

Low-Voltage LED Drivers

The TPS61165 operates over a 3V to 18V input supply and delivers an output voltage up to 38V. It operates at a 1.2 Hz fixed switching frequency to reduce output ripple, improve conversion efficiency, and allow for the use of small external components. The LED current can be changed using one-wire digital or PWM signal. During dimming, the output ripple of TPS61165 at the output capacitor is small and does not generate audible noises associated with common on/off control dimming.

These low-voltage LED drivers are optimized for getting the most life out of battery-powered applications.

Features ▶

- Input voltage: 2.7V to 18V
- Output voltage up to 38V
- Switch current limit: 1.2A
- Switching at 1.2 MHz
- Flexible one-wire digital and PWM brightness control

Benefits ▶

- Wide input supply range for 12V or 16V industrial power rail
- Ultra-small package for high-brightness LED
- Brightness control with no audible noise

Applications ▶

- High-brightness LED lighting
- White LED backlighting up to 7-inch displays
- Matrix setup with up to 60 LEDs (e.g., 6 x 10)



TPS61165: 18 V_{IN} 38 V_{OUT}
2 mm x 2 mm boost driver

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
TPS75105	Linear	PWM	1	4	Parallel	2.7- 5.5	V _{IN} -27 mV	25	83	Over current/over temperature	PWM signal	BL
TPS60250	Boost	PWM	1	7	Parallel	2.7-6.5	6	125	85	Over current/OVM/over temperature	I ² C	FL TR BL
TPS61042		PWM	6	1	Series	2.7-6.0	24	35	85	Over temperature/OVM	PWM signal	FL TR BL
TPS61059		On/off	1	1	Series	2.7-5.5	6	1,500	80	Over temperature/OVM	PWM signal	FL TR BL
TPS61050/2		Digital	1	1	Series	2.5-5.5	V _{IN} -5.5	1,200	96	Over temperature	I ² C	FL TR BL
TPS61062		PWM	5	1	Series	2.7-6.0	24	55	81	Over temperature/OVM	PWM signal	FL TR BL
TPS61081		PWM	6	1	Series	2.7-6.0	27	350	87	Over temperature/OVM	PWM signal	FL TR BL
TPS61200		PWM	1	1	Series	0.3-5.5	V _{IN} -5.5	1,500	91	Over temperature/OVM	PWM signal	FL TR BL
TPS61140/1		On/off	6	2	2x series	3.0-6.0	28	35	85	Over temperature/OVM	PWM signal	FL TR BL
TPS61150/51		On/off, analog	6	2	2x series	3.0-6.0	2 x 27	35	83	Over temperature/OVM	PWM signal/resistor	FL TR BL
TPS61160/61		Digital, analog	6/10	1	Series	2.7-18	26/38	45	87	Over temperature/OVM	Easy scale/PWM	FL TR BL
TPS61165		Digital, analog	10	1	Series	3.0-18	38	350	87	Over temperature/OVM	Easy scale/PWM	FL TR BL
TPS63000		Buck-boost	PWM	1	1	Series	5.5-1.8	5.5-1.2	1,200	96	Load disconnect/over temperature	PWM signal

MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE

*Diagnostic capabilities: OVM: Output voltage monitoring



TLC59xxx Family of Linear LED Drivers

TLC59xxx devices offer up to 1 percent channel-to-channel and 3 percent chip-to-chip current regulation accuracy. The serial data input devices can run up to speeds of 30 MHz. The speed of the image display can be improved by these devices quick turn-on and turn-off time. Also, note the small amount of voltage headroom over the LEDs V_F to bias the internal linear element. The TLC59xxx family of linear LED drivers provides great flexibility to the designer of high quality signage applications such as video walls and billboards.



TLC5942 offers separate control lines for analog and digital dimming

Features ▶

- TLC59116–I²C interface with group dimming and blinking
- TLC5916/17–simple global dimming
- TLC5923–channel-to-channel dimming
- TLC5924–removes ghosting from multiplexed displays

Benefits ▶

- TLC5940–on-chip storage of analog dimming values
- TLC5941–lower cost TLC5940 without EEPROM
- TLC5942–greater control over PWM and analog dimming
- TLC5943–high-resolution PWM dimming
- TLC5945–best for high-speed video

Applications ▶

- Full-motion RGB video wall displays
- Gaming
- Electronic billboard advertisement
- Large panel LCD backlighting units
- Professional 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
TLC59116	Linear	PWM/analog	4	16	Series/parallel	3.3-5	17	100	NA	TSD/LOD	I ² C	CL TR BL SI
TLC5916		Analog	4	8	Series/parallel	3.3-5	17	120	NA	TSD/TEF/LOD	Serial	CL TR BL SI
TLC5917		Analog	4	8	Series/parallel	3.3-5	17	120	NA	TSD/TEF/LOD	Serial	CL TR BL SI
TLC5923		Analog	4	16	Series/parallel	3.0-5.5	17	80	NA	OVM/TSD/LOD	Serial	CL TR BL SI
TLC5924		Analog	4	16	Series/parallel	3.0-5.5	17	80	NA	OVM/TSD/LOD	Serial	CL TR BL SI
TLC5940		PWM/analog	4	16	Series/parallel	3.0-5.5	17	120	NA	TSD/LOD	Serial	CL TR BL SI
TLC5941		PWM/analog	4	16	Series/parallel	3.0-5.5	17	80	NA	TSD/LOD	Serial	CL TR BL SI
TLC5942		PWM/analog	4	16	Series/parallel	3.0-5.5	17	50	NA	TSD/LOD	Serial	CL TR BL SI
TLC5943		PWM/analog	4	16	Series/parallel	3.0-5.5	17	50	NA	TSD/LOD	Serial	CL TR BL SI
TLC5945		PWM/analog	4	16	Series/parallel	3.0-5.5	17	80	NA	TSD/LOD	Serial	CL TR BL SI

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*Diagnostic capabilities: TSD: Thermal shutdown, TEF: Thermal error flag, OVM: Output voltage monitoring, LOD: LED open detection



ZigBee® Wireless Lighting Control

ZigBee® is a standard for low-power wireless mesh networks intended for monitoring and control. This makes ZigBee an ideal solution for lighting systems and enables users to fully control all lights and reduce energy costs. The ZigBee technology can be used in a number of application areas including home lighting, commercial lighting, industrial lighting, and street lighting.

Features ▶

- Low-power wireless mesh network
- Open global standard
- Based on well-known IEEE 802.15.4 specification

Benefits ▶

Low-Power Wireless Mesh Network

- Reliable and robust self-healing wireless network
- Ideal for battery-operated devices
- Easily extendable

Open Global Standard

- Multiple vendors with certified ZigBee stacks available
- Standardized installation
- Suitable both for private networks and networks that require interoperability

Based on IEEE 802.15.4 Specification

- Excellent co-existence with Bluetooth® and Wi-Fi™
- Very small footprint for radios and system-on-chips
- A standardized radio ensures low-cost solutions

Applications ▶

- Intelligent toys
- Home and building automation
- Industrial monitoring and control
- Sensor networks
- Consumer electronics
- General lighting control
- Meter reading

Product Specifications ▶

Part Number	Type	Input Voltage (V)	Over Air Data Rate (kbps)	Data Throughput (kbps)	Frequency (Hz)	Power Consumption	Range (Meters)	System Resources (KB)	Markets
CC2420	Transceiver	2.1-3.6	250	40-150	2.4	Very low	10-100	NA	CL
CC2520		1.8-3.8	250	40-150	2.4	Very low	10-400	NA	CL
CC2430	System-on-chip	2.0-3.6	250	40-150	2.4	Very low	10-100	70+	CL

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Software ▶

In addition to hardware, TI offers a fully ZigBee 2007 compliant ZigBee protocol stack, the Z-Stack. For customers that do not require the full ZigBee stack but would still like to use a standard, TI offers a fully-compliant IEEE 802.15.4 MAC. They are both available as free downloads from the web

- Z-stack version 1.4.3
- Z-stack ZigBee protocol stack

