

DATA SHEET

74F2245

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

Product specification

1996 May 10

IC15 Data Handbook

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

74F2245

FEATURES

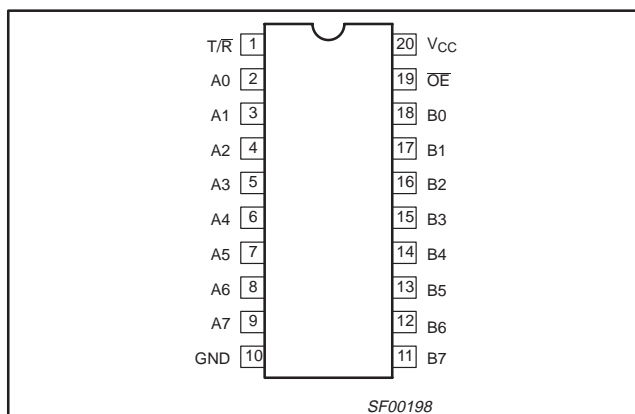
- Octal bidirectional bus interface
- 30 Ohm output termination for driving DRAM
- Outputs are placed in high impedance state during power-off conditions
- SSOP Type II package

DESCRIPTION

The 74F2245 is an octal transceiver featuring non-inverting 3-State bus compatible outputs in both transmit and receive directions. The device features an Output Enable (\overline{OE}) input for easy cascading and Transmit/Receive (T/R) input for direction control. The 3-State outputs, B0-B7, have been designed to prevent output bus loading if the power is removed from the device.

The 30 Ohm series termination on the outputs reduces over/undershoot making them ideal for driving DRAM.

PIN CONFIGURATION



TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F2245	4.0ns	70mA

ORDERING INFORMATION

DESCRIPTION	COMMERCIAL RANGE $V_{CC} = 5V \pm 10\%$, $T_{amb} = 0^{\circ}C$ to $+70^{\circ}C$	DRAWING NUMBER
20-Pin Plastic DIP	N74F2245N	SOT146-1
20-Pin Plastic SOL	N74F2245D	SOT163-1
20-Pin Plastic SSOP	N74F2245DB	SOT339-1

INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F (U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
A0-A7, B0-B7	Data inputs	3.5/1.0	70μA/0.6mA
\overline{OE}	Output Enable input (active Low)	1.0/2.0	20μA/1.2mA
T/R	Transmit/Receive input	1.0/2.0	20μA/1.2mA
A0-A7	A port outputs	150/8	3.0mA/5mA*
B0-B7	B port outputs	150/8	3.0mA/5mA*

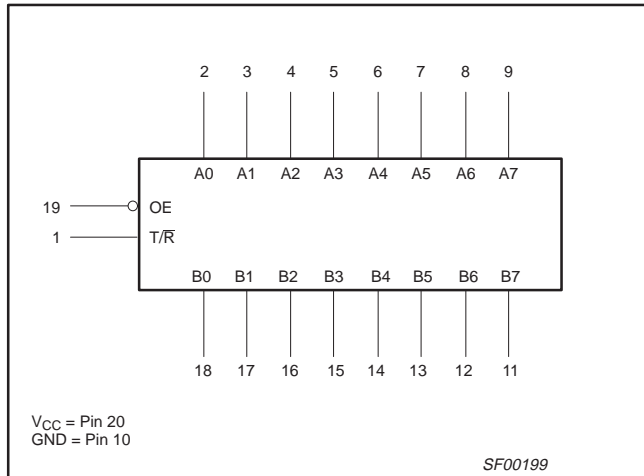
NOTE: One (1.0) FAST unit load is defined as: 20μA in the High state and 0.6mA in the Low state.

* 12mA with reduced noise margin

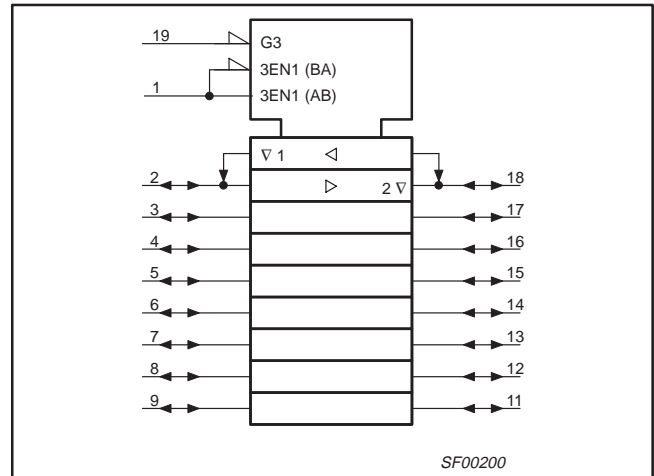
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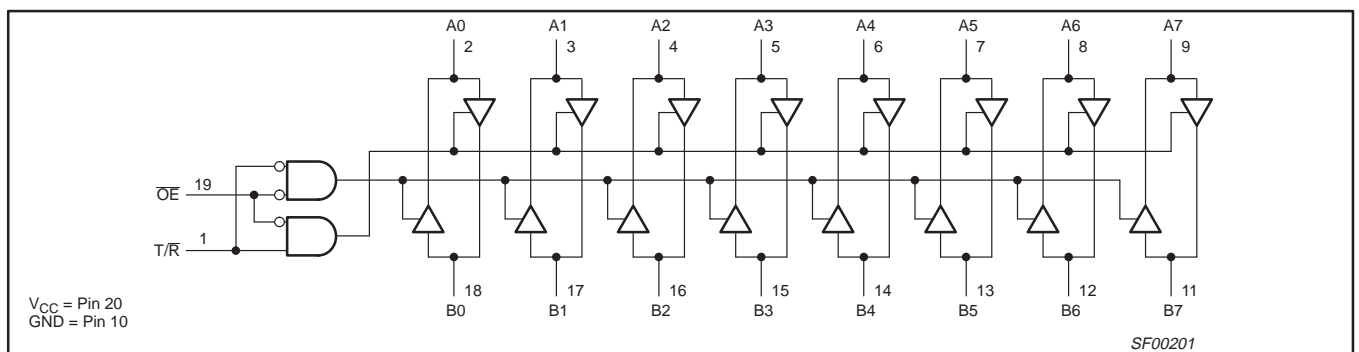
LOGIC SYMBOL



IEC/IEEE SYMBOL



LOGIC DIAGRAM



FUNCTION TABLE

INPUTS		OUTPUTS
OE	T/R	
L	L	Bus B data to Bus A
L	H	Bus A data to Bus B
H	X	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 _{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 +5.5	V	
I _{OUT}	Current applied to output in Low output state	A0-A7	24	mA
		B0-B7	24	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
I _{OH}	High-level output current	A0-A7		-3	mA
		B0-B7		-3*	mA
I _{OL}	Low-level output current	A0-A7		5*	mA
		B0-B7		5*	mA
T _{amb}	Operating free-air temperature range	0		+70	°C

* 12 mA with reduced noise margin

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DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER		TEST CONDITIONS ²			LIMITS			UNIT
						MIN	TYP ¹	MAX	
V _{OH}	High-level output voltage	A0-A7, B0-B7	V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OH} = -3mA	±10% V _{CC}	2.4			V
					±5% V _{CC}	2.7	3.4		V
		A0-A7, B0-B7		I _{OH} = -12mA	±10% V _{CC}	2.0			V
					±5% V _{CC}	2.0			V
V _{OL}	Low-level output voltage	A0-A7, B0-B7	V _{CC} = MIN, V _{IL} = MAX, V _{IH} = MIN	I _{OL} = 5mA	±10% V _{CC}		0.42	0.50	V
					±5% V _{CC}		0.42	0.50	V
		A0-A7, B0-B7		I _{OL} = 12mA	±10% V _{CC}		0.55	0.67	V
					±5% V _{CC}		0.55	0.67	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	OE, T/R	V _{CC} = 5.5V, V _I = 7.0V				100	μA	
		A0-A7, B0-B7	V _{CC} = 5.5V, V _I = 5.5V				1	mA	
I _{IH}	High-level input current	OE, T/R only	V _{CC} = MAX, V _I = 2.7V				20	μA	
I _{IL}	Low-level input current	OE, T/R only	V _{CC} = MAX, V _I = 0.5V				-1.2	mA	
I _{IH} +I _{OZH}	Off-state output current High level voltage applied		V _{CC} = MAX, V _O = 2.7V				70	μA	
I _{IL} +I _{OZL}	Off-state output current Low level voltage applied		V _{CC} = MAX, V _O = 0.5V				-600	μA	
I _{OS}	Short-circuit output current ³	A0-A7	V _{CC} = MAX			-60		-150	mA
		B0-B7				-60		-150	mA
I _{CC}	Supply current (total)	I _{CCH}	V _{CC} = MAX				60	87	mA
		I _{CCL}					70	100	mA
		I _{CCZ}					75	110	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

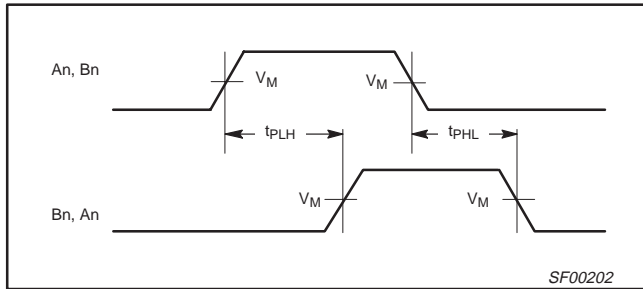
SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT
			V _{CC} = +5.0V T _{amb} = +25°C C _L = 50pF, R _L = 500Ω			V _{CC} = +5.0V ± 10% T _{amb} = 0°C to +70°C C _L = 50pF, R _L = 500Ω		
			MIN	TYP	MAX	MIN	MAX	
t _{PLH} t _{PHL}	Propagation delay An to Bn, Bn to An	Waveform 1	2.5 2.5	3.5 4.0	7.0 7.0	2.5 2.5	8.5 8.0	ns
t _{PZH} t _{PZL}	Output Enable time to High or Low level	Waveform 2 Waveform 3	2.5 3.5	4.5 5.5	8.0 8.5	2.0 3.5	9.5 9.5	ns
t _{PHZ} t _{PLZ}	Output Disable time from High or Low level	Waveform 2 Waveform 3	2.5 1.5	5.0 3.5	7.0 6.5	2.0 1.0	7.5 7.0	ns

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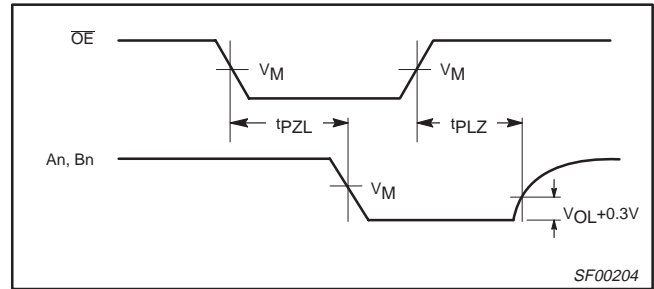
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AC WAVEFORMS

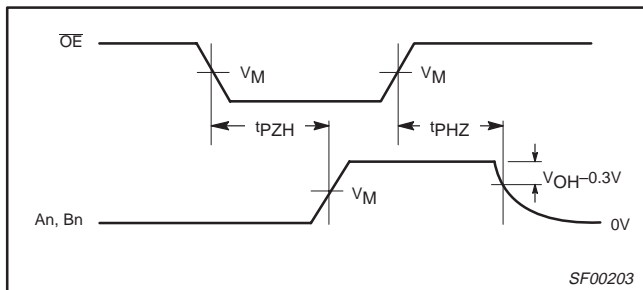
For all waveforms, $V_M = 1.5V$.



Waveform 1. Propagation Delay for Non-Inverting Output



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

Test Circuit for Open Collector 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

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

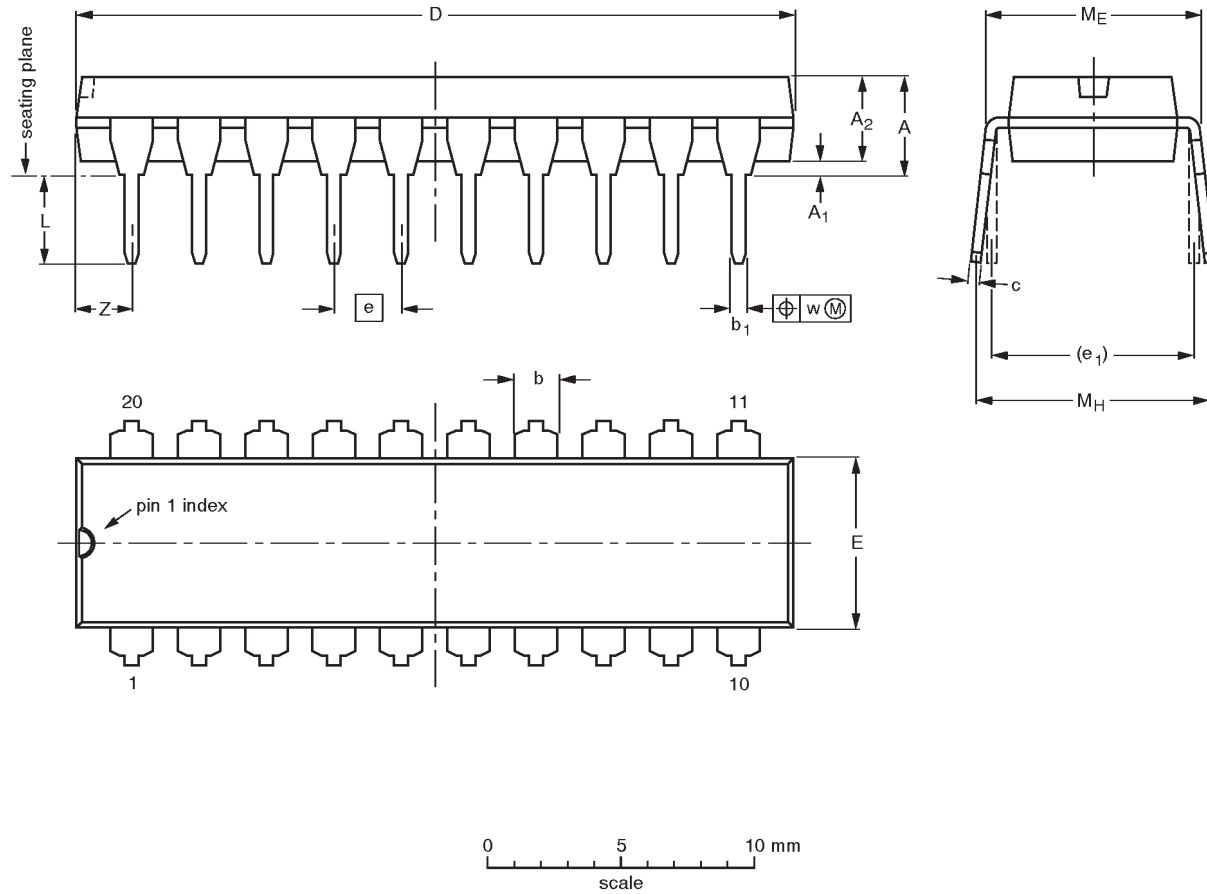
SF00128

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

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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.

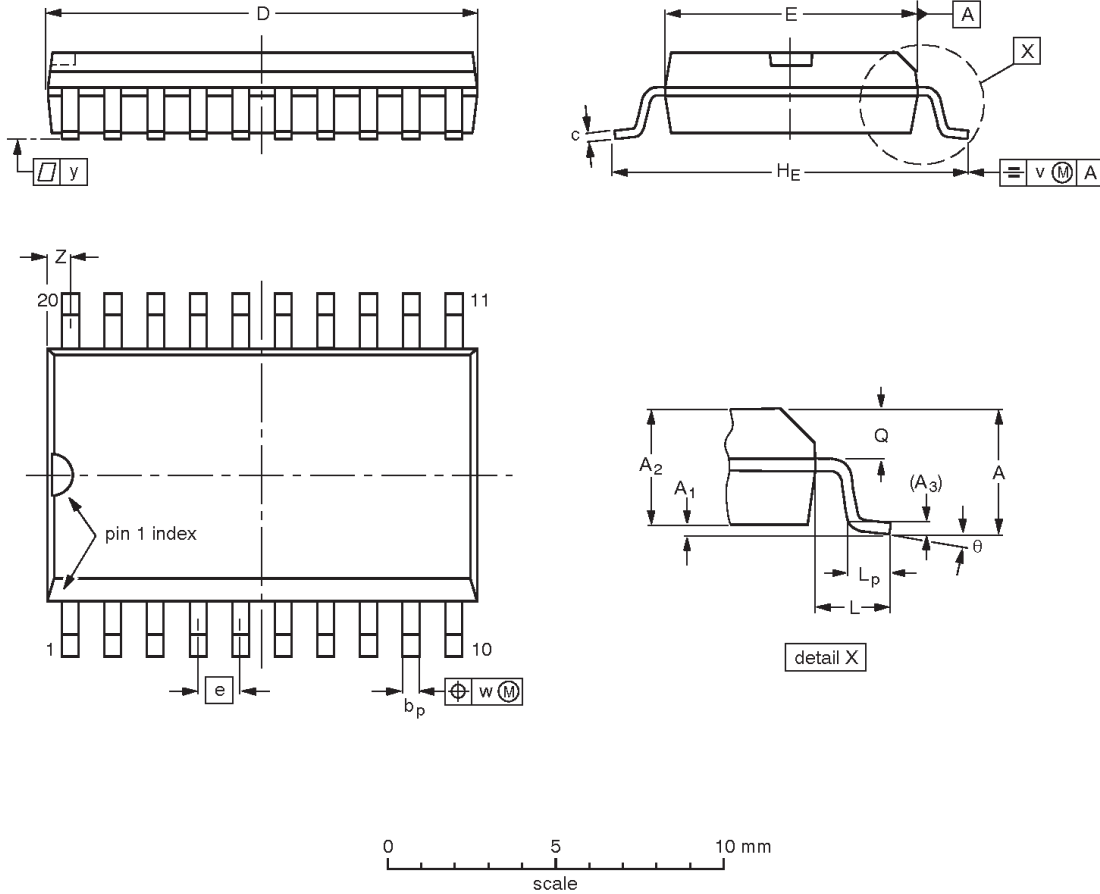
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT146-1			SC603			92-11-17 95-05-24

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

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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° 0°
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	0.42 0.39	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.

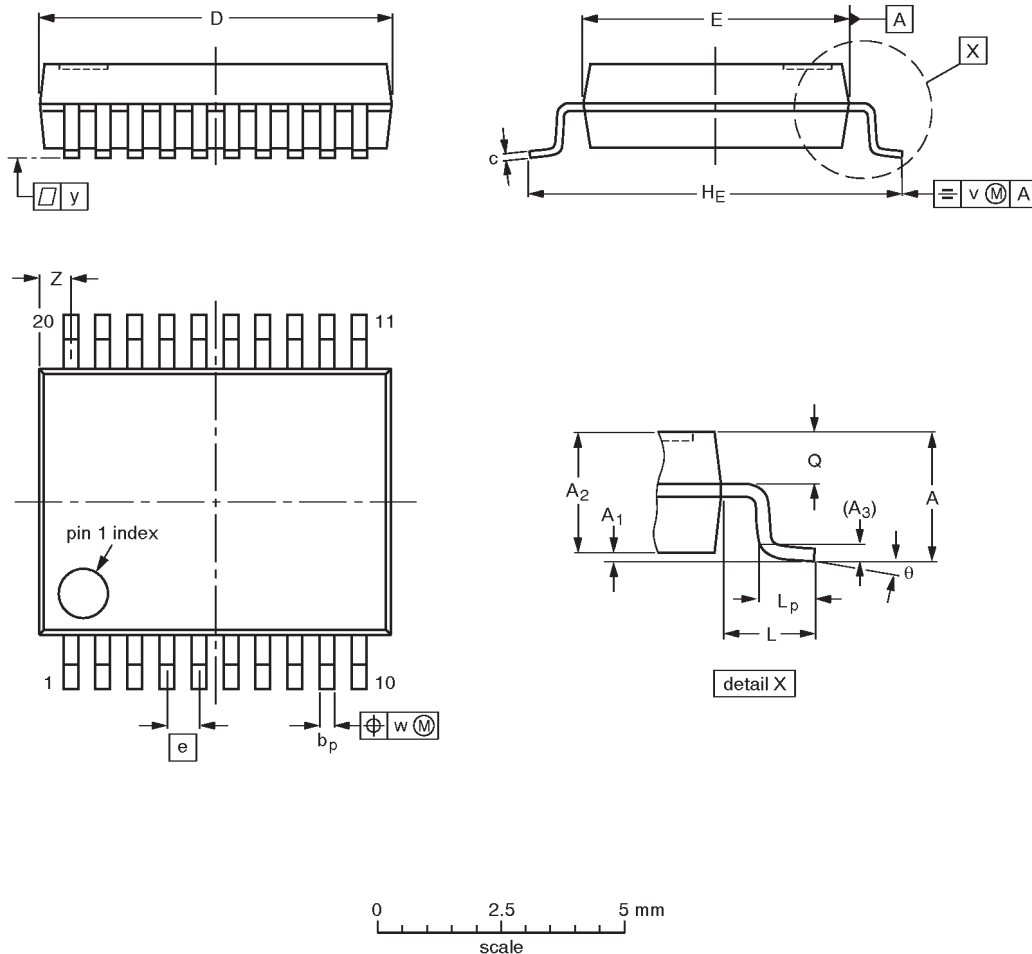
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT163-1	075E04	MS-013AC				92-11-17 95-01-24

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

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

SOT339-1



DIMENSIONS (mm are the original 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	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

Note

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT339-1		MO-150AE				93-09-08 95-02-04

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DEFINITIONS

Data Sheet Identification	Product Status	Definition
<i>Objective Specification</i>	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.
<i>Preliminary Specification</i>	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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