

# MBC550 Series

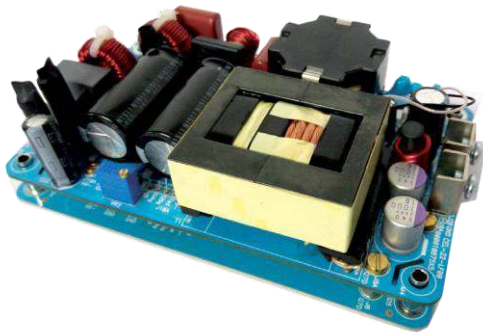
## Open Frame Power Supplies Medical

Not For New Design  
Please refer to exact equivalent product series  
**MWLC550**

The MBC550 Series of open frame medical power supplies feature a wide universal AC input range of 90 – 264 VAC, offering up to 550 W of output power with forced air cooling, or 250 W with conduction cooling in a compact footprint, with a variety of isolated single output voltages.

The MBC series is designed and approved to the latest Medical standards (EN/IEC 60601-1) for Class I applications.

The MBC550 range is ideally suited to a wide variety of medical applications, and where airflow is limited or not available.



### Key Features & Benefits

- 5 x 3 x 1.5 Inch Form Factor
- Up to 550 Watts with Forced Air Cooling
- Efficiencies up to 92%
- -40 to 70°C Operating Temperature
- 12 V / 0.5 A Fan Output, Thermal Shut-Down Feature
- Approved to EN/IEC 60601-1
- Medical (BF) Safety Approvals
- MTBF >3 million hours as per Telcordia SR-332, Issue 3
- RoHS Compliant
- CE Marked

### Applications

- Diagnostic
- Drug Pump
- Dialysis
- Home Health Care
- Monitoring
- Portable Equipment



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## 1. MODEL SELECTION

MODEL NUMBER	VOLTAGE	MAX. LOAD (CONVECTION)	MAX. LOAD <sup>1</sup> (CONDUCTION)	MAX. LOAD (400 LFM)	POWER
MBC550-1T12	12 V	9.17 A	16.67 A	41.67 A	500 W
MBC550-1T15	15 V	7.33 A	13.33 A	33.33 A	500 W
MBC550-1T24	24 V	6.25 A	10.42 A	22.92 A	550 W
MBC550-1T30	30 V	5.00 A	8.33 A	18.33 A	550 W
MBC550-1T48	48 V	3.13 A	5.21 A	11.46 A	550 W
MBC550-1T58	58 V	2.59 A	4.31 A	9.48 A	550 W

<sup>1</sup> Refer to "Recommended Conduction Plate & Clearance" details on page 8.

## 2. INPUT SPECIFICATIONS

Specifications are for nominal input voltage, 25°C unless otherwise stated.

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Input Voltage	Universal (Derate from 100% at 115 VAC to 78% at 90 VAC)	90-264 VAC / 390 VDC
Input Frequency		47-63 Hz
Input Current	115 VAC: 230 VAC:	6 A max. 3 A max.
No Load Power	115 VAC: 230 VAC:	< 0.5 W < 0.7 W
Inrush Current	115 VAC: 230 VAC: 264 VAC:	25 A 45 A 75 A
Leakage Current	115 VAC: 230 VAC: Touch current	< 200 $\mu$ A < 400 $\mu$ A < 100 $\mu$ A
Power Factor	@ Full Load	> 0.95
Switching Frequency	PFC Resonant	70 to 130 KHz 68 to 80 KHz

## 3. OUTPUT SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Output Power <sup>2</sup>	Forced air cooled: Conduction cooled: Convection cooled:	up to 550 W up to 250 W up to 150 W
Efficiency (typical @ 230 VAC full load)	48 V: 24 V: 12 V, 15 V:	92% 91% 90%
Hold-up Time (typical)	Full Load Convection Load Conduction Load	> 16 ms > 55 ms > 30 ms
Line Regulation <sup>4</sup>		+/-0.5%
Load Regulation <sup>4</sup>		+/-1%
Minimum Load		0.0 A
Transient Response	50-100% step load change, at 0.1A/ $\mu$ s slew rate, 50% duty cycle, 50 Hz = 5%	recovery time < 5 ms
Ripple <sup>3,4</sup>	12 V & 15 V 24 V, 30 V, 48 V & 58 V	2.0 % max 1.0 % max
Output Voltage Adjustment		+/-3%
Rise Time	Typical	55 ms

Set Point Tolerance <sup>4</sup>		+/-1%
Over Current Protection	Hiccup mode / Auto recovery	> 110%
Over Voltage Protection	Hiccup mode / Auto recovery	110 to 140%
Short Circuit Protection	Hiccup mode / Auto recovery	
Cooling	Convection Cooled (refer to Derating Curve)	Up to 150 W max
	Conduction Cooled (refer to Derating Curve)	Up to 250 W max
	400 LFM Forced Air Cooled (refer to Derating Curve)	Up to 550 W max

- <sup>2</sup> Combined output power of main output, fan supply shall not exceed max. Power rating.
- <sup>3</sup> Ripple is peak to peak with 20 MHz bandwidth and 10 µF (Electrolytic capacitor) in parallel with a 0.1 µF capacitor at rated line voltage and load ranges.
- <sup>4</sup> Fan supply output voltage tolerance including set point accuracy, line and load regulation is +/-10 % and Ripple and noise is less than 10 %.

## 4. ENVIRONMENTAL SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Operating Temperature <sup>5</sup>	-40 to 0°C startup guaranteed, with spec deviation <sup>6</sup>	-40 to +70°C
Storage Temperature		-40 to +85°C
Relative Humidity	Non-condensing	5% to 95%
Altitude	Operating:	16,000 ft.
	Non-operating:	40,000 ft.

- <sup>5</sup> Thermal shutdown feature: The power supply goes in hiccup mode when the temperature of PCB exceeds 110 °C (+/-10 °C).
- <sup>6</sup> Output ripple can be more than 10% of the output voltage.

## 5. EMC SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Conducted Emissions	EN 55011-B, CISPR22-B, FCC PART15-B	Pass
Radiated Emissions	EN 55011 A; with external core (King core K5B RC 25x12x15-M in input cable)	Pass Level B
Input Current Harmonics	EN 61000-3-2	Class D
Voltage Fluctuation and Flicker	EN 61000-3-3	Pass
ESD Immunity	EN 61000-4-2	Level 4, Criterion A
Radiated Field Immunity	EN 61000-4-3	Level 3, Criterion A
Electrical Fast Transient Immunity	EN 61000-4-4	Level 3, Criterion A
Surge Immunity	EN 61000-4-5	Level 3, Criterion A
Conducted Immunity	EN 61000-4-6	Level 3, Criterion A
Magnetic Field Immunity	EN 61000-4-8	Level 4, Criterion A
Voltage Dips, Interruptions	EN 61000-4-11	Criterion B

## 6. SAFETY SPECIFICATIONS

PARAMETER	DESCRIPTION / CONDITION	SPECIFICATION
Isolation Voltage	Input to Output: (for medical applications)	4000 VAC
	Input to GND:	1500 VAC
	Output to GND: for type BF for type B	1500 VAC 500 VAC
Safety Standard(s)	UL /CSA : ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) AMD1:2012; CORR1:2009; AMD2:2010, (CAN/CSA-C22.2 No. 60601-1 (2008)CAN/CSA C22.2 No. 60601-1:14 IEC : IEC 60601-1: 2005 + CORR. 1:2006 + CORR. 2:2007 + AM1:2012(or IEC 60601-1: 2012 reprint) EN : EN 60601-1:2006;A1	
Agency Approvals	Nemko, UL, C-UL	
CE mark	Complies with LVD Directive	

## 7. CONNECTOR & PIN DESCRIPTION

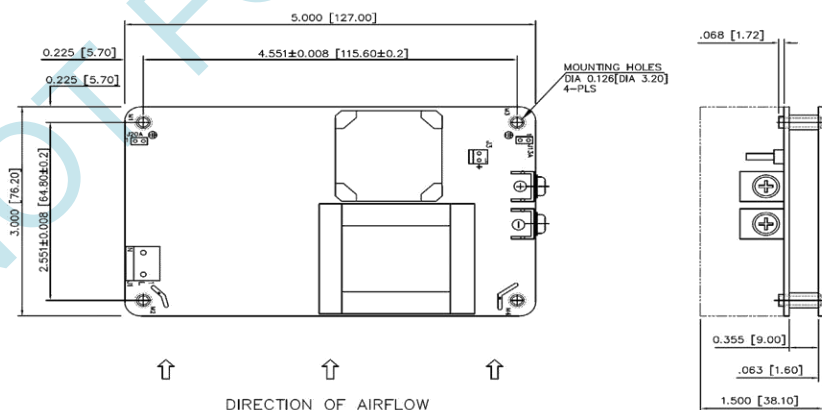
CONNECTOR	PIN	DESCRIPTION / CONDITION	MANUFACTURER / PN
AC Input Connector	J1	Pin 1 Pin 2 Pin 3	AC Line Not Fitted AC Neutral
DC Output Connector (Screw Terminal)	J2	Pin 1 Pin 2	V1 +VE V1 -VE
Aux (Fan) Output	J3	Pin 1 Pin 2	FAN +VE FAN -VE
Earth	J4		

6-32 inches Screw Pan HD  
Mating: Designed to accept Ring Tongue Terminal AMP: 8-31886-1, wherein one 16 AWG (max) wire can be crimped.  
Note: One Ring Tongue Terminal with 16 AWG is recommended for current up to 11A only.  
Use multiple tongue terminals with wire for more current.

AMP: 640456-2  
Mating: 640440-2  
Molex: 19705-4301  
Mating: 19003-0001

## 8. MECHANICAL SPECIFICATIONS

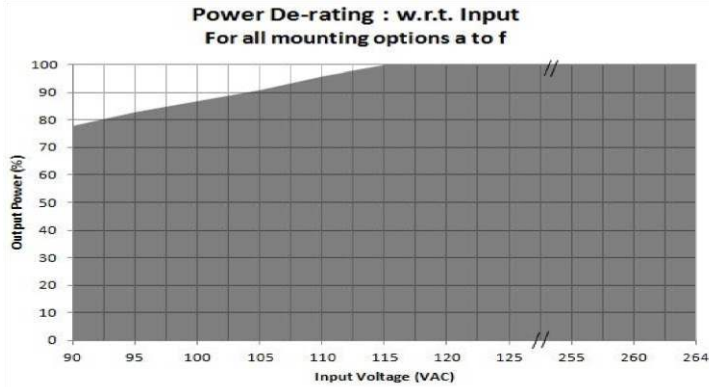
PARAMETER	DESCRIPTION / CONDITION
Weight	approx. 500 g
Dimensions	127 x 76.2 x 38.1 mm (5 x 3 x 1.5 inches)



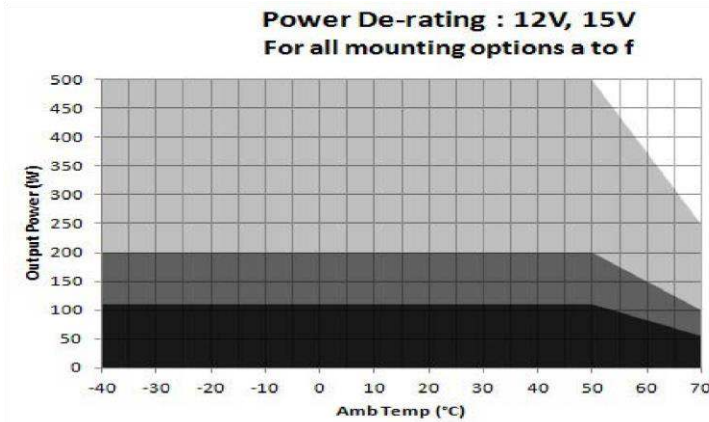
MECHANICAL OUTLINE DIMENSIONS  
ALL DIMENSIONS ARE IN INCHES[MM]  
GEN TOLERANCE : +/-0.04[1.0MM]

Mechanical Drawing

## DERATING CURVES



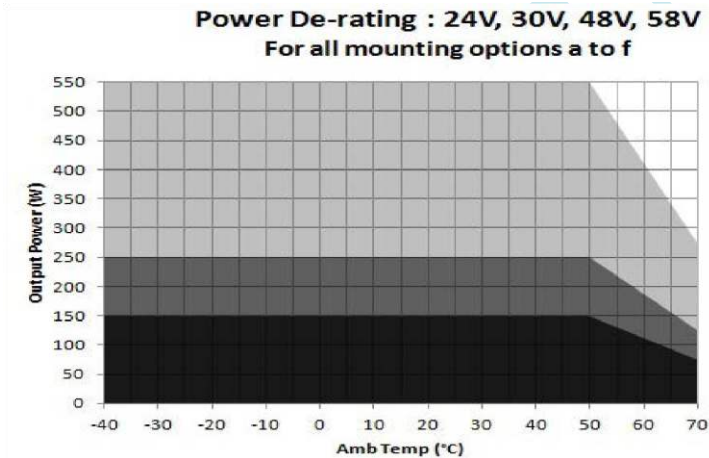
De-rate linearly from 100% at 110 VAC to 78% at 90 VAC



Convection load: 110 W up to 50 °C  
De-rate above 50 °C @ 2.5% per °C

Conduction load: 200 W up to 50 °C  
De-rate above 50 °C @ 2.5% per °C

Forced air cooled load:  
500 W up to 50°C  
De-rate above 50 °C @ 2.5% per °C



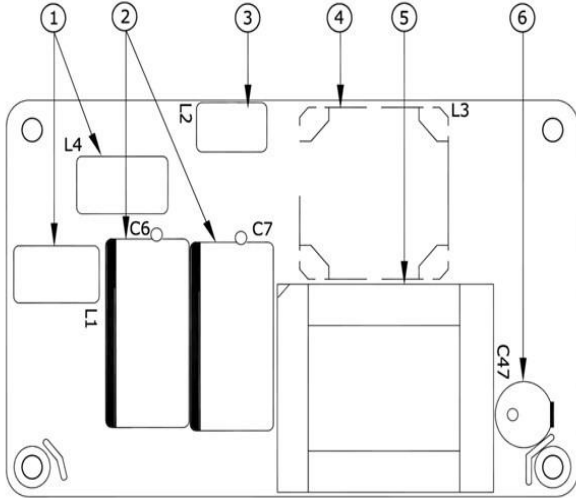
Convection load: 150 W up to 50 °C  
De-rate above 50 °C @ 2.5% per °C

Conduction load: 250 W up to 50 °C  
De-rate above 50 °C @ 2.5% per °C

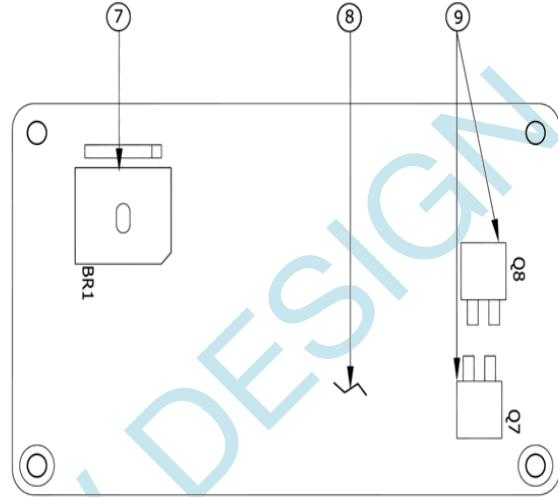
Forced air cooled load:  
550 W up to 50°C  
De-rate above 50 °C @ 2.5% per °C

**MAXIMUM OPERATING TEMPERATURE**

For reliable and safe operation, please make sure the maximum component temperatures given in table below is not exceeded.



TOP PCB



BOTTOM PCB

INDENT NO	DESCRIPTION	MAXIMUM TEMP. ALLOWED (°C)
1	Common mode chokes	95
2	Input Bulk Capacitors	90
3	Differential choke	110
4	Boost Choke	110
5	Output Transformer	125 (for 12 V & 15 V) 110 (for 24 V, 30 V, 48 V, 58 V)
6	Output Capacitor	90
7	Bridge Rectifier	120
8	Aluminum Clad PCB	105
9	Output Rectifiers	110

## MOUNTING OPTIONS

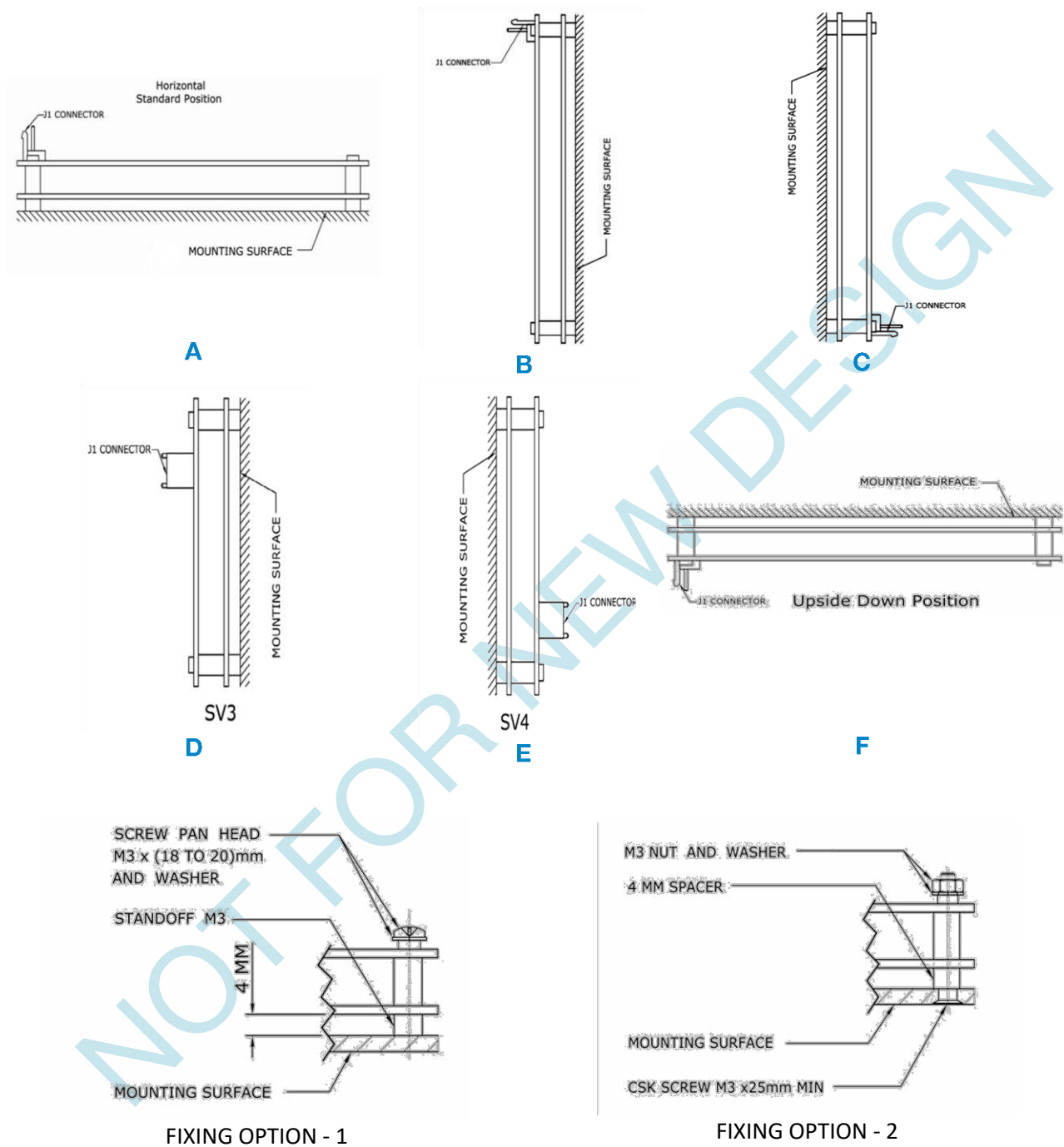


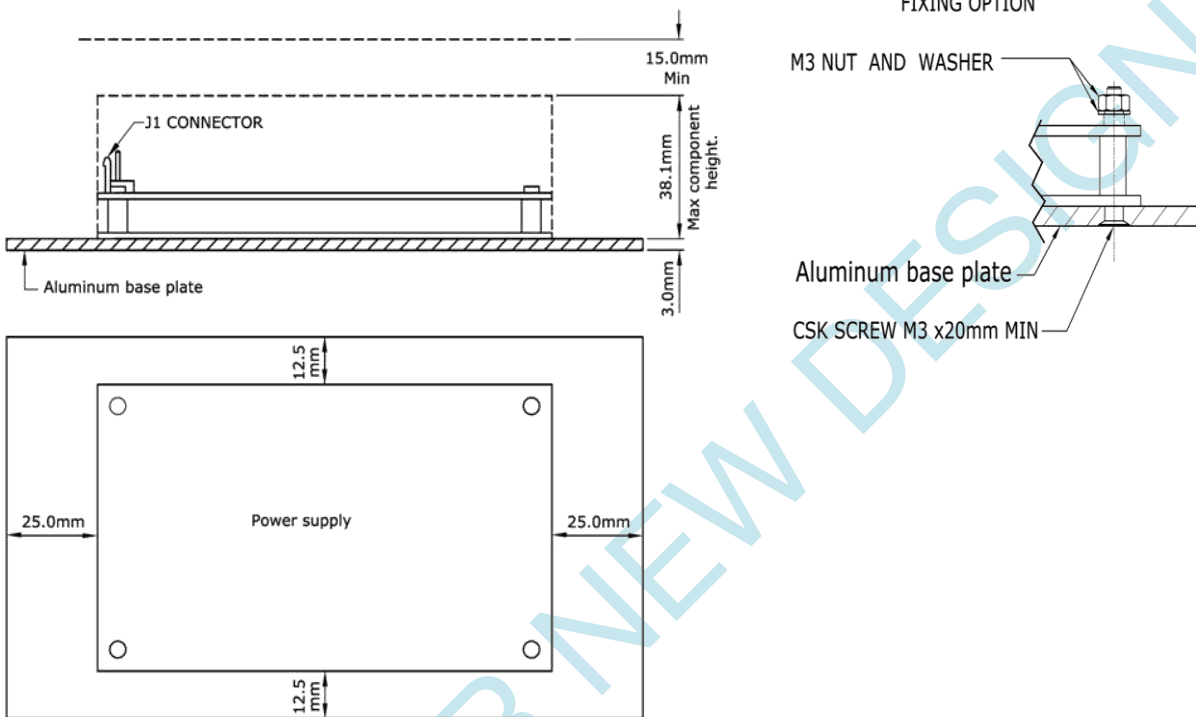
Figure 2. Mounting Options



## RECOMMENDED CONDUCTION PLATE & CLEARANCE

Conduction power rating mentioned in the table is with additional aluminum base plate of 3 mm thickness with 177.8 mm (7 in) length & 101.6 mm (4 in) width.

Clearance of minimum 15 mm above the component height is recommended for better thermal management.



For more information on these products consult: [tech.support@psbel.com](mailto:tech.support@psbel.com)

**NUCLEAR AND MEDICAL APPLICATIONS** - Products are not designed or intended for use as critical components in life support systems, equipment used in hazardous environments, or nuclear control systems.

**TECHNICAL REVISIONS** - The appearance of products, including safety agency certifications pictured on labels, may change depending on the date manufactured. Specifications are subject to change without notice.