TYPES SN5460, SN54H60, SN7460, SN74H60
DUAL 4-INPUT EXPANDERS

REVISED DECEMBER 1983

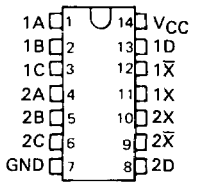
- **Package Options Include Plastic and Ceramic DIPs**
- **Dependable Texas Instruments Quality and Reliability**

description

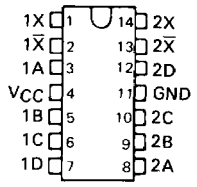
These devices contain two independent 4-input expanders. The '60 perform the Boolean function $X = ABCD$ when connected to X and $\overline{X}$ inputs of SN5423/SN7423, SN5450/SN7450, or SN5453/SN7453. The 'H60 performs the same function when connected to X and $\overline{X}$ inputs of SN54H50/SN74H50, SN54H53/SN74H53, or SN54H55/SN74H55.

The SN5460 and SN54H60 are characterized for operation over the full military temperature range of −55°C to 125°C. The SN7460 and SN74H60 are characterized for operation from 0°C to 70°C.

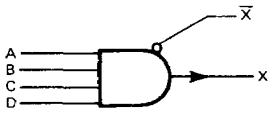
SN5460, SN54H60 . . . J PACKAGE
SN7460, SN74H60 . . . J OR N PACKAGE
(TOP VIEW)



SN5460, SN54H60 . . . W PACKAGE
(TOP VIEW)



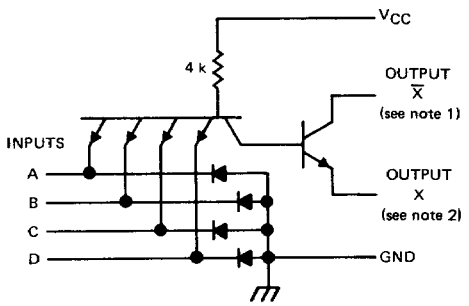
logic diagram (each gate)



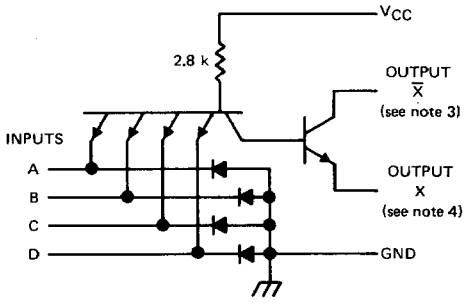
3 TTL DEVICES

schematics (each gate)

'60



'H60



NOTES: 1. Connect to $\overline{X}$ input of '23, '50, or '53 circuit.
2. Connect to X input of '23, '50, or '53 circuit.
3. Connect to $\overline{X}$ input of 'H50, 'H53, or 'H55 circuit.
4. Connect to X input of 'H50, 'H53, or 'H55 circuit.
Resistor values shown are nominal.

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

Supply voltage, V_{CC} (see Note 5) . . . . . 7 V
Input voltage: . . . . . 5.5 V
Operating free-air temperature range: SN54' . . . . . −55°C to 125°C
SN74' . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTE 5: Voltage values are with respect to network ground terminal.

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recommended operating conditions

		SN5460			SN7460			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
T_A	Operating free-air temperature	−55		125	0		70	°C

The '23, '50, and '53 are designed for use with up to four '60 expanders.

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

PARAMETER	TEST CONDITIONS†			SN5460			SN7460			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{\overline{X}X(on)}$	V_{CC} = MIN, $I_{\overline{X}}$ = 3.5 mA	V_{IH} = 2 V, T_A = −55°C	V_X = 1.1 V,			0.4				V
	V_{CC} = MIN, $I_{\overline{X}}$ = 3.8 mA,	V_{IH} = 2 V, T_A = 0°C	V_X = 1 V,						0.4	
$I_{X(on)}$	V_{CC} = MIN, $I_{\overline{X}}$ = 0,	V_{IH} = 2 V, T_A = −55°C	V_X = 1.1 V,	−0.3						mA
	V_{CC} = MIN, $I_{\overline{X}}$ = 0,	V_{IH} = 2 V, T_A = 0°C	V_X = 1 V,					−0.43		
$I_{\overline{X}(off)}$	V_{CC} = MIN, R_X = 1.2 kΩ,	V_{IL} = 0.8 V, T_A = −55°C	$V_{\overline{X}}$ = 4.5 V,			0.15				mA
	V_{CC} = MIN, R_X = 1.2 kΩ,	V_{IL} = 0.8 V, T_A = 0°C	$V_{\overline{X}}$ = 4.5 V,						0.27	
I_I	V_{CC} = MAX,	V_I = 5.5 V				1			1	mA
I_{IH}	V_{CC} = MAX,	V_I = 2.4 V				40			40	μA
I_{IL}	V_{CC} = MAX,	V_I = 0.4 V				−1.6			−1.6	mA
$I_{CC(on)}$	V_{CC} = MAX, V_X = 0.85 V,	V_I = 4.5 V, $I_{\overline{X}}$ = 0			1.2	2.5		1.2	2.5	mA
$I_{CC(off)}$	V_{CC} = MAX, V_X = 0.85 V,	V_I = 0, $I_{\overline{X}}$ = 0			2	4		2	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} = 5V, T_A = 25°C.

recommended operating conditions

		SN54H60			SN74H60			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
T_A	Operating free-air temperature	−55		125	0		70	°C

The 'H50, 'H53, and 'H55 are designed for use with up to four 'H60 expanders.

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

PARAMETER	TEST CONDITIONS†			SN54H60			SN74H60			UNIT
				MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{\overline{X}X(on)}$	V_{CC} = MIN, $I_{\overline{X}}$ = 5.85 mA,	V_{IH} = 2 V, T_A = −55°C	V_X = 1.1 V,			0.4				V
	V_{CC} = MIN, $I_{\overline{X}}$ = 6.3 mA,	V_{IH} = 2 V, T_A = 0°C	V_X = 1 V,						0.4	
	V_{CC} = MAX, $I_{\overline{X}}$ = 7.85 mA,	V_{IH} = 2 V, T_A = 125°C	V_X = 1 V,			0.4				
	V_{CC} = MAX, $I_{\overline{X}}$ = 7.4 mA,	V_{IH} = 2 V, T_A = 70°C	V_X = 1 V,						0.4	
$I_{X(on)}$	V_{CC} = MIN, $I_{\overline{X}}$ = 0,	V_{IH} = 2 V, T_A = −55°C	V_X = 1.1 V,	−0.47						mA
	V_{CC} = MIN, $I_{\overline{X}}$ = 0,	V_{IH} = 2 V, T_A = 0°C	V_X = 1 V,				−0.6			
$I_{\overline{X}(off)}$	V_{CC} = MIN, R_X = 575 Ω,	V_{IL} = 0.8 V, T_A = −55°C	$V_{\overline{X}}$ = 4.5 V,			0.32				mA
	V_{CC} = MIN, R_X = 575 Ω,	V_{IL} = 0.8 V, T_A = 0°C	$V_{\overline{X}}$ = 4.5 V,						0.57	
I_I	V_{CC} = MAX,	V_I = 5.5 V				1			1	mA
I_{IH}	V_{CC} = MAX,	V_I = 2.4 V				50			50	mA
I_{IL}	V_{CC} = MAX,	V_I = 0.4 V				−2			−2	mA
$I_{CC(on)}$	V_{CC} = MAX, V_X = 0.85 V,	V_I = 4.5 V, $I_{\overline{X}}$ = 0			1.9	3.5		1.9	3.5	mA
$I_{CC(off)}$	V_{CC} = MAX, V_X = 0.85 V,	V_I = 0 $I_{\overline{X}}$ = 0			3	4.5		3	4.5	mA
$C_{\overline{X}}$	V_{CC}, inputs, and X open, f = 1 MHz				5.4			5.4		pF

† 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 (except C_X), T_A = 25°C.

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