MOTOROLA

SN54/74LS348
SN54/74LS848

8-INPUT PRIORITY ENCODERS WITH 3-STATE OUTPUTS

The SN54/74LS348 and the SN54/74LS848 are eight input priority encoders which provide the 8-line to 3-line function.

The outputs (A0–A2) and inputs (0–7) are active low. The active low input which has the highest priority (input 7 has the highest) is represented on the outputs (output A0 is the lowest bit). An example would be if inputs 1, 2 and 4 were low, then a binary 4 would be represented on the outputs.

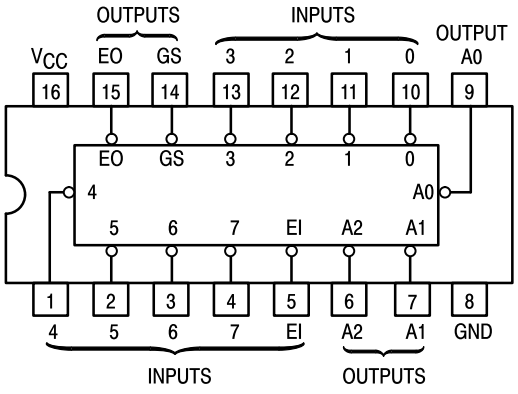
The GS (Group Signal) output is active low when any of the inputs are low. It serves to indicate when any of the inputs are active.

A0, A1 and A2 are three-state outputs. This allows for up to 64 line expansion without the need for special external circuitry.

A logical one on the Enable Input (EI) forces A0, A1 ared A2 to the disabled state and outputs GS and EO to the high state. A high on all data inputs (0–7) together with a low on the EI input disables outputs A0, A1, and A2 and forces output GS to the high state and output EO to the low state.

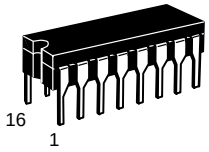
Use of the EI input in conjunction with the EO output provides for the capability of having priority encoding of n input signals.

The LS848 has special internal circuitry providing for a greatly reduced negative going glitch on the GS (Group Signal) output and on a reduced tendency for the A0, A1 and A2 outputs to become momentarily enabled. Both of these occurrences happen when the EI input goes from a logical one to a logical zero and all data inputs (0–7) are held at logical ones. The internal glitch reduction circuitry does add an additional fan-in of one on all data inputs (compared to that of the LS348).

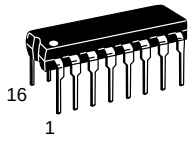


8-INPUT PRIORITY ENCODERS WITH 3-STATE OUTPUTS

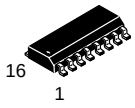
LOW POWER SCHOTTKY



J SUFFIX
CERAMIC
CASE 620-09



N SUFFIX
PLASTIC
CASE 648-08



D SUFFIX
SOIC
CASE 751B-03

ORDERING INFORMATION

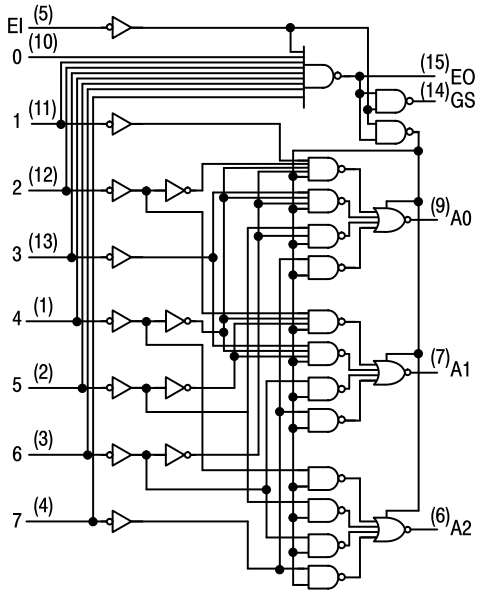
SN54LSXXXJ	Ceramic
SN74LSXXXN	Plastic
SN74LSXXXD	SOIC

FUNCTION TABLE

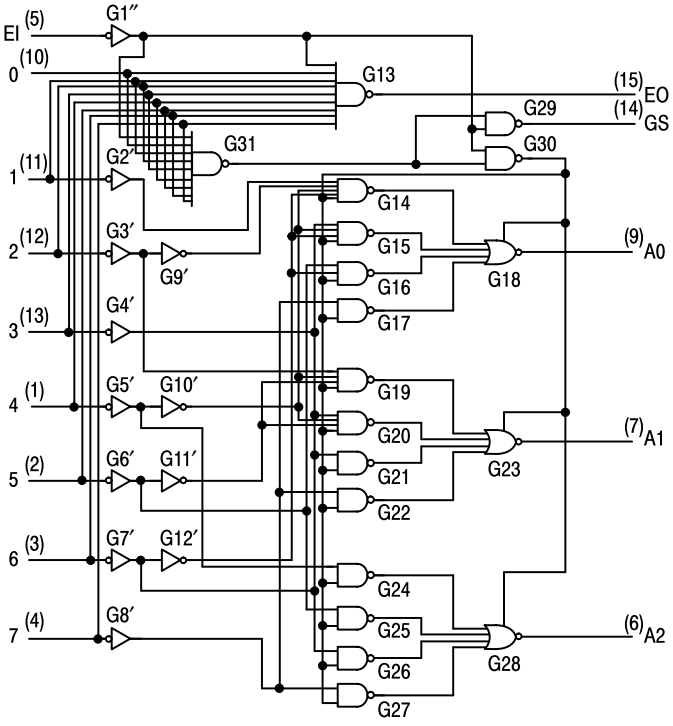
INPUTS									OUTPUTS				
EI	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**A2**	**A1**	**A0**	**GS**	**EO**
H	X	X	X	X	X	X	X	X	Z	Z	Z	H	H
L	H	H	H	H	H	H	H	H	Z	Z	Z	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	H	L	H
L	X	X	X	X	X	L	H	H	L	H	L	L	H
L	X	X	X	X	L	H	H	H	L	H	H	L	H
L	X	X	X	L	H	H	H	H	H	L	L	L	H
L	X	X	L	H	H	H	H	H	H	L	H	L	H
L	X	L	H	H	H	H	H	H	H	H	L	L	H
L	L	H	H	H	H	H	H	H	H	H	H	L	H

H = HIGH Logic Level
L = LOW Logic Level
X = Irrelevant
Z = High Impedance State

BLOCK DIAGRAMS



SN54/74LS348



SN54/74LS848

GUARANTEED OPERATING RANGES

Symbol	Parameter			Min	Typ	Max	Unit
V_{CC}	Supply Voltage		54 74	4.5 4.75	5.0 5.0	5.5 5.25	V
T_A	Operating Ambient Temperature Range		54 74	−55 0	25 25	125 70	°C
I_{OH}	Output Current — High	EO, GS	54, 74			−0.4	mA
I_{OH}	Output Current — High	A0, A1, A2 A0, A1, A2	54 74			−1.0 −2.6	mA
I_{OL}	Output Current — Low	EO, GS	54 74			4.0 8.0	mA
I_{OL}	Output Current — Low	A0, A1, A2 A0, A1, A2	54 74			12 24	mA

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

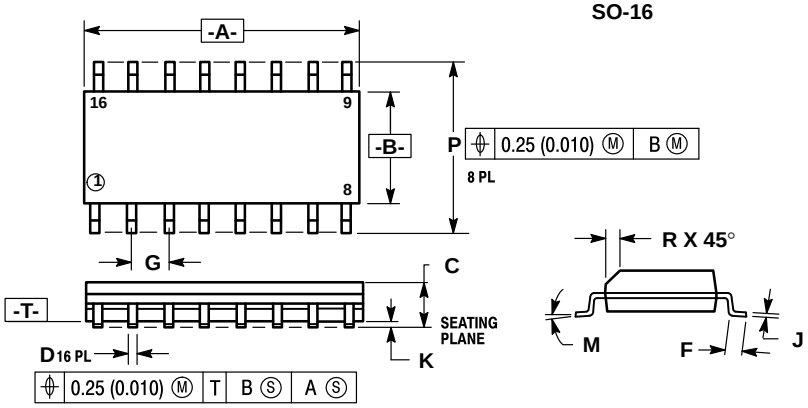
Symbol	Parameter		Limits Min	Limits Typ	Limits Max	Unit	Test Conditions	
V_{IH}	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage for All Inputs	
V_{IL}	Input LOW Voltage	54			0.7	V	Guaranteed Input LOW Voltage for All Inputs	
		74			0.8			
V_{IK}	Input Clamp Diode Voltage			−0.65	−1.5	V	V_{CC} = MIN, I_{IN} = −18 mA	
V_{OH}	Output HIGH Voltage A0, A1, A2	54, 74	2.4	3.1		V	V_{CC} = MIN, I_{OH} = MAX, V_{IN} = V_{IH} or V_{IL} per Truth Table	
	EO, GS	54	2.5	3.5		V		
	EO, GS	74	2.7	3.5		V		
V_{OL}	Output LOW Voltage EO, GS	54, 74		0.25	0.4	V	I_{OL} = 4.0 mA	V_{CC} = V_{CC} MIN, V_{IN} = V_{IL} or V_{IH} per Truth Table
		74		0.35	0.5	V	I_{OL} = 8.0 mA	
V_{OL}	Output LOW Voltage A0, A1, A2	54, 74		0.25	0.4	V	I_{OL} = 12 mA	V_{CC} = V_{CC} MIN, V_{IN} = V_{IL} or V_{IH} per Truth Table
		74		0.35	0.5	V	I_{OL} = 24 mA	
I_{OZH}	Output Off Current HIGH				20	µA	V_{CC} = MAX, V_{OUT} = 2.7 V	
I_{OZL}	Output Off Current LOW				–20	µA	V_{CC} = MAX, V_{OUT} = 0.4 V	
I_{IH}	Input HIGH Current Input 0, EI — LS348				20	µA	V_{CC} = MAX, V_{IN} = 2.7 V	
	Input 0 — LS848				40	µA		
	Other — LS348				40	µA		
	Other — LS848				60	µA		
	Input HIGH Current Input 0, EI — LS348				0.1	mA	V_{CC} = MAX, V_{IN} = 7.0 V	
	Input 0 — LS848				0.2	mA		
	Other — LS348				0.2	mA		
	Other — LS848				0.3	mA		
I_{IL}	Input LOW Current Input 0, EI — LS348				−0.4	mA	V_{CC} = MAX, V_{IN} = 0.4 V	
	Input 0 — LS848				−0.8	mA		
	Other — LS348				−0.8	mA		
	Other — LS848				−1.2	mA		
I_{OS}	Short Circuit Current (Note 1) EO, GS		−20		−120	mA	V_{CC} = MAX	
	A0, A1, A2		−30		−130	mA		
I_{CC}	Power Supply Current Total, Output HIGH			12	23	mA	V_{CC} = MAX All Inputs and Outputs Open	
	Total, Output LOW			13	25		V_{CC} = MAX, Inputs 7, EI = GND All Others Open	

Note 1: Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS (V_{CC} = 5.0 V, T_A = 25°C)

Symbol	From (Input)	To (Output)	Waveform	LS348 Limits			LS848 Limits			Unit	Test Conditions
				Min	Typ	Max	Min	Typ	Max		
t_{PLH}	1 thru 7	A0, A1 or A2	In-Phase		11	17		12	18	ns	C_L = 45 pF, R_L = 667 Ω
t_{PHL}			output		20	30		20	30		
t_{PLH}	1 thru 7	A0, A1 or A2	Out-of-Phase		23	35		23	35	ns	
t_{PHL}			output		23	35		23	35		
t_{PZH}	EI	A0, A1 or A2			25	39		25	39	ns	
t_{PZL}					24	41		24	41		
t_{PLH}	0 thru 7	E0	Out-of-Phase		11	18		11	18	ns	C_L = 15 pF, R_L = 2.0 Ω
t_{PHL}			output		26	40		26	40		
t_{PLH}	0 thru 7	GS	In-Phase		38	55		38	55	ns	
t_{PHL}			output		9.0	21		9.0	21		
t_{PLH}	EI	GS	In-Phase		11	17		11	17	ns	
t_{PHL}			output		14	36		14	36		
t_{PLH}	EI	EO	In-Phase		17	21		17	21	ns	
t_{PHL}			output		25	40		30	45		
t_{PHZ}	EI	A0, A1 or A2			18	27		18	27	ns	C_L = 5.0 pF, R_L = 667 Ω
t_{PLZ}					23	35		23	35		

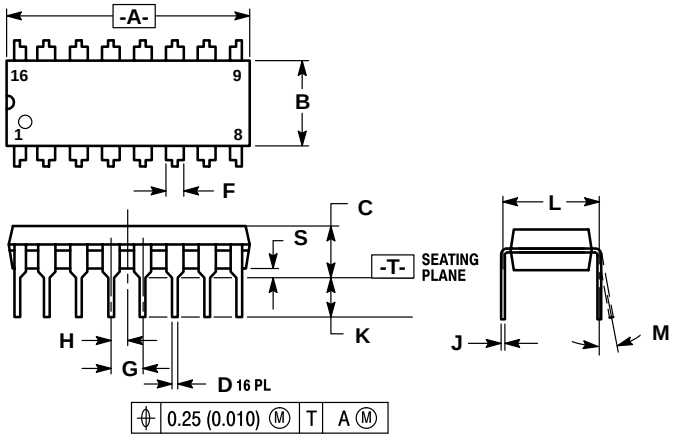
Case 751B-03 D Suffix
16-Pin Plastic
SO-16



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
5. 751B-01 IS OBSOLETE, NEW STANDARD 751B-03.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	9.80	10.00	0.386	0.393
B	3.80	4.00	0.150	0.157
C	1.35	1.75	0.054	0.068
D	0.35	0.49	0.014	0.019
F	0.40	1.25	0.016	0.049
G	1.27 BSC		0.050 BSC	
J	0.19	0.25	0.008	0.009
K	0.10	0.25	0.004	0.009
M	0°	7°	0°	7°
P	5.80	6.20	0.229	0.244
R	0.25	0.50	0.010	0.019

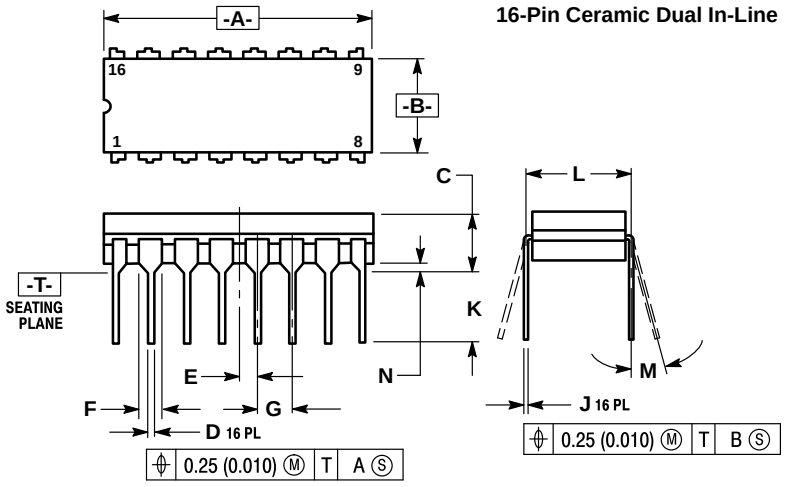
Case 648-08 N Suffix
16-Pin Plastic



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION "L" TO CENTER OF LEADS WHEN FORMED PARALLEL.
4. DIMENSION "B" DOES NOT INCLUDE MOLD FLASH.
5. ROUNDED CORNERS OPTIONAL.
6. 648-01 THRU -07 OBSOLETE, NEW STANDARD 648-08.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	18.80	19.55	0.740	0.770
B	6.35	6.85	0.250	0.270
C	3.69	4.44	0.145	0.175
D	0.39	0.53	0.015	0.021
F	1.02	1.77	0.040	0.070
G	2.54 BSC		0.100 BSC	
H	1.27 BSC		0.050 BSC	
J	0.21	0.38	0.008	0.015
K	2.80	3.30	0.110	0.130
L	7.50	7.74	0.295	0.305
M	0°	10°	0°	10°
S	0.51	1.01	0.020	0.040

Case 620-09 J Suffix
16-Pin Ceramic Dual In-Line



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIM F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
5. 620-01 THRU -08 OBSOLETE, NEW STANDARD 620-09.

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	19.05	19.55	0.750	0.770
B	6.10	7.36	0.240	0.290
C	—	4.19	—	0.165
D	0.39	0.53	0.015	0.021
E	1.27 BSC		0.050 BSC	
F	1.40	1.77	0.055	0.070
G	2.54 BSC		0.100 BSC	
J	0.23	0.27	0.009	0.011
K	—	5.08	—	0.200
L	7.62 BSC		0.300 BSC	
M	0°	15°	0°	15°
N	0.39	0.88	0.015	0.035

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