

COS/MOS INTEGRATED CIRCUITS

4071B
4072B
4075B

HCC/HCF 4071 B
HCC/HCF 4072 B
HCC/HCF 4075 B

PRELIMINARY DATA

4071B - QUAD 2-INPUT OR GATE
4072B - QUAD 4-INPUT OR GATE
4075B - TRIPLE 3-INPUT OR GATE

- MEDIUM-SPEED OPERATION $t_{PLH}, t_{PHL} = 60$ ns. (TYP.) AT $V_{DD} = 10V$
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100 nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD No. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"

The **HCC 4071B/4072B** and **4075B** (extended temperature range) and **HCF 4071B/4072B** and **4075B** (intermediate temperature range) are monolithic integrated circuits, available in 14-lead dual in-line plastic or ceramic package, ceramic flat package and plastic micropackage.

The **HCC/HCF 4071B, 4072B** and **4075B** OR gates provide the system designer with direct implementation of the positive-logic OR function and supplement the existing family of COS/MOS gates.

ABSOLUTE MAXIMUM RATINGS

V_{DD}^*	Supply voltage: HCC types HCF types	-0.5 to 20 -0.5 to 18	V V
V_i	Input voltage	-0.5 to $V_{DD} + 0.5$	V
I_i	DC input current (any one input)	± 10	mA
P_{tot}	Total power dissipation (per package)	200	mW
	Dissipation per output transistor for $T_{op} =$ full package-temperature range	100	mW
T_{op}	Operating temperature: HCC types HCF types	-55 to 125 -40 to 85	°C °C
T_{stg}	Storage temperature	-65 to 150	°C

* All voltage values are referred to V_{SS} pin voltage

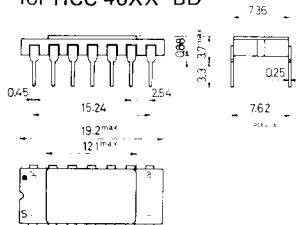
ORDERING NUMBERS:

HCC 40XX BD for dual in-line ceramic package
HCC 40XX BF for dual in-line ceramic package, frit seal
HCC 40XX BK for ceramic flat package
HCF 40XX BE for dual in-line plastic package
HCF 40XX BF for dual in-line ceramic package, frit seal
HCF 40XX BM for plastic micropackage

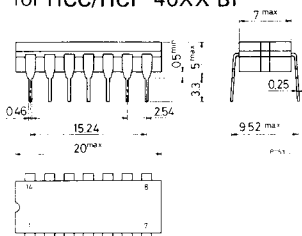
HCC/HCF 4071 B
HCC/HCF 4072 B
HCC/HCF 4075 B

MECHANICAL DATA (dimensions in mm)

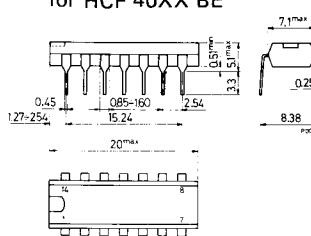
Dual in-line ceramic package
for HCC 40XX BD



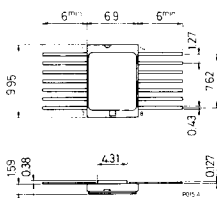
Dual in-line ceramic package
for HCC/HCF 40XX BF



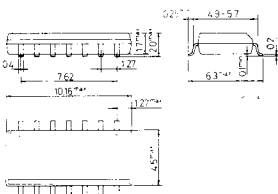
Dual in-line plastic package
for HCF 40XX BE



Ceramic flat package for
HCC 40XX BK

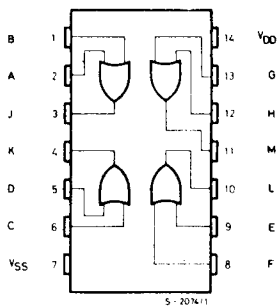


Plastic micropackage for
HCF 40XX BM

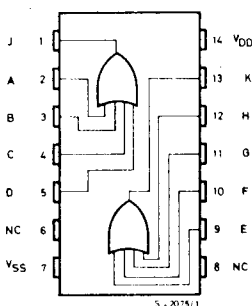


CONNECTION DIAGRAMS

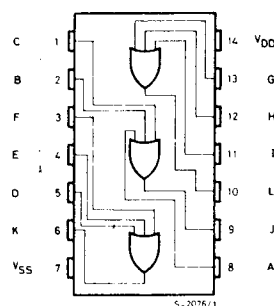
for 4071B



for 4072B



for 4075B

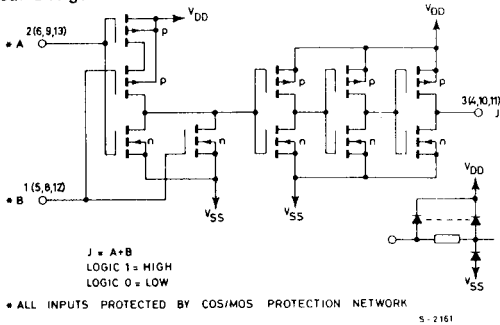


RECOMMENDED OPERATING CONDITIONS

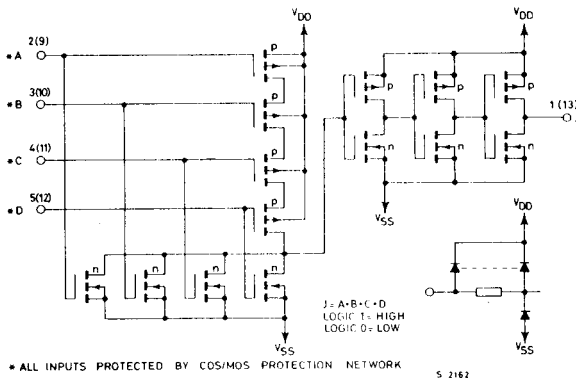
V_{DD}	Supply voltage: HCC types HCF types	3 to 18 V 3 to 15 V
V_I	Input voltage	0 to V_{DD} V
T_{op}	Operating temperature: HCC types HCF types	-55 to 125 °C -40 to 85 °C

SCHEMATIC DIAGRAMS

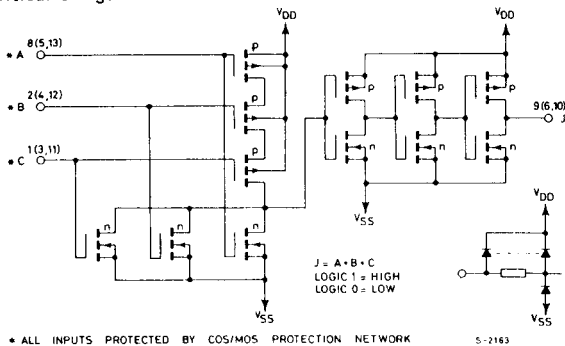
For 4071B - 1 of 4 identical OR gates



For 4072B - 1 of 2 identical OR gates



For 4075B - 1 of 3 identical OR gates



STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

Parameter		Test conditions				Values						Unit		
		V _I (V)	V _O (V)	I _O (μ A)	V _{DD} (V)	T _{Low} *		25°C			T _{High} *			
						Min.	Max.	Min.	Typ.	Max.	Min.		Max.	
I _L	Quiescent current	HCC types	0/ 5			5		0.25		0.01	0.25		7.5	μ A
			0/10			10		-0.5		0.01	0.5		15	
			0/15			15		1		0.01	1		30	
		0/20			20		5		0.02	5		150		
		HCF types	0/ 5			5		1		0.01	1		7.5	
			0/10			10		2		0.01	2		15	
0/15				15		4		0.01	4		30			
V _{OH}	Output high voltage	0/ 5		< 1	5	4.95		4.95			4.95		V	
		0/10		< 1	10	9.95		9.95			9.95			
		0/15		< 1	15	14.95		14.95			14.95			
V _{OL}	Output low voltage	5/0		< 1	5		0.05			0.05		0.05	V	
		10/0		< 1	10		0.05			0.05		0.05		
		15/0		< 1	15		0.05			0.05		0.05		
V _{IH}	Input high voltage		0.5/4.5	< 1	5	3.5		3.5			3.5		V	
			1/9	< 1	10	7		7			7			
			1.5/13.5	< 1	15	11		11			11			
V _{IL}	Input low voltage		4.5/0.5	< 1	5		1.5			1.5		1.5	V	
			9/1	< 1	10		3			3		3		
			13.5/1.5	< 1	15		4			4		4		
I _{OH}	Output drive current	HCC types	0/ 5	2.5		5	-2		-1.6	-3.2		-1.15	mA	
			0/ 5	4.6		5	-0.64		-0.51	-1		-0.36		
			0/10	9.5		10	-1.6		-1.3	-2.6		-0.9		
		0/15	13.5		15	-4.2		-3.4	-6.8		-2.4			
		HCF types	0/ 5	2.5		5	-1.53		-1.36	-3.2		-1.1		
			0/ 5	4.6		5	-0.52		-0.44	-1		-0.36		
0/10	9.5			10	-1.3		-1.1	-2.6		-0.9				
0/15	13.5		15	-3.6		-3.0	-6.8		-2.4					
I _{OL}	Output sink current	HCC types	0/ 5	0.4		5	0.64		0.51	1		0.36	mA	
			0/10	0.5		10	1.6		1.3	2.6		0.9		
			0/15	1.5		15	4.2		3.4	6.8		2.4		
		HCF types	0/ 5	0.4		5	0.52		0.44	1		0.36		
			0/10	0.5		10	1.3		1.1	2.6		0.9		
			0/15	1.5		15	3.6		3.0	6.8		2.4		
I _{IH} , I _{IL}	Input leakage current	HCC types	0/18			18		\pm 0.1		\pm 10 ⁻⁵	\pm 0.1		\pm 1	μ A
		HCF types	0/15		Any input	15		\pm 0.3		\pm 10 ⁻⁵	\pm 0.3		\pm 1	
C _I	Input capacitance			Any input					5	7.5			pF	

* T_{Low} = - 55°C for **HCC** device: -40°C for **HCF** device.

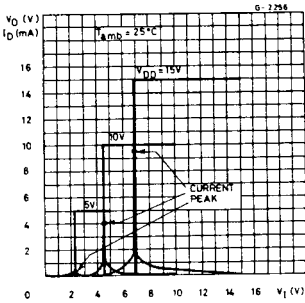
* T_{High} = +125°C for **HCC** device: +85°C for **HCF** device.

The Noise Margin for both "1" and "0" level is: 1V min. with V_{DD}= 5V
2V min. with V_{DD}= 10V
2.5V min. with V_{DD}= 15V

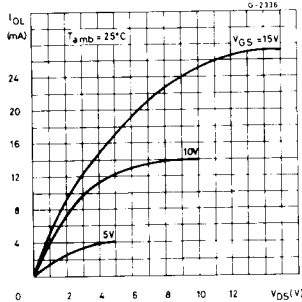
DYNAMIC ELECTRICAL CHARACTERISTICS ($T_{amb} = 25^{\circ}\text{C}$, $C_L = 50\text{ pF}$, $R_L = 200\text{ k}\Omega$, typical temperature coefficient for all $V_{DD} = 0.3\%/^{\circ}\text{C}$ values, all input rise and fall time = 20 ns)

Parameter	Test conditions	Values			Unit	
		V_{DD} (V)	Min.	Typ.		Max.
t_{PHL} Propagation delay time		5		125	250	ns
		10		60	120	
		15		45	90	
t_{PLH} Propagation delay time		5		175	350	ns
		10		70	140	
		15		50	110	
t_{THL} , t_{TLH} Transition time		5		100	200	ns
		10		50	100	
		15		40	80	

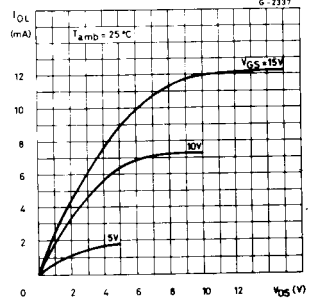
Typical voltage and current transfer characteristics



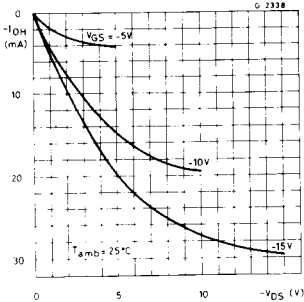
Typical output low (sink) current characteristics



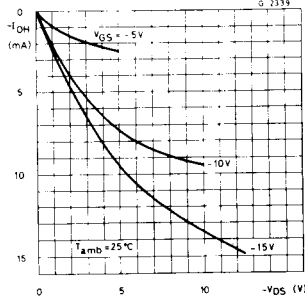
Minimum output low (sink) current characteristics



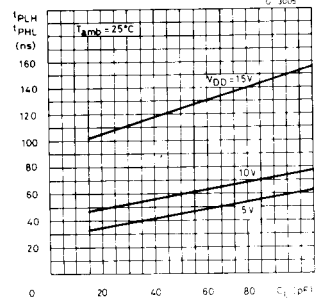
Typical output high (source) current characteristics



Minimum output high (source) current characteristics

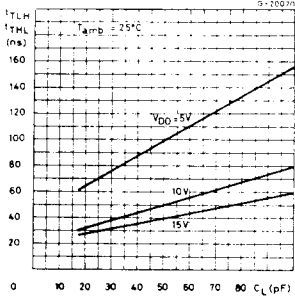


Typical propagation delay time vs. load capacitance

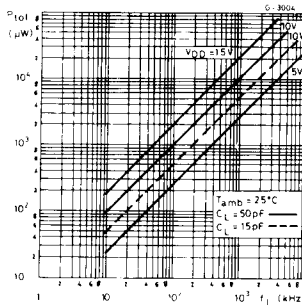


HCC/HCF 4071 B
HCC/HCF 4072 B
HCC/HCF 4075 B

Typical transition time vs. load capacitance

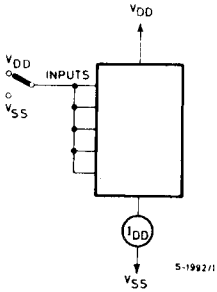


Typical dynamic power dissipation vs. frequency

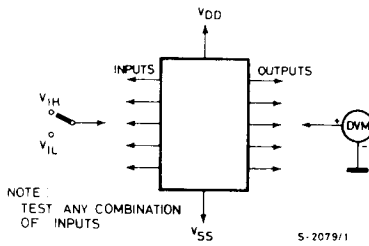


TEST CIRCUITS

Quiescent device current



Input voltage



Input leakage current

