

74AHC594; 74AHCT594

8-bit shift register with output register

Rev. 4 — 7 July 2021

Product data sheet

1. General description

The 74AHC594; 74AHCT594 is a high-speed Si-gate CMOS device and is pin compatible with Low-Power Schottky TTL (LSTTL). It is specified in compliance with JEDEC standard No. 7-A.

The 74AHC594; 74AHCT594 is an 8-bit, non-inverting, serial-in, parallel-out shift register that feeds an 8-bit D-type storage register. Separate clocks (SHCP and STCP) and direct overriding clears (SHR and STR) are provided on both the shift and storage registers. A serial output (Q7S) is provided for cascading purposes.

Both the shift and storage register clocks are positive-edge triggered. If the user wishes to connect both clocks together, the shift register will always be one count pulse ahead of the storage register.

2. Features and benefits

- Wide supply voltage range from 2.0 V to 5.5 V
- Balanced propagation delays
- All inputs have Schmitt-trigger action
- Overvoltage tolerant inputs to 5.5 V
- High noise immunity
- CMOS low power dissipation
- 8-bit serial-in, parallel-out shift register with storage
- Independent direct overriding clears on shift and storage registers
- Independent clocks for shift and storage registers
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level A
- Input levels:
 - For 74AHC594: CMOS level
 - For 74AHCT594: TTL level
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
 - CDM JESD22-C101E exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C

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
74AHC594D	-40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74AHCT594D				
74AHC594PW	-40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74AHCT594PW				
74AHC594BQ	-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
74AHCT594BQ				

5. Functional diagram

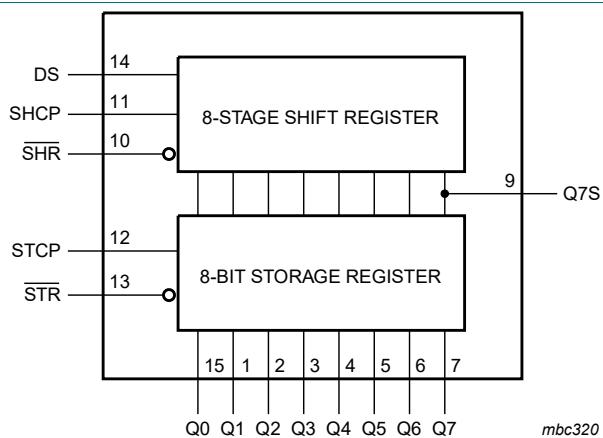


Fig. 1. Functional diagram

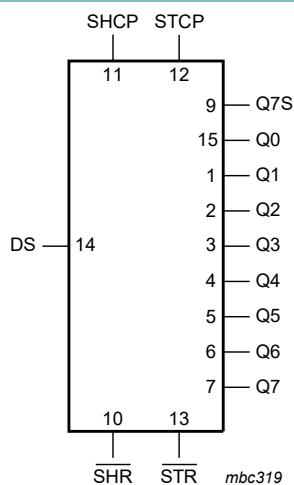


Fig. 2. Logic symbol

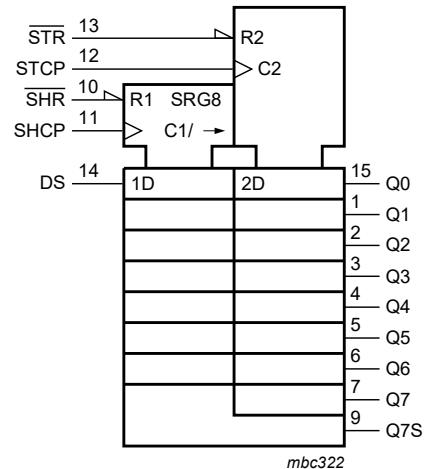


Fig. 3. IEC logic symbol

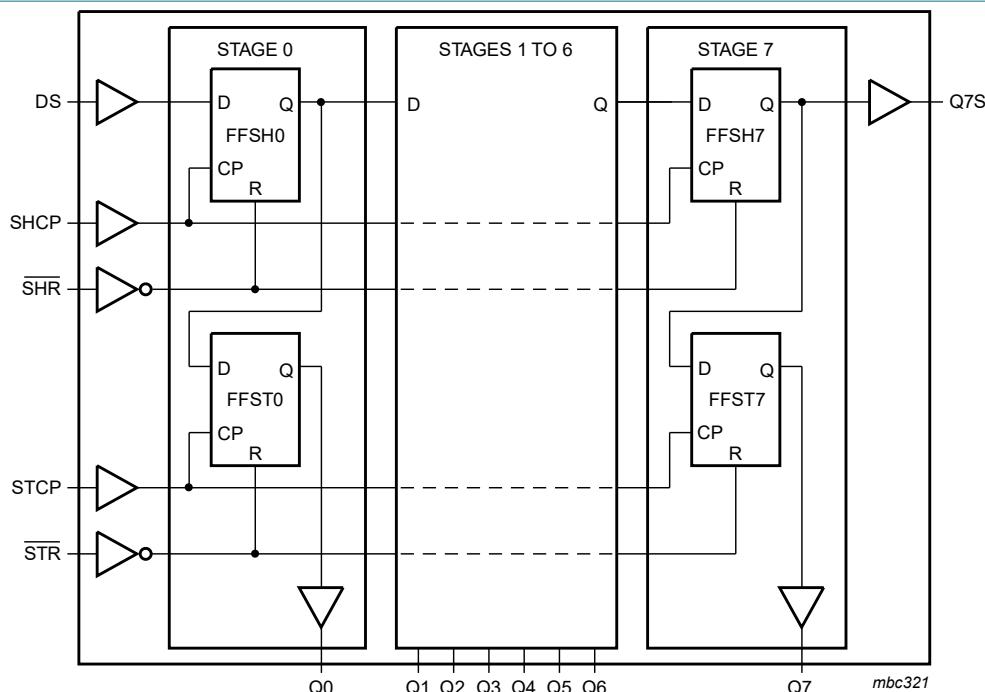


Fig. 4. Logic diagram

6. Pinning information

6.1. Pinning

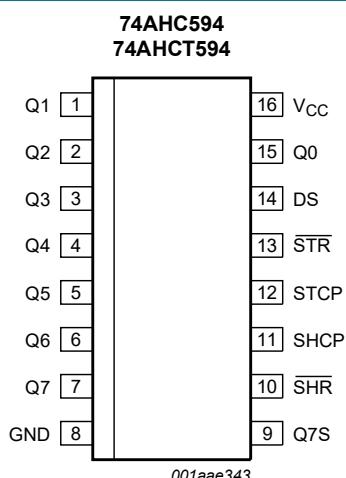


Fig. 5. Pin configuration SOT109-1 (SO16)

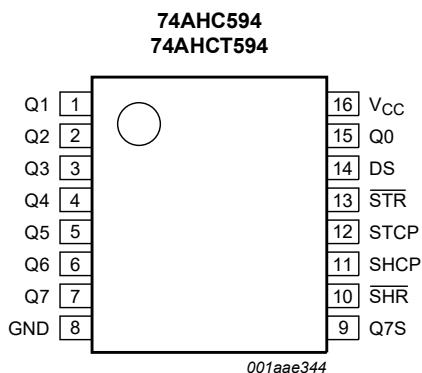
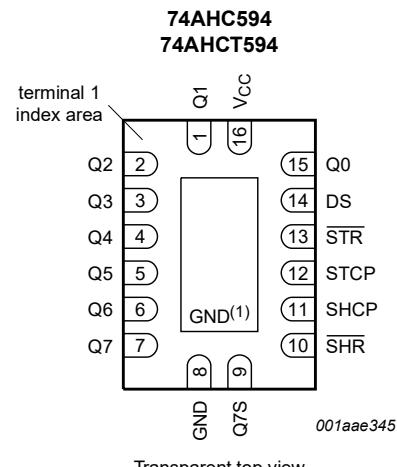


Fig. 6. Pin configuration SOT403-1 (TSSOP16)



(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. 7. 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
SHR	10	shift register reset input (active LOW)
SHCP	11	shift register clock input
STCP	12	storage register clock input
STR	13	storage register reset input (active LOW)
DS	14	serial data input
V _{CC}	16	supply voltage

7. Functional description

Table 3. Function table

$H = \text{HIGH voltage state}$; $L = \text{LOW voltage state}$; $\uparrow = \text{LOW to HIGH transition}$; $X = \text{don't care}$; $\text{NC} = \text{no change}$.

Input					Output		Function
SHCP	STCP	SHR	STR	DS	Q7S	Qn	
X	X	L	X	X	L	NC	a LOW-state on SHR only affects the shift register
X	X	X	L	X	NC	L	a LOW-state on 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

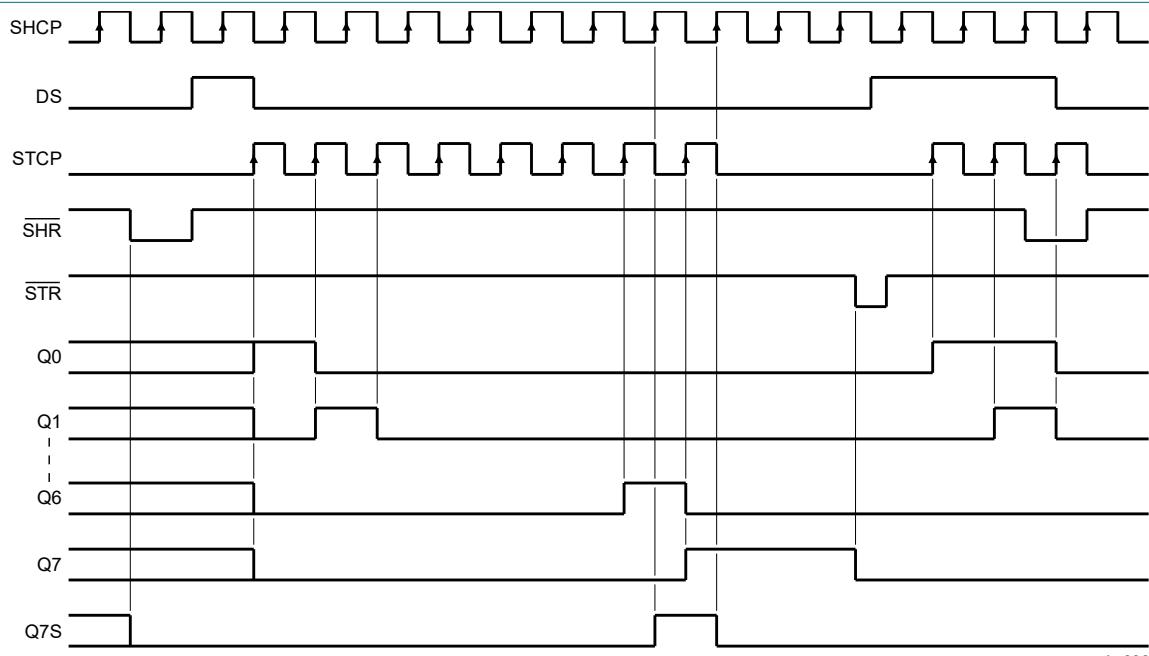


Fig. 8. Timing diagram

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	+7.0	V
V_I	input voltage		-0.5	+7.0	V
I_{IK}	input clamping current	$V_I < -0.5 \text{ V}$ [1]	-20	-	mA
I_{OK}	output clamping current	$V_O < -0.5 \text{ V}$ or $V_O > V_{CC} + 0.5 \text{ V}$ [1]	-20	+20	mA
I_O	output current	$V_O = -0.5 \text{ V}$ to $(V_{CC} + 0.5 \text{ V})$	-25	+25	mA
I_{CC}	supply current		-	+75	mA
I_{GND}	ground current		-75	-	mA
T_{stg}	storage temperature		-65	+150	°C
P_{tot}	total power dissipation	$T_{amb} = -40 \text{ °C}$ to $+125 \text{ °C}$ [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. Operating conditions

Symbol	Parameter	Conditions	74AHC594			74AHCT594			Unit
			Min	Typ	Max	Min	Typ	Max	
V_{CC}	supply voltage		2.0	5.0	5.5	4.5	5.0	5.5	V
V_I	input voltage		0	-	5.5	0	-	5.5	V
V_O	output voltage		0	-	V_{CC}	0	-	V_{CC}	V
T_{amb}	ambient temperature		-40	+25	+125	-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 3.0 \text{ V}$ to 3.6 V	-	-	100	-	-	-	ns/V
		$V_{CC} = 4.5 \text{ V}$ to 5.5 V	-	-	20	-	-	20	ns/V

10. Static characteristics

Table 6. Static characteristics

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

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74AHC594										
V _{IH}	HIGH-level input voltage	V _{CC} = 2.0 V	1.5	-	-	1.5	-	1.5	-	V
		V _{CC} = 3.0 V	2.1	-	-	2.1	-	2.1	-	V
		V _{CC} = 5.5 V	3.85	-	-	3.85	-	3.85	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 2.0 V	-	-	0.5	-	0.5	-	0.5	V
		V _{CC} = 3.0 V	-	-	0.9	-	0.9	-	0.9	V
		V _{CC} = 5.5 V	-	-	1.65	-	1.65	-	1.65	V
V _{OH}	HIGH-level output voltage	V _I = V _{IH} or V _{IL}								
		I _O = -50 µA; V _{CC} = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I _O = -50 µA; V _{CC} = 3.0 V	2.9	3.0	-	2.9	-	2.9	-	V
		I _O = -50 µA; V _{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I _O = -4.0 mA; V _{CC} = 3.0 V	2.58	-	-	2.48	-	2.40	-	V
		I _O = -8.0 mA; V _{CC} = 4.5 V	3.94	-	-	3.80	-	3.70	-	V
V _{OL}	LOW-level output voltage	V _I = V _{IH} or V _{IL}								
		I _O = 50 µA; V _{CC} = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 50 µA; V _{CC} = 3.0 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 50 µA; V _{CC} = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I _O = 4 mA; V _{CC} = 3.0 V	-	-	0.36	-	0.44	-	0.55	V
		I _O = 8 mA; V _{CC} = 4.5 V	-	-	0.36	-	0.44	-	0.55	V
I _I	input leakage current	V _I = 5.5 V or GND; V _{CC} = 0 V to 5.5 V	-	-	0.1	-	1.0	-	2.0	µA
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V	-	-	4.0	-	40	-	80	µA
C _I	input capacitance	V _I = V _{CC} or GND	-	3	10	-	10	-	10	pF

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74AHCT594										
V_{IH}	HIGH-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	2.0	-	-	2.0	-	2.0	-	V
V_{IL}	LOW-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	0.8	-	0.8	-	0.8	V
V_{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}								
		$I_O = -50 \mu\text{A}; V_{CC} = 4.5 \text{ V}$	4.4	4.5	-	4.4	-	4.4	-	V
		$I_O = -8.0 \text{ mA}; V_{CC} = 4.5 \text{ V}$	3.94	-	-	3.80	-	3.70	-	V
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}								
		$I_O = 50 \mu\text{A}; V_{CC} = 4.5 \text{ V}$	-	0	0.1	-	0.1	-	0.1	V
		$I_O = 8 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	-	0.36	-	0.44	-	0.55	V
I_I	input leakage current	$V_I = 5.5 \text{ V or GND}; V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	-	0.1	-	1.0	-	2.0	μA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0 \text{ A}; V_{CC} = 5.5 \text{ V}$	-	-	4.0	-	40	-	80	μA
ΔI_{CC}	additional supply current	per input pin; $V_I = V_{CC} - 2.1 \text{ V}$; other pins at V_{CC} or GND; $I_O = 0 \text{ A}; V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	1.35	-	1.5	-	1.5	mA
C_I	input capacitance	$V_I = V_{CC}$ or GND	-	3	10	-	10	-	10	pF

11. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for test circuit see [Fig. 15](#).

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
74AHC594										
t_{PLH}	LOW to HIGH propagation delay	SHCP to Q7S; see Fig. 9								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$								
		$C_L = 15 \text{ pF}$	-	5.2	8.5	2.2	9.7	2.2	10.6	ns
		$C_L = 50 \text{ pF}$	-	7.4	11.5	3.0	13.2	3.0	14.3	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$								
		$C_L = 15 \text{ pF}$	-	3.8	6.3	1.7	7.2	1.7	7.8	ns
		$C_L = 50 \text{ pF}$	-	4.8	8.0	2.4	9.1	2.4	10.0	ns
		STCP to Qn; see Fig. 10								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$								
		$C_L = 15 \text{ pF}$	-	5.1	8.3	2.3	9.5	2.3	10.6	ns
		$C_L = 50 \text{ pF}$	-	7.3	11.9	3.3	13.6	3.3	14.7	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$								
		$C_L = 15 \text{ pF}$	-	3.5	5.7	1.8	6.5	1.8	7.1	ns
		$C_L = 50 \text{ pF}$	-	4.8	7.8	2.6	9.0	2.6	9.8	ns

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t _{PHL}	HIGH to LOW propagation delay	SHCP to Q7S; see Fig. 9								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.5	8.9	2.3	10.2	2.3	11.0	ns
		C _L = 50 pF	-	7.4	12.1	3.0	13.9	3.0	15.1	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.1	6.7	1.9	7.6	1.9	8.2	ns
		C _L = 50 pF	-	5.4	8.8	2.5	10.1	2.5	11.0	ns
		STCP to Qn; see Fig. 10								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.5	9.1	2.4	10.4	2.4	11.3	ns
		C _L = 50 pF	-	7.3	12.0	3.2	13.8	3.2	15.0	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	3.7	6.0	1.9	6.9	1.9	7.5	ns
		C _L = 50 pF	-	5.2	8.5	2.6	9.7	2.6	10.5	ns
		SHR to Q7S; see Fig. 13								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.7	9.5	2.3	10.8	2.3	11.7	ns
		C _L = 50 pF	-	7.5	12.2	3.6	14.0	3.6	15.2	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.1	6.7	2.0	7.6	2.0	8.2	ns
		C _L = 50 pF	-	5.4	8.8	2.8	10.1	2.8	11.0	ns
		STR to Qn; see Fig. 12								
		V _{CC} = 3.0 V to 3.6 V								
		C _L = 15 pF	-	5.8	9.6	2.8	11.0	2.8	12.0	ns
		C _L = 50 pF	-	7.7	12.5	3.8	14.4	3.8	15.6	ns
		V _{CC} = 4.5 V to 5.5 V								
		C _L = 15 pF	-	4.1	7.2	2.2	8.2	2.2	8.9	ns
		C _L = 50 pF	-	5.4	9.4	3.0	10.7	3.0	11.6	ns
f _{max}	maximum frequency	SHCP or STCP; see Fig. 9 and Fig. 10								
		V _{CC} = 3.0 V to 3.6 V	80	125	-	70	-	65	-	MHz
		V _{CC} = 4.5 V to 5.5 V	90	170	-	80	-	70	-	MHz
t _W	pulse width	SHCP and STCP HIGH or LOW; see Fig. 9 and Fig. 10								
		V _{CC} = 3.0 V to 3.6 V	6.0	-	-	6.5	-	7.0	-	ns
		V _{CC} = 4.5 V to 5.5 V	5.5	-	-	6.0	-	6.5	-	ns
		SHR and STR HIGH or LOW; see Fig. 13 and Fig. 12								
		V _{CC} = 3.0 V to 3.6 V	5.0	-	-	5.0	-	5.5	-	ns
		V _{CC} = 4.5 V to 5.5 V	5.0	-	-	5.2	-	5.7	-	ns

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t_{su}	set-up time	DS to SHCP; see Fig. 11								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	3.5	-	-	3.5	-	4.0	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	3.0	-	-	3.0	-	3.5	-	ns
		\overline{SHR} to STCP; see Fig. 14								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	8.0	-	-	9.0	-	9.5	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.5	-	ns
		SHCP to STCP; see Fig. 10								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	8.0	-	-	8.5	-	9.0	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	5.0	-	-	5.0	-	5.5	-	ns
t_h	hold time	DS to SHCP; see Fig. 11								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	1.5	-	-	1.5	-	2.0	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	2.0	-	-	2.0	-	2.5	-	ns
t_{rec}	recovery time	\overline{SHR} to SHCP; see Fig. 13								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	4.2	-	-	4.8	-	5.3	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	2.9	-	-	3.3	-	3.8	-	ns
		STR to STCP; see Fig. 12								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	4.6	-	-	5.3	-	5.8	-	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	3.2	-	-	3.7	-	4.3	-	ns
C_{PD}	power dissipation capacitance	$f_i = 1 \text{ MHz}; V_i = \text{GND to } V_{CC}$ [2]	-	55	-	-	-	-	-	pF
74AHCT594; $V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$										
t_{PLH}	LOW to HIGH propagation delay	SHCP to Q7S; see Fig. 9								
		$C_L = 15 \text{ pF}$	-	3.8	6.3	1.7	7.2	1.7	7.8	ns
		$C_L = 50 \text{ pF}$	-	4.8	8.0	2.2	9.1	2.2	9.9	ns
		STCP to Qn; see Fig. 10								
		$C_L = 15 \text{ pF}$	-	3.5	5.7	1.8	6.5	1.8	7.1	ns
		$C_L = 50 \text{ pF}$	-	4.6	7.7	2.6	8.8	2.6	9.6	ns
t_{PHL}	HIGH to LOW propagation delay	SHCP to Q7S; see Fig. 9								
		$C_L = 15 \text{ pF}$	-	4.1	6.7	1.8	7.6	1.8	8.3	ns
		$C_L = 50 \text{ pF}$	-	5.4	8.8	2.4	10.1	2.4	11.0	ns
		STCP to Qn; see Fig. 10								
		$C_L = 15 \text{ pF}$	-	3.7	6.1	1.9	6.9	1.9	7.2	ns
		$C_L = 50 \text{ pF}$	-	5.2	8.5	2.6	9.7	2.6	10.5	ns
		\overline{SHR} to Q7S; see Fig. 13								
		$C_L = 15 \text{ pF}$	-	4.3	7.0	2.4	8.0	2.4	8.7	ns
		$C_L = 50 \text{ pF}$	-	5.4	8.8	2.7	10.1	2.7	11.0	ns
		STR to Qn; see Fig. 12								
		$C_L = 15 \text{ pF}$	-	4.5	7.4	2.3	8.4	2.3	9.2	ns
		$C_L = 50 \text{ pF}$	-	5.7	9.4	3.1	10.7	3.1	11.7	ns
f_{max}	maximum frequency	SHCP or STCP; see Fig. 9 and Fig. 10	90	160	-	80	-	70	-	MHz

Symbol	Parameter	Conditions	25 °C			-40 °C to +85 °C		-40 °C to +125 °C		Unit
			Min	Typ[1]	Max	Min	Max	Min	Max	
t _W	pulse width	SHCP and STCP HIGH or LOW; see Fig. 9 and Fig. 10	5.5	-	-	6.0	-	6.5	-	ns
		SHR and STR HIGH or LOW; see Fig. 13 and Fig. 12	5.2	-	-	5.5	-	6.0	-	ns
t _{su}	set-up time	DS to SHCP; see Fig. 11	3.0	-	-	3.0	-	3.5	-	ns
		SHR to STCP; see Fig. 14	5.0	-	-	5.0	-	5.5	-	ns
		SHCP to STCP; see Fig. 10	5.0	-	-	5.0	-	5.5	-	ns
t _h	hold time	DS to SHCP; see Fig. 11	2.0	-	-	2.0	-	2.5	-	ns
t _{rec}	recovery time	SHR to SHCP; see Fig. 13	2.9	-	-	3.3	-	3.8	-	ns
		STR to STCP; see Fig. 12	3.4	-	-	3.8	-	4.3	-	ns
C _{PD}	power dissipation capacitance	f _i = 1 MHz; V _I = GND to V _{CC} [2]	-	55	-	-	-	-	-	pF

[1] Typical values are measured at nominal supply voltage (V_{CC} = 3.3 V and V_{CC} = 5.0 V).

[2] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o) \text{ where:}$$

f_i = input frequency in MHz;

f_o = output frequency in MHz;

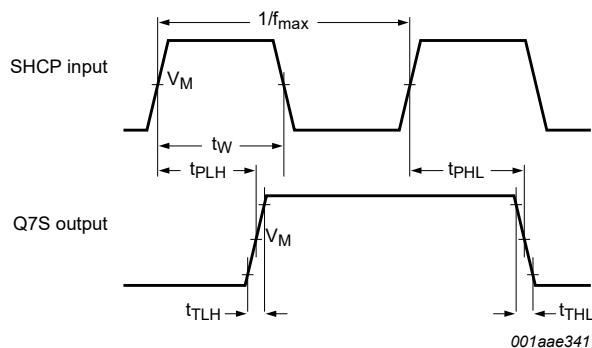
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

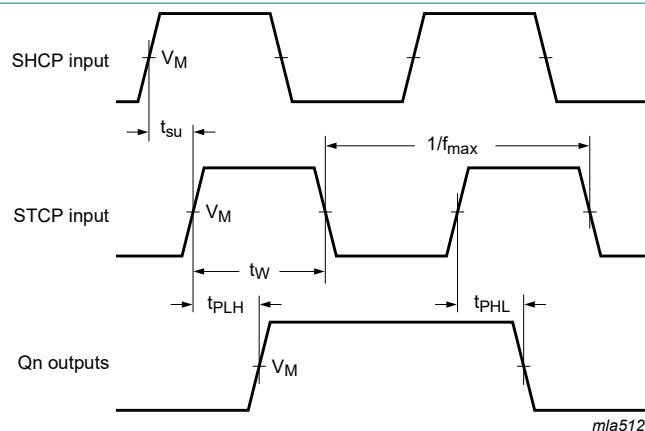
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of the outputs.

11.1. Waveforms and test circuit



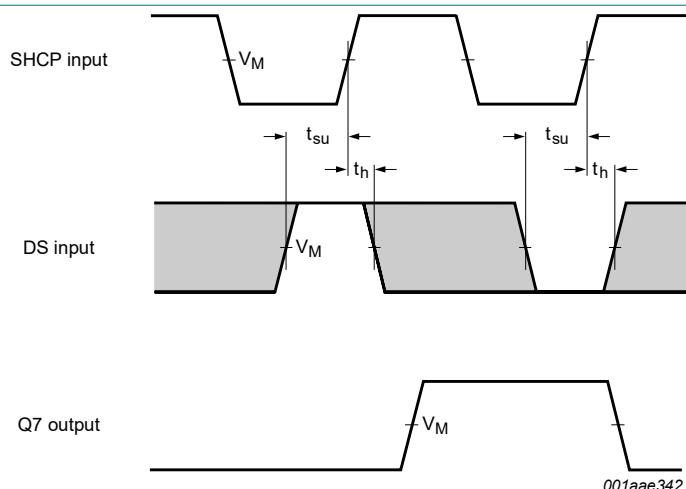
Measurement points are given in [Table 8](#).

Fig. 9. Shift register clock pulse width, maximum frequency and input to output propagation delays



Measurement points are given in [Table 8](#).

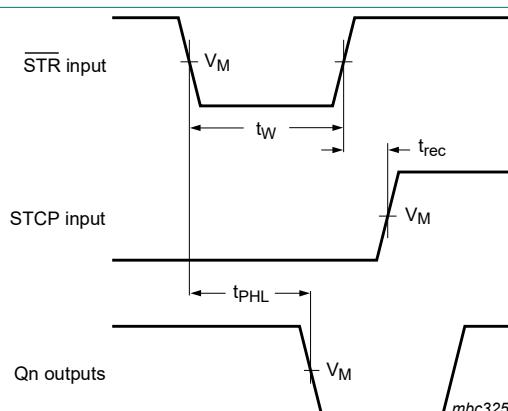
Fig. 10. Shift register clock to storage register clock set-up time and storage clock pulse width, maximum frequency and input to output propagation delays



Measurement points are given in [Table 8](#).

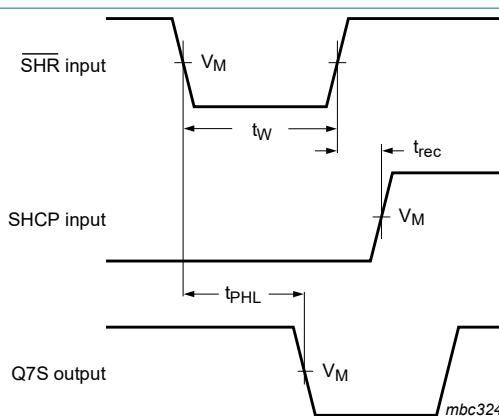
The shaded areas indicate when the input is permitted to change for predictable output performance.

Fig. 11. Shift register clock to data input set-up and hold times



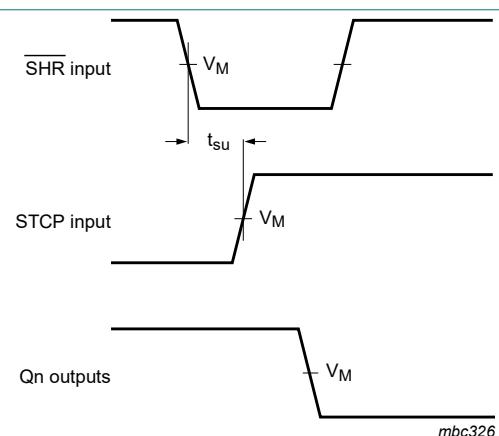
Measurement points are given in [Table 8](#).

Fig. 12. Storage register reset pulse width, input to output propagation delay and recovery time



Measurement points are given in [Table 8](#).

Fig. 13. Shift register reset pulse width, input to output propagation delay and recovery time

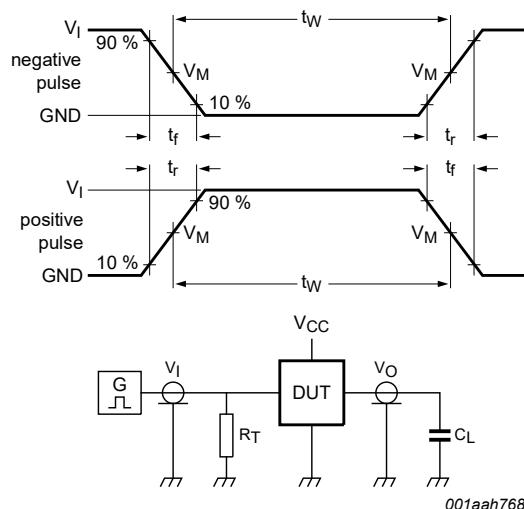


Measurement points are given in [Table 8](#).

Fig. 14. Shift register reset to storage register clock set-up time

Table 8. Measurement points

Type	Input	Output
	V_M	V_M
74AHC594	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
74AHCT594	1.5 V	$0.5 \times V_{CC}$



For test data see [Table 9](#).

Definitions for test circuit:

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

C_L = Load capacitance including jig and probe capacitance.

Fig. 15. Test circuit for measuring switching times

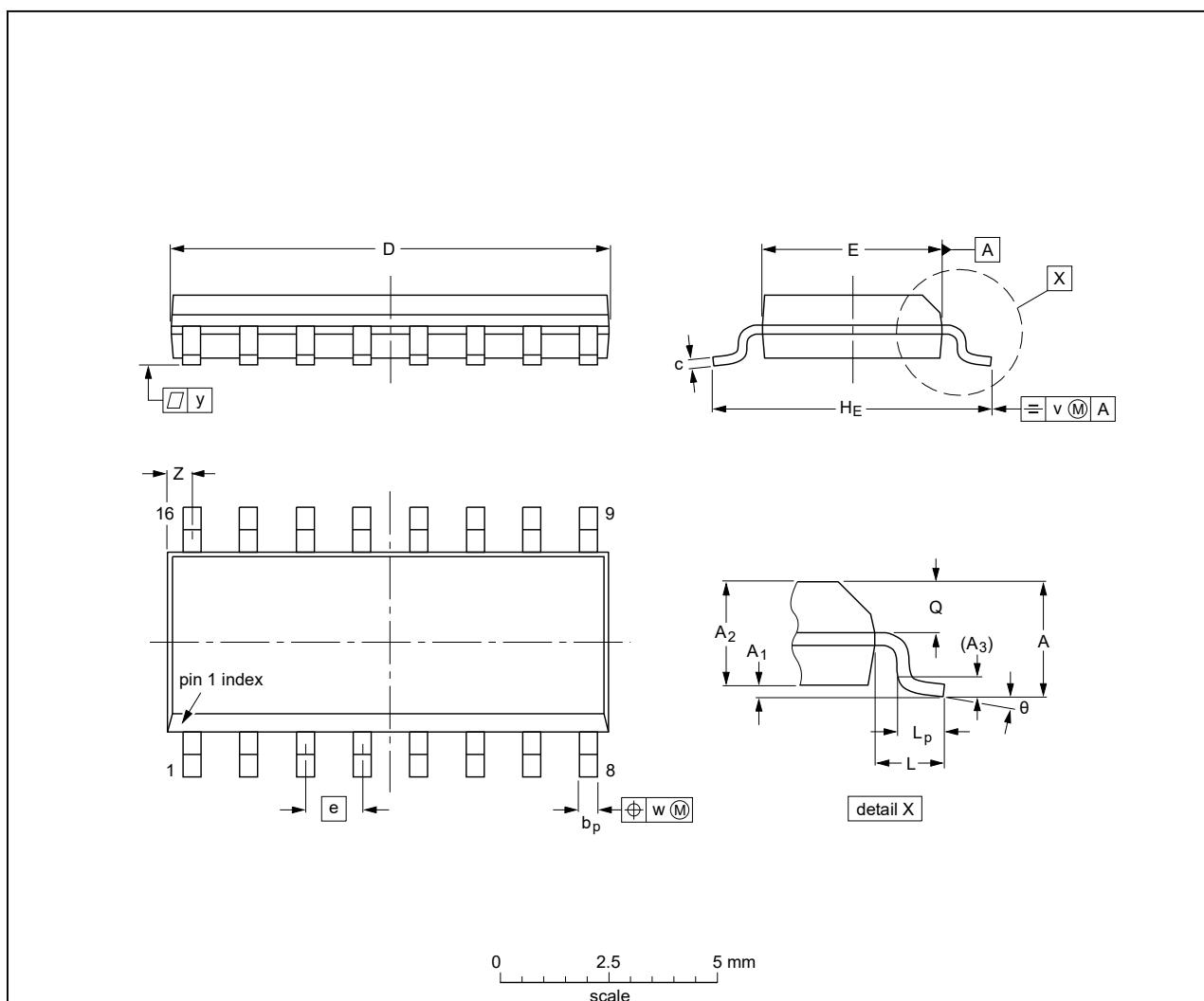
Table 9. Test data

Type	Input		Load	Test
	V_I	t_r, t_f		
74AHC594	V_{CC}	≤ 3.0 ns	15 pF, 50 pF	t_{PLH}, t_{PHL}
74AHCT594	3.0 V	≤ 3.0 ns	15 pF, 50 pF	t_{PLH}, t_{PHL}

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 max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	z ⁽¹⁾	θ
mm	1.75 0.10	0.25 1.25	1.45 0.36	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069 0.004	0.010 0.049	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.39 0.38	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016	0.028 0.020	0.01	0.01	0.004	0.028 0.012	

Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT109-1	076E07	MS-012				99-12-27 03-02-19

Fig. 16. Package outline SOT109-1 (SO16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1

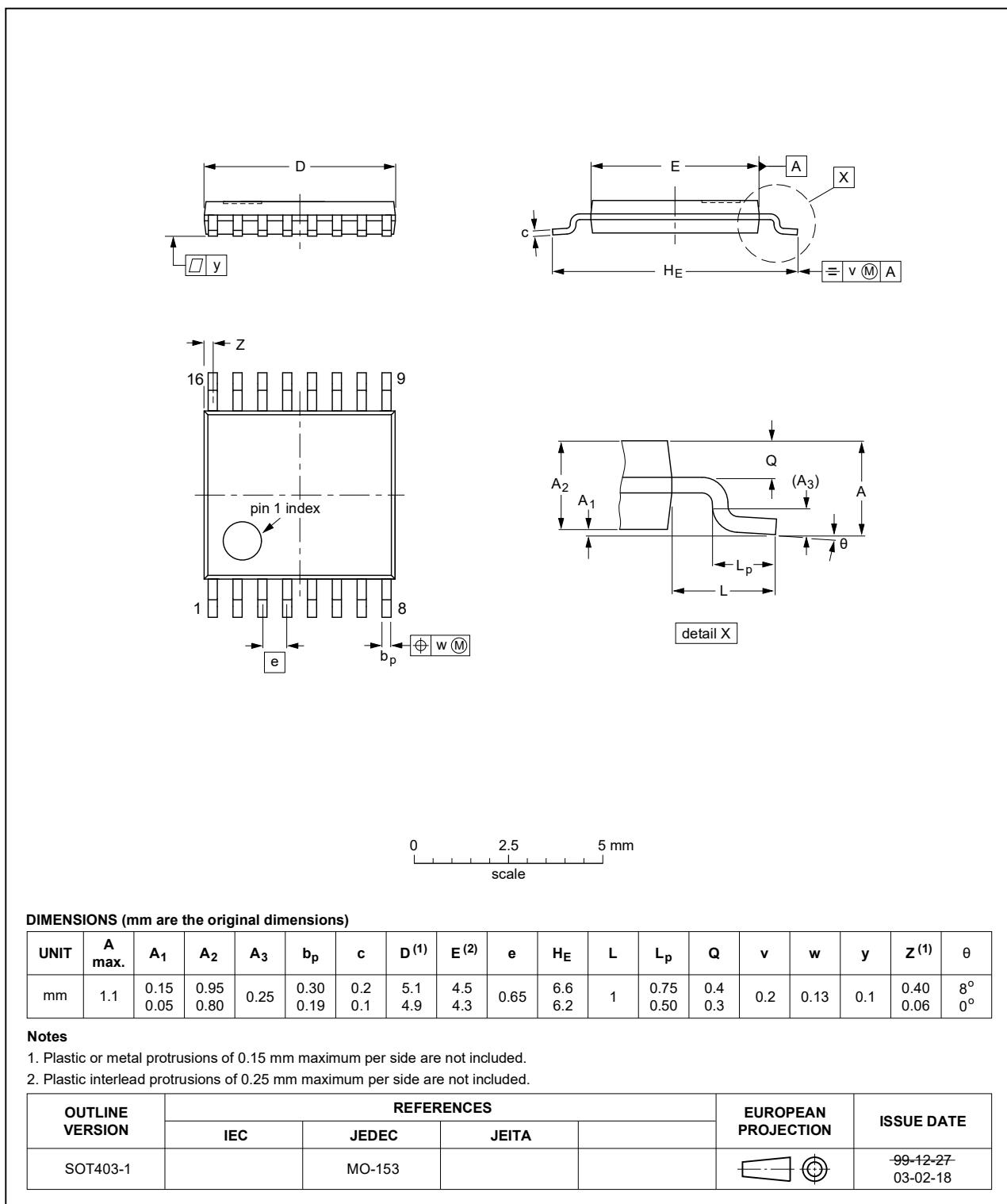


Fig. 17. Package outline SOT403-1 (TSSOP16)

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

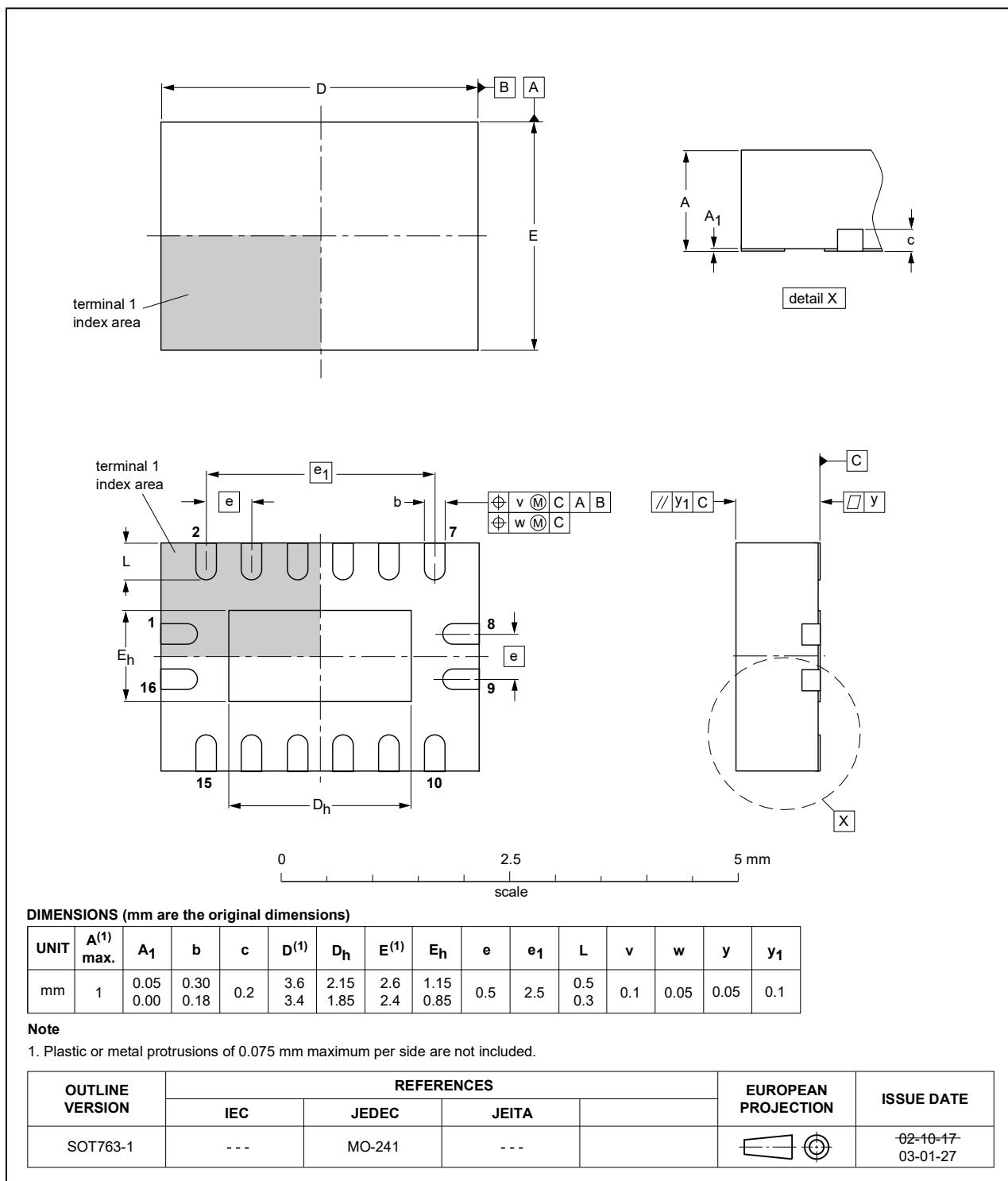


Fig. 18. Package outline SOT763-1 (DHVQFN16)

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
LSTTL	Low-power Schottky Transistor-Transistor Logic
MM	Machine Model
TTL	Transistor-Transistor Logic

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT594 v.4	20210707	Product data sheet	-	74AHC_AHCT594 v.3
Modifications:	<ul style="list-style-type: none"> Type numbers 74AHC594DB and 74AHCT594DB (SOT338-1/SSOP16) removed. 			
74AHC_AHCT594 v.3	20200625	Product data sheet	-	74AHC_AHCT594 v.2
Modifications:	<ul style="list-style-type: none"> 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 2 updated. Table 4: Derating values for P_{tot} total power dissipation updated. 			
74AHC_AHCT594 v.2	20080609	Product data sheet	-	74AHC_AHCT594 v.1
Modifications:	<ul style="list-style-type: none"> The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. Legal texts have been adapted to the new company name where appropriate. Table 6: the conditions for input leakage current have been changed. 			
74AHC_AHCT594 v.1	20060704	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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