

## Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

## Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
  - Class Q Military
  - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
  - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

# SN54F09, SN74F09

## QUADRUPLE 2-INPUT POSITIVE-AND GATES WITH OPEN-COLLECTOR OUTPUTS

D3074, NOVEMBER 1987—REVISED JANUARY 1989

- Package Options include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

### description

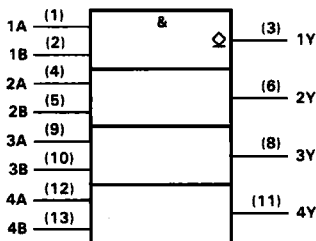
These devices contain four independent 2-input AND gates. They perform the Boolean functions  $Y = A \cdot B$  or  $Y = \overline{A + B}$  in positive logic. The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher  $V_{OH}$  levels.

The SN54F09 is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74F09 is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE (each gate)

INPUTS		OUTPUT
A	B	Y
H	H	H
L	X	L
X	L	L

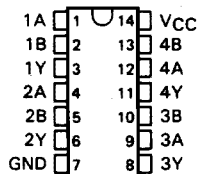
### logic symbol†



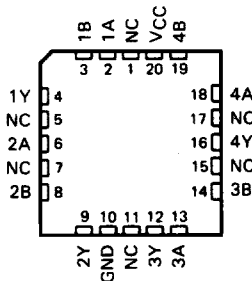
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for D, J, and N packages.

SN54F09 . . . J PACKAGE  
SN74F09 . . . D OR N PACKAGE  
(TOP VIEW)

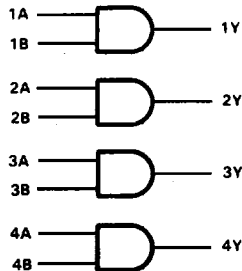


SN54F09 . . . FK PACKAGE  
(TOP VIEW)



NC—No internal connection

### logic diagram (positive logic)



# SN54F09, SN74F09

## QUADRUPLE 2-INPUT POSITIVE-AND GATES WITH OPEN-COLLECTOR OUTPUTS

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

Supply voltage, $V_{CC}$ .....	-0.5 V to 7 V
Input voltage <sup>†</sup> .....	-1.2 V to 7 V
Input current .....	-30 mA to 5 mA
Voltage 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: SN54F09 .....	-55°C to 125°C
SN74F09 .....	0°C to 70°C
Storage temperature range .....	-65°C to 150°C

<sup>†</sup>The input voltage ratings may be exceeded provided the input current ratings are observed.

### recommended operating conditions

	SN54F09			SN74F09			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
$V_{OH}$ High-level output voltage			5.5			5.5	V
$I_{OL}$ 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		SN54F09			SN74F09			UNIT
			MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	MAX	
$V_{IK}$	$V_{CC} = 4.5 V$ ,	$I_I = -18 mA$			-1.2			-1.2	V
$I_{OH}$	$V_{CC} = 4.5 V$ ,	$V_{OH} = 5.5 V$			0.1			0.1	mA
$V_{OL}$	$V_{CC} = 4.5 V$ ,	$I_{OL} = 20 mA$		0.30	0.5		0.30	0.5	V
$I_I$	$V_{CC} = 5.5 V$ ,	$V_I = 7 V$			0.1			0.1	mA
$I_{IH}$	$V_{CC} = 5.5 V$ ,	$V_I = 2.7 V$			20			20	$\mu A$
$I_{IL}$	$V_{CC} = 5.5 V$ ,	$V_I = 0.5 V$			-0.6			-0.6	mA
$I_{CCH}$	$V_{CC} = 5.5 V$ ,	$V_I = 4.5 V$		5	7.8		5	7.8	mA
$I_{CCL}$	$V_{CC} = 5.5 V$ ,	$V_I = 0$		8.1	12.8		8.1	12.8	mA

### switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5 V$ , $C_L = 50 pF$ , $R_L = 500 \Omega$ , $T_A = 25^\circ C$			$V_{CC} = 4.5 V$ to $5.5 V$ , $C_L = 50 pF$ , $R_L = 500 \Omega$ , $T_A = MIN$ to $MAX$ <sup>§</sup>			UNIT	
			'F09			SN54F09		SN74F09		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
$t_{PLH}$	A or B	Y	5	8	9.2	5	10.5	5	9.6	ns
$t_{PHL}$	A or B	Y	1.5	3.4	4.6	1.5	6	1.5	4.8	ns

<sup>‡</sup>All typical values are at  $V_{CC} = 5 V$ ,  $T_A = 25^\circ C$ .

<sup>§</sup>For conditions shown as MIN or MAX, use the appropriate value specified under Recommended Operating Conditions.

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