



LED7706 LED Driver—Monolithic Driver for up to 60 White LEDs for Mobile PC LCD Panel Backlighting



LED7706 demo board

The LED7706 is a monolithic white LED driver specifically designed to supply LED arrays used to backlight mobile PC LCD panels. It consists of a highly-efficient boost converter integrating a power MOSFET and six controlled-current generators (ROWs). The device can manage an output voltage able to supply up to 10 white LEDs per ROW. The boost section is based on a constant switching frequency, peak-current mode architecture. The boost output voltage is controlled so that the lowest voltage of the ROW, referred to as SGND, is equal to an internal reference voltage (400 mV typ.). The typical input voltage range is from 4.5V up to 36V. In addition, the LED7706 has an internal 5V LDO regulator that supplies the internal circuitry of the device and is capable of delivering up to 40 mA. The input of the LDO is the main input voltage (V_{BATT}). The boost section switching frequency can be externally adjusted from 200 kHz to 1 MHz. It also has an internal fixed value of 660 kHz (typ.), which eliminates the need for a resistor, an important feature in minimum component-count applications. The frequency pin (FSW) can also be used as the synchronization input, allowing the LED7706 to operate both as the master or the slave. The generators can be externally programmed to sink from 16 mA up to 30 mA and can be dimmed via a PWM signal (1 percent dimming duty-cycle at 20 kHz can be managed). The device is able to detect and manage the open- and shorted-LED faults. If some ROWs are not used, during the startup the device is able to self-detect and automatically disconnect the ROWs without any fault detection. Output over-voltage, internal power MOSFET over-current, and thermal shutdown are provided as protection.

Features ▶

- Constant-frequency, peak-current control
- Internal power MOSFET
- External sync for multi-device applications
- Pulse-skip, power-saving mode at light load
- Programmable soft-start and OVP protection
- Ceramic output capacitor
- Six ROWs with 30 mA max. current capability (adj.)
- Up to 10 white LEDs per ROW and ROW disable option
- 2% current matching between ROWs
- LED failure (open- and short-circuit) detection
- Housed in VFQFPN 24L space-saving package

Benefits ▶

- High efficiency thanks to adaptive-output voltage
- High-performance 36V rated current generators
- Up to 20 kHz dimming frequency
- Keep external tiny
- Demo board and application notes available

Applications ▶

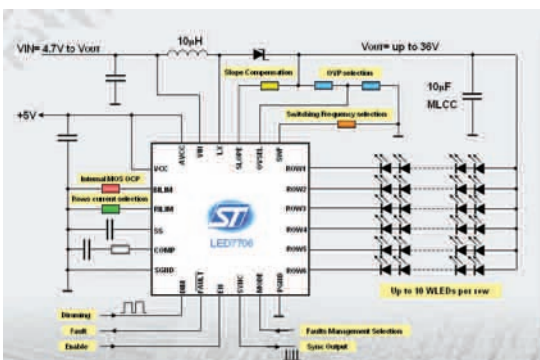
- Backlighting in LCD panels for battery/AC adapter supplied equipment
- Notebook panel backlighting
- Ultra-mobile PC panel backlighting
- Tablet PC panel backlighting
- GPS navigator backlight

Product Specifications ▶

Part Number	Type	Dimming Type	Number of LEDs/String	Number of Strings	Configuration	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Peak Efficiency (%)	Diagnostic Capabilities	Interface	Markets
LED7706	Boost converter	PWM	60 white LEDs	6	Series/parallel	4.5-36	Adaptive to 36V	6 x 30	93	LED short/open	PWM	BL

MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE



Application schematic

STLED316S Panel Controller—LED Display Controller with Key-Scan for Cost-Effective Designs



ST has recently introduced the STLED316S, an integrated LED driver to help designers achieve a more efficient and simplified design for front panels, such as those found on set-top boxes, DVD players, washing machines, dryers, and microwave ovens. The STLED316 is an integrated LED driver that controls front-panel activities. A typical front panel consists of a key-pad, an LED display panel, and various discrete LEDs. The device employs a unique timemultiplexing scheme to drive displays together with key-scans with a limited number of I/Os. The combination of display driving and key-scanning allows the use of a single device like STLED316S for the complete front panel solution. This eliminates the need for sub-CPU and other logics-plus discrete devices, reduces BOM count, and lowers the final cost.

Features ▶

- Common anode LED driver
- Drives 48 outputs (able to drive six digits, each consisting of eight segments)
- Drive capability of up to 40 mA per output. Drives additional eight outputs with individual dimming control; these additional eight outputs could be used to drive discrete LEDs, or it could be used to drive an additional 8-segment digit (e.g., 7 x 8-segment digits)
- Capable of driving red, green, and blue LEDs
- Maximum segment current for the display can be set through one external resistor
- Continuous key-scanning up to 16 keys
- 3-wire serial SPI interface to MCU
- 8-steps dimming capability for each digit
- Available in pin-count optimized SO-24 package

Benefits ▶

- Interrupt output to main CPU upon key-press does not need the CPU to poll the device continuously
- Low power consumption during standby
- Flexibility means that devices can be connected in parallel when more digits/segments are needed
- Minimizes the peripheral component count

Applications ▶

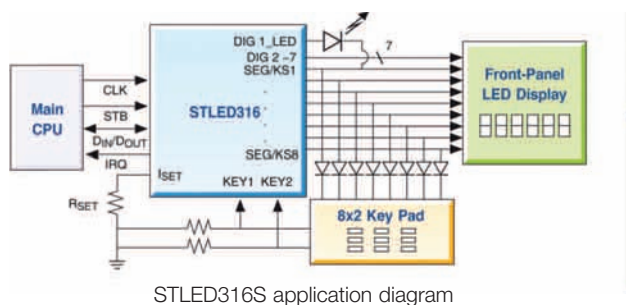
- Can be used in a variety of applications where a front panel interface is present with LED display and key-scanning
- White goods (washers, dryers, microwave ovens, and refrigerators)
- Consumer devices (DVD players, set top boxes, and gaming machines)
- Industrial equipment

Product Specifications ▶

Part Number	Type	Dimming Type	Number of LEDs/String	Number of Strings	Configuration	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Peak Efficiency (%)	Diagnostic Capabilities	Interface	Markets
STLED316SMTR	Linear	PWM	56	NA	7 digits of 8-segment each or 56 discrete LEDs	5	5	40	NA	NA	NA	CL SI

MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE



STLED316S evaluation board and PC GUI



L6902D—Step-Down Regulator with Adjustable Current Limit

The L6902D is a complete and simple step-down switching regulator with adjustable current and voltage feedback. Thanks to its current control loop with external sense resistor it is able to work in constant-current mode, providing up to 1.5A output with an accuracy of 5 percent. The outer voltage control loop is limiting the output voltage in case of load disconnection. Among other benefits, the L6902D features a general purpose 3.3V precise (2 percent) reference voltage or 2.5A (typical value) internal-current limit for short-circuit protection.



L6902D evaluation board

Features ▶

- Adjustable current limit
- Precision 3.3V ($\pm 2\%$) reference
- Few external components
- Thermal shutdown
- Protection against feedback disconnection

Benefits ▶

- Constant voltage and constant current
- Adjustable current limit
- Simple to implement
- Over-voltage protection
- High efficiency

Applications ▶

- General lighting
- Dimmable lighting
- Automotive interior lighting

Product Specifications ▶

Part Number	Type	Dimming Type	Number of LEDs/String	Number of Strings	Configuration	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Peak Efficiency (%)	Diagnostic Capabilities*	Interface	Markets
L6902D	Buck	PWM-analog	8	Single	Series	8-36	36	1,500 max.	97	TSD	PWM/analog	CL

MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE

*Diagnostic capabilities: TSD: Thermal shutdown



ST LED Evaluation Boards

ST Board Order Code	LED Board Description
STEVAL-ILL001V1	Dimmable driver for HB power LEDs with Viper22A (DALI connector)
STEVAL-ILL002V3	High-brightness LED with diagnostic (40 LED) based on STP08DP05
STEVAL-ILL002V4	High-brightness LED with diagnostic (40 LED) based on STP08DP05
STEVAL-ILL003V2	High-brightness LED without diagnostic (32 LED) based on STP16CP596
STEVAL-ILL009V1	RGB color control board based on STP04CM05
STEVAL-ILL010V1	High-intensity LED dimming driver based on L6902
STEVAL-CBP003V1	Front-panel evaluation board based on STLED316S
STEVAL-ILL007V1	High-intensity LED driver for MR-16 format based on L5973D
STEVAL-ILL008V1	LED flashlight demo

STCS2—2A Maximum Constant-Current LED Driver

The STCS2 is a BiCMOS constant-current source designed to provide a precise constant current starting from a varying input voltage source. The main target is to replace the discrete components solution for driving LEDs in low-voltage applications such as 5V, 12V, or 24V giving benefits in terms of precision, integration, and reliability. The device is available in PowerSO-10 that has excellent thermal performance, high-power capability, and high-power density.



Features ▶

- Up to 40V input voltage
- Less than 0.5V voltage overhead
- Up to 2A output current
- PWM dimming pin
- Shutdown pin
- LED disconnection diagnostic

Benefits ▶

- Ease of implementation
- Minimum number of external components
- Integrated protection features
- Keeps solution footprint tiny
- Pb-free packaging available

Applications ▶

- LED constant-current supply for varying input voltages
- General LED lighting
- Small appliances LED lighting
- Car LED lights
- Industrial lighting

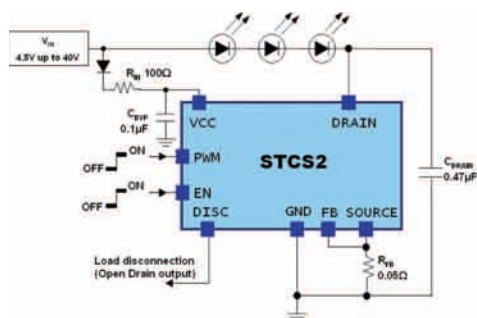


STCS2 demoboard

Product Specifications ▶

Part Number	Type	Dimming Type	Number of LEDs/String	Number of Strings	Configuration	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Peak Efficiency (%)	Diagnostic Capabilities*	Interface	Markets
STCS2	Linear	PWM	10 white LEDs	1	Series	4.5-40	Adaptive to 40V	2A	NA	LOD	NA	CL
MARKETS LEGEND						CL COMMERCIAL LIGHTING	FL FLASHLIGHTS	TR TRANSPORTATION	BL BACKLIGHTING	SI SIGNAGE		

*Diagnostic capabilities: LOD: LED open detection



Typical application diagram for 2.0A LED current