54AC244/54ACT244 Octal Buffer/Line Driver with TRI-STATE® Outputs

Check for Samples: 54AC244-N, 54ACT244-N

FEATURES

- **I_{CC} and I_{OZ} reduced by 50%**
- **TRI-STATE® outputs drive bus lines or buffer memory address registers**
- **Outputs source/sink 24 mA**
- **'ACT244 has TTL-compatible inputs**
- **Standard Microcircuit Drawing (SMD)**
  - **'AC244: 5962-87552**
  - **'ACT244: 5962-87760**
- **54AC244 now qualified to 300Krad RHA designation, refer to the SMD for more information**

DESCRIPTION

The 'AC/'ACT244 is an octal buffer and line driver designed to be employed as a memory address driver, clock driver and bus-oriented transmitter/receiver which provides improved PC board density.

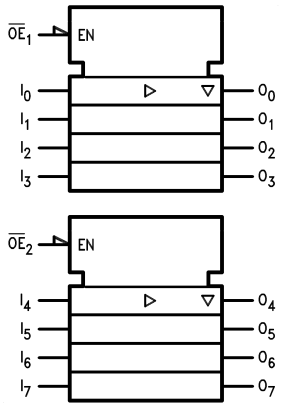

Figure 1. IEEE/IEC

Pin Names	Description
$\overline{OE}_1$, $\overline{OE}_2$	TRI-STATE Output Enable Inputs
I_0–I_7	Inputs
O_0–O_7	Outputs

Connection Diagram

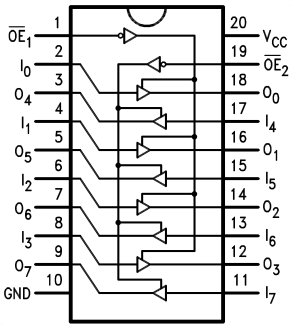

Figure 2. Pin Assignment for DIP and Flatpak

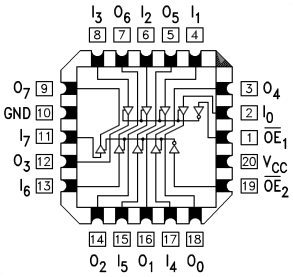

Figure 3. Pin Assignment for LCC

Truth Table

(1) (2)

Inputs		Outputs
$\overline{OE}_1$	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
(2) X = Immaterial
Z = High Impedance

Inputs		Outputs
$\overline{OE}_2$	I_n	(Pins 3, 5, 7, 9)
L	L	L
L	H	H
H	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 OperatingConditions

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

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

			54ACT		
Symbol	**Parameter**	**V_{CC}**	**T_A =**	**Units**	**Conditions**
		(V)	**−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		−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		24 mA
I_{IN}	Maximum Input Leakage Current	5.5	±1.0	µA	V_I = V_{CC}, GND
I_{OZ}	Maximum TRI-STATE®	5.5	±5.0	µA	V_I = V_{IL}, V_{IH}
	Current				V_O = V_{CC}, GND
I_{CCT}	Maximum I_{CC}/Input	5.5	1.6	mA	V_I = V_{CC} − 2.1V
I_{OLD}	(2) Minimum Dynamic Output Current	5.5	50	mA	V_{OLD} = 1.65V Max
I_{OHD}		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.

AC Electrical Characteristics

			54AC			
		V_{CC}	T_A = −55°C			Fig.
Symbol	Parameter	(V)	to +125°C		Units	No.
		(1)	C_L = 50 pF			
			Min	Max		
t_{PLH}	Propagation Delay	3.3	1.0	12.5	ns	
	Data to Output	5.0	1.0	9.5		
t_{PHL}	Propagation Delay	3.3	1.0	12.0	ns	
	Data to Output	5.0	1.0	9.0		
t_{PZH}	Output Enable Time	3.3	1.0	11.5	ns	
		5.0	1.0	9.0		
t_{PZL}	Output Enable Time	3.3	1.0	13.0	ns	
		5.0	1.0	10.5		
t_{PHZ}	Output Disable Time	3.3	1.0	12.5	ns	
		5.0	1.0	10.5		
t_{PLZ}	Output Disable Time	3.3	1.0	13.0	ns	
		5.0	1.0	11.0		

(1) Voltage Range 3.3 is 3.3V ±0.3V Voltage Range 5.0 is 5.0V ±0.5V

AC Electrical Characteristics

			54ACT			
		V_{CC}	T_A = −55°C			Fig.
Symbol	Parameter	(V)	to +125°C		Units	No.
		(1)	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	9.5	ns	
t_{PZL}	Output Enable Time	5.0	1.0	11.0	ns	
t_{PHZ}	Output Disable Time	5.0	1.0	11.0	ns	
t_{PLZ}	Output Disable Time	5.0	1.0	11.5	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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