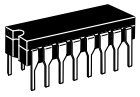
8-Line Multiplexer

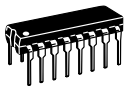
MC10164

The MC10164 is a high speed, low power eight–channel data selector which routes data present at one–of–eight inputs to the output. The data is routed according to the three bit code present on the address inputs. An enable input is provided for easy bit expansion.

P_D = 310 mW typ/pkg (No Load)
t_{pd} = 3.0 ns typ (Data to Output)
t_r, t_f = 2.0 ns typ (20%–80%)



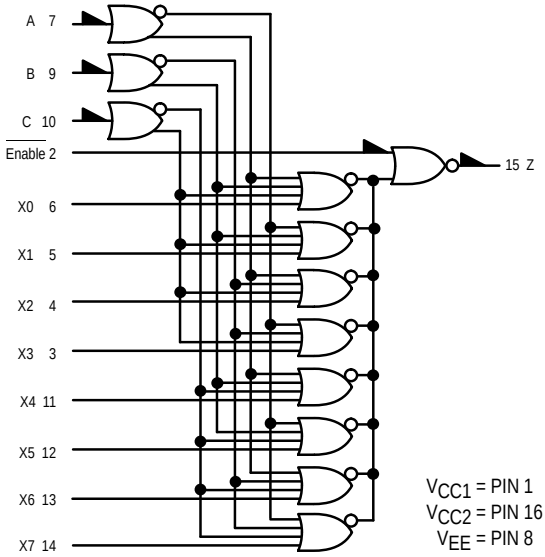
L SUFFIX
CERAMIC PACKAGE
CASE 620–10



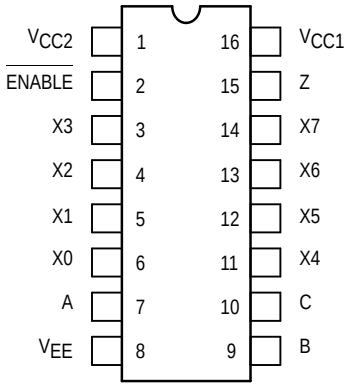
P SUFFIX
PLASTIC PACKAGE
CASE 648–08

FN SUFFIX
PLCC
CASE 775–02

LOGIC DIAGRAM



DIP
PIN ASSIGNMENT



Pin assignment is for Dual–in–Line Package.
For PLCC pin assignment, see the Pin Conversion Tables on page 6–11 of the Motorola MECL Data Book (DL122/D).

TRUTH TABLE

	ADDRESS INPUTS			
ENABLE	C	B	A	Z
L	L	L	L	X0
L	L	L	H	X1
L	L	H	L	X2
L	L	H	H	X3
L	H	L	L	X4
L	H	L	H	X5
L	H	H	L	X6
L	H	H	H	X7
H	X	X	X	L

ELECTRICAL CHARACTERISTICS

Characteristic		Symbol	Pin Under Test	Test Limits							Unit
				–30°C		+25°C			+85°C		
				Min	Max	Min	Typ	Max	Min	Max	
Power Supply Drain Current		I_E	8		83		60	75		83	mAdc
Input Current		I_{inH}	2		425			265		265	µAdc
		I_{inL}	4	0.5		0.5			0.3		µAdc
Output Voltage	Logic 1	V_{OH}	15	–1.060	–0.890	–0.960		–0.810	–0.890	–0.700	Vdc
Output Voltage	Logic 0	V_{OL}	15	–1.890	–1.675	–1.850		–1.650	–1.825	–1.615	Vdc
Threshold Voltage	Logic 1	V_{OHA}	15	–1.080		–0.980			–0.910		Vdc
Threshold Voltage	Logic 0	V_{OLA}	15		–1.655			–1.630		–1.595	Vdc
Switching Times	(50Ω Load)										ns
Propagation Delay		t_{4+15+}	15	1.5	4.9	1.5	3.0	4.7	1.6	5.0	
		t_{4-15-}	15	1.5	4.9	1.5	3.0	4.7	1.6	5.0	
		t_{7+15+}	15	1.9	6.5	2.0	4.0	6.2	2.2	6.7	
		t_{7-15-}	15	1.9	6.5	2.0	4.0	6.2	2.2	6.7	
		t_{2+15-}	15	0.9	3.5	1.0	2.0	3.1	1.0	3.3	
		t_{2-15+}	15	0.9	3.5	1.0	2.0	3.1	1.0	3.3	
Rise Time	(20 to 80%)	t+	15	0.9	3.3	1.1	2.0	3.3	1.2	3.6	
Fall Time	(20 to 80%)	t–	15	0.9	3.3	1.1	2.0	3.3	1.2	3.6	

ELECTRICAL CHARACTERISTICS (continued)

				TEST VOLTAGE VALUES (Volts)					
@ Test Temperature				V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{EE}	
–30°C				–0.890	–1.890	–1.205	–1.500	–5.2	
+25°C				–0.810	–1.850	–1.105	–1.475	–5.2	
+85°C				–0.700	–1.825	–1.035	–1.440	–5.2	
Characteristic		Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW					(V_{CC}) Gnd
				V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{EE}	
Power Supply Drain Current		I_E	8					8	1,16
Input Current		I_{inH}	2	4				8	1,16
		I_{inL}	4		4			8	1,16
Output Voltage	Logic 1	V_{OH}	15	4,9				8	1,16
Output Voltage	Logic 0	V_{OL}	15	9				8	1,16
Threshold Voltage	Logic 1	V_{OHA}	15	4,9			2	8	1,16
Threshold Voltage	Logic 0	V_{OLA}	15	9			2	8	1,16
Switching Times	(50Ω Load)			+1.11V		Pulse In	Pulse Out	–3.2 V	+2.0 V
Propagation Delay		t_{4+15+}	15	9		4	15	8	1,16
		t_{4-15-}	15	9		4	15	8	1,16
		t_{7+15+}	15	5		7	15	8	1,16
		t_{7-15-}	15	5		7	15	8	1,16
		t_{2+15-}	15	7,5		2	15	8	1,16
		t_{2-15+}	15	7,5		2	15	8	1,16
Rise Time	(20 to 80%)	t+	15	9		4	15	8	1,16
Fall Time	(20 to 80%)	t–	15	9		4	15	8	1,16

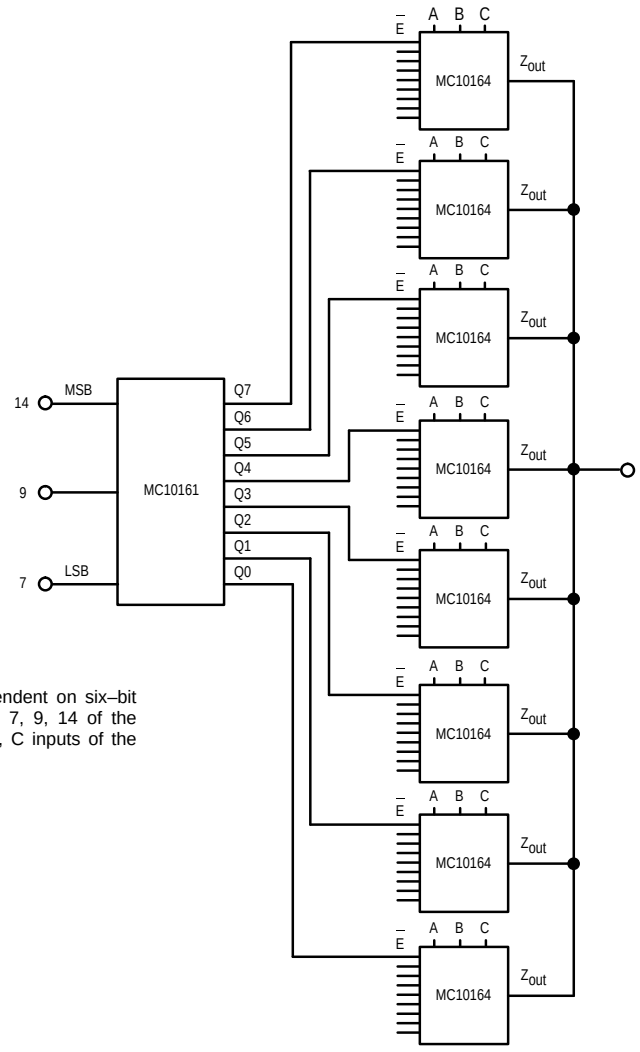
Each MECL 10,000 series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 50–ohm resistor to –2.0 volts. Test procedures are shown for only one gate. The other gates are tested in the same manner.

APPLICATION INFORMATION

The MC10164 can be used wherever data multiplexing or parallel to serial conversion is desirable. Full parallel gating permits equal delays through any data path. The output of the MC10164 incorporates a buffer gate with eight data inputs and an enable. A high level on the enable forces the output low. The MC10164 can be connected directly to a data bus, due to its open emitter output and output enable.

Figure one illustrates how a 1–of–64 line multiplexer can be built with eight MC10164's wire ORed at their outputs and one MC10161 to drive the enables on each multiplexer, without speed degradation over a single MC10164 being experienced.

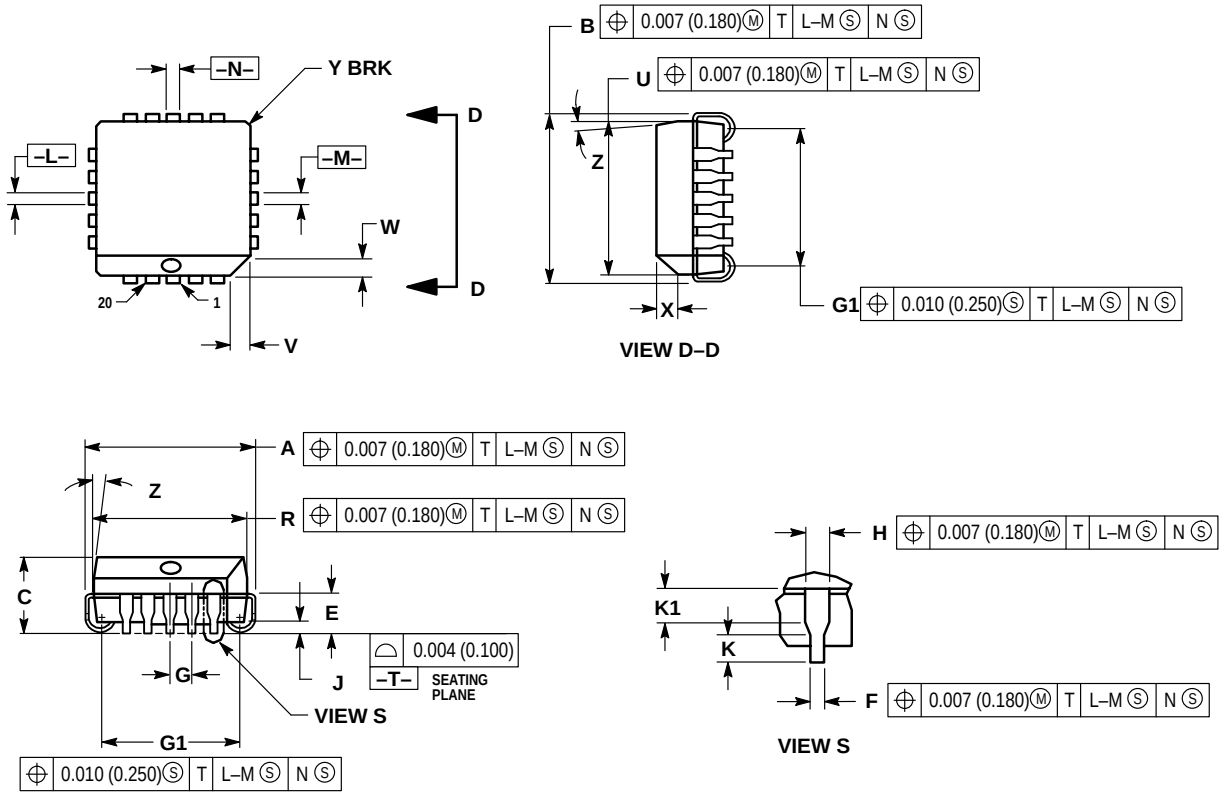
FIGURE 1 — 1–OF–64 LINE MULTIPLEXER



The Bit chosen is dependent on six–bit code present on inputs 7, 9, 14 of the MC10161 and the A, B, C inputs of the MC10164.

OUTLINE DIMENSIONS

FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775–02
ISSUE C

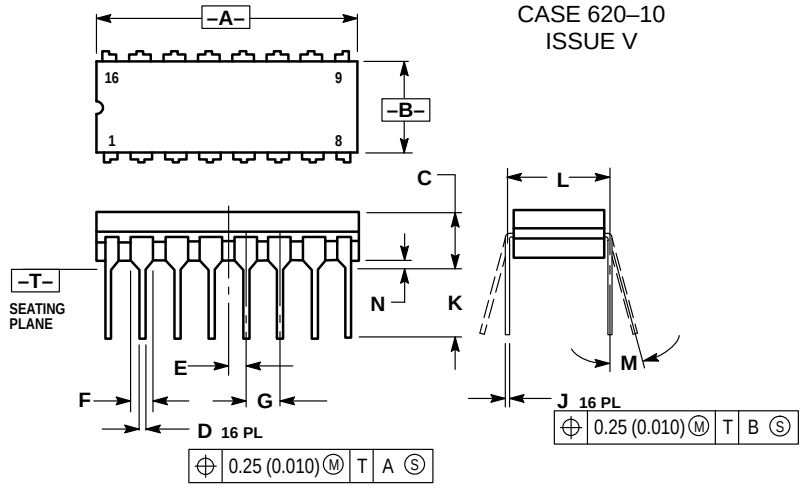


NOTES:
1. DATUMS –L–, –M–, AND –N– DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T–, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
4. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
5. CONTROLLING DIMENSION: INCH.
6. 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	—

OUTLINE DIMENSIONS

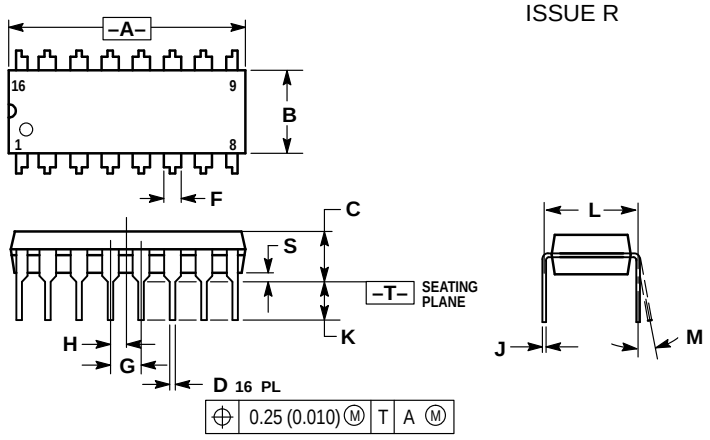
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620–10
ISSUE V



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. DIMENSION F MAY NARROW TO 0.76 (0.030) WHERE THE LEAD ENTERS THE CERAMIC BODY.

	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

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

How to reach us:
USA/EUROPE/Locations Not Listed: Motorola Literature Distribution;
P.O. Box 5405, Denver, Colorado 80217. 303–675–2140 or 1–800–441–2447

Mfax™: RMFAX0@email.sps.mot.com – TOUCHTONE 602–244–6609
INTERNET: http://Design–NET.com

JAPAN: Nippon Motorola Ltd.; Tatsumi–SPD–JLDC, 6F Seibu–Butsuryu–Center, 3–14–2 Tatsumi Koto–Ku, Tokyo 135, Japan. 81–3–3521–8315

ASIA/PACIFIC: Motorola Semiconductors H.K. Ltd.; 8B Tai Ping Industrial Park, 51 Ting Kok Road, Tai Po, N.T., Hong Kong. 852–26629298