

BW9130HV 3A LED Driver with Dimming Control

Description

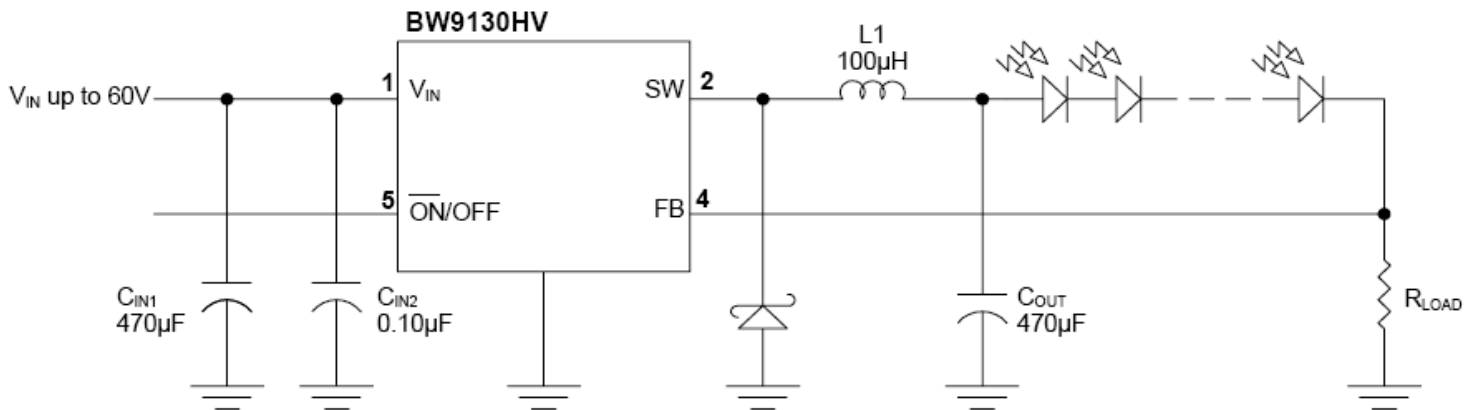
BW9130HV is the monolithic IC designed for a step-down DC/DC converter capable of driving 3A load without an additional transistor. The input voltage range is up to 60V. Its feedback voltage, VFB, is 200mV. The BW9130HV operates at a switching frequency of 52kHz. The external shutdown function is controlled by a logic level on the ON/OFF pin and then the circuit comes into the standby mode with $I_{STBY} \sim 50 \mu A$ (typ.).

The ON/OFF pin may be used for the analog dimming. As the voltage on the ON/OFF pin is increased from 0.07V to 0.67V, the voltage on the FB pin falls from 200mV to 0. The self-protection features include a cycle-by-cycle current limit and a thermal protection. The BW9130HV is available in standard 5LTO220, and 5L-TO263 packages.

Features

- Maximum input voltage up to 60V
- VFB: 200mV
- Frequency: 52KHz
- ILED = 3.0A maximum
- ON/OFF input may be used for the analog dimming
- Thermal protection
- Cycle by cycle current limit

Typical Application Circuits

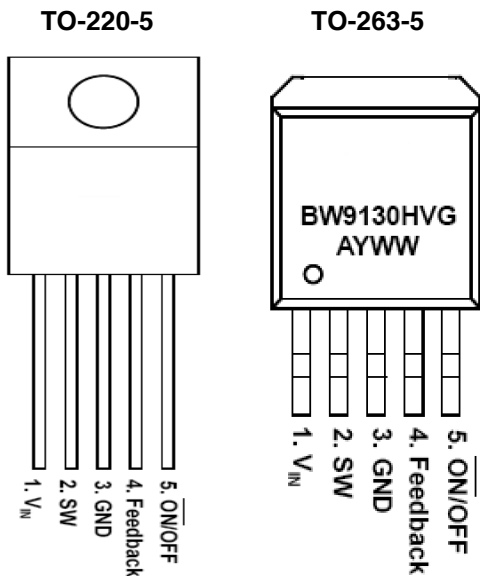


Ordering Information

| Ordering Number | Oscillation Frequency | Package | Shipping |
|-----------------|-----------------------|----------|------------------|
| BW9130HVTA5RG | 52KHz | TO-263-5 | 800 Units / Reel |
| BW9130HVTB5TG | | TO-220-5 | 50 Units / Tube |

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Marking Information and Pin Configurations (Top View)



Absolute Maximum Ratings (Note 1)

| Rating | Symbol | Value | Unit |
|---------------------------------------|--------------|--------------------|------|
| Maximum Supply Voltage | V_{IN} | 63 | V |
| $\overline{ON/OFF}$ Pin Input Voltage | $V_{ON/OFF}$ | -0.3 to V_{IN} | V |
| Feedback Pin Voltage | V_{FB} | -0.3 to V_{IN} | V |
| Minimum SW Voltage | V_{SW} | -0.8 | V |
| Power Dissipation | P_D | Internally Limited | - |
| Storage Temperature Range | T_{STG} | - 65 to 150 | °C |
| Maximum Junction Temperature | T_J | + 150 | °C |
| Minimum EDS Rating (Note 2) | | 2 | kV |
| Lead Temperature (Soldering, 10 sec) | | + 260 | °C |

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur.

Recommended Operating Conditions

| Rating | Symbol | Value | Unit |
|-----------------------------|-----------|-------------|------|
| Maximum Supply Voltage | V_{IN} | 60 | V |
| Operating Temperature Range | T_{OPR} | - 40 to 125 | °C |

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Block Diagram

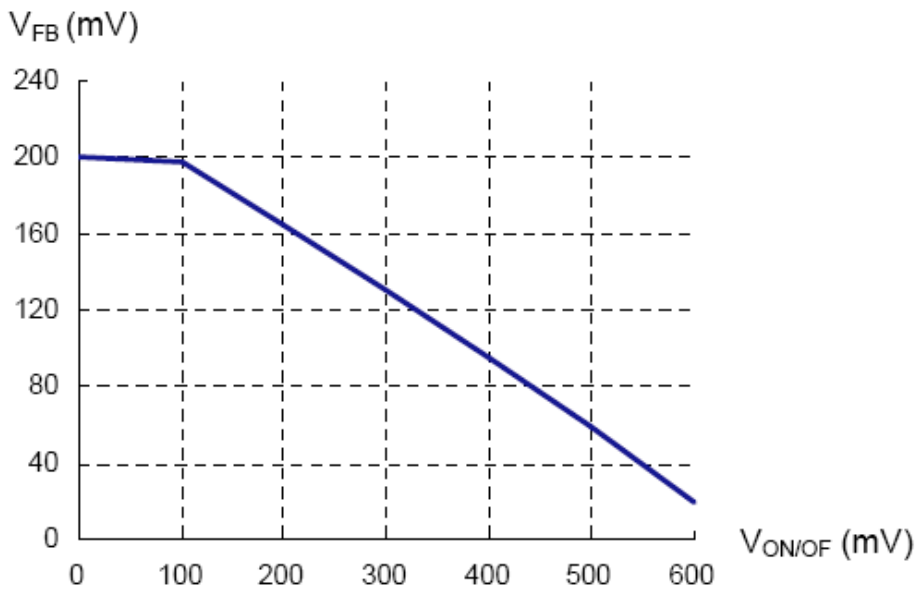
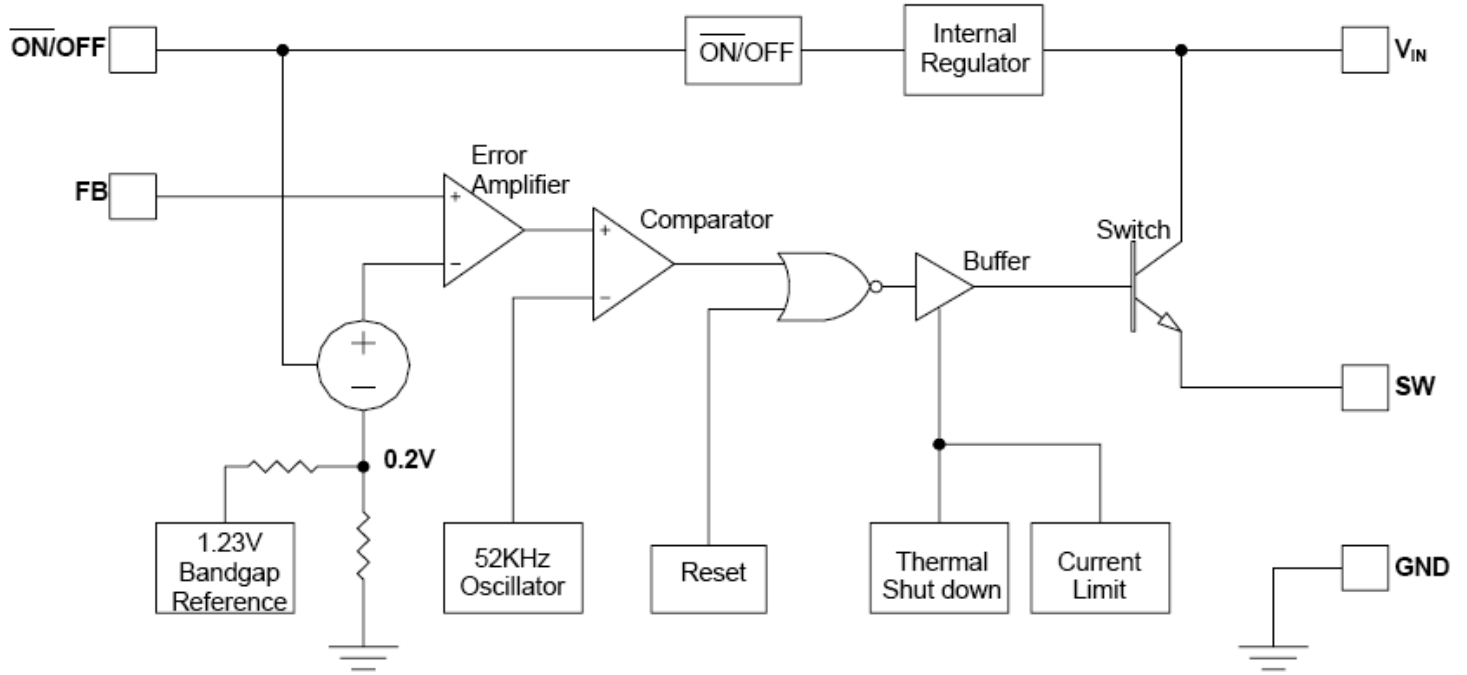


Fig 1 Dimming Voltage

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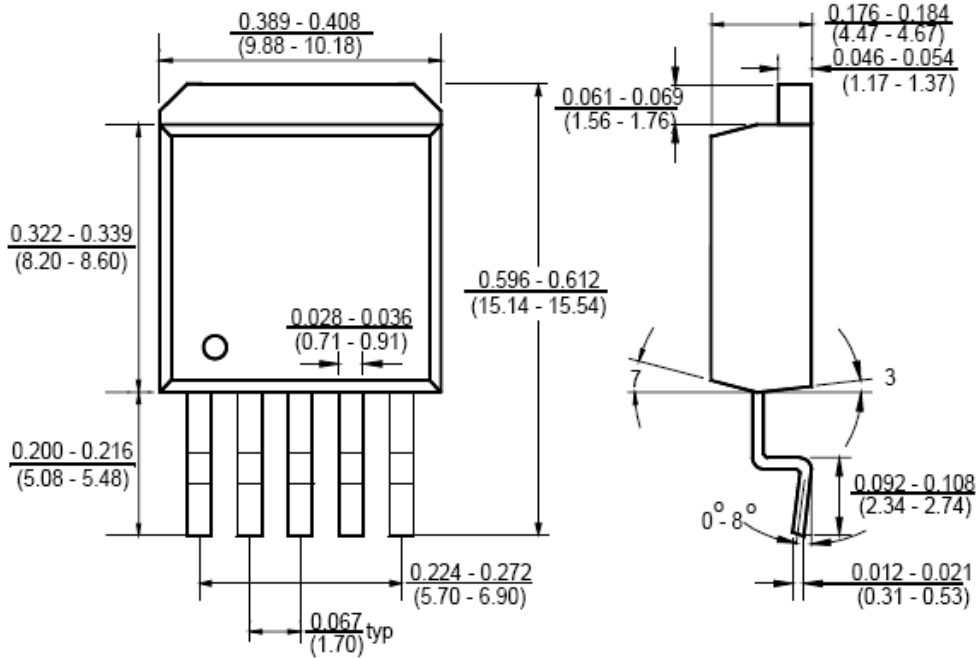
Electrical Characteristics Specifications with standard type face are for $T_J=25^{\circ}\text{C}$, and those with **Bold type** apply over Full Operating Temperature Range

| Parameter | Condition | Symbol | Min | Typ | Max | Unit |
|--|--|--------------------------------|------------|-------------|------------|---------------|
| Feedback Voltage | $V_{IN} = 12\text{V}$, $I_{LOAD} = 350\text{mA}$, $\overline{\text{ON/OFF}} = 0\text{V}$ | V_{FB} | 190 | 200 | 210 | mV |
| | $5.5\text{V} < V_{IN} < 12\text{V}$, $I_{LOAD} = 350\text{mA}$, $\overline{\text{ON/OFF}} = 0\text{V}$ (Note 2) | | 184 | | 216 | |
| | | | 180 | | 220 | |
| Efficiency | $V_{IN} = 12\text{V}$, $I_{LOAD} = 3.0\text{A}$ | η | | 65 | | % |
| FB input current | $V_{FB} = 250\text{mV}$, $\overline{\text{ON/OFF}} = 0\text{V}$ | I_{FB} | | 50 | 150 | nA |
| | | | | | 500 | |
| Oscillator Frequency | | F_{OSC} | 47 | 52 | 58 | kHz |
| | | | 42 | | 63 | |
| Saturation Voltage | $I_{SW} = 3\text{A}$ | V_{SAT} | | 1.35 | 1.5 | V |
| | | | | | 1.7 | |
| Current Limit | | CL | 3.7 | 5.0 | 6.7 | A |
| Maximum Duty Cycle | | DC_{MAX} | 100 | | | % |
| SW Leakage Current | $V_{IN} = 60\text{V}$, $V_{SW} = 0\text{V}$, $V_{FB} = 1.5\text{V}$ | I_{LO} | -0.3 | -0.07 | | mA |
| | $V_{IN} = 60\text{V}$, $V_{SW} = -0.8\text{V}$, $V_{FB} = 1.5\text{V}$ | | -30 | -8 | | |
| Threshold Voltage $\overline{\text{ON/OFF}}$ | | $V_{TH\ ON/OFF}$ | 1.0 | 1.4 | 2.0 | V |
| | | | 0.8 | | 2.2 | |
| Input Current $\overline{\text{ON/OFF}}$ | $V_{\overline{\text{ON/OFF}}} = 2.5\text{V}$ | I_{IH} | -5 | 0.01 | 5 | μA |
| | $V_{\overline{\text{ON/OFF}}} = 0\text{V}$ | I_{IL} | -2 | -0.3 | | |
| Quiescent Current | $V_{FB} = 1.5\text{V}$ | I_Q | | 5.3 | 10 | mA |
| Standby Current | $V_{\overline{\text{ON/OFF}}} = 5\text{V}$, $V_{IN} = 60\text{V}$ | I_{STBY} | | 50 | 200 | μA |
| Dimming Voltage | $I_{LED} = 0$, $V_{IN} = 12\text{V}$, see Fig 1 | $V_{\overline{\text{ON/OFF}}}$ | 600 | 670 | 750 | V |

Note 2 LED must be ensured with load current (I_{LOAD}) at $V_{IN\ MIN}$

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Package Outline Dimensions – TO-263-5



TO-220-5

