CQB150W8 SERIES
150 WATT 8:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency up to 91%
- Fixed Switching Frequency
- Regulated Outputs
- Remote On/Off
- Low No Load Power Consumption
- Fully Protected (OTP/OCP/OVP/UVLO)
- 3000Vac I/O Isolation
- Operating Case Temperature -40 to +105℃
- Quarter Brick Size Meet Industrial Standard 2.28"x1.45"x0.5"
- CB Test Certificate IEC62368-1
- EN 55032/035/EN 50155 Compliant with External Circuits
- UL 62368-1 3rd (Reinforce Insulation) Approval
- Shock & Vibration EN 50155 (EN 61373) Compliant
- Fire & Smoke EN 45545-2 Compliant
- 5000m Operating Altitude
- Option Model with Bus & External UVLO Function

E176177

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	(2)	
CQB150W8-36S05	9-75 VDC	5 VDC	0 mA	25000 mA	25 mA	3901 mA	89	89	50000uF
CQB150W8-36S12	9-75 VDC	12 VDC	0 mA	12500 mA	25 mA	4630 mA	90	90	12500uF
CQB150W8-36S15	9-75 VDC	15 VDC	0 mA	10000 mA	25 mA	4579 mA	91	91	10000uF
CQB150W8-36S24	9-75 VDC	24 VDC	0 mA	6300 mA	30 mA	4719 mA	89	88	6300μF
CQB150W8-36S28	9-75 VDC	28 VDC	0 mA	5400 mA	30 mA	4667 mA	90	89	5400μF
CQB150W8-36S48	9-75 VDC	48 VDC	0 mA	3150 mA	35 mA	4667 mA	90	89	1500μF
CQB150W8-36S54	9-75 VDC	54 VDC	0 mA	2800 mA	35 mA	4667 mA	90	90	1500μF

NOTE:

1. Nominal input voltage 36VDC.
2. Measured at input voltage 48VDC.
3. An external input capacitor 470uF 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
CQB150W8-	II	O	XX	L	-Y (Option)
CQB150W8	36：36 VDC	S：Single	05：05VDC 12：12VDC 15：15VDC 24：24VDC 28：28VDC 48：48VDC 54：54VDC	None：Positive N：Negative	None：M3x0.5 Mounting Inserts -C：Clear Mounting Insert (3.2mm DIA.) -B：With Bus & External UVLO Function -C-B：Clear Mounting Insert (3.2mm DIA.) and with Bus & External UVLO Function

Part Number Example:

CQB150W8-36S12N-C: Quarter Brick, 150W, 8:1 9-75Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert

TECHNICAL SPECIFICATIONS

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

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage	Continuous	All	-0.3		75	V_{dc}
Input Surge Voltage	1000ms max.	All			100	V_{dc}
Operating Case Temperature	At the center part of case plate	All	-40		105	℃
Storage Temperature		All	-55		125	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	9	36	75	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold	80% Load	All	8.0	8.5	8.8	V_{dc}
Turn-Off Voltage Threshold	80% Load	All	7.6	8.0	8.3	V_{dc}
Lockout Hysteresis Voltage	80% Load	All		0.5		V_{dc}
Maximum Input Current	V_{in}=12V to 75V, Full load V_{in}=9V to 12V, 80% load	All			16	A
No-Load Input Current	V_{in}=36V, I_o=0A	See Model Number Table				mA
Input Filter	Pi filter	All				
Inrush Current (I^2t)	As per ETS300 132-2	All			0.1	A^2s
Input Reflected Ripple Current	P-P thru 12uH inductor, 5Hz to 20MHz	All		30		mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=36V, Full load, T_c=25℃	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℃ to 105℃	All			±0.02	%/℃
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Full load, 10uF polymer tantalum and 1uF ceramic capacitors	5Vo			150	mV
		12Vo			150	
		15Vo			150	
		24Vo			240	
		28Vo			240	
		48Vo			480	
		54Vo			480	
RMS.		5Vo			80	mV
		12Vo			80	
		15Vo			80	
		24Vo			120	
		28Vo			120	
		48Vo			220	
		54Vo			220	
Output Current Range	V_{in}= 9 to 12V V_{in}= 12 to 75V	See Power Derating Curve See Model Number Table				A
Over Current Protection	Hiccup Mode. Auto recovery	All	110	150	180	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Trim Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$	Others 54Vo	-20 -20		+15 +10	%
Output Voltage Remote Sense Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$ % of nominal V_o	Others 54Vo			+15 +10	%
Over Voltage Protection	Limited voltage, % of nominal V_o	Others 54Vo	117 112	125 117	140 140	%
Bus Pin Output Voltage	V_{in}= 24 to 75V, T_c=25℃	-B Only		24	26	V_{dc}

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=36V, 48V	See Model Number Table				%

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 di/dt=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		50		ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10%V_{o_set}, Power up	All		50		ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{o_set}	All		50		ms

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Isolation Voltage (100% Factory Hi-Pot Tested @2 sec.)	1 Minute; input to output	All			3000 4200	V_{ac} V_{dc}
	1 Minute; input to case (base plate)	All			2100 3000	V_{ac} V_{dc}
	1 Minute; output to case (base plate)	All			1500 2100	V_{ac} V_{dc}
Isolation Resistance	Input to output	All	100			MΩ
Isolation Capacitance	Input to output	All		1100		pF

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Output ripple frequency	All	180	200	220	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 or Open Circuit		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 or Open Circuit		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		0.4	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	-B Others		6 4	12 12	mA

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All		110		℃
Over Temperature Recovery		All		100		℃
MTBF	I_o=100% of $I_{o\_max.}$; MIL-HDBK - 217F_Notice 1, GB, 25℃	05Vo		568		K hours
		12Vo		627		
		15Vo		753		
		24Vo		856		
		28Vo		792		
		48Vo		945		
		54Vo		912		
Weight		All		66		grams
Potting Material	UL 94V-0					
Case Material	Plastic, DAP, UL 94V-0					
Base Plate Material	Aluminum base plate					
Shock/Vibration	MIL-STD-810F/EN 61373 Compliant					
Humidity	95% RH max. Non condensing					
Altitude	5000m Operating altitude, 12000m Transport altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN 45545-2 Compliant					

EMC SPECIFICATIONS (External components required, please refer to application note.)

EMI	Meets EN 55032 & EN 50155 Compliant (with external filter)		Class A
ESD	EN 61000-4-2	Level 3: Air ±8kV, Contact ±6kV	Perf. Criteria A
Radiated Immunity	EN 61000-4-3	Level 3: 80~1000MHz, 20V/m	Perf. Criteria A
Fast Transient	EN 61000-4-4	Level 3: On power input port, ±2kV, external input capacitor required (EN 50155)	Perf. Criteria A
Surge	EN 61000-4-5	Level 4: Line to earth, ±4kV, Line to line, ±2kV (EN 50155)	Perf. Criteria A
Conducted Immunity	EN 61000-4-6	Level 3: 0.15~80MHz, 10V	Perf. Criteria A
Interruptions of Voltage Supply	EN 50155	Class S3: 20ms interruptions	Perf. Criteria A
Supply Change Over	EN 50155	Class C2: During a supply break of 30 ms	Perf. Criteria A
Application Note Link			CQB150W8-36S Series App Notes
Packaging Information Link			Packaging Information

Immunity to Environmental Conditions

Phenomenon	EN 50155; 2021 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Test	13.4.4	EN 60068-2-1	Class OT6 Temperature: -40℃ Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6(Cycle A) Temperature: 85℃ Duration: 6 hrs	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40℃ Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.8	EN 60068-2-30	Temperature: +25℃ and +55℃ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.10	EN 61373	Frequency range: 5 ~ 150 Hz Vertical: 0.988 m/s^2 Transverse: 0.441 m/s^2 Longitudinal: 0.683 m/s^2 Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.10	EN 61373	Frequency range: 5 ~ 150 Hz Vertical: 5.59 m/s^2 Transverse: 2.49 m/s^2 Longitudinal: 3.87 m/s^2 Duration: 5 hrs / axis	Pass
Shock Test	13.4.10	EN 61373	±Vertical: 30 m/s^2 ±Transverse: 30 m/s^2 ±-Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass

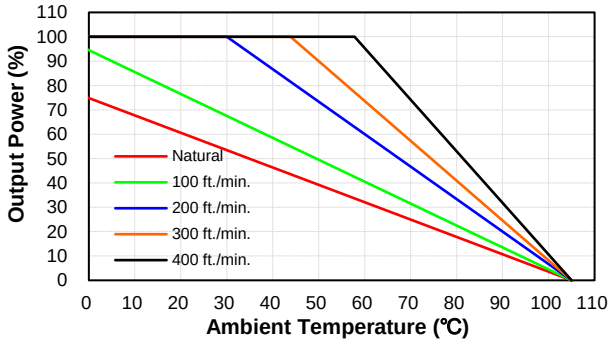
EN 45545-2 Fire & Smoke Test Conditions

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, HL3
	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	EN 45545-2: 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

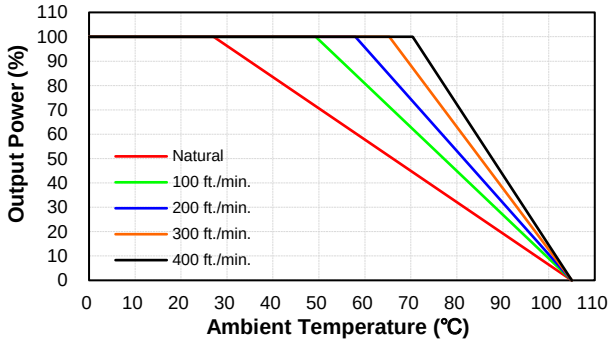
CHARACTERISTIC CURVE

Power Derating Curve

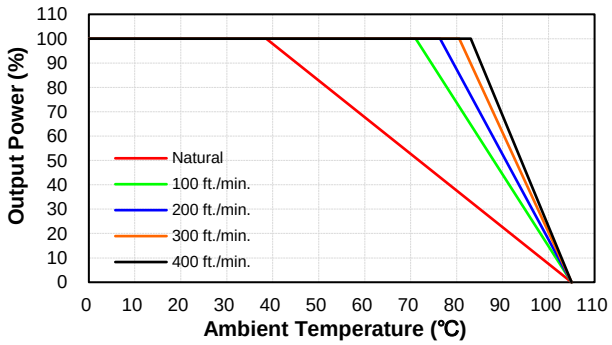
CQB150W8-36S05 Derating Curve without Heatsink (Vin=36V)



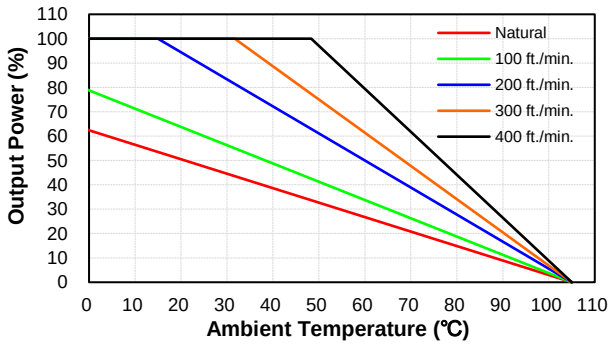
CQB150W8-36S05 Derating Curve with Heatsink QBL127 (Vin=36V)



CQB150W8-36S05 Derating Curve with Heatsink QBT210 (Vin=36V)



CQB150W18-36S12, 15, 28, 48, 54 Derating Curve without Heatsink (Vin=36V)



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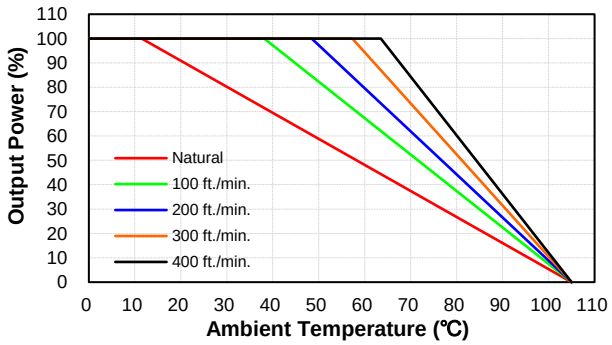
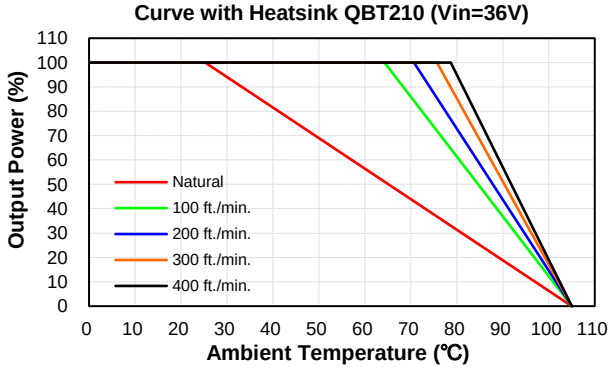
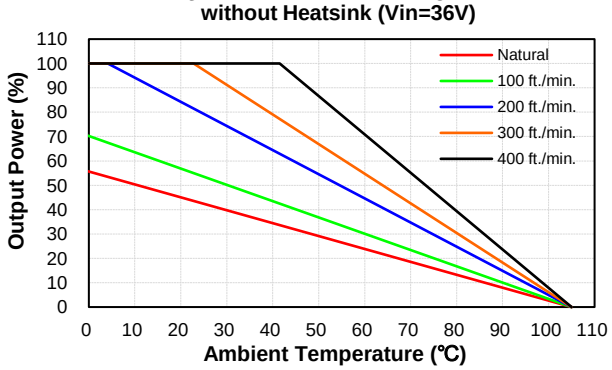


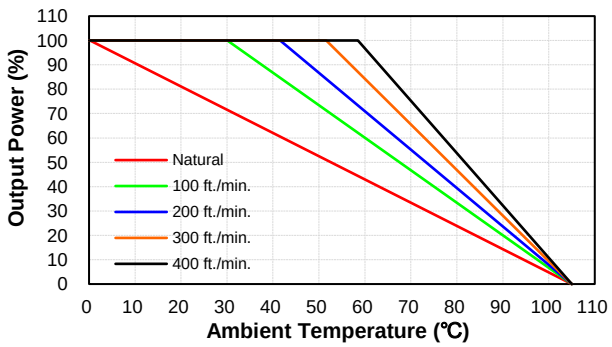
CQB150W8-36S12, 15, 28, 48, 54 Derating Curve with Heatsink QBT210 (Vin=36V)



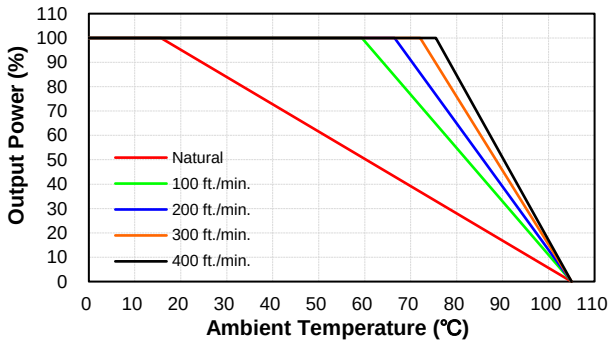
CQB150W8-36S24 Derating Curve without Heatsink (Vin=36V)



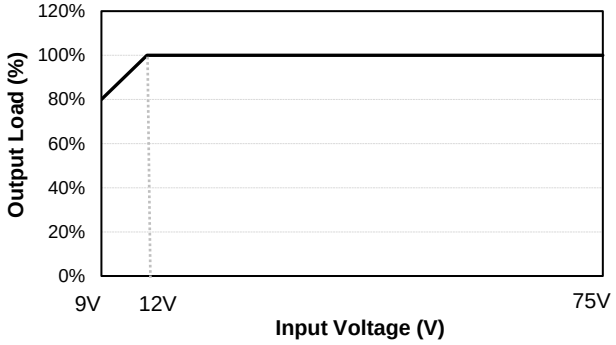
CQB150W8-36S24 Derating Curve with Heatsink QBL127 (Vin=36V)



CQB150W8-36S24 Derating Curve
with Heatsink QBT210 (Vin=36V)

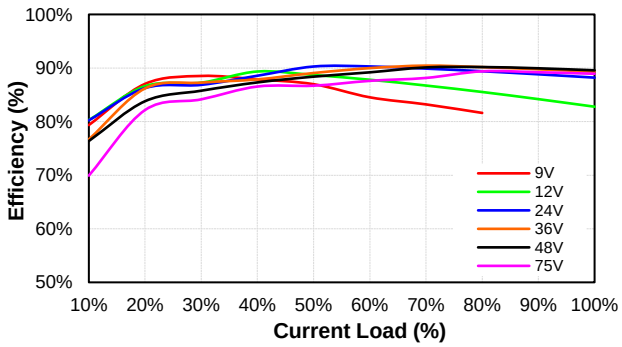


Typical Derating Curve VS Input Voltage

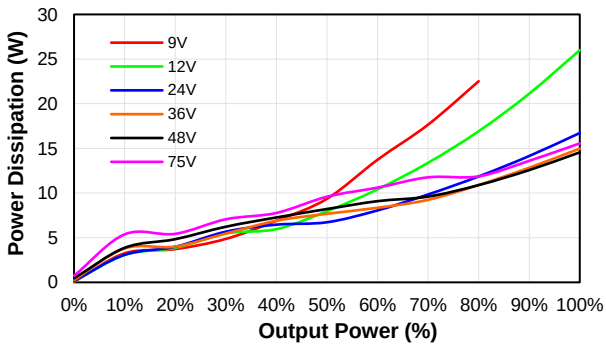


Performance Data

CQB150W8-36S05
Eff Vs Io @25 Deg. C



CQB150W8-36S05
Pd Vs Po @25 Deg. C



CQB150W8-36S12
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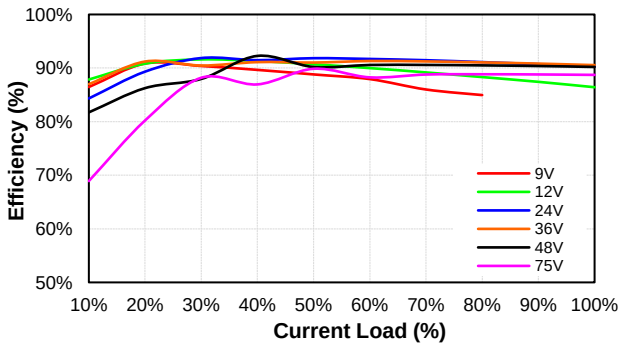

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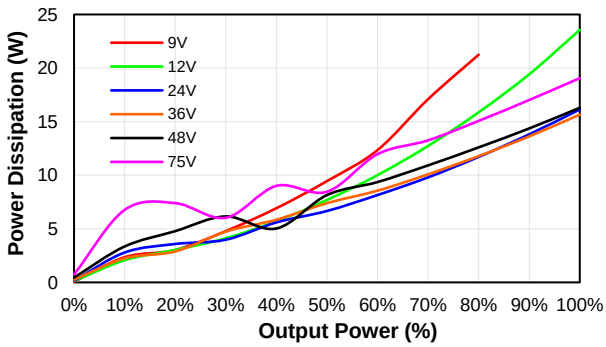

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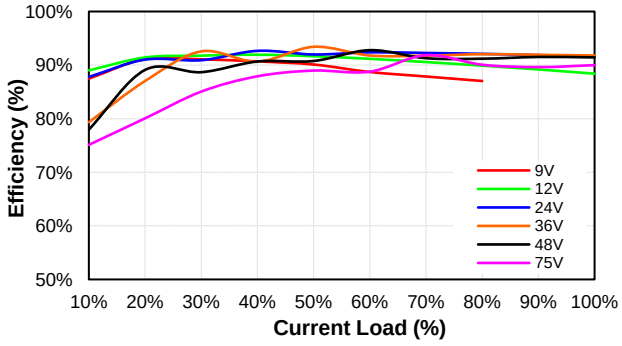

CQB150W8-36S15
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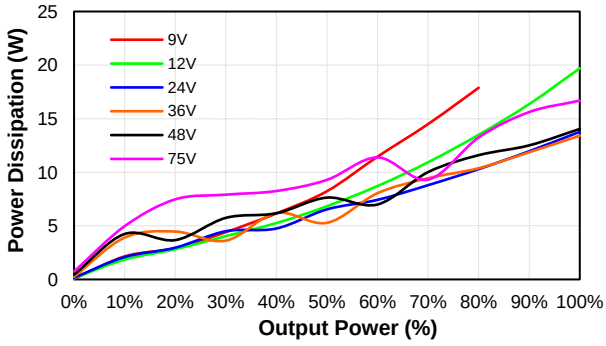

CQB150W8-36S24
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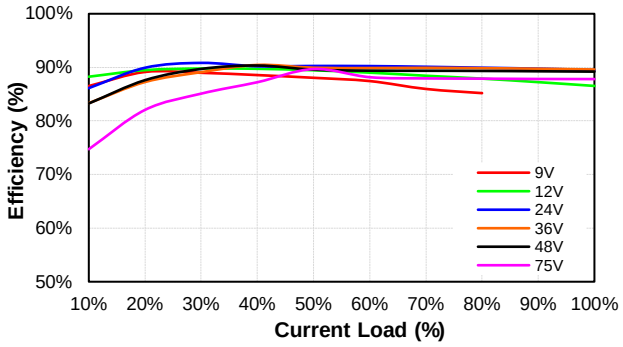
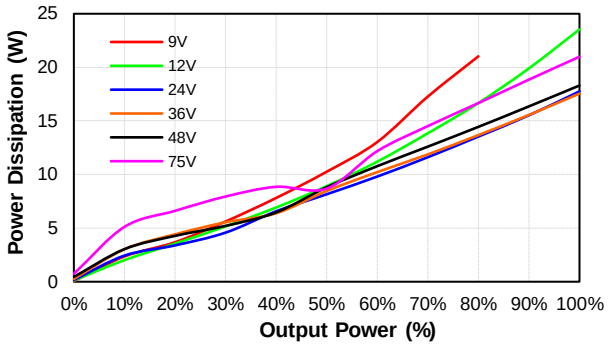
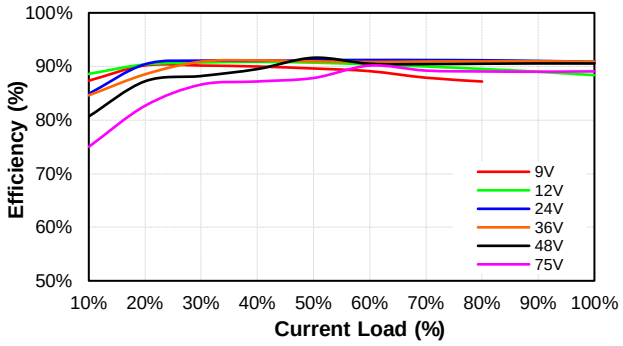


CQB150W8-36S24
Pd Vs Po @25 Deg. C



CQB150W8-36S28
Eff Vs Io @25 Deg. C



CQB150W8-36S28
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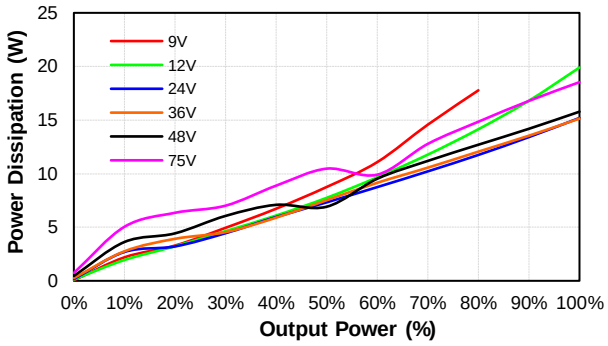

CQB150W8-36S48
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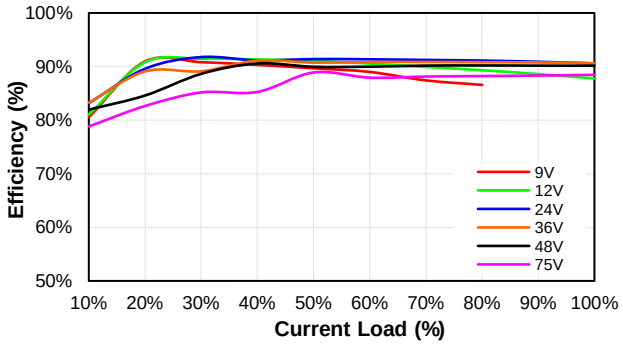

CQB150W8-36S48
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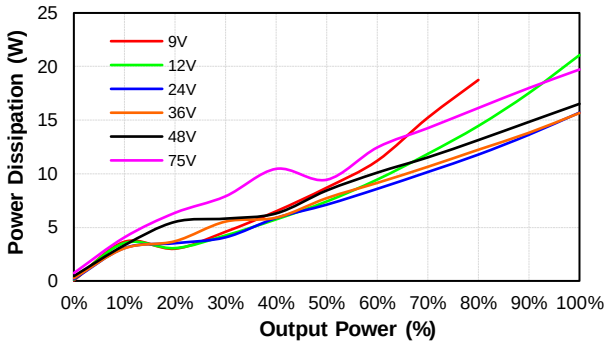

CQB150W8-36S54
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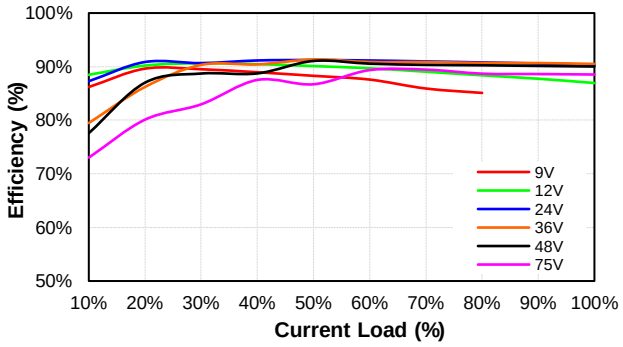

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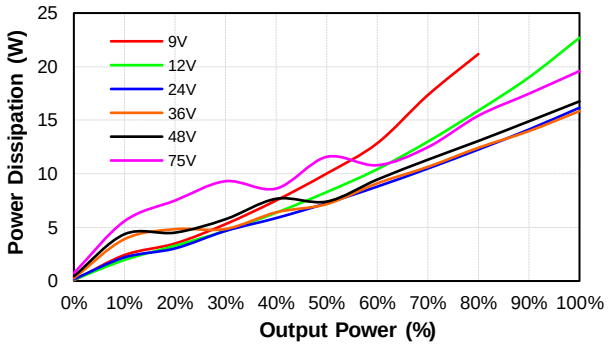
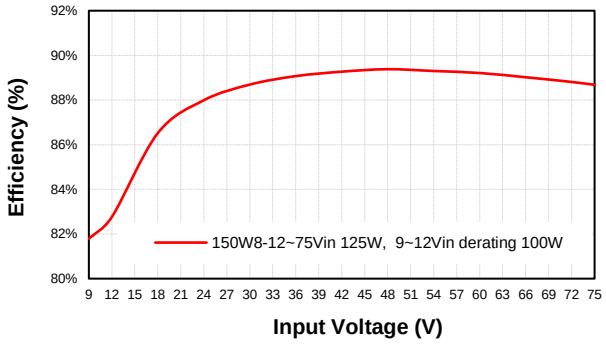
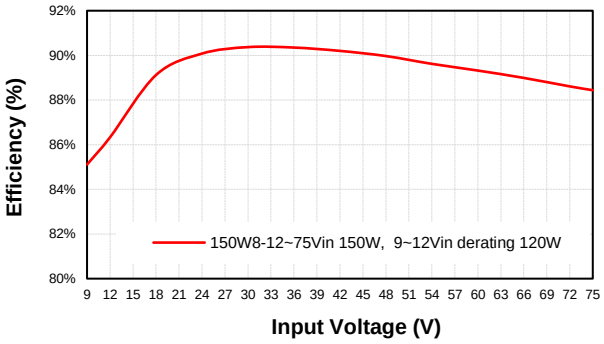


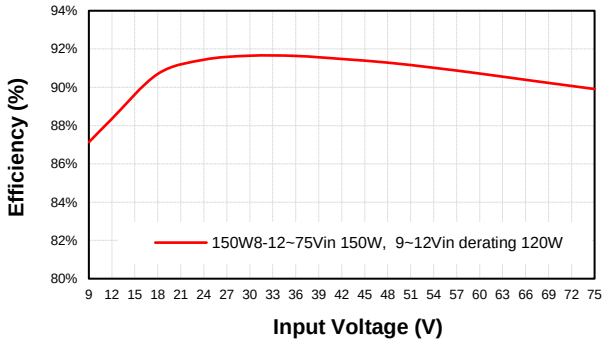
CQB150W8-36S05
Eff Vs Vin @25 Deg. C



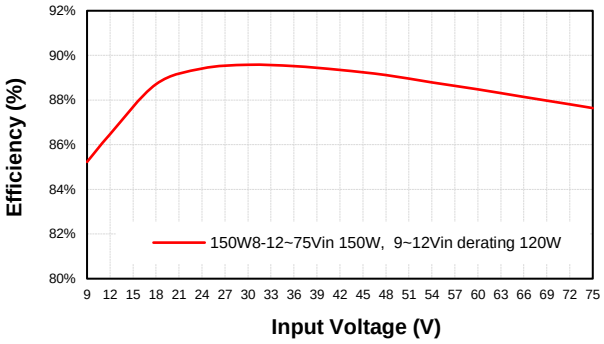
CQB150W8-36S12
Eff Vs Vin @25 Deg. C



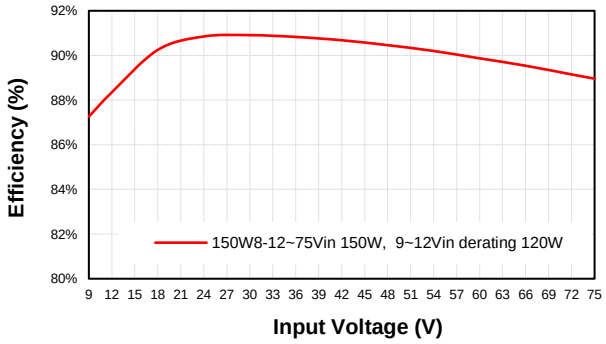
CQB150W8-36S15
Eff Vs Vin @25 Deg. C



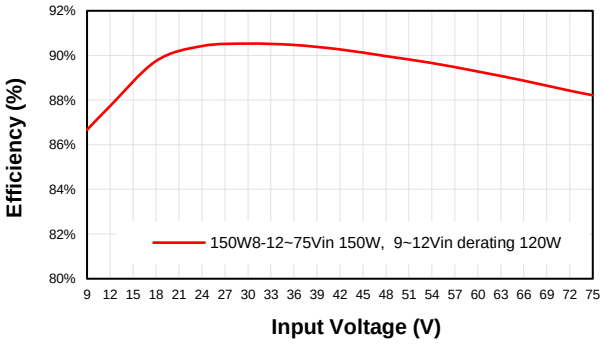
CQB150W8-36S24
Eff Vs Vin @25 Deg. C



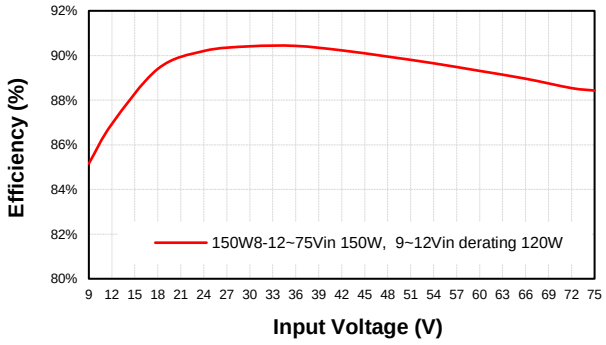
CQB150W8-36S28
Eff Vs Vin @25 Deg. C



CQB150W8-36S48
Eff Vs Vin @25 Deg. C

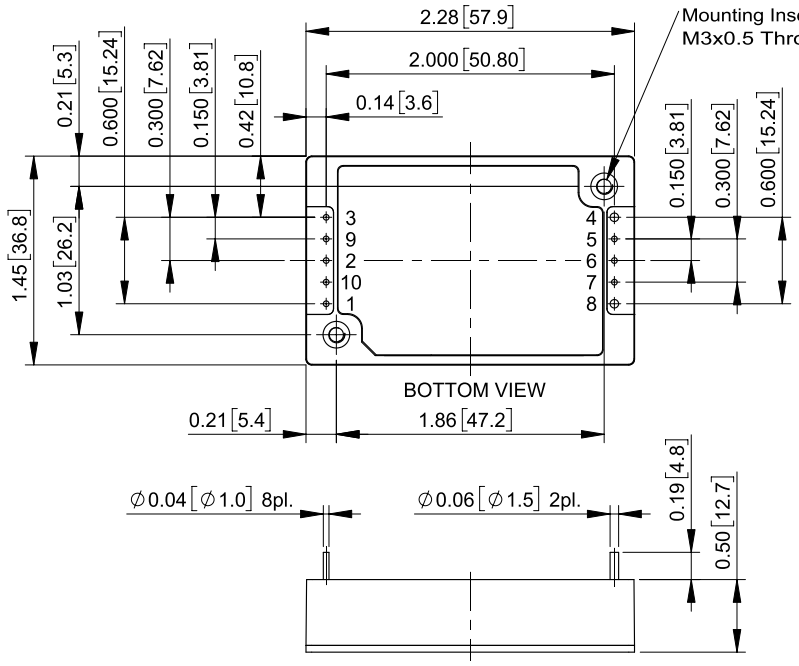


CQB150W8-36S54
Eff Vs Vin @25 Deg. C



Note: 9Vin Efficiency at 80% Full Load

MECHANICAL SPECIFICATION



All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x.xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

Pin Connection

	Standard	Option -B
Pin	Function	
1	+V Input	+V Input
2	On/Off	On/Off
3	-V Input	-V Input
4	-V Output	-V Output
5	-Sense	-Sense
6	Trim	Trim
7	+Sense	+Sense
8	+V Output	+V Output
9	NP	Bus(Option)
10	NP	UVLO(Option)

Note:Pin Size is ∅0.04±0.004 Inch [∅1.0±0.1 mm]
Pin Size is ∅0.06±0.004 Inch [∅1.5±0.1 mm]
NP-No Pin

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