



# CQB200 SERIES 200 WATT 2:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- Efficiency Up to 92%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully protected (OTP/OCP/OVP/UVLO)
- 2250Vdc I/O Isolation
- Operating Case Temperature -40 to +105°C
- Quarter Brick Size Meet Industrial Standard  
2.28"x1.45"x0.5"
- Meet UL62368-1 2<sup>nd</sup> (Functional Insulation)
- Meet Shock & Vibration MIL-STD-810F/EN61373
- Fire & Smoke EN45545-2 Compliant
- 3000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
CQB200-24S24	18-36 VDC	24 VDC	0 mA	8.33 A	10 mA	9100 mA	91.5	6600uF
CQB200-24S28	18-36 VDC	28 VDC	0 mA	7.14 A	10 mA	9100 mA	92	5400uF

**NOTE:**

1. Nominal Input Voltage 24 VDC
2. An External Input Capacitor 220uF KY 47mΩ max. for All Models are Recommended to Reduce Input Ripple Voltage

## PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Mounting Inserts
CQB200-	II	O	XX	L	-Y (Option)
CQB200	24: 24 VDC	S: Single	24: 24VDC 28: 28VDC	None: Positive N: Negative	None: M3x0.5 Mounting Inserts -C: Clear Mounting Insert (3.2mm DIA.)

**Part Number Example:**

**CQB200-24S24N-C:** Quarter Brick, 200W, 2:1 18-36Vdc Input, Single 24Vdc Output, Negative Logic, Clear Mounting Insert



## TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25°C unless otherwise noted.)

### ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All	-0.3		36	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			50	V <sub>dc</sub>
Operating Case Temperature	At the Center Part of Base Plate	All	-40		105	°C
Storage Temperature		All	-55		125	°C

### INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	18	24	36	V <sub>dc</sub>
Input Under Voltage Lockout						
Turn-On Voltage Threshold		All	16.5	17	17.5	V <sub>dc</sub>
Turn-Off Voltage Threshold		All	15.5	16	16.5	V <sub>dc</sub>
Lockout Hysteresis Voltage		All		1.0		V <sub>dc</sub>
Maximum Input Current	V <sub>in</sub> =18V, Full Load.	All		14		A
No-Load Input Current	V <sub>in</sub> =24V, I <sub>o</sub> =0A	See Model Number Table				mA
Input Filter	Pi filter.	All				
Inrush Current (I <sup>2</sup> t)	As per ETS300 132-2.	All			0.1	A <sup>2</sup> s
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz.	All		60		mA

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V <sub>in</sub> =24V, Full Load, T <sub>c</sub> =25°C	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full Load to No Load	All			±0.2	%
Line Regulation	V <sub>in</sub> =High Line to Low Line, Full Load	All			±0.2	%
Temperature Coefficient	T <sub>c</sub> =-40°C to 105°C	All			±0.02	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF tantalum capacitor and 1uF ceramic capacitors	24Vo			280	mV
		28Vo			280	mV
RMS.		24Vo			100	mV
		28Vo			100	mV
Output Current Range	V <sub>in</sub> = 18 to 36V	See Model Number Table				A
Over Current Protection	Hiccup Mode. Auto Recovery.	All	110	130	150	%
Short Circuit Protection		All	Continuous, Auto Recovery.			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	P <sub>o</sub> ≤ max rated power, I <sub>o</sub> ≤ I <sub>o,max</sub>	All	-10		+10	%
Output Voltage Remote Sense Range	P <sub>o</sub> ≤ max rated power, I <sub>o</sub> ≤ I <sub>o,max</sub> % of nominal Vo	All			+10	%
Over Voltage Protection	Limited Voltage, % of Nominal Vo	All	115	125	140	%

### EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V <sub>in</sub> =24V	See Model Number Table				%



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## DYNAMIC CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Current Transient						
Error Band	75% to 100% of $I_{o\_max}$ step load change $d_i/d_t=0.1A/us$ (within 1% $V_{out}$ nominal)	All			±5	%
Recovery Time		All			250	us
Turn-On Delay and Rise Time						
Full load (Constant resistive load)						
Turn-On Delay Time, From On/Off Control	$V_{on/off}$ to 10% $V_{o\_set}$ , Remote On	All		35		ms
Turn-On Delay Time, From Input	$V_{in\_min}$ to 10% $V_{o\_set}$ , Power Up	All		30		ms
Output Voltage Rise Time	10% $V_{o\_set}$ to 90% $V_{o\_set}$	All		15		ms

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% factory Hi-Pot tested @2sec.)	1 minute; Input to Output,	All			2250	$V_{dc}$
	1 minute; Input to Case (Base Plate),	All			2250	$V_{dc}$
	1 minute; Output to Case (Base Plate)	All			2250	$V_{dc}$
Isolation Resistance	Input to Output	All	100			MΩ
Isolation Capacitance	Input to Output	All		1500		pF
	Input to Case (Base Plate)	All		None		
	Output to Case (Base Plate)	All		None		

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse wide modulation (PWM), Fixed	All	225	250	275	KHz
On/Off Control, Positive Remote On/Off logic, Refer to $-V_{in}$ pin.						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	0		1.2	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=On	All	3.5		75	V
On/Off Control, Negative Remote On/Off logic, Refer to $-V_{in}$ pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}=0.0uA$ , Pin open=Off	All	3.5		75	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}=1.0mA$	All	0		1.2	V
On/Off Current (for both remote on/off logic)	$I_{on/off}$ at $V_{on/off}=0V$	All		0.3	1	mA
Leakage Current (for both remote on/off logic)	Logic High, $V_{on/off}=15V$	All			30	uA
Off Converter Input Current	Shutdown input idle current	All		5	10	mA
Over Temperature Shutdown	Temperature at the Center Part of Base Plate, Non-Latching	All		110		°C
Over Temperature Recovery		All		100		°C

## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100%$ of $I_{o\_max}$ ; MIL-HDBK - 217F_Notice 1, GB, 25°C	24S24 24S28		730 625		K hours
Weight		All		68		grams
Case Material	Plastic, DAP, UL 94V-0					
Base plate Material	Aluminum					
Potting Material	UL 94V-0					
Pin Material	Base: Copper Plating: Nickel with Matte Tin					
Shock/Vibration	MEET MIL-STD-810F/EN61373					
Humidity	95% RH max. Non Condensing					



# CQB200 Series

## GENERAL SPECIFICATIONS

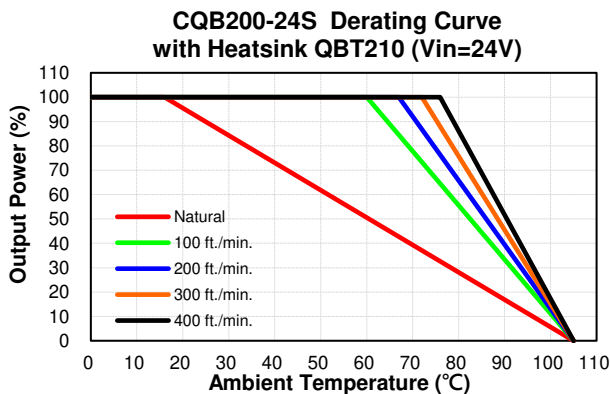
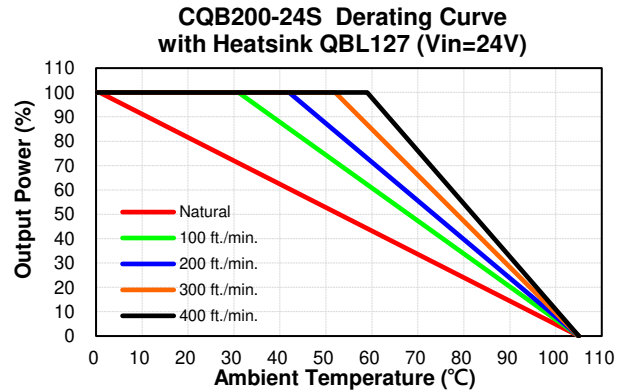
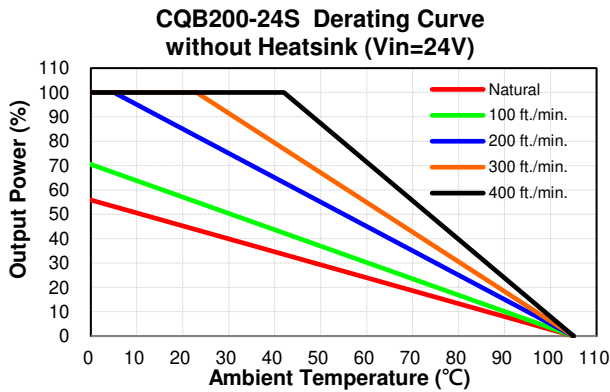
Altitude	3000m Operating Altitude, 12000m Transport Altitude	
Thermal Shock	MIL-STD-810F	
Fire & Smoke	EN45545-2 Compliant	
EMI	Meets EN55032 Compliant (with external filter)	Class A
Application Note Link	<a href="#">CQB200 Series App Notes</a>	
Packaging Information Link	<a href="#">Packaging Information</a>	

## EN45545-2 Fire & Smoke Test Conditions.

Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R24	Oxygen Index Test	EN45545-2: 2013 EN ISO 4589-2	HL1, HL2, HL3
R25	Glow - Wire Test	EN 45545-2:2013 EN 60695-2-11:2001	HL1, HL2, HL3
R26	Vertical Flame Test	EN 45545-2: 2013 EN 60695-11-10: 2013	HL1, HL2, HL3

## CHARACTERISTIC CURVE

### Power Derating Curve

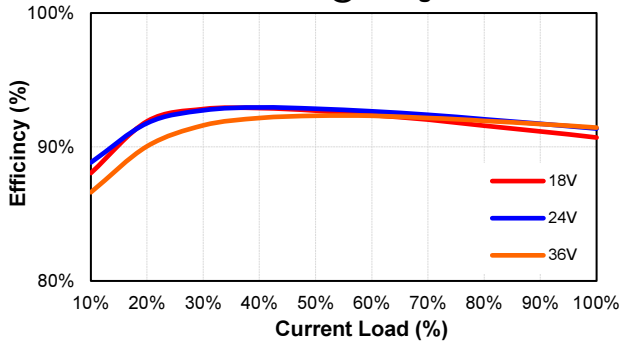




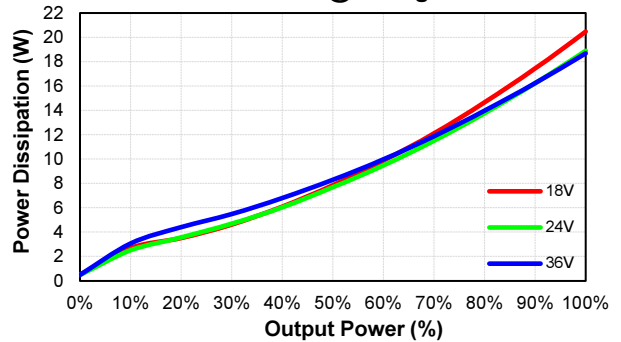
# CQB200 Series

## Performance Data

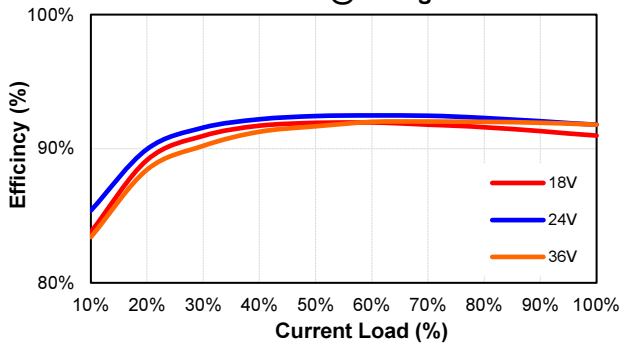
**CQB200-24S24**  
Eff Vs Io @25 Deg. C



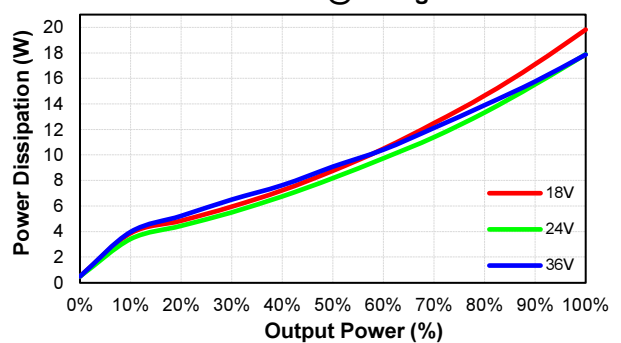
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Pd Vs Po @25 Deg. C



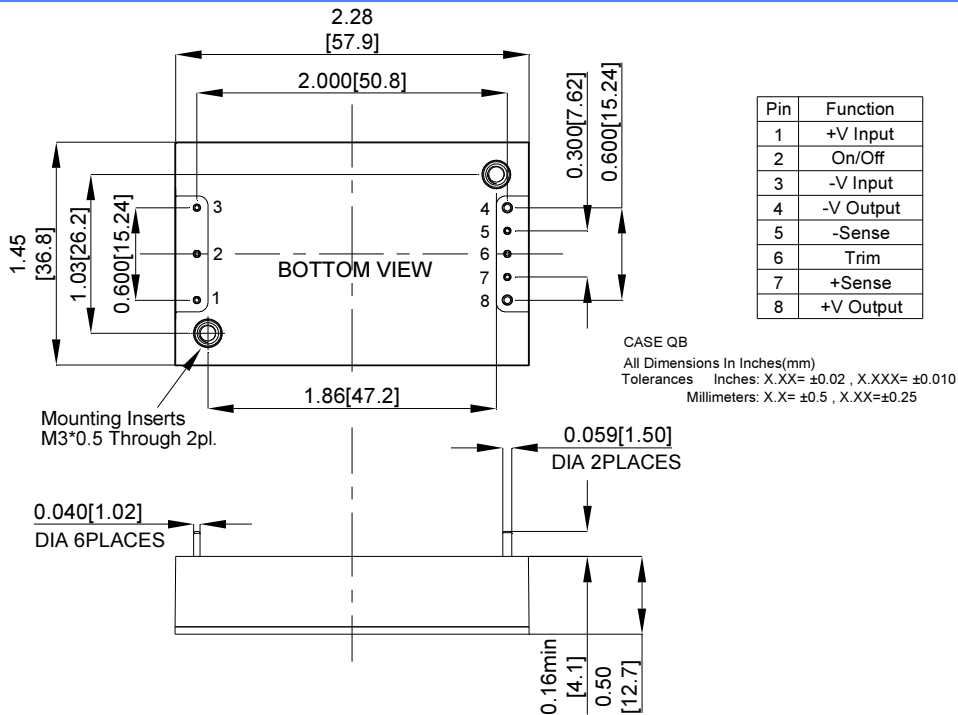
**CQB200-24S28**  
Eff Vs Io @25 Deg. C



**CQB200-24S28**  
Pd Vs Po @25 Deg. C



## MECHANICAL SPECIFICATION



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