

## Linear and Switchmode LED Drivers

The TPS40211 is a wide-input voltage (4.5V to 52V), non-synchronous boost LED driver. It is suitable for boost, flyback, and SEPIC topologies. Current mode control provides improved transient response and simplified loop compensation. It is capable of driving 3A constant current for HB-LEDs.



### Features ▶

- Input voltage: 4.5V to 52V
- Flexible output voltage
- 260 mV Isense voltage
- Switching upto 500 kHz
- 8V LDO for external  $\mu$ C

### Benefits ▶

- Select appropriate topology based on system needs
- Select external components to fit application
- Drive long series of HB-LEDs from low input voltage

### Applications ▶

- Automotive headlamp
- Industrial portable lighting
- Channel lighting
- Architectural lighting



TPS40211 wide-input voltage boost controller

### 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
TPS40211	Boost/flyback/SEPIC	PWM	>20	4	Series	4.5-52	8->150	<3,000	90	Overcurrent, overtemp	PWM signal	FL TR
TPS75105	Linear	PWM	1	4	Parallel	2.7-5.5	$V_{in}-27$ mV	25	83	Overcurrent, overtemp	PWM signal	BL
TPS60250	Boost	PWM	1	7	Parallel	2.7-6.5	6	125	85	Overcurrent, overvoltage, overtemp	I <sup>2</sup> C	FL TR BL
TPS61042		PWM	7	1	Series	1.8-6.0	36	500	85	Overtemp, overvoltage	PWM signal	FL TR BL
TPS61050		Digital	1	1	-	2.5-6.0	$V_{in}-5.5V$	1,200	96	TSD/LOD	I <sup>2</sup> C	FL
TPS61062		PWM	6	1	Series	2.7-6.0	30	400	81	Overtemp, overvoltage	PWM signal	FL TR BL
TPS61081		PWM	6	1	Series	2.7-6.0	27	1,300	87	Overtemp, overvoltage	PWM signal	FL TR BL
TPS61087		PWM	4	1	Series	2.5-6.0	$V_{in}+0.5V-18.5V$	3,200	>90	TSD	PWM signal	CL FL
TPS61200		PWM	1	1	Series	0.3-5.5	5.5	1,500	91	Overtemp, overvoltage	PWM signal	FL TR BL
TPS61500		PWM, analog	10	1	Series	2.9-18	$V_{in}-38V$	3,000	93	Overvoltage	PWM signal	BL
TPS61140		On/off	6	2	2x series	3.0-6.0	24	700	85	Overtemp, overvoltage	PWM signal	FL TR BL
TPS61150/51		On/off, analog	8	2	2x series	3.0-6.0	2x36	700	85	Overtemp, overvoltage	PWM signal/resistor	FL TR BL
TPS61160/61		Digital, analog	6	1	Series	2.7-18	26	700	87	Overtemp, overvoltage	Easy scale/PWM signal	FL TR BL
TPS61165		Digital, analog	7	1	Series	2.7-18	38	1,200	87	Overtemp, overvoltage	Easy scale/PWM signal	FL TR BL
TPS61180/81/82		Digital, analog	10	6	Parallel	5.0-24	40	1,500	90	Overcurrent, overvoltage, overtemp	Easy scale/PWM signal	FL TR BL
TPS63000		Buck-boost	PWM	1	1	Series	5.5-1.8	5.5-1.2	1,800	96	Load disconnect, overtemp	PWM signal
TPS63030	-		1	1	-	1.8-5.0	1.2-5.5	800	96	TSD	PWM signal	FL

#### MARKETS LEGEND

CL COMMERCIAL LIGHTING FL FLASHLIGHTS TR TRANSPORTATION BL BACKLIGHTING SI SIGNAGE

\*Diagnostic capabilities: TSD: Thermal shutdown, LOD: LED open detection



This Arrow sponsored Texas Instruments Analog eLab™ Videocast series partners with Cree, a leader in high-brightness and lighting-class LEDs, and focuses on solid-state lighting along with specific applications like solar powered lighting, cove lighting, and MR16 lamp replacement. Visit [www.arrow.com/TIeLabsCree](http://www.arrow.com/TIeLabsCree) for the latest video; there will be a new videocast launched each week.



## 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.



TLC5942 offers separate control lines for analog and digital dimming

### Features ▶

- TLC59116–I<sup>2</sup>C 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 TLC5941
- 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	–	TSD/LOD	I <sup>2</sup> C	CL TR BL SI
TLC5916		Analog	4	8	Series/parallel	3.3-5	17	120	–	TSD/TEF/LOD	Serial	CL TR BL SI
TLC5917		Analog	4	8	Series/parallel	3.3-5	17	120	–	TSD/TEF/LOD	Serial	CL TR BL SI
TLC5923		Analog	4	16	Series/parallel	3.0-5.5	17	80	–	OVM/TSD/LOD	Serial	CL TR BL SI
TLC5924		Analog	4	16	Series/parallel	3.0-5.5	17	80	–	OVM/TSD/LOD	Serial	CL TR BL SI
TLC5940		PWM/analog	4	16	Series/parallel	3.0-5.5	17	120	–	TSD/LOD	Serial	CL TR BL SI
TLC5941		PWM/analog	4	16	Series/parallel	3.0-5.5	17	80	–	TSD/LOD	Serial	CL TR BL SI
TLC5942		PWM/analog	4	16	Series/parallel	3.0-5.5	17	50	–	TSD/LOD	Serial	CL TR BL SI
TLC5943		PWM/analog	4	16	Series/parallel	3.0-5.5	17	50	–	TSD/LOD	Serial	CL TR BL SI
TLC5945		PWM/analog	4	16	Series/parallel	3.0-5.5	17	80	–	TSD/LOD	Serial	CL TR BL SI
TLC5946	PWM/analog	4	16	Series/parallel	3.0-5.5	17	40	–	TSD/LOD	Serial	CL TR BL SI	

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## 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
- Over air download

### 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
- Over air download: firmware can be upgraded in the field

### Applications ▶

- General lighting control
- Home and building automation
- Industrial monitoring and control
- Sensor networks
- 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
CC2520	Transceiver	1.8-3.6	250	40-150	2,394 MHz-2,507 MHz	RX: 18.5 mA/sleep: <1 uA	10-400	2x 128 byte RX/TX FIFOs	CL
CC2430	System-on-chip	2.0-3.6	250	40-150	2,400 MHz-2,483 MHz	RX: 27 mA/sleep: <1 uA	10-100	4+4 kB SRAM/128 kB Flash	CL
CC2480	Network processor	2.0-3.6	250	40-150	2,400 MHz-2,483 MHz	RX: 27 mA, sleep: <1 uA	10-100	-	CL

#### MARKETS LEGEND

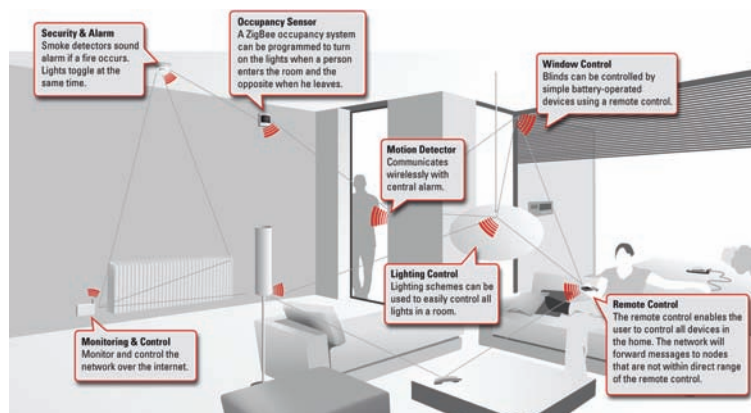
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### Software ▶

In addition to hardware, TI offers a ZigBee® and ZigBee Pro compliant ZigBee protocol stack, the Z-Stack. We offer the full ZigBee stack free of charge: Z-Stack version 2.1.0, including Home Automation Profile

### Development Tools

Part Number	Development Tool
CC2520	CC2520DK
CC2430	CC2430ZDK
CC2480	eZ430-RF2480



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## TMS320C2000™ High-Performance 32-bit Microcontrollers

C2000 MCUs can control not only the power stage, but regulate LED currents as well, eliminating the need for multiple controllers and reducing system cost. On-chip control peripherals allow accurate voltage and current regulation for precise light intensity and color mixing, temperature monitoring to prevent thermal runaway, intelligent/adaptive dimming, and fault detection (over voltage/current, blown string). C2000 also enables communication with external systems via power-line communication (PLC) or wireless technology, and interfaces with other devices via on-chip serial communication peripherals.



### Features ▶

- 40 MHz to 150 MHz C28x core
- 32 KB to 512 KB Flash, 12 KB to 68 KB RAM
- Up to 16 hi-res PWM channels with 150 ps resolution
- 12-bit ADC with up to 16 ADC channels and 12.5 MSPS
- SPI, SCI, CAN, I<sup>2</sup>C, McBSP, and XINT

### Benefits ▶

- Single controller simplifies design and reduces cost
- Precise LED lighting control
- Increased flexibility and additional functionality through software
- Communication with external systems and devices

### Applications ▶

- LED street lighting
- LED backlighting
- LED displays
- Automobile lights

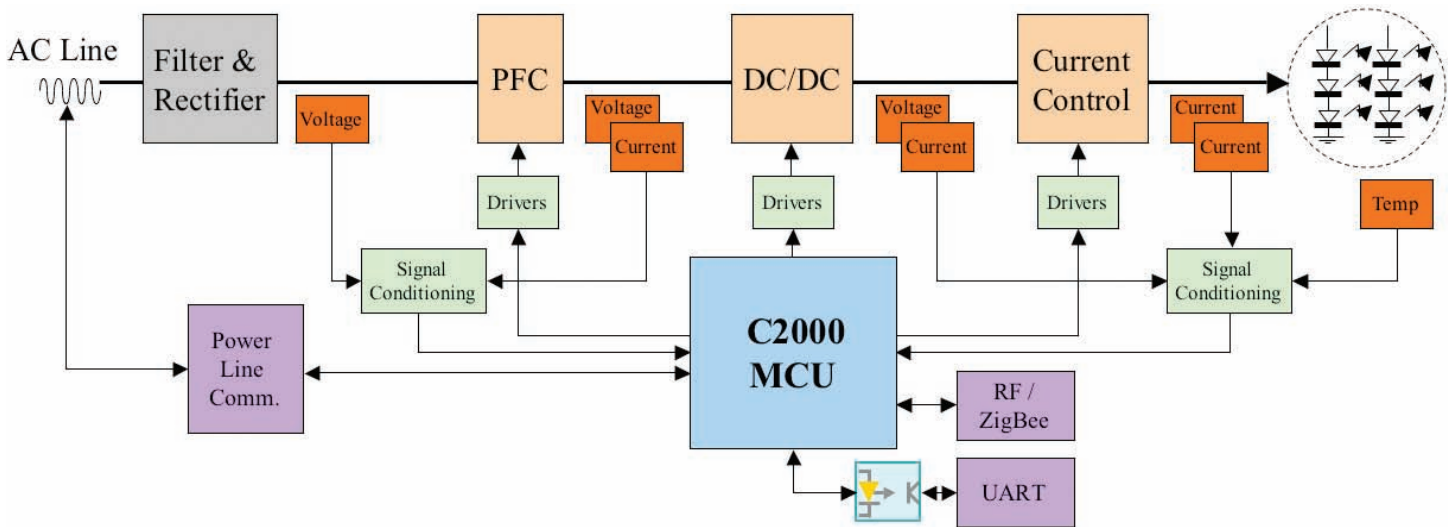
### Product Specifications ▶

Part Number	Type	PWM Ch. (#)/Res. (bits)	Flash (KB)	RAM (KB)	ZigBee® Enabled (Y/N)	Core Supply (V)	IO Supply (V)	I <sup>2</sup> C/Ch. (#)	UART/Ch. (#)	SPI/Ch. (#)	Operating Temperature (°C)	Markets
TMS320F28023	38 TSSOP/48 LQFP	8/15	64	12	N	1.8	3.3	1	1	1	-40 to +125	CL TR BL SI
TMS320F28027		8/15	64	12	N	1.8	3.3	1	1	1	-40 to +125	CL TR BL SI
TMS320F28035	64 TQFP/80 LQFP	14/15	128	20	N	1.8	3.3	1	2	2	-40 to +125	CL TR BL SI
TMS320F2808	100 LQFP/100 BGA	16/15	128	36	N	1.8	3.3	1	4	3	-40 to +125	CL TR BL SI

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### C2000 LED Lighting SBD



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## Integrated Temperature Sensors, Switches, and Fan Controllers

Texas Instruments offers high-accuracy, low-power temperature sensors specified for operation from -40 degrees Celsius to +125 degrees Celsius. Designed for cost-effective thermal management solutions, TI temperature sensors like the TMP102 feature precision for digital temperature sensors which offer +0.5 degrees Celsius (typical) true to 12-bit accuracy, and 1.4V operation in micro-packaging. The TMP300 analog temperature switch offers flexibility for PWM applications designed for reduced power dissipation. As lighting solutions increase demand for tighter thermal management and reduced power dissipation, TI temperature sensors bring performance, low power, and micro-packaging to innovative next-generation designs.

### Features ▶

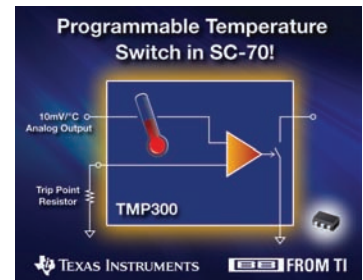
- Highest level of digital temperature sensor accuracy and wide range of package options
- Flexible programmability including over- and under-temperature thresholds, alarm functions, and measurement resolution
- Broad portfolio of digital temperature sensors, remote temperature sensors, temperature switches, and fan controllers

### Benefits ▶

- Maximize power dissipation control in thermal management designs
- Increase system reliability and longevity
- Simplify design process and reduce time to market

### Applications ▶

- Entertainment lighting
- Architectural lighting
- Signage
- LCD displays



TMP300 analog temperature switch

### Product Specifications ▶

Part Number	Type	Description	Accuracy Over Temp. Range (°C)	Specified Temp. Range (°C)	Operating Temp. Range (°C)	Resolution (bits)	Supply Voltage (V)	Supply Current (µA)	Smallest Package	Markets
TMP100	Digital I <sup>2</sup> C/SM bus	Digital temperature sensor	2 3	-25 to +85 -55 to +125	-55 to +125	9-12	2.7-5.5	45	SOT23-6	CL
TMP102		Ultra-low power digital temperature sensor in micro-surface-mount package	2 3	-25 to +85 -55 to +125	-55 to +150	12	1.4-3.6	7	SOT563-6	BL SI
TMP275		Ultra-high accuracy digital temperature sensor	0.5 1	+10 to +85 -40 to +125	-55 to +127	9-12	2.7-5.5	50	MSOP-8	SI
TMP75		Industry standard sensor w/2-wire interface	2.0 3.0	-25 to +85 -40 to +125	-55 to +127	9-12	2.7-5.5	50	MSOP-8	CL
TMP123	Digital SPI interface	Digital temperature sensor w/SPI interface	1.5 2	-25 to +85 -55 to +125	-55 to +150	12	2.7-5.5	35	SOT23-6	CL
TMP300	Analog switch	Comparator-output temperature switch w/additional analog output	±2	-40 to +125	-40 to +150	Output: 10 mV/°C	1.8-18	110	SC70-6	CL
AMC6821	Fan controller	±1°C remote and local temperature sensors w/integrated fan controllers	±1	-40 to +125	-40 to +150	Output: programmable PWM	2.7-5.5	2 mA	SOP-16	CL SI

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