MINMAX®

MKZI40

Series

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POWER FOR A BETTER FUTURE

SERIES

PRODUCT BROCHURE MKZI40

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MKZ140
Series

Railway Certificated
40Watt DC-DC Converter

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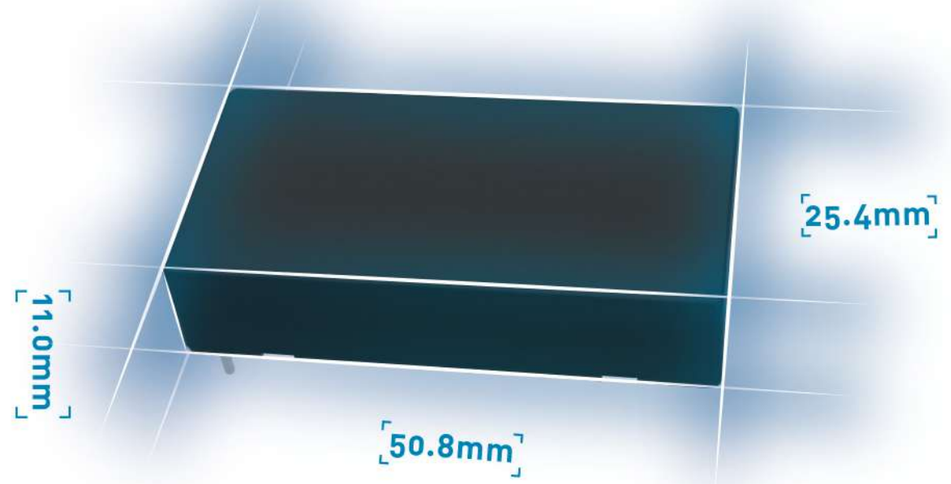
RAILWAY

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

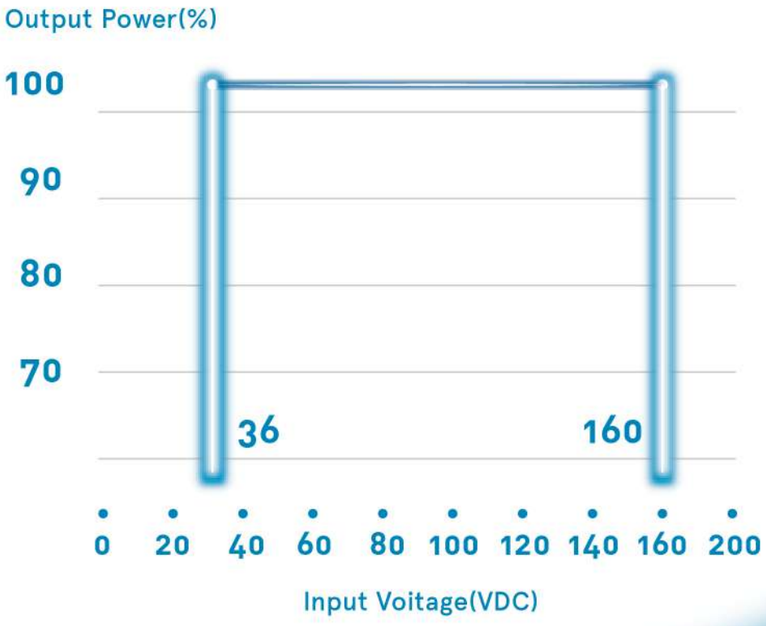
New Compact Railway Certificated 40Watt Power Modules



- 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.

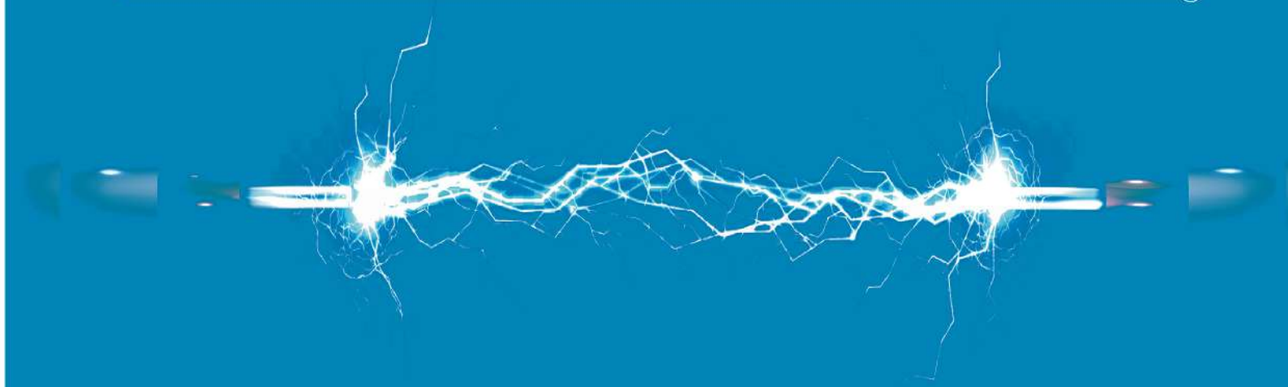
INPUT VOLTAGE RANGE

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



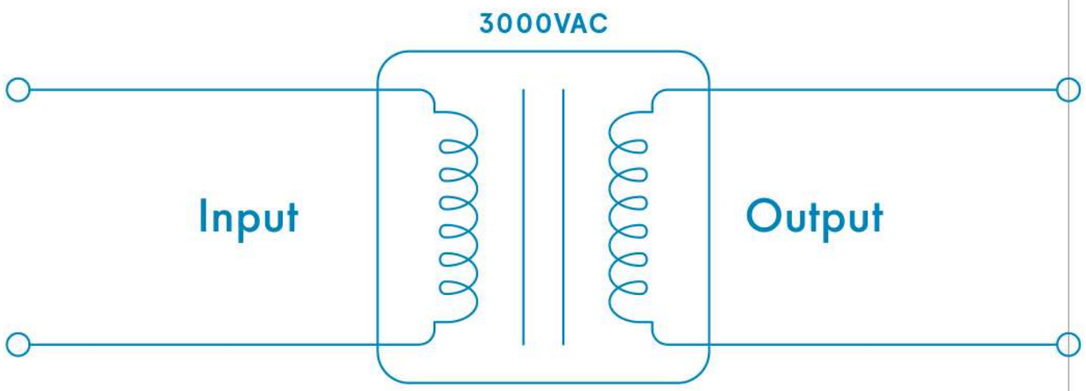
Power Your System Precisely
with Different Output Voltage Options

- High-precision Output Voltage Of 5, 12, 15, 24, 54, ±12 and ±15 VDC. The 54 VDC Output Voltage is More Suitable for the Poe Applications
- Regulated Output Voltage = 5, 12, 15, 24, 54, ±12, ±15 VDC
- Output Setting Accuracy = Max. ±1%
- Line Regulation = Max. ±0.2%
- Load Regulation = Max. ±0.5% @ Single Output
- Load Transient Regulation = Max. ±5%

ISOLATION CAPACITY & INSULATION LEVEL

Rugged Electrical Barrier for System Safety

Combined with the 3000VAC 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 Insulation → Reinforced Insulation	**Input to Case Isolation** → 1500VAC
Input to Output Isolation → 3000VAC Isolation	**Output to Case Isolation** → 1500VAC

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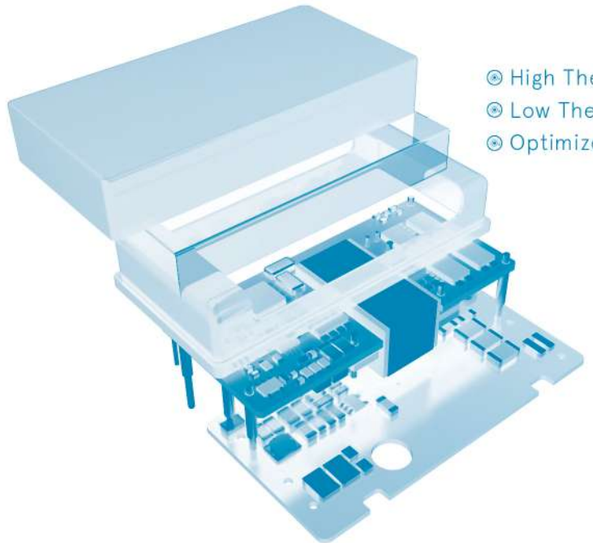


- High Thermal Conductive Adhesives
- Low Thermal Impedance Components
- Optimized PCB Layout

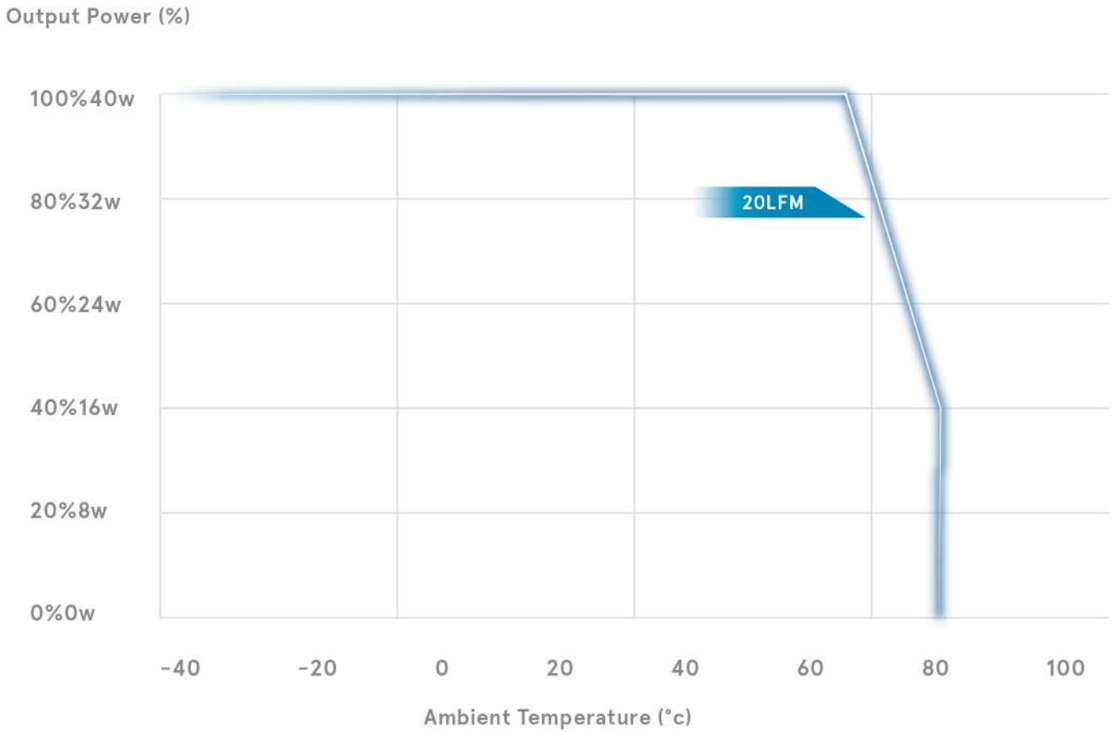
THERMAL MANAGEMENT SYSTEM

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 MKZI40 Series can support -40 ℃ to +80 ℃ temperature range to satisfy the stringent requirements of railway applications.

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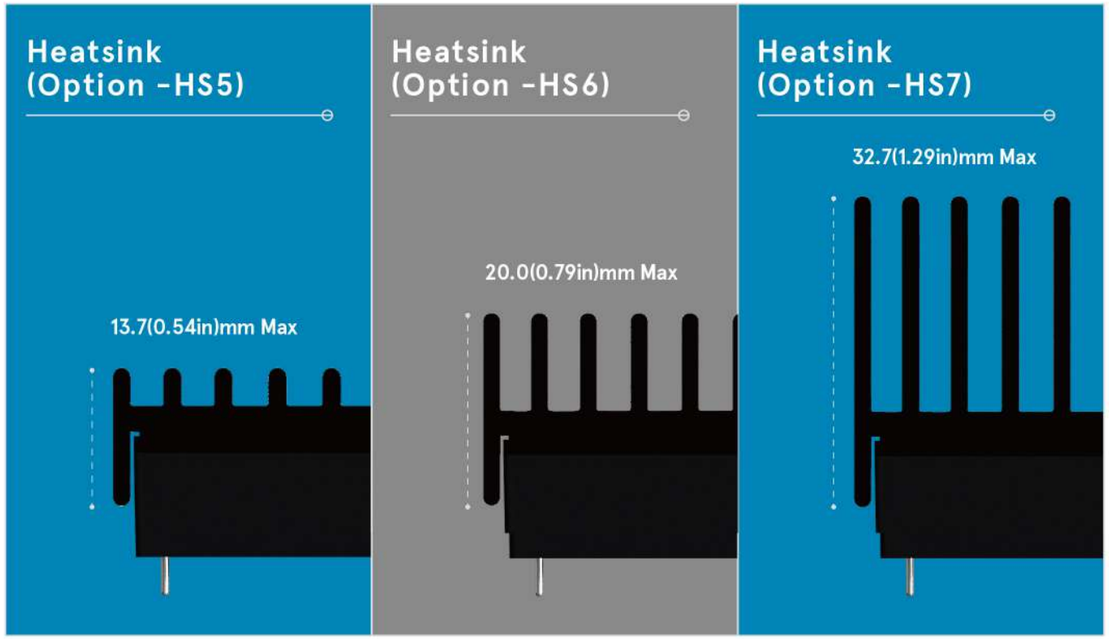
HEATSINK OPTIONS

Multiple Heatsink for Harsh Ambient Temperature Demand

Heatsink Performance

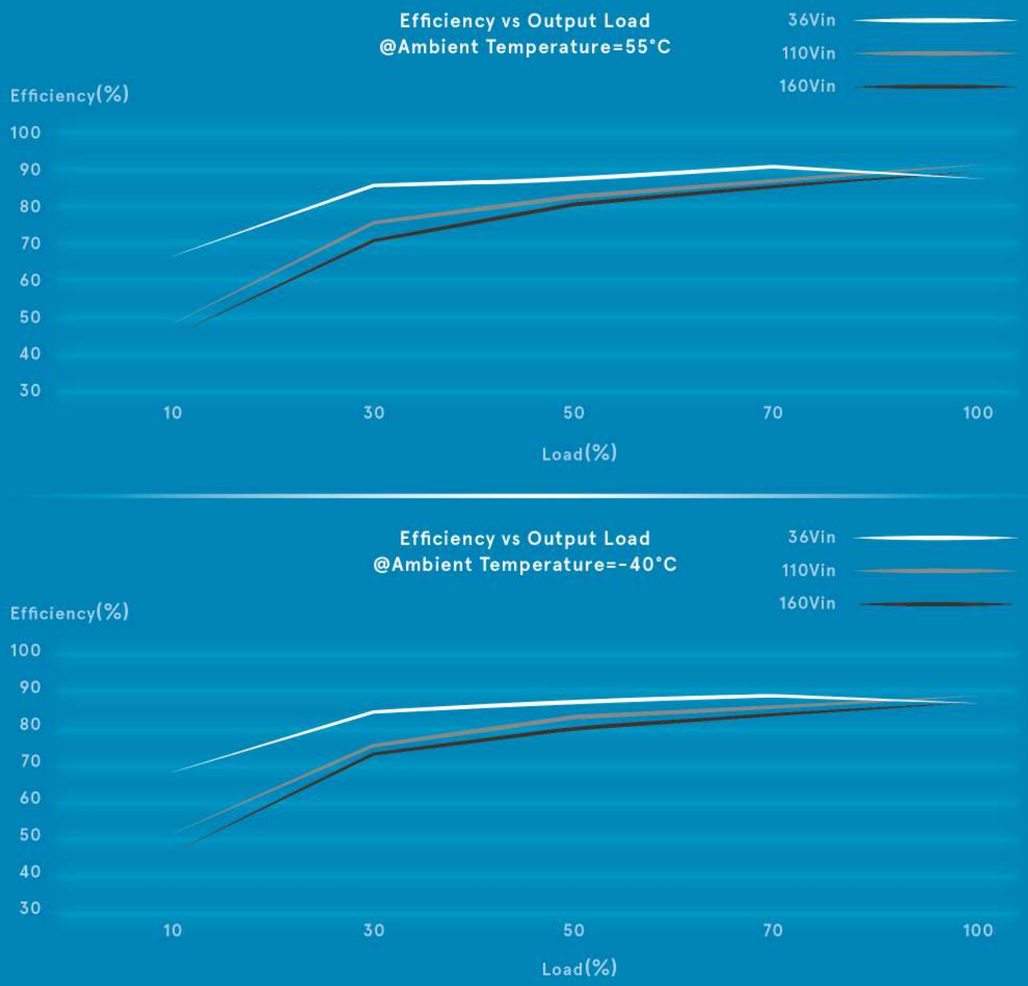


Provide three heatsink options with different heights to meet the usage occasion with different operating temperature ranges

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 dissipationhavehighly stable performance.

HIGH EFFICIENCY

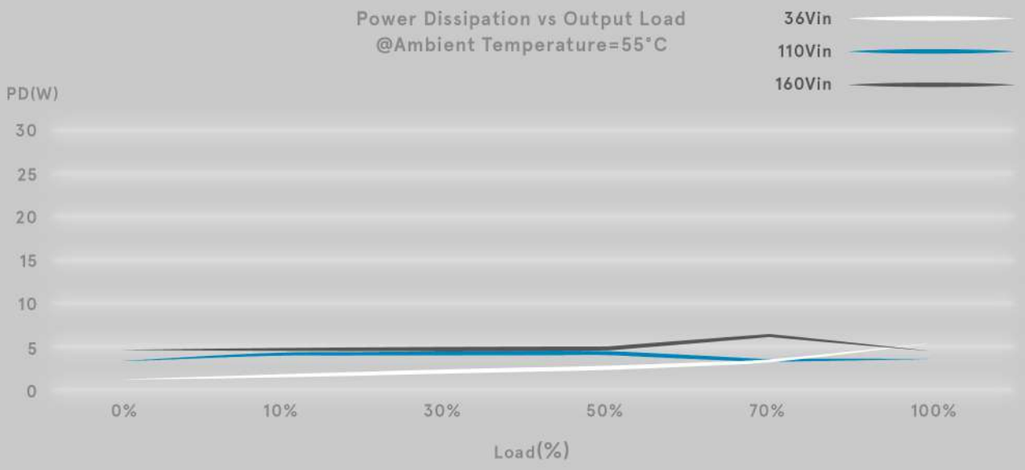
LOW DISSIPATION

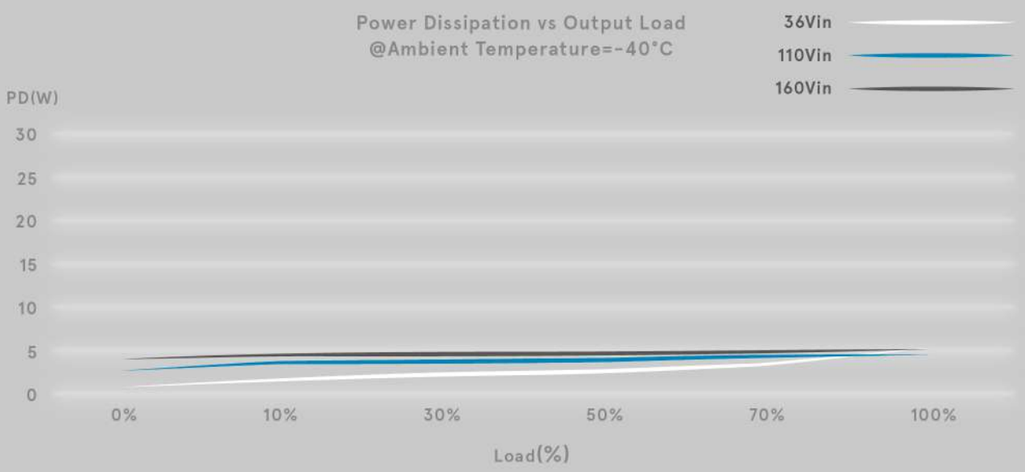
ENERGY SAVING

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.

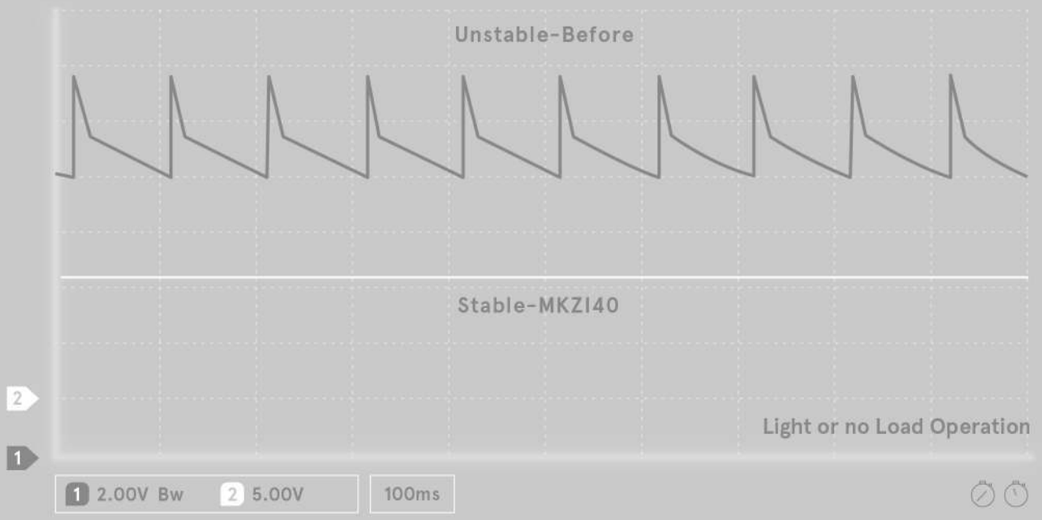




NO DUMMY LOAD DEMAND

No Min. Load/Dummy Load Requirement

The MKZI40 series can support no-load operations to avoid inactive power loss in and instable output voltage oscillation.



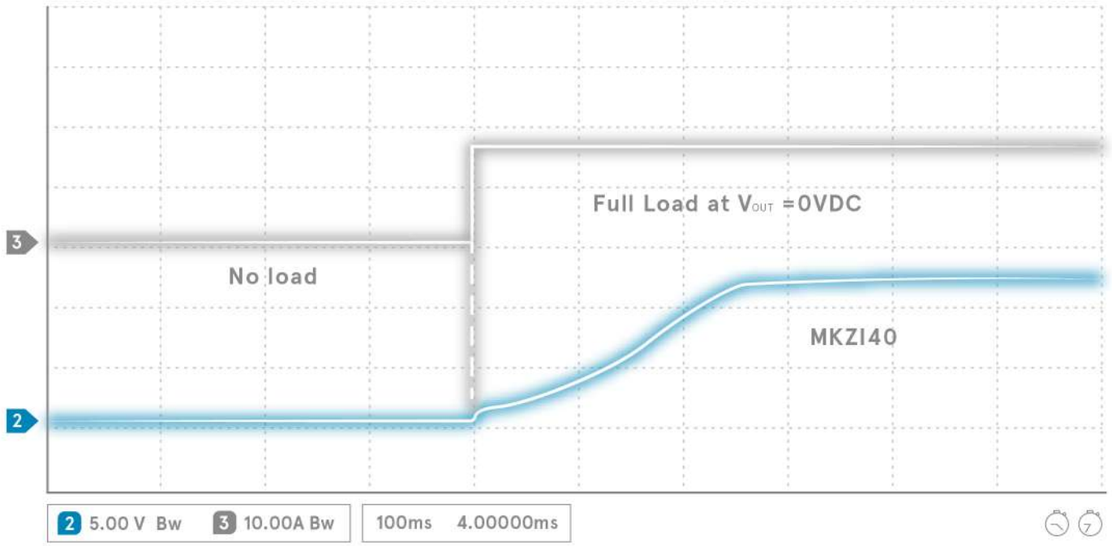
HIGH DURABILITY

HIGH ROUGHNESS

HIGH RELIABILITY

SUPERIOR LOAD DRIVING WITHOUT FAILURE

Superior Load Driving Capability



The MKZI40 series can support superior system load driving capability at very low or even zero voltage output without start-up failure for filed applications needed.

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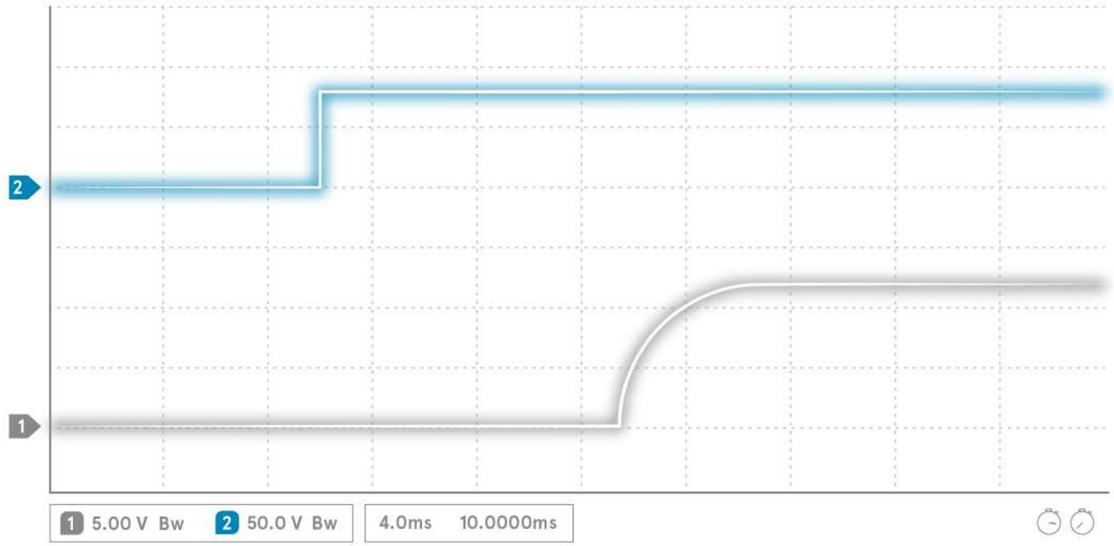
FAST START-UP TIME

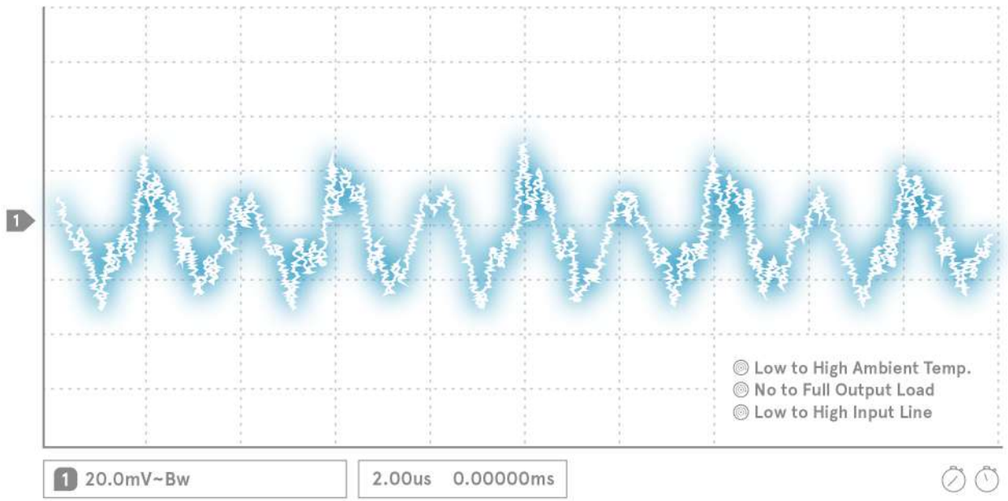
Start-Up Time 30ms without Overshoot



Fast stat-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 MKZI40 series keep low for whole output load, input line and ambient temp. which help to reduce the peripheral components needed and noise interference.

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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 MKZI40 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 Logic Remote ON/OFF
- Output Voltage Trim

The MKZI40 series is also equipped with the positive/negative remote control and output voltage trim functions to provide design flexibility for customers.

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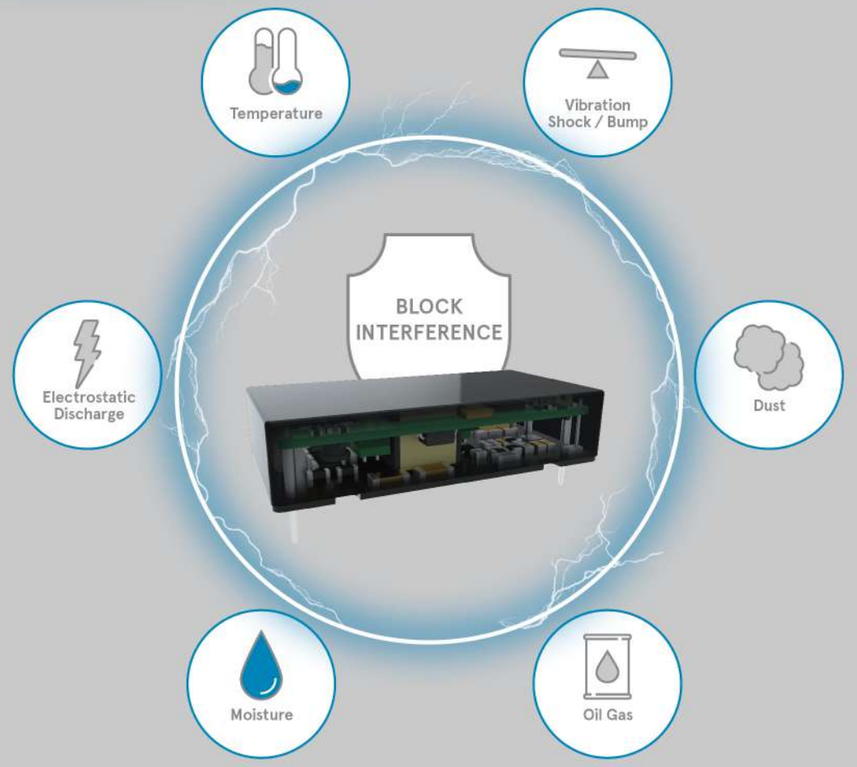
ENCAPSULATION BENEFIT

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 4000 Meters Altitude Operation without Location Limitation

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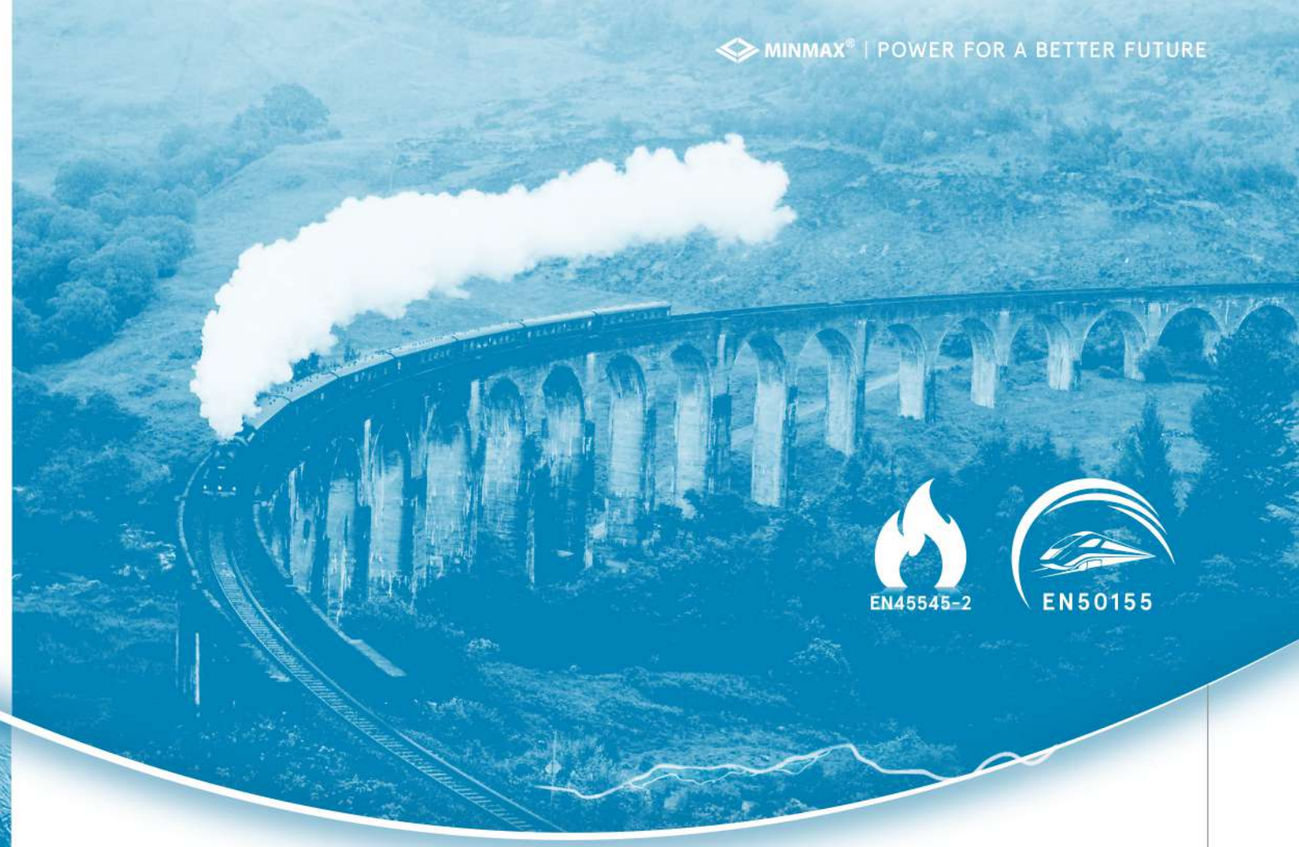


Certifications comply with the railway standard EN 50155 (IEC 60571) and fire protection test EN 45545-2.

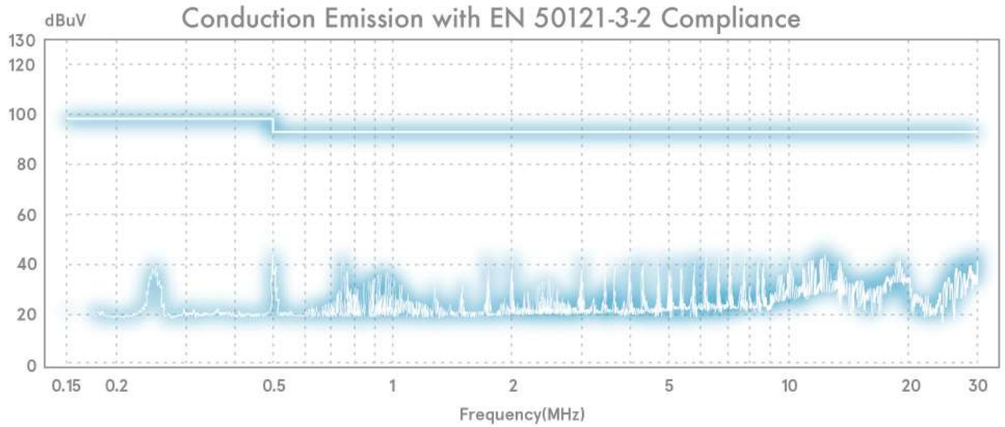
EN 50155
EN 45545-2

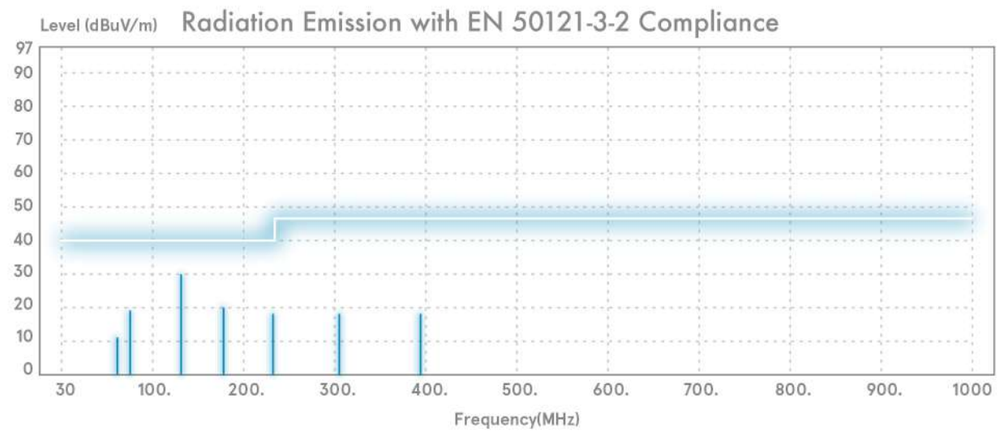
RAILWAY CERTIFICATIONS

Railway Certification Approved for Your Long-term Reliability

RAILWAY EMC COMPLIANCE

Railway Certification Approved for Your Long-term Reliability





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RAILWAY EMC COMPLIANCE

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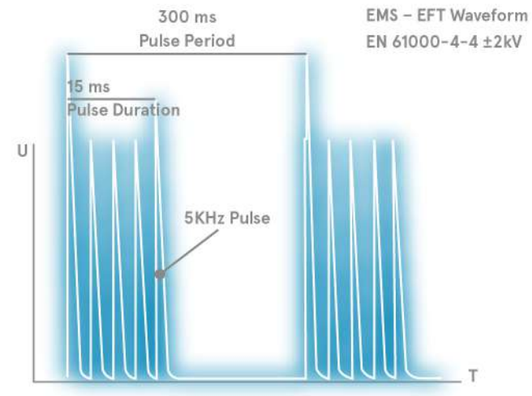

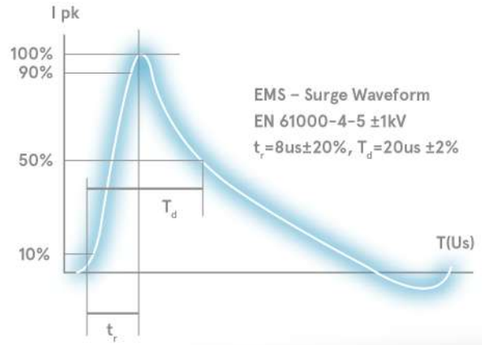

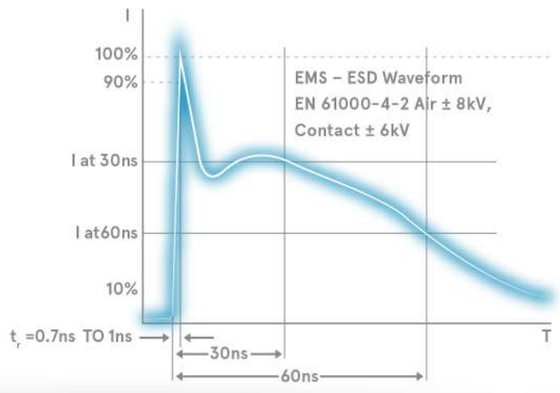

Comply with railway EMC Standards (EN 50121-3-2) with external EMC filter to solve system electromagnetism Issue.

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

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RAILWAY MECHANICAL STRESS TEST

Railway Certification Approved for Your Long-term Reliability

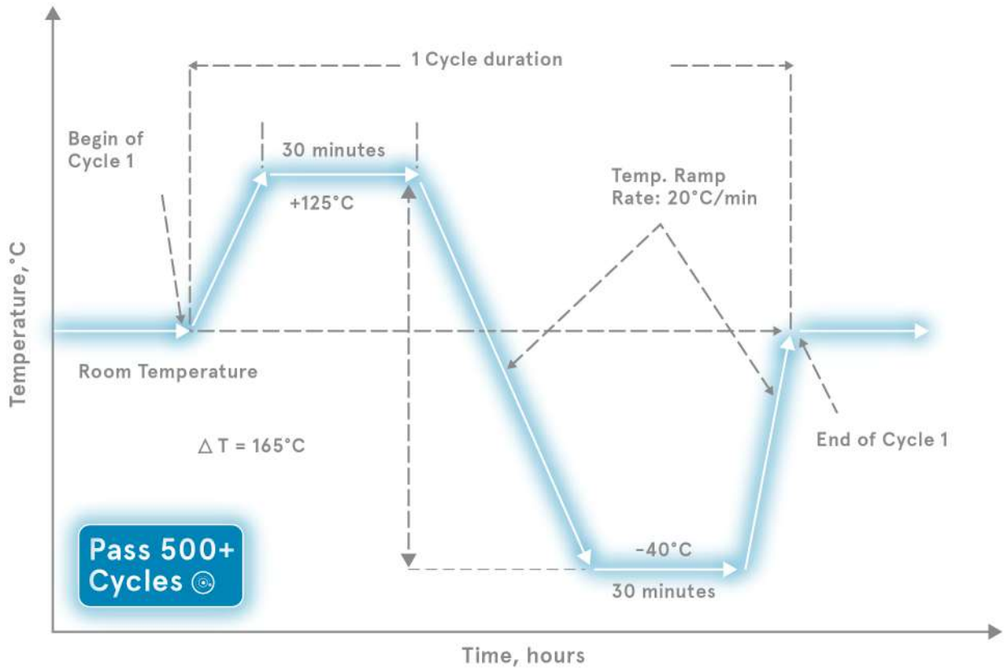
Functional Random Vibration Test
EN 50155 13.4.11/ EN 61373(EN 60068-2-6)

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+

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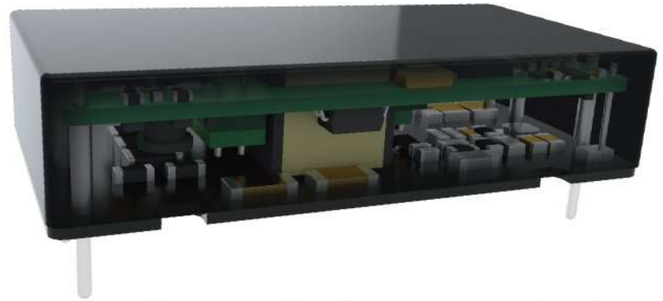
CERTIFICATIONS

Multiple Internal Certification Approved to Solve Your Problems



UL 62368-1 · LISTED · CB Scheme · CE · 3 YEAR WARRANTY · CONFLICT FREE MINERALS POLICY · TWAEO · RoHS Compliant · ISO 9001 ETC · SGS

RAILWAY CERTIFICATION PRODUCT LINE

Expands Railway- Certificated Product Family

Power (W) 3

40

This MKZI40 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

150

Railway Certified DC-DC Power Solutions

DATE / NO /

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