PHILIPS 74F257A multiplexer datasheet

http://www.manuallib.com/philips/74f257a-multiplexer-datasheet.html

The 74F257A has four identical 2-input multiplexers with 3-State outputs which select 4 bits of data from two sources uncer control of a common Select (S) input. The I0a inputs are selected when the common Select input is Low and the I1n inputs are selected when the common Select input is High. Data appears at the outputs in true non-inverted form from the selected inputs. The 74F257A is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the common Slect input. Outputs are forced to a high impedance “off” state when the Output Enable (OE) is High. All but one device must be in high impedance state to avoid currents that would exceed the maximum rating if the outputs were tied together. Design of the Output Enable signals must ensure that there is no overlap when outputs of 3-state devices were tied together.

DATA SHEET

74F257A

Quad 2-line to 1-line selector/multiplexer, non-inverting (3-State)

Product specification

IC15 Data Handbook

1995 Mar 31

Philips Semiconductors

PHILIPS

Quad 2-line to 1-line selector/multiplexer, non-inverting (3-State)

74F257A

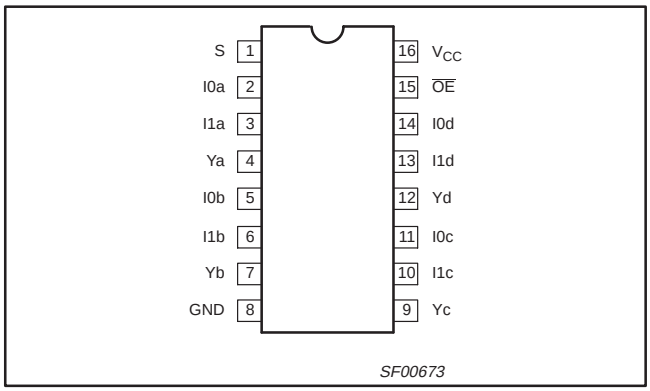
FEATURES

- Industrial range available (–40°C to +85°C)
- Multifunction capability
- Non-inverting data path
- 3-State outputs
- See 74F258A for inverting version

DESCRIPTION

The 74F257A has four identical 2-input multiplexers with 3-State outputs which select 4 bits of data from two sources uncer control of a common Select (S) input. The I0a inputs are selected when the common Select input is Low and the I1n inputs are selected when the common Select input is High. Data appears at the outputs in true non-inverted form from the selected inputs. The 74F257A is the logic implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic levels supplied to the common Slect input. Outputs are forced to a high impedance "off" state when the Output Enable ($\overline{OE}$) is High. All but one device must be in high impedance state to avoid currents that would exceed the maximum rating if the outputs were tied together. Design of the Output Enable signals must ensure that there is no overlap when outputs of 3-state devices were tied together.

PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F257A	4.3ns	12mA

ORDERING INFORMATION

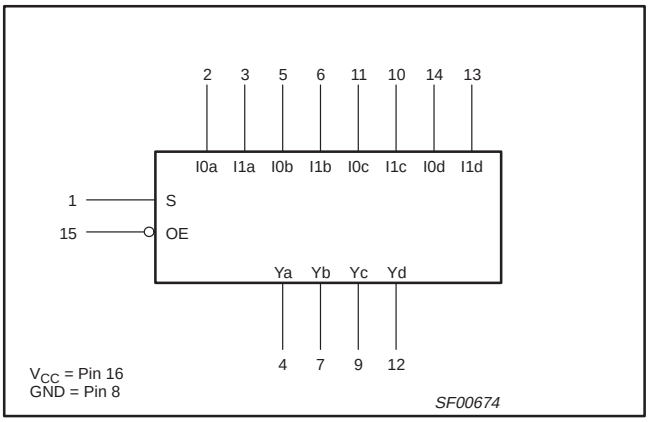
DESCRIPTION	ORDER CODE		DRAWING NUMBER
	COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	INDUSTRIAL RANGE V_{CC} = 5V ±10%, T_{amb} = –40°C to +85°C	
16-pin plastic DIP	N74F257AN	I74F257AN	SOT38-4
16-pin plastic SO	N74F257AD	I74F257AD	SOT109-1

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

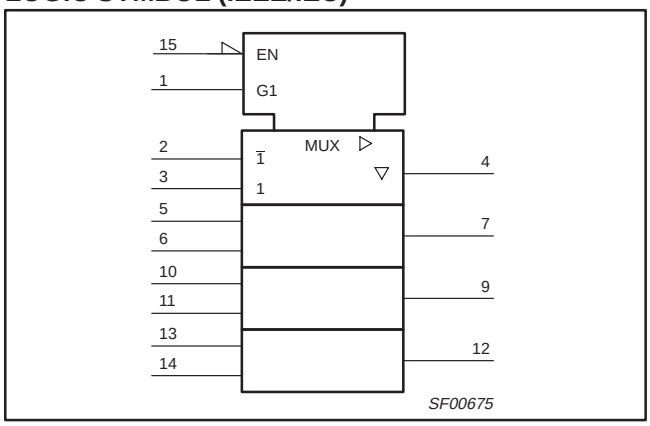
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
I0n, I1n	Data inputs	1.0/1.0	20µA/0.6mA
S	Common Select input	1.0/1.0	20µA/0.6mA
$\overline{OE}$	Output Enable input (active Low)	1.0/1.0	20µA/0.6mA
Ya – Yd	Data outputs	150/33	3.0mA/20mA

NOTE:
One (1.0) FAST unit load is defined as: 20µA in the High state and 0.6mA in the Low state.

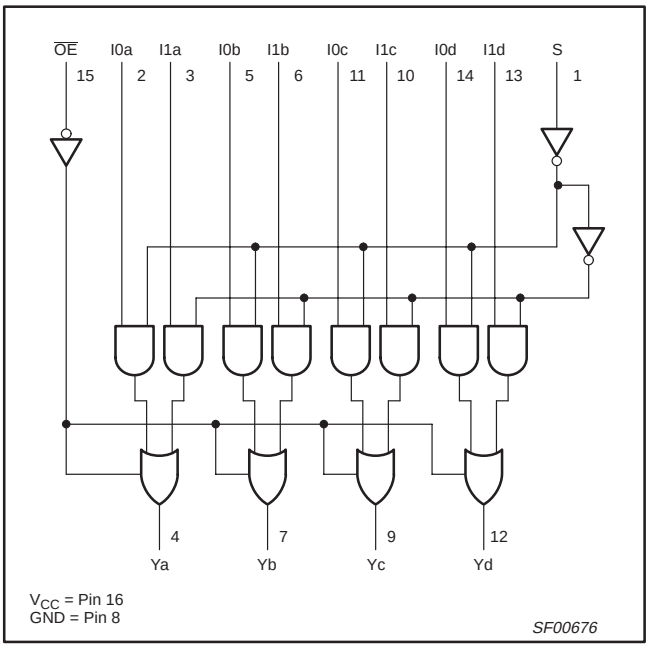
LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



LOGIC DIAGRAM

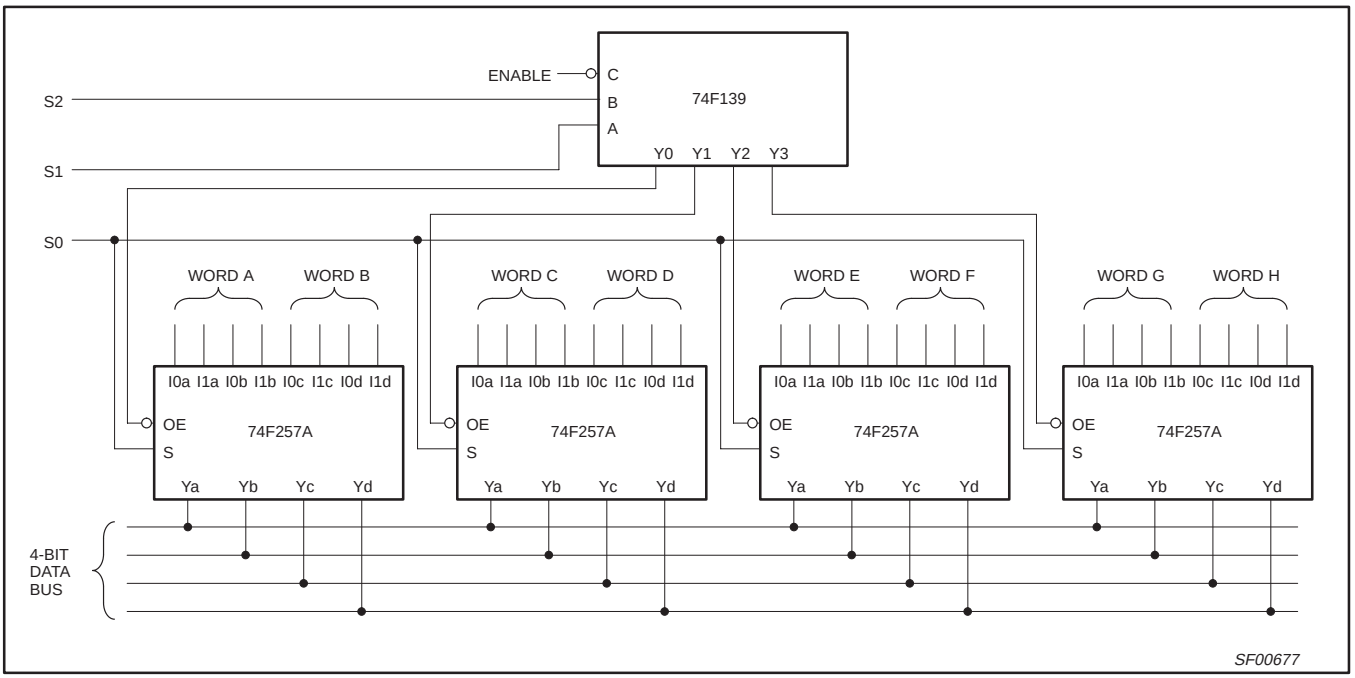


FUNCTION TABLE

INPUTS				OUTPUT
$\overline{OE}$	S	I0	I1	Y
H	X	X	X	Z
L	H	X	L	L
L	H	X	H	H
L	L	L	X	L
L	L	H	X	H

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

APPLICATION



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_{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		48	mA
T_{amb}	Operating free-air temperature range	Commercial range	0 to +70	°C
		Industrial range	–40 to +85	°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				–3	mA
I_{OL}	Low-level output current				24	mA
T_{amb}	Operating free-air temperature range	Commercial range	0		+70	°C
		Industrial range	–40		+85	°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, V_{IH} = MIN, I_{OH} = MAX	±10%V_{CC}	2.4			V
				±5%V_{CC}	2.7	3.3		V
V_{OL}	Low-level output voltage		V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN, I_{OL} = MAX	±10%V_{CC}		0.35	0.50	V
				±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} = MAX, 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		V_{CC} = MAX, V_I = 0.5V				–0.6	mA
I_{OZH}	Off state output current, High-level voltage applied		V_{CC} = MAX, V_O = 2.7V				50	µA
I_{OZL}	Off state output current, Low-level voltage applied		V_{CC} = MAX, V_O = 0.5V				–50	µA
I_{OS}	Short-circuit output current[3]		V_{CC} = MAX		-60		–150	mA
I_{CC}	Supply current[4] (total)	I_{CCH}	V_{CC} = MAX			9.0	15.0	mA
		I_{CCL}				14.5	22.0	mA
		I_{CCZ}				15.0	23.0	mA

NOTES:

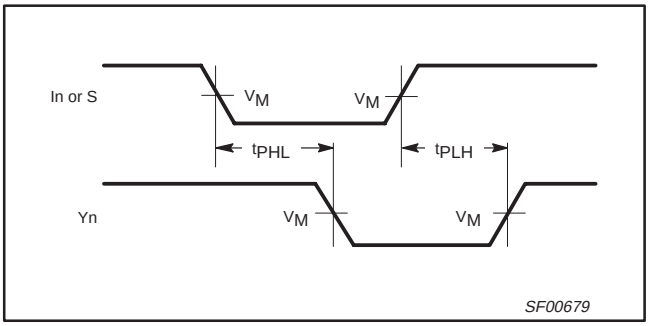
1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_{amb} = 25°C.
3. Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test 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.
4. Measure I_{CC} with all outputs open and inputs grounded.

AC ELECTRICAL CHARACTERISTICS

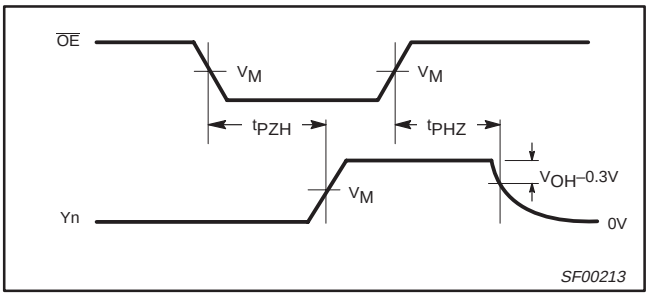
SYMBOL	PARAMETER	TEST CONDITION	LIMITS							UNIT
			T_{amb} = +25°C, V_{CC} = +5.0V, C_L = 50pF, R_L = 500Ω			T_{amb} = 0°C to +70°C, V_{CC} = +5.0V ± 10%, C_L = 50pF, R_L = 500Ω		T_{amb} = –40°C to +85°C, V_{CC} = +5.0V ± 10%, C_L = 50pF, R_L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay In to Yn	Waveform 1	3.0 2.0	4.5 3.5	6.0 5.0	3.0 2.0	7.0 6.0	3.0 2.0	7.0 7.0	ns
t_{PLH} t_{PHL}	Propagation delay S to Yn	Waveform 1	5.0 4.0	7.5 5.5	9.5 7.0	5.0 4.0	10.5 8.0	5.0 4.0	10.5 8.5	ns
t_{PZH} t_{PZL}	Output Enable time to High or Low level	Waveform 2 Waveform 3	4.5 4.5	6.5 6.0	7.5 7.5	4.5 4.5	8.5 8.5	4.5 4.5	8.5 8.5	ns
t_{PHZ} t_{PLZ}	Output Disable time from High or Low level	Waveform 2 Waveform 3	2.0 2.0	4.0 3.5	5.5 5.5	2.0 2.0	6.0 6.0	2.0 2.0	6.0 6.0	ns

AC WAVEFORMS

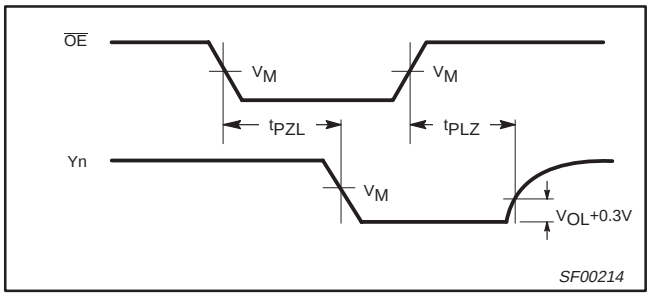
For all waveforms, V_M = 1.5V.



Waveform 1. Propagation Delay, Data and Select to Output

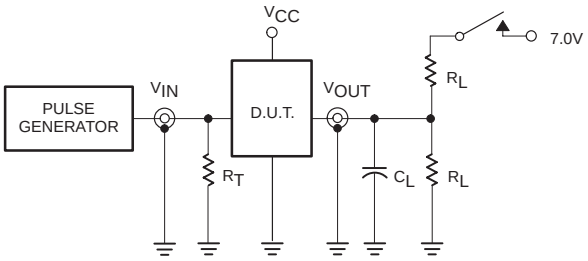


Waveform 2. 3-State Output Enable Time to High Level and Output Disable Time from High Level

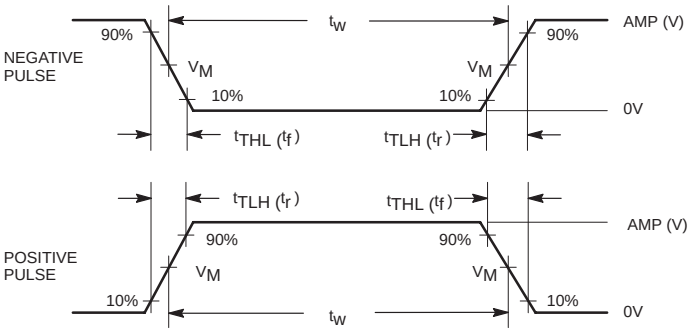


Waveform 3. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level

TEST CIRCUIT AND WAVEFORMS



Test Circuit for 3-State Outputs



Input Pulse Definition

SWITCH POSITION

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

DEFINITIONS:

R_L = Load resistor; see AC electrical characteristics for value.

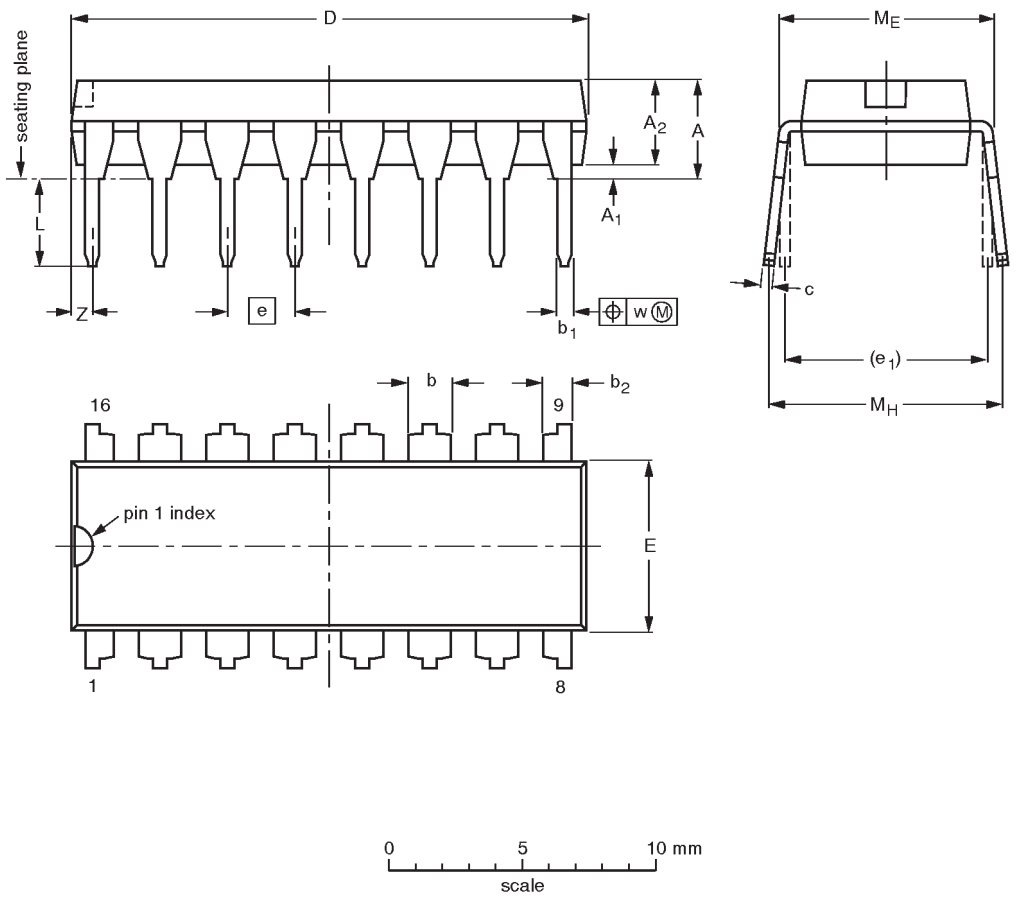
C_L = Load capacitance includes jig and probe capacitance; see AC electrical characteristics for value.

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

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

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



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

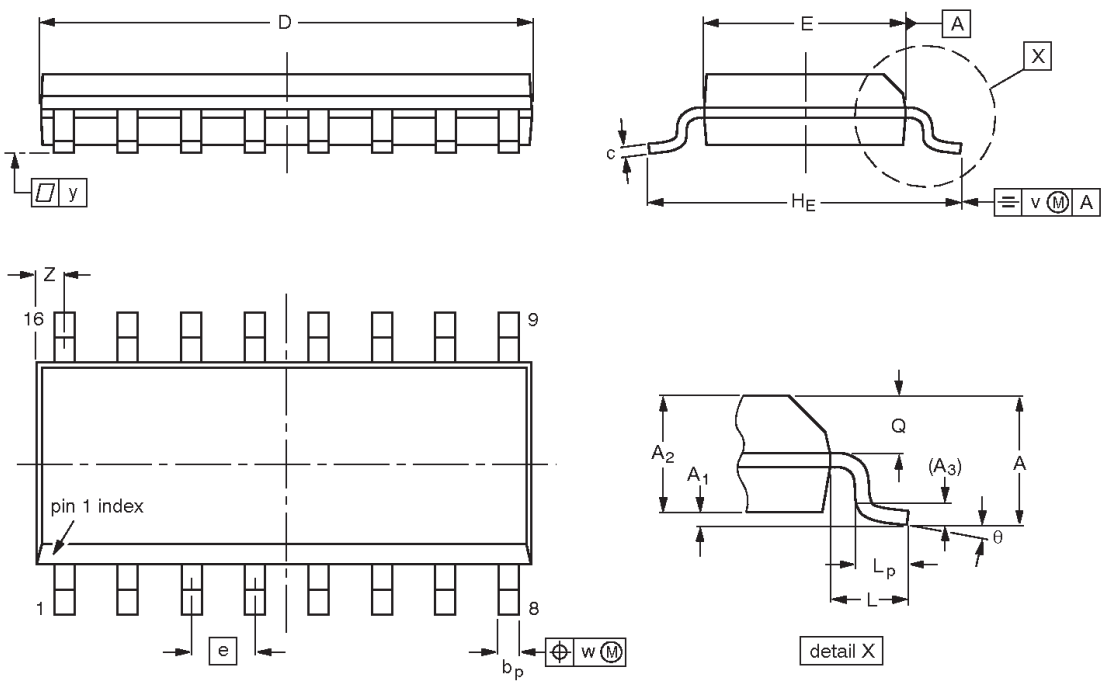
UNIT	A max.	A_1 min.	A_2 max.	b	b_1	b_2	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	1.25 0.85	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	0.76
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.049 0.033	0.014 0.009	0.77 0.73	0.26 0.24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

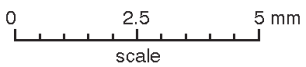
Note

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

DEFINITIONS

Data Sheet Identification	Product Status	Definition
Objective Specification	Formative or in Design	This data sheet contains the design target or goal specifications for product development. Specifications may change in any manner without notice.
Preliminary Specification	Preproduction Product	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	Full 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.

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

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