

Digital Current Controller - Based LED Driver and s Method Thereof

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Inventors: Dr. Amit Kumar Singha, Arnab Kumar Pal

ABSTRACT

Disclosed herein is a system and method for a digital pulse frequency modulation (PFM) converter-based LED driver. The method includes sensing an LED load current (ILED) equivalent voltage (VCSA) by a current sensing circuit. The method further includes receiving the LED load current (ILED) equivalent voltage (VCSA) by an analog to digital converter (ADC) (120) from the current sensing circuit to generate triangular envelope generator drive signal (Q and Q). The method further includes receiving the triangular envelope generator drive signal (Q and Q) by a triangular envelope generator (124) to generate a triangular envelope waveform (Venv). The method further includes generating a sawtooth waveshape (Vsaw) by a sawtooth wave generator (126). The method further includes comparing the triangular envelope waveform (Venv) and the sawtooth waveshape (Vsaw) to generate a ripple free isolated gate driver signal (P and P) by a pulse frequency modulation (PFM) signal generator (130).

KEY APPLICATION AREAS

- 1.LED Lighting Systems.
- 2.LED Display and Signage Systems.
- 3.Smart & Energy-Efficient Lighting.
- 4.Industrial and Commercial Illumination.
- 5.Power Electronics and LED Driver Circuits.
- 6.Automotive and Architectural Lighting.

POTENTIAL USE

1. Driving high-brightness LEDs with ripple-free current control.
2. Eliminating LED flicker caused by power supply ripples.
3. Powering LED displays and digital signage with stable illumination.
4. Energy-efficient lighting in commercial, industrial, and residential applications.
5. LED drivers for automotive, street lighting, and smart lighting systems.
6. High-performance LED power supplies requiring digital control and zero-voltage switching.