

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

| Parameter       |                                        | Conditions                                                         | DM54/74 |         |     |        |         |      | DM54/74 |         |      | Units |
|-----------------|----------------------------------------|--------------------------------------------------------------------|---------|---------|-----|--------|---------|------|---------|---------|------|-------|
|                 |                                        |                                                                    | 23      |         |     | 50, 53 |         |      | H50     |         |      |       |
|                 |                                        |                                                                    | Min     | Typ (1) | Max | Min    | Typ (1) | Max  | Min     | Typ (1) | Max  |       |
| V <sub>IH</sub> | High Level Input Voltage               |                                                                    | 2       |         |     | 2      |         |      | 2       |         |      | V     |
| V <sub>IL</sub> | Low Level Input Voltage                |                                                                    |         |         | 0.8 |        |         | 0.8  |         |         | 0.8  | V     |
| V <sub>I</sub>  | Input Clamp Voltage                    | V <sub>CC</sub> = Min                                              |         |         |     |        |         |      |         |         | -1.5 | V     |
|                 |                                        | I <sub>I</sub> = -8 mA                                             |         |         |     |        |         |      |         |         |      |       |
|                 |                                        | I <sub>I</sub> = -12 mA                                            |         |         |     |        |         |      |         |         |      |       |
| I <sub>OH</sub> | High Level Output Current              |                                                                    |         |         |     |        |         |      |         |         |      |       |
| V <sub>OH</sub> | High Level Output Voltage              | V <sub>CC</sub> = Min, V <sub>I</sub> = (2), I <sub>OH</sub> = Max | 2.4     | 3.4     |     | 2.4    | 3.4     |      | 2.4     | 3.4     |      | μA    |
| I <sub>OL</sub> | Low Level Output Current               |                                                                    |         |         | 16  |        |         | 16   |         |         | 20   | mA    |
| V <sub>OL</sub> | Low Level Output Voltage               | V <sub>CC</sub> = Min, V <sub>I</sub> = (2), I <sub>OL</sub> = Max |         | 0.2     | 0.4 |        | 0.2     | 0.4  |         | 0.2     | 0.4  | V     |
| I <sub>I</sub>  | Input Current at Maximum Input Voltage | V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5 V                      |         |         | 1   |        |         | 1    |         |         | 1    | mA    |
| I <sub>IH</sub> | High Level Input Current               | V <sub>CC</sub> = Max, V <sub>I</sub> = 2.4 V                      |         |         | 40  |        |         | 40   |         |         | 50   | μA    |
|                 | Strobe of 23                           |                                                                    |         |         | 160 |        |         | N/A  |         |         | N/A  |       |
| I <sub>IL</sub> | Low Level Input Current                | V <sub>CC</sub> = Max, V <sub>I</sub> = 0.4 V                      |         |         |     |        |         | -1.6 |         |         | -2   | mA    |
|                 | Strobe of 23                           |                                                                    |         |         |     |        |         | -6.4 |         |         | N/A  |       |
| I <sub>OS</sub> | Short Circuit Output Current           |                                                                    | -20     |         | -55 | -20    |         | -55  | -40     |         | -100 | mA    |
|                 |                                        | DM54                                                               |         |         |     |        |         |      |         |         |      |       |
|                 |                                        | DM74                                                               | -18     |         | -55 | -18    |         | -55  | -40     |         | -100 |       |
| I <sub>CC</sub> | Supply Current                         | V <sub>CC</sub> = Max                                              |         |         |     |        |         |      |         |         |      |       |
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See Table

Note 1: All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.Note 2: The input voltage is V<sub>IH</sub> = 2 V or V<sub>IL</sub> = 0.8 V, as appropriate.

Note 3: Not more than one output should be shorted at a time, and for the DM54H/DM74H, duration of short circuit should not exceed one second.

**Electrical Characteristics** using expander inputs,  $V_{CC} = \text{Min}$ ,  $T_A = \text{Min}$  (unless otherwise noted) (4), (5)

| Device  | $I_{\bar{X}}$ (mA)<br>Expander Current |     |         | $V_{BE}(Q)$ (V)<br>Base-Emitter Voltage of<br>Output Transistor Q |                                               |     | $V_{OH}$ (V)<br>High Level Output Voltage |     |                                               | $V_{OL}$ (V)<br>Low Level Output Voltage |         |     |
|---------|----------------------------------------|-----|---------|-------------------------------------------------------------------|-----------------------------------------------|-----|-------------------------------------------|-----|-----------------------------------------------|------------------------------------------|---------|-----|
|         | Conditions                             | Min | Typ (1) | Max                                                               | Conditions                                    | Min | Typ (1)                                   | Max | Conditions                                    | Min                                      | Typ (1) | Max |
| DM5423  | $V_{\bar{X}\bar{X}} = 0.4 \text{ V}$   |     |         | -3.5                                                              | $I_{\bar{X}} + I_{\bar{X}} = 410 \mu\text{A}$ |     |                                           |     | $I_{\bar{X}} + I_{\bar{X}} = 300 \mu\text{A}$ |                                          |         |     |
| DM5450  | $I_{OL} = 16 \text{ mA}$               |     |         | -2.9                                                              | $R_{\bar{X}\bar{X}} = 0$                      |     |                                           | 1.1 | $R_{\bar{X}\bar{X}} = 138 \Omega$             |                                          | 0.2     | 0.4 |
| DM5453  |                                        |     |         | -2.9                                                              | $I_{OL} = 16 \text{ mA}$                      |     |                                           |     | $I_{OH} = -400 \mu\text{A}$                   |                                          |         |     |
| DM7423  | $V_{\bar{X}\bar{X}} = 0.4 \text{ V}$   |     |         | -3.5                                                              | $I_{\bar{X}} + I_{\bar{X}} = 620 \mu\text{A}$ |     |                                           |     | $I_{\bar{X}} + I_{\bar{X}} = 430 \mu\text{A}$ |                                          |         |     |
| DM7450  | $I_{OL} = 16 \text{ mA}$               |     |         | -3.1                                                              | $R_{\bar{X}\bar{X}} = 0$                      |     |                                           | 1.0 | $R_{\bar{X}\bar{X}} = 130 \Omega$             |                                          | 0.2     | 0.4 |
| DM7453  |                                        |     |         | -3.1                                                              | $I_{OL} = 16 \text{ mA}$                      |     |                                           |     | $I_{OH} = -400 \mu\text{A}$                   |                                          |         |     |
| DM54H50 | $V_{\bar{X}} = 1.4 \text{ V}$          |     |         | -5.85                                                             | $I_{\bar{X}} + I_{\bar{X}} = 700 \mu\text{A}$ |     |                                           |     | $I_{\bar{X}} + I_{\bar{X}} = 470 \mu\text{A}$ |                                          | 0.2     | 0.4 |
| DM74H50 | $V_{\bar{X}} = 1.4 \text{ V}$          |     |         | -6.3                                                              | $I_{\bar{X}} + I_{\bar{X}} = 1.1 \text{ mA}$  |     |                                           |     | $I_{\bar{X}} + I_{\bar{X}} = 600 \mu\text{A}$ |                                          | 0.2     | 0.4 |

Note 1: All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

Note 4: The 23, 50, and 53 are designed for use with up to four 60 expanders.

Note 5: The H50 is designed for use with a H62 expander.

**Supply Currents**

| Device | $I_{CCH}$ (mA)<br>Total With<br>Outputs High |      | $I_{CCL}$ (mA)<br>Total With<br>Outputs Low |     |
|--------|----------------------------------------------|------|---------------------------------------------|-----|
|        | Typ                                          | Max  | Typ                                         | Max |
| 23     | 8                                            | 16   | 10                                          | 19  |
| 50     | 4                                            | 8    | 7.4                                         | 14  |
| 53     | 4                                            | 8    | 5.1                                         | 9.5 |
| H50    | 8.2                                          | 12.8 | 15.2                                        | 24  |

**Switching Characteristics** at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ 

| Device     | Conditions                                                                                    | $t_{PLH}$ (ns)<br>Propagation Delay Time,<br>Low-To-High Level Output |     |     | $t_{PHL}$ (ns)<br>Propagation Delay Time,<br>High-To-Low Level Output |     |     |
|------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----|-----|-----------------------------------------------------------------------|-----|-----|
|            |                                                                                               | Min                                                                   | Typ | Max | Min                                                                   | Typ | Max |
| 23, 50, 53 | $C_L = 15 \text{ pF}$ , $R_L = 400 \Omega$<br>Expander Pins Open                              |                                                                       | 13  | 22  |                                                                       | 8   | 15  |
| 50         | $C_L = 15 \text{ pF}$ , $R_L = 400 \Omega$<br>From Input of 60 Expander                       |                                                                       | 15  | 30  |                                                                       | 10  | 20  |
| H50        | $C_L = 25 \text{ pF}$ , $R_L = 280 \Omega$<br>Expander Pins Open                              |                                                                       | 6.8 | 11  |                                                                       | 6.2 | 11  |
| H50        | $C_L = 25 \text{ pF}$ , $R_L = 280 \Omega$<br>$C = 15 \text{ pF}$ , (GND to $\bar{X}$ of H50) |                                                                       | 11  |     |                                                                       | 7.4 |     |