



INTEL® ENPIRION® POWER SOLUTIONS

Powering Your Innovation



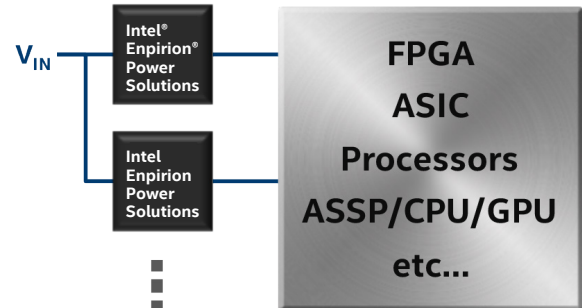
INTEL® ENPIRION® POWER SOLUTIONS

Expertise in Solving Your Toughest Power Challenges

Intel® Enpirion® Power Solutions are high-frequency DC-DC step-down power converters optimized for FPGAs, processors, ASICs, and other semiconductor devices.

Intel Enpirion PowerSoCs enable:

- Low noise and fast transient response performance
- High power density and small footprint
- High efficiency and excellent thermal performance
- Low component count and high reliability
- Ease of design and fast time to market



PART NUMBER	MAX I _{OUT} (A)	V _{IN} RANGE (V)	V _{OUT} RANGE (V)	SWITCHING FREQUENCY (MHZ)	PACKAGE (PINS)	PACKAGE SIZE (MM)			SOLUTION SIZE (MM ²) ⁽¹⁾	DIGITAL V _{OUT} SET (VID OR PMBus*)	POWER GOOD / POK FLAG	PROGRAMMABLE SOFT-START	PRECISION ENABLE	INPUT SYNCHRONIZATION	OUTPUT SYNCHRONIZATION	PARALLEL CAPABILITY	PROGRAMMABLE FREQUENCY	LIGHT LOAD MODE	AUTOMOTIVE-GRADE AVAILABLE
						L	W	H											
POWERSOCS UP TO 6.6V INPUT																			
	EP5348UI	0.4	2.5 – 5.5	0.6 – V _{IN} ⁽²⁾	9.0	uQFN14	2.0	1.75	0.9	21									
	EP5357/8HUJ ⁽³⁾	0.6	2.4 – 5.5	1.8 – 3.3	5.0	QFN16	2.5	2.25	1.1	14	•							•	•
	EP5357/8LUJ ⁽³⁾	0.6	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	5.0	QFN16	2.5	2.25	1.1	14	•							•	•
	EP5368QI	0.6	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	4.0	QFN16	3.0	3.0	1.1	21	•								
	EP5388QI	0.8	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	4.0	QFN16	3.0	3.0	1.1	28	•								
	EP53A7/8HQI ⁽³⁾	1.0	2.4 – 5.5	1.8 – 3.3	5.0	QFN16	3.0	3.0	1.1	21	•							•	•
	EP53A7/8LQI ⁽³⁾	1.0	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	5.0	QFN16	3.0	3.0	1.1	21	•							•	•
	EN5311QI	1.0	2.4 – 6.6	0.6 – V _{IN} ⁽²⁾	4.0	QFN20	4.0	5.0	1.1	36	•								
	EN6310QI	1.0	2.7 – 5.5	0.6 – 3.3	2.2	QFN30	4.0	5.0	1.85	65		•	•						•
	EP53F8QI	1.5	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	4.0	QFN16	3.0	3.0	1.1	40		•							
Footprint Compatible	EN5319QI	1.5	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	3.2	QFN24	4.0	6.0	1.1	50		•							
	EN5329QI	2.0																	
	EN5339QI	3.0																	
	EN5322QI	2.0	2.4 – 5.5	0.6 – V _{IN} ⁽²⁾	4.0	QFN24	4.0	6.0	1.1	58	•	•							
	EN5335/6QI ⁽⁴⁾	3.0	2.4 – 6.6	0.75 – 3.3/V _{IN} ⁽²⁾	5.0	QFN44	7.5	10.0	1.85	157	•	•	•						
	EN5337QI	3.0	2.4 – 5.5	0.75 – V _{IN} ⁽²⁾	5.0	QFN38	4.0	7.0	1.85	75		•	•		•				
	EN6338QI	3.0	2.7 – 6.6	0.75 – V _{IN} ⁽²⁾	1.9	LGA19	3.75	3.75	1.9	45		•	•		•			•	
Footprint Compatible	EN6337QI	3.0	2.5 – 6.6	0.75 – V _{IN} ⁽²⁾	1.9	QFN38	4.0	7.0	1.85	75		•	•		•			•	•
	EN6347QI	4.0																	
	EN6340QI	4.0																	
Footprint Compatible	EN6363QI	6.0	2.7 – 6.6	0.6 – V _{IN} ⁽²⁾	2.0	QFN34	4.0	6.0	2.5	60		•	•	•					
	EN5365/6QI ⁽⁴⁾	6.0	2.4 – 5.5	0.75 – 3.3/V _{IN} ⁽²⁾	5.0	QFN58	10.0	12.0	1.85	229	•	•	•				•		
	EN5367QI	6.0	2.5 – 5.5	0.75 – V _{IN} ⁽²⁾	4.0	QFN54	5.5	10.0	3.0	160		•	•		•		•		
Footprint Compatible	EN6362QI	6.0	3.0 – 6.5	0.6 – V _{IN} ⁽²⁾	0.9 – 1.5	QFN56	8.0	8.0	3.0	160		•	•	•				•	
	EN6382QI	8.0																	
	Footprint Compatible	EN5364QI	6.0	2.4 – 6.6	0.6 – V _{IN} ⁽²⁾	4.0	QFN68	8.0	11.0	1.85	160		•	•	•	•	•		
EN5394QI		9.0	190																
	EN6360QI	8.0	2.5 – 6.6	0.6 – V _{IN} ⁽²⁾	0.9 – 1.5	QFN68	8.0	11.0	3.0	190		•	•	•	•	•	•		•
	EN5395/6QI ⁽⁴⁾	9.0	2.4 – 5.5	0.75 – 3.3/V _{IN} ⁽²⁾	5.0	QFN58	10.0	12.0	1.85	277	•	•	•				•		
	EN63A0QI	12.0	2.5 – 6.6	0.6 – V _{IN} ⁽²⁾	0.9 – 1.5	QFN76	10.0	11.0	3.0	225		•	•	•	•	•	•		•

PART NUMBER	MAX I _{OUT} (A)	V _{IN} RANGE (V)	V _{OUT} RANGE (V)	SWITCHING FREQUENCY (MHZ)	PKG (PINS)	PKG SIZE (MM)			SOLUTION SIZE (MM ²) ⁽¹⁾	V _{OUT} SET: VOLTAGE ID (VID)	POWER GOOD / POK FLAG	PROGRAMMABLE SOFT-START	PRECISION ENABLE	INPUT SYNCHRONIZATION	OUTPUT SYNCHRONIZATION	PARALLEL CAPABILITY	PROGRAMMABLE FREQUENCY	LIGHT LOAD MODE	AUTOMOTIVE-GRADE AVAILABLE	
POWERSOCS UP TO 12V INPUT																				
EN2342QI	4.0	4.5 – 14.0	0.75 – 5.0	0.9 – 1.8	QFN68	8.0	11.0	3.0	200		•	•		•	•		•			
EN29A0QI	10.0	9.0 – 16.0	0.75 – 3.3	0.45 – 2.0	QFN84	12.0	14.0	4.0	450		•	•	•	•	•		•			
Footprint Compatible	EM2030xQI	30.0	4.5 – 16.0	0.5 – 1.3	0.8	QFN100	11.0	17.0	6.8	360		•	•							
	EM2040xQI	40.0																		
Footprint Compatible	EM2120xQI	20.0	4.5 – 16.0	0.7 – 5.0	0.8 or 1.33	QFN100	11.0	17.0	6.8	360	•	•	•							
	EM2130xQI	30.0		0.7 – 3.6																
	EM2140xQI	40.0		0.5 – 1.325							0.8									
Footprint Compatible	EM2260xQI	60.0	4.5 – 16.0	0.5 – 1.3	0.8	QFN152	18.0	23.0	5.0	650	•	•	•		•	•				
	EM2280xQI	80.0			0.5				6.8											
MULTI-OUTPUT POWERSOCS																				
Footprint Compatible	EZ6301QI	1.5	2.7 – 6.6	0.6 – V _{IN} ⁽²⁾	2.5	QFN40	4.0	7.0	1.85	120		•	•	•						
		0.3	1.6 – 5.5	0.9 – V _{IN} ⁽²⁾								•		•						
		0.3	1.6 – 5.5	0.9 – V _{IN} ⁽²⁾								•		•						
	EZ6303QI	2.2	2.7 - 3.6	0.6 – V _{IN} ⁽²⁾	2.5	QFN40	4.0	7.0	1.85	120		•	•	•						
		0.3	1.6 – 5.5	0.9 – V _{IN} ⁽²⁾								•		•						
		0.3	1.6 – 5.5	0.9 – V _{IN} ⁽²⁾								•		•						
LOW DROPOUT REGULATORS (LDOS)																				
EY1602SI-ADJ	0.05	6.0 – 40.0	2.5 – 12.0		SOIC8	6.2	5.0	1.68	~45											
DC-DC REGULATORS																				
ER3105DI	0.5	3.0 – 36.0	0.6 – 34.0	0.3 – 2.0	DFN12	4.0	3.0	1.0	~160		•	•		•			•	•		
ER2120QI	2.0	5.0 – 14.0	0.6 – 5.0	0.5 – 1.2	QFN24	4.0	4.0	0.9	~165		•	•		•			•			
ER6230QI	3.0	2.7 – 6.6	0.75 – V _{IN} ⁽²⁾	1.9	QFN24	4.0	4.0	0.85	85		•	•		•			•	•		
HIGH EFFICIENCY DDR MEMORY TERMINATION (VTT)																				
EV1320QI	2.0	0.95 – 1.8	0.5 – 0.9	0.625	QFN16	3.3	3.3	0.9	40		•	•				•				
EV1340QI	5.0	1.0 – 1.8	0.6 – 0.9	1.5	QFN54	5.5	10.0	3.0	125		•	•								
EV1380QI	8.0	1.2 - 1.65	0.6 – 0.825	1.25 – 1.75	QFN68	8.0	11.0	3.0	200		•	•		•	•	•	•			

FEATURED PRODUCTS

EM2260/EM2280



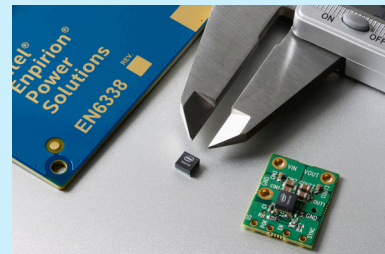
Footprint and Scalable Fully Digital PowerSoCs

EN29A0



10 A Low-Noise PowerSoC

EN6338



3 A High-Efficiency, Tiny PowerSoC

Notes:

1. Size estimate for example single-sided PCB including all suggested external components. Smaller size may be possible with double-sided PCB design.
2. Maximum V_{OUT} = V_{IN} – V_{DROPOUT}, where V_{DROPOUT} = R_{DROPOUT} x Load Current. Reference device datasheet to calculate V_{DROPOUT}.
3. Only “7” version features Light Load Mode. Only “8” version available in automotive grade.
4. Only “5” version features V_{OUT} set by VID.

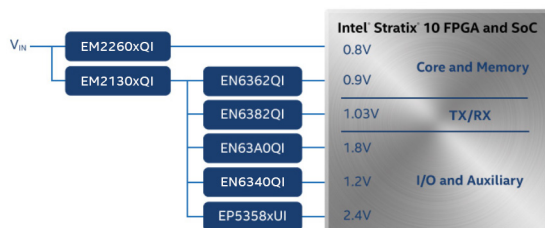
Also available:

ES1030QI: Tiny, Low-Profile, Four-Channel Power Rail Sequencer

For a complete list of Intel® Enpirion® power products, please visit www.intel.com/enpirion

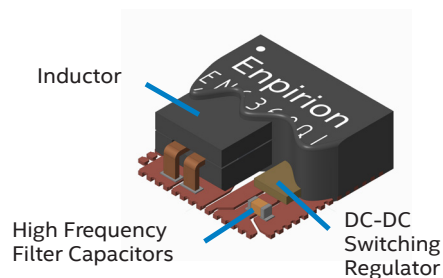
Optimized for FPGA

With programmable logic and power expertise, Intel knows how to power FPGAs



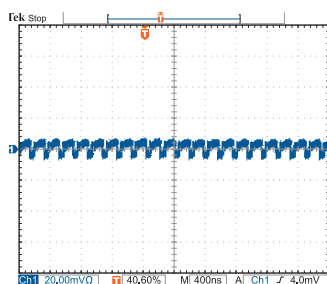
Designed and Validated as a Complete Power Solution

Highly integrated and achieves >80,000 year mean time between failures (MTBF) reliability†



Excellent AC+DC Noise Performance

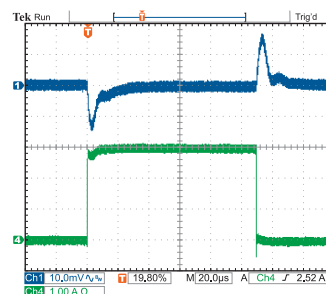
Achieve <10 mV_{pp} ripple and ≤2% accuracy for most devices†



5 V input, 3.3 V output, 500 MHz bandwidth

Fast Transient Response

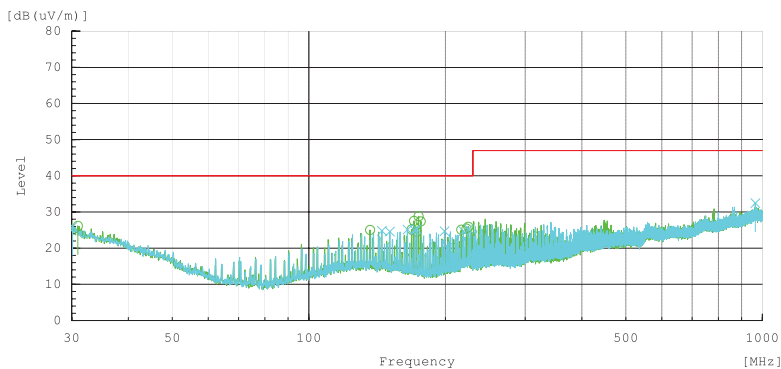
Reduce large, expensive bulk capacitance



5 V input, 3.3 V output, <16 mV deviation

Low EMI Performance

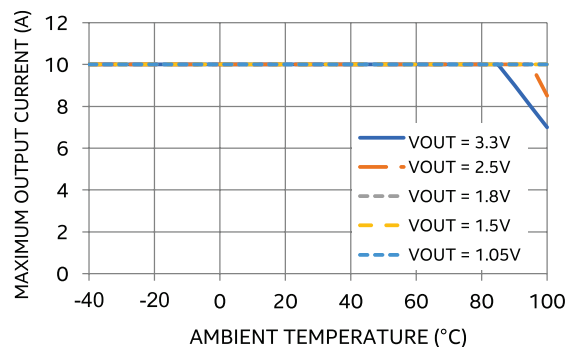
Exceeds CISPR 32 Class B Emissions



Conditions: $V_{IN} = 12\text{ V}$, $V_{OUT} = 1.2\text{ V}$

No Thermal Derating

Minimal thermal derating up to 85°C



Conditions: $V_{IN} = 12\text{ V}$, $T_{JMAX} = 125^{\circ}\text{C}$, $\Theta_{JA} = 10^{\circ}\text{C/W}$, No Air Flow



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†Tests measure performance of components on a particular test, in specific systems. Differences in hardware, software, or configuration will affect actual performance. Consult other sources of information to evaluate performance as you consider your purchase. For more complete information about performance and benchmark results, visit www.intel.com/benchmarks.

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