
PART NUMBER**54H21WC-ROCV**

**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 re-creations are done with the approval of the Original Component Manufacturer. (OCM)

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

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
 - 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 OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

54LS21, 54H21

Dual 4-Input Positive-AND Gates

These devices contain two independent 4-input AND gates.

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FOR REFERENCE ONLY

TYPES SN54H21, SN54LS21, SN74H21, SN74LS21 DUAL 4-INPUT POSITIVE-AND GATES

REVISED APRIL 1985

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

description

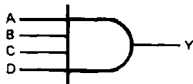
These devices contain two independent 4-input AND gates.

The SN54H21 and SN54LS21 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74H21 and SN74LS21 are characterized for operation from 0°C to 70°C .

FUNCTION TABLE (each gate)

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

logic diagram (each gate)

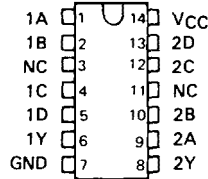


positive logic

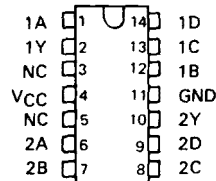
$$Y = A \cdot B \cdot C \cdot D \text{ or } Y = \overline{A} + \overline{B} + \overline{C} + \overline{D}$$

SN54H21 ... J PACKAGE
SN54LS21 ... J OR W PACKAGE
SN74H21 ... J OR N PACKAGE
SN74LS21 ... D, J OR N PACKAGE

(TOP VIEW)

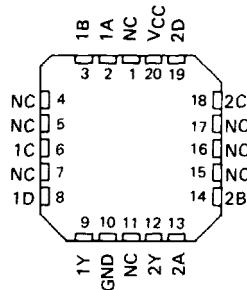


SN54H21 ... W PACKAGE
(TOP VIEW)



SN54LS21 ... FK PACKAGE
SN74LS21 ... FN PACKAGE

(TOP VIEW)



NC - No internal connection

PRODUCTION DATA

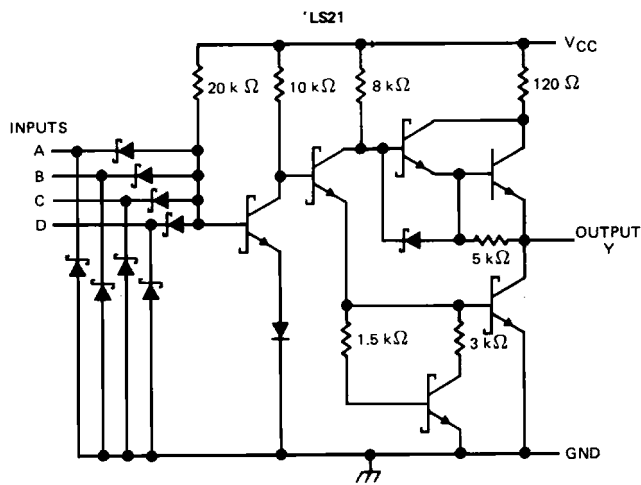
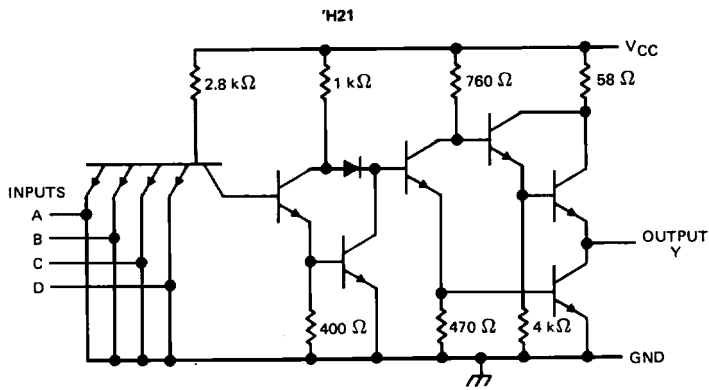
This document contains information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS
INSTRUMENTS

POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

**TYPES SN54H21, SN54LS21,
SN74H21, SN74LS21
DUAL 4-INPUT POSITIVE-AND GATES**

schematics (each gate)



Resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: 'H21	5.5 V
'LS21	7 V
Operating temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

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TTL DEVICES

**TEXAS
INSTRUMENTS**

POST OFFICE BOX 225012 • DALLAS, TEXAS 75265

3-113

TYPES SN54H21, SN74H21

DUAL 4-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54H21			SN74H21			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.8			0.8	V
I_{OH} High-level output current			− 0.5			− 0.5	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 †	SN54H21			SN74H21			UNIT
		MIN	TYP ‡	MAX	MIN	TYP ‡	MAX	
V_{IK}	$V_{CC} = \text{MIN.}$, $I_I = -8 \text{ mA}$			− 1.5			− 1.5	V
V_{OH}	$V_{CC} = \text{MIN.}$, $V_{IH} = 2 \text{ V.}$, $I_{OH} = -0.5 \text{ mA}$	2.4	3.4		2.4	3.4		V
V_{OL}	$V_{CC} = \text{MIN.}$, $V_{IL} = 0.8 \text{ V}$, $I_{OL} = 20 \text{ mA}$		0.2	0.4		0.2	0.4	V
I_I	$V_{CC} = \text{MAX.}$, $V_I = 5.5 \text{ V}$			1			1	mA
I_{IH}	$V_{CC} = \text{MAX.}$, $V_I = 2.4 \text{ V}$			50			50	µA
I_{IL}	$V_{CC} = \text{MAX.}$, $V_I = 0.4 \text{ V}$			−2			−2	mA
$I_{OS} §$	$V_{CC} = \text{MAX.}$	−40		−100	−40		−100	mA
I_{CCH}	$V_{CC} = \text{MAX.}$, $V_I = 4.5 \text{ V}$		12	20		12	20	mA
I_{CCL}	$V_{CC} = \text{MAX.}$, $V_I = 0 \text{ V}$		20	32		20	32	mA

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

‡ 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.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$ (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Any	Y	$R_L = 280 \Omega$, $C_L = 25 \text{ pF}$		7.6	12	ns
t_{PHL}					8.8	12	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

TYPES SN54LS21, SN74LS21 DUAL 4-INPUT POSITIVE-AND GATES

recommended operating conditions

	SN54LS21			SN74LS21			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
V _{CC} Supply voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH} High-level input voltage	2			2			V
V _{IL} Low-level input voltage			0.7			0.8	V
I _{OH} High-level output current			- 0.4			- 0.4	mA
I _{OL} Low-level output current			4			8	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 †	SN54LS21			SN74LS21			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IK}	V _{CC} = MIN, I _I = - 18 mA			- 1.5			- 1.5	V
V _{OH}	V _{CC} = MIN, V _{IH} = 2 V, I _{OH} = - 0.4 mA	2.5	3.4		2.7	3.4		V
V _{OL}	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 4 mA	0.25	0.4		0.25	0.4		V
	V _{CC} = MIN, V _{IL} = MAX, I _{OL} = 8 mA				0.35	0.5		
I _I	V _{CC} = MAX, V _I = 7 V		0.1			0.1		mA
I _{IH}	V _{CC} = MAX, V _I = 2.7 V		20			20		µA
I _{IL}	V _{CC} = MAX, V _I = 0.4 V		- 0.4			- 0.4		mA
I _{OS} §	V _{CC} = MAX	- 20		- 100	- 20		- 100	mA
I _{CCH}	V _{CC} = MAX, V _I = 4.5 V	1.2	2.4		1.2	2.4		mA
I _{CCL}	V _{CC} = MAX, V _I = 0 V	2.2	4.4		2.2	4.4		mA

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

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C

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

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Any	Y	R _L = 2 kΩ, C _L = 15 pF		8	15	ns
t _{PHL}					10	20	ns

NOTE 2: See General Information Section for load circuits and voltage waveforms.

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TTL DEVICES

