

54AC241 • 54ACT241 Octal Buffer/Line Driver with TRI-STATE® Outputs

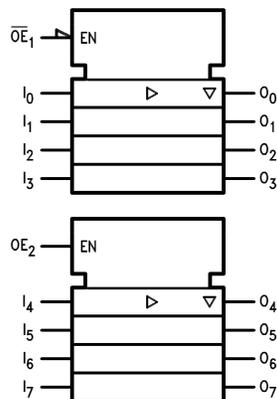
Check for Samples: [54AC241](#), [54ACT241-N](#)

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.



Pin	Description
Names	
\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 Diagram

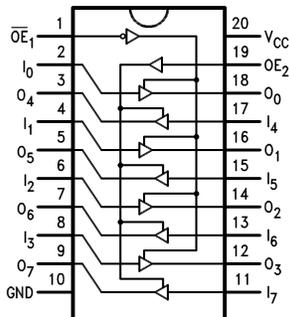


Figure 1. Pin Assignment for DIP and Flatpak



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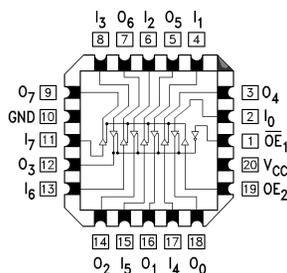


Figure 2. Pin Assignment for LCC

Truth Table (1)

Inputs		Outputs
OE ₁	I _n	(Pins 12, 14, 16, 18)
L	L	L
L	H	H
H	X	Z

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

Inputs		Outputs
OE ₂	I _n	(Pins 3, 5, 7, 9)
H	L	L
H	H	H
L	X	Z



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⁾

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)	
CDIP	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. National does not recommend operation of FACT[®] circuits outside databook 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 ($\Delta V/\Delta t$)	
'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 ($\Delta V/\Delta t$)	
'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		Units	Conditions
			T _A = -55°C to +125°C			
			Guaranteed Limits			
V _{IH}	Minimum High Level	3.0	2.1			V _{OUT} = 0.1V
	Input Voltage	4.5	3.15		V	or V _{CC} - 0.1V
		5.5	3.85			
V _{IL}	Maximum Low Level	3.0	0.9			V _{OUT} = 0.1V
	Input Voltage	4.5	1.35		V	or V _{CC} - 0.1V
		5.5	1.65			
V _{OH}	Minimum High Level	3.0	2.9			I _{OUT} = -50 μA
	Output Voltage	4.5	4.4		V	
		5.5	5.4			
		3.0	2.4			(1) V _{IN} = V _{IL} or V _{IH}
		4.5	3.7		V	I _{OH} = -12 mA
		5.5	4.7			I _{OH} = -24 mA
V _{OL}	Maximum Low Level	3.0	0.1			I _{OUT} = 50 μA
	Output Voltage	4.5	0.1		V	
		5.5	0.1			
		3.0	0.50			(1) V _{IN} = V _{IL} or V _{IH}
		4.5	0.50		V	I _{OL} = 12 mA
		5.5	0.50			I _{OL} = 24 mA
I _{IN}	Maximum Input	5.5	±1.0		μA	V _I = V _{CC} , GND
	Leakage Current					
I _{OZ}	Maximum TRI-STATE					V _I (OE) = V _{IL} , V _{IH}
	Leakage Current	5.5	±5.0		μA	V _I = V _{CC} , GND
I _{OLD}	Minimum Dynamic	5.5	50		mA	V _{OLD} = 1.65V Max
I _{OHD}	Output Current ⁽²⁾	5.5	-50		mA	V _{OHD} = 3.85V Min
I _{CC}	Maximum Quiescent	5.5	80.0		μA	V _{IN} = V _{CC}
	Supply Current					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		Units	Conditions
			T _A = -55°C to +125°C			
			Guaranteed Limits			
V _{IH}	Minimum High Level	4.5	2.0		V	V _{OUT} = 0.1V
	Input Voltage	5.5	2.0			or V _{CC} - 0.1V
V _{IL}	Maximum Low Level	4.5	0.8		V	V _{OUT} = 0.1V
	Input Voltage	5.5	0.8			or V _{CC} - 0.1V
V _{OH}	Minimum High Level	4.5	4.4		V	I _{OUT} = -50 μA
	Output Voltage	5.5	5.4			
						(1) V _{IN} = V _{IL} or V _{IH}
		4.5	3.70		V	I _{OH} = -24 mA
		5.5	4.70			I _{OH} = -24 mA
V _{OL}	Maximum Low Level	4.5	0.1		V	I _{OUT} = 50 μA
	Output Voltage	5.5	0.1			
						(1) V _{IN} = V _{IL} or V _{IH}
		4.5	0.50		V	I _{OL} = 24 mA
		5.5	0.50			I _{OL} = 24 mA
I _{IN}	Maximum Input	5.5	±1.0		μA	V _I = V _{CC} , GND
	Leakage Current					
I _{OZ}	Maximum TRI-STATE	5.5	±5.0		μA	V _I = V _{IL} , V _{IH}
	Leakage Current					
I _{CCT}	Maximum	5.5	1.6		mA	V _I = V _{CC} - 2.1V
	I _{CC} /Input					
I _{OLD}	Minimum Dynamic	5.5	50		mA	V _{OLD} = 1.65V Max
I _{OHD}	Output Current ⁽²⁾	5.5	-50		mA	V _{OHD} = 3.85V Min
I _{CC}	Maximum Quiescent	5.5	80.0		μA	V _{IN} = V _{CC}
	Supply Current					

(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		Units	Fig. No.
			T _A = -55°C			
			to +125°C			
			C _L = 50 pF			
			Min	Max		
t _{PLH}	Propagation Delay	3.3	1.0	12.0	ns	
	Data to Output	5.0	1.0	9.5		
t _{PHL}	Propagation Delay	3.3	1.0	11.5	ns	
	Data to Output	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) (1)	54ACT		Units	Fig. No.
			T _A = -55°C to +125°C			
			C _L = 50 pF			
			Min	Max		
t _{PLH}	Propagation Delay	5.0	1.0	10.0	ns	
	Data to Output					
t _{PHL}	Propagation Delay	5.0	1.0	10.0	ns	
	Data to Output					
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	45.0	pF	$V_{CC} = 5.0V$
	Capacitance			

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