Welcome!
Texas Instruments New Product Update

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- Phone lines will be muted
- Please post questions in the chat or contact your sales person or field applications engineer

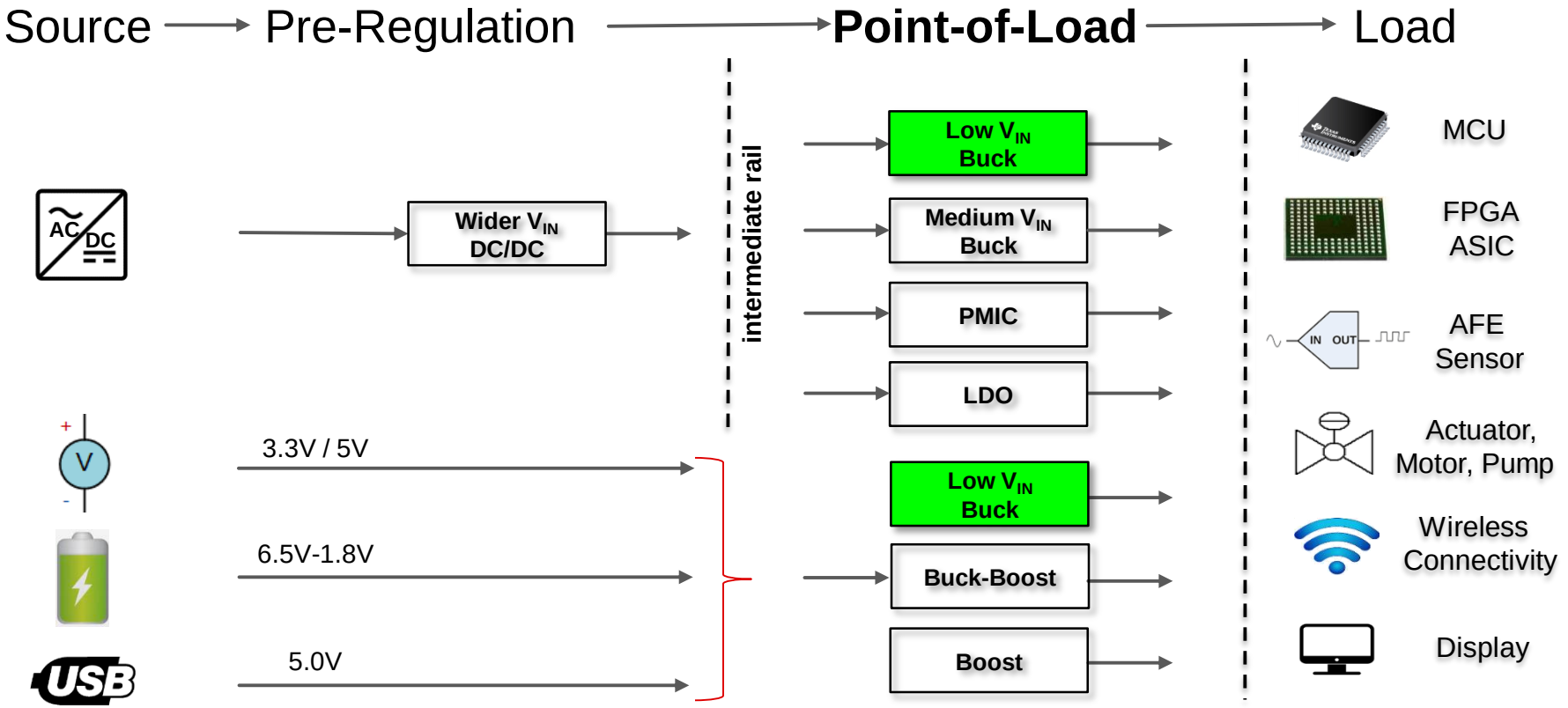
New Product Update:
Low V_{IN} (<7V) Buck (Step Down) DC/DC Converter

January 14, 2021

Agenda

- **Trends & Solutions**
- New product highlights
  - **FPGA/Processor Core Supply with Dynamic Voltage Scaling**
  - **Point-of-Load solutions in easy-to-use, leaded SOT583 package**
  - **Forced-PWM options with low output voltage ripple**
  - **Modules with integrated inductor: Small, Easy, Cost-Effective**
- Closing remarks & next webinar opportunity

Generic power tree using low V_{IN} buck converter

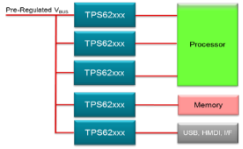


Low V_{IN} (<7V) buck (step-down) DC/DC converter

Trends & solutions

Processor / FPGA / SoC supply

- Tight Accuracy — *1% over full Temperature Range, fixed V_{OUT}*
- Fast Transient Response — *DCS-Control Topology*
- Dynamic Voltage Scaling — *I^2C Interface, V_{SELECT} Function*



Power Density

- Multiple Supply Rails — *Pin-compatible families, PowerGood, Sequencing/Tracking*
- Thermal Performance — *High Efficiency, Power Save Mode, Power Packages*
- Small Solution Size — *Small packages, small & few external components, easy layout*
- Quiet Supply — *Fixed Frequency/Sync, Forced-PWM, Spread Spectrum*

Modules

- Ease-to-use, Time-to-market — *Integrated Inductor, integrated C_{IN}, L, C_{OUT}*
- Small Solution Size — *Embedded Topology (DC/DC below Inductor)*

Low V_{IN} (<7V) buck (step-down) DC/DC converter

Portfolio highlights

I_{OUT}	High Efficiency & Small Size Automatic Power Save		High Efficiency & Small Size Forced-PWM (option)		Fixed Frequency with f_{SW} synchronization		Ultra Low I_Q nano I_Q	Module Integrated Inductor	
0.3A			TPS62240				TPS62740	TPS82740	
			TPS62230	TPS62860				LMZ10500	
0.6A			TPS62260	TPS62806		TPS628510	TPS62840	TPS82670	
				TPS62800					
1A	TPS62824	TLV62568	TPS62824A	TLV62568A	TPS62811	TPS628511		LMZ10501	TPSM82821
				TPS62861				TPS82680	
2A	TPS62825 TPS62088	TLV62569	TPS62825A	TLV62569A	TPS62812	TPS54218 TPS628512		TPS82084	TPSM82822
3A	TPS62826	TLV62585	TPS62826A		TPS62813	TPS54318		TPS82085	TPSM82813
4A	TPS62827	TLV62595	TPS62827A	TLV62595A	TPS62810	TPS52418			TPSM82810
			TPS62864	TPS62865					
5A			TPS62868			TPS54519			
6A			TPS62866	TPS62867		TPS54618		TPSM82480	
			TPS62869	TPS62480					
7A						TPS54719			
9A						TPS54917			

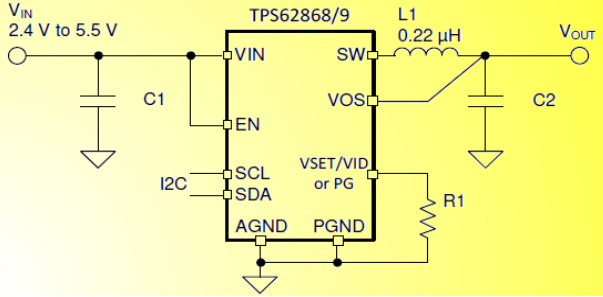
Preview products in **light teal**

Core supply 4A / 6A with DVS (Dynamic Voltage Scaling)

TPS6286x NEW

TPS62 868 / 869

- V_{IN}: 2.4V to 5.5V
- I_{OUT}: 4A / 6A $R_{DS(on)}$: 11mΩ/10.5mΩ
- V_{OUT}: 0.4V to 1.675V / 5mV steps
- DCS-Control Topology
  - Fast Transient Response
  - Low Ripple Transition to Low Power Mode
- I_Q: 4µA
- f_{SW}: 2.4 MHz, L: 220nH
- **1.5 x 2.5 x1mm QFN**
- 1 x 1.8mm WCSP



Your flexible options:

- Selection by external resistor (VSET / VID):
  - Startup output voltage
  - I^2C address
- Selection by I^2C interface:
  - DVS adjust V_{OUT} 0.4V to 1.675V / 5mV steps
  - Power save mode or Forced-PWM mode
  - Output voltage ramp speed
  - Output discharge
  - Thermal pre-warning protection (130°C)
  - Hiccup or latching short-circuit protection

0.6A and 1A bucks w/ I^2C interface: TPS62860 and TPS62861

Core supply 4A / 6A with DVS (Dynamic Voltage Scaling)

TPS6286x NEW

	Low V_{OUT}	Low V_{OUT}	Ultra-Low V_{OUT}	Mid V_{OUT}
I_{OUT} 6A I_{OUT} 4A	**TPS6286 91A/C TPS6286 81A/C**	**TPS6286 60A/B TPS6286 40A/B**	**TPS6286 90A/C TPS6286 80A/C**	**TPS6286 92A/C TPS6286 82A/C**
V_{OUT}	**0.4V – 1.675V**	**0.4V – 1.675V**	**0.2V – 0.8375V**	**0.8V – 3.35V**
Feature	A: VID & I^2C C: PG & I^2C	A: VID & I^2C B: PG/ & I^2C	A: VID & I^2C C: PG & I^2C	A: VID & I^2C C: PG & I^2C
Package	QFN	WCSP	QFN	QFN
Status	Production *(C-version in 2Q21)*	Production	Samples: 1Q'21 RTM: 2Q'21	Samples: 1Q'21 RTM: 2Q'21

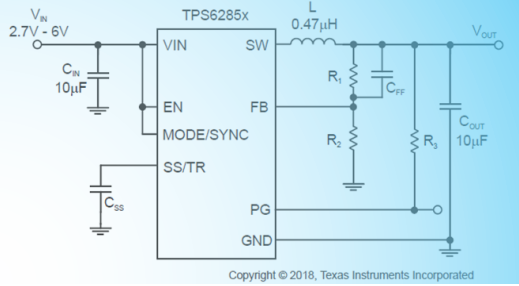
LPDDR5 Memory

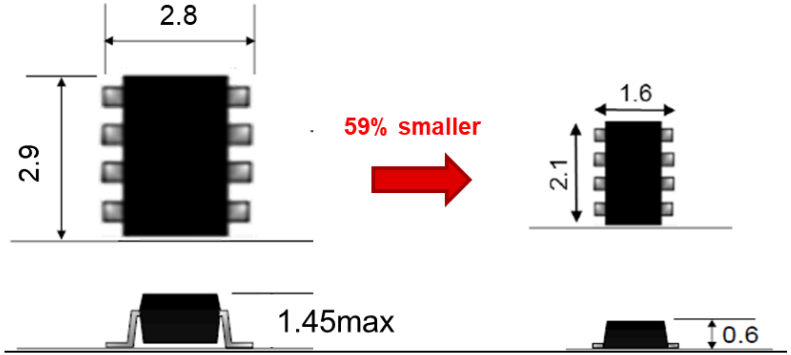
Point of Load solutions in leaded SOT583 package (0.5A-2A)

TPS6285x NEW

TPS62 850 / 851

- V_{IN}: 2.7V to 6.0V
- I_{OUT}: 0.5A, 1A, 2A
- V_{OUT}: 0.6V to 5.5V
- Accuracy: 1% (-40 to +150°C T_J)
- **Fixed Frequency** (sync 1.8-4MHz)
- **Selectable MODE: F-PWM / PSM**
- I_Q: 15µA
- L: 470nH, C_{OUT}: 2x10µF
- **1.6 x 2.1mm SOT583**





SOT23-8
Package size: 8.1mm²

SOT583
Package size: 3.4mm²

	Adjustable Softstart	Selectable Compensation
0.5A	TPS628510	
1A	TPS628511	TPS628501
2A	TPS628512	TPS628502

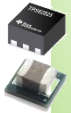
Functional safety capable: documentation available on www.ti.com for FIT rate, Failure mode distribution, Pin-FMA

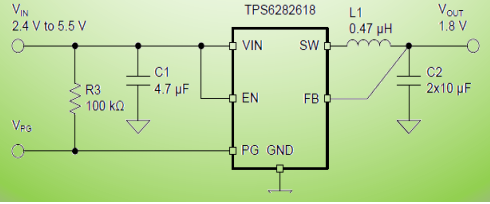
Forced-PWM family extension, pin-2-pin QFN (1A-4A)

TPS6282x NEW

TPS62 82x

- V_{IN}: 2.4V to 5.5V
- I_{OUT}: 1A, 2A, 3A, 4A
- $R_{SD(on)}$: 26mΩ / 25mΩ, up to 97% η
- V_{OUT}: 0.6V to 4V
- Accuracy: 1% (-40 to +125°C T_J)
- DCS-Control™ Topology
- I_Q: 4µA
- f_{SW} : 2.2 MHz
- L: 470nH, C_{OUT}: 2x10µF
- 1.5 x1.5mm QFN (2A,3A,4A) 31mm²
- 2 x 2.5 x 1.2mm TPSM8282x 25mm²





Forced-PWM → **TPS62 82x<u>A</u>** (1.5x1.5mm)

1A family extension

1A / 2A / 3A / 4A family extension

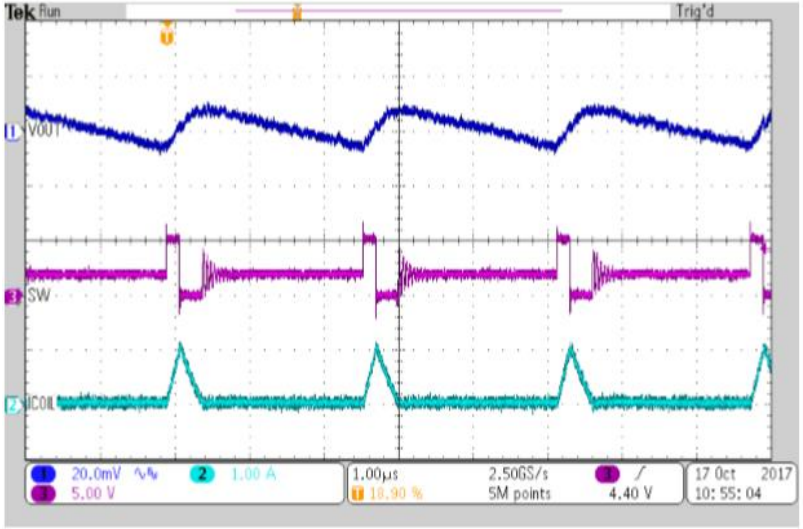
Automatic Power Save Mode		Forced-PWM Mode
1A	TPS62824	TPS62824A
2A	TPS62825	TPS62825A
3A	TPS62826	TPS62826A
4A	TPS62827	TPS62827A

Forced-PWM family extension, pin-2-pin QFN (1A-4A)

TPS6282x NEW

TPS6282x in Power Save Mode

$V_{OUTripple}$ ~10mV @ $0.1A_{OUT}$

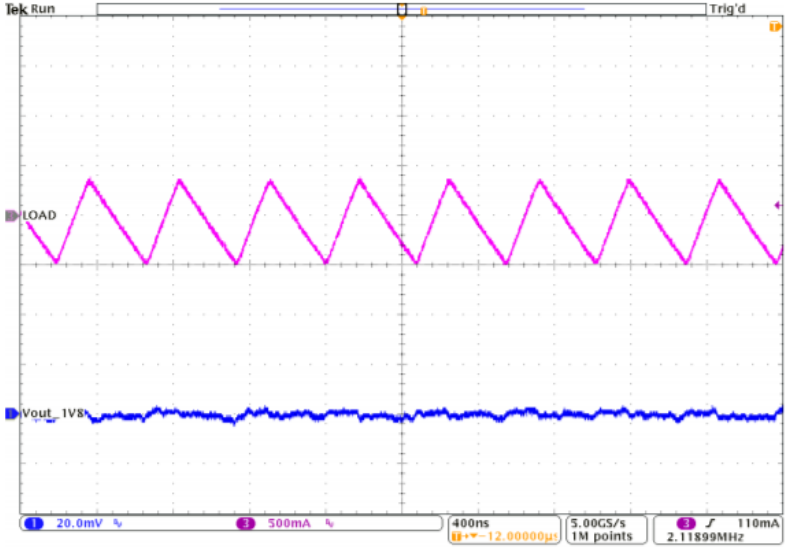


C_{OUT}=2x10µF

I_{OUT}=0.1A

TPS6282xA in Forced-PWM Mode

$V_{OUTripple}$ ~3mV @ no $load_{OUT}$



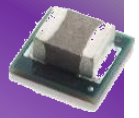
Modules (internal inductor) with very high power density (1A-4A) *TPSM828xx*

NEW

TPSM82 82x

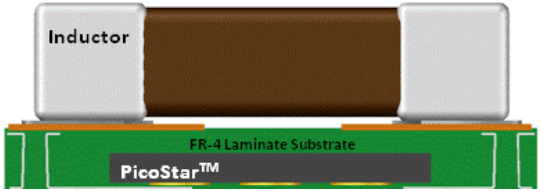
- **2 x 2.5 x 1mm**
- **Integrated Inductor**
- V_{IN}: 2.4V to 5.5V
- **I_{OUT}: 1A / 2A**
- V_{OUT}: 0.6V to 4V (and fixed V_{OUT})
- Accuracy: 1% (-40 to +125°C T_J)
- Efficiency: up to 95%
- I_Q: 4µA
- DCS-Control Topology
  - Fast transient response
  - Low ripple transition to low power

TPSM82 81x



- **3 x 4 x 2.3mm**
- **Integrated Inductor**
- V_{IN}: 2.7V to 6.0V
- **I_{OUT}: 3A, 4A**
- V_{OUT}: 0.6V to 5.5V
- Accuracy: 1% (-40 to +125°C T_J)
- Efficiency: up to 97%
- I_Q: 15µA
- Peak current mode topology
  - Adjustable frequency (1.8-4MHz)
  - Synchronizable
  - Forced-PWM mode
  - Selectable compensation
  - Adjustable soft start
  - Tracking/sequencing
  - Optional spread spectrum

Cross-section of
embedded DC/DC converter modules



- Very small solution size
- Standard reflow manufacturing capable
- Superior EMI and Noise performance

System-in-Package integrates the IC inside a printed circuit board (laminate substrate) with SMD components on top. High volume production using this packaging technology was started at Texas Instruments in 2010.

Low V_{IN} (<7V) buck (step-down) DC/DC converter

New product update

TPS62 80x	*Small solution size down to 0.7x1mm chip scale package*
TPS62 81x	*Automotive qualified 1A – 4A output*
TPS62 82x	*High efficiency, low $R_{DS(on)}$, w/wo Forced-PWM 1A – 4A*
TPS62 84x	*Ultra-Low I_Q down to 60nA operating*
TPS62 85x	*Point-of-Load with Forced-PWM in SOT583 package*
TPS62 86x	*Core supply with Dynamic Voltage Scaling 0.6A – 6A*
TPSM82 8xx	*Easy, small, cost-effective module with integrated inductor*

Visit www.ti.com/npu

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