74AUP1G175

Low-power D-type flip-flop with reset; positive-edge trigger

Rev. 01.mm — 27 March 2006 Preliminary data sheet

1. General description

The 74AUP1G175 is a high-performance, low-power, low-voltage, Si-gate CMOS device, superior to most advanced CMOS compatible TTL families.

Schmitt-trigger action at all inputs makes the circuit tolerant to slower input rise and fall times across the entire V_{CC} range from 0.8 V to 3.6 V.

This device ensures a very low static and dynamic power consumption across the entire V_{CC} range from 0.8 V to 3.6 V.

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

The 74AUP1G175 is a single positive edge triggered D-type flip-flop with individual data (D) input, clock (CP) input, master reset ($\overline{MR}$) input, and Q output.The master reset ($\overline{MR}$) is an asynchronous active LOW input and operates independently of the clock input. Information on the data input is transferred to the Q output on the LOW-to-HIGH transition of the clock pulse. The D input must be stable one set-up time prior to the LOW-to-HIGH clock transition, for predictable operation.

2. Features

- Wide supply voltage range from 0.8 V to 3.6 V
- High noise immunity
- Complies with JEDEC standards:
  - JESD8-12 (0.8 V to 1.3 V)
  - JESD8-11 (0.9 V to 1.65 V)
  - JESD8-7 (1.2 V to 1.95 V)
  - JESD8-5 (1.8 V to 2.7 V)
  - JESD8-B (2.7 V to 3.6 V)
- ESD protection:
  - HBM JESD22-A114-C Class 3A. Exceeds 5000 V
  - MM JESD22-A115-A exceeds 200 V
  - CDM JESD22-C101-C exceeds 1000 V
- Low static power consumption; I_{CC} = 0.9 μA (maximum)
- Latch-up performance exceeds 100 mA per JESD 78 Class II
- Inputs accept voltages up to 3.6 V
- Low noise overshoot and undershoot < 10 % of V_{CC}
- I_{OFF} circuitry provides partial Power-down mode operation

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- Multiple package options
- Specified from –40 °C to +85 °C and –40 °C to +125 °C

3. Quick reference data

Table 1: Quick reference data

GND = 0 V; T_{amb} = 25 °C; $t_r = t_f \leq 3$ ns.

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 0.8 V		-	21.1	-	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.1 V to 1.3 V		2.4	5.9	11.7	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.4 V to 1.6 V		2.0	4.1	6.8	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.65 V to 1.95 V		1.6	3.3	5.4	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 2.3 V to 2.7 V		1.3	2.5	3.6	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 3.0 V to 3.6 V		1.2	2.1	2.9	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 0.8 V		-	17.4	-	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.1 V to 1.3 V		2.4	5.2	9.7	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.4 V to 1.6 V		2.3	3.8	4.9	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 1.65 V to 1.95 V		1.8	3.1	4.9	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 2.3 V to 2.7 V		1.8	2.6	3.6	ns
		C_L = 5 pF; R_L = 1 MΩ; V_{CC} = 3.0 V to 3.6 V		1.6	2.4	3.1	ns
f_{max}	maximum input clock frequency	V_{CC} = 3.0 V to 3.6 V; C_L = 30 pF		190	300	-	MHz
C_I	input capacitance			-	1.5	-	pF
C_{PD}	power dissipation capacitance	V_{CC} = 1.8 V; f = 1 MHz	[1] [2]	-	2.0	-	pF
		V_{CC} = 3.3 V; f = 1 MHz	[1] [2]	-	2.7	-	pF

[1] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

[2] The condition is V_I = GND to V_{CC}.

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4. Ordering information

Table 2: Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74AUP1G175GW	–40 °C to +125 °C	SC-88	plastic surface mounted package; 6 leads	SOT363
74AUP1G175GM	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886
74AUP1G175GF	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1 × 0.5 mm	SOT891

5. Marking

Table 3: Marking

Type number	Marking code
74AUP1G175GW	aT
74AUP1G175GM	aT
74AUP1G175GF	aT

6. Functional diagram

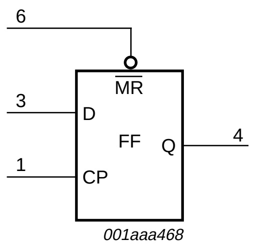

Fig 1. Logic symbol

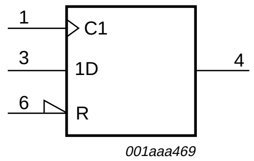

Fig 2. IEC logic symbol

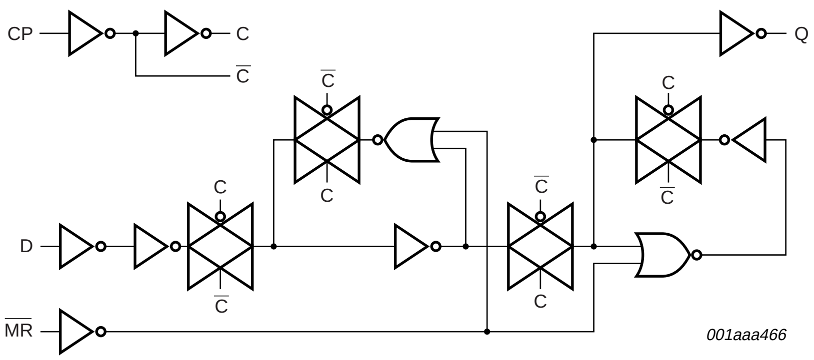

Fig 3. Logic diagram

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7. Pinning information

7.1 Pinning

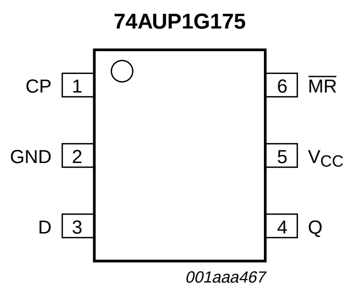

Fig 4. Pin configuration SOT363 (SC-88)

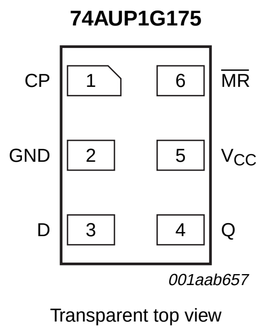

Fig 5. Pin configuration SOT886 (XSON6)

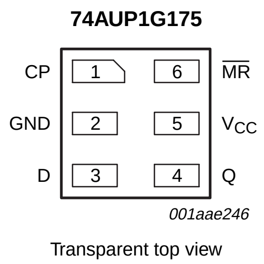

Fig 6. Pin configuration SOT891 (XSON6)

7.2 Pin description

Table 4: Pin description

Symbol	Pin	Description
CP	1	clock input (LOW-to-HIGH, edge-triggered)
GND	2	ground (0 V)
D	3	data input
Q	4	flip-flop output
V_{CC}	5	supply voltage
$\overline{MR}$	6	master reset input (active LOW)

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8. Functional description

8.1 Function table

Table 5: Function table [1]

Operating mode	Input			Output
	$\overline{MR}$	CP	D	Q
Reset (clear)	L	X	X	L
Load ‘1’	H	↑	h	H
Load ‘0’	H	↑	l	L

[1] H = HIGH voltage level;
h = HIGH voltage level one set-up time prior to the LOW-to-HIGH CP transition;
L = LOW voltage level;
l = LOW voltage level one set-up time prior to the LOW-to-HIGH CP transition;
↑ = LOW-to-HIGH CP transition;
X = don’t care.

9. Limiting values

Table 6: 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	+4.6	V
I_{IK}	input clamping current	$V_I < 0$ V		-	–50	mA
V_I	input voltage		[1]	–0.5	+4.6	V
I_{OK}	output clamping current	$V_O < 0$ V		-	–50	mA
V_O	output voltage	active mode and Power-down mode	[1]	–0.5	+4.6	V
I_O	output current	$V_O = 0$ V to V_{CC}		-	±20	mA
I_{CC}	quiescent supply current			-	+50	mA
I_{GND}	ground current			-	–50	mA
T_{stg}	storage temperature			–65	+150	°C
P_{tot}	total power dissipation	T_{amb} = –40 °C to +125 °C	[2]	-	250	mW

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

[2] For SC-88 packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K.
For XSON6 packages: above 45 °C the value of P_{tot} derates linearly with 2.4 mW/K.

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10. Recommended operating conditions

Table 7: Recommended operating conditions

Symbol	Parameter	Conditions	Min	Max	Unit
V_{CC}	supply voltage		0.8	3.6	V
V_I	input voltage		0	3.6	V
V_O	output voltage	active mode	0	V_{CC}	V
		Power-down mode; V_{CC} = 0 V	0	3.6	V
T_{amb}	ambient temperature		−40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	V_{CC} = 0.8 V to 3.6 V	0	200	ns/V

11. Static characteristics

Table 8: Static characteristics

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
T_{amb} = 25 °C						
V_{IH}	HIGH-state input voltage	V_{CC} = 0.8 V	$0.70 \times V_{CC}$	-	-	V
		V_{CC} = 0.9 V to 1.95 V	$0.65 \times V_{CC}$	-	-	V
		V_{CC} = 2.3 V to 2.7 V	1.6	-	-	V
		V_{CC} = 3.0 V to 3.6 V	2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 0.8 V	-	-	$0.30 \times V_{CC}$	V
		V_{CC} = 0.9 V to 1.95 V	-	-	$0.35 \times V_{CC}$	V
		V_{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V_{CC} = 3.0 V to 3.6 V	-	-	0.9	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}				
		I_O = −20 μA; V_{CC} = 0.8 V to 3.6 V	$V_{CC} - 0.1$	-	-	V
		I_O = −1.1 mA; V_{CC} = 1.1 V	$0.75 \times V_{CC}$	-	-	V
		I_O = −1.7 mA; V_{CC} = 1.4 V	1.11	-	-	V
		I_O = −1.9 mA; V_{CC} = 1.65 V	1.32	-	-	V
		I_O = −2.3 mA; V_{CC} = 2.3 V	2.05	-	-	V
		I_O = −3.1 mA; V_{CC} = 2.3 V	1.9	-	-	V
		I_O = −2.7 mA; V_{CC} = 3.0 V	2.72	-	-	V
		I_O = −4.0 mA; V_{CC} = 3.0 V	2.6	-	-	V

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Table 8: Static characteristics *...continued*

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		I_O = 20 μA; V_{CC} = 0.8 V to 3.6 V		-	-	0.1	V
		I_O = 1.1 mA; V_{CC} = 1.1 V		-	-	0.3 × V_{CC}	V
		I_O = 1.7 mA; V_{CC} = 1.4 V		-	-	0.31	V
		I_O = 1.9 mA; V_{CC} = 1.65 V		-	-	0.31	V
		I_O = 2.3 mA; V_{CC} = 2.3 V		-	-	0.31	V
		I_O = 3.1 mA; V_{CC} = 2.3 V		-	-	0.44	V
		I_O = 2.7 mA; V_{CC} = 3.0 V		-	-	0.31	V
		I_O = 4.0 mA; V_{CC} = 3.0 V		-	-	0.44	V
I_I	input leakage current	V_I = GND to 3.6 V; V_{CC} = 0 V to 3.6 V		-	-	±0.1	μA
I_{OFF}	power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V		-	-	±0.2	μA
ΔI_{OFF}	additional power-off leakage current	V_I or V_O = 0 V to 3.6 V; V_{CC} = 0 V to 0.2 V		-	-	±0.2	μA
I_{CC}	quiescent supply current	V_I = GND or V_{CC}; I_O = 0 A; V_{CC} = 0.8 V to 3.6 V		-	-	0.5	μA
ΔI_{CC}	additional quiescent supply current	$V_I = V_{CC} - 0.6$ V; I_O = 0 A; V_{CC} = 3.3 V	[1]	-	-	40	μA
C_I	input capacitance	V_{CC} = 0 V to 3.6 V; V_I = GND or V_{CC}		-	0.8	-	pF
C_O	output capacitance	V_O = GND; V_{CC} = 0 V		-	1.7	-	pF
T_{amb} = −40 °C to +85 °C							
V_{IH}	HIGH-state input voltage	V_{CC} = 0.8 V		0.70 × V_{CC}	-	-	V
		V_{CC} = 0.9 V to 1.95 V		0.65 × V_{CC}	-	-	V
		V_{CC} = 2.3 V to 2.7 V		1.6	-	-	V
		V_{CC} = 3.0 V to 3.6 V		2.0	-	-	V
V_{IL}	LOW-state input voltage	V_{CC} = 0.8 V		-	-	0.30 × V_{CC}	V
		V_{CC} = 0.9 V to 1.95 V		-	-	0.35 × V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V		-	-	0.7	V
		V_{CC} = 3.0 V to 3.6 V		-	-	0.9	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		I_O = −20 μA; V_{CC} = 0.8 V to 3.6 V		$V_{CC} - 0.1$	-	-	V
		I_O = −1.1 mA; V_{CC} = 1.1 V		0.7 × V_{CC}	-	-	V
		I_O = −1.7 mA; V_{CC} = 1.4 V		1.03	-	-	V
		I_O = −1.9 mA; V_{CC} = 1.65 V		1.30	-	-	V
		I_O = −2.3 mA; V_{CC} = 2.3 V		1.97	-	-	V
		I_O = −3.1 mA; V_{CC} = 2.3 V		1.85	-	-	V
		I_O = −2.7 mA; V_{CC} = 3.0 V		2.67	-	-	V
		I_O = −4.0 mA; V_{CC} = 3.0 V		2.55	-	-	V

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Table 8: Static characteristics *...continued*

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = 20\ \mu A$; $V_{CC} = 0.8$ V to 3.6 V		-	-	0.1	V
		$I_O = 1.1$ mA; $V_{CC} = 1.1$ V		-	-	$0.3 \times V_{CC}$	V
		$I_O = 1.7$ mA; $V_{CC} = 1.4$ V		-	-	0.37	V
		$I_O = 1.9$ mA; $V_{CC} = 1.65$ V		-	-	0.35	V
		$I_O = 2.3$ mA; $V_{CC} = 2.3$ V		-	-	0.33	V
		$I_O = 3.1$ mA; $V_{CC} = 2.3$ V		-	-	0.45	V
		$I_O = 2.7$ mA; $V_{CC} = 3.0$ V		-	-	0.33	V
		$I_O = 4.0$ mA; $V_{CC} = 3.0$ V		-	-	0.45	V
I_I	input leakage current	V_I = GND to 3.6 V; $V_{CC} = 0$ V to 3.6 V		-	-	±0.5	μA
I_{OFF}	power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V		-	-	±0.5	μA
ΔI_{OFF}	additional power-off leakage current	V_I or $V_O = 0$ V to 3.6 V; $V_{CC} = 0$ V to 0.2 V		-	-	±0.6	μA
I_{CC}	quiescent supply current	V_I = GND or V_{CC}; $I_O = 0$ A; $V_{CC} = 0.8$ V to 3.6 V		-	-	0.9	μA
ΔI_{CC}	additional quiescent supply current	$V_I = V_{CC} - 0.6$ V; $I_O = 0$ A; $V_{CC} = 3.3$ V	[1]	-	-	50	μA
$T_{amb} = -40$ °C to +125 °C							
V_{IH}	HIGH-state input voltage	$V_{CC} = 0.8$ V		$0.75 \times V_{CC}$	-	-	V
		$V_{CC} = 0.9$ V to 1.95 V		$0.70 \times V_{CC}$	-	-	V
		$V_{CC} = 2.3$ V to 2.7 V		1.6	-	-	V
		$V_{CC} = 3.0$ V to 3.6 V		2.0	-	-	V
V_{IL}	LOW-state input voltage	$V_{CC} = 0.8$ V		-	-	$0.25 \times V_{CC}$	V
		$V_{CC} = 0.9$ V to 1.95 V		-	-	$0.30 \times V_{CC}$	V
		$V_{CC} = 2.3$ V to 2.7 V		-	-	0.7	V
		$V_{CC} = 3.0$ V to 3.6 V		-	-	0.9	V
V_{OH}	HIGH-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = -20\ \mu A$; $V_{CC} = 0.8$ V to 3.6 V		$V_{CC} - 0.11$	-	-	V
		$I_O = -1.1$ mA; $V_{CC} = 1.1$ V		$0.6 \times V_{CC}$	-	-	V
		$I_O = -1.7$ mA; $V_{CC} = 1.4$ V		0.93	-	-	V
		$I_O = -1.9$ mA; $V_{CC} = 1.65$ V		1.17	-	-	V
		$I_O = -2.3$ mA; $V_{CC} = 2.3$ V		1.77	-	-	V
		$I_O = -3.1$ mA; $V_{CC} = 2.3$ V		1.67	-	-	V
		$I_O = -2.7$ mA; $V_{CC} = 3.0$ V		2.40	-	-	V
		$I_O = -4.0$ mA; $V_{CC} = 3.0$ V		2.30	-	-	V

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Table 8: Static characteristics *...continued*

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

Symbol	Parameter	Conditions		Min	Typ	Max	Unit
V_{OL}	LOW-state output voltage	$V_I = V_{IH}$ or V_{IL}					
		$I_O = 20\ \mu A$; $V_{CC} = 0.8\ V$ to $3.6\ V$		-	-	0.11	V
		$I_O = 1.1\ mA$; $V_{CC} = 1.1\ V$		-	-	$0.33 \times V_{CC}$	V
		$I_O = 1.7\ mA$; $V_{CC} = 1.4\ V$		-	-	0.41	V
		$I_O = 1.9\ mA$; $V_{CC} = 1.65\ V$		-	-	0.39	V
		$I_O = 2.3\ mA$; $V_{CC} = 2.3\ V$		-	-	0.36	V
		$I_O = 3.1\ mA$; $V_{CC} = 2.3\ V$		-	-	0.50	V
		$I_O = 2.7\ mA$; $V_{CC} = 3.0\ V$		-	-	0.36	V
		$I_O = 4.0\ mA$; $V_{CC} = 3.0\ V$		-	-	0.50	V
I_I	input leakage current	V_I = GND to 3.6 V; $V_{CC} = 0\ V$ to $3.6\ V$		-	-	±0.75	μA
I_{OFF}	power-off leakage current	V_I or $V_O = 0\ V$ to $3.6\ V$; $V_{CC} = 0\ V$		-	-	±0.75	μA
ΔI_{OFF}	additional power-off leakage current	V_I or $V_O = 0\ V$ to $3.6\ V$; $V_{CC} = 0\ V$ to $0.2\ V$		-	-	±0.75	μA
I_{CC}	quiescent supply current	V_I = GND or V_{CC}; $I_O = 0\ A$; $V_{CC} = 0.8\ V$ to $3.6\ V$		-	-	1.4	μA
ΔI_{CC}	additional quiescent supply current	$V_I = V_{CC} - 0.6\ V$; $I_O = 0\ A$; $V_{CC} = 3.3\ V$	[1]	-	-	75	μA

[1] One input at $V_{CC} - 0.6$ V, other input at V_{CC} or GND.

12. Dynamic characteristics

Table 9: Dynamic characteristics

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
$T_{amb} = 25\ °C$; $C_L = 5\ pF$						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7				
		$V_{CC} = 0.8\ V$	-	21.1	-	ns
		$V_{CC} = 1.1\ V$ to $1.3\ V$	2.4	5.9	11.7	ns
		$V_{CC} = 1.4\ V$ to $1.6\ V$	2.0	4.1	6.8	ns
		$V_{CC} = 1.65\ V$ to $1.95\ V$	1.6	3.3	5.4	ns
		$V_{CC} = 2.3\ V$ to $2.7\ V$	1.3	2.5	3.6	ns
		$V_{CC} = 3.0\ V$ to $3.6\ V$	1.2	2.1	2.9	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8				
		$V_{CC} = 0.8\ V$	-	17.4	-	ns
		$V_{CC} = 1.1\ V$ to $1.3\ V$	2.4	5.2	9.7	ns
		$V_{CC} = 1.4\ V$ to $1.6\ V$	2.3	3.8	4.9	ns
		$V_{CC} = 1.65\ V$ to $1.95\ V$	1.8	3.1	4.9	ns
		$V_{CC} = 2.3\ V$ to $2.7\ V$	1.8	2.6	3.6	ns
		$V_{CC} = 3.0\ V$ to $3.6\ V$	1.6	2.4	3.1	ns

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Table 9: Dynamic characteristics *…continued*

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
f_{max}	maximum input clock frequency CP	see Figure 7				
		V_{CC} = 0.8 V	-	50	-	MHz
		V_{CC} = 1.1 V to 1.3 V	-	200	-	MHz
		V_{CC} = 1.4 V to 1.6 V	-	345	-	MHz
		V_{CC} = 1.65 V to 1.95 V	-	435	-	MHz
		V_{CC} = 2.3 V to 2.7 V	-	550	-	MHz
		V_{CC} = 3.0 V to 3.6 V	-	615	-	MHz
T_{amb} = 25 °C; C_L = 10 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7				
		V_{CC} = 0.8 V	-	24.7	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.6	6.8	13.3	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	4.8	7.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	3.9	6.1	ns
		V_{CC} = 2.3 V to 2.7 V	1.7	3.0	4.3	ns
		V_{CC} = 3.0 V to 3.6 V	1.6	2.7	3.6	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8				
		V_{CC} = 0.8 V	-	21.0	-	ns
		V_{CC} = 1.1 V to 1.3 V	2.6	6.2	11.5	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	4.4	5.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.5	3.7	5.7	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	3.2	4.3	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	3.0	3.9	ns
f_{max}	maximum input clock frequency CP	see Figure 7				
		V_{CC} = 0.8 V	-	50	-	MHz
		V_{CC} = 1.1 V to 1.3 V	-	190	-	MHz
		V_{CC} = 1.4 V to 1.6 V	-	320	-	MHz
		V_{CC} = 1.65 V to 1.95 V	-	420	-	MHz
		V_{CC} = 2.3 V to 2.7 V	-	485	-	MHz
		V_{CC} = 3.0 V to 3.6 V	-	550	-	MHz

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Table 9: Dynamic characteristics *...continued*

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
T_{amb} = 25 °C; C_L = 15 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7				
		V_{CC} = 0.8 V	-	28.1	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.0	7.6	14.8	ns
		V_{CC} = 1.4 V to 1.6 V	2.7	5.3	8.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.3	4.4	6.8	ns
		V_{CC} = 2.3 V to 2.7 V	2.1	3.5	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	2.0	3.1	4.3	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8				
		V_{CC} = 0.8 V	-	24.6	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.1	7.0	13.2	ns
		V_{CC} = 1.4 V to 1.6 V	3.1	5.0	6.7	ns
		V_{CC} = 1.65 V to 1.95 V	2.6	4.3	6.5	ns
		V_{CC} = 2.3 V to 2.7 V	2.6	3.7	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	2.4	3.5	4.4	ns
f_{max}	maximum input clock frequency CP	see Figure 7				
		V_{CC} = 0.8 V	-	50	-	MHz
		V_{CC} = 1.1 V to 1.3 V	-	180	-	MHz
		V_{CC} = 1.4 V to 1.6 V	-	300	-	MHz
		V_{CC} = 1.65 V to 1.95 V	-	405	-	MHz
		V_{CC} = 2.3 V to 2.7 V	-	420	-	MHz
		V_{CC} = 3.0 V to 3.6 V	-	480	-	MHz
T_{amb} = 25 °C; C_L = 30 pF						
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7				
		V_{CC} = 0.8 V	-	38.4	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.6	9.8	19.5	ns
		V_{CC} = 1.4 V to 1.6 V	3.3	6.9	11.2	ns
		V_{CC} = 1.65 V to 1.95 V	3.1	5.7	8.8	ns
		V_{CC} = 2.3 V to 2.7 V	3.0	4.6	6.4	ns
		V_{CC} = 3.0 V to 3.6 V	2.8	4.2	5.7	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8				
		V_{CC} = 0.8 V	-	35.1	-	ns
		V_{CC} = 1.1 V to 1.3 V	3.9	9.3	18.0	ns
		V_{CC} = 1.4 V to 1.6 V	3.9	6.6	8.7	ns
		V_{CC} = 1.65 V to 1.95 V	3.6	5.6	8.6	ns
		V_{CC} = 2.3 V to 2.7 V	3.5	4.8	6.4	ns
		V_{CC} = 3.0 V to 3.6 V	3.3	4.6	5.7	ns

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Table 9: Dynamic characteristics *…continued*

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
f_{max}	maximum input clock frequency CP	see Figure 7				
		V_{CC} = 0.8 V	-	35	-	MHz
		V_{CC} = 1.1 V to 1.3 V	-	130	-	MHz
		V_{CC} = 1.4 V to 1.6 V	-	200	-	MHz
		V_{CC} = 1.65 V to 1.95 V	-	240	-	MHz
		V_{CC} = 2.3 V to 2.7 V	-	275	-	MHz
		V_{CC} = 3.0 V to 3.6 V	-	300	-	MHz
T_{amb} = 25 °C						
t_W	pulse width HIGH or LOW CP	see Figure 7				
		V_{CC} = 0.8 V	-	5.25	-	ns
		V_{CC} = 1.1 V to 1.3 V	-	1.6	-	ns
		V_{CC} = 1.4 V to 1.6 V	-	1.0	-	ns
		V_{CC} = 1.65 V to 1.95 V	-	0.75	-	ns
		V_{CC} = 2.3 V to 2.7 V	-	0.6	-	ns
		V_{CC} = 3.0 V to 3.6 V	-	0.55	-	ns
	pulse width LOW $\overline{MR}$	see Figure 8				
		V_{CC} = 0.8 V	-	9.0	-	ns
		V_{CC} = 1.1 V to 1.3 V	-	3.0	-	ns
		V_{CC} = 1.4 V to 1.6 V	-	1.75	-	ns
		V_{CC} = 1.65 V to 1.95 V	-	1.35	-	ns
		V_{CC} = 2.3 V to 2.7 V	-	0.9	-	ns
		V_{CC} = 3.0 V to 3.6 V	-	0.8	-	ns
t_{rem}	removal time $\overline{MR}$	see Figure 8				
		V_{CC} = 0.8 V	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	-	–1.1	-	ns
		V_{CC} = 1.4 V to 1.6 V	-	–2.0	-	ns
		V_{CC} = 1.65 V to 1.95 V	-	–0.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	-	–0.9	-	ns
		V_{CC} = 3.0 V to 3.6 V	-	–1.0	-	ns
$t_{su(H)}$	set-up time HIGH D to CP	see Figure 7				
		V_{CC} = 0.8 V	-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V	-	0.5	-	ns
		V_{CC} = 1.4 V to 1.6 V	-	0.4	-	ns
		V_{CC} = 1.65 V to 1.95 V	-	0.5	-	ns
		V_{CC} = 2.3 V to 2.7 V	-	0.3	-	ns
		V_{CC} = 3.0 V to 3.6 V	-	0.2	-	ns

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Table 9: Dynamic characteristics *…continued*

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions		Min	Typ [1]	Max	Unit
$t_{su(L)}$	set-up time LOW D to CP	see Figure 7					
		V_{CC} = 0.8 V		-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V		-	0.8	-	ns
		V_{CC} = 1.4 V to 1.6 V		-	0.6	-	ns
		V_{CC} = 1.65 V to 1.95 V		-	0.4	-	ns
		V_{CC} = 2.3 V to 2.7 V		-	0.4	-	ns
		V_{CC} = 3.0 V to 3.6 V		-	0.5	-	ns
t_h	hold time D to CP	see Figure 7			-		
		V_{CC} = 0.8 V		-	-	-	ns
		V_{CC} = 1.1 V to 1.3 V		-	–0.7	-	ns
		V_{CC} = 1.4 V to 1.6 V		-	–0.5	-	ns
		V_{CC} = 1.65 V to 1.95 V		-	–0.5	-	ns
		V_{CC} = 2.3 V to 2.7 V		-	–0.3	-	ns
		V_{CC} = 3.0 V to 3.6 V		-	–0.4	-	ns
C_{PD}	power dissipation capacitance	f = 1 MHz	[2] [3]				
		V_{CC} = 0.8 V		-	1.8	-	pF
		V_{CC} = 1.1 V to 1.3 V		-	1.9	-	pF
		V_{CC} = 1.4 V to 1.6 V		-	1.9	-	pF
		V_{CC} = 1.65 V to 1.95 V		-	2.0	-	pF
		V_{CC} = 2.3 V to 2.7 V		-	2.3	-	pF
		V_{CC} = 3.0 V to 3.6 V		-	2.7	-	pF

[1] All typical values are measured at nominal V_{CC}.

[2] 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;

C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

[3] The condition is V_I = GND to V_{CC}.

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Table 10: Dynamic characteristics

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	–40 °C to +85 °C		–40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C_L = 5 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	2.2	11.9	2.2	12.0	ns
		V_{CC} = 1.4 V to 1.6 V	1.8	7.3	1.8	7.6	ns
		V_{CC} = 1.65 V to 1.95 V	1.3	5.9	1.3	6.2	ns
		V_{CC} = 2.3 V to 2.7 V	1.1	4.0	1.1	4.2	ns
		V_{CC} = 3.0 V to 3.6 V	1.0	3.3	1.0	3.5	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	2.2	10.0	2.2	12.0	ns
		V_{CC} = 1.4 V to 1.6 V	2.1	6.4	2.1	6.6	ns
		V_{CC} = 1.65 V to 1.95 V	1.7	5.4	1.7	5.6	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	4.0	1.5	4.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.3	3.3	1.3	3.6	ns
f_{max}	maximum input clock frequency CP	see Figure 7					
		V_{CC} = 0.8 V	-	-	-	-	MHz
		V_{CC} = 1.1 V to 1.3 V	170	-	-	-	MHz
		V_{CC} = 1.4 V to 1.6 V	310	-	-	-	MHz
		V_{CC} = 1.65 V to 1.95 V	400	-	-	-	MHz
		V_{CC} = 2.3 V to 2.7 V	490	-	-	-	MHz
		V_{CC} = 3.0 V to 3.6 V	550	-	-	-	MHz
C_L = 10 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	2.4	13.6	2.4	13.6	ns
		V_{CC} = 1.4 V to 1.6 V	2.0	8.4	2.0	8.7	ns
		V_{CC} = 1.65 V to 1.95 V	1.8	6.6	1.8	6.9	ns
		V_{CC} = 2.3 V to 2.7 V	1.5	4.7	1.5	5.0	ns
		V_{CC} = 3.0 V to 3.6 V	1.3	4.0	1.3	4.2	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	2.6	11.7	2.6	13.6	ns
		V_{CC} = 1.4 V to 1.6 V	2.4	7.6	2.4	7.8	ns
		V_{CC} = 1.65 V to 1.95 V	2.2	6.3	2.2	6.3	ns
		V_{CC} = 2.3 V to 2.7 V	1.9	4.7	1.9	4.9	ns
		V_{CC} = 3.0 V to 3.6 V	1.8	4.1	1.8	4.3	ns

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Table 10: Dynamic characteristics *...continued*
GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Max	Min	Max	
f_{max}	maximum input clock frequency CP	see Figure 7					
		V_{CC} = 0.8 V	-	-	-	-	MHz
		V_{CC} = 1.1 V to 1.3 V	150	-	-	-	MHz
		V_{CC} = 1.4 V to 1.6 V	280	-	-	-	MHz
		V_{CC} = 1.65 V to 1.95 V	310	-	-	-	MHz
		V_{CC} = 2.3 V to 2.7 V	370	-	-	-	MHz
		V_{CC} = 3.0 V to 3.6 V	410	-	-	-	MHz
C_L = 15 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	2.8	15.2	2.8	15.4	ns
		V_{CC} = 1.4 V to 1.6 V	2.3	9.4	2.3	9.9	ns
		V_{CC} = 1.65 V to 1.95 V	2.1	7.4	2.1	7.9	ns
		V_{CC} = 2.3 V to 2.7 V	1.9	5.3	1.9	5.6	ns
		V_{CC} = 3.0 V to 3.6 V	1.7	4.7	1.7	4.9	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	2.9	13.5	2.9	15.2	ns
		V_{CC} = 1.4 V to 1.6 V	2.6	8.6	2.6	9.1	ns
		V_{CC} = 1.65 V to 1.95 V	2.5	7.2	2.5	7.4	ns
		V_{CC} = 2.3 V to 2.7 V	2.2	5.4	2.2	5.5	ns
		V_{CC} = 3.0 V to 3.6 V	2.1	4.8	2.1	5.0	ns
f_{max}	maximum input clock frequency CP	see Figure 7					
		V_{CC} = 0.8 V	-	-	-	-	MHz
		V_{CC} = 1.1 V to 1.3 V	120	-	-	-	MHz
		V_{CC} = 1.4 V to 1.6 V	190	-	-	-	MHz
		V_{CC} = 1.65 V to 1.95 V	240	-	-	-	MHz
		V_{CC} = 2.3 V to 2.7 V	300	-	-	-	MHz
		V_{CC} = 3.0 V to 3.6 V	320	-	-	-	MHz

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Table 10: Dynamic characteristics *...continued*
GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Max	Min	Max	
C_L = 30 pF							
t_{PHL}, t_{PLH}	HIGH-to-LOW and LOW-to-HIGH propagation delay CP to Q	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	3.4	20.6	3.4	21.0	ns
		V_{CC} = 1.4 V to 1.6 V	3.2	12.4	3.2	13.0	ns
		V_{CC} = 1.65 V to 1.95 V	2.9	9.6	2.9	10.2	ns
		V_{CC} = 2.3 V to 2.7 V	2.6	6.9	2.6	7.3	ns
		V_{CC} = 3.0 V to 3.6 V	2.5	6.5	2.5	6.9	ns
	HIGH-to-LOW and LOW-to-HIGH propagation delay $\overline{MR}$ to Q	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	3.7	18.6	3.7	19.8	ns
		V_{CC} = 1.4 V to 1.6 V	3.6	11.6	3.6	12.2	ns
		V_{CC} = 1.65 V to 1.95 V	3.4	9.6	3.4	9.7	ns
		V_{CC} = 2.3 V to 2.7 V	2.9	7.2	2.9	7.2	ns
		V_{CC} = 3.0 V to 3.6 V	3.1	6.4	3.1	6.9	ns
f_{max}	maximum input clock frequency CP	see Figure 7					
		V_{CC} = 0.8 V	-	-	-	-	MHz
		V_{CC} = 1.1 V to 1.3 V	70	-	-	-	MHz
		V_{CC} = 1.4 V to 1.6 V	120	-	-	-	MHz
		V_{CC} = 1.65 V to 1.95 V	150	-	-	-	MHz
		V_{CC} = 2.3 V to 2.7 V	190	-	-	-	MHz
		V_{CC} = 3.0 V to 3.6 V	200	-	-	-	MHz
C_L = 5 pF, 10 pF, 15 pF, 30 pF							
t_W	pulse width HIGH or LOW CP	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	1.5	-	1.5	-	ns
		V_{CC} = 1.4 V to 1.6 V	0.9	-	0.9	-	ns
		V_{CC} = 1.65 V to 1.95 V	0.7	-	0.7	-	ns
		V_{CC} = 2.3 V to 2.7 V	0.4	-	0.4	-	ns
		V_{CC} = 3.0 V to 3.6 V	0.4	-	0.4	-	ns
	pulse width LOW $\overline{MR}$	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	4.9	-	4.9	-	ns
		V_{CC} = 1.4 V to 1.6 V	2.5	-	2.5	-	ns
		V_{CC} = 1.65 V to 1.95 V	1.8	-	1.8	-	ns
		V_{CC} = 2.3 V to 2.7 V	1.1	-	1.1	-	ns
		V_{CC} = 3.0 V to 3.6 V	0.8	-	0.8	-	ns
t_{rem}	removal time $\overline{MR}$	see Figure 8					
		V_{CC} = 1.1 V to 1.3 V	−1.2	-	−1.2	-	ns
		V_{CC} = 1.4 V to 1.6 V	−0.8	-	−0.8	-	ns
		V_{CC} = 1.65 V to 1.95 V	−0.7	-	−0.7	-	ns
		V_{CC} = 2.3 V to 2.7 V	−0.4	-	−0.4	-	ns
		V_{CC} = 3.0 V to 3.6 V	−0.2	-	−0.2	-	ns

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Table 10: Dynamic characteristics *...continued*

GND = 0 V; see Figure 9

Symbol	Parameter	Conditions	−40 °C to +85 °C		−40 °C to +125 °C		Unit
			Min	Max	Min	Max	
$t_{su(H)}$	set-up time HIGH D to CP	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	1.2	-	1.2	-	ns
		V_{CC} = 1.4 V to 1.6 V	0.8	-	0.8	-	ns
		V_{CC} = 1.65 V to 1.95 V	0.6	-	0.6	-	ns
		V_{CC} = 2.3 V to 2.7 V	0.5	-	0.5	-	ns
		V_{CC} = 3.0 V to 3.6 V	0.5	-	0.5	-	ns
$t_{su(L)}$	set-up time LOW D to CP	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	1.7	-	1.7	-	ns
		V_{CC} = 1.4 V to 1.6 V	1.1	-	1.1	-	ns
		V_{CC} = 1.65 V to 1.95 V	0.9	-	0.9	-	ns
		V_{CC} = 2.3 V to 2.7 V	0.9	-	0.9	-	ns
		V_{CC} = 3.0 V to 3.6 V	0.9	-	0.9	-	ns
t_h	hold time D to CP	see Figure 7					
		V_{CC} = 1.1 V to 1.3 V	0.2	-	0.2	-	ns
		V_{CC} = 1.4 V to 1.6 V	0	-	0	-	ns
		V_{CC} = 1.65 V to 1.95 V	0	-	0	-	ns
		V_{CC} = 2.3 V to 2.7 V	0	-	0	-	ns
		V_{CC} = 3.0 V to 3.6 V	0	-	0	-	ns

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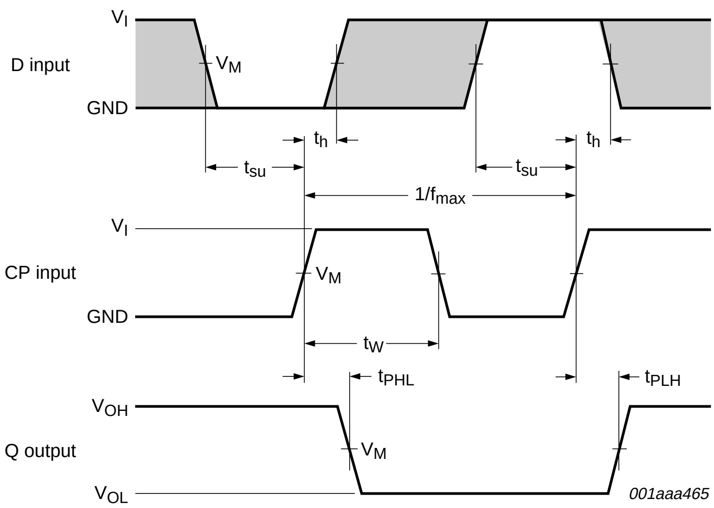
13. Waveforms



Measurement points are given in Table 11.

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

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

Fig 7. The clock input (CP) to output (Q) propagation delays, the clock pulse width, the D to CP set-up, the CP to D hold times and the maximum input clock frequency

Table 11: Measurement points

Supply voltage	Output	Input		
V_{CC}	V_M	V_M	V_I	$t_r = t_f$
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V_{CC}	≤ 3.0 ns

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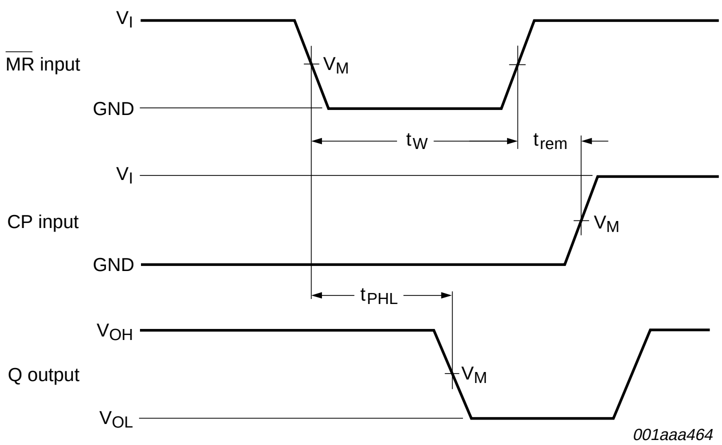

Measurement points are given in Table 12.

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

Fig 8. The master reset ($\overline{MR}$) input to output (Q) propagation delays, the master reset pulse width and the $\overline{MR}$ to CP removal time

Table 12: Measurement points

Supply voltage	Output	Input		
V_{CC}	V_M	V_M	V_I	$t_r = t_f$
0.8 V to 3.6 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	V_{CC}	≤ 3.0 ns

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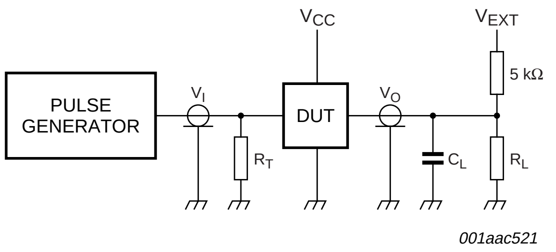

Test data is given in Table 13.

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 the output impedance Z_o of the pulse generator

V_{EXT} = External voltage for measuring switching times.

Fig 9. Load circuitry for switching times

Table 13: Test data

Supply voltage	Load		V_{EXT}		
V_{CC}	C_L	R_L [1]	t_{PLH}, t_{PHL}	t_{PZH}, t_{PHZ}	t_{PZL}, t_{PLZ}
0.8 V to 3.6 V	5 pF, 10 pF, 15 pF and 30 pF	5 kΩ or 1 MΩ	open	GND	$2 \times V_{CC}$

[1] For measuring enable and disable times R_L = 5 kΩ, for measuring propagation delays, setup and hold times and pulse width R_L = 1 MΩ.

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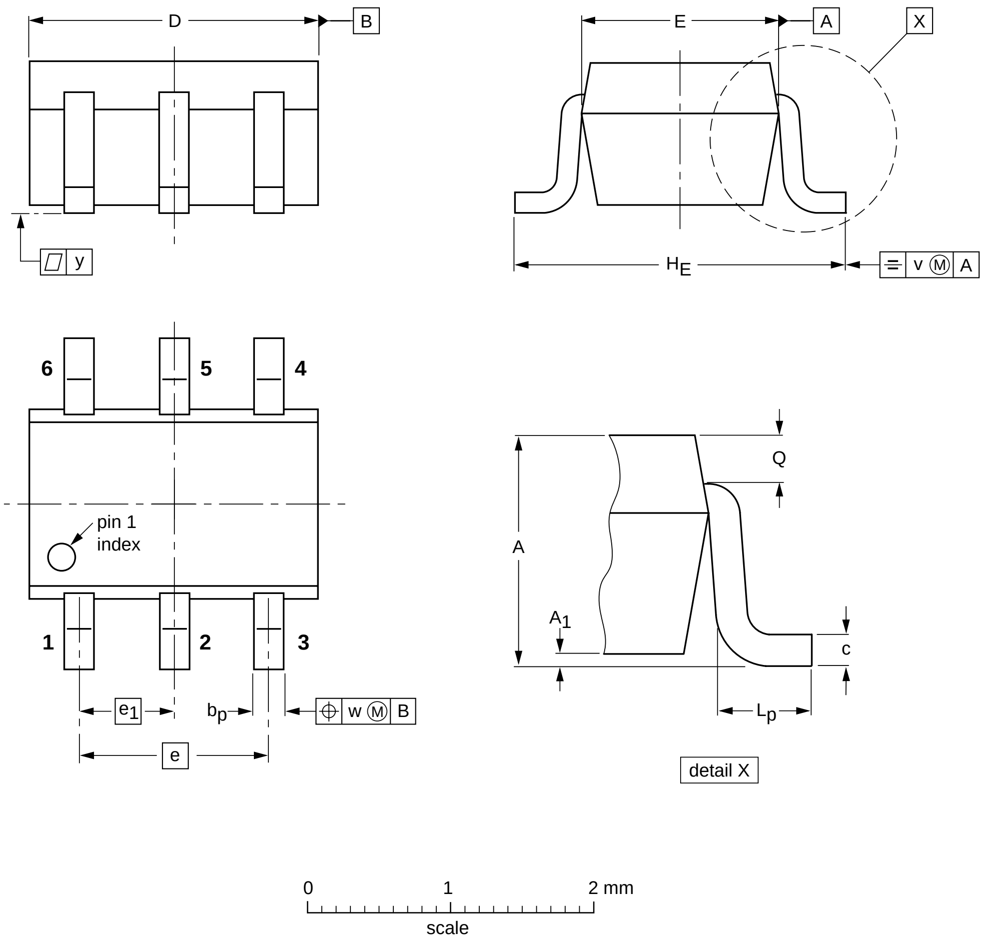
14. Package outline

Plastic surface mounted package; 6 leads **SOT363**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT363			SC-88			~~97-02-28~~ 04-11-08

Fig 10. Package outline SOT363 (SC-88)

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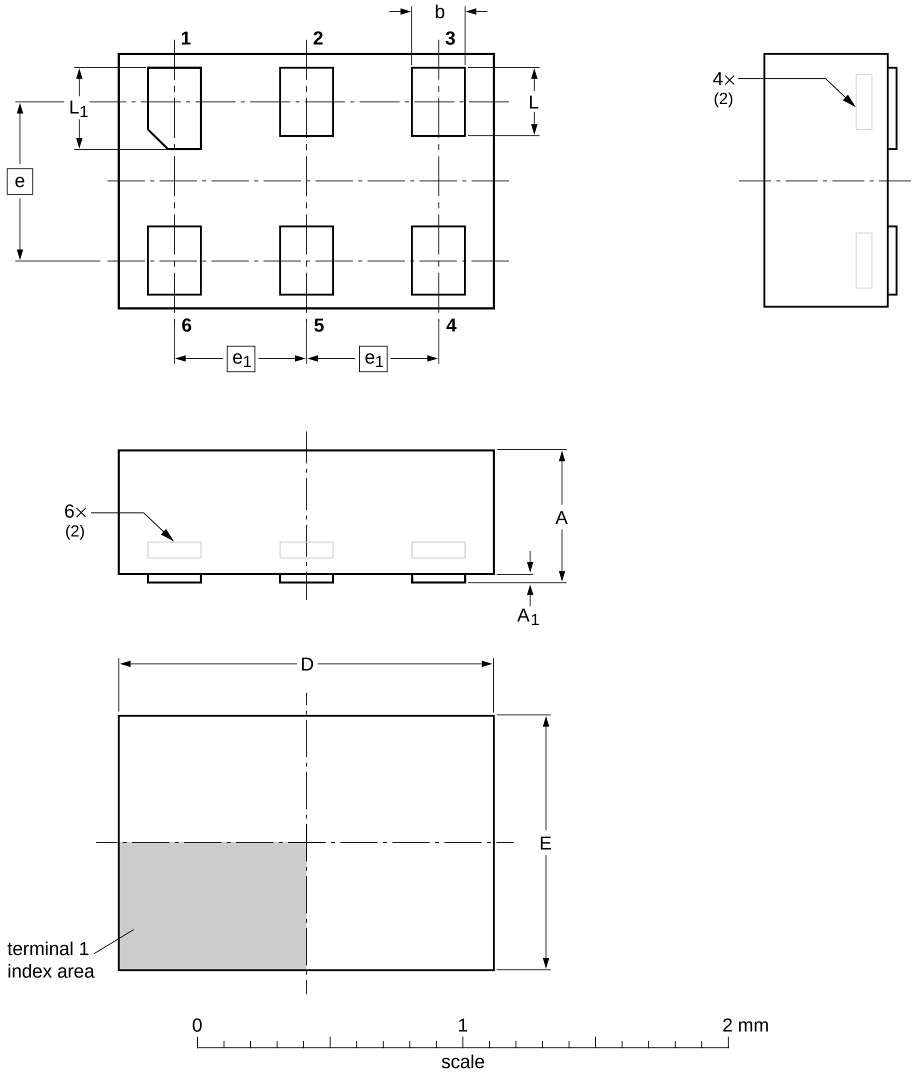
XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm SOT886



DIMENSIONS (mm are the original dimensions)

UNIT	A(1) max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.25 0.17	1.5 1.4	1.05 0.95	0.6	0.5	0.35 0.27	0.40 0.32

Notes

1. Including plating thickness.
2. Can be visible in some manufacturing processes.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT886		MO-252				~~04-07-15~~ 04-07-22

Fig 11. Package outline SOT886 (XSON6)

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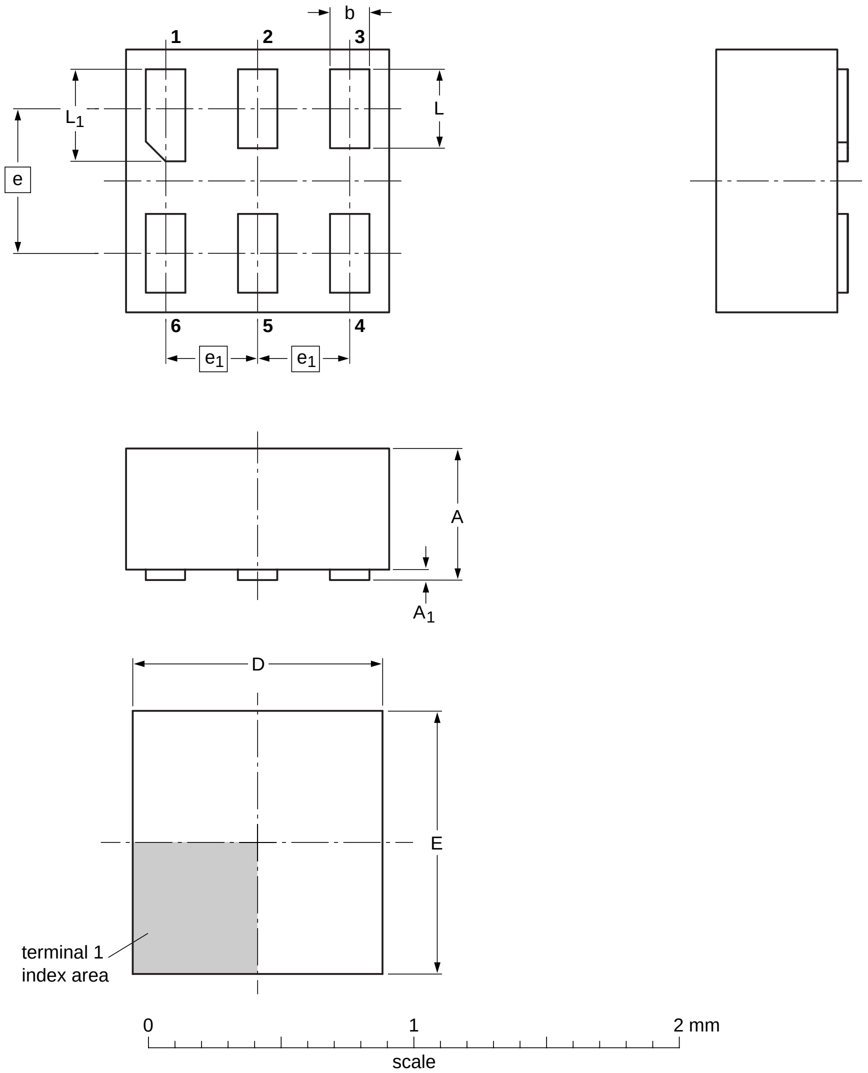
XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm **SOT891**



DIMENSIONS (mm are the original dimensions)

UNIT	A max	A_1 max	b	D	E	e	e_1	L	L_1
mm	0.5	0.04	0.20 0.12	1.05 0.95	1.05 0.95	0.55	0.35	0.35 0.27	0.40 0.32

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT891						~~05-03-11~~ 05-04-06

Fig 12. Package outline SOT891 (XSON6)

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15. Abbreviations

Table 14: Abbreviations

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

16. Revision history

Table 15: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
74AUP1G175_1	20060327	Preliminary data sheet	-	-	-

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17. Data sheet status

Level	Data sheet status [1]	Product status [2] [3]	Definition
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

18. Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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22. Contents

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Date of release: 27 March 2006
Document number: 74AUP1G175_1

Published in The Netherlands