

DATA SHEET

74F379A

Quad register

Product specification

1996 Mar 12

IC15 Data Handbook

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 ($I_{IL} = -20\mu\text{A}$)

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 $V_{CC} = 5V \pm 10\%$, $T_{\text{amb}} = 0^{\circ}\text{C to } +70^{\circ}\text{C}$ | |
| 16-pin plastic DIP | N74F379AN | SOT38-4 |
| 16-pin plastic SO | N74F379AD | SOT109-1 |

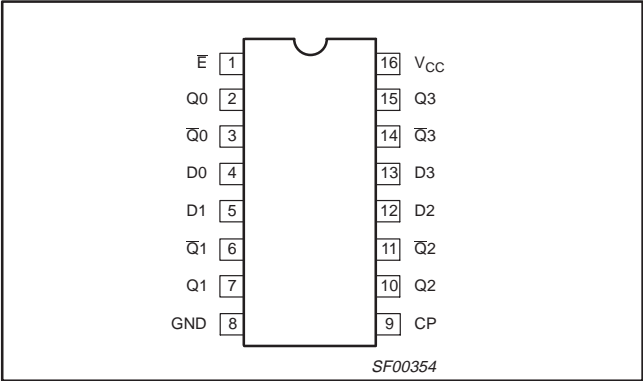
INPUT AND OUTPUT LOADING AND FAN OUT TABLE

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

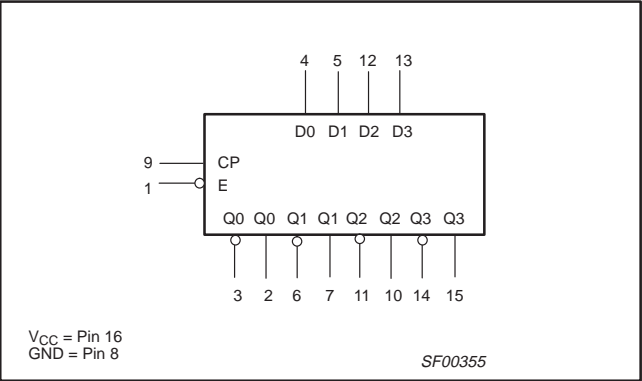
Note to input and output loading and fan out table

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

PIN CONFIGURATION



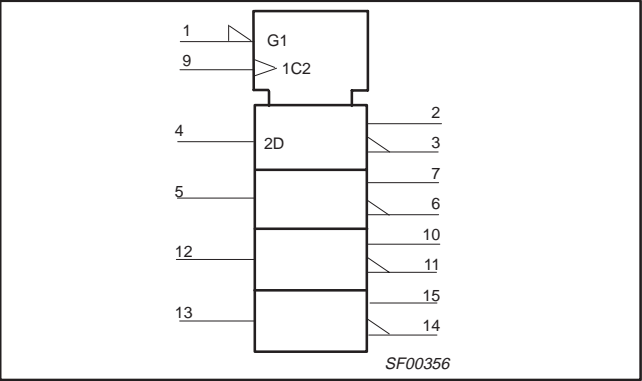
LOGIC SYMBOL



Quad register

74F379A

IEC/IEEE SYMBOL

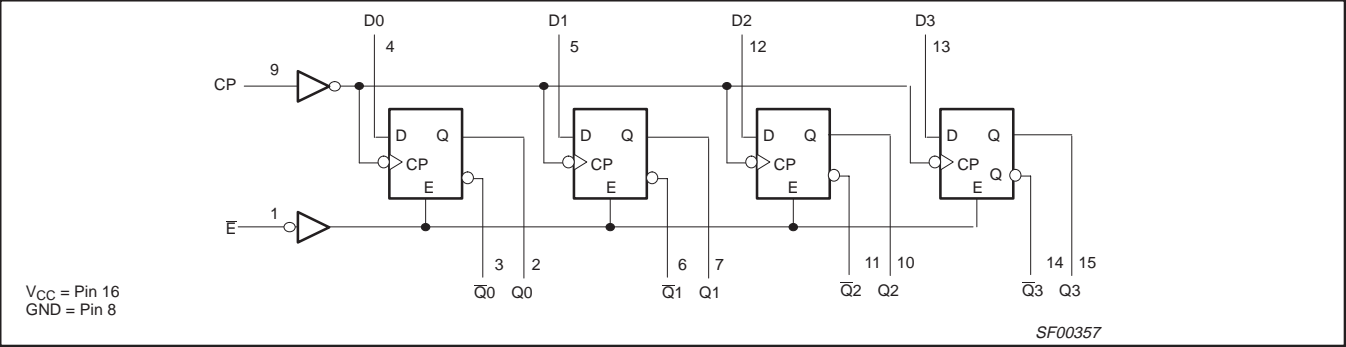


FUNCTION TABLE

| INPUTS | | | OUTPUTS | OUTPUT |
|----------------|------------|----|---------|-----------------|
| \overline{E} | CP | Dn | Qn | \overline{Qn} |
| H | \uparrow | X | NC | NC |
| L | \uparrow | h | H | L |
| L | \uparrow | 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
 \uparrow = Low-to-high clock transition

LOGIC DIAGRAM



Quad register

74F379A

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 | $V_{CC} = \text{MIN}, V_{IL} = \text{MAX},$ $V_{IH} = \text{MIN}, I_{OH} = \text{MAX}$ | $\pm 10\%V_{CC}$ | 2.5 | | V |
| | | | $\pm 5\%V_{CC}$ | 2.7 | 3.4 | V |
| V_{OL} | Low-level output voltage | $V_{CC} = \text{MIN}, V_{IL} = \text{MAX},$ $V_{IH} = \text{MIN}, I_{OL} = \text{MAX}$ | $\pm 10\%V_{CC}$ | | 0.35 | 0.50 |
| | | | $\pm 5\%V_{CC}$ | | 0.35 | 0.50 |
| V_{IK} | Input clamp voltage | $V_{CC} = \text{MIN}, I_I = I_{IK}$ | | -0.73 | -1.2 | V |
| I_I | Input current at maximum input voltage | $V_{CC} = 0.0\text{V}, V_I = 7.0\text{V}$ | | | 100 | μA |
| I_{IH} | High-level input current | $V_{CC} = \text{MAX}, V_I = 2.7\text{V}$ | | | 20 | μA |
| I_{IL} | Low-level input current | | | | -20 | μA |
| I_{OS} | Short-circuit output current ³ | $V_{CC} = \text{MAX}$ | -60 | | -150 | mA |
| I_{CC} | Supply current (total) | | | 29 | 42 | mA |

Notes to DC electrical characteristics

- For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
- All typical values are at $V_{CC} = 5\text{V}$, $T_{amb} = 25^\circ\text{C}$.
- 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.

Quad register

74F379A

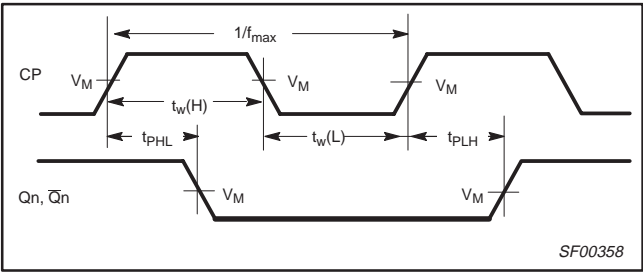
AC ELECTRICAL CHARACTERISTICS

| 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 Q̄n | 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 E̅ 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 E̅ 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 |

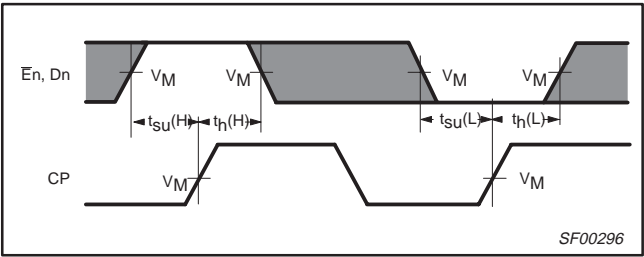
AC WAVEFORMS



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

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.

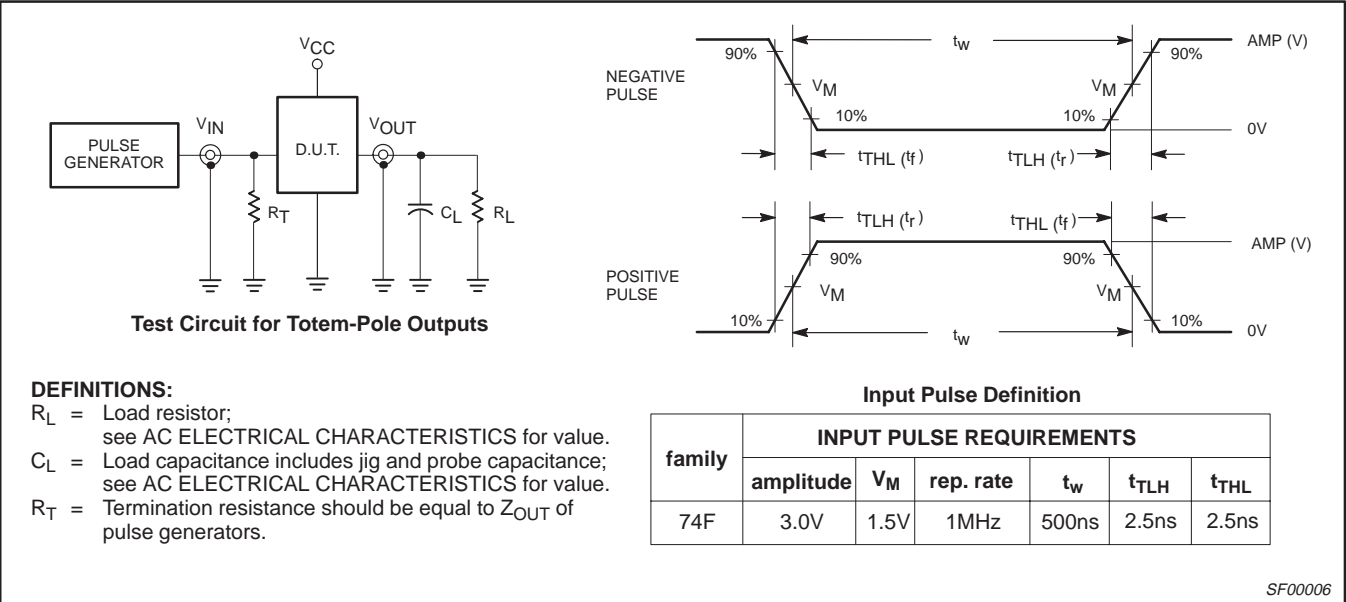


Waveform 2. Data and enable setup time and hold times

Quad register

74F379A

TEST CIRCUIT AND WAVEFORM

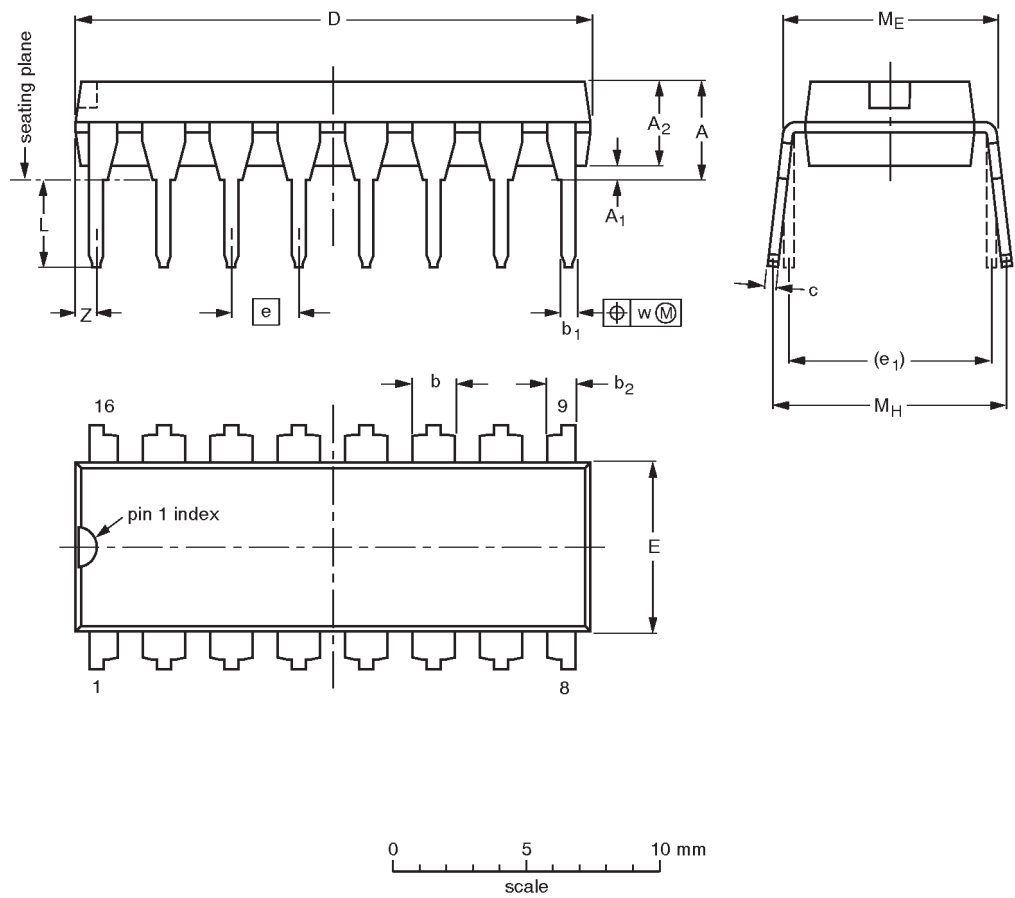


Quad register

74F379A

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.

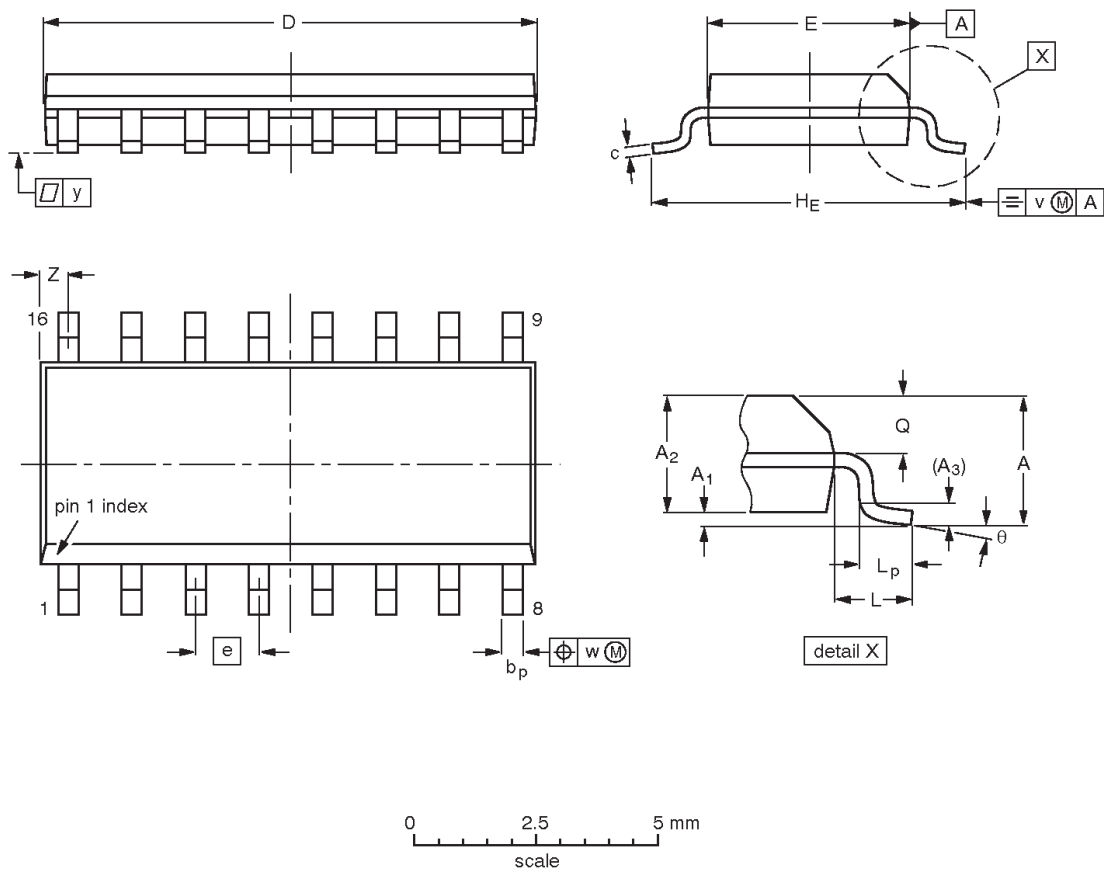
| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|--------------------|------------|-------|------|--|------------------------|----------------------|
| | IEC | JEDEC | EIAJ | | | |
| SOT38-4 | | | | | | 92-11-17 95-01-14 |

Quad register

74F379A

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° 0° |
| 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 |

| | |
|---------------|---------|
| Quad register | 74F379A |
|---------------|---------|

NOTES

Quad register

74F379A

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. |
| Preliminary specification | Qualification | This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |
| Product specification | Production | This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |

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

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 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.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Disclaimers

Life support — These products are not designed for use in life support appliances, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Philips Semiconductors
811 East Arques Avenue
P.O. Box 3409
Sunnyvale, California 94088–3409
Telephone 800-234-7381

© Copyright Philips Electronics North America Corporation 1998
All rights reserved. Printed in U.S.A.

print code

Date of release: 10-98

Document order number:

9397-750-05123

Let's make things better.