CMOS QUAD EXCLUSIVE-OR GATE

FEATURES

- Buffered Outputs
- Diode Protection on all Inputs
- Fully "B"-Series Compatible
- Pin Compatible with 4030 types, MC14507, 74C86

DESCRIPTION

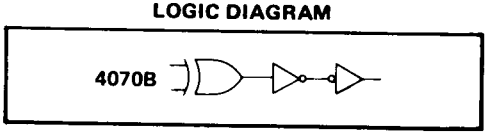
The 4070B contains four independent exclusive-OR gates integrated on a single monolithic silicon chip. Each exclusive-OR gate consists of five N-channel and five P-channel enhancement-mode transistors, plus output buffering devices.

TRUTH TABLE
(one of four gates)

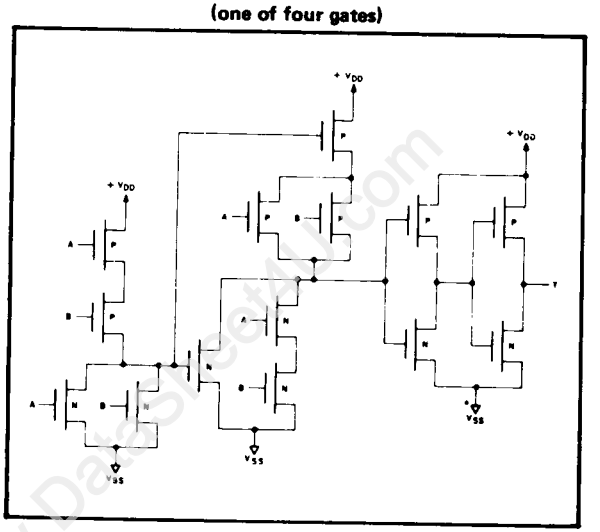
A	B	Y
0	0	0
1	0	1
0	1	1
1	1	0

Where 1 = High Level
0 = Low Level

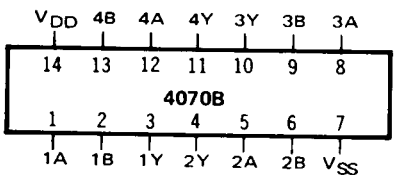
LOGIC DIAGRAM



SCHEMATIC DIAGRAM
(one of four gates)



CONNECTION DIAGRAM
(all packages)



Add suffix for package:

C 14-pin Cerdip
D 14-pin Ceramic
E 14-pin Epoxy
F 14-pin Flat
H Chip

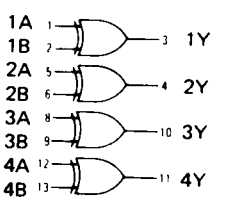
RECOMMENDED OPERATING CONDITIONS

For maximum reliability:

DC Supply Voltage	$V_{DD} - V_{SS}$	3 to 15	Vdc
Operating Temperature	T_A		
C, D, F, H Device		-55 to +125	°C
E Device		-40 to +85	°C

Note: The 4070B is identical to the 4030B; the devices are fully interchangeable in all applications.

FUNCTION DIAGRAM



$Y = A \oplus B$

V_{DD} = Pin 14
V_{SS} = Pin 7

ELECTRICAL CHARACTERISTICS

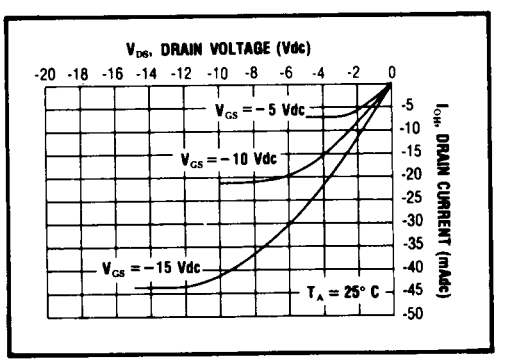
STATIC CHARACTERISTICS [1]

PARAMETER		V_{DD} (Vdc)	CONDITIONS	T_{LOW} [2]		+25°C			T_{HIGH} [2]		Units
				Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
QUIESCENT DEVICE CURRENT	I_{DD}	5	$V_{IN}=V_{SS}$ or V_{DD}	–	0.05	–	0.0005	0.05	–	1.5	μAdc
		10	All valid input	–	0.10	–	0.001	0.10	–	3.0	
		15	combinations	–	0.20	–	0.002	0.20	–	6.0	

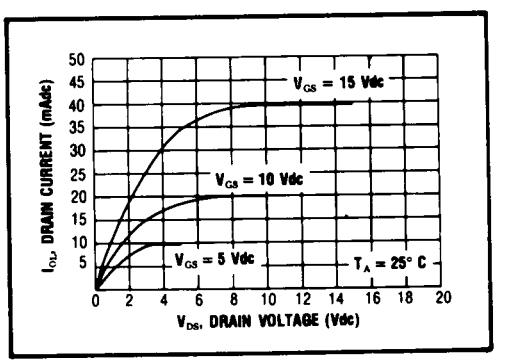
NOTES: [1] Remaining Static Electrical Characteristics are listed under "4000B Series Family Specifications".
[2] T_{LOW} = -55°C for C, D, F, H device.
= -40°C for E device.
T_{HIGH} = +125°C for C, D, F, H device.
= + 85°C for E device.

DYNAMIC CHARACTERISTICS (C_L = 50pF, T_A = 25°C)

PARAMETER		V_{DD} (Vdc)	Min.	Typ.	Max.	Units
PROPAGATION DELAY TIME	t_{PLH}, t_{PHL}	5	–	140	280	ns
		10	–	65	130	
		15	–	50	100	
OUTPUT TRANSITION TIME	t_{TLH}, t_{THL}	5	–	100	200	ns
		10	–	50	100	
		15	–	40	80	



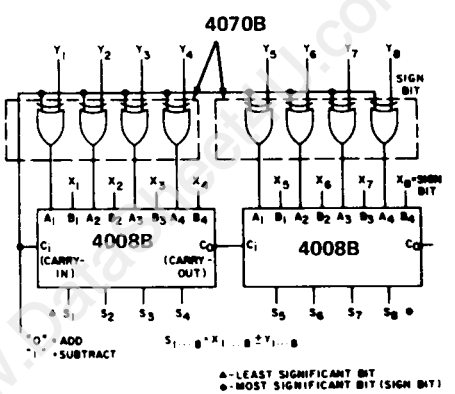
Typical P-Channel
Source Current Characteristics



Typical N-Channel
Sink Current Characteristics

APPLICATIONS INFORMATION

8-BIT TWO'S COMPLEMENT ADDER/SUBTRACTOR



X_8	X_7	X_6	X_5	X_4	X_3	X_2	X_1		X_8	X_7	X_6	X_5	X_4	X_3	X_2	X_1	
0	0	0	0	0	0	0	0	= 0	1	1	1	1	1	1	1	1	= -1
0	0	0	0	0	0	0	1	= 1	1	1	1	1	1	1	1	0	= -2
0	0	0	0	0	0	1	0	= 2	1	1	1	1	1	1	0	1	= -3
0	0	0	0	0	0	1	1	= 3	1	1	1	1	1	1	0	0	= -4
.	.	.	.	.	.	.	.	.	1	1	1	1	1	0	1	1	= -5
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
0	1	1	1	1	1	1	0	= 126	1	0	0	0	0	0	0	1	= -127
0	1	1	1	1	1	1	1	= 127	1	0	0	0	0	0	0	0	= -128

Two's complement numbers and
their equivalent decimal values