

# LED LIGHTING SOLUTIONS

Circuit Protection  
Thermal Management  
I/O Controls  
Capacitors  
Resistors  
Inductors

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[www.panasonic.com/lightingsolutions](http://www.panasonic.com/lightingsolutions)  
1-800-344-2112



POWERED BY

**Panasonic**  
Electronic Components



POWERED BY

# Panasonic

## Electronic Components

Panasonic Electronic Components provides cutting edge component technology that can give your lighting application the performance, reliability and quality that today's consumers demand and that is synonymous with the Panasonic brand.

The Power of Panasonic Electronic Components bring strategic innovations to the product development process. We provide the technology, engineering and manufacturing resources that enable you to plan and build world-class solutions to meet their customer's needs. Panasonic's LED Lighting Solutions can enhance productivity, cut costs, solve problems and protect natural resources in ways you may have never imagined.



Panasonic has a long history in the lighting industry. Prior to becoming a global consumer electronics powerhouse, Konosuke Matsushita, Panasonic's founder, created a simple and efficient lighting socket in 1917 as Panasonic's first product. Today, Panasonic Electronic Components continues his tradition by creating efficient, reliable, and cost effective solutions that serve as the building blocks for a wide range of advanced LED Lighting applications.

The only measure of success is the confidence and trust shown in our technology when it becomes the power behind your products. Make sure your product is Powered By Panasonic Electronic Components.

# CIRCUIT PROTECTION



## ZNR SURGE ABSORBERS

Will protect LED lighting equipment from electric surges that come through AC power lines.

Panasonic has a wide selection of Surface Mount & Disc part numbers.

Surface Mount

- Crack Resistant (Molded Structure)
- Flow/Reflow Soldering

Disc

- Diameters From 5mm to 20mm
- High Surge Withstand Capability & Small Size
- 81V and Higher, With Agency Recognitions

## MULTI-LAYER CHIP VARISTORS

Will protect LED's from ESD damage. White and Blue LED's are most susceptible to ESD damage. MLCVs are available in a wide variety of values.

- ESD suppression
- Accommodate Series LED Combinations
- Can Replace (2) Zener Diodes and (1) Capacitor

# THERMAL MANAGEMENT

## MULTI-LAYER CHIP THERMISTORS

Can aid in the control of LED circuits. Elevated junction temperatures can reduce expected life, resulting in the need for temperature control.

This begins with temperature sensing.

- Brightness Control
- Overheating Prevention

## PYROLYTIC GRAPHITE SHEET

PGS is a heat spreading material with several times the thermal conductivity of copper in its plane.

- Spreads Heat From Hot Spots, Allowing More Efficient Heat Sinking
- Highly Flexible
- Can Be Die Cut to Custom Shapes

# I/O CONTROL

## RF MODULES

RF Modules are an excellent choice for lighting control applications. Two series in Panasonic's RF Module product line are well suited for lighting control:

- Mesh Networking — Complex, multi-node networks are most easily implemented using SNAP<sup>®</sup> (Synapse Network Application Protocol) modules such as the PAN4555 and PAN4561. SNAP networks don't require the use of a coordinator, making them more reliable than other network topologies.
- ISM — With their tiny footprint, ISM modules are Panasonic's most aggressively priced and smallest RF Modules. The PAN2355 series are versatile and ideal for proprietary networks.

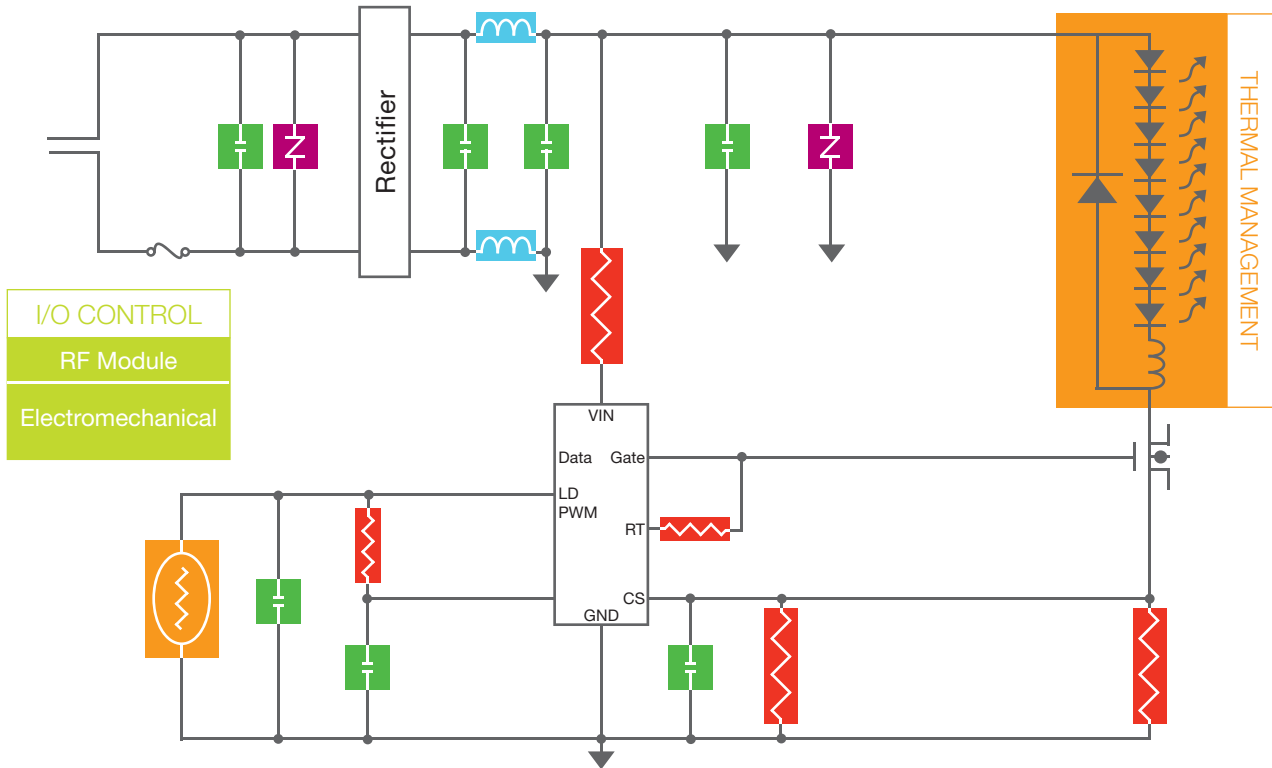
## ELECTROMECHANICAL

Panasonic offers tactile switches and linear potentiometers for lighting control applications, that can be found in cars, offices, homes and flashlights.

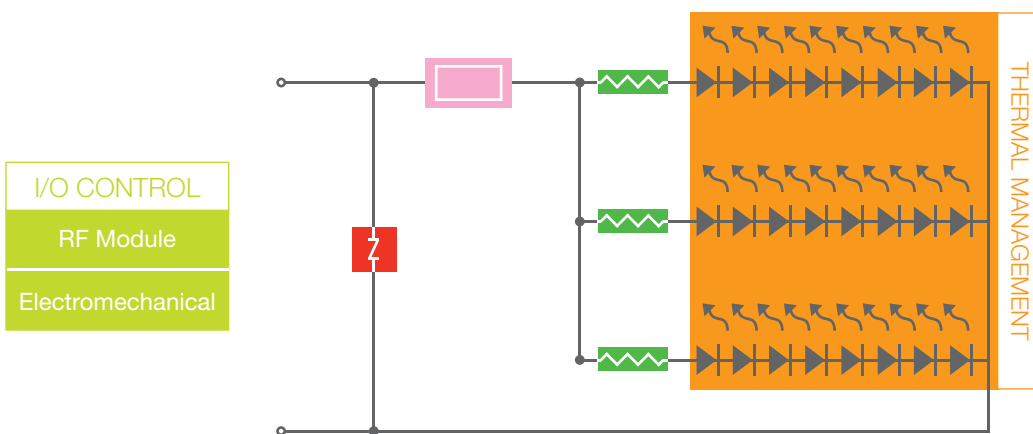
- Panasonic Long Stroke Switches Provide Less Finger Fatigue and Accident-Free Actuation.
- Center Space Switches Allow For LED Integration
- 20mm Slide Potentiometers Provide Smooth Dimming Control

# CIRCUIT EXAMPLES

## AC LED Circuitry



## DC LED Circuitry



# CAPACITORS



## ELECTROLYTIC

HB LED Drivers use surface mount and radial leaded capacitors as output & input capacitors.

- Long Life
- Lower ESR
- High Ripple Current

## SAFETY STANDARD APPROVED FILM

Meets North American & European safety regulations for noise suppression.

- High Reliability
- Safe

## SURFACE MOUNT FILM

Best option for output capacitors.

- Low Audible Noise
- Excellent Characteristics

## METALLIZED POLYPROPYLENE FILM

Used for active filtering applications.

- Small Size With Low Profile
- Low Audible Noise
- High Reliability

## METALLIZED POLYESTER FILM

Used as an output capacitor for HB LED drivers.

- Miniaturized
- Light
- Excellent Performance
- Minimum Change Of Capacitance vs. Temperature Change
- High Insulated Resistance

# RESISTORS



## SURGE TOLERANT CHIP

Panasonic's serpentine pattern design decreases Electric Field Strength per unit length to better handle pulses/ESD.

- Higher Pulse Handling & ESD Resistance Than Standard Thick Film Chip Resistors

## CHIP FUSE

One of the industry's smallest: 0402 & 0603 case sizes.

- Withstand Inrush Current And Fast-Acting, One-Time Blow Characteristics
- Sharp Fusing Distribution
- Pb-Free

## CURRENT-SENSING CHIP

Panasonic offers a wide variety of low resistance chip resistors for use in current sensing applications.

- Low Temperature Coefficient of Resistance (TCR) and High Precision as result of the Alloy Resistive Element
- Wide Range of Case Sizes, From 0402 to 2512
- Low Values, Thick Film to 10mΩ, Metal Bar to 1mΩ

# INDUCTORS



## PIN TERMINAL CHOKE COILS

- Small Sizes
- Wide Range Of Inductance (L) Values

## SMD CHOKE COILS

- Small
- Low Profile
- Wide Range of Inductance (L) Values
- Magnetic Shielding

## SMD POWER CHOKE COILS

- Thin and Small
- High Heat Resistance: 150°C (Including Self-Heating)
- Excellent DC Bias Characteristics
- High Reliability At High Temperatures
- High Tolerance to Vibration
- Low Audible Buzz Noise
- Low DCR and Eddy Current

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**Panasonic ideas for life**