

# DATA SHEET

## **74F365, 74F367** Hex buffers/drivers

Product specification  
Supersedes data of 1999 Jan 08  
IC15 Data Handbook

2000 Jun 30

# Hex buffers/drivers

# 74F365, 74F367

## FEATURES

- High-impedance NPN base inputs for reduced loading (20µA in High and Low states)
- High-speed
- Bus oriented
- 3-State buffer outputs sink 64mA

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F365, 74F367	5.0ns	36mA

## ORDERING INFORMATION

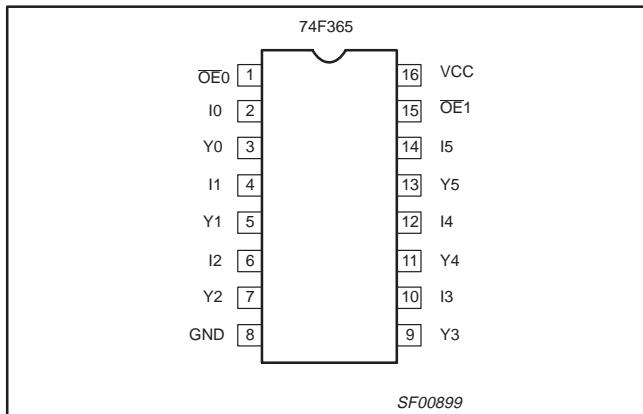
DESCRIPTION	COMMERCIAL RANGE V <sub>CC</sub> = 5V ±10%, T <sub>amb</sub> = 0°C to +70°C	PKG DWG #
16-pin plastic DIP	N74F365N, N74F367N	SOT38-4
16-pin plastic SO	N74F365D, N74F367D	SOT109-1

## INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

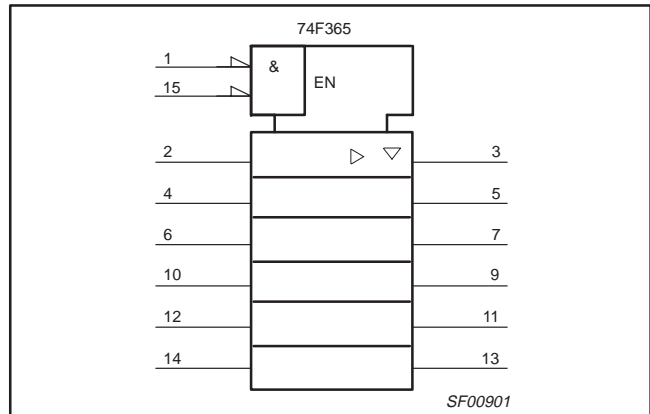
PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
I0 - I5	Inputs	1.0/0.033	20µA/20µA
OE0, OE1	Output enable inputs (active Low)	1.0/0.033	20µA/20µA
Y0 - Y5, Y <sub>0</sub> - Y <sub>5</sub>	Data Outputs	750/106.7	15mA/64mA

NOTE: One (1.0) FAST Unit Load (U.L.) is defined as: 20µA in the High state and 0.6mA in the Low state.

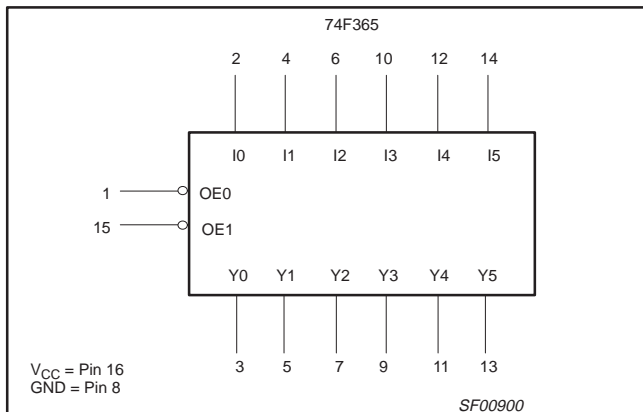
## PIN CONFIGURATION



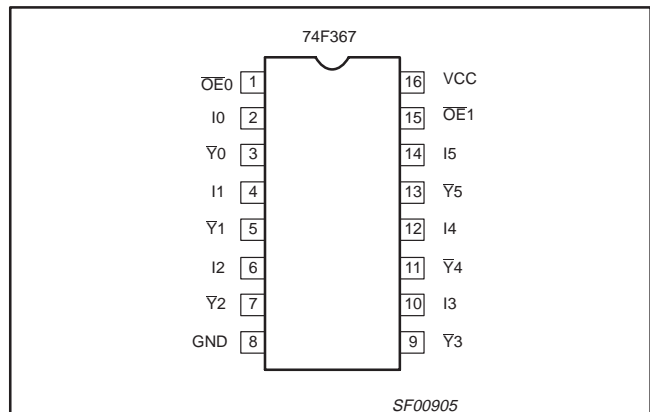
## LOGIC SYMBOL (IEEE/IEC)



## LOGIC SYMBOL



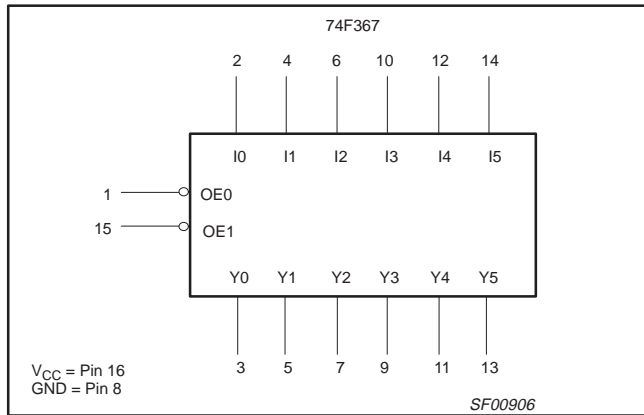
## PIN CONFIGURATION



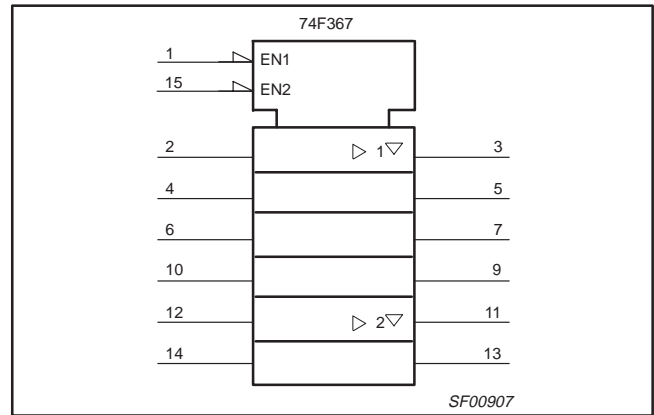
# Hex buffers/drivers

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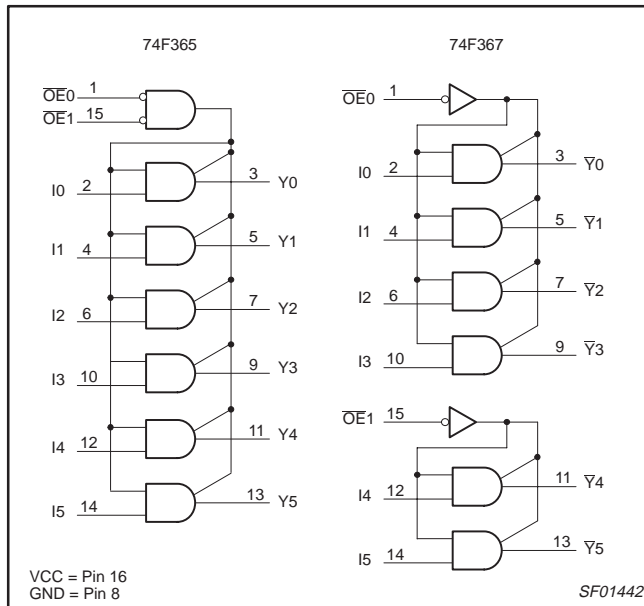
## LOGIC SYMBOL



## LOGIC SYMBOL (IEEE/IEC)



## LOGIC DIAGRAMS



## FUNCTION TABLE for 74F365

INPUTS			OUTPUTS	
$\overline{OE}0$	$\overline{OE}1$	In	$Y_n$	$\overline{Y}_n$
L	L	L	L	H
L	L	H	H	L
X	H	X	Z	Z
H	X	X	Z	Z

H = High voltage level  
 L = Low voltage level  
 X = Don't care  
 Z = High impedance "off" state

## FUNCTION TABLE for 74F367

INPUTS		OUTPUTS	
$\overline{OE}n$	In	$Y_n$	$\overline{Y}_n$
L	L	L	H
L	H	H	L
H	X	Z	Z

H = High voltage level  
 L = Low voltage level  
 X = Don't care  
 Z = High impedance "off" state

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**ABSOLUTE MAXIMUM RATINGS**

(Operation beyond the limits 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 <sub>CC</sub>	Supply voltage range	-0.5 to +7.0	V
V <sub>IN</sub>	Input voltage range	-0.5 to +7.0	V
I <sub>IN</sub>	Input current range	-30 to +5	mA
V <sub>OUT</sub>	Voltage applied to output in High output state range	-0.5 to 5.5	V
I <sub>OUT</sub>	Current applied to output in Low output state	128	mA
T <sub>amb</sub>	Operating free-air temperature range	0 to +70	°C
T <sub>stg</sub>	Storage temperature range	-65 to +150	°C

**RECOMMENDED OPERATING CONDITIONS**

SYMBOL	PARAMETER	LIMITS			UNIT
		MIN	TYP	MAX	
V <sub>CC</sub>	Supply voltage	4.5	5.0	5.5	V
V <sub>IH</sub>	High-level input voltage	2.0			V
V <sub>IL</sub>	Low-level input voltage			0.8	V
I <sub>IK</sub>	Input clamp current			-18	mA
I <sub>OH</sub>	High-level output current			-15	mA
I <sub>OL</sub>	Low-level output current			64	mA
T <sub>amb</sub>	Operating free-air temperature range	0		70	°C

## Hex buffers/drivers

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## DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER		TEST CONDITIONS <sup>1</sup>	LIMITS			UNIT	
				MIN	TYP <sup>2</sup>	MAX		
V <sub>OH</sub>	High-level output voltage		V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN, I <sub>OH</sub> = -3mA	± 10%V <sub>CC</sub>	2.4		V	
				± 5%V <sub>CC</sub>	2.7	3.3	V	
			V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN, I <sub>OH</sub> = -15mA	± 10%V <sub>CC</sub>	2.0		V	
				± 5%V <sub>CC</sub>	2.0		V	
V <sub>OL</sub>	Low-level output voltage		V <sub>CC</sub> = MIN, V <sub>IL</sub> = MAX, V <sub>IH</sub> = MIN, I <sub>OL</sub> = MAX	± 10%V <sub>CC</sub>		0.55	V	
				± 5%V <sub>CC</sub>		0.42	0.55	V
V <sub>IK</sub>	Input clamp voltage		V <sub>CC</sub> = MIN, I <sub>I</sub> = I <sub>IK</sub>		-0.73	-1.2	V	
I <sub>I</sub>	Input current at maximum input voltage		V <sub>CC</sub> = 0.0V, V <sub>I</sub> = 7.0V			100	μA	
I <sub>IH</sub>	High-level input current		V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.7V			20	μA	
I <sub>IL</sub>	Low-level input current		V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.5V			-20	μA	
I <sub>OZH</sub>	Off-state output current, High-level voltage applied		V <sub>CC</sub> = MAX, V <sub>O</sub> = 2.7V			50	μA	
I <sub>OZL</sub>	Off-state output current, Low-level voltage applied		V <sub>CC</sub> = MAX, V <sub>O</sub> = 0.5V			-50	μA	
I <sub>OS</sub>	Short-circuit output current <sup>3</sup>		V <sub>CC</sub> = MAX	-100		-225	mA	
I <sub>CC</sub>	Supply current (total)	74F365 74F367	I <sub>CCH</sub>	V <sub>CC</sub> = MAX		25	35	mA
			I <sub>CCL</sub>			47	62	mA
			I <sub>CCZ</sub>			35	48	mA

## NOTES:

- 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<sub>CC</sub> = 5V, T<sub>amb</sub> = 25°C.
- Not more than one output should be shorted at a time. For testing I<sub>OS</sub>, 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<sub>OS</sub> tests should be performed last.

## AC ELECTRICAL CHARACTERISTICS

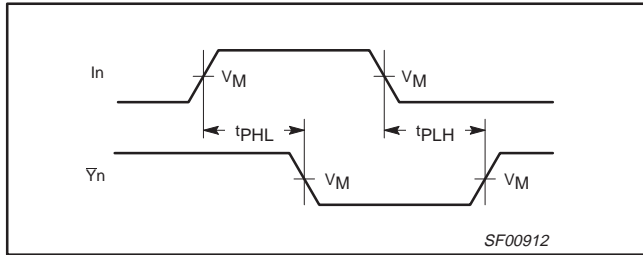
SYMBOL	PARAMETER		TEST CONDITIONS	LIMITS					UNIT
				T <sub>A</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω			T <sub>A</sub> = -55°C to +125°C V <sub>CC</sub> = +5.0V ± 10% C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω		
				MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to Y <sub>n</sub>	74F365, 74F367	Waveform 2	2.5 2.5	4.5 5.5	6.5 7.0	2.0 2.0	7.0 7.5	ns ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable time to High or Low level	74F365	Waveform 3 Waveform 4	2.5 2.5	4.0 5.0	6.5 8.0	2.5 2.5	7.5 8.5	ns ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output Enable time to High or Low level	74F367	Waveform 3 Waveform 4	3.0 3.0	5.5 6.5	7.5 8.5	3.0 3.0	8.5 9.0	ns ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output Disable time from High to Low level		Waveform 3 Waveform 4	2.0 2.0	4.5 4.0	6.5 6.5	2.0 2.0	7.0 7.0	ns ns

# Hex buffers/drivers

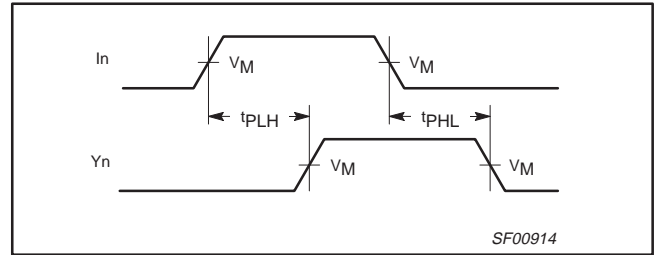
# 74F365, 74F367

## AC WAVEFORMS

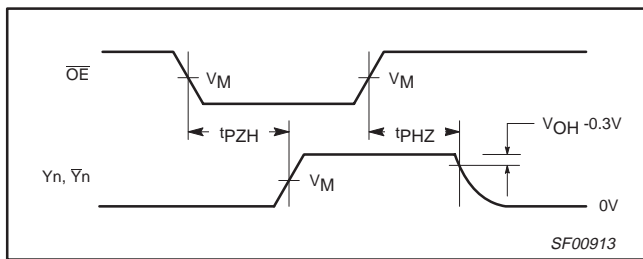
For all waveforms,  $V_M = 1.5V$



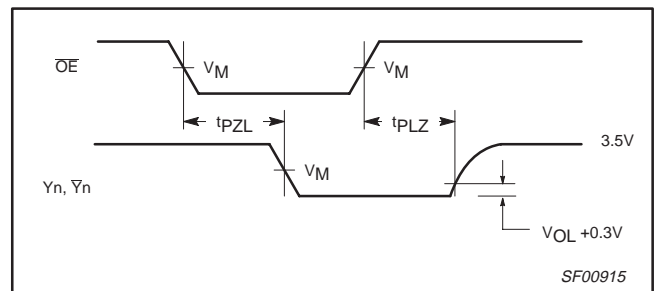
**Waveform 1. For Inverting Outputs**



**Waveform 2. For Non-Inverting Outputs**



**Waveform 3. 3-State Output Enable Time to High Level and Output Disable Time from High Level**



**Waveform 4. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level**

## TEST CIRCUIT AND WAVEFORM

**Test Circuit for 3-State Outputs**

SWITCH POSITION	
TEST	SWITCH
$t_{PLZ}$	closed
$t_{PZL}$	closed
All other	open

**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

SF00777

Hex buffers/drivers

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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 <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	b <sub>2</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	L	M <sub>E</sub>	M <sub>H</sub>	w	Z <sup>(1)</sup> 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.

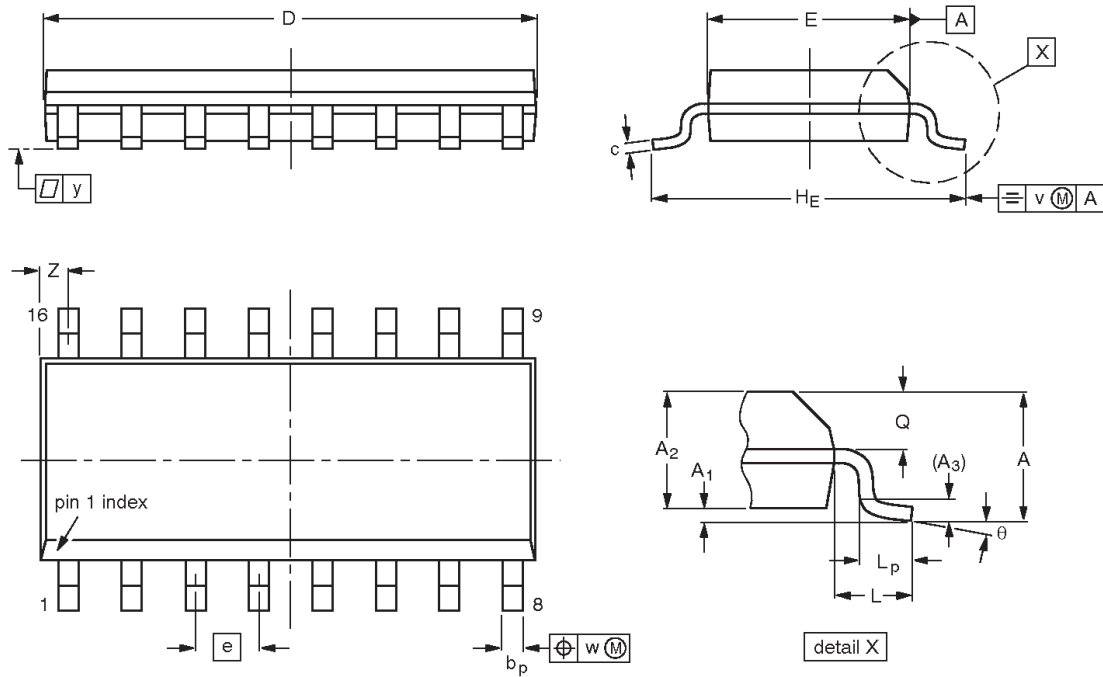
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT38-4						92-11-17 95-01-14

Hex buffers/drivers

74F365, 74F367

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 <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	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



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Hex buffers/drivers

74F365, 74F367

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**NOTES**

## Hex buffers/drivers

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## 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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