

Single, High Current, LED Driver Demoboard

General Description

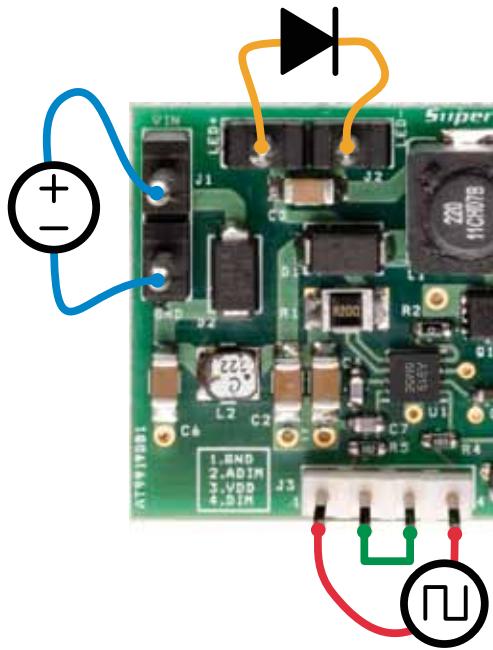
The AT9919DB1 demoboard is a high current LED driver designed to drive one LED at 1.0A from a 9.0 - 16VDC input. The demoboard uses Supertex's AT9919 hysteretic buck LED driver IC.

The AT9919DB1 includes two PWM dimming modes. The analog control of the PWM dimming mode allows the user to dim the LED using a 0 - 2.0V analog signal applied between the ADIM and GND pins (0V gives 0% and 2.0V gives 100%). In this mode, the PWM dimming frequency is set to 1kHz on the board. The digital control of PWM dimming mode allows the user to dim the LEDs using an external, TTL-compatible square wave source applied between DIM and GND. In this case, the PWM dimming frequency and duty ratio are set by the external square wave source.

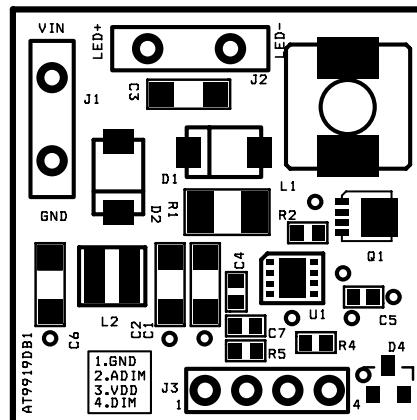
Specifications

| Parameter | Value |
|--|---|
| Input voltage | 9.0 - 16VDC (steady state) 40V max (transient) |
| Reverse polarity protection | 60V (max) |
| Output voltage | 2.0 - 5.0V |
| Output current | 1.0A ± 5% |
| Output current ripple (@13.5V input and 3.3V output) | 16% (peak to peak) |
| Full load efficiency (@13.5V input) | 84% |
| Open LED protection | Yes |
| Output short circuit protection | Yes |
| Dimensions | 25.4mm X 25.4mm |

Connection Diagram



Silk Screen



Connections

Input Connection: Connect the input DC voltage between VIN and GND terminals of connector J1 as shown in the connection diagram.

Output Connection: Connect the LEDs between LED+ (anode of LED string) and LED- (cathode of LED string) of connector J2.

PWM Dimming Connection:

- If no PWM dimming is required, short DIM, VDD and ADIM terminals of connector J3.

- If dimming using an external PWM dimming source, connect the PWM source between the DIM and GND terminals of connector J3 and short terminals ADIM and VDD. The recommended PWM dimming frequency is ≤1.0kHz.
- If dimming using an external analog voltage source, connect the source between the ADIM and GND terminals of connector J3 and short terminals DIM and VDD. The voltage range for control of the PWM dimming is 0 - 2.0V.

Typical Results

Fig. 1. Efficiency vs. Input Voltage Plot

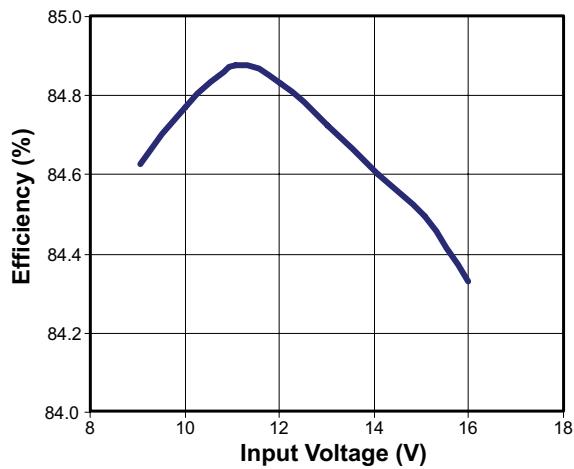


Fig. 2. Line Regulation of LED Current Plot

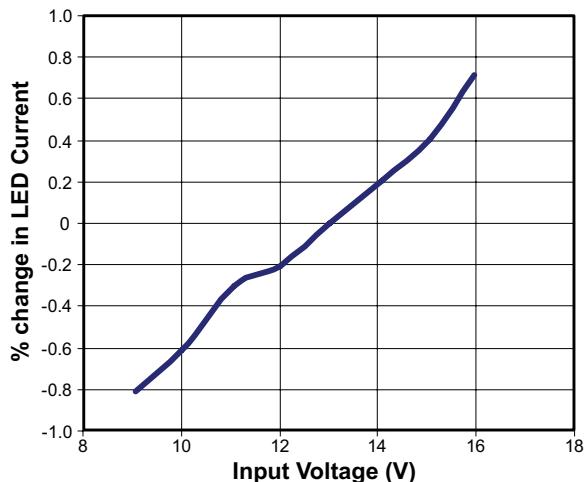


Fig. 3. Efficiency vs. Load Voltage Plot

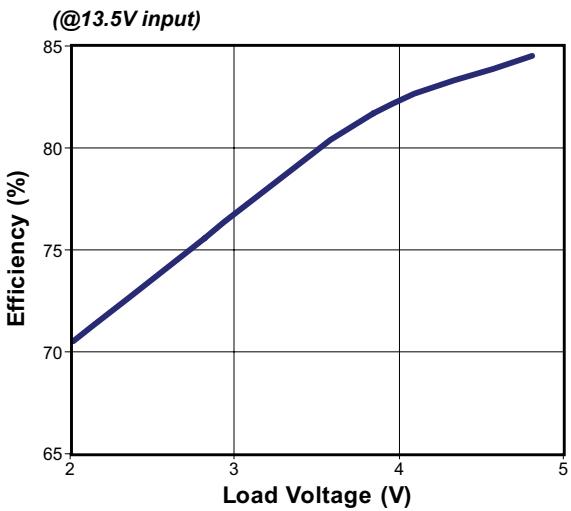
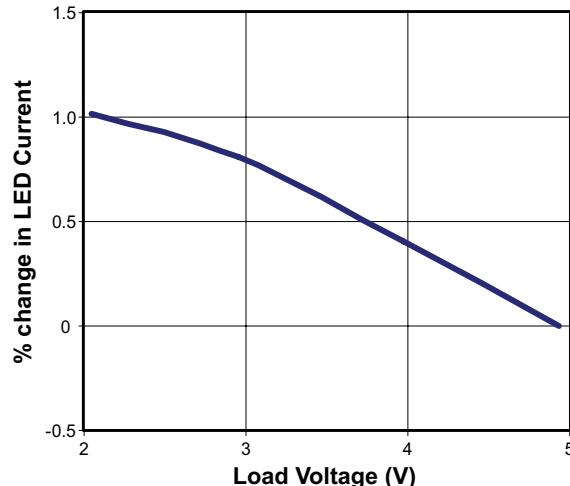
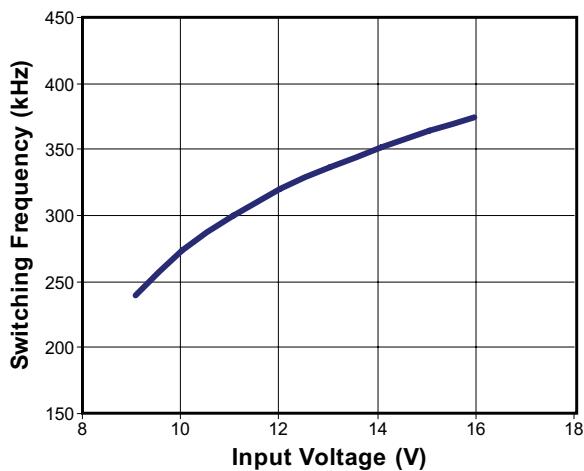


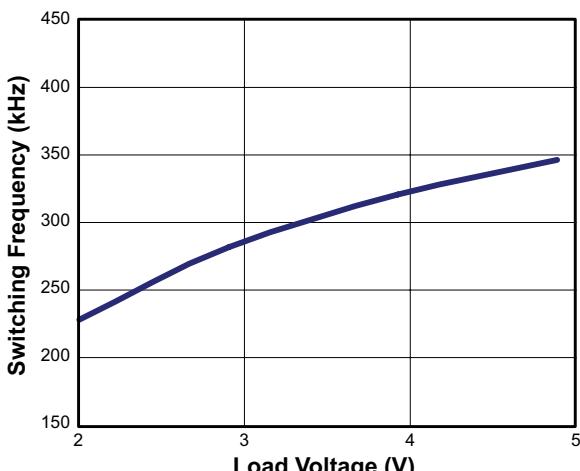
Fig. 4. Load Regulation of LED Current Plot



**Fig. 5. Switching Frequency vs. Input Voltage Plot
(Full Load)**



**Fig. 6. Switching Frequency vs. Load Voltage Plot
(@13.5V input)**

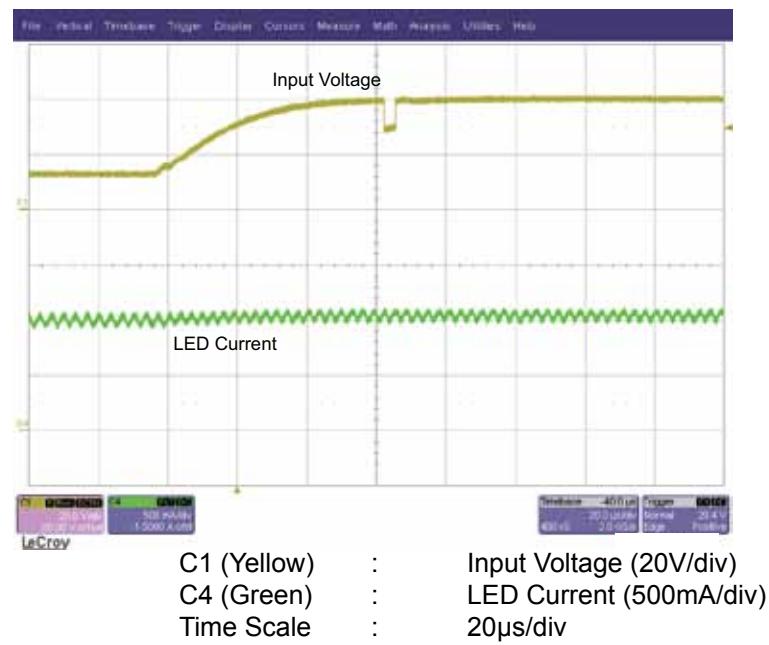


Typical Waveforms (All waveforms are at 13.5V input and 3.3V LED Voltage unless otherwise noted)

Figure 7. Steady State Waveforms



Figure 8. Transient Response of the LED Current



Typical Waveforms (All waveforms are at 13.5V input and 3.3V LED Voltage unless otherwise noted)

Figure 9. PWM Dimming using the DIM input

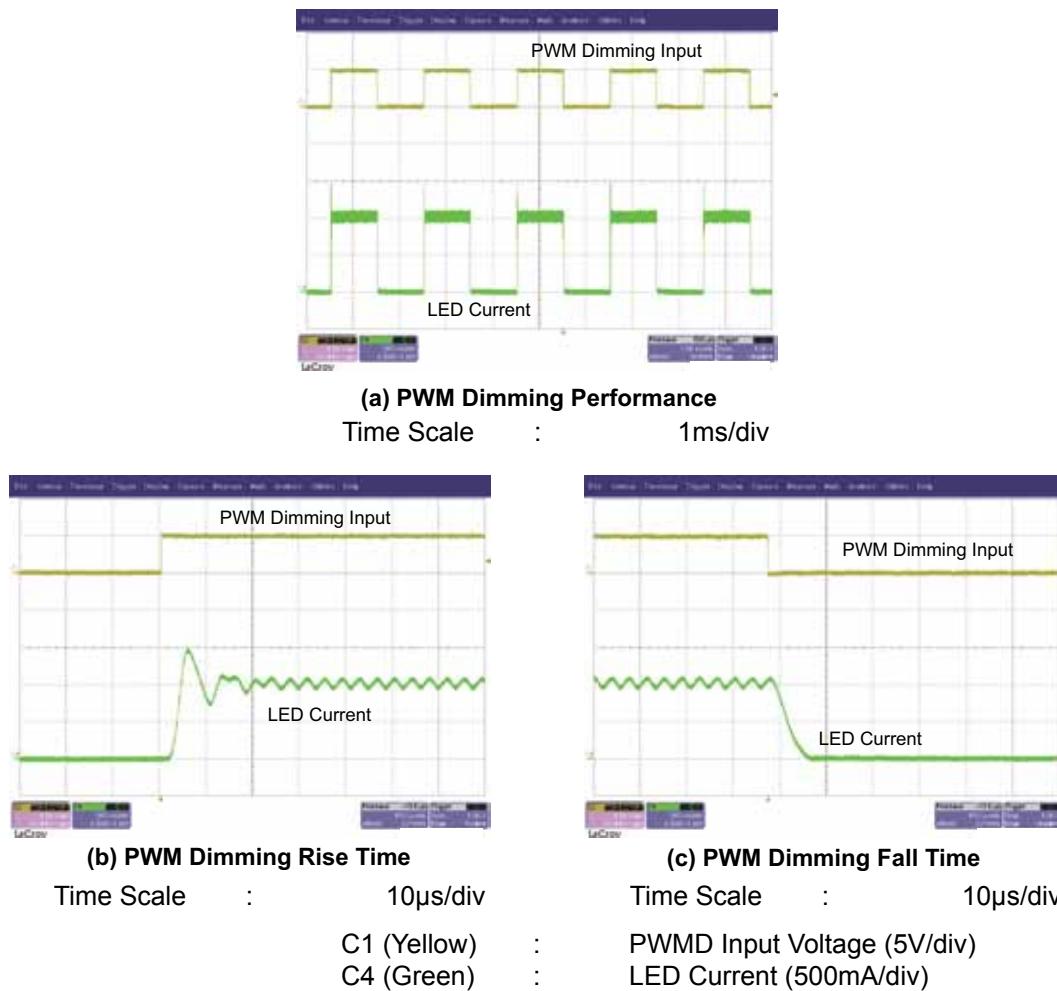
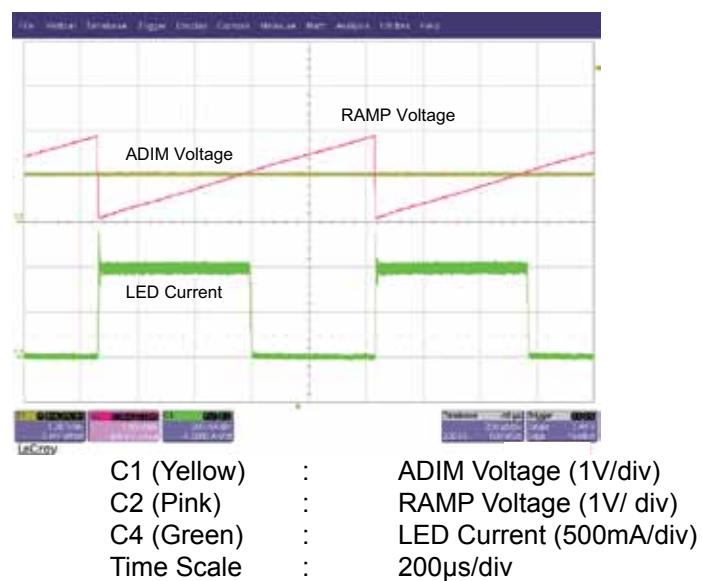
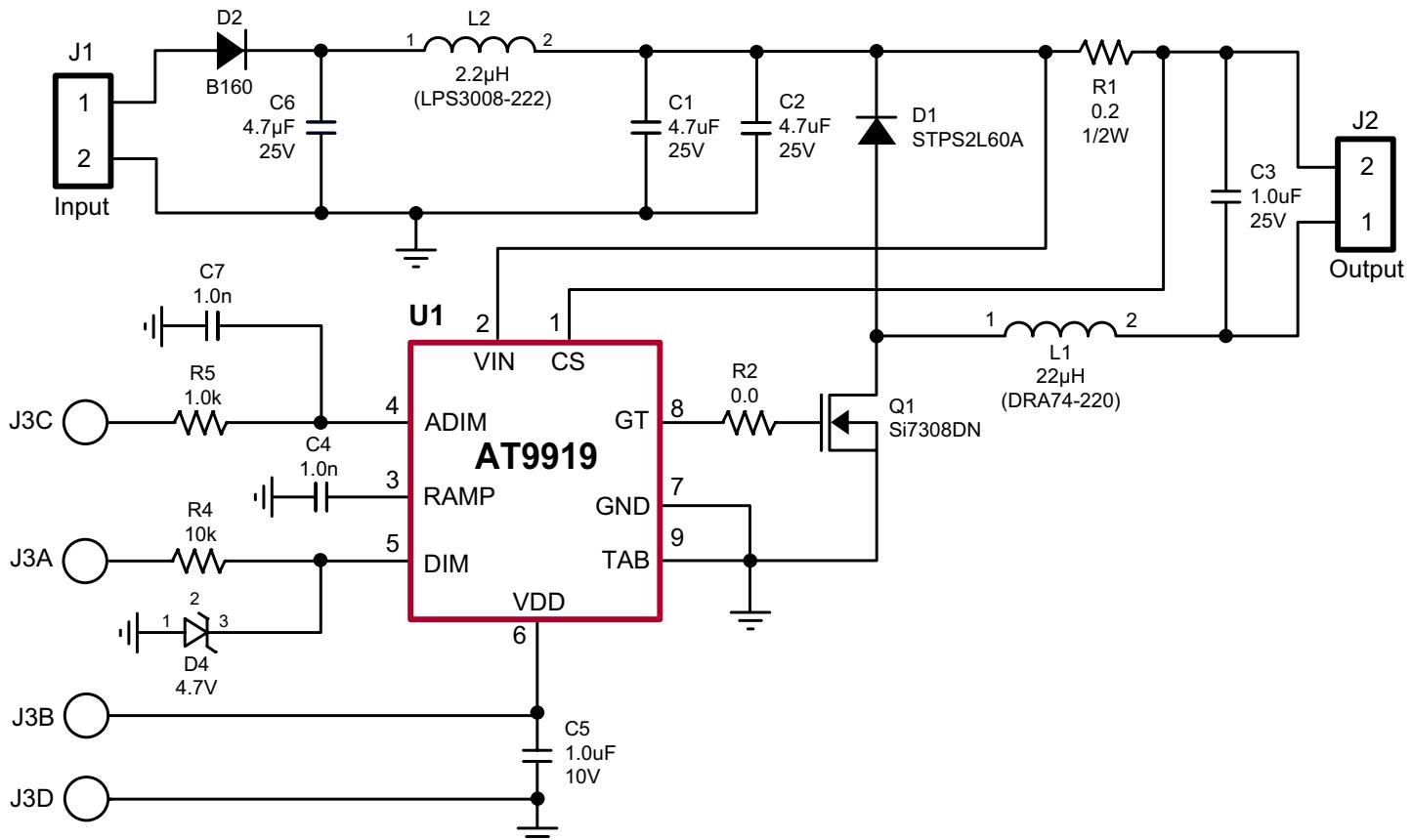


Figure 10. PWM Dimming using the ADIM pin



AT9919DB1 Schematic Diagram



Bill of Materials

| Item # | Qty | RefDes | Description | Package | Manufacturer | Manufacturer's Part Number |
|--------|-----|------------|---|-----------------|---------------|----------------------------|
| 1 | 3 | C1, C2, C6 | 4.7µF, 25V, 10% X7R ceramic capacitor | SMD1206 | Murata | GRM31CR71E475KA88L |
| 2 | 1 | C3 | 1.0µF, 25V, 10% X7R ceramic capacitor | SMD1206 | Kemet | C1206C105K3RACTU |
| 3 | 2 | C4, C7 | 1.0nF, 50V, 5%, C0G ceramic capacitor | SMD0603 | TDK Corp | C1608C0G1H102J |
| 4 | 1 | C5 | 1.0µF, 10V, 10% X7R ceramic capacitor | SMD0603 | Taiyo Yuden | LMK107B7105KA-T |
| 5 | 1 | D1 | 60V, 2A schottky diode | SMA | ST Micro | STPS2L60A |
| 6 | 1 | D2 | 60V, 1A schottky diode | SMA | ST Micro | STPS1L60A |
| 7 | 1 | D4 | 4.7V, 350mW zener diode | SOT-23 | Diodes Inc | BZX84C4V7-7-F |
| 8 | 2 | J1, J2 | 2 position, 5mm pitch, vertical header | Thru-Hole | On Shore Tech | EDSTL130/02 |
| 9 | 1 | J3 | 4 position, 0.100" pitch, vertical header | Thru-Hole | Molex | 22-03-2041 |
| 10 | 1 | L1 | 22µH, 1.8A rms, 1.7A sat inductor | SMT | Coiltronics | DRA74-220-R |
| 11 | 1 | L2 | 2.2µH, 1.0A rms, 1.0A sat inductor | SMT | Coilcraft | LPS3008-222 |
| 12 | 1 | Q1 | 60V, 72mΩ, 9nC N-channel FET | Powerpak 1212-8 | Vishay | SI7308DN-T1-E3 |
| 13 | 1 | R1 | 0.2Ω, 1/2W, 1% chip resistor | SMD1210 | Rohm | MCR25JZHFLR200 |
| 14 | 1 | R2 | 0.0Ω, 1/10W, 5% chip resistor | SMD0603 | Panasonic | ERJ-3GEY0R00V |
| 15 | 1 | R4 | 10kΩ, 1/10W, 5% chip resistor | SMD0603 | Panasonic | ERJ-3GEYJ103V |
| 16 | 1 | R5 | 1kΩ, 1/10W, 5% chip resistor | SMD0603 | Panasonic | ERJ-3GEYJ102V |
| 17 | 1 | U1 | Hysteretic Buck LED Driver | DFN-8 | Supertex | AT9919 |

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- Поставка образцов и прототипов;
- Техническая поддержка проекта;
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