

DATA SHEET

74F2244

Octal buffer with 30Ω equivalent output termination (3-State)

Product specification

1994 Dec 5

IC15 Data Handbook

Philips Semiconductors



PHILIPS

Octal buffer with 30Ω equivalent output termination (3-State)

74F2244

FEATURES

- Octal bus interface
- 30Ω output termination ideal for driving DRAM
- 15mA source current
- SSOP Type II Package

DESCRIPTION

The 74F2244 is an octal buffer that is ideal for driving dynamic DRAM with matching impedance. The outputs are all capable of sinking 5mA and sourcing up to 15mA. The device features two output enables, $\overline{OE}a$ and $\overline{OE}b$, each controlling four of the 3-state outputs.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F2244	4.0ns	30mA

ORDERING INFORMATION

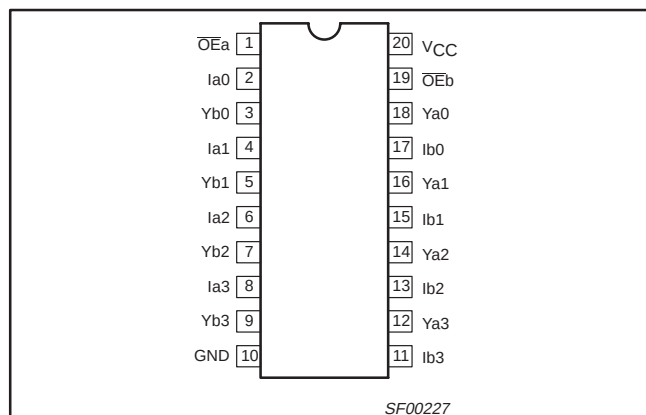
DESCRIPTION	ORDER CODE	DRAWING NUMBER
	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	
20-pin plastic DIP	N74F2244N	SOT146-1
20-pin plastic SOL	N74F2244D	SOT163-1
20-pin plastic SSOP Type II	N74F2244DB	SOT339-1

INPUT AND OUTPUT LOADING AND FAN OUT TABLE

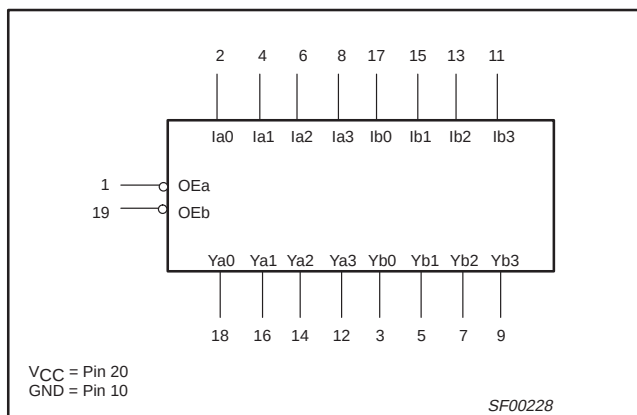
PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
Ian, Ibn	Data inputs	1.0/0.33	20μA/0.2mA
$\overline{OE}a$, $\overline{OE}b$	Output enable inputs (active low)	1.0/0.33	20μA/0.2mA
Yan, Ybn	Data outputs	750/8.33	15mA/5mA

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

PIN CONFIGURATION



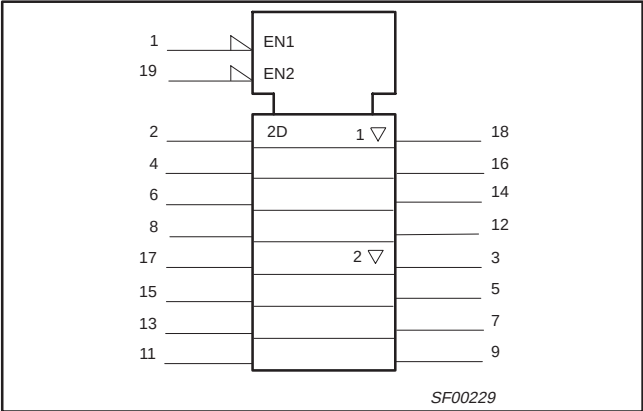
LOGIC SYMBOL



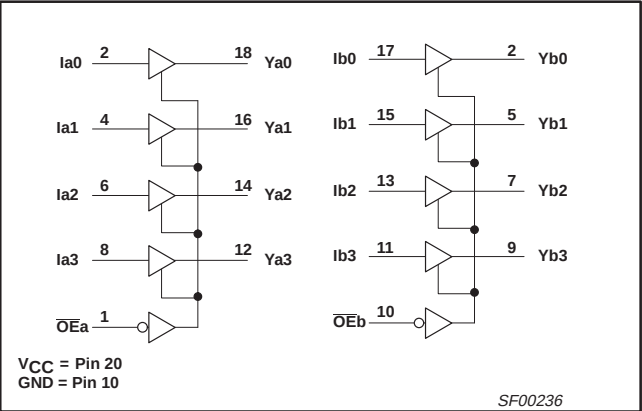
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IEC/IEEE SYMBOL



LOGIC DIAGRAM



FUNCTION TABLE

INPUTS				OUTPUTS	
OEa	Ia	OEb	Ib	Ya	Yb
L	L	L	L	L	L
L	H	L	H	H	H
H	X	H	X	Z	Z

Notes to function table
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 _{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	10	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 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			−15	mA
I _{OL}	Low-level output current			5	mA
T _{amb}	Operating free air temperature range	0		+70	°C

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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} = -3mA	±10%V _C	2.5			V
					±5%V _{CC}	2.7	3.4		V
				I _{OH} = -15mA	±10%V _C	2.0			V
					±5%V _{CC}	2.0			V
V _{OL}	Low-level output voltage		V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN,	I _{OL} = MAX	±10%V _C			0.50	V
					±5%V _{CC}		0.42	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					-0.2	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 (total)		V _{CC} = MAX				20	30	mA
							45	65	mA
							26	40	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_{CC} = 5V, T_{amb} = 25°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.

AC ELECTRICAL CHARACTERISTICS

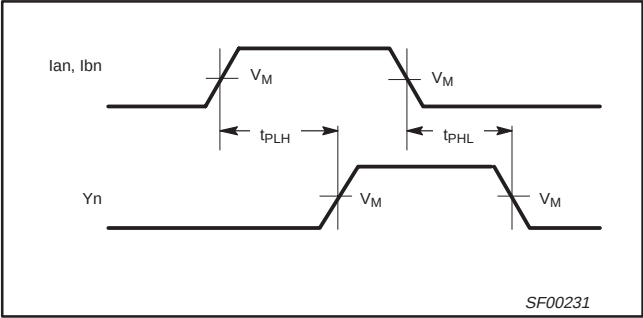
SYMBOL	PARAMETER	TEST CONDITION	LIMITS						UNIT
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω			
			MIN	TYP	MAX	MIN	MAX		
t _{PLH} t _{PHL}	Propagation delay I _{an} , I _{bn} to Y _n	Waveform 1	3.0 2.5	4.5 4.5	7.0 7.0	2.5 2.5	8.0 7.5	ns	
t _{PZH} t _{PZL}	Output enable time to high or low level	Waveform 2 Waveform 3	2.5 3.0	4.5 5.0	7.5 8.0	2.0 3.0	8.0 8.5	ns	
t _{PHZ} t _{PLZ}	Output disable time from high or low level	Waveform 2 Waveform 3	1.5 1.5	3.5 2.5	6.0 5.5	1.0 1.0	6.0 5.5	ns	

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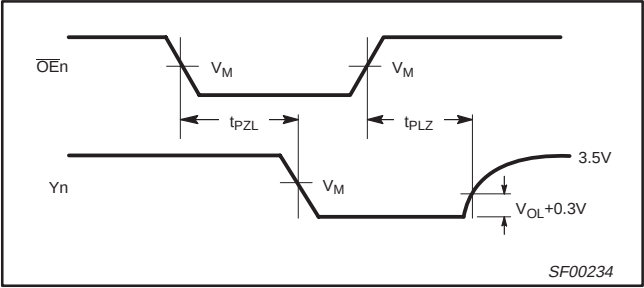
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AC WAVEFORMS

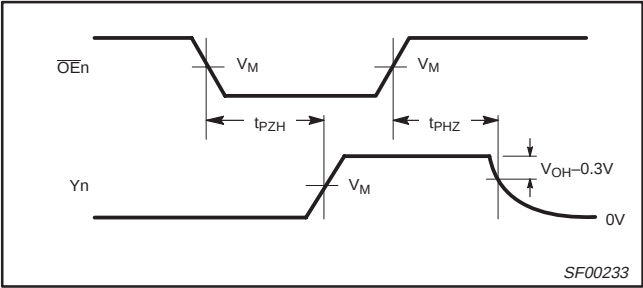
For all waveforms, $V_M = 1.5V$.



Waveform 1. Propagation delay for data to outputs

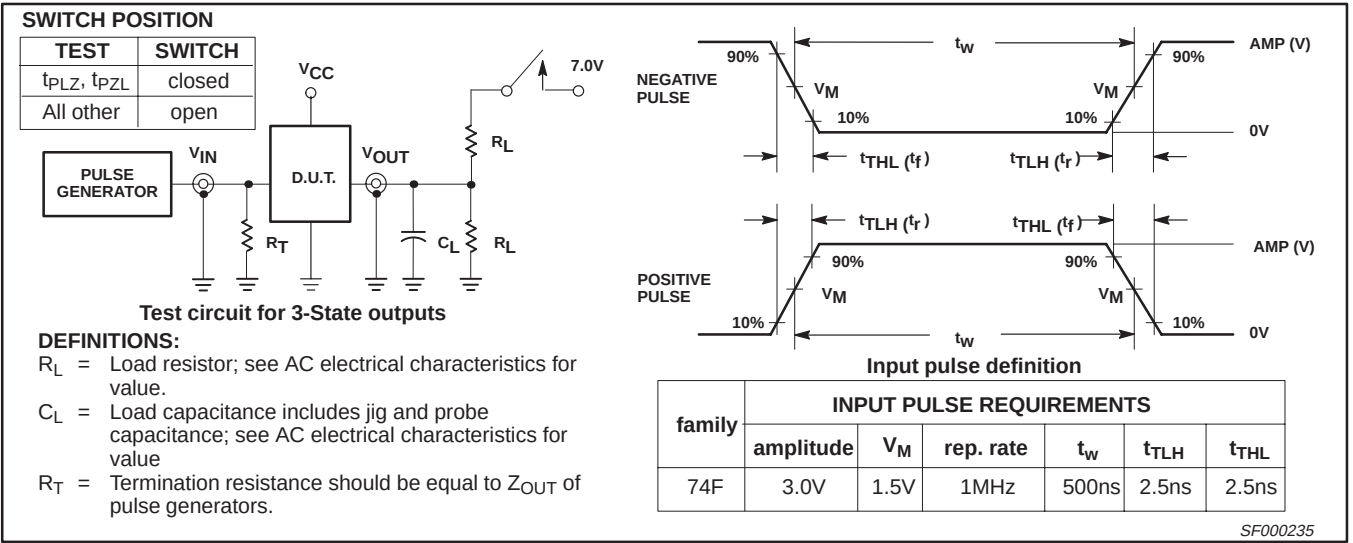


Waveform 3. 3-State output enable time to low level and output disable time from low level



Waveform 2. 3-State output enable time to high level and output disable time from high level

TEST CIRCUIT AND WAVEFORMS

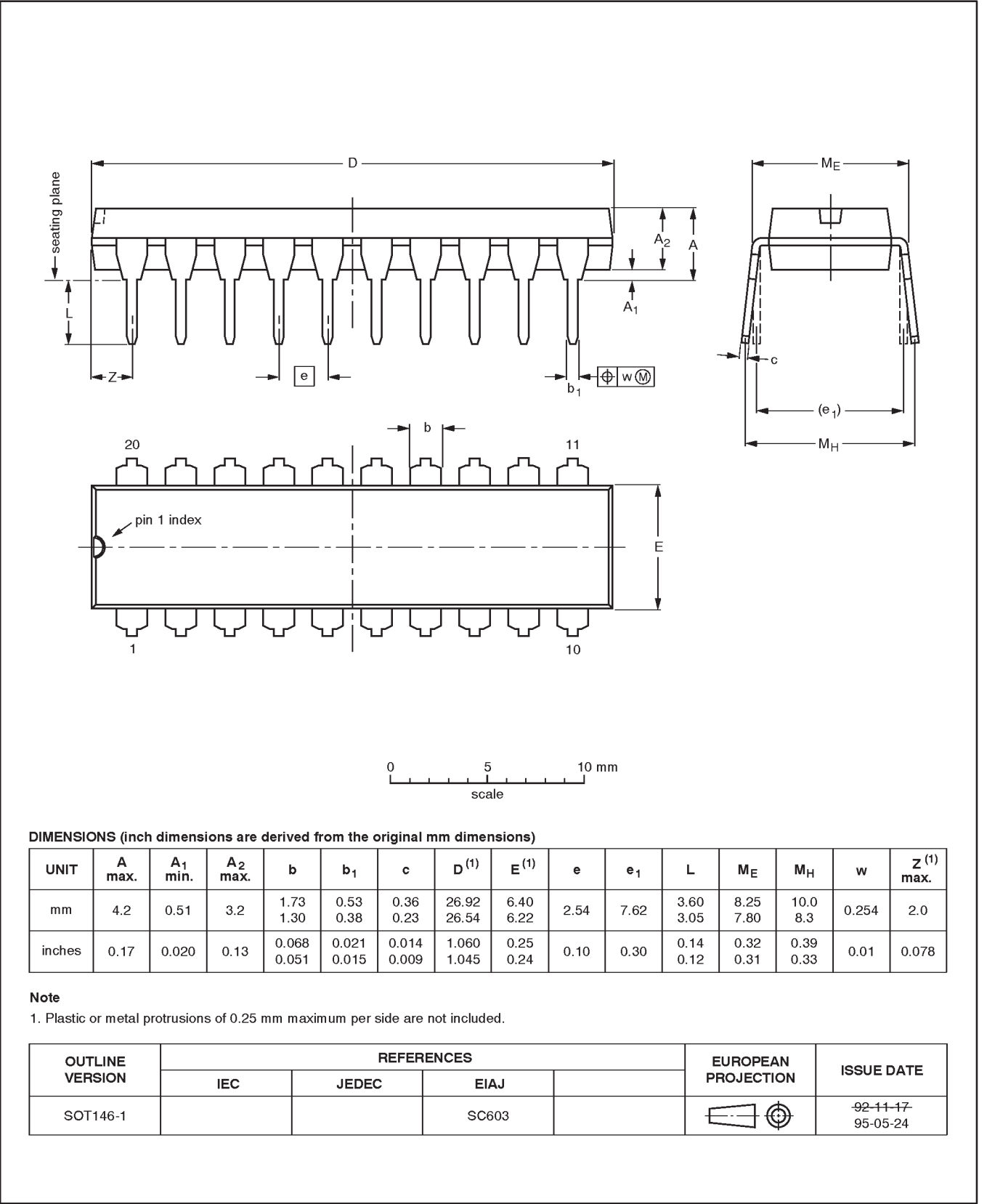


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DIP20: plastic dual in-line package; 20 leads (300 mil)

SOT146-1

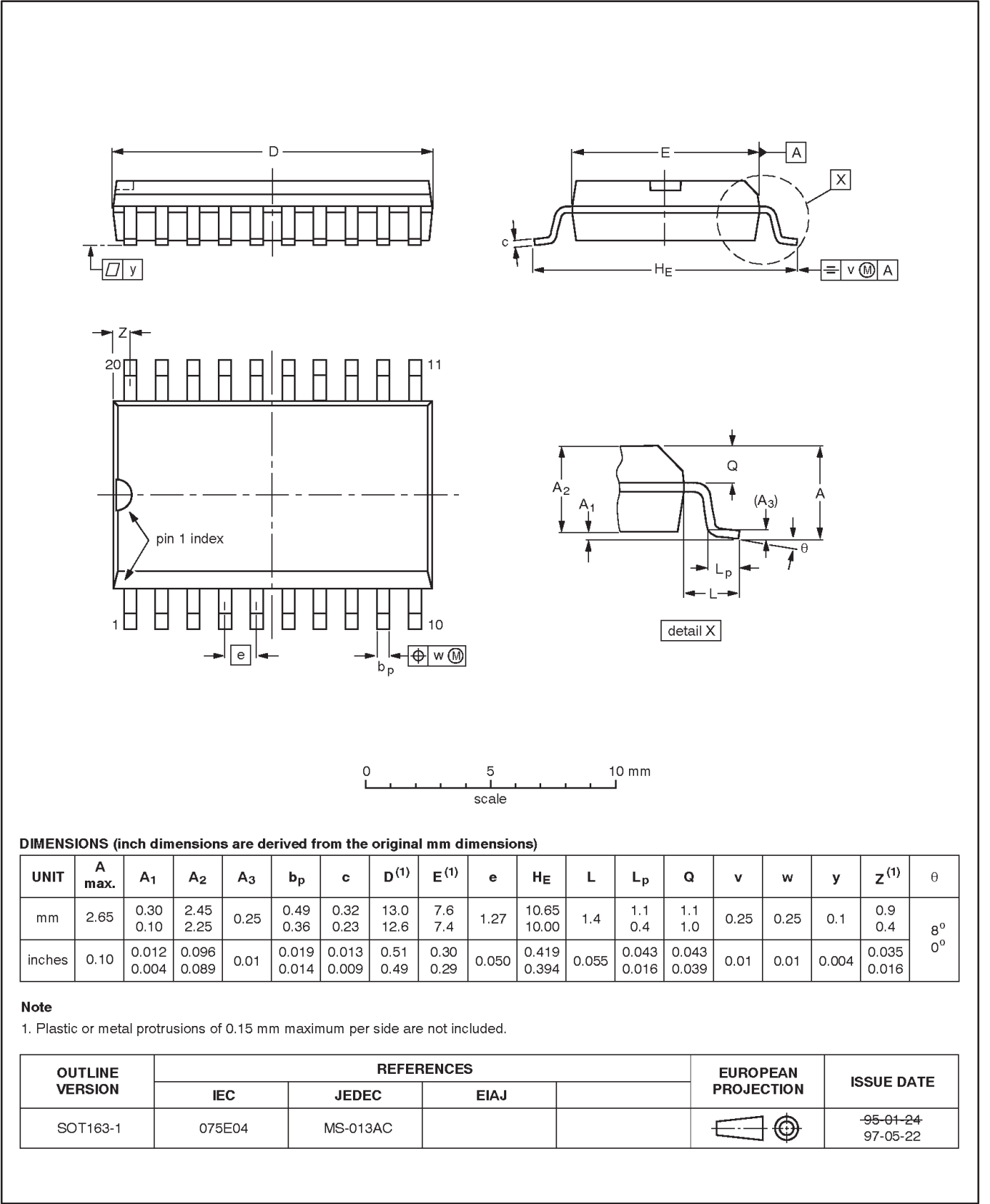


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SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1

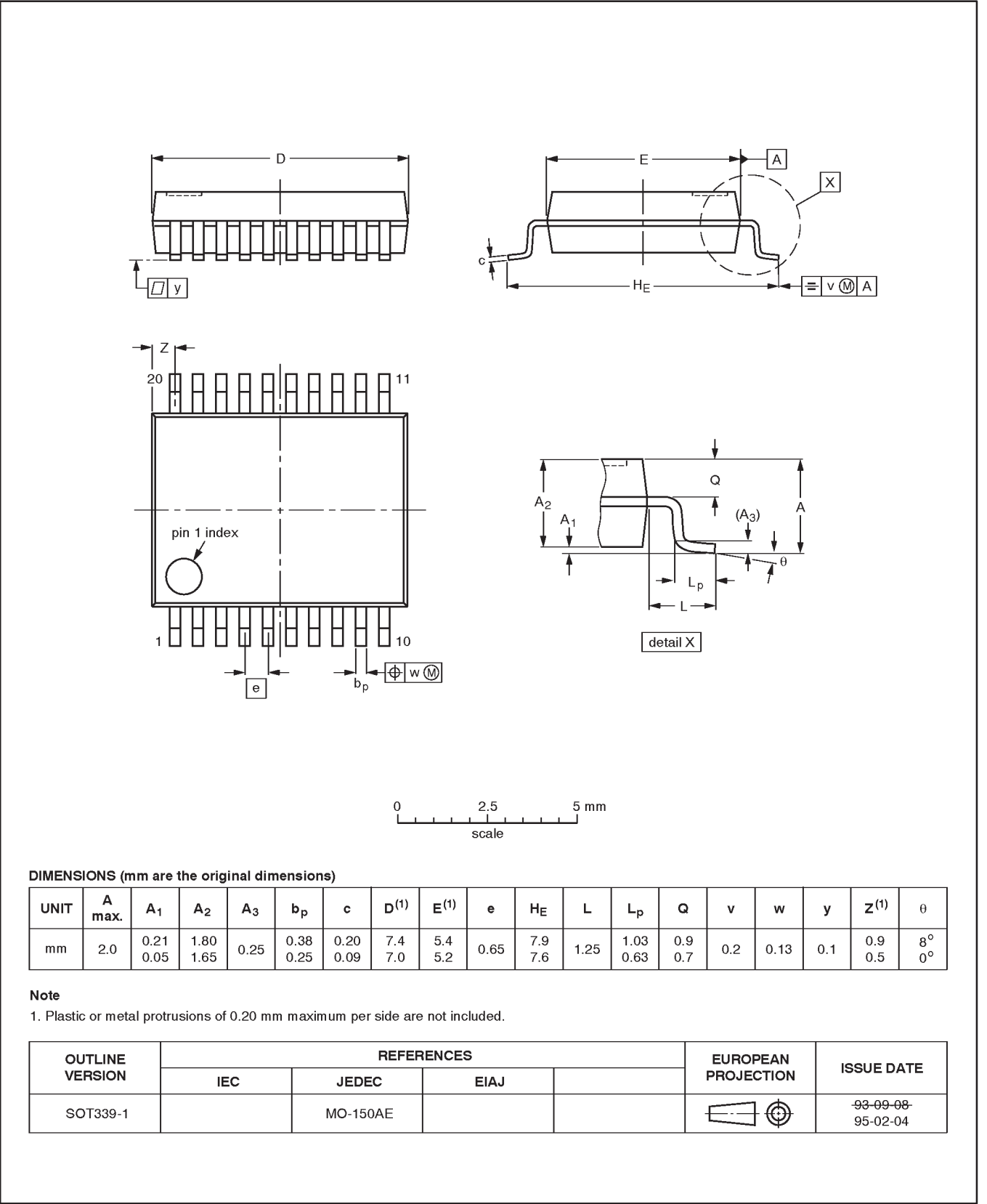


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SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

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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.
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