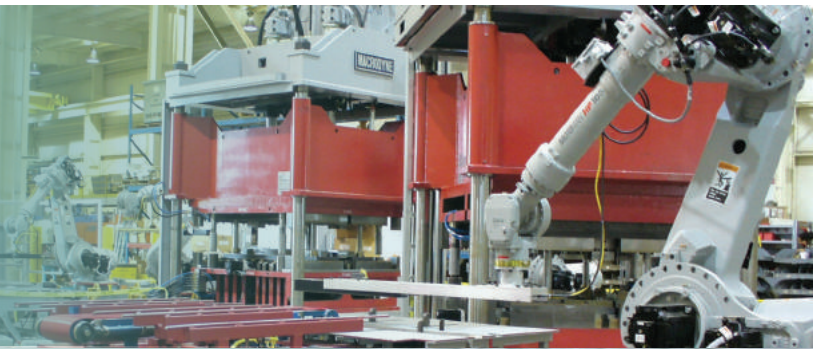
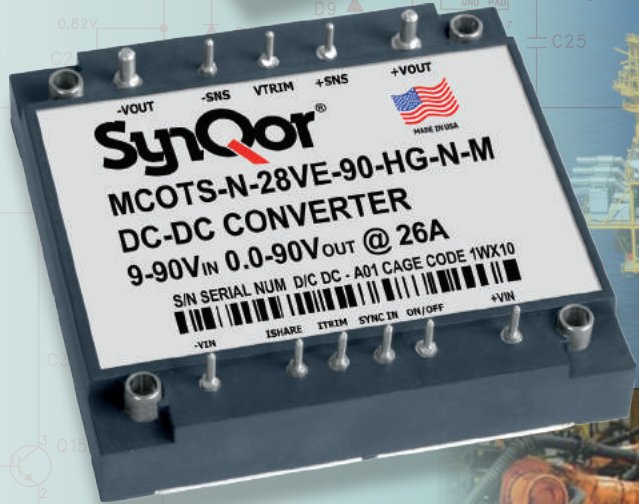


NiQor[®]



Non-Isolated DC-DC Converters

HELIOS
POWER SOLUTIONS

HIGH VOLTAGE, NON-ISOLATED DC-DC CONVERTERS FOR INDUSTRIAL & MILITARY APPLICATIONS

The high input voltage NiQor family of DC-DC converters offers unique solutions for converting high-powered, variable voltages to a wide range of output voltages. The converter is a non-isolated buck-boost regulator, which employs synchronous rectification to achieve extremely high conversion efficiency. They can 'buck' the input voltage down or 'boost' the input voltage up. These products are suitable to provide a regulated non-isolated output voltage from a variable voltage source such as a battery.

NiQor[®] Hi-Voltage listed by Package Size and Output Voltage

NQ20		Series	0-20V
9-20Vdc Input Range			
Quarter	QG		40A
Eighth	ET		20A
	EG		10A

NQ40		Series	0-40V
9-40Vdc Input Range			
Quarter	QT		35A
	QG		30A
Eighth	EP		20A
	ET		15A
	EG		8A

NQ60		Series	0-60V
9-60Vdc Input Range			
Half	HG		40A
Quarter	QT		25A
	QG		20A
Eighth	EP		15A
	ET		10A
	EG		5A

NQ90		Series	0-90V
9-90Vdc Input Range			
Half	HG		26A
Quarter	QT		18A
Eighth	EP		10A

OPERATIONAL FEATURES

- Ultra-high efficiency up to 95%
- Wide input voltage ranges:
9-20V (NQ20); 9-40V (NQ40); 9-60V (NQ60); 9-90V (NQ90)
- Non-isolated
- Buck or Buck/Boost topologies available
- Maximum input/output currents up to 40A
- On-board input and output filtering
- No minimum load requirement
- Remote sense and wide output voltage trim

PROTECTION/CONTROL FEATURES

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

Industrial Hi-Voltage Non-Isolated Part Numbering

Family	Input Voltage	Topology	Output Voltage	Package Size	Performance Series	Thermal Design	Max Current	Options Description:		
								Enable Logic	Pin Length	Feature Set
NQ	20: 9-20V 40: 9-40V 60: 9-60V 90: 9-90V	T: Buck Only (1/8 and 1/4) 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 P: Peta T: Tera	C: Encased D: Encased Non-threaded Baseplate V: Encased Flanged Baseplate	05: 5.0A 08: 8.0A 10: 10A 15: 15A 20: 20A 26: 26A 30: 30A 40: 40A	N: Neg.	K: 0.110" N: 0.145" R: 0.180" Y: 0.250"	S: Standard (1/8 and 1/4 only) C: Current monitor output/ trimmable current limit (1/8 and 1/4 only) F: Current share/ trimmable current limit (half brick only)

Part Numbering Example: NQ20W20ETC20NRS

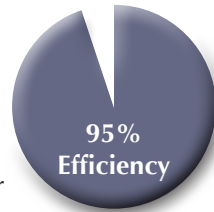
MCOTS Hi-Voltage Non-Isolated Part Numbering

Family	Product	Input Voltage	Output Voltage	Package	Heatsink Option	Screening
MCOTS	N: Non-Isolated	28V: 9-60V 28VE: 9-90V	60: 0-60V 90: 0-90V	QT: Quarter Brick Tera HG: Half Brick Giga	N: Normal Threaded F: Flanged	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-N-28V-60-HG-F-M

BATTERY CHARGING

- 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



QUAD OUTPUT, NON-ISOLATED DC-DC CONVERTERS FOR MILITARY APPLICATIONS

The MCOTS-N QUAD Output non-isolated dc-dc converter employs synchronous rectification to achieve extremely high conversion efficiency in a quarter brick package. The module generates three positive output voltages, and one negative output voltage. All four outputs have a wide output trim range, creating a high degree of flexibility for the user.



OPERATIONAL FEATURES

- Input voltage range: 6.0V ~ 15.0V, 12V nominal
- Four non-isolated outputs including three high current positive outputs, up to 30A each; one auxiliary negative output, up to 1A
- Positive outputs range: 0.8V to 5.0V
- Negative output range: -3.0V to -13.5V
- Common Input and Output Grounds
- High efficiency, up to 93% at full rated load for positive outputs

PROTECTION/CONTROL FEATURES

- Over-current shutdown (All outputs)
- Thermal shutdown (All outputs)
- Over-voltage shutdown (Positive outputs only)
- Input under-voltage lockout (Positive outputs only)

CONTROL FEATURES

- On/Off control for each output
- Output voltage trim for each permits custom voltages
- Remote Sense (Positive outputs only)

OUTPUT VOLTAGE FEATURES

The TRIM input permits the user to adjust the output voltage according to the trim range specifications by using an external resistor connected between the TRIM pin and the Ground pin.

- For positive outputs:
 $R_{trim} = 1200 / (V_{out} - 0.8) - 100 \text{ } (\Omega)$
 e.g. $V_{out} = 5V$ $R_{trim} = 185.7\Omega$
 $V_{out} = 0.8V$ $R_{trim} = \text{OPEN}$
- For negative outputs:
 $R_{trim} = (-100V_{out} - 122.5) / (V_{out} + 13.475) \text{ (k}\Omega\text{)}$
 e.g. $V_{out} = -12V$ $R_{trim} = 730.5k\Omega$
 $V_{out} = -13.475V$ $R_{trim} = \text{OPEN}$

MCOTS Quad Output Non-Isolated Part Numbering

Family	Product	Input Voltage	Output Voltage	Package	Heatsink Option	Screening
MCOTS	N: Non-Isolated	12: 6-15V	Q3P1N: Quad Output 3 Positive, 1 Negative	QT: Quarter Brick Tera	N: Normal Threaded F: Flanged	S: S-Grade M: M-Grade

Part Numbering Example: MCOTS-N-12-Q3P1N-QT-N-S

NON-ISOLATED, ULTRA-HIGH EFFICIENCY DC-DC CONVERTERS FOR TELECOM, INDUSTRIAL AND MEDICAL APPLICATIONS

The NiQor DC-DC converter is a non-isolated buck regulator, which employs synchronous rectification to achieve extremely high conversion efficiency. The NiQor family of converters are used predominately in IBA systems using a front end DC-DC high power bus convertor (48Vin to an intermediate bus voltage). The non-isolated NiQor converters are then used at the point of load to create the low voltage outputs required by the load. The wide trim module can be programmed to a variety of output voltages through the use of a single external resistor.

NiQor[®] listed by Package Size and Output Voltage

NQ04	Package	0.75-3.6V	0.9-3.3V	NQ15, NQ16	Package	0.75-5.0V	0.8-5.0V
2.4-6.0Vin	SMT	10A 36W 16A 58W		6.0-15Vin	SMT		30A 150W
3.0-5.5Vin	SIP		10A 36W 16A 58W	6.0-16Vin	SIP	10A 50W 16A 80W	
3.0-6.0Vin	SIP	10A 36W 16A 58W			SMT	10A 50W 16A 80W	

OPERATIONAL FEATURES

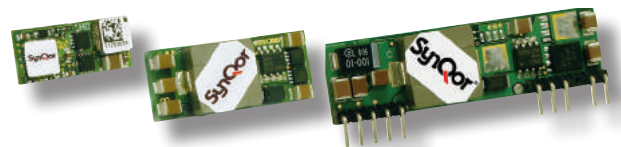
- Ultra-high efficiency up to 96%
- Wide input voltage ranges:
 - 2.4-6.0Vin (NQ04W33 SMT) 0.75-3.6Vout @10A/16A
 - 3.0-6.0Vin (NQ04W33 SIP) 0.75-3.6Vout @10A/16A
 - 3.0-5.5Vin (NQ04T33 SIP) 0.9-3.3Vout @10A/16A
 - 6.0-15Vin (NQ15W50 SMT) 0.8-5.0Vout @30A
 - 6.0-16Vin (NQ16W50 SIP) 0.75-5.0Vout @10A/16A
 - 6.0-16Vin (NQ16W50 SMT) 0.75-5.0Vout @10A/16A
- Wide Trimmable Output Voltage Ranges:
 - 0.75-5.0V (W50)
 - 0.75-3.6V (W33)
 - 0.9 -3.3V (T33)
- Output Voltage Trim Range 0.7 - 5.5V
- Suitable for use in Intermediate Bus Architectures
- On-board input and output filtering
- No minimum load requirement
- Optional features include remote sense, wide output voltage trim, and output current sharing
- Follows DOSA standard pinout and footprint

GENERAL SPECIFICATIONS

- Operating Temperature -40°C to +105°C
- Output Voltage Set Point ±0.7 - 2.0%
- Output Voltage Ripple <1.5% of Vout (typ.)
- Input Ref. Ripple Current <5% of Iin (typ.)
- Switching Frequency 300 - 390kHz
- Transient Response ±40 - 100mV

PROTECTION/CONTROL FEATURES

- Input under-voltage lockout (UVLO)
- Output current limit (OCP) and short circuit protection
- Output over-voltage protection (OVP)
- Thermal shutdown (OTP)
- On/Off control referenced to input side
- Output voltage trim (industry std. trim equations)



NiQor[®] Non-Isolated Part Numbering

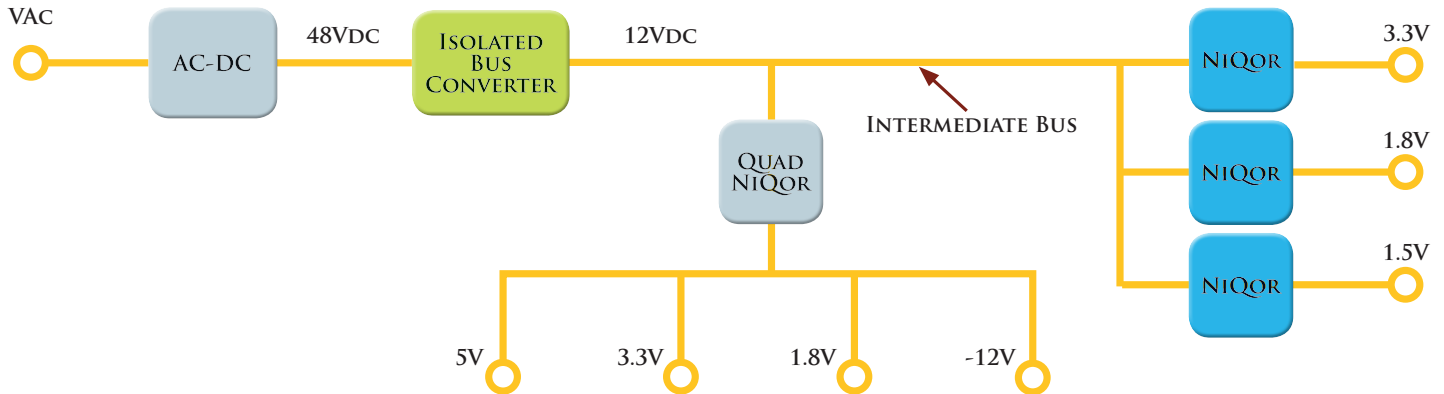
Family	Input Voltage	Output Voltage	Package Type	Performance Series	Thermal Design	Max Current	Options Description		
							Enable Logic	Pin Style	Feature Set
NQ	04: 2.4-6V 15: 6-15V 16: 6-16V	W50: 0.75-5.0V W33: 0.75-3.6V T33: 0.9-3.3V	V: Vert. SIP H: Horiz. SIP S: Surface-Mount	K: Kilo M: Mega G: Giga	A: Open frame	07: 7A 10: 10A 15: 15A 16: 16A 30: 30A	P: Pos./Open O: Neg./Open N: Negative	R: 0.160" SIP Std V: 0.160" Rev. Vert. S: SMT Std.	N: None S: Sense D: Sense & Share G: Sense, Share & Gnd Pins

Part Numbering Example: NQ04W33SMA16PSS

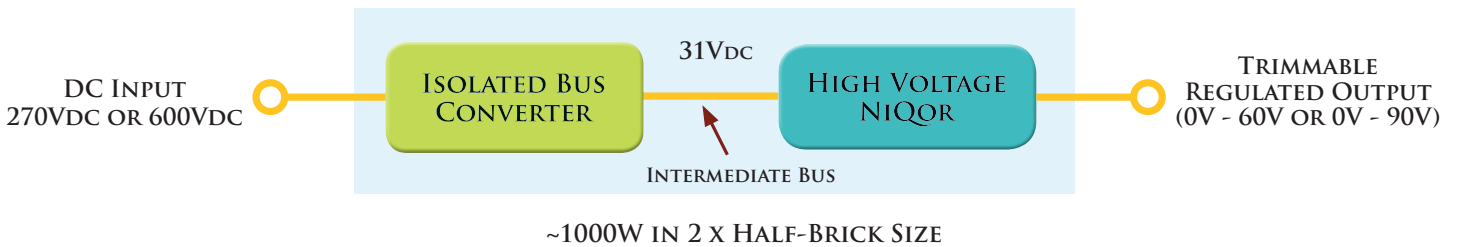
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NiQor[®] APPLICATIONS

INTERMEDIATE BUS ARCHITECTURE



HIGH INPUT VOLTAGE / HIGH POWER / ADJUSTABLE OUTPUT



BATTERY CHARGING



- Constant Current Charging (Trimmable)
- Trimmable Float Voltage
- Zero Back-drive Current Prevents Energizing a Disconnected Input Bus
- Applicable to All Batteries and Fuel Cells