

SN54F240, SN74F240 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SDFS061A – D2932, MARCH 1987 – REVISED OCTOBER 1993

- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline (SOIC) and Shrink Small-Outline (SSOP) Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs

description

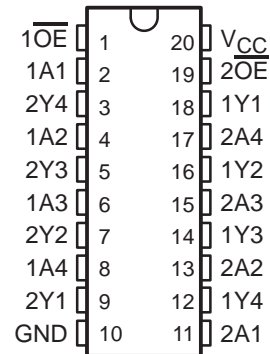
These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'F241 and 'F244, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical \overline{OE} (active-low output-enable) inputs, and complementary OE and \overline{OE} inputs.

The 'F240 is organized as two 4-bit buffers/line drivers with separate output enable (\overline{OE}) inputs. When \overline{OE} is low, the device passes data from the A inputs to the Y outputs. When \overline{OE} is high, the outputs are in the high-impedance state.

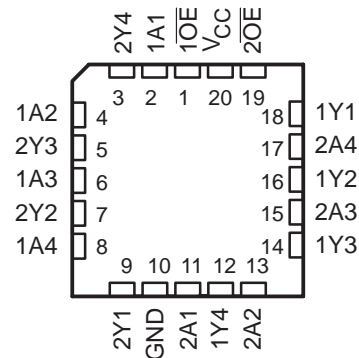
The SN74F240 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54F240 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F240 is characterized for operation from 0°C to 70°C .

SN54F240 . . . J PACKAGE
SN74F240 . . . DB, DW, OR N PACKAGE
(TOP VIEW)



SN54F240 . . . FK PACKAGE
(TOP VIEW)



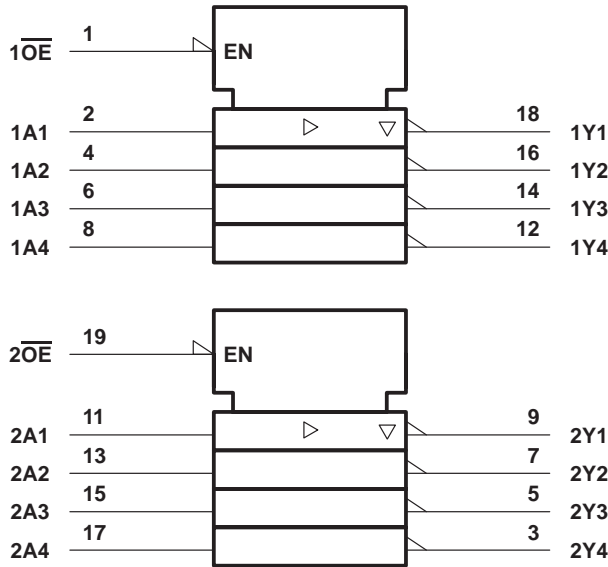
FUNCTION TABLE
(each buffer)

INPUTS		OUTPUT
\overline{OE}	A	Y
L	H	L
L	L	H
H	X	Z

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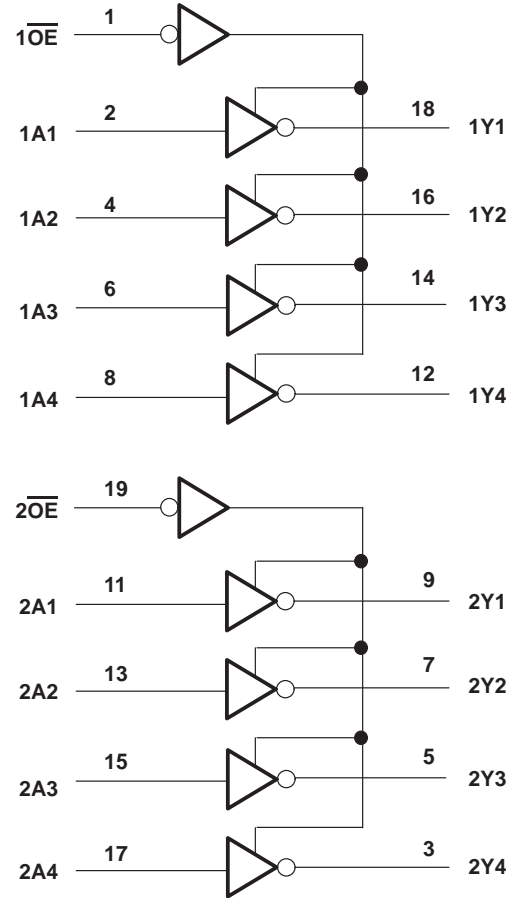
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logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



absolute maximum ratings over operating free-air temperature range (unless otherwise noted)‡

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input voltage range, V_I (see Note 1)	-1.2 V to 7 V
Input current range	-30 mA to 5 mA
Voltage range applied to any output in the disabled or power-off state	-0.5 V to 5.5 V
Voltage range applied to any output in the high state	-0.5 V to V_{CC}
Current into any output in the low state: SN54F240	96 mA
SN74F240	128 mA
Operating free-air temperature range: SN54F240	-55°C to 125°C
SN74F240	0°C to 70°C
Storage temperature range	-65°C to 150°C

‡ Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

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recommended operating conditions

		SN54F240			SN74F240			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{IK}	Input clamp current			-18			-18	mA
I_{OH}	High-level output current			-12			-15	mA
I_{OL}	Low-level output current			48			64	mA
T_A	Operating free-air temperature	-55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS	SN54F240			SN74F240			UNIT
		MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.3	2.4	3.3		V
		$I_{OH} = -12\text{ mA}$	2	3.2				
		$I_{OH} = -15\text{ mA}$			2	3.1		
	$V_{CC} = 4.75\text{ V}$,	$I_{OH} = -3\text{ mA}$			2.7			
V_{OL}	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 48\text{ mA}$	0.38	0.55				V
		$I_{OL} = 64\text{ mA}$				0.42	0.55	
I_{OZH}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.7\text{ V}$			50			50	μA
I_{OZL}	$V_{CC} = 5.5\text{ V}$, $V_O = 0.5\text{ V}$			-50			-50	μA
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$			20			20	μA
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.5\text{ V}$			-1			-1	mA
$I_{OS}‡$	$V_{CC} = 5.5\text{ V}$, $V_O = 0$	-100		-225	-100		-225	mA
I_{CC}	$V_{CC} = 5.5\text{ V}$	Outputs high	19	29	19	29		mA
		Outputs low	50	75	50	75		
		Outputs disabled	42	63	42	63		

† All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

‡ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

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switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, C _L = 50 pF, R _L = 500 Ω, T _A = 25°C			V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX†				UNIT
			'F240			SN54F240		SN74F240		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	Any A	Y	2.2	4.7	7	2.2	9	2.2	8	ns
t _{PHL}			1.2	3.1	4.7	1.2	6	1.2	5.7	
t _{PZH}	$\overline{\text{OE}}$	Y	1.2	3.1	5.3	1.2	6.7	1.2	6.1	ns
t _{PZL}			3.2	6.5	9	3.2	10.5	3.2	10	
t _{PHZ}	$\overline{\text{OE}}$	Y	1.2	3.6	5.3	1.2	6.5	1.2	6.3	ns
t _{PLZ}			1.2	5.6	8	1.2	12.5	1.2	9.5	

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

NOTE 2: Load circuits and waveforms are shown in Section 1.

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-9758501Q2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
5962-9758501QRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
5962-9758501QSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
JM38510/33201B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/33201BRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
JM38510/33201BSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
SN54F240J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SN74F240DBLE	OBSOLETE	SSOP	DB	20		None	Call TI	Call TI
SN74F240DBR	ACTIVE	SSOP	DB	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74F240DW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74F240DWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74F240N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74F240NSR	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ54F240FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54F240J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SNJ54F240W	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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