



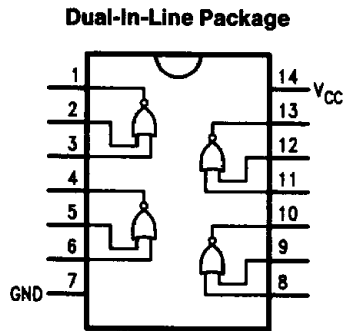
## 54LS33/DM74LS33

### Quad 2-Input NOR Buffer with Open-Collector Outputs

#### General Description

This device contains four independent gates each of which perform the logic NOR function. Outputs are open-collector.

#### Connection Diagram



TL/F/10170-1

Order Number 54LS33DMQB, 54LS33FMQB, DM74LS33M or DM74LS33N  
See NS Package Number J14A, M14A, N14A or W14B

**Absolute Maximum Ratings** (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage	7V
Input Voltage	7V
Output Voltage	7V
Operating Free Air Temperature Range	
54LS	-55°C to +125°C
DM74LS	0°C to +70°C
Storage Temperature Range	-65°C to +150°C

Note: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

**Recommended Operating Conditions**

Symbol	Parameter	54LS33			DM74LS33			Units
		Min	Nom	Max	Min	Nom	Max	
V <sub>CC</sub>	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V <sub>IH</sub>	High Level Input Voltage	2			2			V
V <sub>IL</sub>	Low Level Input Voltage			0.7			0.8	V
V <sub>OH</sub>	High Level Output Voltage			5.5			5.5	V
I <sub>OL</sub>	Low Level Output Current			12			24	mA
T <sub>A</sub>	Free Air Operating Temperature	-55		125	0		70	°C

**Electrical Characteristics** over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.5	V
I <sub>CEX</sub>	High Level Output Current	V <sub>CC</sub> = Min, V <sub>O</sub> = 5.5V, V <sub>IL</sub> = Max			100	μA
V <sub>OL</sub>	Low Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max, V <sub>IH</sub> = Min	54LS		0.4	V
			DM74		0.5	
		I <sub>OL</sub> = 12 mA, V <sub>CC</sub> = Min	DM74		0.4	
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 7V			0.1	mA
I <sub>IH</sub>	High Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			20	μA
I <sub>IL</sub>	Low Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V			-0.4	mA
I <sub>CC</sub>	Supply Current with Outputs High	V <sub>CC</sub> = Max V <sub>IN</sub> = GND			3.6	mA
I <sub>CCL</sub>	Supply Current with Outputs Low	V <sub>CC</sub> = Max V <sub>IN</sub> = Open			13.8	mA

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

**Switching Characteristics** at V<sub>CC</sub> = 5V and T<sub>A</sub> = 25°C (See Section 1 for Test Waveforms and Output Load)

Symbol	Parameter	R <sub>L</sub> = 2 kΩ C <sub>L</sub> = 15 pF		Units
		Min	Max	
t <sub>PLH</sub>	Propagation Delay Time Low to High Level Output		22	ns
t <sub>PHL</sub>	Propagation Delay Time High to Low Level Output		22	ns