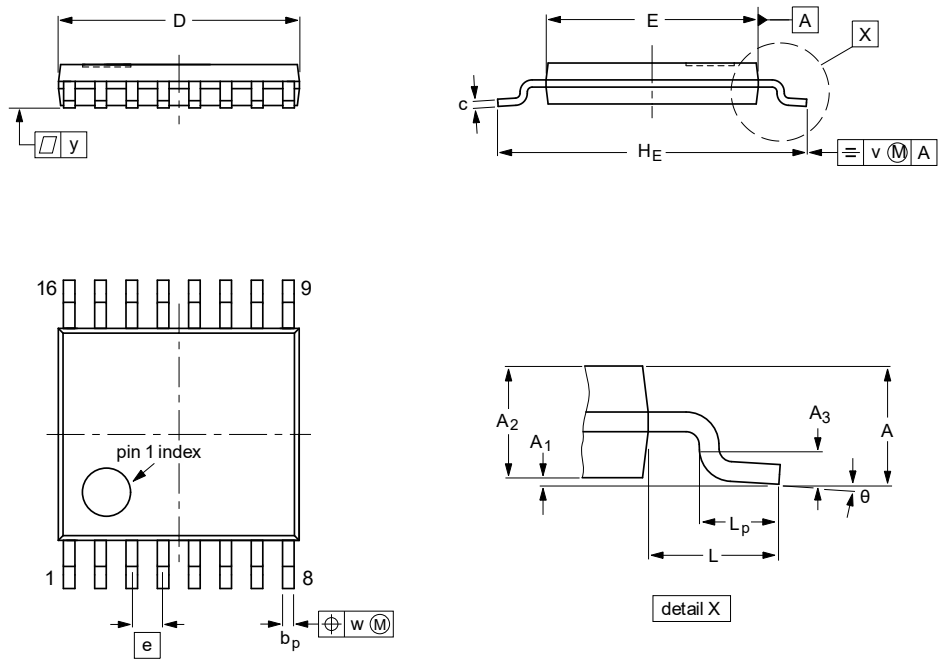
Note
1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

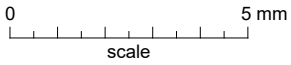
sot109-1_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT109-1		MS-012				~~03-02-19~~ 23-10-27

Fig. 14. Package outline SOT109-1 (SO16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm **SOT403-1**





Dimensions (mm are the original dimensions)

Unit		A	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(2)}$	e	H_E	L	L_p	v	w	y	θ
mm	max	1.20	0.15	1.05		0.30	0.2	5.1	4.5		6.6		0.75				8°
	nom				0.25					0.65		1		0.2	0.1	0.1	
	min		0.05	0.80		0.19	0.09	4.9	4.3		6.2		0.45				0°

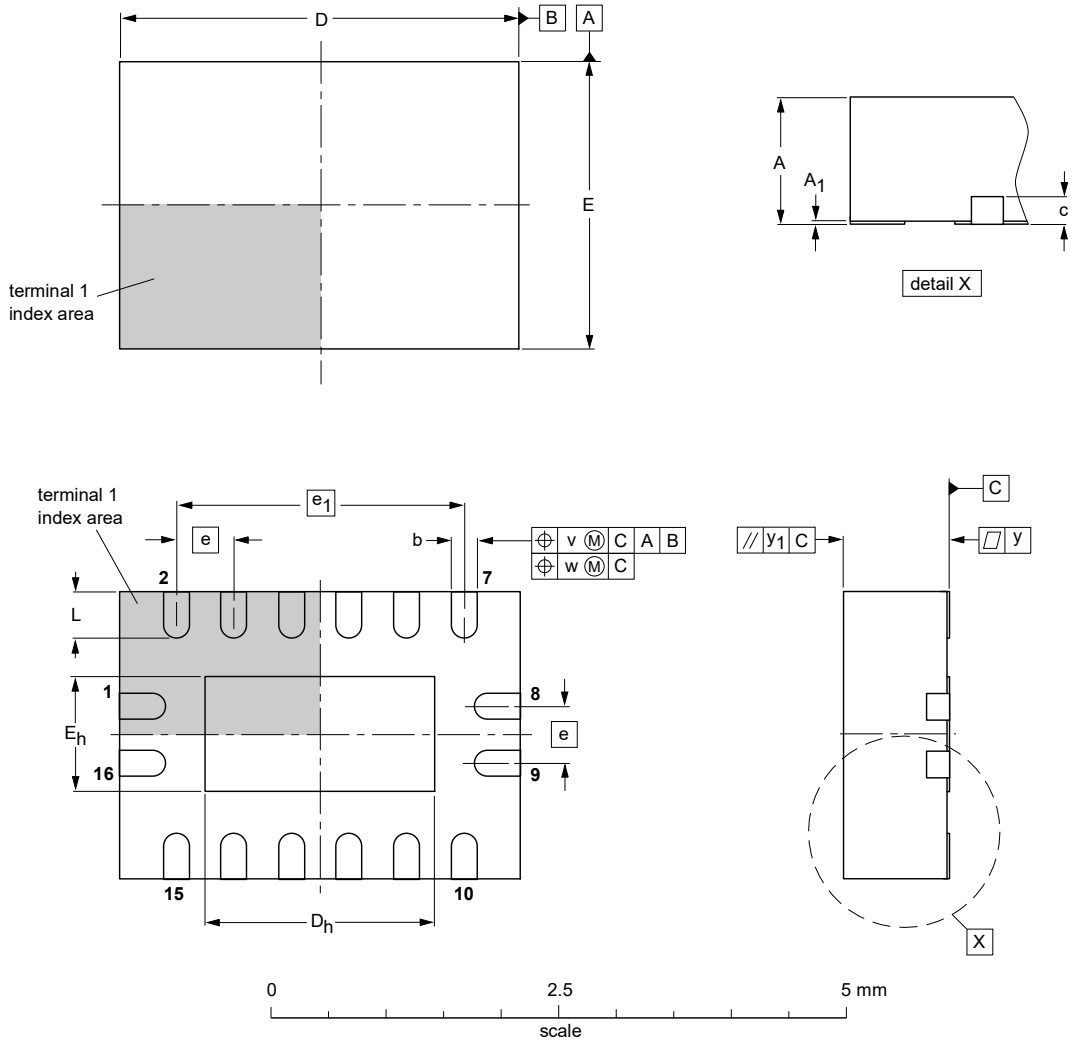
Note
1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

sot403-1_po

Outline version	References				European projection	Issue date
	IEC	JEDEC	JEITA			
SOT403-1		MO-153				~~03-02-18~~ 23-10-27

Fig. 15. Package outline SOT403-1 (TSSOP16)

DHVQFN16: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 x 3.5 x 0.85 mm **SOT763-1**



DIMENSIONS (mm are the original dimensions)

UNIT	$A^{(1)}$ max.	A_1	b	c	$D^{(1)}$	D_h	$E^{(1)}$	E_h	e	e_1	L	v	w	y	y_1
mm	1	0.05 0.00	0.30 0.18	0.2	3.6 3.4	2.15 1.85	2.6 2.4	1.15 0.85	0.5	2.5	0.5 0.3	0.1	0.05	0.05	0.1

Note

1. Plastic or metal protrusions of 0.075 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT763-1	- - -	MO-241	- - -			~~02-10-17~~ 03-01-27

Fig. 16. Package outline SOT763-1 (DHVQFN16)

13. Abbreviations

Table 10. Abbreviations

Acronym	Description
CDM	Charged Device Model
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
TTL	Transistor-Transistor Logic

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC594A_Q100 v.5	20240222	Product data sheet	-	74LVC594A_Q100 v.4
Modifications:	• Fig. 14, Fig. 15: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153.			
74LVC594A_Q100 v.4	20230824	Product data sheet	-	74LVC594A_Q100 v.3
Modifications:	• Section 2: ESD specification updated according to the latest JEDEC standard.			
74LVC594A_Q100 v.3	20200903	Product data sheet	-	74LVC594A_Q100 v.2
Modifications:	• Section 1 and Section 2 updated. • Table 4: Derating values for P_{tot} total power dissipation updated.			
74LVC594A_Q100 v.2	20170721	Product data sheet	-	74LVC594A_Q100 v.1
Modifications:	• The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Section 11: table note added for cascading purposes.			
74LVC594A_Q100 v.1	20131115	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.

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