

# Multilevel Active-Clamped Electrical Energy Converter

A new multilevel conversion technique has been developed to produce efficient, compact, and easily scalable electrical energy converters to be employed in dc-dc, dc-ac, and ac-ac, single- or multiple-phase, conversion applications with unidirectional or bidirectional power flow. Partners to further develop the system and/or to establish commercial agreements along with technical cooperation are sought.

## The Challenge

Every electronic equipment requires a power electronics unit to process electrical energy. This unit is the main component in equipments whose main purpose is to process electrical energy. The efficiency, size, and cost of these conversion units are of great concern due to their extensive use throughout the electronic industry.

Conventional conversion techniques use two-level converters that require a different semiconductor device for each different voltage rating. This calls for a customized converter design for each application and voltage rating which is time consuming and expensive.

Multilevel conversion techniques offer an opportunity to improve the performance of power converters while reducing their size and cost. Different voltage ratings can be accommodated by simply increasing the number of converter levels. But most multilevel topologies need the inclusion of passive components of significant size or present other drawbacks that prevent their extended use.

## The Technology

A novel multilevel active-clamped converter topology and operating principle is proposed for any number of conversion levels. The topology consists on a pyramidal connection of a single semiconductor device, with no passive components required. The novel operating principle ensures low conduction losses and a proper distribution of switching losses with maximum switch utilization.

## Innovative advantages

- Increased conversion efficiency
- Reduced converter volume and weight
- Improved converter reliability
- Increased fault-tolerance capacity
- Lower converter cost

## Current stage of development

The technology has been tested in a laboratory prototype.

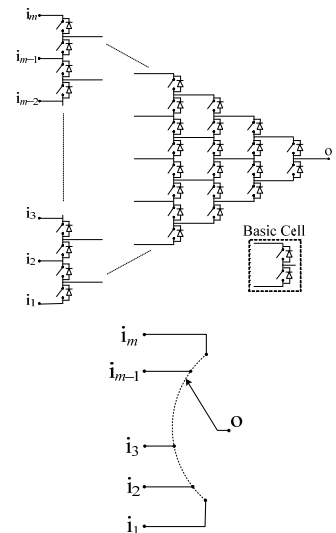
## Applications and Target Market

The technology can be of especial interest to power electronics equipment manufacturers. A wide range of applications are envisioned including power converters for electric vehicles and renewable energy systems (photovoltaic and wind energy conversion systems).

## Reference number

MKT2012/0115\_1

## Novel power electronics multilevel conversion technique



Increased conversion efficiency, reliability, and fault tolerance

Reduced converter volume, weight, and cost

## Business Opportunity

Technology available for licensing with technical cooperation

## Patent Status

Spanish patent application

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