

Glary Power Technology

CBH Series Half Brick up to 250W/60A



The **CBH** series provides up to 250W/60A outputs with industry standard half brick package. The efficient SR stage is combined with patented "Buck Reset" topology that would reduce power loss to achieve 126W/in³ power density. The single side component and multi-layer circuit board design plus the patented Sink-Plate technology would enhance the thermal performance and improve its reliability. Modules are designed for Telecom, Servers, Networking equipments and other applications that use a 24V or 48V input bus.

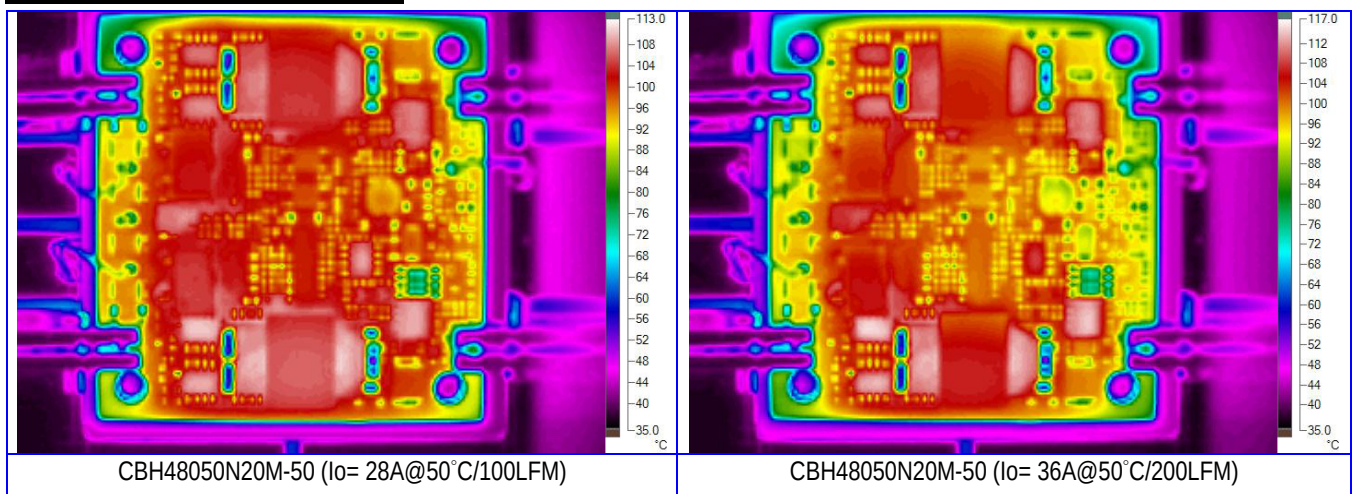
PART NUMBER SYSTEM

CBH	48	050	a	b	c	d	-	50	XX	X
Series Name	Input Voltage	Output Voltage	Enable Logic	Pin Dimension	Standoff Height	Base-Plate		Output Current	Suffix	Version
CBH	48=36V~75V 24=18V~36V	Unit: 0.1V Increments 050=5V 033=3.3V	P: Positive N: Negative	0 : 0.12" 1 : 0.16" 2 : 0.20" 3 : 0.24"	0 : 0.02" 1 : 0.08" 2 : 0.16"	M : 1.0mm Metal Plate A : 3.0mm Sink-Plate B : 5.0mm Sink-Plate E : Metallic enclosure (1.0mm metal plate)		00~60 : For output current rating	For marketing purpose only	

MODEL LIST (Contact to factory for special input / output)

Part Number *	Maximum Input		Maximum Output		Efficiency	Part Number *	Maximum Input		Maximum Output		Efficiency
CBH48050abcd-50XXX	36V~75V	280W	5.0V/50A	250W	91%	CBH24050abcd-50XXX	18V~36V	280W	5.0V/50A	250W	90%
CBH48033abcd-50XXX	36V~75V	186W	3.3V/50A	165W	90%	CBH24033abcd-50XXX	18V~36V	186W	3.3V/50A	165W	89%
CBH48025abcd-60XXX	36V~75V	173W	2.5V/60A	150W	87%	CBH24025abcd-60XXX	18V~36V	173W	2.5V/60A	150W	87%
CBH48018abcd-60XXX	36V~75V	127W	1.8V/60A	108W	85%	CBH24018abcd-60XXX	18V~36V	127W	1.8V/60A	108W	85%
CBH48015abcd-60XXX	36V~75V	109W	1.5V/60A	90W	83%	CBH24015abcd-60XXX	18V~36V	109W	1.5V/60A	90W	83%

REFERENCED THERMAL IMAGES



*CBH Series***SPECIFICATIONS****Absolute Maximum Ratings**

Temperature	Operation Storage	-40°C to +110°C -55°C to +125°C
Input Voltage Range	Operation: 24V Models 48V Models Transient (100mS): 24V Models 48V Models	-0.5V to +40Vdc -0.5V to +80Vdc 50V Maximum 100V Maximum
Isolation Voltage	Input to Output Input to Case Output to Case	2.0KV Minimum 1.0KV Minimum 1.0KV Minimum
Remote Control		-0.5V to +12Vdc

General Parameters

Conversion Efficiency	Typical	See table
Switching Frequency	Typical	330KHz
MTBF	Bellcore TR-332 issue 6	3.30×10 ⁶ hrs @GB/25°C (CBH48050abcd-50XXX)
OTP	Internal	110°C(Tc) ±5°C
Weight	Open frame Metallic enclosure	60g / 1.0mm metal plate 95g / 1.0mm metal plate

Control Functions

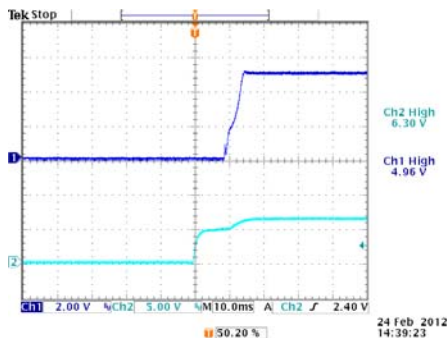
Remote Control	Logic High Logic Low	+3.0V to +6.5V 0V to +1.0V
Input Current of Remote Control Pin		-0.5mA ~ +1.5mA

Input

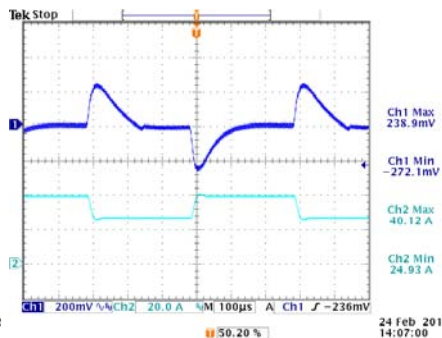
Operation Voltage Range	24V Models 48V Models	+18V to +36Vdc +36V to +75Vdc
Reflected Ripple Current	L _{EXT} = 10uH	30mA rms/100mAp-p
Power ON Voltage Ranges	24V Models 48V Models	+17.0V to +18.0Vdc +34.0V to +36.0Vdc
Power OFF Voltage Ranges	24V Models 48V Models	+15.6V to +16.6Vdc +31.2V to +33.2Vdc
Off State Input Current	V _{NOM}	6mA Max
Latch-State Input Current	V _{NOM}	8mA Max
Input Capacitance	24V Models 48V Models	42.0uF Max 15.0uF Max

Output

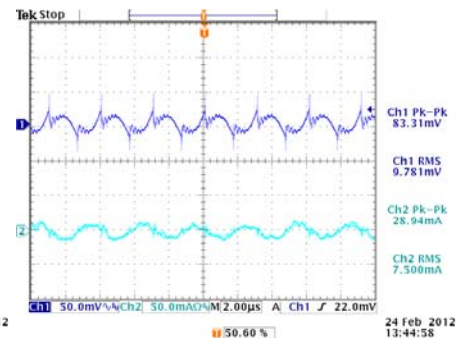
Voltage Accuracy	Typical	±1.0%
Line Regulation	Full Input Range	±0.3%
Load Regulation	0%~100%	±0.3%
Temperature Drift	-40°C ~100°C	±0.03%/°C
Output Tolerance Band	All Conditions	±4%
Ripple & Noise (20MHz)	Peak-Peak (RMS)	3% (1%) V _O
Over Voltage Protection	V _{NOM} , 10% Load	115~130 %V _O
Output Current Limits	V _{NOM}	108%~125%
Voltage Trim	V _{NOM} , 10% Load	±10%
Input Ripple Rejection (<1KHz)	V _{NOM} , Full Load	-50dB
Step Load (2.5A/μS)	50%~75% Load	±6%Vo/500μS
Start-Up Delay Time	V _{NOM} , Full Load	20mS/250mS

*CBH Series***TYPICAL WAVES AND CURVES**

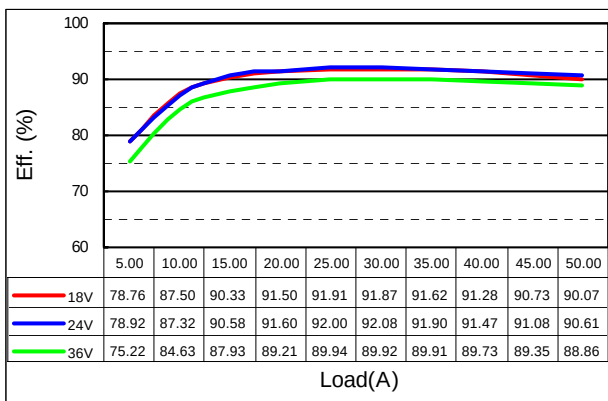
Start-up waveform of CBH24050abcd-50XXX
(V_{IN}: 24V, Load: 50A)



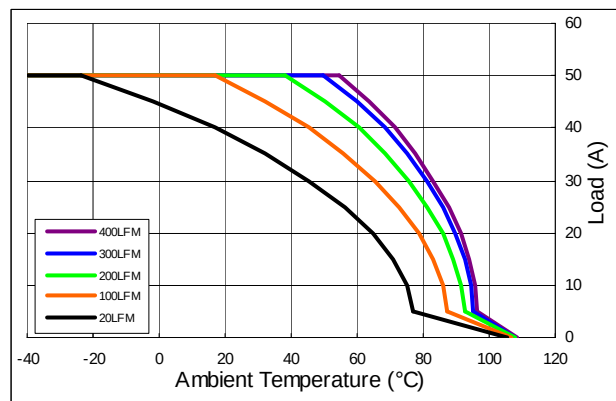
Transient response of CBH24050abcd-50XXX
(V_{IN}: 24V, Load: 39A/24A@2.5A/μs)



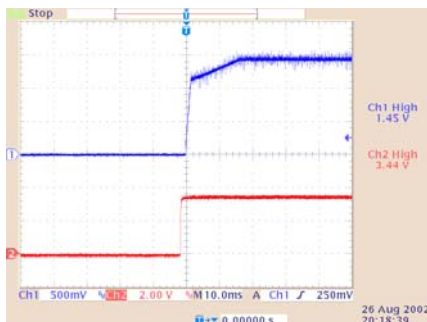
Input/Output ripples of CBH24050abcd-50XXX
(V_{IN}: 24V, Load: 50A, L_{IN}=10μH)



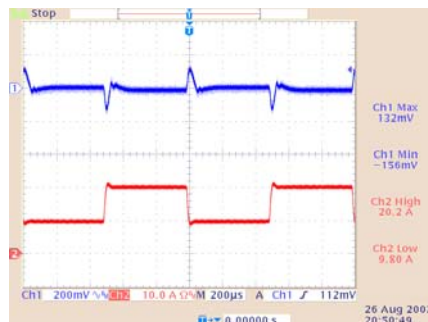
Efficiency plot of CBH24050abcA-50XXX



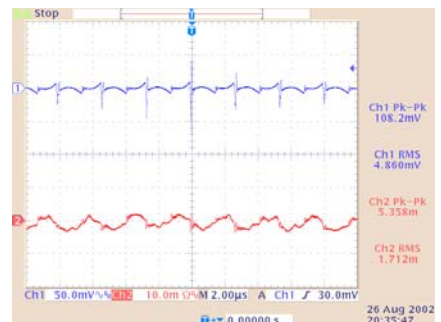
Derating curves of CBH24050abcA-50XXX for T_C=110°C



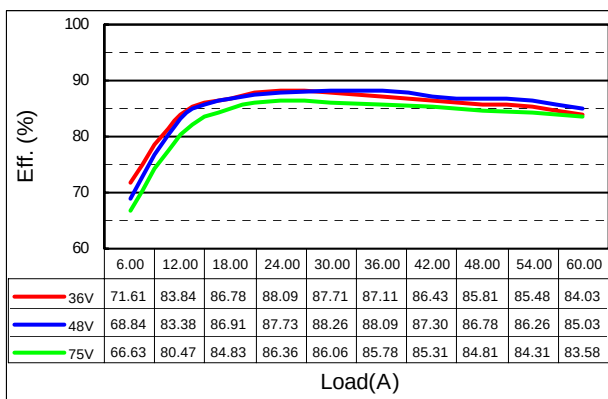
Start-up waveform of CBH48015abcd-60XXX
(V_{IN}: 48V, Load: 60A)



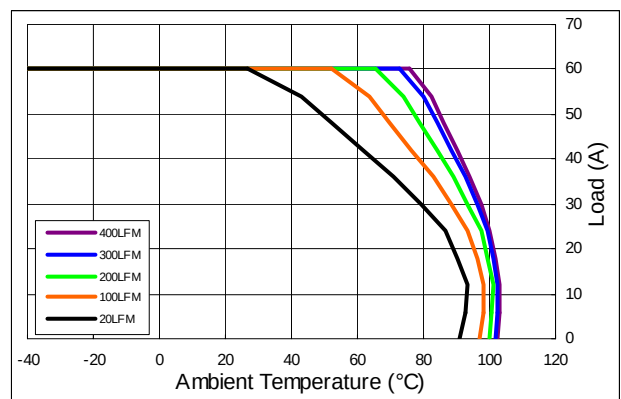
Transient response of CBH48015abcd-60XXX
(V_{IN}: 48V, Load: 20A/10A@2.5A/μs)



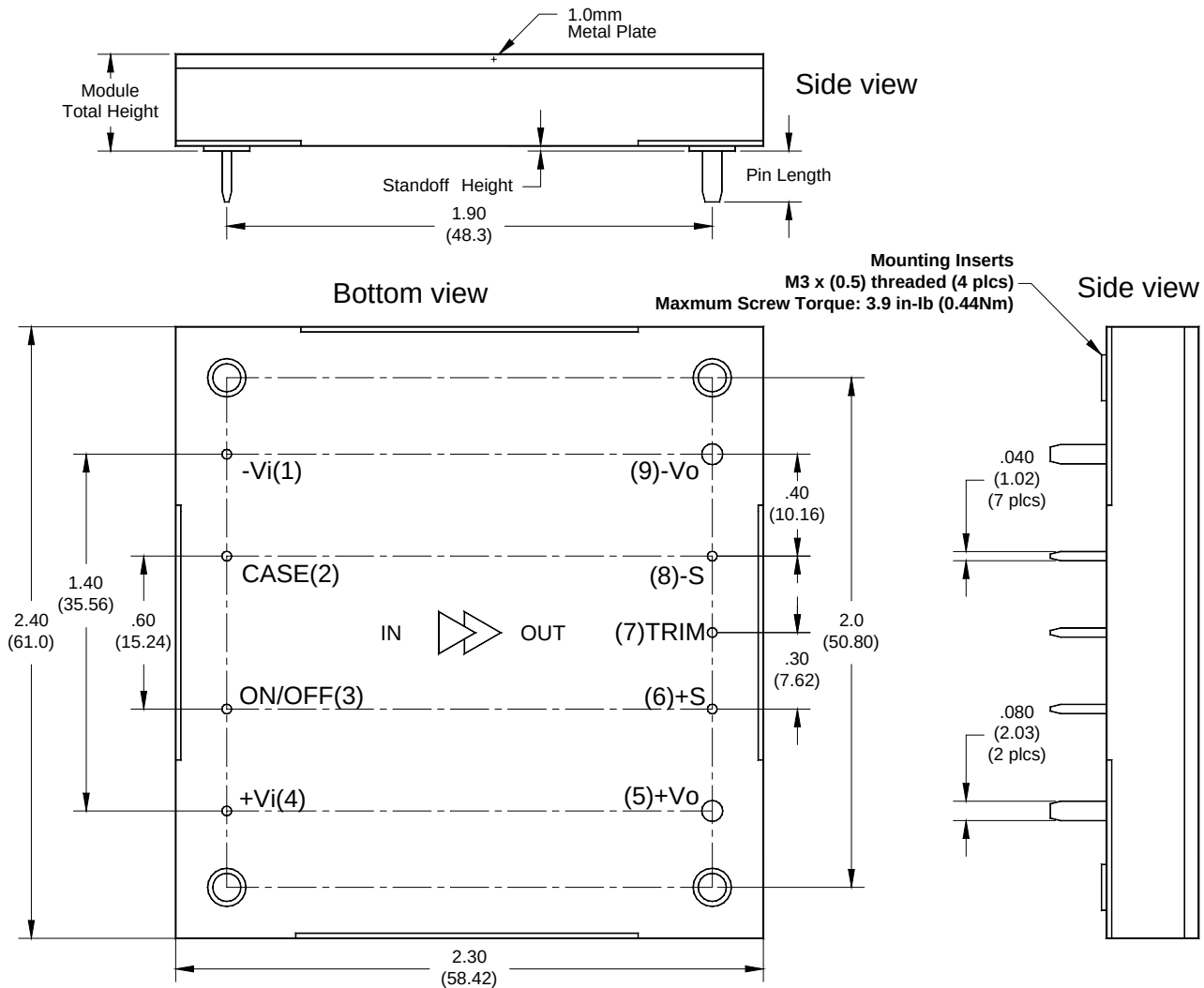
Input/Output ripples of CBH48015abcd-60XXX
(V_{IN}: 48V, Load: 60A, L_{IN}=10μH)



Efficiency plot of CBH48015abcA-60XXX

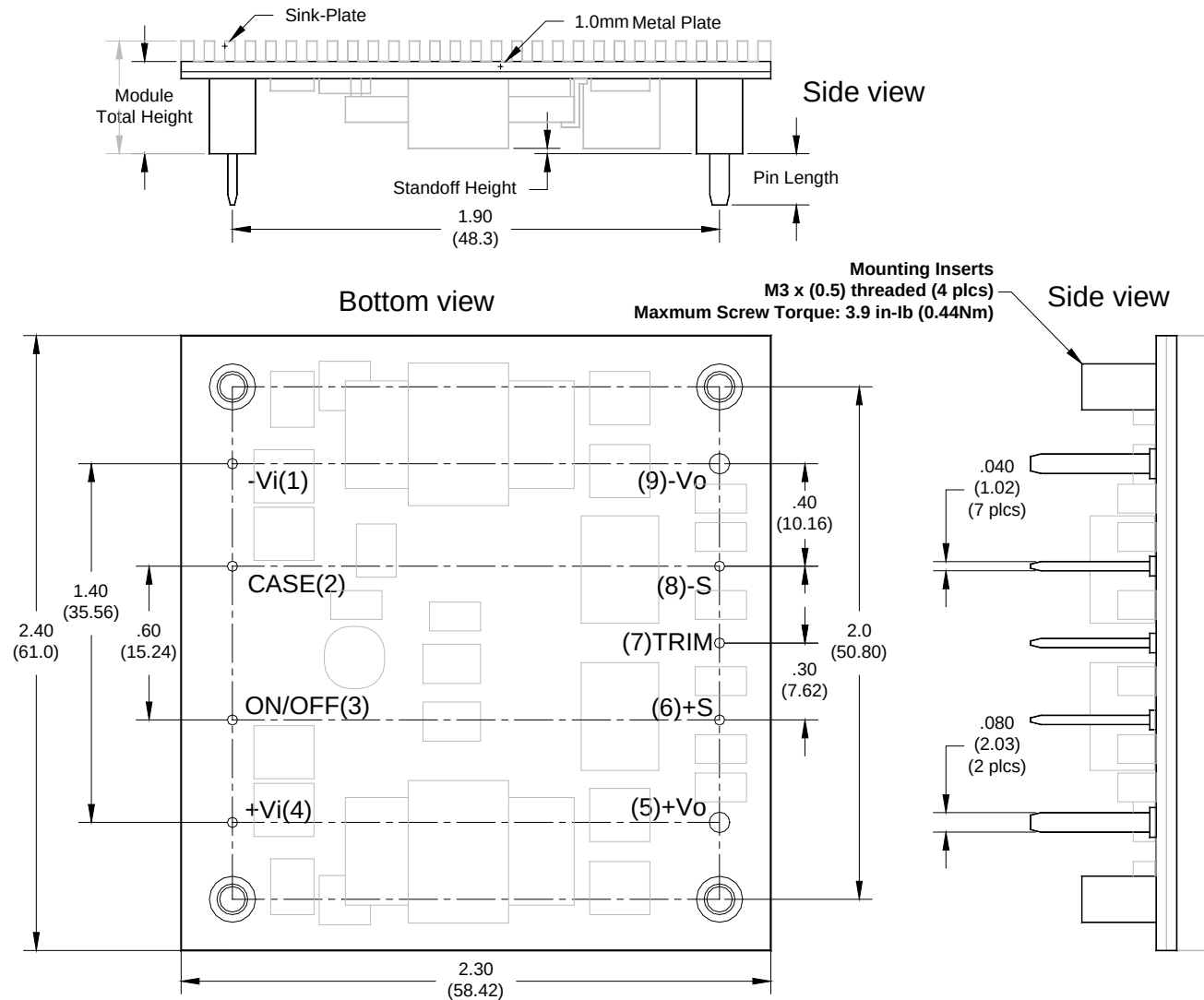


Derating curves of CBH48015abcA-60XXX for T_C=110°C

*CBH Series***METAL ENCLOSED PACKAGE****Dimensions and Pin Connections**

Designation	Function Description	Pin #
-Vi	Negative input	1
CASE	Connected to base plate	2
ON/OFF	Remote control. To turn-on and turn-off output.	3
+Vi	Positive input	4
+Vo	Positive output	5
+S	Positive remote sense	6
TRIM	Output voltage adjust	7
-S	Negative remote sense	8
-Vo	Negative output	9

Dimensions: inches (mm)**Tolerances:** .xx±0.02 (.x±0.5)
.xxx±0.01 (.x±0.25)**Weight:** 95g / 1.0mm metal plate**Base plate:** Aluminum alloy with anode oxide**Mounting inserts:** Stainless steel
Maximum torque: 3.9 in-lb (0.44Nm)**Pin material:** Copper alloy or Brass**Pin plating:** Golden over Nickel

*CBH Series***OPEN FRAME PACKAGE****Dimensions and Pin Connections**

Designation	Function Description	Pin #
-Vi	Negative input	1
CASE	Connected to base plate	2
ON/OFF	Remote control. To turn-on and turn-off output.	3
+Vi	Positive input	4
+Vo	Positive output	5
+S	Positive remote sense	6
TRIM	Output voltage adjust	7
-S	Negative remote sense	8
-Vo	Negative output	9

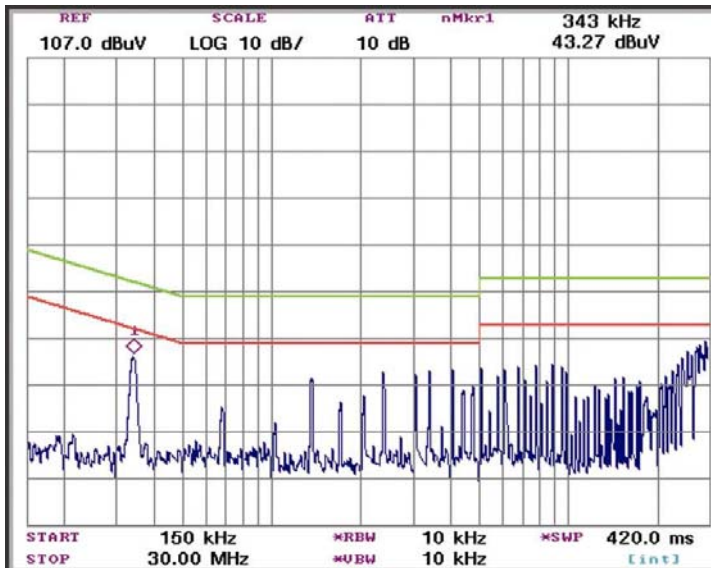
Dimensions: inches (mm)

Tolerances: .xx±0.02 (.x±0.5)
 .xxx±0.01 (.x±0.25)

Weight: 60g / 1.0mm metal plate**Base plate:** Aluminum alloy with anode oxide**Mounting inserts:** Stainless steel**Maximum torque:** 3.9 in-lb (0.44Nm)**Pin material:** Copper alloy or Brass**Pin plating:** Golden over Nickel

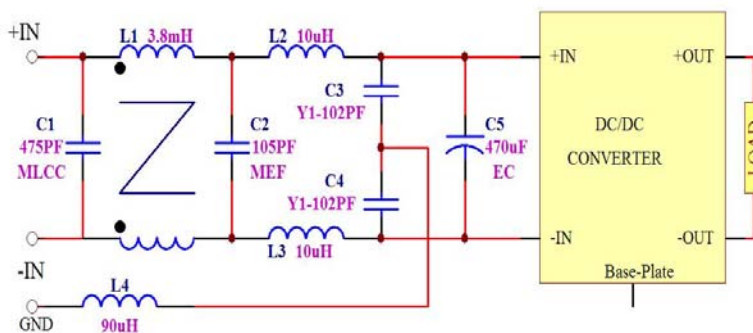
CBH Series

REFERENCED EMC CIRCUIT



Referenced EMC Performance

The tested result shown in left-hand side is obtained by loading the power module with a resistive load only. It can be used as a design reference for customer system. However! The performance of customer's system depends on the whole system design. It should be noted that modifications on the circuit parameters and fine adjustment of the final layout affect the final EMC performance greatly.



Measured conductive level of CBH48050abcd-50XXX
and referenced filter circuit

Bandwidth of EMC Components

No components are ideal for infinite frequency range. The bandwidth of EMC components should be taking into consideration when designing an EMC filter circuit. To connect ceramic capacitor with electricity capacitor in parallel and connect low inductance inductor with big one could get a better bandwidth.

NOTE:

1. It is recommended that the input should be protected by fuses or other protection devices.
2. All specifications are typical at nominal input, full load and 25°C unless otherwise noted.
3. Specifications are subject to change without notice.
4. Printed or downloaded datasheets are not subject to Glary document control.
5. Product labels shown, including safety agency certificates, may vary based on the date of manufacture.
6. Information provided in this documentation is for ordering purposes only.
7. This product is not designed for use in critical life support systems, equipment used in hazardous environments, nuclear control systems or other such applications, which necessitate specific safety and regulatory standards other than the ones listed in this datasheet.

IMPORTANT

- ✱ General specifications and the performances are related to standard series only, no special customer specification display here except requested items.
- ✱ In order to secure effective usage of converter and the validity of Glary's service and warranty coverage, please refer to the application notes for general usage. For needs of usage beyond the application notes, please contact to Glary headquarter or our regional sales representative office for help.

Glary Power Technology

CPH Series Half Brick up to 350W/100A



The **CPH** series provides up to 350W/100A outputs with industry standard half brick package. The efficient SR stage is combined with patented "Buck Reset" topology that would reduce power loss to achieve 176W/in³ power density. The single side component and multi-layer circuit board design plus the patented Sink-Plate technology would enhance the thermal performance and improve its reliability. Modules are designed for Telecom, Servers, Networking equipments and other applications that use a 24V or 48V input bus.

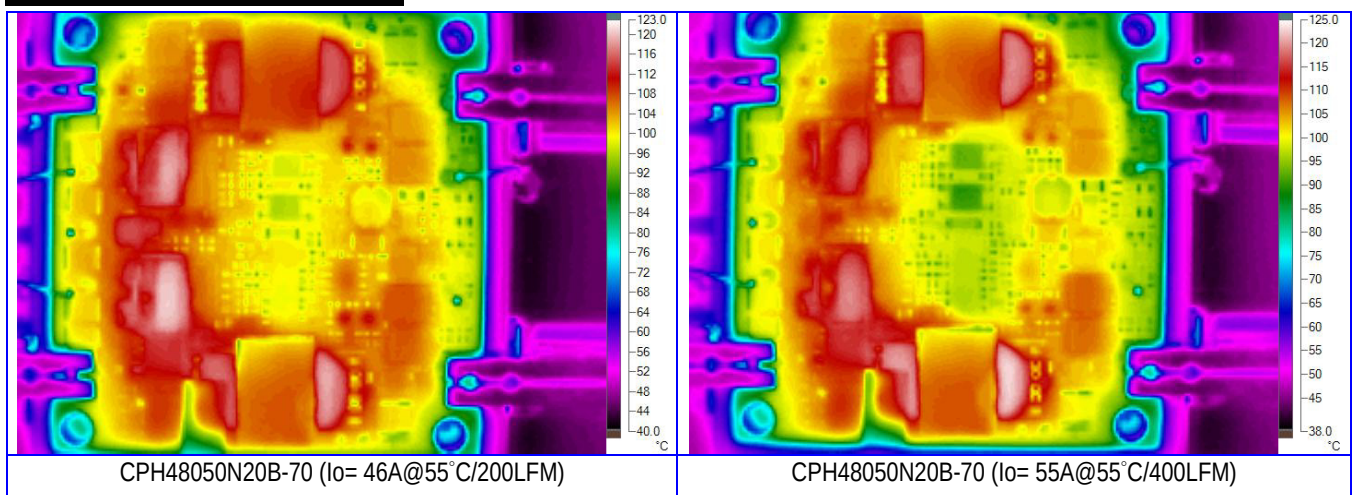
PART NUMBER SYSTEM

CPH	48	050	a	b	c	d	-	70	XX	X
Series Name	Input Voltage	Output Voltage	Enable Logic	Pin Dimension	Standoff Height	Base-Plate		Output Current	Suffix	Version
CPH	48=36V~75V 24=18V~36V	Unit: 0.1V Increments 050=5V 033=3.3V	P: Positive N: Negative	0 : 0.12" 1 : 0.16" 2 : 0.20" 3 : 0.24"	0 : 0.02" 1 : 0.08" 2 : 0.16"	M : 1.0mm Metal Plate A : 3.0mm Sink-Plate B : 5.0mm Sink-Plate E : Metallic enclosure (1.0mm metal plate)	-	00~A0 : For output current rating	For marketing purpose only	

MODEL LIST (Contact to factory for special input / output)

Part Number *	Maximum Input		Maximum Output		Efficiency	Part Number *	Maximum Input		Maximum Output		Efficiency
CPH48050abcd-70XXX	36V~75V	390W	5.0V/70A	350W	90%	CPH24050abcd-70XXX	18V~36V	395W	5.0V/70A	350W	89%
CPH48033abcd-70XXX	36V~75V	260W	3.3V/70A	231W	89%	CPH24033abcd-70XXX	18V~36V	265W	3.3V/70A	231W	88%
CPH48025abcd-80XXX	36V~75V	230W	2.5V/80A	200W	88%	CPH24025abcd-80XXX	18V~36V	235W	2.5V/80A	200W	87%
CPH48018abcd-A0XXX	36V~75V	215W	1.8V/100A	180W	85%	CPH24018abcd-A0XXX	18V~36V	220W	1.8V/100A	180W	84%
CPH48015abcd-A0XXX	36V~75V	185W	1.5V/100A	150W	84%	CPH24015abcd-A0XXX	18V~36V	190W	1.5V/100A	150W	83%

REFERENCED THERMAL IMAGES



*CPH Series***SPECIFICATIONS****Absolute Maximum Ratings**

Temperature	Operation Storage	-40°C to +110°C -55°C to +125°C
Input Voltage Range	Operation: 24V Models 48V Models Transient (100mS): 24V Models 48V Models	-0.5V to +40Vdc -0.5V to +80Vdc 50V Maximum 100V Maximum
Isolation Voltage	Input to Output Input to Case Output to Case	2.0KV Minimum 1.0KV Minimum 1.0KV Minimum
Remote Control		-0.5V to +12Vdc

General Parameters

Conversion Efficiency	Typical	See table
Switching Frequency	Typical	330KHz
MTBF	Bellcore TR-332 issue 6	3.06×10 ⁶ hrs @GB/25°C (CPH48050abcd-70XXX)
OTP	Internal	110°C(Tc) ±5°C
Weight	Open frame Metallic enclosure	60g / 1.0mm metal plate 95g / 1.0mm metal plate

Control Functions

Remote Control	Logic High Logic Low	+3.0V to +6.5V 0V to +1.0V
Input Current of Remote Control Pin		-0.5mA ~ +1.5mA

Input

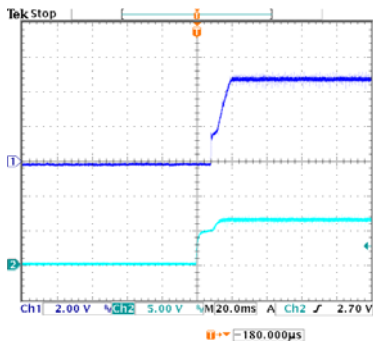
Operation Voltage Range	24V Models 48V Models	+18V to +36Vdc +36V to +75Vdc
Reflected Ripple Current	L _{EXT} = 10uH	30mA rms/100mA-p
Power ON Voltage Ranges	24V Models 48V Models	+17.0V to +18.0Vdc +34.0V to +36.0Vdc
Power OFF Voltage Ranges	24V Models 48V Models	+15.6V to +16.6Vdc +31.2V to +33.2Vdc
Off State Input Current	V _{NOM}	6mA Max
Latch-State Input Current	V _{NOM}	8mA Max
Input Capacitance	24V Models 48V Models	42.0uF Max 15.0uF Max

Output

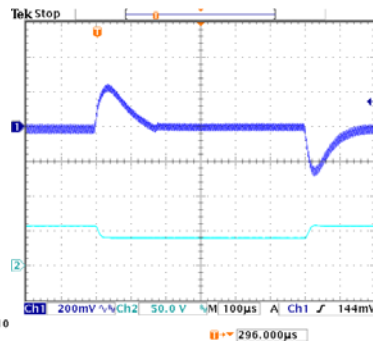
Voltage Accuracy	Typical	±1.0%
Line Regulation	Full Input Range	±0.3%
Load Regulation	0%~100%	±0.3%
Temperature Drift	-40°C ~100°C	±0.03%/°C
Output Tolerance Band	All Conditions	±4%
Ripple & Noise (20MHz)	Peak-Peak (RMS)	3% (1%) V _O
Over Voltage Protection	V _{NOM} , 10% Load	115~130 %V _O
Output Current Limits	V _{NOM}	108%~125%
Voltage Trim	V _{NOM} , 10% Load	±10%
Input Ripple Rejection (<1KHz)	V _{NOM} , Full Load	-50dB
Step Load (2.5A/μS)	50%~75% Load	±6%Vo/500μS
Start-Up Delay Time	V _{NOM} , Full Load	20mS/250mS

CPH Series

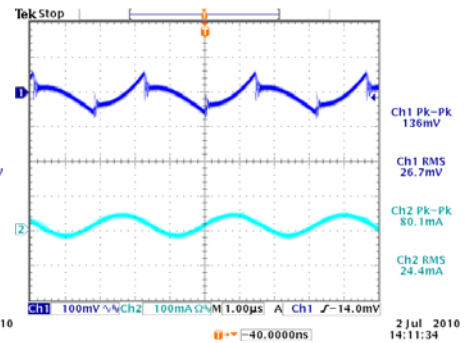
TYPICAL WAVES AND CURVES



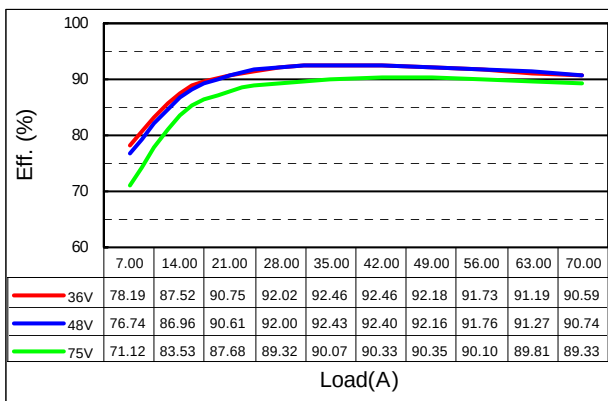
Start-up waveform of CPH48050abcd-70XXX
(V_{IN} : 48V, Load: 70A)



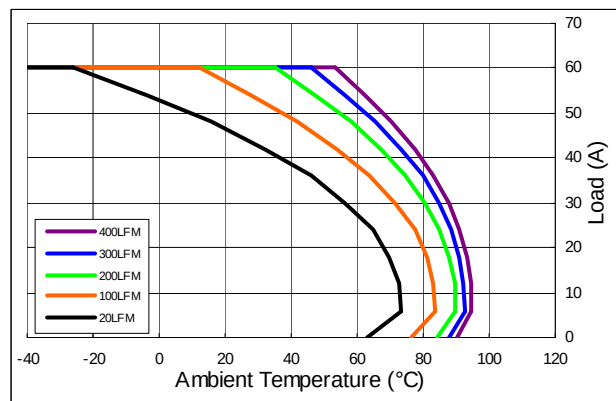
Transient response of CPH48050abcd-70XXX
(V_{IN} : 48V, Load: 52.5A/35.0A@2.5A/µs)



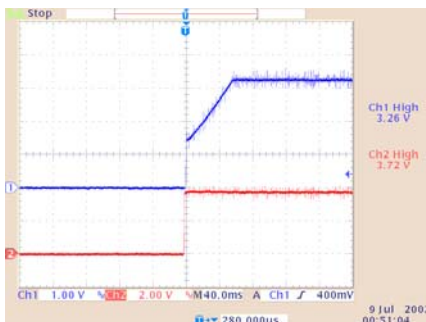
Input/Output ripples of CPH48050abcd-70XXX
(V_{IN} : 48V, Load: 70A, L_{IN} =10µH)



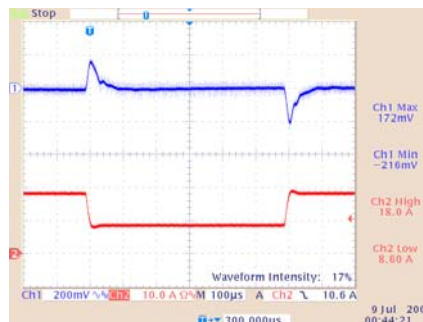
Efficiency Plot of CPH48050abcB-70XXX



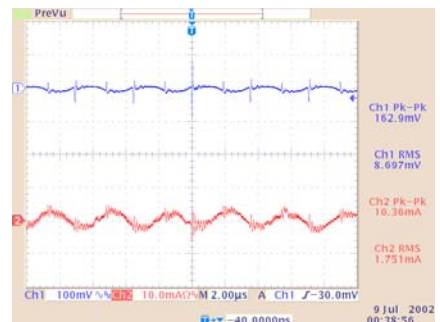
Derating Curves of CPH48050abcB-70XXX for $T_c = 110^\circ\text{C}$



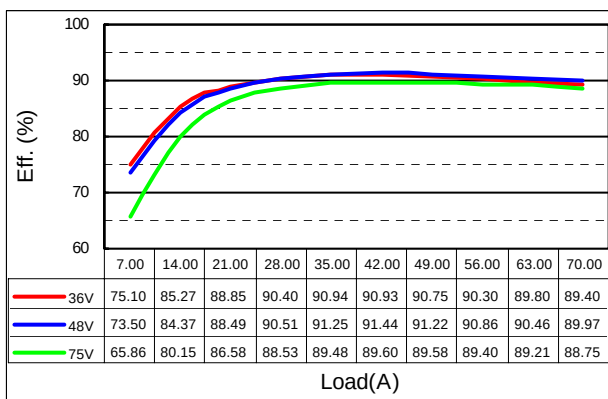
Start-up waveform of CPH48033abcd-70XXX
(V_{IN} : 48V, Load: 70A)



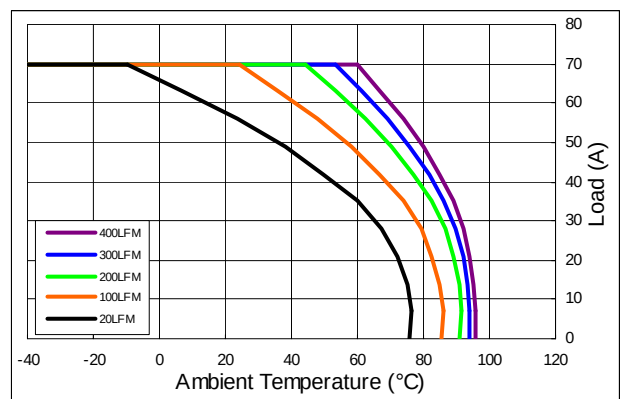
Transient response of CPH48033abcd-70XXX
(V_{IN} : 48V, Load: 18A/8A@2.5A/µs)



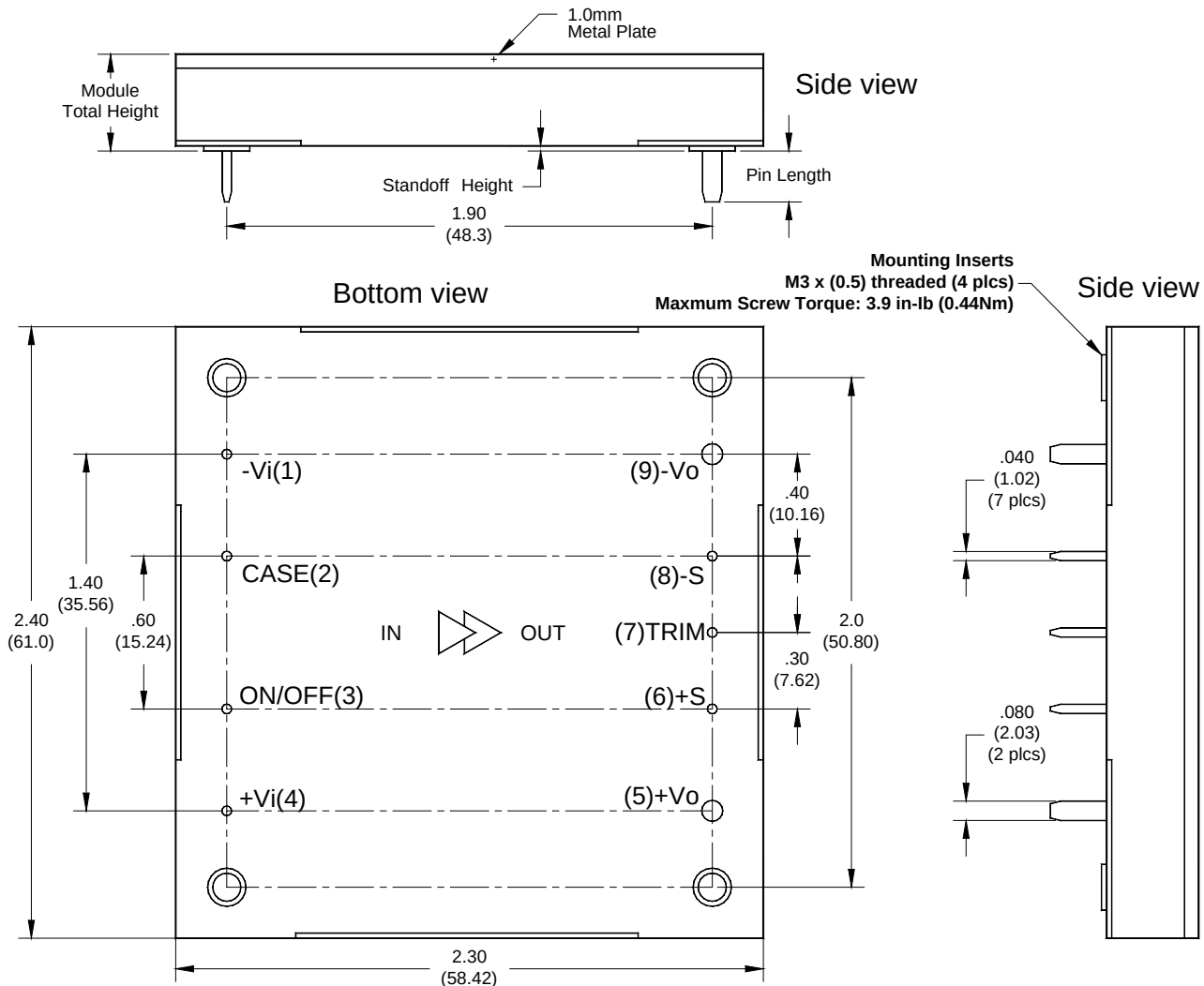
Input/Output ripples of CPH48033abcd-70XXX
(V_{IN} : 48V, Load: 70A, L_{IN} =10µH)



Efficiency Plot of CPH48033abcB-70XXX

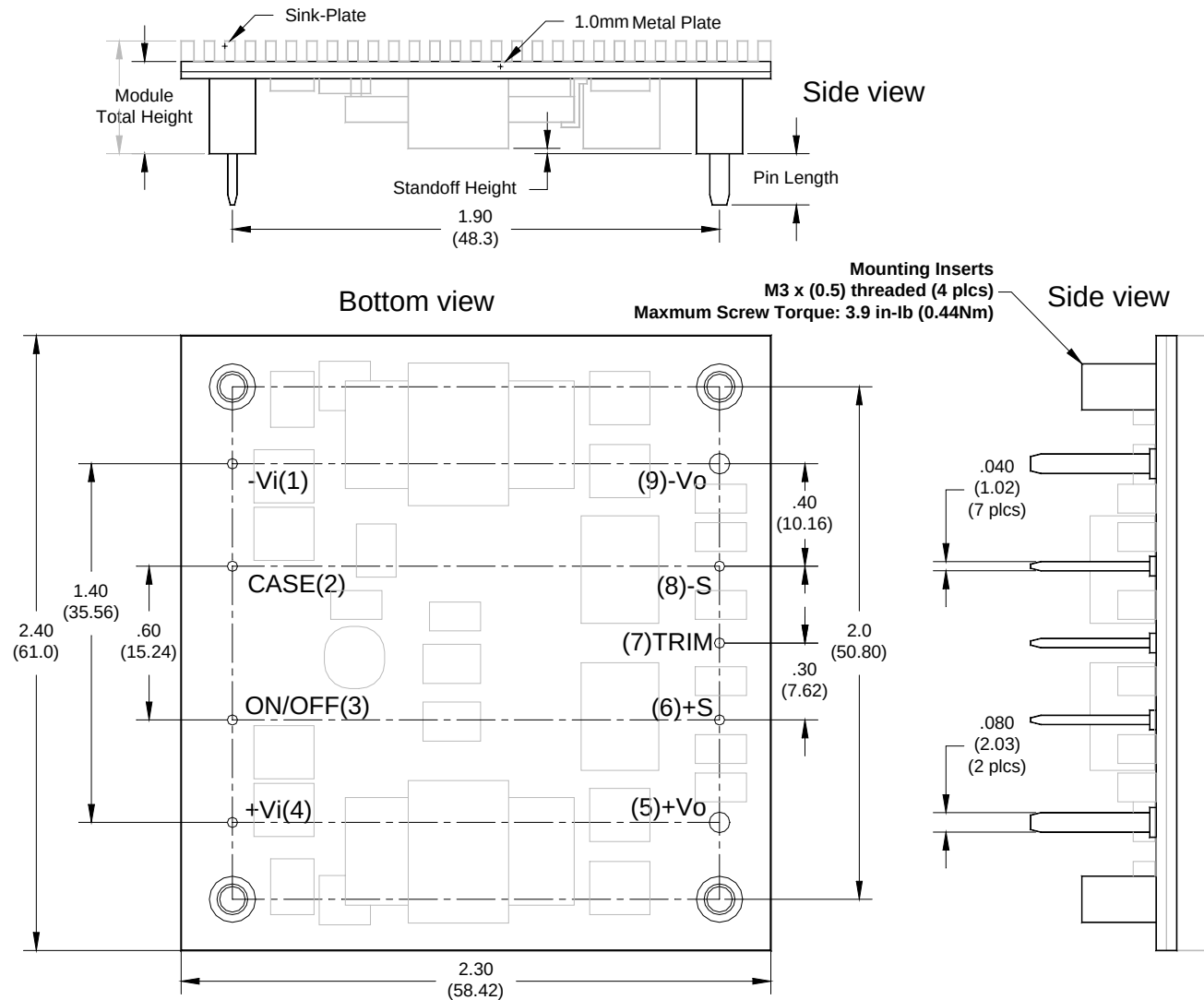


Derating Curves of CPH48033abcB-70XXX for $T_c = 110^\circ\text{C}$

*CPH Series***METAL ENCLOSED PACKAGE****Dimensions and Pin Connections**

Designation	Function Description	Pin #
-Vi	Negative input	1
CASE	Connected to base plate	2
ON/OFF	Remote control. To turn-on and turn-off output.	3
+Vi	Positive input	4
+Vo	Positive output	5
+S	Positive remote sense	6
TRIM	Output voltage adjust	7
-S	Negative remote sense	8
-Vo	Negative output	9

Dimensions: inches (mm)**Tolerances:** .xx±0.02 (.x±0.5)
.xxx±0.01 (.x±0.25)**Weight:** 95g / 1.0mm metal plate**Base plate:** Aluminum alloy with anode oxide**Mounting inserts:** Stainless steel
Maximum torque: 3.9 in-lb (0.44Nm)**Pin material:** Copper alloy or Brass**Pin plating:** Golden over Nickel

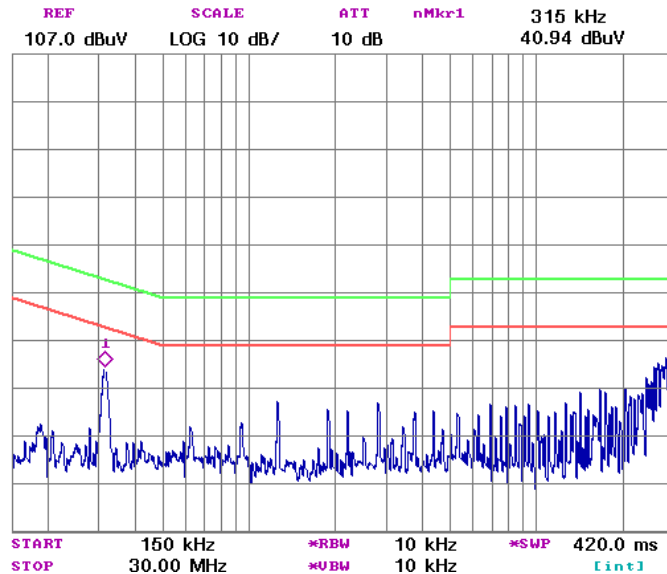
*CPH Series***OPEN FRAME PACKAGE****Dimensions and Pin Connections**

Designation	Function Description	Pin #
-Vi	Negative input	1
CASE	Connected to base plate	2
ON/OFF	Remote control. To turn-on and turn-off output.	3
+Vi	Positive input	4
+Vo	Positive output	5
+S	Positive remote sense	6
TRIM	Output voltage adjust	7
-S	Negative remote sense	8
-Vo	Negative output	9

Dimensions: inches (mm)**Tolerances:** .xx±0.02 (.x±0.5)
.xxx±0.01 (.x±0.25)**Weight:** 60g / 1.0mm metal plate**Base plate:** Aluminum alloy with anode oxide**Mounting inserts:** Stainless steel**Maximum torque:** 3.9 in-lb (0.44Nm)**Pin material:** Copper alloy or Brass**Pin plating:** Golden over Nickel

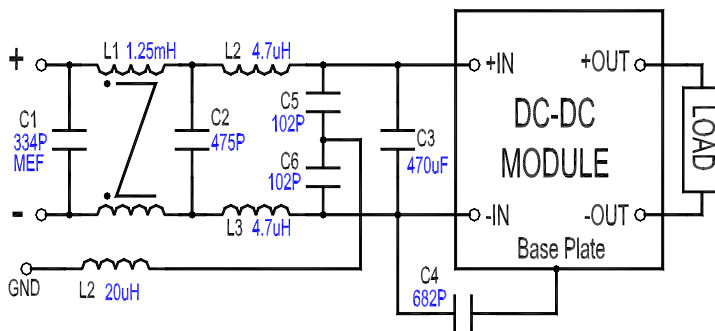
CPH Series

REFERENCED EMC CIRCUIT



Referenced EMC Performance

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Measured conductive level of CPH48050abcd-70XXX
and referenced filter circuit

Bandwidth of EMC Components

No components are ideal for infinite frequency range. The bandwidth of EMC components should be taking into consideration when designing an EMC filter circuit. To connect ceramic capacitor with electricity capacitor in parallel and connect low inductance inductor with big one could get a better bandwidth.

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- ✱ In order to secure effective usage of converter and the validity of Glary's service and warranty coverage, please refer to the application notes for general usage. For needs of usage beyond the application notes, please contact to Glary headquarter or our regional sales representative office for help.