54AC241 • 54ACT241 Octal Buffer/Line Driver with Outputs

Check for Samples: 54AC241, 54ACT241-N

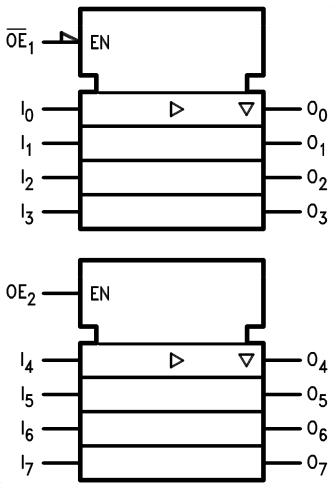
FEATURES

- **I_{CC} and I_{OZ} Reduced by 50%**
- **Non-Inverting TRI-STATE Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **Outputs Source/Sink 24 mA**
- **'ACT241 has TTL-Compatible Inputs**
- **Standard Microcircuit Drawing (SMD)**
  - **'AC241: 5962-87551**
  - **'ACT241: 5962-89847**

DESCRIPTION

The 'AC/'ACT241 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter or receiver which provides improved PC board density.

Logic Symbol



Pin Names	Description
$\overline{OE}_1$,	TRI-STATE Output Enable Input
OE_2	TRI-STATE Output Enable Input (Active HIGH)
I_0–I_7	Inputs
O_0–O_7	Outputs

Connection Diagrams

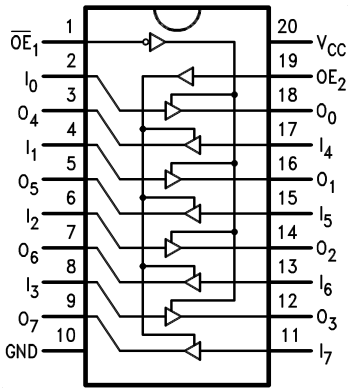


Figure 1. 20-Pin CERDIP or CLGA
See NAF0020A Package

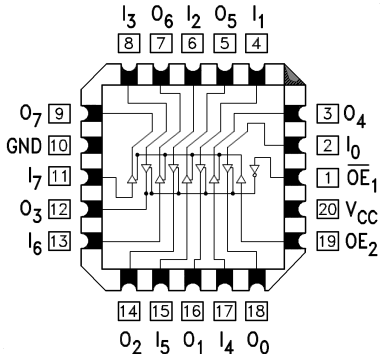


Figure 2. 20-Pin LCCC
See NAJ0020A Package

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

TRUTH TABLE(1)

Inputs		Outputs
$\overline{OE}_1$	I_n	(Pins 12, 14, 16, 18)
L	L	L
L	H	H
H	X	Z

Inputs		Outputs
OE_2	I_n	(Pins 3, 5, 7, 9)
H	L	L
H	H	H
L	X	Z

(1) H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = High Impedance

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

ABSOLUTE MAXIMUM RATINGS(1)(2)

Supply Voltage (V_{CC})		−0.5V to +7.0V
DC Input Diode Current (I_{IK})	V_I = −0.5V	−20 mA
	V_I = V_{CC} + 0.5V	+20 mA
DC Input Voltage (V_I)		−0.5V to V_{CC} + 0.5V
DC Output Diode Current (I_{OK})	V_O = −0.5V	−20 mA
	V_O = V_{CC} + 0.5V	+20 mA
DC Output Voltage (V_O)		−0.5V to V_{CC} + 0.5V
DC Output Source or Sink Current (I_O)		±50 mA
DC V_{CC} or Ground Current per Output Pin (I_{CC} or I_{GND})		±50 mA
Storage Temperature (T_{STG})		−65°C to +150°C
Junction Temperature (T_J) CERDIP		175°C

(1) Absolute Maximum Ratings are those values beyond which damage to the device may occur. The databook specifications should be met, without exception, to ensure that the system design is reliable over its power supply, temperature, and output/input loading variables. Texas Instruments does not recommend operation of FACT circuits outside databook specifications.
(2) If Military/Aerospace specified devices are required, please contact the Texas Instruments Sales Office/Distributors for availability and specifications.

RECOMMENDED OPERATING CONDITIONS

Supply Voltage (V_{CC})		'AC	2.0V to 6.0V
		'ACT	4.5V to 5.5V
Input Voltage (V_I)			0V to V_{CC}
Output Voltage (V_O)			0V to V_{CC}
Operating Temperature (T_A)		54AC/ACT	−55°C to +125°C
Minimum Input Edge Rate (ΔV/Δt)	'AC Devices	V_{IN} from 30% to 70% of V_{CC}	
		V_{CC} @ 3.3V, 4.5V, 5.5V	125 mV/ns
Minimum Input Edge Rate (ΔV/Δt)	'ACT Devices	V_{IN} from 0.8V to 2.0V	
		V_{CC} @ 4.5V, 5.5V	125 mV/ns

DC CHARACTERISTICS FOR 'AC FAMILY DEVICES

Symbol	Parameter	V_{CC} (V)	54AC T_A = −55°C to +125°C Specified Limits	Units	Conditions
V_{IH}	Minimum High Level Input Voltage	3.0 4.5 5.5	2.1 3.15 3.85	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
V_{IL}	Maximum Low Level Input Voltage	3.0 4.5 5.5	0.9 1.35 1.65	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
V_{OH}	Minimum High Level Output Voltage	3.0 4.5 5.5	2.9 4.4 5.4	V	I_{OUT} = −50 µA
		 3.0 4.5 5.5	 2.4 3.7 4.7	 V 	See (1) V_{IN} = V_{IL} or V_{IH} I_{OH} = −12 mA I_{OH} = −24 mA I_{OH} = −24 mA
V_{OL}	Maximum Low Level Output Voltage	3.0 4.5 5.5	0.1 0.1 0.1	V	I_{OUT} = 50 µA
		 3.0 4.5 5.5	 0.50 0.50 0.50	 V 	See (1) V_{IN} = V_{IL} or V_{IH} I_{OL} = 12 mA I_{OL} = 24 mA I_{OL} = 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	±1.0	µA	V_I = V_{CC}, GND
I_{OZ}	Maximum TRI-STATE Leakage Current	5.5	±5.0	µA	V_I (OE) = V_{IL}, V_{IH} V_I = V_{CC}, GND V_O = V_{CC}, GND
I_{OLD}	Minimum Dynamic Output Current (2)	5.5	50	mA	V_{OLD} = 1.65V Max
I_{OHD}		5.5	−50	mA	V_{OHD} = 3.85V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	80.0	µA	V_{IN} = V_{CC} or GND

(1) All outputs loaded; thresholds on input associated with output under test.
(2) Maximum test duration 2.0 ms, one output loaded at a time.

DC CHARACTERISTICS FOR 'ACT FAMILY DEVICES

Symbol	Parameter	V_{CC} (V)	54ACT T_A = −55°C to +125°C Specified Limits	Units	Conditions
V_{IH}	Minimum High Level Input Voltage	4.5 5.5	2.0 2.0	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
V_{IL}	Maximum Low Level Input Voltage	4.5 5.5	0.8 0.8	V	V_{OUT} = 0.1V or V_{CC} − 0.1V
V_{OH}	Minimum High Level Output Voltage	4.5 5.5	4.4 5.4	V	I_{OUT} = −50 µA
					See (1) V_{IN} = V_{IL} or V_{IH}
		4.5 5.5	3.70 4.70	V	I_{OH} = −24 mA I_{OH} = −24 mA
V_{OL}	Maximum Low Level Output Voltage	4.5 5.5	0.1 0.1	V	I_{OUT} = 50 µA
					See (1) V_{IN} = V_{IL} or V_{IH}
		4.5 5.5	0.50 0.50	V	I_{OL} = 24 mA I_{OL} = 24 mA
I_{IN}	Maximum Input Leakage Current	5.5	±1.0	µA	V_I = V_{CC}, GND
I_{OZ}	Maximum TRI-STATE Leakage Current	5.5	±5.0	µA	V_I = V_{IL}, V_{IH} V_O = V_{CC}, GND
I_{CCT}	Maximum I_{CC}/Input	5.5	1.6	mA	V_I = V_{CC} − 2.1V
I_{OLD}	Minimum Dynamic Output Current (2)	5.5	50	mA	V_{OLD} = 1.65V Max
I_{OHD}		5.5	−50	mA	V_{OHD} = 3.85V Min
I_{CC}	Maximum Quiescent Supply Current	5.5	80.0	µA	V_{IN} = V_{CC} or GND

(1) All outputs loaded; thresholds on input associated with output under test.
(2) Maximum test duration 2.0 ms, one output loaded at a time.

AC ELECTRICAL CHARACTERISTICS

See for waveforms

Symbol	Parameter	V_{CC} (V)[1]	54AC T_A = −55°C to +125°C C_L = 50 pF		Units	Fig. No.
			Min	Max		
t_{PLH}	Propagation Delay Data to Output	3.3	1.0	12.0	ns	
		5.0	1.0	9.5		
t_{PHL}	Propagation Delay Data to Output	3.3	1.0	11.5	ns	
		5.0	1.0	9.0		
t_{PZH}	Output Enable Time	3.3	1.0	13.0	ns	
		5.0	1.0	10.0		
t_{PZL}	Output Enable Time	3.3	1.0	13.0	ns	
		5.0	1.0	10.0		
t_{PHZ}	Output Disable Time	3.3	1.0	13.0	ns	
		5.0	1.0	11.5		
t_{PLZ}	Output Disable Time	3.3	1.0	13.0	ns	
		5.0	1.0	11.5		

(1) Voltage Range 3.3 is 3.3V ±3.3V
Voltage Range 5.0 is 5.0V ±0.5V.

AC ELECTRICAL CHARACTERISTICS

See for waveforms

Symbol	Parameter	V_{CC} (V) See[1]	54ACT T_A = −55°C to +125°C C_L = 50 pF		Units	Fig. No.
			Min	Max		
t_{PLH}	Propagation Delay Data to Output	5.0	1.0	10.0	ns	
t_{PHL}	Propagation Delay Data to Output	5.0	1.0	10.0	ns	
t_{PZH}	Output Enable Time	5.0	1.0	11.5	ns	
t_{PZL}	Output Enable Time	5.0	1.0	12.5	ns	
t_{PHZ}	Output Disable Time	5.0	1.0	12.5	ns	
t_{PLZ}	Output Disable Time	5.0	1.0	12.5	ns	

(1) Voltage Range 5.0 is 5.0V ±0.5V.

CAPACITANCE

Symbol	Parameter	Typ	Units	Conditions
C_{IN}	Input Capacitance	4.5	pF	V_{CC} = OPEN
C_{PD}	Power Dissipation Capacitance	45.0	pF	V_{CC} = 5.0V

REVISION HISTORY

Changes from Revision A (April 2013) to Revision B	Page
• Changed layout of National Data Sheet to TI format	5

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