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## WBG - Half-Bridge 150 V GaN Driver

**NCP51810**

Public Information



# NCP51810 Half Bridge 150V GaN Driver

## Value Proposition

The NCP51810 high-speed gate driver is designed to meet the stringent requirements of driving enhancement mode (e-mode) GaN HEMT power switches in offline, half-bridge power topologies. The NCP51810 offers short and matched propagation delays as well as  $-3.5\text{V}$  to  $+150\text{V}$  (typical) common-mode voltage range for the high-side drive. To fully protect the gate of the GaN power transistor against excessive voltage stress, both drive stages employ a dedicated voltage regulator to accurately maintain the gate-source drive signal amplitude. The NCP51810 offers important protection functions such as independent under-voltage lockout (UVLO) and IC thermal shutdown.

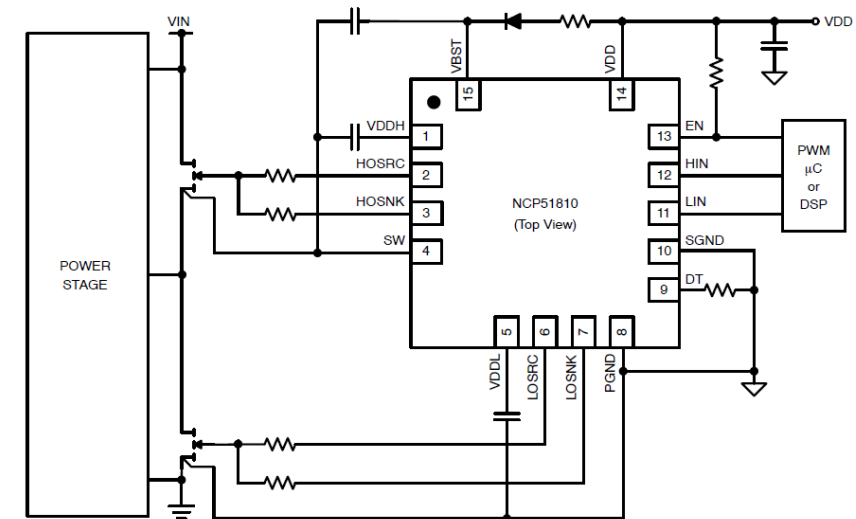
## Features

- 150 V, high side and low side gate driver
- Fast propagation delay of 50 ns max
- 200 V/ns dV/dt Immunity Rating for all SW and PGND Referenced Circuitry
- Separate source and sink output pin
- Regulated 5.2 V gate driver with independent UVLO for high side & low side output stages
- 1ns Rise & Fall Times Optimized for GaN
- Programmable dead-time
- Small package and optimized pin out

## Benefits

- Support 48 V input design with sufficient safety margin
- Suitable for high frequency operation
- Increased efficiency and allow parallelism
- Robust design for high switching frequency application
- Allow control of rise & fall time for EMI tuning
- Optimum driving of GaN power switches and simplify design
- Small PCB foot print, reduced parasitic, suitable for high frequency operation

## Typical Application Diagram



## Market & Applications

- Data center 48V to low voltage intermediate bus converter
- 48V to Point of Load (PoL) converter
- Industrial power module
- Resonant converters or Active clamp flyback converters
- Half bridge and full bridge converters
- Non isolated step down converters



QFN15 4x4, 0.5P  
CASE 485FN

## Ordering information and packaging

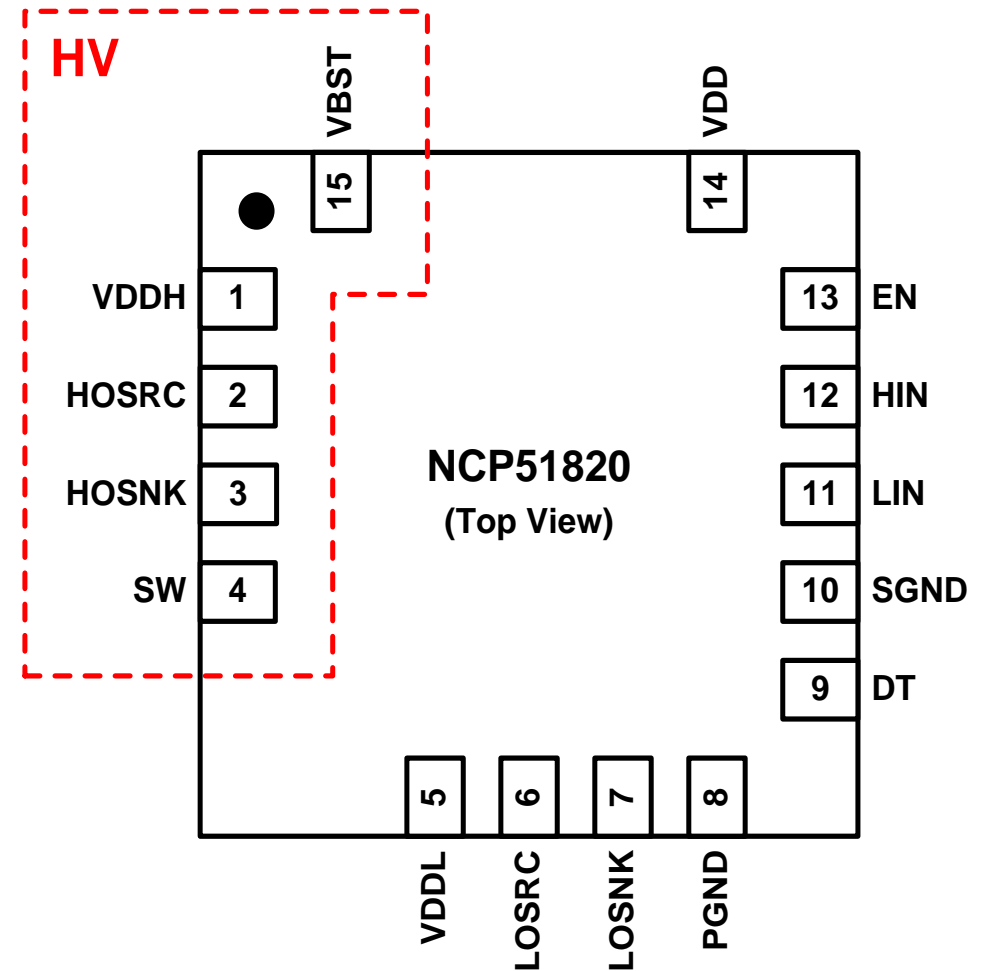
Part Number	Operating Temp	Package
NCP51810AMNTWG	$(-40 ; 125) [^{\circ}\text{C}]$	QFN15 4x4

Public Information



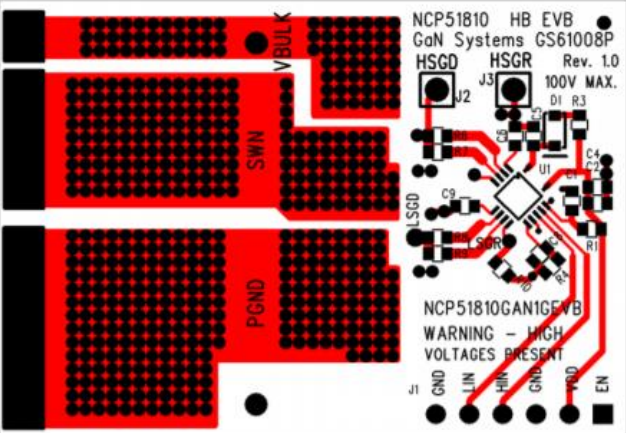
# NCP51810 Detailed Pin Descriptions

1. **VDDH** – local bias rail for the high-side driver
2. **HOSRC** – high-side driver source output
3. **HOSNK** – high-side driver sink output
4. **SW** – switch-node (high-side GaN source return)
5. **VDDL** – local bias rail for the low-side driver
6. **LOSRC** – low-side driver source output
7. **LOSNK** – low-side driver sink output
8. **PGND** – power ground (low-side GaN source return)
9. **DT** – dead-time adjust (mode select)
10. **SGND** – signal ground (reference for all logic control signals)
11. **LIN** – TTL input logic signal for the low-side driver
12. **HIN** – TTL input logic signal for the high-side driver
13. **EN** – TTL enable signal for the driver (active HIGH)
14. **VDD** – IC bias supply voltage rail (8 V – 20 V)
15. **VBST** – bootstrap positive bias voltage

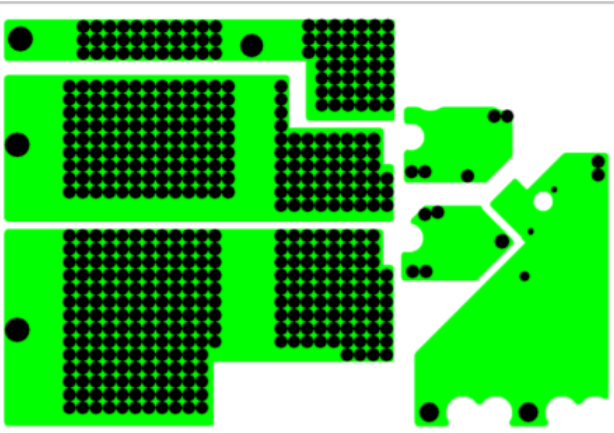


4x4 QFN15

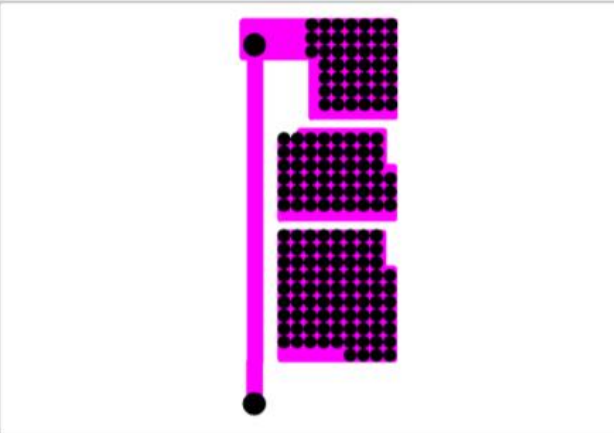
# NCP51810 + 100 V GaN FET Mini Evaluation Board (EVB)



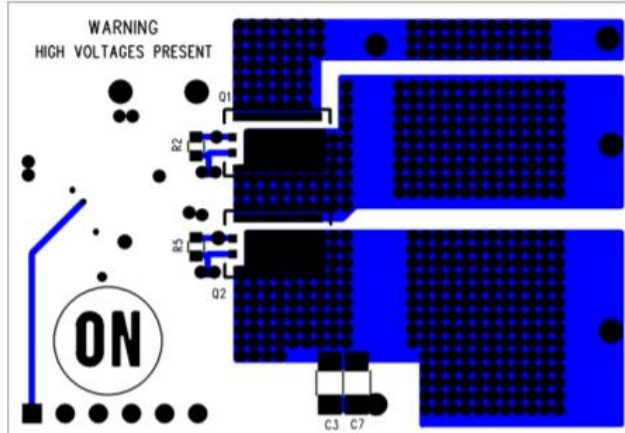
Layer 1



Layer 2

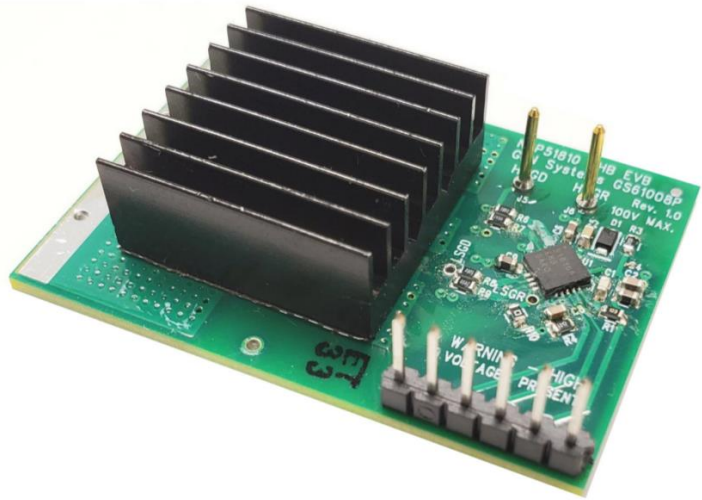


Layer 3

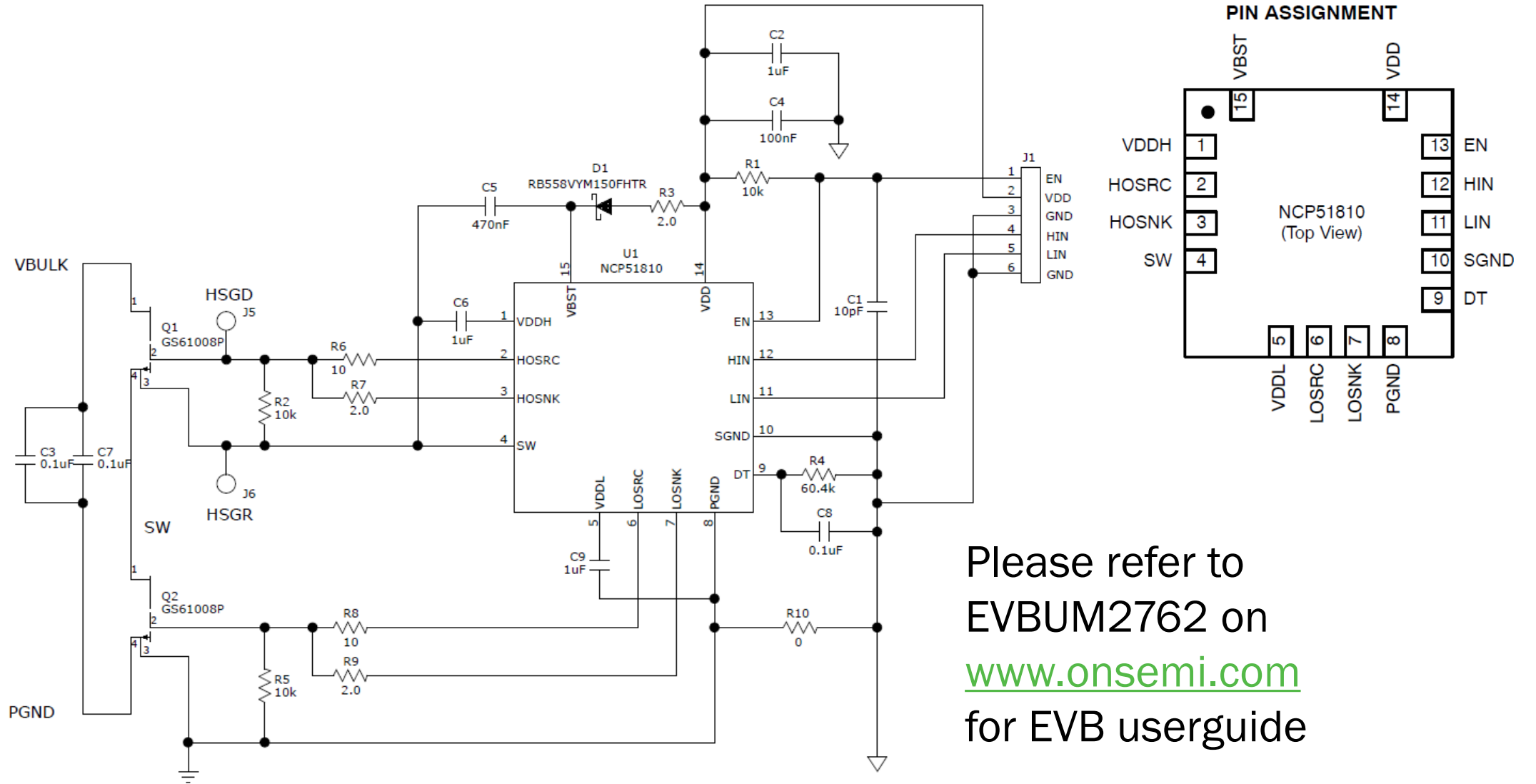


Layer 4

- 100 V GaNFET EVB shown
  - Shown with heatsink (orderable without heatsink)
  - For high-power applications, customer needs to provide their own heatsink and/or fan cooling



# NCP51810 GaN Driver - Mini EVB Schematic



Please refer to  
 EVBUM2762 on  
[www.onsemi.com](http://www.onsemi.com)  
 for EVB userguide

