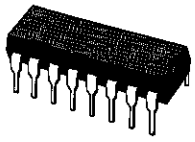
MULTIFUNCTION EXPANDABLE 8-INPUT GATE

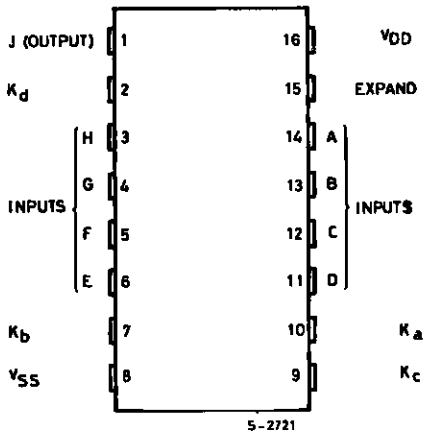
- THREE-STATE OUTPUT
- MANY LOGIC FUNCTIONS AVAILABLE IN ONE PACKAGE
- QUIESCENT CURRENT SPECIFIED TO 20V FOR HCC DEVICE
- STANDARDIZED SYMMETRICAL OUTPUT CHARACTERISTICS
- 5V, 10V, AND 15V PARAMETRIC RATINGS
- INPUT CURRENT OF 100nA AT 18V AND 25°C FOR HCC DEVICE
- 100% TESTED FOR QUIESCENT CURRENT
- MEETS ALL REQUIREMENTS OF JEDEC TENTATIVE STANDARD N°. 13A, "STANDARD SPECIFICATIONS FOR DESCRIPTION OF "B" SERIES CMOS DEVICES"



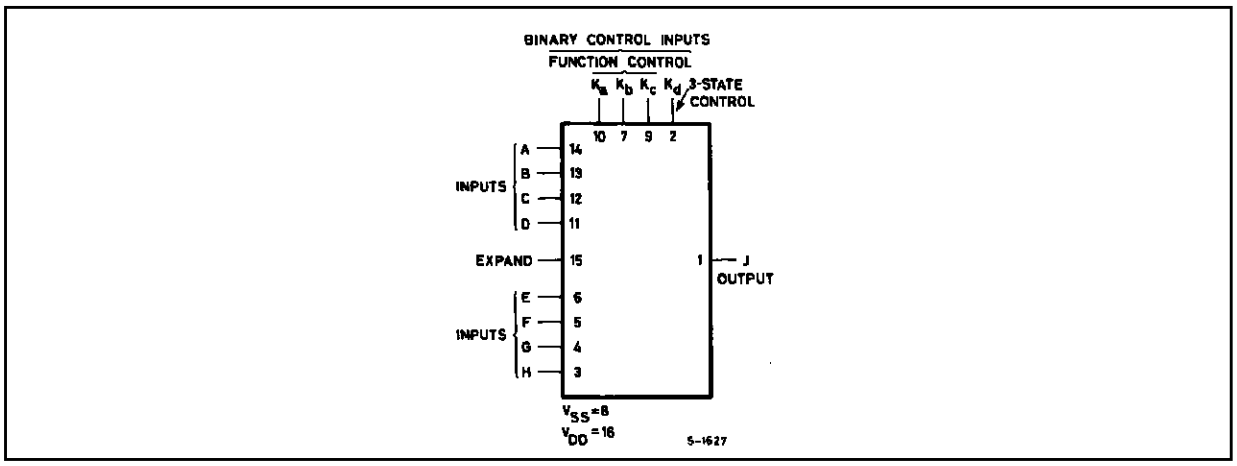
DESCRIPTION

The **CC4048** (extended temperature range) and **CC4048** (intermediate temperature range) are monolithic integrated circuit, available in 16-lead dual in-line plastic or ceramic package and plastic micro package. The **CC4048** is an 8-input gate having four control inputs. Three binary control inputs - Ka, Kb, and Kc - provide the implementation of eight different logic functions. These functions are OR, NOR, AND, NAND, OR/AND, OR/NAND, AND/OR and AND/NOR. A fourth control input-Kd-provides the user with a 3-state output. When control input Kd is high the output is either a logic 1 or a logic 0 depending on the inner states. When control input Kd is low, the output is an open circuit. This feature enables the user to connect this device to a common bus line. In addition to the eight input lines, an EXPAND input is provided that permits the user to increase the number of inputs to one **CC4048** . For example, two **CC4048** 's can be cascaded to provide a 16-input multifunction gate. When the EXPAND input is not used, it should be connected to V_{SS}.

PIN CONNECTIONS



FUNCTIONAL DIAGRAM



ABSOLUTE MAXIMUM RATINGS

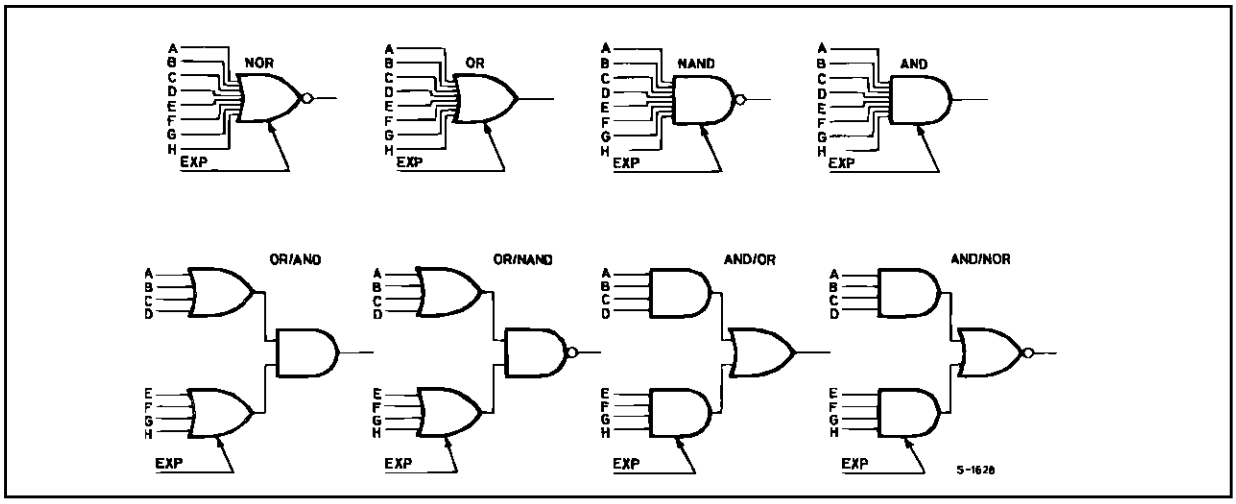
Symbol	Parameter	Value	Unit
V_{DD}*	Supply Voltage : **HCC** Types	– 0.5 to + 20	V
V_i	Input Voltage	– 0.5 to V_{DD} + 0.5	V
I_I	DC Input Current (any one input)	± 10	mA
P_{tot}	Total Power Dissipation (per package) Dissipation per Output Transistor for T_{op} = Full Package-temperature Range	200 100	mW mW
T_{op}	Operating Temperature :	– 55 to + 125	°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 voltages values are referred to V_{SS} pin voltage.

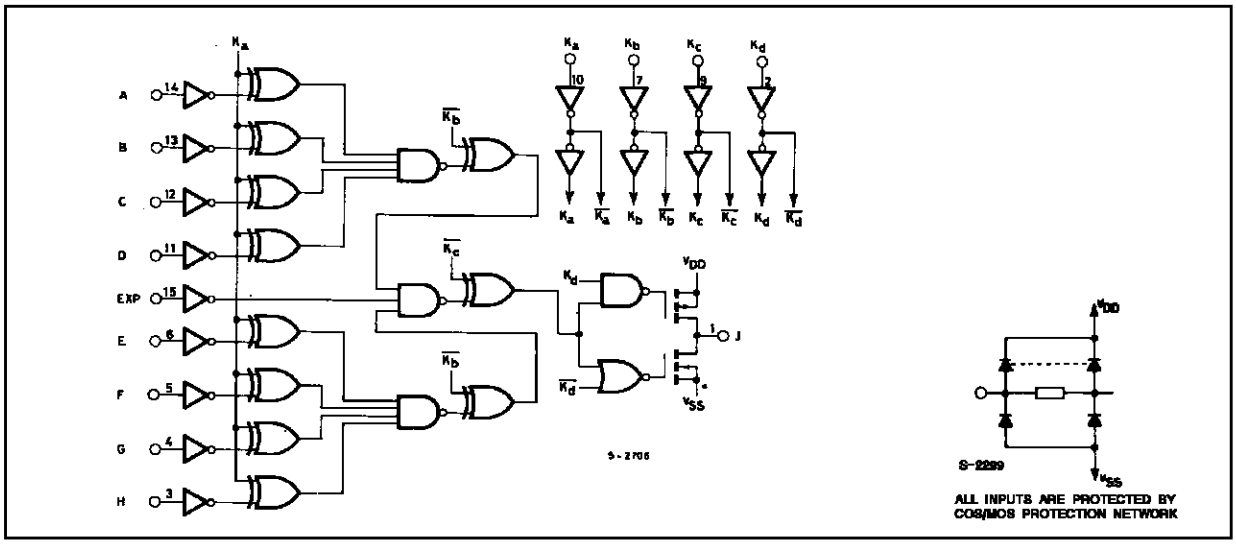
RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{DD}	Supply Voltage :	3 to 18	V
V_I	Input Voltage	0 to V_{DD}	V
T_{op}	Operating Temperature :	– 55 to + 125	°C

BASIC LOGIC CONFIGURATIONS



LOGIC DIAGRAM



FUNCTION TRUTH TABLE

Output Function	Boolean Expression	K_a	K_b	K_c	Unused Input
NOR	$J = \overline{A+B+C+D+E+F+G+H}$	0	0	0	V_{SS}
OR	$J = A+B+C+D+E+F+G+H$	0	0	1	V_{SS}
OR/AND	$J = (A+B+C+D) \bullet (E+F+G+H)$	0	1	0	V_{SS}
OR/NAND	$J = \overline{(A+B+C+D) \bullet (E+F+G+H)}$	0	1	1	V_{SS}
AND	$J = ABCDEFGH$	1	0	0	V_{DD}
NAND	$J = \overline{ABCDEFGH}$	1	0	1	V_{DD}
AND/NOR	$J = \overline{ABCD+EFGH}$	1	1	0	V_{DD}
AND/OR	$J = ABCD+EFGH$	1	1	1	V_{DD}

$K_d = 1$ Normal Inverter Action
$K_d = 0$ High Impedance Output

EXPAND Input = 0

STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

Symbol	Parameter	Test Conditions				Value							Unit
		V_I (V)	V_O (V)	$\|I_O\|$ (µA)	V_{DD} (V)	T_{Low}*		25°C			T_{High}*		
						Min.	Max.	Min.	Typ.	Max.	Min.	Max.	
I_L	Quiescent 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	
		0/18			18		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		
			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	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		
I_{OL}	Output Sink Current	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		
I_{IH}, I_{IL}	Input Leakage Current	0/18	Any Input		18		± 0.1		± 10^{-5}	± 0.01		± 1	µA
I_{OH}	3-state Output Current	0/18	0/18		18		± 0.4		± 10^{-4}	± 0.4		± 12	µA
C_I	Input Capacitance		Any Input						5	7.5			pF