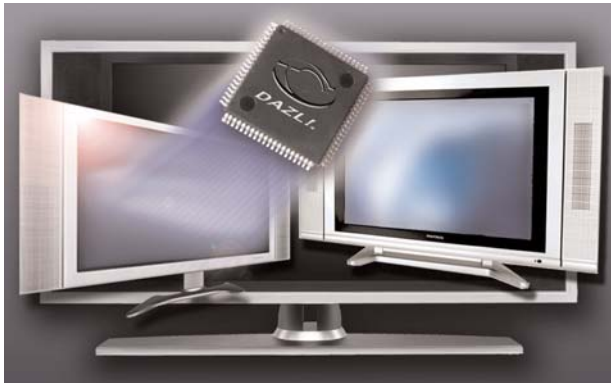


Introduction: DAZL!™ LED Drivers

Microsemi's DAZL! Family of mixed signal high voltage LED driver ICs is designed for LCD panel backlights using strings of either red, green, and blue (RGB) or white LEDs.



DAZL™ LED drivers are ideal for LCD TVs and other large LCD-based displays.

The DAZL! Family integrates all necessary power, analog and logic functions while supporting multiple LED strings in a compact monolithic package. The ICs drive LED strings, while simultaneously monitoring and measuring backlight string voltage and current to control power supply voltage for optimum performance.

The DAZL! Family consists of two ICs, designed for backlight units having either high-power or low-power LEDs:

For high-power LEDs, the PD24012H is capable of driving external MOSFETs for a string current of up to 1.5A on each of 12 ports.

For low-power LEDs, the PD24012L features on-chip MOSFETs capable of driving a string current of up to 60mA on each of its 12 ports. With 65V output voltage supporting each LED string, the PD24012L can accommodate at least 15 low power LEDs per string without external MOSFETs. (~ Vf = 3.5V)

Both DAZL! driver ICs feature 12 independent ports capable of driving 12 LED strings. Each string is controlled by independent PWM circuitry that adjusts string current for the desired color and intensity.

Current, output port voltage and temperature are monitored separately for sophisticated control of each LED string. A temperature sensor at each port automatically shuts down the port in the event of excessive thermal stress.

All PD24012 driver ICs are designed to support a full set of advanced features including scanning backlight (D1) and zone dimming (D2). They also support two external SPI buses that can work independently, or in parallel.

A single SPI bus provides full functionality. When in parallel, one SPI bus is used for initialization and monitoring of values, while the second interfaces directly to a video controller, enabling direct control of enable/disable ports and PWM values.

Value Proposition

Advanced Power Management - To minimize overall system power dissipation, DAZL! adaptively control RGB power supplies output voltage levels based on advanced power management algorithm.

Fault Detection - DAZL! ICs constantly monitor the current and voltage of all LED strings at a high sample rate. This data is saved and sent to a companion PD23000 32-bit system controller.

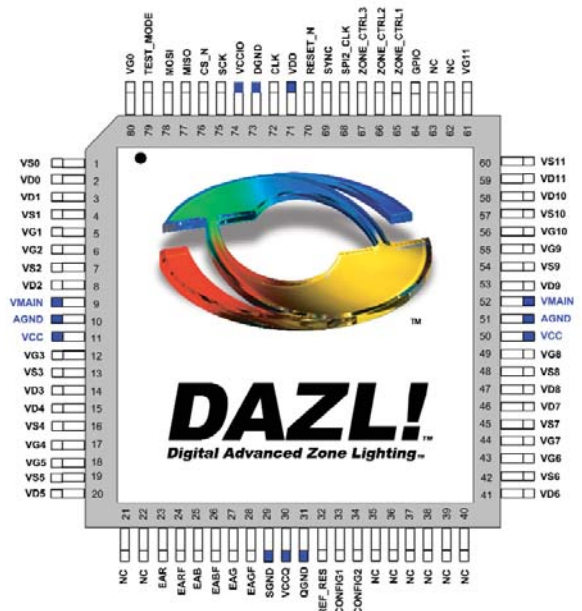
The high sample rate enables the system controller to respond quickly to detected faults due to LED opens and/or shorts.

Advanced Control of Color & Brightness Uniformity - DAZL! ICs feature individually controlled internal PWMs for each of their 12 ports. Frequencies range from 150Hz to 16KHz. Individual PWMs allow for independent control of the current in each string, adjusting automatically for current mismatches between strings to enable more accurate color and brightness uniformity.

Advanced Backlight features - The advanced features of the DAZL! Family enables it to support zone dimming (D2) and scanning backlights (D1). Multiple bus interfaces in the form of two SPI buses that can work in parallel offer higher bandwidth--and the ability to control up to 30 PD24012 ICs and 360 LED strings with a single PD23000 32-bit system controller.

Risk & Cost Reduction - The DAZL! Family is designed to provide significant cost reductions for LED backlight manufacturers. The independent PWMs on each of the 12 ports allow LED strings of any color to be connected to any port. This flexibility provides a universal solution to accommodate a variety of LED string combinations, such as 4R-4G-4B or 3R-6G-3B LEDs. Identical packages and pin outs between the PD24012H and PD24012L drivers allow for similar architecture, design and layout considerations for both low-power and high-power LEDs, reducing development time and risk for a faster time-to-market.

Pin Configuration



DAZL! Features

LED Driver:

- 12 ports to drive 12 LED strings
- Low power LEDs (up to 60mA) driven by internal MosFETs
- High Power LEDs (up to 1.5A) driven by external MosFETs
- Up to 2.1W chip power dissipation

Communication Interface:

- 2x SPI buses for:
 - Enhanced SPI for system control
 - SPI to system host - such as video controller
 - Direct interface to color manager

Protection:

- Short Circuit Protection
- Open Circuit indication
- Over Temperature Protection

PWM:

- 12 PWMs (each port has its own PWM)
- Frequency 150Hz-16KHz

Power Supply:

- Operating Supply Voltage: 5V
- Output Voltage: 65V
- I/O Voltage: 3.3V or 5V

Working Modes

- Normal Mode for standard operation
- Sleep Mode for power saving

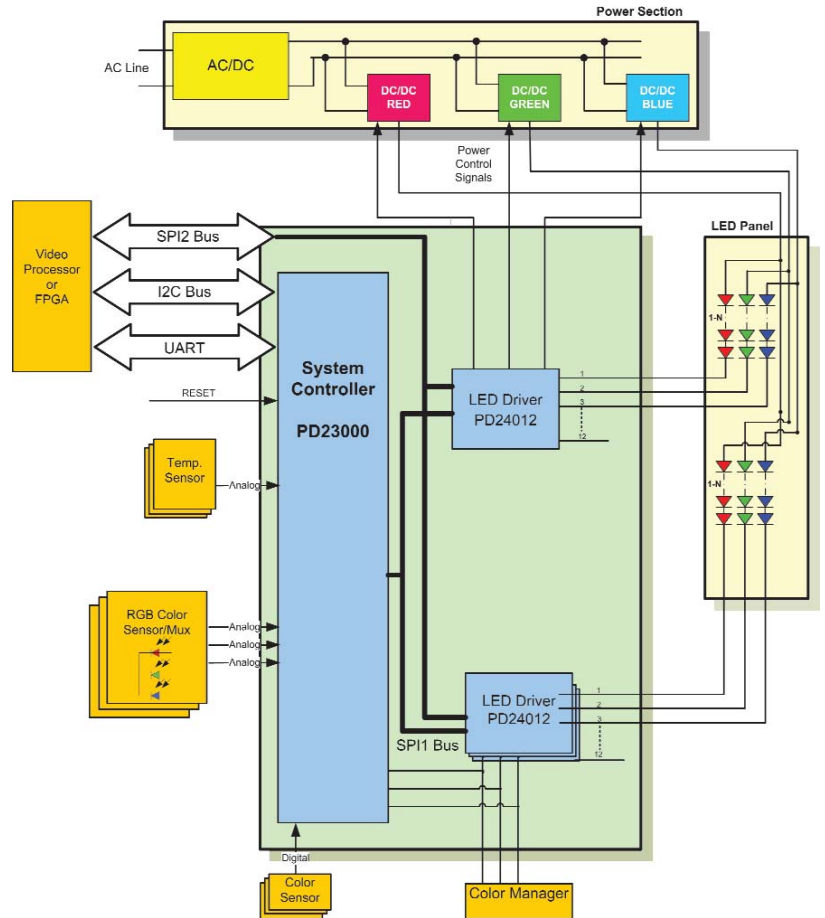
Operating Temperature: -20°C to +85°C

Package: LQFP

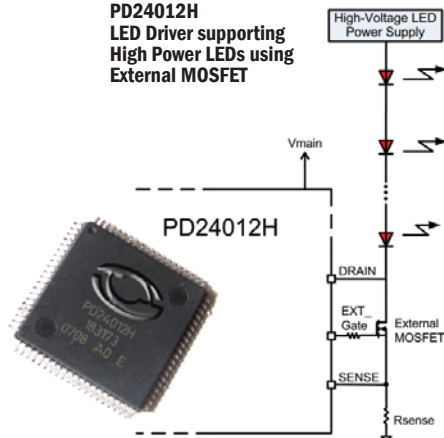
RoHS Compliant

Evaluation Environment

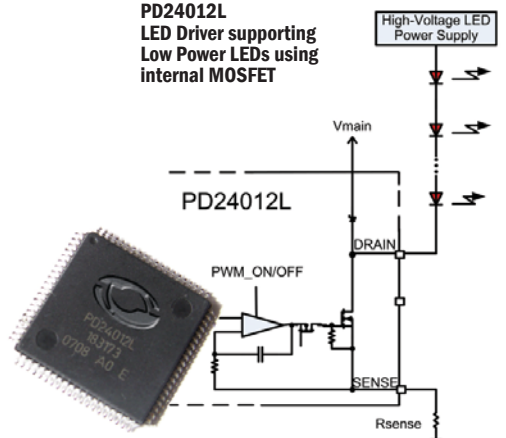
Performance of PD24012 ICs can be fully evaluated using the Microsemi PD25000EV Evaluation Board.



PD24012H
LED Driver supporting
High Power LEDs using
External MOSFET



PD24012L
LED Driver supporting
Low Power LEDs using
internal MOSFET



Ordering Information

Part Number	Description
PD24012L	12 port LED driver with internal MosFETs for Low Power LEDs
PD24012H	12 port LED driver for High Power LEDs



Microsemi[®]

Analog Mixed Signal Group

11861 Western Avenue
Garden Grove, CA 92841
USA

Phone: (714) 372-8080

www.microsemi.com

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