DATA SHEET

74F756
Octal inverter buffer (open-collector)
74F757
Octal buffer (open-collector)
74F760
Octal buffer (open-collector)

Product specification

1989 Nov 27

IC15 Data Handbook

Philips Semiconductors

PHILIPS

74F756 Octal Inverter Buffer (Open Collector)
74F757 Octal Buffer (Open Collector)
74F760 Octal Buffer (Open Collector)

FEATURES

- Octal bus interface
- Open collector versions of 74F240, 74F241 and 74F244

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F756	9.0ns	40mA
74F757	9.0ns	45mA
74F760	9.0ns	45mA

DESCRIPTION

The 74F756, 74F757 and 74F760 are octal buffers that are ideal for driving bus lines of buffer memory address registers. The 74F756 is the open collector version of 74F240, 74F757 is the open collector version of 74F241 and 74760 is the open collector version of 74F244. These devices feature two Output Enables. $\overline{OE}$a and $\overline{OE}$b (or OEb for the 74F757), each controlling four of the outputs.

ORDERING INFORMATION

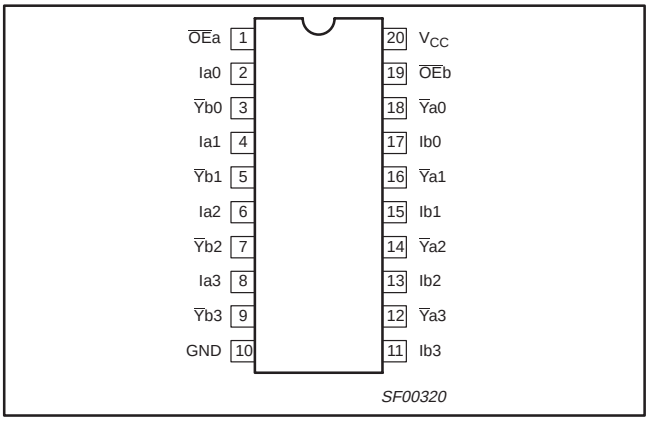
DESCRIPTION	ORDER CODE COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	PKG DWG #
20–pin plastic DIP	N74F756N, N74F757AN, N74F760N	SOT146-1
20–pin plastic SOL	N74F756D, N74F757AD, N74F760D	SOT163-1

INPUT AND OUTPUT LOADING AND FAN OUT TABLE

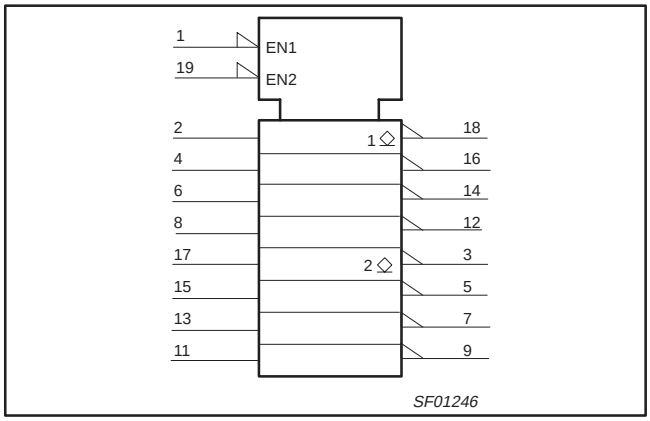
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Ian, Ibn	Data inputs	1.0/1.67	20µA/1.0mA
$\overline{OE}$a, $\overline{OE}$b	Output enable input (active Low)	1.0/1.67	20µA/0.2mA
OEb	Output enable input (active High 74F757)	1.0/1.67	20µA/1.0mA
Yan, Ybn	Data outputs (74F757, 74F760)	OC/106.7	OC/64mA
$\overline{Y}$an, $\overline{Y}$bn	Data outputs (74F756)	OC/106.7	OC/64mA

Notes:
One (1.0) FAST unit load is defined as: 20µA in the high state and 0.6mA in the Low state.
OC=Open Collector

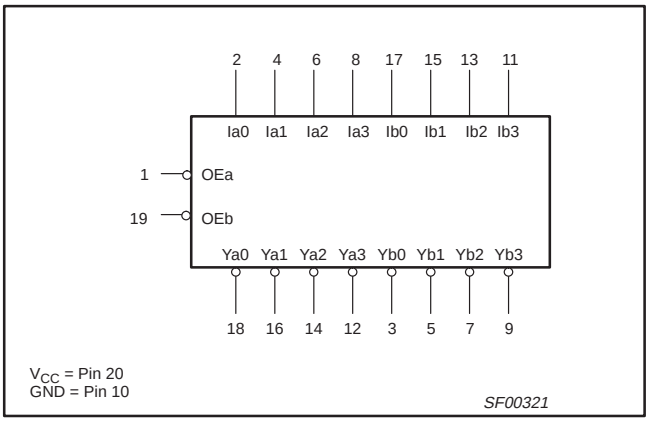
PIN CONFIGURATION for 74F756



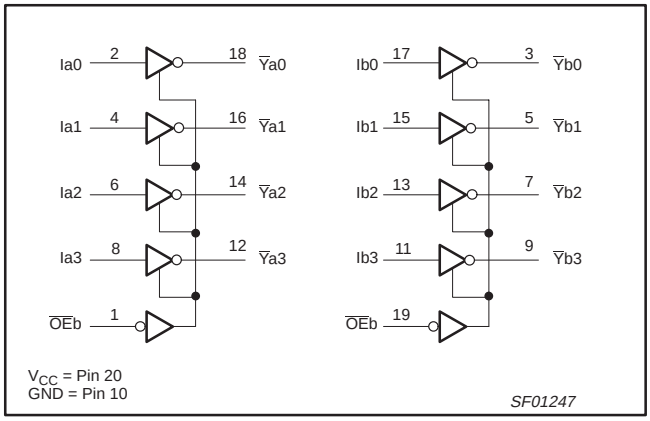
IEC/IEEE SYMBOL for 74F756



LOGIC SYMBOL for 74F756



LOGIC DIAGRAM for 74F756

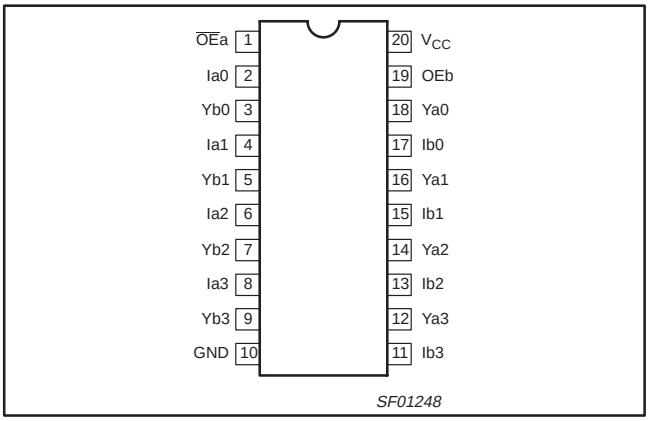


FUNCTION TABLE for 74F756

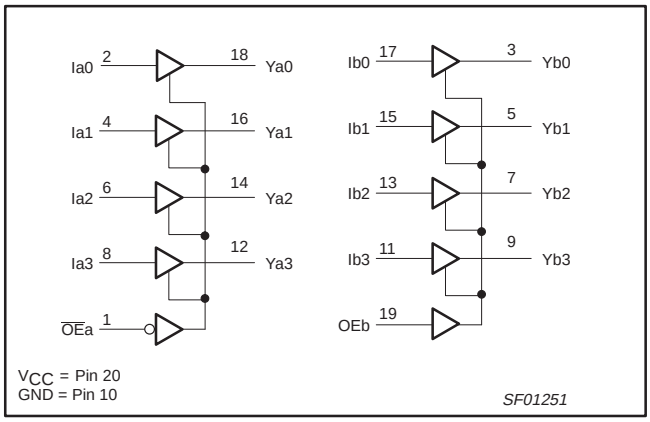
INPUTS				OUTPUTS	
$\overline{OE}a$	Ia	$\overline{OE}b$	Ib	$\overline{Y}a$	$\overline{Y}b$
L	L	L	L	H	H
L	H	L	H	L	L
H	X	H	X	H (off)	H (off)

H = High voltage level
L = Low voltage level
X = Don't care

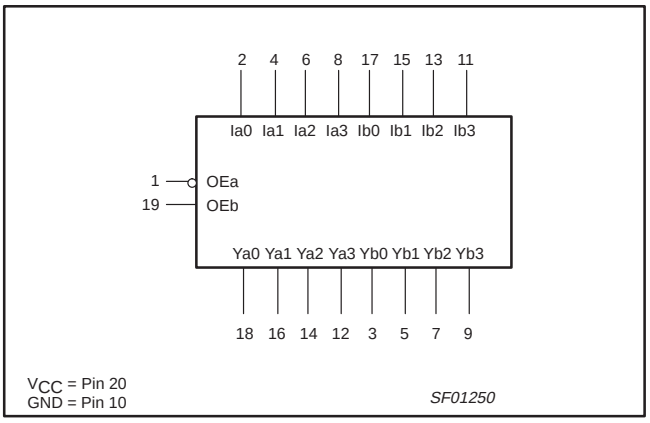
PIN CONFIGURATION for 74F757



LOGIC DIAGRAM for 74F757



LOGIC SYMBOL for 74F757

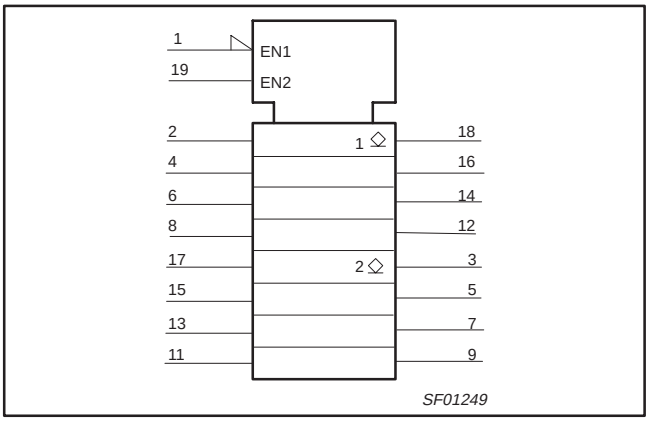


FUNCTION TABLE for 74F757

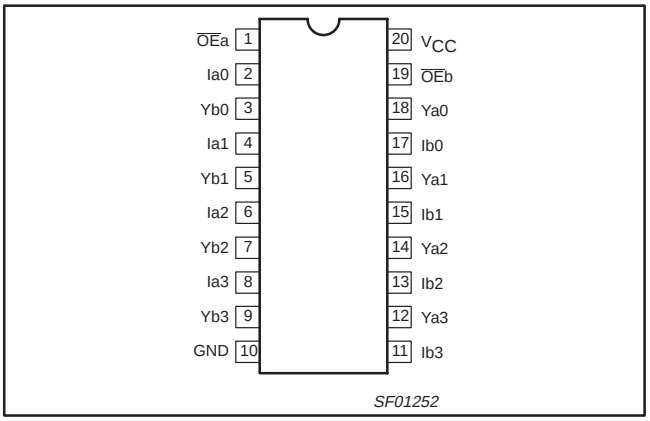
INPUTS				OUTPUTS	
$\overline{OE}a$	Ia	OEb	Ib	Ya	Yb
L	L	H	L	L	L
L	H	H	H	H	H
H	X	L	X	H (off)	H (off)

H = High voltage level
L = Low voltage level
X = Don't care

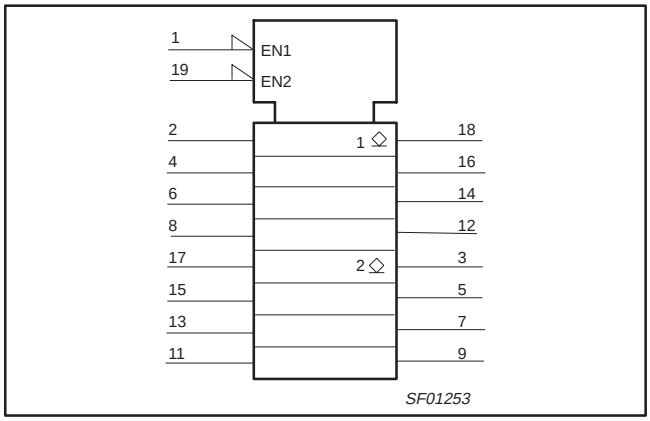
IEC/IEEE SYMBOL for 74F757



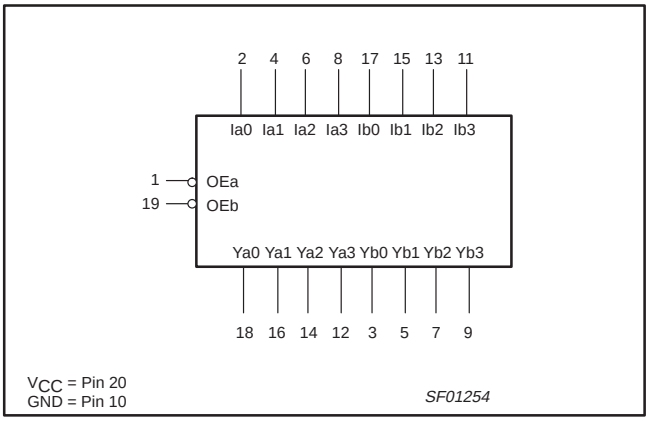
PIN CONFIGURATION for 74F760



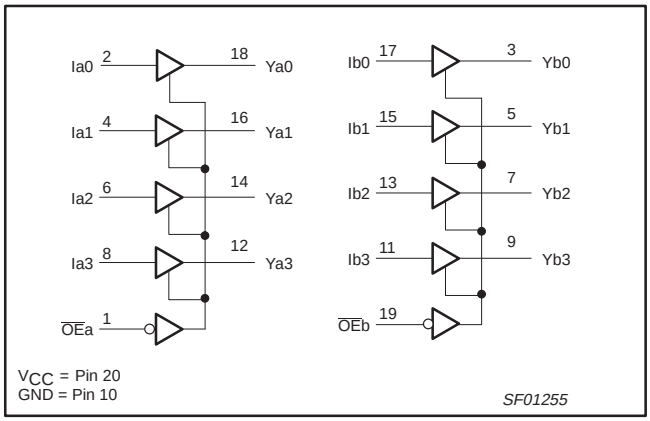
IEC/IEEE SYMBOL for 74F760



LOGIC SYMBOL for 74F760



LOGIC DIAGRAM for 74F760



FUNCTION TABLE for 74F760

INPUTS				OUTPUTS	
$\overline{OE}a$	Ia	$\overline{OE}b$	Ib	Ya	Yb
L	L	L	L	L	L
L	H	L	H	H	H
H	X	H	X	H (off)	H (off)

H = High voltage level
L = Low voltage level
X = Don't care

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	128	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
V_{OH}	High-level output voltage			4.5	V
I_{OL}	Low-level output current			64	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	
I_{OH}	High-level output current			V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN, V_{OH} = MAX					250	µA
V_{OL}	Low-level output voltage			V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN,	I_{OL} = 48MAX	±10%V_{CC}		0.38	0.55	V
					I_{OL}= 64mA	±5%V_{CC}		0.42	0.55	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					–1.0	mA
I_{CC}	Supply current (total)	74F756	I_{CCH}	V_{CC} = MAX				20	30	mA
			I_{CCL}					50	70	mA
		74F757	I_{CCH}					30	40	mA
			I_{CCL}					55	80	mA
		74F760	I_{CCH}					25	37	mA
			I_{CCL}					55	80	mA

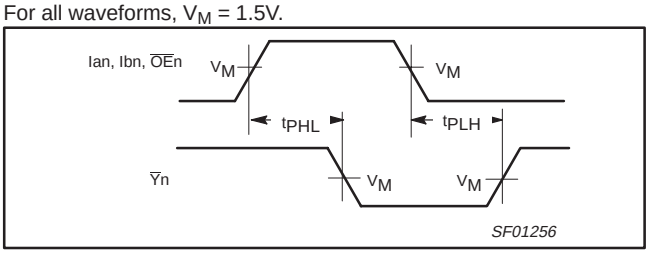
NOTES:
1. For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable type.
2. All typical values are at V_{CC} = 5V, T_{amb} = 25°C.

AC ELECTRICAL CHARACTERISTICS

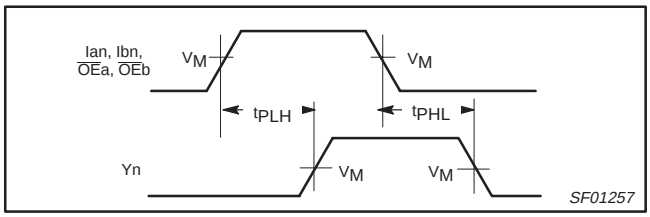
SYMBOL	PARAMETER		TEST CONDITION	LIMITS					UNIT
				T_{amb} = +25°C, V_{CC} = +5.0V, C_L = 50pF, R_L = 500Ω			T_{amb} = 0°C to +70°C, V_{CC} = +5.0V ± 10%, C_L = 50pF, R_L = 500Ω		
				MIN	TYP	MAX	MIN	MAX	
t_{PLH} t_{PHL}	Propagation delay Ian, Ibn to $\overline{Y}$n	74F756	Waveform 1, 2	8.5 1.0	11.0 3.0	14.0 6.0	8.5 1.0	15.0 6.5	ns
t_{PLH} t_{PHL}	Propagation delay $\overline{OE}$n to $\overline{Y}$n		Waveform 1, 2	9.0 5.0	11.5 7.0	14.5 10.0	9.0 4.5	15.0 10.5	ns
t_{PLH} t_{PHL}	Propagation delay Ian, Ibn to Yn	74F757	Waveform 1, 2	7.5 3.0	10.5 5.5	13.5 8.5	7.5 3.0	14.0 9.0	ns
t_{PLH} t_{PHL}	Propagation delay $\overline{OE}$a or OEb to Yn		Waveform 1, 2	9.0 4.5	10.5 7.0	15.0 10.0	8.5 4.0	16.0 10.5	ns
t_{PLH} t_{PHL}	Propagation delay Ian, Ibn to Yn	74F760	Waveform 1, 2	7.5 3.5	10.0 5.5	13.5 8.5	7.5 3.0	14.0 9.0	ns
t_{PLH} t_{PHL}	Propagation delay $\overline{OE}$n to Yn		Waveform 1, 2	9.5 5.0	11.5 7.0	14.5 10.5	9.0 4.5	15.0 10.5	ns

AC WAVEFORMS

For all waveforms, V_M = 1.5V.

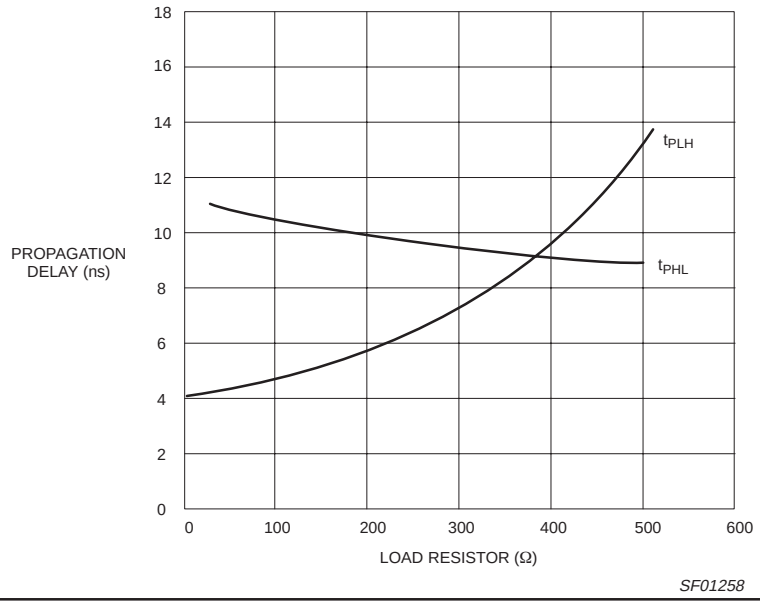


Waveform 1. Propagation Delay for Inverting Outputs



Waveform 2. Propagation Delay for Non-invertlng Outputs

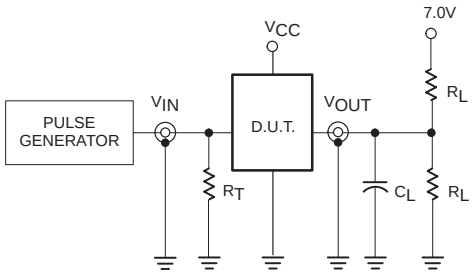
TYPICAL PROPAGATION DELAYS VERSUS LOAD FOR OPEN COLLECTOR OUTPUTS



NOTE:

When using open-collector parts, the value of the pull-up resistor greatly affects the value of the t_{PLH}. For example, changing the pull-up resistor value from 500Ω to 100Ω will improve the t_{PLH} up to 50% with only slight increase in the t_{PHL}. However, if the pull-up resistor is changed, the user must make certain that the total I_{OL} current through the resistor and the total I_{IL}'s of the receivers do not exceed the I_{OL} maximum specification.

TEST CIRCUIT AND WAVEFORMS



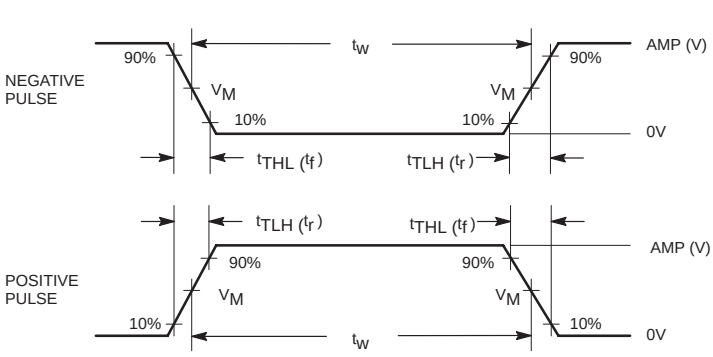
Test Circuit for Open Collector Outputs

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.

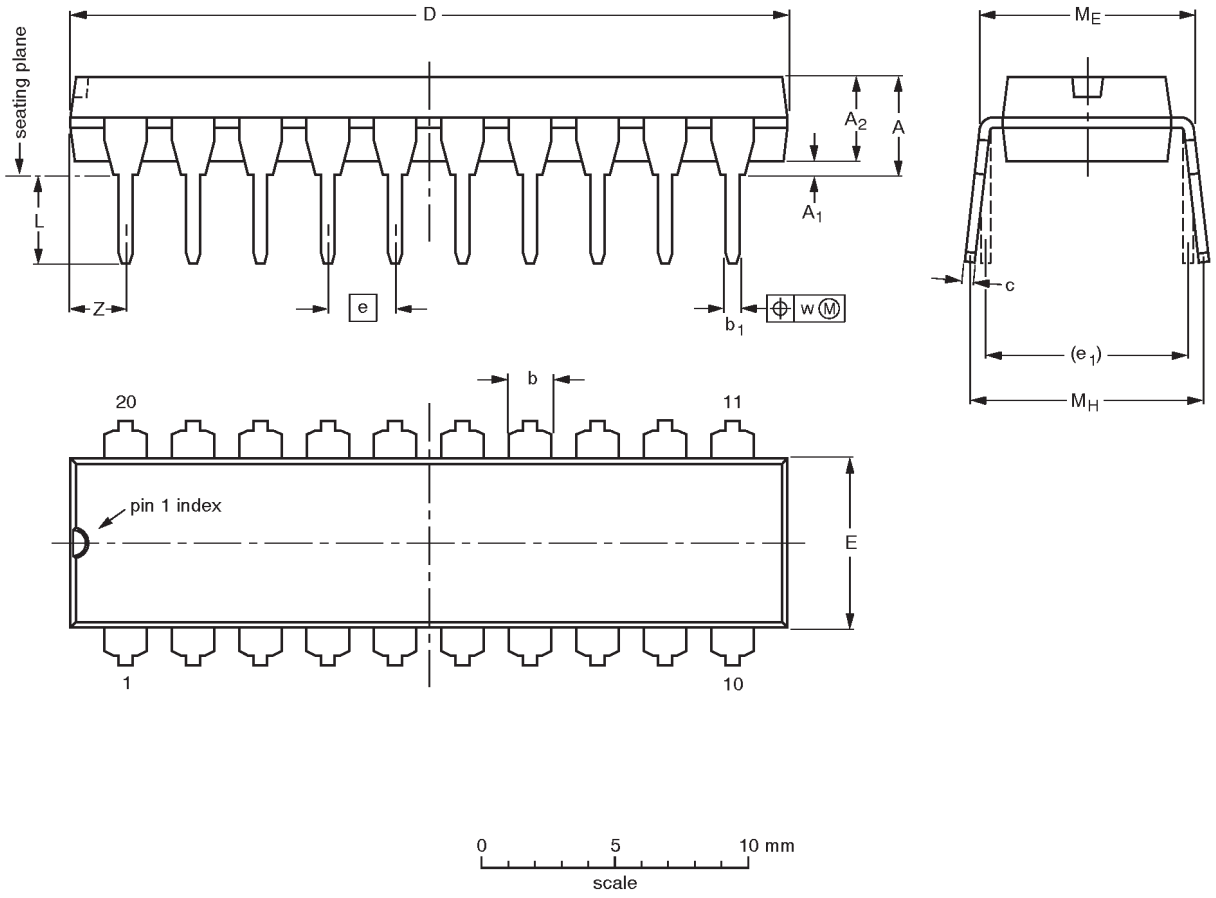


Input Pulse Definition

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

SF00027

DIP20: plastic dual in-line package; 20 leads (300 mil) SOT146-1



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

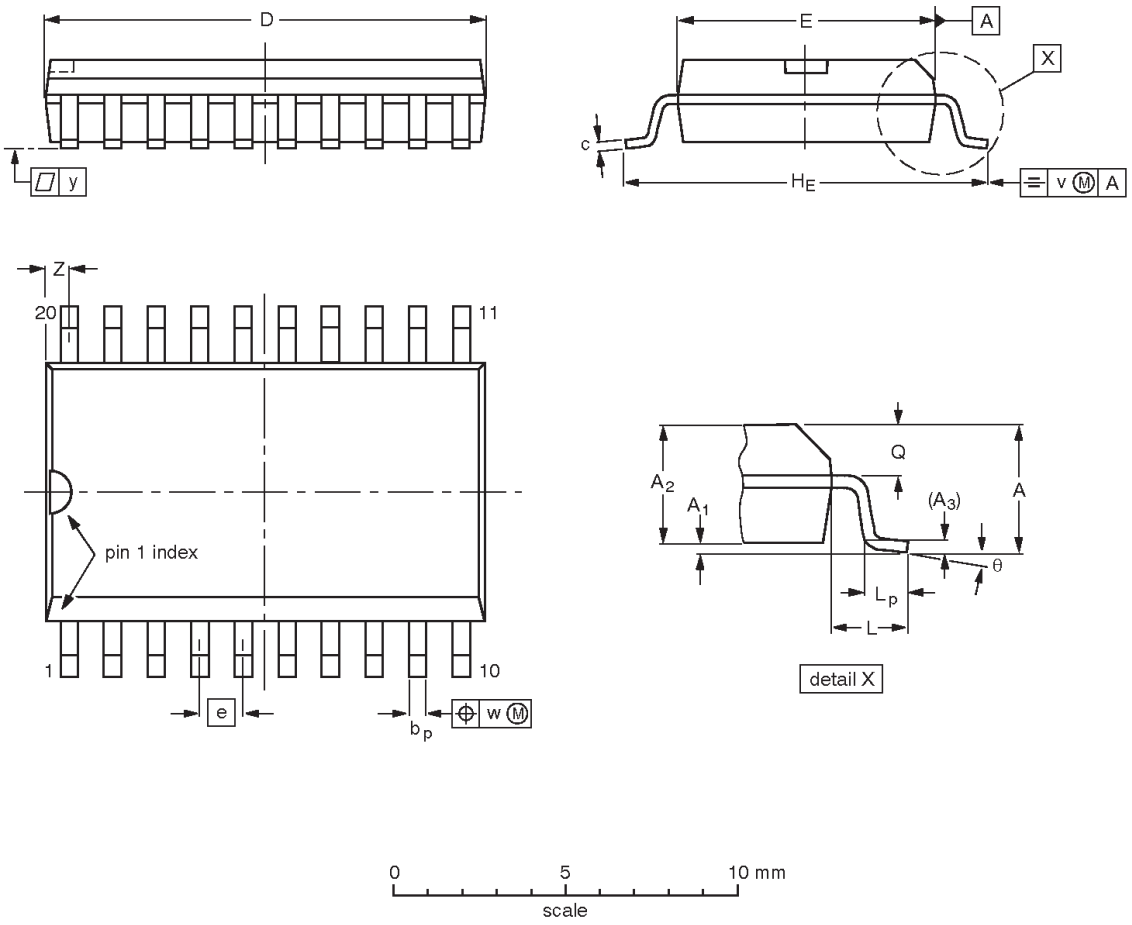
UNIT	A max.	A_1 min.	A_2 max.	b	b_1	c	D (1)	E (1)	e	e_1	L	M_E	M_H	w	Z (1) max.
mm	4.2	0.51	3.2	1.73 1.30	0.53 0.38	0.36 0.23	26.92 26.54	6.40 6.22	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.0
inches	0.17	0.020	0.13	0.068 0.051	0.021 0.015	0.014 0.009	1.060 1.045	0.25 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.078

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			
SOT146-1			SC603			~~92-11-17~~ 95-05-24

SO20: plastic small outline package; 20 leads; body width 7.5 mm **SOT163-1**



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	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8^o 0^o
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

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			
SOT163-1	075E04	MS-013AC				~~95-01-24~~ 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.
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 chages 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.

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