

FOD3182

TRUTH TABLE

| LED | $V_{DD} - V_{SS}$ "Positive Going" (Turn-on) | $V_{DD} - V_{SS}$ "Negative Going" (Turn-off) | V_O |
|-----|--|---|-------|
| Off | | | |

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ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise specified)

| Symbol | Parameter | Value | Unit |
|-----------------------------------|--|----------------------|------|
| T _{STG} | Storage Temperature | -40 to +125 | °C |
| T _{OPR} | Operating Temperature | -40 to +100 | °C |
| T _J | Junction Temperature | -40 to +125 | °C |
| T _{SOL} | Lead Solder Temperature – Wave Solder (Refer to Reflow Temperature Profile, page 15) | 260 for 10 seconds | °C |
| I _{F(AVG)} | Average Input Current (Note 1) | 25 | mA |
| I _{F(tr, tf)} | LED Current Minimum Rate of Rise/Fall | 250 | ns |
| V _R | Reverse Input Voltage | 5 | V |
| I _{OH(PEAK)} | “High” Peak Output Current (Note 2) | 3 | A |
| I _{OL(PEAK)} | “Low” Peak Output Current (Note 2) | 3 | A |
| V _{DD} – V _{SS} | Supply Voltage | -0.5 to 35 | V |
| V _{O(PEAK)} | Output Voltage | 0 to V _{DD} | V |
| P _O | Output Power Dissipation (Note 3) | 250 | mW |
| P _D | Total Power Dissipation (Note 4) | 295 | 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. Derate linearly above +79°C free air temperature at a rate of 0.37mA/°C.
2. Maximum pulse width = 10 μs, maximum duty cycle = 11%.
3. Derate linearly above +79°C, free air temperature at the rate of 5.73 mW/°C.
4. No derating required across operating temperature range.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|-----------------------------------|---------------------|-------------|------|
| V _{DD} – V _{SS} | Power Supply | 10 to 30 | V |
| I _{F(ON)} | Input Current (ON) | 10 to 16 | mA |
| V _{F(OFF)} | Input Voltage (OFF) | -3.0 to 0.8 | V |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended Operating Ranges limits may affect device reliability.

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ELECTRICAL–OPTICAL CHARACTERISTICS (DC) (Apply over all recommended conditions, typical value is measured at $V_{DD} = 30\text{ V}$, $V_{SS} = 0\text{ V}$, $T_A = 25^\circ\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|--------------------|--|--|----------------|------|----------------|----------------------|
| I_{OH} | High Level Output Current | $V_{OH} = (V_{DD} - V_{SS} - 1\text{ V})$ | 0.5 | 0.9 | – | A |
| | | $V_{OH} = (V_{DD} - V_{SS} - 6\text{ V})$ | 2.5 | – | – | |
| I_{OL} | Low Level Output Current | $V_{OL} = (V_{DD} - V_{SS} + 1\text{ V})$ | 0.5 | 1 | – | A |
| | | $V_{OL} = (V_{DD} - V_{SS} + 6\text{ V})$ | 2.5 | – | – | |
| V_{OH} | High Level Output Voltage (Note 5, 6) | $I_O = -100\text{ mA}$ | $V_{DD} - 0.5$ | – | – | V |
| V_{OL} | Low Level Output Voltage (Note 5, 6) | $I_O = 100\text{ mA}$ | – | – | $V_{SS} + 0.5$ | V |
| I_{DDH} | High Level Supply Current | Output Open, $I_F = 10\text{ to }16\text{ mA}$ | – | 2.6 | 4.0 | mA |
| I_{DDL} | Low Level Supply Current | Output Open, $V_F = -3.0\text{ to }0.8\text{ V}$ | – | 2.5 | 4.0 | mA |
| I_{FLH} | Threshold Input Current Low to High | $I_O = 0\text{ mA}$, $V_O > 5\text{ V}$ | – | 3.0 | 7.5 | mA |
| V_{FHL} | Threshold Input Voltage High to Low | $I_O = 0\text{ mA}$, $V_O < 5\text{ V}$ | 0.8 | – | – | V |
| V_F | Input Forward Voltage | $I_F = 10\text{ mA}$ | 1.1 | 1.43 | 1.8 | V |
| $\Delta V_F / T_A$ | Temperature Coefficient of Forward Voltage | $I_F = 10\text{ mA}$ | – | –1.5 | – | mV/ $^\circ\text{C}$ |
| V_{UVLO+} | UVLO Threshold | $V_O > 5\text{ V}$, $I_F = 10\text{ mA}$ | 7 | 8.3 | 9 | V |
| V_{UVLO-} | | $V_O < 5\text{ V}$, $I_F = 10\text{ mA}$ | 6.5 | 7.7 | 8.5 | V |
| $UVLO_{HYST}$ | UVLO Hysteresis | | – | 0.6 | – | V |
| BV_R | Input Reverse Breakdown Voltage | $I_R = 10\text{ }\mu\text{A}$ | 5 | – | – | V |
| C_{IN} | Input Capacitance | $f = 1\text{ MHz}$, $V_F = 0\text{ V}$ | – | 25 | – | pF |

5. In this test, V_{OH} is measured with a dc load current of 100 mA. When driving capacitive load V_{OH} will approach V_{DD} as I_{OH} approaches zero amps.
6. Maximum pulse width = 1 ms, maximum duty cycle = 20%.

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SWITCHING CHARACTERISTICS (Apply over all recommended conditions, typical value is measured at $V_{DD} = 30\text{ V}$, $V_{SS} = 0\text{ V}$, $T_A = 25^\circ\text{C}$, unless otherwise specified.)

| Symbol | Parameter | Test Conditions | Min | Typ | Max | Unit |
|---|--|--|-----|-----|-----|------|
| t_{PLH} | Propagation Delay Time to High Output Level (Note 7) | $I_F = 10\text{ mA}$, $R_G = 10\ \Omega$, $f = 250\text{ kHz}$, Duty Cycle = 50%, $C_g = 10\text{ nF}$ | 50 | 120 | 210 | ns |
| t_{PHL} | Propagation Delay Time to Low Output Level (Note 7) | | 50 | 145 | 210 | ns |
| P_{WD} P_{DD} ($t_{PHL} - t_{PLH}$) | Pulse Width Distortion (Note 8) | | – | 35 | 65 | ns |

TYPICAL PERFORMANCE CURVES

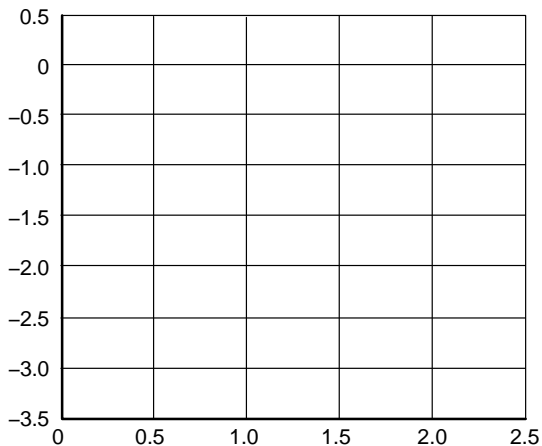


Figure 1. Output High Voltage Drop vs. Output High Current

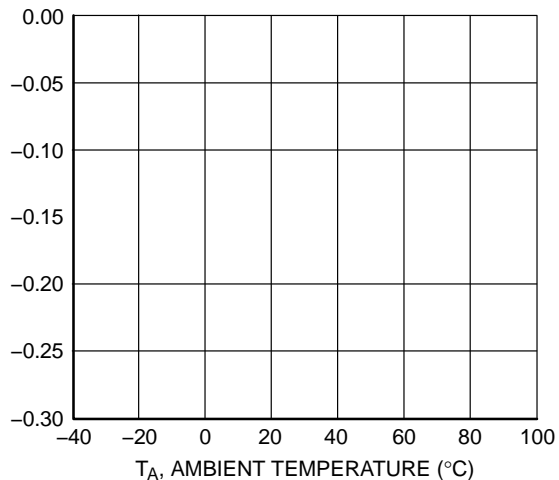


Figure 2. Output High Voltage Drop vs. Ambient Temperature

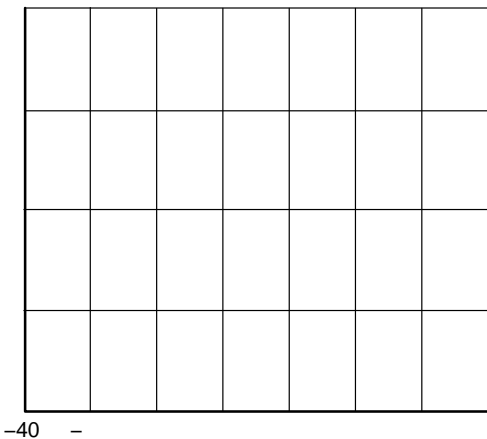


Figure 3. Output High Current vs. Ambient Temperature

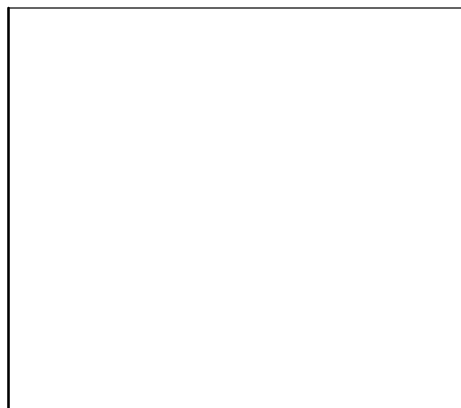


Figure 4. Output High Current vs. Ambient Temperature



Figure 5. Output Low Voltage vs. Output Low Current

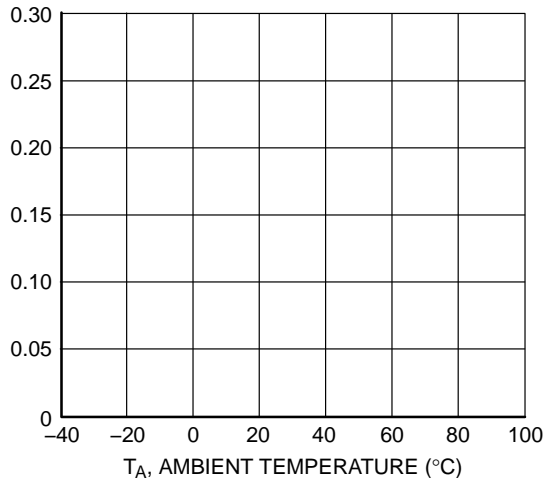


Figure 6. Output Low Voltage vs. Ambient Temperature

TYPICAL PERFORMANCE CURVES (Continued)

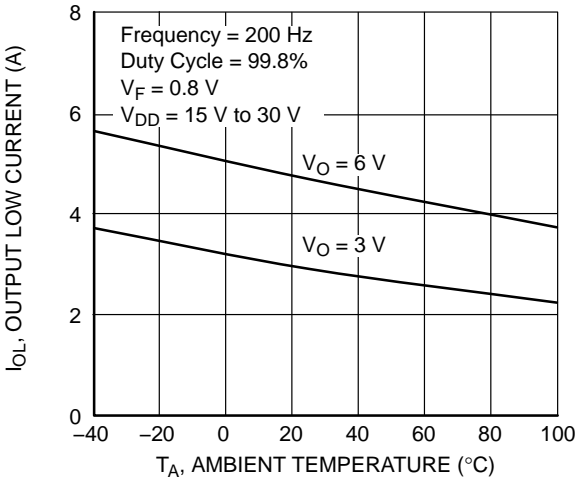


Figure 7. Output Low Current vs. Ambient Temperature

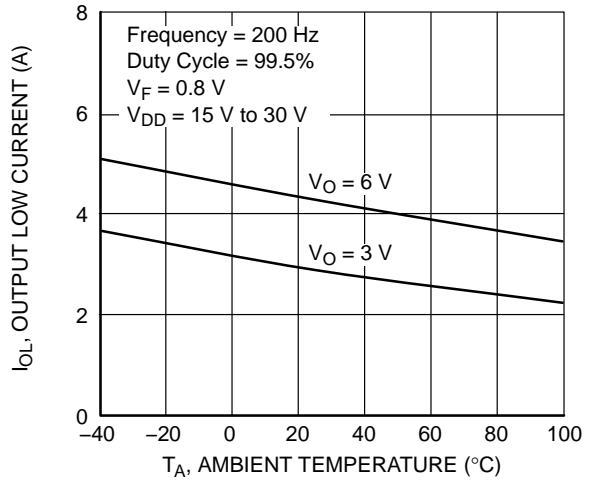


Figure 8. Output Low Current vs. Ambient Temperature

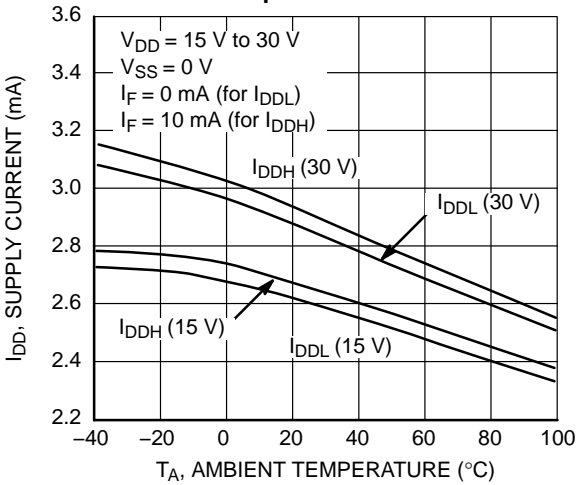


Figure 9. Supply Current vs. Ambient Temperature

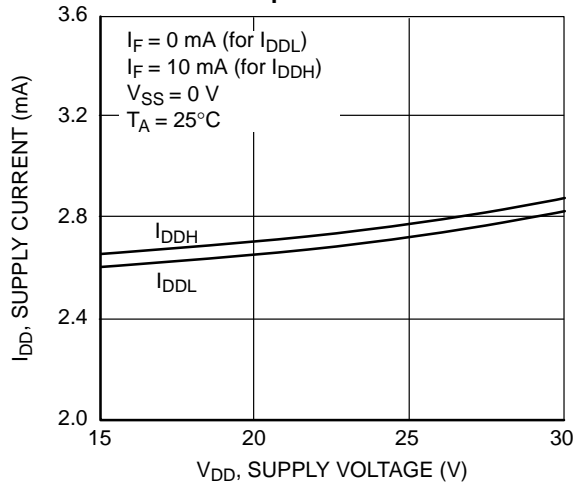


Figure 10. Supply Current vs. Supply Voltage

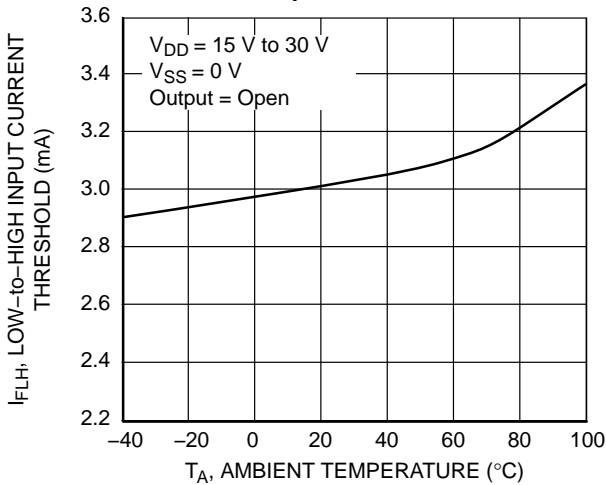


Figure 11. Low-to-High Input Current Threshold vs. Ambient Temperature

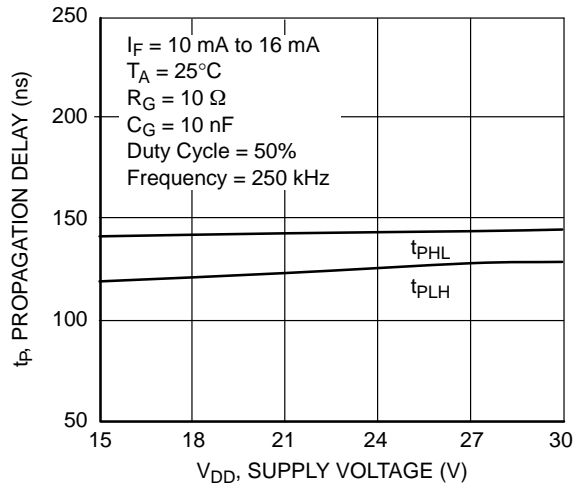


Figure 12. Propagation Delay vs. Supply Voltage

TYPICAL PERFORMANCE CURVES (Continued)

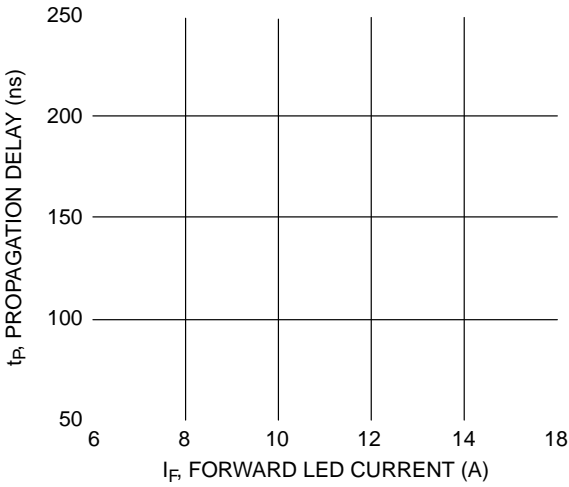


Figure 13. Propagation Delay vs. LED Forward Current

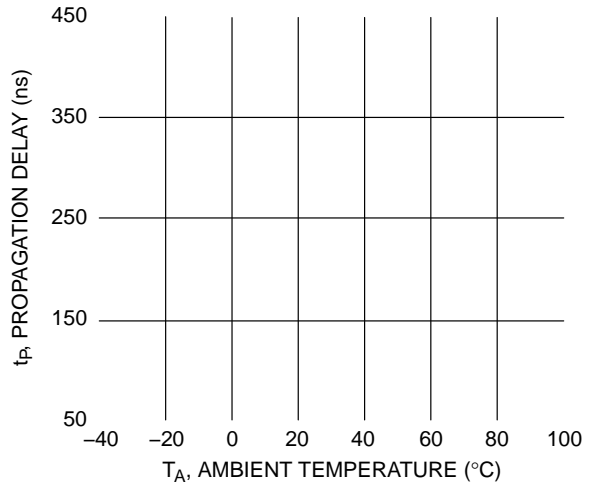


Figure 14. Propagation Delay vs. Ambient Temperature

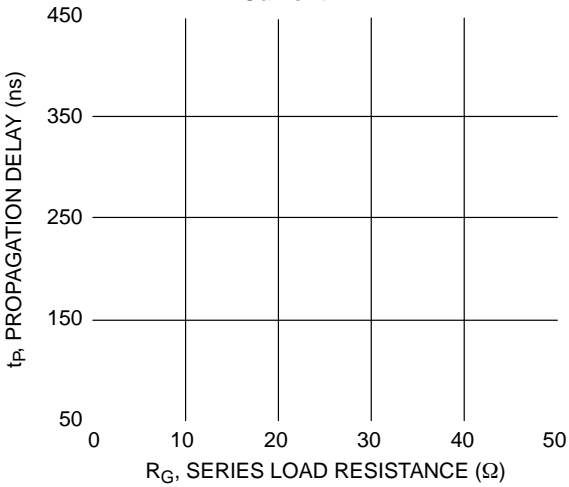


Figure 15. Propagation Delay vs. Series Load Resistance

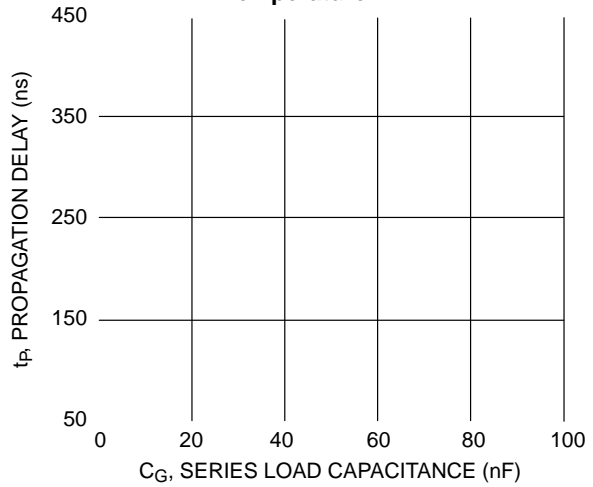


Figure 16. Propagation Delay vs. Series Load Capacitance

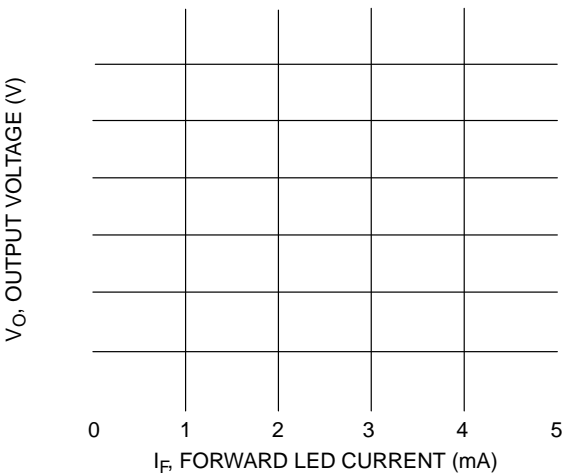


Figure 17. Transfer Characteristics

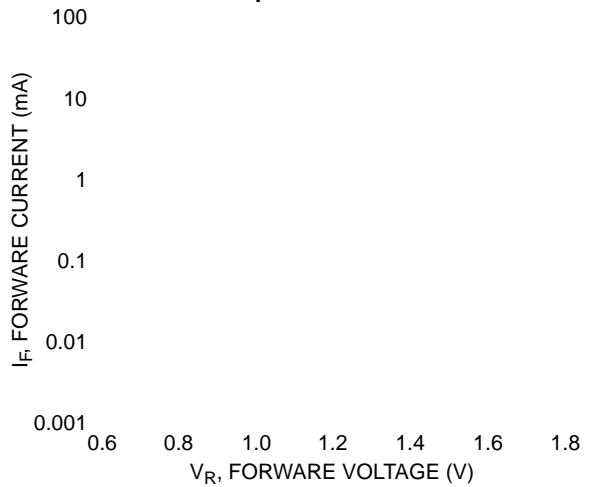


Figure 18. Input Forward Current vs. Forward Voltage

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TYPICAL PERFORMANCE CURVES (Continued)

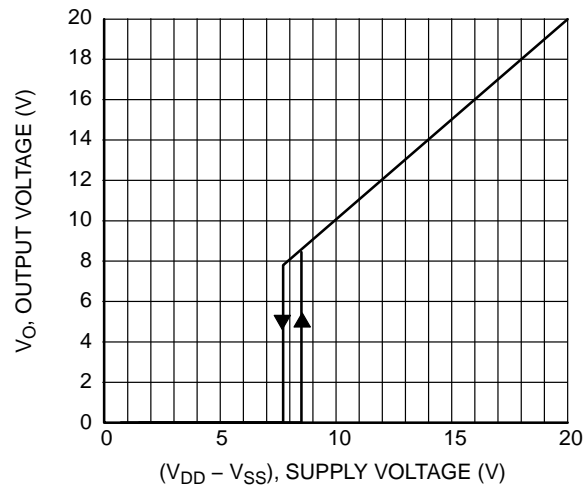


Figure 19. Under Voltage Lockout

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TEST CIRCUIT

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TEST CIRCUIT (Continued)

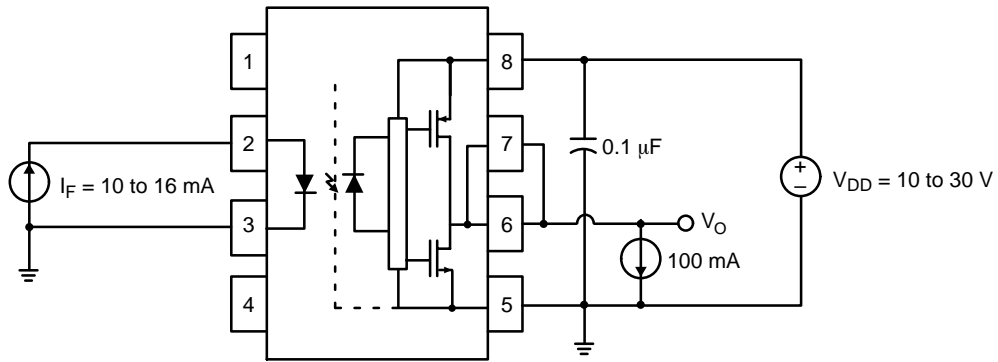


Figure 22. V_{OH} Test Circuit

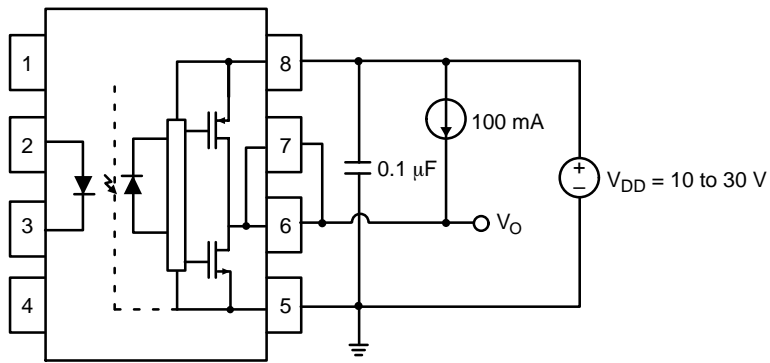


Figure 23. V_{OL} Test Circuit

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TEST CIRCUIT (Continued)

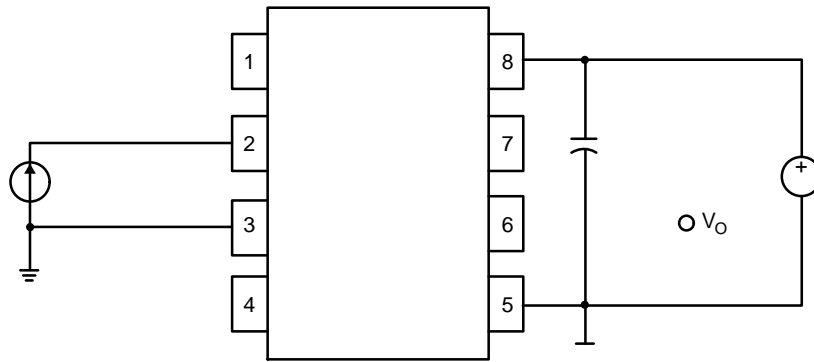
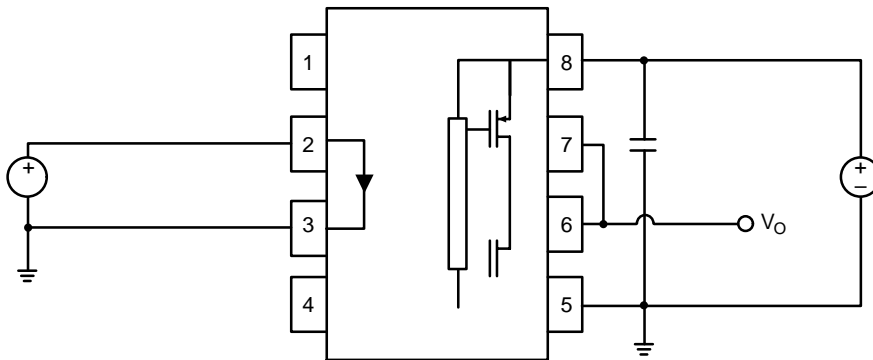
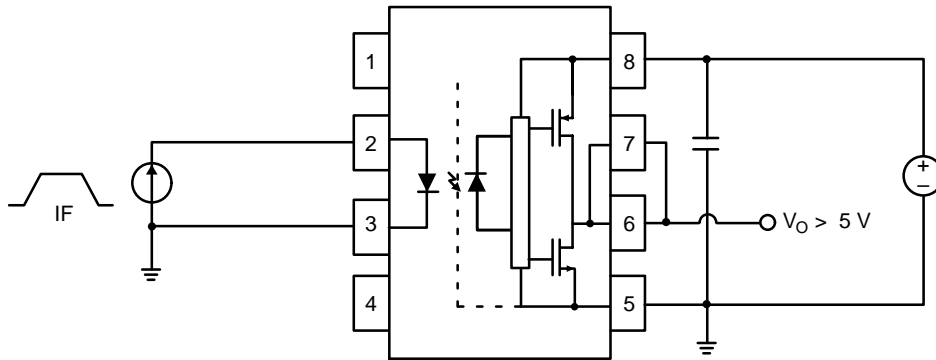


Figure 24. I_{DDH} Test Circuit

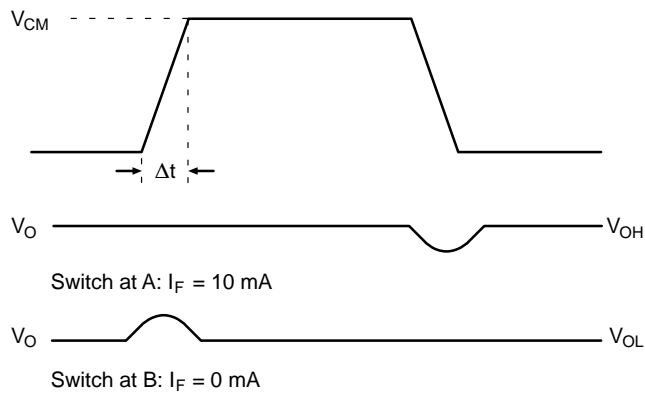
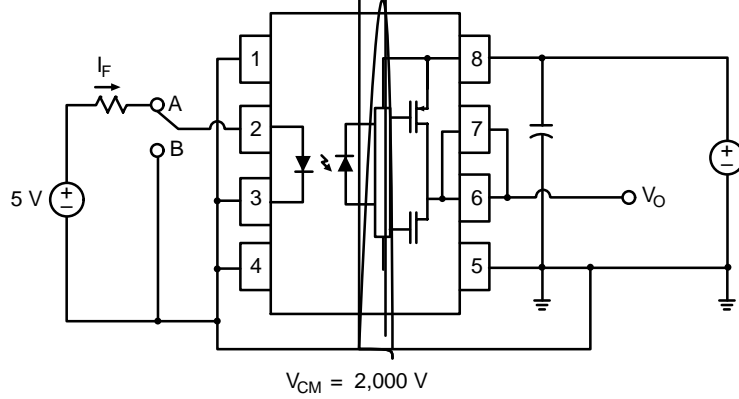
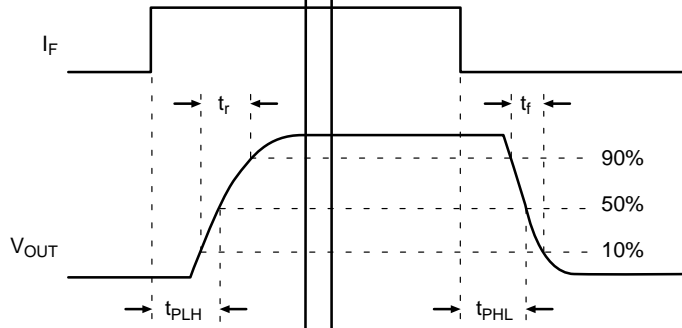
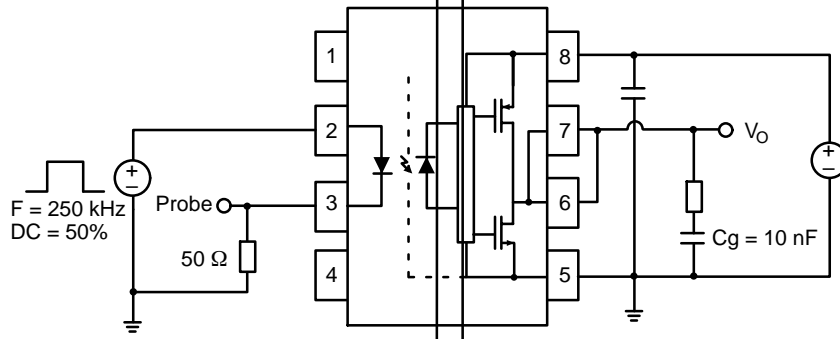
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TEST CIRCUIT (Continued)



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TEST CIRCUIT (Continued)



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REFLOW PROFILE

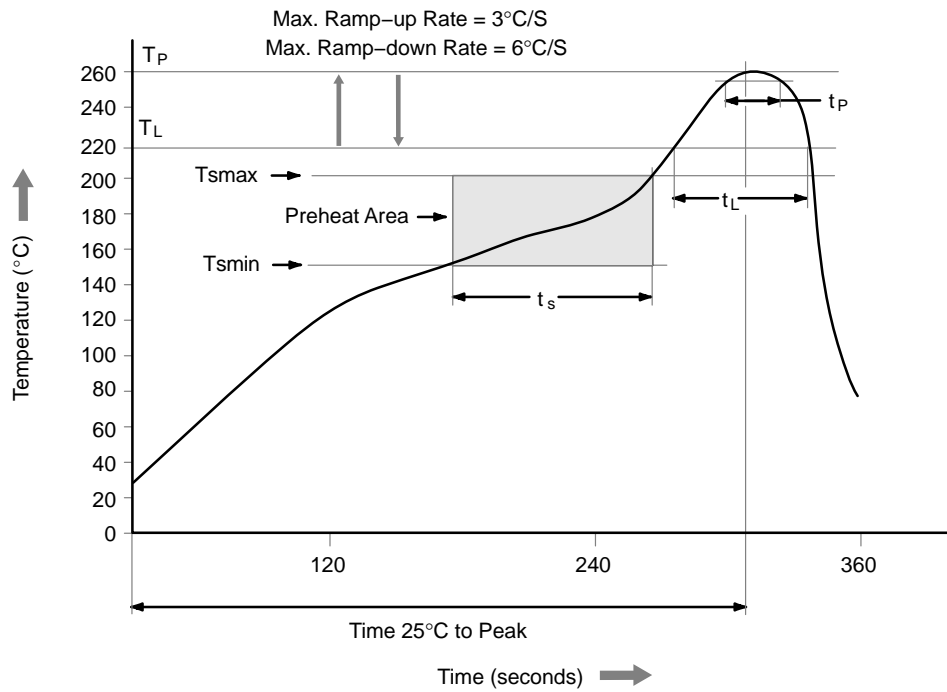


Figure 31. Reflow Profile

Table 1.

| Profile Feature | Pb-Free Assembly Profile |
|-----------------------------------|--------------------------|
| Temperature Min. (Tsmmin) | 150°C |
| Temperature Max. (Tsmmax) | 200°C |
| Time (ts) from (Tsmmin to Tsmmax) | 60–120 seconds |
| Ramp-up Rate (tL to tp) | 3°C/second max. |
| Liquidous Temperature (TL) | 217°C |
| Time (tL) Maintained Above (TL) | 60–150 seconds |
| Peak Body Package Temperature | 260°C +0°C / -5°C |
| Time (tp) within 5°C of 260°C | 30 seconds |

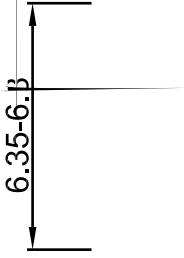
FOD3182

ORDERING INFORMATION

| Part Number | Package | Shipping† |
|-------------|--|-----------------------|
| FOD3182 | PDIP8 9.655x6.61, 2.54P DIP 8-Pin | 50 Units / Tube |
| FOD3182S | PDIP8 GW SMT 8-Pin (Lead Bend) | 50 Units / Tube |
| FOD3182SD | PDIP8 GW SMT 8-Pin (Lead Bend) | 1,000 / Tape and Reel |
| FOD3182V | PDIP8 9.655x6.61, 2.54P DIP 8-Pin, IEC60747-5-2 option | 50 Units / Tube |
| FOD3182SV | PDIP8 GW SMT 8-Pin (Lead Bend), DIN EN/IEC 60747-5-2 option | 50 Units / Tube |
| FOD3182SDV | PDIP8 GW SMT 8-Pin (Lead Bend), DIN EN/IEC 60747-5-2 option | 1,000 / Tape and Reel |
| FOD3182TV | PDIP8 6.6x3.81, 2.54P DIP 8-Pin, 0.4" Lead Spacing, DIN EN/IEC 60747-5-2 option | 50 Units / Tube |
| FOD3182TSV | | |

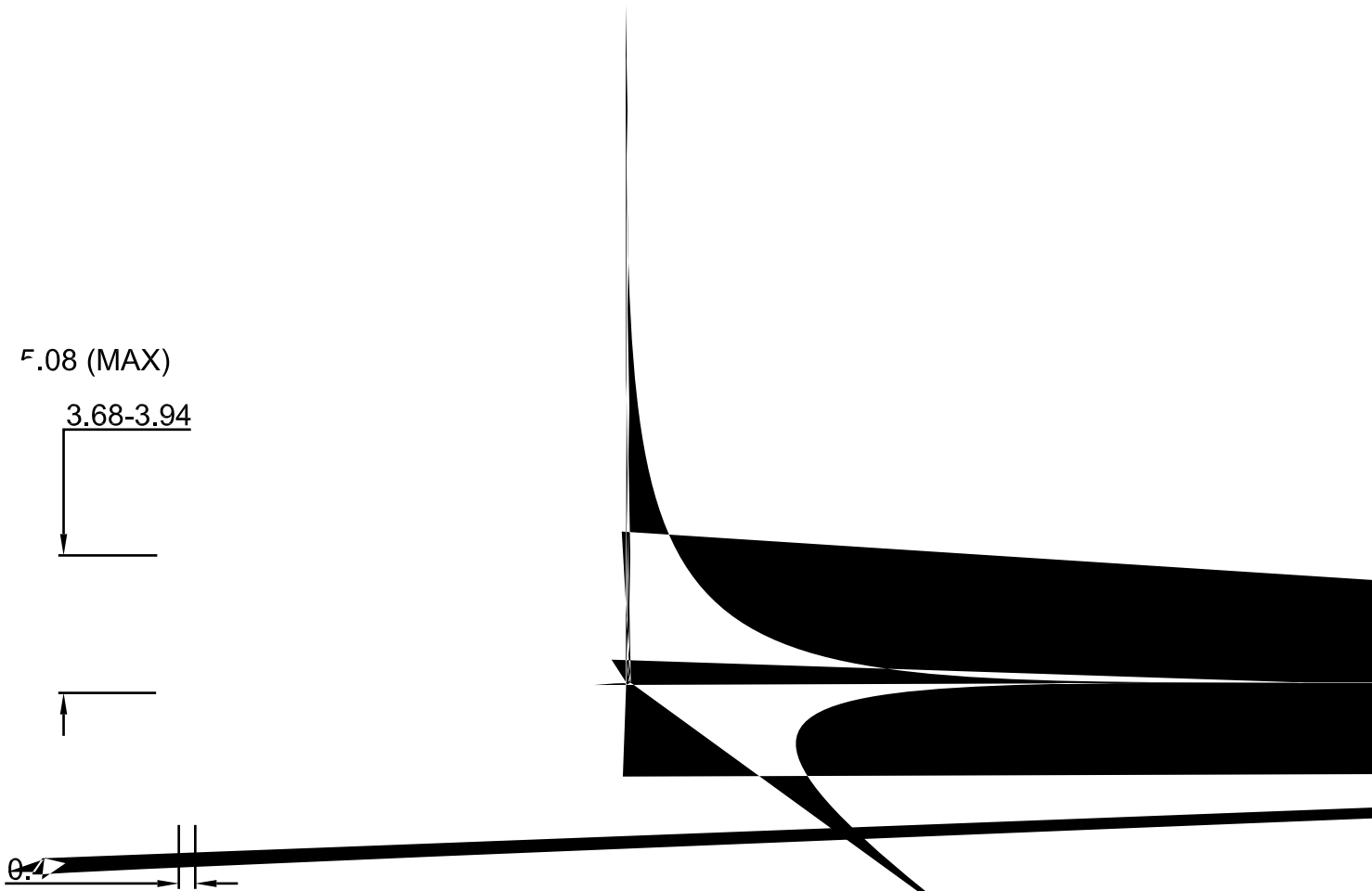
PDIP8 6.6x3.81, 2.54P

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PDIP8 9.655x6.6, 2.54P
CASE 646CQ
ISSUE 0

DATE 18 SEP 2017



PDIP8 GW
CASE 709AC
ISSUE 0

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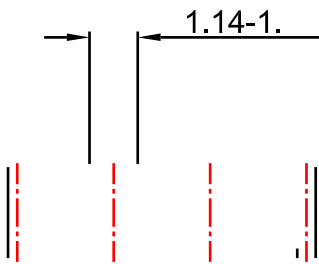
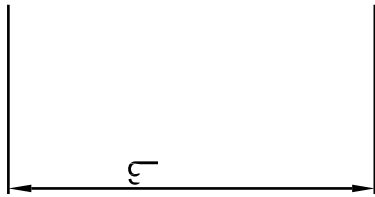
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