

## Quad TTL to MECL Translator

The MC10124 is a quad translator for interfacing data and control signals between a saturated logic section and the MECL section of digital systems. The MC10124 has TTL compatible inputs, and MECL complementary open-emitter outputs that allow use as an inverting/ non-inverting translator or as a differential line driver. When the common strobe input is at the low logic level, it forces all true outputs to a MECL low logic state and all inverting outputs to a MECL high logic state.

Power supply requirements are ground, +5.0 Volts, and -5.2 Volts. Propagation delay of the MC10124 is typically 3.5 ns. The dc levels are standard or Schottky TTL in, MECL 10,000 out.

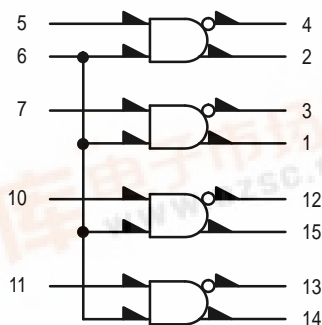
An advantage of this device is that TTL level information can be transmitted differentially, via balanced twisted pair lines, to the MECL equipment, where the signal can be received by the MC10115 or MC10116 differential line receivers. The MC10124 is useful in computers, instrumentation, peripheral controllers, test equipment, and digital communications systems.

$$P_D = 380 \text{ mW typ/pkg (No Load)}$$

$$t_{pd} = 3.5 \text{ ns typ (+ 1.5 Vdc in to 50% out)}$$

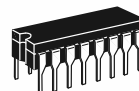
$$t_r, t_f = 2.5 \text{ ns typ (20\%–80\%)}$$

### LOGIC DIAGRAM

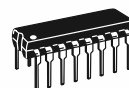


Gnd = PIN 16  
VCC (+5.0Vdc) = PIN 9  
VEE (-5.2Vdc) = PIN 8

## MC10124



**L SUFFIX**  
CERAMIC PACKAGE  
CASE 620-10

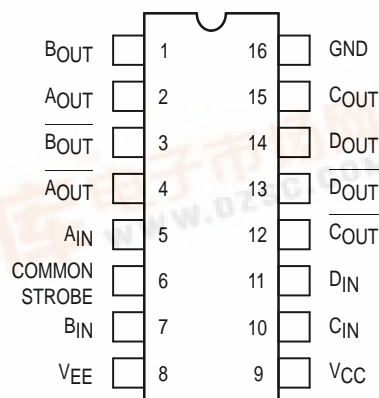


**P SUFFIX**  
PLASTIC PACKAGE  
CASE 648-08



**FN SUFFIX**  
PLCC  
CASE 775-02

### 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).

## ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	Pin Under Test	Test Limits						Unit	
			-30°C		+25°C			+85°C		
			Min	Max	Min	Typ	Max	Min		Max
Negative Power Supply Drain Current	$I_E$	8		72			66		72	mAdc
Positive Power Supply Drain Current	$I_{CCH}$	9		16			16		18	mAdc
	$I_{CCL}$	9		25			25		25	mAdc
Reverse Current	$I_R$	6		200			200		200	$\mu$ Adc
		7		50			50		50	
Forward Current	$I_F$	6		-12.8			-12.8		-12.8	mAdc
		7		-3.2			-3.2		-3.2	
Input Breakdown Voltage	$BV_{in}$	6	5.5		5.5			5.5		Vdc
		7	5.5		5.5			5.5		
Clamp Input Voltage	$V_I$	6		-1.5			-1.5		-1.5	Vdc
		7		-1.5			-1.5		-1.5	
High Output Voltage	$V_{OH}$	1	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	Vdc
		3	-1.060	-0.890	-0.960		-0.810	-0.890	-0.700	
Low Output Voltage	$V_{OL}$	1	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615	Vdc
		3	-1.890	-1.675	-1.850		-1.650	-1.825	-1.615	
High Threshold Voltage	$V_{OHA}$	1	-1.080		-0.980			-0.910		Vdc
		3	-1.080		-0.980			-0.910		
Low Threshold Voltage	$V_{OLA}$	1		-1.655			-1.630		-1.595	Vdc
		3		-1.655			-1.630		-1.595	
Switching Times (50 $\Omega$ Load)										ns
Propagation Delay (+3.5Vdc to 50%) <sup>1</sup>	$t_{6+1+}$	1	1.5	6.8	1.0	3.5	6.0	1.0	6.0	
	$t_{6-1-}$	1	1.0	6.0	1.0	3.5	6.0	1.5	6.8	
	$t_{7+1+}$	1	1.5	6.8	1.0	3.5	6.0	1.0	6.0	
	$t_{7-1-}$	1	1.0	6.0	1.0	3.5	6.0	1.5	6.8	
	$t_{7+3-}$	3	1.5	6.8	1.0	3.5	6.0	1.0	6.0	
	$t_{7-3+}$	3	1.0	6.0	1.0	3.5	6.0	1.5	6.8	
Rise Time (20 to 80%)	$t_{1+}$	1	1.0	4.2	1.1	2.5	3.9	1.1	4.3	
Fall Time (20 to 80%)	$t_{1-}$	1	1.0	4.2	1.1	2.5	3.9	1.1	4.3	

1. See switching time test circuit. Propagation delay for this circuit is specified from +1.5Vdc in to the 50% point on the output waveform. The +3.5Vdc is shown here because all logic and supply levels are shifted 2 volts positive.

MC10124

**ELECTRICAL CHARACTERISTICS** (continued)

			TEST VOLTAGE VALUES (Volts)					
			V <sub>IH</sub>	V <sub>ILmax</sub>	V <sub>IHA'</sub>	V <sub>IILA'</sub>	V <sub>F</sub>	
@ Test Temperature								
-30°C			+4.0	+0.40	+2.00	+1.10	+0.40	
+25°C			+4.0	+0.40	+1.80	+1.10	+0.40	
+85°C			+4.0	+0.40	+1.80	+0.90	+0.40	
Characteristic	Symbol	Pin Under Test	TEST VOLTAGE APPLIED TO PINS LISTED BELOW					Gnd
			V <sub>IH</sub>	V <sub>ILmax</sub>	V <sub>IHA'</sub>	V <sub>IILA'</sub>	V <sub>F</sub>	
Negative Power Supply Drain Current	I <sub>E</sub>	8						16
Positive Power Supply Drain Current	I <sub>CCH</sub>	9	5,6,7,10,11					16
	I <sub>CCL</sub>	9						5,6,7,10,11,16
Reverse Current	I <sub>R</sub>	6					5,7,10,11	16
		7					6	16
Forward Current	I <sub>F</sub>	6	5,7,10,11				6	16
		7	6				7	16
Input Breakdown Voltage	BV <sub>in</sub>	6						5,7,10,11,16
		7						6,16
Clamp Input Voltage	V <sub>I</sub>	6						16
		7						16
High Output Voltage	V <sub>OH</sub>	1	6,7					16
		3		6,7				16
Low Output Voltage	V <sub>OL</sub>	1		6,7				16
		3	6,7					16
High Threshold Voltage	V <sub>OHA</sub>	1	6		7			16
		3	6			7		16
Low Threshold Voltage	V <sub>OLA</sub>	1	6			7		16
		3	6		7			16
Switching Times (50Ω Load)			<b>+6.0 V</b>	<b>Pulse In</b>	<b>Pulse Out</b>			<b>+2.0 V</b>
Propagation Delay (+3.5Vdc to 50%) <sup>1</sup>	t <sub>6+1+</sub>	1	7	6	1			16
	t <sub>6-1-</sub>	1	7	6	1			16
	t <sub>7+1+</sub>	1	6	7	1			16
	t <sub>7-1-</sub>	1	6	7	1			16
	t <sub>7+3-</sub>	3	6	7	3			16
	t <sub>7-3+</sub>	3	6	7	3			16
Rise Time (20 to 80%)	t <sub>1+</sub>	1	6	7	1			16
Fall Time (20 to 80%)	t <sub>1-</sub>	1	6	7	1			16

1. See switching time test circuit. Propagation delay for this circuit is specified from +1.5Vdc in to the 50% point on the output waveform. The +3.5Vdc is shown here because all logic and supply levels are shifted 2 volts positive.

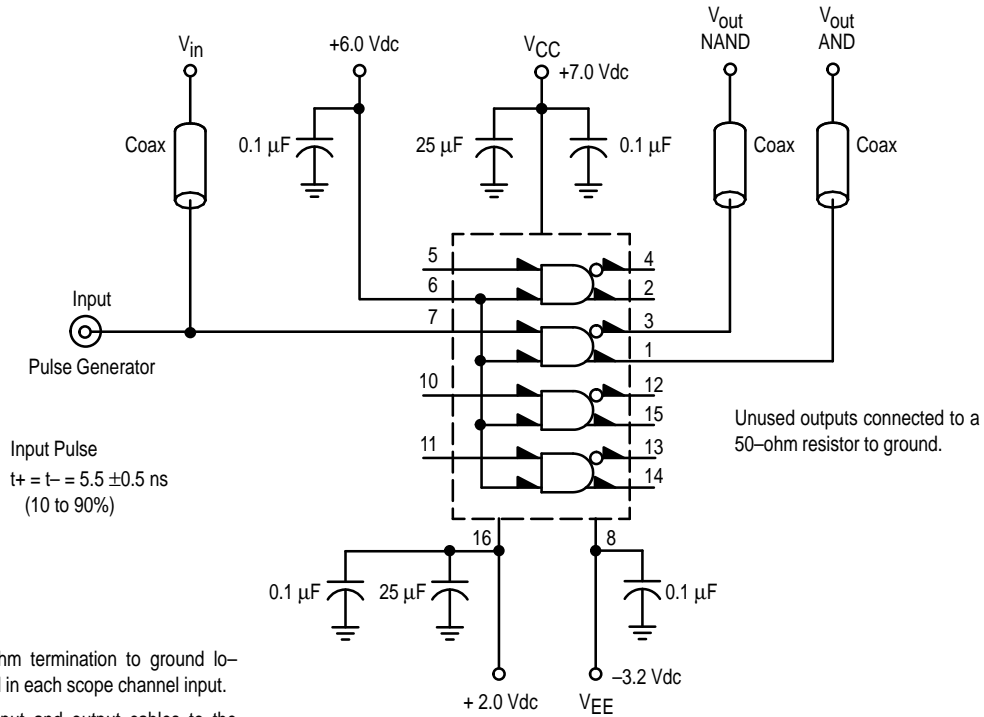
## ELECTRICAL CHARACTERISTICS (continued)

			TEST VOLTAGE VALUES (Volts)			(mA)		Gnd
			V <sub>R</sub>	V <sub>CC</sub>	V <sub>EE</sub>	I <sub>I</sub>	I <sub>in</sub>	
			@ Test Temperature					
			-30°C	+2.40	+5.00	-5.2	-10	
@ Test Temperature								
					TEST VOLTAGE APPLIED TO PINS LISTED BELOW			
Characteristic	Symbol	Pin Under Test	V <sub>R</sub>	V <sub>CC</sub>	V <sub>EE</sub>	I <sub>I</sub>	I <sub>in</sub>	Gnd
Negative Power Supply Drain Current	I <sub>E</sub>	8		9	8			16
Positive Power Supply Drain Current	I <sub>CCH</sub>	9		9	8			16
	I <sub>CCL</sub>	9		9	8			5,6,7,10,11,16
Reverse Current	I <sub>R</sub>	6	6	9	8			16
		7	7	9	8			16
Forward Current	I <sub>F</sub>	6		9	8			16
		7		9	8			16
Input Breakdown Voltage	BV <sub>in</sub>	6		9	8		6	5,7,10,11,16
		7		9	8		7	6,16
Clamp Input Voltage	V <sub>I</sub>	6		9	8	6		16
		7		9	8	7		16
High Output Voltage	V <sub>OH</sub>	1		9	8			16
		3		9	8			16
Low Output Voltage	V <sub>OL</sub>	1		9	8			16
		3		9	8			16
High Threshold Voltage	V <sub>OHA</sub>	1		9	8			16
		3		9	8			16
Low Threshold Voltage	V <sub>OLA</sub>	1		9	8			16
		3		9	8			16
Switching Times (50Ω Load)				<b>+7.0 V</b>	<b>-3.2 V</b>			<b>+2.0 V</b>
Propagation Delay (+3.5Vdc to 50%) <sup>1</sup>	t <sub>6+1+</sub>	1		9	8			16
	t <sub>6-1-</sub>	1		9	8			16
	t <sub>7+1+</sub>	1		9	8			16
	t <sub>7-1-</sub>	1		9	8			16
	t <sub>7+3-</sub>	3		9	8			16
	t <sub>7-3+</sub>	3		9	8			16
Rise Time (20 to 80%)	t <sub>1+</sub>	1		9	8			16
Fall Time (20 to 80%)	t <sub>1-</sub>	1		9	8			16

1. See switching time test circuit. Propagation delay for this circuit is specified from +1.5Vdc in to the 50% point on the output waveform. The +3.5Vdc is shown here because all logic and supply levels are shifted 2 volts positive.

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.

**SWITCHING TIME TEST CIRCUIT**

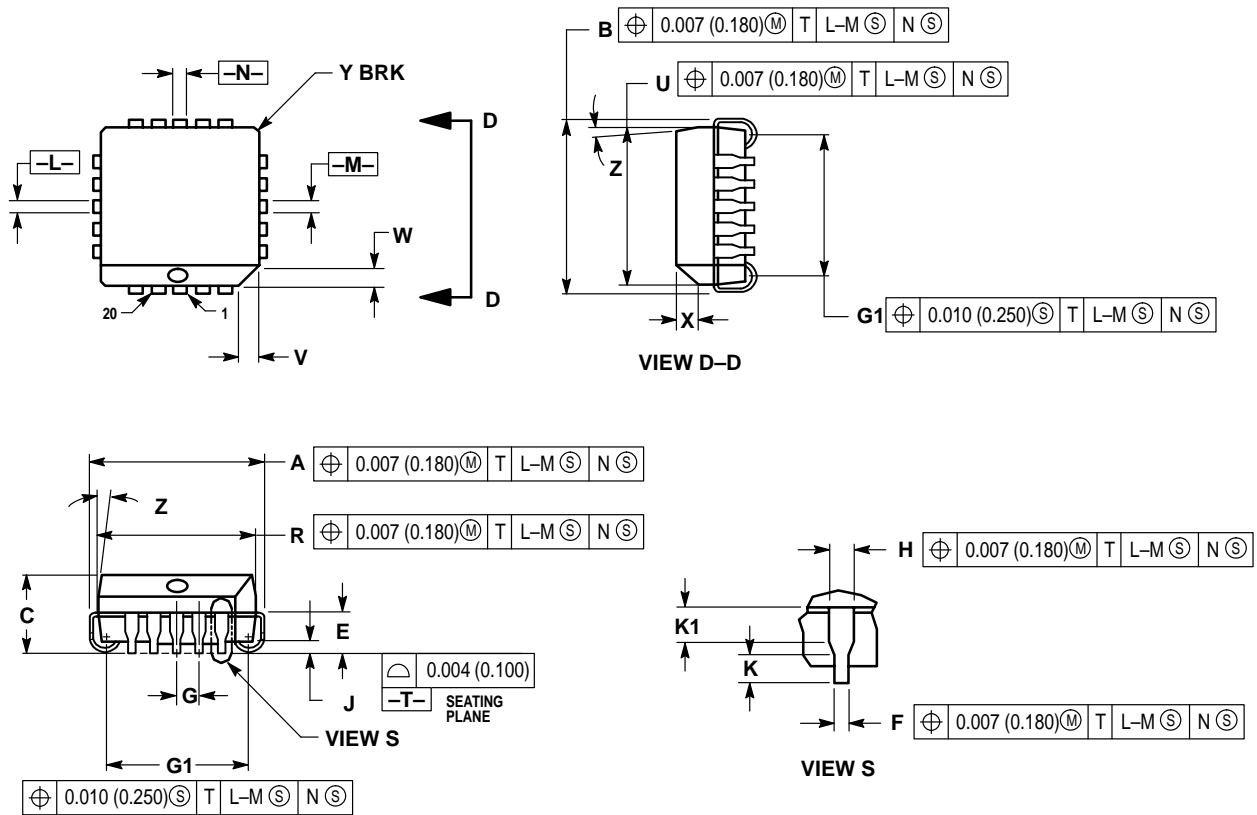


50-ohm termination to ground located in each scope channel input. All input and output cables to the scope are equal lengths of 50-ohm coaxial cable. Wire length should be < 1/4 inch from TP<sub>in</sub> to input pin and TP<sub>out</sub> to output pin.

**NOTE:** All power supply and logic levels are shown shifted 2 volts positive.

OUTLINE DIMENSIONS

FN SUFFIX  
 PLASTIC PLCC PACKAGE  
 CASE 775-02  
 ISSUE C



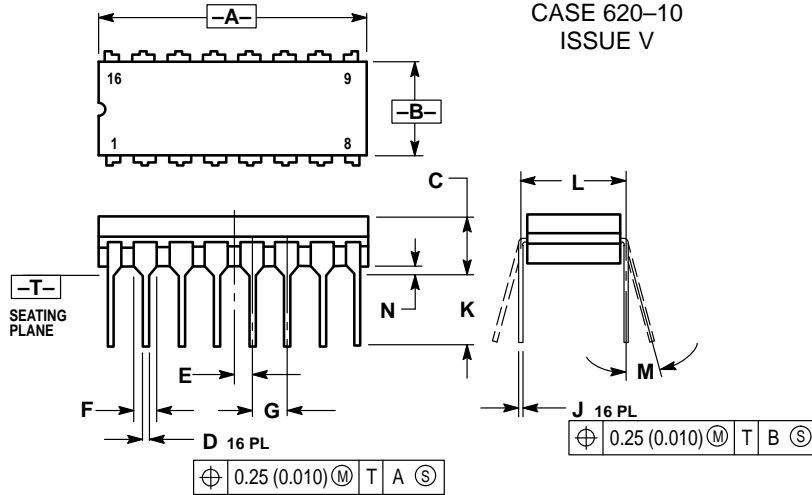
NOTES:

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

DIM	INCHES		MILLIMETERS	
	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

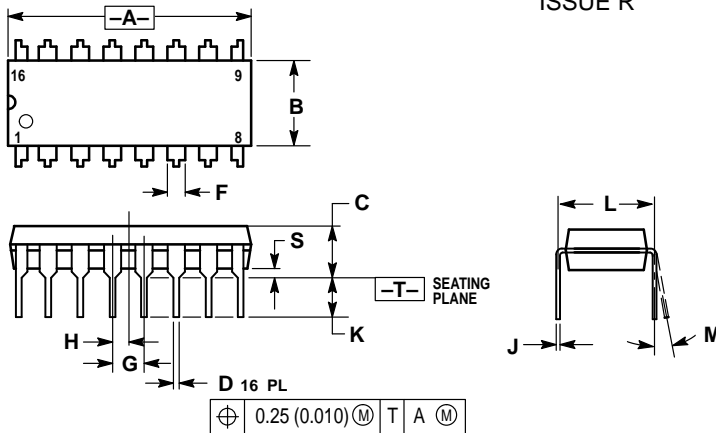
L SUFFIX  
CERAMIC DIP PACKAGE  
CASE 620-10  
ISSUE V



- 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.

DIM	INCHES		MILLIMETERS	
	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.

DIM	INCHES		MILLIMETERS	
	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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