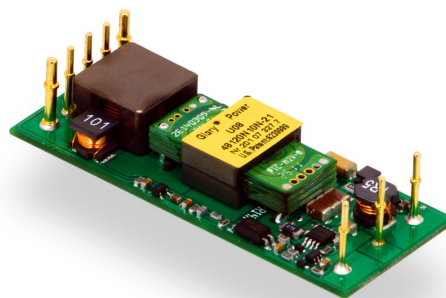


Efficiency >94%	330W/in ³	Current Share	SYNC	4.5Mhrs MTBF
Remote ON OFF	INPUT 2:1	OVP	OTP	OCP
Open Frame Package				CE
			Pb	RoHS 2002/95/EC



The **U08 Series** provides three outputs including 12V, 5V and 3.3V from 18~36V or 36~75V input ranges with industry standard 1/8-Brick pin assignment that operates at -40°C~+100°C. The efficient converter core is designed with patented **“Buck-Reset Forward”** topology, which cooperates with special designed **“Partial-Resonant-Synchronous-Rectifier”** stages at 450kHz switching frequency to efficiently deliver more power, achieving 94% of conversion efficiency and 330W/in³ power density.

A proprietary ultra-fast current limiting circuit is also embedded in the U08 series to eliminate the long existing technical challenge of **“Short-Circuit-Current-Runaway”**, which is a destructive high output current driven by the minimum output voltage in proportion with the propagation delay flowing through the short circuit loop or the low-impedance non-Ohmic loads. The propagation delay of the U08 series with ultra-fast current limiting can be as short as 60nS, effectively shifting the current limit set point higher than that of conventional converters without reliability impact. To provide higher power and improve the system reliability, the U08 series utilizes a proprietary wide-band **“Droop Current Sharing”** control circuit, which allows directly connecting the outputs of modules without a noise sensitive current share bus. The system built by paralleling multiple U08 modules is capable to respond full scale step load within 20μs without evidently overshoot and ringing. The U08 modules also built with **“Anti-Back-Driving”** circuit to prevent the reversed current and further reduce the power loss.

The junction temperature of the power semiconductor chips used in U08 module can be minimized by attaching optional base-plate, which can be mounted to external cooling means by using two screws to provide sufficient mechanical strength and better thermal contact. A proprietary fin-type base-plate as called as **“Sink-plate”** can be integrated with U08 module to ensure full power delivering with low speed airflow cooling. All the special design efforts embedded in this product effectively simplifies the system power design of high performance computing system, high capacity semiconductor testing system and other equipments that the conventional module cannot be used.

MODEL NUMBER SYSTEM

U08	48	120	a	b	c	d	-	XX	XX	X
Series Name	Input Voltage	Output Voltage	Enable Logic	Pin Length	Standoff Height	Base-Plate / module thickness		Setting	Suffix	Version
U08	24:18V~36V 48:36V~75V	Unit: 0.1V Increments 120= 12V 050= 5.0V	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 / 0.46" Contact Glary for special option	-	For customer function only	For marketing purpose only	

The selected option codes for the “**abcd**” section in the model number determine what options will be applied in production. For example, the U0848120**N10N-25** module is configured to has negative enable logic, 0.16” pin length, 0.02” standoff height without base-plate, which result in 0.35” of the module thickness. The total height is 0.37” obtained by summing up the 0.02” standoff height and the 0.35” module thickness.

MODEL LIST (Contact to factory for 4X input models or special specifications)

Part Number *	Maximum Input	Maximum Output	Efficiency	Part Number *	Maximum Input	Maximum Output	Efficiency
U0824120abcd-XXXXX	18V~36V 325W	12.0V/25A 300W	93%	U0848120abcd-XXXXX	36V~75V 385W	12.0V/30A 360W	94%
U0824050abcd-XXXXX	18V~36V 305W	5.0V/55A 275W	92%	U0848050abcd-XXXXX	36V~75V 330W	5.0V/60A 300W	92%
U0824033abcd-XXXXX	18V~36V 250W	3.3V/65A 215W	90%	U0848033abcd-XXXXX	36V~75V 260W	3.3V/70A 231W	90%

Preliminary Data Sheet

COMMON SPECIFICATIONS

Absolute Maximum Ratings

Temperature	Operation Storage	-40°C to +110°C -55°C to +125°C
Input Voltage Range	Operation: 48V Models 24V Models Transient (100mS): 48V Models 24V Models	-0.5V to +80Vdc -0.5V to +40Vdc 100V Maximum 50V 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

MTBF	Bellcore TR-332 issue 6	4.50×10 ⁶ hrs @GB/25°C (U0848120abcd-30XXX)
OTP	T _c	110°C ±5°C for standard setting
Weight	M-type base-plate	32g

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	48V Models 24V Models	+36V to +75Vdc +18V to +36Vdc
Power ON Voltage Ranges	48V Models 24V Models	+34.0V to +36.0Vdc +17.0V to +18.0Vdc
Power OFF Voltage Ranges	48V Models 24V Models	+31.2V to +33.2Vdc +15.6V to +16.6Vdc
Off State Input Current	V _{NOM}	6mA Max
Latch-State Input Current	V _{NOM}	8mA Max
Input Capacitance	48V Models 24V Models	20.0uF Max 40.0uF Max

Output Limitations

Part Number	Capacitive Load C _E	Pre-biased Voltage V _B	Reverse Current I _B	Short Circuit Output Current I _S	Note
U0824033abcd-65xxx	<47000uF@51mΩ Load	<3.1V	<1000mA@V _B	<130A @ 2mΩ Load	
U0824050abcd-55xxx	<22000uF@90mΩ Load	<4.75V	<1000mA@V _B	<110A @ 2mΩ Load	
U0824120abcd-25xxx	<2200uF@480mΩ Load	<11.4V	<500mA@V _B	<50A @ 2mΩ Load	
U0848033abcd-70xxx	<47000uF@47mΩ Load	<3.1V	<1500mA@V _B	<140A @ 2mΩ Load	
U0848050abcd-60xxx	<22000uF@83mΩ Load	<4.75V	<1500mA@V _B	<120A @ 2mΩ Load	
U0848120abcd-30xxx	<2200uF@400mΩ Load	<11.4V	<800mA@V _B	<60A @ 2mΩ Load	

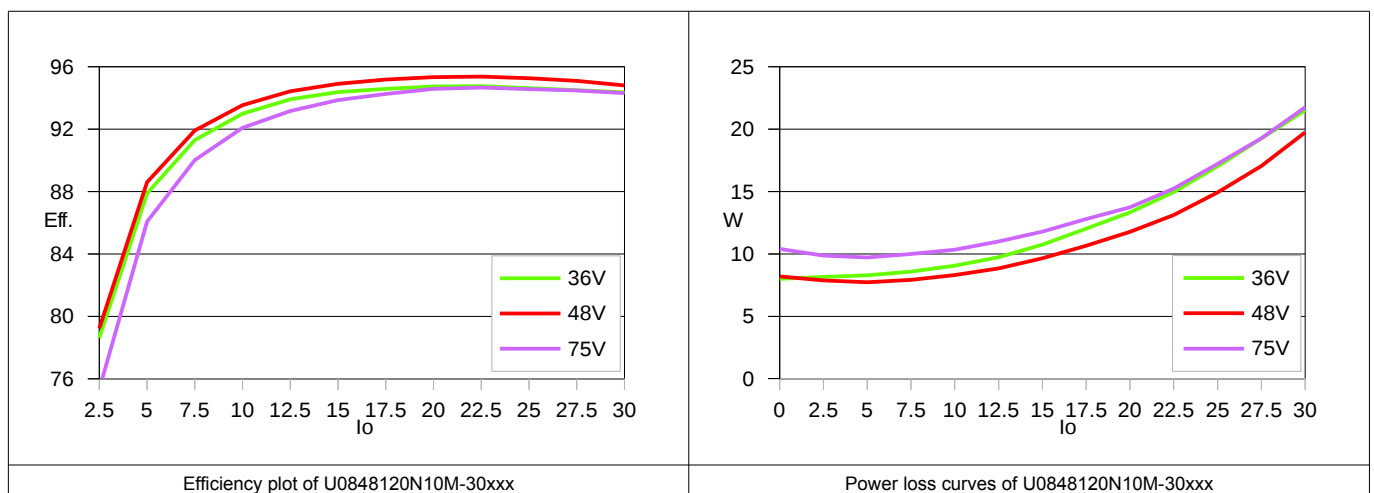
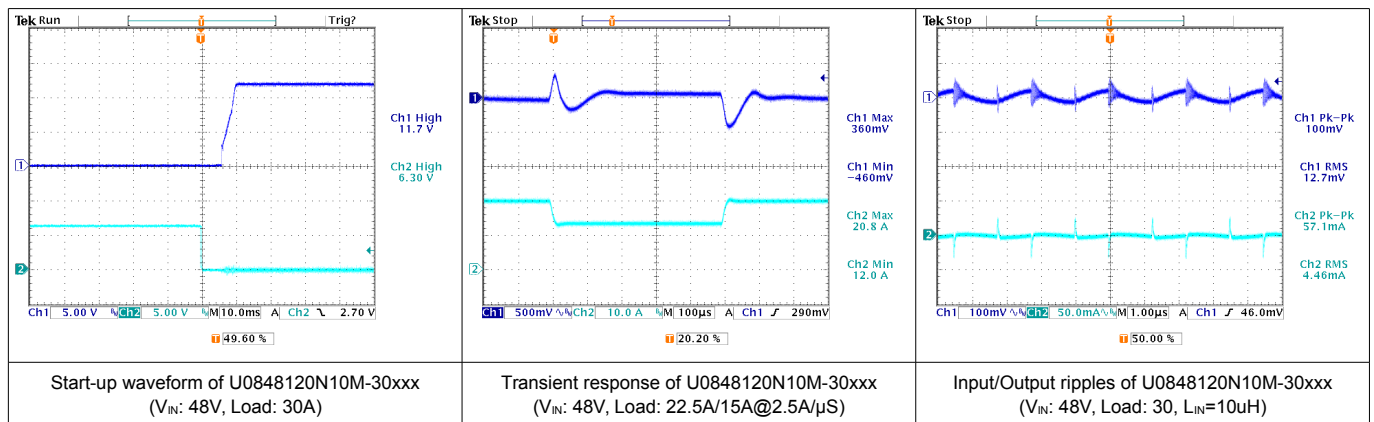
Model Number: U0848120N10M-30xxx

MODEL PARAMETERS

General		
Conversion Efficiency	Typical	See efficiency plots
Switching Frequency	Typical	450KHz

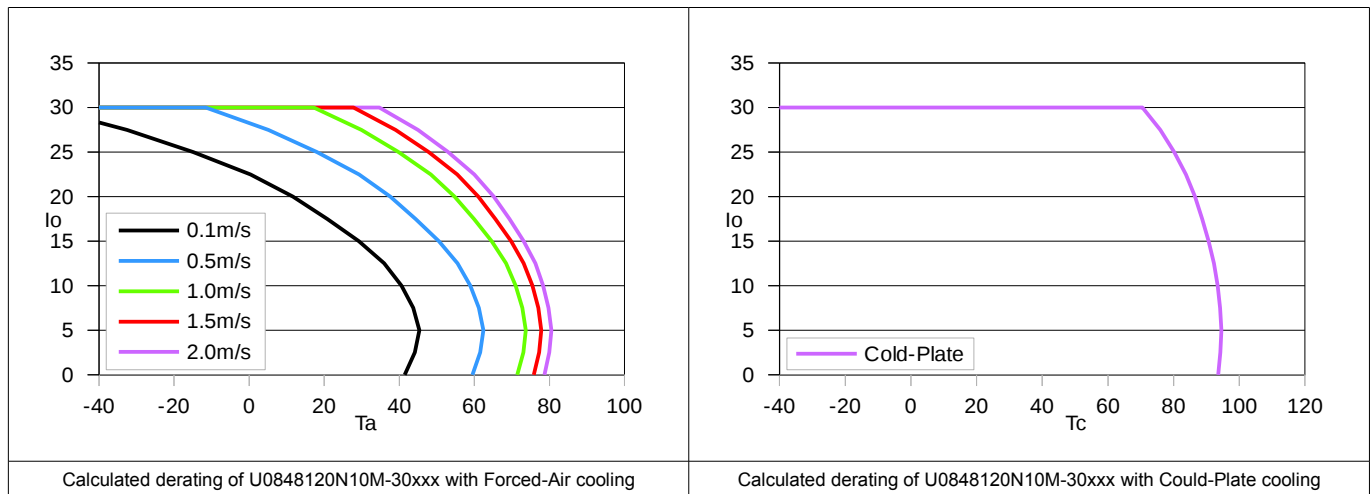
Input/Output		
Reflected Input Ripple Current	$L_{EXT} = 10\mu H$	20mA rms/60mAp-p
Input Ripple Rejection (<1KHz)	V_{NOM} , Full Load	-50dB
Voltage Accuracy	Typical	$\pm 1.0\%$
Line Regulation	Full Input Range	$\pm 0.2\%$
Load Regulation	0%~100%	$\pm 0.2\%$
Temperature Drift	-40°C ~100°C	$\pm 0.03\%/^{\circ}C$
Output Tolerance Band	All Conditions	$\pm 4\%$
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	$\pm 10\%$
Step Load (2.5A/ μS)	50%~75% Load	$\pm 6\%V_O/500\mu S$
Start-Up Delay Time	V_{NOM} , Full Load	20mS/250mS

TYPICAL WAVES AND CURVES



Model Number: U0848120N10M-30xxx

DERATING CURVES



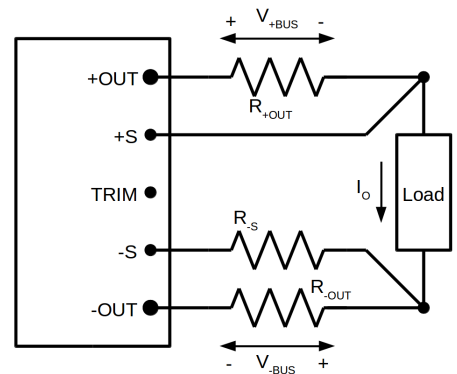
VOLTAGE DROP COMPENSATION

The resistors R_{+OUT} and R_{-OUT} on the right-hand side circuit represent the impedances of the power distribution bus contributing voltage drops V_{+BUS} and V_{-BUS} respectively. The voltage drop V_{+BUS} can be eliminated by connecting the +S to the positive node of the load. The -S pin functions differently as it can disable the droop current sharing, compensate the voltage drop V_{-BUS} , manipulate the load regulation of droop current sharing function or enhance the step load performance.

By connecting a resistor R_S between the -S pin and the negative node of the voltage on the load can be regulated. The values of R_S for eliminating different V_{-BUS} and droop current sharing regulation at full load condition are listed in table below, which can be calculated from the equation right-hand below by letting $I_O = I_{RATED}$ and $V_O = V_{RATED}$. Precision resistor with less than 1% of tolerance is recommended for R_S .

V_{BUS}	60mV	120mV	180mV	240mV	300mV	360mV	420mV	480mV	540mV	600mV
$R_S(\Omega)$	13.15	21.37	27.00	31.09	34.20	36.64	38.61	40.24	41.59	42.75

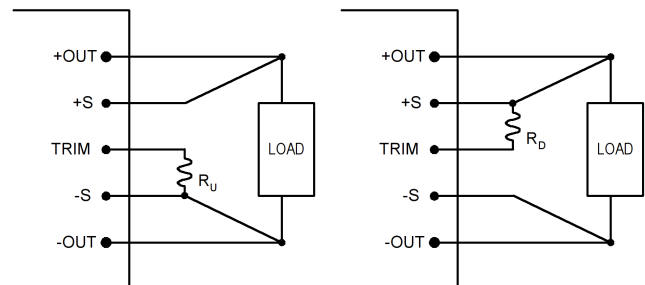
* Please consult Glary Power for manipulating load sharing and dynamic performance.



$$R_S = \frac{(5V_{-BUS} + \frac{0.05I_O}{I_{RATED}})V_{RATED}}{V_O + V_{-BUS} + (\frac{I_O}{60I_{RATED}} - 1)V_{RATED}} - 3$$

TRIM AND TRIM TABLE

The output of the U0848120abcd-30xxx power module can be adjusted for higher or lower than the rated voltage level by connecting the TRIM pin through a resistor to the pins of -S or +S respectively as shown as on the right hand side. The resistor for trimming output voltage higher or lower are denoted as R_U and R_D , which have different resistances for each different output voltage level. The resistance table for trimming the output voltage with 1% of step are listed as below for reference.



Trim Up	+1%	+2%	+3%	+4%	+5%	+6%	+7%	+8%	+9%	+10%	-	-	-	-	-	-	-	-	-
$R_U (K\Omega)$	324.2	162.1	108.1	81.04	64.83	54.03	46.31	40.52	36.02	32.42	-	-	-	-	-	-	-	-	-

Trim Down	-1%	-2%	-3%	-4%	-5%	-6%	-7%	-8%	-9%	-10%	-	-	-	-	-	-	-	-	-
$R_D (K\Omega)$	78.12	37.03	23.33	16.48	12.37	9.63	7.68	6.21	5.07	4.19	-	-	-	-	-	-	-	-	-

* Please contact Glary Power if a trim range beyond $\pm 10\%$ is needed.

DROOP CURRENT SHARING

Fig. 1 shows schematic of the droop current sharing connection by using U08 modules. The droop current sharing function of U08 module allows directly connecting outputs of multiple modules in parallel without current sharing bus. The reliable current sharing is achieved not only by minimizing the output voltage error but also the balancing the impedance of distribution bus. On U08 module, the output voltage error between modules determines the output current error constantly as show in Fig. 2. However, as shown in Fig. 3, the ratio of the shared current error for each module is gradually approaching to zero while the total output current increases.

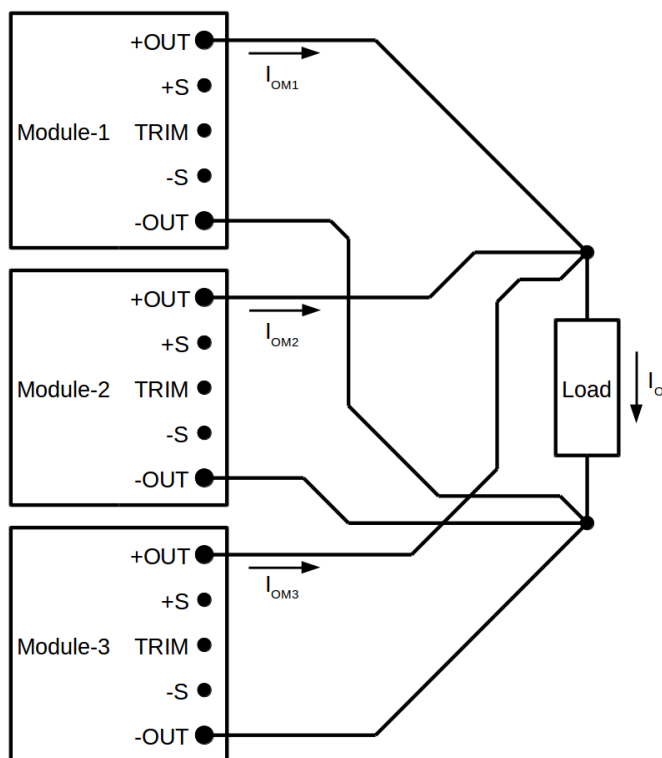


Fig. 1. Schematic of droop current sharing

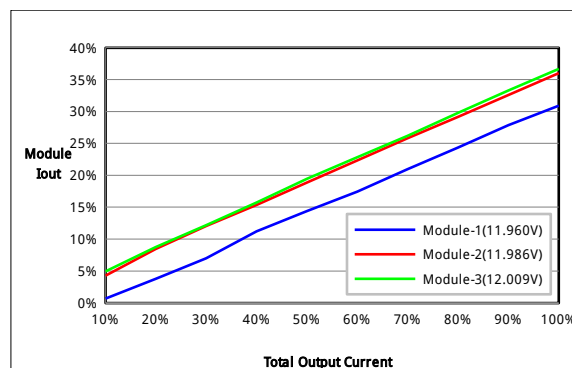


Fig. 2. Current sharing error

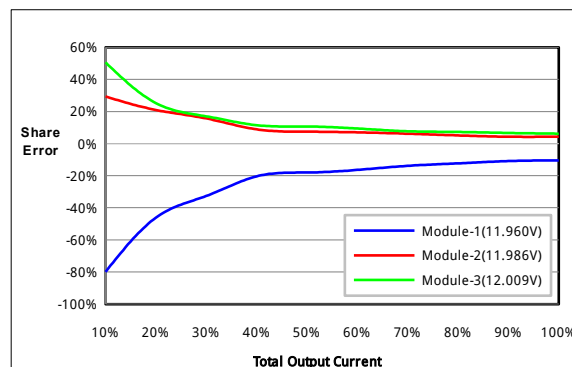


Fig. 3. Related current sharing error

The bandwidth of the droop current sharing loop is comparable to that of the voltage loop, which can respond to high current slew rate load transient without high current peak deviation. Fig. 4 shows waveforms of two U08 modules in current sharing responding to a 0A to 20A step load, the maximum current slew rate is 2.5A/μs limited by the used electrical load for testing. The waveform shows that the current error of two paralleled modules in the time period of 0A load is relatively large due to a significantly output voltage error, which has been reduced with a very short of settling time in the time period of the 20A load current.

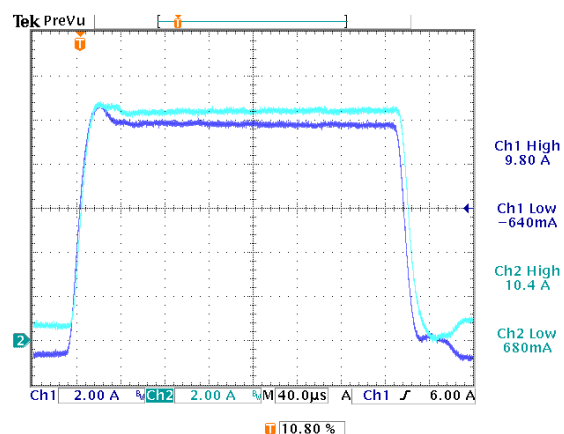


Fig. 4. Step-load response 0A/20A@2.5A/μs

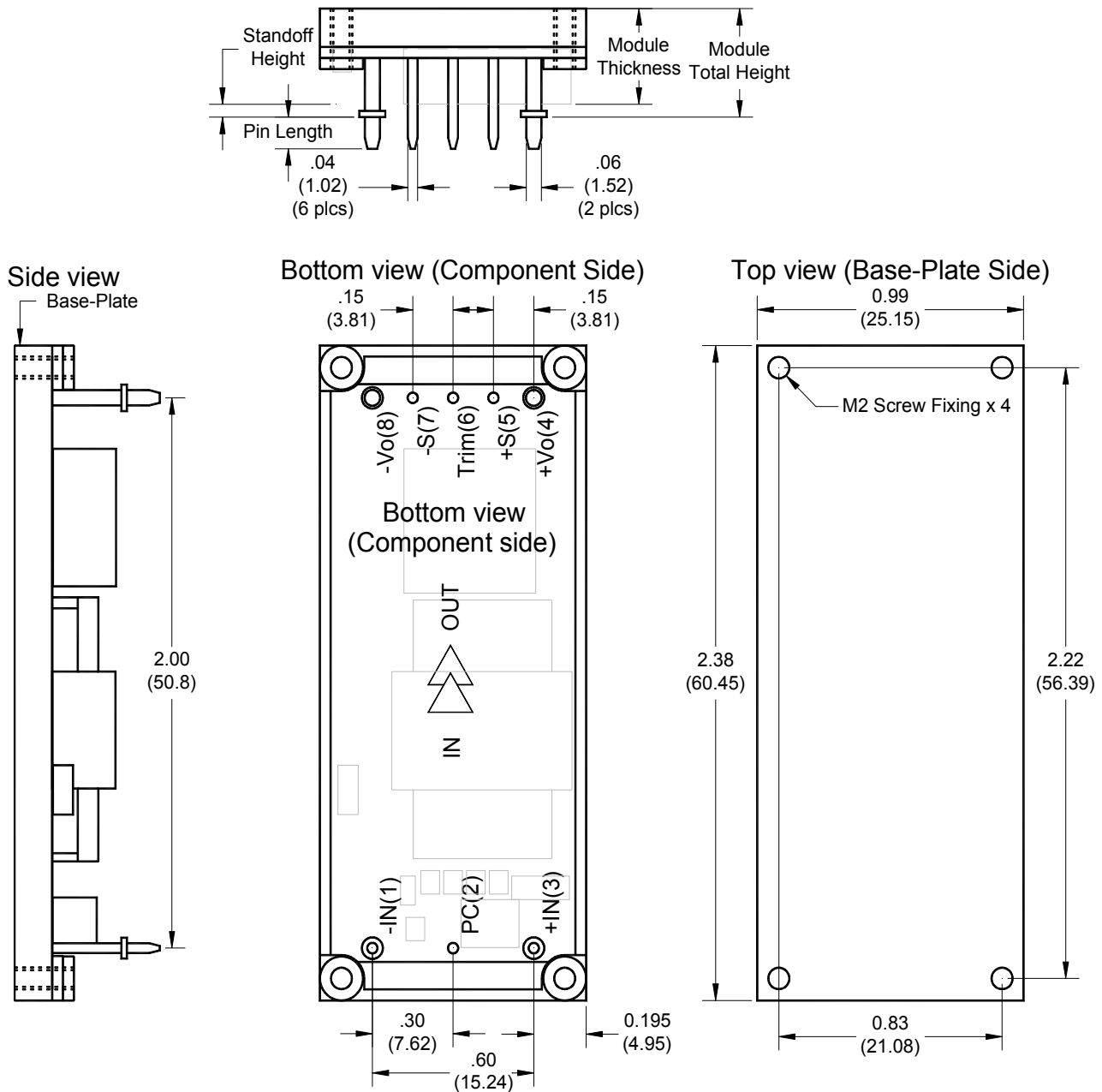
NOTE:

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

IMPORTANT

✳ 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.

MECHANICAL DRAWING



Dimensions and Pin Connections

Designation	Function Description	Pin #
-IN	Negative input	1
PC	Remote control. To turn-on and turn-off output.	2
+IN	Positive input	3
+Vo	Positive output	4
+S	Positive remote sense	5
TRIM	Output voltage adjust	6
-S	Negative remote sense	7
-Vo	Negative output	8

Dimensions: inches (mm)

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

Weight: 32g / M-type base-plate

Base plate: Anode oxide aluminum alloy

Mounting inserts: M2 or through-hole

Maximum torque: 1.3in-lb (0.15Nm)

Pin material: Copper alloy or Brass

Pin plating: Golden over Nickel