National Semiconductor

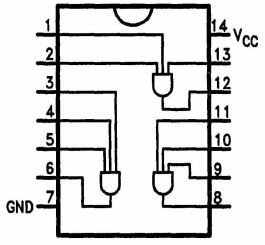
54LS15/DM74LS15 Triple 3-Input AND Gate with Open-Collector Outputs

General Description

This device contains three independent gates, each of which perform the logic AND function. The outputs are open-collector.

Connection Diagram

Dual-In-Line Package



TL/F/10167–1

Order Number 54LS15DMQB, 54LS15FMQB, DM74LS15M or DM74LS15N
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
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 at V_{CC} = +5.0V, T_A = +25°C

Symbol	Parameter	54LS15			DM74LS15			Units
		Min	Nom	Max	Min	Nom	Max	
V_{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High Level Input Voltage	2			2			V
V_{IL}	Low Level Input Voltage			0.7			0.8	V
V_{OH}	High Level Output Voltage			5.5			5.5	V
I_{OL}	Low Level Output Current			4			8	mA
T_A	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_I	Input Clamp Voltage	V_{CC} = Min, I_I = −18 mA				−1.5	V
V_{OL}	Low Level Output Voltage	V_{CC} = Min, I_{OL} = Max, V_{IH} = Min	54LS			0.4	V
			DM74			0.5	
		I_{OL} = 4 mA, V_{CC} = Min	DM74			0.4	
I_I	Input Current @ Max Input Voltage	V_{CC} = Max, V_I = 10V				0.1	mA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = 2.7V				20	μA
I_{IL}	Low Level Input Current	V_{CC} = Max, V_I = 0.4V				−0.4	mA
I_{OH}	High Level Output Current	V_{CC} = Max, V_O = 5.5V				100	μA
I_{CCH}	Supply Current with Outputs High	V_{CC} = Max, V_{IN} = OPEN				3.6	mA
I_{CCL}	Supply Current with Outputs Low	V_{IN} = GND				6.6	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Switching Characteristics

V_{CC} = +5.0V, T_A = +25°C (See Section 1 for test waveforms and output load)

Symbol	Parameter	R_L = 2 kΩ C_L = 15 pF		Units
		Max		
		54LS	DM74	
t_{PLH}	Propagation Delay Time Low to High Level Output	24	20	ns
t_{PHL}	Propagation Delay Time High to Low Level Output	18	14	ns