

# SN54F241, SN74F241 OCTAL BUFFERS/DRIVERS WITH 3-STATE OUTPUTS

SDFS090 – MARCH 1987 – REVISED OCTOBER 1993

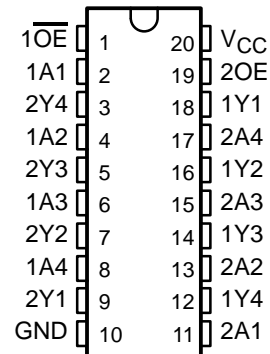
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs

## description

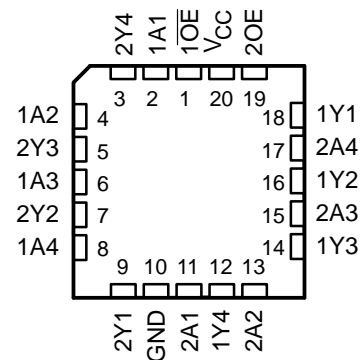
These octal buffers and line drivers are designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters. Taken together with the 'F240 and 'F244, these devices provide the choice of selected combinations of inverting and noninverting outputs, symmetrical  $\overline{OE}$  (active-low output-enable) inputs, and complementary OE and  $\overline{OE}$  inputs.

The SN54F241 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F241 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

SN54F241 . . . J PACKAGE  
SN74F241 . . . DW OR N PACKAGE  
(TOP VIEW)



SN54F241 . . . FK PACKAGE  
(TOP VIEW)

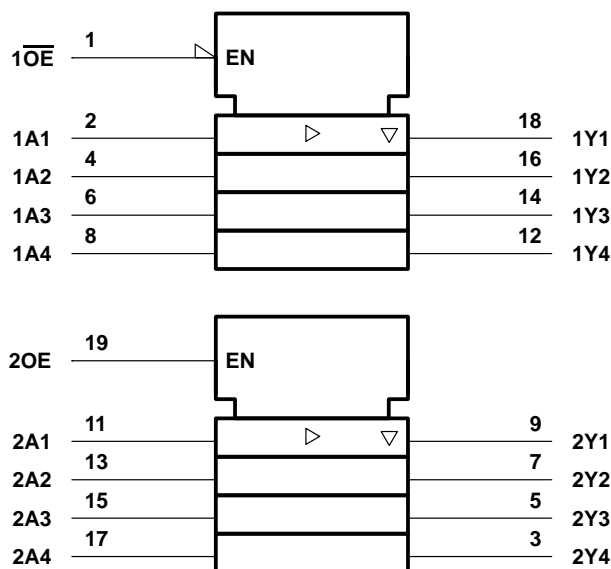


FUNCTION TABLES

INPUTS		OUTPUT
$\overline{1OE}$	1A	1Y
H	X	Z
L	H	H
L	L	L

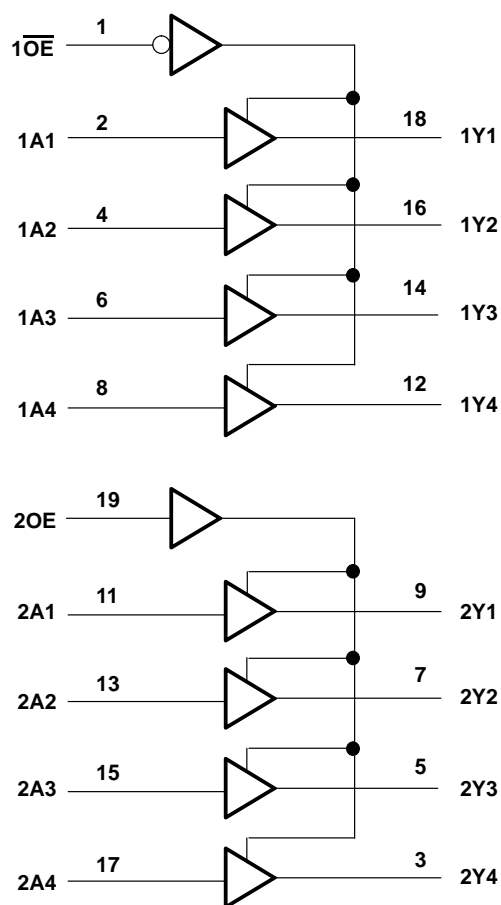
INPUTS		OUTPUT
2OE	2A	2Y
H	H	H
H	L	L
L	X	Z

**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: SN54F241	96 mA
SN74F241	128 mA
Operating free-air temperature range: SN54F241	–55°C to 125°C
SN74F241	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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## OCTAL BUFFERS/DRIVERS

### WITH 3-STATE OUTPUTS

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#### recommended operating conditions

		SN54F241			SN74F241			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		SN54F241			SN74F241			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
$I_{IL}$	OE or $\overline{\text{OE}}$	$V_{CC} = 5.5\text{ V}$ , $V_I = 0.5\text{ V}$			–1			–1	mA
	Any A				–1.6			–1.6	
$I_{OS}‡$	$V_{CC} = 5.5\text{ V}$ , $V_O = 0$		–100		–225	–100		–225	mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high		40	60		40	60	mA
		Outputs low		60	90		60	90	
		Outputs disabled		60	90		60	90	

† 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 <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX†				UNIT
			'F241			SN54F241		SN74F241		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	Any A	Y	1.7	3.6	5.2	1.2	6.5	1.7	6.2	ns
t <sub>PHL</sub>			1.7	3.6	5.2	1.2	7	1.7	6.5	
t <sub>PZH</sub>	$\overline{\text{OE}}$ or OE	Y	1.2	3.9	5.7	1.2	7	1.2	6.7	ns
t <sub>PZL</sub>			1.2	5	7	1.2	8.5	1.2	8	
t <sub>PHZ</sub>	$\overline{\text{OE}}$ or OE	Y	1.2	4.1	6	1.2	7	1.2	7	ns
t <sub>PLZ</sub>			1.2	4.1	6	1.2	7.5	1.2	7	

† 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.

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