

# MRZI100

## Series





# POWER FOR A BETTER FUTURE

PRODUCT BROCHURE SERIES  
MRZI100



FOR MORE INFO, PLEASE GO TO [www.minimaxpower.com](http://www.minimaxpower.com)



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Railway Certificated  
100Watt DC-DC Converter

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# RAILWAY

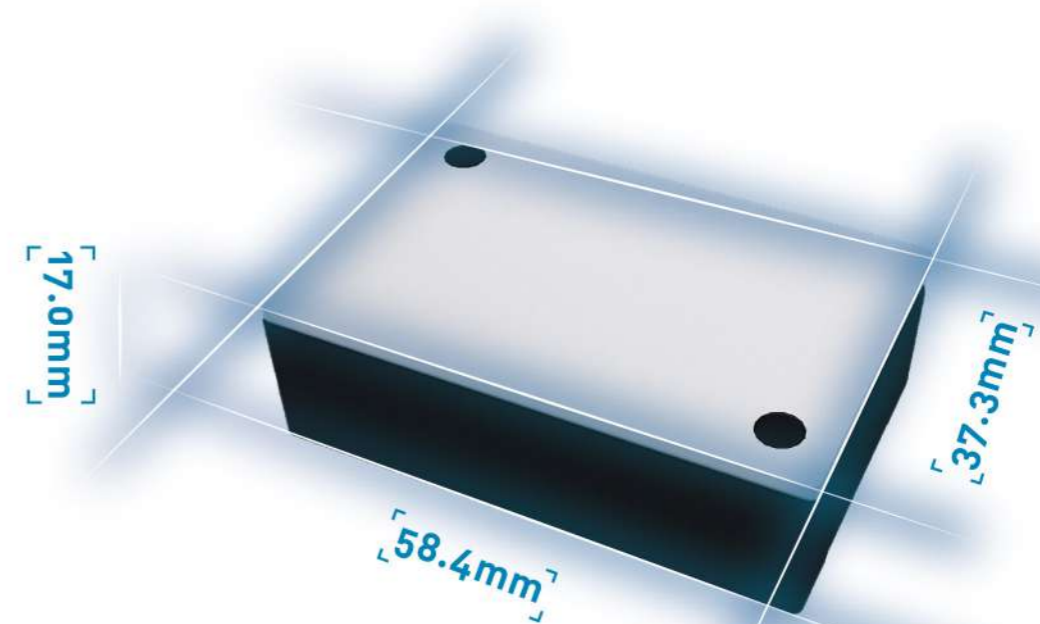
## SUCCESSFUL APPLICATION

- ⊗ Train Air Conditioner
- ⊗ Motor And Train Contoller Braking System
- ⊗ Traction Inverter Relay Protection System
- ⊗ Power Management System
- ⊗ Backup Power System
- ⊗ Passenger Information System
- ⊗ Traffic Light System
- ⊗ Train Door Control System
- ⊗ Cabinet Cooling System Of Railway Industry
- ⊗ Fire Detection System
- ⊗ Passenger Information System
- ⊗ Safety Monitoring System / Drowsiness Detection System
- ⊗ Remote Monitoring System
- ⊗ Traction Inverter
- ⊗ Brake Control System
- ⊗ Automatic Train Protection (ATP)
- ⊗ Turnout Monitoring System



# INTRODUCTION

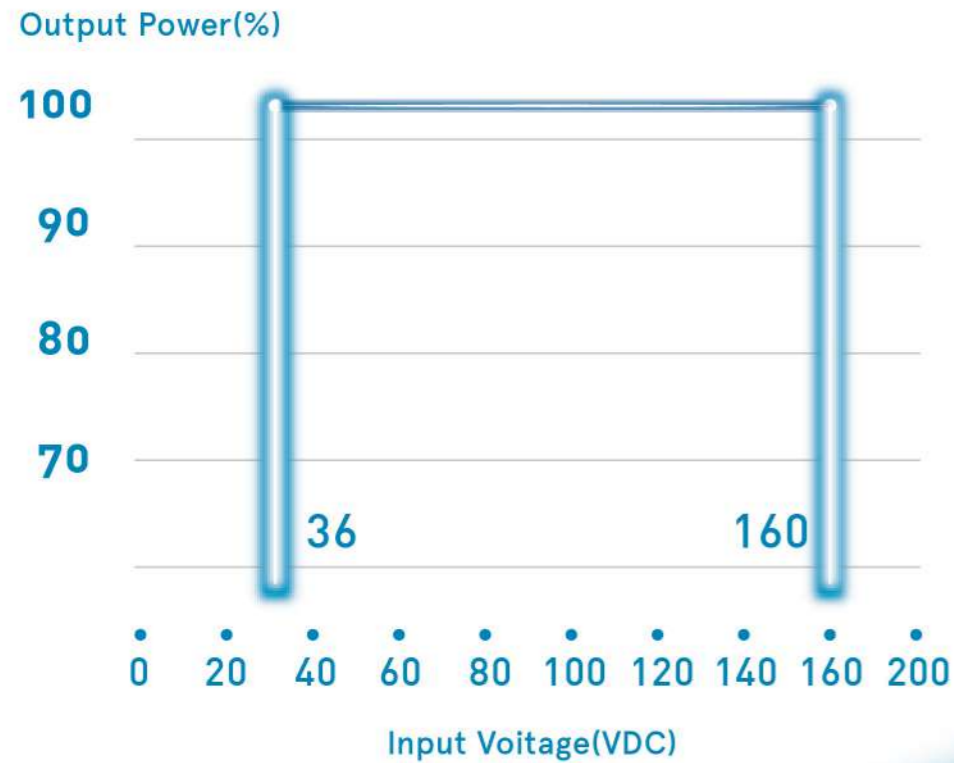
## New Compact Railway Certificated 100 Watt Power Modules



Optimized electric and power loss performance and overall thermal design. High durability and roughness solutions for relevant applications with limited space, strict EMC, and environmental stress demands.

## INPUT VOLTAGE RANGE

Ultra-wide 36-160VDC Input Voltage Range



- Provide wide input voltage range between 36 and 160VDC, to meet different railway DC bus usage requirements.
- The 36VDC voltage is suitable for low voltage start-up demand.
- Can support full output power cover whole input voltage range.

## OUTPUT VOLTAGE

Power Your System Precisely with Different Output Voltage Options

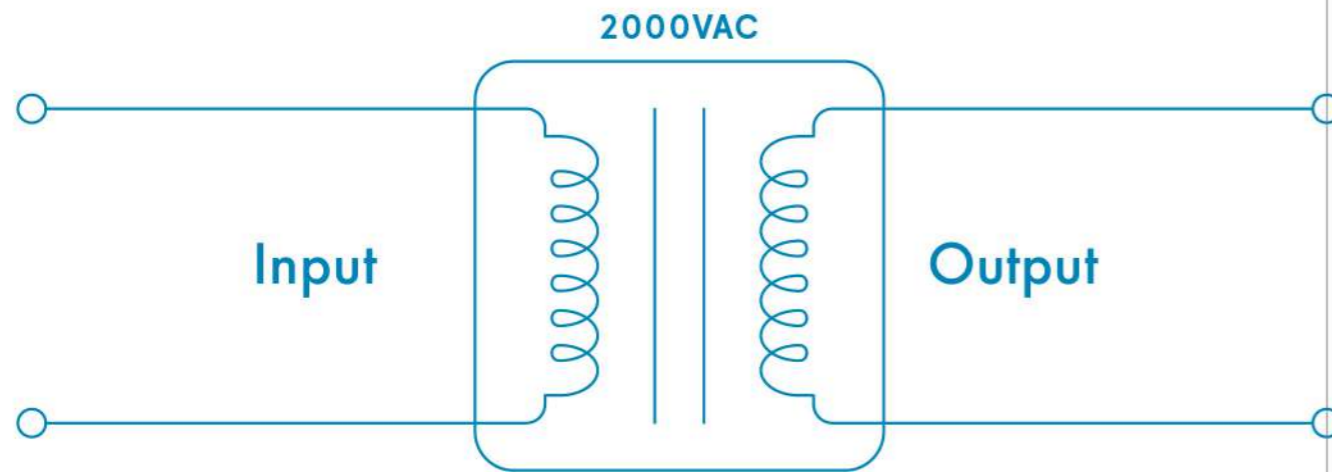
- High-precision output voltage of 5, 12, 15, 24, and 54VDC.
- The 54VDC output voltage is more suitable for the PoE applications
- Regulated Output Voltage = 5, 12, 15, 24, 54VDC
- Output Setting Accuracy = Max.  $\pm 1\%$
- Line Regulation = Max.  $\pm 0.2\%$
- Load Regulation = Max.  $\pm 0.3\%$
- Load Transient Regulation = Max.  $\pm 5\%$



## ISOLATION CAPACITY & INSULATION LEVEL

### Rugged Electrical Barrier for System Safety

Combined with the 2000VAC dielectric and Reinforced insulation system, the Rugged Electrical Barrier can not only avoid damage to the back-end system or injuries to personnel when lightning occurs, but also against the surge voltage impact between two barrier side.



#### Input to Output Isolation

→ Reinforced Insulation

#### Input to Case Isolation

→ 1500VAC

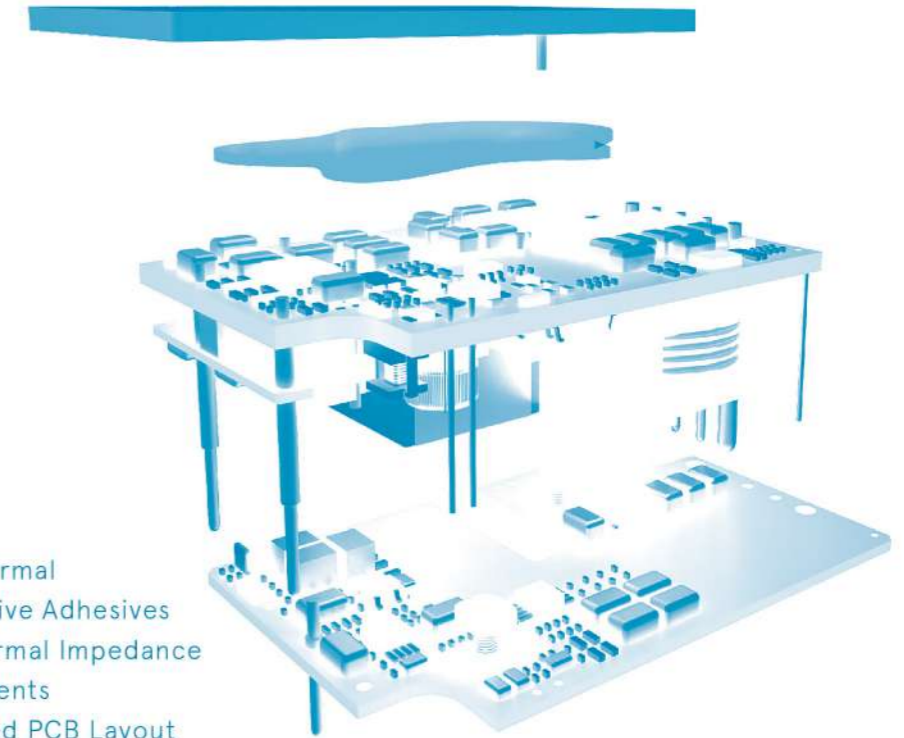
#### Input to Output Isolation

→ 2000VAC Isolation

#### Output to Case Isolation

→ 500VAC

- ⊙ High Thermal Conductive Adhesives
- ⊙ Low Thermal Impedance Components
- ⊙ Optimized PCB Layout



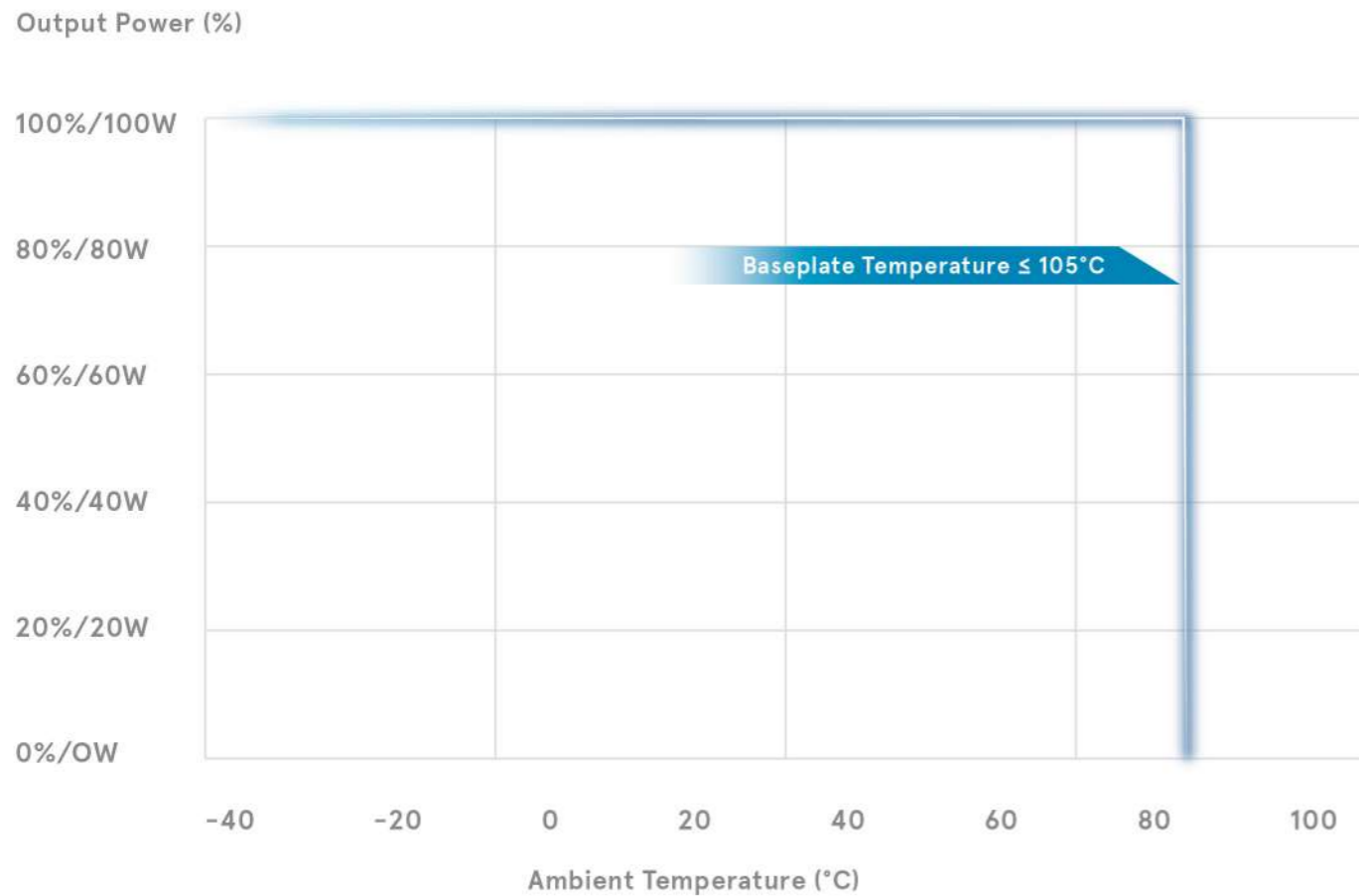
## THERMAL MANAGEMENT SYSTEM

### Improved Thermal Structure Design

Through optimized thermal structure design (such as the high thermal conductive adhesives, Low Thermal Impedance Components and optimized PCB layout) to ensure thermal performance and long-term reliability.

## OPERATING AMBIENT TEMPERATURE RANGE

Extended Operating Ambient Temp. Range

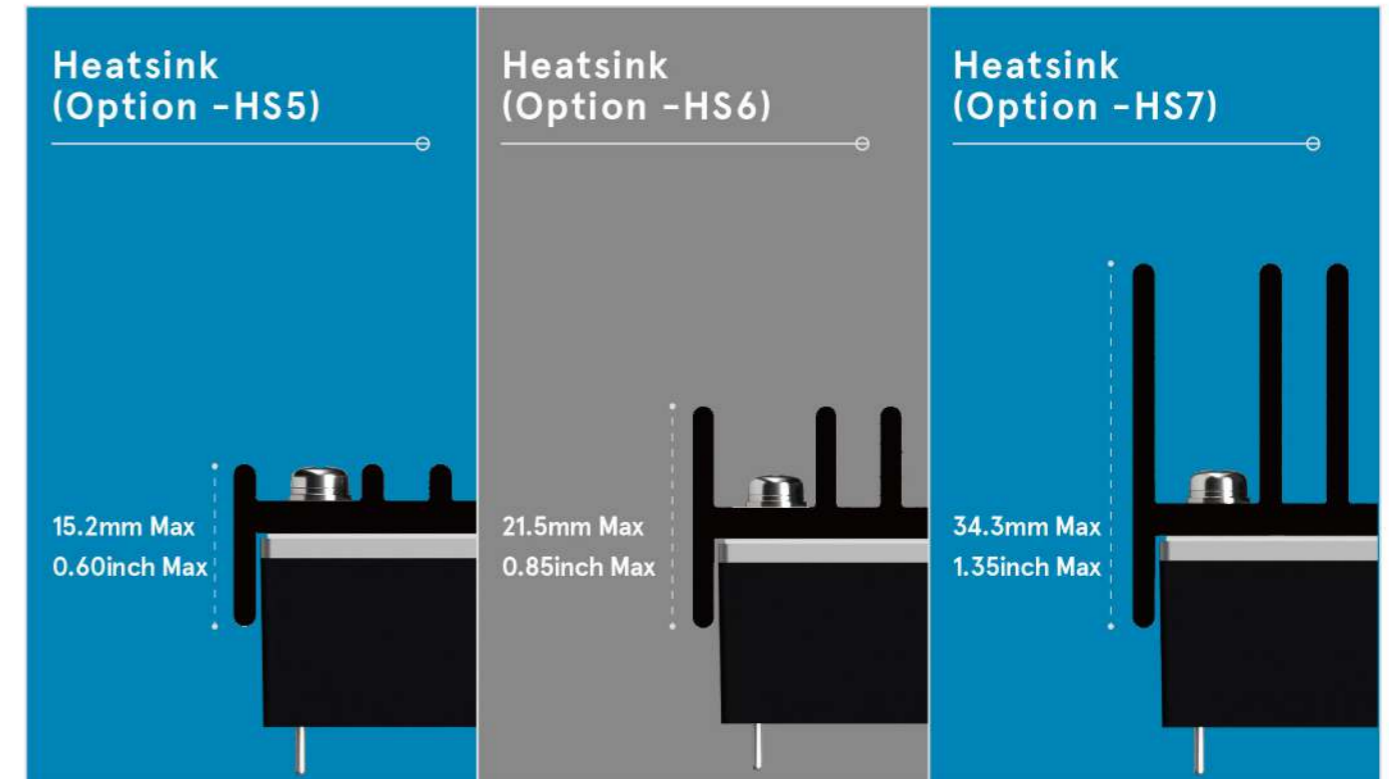


Through the optimization of the overall electrical and thermal structure design, the MRZI100 Series can support -40°C to +85°C temperature range to satisfy the stringent requirements of railway applications.

## HEATSINK OPTIONS

Multiple Heatsink for Harsh Ambient Temperature Demand

Heatsink Performance



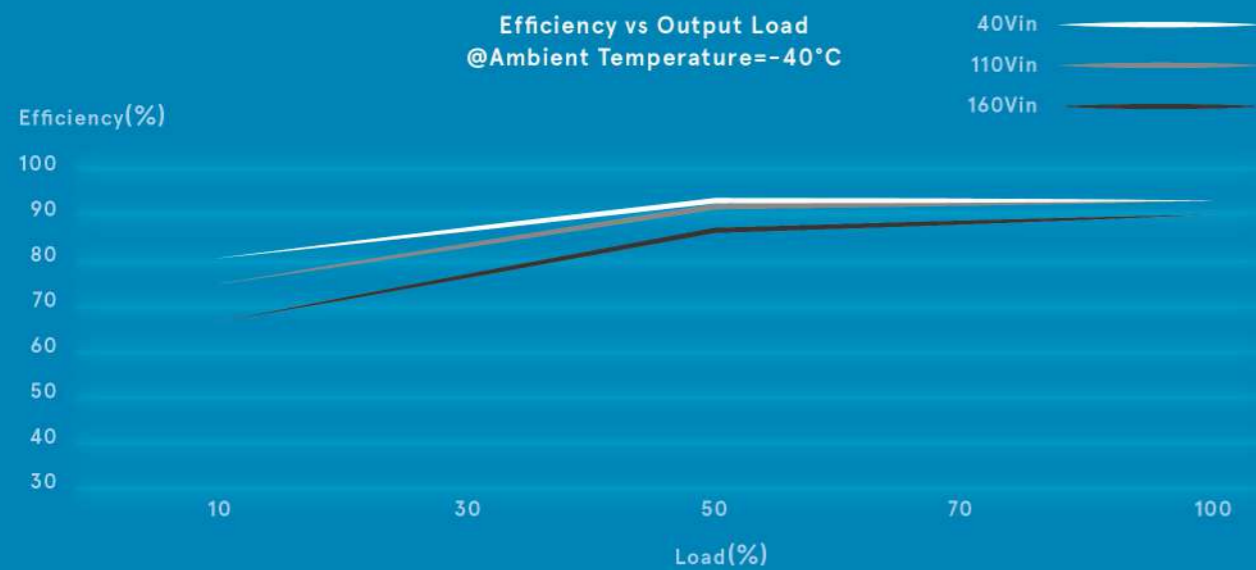
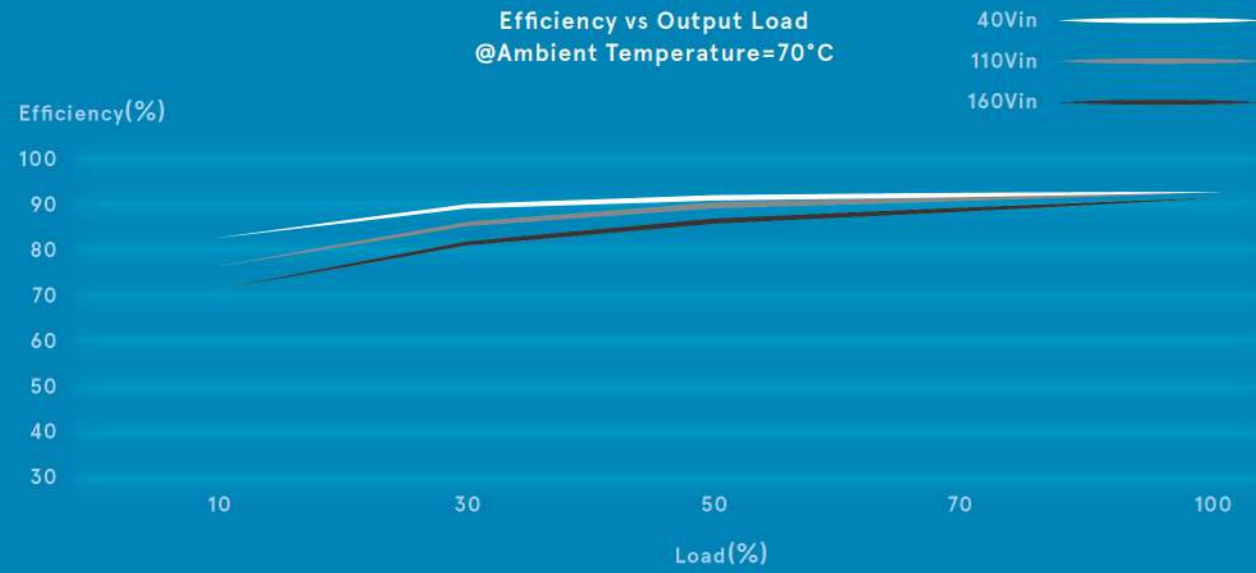
Provide three heatsink options with different heights to meet the usage occasion with different operating temperature ranges.



# EFFICIENCY CURVES

Excellent Efficiency Performance

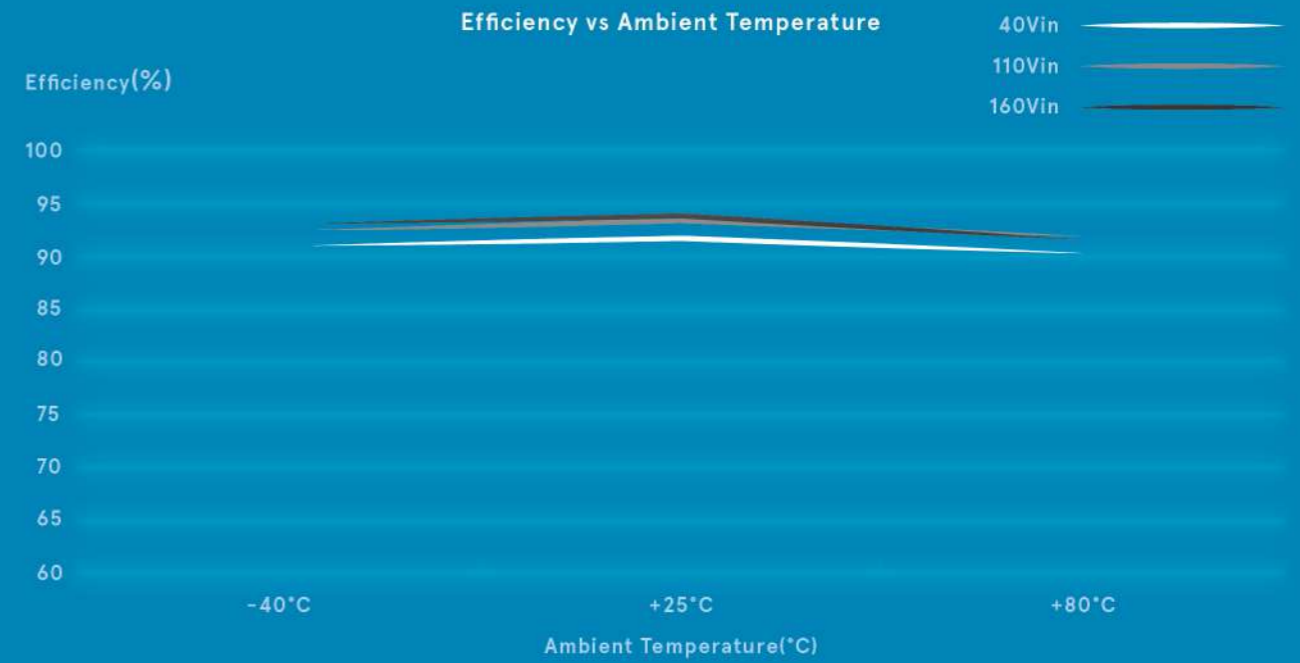
⊕ Even if the input voltage, output current, and ambient temperature change significantly, the overall efficiency, and heat dissipation have highly stable performance.



# EFFICIENCY CURVES

Excellent Efficiency Performance

⊕ Even if the input voltage, output current, and ambient temperature change significantly, the overall efficiency, and heat dissipation have highly stable performance.



HIGH EFFICIENCY ⊕

LOW DISSIPATION ⊕

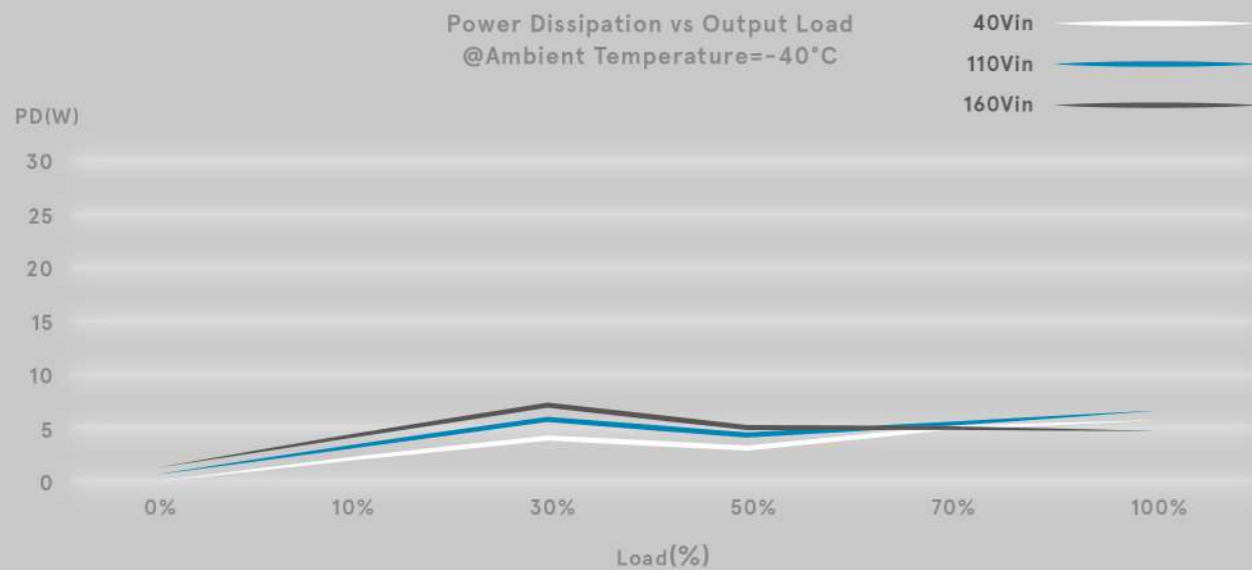
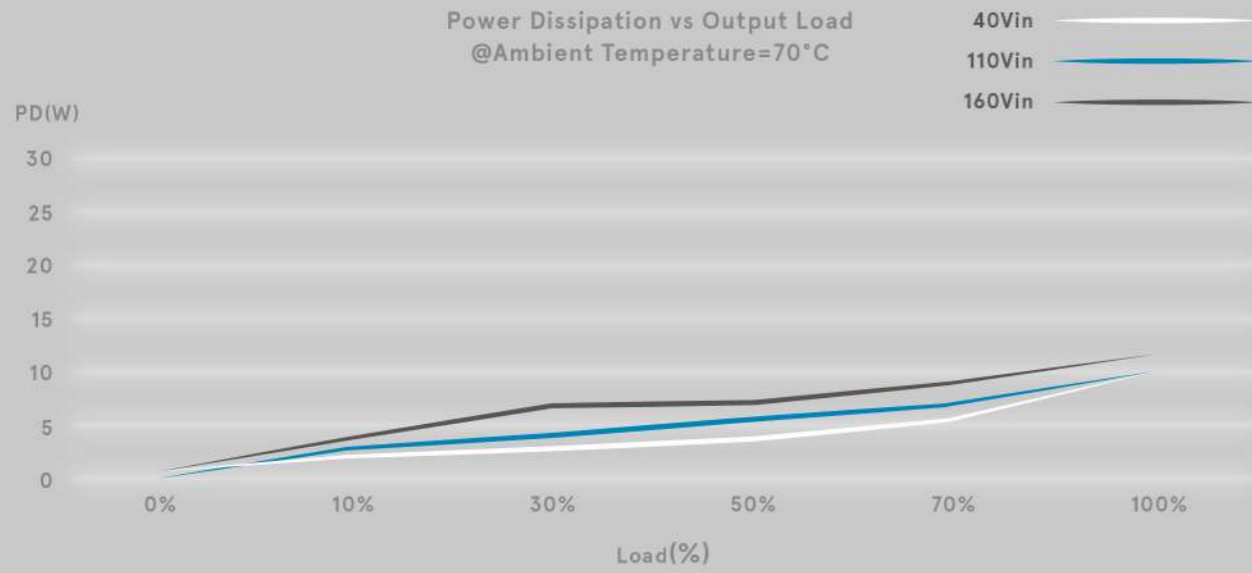
ENERGY SAVING ⊕



# POWER DISSIPATION CURVES

Optimized Power Dissipation Performance

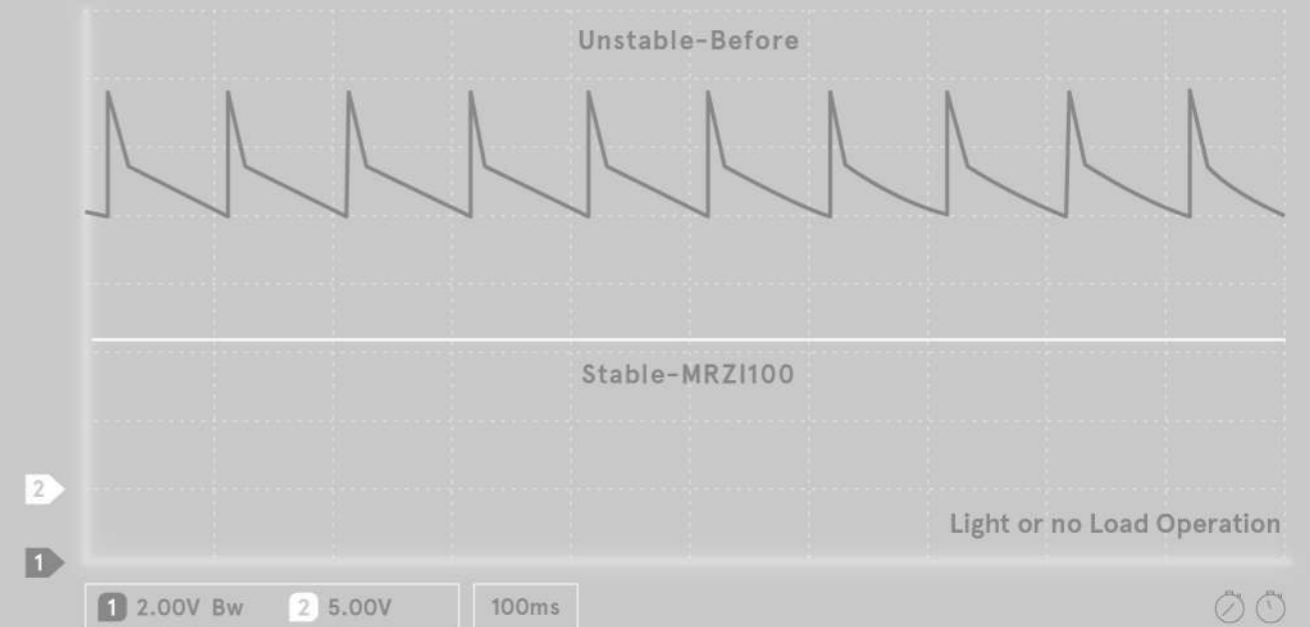
Keeping the power dissipation as low as possible even if the input voltage, output current, and ambient temperature change significantly to ensure highest efficiency and lowest heat dissipation.



# NO DUMMY LOAD DEMAND

No Min. Load /Dummy Load Requirement

The MRZI100 series can support no-load operations to avoid inactive power loss in and instable output voltage oscillation.



HIGH DURABILITY

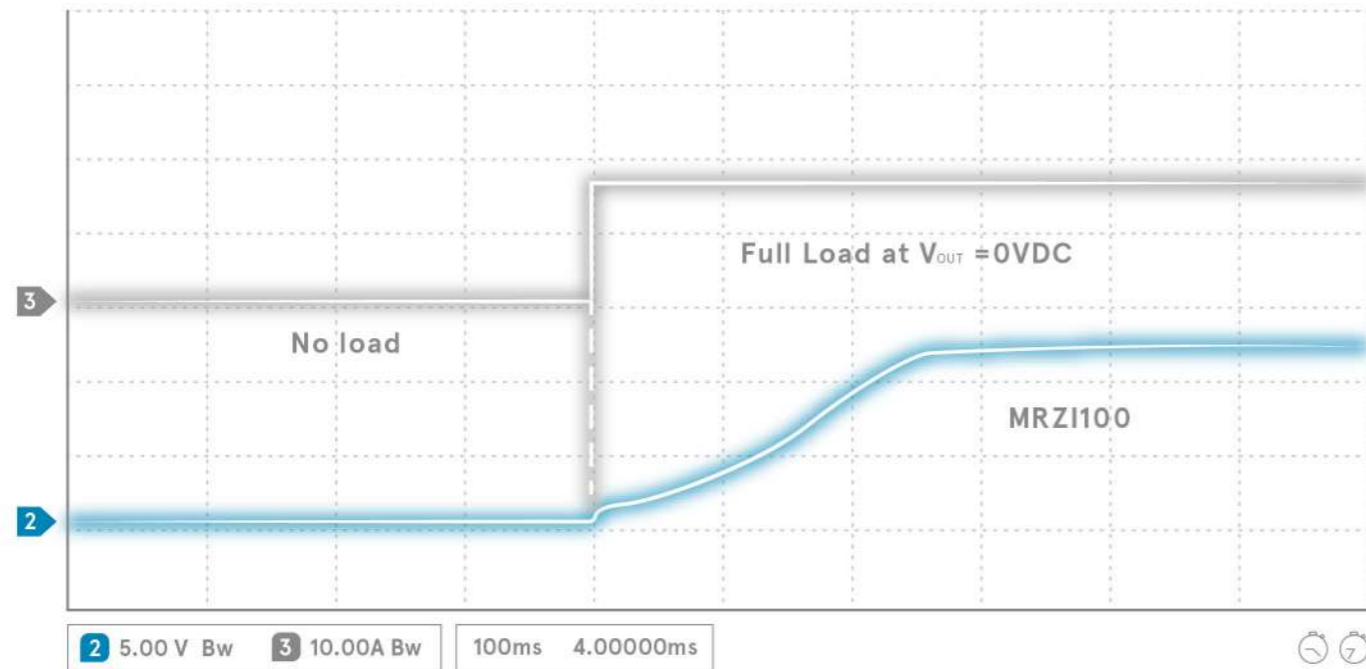
HIGH ROUGHNESS

HIGH RELIABILITY



## SUPERIOR LOAD DRIVING WITHOUT FAILURE

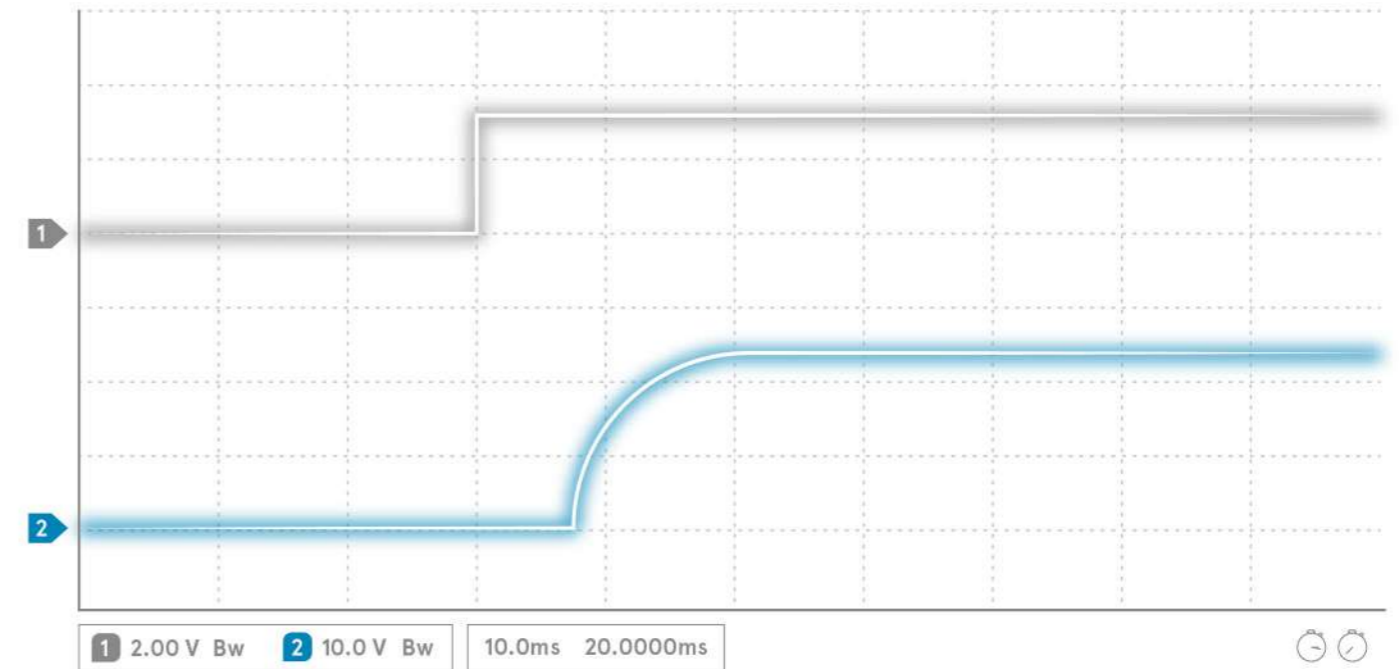
Superior Load Driving Capability



The MRZI100 series can support superior system load driving capability at very low or even zero voltage output without start-up failure for field applications needed.

## FAST START-UP TIME

Fast Start-Up Time 20ms without Overshoot

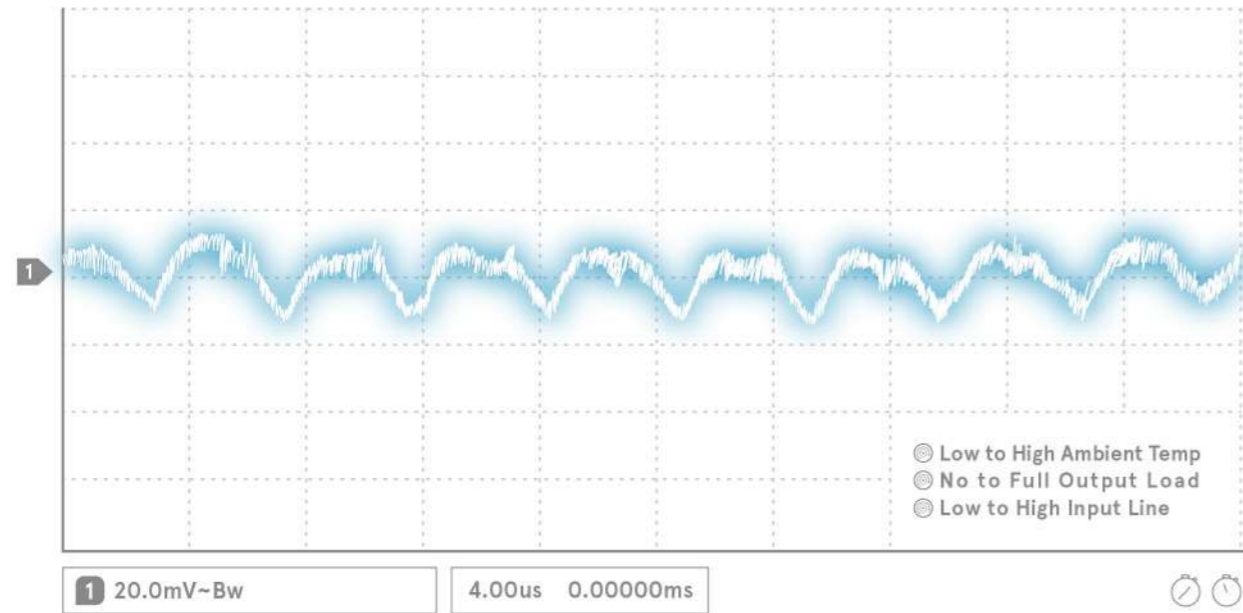


Fast start-up time without overshoot which help to avoid system load timing failure and ensure safety operation during start-up operation.



## RIPPLE & NOISE

Lower Ripple & Noise Interference








Through upgraded noise filtering technique, the ripple & noise of MRZI100 series keep low for whole outputload, input line and ambient temp. which help to reduce the peripheral components needed and noise interference.

## PROTECTION FUNCTION

Completed Abnormal Protection Function



- 
**UVP**  
 INPUT UNDER VOLTAGE PROTECTION
- 
**OCP**  
 OUTPUT OVER CURRENT PROTECTION
- 
**SCP**  
 OUTPUT SHORT CIRCUIT PROTECTION
- 
**OVP**  
 OUTPUT OVER VOLTAGE PROTECTION
- 
**OTP**  
 OVER TEMPERATURE PROTECTION

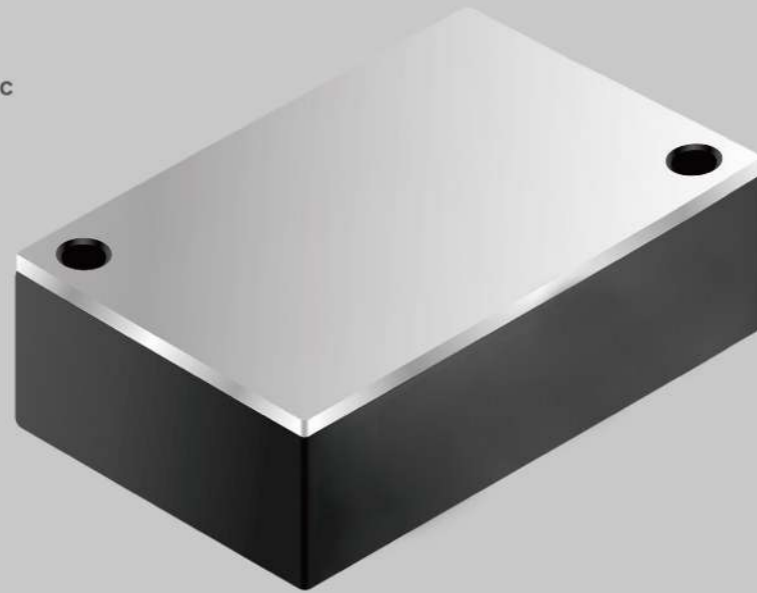
The MRZI100 series is equipped with five protection functions, including the input under voltage, output over current, output short-circuit, output overvoltage, and over temperature protection, which protect the power supply module and back-end system immediately after abnormal operations happened.



## EXTERNAL CONTROL

Flexible Control, Flexible Design

- ⊙ Positive and Negative Logic Remote ON/OFF
- ⊙ Output Voltage Trim
- ⊙ Output Voltage Sensing



The MRZ1100 series is also equipped with the positive/negative remote control, output voltage trim and sensing functions to provide design flexibility for customers.

## ENCAPSULATION BENEFIT

Fully Encapsulated for Blocking Interference



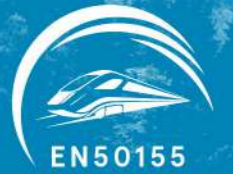
For the electromagnetic susceptibility and environmental physical stress interference which are provided with a comprehensive protection capabilities.



## WITHOUT LOCATION LIMITATION

Support 5,000 Meters Altitude Operation without Location Limitation.

5,000m  
altitude operation



Certifications comply with the railway standard EN 50155 (IEC 60571) and fire protection test EN 45545-2.

EN 50155  
EN 45545-2

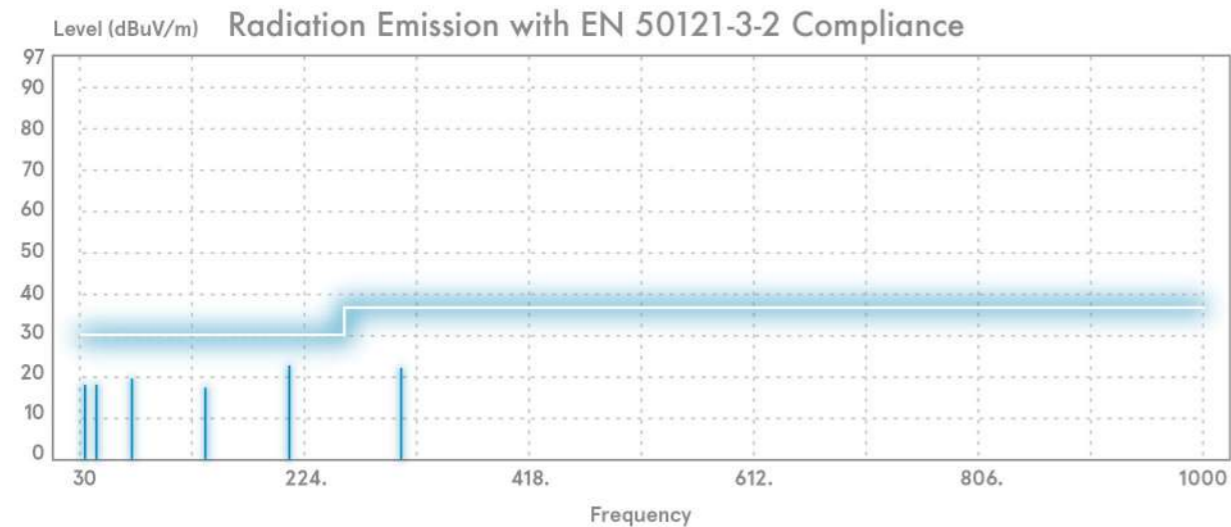
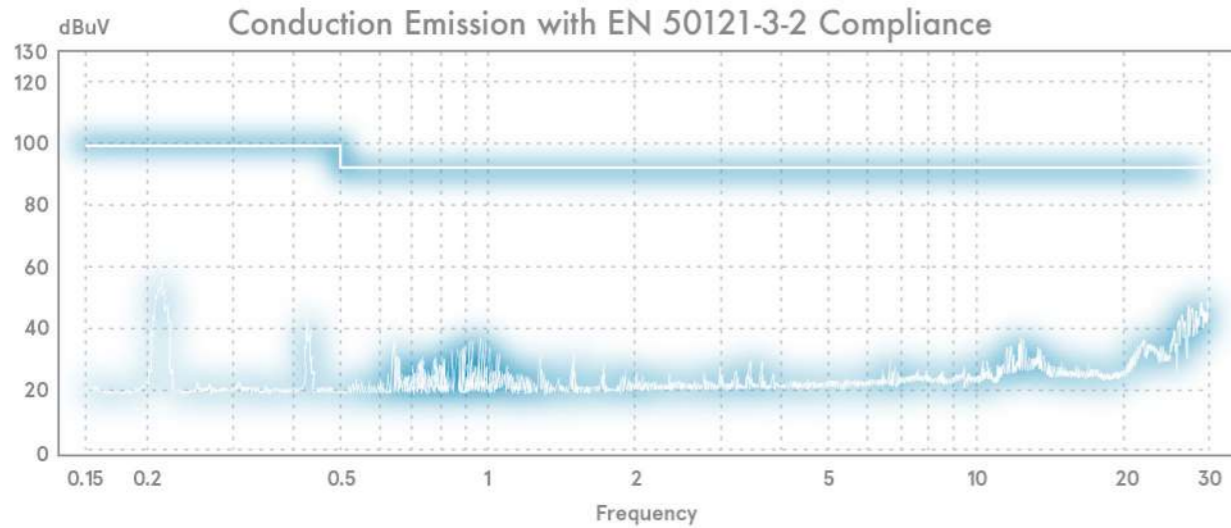
## RAILWAY CERTIFICATIONS

Railway Certification Approved for Your Long-term Reliability



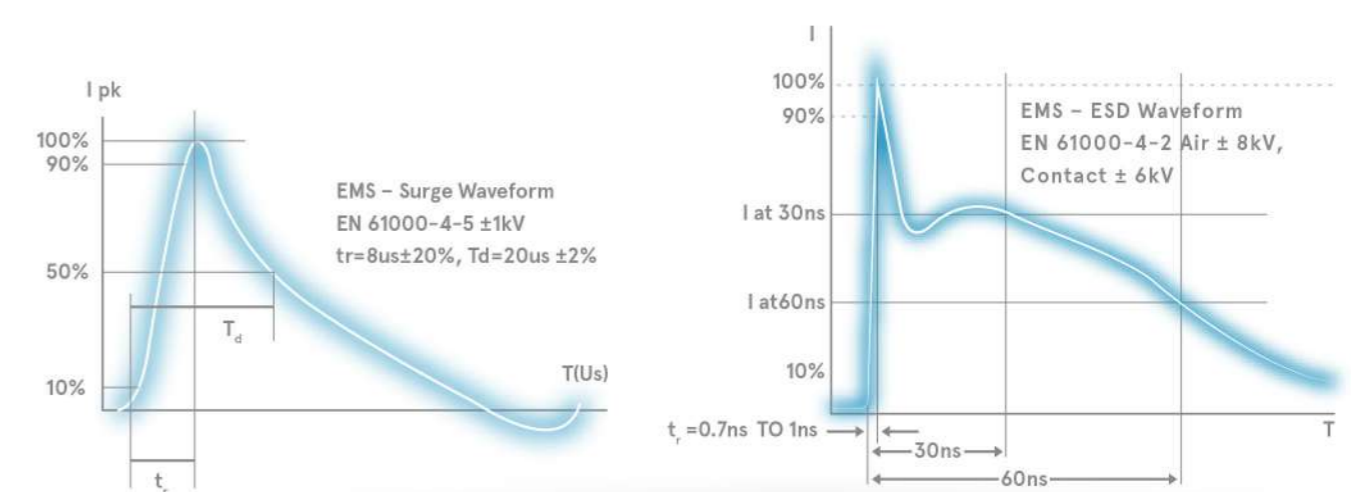
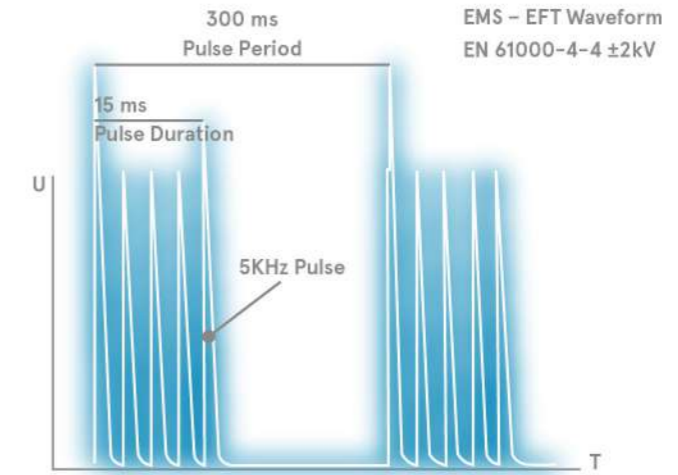
# RAILWAY EMC COMPLIANCE

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Comply with railway EMC Standards (EN 50121-3-2) with external EMC filter to solve system electromagnetism Issue.



# RAILWAY ENVIRONMENT STRESS TEST

Railway Certification Approved for Your Long-term Reliability

Low Temperature Start-up Test  
EN 50155 13.4.4/ EN 60068-2-1

Dry Heat Test  
EN 50155 13.4.5/ EN 60068-2-2

Low Temperature Storage Test  
EN 50155 13.4.6/ EN 60068-2-1

Cyclic Damp Heat Test  
EN 50155 13.4.7/ EN 60068-2-30



# RAILWAY MECHANICAL STRESS TEST

Railway Certification Approved for Your Long-term Reliability

Functional Random Vibration Test  
EN 50155 13.4.11/ EN 61373(EN 60068-2-6)

Increased Random Vibration Test  
EN 50155 13.4.11/ EN 61373(EN 60068-2-6)

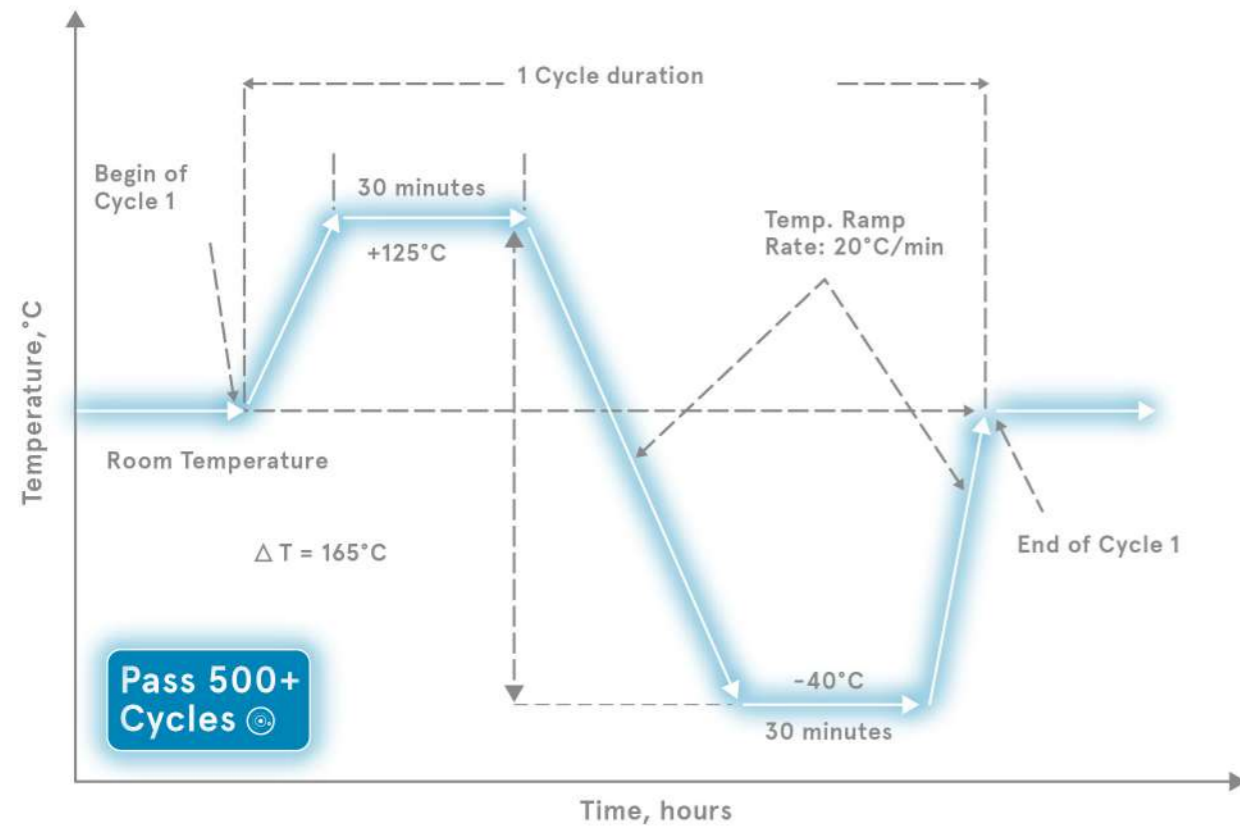
Shock Test  
EN 50155 13.4.11/ EN 61373(EN 60068-2-27)





# THERMAL CYCLING TEST

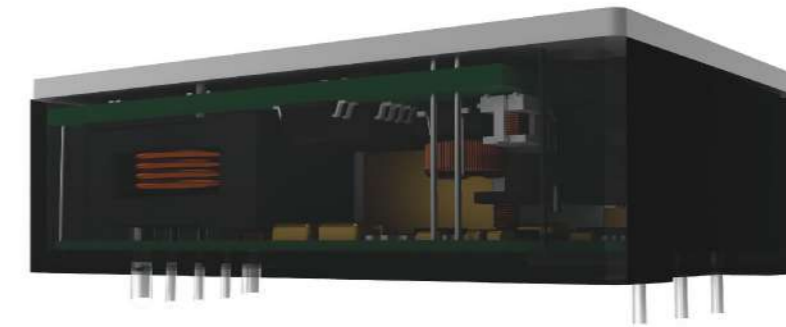
Railway Certification Approved for Your Long-term Reliability



- ⊙ Steady State Duration : 30min
- ⊙ Ramp Rate : 20°C/min
- ⊙ Number of Cycles : Pass 500+

# CERTIFICATIONS

Multiple Internal Certification Approved to Solve Your Problems



## RAILWAY CERTIFICATION PRODUCT LINE

Expands Railway- Certificated Product Family



Power  
(W)

[ 3 ]

[ 150 ]

[ 100 ]

This MRZ1100 & 150 series expands the MINMAX railway-certificated product family, and support the power range from 3Watt to 150Watt, which meets customer needs for One Stop Shopping.

**Railway Certified  
DC-DC Power Solutions**







