



## Contents

### Overview

- Market
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### Charging systems

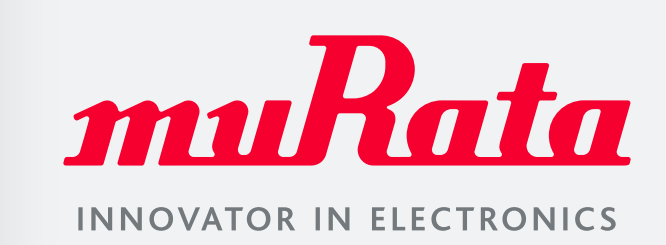
- AC charging
- DC charging

### Murata innovation

- 1 DC-DC power MGJ-series
- 2 DC-DC power NX-series
- 3 Transformer
- 4 Connectivity modules
- 5 Crystal units
- 6 NTC Thermistors
- 7 Piezoelectric sounders
- 8 Micro batteries

Application guide

# Accelerating EV charging infrastructure



# Expanding EV Market

## Are you keeping pace with the ever-evolving market?

The growth of electric vehicle sales has created a substantial demand for high-quality automotive electronics, needed to fulfill the needs of the expanding car sales and charging infrastructure.

With rising global emissions and concerns over the security of oil supplies, the demand for electric vehicles is set to rise further.

As EV technology rapidly evolves, if mass adoption is to prove viable, the surrounding infrastructure must keep pace with developments by providing reliable, consistent, and faster charging performance.



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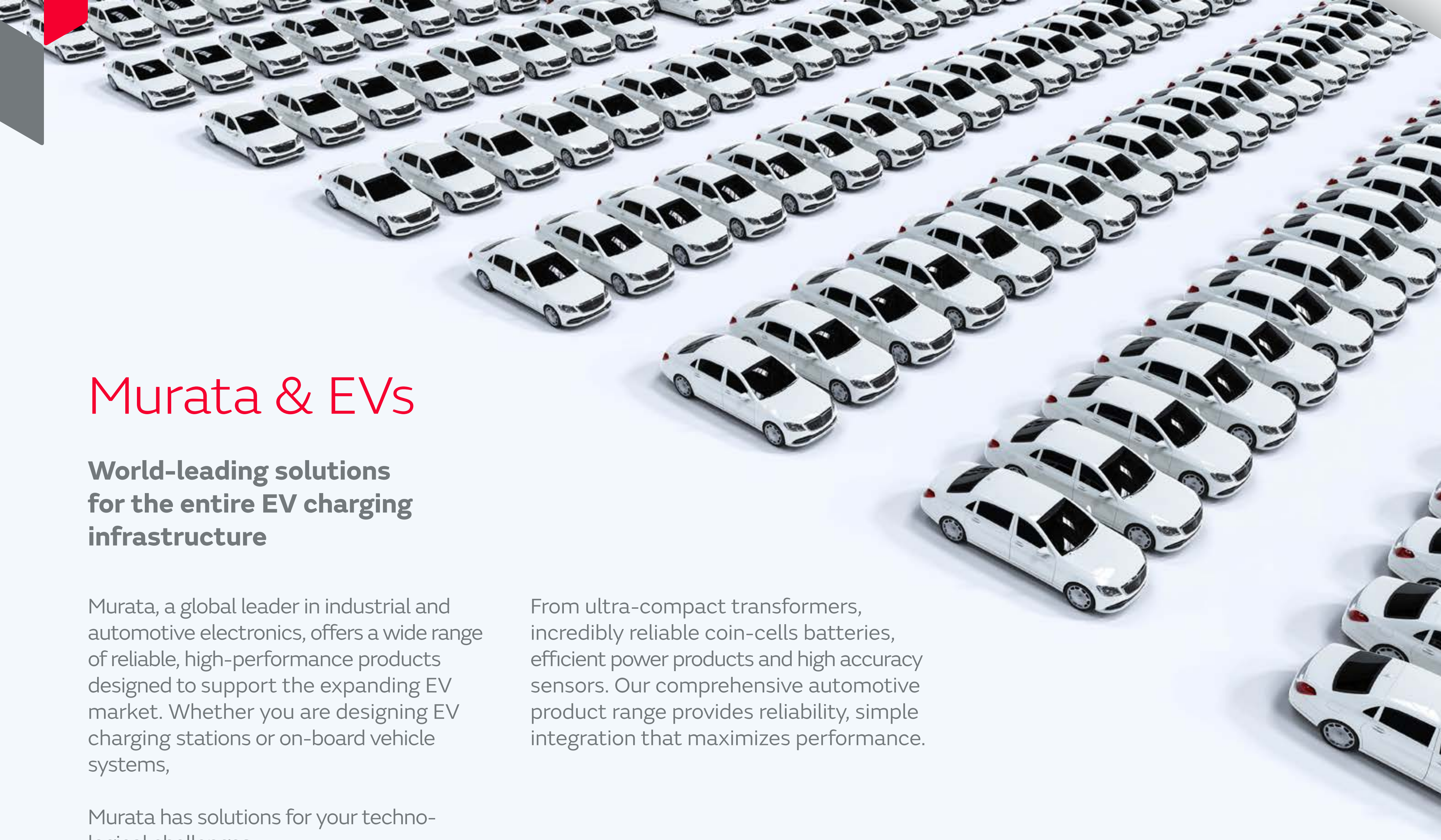
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# Murata & EVs

## World-leading solutions for the entire EV charging infrastructure

Murata, a global leader in industrial and automotive electronics, offers a wide range of reliable, high-performance products designed to support the expanding EV market. Whether you are designing EV charging stations or on-board vehicle systems,

Murata has solutions for your technological challenges..

From ultra-compact transformers, incredibly reliable coin-cells batteries, efficient power products and high accuracy sensors. Our comprehensive automotive product range provides reliability, simple integration that maximizes performance.

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# Why choose Murata...

## Exceptional service, from components to manufacturing and support

As a pioneer in electronics, Murata has the technical expertise and support teams in place to help with all your power conversion [AC-DC and DC-DC], transformers, sensors and connectivity challenges, plus much more.

We continuously pursue innovation, ensuring our market-leading products deliver the highest performance, reliability that provide solutions for a wide variety of applications.

With closed-loop, quality-control manufacturing capabilities backing our extensive product range, we are ready to support the demand of a growing EV marketplace.

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# Innovative Solutions

Within this application guide, we will explore a carefully curated selection of Murata's high-efficiency power conversion products, connectivity modules, crystal units, thermistors, piezo-electrics and micro batteries.

We create reliable solutions and innovative features that can help to accelerate your next automotive charging design.

To discover our entire electrified automotive range or to contact your local Murata representative, please visit our website [here](#). 

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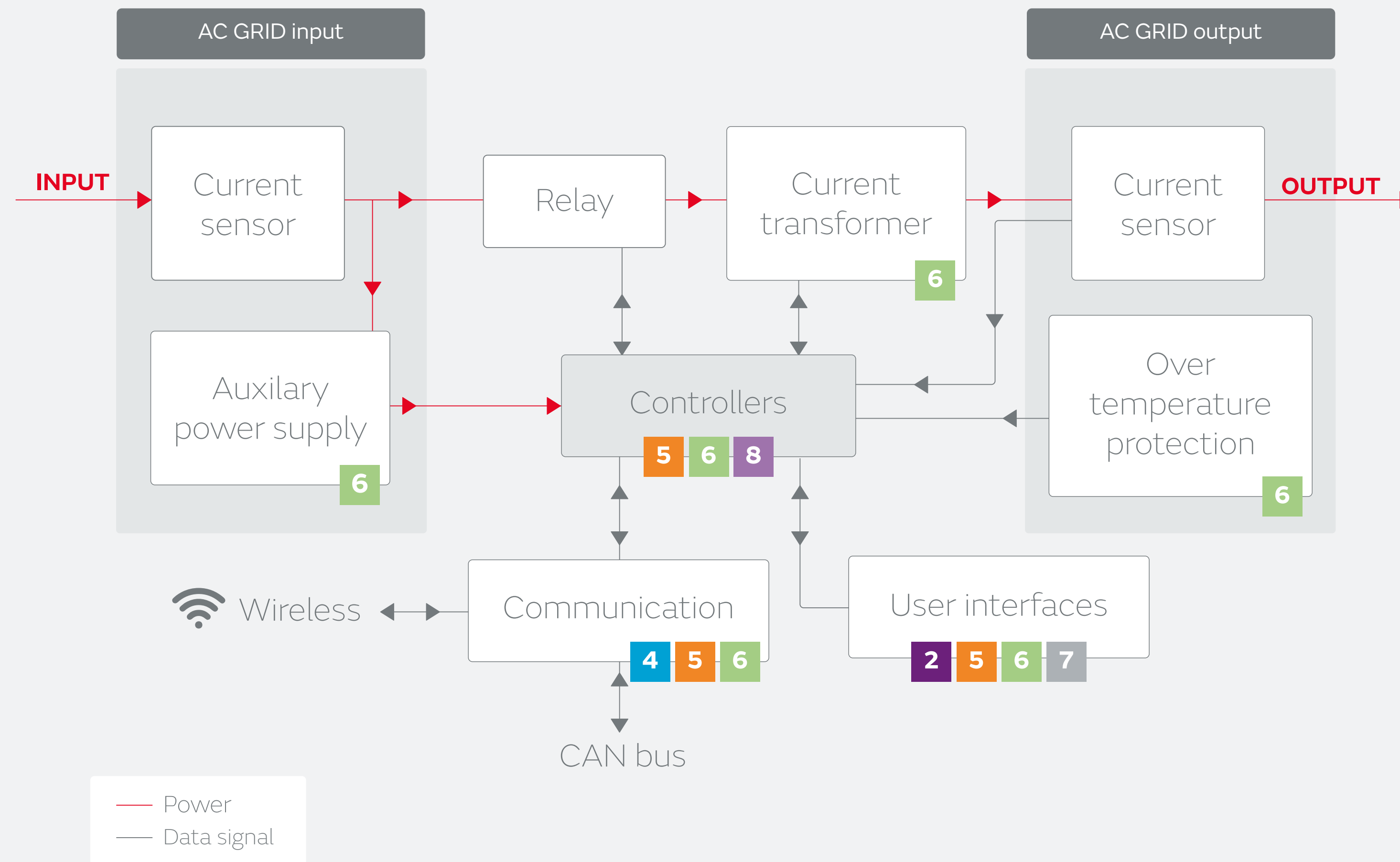
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# AC charger functional block diagram



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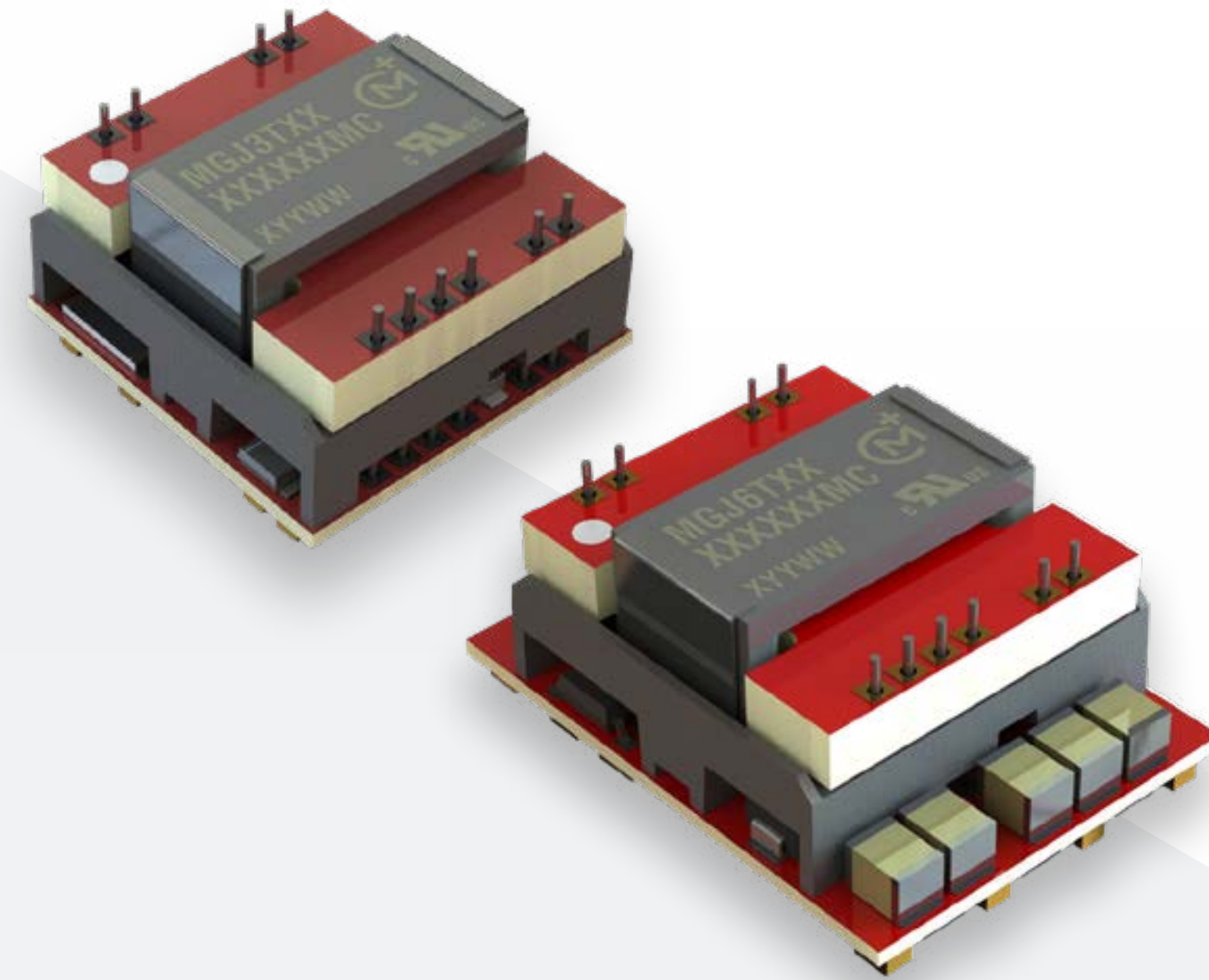
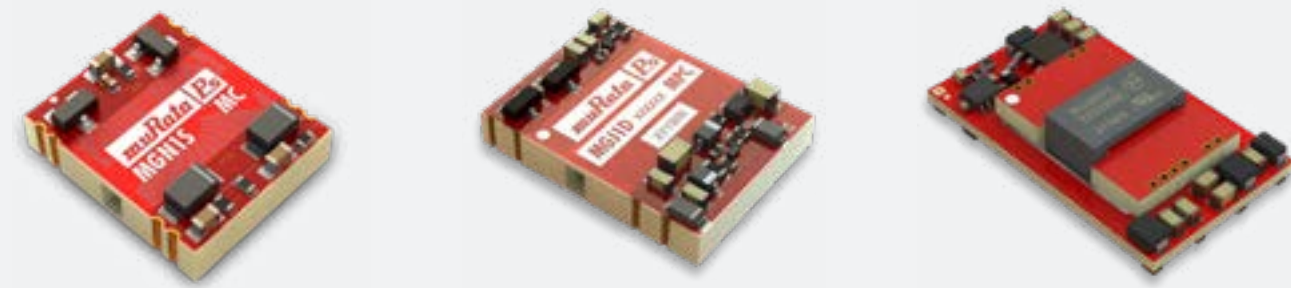
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## MG\* series (1-6W)

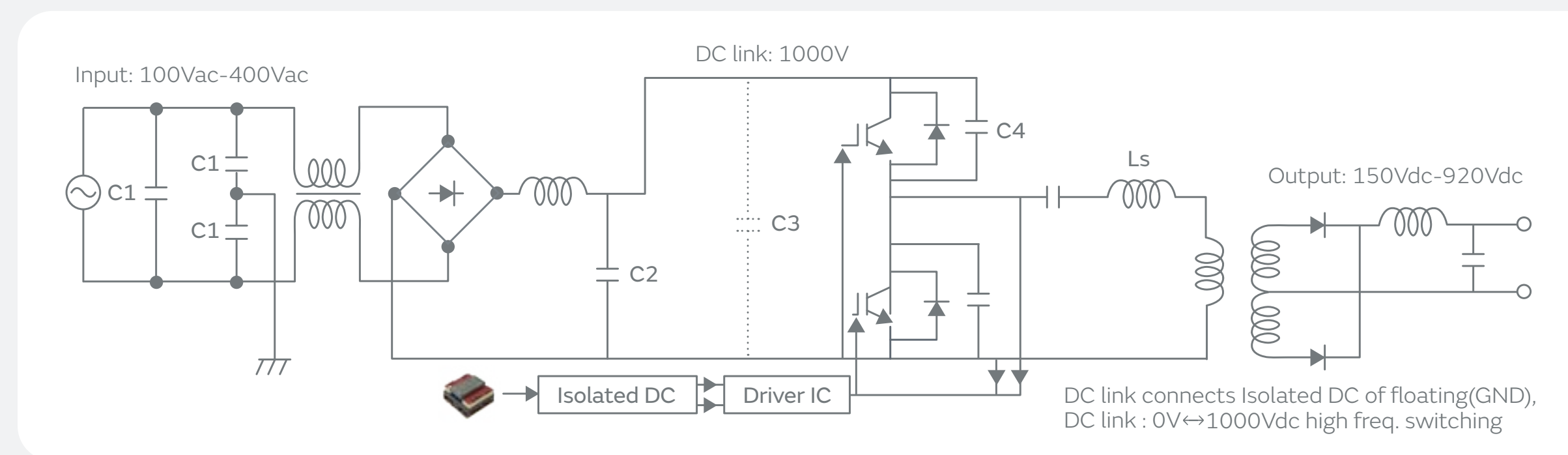
# Isolated DC-DC converter for gate drivers



	MGN 1W	MGJ 1-2W	MGJ 3-6W
Isolation capacitance	2.5pF	≤ 4pF	15pF
Continuous barrier withstand voltage	1.1kVDC	3kVDC	3kVDC
Characterised CMTI	>200kV/μs	>200kV/μs	>100kV/μs
Isolation (up to)	3KVAC	5.7kVDC	10.2kVDC
Operating temp.	-40 up to 105°C	-40 up to 105°C	-40 up to 105°C
Insulation	UL62368 Reinforced (pending)	UL60950 Reinforced	UL60950 Reinforced

### FEATURES:

- Optimized (bipolar) output voltages for MOS, IGBT, SiC & GaN gate drives
- Ultra low isolation capacitance
- High Continuous barrier withstand voltage
- Characterized partial discharge performance
- High dv/dt immunity



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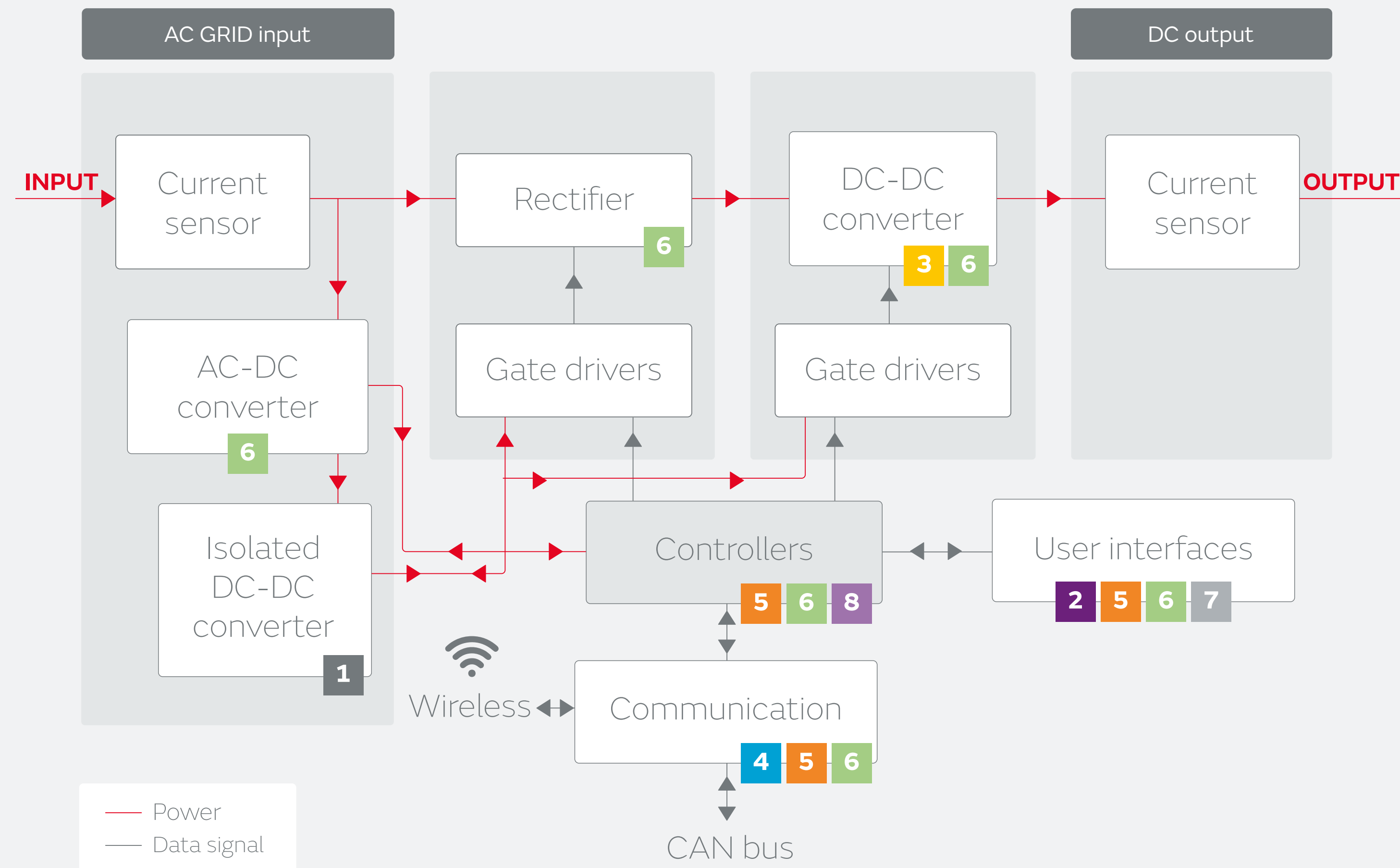
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# DC charger functional block diagram



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# Mode out block diagram

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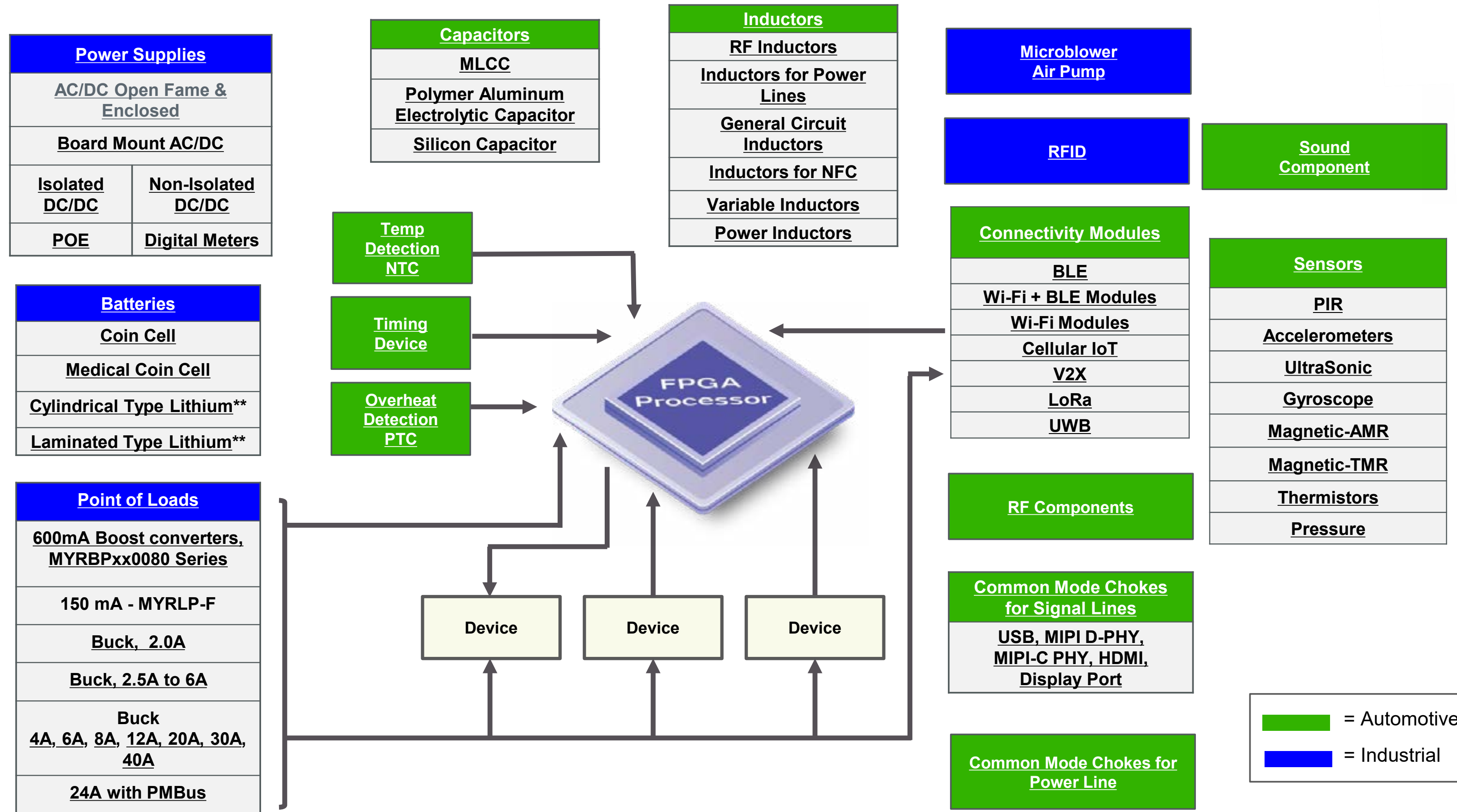
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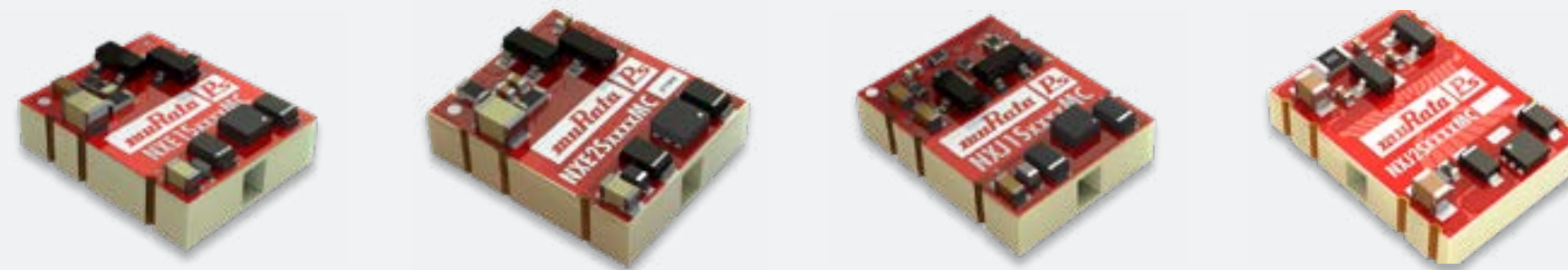
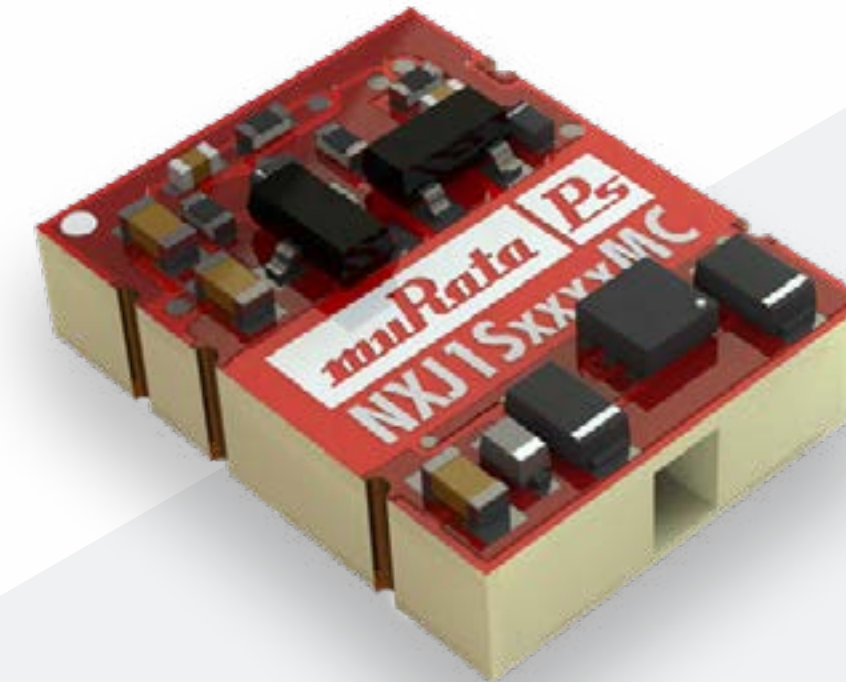
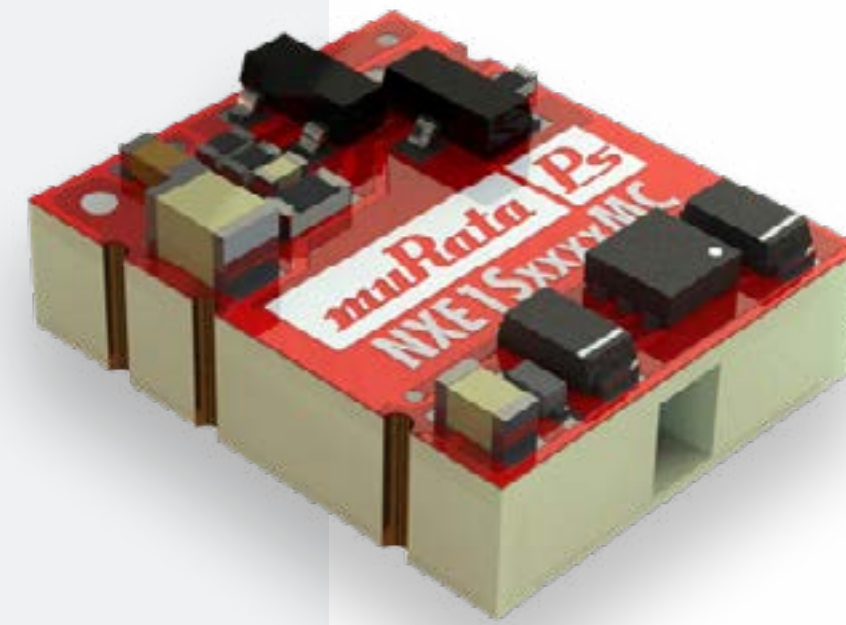


## NXE & NXJ series

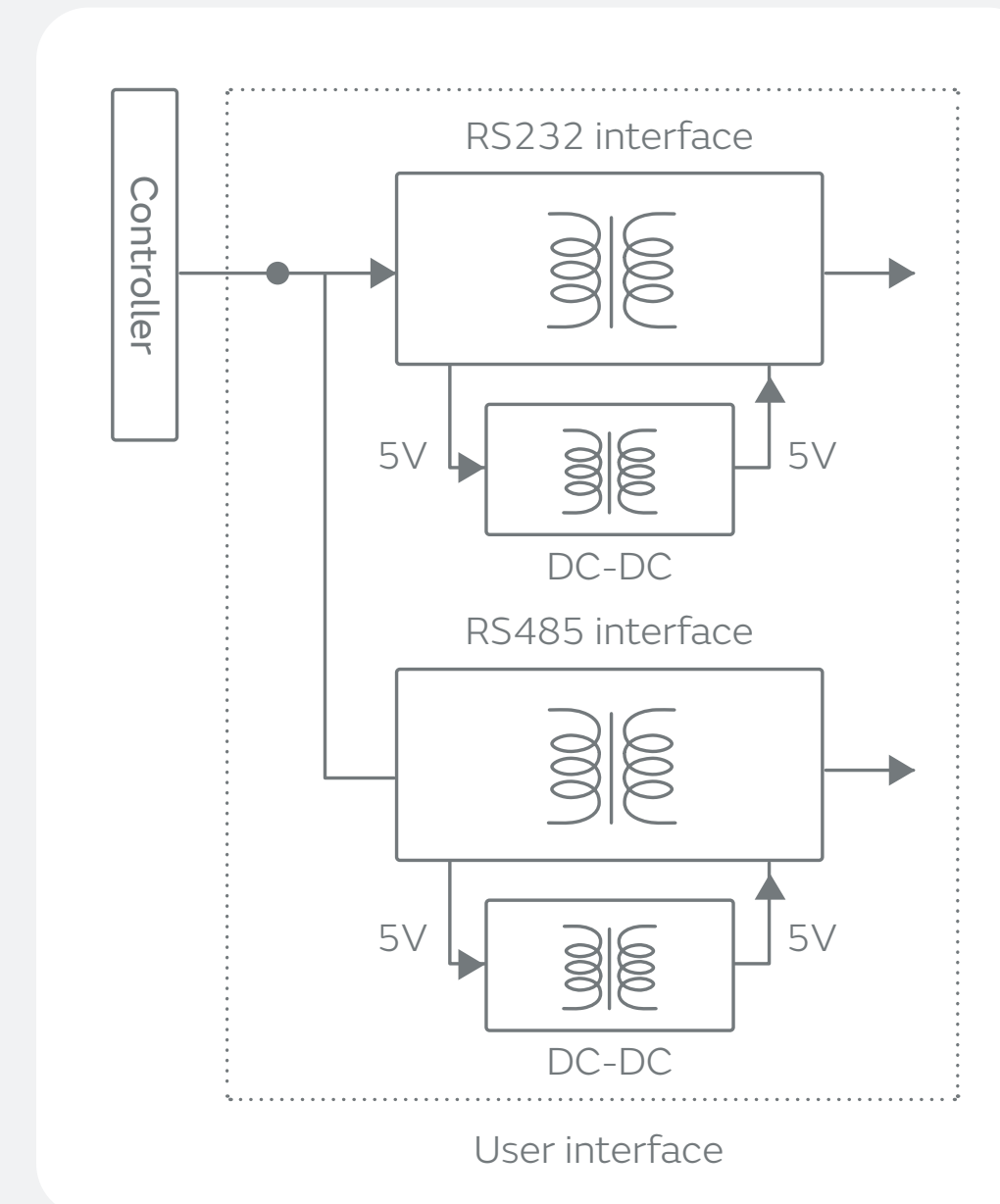
# Isolated DC-DC

### FEATURES:

- 1W & 2W versions
- Lowest profile isolated converters
- Highest isolation for footprint size (up to 5.2kVDC)
- Allows peak reflow temperature of 260°C as per J-STD-020
- Operating Temperature -40 up to +110°C
- UL60950 Approval



	NXE1	NXE2	NXJ1	NXJ2
Vin	3,3,5	5,12	3,3,5,12	5,12,24
Vout:	3,3,5	5,12,15	3,3,5,12,15	5,12,15
Wattage:	1W	2W	1W	2W
Isolation test voltage:	3kVDC	3kVDC	4.2kVDC	5.2kVDC
Operating Temp:	-40 up to 110°C			
Safety:	ANSI/AAMI ES60601-1, UL60950			
	1 MOOP	1 MOOP	1 MOOP	1 MOOP & 2 MOOP



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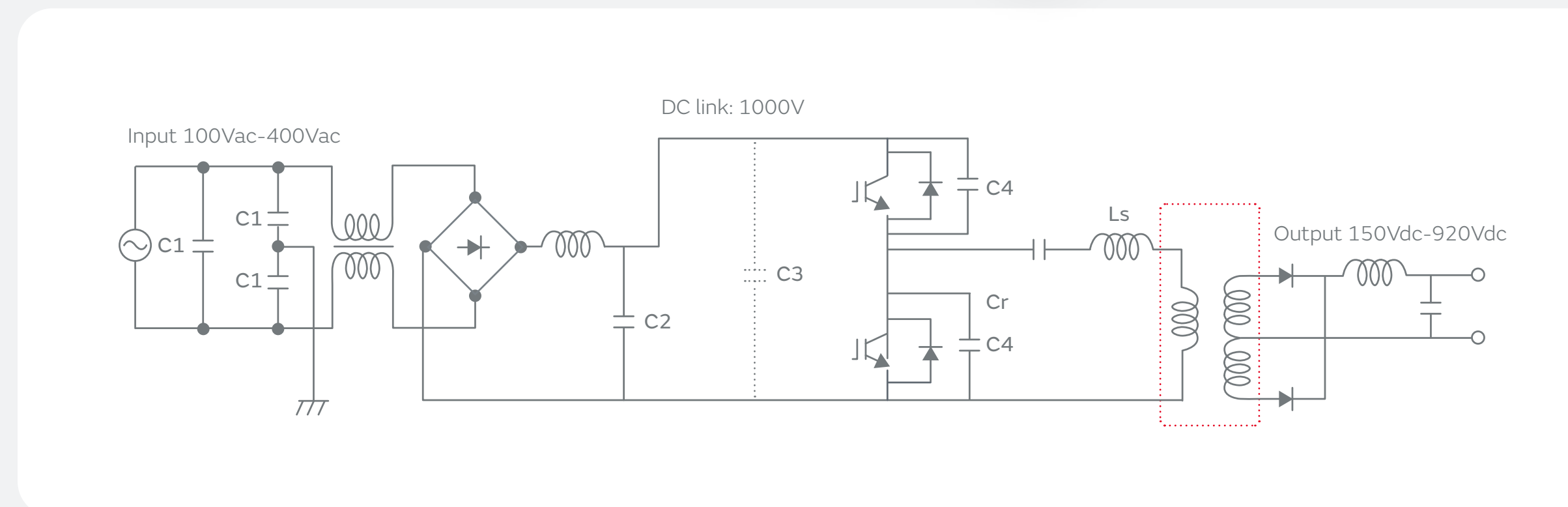
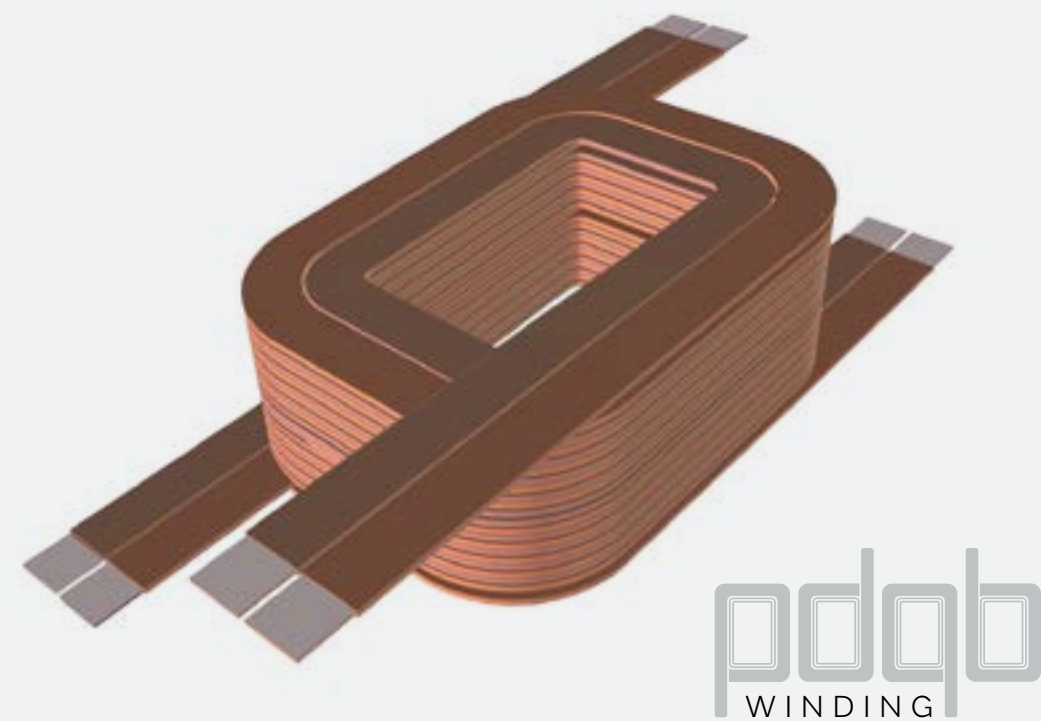
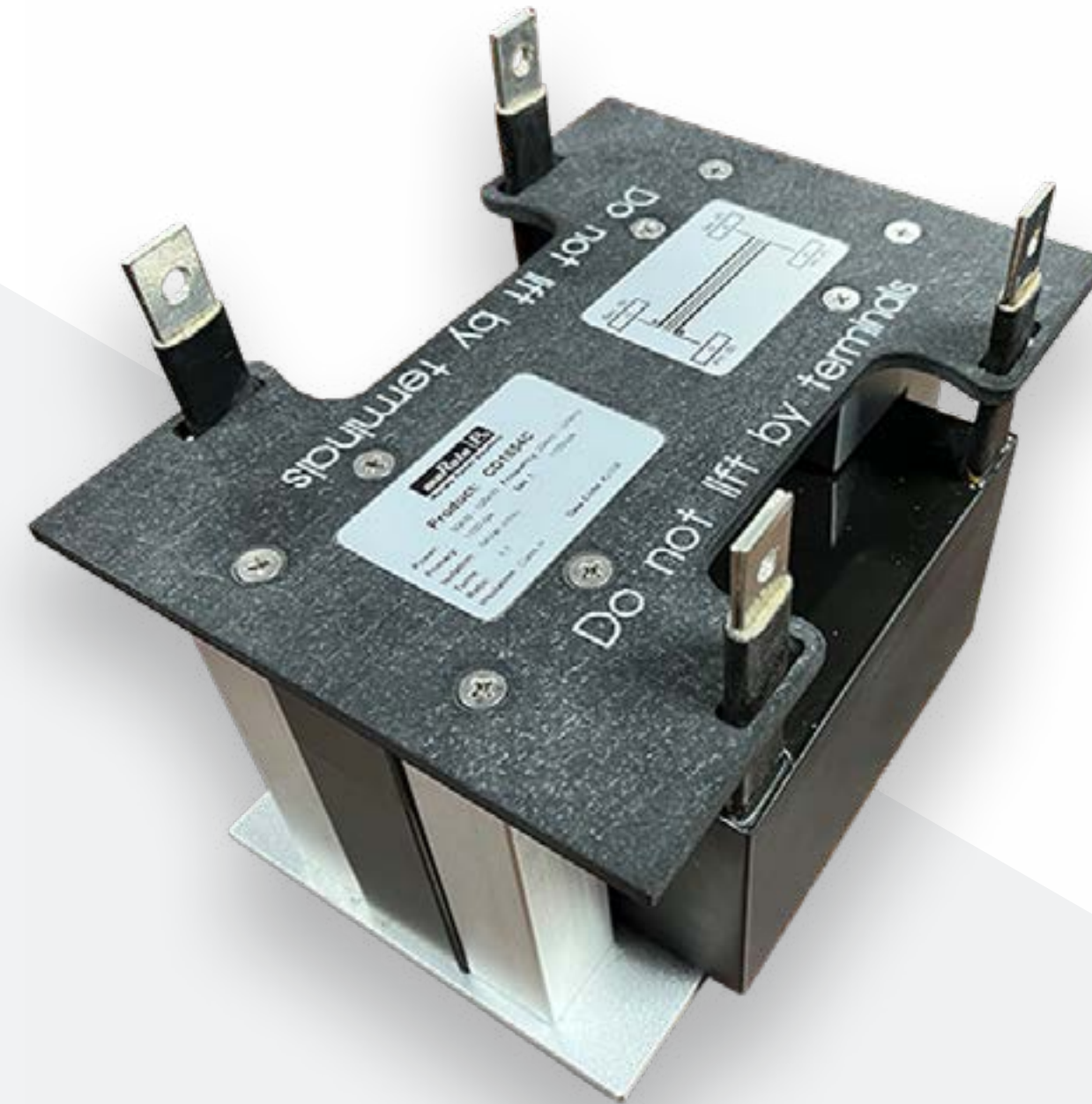
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# High Power High Frequency Transformer for DC-DC converter

## FEATURES:

- Fully customized transformers
- Compact size  
Ex.: 25cm\*18cm\*20cm (100kW, 200kHz)
- Efficiency: >99.5%, achieved by Proprietary pdqb winding technology
- Power rating: 30kW to 400kW
- Frequency: 20kHz to 250kHz
- Isolation: up to 6kV
- Vin: 50V to 1100V
- Vout: 50V to 1100V
- Turns ratio: 1:1 to 10:1



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# Connectivity modules

## FEATURES:

- Broad product line-up
- Strong partnerships IC vendors
- Multiple production locations
- 100% Pre-tested
- Certified Modules
- FAE Support (Global and Local)
- Online support & Forum
- RF simulation & design support

Easy evaluating using [Embedded Artist M.2 boards](#)



## Long Range

[Cat. M1/NB-IoT](#)

### Features:

- Cat. M1/NB-IoT
- Small size
- GPS/GNSS
- Supporting global regulation and major worldwide carriers



## Short Range

[Wi-Fi / Bluetooth](#)

### Features:

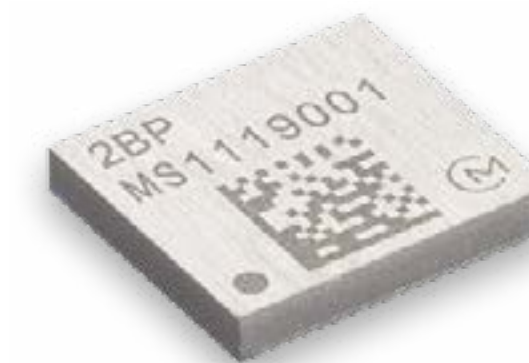
- WiFi 4, 5, 6, 6e and 7 (UD)  
+ BT/BLE and 802.15.4



[UWB](#)

### Features:

- Contactless presence detection
- High Security
- Precise Distance & AoA measuring



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# Crystal unit

## FEATURES:

- Frequency range: 20 to 50MHz
- Component size: 2.0x1.6mm
- [Supporting your robust design by patented technology and others](#) 
- Realizing stable supply for your products
- [Providing evaluation support service, IC matching](#) 
- Automotive grade is available

AEC-Q200

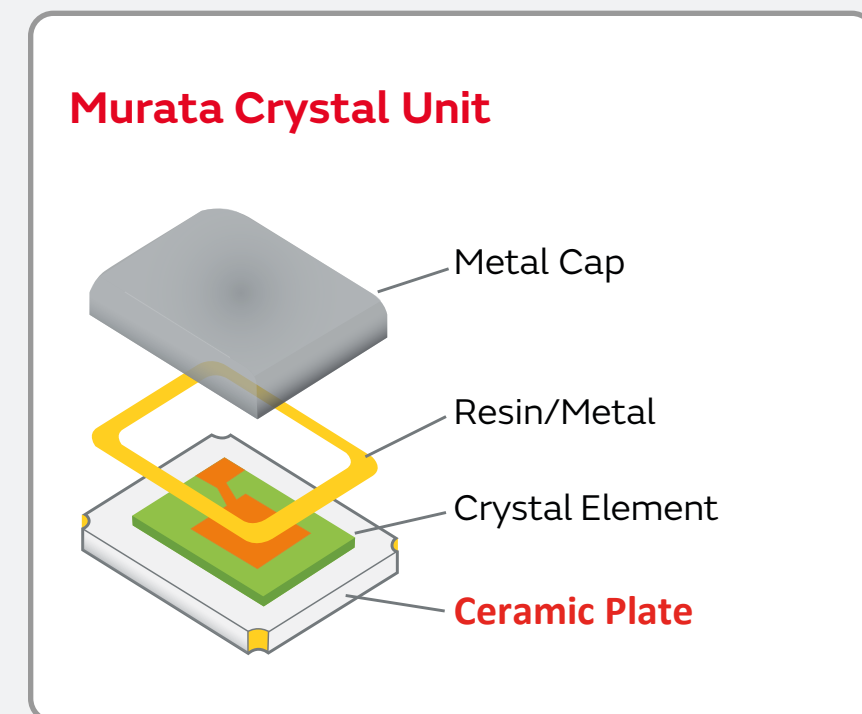
RoHS

Lead free

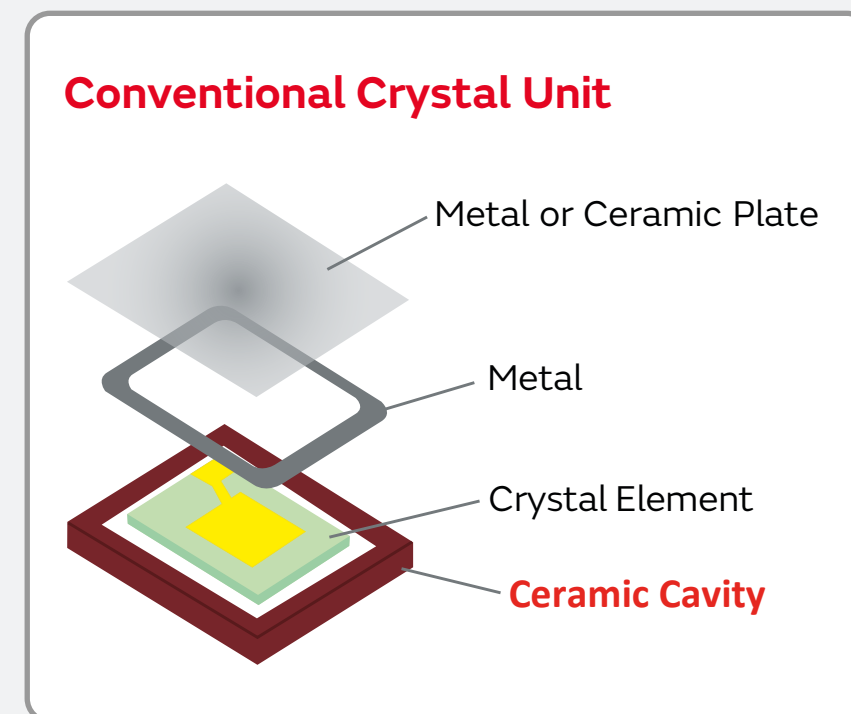
(Only automotive grade)



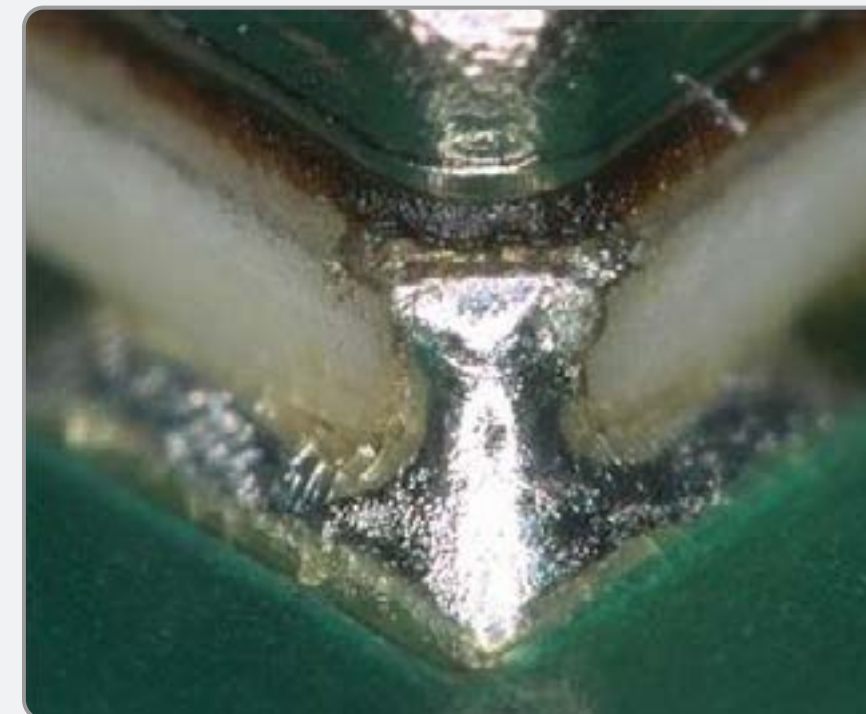
## FEATURES OF THE CERAMIC PLATE



This simple structure, used in ceramic resonators over years, allows us to increase productivity



Ceramic cavity plate is expensive due to its complex structure



Murata Crystals have corner electrodes for checking the solder condition in the soldering process



Corner cut-off design

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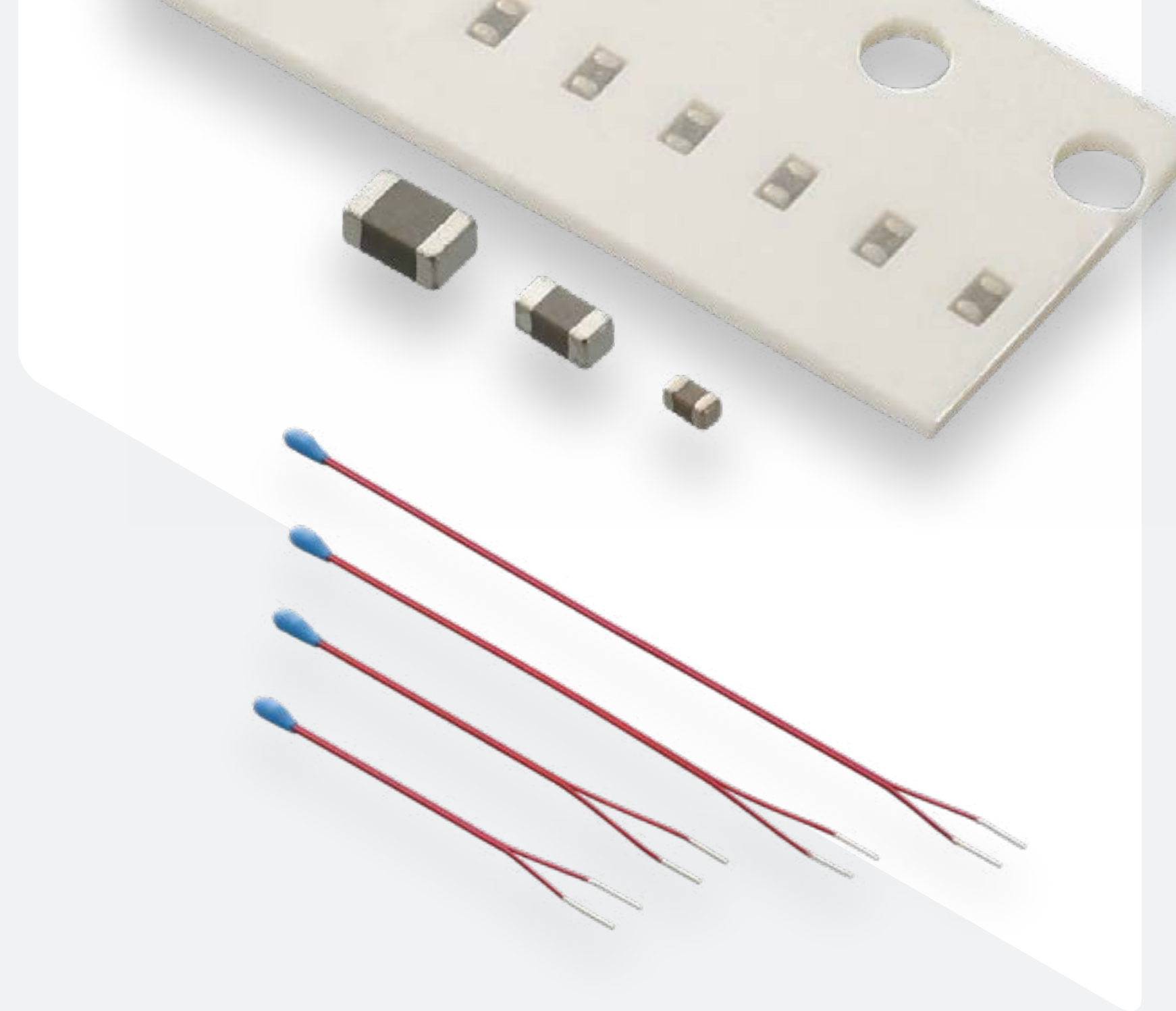
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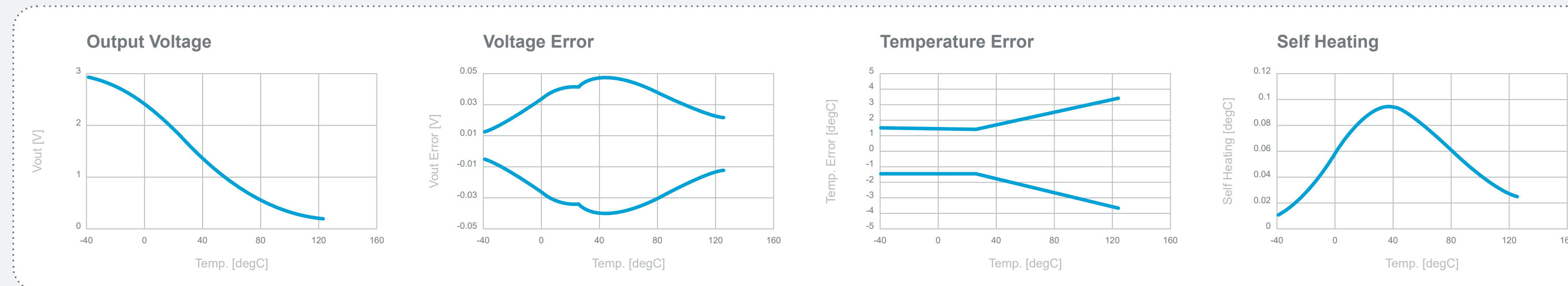
# NTC thermistor



## FEATURES:

- Multiple size lineup; 0603, 0402, and 0201 inches
- Available for wider R25 accuracy variation; 5%, 2%, and 1%
- Automotive grade is available
- Supporting to safety design in tough environmental condition
- Help for seamless production in your company as N°1 share vendor
- Available for design support tool in Murata website

## EXAMPLE OF SIMULATION DATA



Product search: [Link](#)



Performance simulator: [Link](#)



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# Piezoelectric sounders

## FEATURES:

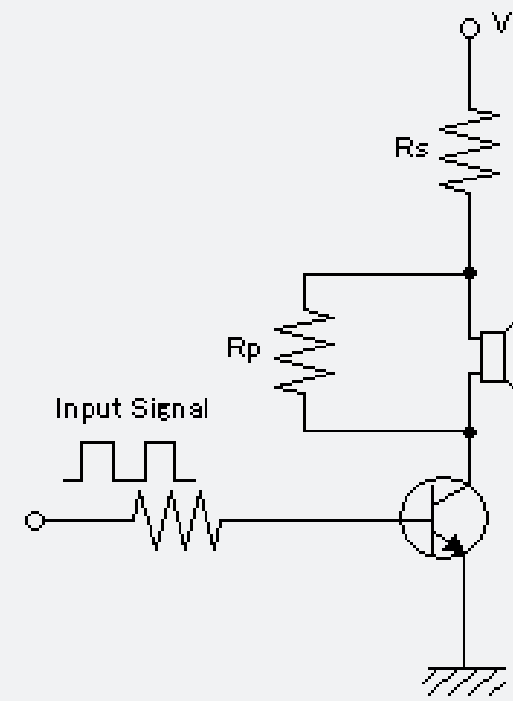
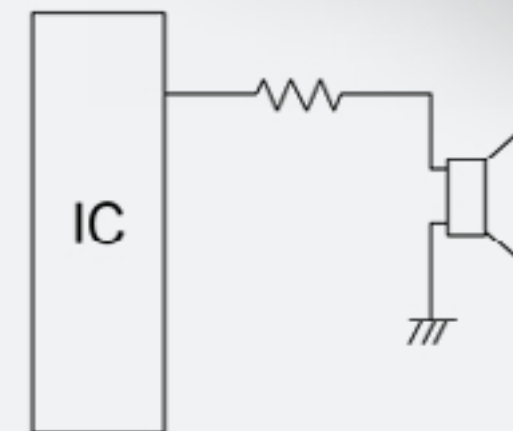
- No magnet inside and light weight
- Low current consumption
- Available for sounding with multiple frequencies
- [Wide selection for the size and loudness](#) ↔

## EASY TO DESIGN:

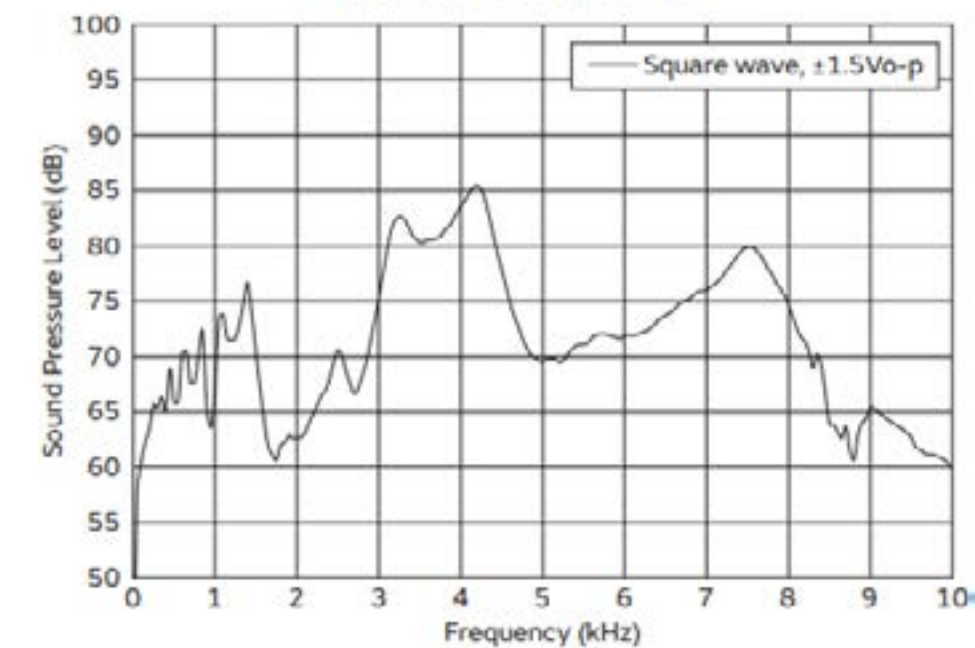
Magnet Free

Simple drive circuit

No cavity housing required



PKLCS1212E4001-R1 / PKLCS1212E40A1-R1  
Conditions: 10cm, A-filter



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## Micro Battery

# CR coin-cell lithium batteries

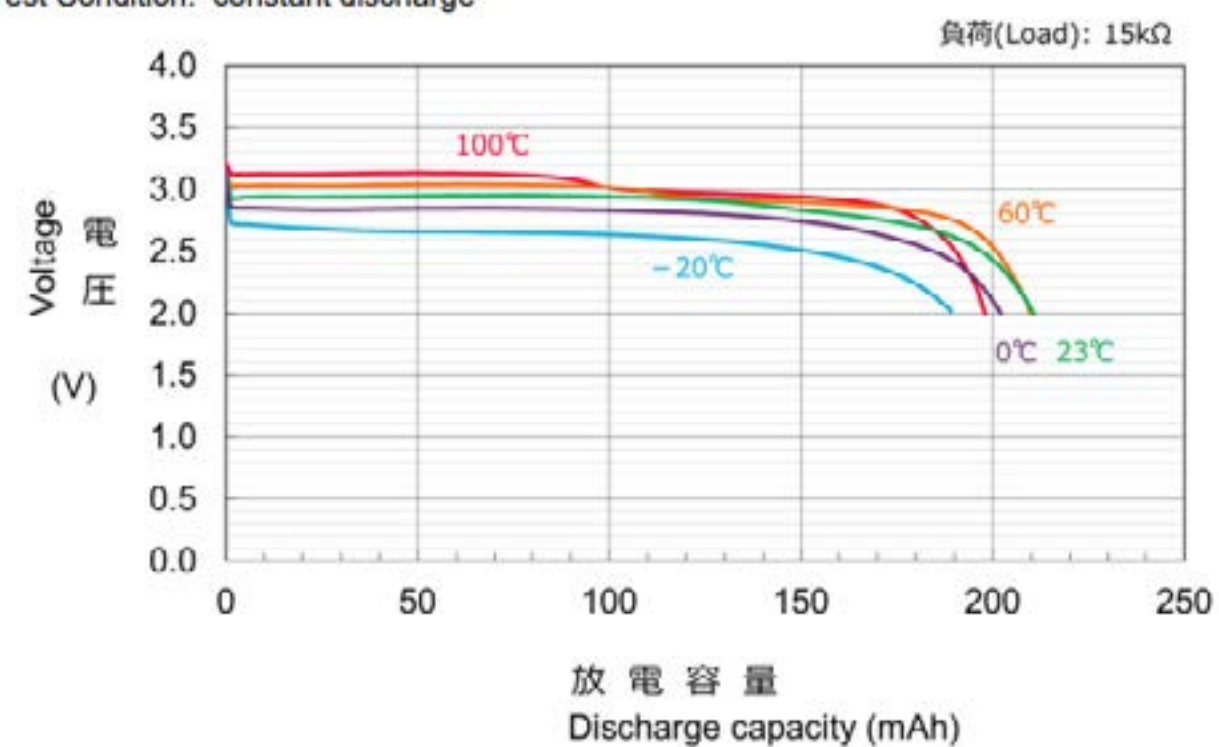
### FEATURES:

- Long life for RTC and memory back-up
- High reliability: Outstanding temperature range
- Stable discharge characteristics

Type	Extended Temperature	Heat Resistant
Operating Temp.	-40°C to +85°C	-40°C to +125°C
Model (Nominal Capacity)	<a href="#">CR2477X</a> (1000mAh)	<a href="#">CR2032W</a> (210mAh)

### [CR2032W](#) Performance

Discharge Characteristics  
Test Condition: constant discharge



### Lightweight, High Voltage and High Energy Density:

The battery voltage is 3V, almost double that of normal alkaline or manganese batteries.



### Excellent Discharge Characteristics:

Voltage characteristics remain stable even for a long period of discharge.



### High quality and reliability:

40 years of manufacturing experience

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# Global Locations

For details please visit [murata.com](http://murata.com)

## ⚠ Note

### 1 Export Control

#### For customers outside Japan:

No Murata products should be used or sold, through any channels, for use in the design, development, production, utilization, maintenance or operation of, or otherwise contribution to (1) any weapons (Weapons of Mass Destruction [nuclear, chemical or biological weapons or missiles] or conventional weapons) or (2) goods or systems specially designed or intended for military end-use or utilization by military end-users.

#### For customers in Japan:

For products which are controlled items subject to the “Foreign Exchange and Foreign Trade Law” of Japan, the export license specified by the law is required for export.

2 Please contact our sales representatives or product engineers before using the products in this catalog for the applications listed below, which require especially high reliability for the prevention of defects which might directly damage a third party's life, body or property, or when one of our products is intended for use in applications other than those specified in this catalog.

- ① Aircraft equipment
- ② Aerospace equipment
- ③ Undersea equipment
- ④ Power plant equipment
- ⑤ Medical equipment
- ⑥ Transportation equipment (vehicles, trains, ships, etc.)
- ⑦ Traffic signal equipment
- ⑧ Disaster prevention / crime prevention equipment
- ⑨ Data-processing equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed above

3 Product specifications in this catalog are as of March 2020. They are subject to change or our products in it may be discontinued without advance notice. Please check with our sales representatives or product engineers before ordering. If there are any questions, please contact our sales representatives or product engineers.

4 Please read rating and ⚠CAUTION (for storage, operating, rating, soldering, mounting and handling) in this catalog to prevent smoking and/or burning, etc.

5 This catalog has only typical specifications. Therefore, please approve our product specifications or transact the approval sheet for product specifications before ordering.

6 Please note that unless otherwise specified, we shall assume no responsibility whatsoever for any conflict or dispute that may occur in connection with the effect of our and/or a third party's intellectual property rights and other related rights in consideration of your use of our products and/or information described or contained in our catalogs. In this connection, no representation shall be made to the effect that any third parties are authorized to use the rights mentioned above under licenses without our consent.

7 No ozone depleting substances (ODS) under the Montreal Protocol are used in our manufacturing process.



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