74HC299

8-bit universal shift register; 3-state

Rev. 4 — 26 February 2016 Product data sheet

1. General description

The 74HC299 is an 8-bit universal shift register with 3-state outputs. It contains eight edge-triggered D-type flip-flops and the interstage logic necessary to perform synchronous shift-right, shift-left, parallel load and hold operations. The type of operation is determined by the mode select inputs S0 and S1. Pins I/O0 to I/O7 are flip-flop 3-state buffer outputs which allow them to operate as data inputs in parallel load mode. The serial outputs Q0 and Q7 are used for expansion in serial shifting of longer words. A LOW signal on the asynchronous master reset input $\overline{MR}$ overrides the Sn and clock CP inputs and resets the flip-flops. All other state changes are initiated by the rising edge of the clock pulse. Inputs can change when the clock is either state, provided that the recommended set-up and hold times are observed. A HIGH signal on the 3-state output enable inputs $\overline{OE1}$ or $\overline{OE2}$ disables the 3-state buffers and the I/On outputs assume a high-impedance OFF-state. In this condition, the shift, hold, load and reset operations can still occur. The 3-state buffers are also disabled by HIGH signals on both S0 and S1, when in preparation for a parallel load operation. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC}.

2. Features and benefits

- Input levels:
  - For 74HC299: CMOS level
- Multiplexed inputs/outputs provide improved bit density
- Four operating modes:
  - Shift left
  - Shift right
  - Hold (store)
  - Load data
- Operates with output enable or at high-impedance OFF-state (Z)
- 3-state outputs drive bus lines directly
- Cascadable for n-bit word lengths
- ESD protection:
  - HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- Specified from −40 °C to +85 °C and from −40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74HC299D	–40 °C to +125 °C	SO20	plastic small outline package; 20 leads; body width 7.5 mm	SOT163-1
74HC299DB	–40 °C to +125 °C	SSOP20	plastic shrink small outline package; 20 leads; body width 5.3 mm	SOT339-1
74HC299PW	–40 °C to +125 °C	TSSOP20	plastic thin shrink small outline package; 20 leads; body width 4.4 mm	SOT360-1

4. Functional diagram

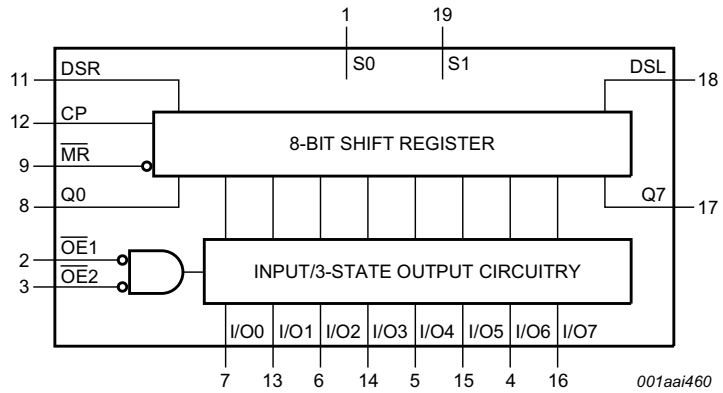


Fig 1. Functional diagram

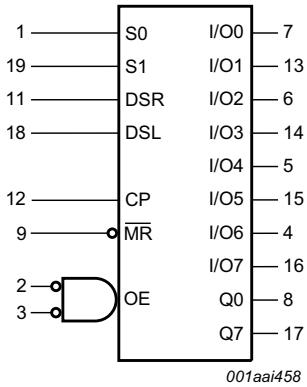


Fig 2. Logic symbol

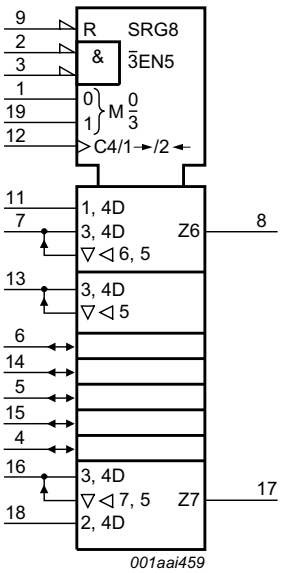


Fig 3. IEC logic symbol

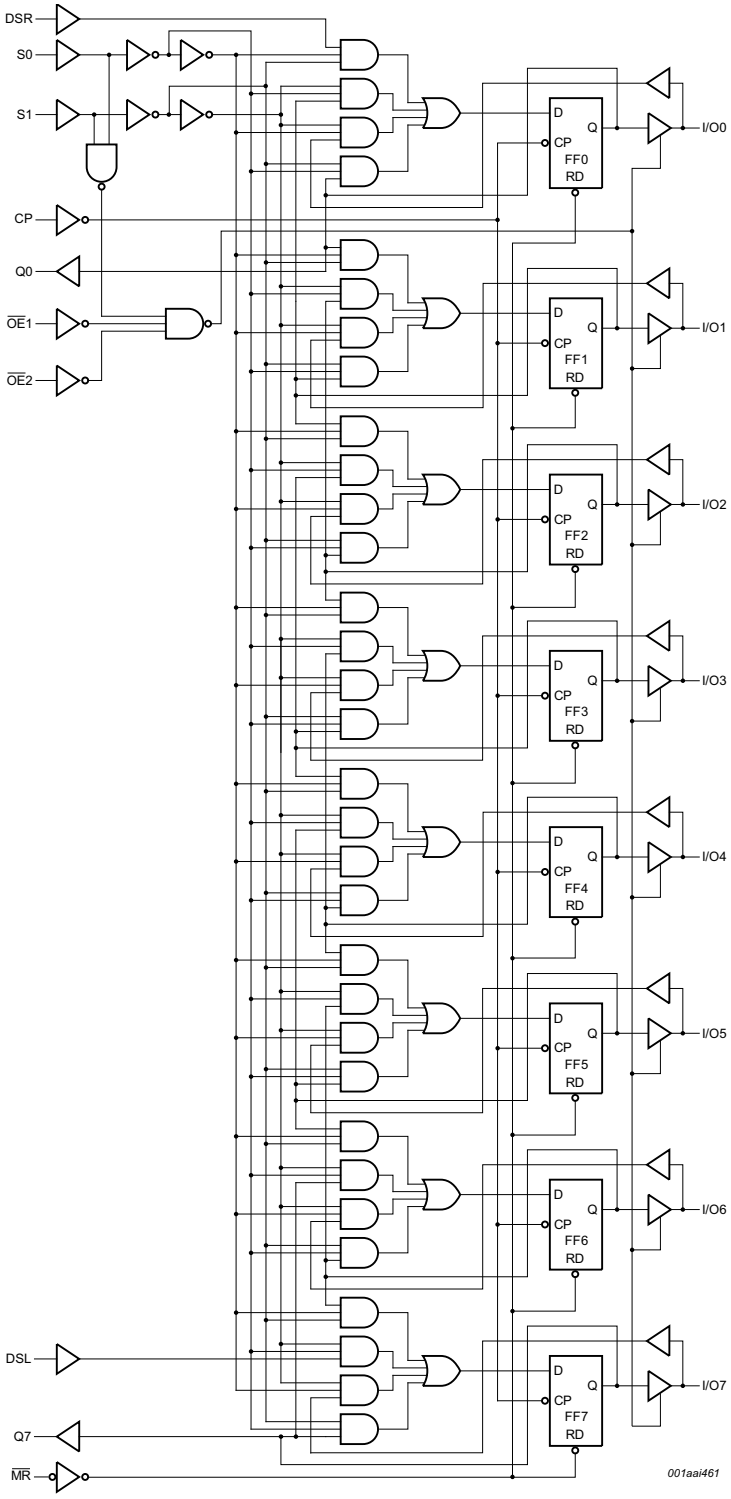


Fig 4. Logic diagram

5. Pinning information

5.1 Pinning

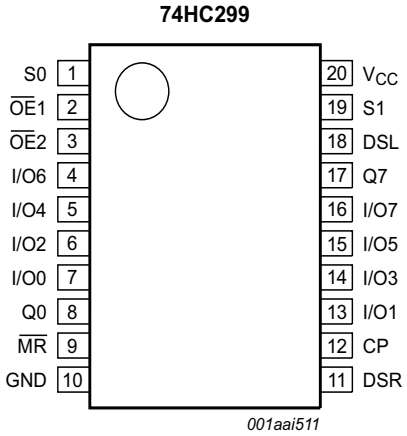


Fig 5. Pin configuration (SO20 and (T)SSOP20)

5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
S0, S1	1, 19	mode select input
$\overline{OE}1$, $\overline{OE}2$	2, 3	3-state output enable input (active LOW)
I/O0, I/O1, I/O2, I/O3, I/O4, I/O5, I/O6, I/O7	7, 13, 6, 14, 5, 15, 4, 16	parallel data input or 3-state parallel output (bus driver)
Q0, Q7	8, 17	serial output (standard output)
$\overline{MR}$	9	asynchronous master reset input (active LOW)
GND	10	ground (0 V)
DSR	11	serial data shift-right input
CP	12	clock input (LOW to HIGH, edge-triggered)
DSL	18	serial data shift-left input
V_{CC}	20	positive supply voltage

6. Functional description

Table 3. Function table[1]

Input				Response
$\overline{MR}$	S1	S0	CP	
L	X	X	X	asynchronous reset; Q0 to Q7 = LOW
H	H	H	↑	parallel load; I/On → Qn
H	L	H	↑	shift right; DSR → Q0, Q0 → Q1, etc.
H	H	L	↑	shift left; DSL → Q7, Q7 → Q6, etc.
H	L	L	X	hold

[1] H = HIGH voltage level;
L = LOW voltage level;
↑ = LOW to HIGH CP transition;
X = don't care.

7. 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	V
I_{IK}	input clamping current	$V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V	[1]	-	±20	mA
I_{OK}	output clamping current	$V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V	[1]	-	±20	mA
I_O	output current	-0.5 V $< V_O < V_{CC} + 0.5$ V				
		standard outputs		-	±25	mA
		bus driver outputs		-	±35	mA
I_{CC}	supply current	standard outputs		-	50	mA
		bus driver outputs		-	70	mA
I_{GND}	ground current	standard outputs		−50	-	mA
		bus driver outputs		−70	-	mA
T_{stg}	storage temperature			−65	+150	°C
P_{tot}	total power dissipation	$T_{amb} = -40$ °C to +125 °C				
		SO20 package	[2]	-	500	mW
		(T)SSOP20 package	[3]	-	500	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] P_{tot} derates linearly at 8 mW/K above 70 °C.

[3] P_{tot} derates linearly at 5.5 mW/K above 60 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V_{CC}	supply voltage		2.0	5.0	6.0	V
V_I	input voltage		0	-	V_{CC}	V
V_O	output voltage		0	-	V_{CC}	V
T_{amb}	ambient temperature		–40	-	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate					
		V_{CC} = 2.0 V	-	-	625	ns/V
		V_{CC} = 4.5 V	-	1.67	139	ns/V
		V_{CC} = 6.0 V	-	-	83	ns/V

9. 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	
V_{IH}	HIGH-level input voltage	V_{CC} = 2.0 V	1.5	1.2	-	1.5	-	1.5	-	V
		V_{CC} = 4.5 V	3.15	2.4	-	3.15	-	3.15	-	V
		V_{CC} = 6.0 V	4.2	3.2	-	4.2	-	4.2	-	V
V_{IL}	LOW-level input voltage	V_{CC} = 2.0 V	-	0.8	0.5	-	0.5	-	0.5	V
		V_{CC} = 4.5 V	-	2.1	1.35	-	1.35	-	1.35	V
		V_{CC} = 6.0 V	-	2.8	1.8	-	1.8	-	1.8	V
V_{OH}	HIGH-level output voltage	V_I = V_{IH} or V_{IL}								
		all outputs								
		I_O = –20 μA; V_{CC} = 2.0 V	1.9	2.0	-	1.9	-	1.9	-	V
		I_O = –20 μA; V_{CC} = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		I_O = –20 μA; V_{CC} = 6.0 V	5.9	6.0	-	5.9	-	5.9	-	V
		standard outputs								
		I_O = –4.0 mA; V_{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I_O = –5.2 mA; V_{CC} = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	V
		bus driver outputs								
		I_O = –6.0 mA; V_{CC} = 4.5 V	3.98	4.32	-	3.84	-	3.7	-	V
		I_O = –7.8 mA; V_{CC} = 6.0 V	5.48	5.81	-	5.34	-	5.2	-	V

Table 6. Static characteristics *…continued*

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	
V_{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}								
		all outputs								
		I_O = 20 μA; V_{CC} = 2.0 V	-	0	0.1	-	0.1	-	0.1	V
		I_O = 20 μA; V_{CC} = 4.5 V	-	0	0.1	-	0.1	-	0.1	V
		I_O = 20 μA; V_{CC} = 6.0 V	-	0	0.1	-	0.1	-	0.1	V
		standard outputs								
		I_O = 4.0 mA; V_{CC} = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I_O = 5.2 mA; V_{CC} = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
		bus driver outputs								
		I_O = 6.0 mA; V_{CC} = 4.5 V	-	0.15	0.26	-	0.33	-	0.4	V
		I_O = 7.8 mA; V_{CC} = 6.0 V	-	0.16	0.26	-	0.33	-	0.4	V
I_I	input leakage current	$V_I = V_{CC}$ or GND; V_{CC} = 6.0 V	-	-	±0.1	-	±1.0	-	±1.0	μA
I_{OZ}	OFF-state output current	$V_I = V_{IH}$ or V_{IL}; V_{CC} = 6.0 V; $V_O = V_{CC}$ or GND	-	-	±0.5	-	±5.0	-	±10.0	μA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; I_O = 0 A; V_{CC} = 6.0 V	-	-	8.0	-	80	-	160	μA
C_I	input capacitance		-	3.5	-	-	-	-	-	pF
$C_{I/O}$	input/output capacitance		-	10	-	-	-	-	-	pF
C_{PD}	power dissipation capacitance	V_I = GND to V_{CC} [1]	-	120	-	-	-	-	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum(C_L \times V_{CC}^2 \times f_o)$ where:
f_i = input frequency in MHz;
f_o = output frequency in MHz;
$\sum(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V;
V_I = GND to V_{CC} for 74HC299;
V_I = GND to (V_{CC} – 1.5 V) for 74HCT299.

10. Dynamic characteristics

Table 7. Dynamic characteristics

GND (ground = 0 V); for test circuit, see Figure 10.

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{pd}	propagation delay	CP to Q0, Q7; see Figure 6 [1]								
		V_{CC} = 2.0 V	-	66	200	-	250	-	300	ns
		V_{CC} = 4.5 V	-	24	40	-	50	-	60	ns
		V_{CC} = 5.0 V; C_L = 15 pF	-	20	-	-	-	-	-	ns
		V_{CC} = 6.0 V	-	19	34	-	43	-	51	ns
		CP to I/On; see Figure 6								
		V_{CC} = 2.0 V	-	66	200	-	250	-	300	ns
		V_{CC} = 4.5 V	-	24	40	-	50	-	60	ns
		V_{CC} = 5.0 V; C_L = 15 pF	-	20	-	-	-	-	-	ns
		V_{CC} = 6.0 V	-	19	34	-	43	-	51	ns
		$\overline{MR}$ to Q0, Q7 or I/On; see Figure 7 [2]								
		V_{CC} = 2.0 V	-	66	200	-	250	-	300	ns
		V_{CC} = 4.5 V	-	24	40	-	50	-	60	ns
		V_{CC} = 5.0 V; C_L = 15 pF	-	20	-	-	-	-	-	ns
		V_{CC} = 6.0 V	-	19	34	-	43	-	51	ns
t_t	transition time	bus driver (I/On); see Figure 6 [3]								
		V_{CC} = 2.0 V	-	14	60	-	75	-	90	ns
		V_{CC} = 4.5 V	-	5	12	-	15	-	18	ns
		V_{CC} = 6.0 V	-	4	10	-	13	-	15	ns
		standard (Q0, Q7); see Figure 6								
		V_{CC} = 2.0 V	-	19	75	-	95	-	110	ns
		V_{CC} = 4.5 V	-	7	15	-	19	-	22	ns
		V_{CC} = 6.0 V	-	6	13	-	16	-	19	ns
t_W	pulse width	CP HIGH or LOW; see Figure 6								
		V_{CC} = 2.0 V	80	17	-	100	-	120	-	ns
		V_{CC} = 4.5 V	16	6	-	20	-	24	-	ns
		V_{CC} = 6.0 V	14	5	-	17	-	20	-	ns
		$\overline{MR}$ LOW; see Figure 7								
		V_{CC} = 2.0 V	80	19	-	100	-	120	-	ns
		V_{CC} = 4.5 V	16	7	-	20	-	24	-	ns
		V_{CC} = 6.0 V	14	6	-	17	-	20	-	ns
t_{PZH}	OFF-state to HIGH propagation delay	$\overline{OE}$n to I/On; see Figure 9 [4]								
		V_{CC} = 2.0 V	-	50	155	-	195	-	235	ns
		V_{CC} = 4.5 V	-	18	31	-	39	-	47	ns
		V_{CC} = 6.0 V	-	14	26	-	33	-	40	ns

Table 7. Dynamic characteristics *...continued*

GND (ground = 0 V); for test circuit, see Figure 10.

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
t_{PZL}	OFF-state to LOW propagation delay	$\overline{OE}$n to I/On; see Figure 9								
		V_{CC} = 2.0 V	-	41	130	-	165	-	195	ns
		V_{CC} = 4.5 V	-	15	26	-	33	-	39	ns
		V_{CC} = 6.0 V	-	12	22	-	28	-	33	ns
t_{PHZ}	HIGH to OFF-state propagation delay	$\overline{OE}$n to I/On; see Figure 9 [5]								
		V_{CC} = 2.0 V	-	66	185	-	230	-	280	ns
		V_{CC} = 4.5 V	-	24	37	-	46	-	56	ns
		V_{CC} = 6.0 V	-	19	31	-	39	-	48	ns
t_{PLZ}	LOW to OFF-state propagation delay	$\overline{OE}$n to I/On; see Figure 9								
		V_{CC} = 2.0 V	-	55	155	-	195	-	235	ns
		V_{CC} = 4.5 V	-	20	31	-	39	-	47	ns
		V_{CC} = 6.0 V	-	16	26	-	33	-	40	ns
t_{rec}	recovery time	$\overline{MR}$ to CP; see Figure 7								
		V_{CC} = 2.0 V	5	–14	-	5	-	5	-	ns
		V_{CC} = 4.5 V	5	–5	-	5	-	5	-	ns
		V_{CC} = 6.0 V	5	–4	-	5	-	5	-	ns
t_{su}	set-up time	DSR, DSL to CP; see Figure 6								
		V_{CC} = 2.0 V	100	33	-	125	-	150	-	ns
		V_{CC} = 4.5 V	20	12	-	25	-	30	-	ns
		V_{CC} = 6.0 V	17	10	-	21	-	26	-	ns
		S0, S1 to CP; see Figure 8								
		V_{CC} = 2.0 V	100	33	-	125	-	150	-	ns
		V_{CC} = 4.5 V	20	12	-	25	-	30	-	ns
		V_{CC} = 6.0 V	17	10	-	21	-	26	-	ns
		I/On to CP; see Figure 6								
		V_{CC} = 2.0 V	125	39	-	155	-	190	-	ns
		V_{CC} = 4.5 V	25	14	-	31	-	38	-	ns
		V_{CC} = 6.0 V	21	11	-	26	-	32	-	ns
t_h	hold time	I/On, DSR, DSL to CP; see Figure 6								
		V_{CC} = 2.0 V	0	–14	-	0	-	0	-	ns
		V_{CC} = 4.5 V	0	–5	-	0	-	0	-	ns
		V_{CC} = 6.0 V	0	–4	-	0	-	0	-	ns
		S0, S1 to CP; see Figure 8								
		V_{CC} = 2.0 V	0	–28	-	0	-	0	-	ns
		V_{CC} = 4.5 V	0	–10	-	0	-	0	-	ns
		V_{CC} = 6.0 V	0	–8	-	0	-	0	-	ns

Table 7. Dynamic characteristics *...continued*

GND (ground = 0 V); for test circuit, see Figure 10.

Symbol	Parameter	Conditions	25 °C			–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	Min	Max	
f_{max}	maximum frequency	CP input; see Figure 6								
		V_{CC} = 2.0 V	5.0	15	-	4.0	-	3.4	-	MHz
		V_{CC} = 4.5 V	25	45	-	20	-	17	-	MHz
		V_{CC} = 5.0 V; C_L = 15 pF	-	50	-	-	-	-	-	MHz
		V_{CC} = 6.0 V	29	54	-	24	-	20	-	MHz

[1] t_{pd} is the same as t_{PHL} and t_{PLH}.

[2] t_{pd} is the same as t_{PHL}.

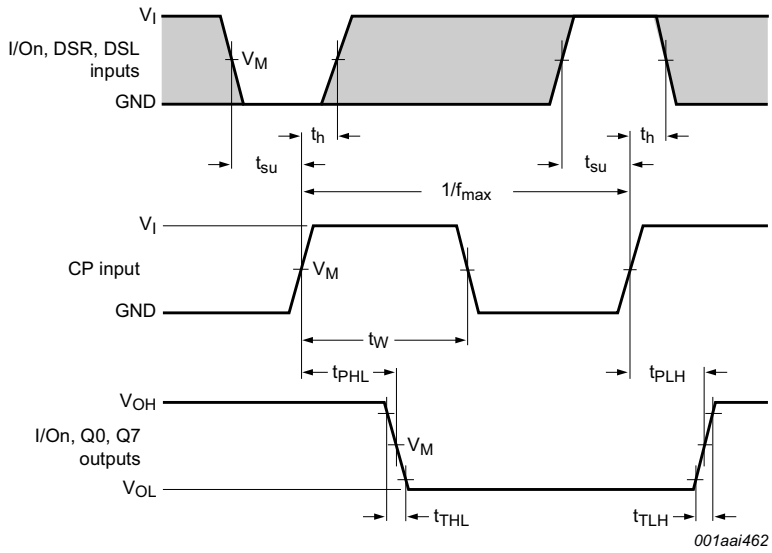
[3] t_t is the same as t_{THL} and t_{TLH}.

[4] t_{en} is the same as t_{PZH} and t_{PZL}.

[5] t_{dis} is the same as t_{PHZ} and t_{PLZ}.

[6] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).
$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ where:
f_i = input frequency in MHz;
f_o = output frequency in MHz;
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs;
C_L = output load capacitance in pF;
V_{CC} = supply voltage in V;
N = number of inputs switching.

11. Waveforms

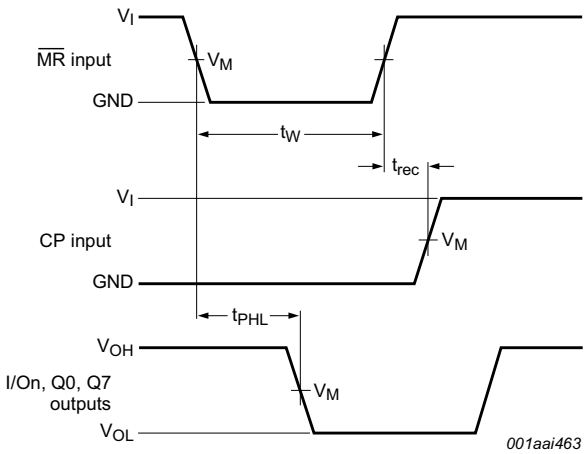


The shaded areas indicate when the input is permitted to change for predictable output performance.

Measurement points are given in Table 8.

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

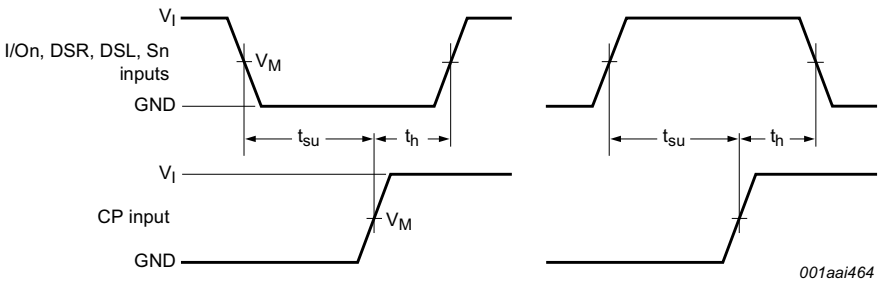
Fig 6. Clock pulse to outputs I/On, Q0, Q7 propagation delays, the clock pulse width, the I/On, DSR and DSL to clock pulse set-up and hold times, the output transition times and the maximum clock frequency



Measurement points are given in Table 8.

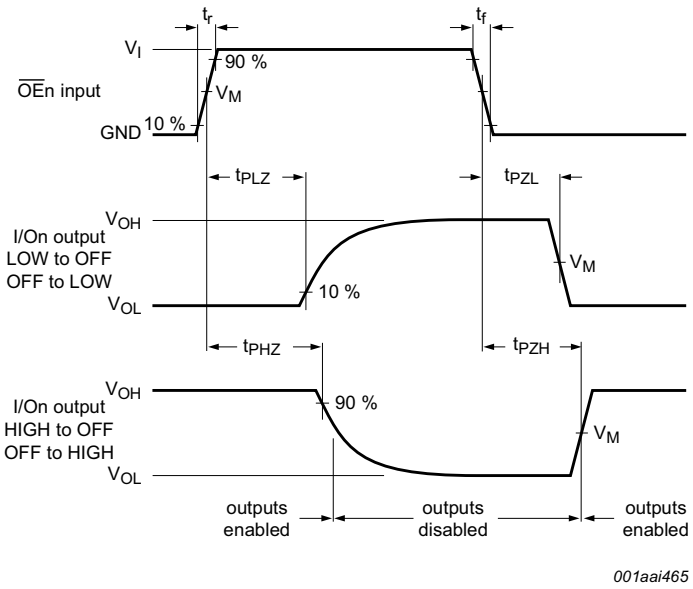
V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig 7. The master reset pulse width (LOW), the master reset to outputs I/On, Q0, Q7 propagation delays and the master reset to clock pulse removal time



Measurement points are given in Table 8.

Fig 8. Set-up and hold times from the mode control inputs S0, S1 to the clock pulse



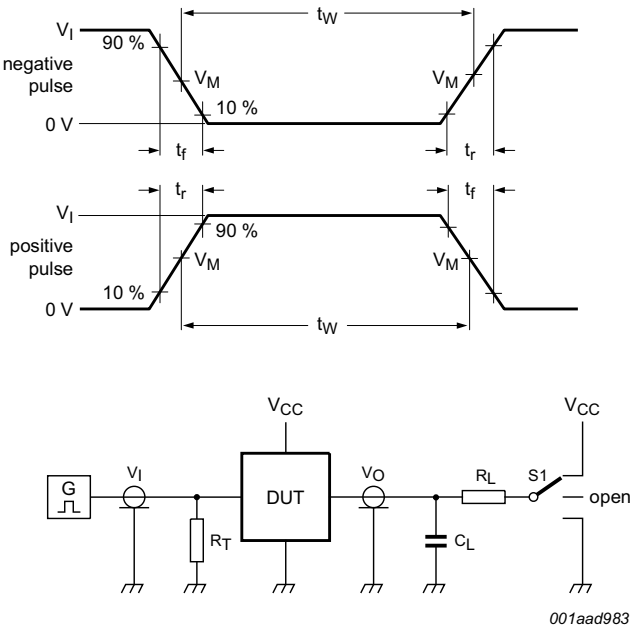
Measurement points are given in Table 8.

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

Fig 9. 3-state enable and disable times for $\overline{OE}$n inputs

Table 8. Measurement points

Input		Output
V_I	V_M	V_M
V_{CC}	$0.5V_{CC}$	$0.5V_{CC}$



Test data is given in Table 9.

Definitions test circuit:

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

C_L = Load capacitance including jig and probe capacitance.

R_L = Load resistance.

S1 = Test selection switch.

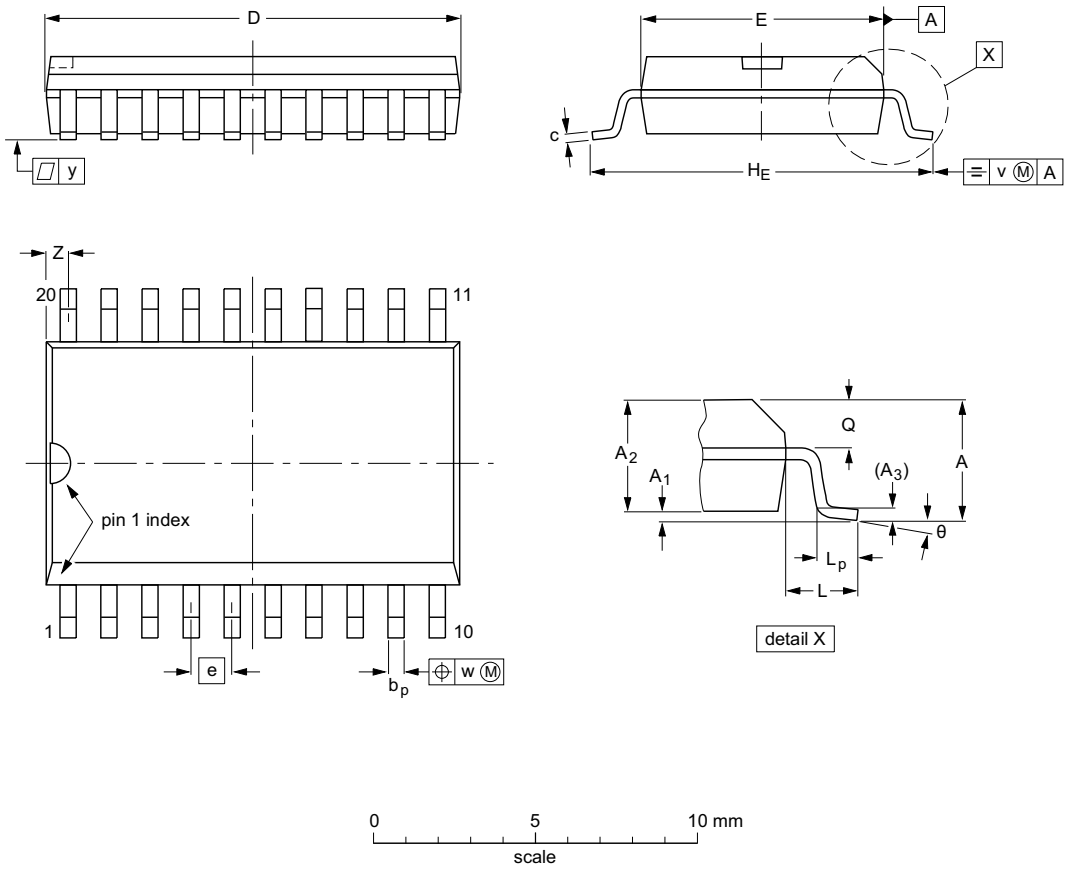
Fig 10. Test circuit for measuring switching times

Table 9. Test data

Input		Load		S1 position
V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}
V_{CC}	6 ns	15 pF, 50 pF	1 kΩ	open

12. Package outline

SO20: plastic small outline package; 20 leads; body width 7.5 mm **SOT163-1**



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	2.65	0.3 0.1	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.1	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.05	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

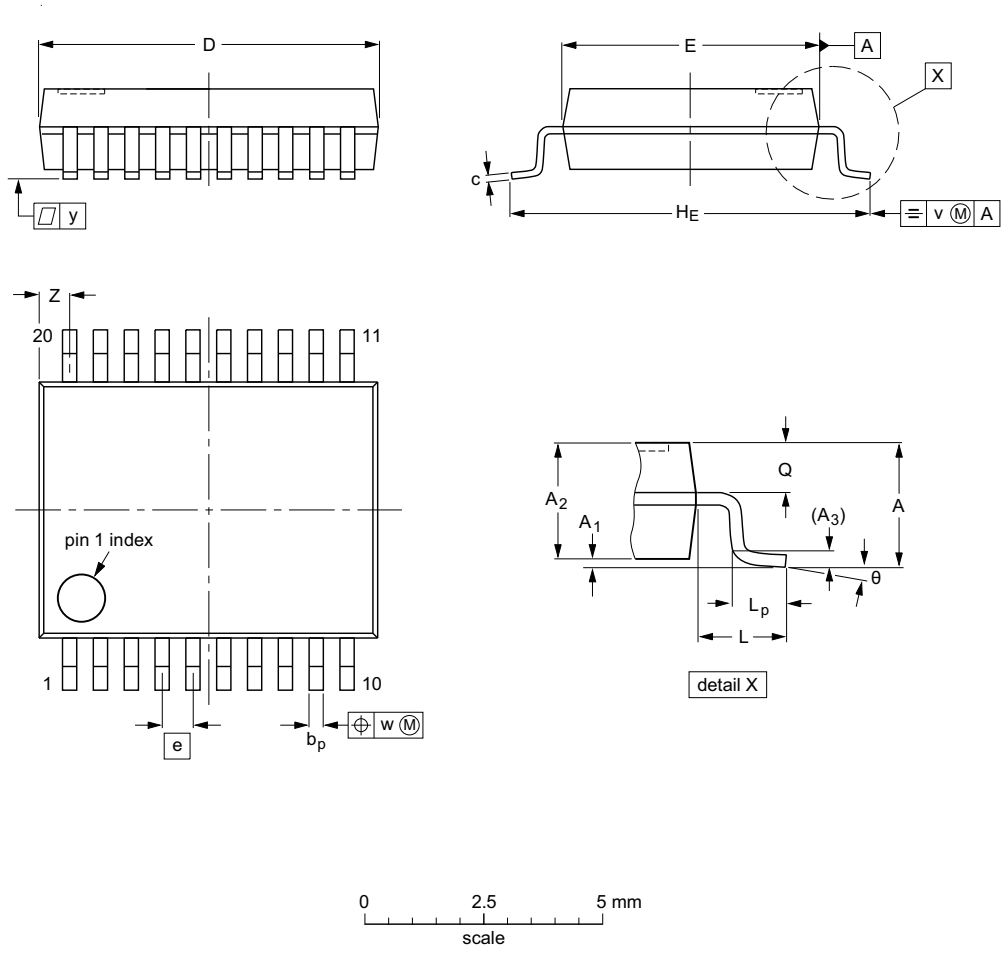
Note

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			
SOT163-1	075E04	MS-013				~~99-12-27~~ 03-02-19

Fig 11. Package outline SOT163-1 (SO20)

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm **SOT339-1**



DIMENSIONS (mm are the original 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	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8^o 0^o

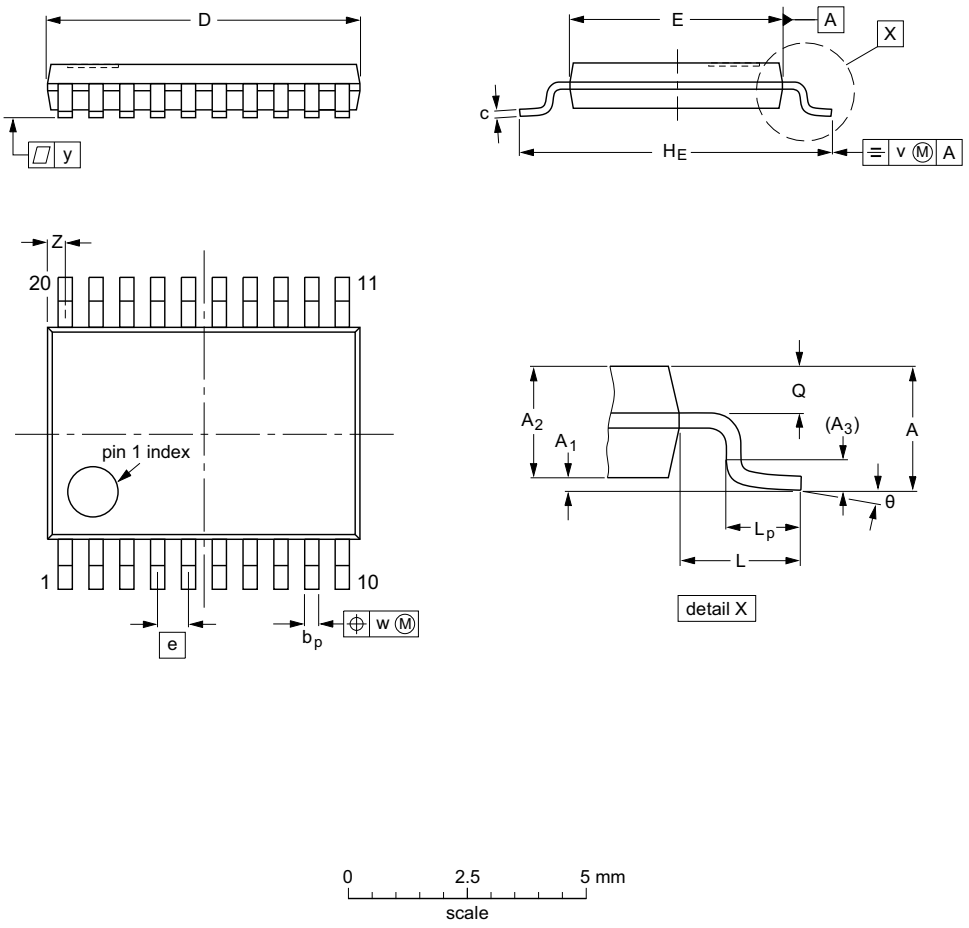
Note

1. Plastic or metal protrusions of 0.2 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT339-1		MO-150				~~99-12-27~~ 03-02-19

Fig 12. Package outline SOT339-1 (SSOP20)

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm **SOT360-1**



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (2)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°

Notes

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.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT360-1		MO-153				~~99-12-27~~ 03-02-19

Fig 13. Package outline SOT360-1 (TSSOP20)

13. Abbreviations

Table 10. Abbreviations

Acronym	Description
CMOS	Complementary Metal Oxide Semiconductor
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC299 v.4	20160226	Product data sheet	-	74HC_HCT299 v.3
Modifications:	• Type numbers 74HC299N and 74HCT299N (SOT146-1) removed. • Type number 74HCT299D (SOT163-1) removed. • Type number 74HCT299DB (SOT339-1) removed. • Type number 74HCT299PW (SOT360-1) removed.			
74HC_HCT299 v.3	20080728	Product data sheet	-	74HC_HCT299_CNV_2
Modifications:	• 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. • Section 3: Ordering information added • Section 12: Package outline drawings added • Section 9 “Static characteristics”: Family data added • Section 11 “Waveforms”: Test circuit added			
74HC_HCT299_CNV v.2	19970828	Product specification	-	-

15. Legal information

15.1 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 URL http://www.nxp.com.

15.2 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. NXP Semiconductors 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 NXP Semiconductors 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 NXP Semiconductors and its customer, unless NXP Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the NXP Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

15.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors 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. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors.

In no event shall NXP Semiconductors 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, NXP Semiconductors' 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 NXP Semiconductors.

Right to make changes — NXP Semiconductors 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 — NXP Semiconductors 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 NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk.

Applications — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors 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 NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors 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.

NXP Semiconductors 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 NXP Semiconductors 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). NXP 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 — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at http://www.nxp.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. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors 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 NXP Semiconductors 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. NXP Semiconductors 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 NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' 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.

15.4 Trademarks

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

16. Contact information

For more information, please visit: **http://www.nxp.com**

For sales office addresses, please send an email to: **salesaddresses@nxp.com**

17. Contents

For more information, please visit: http://www.nxp.com
For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 26 February 2016
Document identifier: 74HC299