CQB75-300S SERIES
75 WATT 2:1 INPUT ISOLATED DC-DC CONVERTER

Features

- Efficiency Up to 90%
- 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”
- Safety Meets IEC/EN/UL 62368-1 2nd (Reinforce Insulation)
- Shock & Vibration MIL-STD-810F Compliant
- Fire & Smoke EN45545 Compliant
- 3000m Operating Altitude



MODEL NUMBER	INPUT VOLTAGE	OUTPUT VOLTAGE	OUTPUT CURRENT		INPUT CURRENT		% EFF.	CAPACITOR LOAD MAX.
			MIN.	MAX.	NO LOAD	FULL LOAD		
CQB75-300S05	180-450 VDC	5 VDC	0 mA	15 A	10 mA	305 mA	82	15000μF
CQB75-300S12	180-450 VDC	12 VDC	0 mA	6.25 A	10 mA	281 mA	88	6250μF
CQB75-300S15	180-450 VDC	15 VDC	0 mA	5 A	10 mA	281 mA	90	5000μF
CQB75-300S24	180-450 VDC	24 VDC	0 mA	3.12 A	10 mA	281 mA	90	3300μF
CQB75-300S48	180-450 VDC	48 VDC	0 mA	1.56 A	10 mA	281 mA	89	1000μF

NOTE:

1. Nominal Input Voltage 300 VDC
2. Measured at 300Vin
3. An External Input Capacitor 33uF 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
CQB75	II	O	XX	L	-Y (Option)
CQB75	300	S: Single	05: 5.0VDC 12: 12VDC 15: 15VDC 24: 24VDC 48: 48VDC	None: Positive N: Negative	None: M3x0.5 Mounting Inserts -C: Clear Mounting Insert (3.2mm DIA.)

Part Number Example:

CQB75-300S12N-C: Quarter Brick, 75W, 2:1 180-450Vdc Input, Single 12Vdc 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		450	V_{dc}
Input Surge Voltage	100ms max.	All			500	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	180	300	450	V_{dc}
Input Under Voltage Lockout						
Turn-On Voltage Threshold		All	165	170	175	V_{dc}
Turn-Off Voltage Threshold		All	155	160	165	V_{dc}
Lockout Hysteresis Voltage		All		10		V_{dc}
Maximum Input Current	V_{in}=180V, Full Load.	05Vo		520		mA
		Others		477		
No-Load Input Current	V_{in}=300V, Io=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}=300V, Full Load, Tc=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	Tc=-40°C to 105°C	All			±0.02	%/°C
Output Voltage Ripple and Noise (5Hz to 20MHz bandwidth)						
Peak-to-Peak	Output ripple and noise measured with an external MLCC 1000pF connected between –Vin to Case, and 10uF aluminum and 1uF ceramic capacitor across output for 48Vout, and with 10uF tantalum and 1uF ceramic capacitor for others.	05Vo			100	mV
		12Vo			150	
		15Vo			150	
		24Vo			240	
		48Vo			480	
RMS.		05Vo			60	mV
		12Vo			60	
		15Vo			60	
		24Vo			100	
		48Vo			200	
Output Current Range	V_{in}= 180 to 450V	See Model Number Table				A
Over Current Protection	Hiccup Mode. Auto Recovery.	All	110	135	160	%
Short Circuit Protection		All	Continuous, Auto Recovery.			
External Load Capacitance	Full load (resistive)	See Model Number Table				uF
Output Voltage Trim Range	Po≦max rated power, $I_o \leqq I_{o_max}$	05Vo	-20		+10	%
		Others	-20		+20	%
Output Voltage Remote Sense Range	Po≦max rated power, $I_o \leqq I_{o_max}$ % of nominal Vo	05Vo			+10	%
		All			+20	%
Over Voltage Protection	Limited Voltage, % of Nominal Vo	05Vo	112		130	%
		Others	122		130	%

EFFICIENCY

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
100% Load	Vin=300V, Full Load.	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% Vout 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		30		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		30		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		333		pF
	Input to Case (Base Plate)	All		None		
	Output to Case (Base Plate)	All		4400		

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pulse wide 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 $I_{on/off}$=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	300S05 300S12 300S15 300S24 300S48		850 850 850 850 1050		K hours
Weight		All		61		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	MIL-STD-810F Compliant					
Humidity	95% RH max. Non Condensing					
Altitude	3000m Operating Altitude, 12000m Transport Altitude					
Thermal Shock	MIL-STD-810F					
Fire & Smoke	EN45545-2 Compliant					
EMI	Meets EN55032 & EN55022 Compliant (with external filter)					Class A
ESD	EN61000-4-2 Level 3: Air ±8kV, Contact ±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, ±2kV, external input capacitor required,					Perf. Criteria A
Surge	EN61000-4-5 Level 4: Line to earth, ±4kV, Line to line, ±2kV					Perf. Criteria A
Conducted immunity	EN61000-4-6 Level 3: 0.15~80MHz, 10V					Perf. Criteria A
Power Frequency Magnetic Field immunity	EN61000-4-8 50/60Hz, 3A/m (r.m.s.)					Perf. Criteria A
Application Note Link						CQB75-300S Series App Notes
Packaging Information Link						Packaging Information

Immunity to Environmental Conditions.

Phenomenon	Reference Clause	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 Total Grms：4.01997 grms Vibration axis：X、Y、Z axis Duration：1hr / axis	Pass
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	Pass
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	Pass
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	Pass

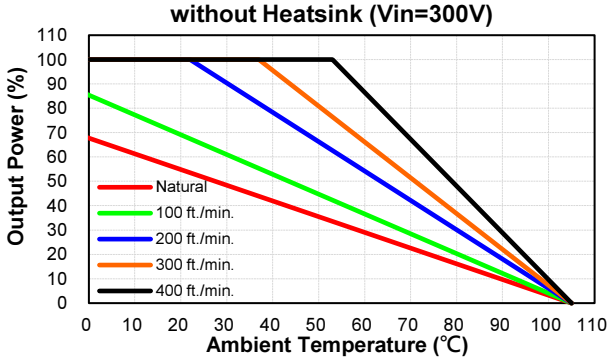
EN45545-2 Fire & Smoke Test Conditions.

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
	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

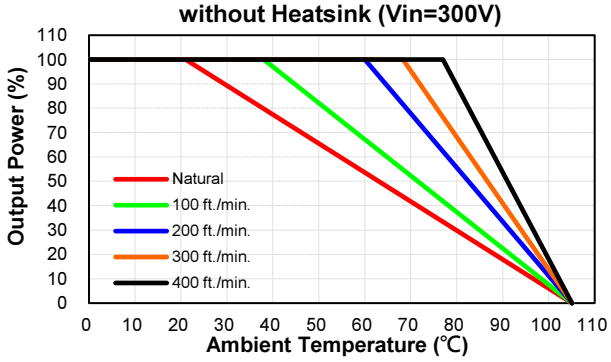
CHARACTERISTIC CURVE

Power Derating Curve

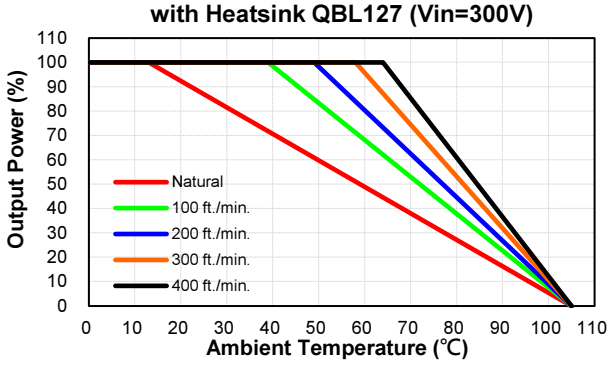
CQB75-300S05 Derating Curve without Heatsink (Vin=300V)



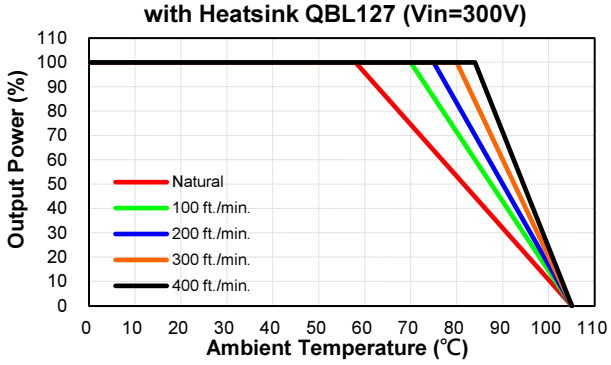
CQB75-300S12, 15, 24, 48 Derating Curve without Heatsink (Vin=300V)



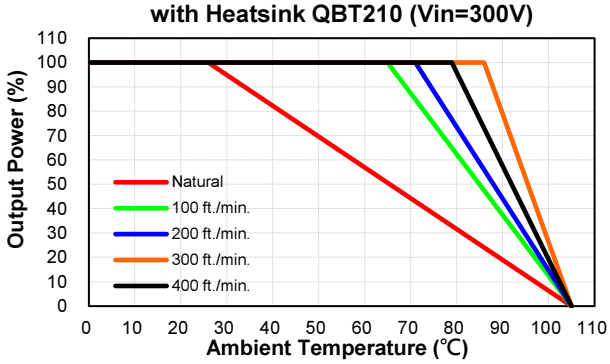
CQB75-300S05 Derating Curve with Heatsink QBL127 (Vin=300V)



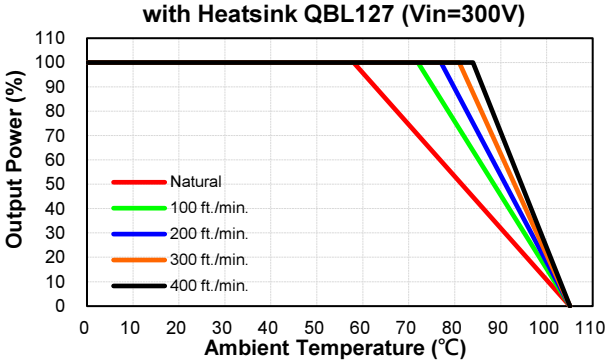
CQB75-300S12, 15, 24, 48 Derating Curve with Heatsink QBL127 (Vin=300V)



CQB75-300S05 Derating Curve
with Heatsink QBT210 (Vin=300V)

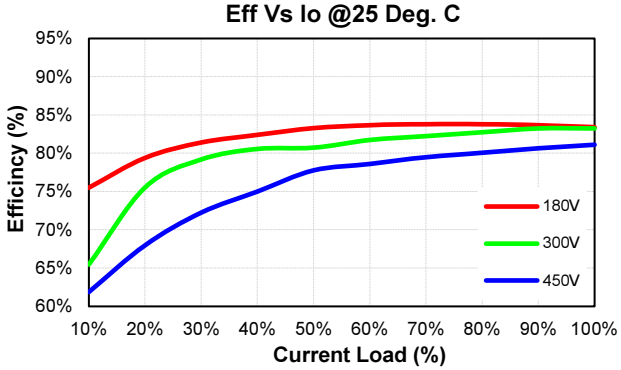


CQB75-300S12, 15, 24, 48 Derating Curve
with Heatsink QBL127 (Vin=300V)

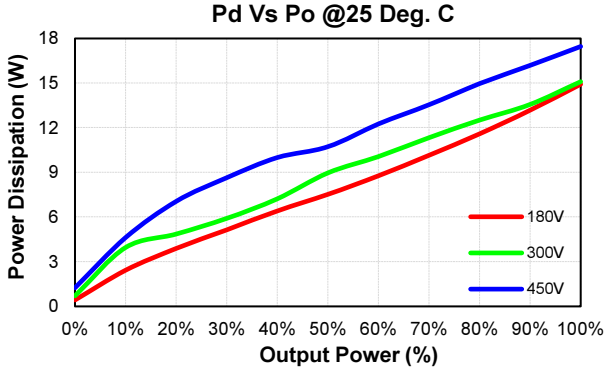


Performance Data

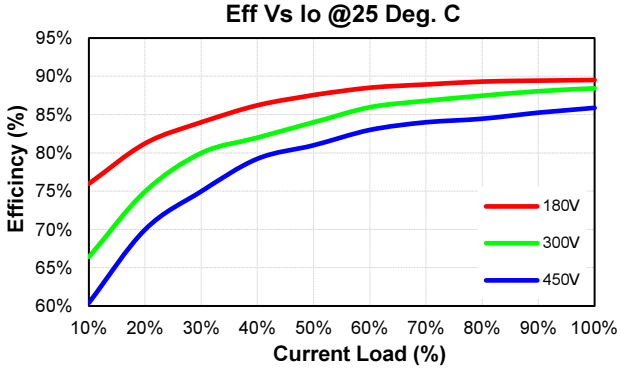
CQB75-300S05
Eff Vs Io @25 Deg. C



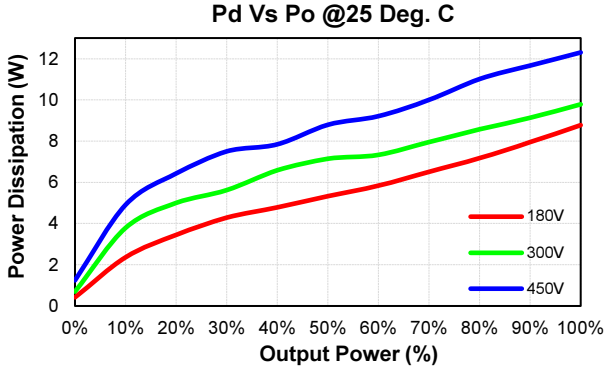
CQB75-300S05
Pd Vs Po @25 Deg. C



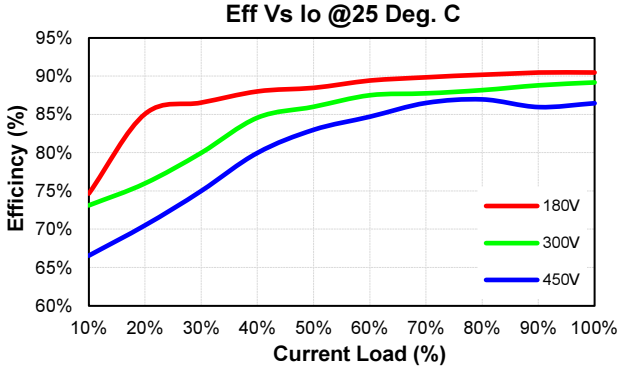
CQB75-300S12
Eff Vs Io @25 Deg. C



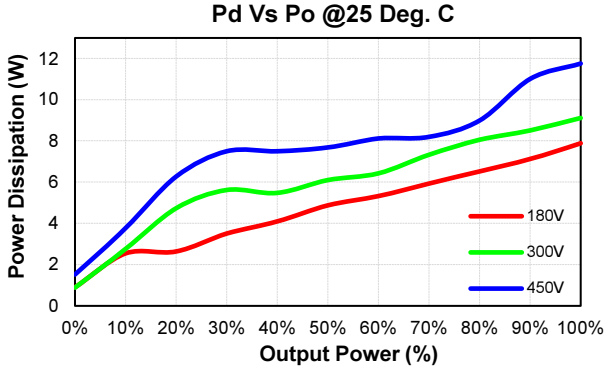
CQB75-300S12
Pd Vs Po @25 Deg. C



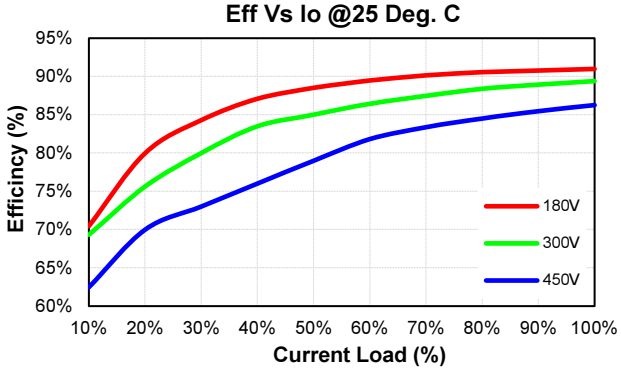
CQB75-300S15
Eff Vs Io @25 Deg. C



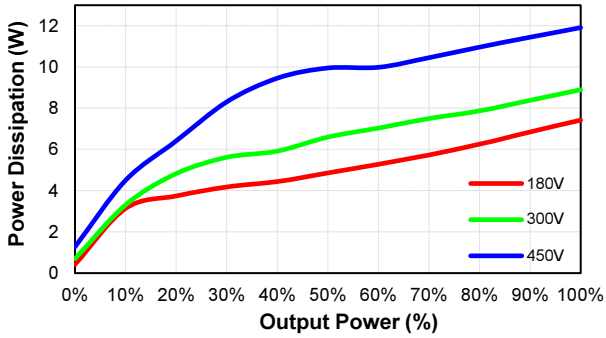
CQB75-300S15
Pd Vs Po @25 Deg. C



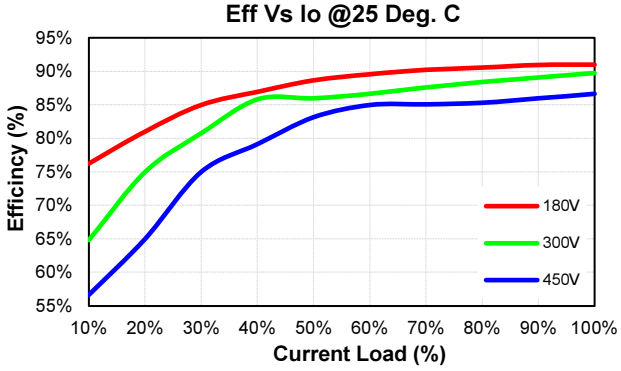
CQB75-300S24
Eff Vs Io @25 Deg. C



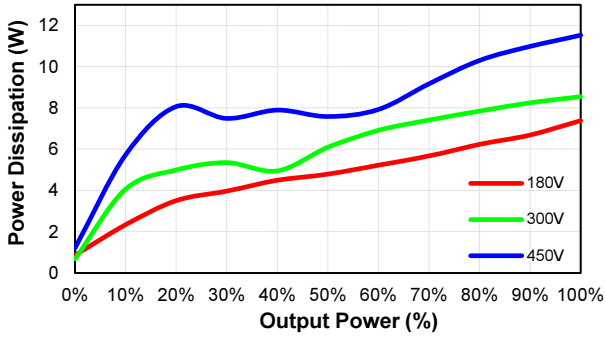
CQB75-300S24
Pd Vs Po @25 Deg. C



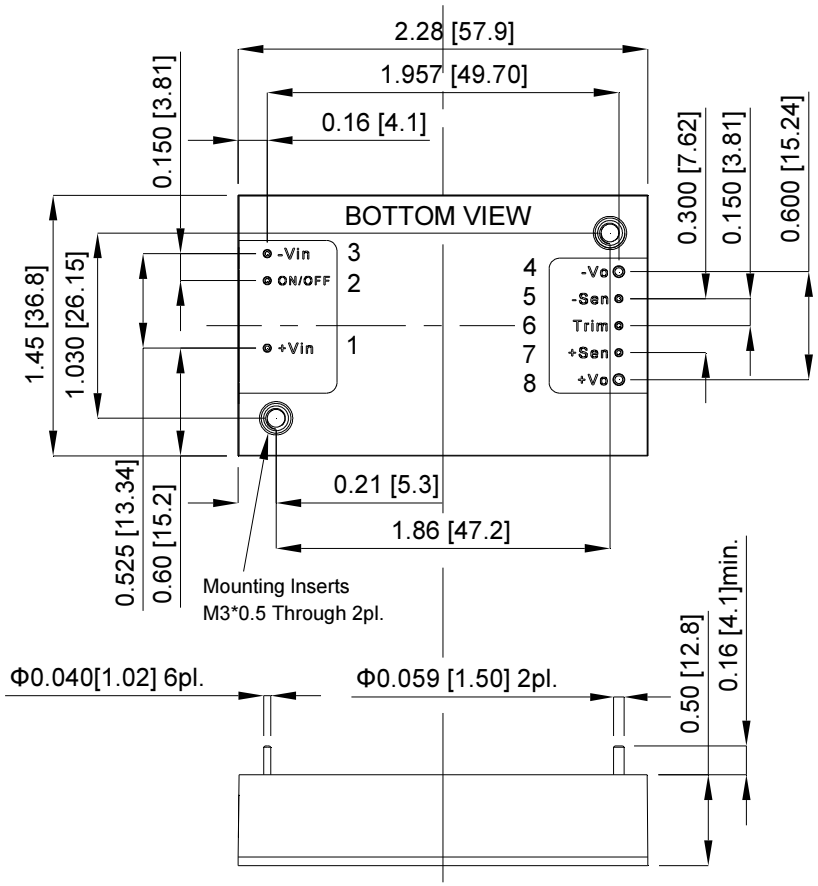
CQB75-300S48
Eff Vs Io @25 Deg. C



CQB75-300S48
Pd Vs Po @25 Deg. C



MECHANICAL SPECIFICATION



PIN CONNECTION	
Pin	Function
1	+V Input
2	On/Off
3	-V Input
4	-V Output
5	-Sense
6	Trim
7	+Sense
8	+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

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