



CQB50W8 SERIES 50 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°C
- Quarter Brick Size Meet Industrial Standard 2.28"x1.45"x0.5"
- CB Test Certificate IEC62368-1
- UL62368-1 2nd (Reinforce Insulation) Approval
- EN50155 Compliant with External Circuits
- Shock & Vibration EN50155 (EN61373) Compliant
- Fire & Smoke EN45545-2 Compliant
- 5000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.		CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD	(1)	(2)	
CQB50W8-36S12	9-75 VDC	12 VDC	0 mA	4.17 A	8 mA	1544 mA	91	90	8000uF
CQB50W8-36S15	9-75 VDC	15 VDC	0 mA	3.33 A	8 mA	1542 mA	90	90	6800uF
CQB50W8-36S24	9-75 VDC	24 VDC	0 mA	2.08 A	10 mA	1541 mA	90	90	2350µF
CQB50W8-36S28	9-75 VDC	28 VDC	0 mA	1.79 A	10 mA	1547 mA	90	90	2350µF
CQB50W8-36S48	9-75 VDC	48 VDC	0 mA	1.05 A	10 mA	1556 mA	91	90	700µF

NOTE:

1. Nominal Input Voltage 36 VDC
2. Measured at 48Vin
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	
CQB50W8-	II	O	XX	L	-Y (Option)	
CQB50W8	36 : 36 VDC	S : Single	12 : 12VDC 15 : 15VDC 24 : 24VDC 28 : 28VDC 48 : 48VDC	None : Positive N : Negative	None : -C :	M3x0.5 Mounting Inserts Clear Mounting Insert (3.2mm DIA.)

Part Number Example:

CQB50W8-36S12N-C: Quarter Brick, 50W, 8:1 9-75Vdc Input, Single 12Vdc Output, Negative Logic, Clear Mounting Insert



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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		75	V _{dc}
Input Surge Voltage	100ms max.	All			100	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	9	36	75	V _{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold		All	8.4	8.8	9.0	V _{dc}
Turn-Off Voltage Threshold		All	7.6	8	8.2	V _{dc}
Lockout Hysteresis Voltage		All		0.8		V _{dc}
Maximum Input Current	V _{in} =9V, Full load.	All		6.7		A
No-Load Input Current	V _{in} =36V, 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		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°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, 22uF aluminum solid capacitor and 1uF ceramic capacitors	12Vo			150	mV
		15Vo			150	
		24Vo			240	
		28Vo			240	
		48Vo			480	
RMS.	Full load, 22uF aluminum solid capacitor and 1uF ceramic capacitors	12Vo			80	mV
		15Vo			80	
		24Vo			120	
		28Vo			120	
		48Vo			220	
Output Current Range	V _{in} = 9 to 75V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	150	210	%
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	-20		+15	%
Output Voltage Remote Sense Range	P _o ≤ max rated power, I _o ≤ I _{o,max} % of nominal V _o	All			+15	%
Over Voltage Protection	Limited voltage, % of nominal V _o	All	117	125	140	%



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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 d/d _t =0.1A/us (within 1% V _{out} nominal)	All			±5	%
Recovery Time					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		20		ms
Turn-On Delay Time, From Input	V _{in_min} to 10%V _{o_set} , Power up	All		20		ms
Output Voltage Rise Time	10%V _{o_set} to 90%V _{o_set}	All		10		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			3000	V _{ac}
					4200	V _{dc}
	1 minute; Input to case (base plate)				2100	V _{ac}
					3000	V _{dc}
	1 minute; Output to case (base plate)				1500	V _{ac}
					2100	V _{dc}
Isolation Resistance	Input to output	All	100			MΩ
Isolation Capacitance	Input to output	All		1000		pF
	Input to case (base plate)			None		
	Output to case (base plate)			1000		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse wide modulation (PWM), Fixed	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		1.0	V
Logic High (Module On)	V _{on/off} at I _{on/off} =0.0uA, Pin open=On	All	4.0		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	4.0		75	V
Logic Low (Module On)	V _{on/off} at I _{on/off} =1.0mA	All	0		1.0	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				100		

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	36S12		718		K hours
		36S15		803		
		36S24		811		
		36S28		800		
		36S48		807		
Weight		All		66		grams
Case Material	Plastic, DAP, UL 94V-0					



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GENERAL SPECIFICATIONS

Base plate Material	Aluminum	
Potting Material	UL 94V-0	
Pin Material	Base: Copper Plating: Nickel with Matte Tin	
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 ± 8 kV, Contact ± 6 kV	Perf. Criteria A
Radiated immunity	EN61000-4-3 Level 3: 80~1000MHz, 20V/m Level 2: 80~1000MHz, 3V/m for EN55035:2017	Perf. Criteria A
Fast Transient	EN61000-4-4 Level 3: On power input port, ± 2 kV, external input capacitor required Level 1: On power input port, ± 0.5 kV, external input capacitor required, for EN55035:2017	Perf. Criteria A
Surge	EN61000-4-5 Level 4: Line to earth, ± 4 kV, Line to line, ± 2 kV Level 1: Line to earth, ± 0.5 kV, for EN55035:2017	Perf. Criteria A
Conducted immunity	EN61000-4-6 Level 3: 0.15~80MHz, 10V Level 2: 0.15~30MHz, 3V, 30~80MHz, 1V for EN55035:2017	Perf. Criteria A
Magnetic Immunity	EN61000-4-8 Level 1: 50Hz, 1A/m for EN55035:2017	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	CQB50W8-36S Series App Notes	
Packaging Information Link	Packaging Information	

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 OT6 Temperature: -40°C Duration: 2 hrs	Pass
Dry Heat Test	13.4.5	EN 60068-2-2	Class OT6 & ST2 Temperature: 85°C Duration: 6 hrs Extended temperature: 100°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: $25^{\circ}\text{C} - 55^{\circ}\text{C}$ Humidity: 90% RH Duration: 48 hrs	Pass
Random Vibration Test	13.4.11	EN 61373	Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ 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: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ 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
Shock Test	13.4.11	EN 61373	Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ Humidity: 50% $\pm 25\%$ RH Frequency range: 5 ~ 150 Hz \pm -Vertical: 30 m/s^2 \pm -Transverse: 30 m/s^2 \pm -Longitudinal: 50 m/s^2 Duration: 30ms x18 (Each axis 3 shocks)	Pass



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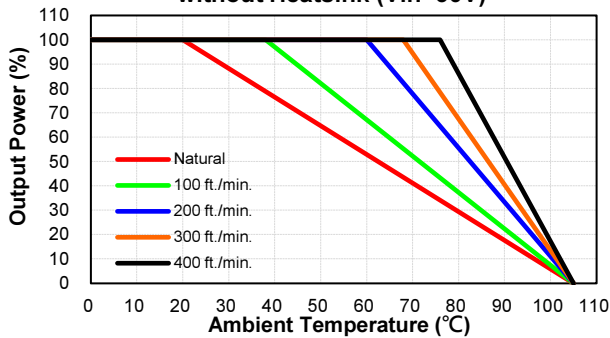
EN45545-2 Fire & Smoke Test Conditions.

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

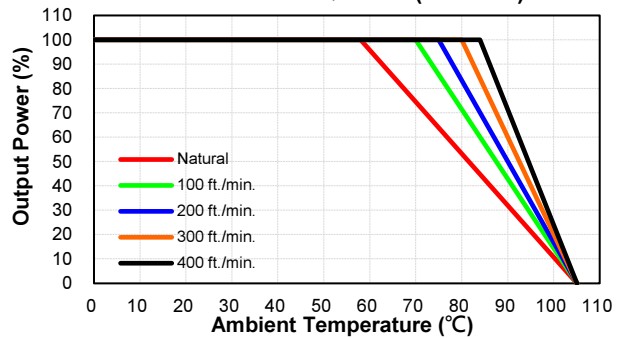
CHARACTERISTIC CURVE

Power Derating Curve

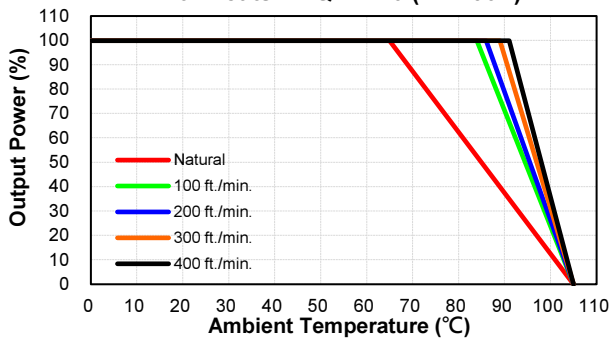
**CQB50W8-36S Derating Curve
without Heatsink (Vin=36V)**



**CQB50W8-36S Derating Curve
with Heatsink QBL127 (Vin=36V)**



**CQB50W8-36S Derating Curve
with Heatsink QBT210 (Vin=36V)**

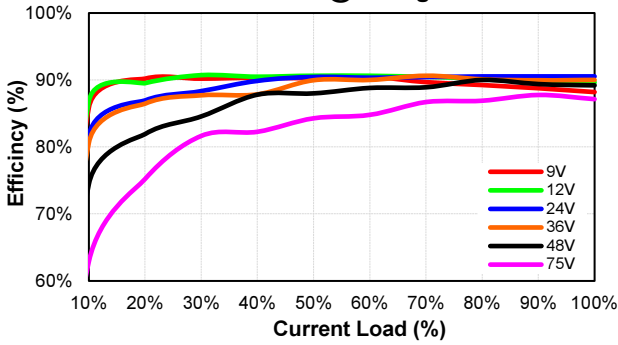




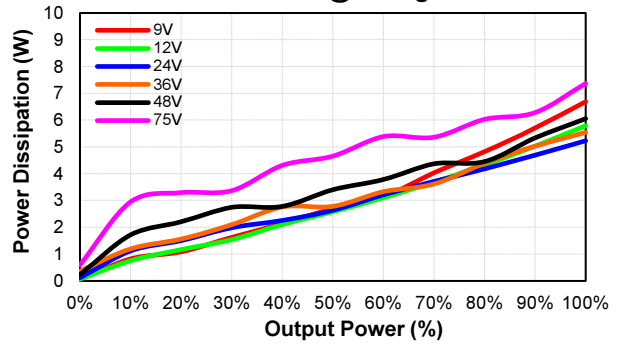
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Performance Data

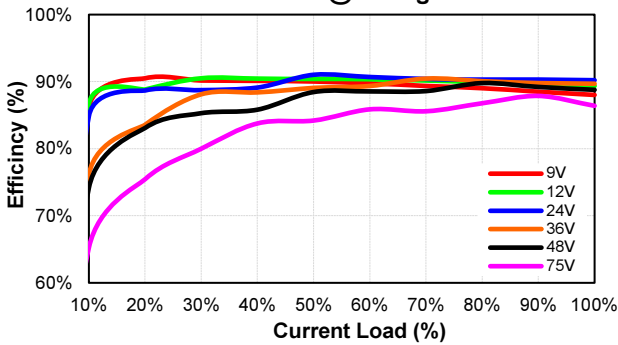
CQB50W8-36S12
Eff Vs Io @25 Deg. C



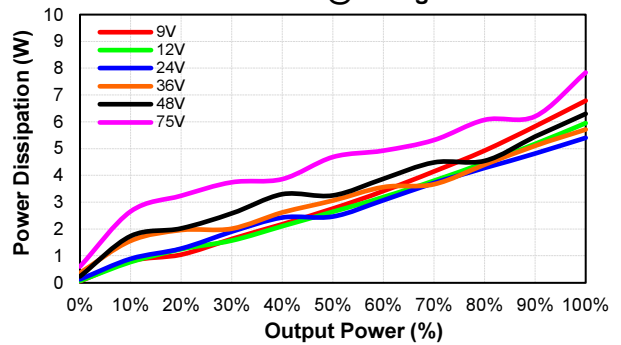
CQB50W8-36S12
Pd Vs Po @25 Deg. C



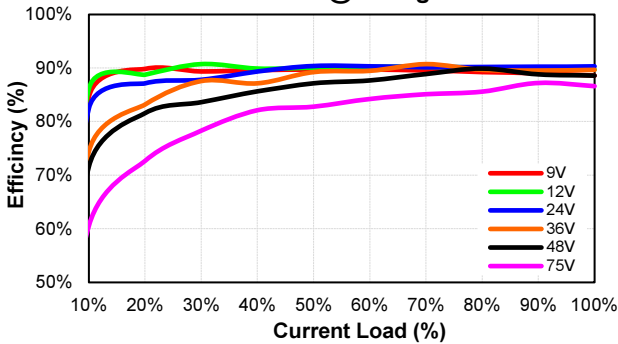
CQB50W8-36S15
Eff Vs Io @25 Deg. C



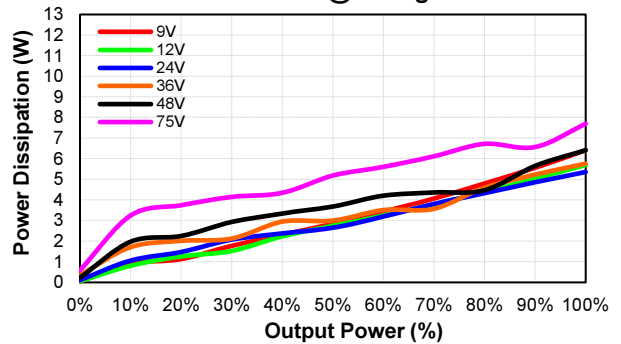
CQB50W8-36S15
Pd Vs Po @25 Deg. C



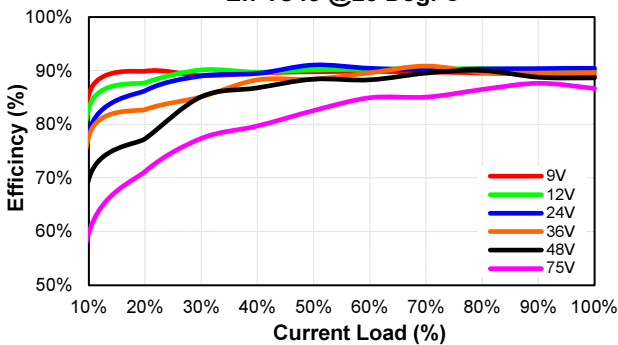
CQB50W8-36S24
Eff Vs Io @25 Deg. C



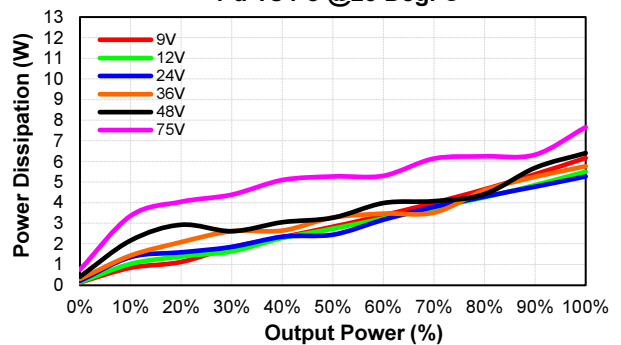
CQB50W8-36S24
Pd Vs Po @25 Deg. C



CQB50W8-36S28
Eff Vs Io @25 Deg. C



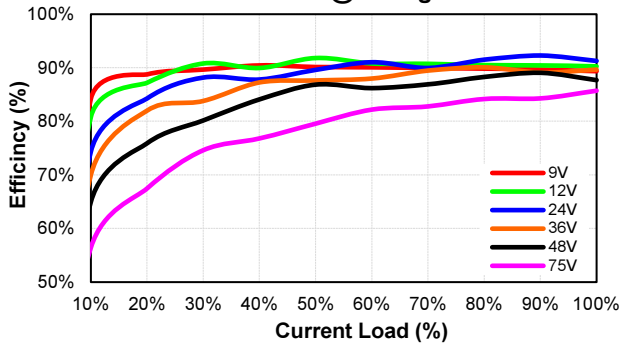
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Pd Vs Po @25 Deg. C



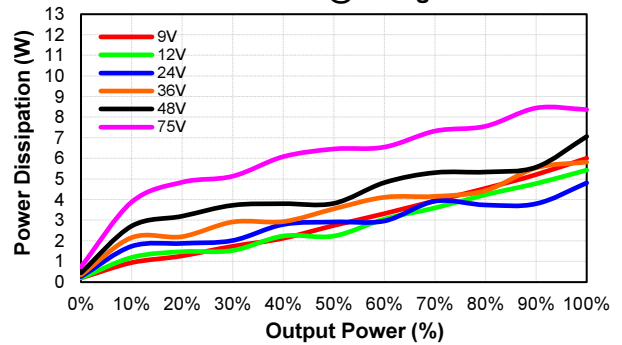


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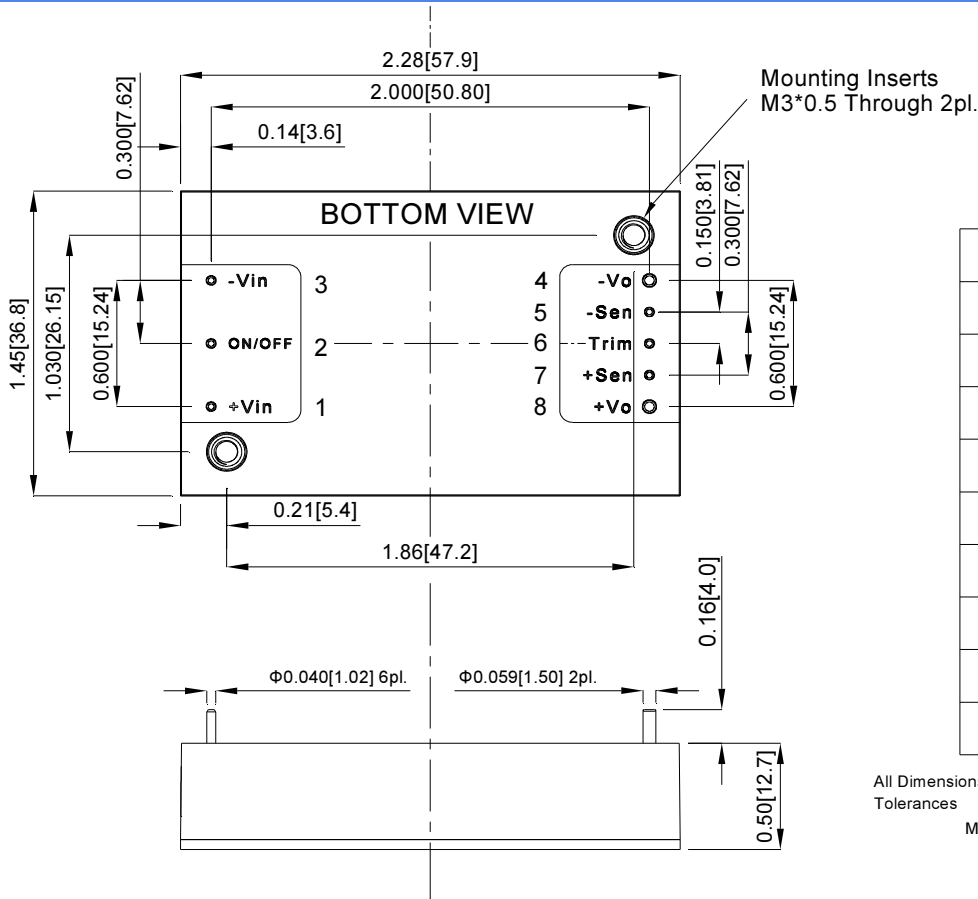
CQB50W8-36S48
Eff Vs Io @25 Deg. C



CQB50W8-36S48
Pd Vs Po @25 Deg. C



MECHANICAL SPECIFICATION



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