

Dual 10-bit buffer/line driver;  
non-inverting (3-State)

MB2827

FEATURES

- Multiple  $V_{CC}$  and GND pins minimize switching noise
- Live insertion/extraction permitted
- 3-State output buffers
- Power-up 3-State
- Output capability: +64mA/−32mA
- Latch-up protection exceeds 500mA per Jedec JC40.2 Std 17

- ESD protection exceeds 2000 V per MIL STD 883 Method 3015 and 200 V per Machine Model

DESCRIPTION

The MB2827 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The MB2827 20-bit buffers provide high performance bus interface buffering for wide data/address paths or buses carrying parity. They have NOR Output Enables ( $n\overline{OE}1$ ,  $n\overline{OE}2$ ) for maximum control flexibility.

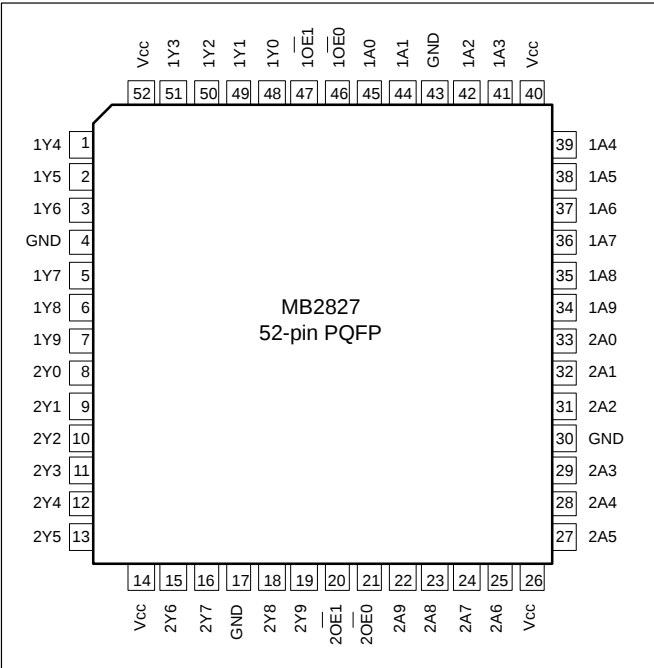
QUICK REFERENCE DATA

| SYMBOL                 | PARAMETER                           | CONDITIONS<br>$T_{amb} = 25^{\circ}C$ ; $GND = 0V$ | TYPICAL | UNIT    |
|------------------------|-------------------------------------|----------------------------------------------------|---------|---------|
| $t_{PLH}$<br>$t_{PHL}$ | Propagation delay<br>$nAx$ to $nYx$ | $C_L = 50pF$ ; $V_{CC} = 5V$                       | 3.0     | ns      |
| $C_{IN}$               | Input capacitance                   | $V_I = 0V$ or $V_{CC}$                             | 4       | pF      |
| $C_{OUT}$              | Output capacitance                  | $V_O = 0V$ or $V_{CC}$ ; 3-State                   | 7       | pF      |
| $I_{CCZ}$              | Total supply current                | Outputs disabled; $V_{CC} = 5.5V$                  | 80      | $\mu A$ |

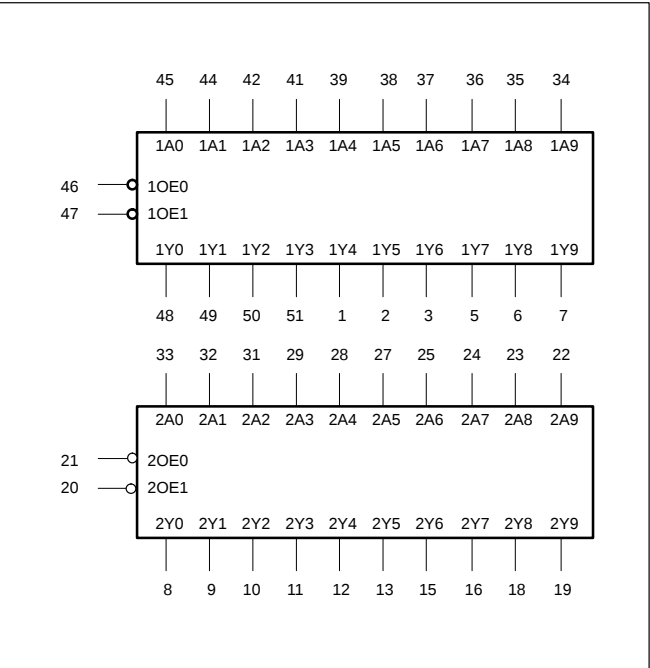
ORDERING INFORMATION

| PACKAGES                      | TEMPERATURE RANGE | ORDER CODE | DRAWING NUMBER |
|-------------------------------|-------------------|------------|----------------|
| 52-pin plastic Quad Flat Pack | −40°C to +85°C    | MB2827BB   | 1418B          |

PIN CONFIGURATION



LOGIC SYMBOL



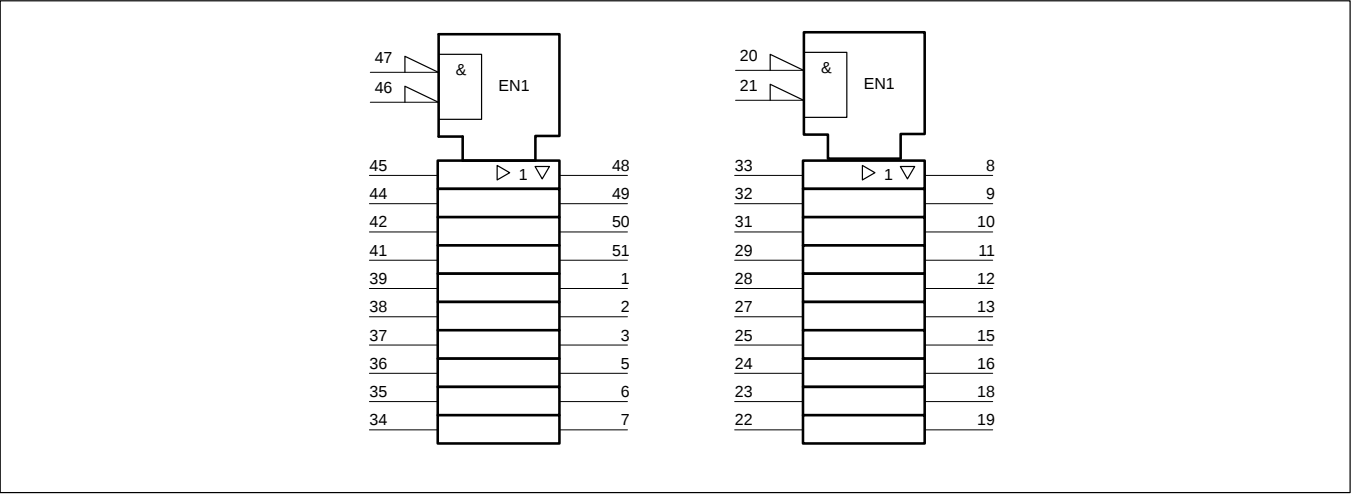
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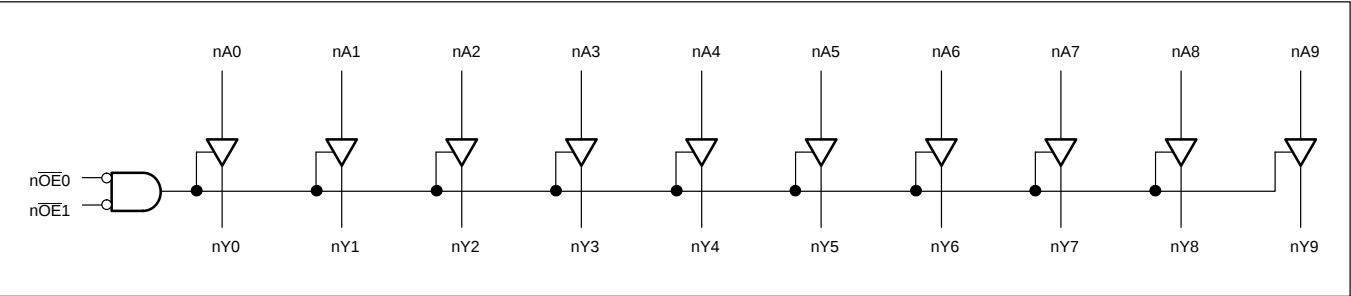
PIN DESCRIPTION

| PIN NUMBER                                                                        | SYMBOL                                                                               | FUNCTION                          |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------|
| 45, 44, 42, 41, 39, 38, 37, 36, 35, 34,<br>33, 32, 31, 29, 28, 27, 25, 24, 23, 22 | 1A0 – 1A9<br>2A0 – 2A9                                                               | Data inputs                       |
| 48, 49, 50, 51, 1, 2, 3, 5, 6, 7, 8, 9,<br>10, 11, 12, 13, 15, 16, 18, 19         | 1Y0 – 1Y9<br>2Y0 – 2Y9                                                               | Data outputs                      |
| 46, 47<br>21, 20                                                                  | 1 $\overline{OE}$ 0, 1 $\overline{OE}$ 1<br>2 $\overline{OE}$ 0, 2 $\overline{OE}$ 1 | Output enable inputs (active–Low) |
| 4, 17, 30, 43                                                                     | GND                                                                                  | Ground (0V)                       |
| 14, 26, 40, 52                                                                    | V <sub>CC</sub>                                                                      | Positive supply voltage           |

LOGIC SYMBOL (IEEE/IEC)



LOGIC DIAGRAM



FUNCTION TABLE

| INPUTS              |     | OUTPUTS | OPERATING<br>MODE |
|---------------------|-----|---------|-------------------|
| n $\overline{OE}$ x | nAx | nYx     |                   |
| L                   | L   | L       | Transparent       |
| L                   | H   | H       | Transparent       |
| H                   | X   | Z       | High impedance    |

H = High voltage level  
L = Low voltage level  
X = Don't care  
Z = High impedance "off" state

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## ABSOLUTE MAXIMUM RATINGS<sup>1, 2</sup>

| SYMBOL    | PARAMETER                      | CONDITIONS                  | RATING       | UNIT |
|-----------|--------------------------------|-----------------------------|--------------|------|
| $V_{CC}$  | DC supply voltage              |                             | −0.5 to +7.0 | V    |
| $I_{IK}$  | DC input diode current         | $V_I < 0$                   | −18          | mA   |
| $V_I$     | DC input voltage <sup>3</sup>  |                             | −1.2 to +7.0 | V    |
| $I_{OK}$  | DC output diode current        | $V_O < 0$                   | −50          | mA   |
| $V_{OUT}$ | DC output voltage <sup>3</sup> | output in Off or High state | −0.5 to +5.5 | V    |
| $I_{OUT}$ | DC output current              | output in Low state         | 128          | mA   |
| $T_{stg}$ | Storage temperature range      |                             | −65 to 150   | °C   |

### NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

## RECOMMENDED OPERATING CONDITIONS

| SYMBOL              | PARAMETER                            | LIMITS |          | UNIT |
|---------------------|--------------------------------------|--------|----------|------|
|                     |                                      | MIN    | MAX      |      |
| $V_{CC}$            | DC supply voltage                    | 4.5    | 5.5      | V    |
| $V_I$               | Input voltage                        | 0      | $V_{CC}$ | V    |
| $V_{IH}$            | High-level input voltage             | 2.0    |          | V    |
| $V_{IL}$            | Low-level Input voltage              |        | 0.8      | V    |
| $I_{OH}$            | High-level output current            |        | −32      | mA   |
| $I_{OL}$            | Low-level output current             |        | 64       | mA   |
| $\Delta t/\Delta v$ | Input transition rise or fall rate   | 0      | 5        | ns/V |
| $T_{amb}$           | Operating free-air temperature range | −40    | +85      | °C   |

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## DC ELECTRICAL CHARACTERISTICS

| SYMBOL                           | PARAMETER                                            | TEST CONDITIONS                                                                                                       | LIMITS                   |       |      |                                   |      | UNIT |
|----------------------------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------|-------|------|-----------------------------------|------|------|
|                                  |                                                      |                                                                                                                       | T <sub>amb</sub> = +25°C |       |      | T <sub>amb</sub> = −40°C to +85°C |      |      |
|                                  |                                                      |                                                                                                                       | MIN                      | TYP   | MAX  | MIN                               | MAX  |      |
| V <sub>IK</sub>                  | Input clamp voltage                                  | V <sub>CC</sub> = 4.5V; I <sub>IK</sub> = −18mA                                                                       |                          | −0.9  | −1.2 |                                   | −1.2 | V    |
| V <sub>OH</sub>                  | High-level output voltage                            | V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = −3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                   | 2.5                      | 2.9   |      | 2.5                               |      | V    |
|                                  |                                                      | V <sub>CC</sub> = 5.0V; I <sub>OH</sub> = −3mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                   | 3.0                      | 3.4   |      | 3.0                               |      | V    |
|                                  |                                                      | V <sub>CC</sub> = 4.5V; I <sub>OH</sub> = −32mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                  | 2.0                      | 2.4   |      | 2.0                               |      | V    |
| V <sub>OL</sub>                  | Low-level output voltage                             | V <sub>CC</sub> = 4.5V; I <sub>OL</sub> = 64mA; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                   |                          | 0.42  | 0.55 |                                   | 0.55 | V    |
| I <sub>I</sub>                   | Input leakage current                                | V <sub>CC</sub> = 5.5V; V <sub>I</sub> = GND or 5.5V                                                                  |                          | ±0.01 | ±1.0 |                                   | ±1.0 | μA   |
| I <sub>OFF</sub>                 | Power-off leakage current                            | V <sub>CC</sub> = 0.0V; V <sub>O</sub> = 4.5V; V <sub>I</sub> = 0V or 5.5V                                            |                          | ±5.0  | ±100 |                                   | ±100 | μA   |
| I <sub>PU</sub> /I <sub>PD</sub> | Power-up/down 3-State output current <sup>3</sup>    | V <sub>CC</sub> = 2.1V; V <sub>O</sub> = 0.5V; V <sub>I</sub> = GND or V <sub>CC</sub> ; V <sub>OE</sub> = Don't care |                          | ±5.0  | ±50  |                                   | ±50  | μA   |
| I <sub>OZH</sub>                 | 3-State output High current                          | V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 2.7V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                    |                          | 5.0   | 50   |                                   | 50   | μA   |
| I <sub>OZL</sub>                 | 3-State output Low current                           | V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 0.5V; V <sub>I</sub> = V <sub>IL</sub> or V <sub>IH</sub>                    |                          | −5.0  | −50  |                                   | −50  | μA   |
| I <sub>CEX</sub>                 | Output High leakage current                          | V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 5.5V; V <sub>I</sub> = GND or V <sub>CC</sub>                                |                          | 5.0   | 50   |                                   | 50   | μA   |
| I <sub>O</sub>                   | Output current <sup>1</sup>                          | V <sub>CC</sub> = 5.5V; V <sub>O</sub> = 2.5V                                                                         | −50                      | −70   | −180 | −50                               | −180 | mA   |
| I <sub>CCH</sub>                 | Quiescent supply current                             | V <sub>CC</sub> = 5.5V; Outputs High, V <sub>I</sub> = GND or V <sub>CC</sub>                                         |                          | 80    | 250  |                                   | 250  | μA   |
| I <sub>CCL</sub>                 |                                                      | V <sub>CC</sub> = 5.5V; Outputs Low, V <sub>I</sub> = GND or V <sub>CC</sub>                                          |                          | 52    | 76   |                                   | 76   | mA   |
| I <sub>CCZ</sub>                 |                                                      | V <sub>CC</sub> = 5.5V; Outputs 3-State; V <sub>I</sub> = GND or V <sub>CC</sub>                                      |                          | 80    | 250  |                                   | 250  | μA   |
| ΔI <sub>CC</sub>                 | Additional supply current per input pin <sup>2</sup> | V <sub>CC</sub> = 5.5V; one input at 3.4V, other inputs at V <sub>CC</sub> or GND                                     |                          | 0.5   | 1.5  |                                   | 1.5  | mA   |

### NOTES:

- Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- This is the increase in supply current for each input at  $3.4\text{V}$ .
- This parameter is valid for any  $V_{CC}$  between  $0\text{V}$  and  $2.1\text{V}$  with a transition time of up to  $10\text{msec}$ . From  $V_{CC} = 2.1\text{V}$  to  $V_{CC} = 5\text{V} \pm 10\%$  a transition time of up to  $100\mu\text{sec}$  is permitted.

## AC CHARACTERISTICS

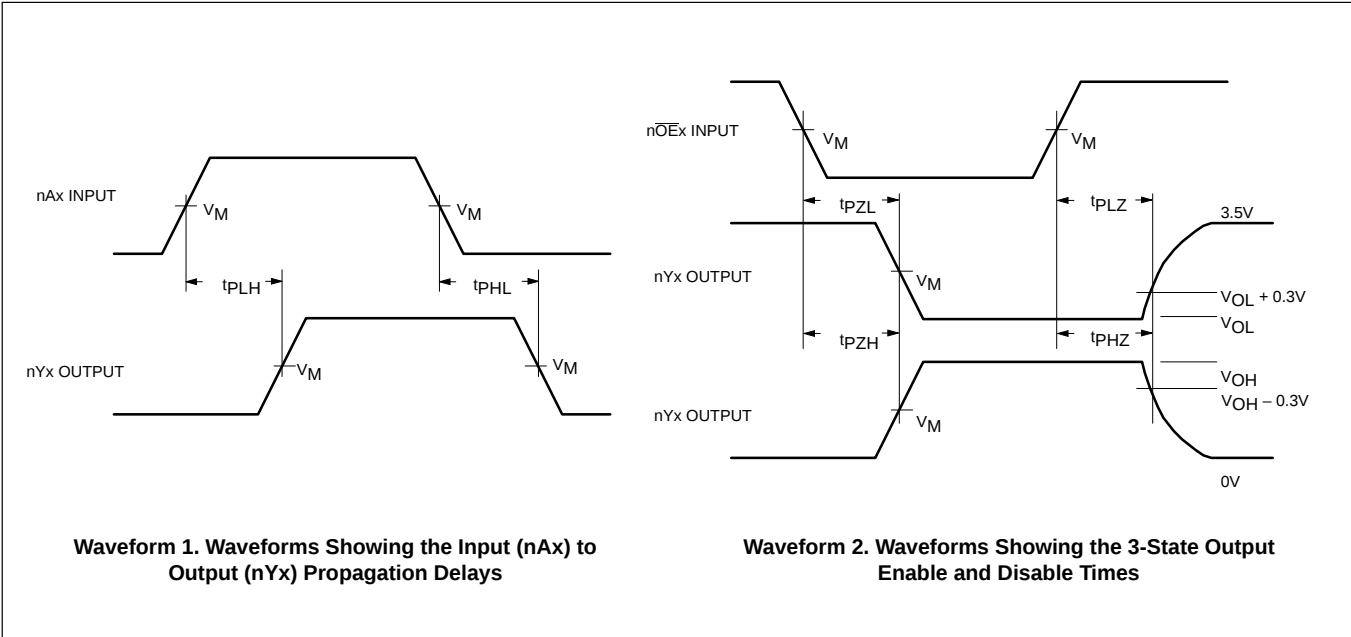
$\text{GND} = 0\text{V}$ ,  $t_R = t_F = 2.5\text{ns}$ ,  $C_L = 50\text{pF}$ ,  $R_L = 500\Omega$

| SYMBOL                               | PARAMETER                                      | WAVEFORM | LIMITS                                              |            |            |                                                                  |            | UNIT |
|--------------------------------------|------------------------------------------------|----------|-----------------------------------------------------|------------|------------|------------------------------------------------------------------|------------|------|
|                                      |                                                |          | T <sub>amb</sub> = +25°C<br>V <sub>CC</sub> = +5.0V |            |            | T <sub>amb</sub> = -40 to +85°C<br>V <sub>CC</sub> = +5.0V ±0.5V |            |      |
|                                      |                                                |          | MIN                                                 | TYP        | MAX        | MIN                                                              | MAX        |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation delay<br>nAx to nYx                | 1        | 1.1<br>1.4                                          | 2.6<br>2.8 | 3.9<br>4.1 | 1.1<br>1.4                                                       | 4.1<br>4.4 | ns   |
| t <sub>PZH</sub><br>t <sub>PZL</sub> | Output enable time<br>to High and Low level    | 2        | 1.7<br>2.4                                          | 3.5<br>4.4 | 4.8<br>5.6 | 1.7<br>2.4                                                       | 5.6<br>6.4 | ns   |
| t <sub>PHZ</sub><br>t <sub>PLZ</sub> | Output disable time<br>from High and Low level | 2        | 1.9<br>1.6                                          | 3.5<br>3.2 | 4.8<br>4.5 | 1.9<br>1.6                                                       | 5.0<br>4.9 | ns   |

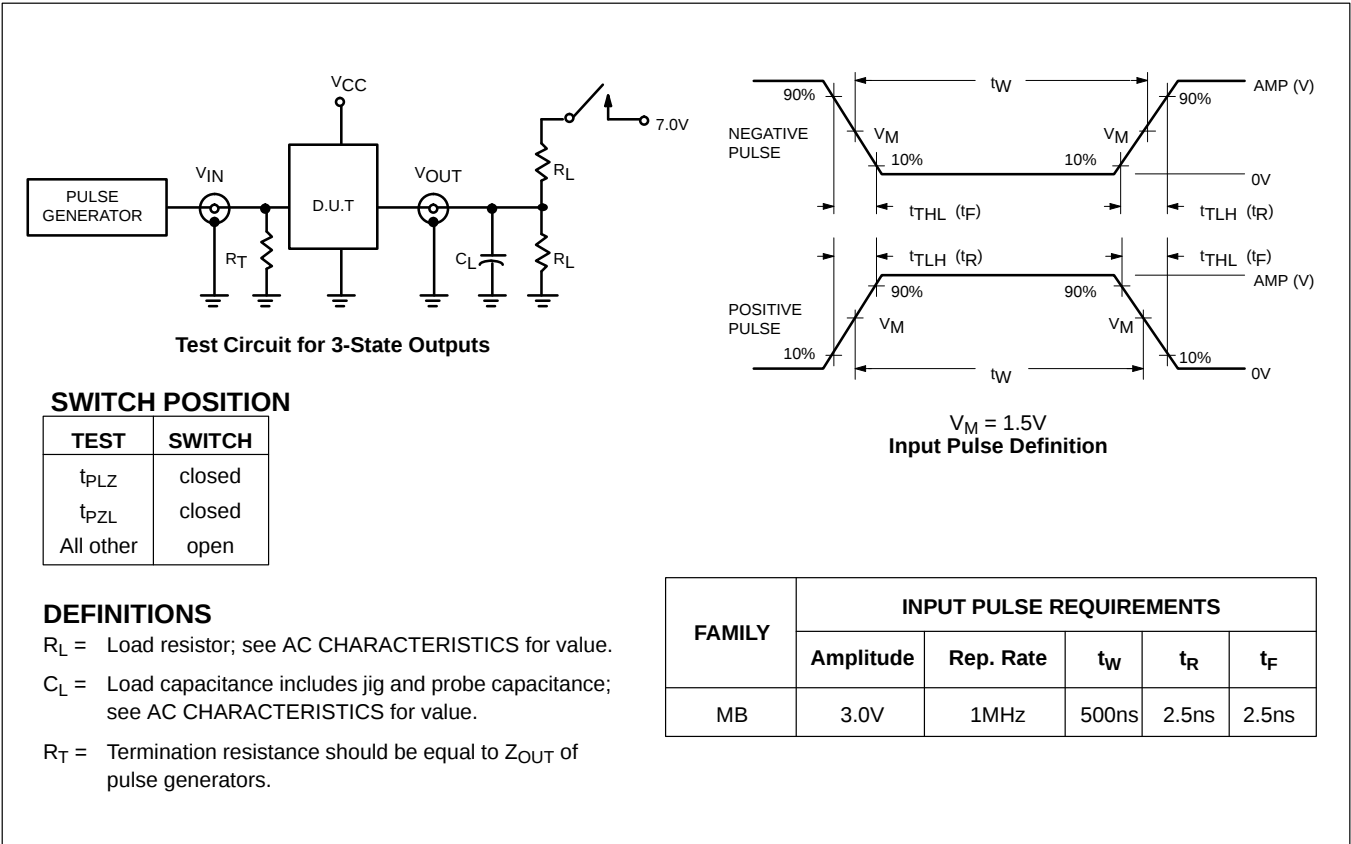
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AC WAVEFORMS

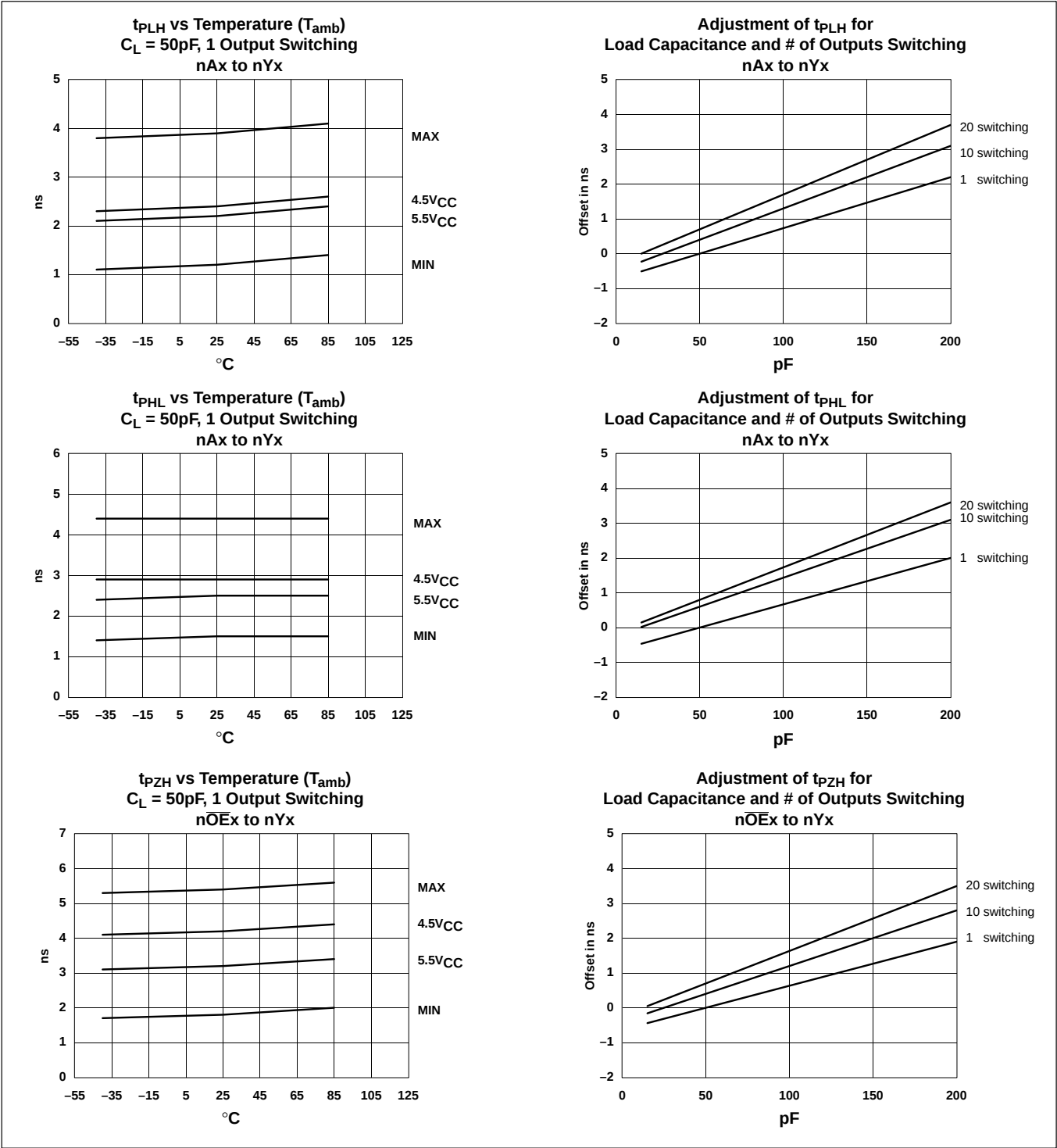


TEST CIRCUIT AND WAVEFORM



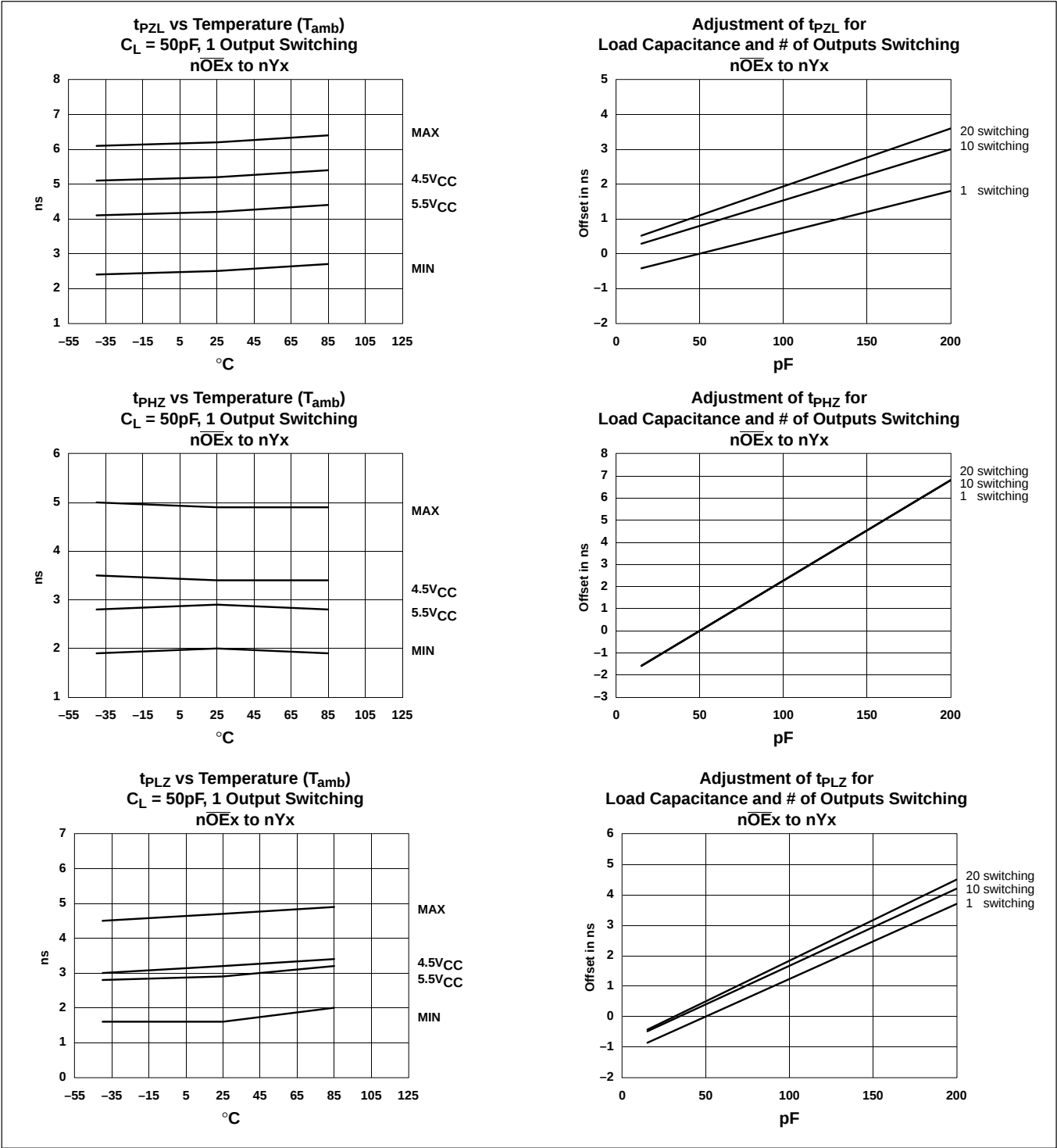
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