

## Technical Data

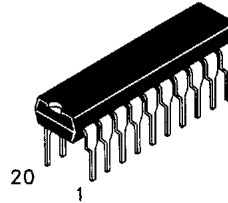
DV74AC240 and DV74AC241 Available Q2 1995

# Octal Buffer/Line Driver with 3-state Outputs

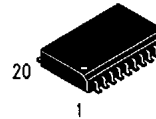
These devices are octal buffer and line drivers designed to be used as a memory address driver, clock driver and bus oriented transmitter or receiver which provides improved PC board density.

- Advanced very high speed CMOS
- Outputs source/sink 24 mA
- Transmission line driving 50 ohms
- ACT has TTL compatible inputs
- AC Device Operation from 2 to 6 volts guaranteed
- DC & AC Parameters guaranteed over -40 to +85°C

## DV74AC240, 241, 244 DV74ACT240, 241, 244

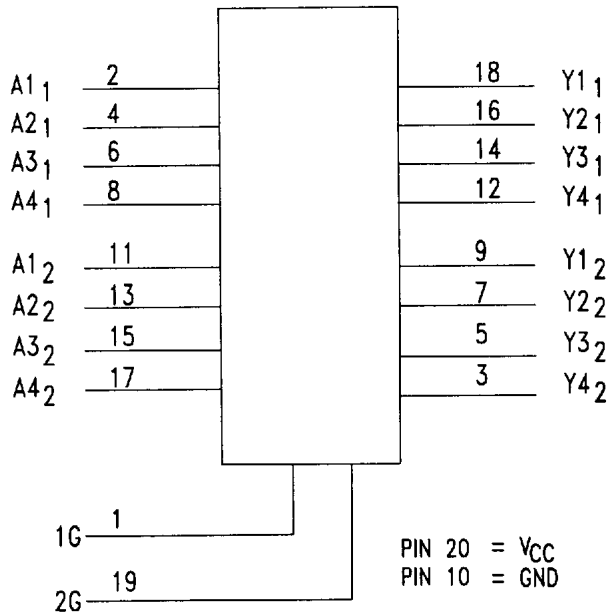


N Suffix  
Plastic DIP  
AVG-005 Case

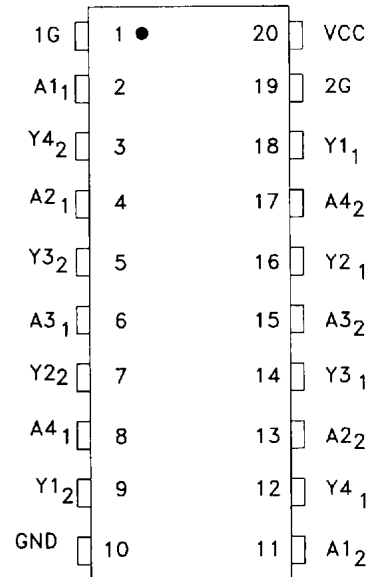


D Suffix  
Plastic SOP  
AVG-006 Case

### LOGIC DIAGRAM



### PIN ASSIGNMENT



Note: Please refer to appropriate truth table for signal phases.

#### AC240, ACT240

Inputs		Output
G <sub>n</sub>	A <sub>n</sub>	Y <sub>n</sub>
L	L	H
L	H	L
H	X	Z

#### AC241-ACT241

Inputs		Output	Inputs		Output
1G	A <sub>n</sub>	Y <sub>n</sub>	2G	A <sub>n</sub>	Y <sub>n</sub>
L	L	L	H	L	L
L	H	H	H	H	H
H	X	Z	L	X	Z

#### AC244, ACT244

Inputs		Output
G <sub>n</sub>	A <sub>n</sub>	Y <sub>n</sub>
L	L	L
L	H	H
H	X	Z

H=HIGHVoltageLevel  
L=LOWVoltageLevel  
Z=HighImpedance

240.241.244

## ABSOLUTE MAXIMUM RATINGS

Maximum ratings are those values beyond which damage to the device may occur.

Symbol	Parameter	AC240, 241, 244 ACT240, 241, 244	Unit
V <sub>CC</sub>	DC Supply Voltage (Referenced to GND)	- 0.5 to +7.0	V
V <sub>IN</sub>	DC Input Voltage (Referenced to GND)	- 0.5 to V <sub>CC</sub> +0.5	V
V <sub>OUT</sub>	DC Output Voltage (Referenced to GND)	- 0.5 to V <sub>CC</sub> +0.5	V
I <sub>IN</sub>	DC Input Current, per Pin	± 20	mA
I <sub>OUT</sub>	DC Output Sink/Source Current, per Pin	± 50	mA
I <sub>CC</sub>	DC V <sub>CC</sub> or GND Current per Output Pin	± 50	mA
T <sub>STG</sub>	Storage Temperature	- 65 to +150	°C

## GUARANTEED OPERATING CONDITIONS

Symbol	Parameter	Min	Typ	Max	Unit	
V <sub>CC</sub>	Supply Voltage	'AC	2.0	5.0	6.0	V
		'ACT	4.5	5.0	5.5	
V <sub>IN</sub> , V <sub>OUT</sub>	DC Input Voltage, Output Voltage, (Ref. to GND)	0		V <sub>CC</sub>	V	
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 1) 'AC Devices	V <sub>CC</sub> @ 3.0 V			150	ns/V
		V <sub>CC</sub> @ 4.5 V			40	ns/V
		V <sub>CC</sub> @ 5.5 V			25	ns/V
t <sub>r</sub> , t <sub>f</sub>	Input Rise and Fall Time (Note 2) 'ACT Devices	V <sub>CC</sub> @ 4.5 V			10	ns/V
		V <sub>CC</sub> @ 5.5 V			8.0	ns/V
T <sub>A</sub>	Operating Ambient Temperature Range	-40		85	°C	
CPD	Power Dissipation Capacitance	V <sub>CC</sub> = 5.0 V		45	pF	
C <sub>IN</sub>	Input Capacitance V <sub>CC</sub> = 5.0 V	V <sub>CC</sub> = 5.0 V		4.5	pF	

1. V<sub>IN</sub> from 30% to 70% V<sub>CC</sub>

2. V<sub>IN</sub> from 0.8 to 2.0 V

## DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	AC240,241,244			Unit	
				T <sub>A</sub> = +25°C		T <sub>A</sub> = -40 to +85°C		
				Typ	Guaranteed Limits			
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1 V	3.0	1.5	2.1	2.1	V	
			4.5	2.25	3.15	3.15		
			5.5	2.75	3.85	3.85		
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1 V	3.0	1.5	0.9	0.9	V	
			4.5	2.25	1.35	1.35		
			5.5	2.75	1.65	1.65		
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OUT</sub> = -50 μA	3.0	2.99	2.9	2.9	V	
			4.5	4.49	4.4	4.4		
			5.5	5.49	5.4	5.4		
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>	-12mA	3.0		2.56	2.46	V
			I <sub>OH</sub> -24mA	4.5		3.86	3.76	
		-24 mA	5.5		4.86	4.76		

240,241,244

Symbol	Parameter	Conditions	V <sub>CC</sub> (V)	AC240,241,244			Unit
				T <sub>A</sub> = +25°C		T <sub>A</sub> = -40 to +85°C	
				Typ	Guaranteed Limits		
V <sub>OL</sub>	Maximum Low Level Output Voltage	I <sub>OUT</sub> = 50 μA	3.0	0.002	0.1	0.1	V
			4.5	0.001	0.1	0.1	
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub>					
		12mA	3.0		0.36	0.44	V
		I <sub>OH</sub> 24mA	4.5		0.36	0.44	
		24 mA	5.5		0.36	0.44	
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> , GND	5.5		±0.1	±1.0	μA
I <sub>OZ</sub>	Maximum 3-state current	V <sub>I</sub> , OE = V <sub>CC</sub> , GND V <sub>O</sub> = V <sub>CC</sub> , GND	5.5		±0.5	±5.0	μA
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5		8.0	80	μA

### AC CHARACTERISTICS

Symbol	Parameter (C <sub>L</sub> = 50 pF)	V <sub>CC</sub> ±10% (V)	AC240				Unit
			T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C		
			Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Data to Output	3.3	1.5	8.0	1.0	9.0	ns
		5.0	1.5	6.5	1.0	7.0	
t <sub>PHL</sub>		3.3	1.5	8.0	1.0	8.5	
		5.0	1.5	6.0	1.0	6.5	
t <sub>PZH</sub>	Output Enable Time	3.3	1.5	10.5	1.0	11.0	ns
		5.0	1.5	7.0	1.0	8.0	
t <sub>PZL</sub>		3.3	1.5	10	1.0	11.0	ns
		5.0	1.5	8.0	1.0	8.5	
t <sub>PHZ</sub>	Output Disable Time	3.3	1.5	10.0	1.0	10.5	ns
		5.0	1.5	9.0	1.0	9.5	
t <sub>PLZ</sub>		3.3	1.5	10.5	1.0	11.5	ns
		5.0	1.5	9.0	1.0	9.5	

Symbol	Parameter (C <sub>L</sub> = 50 pF)	V <sub>CC</sub> ±10% (V)	AC241				Unit
			T <sub>A</sub> = +25°C		T <sub>A</sub> = -40°C to +85°C		
			Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Data to Output	3.3	1.5	9.0	1.5	10.0	ns
		5.0	1.5	7.0	1.0	7.5	
t <sub>PHL</sub>		3.3	1.5	9.0	1.0	10.5	
		5.0	1.5	7.0	1.0	7.5	
t <sub>PZH</sub>	Output Enable Time	3.3	1.5	12.5	1.0	13.0	ns
		5.0	1.5	9.0	1.0	9.5	
t <sub>PZL</sub>		3.3	1.5	12.0	1.5	13.0	ns
		5.0	1.5	9.0	1.0	9.5	
t <sub>PHZ</sub>	Output Disable Time	3.3	1.5	12.0	2.0	12.5	ns
		5.0	1.5	10.0	1.0	10.5	
t <sub>PLZ</sub>		3.3	1.5	12.5	1.0	13.5	ns
		5.0	1.5	10.0	1.0	10.5	

240.241.244

Symbol	Parameter ( $C_L = 50 \text{ pF}$ )	$V_{CC}$ (V)	AC244				Unit
			$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Data to Output	3.3	2.0	9.0	1.5	10.0	ns
t <sub>PHL</sub>		5.0	1.5	7.0	1.0	7.5	
t <sub>PZH</sub>	Output Enable Time	3.3	2.0	10.5	1.5	11.0	ns
t <sub>PZL</sub>		5.0	1.5	7.0	1.5	8.0	
t <sub>PHZ</sub>	Output Diabile Time	3.3	3.0	10.0	1.5	10.5	ns
t <sub>PLZ</sub>		5.0	2.5	9.0	1.0	9.5	
		3.3	2.5	10.5	2.5	11.5	ns
		5.0	2.0	9.0	2.0	9.5	

## ACT — 240,241,244

### DC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Conditions	$V_{CC}$ (V)	ACT240,241,244			Unit
				$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$	
				Typ	Guaranteed Limits		
V <sub>IH</sub>	Minimum High Level Input Voltage	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1 V	4.5 5.5	1.5 1.5	2.0 2.0	2.0 2.0	V
V <sub>IL</sub>	Maximum Low Level Input Voltage	V <sub>OUT</sub> = 0.1V or V <sub>CC</sub> - 0.1 V	4.5 5.5	1.5 1.5	0.8 0.8	0.8 0.8	V
V <sub>OH</sub>	Minimum High Level Output Voltage	I <sub>OUT</sub> = -50 $\mu\text{A}$	4.5 5.5	4.49 5.49	4.4 5.4	4.4 5.4	V
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OH</sub> = -24mA -24 mA	4.5 5.5		3.86 4.86	3.76 4.76	V
V <sub>OL</sub>	Maximum Low Level Output Voltage	I <sub>OUT</sub> = 50 $\mu\text{A}$	4.5 5.5	0.001 0.001	0.1 0.1	0.1 0.1	V
		V <sub>IN</sub> = V <sub>IL</sub> or V <sub>IH</sub> I <sub>OL</sub> = 24mA 24 mA	4.5 5.5		0.36 0.36	0.44 0.44	V
I <sub>IN</sub>	Maximum Input Leakage Current	V <sub>I</sub> = V <sub>CC</sub> , GND	5.5		$\pm 0.1$	$\pm 1.0$	$\mu\text{A}$
I <sub>OZ</sub>	Maximum 3-State Current	V <sub>IN</sub> (OE) = V <sub>IL</sub> , V <sub>IH</sub> V <sub>IN</sub> = V <sub>CC</sub> , GND V <sub>OUT</sub> = V <sub>CC</sub> , GND	5.5		$\pm 0.5$	$\pm 5.0$	$\mu\text{A}$
$\Delta I_{CCT}$	Additional Max I <sub>CC</sub> /Input	V <sub>IN</sub> = V <sub>CC</sub> - 2.1 V	5.5	0.6		1.5	mA
I <sub>CC</sub>	Maximum Quiescent Supply Current	V <sub>IN</sub> = V <sub>CC</sub> or GND	5.5		8.0	80	$\mu\text{A}$

### AC CHARACTERISTICS

Symbol	Parameter ( $C_L = 50 \text{ pF}$ )	$V_{CC}$ $\pm 10\%$ (V)	ACT240				Unit
			$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay, Data to Output	5.0	1.5	8.5	1.5	9.5	ns
t <sub>PHL</sub>			1.5	7.5	1.5	8.5	ns

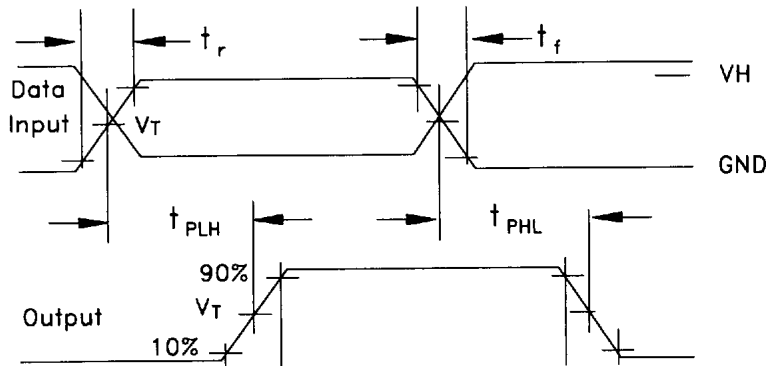
240,241,244

Symbol	Parameter ( $C_L = 50 \text{ pF}$ )	$V_{CC} \pm 10\%$ (V)	ACT240				Unit
			$T_A = +25^\circ\text{C}$		$T_A = -40^\circ\text{C to } +85^\circ\text{C}$		
			Min	Max	Min	Max	
$t_{PZH}$	Output Enable Time	5.0	1.5	8.5	1.0	9.5	ns
$t_{PZL}$		5.0	2.0	9.5	1.5	10.5	ns
$t_{PHZ}$	Output Disable Time	5.0	2.0	9.5	2.0	10.5	ns
$t_{PLZ}$		5.0	2.5	10.0	2.0	10.5	ns

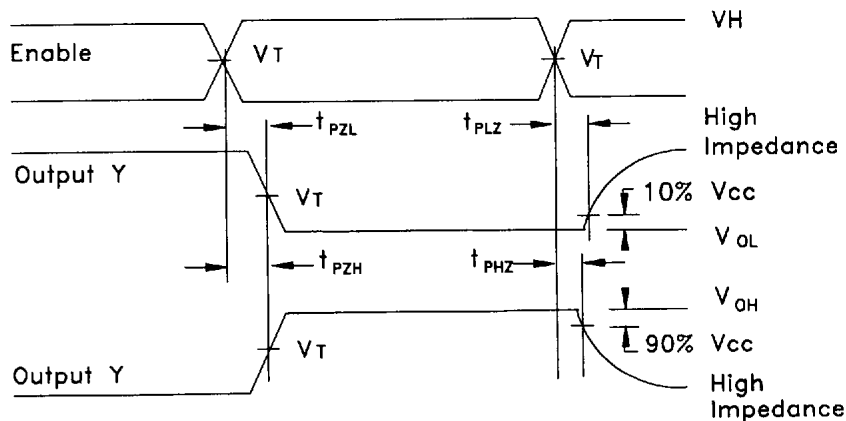
Symbol	Parameter	$V_{CC} \pm 10\%$ (V)	ACT241				Unit
			Min	Max	Min	Max	
$t_{PLH}$	Propagation Delay, Data to Output	5.0	1.5	9.0	1.5	10.0	ns
$t_{PHL}$		5.0	1.5	9.0	1.5	10.0	ns
$t_{PZH}$	Output Enable Time	5.0	1.5	9.0	1.0	10.0	ns
$t_{PZL}$		5.0	1.5	10.0	1.5	11.0	ns
$t_{PHZ}$	Output Disable Time	5.0	1.5	10.5	1.5	11.5	ns
$t_{PLZ}$		5.0	2.0	10.5	1.5	11.5	ns

Symbol	Parameter	$V_{CC} \pm 10\%$ (V)	ACT244				Unit
			Min	Max	Min	Max	
$t_{PLH}$	Propagation Delay, Data to Output	5.0	2.0	9.0	1.5	10.0	ns
$t_{PHL}$		5.0	2.0	9.0	1.5	10.0	ns
$t_{PZH}$	Output Enable Time	5.0	1.5	8.5	1.0	9.5	ns
$t_{PZL}$		5.0	2.0	9.5	1.5	10.5	ns
$t_{PHZ}$	Output Disable Time	5.0	2.0	9.5	1.5	10.5	ns
$t_{PLZ}$		5.0	2.5	10.0	2.0	10.5	ns

### SWITCHING WAVEFORMS



Input and output threshold voltage:  
 $V_T = 50\% V_{CC}$  for AC; 1.5V for ACT  
 $V_H = V_{CC}$  for AC, 3V for ACT



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