

Description

The UMW UCC27524DR device is a dual-channel, high-speed, low-side, gate-driver device capable of effectively driving MOSFET and IGBT power switches. It has a matching rise and fall time when charging and discharging the gate of the power switch. In addition, UMW UCC27524DR has a high degree of latch resistance under all conditions in its rated power and voltage range. UMW UCC27524DR is not damaged when noise spikes (any polarity) of up to 5V appear on the ground pin. UMW UCC27524DR can accept up to 500mA of reverse current without causing damage or logic confusion. All terminals are fully protected by ESD up to 2.0 kV.

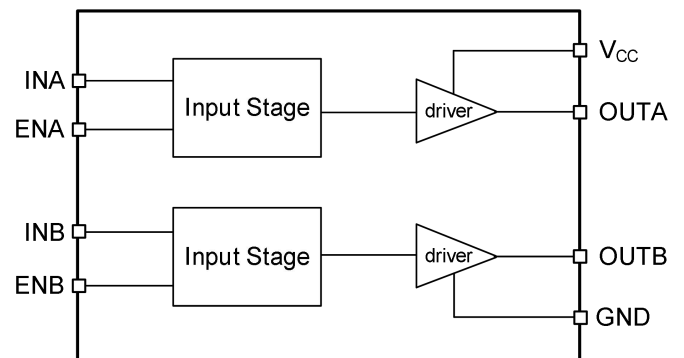
Applications

- line drivers
- Pulse transformer driver
- Driving MOSFETs and IGBTs
- Motor drives
- pulse generator
- Switch-Mode Power Supplies
- DC-to-DC Converters
- class D switching amplifier

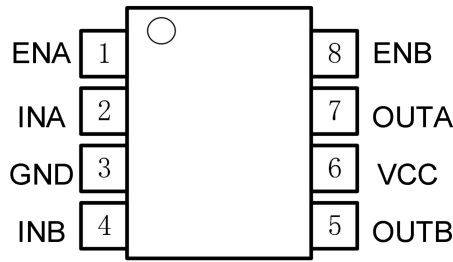
Features

- Latch Protection: withstand 0.5 A reverse current
- Ability to Handle Negative Voltages (-10 V) at Inputs
- Low Output Impedance
- Two Independent Gate-Drive Channel
- Independent-Enable Function for Each Output
- 4-A Peak Source and Sink-Drive Current
- 4.5 to 20-V Single-Supply Range
- High Ability of driving capacitive load:
 - Switch time at 1nF load < 25ns
- Rise/Fall time matching
- Fast Propagation Delays (40-ns Typical)
- Operating Temperature Range of -40 to 125°C
- Turn on/Turn off Delays:
 - Ton/Toff =70ns/70ns

Pin Configuration



Pin Configuration and Functions



8-Pin SOIC8 Package Top View

Pin Functions

| PIN | NAME | DESCRIPTION |
|-----|------|--|
| 1 | ENA | Enable input for Channel A: ENA is biased LOW to disable the Channel A output regardless of the INA state. ENA is biased HIGH or left floating to enable the Channel A output. ENA is allowed to float; hence the pin-to-pin compatibility with the 27524 N/C pin. |
| 2 | INA | Input to Channel A: INA is the non-inverting input in the 27524 device. OUTA is held LOW if INA is unbiased or floating. |
| 3 | GND | Ground: All signals are referenced to this pin. |
| 4 | INB | Input to Channel B: INB is the non-inverting input in the 27524 device. OUTB is held LOW if INB is unbiased or floating. |
| 5 | OUTB | Output of Channel B |
| 6 | VCC | Bias supply input |
| 7 | OUTA | Output of Channel A |
| 8 | ENB | Enable input for Channel B: ENB is biased LOW to disable the Channel B output regardless of the INB state. ENB is biased HIGH or left floating to enable the Channel B output. ENB is allowed to float; hence the pin-to-pin compatibility with the 27524 N/C pin. |

Absolute Maximum Ratings

Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. All voltages are with respect to GND unless otherwise noted, Currents are positive into, negative out of the specified terminal, environment temperature is 25 °C.

| Symbol | Definition | MIN | MAX | UNIT |
|-----------------|--------------------------------|--------|----------------------|------|
| V _{CC} | Supply voltage range | — | 25 | V |
| V _{IN} | INA, INB voltage | GND-10 | V _{CC} +0.3 | |
| ESD | Human body model (HBM) | — | 2000 | V |
| | Charged device model (CDM) | — | 500 | V |
| PD | SOIC package power(TA ≤70°C) | — | 470 | mW |
| T _J | Operating junction temperature | — | +150 | °C |
| T _S | Storage temperature | -45 | +150 | |
| V _{CC} | Supply voltage range | 4.5 | 20 | V |
| T _C | ambient temperature | -40 | 125 | °C |

Electrical Characteristics

TA= 25°C, 4.5V ≤VCC≤18V (unless otherwise noted)

| Symbol | Definition | MIN | TYP | MAX | UNIT |
|------------------|---|------------------------|------|-------|------|
| V _{IH} | Input signal high threshold | 2.4 | — | — | V |
| V _{IL} | Input signal low threshold | — | — | 0.8 | V |
| I _{IN} | Input current(0V≤V _{IN} ≤V _{CC}) | — | — | 300 | μA |
| V _{OH} | High output voltage | V _{CC} -0.025 | — | — | V |
| V _{OL} | Low output voltage | — | — | 0.025 | V |
| R _{OH} | Output pullup resistance(V _{CC} =18V,I _O =100mA) | — | 0.7 | — | Ω |
| R _{OL} | Output pulldown resistance(V _{CC} =18V,I _O =100mA) | — | 04 | — | Ω |
| I _{PK} | Peak output source current | — | 4 | — | A |
| I _{REV} | Reverse current that latch protection can withstand (Working cycle≤2%,t≤300us,V _{CC} =18V) | — | >0.5 | — | A |
| t _R | Rise time(V _{CC} =18V,C _{LOAD} =100pF) | — | — | 15 | ns |
| t _F | Fall time(V _{CC} =18V,C _{LOAD} =100pF) | — | — | 15 | ns |
| t _{ON} | Turn-on propagation delay(V _{CC} =18V,C _{LOAD} =100pF) | — | 25 | 40 | ns |
| t _{OFF} | Turn-off propagation delay(V _{CC} =18V,C _{LOAD} =100pF) | — | 25 | 40 | ns |
| t _{EN} | Enable propagation delay(V _{CC} =18V,C _{LOAD} =100pF) | — | 25 | 40 | ns |
| I _{Q1} | VCC quiescent supply current(V _{INA} =V _{INB} =HIGH) | — | — | 1.5 | mA |
| I _{Q0} | VCC quiescent supply current(V _{INA} =V _{INB} =LOW) | — | — | 1.5 | mA |

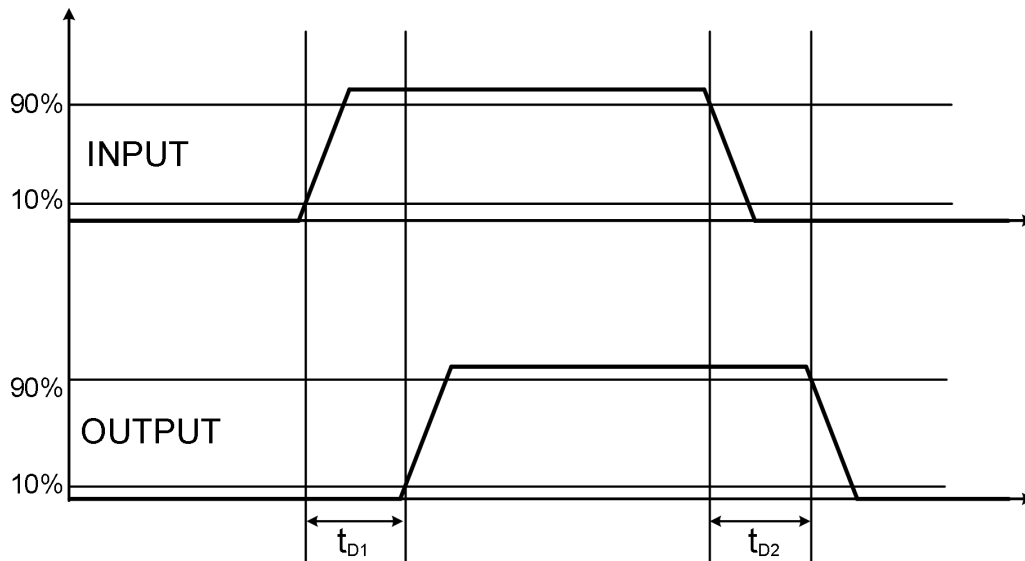


Figure 1 Input-Output waveform(non-inverting)

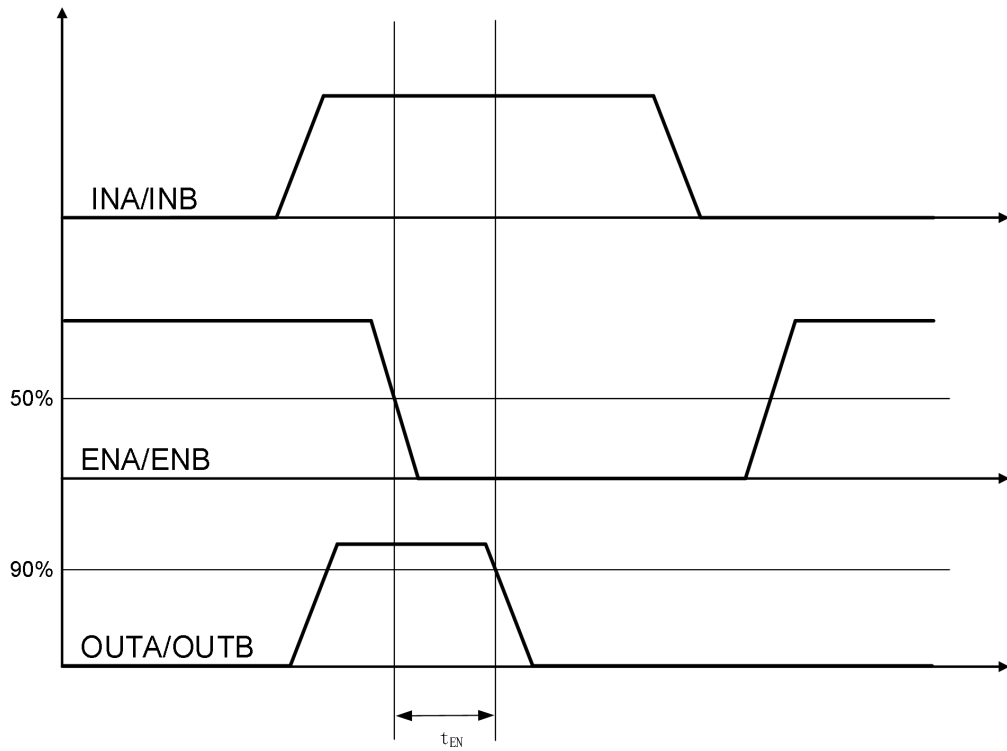


Figure 2 Enable Function waveform

Typical Characteristics

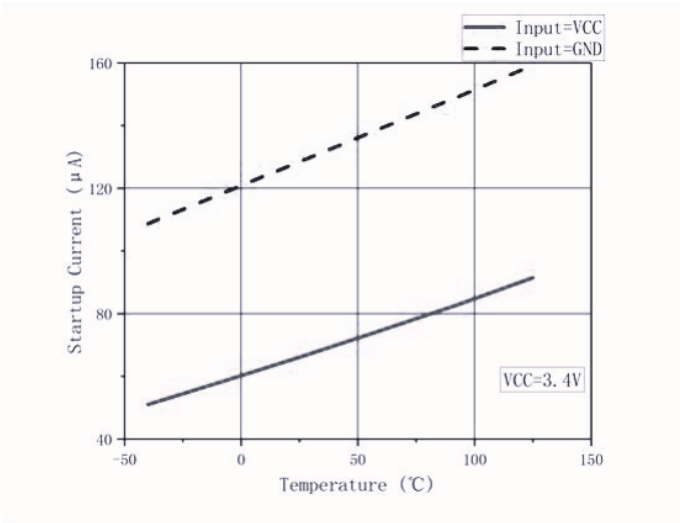


Figure 3. Start-Up Current vs Temperature

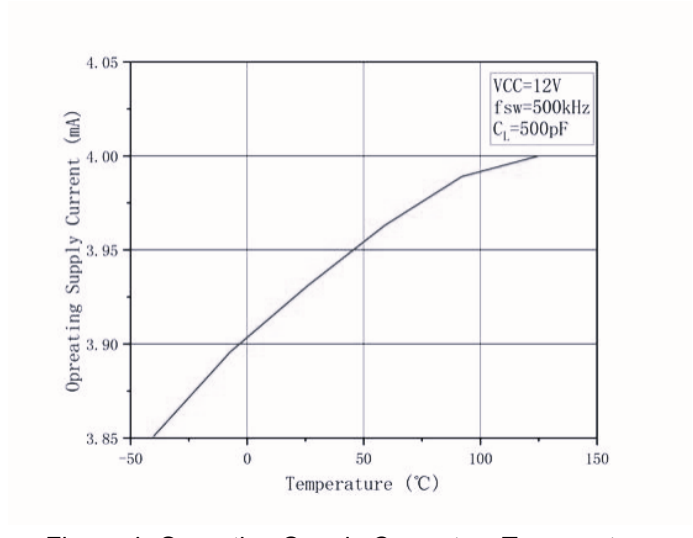


Figure 4. Operating Supply Current vs Temperature (Outputs Switching)

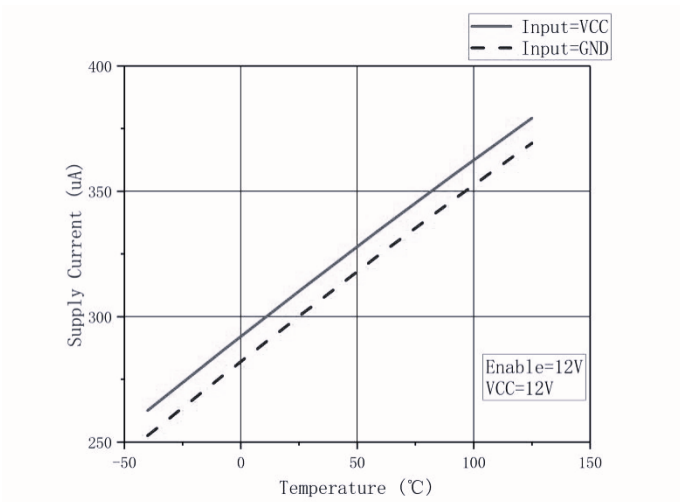


Figure 5. Supply Current vs Temperature (Outputs In DC On/Off Condition)

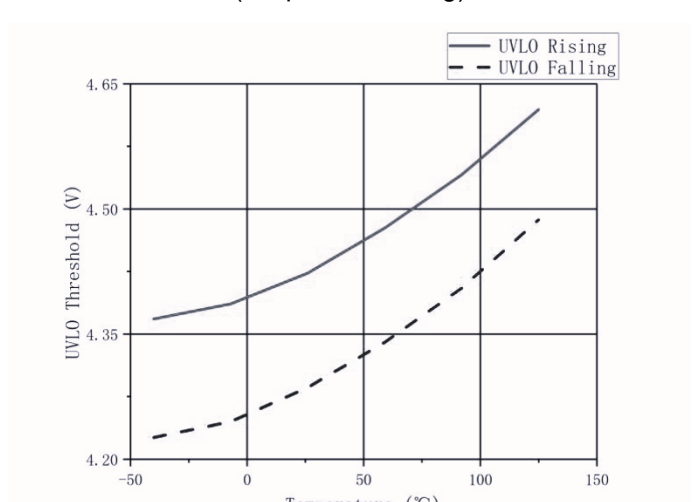


Figure 6. UVLO Threshold vs Temperature

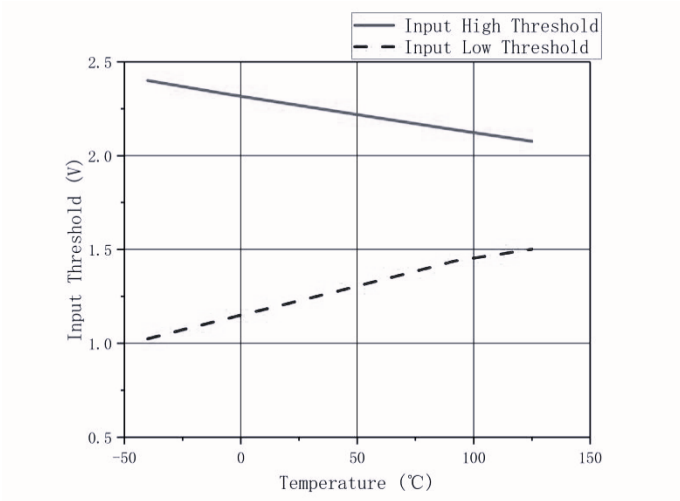


Figure 7. Input Threshold vs Temperature

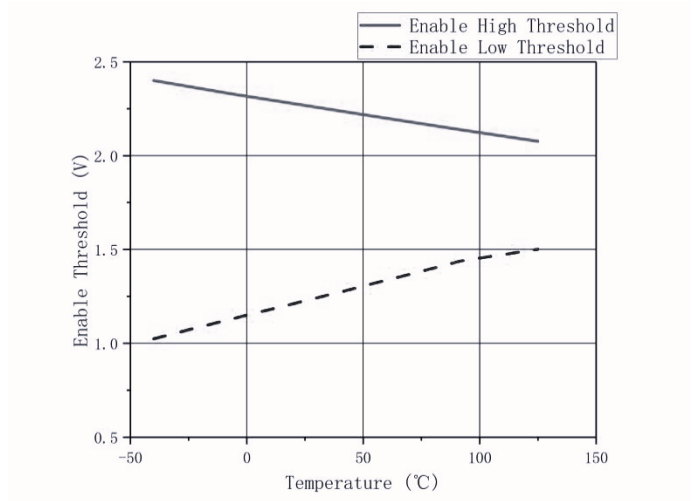


Figure 8. Enable Threshold vs Temperature

Typical Characteristics(continued)

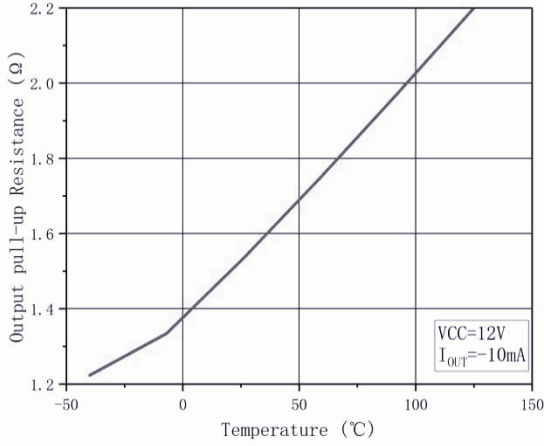


Figure 9. Output Pull-up Resistance vs Temperature

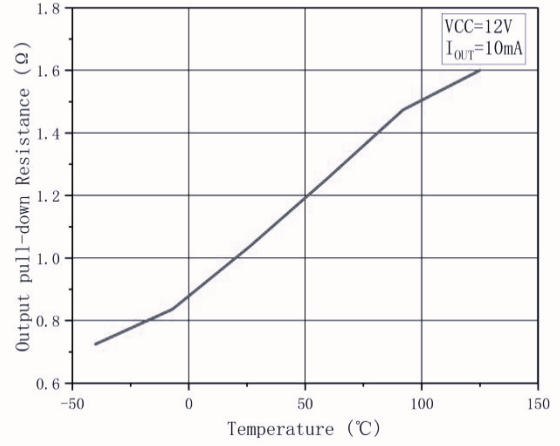


Figure 10. Output Pull-down Resistance vs Temperature

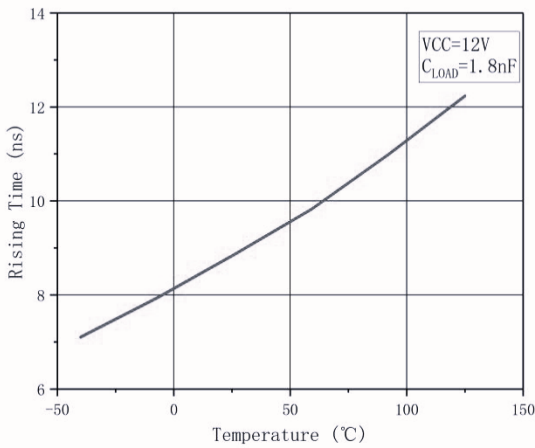


Figure 11. Rise Time vs Temperature

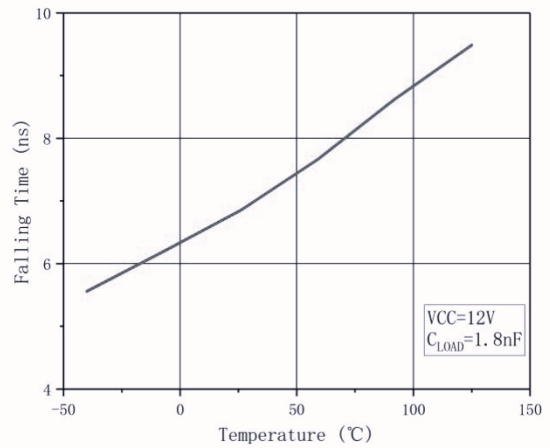


Figure 12. Fall Time vs Temperature

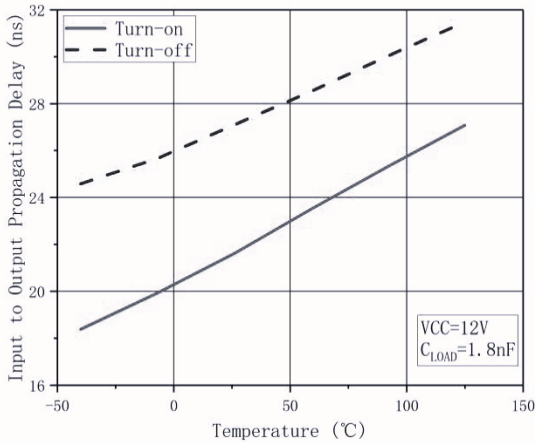


Figure 13. Input to Output Propagation Delay vs Temperature

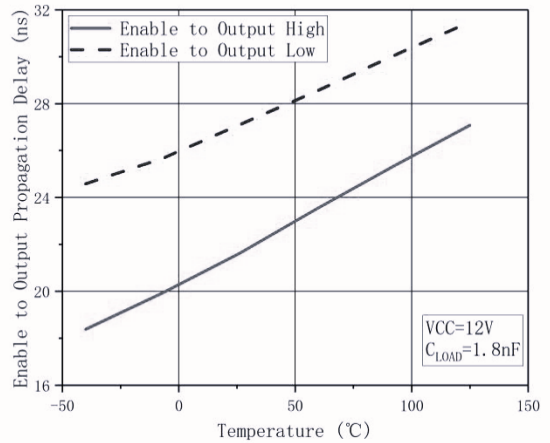


Figure 14. En to Output Propagation Delay vs Temperature

Typical Characteristics(continued)

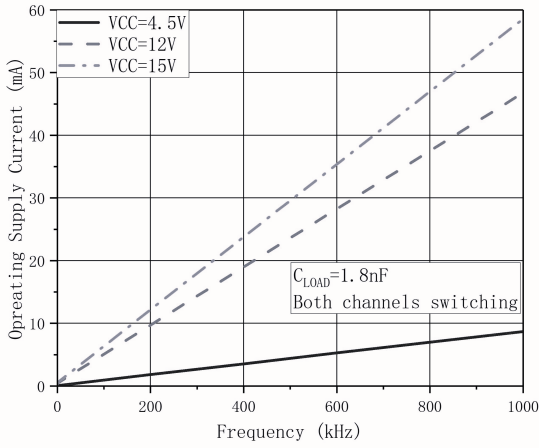


Figure 15. Operating Supply Current vs Frequency

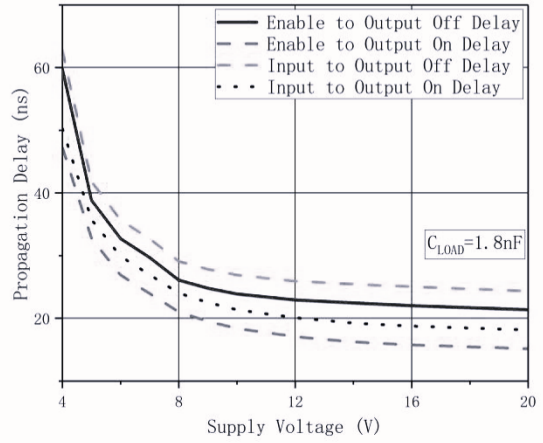


Figure 16. Propagation Delays vs Supply Voltage

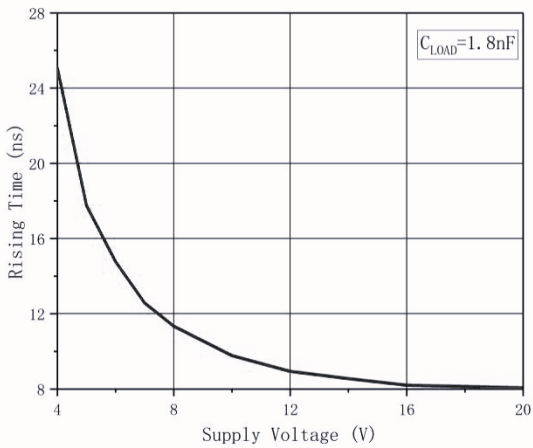


Figure 17. Rise Time vs Supply Voltage

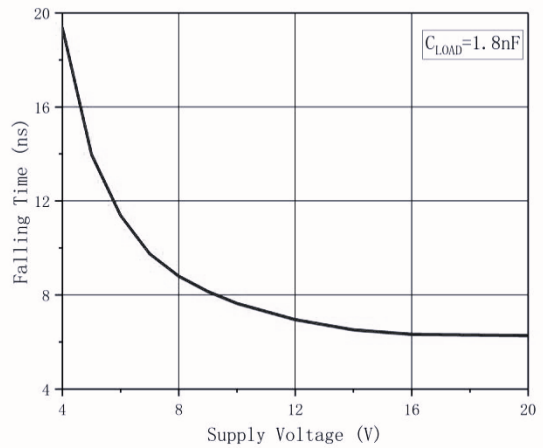


Figure 18. Fall Time vs Supply Voltage

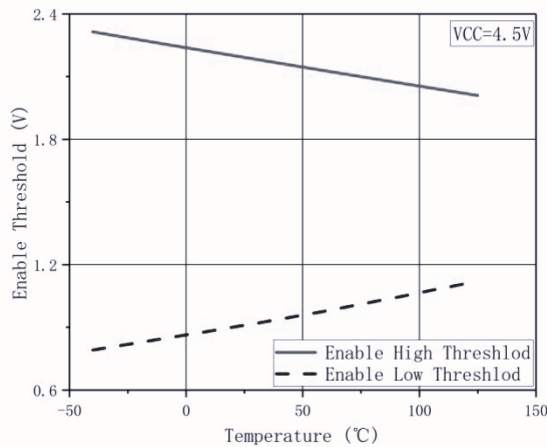
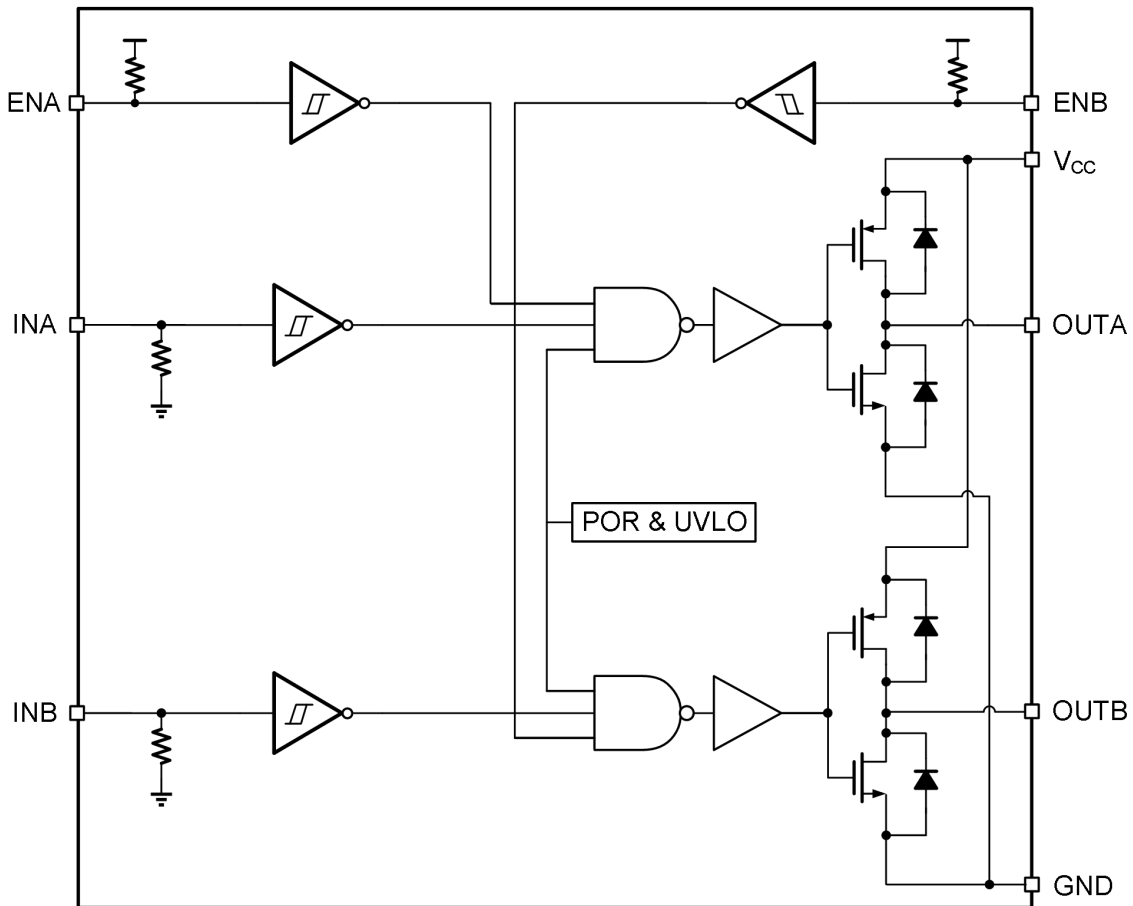


Figure 19. Enable Threshold vs Temperature

Functional Block Diagram



Device Functional Modes

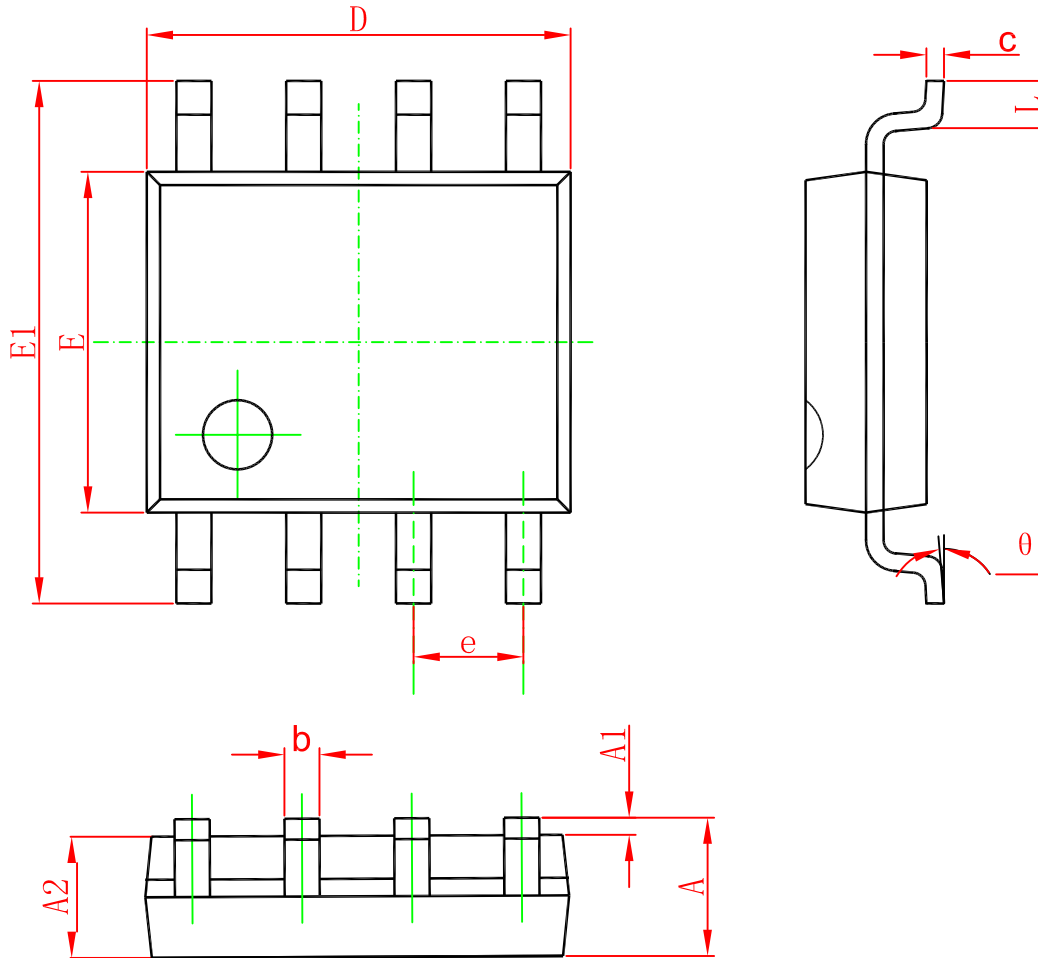
Table 1 Device Logic Table

| ENA | ENB | INA | INB | OUTA | OUTB |
|------------------|------------------|------------------|------------------|------|------|
| H | H | L | L | L | L |
| H | H | L | H | L | H |
| H | H | H | L | H | L |
| H | H | H | H | H | H |
| L | L | Any | Any | L | L |
| Any | Any | x ⁽¹⁾ | x ⁽¹⁾ | L | L |
| x ⁽¹⁾ | x ⁽¹⁾ | L | L | L | L |
| x ⁽¹⁾ | x ⁽¹⁾ | L | H | L | H |
| x ⁽¹⁾ | x ⁽¹⁾ | H | L | H | L |
| x ⁽¹⁾ | x ⁽¹⁾ | H | H | H | H |

(1) Floating condition.

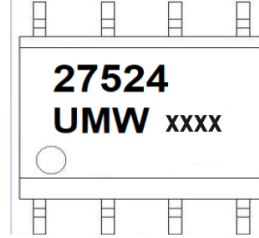
PACKAGING INFORMATION

SOP-8



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min | Max | Min | Max |
| A | 1.350 | 1.750 | 0.053 | 0.069 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 |
| b | 0.330 | 0.510 | 0.013 | 0.020 |
| c | 0.170 | 0.250 | 0.006 | 0.010 |
| D | 4.700 | 5.100 | 0.185 | 0.200 |
| E | 3.800 | 4.000 | 0.150 | 0.157 |
| E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| e | 1.270(BSC) | | 0.050(BSC) | |
| L | 0.400 | 1.270 | 0.016 | 0.050 |
| θ | 0° | 8° | 0° | 8° |

Marking



Ordering information

| Order code | Package | Baseqty | Deliverymode |
|----------------|---------|---------|---------------|
| UMW UCC27524DR | SOP-8 | 2500 | Tape and reel |