



# POWERGOOD



## Railway Power Solution Expert

AC/DC Power Modules, DC/DC Power Modules





# Every Watt Matters!

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## About POWERGOOD

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### Experts born for the power module

POWERGOOD provides AC/DC, DC/DC modules and related products with high reliability, high efficiency and high durability, which can be used in railway, industrial automation, medical, Aviation... In different fields, such as New York City Subway, ALSTOM, DB, SIEMENS... And other well-known companies in various fields around the world.

### Quality first, Customer satisfaction

With the spirit of harmony, advancement, integrity and sharing, we insist on continuous improvement in quality and the concept of "There is no best, only better" to create value beyond customers' expectations with our professional ability and provide you with "good performance, ease of use, reliability and affordability" as a one-stop power supply solution.



## EN 50155 & EN 45545-2

### **EN 50155 Railway Vehicle Certification & EN 45545-2 Fire Test Standard for Rail Vehicle Materials**

EN 50155 Railway certification provides guidelines for the design, construction, manufacture, and documentation requirements for equipment installed on rail vehicles, and specifies test evaluation methods covering EMC, electrical safety, environmental, reliability, vibration, and other aspects of assessment.

EN 45545-2 is the fire safety code for railway vehicles of the International Union of Railways and European countries. The main purpose is to establish rules related to the selection of materials based on their combustion properties, heat emission, smoke density and smoke toxicity.

POWERGOOD power converters are tested in real-world conditions under the demanding EN 50155, EN 45545-2 specifications to ensure reliability, stability and optimal performance during operation, making them an excellent choice for on-board, train, railway and fleet management.

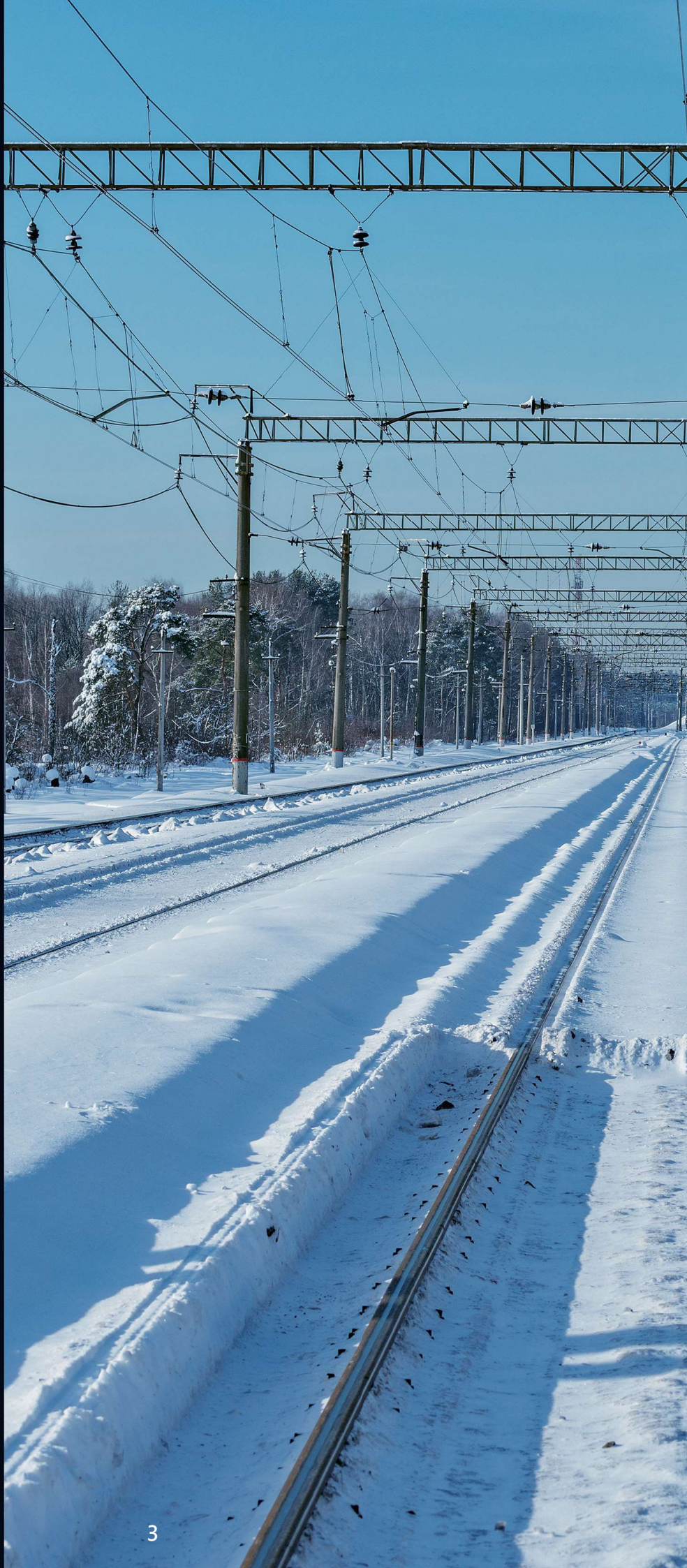
POWERGOOD strictly controls every products we made, from research and development to finished products to carry out various checks, strict quality control and implementation of comprehensive quality assurance, in order to achieve high quality and stability of products, and independent research and development of automatic testing system (ATS) and manufacturing execution system (MES) for the most accurate quality control, with professional ability to create value beyond customer expectations.



## Product Advantage

### AC/DC Power Converter

- 100W up to 700W output power.
- $-40^{\circ}\text{C} \sim +100^{\circ}\text{C}$  ultra-wide operating temperature, achieving optimal protection in strict working environment.
- Full size, including 1/4 brick, 1/2 brick and full brick.
- Built-in active power factor correction(Active PFC).
- High density.
- High Reliability: No aluminum and tantalum electrolytic capacitor inside.
- Output voltage trim range of  $-5\%$  ,  $+5\%$ .
- Fully protected: OCP, OVP, OTP and SCP.
- 3 years warranty.







## Product Advantage

### DC/DC Power Converter

- 7W up to 600W output power, output voltage trim range of -10%, +10%.
- -45°C ~ +115°C ultra-wide operating temperature, achieving optimal protection in strict working environment.
- Wide range of input voltages from 4:1 , 8:1 to 12:1.
- Metal case design, easy for heat dissipation and EMI.
- No aluminum and tantalum electrolytic capacitor inside for high reliability .
- Remote sense for the output voltage. (Depends on different model)
- Fully protected: OVP, OTP, OCP and UVLO.
- 3 years warranty.

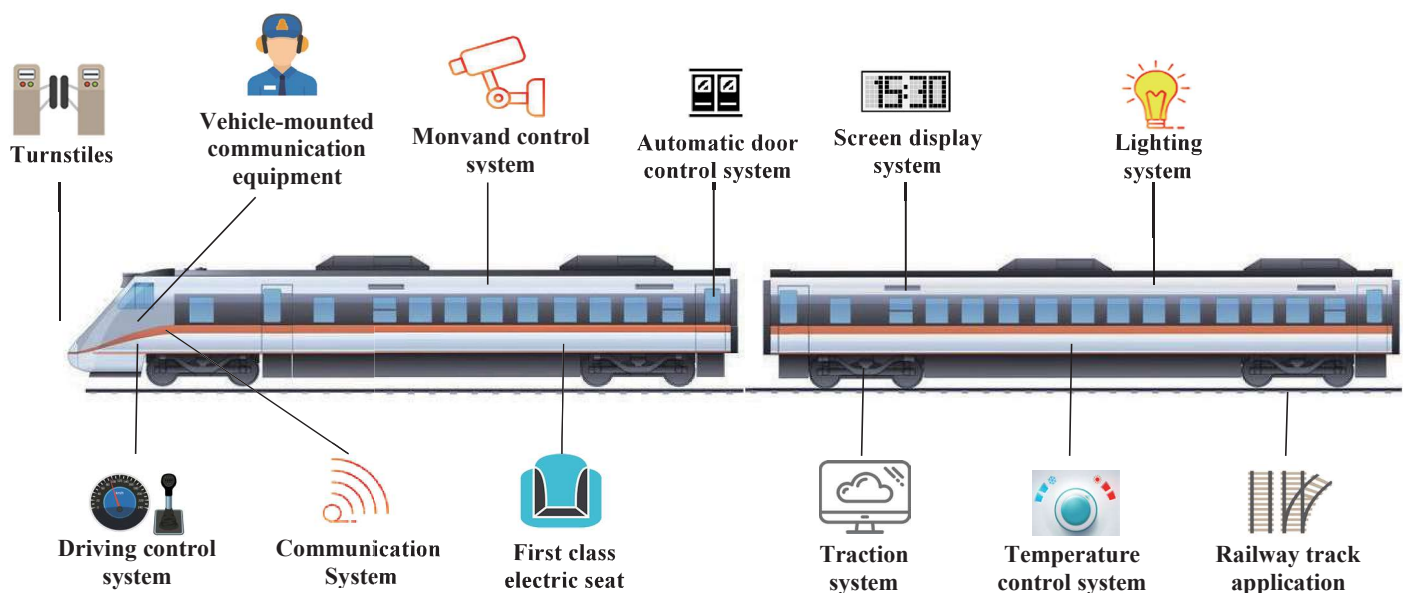




# Application

POWERGOOD provides highly reliable and durable power converters with rich experience and success stories in railway applications, such as in: China, India, USA, Germany and Switzerland, among many other countries, passing extremely harsh environmental tests and challenges.

“Customer first” has always been the service spirit that POWERGOOD attaches great importance to, providing our 30 years of experience in rail transportation and the best solutions to our customers, becoming a one-stop power supply brand supplier.



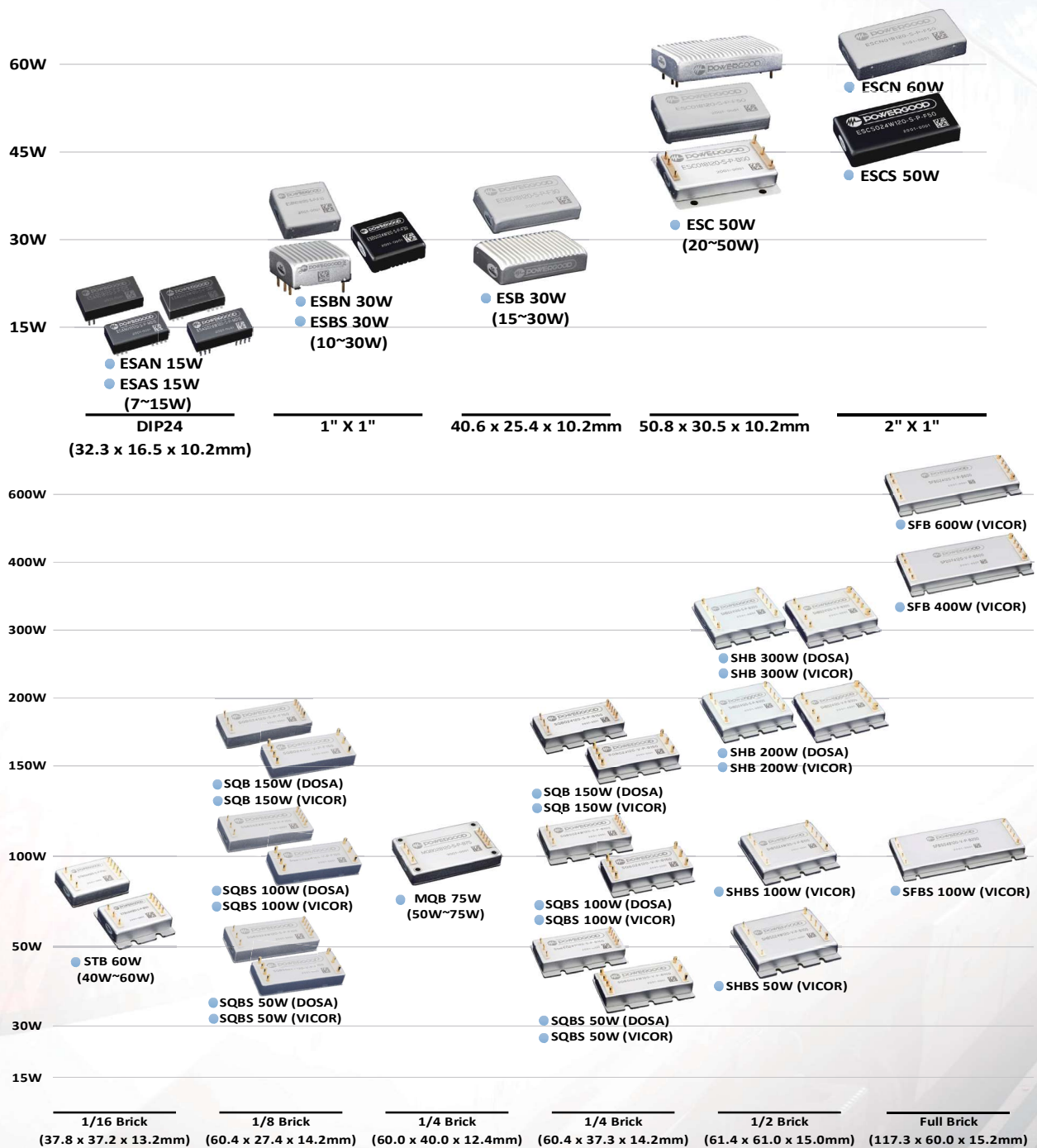


# Railway Application Product Line

## AC/DC power modules for POWERGOOD Railway Application



## DC/DC power modules for POWERGOOD Railway Application





# AC/DC Railway Application Product Introduction

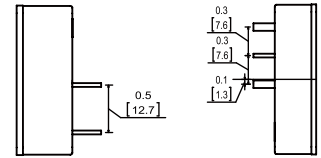
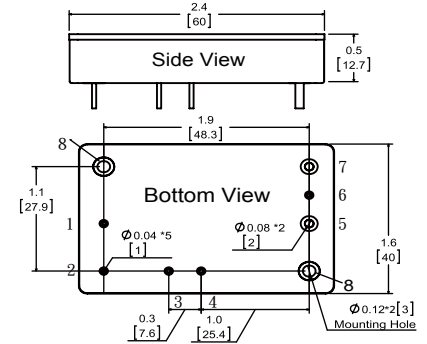
## AC/DC Brick Series Product Feature

- Ultra-thin design (0.5 inch) for brick type, with the world's largest power density ratio.
- No life-span constrained Ceramic Capacitor inside
- Isolation voltage up to 3000 VAC
- Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)
- Easy Hold-up time extension
- No aluminum and tantalum electrolytic capacitor inside for high reliability

### ACQ100 Series

#### 100W / 1/4 Brick

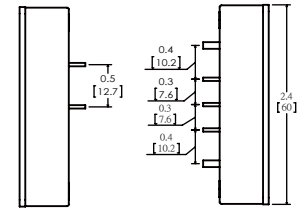
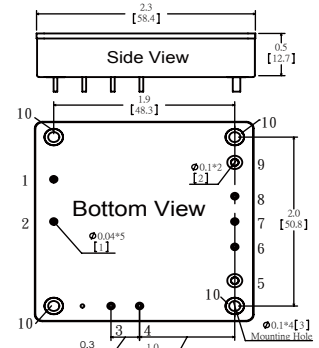
Input Voltage: 90-264 VAC  
 Output Voltage: 5, 12, 24, 28, 36, 48 VDC  
 Output Power: 100W  
 Operating Case Temperature: -40°C~100°C  
 High Efficiency up to 91%  
 Package: Aluminum base with plastic case  
 Size: 2.36" x 1.57" x 0.50"  
 60.0 x 40.0 x 12.7mm



### ACH250 Series

#### 250W / 1/2 Brick

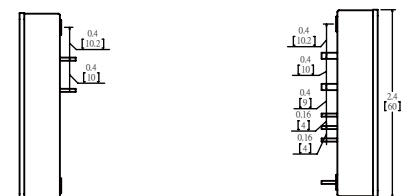
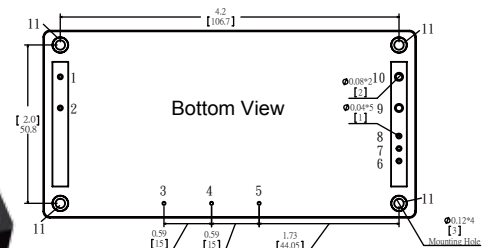
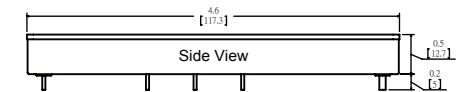
Input Voltage: 90-264 VAC  
 Output Voltage: 12, 24, 28, 36, 48 VDC  
 Output Power: 250W  
 Operating Case Temperature: -40°C~100°C  
 High Efficiency up to 91%  
 Provide remote on/off function (Optional)  
 Package: Aluminum base with plastic case  
 Size: 2.36" x 2.30" x 0.50"  
 60.0 x 58.4 x 12.7mm



### ACF700 Series

#### 700W / Full Brick

Input Voltage: 90-264 VAC  
 Output Voltage: 12, 24, 28, 36, 48 VDC  
 Output Power: 700W  
 Operating Case Temperature: -40°C~100°C  
 High Efficiency up to 90%  
 Package: Aluminum base with plastic case  
 Provide parallel function (Optional)  
 Size: 4.62" x 2.40" x 0.50"  
 117.3 x 60.0 x 12.7mm





# AC/DC Railway Application Product Introduction

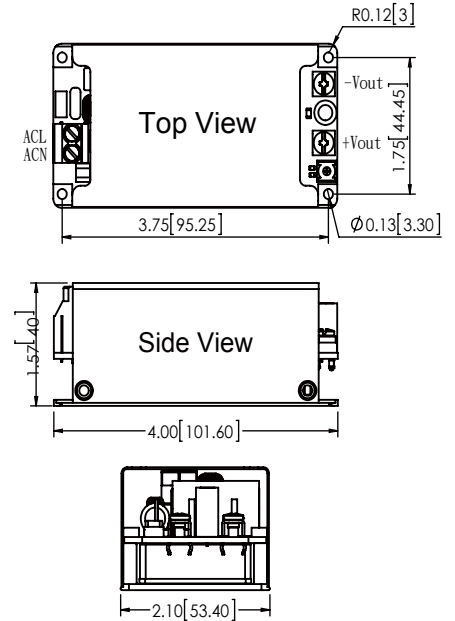
## AC/DC PSU Product Feature

- Built in EMI filter meets EN55032 Class B without external components
- Conduction cooling (e.g. heat radiation from the aluminum base plate to the attached heat sink)
- Open Frame & Aluminum case is optional
- Isolation voltage up to 3000 VAC
- Built-in heat sink
- Terminal blocks for easy wiring and reliable operation

### ACO100 Series

#### 100W / PSU

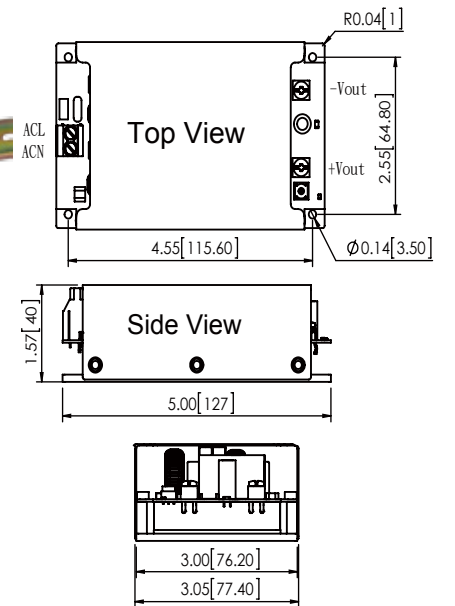
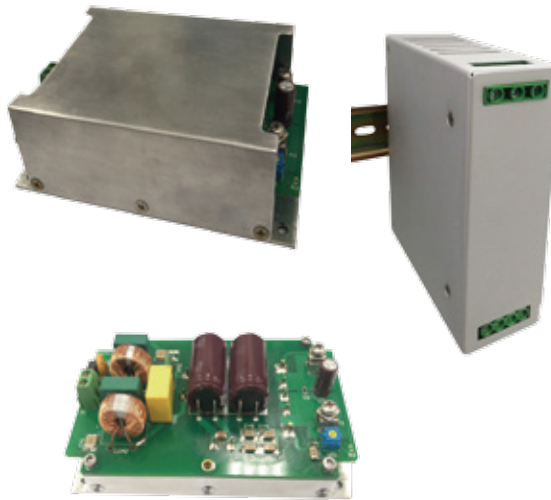
Input Voltage: 90-264 VAC  
 Output Voltage:  
 5, 12, 24, 28, 36, 48 VDC  
 Output Power: 100W  
 Operating Case Temperature:  
 -40°C~100°C  
 High Efficiency up to 91%  
 Package: Open Frame &  
 Aluminum case  
 Size: 4.0" x 2.06" x 1.57"  
 101.6 x 52.4 x 40.0mm



### ACO250 Series

#### 250W / PSU

Input Voltage: 90-264 VAC  
 Output Voltage: 12, 24, 28, 36, 48 VDC  
 Output Power: 250W  
 Operating Case Temperature:  
 -40°C~100°C  
 High Efficiency up to 91%  
 Package: Open Frame &  
 Aluminum case  
 Size: 5.00" x 3.03" x 1.57"  
 127.0 x 77.0 x 40.0mm



### ACO700 Series

#### 700W / PSU

Input Voltage: 90-264 VAC  
 Output Voltage: 12, 24, 28, 36, 48 VDC  
 Output Power: 700W  
 Operating Case Temperature:  
 -40°C~100°C  
 High Efficiency up to 90%  
 Package: Open Frame &  
 Aluminum case



(Coming Soon)



# DC/DC Railway Application Product Introduction

## DC/DC Encapsulated-E Product Feature

- Single / Dual Outputs
- Built in EMI filter meets EN55032 Class A / EN55032 Class B without external components (Optional)
- Saving up to 20% of the circuit board space
- Wide Operating Temperature  $-45^{\circ}\text{C} \sim +105^{\circ}\text{C}$  (Optional:  $-55^{\circ}\text{C} \sim +125^{\circ}\text{C}$ )
- Isolation voltage up to 2000 VDC
- 6-sided metal case design, Industrial standard pin

### ESB Series

15W~30W / 1.6" x 1"

4:1 Wide Input Voltage:

9-36, 18-75 VDC

Output Voltage: 3.3, 5, 12, 15, 24,  $\pm 5$ ,  $\pm 12$ ,  $\pm 15$ ,  $\pm 24$  VDC

Output Power: 15W~30W

Operating Case Temperature:

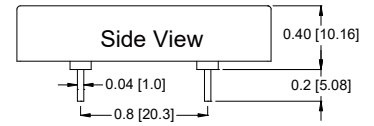
$-45^{\circ}\text{C} \sim 115^{\circ}\text{C}$

High Efficiency up to 91%

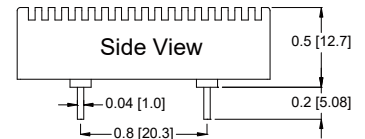
Package: Flat & Heat sink embedded

Size: 1.60" x 1.00" x 0.40" (0.50")

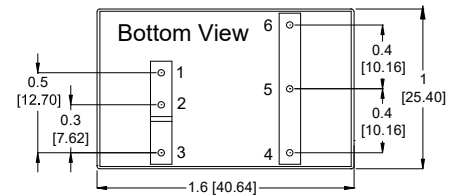
40.6 x 25.4 x 10.2 (12.7)mm



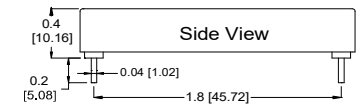
ESB Series Flat



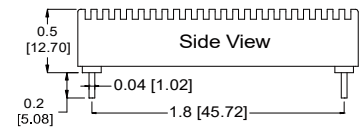
ESB Series Heat Sink Embedded



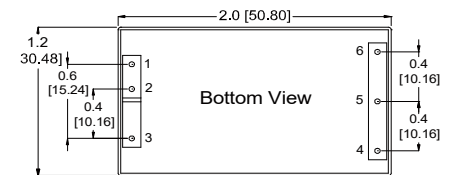
ESB Series Pinout



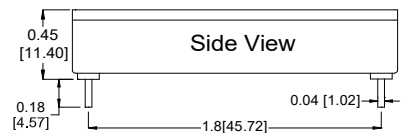
ESC Series Flat



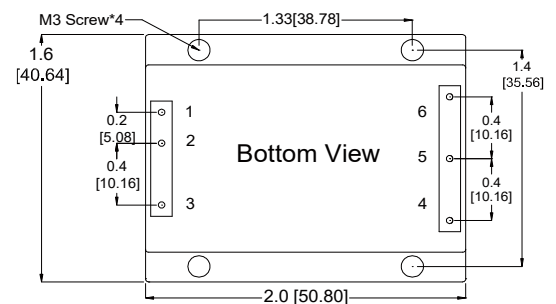
ESC Series Heat Sink Embedded



ESC Series Pinout



ESC Series Baseplate (with Flange)



ESC Series Pinout

### ESC Series

20W~50W / 2" x 1.2"

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage: 3.3, 5, 12, 15, 24,  $\pm 12$ ,  $\pm 15$ ,  $\pm 24$  VDC

Output Power: 20W~50W

Operating Case Temperature:

$-45^{\circ}\text{C} \sim 115^{\circ}\text{C}$

High Efficiency up to 90%

Package: Flat & Heat sink embedded

Size: 2.00" x 1.20" x 0.40" (0.50")

50.8 x 30.5 x 10.2 (12.7)mm



### ESC Series

20W~50W / 2" x 1.6"  
6-side Baseplate

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage: 3.3, 5, 12, 15, 24,  $\pm 12$ ,  $\pm 15$ ,  $\pm 24$  VDC

Output Power: 20W~50W

Operating Case Temperature:

$-45^{\circ}\text{C} \sim 115^{\circ}\text{C}$

High Efficiency up to 90%

Package: 6 sides aluminum case with flange

Size: 2.00" x 1.60" x 0.45"

50.8 x 40.6 x 11.4 mm





# DC/DC Railway Application Product Introduction

## DC/DC Encapsulated - N Product Feature

- Single / Dual Outputs
- Built in EMI filter meets EN55032 Class A without external components (Depends on different model)
- Isolation voltage up to 2000 VDC
- 5-sided metal case design
- Industrial standard pinout
- Maximum power density: up to 60 watts

### ESAN Series

7W~15W / DIP24、SMD24

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage:

3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$ ,  $\pm 15$  VDC

Output Power: 7W~15W

Operating Case Temperature:

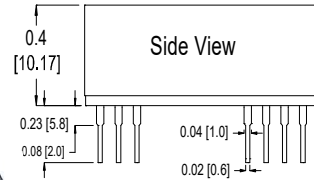
-45°C~85°C

High Efficiency up to 89%

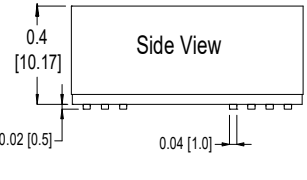
Package: Metal Case & Plastic Case

Size: 1.27" x 0.65" x 0.40"

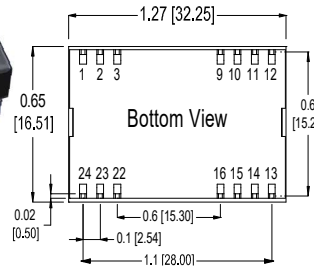
32.3 x 16.5 x 10.2mm



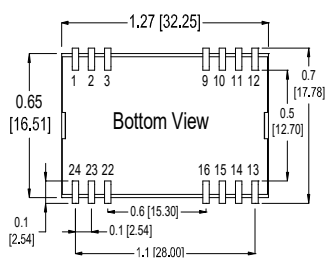
ESAN Series DIP24 Metal Case / Plastic Case



ESAN Series SMD24 Metal Case / Plastic Case



ESAN Series DIP24 Pinout



ESAN Series SMD 24 Pinout

### ESBN Series

10W~20W / 1" x 1"

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage:

3.3, 5, 12, 15,  $\pm 5$ ,  $\pm 12$ ,  $\pm 15$  VDC

Output Power: 10W~20W

Operating Case Temperature:

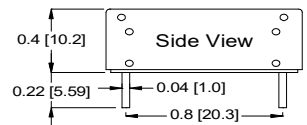
-45°C~115°C

High Efficiency up to 90%

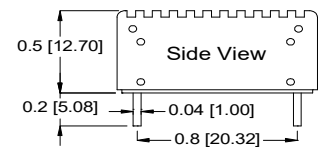
Package: Flat & Heat sink embedded

Size: 1.00" x 1.00" x 0.40" (0.50")

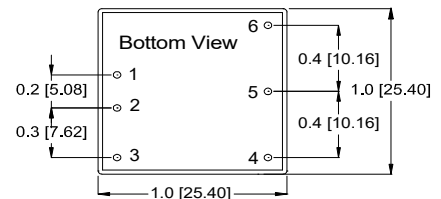
25.4 x 25.4 x 10.2 (12.7)mm



ESBN Series Flat



ESBN Series Heat Sink Embedded



ESBN Series Pinout

### ESCN Series

30W~60W / 2" x 1"

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage: 3.3, 5, 12, 15,

24,  $\pm 12$ ,  $\pm 15$ ,  $\pm 24$  VDC

Output Power: 30W~60W

Operating Case Temperature:

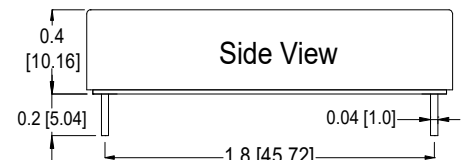
-45°C~115°C

High Efficiency up to 90%

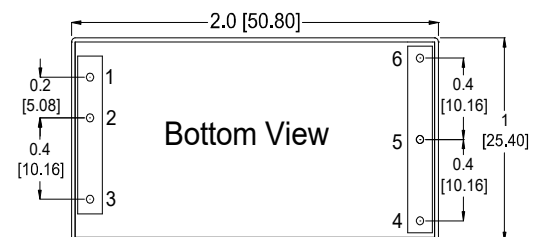
Package: Flat & 6-sided metal case is optional

Size: 2.00" x 1.00" x 0.40"

50.8 x 25.4 x 10.2mm



ESCN Series Flat / 6 Sides Aluminum Case (Optional)



ESCN Series Pinout



# DC/DC Railway Application Product Introduction

## DC/DC Encapsulated - S Product Feature

- Single / Dual Outputs
- Built in EMI filter meets EN55032 Class A without external components (Depends on different model)
- Isolation voltage up to 2000 VDC
- Industrial standard pinout
- Fully SMT manufacturing, standard product, with good lead time, cost-effective

### ESAS Series

#### 15W / DIP24 · SMD24

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage:

5, 12, 15, ±12, ±15 VDC

Output Power: 15W

Operating Case Temperature:

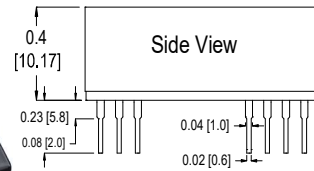
-40°C ~ 100°C

High Efficiency up to 88%

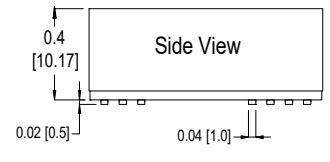
Package: Metal Case & Plastic Case

Size: 1.27" x 0.65" x 0.40"

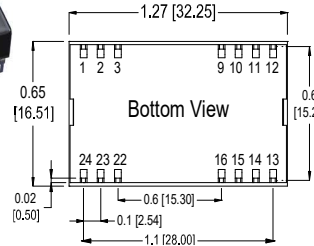
32.3 x 16.5 x 10.2mm



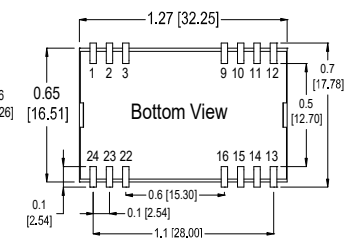
ESAS Series DIP24 Metal Case / Plastic Case



ESAS Series SMD24 Metal Case / Plastic Case



ESAS Series DIP24 Pinout



ESAS Series SMD 24 Pinout

### ESBS Series

#### 30W / 1" x 1"

4:1 Wide Input Voltage:

9-36, 18-75, 40-160 VDC

Output Voltage:

5, 12, 15, ±12, ±15 VDC

Output Power: 30W

Operating Case Temperature:

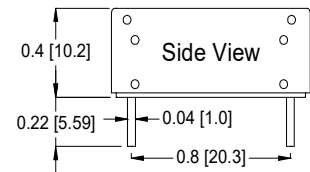
-40°C ~ 100°C

High Efficiency up to 88%

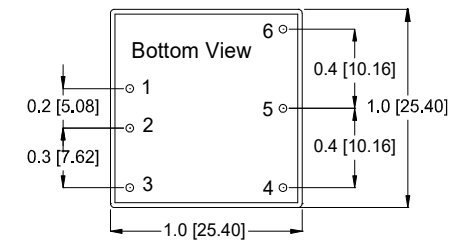
Package: Flat

Size: 1.00" x 1.00" x 0.40"

25.4 x 25.4 x 10.2mm



ESBS Series Flat



ESBS Series Pinout

### ESCS Series

#### 50W / 2" x 1"

4:1 Wide Input Voltage:

9-36, 18-75, 40-180 VDC

Output Voltage:

5, 12, 15, ±12, ±15 VDC

Output Power: 50W

Operating Case Temperature:

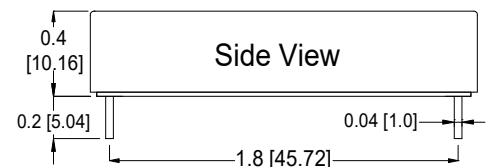
-40°C ~ 100°C

High Efficiency up to 89%

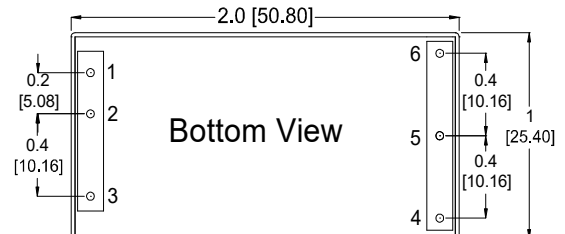
Package: Flat

Size: 2.00" x 1.00" x 0.40"

50.8 x 25.4 x 10.2mm



ESCS Series Flat



ESCS Series Pinout



# DC/DC Railway Application Product Introduction

## DC/DC Brick Series - B Product Feature

- 4:1 / 8:1 / 12:1 Ultra-Wide Input Voltage
- Single / Dual / Multi Outputs
- Built-in EMI filter
- Wide Operating Temperature -45°C ~+105°C (Optional:-55°C ~+125°C)
- Isolation voltage up to 2250 VDC
- The DOSA and VICOR pins are optional and can replace directly without any other additional components.
- Input voltage range up to 110 (40-180) Vin (continuous), with stronger anti input surge ability and higher reliability.

### MQB Series

50W, 75W / 1/4 Brick-DOSA pinout

Ultra-Wide Input 、 Multi Output

8:1 / 12:1 Ultra-Wide Input Voltage:

9-75, 14-154 VDC

Output Voltage:

5, 12, 15, 24, ±12, ±15, ±24 VDC

Output Power: 50W 、 75W

Operating Case Temperature:

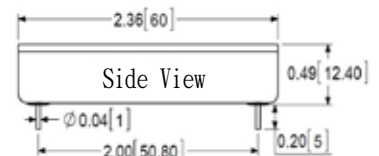
-45°C ~ 105°C

High Efficiency up to 90%

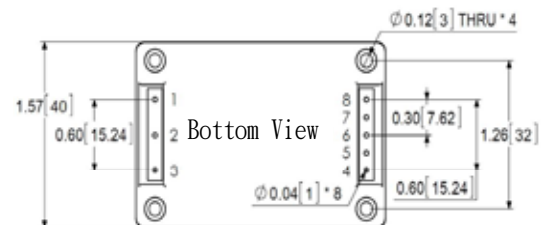
Package: Flat

Size: 2.36" x 1.57" x 0.49"

60.0 x 40.0 x 12.4mm



MQB Series Flat



MQB Series DOSA Pinout

### STB Series

50W / 1/16 Brick with DOSA pinout

4:1 Wide Input Voltage:

9-36, 18-75 VDC

Output Voltage: 3.3, 5, 12, 15, 24 VDC

Output Power: 50W

Operating Case Temperature:

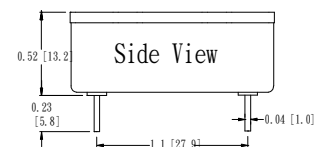
-45°C ~ 105°C

High Efficiency up to 91%

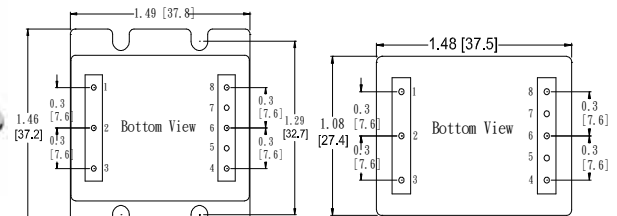
Package: 6 sides aluminum case with flange & Flat

Size: Size: 2.38" x 1.08" x 0.56"

60.4 x 27.4 x 14.2mm



STB Series 6 sides aluminum case with flange / Flat



STB Series 6 sides aluminum case with flange DOSA Pinout

STB Series Flat DOSA Pinout



# DC/DC Railway Application Product Introduction

## DC/DC Brick Series - B Product Feature

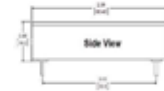
### SQB Series

150 W / 1/8 、1/4 Brick  
with DOSA 、VICOR pinout

4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 5, 12, 24, 28, 48 VDC  
Output Power: 150W  
Operating Case Temperature:  
-45°C ~ 105°C  
High Efficiency up to 92%

Package: 1/8 Brick Flat  
1/4 Brick 6 sides aluminum  
case with flange

Size: 2.38" x 1.08" (1.47") x 0.56"  
60.4 x 27.4 (37.3) x 14.2 mm



1/8 Brick & 1/4 Brick DOSA & Vicor Pinout



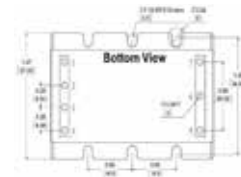
1/8 Brick DOSA Pinout/ 6-sided metal case



1/8 Brick VICOR Pinout/ 6-sided metal case



1/4 Brick DOSA Pinout/ 6-sided metal case



1/4 Brick VICOR Pinout/ 6-sided metal case

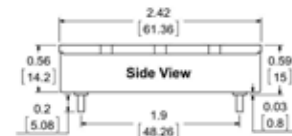
### SHB Series

200W~300W / 1/2 Brick  
with DOSA 、VICOR pinout

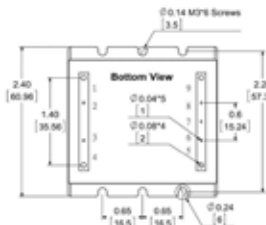
4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 5, 12, 24, 28, 48 VDC  
Output Power: 200W~300W  
Operating Case Temperature:  
-45°C ~ 105°C  
High Efficiency up to 90%

Package: 6 sides aluminum  
case with flange

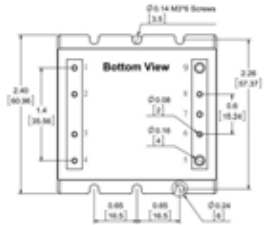
Size: 2.42" x 2.40" x 0.59"  
61.4 x 61.0 x 15.0mm



1/2 Brick DOSA & Vicor Pinout



1/2 Brick DOSA Pinout/ 6-sided metal case



1/2 Brick VICOR Pinout/ 6-sided metal case

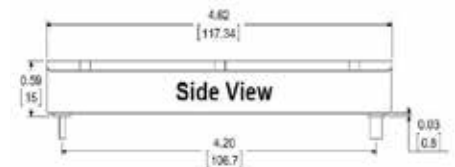
### SFB Series

400W~600W / Full Brick  
with VICOR pinout

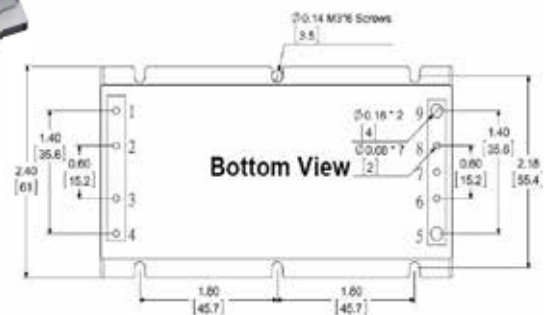
4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 12, 24, 28, 48 VDC  
Output Power: 400W~600W  
Operating Case Temperature:  
-45°C ~ 105°C  
High Efficiency up to 89%

Package: 6 sides aluminum case  
with flange

Provide parallel function  
Size: 4.62" x 2.40" x 0.59"  
117.3 x 61.0 x 15.0mm



Full Brick Vicor Pinout



Full Brick Vicor Pinout/ 6-sided metal case

# DC/DC Railway Application Product Introduction

## DC/DC Brick Series - S Product Feature

- Built-in EMI filter
- Isolation voltage up to 2250 VDC
- Fully SMT manufacturing, standard product, with good lead time, cost-effective
- The DOSA and VICOR pins are optional, can replace directly without any other additional components.
- Input voltage range up to 110 (40-180) Vin (continuous), with stronger anti input surge ability and higher reliability.

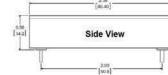
### SQBS Series

50W~100W / 1/8、1/4 Brick with DOSA、VICOR pinout

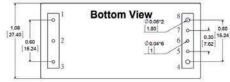
4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 12, 24, 28, 48 VDC  
Output Power: 50W~100W  
Operating Case Temperature:  
-40°C~100°C  
High Efficiency up to 89%  
Package: 1/8 Brick Flat

1/4 Brick 6 sides aluminum case with flange

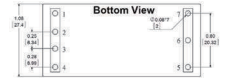
Size: 2.38" x 1.08" (1.47") x 0.56"  
60.4 x 27.4 (37.3) x 14.2 mm



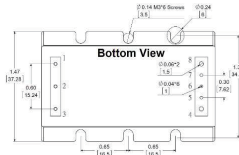
1/8 Brick & 1/4 Brick DOSA & Vicor Pinout



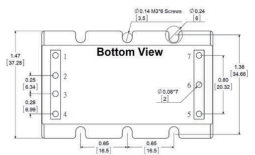
1/8 Brick DOSA Pinout/ 6-sided metal case



1/8 Brick VICOR Pinout/ 6-sided metal case



1/4 Brick DOSA Pinout/ 6-sided metal case

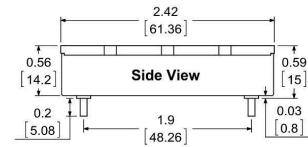


1/4 Brick VICOR Pinout/ 6-sided metal case

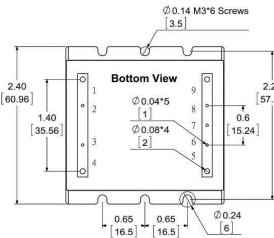
### SHBS Series

50W~100W / 1/2 Brick with DOSA、VICOR pinout

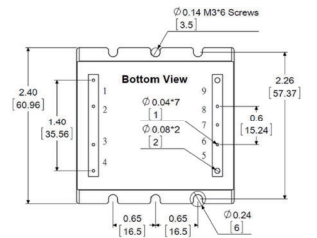
4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 5, 12, 24, 28, 48 VDC  
Output Power: 50W~100W  
Operating Case Temperature:  
-40°C~100°C  
High Efficiency up to 89%  
Package: 6 sides aluminum case with flange  
Size: 2.42" x 2.40" x 0.59"  
61.4 x 61.0 x 15.0mm



1/2 Brick DOSA & Vicor Pinout



1/2 Brick DOSA Pinout/ 6-sided metal case

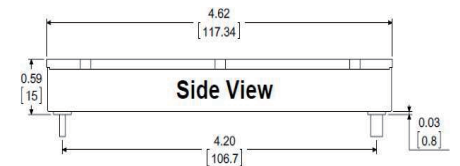


1/2 Brick VICOR Pinout/ 6-sided metal case

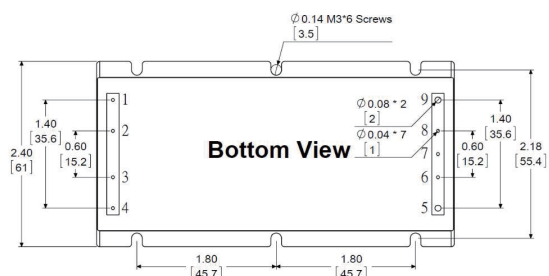
### SFBS Series

50W~100W / Full Brick with VICOR pinout

4:1 Wide Input Voltage:  
9-36, 18-75, 40-180 VDC  
Output Voltage: 5, 12, 24, 28, 48 VDC  
Output Power: 50W~100W  
Operating Case Temperature:  
-40°C~100°C  
High Efficiency up to 89%  
Package: 6 sides aluminum case with flange  
Provide parallel function  
Size: 4.62" x 2.40" x 0.59"  
117.3 x 61.0 x 15.0mm



Full Brick Vicor Pinout



Full Brick Vicor Pinout/ 6-sided metal case





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