

# Low-Power DC/DC Converter Overview

## TPS61 Boost, TPS62 Buck, TPS63 Buck-Boost and TPS82 Module





### Overview

The TPS6-series supports your need for small solution size, low system cost and high power density. These synchronous DC/DC converters with integrated FETs offer high efficiency over a wide load range and very low quiescent current.

### Application Benefits

- **Long battery run-time and low temp** → High efficiency (up to 98%) over wide load range (1μA to 6A), very low  $I_Q$  down to 360nA buck and 300nA boost (15nA in bypass)
- **Small total solution size and cost** → Minimal number of small external components required  
QFN, SON, SOT563 or WCSP needs only  $C_{IN}$ ,  $C_{OUT}$ , L
- **Low EMI and low system noise** → DCS-Control™ topology, high PSRR (90dB), low ripple (10mV) spread spectrum, no need for filtering
- **Easy-to-design and easy-to-use** → Synchronous DC/DC with integrated compensation  
MicroSiP™ modules <6.7mm<sup>2</sup> with integrated  $C_{IN}$ ,  $C_{OUT}$ , L

1Switch Current Limit 2Output current 3Available as TLV version.		<0.9A	≥1A	≥2A	≥3A	≥4A	≥5A
Boost <sup>1</sup>	$V_{IN}$ up to 18V		TPS61170		TPS61175		TPS61088 (10A) <b>TPS61089 (7A)</b> <b>TPS61178 (10A/20V)</b>
	$V_{IN}$ up to 6V	TPS61070 TPS61240 <b>TPS61046<sup>3</sup></b>	TPS61252 TPS61093	TPS61256	TPS61253 <b>TPS61021A</b>		<b>TPS61230A</b> TPS61280A <b>TPS61236 (8A)</b>
	Ultra-low $I_Q$	TPS61220 <sup>3</sup> TPS61291 <b>TPS61098/99/96A</b>	TPS61251				
	Module 	TPS81256					
Buck-Boost <sup>1</sup>	$V_{IN}$ up to 16V			TPS63060	<b>TPS63070</b>		
	$V_{IN}$ up to 5.5V		LM3668 TPS63030 TPS63050	TPS63000 TPS63010	TPS63024	TPS63020 TPS630250 <b>TPS63027</b>	
Buck <sup>2</sup>	$V_{IN}$ up to 17V	TPS62175 (28V <sub>IN</sub> ) TPS62170	TPS62150 <sup>3</sup> TPS62160	TPS62140	TPS62130 <sup>3</sup> TPS62134 (CPU)	<b>TPS62135</b>	TPS62180 (6A) <b>TPS62184 (6A)</b>
	$V_{IN}$ up to 6V	LM3670/1/3/4 TPS62230 TPS62671 (6MHz)	LM3691 TPS62080 <sup>3</sup> <b>TLV62568</b>	<b>TPS62097</b> <b>TLV62084A</b> <b>TLV62569</b>	TPS62085 <sup>3</sup> TPS62090 <sup>3</sup> <b>TLV62585</b>	TPS62095 <sup>3</sup>	<b>TPS62480 (6A)</b>
	Ultra-low $I_Q$	TPS62730 TPS62740 <b>TPS62743/6/8</b> <b>TPS62745 (10V<sub>IN</sub>)</b> <b>TPS62770</b>					
	Module 	TPS82670 TPS82693 TPS82740	TPS82681 <b>TPS82150</b>	<b>TPS82084</b> <b>TPS82140</b>	<b>TPS82085</b> <b>TPS82130</b>	<b>TPSM82135</b>	

\*Available as TLV6 Value Line.

New Products are listed in **bold red**.  
Preview products are listed in **bold teal**.



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# Selection Guide Highlights

The following selection shows examples of the TPS6 and TPS8 series available to streamline your design process.

	Device	Output/ Switch Current (A)	Input Voltage (V)	Output Voltage(V)	DCS-Control™ Topology	Features	Auto. (Q100) <sup>1</sup>	Package(s) Size (mm)	1ku Price (US)
<b>Boost</b>	<b>TPS61220</b>	0.4	0.7 to 5.5	1.8 to 6.0		Startup into load at 0.7V input voltage, 5µA quiescent current		SC70 2x2	\$0.38
	<b>TPS61040</b>	0.4	1.8 to 6.0	V <sub>IN</sub> - 28.0		28V output voltage boost converter in SOT23	✓	SOT23, SON	\$0.50
	<b>TPS61096A</b>	0.5	1.8 to 5.5	4.5 to 28		28V output voltage boost converter with 1µA quiescent current		SON 2x3	Web
	<b>TPS61098</b>	0.5	0.7 to 4.5	2.2 to 4.3		300nA I <sub>q</sub> , boost (w/ bypass) + LDO/load switch (dual output)		SON 1.5x1.5	\$0.52
	<b>TPS61070</b>	0.6	0.9 to 5.5	1.8 to 5.5		1- to 3-cell alkaline/NiMH or 1-cell Li-Ion, 19µA quiescent current	✓	SOT23 3x3	\$0.45
	<b>TPS61291</b>	0.7	0.9 to 5.0	2.5, 3.0, 3.3		15nA quiescent current in bypass mode		SON 2x2	\$0.58
	<b>TPS61046</b>	0.9	1.6 to 5.5	5.0 to 28.0		Display supply (PMOLED, WLED backlight), sensor supply, <10mm <sup>2</sup>		WCSP 0.8x1.2	\$0.42
	<b>TPS61099</b>	1.0	0.7 to 5.5	1.8 - 5.5		Synchronous boost converter with 800nA ultra-low quiescent current		WCSP 0.9 x 1.2	\$0.58
	<b>TPS61093</b>	1.1	1.6 to 6.0	1.7 to 17.0		Integrated isolation switch and output discharge	✓	SON 2.5x2.5	\$1.00
	<b>TPS61170</b>	1.2	3.0 to 18.0	V <sub>IN</sub> - 38.0		High V <sub>OUT</sub> for boost or SEPIC (buck boost) topology	✓	SON 2x2	\$0.80
	<b>TPS61020</b>	1.5	0.9 to 6.5	1.8 to 5.5		LDO down mode for V <sub>IN</sub> > V <sub>OUT</sub> , 96% efficiency	✓	SON 3x3	\$0.78
	<b>TPS61252</b>	1.5	2.3 to 6.0	3.0 to 6.5		Adj. current limit from 100mA to 1.5A, supports large C <sub>OUT</sub>		SON 2x2	\$0.65
	<b>TPS61021A</b>	3.0	0.5 to 4.4	1.8 to 4.0		Boost converter with 0.5V ultra-low input voltage		SON 2x2	\$0.58
	<b>TPS61175</b>	3.0	2.9 to 18.0	V <sub>IN</sub> - 38.0		High V <sub>OUT</sub> for boost, flyback or SEPIC (buck boost) topology	✓	TSSOP 4.4x5	\$1.30
	<b>TPS61253</b>	3.6	2.6 to 4.8	5		3.5MHz fSW for smallest solution size <25mm <sup>2</sup> , 21µA I <sub>Q</sub>		WCSP 1.2x1.3	\$0.48
	<b>TPS61030</b>	4.0	1.8 to 5.5	1.8 to 5.5		1A/5V <sub>OUT</sub> from 1.8V <sub>IN</sub> , high efficiency		QFN 4x4, TSSOP	\$1.15
	<b>TPS61230A</b>	5.0	2.3 to 4.5	2.5 to 5.5		5V/6A high-efficiency step-up converter in 2x2mm QFN package		QFN 2x2	\$0.68
	<b>TPS61089</b>	7.0	2.7 to 12.0	4.5 to 12.6		Synchronous boost converter with adjustable current limit		QFN 2.0x2.5	\$1.10
	<b>TPS61236P</b>	8.0	2.3 to 4.9	2.9 to 5.5		3 to 5V/3A booster with 97% efficiency, adjustable current limit		QFN 2.5x2.5	\$0.78
	<b>TPS61178</b>	10.0	2.7 to 20.0	4.5 to 20.0		10A fully-integrated synchronous boost converter		QFN 3.0x3.5	\$1.80
<b>TPS61088</b>	10.0	2.7 to 12.0	4.5 to 12.6		10A peak current limit, 3.3 to 9V/3A booster, adjustable current limit		QFN 3.5x4.5	\$1.60	
<b>Buck-Boost</b>	<b>TPS63030</b>	1.0	1.8 to 5.5	1.2 to 5.5		Forced fixed frequency and synchronization possible, 96% efficiency		WCSP, SON	\$0.76
	<b>TPS63050</b>	1.0	2.5 to 5.5	2.5 to 5.5		Adjustable current limit, soft-start, 1.2x1.6mm WCSP and HotRod™ QFN		WCSP, QFN	\$0.74
	<b>LM3668</b>	1.8	2.5 to 5.5	2.8 to 5.0		Selectable output voltage 2.8/3.3, 3.0/3.4, 4.5/5.0	✓	SON 3x3	\$1.00
	<b>TPS63000</b>	1.8	1.8 to 5.5	1.2 to 5.5		Forced fixed frequency and synchronization possible, 96% efficiency	✓	QFN 3x3	\$0.85
	<b>TPS63070</b>	3.6	2.0 to 16.0	2.5 to 9.0		Wide-input voltage buck boost with forced PWM and synchronization		QFN 2.5x3	\$1.15
	<b>TPS63020</b>	4.0	1.8 to 5.5	1.2 to 5.5		Forced fixed frequency and synchronization possible, 96% efficiency	✓	QFN 3x4	\$1.15
	<b>TPS630250</b>	4.5	2.3 to 5.5	2.3 to 3.6		Smallest solution size, 1.8x2.1mm WCSP and easy-to-use HotRod QFN		WCSP, QFN	\$1.10
	<b>TPS63027</b>	4.5	2.3 to 5.5	1.0 to 5.5		Wide-output voltage buck boost with forced PWM mode		WCSP 2.1 x 2.1	\$1.10
<b>Buck</b>	<b>TPS62120</b>	75mA	2.0 to 15.0	1.2 to 5.5	✓	Extended UVLO hysteresis for reliable start-up, 96% efficiency, 11µA I <sub>Q</sub>		SOT23, SON 2x2	\$0.49
	<b>TPS62125</b>	0.3	3.0 to 17.0	1.2 to 10	✓	Adjustable EN threshold and hysteresis, 5µA I <sub>Q</sub> ultra-low power		SON 2x2	\$0.53
	<b>TPS62770</b>	0.3	2.5 to 5.5	1.0 to 3.0	✓	Buck + boost + load switch with ultra-low quiescent current		WCSP 1.6x1.6	\$1.20
	<b>TPS62740/3</b>	0.3	2.0 to 5.5	1.2 to 3.3	✓	Ultra-low I <sub>Q</sub> (360nA), 90% efficiency at 10µA load, load switch		SON 2x3, WCSP	\$0.75
	<b>TPS62745</b>	0.3	3.3 to 10.0	1.3 to 3.3	✓	TPS62740 with up to 10V input for multi-cell batteries		SON 2x3	\$0.95
	<b>LM3670/3</b>	0.35	2.5 to 5.5	0.7 to 2.5/3.3		Fixed output voltages, 15µA I <sub>Q</sub>		SOT23, BGA	\$0.30/\$0.55
	<b>TPS62170</b>	0.5	3.0 to 17.0	0.9 to 6.0	✓	Small solution size (<45mm <sup>2</sup> ), power good output, 17µA I <sub>Q</sub>	✓	SON 2x2	\$0.51
	<b>TPS62175</b>	0.5	4.7 to 28.0	1.0 to 6.0	✓	Wide input voltage (up to 28V), <5µA I <sub>Q</sub> quiescent current		SON 2x3	\$0.58
	<b>TPS62230</b>	0.5	2.0 to 6.0	1.0 to 3.3	✓	Tiny and simple LDO alternative for improved power efficiency	✓	SON 1x1.5	\$0.46
	<b>TPS62260</b>	0.6	2.0 to 6.0	0.6 to 6.0		pin compatible with TPS62240 (300mA), TPS62290 (1000mA)	✓	SOT23, SON 2x2	\$0.57
	<b>TPS62671</b>	0.6	2.3 to 4.8	1.05 to 1.8		6MHz, <10mm <sup>2</sup> solution size, 0.4mm height, spread spectrum		WCSP 0.8x1.2	\$0.46
	<b>LM3671/4</b>	0.6	2.7 to 5.5	1.0 to 3.3		Pin-compatible to LM3670/3	✓	SOT23, BGA	\$0.30/\$0.32
	<b>TPS62160</b>	1.0	3.0 to 17.0	0.9 to 6.0	✓	Small solution size (<45mm <sup>2</sup> ), power good output, 17µA I <sub>Q</sub>	✓	MSOP, SON 2x2	\$0.73
	<b>TLV62568</b>	1.0	2.5 to 5.5	0.6 to 5.5		1A high-efficiency step-down buck converter in SOT23 / SOT563		SOT23, SOT563	\$0.39
	<b>LM3691</b>	1.0	2.3 to 5.5	0.75 to 3.3		Fixed output voltages and forced-PWM mode		WCSP 1.3x1.6	\$0.40
	<b>TPS62080</b>	1.2	2.3 to 6.0	0.5 to 4.0	✓	97% efficiency, output discharge, 6µA I <sub>Q</sub> quiescent current		SON 2x2	\$0.67
	<b>TPS62097</b>	2.0	2.5 to 6.0	0.8 - V <sub>IN</sub>	✓	High-efficiency forced PWM and selectable switching frequency		QFN 2x2	\$0.77
	<b>TLV62569</b>	2.0	2.5 to 5.5	0.6 to 5.5		2A high-efficiency step-down buck converter in SOT23 / SOT563		SOT23, SOT563	\$0.44
	<b>TLV62084A</b>	2.0	2.7 to 5.5	0.5 to 4.0	✓	Light-load efficiency, output discharge, power good output		SON 2x2	\$0.56
	<b>TPS62065</b>	2.0	2.9 to 6.0	0.8 to 6.0		3MHz, small solution size, 18µA quiescent current; spread spectrum	✓	SON 2x2	\$0.78
	<b>TPS62085</b>	3.0	2.5 to 6.0	0.8 to 6.0	✓	Short circuit protection, <65mm <sup>2</sup> solution (HotRod package)		SON 2x2	\$0.84
	<b>TPS62090</b>	3.0	2.5 to 6.0	0.8 to 6.0	✓	97% efficiency, selectable fSW, adjustable soft start, tracking	✓	QFN 3x3	\$0.84
	<b>TPS62130</b>	3.0	3.0 to 17.0	0.9 to 6.0	✓	Selectable fSW, adjustable soft start, tracking, 17µA I <sub>Q</sub>	✓	QFN 3x3	\$0.93
	<b>TPS62135</b>	4.0	3.0 to 17.0	0.8 to 12	✓	4.0A buck converter with Eco-mode™ or forced PWM option		QFN 2x3	\$0.95
<b>TPS62095</b>	4.0	2.5 to 5.5	0.8 to 5.5	✓	95% efficiency soft start, tracking, <85mm <sup>2</sup> total solution size		QFN 3x3	\$1.00	
<b>TPS62480</b>	6.0	2.4 to 5.5	0.6 to 5.5		Ultra-small 6A solution with output select, temp good, 23µA I <sub>Q</sub>		QFN 2.5x3	\$1.29	
<b>TPS62180</b>	6.0	4.0 to 17.0	0.9 to 6.0		Ultra-small 6A solution (99mm <sup>2</sup> x1.2mm height), dual-phase, 28µA I <sub>Q</sub>		WCSP 2x3	\$1.36	
<b>TPS62400</b>	0.4/0.6	2.5 to 6.0	0.6 to 6.0		Dual output (180° out-of-phase), dynamic voltage scaling	✓	SON 3x3	\$0.75	
<b>TPS82740A</b>	0.2	2.2 to 5.5	1.8 to 3.3	✓	Ultra-low I <sub>Q</sub> (360nA) buck module, integrated C <sub>IN</sub> , C <sub>OUT</sub> , L (6.7mm <sup>2</sup> )		MicroSiP™ 2.3x2.9	\$1.32	
<b>TPS82670/93</b>	0.6	2.3 to 4.8	1.05 to 3.0		Buck converter module with integrated C <sub>IN</sub> , C <sub>OUT</sub> , L (6.7mm <sup>2</sup> solution)		MicroSiP 2.3x2.9	\$0.95	
<b>TPS82150/40</b>	1.0/2.0	3.0 to 17.0	0.9 to 6.0	✓	1A/2A step-down converter MicroSiP module with integrated inductor		MicroSiP 2.8x3	Web	
<b>TPS8268180</b>	1.6	2.5 to 5.5	0.9 to 1.8		Buck converter module with integrated C <sub>IN</sub> , C <sub>OUT</sub> , L (6.7mm <sup>2</sup> solution)		MicroSiP 2.3x2.9	\$1.21	
<b>TPS82084/85</b>	2/3	2.5 to 6.0	0.8 to 6.0	✓	2A/3A step-down converter MicroSiP modules with integrated inductor		MicroSiP 2.8x3	\$1.46/\$1.70	
<b>TPS82130</b>	3.0	3.0 to 17.0	0.9 to 6.0	✓	3A step-down converter MicroSiP module with integrated inductor		MicroSiP 2.8x3	\$1.90	

<sup>1</sup>Please contact factory to discuss Q100 qualification options.

New products are listed in bold red.

Preview products are listed in bold teal.

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