

SUMMARY SPECIFICATION

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SINGLE & MULTI OUTPUT DC-DC

Model Number	Input Voltage	Output Number	Nominal Voltage	Adjustment Range	Output Current	Output Power	Dimensions
QDRA240NC	48V nom. 36V - 72V		1.2V	0.96 - 1.44V	0 - 60A	72W	116.8 x 61.0 x 12.7 mm 4.6 x 2.4 x 0.5 in.
QDRA240NE			2.2V	1.76 - 2.64V	0 - 60A	132W	
QARA240NF			3.3V	2.7 - 3.9V	0 - 50A	165W	
QARA240NG			5V	4.0 - 6.0V	0 - 40A	200W	
QARA240NJ			12V	9.6 - 14.4V	0 - 18A	216W	
QARA240NK			15V	12.0 - 17.0V	0 - 16A	240W	
QDRA240NL			24V	19.2 - 28.8V	0 - 10A	240W	
QDRA240NGF			1	+5V	4.0 - 6.0V	0 - 25A	
	2	+3.3V	2.7 - 3.9V	0 - 30A			
QDRA240TE	300V nom. 180V - 400V		2.2V	1.76 - 2.64V	0 - 60A	132W	116.8 x 61.0 x 12.7 mm 4.6 x 2.4 x 0.5 in.
QARA240TF			3.3V	2.7 - 3.9V	0 - 50A	165W	
QARA240TG			5V	4.0 - 6.0V	0 - 40A	200W	
QARA240TJ			12V	9.6 - 14.4V	0 - 18A	216W	
QARA240TK			15V	12.0 - 17.0V	0 - 16A	240W	
QDRA240TL			24V	19.2 - 28.8V	0 - 10A	240W	

INPUT SPECIFICATION

Nominal Voltage	48V	300V
Voltage Range	36 - 72V	180 - 400V
Input Current	Single output 7.9A maximum at minimum input voltage	1.6A
	Dual output 8.1A maximum at minimum input voltage	
Turn On Voltage	30 - 35V	150 - 175V
Turn Off Voltage	80% to 90% of turn on voltage	

Input Power

285W maximum at full load. 290W on dual output module.

No Load Power

Maximum 10W at nominal input with no output load.

Efficiency

Typical figures from 64% at 1.2V output to 88% at 24V output.

OUTPUT SPECIFICATION

Nominal Voltage	Nominal output voltages are as shown in the table of models. Setting accuracy is within $\pm 1\%$ of nominal.
Adjustment Range	$\pm 20\% V_{NOM}$. See 'Output Voltage Trim' under Auxiliary Functions.
Current	Maximum continuous current ratings are shown in the table of models. Both outputs of the dual output module can deliver full current simultaneously.
Load Regulation	$0.1\% V_{NOM}$ typical (0.2% maximum), $10mV$ maximum below $5V$ output, for a change in output load current from 0% to 100% .
Line Regulation	$0.02\% V_{NOM}$ typical (0.2% maximum), $10mV$ maximum below $5V$ output, for an input voltage variation from minimum to maximum rated voltage.
Dynamic Regulation	A maximum voltage deviation of $5\% V_{NOM}$ occurs on output 1 when the output load changes from 25% to 75% at $0.1A/\mu s$.
Temperature Coefficient	$\pm 0.02\%/^{\circ}C$ maximum over the operating temperature range.
Ripple & Noise	$1\% V_{NOM}$ pk-pk typical (2% maximum), $100mV$ pk-pk maximum below $5V$ output, over $20MHz$ bandwidth.

PROTECTION

Output Current Limit	The output is protected by a self-resetting current limit set at 110% ($\pm 5\%$) of rated output current, adjustable down to 20% (see auxiliary functions). Short circuit current is typically 200% (160% at output voltages of $5V$ and below).
Output Overvoltage	Latching shutdown occurs when the output voltage exceeds 115% ($\pm 5\%$) of nominal.
Thermal	Latching shutdown occurs if the baseplate temperature exceeds $101 - 120^{\circ}C$. To reset, input power must be removed and the module allowed to cool. Dual output modules $90^{\circ}C \pm 5^{\circ}C$.

AUXILIARY FUNCTIONS

Remote Sense	Up to $500mV$ total lead drop can be compensated for using the remote sense facility. Dual output modules have independent sense connections.
Current Share	When current share pins are joined, modules share to within 3% typically (10% maximum) of average current. Dual outputs are independent.
Enable	Logic input referenced to $-Sense$. Logic low ($< 0.8V$) enables the output, logic high ($> 2V$) or open circuit disables the output.
Voltage Trim	The output voltage can be adjusted $\pm 20\%$ by connecting a resistor between Trim and $-Sense$. Dual output modules have independently adjustable outputs.

Current Limit Trim

Analogue port referenced to $-Sense$. The port sources $1mA$ and the current limit point equals $I_{MAX} \times (V_{ILIMTRIM}) / 4$ for voltages between $0.8V$ and $4V$. Dual outputs are independently adjustable.

OVP Trim

Analogue port referenced to $-Sense$. The port sources $1mA$ and the OVP set point equals $(145 - 30 \times V_{OVPTRIM}) \times V_{OUT} / 100$. On dual output modules each output has independent OVP trim.

Switching Frequency

$1MHz$ nominal.

Sync In

An external clock input. $3.3 - 5.5V$ pk-pk at $1MHz \pm 10\%$.

Sync Out

Clock output, $3.5 - 5V$ pk-pk at $1MHz \pm 2\%$. May be used to drive up to two Sync Input ports.

Healthy

Output referenced to $-Sense$. Output high (V_{OUT}) indicates that the converter is running and $I_{OUT} > 5\% I_{MAX}$. Output resistance in kohms approximately equals output voltage. Not available on dual output module.

Current Monitor

Analogue output referenced to $-Sense$. Current is proportional to the output current from 20% to 100% rated current. At rated current $I_{MON} = 1mA \pm 0.1mA$. Dual outputs are independently monitored.

Temperature Monitor

Analogue output referenced to $-Sense$. Temp. ($^{\circ}C$) = $(V_{MON} \times 100) - 273$. $1k\Omega$ source impedance.

ISOLATION

Input to Case	$2,700V$ d.c. on $300V$ inputs; $2,100V$ d.c. on $48V$ inputs.
Input to Output	$2,700V$ d.c. on $300V$ inputs; $2,100V$ d.c. on $48V$ inputs.
Output to Case	$500V$ d.c.

ENVIRONMENTAL CONDITIONS

Operating Temperature	$-20^{\circ}C$ to $+100^{\circ}C$ baseplate temperature at full output power. Dual output modules: $-20^{\circ}C$ to $+85^{\circ}C$.
Storage Temperature	$-40^{\circ}C$ to $+105^{\circ}C$.
Operating Humidity	95% R.H., non-condensing.
Storage Humidity	95% R.H. non-condensing.

RELIABILITY

MTBF	Predicted MTBF is 1 million hours at $50^{\circ}C$ baseplate temperature. Calculated according to MIL217E under ground benign conditions, the MTBF is 200,000 hours.
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INTERNATIONAL SAFETY STANDARDS

300V input units are CE marked to the Low Voltage Directive.	
UL	UL1950.
VDE	VDE0805/05.90.
CSA	C22.2 #234 - M90.

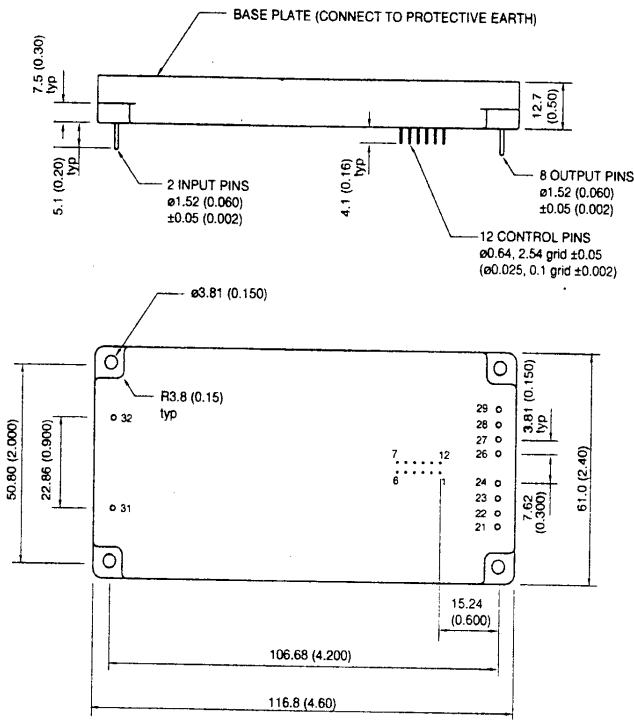
MECHANICAL SPECIFICATION

Dimensions	116.8 (4.6) x 61.0 (2.4) x 12.7 (0.5) + pins.
Mass	Typically 250g (8.8oz).
Pin Size	Power 1.0 (0.039) x 4.6 (0.18) long.
	Signal 0.64 (0.025) diameter x 4.1 (0.16) long.
Finish	Modules have an aluminium baseplate and a black plastic cover.
Earth	The metal baseplate requires connecting to safety earth.

ORDERING INFORMATION

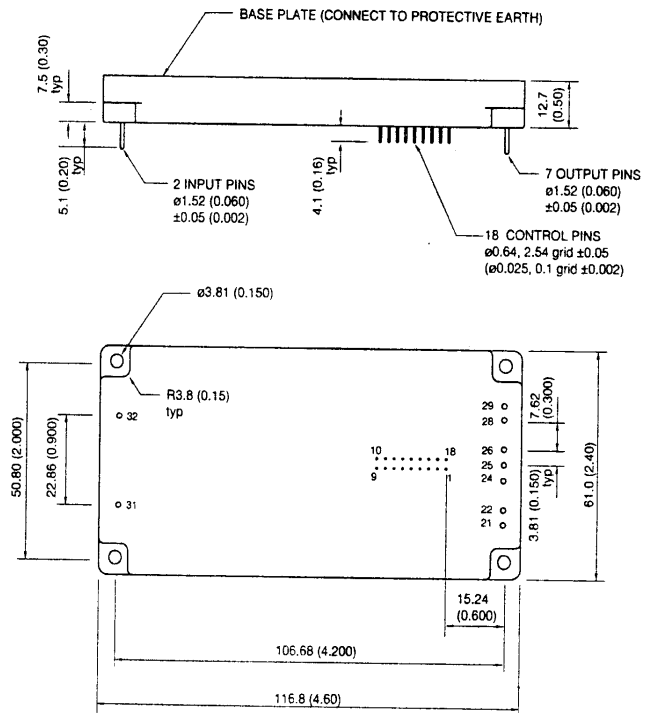
Order the model number as shown in the table of models. See accessories pages for details of mounting kits, heatsinks and gaskets which must be ordered separately.

OUTLINE DRAWING - SINGLE OUTPUT



- Notes:
1. All dimensions in mm and (inches)
 2. Baseplate must be connected to protective earth
 3. General tolerance: X ± 0.5 (0.02)
XX ± 0.25 (0.010)

OUTLINE DRAWING - DUAL OUTPUT



- Notes:
1. All dimensions in mm and (inches)
 2. Baseplate must be connected to protective earth
 3. General tolerance: X ± 0.5 (0.02)
XX ± 0.25 (0.010)

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SINGLE & MULTI OUTPUT DC-DC