# Low-Power DC/DC Converter Overview TPS61 Boost, TPS62 Buck and TPS63 Buck-Boost

## TEXAS INSTRUMENTS

The TPS6 families of synchronous DC/DC converters with integrated FETs offer high efficiency over the complete load current, making them ideal for battery powered and low-power applications. Three main topologies are available: Boost converters (TPS61 and TPS81 series), buck converters (TPS62 and TPS82 series) and buck-boost converters (TPS63 series).

### **Device Family Key Application Benefits:**

- **DCS-Control™ topology** provides very accurate output voltage regulation achieved through excellent line and load transient response together with a seamless transition between PWM and power save mode.
- **Ultra-low power** DC/DC converters have low quiescent current and offer special design concepts needed in wearable, energy harvesting, metering and applications alike.
- The Value-Line portfolio (TLV6 series) offers a relaxed electrical specification for price-sensitive applications.
- MicroSiP<sup>™</sup> modules offer the smallest solution footprint and ease to use by integrating all required components likecapacitors and inductor.

	$V_{IN}$ up to 17V:	TPS62175 (28V <sub>IN</sub> ) <b>TPS62179 (20V<sub>IN</sub>)</b> TPS62170	TPS62150 TPS62160	TPS62140	TPS62130 TPS62134 (CPU)		TPS62180
Buck <sup>1</sup>	$V_{\rm IN}$ up to 6V:	TPS62230 TPS62671 (6MHz)	TPS62080 <b>TPS62684 (6MHz)</b>		TPS62090 <b>TPS62085</b> TPS62360 (CPU)	TPS62095	
	V <sub>IN</sub> up to 5.5V: Value Line		TLV62565	TLV62084			
	Ultra-Low Power / Special Function	TPS62125 (17V <sub>IN</sub> ) TPS62120 (15V <sub>IN</sub> ) <b>TPS62740 (5V<sub>IN</sub>)</b> <b>TPS62730 (3.9V<sub>IN</sub>)</b>	TPS62750				
	$\rm V_{\rm IN}$ up to 12V			TPS63060			
Buck-Boost <sup>2</sup>	$V_{\rm IN}$ up to 5.5V		TPS63036 <b>TPS63050</b>	TPS63010 TPS63000		TPS63020 <b>TPS63025</b>	
	$\rm V_{\rm IN}$ up to 6V	TPS61240	TPS61252	TPS61256	TPS61253		TPS61230 TPS61280
Boost <sup>2</sup>	Ultra-Low Power / Special Function	TPS61220 TPS61291	TPS61251				
	Buck	TPS82670 TPS82693 <b>TPS82740</b>	TPS82681	MicroSiP module – A complete DC/ DC solution with integrated inductor			
Module <sup>1</sup>	Boost	TPS81256		and input/output capacitors. No additional components are require to finish the design.			tors. No are required
		<0.8A	1A	2A	3A	4A	≥5A

<sup>1</sup>Output current. <sup>2</sup>Switch current limit.

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

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### **Selection Guide**

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The following selection is a sample of the TPS6 and TPS8 series that are available to streamline your design process.

	Topol- ogy1	Device <sup>2</sup>	Input Voltage Range (V)	Max. Output/ Switch Current	Output Voltage Range (V)	DCS-Control™ Topology	Features	Personal Electronics	Industrial	Auto. (Q100)1	Package(s)	1ku Price (US)
General Purpose Small, Efficient, Low Iq		TPS62240/60	2.0 to 6.0	0.3/0.6A	0.6 to 6.0		15µA operating quiescent current	1	1	1	SOT, QFN	\$0.50
		TPS62080	2.3 to 6.0	1.2A	0.5 to 4.0	1	6.5µA supply current in Snooze Mode		1		SON	\$0.83
		TLV62565	2.7 to 5.5	1.5A	0.6 to Vin		Power Good with TLV62566	1			SOT	\$0.67
		TPS62065	2.9 to 6.0	2.0A	0.8 to Vin		18µA quiescent current; output discharge		1	1	2x2SON	\$0.90
		TLV62084	2.7 to 5.5	2.0A	0.5 to 4.0	1	Light Load efficiency, output discharge	1			SON	\$0.73
		TPS62085	2.5 to 6.0	3.0A	0.8 to Vin	1	Hiccup short circuit protection	1	1		2x2QFN	\$1.05
		TPS62090	2.5 to 6.0	3.0A	0.8 to Vin	1	Soft Start, Tracking		1	1	3x3QFN	\$1.05
		TPS62095	2.5 to 5.5	4.0A	0.8 to Vin	1	Soft Start, Tracking	1	1		3x3QFN	\$1.65
		TPS61220	0.7 to 5.5	0.4A	1.8 to 5.5		Startup into load at 0.7V input voltage		1		SC-70	\$0.43
		TPS61252	2.3 to 6.0	1.5A	3.0 to 6.5		Adj. Switch Current Limit	1	1		QFN	\$0.75
		TPS61251	2.3 to 6.0	1.5A	3.0 to 6.5		Battery charging; supports large output cap	1	1		QFN	\$0.75
		TPS61230	2.3 to 5.5	5.0A	2.5 to 5.5		3.3 to 5V power conversion for USB	1	1		SON	\$1.15
		TPS61280	2.3 to 4.8	5.0A	2.85 to 4.4		Pass-through mode	1			WCSP	\$0.99
		TPS63030	1.8 to 5.5	1.0A	1.2 to 5.5		Freq. synch. possible	1	1	1	QFN	\$0.95
		TPS63050	2.5 to 5.5	1.0A	2.5 to 5.5		Adj. Input Current Limit; adj. Soft-Start (opt.)	1			WCSP	\$0.91
		TPS63000	1.8 to 5.5	1.8A	1.2 to 5.5		Freq. synch. possible	1	1	1	QFN	\$1.25
		TPS63010	2.0 to 5.5	2.2A	1.2 to 5.5		Freq. synch. possible	1			WCSP	\$1.35
		TPS63020	1.8 to 5.5	4.0A	1.2 to 5.5		Smart Power Good; freq. synch. possible	1	1		QFN	\$1.90
		TPS63025	2.3 to 5.5	5.0A	2.3 to 3.6		High current at small solution size	1	1		WCSP	\$1.75
w Power / -Function		TPS62120	2.0 to 15	75mA	1.2 to 5.5		96% efficiency; extended ULVO hysteresis		1		SOT, SON	\$0.65
		TPS62730	1.9 to 3.9	0.1A	Fixed opt.	1	Bypass for ultra-low power apps	1	1		SON	\$0.65
		TPS62125	3.0 to 17	0.3A	1.2 to 10	1	Adj. EN threshold and hysteresis		1		SON	\$0.70
		TPS62740	2.2 to 5.5	0.3A	1.8 to 3.3	1	Ultra-low lq (360nA)	1	1		SON	\$1.15
a-Lo		TPS62750	2.9 to 6.0	1.5A	0.8 to 5.1		USB-powered; adj. input current, hot-plug	1	1		SON	\$0.95
Set		TPS61291	0.9 to 5.0	0.7A	2.5 to 3.3		Bypass for ultra-low power applications		1		SON	\$0.70
		TPS61253	2.3 to 4.9	3.6A	5.0		Supports USB OTG; load disconnect	1			WCSP	\$0.80
		TPS62175	4.7 to 28	0.5A	1.0 to 6.0	1	Sleep-mode: less than 5µA supply current		1		WSON	\$0.75
		TPS62170	3.0 to 17	0.5A	0.9 to 6.0	1	Power Good output		1	1	SON	\$0.65
put-		TPS62179	2.7 to 20	0.75A	0.9 to 5.5	1	Adjustable input current limit		1		WCSP	\$0.89
Bai		TPS62160	3.0 to 17	1.0A	0.9 to 6.0	1	Power Good output		1	1	SON, VSSOP	\$0.85
age		TPS62140	3.0 to 17	2.0A	0.9 to 6.0	1	Frequency select, Soft Start/Tracking, PGood		1		3x3QFN	\$1.00
Votte		TPS62130	3.0 to 17	3.0A	0.9 to 6.0	1	Frequency select, Soft Start/Tracking, PGood		1	1	3x3QFN	\$1.10
-		TPS62180	4.0 to 17	6.0A	0.9 to 6.0		Dual-phase, phase-shifting		1		WCSP	TBD
		TPS63060	2.5 to 12	2.25A	2.5 to 8.0		Freq. synch. possible	1	1		QFN	\$1.50
al put		TPS62400	2.5 to 6.0	0.4/0.6A	0.6 to 6.0		$180^\circ$ out-of-phase operation; 1-wire interface	1	1	1	3x3QFN	\$0.85
ee 6		TPS62420	2.5 to 6.0	1.0/0.6A	0.6 to 6.0		180° out-of-phase operation; 1-wire interface	1	1	1	3x3QFN	\$1.00
e		TPS62619	2.3 to 5.5	0.35A	Fixed opt.		10mm <sup>2</sup> solution footprint, 0.4mm height	1			WCSP	\$0.50
est		TPS62230	2.0 to 6.0	0.5A	Fixed opt.	1	12mm <sup>2</sup> solution footprint, 0.6mm height	1	1		1x1.5SON	\$0.50
ltior		TPS62671	2.3 to 4.8	0.6A	Fixed opt.		Spread spectrum frequency dithering	1			WCSP	\$0.65
Solu <sup>†</sup>		TPS62660	2.3 to 5.5	1.0A	Fixed opt.		12mm <sup>2</sup> total solution footprint	1			WCSP	\$0.85
		TPS62684	3.2 to 5.5	1.6A	Fixed opt.		Spread spectrum frequency dithering	1			WCSP	\$0.90
CPU Power		TPS62650	2.3 to 5.5	0.8A	0.7 to 1.44		I <sup>2</sup> C interface	1		1	WCSP	\$0.87
		TPS62134	3.0 to 17	3.0A	0.8 to 1.05	√	VID output voltage selection		1		3x3QFN	\$0.90
		TPS62361	2.5 to 5.5	3.0A	0.5 to 1.77	1	I <sup>2</sup> C interface, remote differential sensing	1			WCSP	\$1.26
Module		TPS82740	2.2 to 5.5	0.3A	Fixed opt.		Buck: 6.7mm <sup>2</sup> solution; ultra-low lq (360nA)	1			MicroSiP™	\$0.70
		TPS82671	2.3 to 4.8	0.6A	Fixed opt.		Buck: 6.7mm <sup>2</sup> solution; spread spectrum	1			MicroSiP	\$1.15
		TPS82693	2.3 to 4.8	0.8A	Fixed opt.		Buck: 6.7mm <sup>2</sup> solution; spread spectrum	1			MicroSiP	\$1.50
		TPS82681	2.3 to 5.5	1.6A	Fixed opt.		Buck: 6.7mm <sup>2</sup> solution; spread spectrum	1	1		MicroSiP	\$0.70
		TPS81256	2.5 to 5.5	0.55A	5.0		Boost: <9mm <sup>2</sup> solution; supports USB OTG	1			MicroSiP	\$1.60

<sup>1</sup>Gray = Buck; Red = Buck-Boost; Green = Boost; Blue = Module <sup>2</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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