COS/MOS INTEGRATED CIRCUITS

4081B
4082B
4073B

HCC/HCF 4081B
HCC/HCF 4082B
HCC/HCF 4073B

PRELIMINARY DATA

COS/MOS AND GATES: 4081B QUAD 2 - INPUT AND GATE
4082B DUAL 4 - INPUT AND GATE
4073B TRIPLE 3 - INPUT AND GATE

- MEDIUM SPEED OPERATION - t_{PLH}= 85 ns (TYP.); t_{PHL}= 65 ns (TYP.) AT 10V
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V, AND 15V PARALEMTRIC 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 4081B, HCC 4082B** and **HCC 4073B** (extended temperature range) and the **HCF 4081B, HCF 4082B** and **HCF 4073B** (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 4081B, 4082B** and **4073B** AND gates provide the system designer with direct implementation of the AND function and supplement the existing family of COS/MOS gates.

ABSOLUTE MAXIMUM RATINGS

V_{DD}*	Supply voltage: **HCC** types	-0.5 to 20	V
	HCF types	-0.5 to 18	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	-55 to 125	°C
	HCF types	-40 to 85	°C
T_{stg}	Storage temperature	-65 to 150	°C

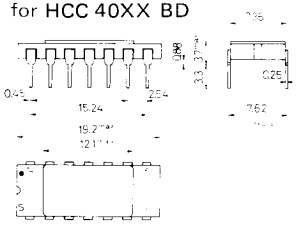
* All voltage values are referred to V_{SS} pin voltage

ORDERING NUMBERS:

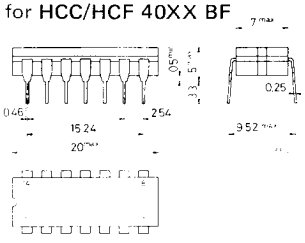
HCC 40XX BD for dual in-line ceramic package
HCC 40XX BF for dual in-line ceramic package frit seal
HCC 40XX BK for ceramic flat package
HCF 40XX BE for dual in-line plastic package
HCF 40XX BF for dual in-line ceramic package frit seal, (intermediate temperature range)
HCF 40XX BM for plastic microcpackage

MECHANICAL DATA (dimensions in mm)

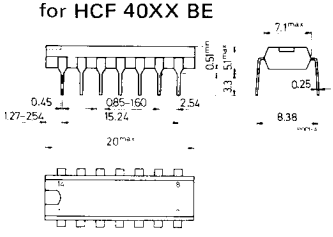
Dual in-line ceramic package for HCC 40XX BD



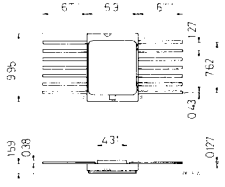
Dual in-line ceramic package for HCC/HCF 40XX BF



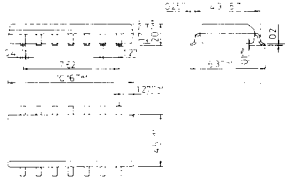
Dual in-line plastic package for HCF 40XX BE



Ceramic flat package for HCC 40XX BK

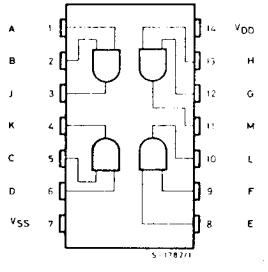


Plastic micropackage for HCF 40XX BM

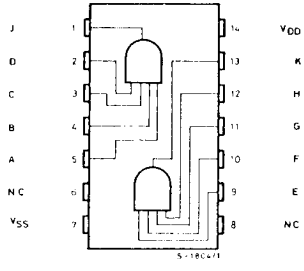


CONNECTION DIAGRAMS

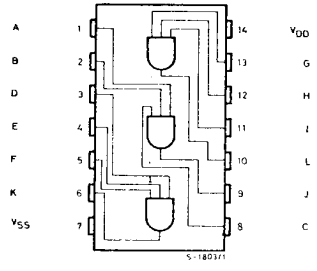
For **4081B**



For **4082B**



For **4073B**



RECOMMENDED OPERATING CONDITIONS

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

STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

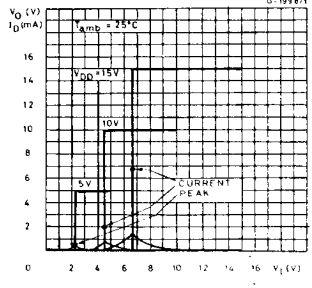
Parameter			Test conditions V_I (V)	V_O (V)	$\|I_O\|$ (μA)	V_{DD} (V)	Values T_{Low}* Min.	T_{Low}* Max.	25°C Min.	25°C Typ.	25°C Max.	T_{High}* Min.	T_{High}* Max.	Unit
I_L	Quiescent current	HCC types	0/ 5			5		0.25		0.01	0.25		7.5	μA
			0/10			10		0.5		0.01	0.5		15	
			0/15			15		1		0.01	1		30	
			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	Any input		18		±0.1		±10 $^{-5}$	±0.1		± 1	μA
		HCF types	0/15			15		±0.3		±10 $^{-5}$	±0.3		± 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

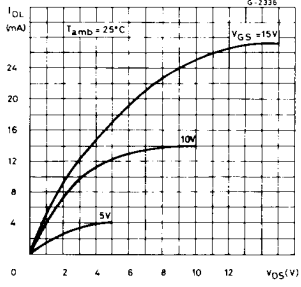
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50 pF, typical temperature coefficient for all V_{DD} values is 0.3%/°C, all input rise and fall times = 20 ns, R_L = 200 kΩ)

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

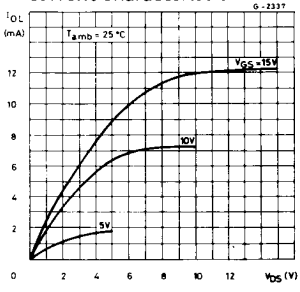
Typical voltage and current transfer characteristics



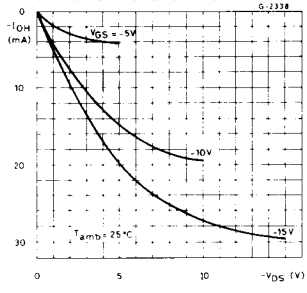
Typical output low (sink) current



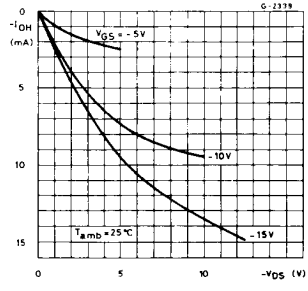
Minimum output low (sink) current characteristics



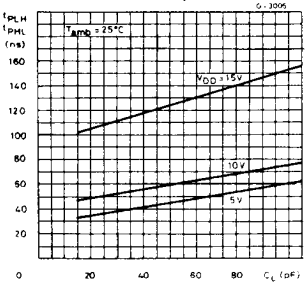
Typical output high (source) current characteristics



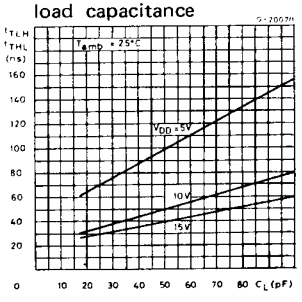
Minimum output high (source) current characteristics



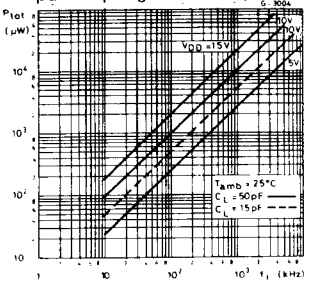
Typical propagation delay time vs. load capacitance



Typical transition time vs. load capacitance

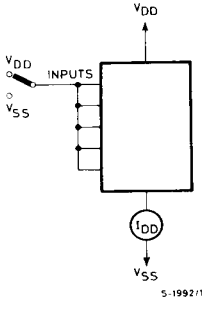


Typical dynamic power dissipation per gate vs. frequency

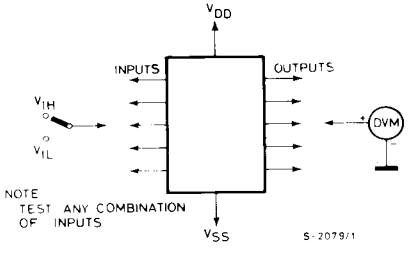


TEST CIRCUITS

Quiescent device current



Input voltage



Input leakage current