COS/MOS INTEGRATED CIRCUITS

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
- MAXIMUM INPUT LEAKAGE CURRENT 1 μA AT 18V (FULL PACKAGE-TEMP. RANGE)
- 5V, 10V, AND 15V PARAMETRIC RATINGS

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, and ceramic flat package. 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	-0.5 to 20	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: for **HCC** types	-55 to 125	°C
	for **HCF** types	-40 to 85	°C
T_{stg}	Storage temperature	-65 to 150	°C

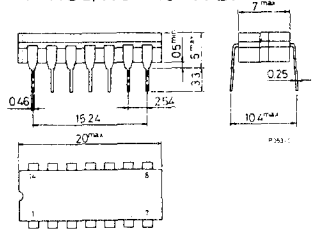
* All voltage values are referred to V_{SS} pin voltage

ORDERING NUMBERS:

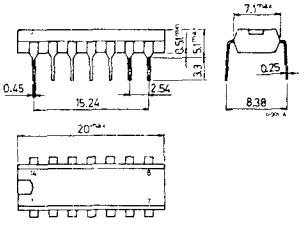
HCC 40XX BD for dual in-line ceramic package
HCC 40XX BF for dual in-line ceramic package frit seal, (extended temperature range)
HCC 40XX BK for ceramic flat package
HCF 40XX BE for dual in-line plastic package
HCF 40XX BF for dual in-line ceramic package frit seal, (intermediate temperature range)

MECHANICAL DATA (dimensions in mm)

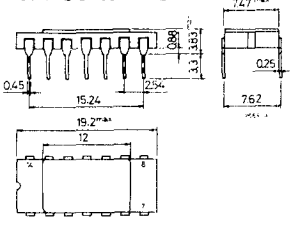
Dual in-line ceramic package
for HCC/HCF 40XX BF



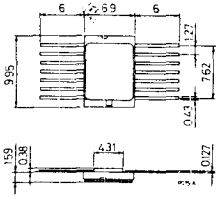
Dual in-line plastic package
for HCF 40XX BE



Dual in-line ceramic package
for HCC 40XX BD

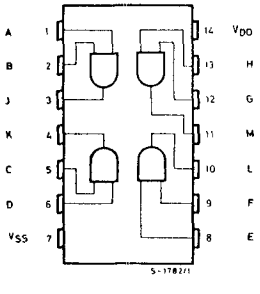


Ceramic flat package
for HCC 40XX BK

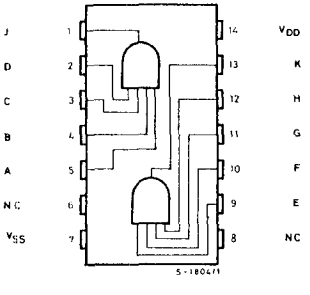


CONNECTION DIAGRAMS

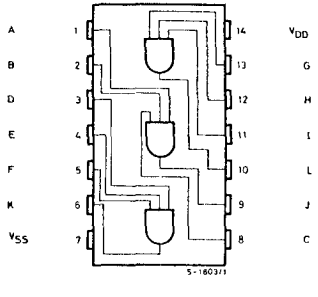
For **4081B**



For **4082B**



For **4073B**



RECOMMENDED OPERATING CONDITIONS

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

STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

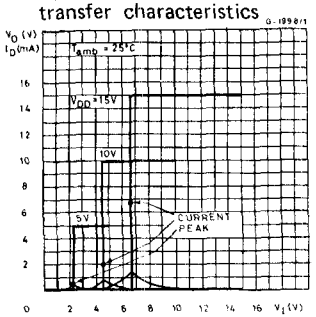
Parameter			Test conditions				Values							Unit
			V_I (V)	V_O (V)	$\|I_O\|$ (μA)	V_{DD} (V)	T_{Low}* Min.	T_{Low}* Max.	25°C Min.	25°C Typ.	25°C Max.	T_{High}* Min.	T_{High}* Max.	
I_L	Quiescent supply current		0/ 5			5		0.25		0.01	0.25		7.5	μA
			0/10			10		0.5		0.01	0.5		15	
			0/15			15		1		0.01	1		30	
			0/20			20		5		0.02	5		150	
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		
				2/13	< 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	
				13/2	< 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	-1.8		-1.6	-3.2		-1.3		
			0/ 5	4.6		5	-0.61		-0.51	-1		-0.42		
			0/10	9.5		10	-1.5		-1.3	-2.6		-1.1		
			0/15	13.5		15	-4		-3.4	-6.8		-2.8		
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	0.61		0.51	1		0.42		
			0/10	0.5		10	1.5		1.3	2.6		1.1		
			0/15	1.5		15	4		3.4	6.8		2.8		
I_{IH},I_{IL}	Input leakage current		0/18	Any input		18		±0.1		$±10^{-5}$	±0.1		±1	μA
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

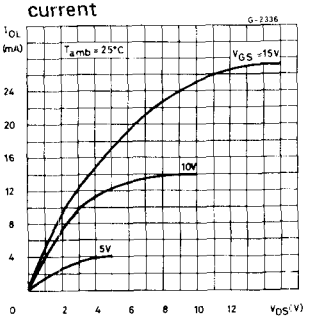
DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 50 pF, typical temperature coefficient for all V_{DD} values is 0.3%/°C, all input rise and fall times = 20 ns, R_L = 200 kΩ)

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	

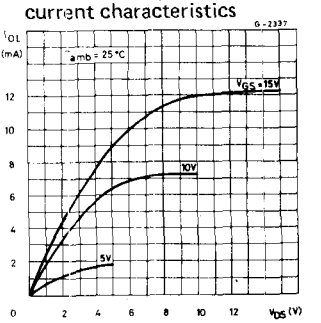
Typical voltage and current transfer characteristics



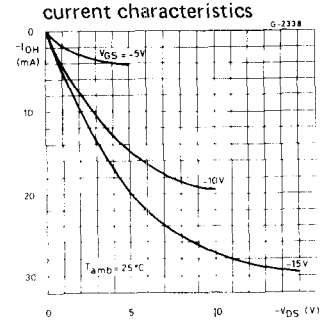
Typical output low (sink) current



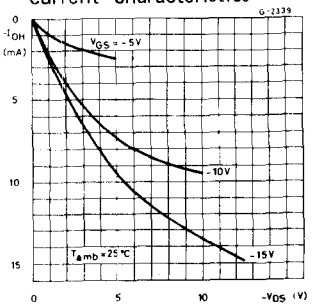
Minimum output low (sink) current characteristics



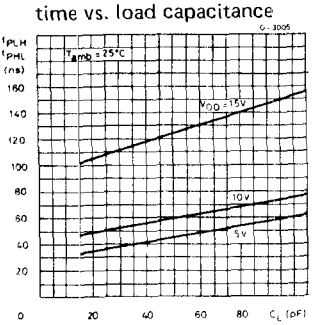
Typical output high (source) current characteristics



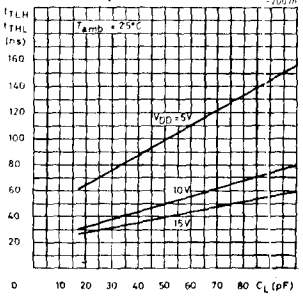
Minimum output high (source) current characteristics



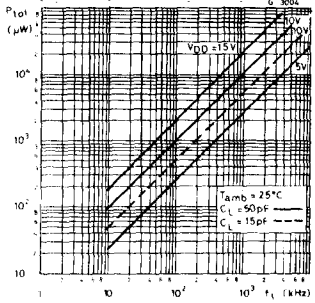
Typical propagation delay time vs. load capacitance



Typical transition time vs. load capacitance

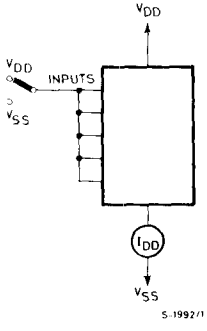


Typical dynamic power dissipation per gate vs. frequency

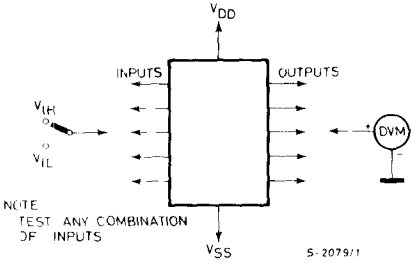


TEST CIRCUITS

Quiescent device current



Input voltage



Input leakage current