CQB150-300S CMFC(D) SERIES
150 WATT 2:1 INPUT ISOLATED DC-DC CONVERTERS

Features

- Efficiency Up to 89%
- 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 +100℃
- UL 62368-1 (Reinforce Insulation) Approval for DC Modules
- EN 55032/22 for EMC Characteristic
- Shock & Vibration Mil-STD-810F Compliant
- Fire & Smoke EN 45545-2 Compliant
- Safety Meets IEC/EN/UL 62368-1
- Build-In EMI Filter
- Chassis Mount, Baseplate Cooled

MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
CQB150-300S05□-CMFC CQB150-300S05□-CMFD	180-425 VDC	5 VDC	0 mA	30 A	10 mA	580 mA	85.5	10000uF
CQB150-300S12□-CMFC CQB150-300S12□-CMFD	180-425 VDC	12 VDC	0 mA	12.5 A	10 mA	560 mA	89	8800uF
CQB150-300S15□-CMFC CQB150-300S15□-CMFD	180-425 VDC	15 VDC	0 mA	10 A	10 mA	560 mA	89	8800uF
CQB150-300S24□-CMFC CQB150-300S24□-CMFD	180-425 VDC	24 VDC	0 mA	6.3 A	10 mA	570 mA	88.5	3300uF
CQB150-300S28□-CMFC CQB150-300S28□-CMFD	180-425 VDC	28 VDC	0 mA	5.4 A	10 mA	570 mA	88.5	3300μF
CQB150-300S48□-CMFC CQB150-300S48□-CMFD	180-425 VDC	48 VDC	0 mA	3.2 A	10 mA	570 mA	89	1000μF

NOTE:

1. Nominal Input Voltage 300 VDC
2. □ = N or none
3. VR is Used for Output Voltage Adjustment.
4. Refer to Application Note for Thermal Resistance and Derating Information.
5. TVS is Included for Input Surge Voltage Protection.
6. Recommend an External Fuse for Input Reverse Polarity Protection (shunt diode is included inside).
7. Output connector CN3 wafer with TAIWAN KING PIN TERMINAL P110I series and mate with JST housing PH series or equivalent.
8. CN1 connection: DINKLE 166-04P5 series or equivalent, suitable electric wire: 18~12AWG (IEC 0.5~4mm^2).
9. CN2 connection: DINKLE EK500V-04P series or equivalent, suitable electric wire: 24~12AWG (IEC 0.5~2.5mm^2).

PART NUMBER

Series	Nominal Input Voltage	Number of Outputs	Nominal Output Voltage	Remote On/Off Logic	Chassis Mount Type		Heatsink
CQB150	II	O	XX	L	-YYY	Z	+WW
CQB150	300：300 VDC	S：Single	05：5VDC 12：12VDC 15：15VDC 24：24VDC 28：28VDC 48：48VDC	None：Positive N：Negative	CMF：Chassis Mount Built in Filter	C：Open Frame D：With Cover	None：Blank HS：Heatsink HD：Heatsink+Din Rail

Part Number Example:

CQB150-300S12N-CMFC: Chassis Mount, 150W, 2:1 180-425Vdc Input, Single 12Vdc Output, Negative Logic, Open Frame

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		425	V_{dc}
Input Surge Voltage	100ms max.	All			500	V_{dc}
Operating Case Temperature	At the center part of base plate	All	-40		100	℃
Storage Temperature		All	-40		105	℃

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Input Voltage		All	180	300	425	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold	Full load	All	165	170	175	V_{dc}
Turn-Off Voltage Threshold	Full load	All	155	160	165	V_{dc}
Lockout Hysteresis Voltage	Full load	All		10		V_{dc}
Input Over Voltage Protection	Module on Module off	All All		440 450		V_{dc}
Maximum Input Current	V_{in}=180V, Full load	All		1		A
No-Load Input Current	V_{in}=300V, I_o=0A	See Model Number Table				mA

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Voltage Set Point Accuracy	V_{in}=300V, Full load, T_c=25℃	All	-1.0		+1.0	%
Output Voltage Regulation						
Load Regulation	Full load to no load	05Vo Others			±0.5 ±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, 1uF ceramic capacitors	5Vo 12Vo 15Vo 24Vo 28Vo 48Vo			120 150 150 200 200 300	mV
RMS.	Full load, 1uF ceramic capacitors	5Vo 12Vo 15Vo 24Vo 28Vo 48Vo			60 80 80 100 100 150	mV
Output Current Range	V_{in}= 180 to 425V	See Model Number Table				A
Over Current Protection	Hiccup mode. Auto recovery	All	110	125	160	%
Short Circuit Protection		All	Continuous, Auto Recovery			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$	All	-20		+10	%
Output Voltage Remote Sense Range	$P_o \leqq$ max. rated power, $I_o \leqq I_{o\_max.}$ % of Nominal Vo	All			+10	%
Over Voltage Protection	Limited voltage, % of nominal V_o	All	115	125	140	%

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	V_{in}=300V	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_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		300		ms
Turn-On Delay Time, From Input	$V_{in\_min.}$ to 10%V_{o_set}, Power up	All		300		ms
Output Voltage Rise Time	10%V_{o_set} to 90%V_{Vo_set}	All		50		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 4200	V_{ac} V_{dc}
	1 Minute; input to case (base plate)	All			2500 3500	V_{ac} V_{dc}
	1 Minute; output to case (base plate)	All			500 700	V_{ac} V_{dc}
Isolation Resistance	Input to output	All	100			MΩ
Isolation Capacitance	Input to output	All		NC		pF
	Input to case (base plate)	5Vo 12Vo 15Vo 24Vo 28Vo 48Vo		3440 3080		
	Output to case (base plate)	All		28200		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse width modulation (PWM), fixed	All	270	300	330	KHz
On/Off Control, Positive Remote On/Off Logic, Refer to -Vin Pin.						
Logic Low (Module Off)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=off	All	0		1.2	V
Logic High (Module On)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	3.5		12	V
On/Off Control, Negative Remote On/Off Logic, Refer to -Vin Pin						
Logic High (Module Off)	$V_{on/off}$ at $I_{on/off}$=1.0mA	All	3.5		12	V
Logic Low (Module On)	$V_{on/off}$ at $I_{on/off}$=0.0uA, Pin open=on	All	0		1.2	V
On/Off Current (for Both Remote On/Off Logic)	$I_{on/off}$ at $V_{on/off}$=3.5-12V	All	0.3		2.1	mA
Off Converter Input Current	Shutdown input idle current	All		3	5	mA
Over Temperature Shutdown	Temperature at the center part of base plate, non-latching	All		105		℃
Over Temperature Recovery		All		95		℃

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℃	5Vo 12Vo 15Vo 24Vo 28Vo 48Vo		509 557 589 598 543 639		K hours
Weight		-CMFC -CMFD -CMFD+HS -CMFD+HD		197 225 472 490		grams
Base plate Material	Aluminum					
Potting Material	UL 94V-0 (DC Module)					
Shock/Vibration	MIL-STD-810F Compliant					
Humidity	95% RH max. Non condensing					
Altitude	2000m Operating altitude, 12000m Transport altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN 45545-2 Compliant					
EMI	EN 55032 & EN 55022 Compliant					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					Perf. Criteria A
Surge	EN 61000-4-5 Level 4: Line to earth, ±4kV, Line to line, ±2kV					Perf. Criteria A
Conducted Immunity	EN 61000-4-6 Level 3: 0.15~80MHz, 10V					Perf. Criteria A
Power Frequency Magnetic Field immunity	EN 61000-4-8 50/60Hz, 3A/m (r.m.s.)					Perf. Criteria A
Application Note Link						CQB150-300S CMFC(D) Series App Notes
Packaging Information Link						Packaging Information

Immunity to Environmental Conditions.

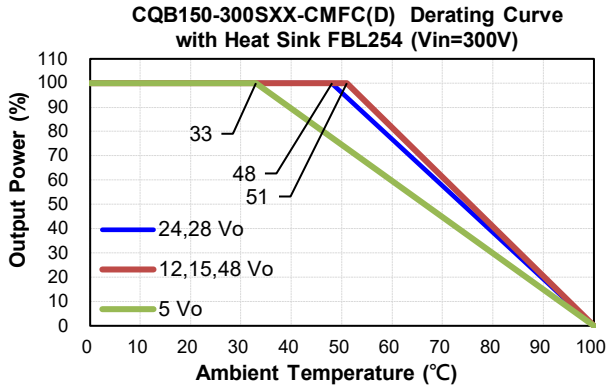
Phenomenon	Reference Clause(s)	Reference Standard	Test Conditions	Result
Vibration Test	MIL-STD-810F Table 514.5C-VIII Figure 514.5C-6	MIL-STD-810F	Unit are non-operating Vibration Waveform: Random Vibration Frequency: 15～2000 Hz Vibration axis: X、Y、Z axis Duration: 1hr/axis	Vibration Test
Shock Test	MIL-STD-810F 516.5 Table 516.5-I	MIL-STD-810F	Wave form: Sawtooth wave Test Category: Crash Hazard Test for Ground Equipment Duration: 10 ms Peak Acceleration: 75 G Cross-over Frequency: 80 Hz No. of Shock: Each axis 3 times Shock Direction: ±X, ±Y, ±Z axis	Shock Test
Thermal Shock Cycling Test	MIL-STD-810F 503.4 Figure 503.4-1	MIL-STD-810F	Temperature：-55℃ to 105℃ Humidity: 95%RH Duration: 8hrs/ 3 times cycling& 4hrs dwell time	Thermal Shock Cycling Test
Thermal Humidity Cycling Test	MIL-STD-810F Notice 3 Method 507.4	MIL-STD-810F	Temperature: 60℃ to 30℃ Humidity: 95%RH Duration: 240 hrs	Thermal Humidity Cycling Test

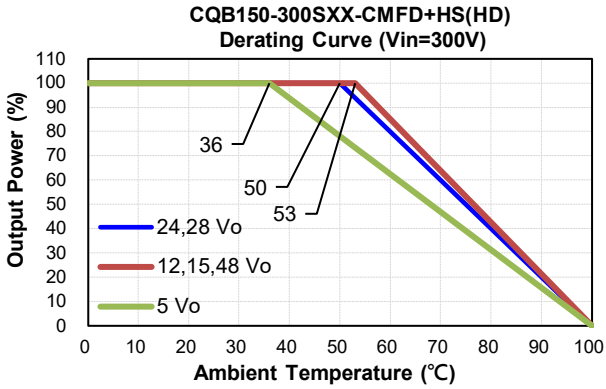
EN 45545-2 Fire & Smoke Test Conditions.

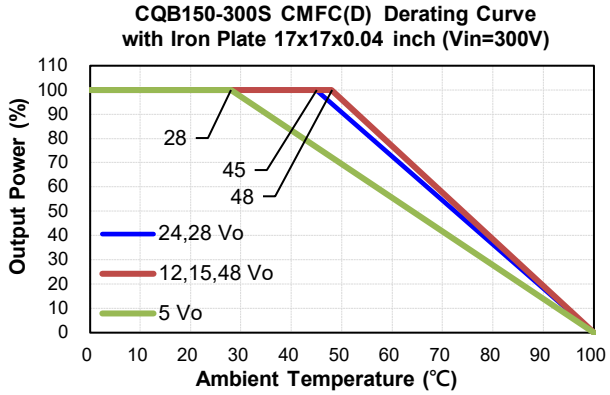
Item		Standard	Hazard Level
R22	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, HL2, HL3
	Smoke Density Test	EN 45545-2: 2013 EN ISO 5659-2: 2013	HL1, HL2, HL3
	Smoke Toxicity Test	EN 45545-2: 2013 NF X70-100: 2006	HL1, HL2, HL3
R23	Oxygen Index Test	EN 45545-2: 2013 EN ISO 4589-2: 2006	HL1, 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

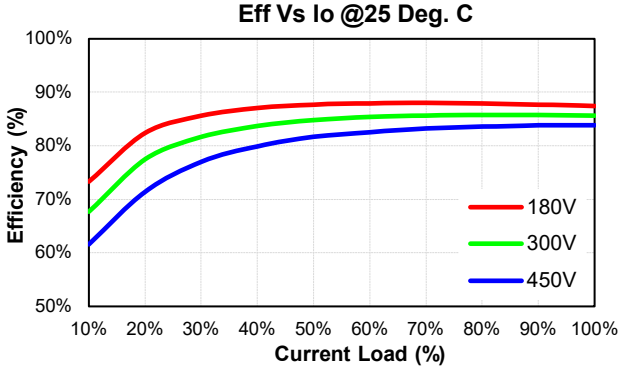




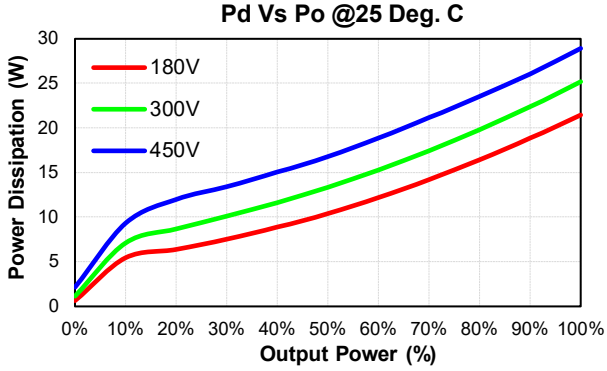


Performance Data

CQB150-300S05-CMFC
Eff Vs Io @25 Deg. C



CQB150-300S05-CMFC
Pd Vs Po @25 Deg. C



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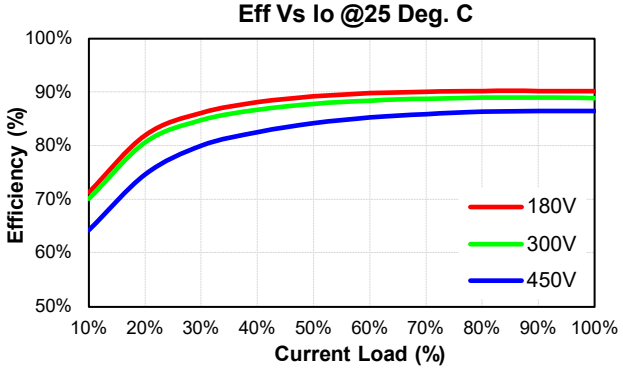
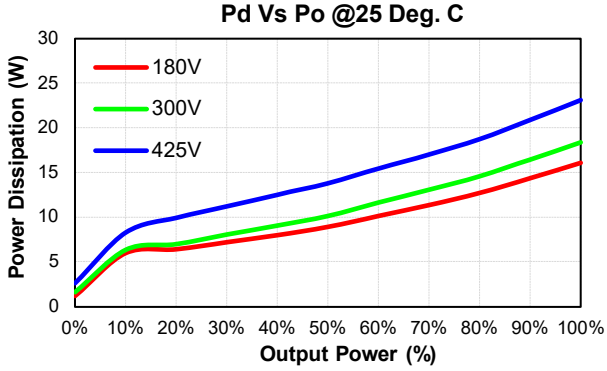


CQB150-300S12-CMFC
Pd Vs Po @25 Deg. C



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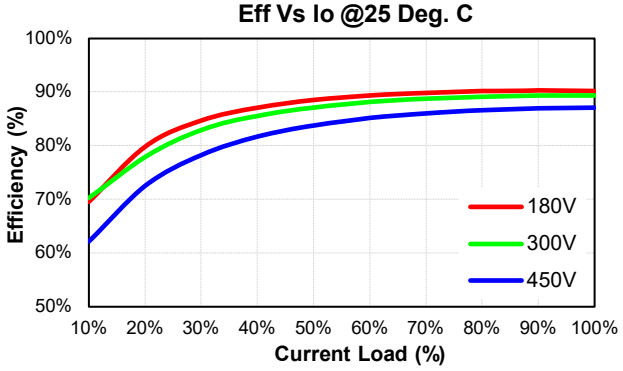

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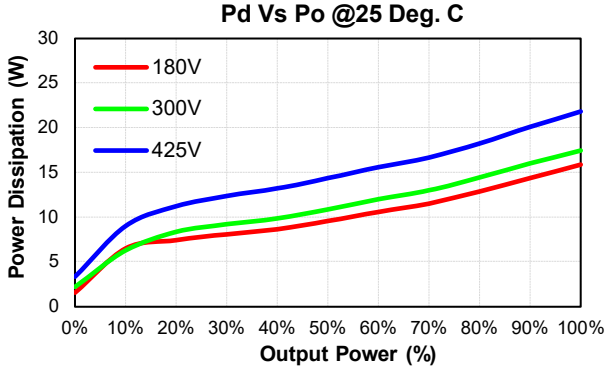
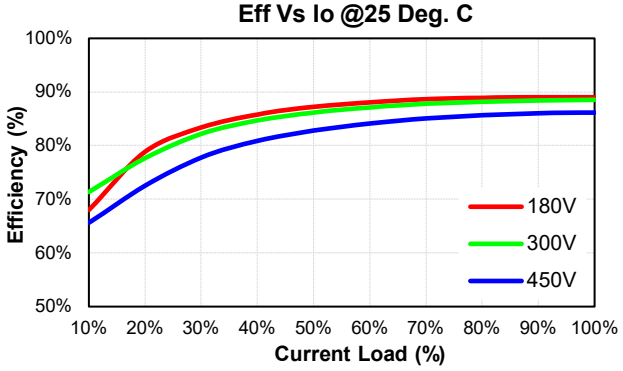
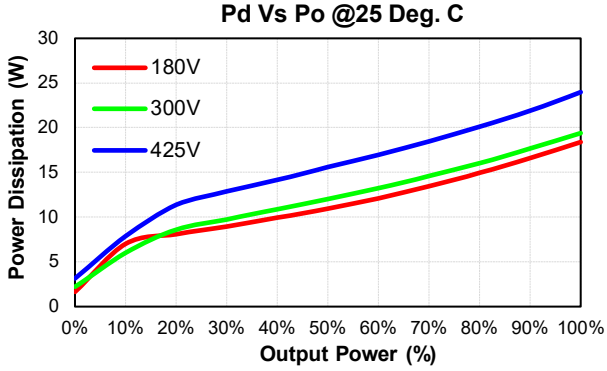
Pd Vs Po @25 Deg. C

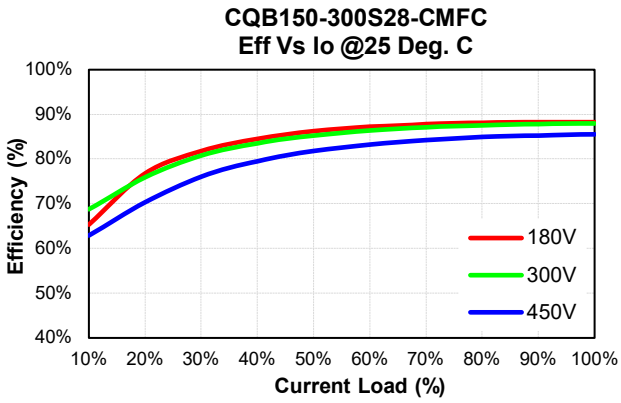


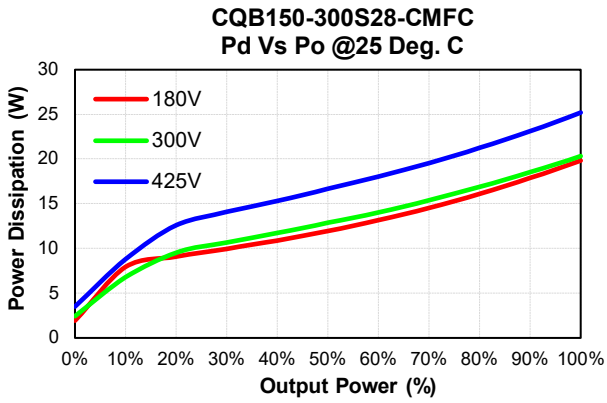
CQB150-300S24-CMFC
Eff Vs Io @25 Deg. C

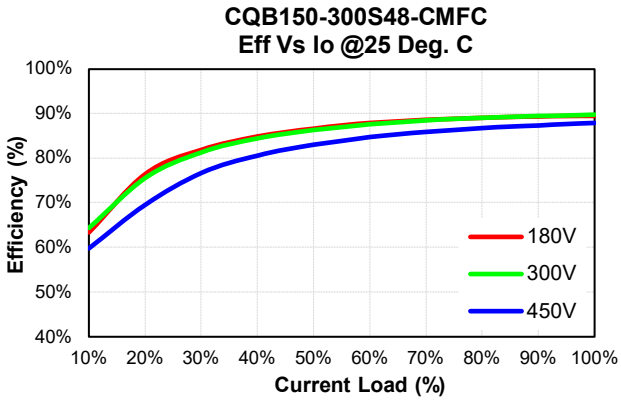


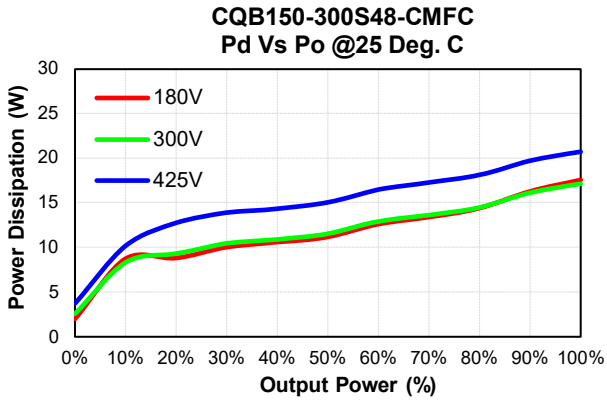
CQB150-300S24-CMFC
Pd Vs Po @25 Deg. C




CQB150-300S28-CMFC
Eff Vs Io @25 Deg. C
Efficiency (%)
100%
90%
80%
70%
60%
50%
40%
10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Current Load (%)
180V
300V
450V

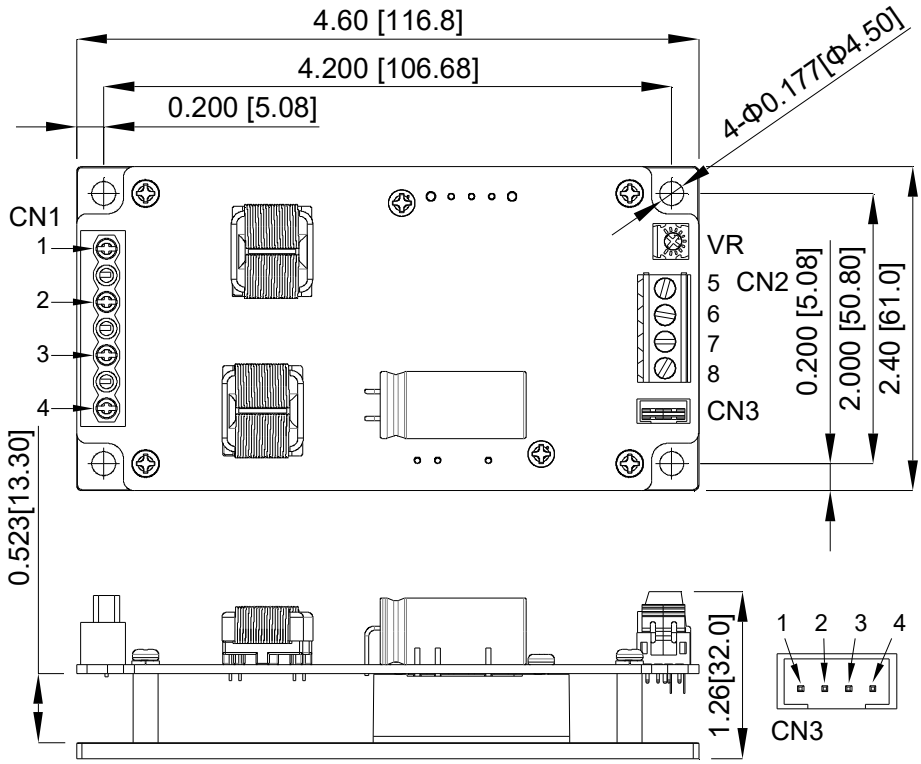

CQB150-300S28-CMFC
Pd Vs Po @25 Deg. C
Power Dissipation (W)
30
25
20
15
10
5
0
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Output Power (%)
180V
300V
425V


CQB150-300S48-CMFC
Eff Vs Io @25 Deg. C
Efficiency (%)
100%
90%
80%
70%
60%
50%
40%
10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Current Load (%)
180V
300V
450V

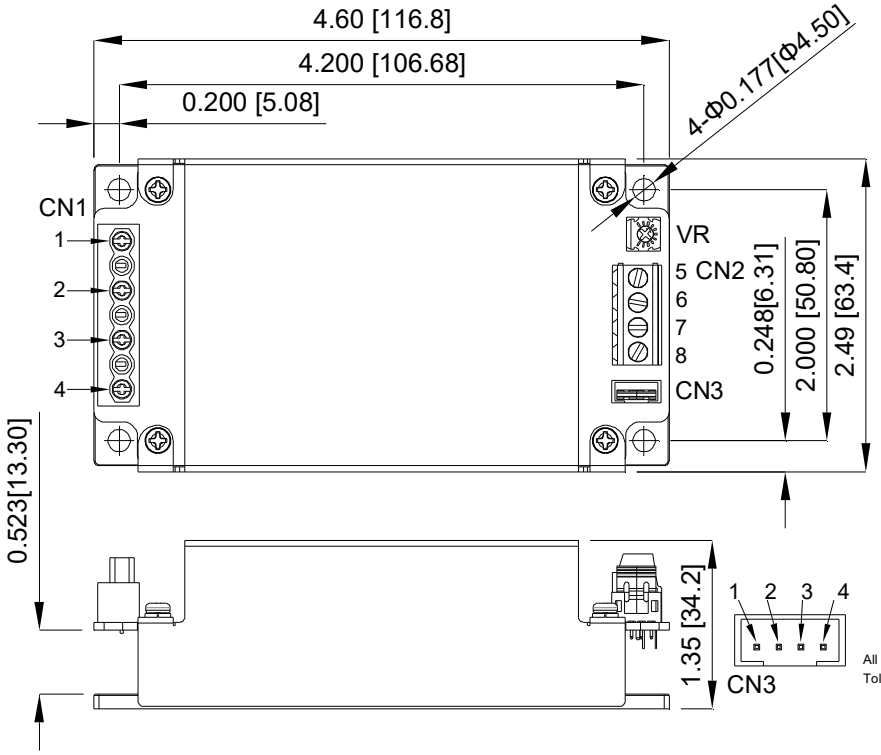

CQB150-300S48-CMFC
Pd Vs Po @25 Deg. C
Power Dissipation (W)
30
25
20
15
10
5
0
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Output Power (%)
180V
300V
425V

MECHANICAL SPECIFICATION

CMFC



CMFD with Cover



CN1 & CN2
PIN CONNECTION

PIN	Function
1	+V Input
2	-V Input
3	Remote
4	Case
5	+V Output
6	+V Output
7	-V Output
8	-V Output

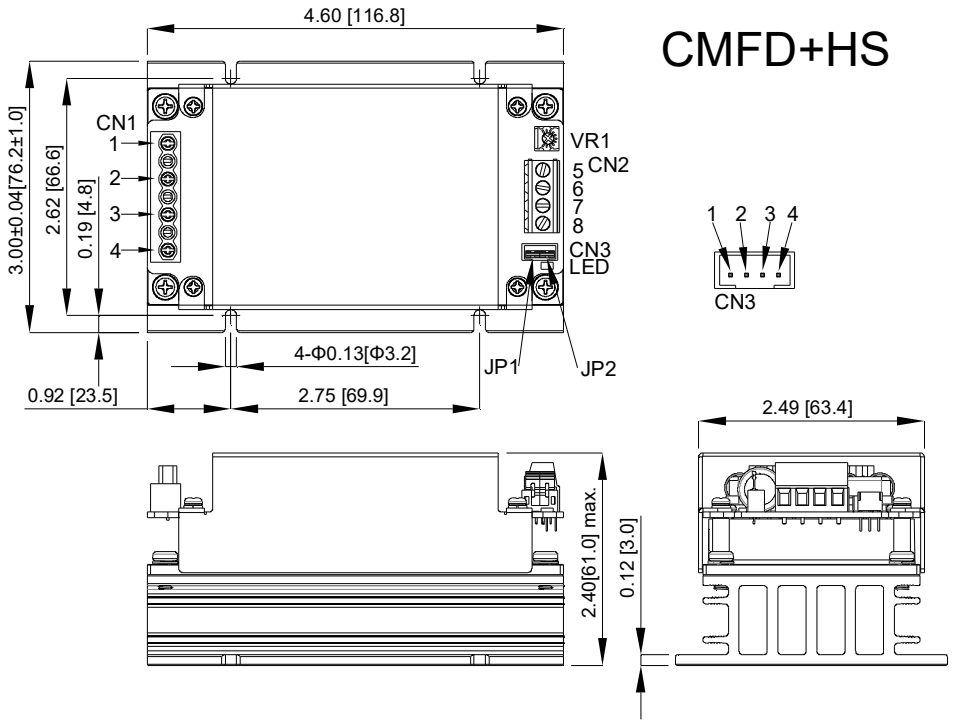
CN3
PIN CONNECTION

PIN	Function
1	-V Output
2	-Sense
3	+Sense
4	+V Output

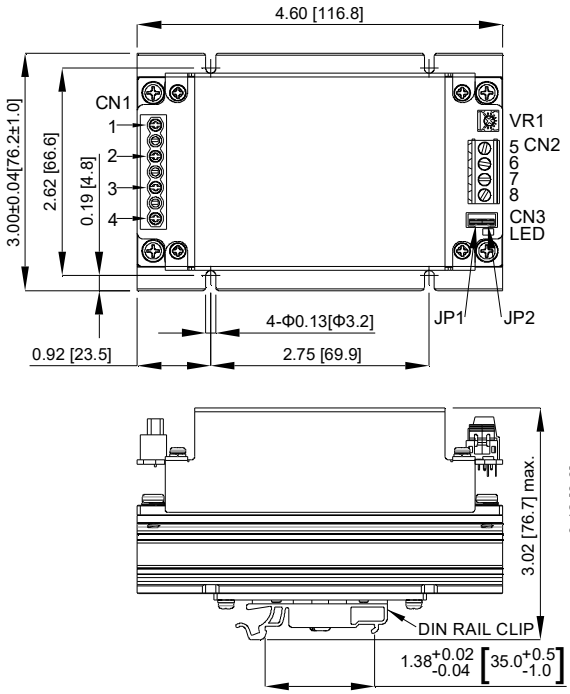
All Dimensions in Inches[mm]
Tolerance Inches: x.xx=±0.02, x .xxx=±0.010
Millimeters: x.x=±0.5, x.xx=±0.25

MECHANICAL SPECIFICATION

CMFD+HS



CMFD+HD



CN1 & CN2
PIN CONNECTION

PIN	Function
1	+V Input
2	-V Input
3	Remote
4	Case
5	+V Output
6	+V Output
7	-V Output
8	-V Output

CN3
PIN CONNECTION

PIN	Function
1	-V Output
2	-Sense
3	+Sense
4	+V Output

*JP1:Short PIN1 & PIN2
*JP2:Short PIN3 & PIN4

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

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