

DM74ALS137

3 to 8 Line Decoder/Demultiplexer with Address Latches

General Description

The ALS137 is a three line to eight line decoder/demultiplexer with latches on the three address inputs. When the latch-enable input ($\overline{GL}$) is LOW, the ALS137 acts as a decoder/demultiplexer. When $\overline{GL}$ goes from LOW-to-HIGH, the address present at the select inputs (A, B, and C) is stored in the latches. Further address changes are ignored as long as $\overline{GL}$ remains HIGH. The output enable controls, $G1$ and $\overline{G2}$, control the state of the outputs independently of the select or latch-enable inputs. All of the outputs are HIGH unless $G1$ is HIGH and $\overline{G2}$ is LOW. The ALS137 is ideally suited for implementing glitch-free decoders in strobed (stored-address) applications in bus-oriented systems.

Features

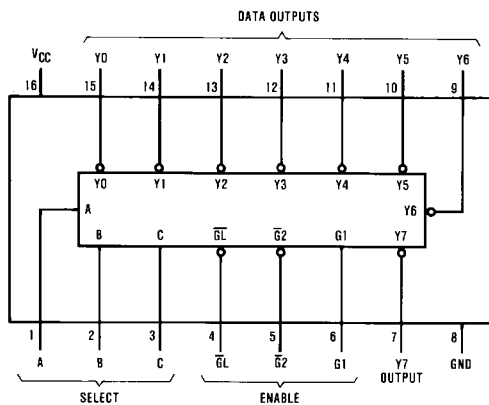
- Combines decoder and 3-bit address latch
- Incorporates 3 enable inputs to simplify cascading
- Low power dissipation: 28 mW typ
- Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process

Ordering Code:

Order Number	Package Number	Package Description
DM74ALS137M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS137N	N16E	16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram



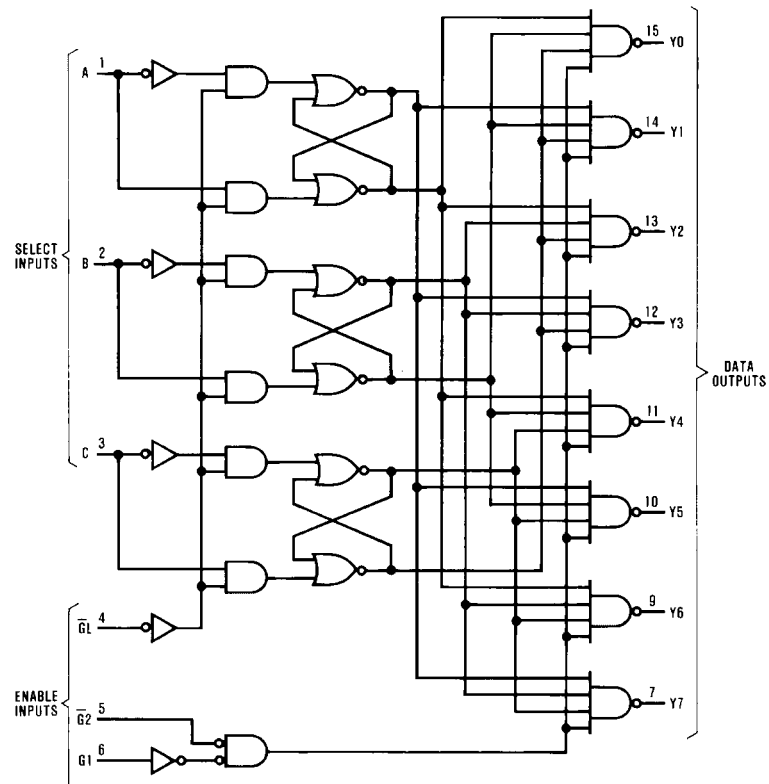
Function Table

Inputs			Outputs										
Enable	Select												
$\overline{GL}$	G1	$\overline{G2}$	C	B	A	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
X	X	H	X	X	X	H	H	H	H	H	H	H	H
X	L	X	X	X	X	H	H	H	H	H	H	H	H
L	H	L	L	L	L	L	H	H	H	H	H	H	H
L	H	L	L	L	H	H	L	H	H	H	H	H	H
L	H	L	L	H	L	H	H	L	H	H	H	H	H
L	H	L	L	H	H	H	H	H	L	H	H	H	H
L	H	L	H	L	L	H	H	H	H	L	H	H	H
L	H	L	H	L	H	H	H	H	H	H	L	H	H
L	H	L	H	H	L	H	H	H	H	H	H	L	H
L	H	L	H	H	H	H	H	H	H	H	H	H	L
H	H	L	X	X	X	Output corresponding to stored address, L; all others, H							

L = LOW State
H = HIGH State
X = Don't Care

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Logic Diagram



Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	–65°C to +150°C
Typical θ_{JA}	
N Package	75.5°C/W
M Package	104.0°C/W

Note 1: 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 tables 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	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			–0.4	mA
I_{OL}	LOW Level Output Current			8	mA
t_W	Width of Enabling Pulse	GL LOW	10		ns
t_{SU}	Setup Time (Note 2)	A, B, C	10 $\uparrow$		ns
t_H	Hold Time (Note 2)	A, B, C	5 $\uparrow$		ns
T_A	Free Air Operating Temperature	0		70	°C

Note 2: The arrow ($\uparrow$) indicates the positive edge of the GL input pulse is used for reference.

Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^\circ C$.

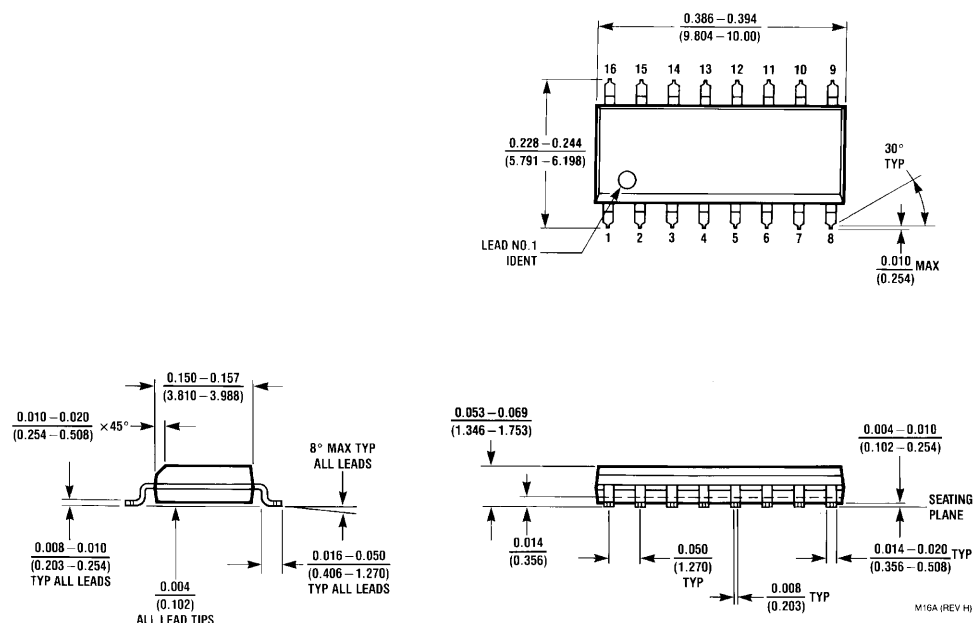
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V$, $I_I = -18\text{ mA}$			–1.5	V
V_{OH}	HIGH Level Output Voltage	$I_{OH} = -0.4\text{ mA}$ $V_{CC} = 4.5V\text{ to }5.5V$	$V_{CC} - 2$			V
V_{OL}	LOW Level Output Voltage	$V_{CC} = 4.5V$ $I_{OL} = 4\text{ mA}$		0.25	0.4	V
		$I_{OL} = 8\text{ mA}$		0.35	0.5	V
I_I	Input Current @ Maximum Input Voltage	$V_{CC} = 5.5V$ $V_{IH} = 7V$	Enable A, B, C		0.1 0.1	mA
I_{IH}	HIGH Level Input Current	$V_{CC} = 5.5V$ $V_{IH} = 2.7V$	Enable A, B, C		20 20	μA
I_{IL}	LOW Level Input Current	$V_{CC} = 5.5V$ $V_{IL} = 0.4V$	Enable A, B, C		–0.1 –0.1	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$, $V_O = 2.25V$	–30		–112	mA
I_{CC}	Supply Current	$V_{CC} = 5.5V$		5	11	mA

Switching Characteristics

over recommended operating free air temperature range.

Symbol	Parameter	Conditions	From (Input) To (Output)	Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	$V_{CC} = 4.5V$ to $5.5V$ $R_L = 500\Omega$ $C_L = 50$ pF	A, B, C to Y	5	20	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		A, B, C to Y	6	20	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		$\overline{G2}$ to Y	4	12	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		$\overline{G2}$ to Y	5	15	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		G1 to Y	5	17	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		G1 to Y	5	15	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		$\overline{GL}$ to Y	7	22	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output		$\overline{GL}$ to Y	7	20	ns

Physical Dimensions inches (millimeters) unless otherwise noted



16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow Package Number M16A

