Welcome to the Texas Instruments New Product Update

We will begin promptly at 1 min past the hour- thank you for your patience
Phone lines will be muted during the presentation.

We are now using web-ex VOIP audio. There is no telephone dial in.

Please post questions on the chat Web-Ex Chat
or contact your sales person or field applications engineer

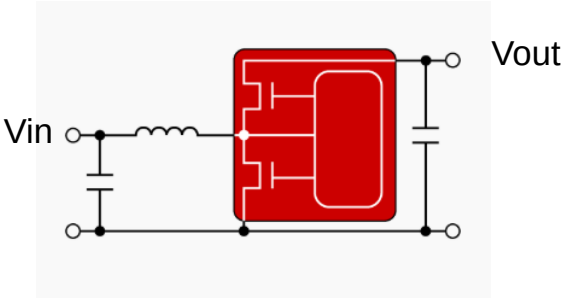
Boost Converter & Controller Solutions

New Products/Reference design Update

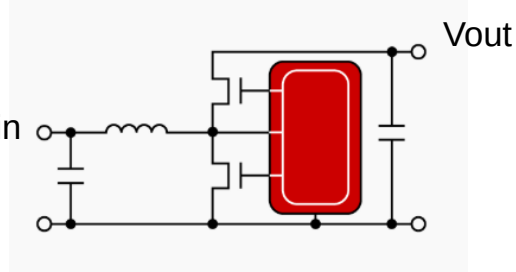
BCS / BMC, TI

4Q 2019

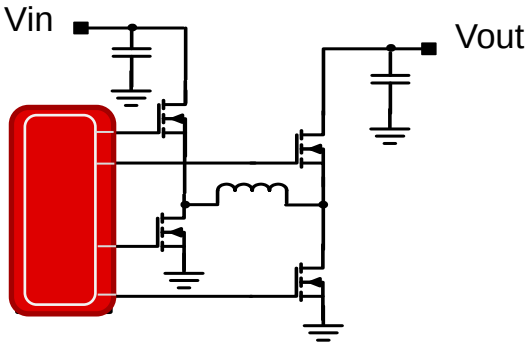
BCS Terminology Definition



Boost Converter



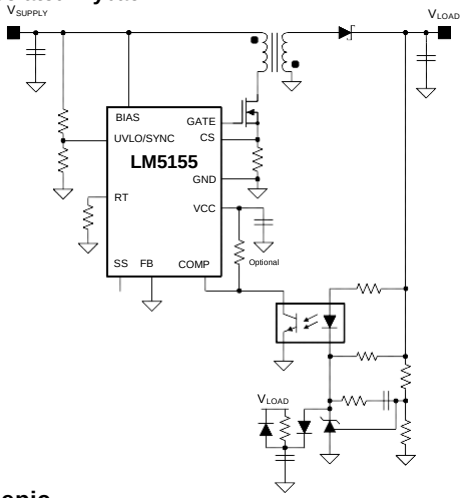
Boost Controller



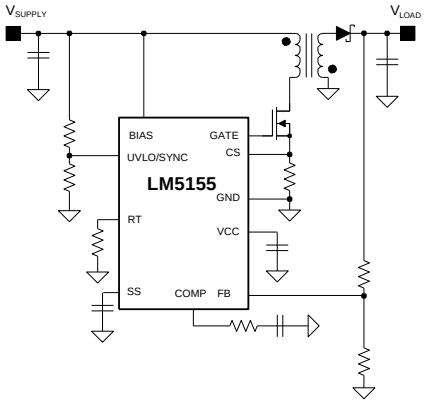
Boost-Buck Converter/Controller

Boost can also be used as Flyback and Sepic

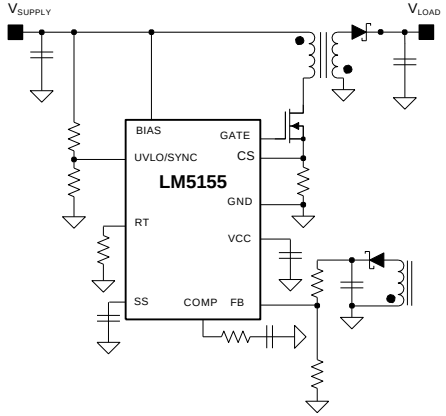
Isolated Flyback



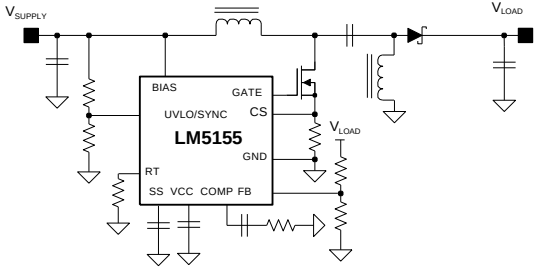
Non-Isolated Flyback



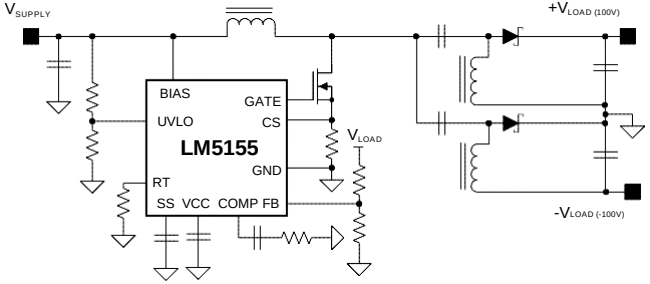
PSR Flyback



Sepic

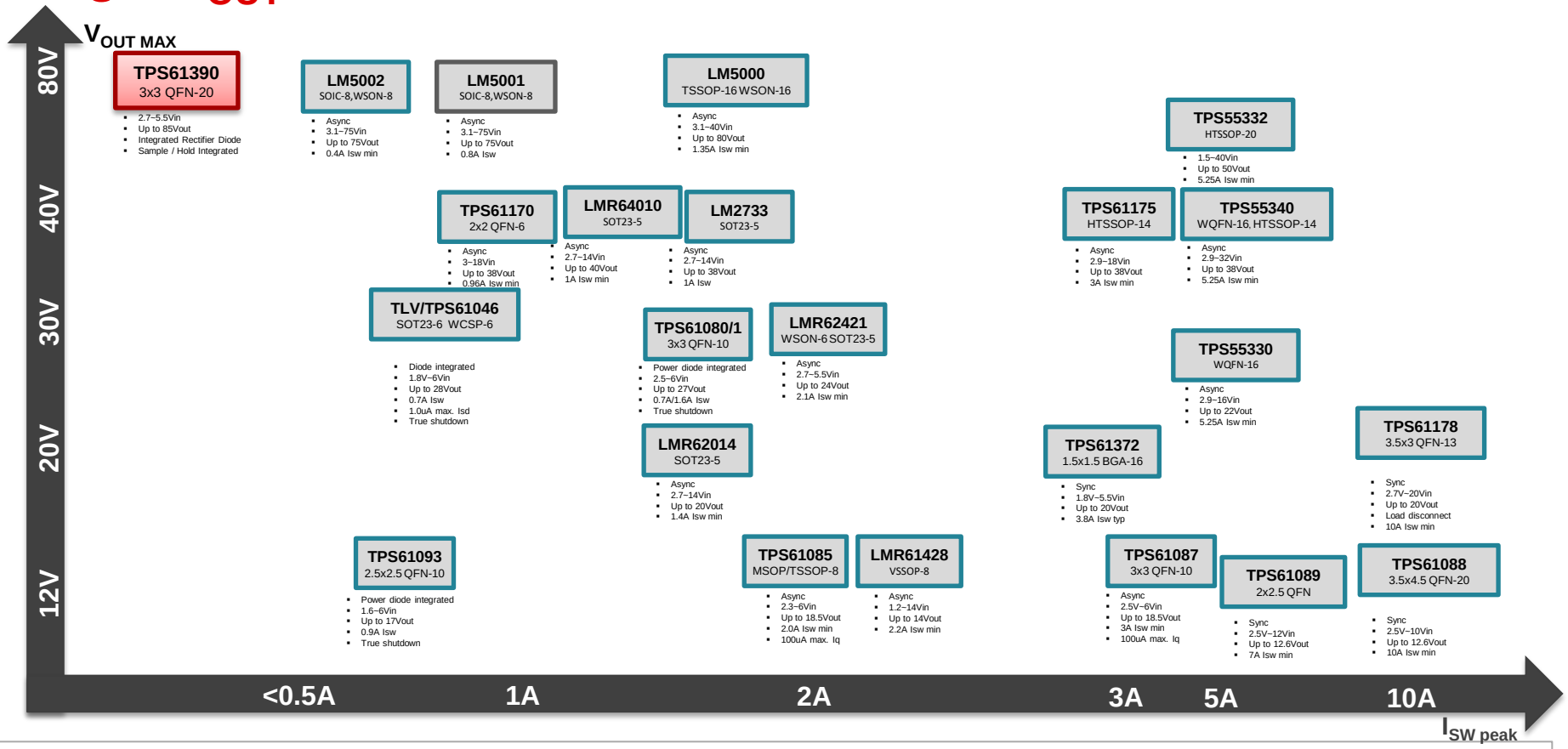


Dual output sepic



High-V_{OUT} Boost Converter

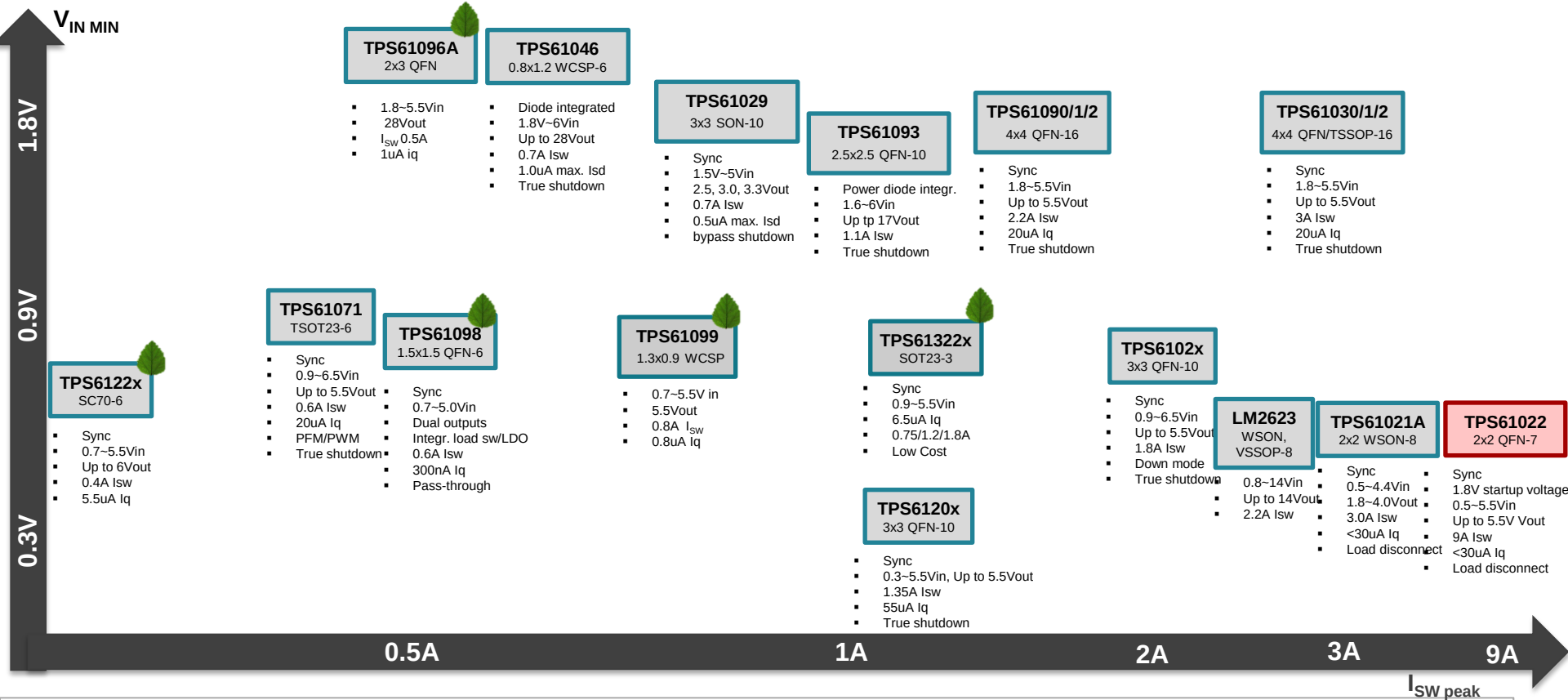
NEW



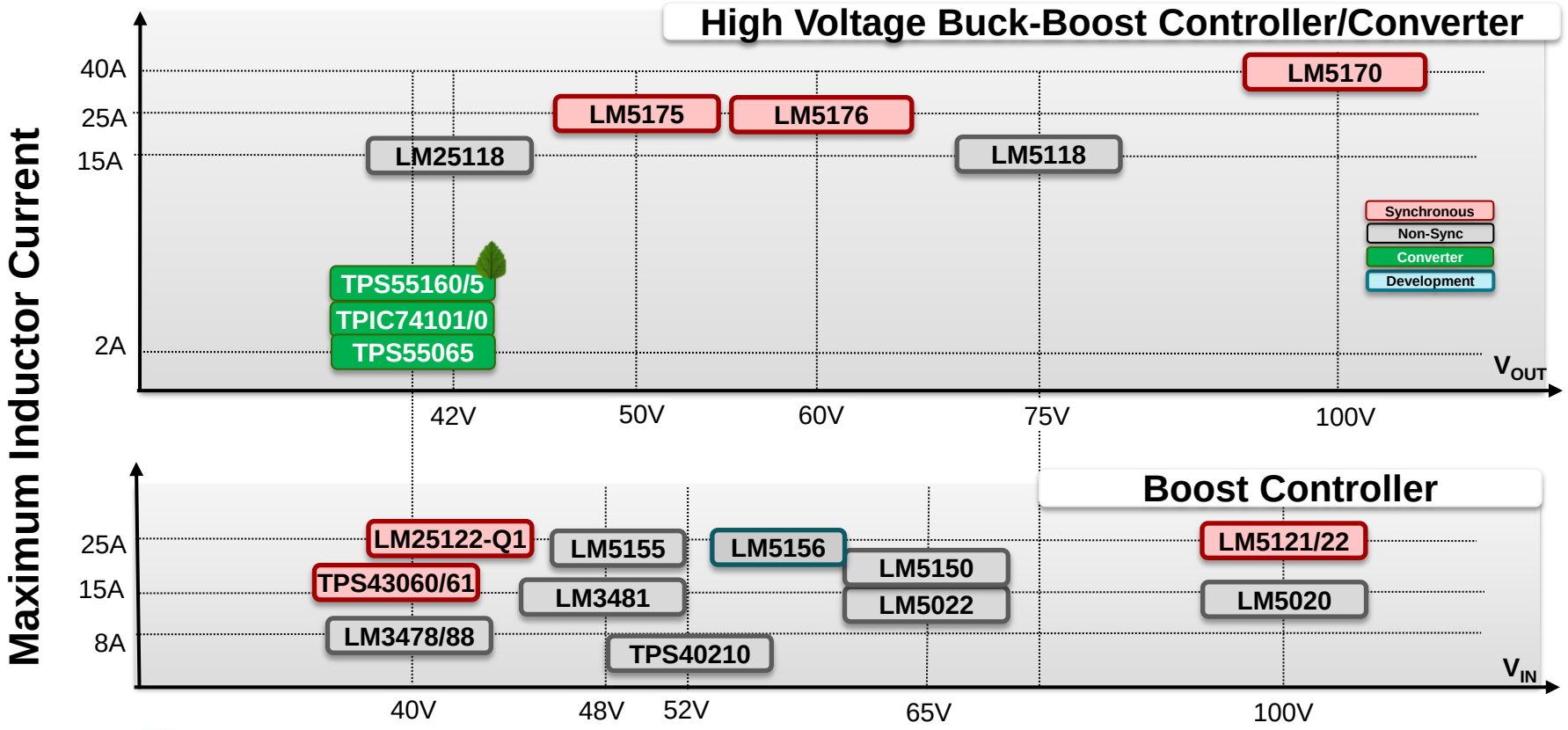
Low-V_{IN} Boost Converter

Low-Iq

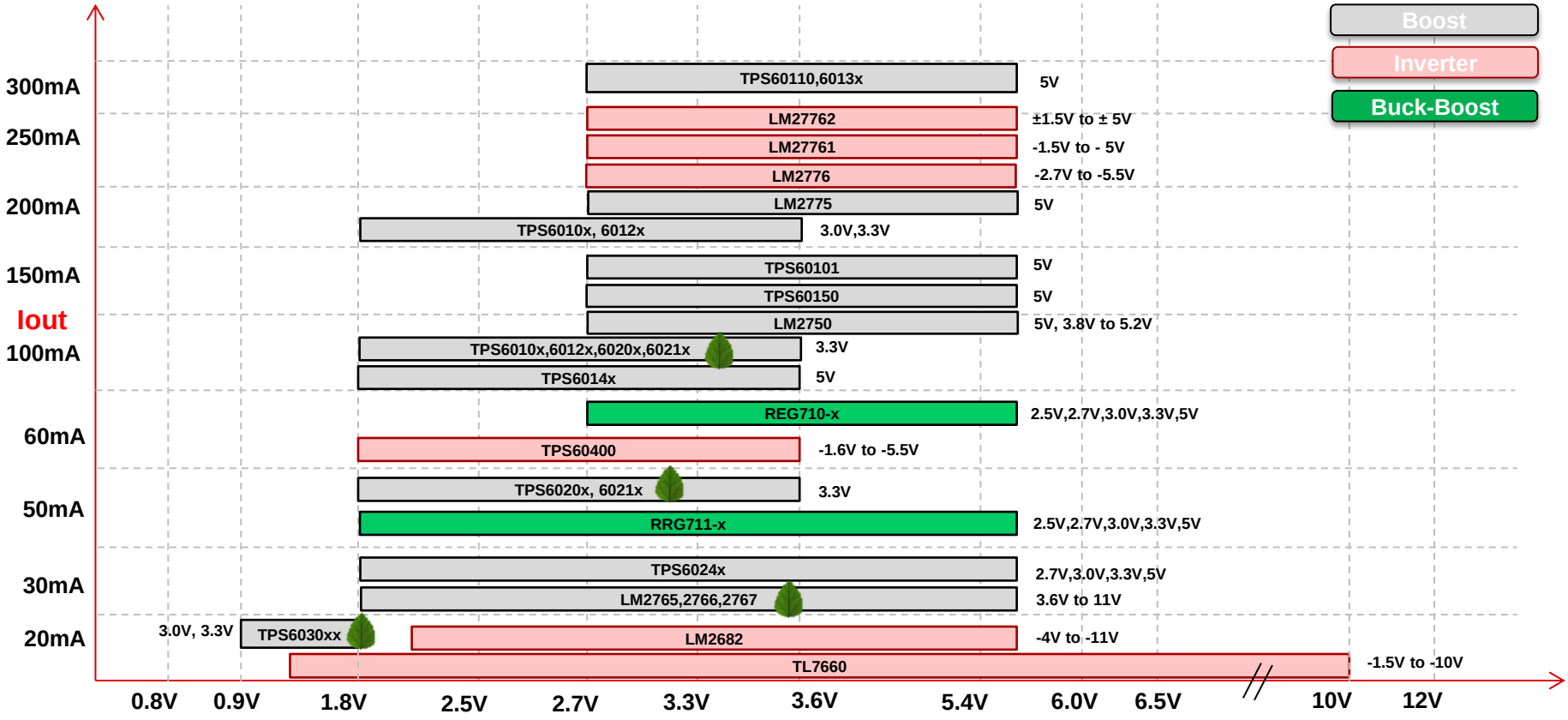
NEW



V_{IN} Buck-Boost Controller/Converter & Boost Controller



Charge Pump(Boost/Inverter/Buck-Boost)



Upcoming 60Vin version with integrated spread spectrum

LM5155/51

2.2MHz Wide VIN Non-synchronous Boost Controller

Features

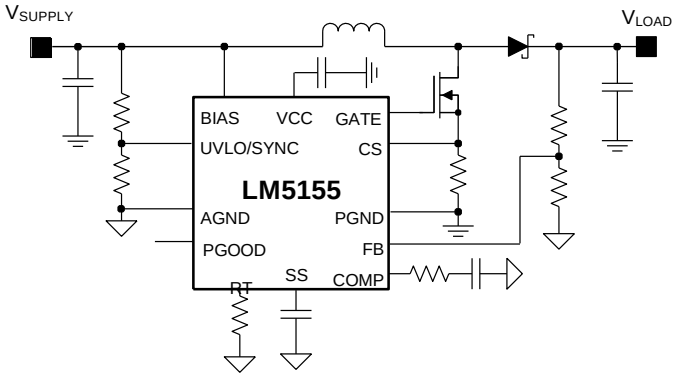
- Wide input range : **3.5V~ 45V**
  (2.97V ~ 16V when BIAS=VCC, 1.5V~45V when BIAS≥2.97V)
- Programmable frequency 100kHz to **2.2MHz** with clock synchronization
- Shutdown I_Q ≤5uA
- Non-switching I_Q ≤ 450uA
- 1.5A peak gate driver
- 100mV current limit threshold with optional hiccup mode protection
- 1.0V +/-1% reference
- Adjustable slope compensation
- Programmable line UVLO
- Adjustable soft-start
- PGOOD indicator
- OVP protection
- Thermal shutdown
- 12pin-WSON package (3mmx2mm) with Wettable Flanks

Applications

- General purpose Boost / Sepic
- Battery powered application
- Industrial Flyback power supply/ Primary side controlled Flyback

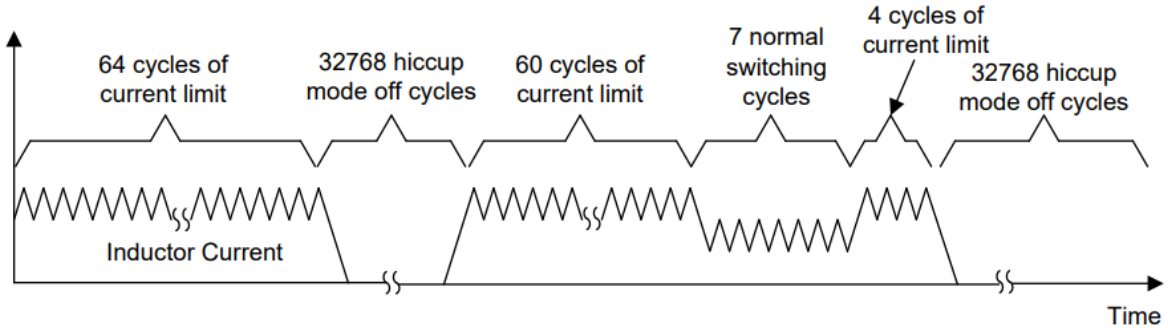
Benefits

- Boost/Sepic/Flyback(Non-isolated/isolated) configurable
- Wide VIN for a variety of power rails including 1-cell battery
- Switching frequency out of AM band
- Small solution size at 2.2MHz
- Low shutdown I_Q reduces battery drain in battery-powered application
- Low current limit threshold minimizes power loss
- Optional hiccup mode for sustained overload / short-circuit protection
- Allows high step-up ratio using SYNC

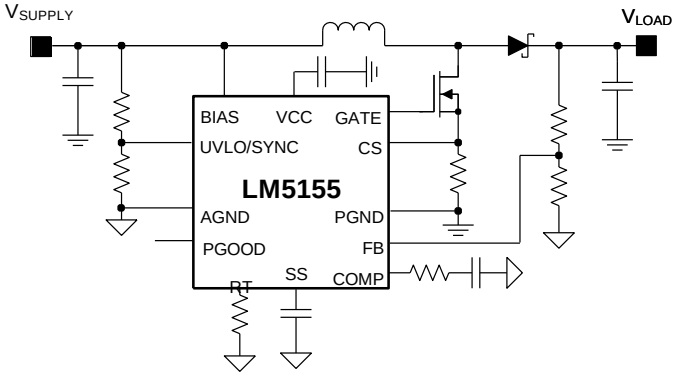


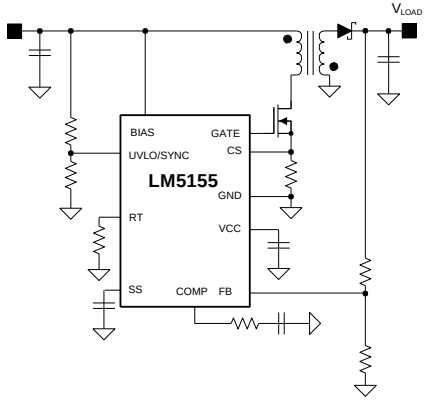
LM5155x

Hiccup Mode Protections



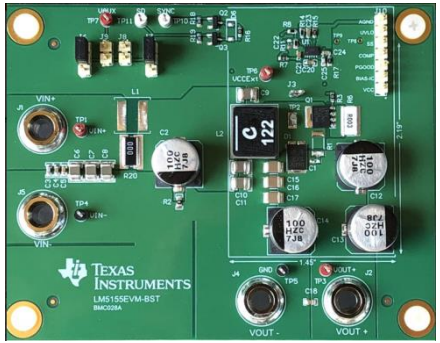
Hiccup mode protection	
Disabled	Enabled
LM5155	LM51551



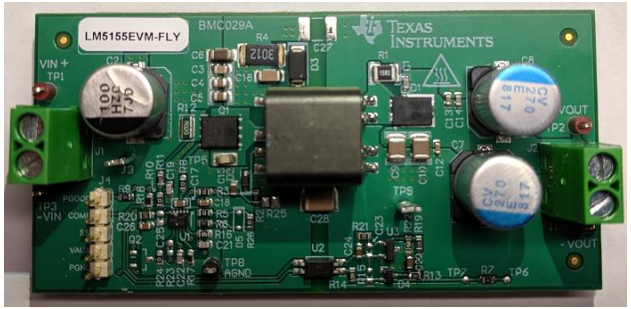


LM5155 EVMs

- Vin: 6-18V
- Vout: 24V
- P: 50W
- 440KHz Switching



Boost EVM



Flyback EVM

- Vin: 18-36V
- Vout: 5V
- P: 20W
- Isolation
- 250KHz Switching

- Vin: 5-42V
- Vout: 12V
- P: 24W
- 2.2MHz Switching

SEPIC EVM

PMP22151 70-W flyback and 37-W boost power tree reference design

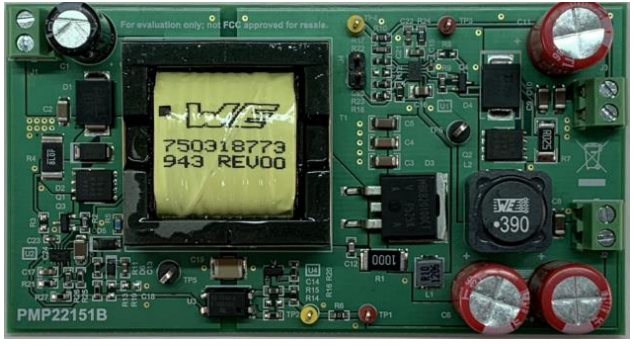
Key Specs: 24V Rail input, 37V boost and 28V isolated output **Device: LM5155**

Features

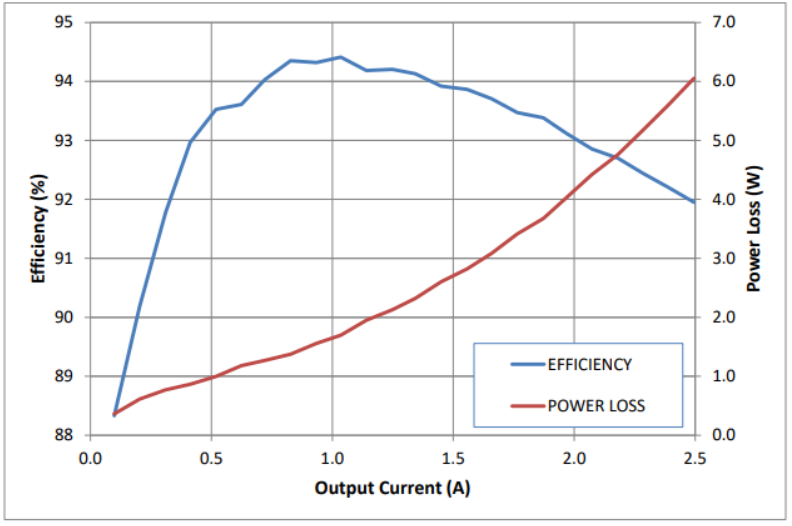
- VIN= 21.4V to 26.4V,
- Vout 1: Isolated Flyback 28V 2.5A
- Vout 2: Boost 37V 1A
- Flyback efficiency up to 94.2%

Applications

- Fire alarm control panel



Performance



LM5170

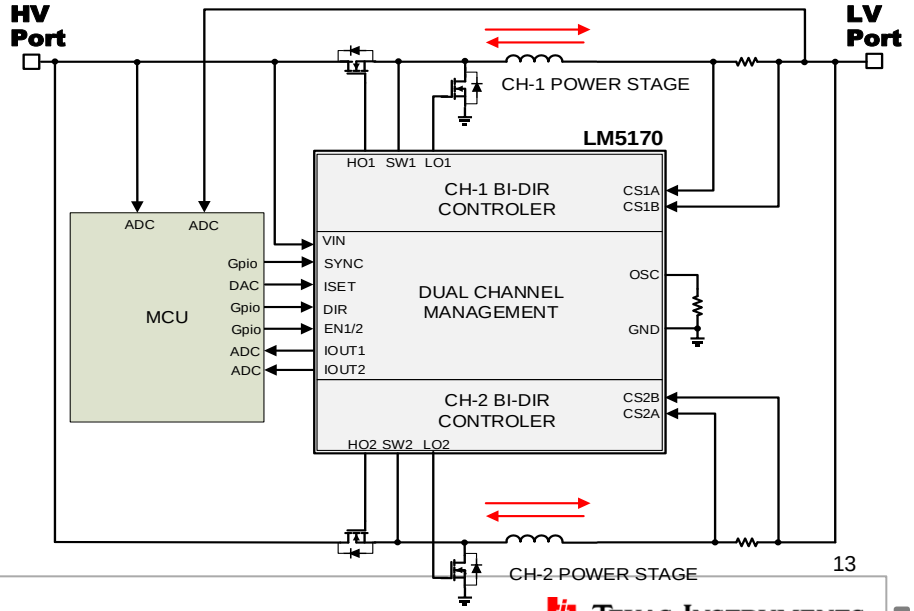
Multiphase Bidirectional Current Controller

Features

- **100-V HV-port and 65-LV port**
- **1% Current Regulation Accuracy**
- **1% Accuracy Current Monitor Outputs**
- **Simple Interface: ISET, DIR, and EN, IOUT**
- **5A Gate Drivers**
- Low Iq (15uA) at shutdown.
- Sync to External Clock, and **Multiphase Stackable**
- Averaged Current Mode Control
- Multi Phase Interleaving Operation
- Independent Enable for Each Channel
- **Diode Emulation** at Light Load prevents negative current
- Programmable Dead Time
- Cycle by Cycle Peak Current Limit
- Over Temperature Shutdown
- **Over Voltage Protection**
- **MOSFET Failure Detection and Protection**
- **Package**: QFP-48 (9 mm x 9 mm)

Benefits

- Optimized Architecture
- Ease of Use
- Cost Effective
- High Performance
- Rich Features/Functions



TPS61390

85-V Boost Converter with Output Current Monitor and Sample / Hold

Features

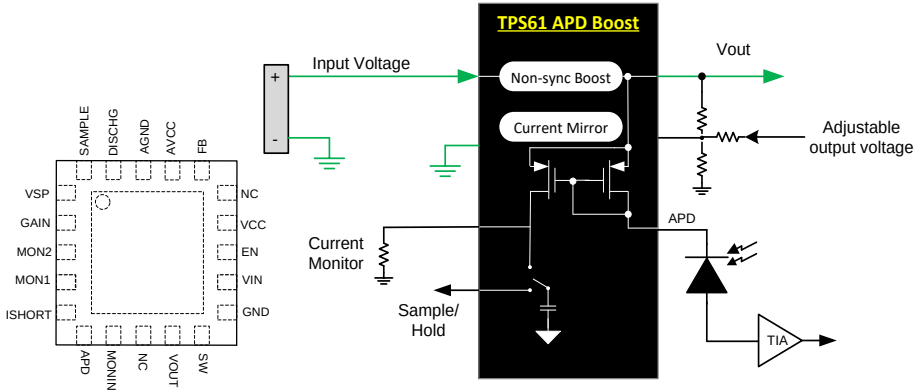
- Input Voltage Range: 2.7 V to 5.5 V
- Output Voltage Range: up to 85 V
- Rdson of Switching FET: 700 mΩ
- Integrated Rectifier Diode
- Current Monitor Range: 0.5 uA to 2 mA, with +/- 10% Accuracy
- Sample / Hold Buffer Offset: 4 mV
- Current Monitor Ratio: 1:5 and 4:5
- Quiescent Current: 1 mA
- Switching Frequency: 750 kHz
- High Optical Power Protection (with a FET in series with APD)
- Sample / Hold Integrated
- 3mm x 3mm QFN – 20 pins

Applications

- Optical Module – OLT (Burst Mode)
- APD Bias
- High Voltage Sensor

Benefits

- **Single Stage to Support Output Voltage up to 85V:** Simplify the power stage structure
- **Compact Solution Size with Highly Integration:** Single chip with 3x3 QFN integrates the Boost, Current Mirror and Sample/hold Circuitry.
- **Low Output Ripple:** Minimize the noise and lower the capacitance
- **Fast High Optical Power Protection:** Rich and robust protection for the APD in fault condition



TPS61022 High current

5V, 9A boost converter with input voltage down to 0.5V

Features

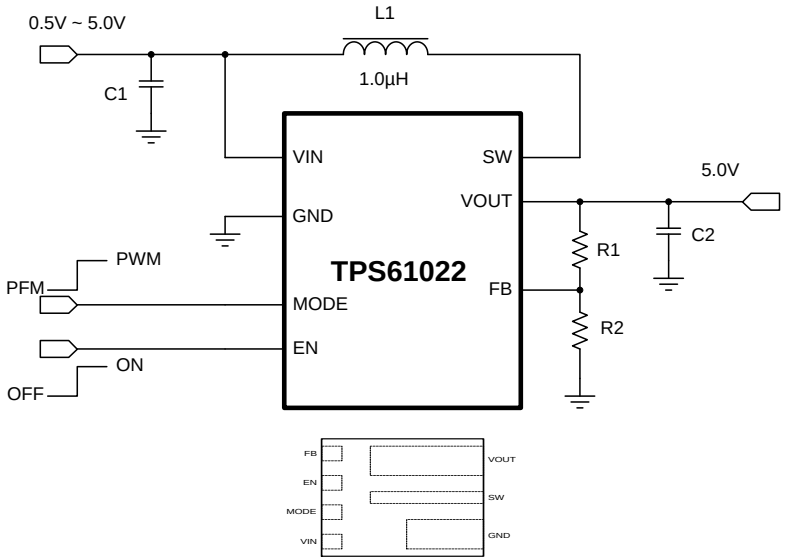
- Input voltage range: 0.5V to 5.5V
- Startup voltage: 1.8V
- Output voltage range: Vin to 5.5V
- Typical 20µA quiescent current from Vout
- Pass-through when Vin > Vout
- Valley current limit: 6.5A min, 9A typical
- Rdson: 13mΩ low side and 18mΩ high side
- Pin-selectable PFM / Forced PWM in light load
- Internal 1ms soft start time
- True disconnection during shutdown
- 1.0MHz/500kHz switching frequency operation
- Available in 2mm x 2mm hotrod QFN package

Applications

- Super Cap
- USB Port
- LED torch

Benefits

- Low input voltage
- Large output current
- Smallest solution in industry



TPS61022 quick start calculator

Description

The TPS61022 provides a power supply solution for portable equipment and IoT devices powered by various batteries and super capacitors. The TPS61022 has minimum 6.5-A valley switch current limit over full temperature range. With a wide input voltage range of 0.5 V to 5.5 V, the TPS61022 supports supercapacitor backup power applications, which may deeply discharge the supercapacitor.

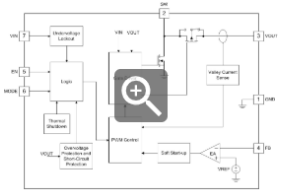
The TPS61022 operates at 1-MHz switching frequency when the input voltage is above 1.5 V. the switching frequency decreases gradually to 0.6 MHz when the input voltage is below 1.5 V down to 1 V. A MODE pin sets the TPS61022

View more

Features

- Input voltage range: 0.5 V to 5.5 V
- 1.8-V Minimum input voltage for start-up
- Output voltage setting range: 2.2 V to 5.5 V
- Two 12-mΩ (LS) / 18-mΩ (HS) MOSFETs
- 8-A Valley switching current limit
- 94.7% Efficiency at V_{IN} = 3.6 V, V_{OUT} = 5 V and I_{OUT} = 3 A
- 1-MHz Switching frequency when V_{IN} > 1.5 V and 0.6-MHz switching frequency when V_{IN} < 1 V
- ±2.5% Reference voltage accuracy over –40°C to +125°C

Diagram



TPS61022 - Functional Diagram

Design resources for you

Technical documents

Document type	Title	Date
Design files	TPS61022 Calculation Tool	31 Jan 2019
Application notes	Supercap last gasp failsafe power for RF comunications in E-Meters	27 Jan 2019
Application notes	Design considerations for a resistive feedback divider in a DC/DC converter	26 Apr 2012

View all technical documents ›

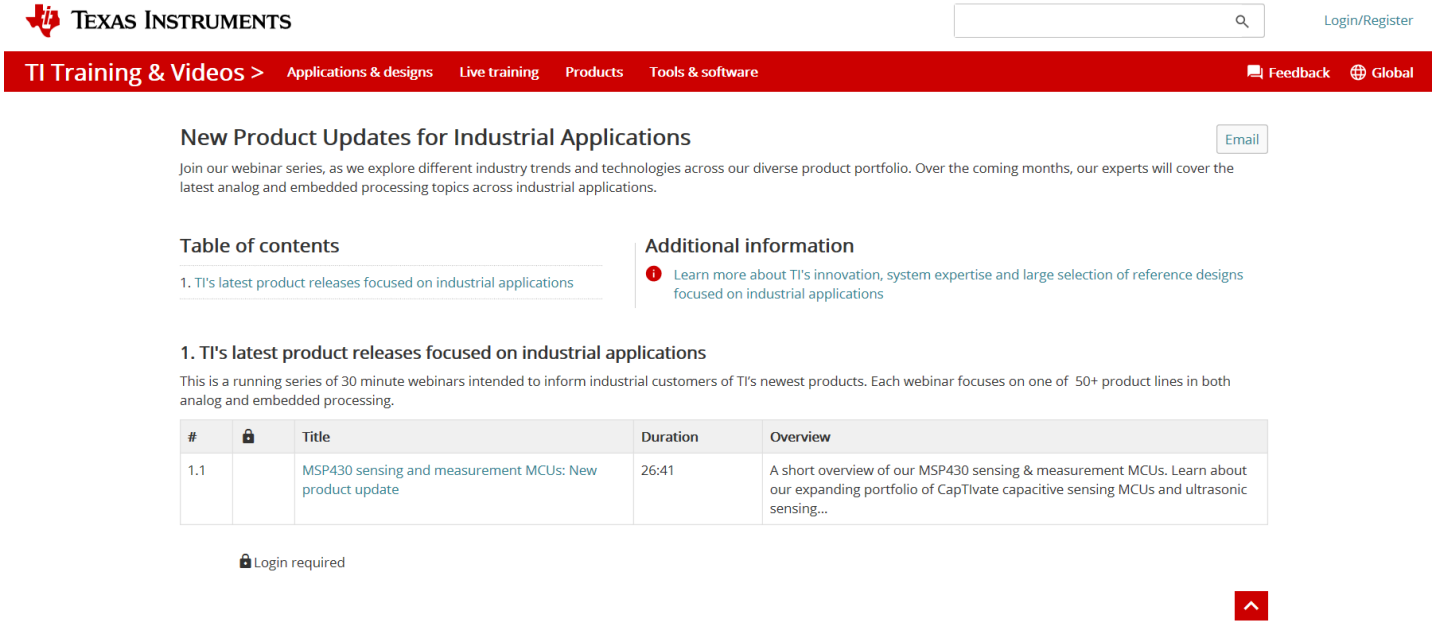
New!
WEBENCH® Power Designer is now even easier to use. Try it now.

WEBENCH® Designer TPS61022

	Min		Max		Range
Vin	2.70	–	4.35	V	0.5 to 5.5V
Vout			5	V	2.2 to 5.5V
Iout			3	A	≤ 4A

New Product Updates now on our website!

https://training.ti.com/npu



Upcoming Broadcasts

Date	Topic
12/12/2019	Power over Ethernet
12/19/2019	Break
12/26/2019	Break
1/2/2020	Break
1/9/2020	SimpleLink™ wired and wireless Arm® MCUs