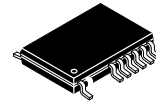
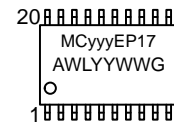


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**TSSOP-20  
DT SUFFIX  
CASE 948E**

**MARKING DIAGRAM\***



yyy = 10 or 100  
 A = Assembly Location  
 WL = Wafer Lot  
 YY = Year  
 WW = Work Week  
 G = Pb-Free Package

(Note: Microdot may be in either location)

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

**Features**

- 220 ps Typical Propagation Delay
- Maximum Frequency > 3.0 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
- Safety Clamp on Inputs
- Q Output Will Default LOW with Inputs Open or at  $V_{EE}$
- $V_{BB}$  Output
- These Devices are Pb-Free, Halogen Free and are RoHS Compliant

**ORDERING INFORMATION**

| Device       | Package                  | Shipping           |
|--------------|--------------------------|--------------------|
| MC10EP17DTG  | TSSOP-20 WB<br>(Pb-Free) | 75 Units /<br>Tube |
| MC100EP17DTG | TSSOP-20 WB<br>(Pb-Free) | 75 Units /<br>Tube |

# MC10EP17, MC100EP17

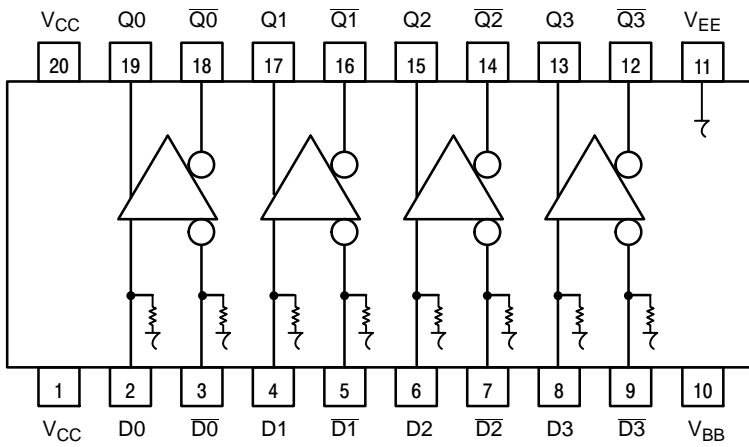


Figure 1. 20-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

| PIN                            | FUNCTION                      |
|--------------------------------|-------------------------------|
| D[0:3]*, $\overline{D}$ [0:3]* | ECL Differential Data Inputs  |
| Q[0:3], $\overline{Q}$ [0:3]   | ECL Differential Data Outputs |
| V <sub>BB</sub>                | Reference Voltage Output      |
| V <sub>CC</sub>                | Positive Supply               |
| V <sub>EE</sub>                | Negative Supply               |

\* Pins will default LOW when left open.

Table 2. ATTRIBUTES

| Characteristics   | Value                       |
|---|-----------------------------|
| Internal Input Pulldown Resistor  | 75 kΩ                       |
| Internal Input Pullup Resistor  | N/A                         |
| ESD Protection<br>Human Body Model<br>Machine Model<br>Charged Device Model | > 2 kV<br>> 100 V<br>> 2 kV |

# MC10EP17, MC100EP17

**Table 3. MAXIMUM RATINGS**

| Symbol        | Parameter  | Condition 1                                    | Condition 2                            | Rating      | Unit                        |
|---------------|--|--|--|-------------|-----------------------------|
| $V_{CC}$      | PECL Mode Power Supply                             | $V_{EE} = 0\text{ V}$                          |  | 6           | V                           |
| $V_{EE}$      | NECL Mode Power Supply                             | $V_{CC} = 0\text{ V}$                          |  | -6          | V                           |
| $V_I$         | PECL Mode Input Voltage<br>NECL Mode Input Voltage | $V_{EE} = 0\text{ V}$<br>$V_{CC} = 0\text{ V}$ | $V_I \leq V_{CC}$<br>$V_I \geq V_{EE}$ | 6<br>-6     | V                           |
| $I_{out}$     | Output Current                                     | Continuous<br>Surge                            |  | 50<br>100   | mA                          |
| $I_{BB}$      | $V_{BB}$ Sink/Source                               |  |  | $\pm 0.5$   | mA                          |
| $T_A$         | Operating Temperature Range                        |  |  | -40 to +85  | $^{\circ}\text{C}$          |
| $T_{stg}$     | Storage Temperature Range                          |  |  | -65 to +150 | $^{\circ}\text{C}$          |
| $\theta_{JA}$ | Thermal Resistance (Junction-to-Ambient)           | 0 lfpm<br>500 lfpm                             | TSSOP-20 WB                            | 140<br>100  | $^{\circ}\text{C}/\text{W}$ |
| $\theta_{JC}$ | Thermal Resistance (Junction-to-Case)              | Standard Board                                 | TSSOP-20 WB                            | 23 to 41    | $^{\circ}\text{C}/\text{W}$ |
| $T_{sol}$     | Wave Solder (Pb-Free)                              |  |  | 265         | $^{\circ}\text{C}$          |

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.

**Table 4. 10EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 3.3\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (Note 1))

| Symbol      | Characteristic   | -40 $^{\circ}\text{C}$ |      |      | 25 $^{\circ}\text{C}$ |      |      | 85 $^{\circ}\text{C}$ |      |      | Unit          |
|-------------|--|------------------------|------|------|-----------------------|------|------|-----------------------|------|------|---------------|
|             |  | Min                    | Typ  | Max  | Min                   | Typ  | Max  | Min                   | Typ  | Max  |               |
| $I_{EE}$    | Power Supply Current   | 42                     | 50   | 65   | 44                    | 52   | 66   | 46                    | 54   | 68   | mA            |
| $V_{OH}$    | Output HIGH Voltage (Note 2)                                 | 2165                   | 2290 | 2415 | 2230                  | 2355 | 2480 | 2290                  | 2415 | 2540 | mV            |
| $V_{OL}$    | Output LOW Voltage (Note 2)                                  | 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)                             | 365                    |      | 1690 | 1430                  |      | 1755 | 1490                  |      | 1815 | mV            |
| $V_{BB}$    | Output Voltage Reference                                     | 1790                   | 1890 | 1990 | 1855                  | 1955 | 2055 | 1915                  | 2015 | 2115 | mV            |
| $V_{IHCMR}$ | Input HIGH Voltage Common Mode Range (Differential) (Note 3) | 2.0                    |      | 3.3  | 2.0                   |      | 3.3  | 2.0                   |      | 3.3  | V             |
| $I_{IH}$    | 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 lfpm.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +0.3 V to -2.2 V.
2. All loading with 50  $\Omega$  to  $V_{CC} - 2.0\text{ V}$ .
3.  $V_{IHCMR}$  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.

## MC10EP17, MC100EP17

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

| Characteristic               | -40°C |      |      | 25°C |      |      | 85°C |      |      | Unit |
|------------------------------|-------|------|------|------|------|------|------|------|------|------|
|                              | Min   | Typ  | Max  | Min  | Typ  | Max  | Min  | Typ  | Max  |      |
| Power Supply Current         | 42    | 50   | 65   | 44   | 52   | 66   | 46   | 54   | 68   | mA   |
| Output HIGH Voltage (Note 2) | 3865  | 3990 | 4115 | 3930 | 4055 | 4180 | 3990 | 4115 | 4240 | mV   |
| Output LOW Voltage (Note 2)  |       |      |      |      |      |      |      |      |      |      |

# MC10EP17, MC100EP17

**Table 7. 100EP DC CHARACTERISTICS, PECL** ( $V_{CC} = 3.3\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (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   | 47    | 55   | 63   | 50   | 58   | 66   | 54   | 62   | 70   | mA            |
| $V_{OH}$    | Output HIGH Voltage (Note 2)                                 | 2155  | 2280 | 2405 | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | mV            |
| $V_{OL}$    | Output LOW Voltage (Note 2)                                  | 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            |
| $V_{BB}$    | Output Voltage Reference                                     | 1775  | 1875 | 1975 | 1775 | 1875 | 1975 | 1775 | 1875 | 1975 | mV            |
| $V_{IHCMR}$ | Input HIGH Voltage Common Mode Range (Differential) (Note 3) | 2.0   |      | 3.3  | 2.0  |      | 3.3  | 2.0  |      | 3.3  | V             |
| $I_{IH}$    | 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 lfpm.

1. Input and output parameters vary 1:1 with  $V_{CC}$ .  $V_{EE}$  can vary +0.3 V to -2.2 V.
2. All loading with  $50\ \Omega$  to  $V_{CC} - 2.0\text{ V}$ .
3.  $V_{IHCMR}$  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** ( $V_{CC} = 5.0\text{ V}$ ,  $V_{EE} = 0\text{ V}$  (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   | 47    | 55   | 63   | 50   | 58   | 66   | 54   | 62   | 70   | 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            |
| $V_{BB}$    | Output Voltage Reference                                     | 3475  | 3575 | 3675 | 3475 | 3575 | 3675 | 3475 | 3575 | 3675 | mV            |
| $V_{IHCMR}$ | Input HIGH Voltage Common Mode Range (Differential) (Note 3) | 2.0   |      | 5.0  | 2.0  |      | 5.0  | 2.0  |      | 5.0  | V             |
| $I_{IH}$    | 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 lfpm.

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  $V_{CC} - 2.0\text{ V}$ .
3.  $V_{IHCMR}$  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.



# MC10EP17, MC100EP17

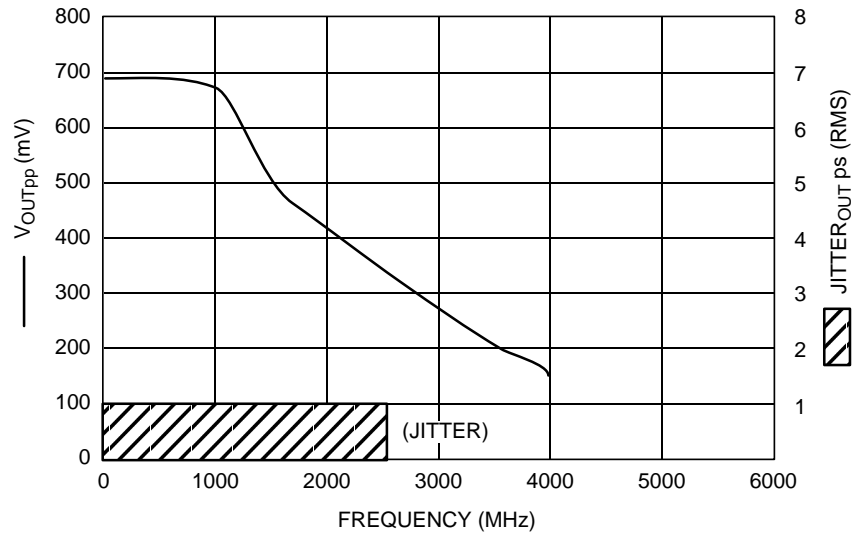


Figure 2. F<sub>max</sub>/Jitter

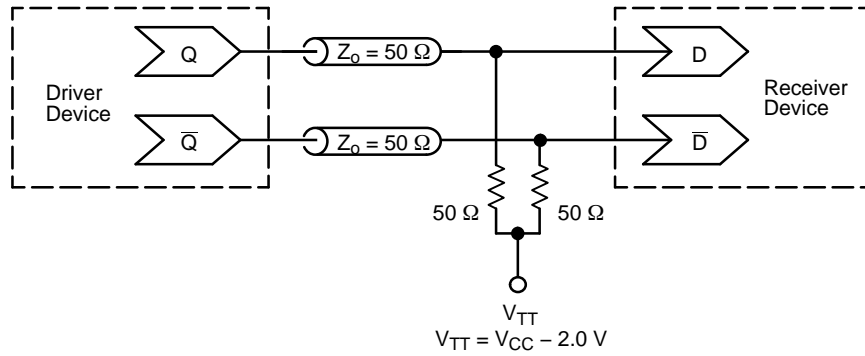


Figure 3. Typical Termination for Output Driver and Device Evaluation  
(See Application Note [AND8020/D](#) – Termination of ECL Logic Devices.)

## Resource Reference of Application Notes

AN1405/D –

TSSOP-20 WB



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