

Rochester Electronics Manufactured Components

Rochester branded components are manufactured using either die/wafers purchased from the original suppliers or Rochester wafers recreated from the original IP. All recreations are done with the approval of the OCM.

Parts are tested using original factory test programs or Rochester developed test solutions to guarantee product meets or exceed the OCM data sheet.

Quality Overview

- ISO-9001
- AS9120 certification
- Qualified Manufacturers List (QML) MIL-PRF-35835
 - Class Q Military
 - Class V Space Level
- Qualified Suppliers List of Distributors (QSLD)
 - Rochester is a critical supplier to DLA and meets all industry and DLA standards.

Rochester Electronics, LLC is committed to supplying products that satisfy customer expectations for quality and are equal to those originally supplied by industry manufacturers.

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 OEM specifications. 'Typical' values are for reference purposes only. Certain minimum or maximum ratings may be based on product characterization, design, simulation, or sample testing.

DM5416/DM7416 Hex Inverting Buffers with High Voltage Open-Collector Outputs

General Description

This device contains six independent gates each of which performs the logic INVERT function. The open-collector outputs require external pull-up resistors for proper logical operation.

Pull-Up Resistor Equations

$$R_{MAX} = \frac{V_O (Min) - V_{OH}}{N_1 (I_{OH}) + N_2 (I_{IH})}$$

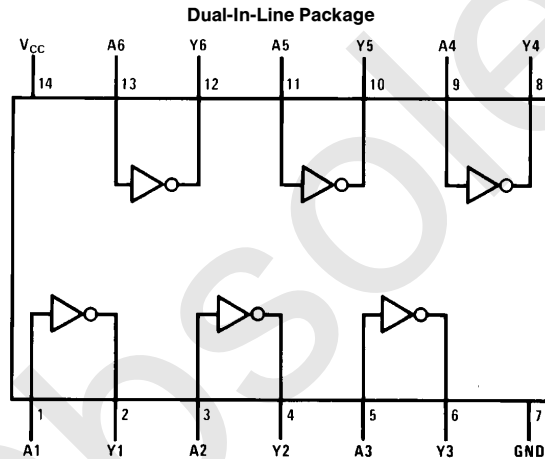
$$R_{MIN} = \frac{V_O (Max) - V_{OL}}{I_{OL} - N_3 (I_{IL})}$$

Where: $N_1 (I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor

$N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor

$N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Connection Diagram



TL/F/6504-1

Order Number DM5416J, DM5416W or DM7416N
See NS Package Number J14A, N14A or W14B

Function Table

$$Y = \bar{A}$$

| Input | Output |
|-------|--------|
| A | Y |
| L | H |
| H | L |

H = High Logic Level
L = Low Logic Level

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 | 5.5V |
| Output Voltage | 15V |
| Operating Free Air Temperature Range | |
| DM54 | −55°C to +125°C |
| DM74 | 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 | DM5416 | | | DM7416 | | | Units |
|-----------------|--------------------------------|--------|-----|-----|--------|-----|------|-------|
| | | Min | Nom | Max | Min | Nom | Max | |
| V _{CC} | Supply Voltage | 4.5 | 5 | 5.5 | 4.75 | 5 | 5.25 | V |
| V _{IH} | High Level Input Voltage | 2 | | | 2 | | | V |
| V _{IL} | Low Level Input Voltage | | | 0.8 | | | 0.8 | V |
| V _{OH} | High Level Output Voltage | | | 15 | | | 15 | V |
| I _{OL} | Low Level Output Current | | | 30 | | | 40 | mA |
| T _A | Free Air Operating Temperature | −55 | | 125 | 0 | | 70 | °C |

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

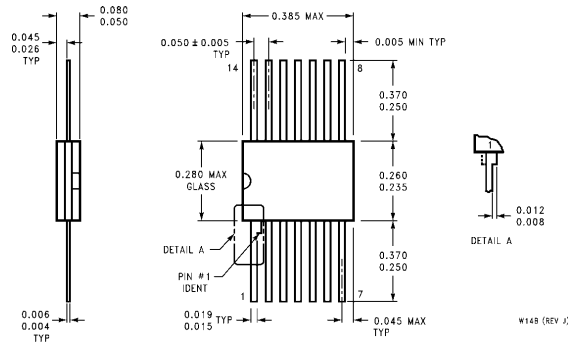
| Symbol | Parameter | Conditions | Min | Typ (Note 1) | Max | Units |
|------------------|-----------------------------------|---|-----|--------------|------|-------|
| V _I | Input Clamp Voltage | V _{CC} = Min, I _I = −12 mA | | | −1.5 | V |
| I _{CEX} | High Level Output Current | V _{CC} = Min, V _O = 15V V _{IL} = Max | | | 250 | μA |
| V _{OL} | Low Level Output Voltage | V _{CC} = Min, I _{OL} = Max V _{IH} = Min | | | 0.7 | V |
| | | I _{OL} = 16 mA, V _{CC} = Min | | | 0.4 | |
| I _I | Input Current @ Max Input Voltage | V _{CC} = Max, V _I = 5.5V | | | 1 | mA |
| I _{IH} | High Level Input Current | V _{CC} = Max, V _I = 2.4V | | | 40 | μA |
| I _{IL} | Low Level Input Current | V _{CC} = Max, V _I = 0.4V | | | −1.6 | mA |
| I _{CCH} | Supply Current with Outputs High | V _{CC} = Max | | 30 | 48 | mA |
| I _{CCL} | Supply Current with Outputs Low | V _{CC} = Max | | 27 | 51 | mA |

Switching Characteristics at V_{CC} = 5V and T_A = 25°C (See Section 1 for Test Waveforms and Output Load)

| Symbol | Parameter | Conditions | Min | Max | Units |
|------------------|---|---|-----|-----|-------|
| t _{PLH} | Propagation Delay Time Low to High Level Output | C _L = 15 pF R _L = 110Ω | | 15 | ns |
| t _{PHL} | Propagation Delay Time High to Low Level Output | | | 23 | ns |

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Physical Dimensions inches (millimeters) (Continued)



**14-Lead Ceramic Flat Package (W)
Order Number DM5416W
NS Package Number W14B**

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2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.



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