



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 2nd (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 _{dc} |
| Input Surge Voltage | 100ms max. | All | | | 50 | V _{dc} |
| 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 _{dc} |
| Input Under Voltage Lockout | | | | | | |
| Turn-On Voltage Threshold | | All | 16.5 | 17 | 17.5 | V _{dc} |
| Turn-Off Voltage Threshold | | All | 15.5 | 16 | 16.5 | V _{dc} |
| Lockout Hysteresis Voltage | | All | | 1.0 | | V _{dc} |
| Maximum Input Current | V _{in} =18V, Full Load. | All | | 14 | | A |
| No-Load Input Current | V _{in} =24V, I _o =0A | See Model Number Table | | | | mA |
| Input Filter | Pi filter. | All | | | | |
| Inrush Current (I ² t) | As per ETS300 132-2. | All | | | 0.1 | A ² 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 _{in} =24V, Full Load, T _c =25°C | All | -1.0 | | +1.0 | % |
| Output Voltage Regulation | | | | | | |
| Load Regulation | Full Load to No Load | All | | | ±0.2 | % |
| Line Regulation | V _{in} =High Line to Low Line, Full Load | All | | | ±0.2 | % |
| Temperature Coefficient | T _c =-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 | |
| RMS. | | 24Vo | | | 100 | mV |
| | | 28Vo | | | 100 | |
| Output Current Range | V _{in} = 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 _o ≤ max rated power, I _o ≤ I _{o,max} | All | -10 | | +10 | % |
| Output Voltage Remote Sense Range | P _o ≤ max rated power, I _o ≤ I _{o,max} % 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 _{in} =24V | See Model Number Table | | | | % |



CQB200 Series

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 $d_i/d_r=0.1A/us$ (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 -Vin 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 -Vin 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

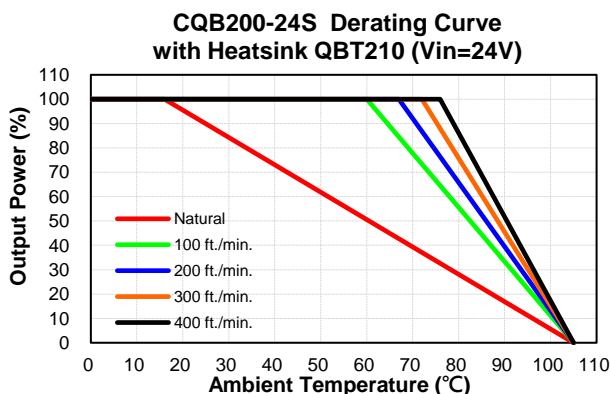
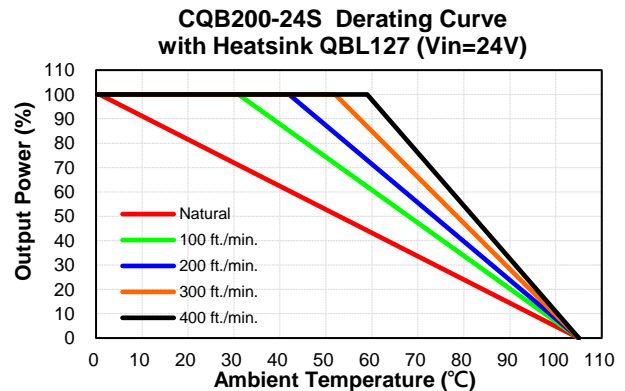
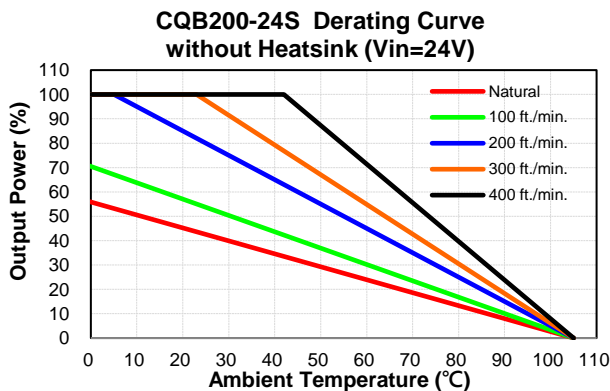
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|----------------------------|---|---------|
| Altitude | 3000m Operating Altitude, 12000m Transport Altitude | |
| Thermal Shock | MIL-STD-810F | |
| Fire & Smoke | EN45545-2 Compliant | |
| EMI | Meets EN55032 Compliant (with external filter) | Class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

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

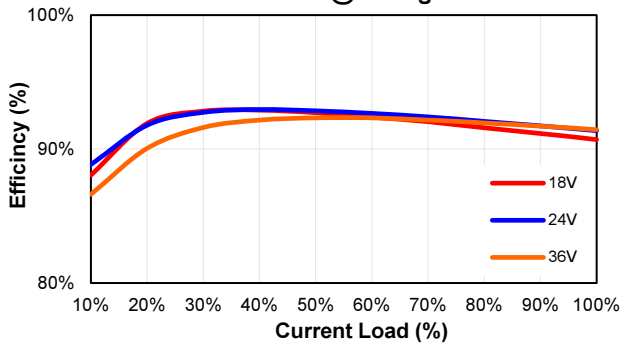




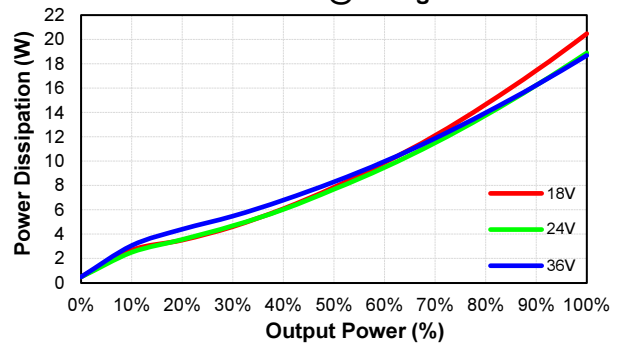
CQB200 Series

Performance Data

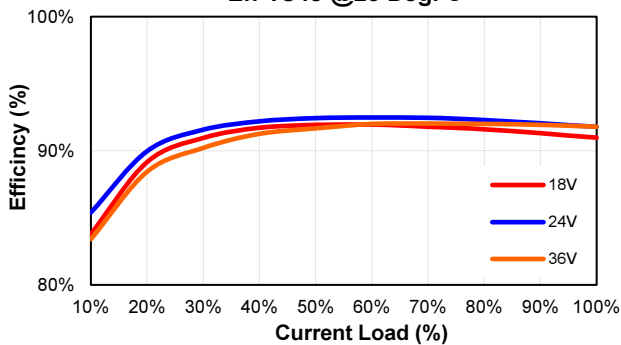
CQB200-24S24
Eff Vs Io @25 Deg. C



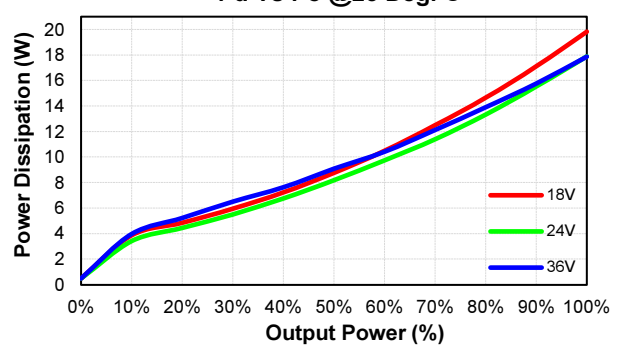
CQB200-24S24
Pd Vs Po @25 Deg. C



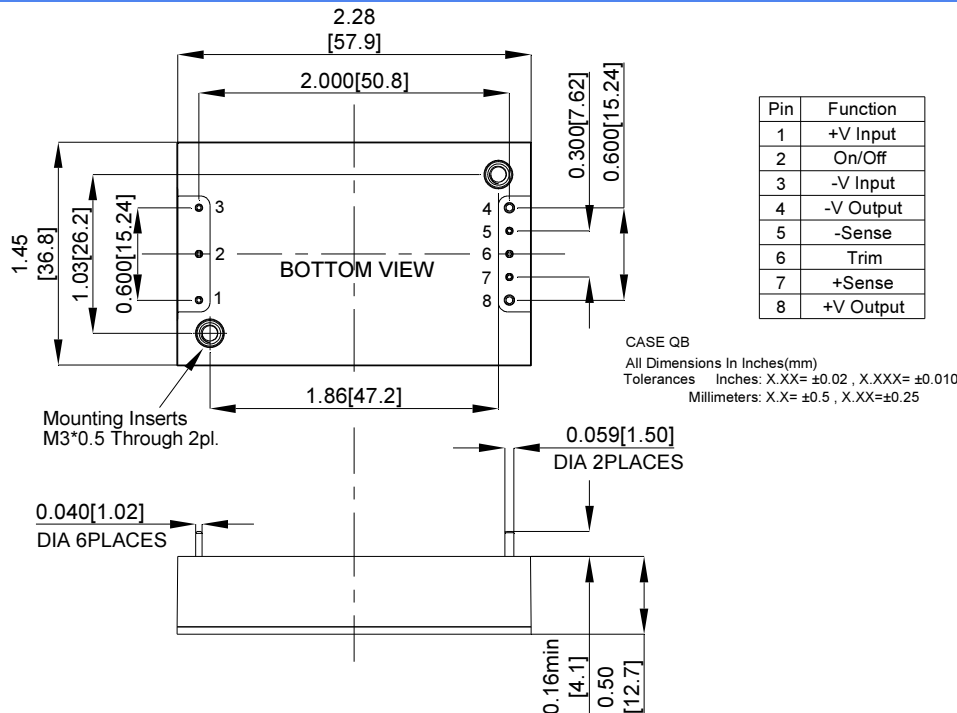
CQB200-24S28
Eff Vs Io @25 Deg. C



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



MECHANICAL SPECIFICATION



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