

DATA SHEET

~~74F30240~~

~~Octal 30Ω line driver with enable,
inverting (open collector)*~~

74F30244

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

** Discontinued part. Please see the Discontinued Product List.*

Product specification

1999 Jan 08

IC15 Data Handbook

30Ω line drivers

74F30240*, 74F30244

74F30240 Octal 30Ω line driver with enable, inverting (open collector)
 74F30244 Octal 30Ω line driver with enable, non-inverting (open collector)

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
- 74F30240 inverting
- 74F30244 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, SOL or CERDIP packages

DESCRIPTION

The 74F30240 and 74F30244 are high current open collector octal buffers composed of eight inverters. The 74F30240 has inverting data paths and the 74F30244 has non-inverting paths. Each device has eight inverters with two Output Enables ($\overline{OE}0$, $\overline{OE}1$), each controlling four outputs. Both drivers are 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)
74F30240	9.5ns	62.5mA
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

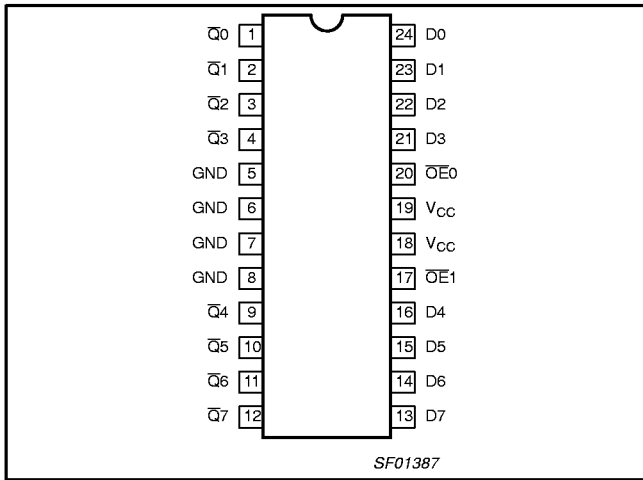
PINS	DESCRIPTION	74F(U.L.) HIGH/LOW	LOAD VALUE HIGH/LOW
D0–D7	Data inputs	1.0/0.033	20μA/20μA
$\overline{OE}0$ – $\overline{OE}1$	Output Enable inputs (Active Low)	1.0/0.033	20μA/20μA
$\overline{Q}0$ – $\overline{Q}7$	Data outputs (OC) for 74F30240	OC/266.7	OC/160mA
Q0–Q7	Data outputs (OC) for 74F30244	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.

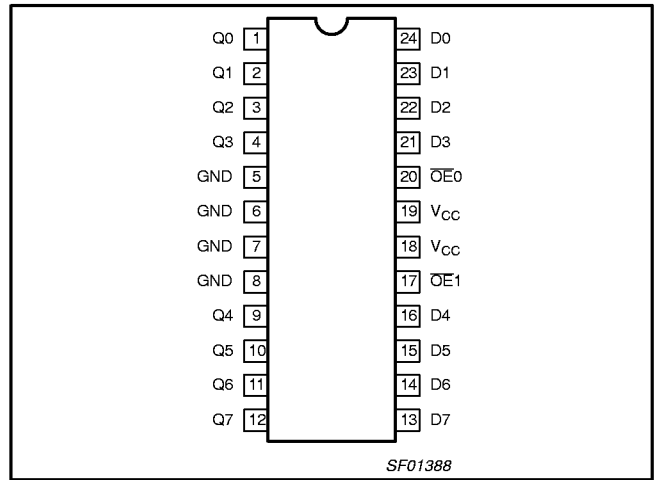
30Ω line drivers

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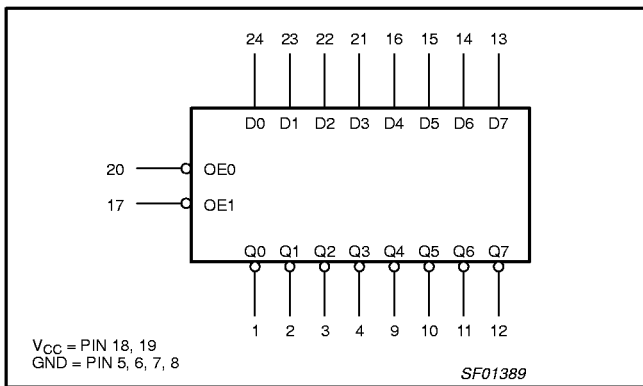
PIN CONFIGURATION – 74F30240



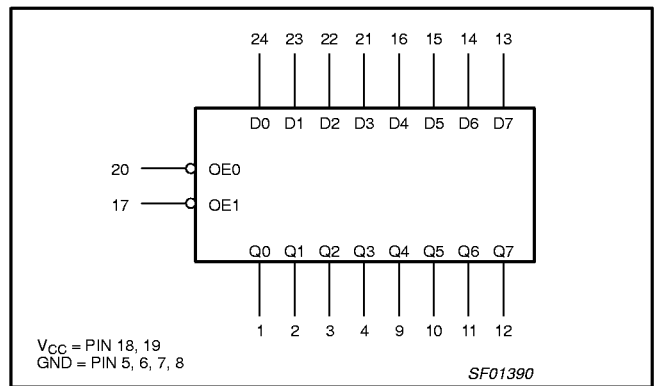
PIN CONFIGURATION – 74F30244



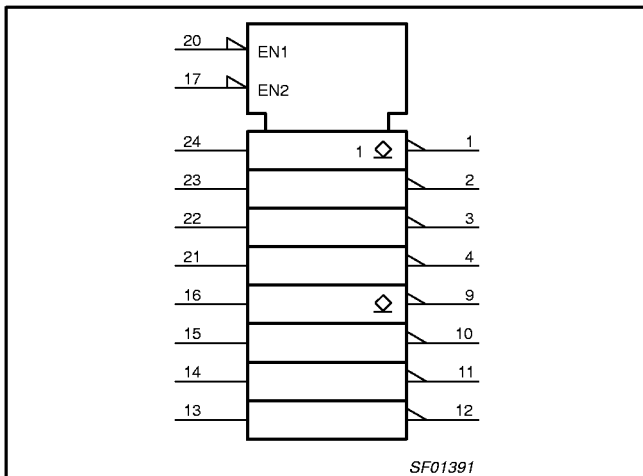
LOGIC SYMBOL – 74F30240



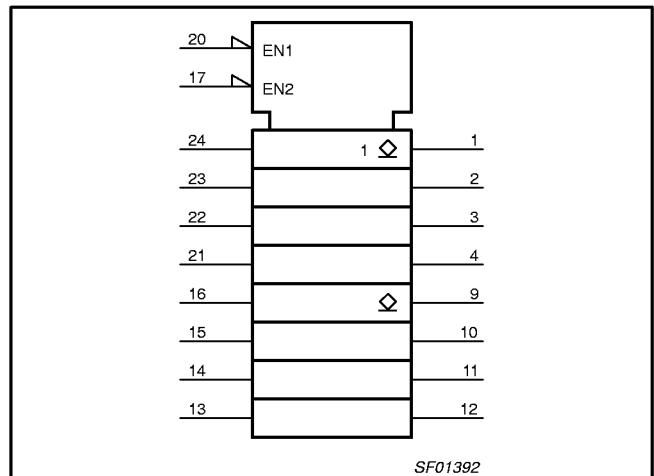
LOGIC SYMBOL – 74F30244



IEC/IEEE SYMBOL – 74F30240



IEC/IEEE SYMBOL – 74F30244

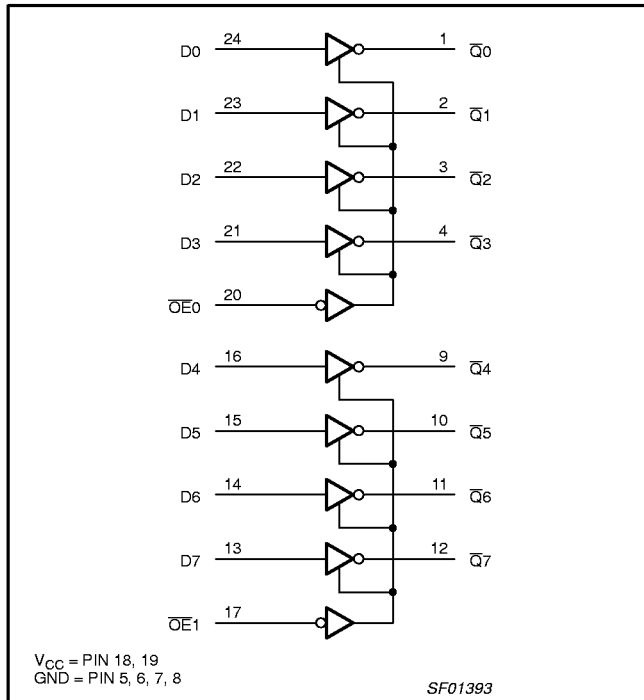


* Discontinued part. Please see the Discontinued Products List.

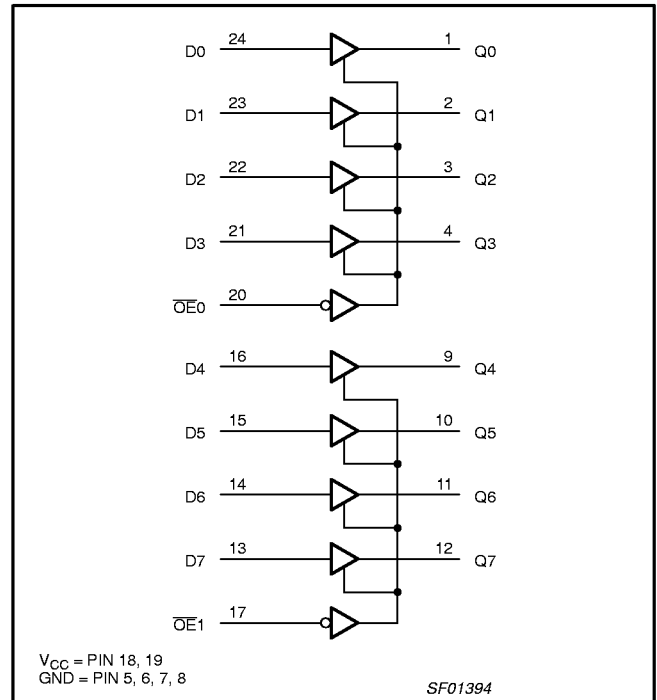
30Ω line drivers

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LOGIC DIAGRAM – 74F30240



LOGIC DIAGRAM – 74F30244



FUNCTION TABLE

INPUTS		OUTPUTS	
		74F30240	74F30244
$\bar{O}E_n$	D_n	\bar{Q}_n	Q_n
L	L	H	L
L	H	L	H
H	X	OFF	OFF

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

* Discontinued part. Please see the Discontinued Products List.

30Ω line drivers

74F30240*, 74F30244

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

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 NO TAG	±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)	74F30240	I _{CCH}	V _{CC} = MAX	13	23	mA	
			I _{CCL}					70
		74F30244	I _{CCH}		V _{CC} = MAX	19	27	
			I _{CCL}					70

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.

* Discontinued part. Please see the Discontinued Products List.

30Ω line drivers

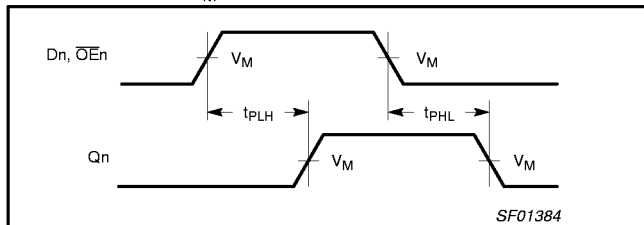
74F30240*, 74F30244

AC ELECTRICAL CHARACTERISTICS

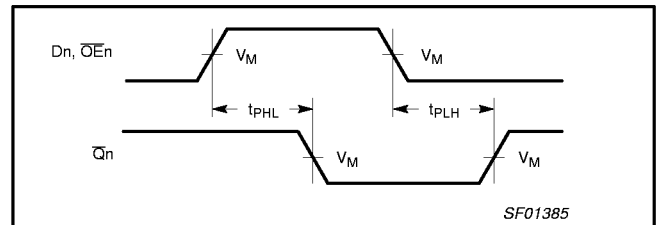
SYMBOL	PARAMETER	TEST CONDITION	LIMITS					UNIT	
			T _{amb} = +25°C V _{CC} = +5.0V C _L = 50pF, R _L = 500Ω			T _{amb} = 0°C to +70°C V _{CC} = +5.0V ± 10% C _L = 50pF, R _L = 500Ω			
			MIN	TYP	MAX	MIN	MAX		
t _{PLH} t _{PHL}	Propagation delay Dn to Qn	74f30240	Waveform 2	4.0 1.0	10.0 2.0	14.5 5.0	4.0 1.0	15.0 5.5	ns
t _{PLH} t _{PHL}	Propagation delay OE _n to Qn		Waveform 1, 2	4.0 3.5	10.0 6.0	14.0 9.0	4.0 3.5	14.5 10.5	ns
t _{PLH} t _{PHL}	Propagation delay Dn to Qn	74f30244	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 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.

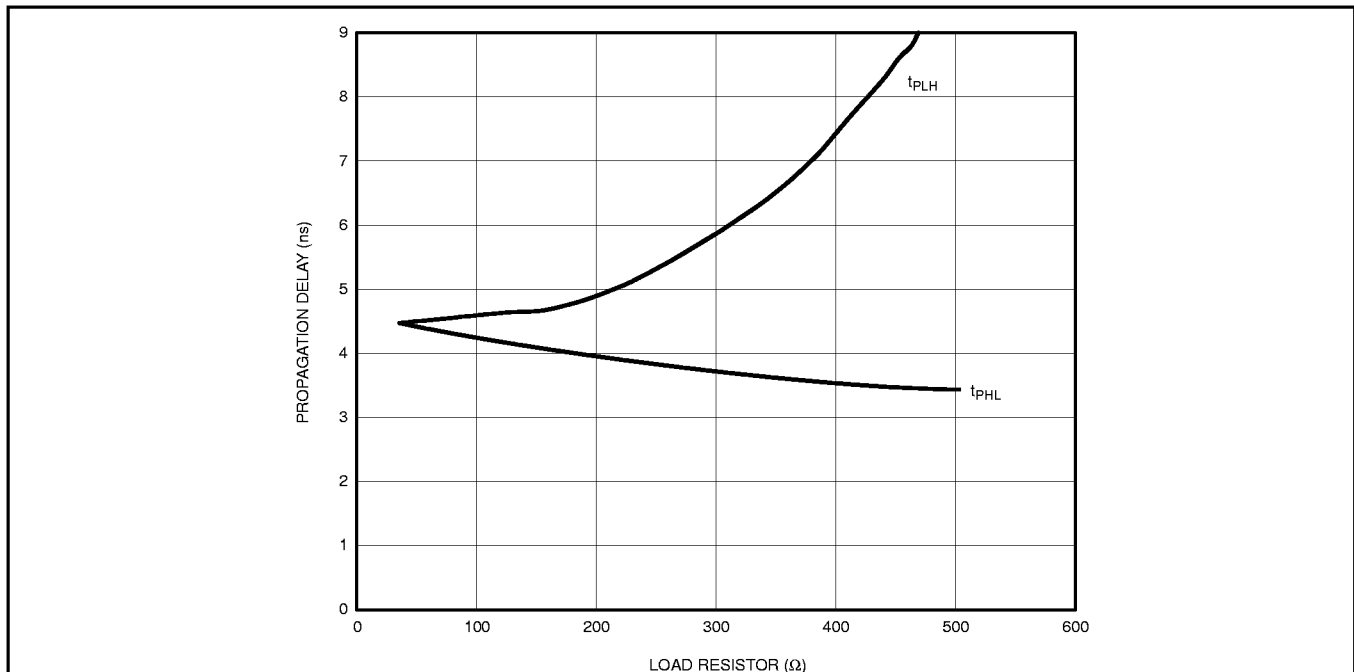


Waveform 1. Propagation Delay for Data to Output



Waveform 2. Propagation Delay for Data to Output

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_Is of the receivers does not exceed the I_{OL} maximum specification.

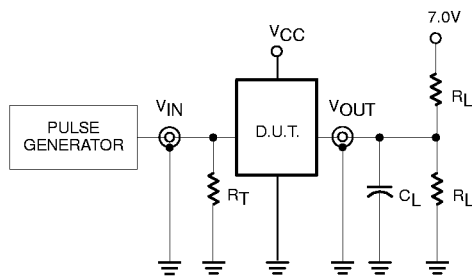
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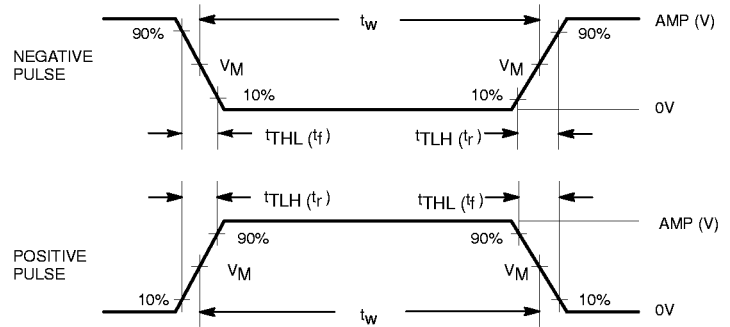
TEST CIRCUIT AND WAVEFORMS



Test Circuit for Open Collector Outputs

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

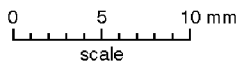
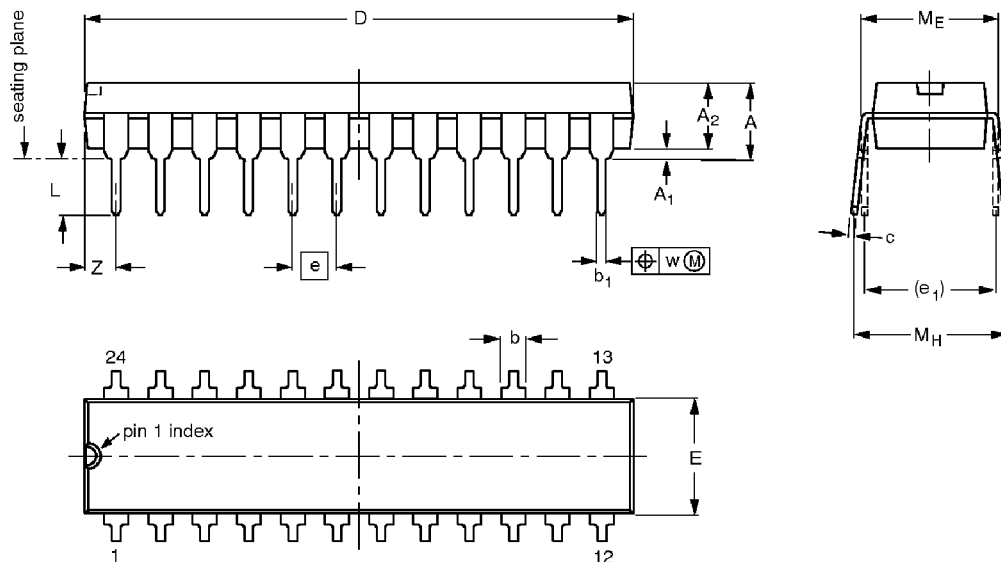
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30Ω line drivers

74F30240*, 74F30244

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

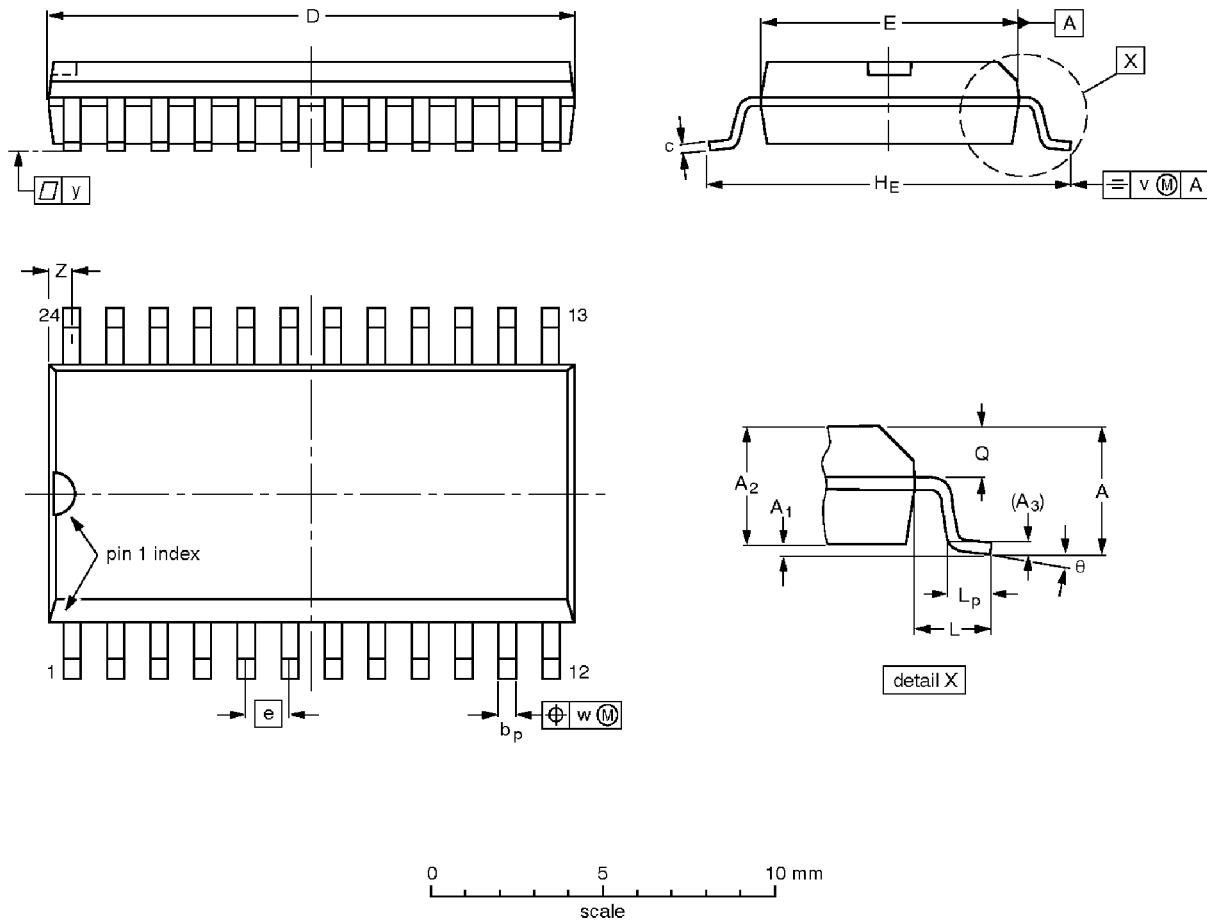
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30Ω line drivers

74F30240*, 74F30244

SO24: plastic small outline package; 24 leads; body width 7.5 mm

SOT137-1



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	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

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30Ω line drivers

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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.
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 changes 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.

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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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