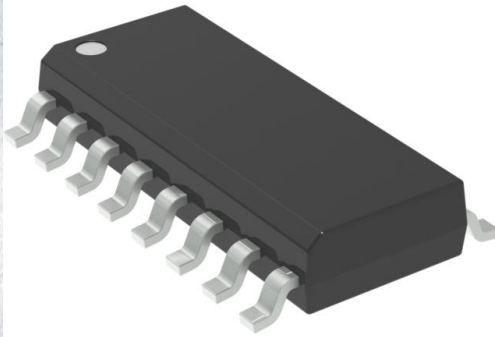


MC100LVEP34DR2G Datasheet

www.digi-electronics.com



<https://www.DiGi-Electronics.com>

| | |
|------------------------------|--|
| DiGi Electronics Part Number | MC100LVEP34DR2G-DG |
| Manufacturer | onsemi |
| Manufacturer Product Number | MC100LVEP34DR2G |
| Description | IC CLOCK GENERATOR 16SOIC |
| Detailed Description | Clock Generator IC 2.8GHz 1 16-SOIC (0.154", 3.90mm Width) |



Tel: +00 852-30501935

RFQ Email: Info@DiGi-Electronics.com

DiGi is a global authorized distributor of electronic components.

Purchase and inquiry

Manufacturer Product Number:

MC100LVEP34DR2G

Series:

100LVEP

DiGi-Electronics Programmable:

Not Verified

PLL:

No

Output:

ECL

Ratio - Input:Output:

1:3

Frequency - Max:

2.8GHz

Voltage - Supply:

2.375V ~ 3.8V

Mounting Type:

Surface Mount

Supplier Device Package:

16-SOIC

Manufacturer:

onsemi

Product Status:

Obsolete

Type:

Clock Generator

Input:

CML, LVDS, NECL, PECL

Number of Circuits:

1

Differential - Input:Output:

Yes/Yes

Divider/Multiplier:

Yes/No

Operating Temperature:

-40°C ~ 85°C

Package / Case:

16-SOIC (0.154", 3.90mm Width)

Base Product Number:

MC100LV

Environmental & Export classification

RoHS Status:

ROHS3 Compliant

REACH Status:

REACH Unaffected

HTSUS:

8542.39.0001

Moisture Sensitivity Level (MSL):

1 (Unlimited)

ECCN:

EAR99

2.5 V/3.3 V ECL ÷2, ÷4, ÷8 Clock Generation Chip

MC100LVEP34

Description

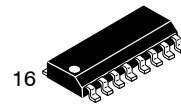
The MC100LVEP34 is a low skew ÷2, ÷4, ÷8 clock generation chip designed explicitly for low skew clock generation applications. The internal dividers are synchronous to each other, therefore, the common output edges are all precisely aligned. The V_{BB} pin, an internally generated voltage supply, is available to this device only. For single-ended input conditions, the unused differential input is connected to V_{BB} as a switching reference voltage. V_{BB} may also rebias AC coupled inputs. When used, decouple V_{BB} and V_{CC} via a 0.01 μF capacitor and limit current sourcing or sinking to 0.5 mA. When not used, V_{BB} should be left open.

The common enable ($\overline{\text{EN}}$) is synchronous so that the internal dividers will only be enabled/disabled when the internal clock is already in the LOW state. This avoids any chance of generating a runt clock pulse on the internal clock when the device is enabled/disabled as can happen with an asynchronous control. An internal runt pulse could lead to losing synchronization between the internal divider stages. The internal enable flip-flop is clocked on the falling edge of the input clock; therefore, all associated specification limits are referenced to the negative edge of the clock input.

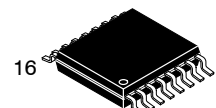
Upon start-up, the internal flip-flops will attain a random state; the master reset (MR) input allows for the synchronization of the internal dividers, as well as multiple LVEP34s in a system. Single-ended CLK input operation is limited to a $V_{CC} \geq 3.0 \text{ V}$ in PECL mode, or $V_{EE} \leq -3.0 \text{ V}$ in NECL mode.

Features

- 35 ps Output-to-Output Skew
- Synchronous Enable/Disable
- Master Reset for Synchronization
- The 100 Series Contains Temperature Compensation.
- PECL Mode Operating Range: $V_{CC} = 2.375 \text{ V}$ to 3.8 V with $V_{EE} = 0 \text{ V}$
- NECL Mode Operating Range: $V_{CC} = 0 \text{ V}$ with $V_{EE} = -2.375 \text{ V}$ to -3.8 V
- Open Input Default State
- LVDS Input Compatible
- These Devices are Pb-Free, Halogen Free/BFR Free and are RoHS Compliant

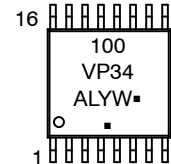
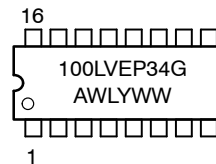


1
SO-16
D SUFFIX
CASE 751B



1
TSSOP-16
DT SUFFIX
CASE 948F

MARKING DIAGRAMS*



- A = Assembly Location
 L, WL = Wafer Lot
 Y = Year
 W, WW = Work Week
 G or ■ = Pb-Free Package

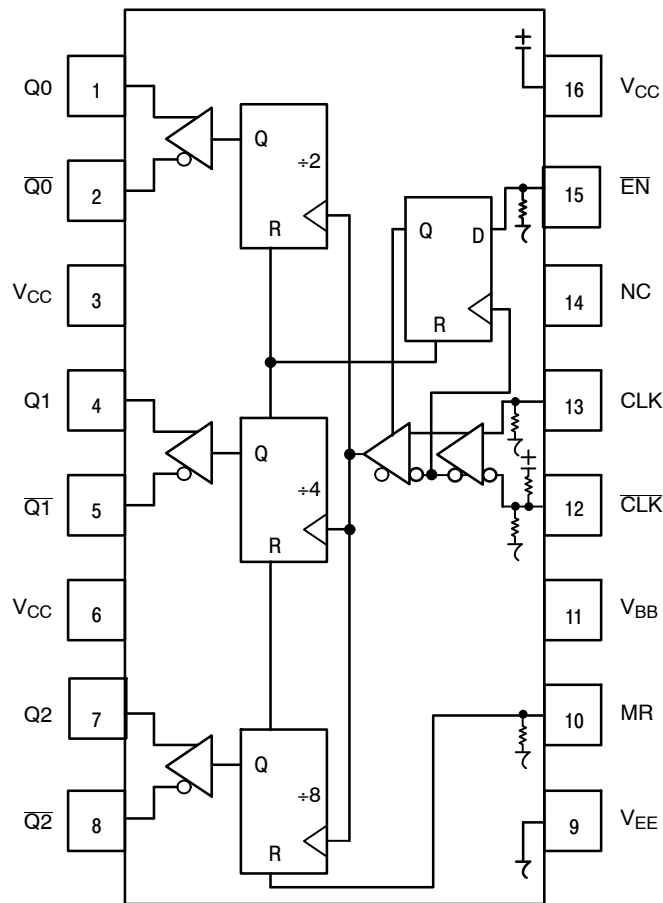
(Note: Microdot may be in either location)

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

ORDERING INFORMATION

| Device | Package | Shipping [†] |
|------------------|-----------------------|-----------------------|
| MC100LVEP34DG | SOIC-16 (Pb-Free) | 48 Units / Tube |
| MC100LVEP34DTG | TSSOP-16 (Pb-Free) | 96 Units / Tube |
| MC100LVEP34DTR2G | TSSOP-16 (Pb-Free) | 2500 / 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](#).

MC100LVEP34

Warning: All V_{CC} and V_{EE} pins must be externally connected to Power Supply to guarantee proper operation.

Figure 1. 16-Lead Pinout (Top View) and Logic Diagram

Table 1. PIN DESCRIPTION

| Pin | Function |
|---------------------------|--------------------------|
| CLK*, \overline{CLK} ** | ECL Diff Clock Inputs |
| EN* | ECL Sync Enable |
| MR* | ECL Master Reset |
| Q0, $\overline{Q0}$ | ECL Diff +2 Outputs |
| Q1, $\overline{Q1}$ | ECL Diff +4 Outputs |
| Q2, $\overline{Q2}$ | ECL Diff +8 Outputs |
| V_{BB} | Reference Voltage Output |
| V_{CC} | Positive Supply |
| V_{EE} | Negative Supply |
| NC | No Connect |

* Pins will default LOW when left open.

**Pins will default to $V_{CC}/2$ when left open.

Table 2. FUNCTION TABLE

| CLK | EN | MR | FUNCTION |
|-----|----|----|-----------------|
| Z | L | L | Divide |
| ZZ | H | L | Hold Q_{0-3} |
| X | X | H | Reset Q_{0-3} |

Z = Low-to-High Transition

ZZ = High-to-Low Transition

MC100LVEP34**Table 3. ATTRIBUTES**

| Characteristics | Value |
|---|-----------------------------|
| Internal Input Pulldown Resistor | 75 k Ω |
| Internal Input Pullup Resistor | 37.5 k Ω |
| ESD Protection Human Body Model Machine Model Charged Device Model | > 2 kV > 200 V > 2 kV |
| Moisture Sensitivity, Indefinite Time Out of Drypack (Note 1) | Level 1 |
| Flammability Rating Oxygen Index: 28 to 34 | UL 94 V-O @ 0.125 in |
| Transistor Count | 210 Devices |
| Meets or exceeds JEDEC Spec EIA/JESD78 IC Latchup Test | |

1. For additional Moisture Sensitivity information, refer to 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 \leq V _{CC} V _I \geq V _{EE} | 6 -6 | V V |
| I _{out} | Output Current | Continuous Surge | | 50 100 | mA mA |
| I _{BB} | V _{BB} Sink/Source | | | \pm 0.5 | mA |
| T _A | Operating Temperature Range | | | -40 to +85 | $^{\circ}$ C |
| T _{stg} | Storage Temperature Range | | | -65 to +150 | $^{\circ}$ C |
| θ_{JA} | Thermal Resistance (Junction-to-Ambient) | 0 lfpm 500 lfpm | SOIC-16 SOIC-16 | 100 60 | $^{\circ}$ C/W $^{\circ}$ C/W |
| θ_{JC} | Thermal Resistance (Junction-to-Case) | Standard Board | SOIC-16 | 33 to 36 | $^{\circ}$ C/W |
| θ_{JA} | Thermal Resistance (Junction-to-Ambient) | 0 lfpm 500 lfpm | TSSOP-16 TSSOP-16 | 138 108 | $^{\circ}$ C/W $^{\circ}$ C/W |
| θ_{JC} | Thermal Resistance (Junction-to-Case) | Standard Board | TSSOP-16 | 33 to 36 | $^{\circ}$ C/W |
| T _{sol} | Wave Solder | <2 to 3 sec @ 248 $^{\circ}$ C | | 265 | $^{\circ}$ 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.

MC100LVPEP34**Table 5. 100EP DC CHARACTERISTICS, PECL** $V_{CC} = 2.5\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 2)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-------------|------|------|-------------|------|------|-------------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 40 | 50 | 60 | 40 | 50 | 60 | 42 | 52 | 62 | mA |
| V_{OH} | Output HIGH Voltage (Note 3) | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | 1355 | 1480 | 1605 | mV |
| V_{OL} | Output LOW Voltage (Note 3) | 505 | 680 | 900 | 505 | 680 | 900 | 505 | 680 | 900 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) (Note 4) | 1335 | | 1620 | 1335 | | 1620 | 1275 | | 1620 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) (Note 4) | 505 | | 900 | 505 | | 900 | 505 | | 900 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential) (Note 4, Note 5) | 1.2 | | 3.3 | 1.2 | | 3.3 | 1.2 | | 3.3 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current D \bar{D} | 0.5 -150 | | | 0.5 -150 | | | 0.5 -150 | | | 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 lpm.

- Input and output parameters vary 1:1 with V_{CC} .
- All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.
- Do not use V_{BB} at $V_{CC} < 3.0\text{ V}$. Single-Ended input CLK pin operation is limited to $V_{CC} \geq 3.0\text{ V}$ in PECL mode.
- 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. 100EP DC CHARACTERISTICS, PECL $V_{CC} = 3.3\text{ V}$, $V_{EE} = 0\text{ V}$ (Note 6)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|--|-------------|------|------|-------------|------|------|-------------|------|------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 40 | 50 | 60 | 40 | 50 | 60 | 42 | 52 | 62 | mA |
| V_{OH} | Output HIGH Voltage (Note 7) | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | 2155 | 2280 | 2405 | mV |
| V_{OL} | Output LOW Voltage (Note 7) | 1305 | 1570 | 1700 | 1305 | 1570 | 1700 | 1305 | 1570 | 1700 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | 2075 | | 2420 | 2075 | | 2420 | 2075 | | 2420 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | 1305 | | 1700 | 1305 | | 1700 | 1305 | | 1700 | mV |
| V_{BB} | Output Voltage Reference (Note 8) | 1775 | 1875 | 1975 | 1775 | 1875 | 1975 | 1775 | 1875 | 1975 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential) (Note 9) | 1.2 | | 3.3 | 1.2 | | 3.3 | 1.2 | | 3.3 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current D \bar{D} | 0.5 -150 | | | 0.5 -150 | | | 0.5 -150 | | | 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 lpm.

- Input and output parameters vary 1:1 with V_{CC} . V_{EE} can vary $+0.925\text{ V}$ to -0.5 V .
- All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.
- Single-Ended input CLK pin operation is limited to $V_{CC} \geq 3.0\text{ V}$ in PECL mode.
- 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.

MC100LVEP34**Table 7. 100EP DC CHARACTERISTICS, NECL** $V_{CC} = 0\text{ V}$, $V_{EE} = -3.8\text{ V}$ to -2.375 V (Note 10)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|-------------|---|--------------|-------|-------|--------------|-------|-------|--------------|-------|-------|---------------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| I_{EE} | Power Supply Current | 40 | 50 | 60 | 40 | 50 | 60 | 42 | 52 | 62 | mA |
| V_{OH} | Output HIGH Voltage (Note 11) | -1145 | -1020 | -895 | -1145 | -1020 | -895 | -1145 | -1020 | -895 | mV |
| V_{OL} | Output LOW Voltage (Note 11) | -1995 | -1700 | -1600 | -1995 | -1700 | -1600 | -1995 | -1700 | -1600 | mV |
| V_{IH} | Input HIGH Voltage (Single-Ended) | -1225 | | -880 | -1225 | | -880 | -1225 | | -880 | mV |
| V_{IL} | Input LOW Voltage (Single-Ended) | -1995 | | -1600 | -1995 | | -1600 | -1995 | | -1600 | mV |
| V_{BB} | Output Voltage Reference (Note 12) | -1525 | -1425 | -1325 | -1525 | -1425 | -1325 | -1525 | -1425 | -1325 | mV |
| V_{IHCMR} | Input HIGH Voltage Common Mode Range (Differential) (Note 13) | $V_{EE}+1.2$ | | 0.0 | $V_{EE}+1.2$ | | 0.0 | $V_{EE}+1.2$ | | 0.0 | V |
| I_{IH} | Input HIGH Current | | | 150 | | | 150 | | | 150 | μA |
| I_{IL} | Input LOW Current D \bar{D} | 0.5 -150 | | | 0.5 -150 | | | 0.5 -150 | | | 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 lfm.

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

11. All loading with $50\ \Omega$ to $V_{CC} - 2.0\text{ V}$.

12. Single-Ended input CLK pin operation is limited to $V_{EE} \leq -3.0\text{ V}$ in NECL mode.

13. 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. AC CHARACTERISTICS $V_{CC} = 0\text{ V}$; $V_{EE} = -3.8\text{ V}$ to -2.375 V or $V_{CC} = 2.375\text{ V}$ to 3.8 V ; $V_{EE} = 0\text{ V}$ (Note 14)

| Symbol | Characteristic | -40°C | | | 25°C | | | 85°C | | | Unit |
|------------------------|---|------------|--|-------------------|------------|--|-------------------|------------|--|-------------------|------|
| | | Min | Typ | Max | Min | Typ | Max | Min | Typ | Max | |
| f_{max} | Maximum Toggle Frequency (See Figure 4. F_{max}) | 2.8 | | | 2.8 | | | 2.8 | | | GHz |
| t_{PLH} t_{PHL} | Propagation Delay to Output CLK to Q0, Q1, Q2 MR to Q | 550 500 | 650 600 | 750 700 | 600 550 | 700 650 | 800 750 | 650 600 | 750 700 | 850 800 | ps |
| t_{JITTER} | RMS Clock Jitter (See Figure 4. $F_{max}/JITTER$) DIV2 $\leq 2.5\text{ GHz}$ DIV2 $\leq 3.0\text{ GHz}$ DIV4 $\leq 2.5\text{ GHz}$ DIV4 $\leq 3.0\text{ GHz}$ DIV8 $\leq 2.5\text{ GHz}$ DIV8 $\leq 3.0\text{ GHz}$ | | 0.36 0.34 0.26 0.32 0.27 0.32 | 0.4 0.4 0.4 | | 0.30 0.40 0.29 0.38 0.30 0.39 | 0.4 0.5 0.5 | | 0.35 0.63 0.33 0.60 0.34 1.10 | 0.6 0.5 0.5 | ps |
| t_S | Setup Time $\bar{E}N$ | 150 | 50 | | 150 | 50 | | 150 | 50 | | ps |
| t_H | Hold Time $\bar{E}N$ | 200 | 100 | | 200 | 100 | | 200 | 100 | | ps |
| t_{RR} | Set/Reset Recovery | 300 | 200 | | 300 | 200 | | 300 | 200 | | ps |
| V_{PP} | Input Swing (Note 15) | 150 | | 1000 | 150 | | 1000 | 150 | | 1000 | mV |
| t_r t_f | Output Rise/Fall Times Q (20% – 80%) | 90 | 170 | 200 | 100 | 180 | 250 | 120 | 200 | 280 | 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.

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

15. $V_{PP(min)}$ is minimum input swing for which AC parameters guaranteed. The device has a DC gain of ≈ 40 .

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

MC100LVEP34

There are two distinct functional relationships between the Master Reset and Clock:

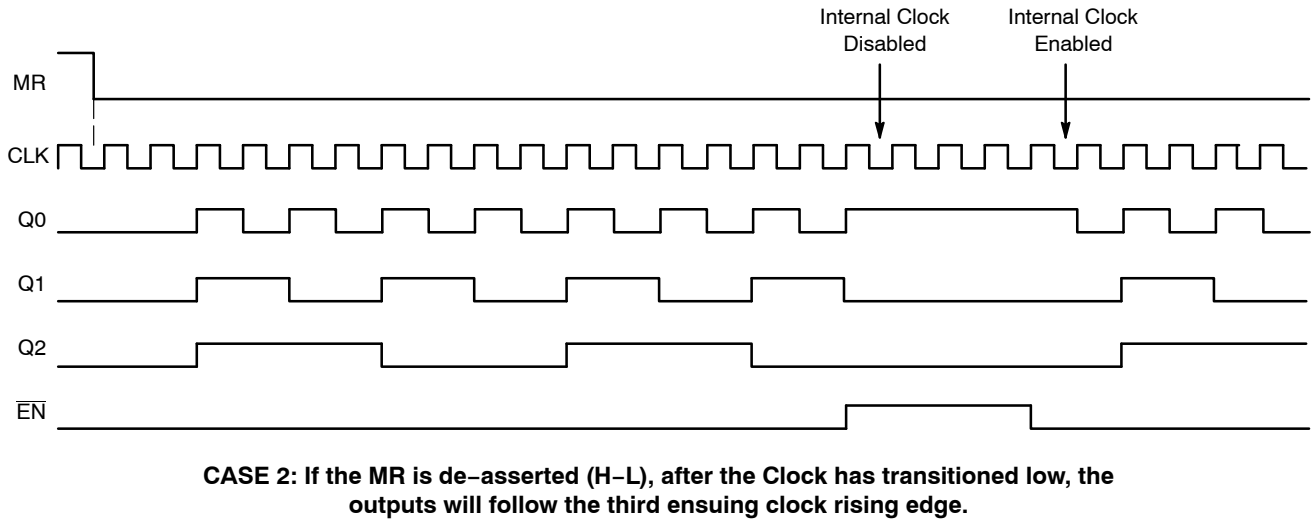
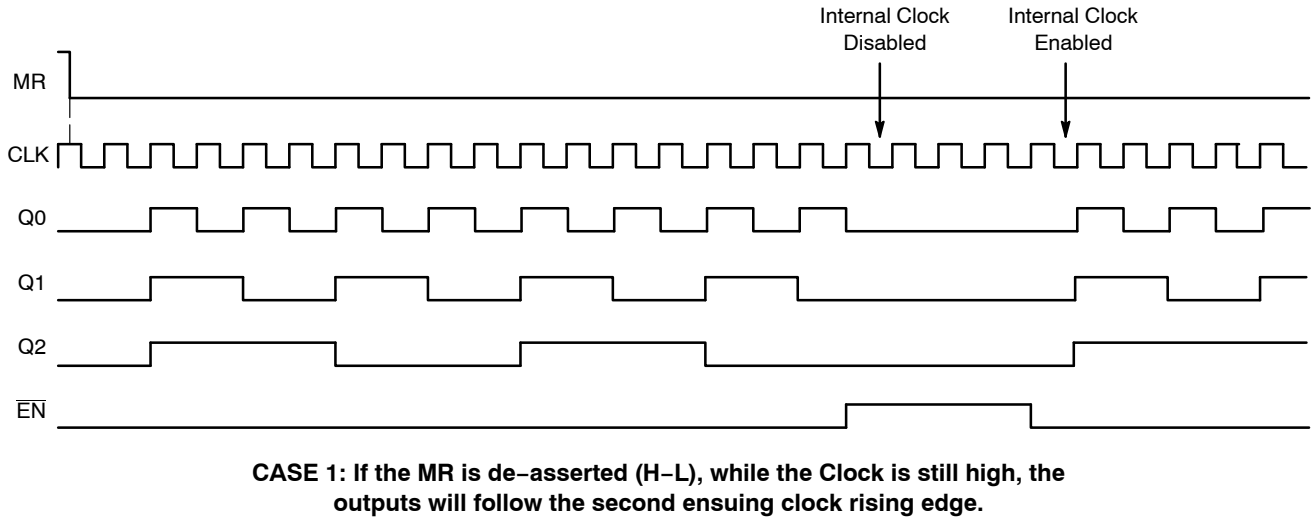


Figure 2. Timing Diagrams

The \overline{EN} signal will “freeze” the internal divider flip-flops on the first falling edge of CLK after its assertion. The internal divider flip-flops will maintain their state during the freeze. When \overline{EN} is deasserted (LOW), and after the next falling edge of CLK, then the internal divider flip-flops will “unfreeze” and continue to their next state count with proper phase relationships.

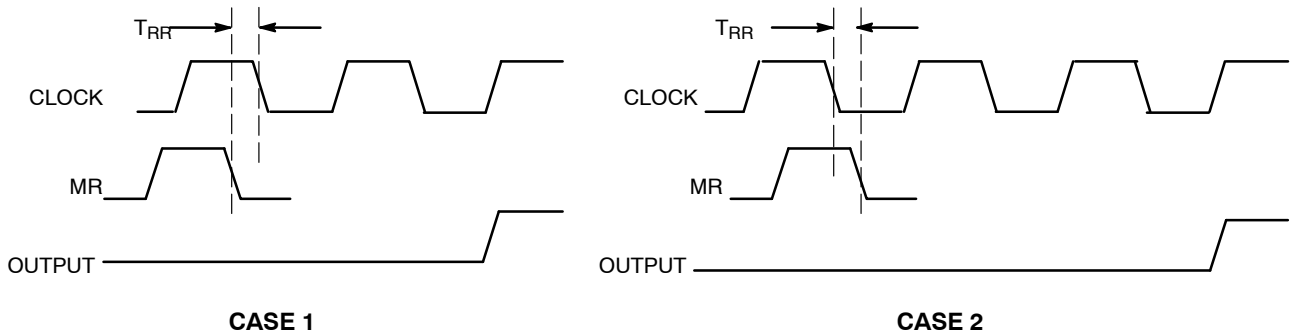


Figure 3. Reset Recovery Time

MC100LVEP34

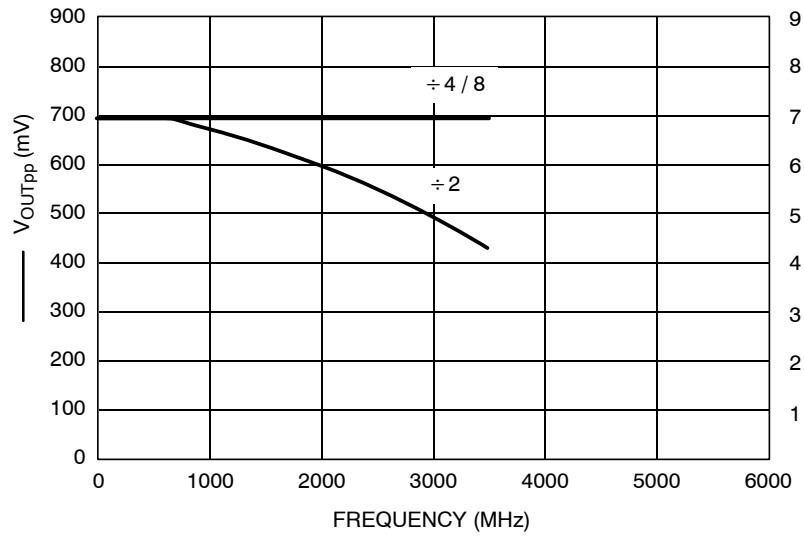


Figure 4. F_{max}

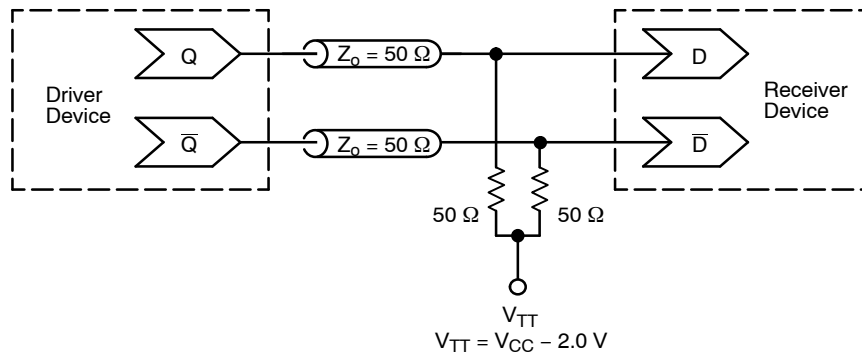


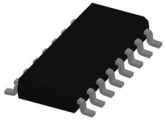
Figure 5. Typical Termination for Output Driver and Device Evaluation
(See Application Note [AND8020/D](#) – Termination of ECL Logic Devices.)

MC100LVEP34**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**

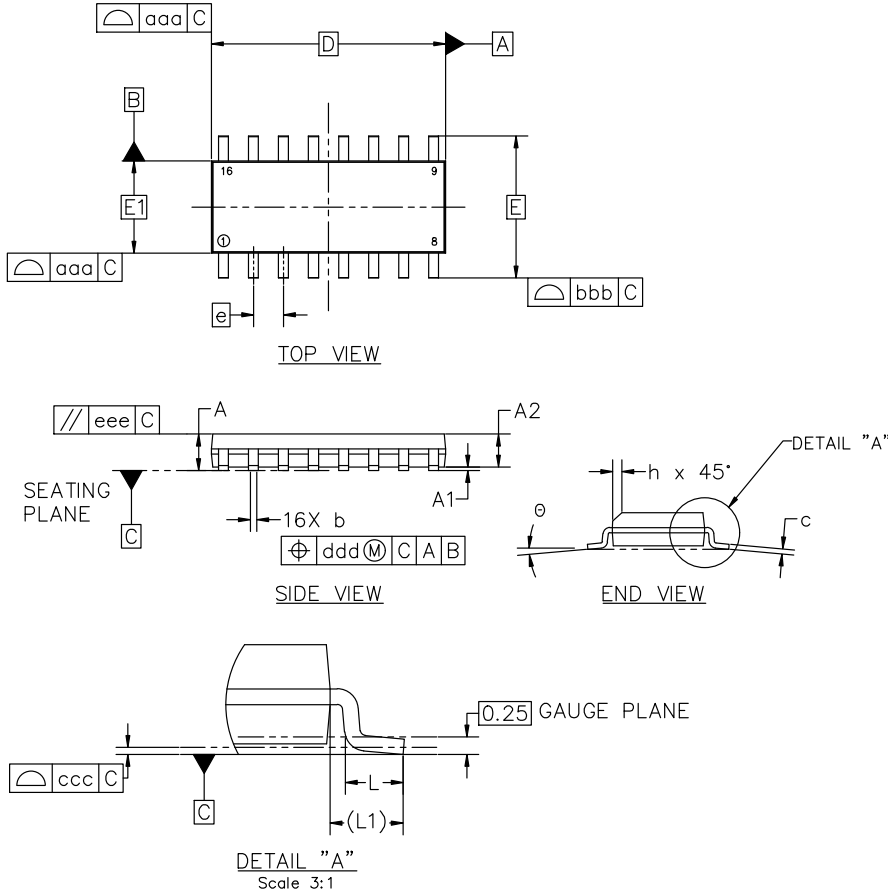


**SOIC-16 9.90x3.90x1.37 1.27P
CASE 751B
ISSUE M**

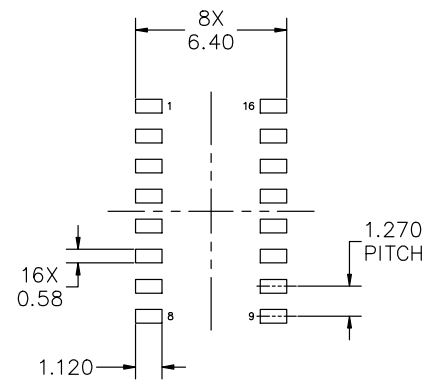
DATE 18 OCT 2024

NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 2018.
2. DIMENSION IN MILLIMETERS. ANGLE IN DEGREES.
3. DIMENSIONS D AND E1 DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15mm PER SIDE.
5. DIMENSION b DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.127mm TOTAL IN EXCESS OF THE b DIMENSION AT MAXIMUM MATERIAL CONDITION.



| MILLIMETERS | | | |
|--------------------------------|----------|------|------|
| DIM | MIN | NOM | MAX |
| A | 1.35 | 1.55 | 1.75 |
| A1 | 0.10 | 0.18 | 0.25 |
| A2 | 1.25 | 1.37 | 1.50 |
| b | 0.35 | 0.42 | 0.49 |
| c | 0.19 | 0.22 | 0.25 |
| D | 9.90 BSC | | |
| E | 6.00 BSC | | |
| E1 | 3.90 BSC | | |
| e | 1.27 BSC | | |
| h | 0.25 | --- | 0.50 |
| L | 0.40 | 0.83 | 1.25 |
| L1 | 1.05 REF | | |
| θ | 0° | --- | 7° |
| TOLERANCE OF FORM AND POSITION | | | |
| aaa | 0.10 | | |
| bbb | 0.20 | | |
| ccc | 0.10 | | |
| ddd | 0.25 | | |
| eee | 0.10 | | |



RECOMMENDED MOUNTING FOOTPRINT

*FOR ADDITIONAL INFORMATION ON OUR PB-FREE STRATEGY AND SOLDERING DETAILS, PLEASE DOWNLOAD THE onsemi SOLDERING AND MOUNTING TECHNIQUES REFERENCE MANUAL, SOLDERM/D

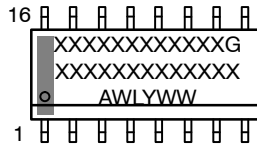
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| DESCRIPTION: | SOIC-16 9.90X3.90X1.37 1.27P | PAGE 1 OF 2 |

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SOIC-16 9.90x3.90x1.37 1.27P
CASE 751B
ISSUE M

DATE 18 OCT 2024

GENERIC MARKING DIAGRAM*



XXXXX = Specific Device Code
 A = Assembly Location
 WL = Wafer Lot
 Y = Year
 WW = Work Week
 G = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "▪", may or may not be present. Some products may not follow the Generic Marking.

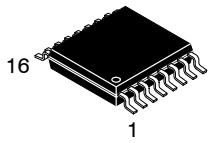
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|---|---|---|---|
| <p>STYLE 1:</p> <p>PIN 1. COLLECTOR 2. BASE 3. EMITTER 4. NO CONNECTION 5. EMITTER 6. BASE 7. COLLECTOR 8. COLLECTOR 9. BASE 10. EMITTER 11. NO CONNECTION 12. EMITTER 13. BASE 14. COLLECTOR 15. EMITTER 16. COLLECTOR</p> | <p>STYLE 2:</p> <p>PIN 1. CATHODE 2. ANODE 3. NO CONNECTION 4. CATHODE 5. CATHODE 6. NO CONNECTION 7. ANODE 8. CATHODE 9. CATHODE 10. ANODE 11. NO CONNECTION 12. CATHODE 13. CATHODE 14. NO CONNECTION 15. ANODE 16. CATHODE</p> | <p>STYLE 3:</p> <p>PIN 1. COLLECTOR, DYE #1 2. BASE, #1 3. EMITTER, #1 4. COLLECTOR, #1 5. COLLECTOR, #2 6. BASE, #2 7. EMITTER, #2 8. COLLECTOR, #2 9. COLLECTOR, #3 10. BASE, #3 11. EMITTER, #3 12. COLLECTOR, #3 13. COLLECTOR, #4 14. BASE, #4 15. EMITTER, #4 16. COLLECTOR, #4</p> | <p>STYLE 4:</p> <p>PIN 1. COLLECTOR, DYE #1 2. COLLECTOR, #1 3. COLLECTOR, #2 4. COLLECTOR, #2 5. COLLECTOR, #3 6. COLLECTOR, #3 7. COLLECTOR, #4 8. COLLECTOR, #4 9. BASE, #4 10. EMITTER, #4 11. BASE, #3 12. EMITTER, #3 13. BASE, #2 14. EMITTER, #2 15. BASE, #1 16. EMITTER, #1</p> |
| <p>STYLE 5:</p> <p>PIN 1. DRAIN, DYE #1 2. DRAIN, #1 3. DRAIN, #2 4. DRAIN, #2 5. DRAIN, #3 6. DRAIN, #3 7. DRAIN, #4 8. DRAIN, #4 9. GATE, #4 10. SOURCE, #4 11. GATE, #3 12. SOURCE, #3 13. GATE, #2 14. SOURCE, #2 15. GATE, #1 16. SOURCE, #1</p> | <p>STYLE 6:</p> <p>PIN 1. CATHODE 2. CATHODE 3. CATHODE 4. CATHODE 5. CATHODE 6. CATHODE 7. CATHODE 8. CATHODE 9. ANODE 10. ANODE 11. ANODE 12. ANODE 13. ANODE 14. ANODE 15. ANODE 16. ANODE</p> | <p>STYLE 7:</p> <p>PIN 1. SOURCE N-CH 2. COMMON DRAIN (OUTPUT) 3. COMMON DRAIN (OUTPUT) 4. GATE P-CH 5. COMMON DRAIN (OUTPUT) 6. COMMON DRAIN (OUTPUT) 7. COMMON DRAIN (OUTPUT) 8. SOURCE P-CH 9. SOURCE P-CH 10. COMMON DRAIN (OUTPUT) 11. COMMON DRAIN (OUTPUT) 12. COMMON DRAIN (OUTPUT) 13. GATE N-CH 14. COMMON DRAIN (OUTPUT) 15. COMMON DRAIN (OUTPUT) 16. SOURCE N-CH</p> | |

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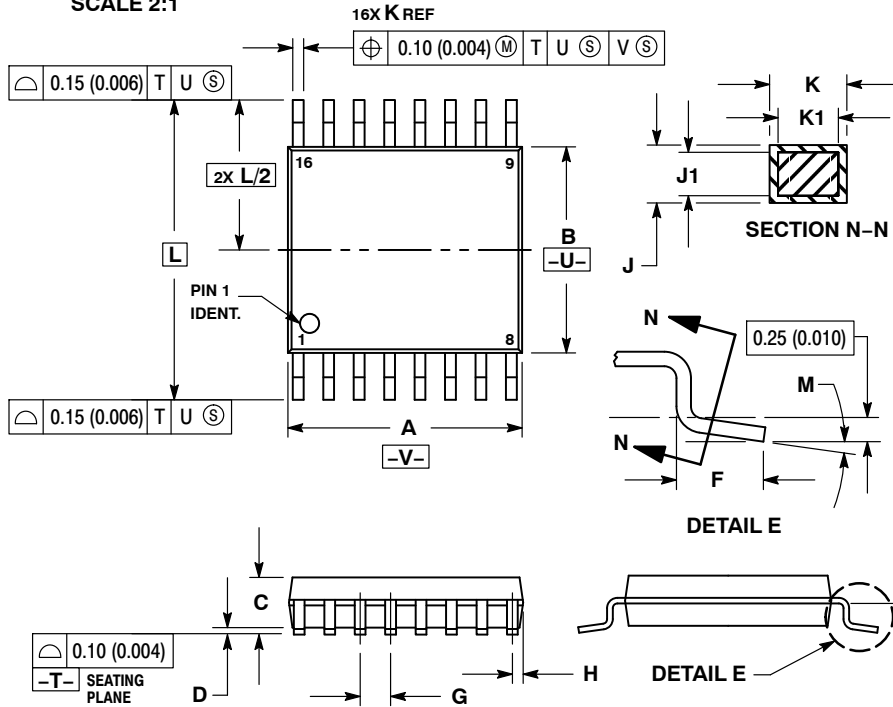


**MECHANICAL CASE OUTLINE
PACKAGE DIMENSIONS**



**TSSOP-16 WB
CASE 948F
ISSUE B**

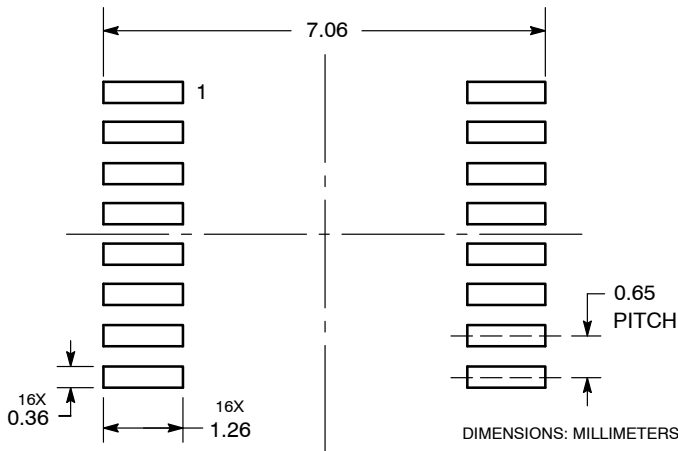
DATE 19 OCT 2006



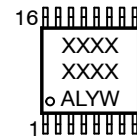
- NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
 2. CONTROLLING DIMENSION: MILLIMETER.
 3. DIMENSION A DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH OR GATE BURRS SHALL NOT EXCEED 0.15 (0.006) PER SIDE.
 4. DIMENSION B DOES NOT INCLUDE INTERLEAD FLASH OR PROTRUSION. INTERLEAD FLASH OR PROTRUSION SHALL NOT EXCEED 0.25 (0.010) PER SIDE.
 5. DIMENSION K DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE DAMBAR PROTRUSION SHALL BE 0.08 (0.003) TOTAL IN EXCESS OF THE K DIMENSION AT MAXIMUM MATERIAL CONDITION.
 6. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
 7. DIMENSION A AND B ARE TO BE DETERMINED AT DATUM PLANE -W-.

| DIM | MILLIMETERS | | INCHES | |
|-----|-------------|------|-----------|-------|
| | MIN | MAX | MIN | MAX |
| A | 4.90 | 5.10 | 0.193 | 0.200 |
| B | 4.30 | 4.50 | 0.169 | 0.177 |
| C | --- | 1.20 | --- | 0.047 |
| D | 0.05 | 0.15 | 0.002 | 0.006 |
| F | 0.50 | 0.75 | 0.020 | 0.030 |
| G | 0.65 BSC | | 0.026 BSC | |
| H | 0.18 | 0.28 | 0.007 | 0.011 |
| J | 0.09 | 0.20 | 0.004 | 0.008 |
| J1 | 0.09 | 0.16 | 0.004 | 0.006 |
| K | 0.19 | 0.30 | 0.007 | 0.012 |
| K1 | 0.19 | 0.25 | 0.007 | 0.010 |
| L | 6.40 BSC | | 0.252 BSC | |
| M | 0° | 8° | 0° | 8° |

**RECOMMENDED
SOLDERING FOOTPRINT***



**GENERIC
MARKING DIAGRAM***



- XXXX = Specific Device Code
- A = Assembly Location
- L = Wafer Lot
- Y = Year
- W = Work Week
- G or ■ = Pb-Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb-Free indicator, "G" or microdot "■", may or may not be present. Some products may not follow the Generic Marking.

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

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