



Industrial

DC-DC power converters & EMI Filters



Products for the
**Global Industrial
Market Environment**



OPERATIONAL FEATURES

- High efficiency up to 95%
- Input voltage ranges from 9V-160V and 180V-425V
- Output power up to 600W
- Fixed frequency switching, low output noise
- No minimum load requirement
- Full Feature optional on some models

MECHANICAL

- Industry standard pin-out configurations
- Flanged baseplate available
- Industry standard footprints:
 - Full Brick: 2.48" x 4.69"
 - Half Brick: 2.39" x 2.49"
 - Quarter Brick: 1.54" x 2.39"
 - Sixteenth Brick: 1.04" x 1.44"

PROTECTION/CONTROL

- Input under-voltage lockout
- Output current limit and short circuit protection
- Active back bias limit prevents damage to converter from external load induced pre-bias
- Output over-voltage protection
- Thermal shutdown

GENERAL SPECIFICATIONS

- | | |
|---|--------------------|
| • Operating Temperature | -40°C to +100°C |
| • Output Voltage Set Point | ±1.0% |
| • Output Voltage Ripple | <1% of Vout (typ.) |
| • Switching Frequency (IQ4H QT and HT) | 240 - 350kHz |
| • Transient Response | 450 - 550kHz |
| • Output Voltage Trim Range (Sixteenth Brick) | <7% of Vout (typ.) |
| • Output Voltage Trim Range (Half Brick Zeta) | +10% to -20% |
| • Isolation Voltage | +10% to -10% |
| | +10% to -50% |
| | Up to 4250Vdc |

SAFETY

IQ12 - IQ48

- Basic Insulation
- 2250V, 30MΩ input-to-output isolation
- CAN/CSA C22.2 NO. 60950-1:2007
- UL 60950-1:2007
- EN 60950-1/A11:2009

IQ64 - IQ4H

- Reinforced Insulation
- Up to 4250V, 100MΩ input-to-output isolation
- CAN/CSA C22.2 NO. 60950-1:2007
- UL 60950-1:2007
- EN 60950-1/A11:2009
- CE marked

EMI Filter Modules

Filters for InQor DC-DC converters

OPERATIONAL FEATURES

- Low DC resistance
- >80dB differential noise attenuation
- >50dB common-mode noise attenuation
- Buck capacitor provides input system stabilization for downstream power converters
- No electrolytic capacitors (all ceramic design)
- High-voltage isolation between chassis and input / output
- Wide temperature range operation

PRODUCT OPTIONS

- Input voltage ranges match available SynQor dc-dc converters



MECHANICAL

- Industry standard form factors
 - Quarter Brick: 1.54" x 2.39"
- Also available with a flanged baseplate

IN-LINE MANUFACTURING PROCESS

- AS9100 and ISO 9001:2000 certified facility
- Full component traceability

DESIGN PROCESS

- Designed to operate with SynQor dc-dc converters to create systems compliant with industry standards. See product datasheets for details.
- Conservative derating guidelines used for reliable operation. See product datasheets for details.

LISTED BY PACKAGE AND OUTPUT VOLTAGE

2:1 INPUT RATIO

VOUT	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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12V_{DC} INPUT (9-22V_{DC} INPUT RANGE, TRANSIENT 25V)

Half Brick	HPC			60A		50A	36A		15A	12A	7.5A	6.5A		4.5A	3.7A
	HTC			50A		40A	28A		12A	9.5A	6A	5A		3.5A	3A
Quarter Brick	QTC			40A		30A	20A	14A	8A	7A	4A		3A		2A
	QGC			30A		20A	15A	10A	6A	5A	3A		2.4A		1.5A
	QMC										2A		1.5A		1A
Sixteenth Brick	SMC	25A	25A	25A	20A	15A	10A	7A	4A	3A					
	SKC	20A	16A	14A	10A	8A	5A	3.5A	2A	1.7A					

VOUT	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
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24V_{DC} INPUT (18-36V_{DC} INPUT RANGE, TRANSIENT 50V)

Half Brick	HZC						60A		50A	40A	25A	21.5A		15A		12A
	HPC			60A		50A	40A		18A	15A	9A	7.5A		5.5A	4.5A	
	HTC			50A		40A	30A		13A	10A	6.5A	5.5A		4A	3.3A	
Quarter Brick	QTC			40A		30A	24A	17A	10A	8A	5A		4A		2.5A	
	QGC			32A		25A	18A	13A	7.5A	6A	3.7A		3A		1.8A	
	QMC												2A		1.2A	
Sixteenth Brick	SMC	25A	25A	25A	20A	15A	10A	7A	4A	3A						
	SKC	20A	16A	14A	10A	8A	5A	3.5A	2A	1.7A						

VOUT	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V	50V
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48V_{DC} INPUT (34-75V_{DC} INPUT RANGE, TRANSIENT 100V)

Half Brick	HZC						60A		50A	40A	25A	21.5A		15A		12A
	HPC			60A		60A	46A		21A	17A	10.5A	9A		6.3A	5.2A	
	HTC			50A		45A	34A		16A	13A	8A	7A		5A	4A	
Quarter Brick	QTC			40A		30A	25A	20A	12A	10A	6A		5A		3A	
	QGC			32A		25A	21A	15A	9A	7A	4.5A		3.5A		2.2A	
	QMC												1.6A		1A	
Sixteenth Brick	SMC	25A	25A	25A	20A	15A	10A	7A	4A	3A						
	SKC	20A	16A	14A	10A	8A	5A	3.5A	2A	1.7A						

VOUT	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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72V_{DC} INPUT (42-110V_{DC} INPUT RANGE)

Half Brick	HPC	60A	60A	46A		21A	17A	10.4A	9A		6.3A	5.2A
	HTC	50A	45A	34A		16A	13A	8A	7A		5A	4A
Quarter Brick	QTC	40A	30A	25A	20A	12A	10A	6A		5A		3A
	QGC	32A	25A	20A	15A	9A	7A	4.5A		3.5A		2A
	QMC								2A		1.2A	



LISTED BY PACKAGE AND OUTPUT VOLTAGE

IQ1B	V _{OUT}	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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110V_{DC} INPUT (66-160V_{DC} INPUT RANGE, TRANSIENT 170V)

Half Brick	HPC	60A	60A	48A		21A	17A	10A	9A		6.3A	5.2A
	HTC	50A	45A	34A		16A	13A	8A	7A		5A	4A
Quarter Brick	QTC	40A	30A	25A	20A	12A	10A	6A		5A		3A
	QGC	32A	23A	18A	15A	9A	7A	4.5A		3.5A		2A
	QMC	25A	15A	10A	7A	4A	3A	2A		1.5A		1A

IQ4H	V _{OUT}	1.8V	2.5V	3.3V	5V	12V	15V	24V	28V	48V
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385V_{DC} INPUT (180-425V_{DC} INPUT RANGE, TRANSIENT 475V)

Full Brick	FTC				80A	50A	40A	25A	21.4A	12.5A
Half	HTC	70A	70A	60A	50A	25A	20A	12.5A	10.7A	6.25A
Quarter	QTC	30A	30A	30A	30A	13A	10A	6.25A	5.35A	3.12A

IQ18	V _{OUT}	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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18V_{DC} INPUT (9-36V_{DC} INPUT RANGE, TRANSIENT 40V)

Half Brick	HPC			60A		50A	36A		15A	12A	7.5A	6.5A		4.5A	3.7A
	HTC			50A		40A	28A		12A	9.5A	6A	5A		3.5A	3A
Quarter Brick	QTC			40A		30A	20A	14A	8A	7A	4A		3A		2A
	QGC			30A		20A	15A	10A	6A	5A	3A		2.4A		1.5A
	QMC										2A		1.5A		1A
Sixteenth Brick	SMC	25A	25A	25A	20A	15A	10A	7A	4A	3A					
	SKC	20A	14A	14A	10A	8A	5A	3.5A	2A	1.7A					

IQ36	V _{OUT}	1.2V	1.5V	1.8V	2.5V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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36V_{DC} INPUT (18-75V_{DC} INPUT RANGE)

Half Brick	HPC			60A		50A	40A	30A	18A	14A	9A	7.5A		5.5A	4.5A
	HTC			50A		40A	30A	22A	13A	10A	6.5A	5.5A		4A	3.2A
Quarter Brick	QTC			40A		30A	24A	17A	10A	8A	5A		4A		2.5A
	QGC			32A		25A	18A	13A	7.5A	6A	3.7A		3A		1.8A
	QMC												2A		1.2A
Sixteenth Brick	SMC	25A	25A	25A	20A	15A	10A	7A	4A	3A					
	SKC	20A	16A	14A	10A	8A	5A	3.5A	2A	1.7A					

IQ70	V _{OUT}	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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70V_{DC} INPUT (34-135V_{DC} INPUT RANGE)

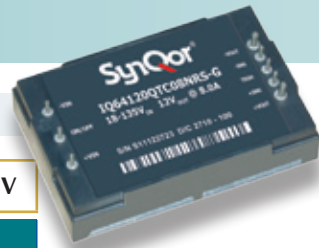
Half Brick	HPC	60A	57A	44A		20A	16A	10A	8.5A		6A	5A
	HTC	50A	43A	32A		15A	12A	7.5A	6.5A		4.5A	3.8A
Quarter Brick	QTC	40A	30A	24A	18A	11A	8.6A	5.5A		4.4A		2.7A
	QGC	32A	23A	17A	12A	7A	5.5A	3.5A		2.8A		1.8A
	QMC	25A	15A	10A	7A	4A	3.3A	2A		1.6A		1A



2:1 INPUT RATIO

4:1 INPUT RATIO

LISTED BY PACKAGE AND OUTPUT VOLTAGE



8:1 INPUT RATIO

IQ32

VOUT	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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32VDC INPUT (9-75VDC INPUT RANGE, TRANSIENT 100V)

Half Brick	HZC			50A		21A	17A	10A	9A		6A	5A
	HPC	55A	45A	32A		13A	11A	6.7A	5.8A		4A	3.4A
	HTC	45A	33A	24A		10A	8A	5A	4.5A		3A	2.5A
Quarter Brick	QTC	35A	25A	17A	12A	7A	5.5A	3.5A		2.8A		1.8A
	QGC	25A	15A	10A	7A	4A	3.3A	2A		1.6A		1A

IQ64

VOUT	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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64VDC INPUT (18-135VDC INPUT RANGE)

Half Brick	HPC	60A	50A	36A		16A	13A	8A	7A		5A	4A
	HTC	50A	40A	28A		12A	10A	6A	5.5A		3.8A	3A
Quarter Brick	QTC	36A	27A	20A	14A	8A	6.5A	4A		3.2A		2A
	QGC	25A	15A	10A	7A	4A	3.3A	2A		1.6A		1A

IQ90

SERIES	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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90VDC INPUT (34-160VDC INPUT RANGE)

Half Brick	HPC	60A	53A	40A		19A	15A	9.5A	8A		5.7A	4.6A
	HTC	50A	40A	30A		13A	10A	6.5A	5.7A		4A	3.2A
Quarter Brick	QTC	40A	30A	24A	17A	10A	8A	5A		4A		2.5A
	QGC	32A	23A	17A	12A	7A	5.5A	3.5A		2.8A		1.8A
	QMC	25A	15A	10A	7A	4A	3.3A	2A		1.6A		1A

12:1 RATIO

IQ68

VOUT	1.8V	3.3V	5V	7V	12V	15V	24V	28V	30V	40V	48V
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68VDC INPUT (12-150VDC INPUT RANGE, TRANSIENT 170V)

Half Brick	HGC			10A		4.4A		2.2A				1.1A
Quarter	QGC			5A		2.2A		1.1A				0.55A

InQor PART NUMBERING GUIDE

FAMILY	CONT. INPUT VOLTAGE	OUTPUT VOLTAGE	PACKAGE SIZE	PERFORMANCE SERIES	THERMAL DESIGN	MAX. IOUT	Options Description		
							ENABLE LOGIC	PIN LENGTH	FEATURES
IQ	12: 9-22V 18: 9-36V 24: 18-36V 32: 9-75V 36: 18-75V 48: 34-75V 64: 18-135V 68: 12-150V 70: 34-135V 72: 42-110V 90: 34-160V 1B: 66-160V 4H: 180-425V	012: 1.2V 015: 1.5V 018: 1.8V 025: 2.5V 033: 3.3V 050: 5.0V 070: 7.0V 120: 12V 150: 15V 240: 24V 280: 28V 300: 30V 400: 40V 480: 48V 500: 50V 720: 72V 960: 96V	S: Sixteenth Brick Q: Quarter Brick H: Half Brick F: Full Brick	K: Kilo M: Mega G: Giga T: Tera P: Peta E: Exa Z: Zeta	C: Encased D: Encased Non-threaded Baseplate V: Flanged Baseplate	60: 60A 50: 50A 30: 30A 10: 10A 06: 6A 02: 2A (not all shown)	N: Negative	R: 0.180"	S: Standard F: Full Feature

Part Numbering Example: IQ1B480QTC03NRS * For valid part numbers, refer to the website or contact your local sales representative or distributor.

Refer to the website, contact your local sales representative or distributor for valid part numbers. Specifications change without notice.

InQor PRODUCT FAMILY MATRIX

2:1 INPUT RATIO		4:1 INPUT RATIO	
Input Voltage Range(s)	9V 18V	IQ12 Input Range: 9-22V Transient: 25V Max. Power: 182W Eff.: Up to 92%	IQ18 Input Range: 9-36V Transient: 40V Max. Power: 182W Eff.: Up to 92%
	25V	IQ24 Input Range: 18-36V Transient: 50V Max. Power: 504W Eff.: Up to 95%	
	34V	IQ48 Input Range: 34-75V Transient: 100V Max. Power: 600W Eff.: Up to 95%	IQ36 Input Range: 18-75V Max. Power: 220W Eff.: Up to 93%
	75V		IQ70 Input Range: 34-135V Max. Power: 240W Eff.: Up to 93%
	100V	IQ1B Input Range: 66-160V Transient: 170V Max. Power: 255W Eff.: Up to 93%	
	170V	IQ72 Input Range: 42-110V Max. Power: 255W Eff.: Up to 93%	
475V	IQ4H Input Range: 180-425V Transient: 475V Max. Power: 600W Eff.: Up to 90%		

8:1 INPUT RATIO		12:1 INPUT RATIO	
Input Voltage Range(s)	9V 18V		
	34V	IQ32 Input Range: 9-75V Transient: 100V Max. Power: 255W Eff.: Up to 91%	
	75V	IQ64 Input Range: 18-135V Max. Power: 200W Eff.: Up to 91%	IQ68 Input Range: 12-150V Transient: 170V Max. Power: 53W Eff.: Up to 90%
	170V	IQ90 Input Range: 34-160V Max. Power: 228W Eff.: Up to 94%	
			



InQor EMI Filters

MODEL NUMBER	INPUT VOLTAGE		OUTPUT CURRENT	ISOLATION VOLTAGE (TO CASE)	MAXIMUM DC RESISTANCE @ 100°C	DIFFERENTIAL-MODE ATTENUATION	COMMON-MODE ATTENUATION
	CONTINUOUS	SURGE ³ (<100MS)					
QUARTER BRICK							
IQ040PFQTC30	±40V	±50V	30A	2250V	20mΩ	>80dB @ 250kHz	>36dB @ 250kHz
IQ080PFQTC20	±80V	±100V	20A	2250V	32mΩ	>80dB @ 250kHz	>36dB @ 250kHz
IQ200PFQTC10	±200V	±250V	10A	2250V	70mΩ	>80dB @ 500kHz	>50dB @ 500kHz
IQ500PFQTC04	±500V	±630V	4.0A	2500V	180mΩ	>80dB @ 500kHz	>50dB @ 500kHz

OPERATIONAL

- Ultra-high efficiency up to 95%
- Wide input voltage ranges:
- 9-20V (NQ20); 9-40V (NQ40); 9-60V (NQ60); 9-90V (NQ90)
- Buck or Buck/Boost Mode available
- Maximum input/output currents up to 80A
- Suitable for use in Intermediate Bus Architectures
- On-board input and output filtering
- No minimum load requirement
- Remote sense and wide output voltage trim

SAFETY

- CAN/CSA C22.2 NO. 60950-1:2007
- UL 60950-1:2007
- EN 60950-1/A1:2010

MECHANICAL

- Industry standard pin-out configurations
 - Industry standard footprints:
- Eighth Brick: 0.99" x 2.39" x 0.50"
 Quarter Brick: 1.54" x 2.39" x 0.50"
 Half Brick: 2.49" x 2.39" x 0.51"

PROTECTION/CONTROL

- Input under-voltage lockout (UVLO)
- Output current limit (OCP) and short circuit protection
- Output over-voltage protection (OVP)
- Thermal shutdown (OTP)
- Output voltage trim

BATTERY CHARGING

(KEY FEATURE OF TRIMMABLE CURRENT LIMIT)

- Provides the power conversion platform for battery charging
- Output current limit is externally controlled for constant-current charging
- Current can be set with an external resistor or an active circuit
- Current analog signal provided for instrumentation and control functions
- Ideal diode output stage with zero back-drive currents prevents discharge of battery when not charging
- Output voltage set-point is independently controlled through trim pin
- Unit will smoothly transition between current and voltage modes as charging cycle needs charge

NiQor Hi-Voltage listed by Package and output voltage

NQ20	SERIES	0-20V
	9-20VDC INPUT RANGE	
Quarter Brick	QG	40A
Eighth Brick	ET	20A
	EG	10A

NQ40	SERIES	0-40V	
	9-40VDC INPUT RANGE		
	Half Brick	HG	60A
	Quarter Brick	QG	30A
Eighth Brick	ET	15A	
	EG	8A	

NQ60	SERIES	0-60V
9-60VDC INPUT RANGE		
Half Brick	HG	40A
Quarter Brick	QG	20A
Eighth Brick	ET	10A
	EG	5A

NQ90	SERIES	0-90V
9-100VDC INPUT RANGE		
Half Brick	HG	26A



NiQor Hi-Voltage PART NUMBERING

FAMILY	INPUT VOLTAGE	MODE	OUTPUT VOLTAGE	PACKAGE SIZE	PERFORMANCE SERIES	THERMAL DESIGN	MAXIMUM CURRENT	OPTIONS DESCRIPTION:		
								ENABLE LOGIC	PIN LENGTH	FEATURE SET
NQ	20: 9-20V 40: 9-40V 60: 9-60V 90: 9-90V	T: Buck W: Buck/Boost	20: 0-20V 40: 0-40V 60: 0-60V 90: 0-90V	E: Eighth Brick Q: Quarter Brick H: Half Brick	G: Giga T: Tera	C: Encased D: Encased Non-threaded Baseplate V: Encased Flanged Baseplate	05: 5A 08: 8A 10: 10A 15: 15A 20: 20A 26: 26A 30: 30A 40: 40A 60: 60A 80: 80A	N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard C: Current monitor output/trimmable current limit F: Current share/trimmable current limit (half brick only)

PART NUMBERING EXAMPLE: NQ20W20ETC20NRS *FOR VALID PART NUMBERS, REFER TO THE WEBSITE OR CONTACT YOUR LOCAL SALES REPRESENTATIVE OR DISTRIBUTOR.

Advancing The Power Curve®

Founded in 1997, SynQor® has become the technology, quality and service leader for high efficiency dc-dc converters for the telecom/datacom marketplace. The PowerQor®, BusQor®, DualQor®, iQor™, and NiQor® product lines, combined with SynQor's unmatched lead-times, flexibility, design support and lowest total cost of ownership have become the benchmark sought by SynQor's worldwide customer base.

In 2004, SynQor began its successful entry into the industrial, medical and military market segments with the InQor®, ACuQor® and MilQor® product lines. These new technology leading dc-dc and ac-dc product lines have enabled customers to realize vast savings in space, weight and overall system costs while dramatically increasing power densities and end-system performance. Equally important is the service and support advantage SynQor has brought to customers in these market segments.

SynQor is a privately owned U.S. company headquartered in Boxborough, Massachusetts, which is also the location of all of its manufacturing operations. SynQor has a design center in Dallas, Texas, and sales/marketing offices in Europe, Malaysia, Korea and China. More information is available on the company's website at www.synqor.com.



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PATENTS

SynQor holds the following U.S. patents, one or more of which apply to each product listed in this document. Additional patent applications may be pending or filed in the future.

5,999,417	6,222,742	6,545,890	6,577,109	6,594,159	6,731,520	6,894,468
6,896,526	6,927,987	7,050,309	7,072,190	7,085,146	7,119,524	7,269,034
7,272,021	7,272,023	7,558,083	7,564,702	7,765,687	7,787,261	8,023,290



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