



CMOS AND GATES: 4081 QUAD 2 - INPUT AND GATE 4082 DUAL 4 - INPUT AND GATE 4073 TRIPLE 3 - INPUT AND GATE

GENERAL DESCRIPTION

The MMC 4081, MMC 4082 and MMC 4073, AND gates provide the system designer with direct implementation of the AND function and supplement the existing family of COS/MOS gates.

The MMC 4081, MMC 4082 and MMC 4073 types are supplied in 14 — lead dual — in — line ceramic or plastic packages.

FEATURES

- Medium speed operation $t_{PLH} = 85$ ns (TYP), $t_{PHL} = 65$ ns (TYP) at 10 V
- Quiescent current specified to 20 μ A

ABSOLUTE MAXIMUM RATINGS

V_{DD}^*	Supply voltage: G and H types E and F types	-0.5 to 20	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) Dissipation per output transistor for $T_A =$ full package-temperature range		200	mW
T_A	Operating temperature: G and H types E and F types	-55 to -40 to -65 to	125 85	$^{\circ}$ C
T_{stg}	Storage temperature		150	$^{\circ}$ C

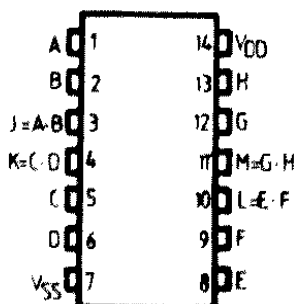
* All voltage values are referred to V_{SS} pin voltage

RECOMMENDED OPERATING CONDITIONS

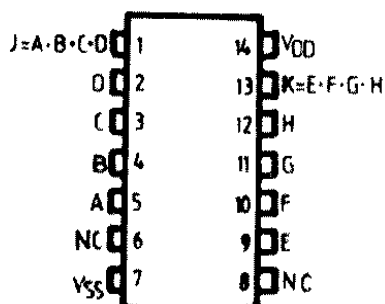
V_{DD}^*	Supply voltage: G and H types E and F types	3 to 3	18 15	V
V_i	Input voltage	0 to V_{DD}		V
T_A	Operating temperature: G and H types E and F types	-55 to -40 to	125 85	$^{\circ}$ C

CONNECTION DIAGRAMS

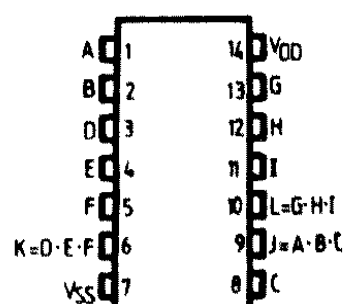
MMC 4081



MMC 4082



MMC 4073



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	G, H 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	
	E, F types	0/5			5		1		0.01	1		7.5		
		0/10			10		2		0.01	2		15		
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	G, H 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		
		E, F 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	G, H 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		
E, F 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	G, H types	0/18	Any input		18		\pm 0.1		\pm 10 ⁻⁵	\pm 0.1		\pm 1	μ A
		E, F types	0/15			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 G, H devices; -40°C for E, F devices.* T_{HIGH} = +125°C for G, H devices; +85°C for E, F devices.

The Noise Margin for both "1" and "0" level is:

1 V min. with V_{DD} = 5 V2 V min. with V_{DD} = 10 V2.5 V min. with V_{DD} = 15 V

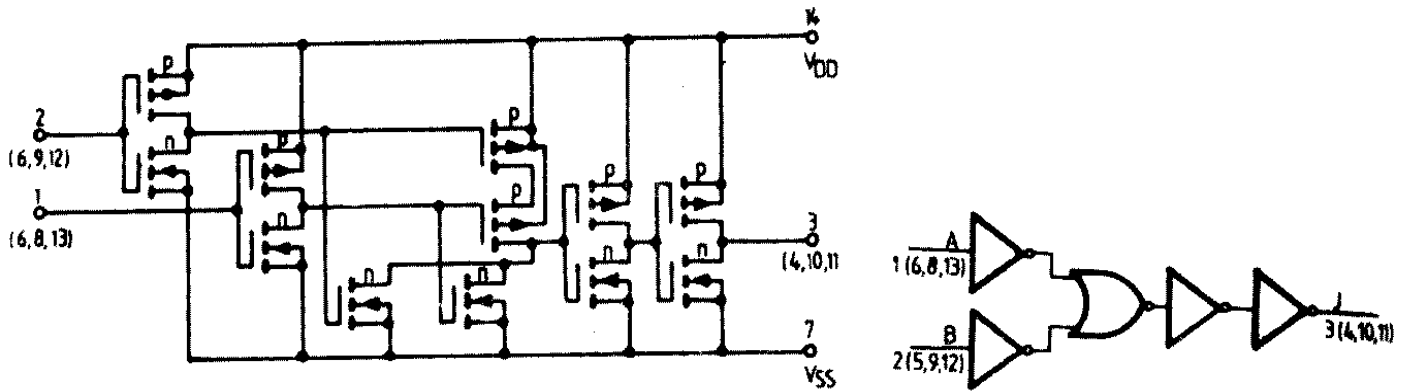
DYNAMIC ELECTRICAL CHARACTERISTICS

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

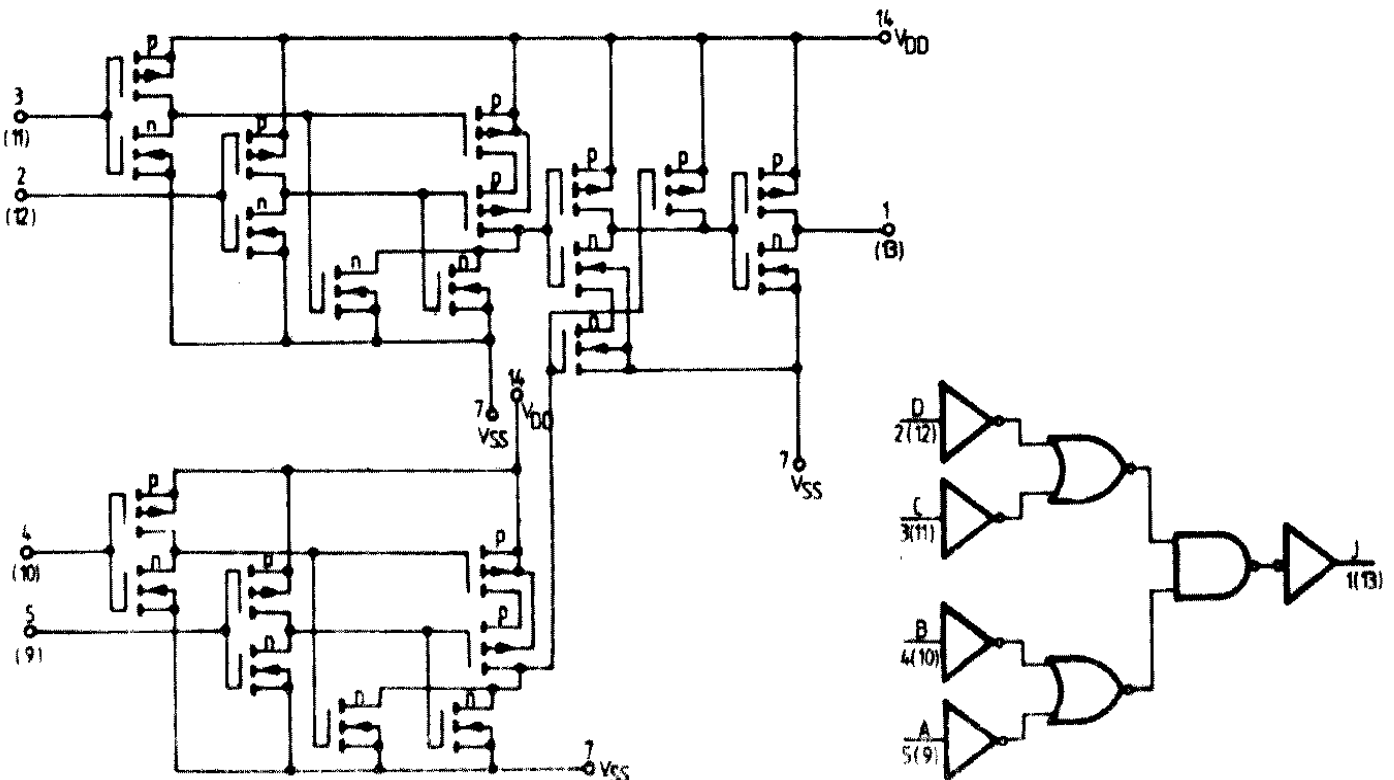
PARAMETER	TEST CONDITIONS	VALUES			UNIT
	V_{DD} (V)	min	typ	max	
t_{PLH} Propagation delay time t_{PHL}	5		125	250	ns
	10		60	120	
	15		45	90	
t_{THL} Transition time t_{TLH}	5		100	200	ns
	10		50	100	
	15		40	80	

SCHEMATIC AND LOGIC DIAGRAMS

MMC 4081



MMC 4082



MMC 4073

