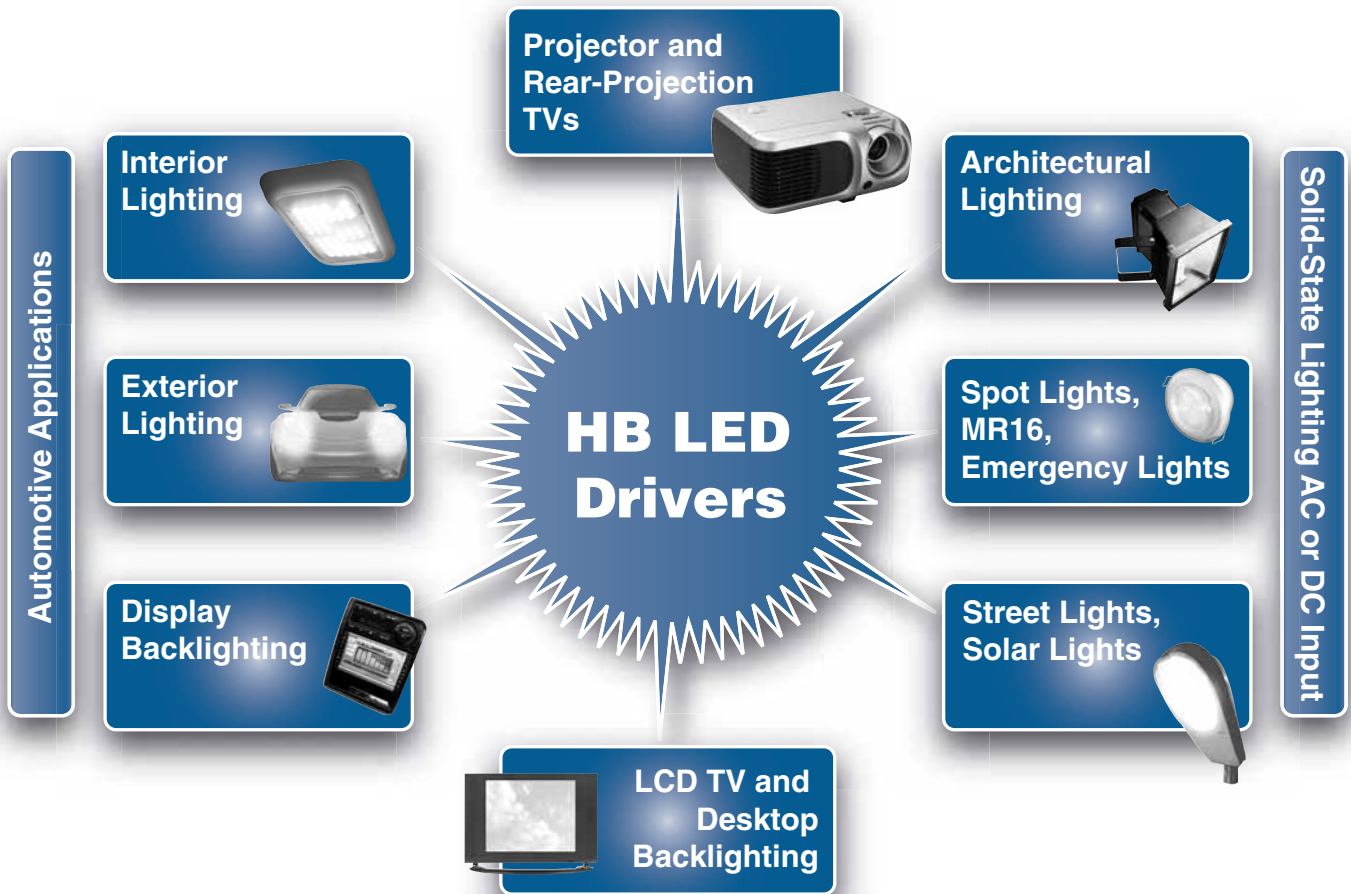


High-Brightness LED Drivers



Maxim's high-brightness LED (HB LED) drivers are dedicated integrated circuits for white or RGB LEDs. They are energy-saving, cost-effective choices that enable the next generation of LCD backlighting, projection, automotive, and general lighting applications. Maxim's continually expanding HB LED portfolio includes 29 products covering the full range of linear and switch-mode topologies (buck, boost, SEPIC, and other topologies).



MAXIM
www.maxim-ic.com/LED

SWITCH-MODE/LINEAR HB LED DRIVERS FOR THE WIDEST RANGE OF LIGHTING APPLICATIONS

Flexible and Robust with Wide Input-Voltage and Output-Power Ranges

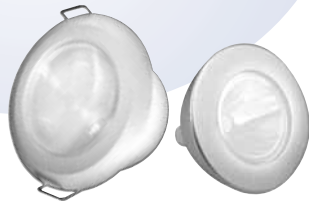
SPOTLIGHT, MR16

MAX16820/MAX16822/MAX16832

- ◆ **Simple:** 6-Pin TDFN; No Compensation Required
- ◆ **Compact:** 2MHz Switching; Miniature Inductor
- ◆ **High Power:** Up to 36W
- ◆ **Wide Input Range:** 4.5V to 65V
- ◆ **Flexible:** PWM or Linear Dimming

MAX16834

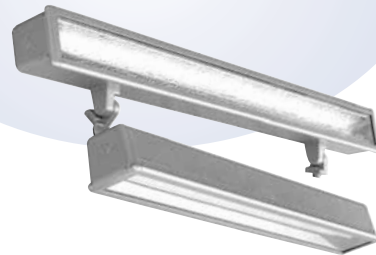
- ◆ **For MR16**



ARCHITECTURAL LIGHTING

MAX16824/MAX16825

- ◆ **Flexible:** Three Independent Channels; PWM or SPI™ I/F for RGB Dimming; SPI I/F Allows Daisy-Chain Modules
- ◆ **Robust:** Short-Circuit Protection; Thermal Shutdown
- ◆ **Saves Cost:** 36V Output; More LEDs per String



STREET AND EMERGENCY LIGHTING

MAX15000/MAX16801/MAX16832

- ◆ **Flexible:** Universal AC or 48VDC Input; PWM Dimming
- ◆ **High Power:** Supplies Up to 75W
- ◆ **Robust:** Thermal Shutdown



EV KITS
AVAILABLE

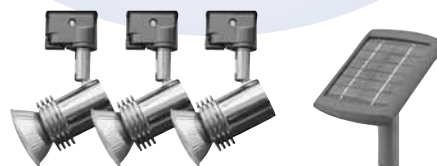
SOLAR-POWERED LIGHTING

MAX16821

- ◆ **Flexible:** Synchronous Buck or Boost
- ◆ **High Power:** Up to 150W
- ◆ **High Efficiency:** > 94%
- ◆ **Robust:** Thermal Shutdown, OVP

MAX16834

- ◆ **For Buck-Boost**



SPI is a trademark of Motorola, Inc.

ROBUST HB LED DRIVERS FOR ALL AUTOMOTIVE LIGHTING APPLICATIONS

Superior Efficiency, Flexibility, and Ease of Use

INDUSTRY'S HIGHEST EFFICIENCY

Front Lights, DRL

MAX16821/MAX16834

- ◆ Up to 75W; > 94% Efficient; Buck, Boost, or Buck-Boost; Thermal Shutdown and Overvoltage Protection

MAX16812/MAX16832

- ◆ 5.5V to 76V Operation; Compact; PWM/Linear Dimming; Thermal Shutdown

MAX16816/MAX16831

- ◆ High-Power Buck, Boost, or Buck-Boost; Programmable LED Current Simplifies Design

ROBUST DRIVERS WITHSTAND LOAD DUMP AND COLD CRANK, +125°C TEMPS, LED SHORT CONDITIONS

SIMPLE TO USE

Interior Lights

MAX16836

- ◆ Compact; Up to 350mA; Low EMI

MAX16804

- ◆ PWM/Theater Dimming; No Microcontroller Required; Low EMI

MAX16805/MAX16806

- ◆ Programmable for LED Binning, Eases Manufacturing

EV KITS AVAILABLE



WIDEST DIMMING RANGE

Display Backlighting

MAX16807-MAX16810

- ◆ Drive 8 to 16 Channels; Boost or SEPIC Modes; 5000:1 Dimming Range

MAX16826

- ◆ I²C-Programmable LED Current Simplifies Designs; Shorted-LED Detection; Boost-Voltage Optimization

FLEXIBLE

Tail Lamps, CHMSL, Sidelights

MAX16823

- ◆ Three Channels; Independent Dimming; Shorted-LED and Open-LED Detection

MAX16824

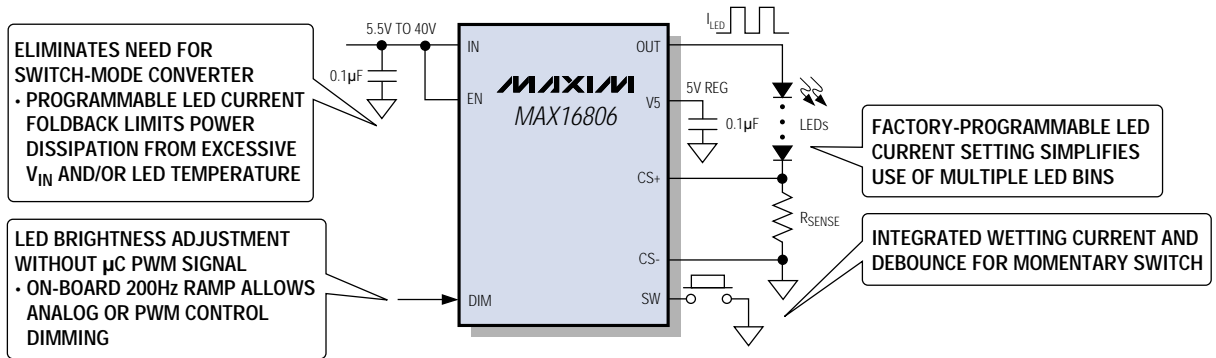
- ◆ Three Channels; Independent Dimming; 150mA/Channel

MAX16815/MAX16828/MAX16836

- ◆ Compact; 100/200/350mA Output; Single Resistor Adjusts Current

FIRST HIGH-CURRENT LINEAR LED DRIVER ELIMINATES THE NEED FOR μ C AND SWITCH-MODE CONVERTER

Ideal for Automotive Lighting Applications; Reduces Cost and EMI



EV KIT AVAILABLE



Small, Thermally Enhanced Package



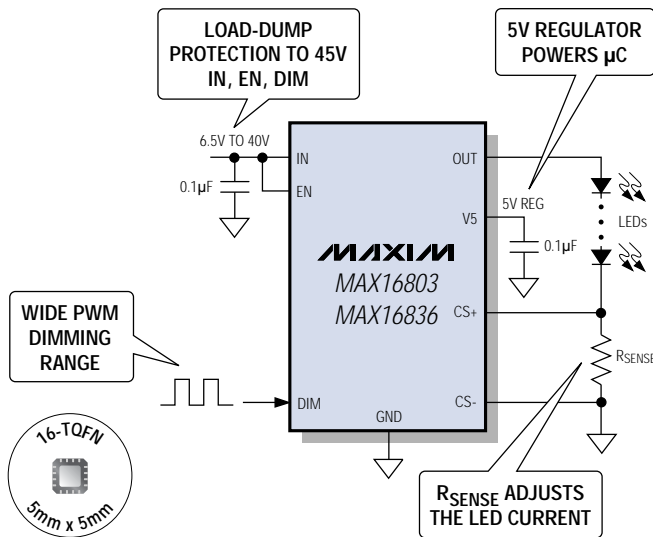
350mA LED Driver Family

Part	EN Pin	$\pm 3.5\%$ LED-Current Accuracy	Load-Dump Protected (45V)	5V Output	DIM Input	DIM with DC Signal	V_{IN} Programmable LED-Current Foldback	Programmable LED-Current Reference	Programmable Thermal Foldback	Momentary-Switch Interface
MAX16800	✓	✓	✓	✓						
MAX16803	✓	✓	✓	✓	✓					
MAX16804	✓	✓	✓	✓	✓	✓				
MAX16805	✓	✓	✓	✓	✓	✓	✓	✓		
MAX16806	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MAX16835	✓	✓	✓	✓						
MAX16836	✓	✓	✓	✓	✓					

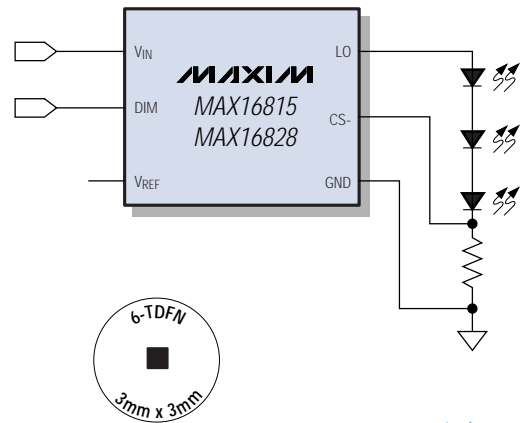
www.maxim-ic.com/MAX16806info

SMALL, HB LED DRIVERS SIMPLIFY LIGHTING DESIGN

350mA DRIVERS



100mA (MAX16815) AND 200mA (MAX16828) DRIVERS



EV KITS
AVAILABLE

Features

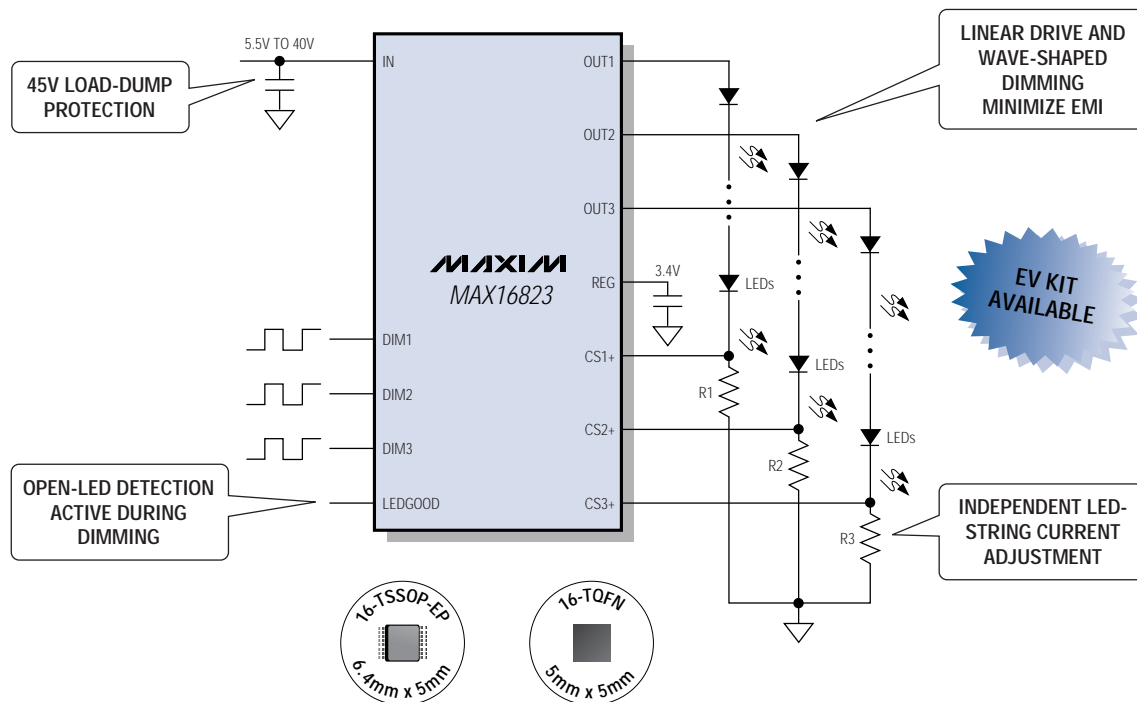
- ◆ Up to 1A LED Current with External Transistor
- ◆ $\pm 3.5\%$ LED Current Accuracy
- ◆ Wave-Shaped Edge Control Minimizes EMI During PWM Dimming
- ◆ Low 200mV Current-Sense Reference Minimizes Power Dissipation
- ◆ Works Down to +5V for Automotive Cold Cranking
- ◆ Short-Circuit Protection
- ◆ Thermal Shutdown
- ◆ Operates from -40°C to $+125^{\circ}\text{C}$

Applications

- ◆ Automotive Interior Lighting
 - ◆ Dome Lights, Map Lights
 - ◆ Radio/Stereo Backlighting
 - ◆ Dashboard Displays
 - ◆ Navigation System Backlighting
- ◆ Automotive Exterior Lighting
 - ◆ Rear Combination Lights (RCLs)
 - ◆ Tail Light/Side Marker Assemblies
- ◆ Display Backlighting
- ◆ Signage and Indicators
- ◆ Ambient and Architectural Lighting

HIGHEST INTEGRATION LED DRIVER IDEAL FOR AUTOMOTIVE APPLICATIONS

High-Voltage, 3-Channel Linear Driver with Open-LED Detection



Flexible

- ◆ Adjustable Constant LED Current (Up to 70mA, 2A with External BJT)
- ◆ $\pm 5\%$ LED Current Accuracy
- ◆ Low Dropout Voltage (0.7V, max)
- ◆ +3.4V Regulator with 4mA Capability

Robust

- ◆ Undervoltage Lockout
- ◆ Short-Circuit Protection
- ◆ Thermal Shutdown
- ◆ Operates from -40°C to $+125^{\circ}\text{C}$

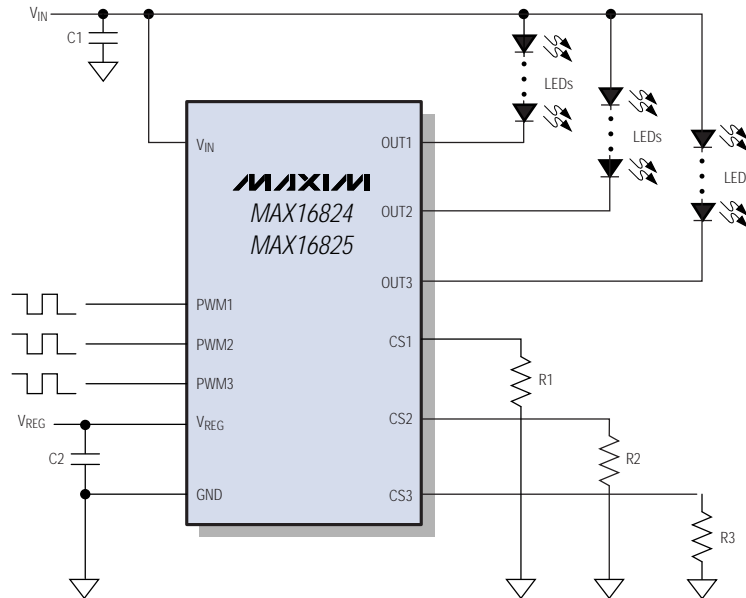
Applications

- ◆ Automotive Lighting (RCL, CHMSL, RGB Ambient)
- ◆ Warning Lights
- ◆ LCD Panel Backlighting

www.maxim-ic.com/MAX16823info

3-CHANNEL HB LED DRIVERS HAVE INDEPENDENT DIMMING

Drive 150mA LED Current with Choice of PWM Dimming or SPI Interface



Features

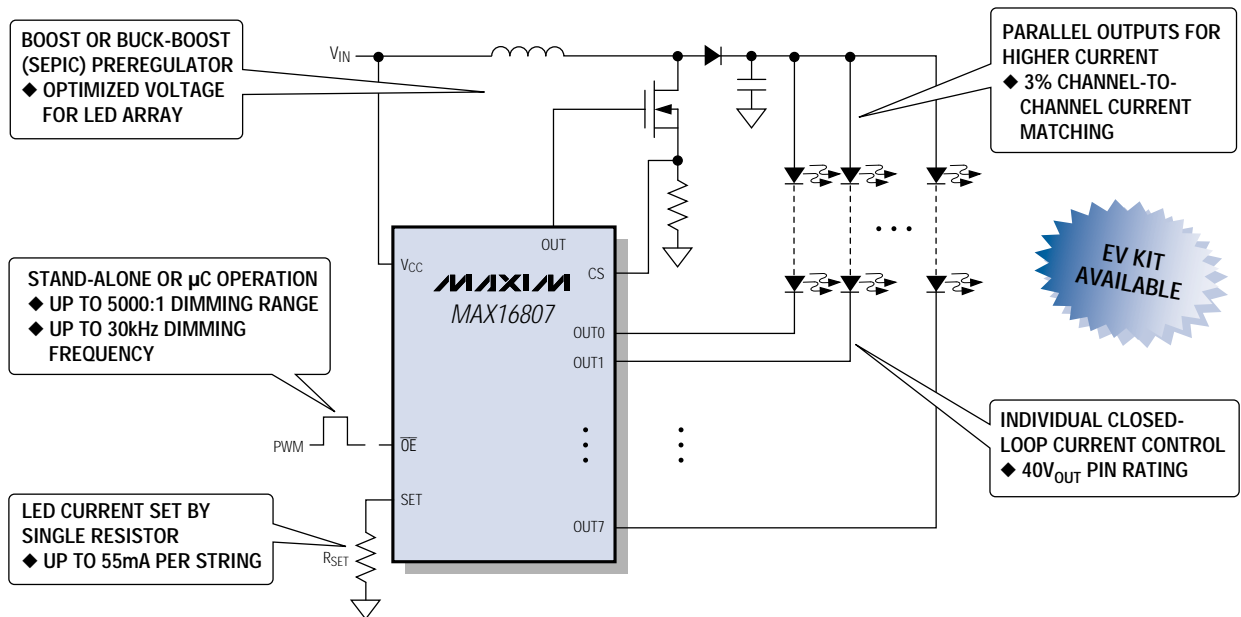
- ◆ Up to 36V Output Voltage Range
- ◆ Three Output Channels with Independently Adjustable LED Current (150mA Each)
- ◆ $\pm 5\%$ LED Current Accuracy
- ◆ Three Dedicated Dimming-Control Pins (MAX16824) or 4-Wire Interface (MAX16825)
- ◆ Auxiliary 5V, 4mA Voltage Regulator
- ◆ Short-Circuit Protection for Each Output
- ◆ Accurate, 200mV Current-Sense Reference Reduces Power Losses
- ◆ Thermal Shutdown
- ◆ Drivers Can Be Cascaded (MAX16825)

Applications

- ◆ Small LCD Displays
- ◆ LED Message Displays
- ◆ Industrial, Architectural and Decorative Lighting
- ◆ Mood Lighting
- ◆ Signage
- ◆ RGB LED Lighting

HIGHEST INTEGRATION LED DRIVERS FOR WHITE- AND RGB-LCD BACKLIGHTING

High-Efficiency PWM Controller with 8 or 16 Constant-Current Channels

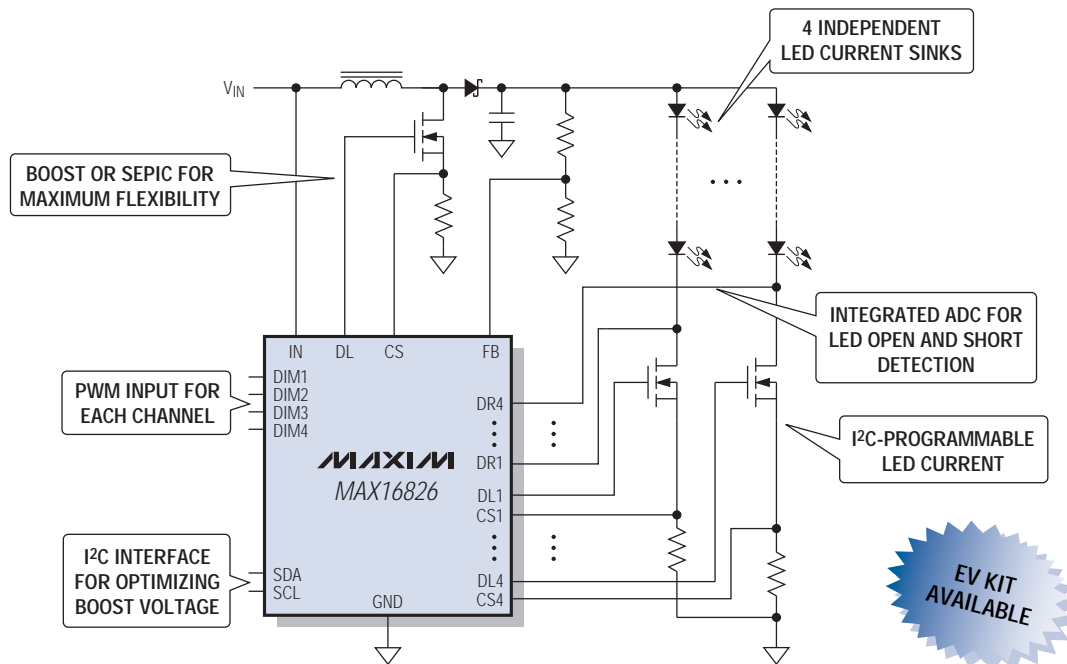


Part	Open-LED Detection	No. of Channels	Package (mm x mm)
MAX16807		8	28-TSSOP-EP (6.4 x 9.7)
MAX16808	✓	8	28-TSSOP-EP (6.4 x 9.7)
MAX16809		16	38-TQFN (5 x 7)
MAX16810	✓	16	38-TQFN (5 x 7)

www.maxim-ic.com/LED-LCD

PROGRAMMABLE HB LED DRIVER OPTIMIZES EFFICIENCY AND ELIMINATES LED BINNING

Ideal for White- and RGB-LCD Backlighting



Flexibility

- ◆ Wide 4.75V to 24V Input Range
- ◆ Large Number of LEDs per String
- ◆ Programmable LED Current Eliminates LED Bins for Brightness Variation

Efficiency

- ◆ Adjusts LED String Voltage to Maximize Efficiency
- ◆ Very Low, < 20µA Standby Current

Robustness

- ◆ Withstands 40V Load Dump
- ◆ External MOSFETs for Better Thermal Management

Precise Color and Dimming Control

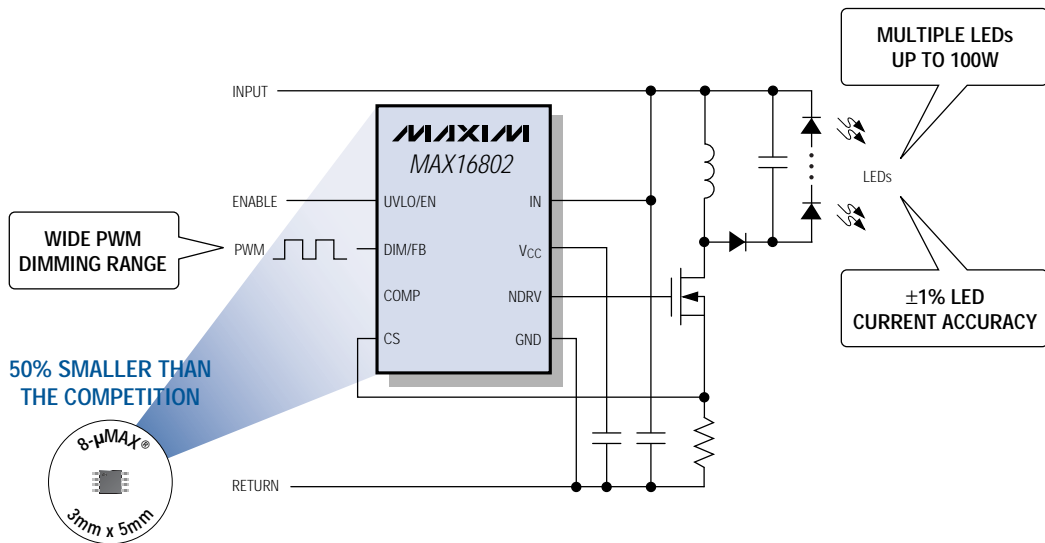
- ◆ Drive All White/Mono, RGB, or RGB + Amber Configurations
- ◆ Individual PWM Inputs
- ◆ > 1000:1 PWM Dimming Range
- ◆ Individual LED Current Adjustment Through I2C Interface

Applications

- ◆ Automotive Displays
- ◆ Industrial Displays
- ◆ Desktop Displays
- ◆ LCD TVs

SMALLEST UNIVERSAL HIGH-BRIGHTNESS LED DRIVERS COVER WIDE INPUT-VOLTAGE RANGE

PWM Dimming and High-Accuracy Current Regulation



SIMPLE AND FLEXIBLE FOR A WIDE RANGE OF APPLICATIONS



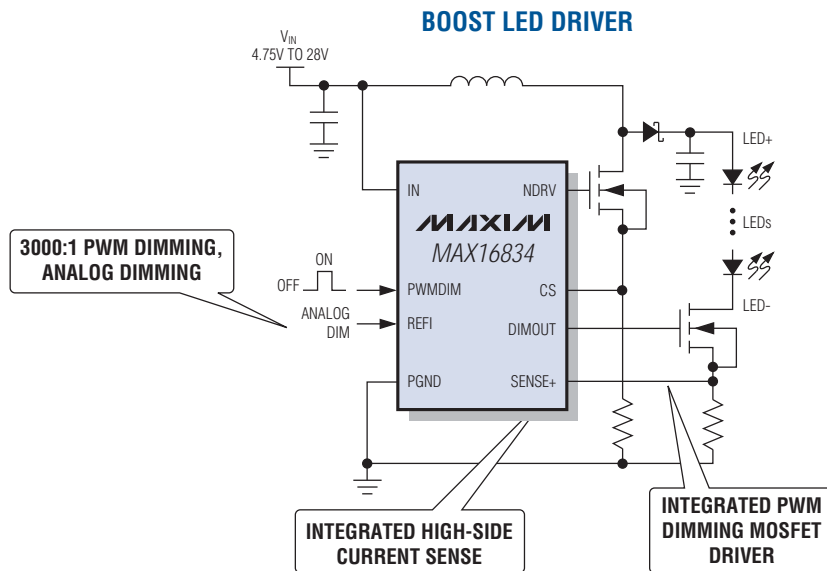
- ◆ Offline Industrial Lighting
- ◆ Street Lighting

Part	Intended Usage	Supply Voltage
MAX15000	Offline applications	85VAC to 265VAC rectified
MAX16801	Offline applications	85VAC to 265VAC rectified
MAX16802	DC applications	Up to 40VDC

µMAX is a registered trademark of Maxim Integrated Products, Inc.

FLEXIBLE HB LED DRIVER SUPPORTS MULTIPLE APPLICATIONS

Configurable for Boost, Buck-Boost, SEPIC, and High-Side Buck Topologies



Features

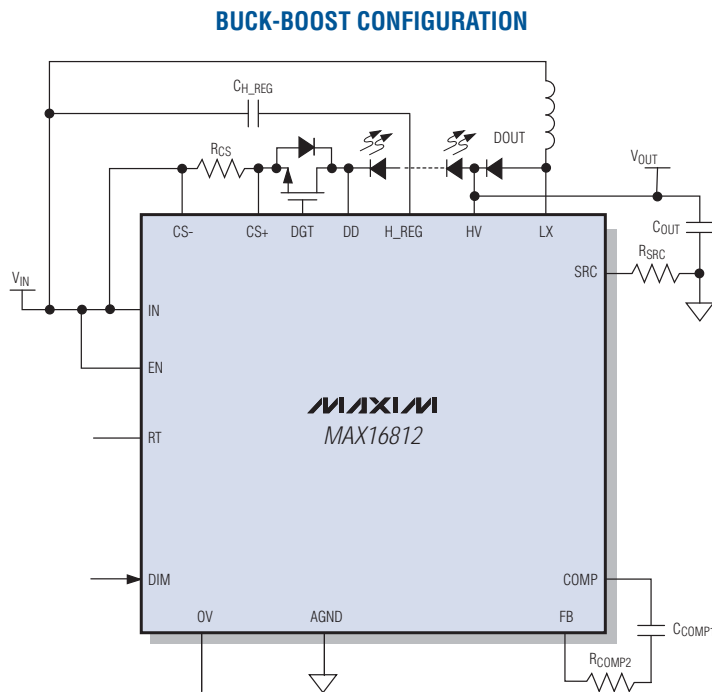
- ◆ Wide Input Operating Voltage Range (4.75V to 28V)
- ◆ 100kHz to 1MHz Programmable High-Frequency Operation
- ◆ External Clock Synchronization Input
- ◆ Programmable UVLO
- ◆ Internal 7V Low-Dropout Regulator
- ◆ Fault Output (Active-Low FLT) for Overvoltage, Overcurrent, and Thermal Warning Faults
- ◆ Programmable True Differential Overvoltage Protection
- ◆ Operates from -40°C to +125°C
- ◆ 20-Pin TQFN-EP Package

Applications

- ◆ Architectural and Decorative Lighting (MR16, MR111)
- ◆ Automotive Rear and Front Lighting
- ◆ DC-DC Boost/Buck-Boost Converters
- ◆ Projection System RGB LED Light Sources
- ◆ Single-String LED LCD Backlighting
- ◆ Spot and Ambient Lights

FLEXIBLE, 76V HB LED DRIVER WITH LINEAR OR PWM DIMMING CONTROL

Integrated Dimming MOSFET Driver Simplifies Design
and Reduces Component Count



Features

- ◆ Integrated 76V, 0.2Ω Power MOSFET
- ◆ 6.5V to 76V Operating Range
- ◆ Buck, Boost, Buck-Boost (Flyback), CUK, and SEPIC Configurations
- ◆ PWM LED Dimming with
 - ◆ PWM Control Signal
 - ◆ Analog Control Signal
 - ◆ Chopped V_{IN} Input

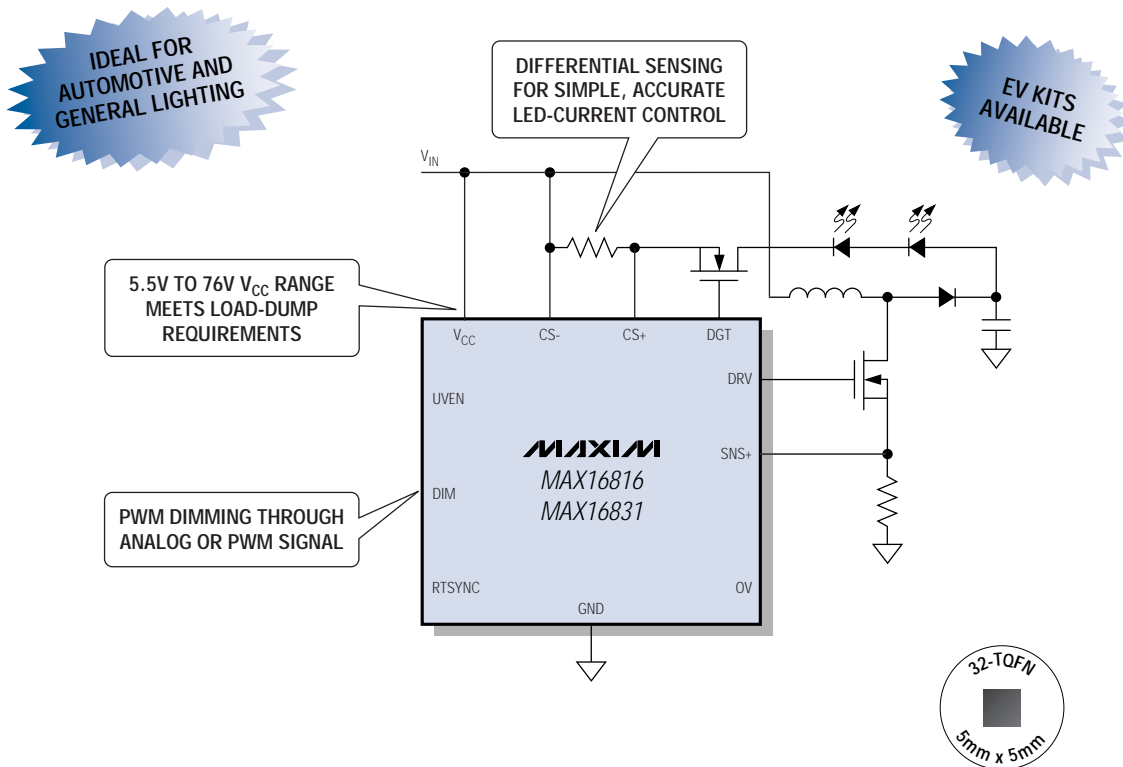
Applications

- ◆ Automotive Exterior Lighting
 - ◆ Tail/Stop/Turn Light Assemblies
 - ◆ Fog and DRL Lights



HIGH-VOLTAGE, HIGH-POWER LED DRIVER SIMPLIFIES DIMMING

Integrated High-Side, n-Channel FET Driver Provides Wide Dimming Range Ideal for Automotive and General Lighting



Features

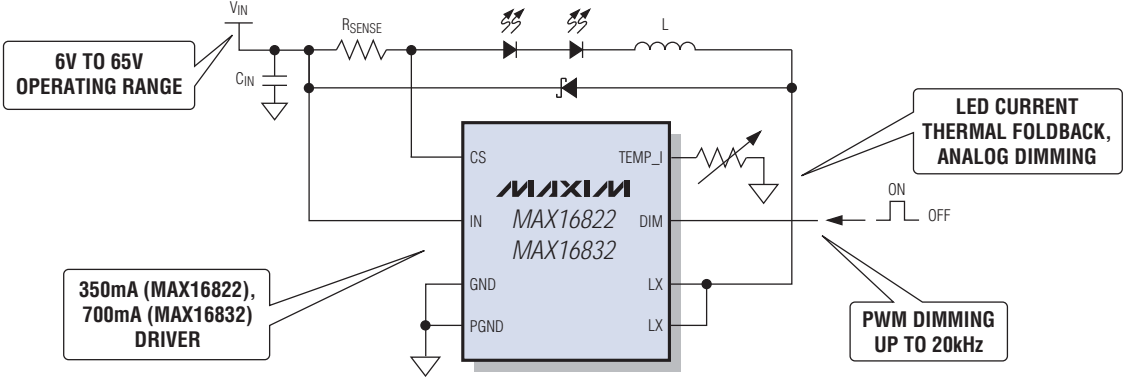
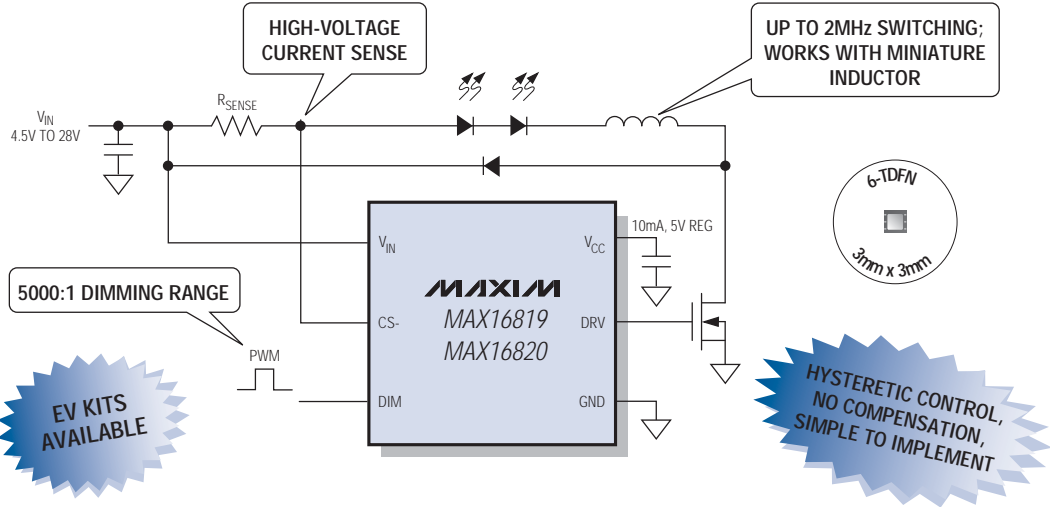
- ◆ 100mV High-Side, Differential LED Current Sense for High Efficiency
- ◆ 200mV Peak Current-Mode-Control Reference
- ◆ Boost, Buck-Boost, Buck, or SEPIC Topologies
- ◆ Programmable LED Current, Soft-Start, and Dimming Edge Control (MAX16816)

Applications

- ◆ Automotive Lighting (High-Beam/Low-Beam/Turn Lights, RCL, DRL, Fog Lights)
- ◆ Industrial and Architectural Lighting
- ◆ Warning and Emergency Lights



HIGH-VOLTAGE, HIGH-EFFICIENCY, HIGH-BRIGHTNESS LED DRIVERS SAVE SPACE AND COST



Features

- ◆ Up to ±5% LED Current Accuracy
- ◆ Supply up to 35W
- ◆ Thermal Shutdown
- ◆ Operates from -40°C to +125°C

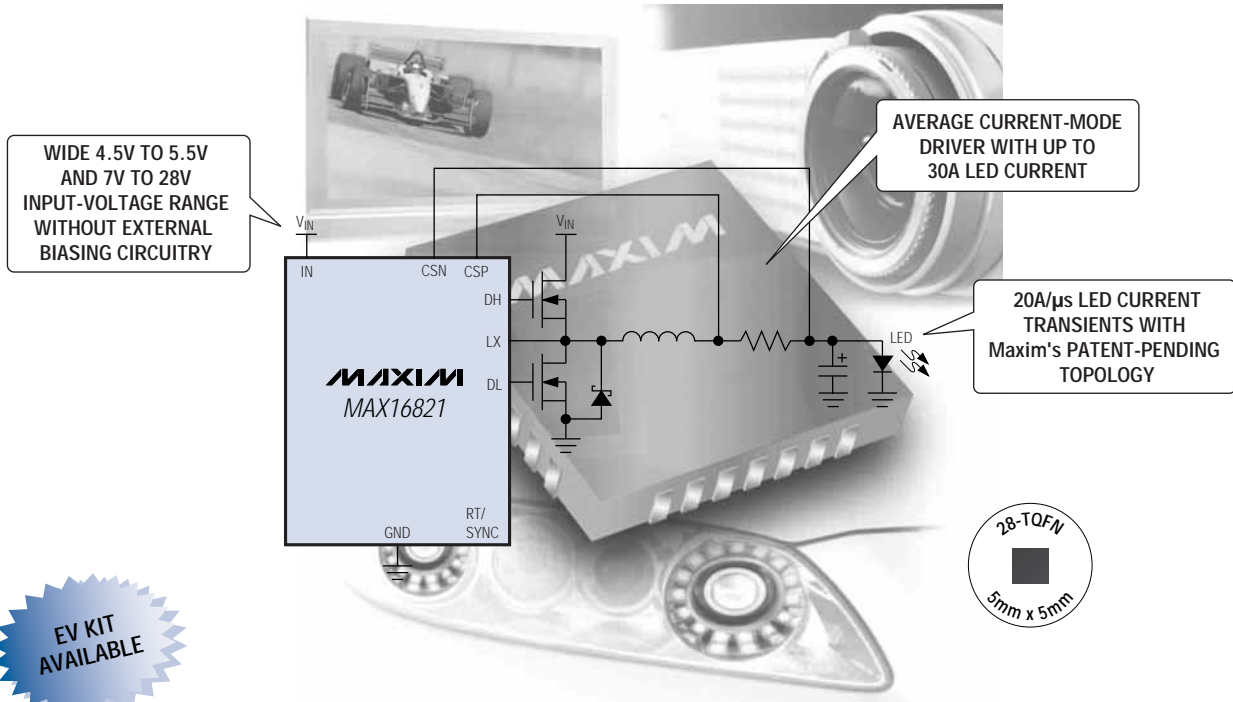
Applications

- ◆ Architectural and Industrial Lighting
- ◆ MR16 Bulbs
- ◆ Automotive Exterior and Interior Lighting
- ◆ Indicators and Emergency Lights

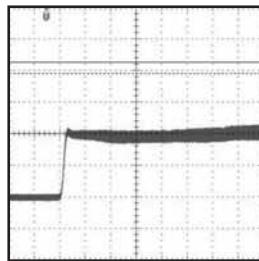


HIGH-POWER LED DRIVER HAS RAPID LED CURRENT PULSING

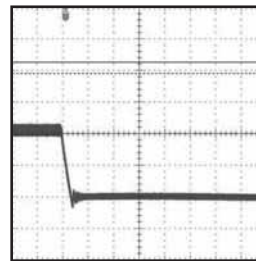
Over 92% Efficiency



LED CURRENT HAS FAST RISE AND FALL TIMES DUE TO Maxim's PATENT-PENDING TOPOLOGY



M 1.00μs
0 TO 10A: t_{RISE} < 500ns



M 1.00μs
10A TO 0: t_{FALL} < 500ns

Features

- ◆ Suitable for Synchronous Buck, Boost, Buck-Boost, SEPIC, and Common-Anode Topologies
- ◆ 125kHz to 1.5MHz Switching Frequency
- ◆ Wide -40°C to +125°C Temperature Range
- ◆ Overvoltage Protection, Thermal Shutdown

Applications

- ◆ Front Projectors and Rear-Projection TV
- ◆ Pocket and Portable Projectors
- ◆ Automotive Exterior Lighting
- ◆ Decorative, Architectural, and Industrial Lighting

Linear High-Brightness LED Drivers

Part	Applications			V _{IN} (V)	I _{LED} (A, max)	PWM Dimming Ratio	Package
	Automotive Lighting	General Lighting	Display Backlighting				
MAX16800	✓	✓		6.5 to 40	0.35	1:30	16-TQFN
MAX16803	✓	✓	✓	6.5 to 40	0.35	1:200	16-TQFN
MAX16804	✓	✓		5.5 to 40	0.35	1:200	20-TQFN
MAX16805	✓	✓		5.5 to 40	0.35	1:200	20-TQFN
MAX16806	✓	✓		5.5 to 40	0.35	1:200	20-TQFN
MAX16815	✓	✓		6.5 to 40	0.1	1:100	6-TDFN
MAX16823	✓	✓		5.5 to 40	0.07/ch	1:200	16-TQFN/TSSOP
MAX16824	✓	✓	✓	6.5 to 28	0.15/ch	1:5000	16-TSSOP
MAX16825	✓	✓	✓	6.5 to 28	0.15/ch	1:5000	16-TSSOP
MAX16828	✓	✓		6.5 to 40	0.2	1:100	6-TDFN
MAX16835	✓	✓		6.5 to 40	0.35	1:80	16-TQFN
MAX16836	✓	✓		6.5 to 40	0.35	1:80	16-TQFN

Switch-Mode High-Brightness LED Drivers

Part	Applications				Topology	V _{IN} (V)	I _{LED} (A, max)	Frequency (Hz)	PWM Dimming Ratio	Package
	Automotive Lighting	General Lighting	Projection	Display Backlighting						
MAX16801		✓			Boost, flyback, SEPIC	10.8, 24	10.0	262k	1:3000	8-μMAX
MAX16802		✓			Boost, buck, flyback, SEPIC	10.8, 24	10.0	262k	1:3000	8-μMAX
MAX16807				✓	Boost, SEPIC + 8 linear	8, 26.5	0.05/ch	20k to 1M	1:5000	28-TSSOP-EP
MAX16808				✓	Boost, SEPIC + 8 linear	8, 26.5	0.05/ch	20k to 1M	1:5000	28-TSSOP-EP
MAX16809				✓	Boost, SEPIC + 16 linear	8, 26.5	0.05/ch	20k to 1M	1:5000	38-TQFN
MAX16810				✓	Boost, SEPIC + 16 linear	8, 26.5	0.05/ch	20k to 1M	1:5000	38-TQFN
MAX8790A				✓	Boost + 6 linear	4.5, 26	0.02/ch	500k, 750k, 1M	1:100	20-TQFN
MAX16812	✓	✓	✓		Boost, buck-boost, buck	6.5, 76	0.5	125k to 500k	1:100	28-TQFN
MAX16816	✓	✓	✓		Boost, buck, buck-boost, SEPIC	5.5, 76	10.0	500k	1:1000	32-TQFN
MAX16819	✓	✓			Buck	4.5, 28	3.0	20k to 2M	1:5000	6-TDFN
MAX16820	✓	✓			Buck	4.5, 28	3.0	20k to 2M	1:5000	6-TDFN
MAX16821	✓	✓	✓		Boost, buck, buck-boost, SEPIC	4.75 to 5.5, 7 to 28	30.0	125k to 1.5M	1:5000	28-TQFN
MAX16822	✓	✓			Buck	6.5, 65	0.35	20k to 2M	1:1000	8-SO
MAX16826	✓	✓	✓	✓	Boost, SEPIC	4.75 to 24	3.0	100k to 1M	1:2000	32-TQFN-EP
MAX16831	✓	✓	✓	✓	Boost, buck, buck-boost, SEPIC	5.5, 76	10.0	500k	1:1000	32-TQFN
MAX16832	✓	✓			Buck	6.5, 65	0.7	20k to 2M	1:1000	8-SO-EP
MAX16834	✓	✓	✓	✓	Boost, buck, buck-boost, SEPIC	4.5, 28	Up to 2	100k to 1M	1:3000	20-TQFN-EP

For Free Samples and Technical Information,
Go to: www.maxim-ic.com/samples

