

Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

PIN	FUNCTION
D0, D1, D0 , D1	ECL Data Inputs
Q, Q	ECL Data Outputs
V _{CC}	Positive Supply
V _{EE}	Negative Supply
EP	(DFN8 only) Thermal exposed pad must be connected to a sufficient thermal conduit. Electrically connect to the most negative supply (GND) or leave unconnected, floating open.

Table 2. TRUTH TABLE

D0*	D1*	D0**	D1**	Q	Q
L H H	ILIT	HHLL	H L H L	L H H L	H L L

- * Pins will default LOW when left open.
- ** Pins will default to 0.666% of V_{CC} when left open.

Table 3. ATTRIBUTES

Characterist	ics	Va	lue				
Internal Input Pulldown Resistor		75 kΩ					
Internal Input Pullup Resistor	Internal Input Pullup Resistor						
ESD Protection	> 4 kV > 200 V > 2 kV						
Moisture Sensitivity, Indefinite Time	Out of Drypack (Note 1)	Pb Pkg	Pb-Free Pkg				
	SOIC-8 TSSOP-8 DFN8	Level 1 Level 1 Level 1	Level 1 Level 3 Level 1				
Flammability Rating	Oxygen Index: 28 to 34	UL 94 V-0	@ 0.125 in				
Transistor Count	135 D	evices					
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test							

^{1.} For additional information, see Application Note AND8003/D.

Table 4. MAXIMUM RATINGS

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V_{CC}	PECL Mode Power Supply	V _{EE} = 0 V		6	V
V_{EE}	NECL Mode Power Supply	V _{CC} = 0 V		-6	V
V _I	PECL Mode Input Voltage NECL Mode Input Voltage	V _{EE} = 0 V V _{CC} = 0 V	$V_{I} \le V_{CC}$ $V_{I} \ge V_{EE}$	6 -6	V V
l _{out}	Output Current	Continuous Surge		50 100	mA mA
T _A	Operating Temperature Range			-40 to +85	°C
T _{stg}	Storage Temperature Range			-65 to +150	°C
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	SOIC-8 SOIC-8	190 130	°C/W
$\theta_{\sf JC}$	Thermal Resistance (Junction-to-Case)	Standard Board	SOIC-8	41 to 44	°C/W
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	TSSOP-8 TSSOP-8	185 140	°C/W
θ_{JC}	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-8	41 to 44	°C/W
θ_{JA}	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	DFN8 DFN8	129 84	°C/W
T _{sol}	Wave Solder Pb Pb-Free	<2 to 3 sec @ 248°C <2 to 3 sec @ 260°C		265 265	°C
$\theta_{\sf JC}$	Thermal Resistance (Junction-to-Case)	(Note 2)	DFN8	35 to 40	°C/W

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

2. JEDEC standard multilayer board - 2S2P (2 signal, 2 power)

Table 5. 10EP DC CHARACTERISTICS, PECL $V_{CC} = 3.3 \text{ V}$, $V_{EE} = 0 \text{ V}$ (Note 3)

			-40°C			25°C			85°C		
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
IEE	Power Supply Current	20	28	36	20	30	38	20	32	38	mA
V _{OH}	Output HIGH Voltage (Note 4)	2165	2290	2415	2230	2355	2480	2290	2415	2540	mV
V _{OL}	Output LOW Voltage (Note 4)	1365	1490	1615	1430	1555	1680	1490	1615	1740	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	2090		2415	2155		2480	2215		2540	mV
V _{IL}	Input LOW Voltage (Single-Ended)	1365		1690	1430		1755	1490		1815	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 5)	2.0		3.3	2.0		3.3	2.0		3.3	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current $\frac{D}{\overline{D}}$	0.5 -150			0.5 -150			0.5 -150			μΑ

- 3. Input and output parameters vary 1:1 with V_{CC}. V_{EE} can vary +0.3 V to -2.2 V.
- 4. All loading with 50 Ω to V_{CC} 2.0 V.
- V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 6. 10EP DC CHARACTERISTICS, PECL V_{CC} = 5.0 V, V_{EE} = 0 V (Note 6)

		-40°C				25°C					
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	20	28	36	20	30	38	20	32	38	mA
V _{OH}	Output HIGH Voltage (Note 7)	3865	3940	4115	3930	4055	4180	3990	4115	4240	mV
V _{OL}	Output LOW Voltage (Note 7)	3065	3190	3315	3130	3255	3380	3190	3315	3440	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3790		4115	3855		4180	3915		4240	mV
V_{IL}	Input LOW Voltage (Single-Ended)	3065		3390	3130		3455	3190		3515	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 8)	2.0		5.0	2.0		5.0	2.0		5.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current D D	0.5 -150			0.5 -150			0.5 -150			μΑ

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.

- 6. Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.
- 7. All loading with 50 Ω to V_{CC} 2.0 V.
- V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 7. 10EP DC CHARACTERISTICS, NECL V_{CC} = 0 V; V_{EE} = -5.5 V to -3.0 V (Note 9)

			-40°C			25°C			85°C		
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	20	28	36	20	30	38	20	32	38	mA
VOH	Output HIGH Voltage (Note 10)	-1135	-1010	-885	-1070	-945	-820	-1010	-885	-760	mV
V _{OL}	Output LOW Voltage (Note 10)	-1935	-1810	-1685	-1870	-1745	-1620	-1810	-1685	-1560	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1210		-885	-1145		-820	-1085		-760	mV
V _{IL}	Input LOW Voltage (Single-Ended)	-1935		-1610	-1870		-1545	-1810		-1485	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 11)	V _{EE} .	+ 2.0	0.0	V _{EE} .	+ 2.0	0.0	V _{EE} -	+ 2.0	0.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current DDD	0.5 -150			0.5 -150			0.5 -150			μΑ

- 9. Input and output parameters vary 1:1 with V_{CC}.
- 10. All loading with 50 Ω to V_{CC} 2.0 V.
- 11. V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 8. 100EP DC CHARACTERISTICS, PECL $V_{CC} = 3.3 \text{ V}$, $V_{EE} = 0 \text{ V}$ (Note 12)

		-40°C			25°C						
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	20	28	36	20	30	38	20	32	40	mA
V _{OH}	Output HIGH Voltage (Note 13)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V _{OL}	Output LOW Voltage (Note 13)	1355	1480	1605	1355	1480	1605	1355	1480	1605	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	2075		2420	2075		2420	2075		2420	mV
V _{IL}	Input LOW Voltage (Single-Ended)	1355		1675	1355		1675	1355		1675	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 14)	2.0		3.3	2.0		3.3	2.0		3.3	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	put LOW Current $\frac{D}{\overline{D}}$	0.5 -150			0.5 -150			0.5 -150			μΑ

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.

Table 9. 100EP DC CHARACTERISTICS, PECL V_{CC} = 5.0 V, V_{FF} = 0 V (Note 15)

			-40°C			25°C			85°C		
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	20	28	36	20	30	38	20	32	40	mA
V _{OH}	Output HIGH Voltage (Note 16)	3855	3980	4105	3855	3980	4105	3855	3980	4105	mV
V _{OL}	Output LOW Voltage (Note 16)	3055	3180	3305	3055	3180	3305	3055	3180	3305	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	3775		4120	3775		4120	3775		4120	mV
V _{IL}	Input LOW Voltage (Single-Ended)	3055		3375	3055		3375	3055		3375	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 17)	2.0		5.0	2.0		5.0	2.0		5.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current DDD	0.5 -150			0.5 -150			0.5 -150			μΑ

^{12.} Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +0.3 V to -2.2 V.

^{13.} All loading with 50 Ω to V_{CC} – 2.0 V.

^{14.} V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

^{15.} Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary +2.0 V to -0.5 V.

^{16.} All loading with 50 Ω to V_{CC} – 2.0 V.

^{17.} V_{IHCMR} min varies 1:1 with V_{EE}, V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

Table 10. 100EP DC CHARACTERISTICS, NECL $V_{CC} = 0 \text{ V}$; $V_{EE} = -5.5 \text{ V}$ to -3.0 V (Note 18)

			-40°C			25°C			85°C		
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
I _{EE}	Power Supply Current	20	28	36	20	30	38	20	32	40	mA
V _{OH}	Output HIGH Voltage (Note 19)	-1145	-1020	-895	-1145	-1020	-895	-1145	-1020	-895	mV
V _{OL}	Output LOW Voltage (Note 19)	-1945	-1820	-1695	-1945	-1820	-1695	-1945	-1820	-1695	mV
V _{IH}	Input HIGH Voltage (Single-Ended)	-1225		-880	-1225		-880	-1225		-880	mV
V_{IL}	Input LOW Voltage (Single-Ended)	-1945		-1625	-1945		-1625	-1945		-1625	mV
V _{IHCMR}	Input HIGH Voltage Common Mode Range (Differential Configuration) (Note 20)	V _{EE} -	+ 2.0	0.0	V _{EE} -	+ 2.0	0.0	V _{EE} .	+ 2.0	0.0	V
I _{IH}	Input HIGH Current			150			150			150	μΑ
I _{IL}	Input LOW Current D D	0.5 -150			0.5 -150			0.5 -150			μΑ

Table 11. AC CHARACTERISTICS $V_{CC} = 0 \text{ V}$; $V_{EE} = -3.0 \text{ V}$ to -5.5 V or $V_{CC} = 3.0 \text{ V}$ to 5.5 V; $V_{EE} = 0 \text{ V}$ (Note 21)

			-40°C			25°C					
Symbol	Characteristic	Min	Тур	Max	Min	Тур	Max	Min	Тур	Max	Unit
f _{max}	Maximum Frequency (Figure 2)		> 3			> 3			> 3		GHz
t _{PLH} , t _{PHL}	Propagation Delay to Output Differential D, \overline{D} to Q, \overline{Q}	170	220	280	180	250	300	200	270	320	ps
t _{JITTER}	Cycle-to-Cycle Jitter (Figure 2)		0.2	< 1		0.2	< 1		0.2	< 1	ps
V _{PP}	Input Voltage Swing (Differential Configuration)	150	800	1200	150	800	1200	150	800	1200	mV
t _r t _f	Output Rise/Fall Times Q, \overline{Q} (20% – 80%)	70	120	170	80	130	180	100	150	200	ps

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.

^{18.} Input and output parameters vary 1:1 with V_{CC}.

^{19.} All loading with 50 Ω to V_{CC} – 2.0 V.

^{20.} V_{IHCMR} min varies 1:1 with V_{EE} , V_{IHCMR} max varies 1:1 with V_{CC}. The V_{IHCMR} range is referenced to the most positive side of the differential input signal.

^{21.} Measured using a 750 mV source, 50% duty cycle clock source. All loading with 50 Ω to V_{CC} – 2.0 V.

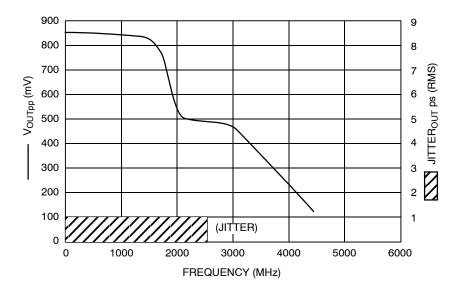


Figure 2. F_{max}/Jitter

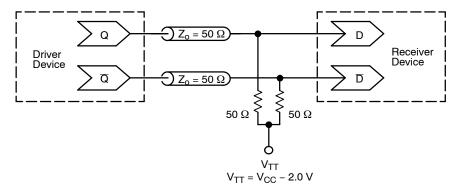


Figure 3. Typical Termination for Output Driver and Device Evaluation (See Application Note AND8020/D – Termination of ECL Logic Devices.)

ORDERING INFORMATION

Device	Package	Shipping [†]
MC10EP08D	SOIC-8	98 Units / Rail
MC10EP08DG	SOIC-8 (Pb-Free)	98 Units / Rail
MC10EP08DR2	SOIC-8	2500 / Tape & Reel
MC10EP08DR2G	SOIC-8 (Pb-Free)	2500 / Tape & Reel
MC10EP08DT	100 Units / Rail	
MC10EP08DTG	TSSOP-8 (Pb-Free)	100 Units / Rail
MC10EP08DTR2	TSSOP-8	2500 / Tape & Reel
MC10EP08DTR2G	TSSOP-8 (Pb-Free)	2500 / Tape & Reel
MC10EP08MNR4G	DFN8 (Pb-Free)	1000 / Tape & Reel
MC100EP08D	SOIC-8	98 Units / Rail
MC100EP08DG	SOIC-8 (Pb-Free)	98 Units / Rail
MC100EP08DR2	SOIC-8	2500 / Tape & Reel
MC100EP08DR2G	SOIC-8 (Pb-Free)	2500 / Tape & Reel
MC100EP08DT	TSSOP-8	100 Units / Rail
MC100EP08DTG	TSSOP-8 (Pb-Free)	100 Units / Rail
MC100EP08DTR2	TSSOP-8	2500 / Tape & Reel
MC100EP08DTR2G	TSSOP-8 (Pb-Free)	2500 / Tape & Reel
MC100EP08MNR4G	DFN8 (Pb-Free)	1000 / Tape & Reel

[†]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.

Resource Reference of Application Notes

AN1405/D - ECL Clock Distribution Techniques

AN1406/D - Designing with PECL (ECL at +5.0 V)

AN1503/D - ECLinPS™ I/O SPiCE Modeling Kit

AN1504/D - Metastability and the ECLinPS Family

AN1568/D - Interfacing Between LVDS and ECL

AN1642/D - The ECL Translator Guide

AND8001/D - Odd Number Counters Design

AND8002/D - Marking and Date Codes

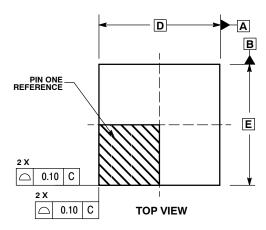
AND8020/D - Termination of ECL Logic Devices

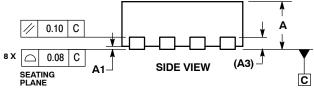
AND8066/D - Interfacing with ECLinPS

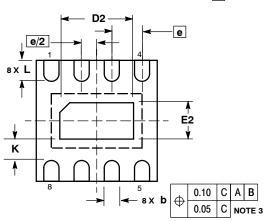
AND8090/D - AC Characteristics of ECL Devices

PACKAGE DIMENSIONS

DFN8 CASE 506AA-01 ISSUE D







BOTTOM VIEW

- NOTES:

 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.

 2. CONTROLLING DIMENSION: MILLIMETERS.

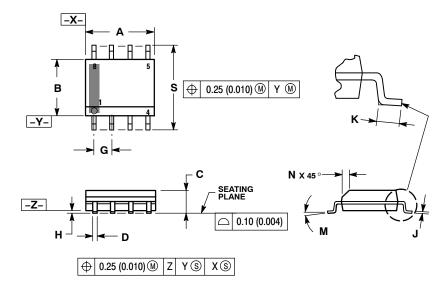
 3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.25 AND 0.30 MM FROM TERMINAL.

 4. COPLANARITY APPLIES TO THE EXPOSED PAD AS WELL AS THE TERMINALS.

	MILLIN	IETERS	
DIM	MIN	MAX	
Α	0.80	1.00	
A1	0.00	0.05	
АЗ	0.20 REF		
b	0.20	0.30	
D	2.00	BSC	
D2	1.10	1.30	
E	2.00 BSC		
E2	0.70	0.90	
е	0.50	BSC	
K	0.20		
L	0.25	0.35	

PACKAGE DIMENSIONS

SOIC-8 NB CASE 751-07 **ISSUE AJ**



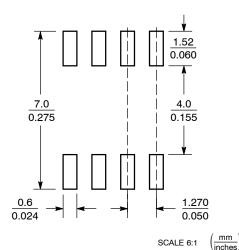
NOTES:

- DIMENSIONING AND TOLERANCING PER
- ANSI Y14.5M, 1982. CONTROLLING DIMENSION: MILLIMETER. DIMENSION A AND B DO NOT INCLUDE MOLD PROTRUSION.
- MAXIMUM MOLD PROTRUSION 0.15 (0.006) PER SIDE.
- PEN SIJE.

 DIMENSION D DOES NOT INCLUDE DAMBAR
 PROTRUSION. ALLOWABLE DAMBAR
 PROTRUSION SHALL BE 0.127 (0.005) TOTAL
 IN EXCESS OF THE D DIMENSION AT
- MAXIMUM MATERIAL CONDITION.
 6. 751–01 THRU 751–06 ARE OBSOLETE. NEW STANDARD IS 751–07.

	MILLIMETERS		INCHES		
DIM	MIN	MAX	MIN	MAX	
Α	4.80	5.00	0.189	0.197	
В	3.80	4.00	0.150	0.157	
C	1.35	1.75	0.053	0.069	
D	0.33	0.51	0.013	0.020	
G	1.27 BSC		0.050 BSC		
H	0.10	0.25	0.004	0.010	
7	0.19	0.25	0.007	0.010	
K	0.40	1.27	0.016	0.050	
М	0 °	8 °	0 °	8 °	
N	0.25	0.50	0.010	0.020	
S	5.80	6.20	0.228	0.244	

SOLDERING FOOTPRINT*

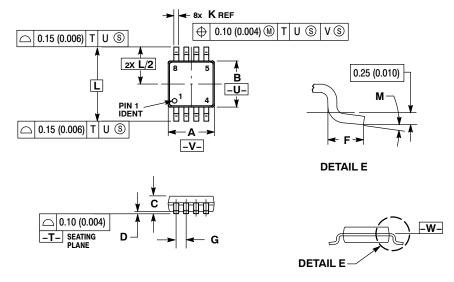


*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

PACKAGE DIMENSIONS

TSSOP-8 **DT SUFFIX** CASE 948R-02

PLASTIC TSSOP PACKAGE **ISSUE A**



NOTES

- DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
- CONTROLLING DIMENSION: MILLIMETER.
- CONTROLLING DIMENSION. MILLIMETER.
 DIMENSION A DOES NOT INCLUDE MOLD FLASH.
 PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
- DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010)
- TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
- DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

	MILLIN	IETERS	INCHES	
DIM	MIN	MAX	MIN	MAX
Α	2.90	3.10	0.114	0.122
В	2.90	3.10	0.114	0.122
С	0.80	1.10	0.031	0.043
D	0.05	0.15	0.002	0.006
F	0.40	0.70	0.016	0.028
G	0.65 BSC		0.026 BSC	
K	0.25	0.40	0.010	0.016
L	4.90 BSC		0.193 BSC	
M	0°	6 °	0°	6°

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MC10EP08/D