

# SN54F521, SN74F521 8-BIT IDENTITY COMPARATORS

SDFS091 – MARCH 1987 – REVISED OCTOBER 1993

- Compares Two 8-Bit Words
- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

## description

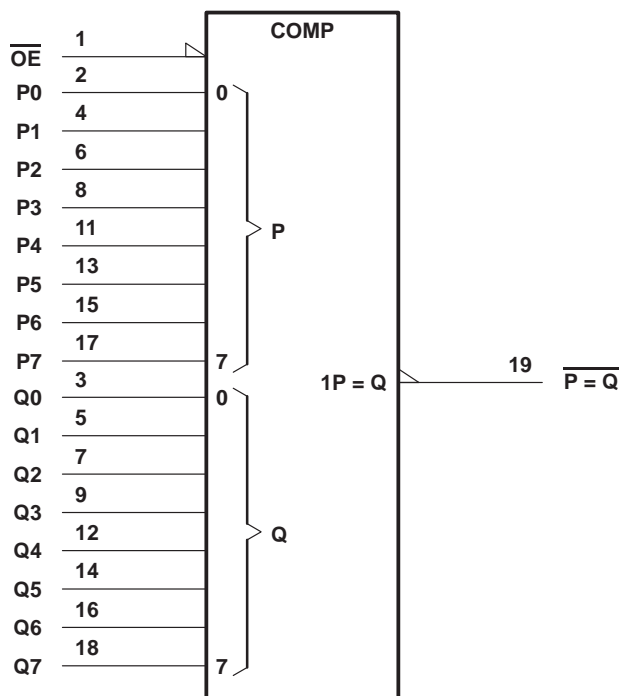
These identity comparators perform comparisons on two 8-bit binary or BCD words. They provide  $\overline{P=Q}$  outputs.

The SN54F521 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F521 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE

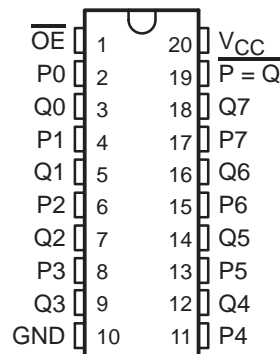
INPUTS		OUTPUT
P, Q	$\overline{\text{OE}}$	$\overline{P=Q}$
P = Q	L	L
P $\neq$ Q	X	H
X	H	H

## logic symbol†

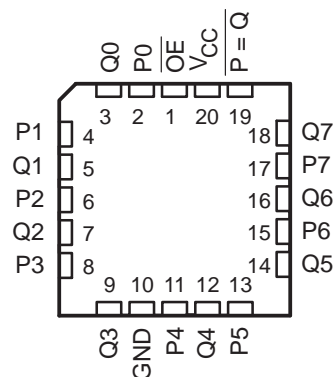


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

SN54F521 . . . J PACKAGE  
SN74F521 . . . DW OR N PACKAGE  
(TOP VIEW)



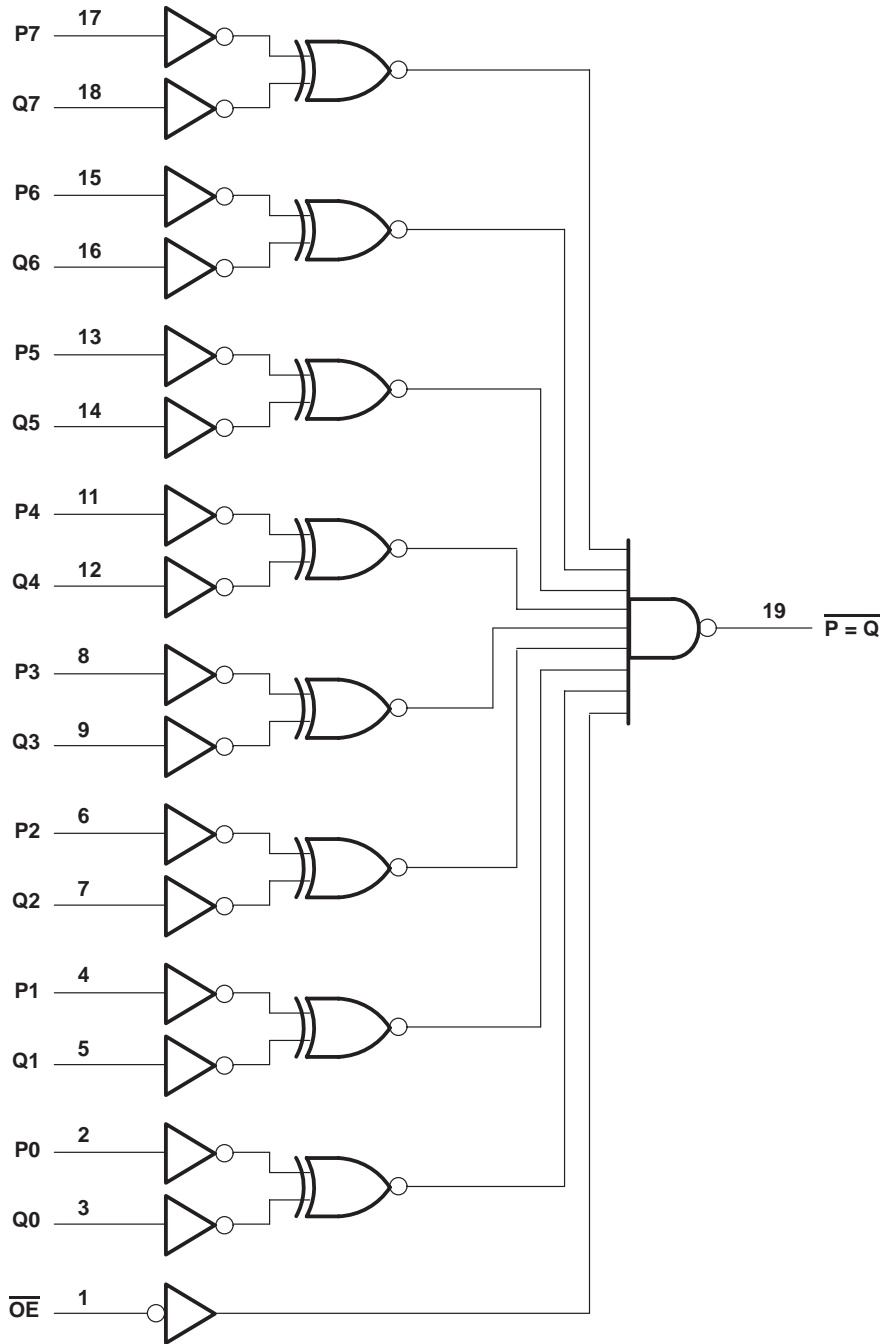
SN54F521 . . . FK PACKAGE  
(TOP VIEW)



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## logic diagram (positive logic)



# SN54F521, SN74F521 8-BIT IDENTITY COMPARATORS

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## 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 high state .....	–0.5 V to $V_{CC}$
Current into any output in the low state .....	40 mA
Operating free-air temperature range: SN54F521 .....	–55°C to 125°C
SN74F521 .....	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.

## recommended operating conditions

		SN54F521			SN74F521			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			–1			–1	mA
$I_{OL}$	Low-level output current			20			20	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	SN54F521			SN74F521			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IK}$	$V_{CC} = 4.5$ V, $I_I = -18$ mA			–1.2			–1.2	V
$V_{OH}$	$V_{CC} = 4.5$ V, $I_{OH} = -1$ mA	2.5	3.4		2.5	3.4		V
	$V_{CC} = 4.75$ V, $I_{OH} = -1$ mA				2.7			
$V_{OL}$	$V_{CC} = 4.5$ V, $I_{OL} = 20$ mA		0.3	0.5		0.3	0.5	V
$I_I$	$V_{CC} = 5.5$ V, $V_I = 7$ V			100			100	μA
$I_{IH}$	$V_{CC} = 5.5$ V, $V_I = 2.7$ V			20			20	μA
$I_{IL}$	$V_{CC} = 5.5$ V, $V_I = 0.5$ V			–0.6			–0.6	mA
$I_{OS}^{\S}$	$V_{CC} = 5.5$ V, $V_O = 0$	–60		–150	–60		–150	mA
$I_{CC}$	$V_{CC} = 5.5$ V, See Note 2		21	32		21	32	mA

‡ All typical values are at  $V_{CC} = 5$  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.

NOTE 2:  $I_{CC}$  is measured with all inputs at 4.5 V.



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## switching characteristics (see Note 3)

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
			'F521			SN54F521		SN74F521		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>PLH</sub>	P or Q	P = Q	2.7	6.6	10	2.7	14	2.7	11	ns
t <sub>PHL</sub>			3.7	6.6	10	3.2	12	3.2	11	
t <sub>PLH</sub>	$\overline{OE}$	$\overline{P = Q}$	2.2	4.6	6.5	2.2	8.5	2.2	7.5	ns
t <sub>PHL</sub>			2.7	6.1	9	2.7	13.5	2.7	10	

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

NOTE 3: Load circuits and waveforms are shown in Section 1.

**PACKAGING INFORMATION**

Orderable Device	Status <sup>(1)</sup>	Package Type	Package Drawing	Pins	Package Qty	Eco Plan <sup>(2)</sup>	Lead/Ball Finish	MSL Peak Temp <sup>(3)</sup>
5962-9759101Q2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
5962-9759101QRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
5962-9759101QSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
JM38510/34701B2A	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
JM38510/34701BRA	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
JM38510/34701BSA	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC
SN54F521J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SN74F521DW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74F521DWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74F521N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74F521N3	OBSOLETE	PDIP	N	20		None	Call TI	Call TI
SN74F521NSR	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ54F521FK	ACTIVE	LCCC	FK	20	1	None	Call TI	Level-NC-NC-NC
SNJ54F521J	ACTIVE	CDIP	J	20	1	None	Call TI	Level-NC-NC-NC
SNJ54F521W	ACTIVE	CFP	W	20	1	None	Call TI	Level-NC-NC-NC

<sup>(1)</sup> 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.

<sup>(2)</sup> 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.

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

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