

# DATA SHEET

## **74F258A**

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

Product specification

1996 Jan 05

IC15 Data Handbook

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

74F258A

## FEATURES

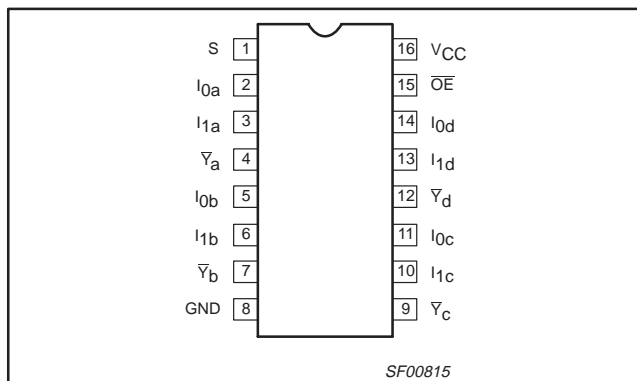
- Multifunction capability
- Non-inverting data path
- 3-State outputs
- See 74F257A for non-inverting version

## DESCRIPTION

The 74F258A has four identical 2-input multiplexers with 3-State outputs which select 4 bits of data from two sources under control of a common Select (S) input. The  $I_{0n}$  inputs are selected when the Select input is Low and the  $I_{1n}$  inputs are selected when the Select input is High. Data appears at the outputs in inverted form.

The 74F258A is the logical implementation of a 4-pole, 2-position switch where the position of the switch is determined by the logic level supplied to the Select input. Outputs are forced to a High impedance "off" state when the Output Enable input ( $\overline{OE}$ ) is High. All but one device must be in the High impedance state to avoid currents that would exceed the maximum ratings if outputs are tied together. Design of the output signals must ensure that there is no overlap when outputs of 3-State devices are tied together.

## PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F258A	3.5ns	14mA

## ORDERING INFORMATION

DESCRIPTION	ORDER CODE	PKG. DWG. #
	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$ , $T_{amb} = 0^{\circ}C \text{ to } +70^{\circ}C$	
16-pin plastic DIP	N74F258AN	SOT38-4
16-pin plastic SO	N74F258AD	SOT109-1

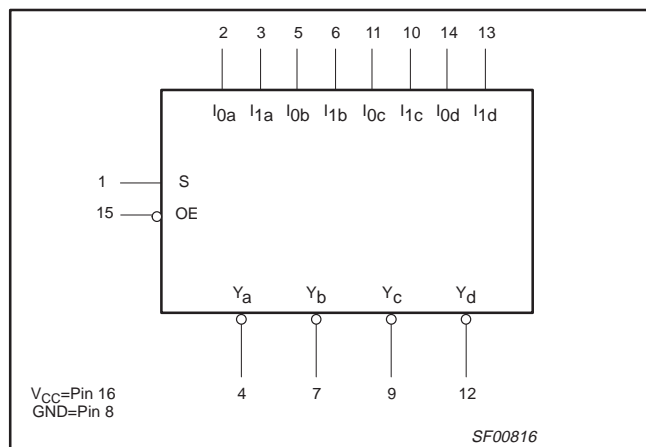
## INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
$I_{0n}, I_{1n}$	Data inputs	1.0/1.0	20 $\mu$ A/0.6mA
S	Common select input	1.0/1.0	20 $\mu$ A/0.6mA
$\overline{OE}$	Output Enable input (active Low)	1.0/1.0	20 $\mu$ A/0.6mA
$\overline{Y}_a - \overline{Y}_d$	Data outputs	150/40	3.0mA/24mA

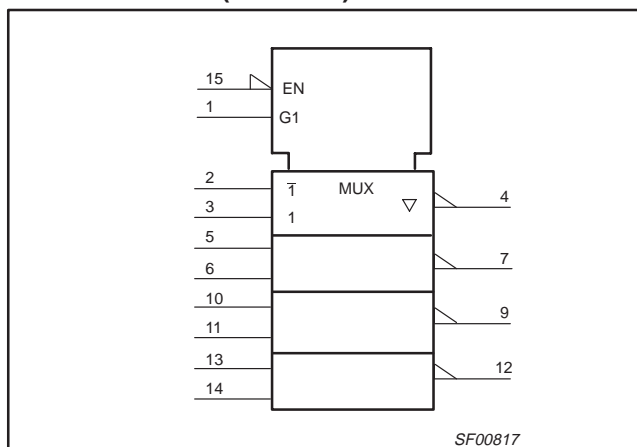
### NOTE:

One (1.0) FAST Unit Load is defined as: 20 $\mu$ A in the High state and 0.6mA in the Low state.

## LOGIC SYMBOL



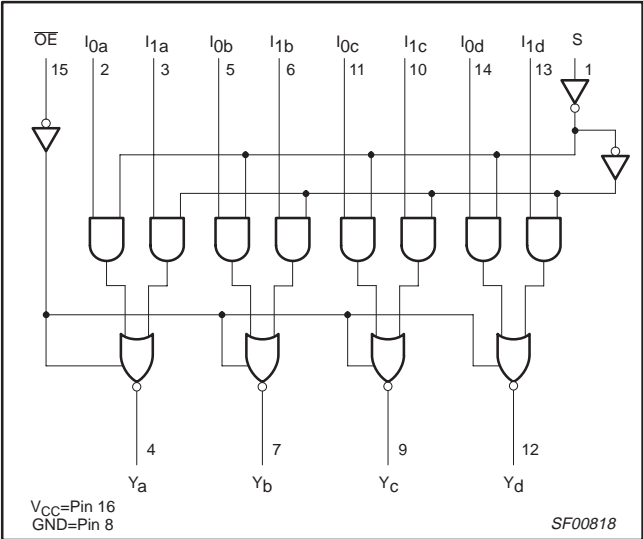
## LOGIC SYMBOL (IEEE/IEC)



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

74F258A

LOGIC DIAGRAM



FUNCTION TABLE

INPUTS				OUTPUT
OE	S	I <sub>0</sub>	I <sub>1</sub>	Y
H	X	X	X	Z
L	H	X	L	H
L	H	X	H	L
L	L	L	X	H
L	L	L	L	L
L	L	H	X	L
L	L	H	H	H

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

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 <sub>CC</sub>	Supply voltage	−0.5 to +7.0	V
V <sub>IN</sub>	Input voltage	−0.5 to +7.0	V
I <sub>IN</sub>	Input current	−30 to +5	mA
V <sub>OUT</sub>	Voltage applied to output in High output state	−0.5 to V <sub>CC</sub>	V
I <sub>OUT</sub>	Current applied to output in Low output state	48	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	NOM	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			−3	mA
I <sub>OL</sub>	Low-level output current			24	mA
T <sub>amb</sub>	Operating free-air temperature range	0		70	°C

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

74F258A

## 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>OL</sub> = MAX	±10%V <sub>CC</sub>	2.4			V
			±5%V <sub>CC</sub>	2.7	3.3		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>		0.30	0.50	V
			±5%V <sub>CC</sub>		0.35	0.50	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> = MAX, 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				-0.6	mA
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, High-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		-60		-150	mA
I <sub>CC</sub>	Supply current (total)	I <sub>CCH</sub>	I <sub>1n</sub> =4.5V, $\overline{OE}$ =I <sub>0n</sub> =S=GND		8.5	11.5	mA
		I <sub>CCL</sub>	I <sub>1n</sub> =S=4.5V, $\overline{OE}$ =I <sub>0n</sub> =GND		17	23	mA
		I <sub>CCZ</sub>	I <sub>1n</sub> = $\overline{OE}$ =4.5V, I <sub>0n</sub> =S=GND		16	22	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

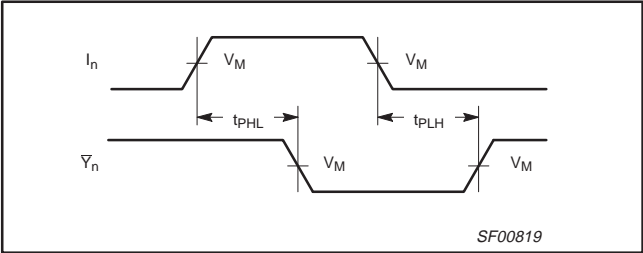
SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T <sub>amb</sub> = +25°C V <sub>CC</sub> = +5.0V C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω			T <sub>amb</sub> = -55°C to +70°C V <sub>CC</sub> = +5.0V ± 10% C <sub>L</sub> = 50pF, R <sub>L</sub> = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay I <sub>n</sub> to Y <sub>n</sub>	Waveform 1	3.0 1.0	4.5 2.5	6.0 4.0	2.5 1.0	7.0 4.5	ns ns
t <sub>PLH</sub> t <sub>PHL</sub>	Propagation delay S to Y <sub>n</sub>	Waveform 2	3.5 2.5	6.5 6.0	8.0 8.0	3.5 2.5	9.0 9.0	ns ns
t <sub>PZH</sub> t <sub>PZL</sub>	Output enable time to High or Low level	Waveform 3 Waveform 4	4.0 4.0	6.0 5.5	7.5 7.5	3.5 3.5	8.5 8.5	ns ns
t <sub>PHZ</sub> t <sub>PLZ</sub>	Output disable time from High or Low level	Waveform 3 Waveform 4	2.0 2.0	3.5 3.5	5.5 5.5	2.0 2.0	6.5 6.0	ns ns

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

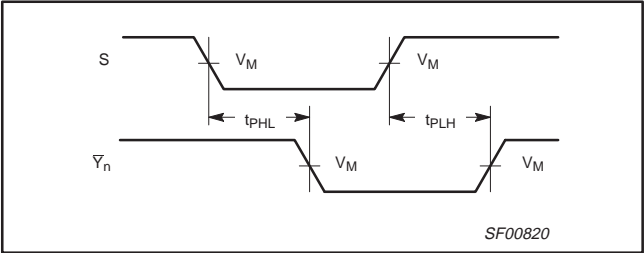
74F258A

AC WAVEFORMS

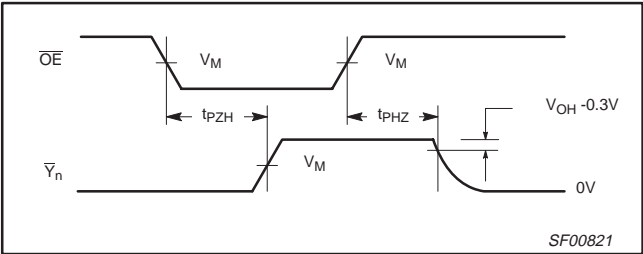
For all waveforms,  $V_M = 1.5V$ .



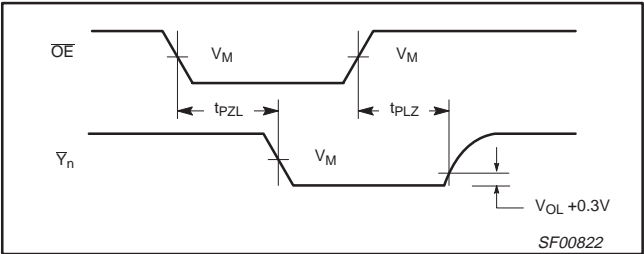
Waveform 1. Propagation Delay  
Data and Select to Output



Waveform 2. Propagation Delay  
Select to Output



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**

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**

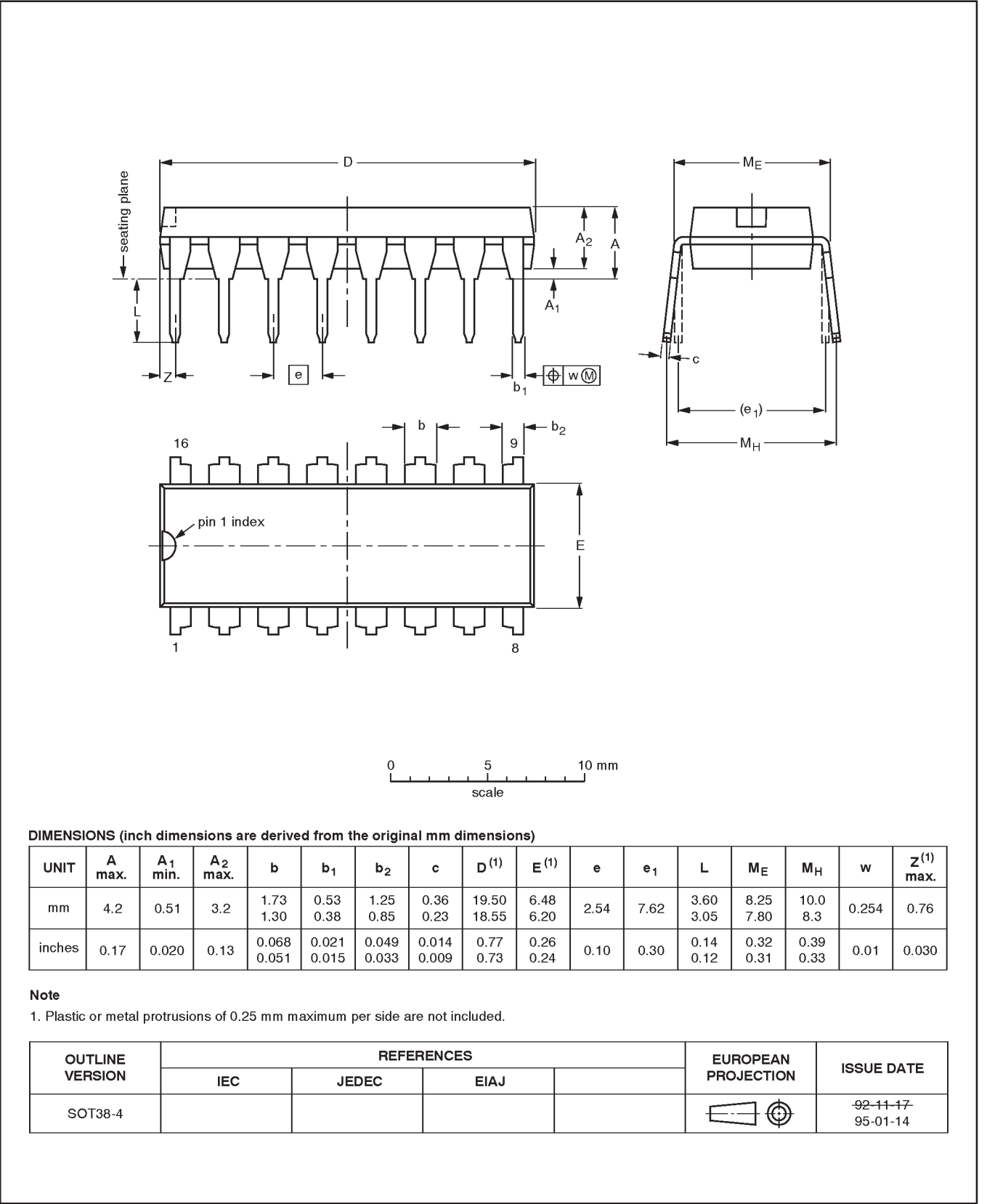
family	INPUT PULSE REQUIREMENTS					
	amplitude	$V_M$	rep. rate	$t_w$	$t_{TLH}$	$t_{THL}$
74F	3.0V	1.5V	1MHz	500ns	2.5ns	2.5ns

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

74F258A

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

SOT38-4

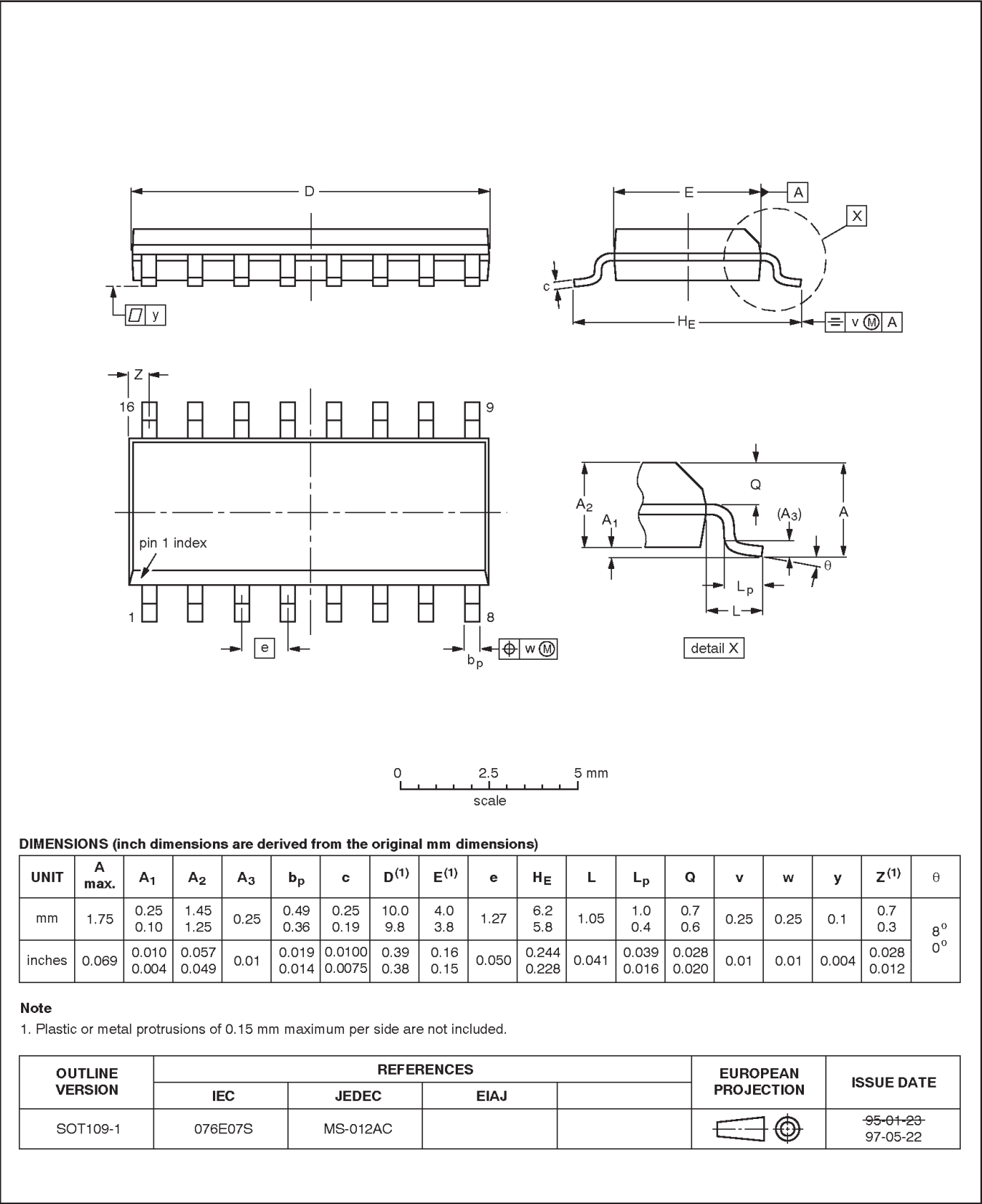


Quad 2-line to 1-line selector/multiplexer, inverting (3-State)

74F258A

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



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

74F258A

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 and Philips Electronics North America Corporation reserve 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. Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

LIFE SUPPORT APPLICATIONS  
Philips Semiconductors and Philips Electronics North America Corporation Products are not designed for use in life support appliances, devices, or systems where malfunction of a Philips Semiconductors and Philips Electronics North America Corporation Product can reasonably be expected to result in a personal injury. Philips Semiconductors and Philips Electronics North America Corporation customers using or selling Philips Semiconductors and Philips Electronics North America Corporation Products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors and Philips Electronics North America Corporation for any damages resulting from such improper use or sale.



Copyright © Each Manufacturing Company.

All Datasheets cannot be modified without permission.

This datasheet has been download from :

[www.AllDataSheet.com](http://www.AllDataSheet.com)

100% Free DataSheet Search Site.

Free Download.

No Register.

Fast Search System.

[www.AllDataSheet.com](http://www.AllDataSheet.com)