



P-DUKE
POWER

Railway Power Solution
Catalogue

Searching the **RIGHT**
POWER SOLUTION
Only **P-DUKE**



IEC 60950-1 | IEC 62368-1 | EN 50155 : 2017 | EN 45545-2 | EN 61373

Who We Are

All the way from the beginning until now, we always insist on quality

Founded in 1992, P-DUKE 100% concentrated on the research, development, production, sales and service of DC/DC Converters and related products. With products sold under our own brand name, P-DUKE to Europe, America, and Japan, we accumulate great skills through years of experience and open up better product awareness which leads to further cooperation with world-famous companies, making P-DUKE an important role in the global market.

Global Logistic, Local Management

We expand our own brand, P-DUKE through various marketing channels to construct a worldwide network. Apart from stabilizing the existing markets, P-DUKE operates strategy management on Niche markets by changing from distribution to local direct selling. With the faith we hold, "Global Logistic, Local Management", we'll keep pushing new innovations toward power modules and therefore creating a full range of product line.



P-DUKE has been respecting and emphasizing the importance of Intellectual Property Rights. We have obtained multinational patents so far. To all the advanced companies in this industry, do not violate our Intellectual Property. Once any enterprises or individuals are found guilty of the infringement of intellectual property rights may be subject to investigate. P-DUKE has the right to protect our customers and be responsible for shareholders' equity.

P-DUKE's patents include the following: US 7,894,214 B1, US 8,817,495 B2, Nr. 20 2010 006 407.4, ZL 2011 2 C088132.5 ...

Power the World, the Innovator of Power Solutions

P-DUKE devotes a lot of efforts in nurturing research staffs. We introduce latest technology skills along with the research instrument and CAD to our factory, making our researches to reach the world-class level.

We've acquired ISO 9001 Quality Management System certification, and safety approval of UL and CE. Our products own many design and manufacturing process patents, and our medical product even won the Innovation Award of TAITRONICS in 2014 and 2015.

P-DUKE has an excellent R & D team. In addition to develop products of high power density and green concept, we also put efforts on researches and developments for multiple kinds of products in order to enhance the completeness of the product specification.



In this challenging environment of railway. We provide power solutions from 8 to 300 Watts of DC/DC converters. They are designed for railway applications and the non-controllable environment. Including unstable input voltage, variable ambient temperature, vibration, mechanical shock and input surge voltage. EN50155 is the basic requirement for railway application but must be approved.

P-DUKE Power has engaged in developing DC/DC converters for over 25-year, with abundant experience and of knowledge in railway, we can provide the best solution for our customers. It is important to choose an appropriate part for railway application. These modules need to be high reliability and longevity in order to make sure the passengers are safe. P-DUKE's power solutions have been approved by public transportation in worldwide.

Our Strength -

High
Reliability

Over
25-Year
Manufacturing Experience

High
Efficiency

Customized
Products

Well
Service

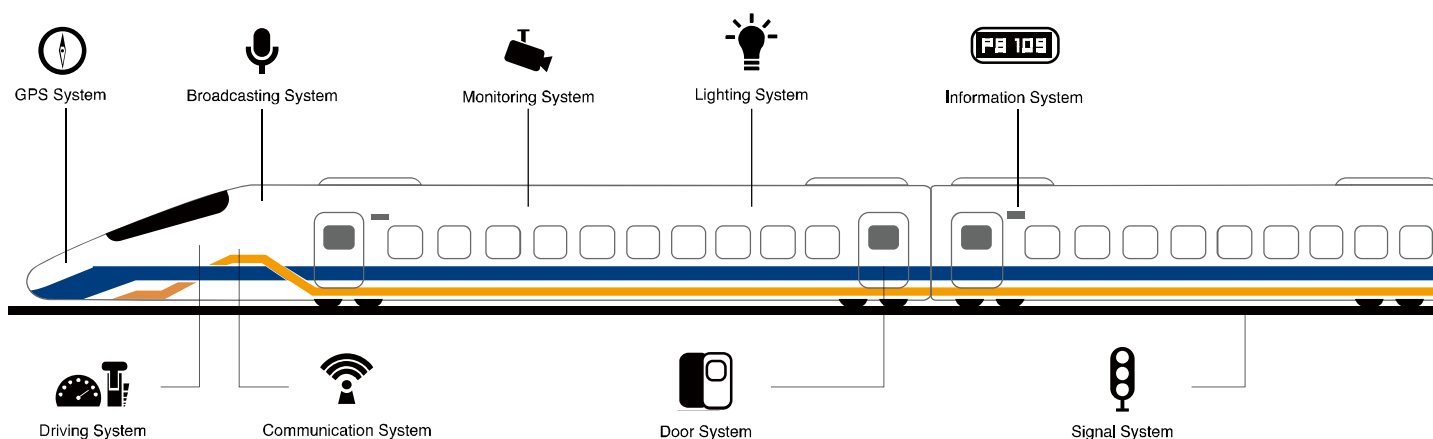


Applications

P-DUKE's railway applications DC/DC converters all have been approved by the following safety and standards.

IEC/ UL/ EN 60950-1
IEC/ UL/ EN 62368-1
EN 50155
EN 45545-2

Information Technology Equipment Safety
Audio/Video, Information Technology and Communication Technology Equipment
Electronic Equipment Used on Rolling Stock
Fire Testing to Railway Components



P-DUKE sells our products via authorized distributors worldwide. We have many successful railway projects in France, China, Spain, Italy, India and Taiwan.

Serving customers is always the first thing to us. We are rich in the experience and knowledge on all kinds of applications of rolling stock. We cooperate with customers, offer the technology and service as we can to help customers run the project smoothly.

Requirements of EN50155

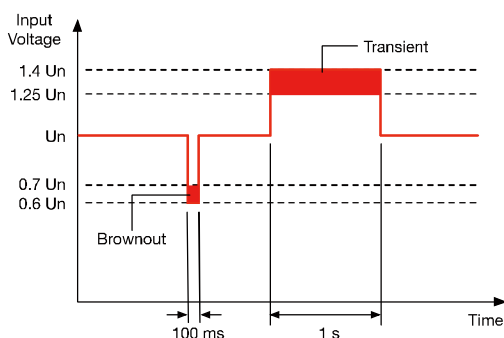
Ambient Temperature

According to the table shown as below required by EN50155, the power module needs to be designed to meet the requirements of surrounding environment and make sure temperature of the power module under the maximum rating.

Class	Column 1 Ambient temperature outside vehicle °C	Column 2 Internal cubicle temperature °C	Column 3 Internal cubicle overtemperature during 10 min °C	Column 4 Air temperature surrounding the printed board assembly °C
T1	-25 +40	-25 +55	+15	-25 +70
T2	-40 +35	-40 +55	+15	-40 +70
T3	-25 +45	-25 +70	+15	-25 +85
TX	-40 +50	-40 +70	+15	-40 +85

Variable Input Voltage

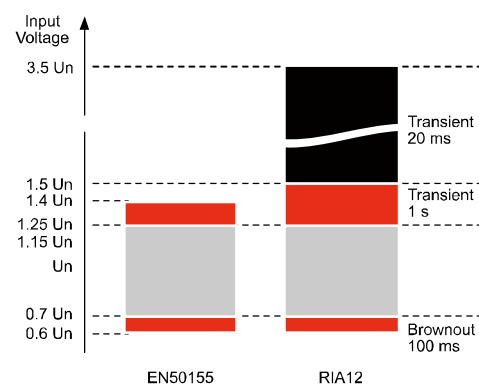
There are several battery systems in railway application. Those are 24, 36, 48, 72, 96, 110VDC. But the input voltage is not stable when the system is operating. It needs to cover 0.6Un brownout and 1.4Un transient. A power module is better to be designed to cover the input range from 0.6Un to 1.4Un.



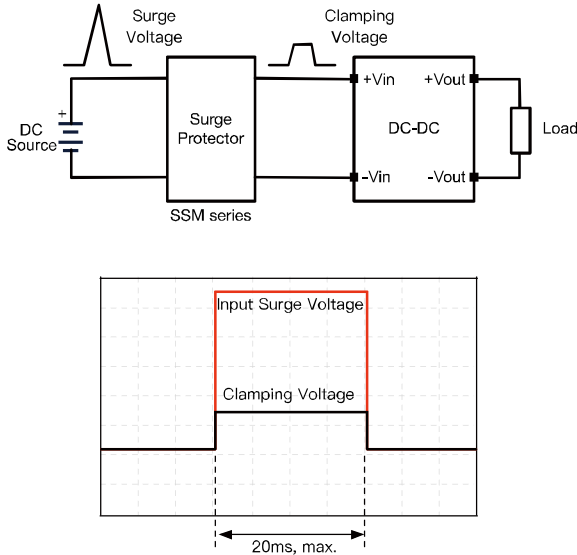
Part No.	Input Range	Battery System Un	Brownout 0.6xUn	Transient 1.4xUn
___-24xxxW	9-36V	24V	14.4V	33.6V
___-48xxxW	18-75V	36V	21.6V	50.4V
___-48xxxW	18-75V	48V	28.8V	67.2V
___-110xxxW	43-160V	72V	43.2V	100.8V
___-110xxxW	43-160V	96V	57.6V	134.4V
___-110xxxW	43-160V	110V	66V	154V
___-72xxxU	14-160V	24, 36, 48, 72, 96, 110V	14.4V	154V

Difference Between EN50155 and RIA12

RIA 12 requires higher input surge voltage than EN50155. It's hard to reduce such high input surge by capacitors, TVS or varistors. P-DUKE can provide surge clamping modules for RIA 12 requirement to clamp input surge voltage in order to protect the power module from damage by 3.5Un input voltage.



Requirements of EN50155



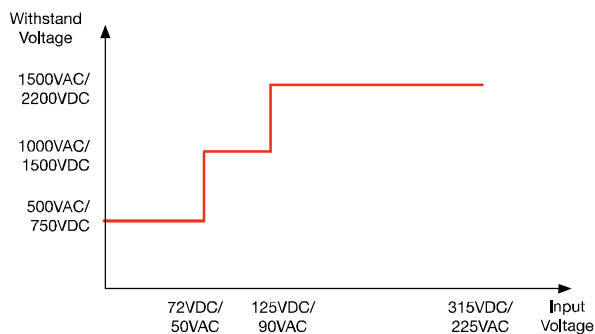
Our surge protector module offers a voltage clamping function to clamp input voltage to a safe value and make the power module keep operating normally.

Isolation Voltage

According to EN50155, there is a basic requirement for isolation voltage between input and output.

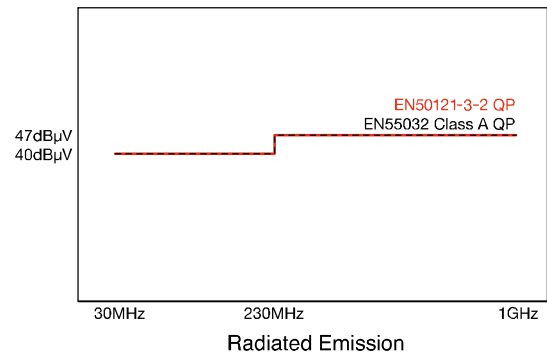
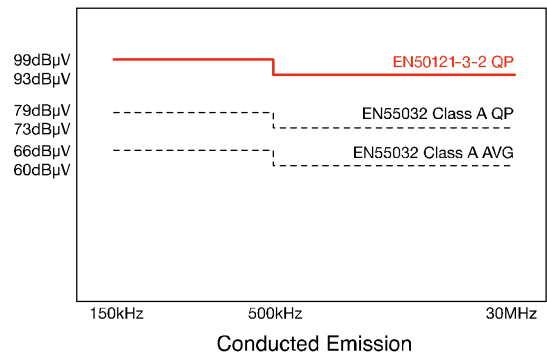
$U_n < 72$: 500VAC
 $72\text{VDC} \leq U_n < 125\text{VDC}$: 1000VAC
 $125\text{VDC} \leq U_n < 315\text{VDC}$: 1500VAC

where U_n is Battery system



EMC

Here shows the limit lines of conducted and radiated emission. All of our products can meet EN55032 Class A with or without external components. P-DUKE can offer you a detail EMI solution on each product. We also have the ability on solving variety issues in all kinds of applications.



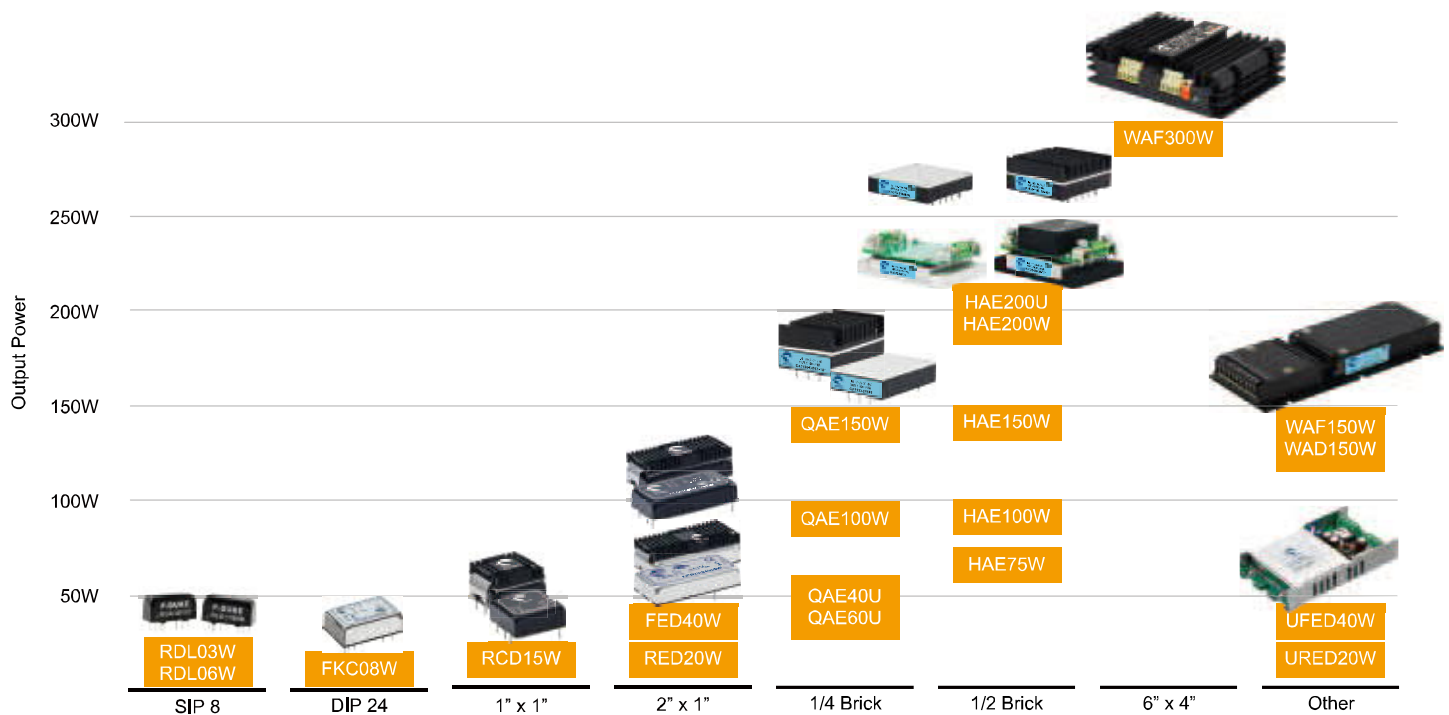
Performance criteria requirements of EMS test.

Parameter	Basic Standard	Conditions	Performance criteria
ESD	EN61000-4-2	Air: $\pm 8\text{kV}$ Contact: $\pm 6\text{kV}$	B
Radiated Immunity	EN61000-4-3	20V/m	A
Fast Transient	EN61000-4-4	$\pm 2\text{kV}$	A
Surge	EN61000-4-5	Line-Gnd: $\pm 2\text{kV}$ Line-Line: $\pm 1\text{kV}$	B
Conducted Immunity	EN61000-4-6	10V/m	A

Railway Product Line

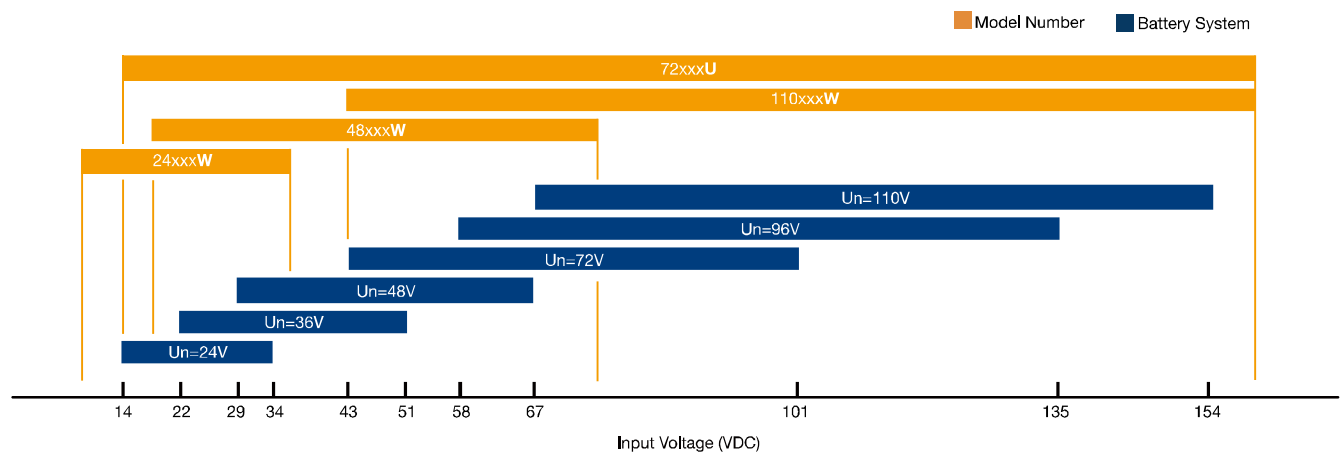
DC/DC Converters for Railway Application

P-DUKE provides 3-300W DC/DC, and many different kinds of package to meet different space and installation requirement in railway application product line.



Model Selection for Specified Un

From the graph under, we can find different product part numbers to go with different Un system. For example, 4 xxxW can cover Un=36V&48V. The last letter W means 4:1 input voltage range, U means over 8:1 input voltage range. Also we can use a single DC/DC converter to cover all Un system. For example, input voltage range of QAE60U is up to 12:1. Part number is QAE60-72SxxU.



Railway Product Line



SSM-110P50-001

20 Watts | Surge Suppression Module

- Input Voltage : 43-160 VDC
- Transient Voltage : 385 VDC, 20 ms, max.
- Meet RIA12 Surge Susceptibility NF F 01-510
- Through Hole Type
- DIP 24 Type



SSM-110004-001 | SSM-110008-001

150-300 Watts | Surge Suppression Module

- Input Voltage : 43-160 VDC
- Transient Voltage : 385 VDC, 20 ms, max.
- Meet RIA12 Surge Susceptibility NF F 01-510
- Through Hole Type
- Standard 1.6"x1" Package



RDLxxW series

3 Watts to 6 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 9, 12, 15, 24, ± 5 , ± 12 , ± 15 VDC
- Up To 3000VDC Isolation Voltage
- Through Hole Type
- Standard SIP 8 Package



FKC08W series

8 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, ± 5 , ± 12 , ± 15 VDC
- 1600VDC Isolation Voltage
- SMD and DIP 24 Type



RCD15W series

15 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 36-160 VDC
- Output Voltage : 3.3, 5, 12, 15, 24, ± 5 , ± 12 , ± 15 , ± 24 VDC
- Built-in EN55032 EMI Class A Filter
- Up To 3000VDC Isolation Voltage
- Allow Operating Under -55°C Ultra Low Ambient Temp.
- Through Hole Type
- Standard 1" x 1" Package

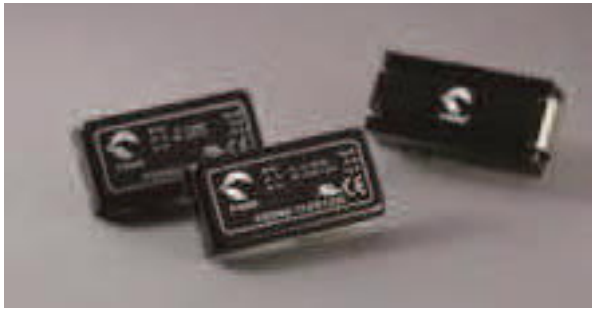


RED20W series

20 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, ± 12 , ± 15 VDC
- Built-in EN55032 EMI Filter
- Up To 2250VDC Isolation Voltage
- Allow Operating Under -55°C Ultra Low Ambient Temp.
- Through Hole Type
- Standard 2" x 1" Package

Railway Product Line



FED40W series

40 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, 24, ± 12 , ± 15 , ± 24 VDC
- Up To 3000VDC Isolation Voltage
- Allow Operating Under -55°C Ultra Low Ambient Temp.
- Through Hole Type
- Standard 2" x 1" Package



URED20W series

20 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, ± 12 , ± 15 VDC
- Built-in EN55032 EMI Class B Filter
- Built-in Inrush Current Limit Circuit
- Fuse Installed
- Up To 2250VDC Isolation Voltage
- Wall Mount and Din-rail Type



UFED40W series

40 Watts | DC-DC

- 4:1 Input Voltage : 9.5-36, 18-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, 24, ± 12 , ± 15 , ± 24 VDC
- Built-in EN55032 EMI Class B Filter
- Built-in Inrush Current Limit Circuit
- Fuse Installed
- Up To 3000VDC Isolation Voltage
- Wall Mount and Din-rail Type



QAE100 / 150W series

82 Watts to 132 Watts | DC-DC

- 4:1 Input Voltage : 8.5-36, 16.5-75, 40-160 VDC
- Output Voltage : 3.3, 5, 12, 15, 24, 30, 48 VDC
- Up To 3000VAC Isolation Voltage
- Through Hole Type
- Standard 1/4 Brick Package



HAE75 / 100 / 150 / 200W series

75 Watts to 240 Watts | DC-DC

- 4:1 Input Voltage : 8.5-36, 16.5-75, 43-160 VDC
- Output Voltage : 3.3, 5, 12, 15, 24, 28, 48 VDC
- Built-in EMI EN55032 Class A Filter with Wall Mount Type
- Up To 3000VAC Isolation Voltage
- Through Hole and Wall Mount Type
- Standard 1/2 Brick Package



QAE40 / 60U series

40 Watts to 60 Watts | DC-DC

- 12:1 Input Voltage : 9-75, 14-160 VDC
- Output Voltage : 5, 12, 15, 24, 28, 48, 53 VDC
- Up To 3000VAC Isolation Voltage
- Through Hole Type
- Standard 1/4 Brick Package

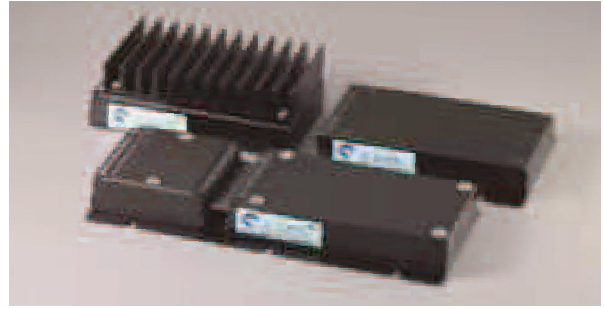
Railway Product Line



HAE200U series

200 Watts | DC-DC

- 10:1 Input Voltage : 16-160 VDC
- Output Voltage : 5, 12, 15, 24, 28, 48, 53 VDC
- Up To 3000VAC Isolation Voltage
- Through Hole and Wall Mount Type
- Standard 1/2 Brick Package



WAD150W / WAF150W series

150 Watts | DC-DC

- 4:1 Input Voltage : 9-36, 18-75, 43-160 VDC
- Output Voltage : 12, 15, 24, 28, 48 VDC
- Built-in EMI EN55032 Class A Filter
- Up To 2250VDC Isolation Voltage
- Reverse Polarity Protection
- Wall Mount Type



WAF300W series

300 Watts | DC-DC

- 4:1 Input Voltage : 18-75, 43-160 VDC
- Output Voltage : 12, 15, 24, 28, 48 VDC
- Built-in EMI EN55032 Class A Filter
- Up To 3000VAC Isolation Voltage
- Current Share Function
- Wall Mount and Din-rail Type



World Headquarters



P-DUKE Technology Co., Ltd.
NO.36, 22nd Rd., Taichung Industrial Park, Taichung,
40850, Taiwan, R.O.C
TEL:+886-4-2359-0668
FAX:+886-4-2359-1337
E-MAIL:sale@pduke.com
WEB:www.pduke.com

U.S.A Branch



P-DUKE Technology, Inc.
717 Brea Canyon Road, Suite#1 Walnut, CA 91789
TEL:+1-909-5985000
FAX:+1-909-5985705
E-MAIL:sale-usa@pduke.com
WEB:us.pduke.com

Please Contact Local Distributor