

# MC14017B

## Decade Counter

The MC14017B is a five-stage Johnson decade counter with built-in code converter. High speed operation and spike-free outputs are obtained by use of a Johnson decade counter design. The ten decoded outputs are normally low, and go high only at their appropriate decimal time period. The output changes occur on the positive-going edge of the clock pulse. This part can be used in frequency division applications as well as decade counter or decimal decode display applications.

### Features

- Fully Static Operation
- DC Clock Input Circuit Allows Slow Rise Times
- Carry Out Output for Cascading
- Divide-by-N Counting
- Supply Voltage Range = 3.0 Vdc to 18 Vdc
- Capable of Driving Two Low-Power TTL Loads or One Low-Power Schottky TTL Load Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4017B
- Triple Diode Protection on All Inputs
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable
- This Device is Pb-Free and is RoHS Compliant

### MAXIMUM RATINGS (Voltages Referenced to $V_{SS}$ )

| Symbol               | Parameter                                         | Value                  | Unit |
|----------------------|---------------------------------------------------|------------------------|------|
| $V_{DD}$             | DC Supply Voltage Range                           | -0.5 to +18.0          | V    |
| $V_{in}$ , $V_{out}$ | Input or Output Voltage Range (DC or Transient)   | -0.5 to $V_{DD} + 0.5$ | V    |
| $I_{in}$ , $I_{out}$ | Input or Output Current (DC or Transient) per Pin | $\pm 10$               | mA   |
| $P_D$                | Power Dissipation, per Package (Note 1)           | 500                    | mW   |
| $T_A$                | Ambient Temperature Range                         | -55 to +125            | °C   |
| $T_{stg}$            | Storage Temperature Range                         | -65 to +150            | °C   |
| $T_L$                | Lead Temperature (8-Second Soldering)             | 260                    | °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. Temperature Derating: "D/DW" Packages: -7.0 mW/°C From 65°C To 125°C

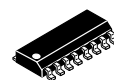
This device contains protection circuitry to guard against damage due to high static voltages or electric fields. However, precautions must be taken to avoid applications of any voltage higher than maximum rated voltages to this high-impedance circuit. For proper operation,  $V_{in}$  and  $V_{out}$  should be constrained to the range  $V_{SS} \leq (V_{in} \text{ or } V_{out}) \leq V_{DD}$ .

Unused inputs must always be tied to an appropriate logic voltage level (e.g., either  $V_{SS}$  or  $V_{DD}$ ). Unused outputs must be left open.



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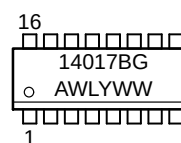


SOIC-16  
D SUFFIX  
CASE 751B

### PIN ASSIGNMENT

|          |   |    |                 |
|----------|---|----|-----------------|
| Q5       | 1 | 16 | $V_{DD}$        |
| Q1       | 2 | 15 | RESET           |
| Q0       | 3 | 14 | CLOCK           |
| Q2       | 4 | 13 | $\overline{CE}$ |
| Q6       | 5 | 12 | $C_{out}$       |
| Q7       | 6 | 11 | Q9              |
| Q3       | 7 | 10 | Q4              |
| $V_{SS}$ | 8 | 9  | Q8              |

### MARKING DIAGRAM



A = Assembly Location  
WL, L = Wafer Lot  
YY, Y = Year  
WW, W = Work Week  
G = Pb-Free Indicator

### ORDERING INFORMATION

See detailed ordering and shipping information in the package dimensions section on page 7 of this data sheet.

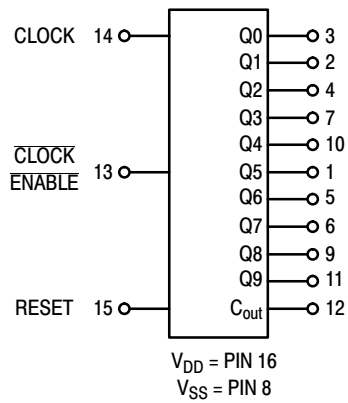
# MC14017B

**FUNCTIONAL TRUTH TABLE**  
(Positive Logic)

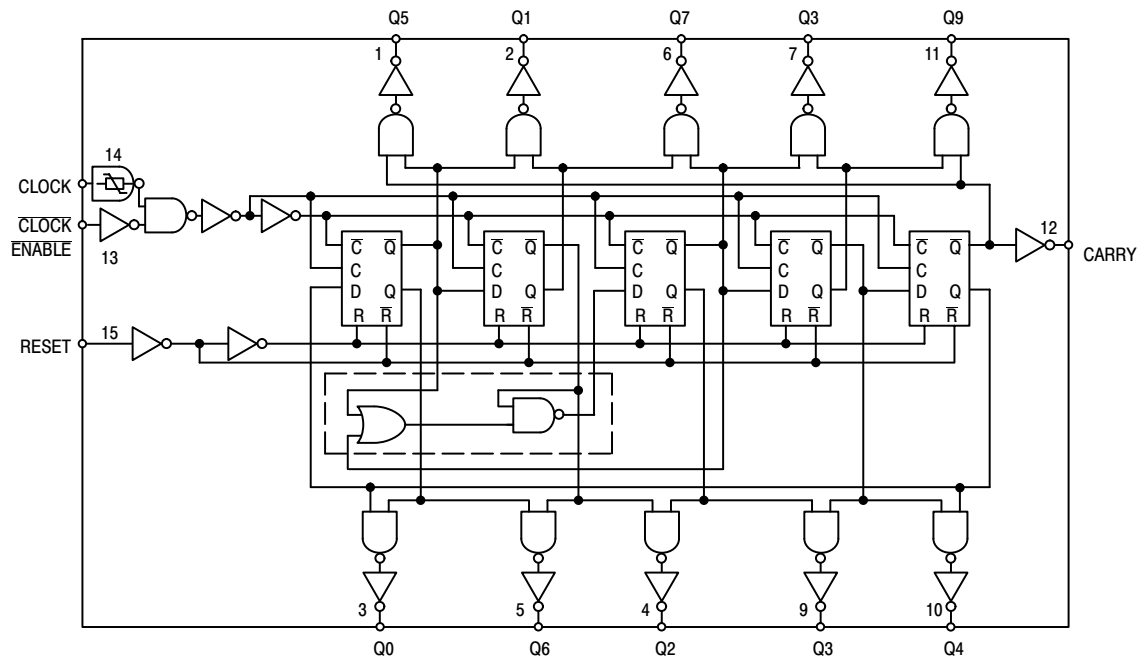
| Clock                                                                             | Clock Enable                                                                      | Reset | Decode Output=n |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-------|-----------------|
| 0                                                                                 | X                                                                                 | 0     | n               |
| X                                                                                 | 1                                                                                 | 0     | n               |
| X                                                                                 | X                                                                                 | 1     | Q0              |
|  | 0                                                                                 | 0     | n+1             |
|  | X                                                                                 | 0     | n               |
| X                                                                                 |  | 0     | n               |
| 1                                                                                 |  | 0     | n+1             |

X = Don't Care. If  $n < 5$  Carry = "1",  
Otherwise = "0".

**BLOCK DIAGRAM**



**LOGIC DIAGRAM**



# MC14017B

## ELECTRICAL CHARACTERISTICS (Voltages Referenced to V<sub>SS</sub>)

| Characteristic                                                                                                                                      | Symbol                       | V <sub>DD</sub><br>Vdc | -55°C                                                                                                                                                          |      | 25°C  |                 |      | 125°C |      | Unit |
|-----------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------|-----------------|------|-------|------|------|
|                                                                                                                                                     |                              |                        | Min                                                                                                                                                            | Max  | Min   | Typ<br>(Note 2) | Max  | Min   | Max  |      |
| Output Voltage<br>V <sub>in</sub> = V <sub>DD</sub> or 0                                                                                            | "0" Level<br>V <sub>OL</sub> | 5.0                    | –                                                                                                                                                              | 0.05 | –     | 0               | 0.05 | –     | 0.05 | Vdc  |
|                                                                                                                                                     |                              | 10                     | –                                                                                                                                                              | 0.05 | –     | 0               | 0.05 | –     | 0.05 |      |
|                                                                                                                                                     |                              | 15                     | –                                                                                                                                                              | 0.05 | –     | 0               | 0.05 | –     | 0.05 |      |
|                                                                                                                                                     | "1" Level<br>V <sub>OH</sub> | 5.0                    | 4.95                                                                                                                                                           | –    | 4.95  | 5.0             | –    | 4.95  | –    | Vdc  |
|                                                                                                                                                     |                              | 10                     | 9.95                                                                                                                                                           | –    | 9.95  | 10              | –    | 9.95  | –    |      |
|                                                                                                                                                     |                              | 15                     | 14.95                                                                                                                                                          | –    | 14.95 | 15              | –    | 14.95 | –    |      |
| Input Voltage<br>(V <sub>O</sub> = 4.5 or 0.5 Vdc)<br>(V <sub>O</sub> = 9.0 or 1.0 Vdc)<br>(V <sub>O</sub> = 13.5 or 1.5 Vdc)                       | "0" Level<br>V <sub>IL</sub> | 5.0                    | –                                                                                                                                                              | 1.5  | –     | 2.25            | 1.5  | –     | 1.5  | Vdc  |
|                                                                                                                                                     |                              | 10                     | –                                                                                                                                                              | 3.0  | –     | 4.50            | 3.0  | –     | 3.0  |      |
|                                                                                                                                                     |                              | 15                     | –                                                                                                                                                              | 4.0  | –     | 6.75            | 4.0  | –     | 4.0  |      |
|                                                                                                                                                     | "1" Level<br>V <sub>IH</sub> | 5.0                    | 3.5                                                                                                                                                            | –    | 3.5   | 2.75            | –    | 3.5   | –    | Vdc  |
|                                                                                                                                                     |                              | 10                     | 7.0                                                                                                                                                            | –    | 7.0   | 5.50            | –    | 7.0   | –    |      |
|                                                                                                                                                     |                              | 15                     | 11                                                                                                                                                             | –    | 11    | 8.25            | –    | 11    | –    |      |
| Output Drive Current<br>(V <sub>OH</sub> = 2.5 Vdc)<br>(V <sub>OH</sub> = 4.6 Vdc)<br>(V <sub>OH</sub> = 9.5 Vdc)<br>(V <sub>OH</sub> = 13.5 Vdc)   | Source<br>I <sub>OH</sub>    | 5.0                    | –3.0                                                                                                                                                           | –    | –2.4  | –4.2            | –    | –1.7  | –    | mAdc |
|                                                                                                                                                     |                              | 5.0                    | –0.64                                                                                                                                                          | –    | –0.51 | –0.88           | –    | –0.36 | –    |      |
|                                                                                                                                                     |                              | 10                     | –1.6                                                                                                                                                           | –    | –1.3  | –2.25           | –    | –0.9  | –    |      |
|                                                                                                                                                     |                              | 15                     | –4.2                                                                                                                                                           | –    | –3.4  | –8.8            | –    | –2.4  | –    |      |
|                                                                                                                                                     | Sink<br>I <sub>OL</sub>      | 5.0                    | 0.64                                                                                                                                                           | –    | 0.51  | 0.88            | –    | 0.36  | –    | mAdc |
|                                                                                                                                                     |                              | 10                     | 1.6                                                                                                                                                            | –    | 1.3   | 2.25            | –    | 0.9   | –    |      |
|                                                                                                                                                     |                              | 15                     | 4.2                                                                                                                                                            | –    | 3.4   | 8.8             | –    | 2.4   | –    |      |
| Input Current                                                                                                                                       | I <sub>in</sub>              | 15                     | –                                                                                                                                                              | ±0.1 | –     | ±0.00001        | ±0.1 | –     | ±1.0 | μAdc |
| Input Capacitance<br>(V <sub>in</sub> = 0)                                                                                                          | C <sub>in</sub>              | –                      | –                                                                                                                                                              | –    | –     | 5.0             | 7.5  | –     | –    | pF   |
| Quiescent Current<br>(Per Package)                                                                                                                  | I <sub>DD</sub>              | 5.0                    | –                                                                                                                                                              | 5.0  | –     | 0.005           | 5.0  | –     | 150  | μAdc |
|                                                                                                                                                     |                              | 10                     | –                                                                                                                                                              | 10   | –     | 0.010           | 10   | –     | 300  |      |
|                                                                                                                                                     |                              | 15                     | –                                                                                                                                                              | 20   | –     | 0.015           | 20   | –     | 600  |      |
| Total Supply Current (Notes 3 & 4)<br>(Dynamic plus Quiescent,<br>Per Package)<br>(C <sub>L</sub> = 50 pF on all outputs, all<br>buffers switching) | I <sub>T</sub>               | 5.0<br>10<br>15        | I <sub>T</sub> = (0.27 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (0.55 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (0.83 μA/kHz) f + I <sub>DD</sub> |      |       |                 |      |       |      | μAdc |

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.

2. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

3. The formulas given are for the typical characteristics only at 25°C.

4. To calculate total supply current at loads other than 50 pF:

$$I_T(C_L) = I_T(50 \text{ pF}) + (C_L - 50) Vfk$$

where: I<sub>T</sub> is in μA (per package), C<sub>L</sub> in pF, V = (V<sub>DD</sub> – V<sub>SS</sub>) in volts, f in kHz is input frequency, and k = 0.0011.

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## SWITCHING CHARACTERISTICS (Note 5) ( $C_L = 50 \text{ pF}$ , $T_A = 25^\circ\text{C}$ )

| Characteristic                                                                                                                                                                                                                                       | Symbol                  | $V_{DD}$<br>Vdc | Min               | Typ<br>(Note 6)   | Max                | Unit |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|-----------------|-------------------|-------------------|--------------------|------|
| Output Rise and Fall Time<br>$t_{TLH}, t_{THL} = (1.5 \text{ ns/pF}) C_L + 25 \text{ ns}$<br>$t_{TLH}, t_{THL} = (0.75 \text{ ns/pF}) C_L + 12.5 \text{ ns}$<br>$t_{TLH}, t_{THL} = (0.55 \text{ ns/pF}) C_L + 9.5 \text{ ns}$                       | $t_{TLH},$<br>$t_{THL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 100<br>50<br>40   | 200<br>100<br>80   | ns   |
| Propagation Delay Time<br>Reset to Decode Output<br>$t_{PLH}, t_{PHL} = (1.7 \text{ ns/pF}) C_L + 415 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.66 \text{ ns/pF}) C_L + 197 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.5 \text{ ns/pF}) C_L + 150 \text{ ns}$ | $t_{PLH},$<br>$t_{PHL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 500<br>230<br>175 | 1000<br>460<br>350 | ns   |
| Propagation Delay Time<br>Clock to $C_{out}$<br>$t_{PLH}, t_{PHL} = (1.7 \text{ ns/pF}) C_L + 315 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.66 \text{ ns/pF}) C_L + 142 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.5 \text{ ns/pF}) C_L + 100 \text{ ns}$     | $t_{PLH},$<br>$t_{PHL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 400<br>175<br>125 | 800<br>350<br>250  | ns   |
| Propagation Delay Time<br>Clock to Decode Output<br>$t_{PLH}, t_{PHL} = (1.7 \text{ ns/pF}) C_L + 415 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.66 \text{ ns/pF}) C_L + 197 \text{ ns}$<br>$t_{PLH}, t_{PHL} = (0.5 \text{ ns/pF}) C_L + 150 \text{ ns}$ | $t_{PLH},$<br>$t_{PHL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 500<br>230<br>175 | 1000<br>460<br>350 | ns   |
| Turn-Off Delay Time<br>Reset to $C_{out}$<br>$t_{PLH} = (1.7 \text{ ns/pF}) C_L + 315 \text{ ns}$<br>$t_{PLH} = (0.66 \text{ ns/pF}) C_L + 142 \text{ ns}$<br>$t_{PLH} = (0.5 \text{ ns/pF}) C_L + 100 \text{ ns}$                                   | $t_{PLH}$               | 5.0<br>10<br>15 | –<br>–<br>–       | 400<br>175<br>125 | 800<br>350<br>250  | ns   |
| Clock Pulse Width                                                                                                                                                                                                                                    | $t_{w(H)}$              | 5.0<br>10<br>15 | 250<br>100<br>75  | 125<br>50<br>35   | –<br>–<br>–        | ns   |
| Clock Frequency                                                                                                                                                                                                                                      | $f_{cl}$                | 5.0<br>10<br>15 | –<br>–<br>–       | 5.0<br>12<br>16   | 2.0<br>5.0<br>6.7  | MHz  |
| Reset Pulse Width                                                                                                                                                                                                                                    | $t_{w(H)}$              | 5.0<br>10<br>15 | 500<br>250<br>190 | 250<br>125<br>95  | –<br>–<br>–        | ns   |
| Reset Removal Time                                                                                                                                                                                                                                   | $t_{rem}$               | 5.0<br>10<br>15 | 750<br>275<br>210 | 375<br>135<br>105 | –<br>–<br>–        | ns   |
| Clock Input Rise and Fall Time                                                                                                                                                                                                                       | $t_{TLH},$<br>$t_{THL}$ | 5.0<br>10<br>15 | No Limit          |                   |                    | –    |
| Clock Enable Setup Time                                                                                                                                                                                                                              | $t_{su}$                | 5.0<br>10<br>15 | 350<br>150<br>115 | 175<br>75<br>52   | –<br>–<br>–        | ns   |
| Clock Enable Removal Time                                                                                                                                                                                                                            | $t_{rem}$               | 5.0<br>10<br>15 | 420<br>200<br>140 | 260<br>100<br>70  | –<br>–<br>–        | ns   |

5. The formulas given are for the typical characteristics only at  $25^\circ\text{C}$ .

6. Data labelled "Typ" is not to be used for design purposes but is intended as an indication of the IC's potential performance.

# MC14017B

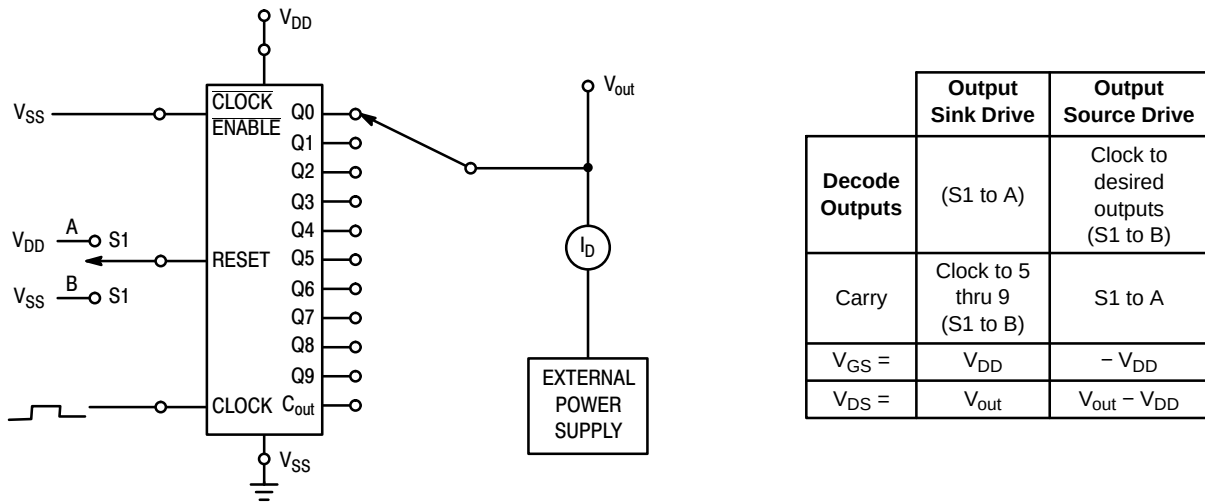


Figure 1. Typical Output Source and Output Sink Characteristics Test Circuit

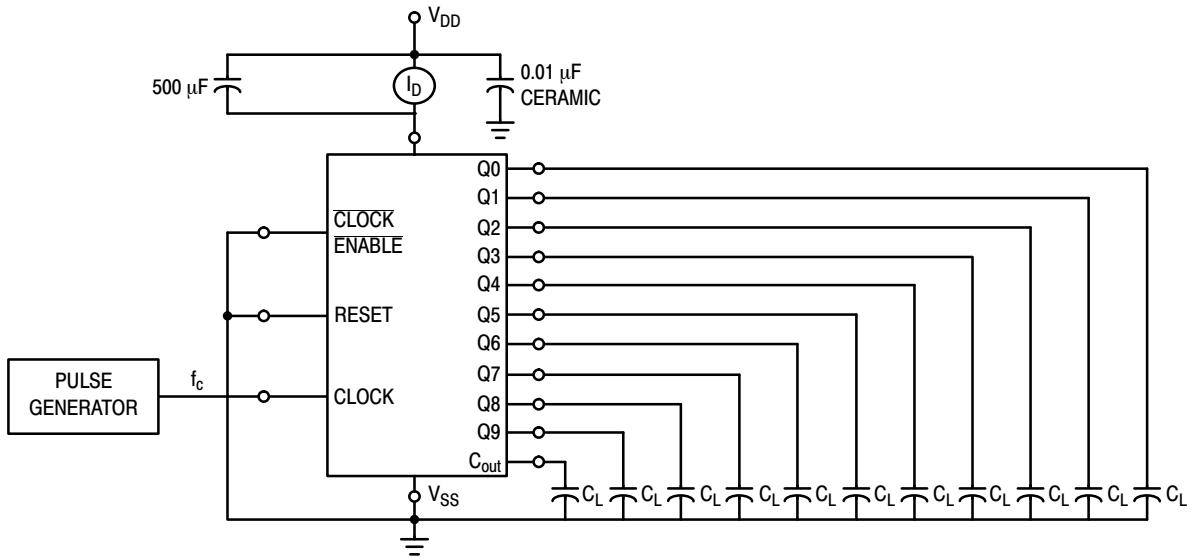


Figure 2. Typical Power Dissipation Test Circuit

# MC14017B

## APPLICATIONS INFORMATION

Figure 3 shows a technique for extending the number of decoded output states for the MC14017B. Decoded outputs are sequential within each stage and from stage to stage, with no dead time (except propagation delay).

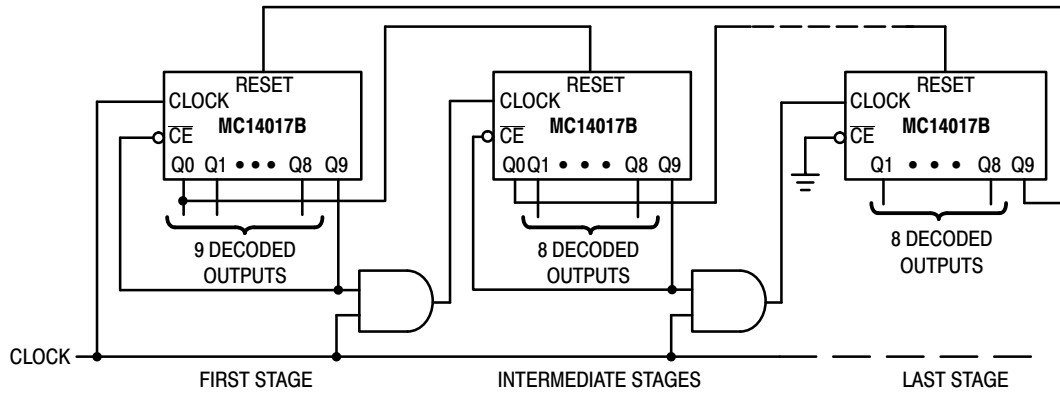


Figure 3. Counter Expansion

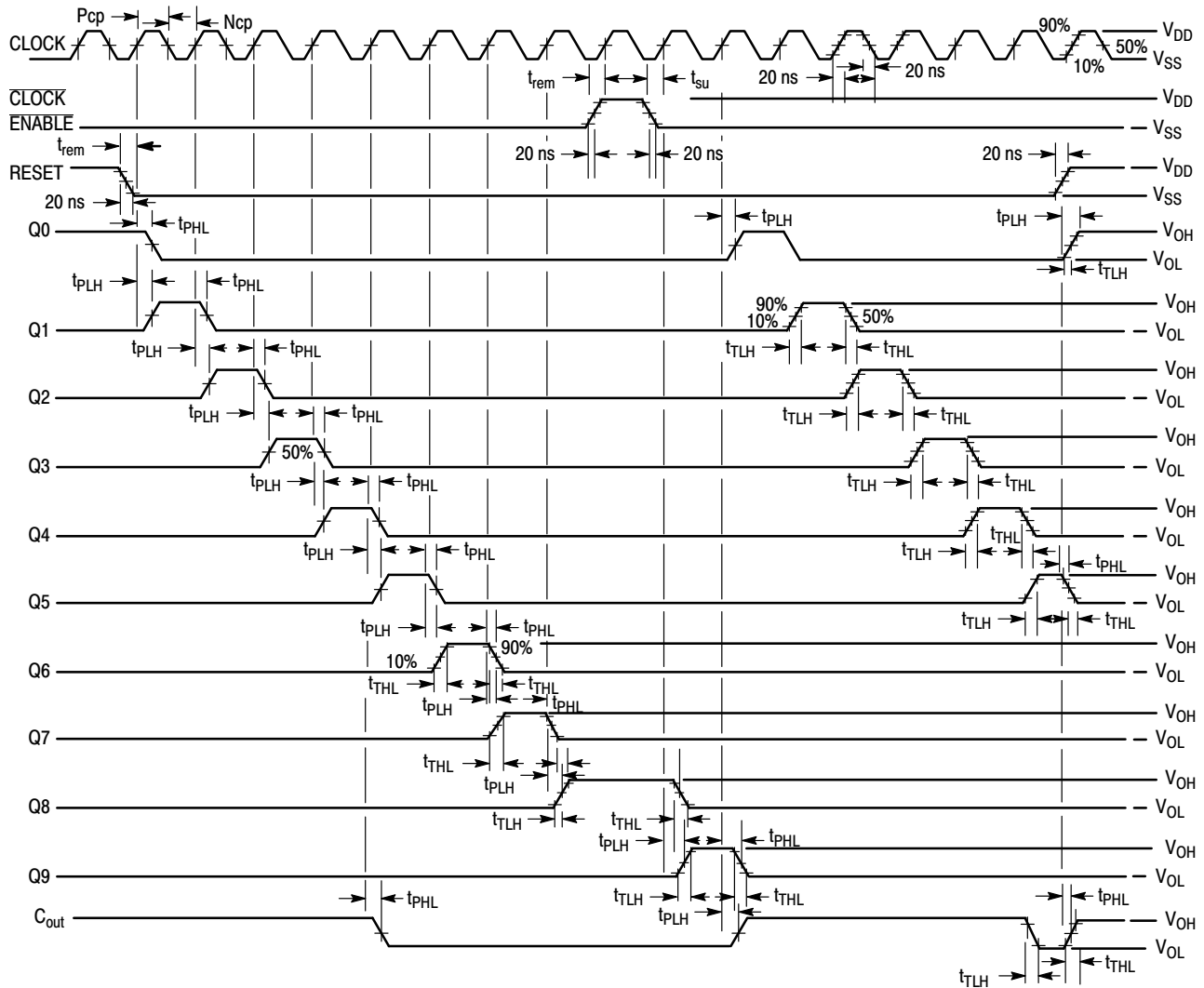


Figure 4. AC Measurement Definition and Functional Waveforms

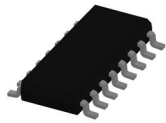
## MC14017B

### ORDERING INFORMATION

| Device         | Package              | Shipping <sup>†</sup>    |
|----------------|----------------------|--------------------------|
| MC14017BDG     | SOIC-16<br>(Pb-Free) | 48 Units / Rail          |
| NLV14017BDG*   | SOIC-16<br>(Pb-Free) | 48 Units / Rail          |
| MC14017BDR2G   | SOIC-16<br>(Pb-Free) | 2500 Units / Tape & Reel |
| NLV14017BDR2G* | SOIC-16<br>(Pb-Free) | 2500 Units / Tape & Reel |

<sup>†</sup>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.

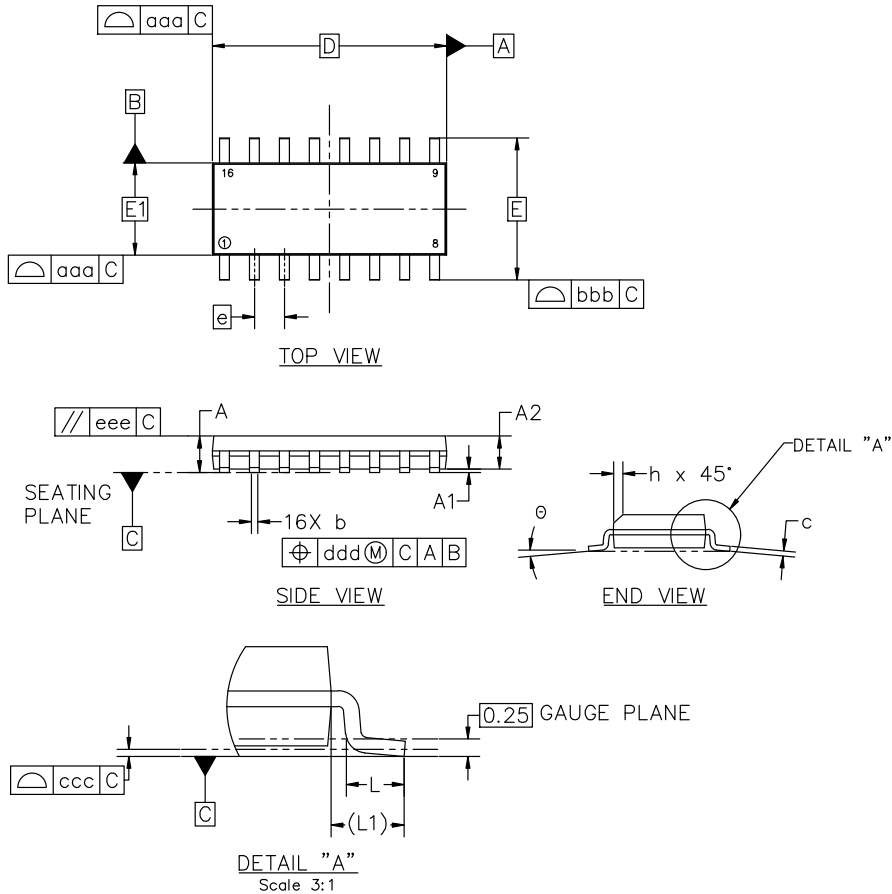
\*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.


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

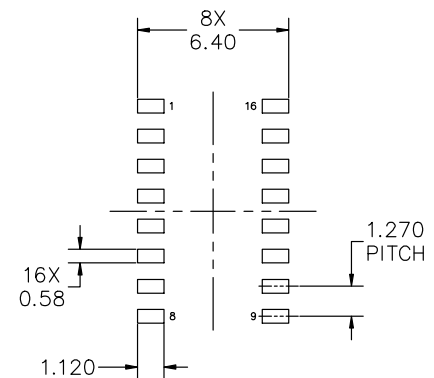
DATE 18 OCT 2024

## 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     |      |      |



\*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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| <b>DESCRIPTION:</b>     | <b>SOIC-16 9.90X3.90X1.37 1.27P</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                               |

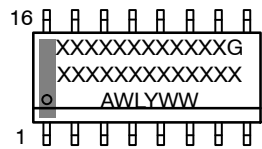
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SOIC-16 9.90x3.90x1.37 1.27P  
CASE 751B  
ISSUE M

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.

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

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