DATA SHEET

74F379A
Quad register

Product specification

1996 Mar 12

IC15 Data Handbook

Philips
Semiconductors

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Quad register 74F379A

FEATURES

- Edge–triggered D–type inputs
- Buffered positive edge–triggered clock
- Buffered common enable input
- True and complementary outputs
- Offers light loading PNP inputs (I_{IL} = –20µA)

DESCRIPTION

The 74F379A is a 4–bit register with buffered common enable ($\overline{E}$). This device is similar to the 74F175A but features the common enable rather than common master reset.

TYPE	TYPICAL f_{max}	TYPICAL SUPPLY CURRENT (TOTAL)
74F379A	200MHz	29mA

ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PKG, DWG. #
	COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	
16–pin plastic DIP	N74F379AN	SOT38–4
16–pin plastic SO	N74F379AD	SOT109–1

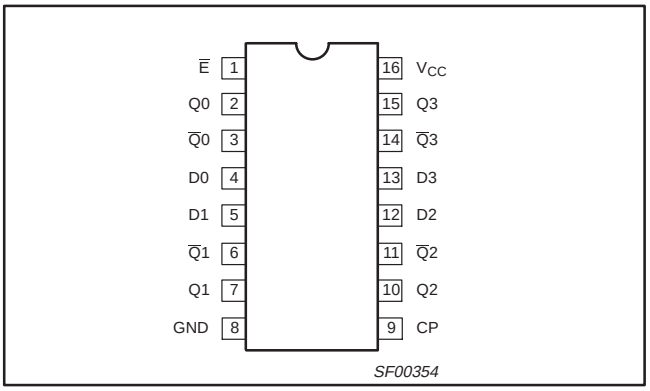
INPUT AND OUTPUT LOADING AND FAN OUT TABLE

TYPE	PINS	DESCRIPTION	74F (U.L.) HIGH/ LOW	LOAD VALUE HIGH/LOW
74F379A	D0 – D3	Data inputs	1.0/0.033	20µA/20µA
	CP	Clock pulse input (active rising edge)	1.0/0.033	20µA/20µA
	$\overline{E}$	Enable input (active low)	1.0/0.033	20µA/20µA
	Q0 – Q3	True outputs	50/33	1.0mA/20mA
	$\overline{Q}$0 – $\overline{Q}$3	Complementary outputs	50/33	15mA/20mA

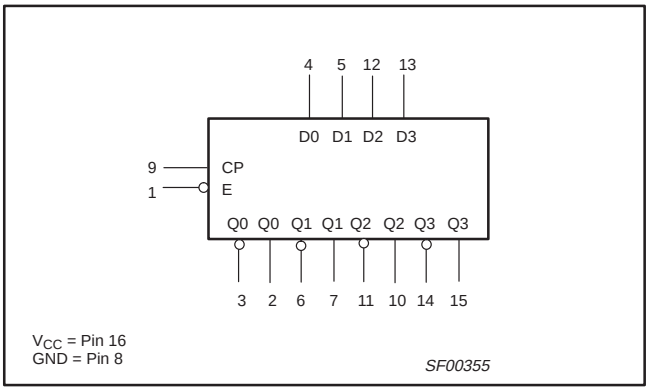
Note to input and output loading and fan out table

1. One (1.0) FAST unit load is defined as: 20µA in the high state and 0.6mA in the low state.

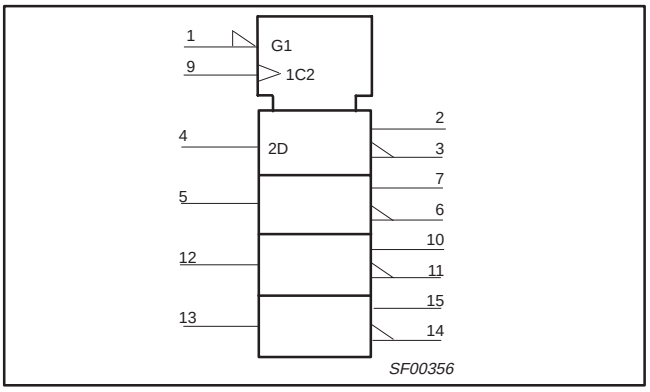
PIN CONFIGURATION



LOGIC SYMBOL



IEC/IEEE SYMBOL



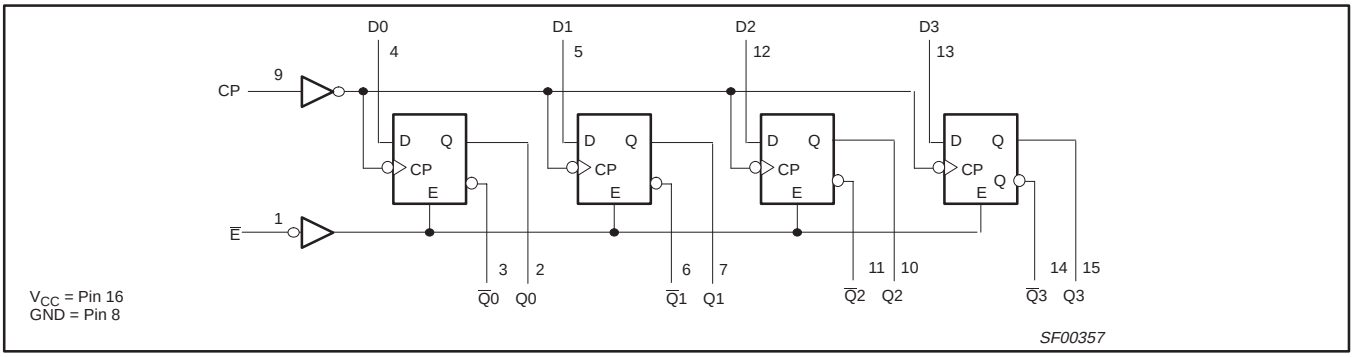
FUNCTION TABLE

INPUTS			OUTPUTS	OUTPUT
$\overline{E}$	CP	Dn	Qn	$\overline{Q}$n
H	↑	X	NC	NC
L	↑	h	H	L
L	↑	l	L	H

Notes to function table

H = High–voltage level
h = High state must be present one setup time before the low–to–high clock transition
L = Low–voltage level
l = Low state must be present one setup time before the low–to–high clock transition
NC = No change
X = Don't care
↑ = Low–to–high clock transition

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

(Operation beyond the limit set forth in this table may impair the useful life of the device.
Unless otherwise noted these limits are over the operating free air temperature range.)

SYMBOL	PARAMETER	RATING	UNIT
V_{CC}	Supply voltage	–0.5 to +7.0	V
V_{IN}	Input voltage	–0.5 to +7.0	V
I_{IN}	Input current	–30 to +5	mA
V_{OUT}	Voltage applied to output in high output state	–0.5 to V_{CC}	V
I_{OUT}	Current applied to output in low output state	40	mA
T_{amb}	Operating free air temperature range	0 to +70	°C
T_{stg}	Storage temperature range	–65 to +150	°C

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5.0	5.5	V
V_{IH}	High–level input voltage	2.0			V
V_{IL}	Low–level input voltage			0.8	V
I_{Ik}	Input clamp current			–18	mA
I_{OH}	High–level output current			–1	mA
I_{OL}	Low–level output current			20	mA
T_{amb}	Operating free air temperature range	0		+70	°C

DC ELECTRICAL CHARACTERISTICS

(Over recommended operating free-air temperature range unless otherwise noted.)

SYMBOL	PARAMETER	TEST CONDITIONS[1]		LIMITS			UNIT
				MIN	TYP[2]	MAX	
V_{OH}	High-level output voltage	V_{CC} = MIN, V_{IL} = MAX,	±10%V_{CC}	2.5			V
		V_{IH} = MIN, I_{OH} = MAX	±5%V_{CC}	2.7	3.4		V
V_{OL}	Low-level output voltage	V_{CC} = MIN, V_{IL} = MAX,	±10%V_{CC}		0.35	0.50	V
		V_{IH} = MIN, I_{OL} = MAX	±5%V_{CC}		0.35	0.50	V
V_{IK}	Input clamp voltage	V_{CC} = MIN, I_I = I_{IK}			–0.73	-1.2	V
I_I	Input current at maximum input voltage	V_{CC} = 0.0V, V_I = 7.0V				100	µA
I_{IH}	High–level input current	V_{CC} = MAX, V_I = 2.7V				20	µA
I_{IL}	Low–level input current					–20	µA
I_{OS}	Short–circuit output current3	V_{CC} = MAX		-60		-150	mA
I_{CC}	Supply current (total)				29	42	mA

Notes to DC electrical characteristics

1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_{amb} = 25°C.
3. Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a high output may raise the chip temperature well above normal and thereby cause invalid readings in other parameter tests. In any sequence of parameter tests, I_{OS} tests should be performed last.

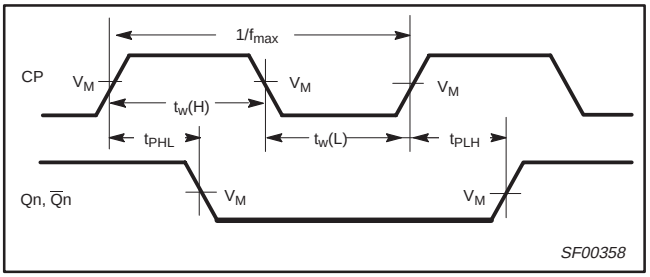
AC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T_{amb} = +25°C V_{CC} = +5.0V C_L = 50pF, R_L = 500Ω			T_{amb} = 0°C to +70°C V_{CC} = +5.0V ± 10% C_L = 50pF, R_L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
f_{max}	Maximum clock frequency	Waveform 1	175	200		155		MHz
t_{PLH} t_{PHL}	Propagation delay CP to Qn or $\overline{Q}$n	Waveform 1	2.0 4.0	3.5 5.5	6.5 8.0	2.0 3.5	7.0 8.5	ns

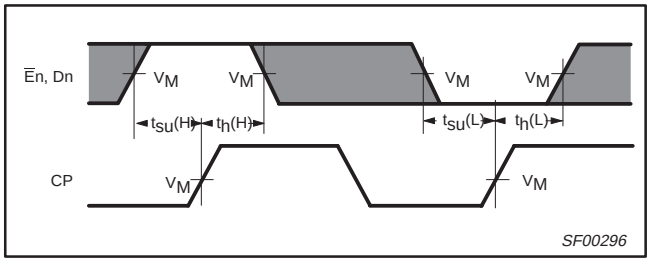
AC SETUP REQUIREMENTS

SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			T_{amb} = +25°C V_{CC} = +5.0V C_L = 50pF, R_L = 500Ω			T_{amb} = 0°C to +70°C V_{CC} = +5.0V ± 10% C_L= 50pF, R_L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t_{su} (H) t_{su} (L)	Setup time, high or low level Dn to CP	Waveform 2	3.0 3.0			3.5 3.5		ns
t_h (H) t_h (L)	Hold time, high or low level Dn to CP	Waveform 2	0 0			0 0		ns
t_{su} (H) t_{su} (L)	Setup time, high or low level $\overline{E}$ to CP	Waveform 2	4.0 3.5			4.5 4.0		ns
t_h (H) t_h (L)	Hold time, high or low level $\overline{E}$ to CP	Waveform 2	0 0			0 0		ns
t_w (H) t_w (L)	CP Pulse width, high or low	Waveform 1	3.5 4.5			3.5 4.5		ns

AC WAVEFORMS



Waveform 1. Propagation delay for clock input to output, clock pulse widths, and maximum clock frequency

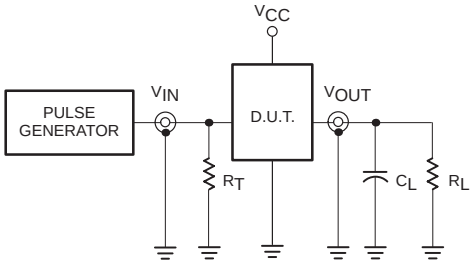


Waveform 2. Data and enable setup time and hold times

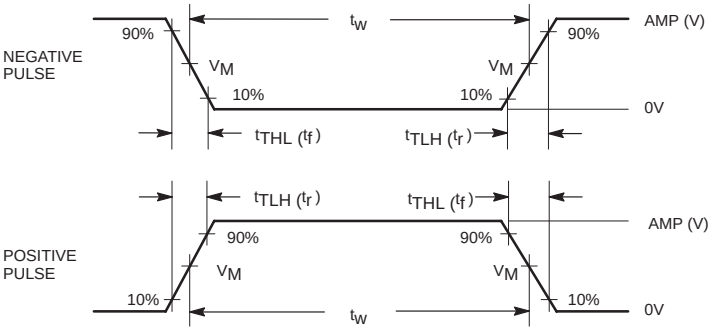
Notes to AC waveforms

1. For all waveforms, V_M = 1.5V.
2. The shaded areas indicate when the input is permitted to change for predictable output performance.

TEST CIRCUIT AND WAVEFORM



Test Circuit for Totem-Pole Outputs



DEFINITIONS:

R_L = Load resistor; see AC ELECTRICAL CHARACTERISTICS for value.

C_L = Load capacitance includes jig and probe capacitance; see AC ELECTRICAL CHARACTERISTICS for value.

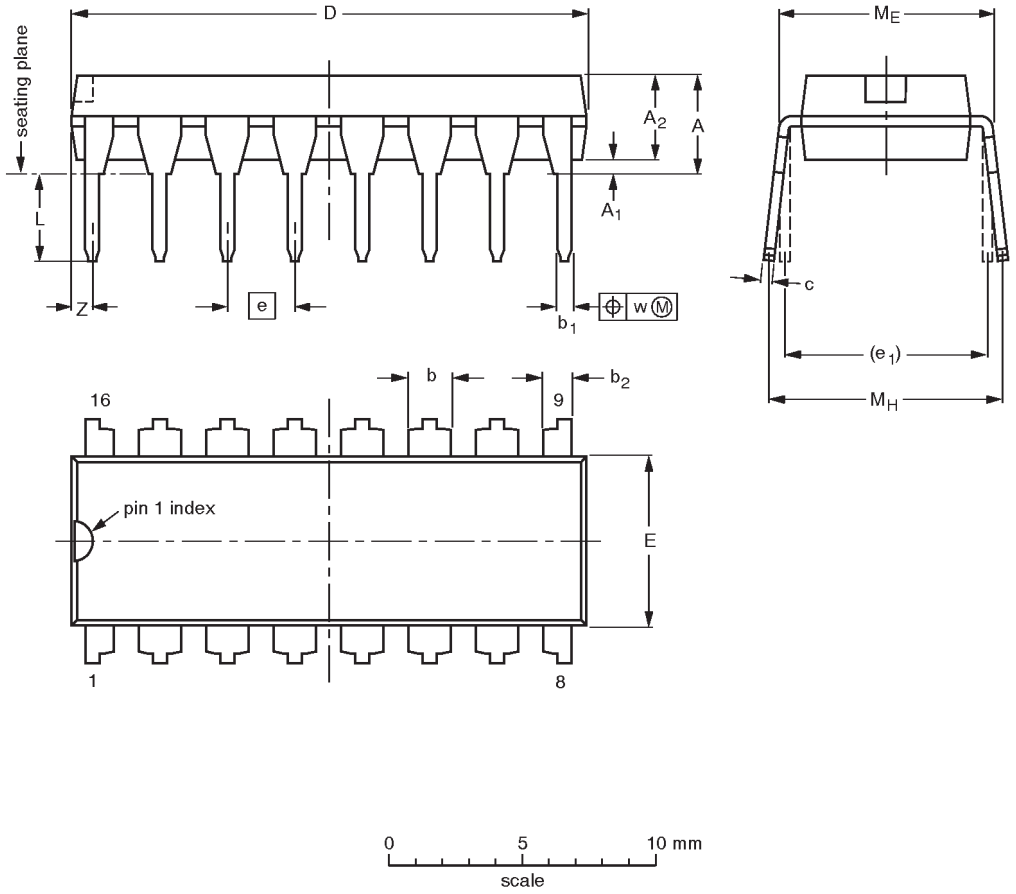
R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

Input Pulse Definition

family	INPUT PULSE REQUIREMENTS					
	amplitude	V_M	rep. rate	t_w	t_{TLH}	t_{THL}
74F	3.0V	1.5V	1MHz	500ns	2.5ns	2.5ns

SF00006

DIP16: plastic dual in-line package; 16 leads (300 mil) **SOT38-4**



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

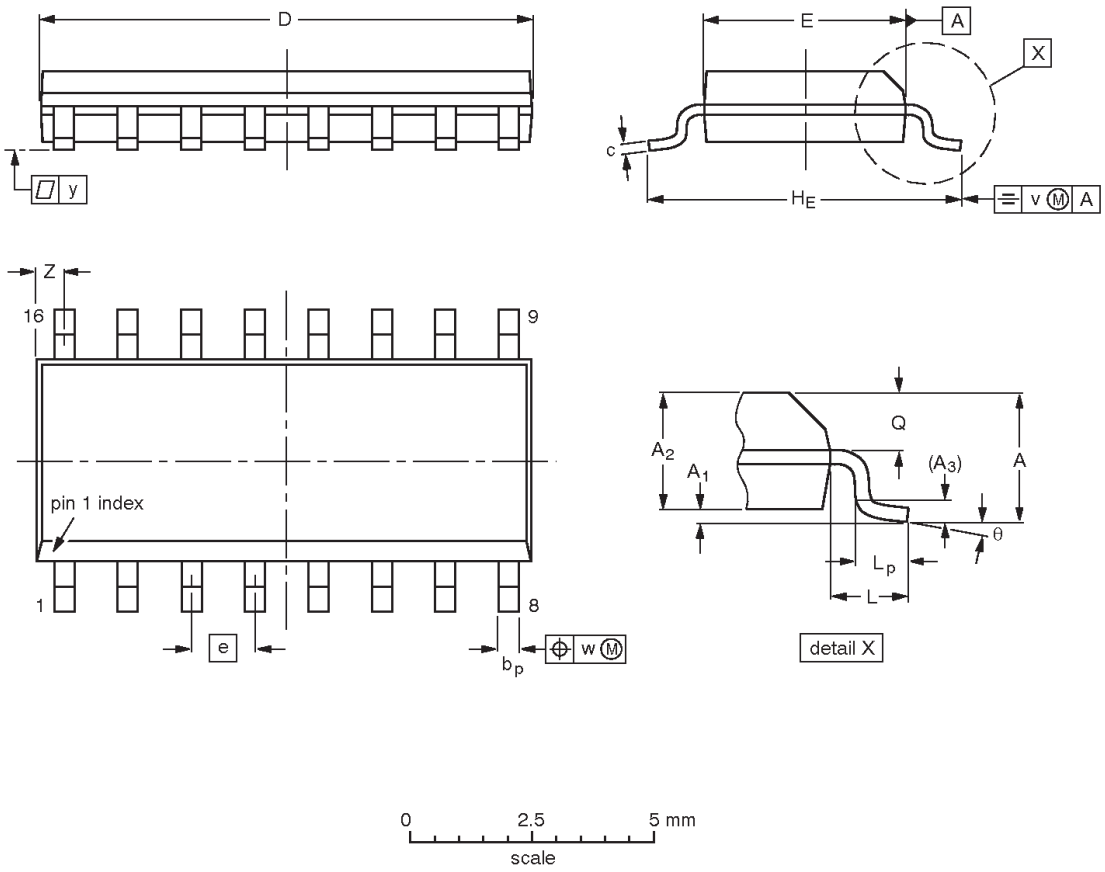
UNIT	A max.	A_1 min.	A_2 max.	b	b_1	b_2	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	1.25 0.85	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	0.76
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.049 0.033	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.030

Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT38-4						~~92-11-17~~ 95-01-14

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	0.25 0.10	1.45 1.25	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^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.39 0.38	0.16 0.15	0.050	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 maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT109-1	076E07S	MS-012AC				~~95-01-23~~ 97-05-22

NOTES

Data sheet status

Data sheet status	Product status	Definition [1]
Objective specification	Development	This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.
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[1] Please consult the most recently issued datasheet before initiating or completing a design.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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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