National Semiconductor

MM54C32/MM74C32 Quad 2-Input OR Gate

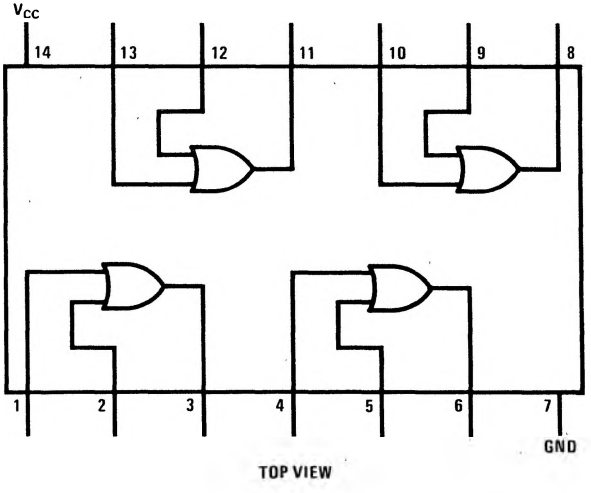
General Description

Employing complementary MOS (CMOS) transistors to achieve low power and high noise margin, these gates provide the basic functions used in the implementation of digital integrated circuit systems. The N and P-channel enhancement mode transistors provide a symmetrical circuit with output swings essentially equal to the supply voltage. This results in high noise immunity over a wide supply voltage range. No dc power other than that caused by leakage current is consumed during static conditions. All inputs are protected against static discharge damage.

Features

■ Wide supply voltage range	3.0V to 15V
■ Guaranteed noise margin	1.0V
■ High noise immunity	0.45 V_{CC} (typ.)
■ Low power TTL compatibility	fan out of 2 driving 74L

Connection Diagram



TOP VIEW

Absolute Maximum Ratings (Note 1)

Voltage at Any Pin	$-0.3V$ to $V_{CC}+0.3V$	Package Dissipation	500 mW
Operating Temperature Range		Operating V_{CC} Range	3.0V to 15V
MM54C32	$-55°C$ to $+125°C$	Absolute Maximum V_{CC}	18V
MM74C32	$-40°C$ to $+85°C$	Lead Temperature (Soldering, 10 seconds)	300°C
Storage Temperature Range	$-65°C$ to $+150°C$		

DC Electrical Characteristics

Min/max limits apply across temperature range unless otherwise noted.

	Parameter	Conditions	Min.	Typ.	Max.	Units
	CMOS to CMOS					
$V_{IN(1)}$	Logical "1" Input Voltage	$V_{CC}=5.0V$	3.5			V
		$V_{CC}=10V$	8.0			V
$V_{IN(0)}$	Logical "0" Input Voltage	$V_{CC}=5.0V$			1.5	V
		$V_{CC}=10V$			2.0	V
$V_{OUT(1)}$	Logical "1" Output Voltage	$V_{CC}=5.0V$, $I_O=-10\mu A$	4.5			V
		$V_{CC}=10V$, $I_O=-10\mu A$	9.0			V
$V_{OUT(0)}$	Logical "0" Output Voltage	$V_{CC}=5.0V$, $I_O=10\mu A$			0.5	V
		$V_{CC}=10V$, $I_O=10\mu A$			1.0	V
$I_{IN(1)}$	Logical "1" Input Current	$V_{CC}=15V$, $V_{IN}=15V$		0.005	1.0	μA
$I_{IN(0)}$	Logical "0" Input Current	$V_{CC}=15V$, $V_{IN}=0V$	-1.0	-0.005		μA
I_{CC}	Supply Current	$V_{CC}=15V$		0.05	15	μA
	CMOS/LPTTL Interface					
$V_{IN(1)}$	Logical "1" Input Voltage					
	MM54C32	$V_{CC}=4.5V$	$V_{CC}-1.5$			V
	MM74C32	$V_{CC}=4.75V$	$V_{CC}-1.5$			V
$V_{IN(0)}$	Logical "0" Input Voltage					
	MM54C32	$V_{CC}=4.5V$			0.8	V
	MM74C32	$V_{CC}=4.75V$			0.8	V
$V_{OUT(1)}$	Logical "1" Output Voltage					
	MM54C32	$V_{CC}=4.5V$, $I_O=-360\mu A$	2.4			V
	MM74C32	$V_{CC}=4.75V$, $I_O=-360\mu A$	2.4			V
$V_{OUT(0)}$	Logical "0" Output Voltage					
	MM54C32	$V_{CC}=4.5V$, $I_O=360\mu A$			0.4	V
	MM74C32	$V_{CC}=4.75V$, $I_O=360\mu A$			0.4	V
	Output Drive (See 54C/74C Family Characteristics Data Sheet) (short circuit current)					
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC}=5.0V$, $V_{OUT}=0V$, $T_A=25°C$	-1.75	-3.3		mA
I_{SOURCE}	Output Source Current (P-Channel)	$V_{CC}=10V$, $V_{OUT}=0V$, $T_A=25°C$	-8.0	-15		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC}=5.0V$, $V_{OUT}=V_{CC}$, $T_A=25°C$	1.75	3.6		mA
I_{SINK}	Output Sink Current (N-Channel)	$V_{CC}=10V$, $V_{OUT}=V_{CC}$, $T_A=25°C$	8.0	16		mA

AC Electrical Characteristics

$T_A=25°C$, $C_L=50\,pF$, unless otherwise specified.

	Parameter	Conditions	Min.	Typ.	Max.	Units
t_{pd}	Propagation Delay Time to	$V_{CC}=5.0V$		80	150	ns
	Logical "1" or "0"	$V_{CC}=10V$		35	70	ns
C_{IN}	Input Capacitance	Any Input (Note 2)		5		pF
C_{PD}	Power Dissipation Capacitance	Per Gate (Note 3)		15		pF

Note 1: "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. Except for "Operating Temperature Range" they are not meant to imply that the devices should be operated at these limits. The table of "Electrical Characteristics" provides conditions for actual device operation.

Note 2: Capacitance is guaranteed by periodic testing.

Note 3: C_{PD} determines the no load ac power consumption of any CMOS device. For complete explanation see 54C/74C Family Characteristics application note — AN-90.