

54S/74S240 • 54LS/74LS240
54S/74S241 • 54LS/74LS241
54LS/74LS244

OCTAL BUFFER/LINE DRIVER
 (With 3-State Outputs)

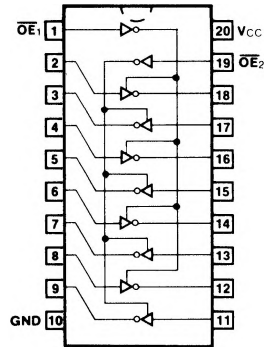
DESCRIPTION — The '240, '241 and '244 are octal buffers and line drivers designed to be employed as memory address drivers, clock drivers and bus oriented transmitters/receivers which provide improved PC board density.

- **HYSTERESIS AT INPUTS TO IMPROVE NOISE MARGINS**
- **3-STATE OUTPUTS DRIVE BUS LINES OR BUFFER MEMORY ADDRESS REGISTERS**
- **OUTPUTS SINK 24 mA (74LS) OR 40 mA(74S)**
- **15 mA SOURCE CURRENT**
- **INPUT CLAMP DIODES LIMIT HIGH SPEED TERMINATION EFFECTS**
- **FULLY TTL AND CMOS COMPATIBLE**

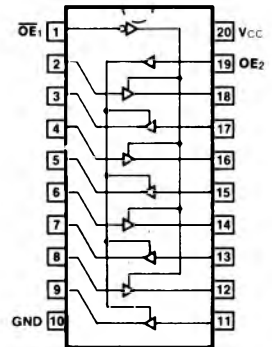
ORDERING CODE: See Section 9

PKGS	PIN OUT	COMMERCIAL GRADE	MILITARY GRADE	PKG TYPE
		V _{CC} = +5.0 V, ±5%, T _A = 0°C to +70°C	V _{CC} = +5.0 V, ±10%, T _A = -55°C to +125°C	
Plastic DIP (P)	A	74S240PC, 74LS240PC		9Z
	B	74S241PC, 74LS241PC		
	C	74LS244PC		
Ceramic DIP (D)	A	74S240DC, 74LS240DC	54S240DM, 54LS240DM	4E
	B	74S241DC, 74LS241DC	54S241DM, 54LS241DM	
	C	74LS244DC	54LS244DM	
Flatpak (F)	A	74S240FC, 74LS240FC	54S240FM, 54LS240FM	4F
	B	74S241FC, 74LS241FC	54S241FM, 54LS241FM	
	C	74LS244FC	54LS244FM	

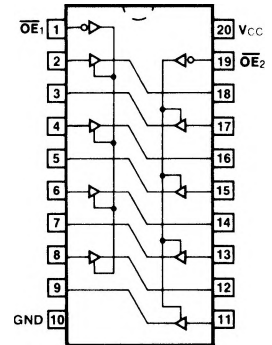
CONNECTION DIAGRAMS
PINOUT A



PINOUT B



PINOUT C



INPUT LOADING/FAN-OUT: See Section 9

PIN NAMES	DESCRIPTION	54/74S (U.L.) HIGH/LOW	54/74LS (U.L.) HIGH/LOW
OE ₁ , OE ₂	3-State Output Enable (Active LOW)	1.25/1.25	0.5/0.25
OE ₂	3-State Output Enable (Active HIGH)	1.25/1.25	0.5/0.25
	Inputs	1.25/0.25	0.5/0.125
	Outputs	75/40 (30)	75/15 (7.5)

TRUTH TABLES

'S240, 'LS240

INPUTS		D	OUTPUT
\overline{OE}_1	\overline{OE}_2		
L	L		H
L	H		L
H	X		Z

'S241, 'LS241

INPUTS			OUTPUT
\overline{OE}_1	OE_2	D	
L	H	L	L
L	H	H	H
H	L	X	Z

'LS244

INPUTS		D	OUTPUT
\overline{OE}_1	\overline{OE}_2		
L	L		L
L	H		H
H	X		Z

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

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

SYMBOL	DESCRIPTION		54/74S		54/74LS		UNITS	CONDITIONS	
			Min	Max	Min	Max			
V _{OH}	Output HIGH Voltage	XM	2.0		2.0		V	$I_{OH} = -12 \text{ mA}$	$V_{IH} = 2.0 \text{ V}$ $V_{IL} = 0.5 \text{ V}$ $V_{CC} = \text{Min}$
		XC	2.0		2.0			$I_{OH} = -15 \text{ mA}$	
		XM	2.4		2.4		V	$V_{CC} = \text{Min}, V_{IH} = 2.0 \text{ V}$ $V_{IL} = \text{Max}, I_{OH} = -3.0 \text{ mA}$	
		XC	2.4		2.4			$V_{CC} = \text{Min}, V_{IH} = 2.0 \text{ V}$ $V_{IL} = \text{Max}, I_{OH} = -1.0 \text{ mA}$	
V _{OL}	Output LOW Voltage	XM				0.4	V	$I_{OL} = 12 \text{ mA}$	$V_{CC} = \text{Min}$
		XC				0.4		$I_{OL} = 12 \text{ mA}$	
		XC				0.5		$I_{OL} = 24 \text{ mA}$	
		XM		0.55			V	$I_{OL} = 48 \text{ mA}$	$V_{CC} = \text{Min}$
XC		0.55			$I_{OL} = 64 \text{ mA}$				
I _{OS}	Output Short Circuit Current		-50	-225	-40	-225	mA	$V_{CC} = \text{Max}$	
I _{CC}	Power Supply Current	HIGH	'240	XM	123		23	mA	$V_{CC} = \text{Max}$
				XC	135		23		
			'241	XM	147		23		
				XC	160		23		
			'244	XM			23		
				XC			23		
		LOW	'240	XM	145		44	mA	$V_{CC} = \text{Max}$
				XC	150		44		
			'241	XM	170		46		
				XC	180		46		
			'244	XM			46		
				XC			46		
OFF	'240	XM	145		50	mA	$V_{CC} = \text{Max}$		
		XC	150		50				
	'241	XM	170		54				
		XC	180		54				
	'244	XM			54				
		XC			54				

AC CHARACTERISTICS: $V_{CC} = +5.0\text{ V}$, $T_A = +25^\circ\text{C}$ (See Section 3 for waveforms and load configurations)

SYMBOL	PARAMETER	54/74S		54/74LS		UNITS	CONDITIONS
		$C_L = 50\text{ pF}$ $R_L = 90\ \Omega$		$C_L = 50\text{ pF}$			
		Min	Max	Min	Max		
tPLH tPHL	Propagation Delay Data to Output ('240)	7.0	7.0	14	18	ns	Figs. 3-1, 3-4
tPLH tPHL	Propagation Delay Data to Output ('241)	9.0	9.0	18	18	ns	Figs. 3-1, 3-5
tPLH tPHL	Propagation Delay Data to Output ('244)			18	18	ns	
tpZH tpZL	Output Enable Time ('S240)	10	15			ns	Figs. 3-3, 3-11, 3-12
tpZH tpZL	Output Enable Time ('LS240, 'LS241, 'S241)	12	15	23	30	ns	Figs. 3-3, 3-11, 3-12 $R_L = 667\ \Omega$ ('LS)
tPLZ tPHZ	Output Disable Time	15	9.0	25	18	ns	Figs. 3-3, 3-11, 3-12 $R_L = 667\ \Omega$, $C_L = 5\text{ pF}$ ('LS)