

TITLE : SMPS LOAD INDICATION

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PROBLEM STATEMENT:

Design and simulate an SMPS load indication circuit in eSim such that it provides accurate real-time monitoring of load current, low power dissipation, and minimal error. The circuit should efficiently indicate the presence and magnitude of load on the SMPS using analog components, with optimized response, accuracy, and practical applicability.

ABSTRACT:

Monitoring the load in Switched-Mode Power Supplies (SMPS) is essential for efficiency, safety, and reliability. In this project, an SMPS load indication circuit is designed and simulated using eSim, employing analog components only such as resistors, op-amps, and transistors. The circuit detects real-time load current and provides a visual indication via LEDs or a voltmeter, ensuring accurate representation of load magnitude with minimal power dissipation. The design is optimized for low complexity, fast response, and high reliability, making it suitable for both laboratory and practical industrial applications. Simulation results demonstrate effective load monitoring under varying conditions, highlighting a compact and efficient solution for real-time SMPS load indication.

PROPOSED CIRCUIT:

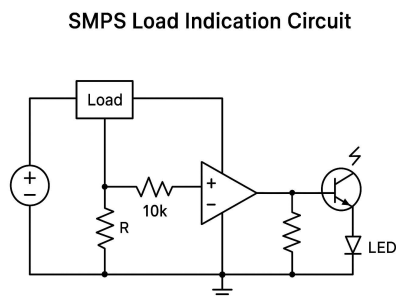


Fig 1: Implementation of SMPS Load Indicator Circuit

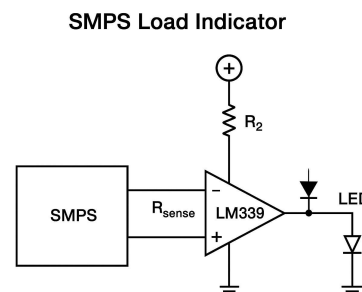


Fig 2: Schematic of SMPS Load Indicator

SOURCE/REFERENCES:

- 1)[1] Texas Instruments, *LM339, LM239, LM2901 Low-Power Low-Offset Voltage Quad Comparators Datasheet*. Dallas, TX, USA: Texas Instruments Inc., 2016.
- 2)[2] ON Semiconductor, *AN1048/D – Current Sense Circuit Collection*. Phoenix, AZ, USA: ON Semiconductor, 2004.
- 3)[3] Analog Devices, *Current Sense Circuit Collection – Analog Dialogue*. Norwood, MA, USA: Analog Devices Inc., 2009.