DATA SHEET

74F30244

Octal 30Ω line driver with enable, non-inverting (open collector)

Product specification
Supersedes data of 1999 Jan 08
IC15 Data Handbook

2000 Jun 30

**Philips
Semiconductors**

PHILIPS

Octal 30Ω line driver with enable, non-inverting (open collector)

74F30244

FEATURES

- Ideal for driving transmission lines or backplanes. 160mA I_{OL} ideal for applications with impedance as low as 30Ω

- Guaranteed threshold voltages on the incident wave while driving line as low as 30Ω

- High impedance NPN base inputs for reduced loading (20μA in High and Low states)

- Ideal for applications which require high output drive and minimal bus loading

- Octal interface

- Non-inverting

- Open-Collector outputs sink 160mA

- Multiple side pins are used for V_{CC} and GND to reduce lead inductance (improves speed and noise immunity)

- Available in 24-pin standard slim DIP (300mil) plastic or SOL

DESCRIPTION

The 74F30244 is a high current open collector octal buffer composed of eight inverters. The 74F30244 has non-inverting paths. The device has eight inverters with two Output Enables ($\overline{OE}0$, $\overline{OE}1$), each controlling four outputs. The driver is designed to deal with the low-impedance transmission line effects found on printed circuit boards when fast edge rates are used. The 160mA I_{OL} provides ample power to achieve TTL switching voltages on the incident wave.

TYPE	TYPICAL PROPAGATION DELAY	TYPICAL SUPPLY CURRENT (TOTAL)
74F30244	10.5ns	69mA

ORDERING INFORMATION

DESCRIPTION	COMMERCIAL RANGE V_{CC} = 5V ±10%, T_{amb} = 0°C to +70°C	PACKAGE DRAWING NUMBER
24-pin Plastic Slim DIP (300mil)	N74F30244N	SOT222-1
24–pin Plastic SOL[1]	N74F30244D	SOT137-1

NOTE:
1. Because of the high current sinking capability of these parts, the SOL package should only be used under the following conditions:
   - a. 50% duty cycle,

   AND
   - b. 3/5 of remaining 50% driving ≤ 100mA (leaving the remaining 2/5 of the drive ≤ 160mA)

   OR
   - c. use ≤ 450 linear feet per minute forced air or other thermal mounting techniques.
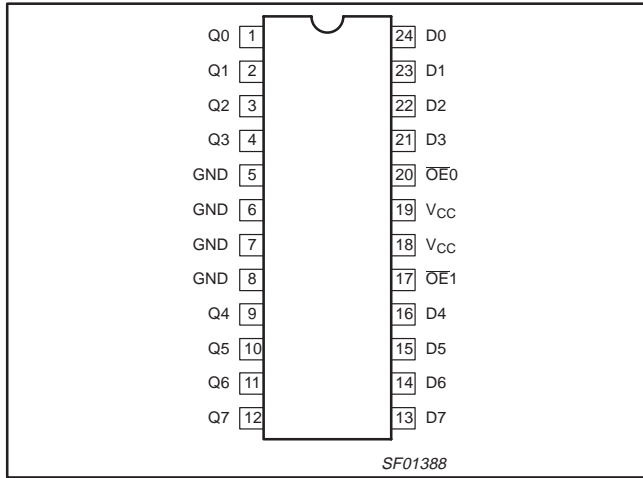
INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D0–D7	Data inputs	1.0/0.033	20μA/20μA
$\overline{OE}0$–$\overline{OE}1$	Output Enable inputs (Active Low)	1.0/0.033	20μA/20μA
Q0–Q7	Data outputs (OC)	OC/266.7	OC/160mA

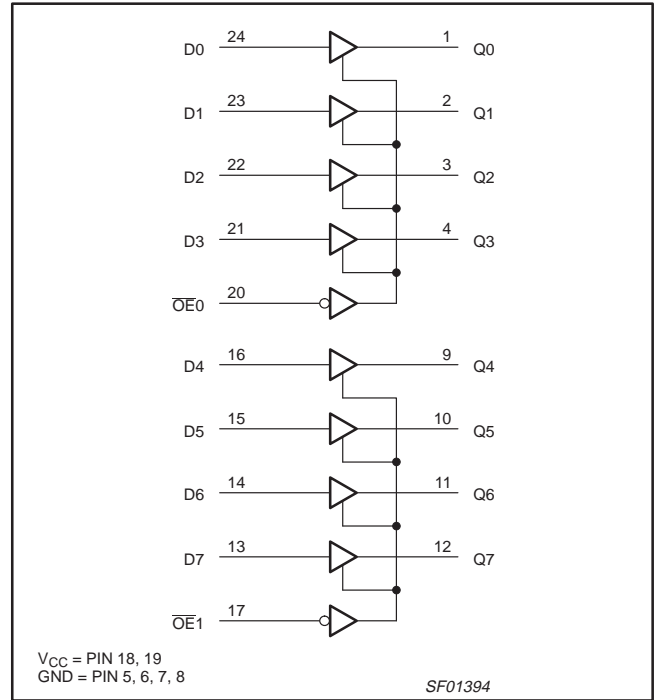**NOTE:** One (1.0) FAST unit load is defined as: 20μA in the High state and 0.6mA in the Low state. OC = Open Collector.

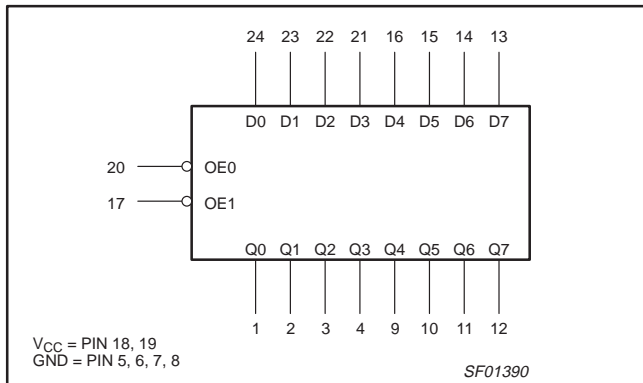# Octal 30Ω line driver with enable, non-inverting (open collector)
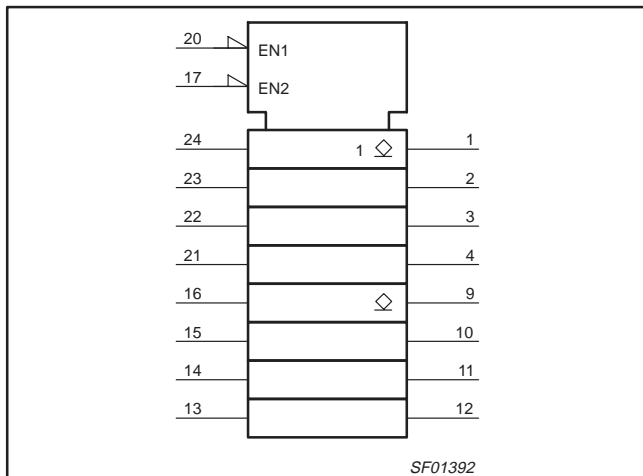
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PIN CONFIGURATION

Q0	1	24 D0
Q1	2	23 D1
Q2	3	22 D2
Q3	4	21 D3
GND	5	20 $\overline{OE}0$
GND	6	19 V_{CC}
GND	7	18 V_{CC}
GND	8	17 $\overline{OE}1$
Q4	9	16 D4
Q5	10	15 D5
Q6	11	14 D6
Q7	12	13 D7

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LOGIC SYMBOL

24 23 22 21 16 15 14 13

D0 D1 D2 D3 D4 D5 D6 D7

20 — OE0

17 — OE1

Q0 Q1 Q2 Q3 Q4 Q5 Q6 Q7

1 2 3 4 9 10 11 12

V_{CC} = PIN 18, 19
GND = PIN 5, 6, 7, 8

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LOGIC DIAGRAM

D0	24	1	Q0
D1	23	2	Q1
D2	22	3	Q2
D3	21	4	Q3
$\overline{OE}0$	20		
D4	16	9	Q4
D5	15	10	Q5
D6	14	11	Q6
D7	13	12	Q7
$\overline{OE}1$	17		

V_{CC} = PIN 18, 19
GND = PIN 5, 6, 7, 8

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IEC/IEEE SYMBOL

20 — EN1

17 — EN2

24	1 ◇	1
23		2
22		3
21		4
16	◇	9
15		10
14		11
13		12

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FUNCTION TABLE

INPUTS		OUTPUTS
$\overline{OE}n$	Dn	Qn
L	L	L
L	H	H
H	X	OFF

H = High voltage level
L = Low voltage level
X = Don't care
OFF = Pulled up through resistor (Open Collector)

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 V_{CC}	V
I_{OUT}	Current applied to output in Low output state	320	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			160	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	
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 current		V_{CC} = MIN, V_{IL} = MAX, V_{IH} = MIN	I_{OL} = 100mA	±10% V_{CC}		0.42	0.55	V
				I_{OL} = 160mA[3]	±5% V_{CC}			0.80	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} = 0.0V, 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					−20	µA
I_{CC}	Supply current (total)	74F30244 I_{CCH}	V_{CC} = MAX				19	27	mA
		I_{CCL}					70	100	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.
3. I_{OL1} is the current necessary to guarantee the High-to-Low transition in a 30Ω transmission line on the incident wave.

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 Dn to Qn	Waveform 1	4.0 3.0	10.5 5.5	14.5 9.0	4.0 3.0	15.0 9.5	ns
t_{PLH} t_{PHL}	Propagation delay $\overline{OE}$n to Qn	Waveform 1, 2	4.0 3.5	9.5 6.0	14.0 9.0	4.0 3.5	14.5 10.5	ns

AC WAVEFORMS

For all waveforms, V_M = 1.5V.
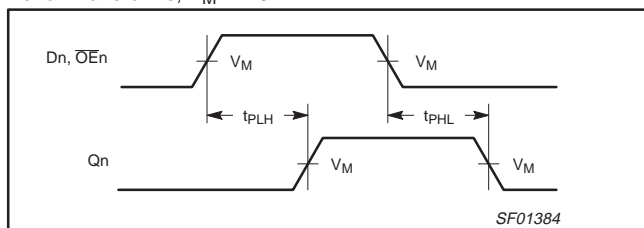
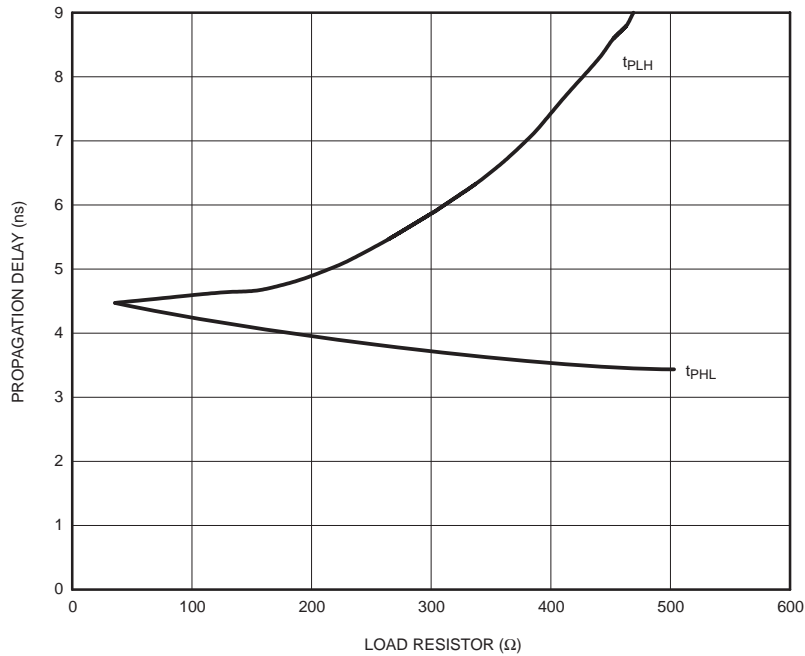

Waveform 1. Propagation Delay for Data to Output
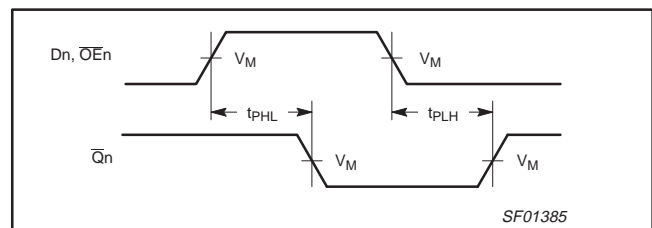
Waveform 2. Propagation Delay for Data to Output

Octal 30Ω line driver with enable, non-inverting (open collector)

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 specified pull-up resistor value from 500Ω to 100Ω will improve the t_{PLH} up to 50% with only a slight increase in the t_{PHL}. However, if the value of 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 does not exceed the I_{OL} maximum specification.
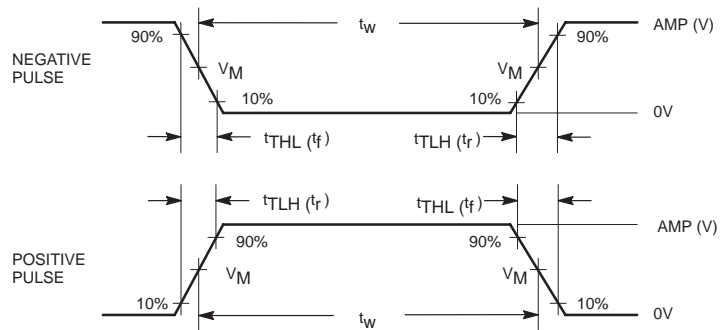
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TEST CIRCUIT AND WAVEFORMS

Test Circuit for Open Collector Outputs

Input Pulse Definition
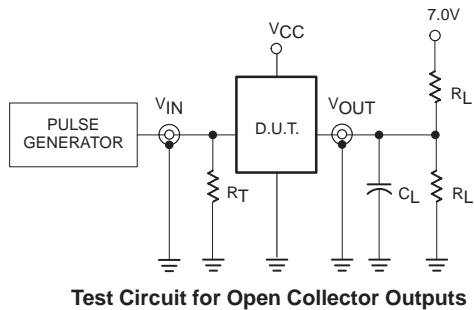
DEFINITIONS:
R_L = Load resistor;
        see AC electrical characteristics for value.
C_L = Load capacitance includes jig and probe capacitance;
        see AC electrical characteristics for value.
R_T = Termination resistance should be equal to Z_{OUT} of
        pulse generators.

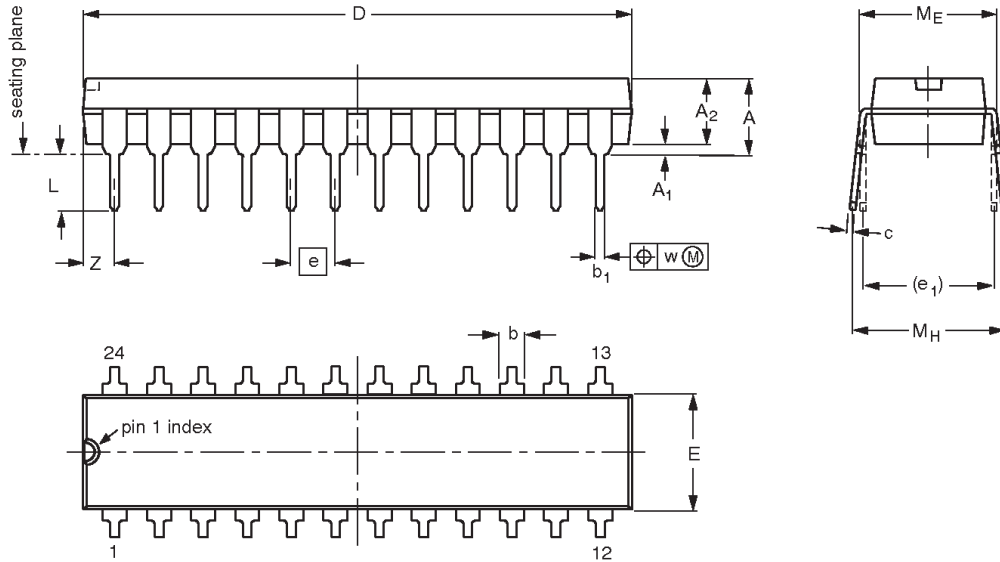| family	INPUT PULSE REQUIREMENTS					
	amplitude	V_M	rep. rate	t_w	t_{TLH}	t_{THL}
74F	3.0V	1.5V	1MHz	500ns	2.5ns	2.5ns

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Octal 30Ω line driver with enable, non-inverting
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DIP24: plastic dual in-line package; 24 leads (300 mil)   **SOT222-1**

DIMENSIONS (millimetre dimensions are derived from the original inch 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	4.70	0.38	3.94	1.63 1.14	0.56 0.43	0.36 0.25	31.9 31.5	6.73 6.48	2.54	7.62	3.51 3.05	8.13 7.62	10.03 7.62	0.25	2.05
inches	0.185	0.015	0.155	0.064 0.045	0.022 0.017	0.014 0.010	1.256 1.240	0.265 0.255	0.100	0.300	0.138 0.120	0.32 0.30	0.395 0.300	0.01	0.081

Note

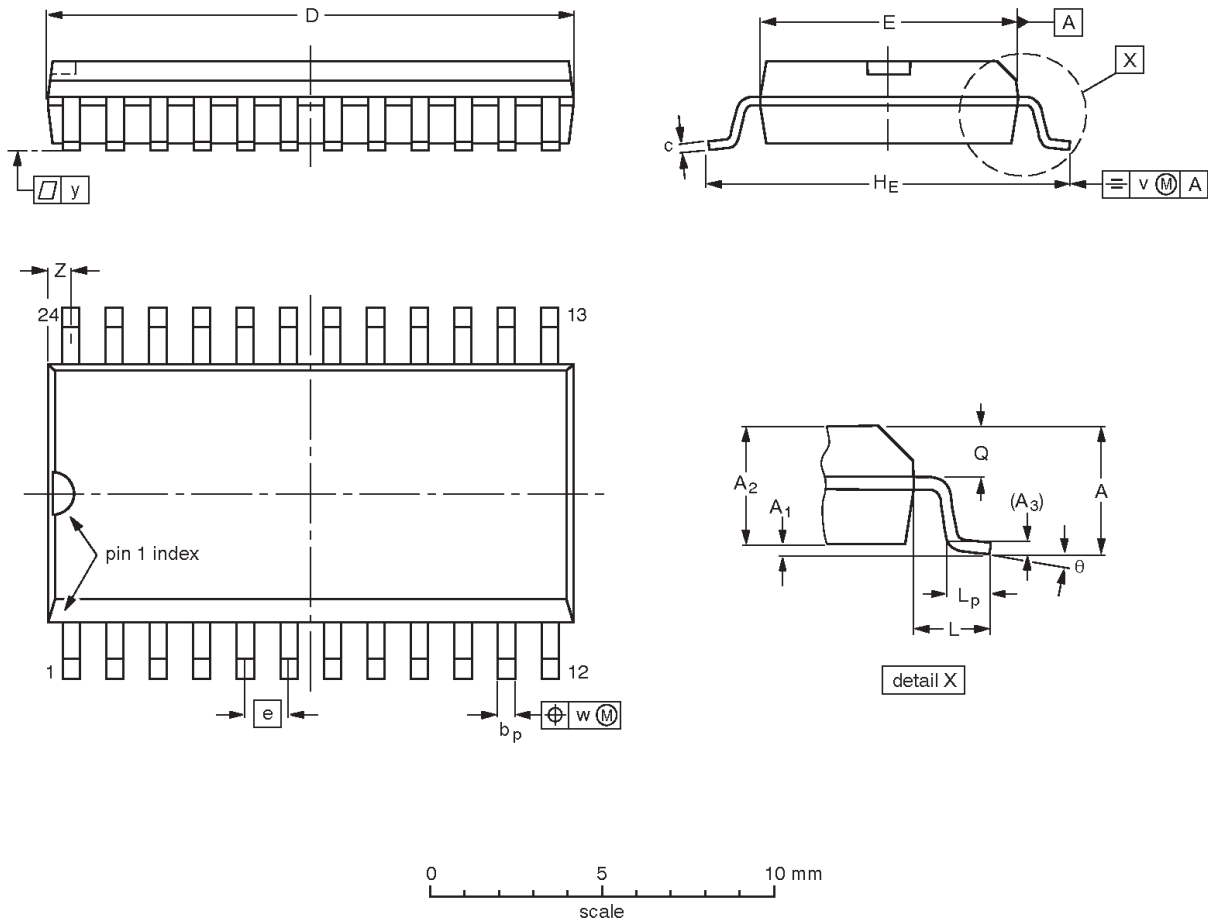1. Plastic or metal protrusions of 0.01 inches maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT222-1		MS-001AF				95-03-11

Octal 30Ω line driver with enable, non-inverting
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SO24:   plastic small outline package; 24 leads; body width 7.5 mm   **SOT137-1**

pin 1 index

detail X

0   5   10 mm
scale

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

UNIT	A max.	A₁	A₂	A₃	bₚ	c	D[1]	E[1]	e	H_E	L	Lₚ	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	15.6 15.2	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	0.61 0.60	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			
SOT137-1	075E05	MS-013AD				~~95-01-24~~ 97-05-22

NOTES

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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.
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[1] Please consult the most recently issued datasheet before initiating or completing a design.

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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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