

Murata Power Solutions

# DC-DC converters for healthcare applications

*Designed for safety and reliability*

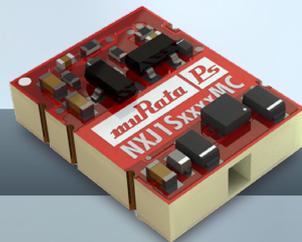


# Designed for reliability

Murata's range of DC-DC converters for healthcare applications offer various levels of medical safety agency recognition - in consideration of both the safety of the patient and the operator. They also feature low barrier capacitance to serve the medical application requirement of low leakage current.

## Applications

- MRI
- X-Ray
- Ultrasound
- Blood pressure monitors
- Telehealth and remote health monitoring systems
- Infusion pumps
- CPAP machines
- Equipment cable isolation
- Robotics



## NXJ1

### Features

- 3.3V, 5V & 12V inputs
- 3.3V, 5V, 12V & 15V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 200Vrms
  - Basic insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOPP to a working voltage of 250Vrms
- Isolation test voltage 4.2kVDC
- Up to 110°C operating temperature
- Short circuit protection
- Substrate embedded transformer
- Industry standard footprint
- Halogen free
- Manufactured in the UK

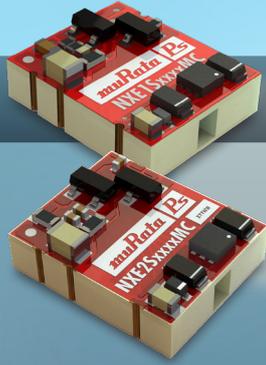


## NXJ2

### Features

- 5V, 12V & 24V inputs
- 5V, 12V & 15V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOPP & 2 MOOP to a working voltage of 250Vrms
- Isolation test voltage 5.2kVDC
- Up to 95°C operating temperature
- Short circuit protection
- Substrate embedded transformer
- Low profile
- Industry standard footprint
- Halogen free
- Manufactured in the UK

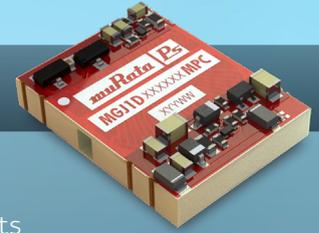
## NXE1 & NXE2



### Features

- 3.3V, 5V & 12V inputs
- 3.3V, 5V, 12V & 15V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 125Vrms
  - Basic insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOOP to a working voltage of 250Vrms
- Isolation test voltage 3kVDC
- Up to 100°C operating temperature
- Short circuit protection
- Substrate embedded transformer
- Automated manufacture
- Industry standard footprint
- Halogen free
- Manufactured in the UK

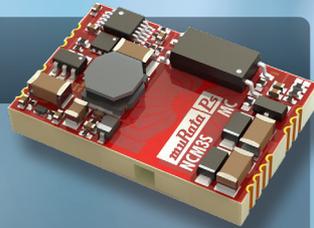
## MGJ1



### Features

- 5V, 12V, 15V & 24V inputs
- +15V/-3V, +15V/-5V, +15V/-9V & +19V/-5V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 2 MOPP to a working voltage of 250Vrms
- Continuous barrier withstand voltage 3kVDC
- Isolation test voltage 5.7kVDC
- Up to 105°C operating temperature
- Optimised bipolar output voltages for IGBT/SiC & MOSFET gate drives
- Isolation capacitance 3pF
- Creepage and clearance 9mm
- Manufactured in the UK

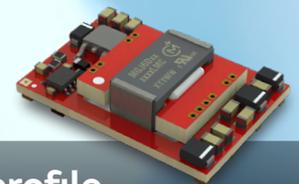
## NCM3



### Features

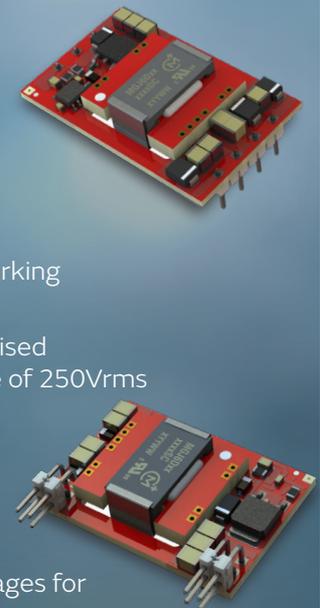
- Wide 4:1 input range with nominal of 12V
- 5V, 12V & 24V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 pending recognition
  - 2 MOPP to a working voltage of 250Vrms
- Isolation test voltage 5kVAC
- Up to 105°C operating temperature
- <1uA leakage current
- Continuous short circuit protection
- Manufactured in the UK

## MGJ6 SIP/DIP & Low profile

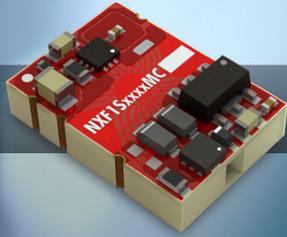


### Features

- 12V & 24V inputs
- +15V/-5V, +15/-10V & +20V/-5V outputs
- Patent protected
- UL60950 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 2 MOPP to a working voltage of 250Vrms
- Continuous barrier withstand voltage 3kVDC
- Isolation test voltage 5.7kVDC
- 105°C operating temperature
- Optimised bipolar output voltages for IGBT/SiC & MOSFET gate drives
- Isolation capacitance 15pF
- Creepage and clearance 8mm



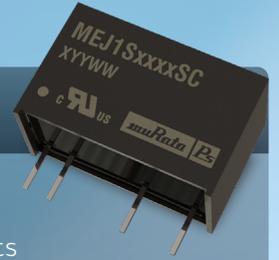
## NXF1



### Features

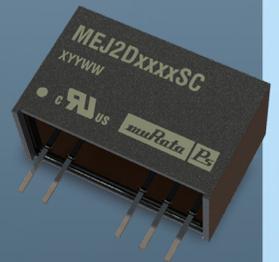
- 3.3V & 5V inputs
- 3.3V & 5V outputs
- Patent protected
- UL62368 recognised
  - Reinforced insulation to a working voltage of 125Vrms
  - Basic insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOPP/2 MOOP to a working voltage of 125Vrms
  - 1 MOOP to a working voltage of 250Vrms
- Isolation test voltage 3kVDC
- Up to 105°C operating temperature
- Short circuit protection
- Substrate embedded transformer
- Manufactured in the UK

## MEJ1 & MEJ2

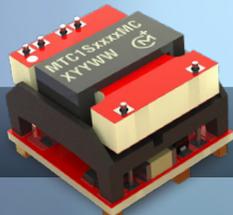


### Features

- 3.3V, 5V, 12V, 15V & 24V inputs
- 3.3V, 5V, 9V, 12V & 15V outputs
- $\pm 3.3V$ ,  $\pm 5V$ ,  $\pm 9V$ ,  $\pm 12V$  &  $\pm 15V$  dual outputs
- Patent protected
- UL60950 recognised - basic/supplementary insulation to a working voltage of 200Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOOP to a working voltage of 200Vrms
- Isolation test voltage 5.2kVDC
- 85°C operating temperature
- Internal SMD construction
- Industry standard SIP package style
- Fully encapsulated with toroidal magnetics
- Pin compatible with the MEV, NMV, NMK, MEJ2 & NMJ

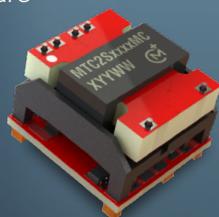


## MTC1 & MTC2

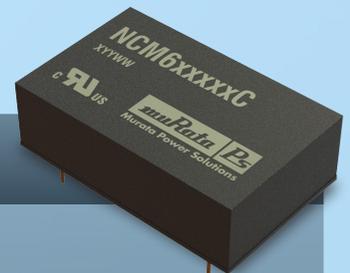


### Features

- 2:1 input range with nominals of 5V, 12V & 24V
- 3.3V, 5V & 12V outputs
- Patent protected
- UL60950 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOPP & 2 MOOP to a working voltage of 250Vrms
- Isolation test voltage 3kVAC
- Up to 105°C operating temperature
- Short circuit protection
- Remote on/off pin
- No electrolytic capacitors
- Creepage and clearance 5mm
- Output voltage trim



## NCM6



### Features

- Wide 4:1 input range with nominals of 5V & 12V
- 5V, 12V & 15V outputs
- $\pm 5V$ ,  $\pm 12V$  &  $\pm 15V$  dual outputs
- Patent protected
- UL60950 recognised
  - Reinforced insulation to a working voltage of 250Vrms
- ANSI/AAMI ES60601-1 recognised
  - 1 MOPP & 2 MOOP to a working voltage of 250Vrms
- Isolation test voltage 5.2kVDC
- 85°C operating temperature
- Typical efficiency to 88%
- Encapsulated for superior thermal performance
- Power density 0.94W/cm<sup>3</sup>
- Under voltage lockout
- Control pin option

# Designed for safety

Power	UL60950 insulation	UL60950 working voltage	MOPP	MOOP	ES60601-1 working voltage	Murata series
<b>1 Watt</b>	Reinforced (UL62368-1)	200Vrms	1		250Vrms	NXJ1
	Basic (UL62368-1)	250Vrms				
<b>1 Watt</b>	Reinforced (UL62368-1)	250Vrms	2		250Vrms	MGJ1
<b>1 Watt</b>	Reinforced (UL62368-1)	125Vrms	1	2	125Vrms	NXF1
	Basic (UL62368-1)	250Vrms		1	250Vrms	
<b>1 &amp; 2 Watt</b>	Reinforced (UL62368-1)	125Vrms		1	250Vrms	NXE1 NXE2
	Basic (UL62368-1)	250Vrms				
<b>1 &amp; 2 Watt</b>	Basic/ Supplementary	200Vrms		1	200Vrms	MEJ1 MEJ2
<b>1 &amp; 2 Watt</b>	Reinforced	250Vrms	1	2	250Vrms	MTC1 MTC2
<b>2 Watt</b>	Reinforced (UL62368-1)	250Vrms	1	2	250Vrms	NXJ2
<b>3 Watt</b>	Reinforced (UL62368-1)	250Vrms	2		250Vrms (Pending)	NCM3
<b>6 Watt</b>	Reinforced	250Vrms	2		250Vrms	MGJ6 SIP/DIP MGJ6 Low profile
<b>6 Watt</b>	Reinforced	250Vrms	1	2	250Vrms	NCM6
<b>6 Watt</b>	Reinforced	250Vrms	1	2	250Vrms	MGJ6

# Global locations

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



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- ④ Traffic signal equipment
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- ⑦ Power plant equipment
- ⑧ Transportation equipment (vehicles, trains, ships, etc.)
- ⑨ Disaster prevention / crime prevention equipment
- ⑩ Application of similar complexity and/or reliability requirements to the applications listed above

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