MC10H159

Quad 2-Input Multiplexer

(Inverting)

ON Semiconductor®

http://onsemi.com

Description

The MC10H159 is a quad 2−input multiplexer with enable. This MECL 10H™ part is a functional/pinout duplication of the standard MECL 10K™ family part, with 100% improvement in propagation delay and no increase in power−supply current.

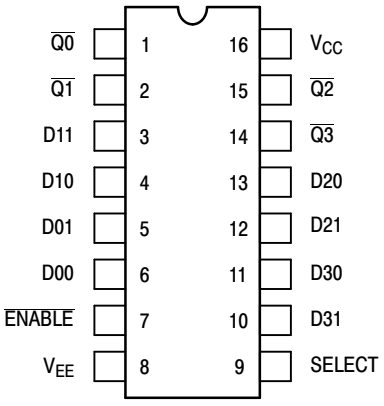
Features

- Propagation Delay, 1.5 ns Typical
- Power Dissipation, 218 mW Typical
- Improved Noise Margin 150 mV (Over Operating Voltage and Temperature Range)
- Voltage Compensated
- MECL 10K Compatible
- Pb−Free Packages are Available*

TRUTH TABLE

Enable	Select	D0	D1	Q
L	L	X	L	H
L	L	X	H	L
L	H	L	X	H
L	H	H	X	L
H	X	X	X	L

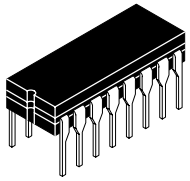
DIP
PIN ASSIGNMENT

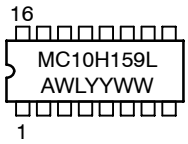


Pin assignment is for Dual−in−Line Package.
For PLCC pin assignment, see the Pin Conversion Tables on page 18 of the ON Semiconductor MECL Data Book (DL122/D).

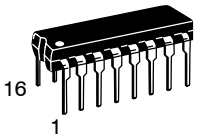
*For additional information on our Pb−Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

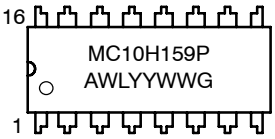
MARKING DIAGRAMS*



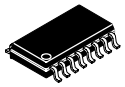


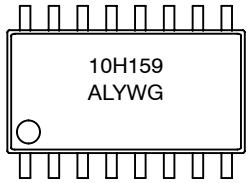
CDIP−16
L SUFFIX
CASE 620A



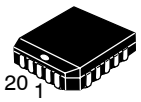


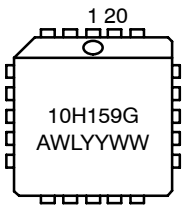
PDIP−16
P SUFFIX
CASE 648





SOEIAJ−16
CASE 966





PLLC−20
FN SUFFIX
CASE 775

A = Assembly Location
WL, L = Wafer Lot
YY, Y = Year
WW, W = Work Week
G = Pb−Free Package

*For additional marking information, refer to Application Note AND8002/D.

ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 4 of this data sheet.

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Table 1. MAXIMUM RATINGS

Symbol	Characteristic	Rating	Unit
V_{EE}	Power Supply (V_{CC} = 0)	−8.0 to 0	Vdc
V_I	Input Voltage (V_{CC} = 0)	0 to V_{EE}	Vdc
I_{out}	Output Current – Continuous – Surge	50 100	mA
T_A	Operating Temperature Range	0 to +75	°C
T_{stg}	Storage Temperature Range – Plastic – Ceramic	−55 to +150 −55 to +165	°C °C

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

Table 2. ELECTRICAL CHARACTERISTICS (V_{EE} = −5.2 V ±5%) (Note 1)

		0°		25°		75°		
Symbol	Characteristic	Min	Max	Min	Max	Min	Max	Unit
I_E	Power Supply Current	–	58	–	53	–	58	mA
I_{inH}	Input Current High Pin 9 Pins 3−7 and 10−13	 – –	 475 515	 – –	 295 320	 – –	 295 320	μA
I_{inL}	Input Current Low	0.5	–	0.5	–	0.3	–	μA
V_{OH}	High Output Voltage	−1.02	−0.84	−0.98	−0.81	−0.92	−0.735	Vdc
V_{OL}	Low Output Voltage	−1.95	−1.63	−1.95	−1.63	−1.95	−1.60	Vdc
V_{IH}	High Input Voltage	−1.17	−0.84	−1.13	−0.81	−1.07	−0.735	Vdc
V_{IL}	Low Input Voltage	−1.95	−1.48	−1.95	−1.48	−1.95	−1.45	Vdc

1. Each MECL 10H series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 50 Ω resistor to −2.0 V.

Table 3. AC PARAMETERS

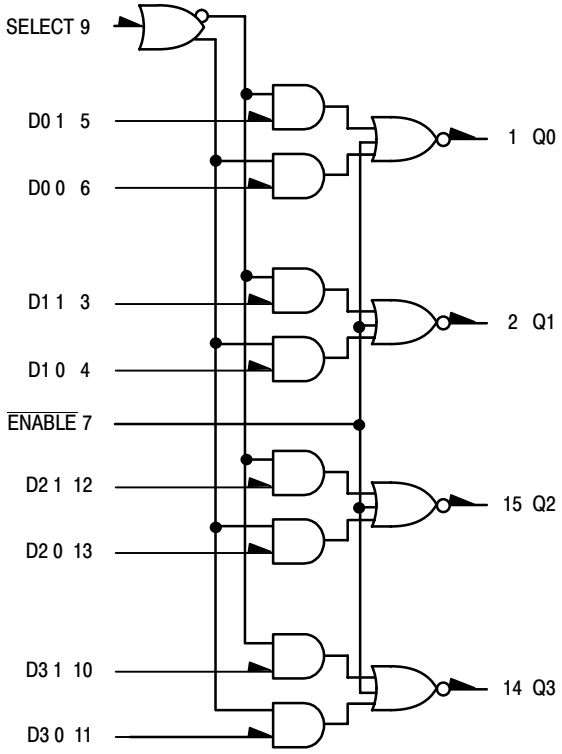
		0°		25°		75°		
Symbol	Characteristic	Min	Max	Min	Max	Min	Max	Unit
t_{pd}	Propagation Delay Data Select Enable	 0.5 1.0 1.0	 2.2 3.2 3.2	 0.5 1.0 1.0	 2.2 3.2 3.2	 0.5 1.0 1.0	 2.2 3.2 3.2	ns
t_r	Rise Time	0.5	2.2	0.5	2.2	0.5	2.2	ns
t_f	Fall Time	0.5	2.2	0.5	2.2	0.5	2.2	ns

NOTE: Device will meet the specifications after thermal equilibrium has been established when mounted in a test socket or printed circuit board with maintained transverse airflow greater than 500 lfpm. Electrical parameters are guaranteed only over the declared operating temperature range. Functional operation of the device exceeding these conditions is not implied. Device specification limit values are applied individually under normal operating conditions and not valid simultaneously.

APPLICATION INFORMATION

The MC10H159 is a quad two channel multiplexer with enable. It incorporates common enable and common data select inputs. The select input determines which data inputs are enabled. A high (H) level enables data inputs D0 0, D1 0, D2 0, and D3 0. A low (L) level enables data inputs D0 1, D1 1, D2 1, and D3 1. Any change on the data inputs will be reflected at the outputs while the enable is low. Input levels are inverted at the output.

LOGIC DIAGRAM



V_{CC} PIN 16
V_{EE} PIN 8

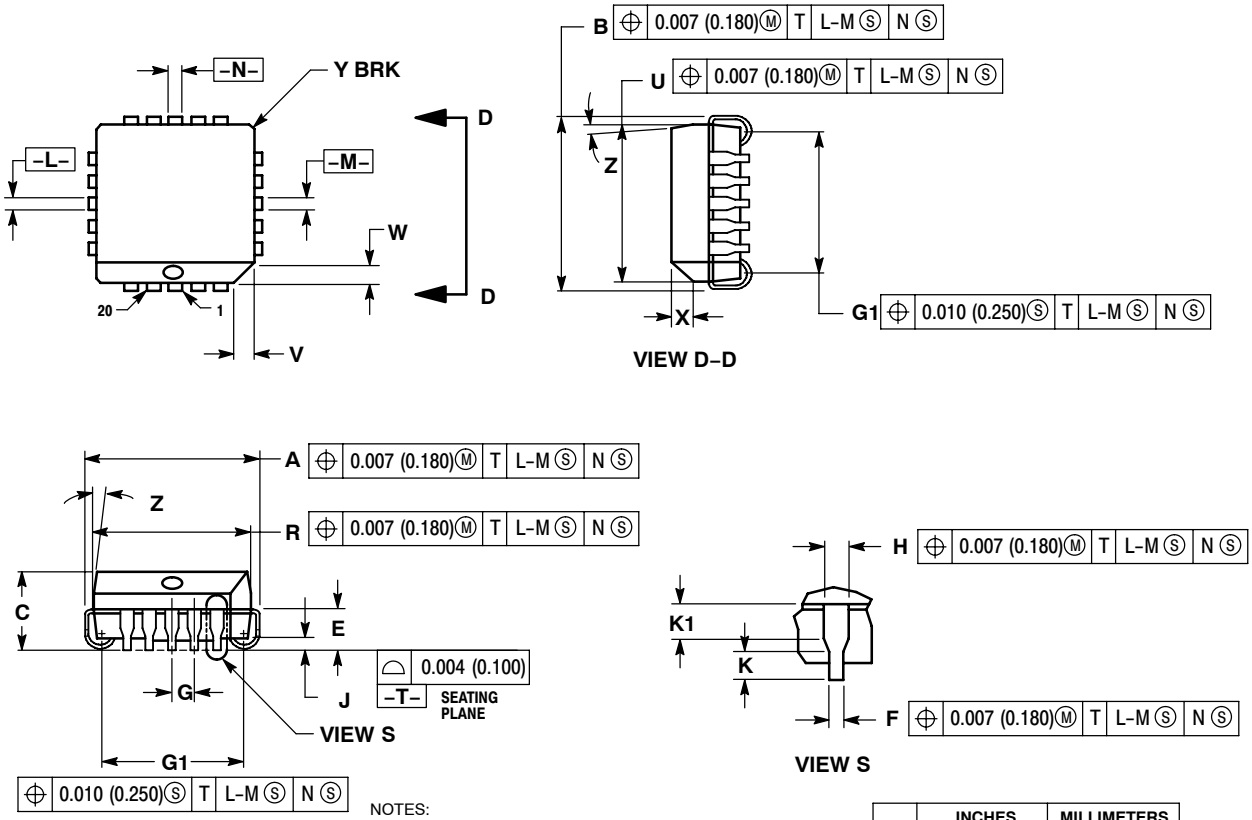
ORDERING INFORMATION

Device	Package	Shipping†
MC10H159FN	PLLC−20	46 Units / Rail
MC10H159FNG	PLLC−20 (Pb−Free)	46 Units / Rail
MC10H159FNR2	PLLC−20	500 / Tape & Reel
MC10H159FNR2G	PLLC−20 (Pb−Free)	500 / Tape & Reel
MC10H159L	CDIP−16	25 Unit / Rail
MC10H159M	SOEIAJ−16	50 Unit / Rail
MC10H159MG	SOEIAJ−16 (Pb−Free)	50 Unit / Rail
MC10H159MEL	SOEIAJ−16	2000 / Tape & Reel
MC10H159MELG	SOEIAJ−16 (Pb−Free)	2000 / Tape & Reel
MC10H159P	PDIP−16	25 Unit / Rail
MC10H159PG	PDIP−16 (Pb−Free)	25 Unit / Rail

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

PACKAGE DIMENSIONS

20 LEAD PLLC
CASE 775−02
ISSUE E

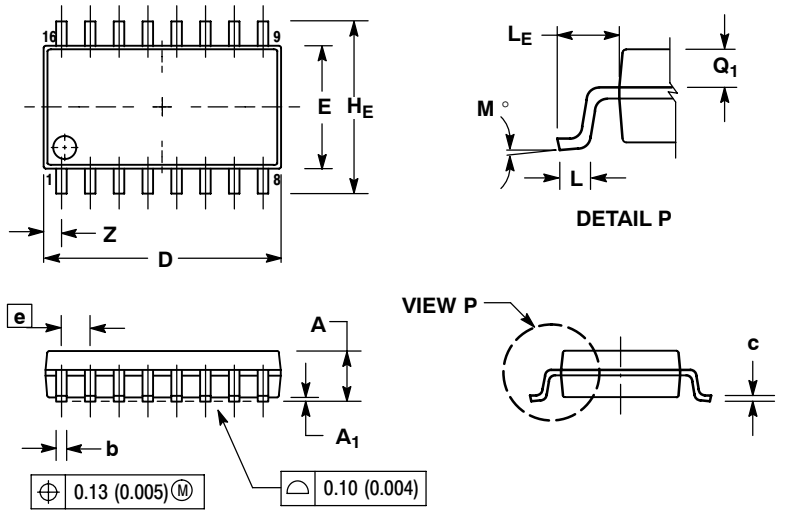


NOTES:
1. DIMENSIONS AND TOLERANCING PER ANSI Y14.5M, 1982.
2. DIMENSIONS IN INCHES.
3. DATUMS –L–, –M–, AND –N– DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
4. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T–, SEATING PLANE.
5. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
6. DIMENSIONS IN THE PACKAGE TOP MAY BE SMALLER THAN THE PACKAGE BOTTOM BY UP TO 0.012 (0.300). DIMENSIONS R AND U ARE DETERMINED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY EXCLUSIVE OF MOLD FLASH, TIE BAR BURRS, GATE BURRS AND INTERLEAD FLASH, BUT INCLUDING ANY MISMATCH BETWEEN THE TOP AND BOTTOM OF THE PLASTIC BODY.
7. DIMENSION H DOES NOT INCLUDE DAMBAR PROTRUSION OR INTRUSION. THE DAMBAR PROTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE GREATER THAN 0.037 (0.940). THE DAMBAR INTRUSION(S) SHALL NOT CAUSE THE H DIMENSION TO BE SMALLER THAN 0.025 (0.635).

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.385	0.395	9.78	10.03
B	0.385	0.395	9.78	10.03
C	0.165	0.180	4.20	4.57
E	0.090	0.110	2.29	2.79
F	0.013	0.019	0.33	0.48
G	0.050 BSC		1.27 BSC	
H	0.026	0.032	0.66	0.81
J	0.020	−−−	0.51	−−−
K	0.025	−−−	0.64	−−−
R	0.350	0.356	8.89	9.04
U	0.350	0.356	8.89	9.04
V	0.042	0.048	1.07	1.21
W	0.042	0.048	1.07	1.21
X	0.042	0.056	1.07	1.42
Y	−−−	0.020	−−−	0.50
Z	2 °	10 °	2 °	10 °
G1	0.310	0.330	7.88	8.38
K1	0.040	−−−	1.02	−−−

PACKAGE DIMENSIONS

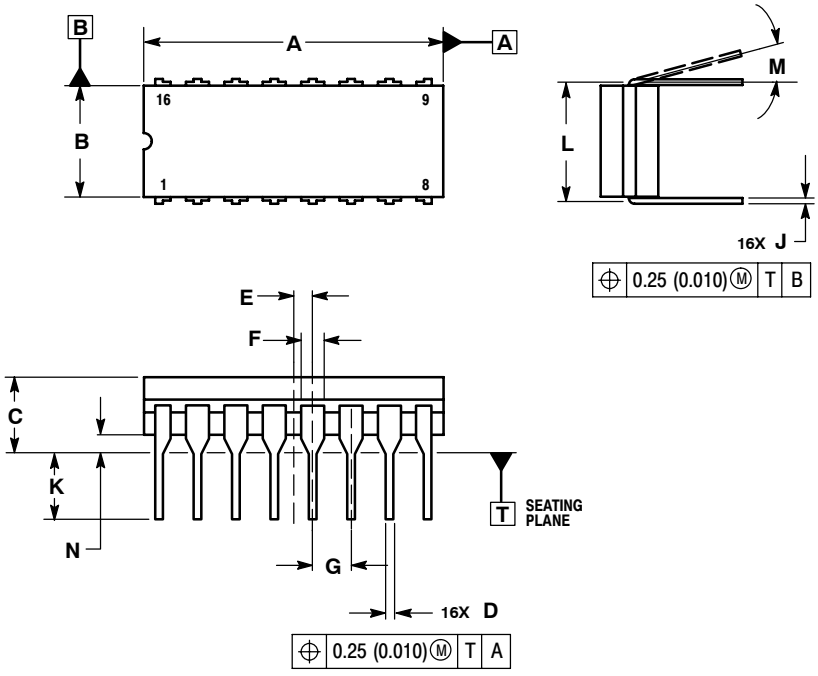
SOEIAJ−16
CASE 966−01
ISSUE A



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS AND ARE MEASURED AT THE PARTING LINE. MOLD FLASH OR PROTRUSIONS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
4. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
5. THE LEAD WIDTH DIMENSION (b) DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE LEAD WIDTH DIMENSION AT MAXIMUM MATERIAL CONDITION. DAMBAR CANNOT BE LOCATED ON THE LOWER RADIUS OR THE FOOT. MINIMUM SPACE BETWEEN PROTRUSIONS AND ADJACENT LEAD TO BE 0.46 (0.018).

	MILLIMETERS		INCHES	
DIM	MIN	MAX	MIN	MAX
A	---	2.05	---	0.081
A_1	0.05	0.20	0.002	0.008
b	0.35	0.50	0.014	0.020
c	0.10	0.20	0.007	0.011
D	9.90	10.50	0.390	0.413
E	5.10	5.45	0.201	0.215
e	1.27 BSC		0.050 BSC	
H_E	7.40	8.20	0.291	0.323
L	0.50	0.85	0.020	0.033
L_E	1.10	1.50	0.043	0.059
M	0 °	10 °	0 °	10 °
Q_1	0.70	0.90	0.028	0.035
Z	---	0.78	---	0.031

CDIP−16
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620A−01
ISSUE O

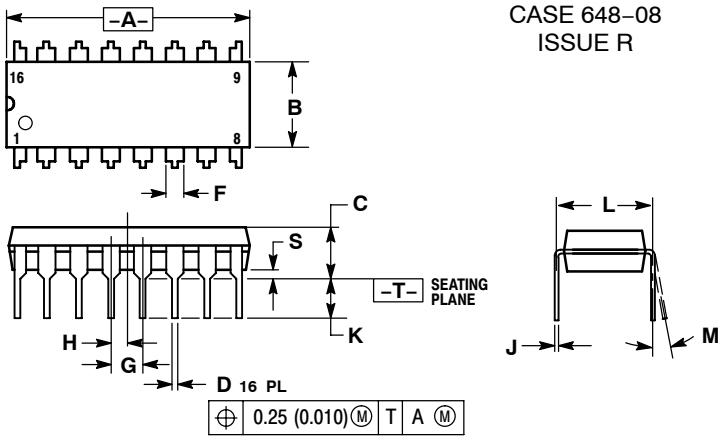


NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.
5 THIS DRAWING REPLACES OBSOLETE CASE OUTLINE 620−10.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.750	0.785	19.05	19.93
B	0.240	0.295	6.10	7.49
C	---	0.200	---	5.08
D	0.015	0.020	0.39	0.50
E	0.050 BSC		1.27 BSC	
F	0.055	0.065	1.40	1.65
G	0.100 BSC		2.54 BSC	
H	0.008	0.015	0.21	0.38
K	0.125	0.170	3.18	4.31
L	0.300 BSC		7.62 BSC	
M	0 °	15 °	0 °	15 °
N	0.020	0.040	0.51	1.01

PACKAGE DIMENSIONS

PDIP−16
P SUFFIX
PLASTIC DIP PACKAGE
CASE 648−08
ISSUE R



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.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	0.740	0.770	18.80	19.55
B	0.250	0.270	6.35	6.85
C	0.145	0.175	3.69	4.44
D	0.015	0.021	0.39	0.53
F	0.040	0.70	1.02	1.77
G	0.100 BSC		2.54 BSC	
H	0.050 BSC		1.27 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.130	2.80	3.30
L	0.295	0.305	7.50	7.74
M	0 °	10 °	0 °	10 °
S	0.020	0.040	0.51	1.01

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