



# CQB75W14 SERIES 75 WATT 14:1 INPUT ISOLATED DC-DC CONVERTER

## Features

- 75W Isolated Output
- Efficiency up to 91%
- Fixed Switching Frequency
- 14:1 Input Range
- 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°C
- Quarter Brick Size Meet Industrial Standard 2.28"x1.45"x0.5"
- CB Test Certificate IEC62368-1
- EN55032/EN55035/EN50155 Compliant with External Circuits
- UL62368-1 2nd (Reinforce Insulation) Approval
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 5000m Operating Altitude.
- Option Model with Bus & External UVLO Function



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	(2)	
CQB75W14-72S05	12-160 VDC	5 VDC	0 mA	15000 mA	20 mA	1190 mA	89	87.5	15000uF
CQB75W14-72S12	12-160 VDC	12 VDC	0 mA	6300 mA	20 mA	1193 mA	88	87	6300uF
CQB75W14-72S15	12-160 VDC	15 VDC	0 mA	5000 mA	20 mA	1170 mA	89.5	88.5	5000uF
CQB75W14-72S24	12-160 VDC	24 VDC	0 mA	3120 mA	15 mA	1169 mA	89.5	89	3120uF
CQB75W14-72S28	12-160 VDC	28 VDC	0 mA	2700 mA	15 mA	1167 mA	91	89	2700uF
CQB75W14-72S54	12-160 VDC	54 VDC	0 mA	1400 mA	20 mA	1167 mA	91	88.5	750uF

**NOTE:**

1. Nominal Input Voltage 72 VDC
2. Measured at Input Voltage 110VDC
3. An External Input Capacitor 220uF 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
CQB75W14-	II	O	XX	L	-Y (Option)
CQB75W14	72 : 72 VDC	S : Single	05 : 05VDC 12 : 12VDC 15 : 15VDC 24 : 24VDC 28 : 28VDC 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:**

**CQB75W14-72S12N-C:** Quarter Brick, 75W, 14:1 12-160Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert



# CQB75W14 Series

## 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		160	V <sub>dc</sub>
Input Surge Voltage	100ms max.	All			185	V <sub>dc</sub>
Operating Case Temperature	At the center part of case 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	12	72	160	V <sub>dc</sub>	
Input Under Voltage Lockout							
Turn-On Voltage Threshold	Full Load	All	10.7	11	11.7	V <sub>dc</sub>	
Turn-Off Voltage Threshold	Full Load	All	9.7	10	10.7	V <sub>dc</sub>	
Lockout Hysteresis Voltage	Full Load	All		1.0		V <sub>dc</sub>	
Maximum Input Current	V <sub>in</sub> =12V, Full load	All			8.0	A	
No-Load Input Current	V <sub>in</sub> =72V, 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		30		mA	

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V <sub>in</sub> =72V, 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 polymer tantalum and 1uF ceramic capacitors.	5V <sub>o</sub>			150	mV
		12V <sub>o</sub>			150	
		15V <sub>o</sub>			150	
		24V <sub>o</sub>			240	
		28V <sub>o</sub>			240	
		54V <sub>o</sub>			480	
RMS.	Full load, 10uF polymer tantalum and 1uF ceramic capacitors.	5V <sub>o</sub>			80	mV
		12V <sub>o</sub>			80	
		15V <sub>o</sub>			80	
		24V <sub>o</sub>			120	
		28V <sub>o</sub>			120	
		54V <sub>o</sub>			220	
Output Current Range	V <sub>in</sub> = 12 to 160V	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
Output Voltage Trim Range	P <sub>o</sub> ≤ max rated power, I <sub>o</sub> ≤ I <sub>o_max</sub>	Others	-20		+15	%
		54V <sub>o</sub>	-20		+10	



# CQB75W14 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Remote Sense Range	$P_o \leq$ max rated power, $I_o \leq I_{o\_max}$ % 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 $160V$ , $T_c = 25^\circ C$	-B Only		24	26	$V_{dc}$

## EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	$V_{in} = 72V$ , $110V$	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			$\pm 5$	%
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			M $\Omega$
Isolation Capacitance	Input to output	All		1000		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 $-V_{in}$ 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 or Open Circuit		160	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 or Open Circuit		160	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 10	mA
Over Temperature Shutdown	Temperature at the center part of case, non-latching	All		110		$^\circ C$
Over Temperature Recovery		All		100		$^\circ C$



# CQB75W14 Series

## 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	05Vo		570		K hours
		12Vo		690		
		15Vo		785		
		24Vo		840		
		28Vo		800		
		54Vo		850		
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/EN61373 Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	5000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN45545-2 Compliant					
EMI	Meets EN55032 & EN50155 Compliant (with external filter)					Class A
ESD	EN61000-4-2	Level 3: Air $\pm 8kV$ , Contact $\pm 6kV$				Perf. Criteria A
Radiated immunity	EN61000-4-3	Level 3: 80~1000MHz, 20V/m				Perf. Criteria A
Fast Transient	EN61000-4-4	Level 3: On power input port, $\pm 2kV$ , external input capacitor required (EN50155)				Perf. Criteria A
Surge	EN61000-4-5	Level 4: Line to earth, $\pm 4kV$ , Line to line, $\pm 2kV$ (EN50155)				Perf. Criteria A
Conducted immunity	EN61000-4-6	Level 3: 0.15~80MHz, 10V				Perf. Criteria A
Interruptions of Voltage Supply	EN50155	Class S3: 20ms interruptions				Perf. Criteria A
Supply Change Over	EN50155	Class C2: During a supply break of 30 ms				Perf. Criteria A
Application Note Link			<a href="#">CQB75W14-72S Series App Notes</a>			
Packaging Information Link			<a href="#">Packaging Information</a>			

## Immunity to Environmental Conditions

Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Low Temperature Start-up test	13.4.4	EN 60068-2-1	Class OT4 Temperature: -40°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT4 & ST2 Temperature: 70°C Duration: 6 hrs Extended temperature: 85°C Extended Duration: 10min	Pass
Low Temperature Storage Test	13.4.6	EN 60068-2-1	Temperature: -40°C Duration: 16 hrs	Pass
Cyclic Damp Heat Test	13.4.7	EN 60068-2-30	Temperature: 25°C- 55°C Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: 25°C +/- 10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz Vertical: 1.01 $m/s^2$ Transverse: 0.450 $m/s^2$ Longitudinal: 0.700 $m/s^2$ Duration: 10 min / axis	Pass
Simulated Long Life Test at Increased Random Vibration Levels	13.4.11	EN 61373	Temperature: 25°C +/-10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz Vertical: 5.72 $m/s^2$ Transverse: 2.55 $m/s^2$ Longitudinal: 3.96 $m/s^2$ Duration: 5 hrs / axis	Pass



# CQB75W14 Series

Phenomenon	EN50155; 2017 Reference Clause(s)	Reference Standard	Test Conditions	Result
Shock Test	13.4.11	EN 61373	Temperature: 25°C +/-10°C Humidity: 50% +/-25% RH Frequency range: 5 ~ 150 Hz +/-Vertical: 30 m/s <sup>2</sup> +/-Transverse: 30 m/s <sup>2</sup> +/-Longitudinal: 50 m/s <sup>2</sup> Duration: 30ms x18 (Each axis 3 shocks)	Pass

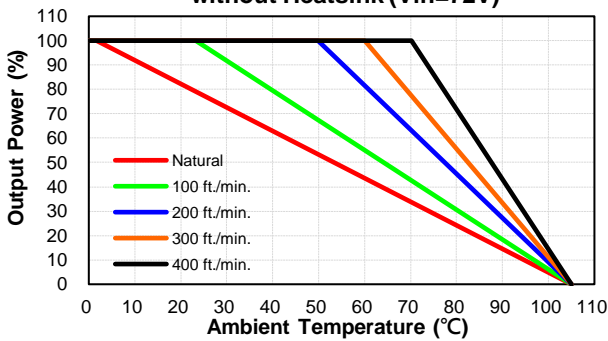
## EN45545-2 Fire & Smoke Test Conditions

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, 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	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

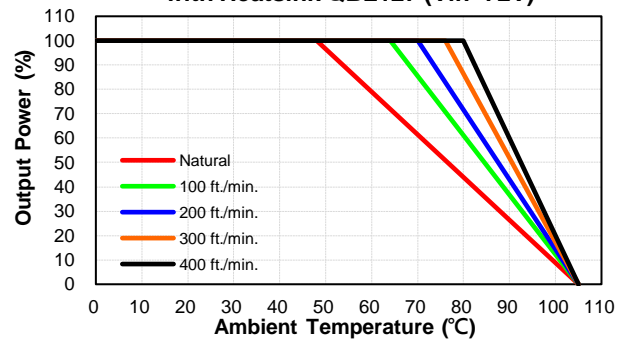
## CHARACTERISTIC CURVE

### Power Derating Curve

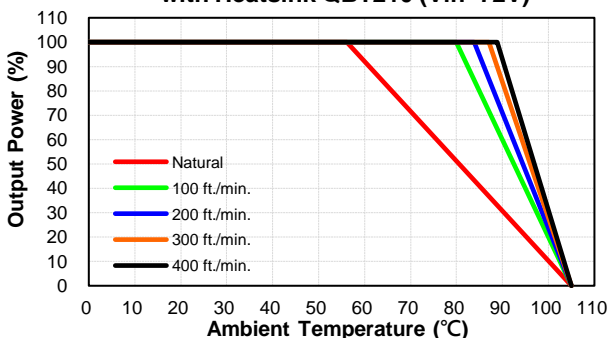
**CQB75W14-72S05, 12 Derating Curve without Heatsink (Vin=72V)**



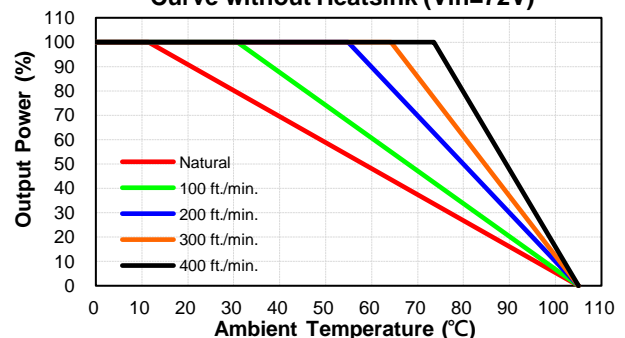
**CQB75W14-72S05, 12 Derating Curve with Heatsink QBL127 (Vin=72V)**



**CQB75W14-72S05, 12 Derating Curve with Heatsink QBT210 (Vin=72V)**



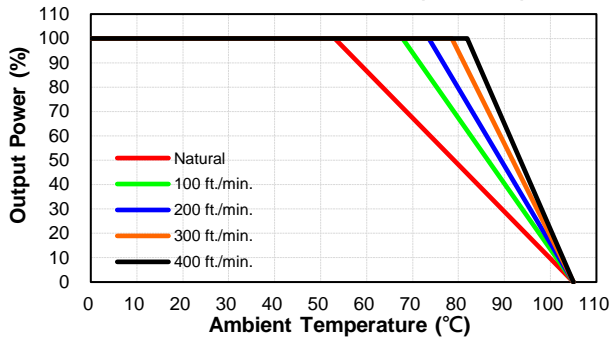
**CQB75W14-72S15, 24, 28, 54 Derating Curve without Heatsink (Vin=72V)**



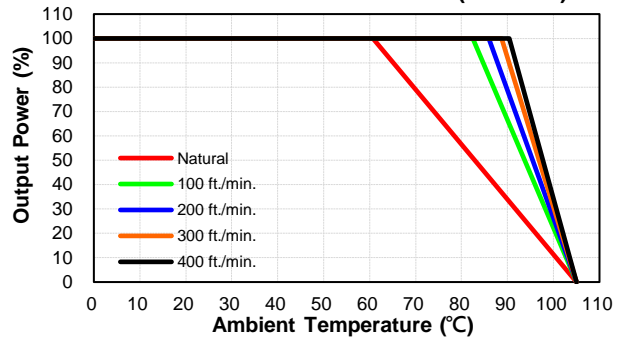


# CQB75W14 Series

**CQB75W14-72S15, 24, 28, 54 Derating Curve with Heatsink QBL127 (Vin=72V)**

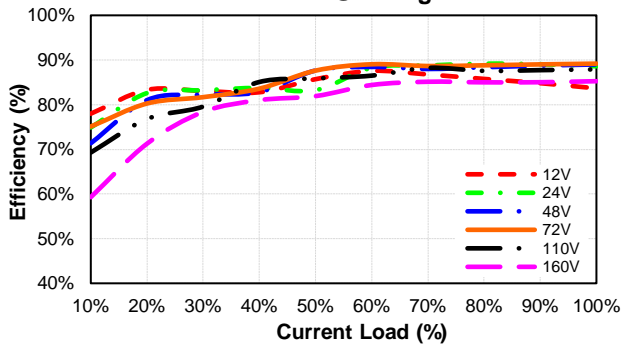


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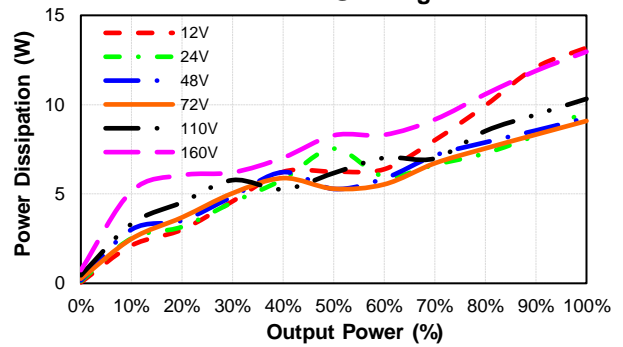


## Performance Data

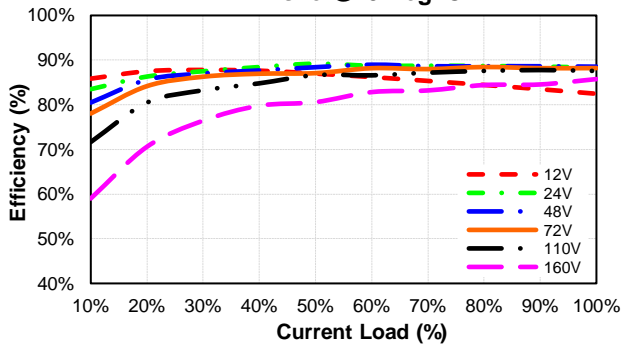
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Eff Vs Io @25 Deg. C**



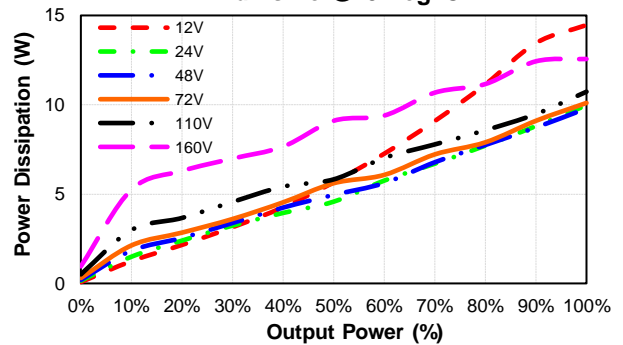
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**CQB75W14-72S12  
Eff Vs Io @25 Deg. C**



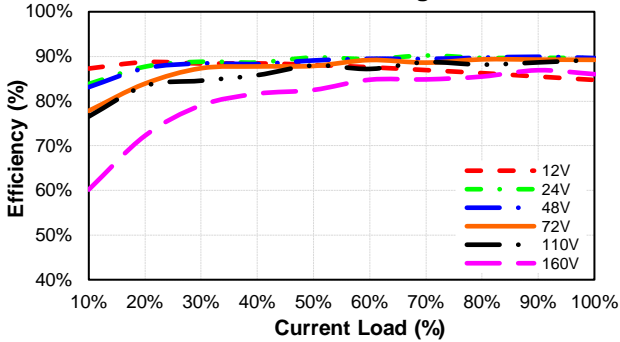
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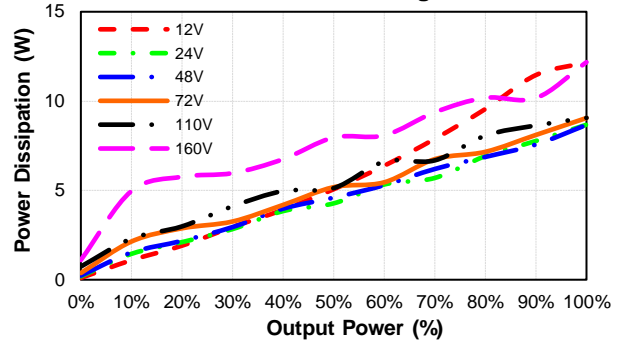


# CQB75W14 Series

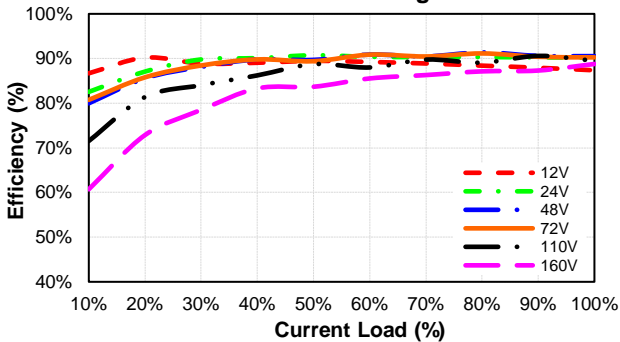
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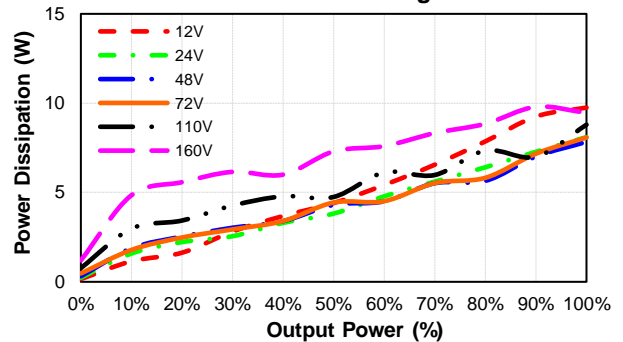
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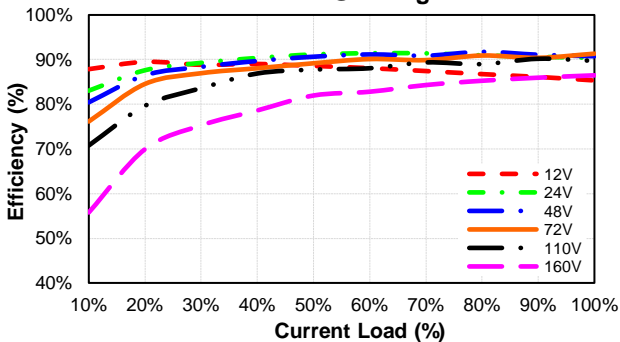
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Eff Vs Io @25 Deg. C



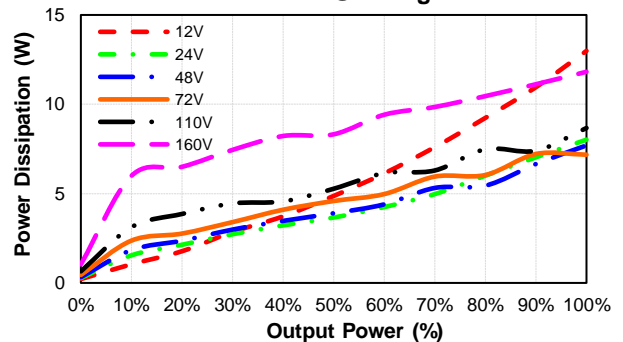
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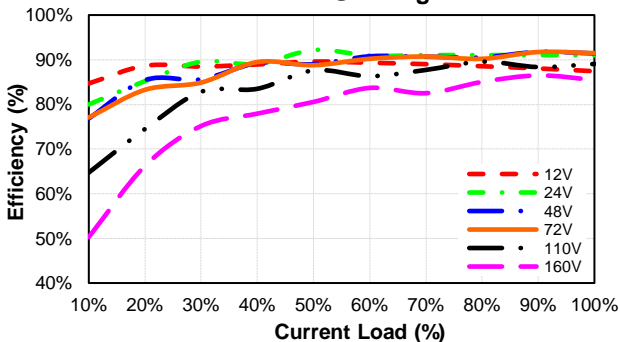
**CQB75W14-72S28**  
Eff Vs Io @25 Deg. C



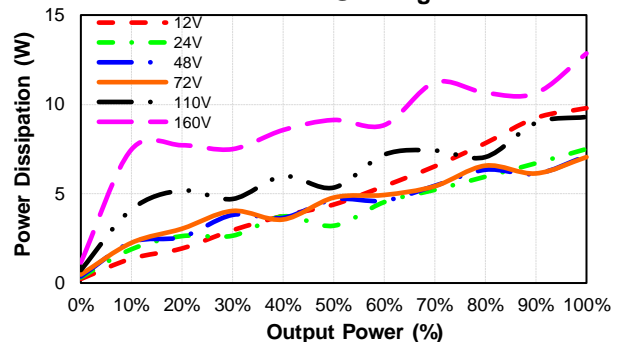
**CQB75W14-72S28**  
Pd Vs Po @25 Deg. C



**CQB75W14-72S54**  
Eff Vs Io @25 Deg. C



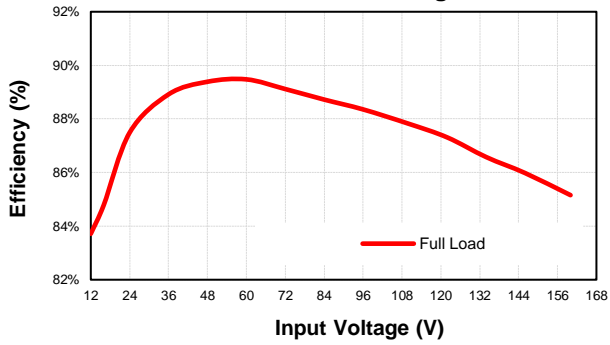
**CQB75W14-72S54**  
Pd Vs Po @25 Deg. C



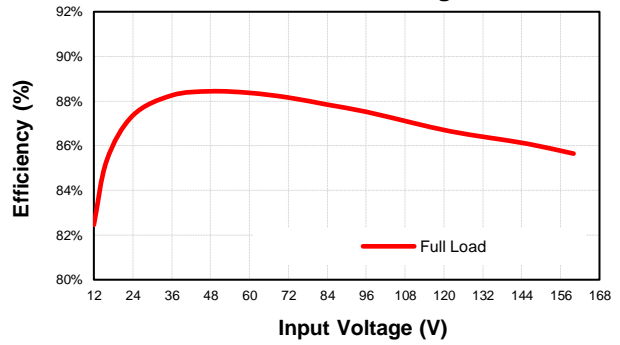


# CQB75W14 Series

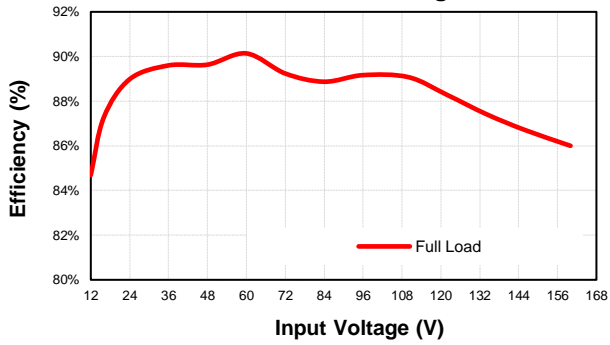
**CQB75W14-72S05**  
Eff Vs Vin @25 Deg. C



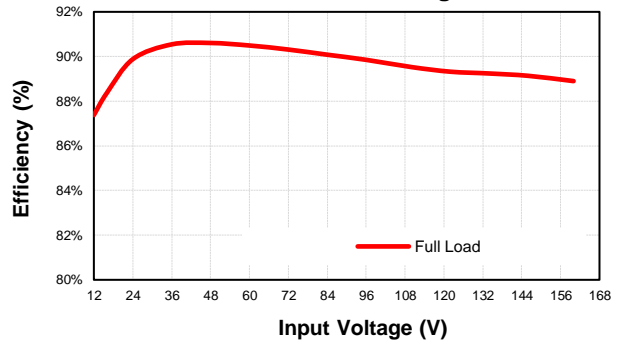
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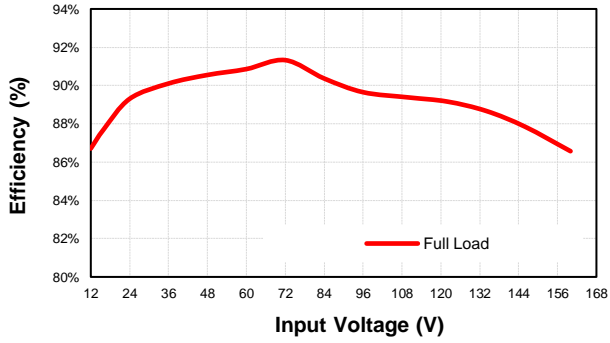
**CQB75W14-72S15**  
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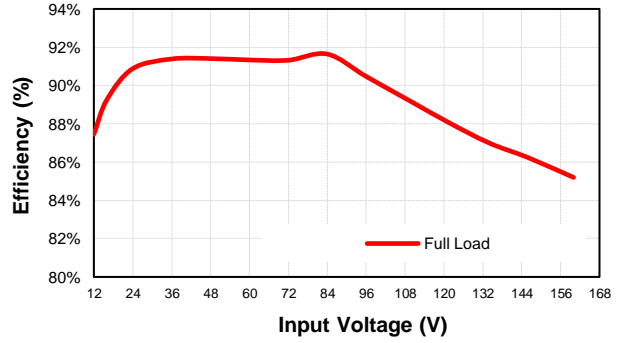
**CQB75W14-72S24**  
Eff Vs Vin @25 Deg. C



**CQB75W14-72S28**  
Eff Vs Vin @25 Deg. C



**CQB75W14-72S54**  
Eff Vs Vin @25 Deg. C



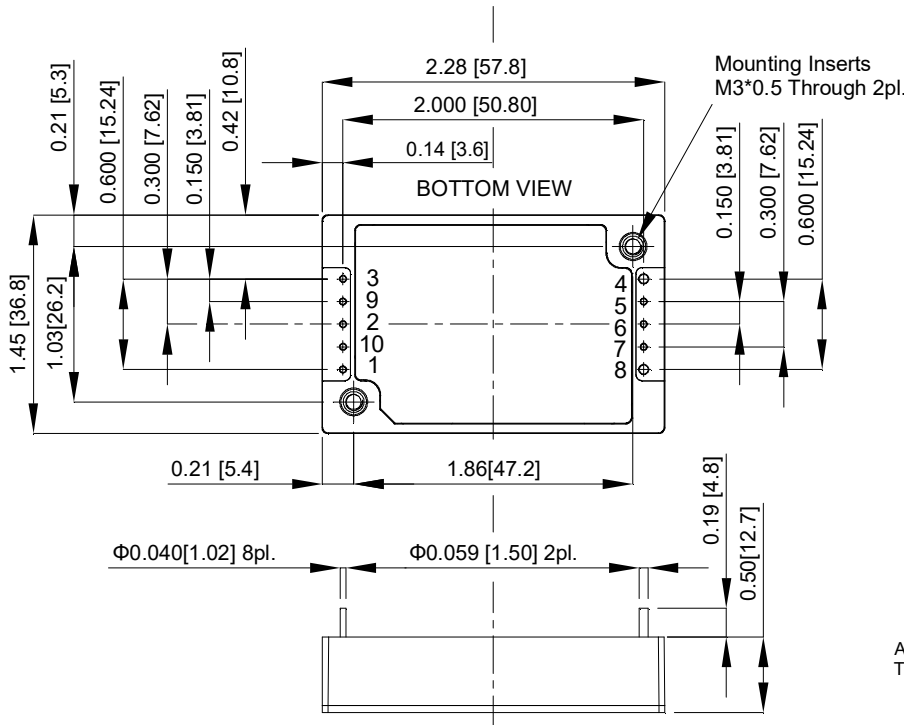
Note: 12Vin Efficiency at 80% Full Load





# CQB75W14 Series

## MECHANICAL SPECIFICATION



PIN CONNECTION		
PIN	STANDARD	OPTION -B
	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(Optional)
10	NP	UVLO(Optional)

\*NP-NO PIN

All Dimensions In Inches[mm]  
 Tolerances Inches: X.XX= ±0.02 , X.XXX= ±0.010  
 Millimeters: X.X= ±0.5 , X.XX= ±0.25