

# MC14543B

## BCD-to-Seven Segment Latch/Decoder/Driver for Liquid Crystals

The MC14543B BCD-to-seven segment latch/decoder/driver is designed for use with liquid crystal readouts, and is constructed with complementary MOS (CMOS) enhancement mode devices. The circuit provides the functions of a 4-bit storage latch and an 8421 BCD-to-seven segment decoder and driver. The device has the capability to invert the logic levels of the output combination. The phase (Ph), blanking (BI), and latch disable (LD) inputs are used to reverse the truth table phase, blank the display, and store a BCD code, respectively. For liquid crystal (LC) readouts, a square wave is applied to the Ph input of the circuit and the electrically common backplane of the display. The outputs of the circuit are connected directly to the segments of the LC readout. For other types of readouts, such as light-emitting diode (LED), incandescent, gas discharge, and fluorescent readouts, connection diagrams are given on this data sheet.

Applications include instrument (e.g., counter, DVM etc.) display driver, computer/calculator display driver, cockpit display driver, and various clock, watch, and timer uses.

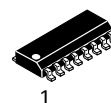
### Features

- Latch Storage of Code
- Blanking Input
- Readout Blanking on All Illegal Input Combinations
- Direct LED (Common Anode or Cathode) Driving Capability
- Supply Voltage Range = 3.0 V to 18 V
- Capable of Driving 2 Low-power TTL Loads, 1 Low-power Schottky TTL Load or 2 HTL Loads Over the Rated Temperature Range
- Pin-for-Pin Replacement for CD4056A (with Pin 7 Tied to  $V_{SS}$ ).
- Chip Complexity: 207 FETs or 52 Equivalent Gates
- 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



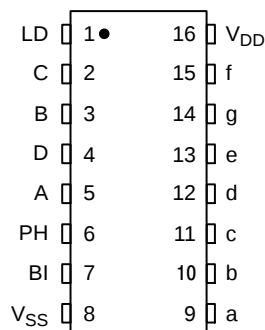
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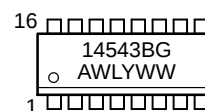


SOIC-16  
D SUFFIX  
CASE 751B

### PIN ASSIGNMENT



### MARKING DIAGRAM



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

### ORDERING INFORMATION

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

# MC14543B

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

| Parameter                                                 | Symbol                     | Value                  | Unit |
|-----------------------------------------------------------|----------------------------|------------------------|------|
| DC Supply Voltage Range                                   | $V_{DD}$                   | -0.5 to +18.0          | V    |
| Input Voltage Range, All Inputs                           | $V_{in}$                   | -0.5 to $V_{DD} + 0.5$ | V    |
| DC Input Current per Pin                                  | $I_{in}$                   | $\pm 10$               | mA   |
| Power Dissipation per Package (Note 1)                    | $P_D$                      | 500                    | mW   |
| Operating Temperature Range                               | $T_A$                      | -55 to +125            | °C   |
| Storage Temperature Range                                 | $T_{stg}$                  | -65 to +150            | °C   |
| Maximum Continuous Output Drive Current (Source or Sink)  | $I_{OHmax}$<br>$I_{OLmax}$ | 10<br>(per Output)     | mA   |
| Maximum Continuous Output Power (Source or Sink) (Note 2) | $P_{OHmax}$<br>$P_{OLmax}$ | 70<br>(per Output)     | mW   |

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" Package: -7.0 mW/°C From 65°C To 125°C

2.  $P_{OHmax} = I_{OH} (V_{OH} - V_{DD})$  and  $P_{OLmax} = I_{OL} (V_{OL} - V_{SS})$

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.

## TRUTH TABLE

| Inputs |    |     |   |   |   |   | Outputs                              |   |   |   |   |   |   | Display          |
|--------|----|-----|---|---|---|---|--------------------------------------|---|---|---|---|---|---|------------------|
| LD     | BI | Ph* | D | C | B | A | a                                    | b | c | d | e | f | g |                  |
| X      | 1  | 0   | X | X | X | X | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 0 | 0 | 0 | 0 | 1                                    | 1 | 1 | 1 | 1 | 1 | 0 | 0                |
| 1      | 0  | 0   | 0 | 0 | 0 | 1 | 0                                    | 1 | 1 | 0 | 0 | 0 | 0 | 1                |
| 1      | 0  | 0   | 0 | 0 | 1 | 0 | 1                                    | 1 | 0 | 1 | 1 | 0 | 1 | 2                |
| 1      | 0  | 0   | 0 | 0 | 1 | 1 | 1                                    | 1 | 1 | 1 | 0 | 0 | 1 | 3                |
| 1      | 0  | 0   | 0 | 1 | 0 | 0 | 0                                    | 1 | 1 | 0 | 0 | 1 | 1 | 4                |
| 1      | 0  | 0   | 0 | 1 | 0 | 1 | 1                                    | 0 | 1 | 1 | 0 | 1 | 1 | 5                |
| 1      | 0  | 0   | 0 | 1 | 1 | 0 | 1                                    | 0 | 1 | 1 | 1 | 1 | 1 | 6                |
| 1      | 0  | 0   | 0 | 1 | 1 | 1 | 1                                    | 1 | 1 | 0 | 0 | 0 | 0 | 7                |
| 1      | 0  | 0   | 1 | 0 | 0 | 0 | 1                                    | 1 | 1 | 1 | 1 | 1 | 1 | 8                |
| 1      | 0  | 0   | 1 | 0 | 0 | 1 | 1                                    | 1 | 1 | 1 | 0 | 1 | 1 | 9                |
| 1      | 0  | 0   | 1 | 0 | 1 | 0 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 1 | 0 | 1 | 1 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 1 | 1 | 0 | 0 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 1 | 1 | 0 | 1 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 1 | 1 | 1 | 0 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 1      | 0  | 0   | 1 | 1 | 1 | 1 | 0                                    | 0 | 0 | 0 | 0 | 0 | 0 | Blank            |
| 0      | 0  | 0   | X | X | X | X | **                                   |   |   |   |   |   |   | **               |
| †      | †  | †   | † |   |   |   | Inverse of Output Combinations Above |   |   |   |   |   |   | Display as above |

X = Don't care

† = Above Combinations

\* = For liquid crystal readouts, apply a square wave to Ph

For common cathode LED readouts, select Ph = 0

For common anode LED readouts, select Ph = 1

\*\* = Depends upon the BCD code previously applied when LD = 1

# MC14543B

## 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 3)                         | Max                   | Min                                | Max                   |      |
| Output Voltage<br>“0” Level<br>V <sub>in</sub> = V <sub>DD</sub> or 0                                                                                                                      | V <sub>OL</sub> | 5.0<br>10<br>15              | –<br>–<br>–                                                                                                                                                 | 0.05<br>0.05<br>0.05  | –<br>–<br>–                        | 0<br>0<br>0                             | 0.05<br>0.05<br>0.05  | –<br>–<br>–                        | 0.05<br>0.05<br>0.05  | Vdc  |
| V <sub>in</sub> = 0 or V <sub>DD</sub><br>“1” Level                                                                                                                                        | V <sub>OH</sub> | 5.0<br>10<br>15              | 4.95<br>9.95<br>14.95                                                                                                                                       | –<br>–<br>–           | 4.95<br>9.95<br>14.95              | 5.0<br>10<br>15                         | –<br>–<br>–           | 4.95<br>9.95<br>14.95              | –<br>–<br>–           | Vdc  |
| Input Voltage<br>“0” Level<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)                                                 | V <sub>IL</sub> | 5.0<br>10<br>15              | –<br>–<br>–                                                                                                                                                 | 1.5<br>3.0<br>4.0     | –<br>–<br>–                        | 2.25<br>4.50<br>6.75                    | 1.5<br>3.0<br>4.0     | –<br>–<br>–                        | 1.5<br>3.0<br>4.0     | Vdc  |
| “1” Level<br>(V <sub>O</sub> = 0.5 or 4.5 Vdc)<br>(V <sub>O</sub> = 1.0 or 9.0 Vdc)<br>(V <sub>O</sub> = 1.5 or 13.5 Vdc)                                                                  | V <sub>IH</sub> | 5.0<br>10<br>15              | 3.5<br>7.0<br>11                                                                                                                                            | –<br>–<br>–           | 3.5<br>7.0<br>11                   | 2.75<br>5.50<br>8.25                    | –<br>–<br>–           | 3.5<br>7.0<br>11                   | –<br>–<br>–           | Vdc  |
| Output Drive Current<br>(V <sub>OH</sub> = 2.5 Vdc)<br>(V <sub>OH</sub> = 4.6 Vdc)<br>(V <sub>OH</sub> = 0.5 Vdc)<br>(V <sub>OH</sub> = 9.5 Vdc)<br>(V <sub>OH</sub> = 13.5 Vdc)<br>Source | I <sub>OH</sub> | 5.0<br>5.0<br>10<br>10<br>15 | –3.0<br>–0.64<br>–<br>–1.6<br>–4.2                                                                                                                          | –<br>–<br>–<br>–<br>– | –2.4<br>–0.51<br>–<br>–1.3<br>–3.4 | –4.2<br>–0.88<br>–10.1<br>–2.25<br>–8.8 | –<br>–<br>–<br>–<br>– | –1.7<br>–0.36<br>–<br>–0.9<br>–2.4 | –<br>–<br>–<br>–<br>– | mAdc |
| (V <sub>OL</sub> = 0.4 Vdc)<br>(V <sub>OL</sub> = 0.5 Vdc)<br>(V <sub>OL</sub> = 9.5 Vdc)<br>(V <sub>OL</sub> = 1.5 Vdc)<br>Sink                                                           | I <sub>OL</sub> | 5.0<br>10<br>10<br>15        | 0.64<br>1.6<br>–<br>4.2                                                                                                                                     | –<br>–<br>–<br>–      | 0.51<br>1.3<br>–<br>3.4            | 0.88<br>2.25<br>10.1<br>8.8             | –<br>–<br>–<br>–      | 0.36<br>0.9<br>–<br>2.4            | –<br>–<br>–<br>–      | mAdc |
| Input Current                                                                                                                                                                              | I <sub>in</sub> | 15                           | –                                                                                                                                                           | ±0.1                  | –                                  | ±0.00001                                | ±0.1                  | –                                  | ±1.0                  | μAdc |
| Input Capacitance                                                                                                                                                                          | C <sub>in</sub> | –                            | –                                                                                                                                                           | –                     | –                                  | 5.0                                     | 7.5                   | –                                  | –                     | pF   |
| Quiescent Current (Per Package)<br>V <sub>in</sub> = 0 or V <sub>DD</sub> ,<br>I <sub>out</sub> = 0 μA                                                                                     | I <sub>DD</sub> | 5.0<br>10<br>15              | –<br>–<br>–                                                                                                                                                 | 5.0<br>10<br>20       | –<br>–<br>–                        | 0.005<br>0.010<br>0.015                 | 5.0<br>10<br>20       | –<br>–<br>–                        | 150<br>300<br>600     | μAdc |
| Total Supply Current (Note 4, 5)<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> = (1.6 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (3.1 μA/kHz) f + I <sub>DD</sub><br>I <sub>T</sub> = (4.7 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.

3. Noise immunity specified for worst-case input combination.

Noise Margin for both "1" and "0" level = 1.0 V min @ V<sub>DD</sub> = 5.0 V  
2.0 V min @ V<sub>DD</sub> = 10 V  
2.5 V min @ V<sub>DD</sub> = 15 V

4. To calculate total supply current at loads other than 50 pF: I<sub>T</sub>(C<sub>L</sub>) = I<sub>T</sub>(50 pF) + 3.5 × 10<sup>–3</sup> (C<sub>L</sub> – 50) V<sub>DD</sub>f where: I<sub>T</sub> is in μA (per package), C<sub>L</sub> in pF, V<sub>DD</sub> in V, and f in kHz is input frequency.

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

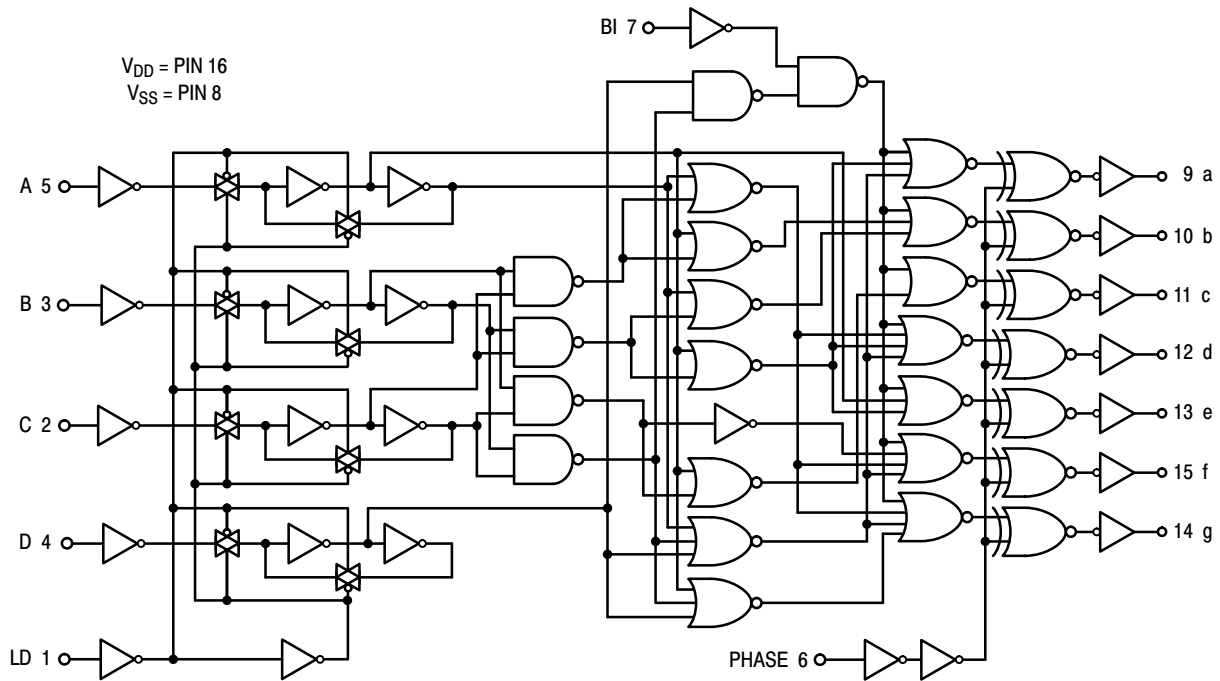
# MC14543B

## SWITCHING CHARACTERISTICS (Note 6) ( $C_L = 50 \text{ pF}$ , $T_A = 25^\circ\text{C}$ )

| Characteristic                                                                                                                                                                               | Symbol    | $V_{DD}$        | Min               | Typ               | Max                | Unit |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------------|-------------------|-------------------|--------------------|------|
| Output Rise Time<br>$t_{TLH} = (3.0 \text{ ns/pF}) C_L + 30 \text{ ns}$<br>$t_{TLH} = (1.5 \text{ ns/pF}) C_L + 15 \text{ ns}$<br>$t_{TLH} = (1.1 \text{ ns/pF}) C_L + 10 \text{ ns}$        | $t_{TLH}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 100<br>50<br>40   | 200<br>100<br>80   | ns   |
| Output Fall Time<br>$t_{THL} = (1.5 \text{ ns/pF}) C_L + 25 \text{ ns}$<br>$t_{THL} = (0.75 \text{ ns/pF}) C_L + 12.5 \text{ ns}$<br>$t_{THL} = (0.55 \text{ ns/pF}) C_L + 12.5 \text{ ns}$  | $t_{THL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 100<br>50<br>40   | 200<br>100<br>80   | ns   |
| Turn-Off Delay Time<br>$t_{PLH} = (1.7 \text{ ns/pF}) C_L + 520 \text{ ns}$<br>$t_{PLH} = (0.66 \text{ ns/pF}) C_L + 217 \text{ ns}$<br>$t_{PLH} = (0.5 \text{ ns/pF}) C_L + 160 \text{ ns}$ | $t_{PLH}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 605<br>250<br>185 | 1210<br>500<br>370 | ns   |
| Turn-On Delay Time<br>$t_{PHL} = (1.7 \text{ ns/pF}) C_L + 420 \text{ ns}$<br>$t_{PHL} = (0.66 \text{ ns/pF}) C_L + 172 \text{ ns}$<br>$t_{PHL} = (0.5 \text{ ns/pF}) C_L + 130 \text{ ns}$  | $t_{PHL}$ | 5.0<br>10<br>15 | –<br>–<br>–       | 505<br>205<br>155 | 1650<br>660<br>495 | ns   |
| Setup Time                                                                                                                                                                                   | $t_{su}$  | 5.0<br>10<br>15 | 350<br>450<br>500 |                   | –<br>–<br>–        | ns   |
| Hold Time                                                                                                                                                                                    | $t_h$     | 5.0<br>10<br>15 | 40<br>30<br>20    |                   | –<br>–<br>–        | ns   |
| Latch Disable Pulse Width (Strobing Data)                                                                                                                                                    | $t_{WH}$  | 5.0<br>10<br>15 | 250<br>100<br>80  | 125<br>50<br>40   | –<br>–<br>–        | ns   |

6. The formulas given are for the typical characteristics only.

## LOGIC DIAGRAM



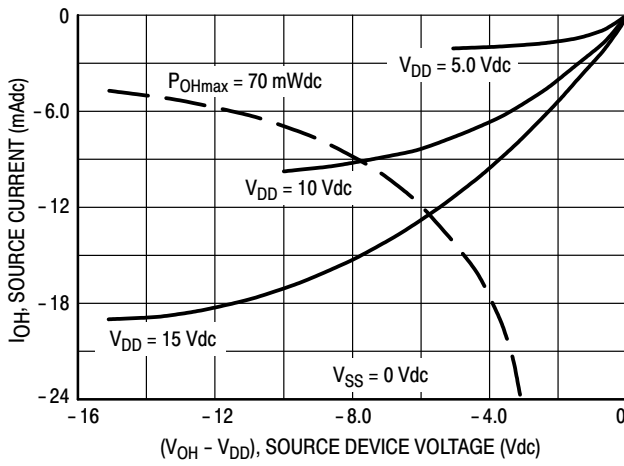


Figure 1. Typical Output Source Characteristics

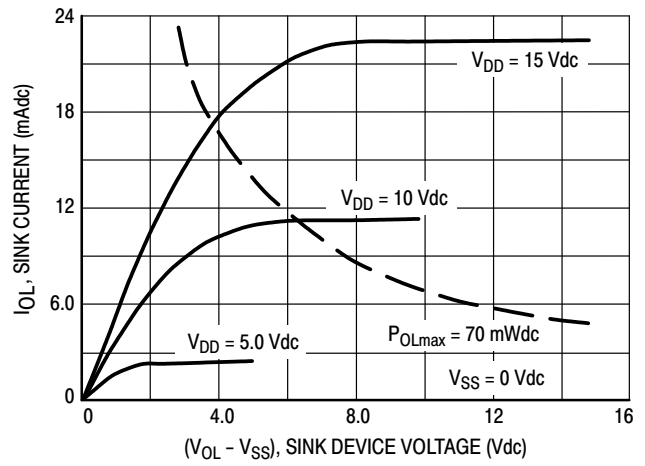


Figure 2. Typical Output Sink Characteristics

Inputs BI and Ph low, and Inputs D and LD high.  
f in respect to a system clock.  
All outputs connected to respective  $C_L$  loads.

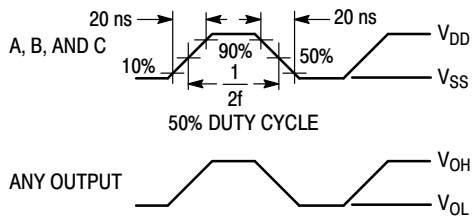
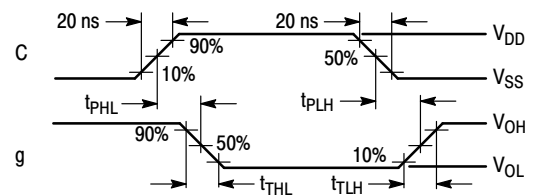
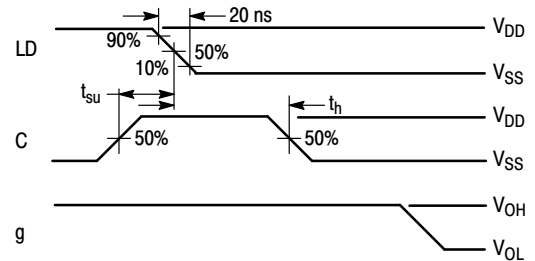


Figure 3. Dynamic Power Dissipation Signal Waveforms

(a) Inputs D, Ph, and BI low, and Inputs A, B, and LD high.



(b) Inputs D, Ph, and BI low, and Inputs A and B high.



(c) Data DCBA strobed into latches

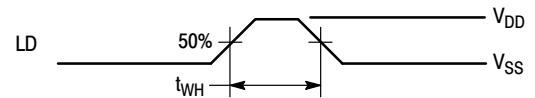
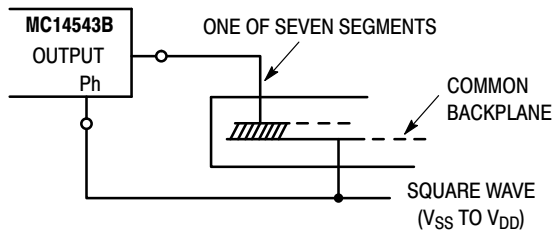


Figure 4. Dynamic Signal Waveforms

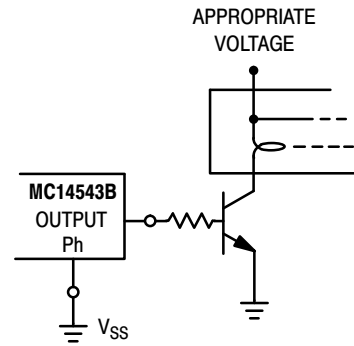
# MC14543B

## CONNECTIONS TO VARIOUS DISPLAY READOUTS

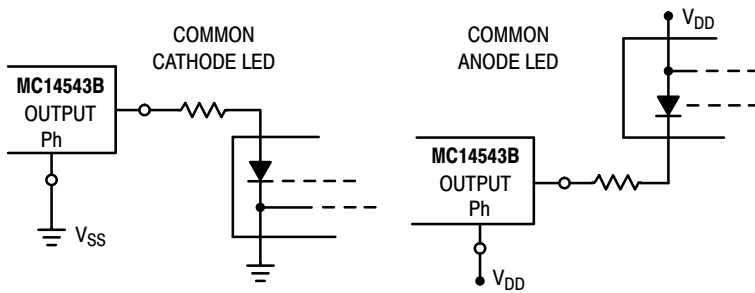
### LIQUID CRYSTAL (LC) READOUT



### INCANDESCENT READOUT

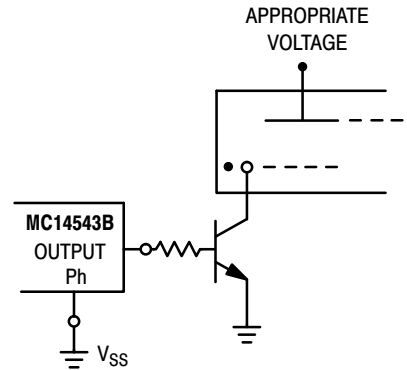


### LIGHT EMITTING DIODE (LED) READOUT

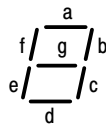


NOTE: Bipolar transistors may be added for gain (for  $V_{DD} \leq 10$  V or  $I_{out} \geq 10$  mA).

### GAS DISCHARGE READOUT



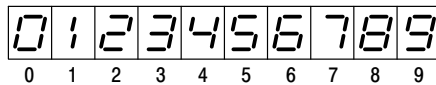
## CONNECTIONS TO SEGMENTS



$V_{DD}$  = PIN 16

$V_{SS}$  = PIN 8

## DISPLAY



## MC14543B

### ORDERING INFORMATION

| Device         | Package              | Shipping <sup>†</sup> |
|----------------|----------------------|-----------------------|
| MC14543BDG     | SOIC-16<br>(Pb-Free) | 48 Units / Rail       |
| MC14543BDR2G   | SOIC-16<br>(Pb-Free) | 2500 / Tape & Reel    |
| NLV14543BDR2G* | SOIC-16<br>(Pb-Free) | 2500 / 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.

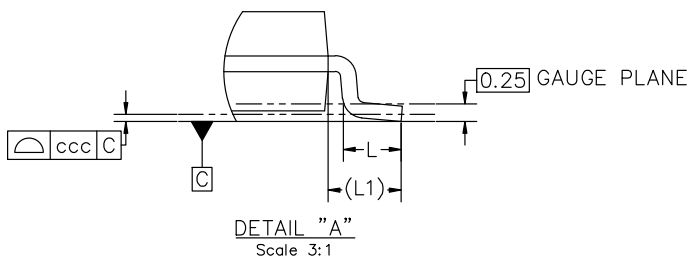
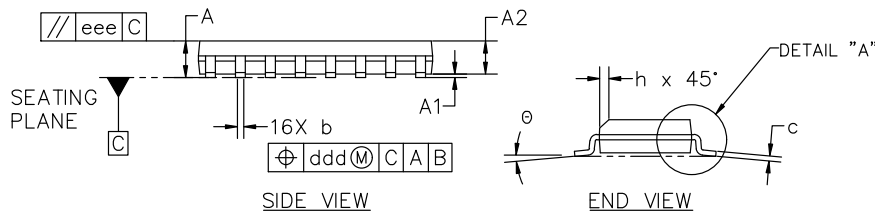
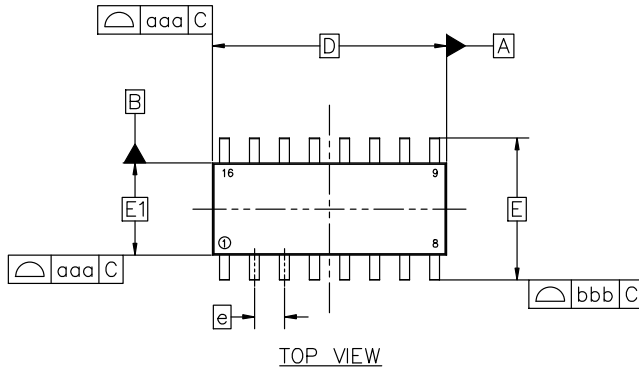
\*NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable.


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

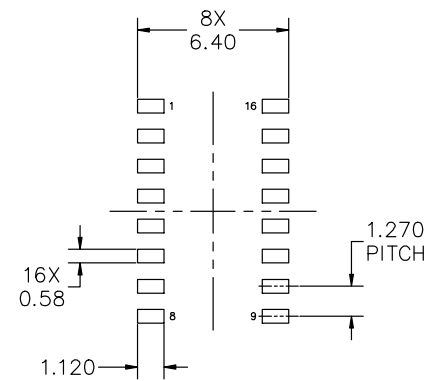
DATE 18 OCT 2024

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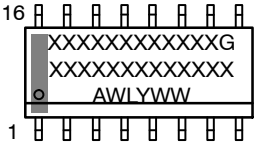
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| <b>DESCRIPTION:</b>     | <b>SOIC-16 9.90X3.90X1.37 1.27P</b> | <b>PAGE 1 OF 2</b>                                                                                                                                                                  |

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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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