

What is PhotoMOS?

Panasonic Electric Works offers a wide range of PhotoMOS relays for use in telecommunication, measurement, security devices and industrial control. Obviously, the PhotoMOS relay differs from the conventional electromechanical relay, but it also distinguishes itself from other switching solutions that utilize optocouplers or semiconductors.

The construction of the PhotoMOS relay is illustrated below:

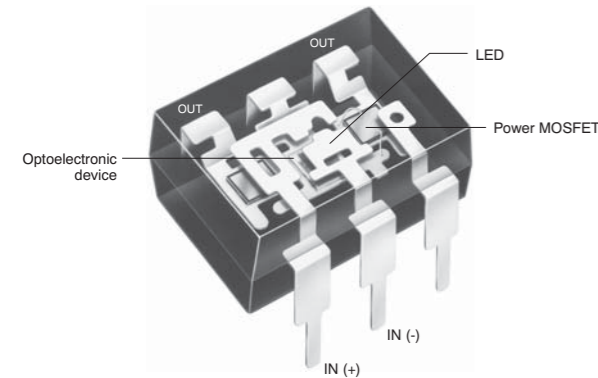


Figure 1 PhotoMOS internal construction

The input pins are connected to a light emitting diode. This LED is located on the upper part of the relay and as soon as a current flows through it, it starts emitting infrared light. Below the LED, there is an array of solar cells intergrated into an optoelectronic device, thus switching the output transistors.

The light emitter and detector are moulded in translucent resin that allows light to pass through but provides a dielectric barrier between the input and output side. By integrating an internal circuit in the optoelectronic device, it serves as a control circuit for switching the power MOSFETs and therefore the load circuit in an ON or OFF state.

A single power MOSFET is only capable of switching a DC voltage since its internal source-drain diode will become forward biased if the load polarity is reversed. Using a PhotoMOS relay for switching AC voltages therefore requires two source-coupled power MOSFETs in one PhotoMOS relay.

By connecting the two output transistors of an AC relay in parallel, the allowable DC current can also be increased (A, B or C connection) as illustrated below:

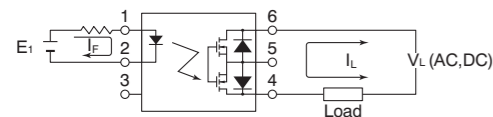


Figure 2 PhotoMOS in A connection

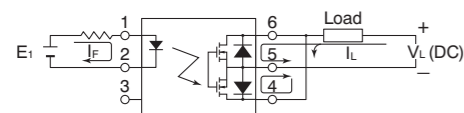
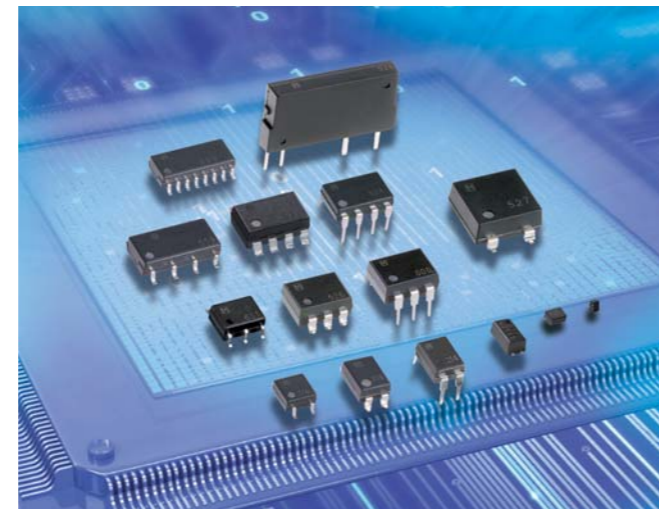


Figure 3 PhotoMOS in C connection

Basically, the power MOSFET's output acts as a pure ohmic resistance thus distinguishing the PhotoMOS from an optocoupler or triac solution, since no saturation voltage or offset voltage is required. However the aforementioned source-drain diode of the MOSFET may influence the linearity of the output, and the output capacitance may limit the usability for higher frequencies. This strongly depends on the type of PhotoMOS relay used and on the application's requirements.



Due to Panasonic's broad product range, we are able to offer PhotoMOS relays for numerous applications, enabling you to utilize

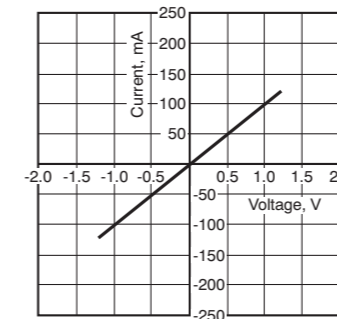
PhotoMOS advantages:

- Low control current
- Control of small analog signals
- Low leakage current
- Fast switching speed
- Stable ON-resistance over lifetime
- Extremely long product life
- Small size
- Flexible mounting position
- High vibration and shock resistance
- No contact bouncing
- No switching noise

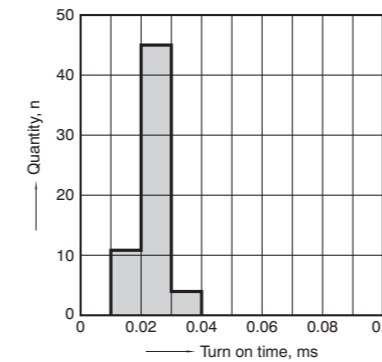
Due to the enormous variety of PhotoMOS relays, they are suitable for numerous applications (see figure 4). They can be used in telecommunications and for measurement equipment, for switching and controlling small motors or other power loads, and for controlling various signals out of microcontrollers.

Examples of PhotoMOS Advantages

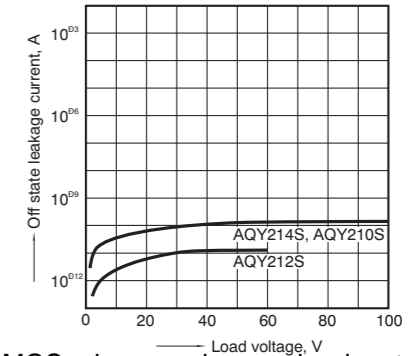
1. High output linearity without any saturation or offset voltage making PhotoMOS perfectly suitable for switching signals or loads (AQY225R2V).



2. Fast switching times with stable behavior over lifetime and no contact bouncing due to semiconductor technology (AQY221N3V).



3. Perfectly suited for switching low level signals due to low off-state leakage current in the range of pA to nA (AQY21*S).



4. PhotoMOS relays require very low input control currents. Sensitive types are also available (AQV234). Take temperature and safety considerations into account.

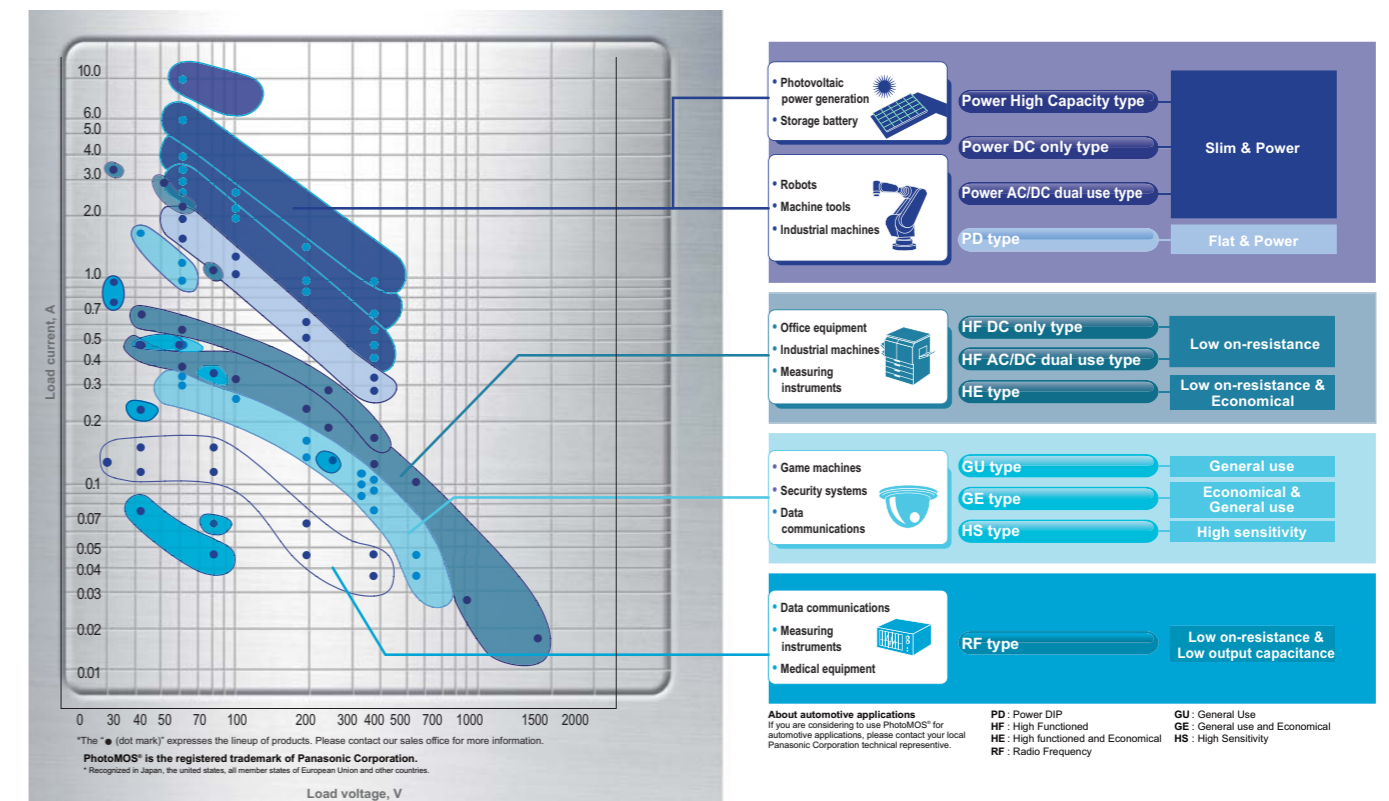
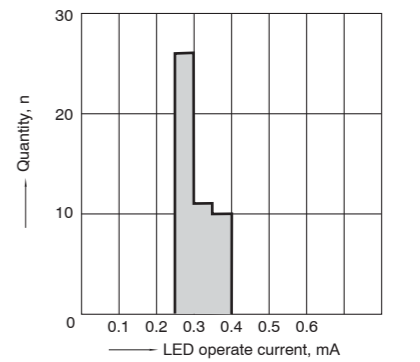


Figure 4 PhotoMOS load current vs. voltage - Selector Chart