

74F240 • 74F241 • 74F244

Octal Buffers/Line Drivers with 3-STATE Outputs

General Description

The 74F240, 74F241 and 74F244 are octal buffers and line drivers designed to be employed as memory and address drivers, clock drivers and bus-oriented transmitters/receivers which provide improved PC and board density.

Features

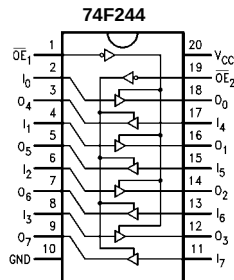
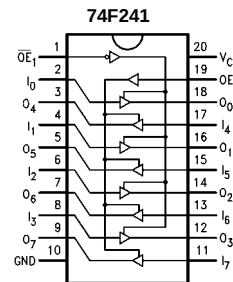
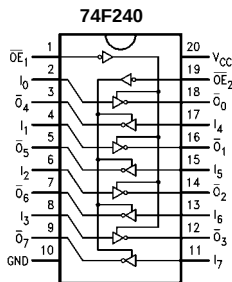
- 3-STATE outputs drive bus lines or buffer memory address registers
- Outputs sink 64 mA (48 mA mil)
- 12 mA source current
- Input clamp diodes limit high-speed termination effects

Ordering Code:

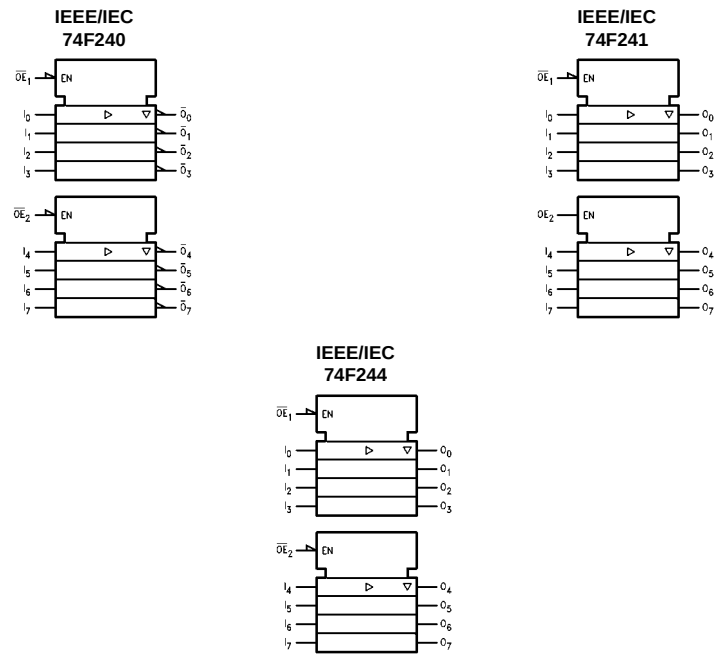
Order Code	Package Number	Package Description
74F240SC (Note 1)	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74F240SJ (Note 1)	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F240PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74F241SC	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74F241PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide
74F244SC (Note 1)	M20B	20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
74F244SJ (Note 1)	M20D	20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
74F244MSA (Note 1)	MSA20	20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
74F244PC	N20A	20-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300" Wide

Note 1: Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagrams



Logic Symbols



Unit Loading/Fan Out

Pin Names	Description	U.L. HIGH/LOW	Input I_{IH}/I_{IL} Output I_{OH}/I_{OL}
$\overline{OE}_1, \overline{OE}_2$	3-STATE Output Enable Input (Active LOW)	1.0/1.667	20 μ A/-1 mA
OE_2	3-STATE Output Enable Input (Active HIGH)	1.0/1.667	20 μ A/-1 mA
I_0-I_7	Inputs (74F240)	1.0/1.667 (Note 2)	20 μ A/-1 mA
I_0-I_7	Inputs (74F241, 74F244)	1.0/2.667 (Note 2)	20 μ A/-1.6 mA
$\overline{O}_0-\overline{O}_7, O_0-O_7$	Outputs	600/106.6 (80)	-12 mA/64 mA (48 mA)

Note 2: Worst-case 74F240 enabled; 74F241, 74F244 disabled

Truth Tables

74F240						74F244					
$\overline{OE}_1$	D_{1n}	O_{1n}	$\overline{OE}_2$	D_{2n}	O_{2n}	$\overline{OE}_1$	D_{1n}	O_{1n}	$\overline{OE}_2$	D_{2n}	O_{2n}
H	X	Z	H	X	Z	H	X	Z	H	X	Z
L	H	L	L	H	L	L	H	H	L	H	H
L	L	H	L	L	H	L	L	L	L	L	L

74F241					
$\overline{OE}_1$	D_{1n}	O_{1n}	OE_2	D_{2n}	O_{2n}
H	X	Z	L	X	Z
L	H	H	H	H	H
L	L	L	H	L	L

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

Absolute Maximum Ratings(Note 3)

Storage Temperature	–65°C to +150°C
Ambient Temperature under Bias	–55°C to +125°C
Junction Temperature under Bias	–55°C to +150°C
V _{CC} Pin Potential to Ground Pin	–0.5V to +7.0V
Input Voltage (Note 4)	–0.5V to +7.0V
Input Current (Note 4)	–30 mA to +5.0 mA
Voltage Applied to Output in HIGH State (with V _{CC} = 0V)	
Standard Output	–0.5V to V _{CC}
3-STATE Output	–0.5V to +5.5V
Current Applied to Output in LOW State (Max)	twice the rated I _{OL} (mA)
ESD Last Passing Voltage (Min)	4000V

Recommended Operating Conditions

Free Air Ambient Temperature	0°C to +70°C
Supply Voltage	+4.5V to +5.5V

Note 3: Absolute maximum ratings are values beyond which the device may be damaged or have its useful life impaired. Functional operation under these conditions is not implied.

Note 4: Either voltage limit or current limit is sufficient to protect inputs.

DC Electrical Characteristics

Symbol	Parameter	Min	Typ	Max	Units	V _{CC}	Conditions
V _{IH}	Input HIGH Voltage	2.0			V		Recognized as a HIGH Signal
V _{IL}	Input LOW Voltage			0.8	V		Recognized as a LOW Signal
V _{CD}	Input Clamp Diode Voltage			–1.2	V	Min	I _{IN} = –18 mA
V _{OH}	Output HIGH Voltage	10% V _{CC}	2.4				I _{OH} = –3 mA
		10% V _{CC}	2.0		V	Min	I _{OH} = –15 mA
		5% V _{CC}	2.7				I _{OH} = –3 mA
V _{OL}	Output LOW Voltage	10% V _{CC}		0.55	V	Min	I _{OL} = 64 mA
I _{IH}	Input HIGH Current			5.0	μA	Max	V _{IN} = 2.7V
I _{BVI}	Input HIGH Current Breakdown Test			7.0	μA	Max	V _{IN} = 7.0V
I _{CEX}	Output HIGH Leakage Current			50	μA	Max	V _{OUT} = V _{CC}
V _{ID}	Input Leakage Test	4.75			V	0.0	I _{ID} = 1.9 μA All Other Pins Grounded
I _{OD}	Output Leakage Circuit Current			3.75	μA	0.0	V _{IOD} = 150 mV All Other Pins Grounded
I _{IL}	Input LOW Current			–1.0 –1.6	mA	Max	V _{IN} = 0.5V ($\overline{OE}_1, \overline{OE}_2, OE_2, D_n$ 74F240)) V _{IN} = 0.5V (D _n (74F241, 74F244))
I _{OZH}	Output Leakage Current			50	μA	Max	V _{OUT} = 2.7V
I _{OZL}	Output Leakage Current			–50	μA	Max	V _{OUT} = 0.5V
I _{OS}	Output Short-Circuit Current	–100		–225	mA	Max	V _{OUT} = 0V
I _{ZZ}	Bus Drainage Test			500	μA	0.0V	V _{OUT} = 5.25V
I _{CCH}	Power Supply Current (74F240)		19	29	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current (74F240)		50	75	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current (74F240)		42	63	mA	Max	V _O = HIGH Z
I _{CCH}	Power Supply Current (74F241, 74F244)		40	60	mA	Max	V _O = HIGH
I _{CCL}	Power Supply Current (74F241, 74F244)		60	90	mA	Max	V _O = LOW
I _{CCZ}	Power Supply Current (74F241, 74F244)		60	90	mA	Max	V _O = HIGH Z

AC Electrical Characteristics

Symbol	Parameter	T _A = +25°C V _{CC} = +5.0V C _L = 50 pF			T _A = -55°C to +125°C V _{CC} = 5.0V C _L = 50 pF		T _A = 0°C to +70°C V _{CC} = 5.0V C _L = 50 pF		Units
		Min	Typ	Max	Min	Max	Min	Max	
t _{PLH}	Propagation Delay	3.0	5.1	7.0	3.0	9.0	3.0	8.0	ns
t _{PHL}	Data to Output (74F240)	2.0	3.5	4.7	2.0	6.0	2.0	5.7	
t _{PZH}	Output Enable Time (74F240)	2.0	3.5	4.7	2.0	6.5	2.0	5.7	ns
t _{PZL}		4.0	6.9	9.0	4.0	10.5	4.0	10.0	
t _{PHZ}	Output Disable Time (74F240)	2.0	4.0	5.3	2.0	6.5	2.0	6.3	
t _{PLZ}		2.0	6.0	8.0	2.0	12.5	2.0	9.5	
t _{PLH}	Propagation Delay	2.5	4.0	5.2	2.0	6.5	2.5	6.2	ns
t _{PHL}	Data to Output (74F241, 74F244)	2.5	4.0	5.2	2.0	7.0	2.5	6.5	
t _{PZH}	Output Enable Time	2.0	4.3	5.7	2.0	7.0	2.0	6.7	ns
t _{PZL}	(74F241, 74F244)	2.0	5.4	7.0	2.0	8.5	2.0	8.0	
t _{PHZ}	Output Disable Time	2.0	4.5	6.0	2.0	7.0	2.0	7.0	
t _{PLZ}	(74F241, 74F244)	2.0	4.5	6.0	2.0	7.5	2.0	7.0	

Physical Dimensions inches (millimeters) unless otherwise noted



**20-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-013, 0.300" Wide
Package Number M20B**

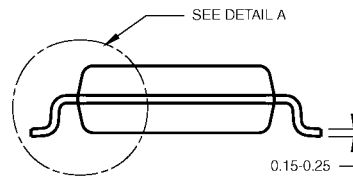
Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



LAND PATTERN RECOMMENDATION



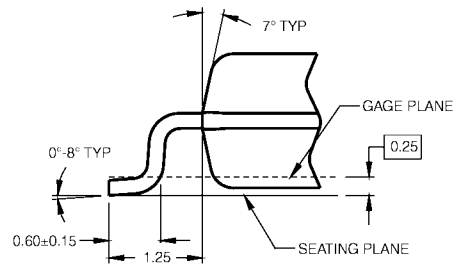
DIMENSIONS ARE IN MILLIMETERS



NOTES:

- A. CONFORMS TO EIAJ EDR-7320 REGISTRATION, ESTABLISHED IN DECEMBER, 1998.
- B. DIMENSIONS ARE IN MILLIMETERS.
- C. DIMENSIONS ARE EXCLUSIVE OF BURRS, MOLD FLASH, AND TIE BAR EXTRUSIONS.

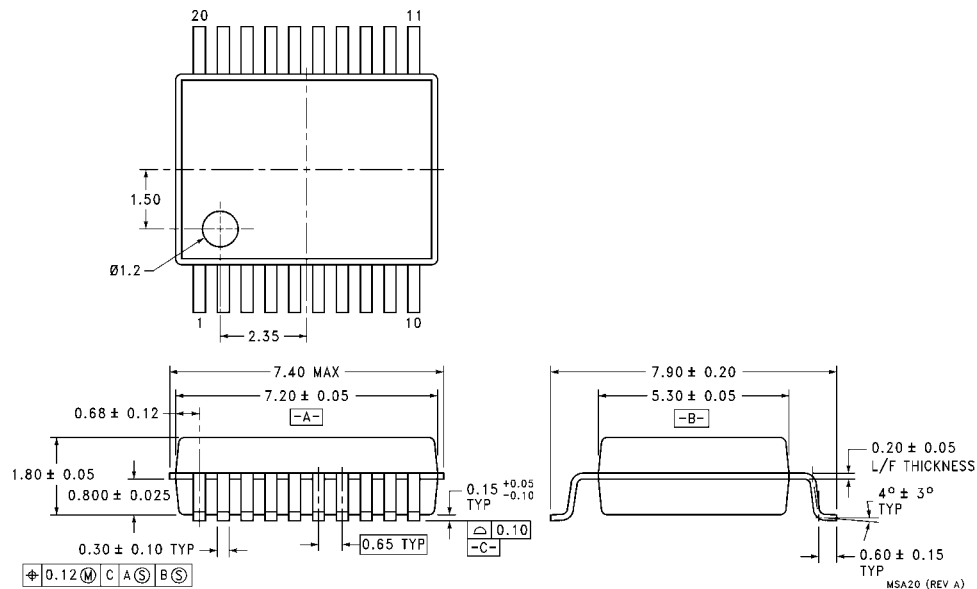
M20DRevB1



DETAIL A

20-Lead Small Outline Package (SOP), EIAJ TYPE II, 5.3mm Wide
Package Number M20D

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)



**20-Lead Shrink Small Outline Package (SSOP), JEDEC MO-150, 5.3mm Wide
Package Number MSA20**

