

## 3.3 V/5 V ECL 2:1 Multiplexer

### MC100EP58

#### Description

The MC100EP58 is a 2:1 multiplexer. The device is pin and functionally equivalent to the EL58 and LVEL58 devices.

The 100 Series contains temperature compensation.

#### Features

- 310 ps Typical Propagation Delay
- Maximum Frequency > 3 GHz Typical
- PECL Mode Operating Range:
  - ◆  $V_{CC} = 3.0\text{ V to }5.5\text{ V}$  with  $V_{EE} = 0\text{ V}$
- NECL Mode Operating Range:
  - ◆  $V_{CC} = 0\text{ V}$  with  $V_{EE} = -3.0\text{ V to }-5.5\text{ V}$
- Open Input Default State
- Q Output Will Default LOW with Inputs Open or at  $V_{EE}$
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant



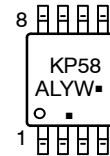
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**TSSOP-8  
DT SUFFIX  
CASE 948R-02**

#### MARKING DIAGRAM\*



K = MC100  
A = Assembly Location  
L = Wafer Lot  
Y = Year  
W = Work Week  
▪ = Pb-Free Package

(Note: Microdot may be in either location)

\*For additional marking information, refer to Application Note [AND8002/D](#).

#### ORDERING INFORMATION

Device	Package	Shipping
MC100EP58DTG	TSSOP-8 (Pb-Free)	100 Units / Tube

# MC100EP58

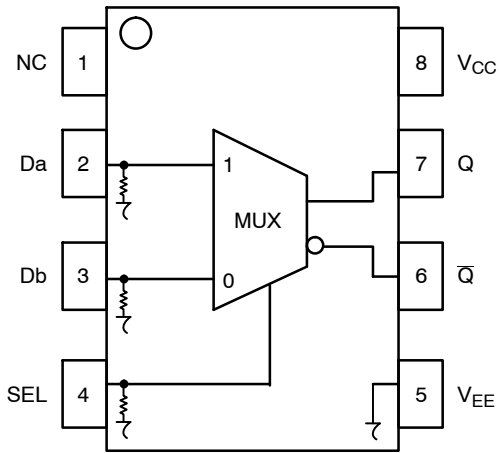


Figure 1. 8-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

PIN	FUNCTION
Da*, Db*	ECL Data Inputs
SEL*	ECL Select Inputs
Q, $\bar{Q}$	ECL Data Outputs
V <sub>CC</sub>	Positive Supply
V <sub>EE</sub>	Negative Supply
NC	No Connect

\* Pins will default LOW when left open.

Table 2. TRUTH TABLE

SEL	Data
H	a
L	b

Table 3. ATTRIBUTES

Characteristics	Value
Internal Input Pulldown Resistor	75 k $\Omega$
Internal Input Pullup Resistor	N/A
ESD Protection Human Body Model Machine Model Charged Device Model	> 4 kV > 200 V > 2 kV
Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1)	Pb-Free Pkg
TSSOP-8	Level 3
Flammability Rating Oxygen Index: 28 to 34	UL 94 V-0 @ 0.125 in
Transistor Count	41 Devices
Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test	

1. For additional information, see Application Note [AND8003/D](#).

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**Table 4. MAXIMUM RATINGS**

Symbol	Parameter	Condition 1	Condition 2	Rating	Unit
V <sub>CC</sub>	PECL Mode Power Supply	V <sub>EE</sub> = 0 V		6	V
V <sub>EE</sub>	NECL Mode Power Supply	V <sub>CC</sub> = 0 V		-6	V
V <sub>I</sub>	PECL Mode Input Voltage NECL Mode Input Voltage	V <sub>EE</sub> = 0 V V <sub>CC</sub> = 0 V	V <sub>I</sub> ≤ V <sub>CC</sub> V <sub>I</sub> ≥ V <sub>EE</sub>	6 -6	V
I <sub>out</sub>	Output Current	Continuous Surge		50 100	mA
I <sub>BB</sub>	V <sub>BB</sub> Sink/Source			±0.5	mA
T <sub>A</sub>	Operating Temperature Range			-40 to +85	°C
T <sub>stg</sub>	Storage Temperature Range			-65 to +150	°C
θ <sub>JA</sub>	Thermal Resistance (Junction-to-Ambient)	0 lfpm 500 lfpm	TSSOP-8	185 140	°C/W
θ <sub>JC</sub>	Thermal Resistance (Junction-to-Case)	Standard Board	TSSOP-8	41 to 44	°C/W
T <sub>sol</sub>	Wave Solder (Pb-Free)	<2 to 3 sec @ 260°C		265	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

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

**Table 5. 100EP DC CHARACTERISTICS, PECL (V<sub>CC</sub> = 3.3 V, V<sub>EE</sub> = 0 V (Note 1))**

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
I <sub>EE</sub>	Power Supply Current	20	28	37	20	31	39	25	33	42	mA
V <sub>OH</sub>	Output HIGH Voltage (Note 2)	2155	2280	2405	2155	2280	2405	2155	2280	2405	mV
V <sub>OL</sub>	Output LOW Voltage (Note 2)	1355	1480	1605	1355	1480	1605	1355	1480	1605	mV
V <sub>IH</sub>	Input HIGH Voltage (Single-Ended)	2075		2420	2075		2420	2075		2420	mV
V <sub>IL</sub>	Input LOW Voltage (Single-Ended)	1355		1675	1355		1675	1355		1675	mV
I <sub>IH</sub>	Input HIGH Current			150			150			150	μA
I <sub>IL</sub>	Input LOW Current	0.5			0.5			0.5			μA

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.

1. Input and output parameters vary 1:1 with V<sub>CC</sub>. V<sub>EE</sub> can vary +0.3 V to -2.2 V.
2. All loading with 50 Ω to V<sub>CC</sub> - 2.0 V.

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**Table 6. 100EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 5.0\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current	20	28	37	20	31	39	25	33	42	mA
$V_{OH}$	Output HIGH Voltage (Note 2)	3855	3980	4105	3855	3980	4105	3855	3980	4105	mV
$V_{OL}$	Output LOW Voltage (Note 2)	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
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5			0.5			0.5			$\mu\text{A}$

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 lfm.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +2.0 V to -0.5 V.
2. All loading with 50  $\Omega$  to  $V_{CC} - 2.0\text{ V}$ .

**Table 7. 100EP DC CHARACTERISTICS, NECL** ( $V_{CC} = 0\text{ V}$ ,  $V_{EE} = -5.5\text{ V}$  to  $-3.0\text{ V}$  (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$I_{EE}$	Power Supply Current	20	28	37	20	31	39	25	33	42	mA
$V_{OH}$	Output HIGH Voltage (Note 2)	-1145	-1020	-895	-1145	-1020	-895	-1145	-1020	-895	mV
$V_{OL}$	Output LOW Voltage (Note 2)	-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
$I_{IH}$	Input HIGH Current			150			150			150	$\mu\text{A}$
$I_{IL}$	Input LOW Current	0.5			0.5			0.5			$\mu\text{A}$

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 lfm.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .
2. All loading with 50  $\Omega$  to  $V_{CC} - 2.0\text{ V}$ .

**Table 8. AC CHARACTERISTICS** ( $V_{CC} = 0\text{ V}$ ;  $V_{EE} = -3.0\text{ V}$  to  $-5.5\text{ V}$  or  $V_{CC} = 3.0\text{ V}$  to  $5.5\text{ V}$ ;  $V_{EE} = 0\text{ V}$  (Note 1))

Symbol	Characteristic	-40°C			25°C			85°C			Unit
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
$f_{\max}$	Maximum Frequency (See Figure 2. $F_{\max}/\text{JITTER}$ )		> 3			> 3			> 3		GHz
$t_{PLH}$ , $t_{PHL}$	Propagation Delay to Output Differential D to Q, $\bar{Q}$ SEL to Q, $\bar{Q}$	200	280	380	210	310	410	220	340	420	ps
$t_{\text{JITTER}}$	Cycle-to-Cycle Jitter (See Figure 2. $F_{\max}/\text{JITTER}$ )		0.2	< 2		0.2	< 2		0.2	< 2	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, $\bar{Q}$ (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 lfm.

1. Measured using a 750 mV source, 50% duty cycle clock source. All loading with 50  $\Omega$  to  $V_{CC} - 2.0\text{ V}$ .

## MC100EP58

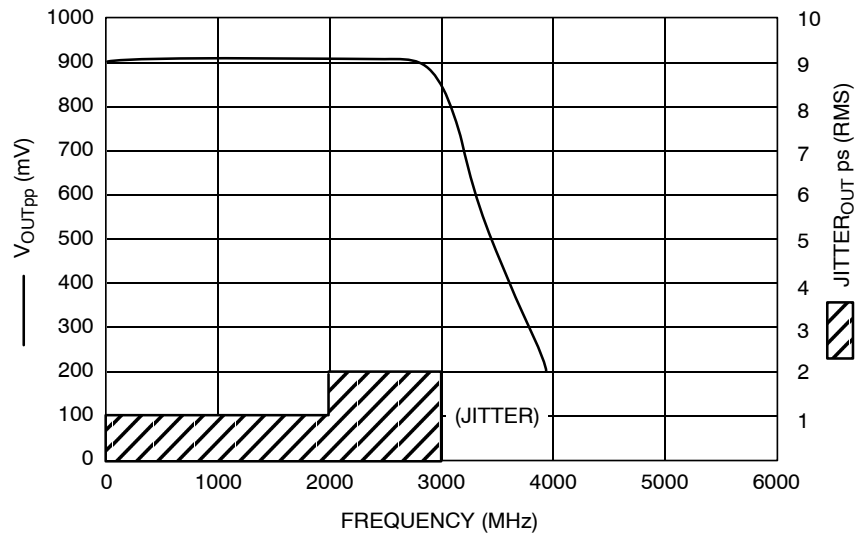


Figure 2.  $F_{max}/Jitter$

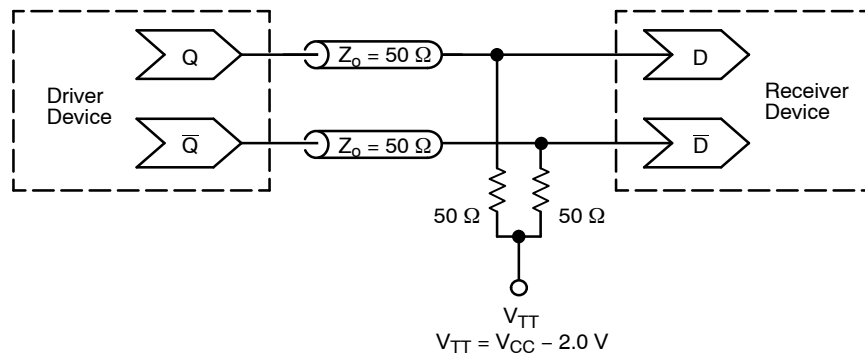


Figure 3. Typical Termination for Output Driver and Device Evaluation  
(See Application Note [AND8020/D](#) – Termination of ECL Logic Devices.)

### 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
- AN1672/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

# MECHANICAL CASE OUTLINE

## PACKAGE DIMENSIONS

ON Semiconductor®



SCALE 2:1

### TSSOP 8 CASE 948R-02 ISSUE A

DATE 04/07/2000



**NOTES:**

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: MILLIMETER.
3. 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.
4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
6. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.90	3.10	0.114	0.122
B	2.90	3.10	0.114	0.122
C	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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