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**PART NUMBER****54LS154F883C-ROCA**

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- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-38535
  - Class Q Military
  - Class V Space Level

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*The original manufacturer's datasheet accompanying this document reflects the performance and specifications of the Rochester manufactured version of this device. Rochester Electronics guarantees the performance of its semiconductor products to the original OCM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.*

# DM54LS154,DM74LS154

*DM54LS154 DM74LS154 4-Line to 16-Line Decoders/Demultiplexers*



Literature Number: SNOS284A

## DM54LS154/DM74LS154 4-Line to 16-Line Decoders/Demultiplexers

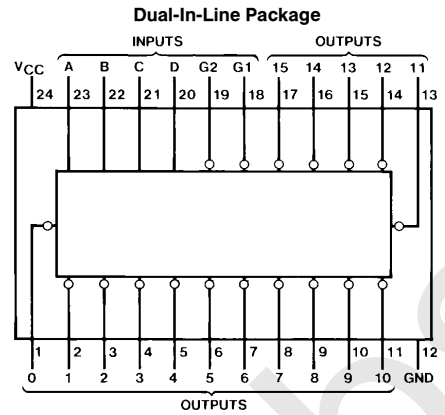
### General Description

Each of these 4-line-to-16-line decoders utilizes TTL circuitry to decode four binary-coded inputs into one of sixteen mutually exclusive outputs when both the strobe inputs, G1 and G2, are low. The demultiplexing function is performed by using the 4 input lines to address the output line, passing data from one of the strobe inputs with the other strobe input low. When either strobe input is high, all outputs are high. These demultiplexers are ideally suited for implementing high-performance memory decoders. All inputs are buffered and input clamping diodes are provided to minimize transmission-line effects and thereby simplify system design.

### Features

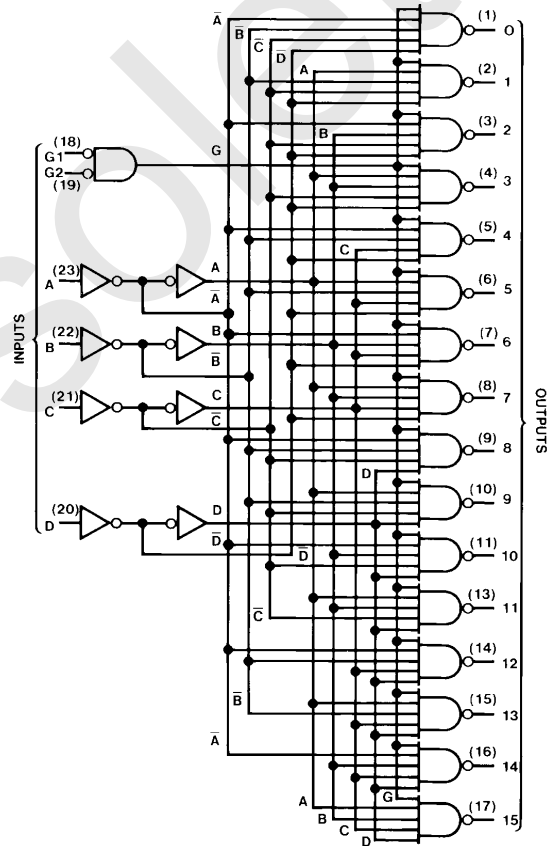
- Decodes 4 binary-coded inputs into one of 16 mutually exclusive outputs
- Performs the demultiplexing function by distributing data from one input line to any one of 16 outputs
- Input clamping diodes simplify system design
- High fan-out, low-impedance, totem-pole outputs
- Typical propagation delay  
3 levels of logic 23 ns  
Strobe 19 ns
- Typical power dissipation 45 mW

### Connection and Logic Diagrams



Order Number **DM54LS154J**,  
**DM74LS154WM** or **DM74LS154N**  
 See NS Package Number **J24A**, **M24B** or **N24A**

TL/F/6394-1



TL/F/6394-2

## Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

|                                      |                 |
|--------------------------------------|-----------------|
| Supply Voltage                       | 7V              |
| Input Voltage                        | 7V              |
| Operating Free Air Temperature Range |                 |
| DM54LS                               | −55°C to +125°C |
| DM74LS                               | 0°C to +70°C    |
| Storage Temperature Range            | −65°C to +150°C |

Note: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

## Recommended Operating Conditions

| Symbol          | Parameter                      | DM54LS154 |     |      | DM74LS154 |     |      | Units |
|-----------------|--------------------------------|-----------|-----|------|-----------|-----|------|-------|
|                 |                                | Min       | Nom | Max  | Min       | Nom | Max  |       |
| V <sub>CC</sub> | Supply Voltage                 | 4.5       | 5   | 5.5  | 4.75      | 5   | 5.25 | V     |
| V <sub>IH</sub> | High Level Input Voltage       | 2         |     |      | 2         |     |      | V     |
| V <sub>IL</sub> | Low Level Input Voltage        |           |     | 0.7  |           |     | 0.8  | V     |
| I <sub>OH</sub> | High Level Output Current      |           |     | −0.4 |           |     | −0.4 | mA    |
| I <sub>OL</sub> | Low Level Output Current       |           |     | 4    |           |     | 8    | mA    |
| T <sub>A</sub>  | Free Air Operating Temperature | −55       |     | 125  | 0         |     | 70   | °C    |

## Electrical Characteristics over recommended operating free air temperature range (unless otherwise noted)

| Symbol          | Parameter                         | Conditions                                                                                   | Min                        | Typ (Note 1) | Max          | Units |
|-----------------|-----------------------------------|----------------------------------------------------------------------------------------------|----------------------------|--------------|--------------|-------|
| V <sub>I</sub>  | Input Clamp Voltage               | V <sub>CC</sub> = Min, I <sub>I</sub> = −18 mA                                               |                            |              | −1.5         | V     |
| V <sub>OH</sub> | High Level Output Voltage         | V <sub>CC</sub> = Min, I <sub>OH</sub> = Max<br>V <sub>IL</sub> = Max, V <sub>IH</sub> = Min | DM54<br>2.5<br>DM74<br>2.7 | 3.4          |              | V     |
| V <sub>OL</sub> | Low Level Output Voltage          | V <sub>CC</sub> = Min, I <sub>OL</sub> = Max<br>V <sub>IL</sub> = Max, V <sub>IH</sub> = Min | DM54<br>DM74               | 0.25<br>0.35 | 0.4<br>0.5   | V     |
|                 |                                   | I <sub>OL</sub> = 4 mA, V <sub>CC</sub> = Min                                                | DM74                       | 0.25         | 0.4          |       |
| I <sub>I</sub>  | Input Current @ Max Input Voltage | V <sub>CC</sub> = Max, V <sub>I</sub> = 7V                                                   |                            |              | 0.1          | mA    |
| I <sub>IH</sub> | High Level Input Current          | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V                                                 |                            |              | 20           | μA    |
| I <sub>IL</sub> | Low Level Input Current           | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4V                                                 |                            |              | −0.4         | mA    |
| I <sub>OS</sub> | Short Circuit Output Current      | V <sub>CC</sub> = Max (Note 2)                                                               | DM54<br>DM74               | −20<br>−20   | −100<br>−100 | mA    |
| I <sub>CC</sub> | Supply Current                    | V <sub>CC</sub> = Max (Note 3)                                                               |                            | 9            | 14           | mA    |

Note 1: All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I<sub>CC</sub> is measured with all outputs open and all inputs grounded.

## Switching Characteristics at V<sub>CC</sub> = 5V and T<sub>A</sub> = 25°C (See Section 1 for Test Waveforms and Output Load)

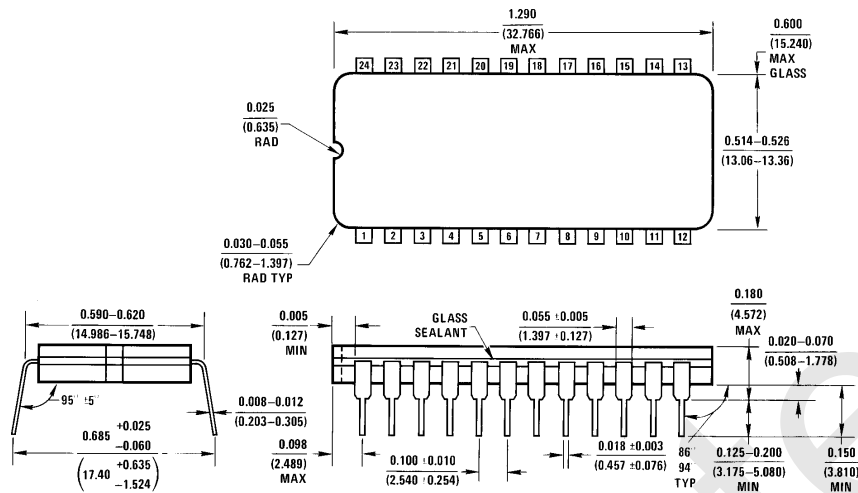
| Symbol           | Parameter                                          | From (Input)<br>To (Output) | R <sub>L</sub> = 2 kΩ  |     |                        |     | Units |
|------------------|----------------------------------------------------|-----------------------------|------------------------|-----|------------------------|-----|-------|
|                  |                                                    |                             | C <sub>L</sub> = 15 pF |     | C <sub>L</sub> = 50 pF |     |       |
|                  |                                                    |                             | Min                    | Max | Min                    | Max |       |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Data to<br>Output           |                        | 30  |                        | 35  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Data to<br>Output           |                        | 30  |                        | 35  | ns    |
| t <sub>PLH</sub> | Propagation Delay Time<br>Low to High Level Output | Strobe to<br>Output         |                        | 20  |                        | 25  | ns    |
| t <sub>PHL</sub> | Propagation Delay Time<br>High to Low Level Output | Strobe to<br>Output         |                        | 25  |                        | 35  | ns    |

| Function Table |    |   |   |   |   |         |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
|----------------|----|---|---|---|---|---------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|
| Inputs         |    |   |   |   |   | Outputs |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |
| G1             | G2 | D | C | B | A | 0       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| L              | L  | L | L | L | L | L       | H | H | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | L | L | H | H       | L | H | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | L | H | L | H       | H | L | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | L | H | H | H       | H | H | L | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | H | L | L | H       | H | H | H | L | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | H | L | H | H       | H | H | H | H | L | H | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | H | H | L | H       | H | H | H | H | H | L | H | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | L | H | H | H | H       | H | H | H | H | H | H | L | H | H | H  | H  | H  | H  | H  | H  |
| L              | L  | H | L | L | L | H       | H | H | H | H | H | H | H | L | H | H  | H  | H  | H  | H  | H  |
| L              | L  | H | L | L | H | H       | H | H | H | H | H | H | H | H | L | H  | H  | H  | H  | H  | H  |
| L              | L  | H | L | H | L | H       | H | H | H | H | H | H | H | H | H | L  | H  | H  | H  | H  | H  |
| L              | L  | H | L | H | H | H       | H | H | H | H | H | H | H | H | H | H  | L  | H  | H  | H  | H  |
| L              | L  | H | H | L | L | H       | H | H | H | H | H | H | H | H | H | H  | H  | L  | H  | H  | H  |
| L              | L  | H | H | H | L | H       | H | H | H | H | H | H | H | H | H | H  | H  | H  | L  | H  | H  |
| L              | L  | H | H | H | H | H       | H | H | H | H | H | H | H | H | H | H  | H  | H  | H  | L  | H  |
| L              | H  | X | X | X | X | H       | H | H | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| H              | L  | X | X | X | X | H       | H | H | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |
| H              | H  | X | X | X | X | H       | H | H | H | H | H | H | H | H | H | H  | H  | H  | H  | H  | H  |

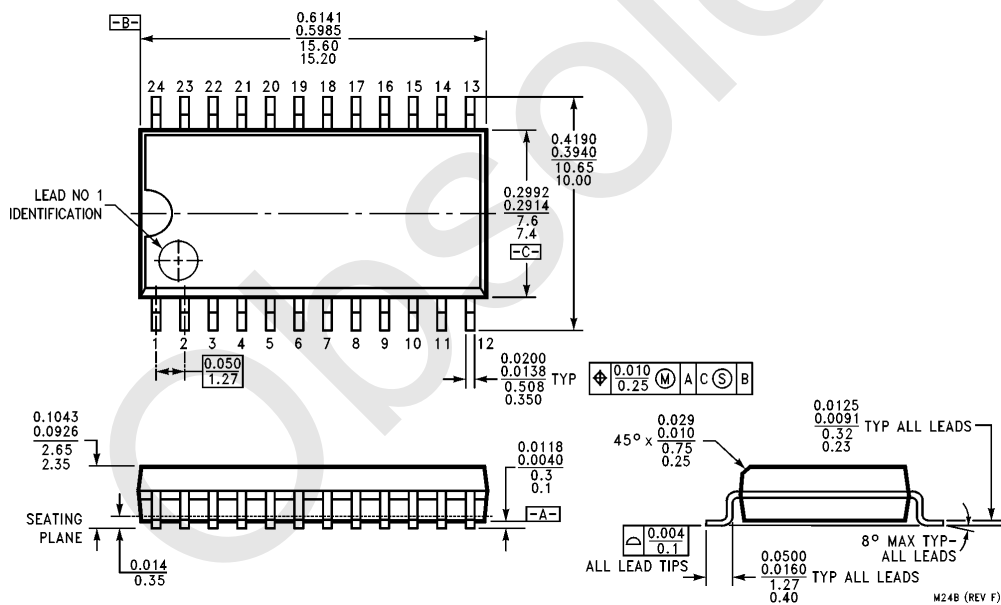
H = High Level, L = Low Level, X = Don't Care

Obsolete

## Physical Dimensions inches (millimeters)

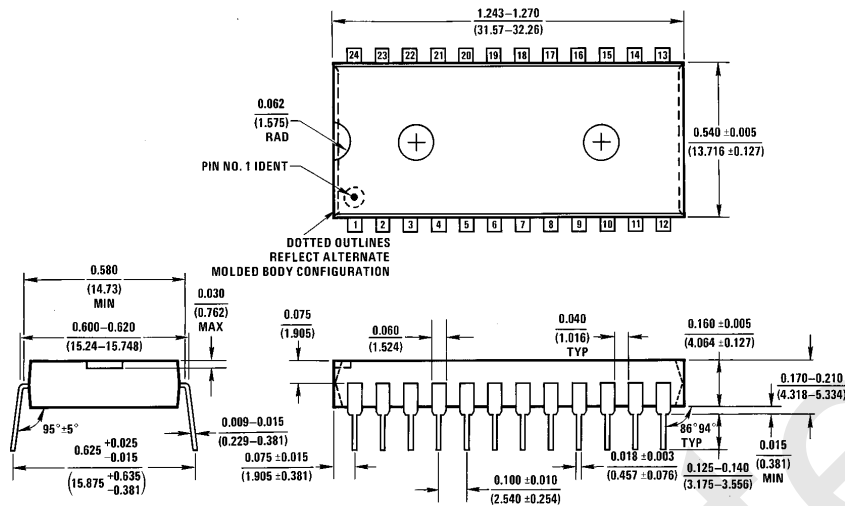


**24-Lead Ceramic Dual-In-Line Package (J)**  
**Order Number DM54LS154J**  
**NS Package Number J24A**



**24-Lead Wide Small Outline Molded Package (M)**  
**Order Number DM74LS154WM**  
**NS Package Number M24B**

## Physical Dimensions inches (millimeters) (Continued)



**24-Lead Molded Dual-In-Line Package (N)**  
**Order Number DM74LS154N**  
**NS Package Number N24A**

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**National Semiconductor Corporation**  
 1111 West Bardin Road  
 Arlington, TX 76017  
 Tel: 1(800) 272-9959  
 Fax: 1(800) 737-7018

**National Semiconductor Europe**  
 Fax: (+49) 0-180-530 85 86  
 Email: cnjwge@tevm2.nsc.com  
 Deutsch Tel: (+49) 0-180-530 85 85  
 English Tel: (+49) 0-180-532 78 32  
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 19th Floor, Straight Block,  
 Ocean Centre, 5 Canton Rd.  
 Tsimshatsui, Kowloon  
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