

# NPI G6QE RELAY

New Product Introduction  
September 2018

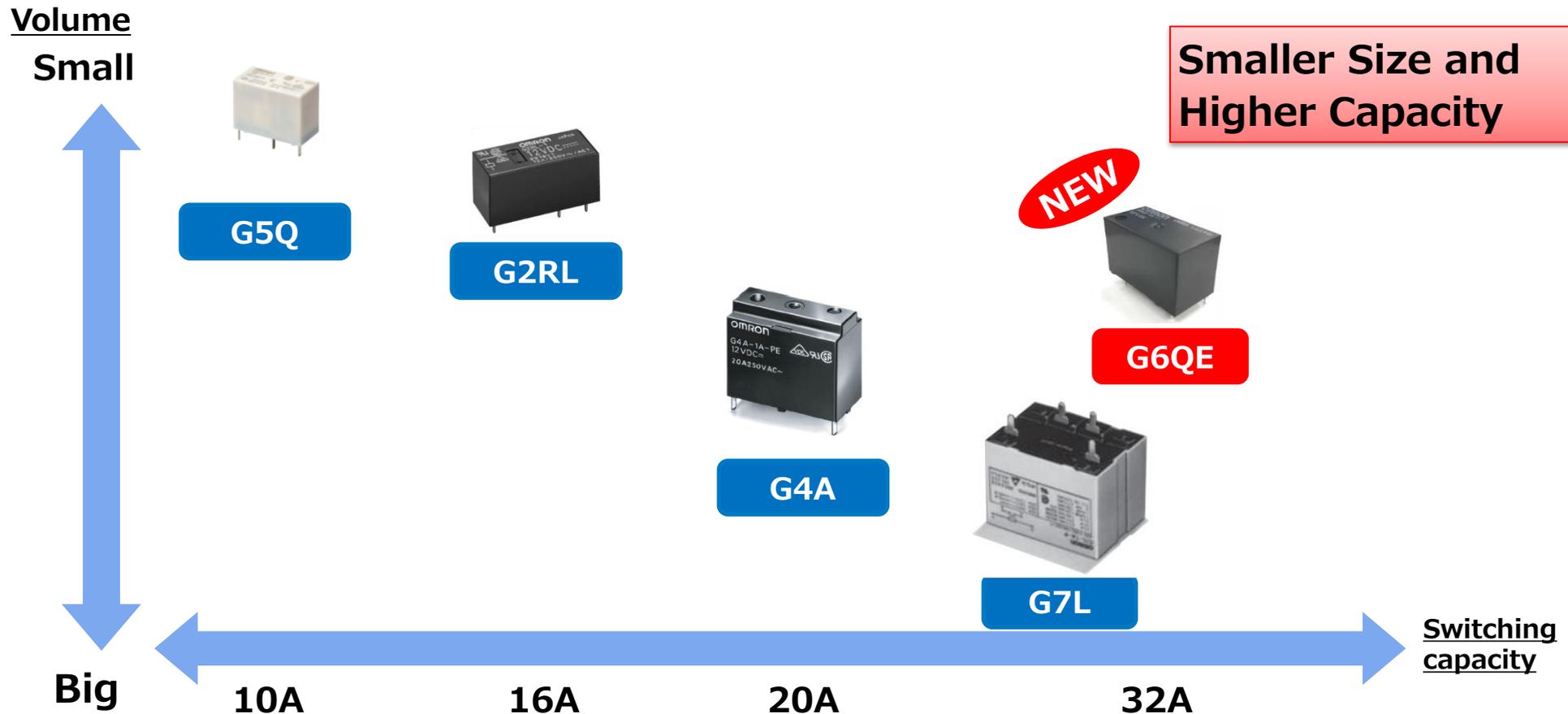


Omron's new PCB Power Relay boasting  
High Switching Capacity of 32A in a Small Size Package

**OMRON**

# New Product introduction: G6QE

■ Omron's new Power PCB Relay G6QE was developed for High Switching Capacity of 32A while providing space saving on customer's application due to its small size package.



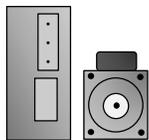
# Target Applications

- The G6QE is very versatile and can be used in a wide array of applications

## 【Target applications】

- Industrial, FA
- Home appliance
- Commercial application

Ex)



Servo



Inverter



Power supply

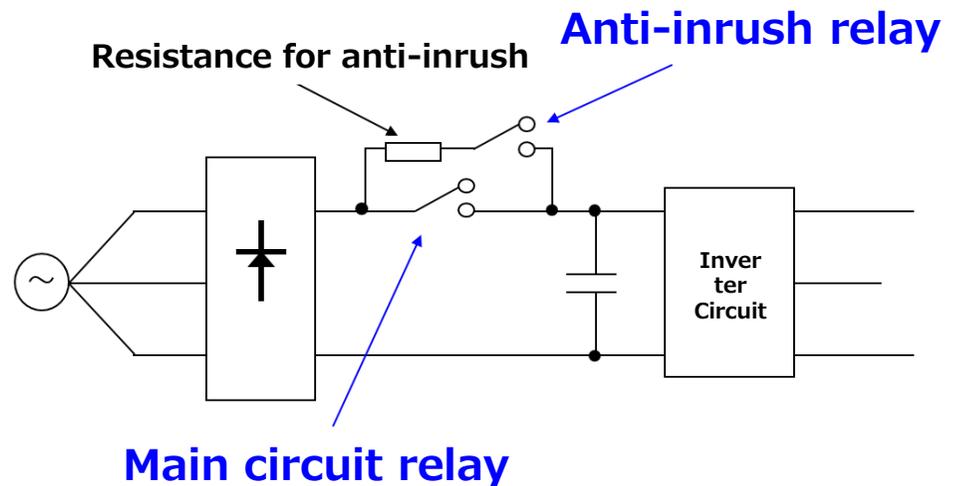
## 【Requirements of Application】

- Small size
- High capacity
- Energy saving

## 【Relay function】

- Anti-Inrush of inverter circuit
- Each load control ( motor, heater, power supply etc)

### Circuit example (Anti-Inrush)



## G6QE Advantages for customers

- **G6QE contributes to Downsizing of end customer's product due to its small size; provides High Performance due to its High Current Switching, and Energy Saving by Allowing Holding Voltage Method.**

### ◆ **Downsizing & High Performance in customer's application**

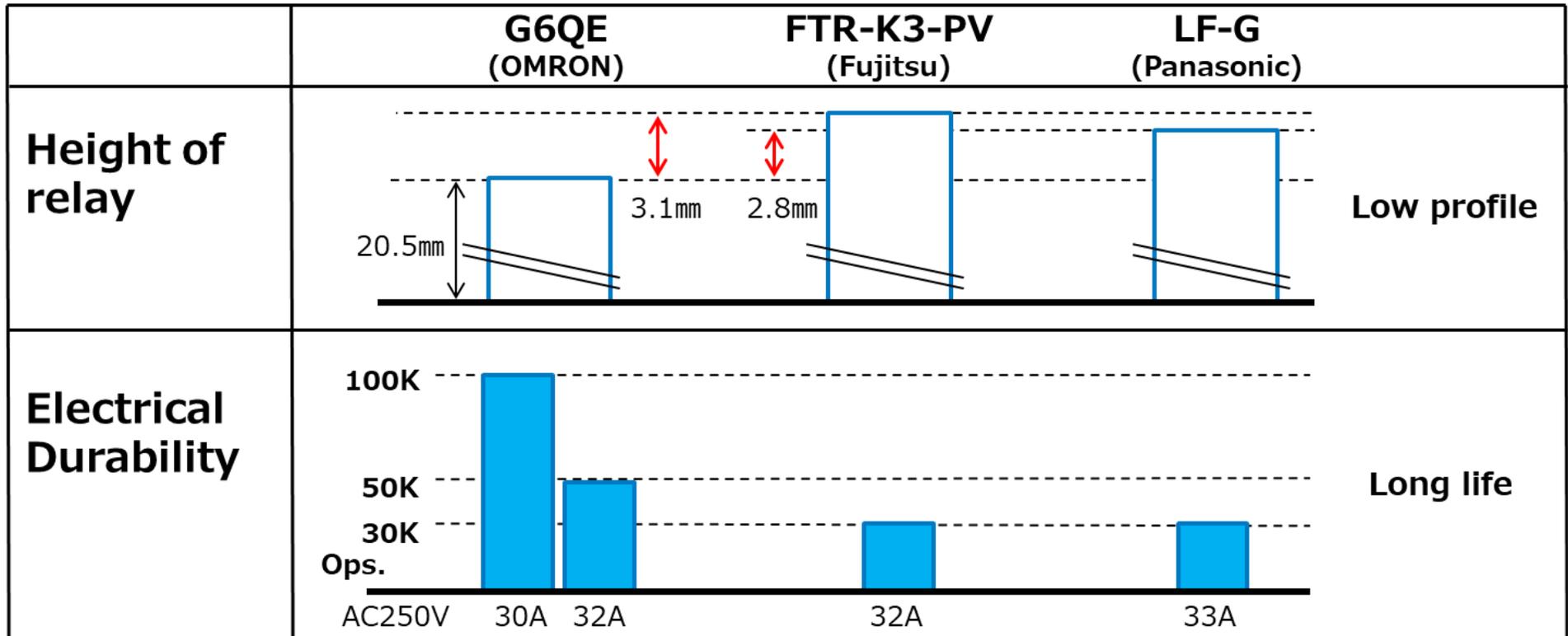
=>By offering **32A High Switching capacity in a small package**, G6QE allows customers to design smaller size and higher performance in application.

### ◆ **Energy Saving**

=>By operating with holding voltage method, Power consumption will be reduced to 12% min. It enables energy saving and lowers heat generation in the application.

# Downsizing of customer's application design and additionally offering a higher performance

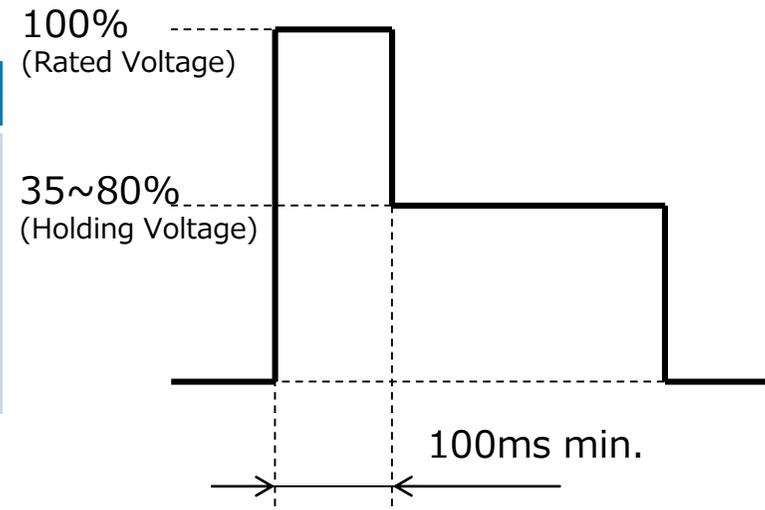
- G6QE is a small relay with a 32A contact rating
- It will allow customers to reduce the height of their enclosure design
- Achieved Smaller Size and Higher Durability than competitors products



# G6QE Energy saving method

- By lowering coil voltage after relay operation, Enable to reduce power consumption and heat generation.

Type	G6QE
Power Consumption & Ambient operating temperature	<ul style="list-style-type: none"> <li>•When applying Rated Coil Voltage 1400mW at -40°C to +60°C</li> <li>•When applying <b>Holding Voltage at 35% to 80%</b> <b>172mW(min.)</b> at -40°C to <b>+85°C</b></li> </ul>



\*If the coil voltage is reduced to the holding voltage after Relay operation, first apply the rated voltage to the coil for at least 100 ms, as shown above.

# **G6QE Appendix.**

# G6QE Features

- With the same terminal arrangement as Existing product G4A, Enables replacement to G6QE without changing PCB design.

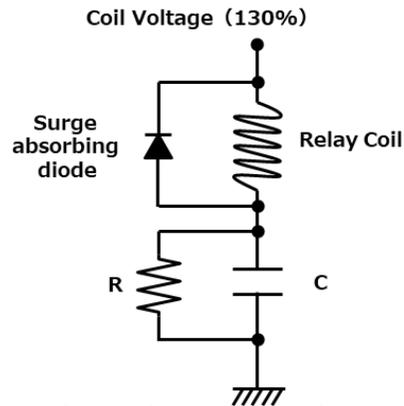
Comparison between G6QE and existing product

Type	Switching Current	Power consumption	Size(mm)			Terminal Arrangement
			Width	Depth	Height	
<b>NEW</b> G6QE	<b>32A</b>	1,400mW	30.5	16	<b>20.5</b>	<b>Same</b>
G4A	20A	900mW	30.5	16	26.8	

# How to reduce voltage applied to the coil

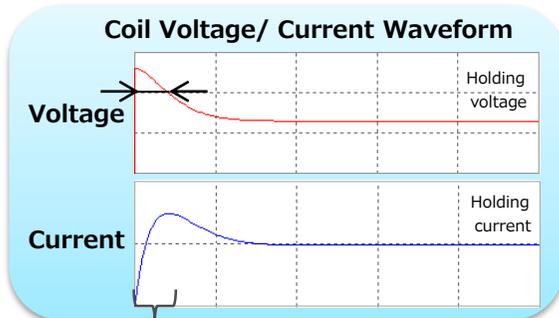
- Support lower power consumption by reducing the applied holding voltage to the coil after contacts have already closed

## 1. CR circuit method



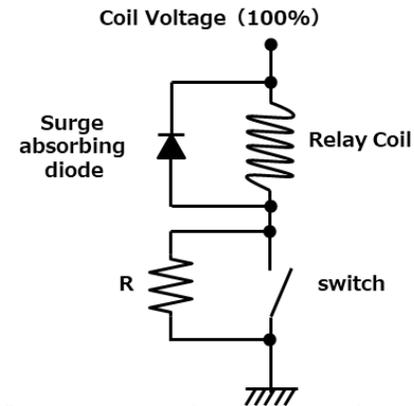
- ① First, turn a relay ON by applying voltage at the rated voltage or more.
- ② After the relay turns on by the current flowing in C, suppress the current by R.

※ C is set with the capacity that the current over the rated current flows for 40ms or more.  
R is set so that a current of 50% or more of the rated current flows.



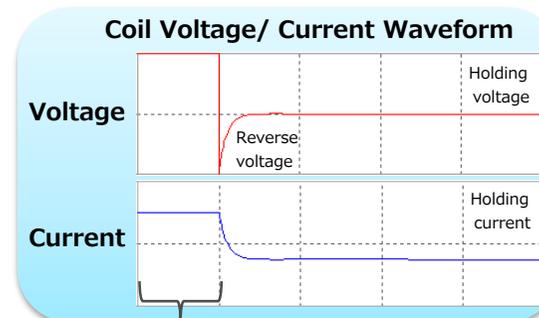
First, Applying 100% or more Rated Coil voltage to the coil for 40ms.min.

## 2. Switching method



- ① First, turn a relay ON by applying voltage by the switch .
- ② When the switch is opened, the current is suppressed by resistance.

※ When the switch is off, R is set so that a current of 50% or more of the rated current flows.



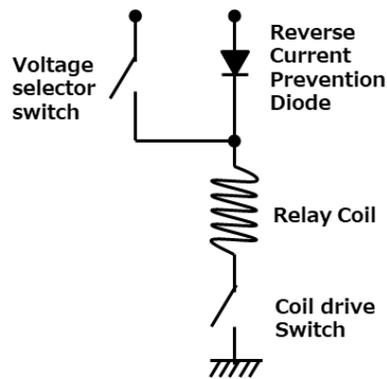
First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

# How to reduce voltage applied to the coil

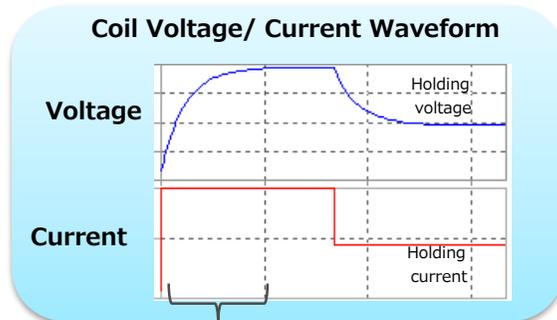
- Support lower power consumption by reducing the applied holding voltage to the coil after contacts have already closed

## 3. Switching method (Two systems)

Coil Voltage (100%)    Coil Voltage (50%)



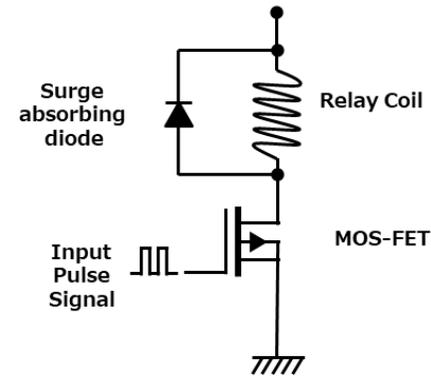
- ① First, turn relay ON by applying voltage and turn on the coil drive switch.
- ② When the relay turns ON, turn the voltage selector switch OFF.



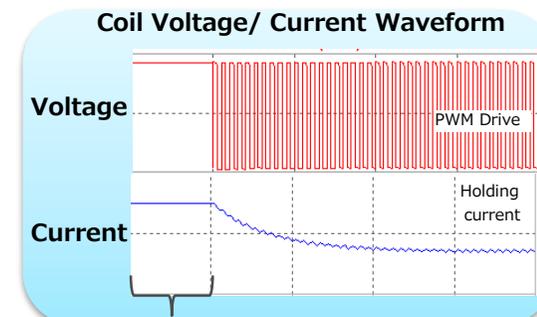
First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

## 4. PWM method

Coil Voltage (100%)



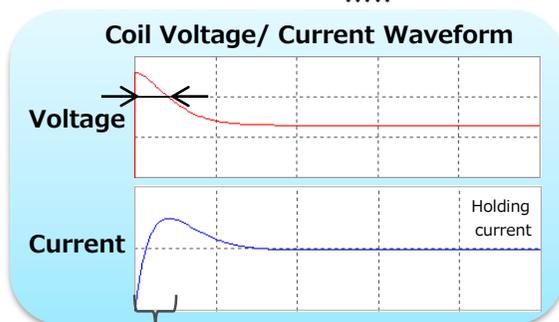
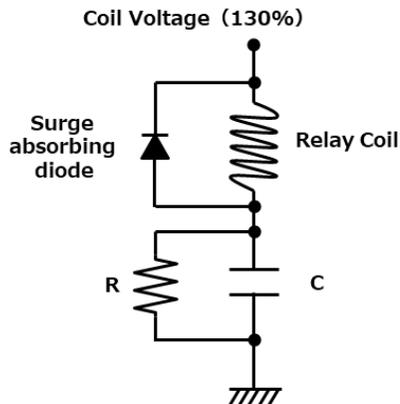
- ① First, turn relay ON by applying voltage to the MOS-FET for 100ms Min.
- ② Then, applying pulse voltage (PWM drive), The current will be reduced to Holding current. It reduces Relay coil consumption.



First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

## ■ Example of Energy Saving Effect Calculation

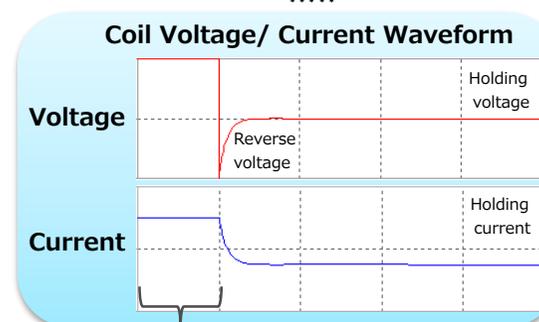
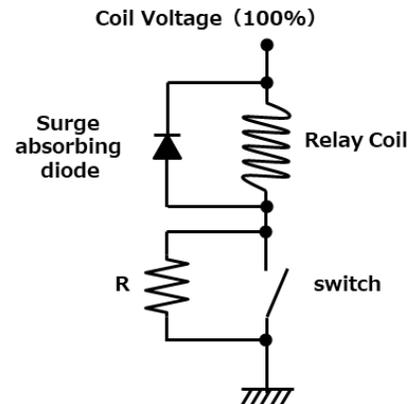
### 1. CR circuit method



First, Applying more 100% Rated Coil voltage to the coil for 40ms.min.

1. Circuit Voltage : 1.3 time
2. Steady current : 0.5 times
3. Watt consumption  $W = V \times I$   
 $W = 1.3V \times 0.5 I$   
 $= 0.65V I \Rightarrow$ Reduced by 35%

### 2. Switching method



First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

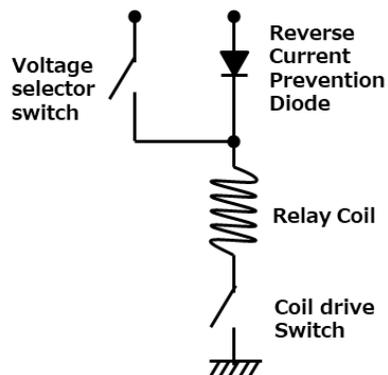
1. Circuit Voltage : 1.0 time
2. Steady current : 0.5 times
3. Watt consumption  $W = V \times I$   
 $W = 1.0V \times 0.5 I$   
 $= 0.5V I \Rightarrow$ Reduced by 50%!!

**There is a risk of product life, vibration resistance, shock performance deterioration.  
 When considering use, please consult with the product person in charge.**

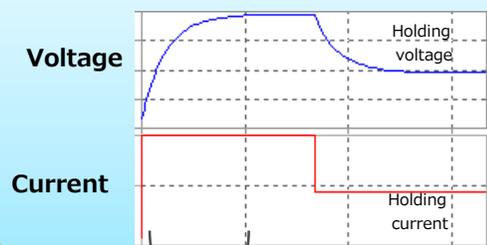
## ■ Example of Energy Saving Effect Calculation

### 3. Switching method (Two systems)

Coil Voltage (100%)    Coil Voltage (50%)



Coil Voltage/ Current Waveform

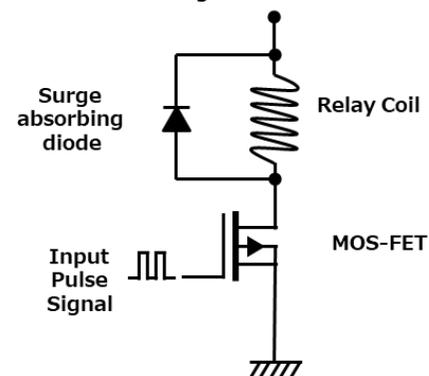


First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

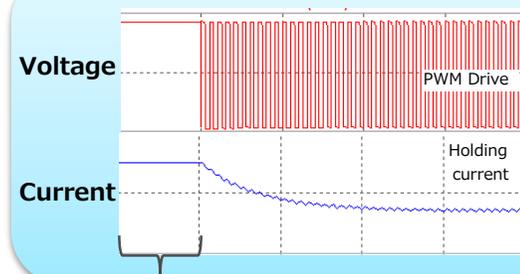
1. Circuit Voltage : 0.5 time
2. Steady current : 0.5 times
3. Watt consumption  $W = V \times I$   
 $W = 0.5V \times 0.5I$   
 $= 0.25 V I \Rightarrow$ Reduced by 75%!!

### 4. PWM method

Coil Voltage (100%)



Coil Voltage/ Current Waveform



First, Applying 100% Rated Coil voltage to the coil for 100ms.min.

1. Circuit Voltage : 1.0 time  
ON time : 50%
2. Steady current : 0.5 times
3. Watt consumption  $W = V \times I$   
 $W = 1.0 \times 0.5V \times 0.5I$   
 $= 0.25 V I \Rightarrow$ Reduced by 75%!!

**There is a risk of product life, vibration resistance, shock performance deterioration.  
When considering use, please consult with the product person in charge.**



**Thank You**