

Silent Switcher Technology

Industry's Lowest Noise Switching Regulators

Analog Devices' Silent Switcher® technology is the greatest development in power supplies since the switch-mode power supply itself. The Silent Switcher architecture simplifies design and PCB layout, reducing the chance of a redesign. The small solution size supports a range of applications, including industrial, instrumentation and measurement, healthcare, aerospace, communications, automotive, energy, data center, and more. This noise-cancelling technology increases system performance with the following benefits:

- ▶ Ultralow EMI performance that passes CISPR 25 Class 5
- ▶ Higher efficiency across all loads, improved thermal performance, and smaller solution size
- ▶ Higher achievable step-down ratios due to low minimum on times

LT7182S Dual 6 A, 20 V Silent Switcher 2 Step-Down Regulator with Digital Power System Management



- ▶ High frequency, low EMI, compact solution
- ▶ PMBus® enabled programmable power supply parameters, accurate telemetry, and EEPROM fault logging
- ▶ $\pm 0.25\%$ output voltage accuracy for optimized system performance over temperature

Silent Switcher Regulators: Technology Benefits that Involve No Trade-Offs!

Silent Switcher Technology

- ▶ Low EMI
- ▶ High efficiency
- ▶ High switching frequency

Silent Switcher 2 Technology

Includes all the features of Silent Switcher technology plus

- ▶ Integrated precision capacitors
- ▶ Smaller solution size
- ▶ Simplifies PCB layout

Silent Switcher 3 Technology

Includes all the features of Silent Switcher technology plus

- ▶ Ultralow LF noise (10 Hz to 100 kHz)
- ▶ Ultrafast transient response



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[ANALOG.COM/SILENTSWITCHER](https://www.analog.com/silentswitcher)

Silent Switcher Portfolio

Ultralow EMI Emissions

	Part Number	Number of Outputs	V _{IN} Range (V)	I _{OUT} Typ (A)	Minimum On Time (ns)	Frequency	I _Q	Spread Spectrum	Package (mm)		
Step-Down Regulators (Buck)	42 V _{IN} to 65 V _{IN} (Max)	LT8614	1	3.4 to 42	4	30	200 kHz to 3 MHz	1.7 μA	No	3 × 4, 18-lead FCQFN	
		LT8636	1	3.4 to 42	5	30	200 kHz to 3 MHz	1.7 μA	Yes	4 × 3, 20-lead LQFN	
		LT8637	1	3.4 to 42	5	30	200 kHz to 3 MHz	1.7 μA	Yes	4 × 3, 20-lead LQFN	
		LT8640	1	3.4 to 42	5, 7 peak	30	200 kHz to 3 MHz	1.7 μA	Yes	3 × 4, 18-lead FCQFN	
		LT8640A	1	3.4 to 42	5, 8 peak	30	200 kHz to 3 MHz	1.7 μA	Yes	3 × 4, 18-lead FCQFN	
		LT8640S-2	1	3.4 to 42	6	30	200 kHz to 3 MHz	1.7 μA	Yes	4 × 4, 24-lead LQFN	
		LT8641	1	3 to 65	3.5, 5 peak	35	200 kHz to 3 MHz	1.7 μA	Yes	3 × 4, 18-lead FCQFN	
		LT8641A	1	3 to 65	3.5, 5 Peak	35	200 kHz to 3 MHz	1.7 μA	Yes	3 × 4, 18-lead FCQFN	
		LT8643S-2	1	3.4 to 42	6	30	200 kHz to 3MHz	1.7 μA	Yes	4 × 4, 24-lead LQFN	
		LT8645S-2	1	3.4 to 65	8	40	200 kHz to 2.2 MHz	1.7 μA	Yes	6 × 4, 32-lead LQFN	
Step-Down Regulators (Buck)	18 V _{IN} to 36 V _{IN} (Max)	LT8642-1	1	2.8 to 18	10	20	200 kHz to 3 MHz	240 μA	Yes	3 × 4, 20-lead LQFN	
		5.5 V _{IN} (Max)	LTC3307A	1	2.25 to 5.5	3	22	1 MHz to 3 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3307B	1	2.25 to 5.5	3	22	3 MHz to 10 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3308A	1	2.25 to 5.5	4	22	1 MHz to 3 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3308B	1	2.25 to 5.5	4	22	3 MHz to 10 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3309A	1	2.25 to 5.5	6	22	1 MHz to 3 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3309B	1	2.25 to 5.5	6	22	3 MHz to 10 MHz	40 μA	No	2 × 2, 12-lead LQFN
			LTC3310	1	2.25 to 5.5	10	35	500 kHz to 5 MHz	1.3 mA	No	3 × 3, 18-lead LQFN
			LTC3310-1	1	2.25 to 5.5	10	35	500 kHz to 5 MHz	1.3 mA	No	3 × 3, 18-lead LQFN
			LTC3311	1	2.25 to 5.5	12.5	35	500 kHz to 2.25 MHz	1.3 mA	No	3 × 3, 18-lead LQFN
LTC3313	1		2.25 to 5.5	15	35	500 kHz to 2.25 MHz	1.3 mA	No	3 × 3, 18-lead LQFN		
Boost Regulators (Step-Up)	28 V _{IN} to 40 V _{IN} (Max)	LT8336	1	2.7 to 40	2.5 (I _{PEAK})	20	300 kHz to 3 MHz	4 μA	Yes	3 × 3, 16-lead LQFN	
		LT8337	1	2.7 to 28	5 (I _{PEAK})	20	300 kHz to 3 MHz	4 μA	Yes	3 × 3, 16-lead LQFN	
Buck-Boost Regulators	40 V _{IN} (Max)	1	3 to 40	6.3 (I _{PEAK})	—	200 kHz to 2 MHz	3.5 μm	Yes	4 × 6, 28-lead LQFN		

Silent Switcher 2 Portfolio

Ultralow EMI Emissions on Any PCB, Eliminates PCB Layout Sensitivity

		Part Number	Number of Outputs	V _{in} Range (V)	I _{out} Typ (A)	Minimum On Time (ns)	Frequency	I _o	Spread Spectrum	Package (mm)
Step-Down Regulators (Buck)	42 V _{in} to 65 V _{in} (Max)	LT8608S	1	3 to 42	1.5	35	200 kHz to 2.2 MHz	1.7 μA	Yes	2 × 3, 12-lead LQFN
		LT8609S	1	3 to 42	2	45	200 kHz to 2.2 MHz	1.7 μA	Yes	3 × 3, 16-lead LQFN
		LT8638S	1	2.8 to 42	10, 12 peak	25	200 kHz to 3 MHz	90 μA	Yes	5 × 4, 28-lead LQFN
		LT8640S	1	3.4 to 42	6	30	200 kHz to 3 MHz	1.7 μA	Yes	4 × 4, 24-lead LQFN
		LT8643S	1	3.4 to 42	6	30	200 kHz to 3 MHz	1.7 μA	Yes	4 × 4, 24-lead LQFN
		LT8645S	1	3.4 to 65	8	40	200 kHz to 2.2 MHz	1.7 μA	Yes	6 × 4, 32-lead LQFN
		LT8646S	1	3.4 to 65	8	40	200 kHz to 2.2 MHz	17 μA	Yes	6 × 4, 32-lead LQFN
		LT8648S	1	3 to 42	15	25	200 kHz to 2.2 MHz	140 μA	Yes	7 × 4, 36-lead LQFN
		LT8650S	2	3 to 42	4, 6 peak	40	300 kHz to 3 MHz	3.7 μA	Yes	6 × 4, 32-lead LQFN
		LT8650SP	2	3 to 42	6, 8 peak	40	300 kHz to 3 MHz	3.7 μA	Yes	6 × 4, 32-lead LQFN
		LT8653S	2	2.6 to 42	2	30	300 kHz to 3 MHz	6.2 μA	Yes	4 × 3, 20-lead LQFN
		LT8685S	4	3 to 42	2.5	25	350 kHz to 3 MHz	1.2 μA	Yes	5 × 6, 36-lead LQFN
		LT8686S	4	3 to 42	2	20	350 kHz to 3 MHz	12 μA	Yes	5 × 5, 32-lead LQFN
		LT8692S	4	3 to 42	2	20	1.6 MHz to 2.5 MHz	3.6 μA	Yes	4 × 3, 20-lead LQFN
		LT8698S	1	7 to 42	3	30	300 kHz to 3 MHz	2.5 mA	Yes	6 × 4, 32-lead LQFN
	8 V _{in} to 20 V _{in} (Max)	LT7200S	4	1.5 to 18	±5	12	400 kHz to 3 MHz	2 mA	No	5 × 6, 48-lead LQFN
		LT8642S	1	2.8 to 18	10	20	200 kHz to 3 MHz	239 μA	Yes	4 × 4, 24-lead LQFN
		LT8644S	1	1.5 to 8	16	20	300 kHz to 3.5 MHz	125 μA	Yes	4 × 4, 24-lead LQFN
		LT8652S	2	2.6 to 18	8.5	20	300 kHz to 3 MHz	16 μA	Yes	4 × 7, 36-lead LQFN
	8 V _{in} to 20 V _{in} (Max) with PHiBus	LT7182S	2	1.5 to 20	6	25	400 kHz to 4 MHz	7 mA	No	7 × 5, 40-lead LQFN
5.5 V _{in} (Max)	LTC3310S	1	2.25 to 5.5	10	35	500 kHz to 5 MHz	1.3 mA	No	3 × 3, 18-lead LQFN	
	LTC3310S-1	1	2.25 to 5.5	10	35	500 kHz to 5 MHz	1.3 mA	No	3 × 3, 18-lead LQFN	
	LTC3311S	1	2.25 to 5.5	12.5	35	500 kHz to 2.25 MHz	1.3 mA	No	3 × 3, 18-lead LQFN	

Silent Switcher 3 Portfolio

Ultralow Noise Performance, Ultrafast Transient Performance

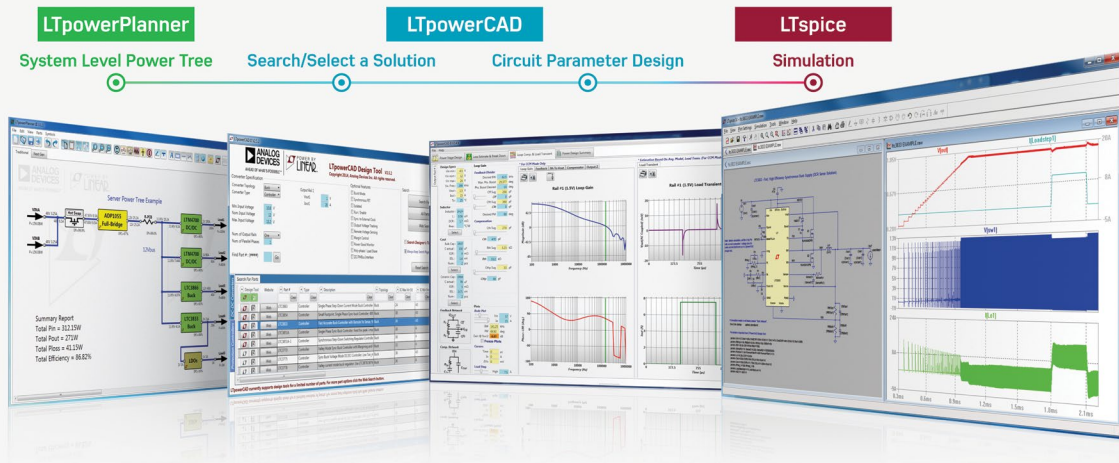
		Part Number	Number of Outputs	V _{in} Range (V)	I _{out} (A)	Minimum On Time (ns)	V _{out} (Min) (V)	Frequency	I _o (mA)	RMS Noise (μV)	Package (mm)
Step-Down Regulators (Buck)	18 V _{in} (Max)	LT8622S	1	2.7 to 18	2	12	0	300 kHz to 6 MHz	2.8	4	4 × 3, 20-lead LQFN
		LT8624S	1	2.7 to 18	4	12	0	300 kHz to 6 MHz	2.8	4	4 × 3, 20-lead LQFN
		LT8625S	1	2.7 to 18	8	15	0	300 kHz to 4 MHz	2.8	4	4 × 3, 20-lead LQFN
		LT8625SP	1	2.7 to 18	8	15	0	300 kHz to 4 MHz	2.8	4	4 × 3, 20-lead LQFN
		LT8625SP-1	1	2.7 to 18	8	15	0	300 kHz to 4 MHz	2.8	4	4 × 4, 24-lead LQFN
		LT8627SP	1	2.8 to 18	16	16	0	300 kHz to 4 MHz	3.2	4	4 × 4, 24-lead LQFN

Silent Switcher μ Module[®] Regulators

Ultralow EMI Switching μ Module Regulators Simplify Design and Layout

	Part Number	Number of Outputs	V_{in} Range (V)	I_{out} Typ (A)	V_{out} (Min) (V)	Frequency	I_o	Spread Spectrum	Package (mm)		
Step-Down Regulators (Buck)	40 V_{in} to 60 V_{in} (Max)	LTM8002	1	3.4 to 40	2.5	0.97	200 kHz to 3 MHz	8 μ A	Yes	6.25 × 6.25 × 2.22 BGA	
		LTM8003	1	3.4 to 40	3.5	0.97	200 kHz to 3 MHz	8 mA	Yes	9 × 6.25 × 3.32 BGA	
		LTM8024	2	3 to 40	3.5	0.8	200 kHz to 3 MHz	90 μ A	Yes	11.25 × 9 × 3.32 BGA	
		LTM8051	4	3 to 40	1.2	0.8	300 kHz to 3 MHz	60 μ A	Yes	11.25 × 6.25 × 2.22 BGA	
		LTM8053	1	3.4 to 40	3.5	0.97	200 kHz to 3 MHz	300 μ A	Yes	9 × 6.25 × 3.32 BGA	
		LTM8060	4	3 to 40	4	0.8	200 kHz to 3 MHz	300 μ A	Yes	16 × 11.9 × 3.32 BGA	
		LTM8063	1	3.2 to 40	2	0.8	200 kHz to 2.2 MHz	8 μ A	Yes	6.25 × 4 × 2.22 BGA	
		LTM8065	1	3.4 to 40	2.5	0.97	200 kHz to 3 MHz	8 μ A	Yes	6.25 × 6.25 × 2.32 BGA	
		LTM8071	1	3.6 to 60	5	0.97	200 kHz to 2.2 MHz	300 μ A	Yes	11.25 × 9 × 3.32 BGA	
		LTM8073	1	3.4 to 60	3	0.8	200 kHz to 3 MHz	275 μ A	Yes	9 × 6.25 × 3.32 BGA	
		LTM8074	1	3.2 to 40	1.2	0.8	200 kHz to 2.2 MHz	8 μ A	Yes	4 × 4 × 1.82 BGA	
		LTM8078	2	3 to 40	1.4	0.8	300 kHz to 3 MHz	60 μ A	Yes	6.25 × 6.25 × 2.22 BGA	
	Buck + LDO (Step-Down Regulator)	40 V_{in} (Max)	5.5 V_{in} (Max)	LTM4658	1	2.5 to 5.5	10	0.5	1 MHz to 3 MHz	1.6 mA	No
LTM4670				4	2.25 to 5.5	10	0.5	1.2 MHz to 2.6 MHz	70 mA	No	15 × 7.5 × 4.6 BGA
16 V_{in} to 18 V_{in} (Max)			LTM4652	2	4.5 to 18	25	0.6	300 kHz to 780 kHz	135 mA	Yes	16 × 16 × 4.92 BGA
			LTM4702	1	3 to 16	8	0.3	300 kHz to 3 MHz	13 mA	Yes	6.25 × 6.25 × 5.02 BGA

Design Tools



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