INTEGRATED CIRCUITS

DATA SHEET

74F2245

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

Product specification

1996 May 10

IC15 Data Handbook





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

74F2245

FEATURES

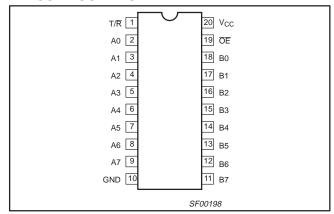
- Octal bidirectional bus interface
- 30 Ohm output termination for driving DRAM
- Outputs are placed in high impedance state during power-off conditions
- SSOP Type II package

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 ±10%, T _{amb} = 0°C to +70°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
ŌĒ	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*

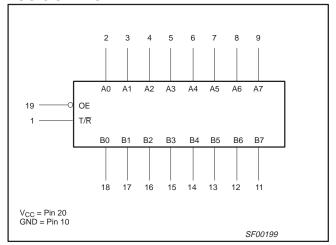
NOTE: One (1.0) FAST unit load is defined as: 20µA in the High state and 0.6mA in the Low state.

¹²mA with reduced noise margin

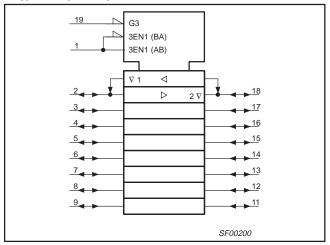
Octal transceiver with 30Ω equivalent output termination (3-State)

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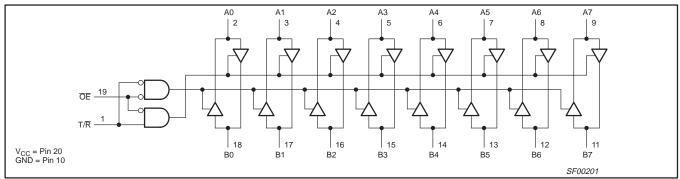
LOGIC SYMBOL



IEC/IEEE SYMBOL



LOGIC DIAGRAM



FUNCTION TABLE

INP	UTS	OUTPUTS
ŌĒ	T/R	0017013
L	L	Bus B data to Bus A
L	Н	Bus A data to Bus B
Н	Х	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						
	Compart applied to a struct in Law authors state	A0-A7	24	mA					
IOUT	Current applied to output in Low output state	B0-B7	24	mA					
T _{amb}	Operating free-air temperature range	0 to +70	°C						
T _{stg}	Storage temperature range	Storage temperature range							

RECOMMENDED OPERATING CONDITIONS

SYMBOL	DADAMETER	PARAMETER						
STWIBUL	PARAMETER	MIN	NOM	MAX	UNIT			
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		
	Library and and an extension and an exte	A0-A7			-3	mA		
IOH	High-level output current	B0-B7			-3*	mA		
	Laurence autoritaria	A0-A7			5*	mA		
loL	Low-level output current	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	DADAMETE		TE6	ST CONDITIONS		LIMITS			
STMBUL	PARAMETE	Κ.	153	SI CONDITIONS	5 *	MIN	TYP ¹	MAX	UNIT
		40 47 DO D7		J 2000 A	±10% V _{CC}	2.4			V
	LPak lavel syderot velta es	A0-A7, B0-B7	$V_{CC} = MIN,$	$I_{OH} = -3mA$	±5% V _{CC}	2.7	3.4		V
V _{OH}	High-level output voltage	40 47 DO D7	$V_{IL} = MAX,$ $V_{IH} = MIN$	1 10 1	±10% V _{CC}	2.0			V
		A0-A7, B0-B7		$I_{OH} = -12mA$	±5% V _{CC}	2.0			V
		40 47 00 07		I _{OL} = 5mA	±10% V _{CC}		0.42	0.50	V
V	l and land and and are	A0-A7, B0-B7	$V_{CC} = MIN,$ $V_{IL} = MAX,$	I _{OL} = 5mA	±5% V _{CC}		0.42	0.50	V
V _{OL}	Low-level output voltage		$V_{IH} = IVIAX,$ $V_{IH} = MIN$	1 404	±10% V _{CC}		0.55	0.67	V
		A0-A7, B0-B7		$I_{OL} = 12mA$	±5% V _{CC}		0.55	0.67	
V _{IK}	Input clamp voltage	•	$V_{CC} = MIN, I_I =$	$V_{CC} = MIN, I_I = I_{IK}$				-1.2	V
	Input current at maximum	$V_{CC} = 5.5V, V_{I}$	= 7.0V			100	μΑ		
t _l	input voltage	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	μΑ
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	μΑ
I _{IL} +I _{OZL}	Off-state output current Low level voltage applied		V _{CC} = MAX, V	$V_{CC} = MAX, V_O = 0.5V$				-600	μΑ
	Oh ant aimenit andmost answerst3	A0-A7	\/			-60		-150	mA
los	Short-circuit output current ³	B0-B7	$V_{CC} = MAX$			-60		-150	mA
		I _{ССН}					60	87	mA
I _{CC}	Supply current (total) I _{CCL}	I _{CCL}	V _{CC} = MAX			70	100	mA	
		I _{CCZ}	1				75	110	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

				LIMITS							
SYMBOL	PARAMETER	TEST CONDITION	V ₀ T _a C _L = 5	_{CC} = +5.0 _{mb} = +25 0pF, R _L =	V °C : 500Ω	V _{CC} = +5. T _{amb} = 0°C C _L = 50pF,	UNIT				
			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}	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}	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			

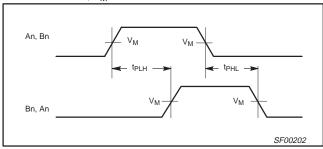
Not more than one output should be shorted at a time. For testing I_{OS}, the use of high-speed test apparatus and/or sample-and-hold techniques are preferable in order to minimize internal heating and more accurately reflect operational values. Otherwise, prolonged shorting of a High output may raise 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.

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

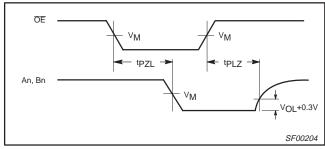
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AC WAVEFORMS

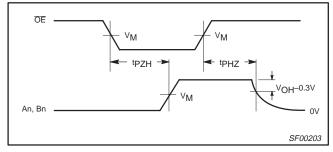
For all waveforms, $V_M = 1.5V$.



Waveform 1. Propagation Delay for Non-Inverting Output

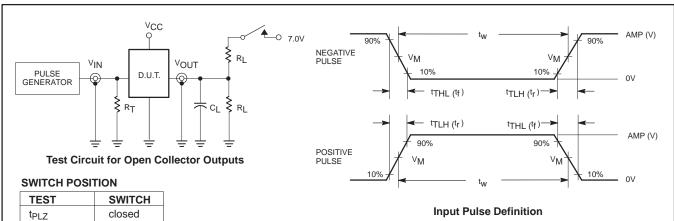


Waveform 3. 3-State Output Enable Time to Low Level and Output Disable Time from Low Level



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

TEST CIRCUIT AND WAVEFORMS



DEFINITIONS:

 t_{PZL}

All other

 R_L = Load resistor;

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

closed

open

see AC electrical characteristics for value.

 $R_T = Termination resistance should be equal to <math display="inline">Z_{OUT}$ of pulse generators.

family	INP	INPUT PULSE REQUIREMENTS											
	amplitude	V_{M}	rep. rate	t _w	t _{TLH}	t _{THL}							
74F	₽F 3.0V		1MHz	500ns	2.5ns	2.5ns							

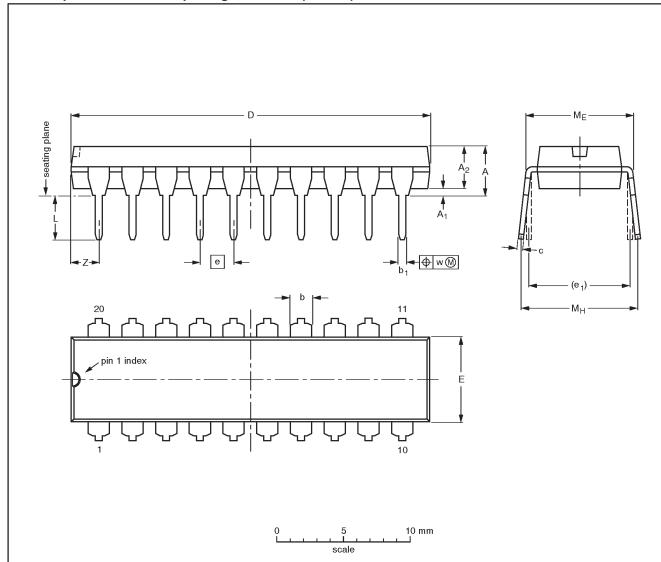
SF00128

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)

UN	IIT	A max.	A ₁ min.	A ₂ max.	b	b ₁	С	D ⁽¹⁾	E ⁽¹⁾	е	e ₁	L	ME	M _H	w	Z ⁽¹⁾ max.
m	m	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
incl	nes	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.

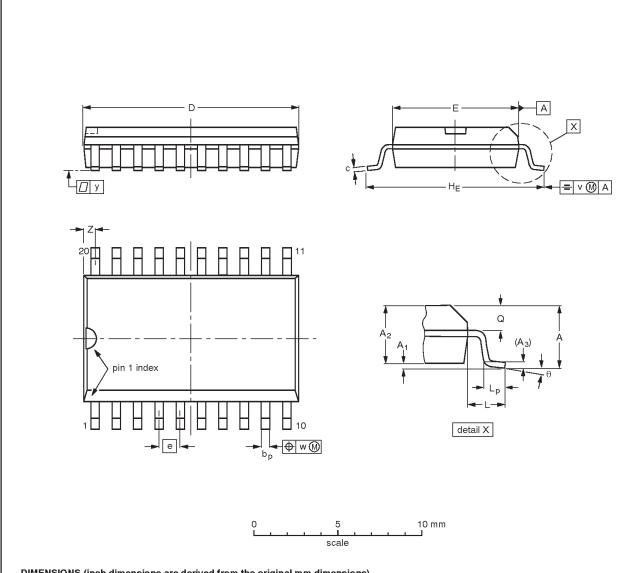
OUTLINE		EUROPEAN	ISSUE DATE				
VERSION IEC JEDEC EIAJ				PROJECTION	ISSUE DATE		
SOT146-1			SC603			92-11-17 95-05-24	

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	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	٧	w	у	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°
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	o°

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	EIAJ		PROJECTION	1330E DATE	
SOT163-1	075E04	MS-013AC				-92-11-17 95-01-24	

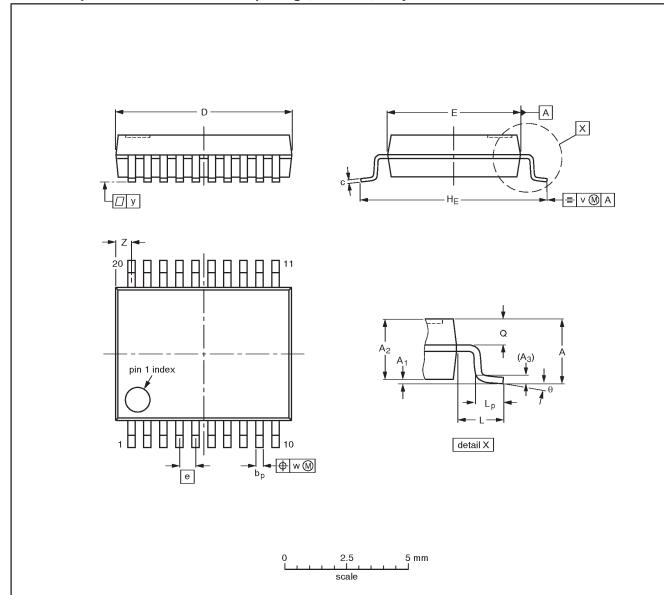
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SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	Α1	A ₂	A ₃	bр	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Ø	v	w	у	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		REFER	RENCES	EUROPEAN		
VERSION	IEC	JEDEC	EIAJ	PROJECTION	ISSUE DATE	
SOT339-1		MO-150AE			93-09-08 95-02-04	

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