

# Building Automation **ENERGY MANAGEMENT SOLUTIONS**

Wireless Modules  
Passive and Electromechanical Components



# PANASONIC ENERGY MANAGEMENT SOLUTIONS

Components for Smart Grid and Renewable Energy

“ Our mission:  
Enable energy saving  
and higher comfort  
for everyone ”

## The way we generate and use energy is changing drastically.

Just connecting to the grid is a thing of the past. Today we all have to be part of the new energy infrastructure and contribute to energy saving.

Panasonic has been supporting the change for years and offers components and modules for efficient, ecological and economical energy management solutions.



### Example battery storage system

- 1 Solar panels
- 2 Solar inverter
- 3 Battery inverter/controller
- 4 Batteries
- 5 Smart meter

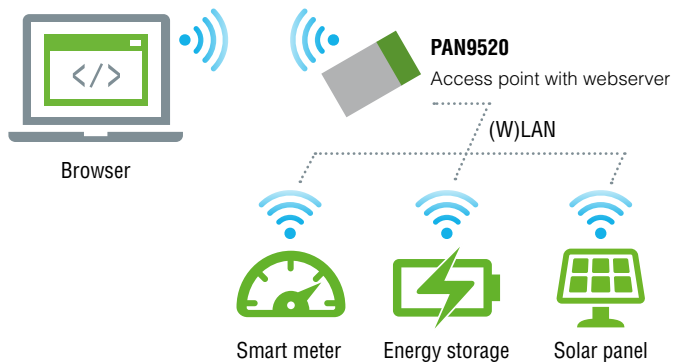
# WIRELESS MODULES

## High Reliability with Additional Crystal

“ Low-cost embedded Wi-Fi solution enables fast time-to-market! ”

The PAN9520 combines a high-performance CPU and a 2.4 GHz high-sensitivity radio in one small solution, making it possible to also run any application code directly on the module. Additionally, the integrated crystal ensures connection performance over a full temperature range and lifetime. Next to the evaluation board, a huge number of preprogrammed software elements can be used as a starting point for development. The small size and latest Wi-Fi security features qualify the low-cost solution as an ideal choice for building automation applications.

The PAN9520 can be easily integrated into an existing (W)LAN network at home, where controlling the smart devices or usage data can be displayed via a webinterface.



PAN9520 – Wi-Fi 4 Embedded Module

- » Xtensa® single-core 32-bit LX7 microprocessor, up to 240 MHz
- » Chip internal 128 kB ROM, 320 kB SRAM, and 16 kB low-power SRAM
- » Integrated QSPI flash and PSRAM (a variety of memory densities are available)
- » All security features required for WPA2 and WPA3-Personal
- » Espressif Integrated Development Framework (ESP-IDF) with a multitude of examples available for software development
- » Surface mount type (SMT): 24 mm × 13 mm × 3.1 mm
- » Industrial temperature range from -40°C to 85°C

Go to  
product  
page

# HYBRID CAPACITORS

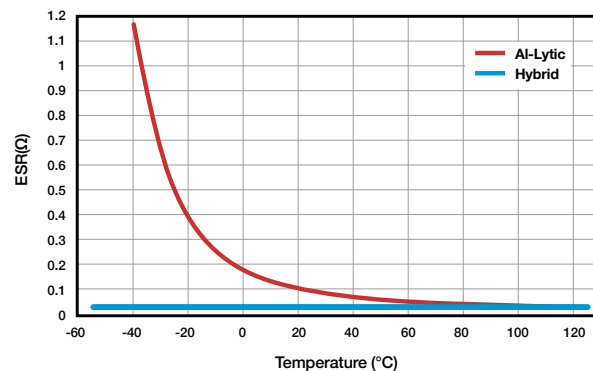
For DCDC Converters or Smart Meter Control Boards

“ Tough against humidity and extreme temperature, longer lifetime, perfect for outdoor usage. ”

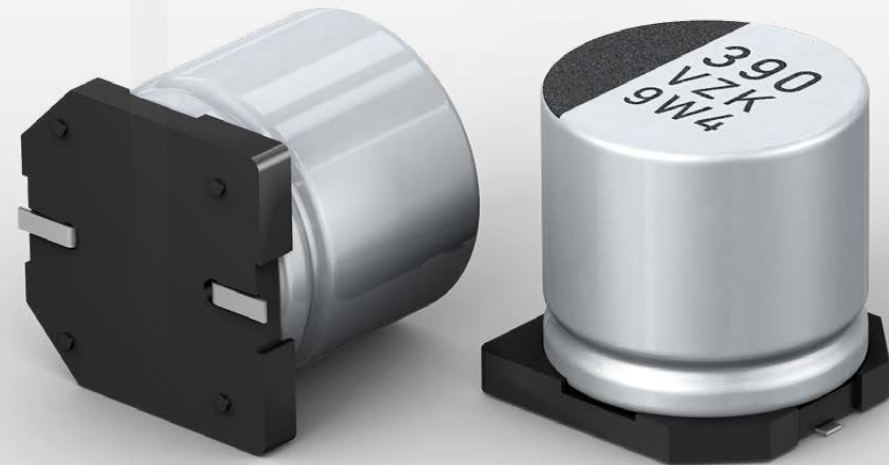
Hybrid capacitors combine a conductive polymer and electrolyte liquid to enable high performance and high reliability. As features of both technologies, large ripple current (low equivalent series resistance - ESR), low leakage current and high reliability all contribute to downsizing and the high reliability of the equipment.

In addition, hybrid has a long lifetime thanks to polymer technology, and its ESR shows little change, even at low temperatures, and high humidity resistance performance. This makes it perfect for use with smart meters that are installed outdoors or exposed to low temperatures.

## Temperature Characteristics



Impact from temperature is small. Low ESR even at low temperatures.



- » Higher ripple (up to 5.8 Arms)
- » Small case size (down to 5 x 5.8 mm)
- » Super-low leakage current
- » AEC-Q200 compliant
- » Anti-vibration type available for all standard type (Φ6~)

Open  
white paper

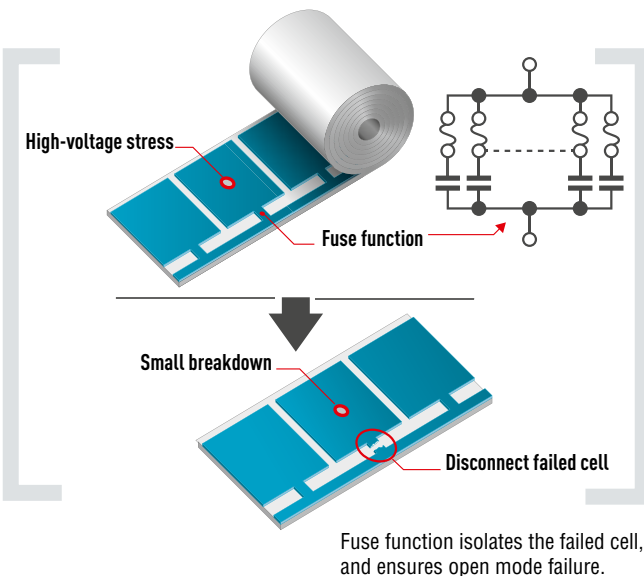


# FILM CAPACITORS

Safety and Reliability Guaranteed for Optimized Solar Inverter Design

“ Zero safety risk and high resistance against moisture. ”

The outstanding feature of Panasonic's film capacitors is the integrated safety function. An original in-house patterned metallization process is the basis of a special structure which performs as a fuse mechanism that prevents the capacitor from experiencing short mode failure. Additionally, it achieves a very stable capacitance level over the capacitor's lifetime and therefore guarantees high reliability. Furthermore, a long lifetime is realized by high temperature and moisture resistance using an originally developed sealing technology.



- » Rated voltage 275VAC to 310VAC (EMI suppression safety class X2), 250VAC to 600VAC (output AC filter), 450VDC to 1100VDC (input DC filter and snubber)
- » 0.0082 $\mu$ F to 10 $\mu$ F (EMI suppression safety class X2), 0.1 $\mu$ F to 110 $\mu$ F (input/output filter and snubber)
- » -40°C to 110°C
- » Built-in fuse function
- » High moisture resistance
- » Flame-retardant plastic (case and sealing resin)



# POLYMER CAPACITORS

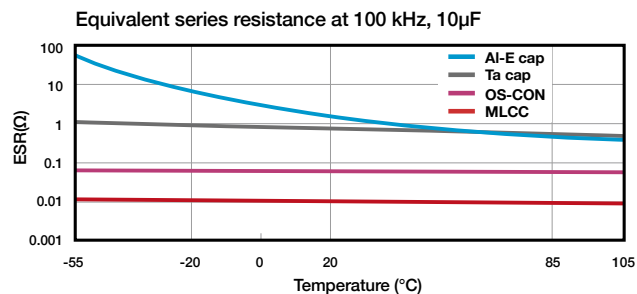
## OS-CON Conductive Polymer Aluminum Solid Capacitors

“ High voltage, high reliability  
and long lifetime. ”

OS-CON is an aluminum solid capacitor with high conductive polymer. OS-CON acquires low equivalent series resistance (ESR), excellent noise reduction capability and frequency characteristics. In addition, OS-CON has a long life span and its ESR shows little change, even at low temperatures, which makes it perfect use in security, surveillance cameras and any applications that are installed outdoors or exposed to low temperatures. Low temperatures and long usage can deteriorate capacitance and ESR of capacitors that contain liquid, but OS-CON, due to its solid material, is not affected by these factors.

### ESR Temperature Characteristics

OS-CON vs. other types



\* ESR is not dependent on temperature, showing hardly any changes.



- » A wide voltage range from 2 to 100 volts
- » High capacitance up to 2700 $\mu$ F
- » Low ESR down to 5m $\Omega$
- » Long lifetime
- » High ripple current

Go to  
product  
page

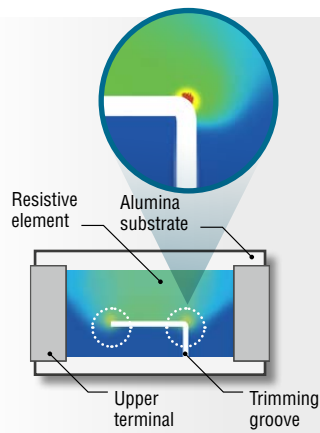
# FIXED RESISTORS

## High Power / Anti-Surge Thick Film Chip Resistors ERJP Series

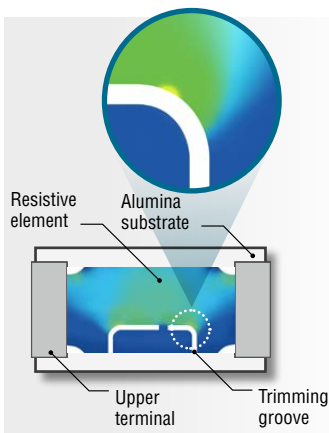
“ Downsizing and component saving with high-power, anti-surge resistors. ”

Panasonic offers a wide range of high-power, anti-surge resistors, designed and tested to be used in a variety of applications. The Anti-Surge Thick Film Chip Resistors ERJP series has a unique trimming shape for surge distribution, as well as proven small size and high power and overload characteristics. Excellent heat dissipation with optimized resistance pattern and resistance material, and the electrode design enables downsizing and a high-power rating.

### Other company



### Panasonic



Unique "double-C-shaped trimming" for surge distribution  
Achieved small size and high power and overload characteristics



- » Case size from 0402 to 1210
- » Resistance values from 1Ω to 10MΩ
- » Power rating from 0.2W to 0.66W
- » AEC-Q200, RoHS compliant
- » Anti-pulse, anti-surge, anti-ESD
- » Soft termination technology for highest solder-joint reliability

Go to  
product  
page

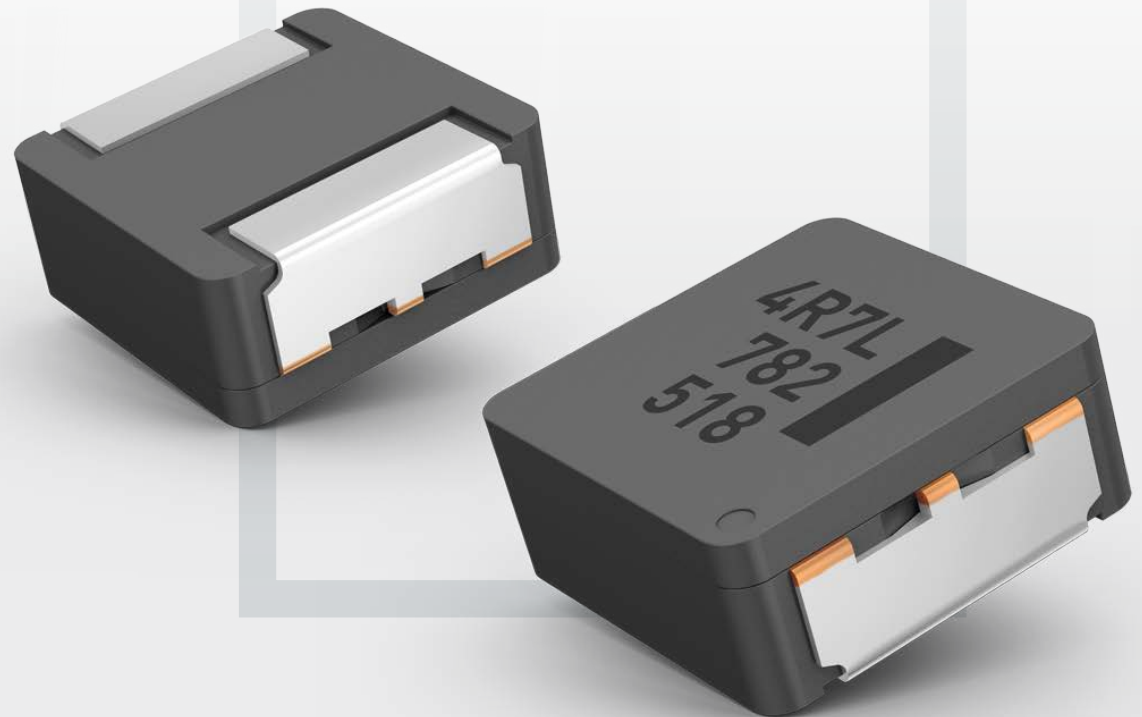
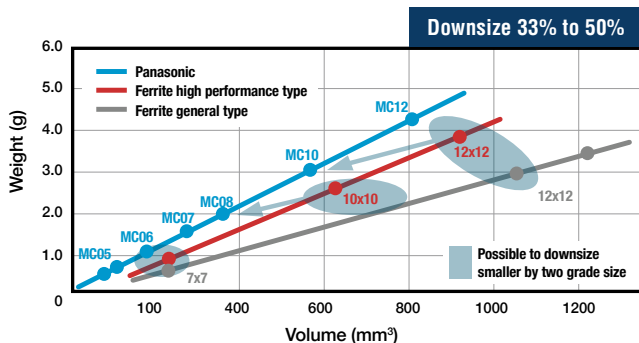
# POWER CHOKE COILS

Metal Composite Magnetic Core Technology for High Current Capability and Outstanding Reliability

“ Downsize your application  
to invisibility. ”

With the ETQP series, Panasonic offers metal composite power inductors with best-in-class reliability and efficiency. The unique magnetic core material provides no hard saturation characteristics against DC bias current and allows for very low power loss and reduced DC resistance. It has a much higher energy density compared with ferrite inductors, which in turn leads to 30% to 50% smaller case sizes and therefore perfectly supports the ongoing trend of downsizing electronic systems with high current capabilities. In addition, the inductance value does not vary over temperature, which further helps to ease the development of electronic systems. Together with its high heat resistance, it is the perfect power inductor to guarantee the highest reliability in energy management systems.

## Downsize: Volume/Weight Reduction Effect



- » Variety of inductance ranges: from 0.33uH to 100uH
- » Package size from 5 x 5 mm to 12 x 12 mm
- » Up to 85A saturation, 53A rated / 0.33uH
- » Operation temp. -55°C to +155°C, up to +180°C in short time
- » Miniaturization: -50% space saving vs. ferrite inductor
- » Vibration resistance from 10G to 30G

Go to  
product  
page



# LIGHT TOUCH & DETECTOR SWITCHES

For Detection of Cover Opening and HMI-Operation

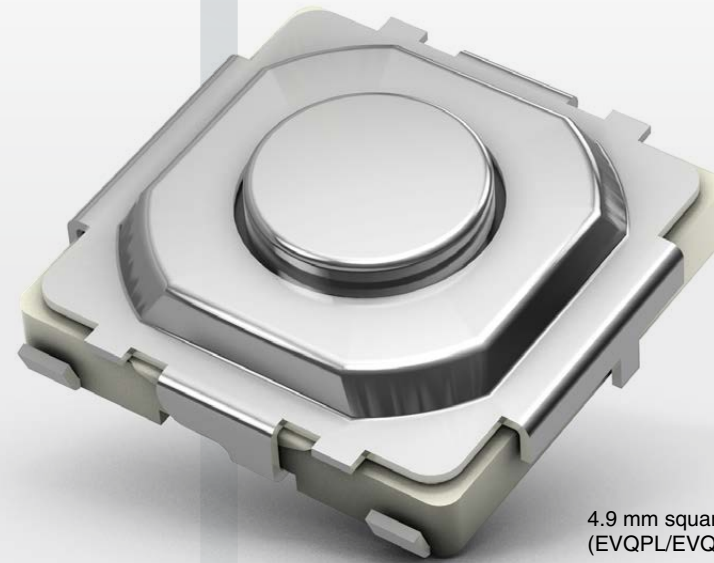
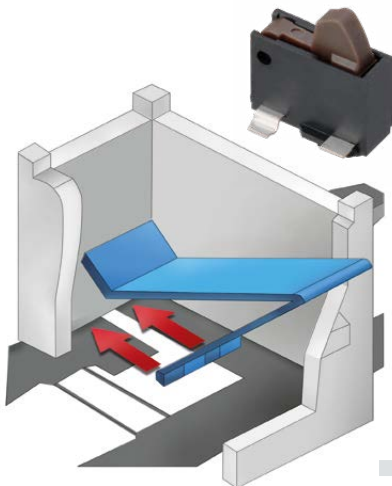
“ A mechanical sliding spring design ensures consistent signal output. ”

When it comes to building automation systems, detector switches are mainly used in safety or security applications. One example is lid-opening detection: Unauthorized opening of housings can result in injuries because of high voltage or system failure. By detecting the opening, the system can switch off and shut down to avoid any accidental contact or manipulation.

For physical user-interface applications, a large variety of tactile (light touch) switches is available. Each switch is engineered for low contact resistance, small bounce noise, high contact reliability and a sharp tactile feel.

Detector Switch

A mechanical sliding spring ensures constant signal output with self cleaning effect.



4.9 mm square SMD  
(EVQPL/EVQ3PL/EVQ5PL/EVQPT)

- » Consistency in quality with simple structure
- » Long life
- » High accuracy: All parts are produced in-house, full control over production process and quality management

Go to  
product  
page



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