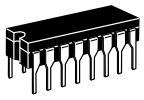
Quad Bus Driver

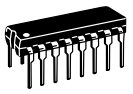
MC10192

The MC10192 contains four line drivers with complementary outputs. Each driver has a Data (D) input and shares an Enable (E) input with another driver. The two driver outputs are the uncommitted collectors of a pair of NPN transistors operating as a current switch. Each driver accepts 10K MECL input signals and provides a nominal signal swing of 800 mV across a 50 Ω load at each output collector. Outputs can drive higher values of load resistance, provided that the combination of I_R drop and load return voltage V_{LR} does not cause an output collector to go more negative than –2.4 V with respect to V_{CC}. To avoid output transistor breakdown, the load return voltage should not be more positive than +5.5 V with respect to V_{CC}. When the E input is high, both output transistors of a driver are nonconducting. When not used, the E inputs, as well as the D inputs, may be left open.

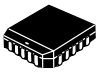
- Open Collector Outputs Drive Terminated Lines or Transformers
- 50 kΩ Input Pulldown Resistors on All Inputs (Unused Inputs May Be Left Open)
- Power Dissipation = 575 mW typ/pkg (No Load)
- Propagation Delay = 3.5 ns typ (E — Output)
  3.0 ns typ (D — Output)



L SUFFIX
CERAMIC PACKAGE
CASE 620–10

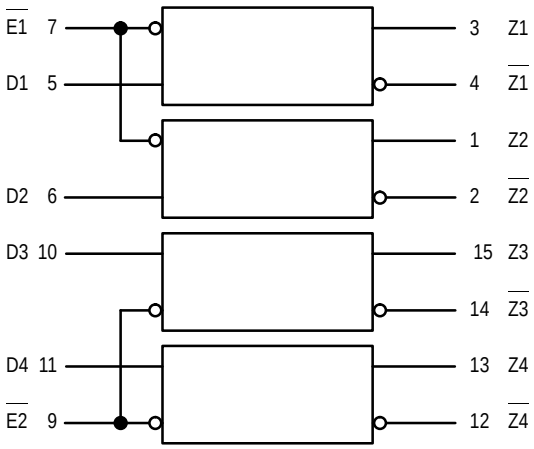


P SUFFIX
PLASTIC PACKAGE
CASE 648–08



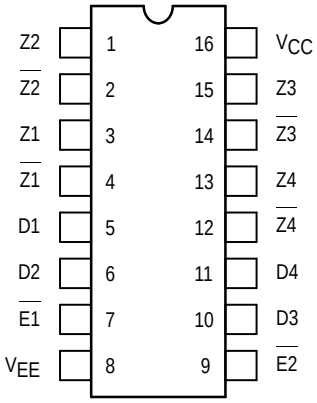
FN SUFFIX
PLCC
CASE 775–02

LOGIC DIAGRAM



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

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

Inputs		Output	
$\overline{E}$	D	Z	$\overline{Z}$
H	X	H	H
L	H	H	L
L	L	L	H

Note: Unused outputs must be terminated to V_{CC} for proper operation.

ELECTRICAL CHARACTERISTICS

Characteristic		Symbol	Pin Under Test	Test Limits						Unit
				–30°C		+25°C		+85°C		
				Min	Max	Min	Max	Min	Max	
Power Supply Drain Current		I_E	8		154		140		154	mAdc
Input Current		I_{inH}	5		350		220		220	µAdc
		I_{inL}	5	0.5		0.5		0.3		µAdc
Output Current High	Logic 1	I_{OH}	2				2.0			mAdc
Output Current Low	Logic 0	I_{OL}	2	13.5	18.0	14.0	18.0	14.0	19.0	mAdc
Threshold Current High	Logic 1	I_{OHC}	2		2.0		2.0		2.0	mAdc
Threshold Current Low	Logic 0	I_{OLC}	2	13.5		14.0		14.0		mAdc
Output Sink Current Low	Logic 0	I_{OS}	2	13.3		13.9		13.3		mAdc
Load Return Voltage Absolute Max Rating (Note 1.)		V_{LR}			5.5		5.5		5.5	V
Output Voltage Low (Note 2.)		V_{OLS}				–2.4				V
Switching Times	(50Ω Load)									ns
Propagation Delay	$\overline{E}$ to Output	t_{PHL}				2.0	6.0			
	D to Output	t_{PLH}				1.5	4.5			
Rise/Fall Time	(20 to 80%)	t_{TLH} t_{THL}					3.3			

1. The 5.5V value is a maximum rating, do not exceed. A 270Ω resistor will prevent output transistor breakdown.
2. Limitations of load resistor and load return voltage combinations. Refer to page 3–160 description.

ELECTRICAL CHARACTERISTICS (continued)

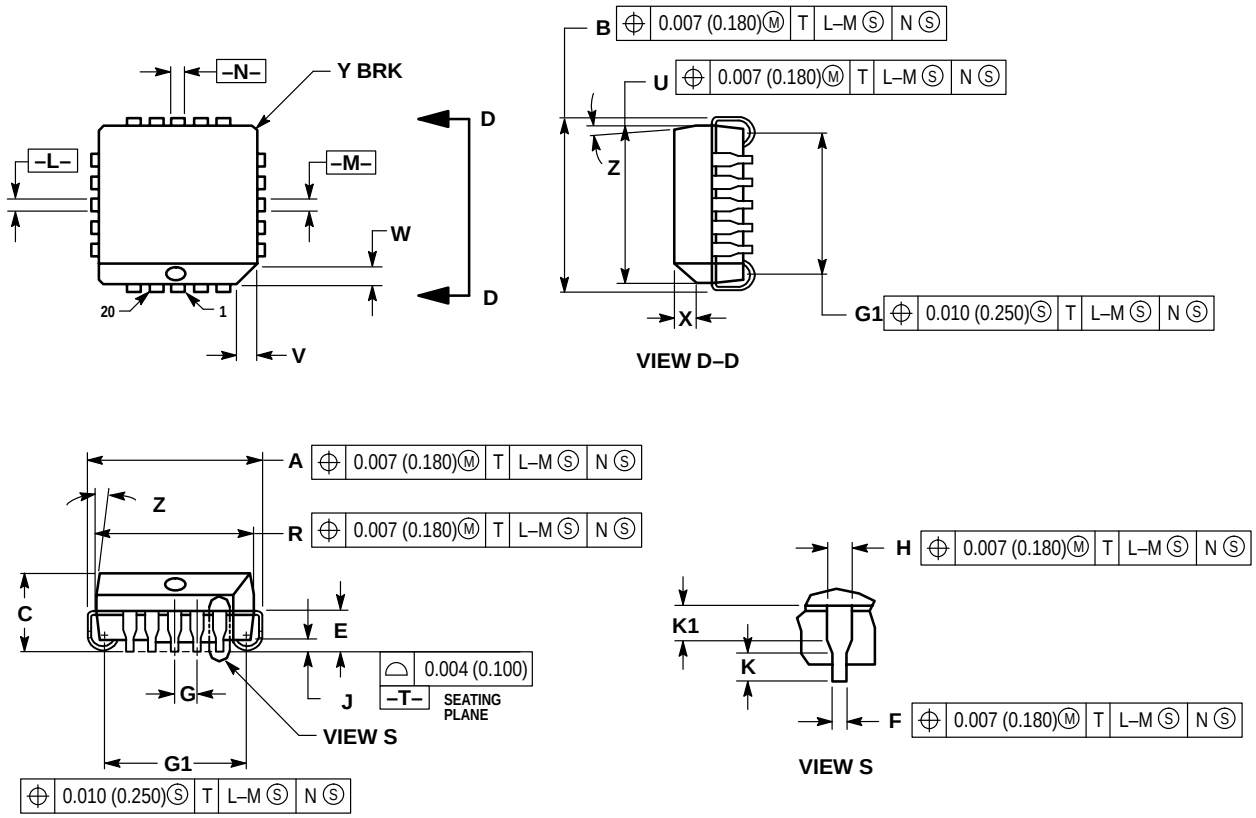
@ Test Temperature	TEST VOLTAGE VALUES (Volts)					
	V_{IHmax}	V_{ILmin}	V_{IHAmin}	V_{ILAmax}	V_{EE}	
–30°C	–0.890	–1.890	–1.205	–1.500	–5.2	
+25°C	–0.810	–1.850	–1.105	–1.475	–5.2	
+85°C	–0.700	–1.825	–1.035	–1.440	–5.2	

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	16
Input Current		I_{inH}	5	5				8	16
		I_{inL}	5		5			8	16
Output Current High	Logic 1	I_{OH}	2		5,6,10,11			8	16
Output Current Low	Logic 0	I_{OL}	2	5,6,10,11				8	16
Threshold Current High	Logic 1	I_{OHC}	2		5,7,9,10,11		6	8	16
Threshold Current Low	Logic 0	I_{OLC}		5,10,11	7,9	6		8	16
Output Sink Current Low	Logic 0	I_{OS}	2	5,6,10,11				8	16
Load Return Voltage Absolute Max Rating (Note 1.)		V_{LR}						8	16
Output Voltage Low (Note 2.)		V_{OLS}						8	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.

OUTLINE DIMENSIONS

FN SUFFIX
PLASTIC PLCC PACKAGE
CASE 775–02
ISSUE C

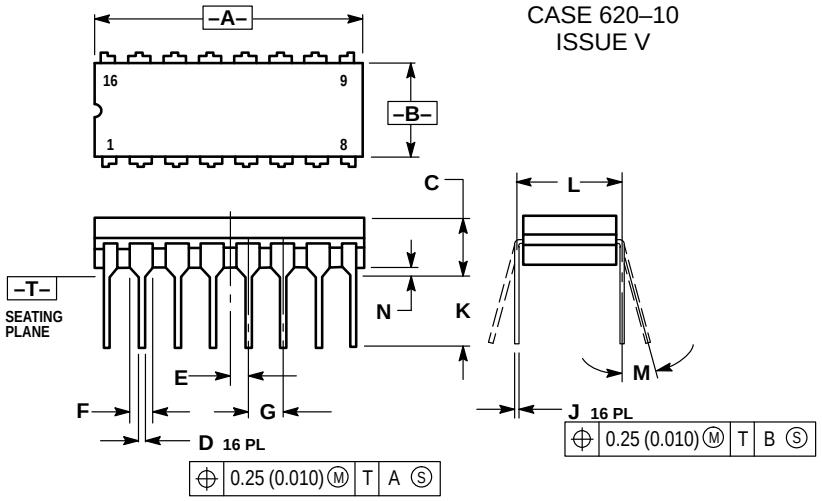


NOTES:
1. DATUMS –L–, –M–, AND –N– DETERMINED WHERE TOP OF LEAD SHOULDER EXITS PLASTIC BODY AT MOLD PARTING LINE.
2. DIMENSION G1, TRUE POSITION TO BE MEASURED AT DATUM –T–, SEATING PLANE.
3. DIMENSIONS R AND U DO NOT INCLUDE MOLD FLASH. ALLOWABLE MOLD FLASH IS 0.010 (0.250) PER SIDE.
4. DIMENSIONING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

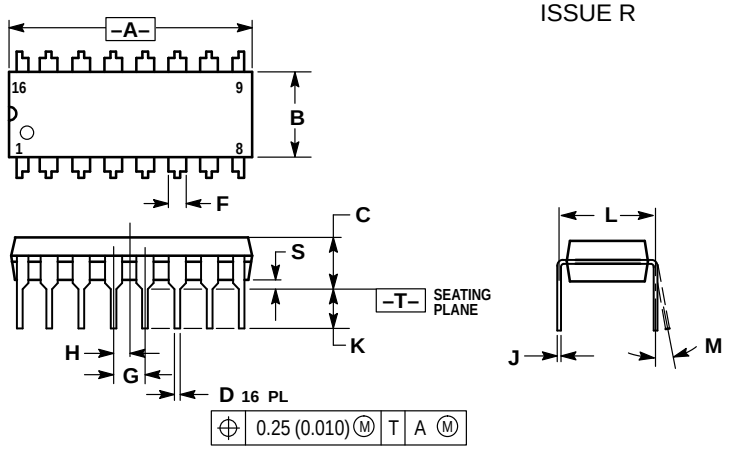
L SUFFIX
CERAMIC DIP PACKAGE
CASE 620–10
ISSUE V



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