# HCC4071B/72B/75B
# HCF4071B/72B/75B

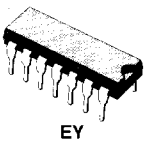
## OR GATE

**4071B - QUAD 2–INPUT OR GATE**

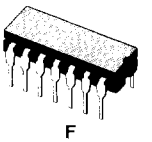
**4072B - QUAD 4–INPUT OR GATE**

**4075B - TRIPLE 3–INPUT OR GATE**

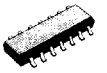
- MEDIUM-SPEED OPERATION $t_{PLH}$, $t_{PHL}$ = 60ns. (typ.) AT $V_{DD}$ = 10V
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- 5V, 10V AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD N°. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"



**EY**
(Plastic Package)



**F**
(Ceramic Frit Seal Package)



**M1**
(Micro Package)

**C1**
(Plastic Chip Carrier)

**ORDER CODES :**

HCC40XXBF HCF40XXBM1
HCF40XXBEY HCF40XXBC1

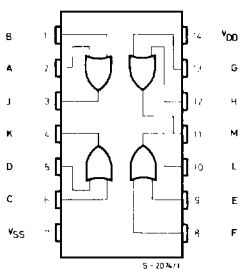
### DESCRIPTION

The **HCC4071B/4072B** and **4075B** (extended temperature range) and **HCF4071B/4072B** and **4075B** (intermediate temperature range) are monolithic integrated circuits, available in 14-lead dual in-line plastic or ceramic package and plastic micropackage.

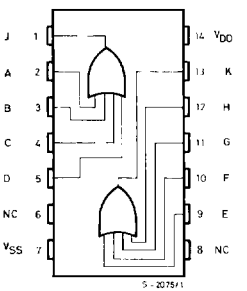
The **HCC/HCF4071B, 4072B** and **4075B** OR gates provide the system designer with direct implementation of the positive-logic OR function and supplement the existing family of COS/MOS gates.

### PIN CONNECTIONS

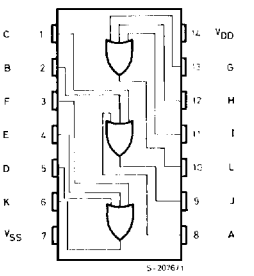
**4071B**




**4072B**




**4075B**



## ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DD}$* | Supply Voltage : **HCC** Types<br>**HCF** Types | − 0.5 to + 20<br>− 0.5 to + 18 | V<br>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)<br>Dissipation per Output Transistor<br>for Top = Full Package-temperature Range | 200<br><br>100 | mW<br><br>mW |
| $T_{op}$ | Operating Temperature : **HCC** Types<br>**HCF** Types | − 55 to + 125<br>− 40 to + 85 | °C<br>°C |
| $T_{stg}$ | Storage Temperature | − 65 to + 150 | °C |

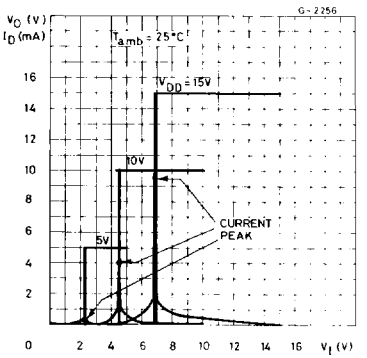
Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for external periods may affect device reliability.

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

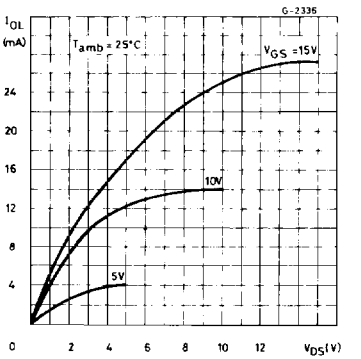
## RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|---|---|---|---|
| $V_{DD}$ | Supply Voltage : **HCC** Types<br>**HCF** Types | 3 to 18<br>3 to 15 | V<br>V |
| $V_I$ | Input Voltage | 0 to $V_{DD}$ | V |
| $T_{op}$ | Operating Temperature : **HCC** Types<br>**HCF** Types | − 55 to + 125<br>− 40 to + 85 | °C<br>°C |

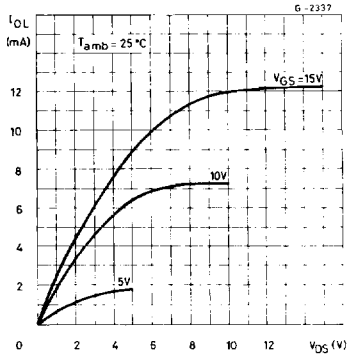
Typical Voltage and Current Transfer Characteristics.



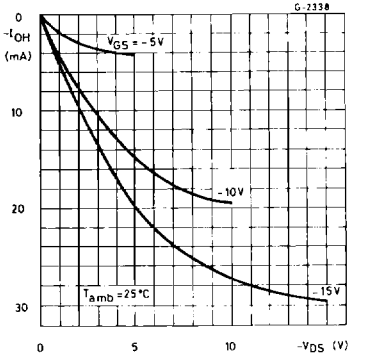

Typical Output Low (sink) Current Characterisitcs.



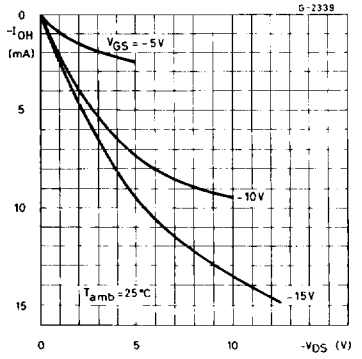
Minimum Output Low (sink) Current Characteristics.



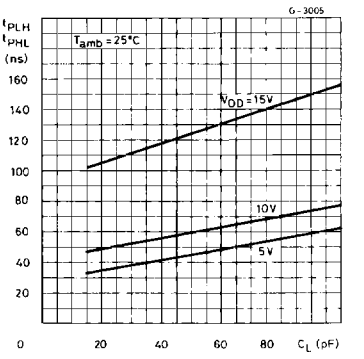

Typical Output High (source) Current Characteristics.



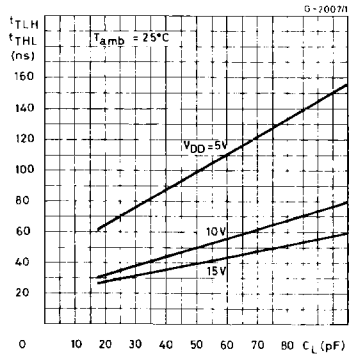

Minimum Output High (source) Current Characterisitcs.



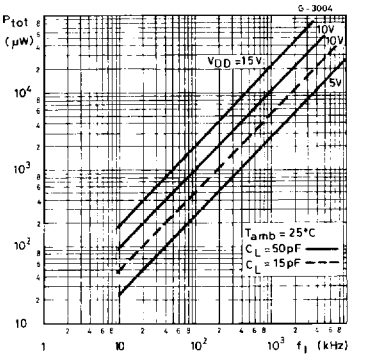

Typical Propagation Delay Time vs. Load Capacitance.




Typical Transition Time vs. Load Capacitance.

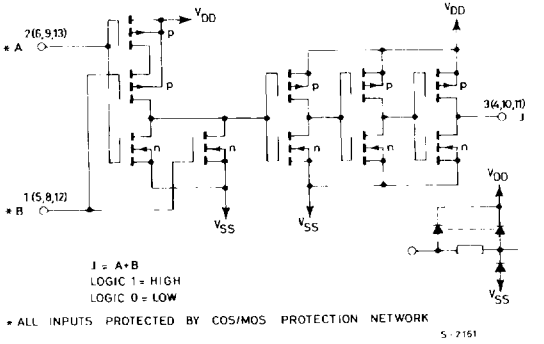



Typical Dynamic Power Dissipation vs. Frequency.

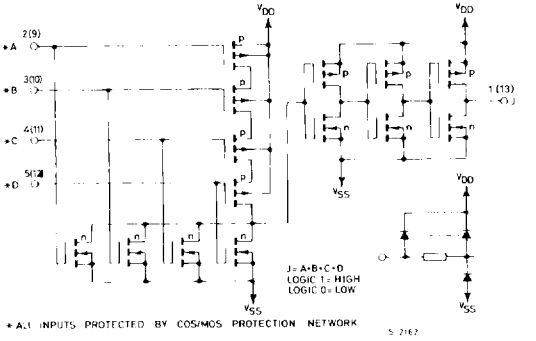


## SCHEMATIC DIAGRAMS

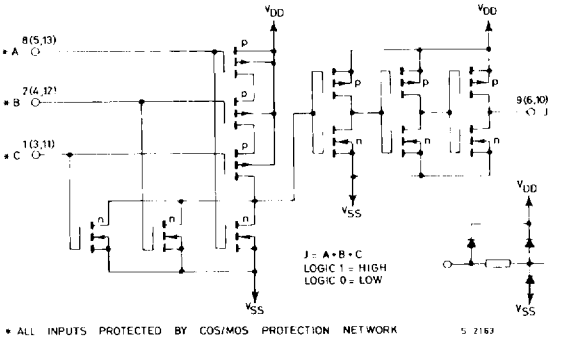
**4071B** – 1 of 4 identical OR gates




**4072B** – 1 of 2 identical OR gates




**4075B** – 1 of 3 identical OR gates



**STATIC ELECTRICAL CHARACTERISTICS** (over recommended operating conditions)

| Symbol | Parameter | | Test Conditions $V_I$ (V) | $V_O$ (V) | $\|I_O\|$ (μA) | $V_{DD}$ (V) | Value $T_{Low}$* Min. | Max. | 25°C Min. | Typ. | Max. | $T_{High}$* Min. | 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 | | $\pm 10^{-5}$ | ± 0.1 | | ± 1 | μA |
| | | HCF Types | 0/15 | | | 15 | | ± 0.3 | | $\pm 10^{-5}$ | ± 0.3 | | ± 1 | |
| $C_I$ | Input Capacitance | | | Any Input | | | | | | 5 | 7.5 | | | pF |

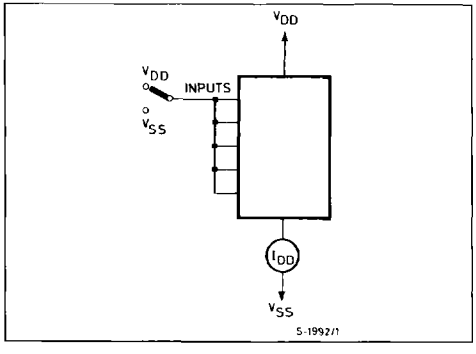
* $T_{Low}$ = − 55°C for **HCC** device : − 40°C for **HCF** device.
* $T_{High}$ = + 125°C for **HCC** device : + 85°C for **HCF** device.
The Noise Margin for both "1" and "0" level is : 1V min. with $V_{DD}$ = 5V, 2V min. with $V_{DD}$ = 10V, 2.5 V min. with $V_{DD}$ = 15V.

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

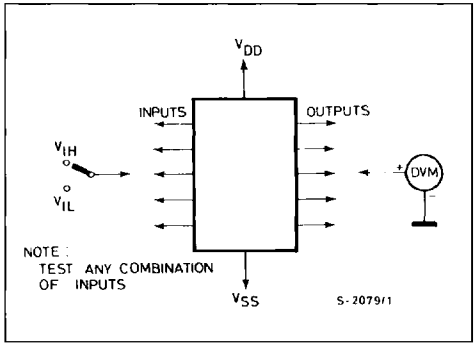
| Symbol | Parameter | Test Conditions | | Value | | | Unit |
|---|---|---|---|---|---|---|---|
| | | | $V_{DD}$ (V) | Min. | Typ. | Max. | |
| $t_{PHL}$ | Propagation Delay Time | | 5 | | 125 | 250 | ns |
| | | | 10 | | 60 | 120 | |
| | | | 15 | | 45 | 90 | |
| $t_{PLH}$ | Propagation Delay Time | | 5 | | 175 | 350 | ns |
| | | | 70 | | 50 | 140 | |
| | | | 15 | | 50 | 140 | |
| $t_{THL}$, $t_{TLH}$ | Transition Time | | 5 | | 100 | 200 | ns |
| | | | 10 | | 50 | 100 | |
| | | | 15 | | 40 | 80 | |

## TEST CIRCUITS

Quiescent Device Current.




Input Voltage.




Input Leakage Current.